

BEHAVIORAL ECOLOGY AND MANAGEMENT OF STRIPED SKUNKS IN GREAT SMOKY MOUNTAINS NATIONAL PARK

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ONE OF THE MANY EXCITING WILDLIFE encounters experienced by visitors to Great Smoky Mountains National Park, Tennessee, is meeting a striped skunk (*Mephitis mephitis*). Such encounters often produce wonderment, fear, and ambivalent actions by visitors. What will the skunk do? What will the visitors do? What kind of behavior will the encounter elicit from the skunk? Animal behavior in the wild and in situations where human contact is probable yields information about the biology and ecology of the animal that may influence management decisions affecting this valuable wild natural resource. Researchers at the University of Tennessee, Knoxville, are currently studying the striped skunk in Great Smoky Mountains National Park in order to better understand its behavioral ecology in the wild and to produce information that will be helpful to park natural resource managers and interpretive staff.

While many behaviors of striped skunks, such as reproductive and denning behaviors, have been studied, many facets are still not fully understood. A mustelid, the striped skunk is a solitary carnivore. It does not behave like social animals in that it does not cooperate with other members of the species to find food, defend territory, locate shelter, or select a mate. This does not mean that skunks do not interact at all with other skunks. Skunks have been observed to den in groups of up to 19 in Canada (Gunson and Bjorge, 1979). Park rangers and visitors report observing adult striped skunks (presumably mother skunks) often accompanied by 3 to 5 young trailing behind in the early evening hours in park campgrounds.

Researchers in the Smokies are attempting to understand the home ranges of the striped skunk. Home range is an important facet of behavior to study because it may yield information that not only helps behavioral ecologists learn

Coauthor Andrea Bixler weighs an anesthetized skunk that was probably less than 2 months old. Researchers measured each captured skunk for weight, head-body length, tail length, and upper canine length.



more about the behavior of this solitary carnivore, but also may help park personnel manage this important member of the mountain community. For example, we do not know how striped skunk relatedness affects home range overlap. If relatedness is an important component in determining home range, how do individual striped skunks communicate relatedness? Knowledge of this behavior would influence decisions regarding relocation of individual striped skunks when necessary.

Skunks are well known for their ability to spray musk when frightened or threatened. A long held belief is that this noxious spray evolved exclusively for defense against predators such as bobcats, coyotes, foxes, and owls (although it is not effective against owls as owls are unable to smell!). However, it is possible that skunks also could use this powerful and persistent odor to communicate with other skunks. Communication by odor (chemocommunication) is often observed among solitary carnivores and may be used to convey information about genetic relatedness, among other things (Gorman

and Trowbridge 1989). Individual differences in the composition of the musk sprayed by striped skunks may represent genetic differences useful in kin recognition. Striped skunks may be able to recognize kin and respond differentially to them based on scent differences. It is also possible that differences in spray composition are due to sex, age, diet, body size, or time since the skunk last sprayed.

Skunks may also space their home ranges according to relatedness. In other members of the mustelid family, while male and female ranges commonly overlap, males possess home ranges exclusive of other males, and females possess home ranges exclusive of other females (Powell 1979). However, a trap-recapture study in Cades Cove campground of Great Smoky Mountains National Park found that both male and female home ranges overlapped each other (Goldsmith 1980). Research currently in progress in the larger Cades Cove subdistrict may yield similar findings on skunk home range area and overlap.

From January 1993 through February 1995 researchers devoted over 260 nights to trapping and radio-tracking skunks in the Cades Cove area of the park. By February 1995 over 2,500 trap nights with a trap success of about 2.5% (56 skunks not including 14 recaptures) had been completed. Trap success has varied from month to month with most captures occurring during February. This is probably because skunks leave their winter dens and move extensively in search of food and mates during this time.

TABLE 1 PRELIMINARY HOME RANGES COMPUTED FOR 9 COLLARED STRIPED SKUNKS

Sex	# Locations	# Nights	Home Range
F	157	84	1.35 km ²
F	133	51	0.45 km ²
F	96	53	0.54 km ²
F	230	102	1.05 km ²
F	184	125	1.27 km ²
M	51	34	1.69 km ²
M	62	45	0.58 km ²
M	64	45	0.92 km ²
M	137	90	0.90 km ²

(1 km²=0.386 square miles)

Preliminary home ranges computed for 9 radio-collared animals using the minimum convex polygon method from WildTrak software is presented in table 1. Only those skunks located at least 50 times are included. Since multiple locations were sometimes made on the same night, the number of nights the researchers tracked each animal is also given. The nights were not necessarily consecutive.

All skunks inhabiting home ranges within 2 km (1.2 mi) of the Cades Cove picnic area and campground make occasional forays into these areas. This has implications for skunk management, as relocation of skunks found in the picnic area and campground over a period of a few days would not eliminate all the skunks that use the area. Data collected thus far indicate that female skunk home ranges overlap extensively, up to 90% of each animal's total range. Male skunk ranges overlap as much as 85%, and males

overlap females by 10% of total range. These data suggest that many more skunks may inhabit an area than is apparent from just the size of their home ranges.

Through the use of radiotelemetry, researchers are monitoring skunk movements and home ranges. Laboratory analyses of blood and genetic assays are being used to see whether and how relatedness is associated with spacing patterns in the wild. The scientists are also conducting biochemical analyses of the composition of musk to see if spacing patterns are mediated by individual odors.

Analyses of collected scent samples are continuing. These careful field studies are exploring the behavioral ecology of the striped skunk and are increasing our knowledge of this animal.

In contrast to these studies, which give a more complete picture of the species, visitors often glimpse the striped skunk only in park campgrounds when the creatures make their nightly rounds in search of food. While sightings like this can be a source of enjoyment for many visitors, the experience is often artificial and not an accurate view of the natural world.

In the wild, striped skunks forage and hunt at night locating prey primarily by smell and sound. Their natural diet includes various insects and insect larvae that they acquire by clawing holes in the ground. Striped skunks eat small reptiles and amphibians such as lizards and frogs. Skunks also will eat carrion and will occasionally stalk and take smaller mammals. The skunks also range beyond campgrounds; according to Linzey and Linzey (1971), the striped skunk has been observed at elevations up to 5,200 feet in the park. Viewing these animals scavenging through picnic and campground trash may not be the lasting impression of the wild that will insure public support for the continued preservation of wildlife.

A better understanding of the behavior of these animals can help guide natural resource managers to make good decisions for the benefit of the animal, to use appropriate management techniques, and to provide visitors with the best of experiences the natural world has to of-

fer. The results of behavioral research can also provide interpreters with interesting and accurate information that can be passed on to park visitors, enhancing visitor appreciation and understanding of wildlife. The ongoing study of the behavioral ecology of striped skunks is an important step in the understanding and management of this beautiful solitary carnivore of Great Smoky Mountains National Park.



REFERENCES

- Goldsmith, D.M. 1981. The ecology and natural history of striped skunks in the Cades Cove campground, Great Smoky Mountains National Park, Tennessee. M.S. thesis, University of Tennessee.
- Gorman, M.L. and B.J. Trowbridge. 1989. The role of odor in the social lives of carnivores. Pages 57-88 in J.L. Gittleman, editor. Carnivore Behavior, Ecology and Evolution. Cornell University Press, Ithaca.
- Gunson, J.R. and R.R. Bjorge. 1979. Winter denning of the striped skunk in Alberta. Canadian Field-Naturalist 93(3):252-258.
- Linzey, A.V. and D.W. Linzey. 1971. Mammals of Great Smoky Mountains National Park. The University of Tennessee Press, Knoxville.
- Powell, R.A. 1979. Mustelid spacing patterns: Variations on a theme by Mustela. Z. Tierpsychologica 50:153-165.

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