

FINAL

Inventory of the Herpetofauna of Little River Canyon National Preserve



Photo by Mary Shew, NPS Staff

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**National Park Service
Cumberland Piedmont Inventory and Monitoring Network
PO Box 112
Mammoth Cave, KY 42259**

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Inventory of the Herpetofauna Of Little River Canyon National Preserve (LIRI)

INTRODUCTION

This 5,543 ha preserve protects the nation's longest mountaintop river, which flows for almost its entire length down the middle of Lookout Mountain in northeast Alabama. The free-flowing Little River is one of the cleanest, wildest waterways in the South and its canyons are some of the deepest (183 m) in the Southeast. This is the newest park unit in the Cumberland/Piedmont Inventory and Monitoring Network, having been authorized in 1992. It is managed under the guidance of the 1916 Organic Act. The National Park Service (NPS) is responsible for the preservation of native wildlife, including amphibian and reptile species, within Little River Canyon National Preserve in accordance with the 1916 NPS Organic Act, as amended and this direction is re-enforced through both NPS policy and guidelines affecting natural resource management. The Cumberland/Piedmont Inventory and Monitoring Network was established by the NPS Natural Resource Challenge Initiative. Among the goals set forth by this initiative are documentation of the occurrence of at least 90% of the species of vertebrates and vascular plants that occur within each National Park unit containing "significant natural resources" and documenting relative frequencies of occurrence by habitat type and descriptions of the distribution and relative abundance of species of special concern. Following a preliminary review of the existing inventory data within each network park, the Inventory and Monitoring Network for the Cumberland/Piedmont determined that the largest and most pressing data gaps involved amphibian and reptile species. This lack of information was targeted as one of the network's highest priorities for funding. It is therefore necessary to conduct a baseline inventory of the herpetofauna resources within these NPS Parks, because the existing information is either non-existent or poorly defined.

This inventory effort will provide Park Managers with comprehensive, scientifically based information about the distribution and status of herpetofauna resources occurring within the parks. This information will be used for management decisions regarding park resources and protection, as well as education and outreach to the public. Further, this is an important part of the groundwork necessary for managers to develop effective monitoring programs designed to ensure the continued long-term health of Park natural resources.

Recent data shows that reptiles and amphibians are important, perhaps critical, components of terrestrial and aquatic ecosystems. Both groups are considered to be excellent indicator species of environmental degradation, amphibians because of their complex life cycle and permeable skin and reptiles because of their frequent position as the top carnivores in the food chain (Gibbons 1988). These facts have led to an increasing recognition of the need for collecting better data on the biodiversity and ecology of amphibians and reptiles by NPS managers (Scott and Seigel 1992).

Currently, NPS managers at Little River Canyon National Preserve possess neither a comprehensive baseline inventory nor the information upon which to base monitoring of the

Preserve's amphibian and reptile species utilizing Preserve lands and waters. In recent years, the shift to protecting biodiversity through the preservation of functional ecosystems has made reliable inventory and monitoring programs of critical importance to NPS management. Without detailed information on the distribution, habitat requirements and relative abundance of native amphibian and reptile species, resource managers may only preserve that portion of the fauna which is highly visible or economically important (Bogan, *et al*, 1988). For these reasons, Accipiter Biological Consultants was contracted by the NPS to design and develop a Preserve-wide inventory of reptile and amphibian species currently occurring at the Preserve as part of the overall Inventory and Monitoring Program being conducted for the Cumberland/Piedmont Inventory and Monitoring Network.

GOALS AND OBJECTIVES

This inventory program for surveying reptile and amphibian species at Little River Canyon National Preserve has the following goals:

1. To determine species presence information, both habitat specific and across landscapes and to document at least 90% of the species thought to occupy the Preserve lands.
2. To document relative frequencies of occurrence by habitat type within the Preserve.
3. To describe the distribution and relative abundance of species of special concern within the Preserve.
4. To collect voucher specimens or photographs of species occurring in the Preserve which are not already documented. Emphasis is put on photographic vouchers in this Preserve.

DESCRIPTION OF THE STUDY AREA

Little River Canyon National Preserve can be divided into four communities: oak-hickory forests, canyon shoulders, sandstone rock outcrops, and riparian areas. Oak-hickory forests occupy deep soils above the canyon shoulders. Downslope, Shortleaf and Loblolly Pine are common, grading into Virginia Pine on the glade-like canyon shoulders. Sandstone rock outcrops are common along the canyon shoulder and harbor mainly stunted Virginia or Scrub Pine. The shrub layer consists of Sparkleberry, Fringe Tree, Georgia Holly, and Black Gum. Riparian areas usually are narrow except in broader channels where oxbows exist, with woods of mainly Red Maple, Beech, Umbrella Magnolia, Sycamore, and River Birch.

Habitats and Descriptions

Thirteen major community types were utilized in this inventory process. These were provided by NPS personnel and include the following:

Mixed Hardwood Forest (MH) – This category consists of hardwood forest dominated by Oaks, Hickory, Ash and Maples. While it may occur under mesic conditions, it is usually found higher on the slopes than the following.

Mixed Mesic Hardwood Forest (MF) – This habitat includes such tree species as Red Maple,

Beech, River Birch, Sycamores and Umbrella Magnolia. It usually includes lower areas in the proximity of streams or springs.

Dry Oak Forest (DO) – This habitat is dominated by Chestnut, Black and Scarlet Oak and is located primarily on disturbed dry upper slope sites. A shrub layer is usually present, but varies in thickness and species composition at various points along the Preserve.

Pine/Hardwood Forest (PH) – This habitat consists of mixed Pine and hardwood species. It is usually found on slopes or ridges and usually has little understory.

Pine Forest (PI) – This habitat consists primarily of pine species stands. On Little River Canyon National Preserve these stands could include Virginia, Shortleaf, Scrub or Loblolly Pine.

Open Fields (OF) – This habitat consists of open, grassy areas and exists in several forms on the Park. Mowed fields are also included in this habitat form.

Sandstone Glades (SG) – Generally open areas of predominantly Sandstone substrate dominated by forbs and grasses within the glade and many times being encroached on by Eastern Red Cedar and various oak species.

Streams (ST) – These habitats feature flowing water of an ephemeral, intermittent or perennial nature. Substrate on the bottom ranges from mud or sand to various sized cobbles or even bedrock. Streams are also often associated with adjacent habitats such as forests. The Little River is the largest such habitat on the Preserve.

Springs (SP) – Springs occur where ground water discharges to the surface. Small stream flows often result, however, for purposes of this inventory, only stream flows where the ground water discharge point is readily apparent are considered springs.

Ponds (PO) – This habitat is comprised of water bodies which are encircled with hydric vegetation. It includes manmade lakes, as well as natural (beaver dams) water bodies. Emergent vegetation may or may not exist depending on conditions.

Bogs (BO) – This habitat is uncommon on the Preserve and is characterized, in general, by areas of seasonally flowing and standing water and hydric vegetation. Most prevalent on the Preserve is Pitcher Plant bogs containing threatened Pitcher Plant species.

Wet Rock Faces (WR) – Rock faces which, either ephemerally or perennially have water running down them. The water may originate from a spring or from runoff. Various mosses and ferns are typical on these rock faces.

Dry Rock Faces (DR) – Rock faces with no apparent source of constantly running water. These areas tend to have vegetation adapted to drier habitats than the above giving them a different effect than even the wet rock faces with ephemeral water sources.

METHODOLOGIES

A detailed review of the field methods utilized in this inventory program is provided in the following paragraphs. This selection of methodologies was determined by the need to balance the availability of suitable personnel against the need to establish a valid, quantifiable inventory program.

This project began with a literature search to establish a potential list of reptile and amphibian species that include Little River Canyon National Preserve in their range of distribution. This search provided a potential list of 73 species or discernable subspecies. Further search was conducted to determine if potential habitat exists on Little River Canyon National Preserve for each species on that list and to gain insight on the life history of each species. A number of species reach the limit of their natural range at or near the Preserve. Confirming their presence was a priority during this inventory process.

We utilized seven primary inventory methods to attain goals 1 and 2. These are random plots with associated sampling frameworks to provide standardized results for defined habitat areas and general herpetological collecting and observation, minnow traps, coverboards, audio frog breeding surveys, road surveys and drift fences utilizing funnel type live traps or cover boards to inventory special habitat areas.

All plots utilized by Accipiter Biological Consultant staff are described by coordinates and habitat in the tables below. All coordinates for ABC established plots were obtained with a handheld Garmin GPS 12 XL unit in the field. Estimated error for each plot was + - 5 meters. All coordinates for Nature Serve established plots were given to us by National Park Service staff.

Random Plots with Associated Sampling Frameworks

Circular, 1-hectare random plots were established by the NPS as part of the networks' vegetation mapping/plant inventory project. Most of the plots fall within common habitats that comprise much of the area within the Preserve – primarily terrestrial or rarely flooded environments. These include both open and wooded habitats. Operationally, the grid plots are sampled in a structured manner that involves cover boards and constrained-area searches within the 8 m² rectangular plots, as well as generalized searches of the remainder of the circular 1-hectare plot. The structured placement of the cover boards and 8m² rectangular plots for constrained-area searches is for the purpose of producing standardized results for defined habitat areas that can be compared to estimate relative species richness among parks and habitat types. Within plots, one of two survey techniques were applied uniformly across all spatial and temporal replicates, unless otherwise provided for. (a) Where the plots fell either in open environments or in floodplains (whether open or forested) cover boards were used, as shown in Statement of Work. (b) Where the plots fell in upland forest and woodland, 8m² plots without cover boards were used in a system of “area-constrained searches”.

a. Cover board methodology: Applicable in open environments such as prairies, old fields and hay fields, as well as flood plains and riparian corridors, and in forest/field edges.

- i. Within each 1-ha plot, four cover boards were laid out in a systematic cluster, as shown in the Statement of Work.
- ii. Two boards were placed flush with a line running north through each plot center. The northwest corner of one of these boards was placed flush with the east side of the line at 10 meters north of the center point. The southeast corner of the other board was placed flush with the west side of the line at 10 meters south of the center point.
- iii. Two boards were placed flush with a second line that runs perpendicular to the north running line (90°- 270°). The northeast corner of one of these boards was placed flush with the south side of the line at 10 meters east of the plot center. The southwest corner of the other board was placed flush with the north side of the line at 10 meters west of the center point.
- iv. At each plot, 2 of the boards were wooden and the other 2 were tin (of approximately equivalent dimensions). Preferred material for the wooden boards was 4' X 4' plywood.

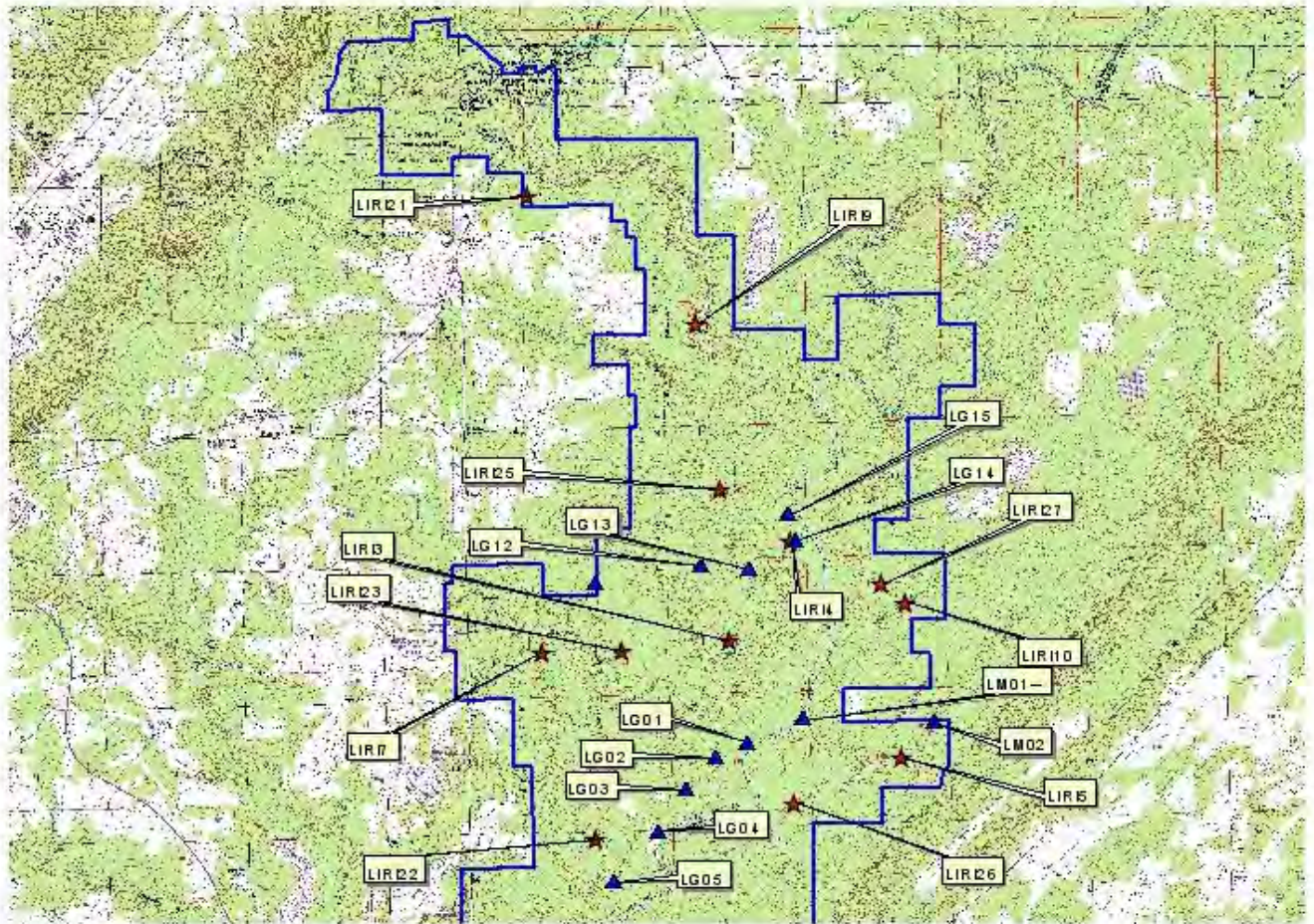
b. Area constrained search (ACS) methodology: To be applied in wooded environments such as upland and successional forest (where cover boards are not used).

- i. At each 1 ha plot, four ACS plots were laid out in a systematic cluster as illustrated in the Statement of Work.
- ii. Each ACS plot was 8m².
- iii. Two ACS plots were placed flush with a line running north through each grid point. The northwest corner of one of these plots was placed flush with the east side of the line at 20 meters north of the plot center. The southeast corner of the other plot was placed flush with the west side of the line at 20 meters south of the center point.
- iv. Two ACS plots were placed flush with a second line that runs perpendicular to the north running line (90°- 270°). The northeast corner of one of these plots was placed flush with the south side of the line at 20 meters east of the plot center. The southwest corner of the other plot was placed flush with the north side of the line at 20 meters west of the center point.

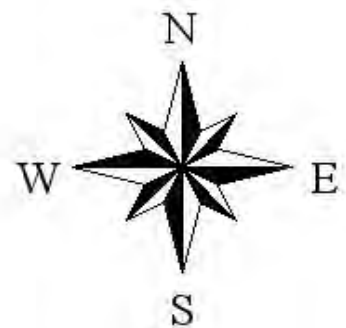
Frequency of cover board and ACS sampling on sample plots: Within each 1 ha plot, each set of cover boards and/or set of ACS plots were sampled at least once during each season in which herpetofauna are active.

During the course of this inventory 32 of these plots were utilized and have been surveyed six times. Results of these surveys may be found in Appendix A. Table 1 lists the utilized plots and their location and affiliated habitat.

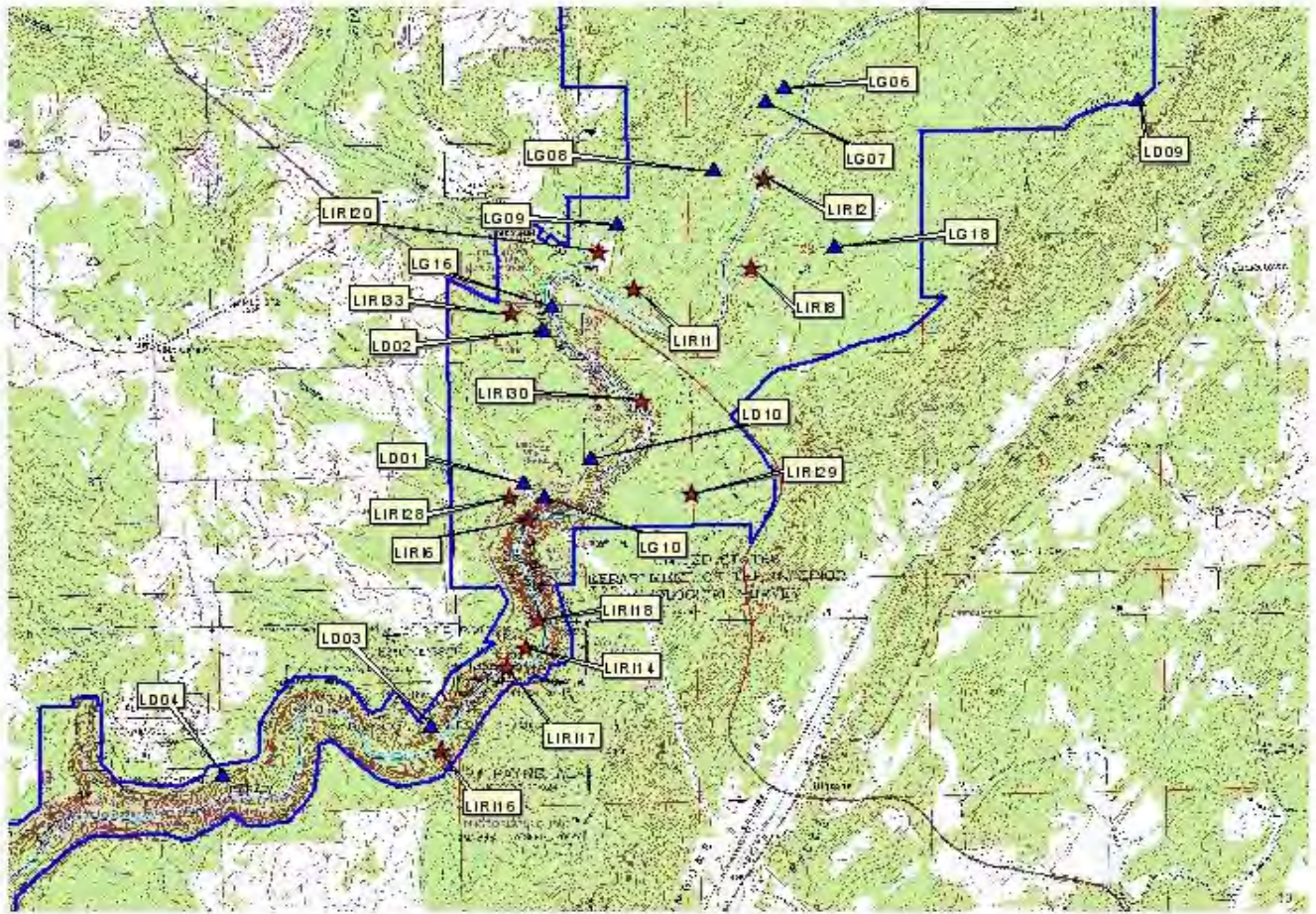
Little River Canyon North Sampling Plot Locations



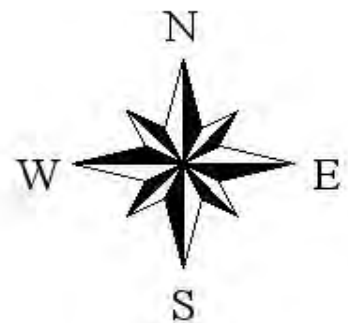
- ▲ Plot established by Accipiter Biological
- ★ Naturereserve plots



Little River Canyon Central Sampling Plot Locations



- ▲ Plots established by Accipiter Biological
- ★ Naturserve plots



Little River Canyon South Sampling Plot Locations



- ▲ Plots established by Accipiter Biological
- ★ NatureServe plots

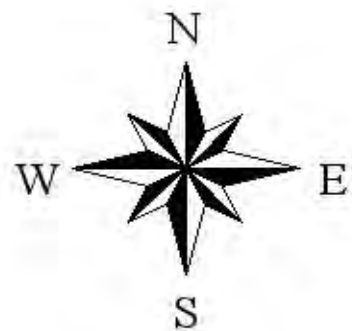


Table 1: Random Plots Established by Nature Serve

Plot #	UTM Coordinates NAD 83	Habitat
R-1	16 S 626767 3807019	PI
R-2	16 S 627661 3807833	PH
R-3	16 S 629370 3812055	PH
R-4	16 S 630077 3813252	DO
R-5	16 S 631361 3810645	PH
R-6	16 S 626046 3805341	ST, DR
R-7	16 S 627206 3811917	DO
R-8	16 S 627573 3807174	MF
R-9	16 S 628987 3815866	PH
R-10	16 S 631399 3812515	PH
R-11	16 S 620960 3794863	MF
R-12	16 S 621676 3801205	MF, MH
R-13	16 S 621440 3802258	PI
R-14	16 S 626025 3804415	MF
R-15	16 S 621687 3797025	MH
R-16	16 S 625443 3803656	MF
R-17	16 S 625896 3804269	ST, MF
R-18	16 S 626114 3804616	ST
R-19	16 S 621683 3802002	OF
R-20	16 S 626528 3807291	PI
R-21	16 S 627029 3817410	MH
R-22	16 S 627817 3809654	MH
R-23	16 S 628122 3811929	PH
R-25	16 S 629250 3813882	PH
R-26	16 S 630113 3810100	PH
R-27	16 S 631115 3812745	MH
R-28	16 S 625912 3805504	SG
R-29	16 S 627156 3805530	BO
R-30	16 S 626819 3806210	SG
R-31	16 S 621218 3794855	DO, MH
R-32	16 S 622073 3801962	MF
R-33	16 S 625920 3806841	BO

General Herpetological Collecting and Observation

Also known as hand collecting, this method is purported to provide the largest number of individuals and species based on comparable inventory projects. Specific methods included carefully turning and replacing ground cover, time constrained hand collecting, seining and dip netting of small ponds or streams within the area, and spotlight surveys of aquatic habitats. Some hand collecting was accomplished by raking small areas of forest floor debris on

appropriate plots. All disturbed habitats were restored to their original condition to the greatest degree possible. This methodology also includes visual observations of reptiles and amphibians made during the survey of the area, including surveys of basking turtles, frogs and snakes at a distance utilizing binoculars. Sites have been chosen so as to sample each major habitat within the Park unit. During the course of this inventory 18 sites have been established to sample the major as well as specialized habitats within the Preserve. Each has been sampled six times. Data on reptiles and amphibians located during this sampling is located in Appendix A. Table 2 lists the utilized plots and their location and affiliated habitat.

Table 2: General Collecting Sites

Plot #	UTM Coordinates NAD 83	Habitat
G-1	16 S 629551 3810822	PH
G-2	16 S 629192 3810646	PH
G-3	16 S 628844 3810273	ST
G-4	16 S 628530 3809755	PI, ST
G-5	16 S 628022 3809146	PI, SP
G-6	16 S 627791 3808494	ST
G-7	16 S 627656 3808391	PI, PH
G-8	16 S 627295 3807889	SP
G-9	16 S 626639 3807499	ST
G-10	16 S 626141 3805508	PI, SG
G-11	16 S 627813 3812752	PO
G-12	16 S 629012 3812959	PH
G-13	16 S 629586 3812921	PH
G-14	16 S 630106 3813247	SP
G-15	16 S 630027 3813565	ST, WR
G-16	16 S 626187 3806903	SG, ST
G-17	16 S 620853 3795075	ST, DR, DO
G-18	16 S 628127 3807325	PH, ST

Minnow Traps

Minnow traps are an effective means of capturing aquatic amphibians and reptiles, especially tadpoles, frogs, salamanders, salamander larvae and aquatic snakes. They can be set in most aquatic situations, but appear to be most effective in ponds or swamps with shallow waters. Traps are set near the shoreline, in water deep enough to at least cover the funnel openings. The traps are set from 5-10 meters apart and are checked daily. During the course of this inventory 2 sites have been identified for utilization of this methodology. Some of these suffered from lack of water depth during the late summer visits. All others were sampled during those timeframes. Fast moving water in Little River and lack of water depth in most other water sources made this a very problematic methodology at Little River Canyon National Preserve. Data on reptiles and amphibians located during these samplings is located in Appendix A. Table 3 lists the utilized plots and their location and affiliated habitat.

Table 3: Minnow Trapping Sites

Plot #	UTM Coordinates NAD 83	Habitat
M-1	16 S 630208 3811114	ST
M-2	16 S 631723 3811067	ST

Coverboards (Artificial Shelters)

One of the major disadvantages of minnow and other “active” traps is that they must be set and monitored on a continual basis. An alternative method of inventorying herpetological communities involves the use of artificial shelters established in systematic arrays in various habitats. This method has been utilized extensively to sample reptile and amphibian populations nationwide in a variety of habitats. The major advantages of this approach are that they require no maintenance and they can be checked whenever time permits. These shelters are very effective in sampling salamanders, lizards, snakes and frogs. The sampling scheme utilized consists of the following; Arrays of coverboards consisting of .66 meter by .66 meter sections of exterior plywood were established and set up. Each array consisted of at least four boards and was arranged randomly through each terrestrial habitat block located on Preserve. All were sampled every field day during the study that investigators are in the area of the array. Realistically, arrays should be sampled at least a month after they are set up to allow the boards to age and to adequately compact the vegetation under them for easier visibility of reptiles and amphibians utilizing the shelters. These coverboards were also utilized in conjunction with drift fences. (See Drift Fences section below.)

Frog Breeding Surveys

The fact that anuran amphibians congregate for breeding allows for highly effective inventories of these species. These surveys involve the systematic survey of major aquatic habitats during the primary breeding seasons for these species in early spring and early summer.

Sites established under this approach were surveyed by spot lighting at night and by active listening in the various aquatic habitats by the biologists involved in this study. During the course of this inventory, the entire Park was driven twelve times at speeds appropriate for the road riding methodology detailed below, six times during the day and six times at night (after dark). At least 12 sites were established to have calling anurans during those surveys. Those sites were specifically monitored throughout the remainder of this inventory process. Data on frogs and toads located during this sampling is located in Appendix A. Table 4 lists the utilized plots and their location and affiliated habitat.

Table 4: Frog Breeding Survey Sites

Plot #	UTM Coordinates NAD 83	Habitat
G-6	16 S 627791 3808494	ST
G-10	16 S 626141 3805508	SG
G-16	16 S 626187 3806903	ST
G-17	16 S 620853 3795075	ST
D-1	16 S 625999 3805606	PH
D-2	16 S 626128 3806723	MH, MF
D-5	16 S 622380 3802945	MH, DO
D-6	16 S 621509 3803014	PI
D-7	16 S 621690 3800816	DO
R-1	16 S 626767 3807019	PI
R-11	16 S 620960 3794863	ST
R-13	16 S 621440 3802258	PH

Road Surveys

Many amphibians and reptiles routinely cross roads during their daily activities and investigators have found this approach to be the most effective method of sampling many terrestrial snakes, lizards, turtles, frogs and toads, as well as many semi-aquatic snakes. This approach has been used to successfully census and monitor amphibians and reptiles throughout the country and provides a transferable approach for use at Little River Canyon National Preserve. The sampling scheme for this approach consists of driving at slower speeds (10-25 miles per hour) and observing the amphibians and reptiles crossing or otherwise utilizing the roadway. The entire Preserve was sampled utilizing this methodology two times each visit to the Park, once during the day and once at night (after dark). The Preserve has been sampled in its entirety twelve times. Overall the results have been disappointing, with few reptiles and amphibians tallied utilizing this methodology. Data on reptiles and amphibians located during this sampling is located in Appendix A.

Drift Fences

Drift fences are frequently a most productive method of inventorying herpetological communities. Equipped with pitfall traps, funnel traps or both, studies show that the productivity of drift fences is significantly higher than hand-captures, although, this does not always apply in all areas of the country. These arrays were set up to sample each terrestrial habitat identified on the Park lands. These arrays have been developed using 10 inch aluminum flashing for drift fence material with plastic 5-gallon pails embedded in the ground so that the top was flush with the ground surface being used for pitfalls. Aluminum screen funnel traps and plastic funnel traps used by commercial snake breeders were used to augment the trapping effort at the drift fence sites. This methodology was further augmented by the use of .66 meter by .66 meter coverboards placed alongside the drift fences since pitfall traps could not be utilized in many areas due to the shallow soil. 10 sites were established utilizing these sample methods on the Preserve

with the first active trapping beginning during the spring 2004 surveys with data on reptiles and amphibians located during the sampling located in Appendix A. Table 5 lists the utilized plots and their location and affiliated habitat.

Table 5: Drift Fence Sites

Plot #	UTM Coordinates NAD 83	Habitat
D-1	16 S 625999 3805606	PH
D-2	16 S 626128 3806723	MF
D-3	16 S 625362 3803844	MH
D-4	16 S 623935 3803484	PH
D-5	16 S 622380 3802945	DO
D-6	16 S 621509 3803014	PI
D-7	16 S 621690 3800816	DO
D-8	16 S 622127 3800550	PI
D-9	16 S 630205 3808396	MH
D-10	16 S 626466 3805783	MF

ANALYSIS OF SURVEY METHODOLOGY EFFICIENCY

Table 6 summarizes the overall efficiency of the seven field methodologies utilized in this survey as well as the efficiency of all seven combined. An efficiency quotient has been established to enumerate this efficiency and is determined by dividing the number of species inventoried by a certain methodology by 73, the total number of species known to occur in the general area of Little River Canyon National Preserve. This would give a numerical value of the likelihood of a given methodology to accomplish a total inventory given the conditions available on Little River Canyon National Preserve during the survey.

Table 6: Field Methodology Efficiency Analysis

Methodology	No. of Species (n)	No. of Individuals	Efficiency Quotient (n/73)
General Herpetological Collecting	35	232	.479
Minnow Traps	1	1	.014
Random Plots	7	13	.096
Frog Breeding Surveys	9	92+	.123
Road Surveys	10	60	.137
Drift Fences	10	20	.137
Combined Six Methodologies	41	418	.562

Table 6 shows very low efficiency quotients for several of the methodologies used in this inventory. This is to be expected as minnow traps and frog breeding surveys target smaller numbers of species than other methodologies. Each methodology has its own strengths and weaknesses as an inventory device. These and other potential biases will be discussed in the following paragraphs. Weather is a factor affecting the efficiency of all individual field methods, as well as the combination of the six.

PROCESSING OF INDIVIDUALS

All reptiles and amphibians captured or observed to date have been identified to species (many to identifiable subspecies), and where possible, sexed, measured for length (snout to vent length is becoming the standard for measuring snakes, lizards and amphibians, while carapace length is used for turtles), weighed and checked for reproductive condition. All lengths are recorded in millimeters while weights are recorded in grams. Sexing of snakes is done by probing which has a 96% reliability rate. Lizards are sometimes harder to sex, but anal pores and display markings of males are helpful in this respect. Turtles are sexed by a combination of indented plastron of most male individuals and location of the vent in relation to the end of the shell. Frogs, toads and salamanders are hard to sex with any degree of reliability outside the breeding season.

RESULTS

Analysis of Species Richness and Relative Abundance

The following tables and text analyze the species richness and relative abundance of the reptiles and amphibians found on Little River Canyon National Preserve in two contexts; parkwide and at the habitat level. The numbers in the tables reflect the relative abundance of that species compared to other species within that assemblage. This number is acquired by dividing the number of individuals found by the number of sampling points located within that geographic area or habitat (Jones, 1988). These numbers reflect only the results of this inventory and do not include previous or concurrent studies on the Park.

Table 7: Species Richness Analysis

<u>Level of Analysis</u>	<u>Number of Species</u>
Parkwide	41
Habitats	
Mixed Hardwood Forest	19
Mixed Mesic Hardwoods	7
Dry Oak	5
Pine/Hardwood Forest	21
Pine Forest	8
Open Field	0
Sandstone Glade	12
Stream	21

Habitats	<u>Number of Species</u>
Spring	7
Pond	8
Bog	2
Wet Rock Faces	4
Dry Rock Faces	2

Table 8: Relative Abundance at Park Level

Species	Relative Abundance Factor
Spotted Salamander	.045
Spotted Dusky Salamander	.045
Ocoee Salamander	.045
Northern Slimy Salamander	.205
Green Salamander	.023
Spring Salamander	.034
Northern Red Salamander	.023
Southern Two-lined Salamander	.080
Longtail Salamander	.023
Cave Salamander	.057
American Toad	.205
Fowler's Toad	.659
Northern Cricket Frog	.307
Cope's Gray Treefrog	.227
Spring Peeper	.102
Eastern Narrowmouth Toad	.011
Bullfrog	.273
Green Frog	.295
Southern Leopard Frog	.352
Pickerel Frog	.148
Common Snapping Turtle	.011
Eastern Box Turtle	.091
Green Anole	.148
Eastern Fence Lizard	.602
Six-lined Racerunner	.091
Ground Skink	.045
Five-lined Skink	.148
Broadhead Skink	.011
Southeastern Five-lined Skink	.011
Midland Watersnake	.068
Queen Snake	.023
Eastern Garter Snake	.057

Species	Relative Abundance Factor
Smooth Earth Snake	.023
Ringneck Snake	.045
Eastern Worm Snake	.023
Northern Black Racer	.045
Corn (Red Rat) Snake	.023
Rat Snake	.023
Black Kingsnake	.034
Copperhead	.057
Cottonmouth	.011

Table 9: Relative Abundance by Terrestrial Habitats

Species	Mixed Hardwood Forest (9 Sites)	Mixed Mesic Hardwoods (10 Sites)	Dry Oak Forest (8 Sites)	Pine/Hardwood Forest (18 Sites)	Pine Forest (11 Sites)	Open Field (1 site)	Sandstone Glade (5 Sites)
Spotted Salamander							
Spotted Dusky Salamander				.056			
Ocoee Salamander							
Northern Slimy Salamander	.778	.200		.167	.364		
Green Salamander							
Spring Salamander							
Northern Red Salamander							
Southern Two-lined Salamander							
Longtail Salamander				.056			
Cave Salamander							
American Toad	.222	.100		.111	.091		
Fowler's Toad	1.778	.300	.250	.722	.455		1.400
Northern Cricket Frog	.444						1.600
Cope's Gray Treefrog	.222			.278			1.400
Spring Peeper	.111						.800
Eastern Narrowmouth Toad	.111						
Bullfrog							.400
Green Frog	.667	.300		.222			
Southern Leopard Frog				.333	.273		.600
Pickrel Frog	.333						

Species	Mixed Hardwood Forest (9 Sites)	Mixed Mesic Hardwoods (10 Sites)	Dry Oak Forest (8 Sites)	Pine/Hardwood Forest (18 Sites)	Pine Forest (11 Sites)	Open Field (1 site)	Sandstone Glade (5 Sites)
Common Snapping Turtle							
Eastern Box Turtle	.444	.100	.125	.111			
Green Anole				.222	.182		1.400
Eastern Fence Lizard	1.000	.100		1.333	.455		2.400
Six-lined Racerunner				.222			.800
Ground Skink	.444						
Five-lined Skink	.333			.222	.273		.600
Broadhead Skink				.056			
Southeastern Five-lined Skink							.200
Midland Watersnake							
Queen Snake							
Eastern Garter Snake				.111			
Smooth Earth Snake	.222						
Ringneck Snake	.111		.125	.111			
Eastern Worm Snake	.111	.100					
Northern Black Racer	.111		.125	.056			
Corn (Red Rat) Snake					.091		.200
Rat Snake				.056			
Black Kingsnake	.111			.111			
Copperhead				.111			
Cottonmouth	.111		.125				

Table 10: Relative Abundance by Aquatic Habitats and Rock Faces

Species	Stream (17 Sites)	Spring (3 Sites)	Pond (1 Site)	Bog (7 Sites)	Wet Rock Face (1 Site)	Dry Rock Face (2 Sites)
Spotted Salamander	.235					
Spotted Dusky Salamander	.176					
Ocoee Salamander	.118	.667				
Northern Slimy Salamander					2.000	
Green Salamander					2.000	

Species	Stream (17 Sites)	Spring (3 Sites)	Pond (1 Site)	Bog (7 Sites)	Wet Rock Face (1 Site)	Dry Rock Face (2 Sites)
Spring Salamander	.059	.667				
Northern Red Salamander	.059	.333				
Southern Two-lined Salamander	.059	1.333			2.000	
Longtail Salamander						.500
Cave Salamander					5.000	
American Toad	.353	.667	4.000			
Fowler's Toad	.706					
Northern Cricket Frog	.647		4.000			
Cope's Gray Treefrog	.235		2.000			
Spring Peeper	.235					
Eastern Narrowmouth Toad						
Bullfrog	1.294					
Green Frog	.294		8.000			
Southern Leopard Frog	.353	3.667	2.000			
Pickrel Frog	.588					
Common Snapping Turtle	.059					
Eastern Box Turtle						
Green Anole						
Eastern Fence Lizard	.118					
Six-lined Racerunner						
Ground Skink						
Five-lined Skink						
Broadhead Skink						
Southeastern Five-lined Skink						
Midland Watersnake	.176		2.000	.500		
Queen Snake	.118					
Eastern Garter Snake	.059	.333	1.000			
Smooth Earth Snake						
Ringneck Snake						
Eastern Worm Snake						
Northern Black Racer						.500
Corn (Red Rat) Snake						
Rat Snake			1.000			
Black Kingsnake						
Copperhead				.500		
Cottonmouth	.059					

THREATENED AND ENDANGERED SPECIES

Little River Canyon National Preserve is located in Dekalb and Cherokee Counties, Alabama. The federal Endangered Species Act (ESA) lists a number of species as endangered, threatened or as candidate species for listing under those designations.

The Endangered Species Act lists the following species occurring in Alabama as **endangered**:

Mississippi Gopher Frog	Leatherback Sea Turtle
Atlantic Hawksbill Turtle	Alabama Redbelly Turtle
Kemp's Ridley Sea Turtle	

None of these species naturally occur near Little River Canyon National Preserve and none were found during this inventory.

The Endangered Species Act lists the following species occurring in Alabama as **threatened**:

Flatwoods Salamander	Green Sea Turtle
Red Hills Salamander	Flattened Musk Turtle
Eastern Indigo Snake	Gopher Tortoise
Loggerhead Sea Turtle	

None of these species naturally occur near Little River Canyon National Preserve and none were found during this inventory.

The Endangered Species Act lists the following species occurring in Alabama as **candidate** species for listing. By law, these species must be treated as though they were listed until a final determination is made.

Black Warrior Waterdog	Black Pine Snake
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Neither of these species naturally occurs near Little River Canyon National Preserve and none were found during this inventory.

The State of Alabama lists the following species as **protected species**. Species with a state protected status are protected by the Nongame Species Regulation (Section 220-2-.92, page 79-82) of the *Alabama Regulations for 2005-2006 on Game, Fish, and Fur Bearing Animals*. In addition to the following species, all Alabama species listed above under the Endangered Species Act are protected under this state statute.

Pine Barrens Treefrog	Alligator Snapping Turtle
Gopher Frog	Barbour's Map Turtle
Hellbender	Escambia Map Turtle
Green Salamander	Delta Map Turtle
Seal Salamander	Black-knobbed Sawback
Southern Hognose Snake	Alabama Map Turtle

Coachwhip
Gulf Salt Marsh Snake
Florida Pine Snake

Mississippi Diamondback Terrapin
Florida Softshell (Partial protection by size limit)

Of these species only the Green Salamander, Coachwhip, Alligator Snapping Turtle and Alabama Map Turtle have distributions that include the area of Little River Canyon National Preserve. Habitat for the Alligator Snapping Turtle does not occur in Little River Canyon National Preserve although Mount (Mount, 1975) lists the Alabama distribution as including the Preserve. Ernst, et.al. 1994 does not list this species in the area of Little River Canyon National Preserve. The mapped distributions of the Coachwhip and the Alabama Map Turtle include the area of the Preserve, and while none were located during this inventory or the work by Dunaway, Dunaway does document previous occurrence of both species in the Little River Canyon area (Dunaway, 1995). A small population of Green Salamanders was located on wet rock faces near the Highway 35 bridge over the river during this study. Dunaway also documented this species during her study.

DISCUSSION

During the course of this inventory process several potential sources of bias were noted. Weather nearly always creates some bias in herpetological survey. Because of the need for fairly exacting moisture and heat parameters by most reptile and amphibian species, some bias is certain to occur. During the time of our surveys, weather appeared to be within normal parameters for the area of the Preserve. Therefore, little bias would enter in to these survey results.

Another thing that became apparent was that randomly placed plots do not work well for reptiles and amphibians. They do work for birds, but, for more sedentary species, they do not seem to be of much value. Most reptiles and amphibians depend on fairly exacting microhabitats in which to live and randomly placed plots do not take this into account, thus leading to great inefficiency, especially as an inventory technique. This was borne out in other herpetological inventories conducted by Accipiter Biological Consultants including those on the Natchez Trace Parkway, Camp Dodge, Iowa Military Training Area, the Blue Ridge Parkway and now at Little River Canyon National Preserve. In all cases this technique utilized the most time and produced among the fewest individuals.

Past Herpetological Surveys of Little River Canyon National Preserve

During the course of research for this project one previous study was noted for this park. In 1993 and 1994 Melissa J. Dunaway, graduate student at Jacksonville State University, conducted a herpetological survey of Little River Canyon, Alabama. While this survey included areas which are off of the Little River Preserve, at least three of her study sites were located within the boundaries of the current Preserve. She documented 47 species of reptiles and amphibians during her study, 33 of them from her study sites on the Preserve. In her work, Dunaway also reports an additional 21 species which she determined to be reported or documented from Little River Canyon. Other studies summarized by Dunaway in her paper including Penn (1940), Redmond (1975) and Mount as reported in his book *The Reptiles and Amphibians of Alabama*

(1975). Dunaway does not break down which species were located during which study. Notations are made for these species in the Annotated Checklist in Appendix B of this document. Two additional sources are cited in the current NPSpecies database for the Preserve. They are National Park Service, Division of Planning, Design, and Compliance, Southeast Region. 1991. Special Resource Study Little River Canyon Area, Cherokee, Dekalb and Etowah Counties, Alabama and National Park Service, Natural Resource-Management Assessment Program (NRMAP) Park Profile Input Request, 1997. The 1991 citation may have been one of the works cited by Dunaway although it is not specifically mentioned in her report. All species on the 1991 designation were included in Dunaway's summary which leads these researchers to believe that this was one of the sources cited in her report. Citations for both references' species are specifically made in the Annotated Checklist.

Anecdotal Observation Records

Anecdotal observations are those observations made by other people, outside the study, which may or may not be verified as to the true species observed. The usefulness of this type of data is limited and depends, to a great extent, on the experience of the observer. Twenty eight species were given to our researchers as anecdotal observations. Many of these species have been verified by other sources in more scientific studies. Each has been designated by study and as anecdotal in the Annotated Checklist. Five new species were added to the list as anecdotal sightings. These include the Green Treefrog, Barking Treefrog, Upland Chorus Frog, Mountain Chorus Frog and Wood Frog. All were reported by Preserve staff with the Green Treefrog and Barking Treefrog supported by very nice photographs.

During the course of this study a number of NPS employees, especially maintenance workers and rangers, who are out on the Park daily, local inhabitants and visitors to the Park were interviewed in regards to reptile and amphibian species that they had observed on the Park. While this is not a reliable method of gaining information for a study of this type, several interesting conclusions could be drawn from the information.

1. Many local people fear all snakes and feel that all should be killed without delay.
2. Timber Rattlesnakes, Cottonmouths and Copperheads may have been more prevalent than survey methodologies led us to believe. Many were reported to us but few were found during the surveys.

Taxonomic Issues and the NPSpecies Database

Since the beginning of this project, all North American species in the Genus *Eumeces* have been changed to *Plestiodon*. This would include all species of skinks found on the Little River Canyon National Preserve with the exception of the Ground Skink. Additionally, all lizards of the Genus *Cnemidophorus* residing in North America north of Mexico have been relegated to the Genus *Aspidozelis*. These changes have been made, where appropriate, in this text. Similar changes should be made to update the NPSpecies database.

Desmognathus fuscus is listed in the current NPSpecies database as present on the Preserve with reference to Dunaway's study. At the time of her study, the species was present, but, has since

been divided into at least three new species. Currently, the population occurring at Little River Canyon National Preserve is *Desmognathus conanti*, the Spotted Dusky Salamander. *D. fuscus* no longer occurs within several hundred miles of the Preserve. This should be shown as an update to the NPSpecies database.

In the same vein, *Desmognathus ochrophaeus* is listed in the current NPSpecies database. This species has since been broken down into at least four new species. *D. ochrophaeus*, as it now exists, is not known from Alabama. The currently residing species is *D. ocoee*, the Ocoee Salamander. As above, this is the same species located by Dunaway, but, the taxonomy has changed since her report.

Nerodia sipedon, the Northern Water Snake is listed also. However, the Northern Water Snake form is not known from the state of Alabama, where only the distinguishable subspecies *N. s. pleuralis*, the Midland Watersnake exists. Both are listed in the NPSpecies database currently.

Like the above species the current NPSpecies database lists the Loggerhead Musk Turtle, *Sternotherus minor* as occurring on the Preserve. However, the nominate form only exists well to the southeast of the Preserve. The locally occurring form is *S. m. peltifer*, the Stripeneck Musk Turtle. The Stripeneck is currently listed as unconfirmed while the Loggerhead is listed as Present in the Park. The Loggerhead form does not exist in the Preserve and should be deleted. The Stripeneck should be shown as the locally occurring form.

Rat Snakes also pose a problem for reporting in the Preserve. All specimens captured by Accipiter Biological Consultants staff showed varying degrees of hybridization between the Black Rat Snake and the Gray Rat Snake. Even Mount 1975 concurs that individuals in northeastern Alabama populations are so highly integrated that they cannot be identified to sub specific level. This being the case, Rat Snakes within the Preserve should probably be identified only to specific level of *Elaphe obsoleta*. Even the photographic voucher of this species for this study shows characteristics of both subspecies.

Identification of Gray Treefrogs and Cope's Gray Treefrogs by sound in various areas is a very problematic venture. It has been a constant source of headache for these researchers. While the calls of these species appear to be very different, current distribution maps have dispelled coexistence in several southern states including Alabama. The Amphibian Research and Monitoring Initiative (ARMI) of the US Geological Survey has mapped these species utilizing the very different DNA patterns of the two species. Utilizing the maps developed in this way, the Gray Treefrog, *Hyla versicolor*, does not exist in the state of Alabama or in adjoining areas of Georgia. This being said, the researchers on this inventory have, on several occasions, heard what they believed to be Gray Treefrogs in areas far removed from where ARMI believes them to be. Dunaway, in her study, reports hearing a single individual of *Hyla versicolor* at one of her sites adjacent to the Preserve. We have included the species in the Annotated Checklist for the Preserve based on that report with a notation that it was found adjacent, but not on the Preserve.

In Dunaway's report she lists the Southern Cricket Frog as being heard by her staff near the Highway 35 bridge over the Little River. She quotes Mount 1975 as stating the species is found throughout the state of Alabama. A look at page 65 of that reference shows that the species is

missing from most of the northeastern quarter of the state including the area of Little River Canyon National Preserve. In the experience of Accipiter Biological staff, the calls of the Northern and Southern Cricket Frogs are very similar and usually only separated in the field when both are present. Aberrant calls are common in most species and in view of what would be a rather large range extension, she may have run upon one of these occurrences. All specimens caught in hand by our researchers were visually keyed out to the Northern species as the two are very different in hand. In view of these facts, we have opted to leave the Southern Cricket Frog off of the Annotated Checklist for the Preserve. If, after reviewing the facts, the NPS wishes to retain the species, they may do so at their discretion.

The NPSpecies database for Little River Canyon National Preserve currently lists the Dusky Gopher Frog as Probably Present in the Preserve. This is probably an error as the nearest population of that species occurs as an isolated population in central Shelby County, some 125 miles to the southwest. In the literature, this species is not known from northern half of the state with the exception of that one small population.

Dunaway also lists six species of turtles found during her study. These include the Painted Turtle, River Cooter, Slider, Stripe-necked Musk Turtle, Musk Turtle and Spiny Softshell. All were found on her sampling stations outside the boundaries of the Preserve. Most of these species prefer still or slow flowing water with mud or sandy substrate. The softshell has been known to utilize riverine areas with some cobble, but still prefers areas with mudflats. Adult sliders and cooter are more vegetarian in nature and require thick aquatic vegetation to meet their nutritional needs. Areas which meet the needs of these six species are very rare on the Preserve. As beaver ponds develop in various areas of the Preserve more habitat could become available for all six species. Currently we find documentation for only two of the six species on the Preserve itself. However, we have listed all six in the Annotated Checklist based on their confirmed presence adjacent to the Preserve as provided for in the NPSpecies database. Good photographs provided by Preserve staff exist for the River Cooter and Musk Turtle.

Dunaway also cites the Three-lined Salamander as present in her study at one of her off Preserve sites. As the Preserve is well within range of distribution for this species and there is suitable habitat for these salamanders on the Preserve we have added this species to the Annotated Checklist based on their confirmed presence adjacent to the Preserve as provided for in the NPSpecies database.

SUMMARY

During the course of this inventory 74 species of amphibians and reptiles were documented for Little River Canyon National Preserve on the Annotated Checklist. As our starting list consisted of 73 species the goal of 90% of expected species appears to be met. However, one species on our initial list were not located. This was the Mole Snake. Habitat exists for this species on the Preserve and it could be added to the list at any time in the future. The Mole Snake spends a great deal of time underground and is a hard species to pick up on inventories of this kind. A population could exist on the Preserve without the knowledge of biologists studying the area.

Two species documented on this study did not appear on our original list. These are the Green Treefrog and Eastern Glass Lizard, both of which would be considered outside of their mapped range of distribution. Suitable habitat exists for both species on the Preserve. The Green Treefrog has good photographic documentation from Preserve staff. The Eastern Glass lizard would be more suspect, but, is documented in the literature.

CONSERVATION AND MANAGEMENT RECOMMENDATIONS

Throughout history, many human activities have proven detrimental to the natural biota. As human populations increase, more and more natural habitat is eliminated or modified such that many species are now at risk. Several major threats to reptile and amphibian populations exist. The greatest include habitat destruction, modification of hydrologic controls that affect wetlands, pollution and collection for commercial or scientific purposes. The following are a series of conservation and management recommendations aimed at mitigating the effects of these threats on Little River Canyon National Preserve. These are not meant to be binding on the National Park Service, but rather recommendations for best management practices on the Park.

- As is the case with so many kinds of wildlife, reptiles and amphibians are under great pressure and they are rapidly disappearing from many areas where they were formerly abundant. This is due in the largest part to ignorance of the value of these animals, habitat destruction and exploitation for the pet trade. Current regulations of the National Park Service protect and manage all native wildlife within the National Park System lands. With this progressive attitude in mind, **land managers at Little River Canyon National Preserve should entirely eliminate the collection of native reptiles and amphibians, except as allowed by law through the scientific collecting permit process, and enforce laws relating to killing or harassing of these animals to the highest degree possible.**
- **All wetland areas should be managed to preserve, protect and, if necessary, restore natural functions in compliance with Executive Orders 11988 (requires agencies to preserve natural values served by floodplains) and 11990 (requires avoidance of adverse impacts associated with destruction or modification of wetlands), with the objective of minimizing degradation of stream banks and the loss of wetland habitat.**
- **Disturbed wetland areas could be enhanced by revegetation with native plants around the wetland to control erosion and reduce nutrient inputs into the water.** All amphibians and many aquatic reptiles are adversely affected by impurities in the water. To this end **chemical pesticides and non-biodegradable herbicides should be avoided, especially within 300 feet of any wetland. They should be used only in conjunction with an established Integrated Pest Management Plan.**
- **Where appropriate sites and habitat types exist, especially where ephemeral pools have been drained or otherwise destroyed, consideration should be given to construction of additional ephemeral pools, in close consultation with herpetologists and botanists familiar with the native species of the area. This could be undertaken**

in the northernmost forested areas of the Preserve. Sites should be carefully chosen, so as not to destroy other valuable resources, or disrupt natural drainage patterns. They are relatively easy to create and provide potential habitat for a majority of the *Ambystoma* salamander species and anurans occupying the Preserve. The book entitled A Guide to Creating Vernal Ponds by Tom Biebighauser is an excellent sourcebook. If the NPS cannot find a copy, Accipiter Biological Consultants will provide one at no cost. Inexpensive labor and machinery exist with the Planning, Operations and Training Offices of the Alabama Army National Guards. ABC has facilitated these cooperative efforts between military engineers and other National Parks and Forests and in each instance it produced a win-win situation. The engineers get excellent training on their equipment, the NPS gets new habitat built for the cost of allowing the troops to camp while they work and the wildlife gets additional habitat. ABC will gladly put NPS land managers in touch with the appropriate offices for this type of project.

- **Wherever possible, on the Preserve, beaver ponds should be left to develop naturally.** This should be done to the maximum extent possible and to the extent that the NPS mission and public safety are not compromised. This pond habitat may provide the only breeding resource on the Preserve for a number of amphibian species which require still or standing water for breeding purposes. These ponds contribute to biodiversity of the area for both flora and fauna and may provide for educational experiences for visitors to the Preserve.
- The following is recommended to further the success of the permanent wetlands on the Park for reptile and amphibian species. **Keep fish out of wetland areas, especially game fish, except for where nature provides them.** These fish are highly predatory on amphibian eggs and larvae. Large game fish are also capable of ingesting adult frogs or salamanders and young aquatic snakes and turtles. Many amphibian species will not breed where these species are present. Even small fish species are capable of making heavy inroads on amphibian eggs.
- While the wetlands on the Park appear to be in fair shape, they do not exist alone, but have hydrologic and biologic ties with the surrounding landscape. **Vegetative corridors should be provided or maintained where they exist between wetlands and surrounding upland areas. Land managers should encourage native vegetative diversity in all habitats located on the Preserve.**
- **Rights-of-way should be placed near current habitat edge areas to reduce fragmentation of larger blocks of pristine habitat. Avoid building roads or new trails parallel to streams in riparian zones or through wet meadows. Stream crossings should be at right angles to minimize impacts on riparian vegetation, streambanks, soils, and water quality.**
- **Activities that will interrupt ecosystem processes should be avoided, or an alternative location for the activity should be sought. For example, avoid fragmentation activities that will interrupt the water flow patterns in wetland communities or create barriers between connected habitats used by reptile and**

amphibian species. Roads and firebreaks that disrupt natural hydrologic and burn patterns in higher quality ecotones that serve as reptile and amphibian habitat should be reduced to the minimum level necessary to accomplish the NPS mission, with remaining ecotones being allowed to recover. Roads that transect ecotones should be stabilized to prevent unnecessary erosion impacts and fire ditches and breaks should be restored to the original grade to restore natural hydrologic patterns. Where hydrologic fragmentation has already occurred, the NPS should conduct studies on its effect on reptile and amphibian populations. These studies should be comparative, comparing the fragmented habitats to more pristine habitats on the Park.

- No ecological benefits are gained by utilizing intensive site preparation activities that cause severe soil disturbance at sites. Therefore, **mechanical site preparation activities in susceptible areas should be minimal and restricted to nonmechanical approaches, if possible.** Intensive site preparation activities are known to lead to invasion by invasive exotic weedy species, and to exacerbate erosion problems.
- During 2003-2005 a baseline inventory of the reptile and amphibian species was accomplished on Little River Canyon National Preserve. The results of this survey are included in this report. **In addition, a monitoring plan for reptile species should be developed. This monitoring plan should be implemented as soon as time, personnel and financial resources are available.**
- **Visitors and employees at Little River Canyon National Preserve should be encouraged to leave microhabitats intact. Rocks, logs, boards and other ground debris should be replaced when disturbed.** These microhabitats form a large share of the usable reptile and amphibian habitat on Preserve lands. This encouragement could potentially come in the form of notices on Preserve maps, literature and bulletin boards currently located at a number of pullovers throughout the Preserve. These same sources could also be used to **educate visitors and employees on the usefulness of these animals, and to prohibit the harassment of reptiles, amphibians and other native wildlife on Little River Canyon National Preserve.**

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REFERENCES

- Alabama Department of Conservation & Natural Resources. 2005. Alabama Regulations for 2005-2006 on Game, Fish, and Fur Bearing Animals. Alabama Department of Conservation & Natural Resources, Division of Wildlife & Freshwater Fisheries. Montgomery, Alabama. pp 79-82
- Alabama Natural Heritage Program. 2005. Alabama Inventory List: the Rare, Threatened and Endangered Plants & Animals of Alabama. Privately printed by the Alabama Natural Heritage Program, Montgomery, Alabama. 57 pp.
- Beacham, Walton, F.V. Castronova, S. Sessine, Eds. 2001. Beacham's Guide to the Endangered Species of North America: Volume 6: Dicots, Monocots, Glossary, Organizations, Indexes. Gale Group, Inc. Farmington Hills, Michigan. pp 3377-3378.
- Biebighauser, T.R. 2002. A Guide to Creating Vernal Ponds: All the Information You Need to Build and Maintain an Ephemeral Wetland. Published by the USDA Forest Service in cooperation with Ducks Unlimited, Inc. and the Izaak Walton League of America, South Morehead, KY. 33pp.
- Bogan, M. A., R. B. Finley, Jr. And S. J. Petersberg. 1988. IN: Management of Amphibians, Reptiles and Small Mammals in North America (R. C. Szaro, K. Severson and D. R. Patton, eds). USDA Forest Service Technical Report, RM-166, pp 254-261.
- Conant, Roger and J.T. Collins. 1998. A Field Guide to Reptiles and Amphibians of Eastern/Central North America. Houghton Mifflin Company, Boston, Massachusetts. 569 pp.
- Cooperrider, A.Y., R.J. Boyd and H. R. Stuart, eds. 1986. Inventory and Monitoring of Wildlife Habitat. US Department of the Interior, Bureau of Land Management Service Center. Denver, Colorado. 858pp.
- Dunaway, M. J. 1995. A Herpetofaunal Survey of Little River Canyon, Alabama. Unpublished thesis submitted to Jacksonville State University, Jacksonville, Alabama. 143 pp.
- Ernst, C.H., J.E. Lovich and R.W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington, DC and London. 577 pp.
- Fitch, H. S. 1992. Methods of Sampling Snake Populations and Their Relative Success. Herpetological Review. Rev. 23: 17-19.
- Gibbons, J. W. 1988. The Management of Amphibians, Reptiles and Small Mammals in North America: The Need for an Environmental Attitude Adjustment. IN: Management of Amphibians, Reptiles and Small Mammals in North America (R. C. Szaro, K. Severson and D. R. Patton, eds). USDA Forest Service Technical Report, RM-166, pp 4-10.
- Heyer, W. Ronald et al. eds. 1994. Measuring and Monitoring Biological Diversity: Standard

- Methods for Amphibians. Smithsonian Institution Press, Washington DC. 364 pp.
- Jones, K.B. 1988. Distribution and Habitat Associations of Herpetofauna in Arizona: Comparisons by Habitat Type. IN: Management of Amphibians, Reptiles and Small Mammals in North America (R. C. Szaro, K. Severson and D. R. Patton, eds). USDA Forest Service Technical Report, RM-16. pp 109-127.
- Martof, B.S., W.M. Palmer, J.R. Bailey, and J.R. Harrison, III. 1980. Amphibians and Reptiles of the Carolinas and Virginia. University of North Carolina Press, Chapel Hill, NC. 257 pp.
- Mount, R.H. 1975. The Reptiles and Amphibians of Alabama. Auburn Printing Company, Auburn, Alabama. 345 pages.
- National Park Service, Division of Planning, Design, and Compliance, Southeast Region. 1991. Special Resource Study Little River Canyon Area, Cherokee, Dekalb and Etowah Counties, Alabama.
- National Park Service, Natural Resource-Management Assessment Program (NRMAP) Park Profile Input Request, 1997.
- Petranka, J.W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington, DC and London. 587 pp.
- Ramos, E. 1999. State Reptile and Amphibian Regulations. Reptile and Amphibian Magazine Pottsville, PA. p 6.
- Scott, N. J. Jr. And R. A. Seigel. 1992. The Management of Amphibian and Reptile Populations: Species Priorities and Methodological and Theoretical Constraints. IN: Wildlife 2001: Populations (D. McCullough, ed). Elsevier Publishing Company, London. Pp 343-368.
- Vogt, R. C. and R. L. Hine. 1982. Evaluation of Techniques for Assessment of Amphibian and Reptile Populations. IN Herpetological Communities (N. J. Scott, Jr., ed). U. S. Department of the Interior, Fish and Wildlife Service, Wildlife Research Report 13. Pp 201-217.
- Wright, A.H. and A.A. Wright. 1994. Handbook of Snakes of the United States and Canada, Vols 1 and 2. Comstock Publishing Associates, Ithaca, NY. 1105 pp.

APPENDIX A

LIRI
FIELD
DATASHEETS

APPENDIX A KEY

HAB = Habitat

MF = Mixed Hardwood Forest
MH = Mixed Mesic Hardwoods
DO = Dry Oak Forest
PH = Pine/Hardwood Forest
PI = Pine Forest
OF = Open Field
SG = Sandstone Glade
PO = Pond
SP = Spring
ST = Stream
BO = Bog
WR = Wet Rock Face
DR = Dry Rock Face

SKY = Cloud Cover

0 = Clear or few clouds
1 = Partly cloudy or variable
2 = Cloudy or overcast
4 = Fog or smoke
5 = Drizzle
7 = Snow
8 = Showers

RAIN = Rainfall in last 24 hours

Y = Yes
N = No

= Number of individuals found

AGE

A = Adult
J = Juvenile
L = Larval Stage
U = Unknown

SEX

M = Male
F = Female
U = Unknown

S to V = Snout to Vent Length in mm.

WT = Weight in Grams

* = not weighed

Audio Frog Surveys

HEARD

1 = One frog calling
2 = Two frogs calling
3 = Three frogs calling
4 = Chorus of frogs calling

LIRI GENERAL COLLECTING DATASHEET

DATE	SITE #	HAB	SKY	TEMP	RAIN	SPECIES	#	AGE	SEX	S to V	WT	NOTES
09/09/03	M 1	PH	1	81	N	FIVE-LINED SKINK	1	J	U	*	*	OBSERVED
09/11/03	G 10	PI	1	83	N	EASTERN FENCE LIZARD	4	A	U	*	*	OBSERVED
09/11/03	G 10	PI	1	83	N	FIVE-LINED SKINK	1	J	U	42	4.0	
04/06/04	G 4	PI	0	63	N	NORTHERN SLIMY SALAMANDER	1	J	U	30	0.5	
04/06/04	G 5	PI	0	63	N	NORTHERN SLIMY SALAMANDER	2	J	U	33	0.5	
04/06/04	G 7	PI	0	64	N	NORTHERN SLIMY SALAMANDER	1	J	U	37	1.0	
04/06/04	G 10	PI	0	67	N	EASTERN FENCE LIZARD	1	A	M	77	10.0	PIC 1
04/06/04	G 10	PI	0	67	N	GREEN ANOLE	2	A	M	61	3.5	PIC 2
04/07/04	G 14	SP	0	65	N	SOUTHERN LEOPARD FROG	10	A	U	52	17.0	PIC 3
04/07/04	G 16	SG	0	72	N	GREEN ANOLE	1	A	M	58	3.0	
04/07/04	G 16	SG	0	72	N	SOUTHEASTERN FIVE-LINED SKINK	1	A	M	69	8.0	
04/07/04	D 1	PH	O	72	N	BLACK KINGSNAKE	1	A	M	1953	391.0	
06/23/04	G1	PH	2	78	Y	BROADHEAD SKINK	1	A	M	*	*	OBSERVED
06/23/04	G3	ST	2	77	Y	OCOEE SALAMANDER	2	J	U	40	1.0	
06/23/04	G3	ST	2	77	Y	AMERICAN TOAD	2	A	M	68	32.0	PIC 5
06/23/04	G4	ST	2	78	Y	MIDLAND WATERSNAKE	1	A	F	430	62.0	
06/23/04	G4	ST	2	78	Y	SOUTHERN LEOPARD FROG	1	A	U	26	3.0	
06/23/04	G4	ST	2	78	Y	GREEN FROG	2	J	U	22	1.0	PIC 7
06/23/04	G5	SP	2	79	Y	SOUTHERN TWO-LINED SALAMANDER	4	A	U	33	0.5	PIC 16
06/23/04	G8	SP	2	81	Y	AMERICAN TOAD	2	A	M	65	25.0	
06/23/04	G8	SP	2	81	Y	SOUTHERN LEOPARD FROG	1	A	M	24	2.5	
06/23/04	G8	SP	2	81	Y	OCOEE SALAMANDER	2	A	U	38	1.0	
06/23/04	G11	PO	1	84	Y	MIDLAND WATERSNAKE	1	J	M	162	3.0	PIC 23
06/23/04	G11	PO	1	84	Y	NORTHERN CRICKET FROG	4	A	U	18	0.5	
06/23/04	G11	PO	1	84	Y	GREEN FROG	8	A	U	50	2.0	
06/23/04	G11	PO	1	84	Y	SOUTHERN LEOPARD FROG	2	A	U	21	2.5	
06/23/04	G12	PH	1	85	Y	NORTHERN SLIMY SALAMANDER	1	A	U	63	6.0	
06/23/04	G12	PH	1	86	Y	BLACK KINGSNAKE	1	A	M	723	168.0	PIC 20
06/23/04	G16	SG	1	86	Y	FOWLER'S TOAD	5	A	U	43	7.0	PIC 4
06/24/04	G10	SG	2	81	Y	FIVE-LINED SKINK	1	A	U	*	*	OBSERVED
09/13/04	G17	ST	2	76	Y	QUEEN SNAKE	1	A	U	*	*	OBSERVED
09/13/04	G17	ST	2	77	Y	FOWLER'S TOAD	2	A	U	60	18.0	
09/13/04	G17	DR	2	78	Y	LONG-TAILED SALAMANDER	1	A	U	56	2.0	
09/13/04	G17	ST	2	77	Y	SOUTHERN TWO-LINED SALAMANDER	1	A	U	29	0.5	
09/13/04	G17	ST	2	77	Y	SPRING SALAMANDER	1	A	U	49	3.0	
09/13/04	G17	ST	2	76	Y	BULLFROG	3	A	U	*	*	OBSERVED
09/13/04	G17	DO	2	76	Y	EASTERN BOX TURTLE	1	A	M	170	468.0	
09/13/04	R11	PH	2	74	Y	EASTERN FENCE LIZARD	2	A	M	56	7.0	1 JUV.
09/13/04	R31	ST	2	77	Y	FOWLER'S TOAD	2	J	U	32	4.0	
09/13/04	R31	MH	2	77	Y	FIVE-LINED SKINK	3	A	U	*	*	OBSERVED
09/13/04	R31	MH	2	77	Y	EASTERN FENCE LIZARD	7	A	U	58	7.5	5 JUV.
DATE	SITE #	HAB	SKY	TEMP	RAIN	SPECIES	#	AGE	SEX	S to V	WT	NOTES

LIRI GENERAL COLLECTING DATASHEET

09/14/04	R19	PH	2	75	N	EASTERN FENCE LIZARD	10	A	M	69	10.0	
09/14/04	R32	PH	2	75	N	FOWLER'S TOAD	2	J	U	29	3.5	
09/14/04	R14	PH	2	75	N	COPPERHEAD	1	J	U	*	*	OBSERVED
09/14/04	D2	PH	2	82	N	EASTERN FENCE LIZARD	1	J	U	*	*	OBSERVED
09/14/04	G10	SG	2	82	N	EASTERN FENCE LIZARD	4	A	U	*	*	OBSERVED
09/14/04	G10	SG	2	82	N	GREEN ANOLE	2	A	F	*	*	OBSERVED
09/14/04	G10	SG	2	82	N	SIX-LINED RACERUNNER	1	J	U	36	3.0	PIC 30
09/14/04	D4	SG	2	82	N	EASTERN FENCE LIZARD	4	J	U	*	*	OBSERVED
09/14/04	G16	WR	2	83	N	CAVE SALAMANDER	1	A	U	41	1.0	PIC 26
09/14/04	G16	ST	2	83	N	MIDLAND WATERSNAKE	1	A	U	*	*	OBSERVED
09/14/04	G16	PH	2	83	N	GREEN ANOLE	1	A	M	61	4.0	
09/15/04	G6	ST	2	74	N	NORTHERN CRICKET FROG	3	A	U	18	1.0	
09/15/04	G6	ST	2	74	N	SPOTTED DUSKY SALAMANDER	1	A	U	52	2.5	
09/15/04	G7	PH	2	75	N	EASTERN GARTER SNAKE	1	J	U	163	2.0	
09/15/04	G7	PH	2	75	N	FOWLER'S TOAD	2	A	U	55	14.0	
09/15/04	G11	PO	2	75	N	COPE'S GRAY TREEFROG	2	A	U	41	6.5	
09/15/04	G11	PO	2	75	N	MIDLAND WATERSNAKE	1	J	F	179	3.5	
09/15/04	G2	ST	2	76	N	NORTHERN RED SALAMANDER	1	A	U	93	12.5	
09/15/04	G2	ST	2	76	N	SPOTTED SALAMANDER	4	L	U	18	0.5	
09/16/04	R5	PH	1	75	Y	NORTHERN BLACK RACER	1	A	M	738	142.0	
09/16/04	R10	PH	1	76	Y	EASTERN FENCE LIZARD	3	A	F	70	11.5	
06/26/05	G10	SG	2	78	Y	COPE'S GRAY TREEFROG	1	A	M	42	7.0	
06/27/05	G8	SG	2	78	Y	EASTERN FENCE LIZARD	1	A	M	*	*	OBSERVED
06/27/05	R31	PH	2	90	Y	SIX-LINED RACERUNNER	2	A	U	*	*	OBSERVED
06/27/05	R31	PH	2	90	Y	FIVE-LINED SKINK	2	A	U	*	*	OBSERVED
06/27/05	R31	PH	2	90	Y	RINGNECK SNAKE	1	A	F	266	4.5	
06/27/05	G17	ST	2	90	Y	QUEEN SNAKE	1	J	U	*	*	OBSERVED
06/27/05	G17	ST	2	90	Y	COTTONMOUTH	1	J	U	*	*	OBSERVED
06/27/05	R31	ST	2	90	Y	COMMON SNAPPING TURTLE	1	J	F	170	850.0	PIC 14
06/27/05	G10	SG	2	86	Y	EASTERN FENCE LIZARD	3	A	M	70	8.0	
06/27/05	G10	SG	2	86	Y	GREEN ANOLE	4	A	F	59	5.0	2 JUV.
06/27/05	G10	SG	2	86	Y	FIVE-LINED SKINK	2	A	U	63	7.5	PIC 9
06/27/05	G16	WR	2	86	Y	SOUTHERN TWO-LINED SALAMANDER	2	A	U	42	0.5	
06/27/05	G16	WR	2	86	Y	NORTHERN SLIMY SALAMANDER	1	J	U	32	0.5	
06/27/05	G16	WR	2	86	Y	GREEN SALAMANDER	1	A	U	*	*	OBSERVED
06/27/05	G16	WR	2	86	Y	CAVE SALAMANDER	3	A	U	48	1.0	
06/27/05	D6	PH	2	87	Y	LONG-TAILED SALAMANDER	1	A	U	64	5.0	PIC 24
06/27/05	R12	MH	2	87	Y	EASTERN BOX TURTLE	1	A	M	172	482.0	PIC 17
06/28/05	R30	ST	1	86	Y	BULLFROG	2	A	M	107	67.0	PIC 15
06/28/05	R2	ST	1	86	Y	EASTERN GARTER SNAKE	1	A	F	359	26.0	
06/28/05	R26	PH	1	86	Y	EASTERN FENCE LIZARD	1	A	F	*	*	OBSERVED
DATE	SITE #	HAB	SKY	TEMP	RAIN	SPECIES	#	AGE	SEX	S to V	WT	NOTES
06/28/05	R4	MH	1	86	Y	GROUND SKINK	1	A	U	49	1.0	

LIRI GENERAL COLLECTING DATASHEET

06/28/05	R4	MH	1	86	Y	EASTERN FENCE LIZARD	1	A	M	86	9.0	
06/28/05	R1	MH	1	87	Y	AMERICAN TOAD	1	A	M	70	36.0	
06/28/05	G16	ST	1	87	Y	EASTERN FENCE LIZARD	2	A	M	73	8.5	
06/28/05	G16	ST	1	88	Y	BULLFROG	3	A	M	105	66.0	
06/28/05	R33	BO	1	88	Y	COPPERHEAD	1	J	F	*	*	
06/28/05	R33	BO	1	88	Y	MIDLAND WATERSNAKE	1	A	F	655	138.0	
06/29/05	R29	MF	1	84	N	EASTERN BOX TURTLE	1	A	M	174	482.0	
06/29/05	G10	SG	1	84	N	SIX-LINED RACERUNNER	3	A	U	*	*	OBSERVED
06/29/05	R32	SP	1	85	N	SPRING SALAMANDER	2	A	U	92	16.0	PIC 19
06/29/05	R32	ST	1	85	N	NORTHERN CRICKET FROG	2	A	U	31	0.5	PIC 21
06/29/05	R32	ST	1	85	N	FOWLER'S TOAD	8	A	U	42	7.5	
06/29/05	R32	ST	1	86	N	AMERICAN TOAD	2	A	U	51	15.0	
06/29/05	R19	MH	1	86	N	NORTHERN BLACK RACER	1	A	M	1042	430.0	PIC 29
06/29/05	R19	MH	1	87	N	EASTERN BOX TURTLE	1	A	M	158	492.0	
06/29/05	R33	SP	1	87	N	EASTERN GARTER SNAKE	1	A	F	*	*	
06/29/05	R33	SP	1	87	N	NORTHERN RED SALAMANDER	1	A	U	59	4.5	PIC 22
09/04/05	G18	PH	1	78	N	EASTERN FENCE LIZARD	5	*	U	*	*	EGGS -MOTHER SEEN
09/04/05	G18	ST	1	78	N	SPOTTED DUSKY SALAMANDER	2	A	U	33	1.0	
09/04/05	R32	MF	1	86	N	FOWLER'S TOAD	1	J	U	21	0.5	
09/04/05	R32	MF	1	86	N	EASTERN FENCE LIZARD	1	J	U	29	0.5	
09/04/05	R19	MH	1	86	N	FOWLER'S TOAD	4	J	U	23	0.5	
09/04/05	R13	PH	1	86	N	EASTERN GARTER SNAKE	1	A	F	382	27.0	
09/05/05	R6	DR	0	79	N	NORTHERN BLACK RACER	1	A	U	*	*	OBSERVED
09/05/05	G10	PH	0	81	N	GREEN ANOLE	3	A	M	44	1.5	2 JUV.
09/05/05	G16	WR	0	83	N	NORTHERN SLIMY SALAMANDER	1	A	U	61	5.5	
09/05/05	G16	WR	0	83	N	GREEN SALAMANDER	1	A	U	41	1.0	
09/05/05	G16	WR	0	83	N	CAVE SALAMANDER	1	A	U	42	1.0	
09/05/05	G16	ST	0	83	N	BULLFROG	2	J	U	61	8.5	
09/06/05	G17	ST	0	80	N	PICKEREL FROG	3	A	U	63	21.0	PIC 18
09/06/05	G17	MH	0	80	N	EASTERN FENCE LIZARD	1	J	M	27	0.5	
09/06/05	R11	MH	0	81	N	NORTHERN SLIMY SALAMANDER	1	J	U	31	0.5	
06/01/05	R31	PH	1	81	N	SIX-LINED RACERUNNER	2	A	U	56	5.5	

LIRI ANURAN AUDIO DATASHEET

DATE	SITE #	HAB	SKY	TEMP	RAIN	SPECIES	#	NOTES
04/06/04	G16	SG	0	62	N	NORTHERN CRICKET FROG	4	
04/06/04	G16	SG	0	62	N	COPE'S GRAY TREEFROG	3	
04/06/04	G16	SG	0	62	N	SPRING PEEPER	4	
04/06/04	G16	SG	0	62	N	BULLFROG	2	
04/06/04	G16	SG	0	62	N	SOUTHERN LEOPARD FROG	3	
04/06/04	D2	MH	0	61	N	NORTHERN CRICKET FROG	4	
04/06/04	D2	MH	0	61	N	PICKEREL FROG	3	
04/06/04	D7	DO	0	61	N	FOWLER'S TOAD	2	
04/06/04	G17	ST	0	61	N	PICKEREL FROG	2	
04/06/04	G17	ST	0	61	N	SOUTHERN LEOPARD FROG	3	
04/06/04	G17	ST	0	61	N	BULLFROG	1	
04/06/04	R11	ST	0	60	N	COPE'S GRAY TREEFROG	4	
04/06/04	R11	ST	0	60	N	NORTHERN CRICKET FROG	2	
04/06/04	R11	ST	0	60	N	BULLFROG	4	
04/06/04	R11	ST	0	60	N	SPRING PEEPER	4	
04/06/04	R11	ST	0	60	N	SOUTHERN LEOPARD FROG	2	
04/06/04	R11	ST	0	60	N	PICKEREL FROG	2	
06/23/04	G6	ST	2	79	Y	NORTHERN CRICKET FROG	4	
06/23/04	D6	PI	5	77	Y	FOWLER'S TOAD	2	
06/23/04	R1	PI	5	76	Y	SOUTHERN LEOPARD FROG	3	
06/24/04	D1	PH	2	80	Y	COPE'S GRAY TREEFROG	3	
09/14/04	G17	ST	2	71	N	BULLFROG	2	
09/14/04	G16	ST	2	70	N	BULLFROG	2	
09/14/04	G17	ST	2	70	N	GREEN FROG	3	
09/14/04	G17	ST	2	70	N	PICKEREL FROG	3	
06/26/05	G16	PH	2	78	Y	SOUTHERN LEOPARD FROG	2	
06/26/05	G10	SG	2	78	Y	COPE'S GRAY TREEFROG	3	
06/26/05	D5	MH	2	78	Y	COPE'S GRAY TREEFROG	2	
06/26/05	R13	PH	2	78	Y	COPE'S GRAY TREEFROG	1	
06/26/05	D6	PH	2	78	Y	SOUTHERN LEOPARD FROG	4	
06/26/05	G16	ST	2	77	Y	AMERICAN TOAD	2	
06/26/05	G16	ST	2	77	Y	BULLFROG	3	
06/26/05	G10	SG	2	76	Y	NORTHERN CRICKET FROG	4	

LIRI DRIFT FENCE DATASHEET

DATE	SITE #	HAB	SKY	TEMP	RAIN	SPECIES	#	AGE	SEX	S to V	WT	NOTES
06/24/04	D7	MH	5	81	Y	NORTHERN SLIMY SALAMANDER	1	A	U	39	1.0	PIC 8
06/24/04	D9	MH	2	81	Y	EASTERN WORM SNAKE	1	J	F	97	1.0	PIC 11
09/14/04	D2	MH	2	76	N	NORTHERN SLIMY SALAMANDER	2	A	U	66	13.0	
09/14/04	D2	MH	2	76	N	GROUND SKINK	1	A	U	44	3.0	
09/14/04	D5	DO	2	77	N	NORTHERN BLACK RACER	1	A	F	485	37.0	
09/15/04	D7	DO	2	77	N	RINGNECK SNAKE	1	A	M	282	5.5	
09/15/04	D10	MH	2	78	N	NORTHERN SLIMY SALAMANDER	3	A	U	48	3.0	
09/15/04	D2	MH	2	78	N	SMOOTH EARTH SNAKE	1	A	F	210	7.0	
06/27/05	D8	PH	2	82	Y	EASTERN FENCE LIZARD	1	A	F	69	10.0	
06/27/05	D7	MH	2	87	Y	SMOOTH EARTH SNAKE	1	A	M	215	8.0	PIC 25
06/27/05	D6	PH	2	87	Y	SPOTTED DUSKY SALAMANDER	1	A	U	43	1.5	PIC 28
06/28/05	D9	MH	2	86	Y	EASTERN NARROWMOUTH TOAD	1	A	U	22	0.5	PIC 12
09/04/05	D10	PH	1	78	N	EASTERN FENCE LIZARD	1	J	U	29	0.5	
09/04/05	D9	MF	1	78	N	EASTERN WORM SNAKE	1	A	M	240	10.0	
09/04/05	D9	MF	1	78	N	NORTHERN SLIMY SALAMANDER	1	J	U	36	1.0	
09/04/05	D6	MH	1	78	N	FOWLER'S TOAD	1	J	U	44	6.5	
09/04/05	D6	PH	1	78	N	NORTHERN SLIMY SALAMANDER	1	A	U	67	13.0	

LIRI MINNOW TRAP DATASHEET

DATE	SITE #	HAB	SKY	TEMP	RAIN	SPECIES	#	AGE	SEX	S to V	WT	NOTES
09/14/04	M2	ST	2	75	Y	MIDLAND WATERSNAKE	1	A	F	305	29.0	

LIRI RANDOM PLOT DATASHEET

DATE	SITE #	HAB	SKY	TEMP	RAIN	SPECIES	#	AGE	SEX	S to V	WT	NOTES
06/23/04	R4	MH	2	78	Y	RINGNECK SNAKE	1	A	F	325	6.0	PIC 6
09/15/04	R23	PO	2	80	N	EASTERN GARTER SNAKE	1	J	M	328	19.5	PIC 13
09/15/04	R26	PO	2	81	N	RAT SNAKE	1	A	U	*	*	
09/15/04	R20	PI	2	81	N	FIVE-LINED SKINK	2	A	M	105	10.0	
06/28/05	R25	PH	1	83	Y	AMERICAN TOAD	2	J	U	24	0.5	
06/28/05	R22	MH	1	85	Y	GROUND SKINK	1	A	U	37	0.5	PIC 27
09/04/05	R21	MF	1	78	N	NORTHERN SLIMY SALAMANDER	1	A	U	36	0.5	
09/04/05	R9	PH	1	78	N	RINGNECK SNAKE	1	A	F	212	4.0	
09/04/05	R3	PH	1	78	N	FIVE-LINED SKINK	1	A	M	63	8.0	
09/05/05	R10	PH	0	74	N	NORTHERN SLIMY SALAMANDER	1	A	U	63	7.5	
09/05/05	R27	MH	0	74	N	GROUND SKINK	1	A	U	32	0.1	

LIRI ROAD RIDE DATASHEET

DATE	SITE #	HAB	SKY	TEMP	RAIN	SPECIES	#	AGE	SEX	S to V	WT	NOTES
06/23/04	G10	SG	5	78	Y	FOWLER'S TOAD	1	A	F	62	23.0	
06/23/04	G10	SG	5	78	5	CORN SNAKE	1	J	U	*	*	OBSERVED
06/23/04	R14	MF	5	78	Y	FOWLER'S TOAD	2	A	M	60	22.0	
06/23/04	R14	MF	5	78	Y	AMERICAN TOAD	1	A	U	42	53.0	
06/23/04	R14	MF	5	78	Y	GREEN FROG	3	A	U	32	3.0	
06/23/04	D3	MH	5	78	Y	FOWLER'S TOAD	6	A	M	57	19.0	
06/23/04	D3	MH	5	78	Y	GREEN FROG	6	A	U	29	2.5	
06/23/04	D4	PH	5	77	Y	GREEN FROG	4	A	U	29	2.5	
06/23/04	D4	PH	5	77	Y	FOWLER'S TOAD	3	A	M	57	20.0	
06/23/04	D6	PI	5	77	Y	FOWLER'S TOAD	3	A	F	63	25.0	
06/23/04	D6	PI	5	77	Y	AMERICAN TOAD	1	A	U	45	6.0	
06/24/04	D1	PH	2	81	Y	COPE'S GRAY TREEFROG	1	A	U	47	8.5	PIC 10
09/14/04	D1	PO	2	76	N	AMERICAN TOAD	4	A	U	90	10.5	
09/14/04	D2	MH	2	76	N	FOWLER'S TOAD	3	A	U	59	17.0	
09/14/04	D2	MH	2	76	N	SPRING PEEPER	1	A	U	30	0.5	
09/14/04	D6	PI	2	75	N	CORN SNAKE	1	J	M	253	12.0	
09/14/04	D7	DO	2	75	N	COPPERHEAD	1	A	M	439	81.0	
09/14/04	R12	MH	2	75	N	FOWLER'S TOAD	1	A	U	48	1.5	
09/16/04	D9	PH	1	75	Y	EASTERN BOX TURTLE	1	A	M	118	246.0	
09/16/04	R5	PH	1	75	Y	COPPERHEAD	1	A	F	597	187.0	
06/26/05	G10	SG	2	78	Y	FOWLER'S TOAD	1	A	U	48	8.0	
06/26/05	R14	PH	2	78	Y	FOWLER'S TOAD	2	A	U	55	10.0	
06/26/05	D4	PH	2	78	Y	FOWLER'S TOAD	2	A	U	50	9.5	
06/27/05	R19	PH	2	87	Y	RAT SNAKE	1	A	M	828	99.0	PIC 31
06/27/05	D5	MH	2	91	Y	EASTERN BOX TURTLE	1	J	F	87	152.0	
06/27/05	D3	MH	2	82	Y	COPPERHEAD	1	A	F	487	118.0	
09/05/05	D4	PH	0	66	N	FOWLER'S TOAD	2	A	U	52	9.5	
09/05/05	R19	PH	0	67	N	EASTERN BOX TURTLE	1	A	M	115	235.0	
09/05/05	D3	MH	0	64	N	FOWLER'S TOAD	1	A	U	54	10.0	
09/05/05	D3	MH	0	64	N	AMERICAN TOAD	1	A	M	91	10.5	
09/05/05	R12	MH	0	64	N	BLACK KINGSNAKE	1	A	M	724	82.0	
09/06/05	G17	MH	0	80	N	EASTERN BOX TURTLE	1	A	M	168	420.0	

APPENDIX B

**ANNOTATED
CHECKLIST
OF THE REPTILE
AND
AMPHIBIAN SPECIES
OF
LITTLE RIVER CANYON
NATIONAL PRESERVE**

ANNOTATED REPTILE AND AMPHIBIAN CHECKLIST KEY

Native

N = Native to LIRI-- Native; includes endemic or indigenous

I = Introduced to LIRI

Park Status

P = Present-- Extremely high confidence in preserve; Current, verifiable evidence exists; Extant.

PP = Probably Present-- Very high confidence in preserve; Verifiable evidence may exist, but not current; Preserve within range; Appropriate habitat exists; Adjacent to preserve.

H = Historical-- Extremely low confidence in preserve; Verifiable evidence exists but not current.

U = Unconfirmed-- Very low to high confidence in preserve; Verifiable evidence may exist, but not current or insufficient.

? = Unknown

Residency

R = Resident on the Preserve

B = Positive Breeder on the Preserve—Reproduces.

U = Unknown

Abundance

A = Abundant-- Large numbers; Habitats covering large portion of preserve.

C = Common-- Large numbers; Habitats not covering large portion of preserve

U = Uncommon-- Few to moderate numbers; Sporadic; Habitats uncommon in preserve.

R = Rare-- Few individuals; Habitats rare.

? = Unknown

Previous Studies

D = Dunaway (1995)

S = SERO (1991) National Park Service, Division of Planning, Design, and Compliance, Southeast Region. 1991. Special Resource Study Little River Canyon Area, Cherokee, Dekalb and Etowah Counties, Alabama

N = National Park Service, Natural Resource-Management Assessment Program (NRMAP) Park Profile Input Request, 1997.

O = Other studies summarized by Dunaway in her paper including Penn (1940), Redmond (1975) and Mount as reported in his book The Reptiles and Amphibians of Alabama (1975).

Dunaway does not break down which species were located during which study.

Voucher Exists

P = Photographic voucher obtained during this study

Other

A = Anecdotal record for the preserve (Staff or visitor observation)

D = Located by Dunaway adjacent to preserve

ANNOTATED REPTILE AND AMPHIBIAN CHECKLIST	NATIVE	PARK STATUS	RESIDENCY	ABUNDANCE	FOUND 2003/2005	PREVIOUS STUDIES	VOUCHER EXISTS	OTHER
Order Caudata - Salamanders								
Ambystomatidae – Mole Salamanders								
Spotted Salamander - <i>Ambystoma maculatum</i>	N	P	B	U	X	D		
Marbled Salamander - <i>Ambystoma opacum</i>	N	P	R	?		O, S		
Salamandridae – Newts								
Red-spotted Newt [Red Eft] - <i>Notophthalmus viridescens</i>	N	P	B	U		D		A
Plethodontidae – Lungless Salamanders								
Spotted Dusky Salamander - <i>Desmognathus conanti</i>	N	P	R	C	X	D	P	A
Ocoee Salamander - <i>Desmognathus ocoee</i>	N	P	B	U	X	D		
Zigzag Salamander – <i>Plethodon dorsalis</i>	N	P	R	C		D		
Northern Slimy Salamander – <i>Plethodon glutinosus</i>	N	P	B	A	X	D	P	
Four-toed Salamander – <i>Hemidactylium scutatum</i>	N	P	?	?		O, S		
Green Salamander – <i>Aneides aeneus</i>	N	P	R	U	X	D		A
Spring Salamander - <i>Gyrinophilus porphyriticus</i>	N	P	R	U	X	D	P	
Northern Red Salamander - <i>Pseudotriton ruber ruber</i>	N	P	R	U	X	D	P	A
Southern Two-lined Salamander - <i>Eurycea cirrigera</i>	N	P	R	C	X	D	P	
Longtail Salamander – <i>Eurycea longicauda</i>	N	P	R	C	X	D	P	
Three-lined Salamander – <i>Eurycea guttolineata</i>	N	?	?	?				D
Cave Salamander – <i>Eurycea lucifuga</i>	N	P	R	C	X	O, S	P	
Order Anura – Frogs and Toads								
Pelobatidae – Spadefoots								
Eastern Spadefoot – <i>Scaphiopus holbrookii</i>	N	P	?	?		O, S		
Bufonidae – True Toads								
American Toad - <i>Bufo americanus</i>	N	P	B	A	X	D	P	
Fowler's Toad - <i>Bufo woodhousii fowleri</i>	N	P	B	A	X	D	P	
Hylidae – Treefrogs and Allies								
Northern Cricket Frog - <i>Acris crepitans</i>	N	P	B	A	X	D	P	
Gray Treefrog - <i>Hyla versicolor</i>	N	?	?	?				D
Cope's Gray Treefrog - <i>Hyla chrysoscelis</i>	N	P	B	A	X	D	P	A

ANNOTATED REPTILE AND AMPHIBIAN CHECKLIST	NATIVE	PARK STATUS	RESIDENCY	ABUNDANCE	FOUND 2003/2005	PREVIOUS STUDIES	VOUCHER EXISTS	OTHER
Green Treefrog – <i>Hyla cinerea</i>	N	P	R	R				A
Barking Treefrog – <i>Hyla gratiosa</i>	N	P	R	R				A
Spring Peeper - <i>Pseudacris crucifer</i>	N	P	B	C	X	D		A
Upland Chorus Frog – <i>Pseudacris triseriata feriarum</i>	N	P	R	?				A
Mountain Chorus Frog – <i>Pseudacris brachyphona</i>	N	P	R	?				A
Microhylidae – Narrowmouth Toads								
Eastern Narrowmouth Toad – <i>Gastrophryne carolinensis</i>	N	P	R	R	X		P	
Ranidae – True Frogs								
Bullfrog - <i>Rana catesbeiana</i>	N	P	B	A	X	D	P	
Green Frog - <i>Rana clamitans melanota</i>	N	P	B	A	X	D, S	P	
Wood Frog – <i>Rana sylvatica</i>	N	P	R	?				A
Southern Leopard Frog – <i>Rana utricularia</i>	N	P	B	A	X	D	P	A
Pickerel Frog – <i>Rana palustris</i>	N	P	B	C	X	D	P	
Order Testudines - Turtles								
Chelydridae – Snapping Turtles								
Common Snapping Turtle - <i>Chelydra serpentina</i>	N	P	B	U	X	D	P	
Kinosternidae – Musk and Mud Turtles								
Musk Turtle - <i>Sternotherus odoratus</i>	N	P	B	U				D, A
Stripeneck Musk Turtle – <i>Sternotherus minor peltifer</i>	N	?	?	?				D
Eastern Mud Turtle - <i>Kinosternon subrubrum</i>	N	P	R	U		O, S		
Emydidae – Box and Water Turtles								
Eastern Box Turtle - <i>Terrapene carolina carolina</i>	N	P	B	C	X	D	P	
Alabama Map Turtle – <i>Graptemys pulchra</i>	N	P	R	R		O, S		
Slider – <i>Trachemys scripta</i>	N	?	?	?				D
River Cooter – <i>Pseudemys concinna</i>	N	P	R	R				D, A
Painted Turtle - <i>Chrysemys picta</i>	N	?	?	?				D
Trionychidae – Softshell Turtles								
Spiny Softshell – <i>Apalone spinifera</i>	N	?	?	?				D

ANNOTATED REPTILE AND AMPHIBIAN CHECKLIST	NATIVE	PARK STATUS	RESIDENCY	ABUNDANCE	FOUND 2003/2005	PREVIOUS STUDIES	VOUCHER EXISTS	OTHER
Order Squamata – Lizards and Snakes								
Suborder Lacertilia – Lizards								
Polychridae - Anoles								
Green Anole – <i>Anolis carolinensis</i>	N	P	R	C	X	D	P	
Phrynosomatidae – Spiny Lizards and Allies								
Eastern Fence Lizard - <i>Sceloporus undulatus</i>	N	P	B	A	X	D	P	
Teiidae – Whiptails								
Six-lined Racerunner – <i>Aspidoscelis sexlineatus</i>	N	P	B	C	X	D	P	
Scincidae – Skinks								
Five-lined Skink - <i>Plestiodon fasciatus</i>	N	P	B	C	X	D	P	
Broadhead Skink – <i>Plestiodon laticeps</i>	N	P	R	U	X	D		
Southeastern Five-lined Skink – <i>Plestiodon inexpectatus</i>	N	P	R	U	X	D		
Ground Skink – <i>Scincella lateralis</i>	N	P	R	U	X	D	P	
Anguidae – Glass Lizards and Alligator Lizards								
Eastern Glass Lizard – <i>Ophisaurus ventralis</i>	N	P	R	U		S		
Slender Glass Lizard – <i>Ophisaurus attenuatus</i>	N	PP	?	?		O		A
Suborder Serpentes - Snakes								
Colubridae – Colubrids								
Midland Watersnake - <i>Nerodia sipedon pleuralis</i>	N	P	B	C	X	D, S	P	A
Queen Snake – <i>Regina septemvittata</i>	N	P	B	U	X	D		
Brown Snake - <i>Storeria dekayi</i>	N	P	R	U		O		A
Redbelly Snake – <i>Storeria occipitomaculata</i>	N	P	R	U		O		A
Eastern Garter Snake - <i>Thamnophis sirtalis</i>	N	P	R	C	X	D	P	
Eastern Ribbon Snake – <i>Thamnophis sauritus</i>	N	P	R	?		O, S		
Smooth Earth Snake – <i>Virginia valeriae</i>	N	P	R	U	X	O	P	A
Eastern Hognose Snake – <i>Heterodon platirhinos</i>	N	P	R	U		O		A
Ringneck Snake - <i>Diadophis punctatus</i>	N	P	R	C	X	O, S	P	A
Eastern Worm Snake - <i>Carphophis amoenus</i>	N	P	B	U	X	D	P	
Northern Black Racer - <i>Coluber constrictor constrictor</i>	N	P	R	C	X	D	P	
Coachwhip – <i>Masticophis flagellum</i>	N	P	R	?		O, N		

ANNOTATED REPTILE AND AMPHIBIAN CHECKLIST	NATIVE	PARK STATUS	RESIDENCY	ABUNDANCE	FOUND 2003/2005	PREVIOUS STUDIES	VOUCHER EXISTS	OTHER
Rough Green Snake - <i>Opheodrys aestivus</i>	N	P	R	U		D		A
Corn Snake [Red Rat Snake] - <i>Elaphe guttata</i>	N	P	B	U	X	D		
Rat Snake - <i>Elaphe obsoleta</i>	N	P	B	U	X	D	P	A
Northern Pine Snake – <i>Pituophis melanoleucus melanoleucus</i>	N	P	R	R		O, S		A
Black Kingsnake – <i>Lampropeltis getula nigra</i>	N	P	R	C	X	O	P	
Eastern Milksnake – <i>Lampropeltis triangulum triangulum</i>	N	PP	?	?		O		
Scarlet Snake – <i>Cemophora coccinea</i>	N	P	R	R		O, S		A
Southeastern Crowned Snake – <i>Tantilla coronata</i>	N	P	R	?		O, S		
Viperidae - Vipers								
Crotalinae – Pit Vipers								
Copperhead - <i>Agkistrodon contortrix</i>	N	P	B	C	X	D		A
Cottonmouth – <i>Agkistrodon piscivorus</i>	N	P	B	U	X	O		A
Timber Rattlesnake - <i>Crotalus horridus</i>	N	P	R	U		O		A

APPENDIX C

**LIFE HISTORY
INFORMATION
OF THE
REPTILE
AND
AMPHIBIAN SPECIES
OF
LITTLE RIVER CANYON
NATIONAL PRESERVE**

SPOTTED SALAMANDER

(Ambystoma maculatum)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits forested areas with nearby ponds or slow streams throughout the Preserve.

Special Habitat Requirements:

Requirements include shallow water bodies in which to breed and moist areas in which to hide.

Breeding:

Breeds February through April. Females normally deposit 2-4 egg masses containing 1-250 eggs each. Incubation is 3-4 weeks with metamorphosis occurring at 6-16 weeks.

Food Habits:

This species will eat any insect or invertebrate it can fit into its mouth.

Other Information

This species is found in small pools primarily beaver ponds within the Preserve. In most cases, the spent egg masses are more noticeable than the salamander or its larvae. Adults seen primarily during early spring breeding period.

MARBLED SALAMANDER

(Ambystoma opacum)

Status:

Unknown. Included based on previous studies.

Distribution and Habitat:

This species inhabits forested areas with vernal ponds or perennial ponds for breeding.

Special Habitat Requirements:

Requirements include shallow water bodies in which to breed and moist areas in which to hide.

Breeding:

Mating takes place in autumn and the female lays approximately 100 eggs which are deposited in a small depression in the soil. They hatch after winter rains inundate the nest. Larvae transform in April or May.

Food Habits:

The diet consists of earthworms, insects and snails.

Other Information

This species is seldom seen except during the mating season..

**RED-SPOTTED NEWT (RED
EFT)**

(Notophthalmus viridescens)

Status:

Uncommon.

Distribution and Habitat:

Occupies ponds, particularly beaver ponds, and quiet portions of small streams throughout the Preserve.

Special Habitat Requirements:

Requirements include shallow permanent or semi permanent bodies of unpolluted water with live vegetation.

Breeding:

After courtship in spring and fall the female deposits eggs singly on submerged vegetation, folding a leaf around each egg. Eggs hatch is about 35 days.

Food Habits:

Food includes insects, crustaceans, mollusks and eggs of other amphibians.

Other Information

Aquatic stages are easily seen in beaver ponds within the Preserve.

**SPOTTED DUSKY
SALAMANDER**

(Desmognathus conanti)

Status:

Common.

Distribution and Habitat:

Occupies edges of small woodland streams, brooks, springs and seepage areas over the entire Preserve. Seldom wanders far from running or trickling water.

Special Habitat Requirements:

Requirements include running waterways with stones, chunks of wood or other miscellaneous debris to provide shelter for the salamanders and their food.

Breeding:

Breeding takes place in the spring and eggs are deposited in small clusters under stones or logs near water where the female stays curled around them until they hatch. The aquatic larval period lasts from 2-8 months

Food Habits:

The diet consists of small arthropods including snails, earthworms, beetles and flies.

Other Information

Commonly seen in many of the small streams within the Preserve. Particularly noticeable in streams or seeps with good leaf beds.

OCOEE SALAMANDER

(Desmognathus ocoee)

Status:

Uncommon.

Distribution and Habitat:

This species is found on wet rock faces, in seepage areas and in forest floor habitats in and about the vicinities of streams within the Preserve

Special Habitat Requirements:

Requirements include wet rock faces, seepages or other wet microhabitats for breeding.

Breeding:

Breeding takes place in late spring, summer and fall. Females deposit the eggs in small grape-like clusters in hollowed depressions beneath rocks, logs or leaf litter near springs, seeps or small streams. Females brood their clutch and incubate from 57-74 days. The larval period lasts from 9-10 months.

Food Habits:

This species is a generalist feeder that eats snails, earthworms, beetles, flies and a host of other terrestrial arthropods. They have also been known to eat larvae of other *Desmognathus* species.

Other Information

Usually seen on wet rock faces at night.

ZIGZAG SALAMANDER

(Plethodon dorsalis)

Status:

Common.

Distribution and Habitat:

This species inhabits seepages near rock outcroppings on slopes in mixed hardwood forests.

Special Habitat Requirements:

Requirements include talus slopes, rocky hillsides and other habitats with rocky substrates in mesic forests.

Breeding:

Breeding occurs from fall to midspring. Females deposit 1-10 eggs in underground retreats in late spring or early summer and attend them until hatching some 90 days later. The young are miniature replicas of the adults and are terrestrial.

Food Habits:

This species eats primarily spiders, beetles, mites and other small arthropods.

Other Information

Look for this species in appropriate habitats throughout the canyon portions of the Preserve.

**NORTHERN SLIMY
SALAMANDER**
(*Plethodon glutinosus*)

Status:

Abundant.

Distribution and Habitat:

This species inhabits moist woodland habitats which are not susceptible to flooding. They should be found throughout the Preserve.

Special Habitat Requirements:

This species generally requires more moisture than other salamanders of this genus.

Breeding:

Eggs are laid in late summer or fall in or under logs and among roots. Young do not have an aquatic stage.

Food Habits:

Invertebrates including earthworms, beetles and ants are the mainstay of the diet.

Other Information

This species is often found by turning logs or flat rocks in their preferred habitat.

FOUR-TOED SALAMANDER
(*Hemidactylium scutatum*)

Status:

The status of this species on the Preserve is unknown and is included here based on documentation from previous studies.

Distribution and Habitat:

This species inhabits forests surrounding swamps, bogs, marshes or vernal ponds and other fish free sites.

Special Habitat Requirements:

Requirements include bogs, seepages or shallow ponds with moss covered logs, roots and grass clumps over quiet water.

Breeding:

Breeding occurs in the fall and early winter. Females lay about 30-50 eggs under moss and attends them until hatching. Aquatic larval period is approximately 6 weeks after which the juveniles emerge as terrestrial salamanders.

Food Habits:

This species eats beetles, spiders, mites, bristletails and other small invertebrate taxa.

Other Information

Look for this species in mossy bog areas of the Preserve.

GREEN SALAMANDER

(Aneides aeneus)

Status:

Uncommon. This species may be more common on the Preserve than surveys from this inventory indicate.

Distribution and Habitat:

This species occurs on or near rock faces in conjunction with streams or caves. At times they may be found in debris at the bottom of the rock face or in forested areas nearby.

Special Habitat Requirements:

Requirements include rock faces with varied fissures and cracks and nearby rocks and logs under which to hide.

Breeding:

Ten to 27 eggs are laid in an adhesive glob on the top of fissures in rock faces. Females brood and protect eggs for 67-82 days. Young are born terrestrial.

Food Habits:

Food consists of a wide variety of small terrestrial invertebrates and their larvae.

Other Information

This species should be looked for under rocks and logs and on rock faces adjacent to Little River.

SPRING SALAMANDER

(Gyrinophilus porphyriticus)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits springs and other small, cold, rocky streams throughout the Preserve.

Special Habitat Requirements:

Requirements include small fish free running water sources with rocks or leaf beds under which the salamanders may hide.

Breeding:

Breeding is little studied. Females attach 20-60 eggs to the lower surface of submerged rocks, usually in deep underground recesses of springs or seeps. The female attends the eggs which hatch in about 3 months. The hatchlings have a larval period of about 3-4 years.

Food Habits:

This species eats primarily other salamanders, large insects and worms.

Other Information

This species was located most often in small spring flows within the Preserve.

**NORTHERN RED
SALAMANDER**

(Pseudotriton ruber ruber)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits habitats in or near springs or streams in open or wooded areas throughout the Preserve.

Special Habitat Requirements:

Requirements include areas of clear, cool and not stagnant water. Streams with substrates of sand, gravel or rock are preferred.

Breeding:

Courtship occurs in summer, spawning in October and hatching in December. About 70 eggs are laid in aquatic vegetation. The larval stage lasts about 32 months.

Food Habits:

Earthworms, insects and smaller salamanders are the chief foods.

Other Information

This species is most easily found by looking under moss, stones, logs or within leaf beds in the preferred habitat.

**SOUTHERN TWO-LINED
SALAMANDER**

(Eurycea cirrigera)

Status:

Common.

Distribution and Habitat:

This species lives in or near springs, seepages and streams in hardwood forests and swamps in the Preserve.

Special Habitat Requirements:

Requirements include rocks or logs in their preferred habitat under which to hide and rocks or logs in running water for egg laying.

Breeding:

Mating occurs in the fall, and eggs are laid in the winter or early spring. The female deposits a flat cluster of eggs on the underside of rocks or logs in running water. The female remains with the eggs until the aquatic larvae hatch. Larval period lasts from 1-3 years.

Food Habits:

Food consists of small terrestrial or aquatic invertebrates and their larvae.

Other Information

This species was commonly located in or near small streams or seeps by turning logs and rocks.

LONG-TAILED SALAMANDER

(Eurycea longicauda)

Status:

Common.

Distribution and Habitat:

This species lives in or near the margins of shaded seeps, springs or streams and sometimes in forested situations.

Special Habitat Requirements:

Requirements include rocks or logs in their preferred habitat under which to hide and shaded waterways for larval stages.

Breeding:

Mating occurs in the fall or early winter. Females lay approximately 90 eggs which are attached to stones, roots or boards in running water or suspended above the water. Hatching occurs in 4-12 weeks. Larval period lasts from 4-7 months.

Food Habits:

Food consists of a wide variety of small terrestrial or aquatic invertebrates and their larvae.

Other Information

This species should be looked for in appropriate habitat throughout the Park.

THREE-LINED SALAMANDER

(Eurycea guttolineata)

Status:

Unknown. Listed here due to observations adjacent to the Preserve.

Distribution and Habitat:

This species lives in or near the margins of shaded seeps, springs, bogs, streams or vernal ponds in bottomland hardwood forested areas.

Special Habitat Requirements:

Requirements include rocks or logs in their preferred habitat under which to hide and shaded waterways for larval stages.

Breeding:

Mating occurs in the fall or early winter. Females lay groups of approximately 8-14 eggs which are attached to stones, roots or boards in running water or suspended above the water. Hatching occurs in 4-12 weeks. Larval period lasts from 4-7 months.

Food Habits:

Food consists of a wide variety of small terrestrial or aquatic invertebrates and their larvae.

Other Information

This species should be looked for in appropriate habitat throughout the Preserve by turning logs and rocks.

CAVE SALAMANDER

(Eurycea lucifuga)

Status:

Common.

Distribution and Habitat:

This species occurs on or near rock faces in conjunction with streams or caves. Many times they may be found in debris at the bottom of the rock face or in forested areas nearby.

Special Habitat Requirements:

Requirements include rock faces with varied fissures and cracks and nearby rocks and logs under which to hide and shaded waterways for larval stages.

Breeding:

Oviposition occurs in the fall or early winter. Females lay single eggs which are attached by a stalk to the side of small rimstone pools. Eggs number from 60-120. Larval period lasts from 6-18 months.

Food Habits:

Food consists of a wide variety of small terrestrial or aquatic invertebrates and their larvae.

Other Information

This species should be looked for under rocks and logs and on rock faces.

EASTERN SPADEFOOT TOAD

(Scaphiopus holbrookii)

Status:

Unknown. Listed here based on observations during previous studies as reported in the literature.

Distribution and Habitat:

This species is very subterranean and nocturnal. They will remain torpid underground during dry seasons. They prefer sandy lowlands.

Special Habitat Requirements:

Requirements include shallow, temporary pools for breeding.

Breeding:

This species breeds after very heavy, warm summer rains. Eggs and tadpoles develop rapidly, requiring only 20-30 days to become little toads.

Food Habits:

Food consists of insects and worms.

Other Information

The best way to find this species is to listen for their explosive, low-pitched “wank” call which is repeated every 2 seconds after warm summer rains.

AMERICAN TOAD

(Bufo americanus)

Status:

Abundant

Distribution and Habitat:

These toads are habitat generalists, inhabiting nearly all habitats within the Preserve.

Special Habitat Requirements:

Requirements include shallow water bodies in which to breed and moist areas in which to hide.

Breeding:

Breeds February through April. The female lays approximately 6000 eggs in two long strings on the bottom of shallow pools. Metamorphosis takes about 2 months.

Food Habits:

This species will eat any insect or invertebrate it can fit into its mouth.

Other Information

Often seen crossing the roads at night.

FOWLER'S TOAD

(Bufo woodhousii fowler)

Status:

Abundant

Distribution and Habitat:

These toads are habitat generalists, inhabiting nearly all habitats within Preserve.

Special Habitat Requirements:

Requirements include sandy areas.

Breeding:

Breeds March through May. The female lays approximately 7000 eggs in two long strings on the bottom of shallow pools. Eggs hatch in about one week. Metamorphosis takes about 1-2 months.

Food Habits:

This species will eat any insect or invertebrate it can fit into its mouth.

Other Information

Often seen crossing the roads at night or after rains. They disappear under ground during droughts.

NORTHERN CRICKET FROG

(Acris crepitans)

Status:

Abundant.

Distribution and Habitat:

Occupies open grassy margins of ponds and streams in the Preserve.

Special Habitat Requirements:

Requirements include emergent vegetation or vegetation along the shore.

Breeding:

Breeding takes place when weather warms up in spring. Eggs are laid singly or in small groups attached to stems or scattered on the bottom in shallow water. Transformation occurs in late summer.

Food Habits:

Small insects and spiders are the major food sources.

Other Information

Commonly seen or heard in appropriate habitats in warm weather throughout the Preserve.

GRAY TREEFROG

(Hyla versicolor)

Status:

Unknown. Listed here based on documentation from the literature of previous studies.

Distribution and Habitat:

Occupies areas with small trees or shrubs near or standing in shallow bodies of water within the Preserve.

Special Habitat Requirements:

Requirements include emergent vegetation in unpolluted water bodies.

Breeding:

Breeding takes place from May to August. Scattered groups of 10-40 eggs are laid on the surface of shallow ditches, puddles and ponds. Hatching occurs in 5 days and metamorphosis occurs in about 50 days.

Food Habits:

The diet consists of arboreal insects.

Other Information

This frog is seldom seen outside of the breeding season. It may be heard singing in appropriate habitats within the Preserve.

COPE'S GRAY TREEFROG

(Hyla chrysoscelis)

Status:

Abundant.

Distribution and Habitat:

Occupies areas with small trees or shrubs near or standing in shallow bodies of water within the Preserve.

Special Habitat Requirements:

Requirements include emergent vegetation in unpolluted water bodies.

Breeding:

Breeding takes place from May to August. Scattered groups of 10-40 eggs are laid on the surface of shallow ditches, puddles and ponds. Hatching occurs in 5 days and metamorphosis occurs in about 50 days.

Food Habits:

The diet consists of arboreal insects.

Other Information

This frog is seldom seen outside of the breeding season. It may be heard singing in appropriate habitats within the Preserve.

GREEN TREEFROG

(Hyla cinerea)

Status:

Rare.

Distribution and Habitat:

Occupies areas with emergent vegetation, small trees or shrubs near or standing in shallow bodies of water.

Special Habitat Requirements:

Requirements include emergent vegetation in unpolluted water bodies.

Breeding:

Breeding takes place from May to June. Approximately 400 eggs are laid amid floating vegetation. Hatching occurs in 5 days and metamorphosis occurs in about 60 days.

Food Habits:

The diet consists of arboreal insects.

Other Information

This frog is seldom seen outside of the breeding season. It may be heard singing in appropriate habitats within the Park.

BARKING TREEFROG

(Hyla gratiosa)

Status:

Rare.

Distribution and Habitat:

Occupies areas with shallow bodies of water and low, wet woods within the Preserve.

Special Habitat Requirements:

Requirements include emergent vegetation in unpolluted water bodies.

Breeding:

Breeding takes place from May to August. Females deposit approximately 2000 eggs singly on the bottom of a pond.. Hatching occurs in 5 days and metamorphosis occurs in 40-70 days.

Food Habits:

The diet consists of arboreal insects.

Other Information

This frog is seldom seen outside of the breeding season. It may be heard singing in appropriate habitats within the Preserve.

SPRING PEEPER

(Hyla crucifer)

Status:

Common.

Distribution and Habitat:

Occupies woodlands near temporary or semi permanent ponds or swamps throughout the Preserve.

Special Habitat Requirements:

Requirements include second growth or cutover woodlots near unpolluted water body.

Breeding:

Breeding takes place from October through March. About 900 eggs are attached singly to submerged objects in shallow water. Eggs hatch in 5-7 days and metamorphosis occurs in 3-4 months.

Food Habits:

The diet consists of small arthropods.

Other Information

This frog is seldom seen outside of the breeding season. It may sometimes be seen wandering in woody areas after rains. More often heard than seen.

UPLAND CHORUS FROG

(Pseudacris triseriata)

Status:

Unknown. Listed here due to anecdotal reports on the Preserve.

Distribution and Habitat:

This species inhabits grassy swales, moist woodlands, river bottom swamps and the environs of ponds, bogs and marshes.

Special Habitat Requirements:

Semi-permanent pools are required for breeding.

Breeding:

Breeds December through March. Females lay about 1000 eggs in clusters of 60 each. Eggs are attached to vegetation with metamorphosis in 2-3 months.

Food Habits:

Small arthropods are eaten.

Other Information

This species may be active year around in suitable habitats throughout the Preserve.

MOUNTAIN CHORUS FROG

(Pseudacris brachyphona)

Status:

Unknown. Included here based on anecdotal records from the Preserve.

Distribution and Habitat:

This species inhabits forested slopes and hilltops near springs or shallow sources of water.

Special Habitat Requirements:

Shallow bodies of water in woods or at its edge are required for breeding.

Breeding:

Breeds from February to April. Females lay about 400 eggs in clusters of 10-50 each. Eggs are attached to vegetation in shallow ponds or along the edges of streams. Eggs hatch within 4-5 days with metamorphosis in 50-56 days.

Food Habits:

Small arthropods are eaten.

Other Information

This species should be searched for in appropriate habitats along Highway 176.

EASTERN NARROWMOUTH TOAD

(Gastrophryne carolinensis)

Status:

Rare.

Distribution and Habitat:

Occupies areas containing logs, rocks, boards or burrows under which they may hide.

Special Habitat Requirements:

Requirements include areas containing logs, rocks, boards or burrows under which they may hide.

Breeding:

Breeding takes place from May through July. Packets of about 850 eggs are laid on the surface of the water. Eggs hatch in 5-7 days and metamorphosis occurs in 20-70 days.

Food Habits:

The diet consists primarily of ants.

Other Information

This species is very secretive, entirely terrestrial and more often heard than seen.

BULLFROG *(Rana catesbeyiana)*

Status:

Abundant.

Distribution and Habitat:

This species inhabits larger lakes, ponds, bogs and sluggish stream habitats throughout the Preserve.

Special Habitat Requirements:

Requirements include vegetation or snags at the water edge in which to hide.

Breeding:

Breeding takes place in late spring and summer. About 12,000 eggs are laid with hatching occurring in 5 days and metamorphosis occurring about a year later.

Food Habits:

The diet consists of insects, crayfish and any small vertebrate which will fit in their mouths.

Other Information

Often seen basking on logs or shores within the Preserve.

GREEN FROG

(Rana clamitans melanota)

Status:

Abundant.

Distribution and Habitat:

This species inhabits shallow fresh water habitats throughout the Preserve. Streams and brooks are preferred.

Special Habitat Requirements:

Requirements include shallow and unpolluted water bodies.

Breeding:

Breeding takes place in May and June. The female lays about 3000 eggs in a raft like surface film. Most tadpoles transform within a few months, but, some overwinter.

Food Habits:

The diet consists primarily of arthropods, snails and worms.

Other Information

The banjo-like twang of their call is often heard within the Preserve. It is readily seen at most water bodies within the Preserve.

WOOD FROG

(Rana palustris)

Status:

Unknown. Listed here due to anecdotal observations reported by Preserve staff.

Distribution and Habitat:

This species inhabits moist wooded habitats near water throughout the Preserve.

Special Habitat Requirements:

Semi-permanent, shallow pools with vegetation are required for breeding.

Breeding:

Breeds March through April. Females lay 2000-3000 eggs in a round globular mass. Eggs hatch in 10-14 days. Metamorphosis occurs in 6-12 weeks.

Food Habits:

The food of this species consists of a variety of small invertebrates, mostly insects.

Other Information

This species may be readily observed only during its early spring breeding season.

SOUTHERN LEOPARD FROG

(Rana utricularia)

Status:

Abundant.

Distribution and Habitat:

This species inhabits shallow fresh water habitats throughout the Preserve. Streams and ponds are preferred.

Special Habitat Requirements:

Requirements include shallow and unpolluted water bodies.

Breeding:

Breeding takes place in winter or early spring. The female attaches a firm cluster of several hundred eggs to vegetation just below the water surface. Eggs hatch in 7-14 days. Most tadpoles transform within a few months, but, some overwinter.

Food Habits:

The diet consists primarily of insects.

Other Information

This species is easily found at any pond in the Preserve.

PICKEREL FROG

(Rana palustris)

Status:

Common.

Distribution and Habitat:

This species inhabits sphagnum bogs, rocky ravines, meadow streams and a wide variety of other habitats near water throughout the Preserve.

Special Habitat Requirements:

Semi-permanent pools with vegetation are required for breeding.

Breeding:

Breeds April through May. Females lay about 3000 eggs in a round mass attached to aquatic plants. Metamorphosis occurs in 70-80 days.

Food Habits:

Insects and smaller frogs are the main food sources. .

Other Information

This species may be readily observed as it ventures well away from water during the summer when vegetation can provide shelter and shade.

COMMON SNAPPING TURTLE

(Chelydra serpentina)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits large or small permanent bodies of fresh water throughout the Preserve.

Special Habitat Requirements:

This species is a habitat generalist within aquatic habitat types.

Breeding:

Females lay approximately 25 spherical eggs in early spring in a shallow nest, sometimes at considerable distance from water.

Food Habits:

This species is omnivorous. It includes aquatic invertebrates, fish, reptiles, birds, mammals, carrion and aquatic vegetation in its diet.

Other Information

Most often observed in spring as adults wander from one water body to another and young travel from nests to water.

MUSK TURTLE

(Sternotherus odoratus)

Status:

Uncommon, although this species may be more common than inventory surveys indicate.

Distribution and Habitat:

This species inhabits shallow, clear water streams throughout the Preserve. It prefers lower elevations.

Special Habitat Requirements:

This species prefers still waters with soft bottoms.

Breeding:

Females lay 2-5 white, brittle, elliptical eggs in soft dirt or humus close to water.

Food Habits:

This species is omnivorous. Insects and snails are the most common foods.

Other Information

Most often observed at Canyon Mouth Park area.

STRIPENECK MUSK TURTLE

(Sternotherus minor peltifer)

Status:

Unknown. Listed here on the basis of literature reports from adjacent to the Preserve.

Distribution and Habitat:

This species is highly aquatic, inhabiting swamps, rivers and streams with muddy bottoms.

Special Habitat Requirements:

This species prefers still waters with soft, muddy bottoms and submerged logs.

Breeding:

Females lay 1-5 white, brittle, elliptical eggs in soft dirt or humus close to water. Two to five such clutches may be laid each year.

Food Habits:

This species is omnivorous. Insects and snails are the most common foods.

Other Information

Look for this species in slow moving reaches of Little River and in the vicinity of beaver ponds.

EASTERN MUD TURTLE

(Kinosternon subrubrum)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits a variety of aquatic habitats including marshes, lakes and ponds.

Special Habitat Requirements:

This species requires shallow water with muddy bottom. Abundant vegetation is also required.

Breeding:

Females lay approximately 3-5 eggs in midsummer. A shallow nest is made in loose soil near the water. Hatching occurs about 100 days after laying.

Food Habits:

This species is omnivorous and primarily consists of aquatic vegetation, insects, crayfish and small mollusks, as well as carrion.

Other Information

This species is most often observed while traveling from one water source to another on the Preserve.

EASTERN BOX TURTLE

(Terrapene carolina carolina)

Status:

Common.

Distribution and Habitat:

This species is largely terrestrial and they utilize forested habitats and field edges throughout the Preserve.

Special Habitat Requirements:

While being largely terrestrial, they do need water close at hand in which to soak.

Breeding:

Females lay 3-8 eggs in June or July. A shallow nest is made in loose soil.

Food Habits:

A wide variety of plants and small animals are eaten.

Other Information

This species is often seen crossing the roads, especially after rains.

ALABAMA MAP TURTLE

(Gratemys pulchra)

Status:

Rare.

Distribution and Habitat:

This species prefers large, swift creeks and rivers.

Special Habitat Requirements:

This species requires large, swift creeks and rivers with abundant basking sites in the form of logs and brush.

Breeding:

Females lay approximately 4-6 eggs. A shallow nest is made in loose soil near the water. Multiple clutches may be laid.

Food Habits:

This species utilizes aquatic mollusks and snails to a high degree. It is also known to feed on carrion in the water.

Other Information

This species is listed as protected in Alabama and if populations are located within the Preserve, they should be managed appropriately.

SLIDER
(*Trachemys scripta*)

Status:

Unknown. Listed here based on literature reports of observations adjacent to the Preserve.

Distribution and Habitat:

This species inhabits a variety of aquatic habitats including rivers, ditches, sloughs, lakes and ponds.

Special Habitat Requirements:

This species requires quiet water with muddy bottom and a profusion of vegetation.

Breeding:

Females lay approximately 10 eggs in May or June. A shallow nest is made in loose soil and the nest may be far from water. Multiple clutches may be laid.

Food Habits:

This species is omnivorous, but juveniles are more carnivorous eating small aquatic insects and snails. Adults eat large amounts of aquatic vegetation.

Other Information

Look for this species in beaver ponds and slow moving portions of Little River.

RIVER COOTER
(*Pseudemys concinna*)

Status:

Rare.

Distribution and Habitat:

This species inhabits a variety of aquatic habitats including rivers, ditches, sloughs, lakes and ponds.

Special Habitat Requirements:

This species requires quiet water with muddy bottom and a profusion of vegetation.

Breeding:

Females lay approximately 10 eggs in May or June. A shallow nest is made in loose soil and the nest may be far from water. Multiple clutches may be laid.

Food Habits:

This species is omnivorous, but juveniles are more carnivorous eating small aquatic insects and snails. Adults eat large amounts of aquatic vegetation.

Other Information

This species is most easily seen in the Canyon Mouth Park area.

PAINTED TURTLE

(Chrysemys picta)

Status:

Unknown. Listed here due to literature supported sightings adjacent to the Preserve.

Distribution and Habitat:

This species inhabits a variety of aquatic habitats including marshes, lakes and ponds.

Special Habitat Requirements:

This species requires shallow water with muddy bottom and logs for basking. Abundant vegetation is also required.

Breeding:

Females lay approximately 2-10 eggs in midsummer. A shallow nest is made in loose soil near the water

Food Habits:

This species is omnivorous and primarily consists of aquatic vegetation, insects, crayfish and small mollusks.

Other Information

This species is most often observed basking on logs or banks of small ponds.

SPINY SOFTSHELL

(Apalone spinifera)

Status:

Unknown. Included here based on literature supported sightings adjacent to the Preserve.

Distribution and Habitat:

This species inhabits a variety of aquatic habitats including rivers, lakes and ponds.

Special Habitat Requirements:

This species requires shallow water with muddy or sandy bottom.

Breeding:

Females lay approximately 17-33 spherical eggs in May to July. A shallow nest is made in loose soil or sand on shore near the water

Food Habits:

This species actively seeks small prey including insects, fish, crayfish, worms, amphibians, reptiles and carrion.

Other Information

This species should be watched for in appropriate habitat particularly in the Canyon Mouth Park area.

GREEN ANOLE
(*Anolis carolinensis*)

Status:

Common.

Distribution and Habitat:

This species inhabits disturbed areas such as roadsides, forest edges and building sites having an abundance of shrubbery.

Special Habitat Requirements:

Requirements include shrubby areas with plenty of sunlight.

Breeding:

Females lay 1egg every two weeks for the entire breeding season. Eggs are laid in a shallow depression in moist soil or rotten wood and take about 7 weeks to hatch.

Food Habits:

This species eats small insects and spiders.

Other Information

Most often observed sunning on rail fences in developed portions of the Preserve.

EASTERN FENCE LIZARD
(*Sceloporus undulatus*)

Status:

Abundant.

Distribution and Habitat:

This species inhabits open pine and mixed woods, building sites and fences at lower elevations.

Special Habitat Requirements:

Requirements include open areas with plenty of sunlight.

Breeding:

Females lay from 6-10 eggs in late spring in burrows under rotten logs. Second clutches are sometimes produced in early summer.

Food Habits:

This species eats arthropods such as spiders, crickets, grasshoppers, beetles and snails.

Other Information

Most often observed sunning on rail fences in developed portions of the Preserve.

SIX-LINED RACERUNNER

(Aspidozelis sexlineatus)

Status:

Common.

Distribution and Habitat:

This species inhabits open sandy fields, building sites and fences at lower elevations.

Special Habitat Requirements:

Requirements include open areas with plenty of sunlight.

Breeding:

Females lay from 5-6 eggs. Second clutches are sometimes produced in early summer. Hatchlings appear from late June into September.

Food Habits:

This species eats arthropods such as spiders, crickets, grasshoppers, beetles and snails.

Other Information

Most often observed near rail fences in developed portions of the Preserve.

FIVE-LINED SKINK

(Plestiodon fasciatus)

Status:

Common.

Distribution and Habitat:

This species inhabits moist, wooded areas in the throughout the Preserve.

Special Habitat Requirements:

Requirements include damp areas, dead trees and snags where insects are abundant.

Breeding:

Females lay from 6-12 eggs in June in nests in rotten wood or under rocks.

Food Habits:

This species eats arthropods such as spiders, crickets, grasshoppers and beetles.

Other Information

Most often observed sunning on fences in developed portions of the Preserve.

BROADHEAD SKINK

(Plestiodon laticeps)

Status:

The status of this species on the Preserve is unknown and is included here based on observation during previous studies.

Distribution and Habitat:

This species inhabits wooded areas with large spreading trees at lower elevations.

Special Habitat Requirements:

Requirements include large spreading trees and bare branches on which to bask. Sometimes utilizes tree cavities and hollow trees.

Breeding:

Females lay from 6-15 eggs in June or July in nests in tree cavities, rotten wood or under rocks or logs.

Food Habits:

This species eats larger arthropods. Specific species reflect the arboreal nature of this skink.

Other Information

Look for this species in appropriate habitats throughout the Preserve.

SOUTHEASTERN FIVE-LINED SKINK

(Plestiodon inexpectatus)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits disturbed areas and building sites throughout the Preserve.

Special Habitat Requirements:

Requirements include damp areas, dead trees and snags where insects are abundant.

Breeding:

Females lay from 6-12 eggs in June in nests in rotten wood or under rocks.

Food Habits:

This species eats arthropods such as spiders, crickets, grasshoppers and beetles.

Other Information

Most often observed sunning on fences in developed portions of the Preserve.

GROUND SKINK
(*Scincella lateralis*)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits disturbed areas and open woodlands at lower elevations.

Special Habitat Requirements:

Requirements include areas of leaf litter or detritus in which to forage.

Breeding:

Two or more clutches of from 1-7 eggs are laid in burrows under leaf litter.

Food Habits:

This species eats primarily small insects and spiders.

Other Information

Look for this species in appropriate habitats throughout the Preserve.

EASTERN GLASS LIZARD
(*Ophisaurus ventralis*)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits flatwoods and other sandy environments.

Special Habitat Requirements:

Requirements include sandy areas with logs, rocks or rubbish near water.

Breeding:

Female lays 5-17 eggs in a shallow depression under a log and often remains with them until they hatch.

Food Habits:

This species eats insects, small lizards, snakes and eggs of ground nesting birds.

Other Information

Look for this species in appropriate habitats throughout the Preserve.

SLENDER GLASS LIZARD

(Ophisaurus attenuatus)

Status:

Unknown. Listed here based on anecdotal sightings by Preserve staff.

Distribution and Habitat:

This species inhabits grassy fields, woodland margins and other open, dry places.

Special Habitat Requirements:

Requirements include dry, open areas.

Breeding:

Female lays 4-19 eggs in a shallow depression under a log and often remains with them until they hatch.

Food Habits:

This species eats insects, small lizards, snakes and eggs of ground nesting birds.

Other Information

Look for this species in appropriate habitats throughout the Preserve.

MIDLAND WATERSNAKE

(Nerodia sipedon pleuralis)

Status:

Common.

Distribution and Habitat:

This species inhabits swamps, marshes, streams, ponds and lakes throughout the Preserve.

Special Habitat Requirements:

This species requires quiet water with fish populations.

Breeding:

Eight to fifty young are born live in late summer.

Food Habits:

This species actively seeks fish and amphibians as the chief food items.

Other Information

This species is often observed basking on logs or overhanging limbs at the water's edge.

QUEEN SNAKE
(*Regina septemvittata*)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits rocky streams and rivers at lower altitudes within the Preserve.

Special Habitat Requirements:

This species requires limbs over the water for basking and stones or debris along the water's edge for hiding.

Breeding:

Five to twenty three young are born live in late summer.

Food Habits:

This species is a crayfish specialist.

Other Information

This species should be searched for in branches at the edge of waterways throughout the Preserve.

BROWN SNAKE
(*Storeria dekayi*)

Status:

Uncommon. This species could be more common on the Preserve than this inventory survey indicates.

Distribution and Habitat:

This species inhabits bogs, swamps, freshwater marshes and moist woods and hillsides.

Special Habitat Requirements:

This species requires ground litter under which to forage and hide.

Breeding:

Three to twenty seven young are born live in late summer.

Food Habits:

This species is a slug and earthworm specialist.

Other Information

This species is very secretive and should be searched for in appropriate habitats throughout the Preserve.

REDBELLY SNAKE
(*Storeria occipitomaculata*)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits pine forest, swamp margins, open deciduous forests, timbered hillsides and wooded developed areas.

Special Habitat Requirements:

This species requires ground litter under which to forage and hide.

Breeding:

Two to twenty one young are born live in late summer or early fall.

Food Habits:

This species is a slug and earthworm specialist.

Other Information

This species is very secretive and should be searched for in appropriate habitats throughout the Preserve.

EASTERN GARTER SNAKE
(*Thamnophis sirtalis*)

Status:

Common.

Distribution and Habitat:

This species is a habitat generalist and may be found in meadows, marshes, woodlands, hillsides, and along streams and ditches throughout the Preserve.

Special Habitat Requirements:

This species is most often associated with moist environments and is sensitive to pollution.

Breeding:

Seven to more than one hundred young are born live in late summer.

Food Habits:

Earthworms, fish and amphibians form the bulk of the diet.

Other Information

Most often seen foraging on forest floors or crossing the roads during the day.

EASTERN RIBBON SNAKE

(Thamnophis sauritus)

Status:

The status of this species on the Preserve is unknown and is included here based on reports from previous surveys of the Preserve.

Distribution and Habitat:

This species may be found in damp meadows, marshes and along streams throughout the Preserve.

Special Habitat Requirements:

This species requires water bodies in close proximity with fish or amphibian populations.

Breeding:

Three to twenty young are born live in mid to late summer.

Food Habits:

Amphibians and small fish form the bulk of the diet.

Other Information

More aquatic than other garter snakes.

SMOOTH EARTH SNAKE

(Virginia valeriae)

Status:

Uncommon.

Distribution and Habitat:

This species frequents open forested habitats and forest edges with decaying logs or stumps throughout the Preserve.

Special Habitat Requirements:

This species needs logs, stones or other surface cover under which to hide.

Breeding:

Two to fourteen young per litter are born in the summer.

Food Habits:

Earthworms are its chief food source.

Other Information

These small snakes are most often located by turning rocks and logs in wooded areas of the Preserve.

EASTERN HOGNOSE SNAKE

(Heterodon platirhinos)

Status:

Uncommon.

Distribution and Habitat:

This species may be found in any habitat containing sandy or friable loam soils at lower elevations of the Preserve.

Special Habitat Requirements:

This species requires sandy areas for foraging and nesting.

Breeding:

Females lay from 4-60 eggs in nests a few centimeters deep in open, sandy fields. Nesting occurs in June or July.

Food Habits:

Toads are the principle food, but other amphibians, insects, birds, and small mammals are occasionally eaten.

Other Information

These snakes are usually active during the day.

RINGNECK SNAKE

(Diadophis punctatus)

Status:

Common.

Distribution and Habitat:

This species frequents forested habitats with decaying logs or stumps throughout the Preserve.

Special Habitat Requirements:

While not aquatic, these snakes prefer areas where there is evidence of moisture such as around springs, damp forested hillsides and poorly drained pine woods.

Breeding:

Females lay from 1-10 eggs in sawdust piles, rotten logs or in damp soil under flat stones.

Food Habits:

Earthworms and small salamanders are the principal foods, but frogs, lizards and other small snakes are sometimes eaten.

Other Information

These snakes are almost entirely nocturnal. Individuals may be observed on the Preserve at night, especially during or following rains.

EASTERN WORM SNAKE

(Carphophis amoenus)

Status:

Uncommon. This species could be more common on the Preserve than is indicated by this inventory survey. Very secretive.

Distribution and Habitat:

This species frequents moist, forested habitats at low to medium elevations and should be found throughout the Preserve.

Special Habitat Requirements:

Requires moist earth and will bury deep underground in dry weather.

Breeding:

Females lay from 2-8 eggs in sawdust piles or rotten logs in early summer.

Food Habits:

Earthworms and soft bodied insects are the principal foods of this diminutive species.

Other Information

The best way to find these snakes is to turn over logs or flat rocks in moist woods.

NORTHERN BLACK RACER

(Coluber constrictor constrictor)

Status:

Common.

Distribution and Habitat:

This species is a habitat generalist and can be found throughout the Preserve.

Special Habitat Requirements:

Preferred habitats include brushy open areas, open woods and rocky hillsides.

Breeding:

Females lay from 4-20 eggs in sawdust piles, rotten logs, stumps or under rocks in June or July.

Food Habits:

Insects, amphibians, reptiles, birds and small mammals are eaten.

Other Information

This diurnal species is commonly seen crossing the roads in the Preserve.

COACHWHIP
(*Masticophis flagellum*)

Status:

The status of this species on the Preserve is unknown and is included here based on reports from surveys done previously on the Preserve.

Distribution and Habitat:

This species may be found in any habitat containing sandy or friable loam soils at lower elevations.

Special Habitat Requirements:

This species requires sandy areas for foraging and nesting.

Breeding:

Females lay from 4-16 eggs.

Food Habits:

Food consists chiefly of lizards, snakes, birds and small mammals.

Other Information

These snakes are usually active during the day.

ROUGH GREEN SNAKE
(*Opheodrys aestivus*)

Status

Uncommon. This species could be more common on the Park than is indicated by this inventory survey.

Distribution and Habitat:

This species frequents moist, forested habitats at low to medium elevations and should be found throughout the Preserve.

Special Habitat Requirements:

Requires dense vegetation overhanging stream or lake borders.

Breeding:

Females lay from 3-12 eggs under rotten logs or rocks in late spring or early summer. Sometimes known to nest communally.

Food Habits:

Chief food items include spiders, crickets, grasshoppers and insect larvae.

Other Information

Most often seen crossing roads after summer rains.

CORN (RED RAT) SNAKE

(Elaphe guttata)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits forested environments at low elevations throughout the Preserve.

Special Habitat Requirements:

Preferred habitats include pine barrens or wooded areas on rocky slopes. This species spends most of its time prowling rodent burrows or other subterranean passageways.

Breeding:

Females lay from 3-27 eggs in abandoned rodent burrows or in or under rotten logs or sawdust piles.

Food Habits:

Small mammals, birds and their eggs, frogs and lizards are eaten.

Other Information

These snakes may be seen crossing the roads during the day or night.

RAT SNAKE

(Elaphe obsoleta)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits rocky timbered hillsides to flat fields throughout the Preserve.

Special Habitat Requirements:

Generally found near wooded areas.

Breeding:

Females lay from 5-25 eggs in or under rotten logs, stumps or sawdust piles in late spring or early summer.

Food Habits:

Small mammals, birds and their eggs, frogs and lizards are eaten.

Other Information

These snakes may be seen crossing the roads during the day.

NORTHERN PINE SNAKE
(*Pituophis melanoleucus melanoleucus*)

Status:

Rare.

Distribution and Habitat:

This species may be found in sandy areas with pine or live oaks or dry upland forest at lower elevations of the Preserve.

Special Habitat Requirements:

This species requires sandy areas for foraging and nesting.

Breeding:

Females lay from 3-12 eggs in nests a few centimeters deep in open, sandy fields.

Food Habits:

This powerful constrictor feeds on small mammals, birds and their eggs.

Other Information

These snakes are usually active during the early morning and late afternoon.

BLACK KINGSNAKE
(*Lampropeltis getula nigra*)

Status:

Common.

Distribution and Habitat:

This species may inhabit nearly all available habitats at lower elevations throughout the Preserve.

Special Habitat Requirements:

Requires surface cover under which to hide.

Breeding:

Females lay from 5-20 eggs in or under rotten logs and similar places.

Food Habits:

Small mammals and other snakes are the principal food sources, although birds and some amphibians are also eaten.

Other Information

These snakes may be seen foraging during the day.

EASTERN MILKSNAKE
(*Lampropeltis triangulum triangulum*)

Status:

Unknown. This species is included here based on observations reported in the literature.

Distribution and Habitat:

This species inhabits woodlands and grassy meadows.

Special Habitat Requirements:

Requires surface cover under which to hide.

Breeding:

Females lay from 5-16 eggs in sawdust piles or loose soil under rotten logs and similar places.

Food Habits:

These constrictors feed chiefly on lizards, small snakes and small mammals.

Other Information

Look for these snakes on the Preserve roads during the night or day. They may also be found by turning surface cover such as logs or flat rocks in appropriate habitats.

SCARLET SNAKE
(*Cemophora coccinea*)

Status:

Rare.

Distribution and Habitat:

This species inhabits sandy pine woodlands.

Special Habitat Requirements:

Requires surface cover under which to hide.

Breeding:

Females lay from 2-6 eggs in sawdust piles or loose soil under rotten logs and similar places.

Food Habits:

These constrictors feed chiefly on lizards, small snakes, insects, newborn mice and reptile eggs.

Other Information

Look for these snakes on the Preserve roads during the night.

**SOUTHEASTERN CROWNED
SNAKE**

(*Tantilla coronata*)

Status:

Unknown. Listed here based on documentation from previous studies.

Distribution and Habitat:

This species may inhabit nearly all available habitats at lower elevations throughout the Preserve.

Special Habitat Requirements:

Requires surface cover under which to hide.

Breeding:

Females lay from 3-4 eggs in or under rotten logs and similar places.

Food Habits:

Food consists of centipedes, termites and soft bodied insects.

Other Information

These snakes may be seen foraging during the night or by turning surface debris during the day.

COPPERHEAD
(*Agkistrodon contortrix*)

Status:

Common.

Distribution and Habitat:

This species inhabits woodlands throughout the Preserve.

Special Habitat Requirements:

Requires surface cover under which to hide.

Breeding:

Three to fourteen young are born live in late summer after spring mating.

Food Habits:

Insects, amphibians, reptiles, birds and small mammals are eaten.

Other Information

Often seen on the forest floor during the day.

COTTONMOUTH
(*Agkistrodon piscivorus*)

Status:

Uncommon.

Distribution and Habitat:

This species inhabits lowland swamps, lakes and rivers within the Preserve.

Special Habitat Requirements:

Prefers aquatic habitats with logs or overhanging branches on which to sun.

Breeding:

Three to fourteen young are born live in late summer.

Food Habits:

Fish and amphibians are the primary foods although reptiles, birds and small mammals are also taken.

Other Information

These snakes may be observed swimming in small ponds within the Preserve.

TIMBER RATTLESNAKE
(*Crotalus horridus*)

Status:

Uncommon. This species may be more common on the Preserve than surveys from this inventory indicate.

Distribution and Habitat:

This species inhabits rocky hillsides, fields bordered by forests and low pinewoods throughout the Preserve.

Special Habitat Requirements:

Usually most common in second growth forested areas where rodents abound. .

Breeding:

Five to nineteen young are born live in late summer after mating in early spring.

Food Habits:

Small mammals, especially rodents, are the chief food.

Other Information

Sometimes seen crossing the Preserve roads.

APPENDIX D

LIRI PHOTOGRAPHIC VOUCHER PICTURE LOG

Little River Canyon National Preserve Photographic Voucher Log

ABC PHOTO #	COMMON NAME	SCIENTIFIC NAME	DATE	COORDINATES
1	Eastern Fence Lizard	<i>Sceloporus undulatus</i>	4/6/04	16 S 626141 3805508
2	Green Anole	<i>Anolis carolinensis</i>	4/6/04	16 S 626141 3805508
3	Southern Leopard Frog	<i>Rana utricularia</i>	4/7/04	16 S 630106 3813247
4	Fowler's Toad	<i>Bufo woodhousii fowleri</i>	6/23/04	16 S 626187 3806903
5	American Toad	<i>Bufo americanus</i>	6/23/04	16 S 628844 3810273
6	Ringneck Snake	<i>Diadophis punctatus</i>	6/23/04	16 S 630077 3813252
7	Green Frog	<i>Rana clamitans melanota</i>	6/23/04	16 S 628530 3809755
8	Northern Slimy Salamander	<i>Plethodon glutinosus</i>	6/24/04	16 S 621690 3800816
9	Five-lined Skink	<i>Plestiodon fasciatus</i>	6/27/05	16 S 626141 3805508
10	Cope's Gray Treefrog	<i>Hyla chrysoscelis</i>	6/24/04	16 S 625999 3805606
11	Eastern Worm Snake	<i>Carphophis amoenus</i>	6/24/04	16 S 630205 3808396
12	Eastern Narrowmouth Toad	<i>Gastrophryne carolinensis</i>	6/28/05	16 S 630205 3808396
13	Eastern Garter Snake	<i>Thamnophis sirtalis</i>	9/15/04	16 S 628122 3811929
14	Common Snapping Turtle	<i>Chelydra serpentina</i>	6/27/05	16 S 621218 3794855
15	Bullfrog	<i>Rana catesbeiana</i>	6/25/05	16 S 626819 3806210
16	Southern Two-lined Salamander	<i>Eurycea cirrigera</i>	6/23/04	16 S 628022 3809146
17	Eastern Box Turtle	<i>Terrapene carolina carolina</i>	6/27/05	16 S 621676 3801205
18	Pickerel Frog	<i>Rana palustris</i>	9/6/05	16 S 620853 3795075
19	Spring Salamander	<i>Gyrinophilus porphyriticus</i>	6/29/05	16 S 622073 3801962
20	Black Kingsnake	<i>Lampropeltis getula nigra</i>	6/23/04	16 S 629012 3812959
21	Northern Cricket Frog	<i>Acris crepitans</i>	6/29/05	16 S 622073 3801962
22	Northern Red Salamander	<i>Pseudotriton ruber ruber</i>	6/29/05	16 S 625920 3806841
23	Midland Watersnake	<i>Nerodia sipedon pleuralis</i>	6/23/04	16 S 627813 3812752
24	Longtail Salamander	<i>Eurycea longicauda</i>	6/27/05	16 S 621509 3803014
25	Smooth Earth Snake	<i>Virginia valeriae</i>	6/27/05	16 S 621690 3800816
26	Cave Salamander	<i>Eurycea lucifuga</i>	9/14/04	16 S 626187 3806903
27	Ground Skink	<i>Scincella lateralis</i>	6/28/05	16 S 627817 3809654
28	Spotted Dusky Salamander	<i>Desmognathus conanti</i>	6/27/05	16 S 621509 3803014
29	Northern Black Racer	<i>Coluber constrictor constrictor</i>	6/29/05	16 S 621683 3802002
30	Six-lined Racerunner	<i>Aspidoscelis sexlineatus</i>	9/14/04	16 S 626141 3805508
31	Rat Snake	<i>Elaphe obsoleta</i>	6/27/05	16 S 621683 3802002