Transactions of the Illinois State Academy of Science received 6/23/08
(2009), Volume 102, #1&2, pp. 117-129 accepted 1/10/09

Aspects of Raccoon Life History in West-Central Illinois

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ABSTRACT

Raccoons (*Procyon lotor*) were livetrapped and marked during 1989–1993 in an agriculturally dominated landscape in Brown County, west-central Illinois. Densities averaged 4.5 per km^2 with males dominating in the younger age classes (< 2 yrs) and females in older raccoons. Breeding rates averaged 46% for yearling females and 87% for adult females, with yearlings contributing about 20% of annual production. Juvenile survival rate averaged 74% between birth and 6 months. Both sexes continued to gain body weight into their 3rd year with males consistently heavier ($P < 0.03$) than females. Males lost body condition in winter while females remained in a more stable condition throughout the year. Dispersal behavior was more pronounced in males. Females of all age classes remained on the study area somewhat longer ($P > 0.05$) than males. Males were more likely to die from hunting and trapping causes while females were more likely than males to die of disease. Seasonal home ranges were similar for both sexes ($P < 0.05$) but male ranges averaged somewhat larger areas. We found no evidence that west-central Illinois raccoons were territorial as a paired removal experiment showed no attempt by the remaining member of each pair to make directed movements into a vacated range. Our study animals appeared to be above average in weight and condition, to be breeding at a level consistent with a healthy condition and to be generally under-harvested.

INTRODUCTION

Raccoons are adaptable and equally at home in urban and rural environments (Prange et al. 2004, Lotze and Anderson 1979). Raccoon populations are currently high in Illinois, the result of low exploitation by hunters and trappers and favorable habitat conditions (Gehrt et al. 2002, Bluett and Hubert 1992).

Aspects of raccoon life history have been previously investigated throughout Illinois. These reports have included the fate of translocated raccoons (Mosillo et al. 1999), a demographic comparison of rural and urban raccoons (Prange et al. 2003, 2004), and a general life history study (Stevens et al. 1995), all from northern Illinois. In addition, age specific reproductive rates were determined from harvested raccoons collected in west-central and northern Illinois (Fritzell et al. 1985) while reproductive cycles, aging techniques, and kit growth rates were examined from raccoons captured in west-central and east-central Illinois (Sanderson and Nalbandov 1973, Sanderson 1961, Montgomery 1964, 1968). Incidence of lead in raccoon livers collected in west-central and east-central Illinois were reported by Sanderson and Thomas (1961) and Stains (1961) examined winter temperature variations inside and outside raccoon tree dens in southern Illinois. Ellis (1964) reported one of the early uses of radio telemetry in delineated animal movements using raccoons captured in east-central Illinois. Demographic comparisons including sex ratios, age composition, litter size, and body weights among raccoons harvested in west-central, northern and southeastern Illinois were reported by Sanderson and Hubert (1981). Nielsen et al. (2007) surveyed the incidence of *Bayliscaris procyonis* and canine distemper virus in southern Illinois raccoons. Roy Nielsen and Nielsen (2007) examined relatedness and spacing among raccoons, and Wilson and Nielsen (2007) determined habitat selections by day bedded raccoons, both studies conducted in southern Illinois.

These studies determined the raccoon population in Illinois to be generally healthy and to have been increasing, particularly in urban areas. Because of their potential to affect disease transmissions among humans and domestic animals, as well as the often destructive nature of their feeding and denning behaviors, knowledge of raccoon life history traits remain important if we are to coexist with them in an increasingly urbanizing environment.

Previously published reports from our study of raccoon ecology in west-central Illinois have included a serological survey for infectious disease agents of raccoons (Mitchell et al. 1999a), an examination of aerobic microbial flora (Mitchell et al. 1999b), periodontal indices and the prevalence of cavities (Hungerford et al. 1999), raccoon survival (Mankin et al. 1999), and denning behavior (Nixon et al. 2001). Our objectives in this present report were to complete our examination of raccoon population dynamics and social relationships in a rural population exposed to hunting and trapping pressures in west-central Illinois.

STUDY AREA

The privately owned 23.4 km^2 study area was located in Brown County, Illinois and consisted of 59% row crops (corn [*Zea maize*] and soybean [*Glycine* max]), 13% fescue dominated pasture or forage (alfalfa [*Medicago sativa*]-clover [*Trifolium* sp.] or wheat [*Triticum aestivum*]), 25% shrub and second growth upland oak (*Quercus* sp.)-hickory (*Carya* sp.), 2% farmsteads, and a few farm ponds (0.01%). The study area was fixed by the boundaries of the Wells Creek watershed in Brown County. Pastures grazed by domestic livestock were scattered throughout the study area. Raccoons had access to waste grain, livestock feed and some garbage from scattered farmsteads. This area was open for raccoon hunting and trapping each fall (November–January each year) and occurred on most farms on the study area.

METHODS

Livetrapping was undertaken each spring (March–June) and fall (August–October) on the study area from fall 1989 through fall 1993. Homemade box traps were baited with sardines and set for 10–30 days, with traps placed in areas likely to attract raccoons rather than placed in any type of regular configuration. Trap density varied with trapping success over the study area. Raccoon handling followed the animal protocol procedures outlined by the University of Illinois Institutional Animal Care and Use Committee. Captured raccoons were sedated using Telozol (Tiletamine HCL and Zolazepam HCL, Fort Dodge Labs, Inc, Fort Dodge, Iowa) given intramuscularly at 5 mg/kg of weight. Raccoons were allowed to remain in a trap until fully recovered from sedation and then released. Captured raccoons were ear-tagged using rotatable tags, sexed, weighed (first capture only as a juvenile, yearling, or adult), field aged (as birth year or after birth year), examined for external parasites, bled using heart puncture, measured for length and checked for tooth cavies and general oral condition. A fecal sample was also taken for parasite and disease diagnosis and a premolar tooth extracted from raccoons > 1 year old for aging using tooth cementum annuli (Grau et al. 1970). Females were checked for signs of nursing during the spring trapping period. Breeding rates of females on our study area were then compared with placental scar counts from west-central Illinois raccoons examined at the Peradi Brothers Fur and Wool Company, Farmington, IL by G. C. Sanderson during 1990–93 (G. C. Sanderson, Illinois Natural History Survey, personal communication 1995).

Without a rigorous trapping design, mark recapture analysis based on a JOLLY-SEBER analysis (Pollock et al. 1990) produced very high variances around a mean value. We used the minimum number of raccoons known present during each trapping period, developed from the age structure of captured raccoons each trapping period minus known dispersals and deaths.

We determined longevity of individuals on the study area based on recaptures and known mortality and dispersals reported to us by the public. When a marked raccoon disappeared from the area between trapping periods we used the midpoint between trapping efforts as an approximate disappearance date. Causes of mortality were also developed from necropsies of radio marked and eartagged raccoons.

Radio transmitters (Advanced Telemetry Systems, Isanti, MN) equipped with a motion sensitive switch were placed on 22 males (8 juveniles, 14 adults) and 24 females (7 juveniles, 4 yearlings, 13 adults). Radio marked raccoons were located using 2 truck-mounted, 8-element yagi antennas aligned in a null configuration. Each radio location was derived from 2–5 bearings taken from fixed locations generally less than 400 m apart scattered over both study areas. In summer, location error using >100 known radio-locations varied from a low of 77 m using 4 bearings to 147 m using 2 bearings. Location errors in winter fell between these bearings. Accuracy of locations was verified using transmitters placed at known locations throughout each study area, as well as a line-of-sight to a known transmitter location to align the antennas. These data indicated that raccoon locations could usually be accurately located within the 1-ha grids that covered the study area. Raccoons were radio located 2–4 times per week throughout the year usually from late afternoon to 2–4 hours post sunset, with locations taken < 60 min. apart. Locations produced by radio fixes were validated using the computer program LOCATE II (Nams 1990) and then assigned to a 1-ha grid. Radios emitting a mortality signal were located on foot using a hand antenna. Seasonal home ranges of radio marked raccoons were determined using the program RANGES IV (Kenwood 1990). Home range area was calculated using the harmonic mean method (Dixon and Chapman 1980) and was defined as the 75% outer convex polygon. Wandering-feeding movements of raccoons were determined by locating raccoons in a diurnal resting site and then relocating them periodically up to 4 hours after sunset. Known dispersal rates were calculated from movements of radio marked raccoons as well as from deaths of ear-tagged raccoons off the study areas.

Raccoons may or may not demonstrate sex related territorial behavior in Illinois (Gehrt and Fox 2004, Gehrt and Fritzell 1998). To examine this aspect of social behavior, we radio marked 10 adjacent adult raccoons (3 male pairs, 2 female pairs), 4 pairs on the study area and 1 pair on an adjacent state park and collected at least 6 months of movements (including simultaneous locations if possible). We then removed one member of each pair and monitored the movements of the remaining raccoon to see if home range locations changed after removal of the neighbor. Changes in home range shapes of remaining adults after removal of the neighbor were measured to see what portion remained constant, were abandoned, or were totally new in relation to the neighbor's home range.

Radio locations for all radio marked raccoons were grouped into periods bounded by important behavioral or physiological changes that potentially affect movement patterns. The winter period (1 December–15 March) was one of weight loss, communal denning, breeding, and reduced movements during inclement weather. Spring (16 March–31 May) brought weight gains for both sexes and birth and early kit growth. Summer (1 June–30 September) was a time of rapid kit growth, increasing movements of females and young, and abundant food sources. Fall (1 October-30 November) included weight gains prior to winter and partial or complete family breakup.

Comparisons between the sexes and ages of raccoons were examined using Oneway Anova and Chi-squared analysis where appropriate (Sokal and Rohlf 1995). Means are reported with standard errors.

RESULTS

Raccoon numbers

Between fall 1989 and fall 1993, we captured 440 individual raccoons on the study area (249 males and 191 females). Usable data were obtained for this report only from 346 raccoons (208 males and 138 females), with the remainder dying early, dispersing, or never located again. The minimum known number of raccoons present ranged from an average of 115 in the fall (range 71–171) to 90 in the spring (range 58–124) (4 seasons), indicating a density of about 4.5 raccoons km^2 on the study area during our trapping program.

Pooling captures from all 4 years, sex ratios were significantly different between age classes in the spring ($X^2 = 14.2$, df = 4,225, P < 0.006) due to a preponderance of males in the yearling and 2-year-old classes and more abundant females in the older classes (Table 1). This same pattern repeated in the fall trapping but the sex ratios were not significantly different (P = 0.08). Higher mortality and dispersal behaviors for males likely accounted for the differences in sex ratios in the older age classes (Table 1).

Breeding rates and recruitment

Yearling breeding rates, evidenced by nursing, averaged 46% on the study area (range 33–54%, N = 41) and were lower than those recorded using placental scar counts at the Peradi Brothers Fur and Wool Company for raccoons killed in west-central Illinois for 1990–1993 (50%, N = 32, range = 33–67%) (G. C. Sanderson, Illinois Natural History Survey, personal communication 1995). Adult female breeding was also lower (87%, N = 60, range = 80–93%) than for females examined at the fur house (98% parous, N = 53, range = 75–100%) and other areas in Illinois (Sanderson and Hubert 1981). A higher breeding rate based only on placental scars would be expected because of in utero mortalities and, in the raccoon, the presence of scars from previous pregnancies (Sanderson and Nalbandov 1973).

A crude estimate of kit recruitment to weaning age was possible using placental scars found in females examined at the fur house compared with the number of juveniles per breeding female captured in the fall on our study areas. The losses of young (death and dispersals) averaged 26% for the 4–6 months interval between birth and capture. A trap bias favoring juvenile captures is at least partially offset by the dispersal tendencies for post-weaned young.

Body weights and condition

Body weights were not obtained from all captures because of time constraints (multiple captures/day), physical deformities, or an obvious appearance of poor condition. Older age classes weighed more into their 3rd year (Table 2). Age class body weights (juveniles, yearlings, and adults) did not differ between seasons for either sex. Spring and fall weights of male yearlings were significantly heavier than female yearling weights (P < 0.03), and two-year old males were heavier than two-year old females in the fall (P < 0.007) but not in the spring. Three-year old and older male raccoons were significantly heavier than females during both trapping seasons (P < 0.01). As reported by Mankin et al. (1999), there were no significant differences in condition indices (body mass/body length^3 X 100,000) between males and females within any age group (P > 0.17) in this population. Male condition significantly increased from spring to fall (F = 4.8, P < 0.001), while adult female condition remained fairly constant throughout the year (P = 0.17) (Mankin et al. 1999).

Known dispersals

Dispersal behavior declined slowly in males as they matured but declined abruptly in females after their first year of life. Yearling and older males were much more likely to disperse away from their natal area than females (Table 4). Dispersal tendencies of both sexes of juveniles were similar. Males were also more likely to disperse farther away than were females. Three males were killed > 32 km from the study area, a juvenile shot 40 km east, a yearling shot 35 km northwest, and a yearling trapped 42 km northwest of the study area.

Longevity and mortality

Females remained on the study area longer than males for all 3 age classes, but the differences were not significant ($P > 0.05$). Female juveniles averaged 8.5 ± 1.0 months (N = 51) on the study area while male juveniles averaged 6.9 ± 0.9 months (N = 68). For yearlings, females averaged 8.9 ± 1.2 months (N = 51) and males 6.3 ± 0.8 months (N = 78). Adult females averaged nearly 1 year on the study area (11.1 ± 1.5 months; N = 50), and adult males averaged 8.2 ± 1.3 months.

A total of 10 males and 14 females survived to 5 years and older. Three males reached 6 years and 2 reached 7 years. For females, 9 reached 6 years and 1 reached 7 years when killed. Female #838, tagged as a juvenile in fall 1993, was killed at the age of 12 years on the highway in December 2005 close to its capture site.

Hunting and trapping, highway accidents, and various diseases were the leading causes of known mortality for raccoons on the study area (Table 4). Hunting and trapping losses accounted for 69% of the known mortality. Proportionate losses to various mortality agents were about the same for both sexes, with males more likely to be harvested and females to die of disease.

Home ranges and local movements

For each sex, there was no significant difference in home range size among seasons ($P > 0.05$). Females averaged smaller home ranges compared to males throughout the year, except in fall for > 2 year old females (Table 5). Seasonal home range averages were similar between sexes ($P > 0.05$).

Wandering-feeding movements of radio marked raccoons averaged less for males (212 m/hr) than for females (277 m/hr) during winter ($P < 0.05$) (Table 6). Movements of both sexes were similar during the remainder of the year. During the breeding season there were 13 days where males were located on consecutive days. For 10 of these days movement was < 100 m. Three other daily movements were 860 m, 861 m, and 608 m, respectively. For females during the same period, there were 12 days with no movement between locations and 1 movement of 3,111 m between day beds. During the parturition period, 2 movements of females were < 100 m, and one movement totaled 223 m. During summer, 8 movements were < 100 m, and 9 movements averaged 582 m with a range of 141–1,334 m.

Social relationships

For the 5 pairs of adjacent raccoons > 1 year old (2 pairs of females, 3 pairs of males) that were monitored pre-and post removal of one member, all but the parous pair of females (#299 and #499) showed significant home range overlap (> 50%) during the pre-removal phase of study (total telemetry locations all pairs = 2,145).

For the 3 adult males remaining post-removal, 2 males increased their home range, and 1 decreased the size of its range. All 3 males moved into new areas and changed their centers of activity after removal of their neighbor, but they made no directed moves into the newly vacated neighbor's range. The change in male activity centers averaged 500 m (range 200–940 m) after neighbor removal with an average of 24% of each home range into a new area (range = 9.5–33%). Only male #670 moved into the previous neighbor's range to any extent (22% of the post removal range). Prior to removal of a neighbor, males did not socialize with each other to any extent in winter or spring (mean distance apart averaged between 232–276 m when simultaneously radio-tracked, locations = 211). During summer and fall, these males were occasionally located within the same hectare (1 pair were together about 30% of the time [N = 16 locations], another pair 20% of the time [N = 23 locations]) but these pairs averaged between 206–403 m apart.

Both remaining females increased their range after removal of their neighbor by occupying totally new territory (not part of the previous neighbor's range) averaging 31% of the post-removal home range. We also found that our 2 female pairs did not socialize during the year, averaging between 370–833 m apart (N = 4–16 simultaneous locations per season). These changes in home range observed over time were mimicked for our other radio marked samples of both sexes, with seasonal changes common as raccoon aged and neighbors were killed or dispersed. It should be pointed out that we did not control for new adults moving into the vacated ranges, for any subadults maturing in the vacated ranges, and for any unmarked and unknown adults that may have been present in both pre-and post-removal home ranges.

DISCUSSION

Rural raccoons in west-central Illinois appeared to be above average in weight with males heavier than females, were breeding at a level consistent with a healthy population (Fritzell et al. 1985), and were relatively stable in numbers during our study. Body weights continued to increase at least into the third year, a reflection of good nutrition and success at locating food sources. Annual survival rate of radio marked raccoons averaged 0.74 ± 0.07 in this population (Mankin et al. 1999). Raccoon density on our study area was similar to rural populations studied in McHenry County (Prange et al. 2004) but lower than densities for 2 areas in Lee County (Stevens et al. 1995), both in northern Illinois. Rural populations appear to be consistently smaller than suburban or urban populations, the result of lower survival and site fidelity for both sexes in rural habitats (Prange et al. 2004). Females survived on the area longer than males, were less likely to be killed by hunters and trappers, and remained in good condition throughout the year. Higher mortality and dispersal behavior for males likely accounted for the difference in sex ratios in the older age classes. Males occupied larger home ranges, were more likely to be killed, and lost condition during the winter months. Family breakup occurred both in the fall and spring, but families often remained together throughout the winter (Gehrt and Fritzell 1998). For carnivores, male home range size appears to be influenced by the spatial distribution of food supplies and female numbers and distribution, while range size of females conforms more to resource distribution (Sandell 1989).

The overlap of home ranges (> 50%) for our paired raccoons prior to removal of one of each pair indicated a lack of exclusive territoriality. It could be argued that the lack of movement into the vacated range by the surviving raccoon was the result of aggression by the resident prior to removal. However, based on simultaneous radiotracking prior to any removal, raccoons were seldom together and gave no indication that aggression had occurred (rapid movements away from each other, no injuries were observed). The male pairs did travel together occasionally in summer and fall.

There seems to be a mutual avoidance behavior most of the year for both sexes with males more likely to associate at least occasionally. Radio marked raccoons were almost always observed feeding alone except for mother and young associations. Our marked raccoons did seek out communal feeding sites throughout the year and denning sites in winter, and a dominance hierarchy was evident at these sites (visual observations).

Gehrt and Fox (2004) reported that raccoons in northern areas of North America were considered solitary in habit with spatial overlap greatest during the winter months. However, Pitt et al. (2008) found male raccoons organized as 2-member coalitions that were territorial in southern Manitoba, Canada, a population at the edge of their continental distribution. Each of these coalitions overlapped several female ranges. At least some males in the southern United States, also manifest territorial behavior to other males. Gehrt and Fritzell (1997) found some males were arranged in intra-sexual groups in all seasons in south Texas. Chamberlain and Leopold (2002) also noted some male groups manifested territorial behavior in Mississippi. Male home ranges are usually larger than female ranges and overlap several female ranges (Barding 2006, Prange et al. 2004, Walker and Sunquist 1997). Females throughout their range occupy overlapping home ranges but, except at communal feeding sites, do not socialize with other females (Fritzell 1978, Barding 2006, Gehrt and Fox 2004, Suzuki et al. 2003, Pitt et al. 2008). We captured adults of both sexes at the same livetrap location during each trapping period, indicating the raccoons were occupying overlapping home ranges on our study area. Roy Nielsen and Nielsen (2007) reported that many raccoon litters had multiple sires indicating > 1 male had access to these estrous females. While we were unable to demonstrate any obvious terroritial behavior among west-central Illinois raccoons, such behavior remains a possibility.

Our limited radio tracking bed-to-bed of both sexes obviously underestimated daily movements. Summer bed-to-bed movements averaged 3.2 km for adult males, 2.4 km for yearling males, 1.6 km for adult females, and 1.5 km for barren females in North Dakota (Greenwood 1982). Mech et al. (1966) and Barding (2006) reported movements closer to our findings, ranging from 232–956 m.

Without a resurgence in raccoon fur prices, hunting and trapping will likely not materially reduce raccoon numbers in Illinois, but any reduction in numbers would aid in reducing raccoon densities. Clark et al. (1989) determined that harvest levels must exceed 40% of the raccoon population to become additive to overall mortality and to significantly affect subsequent densities. There is no indication that harvests in Illinois are approaching this level at present (Bluett and Hubert 1992). Local populations are also subject to canine distemper viral outbreaks, generally on a 3–5 year cycle (Mitchell et al. 1999a, Lotze and Anderson 1979). These localized reductions are usually quickly replenished by dispersers from unaffected populations, usually juveniles and adult males (Barton and Roth 2007). The steady increase in the spread of suburban housing throughout Illinois is also increasing human and raccoon interactions (Prange et al. 2004) and causing a resultant upsurge in nuisance complaints (Bluett 1995).

ACKNOWLEDGEMENTS

We are grateful to J. Seets, M. A. Mitchell, and G. R. Lang for their assistance in this study. We also thank the landowners of the Wells Creek watershed for allowing us access to their farms. G. F. Hubert, Jr., Illinois Department of Natural Resources, provided financial and logistical support. This study was supported by the Federal Aid in Wildlife Restoration Project W-104-R, the Illinois Department of Natural Resources, the U.S. Fish and Wildlife Service, and the Illinois Natural History Survey cooperating.

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Table 1. Sex and age of raccoons livetrapped in Brown County, Illinois, 1989–93. Numbers are summaries of all raccoons captured each year.

	Fall				Spring			
Age (in years)	Males	%	Females	%	Males	%	Females	%
< 1	76	42.4	66	48.9	—[a]	—	—	—
1	47	26.2	22	16.3	58	47.1	36	32.7
2	34	18.9	18	13.3	38	30.9	27	24.5
3	9	5.0	11	8.1	16	13.0	19	17.3
4	6	3.3	8	5.9	5	4.1	12	10.9
≥ 5	7	3.9	10	7.4	6	4.9	16	14.5
Total	179		135		123		110	

[a]juveniles too young to livetrap

Table 2. Body weights of raccoons at first capture in Brown County, Illinois 1989–93.

		Males			Females		
			Mean Weight			Mean Weight	
Age (in years)	Season	N	Kg	S.E.	N	Kg	S.E.
< 1	Fall	47	3.7	0.14	35	3.5	0.15
1	Spring	33	5.3	0.14	28	4.5	0.12
	Fall	18	5.5	0.19	8	4.7	0.21
2	Spring	19	5.7	0.26	7	5.1	0.30
	Fall	16	6.5	0.29	8	5.1	0.28
≥3	Spring	3	6.7	0.21	12	5.4	0.22
	Fall	3	7.6	0.23	7	5.4	0.30

Table 3. Dispersal behavior of raccoons livetrapped in Brown County, Illinois 1989–93.

			Known Dispersal	
Age (in years)	Sex	Number	N	Percent
< 1	Male	16	5	31.2
	Female	12	3	25.0
1	Male	30	10	33.3
	Female	24	1	4.2
≥2	Male	71	10	14.1
	Female	57	3	5.3

Table 4. Known causes of mortality for a marked sample of raccoons in Brown County, Illinois 1989–93.

	Females					Males				
	Juvenile	Yearling	Adult	Total	%	Juvenile	Yearling	Adult	Total	%
Harvest	11	9	17	37	67.3	11	15	27	53	70.7
Highway	3	2	3	8	14.5	0	3	7	10	13.3
Disease	0	1	8	9	16.4	0	1	6	7	9.3
Dog	0	0	1	1	1.8	0	0	3	3	4.0
Misc[a]	0	0	0	0	0	0	0	2	2	2.7
Total	14	12	29	55		11	19	45	75	

[a]one electrocuted, one poisoned

Table 5. Seasonal home ranges of radio-marked raccoons in Brown County, Illinois, 1989–93. Home ranges are defined as the 75% outer convex polygon (Dixon and Chapman 1980).

				Home Range (ha)		
Age (in years)	Season	Sex	N	Mean	S.E.	Range
< 1	Winter[a]	Male	6	59.9	15.2	16–115
		Female	8	26.6	4.9	7–47
1	Spring	Male	5	45.8	17.5	12–108
		Female	5	13.1	2.3	7–20
	Summer	Male	3	60.2	14.7	31–78
		Female	9	23.7	3.1	9–37
	Fall	Male	2	37.0	13.0	24–50
		Female	6	21.7	4.5	12–39
≥ 2	Winter	Male	11	32.0	7.4	7–82
		Female	4	22.1	5.7	12–35
	Spring	Male	7	33.8	6.8	11–71
		Female	7	24.0	9.2	3–71
	Summer	Male	18	54.3	6.0	16–109
		Female	14	51.6	12.1	15–186
	Fall	Male	18	40.1	4.2	11–88
		Female	10	44.1	7.4	17–90

[a] Winter = 1 Dec–15 March; Spring = 16 March–31 May; Summer = 1 June–30 September; Fall = 1 October–30 November.

Table 6. Raccoon movements (m/hour) between the location of a diurnal resting site and the last radio location taken 3–4 hours after sunset.

				Meters per hour	
Season	Sex	Number of raccoons	Number of locations	Mean	S.E.
Winter[a]	Male	4	30	212.3	3.5
	Female	3	34	276.6	4.3
Spring	Male	6	47	296.8	4.1
	Female	7	30	260.2	5.2
Summer	Male		----- No Data -----		
	Female	11	117	193.4	1.3
Fall	Male	4	10	372.8	14.2
	Female	3	6	373.3	15.7

[a] Winter = 1 Dec–15 March; Spring = 16 March–31 May; Summer = 1 June–30 September; Fall = 1 October–30 November.