

MAMMALS OF SHILOH NATIONAL MILITARY PARK

REPORT

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The following pages, slides, and collection of articles represent a report prepared for Shiloh National Military Park concerning a small mammal research project conducted during 1983 and 1984. The report lists the species verified during the study. Additional information has been included to make the inventory more complete. Selected information and slides have been added in order to provide resources from which material for interpretive programs could be drawn. The format of the report is such that new material could be added as it becomes available. Sections of the report are as follows:

- I. Checklist of Mammals
- II. Information on Selected Species
- III. Mist Netting Bats
- IV. Determining Relative Abundance of Selected Species by Scent Station Lines
- *
V. Slides of Raccoon Studies and Available Mammalian Species

*IVa. Survey of the ABUNDANCE OF medium-sized MAMMALS ON Shiloh N.M.P. - By PAUL LeBERG msu.

CHECKLIST OF MAMMALS

Shiloh National Military Park

Listed below are the species of mammals which are indicated by the current literature to occur on Shiloh National Military Park. Species marked with a single asterisk (*) have been verified by collection, sighting, or sign. Species marked with a double asterisk (**) are endangered species which have been verified on the site.

Order Marsupialia, ~~Marsupials~~

Family Didelphidae

- * Didelphis virginiana Opossum /

Order Insectivora, Insectivores

Family Soricidae

- * Sorex longirostris Southeastern Shrew
- * Blarina carolinensis Southern short-tailed shrew
- Cryptotis parva Least shrew

Family Talpidae,

- * Scalopus aquaticus Eastern mole

Order Chiroptera, Bats

Family Vespertilionidae

- * Myotis lucifugus Little brown myotis
- * Myotis austroriparus Southeastern myotis
- ** Myotis grisescens Gray myotis
- * Myotis keenii Keen's myotis
- ~~**~~ Myotis sodalis Indiana myotis - not verified on site
- Myotis leibii Small-footed myotis

- * Peromyscus leucopus White-footed mouse
- * Peromyscus gossypinus Cotton mouse
- * Ochrotomys nuttalli Golden mouse
- Sigmodon hispidus Hispid cotton rat
- Neotoma floridana Eastern wood
- Synaptomys cooperi Southern bog lemming
- Microtus ochrogaster Prairie vole
- * Microtus pinetorum Woodland vole
- Ondatra zibethicus Muskrat

Family Muridae, Murids

- Rattus rattus Black rat
- Rattus norvegicus Norway rat
- * Mus musculus House mouse

Family Zapodidae

- Zapus hudsonicus Meadow jumping mouse

Order Carnivora, Carnivores

Family Canidae

- * Canis latrans Coyote
- * Vulpes fulva Red fox
- * Urocyon cinereoargenteus Gray fox

Family Procyonidae, Raccoons and Allies

- * Procyon lotor Raccoon

Family Mustelidae, Mustelids

- Mustela frenata Long-tailed weasel
- * Mustela vison Mink
- * Mephitis mephitis Striped skunk
- Spilogale putorius Eastern spotted skunk
- Lutra canadensis River otter

* Lasionycteris noctivagans Silver-haired bat

* Pipistrellus subflavus Eastern pipistrelle

Eptesicus fuscus Big brown bat

* Lasiurus borealis Red bat

* Lasiurus seminolus Seminole bat

* Lasiurus cinereus Hoary bat

* Nycticeius humeralis Evening bat

Plecotus rafinesquii Rafinesque's big-eared bat

Order Edentata, Sloths, Anteaters, and Armadillos

Family Daspodidae

* Dasypus novemcinctus Nine-banded armadillo

Order Lagomorpha, Hares, Rabbits, and Pikas

Family Leporidae

* Sylvilagus floridanus Eastern cottontail

Sylvilagus aquaticus Swamp rabbit

Order Rodentia, Rodents

Family Sciuridae,

Tamias striatus Eastern chipmunk

* Marmota monax Woodchuck

* Sciurus carolinensis Gray squirrel

* Sciurus niger Fox squirrel

Glaucomys volans Southern flying squirrel

Family Castoridae, Beavers

* Castor canadensis Beaver

Family Cricetidae, Cricetids

* Oryzomys palustris Marsh rice rat

* Reithrodontomys humulis Eastern harvest mouse

Peromyscus maniculatus Deer mouse

Family Felidae, Cats and Allies

* Felis rufus Bobcat

Order Artiodactyla, Artiodactyla

* Odocoileus virginiana White-tailed deer

NOTES

Endangered Species.--The gray myotis (Myotis grisescens) probably forges over most all of Shiloh National Military Park. However, since suitable dwellings are lacking, it is doubtful that the Park serves the species in any other way. Caves which the species are known to use occur in proximity to the Park. Protected feeding areas are important to the species. Much is yet to be learned concerning the role of such areas to bats. The Indiana myotis (Myotis sodalis) probably also uses the Park in forging. The forested area of the Park along Owl Creek should be investigated in more detail. This habitat is similar to that used by females in rearing young. Little is known about the summer habits of this species. Only a few summer nursery colonies have been identified.

Check List.--The deer mouse (Peromyscus maniculatus) and eastern spotted skunk (Spilogale putorius) are shown by distribution maps in the literature to occur on the Park. These occurrences are doubtful.

Abundance.--The most abundant small mammals on the Park appear to be the white-footed mouse (Peromyscus leucopus) and the woodland vole (Microtus pinetorum).

Mountain Lion.--Some distribution maps in the literature indicate the presence of the mountain lion (Felis concolor) in Tennessee. However, there are no recent verified records of this species in the state.

Red Wolf.--Some distribution maps in the literature indicate the presence of the red wolf (Canis niger) in Tennessee. There are no recent verified records of this species in the state.

Small Mammals Actually Collected.--Blarina carolinensis, Sorex longirostris, Scalopus aquaticus, Myotis lucifugus, M. keenii, M. austroriparius, Lasiurus borealis, L. seminolus, L. cinereus, Lasionycteris noctivagans, Nycticeius humeralis, Pipistrellus subflavus, Peromyscus leucopus, P. gossypinus, Oryzomys palustris, Ochrotomys nuttalli, Mus musculus, Microtus pinetorum, and Reithrodontomys humulis.

**SURVEY OF THE ABUNDANCE OF
MEDIUM-SIZED MAMMALS ON
SHILOH NATIONAL MILITARY PARK**

Prepared by

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February, 1985

Since human activities such as hunting and trapping are forbidden on national parks, they serve as sanctuaries for many species of wildlife. This protection may allow populations to grow at faster than normal rates and, perhaps, exceed carrying capacity. When populations reach high levels, they may have an impact on both habitats and humans. Dense concentrations of wildlife may be highly visible and useful in attracting visitors; however, such concentrations may be more prone to disease outbreaks (e.g., rabies and distemper) that can affect people as well as domestic and native animals. High levels of herbivores can drastically affect the vegetational composition of an area, and predator populations may or may not mediate these effects. Feral domestic animals are often found on protected areas. High populations of such species may also have an impact on natural environments. Since high population levels of many species may have economic, social, and biological influences, it is important to monitor wildlife populations.

The purpose of the present study was to obtain basic population data on medium-sized mammals of Shiloh National Military Park. Raccoons (Procyon lotor) and opossums (Didelphis virginiana) were the species of primary interest; however, information was also obtained on skunks (Mephitis mephitis), domestic cats (Felis domesticus) and domestic dogs (Canis familiaris). With the protection offered by national parks to wildlife populations and with the removal of most large predators from western Tennessee at the turn of the century, population levels in this region, as well as others, are in need of examination.

STUDY AREA AND METHODS

Two sites were studied on Shiloh National Military Park in Hardin County, Tennessee. A 9 X 9 trap grid was established on one site adjacent

to the Tennessee River (Fig. 1). This grid was open for 27 days between 28 December 1983 and 30 January 1984. The northern boundary of the grid closely followed the northern boundary of the park from the Tennessee River to the intersection of Highway 22 and Grant Road. The southwestern corner of the grid was located near the point where Confederate Road crossed Glover Creek. The overstory was comprised of white and red oak (Quercus spp.), sweetgum (Liquidambar styraciflua), and juniper (Juniperus virginiana) on the ridge tops, and beech (Fagus grandifolia) and yellow poplar (Liriodendron tulipifera) in the hollows. Topography of the area consisted of alternating ridge tops and hollows with steep slopes. Streams were found in most of the hollows. Several large agricultural fields and mowed areas were also present.

Site 2 was located in the Owl Creek drainage system. A 4 X 11 trap grid was trapped on this site for 21 days between 28 December 1983 and 17 January 1984 on this site. One of the long sides of the grid paralleled Owl Creek with the southwestern corner being located at the southwestern corner of the park at Owl Creek, below the picnic area. The northwestern corner was located near the old iron bridge that crossed Owl Creek. The southeastern corner of the grid was located near the picnic grounds. The overstory was composed of mature sweetgum, ash (Fraxinus pennsylvanica), water tupelo (Nyssa aquatica), and silver maple (Acer saccharinum). The topography of the area was very flat. A soybean field covered 15 percent of the area. Several streams and beaver ponds were located on the site. For a more detailed description of the vegetation and topography of the study area, see Jones (1983) and Leberg (1985).

Traps were spaced at 200 m intervals, with actual trap placement taking advantage of terrain to maximize the chances of capture. Both Tomahawk and

Havahart livetraps were employed and baited with fish daily. Sticks were piled along the sides and backs of traps to prevent animals from removing the bait from the outside.

On the morning of capture, raccoons, opossums, and cats were immobilized with a mixture of ketamine hydrochloride and acetylpromazine. The raccoons and opossums were tagged in both ears, cats were identified by clipping small areas of fur or by unusual color markings. Animals were weighed, sexed, and aged, and four external measurements were taken. Dog and skunk captures were recorded, but these species were not marked.

Population size (the number of animals on each site), based on capture-recapture data, was estimated using the CAPTURE program of White et al. (1978). To determine the area affected by the trapping grid, a strip one half the average maximum distance moved between recaptures was added to the perimeter of each grid. Density was obtained by dividing the area trapped by the number of animals captured. Ninety-five percent confidence intervals were calculated for each estimate (Wilson and Anderson 1985).

RESULTS AND DISCUSSION

Results of the capture-recapture trapping estimates can be seen in Table 1. Raccoon densities of 1 per 5.2 ha (13.5 acres) in the bottomland and 1 per 11.3 ha (27.7 acres) in the upland are both high when compared to other studies in western Tennessee. However, they are similar to estimates for the same types of habitat in the state as well as in other parts of the range. (Leberg 1985). The opossum densities of 1 per 11.9 ha (29.2 acres) in the bottomland and 1 per 17.9 ha (43.1 acres) are also comparable to other estimates of opossum densities (Weckerly et al. In prep.). Sex ratios for both of these species were approximately 1:1. The age ratio of the raccoons appeared to be more skewed to the older age

classes than on other areas. This may be the result of protection of the raccoon population from harvest. In general, the populations of both species appeared to be at normal levels and have probably benefited from the protection afforded by the park.

It was not possible to estimate cat densities due to their unequal use of the study areas. Two individual cats were captured on the bottomland site, 6 were captured on the upland site. Most of these cats appeared to be well fed and some wore collars indicating that a large portion of the animals were not totally feral. The fact that all of the cat captures on the upland grid were made within 400 m of houses, at the northern boundary of the park, further supports this conclusion. While these animals were not feral, their numbers were quite high but not atypical for protected areas in proximity to human communities. Since small mammal trapping yielded a normal percentage catch for this habitat and since bird populations are apparently well established, there is no evidence that suggest a significant impact on the park by domestic cats.

Thirteen skunk captures were made on the upland grid, none on the bottomland grid. I noticed this preference for dryer sites on study areas which I investigated off the park in other parts of western Tennessee. The number of skunk captures is well within the range seen on other study areas in similar habitat.

Dog abundance appeared to be quite high on the park. Two were captured on the bottomland grid, and one was captured on the upland grid. In addition to these captures, people working on the study were "confronted" by groups of dogs, twice in the Owl Creek area and three times on the upland grid. These encounters usually consisted of the dogs approaching individuals, sometimes to a close range while barking. After the person yelled, the animals retreated in all known cases.

All of the species studied in the present investigation were abundant, most at levels higher than common on other study areas in the state. This may be beneficial since one reason people visit natural areas such as parks is to view wildlife. High concentrations of wildlife make this aesthetic experience more frequent, but they may potentially have negative environmental impacts. None of the species studied in the present investigation appeared likely to directly impact the vegetative communities associated with the park. Free running dogs may greatly impact white-tail deer (Odocoileus virginianus) and other herbivore populations. Other species studied may similarly affect rabbit (Sylvilagus spp.) or small mammal populations. These herbivores may effect the vegetational composition of the area. Rabbits were relatively uncommon on the area and deer were not abundant. It is not known if the dogs and other predators studied were seriously impacting these species. The level of cat and dog depredation on local wildlife can not be determined from available data; however, some predation surely exists. Dog harassment of both deer and raccoons has been documented in Tennessee (Nichols and Whitehead 1978, Minser and Pelton 1982). Dogs may pose a potential threat to human visitors to the area but appeared to be easily scared away in most cases. More work is needed to determine the impact of such high populations of both cats and dogs on native wildlife populations.

Wildlife and feral domestic animals are more prone to contract several diseases at high population densities. In the Southeast, rabies is sustained in populations by skunks and raccoons but is most often transmitted to man by domestic animals (Davis et al. 1970). With high populations of several of these groups at Shiloh there is a potential problem. Unusual activities of these species should be noted and proper authorities informed.

Raccoons are susceptible to parvovirus (Nettles et al. 1980) and could transmit this disease to dogs. Dense populations of raccoons are also susceptible to canine distemper which can affect domestic animals. Keeler (1978) studied a population of raccoons in Cades Cove in the Great Smoky Mountains National Park. The population declined from a density of 1/18 ha to 1/50 hectares after a distemper epizootic. The raccoon populations on Shiloh are 1.5 to 3.5 times as dense as the predecline raccoon population at Cades Cove. The high populations of the studied species on Shiloh, with their protected status, make it important to monitor populations over a period of time to see if the populations are self limiting or if they are controlled by disease outbreaks that are potentially dangerous to visitors. Again, unusual activities of these animals should be noted and the proper authorities informed.

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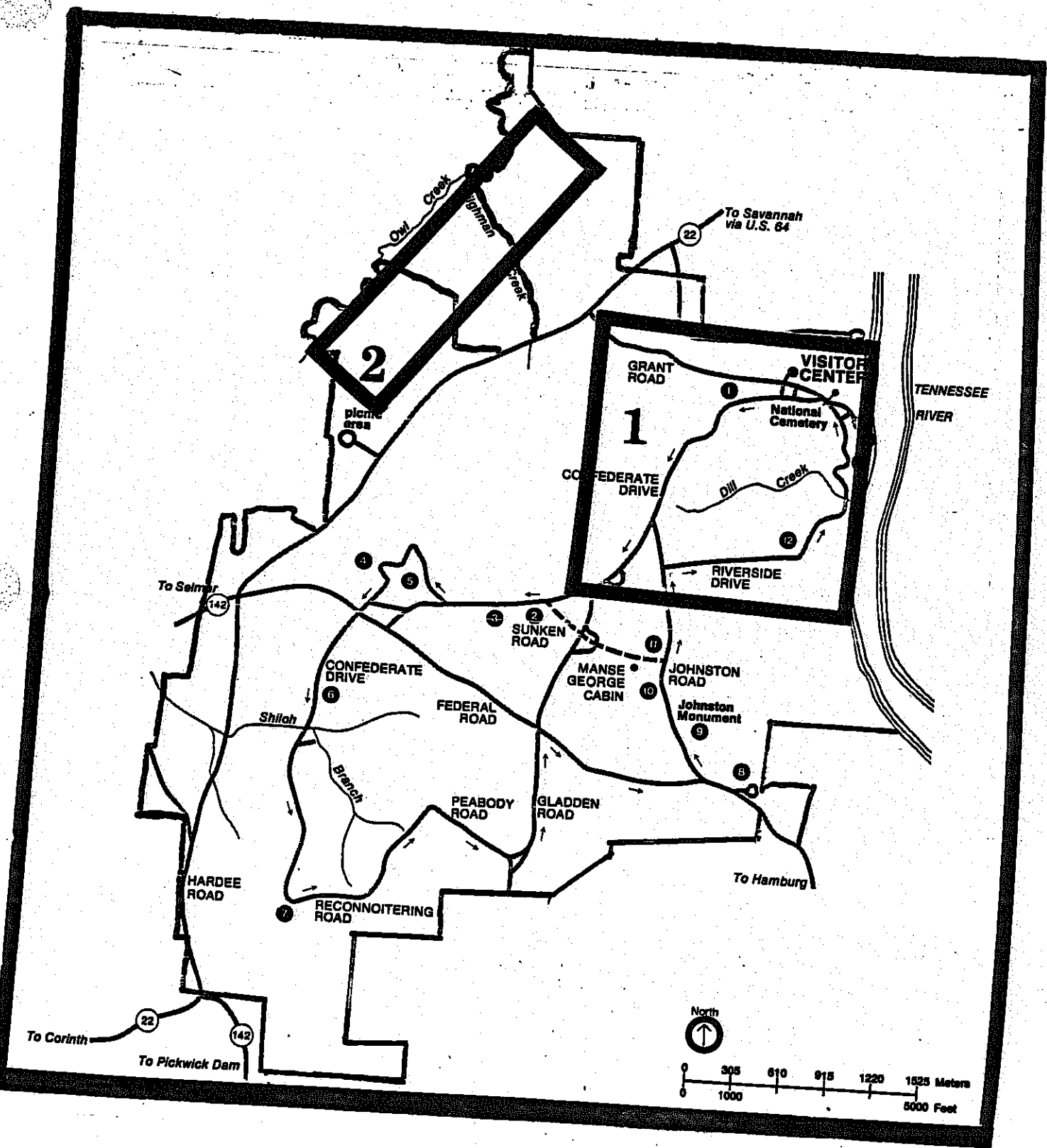
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Table 1. Results of raccoon and opossum capture-recapture studies for two sites on Shiloh National Military Park, Hardin County, Tennessee.

Site	Opossum			Raccoon		
	Density			Density		
	n ^a (animals per ha)	95% CI		n ^a (animals per ha)	95% CI	
1 (Upland)	18	1/17.9	10.7 to 44.3	23	1/11.3	8.4-17.3
2 (Bottomland)	17	1/11.9	9.7 to 17.5	17	1/5.2	3.8-10.0

^aThe total number of individuals captured on each grid.

Fig. 1. Study sites used in a capture-recapture study of raccoon and opossum densities on Shiloh National Military Park, Hardin County, Tennessee. 1.--Upland site; 2.--Bottomaland site.



89-97

ARMADILLO

On August 27, 1989 (Sunday) about 7:00 AM park maintenance man Benny McClain found a road kill armadillo while on the way to work. It was a very fresh kill on Hwy 64 in Crump. The animal appeared to be healthy when killed. It was a male, about 8 pounds (est). Armadillos are rare in Hardin County at this time, Crump is about 6 miles from the Park boundary. I observed the dead animal.

Louell K. Higgins
Res. Mgmt. Specialist
8/27/89

On Monday May 15, 1995 at 7:50 a.m. I observed a road kill adult armadillo on Hwy 22 1.5 mile north of the park near the Snake Creek bridge.

Louell K. Higgins

On Monday June 26, 1995 at 7:45 a.m. I observed a road kill adult armadillo on Hwy 64 in Crump, 6 miles north of the park.

Louell K. Higgins

On Saturday August 17, 1996 I found a road kill armadillo (male) on Hwy 22 inside the park at Tilghman Branch. This is the first actually seen inside the park. The animal appeared healthy and weighed perhaps 8 pounds.

Louell K. Higgins

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Information on Selected Species

Species occurring in the checklist (Section I) which represent the orders Marsupialia, Insectivora, Chiroptera, Lagomorpha, and Rodentia are included in the following accounts. The accounts were taken from:

Lowery, G. H., Jr. 1974. The mammals of Louisiana and its adjacent waters. Louisiana State Univ. Press. 565 pp.

Schwartz, C. W., and E. R. Schwartz. 1981. The wild mammals of Missouri. Univ. Missouri Press. 356 pp.

Section III

Mist Netting Bats

The following information was taken from:

Barbour, R. W., and W. H. Davis. 1969. Bats of America.

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Section IV

Determining Relative Abundance of Selected Species by Scent Station Lines

The following information was taken from:

Coggin, J. L., and J. S. Zack. 1981. The Scent post: How biologists are attracting wildlife to learn more about population trends. Virginia Wildlife. 8-9.

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Section V

Slides of Raccoon Studies
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