

Title : The reintroduction of the swift fox in Canada (1983 - 1997)

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BACKGROUND: The swift fox (*Vulpes velox/V.v.hebes*), native to the Great Plains, is North America's smallest canid species. Prior to the habitat transformation resulting from the European invasion of North America, the swift fox was abundant, widespread and common, throughout its known range (Johnson, 1969). Early European travelers on the Great Plains remarked on its numbers (Lewis and Clark, 1805, Allen 1874, Grinnell 1875 Coues 1878) and their reports are confirmed by the fur trader's returns (American Fur Co., Hudson's Bay Co.). Both John James Audubon and the Emperor Maximilian of Mexico had pet swift fox and remarked on their vocalizations and liveliness.

Swift fox are a noisy, gregarious, non-territorial species (U.S. Bureau of Land Mgmt, Internal Report, 1975, Carlington 1980, Weagle and Smeeton 1995). They are opportunistic feeders, eating seeds, berries, grass, insects, amphibians, reptiles, small mammals and birds (Grinnell et al, 1937, Egoscue, 1962, Weagle and Smeeton 1995, Bremner, 1997). They are extremely selective when choosing a mate, and, once the decision is made, appear to mate for life (Soper 1964, Sanfield, 1974, Weagle and Smeeton, 1995).

Although some radio collared individuals have traveled startling distances immediately after release into new habitat, animals in established populations with a sufficient prey base do not seem to be very wide ranging. They will return annually to the same natal den to raise their cubs. Once the cubs are ambulatory, the animals will leave the natal den and utilize a series of other den sites.

Swift fox have a distinctive mating call, which can be heard over a mile in open country. This call can be used to identify individuals, and has been developed by the Cochrane Ecological Institute (CEI) as a non-intrusive method of population census. Swift fox are constantly vocal, uttering a wide variety of calls, some of them startlingly loud when compared to the size of the fox. After the cubs are born, warning barks are picked up and

repeated by all adults within earshot of the first alarmist. Swift fox will utter warning barks on sighting both avian and terrestrial predators.

The breeding season occurs from late January to March, cubs are born, after a gestation period of 51 days, from mid April to mid June. Litter sizes vary from one to seven with an average of four. For the first 14 days after the birth of cubs, the male will do all the hunting for vixen and cubs. When the cubs are older, either the male or female will hunt leaving the other parent with the cubs. Swift fox will protect the immediate vicinity of the natal den, until the cubs' eyes open and they begin exploring outside the natal den, on average at 15 days. We have noted, in the 20 acre group enclosure at the CEI, that after the cubs begin moving around, other non related swift fox, are permitted to approach and to feed them. Cubs are born to established pairs earlier than to newly paired animals.

Without cubs, swift fox are largely nocturnal, but while raising cubs they appear to be active both day and night (Pruss,1994, Teeling, 1996.). It is believed that swift fox cubs usually disperse at five months of age, in late August/September. We have noted that where late born cubs are allowed to over-winter with their parents, they are permitted to freely associate with cubs born to their parents in the following year.

Historically, in the U.S., the swift fox range once encompassed the prairie states of Montana, Wyoming, North and South Dakota, Nebraska, Colorado, Kansas, .N.W. Texas, Eastern New Mexico and the Oklahoma panhandle. In Canada, the swift fox was found in Alberta, Saskatchewan and Manitoba as far north as the Latitude 53N.

A significant number of Plains Indian tribes considered the swift fox to be a sacred animal, an "animal of the soul". There were swift fox warrior societies among the Sioux, Blackfoot, Blood, Blackfeet, Peigan, Oglala, and Assiniboine tribes. Ritually treated swift fox bones, dated at 7,500 years, have been excavated from the fire pits of the first peoples to come to North America over the Beringia land bridge.

By the 1930's, the swift fox was extinct throughout its Canadian range, and reduced to pocket populations in remnant prairie habitat within its U.S. range. In 1978, the species was declared extirpated in Canada (C.O.S.E.W.I.C. 1978). In 1995, as a result of a Petition to List the Swift Fox under the Endangered Species Protection Act (Sharps, 1993) the U.S. Fish & Wildlife Service published the results of their Twelve Month Finding. This stated that, in the opinion of the Service, the swift fox was extirpated over 90 per cent of it's historic U.S. range and, in the remaining 10 per cent of its range, was only found in isolated scattered pockets of remnant prairie habitat (U.S. Federal Register, Vol.60, No.116, 1995).

As the European naturalists explored the new continent of North America, the swift fox was discovered and described many times, resulting in taxonomic chaos. Merriam(1902) described two species; the swift fox *Vulpes velox* and the kit fox, *Vulpes macrotis*, and two subspecies, *Vulpes velox hebes* the northern swift fox, and *Vulpes macrotis mutica*, the San Joaquin kit fox. In 1978, when the swift fox(*Vulpes velox/V.v.hebes*) in Canada was declared extirpated, in the U.S. *Vulpes velox*, *Vulpes velox hebes*, and *Vulpes*

macrotis were lumped together to form one species which tripled the estimated U.S. population. This action caused the removal of protection (Endangered Species Act regulations, PSF/LE ENF 4-REG-17) from the Northern swift fox. It might be worth noting the curious fact that, although the swift fox is recognized as extirpated in Canada and reduced to pocket populations within its remnant U.S. range, it is not listed in the IUCN Red Data Book. The swift fox is stringently protected in Canada, and, with the exception of S. Dakota, where it is fully protected, is protected under fur-bearer legislation in most States.

In less than 100 years the swift fox population in North America had gone from being abundant, widespread, and common, to extirpation or remnant pocket populations within apparently optimum habitat.

Many reasons have been put forward for the rapid decline of the swift fox, among them an increase in the coyote population, an invasive red fox population and climate change. The most significant reasons would appear to be an intensive poisoning program that occurred in association with the eradication of the buffalo, trapping, the transformation of their habitat from wild grasslands to checkerboard farmland, and the heavy use of pesticides for grasshopper control.

CAPTIVE COLONY. In 1972, six years before the species was declared extirpated in Canada, Miles and Beryl Smeeton brought 2 pairs of swift fox to the CEI. Their express purpose was to initiate a captive-breeding program designed to provide animals for reintroduction, not for exhibit, trade, sale or other financial gain. In 1977, Beryl Smeeton signed a co-operative agreement with the University of Calgary, whereby the University would undertake research into re-introduction sites while the CEI undertook to provide swift foxes for release. The CEI initiated and maintains the swift fox studbook, now on ISIS software. All captive-bred swift fox are descended from U.S. stock imported from Wyoming, S. Dakota, and Colorado.

From 1986 to 1996, during the program, ownership of the foxes was transferred to the Canadian Wildlife Service. Although the colony continued to be managed by, and remained at, and in a large part was funded by the CEI. Ownership of the captive colony has been returned by the CWS to the CEI. In 1978, the species was declared extirpated throughout its Canadian range. In 1983 the first swift fox were released in southern Alberta.

The CEI consists of 160 fenced acres of native mixed grass prairie habitat set in the eastern foothills of the Rockies. The greater part of the land is utilized by other native species among them, elk *Cervus canadensis*, Moose *Alces alces*, white tail *Odocoileus virginianus* and mule deer *Odocoileus hemionus*, and coyote *Canis latrans*. The CEI facilities consist of 23 single pair swift fox enclosures, 2 group enclosures, one of 20 acres and one of 2 _ acres, 14 quarantine pens, an animal health center and student housing. The single pair enclosures are a minimum of 30 x 60 m. in size and each contains two fox shelters, similar in construction to the PPS used in the swift fox releases. Brush piles seeded with grain have been placed in each enclosure, as research

(Bremner, 1997) has shown that brush piles are attractive to small mammals and birds. This enclosure enrichment policy increases hunting opportunity for the swift foxes. Fencing for all enclosures consists of chainlink panels surmounted by a 4ft. overhang, with 4 ft. groundwire along the perimeter. The daily activity pattern and hunting behavior of the captive-bred swift fox in the CEI enclosures, mirrors that observed in wild swift fox. (Pruss 1994, Teeling 1996, Bremner 1997)

REINTRODUCTION METHODS:

University of Calgary 1983 - 1985 SOFT RELEASE METHOD. This method was designed to give the captive-bred swift fox from the CEI a gentle introduction to the release site. Chain link panels were used to build fox enclosures similar to those at the CEI (Carlington, 1980, Reynolds 1983). The swift fox were transported to the site, fed and maintained there, with the intention of a gradual release. The foxes intended for reintroduction were moved to the release site in 1981 but, due to unforeseen political problems, were not released until 1983 (Reynolds 1983). Although small numbers of foxes were reintroduced using the soft release method, known recruitment outweighed known die off. However, the method was expensive in equipment, time and manpower.

Government agencies 1985 - 1996 HARD RELEASE METHOD. The Canadian Wildlife Service, Alberta Department of the Environment and the Saskatchewan Dept. of Environment and Resource Management utilized the Hard Release method. This involved, catching up the swift foxes at the captive-breeding facility, veterinary examination of the foxes, placing the foxes in individual plastic kennels, driving down to the release sites and tipping the foxes out onto the prairie, never more than 1Km from a road. Where the drive to the release site was 8 hours or more, the foxes would spend the night in the kennels. This method was quicker, and vastly cheaper in manpower and equipment. Foxes released using this method have traveled great distances from the release site and a marked die-off has been noted over the first three weeks after release (Brechtel et al, 1993).

Cochrane Ecological Institute 1993 – 1997 PORTABLE PROTECTIVE SHELTER (PPS) METHOD. In 1991, as result of attending a swift fox release utilizing the Hard Release method, the CEI decided that some of their animal welfare concerns would be alleviated through the use of a different method of release. This resulted in the development of the PPS method. Unlike the hard release method, all prophylactic veterinary care was undertaken over the summer, prior to release. The PPS method consists of first researching the proposed release site to ensure the site was fairly isolated, there was sufficient escape terrain (lots of holes), available water, and a good prey base. Once a suitable site is identified a Portable Protective Shelter (PPS) is placed there. The PPS consists of a small three chambered box surmounted by an A-Frame which can be carried on a pack-board and assembled on site. Use of the PPS has been proven to enhance survival of swift fox over the first month after release and also encourages the released animals to stay in the release sites.

There is very little information available on the habits and requirements of the swift fox, as result, research on kit fox, red fox, and other canids has been used in the design of the

Swift fox reintroduction program (Carlington 1980). Swift fox were distributed in small numbers over a large area in hopes that they would breed and re-colonize each site. This method did not work out; the released animals vanished, or coalesced into one small area (Hjertaas, 1994, Smeeton and Weagle 1998). Where swift fox were repeatedly released into an area with an active swift fox presence, the population appeared to consolidate and expand (Smeeton and Weagle, 1998). Survival of reintroduced swift fox has been variously estimated at between 18 and 37 per cent. Captive raised swift fox released in 1989, 1990, 1991, and 1994 were trapped as part of the incidental take of a Ph.D. student in 1996, indicating that individual swift fox have good survival. There are estimated to be 287 swift fox in the release sites in Canada (Cottrill, 1997). Over the length of the program, 841 captive-bred swift fox have been released and 91 wild trapped U.S. swift fox have been translocated to Canada.

The government agencies in an attempt to decide if wild trapped translocated U. S. swift fox had a greater reintroduction potential, and thus a higher economic value undertook the translocation program. A Spring Release Experiment (1989, 1990, 1991) was designed to answer the question. Each January, 20 wild U.S. swift fox from a Wyoming pocket population were trapped on an annual basis. These animals were then quarantined from January to April (over the breeding season) and hard released in April with an equal number of held over captive-bred juveniles from the previous year. Both groups were radio collared and monitored. The captive-bred juveniles died much more rapidly over the first 3 months, but after one year there was a negligible statistical difference in survival between the two groups (Hjertaas, 1994). As result of this experiment, it was decided that spring was an unsuitable time for release (Brechtel et al, 1993). Swift fox for this experiment were trapped from the same area in Wyoming in 1989, 1990, 1991, 1994, and 1996. In 1996, despite a threefold increase in trapping effort, only seven animals were obtained.

Human preconceptions dictated a belief that captive bred swift fox were less satisfactory subjects for reintroduction than wild trapped translocated animals. Captive bred animals were believed to be naïve; thus unable to identify predators, hunt, or dig dens. Recent research (Teeling 1996, Bremner 1997, Weagle and Smeeton 1995) has shown that the behaviour of captive-bred swift fox echoes that of wild swift fox and they are able to identify predators, hunt, and dig dens, survive, breed and raise their young if released in a suitable manner into optimum terrain. Above all, captive bred stock adds to the world's population of swift fox, translocation does not. So far, no research has been undertaken on the effect on the pocket populations of the removal of swift fox for translocation.

The present policy outlined in the Canadian National Recovery Plan for the Swift Fox (Brechtel et al, 1995) demands that the captive colony cease production in 1997, and any future releases in the Canadian reintroduction sites should be from translocated U.S. swift fox stock. A goal number for success has been set at 400 individuals. This goal has not yet been attained.

There is no doubt that the Canadian swift fox reintroduction is a successful program. It complies with the IUCN reintroduction criteria. Both reintroduced and translocated

animals have survived and bred (often to each other) in the release sites. There is suitable protected habitat available, a strong grassroots support for the program, enforceable legislation to protect the species, and there is (at the moment) a large captive breeding colony of wide genetic heterozygosity.

The Canadian swift fox reintroduction program has been a pioneering effort in this field, from which a lot can be learnt. From 1979 to 1993, no behavioral studies were undertaken on the swift fox by any scientific or government agency. From 1993 to 1998 graduate students at the CEI have undertaken behavioral studies. Behavioral studies were considered to be time consuming and thus expensive, as well as hard to quantify, and as such, unjustified. No domestic animal could be efficiently maintained, unless its behavioral requirements were known and addressed. However, when dealing with the behavioral requirements of an endangered species, such as the swift fox, behavior studies were set at lowest priority. The financial cost, in loss of released foxes, of such an oversight has been severe.

The philosophical differences between advocates of captive bred reintroductions versus the translocation of wild trapped swift fox has also deeply effected both the program and the National Recovery Plan for the Swift Fox. Although seldom addressed, one of the underlying arguments against reintroduction of captive bred animals is the anticipated cost of producing them. No value is attributed to the addition to the world population of animals of known genetic background, known health, and known age. In general, cost of translocated animals is only estimated with regards to capture and transport. It is seldom that the effect of removal of animals from the remaining wild stock is factored in. Nor the possible cost should disease be inadvertently introduced into the release sites. The result of the Canadian policy with respect of captive breeding has put the world's only captive colony of swift fox at risk.

All reintroduction programs have to tread a wary path through a beauracratc jungle. Any potential reintroduction program organizers should understand that it is essential to know how to manage conflicting jurisdictions.

Literature Cited:

Allen 1874,

Brechtel et al, 1995. Swift fox Recovery Plan, ?????????????????????????????????

Brechtel, S.H., L.N. Carbyn, D. Hjertaas, and C. Mamo. *1993 Canadian Swift Fox Reintroduction Feasibility Study: 1989 TO 1992 - Report and Recommendations of the National recovery Team.* Unpublished Report, Alberta Environmental Protection, Edmonton, Alberta, Canada

Bremner, S. 1997. *Diet and hunting behaviour of captive-bred swift fox (Vulpes velox/Vulpes velox hebes) intended for release*. M.Sc. Thesis, University of Edinburgh

C.O.S.E.W.I.C. 1978. *COSEWIC Status Reports and Evaluations. Volume 1. Official Classification of the Swift Fox as Extirpated in Canada*. Committee on the Status of Endangered Wildlife in Canada, Ottawa, Ontario, Canada

Carlington, B. G. 1980. *Reintroduction of the Swift fox (Vulpes velox) to the Canadian prairie*. M.Sc. Thesis, University of Calgary

Cottrill, 1997

Coues 1878)

Egoscue, H.J. 1962 Ecology and life history of the kit fox in Toole County, Utah. *ECOLOGY*, **43(3)**, 481-497.

Grinnell 1875

Grinnell et al , 1937,

Hjertaas, D. 1994. *Reintroduction of the Swift fox on the Wood Mountain Plateau*. Saskatchewan Environment and Resource Management, Regina, Saskatchewan, Canada

Johnson, 1969

Lewis and Clark, 1805,

Merriam 1902

Pruss, S.D. 1994. *An observational natal den study of wild Swift fox (Vulpes velox) on the Canadian prairie*. M.Sc. Thesis, University of Calgary.

Reynolds, J. 1983. *A plan for the reintroduction of the swift fox to the Canadian Prairies*. M.Sc. Thesis, University of Calgary.

Sanfield, 1974

Soper 1964,

Teeling, E. C. 1996. *Born to be free: Captive breeding as a conservation technique*. MSc Thesis, University of Edinburgh

U.S.Bureau of Land Mgmt, Internal Report, 1975, ????????????????????

Sharps,. J. C. 1993 Petition to List Swift fox USA??????????????????

Weagle K. and C. Smeeton. 1995. Behavioral aspects of the Swift fox (*Vulpes velox*) reintroduction program. *Proceedings of the 2nd International Conference on Environmental Enrichment, Copenhagen, August 1995.*