

The Herpetofauna and Ichthyofauna of the Cucumber Creek Watershed in the Ouachita Mountains, LeFlore County, Oklahoma

William I. Lutterschmidt and Christopher M. Taylor¹

Department of Zoology and Oklahoma Biological Survey, University of Oklahoma, Norman, OK 73019

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We surveyed the reptiles, amphibians, and fishes of the Cucumber Creek Watershed in the Upper Mountain Fork Drainage of LeFlore County, Oklahoma from June 1994 through November 1995. The herpetofaunal survey involved approximately 430 person-hrs and 238 trap-hrs. Sixteen amphibian and 19 reptilian species were identified and/or collected by a variety of searching and trapping techniques. A total of 13 fish species were identified by snorkeling thirty stream pools and associated riffles. The fish (*Lythrurus snelsoni*) endemic to the Little River system was found to be abundant in Cucumber Creek.

INTRODUCTION

Cucumber Creek Watershed (CCW) is in the Upper Mountain Fork Drainage of the Little River system in southeastern LeFlore County, Oklahoma (Fig. 1); it lies within the Ouachita Biotic District (1). Cucumber Creek is an upland stream that runs ca. 16 km in a westerly direction until entering Big Eagle Creek just west of U.S. Highway 259. The creek is a high-gradient stream with boulder/cobble substrata, low conductant surface flows, and slightly acidic water (2,3). Numerous tributary streams feed Cucumber Creek from Kiamichi Mountain on the north and Blue Bouncer Mountain to the south. The main channel of the creek is highly braided and intermittent. Major seasonal changes in both water level and flow were observed with long sections of the stream becoming dry during summer. Isolated pools throughout the Cucumber Creek streambed serve as refuges for arthropods, fishes, and aquatic herptiles during this dry period. This is the first survey of the fishes and herptiles of the CCW.

We surveyed the herpeto- and ichthyofauna to make a preliminary species inventory of approximately 3,000 acres of the CCW. The Nature Conservancy has protected this acreage through acquisition, management agreement, or registry. This species inventory will provide baseline data for future documentation of changes in species composition due to both natural and unnatural disturbance.

METHODS

Herpetofauna: The herpetofaunal survey of the CCW (Fig. 1) consisted of five three-day sampling periods beginning in March and ending in November 1995. The creek was surveyed repeatedly from its confluence with Big Eagle Creek (where Cucumber Creek intersects U.S. Highway 259) 4 km (2.48 miles) upstream to a natural beaver pond (34°34' 34" N, 94° 40' 08" W); (Sections 8, 9, and 10, T1N, R25E;

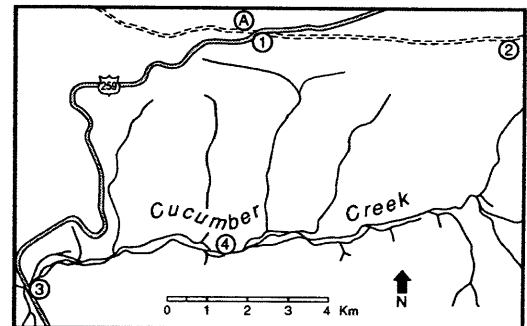


Figure 1. Map of the area sampled within the CCW. "A" shows the locality of the Three Sticks Vista on U.S. Highway 259. The area between sites 1 and 2 indicates the area of intensive sampling for herpetofauna along a forestry road above the CCW. Several ponds along this gravel road were also seined and sampled. Sites 3 and 4 indicate the area (from U.S. highway 259 to a beaver pond) of intensive sampling along Cucumber Creek. Areas of intensive sampling consisted of multiple searching/trapping efforts for each sampling trip.

¹Present address: Department of Biological Sciences, Mississippi State University, Mississippi State, MS 39762-5759
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Octavia quad). We also intensely surveyed the mountain ridge top along a forestry road ca. 4 km up slope from the CCW. This road was sampled from its entrance on U.S. Highway 259 (approximately 34° 36' 26" N, 94° 36' 54" W) ca. 8 km to a private cabin (owner Ben Curtis, 34° 36' 45" N, 94° 35' 19" W); (Sections 25 and 26, T2N, R25E Octavia quad and Sections 29 and 30, T2N, R26E; Octavia quad). The south slope of Kiamichi Mountain was also surveyed for adult salamanders and other herpetofauna. All reported coordinates were measured using a Magellan Trailblazer™ GPS.

Sampling consisted of search and hand capture techniques using rakes, snake hooks, tongs, dip nets, seines, and a CO₂ pistol (e.g. 4,5). Road sampling (5) and various trapping technique such as funnel traps (5,6,7), and snake "mist" netting (8) were also used. The five samples made during March, June, September, October, and early November ensured the sampling of taxa that may be seasonally inactive. Both diurnal and nocturnal surveys were conducted. During nocturnal sampling, headlamps were used for spotlighting eye-shines of aquatic frogs and searching for more terrestrial and arboreal herpetofauna.

Ichthyofauna: Thirty pools were surveyed in the CCW from 27 June to 22 July 1994. Pools were scattered throughout the watershed from approximately 150 m above U.S. Highway 259 bridge over Cucumber Creek (Section 8, T1N, R25E; Octavia quad) to approximately 300 m upstream of an abandoned cabin in the Cucumber Creek Preserve (Section 5, T1N, R26E; Lynn Mountain quad.).

Each pool habitat was surveyed by entering the pool at the downstream end and snorkeling through the entire pool to observe the presence of all fish species. Two to three passes were necessary to make accurate observation in larger pools. This sampling method was much more efficient than seining because of the coarse substrate. Electroshocking was also not logistically feasible because of rugged topography and the absence of roads in the preserve. However, all fish species identified by snorkeling were known to occur in the creek from seine collections from several creeks (including Cucumber Creek) in the Little River system.

RESULTS and DISCUSSION

Herpetofauna: This survey consisted of approximately 430 person-hrs and 238 trap-hrs. A total of 35 herpetofaunal species were surveyed (Table 1). Voucher specimens were deposited in the Oklahoma Museum of Natural History (OMNH) under field tags L.J. Vitt, numbers 3621 through 3683. Specimen location information was also given to the Oklahoma Natural Heritage Inventory (ONHI). This sample represents 42.2% of the 83 endemic species which could occur at Cucumber Creek strictly on the basis of Oklahoma geographical range and distribution maps. The OMNH has LeFlore County records for 54 of the 83 species (Table 2); our sample represents nearly 65% of the OMNH species records. However, many of these OMNH specimens are for localities far from the CCW (e.g., *Crotalus atrox*: specimens found in more northern localities near Wister and Talihina). Because the OMNH has only 54 LeFlore Co. species records for the possible 83 species, the 35 species surveyed on CCW during this short time period may be a good representation of the herpetofauna of Cucumber Creek.

The best representation of taxa which could occur in the CCW was for Lacertilia (60%), with 6 of 10 species sampled. This was followed by Caudata (53.8%), with 7 of 13 species represented, Anura (52.9%), with 9 of 17 species represented, Serpentes (40%), with 12 of 30 species represented, and Testudines (7.6%), with 1 of 13 species represented. The underrepresentation of Testudines is a concern. Only two *Terrapene carolina* were observed (one collected by W.I.L. and the other seen by C.M.T. during the *Lythrurus snelsoni* project). Although few *T. carolina* were observed, no aquatic turtles (which are conspicuous while basking) were observed. Seining pools with stable water levels (e.g., the beaver pond) also proved to be unsuccessful in capturing turtles. The apparent absence of aquatic turtles from Cucumber Creek may indicate that this stream's hydrology and frequent drying is unable to support aquatic turtles. However, we recommend that future sampling of Cucumber Creek should incorporate intensive turtle trapping to confirm these results.

Large changes in seasonal abundance

TABLE 1. Species surveyed and voucher specimens of the Cucumber Creek herpetological survey, LeFlore Co., Oklahoma. Voucher specimens where collected and deposited in the Oklahoma Museum of Natural History (Field Tags: L.J. Vitt #3621-3683).

	Taxon	Common Name
Class: Amphibia		
Order: Anura	<i>Acris crepitans</i> ^a	Cricket frog
	<i>Bufo americanus</i>	American toad
	<i>Hyla chrysoscelis</i>	Gray treefrog
	<i>Pseudacris crucifer</i>	Spring peeper
	<i>Pseudacris triseriata</i> ^a	Upland chorus frog
	<i>Rana clamitans</i>	Green frog
	<i>Rana utricularia</i> (<i>sphenocephala</i>)	Southern leopard frog
	<i>Rana palustris</i>	Pickerel frog
	<i>Rana catesbeiana</i>	Bullfrog
Order: Caudata	<i>Ambystoma maculatum</i>	Spotted salamander
	<i>Desmognathus brimleyorum</i>	Ouachita dusky salamander
	<i>Eurycea multiplicata</i>	Many-ribbed salamander
	<i>Notophthalmus viridescens</i>	Red-spotted newt
	<i>Plethodon ouachitae</i>	Rich Mountain salamander
	<i>Plethodon serratus</i>	Southern redback salamander
	<i>Plethodon kiamichi</i>	Kiamichi slimy salamander
Class: Reptilia		
Order: Testudines	<i>Terrapene carolina</i>	Three-toed box turtle
Order: Lacertilia	<i>Anolis carolinensis</i> ^a	Green anole
	<i>Cnemidophorus sexlineatus</i>	Racerunner
	<i>Eumeces anthracinus</i>	Southern coal skink
	<i>Eumeces fasciatus</i>	Five-lined skink
	<i>Sceloporus undulatus</i>	Fence lizard
	<i>Scincella lateralis</i>	Ground skink
Order: Serpentes	<i>Agkistrodon piscivorus</i>	Cottonmouth or Water moccasin
	<i>Agkistrodon contortrix</i>	Copperhead
	<i>Carphophis vermis</i>	Western worm snake
	<i>Coluber constrictor</i>	Black racer
	<i>Crotalus horridus</i>	Timber rattlesnake
	<i>Diadophis punctatus</i>	Ringneck snake
	<i>Lampropeltis getulus</i>	Speckled kingsnake
	<i>Nerodia erythrogaster</i>	Blotched water snake
	<i>Nerodia sipedon</i>	Northern water snake
	<i>Thamnophis sirtalis</i> ^a	Common garter snake
	<i>Storeria dekayi</i>	Brown snake
	<i>Virginia striatula</i> ^a	Rough earth snake
Class: Actinopterygii		
Order: Esociformes	<i>Esox americanus</i>	Grass pickerel
Order: Cypriniformes	<i>Campostoma anomalum</i>	Central stone roller
	<i>Erimyzon oblongus</i>	Creek chubsucker
	<i>Lythrurus nelsoni</i>	Ouachita Mountain shiner
	<i>Notropis boops</i>	Bigeye shiner
	<i>Pimephales notatus</i>	Bluntnose minnow
	<i>Semotilus atromaculatus</i>	Creek chub
Order: Siluriformes	<i>Ameiurus natalis</i>	Yellow bullhead
Order: Perciformes	<i>Etheostoma radiosum</i>	Orangebelly darter
	<i>Lepomis cyanellus</i>	Green sunfish
	<i>Lepomis macrochirus</i>	Bluegill sunfish
	<i>Lepomis megalotis</i>	Longear sunfish
	<i>Micropterus dolomieu</i>	Smallmouth bass

^a Species either seen or identified by call, but not captured for museum vouchers.

TABLE 2. Species list for the possible taxa of the Cucumber Creek Watershed according to geographical range and distribution maps. Species records for LeFlore Co. (OMNH) and the species sampled at Cucumber Creek during this survey are indicated.

Possible Taxa ^a	LeFlore Co. Records ^b	Cucumber Creek ^c	Possible Taxa ^a	LeFlore Co. Records ^b	Cucumber Creek ^c
AMPHIBIA			Lacertilia		
Caudata			<i>Anolis carolinensis</i>	X	X
<i>Notophthalmus viridescens</i>	X	X	<i>Crotaphytus collaris</i>	X	
<i>Necturus maculosus</i>	X		<i>Sceloporus undulatus</i>	X	X
<i>Ambystoma annulatum</i>			<i>Cnemidophorus sexlineatus</i>	X	X
<i>Ambystoma opacum</i>			<i>Scincella lateralis</i>	X	X
<i>Ambystoma maculatum</i>	X	X	<i>Eumeces anthracinus</i>	X	X
<i>Ambystoma texanum</i>	X		<i>Eumeces fasciatus</i>	X	X
<i>Desmognathus brimleyorum</i>	X	X	<i>Eumeces laticeps</i>	X	
<i>Eurycea longicauda</i>			<i>Eumeces septentrionalis</i>		
<i>Eurycea multiplicata</i>	X	X	<i>Ophisaurus attenuatus</i>		
<i>Plethodon ouachitae</i>	X	X	Serpentes		
<i>Plethodon serratus</i>	X	X	<i>Heterodon platyrhinus</i>	X	
<i>Plethodon albagula</i>			<i>Carphophis vermis</i>	X	X
<i>Plethodon kiamichi</i>		X	<i>Diadophis punctatus</i>	X	X
Anura			<i>Tantilla gracilis</i>	X	
<i>Bufo americanus</i>	X	X	<i>Sonora semiannulata</i>		
<i>Bufo woodhousii</i>	X		<i>Opheodrys aestivus</i>	X	
<i>Bufo punctatus</i>			<i>Masticophis flagellum</i>	X	
<i>Scaphiopus bombifrons</i>			<i>Coluber constrictor</i>	X	X
<i>Scaphiopus holbrookii</i>			<i>Elaphe guttata</i>		
<i>Gastrophryne carolinensis</i>	X		<i>Elaphe obsoleta</i>	X	
<i>Gastrophryne olivacea</i>			<i>Lampropeltis calligaster</i>	X	
<i>Hyla chrysoscelis</i>	X	X	<i>Lampropeltis getulus</i>	X	X
<i>Acris crepitans</i>	X	X	<i>Lampropeltis triangulum</i>		
<i>Pseudacris triseriata</i>	X	X	<i>Cemophora coccinea</i>		
<i>Pseudacris crucifer</i>		X	<i>Storeria dekayi</i>	X	X
<i>Pseudacris streckeri</i>			<i>Storeria occipitomaculata</i>		
<i>Rana catesbeiana</i>		X	<i>Virginia striatula</i>		X
<i>Rana areolata</i>			<i>Virginia valeriae</i>	X	
<i>Rana clamitans</i>		X	<i>Tropidoclonion lineatum</i>		
<i>Rana utricularia</i>	X	X	<i>Thamnophis proximus</i>	X	
<i>Rana palustris</i>		X	<i>Thamnophis sirtalis</i>	X	X
REPTILIA			<i>Regina grahamii</i>		
Testudines			<i>Nerodia rhombifera</i>	X	
<i>Chelydra serpentina</i>	X		<i>Nerodia erythrogaster</i>	X	X
<i>Macrolemys temminckii</i>			<i>Nerodia sipedon</i>	X	X
<i>Sternotherus carinatus</i>	X		<i>Agkistrodon piscivorus</i>	X	X
<i>Sternotherus odoratus</i>	X		<i>Agkistrodon contortrix</i>	X	X
<i>Kinosternon subrubrum</i>	X		<i>Sistrurus miliarius</i>		
<i>Graptemys kohnii</i>			<i>Crotalus horridus</i>	X	X
<i>Graptemys pseudogeographica</i>	X		<i>Crotalus atrox</i>	X	
<i>Pseudemys concinna</i>	X				
<i>Trachemys scripta</i>	X				
<i>Terrapene carolina</i>	X	X			
<i>Terrapene ornata</i>					
<i>Apalone muticus</i>	X				
<i>Apalone spiniferus</i>	X				

a According to Oklahoma geographical range and distribution maps.

b From OMNH

c Species sampled during this survey.

were observed in three Anuran species; *Bufo americanus*, *Hyla chrysoscelis*, and *Rana clamitans*. *B. americanus* demonstrated explosive breeding during rainy nights on 26 March and 2 June. Hundreds of toads were observed on U.S. Highway 259, the forestry road, and in the watershed. Toads were using small pools in these roads for breeding. We also observed *Ambystoma maculatum* only during heavy rain on 26 March.

A similar explosion in activity was observed in *H. chrysoscelis* during the 2, 3, and 4 June 1995 sampling. Although such an increase of activity was not observed in *R. clamitans*, these frogs seemed to be more abundant during the early September sample. All other taxa either did not show changes in seasonal activity or too few individuals were sampled for discussion.

Ichthyofauna: Thirteen species of fishes were found in Cucumber Creek. All species were common inhabitants of small, upland Ouachita Mountain streams in the Little River system (C.M. Taylor, unpublished data). *Lythrurus snelsoni* (Ouachita Mountain shiner) was common in Cucumber Creek, and is a federal category 2 candidate for listing as an endangered species (9). It is possible that other fish species may occur in Cucumber Creek, especially during other seasons when water levels are high and upstream movement is more likely. Furthermore, some species are known to make upstream spawning migrations in spring (e.g. *Ichthyomyzon* spp.). We sampled only in the late summer when flows were at their lowest.

This survey provides the Nature Conservancy with a preliminary species inventory for future conservation efforts and future documentation of faunal changes within the CCW. Future surveying efforts should be considered in order to document the stability of these faunal populations and to monitor changes in species composition.

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