

## FOSTERING BLACK BEAR CUBS IN THE WILD

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*Abstract:* Three black bear (*Ursus americanus*) cubs were abandoned, at approximately 2 weeks of age, on 4 February 1976, in New York State's Catskill region. The dens of 4 radio-telemetered adult female bears were located by the Department of Environmental Conservation during research on the black bear population in the Catskills. Two of the abandoned cubs were placed in the only maternity den existing among the 4 radio-telemetered female bears. The 6-week-old foster cubs were accepted by the adult female bear. The foster mother left the den in mid-April accompanied by 3 cubs. The family group was observed twice from radiotracking aircraft during the spring and summer of 1976.

Since 1970, the Department of Environmental Conservation has intensively investigated the population of black bears inhabiting the Catskill region of New York State. The research was prompted by a decline in the number of legally harvested bears during the preceding 20 years. A mark-and-recapture program and examination of all hunter-killed bears were the principal initial aspects of the study. Chief among the preliminary findings was the existence of 2 subpopulations (McCaffrey et al. 1976): a northern component distinct from a smaller southern component contiguous with a bear population in Pennsylvania.

Research continued in an effort to obtain additional information necessary for completion of a long-range management plan (Clarke 1976a). Attention was focused on the northern subpopulation (approximately 150 bears, summer 1976) occupying an area of about 2,250 km<sup>2</sup>. The northern range includes a major portion of the Catskill Forest Preserve (948 km<sup>2</sup>), an area of extensive unbroken northern hardwood forest with red spruce (*Picea rubens*) and balsam fir (*Abies balsamea*) at high elevations, dominated by the Catskill Mountain landform (Stout 1958).

Radiotelemetry was used in the northern Catskills to acquire data on bear habitat preferences, home ranges, and reproductive success. Five adult bears (4 females, 1 male) possessed active radiocollars during the winter of 1975-76. Plans to locate and inspect the dens of the 5 radio-telemetered bears were altered by a midwinter incident. On 4 February 1976, an adult female bear was displaced from her den by a dog whose owner was hunting varying hares (*Lepus americanus*). The adult female abandoned the 3 cubs she had with her in an exposed den, a shallow depression partially shielded by a pole-sized windfall (Clarke 1976b). The den was situated at an elevation of approximately 731 m on the upper southwest slope of High Point Mountain in Olive Township, Ulster County. The cubs were removed from the den on the day of abandonment. Our observations during the next 2 weeks failed to produce evi-

dence that the adult female had returned to the den. A decision was made to attempt fostering the cubs with 1 or more of the radio-telemetered adult females if they were found to possess cubs.

We wish to thank H. E. Doig, Director of the Division of Fish and Wildlife, and S. L. Free, Chief of the Bureau of Wildlife, for their support in the early decision to attempt fostering the cubs. Further acknowledgment is given to N. Clarke, N. O'Pezio, and A. Hackford, who assisted in care of the cubs; also to M. Kent for initial cub care. This work has been part of Catskill black bear research conducted under Federal Aid in Fish and Wildlife Restoration Project W-89-R, Job X-7.

### METHODS

Effort to locate and inspect the dens occupied by the 4 radio-telemetered female bears was accelerated upon commitment to attempt fostering the cubs. Severely restricted den openings prohibited our entry to determine the presence of cubs with the 4 adult female bears. Consequently we used a portable cassette tape recorder and a remote omnidirectional microphone for recording sounds within the dens. We hoped to discern the presence of cubs and judge their numbers by analysis of recorded vocalizations. Only 1 maternity den was found among the 4 dens examined.

The abandoned cubs, 1 female and 2 males, weighed 0.81 kg, 0.84 kg, and 0.89 kg, respectively, on 7 February, 2 days after the Big Game Project received them (Fig. 1). We estimated their age to be 2 weeks on the basis of close similarity to cubs aged by Poelker and Hartwell (1973). The cubs were immediately placed on a ration, presented for *ad libitum* consumption 4 times daily, of 1 chicken egg yolk and 15 ml honey mixed with 390 ml of Esbilac (a Borden Company enriched milk substitute).

On 27 February, the cubs were prepared for the fostering attempt. We decided not to place ear tags on the cubs because such marks might make the cubs appear



Fig. 1. Abandoned black bear cub at about 2 weeks of age, Catskill region, New York, 1976.

alien to the foster mother. A number was tattooed on the inner surface of each cub's upper lip; distinctive digits 2, 3, and 4 were given to the female and 2 males, respectively. The lip tattoos were considered permanent marks that would permit the bears to be identified if they were captured again or were taken by hunters.

We attempted to freeze-brand each cub for possible distant recognition upon emergence from the den. A livestock freeze-branding iron was used to place a mark on 1 of 3 readily observable sites: left shoulder, right thigh, or left thigh. The branding iron was equilibrated in a mixture of dry ice and denatured alcohol. The hair at each site was clipped close to the skin surface with surgical scissors. Branding iron application time for each cub was 12-15 seconds.

The cubs were transported to the den site on 4 March. We planned to attempt the fostering during a period of cold weather, anticipating an increased probability that the foster mother would be dormant. The den was situated on a south-facing slope in an area of hardwoods and extensive rock outcrops, at an elevation of about 975 m, approximately 3 km from the nearest road. Accumulated snow had been reduced to about 15 cm under forest cover. Sites lacking overhead cover had intermittent patches of exposed ground at upper elevations, grading to extensive areas free of snow at lower elevations. The den was a ground cavity between 2 layers of rock outcrop, with the entrance facing downhill. The interior of the den was approximately 1 m wide, 2 m deep, and 0.5 m high.

We carried the cubs to the den in a vented styrofoam container. We fed them their scheduled morning ration

later than usual, within 30 minutes of reaching the den, hoping to induce a quiescent state for their placement with the foster mother. The cubs were handled in their soiled cotton towel bedding, which had not been changed for several days, to eliminate direct human contact and thus to avoid leaving human scent on the cubs. We devised a tool for placing the cubs into the den, realizing that it would be impossible to approach the den from downhill without the risk of being seen by the dened female. The cubs had to be placed in the den from a position on top of the rock outcrop extending over the den entrance. The tool was constructed out of a metal pipe, a plastic pail, scraps of wood, bolts, and cord. Its function was to lower the cubs in the pail, mounted on the pole, to the den entrance and spill the cubs into the den through a pivoting action of the pail. We set up a time-lapse Kodak Analyst super 8 mm camera to monitor the den site and document spring emergence of the bears. A timer activated the camera from dawn to dusk exposing 1 frame of film about every 50 seconds.

## RESULTS.

Analysis of the cub vocalizations recorded at the 1 maternity den suggested the presence of only 1 cub. We decided to attempt fostering only 2 of the cubs, the female and the larger of the 2 males, rather than risk overtaxing the adult female's lactation capability if she really had more than 1 cub.

An average body weight gain of 1.44 kg was achieved by the 3 cubs over the 26 days preceding fostering on 4 March (Table 1). Male cub number 3

Table 1. Body weights (kg) of abandoned black bear cubs, Catskill region, New York, 1976.

Sex	Tattoo number	7 February (2 weeks old)	3 March (6 weeks old)	23 March (9 weeks old)
Female	2	0.81	2.47	-
Male	3	0.84	2.17	3.84
Male	4	0.89	2.21	-

was shipped via commercial aircraft to the West Virginia Department of Natural Resources at Elkins, where facilities existed for extended care of the bear, with possible contribution of management information. During the 46 days preceding shipment on 24 March, the cub gained 3.00 kg in body weight.

A predictable initial response was achieved with the freeze-branding. The skin had a white appearance upon withdrawal of the branding iron, followed by a slight

reddening and swelling over the ensuing 24 hours. A small scab formed and flaked off with the regrowth of hair at each brand site during the 6-day period after branding. We observed no white hair at the brand sites before the cubs were fostered, at 6 days postbranding, or when the remaining cub was shipped to West Virginia at 26 days postbranding. Reports received from personnel of the West Virginia Department of Natural Resources indicated that white hair never appeared at the branding site on cub number 3.

We attempted the fostering when the cubs were approximately 6 weeks of age. Although we fed the 2 cubs about 30 minutes before placing them in the den, they vocalized loudly when picked up and taken from the warm styrofoam container. We quickly put the cubs into the pail and lowered them to the den entrance. They crawled into the den, aided by the momentum of their exit from the cub-placing tool. Before introducing the cubs we had looked into the den, using a mirror attached to a pole; the adult female was asleep, facing the den entrance. After introducing the cubs, the adult female, apparently still asleep, was observed in a different position with her back toward the den entrance. The foster cubs had apparently crawled to the adult female and had begun nursing, judging by the suckling sounds emanating from the den during the hour we waited nearby. The only other sounds we heard were subdued cub vocalizations previously associated with nursing. We heard no sound suggesting distress.

The time-lapse camera recorded the emergence of the adult female from the den on 7 April. She was photographed over the next 2 days spending considerable time moving around immediately outside the den. Cubs were photographed outside the den for the first time on 14 April. The adult female and cubs were last photographed on 16 April. The family unit apparently left the den for the final time before dawn on 17 April. Despite observing individual cubs engaged in such activity as climbing small trees immediately outside the den, we were not able to distinguish more than 2 cubs at any 1 time in the film.

On 2 occasions during the spring and summer of 1976, the adult female and 3 cubs were observed from our radiotracking aircraft. During this period, the adult

female's home range covered about 50.7 km<sup>2</sup> and included the area of the preceding winter's den. The adult female had selected her winter den site for 1976-77 by 6 December, approximately 2.5 km from her previous den. We observed the adult female with an undetermined number of yearlings in the den during that winter. We planned to immobilize the adult female and the yearlings during late winter in an effort to collect physical data, change the adult female's radiocollar, and examine the yearlings for lip tattoos to ascertain the ultimate degree of fostering success.

## DISCUSSION

This case of cub abandonment may be viewed as the documented loss of 3 individuals from the Catskill bear population to a cause of mortality other than legal hunting. Previously reported estimates that legal hunting represents 90 percent of all Catskill bear mortality (McCaffrey et al. 1976) still appear valid. Death is the expected consequence of abandoning young preweaned cubs in winter dens. In this case we counteracted, in part, the imminent population loss, at least initially, of the cubs by placing 2 of them with a nursing foster mother in a den in the wild, to our knowledge the first reported such attempt involving the black bear.

Human developmental encroachments upon black bear habitat may present serious problems for the integrity of relatively small populations of black bears and their ranges. Increasing human activities in winter in some areas may adversely affect reproductive success of black bears. Adult female black bears selecting exposed surface dens appear to be most vulnerable to disturbance. In the Catskills we have observed most dens to be ground cavities, which apparently afford the occupants maximum protection from intrusion.

Fostering young abandoned or orphaned black bear cubs with wild adult female black bears appears to be a feasible technique. Its management application is obviously limited; wildlife managers must have knowledge of the locations of occupied black bear maternity dens. During black bear investigations employing radiotelemetry, there is an opportunity, although usually short-term, to apply this technique if precipitating circumstances arise.

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