

**Smeeton, Clio and Ken Weagle. 1997. The reintroduction of Swift fox to the West Block of Grasslands National Park, Saskatchewan, using captive bred animals.**

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**ABSTRACT**

The reintroduction of Swift fox to the West Block of Grasslands National Park, West Block began in 1993. Between 1993 and 1997, 121 captive bred Swift fox were released into the park and the areas to the south of the park (Masfield Pasture). To reduce the initial mortality of the released animals a method involving the use of Portable Protective Shelters was developed (PPS system). The use of the PPS system was shown to keep the animals in the general release area and thought to reduce the initial mortality that had been documented to be high. Monitoring data from the area from 1994 to 1997 has shown that the population has established itself and appears to be expanding from the immediate release area. No less than 10 den sites have been identified in the area, three of which have been documented to produce kits. The PPS system used for releases in the GNP West Block have been demonstrated to be more effective in establishing a Swift fox population than the more scattered approach used in the GNP East Block area. Although the actual population numbers are not determined and sustainable population level is unknown, the experiment has shown that captive bred animals alone can be successfully used to reintroduce Swift fox, into suitable habitat.

### **Introduction:**

The Canadian Swift fox reintroduction program began in 1971 and 1972 when Beryl Smeeton of the Wildlife Reserve of Western Canada, Cochrane, Alberta (now Cochrane Ecological Institute) imported two pair of Swift fox from Colorado. Mrs. Smeeton's intention was to start a program that would see the Swift fox once again living on the Canadian Prairie. In 1977 a cooperative agreement was signed between Beryl Smeeton and the University of Calgary (Dr. Steven Herrero) to start the field work involved with reintroduction of the Swift fox. The agreement outlined a series of research projects to be conducted as M.Sc. thesis (Carlington, 1980; Reynolds, 1983; Schroeder, 1985). The Canadian Wildlife Service became involved with the project in 1978 after the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated the Swift fox as an 'extirpated' species in Canada. Alberta Fish and Wildlife Division was invited to join the project in 1978 but they declined. Saskatchewan joined the project in 1983 when they signed a cooperative agreement with the Canadian Wildlife Service. The combined effort of the University of Calgary and the Smeeton's breeding program at the Wildlife Reserve of Western Canada resulted in the first release of Swift fox on September 13, 1983. Since that time, a total of 841 animals have been reintroduced. Of these a total of 121 have been introduced into the West Block of GNP and the surrounding area.

In 1991 the Cochrane Ecological Institute (CEI), formerly the Wildlife Reserve of Western Canada, was involved in the releases for the first time. It was apparent to CEI personnel that, from an animal welfare standard, improvement was needed in the release procedures, monitoring was needed on released animals, and research had to be conducted that would quantify the contribution and usefulness of captive bred animals in the reintroduction program. In 1992 CEI, working in cooperation with Grasslands National Park, began research on release procedures and began post release monitoring in Grasslands National Park. In addition the West Block of Grasslands National Park was chosen as a site where only captive bred animals would be released, so that the progress of these animals could be documented.

This paper presents the results of the captive-bred Swift fox reintroduction into West Block area of Grasslands National Park, Saskatchewan and summarizes the results to form a blueprint for the reintroduction of captive-bred animals.

### **Methods:**

From 1992 to 1997 a total of 121 captive bred Swift fox from CEI were released into GNP West Block and the surrounding area (Table 1) and Figure 2. In 1992 the CEI used an experimental 50-acre enclosure adjacent to Grassland's National Park, for the release of eight Swift fox. The enclosure was dismantled after 2 weeks, and the animals intensively monitored for 6 weeks after release. As result of this preliminary work, swift fox release methods developed by the CEI for use from 1993 to 1997 were as follows.

### **Release Site Selection**

Release sites for the release of Swift fox using the Protective Portable Shelter (PPS) method were selected using the following five criteria:

- 1) evidence of Swift fox activity - old dens;
- 2) escape terrain (i.e. numerous badger holes);
- 3) supply of varied prey base;
- 4) activity of potential predators (i.e. coyotes, eagles); and
- 5) proximity to source of water.

These criteria were developed from a 1993 survey of Swift fox den sites in South Dakota. Potential release sites were surveyed, on foot, before the release date and areas fitting the above criteria were selected. A minimum of 24 hours before the actual release the PPS was placed at the site. This shelter was similar to the den boxes used in the captive breeding program at CEI but modified so that it could be folded up and transported on a pack board. The PPS had two parts, an internal chambered den box, and an external A-frame (Figure 2). Where possible, PPS, were placed in the breeding enclosures of animals intended for re-introduction. These PPS were clearly marked, and prior to the transport of the swift foxes, were removed from the enclosure and placed in the site where that group would be released.

The PPS was removed from the release sites at different times each year. In 1993 they were removed at 10 days, in 1994 and 1996 after five days, in 1995 after three days, and in 1997 after 7 days.

#### **Pre-release Animal Processing.**

Previous to, and including 1993, the Swift fox were taken from the breeding pens and placed in the cloud kennels two days before the actual release. One day was occupied with trapping and catching the swift fox intended for release. The animals were then placed in cloud kennels and the kennels stacked in a holding area over night. The following day they were given a physical check by a veterinarian and inoculated with rabies (Imrab3 vaccine), Liptospira canicola, and Ictohaemorrhagiae bacterin (Fort Dodge) vaccines (this was the third in a series of inoculations). After all Swift fox to be released that year were processed, they were transported to the release sites. The release took place on the third day after they were taken from the breeding pens with the animals spending a minimum of 48 hours in the cloud kennel. Once the animals were in the release area the kenneled animals remained stacked in the truck as it drove from release site to release site. This procedure added up to ten hours on the time some animals were in kennels prior to release (total of 58 hours).

This method of pre-release animal processing was changed in 1994. From 1994 to 1997, during the week prior to the release, Swift fox intended for release were captured in the breeding pens and given their final inoculations and a physical check by a veterinarian. After the inoculations the animals were left in the pens. At noon on the day prior to release, the Swift fox were recaptured in the breeding pens, put into cloud kennels and immediately transported to Grasslands National Park headquarters (the transportation distance was approximately 500 km.) arriving sometime during the night. Information on the individual release sites and the animals intended for those sites was provided to the monitoring teams. At dawn on the morning of the re-introduction, each monitoring team transported its designated swift fox group immediately to the designated release site

for release. This reduced their time in the cloud kennels (from capture in the breeding pens to release) to less than 24 hours.

### **Release**

At the release sites the cloud kennels containing the Swift fox were placed in a semi circle with the doors pointing toward the PPS. Rocks were placed on top of each kennel to prevent it being blown over. Food (dead mice) was placed in the PPS and a dish of water was provided adjacent to the PPS. A minimum of 30 minutes after the kennels have been in place, one member of the transportation and monitoring team for the specific release site opened the doors of the cloud kennel, using rocks to ensure that the doors could not be accidentally closed, and retreated 100 m. from the site. The Swift fox were allowed to leave the cloud kennels at their own pace. Once all the Swift fox for the site had left their cloud kennels and no longer showed any interest in them, the kennels were removed from the area.

### **Post Release Monitoring**

For the first 24 hours volunteers monitored each release site. The monitors viewed the behavior and activity of the released animals from a distance of at least 100 meters. From 1993 to 1997 all release sites were monitored for a further 10 days on a daily basis.

### **Data Sources on Swift Fox in the area of GNP West Block:**

The population monitoring of the Swift fox population in GNP West Block has been almost entirely collected by CEI. The data has been summarized in a series of unpublished data reports as follows. Cochrane Wildlife Reserve (1993) summarizes the observations on the use of the PPS to reduce stress and increase Swift fox survival during the releases program in 1993. Dennington (1994) reported on the utilization of Swift fox habitat in the West Block of Grasslands National Park from March 8 to 17, 1994. Cochrane Ecological Institute (1994,a) reported on a habitat survey and night-lighting to select the Swift fox release sites in Grasslands National Park and area in 1994. Michie (1994,a) reported on scent stations, night lighting and snow tracking in the East and West Block of GNP and Masefield and Val Marie PFRA Pastures to monitoring the movements and survival of the 1994 captive bred releases. Michie (1994,b) Summarized field observation from GNP West Block in July 1994 and the observation of a natal den. Michie (1994,c) presented data collected during a scent post survey and night lighting in November 1994. Cochrane Ecological Institute (1994,b) summarizes observations on the post - release monitoring of the Captive Bred Swift fox released using the PPS in 1994. Stephens (1995) summarizes data on the development of a playback response method of population estimation of Swift fox, as well as night lighting and ground search data for both the East and West Block of GNP. Stephens, and Etemadi (1994) reported data on the analysis of scat contents of 21 Swift fox scat collected during the 1994 releases in Grasslands national Park. Smeeton (1994) described the concept of the PPS and reports data from its use in GNP.

In 1995 a scent post survey was conducted in the release area to examine the population levels the findings of this survey have been reported separately in CEI (1995).

Additional population monitoring was conducted in 1996 using voice printing methods (CEI, 1996) and by live trapping in 1996/97 (Cotterill, 1997).

### **Results and Discussion:**

Table 1 summarizes the total numbers of Swift fox released in the GNP West Block from 1992 to 1997. The locations of the captive-bred Swift fox release sites are found in Figure 2. From 1992 to 1994 the release sites were contained within the GNP West Block. Monitoring data in the fall of 1994 (Michie, 1994, a,b,c and CEI, 1995) indicated that there had been a movement of the released Swift fox out of GNP and into the adjacent lands, especially into the Masefield Pasture area south of the park (Figure 3).

The strategy for the releases into the West Block was to release only into areas selected on habitat characteristics that matched known Swift fox habitat in South Dakota (Smeeton, 1994). Releases were monitored to document success and add to the knowledge base for subsequent release site selection. This concentrated the releases into what was considered the optimum habitat. The expansion of the habitat utilized by the released animals to areas outside GNP West Block indicated the reintroduced population was expanding into additional suitable habitat. The locating of several den sites in Masefield Pasture in 1994 and again in 1995 supported this conclusion and led to an expansion of the release range into that area. This was further supported by scent post work in the summer of 1995 (CEI, 1995) and releases in 1995 to 1997 were expanded to include not only the Masefield Pasture but also private land between the Masefield Pasture and GNP West Block.

Table 2 summarizes the Post release monitoring for the PPS releases from 1993 to 1997. The tendency of the Swift fox to use the PPS in the first 24 hours may be related to the weather pattern during that period. In 1993 the weather on the day of the release was warm (20 C) and windy (gusts to 60 km/hr). In 1994 the release day was mild (15 C) with a light breeze (< 10 km/hr). In the evening of the release day in 1995 (from c. 7:30 PM to c. 3:00 am), there was a violent storm (25 mm of rain and wind gusts to 65 km/hr). The use of the PPS over the first 48 and 72 hours in 1994 was lower than other years. It is felt that this pattern reflects the response to weather patterns and the gradual adaptation of the animal to its new surroundings. The observations on the higher use of dens in the release sites on initial release days with high wind, was supported by observations in the captive breeding colony. Teeling (1997) found that in both high windspeed and high temperatures the activity levels of captive Swift fox were reduced.

In all years within the first 48 hours some of the released animals had established den sites. The most dramatic example of this was in 1995 when animals at each of the release sites had established at least one den site within this time frame.

In 1993 and 1994 the PPS were removed from the release sites 10 and five days, respectively, after the release. No Swift fox were occupying them at the time of removal in either of these years. In 1995 the PPS were removed three days after the release. At

this time four of the five PPS were still in use indicating that three days was too early to remove the PPS. In 1997 the PPS were removed after 7 days.

In 1995 one group of five Swift fox were released into the GNP East Block without a PPS. They immediately went into existing badger holes in the area. Although the site was monitored over the following seven days no additional sign was found of the individuals. Similar attempts were made to monitor the Swift fox released without PPS in 1993, but no sign could be found of the animals after the release day.

Hjertaas, (1994) in his analysis of the mortality of Swift fox released in the Wood Mountain Area found that the period of highest mortality was in the first weeks after the release. If the individuals survived to approximately six months there was little difference between the captive raised and wild translocated individuals. Brechtel, et al (1993), made similar conclusions. It was assumed from the observations on the use of PPS that survival in this initial period was enhanced, therefore increasing the success of the captive raised animals. Although this was not confirmed through the use of radio collaring mortality studies, the circumstantial evidence presented below supported the fact that the captive bred Swift fox released in the GNP West Block have established an initial population which has produces young in the wild.

Figure 3 summarizes the data collected on Swift fox in the GNP West Block area up to 1995 (from CEI, 1995). In 1995 and 1996 research was underway at CEI to develop a method of censusing the Swift Fox population using voice printing (CEI, 1996). Field work during the initial stages of this research found extensive use of the GNP West Block and Masefield Pasture by the species and a playback/recall survey in the winter of 1996 confirmed the earlier findings (Figure 4).

The most compelling evidence for the success of the West Block reintroduction program was the locating, between 1994 and 1996, of 10 den sites in the area. Three of these den sites have been documented to produce kits. Known Swift fox sightings are another positive sign of an establishing population. These sightings have occurred over a wide area including both GNP West Block and Masefield PFRA Community Pasture. Swift fox scat have also been found over a similar wide area indicating an expansion of the population from the relatively concentrated release area into surrounding suitable habitat.

In an attempt to show the success of the release methods used in the GNP West Block and the GNP East Block Figure 5 presents the release sites and Swift fox sign found in the GNP East Block area. From 1990 to 1995 one hundred and sixty-two (162) Swift fox had been released into the East Block area. These animals were released into an area of approximately 1187 km<sup>2</sup> resulting in a release density of 0.136 fox /km<sup>2</sup>.

In comparison over the same period 65 Swift fox were released into a 89 km<sup>2</sup> area, resulting in a release density of 0.733 fox/km<sup>2</sup>. Figure 3 showed that the West Block population has spread from the GNP West Block proper into the Masefield Pasture. Where as in the East Block (Figure 5) the population has contracted into a smaller area. In the East Block the releases were done with a shot-gun approach on the hypothesis that

covering more area would cover more habitat. In reality, instead of the animals occupying the habitat of the releases the population has contracted into a smaller area.

### **Blueprint for the re-introduction of swift fox.**

1. The release areas must have some form of protection and/or cooperation must be obtained from the land owners (in this case Heritage Canada, Prairie Farm Rehabilitation Association and individual farmers)
2. A captive-breeding colony capable of the production of sufficient numbers of animals for reintroduction must be maintained for the duration of the program.
3. Habitat requirements for the species must be understood and used as selection criteria for release sites
4. Transportation methods must be developed that reduce stress on individuals prior to release
5. Release methods to reduce initial mortality must be developed
6. Post release monitoring (at individual release sites) must be conducted
7. The release method development must be an iterative process which incorporates new data into methodology development on a yearly basis
8. Population monitoring must be conducted to assess the development and expansion of the population
9. Selection of new release sites should be based on the population monitoring and sites should be placed in areas where the released animals have moved and been successful.
10. During the release program research and monitoring should be focused on the question of the sustainability of the new population.

### **Literature Cited**

- 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, Edmonton, Alberta Environmental Protection
- Cochrane Ecological Institute. 1994,a. Survey of Swift fox activity and possible release sites in Grasslands National Park (15 August to 6 September 1994). Unpublished Report.
- Cochrane Ecological Institute. 1994,b. Observations of Captive Raised Swift foxes on release into Grasslands National Park, September 12th - 22nd, 1994. Unpublished Report.
- Cochrane Ecological Institute. 1995, a. Data Summary and Scent Post Survey for Swift Fox in the West Block, Grasslands National Park 1995. Unpublished Report to Grasslands National Park.

Cochrane Ecological Institute. 1995, b. Non Intrusive Population Estimator for Swift Fox Using Voice Printing. Confidential Report to Alberta EcoTrust, Calgary, AB . June 1996. pp 53.

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. Ottawa. Committee on the Status of Endangered Wildlife in Canada

Carlington, B. G. 1980. REINTRODUCTION OF THE SWIFT FOX (VULPES VELOX) TO THE CANADIAN PRAIRIE. M.Sc. Thesis, University of Calgary,

Cochrane Wildlife Reserve. 1993. The use of "A" frame Portable Protective Structures (PPS) in the 1993 Swift fox release program in Grasslands National Park, Val Marie, Saskatchewan Canada. Unpublished Report.

Cotterill, S.E. 1997. Population census of Swift Fox (*Vulpes velox*) in Canada: Winter 1996-1997. Alberta Environmental Protection, Natural Resources Service, Wildlife Management Division. 50 pp.

Dennington, M. 1994. Swift fox reconnaissance survey Grasslands National Park, March 1994. Prepared for Cochrane Ecological Institute by Redwing Naturalists, Creston, B.C. April 1994. Unpublished Report.

Diefenbach, D.R., Conroy, M.J., Warren, R.J., James, W.E., Baker, L.A. & Hon, T. 1994 A test of the scent-station survey technique for bobcats. *Journal of Wildlife Management*, **58**, 10-17.

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

Michie, J. 1994,a. Monitoring of Swift fox in Grasslands National Park, November 1994. Prepared for Cochrane Ecological Institute, Cochrane, AB. Unpublished Report.

Michie, J. 1994,b. Swift fox update in Grasslands National Park, West Block. July 18 - 26, 1994. Prepared for Cochrane Ecological Institute. Unpublished Report.

Michie, J. 1994,c. Swift fox monitoring in Masfield and Val Marie PFRA Community Pastures and their suitability as future release sites. Prepared for Saskatchewan Environment and Resource Management. Unpublished Report.

- Reynolds, J. 1983. A plan for the reintroduction of the swift fox to the Canadian Prairies. Master's Degree Project, Faculty of Environmental Design, University of Calgary, Calgary, Alberta, Canada.
- Schroeder, C. 1987. Swift Fox Reproductive Biology in Captivity. Manuscript report, University of Calgary, Calgary, Canada.
- Smeeton, C. 1994. Reintroducing the Swift Fox. Canid Action News, Newsletter of the Canid Specialist Group, IUCN. 2: 13-16
- Stephens, P. 1995. Monitoring of Swift fox by breeding call playback and other techniques in Grasslands National Park Saskatchewan 23.4.95 - 7.4.95. Prepared for Cochrane Ecological Institute. May 1995. Unpublished Report.
- Stephens, P. and H. Etemadi. 1994. Investigation into the habitat and diet of six captive Swift fox. June to October, 1994. Cochrane Ecological Institute/cochrane Wildlife Reserve, Unpublished Report.
- Teeling, E. C. 1996. Born to be free: Captive Breeding as a conservation technique. A Dissertation in Part Fulfillment of the Degree of MSc in Applied Behavior and Animal Welfare at the University of Edinburgh, Scotland. 1966. 48pp.
- 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.

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**Figure 1: A schematic diagram of the PPS consisting of a den box (75 cm x 30 cm X 30 cm) with a hinged top and an A-Frame (80 cm X 80 cm high). Both are constructed of 1.85 cm plywood. The entrance holes are apposed and 15cm in diameter. (Drawing not to scale.)**

**Figure 2: Summary of all Swift fox release sites for the GNP West Block, 1992 to 1997.**

**Figure 3: Summary of data collected on the Swift fox population in the area of GNP West Block from 1992 to 1997.**

**Figure 4: The results of a playback recall survey of GNP West Block during March 1996.**

Figure 5: Summary of the Swift fox releases and sign in the area of Grasslands National Park, East Block (from CEI, 1995).

**Table 1: Summary of the  
Swift fox released into GNP  
from 1990 to 1997, inclusive.**

Year	Swift Fox Released
1992	38
1993	24
1994	10
1995	16
1996	7
1997	26
Total	121

**Table 2: Summary of the post release observations for Swift fox released using the PPS method from 1993 to 1995.**

Year	No. foxes Released	Initial Reaction			Use of A frame			Swift Fox Spotted at 7 Days
		Bolted	Entered PPS	Investigate Area	24 Hr	48hrs	72hrs	
1993	16	12	4	0	11 (69%)	4 (25%)	N/D	N/D
1994	19	8	0	11	4 (21%)	3 (16%)	3 (16%)	6 (31%)
1995	23	2	17	0	21 (91%)	13 (56%)	8 (35%)	9 (32%)
Total	58	22	21	11	36 (62%)	20 (34%)	11 (19%)	15 (32%)