

**RESULTS OF THE 2000  
BLACK-FOOTED FERRET RELEASE EFFORT  
IN AUBREY VALLEY, ARIZONA**

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# RESULTS OF THE 2000 BLACK-FOOTED FERRET RELEASE EFFORT IN AUBREY VALLEY, ARIZONA

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## INTRODUCTION

This report describes Arizona Game and Fish Department (AGFD) activities directed toward reintroducing the black-footed ferret (*Mustela nigripes*) into Aubrey Valley, Arizona, during calendar year 2000. Field activities included prairie dog density surveys; monitoring of diseases which may have a detrimental effect on establishing a self-sustaining ferret population; use of on-site, acclimation pens as a practical tool for releasing ferrets into the wild and for breeding animals on-site; and monitoring of released ferrets.

This reintroduction project is a cooperative effort among AGFD, Arizona State Land Department, The Phoenix Zoo, U.S. Fish and Wildlife Service (USFWS), The Navajo Nation, The Hualapai Nation, and private land managers. AGFD and USFWS are charged with project leadership, with AGFD assuming primary responsibility for initiating field activities.

AGFD's ferret reintroduction activities are evaluated on an annual basis to help ensure that objectives outlined in the release protocol are being accomplished (Van Pelt 1996). Annual evaluations may determine that protocols or procedures need to be modified to allow for unforeseen circumstances or events.

## BACKGROUND

Once occurring in 12 western states, the black-footed ferret was listed by USFWS as endangered on March 11, 1967. It was also included in *Threatened Native Wildlife in Arizona* (AGFD 1988) and *Wildlife of Special Concern in Arizona* (In prep.) as endangered.

Since 1987, AGFD has been involved with black-footed ferret reintroduction activities (Yarchin et al. 1988, Belitsky et al. 1994). Beginning in 1990, matching funds were made available to AGFD through Section 6 of the Endangered Species Act, and more recently, the AGFD Heritage Fund, to intensely evaluate existing habitat for possible reintroduction of black-footed ferrets in Arizona. After evaluating eight Gunnison's prairie dog (*Cynomys gunnisoni*) complexes across northern Arizona, the Aubrey Valley was selected as the best site for an initial reintroduction (Van Pelt 1995).

Brown (1982) characterizes Aubrey Valley as a Plains and Great Basin Grassland Community, with annual precipitation averaging 25 to 30 cm. The valley floor is approximately 220 km<sup>2</sup> in area and ranges in elevation from 1,600 to 1,900 m. Bounded on both sides by pinyon-juniper ridges, it runs along a 41 km northwest-southeast axis. The valley is 12 km wide near mile marker 124 on U.S. Highway 66.

While evaluating potential ferret habitat, a statewide scoping effort was initiated to determine and discuss with the public their attitude toward black-footed ferret reintroduction. Through this process, it was determined that the designation of a nonessential experimental population (as prescribed in Section 10j of the Endangered Species Act of 1973, as amended) would be essential to development of a viable ferret reintroduction project in Arizona.

In October 1993, after recommending Aubrey Valley as the fourth reintroduction site to the Black-footed Ferret Interstate Coordinating Committee, AGFD and USFWS initiated the nonessential experimental population designation process. In November 1995, a proposed rule was published in the Federal Register (USFWS 1995). A hearing was held in Seligman, Arizona on December 12, 1995, to facilitate public comment. The public comment period closed on January 2, 1996. A final rule designating the Aubrey Valley Experimental Population Area (AVEPA) was published on March 20, 1996 (USFWS 1996).

The AVEPA is described as the Aubrey Valley west of the Aubrey Cliffs, starting from Chino Point and running along the crest of the cliffs north to Indian Route 18. The boundary then runs along Route 18 to the line bordering townships 27 and 26 north. It then runs east to the line bordering ranges 10 and 11 west, at which point it turns south to the line bordering townships 24 and 25 north. From that point, the boundary runs east to the corner section marker and turns south to the Hualapai Indian Reservation boundary. It then follows the reservation boundary until it reaches U.S. Highway 66, where it turns east and runs along the highway approximately 6 km to a northern point of the Juniper Mountains. It then follows the Juniper mountains back to Chino Point (Figure 1).

## METHODS

The primary goal of the Arizona reintroduction effort is to re-establish black-footed ferrets in the Aubrey Valley as quickly as possible. To do this, our focus has been on pre-conditioning release candidates and developing on-site breeding protocols that will enhance and contribute to the national recovery of the black-footed ferret (USFWS 1988).

With the release of 35 black-footed ferrets in September 1996, Arizona became the fourth reintroduction site in the United States (Van Pelt and Brennan 1997). An important aspect of the Arizona release was the development and evaluation of on-site, acclimation pens for pre-conditioning of release candidates. Pens originally constructed in 1996 are still in use in 2000, although various modifications and enhancements have been made through time.

Breeding protocols, developed in 1998, include confinement of females in a buried nest box connected by an artificial tube to an above ground cage. Biologists are then able to confirm whelping and monitor the status of kit development. Changes in testicular and vulval size and condition are monitored to determine reproductive condition and cytological samples taken from females are used to predict onset of estrus (Harder and Kirkpatrick 1994). AGFD biologists stain the samples and interpret results. Pairing occurs when observed cornified epithelial cells approach 90% of all cells counted. A pairing is considered successful if samples taken after pairing showed a decrease in these epithelial cells. Biologists also look for orange saliva staining on the back of the female ferret's neck.

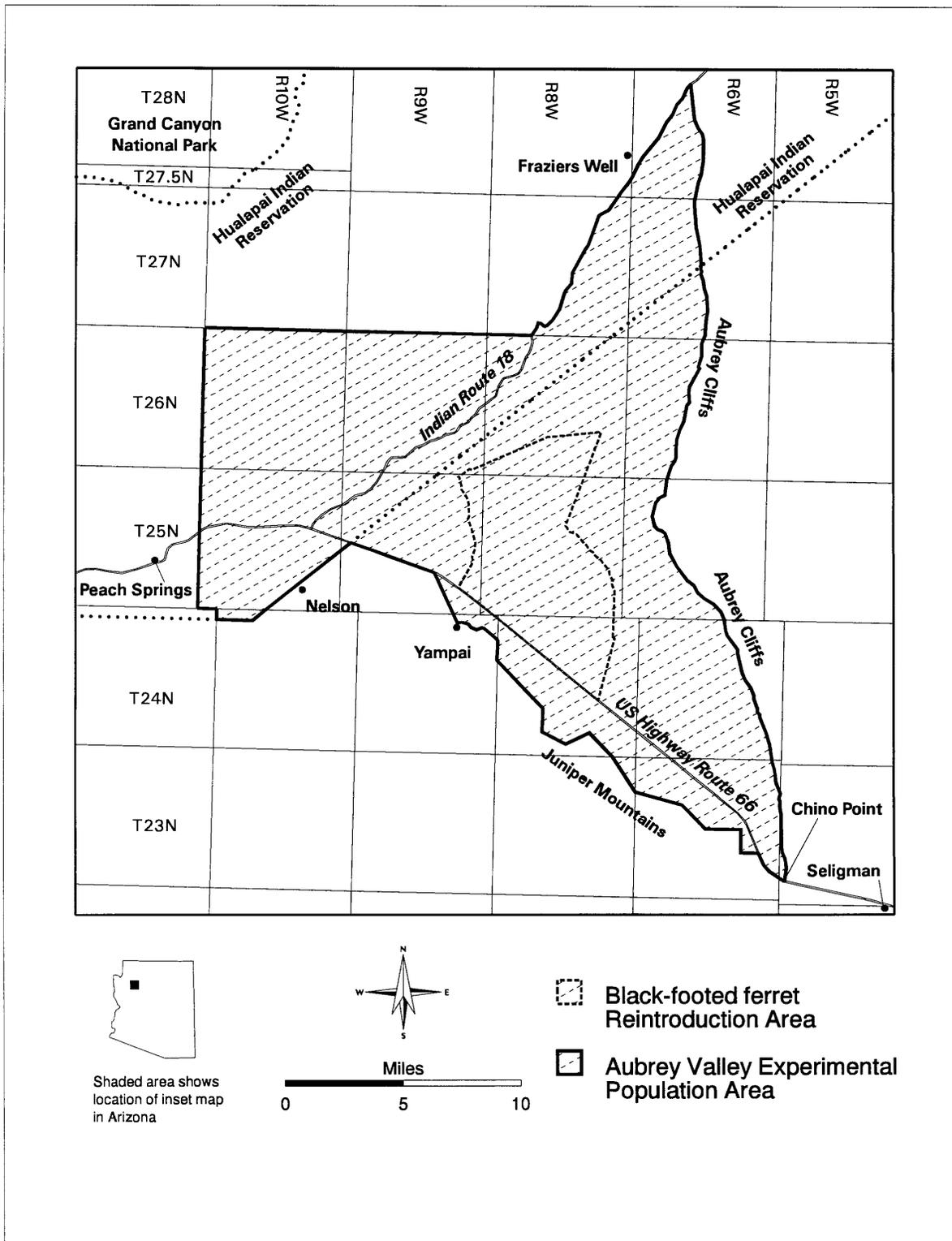


Figure 1. Delineation of the Aubrey Valley Experimental Population Area.

This technique proved successful and produced 26 kits in 1998 (Winstead et al. 1999) and 63 kits in 1999 (Winstead et al. 2000). The same method was used again in 2000.

In addition to breeding efforts, previously established monitoring programs were continued in 2000. This included techniques described by Biggins et al. (1993) for monitoring prairie dog densities and procedures outlined by Clark et al. (1984) for nocturnal ferret surveys. Disease monitoring efforts for plague and canine distemper established in 1996 were continued in 2000 with the assistance of the Arizona Department of Health Services Vector and Zoonotic Diseases Division (VZD), the U.S. Department of Agriculture Animal and Plant Health Inspection Service-Wildlife Services (APHIS-WS), and the University of Arizona (UA). Methods were similar to those described by Williams (1991).

## RESULTS

### PEN DESIGN

Ten pre-conditioning pens each encompassing 1-acre of prairie dog habitat, are currently on-site in the AVEPA and are at least 0.25 mile apart from each other. Van Pelt (1996) describes the design and construction. Each pen is divided into 4 equal sections and contains adequate burrows for ferret exploration and habitation. Monofilament line is stretched across the top of the pens to deter raptors. To reduce escapes, prairie dogs within 10 m of the pen are removed and their burrows plugged with chicken wire.

No significant improvements were made to pens in 2000. However, maintenance occurred to keep pens secure for captive ferrets and to repair damage from severe weather. Activities included fixing shorts in electric fencing, weed removal, replacement of monofilament line, tightening perimeter fencing, adding structural support, and reattaching or replacing flashing. Barbed wire was installed around fence chargers to protect them from livestock. The tenth pen, never used and badly deteriorated, was dismantled.

### PEN INTEGRITY

The pens have continued to be successful at keeping terrestrial predators out. However, prairie dogs sometimes dig under the fencing. Pen breaches are located using a leaf blower and blowing non-toxic smoke into burrows. Burrows that compromise the pen's integrity are sealed with chicken wire and back-filled. To prevent further digging into pens, all prairie dogs within approximately 10 m of the pens are trapped and removed when necessary.

An unexpected result was that at least 6 gopher snakes (*Pituophis melanoleucus*) were killed or injured when they attempted to enter the pens and crossed the lower electric fence wires.

Raptor attacks became a problem in December. A ferret (SB P144) was attacked and killed by a raptor that was able to successfully maneuver through monofilament line stretched across the top of the pen. A second ferret (P142) in the same pen section was found injured a few days later. Immediately following these attacks, monofilament was replaced or modified in pens containing

ferrets. The gaps between strands of line were reduced from 3 feet to 1.5 feet. Another ferret (P12) was killed and eaten by a raptor on December 31. Permission to take the depredating ferruginous hawk(s) (*Buteo regalis*) was sought from the USFWS and granted in January 2002.

The original intent of the acclimation pens was to hold animals for 3 months pending release. We have been quite successful at holding animals for this period of time, and 158 animals in the last 5 years have been held for more than 90 days. By incorporating minor pen modifications, such as monofilament line for raptor protection, the pen design was improved to allow for holding animals longer and to attempt on-site breeding. Other actions implemented to increase holding times included intense spotlighting after the arrival of new animals to guard against escapes, prairie dog trapping in the immediate area surrounding pens, filling and marking possible problematic burrows, and creating new solutions to prevent burrow escapes. These actions were necessary to make the transition from short term holding to a more long-term holding capacity. The past misfortunes and current successes of our pen design have been of value to other sites that use acclimation pens.

With improvements in pen design, use of better materials, and active monitoring of prairie dogs close to the pens, our success at holding ferrets has improved. Only 1 animal escaped during 2000.

#### PRAIRIE DOG MONITORING

Based on studies of white-tailed (*C. leucurus*) and black-tailed prairie dog (*C. ludovicianus*) towns, Biggins et al. (1993) proposed guidelines for analyzing prairie dog town densities. They defined a measure of good ferret habitat in white-tailed prairie dog towns to be the proportion of transects in a hectare with at least 25 active burrows, divided by the total number of transects.

In 1999, the USFWS requested reintroduction proponents to identify and describe a subcomplex in which ferrets will be placed using a modified 1.5-km circumscription rule. For the AVC, this eliminates towns 1 through 5 from the subcomplex evaluation. The Aubrey Valley Subcomplex (AVSC) is comprised of 11 towns, towns 6 through 16, encompassing 11,391 ha (28,147 ac). Two primary towns, Pica Camp and North Audley, encompass the highest quality of habitat in the valley and make up 83% of the AVSC. The total prairie dog acreage in Aubrey Valley was estimated to be 29,653 acres (12,001 ha) when mapped in 1997 (Figure 2).

During June and July 2000, prairie dog activity and burrow density were sampled at 64 established transect blocks located throughout the AVEPA (Tables 1, 2, and 3). We ran 389 transects, with 50% of completed transects being classified as good ferret habitat. Active burrow densities ranged from 0 to 130 per hectare, with an overall mean of 32 per hectare.

Using burrow densities, prairie dog density estimates for AVEPA ranged from 0 to 10.57 prairie dogs per hectare (mean = 6.12). Estimated prairie dog density was used to determine black-footed ferret carrying capacity, reported in terms of black-footed ferret families. A ferret family is defined by Biggins et al. (1993) as 1 female, 3.3 young and 0.5 male. The 2000 ferret family estimate for AVEPA is 67 families.

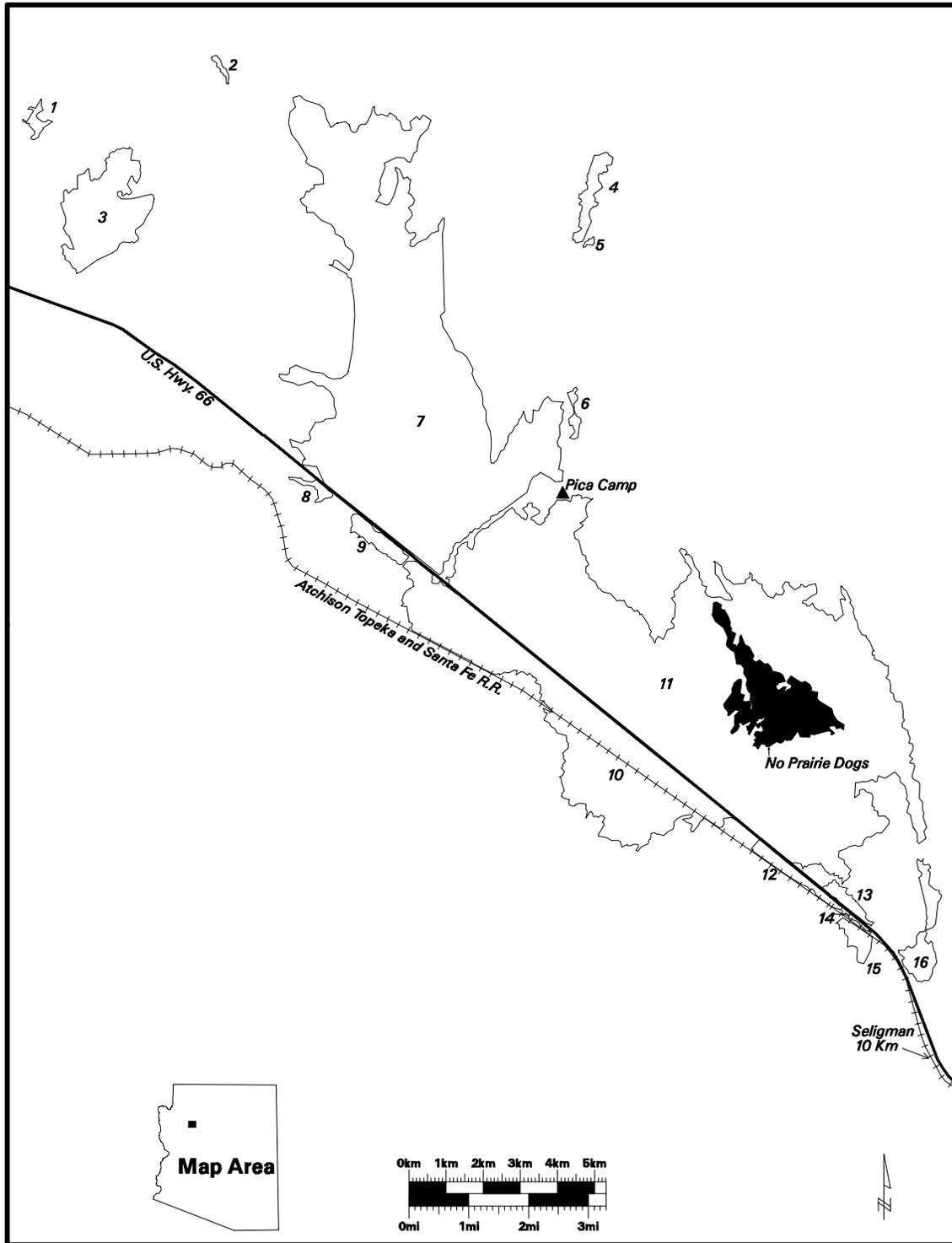


Figure 2. Prairie dog towns within the Aubrey Valley Complex.

1. Reservation	5. Owl track	9. Mission	13. North Caterpillar
2. Prairie Hills	6. Valley	10. South Audley	14. Streamline
3. Grand Canyon	7. Pica Camp	11. North Audley	15. Railroad Corner
4. Cliff	8. Devil Horn	12. Tin Shack	16. South Caterpillar

Table 1. Completed prairie dog transects - North and South Audley, Aubrey Valley, Arizona.								
Site Number	Active Burrows Per Hectare (Transects completed)							
	1993	1994	1995	1996	1997	1998	1999	2000
1	28 (13)	23 (10)	21 (5)	11 (5)	9 (5)	9 (6)	1 (6)	1 (6)
2	55 (8)	54 (10)	25 (5)	29 (5)	22 (5)	49 (6)	41 (6)	47 (6)
3	24 (14)	40 (20)	27 (5)	36 (5)	51 (5)	41 (6)	40 (6)	8 (6)
4	32 (8)	35 (8)	35 (5)	11 (5)	19 (5)	38 (6)	53 (6)	5 (6)
5	35 (10)	24 (10)	24 (5)	15 (5)	21 (5)	18 (6)	19 (6)	7 (6)
6	39 (10)	22 (10)	33 (5)	11 (5)	53 (5)	34 (6)	49 (7)	21 (6)
7	59 (8)	31 (10)	32 (5)	7 (5)	13 (5)	44 (6)	27 (6)	12 (6)
8	6 (8)	1 (10)	11 (5)	2 (5)	7 (5)	28 (6)	2 (7)	1 (6)
9	5 (10)	4 (8)	6 (5)	3 (5)	19 (5)	9 (6)	1 (6)	0 (6)
10	25 (5)	23 (5)	42 (4)	41 (5)	46 (5)	41 (6)	81 (6)	46 (6)
11	31 (8)	31 (10)	33 (5)	2 (5)	1 (5)	7 (6)	7 (6)	3 (6)
12	42 (33)	36 (20)	33 (5)	5 (5)	7 (5)	23 (6)	25 (6)	24 (6)
13	42 (7)	69 (10)	46 (5)	34 (5)	15 (5)	44 (6)	39 (6)	57 (6)
14	30 (10)	15 (10)	20 (5)	0 (5)	1 (5)	2 (6)	0 (6)	3 (6)
15	40 (15)	14 (20)	14 (5)	7 (5)	9 (5)	18 (6)	20 (6)	22 (6)
16	63 (5)	26 (5)	60 (5)	12 (5)	34 (5)	22 (6)	43 (6)	59 (6)
17	63 (5)	51 (5)	20 (5)	16 (4)	27 (5)	32 (6)	64 (6)	58 (6)
18	60 (19)	59 (20)	21 (5)	25 (5)	9 (5)	23 (6)	27 (6)	46 (6)
19	27 (10)	24 (10)	18 (5)	40 (5)	13 (5)	15 (6)	39 (6)	38 (6)
20	55 (8)	56 (8)	32 (4)	33 (5)	51 (5)	48 (6)	33 (6)	44 (6)
21	68 (8)	40 (10)	22 (4)	50 (5)	47 (5)	114 (6)	100 (6)	77 (6)
22	80 (8)	86 (10)	16 (5)	26 (5)	15 (5)	29 (6)	44 (6)	24 (6)
23	42 (10)	26 (8)	21 (5)	29 (5)	11 (5)	42 (6)	44 (6)	51 (6)
24	17 (4)	82 (5)	47 (5)	51 (5)	20 (5)	34 (6)	27 (6)	32 (6)
25	51 (5)	72 (5)	17 (5)	37 (5)	17 (5)	36 (6)	8 (6)	2 (5)
52	47 (5)	43 (5)	- (0)	17 (5)	- (0)	6 (6)	45 (6)	74 (6)
61	31 (5)	27 (5)	19 (4)	39 (5)	14 (5)	42 (6)	17 (4)	20 (6)
62	50 (5)	57 (5)	14 (5)	33 (5)	21 (5)	34 (6)	37 (6)	29 (6)
N=28	41 (264)	38 (262)	26 (131)	23 (139)	21 (135)	32 (168)	32 (168)	29 (167)

Table 2. Completed prairie dog transects - Pica Camp, Aubrey Valley, Arizona.								
Site Number	Active Burrows Per Hectare (Transects completed)							
	1993	1994	1995	1996	1997	1998	1999	2000
26	10 (8)	9 (8)	19 (5)	11 (5)	16 (5)	25 (6)	13 (6)	10 (6)
27	19 (10)	50 (10)	15 (6)	7 (5)	14 (5)	- (0)	29 (6)	11 (6)
28	16 (5)	30 (5)	12 (5)	27 (5)	28 (5)	64 (6)	40 (6)	19 (6)
29	32 (10)	16 (10)	70 (5)	31 (5)	31 (5)	41 (6)	69 (6)	67 (6)
30	22 (20)	66 (20)	73 (6)	39 (5)	47 (5)	121 (6)	80 (6)	54 (12)
31	56 (7)	78 (10)	27 (6)	15 (5)	26 (5)	24 (6)	40 (6)	57 (6)
32	12 (6)	56 (10)	36 (5)	42 (5)	34 (5)	43 (6)	64 (6)	48 (6)
33	12 (7)	29 (10)	20 (4)	27 (5)	22 (5)	19 (6)	7 (6)	68 (6)
34	16 (6)	10 (10)	20 (5)	14 (5)	16 (5)	7 (6)	25 (6)	14 (6)
35	5 (6)	2 (10)	12 (6)	15 (5)	2 (5)	5 (6)	9 (6)	7 (6)
36	40 (10)	23 (10)	26 (5)	41 (5)	40 (5)	54 (6)	47 (6)	29 (6)
37	68 (8)	21 (10)	41 (6)	18 (5)	60 (5)	86 (6)	76 (6)	52 (6)
38	44 (10)	15 (10)	100 (6)	69 (5)	62 (5)	47 (6)	59 (6)	40 (6)
39	11 (10)	9 (8)	52 (5)	47 (5)	43 (5)	50 (6)	31 (6)	33 (6)
40	16 (10)	61 (10)	31 (5)	27 (5)	31 (5)	69 (6)	25 (6)	57 (6)
41	33 (10)	102 (10)	31 (5)	20 (5)	17 (5)	73 (6)	19 (6)	55 (6)
42	106 (8)	19 (10)	39 (5)	57 (5)	26 (5)	59 (6)	126 (6)	86 (6)
43	60 (10)	35 (10)	32 (5)	26 (5)	32 (5)	76 (6)	49 (6)	81 (6)
44	41 (10)	56 (10)	31 (5)	54 (5)	36 (5)	56 (6)	45 (6)	48 (6)
45	10 (8)	54 (10)	1 (5)	34 (5)	43 (5)	66 (6)	31 (6)	47 (6)
47	26 (5)	29 (5)	2 (5)	25 (5)	17 (5)	33 (6)	45 (6)	46 (6)
60	12 (5)	6 (5)	26 (5)	20 (5)	12 (5)	12 (6)	5 (6)	1 (6)
N=22	30 (189)	35 (211)	33 (115)	30 (110)	30 (110)	49 (126)	42 (132)	44 (138)

Table 3. Prairie dog transects completed in satellite prairie dog towns found within Aubrey Valley, Arizona.								
Site Number	Active Burrows Per Hectare (Transects completed)							
	1993	1994	1995	1996	1997	1998	1999	2000
46	- (0)	29 (5)	10 (6)	- (0)	3 (5)	3 (6)	27 (6)	31 (6)
48	38 (5)	35 (5)	14 (6)	0 (5)	0 (5)	0 (6)	0 (6)	0 (6)
49	65 (5)	106 (10)	3 (6)	0 (5)	0 (5)	0 (6)	0 (6)	0 (6)
50	36 (5)	23 (5)	0 (4)	0 (5)	1 (5)	0 (6)	0 (6)	0 (0)
51	42 (18)	26 (10)	- (0)	2 (5)	9 (5)	2 (6)	22 (6)	16 (6)
53	21 (8)	23 (10)	22 (5)	0 (5)	4 (5)	3 (6)	4 (6)	1 (6)
54	23 (9)	24 (5)	18 (5)	7 (5)	35 (5)	31 (6)	63 (6)	49 (6)
55	40 (9)	41 (5)	14 (5)	16 (5)	9 (5)	9 (6)	40 (6)	29 (6)
56	30 (18)	6 (5)	18 (4)	17 (5)	57 (5)	64 (6)	34 (6)	12 (6)
57	5 (5)	40 (5)	12 (6)	1 (5)	3 (5)	17 (6)	1 (6)	2 (6)
58	11 (5)	18 (5)	10 (5)	6 (4)	1 (5)	1 (6)	1 (6)	1 (6)
59	7 (4)	9 (5)	2 (6)	2 (4)	0 (5)	0 (6)	4 (2)	4 (6)
63	- (0)	18 (5)	4 (5)	4 (5)	11 (5)	16 (6)	40 (6)	58 (6)
64	- (0)	53 (5)	1 (5)	7 (5)	14 (5)	45 (6)	37 (6)	46 (6)
N=14	27 (91)	32 (85)	10 (68)	5 (63)	11 (70)	14 (84)	19 (80)	18 (84)

#### PRAIRIE DOG TRAPPING AND QUARANTINE

In 1997, a quarantine facility was constructed on Arizona Department of Transportation property in Seligman and expanded in 1998 and 1999. Current holding capacity is 500 Gunnison's prairie dogs or 670 black-tailed prairie dogs (*C. ludovicianus*).

After completing a 14-day quarantine period, prairie dogs were euthanized using CO<sub>2</sub> and processed at the facility or were used live for feeding ferrets. In 2000, a total of 1,778 prairie dogs were quarantined. Nine hundred thirty nine and 127 Gunnison's prairie dogs were trapped in the Flagstaff and Williams areas, respectively. The remaining 712 were black-tailed prairie dogs donated by *Dog Gone*, a private pest control company in Colorado. We took 25 frozen prairie dogs to the Phoenix Zoo for use in their ferret breeding program.

In order to maintain ferrets on-site in 2000, we used approximately 1,086 kg of food, primarily prairie dog (861 kg) and domestic rabbit (225 kg). Of prairie dogs quarantined, 204 were fed live to ferrets in pre-conditioning pens for imprinting kits and training adults to hunt and kill them.

## DISEASE MONITORING

Carnivore sampling for canine distemper and plague occurs within a 25-mile radius of the release sites, with a majority of the specimens collected within the AVEPA. Thirty-four coyotes and 1 badger were collected as part of the distemper and plague monitoring effort in 2000. Collection occurred during May, June, September, October, and November.

The VZD has monitored plague activity in Arizona since 1974. Documenting human cases, testing carnivore blood samples for titers, and testing flea pools collected from prairie dog burrows monitors outbreaks. Fleas have not been collected recently from the Aubrey Valley and serology of carnivores collected within and adjacent to the AVEPA has shown a low incidence of positive results. In 2000, 33 predator blood samples were tested for plague and 2 (0.1%) tested positive (Table 4). As observed in the past, plague is active in Coconino and Yavapai Counties, but not within Aubrey Valley.

Canine distemper has been monitored in the Aubrey Valley area by AGFD since 1993. Blood samples and fixed tissues were sent to the University of Arizona for analysis and histological interpretation. In 2000, 34 predator blood samples were submitted for analysis and 8 (23%) tested positive (Table 4). Canine distemper was probably not active in 2000, because no viral inclusions were observed in any tissues. Evidence of pneumonia was observed in lung tissue of 4 juvenile coyotes collected during the fall.

Three prairie dogs submitted for necropsy in November died from *Staphylococcus aureus* septicemia. One submitted in December died from a cerebral cortical abscess. All were negative for plague, distemper, tularemia, and rabies.

## FERRET ALLOCATION

In 2000, 74 ferrets were involved in the Arizona recovery effort (Table 5). We started the year with 28 ferrets. One was received on August 15, 1997 (held for 1,096 days), 2 were born on-site between June 6 and 9, 1998 (held a median of 939 days), 6 were received between August 24 and November 10, 1998 (held a median of 581 days), and 19 were received between April 13 and November 15, 1999 (held a median of 320 days).

Sixteen ferrets (all kits) were newly allocated in 2000 and shipments of animals occurred on May 27, June 6, August 8, and August 16. Arizona held them for a median of 94 days. One adult female was returned on June 6 to Aubrey Valley from the Phoenix Zoo where she received treatment for a leg broken in 1999 by a vehicle. On-site breeding was successful and produced 29 ferrets.

In 2000, 22 mortalities were documented including 14 kits produced on-site. Two females (SB P12 and P144) were killed and eaten by a raptor. Two (male SB 2510, female SB 2549) were found dead in burrows, but were too decomposed to submit for necropsy. Five adult ferrets were submitted for necropsy. One female (SB 1815) died from severe necrotizing pneumonia and chronic pancreatitis. A second female (SB 1660) died from severe amyloidosis in kidney and spleen. She had also aspirated food that caused acute suppurative bronchitis and bronchiolitis.

Table 4. Results of the 2000 predator disease monitoring effort in Aubrey Valley, Arizona.					
Collection Date	Species	Sex	Age	Canine Distemper	Sylvatic Plague
5/31/00	Coyote	F	A	32	<32
6/1/00	Coyote	F	A	512	<32
6/1/00	Coyote	F	A	<4	<32
6/4/00	Coyote	M	A	<128	<32
6/4/00	Coyote	F	A	<4	<32
6/4/00	Coyote	F	A	128	<32
6/4/00	Coyote	F	A	512	128
6/5/00	Coyote	M	A	<16	<32
6/14/00	Coyote	F	A	8	<32
6/17/00	Badger	F	A	<4	-
6/17/00	Coyote	F	A	8	<32
6/19/00	Coyote	M	A	4	<32
6/19/00	Coyote	F	A	<4	<32
6/19/00	Coyote	M	A	<4	-
6/20/00	Coyote	M	A	8	<32
6/21/00	Coyote	M	A	256	<32
6/23/00	Coyote	M	A	4	<32
9/26/00	Coyote	M	A	<256	Negative
9/29/00	Coyote <sup>1</sup>	F	J	<4	Negative
9/29/00	Coyote <sup>1</sup>	F	J	8	Negative
10/3/00	Coyote	M	A	<4	Negative
10/3/00	Coyote	F	A	-	Negative
10/6/00	Coyote <sup>1</sup>	M	J	<4	Negative
10/10/00	Coyote <sup>1</sup>	F	J	16	Negative
10/10/00	Coyote	M	J	16	Negative
10/11/00	Coyote	F	A	64	Negative
10/11/00	Coyote	M	J	32	Negative
10/12/00	Coyote	M	A	128	Negative
10/16/00	Coyote	F	J	16	Negative
10/16/00	Coyote	M	A	16	Negative
10/16/00	Coyote	M	A	512	Negative
10/18/00	Coyote	M	A	512	Negative
11/29/00	Coyote	F	A	<4	Negative
11/29/00	Coyote	M	A	<4	2048
11/29/00	Coyote	F	A	<4	Negative
Coyote Juvenile/Total 7/34	Negative-1:64			26	31
	Positive (1:128-1:4096)			8	2
	No sample			1	2
	Grand Totals			35	35

<sup>1</sup> Lung tissue showed evidence of pneumonia.

Year	Held Over	Allocated	BIRTHS	Releases	Escapes	Missing	Deaths	Transfers	Year End Total
1996		83	0	35	5	12	10	1	20
1997	20	33	0	0	1	15	5	0	32
1998	32	38	26	26	11	13	17	3	26
1999	26	69	63	52	7	9	62	0	28
2000	28	17*	29	19	1	9	22	2	21
Sum		240	118	132	25	58	116	6	

\* Includes 1 female from 1999 that was released, injured, recaptured, and transferred to Phoenix Zoo where she recovered. She was returned to Aubrey Valley in 2000.

A third female (SB 3036) died from granulomatous pneumonia caused by *Emmonsia*. This soil-borne fungus does not reproduce in the animal but incites a severe inflammatory response (adiasporomycosis). A male (SB 2797) died from heart failure due to myocarditis. The cause of death of the last adult ferret, a female (SB 1796) was undetermined.

Nine ferrets were missing-in-action including 4 kits produced on-site. Only 1 ferret escaped in 2000. Missing-in-action is defined as not being able to determine if ferrets died underground, were killed, or escaped. As in 1999, proportionally fewer animals held in pre-conditioning pens escaped or were missing this year than in the previous years (12% vs. 20-30%).

Arizona released 19 ferrets (5 adults, 14 kits) into Aubrey Valley in 2000. Releases occurred during August to mid-November. We used a hard release technique on 10 ferrets (7 equipped with transmitters), while the remainder were allowed to leave pre-conditioning pens at will.

Two adult female ferrets (SB 1302 and 1436) could not be released due to health concerns and were transferred to the Phoenix Zoo for display purposes. The remaining 21 animals are being maintained in acclimation pens for release or breeding in spring 2001.

#### PRE-CONDITIONING

The release technique implemented by Arizona employs the use of on-site, acclimation pens. Each pen encloses one acre of prairie dog habitat and is divided into four separate sections. Each section accommodates one adult ferret or family unit. Pre-conditioning allows the ferrets to become accustomed to using prairie dog burrows.

In 2000, 9 ferrets (5 males, 4 females) were released using a "soft release" method that allows them to leave on their own accord through tubes inserted into acclimation pens. On the average, each ferret released this way was given 5 live prairie dogs and pre-conditioned for 99 days (Appendix A).

Ten other animals (6 males, 4 females) were released using a "hard release" method, new to Arizona reintroduction efforts in 1999. Ferrets were released from transport boxes into a burrow within high-density prairie dog towns (as indicated by annual surveys). Most were released during nighttime and

7 wore a radio collar. On the average, each ferret released this way was given 7 live prairie dogs and pre-conditioned for 350 days (Appendix A).

#### ON-SITE REPRODUCTION

Using protocols developed in 1998, 7 males were used to breed 14 females, with the first pairing of ferrets occurring on April 14 and the last on May 13 (Table 6). The breeding season was approximately 1 week earlier than in 1999.

Eight females were successfully bred and produced litters ranging in size from 1 to 6. Births occurred between May 27 and June 19. Of the 29 kits born, 24 (83%) survived the first 30 days of life and were released from nest boxes into acclimation pens. Fifteen were alive and pit tagged in late September and 1 was missing during tagging, but found alive in January 2001.

Prairie dogs were used for burrow maintenance and construction within pen sections while female ferrets were confined to breeding cages. Additional burrows were made available and existing burrows were in better condition when females moved their litters from nest boxes. Kit mortality in 1999 may have been high because some burrows became unsuitable for kit rearing from excessive waste accumulation.

Changes in the nest box setup were made to address temperature concerns that inevitably affect kit survival. Nest boxes were buried deeper in 2000 than in prior years (the bottom of the box at approximately 30 inches below the surface versus approximately 16 inches). Wood collars extended from nest boxes to the surface to prevent collapse of the hole into the nests. Wood lids, insulated with 1 inch thick Styrofoam, were fitted on top of the collar. Ice blocks (frozen 2-liter soda bottles) were placed on top of the nest box during the warmest days. The intent was to keep the nest box temperature below 27 °C (80 °F).

Optic Stowaway® Data Loggers were used from April 28 to July 21, 2000 to record temperatures associated with nest boxes. Data were collected from inside an old design nest box, on top (inside the wooden collar but outside the box) of a new design nest box (A), and both on top of and inside a second new design box (B). Temperatures were automatically recorded at approximately 16-minute intervals (7,650 valid data points for each probe over 85 days). Both new design boxes contained a female ferret that whelped. Five kits were born on June 1 in box A and 6 kits were born on June 19 in box B.

Deeper burial and use of ice during hot days improved temperature conditions within nest boxes (Table 7). Temperatures associated with the new design nest box reached or exceeded 27 °C on fewer days than did the ones associated with the old design nest box. In general, there was less change in temperature through the whelping season for the new design boxes (5-6 °C) than for the old design (8 °C). As would be expected, temperatures inside a nest box containing ferrets are higher than outside of the same box. Body heat raised internal temperatures 1.3 °C on average.

Table 6. Summary of 2000 ferret breeding efforts.						
Dam, Sire	Pairing Date	Birth Date	Litter Size	Kit (# and sex)		Comments
				Deaths	Survivors	
2550, 2857	04/14	05/27	3	1M, 1F	1M	Male kit dead 06/12, female kit dead 06/28.
P12, 2509	04/20	-				
1994, 2794	04/20	-				
P15, 2585	04/20	06/01	4	1F	2M, 1F	Female kit dead 06/12.
1905, 2857	04/20	-				
2115, 2784	04/20	06/02	3	1U	2F	Kit dead 06/11.
3001, 2850	04/20	06/01	5		2M, 3F	
2535, 2509	04/28	-				
1660, 3013	04/30	06/11	4	1F	1M, 2F	Female kit dead 07/26.
2084, 2797	04/30	06/12	2	2M		Dam and kits MIA 08/12.
1842, 2585	05/05	06/16	2		2F	
2956, 2784	05/07	-				
3036, 3013	05/08	06/19	6	5M, 1U		Unknown kit dead 06/20, 1 male kit dead 07/06, 4 others dead 08/20.
1815, 2797	05/13	-				
Sum			29	13	16	

Table 7. Summary of nest box temperatures (°C) recorded April 28 to July 21, 2000.				
	Inside old box	Outside box A	Outside box B	Inside box B
# days ≥ 27° recorded	42	5	1	15
Percent of days ≥ 27° recorded	49.4	5.8	1.2	17.6
Average monthly temperature				
April	16.2	18.4	17.6	18.4
May	19.5	20.5	20.2	21.5
June	24.1	22.4	23.2	24.3
July	24.5	24.7	22.4	24.0

#### FERRET MONITORING

Presently, the primary technique used to determine short and long term survival is nocturnal searches using spotlights. In 2000, spotlight surveys were conducted in blocks of 3 consecutive nights during the months of July, August, and September and during two consecutive nights in November. These surveys totaled 783 person-hours, including 83 hours of backpack surveying. Five hours of snow tracking was done in March.

There were 3 confirmed black-footed ferret sightings (SB 1905 once and SB 3035 twice) and 5 sightings of ferrets without confirmation of identity (Table 8). Observers were able to classify the sex of 2 unidentified animals. The female may have been SB 3167 who had been recently soft released from a pen nearby. There was also 1 possible sighting. A possible sighting is defined as green eyeshine close to the ground and displaying ferret movements. Furthermore, the public reported ferret sightings 5 times during 2000.

Studbook	Sex	Age	Release Date	Last Observation	Days Known Alive
3035	M	1	9/07/99 (escaped)	7/17	315
Unknown 1	-	-	-	7/22	-
Unknown 2	-	-	-	8/12	-
Unknown 3	-	-	-	8/19	-
1905	F	3	8/14	11/11	90
Possible 1	-	-	-	11/19	-
Unknown 4	M	-	-	12/7	-
Unknown 5 (3167 ?)	F	-	11/26 (?)	12/7	11 (?)

Unknowns 1 and 3 were observed in the same area and may be the same animal. Unknown 5 may have been SB 3167, but was not confirmed.

During August, preliminary tests compared the usable range of a conventional radio collar design with that of an implantable transmitter designed by Research Branch and Telonics. When both types were placed on the ground inside the depression of prairie dog burrows, the collar was more audible than the implant out to 450 m (0.28 mi). Both signals were faint at that distance. When placed inside burrows but near the ground surface, the collar was first detected at 322 m (0.2 mi) and the implant at 9 m (30 ft). The implant's antenna was coiled in this test.

When placed under conditions similar to the last test but elevating the receiving antenna approximately 61 m (200 ft) higher, only the collar was detectable out to 965 m (0.6 mi). The implant was not audible until the receiver was <160 m (0.1 mi) away. The collar signal at the top of Chino Point (325 m or 1,065 ft higher than Aubrey Valley) was better than the implant when transmitters were placed at various locations along Highway 66. The collar could be detected as far away as Pica Camp Road (about 20 km or 12 mi away).

Telemetry using conventional radio collars was tried during winter 2000 to document ferret survival and movements. Wildlife Materials transmitters (148-149 MHz) were shipped to Dean Biggins (USGS-BRD) to be attached to wool collars. Eight ferrets were anesthetized using isoflurane and collared following standard protocols during the morning of November 13. Doug Albertson (National Park Service) trained project staff on these protocols and supervised the process.

Seven radioed ferrets (5 males, 2 females) were released that evening in 3 locations. Although all transmitters were tested prior to their attachment, 1 failed later and that animal (female 1660) was not released as planned. Six animals were detected the night following their release, but only 3 were observed (Table 9). One animal (SB 3166) was very close to his release location (40 m or 131 ft). One (SB 2853) had moved about 155 m (0.1 mi) from his release location and the other (P134) had moved 1.1 km (0.7 mi) from his. One collar was recovered on November 18 and was still attached to a severed head of a male ferret (SB 2585) that had been killed and eaten by a predator. It was found under a shrub and had been lightly covered with soil. Eleven other detections of ferrets were strictly signals heard from various locations.

Table 9. Telemetered ferrets detected during surveys in Aubrey Valley, 2000.					
Studbook	Sex	Age	# Detections	Last Detection	Comments
2585	M	2	2	11/18	Predator mortality.
2853	M	1	5	11/24*	Visual 11/15. Slipped collar recovered 12/22
3161	M	Kit	0	-	No detection after release.
3163	F	Kit	1	11/15	No visual.
3166	M	Kit	2	11/15	Visual.
3297	F	Kit	1	11/14	No visual.
P134	M	Kit	3	11/21	Visual 11/15.

\*No apparent movement after this date.

Detection of signals from ground locations on the valley floor and on the sides of Aubrey Cliffs was not frequent. During the night of November 21, an aircraft was used to attempt location of radioed ferrets with poor success. Two out of 3 test collars were detectable from about 0.5 km (0.3 mi) away although they could be heard from a distance of 0.8 km (0.5 mi) once located. No ferrets other than the 2 detected by ground based personnel were found from the air.

A second flight occurred during daylight hours on December 21. One collar (SB 2853) was located; no other signals were heard. This collar, retrieved the following day, was found lying 45 cm (18 in) in a burrow and about 30 cm (1 ft) below the ground surface. There was no sign of blood on the collar and likely the ferret had pulled it off. The collar was lost 0.8 km (0.5 mi) from the ferret's release location.

Examination of unused radio transmitters suggested that they were flawed. When rubbed or shaken, the signal became highly variable and some transmitted very weak signals. Pulse rates changed also changed and occasionally stopped. Fourteen transmitters will be returned to the manufacturer for subsequent testing and evaluation.

#### DISCUSSION

We demonstrated that ferrets could be held for extended periods of time for acclimation and breeding. The maximum time an individual ferret had been held before release was 1,096 days. Modifications to pen electric fence systems reduced escapes when ferrets are free roaming within acclimation pens. An unexpected benefit was prevention of large snakes from entering the pens. Raptors became problematic at the end of the year as migrating hawks learned to negotiate the monofilament and enter pens. Closer spacing of lines was seen as a long-term solution. The short-term solution of removing depredating birds was initiated.

Our breeding protocol enabled us to successfully produce kits on-site in Aubrey Valley 3 years in a row. The methodology allowed optimal pairing of ferrets to occur, monitoring of dam and kits with minimal disturbance, and unhampered release into acclimation pens. Modifications to nest boxes allowed 90% to survive their first 30 days. In 2001, on-site breeding will continue using the same protocol. However, bred ferrets may be released in early summer to whelp and raise young in the wild. Ferret production would coincide with prairie dog births and ferret survival may be higher when prey is abundant for them and their predators.

We were able to release ferrets from allocations and on-site production into Aubrey Valley. Radio telemetry efforts in 2000 produced poor results due to faulty transmitter construction. However, one radioed animal (SB 2585) was killed by a predator only 5 days after it was released. A second collar was recovered in a burrow after the ferret (SB 2853) had slipped it off 7 days after its release. One individual, a male who escaped in 1999 (SB 3035) survived in the wild for 315 days.

#### RECOMMENDATIONS

- 1) Continue on-site breeding of ferrets to enhance releases of allocated ferrets.
- 2) Release suitable ferrets in early summer to coincide with prairie dog births as a means to enhance survival rates of ferrets.
- 3) Continue to test feasibility of internal radio transmitters as a monitoring tool for released ferrets. Tests may include signal range determinations of transmitters above and below ground, suitability of various locations for the receiver, and the degree of signal attenuation after a transmitter is implanted in an animal.
- 4) Release some ferrets with radio collars to monitor dispersal and survival.

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APPENDIX A. STATUS OF FERRETS IN AUBREY VALLEY, 2000.

Studbook	Sex	Date Received	Last Age	Days held	Live Prairie Dogs Fed	Status
1302	F	09/10/98	4.8	517	-	Not releasable. Transferred to zoo 02/08/00.
1436	F	09/23/99	4.7	139	-	Not releasable. Transferred to zoo 02/08/00.
1610	F	06/06/00	4.4	127	6	MIA 10/10/00.
1645	F	10/15/99	3.7	106	-	MIA 01/28/00.
1660	F	10/13/99	4.5	405	1	Mortality 11/20/00.
P149	M	06/11/00	Kit	204	1	Born on-site. In pen 12/31/00.
P150	F	06/11/00	Kit	204	1	Born on-site. In pen 12/31/00.
P151	F	06/11/00	Kit	172	-	Born on-site. Mortality 11/29/00.
P152	F	06/11/00	Kit	46	-	Born on-site. Mortality 07/26/00.
1796	F	10/13/99	3.8	109	-	Mortality 01/29/00.
1815	F	10/15/99	4.1	306	-	Mortality 08/15/00.
1842	F	11/15/99	4.7	413	1	In pen 12/31/00.
P155	F	06/16/00	Kit	199	1	Born on-site. In pen 12/31/00.
P156	F	06/16/00	Kit	199	1	Born on-site. In pen 12/31/00.
1905	F	08/15/97	3.4	1,096	2	Hard released 08/14/00. Alive 11/11/00.
1994	F	11/15/99	3.2	274	2	Hard released 08/14/00.
2084	F	10/13/99	3.3	305	-	MIA 08/12/00.
P153	M	06/12/00	Kit	62	-	Born on-site. MIA 08/12/00.
P154	M	06/12/00	Kit	62	-	Born on-site. MIA 08/12/00.
2115	F	10/15/99	3.6	444	1	In pen 12/31/00.
P146	F	06/02/00	Kit	213	2	Born on-site. In pen 12/31/00.
P147	F	06/02/00	Kit	213	1	Born on-site. In pen 12/31/00.
P148	U	06/02/00	Kit	10	-	Born on-site. Mortality 06/11/00.
2509	M	11/10/98	2.1	644	13	Hard released 08/14/00.
2510	M	11/10/98	1.6	447	-	Mortality 01/30/00.
2535	F	08/24/98	2.6	861	-	In pen 12/31/00.
2549	F	11/10/98	1.6	431	-	Mortality 01/14/00.
2550	F	11/10/98	2.6	783	4	In pen 12/31/00.
P134	M	05/27/00	Kit	171	4	Born on-site. Hard released 11/13/00. Radioed. Alive 11/15/00.
P135	M	05/27/00	Kit	17	-	Born on-site. Mortality 06/12/00.
P136	F	05/27/00	Kit	33	-	Born on-site. Mortality 06/28/00.
2585	M	04/13/99	2.5	581	14	Hard released 11/13/00. Radioed. Mortality 11/18/00.
2784	M	11/15/99	1.6	413	8	In pen 12/31/00.
2797	M	10/15/99	1.1	261	9	Mortality 07/01/00.
2850	M	11/15/99	1.0	214	10	MIA 06/15/00.
2853	M	11/15/99	1.4	365	18	Hard released 11/13/00. Radioed. Alive 11/15/00.
2857	M	11/15/99	1.5	413	10	In pen 12/31/00.
2956	F	11/15/99	1.3	268	2	Escaped 08/08/00.
3001	F	10/13/99	1.7	446	1	In pen 12/31/00.
P141	M	06/01/00	Kit	188	2	Born on-site. MIA 12/05/00.
P142	M	06/01/00	Kit	214	1	Born on-site. In pen 12/31/00.
P143	F	06/01/00	Kit	150	1	Born on-site. Mortality 10/28/00.
P144	F	06/01/00	Kit	197	1	Born on-site. Mortality 12/14/00.
P145	F	06/01/00	Kit	155	-	Born on-site. MIA 11/02/00.

APPENDIX A (CONTINUED).

Studbook	Sex	Date Received	Last Age	Days held	Live Prairie Dogs Fed	Status
3013	M	10/13/99	1.7	446	9	In pen 12/31/00.
3036	F	10/13/99	1.3	320	3	Mortality 08/27/00.
P157	M	05/08/00	Kit	105	-	Born on-site. Mortality 08/20/00.
P158	M	05/08/00	Kit	105	-	Born on-site. Mortality 08/20/00.
P159	M	05/08/00	Kit	105	-	Born on-site. Mortality 08/20/00.
P160	M	05/08/00	Kit	105	-	Born on-site. Mortality 08/20/00.
P161	M	05/08/00	Kit	60	-	Born on-site. Mortality 07/06/00.
P162	U	05/08/00	Kit	44	-	Born on-site. Mortality 06/20/00.
3157	F	08/16/00	Kit	138	3	In pen 12/31/00.
3158	F	08/16/00	Kit	138	4	In pen 12/31/00.
3161	M	08/16/00	Kit	90	4	Hard released 11/13/00. Radioed.
3163	F	08/16/00	Kit	90	6	Hard released 11/13/00. Radioed.
3166	M	08/16/00	Kit	90	4	Hard released 11/13/00. Radioed.
3167	F	08/16/00	Kit	103	3	Released 11/26/00.
3290	F	06/06/00	Kit	156	8	Released 11/08/00.
3291	F	06/06/00	Kit	156	8	Released 11/08/00.
3296	M	08/08/00	Kit	41	1	MIA 09/17/00.
3297	F	08/08/00	Kit	98	5	Hard released 11/13/00. Radioed.
3299	M	08/08/00	Kit	63	3	Released 10/09/00.
3300	M	08/08/00	Kit	63	4	Released 10/09/00.
3304	M	08/08/00	Kit	64	4	Released 10/10/00.
3305	M	08/08/00	Kit	64	2	Released 10/10/00.
3306	F	08/08/00	Kit	111	4	Released 11/26/00.
3308	M	08/08/00	Kit	111	5	Released 11/26/00.
P12	F	06/06/98	2.6	940	-	Born on-site 1998. Mortality 12/31/00.
P15	F	06/09/98	2.6	937	2	Born on-site 1998. In pen 12/31/00.
P137	M	06/01/00	Kit	214	2	Born on-site. In pen 12/31/00.
P138	M	06/01/00	Kit	214	1	Born on-site. In pen 12/31/00.
P139	F	06/01/00	Kit	214	1	Born on-site. In pen 12/31/00.
P140	F	06/01/00	Kit	12	-	Born on-site. Mortality 06/12/00.

APPENDIX B. U.S. FISH AND WILDLIFE SERVICE ANNUAL REPORT FORM

Reintroduction Site: Aubrey Valley, Arizona

Date Submitted: January 22, 2001

Submitted by (name/title): Richard Winstead, Nongame Specialist, Arizona Game and Fish  
 Department-Region III

Studbook/ Site No.	Transponder Number	M/F	Date Rec.	Date Re/Tr	Pre. Treat	Last Obs.	How ID	Status	Kits Prod
1302	116247760	F	09/10/98		PS			AC	
<b>Non-releasable for health reasons, transferred to Phoenix Zoo 02/08/00.</b>									
1436	029078265 029105830	F	09/23/99		PS			AC	
<b>Non-releasable for health reasons, transferred to Phoenix Zoo 02/08/00.</b>									
1610	016334115 036362545	F	06/06/00		PS				
<b>MIA 10/10/00.</b>									
1645	036312557 036370056	F	10/15/99		PS				
<b>MIA 01/28/00.</b>									
1660	020847076 032619037	F	10/13/99		PS			D	1.3.0
<b>Dead 11/20/00 from amyloidosis of kidney and spleen.</b>									
1796	020846840 032629256	F	10/13/99		PS			D	
<b>Dead 01/29/00 from undetermined cause.</b>									
1815	021332109 036331893	F	10/15/99		PS			D	0.0.0
<b>Dead 08/15/00 from necrotizing pneumonia.</b>									
1842	027019382 036311367	F	11/15/99		PS			AC	0.2.0
<b>Released 03/01.</b>									
1905	017383512	F	08/15/97	08/14/00	PS	11/11/00	T		0.0.0
1994	017581057A 028617864A	F	11/15/99	08/14/00	PS	08/14/00			0.0.0
2084	021102065 034880257	F	10/13/99		PS				2.0.0
<b>MIA 08/12/00 with kits P153 and P154.</b>									
2115	116274777	F	10/15/99		PS			AP	0.2.1
2509	010368775	M	11/10/98	08/14/00	PS	08/14/00			
2510	011039106	M	11/10/98		PS			D	
<b>Dead 01/30/00. Decomposed, no necropsy.</b>									
2535	028624333 028768073	F	08/24/98		PS			AP	0.0.0
2549	115665580	F	11/10/98		PS			D	
<b>Dead 01/14/00. Decomposed, no necropsy.</b>									
2550	115767243	F	11/10/98		PS			AP	2.1.0
2585	029073828	M	04/13/99	11/13/00	PS	11/18/00	R	D	
<b>Radio collar and partial carcass recovered, killed by coyote.</b>									
2784	029037613 031063288	M	11/15/99		PS			AP	
2797	032628563 032632572	M	10/15/99		PS			D	
<b>Dead 07/01/00 from myocarditis.</b>									
2850	036322259 122544767A	M	11/15/99		PS				
<b>MIA 06/15/00.</b>									

APPENDIX B (CONTINUED).

Studbook/ Site No.	Transponder Number	M/F	Date Rec.	Date Re/Tr	Pre. Treat	Last Obs.	How ID	Status	Kits Prod
2853	036371548 036373515	M	11/15/99	11/13/00	PS	11/15/00	T		
2857	031078807 036328363	M	11/15/99		PS			AP	
2956	122928666A 032612307	F	11/15/99		PS				0.0.0
3001	032619826 032630361	F	10/13/99		PS			AP	2.3.0
3013	032619797 032625101	M	10/13/99		PS			AP	
3036	032617794 032631531	F	10/13/99		PS			D	5.0.1
3157	039071315 039111771	F	08/16/00		PS			AP	
3158	039063885 039109782	F	08/16/00		PS			AP	
3161	039067619 039079290	M	08/16/00	11/13/00	PS	11/13/00			
3163	039120269 039256299	F	08/16/00	11/13/00	PS	11/13/00			
3166	039043610 039081800	M	08/16/00	11/13/00	PS	11/13/00			
3167	039076552 039098599	F	08/16/00	11/26/00	PS	11/26/00			
3290	034591110 034596063	F	06/06/00	11/08/00	PS	11/08/00			
3291	034572790 034578557	F	06/06/00	11/08/00	PS	11/08/00			
3296	039114574 039119052	M	08/08/00		PS				
3297	039076577 039100771	F	08/08/00	11/13/00	PS	11/13/00			
3299	039062623 039064298	M	08/08/00	10/09/00	PS	10/09/00			
3300	039077832	M	08/08/00	10/09/00	PS	10/09/00			
3304	039107570 039107822	M	08/08/00	10/10/00	PS	10/10/00			
3305	039071075 039074049	M	08/08/00	10/10/00	PS	10/10/00			
3306	039110890 039115081	F	08/08/00	11/26/00	PS	11/26/00			
3308	039077124 039257081	M	08/08/00	11/26/00	PS	11/26/00			
<b>NON-SSP ANIMALS</b>									
P12	029589585	F	06/06/98		PBS			D	0.0.0
			<b>Dead 12/31/00 from raptor attack. Dam 1437, sire 1285. AKA 1SE98F1</b>						

APPENDIX B (CONTINUED).

Studbook/ Site No.	Transponder Number	M/F	Date Rec.	Date Re/Tr	Pre. Treat	Last Obs.	How ID	Status	Kits Prod
P15	029592574	F	06/09/98		PBS			AP	2.2.0
			<b>Dam 1200, sire 1614. AKA 5SE98F2</b>						
P134	043296785	M	05/27/00	11/13/00	PBS	11/15/00	T		
			<b>Dam 2550, sire 2857. AKA 7SE00M1.</b>						
P135		M	05/27/00		PBS			D	
			<b>Dead 06/12/00. Dam 2550, sire 2857. AKA 7SE00M2.</b>						
P136		F	05/27/00		PBS			D	
			<b>Dead 06/28/00. Dam 2550, sire 2857. AKA 7SE00F1.</b>						
P137	043288834	M	06/01/00		PBS			AC	
			<b>Released 03/01. Dam P15, sire 2585. AKA 5SE00M1.</b>						
P138	043124879	M	06/01/00		PBS			AC	
			<b>Released 03/01. Dam P15, sire 2585. AKA 5SE00M2.</b>						
P139	043270856	F	06/01/00		PBS			AC	
			<b>Released 03/01. Dam P15, sire 2585. AKA 5SE00F1.</b>						
P140		F	06/01/00		PBS			D	
			<b>Dead 06/12/00. Dam P15, sire 2585. AKA 5SE00F2.</b>						
P141	043115368	M	06/01/00		PBS				
			<b>MIA 12/05/00. Dam 3001, sire 2850. AKA 2NW00M1.</b>						
P142	043017352	M	06/01/00		PBS			AC	
			<b>Released 03/01. Dam 3001, sire 2850. AKA 2NW00M2.</b>						
P143	043286023	F	06/01/00		PBS			D	
			<b>Dead 10/28/00. Decomposed, no necropsy, likely cause coccidiosis. Dam 3001, sire 2850. AKA 2NW00F1.</b>						
P144	043266794	F	06/01/00		PBS			D	
			<b>Dead 12/14/00 from raptor attack. Dam 3001, sire 2850. AKA 2NW00F2.</b>						
P145	043005887	F	06/01/00		PBS				
			<b>MIA 11/02/00. Dam 3001, sire 2850. AKA 2NW00F3.</b>						
P146	043061321	F	06/02/00		PBS			AC	
			<b>Released 03/01. Dam 2115, sire 2784. AKA 5SW00F1.</b>						
P147	043306562	F	06/02/00		PBS			AC	
			<b>Released 03/01. Dam 2115, sire 2784. AKA 5SW00F2.</b>						
P148		U	06/02/00		PBS			D	
			<b>Dead 06/11/00. Dam 2115, sire 2784. AKA 5SW00U1.</b>						
P149	042881545	M	06/11/00		PBS			AC	
			<b>Released 03/01. Dam 1660, sire 3013. AKA 4SE00M1.</b>						
P150	042625355	F	06/11/00		PBS			AC	
			<b>Released 03/01. Dam 1660, sire 3013. AKA 4SE00F1.</b>						
P151	042633023	F	06/11/00		PBS			D	
			<b>Dead 11/29/00. Dam 1660, sire 3013. AKA 4SE00F2.</b>						
P152		F	06/11/00		PBS			D	
			<b>Dead 07/26/00. Dam 1660, sire 3013. AKA 4SE00F3.</b>						
P153		M	06/12/00		PBS				
			<b>MIA 08/12/00 with dam. Dam 2084, sire 2797. AKA 1SE00M1.</b>						
P154		M	06/12/00		PBS				
			<b>MIA 08/12/00 with dam. Dam 2084, sire 2797. AKA 1SE00M2.</b>						
P155	043096583	F	06/16/00		PBS			AC	
			<b>Released 03/01. Dam 1842, sire 2585. AKA 5NE00F1.</b>						
P156	Untagged to date	F	06/16/00		PBS			AC	
			<b>Released 03/01. Dam 1842, sire 2585. AKA 5NE00F2.</b>						

APPENDIX B (CONTINUED).

Studbook/ Site No.	Transponder Number	M/F	Date Rec.	Date Re/Tr	Pre. Treat	Last Obs.	How ID	Status	Kits Prod
P157		M	05/08/00		PBS			D	
			<b>Dead 08/20/00. Dam 3036, sire 3013. AKA 2SE00M1.</b>						
P158		M	05/08/00		PBS			D	
			<b>Dead 08/20/00. Dam 3036, sire 3013. AKA 2SE00M2.</b>						
P159		M	05/08/00		PBS			D	
			<b>Dead 08/20/00. Dam 3036, sire 3013. AKA 2SE00M3.</b>						
P160		M	05/08/00		PBS			D	
			<b>Dead 08/20/00. Dam 3036, sire 3013. AKA 2SE00M4.</b>						
P161		M	05/08/00		PBS			D	
			<b>Dead 07/06/00. Dam 3036, sire 3013. AKA 2SE00M5.</b>						
P162		U	05/08/00		PBS			D	
			<b>Dead 06/20/00. Dam 3036, sire 3013. AKA 2SE00U1.</b>						

M = Male  
 F = Female

T = Transponder chip reading

Pretreatment –

PBS = Pen born, pens on or near reintroduction area  
 PBO = Pen born, breeding facilities away from reintroduction area  
 PS = Preconditioned in pens on or near reintroduction site  
 PO = Preconditioned in pens away from reintroduction site  
 U = Unknown

Status –

AC = Alive, being held in captivity  
 AP = Alive, being held in on-site pens  
 for breeding purposes  
 D = Dead, body/parts recovered