Black Bear Roadkills in Florida

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Abstract: From 1976 to 1986, 99 black bears (*Ursus americanus*) killed by motor vehicles were collected from roadsides throughout Florida. Males ($N = 66$) were killed approximately twice as frequently as females ($N = 30$). Males of dispersal age were killed more frequently than bears in other age classes. Seasonal peaks in roadkills occurred in May–July and in October–December. Strategies aimed at reducing the number of road-killed bears include driver education, bear crossing signs, and underpasses in new highway construction projects which allow bears safe passage.

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Currently, black bears are widely distributed in Florida, but the contiguous presettlement distribution has become fragmented because of habitat destruction (Brady and Maehr 1985). In 1974, projections of continued and accelerating loss of wildlands led to the black bear being listed in most of Florida as a threatened species. Because the outlook includes a proliferation of highways and a concomitant increase in habitat fragmentation, an understanding of the dynamics of vehicle-related mortality is needed to guide development and mitigation efforts. Our objective was to describe the sex and age characteristics of road-killed bears and to discuss the impact of road-kill mortality on Florida bear populations.

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Methods

Black bear carcasses were collected from roadsides from 1976 to 1986. Few carcasses were collected prior to 1979; but from 1979 to 1986, carcasses were actively solicited and greater numbers were acquired. When possible, the sex, age, location of kill, and date of kill were recorded for each specimen. Age was determined by analysis of cementum annuli of premolars (Willey 1974).

Results and Discussion

From 1976 to 1986, 99 bear carcasses were collected (Table 1). The variability in the number of carcasses per year is believed a result of collection effort rather than a reflection of bear population trends. Roadkilled bears were collected from 27 of Florida's 67 counties. The greatest number of roadkills ($N = 23$) were in Collier County in southwest Florida. The majority of these bears were killed on highways dissecting the Big Cypress Preserve. Other counties with large numbers of roadkills were Lake ($N = 15$) and Marion ($N = 13$) in central Florida. The remaining roadkills were scattered throughout the state. Few roadkills occurred in the 5 counties with legal hunting. In Pennsylvania during years closed to bear hunting, the number of roadkills increased to 65% of the total mortality, up from 7% to 20% in years with hunting (Lindzey et al. 1983). Considering that most mortality of adult bears is human related (Bunnel and Tait 1981), roadkill mortality may represent a major cause of death for Florida bears in areas without hunting.

Determination of sex was made on 96 of the carcasses. Males ($N = 66$) were killed approximately twice as frequently as were females ($N = 30$). In hunted populations, males may be 3 to 4 times more vulnerable to harvest, primarily because of their more extensive moments (Bunnell and Tait 1980). Other reasons for the greater vulnerability of males to hunting include: legal protection given to fe-

Table 1. The number and sex of black bear roadkills collected in Florida, 1976–86.

Year	Number of carcasses	Sex		
		Male	Female	Unknown
1976	2	2	–	–
1977	0	–	–	–
1978	1	1	–	–
1979	7	6	–	1
1980	5	3	2	–
1981	9	5	4	–
1982	9	9	–	–
1983	16	11	5	–
1984	10	5	5	–
1985	19	10	9	–
1986	21	14	5	2
Total	99	66	30	3

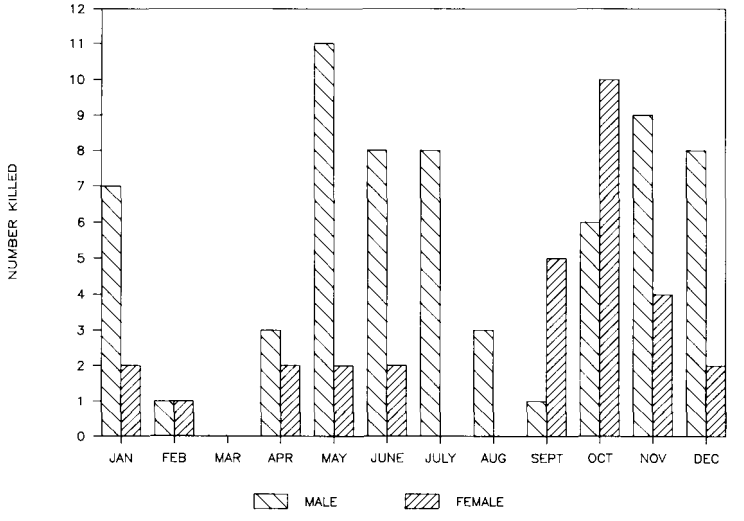

Figure 1. Black bear roadkills in Florida by month: 1976–86.

males with cubs; and hunter selection toward larger, trophy bears, which are typically male. In the case of roadkills, the greater vulnerability of males is likely a consequence of their more extensive movements, which increase the probability of a collision.

Roadkills occurred in every month except March. Peaks in the number of bears killed were observed in May–July and in October–December (Fig. 1). The increased movements of males associated with dispersal and breeding (Rogers 1987) may explain the high number of roadkills in May–July. The second peak in roadkills in October–December is thought to be related to increased movements associated with the fall search for energy rich foods (Rogers 1987).

Roadkills claimed more females than males only during September and October (Fig. 1). In Pennsylvania, daily movements of adult females exceeded those of males during these 2 months (Alt et al. 1980). Because of the relationship between movements and vulnerability to both roadkill and hunting mortality, the increased vulnerability of females in September and October should be considered in the timing of bear hunting seasons. In hunted populations, where protection of females is a management strategy, bear hunting during these months should be avoided.

Ages were assigned to 92 of the carcasses for which the sex was known. The mean age of males killed ($N = 62$) was 3 years, whereas for females ($N = 30$) it was 5 years (Fig. 2). Female mortality was not concentrated in a particular age class. Males, however, were killed most frequently at 1 to 4 years old. Family break-up occurs when the offspring are 1 year old, and dispersal, which appears to be restricted to males (Alt and Lindzey 1980), occurs at age 2 to 4 (Rogers 1987). The high number of males killed in the age classes 1 to 4 indicates an increased

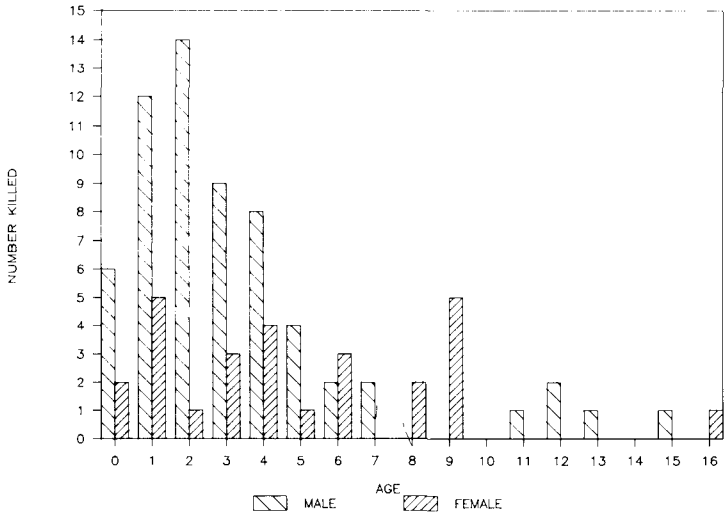

Figure 2. Age distribution of black bears roadkilled in Florida: 1976–86.

vulnerability to vehicle collisions after family break-up and during the age of dispersal when they may be traveling outside of their familiar natal home range.

As Florida's human population expands and black bear populations become more fragmented, vehicle-related mortality will become more significant by further reducing the numbers of residents in small populations already prone to local extinctions. Efforts aimed at reducing the incidence of black bear roadkills in Florida include erection of warning signs along highways near bear crossings and the publication of information about animal-vehicle collisions in the Florida Driver's Handbook. Other methods being considered include fencing along major highways and the incorporation of underpasses for the safe passage of bears and other wildlife in new highway construction projects. Because roadkills provide useful data on populations where information from other sources is largely lacking, efforts to collect roadkilled bears should continue.

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