

AIDING THE WILD SURVIVAL OF ORPHANED BEAR CUBS

Lynn L. Rogers

USDA—Forest Service North Central Forest Experiment Station 1992 Folwell
Avenue St. Paul, MN 55108

ABSTRACT

Reliable methods for aiding the wild survival of abandoned or orphaned bear cubs are needed for use with threatened and endangered species and for use with black bears (*Ursus americanus*) in areas where populations are low. Methods used in northeastern Minnesota and other areas are reported or reviewed. Options include: (1) returning abandoned cubs to their mothers, (2) introducing orphaned cubs to wild foster mothers, (3) leaving orphans alone that have reached the age of self-sufficiency or transporting them to more favorable areas, and (4) raising orphans for release at the age of self-sufficiency. Mothers with cubs will readily accept strange cubs in their dens and, under some conditions, at other times of the year. Foster mothers may need to have supplemental food placed in their territories if they are to raise adopted cubs, especially if adoptions enlarge litters to more than 3 cubs. Although black bear cubs normally remain with their mothers for 17 months, they are commonly self-sufficient at 5 months of age (by July), and they instinctively construct dens in fall. Cubs raised in captivity and released at 5 months to 6 years of age have reportedly shown good survival with few instances of nuisance problems. Most of these releases were in remote areas of Idaho and Michigan.

INTRODUCTION

Methods for aiding the wild survival of orphaned cubs have been tested mainly on black bears (Krott and Krott 1962; Vibe 1975; Clarke et al. 1980; Jonkel et al. 1980; Alt 1984; Alt and Beecham 1984; Cowan 1972) but are also intended for use with threatened and endangered species of bears around the world. Grizzly bear (*Ursus arctos horribilus*) orphans are becoming more common through increasing confrontations between people and bears (Jonkel et al. 1980). Subdivision of grizzly habitat and increased use of backcountry for recreation, logging, and other human uses are contributing to the problem (Jonkel et al. 1980). Similar problems are occurring in black bear habitat, particularly in parts of the eastern United States (Maehr 1984; Brady and Maehr 1985). All bear species have low reproductive rates. Where populations are low, survival of orphaned cubs, particularly females, can be important to the viability of populations. However, orphaned cubs are commonly shot or placed in zoos because of widespread belief that they cannot survive in the wild (Jonkel et al. 1980; Rogers, unpubl. data).

In this paper I present information on natural survival of orphaned cubs in northeastern Minnesota, report methods of aiding the wild survival of orphaned cubs there, and review information on these subjects from other regions and with other species of bears. Options for aiding the wild survival of abandoned or orphaned cubs include: (1) returning abandoned cubs to their mothers, (2) introducing abandoned or orphaned cubs to foster mothers, (3) leaving them alone or transporting them to more favorable areas, and (4) raising them in captivity for release when they reach self-sufficiency at > 5 months of age. The option to use a given case depends, among other things, on time of year, condition of the cub, and characteristics of the location.

RETURNING ABANDONED CUBS TO THEIR MOTHERS

Black bear cubs are usually born in January (Rogers 1976; Alt 1983), and families typically emerge in late March or April (Johnson and Pelton 1980; Rogers 1985). Cubs are commonly abandoned when mothers are disturbed from natal dens or when dens are destroyed by logging or construction operations. Mothers disturbed from dens only rarely return for their cubs (Erickson and Martin 1960). Radio-collared bears disturbed from dens usually move less than 3.6 km to old dens or to bedding sites (Erickson and Martin 1960; Poelker and Hartwell 1973; Rogers, unpubl. data). In snowy regions, disturbed bears can be tracked to their new locations. If cubs have been abandoned, they should be kept warm while the mother is tracked. If the new location is a den, the cubs can be tossed gently in or placed near the entrance where the mother can retrieve them. A mother in Pennsylvania emerged from a den and retrieved a crying cub 10 m away (Alt and Beecham 1984). Bears that move to bedding locations, rather than to old dens, usually retreat when approached, and probably could not be presented with cubs. Options 2 and 4 would be alternatives in these cases.

Cubs may also be abandoned in late spring and early summer when newly emerged families begin increasing their foraging areas (Grenoble 1984). Cubs are especially likely to climb trees to escape danger during this period. Black bear mothers usually run away, rather than defend their cubs against people, and return later (Rogers 1977). Well-meaning people often capture the treed cubs, believing them to be abandoned (Grenoble 1984). Where possible, these cubs should be returned to the capture site within a day for possible reuniting with their mother. In Minnesota, a cub of a radio-collared mother was captured and transported from a mother's territory on 8 August and was returned to the capture site a day later. The cub and mother reunited and were found together in a den in fall.

INTRODUCING ORPHANED CUBS TO WILD FOSTER MOTHERS

Cubs that are orphaned or abandoned before bears emerge from dens may be considered for adoption if locations of lactating mothers are known. Mothers in dens with newborn cubs will usually accept strange cubs (Alt and Beecham 1984; Alt 1984). For example, in northeastern Minnesota, on 11 April 1978, two female orphans approximately 11 weeks old were gently tossed into the dens of radio-collared females that had cubs of their own. The orphans had been fed by various people for a week before the introduction, and one of the cubs initially ran back to the researcher and was tossed in a second time. Both cubs eventually touched noses with their foster mothers and then crawled underneath them. All members of both families survived for at least 2.5 years, and the orphans were each radio-tracked for 5 years. The orphans fully integrated into their new families. Their growth was comparable to that of their new littermates, and their movements after family breakup were similar to those of natural daughters; both established adult territories adjacent to their foster mothers'. Neither visited areas of human habitation or otherwise engaged in nuisance activities.

In Pennsylvania, Idaho, Maine and New York, 30 orphaned cubs were introduced to undrugged lactating mothers in dens (Clarke et al. 1980; Alt and Beecham 1984). Twenty-eight (93%) of them were adopted, one was killed, and the other rejected the mother and died within a day. The latter cub was one of three that had been fed by people for several weeks (Clarke et al. 1980; Alt and Beecham 1984). Of six orphans that were placed in dens with drugged mothers, only two were adopted (Alt and Beecham 1984).

Adoption attempts become more difficult after bears leave their dens and begin to roam. Mothers then discriminate by smell between their own and other progeny (Alt 1984). In northeastern Minnesota, a mother that was bedded with her three cubs near their den accepted an orphan on 11 April. She moved away when researchers approached and placed the orphan among the other cubs in her bed. She was seen with all four cubs on 15 May, indicating that the orphan was accepted. By contrast, mothers in Pennsylvania killed or abandoned 8 of 11 orphaned cubs that were presented to them between 26 April and 4 June, after the mothers had begun roaming (Alt 1984). At least twice, the intended foster mothers ran to orphans, smelled them, and killed them (Alt 1984).

Alt (1984) then tested methods for reducing aggression toward orphans. In two tests of the first method, black bear families were treed, orphans were released into the trees, and the mothers were kept from the cubs for 2 to 7 hours. The orphans were accepted. In three tests of the second method, mothers were drugged, Vicks Vapo Rub was placed in their nostrils, and orphans were introduced to the sleeping mothers. The orphans again were accepted. More recently, Alt (pers. commun.) found that simply rubbing Vicks Vapo Rub on orphans before introducing them inhibited aggression by foster mothers.

Not all mothers can raise extra cubs. Although a mother that supplemented her diet with garbage raised six cubs, including two orphans, in Pennsylvania (Alt and Beecham 1984), food supplies in many areas are not sufficient to support enlarged litters. In Alaska, a brown bear mother (*Ursus arctos gyas*) with three natural cubs plus two adopted ones lost all five by the next year (Erickson and Miller 1963).

In northeastern Minnesota, cub survival commonly declines with increasing litter size even in natural litters (Rogers 1976). Adding the orphans to the litters of one, two, and three caused a noticeable decline in growth or survival in the two largest litters. When the mothers and young were weighed in dens in late winter, 10 to 11 months after the adoptions, the orphan and natural progeny weighed 12.7 and 10.5 kg, respectively, in the litter of two; 8.2, 8.2 and 6.0 kg in the litter of three; and 9.1, 7.0, and 5.0 kg in the litter of four. In the latter litter, one member had died by the time of the weighing; the other three in that litter starved shortly after emerging, by 2 May, at distances of 20, 500, and 2400 m from the den. Whether or not the orphaned cub was among the last three in that litter is uncertain because they all lost their ear tags. In the two smaller litters, weights were usually light. The yearlings from the litter of three were the lightest weight yearlings to survive of 38 studied in northeastern Minnesota (30 reported by Rogers (1983) plus the 8 reported here). Two of them were lighter than yearlings that died in the litter of four.

Ear tag loss in the three litters was 75% (12 of 16 tags lost), compared with only 2.6% (2 of 77 tags lost) in earlier years (difference significant, $P < 0.0001$, $X^2 = 54$). One possible explanation for the unusual high loss in the enlarged litters is that there may have been an unusual amount of fighting over nipples and food due to possible disruption of social hierarchies among the natural cubs. Such disruption would probably be exacerbated by the observed malnutrition.

The poor growth and survival in enlarged litters in northeastern Minnesota contrasts with the high survival in the family with six cubs that ate supplemental garbage in Pennsylvania (Alt and Beecham 1984). Providing supplemental food in territories of foster mothers in suboptimal habitats probably would increase the reliability of adoption as a method for aiding the wild survival of orphaned cubs. Providing supplemental food that would not subsequently be associated with people should be considered when adoption is used with threatened or endangered species or in areas where survival of orphans is important to the viability of low populations. An alternative is replacing male cubs with female cubs (C. Jonkel and G. Alt, pers. commun.).

Experiments are being devised to test the feasibility of adoptions of grizzly bear cubs by black bear mothers (C. Jonkel, pers. commun.).

SELF-SUFFICIENCY OF ORPHANED CUBS

Black bear mothers normally keep their cubs for approximately 17 months (Rogers 1985). They nurse them into summer and, in some cases, again the following spring (Rogers 1985). Mothers protect their cubs, open insect-ridden logs for them, and lead them to distant feeding locations which the cubs sometimes revisit as adults (Rogers 1985). Mothers construct dens in fall and share their warmth in winter (Rogers 1985). They tolerate their independent offsprings in the maternal territory, are differently aggressive to nonkin, and thereby aid their maturing daughters in establishing adjacent territories (Rogers 1985).

Despite the benefits normally obtained from mothers, cubs orphaned in their first summer showed high survival in Alaska (Johnson and LeRoux 1973), northern Michigan (Erickson 1959), Newfoundland (Payne 1975), and northeastern Minnesota (see below). In Alaska, a grizzly cub that was orphaned on 23 August and transported to an unfamiliar area was recovered the following year (Johnson and LeRoux 1973). In northern Michigan, Erickson (1959) released 20 orphan cubs in unfamiliar remote areas between 15 July and 29 September. Many of them had been caught accidentally by coyote bounty trappers and were injured; five had amputated feet, one had a fractured jaw, and two had lacerated feet. They varied in weight from 8 to 37 kg (average 14 kg) at the time of release. Seven of the 20, including two of the five with amputated feet (one of which weighed only 8 kg at release), were later shot or recaptured, showing that they had survived as orphans. The percentage recovered did not differ significantly from that of 12 non-orphaned cubs that were released with their mothers as controls; four of those were recovered. However, of the seven orphans that were recovered, six were recovered later in the same year, so a question remained concerning overwinter survival.

To learn overwinter survival rates, we gave radio collars to 14 orphaned cubs more than 7 months old in northeastern Minnesota. Of these, two cubs soon were shot, two were killed by trains, and one died of unknown causes, reducing the sample for overwinter studies to nine. All nine made dens, showing that den construction is instinctive for cubs even though their mothers normally would make dens for them. All nine survived until spring. One was killed in spring leaving eight for continued study. Of these, at least seven survived past the time they normally would leave their mothers. The radio-collar of the eighth was removed (see below).

However, a confounding factor in the high survival is that 11 of the 14 orphans had access to supplemental food. These were orphaned because their mothers were shot as nuisances, and the human food sources used by the mothers were available to the cubs. As a result, many of them grew more rapidly than cubs with mothers.

The two that grew most rapidly ate their mother's carcass in late June and then supplemented their diets with garbage. These weighed 13.2 and 17.3 kg on 23 August and weighed 17.3 and 23.6 kg when they were killed by a train on 23 September of the same year.

Two orphans without supplemental food weighed 14.7 and 17.5 kg when their mother was killed on 10 August. Both survived past 3 years of age. A third without supplemental food weighed 13.2 kg when he was orphaned on 20 September. He survived at least until the following 17 April when he weighed 7.7 kg. His radio-collar was removed at that time. His survival is doubtful because his weight was within the range where there is high mortality. Nine of 12 other yearlings that weighed less than 10 kg in spring died (Rogers 1983, and this paper). Altogether the data for orphaned cubs indicate that survival after July (approximately 6 months of age) is determined by more by food supply than by the presence of the mother.

Two orphans that ate supplemental garbage were radio-tracked to maturity. Both were females, and both took over their dead mothers' territories. However, one of them used only a small portion of her mother's territory until a neighboring female that had taken over most of it was killed (Rogers 1985). The two orphans produced their first litters at 4 and 5 years of age, as is normal for females that supplement their diets with garbage in northeastern Minnesota (Rogers 1985).

RAISING ORPHANS FOR LATER RELEASE

Bears of several species have been raised in captivity and released at various ages over 5 months (Erickson 1959; Krott and Krott 1962; Jonkel et al. 1980; Alt and Beecham 1984). Erickson (1959) released two cubs, 5.3 and 6.5 months of age, on islands where fruit-producing plants were scarce. The two survived past 17 months of age despite a lack of previous experience in foraging for food. Alt and Beecham (1984) released 23 cubs, 14 yearlings, and 2 six-year-old bears that had been in captivity most of their lives. The releases were mainly in remote areas of Idaho (Alt, pers. commun.). Fifteen of the releases were termed successful by the authors because the bears were recovered in good condition in non-nuisance situations after at least 30 days (Alt and Beecham 1984). Twenty releases were of unknown success because the bears were not subsequently found. Four releases were unsuccessful; one cub died, and three cubs became nuisances within 4 days after release. The three had become tame to people and had been released within 3 km of developed areas to which they soon moved. The authors recommended minimizing human contact with captive bears or releasing them in remote areas if they nevertheless became tame. A grizzly cub released in November after being raised in captivity for approximately 15 weeks was seen the next spring (Jonkel et al. 1980).

CONCLUSIONS

Black bear mothers in dens will usually accept strange cubs, and mothers out-

side dens can be induced to accept them. Mothers have raised litters of up to six cubs where food is abundant (Alt and Beecham 1984); but where food is less abundant, supplemental food may have to be provided in foster mothers' territories if enlarged litters are to survive. Black bear cubs without mothers have demonstrated self-sufficiency at 5 months of age where food was sufficient (Erickson 1959; Alt and Beecham 1984). Orphans instinctively construct dens in fall even though their mothers would normally do this. Orphans raised to self-sufficiency with a minimum of human contact have caused few nuisance problems when released in remote areas (Alt and Beecham 1984).

ACKNOWLEDGMENTS

I thank L. Medved, S. Burch, and R. Field for field assistance and thank G. Alt, P. Beaver, J. Fitzpatrick, C. Jonkel, M. Nelson, and J. Sweeney for helpful suggestions on the manuscript.

LITERATURE CITED

- Alt, G.L. 1983. Timing of parturition of black bears (*Ursus americanus*) in northeastern Pennsylvania. *J. Mamm.* 64:305-307.
- . 1984. Cub adoption in the black bear. *J. Mamm.* 65:511-512.
- Alt, G.L. and J.J. Beecham. 1984. Reintroduction of orphaned black bear cubs into the wild. *Wildl. Soc. Bull.* 12:169-174.
- Brady, J.R., and D.S. Maehr. 1985. Black bear distribution in Florida. *Ha. Field-Nat.* 13:(in press).
- Clarke, S.H., J. O'Pezio, and C. Hackford. 1980. Fostering black bear cubs in the wild. *Intl. Conf. Bear Biol. and Manage.* 3:163-166.
- Cowan, I.M. 1972. The status and conservation of bears (Ursidae) of the world—1970. Pages 343-367 in S. Herrero, ed. *Bears—their biology and management*. IUCN new series no. 23. Morges, Switzerland.
- Erickson, A.W. 1959. The age of self-sufficiency in the black bear. *J. Wildl. Manage.* 23:401-405.
- Erickson, A.W., and P. Martin. 1960. Black bear carries cubs from den. *J. Mamm.* 41:408.
- Erickson, A.W., and L.H. Miller, 1963. Cub adoption in the brown bear. *J. Mamm.* 44:584-585.
- Grenoble, S. 1984. A barn full of bears. *Am. Forests* 90(12):24-28, 61-62.
- Johnson, K.G., and M.R. Pelton. 1980. Environmental relationships and the denning period of black bears in Tennessee. *J. Mamm.* 61:653-660.
- Johnson, L.J., and P. LeRoux. 1973. Age of self-sufficiency in brown/grizzly bear in Alaska. *J. Wildl. Manage.* 37:122-123.
- Jonkel, C., P. Husby, R. Russell, and J. Beecham. 1980. The reintroduction of orphaned grizzly bear cubs into the wild. *Intl. Conf. Bear Biol. and Manage.* 3:163-166

- Krott, P., and G. Krott. 1962. Zum Verhalten des braunbaren (*Ursus arctos* L. 1778) in den Alpen. *Z. Tierpsychol.* 20:160-206.
- Maehr, D.S. 1984. Distribution of black bears in eastern North America. *Proc. East. Workshop Black Bear Manage, and Res.* 7:(In press).
- Payne, N.F. 1975. Unusual movements of Newfoundland black bears. *J. Wildl. Manage.* 29:812-813.
- Poelker, R.J., and H.D. Hartwell. 1973. Black bear of Washington, Washington State Game Dept. *Biol. Bull. No. 14.* 180 pp.
- Rogers, L.L. 1976. Effects of mast and berry crop failures on survival, growth and reproductive success of black bears. *Trans N. Am. Wildl. Nat. Resources Conf.* 41-431-438.
- . 1977. The ubiquitous American black bear. Pages 28-33 in Wm. H. Nesbitt and J.S. Parker, eds. *North American Big Game.* Boone and Crockett Club and National Rifle Association of America. Washington, D.C.
- . 1983. Effects of food supply, predation, cannibalism, parasites, and other health problems on black bear populations. Pages 194-211 in F. Bunnell, D.S. Eastman and J.M. Peek, eds. *Symposium on Natural Regulation of Wildlife Populations.* Forest, Wildlife, and Range Experiment Station Proceedings 14. University of Idaho Moscow. 225 pp.
- . 1985. Effects of food supply on social behavior, movements, and population growth of black bears in northeastern Minnesota. *Wildl. Monogr.* (In press).
- Vibe, C. 1975. Preliminary report on the 2nd Danish polar bear expedition to northeast Greenland, 1974. (Unpubl.) 8 pp.

Wildlife Rehabilitation

Volume 4

Proceedings of
the 4th Annual Symposium of
the National Wildlife Rehabilitators' Association
Held at the Radisson Hotel, St. Paul, Minnesota
March 21-24, 1985
Sponsored by the Carpenter
St. Croix Valley Nature Center

Edited by Paul Beaver, Ph.D.
Science Museum, Springfield, MA and
Quabaug Bird Sanctuary, Ware, MA

Published on behalf of NWRA
by Daniel James Mackey