

BLACK BEARS, PEOPLE, AND GARBAGE DUMPS IN MINNESOTA

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Abstract: Black bears (*Ursus americanus*) that fed at dumps continued to feed on wild foods. Feeding on garbage increased nutritional levels and enabled bears to grow more rapidly, mature sooner, and achieve higher reproductive success than did bears on solely natural diets. Use of dumps and competitive interactions increased in years when natural food was scarce. Properly situated garbage dumps may serve as buffers against nuisance activity rather than as an introduction to it. Injuries to people are rare at dumps. Dumps enable recreationists to become familiar with bear behaviour. Drawbacks of bears feeding in dumps are discussed.

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Although open garbage pits are being phased out, hundreds remain, especially in black bear habitat. This paper reviews and summarizes information on the use of dumps by black bears and on bear-human interactions in northeastern Minnesota. The data were collected during ecological studies of black bears during 1969-1986 (Rogers 1987a).

STUDY AREA

The study area was centered in the Superior National Forest in northeastern Minnesota (Lat 47°45'N, Long 91°30'W). The area had low fertility and a growing season that averaged only 118 days between mid-May and mid-September (Rogers 1987a:8). Vegetation was typical of the northern Great Lakes region in that it contained components of both the boreal forest and the temperate deciduous forest (Maycock and Curtis 1960). Bear foods available in summer included hazelnuts (*Corylus cornuta*) and various fruits subject to frequent crop failure due to spring frost or summer drought (Rogers 1987a:9). The fruits most important to bears ripened in July, declined in late August, and became very scarce after that. Hard mast, other than unreliable hazelnuts, was absent over most of the area. Human presence included scattered resorts and residences and a community of approximately 35 families. South of the study area were larger communities of perhaps 40 - 200 families. Garbage pits varied from small pits used by single resorts or a few families to larger dumps used by the communities.

BEHAVIOUR, GROWTH, AND REPRODUCTION

Adult males predominated at community dumps, as was also reported by Black (1958) for New York. The sex ratio (M:F) of bears foot-snared at Minnesota dumps was 17:5, with 14 of the males being at least 3 years old. In the overall population, the sex ratio of bears at least 3 years old was 51:93 (Rogers 1987a:12).

Although both sexes used dumps within their usual ranges, only males concentrated their feeding at dumps when travelling outside their usual ranges. Females travelling outside their usual ranges avoided strange males (Jonkel and Cowan 1971; Garshelis and Pelton 1981), including aggregations of strange males at dumps (Rogers 1987a:34). Twenty-two (69%) of 32 radio-collared males travelled extensively outside their usual ranges in late summer and fall, with half of them concentrating their activities at dumps (Rogers 1987a:31, 34). Only 42 (40%) of 105 radio-collared females travelled extensively outside their usual ranges (male-female difference significant, $\chi^2 = 8.14$, 1 df, $P < 0.005$) with none concentrating their activities at a dump (Rogers 1987a:31).

Bears that ate garbage also continued to forage for natural foods. Droppings at garbage dumps consisted mainly of wild foods until fruit disappeared in late August. During 1 - 23 August, 99 (75%) of 132 droppings collected at dumps contained mainly natural foods. During 24 - 31 August, the availability of wild fruit declined and only 26 (35%) of 74 droppings collected at

dumps contained mainly natural foods. Few fruits were observed in the forest in September, and only 7 (8%) of 89 droppings collected at dumps during 1-10 September contained mainly wild food. Droppings collected at dumps after 10 September (7V= 14) contained only garbage. Thus, garbage supplemented wild food when wild food was available and provided nourishment after wild fruit and nuts became scarce, extending bears' growing season beyond that possible with only wild food.

Black bears that fed on garbage matured sooner and reproduced more successfully than bears that ate solely natural diets (Table 1).

Table 1. Reproductive parameters of female black bears eating natural foods only and supplemental garbage in northeastern Minnesota, 1970-1980^a.

Reproductive Parameter	Mean	Range	N
Natural Foods Only			
Age at first reproduction	6.3 years	4-8 years	17
Intervals between litters ^b	2.3 years	2-4 years	36
No. cubs in first litter	2.1 years	1-3 years	17
No. cubs in subsequent litters	2.5 years	1-3 years	35
With Supplemental Garbage			
Age at first reproduction	4.4 years	3-5 years	11
Intervals between litters ^b	2.0 years	2 years	8
No. cubs in first litter	2.5 years	1-3 years	8
No. cubs in subsequent litters	3.4 years	3-4 years	10

^a Condensed from Rogers 1987a: Tables 8-10.

^b Excluding intervals of 1 year due to litters being lost before mating seasons.

Bears that fed at dumps also grew more rapidly and became heavier (Rogers et al. 1976). A 3-year-old male

weighed 177 kg, which is more than twice as heavy as any 3-year-old captured away from dumps in north-eastern Minnesota. A 7-year-old male gained 104 kg in 71 days at a dump, gaining an average of nearly 1.5 kg/day. Black (1958) reported 3-week gains averaging 1.75 - 1.99 kg/day by adult males at dumps in New York. In the Minnesota study, the largest bears of each sex were captured at dumps, including a 278-kg male and a 135-kg female. The 278-kg male was very obese and abandoned the dump to retire to a den in late September, as was common for obese bears at dumps (Rogers 1987a:37). Matson (1946) reported that very obese bears in Pennsylvania abandoned abundant wild food to move to dens.

Black bears that forage on wild foods are typically active from dawn to 1 - 2 hours after sunset in summer (Garshelis and Pelton 1981; Rogers 1987a:18). Daylight feeding facilitates use of colour vision to find fruit (Bacon and Burghardt 1976; Garshelis and Pelton 1981). Bears that fed at dumps in Minnesota tended to follow a similar activity pattern, as determined during twenty-five 24-hour observation periods at 7 community dumps and additional observations at 21 other dumps. Bears typically gathered at most community dumps at dusk and moved away 1-3 hours later, presumably to sleep. However, activity patterns differed among individuals. A few bears visited dumps later at night or during the day. Activity patterns also differed between dumps. Bears visited Tofte dump mainly during the day and early evening. The major activity peak at Tofte dump in mid-August was between 0915 and 1330 hrs (maximum = 11 bears present at 1000 hrs, CST) with a shorter peak between 1730 and 1930 hrs (maximum = 12 bears at 1745 hrs). Fewest bears were present between 2145 and 0515 hrs (0-3). By contrast, bears visited the Babbitt dump mainly at night because workers there harassed bears during the day. This dump was covered daily with soil, so foraging took more time, and the bears dug throughout the night in mid-September, leaving around dawn. Peak activity was between 1900 and 0300 hrs (maximum = 8 bears present at 2245 hrs). Night feeding periods for 2 radio-collared males in this dump were 7.4 and 8.0 hours on 16 September. These were the smallest (91 kg) and largest (278 kg) bears observed in the dump. They spent the day 0.6 - 1.1 km away, mostly inactive.

Although territories of females overlapped little away from dumps, adjacent territories always overlapped at garbage dumps (Rogers 1987a:49). All dumps studied were located in narrow areas of territory overlap where territoriality gave way to dominance hierarchies (Rogers 1987a:49). Females whose territories did not border

dumps seldom trespassed across territories to reach dumps, which corroborates findings by Jonkel and Cowan (1971) for Montana.

Despite the influence of dumps on local movements, the availability of dumps did not deter bears from making long foraging movements in late summer and early fall. Seven (30%) of 23 females with dumps in their territories left their territories temporarily to forage widely, as did 35 (31%) of 114 females with no dumps in their territories. Similarly, subadult males dispersed from their mothers' territories regardless of the presence of dumps, which suggests that the proximal stimulus for male dispersal is not food shortage (Rogers 1987b).

Food shortage influenced use of dumps in other ways, however. In years of natural food shortage, greater numbers of bears used dumps. Natural food was scarce in 1972, and the maximum number of bears seen in the Tofte dump at one time averaged 9.2 (range 7-12 bears) during five 24-hour periods. Natural food was more abundant in 1973, and the maximum number of bears seen at one time in that dump averaged only 5.8 (range 2-9) during ten 24-hour periods (difference significant, $t = 3.13$, 13 df, $P < 0.01$). Individuals also concentrated their foraging more strongly at dumps in years of natural food shortage (Rogers 1987a:34-36). As competition for garbage increased, serious fights became more common. Fights were common in 1985 when natural food was so scarce that nuisance complaints were at a record high (D. Garshelis 1986; Minnesota nuisance bear surveys -1981-1985; Minnesota Department of Natural Resources office memorandum). Injuries included a broken leg, a 12 cm laceration, and loss of a nose pad (Rogers 1987a:35). It was also in 1985 that the largest number of bears was observed feeding simultaneously in a dump - 44 at the Colville dump near Grand Marais, Minnesota (Wm. Peterson, Minnesota Department of Natural Resources, pers. commun. 1985).

Despite the concentration of bears around the Colville dump, nuisance activity was curiously lacking within 10 km of the dump (Wm. Peterson, pers. commun. 1985). Similarly, nuisance activity in Kawishiwi River Campground was reduced below traditional levels during 1984-1987 when food was provided 0.43 km away (Rogers, unpubl. data). Further, a resort operator reported that he had few problems with bears during the years he maintained a dump 1 km from his resort, but that he has had numerous problems in the 10 years since the dump was closed (D. Bauer, pers. commun. 1986). These observations suggest that garbage dumps, properly situated, can serve as buffers against nuisance activity rather than as an introduction to it. The data suggest that bears tend to eat where they can most efficiently

satisfy their nutritional needs. In years of abundant wild food, that will be in the forest. In other years, that may be in dumps or, in the absence of dumps, at campgrounds or residential areas.

In years of scarce wild food, black bears are almost as quick as chipmunks to overcome their fear of people and seek people's food. However, the notion that bears that taste unnatural food will preferentially seek it thereafter has little factual support, although this may be true for certain individuals due to individual taste preferences or injuries that hamper travel. Bears generally appear to prefer wild fruit and nuts, and they commonly abandon dumps and campgrounds when those wild foods are abundant. The notion that bears that taste human food will preferentially seek it thereafter is an unstated assumption underlying some management policies and should not be accepted without testing. Further study is needed to identify factors influencing nuisance behaviour, including the role of dumps.

BEAR-HUMAN INTERACTIONS AT DUMPS

Only nonhabituated bears that run when people appear are usually found at small dumps used by only a few people. Human smell on garbage apparently does little or nothing to habituate bears to human presence. However at large community dumps often frequented by people, bears become habituated to people, and many of these dumps in Minnesota have become tourist attractions. Most of the people watch the bears from their cars or from a distance, but a few mingle with them, throwing them food or even hand-feeding certain individuals. Some people test bears' responses by hitting them with rocks. Others come to dump garbage, typically paying little attention to the bears. The bears usually pay more attention to each other than to the people, although a few bears approach people for marshmallows or other treats not usually found in garbage.

Although people and bears have been mingling at dumps for decades, injuries to people are rare at dumps. No serious injuries at dumps have been reported in any of the northeastern states in which I have made extensive inquiry: Minnesota, Wisconsin, Michigan, New York, Vermont, New Hampshire, and Maine. However, numerous injuries have been associated with hand-feeding of bears in national parks (Pelton et al. 1976; Singer and Bratton 1980). The difference in numbers of injuries is probably due to differences in the 2 situations. Bears visit dumps primarily to eat garbage, not to seek

handouts from people. They tend to be so well fed that the few that do seek handouts are hard to tease with food. The vast majority ignore or avoid observers that keep a respectful distance, and the garbage that often surrounds feeding bears discourages many people from approaching.

Black bears that are approached at dumps retreat rather than defend their food. All feeding bears, including groups, observed by the author during 21 years of study retreated when approached closely. Being solitary animals, they apparently form no social alliances other than family groups (Rogers 1987a:50) and feel no safety in numbers.

Dumps provide opportunities for people to see the largest and most dominant bears in the population (Rogers 1987a:35). Viewing bears at dumps may be the only regular opportunity for most people to see interactions among bears, including play. Bears that are less well fed seldom play, spending nearly all their waking hours foraging (Egbert and Stokes 1976; Rogers 1987a:49). Dumps give recreationists the chance to become familiar with black bear vocalizations and body language. This may help them overcome apprehension about camping and hiking in black bear country, and provide them with knowledge of bear behaviour and communication that may be helpful when responding to encounters with bears.

HEALTH AND MORTALITY FACTORS

Dumps may be sources of parasites such as trichina worms (*Trichinella spiralis*) and fish tapeworms (*Diphyllobothrium* spp.). However, garbage is probably not the usual source of trichina worms because bear trichinosis is less common where garbage is abundant than it is in remote regions of Canada and Alaska (Rogers and Rogers 1976).

Dumps can contain toxic substances which bears could carry off or consume. Bears commonly carry plastic bags into the woods and scatter the contents while searching for edible garbage. This problem can be reduced by people emptying plastic bags into dumps rather than throwing them in full. There have been no reports of bears dying as a result of poisoning at dumps.

Stringham (In Press) presented evidence that mortality among grizzly bear (*Ursus arctos*) cubs is higher where grizzlies congregate than in other areas. He attributed the difference to cannibalism. Black bear cubs may be less vulnerable to this because they more readily climb

trees and they are commonly left up trees while their mothers feed at dumps.

Bears that feed in dumps can be especially vulnerable to hunters because hunters often concentrate at dumps (Rogers, unpubl. data). To reduce this problem and to increase safety for people at dumps, shooting is illegal within 0.8 km (0.5 mi) of dumps in Minnesota.

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