

SOCIAL RELATIONSHIPS, MOVEMENTS, AND POPULATION DYNAMICS OF BLACK BEARS IN NORTHEASTERN MINNESOTA

Order No. 7809733

ROGERS, Lynn Leroy, Ph.D. University of Minnesota, 1977. 203pp.

Social relationships, movements, and population dynamics of black bears were studied in northeastern Minnesota during 1969-1977. One hundred and six bears were fitted with radio-collars and some of them were radio-tracked nearly throughout the 9 years of study. The 106 bears included most residents of the 300 km² study area. Observed behavior of bears accorded with predictions of kinship theory in that behavior differentially enabled close kin to compete for food and space despite solitary living habits. Mature females held territories averaging 9.6 ± 0.5 km² (N=50) in size. Mature males used much larger areas that included the territories of 7-15 females. Ranges of males were not defended as territories and overlapped to the extent that no male had exclusive access to any female. After the mating season, males usually were found between rather than in female territories. In late summer and early fall, both males and females often left their usual ranges to exploit distant sources of seasonally abundant food. During that time, some males and females ranged as far as 201 and 92 km, respectively, outside their usual ranges. All returned for denning. Mature bears reused approximately the same ranges each year for denning and mating. Young were born in dens in late January and remained with their mothers for 16-17 months, usually separating in June of their second year. Newly independent yearlings established small ranges within the territories of their mothers. Mothers usually avoided the ranges of their offspring and shifted their territories away as their young matured and required more space. Males dispersed as 2- or 3-year-olds, moving up to 224 km or more away from their birthplaces. By dispersing, males reduced both inbreeding and competition among kin. By contrast, females usually established territories near their birthplaces, expanding the ranges that they established as yearlings. Dispersal by males from their birthplaces appeared to be voluntary and not prompted by aggressive interactions. However, social pressure from adult males with permanent ranges did appear to deter dispersing males from settling. By reducing immigration, adult males reduced the competition for food faced by their offspring; in that way, adult males probably increased the survival and growth rates of those offspring. Although bears were solitary where food was dispersed, they integrated into hierarchies where food was clumped as at garbage dumps. This plasticity of social relationships and the fact that mothers accommodated their young within their territories suggest that social factors were of relatively little importance in limiting numbers on a population-wide scale. Conversely, social order may increase the efficiency of feeding for most bears, thereby permitting higher population densities than otherwise would be possible. Population density

appeared to be limited instead by scarce food and human-related mortality. Undernourished females failed to reproduce until as late as 8 years of age, and during a 3-year period of scarce food (1974-1976), intervals between litters became as long as 4 years. Following years of scarce food, lean females either produced no cubs or produced cubs that experienced high mortality. During the 3-year period of scarce food, mortality among cubs rose to 50 percent and mortality among yearlings reached 75 percent. Eighty-eight percent of the cubs born during the third consecutive year of scarce food (1976) died before reaching 1.5 years of age. Older bears were less prone to nutrition-related mortality and usually died from human-related causes. Ninety percent were shot. Others were killed by cars, trains, and electrical powerlines. One family was killed by timber wolves. The resident population of the 300 km² study area remained at approximately one bear per 4.5 km (1.7 mi²) during 1972-1975 but declined 28 percent to approximately one bear per 6.3 km² (2.4 mi²) by June 1977 following the 3 years of scarce food.

The complete dissertation is on file in the Natural History Library (Bell Museum) and in the Biomedical Library (Dishell Hall)

Reprinted from
DISSERTATION ABSTRACTS INTERNATIONAL
 Volume XXXIX, Number 1, 1978

UNIVERSITY MICROFILMS INTERNATIONAL
 Dissertation & Masters Theses Demand Copies Price List

	MICROFORM		XEROGRAPHIC	
	U.S./Canada	Elsewhere	U.S./Canada	Elsewhere
Academic*	8.25	12.00	16.50	24.00
Other	11.00	12.00	22.00	24.00

Library binding: Add \$5.00 per volume.

Ordering and Shipping Information

To expedite orders of masters theses and doctoral dissertations:

1. Order by publication number and author's name and specify kind of copy (microfilm, microfiche or xerographic) wanted.
2. Send your order to University Microfilms International, Dissertation Copies, Post Office Box 1764, Ann Arbor, Michigan 48106.

Individuals must send check or money order with their orders. Institutions will be billed when their orders are shipped; they should order on their standard purchase order form, being sure to include the purchase order number and tax exemption number if applicable.

*Academic prices apply to all universities, colleges, and high schools.
 This includes their libraries, departments, faculty, staff and students.