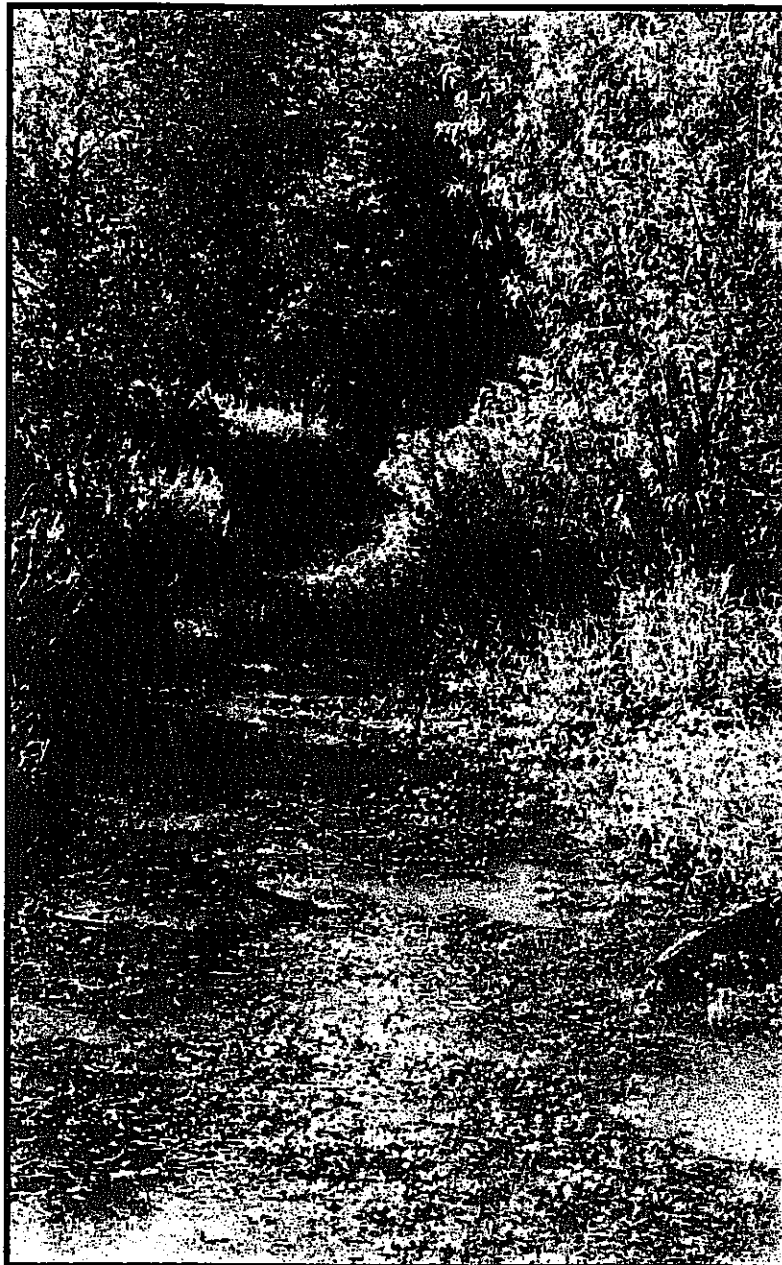


**AN INVESTIGATION AND ASSESSMENT OF AMPHIBIAN
AND REPTILE FAUNA OF SHILOH NATIONAL
MILITARY PARK, HARDIN COUNTY, TENNESSEE**



BASELINE SURVEY REPORT

March 15, 1999

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INTRODUCTION

Shiloh National Military Park (SNMP), established December 27, 1894, preserves the site of the largest civil war battle during the Union's 1862 campaign. The goal for this campaign was the possession of the major western Confederate railroads and military control of the lower Mississippi River Valley. In 1933, Shiloh was consolidated into the National Park system and managed under the principles of the 1916 Organic Act. This Act directs the agency to preserve the nation's scenic, natural and historic heritage, unimpaired, for the benefit and enjoyment of present and future generations (NPS, 1994). Today visitors to the park can take an auto tour along a 9.5 mile loop or hike the many trails. There are over 150 commemorative monuments, 500 troop position markers and more than 200 cannons located throughout the forest and fields. Having been protected for over a hundred years, most of Shiloh's natural habitats remain virtually untouched. The purpose of this study is to begin to document baseline data on the herpetofauna found to occur at Shiloh National Military Park, Hardin Co. TN. Special emphasis was given to those species deemed Rare, Threatened, Endangered, or "In Need of Management" (RTE) by the Tennessee Department of Environment and Conservation, Tennessee Wildlife Resources Agency, or the U.S. Fish and Wildlife Service.

STUDY SITE

SNMP is located in Hardin, Co. Tennessee; bordered by Owl Creek to the west and the Tennessee River to the east. The park (Figure 1) consists of ca. 1620 ha (4000 acres) and covers 96% of the actual battle site (NPS, 1994). The park at Shiloh is made up of gently rolling to nearly level plains in the uplands area with several steep ravines

cutting through the landscape, steep eroding river bluffs located along the Tennessee River and the occasional flooded bottomland along Owl Creek. The vegetation consists mainly of forests (1296 ha), historic fields (presently hay crops) and open grassy areas (324 ha). The uplands are dominated by a mixed oak forest except on old abandoned fields which are now dominated by pines and red cedars. Ravines and river bluffs are dominated by mesic hardwoods and the floodplain and terraces immediately above them are dominated by alluvial and mixed bottomland forests, respectively (Jones and White, 1981). The soil of the uplands is predominately Paden silt loam which is acidic and low in fertility. The soil on the ravine slopes are Waynesboro gravel and sandy loam. The Warely and Woftever silt loams found in the bottomlands, are acidic, medium to low fertility, and poorly drained (USDA Soil Conservation Service 1962).

FIELD SAMPLING

Documentation of any existing populations of RTE species occurring at Shiloh National Military Park was non-existent. Based on suspected distribution ranges (Conant and Collins 1991), three State listed RTE species of amphibians and five State listed RTE species of reptiles were considered potential inhabitants of Shiloh National Military Park (Table 1). Nine collection trips were made to SNMP between September 17, 1997, and August 24, 1998 (Table 2). According to range maps found in the Peterson Field Guide *Reptiles and Amphibians of Eastern/Central North America* (Conant and Collins, 1991) and the *Atlas of Amphibians in Tennessee* (Redmond and Scott 1996), Table 3 lists all known species that have their distribution range near or at Shiloh National Military Park. All habitat types occurring on SNMP such as old fields, pine forests, hardwood forests,

mixed forests, wetlands, small creeks, and springs were surveyed for occurrence of RTE and non-RTE species. Survey technique included: 1) lifting logs, debris and rocks in terrestrial habitats and along the banks of aquatic habitats, 2) the use of seine nets, dip nets, minnow traps, and baited hoop traps in aquatic habitats, 3) driving roads at night (road cruising), and 4) identification of chorusing frogs by their breeding calls. Road cruising was used to search for basking snakes during late afternoons and amphibians during rainy evenings and nights.

Table 1. Rare, Threatened, or Endangered Amphibians and Reptiles with Possible Occurrence on Shiloh National Military Park, Hardin County, Tennessee.

Genus/species Name	Common Name	State Status	Global Rank	State Rank
<i>Ambystoma talpoideum</i>	Mole salamander	D	G5	S4
<i>Cryptobranchus alleganiensis</i>	Hellbender	D	G4	S3
<i>Hyla Gratiola</i>	Barking Treefrog	D	G5	S3
<i>Opitisaurs a. longicauda</i>	Eastern Slender glass lizard	D	G5T5	S3
<i>Macroclermys temminckii</i>	Alligator Snapping turtle	D	G3G4	S3
<i>Pituophis m. melanoleucus</i>	Northern Pine snake	T	G5T4	S3
<i>Sistrurus miliarius streckeri</i>	Western Pigmy rattlesnake	T	G5T4	S2
<i>Anolis carolinensis</i>	Green Anole	D	G5	S3

Table 2. Summary of the field work for survey of the amphibians and reptiles of Shiloh National Military Park, Hardin County, Tennessee, September 1997 - August 1998.

Year/Month	Number of Days	Number of man-hours
1997		
September	5	40
October	4	36
November	3	24
1998		
March	4	30
June	4	36
August	7	84
Total	27	250

IDENTIFICATION OF SPECIMENS

All amphibians and reptiles captured in this study were examined and identified by Gary R. Pritts, Field Biologist. Species identification was based on Mr. Pritts' experience and current reference literature available (Altig 1970, Altig and Ireland 1984, Conant and Collins 1991) and consultation with other herpetologists. The identification of some amphibians and reptiles mentioned in this report from work conducted by others prior to this survey were based on those researchers' experience and knowledge of the field of herpetology.

Table 3: List of Amphibians and Reptiles with possible occurrence at Shiloh National Military Park, Hardin County, Tennessee

Species	
Common Name	Genus/species Name
TURTLES	
Alligator Snapping Turtle	<i>Macrolemys temminckii</i>
Common Snapping Turtle	<i>Chelydra serpentina serpentina</i>
Common Musk Turtle	<i>Stemotherus odoratus</i>
Eastern Mud Turtle	<i>Kinostemon subrubrum subrubrum</i>
Ouachita Map Turtle	<i>Graptemys pseudogeographica ouachitensis</i>
Common Map Turtle	<i>Graptemys geographica *</i>
Southern Painted Turtle	<i>Chrysemys picta dorsalis</i>
Midland Painted Turtle	<i>Chrysemys picta marginata</i>
Red-eared Slider Turtle	<i>Trachemys scripta elegans</i>
Eastern Box Turtle	<i>Terrapene carolina carolina</i>
Midland Smooth Softshell Turtle	<i>Apalone mutica mutica</i>
Eastern Spiny Softshell Turtle	<i>Apalone spinifera spinifera</i>
Hieroglyphic River Cooter	<i>Pseudemys concinna hieroglyphica</i>
LIZARDS	
Northern Fence Lizard	<i>Sceloporus undulatus hyacinthinus</i>
Ground Skink	<i>Scincella lateralis</i>
Five-lined Skink	<i>Eumeces fasciatus</i>
Southeastern Five-lined Skink	<i>Eumeces inexpectatus</i>
Broadhead Skink	<i>Eumeces laticeps</i>
Six-lined Racerunner	<i>Cnemidophorus sexlineatus sexlineatus</i>
Eastern Slender Glass Lizard	<i>Ophisaurus attenuatus longicaudus</i>
Green Anole	<i>Anolis carolinensis *</i>
SNAKES	
Midland Water Snake	<i>Nerodia sipedon pleuralis</i>
Yellowbelly Water Snake	<i>Nerodia erythrogaster flavigaster</i>
Diamondback Water Snake	<i>Nerodia rhombifer rhombifer</i>
Queen Snake	<i>Regina septemvittata</i>
Eastern Garter Snake	<i>Thamnophis sirtalis sirtalis</i>
Eastern Ribbon Snake	<i>Thamnophis sauritus sauritus</i>
Midland Brown Snake	<i>Storeria dekayi wrightorum</i>
Northern Redbelly Snake	<i>Storeria occipitomaculata occipitomaculata</i>
Eastern Smooth Earth Snake	<i>Virginia valeriae valeriae **</i>

Species	
Common Name	Genus/species Name
Mississippi Ringneck Snake	<i>Diadophis punctatus stictogynys</i>
Eastern Hognose Snake	<i>Heterodon platirhinos</i>
Eastern Worm Snake	<i>Carphophis amoenus amoenus</i>
Midwest Worm Snake	<i>Carphophis amoenus helenae</i>
Northern Scarlet Snake	<i>Cemophora coccinea copel</i>
Rough Green Snake	<i>Opheodrys aestivus</i>
Western Mud Snake	<i>Farancia abacura reinwardti</i>
Southern Black Racer	<i>Coluber constrictor priapus</i>
Eastern Coachwhip	<i>Masticophis flagellum flagellum *</i>
Northern Pine Snake	<i>Pituophis melanoleucus melanoleucus **</i>
Black Rat Snake	<i>Elaphe obsoleta obsoleta *</i>
Gray Rat Snake	<i>Elaphe obsoleta spiloides</i>
Corn Snake	<i>Elaphe guttata guttata</i>
Scarlet Kingsnake	<i>Lampropeltis triangulum elapsoides</i>
Mole Kingsnake	<i>Lampropeltis calligaster rhombonaculata</i>
Prairie Kingsnake	<i>Lampropeltis calligaster calligaster</i>
Speckled Kingsnake	<i>Lampropeltis getula holbrooki</i>
Black Kingsnake	<i>Lampropeltis getula nigra</i>
Southeastern Crowned Snake	<i>Tantilla coronata</i>
Western Cottonmouth	<i>Agkistrodon piscivorus leucostoma</i>
Northern Copperhead	<i>Agkistrodon contortrix mokasen</i>
Pigmy Rattlesnake	<i>Sistrurus miliarius streckeri</i>
Timber Rattlesnake	<i>Crotalus horridus</i>
<u>SALAMANDERS</u>	
Hellbender	<i>Cryptobranchus alleganiensis alleganiensis</i>
Mudpuppies	<i>Necturus maculosus</i>
Red-spotted Newt	<i>Notophthalmus viridescens viridescens *</i>
Central Newt	<i>Notophthalmus viridescens louisianensis</i>
Mole Salamander	<i>Ambystoma talpoideum **</i>
Smallmouth Salamander	<i>Ambystoma texanum</i>
Eastern Tiger Salamander	<i>Ambystoma tigrinum tigrinum **</i>
Spotted Salamander	<i>Ambystoma maculatum</i>
Marbled Salamander	<i>Ambystoma opacum</i>
Spotted Dusky Salamander	<i>Desmognathus fuscus conanti</i>
Northern Spring Salamander	<i>Gyrinophilus porphyriticus porphyriticus **</i>
Northern Red Salamander	<i>Pseudotriton ruber ruber **</i>
Southern Red Salamander	<i>Pseudotriton ruber violaceus</i>
Mississippi Slimy Salamander	<i>Plethodon mississippi</i>
Eastern Zigzag Salamander	<i>Plethodon dorsalis dorsalis *</i>
Southern Two-lined Salamander	<i>Eurycea cirrigera</i>
Cave Salamander	<i>Eurycea lucifuga *</i>
Longtail Salamander	<i>Eurycea longicauda longicauda *</i>
Three-lined Salamander	<i>Eurycea longicauda guttolineata</i>
<u>TOADS AND FROGS</u>	
Eastern Spadefoot	<i>Scaphiopus holbrooki holbrooki</i>
Eastern Narrowmouth Toad	<i>Gastrophryne carolinensis</i>
American Toad	<i>Bufo americanus</i>
Fowler's Toad	<i>Bufo woodhousii fowleri</i>
Green Treefrog	<i>Hyla cinerea **</i>
Bird Voiced Treefrog	<i>Hyla avivoca **</i>
Barking Treefrog	<i>Hyla gratiosa</i>
Gray Treefrog	<i>Hyla chrysoscelis</i>
Upland Chorus Frog	<i>Pseudacris triseriata feriarum</i>
Spring Peepers	<i>Pseudacris crucifer</i>
Mountain Chorus Frog	<i>Pseudacris brachyphona **</i>
Northern Cricket Frog	<i>Acris crepitans crepitans</i>
Southern Cricket Frog	<i>Acris gryllus gryllus **</i>
Green Frog	<i>Rana clamitans melanota</i>
Bullfrog	<i>Rana catesbeiana</i>
Southern Leopard Frog	<i>Rana utricularia</i>
Pickering Frog	<i>Rana palustris</i>
* - SNMP at edge of species geographical range	
** - SNMP within 20 miles outside of species indicated geographical range	

RESULTS AND DISCUSSION

From the nine collection trips made to SNMP during this investigation, seventeen amphibians and fourteen reptiles were identified (Table 4). This included 3 turtle species, 3 lizard species, 8 snake species, 10 salamander species and 7 toad/frog species. Of the eight potential State listed Rare, Threatened or Endangered species thought to occur at SNMP, only the mole salamander (*Ambystoma talpoideum*) was identified as an inhabitant. The Hellbender (*Cryptobranchus alleganiensis*) was listed as a potential inhabitant to the area due to its distribution range, but the habitat type required by this species is not available on Shiloh National Military Park property. The alligator snapping turtle (*Macrolemys temminckii*) found to inhabit the Tennessee River which borders the eastern boundary of the park usually stays in the depths of the larger waterway. Although this turtle has been known to occasionally move up into the shallower streams, two of the three streams which flow into the Tennessee River from the Park's property are inaccessible. No sampling was conducted on the Tennessee River even though the Park's property boundary extends below the water line.

For the past few years, there has been several informal surveys conducted on SNMP property. The results of these surveys were not documented nor published. For this reason, the results from the two other investigators will be added and summarized in this section. Information about the herpfauna occurring at Shiloh was initially provided by Ranger Kent Higgins (personal comm.), SNMP Resource Management Officer. Ranger Higgins has been with the Park Service since 1959 and during his tenure at Shiloh (1984 - 1998), he has identified approximately 22 species of amphibians and reptiles (Table 4) which include 1 turtle specie, 2 lizard species, 10 snake species, 4 salamander species and

5 toad/frog species. Since herpetology was not his major job function at the Park, he kept a running tab of those specimens he identified, but made no other documentation and no specimens were collected, added or maintained in a herpetological collection. Additional information about the herpfauna occurring at Shiloh was provided by a second investigator, Dr. William Gutzke. Dr. Gutzke (personal comm.) from the University of Memphis conducted informal field surveys of the herpfauna of SNMP periodically since 1995. He spent approximately 32 man days in the field and has occasionally brought his Herpetology class to Shiloh to demonstrate field collection techniques. Due to restrictions put in place by Park officials, no voucher specimens were allowed to be sessioned and placed into a University herpetological collection. Consequently, very little if any documentation has been made from any of the survey work done prior to this investigation. Since 1995, Dr. Gutzke has captured and identified approximately 42 species of amphibians and reptiles (Table 4) inhabiting SNMP. This includes 2 turtle species, 4 lizard species, 12 snake species, 12 salamander species, and 12 toad/frog species. The combined data from all three investigators now places the total number of amphibians (27) and reptiles (25) identified at SNMP to date at 52 species.

During one field trip, Dr. Gutzke captured a salamander larvae he believed to be a Tiger salamander larvae (*Ambystoma tigrinum*). This specimen was found in the Indian Mound pond area. He now questions the identification since he has not seen another larvae or an adult on SNMP property.

Table 4: List of Amphibians and Reptiles Identified at Shiloh National Military Park, Hardin County, Tennessee

Species		Researcher		
Common Name	Genus/species Name	G. Pritts	W. Gutzke	K. Higgins
<u>TURTLES</u>				
Common Snapping Turtle	<i>Chelydra serpentina serpentina</i>			X
Eastern Mud Turtle	<i>Kinostemon subrubrum subrubrum</i>		X	
Red-eared Slider Turtle	<i>Trachemys scripta elegans</i>	X		
Eastern Box Turtle	<i>Terrapene carolina carolina</i>	X	X	
Eastern Spiny Softshell Turtle	<i>Apalone spinifer spinifer</i>	X		
<u>LIZARDS</u>				
Northern Fence Lizard	<i>Sceloporus undulatus hyacinthinus</i>	X	X	X
Ground Skink	<i>Scincella lateralis</i>	X	X	
Five-lined Skink	<i>Eumeces fasciatus</i>	X	X	X
Broadhead Skink	<i>Eumeces laticeps</i>		X	
<u>SNAKES</u>				
Midland Water Snake	<i>Nerodia sipedon pleuralis</i>	X		
Yellowbelly Water Snake	<i>Nerodia erythrogaster flavigaster</i>		X	
Diamondback Water Snake	<i>Nerodia rhombifer rhombifer</i>		X	
Eastern Garter Snake	<i>Thamnophis sirtalis sirtalis</i>		X	X
Midland Brown Snake	<i>Storeria dekayi wrightorum</i>	X	X	X
Northern Redbelly Snake	<i>Storeria occipitomaculata occipitomaculata</i>	X	X	
Mississippi Ringneck Snake	<i>Diadophis punctatus sictogenys</i>	X	X	
Eastern Hognose Snake	<i>Heterodon platirhinos</i>	X	X	X
Eastern Worm Snake	<i>Carphophis amoenus amoenus</i>		X	X
Rough Green Snake	<i>Ophedrys aestivus</i>			X
Southern Black Racer	<i>Coluber constrictor priapus</i>	X	X	
Black Rat Snake	<i>Elaphe obsoleta obsoleta</i> *			X
Gray Rat Snake	<i>Elaphe obsoleta spiloides</i>		X	X
Corn Snake	<i>Elaphe guttata guttata</i>			X
Western Cottonmouth	<i>Agkistrodon piscivorus leucostoma</i>	X	X	X
Northern Copperhead	<i>Agkistrodon contortrix mokasen</i>	X	X	X
<u>SALAMANDERS</u>				
Red-spotted Newt	<i>Notophthalmus viridescens viridescens</i> *	X		
Central Newt	<i>Notophthalmus viridescens louisianensis</i>	X	X	X
Mole Salamander	<i>Ambystoma talpoideum</i> **	X	X	
Smallmouth Salamander	<i>Ambystoma texanum</i>		X	
Eastern Tiger Salamander	<i>Ambystoma tigrinum tigrinum</i> **		X	
Spotted Salamander	<i>Ambystoma maculatum</i>	X	X	
Marbled Salamander	<i>Ambystoma opacum</i>	X	X	
Spotted Dusky Salamander	<i>Desmognathus fuscus conanti</i>	X	X	X
Northern Spring Salamander	<i>Gyrinophilus porphyriticus porphyriticus</i> **		X	
Northern Red Salamander	<i>Pseudotriton ruber ruber</i> **	X	X	X
Southern Red Salamander	<i>Pseudotriton ruber vloscai</i>		X	
Mississippi Slimy Salamander	<i>Plethodon mississippi</i>	X	X	X
Eastern Zigzag Salamander	<i>Plethodon dorsalis dorsalis</i> *		X	
Southern Two-lined Salamander	<i>Eurycea cirrigera</i>	X	X	

Species		Researcher		
Common Name	Genus/species Name	G. Pritts	W. Gutzke	K. Higgins
Three-lined Salamander	<i>Eurycea longicauda guttolineata</i>	X		
TOADS AND FROGS				
Eastern Narrowmouth Toad	<i>Gastrophryne carolinensis</i>		X	
American Toad	<i>Bufo americanus</i>	X	X	
Fowler's Toad	<i>Bufo woodhousii fowleri</i>	X	X	
Green Treefrog	<i>Hyla cinerea</i> **		X	
Gray Treefrog	<i>Hyla chrysoscelis</i>	X	X	X
Upland Chorus Frog	<i>Pseudacris triseriata feriarum</i>		X	
Spring Peepers	<i>Pseudacris crucifer</i>	X	X	X
Mountain Chorus Frog	<i>Pseudacris brachyphona</i> **		X	
Northern Cricket Frog	<i>Acris crepitans crepitans</i>		X	
Southern Cricket Frog	<i>Acris gryllus gryllus</i> **		X	
Green Frog	<i>Rana clamitans melanota</i>	X	X	X
Bullfrog	<i>Rana catesbeiana</i>	X	X	X
Southern Leopard Frog	<i>Rana utricularia</i>	X		X
* - SNMP at edge of species geographical range				
** - SNMP within 20 miles outside of species indicated geographical range				

Although the range map for *Ambystoma tigrinum* shows the SNMP property is within 20 miles outside of the salamander's known geographical range, the habitat type used by this species is available at SNMP and indicates this species could still possibly occur at this site. Another species of salamander captured and identified by Dr. Gutzke was the mole salamander (*Ambystoma talpoideum*). The mole salamander is listed in Tennessee with a State Status D, Global Rank G5 and a State Rank of S4. A second specimen of mole salamander was also captured during this investigation near the same area (Indian Mound pond) as Dr. Gutzke's specimen was discovered. This would indicate there is a viable population occurring on SNMP's property. The edge of the known geographical range for this species is also indicated to be within 20 miles of the park's property. Five other species of amphibians were also found outside of their known geographical distribution ranges. These species were the Northern Spring salamander (*Gyrinophilus porphyriticus porphyriticus*), Northern Red salamander (*Pseudotriton ruber ruber*), Mountain Chorus

frog (*Pseudacris brachyphona*), Southern Cricket frog (*Acris gryllus gryllus*) and the Green Treefrog (*Hyla cinerea*).

After reviewing the possible occurrence list of species in Table 3, the diversity of the herpfauna at Shiloh National Military Park is expected to be much larger than just the 52 species found and identified to date. Several species listed in this report which were not found are secretive or only forage at night and could easily have been missed during this or the other surveys. To locate and capture these species, other methods such as installing pitfall traps (Heyer et al. 1994) near amphibian breeding areas or placing small mammal traps out to capture night foraging snakes may need to be considered. Several areas surveyed should have contained higher species diversity than what was found to be present during this survey. One area needing further investigation is a large pine area north of Peabody mortuary monument. This pine area could possibly be home to the northern pine snake (*Pituophis m. melanoleucus*) which is a very secretive and rarely seen specie of snake. Another area in need of more investigation is the Owl Creek beaver pond area. Due to such dry conditions during the time this area was surveyed, only two sampling days were spent in this area. Snakes such as the pigmy rattlesnake (*Sistrurus miliarius*), timber rattlesnake (*Crotalus horridus*) or one of the many species of kingsnakes (*Lampropeltis sp.*) thought to occur at SNMP may be found to inhabit this area. Several species of turtles (snapping, map, musk and painted) are also suspected to inhabit the Beaver pond area as well.

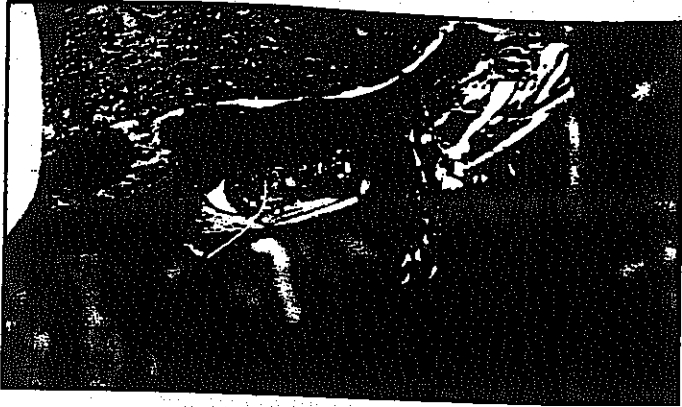
This report should be used as a starting point for future investigations into the herpfauna located at Shiloh National Military Park and not considered as a final conclusion.

Photographs of some of the specimens captured and released during this survey are shown in Appendix A.

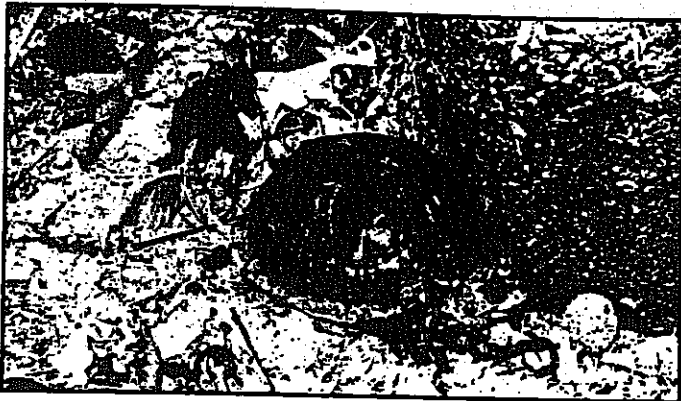
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Appendix A: Photo Documentation of the Amphibians and Reptiles from
Shiloh National Military Park, Hardin County, Tennessee



Trachemys scripta elegans
Red-eared Slider Turtle
Owl Creek Beaver Pond area
SNMP, Hardin Co. TN. 08-25-98



Terrapene carolina carolina
Eastern Box Turtle
Riversbottom Branch area
SNMP, Hardin Co. TN. 08-24-98



Sceloporus undulatus hyacinthinus
Northern Fence Lizard
Staff Housing (Quarter #6)
SNMP, Hardin Co. TN. 08-25-98



Nerodia sipedon pleuralis
Midland Water Snake
Pittsburg Landing area
SNMP, Hardin Co. TN. 08-25-98