



All Photos by the Author

BLACK BEAR

OF MINNESOTA

BY LYNN ROGERS¹

THE FIRST BLACK BEAR STUDY to be undertaken in Minnesota was begun in June of 1969. It is a three year study being conducted by the author for the purpose of obtaining information that will aid in the management of the state's bear population. Field efforts are being directed toward learning as much as possible about bears' habits, numbers, mortality, breeding, and hibernation.

METHODS

In 1969, 53 bears were live-captured by means of foot snares in a 230 square mile area located in Lake County just south of the Boundary Waters Canoe Area. The purpose of these captures was to determine, among other things, the sex ratio and age structure of the bear population within that area. In order to compare bears living in "wild" areas with those

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that frequent large dumps along the north shore of Lake Superior, 31 additional captures were made in the dumps. Each bear that was captured was administered a tranquilizer and an anesthetic so that it could be ear-tagged, weighed, and measured. The measurements indicated the approximate age of each bear and whether or not it was mature.

To accurately determine age, a first lower premolar was extracted from each anesthetized bear. This tooth, which is smaller than any human tooth, shows annual rings which can be counted under a microscope after the tooth has been chemically softened, sliced, and stained. By learning the ages of a large number of bears, the average age of the population and the mortality rate for each age-class is revealed. Previous work by the author in Michigan showed that the loss of the first lower premolar does not hamper bears' feeding even on the day of the extraction.

A blood sample was also taken from each bear in order to determine the animal's general health, nutritional status, and blood parasite load. Information obtained from the blood samples may give clues to some of the causes of natural mortality; and by comparing blood taken in summer with that taken in winter, certain physiological changes which occur with denning may be determined.

Recaptures of tagged individuals provided information on growth rates, seasonal weight changes, and

movements. In order to gain additional information on movements and to obtain data on habitat use, nine bears were fitted with collars containing small radio transmitters late in the summer of 1969. The battery life of the radios varied from one month to a year, and each radio was made to broadcast on a different frequency to facilitate individual recognition. The collars were made to fit quite loosely to allow for fat accumulation and in hopes that the bears would become accustomed to them quickly. They appeared to accept the radio collars quite readily as evidenced by the lack of claw marks on recovered collars, so the movements of radioed animals were assumed to be unaltered by these one pound packages.

In 1970, radio telemetry became the major emphasis of the project. Trapping then was concentrated in an area of only 47 square miles in order to place radios on bears living within a small area; thus, information regarding interaction between individuals could be obtained.

In the course of the summer, forty-nine individual bears were found within the trapping area, and 36 of them received radios. The remaining 13 were cubs. Twelve bears' radios transmitted long enough to permit locating the animals in their dens. These 12 individuals can be particularly valuable because they can give some indication of the percentage of the population that dies during the winter denning period and because those that survive the denning period

SNARE SET AT DEN ENTRANCE



can be re-radioed just before they leave their dens in the spring. Movement data obtained from these animals in two or more consecutive years can suggest how bears' activities vary with differences in food availability, maturity, and breeding condition.

Yearling cubs which have accompanied radioed sows to their dens also can be radio-collared. By following them after they leave their mothers in the spring, the distance that young bears travel to find areas of their own in which to settle down may be learned.

Knowledge of the movements of several bears in the same area reveals, among other things, the size of the area used by the average bear and the extent to which this area is shared with other bears. This type of information is very helpful in estimating the number of bears per square mile, a piece of information that is very important in a good management program.

FOOD STUDIES

One hundred and forty fecal droppings were collected and analyzed in 1970 to learn which were the important foods and how bears' diets varied with the seasons. Ants, grass, and other green vegetation were the important foods in spring but were largely forsaken for strawberries when the latter began to ripen. Blueberries were extraordinarily abundant in 1970 and remained a major food item from mid-July until early September. However, during a 2½ week period in early August, wild sarsaparilla berries replaced blueberries as the number one food item even though blueberries reached their peak during that period. Mountain ash berries were consumed in quantity in September, October, and November and were gen-

erally the last major food to be eaten before denning.

Numerous other foods, such as raspberries, red osier dogwood berries, juneberries, cherries, and garbage, were utilized to a lesser extent throughout the summer. The juneberry and cherry crops largely failed on the study area in 1970, so these species were probably utilized to a lesser extent than usual.

A dropping containing deer hair and another containing beaver hair were found. Although it is possible that bears killed these animals, it is much more likely that bears chanced upon the carcasses of animals killed by wolves.

DATA FROM CAPTURED BEARS

Weights of 89 bears 1½ years or older ranged from 70 to 421 pounds and averaged 153 pounds. Adult males were usually heavier than adult females. Weights increased throughout the summer and fall as bears added fat for winter sustenance; and by the time of denning, some individuals had added more than 60% to their early summer weight.

The sex ratio of mature bears caught in "wild" areas was slightly unbalanced toward females, while the sex ratio of mature bears caught in large dumps along the north shore of Lake Superior was heavily unbalanced toward males. Generally the larger the congregation of bears at a dump, the greater was the proportion of males. Large congregations of bears in dumps usually did not occur until after mid-July when bears' breeding season (late May to mid-July) had largely ended.

Certain irregularities in the 1969 population sample may have been due to poor natural bear food in 1968. The District Forest Ranger, the Game Warden, and

BLACK BEAR IN DEN





FAMILY LOAFING IN THE SUN

local berry pickers all report that natural bear foods were extremely scarce in 1968 and that bears made numerous raids on garbage cans and dumps that year. In 1969, yearling bears were almost nonexistent, suggesting that cubs born in 1968 had not survived; two-year-olds captured in 1969 were still the size of yearlings, indicating that they had not achieved normal growth the year before; and only six percent of the females were with cubs.

A large number of females came into heat in 1969 which suggested that there would be a large cub crop in 1970, and indeed 30% of the females captured in 1970 were accompanied by cubs. This percentage may be considered high as less than half of the population is mature (4 years or older), and mature sows normally produce cubs only every other year.

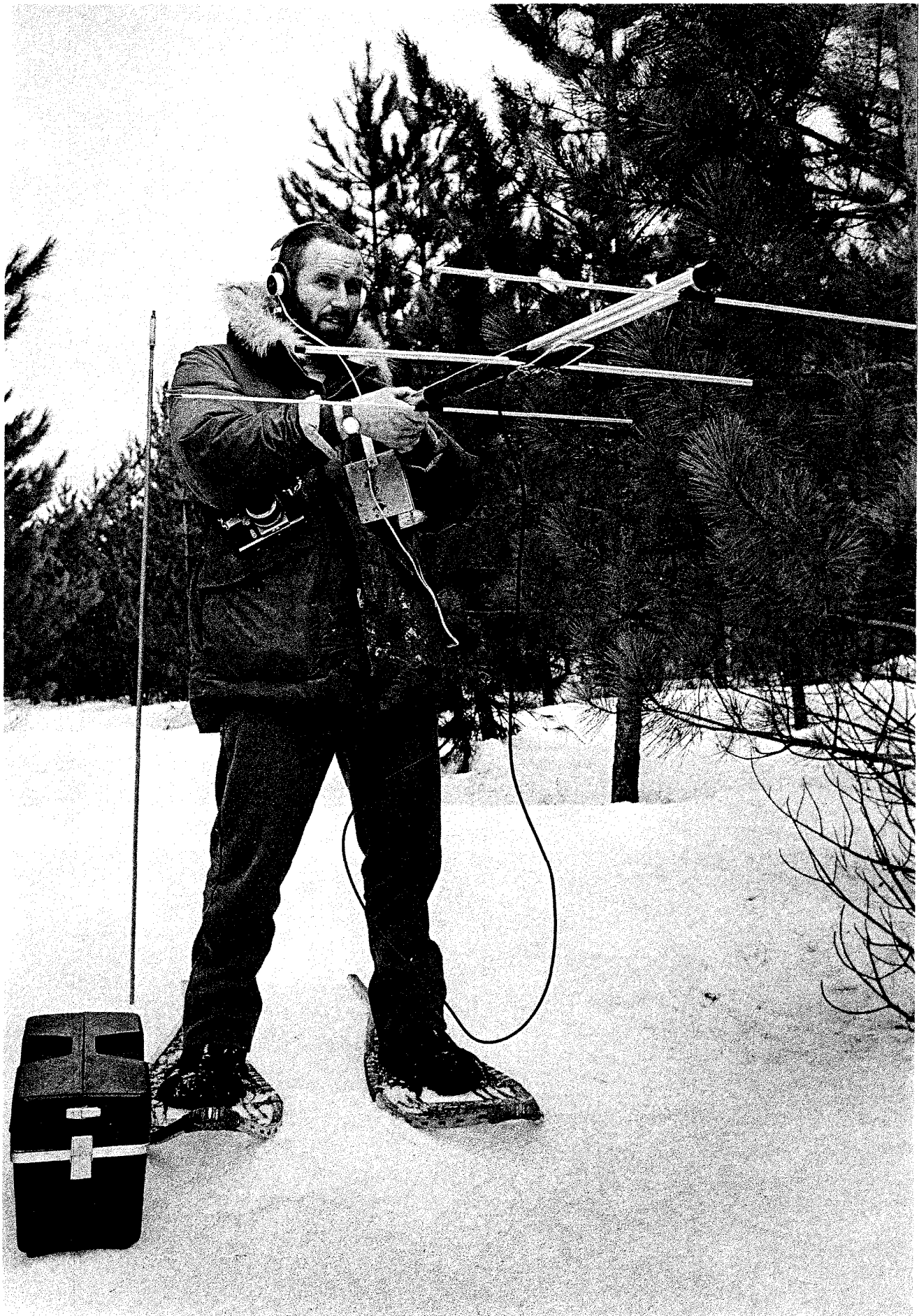
Two of the yearling size two-year-olds captured in June of 1969 were recaptured as three-year-olds in October of 1970. Both had made amazing weight gains during two summers of fair to excellent berry crops. One went from 79 to 182 pounds, while the other went from 90 to 199 pounds.

Bears occurred in two color phases, black and brown, with about one bear in 25 being of the brown or cinnamon color phase. Approximately three bears in ten had a white spot or V on the chest, but in many of these the white spot was so small that it was difficult to distinguish at a distance.

RADIO TELEMETRY DATA

The 1969 and 1970 radio telemetry data are not yet completely analyzed, so only the more apparent findings will be presented here. Funds permitting, 1971 will be devoted entirely to radio-tracking in order to learn as much as possible about bears' habits.

Radio-tracking showed that most bears were more active at night and that they sought the cool spruce swamps and stream-side alder thickets during the heat of the day. Occasionally a bear would bed in the same general location for several consecutive days, but it usually would use a different resting site within the area each day. Radio-marked bears disturbed by the author at resting sites usually moved quietly away and then circled downwind. Most of them were never seen.



RADIO TELEMETRY EQUIPMENT USED IN STUDY
NATURALIST

Many bears confined most of their activities to an area of less than twenty square miles, while others wandered over an extremely large area. One of the former spent the summer in a square mile area, whereas one of the latter moved a straight line distance of 37 square miles in 60 days.

Denning began relatively early in 1970. The first of the twelve radioed bears mentioned earlier began denning on September 28, and over half of them were in dens by October 15. Several of them were in dens even before leaf fall occurred and were found to be sleeping through clear days with 60 plus temperatures.

Old bull-dozed piles of logs, brush, and soil were most often chosen for den sites. Some bears excavated dens under large boulders, and a few dug burrows beneath stumps, windfalls, or tree roots. Most burrows were five to seven feet long and had a six to twelve inch deep body-sized depression at the far end. The depression was usually lined with grass, leaves, and clubmoss that were raked from an area extending up to 82 feet from the den entrance. In two cases, bears also plugged their den entrances with nest-lining materials. The large raked area and the excavated soil made den sites quite conspicuous before snowfall.

Three radioed bears were observed in their dens in the winter of 1969-70. One of them, a mature female, was disturbed on New Year's Day and left the den. She unerringly found an old den a mile away and there finished her winter sleep. Several weeks after she arrived at the second den she bore two cubs; and in late April with only a few patches of snow remaining, she left the den with her family. On May first, they were radio-located about a half mile from the den with a snowstorm threatening. Rather than return to the den, she constructed a nest of grass and leaves beside a log and weathered the storm curled up in the nest with the cubs. The family remained within two miles of the den until at least August twenty-seventh when the radio transmitter apparently failed.

Another bear lost over fifty pounds after entering the den and weighed 125 pounds on New Year's Day. With four months to go before it would eat again, the

Several people and agencies in addition to the sponsor, The Twin Cities Big Game Club, deserve mention. The North Central Forest Experiment Station of the U. S. Forest Service provided a significant amount of flying time and provided an assistant during a time when the work was such that one man could not do it. The Isabella Ranger Station has also given assistance. Valerian Kuechle, Richard Reichle, and Ralph Shuster of the Cedar Creek Natural History Area built the radio telemetry equipment. Dr. Ulysses S. Seal of the University of Minnesota's Department of Biochemistry and of the Veterans'

bear looked as though it was too thin to survive the winter. Surprisingly, it lost only 10 more pounds before leaving the den in late April and was still alive on September fifth when radio contact was lost. Data gathered from other bears in 1970 indicate that it is not uncommon for bears to lose a great deal of weight early in the denning period.

BEARS' STATUS IN MINNESOTA

The black bear, which is the only species of bear in Minnesota, is found in approximately the northeastern third of the state. Currently they are protected except during deer seasons in Cook and Itasca Counties and in parts of Lake, St. Louis, and Cass Counties. In the rest of the state, they may be killed at any time of the year.

Many bears are killed in the summertime when their fur is not prime, and they are left to rot. Most of these are killed in the vicinity of dumps by nearby residents who fear the animals. In the summer of 1968 when natural foods were scarce, at least 26 bears were killed in the vicinity of two small dumps in the study area after they had tipped over garbage cans at nearby dwellings. Radio-telemetry data show that nearly every bear living within six miles of a dump makes a visit to such a food source, especially when natural foods are scarce. Consequently, if every bear that visits a dump is killed, the bulk of the population will be eliminated.

RECOMMENDATIONS

A comparison of data gathered in this state with data gathered in states in which bears are prized game animals indicates that bears could be harvested in this state when their fur is prime. I believe that fewer bears would be wasted if the following recommendations were put into effect:

1. Garbage disposal areas should be located at least one mile from residential areas.
2. An annual bear hunting season that begins with the opening of grouse season and ends with the closing of deer season should be initiated.
3. Killing of bears outside the hunting season should be limited to those bears that are actually doing damage.

Administration Hospital's Division of Metabolic Research is kindly analyzing the blood samples. David Kuehn of the Bell Museum of Natural History is processing and determining the ages of extracted bears' teeth. Dr. James Peek and graduate students John Wetzel and Carlos Naranjo, all of the Department of Entomology, Fisheries, and Wildlife of the University of Minnesota gave considerable assistance. The project would not have been as successful without the co-operation of the local people, particularly Donald Huseby and Robert Hunger.