

WHY BLACK BEARS ARE MASTERS AT WINTER SURVIVAL

by Lynn L. Rogers and Al Taylor

Have you ever snuggled up to a bear in its winter den and pressed your ear against its chest to listen for a heartbeat? No? This has been among the experiences of biologists working on wildlife habitat research for the North Central Forest Experiment Station during an 18-year study of black bear habits and habitat in northern Minnesota. North Central is a research unit of the USDA Forest Service and is headquartered in St. Paul, Minnesota.

One day in January, several years ago, a biologist was trying to determine a bear's heartbeat in this fashion. A bear's heart beats softly and slowly during hibernation—sometimes as slow as eight beats a minute. Suddenly the man sensed a strong, rapid heartbeat—a sign that the bear was waking up! As it began to stir and lift its head, the biologist wiggled his way out of the den. Even from outside the den he could hear the rapid thump of the bear's heart—which he thought for a moment was

his own. It had accelerated to 175 beats per minute in just a few seconds.

Hibernation is a marvel of adaptation to winter. The physiological cycle begins in summer when bears start depositing fat, resulting from such foods as wild fruits, hazelnuts, acorns, ants, and other insects that bears find in rotten logs and decayed hollows of trees. Providing these foods is a good reason for maintaining wild fruit-producing species and for leaving dead trees in a forest. The forest ecosystem can supply timber for people as well as food and cover for wildlife.

A good berry year is important for bears in preparing for their long winter nap. The hormones which regulate hibernation do not allow it to occur in summer, so bears could starve in the absence of summer food just as we would. The foods that bears can resort to when nuts and berries are scarce are not as plentiful as one might think. Black bears can not efficiently digest

most green vegetation; they have to rely on the more digestible foods in which nutrients are concentrated, such as berries, nuts, buds, catkins, and tubers. Not finding these, bears are more likely to resort to food in campgrounds, garbage dumps, and dumpsters behind restaurants. And this is when some bears become nuisances.

During hibernation, the bear loses body heat slowly due to its thick fur and lowered metabolism. It seldom defecates, even though feces slowly build up in the colon from tissue that sloughs off from inside the digestive tract. The kidneys have slowed their function for the winter, and little urine is produced. The urea in the system is broken down and the nitrogen from it is reused to build protein. This ability of bears to build protein while fasting allows them to maintain their muscle and organ tissue throughout the winter. They only use up fat.

Dens usually are burrows, hollow



trees, or rock crevices. Many dens are little more than windbreaks with temperatures inside about as cold as outside; others are merely nests on the ground. A bear's body heat doesn't warm up the den more than a few degrees unless the den is well insulated by deep snow, and then the den temperature is still usually below freezing. Despite this, less than one percent of the bears in northern Minnesota die in dens. Starvation losses typically are limited to cubs and yearlings, and the mortality usually occurs in spring or summer.

It's always a point of interest that cubs are born at the unlikely time of mid-hibernation – usually in January. The mother bear rests in a position which enables the cubs to nurse as needed, and she lethargically attends to all the needs of the cubs.

To better understand bear biology, the Station's wildlifers have sought out the bear in its winter lair. They then tranquilize it, bring it out of its den, weigh

it, and put a new radio collar on it so they can track it by radio the next summer. Then, after taking some blood samples, it's back to bed for the bear for the rest of its winter sleep. This information and accumulated data over the years help the biologists better understand bear habitat needs and how habitat affects reproductive success, cub survival, and bear movements. The studies also give insight into bear behavior toward each other and toward man. Unexpectedly, the studies are providing information useful in human medicine. Blood samples taken to determine how bears fare in different habitats are giving new insights into mammalian physiology. Several, medical centers, led by Dr. Ralph Nelson of the University of Illinois, are using these bear data in ways that make the information relevant in further study and treatment of kidney disease, atherosclerosis, gall stones, amnesia, diabetes, and severe burns.

Long before modern man was on the

scene in early America, the original people here—the American natives—had high regard for the black bear and considered it a clever and intelligent animal. The writers share their view.

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