

HOMING BY BLACK BEARS AND OTHER LARGE MAMMALS

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

Translocated individuals of the following species have returned home from up to the indicated distances: white-tailed deer (*Odocoileus virginianus*), 560 km (Halm 1945); polar bear (*Ursus maritimus*), 480 km (Stirling et al. 1977); timber wolf (*Canis lupus*), 282 km (Henshaw and Stephenson 1974); grizzly bear (*Ursus arctos*), 258 km (Miller and Ballard 1982); black bear (*Ursus americanus*), 229 km (Harger 1970); house cat, 217 km (Carthy 1956); red fox (*Vulpes vulpes*), 56 km (Phillips and Mech 1970); and mule deer (*Odocoileus hemionus*), 50 km (Eberhardt and Pickens 1979). Many of these feats are difficult to explain by random-scatter or familiar-area hypotheses. It seems likely that some individuals of these species can orient homeward from unfamiliar areas.

For black bears, data are now sufficient to determine that random-scatter or familiarity with the release area are not the primary means by which homing is accomplished. A review of translocations in 10 states and provinces (Rogers, in preparation a) shows a statistically significant tendency for black bears to orient homeward after release, regardless of translocation distance, corroborating findings by Harger (1970). At translocation distances of 64 to 120 km, 36 (65%) of 55 bears were recovered within 22.5° of the homeward direction. At translocation distances of 120 to 271 km, 16 (73%) of 22 moved at least 35 km toward home. However, the percentage of bears that returned the full distance home declined markedly as translocation distance increased. At translocation distances less than 64 km, 81 (79%) of 102 returned, but only 27

(49%) of 55 returned from 64 to 120 km, and only 6 (27%) of 22 returned from 120 to 271 km.

In national parks with diligent programs for translocating nuisance bears, there also was a decline in homing success with increasing distance (Beeman and Pelton 1976, Harms 1976, Singer and Bratton 1980, Cella and Keay 1980, Rogers, in preparation b), but the percentages of bears returning home were lower and the translocation distances were generally shorter than in other areas. For example, in Yosemite National Park, only 23 (35%) of 65 bears returned from 13 to 29 km, 3 of 14 returned from 29 to 37 km, and 7 (15%) of 46 returned from 37 to 48 km (Harms 1976). There are several possible explanations for this lower homing success in national parks. One possibility is that a high proportion of the bears were not residents of the areas from which they were removed. Where there is a diligent program of capture and removal of nuisance bears, i.e. the national parks, there is unlikely to be many resident bears in the vicinity of common nuisance sites.

In conclusion, there is evidence that many black bears and some individuals of other species of large mammals are somehow able to orient homeward from unfamiliar areas. The mechanisms for this navigation are unknown for these animals. The ability of black bears to carry long-life radio-transmitters makes them good subjects for experiments to determine homing mechanisms. I thank R. R. Buech, L. D. Mech, and C. Walcott for reviewing the manuscript.

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