2003 Monitoring Report
for the
Blackfeet Nation and Defenders of Wildlife
Swift Fox Reintroduction Project

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Summary:

This report documents monitoring conducted on swift fox (*Vulpes velox*) on the Blackfeet Indian Reservation, Montana, from May through August 2003. Field work focused on locating and monitoring natal dens, tracking adult foxes via radio telemetry and locating foxes in previously unsurveyed areas of the reservation. In May, there were a potential 21 radio-collared animals on the Blackfeet Reservation. This number had decreased to 10 in August with 4 of the 10 missing. Ten animals were found dead (presumed/confirmed coyote kills) and 1 animal had its collar chewed off. The 6 collared foxes, 2 of which had active natal dens, were monitored throughout the summer and were located a total of 69 times. In addition, 18 uncollared adult foxes were observed on 79 different occasions. Field technicians located 8 natal dens producing 38 kits. It is believed that at least 3 of these natal dens also produced litters in 2002. Total swift fox observed, including kits, was 61 animals.

A standardized method was implemented to test its efficacy in locating foxes. This visual survey method covered 15,650 acres of tribal land and had a detection rate of 4.8% for swift fox. Spotlighting was also used as a tool to locate swift fox and was productive in aiding field crews in relocating foxes that frequently moved natal dens. Informative signs and sighting report sheets were displayed in several towns on and around the reservation but had little effect in providing additional information, even with the impetus of a monetary reward.

Methods:

Radio telemetry

Radio-collared animals were located approximately once every 5 days by vehicle using a bipolar antenna to obtain a general location and then triangulating on the location of the frequency using an H-antenna. Adult foxes, even those without kits, were fairly localized for the summer and were often found at the same sites for consecutive locations. Collared animals whose signals were not obtained by vehicle were found by aerial flights. The entire Blackfeet Reservation was surveyed by air during the summer of 2003. Flights were systematic by following cardinal directions and flying transects 5.0-6.5 km (3-4 miles) apart.

To ascertain the attenuation of the collars' signals due to the substrate we buried active collars in abandoned den holes and flew over the location. When the radio collar was buried the signal could be heard from approximately 0.8 km (0.5 mile), suggesting a marked weakening of the signal when animals are underground. To maximize our flying time flights after this test were conducted about 1 hour before sunset and usually continued until 1 hour after sunset. This is a time of day when swift fox have been shown to be active (Kitchen et al. 1999) and presumably would not be underground. All telemetry locations were recorded in UTMs (NAD 27) and are presented in Appendix A.

Systematic Visual Surveys

Because the Blackfeet Reservation encompasses over 1.0 million acres of suitable swift fox habitat the need for a systematic method to determine abundance is essential. A systematic method was implemented by having an observer stand on a geographic high point with spotting scope and binoculars and search the entire area in view for 1 hour at peak activity times of the day (early a.m. and dusk).

Total area surveyed by each point was determined before surveys were implemented by standing on a high point and observing Richardson's ground squirrels (*Spermophilus richardsonii*) or horned larks (*Eremophila alpestris*), then walking out to that location and recording the UTMs. Other tests found that known fox dens could be observed from a distance of 2.0 km (1.25 miles) and badgers (*Taxidea taxus*) were also seen at distances of > 2.4 km (1.5 miles) through a spotting scope. A conservative estimate of 320 acres was sampled for each survey point with a 360' view.

All survey points were hand-drawn on topographical maps and acreage estimated by excluding any buttes or hills as noted on the observer's data sheet. Sightings of any foxes, coyotes, badgers, or raptors were recorded. Notes were also recorded on prevalence of prey species such as Richardson's ground squirrels, horned larks and grasshoppers. Visual surveys originated on or near the AMS ranch in an effort to completely survey the release site and its adjacent lands. Surveys were then expanded into areas of past swift fox activity or areas that had not previously been surveyed during past monitoring efforts.

Spotlighting

Spotlighting from a vehicle began in mid-July and continued through August. All roads on the AMS ranch and most on immediately adjacent lands were driven at night

and habitat on both sides of the vehicle was surveyed. Spotlighting also expanded to include areas of previous fox activity or areas that had not been surveyed in the past.

Signs

Informative signs (Appendix C) describing the biology and appearance of swift fox were displayed in local businesses on and adjacent to the reservation. The first sign included a photo and brief description of the swift fox and a data sheet to report any sightings. The second sign, displayed late in the summer, was virtually identical but included a $50.00 reward for any reports leading to a new, active, natal den. The idea of a reward was not discussed until late in the summer, hence the sign was not displayed at a time when kits are often seen during daylight hours. Signs were displayed at Browning Hardware, Browning Tribal Headquarters, East Glacier post office, Dupuyer post office, Cut Bank post office, Cut Bank Albertson's and the USDA Service Center in Cut Bank.

Results:

Radio telemetry

In May, the project had a total of 21 collared animals. By the end of the field season in August, this number had been reduced to 10 due to mortality and the loss of one collar. Despite systematic aerial flights of the entire reservation, 4 collared animals were not located during the field season. The remaining 6 collared animals were located a total of 69 times (Appendix A and Map 1).

Of the 6 known living animals that had collars during the summer of 2003, only 2 successfully bred (151.292, 151.056), though one of the collared animals (150.883) had bred in 2002 and was observed the entire summer with or near an adult male (151.524). An additional adult (151.663) did not breed successfully even though this animal was thought to be an older female because of her excessive tooth wear (Schauster 2003). It is unknown why 4 of the 6 collared animals did not breed successfully. Two of these 4 animals could have been first-year adults and it has been shown that swift fox frequently do not breed until their second year (Carbyn et al. 1994) however I would not expect this from a newly developing population.

Of the 10 dead collared animals retrieved in 2003, 7 of these were found before mid-June. Five of these 7 were severely decomposed and determining the cause of death was difficult though 3 of the foxes had puncture wounds resembling that of coyote predation. It should also be noted that 7 of the 10 mortalities were animals collared during the winter of 2003. It is unknown if the radio collars were a factor in their deaths though information from kill sites suggested that this was not the case.

Information on 1 dead animal (150.744) was not available because it was anonymously turned in at the tribal office in Browning. None of the remaining 9 dead foxes were found near roads and only 1 (150.625) was found in a cultivated field. In addition to the 10 confirmed mortalities, 1 animal (151.194) had its collar chewed off in the Birch Creek area at the southern end of the reservation boundary, nearly 23 km (14 miles) from where it was originally collared by Schauster in February 2003.
Locations of mortalities are displayed on Map 4.

Systematic Visual Surveys

A total of 63 survey units covered approximately 15,650 acres and located 1 natal den, 1 collared fox and 2 uncollared adults. Swift fox were found on 4.8% of the survey units. In contrast, coyotes (*Canis latrans*) were observed on 20.6% of the survey units. Raptors were observed on nearly 27% of survey units, though observations of raptors near active dens indicated that swift fox on the reservation do not appear to alter behavior in the presence of raptors. No foxes were located after June even though nearly 78% of all survey points were conducted after this time. This suggests that as average temperature increases during the latter months of summer (Appendix G) the foxes, kits included, may become more nocturnal making this survey method ineffective. General areas covered, total acres within those regions and success of those survey points are presented in Table A. Full data is presented in Appendix B.

Table A.

Region	# of survey points	Total acres	# swift fox observed
AMS Ranch	20	4800	10 (incl.1 natal den)
Badger Creek	15	3940	0
Blacktail Creek	1	250	0
East Glacier	16	4105	2
Hugo and South Roads	1	275	0
Lenoir Road	2	410	0
Molly Nipple	6	1510	0
Two Medicine	2	360	0
TOTAL	**63**	**15,650**	**12**

Spotlighting

Spotlighting was used as a tool to locate foxes and to relocate foxes that had moved natal dens. This method was not implemented in a systematic manner. Total road and track driven was approximately 220 km (137 miles). Spotlighting relocated 7 of 8 natal dens that had been moved by the adults (8 natal dens occupied 30 locations during 2003) and located 2 separate uncollared adults in the Mission and Guardipee Lake areas (Map 1). Spotlighting can be an effective tool to locate foxes in the future, however, difficulties associated with topography and road access can hamper standardization.

Signs

The display of signs, even with a monetary incentive, was not an effective means to obtain additional reports of swift foxes. Despite the description and accompanying photograph of a swift fox (Appendix C), quite often reports we investigated were red fox (*Vulpes vulpes*) sightings. Reports by individuals lead to 4 red fox and 2 swift fox that were previously known. From personal observation it appears that kits are more active during the daylight hours early in the summer thus displaying reward signs earlier in the season may have produced better results. All signs were removed at the end of August.

Discussion

Natal Dens

A total of 8 natal dens were found in 2003 producing 38 kits (mean = 4.75, SE = 0.62, range: 3-7) (Map 2). This is an increase of 7 kits from 2002. I believe that at least 3 of these dens also produced litters in 2002. An additional 4 pair of adults did not breed successfully and 4 more single adults did not produce litters. A descriptive summary of natal dens is included in Appendix D and UTMs are reported in Appendix E.

Table B. displays the total number of swift fox natal dens found from 1999 through 2003 and Table C. displays the total number of swift fox kits observed during this same time period. Some of the data for these graphs were derived from past monitoring reports and may reflect differences in monitoring efforts more than actual fox abundance.

Table B. Number of swift fox natal dens found on Blackfeet Reservation between 1999 and 2003.

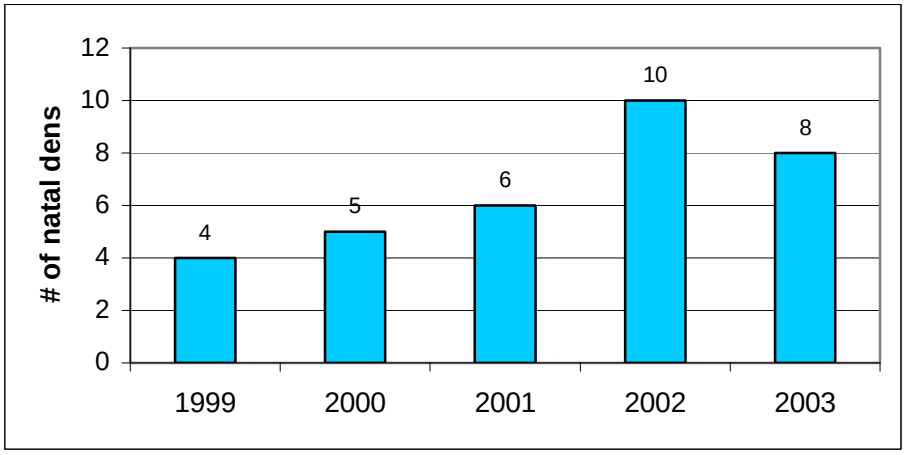
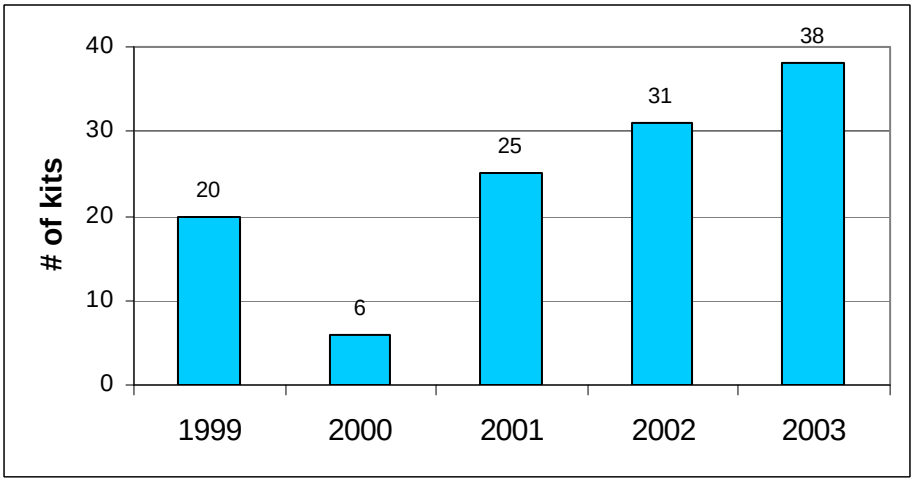


Table C. Number of swift fox kits seen on Blackfeet Reservation between 1999 and 2003



Uncollared adults

A total of 79 observations of uncollared adults, mostly at natal dens, were made during the 2003 field season (Map 1). Six uncollared adults that did not occupy natal dens were also observed though 1 of these was struck and killed by a vehicle along Highway 89 on August 19. Interestingly, 2 uncollared adults were located in the vicinity of the "East Glacier Den" (Waters and Ausband 2002 den site 1). The East Glacier pair had produced kits 3 years consecutively, but no evidence of natal dens was found in the East Glacier area. It is unknown if the 2 adults observed during the 2003 field season were the former breeding pair of the East Glacier den. Locations of uncollared foxes are reported in Appendix F and displayed on Map 1.

Table D. Total known swift fox present on the Blackfeet Reservation summer 2003:

	May	August
Collared adults	21	6 (4 missing)
Uncollared adults		18
Kits	38	37
TOTAL	**59**	**61 - 65**

Coyotes

During the summer of 2003 we observed coyotes on 55 separate occasions. Though I do not have a total number of sightings from 2002, I feel confident stating that many more coyotes were seen during the 2003 field season (Map 3). This may be explained in part by a cessation in aerial coyote control. Dan Carney, Blackfeet Fish and Wildlife, informed me that intense coyote control in the Mission Lake area ceased in December 2002. Coyotes can have a major impact on swift fox populations through predation (Olson and Lindzey 2002). The increase in sightings in 2003 and high mortality of foxes collared in 2003 suggest that coyotes may be having an impact on the Blackfeet swift fox population (Map 4). Three of these 10 foxes were skinned and examined closely for wounds. Puncture wounds to the skulls and neck indicate that these animals were killed by coyotes. Specimens have been accessioned into the Philip Wright Zoological Museum at The University of Montana in Missoula.

Red Fox

Red fox sightings were recorded on an incidental basis. A total of 9 red fox dens producing more than 45 kits were found in 2003. Locations of red fox dens were under abandoned buildings, in strip-farmed wheat fields, banks of irrigation ditches and hay meadows (Map 5). No red fox sightings or dens were located in short-grass prairie. During the summer of 2003, red fox did not appear to be a significant competitor with swift fox on the Blackfeet Reservation.

Literature Cited

Carbyn, L.N., H.J. Armbruster, and C. Mamo. 1994. The swift fox reintroduction program in Canada from 1983 to 1992. Pages 247-271 *in* Bowles, M.L. and C.J. Whelan. Restoration of Endangered Species. Cambridge University Press, UK.

Kitchen, A.M., E.M. Gese, and E.R. Schauster. 1999. Resource partitioning between coyotes and swift foxes: space, time, and diet. Canadian Journal of Zoology, 77:1645-1656.

Olson, T.L., and F.G. Lindzey. 2002. Swift fox survival and production in southeastern Wyoming. Journal of Mammalogy, 83(1):199-206.

Schauster, E. 2003. Final report: trapping and radio-collaring efforts for swift fox (*Vulpes velox*) on the Blackfeet Indian Reservation, Montana, January – March 2003. Unpublished report. 18 p. plus appendices.

Waters, S. and D. Ausband. 2002. Blackfeet swift fox (*Vulpes velox*) reintroduction and monitoring programme. Fieldwork report for Defenders of Wildlife, May – October 2002. Unpublished report.

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