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SPOTTED SKUNKS (*SPILOGALE PUTORIUS AMBARVALIS*) TRAPPED AT CANAVERAL NATIONAL SEASHORE AND MERRIT ISLAND, FLORIDA

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Abstract.—Mark-recapture studies on spotted skunks were conducted at Canaveral National Seashore (C.N.S.) and Merritt Island National Wildlife Refuge (M.I.N.W.R.) in 1973-1974 and in 1982-1983. Spotted skunks were captured in dry, well-vegetated habitats. Information presented herein may be useful in conserving this rapidly declining species in the central United States. A total of 243 skunks was studied. Adult males at C.N.S. in 1973-1974 had a mean weight of 398.8g (S.D. 80.7g); females averaged 282.5g (S.D. 39.4g). Mean weights for 1982-1983 were similar. Five juveniles averaged 119.2g (S.D. 38.5) in 1973-1974. Average distance between successive captures was 551 m for males and 386 m for females during 1982-1983. Data on juvenile captures from this and other studies indicate that spotted skunks on Florida's east coast have an extended period of reproduction. Capture success for both sexes was higher in the cooler months; capture probability was measured at over 0.5.

The eastern spotted skunk (*Spilogale putorius*) is threatened or rare in many mid-western states and its status is unknown in several southern states. Populations of the Florida subspecies (*S. p. ambarvalis*) are abundant in south Florida (Kaplan and Mead 1991) and in suitable habitat in east-central Florida (Kinlaw et al. 1995). Current knowledge of the biology of the Florida subspecies of eastern spotted skunks comes from Van Gelder's (1959) taxonomic revision of the species, Manaro's (1961) ecological observations, and Mead's work on reproductive biology, especially Mead (1968) and Kaplan and Mead (1994). Natural history notes on distribution are reported by Bangs

(1898), Hamilton (1941), and Schwartz (1952) and behavior by Howell (1920), Van Gelder (1953), Frank and Lips (1989), and Toland (1991). We report herein weights, movements, reproduction, capture success, and habitat utilization. This paper is a companion to our population estimation report (Kinlaw et al. 1995). The 1973-1974 study was conducted to collect baseline biological data on intermediate-sized mammals, whereas the 1982-1983 study was conducted in an effort to census spotted skunks.

METHODS AND STUDY AREA

We live-trapped spotted skunks at Merritt Island National Wildlife Refuge (M.I.N.W.R.) and Canaveral National Seashore (C.N.S.) in 1973-1974 and at C.N.S. in 1982-1983. On M.I.N.W.R. traps were set along embankments surrounding mosquito impoundments and along randomly selected stations in the interior. On C.N.S. traps were set only in the coastal strand community (Stout 1979), a continuous, dense thicket of woody vegetation with little understory. Common plants that grow here are saw palmetto (*Serenoa repens*), wax myrtle (*Myrica cerifera*), buckthorn (*Bumelia tenax*), and snowberry (*Chiococca alba*). Stout (1979) also recognized coastal dune and wetland communities along C.N.S. Average width of the coastal strand community along the 16-km strip is 150 m. An asphalt highway bisects lengthwise the southern 8 km of the seashore and a foot trail bisects lengthwise the remaining 8 km. Along C.N.S., a systematic sampling scheme was used. Traps were placed in two rows, with one row 25 m east and one row 25 m west of the road. A north-south spacing of 80 m was used between traps. The live traps used were non-collapsible, single-door Tomahawk traps (25.4 × 30.4 × 81.3 cm) and collapsible, double-door National traps (22.9 × 66.0 cm.). Traps were baited daily with commercial cat food. Captured skunks were ear-tagged and weighed. Other data collected included sex, weight, age (adult or juvenile), reproductive condition, ectoparasites, hind foot length, and trap location. A 16-km section of C.N.S. was trapped in the spring of 1973, an 8-km section in summer and winter of 1974, and a 5-km section from March 1982 to March 1983. In 1973-1974, 9820 trapnights were completed at C.N.S. and 5040 completed at M.I.N.W.R. In 1982-1983, 1259 trapnights were completed on C.N.S. Further details on trapping methodology and sex ratios of these populations can be found in Ehrhart (1976), Kinlaw et al. (1995), and Kinlaw (1990,1995, and in press).

RESULTS AND DISCUSSION

In 1973-1974, 132 skunks were captured 622 times at C.N.S. and 42 skunks were captured 80 times at M.I.N.W.R. In 1982-1983, 63 skunks were captured 112 times.

Weights of spotted skunks are in Table 1. The 1973-1974 study documented the largest male reported to date; the 1982-1983 study the largest female.

Average distance between successive captures was 335 m for males and 144 m for females during the spring of 1973. In September 1973, the means were 368 m for males and 116 m for females. Because of small sample size for the 1982-1983 data, we only report the average distance moved by each sex for all seasons: 551 m and 386 m for males and females, respectively. We also recorded the maximum straight-line distance moved by each individual. Means of these maximum distances for spring of 1973 was 1332 m for males and 282 m for females. Means for males and females in the summer of 1973 were 1006 m and 107 m, respectively. For 1982-1983, we only report a sin-

Table 1. Weights (g) of spotted skunks captured at Canaveral National Seashore (C.N.S.), Merritt Island National Wildlife Refuge (M.I.N.W.R.), and from Van Gelder (1959).

	<u>C.N.S.</u>		<u>M.I.N.W.R.</u>	<u>Van Gelder</u>
	1973-1974	1982-1983	1973-1974	(1959)
	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD
	(n)	(n)	(n)	(n)
Adult males	398.8 \pm 80.7	391.3 \pm 81.9	431.1 \pm 89.3	396.3
	(94)	(27)	(36)	
Adult females	282.5 \pm 39.4	290.4 \pm 48.4	224.5 \pm 50.4	305.0
	(38)	(36)	(6)	
Juveniles	119.2 \pm 38.5	115	—	—
	(5)	(1)		
Largest male	700	535	700	527
Largest female	365	375	300	339

gle value, the longest single distance moved: 1760 m for one male and 800 m for one female.

Van Gelder (1959) postulated that Florida spotted skunks have a bimodal distribution of annual parturition, with the first births occurring in late July-August and the second occurring in winter. However, Mead (1968) provided data to show that reproduction is simply extended rather than bimodal, via a prolonged or recurring estrus period. Females that have not mated or have lost their first litter of the year may breed until early July (R. A. Mead, *in litt.*) but by October testes size, number of sperm, and serum concentration of testosterone of males are at a low point in the cycle (Kaplan and Mead 1994). We captured five juveniles during August-September 1973 and one in August 1982. These juveniles would have been born in May-June of each respective year, and thus derived from a March-April mating. Manaro (1961) captured nine juveniles in February-March 1958 approximately 30 km north of C.N.S. Manaro's (1961) animals would have been born in September-October and derived from a July-August mating. Our field data along with those of Manaro (1961) confirm Mead's hypothesis.

An observation was made of a dispersing spotted skunk. A juvenile female weighing 115 g was first captured on 19 August 1982, and then recaptured 3040 m away on 26 October 1982. She was recaptured for the third time on 19 January 1983, 4640 m from her first capture site.

On two different occasions (20 September 1973 and 19 August 1982), two different spotted skunks were captured together in the same trap. Probably these individuals were foraging in pairs.

Capture success for both studies was better during cooler months than hotter months. At C.N.S., males averaged 2.74 and 3.18 recaptures/individual during the spring of 1973 and winter of 1973-1974, respectively. Males averaged 3.10 recaptures for the entire 1982-1983 study period. Female recaptures averaged only 1.00 in the spring 1973, but 3.15 for the entire 1982-1983 period. The capture probability—defined as the probability that an individual will be captured on any given trapping occasion given that it is alive (Otis et al. 1978), was calculated as greater than 0.50 by both the CAPTURE (Otis et al. 1978) and JOLLY (Pollock et al. 1990) computer programs for the spring of 1973. The population density was 40 skunks/km² during the spring of 1973 (Kinlaw et al. 1995). An analysis of the effects of weather on catchability is reported in Kinlaw et al. (1995).

In 1973-1974 spotted skunks were abundant in all of the drier habitats at M.I.N.W.R.; no skunks were taken in semi-aquatic habitats. In 1982-1983 more skunks were captured in the southern half of C.N.S., consisting of almost 100% ground cover of *Serenoa repens*, *Chiococca alba*, *Myrica cerifera*, and *Bumelia tenax*. The northern half of C.N.S. was considerably more open, with scattered patches of *Spartina* and *S. repens* ($X^2 = 5.14$, $p < 0.025$). These observations confirm those of Van Gelder (1959) that spotted skunks prefer well-vegetated areas.

In south Florida, eastern spotted skunks will enter Sherman live-traps in pursuit of rodents already captured (I. J. Stout, pers. comm.). One spotted skunk was captured in a trap also containing a dead cotton rat (*Sigmodon hispidus*).

Little information is available in the literature on the physical condition of wild spotted skunks. Van Gelder (1959), using museum specimens, reported lesions of the frontal sinuses in adult and sub-adults, and that one juvenile had signs of parasitic infection to its cranium. In this study, six captured skunks were blind in one eye and one skunk was completely blind. Many captured skunks had wounds on the head and above one or both eyes. Whether these abrasions came from scraping against the serrated saw palmetto or from attempting to escape from traps is not known (Kinlaw 1995, in press). Six had missing claws or swollen feet, one had a mutilated tail, one lacked control of the rear extremities, and many had infected ears (both tagged and untagged). Two tick species (*Dermacentor variabilis* and *Ixodes cookei*) were common, along with fleas and chiggers around the head of some individuals.

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