THE REINTRODUCTION OF ORPHANED GRIZZLY BEAR CUBS INTO THE WILD

CHARLES JONKEL, Border Grizzly Project, University of Montana, Missoula 59812
PETER HUSBY, Border Grizzly Project, University of Montana, Missoula 59812
RICHARD RUSSELL, Canadian Wildlife Service, Room 1000, 9942-108 Street, Edmonton, Alberta T5K 2J5
JOHN BEECHAM, Idaho Department of Fish and Game, 109 West 44th Street, Boise 83704

Abstract: Several techniques can be used to return captured orphaned bear cubs to the wild. They can be released immediately in suitable habitat, be adopted by another female with young, or be fattened and then released. The last technique was used successfully to return to the wild an orphaned cub obtained by the Border Grizzly Project of the University of Montana in 1975. The cub was fattened in captivity and released into an artificial den after being fitted with a radiocollar. She denned successfully nearby and survived the winter and early spring with no known problems.

Orphaned grizzly cubs (*Ursus arctos horribilis*) are becoming more common because of the increasing interactions and confrontations between people and bears. Intensive oil and gas exploration, subdivisions in grizzly habitat, increased backcountry recreational use, logging, and similar activities will undoubtedly result in greater bear mortality in the future. Unfortunately, much of the mortality may involve females with cubs because of their aggressive nature in enounters with people. In instances of female mortality, young cubs either have to be destroyed or must be sent to zoos or other facilities, which constitutes mortality so far as the wild population is concerned. With the grizzly now listed as a threatened species south of Canada under the U.S. Endangered Species Act of 1973, and because of the uncertain status of the various populations, there is a need to limit such grizzly mortality.

Because of these concerns and the low reproductive potential of grizzlies (Craighead et al. 1974), the survival of orphaned cubs, especially females, is increasingly important (Stirling et al. 1976). Concepts and techniques for the reintroduction of orphaned cubs include:

(1) Immediate release of the cubs into suitable habitat. If orphaned late in the year, after they have acquired sufficient fat reserves and a familiarity with bear habitat, they may survive on their own. Erickson (1959) in Michigan and Payne (1975) in Newfoundland found that black bear cubs (*U. americanus*) were self-sufficient if orphaned after August. In Glacier National Park, 2 grizzly cubs orphaned in late autumn were known to have denned. One of these bears was observed the next year (Martinka, personal communication). Russell observed 3 grizzly cubs that survived in the wild after their mother was shot in Jasper National Park, Canada, on 4 July 1975. The 3 cubs seemed very dependent on each other for security and panicked when they became separated.

(2) Adoption of orphaned cubs by females that have cubs or that have recently lost cubs. Hornocker (1962), Erickson and Miller (1963), Bledsoe (1975), Vibe (1975), and Sumner and Craighead (personal communication) have documented the natural adoption of black, grizzly, and polar bear (*U. maritimus*) cubs in the wild. The cubs adopted by a female polar bear with 2 cubs of her own did not fare well, however, as 1 was found dead the next year and the other, wandering into a settlement, was in an emaciated condition (Vibe 1975).

We know of 2 attempts at planned adoption of orphaned cubs by free-ranging females. Lentfer (personal communication) successfully facilitated the adoption of an orphaned polar bear cub in northern Alaska. The female, which had 1 cub of her own, was immobilized and the orphan began nursing soon after being placed with her. Scents (body oils) of the orphaned cub, female, and natural cub were mixed together by hand to help prevent rejection of the new cub.

Hugie (personal communication), working on black bears in Baxter State Park, Maine, reported the possible adoption of 2 orphaned cubs by a female black bear with 2 cubs:

> The cubs were captured and held for several days. Park personnel found that another female with 2 cubs was utilizing a garbage dump near the area where the first female was killed. The 2 orphaned cubs were taken to the dump and released in the presence of the second female and her cubs. Later, a female with 4 cubs was observed in the same area.

A similar method designed for the adoption of grizzly cubs would involve keeping an inventory each year of the locations of female grizzlies with young, especially in areas where the females could be easily captured. Whenever orphaned cubs were obtained, immediate efforts would be made to capture a female with young, and to put the orphans with her. To ensure

adoption, the cubs should be allowed to nurse, possible by using Oxytocin to stimulate lactation (Bowes and Jonkel 1975), and the female should be injected with a tranquilizer before she recovers. Saturating the orphaned cubs with scent from the female and her natural cubs (i.e., urine, saliva, body oil) may also encourage the female to accept the orphans. Additional techniques include:

(a) Hold the group in confinement for a short period to increase the exposure of the foster mother to the orphans.

(b) Spray a strong deodorant directly onto the nose of the female and on the orphan cubs to help prevent rejection. This practice is common on commercial mink ranches, where it is desirable to raise orphaned litters. The technique has not been tried on bears, however.

(c) Place food near the release area to encourage the family group to remain together and build stronger ties, thus reducing competition between the cubs, and perhaps to hold the orphans at the site to give the investigator a second chance to reintroduce them to the wild should the adoption fail.

(3) Reintroduction of orphaned grizzly cubs to the wild after holding the cubs in captivity, feeding them for maximum weight gain, and releasing them during periods of food abundance or during the denning season. Greer (personal communication) has released orphaned black bear cubs in the Yellowstone Park area in this way, and Krott and Krott (1962) were able to release 0.8-year-old orphaned European brown bear cubs by taking them to suitable habitat and walking with them to various feeding and denning areas. At Churchill, Manitoba, polar bears of various ages have been released into the wild successfully (i.e., have been seen or recaptured in later years) after being held 3-4 months in captivity for physiological studies (Jonkel et al. 1976). Beecham has held 10 orphaned black bear cubs in captivity in Idaho and released them at various times of the year with total success. He considers fattening the cubs in captivity and releasing them during periods of food abundance to be key factors in successful reintroductions.

The University of Montana Border Grizzly Project (BGP) obtained 2 orphaned grizzly cubs on 31 July 1975, when a female was illegally killed near Ford Station, Montana, west of Glacier National Park. The remainder of this paper reports the techniques used to return 1 of these cubs to the wild.

METHODS

Care of Cubs in Captivity

Two orphaned cubs were captured alive by Montana Fish and Game Department personnel and were moved to the State Animal Shelter in Helena. They were approximately 6.5 months old when orphaned and were in good condition, although somewhat small for their age (approximately 9.0 and 13.5 kg).

The cubs were fed a mixture of evaporated milk and water during their first 3 weeks in captivity. As the milk ration was phased out, increasing amounts of fruit and dry dog food were supplied.

On 9 September 1975, the cubs were transferred to facilities at the University of Montana. The female cub was maintained at the University of Montana and was prepared for release into the wild. The cub was fed for maximum weight gain by providing all she would consume of fruit, vegetables, dry dog food, and evaporated milk. She was weighed at weekly intervals during this period of maximum weight gain (Table 1).

Table 1. Weights of a female grizzly bear cub taken weekly prior to feeding, 7 October-7 November 1975.

Date	Weight (kg)
7 October	38.1
14 October	43.5
21 October	46.3
28 October	48.5
4 November	48.1
7 November	50.8

The Den Site

An artificial den was constructed to increase the cub's chances of survival in the wild. The den site, selected on the basis of published descriptions of grizzly dens (Craighead and Craighead 1972, Pearson 1975), was located in the Shorty Creek area of the Whitefish Range, approximately 17 km from the site where the cub was orphaned. The den was dug under a large spruce (*Picea engelmannii*) so that the entrance was between the roots on the downhill side. The floor of the den consisted of gravel but was covered with leaves and straw before the cub was released. The form and dimensions of the den are shown in Fig. 1.

Vegetation in the den site area consisted of a mature spruce-fir *(Picea-Abies)* overstory that was previously logged for mature western larch *(Larix occidentalis)*. The den was at an elevation of 1,380 m on an east-facing slope about 5 m from the bottom of a steep draw. The slope of the hillside was approximately 30°.

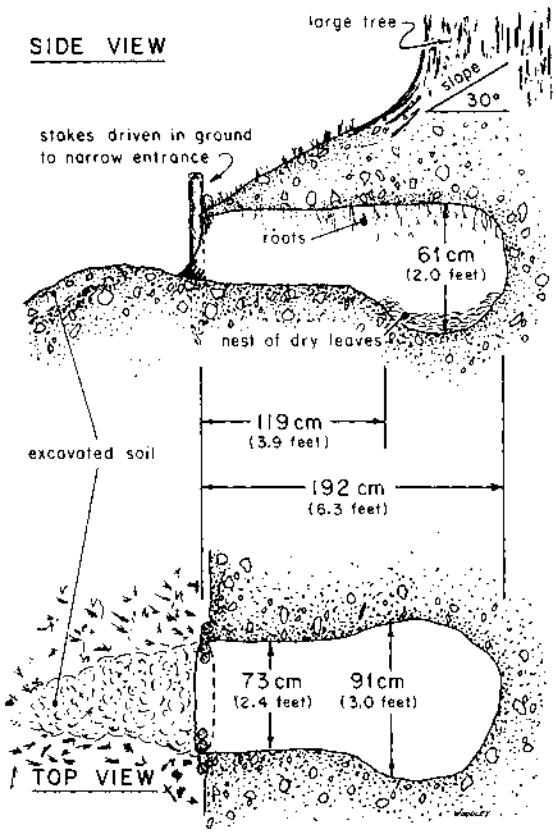

Fig. 1. Diagrammatic views of artificial grizzly den, Shorty Creek, 1975.

The cub was ear-tagged, fitted with a radiocollar, and transported to the site of release. Succinylcholine chloride and acepromazine were used as immobilizers. After release, her movements were monitored by radiotracking, visual sightings, and track observations.

RESULTS

Prerelease Preparation

During the period from 7 October through 7 November, when the cub was being fed for maximum weight gain, she gained 12.7 kg (Table 1), a gain of 0.41 kg/day, which is slightly less than the 0.635 kg/day gained by a free-ranging subadult female grizzly in the Yukon as reported by Pearson (1975). From 21 October through 7 November, the cub's food intake decreased, possibly due to physiological changes associated with the urge to den. She displayed signs of lethargy during this latter period and was often engaged in digging activities in the bedding of her cage.

Introduction to the Den

The cub was transported to the den on 11 November 1975. The temperature was −3.9 C and 15 cm of snow covered the ground. The cage in which she was transported was placed directly against the entrance to the den. Wooden stakes were driven into the ground on both sides of the den entrance to narrow it and to prevent the bear's escape as she moved into the den. The gate of the cage was opened at about 1500 hours, but the bear was reluctant to enter the den. After being coaxed with food and prodded unsuccessfully, the cub abruptly backed into the den 1.5 hours after the cage was opened.

The cage was removed once the cub was in the den and the den entrance was closed by placing more stakes across the tunnel. The animal was quiet in the den during this procedure. Although it was obvious that the cub could dig her way out through the stake barrier, we hoped that by confining her as long as possible in the den we could provide more time for adjustment to her new surroundings and thereby encourage her to stay in the den.

At 1700 hours, all personnel and equipment were withdrawn from the den area. A strong radio signal was received from the bear's transmitter at this time. At 2000 hours, we returned to the area and received a signal while standing approximately 40 m from the den. The cub had dug through the barricaded entrance but was still in the area of the den. In order to avoid scaring her from the den site, we again withdrew from the area.

The next morning, 12 November, the bear was standing above the den entrance at 0800 hours. Again that evening, a strong signal was detected from the den area and the cub was not in sight, indicating that she was probably in the den.

At 0800 hours on 13 November, we approached the den after receiving a strong radio signal. We observed the bear scraping leaves away from the den entrance. The cub saw us, walked downslope from the den, turned, and slowly approached us on an old skid road. The transmitter was gone from her neck. We left the area and returned in the early afternoon. The cub was nowhere in sight and the radiocollar was found inside the den. She had enlarged the den, making it wider and deeper. She had also dug 3 shallow excavations within 100 m and upslope of the original den. No good tracks could be found, but we left a box of fruit just above the den in hopes of keeping her in the area.

Some of the fruit had been eaten on 14 November, but heavy rain was now falling and her tracks were difficult to follow. On the evening of 15 November, the tracks of a grizzly cub coming from the release area

were found on the Shorty Creek road, approximately 3 km from the release site. We followed the tracks on 16 November to a ridgetop at an elevation of approximately 2,370 m, where they were lost in drifting snow. Attempts to relocate the tracks and the cub failed, and no tracks were seen again that winter on any trails or roads in the area.

The released cub was seen by BGP personnel and various other people on 10 different occasions in spring 1976, in an area approximately 8 km from the artificial den site. She appeared to be in good condition and was feeding extensively on roadside and sidehill vegetation.

DISCUSSION

It has been reported that the final move to the den site is initiated by heavy snowfall and subfreezing temperatures (Craighead and Craighead 1972), but a combination of environmental and individual factors are probably responsible (Pearson 1975). The absence of a heavy, permanent snow cover at the artificial den site and the disturbance of the young bear by field crews may have accounted for her failure to stay in the release area and utilize the den.

To improve future chances that a bear will stay in the release area, several improvements should be made in the release techniques. The bear should be released into the artificial den when a heavy, permanent snow cover is on the ground. Heavy snow will make travel difficult and may encourage the bear to remain in the den. The bear should be monitored by its radio signal without approaching the release site to within visual or auditory range. Disturbance at the den site after the release should be kept to a minimum to prevent the bear from being frightened from the area.

The technique of returning an orphaned cub to the wild by releasing it during the denning season seems to have promise. It has advantages over adoption attempts in that a female with cubs does not have to be found and captured, and the orphan can be released when it is ready to go, not when and if a female with cubs can be captured. A possible disadvantage is that cubs may habituate to people during the feeding period. It is hoped that future releases of this type will be attempted, employing the improvements suggested, and that further data will thereby become available.

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