

THE HERPETOFAUNA OF BARNETT WOODS NATURAL AREA, MONTGOMERY COUNTY, TENNESSEE

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ABSTRACT

The herpetofauna of Barnett Woods, a Nature Conservancy property in Montgomery County, Tennessee, was inventoried from 1982 through 1985. A systematic collecting strategy employing manual techniques and drift fences was used to sample the six major habitat types identified. Seven salamander, eight frog, one turtle, three lizard, and six snake species were found. All were expected based on previous studies in the region. None was listed by state or federal authorities as animals in need of special attention.

INTRODUCTION

Barnett Woods is a 28-hectare (70-acre) Nature Conservancy property in northwestern Middle Tennessee, Montgomery County (Figure 1). Its botanical features, history, exact location, and many physical characteristics were given by Chester (1986), who underestimated the size at 16 hectares (40 acres). The purpose of this report is to chronicle its herpetofauna and to compare it to that described for the surrounding region.

Two studies dealing directly with the herpetology of northwestern Middle Tennessee have been published. Scott and Snyder (1967) described the herpetology of Montgomery County, and Snyder (1972) characterized and illustrated (with color photos) the amphibians and reptiles of Land Between The Lakes, which includes portions of Stewart County. Redmond's (1985) dissertation on the biogeography of amphibians in Tennessee and Gentry's (1955-1956) two-part annotated checklist of Tennessee's herpetofauna also provide much information on this area.

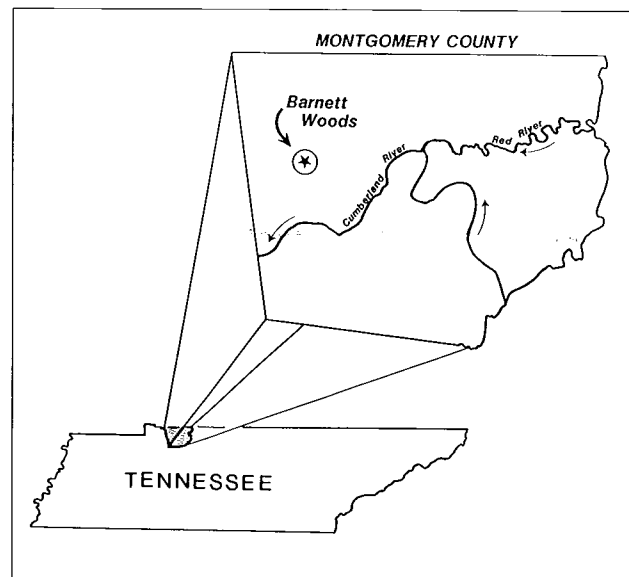


Figure 1. Location of Barnett Woods.

METHODS

Thirty-two trips over a four-year span (1982-1985) were made to the study area. All visits were carried out during the period from March through October. Total trips taken during each calendar month were as follows: eight in March, seven in April, five in May, four in June, four in July, six in August, four in September, and five in October.

On each visit to the study area, the same basic route

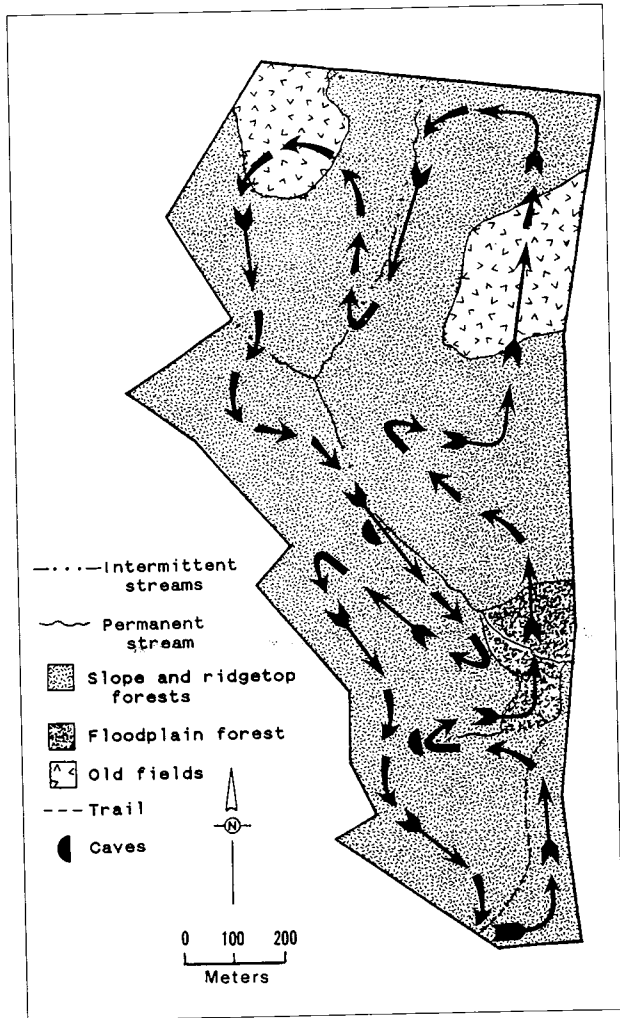


Figure 2. Cover map of Barnett Woods showing path followed (arrows) during each visit to the area.

(Figure 2) traversing all major habitat types was followed. Along it, a thorough search for specimens was carried out and the following information recorded when individuals were encountered: species, sex, age class, time of day, ambient temperature, location, cover type, and microhabitat. During 1984, hand collecting in the old fields and ridge-top forest was augmented by using three sets of 30-meter-long drift fences, each accompanied by five equally spaced pairs of pitfalls (19-liter plastic buckets).

A limited number of specimens were kept as vouchers and deposited in the Austin Peay State University Museum of Zoology (APSU 3852 through 3932).

RESULTS

Overall, 240 records, representing 25 species, were logged. These are listed by major groups, species, and habitat types in Table 1.

Table 1. Numbers of herptile records accumulated at Barnett Woods from 1982 to 1985 broken down by major groups, species and habitat types.

Major groups and species	Habitat types						Totals
	Fore-edge slopes and ridge tops	Old fields	Floodplain forest	Intermittent streams	Permanent streams	Cave entrances	
Salamanders							
<i>Plethodon glutinosus</i> (slimy salamander)	24	-	-	7	-	4	35
<i>Plethodon dorsalis</i> (zigzag salamander)	23	-	-	6	1	1	31
<i>Desmognathus fuscus</i> (dusky salamander)	-	-	-	5	11	1	17
<i>Eurycea longicauda</i> (longtail salamander)	3	-	-	8	6	2	19
<i>Eurycea bislineata</i> (N. two-lined salamander)	-	-	-	5	6	1	12
<i>Eurycea lucifuga</i> (cave salamander)	-	1	-	1	-	5	7
<i>Pseudotriton ruber</i> (red salamander)	-	-	-	-	2	-	2
Subtotals	50	1	0	32	26	14	123
Frogs and Toads							
<i>Rana palustris</i> (pickrel frog)	-	1	-	1	10	2	14
<i>Rana utricularia</i> (S. leopard frog)	2	1	-	5	4	-	12
<i>Acris crepitans</i> (cricket frog)	1	-	-	4	5	-	10
<i>Hyla chrysoscelis</i> (Cope's gray treefrog)	5	-	1	1	-	-	7
<i>Bufo americanus</i> (American toad)	4	1	-	1	1	-	7
<i>Gastrophryne carolinensis</i> (narrowmouth toad)	1	6	-	-	-	-	7
<i>Bufo woodhousii</i> (Woodhouse's toad)	2	3	-	1	-	-	6
<i>Rana catesbeiana</i> (bullfrog)	1	-	-	1	1	1	4
Subtotals	16	12	1	14	21	3	67
Turtles							
<i>Terrapene carolina</i> (E. box turtle)	9	-	1	2	-	-	12
Lizards							
<i>Sceloporus undulatus</i> (fence lizard)	3	6	-	1	-	-	10
<i>Scincella lateralis</i> (ground skink)	7	1	-	-	-	-	8
<i>Eumeces fasciatus</i> (five-lined skink)	3	-	-	-	-	-	3
Subtotals	13	7	0	1	0	0	21
Snakes							
<i>Diadophis punctatus</i> (ringneck snake)	3	-	-	3	1	-	7
<i>Elaphe obsoleta</i> (rat snake)	2	-	-	-	-	1	3
<i>Carphophis amoenus</i> (worm snake)	1	-	-	1	-	-	2
<i>Coluber constrictor</i> (racer)	2	-	-	-	-	-	2
<i>Virginia valeriae</i> (smooth earth snake)	-	-	-	2	-	-	2
<i>Thamnophis sirtalis</i> (common garter snake)	-	1	-	-	-	-	1
Subtotals	8	1	0	6	1	1	17
Totals	96	21	2	55	48	18	240

Amphibians

Fifteen species of amphibians (seven salamanders and eight frogs) were encountered. All were upland forms previously documented from similar habitats in the surrounding region (Scott and Snyder 1967, Snyder 1972). None was on the state or federal lists of animals considered endangered, threatened, or otherwise in need of special attention (Eager and Hatcher 1980).

Among salamanders, two species of *Plethodon* (*P. glutinosus* and *P. dorsalis*) were encountered most often, both in essentially the same array of habitats, especially forested slopes and ridge tops. *Desmognathus fuscus* and two species of *Eurycea* (*E. longicauda* and *E. lucifuga*) followed in apparent abundance, occurring in stream situations and about cave entrances. The salamander least often found was *Pseudotriton ruber*. It was discovered only twice, both times beneath rocks along a spring-fed permanent stream.

Rana palustris and *R. utricularia* were the most commonly encountered frogs. The former was confined mainly to the permanent stream, but also turned up in cave entrances, an old field, and an intermittent stream. The latter seemed at home in both stream types and was occasionally found some distance from water in slope forests and old fields. Almost as common was *Acris crepitans*, which, except for one record from a mesic forested slope, was always found in association with streams. *Hyla chrysoscelis*, two species of *Bufo* (*B. americanus* and *B. woodhousii*), and *Gastrophryne carolinensis* were encountered nearly equally, but differed somewhat in habitat preference. *Hyla chrysoscelis* and *B. americanus* seemed to prefer forested slopes and ridge tops, but were sometimes found elsewhere. *Gastrophryne carolinensis* was found almost exclusively in old fields (the one record from a forested ridge top was very near an old field). *Bufo woodhousii* was taken in old fields, on forested slopes and ridge tops, and along an intermittent stream. *Rana catesbeiana* was recorded fewer times than any frog, but each time in a different habitat (all except old fields and floodplain forest).

Reptiles

Ten species of reptiles (one turtle, three lizards, and six snakes) were found. As with the amphibians, all were upland species previously documented from the region (Scott and Snyder 1968, Snyder 1972), and none was on the state list of animals in need of special attention (Eager and Hatcher 1980).

Terrapene carolina was the only turtle present. It was found mainly in forested areas, but turned up occasionally in intermittent streams.

Three lizards were noted on the area. Most abundant and widespread of these was *Sceloporus undulatus*. It seemed to prefer dryer sites (old fields and forested slopes and ridge tops), but was found once in an intermittent stream. *Scincella lateralis* and *Eumeces fasciatus* complete the lizard list. Forested slopes and ridge tops appeared

to be their preferred habitat.

Of the six species of snakes, *Diadophis punctatus* was seen most often and in the widest array of habitats. Forested slopes and ridge tops and intermittent streams accounted for all but one record, which was from the edge of a permanent stream. *Elaphe obsoleta* was the second-most-seen snake, usually on forested slopes and ridge tops. It was the only snake found in the cave entrance (one record). *Carphophis amoenus*, *Coluber constrictor*, and *Virginia valeriae* were each taken twice, but only *C. amoenus* was recorded in as many habitats (forested slopes and ridge tops, and intermittent stream). Both records for *C. constrictor* were from the former of these habitats, whereas *V. valeriae* was found exclusively in the latter. *Thamnophis sirtalis* was recorded once, in an old field.

DISCUSSION

Faunal mix

Figure 3 depicts the proportion of the total species count in each habitat that was represented by species of the various amphibian and reptile groups. Frogs were in the majority in three habitats (forested slopes and ridge tops, old fields, and intermittent streams); whereas salamanders

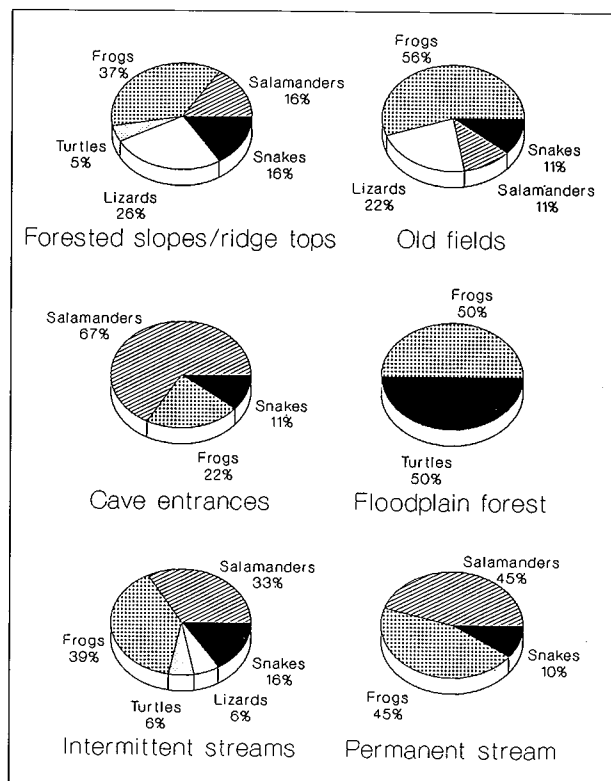


Figure 3. Breakdown (percentages) of total species complement in each habitat type by major groups represented.

dominated in one (cave entrances). Equal numbers of species from just two groups were found in two habitats: permanent stream (with equal numbers of frog and salamander species) and floodplain forest (with the same number of frog and turtle species). All five herptile groups were present in two habitats (forested slopes and ridge tops, and intermittent streams); four groups were represented in one (old fields), and three groups in two (cave entrance and permanent stream). The least variety was observed in the floodplain forest, where only two groups were observed.

Species richness and diversity

For purposes of analysis, the six habitats recognized on the area (Table 1) were lumped into one of three major categories: terrestrial, stream, and cave. Each of these is discussed below.

Three habitats were considered terrestrial: forested slopes and ridge tops, old fields, and floodplain forest. In these, 119 individuals and 21 species were recorded. Eighty-one percent (96) of the total individual records came from forested slopes and ridge tops, 18% (21) from old fields, and 1% (2) from the floodplain forest. Of the 21 species found in terrestrial habitats, 19 (90%) were seen in the slope and ridge top forest, nine (42%) were found in old fields, and two (10%) were logged in the floodplain forest. Species diversity (Shannon index, H' , \log_{10}) for each of the terrestrial habitats was calculated from the entire study's pooled data. In decreasing order, it was 1.01 for forested slopes and ridge tops, 0.81 for old fields, and 0.30 for floodplain forest.

Stream records amounted to 103, representing 19 species. Fifty-five (53%) of the individual records came from the intermittent streams, leaving 48 (47%) from the permanent stream. Eighteen (95%) of the total stream species were found in intermittent streams; eleven (63%) were encountered in the permanent stream. Overall diversity in each stream habitat was 1.13 (intermittent) and 0.90 (permanent). Cave entrances produced 18 records representing nine species (six salamanders, two frogs, and one snake). Salamanders dominated with 78% (14) of the total. Species diversity in this habitat was 0.86.

Comparisons with regional fauna

Only 38% of the herptile species reported from LBL (Snyder 1972) and just 40% of those listed for Montgomery County (Scott and Snyder 1968) were found at Barnett Woods. This was due in part to its comparatively low habitat diversity. Several major habitat types found in both LBL and Montgomery County are lacking at Barnett Woods. These include large rivers and their associated deltas, small and large impoundments, permanent and temporary ponds, upland swamps, and marshy open land. If species typical of these surroundings are excluded from the comparisons, the percent similarity between the herpetofauna of Barnett Woods and these two areas increases substantially: to 61% and 68%, respectively. Also possibly

contributing to Barnett Woods' seemingly low species richness as compared to LBL and Montgomery County could be its small area. At twenty-eight hectares, it is dwarfed by the thousands (68 and 140, respectively) of hectares encompassed by these areas. And finally, chance almost certainly played a role in limiting the number of herptile species found at Barnett Woods. This applies especially to forms such as *Crotalus horridus* which, although known from western Montgomery County, is infrequently seen there.

Species of probable occurrence

Several species not documented at Barnett Woods during this study quite likely occur there. Based on their habitat requirements and the close proximity of previous records, at least transients, or individuals in nonbreeding condition (e.g. pond-breeding amphibians), of the following species can be expected: *Ambystoma maculatum*, *A. tigrinum*, *Notophthalmus viridescens*, *Pseudacris crucifer*, *Cnemidophorus sexlineatus*, *Heterodon platirhinos*, *Lampropeltis getulus*, *Opheodrys aestivus*, *Nerodia sipedon*, *Agkistrodon contortrix*, and *Crotalus horridus*. Only continued monitoring efforts of the area's herpetofauna will prove this prediction valid.

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