

## AN ANNOTATED LIST OF TRICHOPTERA ALONG SEVERAL STREAMS IN THE BANKHEAD NATIONAL FOREST IN NORTHWEST ALABAMA<sup>1</sup>

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**ABSTRACT:** The distribution and seasonal occurrence of adult Trichoptera at fifteen stream sites within the Bankhead National Forest is presented. Annotations include information on species habitat and relative abundance. The trichopteran fauna was represented by 135 species. Forty-four species previously unknown from this area and two species that appear to be endemic were collected. One species collected is a new state record for Alabama (*Pycnopsyche guttifer*), and one species is new to science (*Setodes* n. sp.)

The Bankhead National Forest (BNF) is the largest of Alabama's National forests. It is distinctive among other national forests in the state because it contains the Sipsey Wilderness Area. The relative absence of certain anthropogenic activities, for example, silvaculture, poultry operations and industrial facilities in the National Forest, especially within the Sipsey Wilderness Area, has enhanced its ability to sustain populations of flora and fauna that might not exist in other more impacted streams in Alabama. Previous surveys have detected several rare or restricted plants and animals (Harris 1990; McDearman 1976; McGregor 1992), but studies of caddisflies in the area have been few. Several caddisflies found in the BNF are thought to be rare or restricted in distribution (Harris 1990).

The BNF is situated in Franklin, Lawrence, and Winston Counties in Northwest Alabama, and lies almost entirely within the Cumberland Plateau in the Appalachian Plateau physiographic province, with a small northern portion located in the Highland Rim. Although the Bankhead has remained somewhat protected for a large part of this century, increases in silvaculture, poultry industries, and strip mining over the past several decades have increased the chances for degradation to occur in streams draining this region. Because of this possible risk coupled with the relatively unknown insect fauna of this region, a survey and analysis of the caddisfly fauna of several streams in the forest was initiated.

Fifteen sites on fourteen streams located throughout the BNF were sampled monthly for one year, during the months between January and December 1993. The majority of the BNF lies within the Mobile Bay Drainage and contains tributaries of the Sipsey Fork of the Black Warrior River. However, Tennessee River tributaries drain a small portion of it, one of which, Lee Creek was

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sampled. The remaining streams are all part of the Mobile Bay Drainage. The majority of the forest is underlain by sandstone and shale of the Pottsville Formation of the Pennsylvanian age, with limestone and dolomite crops occurring in the upper area ranging in age from Early Mississippian to Early Pennsylvanian (Adams et al. 1926). Streams that lie in the Cumberland Plateau portion of the forest all flow to the south and are tributaries to the Black Warrior River. The larger streams occupy deeply entrenched valleys, with overhanging bedrock cliffs occurring throughout the drainage basin. Streams located in the northern boundaries of the forest lie within the Highland Rim Province and drain to the Tennessee River. This area is characterized by gently rolling hills, and the majority of the streams are slow and meandering. The benthic substrates of streams occurring in the Bankhead, although variable, consist primarily of flat bedrock with large, flat slabs of sandstone. A few of the smaller streams have sandy substrates, and streams draining the Bangor Limestone have limestone substrates of cobbles and boulders. Thompson Creek in western Lawrence County is unique in having large cobble for substrate, intermixed with sand and gravel. Lee Creek, in the northern-most boundary of the forest, displays slow moving waters, with sand and gravel substrate. It also contained a large amount of organic debris in its channel during the colder months.

## METHODS

During the survey, water and air temperature (bulb thermometer), specific conductance (Cole-Parmer Model 1481-40), and pH (Cole-Parmer Model 612 pH meter) were measured monthly in the field at all sites. Water samples were taken seasonally and returned to the lab where alkalinity was determined (Wetzel and Likens 1991). All water quality parameters were expressed as the mean of the 12 monthly samples (Table 1). The majority of the biological collections were obtained by ultraviolet light trapping methods (Harris et al. 1991) from February to November 1993. Light traps were situated on the stream banks and operated for approximately one hour after dusk. Additional adult specimens were occasionally collected by sweeping along stream margins. Specimens were preserved in 80% ethanol. In all, 102 collections were made from which 9,329 caddisfly individuals were identified.

## RESULTS

One hundred thirty-five (135) species representing 19 families and 46 genera were recorded. An annotated list of species documented is presented below (Table 2). Information for each species includes collection sites and number of individuals collected. A more detailed discussion of distributions is contained in Hicks (1995). An asterisk indicates species previously not reported from the BNF. In most cases only males of the species were identified. Voucher specimens are housed in the Aquatic Insect Museum of the University of Alabama.



## COLLECTION SITES

1. Lawrence Co.; Borden Creek; Forest Rd 208, 12.5 mi N Double Springs, T8S, R8W, Sec. 28/21.
2. Lawrence Co.; Brushy Creek; Forest Rd 254, 9.1 mi S Moulton, T8S, R7W, Sec. 21.
3. Lawrence Co.; Hubbard Creek; Forest Rd 210, 8.5 mi NE Haleyville, T8S, R9W, Sec. 23.
4. Lawrence Co.; Lee Creek; Alexander Motorway, 8.5 mi S/SW Moulton, T8S, R7W, Sec. 1.
5. Lawrence Co.; Thompson Creek; Forest Rd 208, 9.5 mi NE Haleyville, T8S, R9W, Sec. 22.
6. Lawrence Co.; West Fork Creek; Forest Rd 244, 10.6 mi S Moulton, T8S, R8W, Sec. 36.
7. Winston Co.; Brushy Creek; Forest Rd 255, 5.2 mi NW Addison, T9S, R7W, Sec. 23.
8. Winston Co.; Clear Creek; Co. Rd 25, 1.3 mi SW Double Springs, T11S, R9W, Sec. 1.
9. Winston Co.; Coon Creek; Co. Rd 8, 6.5 mi SE Double Springs, T11S, R7W, Sec. 30.
10. Winston Co.; Inman Creek; Forest Rd 124, 1.6 mi W Addison, T9S, R7W, Sec. 26.
11. Winston Co.; Long Branch; Co. Rd 80, 2 mi NE Addison, T9S, R6W, Sec. 23.
12. Winston Co.; Mile Creek; Co. Rd 13, 2.8 mi SW Addison, T10S, R7W, Sec. 15.
13. Winston Co.; Sandy Creek; Co. Rd 2, 3 mi NE Double Springs, T10S, R8W, Sec. 11.
14. Winston Co.; West Sipsey Fork; Recreational site, Sipsey Wilderness Area, 9.5 mi N Double Springs, T9S, R8W, Sec. 8.
15. Winston Co.; Wildcat Branch; unnamed Co. Rd, 6 mi S/SW Double Springs, T11S, R9W, Sec. 25.

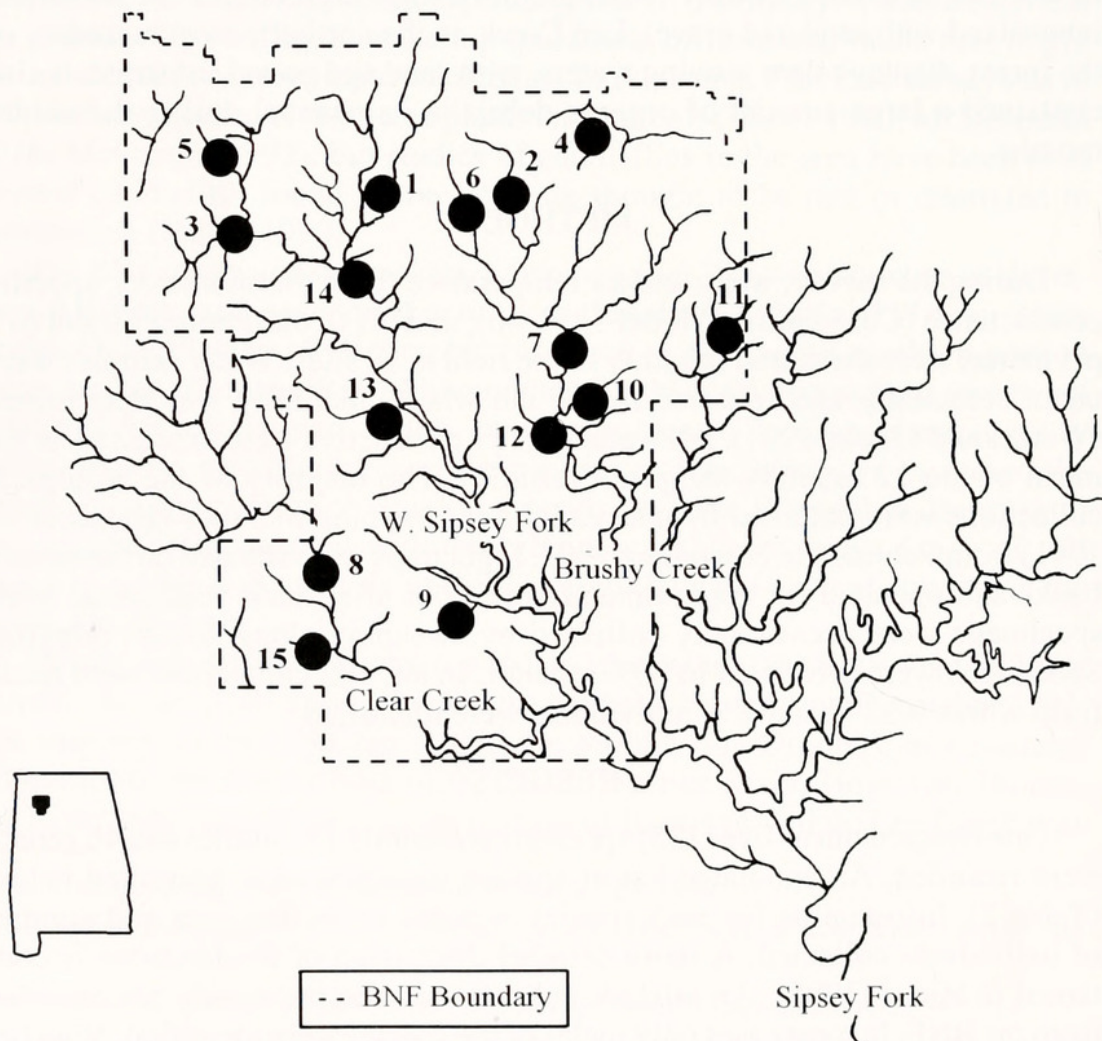


Figure 1. Collecting sites in the Bankhead National Forest. Numbers correspond to those listed in text.



**Table 1. Annual mean values for selected water quality parameters of streams sampled in the Bankhead National Forest (Winston Co., Lawrence Co.) (1993)**

Stream	Air Temp. (°C)	Water Temp. (°C)	pH (units)	Conductivity (umhos/cm)	Alkalinity (mg/l as CaCO <sub>3</sub> )
Clear Cr.	18.1	15.4	7.1	25.1	1.2
Coon Cr.	19.2	15.4	6.9	23.4	1.0
Inman Cr.	16.8	15.2	7.3	22.4	1.1
Long Br.	15.7	14.3	7.2	41.2	1.6
Mile Cr.	18.9	15.8	6.9	25.1	0.9
Sandy Cr.	18.6	15.9	6.9	26.7	0.6
W. Sipsey Fork	18.3	16.7	7.2	65.2	2.8
Wildcat Br.	18.7	16.2	6.8	18.0	0.5
Borden Cr.	18.6	16.9	7.2	135.6	6.7
Brushy Cr. I	15.7	15.4	6.9	19.0	1.0
Brushy Cr. II	16.2	14.5	7.2	16.5	1.1
Hubbard Cr.	18.0	15.0	6.7	20.9	1.3
Lee Cr.	16.0	15.7	7.1	84.5	6.0
Thompson Cr.	18.5	16.6	6.9	51.2	3.8
West Fork Cr.	18.6	15.9	7.2	26.3	1.0

**Table 2. Annotated list of species collected in the Bankhead National Forest**

Family	Species	Collection Site Number	# of Individuals
Dipseudopsidae	<i>Phylocentropus carolinus</i>	7,9,12	
	Carpenter*		15
	<i>P. lucidus</i> (Hagen)	3,9	4
Hydropsychidae	<i>P. placidus</i> (Banks)	1,3,5,6,7,10,11,12,13,14,15	92
	<i>Ceratopsyche sparna</i> Ross	1,3,7,8,9,10,11,12,13,14,15	88
	<i>Cheumatopsyche burksi</i> Ross*	8,10	2
	<i>C. campyla</i> Ross*	6,8,9,10,13	243
	<i>C. editsa</i> Gordon*	2	2
	<i>C. goera</i> Denning	1,4,6,7,8,10,11,12,13,14,15	147
	<i>C. kinlockensis</i>		
	Gordon, Harris, Lago	3	1
	<i>C. oxa</i> Ross	1,2,3,4,5,6,7,10,12	34
	<i>C. pasella</i> Ross	1,2,3,5,6,7,8,9, 10,11,12,13, 14,15	130
	<i>C. pettiti</i> (Banks)	2,5,6,7,8,10,11,12,13,14,15	53
	<i>C. pinaca</i> Ross	3,12,15	6
	<i>Hydropsyche betteni</i> Ross	2,3,5,6,9,12,15	51
	<i>H. dicantha</i> Ross*	1,2,3,7,8,9,15	54
	<i>H. sp. nr. frisoni</i> Ross*	14	1
	<i>H. mississippiensis</i>		
	Flint*	1,2,8,11,12,13,14,15	143
	<i>H. orris</i> Ross	1,3,4,5,6,7,8,9,10,11,12,13	73
	<i>H. rossi</i>		
	Flint, Voshell, Parker*	8,13	3
	<i>H. venularis</i> Banks*	8,10,12	10
	<i>Macrostemum carolina</i> (Banks)*	4,5,8,15	10
	<i>M. zebratum</i> (Hagen)*	8	4

Family	Species	Collection Site Number	# of Individuals
Polycentropodidae	<i>Cernotina calcea</i> Ross	7,9,11,13	6
	<i>Cyrnellus fraternus</i> (Banks)*	5,6,7,12,14	12
	<i>Neureclipsis melco</i> Ross	13	1
	<i>Paranyctiophylax affinis</i> (Banks)	1,2,7,12,13,14	23
	<i>P. denningi</i> (Morse)	3,4,5,6,9,10,11,12,14,15	151
	<i>P. moesta</i> (Banks)	5,6,7,12,14,15	26
	<i>P. serratus</i> (Lago and Harris)	2	3
	<i>Polycentropus alabamensis</i> Hamilton, Harris, and Lago	3,9	5
	<i>P. blicklei</i> Ross and Yamamoto	5,8,9,14	14
	<i>P. cinereus</i> Hagen	1,5,12	6
	<i>P. confusus</i> Hagen	1,3,5,6,8,9,10,11,12,13,14,15	257
	<i>P. crassicornis</i> Walker*	4	4
Psychomyiidae	<i>Lype diversa</i> (Banks)	1,2,3,4,5,6,7,8,9,10,11,12, 13,14	167
	<i>Psychomyia flavida</i> Hagen*	1,7,8,12,14	86
Philopotamidae	<i>Chimarra aterrima</i> Hagen	1,3,5,6,7,14	51
	<i>C. feria</i> Ross*	14	2
	<i>C. obscura</i> (Walker)	1,3,4,5,8,11,12,13,14,15	401
	<i>Dolophilodes distinctus</i> (Walker)	4,5,9	4
Glossosomatidae	<i>Agapetus alabamensis</i> Harris*	4	1
	<i>A. hessi</i> Leonard and Leonard	1,2	42
	<i>A. rossi</i> Denning	5,7,10,11	34
	<i>Glossosoma nigrior</i> Banks	1,3,14	4
Hydroptilidae	<i>Dibusa angata</i> Ross*	1,5,7,8,12,13,14	48
	<i>Hydroptila alabama</i> Harris and Kelley	1,2,3,5,7,8,10,11,12,13,14,15	182
	<i>H. armata</i> Ross	1,3,11,13,14	5
	<i>H. disgalera</i> Holzenthal and Kelley	9	4
	<i>H. gunda</i> Milne	3,5,8,11,12,13,14	59
	<i>H. hamata</i> Morton	1,3,5,6,7,8,10,11,12,13,14	667
	<i>H. novicola</i> Blickle and Morse	8,15	14
	<i>H. oakmulgeensis</i> Harris	3,5,8,14,15	169
	<i>H. oneili</i> Harris	3,10,11,13,14,15	38
	<i>H. paralatosa</i> Harris	5,9	2
	<i>H. paramoena</i> Harris*	12	1
	<i>H. quinola</i> Ross	3,8,12	9
	<i>H. remita</i> Blickle and Morse*	9	1
	<i>H. vala</i> Ross	2,3,4,5,6,10,11,12,14	80
	<i>H. virgata</i> Ross*	4,5	2
	<i>H. waubesiana</i> Betten	11,14	7
	<i>Mayatrichia ayama</i> Mosely*	8,15	56
	<i>Neotrichia vibrans</i> Ross	4,5,8,9,12,14,15	59
	<i>Ochrotrichia shawnee</i> Ross	5,8,10,14,15	245
	<i>O. elongiralla</i> Harris*	4	1
	<i>Orthotrichia aegerfasciella</i> (Chambers)	1,2,3,4,5,6,7,8,11,12,13,14	62



Family	Species	Collection Site Number	# of Individuals
	<i>O. cristata</i> Morton*	1,5,8,13,14	28
	<i>Oxyethira janella</i> Denning*	7	1
	<i>O. novasota</i> Ross	1,2,3,5,6,8,9,12,13,14,15	7
	<i>O. pallida</i> (Banks)	9,13	3
	<i>O. rivicola</i> Blickle and Morse	5,7,14	10
	<i>O. zeronia</i> Ross*	13	2
	<i>Stactobiella delira</i> Ross*	2,7,8,14	27
	<i>S. palmata</i> Ross	1,7,10	7
Rhyacophilidae	<i>Rhyacophila carolina</i> Banks	2,3,4,5,6,8,9,10,12,13	47
	<i>R. fenestra</i> Ross*	1,4,5	4
	<i>R. glaberrima</i> Ulmer	9,13	2
	<i>R. ledra</i> Ross*	8	1
	<i>R. lobifera</i> Betten*	7,11,14	5
	<i>R. torva</i> Hagen*	9	1
Brachycentridae	<i>Brachycentrus numerosus</i> (Say)*	8	1
	<i>Micrasema rusticum</i> (Hagen)	2,3,5,7,8,10,11,12,13,14	144
	<i>M. wataga</i> Ross	7	1
Goeridae	<i>Goera townesi</i> Morse	1,2,5,7,8,10,12,13,14	69
Lepidostomatidae	<i>Lepidostoma latipenne</i> (Banks)	3,5,6,8,9,13,14	32
	<i>L. weaveri</i> Harris*	5	1
Limnephilidae	<i>Ironoquia punctatissima</i> (Walker)*	4	1
	<i>Pycnopsyche gentilis</i> (Mclachlan)*	15	3
	<i>P. guttifer</i> (Walker)	1	1
	<i>P. indiana</i> (Ross)	8,10,14	9
	<i>P. lepida</i> (Hagen)	1,10,14	10
	<i>P. luculenta</i> (Betten)	9,13	3
	<i>P. scabripennis</i> (Rambur)	5,6,7,10,14	12
Uenoidae	<i>Neophylax oligius</i> Ross	10	1
	<i>N. concinnus</i> Mclachlan	1	3
Phryganeidae	<i>Agrypnia vestita</i> (Walker)	8,9,15	26
	<i>Ptilostomis ocellifera</i> (Walker)*	4,9,10,15	7
	<i>P. postica</i> (Walker)*	4	1
Calamoceratidae	<i>Anisocentropus pyraloides</i> (Walker)	5,9,14	34
	<i>Heteroplectron americanum</i> (Walker)	9	4
Leptoceridae	<i>Ceraclea ancylus</i> (Vorhies)*	1,7,8,11,12	37
	<i>C. cancellata</i> (Betten)	1,3,5,6,7,8,14,15	1,010
	<i>C. flava</i> (Banks)	1,8	328
	<i>C. macualta</i> (Banks)	2,7,8,11,14	83
	<i>C. nepha</i> (Ross)	8,11,12,14	16
	<i>C. protonepha</i> Morse and Ross	2,7,9,10	6
	<i>C. tarsipunctata</i> (Vorhies)	2,5,7,8,10,12,13,14,15	938
	<i>C. transversa</i> (Hagen)*	1,2,3,5,7,8,10,12,13,14	72
	<i>Leptocerus americanus</i> (Banks)	13	1
	<i>Mystacides sepulchralis</i> (Walker)	1,2,3,4,6,7,8,9,10,11,12,13,14	201
	<i>Nectopsyche candida</i> (Hagen)	8	18
	<i>N. exquisita</i> (Walker)*	2,8,14	13
	<i>N. pavida</i> (Hagen)	1,3,8,10,12,13,14	125

Family	Species	Collection Site Number	# of Individuals
	<i>Oecetis avara</i> (Banks)	2,3,14	18
	<i>O. cinerascens</i> (Hagen)*	5	1
	<i>O. ditissa</i> Ross	1,3,4,5,6,11,13,14,15	37
	<i>O. georgia</i> Ross	9	7
	<i>O. inconspicua</i> (Walker)	1,2,3,4,5,6,7,8,9,10,11,12, 13,14,15	365
	<i>O. nocturna</i> Ross	1,2,3,4,5,6,7,8,9,10,11,12, 13,14,15	228
	<i>O. persimilis</i> (Banks)	1,2,3,5,7,8,10,11,12,13,14	123
	<i>O. sphyra</i> Ross	6,8,9,15	471
	<i>Setodes</i> n. sp.	14	2
	<i>Triaenodes cumberlandensis</i> Etnier and Way	13	1
	<i>T. ignitus</i> (Walker)	8,9,10,15	9
	<i>T. injustus</i> (Hagen)	15	2
	<i>T. marginatus</i> Sibley*	3	1
	<i>T. ochraceus</i> (Betten and Mosely)	3,4,6	3
Molannidae	<i>Molanna blenda</i> Sibley*	12	1
	<i>M. tryphena</i> Betten	1,2,3,6,7,8,9,10,12,13	41
	<i>M. ulmerina</i> Navas	6,9,10,12,13	19
Odontoceridae	<i>Psilotreta frontalis</i> Banks	2,9	6
Helicopsychidae	<i>Helicopsyche borealis</i> (Hagen)	3,5,7,8,14,15	48
Sericostomatidae	<i>Agarodes crassicornis</i> (Walker)*	8,9,15	19
	<i>A. griseus</i> Banks	8,9,15	12
	<i>A. libalis</i> Ross and Scott*	8	6
	<i>A. stannardi</i> (Ross)	8,9,13,15	19

## DISCUSSION

One hundred two collections from 15 sites along 14 streams in the Bankhead National Forest yielded 135 species of caddisflies, from 46 genera and 19 families. Two species collected are apparently endemic to the BNF (*Cheumatopsyche kinlockensis* and *Setodes* n. sp.). One species was a new state record for Alabama (*Pycnopsyche guttifer*). One species was collected that is new to science (*Setodes* n. sp.).

Adults were collected from March to October, 1993. The number of species and individuals collected were greatest from May to August, with greatest monthly diversity occurring from May to July. Numbers of species, genera and families collected were high in comparison to other trichopteran surveys of drainages or regions of Alabama and other states (Frazer et al. 1991, Holzenthal et al. 1982, Harris et al. 1984, Haynes 1995), which suggests that the BFN supports a particularly rich fauna. The wide diversity of habitats and cool, swift, oxygen richwaters probably accounts for the rich fauna. Emergence patterns of specific taxa were not different based on size or location of stream.



Hydropsychidae, Hydroptilidae, Leptoceridae and Polycentropodidae were represented by a total of 91 species, accounting for 66.9 percent of the species collected, whereas Calamoceratidae, Lepidostomatidae, Psychomyiidae, Uenoidae, Odontoceridae, Helicopsychidae and Goeridae were represented by 11 species, accounting for eight percent of the species collected. These percentages are similar to other southeastern systems and are explained by the adaptation of the larger families to warmer waters and the smaller families containing fewer species per family (Wiggins 1977).

Clear Creek exhibited the largest number of species (62) and individuals (4588) collected, whereas Lee Creek contained the smallest (26 species and 67 individuals). Streams draining the Wilderness Area yielded 2101 individuals (23 % of total) and 85 species (63 % of total). All other streams yielded 7228 individuals (77 % of total) and 123 species (91 % of total). The difference in percentages of these two areas likely is due to the difference in number of streams and area sampled.

Some taxa had widespread distributions and others appear to be limited in their distribution within the study area. A number of taxa were restricted to more than one stream located in the southern portion of the study area. Two species were restricted to more than one stream in the Wilderness Area. No taxa were restricted to more than one stream located in the western portion of the study area. These distributional patterns may arise from a variety of factors including habitat, characteristics of the stream, or water chemistry. A more detailed discussion of distribution patterns can be found in Hicks (1995).

Based on the results presented in this survey, the BNF contains a rich fauna of Trichoptera compared to other areas in Alabama, and contains several rare or endemic species. Because of this and other similar faunistic and floristic surveys of the area, the BNF deserves protection from harmful impacts in order to protect its natural history.

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