



## ALGONQUIN ECO WATCH GROUP

### Black Bear Study

**Part 1 Study** - Seasonal Movement Patterns and Feeding Habits of Large Adult Male Black Bears in Algonquin Provincial Park, Ontario.

**Part 2 Discussion** - Some Possible Causes of Fatal Attacks on Humans by large Adult Male Black Bears.

#### **PART ONE**

Seasonal Movement Patterns and Feeding Habits of Large Adult Male Black Bears in Algonquin Provincial Park, Ontario.

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A five year on-going study (1992-97) of large (120kg+) adult male black bears (*Ursus americanus*) in Algonquin Park, Ontario, Canada, has yielded much information concerning seasonal feeding habits, movement patterns and intra-specific interactions. In excess of 1000 aerial and ground fixes were used to determine accurate estimates of breeding, mid-summer and late summer-fall ranges, as well as 15 denning locations of 8 bears. Breeding territories range from 19.3km<sup>2</sup> to 87.6 km<sup>2</sup> ( $\bar{x}$  = 40.4 km<sup>2</sup>, n = 7), implying that there could be as many as 191 large males breeding within un hunted Algonquin Park (7730 km<sup>2</sup>) annually. Twelve of 15 (80%) known den sites occurred within established breeding ranges. Predation by black bears on as many as five moose (*Alces alces*) (four calves, one yearling bull and possibly one cow) and one black bear has been documented during this study. Post breeding movements of radio-collared bears to areas outside Algonquin Park were generally (90.9%, n = 11) to lower elevations and may be learned, or coincide with either plant phenology and species abundance, or the presence of garbage dumps. Nine of 15 (46.1%) bears utilized dumps, and generally did so during the dark hours, spending the daylight hours between 0.5 km and 2.0 km ( $\bar{x}$  = 1.25km) away from the site at secluded locations. Linear post-breeding movements varied between 18.8 km and 73.8 km ( $\bar{x}$  = 46.1 km, n = 11) and were repeated in successive years by four of six bears (66.6%), which implies directed rather than random movement. No collar related mortality occurred, although six of 18 (33.3%) bears lost their collars as a result of pull-off (four), breakage (one), or cow moose defensive behaviour (one). Movements out of Algonquin Park (nine) occurred between July 4 and August 17 ( $\bar{x}$  = July 25, n = 14), and lasted between 15 and 251 days ( $\bar{x}$  = 82.7 days). Return fall movements to breeding/ denning range occurred between September 9 and October 17 ( $\bar{x}$  = Sept. 29). Six of 11 (54.5%) collared bears which exited Algonquin Park died as a result of hunting, including one which survived a previous arrow

wound. The importance and availability of various seasonal habitat needs (e.g. soft and hard mast) are discussed.

Some Possible Causes of Fatal Attacks on Humans by large Adult Male Black Bears.

## **PART TWO**

A Discussion.

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As a result of five human deaths inflicted by two large adult male black bears (*Ursus americanus*) in Algonquin Park, Ontario, a long-term study is being conducted to examine certain aspects of bears anatomy, physiology and behaviour which might lead toward a better understanding of such attacks. While it is extremely unusual to be attacked by a black bear, most such instances across North America ( 96.6%, n = 29) involve adult males in excess of 120kg body weight. Evidence at Algonquin Park kill sites indicated that the attacks were predatory in nature.

Predation by large adult male black bears on Algonquin Park moose (*Alces alces*) and other bears in excess of 40kg has been documented, proving that these bears are capable of preying on, and have developed a search image for, prey equal to or larger in size than many humans.

Back country bears that normally avoid human contact become quite tolerant of human presence at dump sites (food sources) that they frequent during the non-breeding period. The presence of food at back country campsites however, may trigger unpredictable responses toward humans by these same bears.

Joint studies with the Ontario Veterinary College indicate that the black bear is relatively high on the mammalian evolutionary scale, and therefore subject to many of the same types of aberrant behaviour as other mammals, resulting from " commonplace" brain dysfunction such as viral infection or tumours. While trauma to specific locations in the brain, such as the temporal lobe/amygdala area (which may control violent behaviour) could occur in all segments of a black bear population - e.g. as a result of defensive behaviour by a cow moose, or falling from a mast tree - large adult males would be at greater risk to this type of injury because of their aggressive breeding behaviour (fighting with other males) and predation on other bears. The danger of heavy metal contamination to the brain of large adult males is increased at dump sites where contaminants may have been discarded, owing to the dominant status and greater retention period (age) of such bears.

Elevated gonadotropin-releasing hormone (GnRH), luteinizing hormone (LH) and testosterone levels during the breeding season (May-July), or at other times due to pituitary malfunction, could lead to aggressive behaviour toward other species by large adult (especially dominant) male bears. Testicular trauma - e.g. cysts - could also lead to such

behaviour at other times of year. While all considered abnormalities would be expected to occur only sporadically in most bear populations, they would be more likely found in a population such as Algonquin Park's where large adult males are not hunted and consequently represent a larger proportion of the population.

Even though experiments have been conducted that indicate no relationship between human menstrual flow and black bear attacks, we feel that there is sufficient evidence indicating similarities between the vaginal discharge components of various mammalian (and primate) species - especially at ovulation when pheromone production and excretion are maximized - to warrant further investigation.

The production of musk-like pheromone compounds by the adult males of some mammalian species including Man and the domestic boar (*Sus scrofa*) also suggests that further investigation with black bears in this regard should be given a high priority. There is documentation in the literature that pheromones have cross-species significance, as attractant and/or agonistic cues.

Efforts will continue to collect tissue samples from Algonquin black bears, which will be subjected to DNA analysis to establish possible genetic links between individuals, particularly those displaying aggressive behaviour.

NOTE: Funding constraints have led to a phasing out of the Algonquin Black Bear Study. Monitoring of the one remaining radio-collared bear will continue through 2001. In addition, efforts will be made to publish the results of this 10-year project.