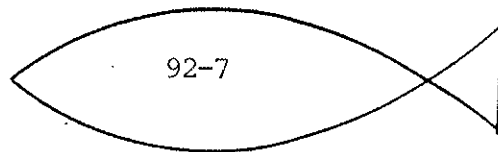
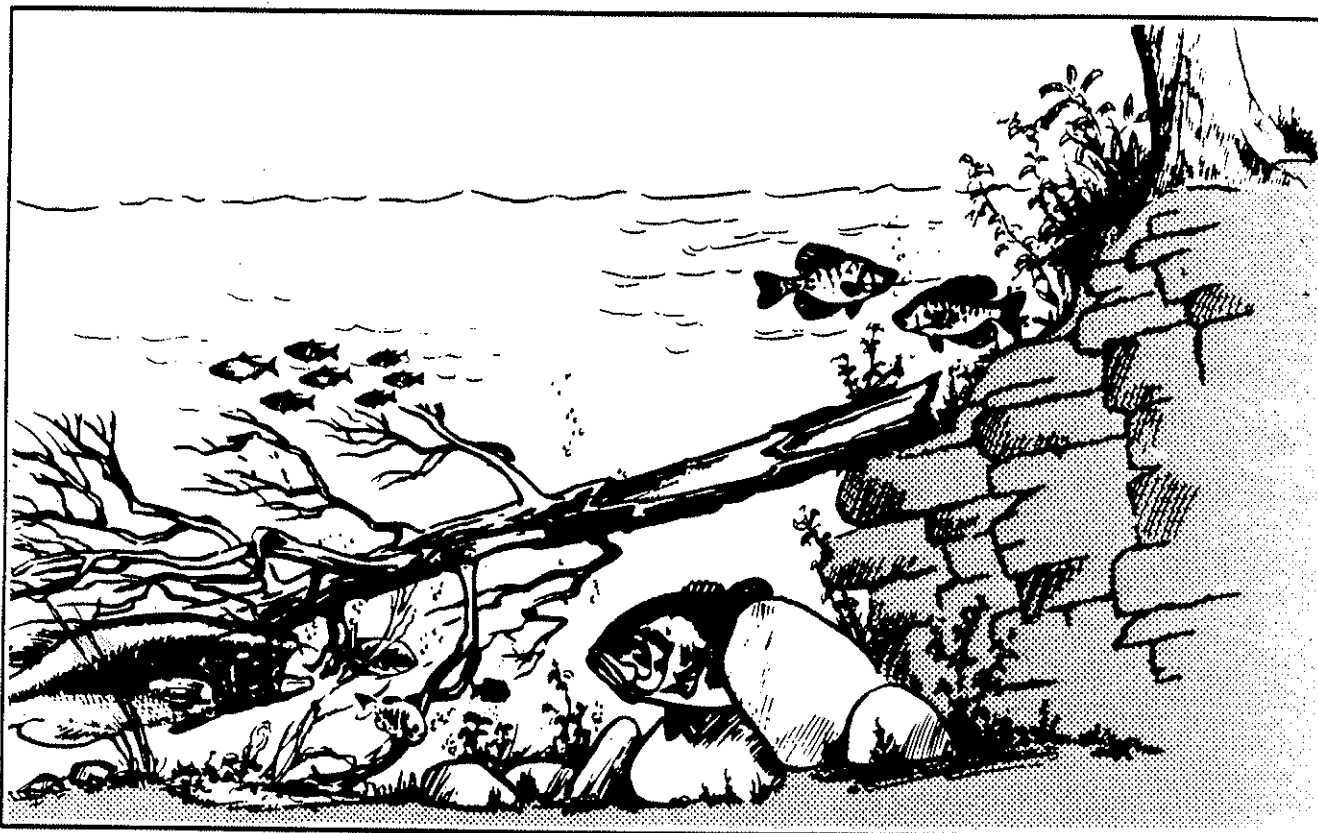


# FISHERIES REPORT



ANNUAL STREAM FISHERY  
DATA COLLECTION REPORT  
REGION IV  
1990



*Prepared By*

*Rick D. Bivens  
and  
Carl E. Williams*

Tennessee Wildlife



Resources Agency

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REGION IV STREAM FISHERY DATA COLLECTION REPORT

1990

Prepared by

Rick D. Bivens

and

Carl E. Williams

TENNESSEE WILDLIFE RESOURCES AGENCY

November, 1991

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## INTRODUCTION

The fish fauna of Tennessee is the most diverse in the United States with approximately 290 species of native fish occurring within the state. This number is greater than found in any other state and the majority of these occur in our larger rivers and streams.

Streams and rivers across the state are valuable natural resources. As well as offering a variety of recreational opportunities, they are also sources of both commercial and domestic water. The management and protection of this important resource is defined as a strategic goal of the Tennessee Wildlife Resources Agency (TWRA).

This is the fourth annual report on stream fishery data collection in Region IV. The main purpose of this project has been to collect baseline information on fish and macroinvertebrate populations of streams in the region. This baseline data is necessary to update and expand our Tennessee Aquatic Data Base System (TADS) and to aid in resource management. In addition, we have also cooperated with the Tennessee Valley Authority, U. S. Forest Service, and the National Park Service on various stream fisheries projects.

Region IV has 4,847 miles of streams that total approximately 14,111 acres. There are approximately 800

miles that are classified as coldwater streams (TWRA 1990). Except for a few streams in Anderson, Campbell and Claiborne counties that drain into the Cumberland River system, the streams in Region IV are in the upper Tennessee River drainage. The main river systems in the region are the Clinch, Powell, Little Tennessee, mainstream Tennessee River, French Broad and Holston.

The streams included in this report were sampled for various reasons. Some, to assess the effects of stream pollution, and others for general interest or to obtain baseline data on fish populations and species diversity.

The information gathered for this project is of general nature and broad in scope. Therefore, it is presented in this report simply as individual stream accounts. These accounts include a general summary of the survey work that took place along with the data collected and a comment and management recommendations section for each stream. Sample site location maps and field data forms are also included in these accounts.

## METHODS

The streams to be surveyed and the methods required are outlined in TWRA Field Request No. 90-4. In addition to this list, eighteen other streams were sampled and are included in this report. The survey work was conducted from March to November, 1990. Forty-seven fish samples and 31 benthic samples from 39 streams were collected.

Qualitative fish data were collected using standard electrofishing techniques, seining, toxicants, and explosives. Streams were sampled with backpack shockers, or various combinations of shockers and seines. In general, small streams were sampled with a single backpack unit while larger streams were sampled with multiple units. Larger rivers were sampled with a boat shocker where deeper water permitted and with a backpack shocker or backpack shocker in combination with a seine on the shallow riffle areas. One river sample involved electrofishing followed by the use of sodium cyanide and Primacord in pools too deep to wade. In another case, renovation work was conducted with electrofishing followed by rotonone.

Sample lengths ranged from 100 feet to 0.6 mile. Most were 400 feet which is generally enough to include both riffle and pool habitats on the smaller and medium size streams.

Fish were identified in the field and released when possible. When field identification was impossible or impractical, they were preserved in 10% formalin for later determination. Examination and confirmation on identification of problematic specimens was made by Dr. David A. Etnier, University of Tennessee, and by comparisons with identified specimens in our Region IV fish collection. Most of the preserved fish collected this year will also be catalogued into our collection. Some will be deposited in the University of Tennessee Research Collection of Fishes. Common and scientific names of fishes used in this report are after Robins et al. (1991) and Etnier and Starnes (in press).

Game fish were weighed and measured individually. Nongame fish (suckers, catfish, carp, goldfish and large shad) and forage fish (minnows, darters, sculpins, and small shad) were weighed as a group by species and a length range was obtained. In some cases, only numbers were determined. All fish data collected were recorded on Fish Field Data Forms and all measurements are reported in English units. The letter "t" is recorded where the weight was represented by only a trace amount (less than 0.01 lb.).

Most qualitative samples are divided into categories of game fish by species, nongame fish, and forage fish. These are summarized as actual numbers and weights for all fish collected and also as percentages of the total for each group. All the field data forms are presented along with each summary in the stream accounts.

Qualitative benthic samples were generally collected from each fish sample site. These were taken with aquatic insect nets, by rock turning, and selected pickings from as many different habitats as possible within the sample area. They were, for the most part, timed sampling efforts of 1.5 hours duration with a few lasting up to 2 hours. No Surber samples were collected at all this year as taxa richness and relative abundance were the primary considerations. Taxa richness reflects the health of the aquatic community and biological impairment is reflected in the absence of pollution sensitive taxa such as Ephemeroptera, Plecoptera and Trichoptera.

Large particles and debris were picked from the samples and discarded in the field. The remaining sample was preserved in 50% isopropanol and later sorted in the laboratory. Organisms were enumerated and attempts were made to identify specimens to species level when reasonably possible, many were identified to genus, and most, at least, to family. Dr. David A. Etnier, University of Tennessee, examined much of the material and either made or confirmed our attempted identifications. Comparisons with identified specimens in our aquatic invertebrate collection were also useful in making determinations. Dr. Paul W. Parmalee, University of Tennessee, assisted in identifying the mussel relics we collected. For the most part, nomenclature of aquatic insects used in this report follows Brigham et al, (1982). Names of stoneflies (Plecoptera) are after Stewart and Stark (1988) from which many of the determinations were

also made. Benthic results are reported in both table and graphic form with each stream account.

Water quality data were taken at most sites in conjunction with the fishery and benthic samples. The sample included dissolved oxygen (DO), temperature, pH, and conductivity. Data were taken from midstream and mid-depth at each site, using a YSI Model 58 DO meter, a YSI Model 33 S-C-T meter, and an Orion Model SA 210 pH meter. Stream velocities were measured with a Marsh-McBirney Model 201D current meter. The Robins-Crawford "rapid crude" technique (as described by Orth 1983) was used to estimate flows. Water quality parameters along with habitat data were recorded on Field Physiochemical Data Forms. These are included in each stream account.

Sample site locations were delineated on 7.5 minute topographical maps and copies of these have been included in the stream accounts. TADS river reach numbers and quadrangle map coordinates for sample sites are recorded on all data forms.

STREAM ACCOUNTS

## Conasauga Creek

One qualitative fishery survey was conducted in November 1990:

**Location and Length** - Tributary to the Hiwassee River. The sample area was located on White Cliff Farm about 0.3 mi. upstream of the mouth of Hatter Branch and was sampled on 9 November 1990. It was 400 ft. in length and averaged 28.5 ft. in width. The site was in Monroe County. Mecca Quadrangle.

**Gear Type** - The site was sampled using two backpack electrofishing units operating at 120 v. AC.

**Water Quality** - Data were taken from midstream on 9 November 1990: DO - 10.0 ppm, pH - 7.5, Temperature - 51.6 F, Conductivity - 100 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey. The sample contained 361 organisms and represented 42 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Largemouth bass	1	0.3	0.69	5.8
Rock bass	3	0.8	0.67	5.6
Redbreast sunfish	11	2.8	0.18	1.5
Green sunfish	25	6.4	0.71	6.0
Bluegill	22	5.6	0.21	1.8
Longear sunfish	5	1.3	0.21	1.8
Redear sunfish	1	0.3	0.04	0.3
Nongame Fish	30	7.7	6.01	50.4
Forage Fish	292	74.8	3.20	26.8
TOTAL	390		11.92	



**Comments** - This stream was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 390 fish weighing 11.92 lb. and comprising 23 species from our sample site. Six native game species, largemouth bass (*Micropterus salmoides*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), bluegill (*L. macrochirus*), longear sunfish (*L. megalotis*), and redbreast sunfish (*L. microlophus*), along with exotic redbreast sunfish (*L. auritus*) were collected. Largemouth bass and redbreast sunfish were each represented by single specimens, and only three rock bass were found. Redbreast sunfish, green sunfish, and bluegill were fairly well represented number-wise but most were small individuals. It is interesting to note the occurrence of the longear sunfish from this stream. Longear sunfish are apparently being replaced by the ecologically similar redbreast sunfish in much of the upper Tennessee River drainage (Etnier et al. 1983). Seventeen nongame and forage species were also collected and these made up about 82% of the total number and 77% of the total weight. Forage species accounted for about 75% of the total number of fish collected. Of particular interest were shiner species such as warpaint (*Luxilus coccogenis*), Tennessee (*Notropis leuciodus*), and telescope (*N. telescopus*) which are fairly intolerant forms. Another species of interest was the northern studfish (*Fundulus catenatus*). Although it is widely distributed, it is not commonly encountered in east Tennessee streams. Four darter species, the greenside (*Etheostoma blennioides*), rainbow (*E. caeruleum*), redline (*E. rufilineatum*), and snubnose (*E. simoterum*) were also collected here. Our collection of *E. caeruleum* here is apparently the first for this species in the Hiwassee River system and the single specimen was deposited in the University of Tennessee Research Collection of Fishes (UT Cat. No. 91.3988). This species is widely distributed and typically abundant in middle Tennessee, but is much less common in the east part of the state (Etnier and Starnes in press).

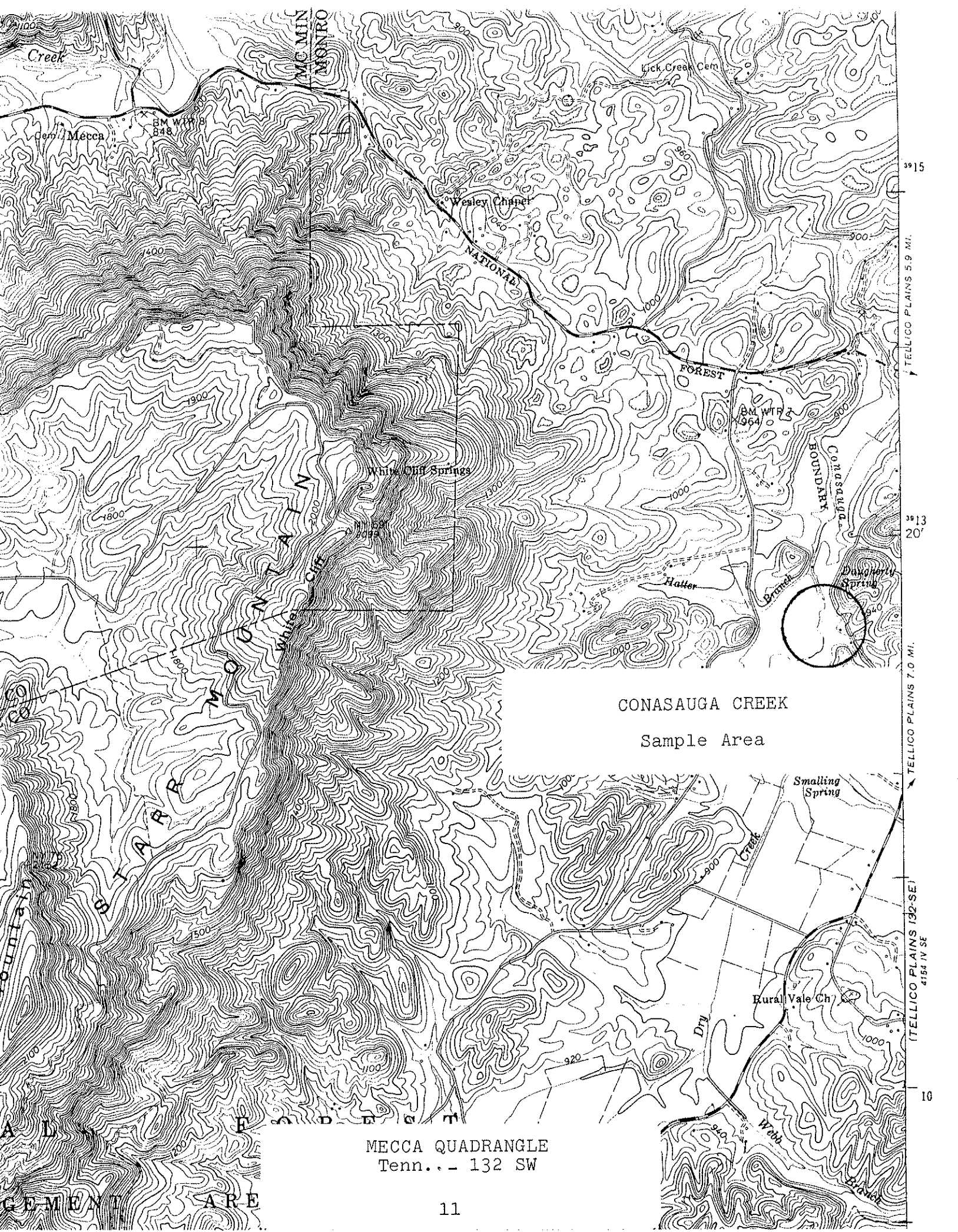
This stream still has fairly good water quality even though it receives considerable run-off from agricultural activities along the watershed. We observed siltation being quite heavy in places, probably from open and eroding banks where cattle have access to the stream. It has a fairly diverse

fish fauna and several of the species collected are fairly intolerant forms. The occurrence of four darter species further attests to good water quality.

Benthic macroinvertebrates from our sample included Baetidae, Baetiscidae, Heptageniidae, Leptophlebiidae, and Oligoneuriidae mayflies, Peltoperlidae, Perlidae, and Perlodidae stoneflies, Glossosomatidae, Hydropsychidae, Limnephilidae, and Philopotamidae caddisflies, and Dryopidae, Dytiscidae, Elmidae, Hydrophilidae, and Psephenidae beetles. Pleurocerid snails included *Anculosa subglobosa* and *Goniobasis*. Three species of crayfish, *Cambarus longirostris*, *Orconectes erichsonianus* and *O. forceps* were also present. Trichopterans represented about 32%, ephemeropterans 20%, coleopterans 12%, and plecopterans about 2% of the total number of organisms collected (Fig. 1). A total of 42 taxa was collected at this site.

#### **Management Recommendations:**

1. The fish species assemblage and taxa richness of macroinvertebrates indicate that this is a fairly good quality stream that should be protected from any further degradation.



MECCA QUADRANGLE  
Tenn. - 132 SW

3915

3913  
20'

TELlico PLAINS 7.0 MI.

TELlico PLAINS (32-SE)  
4154 IV SE

10

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Conasauga Creek Lat-Long 351945N - 842247W  
Watershed Hiwassee River Length of Sample 400 ft.  
Station (See comments) Reach 06020002-81,1  
County Monroe Date/Time 9 November 1990/1030  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 28.5 ft. Average Depth 0.7 ft. Maximum Depth 3.6 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud - % Silt 15 % Sand 35 % Clay - %  
Gravel 25 % Rubble 20 % Boulders 5 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 20 % Clay - %  
Gravel 15 % Rubble 50 % Boulders 5 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average \_\_\_\_\_ Scarce X
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 40 % of Stream.
8. Flow (CFS) 19.3 : Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Overcast with light rain and cool; air temp. - 52°F.
10. Past Weather (last 24 hours) Partly cloudy and cold overnight.
11. pH 7.5 Temp. 51.6°F Conductivity 100 D.O. 10.0 % Saturation 89
12. Comments: Sample location was on White Cliff Farm about 0.3 mi.  
upstream of the mouth of Hatter Branch. Siltation is fairly  
heavy from agricultural activities; cattle in stream, etc.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Conasauga Creek Lat-Long 351945N - 842247W  
 Watershed Hiwassee River Date 9 November 1990  
 County Monroe Reach 06020002-81,1  
 Type of Sampling Electrofishing Pool Elevation 862 ft.  
 Gear Type Two backpack shockers @ Time 1330 - 1430  
120 v. AC

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Micropterus salmoides</i>	220	1	11	0.69			
<i>Ambloplites rupestris</i>	13	2	6	0.39			
" "	"	1	7	0.28			
<i>Lepomis auritus</i>	201	9	2	0.11			
" "	"	2	3	0.07			
<i>L. cyanellus</i>	202	3	1	0.01			
" "	"	11	2	0.13			
" "	"	6	3	0.15			
" "	"	2	4	0.10			
" "	"	3	5	0.32			
<i>L. macrochirus</i>	206	10	1	0.04			
" "	"	9	2	0.09			
" "	"	3	3	0.08			
<i>L. megalotis</i>	208	2	2	0.03			
" "	"	1	3	0.02			
" "	"	2	4	0.16			
<i>L. microlophus</i>	209	1	3	0.04			
<i>Catostomus commersoni</i>	32	4	5-13	1.87			
<i>Hypentelium nigricans</i>	166	18	2-12	1.64			
<i>Moxostoma dquesnei</i>	229	8	2-12	2.50			
<i>Campostoma anomalum</i>	25	48	2-5	0.80			
<i>Luxilus chrysocephalus</i>	249	41	1-6	0.93			
<i>L. coccogenis</i>	248	63	1-5	0.48			

Continued on next page

Field Notes: 400 ft. sample area.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Mark Hughes

WR-0525



Conasauga Creek: Qualitative Benthic Sample

9 November 1990

Field # 273

Monroe Co., TN; Approx. 0.3 mi. upstream of the mouth of  
Hatter Branch. Coordinates: 351945N - 842247W. Mecca,  
Tenn., # 132 SW Quad. Reach # 06020002-81,1.

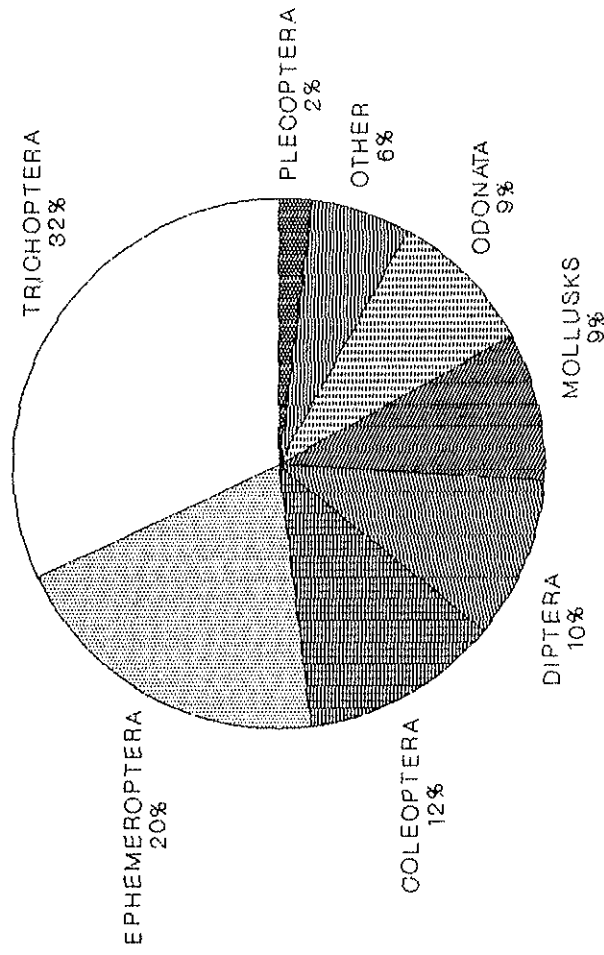
TAXA	NUMBER
ANNELEIDA:	
Oligochaeta	5
COLEOPTERA:	
Dryopidae/ <u>Helichus</u> adult	1
Dytiscidae/ <u>Hydroporus</u> adult	1
Elmidae/ <u>Optioservus</u> larvae	37
Hydrophilidae/ <u>Sperchopsis tessellatus</u> adults	2
Psephenidae/ <u>Psephenus herricki</u> larva	1
DECAPODA:	
Cambaridae/ <u>Cambarus (Hiaticambarus) longirostris</u> male 2nd.	1
C. (H.) <u>longirostris</u> female	1
<u>Orconectes</u> (prob. <u>erichsonianus</u> )	2
<u>O. forceps</u> male 1st.	1
DIPTERA:	
Athericidae/ <u>Atherix lantha</u>	1
Chironomidae	10
Simuliidae	8
Tipulidae/ <u>Tipula</u>	17
EPHEMEROPTERA:	
Baetidae/ <u>Baetis gibbera</u>	1
Baetiscidae/ <u>Baetisca</u>	1
Heptageniidae/ <u>Stenonema</u>	19
<u>Stenonema mediopunctatum</u>	1
<u>S. pudicum</u>	18
Leptophlebiidae/ <u>Habrophlebiodes</u>	1
Oligoneuriidae/ <u>Isonychia</u>	31
GASTROPODA:	
Pleuroceridae/ <u>Anculosa subglobosa</u>	1
<u>Goniobasis</u>	31
HEMIPTERA:	
Corixidae/ <u>Trichocorixa</u>	1

Conasauga Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
MEGALOPTERA:	
Corydalidae/ <u>Corydalus cornutus</u>	7
<u>Nigronia serricornis</u>	3
Sialidae/ <u>Sialis</u>	1
ODONATA:	
Aeshnidae/ <u>Basiaeschna janata</u>	1
<u>Boyeria vinosa</u>	1
Calopterygidae/ <u>Calopteryx</u>	15
Coenagrionidae/ <u>Argia</u>	2
Gomphidae/ <u>Gomphus</u> early instars	10
<u>Gomphus lividus</u>	1
<u>Hagenius brevistylus</u>	1
Libellulidae/ <u>Sympetrum</u>	1
Macromiidae/ <u>Macromia</u>	2
PELECYPODA:	
Unionidae/ <u>Villosa vanuxemensis</u> relic	1
PLECOPTERA:	
Peltoperlidae/ <u>Peltoperla</u>	2
Perlidae/ <u>Acroneuria abnormis</u>	3
Perlodidae/ <u>Utaperla gaspesiana</u>	1
TRICHOPTERA:	
Glossosomatidae/ <u>Glossosoma</u>	9
Hydropsychidae/ <u>Cheumatopsyche</u>	49
<u>Hydropsyche betteni/depravata</u>	28
<u>Symphitopsyche sparna</u>	1
Limnephilidae/ <u>Pycnopsyche</u>	3
Philopotamidae/ <u>Chimarra</u>	27
	362



CONASAUGA CREEK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 362  
TAXA RICHNESS = 42

Figure 1.

## Coker Creek

One qualitative fishery survey was conducted in October 1990:

**Location and Length** - Tributary to the Hiwassee River. The sample area was located just upstream of the bridge on Joe Brown Highway and was sampled on 22 October 1990. It was 400 ft. in length and averaged 18.5 ft. in width. The site was in Monroe County. Tellico Plains Quadrangle.

**Gear Type** - The site was sampled with a single backpack electrofishing unit operating at 350 v. AC.

**Water Quality** - Data were taken from midstream on 22 October 1990: DO - 8.7 ppm, pH - 7.2, Temperature - 59.0 F, Conductivity - 25 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey. The sample contained 364 organisms and represented 61 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	% by	
		<u>No.</u>	<u>Wt.</u>
Smallmouth bass	3	1.9	0.10
Rock bass	15	9.7	0.94
Redbreast sunfish	1	0.6	0.01
Bluegill	1	0.6	0.12
Rainbow trout	1	0.6	0.06
Nongame Fish	17	11.0	1.96
Forage Fish	117	75.5	2.46
TOTAL	155		5.65

**Comments** - This stream was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 155 fish weighing 5.65 lb. and comprising 10 species from our sample site. Three native game species, smallmouth bass (*Micropterus dolomieu*), rock bass (*Ambloplites rupestris*), and bluegill (*Lepomis macrochirus*), along with rainbow trout (*Oncorhynchus mykiss*) and redbreast sunfish (*L. auritus*) were collected. Redbreast sunfish, bluegill and rainbow trout were each represented by single specimens and only three small, smallmouth bass were found. Rock bass were the only game fish collected in any numbers or size and they made up about 10% by number and 17% by weight of all fish collected. Five nongame and forage species were also collected and these made up about 86% of the total number and 78% of the total weight. Forage species accounted for about 75% of the total number of fish collected and of these, stonerollers (*Campostoma anomalum*) were the most abundant. No sculpin or darter species were collected at all and the warpaint shiner (*Luxilus coccogenis*) was the only shiner species present.

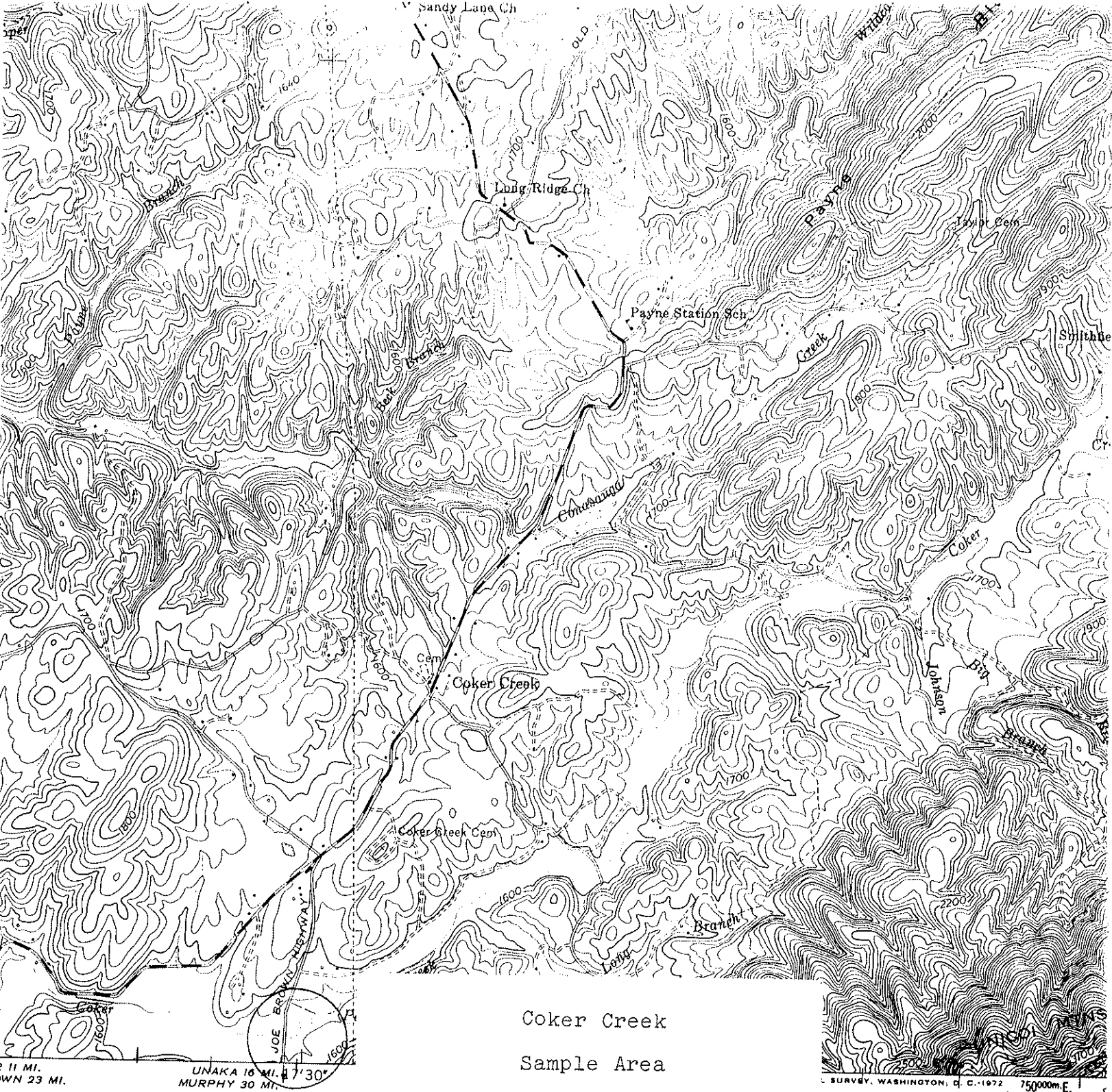
This is a high quality Blue Ridge stream and its low species diversity is probably due to its overall small stream habitat. Also, at the site sampled, cover for fish is somewhat limited mainly because of the large amount of bedrock present. At this point, the stream is probably beginning to be marginal for trout as indicated by the presence of one apparently stream reared rainbow. There was some siltation evident, but for the most part this is a nice, clean, little stream.

Benthic macroinvertebrates from our sample included Baetidae, Ephemerellidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, Peltoperlidae, Perlidae, Perlodidae, and Pteronarcyidae stoneflies, Brachycentridae, Calamoceratidae, Glossosomatidae, Hydropsychidae, Limnephilidae, Odontoceridae, Philopotamidae, Phryganeidae, Polycentropodidae, and Rhyacophilidae caddisflies, and Dryopidae, Elmidae, Gyrinidae, Psephenidae, and Ptilodactylidae beetles. Fingernail clams (*Sphaerium*) and periwinkle (*Goniobasis*) and planorbid snails were present. An unidentified *Cambarus* sp. was the only crayfish collected. Trichopterans represented about 34%, ephemeropterans and dipterans each 12%, and plecopterans about 8% of the total number of organisms collected (Fig. 2). A total of 61 taxa was collected at this site. Almost 25% of these were caddisfly taxa. Of special interest to us was the collection of calamoceratid caddisflies, *Heteroplectron americanum* and *Anisocentropus pyraloides*, from this site. These

are the only eastern North American species of this family and this is the first time we have collected either. Also of interest is the collection of a single specimen of *Anchytarsus bicolor* larva. Aquatic ptilodactylids are considered quite rare and their distribution is sporadic, even in streams where they are known to occur (Brigham et al. 1982). *Anchytarsus bicolor* is the only species known from eastern North America and the larvae are generally found in small, cool streams and spring brooks where they may be locally common.

**Management Recommendations:**

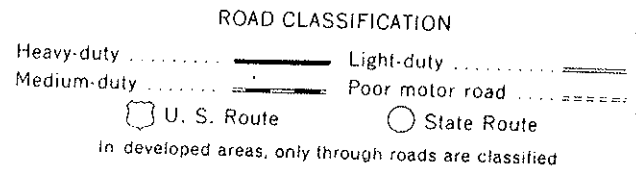
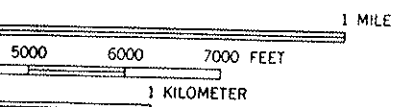
1. This is a good to excellent quality Blue Ridge stream that merits watershed protection.
2. Upstream from where we sampled needs to be checked to see if a viable trout population exists.



UNAKA 18 MI.  
MURPHY 30 MI.

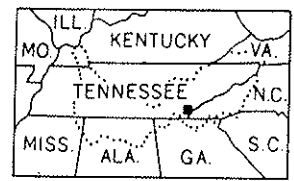
### Coker Creek Sample Area

SURVEY, WASHINGTON, D. C. 1972 1:50,000 M.E.



CONTOURS

STANDARDS  
WASHINGTON, D. C. 20242,  
401 OR KNOXVILLE, TENN. 37902,  
E. TENNESSEE 37219  
IS AVAILABLE ON REQUEST



QUADRANGLE LOCATION

TELLICO PLAINS, TENN.-N.C.  
N3515-W8415/7.5

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Coker Creek Lat-Long 351503N - 841732W  
Watershed Hiwassee River Length of Sample 400 ft.  
Station (See comments) Reach 06020002-123,0  
County Monroe Date/Time 22 October 1990/1000  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 18.5 ft. Average Depth 0.6 ft. Maximum Depth 2.6 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud - % Silt 5 % Sand 20 % Clay - %  
Gravel 10 % Rubble 30 % Boulders 10 % Bedrock 25 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 5 % Sand 20 % Clay - %  
Gravel 20 % Rubble 30 % Boulders 20 % Bedrock 5 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Rushes and  
Average X Salix nigra Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20 %  
of stream, Average in 40 %, Poor in 40 %
7. Shade or Canopy Good over 50 % of Stream.
8. Flow (CFS) 5.4 : Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Cloudy with light rain; air temp. - 65°F.
10. Past Weather (last 24 hours) Clear and mild, turning cloudy overnight.
11. pH 7.2 Temp. 59°F Conductivity 25 D.O. 8.7 % Saturation 86
12. Comments: Sample location was just upstream of the bridge on Joe Brown Highway. Nice, clean, little stream. Some siltation and cover for fish somewhat limiting; bedrock pools, etc.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Coker Creek Lat-Long 351503N - 841732W  
 Watershed Hiwassee River Date 22 October 1990  
 County Monroe Reach 06020002-123,0  
 Type of Sampling Electrofishing Pool Elevation 1573 ft.  
 Gear Type One backpack shocker @ Time 1320 - 1420  
350 v. AC

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		219	2	2	0.02			
"	"	"	1	6	0.08			
<i>Ambloplites rupestris</i>		13	7	1	0.01			
"	"	"	2	2	0.02			
"	"	"	1	5	0.11			
"	"	"	5	6	0.80			
<i>Lepomis auritus</i>		201	1	2	0.01			
<i>L. macrochirus</i>		206	1	5	0.12			
<i>Oncorhynchus mykiss</i>		353	1	5	0.06			
<i>Hypentelium nigricans</i>		166	17	1-11	1.96			
<i>Camptostoma anomalum</i>		25	78	1-5	0.60			
<i>Luxilus coccogenis</i>		248	22	3-5	0.45			
<i>Rhinichthys atratulus</i>		351	2	2-3	0.02			
<i>Semotilus atromaculatus</i>		360	15	1-9	1.39			

Field Notes: 400 ft. sample length. One rainbow trout escaped capture.  
No sculpin or darter species collected or observed at all.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

Coker Creek: Qualitative Benthic Sample

22 October 1990

Field # 264

Monroe Co., TN; Just upstream of the bridge on Joe Brown Hwy. Coordinates: 351503N - 841732W. Tellico Plains, Tenn. -N.C., # 132 SE Quad. Reach # 06020002-123,0.

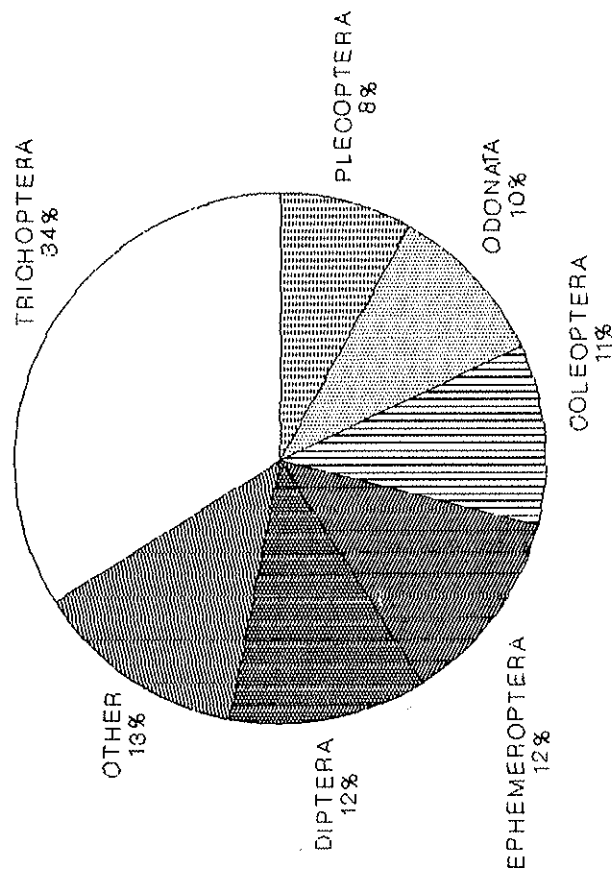
TAXA	NUMBER
COLEOPTERA:	
Dryopidae/ <u>Helichus</u> adults	3
Elmidae/ <u>Dubiraphia</u> adult	1
<u>Optioservus</u> larvae	12
<u>Optioservus</u> <u>ovalis</u> adult	1
<u>Oulimnius</u> <u>latiusculus</u> adult	1
<u>Promoresia</u> <u>tardella</u> larvae	6
<u>Promoresia</u> <u>tardella</u> adults	9
Gyrinidae/ <u>Dineutus</u> <u>ciliatus</u> male	1
<u>Dineutus</u> <u>ciliatus</u> females	2
Psephenidae/ <u>Psephenus</u> <u>herricki</u>	4
Ptilodactylidae/ <u>Anchytarsus</u> <u>bicolor</u> larva	1
DECAPODA:	
Cambaridae/ <u>Cambarus</u> (males & females)	4
DIPTERA:	
Athericidae/ <u>Atherix</u> <u>lantha</u>	1
Chironomidae	34
Simuliidae	3
Tabanidae/ <u>Chrysops</u>	2
Tipulidae/ <u>Hexatoma</u>	2
<u>Tipula</u>	3
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	2
Ephemerellidae/ <u>Ephemerella</u>	1
<u>Eurylophella</u>	1
Ephemeridae/ <u>Ephemera</u>	1
<u>Hexagenia</u>	8
Heptageniidae/ <u>Stenacron</u>	1
<u>Stenonema</u> <u>pubidicum</u>	28
Oligoneuriidae/ <u>Isonychia</u>	3
GASTROPODA:	
Planorbidae	16
Pleuroceridae/ <u>Goniobasis</u>	6



Coker Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
MEGALOPTERA:	
Corydalidae/ <u>Corydalis cornutus</u>	2
<u>Nigronia fasiatus</u>	1
<u>N. serricornis</u>	12
Sialidae/ <u>Sialis</u>	1
ODONATA:	
Aeshnidae/ <u>Basiaeschna janata</u>	5
<u>Boyeria grafiana</u>	2
Calopterygidae/ <u>Calopteryx</u>	11
Coenagrionidae/ <u>Argia</u>	2
Cordulegastridae/ <u>Cordulegaster maculata</u>	4
Comphidae/ <u>Gomphus</u> (Genus A)	4
<u>Gomphus lividus</u>	5
<u>Hagenius brevistylus</u>	1
<u>Lanthus</u>	1
<u>Ophiogomphus mainensis</u>	1
Macromiidae/ <u>Macromia</u>	2
PELECYPODA:	
Spaheriidae/ <u>Sphaerium</u>	3
PLECOPTERA:	
Peltoperlidae/ <u>Peltoperla</u>	1
Perlidae/ <u>Acroneuria abnormis</u>	18
<u>Eccoptura xanthenes</u>	1
Perlodidae (early instars)	4
Pteronarcyidae/ <u>Pteronarcys</u>	4
TRICHOPTERA:	
Brachycentridae/ <u>Micrasema</u>	1
Calamoceratidae/ <u>Anisocentropus pyraloides</u>	3
<u>Heteroplectron americanum</u>	5
Glossosomatidae/ <u>Glossosoma</u>	12
Hydropsychidae/ <u>Cheumatopsyche</u>	7
<u>Diplectrona modesta</u>	2
<u>Hydropsyche betteni/depravata</u>	29
<u>Symphitopsyche sparna</u>	4
Limnephilidae/ <u>Pycnopsyche</u>	10
Odontoceridae/ <u>Psilotreta frontalis</u>	2
Philopotamidae/ <u>Chimarra</u>	23
<u>Dolophilodes</u>	7
Phryganeidae/ <u>Ptilostomis</u>	2
Polycentropodidae/ <u>Phylocentropus</u>	14
Rhyacophilidae/ <u>Rhyacophila fuscula</u>	6

COKER CREEK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 369  
TAXA RICHNESS = 61

Figure 2.

## Big War Creek

Two qualitative surveys were conducted in July 1990:

**Location and Length** - Tributary to the Clinch River. Sample area 1 was located at the first bridge on Pawpaw Road and was sampled on 18 July 1990. It was 300 ft. in length and averaged 39.9 ft. in width. Sample area 2 was located along the gravel road approximately 0.5 mi. upstream of the Highway 31 crossing and was sampled on 19 July 1990. It was 300 ft. in length and averaged 25.3 ft. in width. Both sites were in Hancock County. Area 1, Swan Island Quadrangle. Area 2, Lee Valley Quadrangle.

**Gear Type** - Site 1 was sampled by making one pass with a single backpack electrofishing unit operating at 110 v. AC. Site 2 was sampled by making two passes with a single backpack electrofishing unit operating at 110 v. AC.

**Water Quality** - Data were taken from midstream at each site. Area 1 on 18 July 1990: DO - 10.1 ppm, pH - 8.3, Temperature - 67.2 F, Conductivity - 315 micromhos/cm. Area 2 on 19 July 1990: DO - 9.8 ppm, pH - 8.1, Temperature 64.9 F, Conductivity - 270 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative sample at each site. Area 1 sample contained 562 organisms and represented 62 taxa. Area 2 sample contained 470 organisms and represented 52 taxa.

**Fish Collected:**Area 1

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Smallmouth bass	9	1.4	0.66	3.6
Largemouth bass	1	0.2	0.01	0.1
Rock bass	55	8.6	5.04	27.5
Redbreast sunfish	5	0.8	0.40	2.2
Bluegill	4	0.6	0.23	1.3
Longear sunfish	2	0.3	0.11	0.6
Nongame Fish	14	2.2	4.02	21.9
Forage Fish	547	85.9	7.85	42.9
TOTAL	637		18.32	

Area 2

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Smallmouth bass	19	4.0	1.58	11.8
Spotted bass	1	0.2	t	t
Rock bass	31	6.6	2.39	17.8
Bluegill	2	0.4	0.08	0.6
Nongame Fish	9	1.9	0.42	3.1
Forage Fish	409	86.7	8.97	66.7
TOTAL	471		13.44	

**Comments** - We surveyed two sites on this stream primarily to develop a fish species list and to collect stream data for TADS. This stream is known to be an excellent rock bass (*Ambloplites rupestris*) stream in the region and probably receives considerable fishing pressure. The Agency had made no previous studies or fish collections from this stream.

We collected a total of 637 fish weighing 18.32 lb. and comprising 27 species from site 1. Five native game species, smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), rock bass, bluegill (*Lepomis macrochirus*), and longear sunfish (*L. megalotis*), along with exotic redbreast sunfish (*L. auritus*) were collected. Redbreast, bluegill and

longear sunfish were all represented either in small numbers or small size and only one largemouth bass was collected. Therefore, comparison of inch class distributions was made for smallmouth bass and rock bass only (Fig. 3). Smallmouth bass made up about 1% compared to about 9% by rock bass, of the total number of fish collected. Also, smallmouth bass contributed only 4% as compared to 28% by rock bass of the total weight. Twenty-one nongame and forage species were also collected and these comprised about 88% of the total number and 65% of the total weight. Some were represented by single specimens while others were fairly abundant. Of particular interest were the fairly intolerant shiner species such as warpaints (*Luxilus coccogenis*), Tennessee (*Notropis leuciodus*), and telescopes (*N. telescopus*) along with the stargazing minnow (*Phenacobius uranops*). These shiners were fairly abundant, but only a single specimen of the stargazing minnow was collected. Also, seven darter species, the greenside (*Etheostoma blennioides*), fantail (*E. flabellare*), redline (*E. rufilineatum*), snubnose (*E. simoterum*), wounded (*E. vulneratum*), banded (*E. zonale*), and the logperch (*Percina caprodes*), were collected. It is somewhat unusual to find *E. vulneratum* in a stream this size as it is an inhabitant of moderate to large rivers (Etnier and Starnes in press). However, it is locally abundant in the Clinch River upstream of Norris Reservoir and as this sample site was approximately 0.5 mile upstream of the Clinch River, it is probably not too surprising that it occurs here.

At the upstream site we collected 471 fish weighing 13.44 lb. and comprising 18 species. Game fish from this site included smallmouth bass, one spotted bass (*Micropterus punctulatus*), rock bass and bluegill. No redbreast or longear sunfish were found here and only two small bluegill were collected. Smallmouth bass and rock bass were again the primary game species collected (Fig. 5). Smallmouth bass made up 4% and rock bass about 7% by numbers and about 12% and 18% by weight of all fish collected. Fourteen nongame and forage species were collected and most were the same as found at the downstream site. Three species, the spotted bass, yellow bullhead (*Ameiurus natalis*), and blacknose dace (*Rhinichthys atratulus*) were collected here but not at the downstream site. These were all represented by single specimens. Also, four darter species, the greenside, fantail, redline and snubnose were represented here.

Although seven game fish species were collected, in all, it appears that smallmouth bass and rock bass are most important to the fishery. And, based on

numbers and weights from our limited sampling effort, the rock bass is the primary game species. A total of 30 fish species was collected from both sites combined. Several of these, as stated above, are fairly intolerant forms even though the stream receives considerable run-off from agricultural activities along the entire watershed. The occurrence of seven darter species further attests to good water quality.

Benthic macroinvertebrates from our sample at Site 1 included Baetidae, Ephemeridae, Heptageniidae, Leptophlebiidae, Oligoneuriidae and Tricorythidae mayflies, perlid stoneflies, Hydropsychidae, Leptoceridae, Limnephilidae, Philopotamidae and Psychomyiidae caddisflies, and Elmidae and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) and fingernail clam (*Sphaerium*) were present along with periwinkle snails (*Goniobasis*). Other snails included *Anculosa subglobosa*, *Pleurocera uncialis*, and *Campeloma*. *Cambarus longirostris* was the only crayfish in our sample and both crayfish and snails were abundant. Coleopterans represented about 43%, ephemeropterans about 15%, mollusks 16%, and trichopterans about 10% of the total number of organisms collected (Fig. 4). A total of 62 taxa was collected at this site.

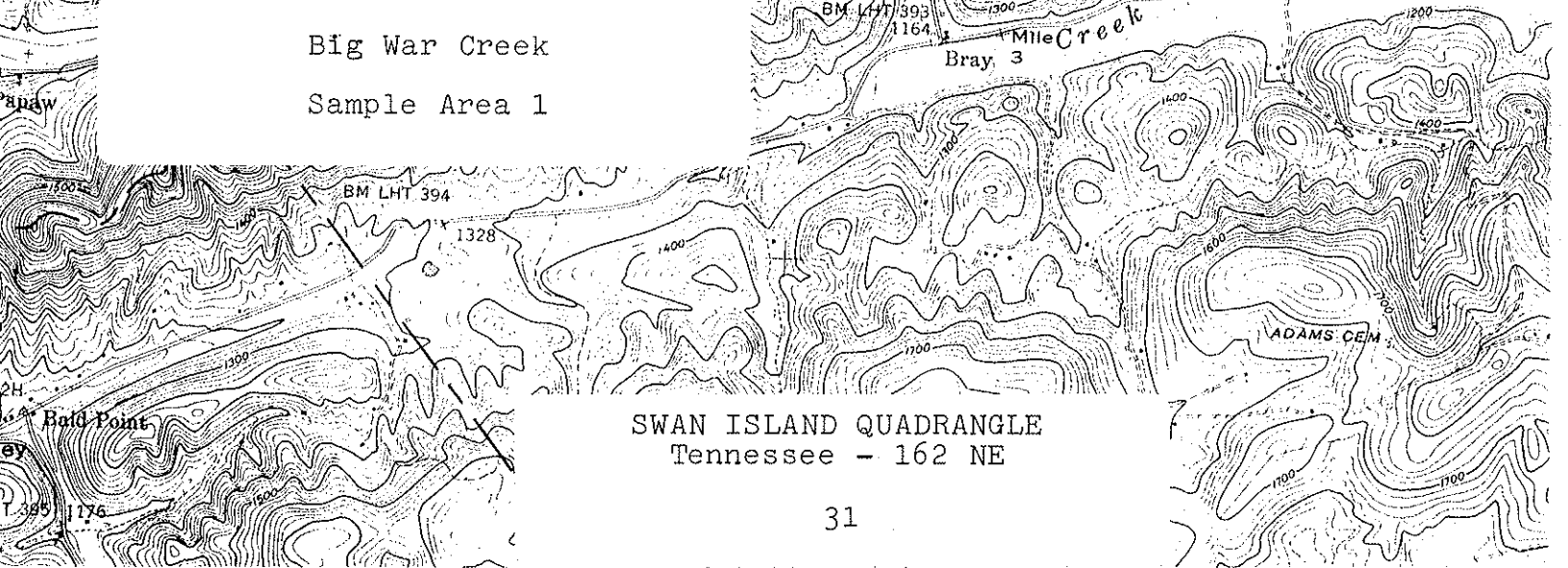
Benthic macroinvertebrates from our sample at Site 2 included Baetidae, Caenidae, Ephemeridae, Heptageniidae, Leptophlebiidae, Oligoneuriidae and Tricorythidae mayflies, perlid stoneflies, Hydropsychidae, Limnephilidae and Leptoceridae caddisflies, and Elmidae, Gyrinidae, Hydrophilidae and Psephenidae beetles. The Asian clam and fingernail clam were present but *Goniobasis* was the only pleurocerid snail collected. Limpets (*Ferrissia*) were also present. Ephemeropterans represented about 29%, trichopterans about 23%, and coleopterans about 20% of the total number of organisms collected (Fig. 6). A total of 52 taxa was collected at this site.

#### **Management Recommendations:**

1. The fish species diversity and taxa richness of macroinvertebrates and the presence of many intolerant forms indicate that this is a good to excellent quality Ridge and Valley stream that merits extra protection from any source of pollution or habitat destruction.
2. Conduct more intensive population surveys in the future, i.e., three-pass depletion electrofishing samples and age structures.



Big War Creek  
 Sample Area 1



SWAN ISLAND QUADRANGLE  
 Tennessee - 162 NE

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Big War Creek Lat-Long 362534N - 832052W  
Watershed Clinch River Length of Sample 300 ft.  
Station Site # 1 Reach 06010205-14,0  
County Hancock Date/Time 18 July 1990/0830  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 39.9 ft. Average Depth 0.8 ft. Maximum Depth 3.2 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 10 % Rubble 10 % Boulders 10 % Bedrock 50 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 20 % Clay - %  
Gravel 10 % Rubble 20 % Boulders 10 % Bedrock 30 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous X (*Dianthera americana*)  
Average \_\_\_\_\_ Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 75 % of Stream.
8. Flow (CFS) 26.6 : Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy, warm and humid; air temp. - 72°F.
10. Past Weather (last 24 hours) Partly cloudy, warm but less humid.
11. pH 8.3 Temp. 67.2°F Conductivity 315 D.O. 10.1 % Saturation 105
12. Comments: Sample area location at first bridge on Pawpa Road.  
Stream slightly dingy due to recent rainfall. Lots of bedrock  
ledges in pools. Fairly silty, mainly from agricultural activities  
in the watershed.



FISH FIELD DATA FORM

Site #1 - bridge on Pawpa Road.

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Big War Creek  
 Watershed Clinch River  
 County Hancock  
 Type of Sampling Electrofishing  
 Gear Type 1 backpack @ 110 v. AC

Lat-Long 362534N - 832052W  
 Date 18 July 1990  
 Reach 06010205-14,0  
 Pool Elevation 1105 ft.  
 Time 1230-1500

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	5	1	0.01			
"	"	"	2	5	0.12			
"	"	"	1	8	0.21			
"	"	"	1	9	0.32			
<i>M. salmoides</i>		220	1	8	0.01			
<i>Ambloplites rupestris</i>		13	18	3	0.58			
"	"	"	12	4	0.60			
"	"	"	12	5	1.15			
"	"	"	8	6	1.32			
"	"	"	4	7	1.01			
"	"	"	1	8	0.38			
<i>Lepomis auritus</i>		201	3	4	0.17			
"	"	"	2	5	0.23			
<i>L. macrochirus</i>		206	1	3	0.04			
"	"	"	2	4	0.08			
"	"	"	1	5	0.11			
<i>L. megalotis</i>		208	1	3	0.04			
"	"	"	1	4	0.07			
<i>Moxostoma duquesnei</i>		229	2	6-17	1.81			
<i>Hypentelium nigricans</i>		166	12	1-13	2.21			
<i>Campostoma anomalum</i>		25	202	1-6	4.17			
<i>Cyprinella galactura</i>		253	7	1-3	0.04			
Continued on next page.								

Field Notes: 300 ft. sample area. Crayfish and snails abundant.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

FISH FIELD DATA FORM

Site #1 - bridge on  
Pawpa Road.

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Big War Creek Lat-Long 362534N - 832052W  
 Watershed Clinch River Date 18 July 1990  
 County Hancock Reach 06010205-14,0  
 Type of Sampling Electrofishing Pool Elevation 1105 ft.  
 Gear Type 1 backpack @ 110 v. AC Time 1230-1500

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Hybopsis amblops</i>		155	8	2-3	0.04			
<i>Luxilus chrysocephalus</i>		249	52	1-6	0.60			
<i>L. coccogenis</i>		248	72	1-4	0.39			
<i>Nocomis micropogon</i>		234	51	1-7	1.66			
<i>Notropis leuciodus</i>		255	36	1-2	0.10			
<i>N. telescopus</i>		272	28	1-2	0.05			
<i>Phenacobius uranops</i>		330	1	3	0.01			
<i>Pimephales notatus</i>		334	1	2	t			
<i>Semotilus atromaculatus</i>		360	1	1	t			
<i>Etheostoma blennioides</i>		80	17	1-4	0.29			
<i>E. flabellare</i>		92	4	1-2	0.01			
<i>E. rufilineatum</i>		108	15	1-2	0.06			
<i>E. simoterum</i>		111	16	1-2	0.06			
<i>E. vulneratum</i>		101	3	2	0.03			
<i>E. zonale</i>		134	3	1-2	t			
<i>Percina caprodes</i>		306	3	4	0.08			
<i>Cottus caroliniae</i>		40	27	1-3	0.26			

Field Notes: 300 ft. sample length. Crayfish and snails abundant.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

GAME FISH FROM BIG WAR CREEK  
 SITE 1  
 INCH CLASS DISTRIBUTION

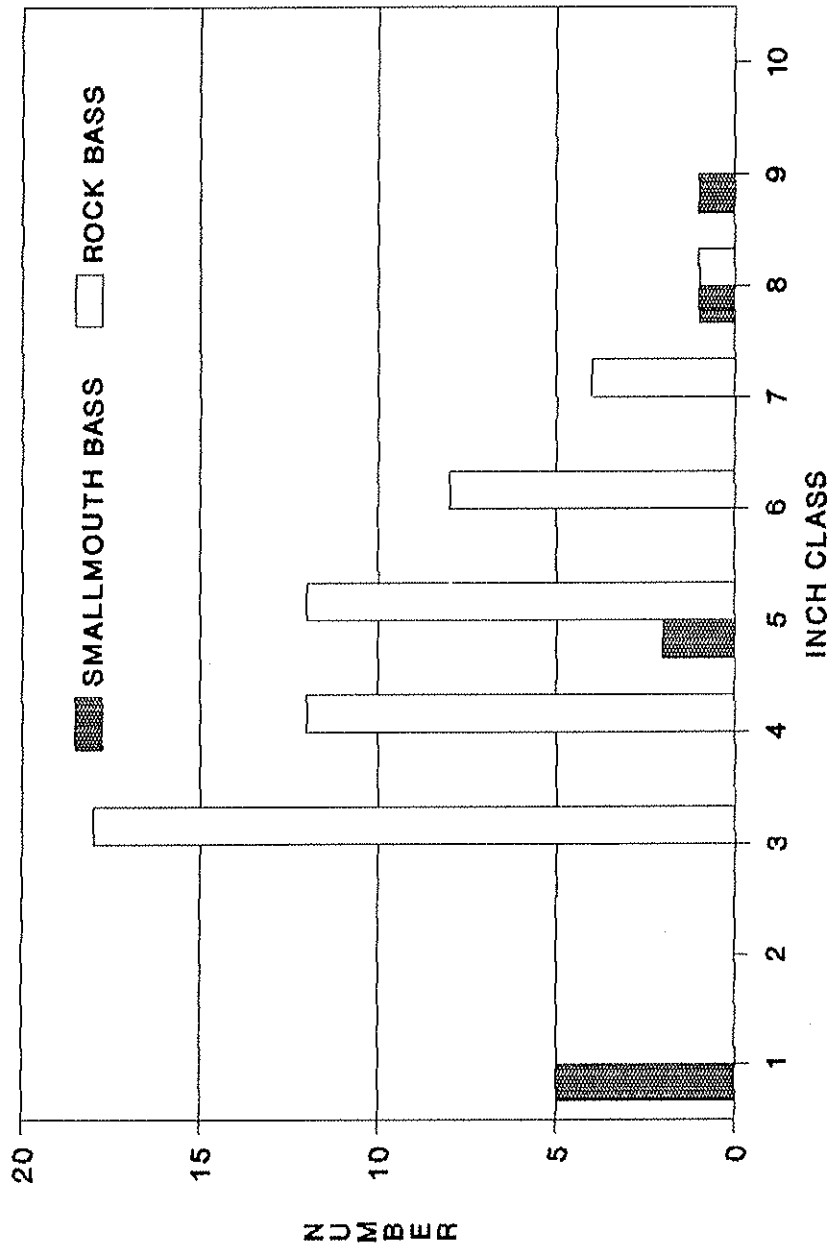


Figure 3.

Big War Creek: Site # 1, Qualitative Benthic Sample

18 July 1990

Field # 224

Hancock Co., TN; First bridge crossing upstream of the mouth  
(on Pawpa Rd.). Coordinates: 362534N - 832052W. Swan  
Island, Tenn., # 162 NE Quad. Reach # 06010205-14,0.

TAXA	NUMBER
ANNELIDA:	
Hirudinea	1
Oligochaeta	1
COLEOPTERA:	
Elmidae/ <u>Dubiraphia quadrinota</u> adult	1
<u>Microcylloepus pusillus aptus</u> adult	1
<u>Optioservus</u> larvae	54
<u>O. trivittatus</u>	35
<u>Promoesia</u> larvae	6
<u>P. elegans</u> adults	2
<u>Stenelmis</u> larvae	76
<u>Stenelmis</u> adults	48
Psephenidae/ <u>Psephenus herricki</u> larvae	16
DIPTERA:	
Athericidae/ <u>Atherix lantha</u>	10
Chironomidae	15
Simuliidae	1
Stratiomyidae/(Possibly <u>Allognosta</u> )	1
Tabanidae/ <u>Tabanus</u>	1
Tipulidae/ <u>Antocha</u> pupa	1
DECAPODA:	
Cambaridae/ <u>Cambarus</u> ( <u>Hiaticambarus</u> ) <u>longirostris</u> male 2nd.	1
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	40
<u>Pseudocloeon</u>	1
Ephemerellidae early instar	1
Ephemeridae/ <u>Hexagenia</u>	3
Heptageniidae/ <u>Heptagenia</u>	4
<u>Stenacron</u> early instar	1
<u>Stenacron interpunctatum</u>	1
<u>Stenonema</u>	15
<u>Stenonema mediopunctatum</u>	6
Leptophlebiidae/ <u>Choroterpes</u> (Prob. <u>hubelli</u> )	1
Oligoneuriidae/ <u>Isonychia</u>	11
Tricorythidae/ <u>Tricorythodes</u>	1

Big War Creek: Site # 1, Qualitative Benthic Sample cont.

TAXA	NUMBER
GASTROPODA:	
<u>Ancylidae/Ferrissia relic</u>	2
<u>Physidae/Physa relic</u>	1
<u>Pleuroceridae/Anculosa subglobosa</u>	1
<u>Goniobasis</u>	44
<u>Pleurocera unciala</u>	19
<u>Viviparidae/Campeloma</u>	2
HEMIPTERA:	
<u>Gerridae/Metrobates (Prob. hesperius) adult</u>	1
<u>Hydrometridae/Hydrometra</u>	1
<u>Veliidae/Rhagovelia obesa nymph</u>	1
ISOPODA:	
<u>Asellidae/Lirceus</u>	1
LEPIDOPTERA:	
<u>Pyralidae/Petrophila</u>	2
MEGALOPTERA:	
<u>Corydalidae/Corydalis cornutus</u>	5
<u>Nigronia serricornis</u>	7
<u>Sialidae/Sialis</u>	1
ODONATA:	
<u>Aeshnidae/Boyeria vinosa</u>	7
<u>Calopterygidae/Hetaerina americana</u>	4
<u>Coenagrionidae/Argia</u>	2
<u>Gomphidae/Dromogomphus spinosus</u>	6
<u>Gomphurus lineatifrons</u>	1
<u>Gomphus</u>	1
<u>Gomphus (Genus A consanguis) *</u>	1
<u>G. lividus</u>	3
<u>Hagenius brevistylus</u>	6
<u>Ophiogomphus mainensis</u>	1
<u>Stylogomphus albistylus</u>	2
<u>Macromiidae/Macromia</u>	1
PLECOPTERA:	
<u>Perlidae/Acroneuria evoluta</u>	3
<u>Neoperla</u>	4
PELECYPODA:	
<u>Corbiculidae/Corbicula fluminea</u>	7
<u>Sphaeriidae/Sphaerium</u>	14

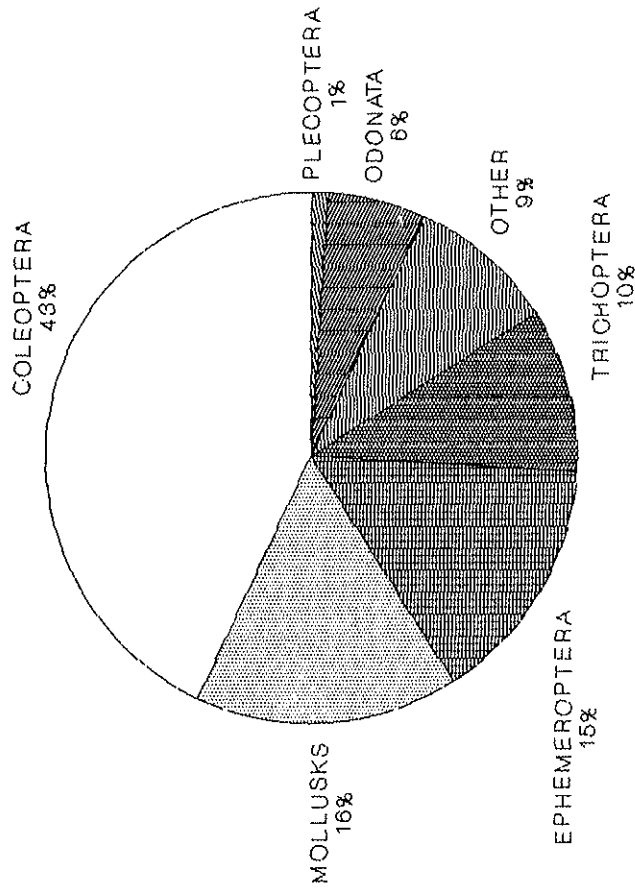
Big War Creek: Site # 1, Qualitative Benthic Sample cont.

TAXA	NUMBER
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	13
<u>Hydropsyche</u> early instar	1
<u>Hydropsyche betteni/depravata</u>	10
<u>H. frisoni</u>	6
<u>Symphitopsyche cheilonis</u>	8
Leptoceridae/ <u>Triaenodes</u> larva	1
<u>Triaenodes</u> pupae	2
Limnephilidae/ <u>Goera calcarata</u>	2
<u>Neophylax mitchelli</u>	4
Philopotamidae/ <u>Chimarra</u>	3
Psychomyiidae/ <u>Psychomyia flavida</u>	4
URODELA:	
Plethodontidae/ <u>Desmognathus fuscus</u>	1
	562

\* (from Louton 1982)

Unionidae relics of Villosa iris and  
V. trabilis were collected at this site.

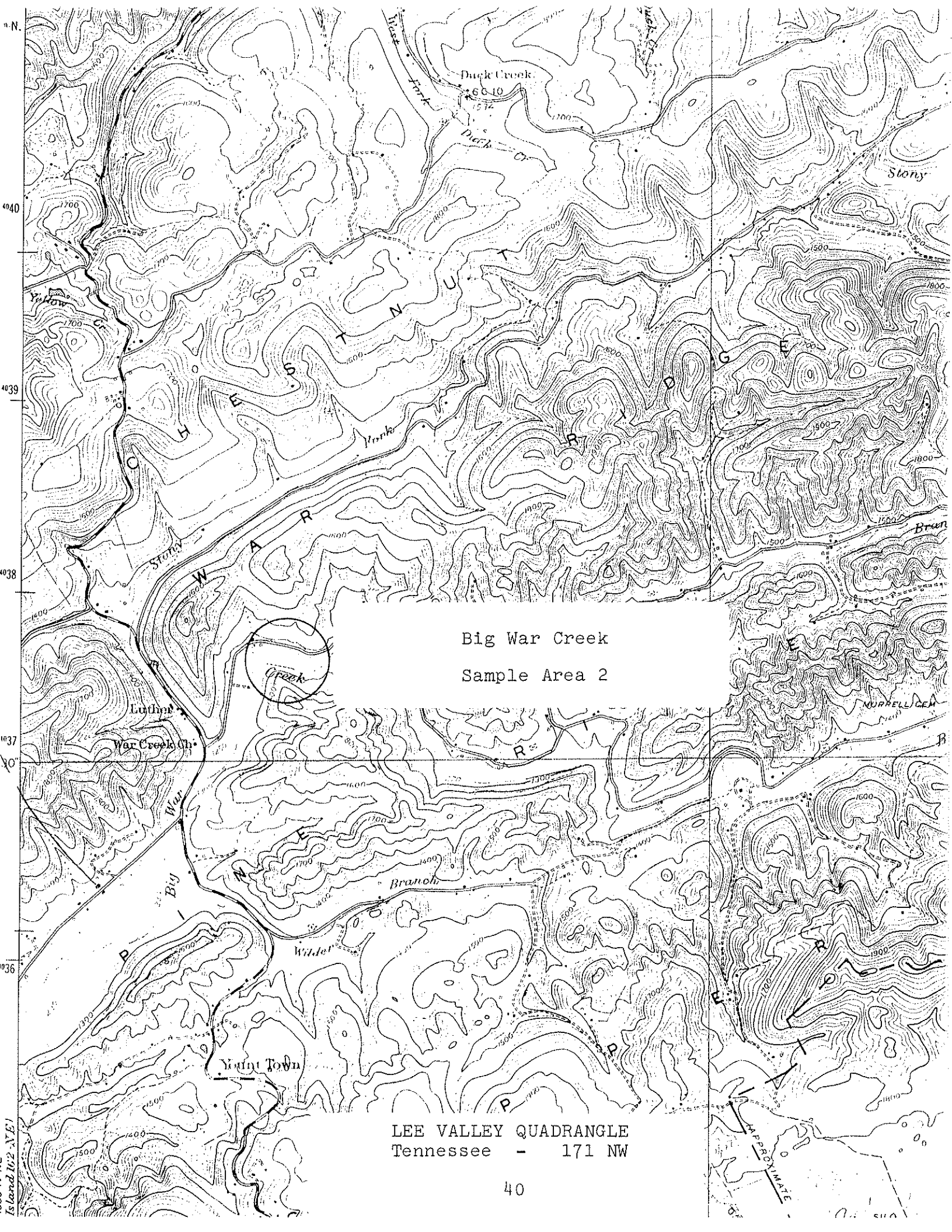
**BIG WAR CREEK  
SITE 1  
BENTHIC MACROINVERTEBRATES**



PERCENT OF TOTAL NUMBER OF ORGANISMS

**n = 562  
TAXA RICHNESS = 62**

Figure 4.



Big War Creek  
Sample Area 2

LEE VALLEY QUADRANGLE  
Tennessee - 171 NW

Island 16.2 N.E.

APPROXIMATE



TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Big War Creek Lat-Long 362751N - 831350W  
Watershed Clinch River Length of Sample 300 ft.  
Station Site # 2 Reach 06010205-14,0  
County Hancock Date/Time 19 July 1990/0900  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 25.3 ft. Average Depth 0.8 ft. Maximum Depth 3.7 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud 5 % Silt 10 % Sand 10 % Clay - %  
Gravel 10 % Rubble 10 % Boulders 15 % Bedrock 40 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 10 % Rubble 15 % Boulders 5 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average X Moss on rocks \_\_\_\_\_ Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 80 % of Stream.
8. Flow (CFS) 10.7 : Compared to Normal: Low \_\_\_\_\_ Normal \_\_\_\_\_ Slightly High X
9. Present Weather Partly cloudy, warm and humid; air temp.- 71°F.
10. Past Weather (last 24 hours) Partly cloudy, warm and humid with storms.
11. pH 8.1 Temp. 64.9°F Conductivity 270 D.O. 9.8 % Saturation 106
12. Comments: Sample area location was along gravel road approx. 0.5 mi. upstream of the hwy. 31 crossing. The stream was slightly high and dingy due to thunder storm on the previous afternoon. Fairly silty due to agricultural practices and from gravel road that parallels the stream.

FISH FIELD DATA FORM

Site #2 - Approx. 0.5  
mi. upstream  
of hwy. 31  
crossing.

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Big War Creek  
Watershed Clinch River  
County Hancock  
Type of Sampling Electrofishing  
Gear Type 1 backpack @ 110 v. AC &  
making two passes.

Lat-Long 362751N - 831350W  
Date 19 July 1990  
Reach 06010205-14,0  
Pool Elevation 1245 ft.  
Time 1215-1430

Name	SPECIES CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>	218	9	1	0.02			
"	"	1	3	0.02			
"	"	1	4	0.04			
"	"	2	5	0.15			
"	"	3	6	0.31			
"	"	1	7	0.15			
"	"	1	9	0.29			
"	"	1	10	0.60			
<i>M. punctulatus</i>	219	1	1	t			
<i>Ambloplites rupestris</i>	13	5	2	0.05			
"	"	5	3	0.17			
"	"	11	4	0.58			
"	"	4	5	0.43			
"	"	4	6	0.66			
"	"	2	7	0.50			
<i>Lepomis macrochirus</i>	206	1	2	0.01			
"	"	1	4	0.07			
<i>Ameiurus natalis</i>	174	1	7	0.27			
<i>Hypentelium nigricans</i>	166	8	1-7	0.15			
<i>Campostoma anomalum</i>	25	169	1-6	4.91			
<i>Cyprinella galactura</i>	253	3	2-4	0.04			
Continued on next page.							

Field Notes: 300 ft. sample length. Made two passes with backpack shocker  
due to the water being dingy.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

FISH FIELD DATA FORM

Site #2 - Approx. 0.5  
mi. upstream  
of hwy. 31  
crossing.

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Big War Creek

Lat-Long 362751N - 831350W

Watershed Clinch River

Date 19 July 1990

County Hancock

Reach 06010205-14,0

Type of Sampling Electrofishing

Pool Elevation 1245 ft.

Gear Type 1 backpack @ 110 v. AC &  
making two passes.

Time 1215-1430

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Luxilus chrysocephalus</i>	249	48	1-6	1.58			
<i>L. coccogenis</i>	248	78	1-4	0.54			
<i>Nocomis micropogon</i>	234	67	1-7	1.64			
<i>Notropis telescopus</i>	272	22	1-3	0.10			
<i>Rhinichthys atratulus</i>	351	1	1	t			
<i>Etheostoma blennioides</i>	80	1	4	0.03			
<i>E. flabellare</i>	92	2	2	0.01			
<i>E. rufilineatum</i>	108	7	1-2	0.03			
<i>E. simoterum</i>	111	2	1-2	0.01			
<i>Cottus carolinae</i>	40	9	1-3	0.08			

Field Notes: 300 ft. sample length. Made two passes with backpack shocker  
due to the water being dingy.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

GAME FISH FROM BIG WAR CREEK  
 SITE 2  
 INCH CLASS DISTRIBUTION

■ SMALLMOUTH BASS □ ROCK BASS

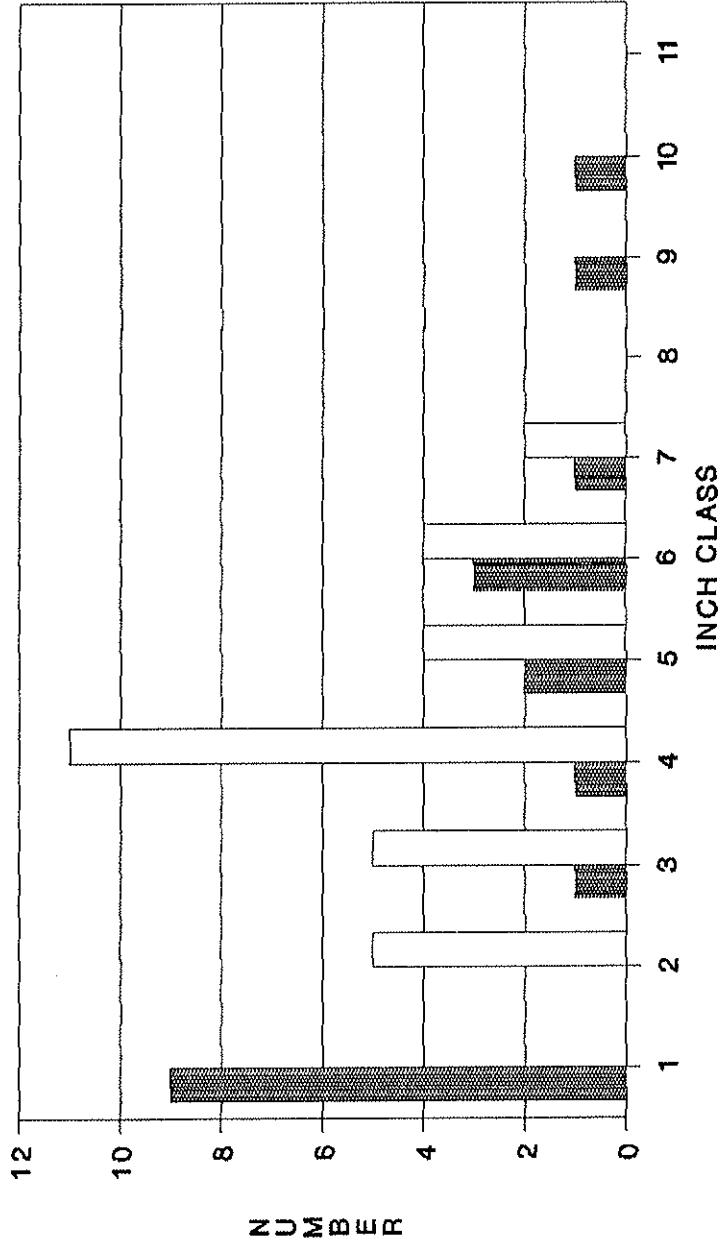


Figure 5.

Big War Creek: Site # 2, Qualitative Benthic Sample

19 July 1990

Field # 225

Hancock Co., TN; Approx. 0.7 mi. upstream of hwy. 31 along  
Cool Br. Rd. Coordinates: 362751N - 831350W. Lee Valley,  
Tenn., # 171 NW Quad. Reach # 06010205-14,0.

TAXA	NUMBER
ANNELEIDA:	
<u>Oligochaeta</u>	3
COLEOPTERA:	
<u>Elmidae/Dubiraphia vittata</u> adults	16
<u>Macronychus glabratus</u> adult	1
<u>Optioservus</u> larvae	2
<u>Optioservus ovalis</u> adult	1
<u>O. trivittatus</u> adult	1
<u>Promoresia elegans</u> adult	1
<u>P. elegans</u> larvae	2
<u>Stenelmis</u> adults	45
<u>Stenelmis</u> larvae	13
<u>Gyrinidae/Dineutus discolor</u> adult male	1
<u>Hydrophilidae/Cymbiodyta vindicata</u> adult	1
<u>Psephenidae/Psephenus herricki</u> larvae	9
DIPTERA:	
Chironomidae	17
Simuliidae	6
Tabanidae/ <u>Tabanus</u>	1
Tipulidae/ <u>Antocha</u>	1
<u>Limnophila</u>	1
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	31
<u>Pseudocloeon</u>	4
Caenidae/ <u>Caenis</u>	21
Ephemeridae/ <u>Hexagenia</u>	2
Heptageniidae/ <u>Heptagenia</u>	12
<u>Stenacron interpunctatum</u>	17
<u>Stenonema</u> early instars	11
<u>Stenonema mediopunctatum</u>	24
<u>S. modestum</u>	1
Leptophlebiidae/ <u>Choroterpes</u> (Prob. <u>hubbelli</u> )	1
Oligoneuriidae/ <u>Isonychia</u>	5
Tricorythidae/ <u>Tricorythodes</u>	7

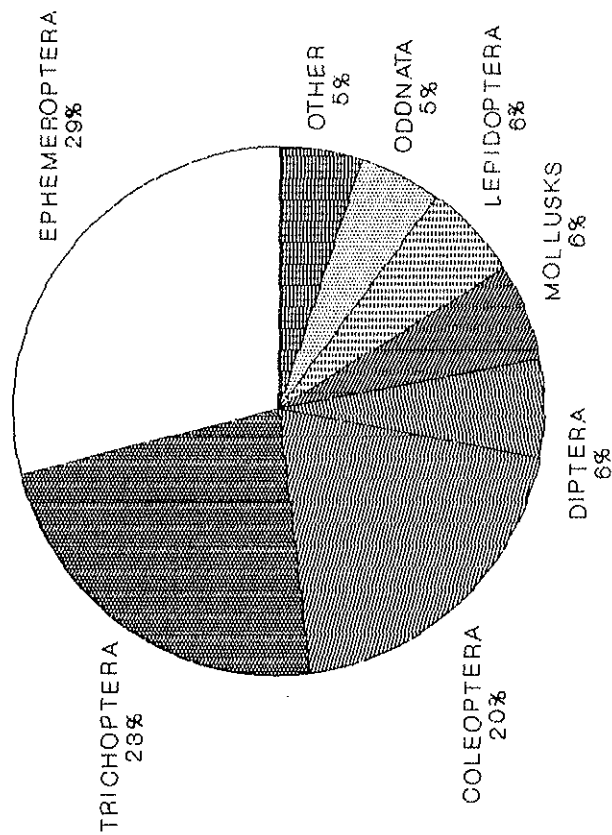
Big War Creek: Site # 2, Qualitative Benthic Sample cont.

TAXA	NUMBER
GASTROPODA:	
<u>Ancylidae/Ferrissia</u>	3
<u>Physidae/Physa relic</u>	1
<u>Pleuroceridae/Goniobasis</u>	15
HEMIPTERA:	
<u>Gerridae/Gerris nymph</u>	3
<u>Gerris conformis</u> adult male	1
<u>Gerris conformis</u> adult female	1
<u>Trepobates inermis</u> adult male	1
<u>Trepobates inermis</u> adult female	1
<u>Mesoveliidae/Mesovelia</u>	1
<u>Veliidae/Microvelia</u> adult	1
<u>Rhagovelia obesa</u> nymph	2
LEPIDOPTERA:	
<u>Pyralidae/Petrophila</u>	30
MEGALOPTERA:	
<u>Corydalidae/Corydalus cornutus</u>	4
<u>Nigronia serricornis</u>	3
ODONATA:	
<u>Aeshnidae/Boyeria vinosa</u>	6
<u>Coenagrionidae/Argia</u>	2
<u>Gomphidae/Gomphus</u> early instar	1
<u>Gomphus</u> (Genus A. <u>consanguis</u> ) *	1
<u>G. lividus</u>	4
<u>Hagenius brevistylus</u>	2
<u>Stylogomphus albistylus</u>	7
PLECOPTERA:	
<u>Perlidae/Acroneuria</u> early instars	2
<u>Neoperla</u> early instars	2
PELECYPODA:	
<u>Corbiculidae/Corbicula fluminea</u>	1
<u>Sphaeriidae/Sphaerium</u>	10
TRICHOPTERA:	
<u>Hydropsychidae/Cheumatopsyche</u>	8
<u>Hydropsyche betteni/depravata</u>	86
<u>H. frisoni</u>	4
<u>Symphitopsyche cheilonis</u>	5
<u>Limnephilidae/Neophylax mitchelli</u>	3
<u>Leptoceridae/Triaenodes</u>	1

470

\* (from Louton 1982)

BIG WAR CREEK  
SITE 2  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

$n = 470$   
TAXA RICHNESS = 52

Figure 6.

## Richardson Creek (Byrd Creek)

One qualitative fishery survey was conducted in July 1990:

**Location and Length** - Tributary to the Clinch River. The sample area was located approximately 0.6 mi. upstream of the first bridge crossing at the ford on the off road and was sampled on 20 July 1990. It was 400 ft. in length and averaged 38.3 ft. in width. The site was in Hancock County. Kyles Ford Quadrangle.

**Gear Type** - The site was sampled using a single backpack electrofishing unit operating at 110 v. AC.

**Water Quality** - Data were taken from midstream on 20 July 1990: DO - 9.7 ppm, pH - 8.4, Temperature - 65.7 F, Conductivity - 310 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting an hour and forty-five minute qualitative sample. The sample contained 707 organisms and represented 64 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Rainbow trout	9	1.0	2.70	17.6
Spotted bass	2	0.2	0.08	0.5
Bluegill	1	0.1	0.04	0.3
Nongame Fish	8	0.9	1.32	8.6
Forage Fish	842	97.7	11.21	73.0
TOTAL	862		15.35	

**Comments** - This stream was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 862 fish weighing 15.35 lb. and comprising 11 species from our sample site. Two native game species were collected and these were represented by only two specimens of spotted bass (*Micropterus punctulatus*) and one bluegill (*Lepomis macrochirus*). However, nine rainbow trout (*Oncorhynchus mykiss*) were collected. These were "holdover" fish from three earlier stockings this year. Richardson Creek,



which is locally known as Byrd Creek, received about 1,850 trout in early 1990, prior to our sampling, and has been on Region IV's stocking list for several years. Average coefficient of condition (K) for the nine rainbows we collected was 0.91 and ranged from 0.76 to 1.02 with several fish looking emaciated. Blacknose dace (*Rhinichthys atratulus*) and stonerollers (*Campostoma anomalum*) accounted for the greater number of all fish collected with blacknose dace being the most abundant. Two darter species, the fantail (*Etheostoma flabellare*) and the snubnose (*E. simoterum*) were fairly abundant, however, no shiners were collected at all.

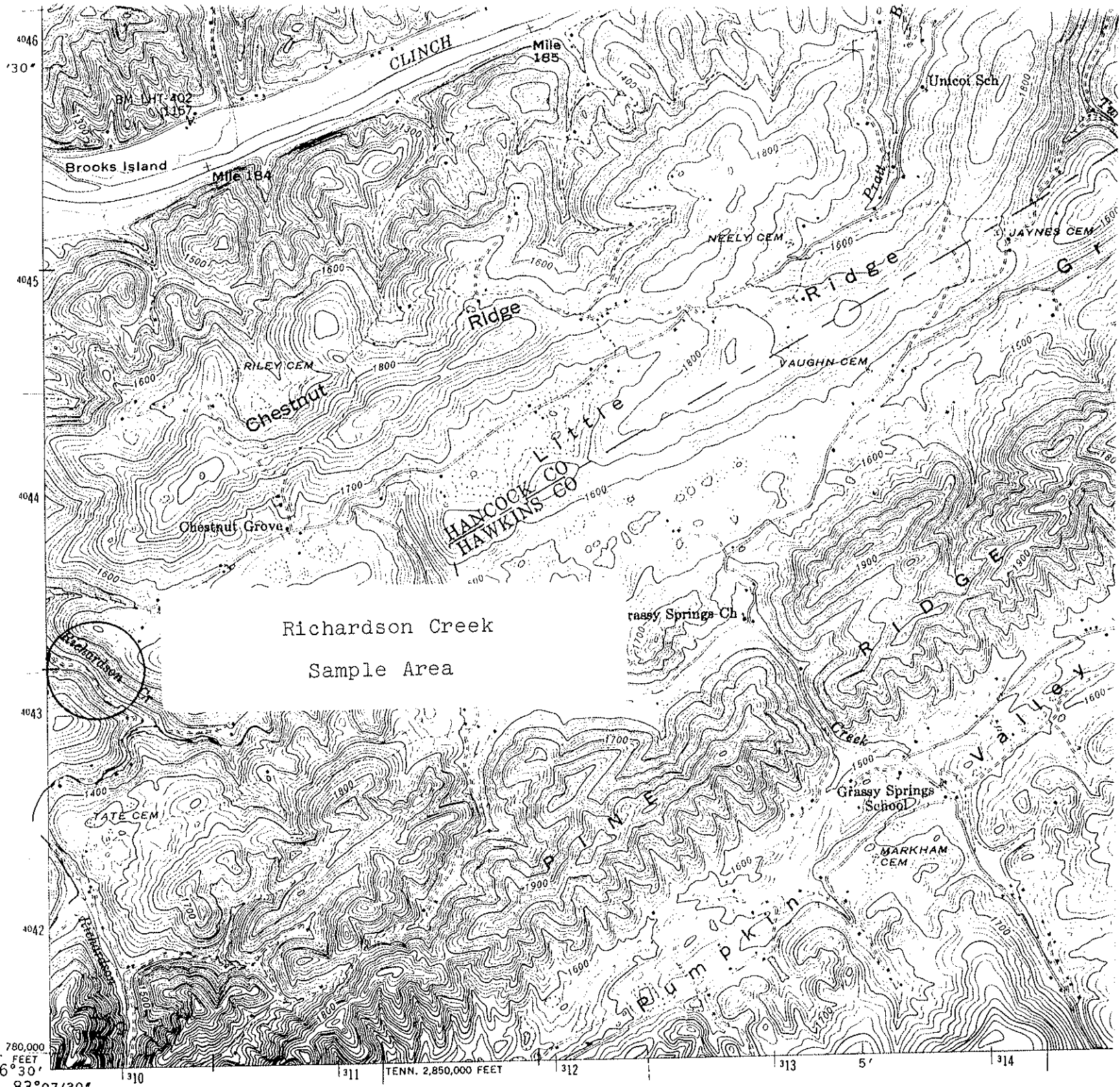
The stream is generally shallow and wide and fish habitat consists of many bedrock ledges with few deep pools. However, riffle areas are strewn with many boulders that create good cover for fish. Siltation is not extremely heavy, but the amount of the gravel-rubble type substrate is limited. It is also in a mostly forested watershed with little apparent disturbance and could readily be compared to similar size streams in the Cherokee National Forest. And, with water temperature around 66 F in the middle of July, and apparently few native game fish, the Agency is probably justified in continuing trout management.

Benthic macroinvertebrates from our sample included Baetidae, Ephemeridae, Heptageniidae, Leptophlebiidae, and Oligoneuriidae mayflies, Capniidae, Peltoperlidae, and Perlidae stoneflies, Hydropsychidae, Limnephilidae, Odontoceridae, Philopotamidae and Rhyacophilidae caddisflies, and Elmidae and Psephenidae beetles. Periwinkle snails (*Goniobasis*) were present along with fingernail clams (*Sphaerium*). *Cambarus longirostris* was the only crayfish collected. Trichopterans represented about 30% and coleopterans about 25% of the total number of organisms (Fig. 7), and a total of no less than 64 taxa was collected.

Of special interest is the collection of 70 specimens of *Hydropsyche rotosa* at this site. This makes the second stream in the Clinch River system where we have collected this species. Prior to our collecting *H. rotosa* in Puncheon Camp Creek in Grainger County in 1989, (Bivens and Williams 1990), it was known only from its type locality near Tusculum College in Greene County, Tennessee (Etnier and Schuster 1979).

**Management Recommendations:**

1. Continue to stock trout due to adequate temperature and the apparent absence of native game fish.
2. Consider stocking brown trout (*Salmo trutta*) due to the abundance of blacknose dace and stonerollers available for forage.
3. This might be a good stream to experiment with introducing wild brown trout from other naturalized stream populations in the region.



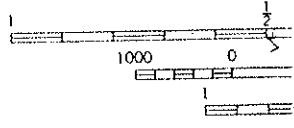
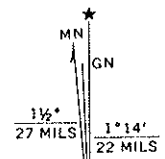
Richardson Creek  
Sample Area

780,000  
FEET  
6° 30'  
83° 07' 30"

1310 | TENN. 2,850,000 FEET | 1312 | 1313 | 1314

Mapped, edited, and published by Tennessee Valley Authority  
Control by USGS, USC&GS, and Tennessee Valley Authority  
Topography by photogrammetric methods from aerial  
photographs. Field checked 1947  
Map projection. 1927 North American datum  
10,000-foot grids based on Tennessee coordinate system and  
Virginia coordinate system, south zone  
1000-meter Universal Transverse Mercator grid ticks,  
zone 17, shown in blue

Revisions shown in purple and recompilation of woodland areas  
compiled by the Geological Survey in cooperation  
Virginia from aerial photographs taken 1969. 1  
not field checked



UTM GRID AND 1969 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

KYLES FORD QUADRANGLE  
Tenn.-VA. - 170 SE

THIS MAP  
FOR SALE BY  
TENNESSEE  
VIRGINIA DIVISION C  
AND U. S. TENNESSEE VALLEY  
A FOLDER DESCRIBES

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Richardson Creek (Byrd Creek) Lat-Long 363102N - 830729W  
Watershed Clinch River Length of Sample 400 ft.  
Station (see below) Reach 06010205-78,0  
County Hancock Date/Time 20 July 1990/0900  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 38.3 ft. Average Depth 0.6 ft. Maximum Depth 2.4 ft.
2. Estimated Percent of Stream in Pools is 25 %
3. Estimated Percent Pool Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 10 % Rubble 10 % Boulders 10 % Bedrock 50 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 10 % Rubble 10 % Boulders 30 % Bedrock 30 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous X (*Dianthera americana*)  
Average \_\_\_\_\_ Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20 %  
of stream, Average in 40 %, Poor in 40 %
7. Shade or Canopy Good over 50 % of Stream.
8. Flow (CFS) 7.6: Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Overcast, warm, and humid; air temp. - 71°F.
10. Past Weather (last 24 hours) Partly cloudy, warm and humid.
11. pH 8.4 Temp. 65.7°F Conductivity 310 D.O. 9.7 % Saturation 104
12. Comments: Sample area location approx. 0.6 mi. upstream of the first bridge crossing at the stream crossing of the off road. The habitat is mostly bedrock ledges with a few deep pools; the stream is mostly wide and shallow.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Richardson Creek Lat-Long 363102N - 830729W  
 Watershed Clinch River Date 20 July 1990  
 County Hancock Reach 06010205-78,0  
 Type of Sampling Electrofishing Pool Elevation 1250 ft.  
 Gear Type One backpack @ 110 v. AC Time 1215-1345

SPECIES		CODE	NUMBER	LENGTH	WT.		
Name							
<i>Oncorhynchus mykiss</i>		353	1	8	0.26		
"	"	"	5	9	1.30		
"	"	"	3	10	1.14		
<i>Micropterus punctulatus</i>		219	1	2	0.01		
"	"	"	1	5	0.07		
<i>Lepomis macrochirus</i>		206	1	3	0.04		
<i>Catostomus commersoni</i>		32	2	7-10	0.76		
<i>Hypentelium nigricans</i>		166	6	5-7	0.56		
<i>Camptostoma anomalum</i>		25	123	1-6	4.58		
<i>Rhinichthys atratulus</i>		351	580	1-3	5.67		
<i>Semotilus atromaculatus</i>		360	1	1	t		
<i>Etheostoma flabellare</i>		92	23	1-2	0.13		
<i>E. simoterum</i>		111	56	1-2	0.28		
<i>Cottus carolinae</i>		40	59	1-5	0.55		

Field Notes: 400 ft. sample area. Rainbow trout were stocked fish.  
Avg. K for rainbow trout was 0.91.  
 Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

## Richardson Creek: Qualitative Benthic Sample

20 July 1990

Field # 226

Hancock Co., TN; Approx. 0.6 mi. upstream of 1st. bridge  
at the stream crossing of the off road. Coordinates:  
363102N - 830729W. Kyles Ford, Tenn.-VA., # 170 SE Quad.  
Reach # 06010205-78,0.

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	4
COLEOPTERA:	
Elmidae/ <u>Dubiraphia quadrinota</u> adults	2
<u>Optioservus</u> larvae	8
<u>O. trivittatus</u> adult	1
<u>Promoresia elegans</u> larvae	14
<u>Promoresia elegans</u> adults	25
<u>Stenelmis</u> larvae	26
<u>Stenelmis</u> adults	59
Eubriidae/ <u>Ectopria</u>	1
Hydrophilidae/ <u>Cymbiodyta vindicata</u>	2
Psephenidae/ <u>Psephenus herricki</u> larvae	38
<u>Psephenus herricki</u> adults	2
DECAPODA:	
Cambaridae/ <u>Cambarus (Hiaticambarus) longirostris</u>	
male 1st.	1
juvenile male	1
DIPTERA:	
Chironomidae	34
Empididae	3
Psychodidae/ <u>Telmatoscopus</u>	1
Simuliidae larvae	11
Simuliidae pupa	1
Tabanidae/ <u>Tabanus</u>	1
Tipulidae/ <u>Antocha</u>	18
<u>Tipula</u>	2
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	37
<u>Pseudocloeon</u>	1
Caenidae/ <u>Caenis</u>	2
Ephemerellidae (early instar)	1

Richardson Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
EPHEMEROPTERA: cont.	
Ephemeridae/ <u>Ephemera</u>	1
<u>Hexagenia</u> ( <u>Hexagenia</u> ) <u>atrocaudata</u>	5
Heptageniidae/ <u>Epeorus</u> ( <u>Iron</u> ) <u>rubidus</u> / <u>subpallidus</u>	9
<u>Heptagenia</u>	17
<u>Stenacron</u> <u>interpunctatum</u>	6
<u>Stenonema</u>	20
<u>Stenonema</u> ( <u>Maccaffertium</u> ) <u>ithaca</u>	1
<u>S. (M.)</u> <u>terminatum</u> <u>terminatum</u>	3
Leptophlebiidae/ <u>Choroterpes</u> ( <u>hubbelli</u> )	1
<u>Habrophlebiodes</u>	1
<u>Paraleptophlebia</u>	2
Oligoneuriidae/ <u>Isonychia</u>	17
GASTROPODA:	
Pleuroceridae/ <u>Goniobasis</u>	34
HEMIPTERA:	
Corixidae nymph	1
Gerridae/ <u>Gerris</u> nymph	1
<u>Gerris</u> ( <u>Aquarius</u> ) <u>remigis</u> adult males	4
<u>Gerris</u> ( <u>Aquarius</u> ) <u>remigis</u> adult females	3
Veliidae/ <u>Rhagovelia</u> <u>obesa</u> adult male	1
LEPIDOPTERA:	
Noctuidae	1
Pyralidae/ <u>Petrophila</u>	1
MEGALOPTERA:	
Corydalidae/ <u>Corydalis</u> <u>cornutus</u>	1
<u>Nigronia</u> <u>serricornis</u>	19
ODONATA:	
Aeshnidae/ <u>Boyeria</u> <u>vinosa</u>	1
Gomphidae/ <u>Gomphus</u> (Genus A. <u>consanguis</u> ) *	5
<u>G. lividus</u>	1
<u>Hagenius</u> <u>brevistylus</u>	1
<u>Stylogomphus</u> <u>albistylus</u>	8
OSTRACODA:	1
PELECYPODA:	
Sphaeriidae/ <u>Sphaerium</u>	4

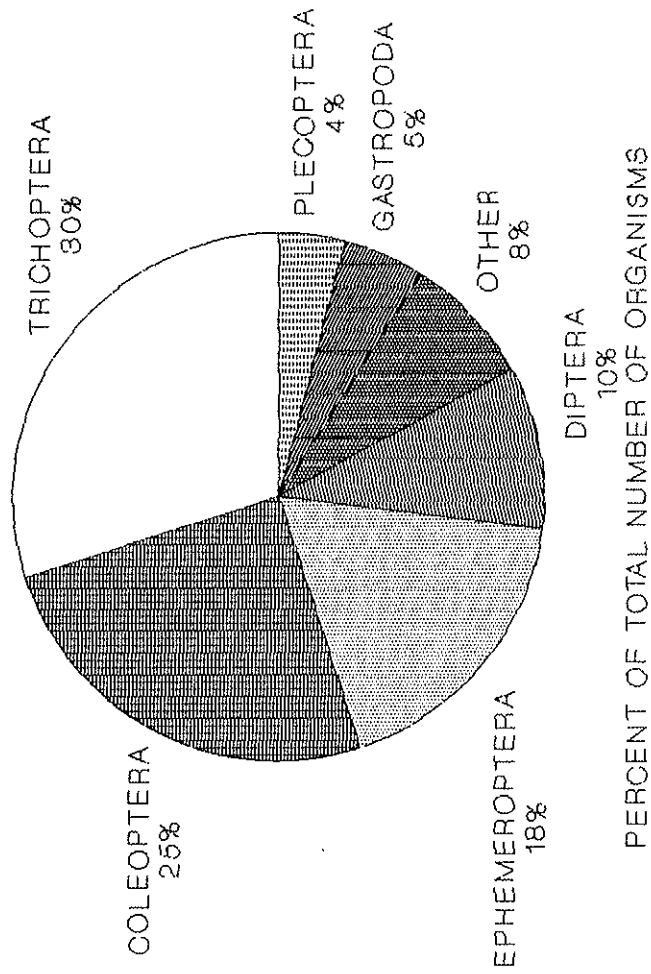
Richardson Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
PLECOPTERA:	
Capniidae	3
Peltoperlidae/ <u>Peltoperla</u>	15
Perlidae/ <u>Acroneuria</u> (early instars)	4
<u>Neoperla</u>	6
<u>Paragnetina immarginata</u>	1
<u>P. media</u>	1
TRICHOPTERA:	
Glossosomatidae/ <u>Glossosoma</u>	2
Hydropsychidae/ <u>Cheumatopsyche</u> larvae	54
<u>Cheumatopsyche</u> pupa	1
<u>Hydropsyche betteni/depravata</u>	39
<u>H. rotosa</u>	70
<u>Symphitopsyche bronta</u>	14
Limnephilidae/ <u>Goera calcarata</u>	2
<u>Neophlyax mitchelli</u>	6
<u>Pycnopsyche</u>	2
Odontoceridae/ <u>Psilotreta labida</u>	11
Philopotamidae/ <u>Chimarra</u>	3
<u>Dolophilodes distinctus</u>	6
Rhyacophilidae/ <u>Rhyacophila fuscula</u>	1
	707

\* (from Louton 1982)



RICHARDSON CREEK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

$n = 707$   
TAXA RICHNESS = 64

Figure 7.

## Mill Creek

One qualitative fishery survey was conducted in October 1990:

**Location and Length** - Tributary to the Clinch River. The sample area was located at the Highway 70 bridge at Livesay Mill and was sampled on 15 October 1990. It was 400 ft. in length and averaged 8.7 ft. in width. The site was in Hancock County. Kyles Ford Quadrangle.

**Gear Type** - The site was sampled by making one pass with a single backpack electrofishing unit operating at 120 v. AC.

**Water Quality** - Data were taken from midstream on 15 October 1990: DO - 10.4 ppm, pH - 8.4, Temperature - 56.8 F, Conductivity - 290 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey. The sample contained 662 organisms and represented 35 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Nongame Fish	1	0.4	0.02	1.0
Forage Fish	230	99.6	1.91	99.0
TOTAL	231		1.93	

**Comments** - This stream was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 231 fish weighing 1.93 lb. and comprising only six species. No game fish or darter species were found and blacknose dace (*Rhinichthys atratulus*) accounted for about 65% of the total number of fish collected. Banded sculpin (*Cottus carolinae*) were the next most abundant fish collected. This is a small spring-fed stream and the fish species present are typical of small stream habitats. It is fairly silty and has lots of domestic rubbish along the stream course.

Benthic macroinvertebrates from our sample included Baetidae, Ephemerellidae, Ephemeridae, Heptageniidae and Oligoneuriidae mayflies, Glossosomatidae, Hydropsychidae and Philopotamidae caddisflies, and Elmidae and Psephenidae beetles. Periwinkle snails (*Goniobasis*) and the Appalachian brook crayfish (*Cambarus bartonii*) were present. Both crayfish and snails were abundant. Isopods represented about 31%, trichopterans 24%, and ephemeropterans about 14% of the total number of organisms collected (Fig. 8). A total of 35 taxa was collected at this site. Of special interest is the collection of 54 specimens of undetermined *Symphitopsyche* larvae. These appeared so different that Dr. David A. Etnier (University of Tennessee) suggested that they may possibly be an undescribed species.

**Management Recommendations:**

1. This is a small stream with probably no fishing potential at all.
2. It would be interesting to follow up on the undetermined *Symphitopsyche* collected here. Collecting adults at night with light traps would be a good first step in doing this.



VIRGINIA  
TENNESSEE

Mill Creek  
Sample Area

KYLES FORD QUADRANGLE  
Tenn.-VA. - 170 SE

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Mill Creek Lat-Long 363325N - 830213W  
Watershed Clinch River Length of Sample 400 ft.  
Station (see below) Reach 06010205-  
County Hancock Date/Time 15 October 1990/1030  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 8.7 ft. Average Depth 0.3 ft. Maximum Depth 1.9 ft.
2. Estimated Percent of Stream in Pools is 20 %
3. Estimated Percent Pool Bottom is Mud - % Silt 10 % Sand 20 % Clay - %  
Gravel 20 % Rubble 30 % Boulders 20 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 20 % Clay - %  
Gravel 15 % Rubble 30 % Boulders 20 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average \_\_\_\_\_ Scarce X
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20 %  
of stream, Average in 50 %, Poor in 30 %
7. Shade or Canopy Good over 40 % of Stream.
8. Flow (CFS) 0.75 : Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy and cool; air temp. - 58°F.
10. Past Weather (last 24 hours) Partly cloudy and cool.
11. pH 8.4 Temp. 56.8°F Conductivity 290 D.O. 10.4 % Saturation 100
12. Comments: Sample area location at Hwy. 70 bridge at Livesay Mill.  
Small stream, with probably no fishing potential. Fairly silty  
with lots of rubbish along stream course.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Mill Creek  
Watershed Clinch River  
County Hancock  
Type of Sampling Electrofishing  
Gear Type One backpack @ 120 v. AC

Lat-Long 363325N - 830213W  
Date 15 October 1990  
Reach 06010205-  
Pool Elevation 1150 ft.  
Time 1400-1430

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Catostomus commersoni</i>		32	1	3	0.02			
<i>Campostoma anomalum</i>		25	17	2-4	0.14			
<i>Luxilus chrysocephalus</i>		249	8	1-5	0.10			
<i>Rhinichthys atratulus</i>		351	152	1-3	1.10			
<i>Semotilus atromaculatus</i>		360	5	2-6	0.10			
<i>Cottus carolinae</i>		40	48	1-5	0.47			

Field Notes: 400 ft. sample length. Crayfish and periwinkle snails were abundant. No game fish or darter species were collected.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

Mill Creek: Qualitative Benthic Sample

15 October 1990

Field # 261

Hancock Co., TN; Just upstream of Hwy. 70 crossing at Livesay Mill near Kyles Ford. Coordinates: 363325N - 830213W.  
 Kyles Ford, Tenn.-Va., # 170 SE Quad. Reach # 06010205-.

TAXA	NUMBER
<b>AMPHIPODA:</b>	
Gammaridae/ <u>Gammarus</u>	12
<b>ANNELIDA:</b>	
Oligochaeta	6
<b>COLEOPTERA:</b>	
Elmidae/ <u>Optioservus</u> larvae	5
<u>Optioservus ovalis</u> adults	5
<u>Promoresia elegans</u> larvae	2
<u>P. elegans</u> adults	8
<u>Stenelmis</u> larvae	2
<u>Stenelmis</u> adults	2
Psephenidae/ <u>Psephenus herricki</u>	31
<b>DECAPODA:</b>	
Cambaridae/ <u>Cambarus</u> ( <u>Cambarus</u> ) <u>bartonii</u> males 1st.	3
<u>C. (C.) bartonii</u> males 2nd.	14
<u>C. (C.) bartonii</u> females	6
<b>DIPTERA:</b>	
Chironomidae larvae	4
Chironomidae pupae	3
Simuliidae	1
Tipulidae/ <u>Tipula</u>	17
<b>EPHEMEROPTERA:</b>	
Baetidae/ <u>Baetis</u>	42
<u>Pseudocloeon</u>	2
Ephemerellidae/ <u>Ephemerella</u>	7
Ephemeridae/ <u>Ephemera</u>	1
Heptageniidae/ <u>Stenacron interpunctatum</u>	1
<u>Stenonema</u>	35
Oligoneuriidae/ <u>Isonychia</u>	7
<b>GASTROPODA:</b>	
Pleuroceridae/ <u>Goniobasis</u>	54

Mill Creek: Qualitative Benthic Sample cont.

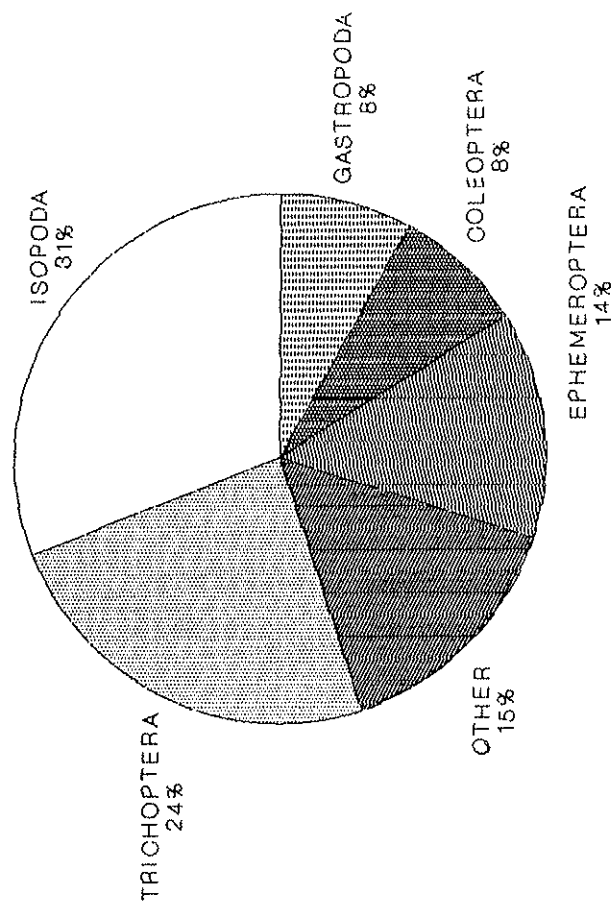
TAXA	NUMBER
HEMIPTERA:	
Veliidae/ <u>Rhagovelia obesa</u> adult males	9
<u>Rhagovelia obesa</u> adult females	8
ISOPODA:	
Asellidae/ <u>Lirceus</u>	202
MEGALOPTERA:	
Corydalidae/ <u>Nigronia serricornis</u>	4
Sialidae/ <u>Sialis</u>	1
ODONATA:	
Aeshnidae/ <u>Boyeria grafiana</u>	1
Calopterygidae/ <u>Calopteryx</u>	1
Gomphidae/ <u>Gomphus</u> (Genus A <u>consanguis</u> ) *	1
<u>Gomphus lividus</u>	1
<u>Stylogomphus albistylus</u>	4
PELECYPODA:	
Unionidae/ <u>Fusconaia barnesiana</u> relic	1
PLECOPTERA:	
Perlidae early instar	1
TRICHOPTERA:	
Glossosomatidae/ <u>Glossosoma</u>	1
Hydropsychidae/ <u>Cheumatopsyche</u>	9
<u>Diplectrona modesta</u>	8
<u>Hydropsyche betteni/depravata</u>	4
<u>Symphitopsyche bronta</u>	3
<u>Symphitopsyche</u> (undetermined) **	54
Philopotamidae/ <u>Chimarra</u>	79
	662

\* (from Louton 1982)

\*\* Possibly an undescribed species.



MILL CREEK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 662  
TAXA RICHNESS = 35

Figure 8.

## War Creek

One qualitative fishery survey was conducted in October 1990:

**Location and Length** - Tributary to the Clinch River. The sample area was located approximately 0.2 mi. downstream of Highway 70 crossing along Old Lee Valley Road near Eidson and was sampled on 15 October 1990. It was approximately 150 ft. in length and averaged 4.0 ft. in width. The site was in Hawkins County, Kyles Ford Quadrangle.

**Gear Type** - The site was sampled with a single backpack electrofishing unit operating at 120 v. AC.

**Water Quality** - No data collected.

**Benthos Collection** - No collection was made.

**Fish Collected** - (See data sheet for species list)

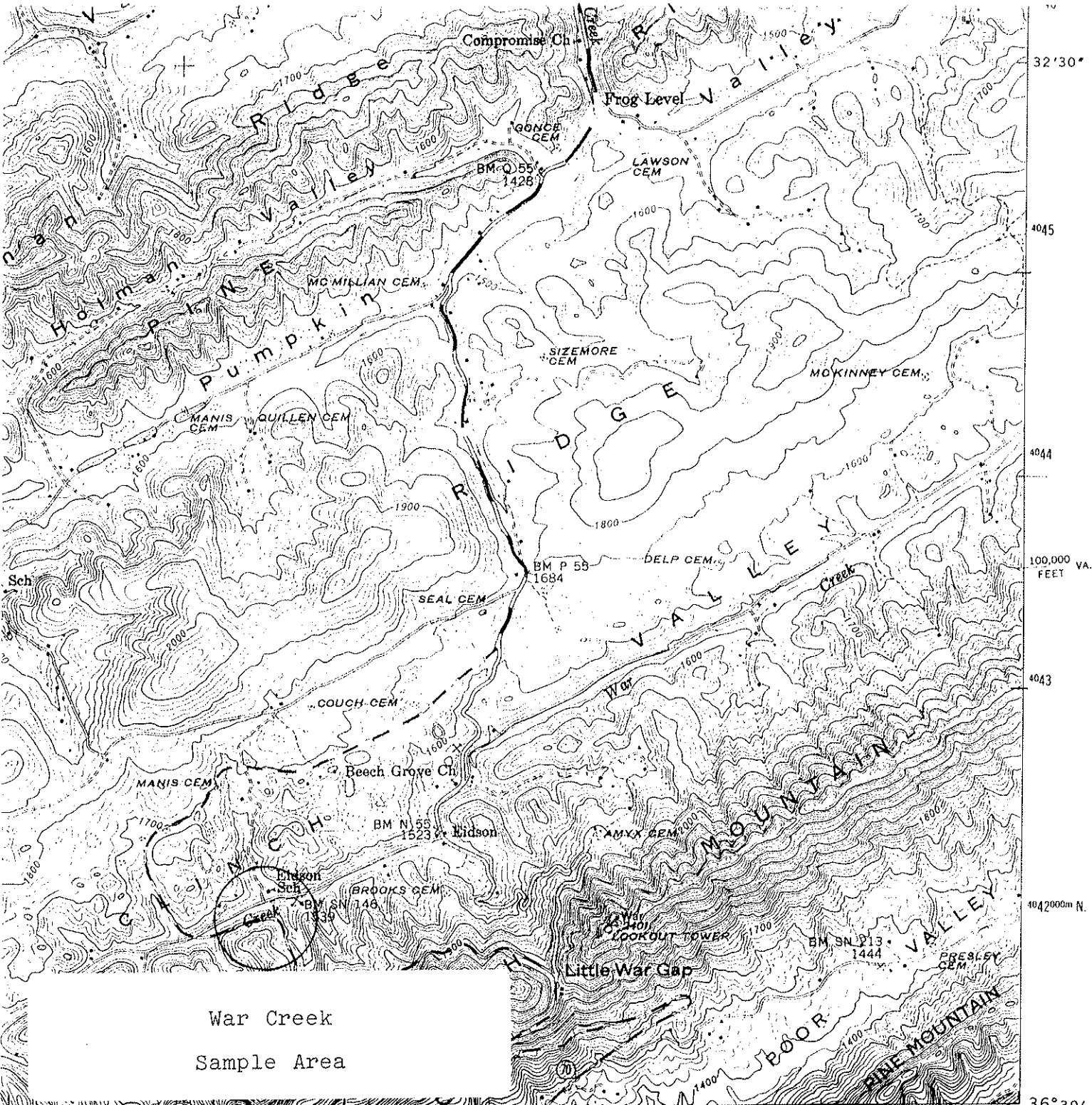
**Comments** - This stream was sampled primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted in the headwaters and emphasis was placed on the fish species present and their relative abundance.

In all, a total of seven species was collected from this site. No game species were found at all and blacknose dace (*Rhinichthys atratulus*) and striped shiners (*Luxilus chrysocephalus*) were the most abundant species present. Creek chub (*Semotilus atromaculatus*) were fairly common also. These species typify the small stream habitat from which they were collected. *Etheostoma flabellare* and *E. simoterum* were the only darters present.

At the area sampled, this is a clean little stream with gravel-rubble-boulder type substrate. No benthic sample was made but we did collect crayfish. Two species, the Appalachian brook crayfish (*Cambarus bartonii*) and *C. longirostris* were present.

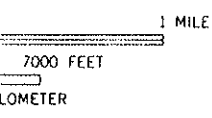
**Management Recommendations:**

1. No specific management is suggested other than protection of the watershed.
2. This appears to be an excellent quality stream in the headwaters, additional sampling (both fish and benthic) is suggested downstream near the mouth.

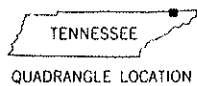


War Creek  
Sample Area

317 | 2'30" | 318 | VA. 670,000 FEET | 319 | INTERIOR-GEOLOGICAL SURVEY, WASHINGTON, D.C. - 1970 | 320000m.E. | 83°00' | 36°30'



ROGERSVILLE II MI.  
ROAD CLASSIFICATION  
 Heavy-duty ————— Light-duty - - - - -  
 Medium-duty ———— Unimproved dirt - - - - -  
 ○ State Route



KYLES FORD, TENN.-VA.  
170-SE  
1947

N3630—W8300/7.5  
PHOTOREVISED 1969  
AMS 4357 II SE—SERIES V841

242,  
NIA 22903,  
XVILLE, TENN. 37902  
REQUEST

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream War Creek Lat-Long 363030N - 830215W  
 Watershed Clinch River Date 15 October 1990  
 County Hawkins Reach 06010205 - 81,0  
 Type of Sampling Electrofishing Pool Elevation 1550 ft.  
 Gear Type One backpack shocker @ Time 1610 - 1630  
120 v. AC

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Hypentelium nigricans</i>	166	1					
<i>Luxilus chrysocephalus</i>	249	62					
<i>Rhinichthys atratulus</i>	351	71					
<i>Semotilus atromaculatus</i>	360	21					
<i>Etheostoma flabellare</i>	92	8					
<i>E. simoterum</i>	111	1					
<i>Cottus caroliniae</i>	40	6					
<i>Cambarus bartonii</i>		4					
<i>C. longirostris</i>		1					

Field Notes: Sample location was approx. 0.2 mi. downstream of hwy. 70  
crossing along Old Lee Valley Rd. near Edison. Approx. 150 ft. sample.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

## Pond Creek and Tributaries

One qualitative fishery survey was conducted on Pond Creek and three samples on three of its tributaries in October 1990:

**Location and Length** - Tributary to the Tennessee River. The sample area was located approximately 0.2 mi. upstream of the intersection of New Hope Church Road and Pond Creek Road and was sampled on 3 October 1990. It was 400 ft. in length and averaged 21.6 ft. in width. The site was in Loudon County. Two tributary sites were in Monroe County. Philadelphia Quadrangle. (See accompanying maps showing tributary sample locations).

**Gear Type** - The site was sampled using a single backpack electrofishing unit operating at 110 v. AC.

**Water Quality** - Data were taken from midstream on 3 October 1990: DO - 8.8 ppm, pH - 7.9, Temperature - 60.3 F, Conductivity - 245 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey. The sample contained 310 organisms and represented 39 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by</u>		<u>% by</u>	
		<u>No.</u>	<u>Wt.</u>	<u>Wt.</u>	<u>Wt.</u>
Spotted bass	1	0.5	0.21	3.5	
Rock bass	3	1.4	0.23	3.8	
Redbreast sunfish	9	4.1	0.38	6.3	
Green sunfish	6	2.7	0.12	2.0	
Bluegill	11	5.0	0.13	2.2	
Hybrid sunfish	8	3.7	0.06	1.0	
Nongame Fish	18	8.2	3.76	62.5	
Forage Fish	163	74.4	1.13	18.8	
TOTAL	219		6.02		

(See accompanying data sheets for fish species collected from tributaries)

**Comments** - We sampled one site on Pond Creek proper and three sites on its tributaries primarily to develop a fish species list and to collect stream data for TADS. We were also interested in checking on the

status of the flame chub (*Hemitemia flammea*) reported from this portion of the stream in the early 1970's (TVA Regional Natural Heritage Project data). The Agency has made no previous studies or fish collections from this stream.

A total of 219 fish weighing 6.02 lb. and comprising 17 species was collected from the main stream sample site. Four native game species, spotted bass (*Micropterus punctulatus*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), and bluegill (*L. macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were collected. Only one spotted bass, three small rock bass, and small green sunfish and bluegills were collected and the redbreast sunfish was the only game fish found in any size or numbers. They made up 4% by number and about 6% by weight of all fish collected. Twelve nongame and forage species were also collected and these comprised about 82% of the total number and 81% of the total weight. Forage species made up about 74% of all fish collected and were represented by fairly tolerant forms. The greenside darter (*Etheostoma blennioides*) and the snubnose (*E. simoterum*) were the only darter species collected.

No flame chubs were found in our Pond Creek sample, however, we did collect them from the spring tributary sites. The flame chub is a species associated with clear, cold springs and spring-fed streams and is a species of special concern and deemed in need of management by the Tennessee Heritage Program and TWRA (Starnes and Etnier 1980). There are several of these large springs and spring runs on Pond Creek and the three sites we sampled all had flame chubs present. In one spring-fed stream (Tributary Number 2) we collected no less than 77 specimens. Also, a stream that originates at Richardson Spring and flows into Pond Creek has recently been used as the study site for life history research of this species (Sossamon 1990). Blacknose dace (*Rhinichthys atratulus*) was the only other species collected in the tributary samples but not in the main stream sample. This made a total of 19 fish species collected.

Pond Creek is a low gradient stream that is fairly wide and shallow. It is heavily impacted by agricultural activities, mainly dairy farms, along the entire watershed. The stream has open and eroding banks and is very silty and dingy. The fish species present were typical components of polluted conditions and no intolerant forms were collected. The presence of several hybrid sunfish may also attest to a stressed

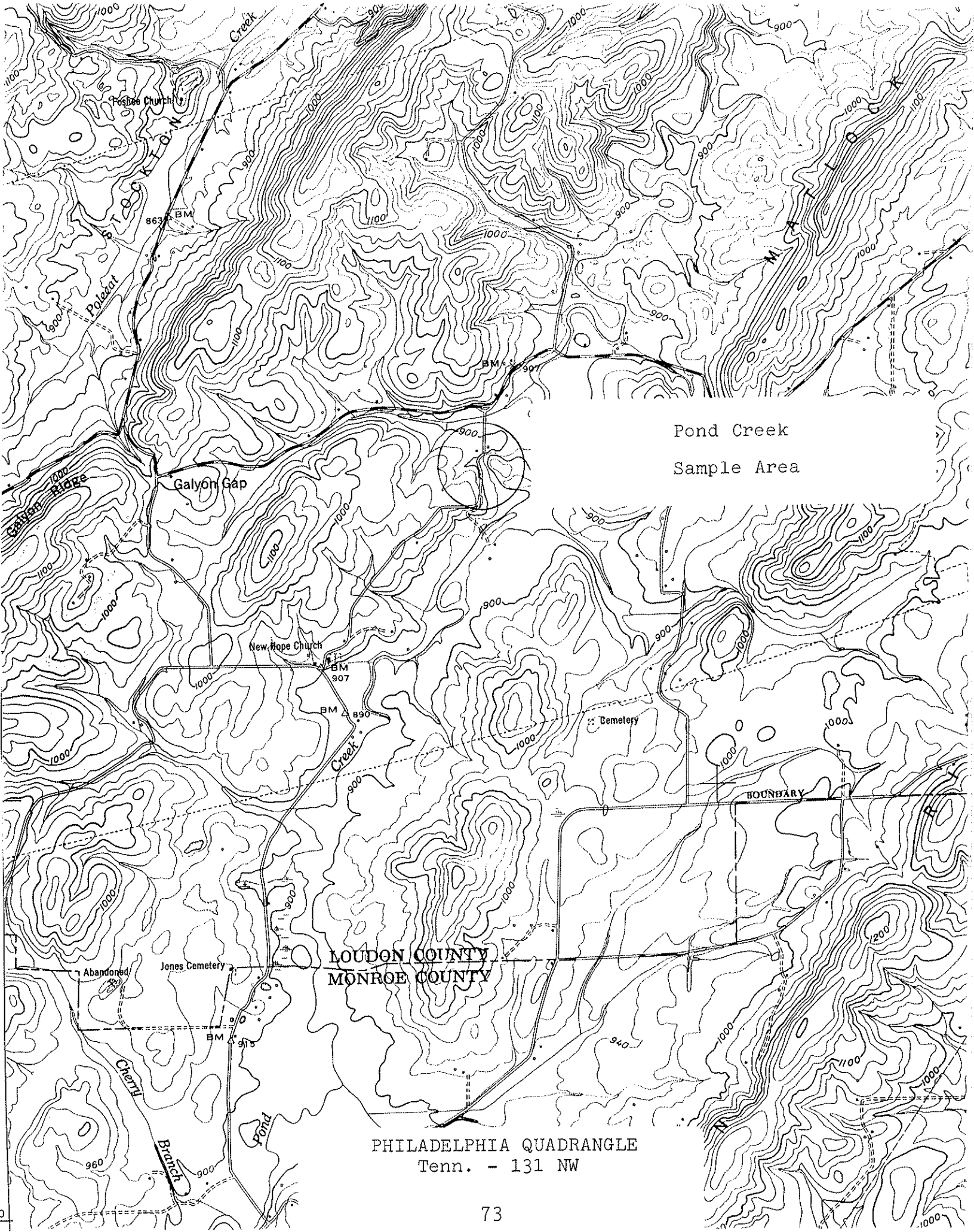
enviornment.

Benthic macroinvertebrates from our sample included Baetidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, Brachycentridae and Hydropsychidae caddisflies, and Elmidae, Dytiscidae, Gyrinidae, Helodidae and Hydrophilidae beetles. No plecopterans were collected at all. Limpets (*Ferrissia*) and *Physa* snails were the only gastropods found and only a single Asian clam (*Corbicula fluminea*) was collected. Two species of crayfish, *Cambarus longirostris* and *Orconectes erichsonianus* were present. Trichopterans represented about 30%, dipterans 24%, ephemeropterans 14%, and odonates about 12% of the total number of organisms collected (Fig. 9). A total of 39 taxa was collected at this site, but most were tolerant forms.

**Management Recommendations:**

1. The main stream is being adversely impacted by non-point pollution from agricultural sources and no management other than trying to reduce this pollution can be suggested at this time.
2. Protection of the spring habitats in this watershed where *Hemitremia* populations are found should be of first importance as their restricted habitats are vulnerable to modification or destruction.





Pond Creek  
Sample Area

LOUDON COUNTY  
MONROE COUNTY

PHILADELPHIA QUADRANGLE  
Tenn. - 131 NW

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Pond Creek Lat-Long 354057N - 842817W  
Watershed Tennessee River Length of Sample 400 ft.  
Station (See comments) Reach 06010201-13,1  
County Loudon Date/Time 3 October 1990/1030  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 21.6 ft. Average Depth 0.5 ft. Maximum Depth 2.1 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud 20 % Silt 20 % Sand 20 % Clay - %  
Gravel 20 % Rubble 20 % Boulders - % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud 5 % Silt 20 % Sand 20 % Clay - %  
Gravel 30 % Rubble 20 % Boulders 5 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
*Salix nigra*  
Average X *Dianthera americana* Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20 %  
of stream, Average in 40 %, Poor in 40 %
7. Shade or Canopy Good over 20 % of Stream.
8. Flow (CFS) 12.9: Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy and mild; air temp. - 70° F.
10. Past Weather (last 24 hours) Partly cloud and cool overnight.
11. pH 7.9 Temp. 60.3° F Conductivity 245 D.O. 8.8 % Saturation 90
12. Comments: Sample location was approx. 0.2 mi. upstream of the inter-  
section of New Hope Church Rd. and Pond Creek Rd. The stream is  
heavily impacted by agricultural practices (mainly dairy farms)  
along the entire watershed. The stream has open and eroding banks  
and is very silty and dingy. Cattle in stream, etc.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Pond Creek Lat-Long 354057N - 842817W  
 Watershed Tennessee River Date 3 October 1990  
 County Loudon Reach 06010201-13,1  
 Type of Sampling Electrofishing Pool Elevation 875 ft.  
 Gear Type One backpack shocker @ Time 1340 - 1430  
120 v. AC

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus punctulatus</i>		219	1	7	0.21			
<i>Ambloplites rupestris</i>		13	1	3	0.02			
"	"	"	2	5	0.21			
<i>Lepomis auritus</i>		201	1	1	0.01			
"	"	"	2	2	0.03			
"	"	"	3	3	0.07			
"	"	"	2	4	0.14			
"	"	"	1	6	0.13			
<i>L. cyanellus</i>		202	5	2	0.08			
"	"	"	1	3	0.04			
<i>L. macrochirus</i>		206	3	1	0.01			
"	"	"	6	2	0.06			
"	"	"	2	3	0.06			
* Hybrid sunfish			1	1	t			
"	"		7	2	0.06			
<i>Dorosoma cepedianum</i>		48	2	9	0.60			
<i>Aplodinotus grunniens</i>		20	1	12	0.86			
<i>Hypentelium nigricans</i>		166	13	3-11	1.18			
<i>Minytrema melanops</i>		221	1	13	0.86			
<i>Moxostoma erythrurum</i>		230	1	8	0.26			
<i>Campostoma anomalum</i>		25	64	2-5	0.82			
<i>Luxilus coccogenis</i>		248	1	3	0.02			
<i>Hybopsis amblops</i>		155	11	1-2	0.05			
Continued on next page								

\* Bluegill x Redbreast and Green x redbreast sunfish hybrids.

Field Notes: 400 ft. sample length.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Pond Creek Lat-Long 354057N - 842817W  
 Watershed Tennessee River Date 3 October 1990  
 County Loudon Reach 06010201-13,1  
 Type of Sampling Electrofishing Pool Elevation 875 ft.  
 Gear Type One backpack shocker @ Time 1340 -1430  
120 v. AC

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Etheostoma blennioides</i>	81	5	2-3	0.04			
<i>E. simoterum</i>	111	11	1-2	0.04			
<i>Gambusia affinis</i>	147	51	1	0.03			
<i>Cottus carolinae</i>	40	20	1-3	0.13			

Field Notes: 400 ft. sample length.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

Pond Creek: Qualitative Benthic Sample

3 October 1990

Field # 254

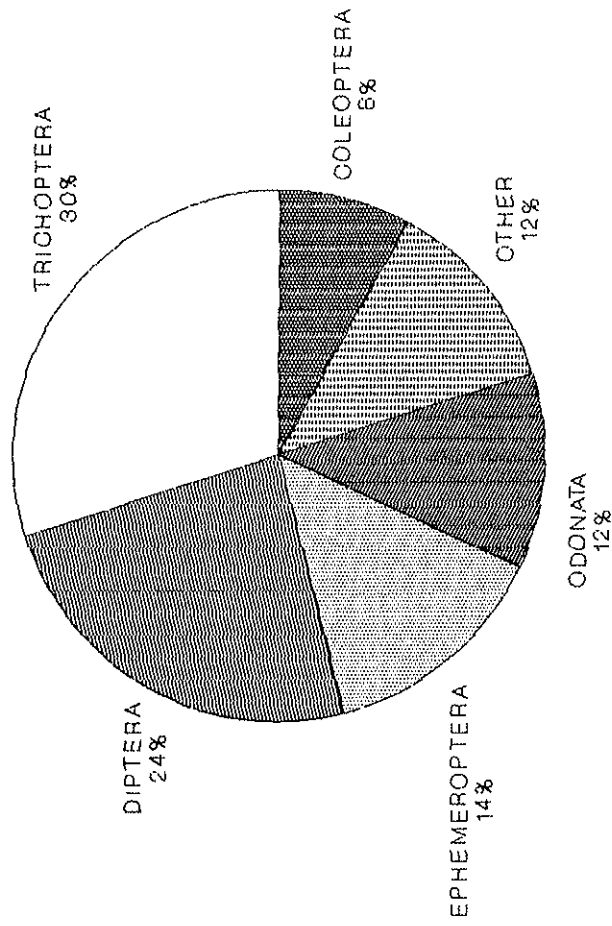
Loudon Co., TN; Approx. 0.2 mi. upstream of intersection of  
 New Hope Church Rd. and Pond Cr. Rd. Coordinates: 354057N -  
 842817W. Philadelphia, Tenn., # 131 NW Quad. Reach #  
 06010201-13,1.

TAXA	NUMBER
ANNELEIDA:	
Oligochaeta	1
COLEOPTERA:	
Elmidae/ <u>Dubiraphia</u> adults	13
<u>Macronychus glabratus</u> larva	1
<u>Macronychus glabratus</u> adult	1
<u>Stenelmis</u> larvae	3
<u>Stenelmis</u> adult	1
Dytiscidae/ <u>Hydroporus</u> adults	3
Gyrinidae/ <u>Gyrinus</u> larva	1
Helodidae/ <u>Cyphon</u>	1
Hydrophilidae/ <u>Tropisternus blatchleyi blatchleyi</u>	1
DECAPODA:	
Cambaridae/ <u>Cambarus (Hiaticambarus) longirostris</u>	
male 2nd.	1
<u>C. (H.) longirostris</u> juvenile males	3
<u>C. (H.) longirostris</u> juvenile females	4
<u>Orconectes erichsonianus</u> male 1st.	1
<u>O. erichsonianus</u> females	2
DIPTERA:	
Chironomidae larvae	42
Chironomidae pupae	2
Simuliidae larvae	21
Simuliidae pupae	5
Tabanidae/ <u>Chrysops</u>	2
Tipulidae/ <u>Tipula</u>	3
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	31
Ephemeridae/ <u>Hexagenia</u>	1
Heptageniidae/ <u>Stenacron interpunctatum</u>	2
<u>Stenonema</u>	4
<u>Stenonema mediopunctatum</u>	1
Oligoneuriidae/ <u>Isonychia</u>	6

Pond Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
<b>GASTROPODA:</b>	
Ancylidae/ <u>Ferrissia</u>	5
Physidae/ <u>Physa</u>	4
<b>HEMIPTERA:</b>	
Belostomatidae/ <u>Belostoma flumineum</u>	1
Corixidae/ <u>Trichocorixa</u> adults	2
Unid. nymph and adults	3
Veliidae/ <u>Rhagovelia obesa</u>	1
<b>ISOPODA:</b>	
Asellidae/ <u>Lirceus</u>	1
<b>MEGALOPTERA:</b>	
Sialidae/ <u>Sialis</u>	3
<b>ODONATA:</b>	
Aeshnidae/ <u>Basiaesha janata</u>	1
<u>Boyeria vinosa</u>	7
Calopterygidae/ <u>Calopteryx</u>	19
<u>Hetaerina americana</u>	8
Coenagrionidae/ <u>Argia</u>	1
<u>Enallagma</u>	1
Gomphidae/ <u>Gomphus</u>	1
<b>PELECYPODA:</b>	
Corbiculidae/ <u>Corbicula fluminea</u>	1
<b>TRICHOPTERA:</b>	
Brachycentridae/ <u>Brachycentrus</u>	32
Hydropsychidae/ <u>Cheumatopsyche</u>	22
<u>Hydropsyche</u>	4
<u>Hydropsyche betteni/depravata</u>	35
<u>Symphitopsyche cheilonis</u>	1
	310

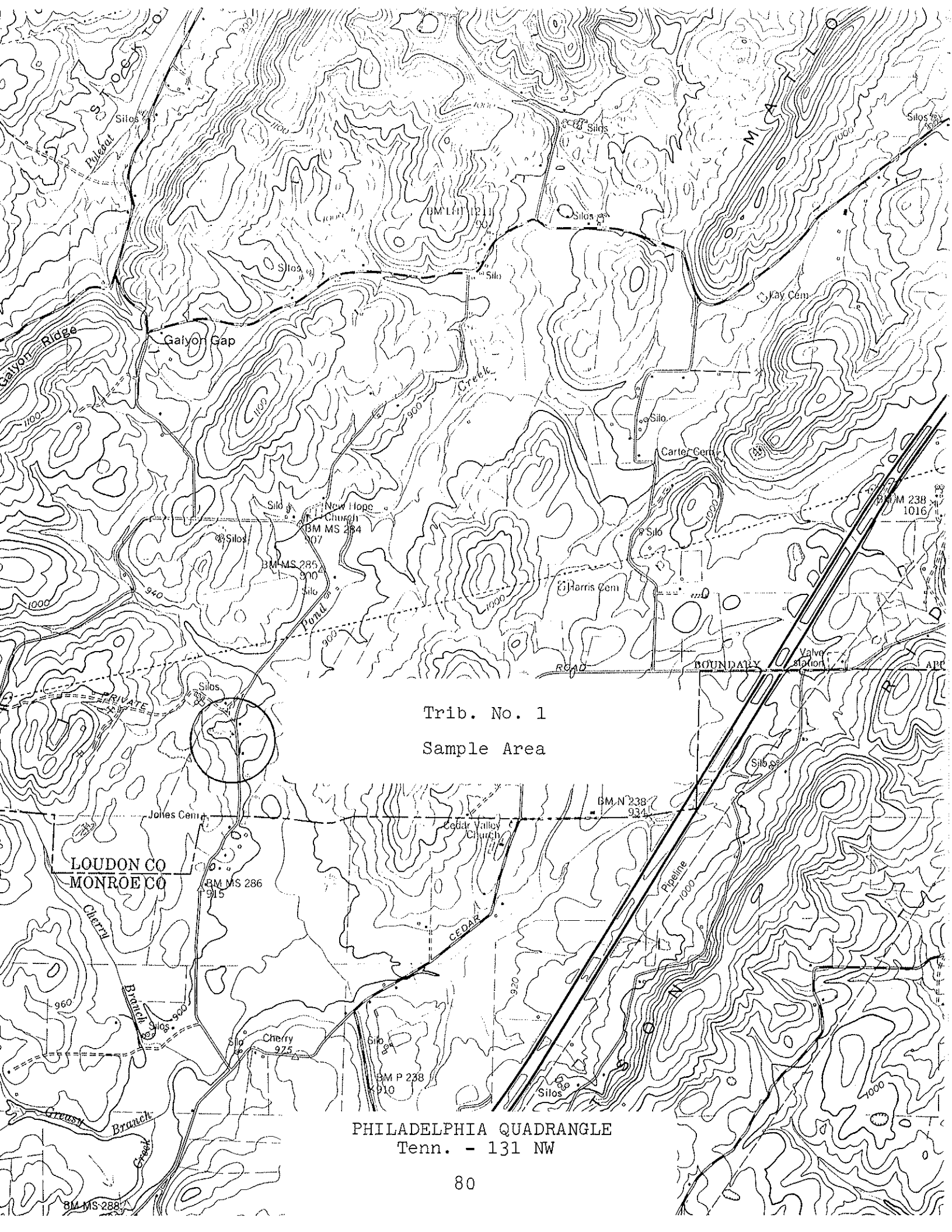
POND CREEK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 310  
TAXA RICHNESS = 39

Figure 9.



Trib. No. 1  
Sample Area

LOUDON CO  
MONROE CO

PHILADELPHIA QUADRANGLE  
Tenn. - 131 NW



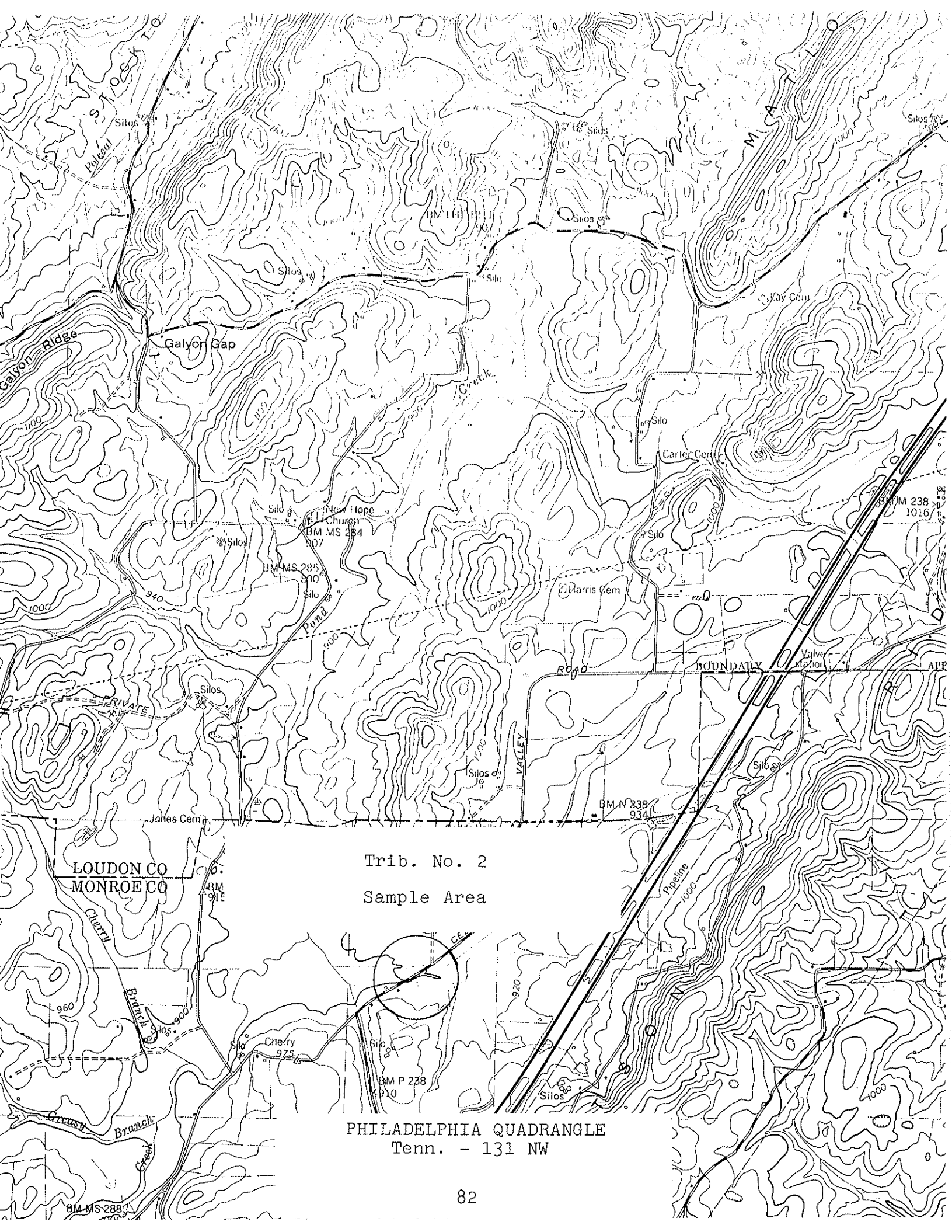
TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Spring Trib. to Pond Creek Lat-Long 353950N - 842905W  
 Watershed Tennessee River Date 3 October 1990  
 County Loudon Reach 06010201-  
 Type of Sampling Electrofishing Pool Elevation 898 ft.  
 Gear Type Backpack shocker Time PM sampling

SPECIES		CODE	NUMBER	LENGTH	WT.			
Name								
<i>Hemitremia flammea</i>		148	11	1-2	0.04			

Field Notes: Sample location was at spring area approx. 0.3 mi. North of the Monroe-Loudon Counties line on the New Hope Chruch Road.  
 Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525



LOUDON CO  
MONROE CO

Trib. No. 2  
Sample Area

PHILADELPHIA QUADRANGLE  
Tenn. - 131 NW

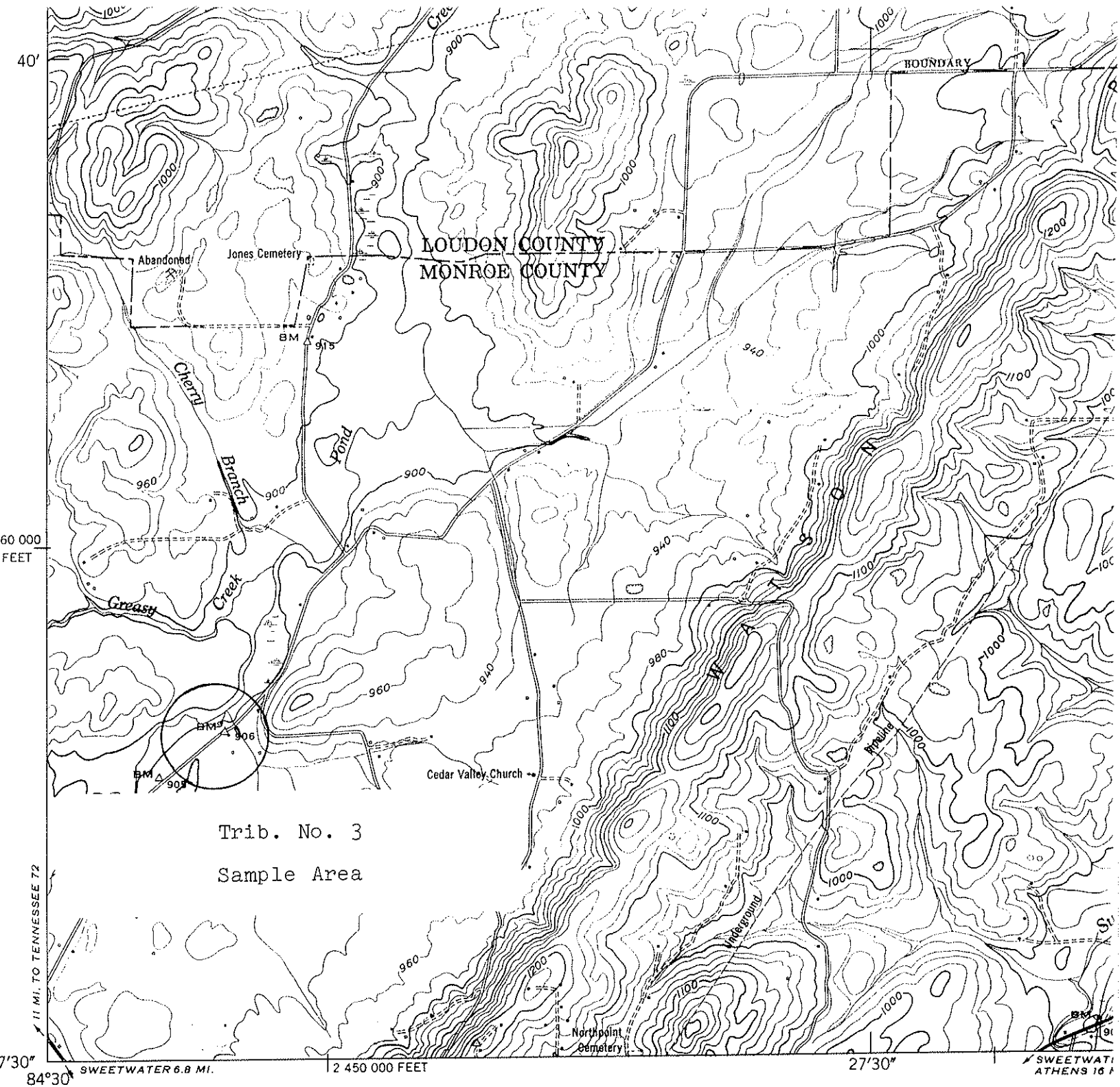
TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Spring Trib. to Pond Creek Lat-Long 353903N - 842826W  
 Watershed Tennessee River Date 3 October 1990  
 County Monroe Reach 06010201-  
 Type of Sampling Electrofishing Pool Elevation 900 ft.  
 Gear Type Backpack shocker Time PM sampling

SPECIES		CODE	NUMBER	LENGTH	WT.			
Name								
<i>Lepomis cyanellus</i>		202	2	2	0.02			
"	"	"	3	3	0.08			
<i>L. macrochirus</i>		206	7	2	0.07			
"	"	"	2	3	0.04			
"	"	"	1	4	0.05			
<i>Campostoma anomalum</i>		25	3	2-4	0.06			
<i>Hemitremia flammea</i>		148	77	1-2	0.22			
<i>Hybopsis amblops</i>		155	1	2	0.01			
<i>Rhinichthys atratulus</i>		351	2	2-3	0.02			
<i>Etheostoma simoterum</i>		111	1	2	t			
<i>Gambusia affinis</i>		147	16	1	0.01			
<i>Cottus caroliniae</i>		40	10	1-2	0.22			

Field Notes: Sample location was approx. 0.7 mi. Southwest of the Monroe-Loudon Counties line along Cedar Valley Road.

Name of Collector(s): Rick D. Bivens and Carl E. Williams



Mapped and edited by Tennessee Valley Authority  
Published by the Geological Survey

Control by USC&GS, USGS, and TVA

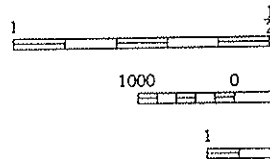
Complete field revision by TVA 1952, using aerial photographs taken 1952 and by reference to TVA-USGS quadrangle dated 1940. Original map compiled by multiplex methods from aerial photographs taken 1939

Polyconic projection. 1927 North American datum  
10,000-foot grid based on Tennessee rectangular coordinate system

----- Indicates Watts Bar Lake Easement Boundary

PHILADELPHIA QUADRANGLE  
Tenn. - 131 NW

TRUE NORTH  
MAGNETIC NORTH



THIS  
FOR SALE  
TENN  
U. S. TENNESSE  
A FOLDER DESC

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Spring Trib. to Pond Creek Lat-Long 353821N - 842928W  
 Watershed Tennessee River Date 3 October 1990  
 County Monroe Reach 06010201-  
 Type of Sampling Electrofishing Pool Elevation 900 ft.  
 Gear Type Backpack shocker Time PM sampling

Name	SPECIES CODE	NUMBER	LENGTH	WT.			
<i>Hemitremia flammea</i>	148	16	1-2	0.05			

Field Notes: Sample location was spring area approx. 0.3 mi. upstream of the mouth of Greasy Branch.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

## Turkey Creek

Two qualitative fishery surveys were conducted in October 1990:

**Location and Length** - Tributary to the Tennessee River (Fort Loudoun Reservoir). Sample area 1 was located just upstream of the intersection of Highway 11 and Concord Road. It was 400 ft. in length and averaged 15.0 ft. in width. Sample area 2 was located both upstream and downstream of Lovell Road crossing and up the Blue Springs tributary. Sample area length and width measurements were not taken at Site 2. Both sites were sampled on 9 October 1990 and were in Knox County. Lovell Quadrangle.

**Gear Type** - Both sites were sampled using a single backpack electrofishing unit operating at 120 v. AC.

**Water Quality** - Data were taken from midstream at Site 1 only on 9 October 1990: DO - 9.3 ppm, pH - 7.9, Temperature - 64.4 F, Conductivity - 325 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey at Site 1 only. The sample contained 244 organisms and represented 26 taxa.

### Fish Collected:

<u>Species</u>	<u>Site 1</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Smallmouth bass	2	0.6	0.05	0.6
Largemouth bass	7	2.2	0.43	4.8
Green sunfish	58	18.4	0.99	11.0
Bluegill	25	8.0	0.12	1.3
Nongame Fish	50	15.9	4.98	55.6
Forage Fish	172	54.7	2.39	26.7
TOTAL	314		8.96	

## Site 2

<u>Species</u>	<u>No.</u>	<u>% by No.</u>
Green sunfish	1	3.1
Redbreast sunfish	1	3.1
Nongame Fish	6	18.8
Forage Fish	24	75.0
TOTAL	32	

**Comments** - This stream was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. It heads up from several spring sources and prior to the accelerated development of west Knox County, it probably had good to excellent water quality. Even a decade ago it supported a fairly diverse benthic macroinvertebrate population (R. D. Bivens, personal observation). Since the early 1980's the stream has been severely impacted by urbanization of the Farragut area and from truck stops at the I-40/I-75 - Lovell Road interchange. It has received considerable siltation from construction (shopping centers and housing developments) and fuel and chemical spills at the I-40/I-75 locality are not uncommon occurrences. We surveyed two sites primarily to document stream conditions at the present time.

We collected a total of 314 fish weighing 8.96 lb. and comprising 13 species from Site 1. Four native game species, smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), green sunfish (*Lepomis cyanellus*), and bluegill (*L. macrochirus*) were present. Only largemouth bass and green sunfish were collected in any numbers or size (Fig. 10). Although several bluegill were collected, they were all small and only two small smallmouth bass were found. Largemouth bass made up about 2% by number and 5% by weight while green sunfish comprised about 18% by number and 11% by weight of all fish collected. Nine nongame and forage species were also collected and these made up about 71% of the total number and 82% of the total weight. Forage species comprised about 55% of all fish collected and were represented by mostly tolerant forms. The only interesting occurrence was a single specimen of the flame chub (*Hemitremia flammea*). This species occurs exclusively in springs and spring runs from the vicinity of Knoxville southward (Etnier and Starnes in press) and is considered in need of management in Tennessee (Starnes and Etnier 1980). The flame chub was collected from this stream at an upstream site

near Lovell Road in 1963 (University of Tennessee Cat. No. 44.562). That collection was of a single specimen also (TVA Regional Natural Heritage Project data). The snubnose darter (*Etheostoma simoterum*) was the only darter species present and only two specimens were collected. Stonerollers (*Campostoma anomalum*), blacknose dace (*Rhinichthys atratulus*), and banded sculpin (*Cottus carolinae*) were the most abundant forage species. White suckers (*Catostomus commersoni*) were also abundant and accounted for almost 56% of the total weight.

At Site 2 we randomly electrofished a large area both upstream and downstream of the Lovell Road crossing and up the Blue Spring tributary. We collected a total of only 32 fish that comprised seven species here. Only two game species, green sunfish and redbreast sunfish (*Lepomis auritus*), were collected at this site, and they were represented by single specimens each. Except for redbreast sunfish, all other species collected here were also collected at the downstream site. This is the general area where the 1963 record of *Hemitremia flammea* is from, however, we did not find it this time. It is also the area where siltation and fuel spills have impacted the stream the most. There were places where we could not wade the stream because the mud was too deep. Also, the substrate released a strong petroleum smell whenever it was disturbed by wading.

Benthic macroinvertebrates were collected at the downstream site only. Included in this sample was baetid mayflies, hydropterygids caddisflies, and elmids beetles. No plecopterans were collected at all. Snails included *Physa* and periwinkles (*Goniobasis*). Two crayfish species, *Cambarus longirostris* and *Orconectes erichsonianus* were collected. Mollusks represented about 21%, oligochaets 17%, hemipterans 14%, and odonates and trichopteranans each about 13% of the total number of organisms collected (Fig. 11). A total of only 26 taxa was collected at this site, most of which were tolerant forms.

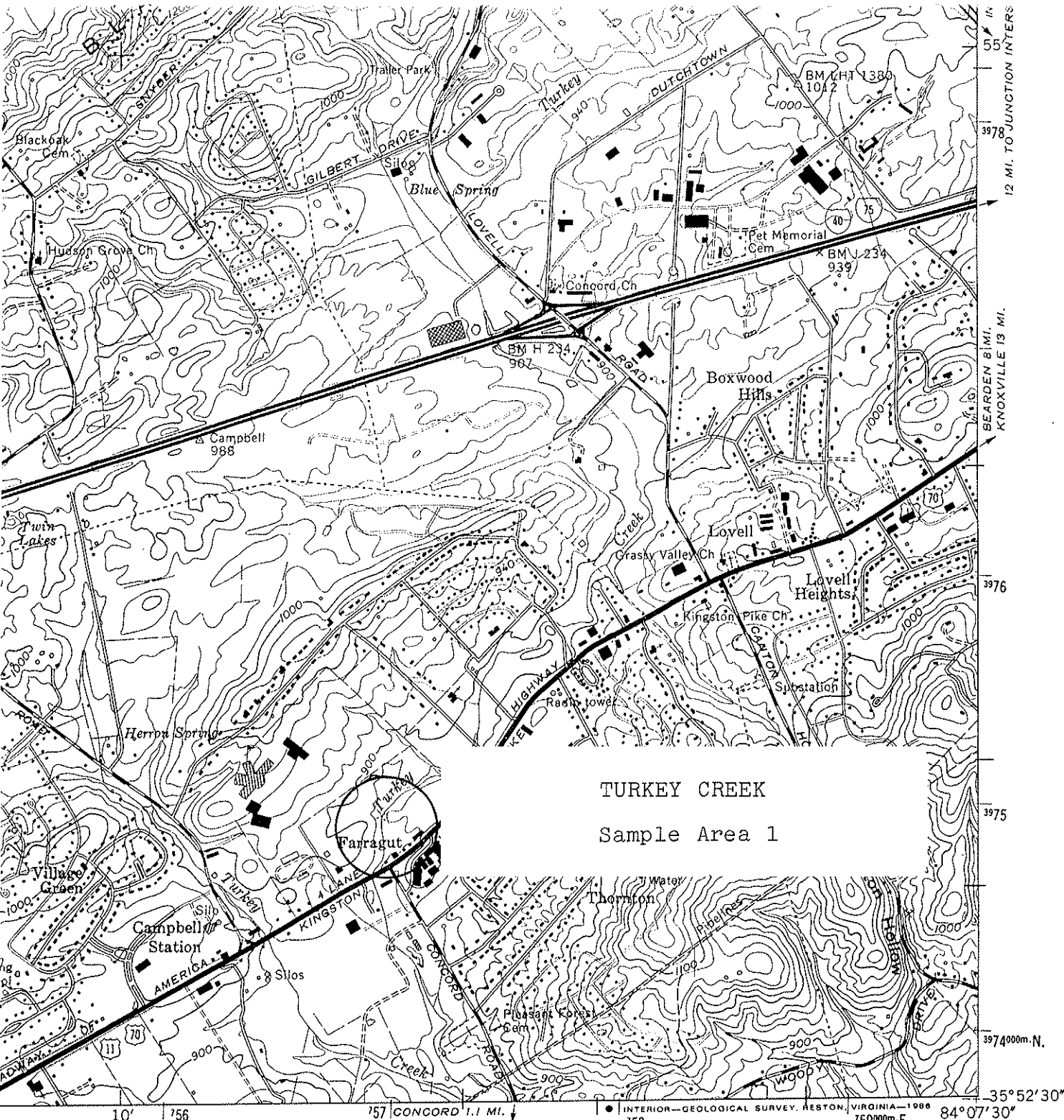
Both fish and macroinvertebrate populations had low total numbers, low species diversities, and were comprised primarily of tolerant forms. The stream is still being adversely impacted from the various sources of pollution as stated above.

#### **Management Recommendations:**

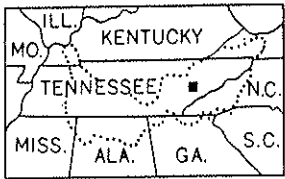
1. No specific management, other than trying to reduce pollution, can be suggested at this time.



2. As flame chubs apparently still survive in this stream, (although the population is probably very low), it warrants an extra measure of protection. The flame chub has been listed of special concern by the Tennessee Heritage Program and deemed in need of management by TWRA (Starnes and Etnier 1980).



TURKEY CREEK  
Sample Area 1



QUADRANGLE LOCATION

There may be private inholdings within the boundaries of the National or State reservations shown on this map

ROAD CLASSIFICATION

- Primary highway, all weather, hard surface
- Light-duty road, all weather, improved surface
- Secondary highway, all weather, hard surface
- Unimproved road, fair or dry weather
- Interstate Route
- U. S. Route
- State Route

LOVELL, TENN.  
35084-H2-TF-024

1968  
PHOTOREVISED 1980  
DMA 4155 | NW-SERIES V841

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Turkey Creek Lat-Long 355241 - 840914W  
Watershed Tennessee River Length of Sample 400 ft.  
Station Site # 1 Reach 06010201-95,0  
County Knox Date/Time 9 October 1990/1045  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 15.0 ft Average Depth 0.5 ft. Maximum Depth 2.1 ft.
2. Estimated Percent of Stream in Pools is 25 %
3. Estimated Percent Pool Bottom is Mud 5 % Silt 15 % Sand 20 % Clay 5 %  
Gravel 20 % Rubble 30 % Boulders 5 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 20 % Clay - %  
Gravel 20 % Rubble 40 % Boulders 10 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average X Water willow, moss,  
and water cress \_\_\_\_\_ Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20 %  
of stream, Average in 40 %, Poor in 40 %
7. Shade or Canopy Good over 10 % of Stream.
8. Flow (CFS) 4.1 : Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy and warm; air temp. - 80°F.
10. Past Weather (last 24 hours) Same with some rainfall earlier.
11. pH 7.9 Temp. 64.4°F Conductivity 325 D.O. 9.3 % Saturation 99
12. Comments: Sample location upstream of intersection of Hwy. 11 and  
Concord Road. The stream was slightly high due to recent rain.  
The stream receives considerable run-off from urban areas,  
construction, and from truck stops at I-40/75.

FISH FIELD DATA FORM

Site #1 - Upstream of Hwy.  
11 and Concord  
Road.

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Turkey Creek Lat-Long 355241N - 840914W  
 Watershed Tennessee River Date 9 October 1990  
 County Knox Reach 06010201 - 95,0  
 Type of Sampling Electrofishing Pool Elevation 875 ft.  
 Gear Type One backpack shocker @ Time 1345 - 1445  
120 v. AC

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Micropterus dolomieu</i>	218	2	3	0.05			
<i>M. salmoides</i>	220	1	2	0.01			
" "	"	3	3	0.06			
" "	"	2	4	0.09			
" "	"	1	8	0.27			
<i>Lepomis cyanellus</i>	202	4	1	0.02			
" "	"	41	2	0.47			
" "	"	8	3	0.20			
" "	"	4	4	0.22			
" "	"	1	5	0.08			
<i>L. macrochirus</i>	206	21	1	0.09			
" "	"	4	2	0.03			
<i>Catostomus commersoni</i>	32	50	3-13	4.98			
<i>Campostoma anomalum</i>	25	57	1-6	1.08			
<i>Hemitremia flammea</i>	148	1	2	t			
<i>Pimephales promelas</i>	335	1	1	t			
<i>Rhinichthys atratulus</i>	351	49	1-3	0.46			
<i>Semotilus atromaculatus</i>	360	6	1-5	0.20			
<i>Gambusia affinis</i>	147	3	1	t			
<i>Cottus carolinae</i>	40	53	1-4	0.64			
<i>Etheostoma simoterum</i>	111	2	1-2	0.01			

Field Notes: 400 ft. sample length. Stream was slightly dingy.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

GAME FISH FROM TURKEY CREEK  
SITE 1  
INCH CLASS DISTRIBUTION

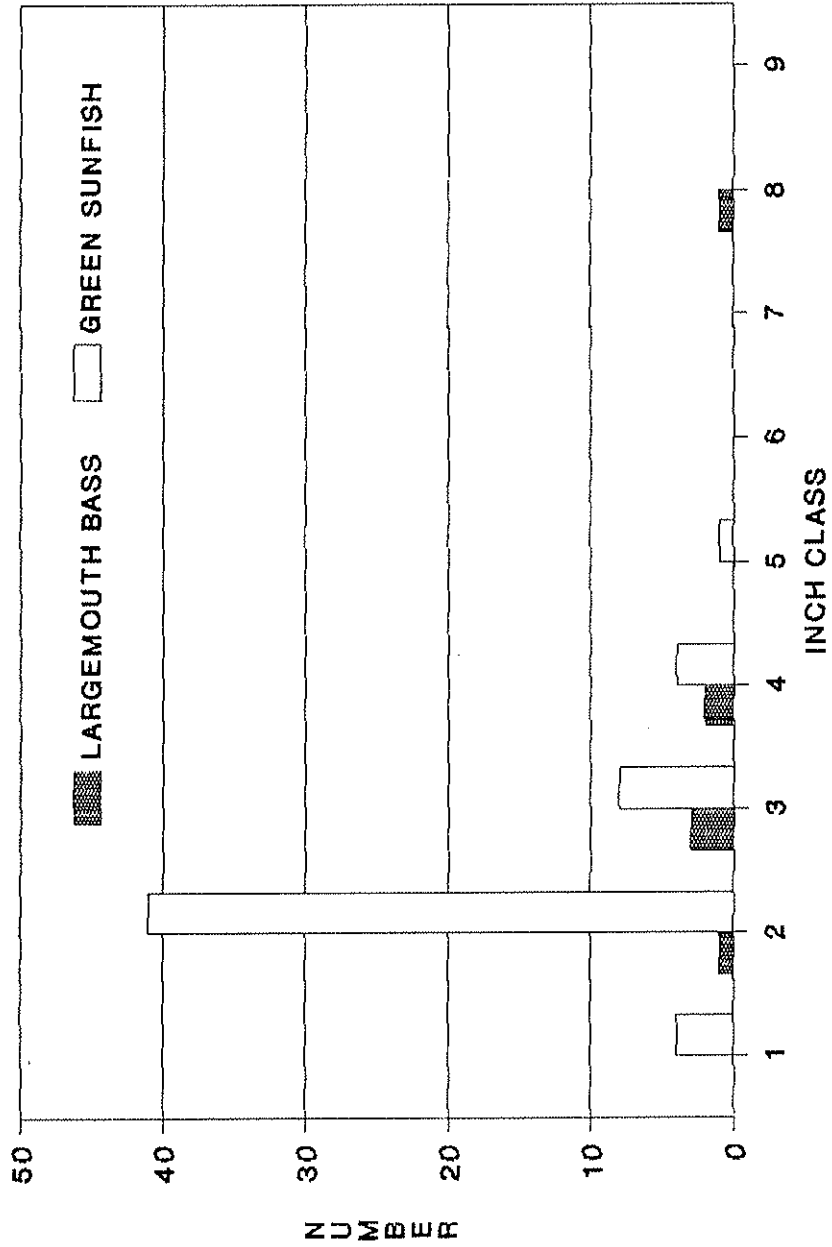


Figure 10.

Turkey Creek: Site # 1, Qualitative Benthic Sample

9 October 1990

Field # 258

Knox Co., TN; Upstream of intersection of Hwy. 11 and Concord Rd. at shopping center. Coordinates: 355241N - 840914W. Lovell, Tenn., # 138 NW Quad. Reach # 06010201-95,0.

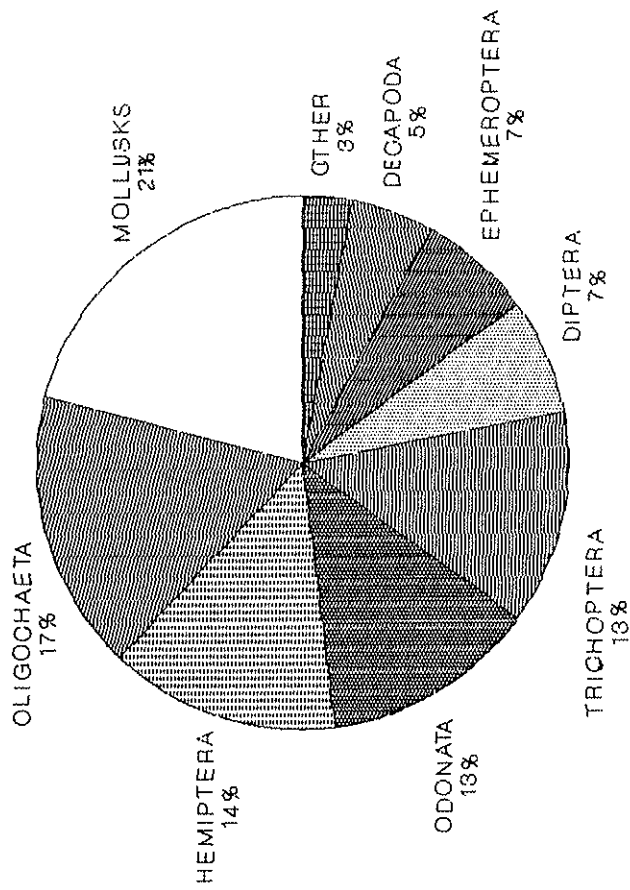
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TAXA	NUMBER
ANNLEDIA:	
Oligochaeta	41
COLEOPTERA:	
Elmidae/Optioservus larva	1
<u>Stenelmis</u> adult	1
DECAPODA:	
Cambaridae/ <u>Cambarus</u> ( <u>Hiaticambarus</u> ) <u>longirostris</u>	
male 1st.	1
<u>C.</u> ( <u>H.</u> ) <u>longirostris</u> males 2nd.	2
<u>C.</u> ( <u>H.</u> ) <u>longirostris</u> females	3
<u>Orconectes</u> <u>erichsonianus</u> male 1st.	1
<u>O.</u> <u>erichsonianus</u> males 2nd.	2
<u>O.</u> <u>erichsonianus</u> females	4
DIPTERA:	
Chironomidae larvae	13
Chironomidae pupa	1
Simuliidae	1
Tipulidae/ <u>Antocha</u>	1
<u>Tipula</u>	1
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	17
GASTROPODA:	
Physidae/ <u>Physa</u>	2
Pleuroceridae/ <u>Goniobasis</u>	48
HEMIPTERA:	
Belostomatidae/ <u>Belostoma</u> <u>flumineum</u>	2
Gerridae/ <u>Gerris</u> nymphs	3
<u>Gerris</u> ( <u>Aquarius</u> ) <u>remigis</u> adults	9
Nepidae/ <u>Ranatra</u> <u>fusca</u>	1
Veliidae/ <u>Microvelia</u> nymph	1
<u>Rhagovelia</u> <u>obesa</u> nymph	1
<u>Rhagovelia</u> <u>obesa</u> adults	17

Turkey Creek: Site # 1, Qualitative Benthic Sample cont.

TAXA	NUMBER
ISOPODA:	
Asellidae/ <u>Asellus</u>	2
MEGALOPTERA:	
Sialidae/ <u>Sialis</u>	3
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	11
Calopterygidae/ <u>Calopteryx</u>	18
Coenagrionidae/ <u>Argia</u>	1
Corduliidae/ <u>Somatochlora</u>	3
PELECYPODA:	
Unid. small specimen	1
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	6
<u>Hydropsyche betteni/depravata</u>	25
	244

TURKEY CREEK  
SITE 1  
BENTHIC MACROINVERTEBRATES

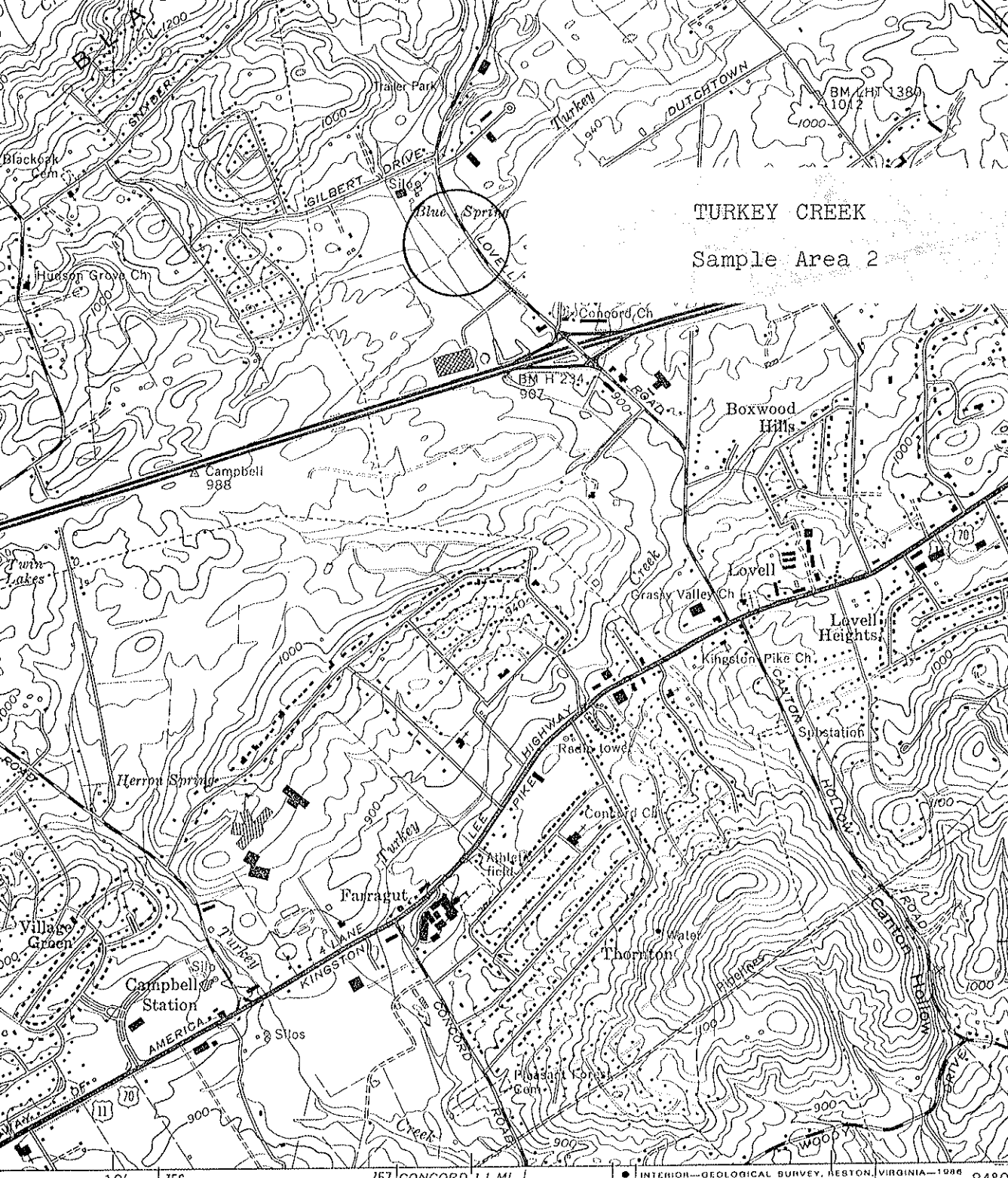


PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 244  
TAXA RICHNESS = 26

Figure 11.





TURKEY CREEK  
Sample Area 2

12 MI. TO JUNCTION INTERSTA

BEARDEN 8 MI.

3976

3975

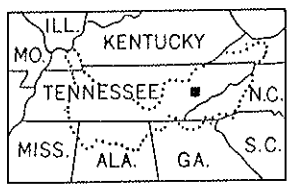
3974 000m. N.

35° 52' 30"

84° 07' 30"

(LOUISVILLE 138-SE)  
155 1 SE

1 MILE



QUADRANGLE LOCATION

ROAD CLASSIFICATION (TVA 138-NW)

Primary highway, all weather, hard surface	Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface	Unimproved road, fair or dry weather
○ Interstate Route	○ U. S. Route
	○ State Route

LOVELL, TENN.  
35084-H2-TF-024

1968  
PHOTOREVISED 1980  
DMA 4155 I NW-SERIES V841

There may be private inholdings within the boundaries of the National or State reservations shown on this map

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Turkey Creek Lat-Long 355436N - 840900W  
 Watershed Tennessee River Date 9 October 1990  
 County Knox Reach 06010201-95,0  
 Type of Sampling Electrofishing Pool Elevation 910 ft.  
 Gear Type One backpack shocker @ Time 1630 - 1730  
120 v. AC

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Lepomis auritus</i>	201	1					
<i>L. cyanellus</i>	202	1					
<i>Catostomus commersoni</i>	32	6					
<i>Pimephales promelas</i>	335	1					
<i>Rhinichthys atratulus</i>	351	13					
<i>Semotilus atromaculatus</i>	360	4					
<i>Cottus carolinae</i>	40	6					

Field Notes: Electrofished both upstream and downstream of Lovell Road  
crossing, and up the Blue Spring tributary.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

## Sinking Creek

One qualitative fishery survey was conducted in September 1990:

**Location and Length** - Tributary to the Tennessee River (Fort Loudoun Reservoir). The sample area was located at the concrete bridge approximately 0.35 mi. upstream of Toole Bend Road and was sampled on 7 September 1990. It was 400 ft. in length and averaged 9.9 ft. in width. The site was in Knox County. Bearden Quadrangle.

**Gear Type** - The site was sampled using a single backpack electrofishing unit operating at 120 v. AC.

**Water Quality** - Data were taken from midstream on 7 September 1990: DO - 9.0 ppm, pH - 7.6, Temperature - 59.9 F, Conductivity - 360 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey. The sample contained 355 organisms and represented 31 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Largemouth bass	7	4.8	0.04	1.1
Redbreast sunfish	18	12.2	0.94	26.9
Bluegill	20	13.6	0.86	24.6
Nongame Fish	10	6.8	0.67	19.1
Forage Fish	92	62.6	0.99	28.3
TOTAL	147		3.5	

**Comments** - This stream was sampled primarily to develop a species diversity list and collect stream information for TADS. It was partially done to address a request from the Smoky Mountain Chapter of Trout Unlimited. They wished to establish a stream trout feeding project close to Knoxville. They chose this stream because it originates from two large springs and has adequate year-round water temperature for trout. We were also interested in checking on the possible occurrence of the flame chub (*Hemitremia flammea*). This is a

species considered in need of management in Tennessee (Starnes and Etnier 1980). It occurs exclusively in springs and spring runs from the vicinity of Knoxville southward. The Agency has made no previous studies or fish collections from this stream.

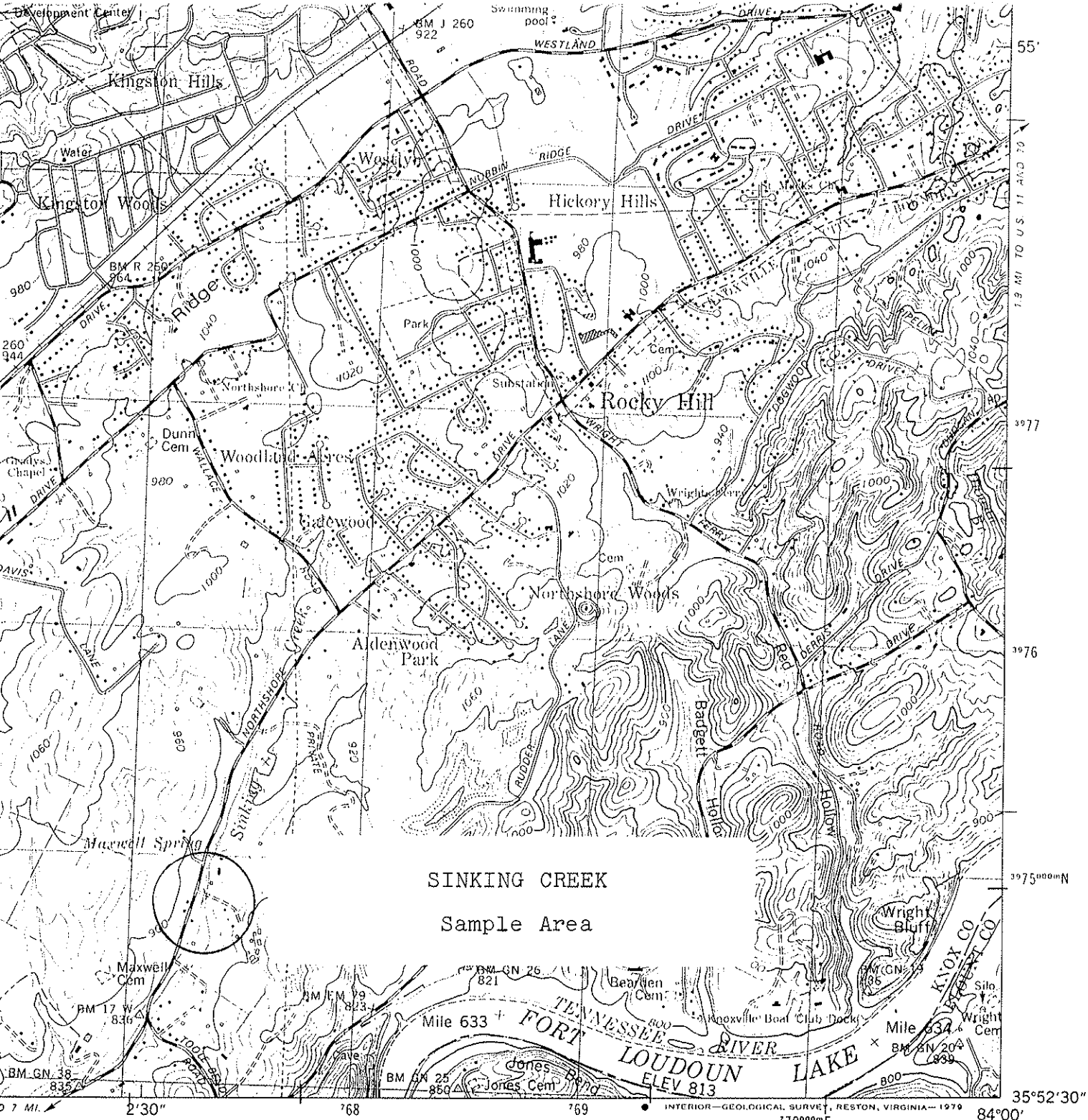
We collected a total of 147 fish weighing 3.5 lb. and comprising seven species. Two native game species, largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were present. The game fish were small even though bluegill and redbreast sunfish comprised about 26% of the total number and 51% of the total weight collected. All seven largemouth bass were in the 2 inch size class. Only four nongame and forage species were collected and these comprised 69% of the total number and about 47% of the total weight. Forage species made up about 62% of all fish collected and were represented by tolerant forms. Banded sculpin (*Cottus carolinae*) were the most abundant species collected and no darter species or flame chubs were found.

Sinking Creek is a low gradient, slow moving stream that does not have the capability of flushing its silt load. It has been heavily impacted by siltation, probably from home construction sites in the watershed. Mud is heavy along the stream course and in pool areas it is up to 6 inches deep. Also, cover is somewhat lacking in pool areas where there is a notable absence of boulder habitat. The fish species present were typical components of polluted conditions and no intolerant forms were collected.

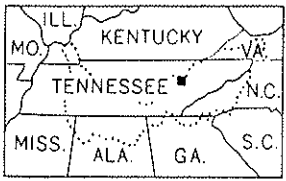
Benthic macroinvertebrates from our sample included Baetidae, Ephemerellidae, Ephemeridae and Heptageniidae mayflies, Glossosomatidae, Hydropsychidae, Lepidostomatidae, Limnephilidae and Polycentropodidae caddisflies, and Elmidae and Eubriidae beetles. No plecopterans were collected at all and periwinkle snails (*Goniobasis*) was the only gastropod present. *Cambarus* (probably *bartonii*) was the only crayfish species collected. Trichopterans represented about 20%, coleopterans 17%, and amphipods about 14% of the total number of organisms collected (Fig. 12). A total of only 31 taxa was collected at this site, most of which were tolerant forms.

**Management Recommendations:**

1. Both fish and macroinvertebrate populations had low total numbers, low species diversity and were comprised mostly of tolerant forms. This stream is probably being adversely impacted by siltation from new home construction and development in the watershed.
2. No specific management other than trying to reduce siltation can be suggested at this time.
3. Since no flame chubs were found, there should be no problem with stocking trout in this stream for the Trout Unlimited project. No reproduction of trout would be expected.



SINKING CREEK  
Sample Area



QUADRANGLE LOCATION

ROAD CLASSIFICATION

- Heavy-duty ..... ————— Poor motor road ..... =====
  - Medium-duty ..... ——— Wagon and jeep track -----
  - Light-duty ..... ——— Foot trail ..... - - - - -
  - Interstate Route      ◻ U. S. Route      ○ State Route
- In developed areas, only through roads are classified

BEARDEN, TENN.  
N3552.5-W8400/7.5

1978

AMS 4155 I NE-SERIES V841

MARYVILLE 147-SW  
255 IV SW

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Sinking Creek Lat-Long 355259N - 840218W  
Watershed Tennessee River Length of Sample 400 ft.  
Station (see below) Reach 0601020-  
County Knox Date/Time 7 September 1990/0900  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 9.9 ft. Average Depth 0.4 ft. Maximum Depth 3.1 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud 40 % Silt 35 % Sand 10 % Clay - %  
Gravel 5 % Rubble 5 % Boulders 5 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud 10 % Silt 10 % Sand 10 % Clay - %  
Gravel 20 % Rubble 30 % Boulders 20 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Some Nasturtium officinale.  
Average X Moss on rocks. Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 60 % of Stream.
8. Flow (CFS) 1.0 : Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Clear and mild; air temp. - 72° F.
10. Past Weather (last 24 hours) Clear, very hot and humid.
11. pH 7.6 Temp. 59.9° F Conductivity 275 D.O. 9.0 % Saturation 90
12. Comments: Sample area location at concrete bridge approx. 0.35 mi.  
upstream of Toole Bend Road. Siltation and mud is heavy along the  
the stream course, probably from construction work. Cover is some-  
what lacking (absence of boulders mostly) in the pools. Low gradi-  
ent, slow moving stream that isn't capable of flushing its silt load.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Sinking Creek  
 Watershed Tennessee River  
 County Knox  
 Type of Sampling Electrofishing  
 Gear Type 1 backpack @ 120 v. AC

Lat-Long 355259N - 840218W  
 Date 7 September 1990  
 Reach 06010201-  
 Pool Elevation 850 ft.  
 Time 1050-1135

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus salmoides</i>		220	7	2	0.04			
<i>Lepomis auritus</i>		201	1	2	0.01			
"	"	"	6	3	0.18			
"	"	"	8	4	0.44			
"	"	"	3	5	0.31			
<i>L. macrochirus</i>		206	1	2	0.01			
"	"	"	11	3	0.33			
"	"	"	7	4	0.38			
"	"	"	1	5	0.14			
<i>Catostomus commersoni</i>		32	10	4-7	0.67			
<i>Rhinichthys atratulus</i>		351	26	1-3	0.15			
<i>Semotilus atromaculatus</i>		360	2	2-4	0.05			
<i>Cottus carolinae</i>		40	64	1-5	0.79			

Field Notes: 400 ft. sample length.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525



Sinking Creek: Qualitative Benthic Sample

7 September 1990

Field # 243

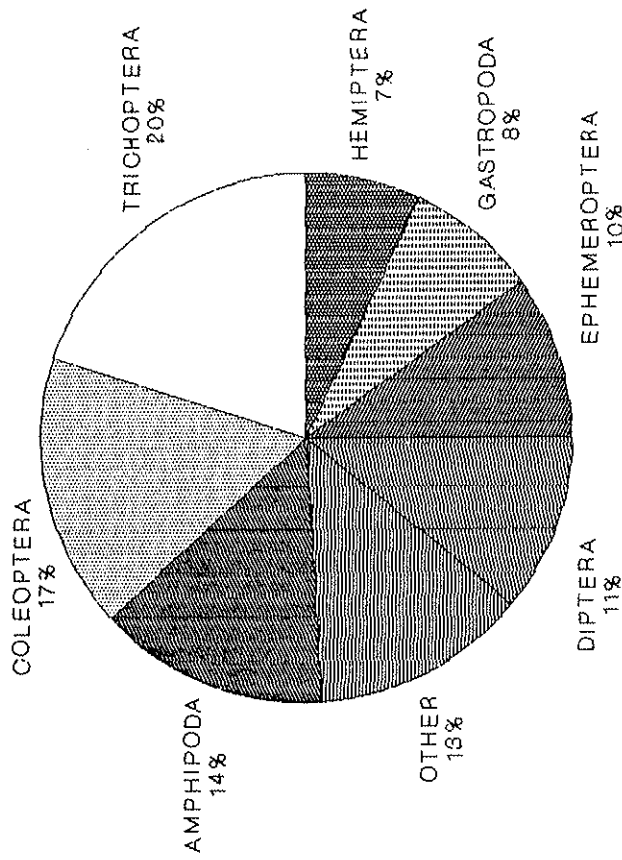
Knox Co., TN; At the concrete bridge approx. 0.35 mi.  
upstream of Toole Bend Road. Coordinates: 355259N - 840218W  
Bearden, Tenn., # 138 NE Quad. Reach # 0601020-.

TAXA	NUMBER
AMPHIPODA:	
Gammaridae/ <u>Gammarus</u>	50
ANNELIDA:	
Oligochaeta	
COLEOPTERA:	
Elmidae/ <u>Optioservus</u> larvae	30
<u>Optioservus ovalis</u> adults	22
<u>Stenelmis</u> adults	7
Eubriidae/ <u>Ectopria</u> larvae	3
DECAPODA:	
Cambaridae/ <u>Cambarus</u> (probably <u>bartonii</u> ) males	9
<u>Cambarus</u> (probably <u>bartonii</u> ) females	5
DIPTERA:	
Chironomidae	24
Simuliidae larvae	10
Simuliidae pupae	2
Tipulidae/ <u>Antocha</u>	1
<u>Tipula</u>	4
EPHEMEROPTERA:	
Baetidae/Baetis	18
Ephemerellidae/ <u>Ephemerella</u>	1
Ephemeridae/ <u>Hexagenia</u>	3
Heptageniidae/ <u>Stenacron interpunctatum</u>	13
GASTROPODA:	
Pleuroceridae/ <u>Goniobasis</u>	27
HEMIPTERA:	
Corixidae	6
Gerridae/ <u>Gerris</u> nymphs	7
<u>Gerris</u> (Aquarius) <u>remigis</u> adult females	2
Veliidae/ <u>Rhagovelia obesa</u> nymph	1
<u>Rhagovelia obesa</u> adults	10

Sinking Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
HYDRACARINA:	1
ISOPODA:	
Asellidae/ <u>Asellus</u>	5
MEGALOPTERA:	
Corydalidae/ <u>Nigronia fasciatus</u>	3
Sialidae/ <u>Sialis</u>	4
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	7
Corduliidae/ <u>Somatochlora</u>	2
TRICHOPTERA:	
Glossosomatidae/ <u>Glossosoma</u> larvae	3
<u>Glossosoma</u> pupae	4
Hydropsychidae/ <u>Cheumatopsyche</u>	25
<u>Hydropsyche</u> pupae	2
<u>Hydropsyche betteni/depravata</u>	20
Lepidostomatidae/ <u>Lepidostoma</u>	1
Limnephilidae/ <u>Neophylax</u>	10
<u>Pycnopsyche</u> pupa	1
Molannidae/ <u>Molanna</u> (3 empty cases)	
Polycentropodidae/ <u>Polycentropus</u>	1
	355

**SINKING CREEK  
BENTHIC MACROINVERTEBRATES**



PERCENT OF TOTAL NUMBER OF ORGANISMS

**n = 355  
TAXA RICHNESS = 31**

Figure 12.

## Ellejoy Creek and Tributaries

One qualitative fishery survey was conducted on Ellejoy Creek and three samples on three of its tributaries in October 1990:

**Location and Length** - Tributary to Little River. The sample area was located along Munsey Hatcher Road near stream mi. 5.15 and was sampled on 2 October 1990. It was 300 ft. in length and averaged 18.4 ft. in width. The site was in Blount County, Wildwood Quadrangle. (See accompanying maps showing tributary sample locations)

**Gear Type** - The site was sampled with a single backpack electrofishing unit operating at 120 v. AC.

**Water Quality** - Data were taken from midstream on 2 October 1990: DO - 8.3 ppm, pH - 8.0, Temperature - 59.4 F, Conductivity - 250 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey. The sample contained 571 organisms and represented 51 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Redbreast sunfish	146	22.3	2.66	31.4
Green sunfish	1	0.2	0.02	0.2
Bluegill	6	0.9	0.22	2.6
Largemouth bass	2	0.3	0.04	0.5
Nongame Fish	61	9.3	3.10	36.6
Forage Fish	439	67.0	2.43	28.7
TOTAL	655		8.47	

(See accompanying data sheets for fish species collected from tributaries)

Comments - We sampled one site on Ellejoy Creek and three sites on its tributaries primarily to develop a fish species list and to collect stream data for TADS. We were also interested in checking on the occurrence of the flame chub (*Hemitremia flammea*) as it had been reported from this watershed (TVA Regional Heritage Project data). The Agency has made no previous studies or fish collections from this stream.

A total of 655 fish weighing 8.47 lb. and comprising 22 species was collected from the main stream sample site. Three native game species, largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), and bluegill (*L. macrochirus*) along with exotic redbreast sunfish (*L. auritus*) were collected. Only two small largemouth bass, one green sunfish and a few bluegills were found and the redbreast sunfish was the only game fish collected in any numbers. They made up 22% by number and about 31% by weight of all fish collected, however, the vast majority (88%) of these were 3 inches and less. Eighteen nongame and forage species were also collected and these comprised about 76% of the total number and 65% of the total weight. Forage species made up about 67% of all fish collected and with the exception of warpaint shiners (*Luxilus coccogenis*) and telescope shiners (*Notropis telescopus*) most were represented by fairly tolerant forms. Four darter species, the greenside (*Etheostoma blennioides*), fantail (*E. flabellare*), snubnose (*E. simotereum*), and blueside (*E. stigmaeum jessiae*) were also collected.

No flame chubs were found in our Ellejoy Creek sample, however, we did collect them from Little Ellejoy Creek, a spring-fed tributary. The flame chub is a species associated with clear, cold springs and spring-fed streams and is a species of special concern and deemed in need of management by the Tennessee Heritage Program and TWRA (Starnes and Etnier 1980). A total of 32 flame chubs was collected from this site and 16 specimens were preserved for our reference collection. Flame chubs and a single rock bass (*Ambloplites rupestris*) were the only other species collected in the tributary samples but not in the main stream sample. This made a total of 24 fish species collected from the watershed.

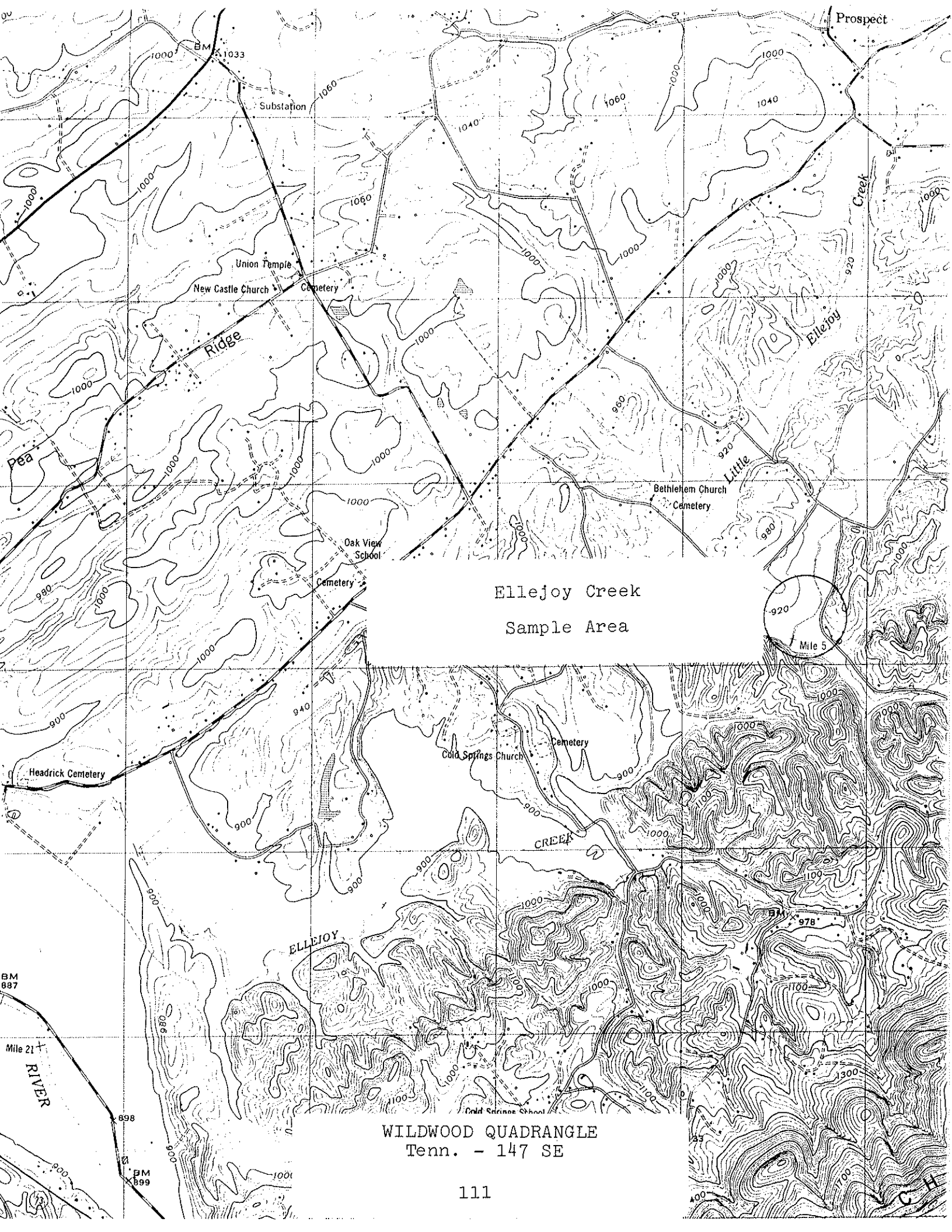
Ellejoy Creek is a low gradient stream that is fairly shallow for the most part. It is heavily impacted by agricultural activities, mainly dairy farms, along the entire watershed. It has open eroding banks and siltation is heavy along the stream course. The fish

species present were typical components of polluted conditions, however, a few intolerant forms were found. The absence of any rock bass in the mainstream sample may also indicate a stressed environment.

Benthic macroinvertebrates from our sample included Baetidae, Caenidae, Ephemeridae, Heptageniidae and Oligoneuriidae mayflies, perlid stoneflies, Hydropsychidae and Philopotamidae caddisflies, and Dryopidae, Elmidae, Helodidae and Psephenidae beetles. Asian clams (*Corbicula fluminea*) and fingernail clams (*Sphaerium*) were abundant. Limpets (*Ferrissia*) and *Physa* and pleurocerid snails were also present. Two species of crayfish, *Orconectes erichsonianus* and *O. forceps* were present. Ephemeropterans represented about 26%, mollusks 20%, trichopterans 19%, and dipterans about 13% of the total number of organisms collected (Fig. 13). A total of 51 taxa was collected, most of which were tolerant forms.

#### **Management Recommendations:**

1. The main stream is being adversely impacted by non-point pollution from agricultural sources and no management other than trying to reduce this pollution can be suggested at this time.
2. Protection of the spring habitat in this watershed where the *Hemitremia* population was found should be of first importance as their restricted habitat is vulnerable to modification or destruction.



Ellejory Creek  
Sample Area

WILDWOOD QUADRANGLE  
Tenn. - 147 SE

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Ellejoy Creek Lat-Long 354658N - 834807W  
Watershed Little River Length of Sample 300 ft.  
Station Stream mi. 5.15 Reach 06010201-33,1  
County Blount Date/Time 2 October 1990/1030  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 18.4 ft. Average Depth 0.6 ft. Maximum Depth 2.2 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud 10 % Silt 20 % Sand 20 % Clay - %  
Gravel 20 % Rubble 20 % Boulders 10 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 20 % Sand 20 % Clay - %  
Gravel 15 % Rubble 30 % Boulders 15 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average \_\_\_\_\_ Scarce \_\_\_\_\_ Some *Dianthera americana*
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 50 % of Stream.
8. Flow (CFS) 3.4 : Compared to Normal; Low X Normal \_\_\_\_\_ High \_\_\_\_\_
9. Present Weather Partly cloudy and mild; air temp. - 59°F.
10. Past Weather (last 24 hours) Partly cloudy and mild, cool overnight.
11. pH 8.0 Temp. 59.4°F Conductivity 250 D.O. 8.3 % Saturation 83
12. Comments: Siltation is heavy along the stream course due to  
agricultural practices, primarily dairy operations which are  
numerous along the watershed.



FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Ellejoy Creek Lat-Long 354658N - 834807W  
 Watershed Little River Date 2 October 1990  
 County Blount Reach 06010201-33,1  
 Type of Sampling Electrofishing Pool Elevation 905 ft.  
 Gear Type 1 backpack @ 120 v. AC Time 1350-1500

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Lepomis auritus</i>		201	88	1	0.26			
"	"	"	5	2	0.07			
"	"	"	35	3	0.85			
"	"	"	6	4	0.27			
"	"	"	8	5	0.66			
"	"	"	4	6	0.55			
<i>L. cyanellus</i>		202	1	3	0.02			
<i>L. macrochirus</i>		206	4	3	0.10			
"	"	"	1	4	0.03			
"	"	"	1	5	0.09			
<i>Micropterus salmoides</i>		220	2	3	0.04			
<i>Ameiurus natalis</i>		174	1	4	0.06			
<i>Dorosoma cepedianum</i>		48	4	7-8	0.91			
<i>Hypentelium nigricans</i>		166	56	2-12	2.13			
<i>Campostoma anomalum</i>		25	230	1-5	1.16			
<i>Cyprinella galactura</i>		253	1	3	0.01			
<i>C. spiloptera</i>		269	8	2-3	0.05			
<i>Hybopsis amblops</i>		155	7	2	0.03			
<i>Luxilus chrysocephalus</i>		249	13	1-4	0.10			
<i>L. coccogenis</i>		248	1	4	0.03			
<i>Notropis stramineus</i>		271	64	1-2	0.13			
<i>N. telescopus</i>		272	5	2-3	0.04			
Continued on next page.								

Field Notes: 300 ft. sample length.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Ellejoy Creek Lat-Long 354658N - 834807W  
 Watershed Little River Date 2 October 1990  
 County Blount Reach 06010201-33,1  
 Type of Sampling Electrofishing Pool Elevation 905 ft.  
 Gear Type 1 backpack @ 120 v. AC Time 1350-1500

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Rhinichthys atratulus</i>	351	28	1-2	0.08			
<i>Semotilus atromaculatus</i>	360	3	1-2	0.01			
<i>Etheostoma blenniodes</i>	81	13	2-3	0.10			
<i>E. flabellare</i>	92	3	1-2	0.01			
<i>E. simoterum</i>	111	27	1-2	0.15			
<i>E. stigmaeum jessiae</i>	96	6	1-2	0.02			
<i>Cottus carolinae</i>	40	30	2-3	0.51			

Field Notes: 300 ft. sample length.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

Ellejoy Creek: Qualitative Benthic Sample

2 October 1990

Field # 250

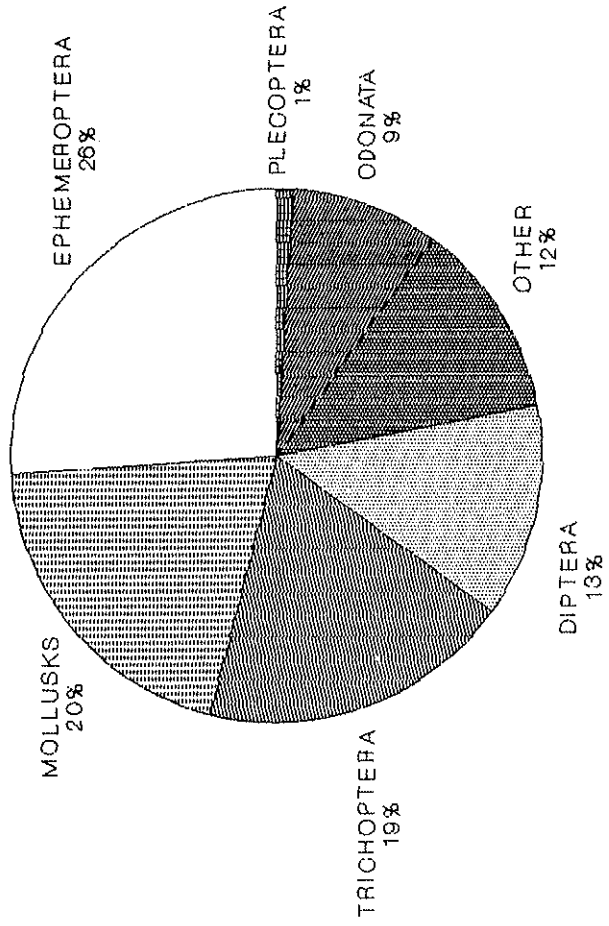
Blount Co., TN; Munsey Hatcher Road near stream mi. 5.15.  
 Coordinates: 354658N - 834807W. Wildwood, Tenn., # 147 SE  
 Quad. Reach # 06010201-33,1.

TAXA	NUMBER
ANNELEIDA:	
<u>Oligochaeta</u>	1
COLEOPTERA:	
<u>Dryopidae/Helichus</u> adults	2
<u>Elmidae/Ancyronyx variegatus</u>	1
<u>Dubiraphia vittata</u>	1
<u>Optioservus</u> larvae	12
<u>Macronychus glabratus</u> larva	1
<u>Macronychus glabratus</u> adult	1
<u>Stenelmis</u>	3
<u>Helodidae/Cyphon</u> larva	1
<u>Psephenidae/Psephenus herricki</u>	3
DECAPODA:	
<u>Cambaridae/Orconectes erichsonianus</u> males 1st.	2
<u>Orconectes erichsonianus</u> females	2
<u>O. forceps</u> males 1st.	10
<u>O. forceps</u> females	3
DIPTERA:	
<u>Ceratopogonidae/Atrichopogon</u>	1
Chironomidae	60
Simuliidae (larva & pupa)	2
Tabanidae/ <u>Tabanus</u>	3
Tipulidae/ <u>Antocha</u>	1
<u>Hexatoma</u>	5
<u>Tipula</u>	5
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	43
<u>Pseudocloeon</u>	2
Ephemeridae/ <u>Ephemera</u>	1
<u>Hexagenia</u>	5
Heptageniidae/ <u>Stenonema</u>	37
<u>Stenonema mediopunctatum</u>	2
Oligoneuriidae/ <u>Isonychia</u>	56
Caenidae/ <u>Caenis</u>	1

Ellejoy Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
GASTROPODA:	
Ancylidae/ <u>Ferrissia</u>	9
Physidae/ <u>Physa</u>	1
Pleuroceridae	4
HEMIPTERA:	
Corixidae/ <u>Trichocorixa</u>	2
(Unid. nymph and adults)	4
Veliidae/ <u>Rhagovelia obesa</u> nymph	1
MEGALOPTERA:	
Corydalidae/ <u>Corydalus cornutus</u>	16
<u>Nigronia serricornis</u>	1
NEMATOMORPHA:	
	1
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	8
Calopterygidae/ <u>Calopteryx</u>	17
Coenagrionidae/ <u>Argia</u>	3
<u>Enallagma</u>	8
Gomphidae/ <u>Gomphus</u> (Genus A - early instars)	2
<u>Gomphus (Gomphurus) lineatifrons</u>	1
<u>G. (Stylurus) laurae</u>	4
<u>Hagenius brevistylus</u>	3
<u>Progomphus obscurus</u>	3
Macromiidae/ <u>Macromia</u>	4
PELECYPODA:	
Corbiculidae/ <u>Corbicula fluminea</u>	57
Sphaeriidae/ <u>Sphaerium</u>	43
PLECOPTERA:	
Perlidae/ <u>Acroneuria evoluta</u>	4
<u>Eccoptura xanthenes</u>	1
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	57
<u>Hydropsyche betteni/depravata</u>	43
<u>H. (probably frisoni)</u>	5
Philopotamidae/ <u>Chimarra</u>	2
	571

ELLEJOY CREEK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 571  
TAXA RICHNESS = 51

Figure 13.



Trib. to Ellejoy Creek  
Sample Area

WILDWOOD QUADRANGLE  
Tenn. - 147 SE

FISH FIELD DATA FORM

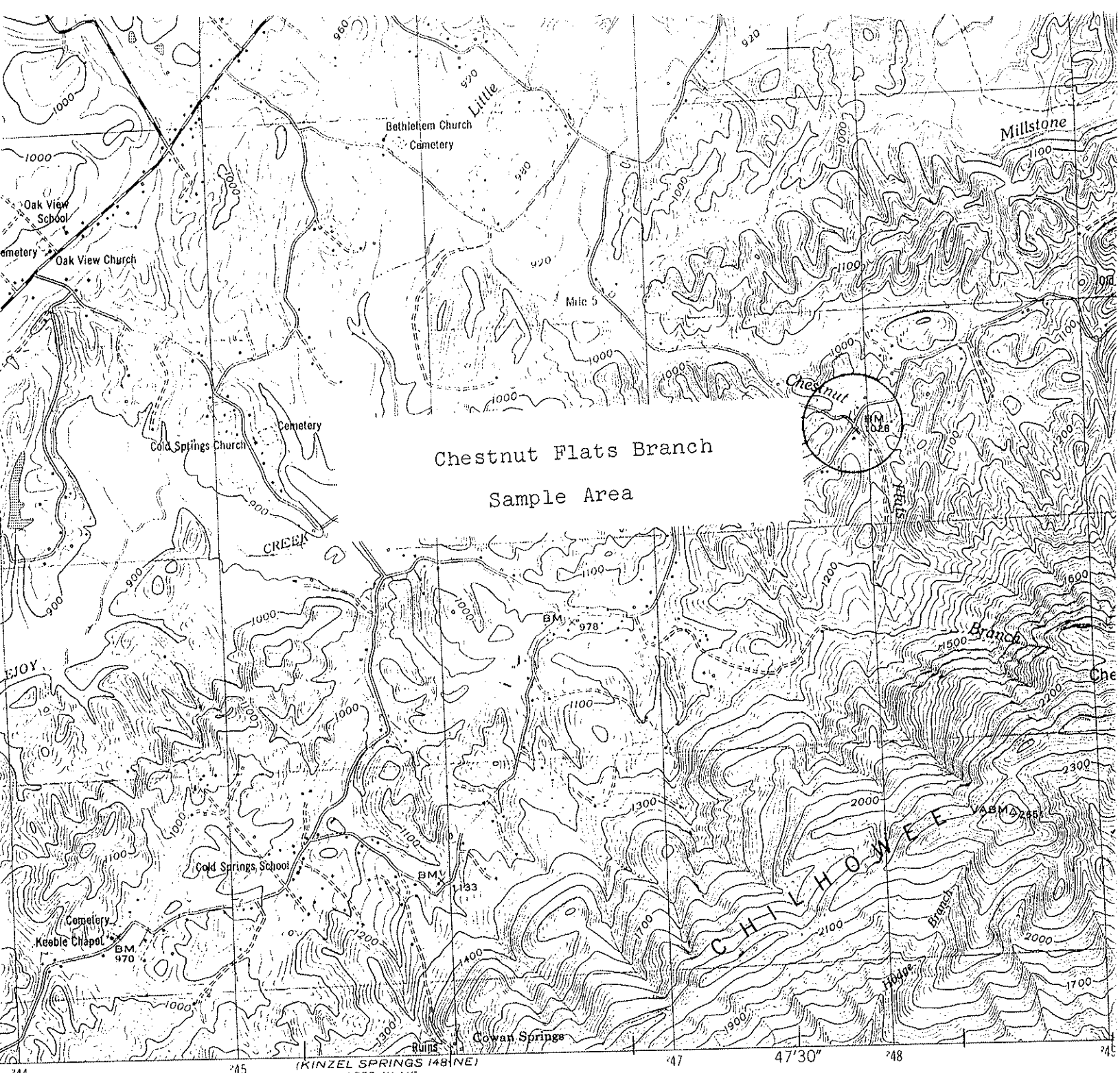
TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Trib. to Ellejoy Creek Lat-Long 354608N - 834846W  
 Watershed Little River Date 2 October 1990  
 County Blount Reach 06010201-  
 Type of Sampling Electrofishing Pool Elevation 903 ft.  
 Gear Type 1 backpack @ 120 v. AC Time PM sampling

Name	SPECIES	CODE	NUMBER	LENGTH	WT.		
<i>Ambloplites rupestris</i>		13	1	1	-		
<i>Hypentelium nigricans</i>		166	1	3	0.02		
<i>Campostoma anomalum</i>		25	60	1-2	0.26		
<i>Rhinichthys atratulus</i>		351	120	1-3	0.27		
<i>Semotilus atromaculatus</i>		360	20	1-4	0.17		
<i>Etheostoma simoterum</i>		111	13	1-2	0.03		
<i>Cottus carolinae</i>		40	3	2-3	0.04		
<i>Orconectes forceps</i>			2				

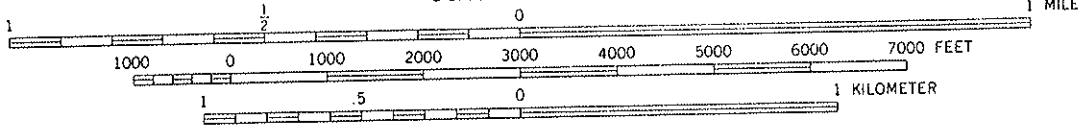
Field Notes: Sample location was south of Ellejoy Creek along the gravel portion of Cold Springs Road. Sample length approx. 100 ft.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

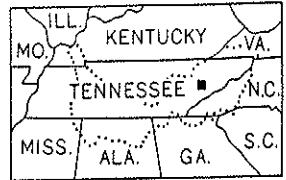


Chestnut Flats Branch  
Sample Area

SCALE 1:24 000



CONTOUR INTERVAL 20 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929



QUADRANGLE LOCATION

THIS MAP COMPLIES WITH  
FOR SALE BY U.S. GEOLOGICAL  
TENNESSEE DIVISION OF  
U.S. TENNESSEE VALLEY AUTHORITY, CH  
A FOLDER DESCRIBING TOPOGRAPHY

WILDWOOD QUADRANGLE  
Tenn. - 147 SE

Revisions shown in purple and wood  
the Tennessee Valley Authority from  
taken 1976 and other source data.  
not field checked. Map edited 1980



FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

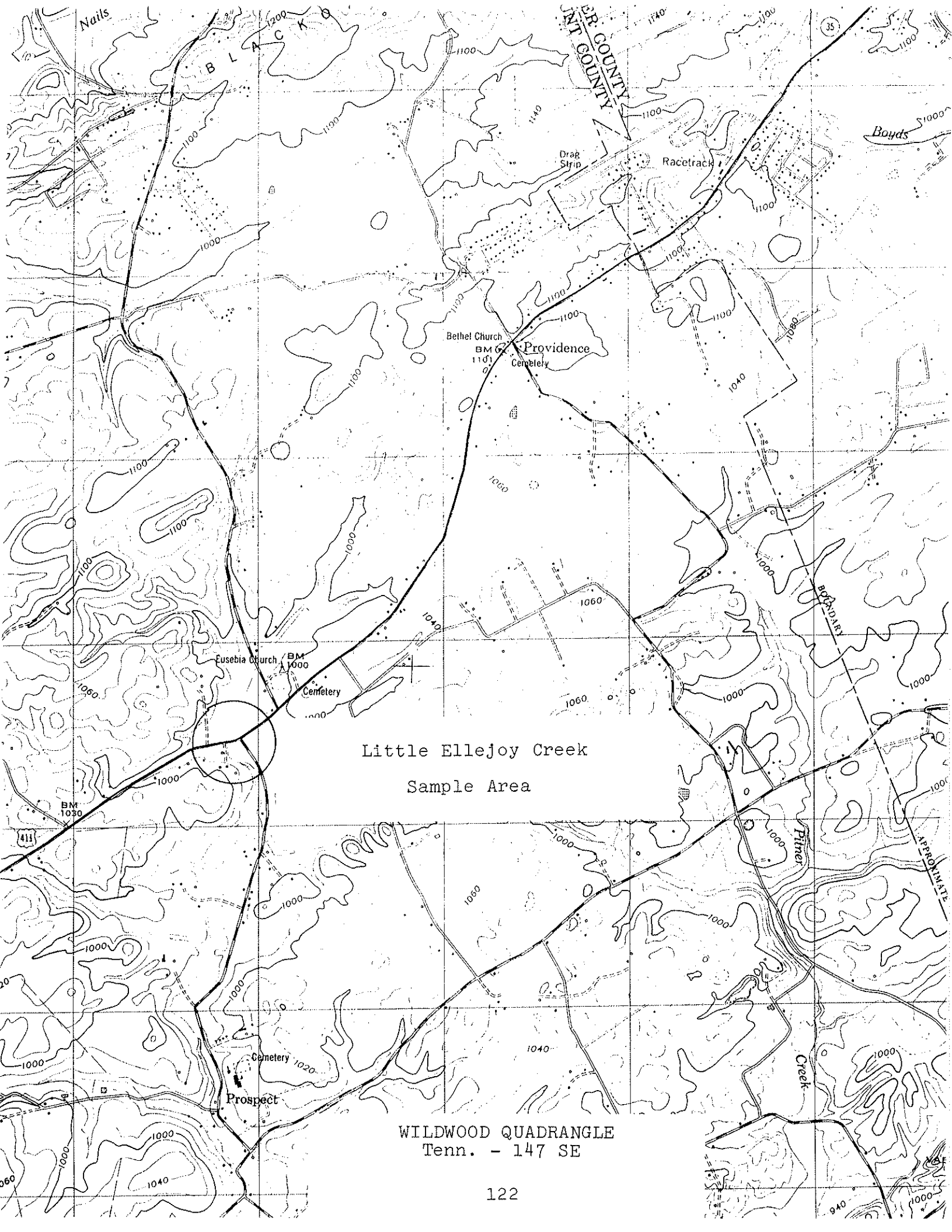
Stream Chestnut Flats Branch Lat-Long 354634N - 834718W  
Watershed Little River Date 2 October 1990  
County Blount Reach 06010201-  
Type of Sampling Net Pool Elevation 1010 ft.  
Gear Type Dip net Time PM sampling

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Rhinichthys atratulus</i>	351	(few)					
<i>Semotilus atromaculatus</i>	360	(few)					

Field Notes: Sample location at intersection of Munsey Hatcher Rd. and Old Chilhowee Rd., near BM 1028 on the Wildwood Quad. map.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525



Little Ellejoy Creek  
Sample Area

WILDWOOD QUADRANGLE  
Tenn. - 147 SE

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Little Ellejoy Creek Lat-Long 354946N - 834809W  
Watershed Little River Date 2 October 1990  
County Blount Reach 06010201-78,0  
Type of Sampling Electrofishing Pool Elevation 962 ft.  
Gear Type 1 backpack @ 120 v. AC Time PM sampling

Name	SPECIES CODE	NUMBER	LENGTH	WT.			
<i>Lepomis auritus</i>	201	(Present but not counted)					
<i>L. macrochirus</i>	206	(Present but not counted)					
<i>Cyprinella spiloptera</i>	269	1	2	-			
<i>Hemitremia flammea</i>	148	*16	1-2	0.06			
<i>Rhinichthys atratulus</i>	351	15	1-2	0.07			
<i>Semotilus atromaculatus</i>	360	1	3	0.02			
<i>Etheostoma simoterum</i>	111	6	1-2	0.02			
<i>Cottus carolinae</i>	40	11	1-3	0.14			

\* Collected a total of 32 *H. flammea* but kept only 16.  
Field Notes: Sample location on downstream side of Hwy. 411 bridge.  
Sample length approx. 100 ft.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

## Notchy Creek

One qualitative fishery survey was conducted in October 1990:

**Location and Length** - Tributary to the Tellico River (Tellico Reservoir). The sample area was located near an old quarry site along Highway 68 and was sampled on 30 October 1990. It was approximately 200 ft. in length and averaged 3.5 ft. in width. The site was in Monroe County. Mount Vernon Quadrangle.

**Gear Type** - The site was sampled with a single backpack electrofishing unit operating at 120 v. AC.

**Water Quality** - No data collected.

**Benthos Collection** - No collection was made (some crayfish and snails were collected).

**Fish Collected:** (See data sheet for species list)

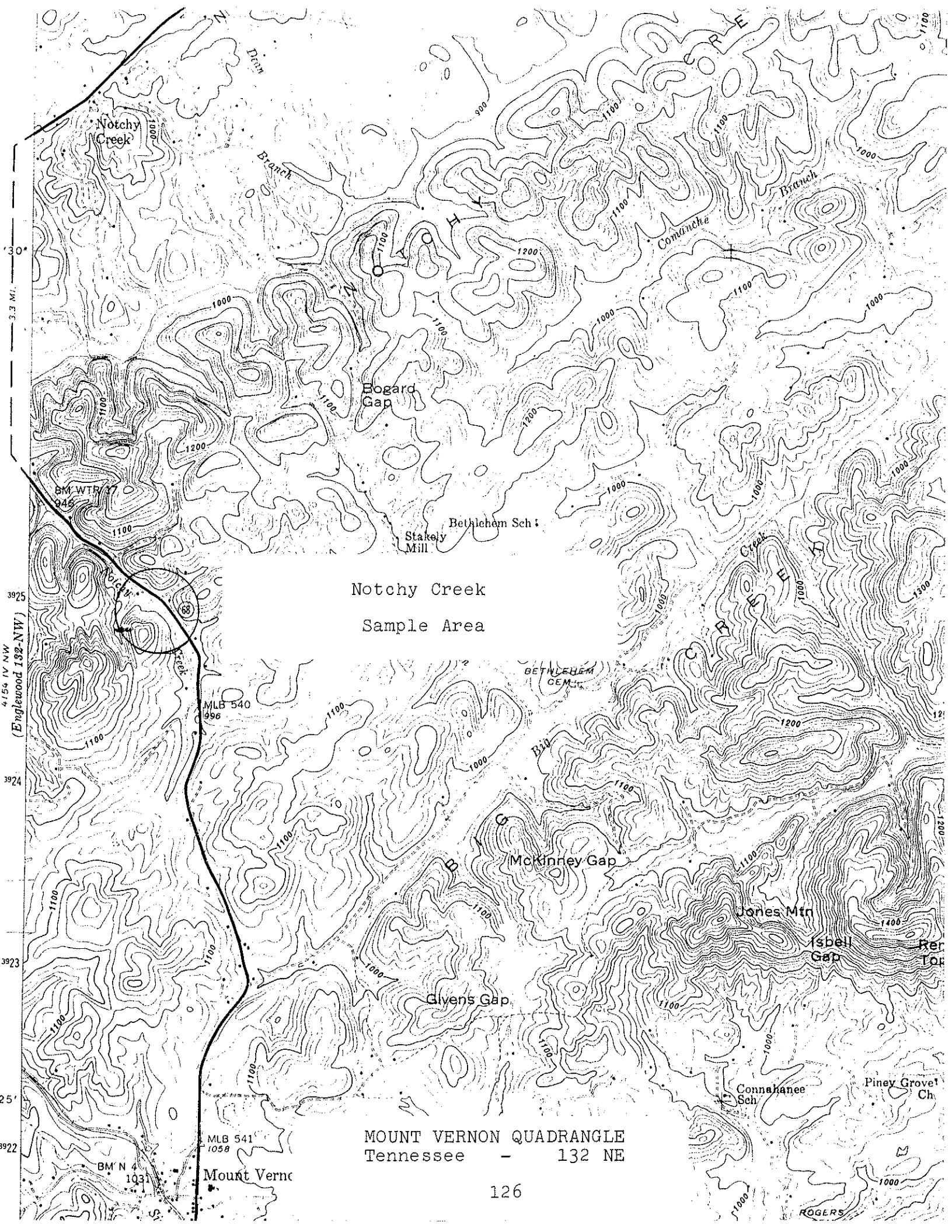
**Comments** - This stream was sampled primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted in the headwaters and emphasis was placed on the fish species present and their relative abundance.

A total of 196 fish comprising only three species was collected. A single bluegill specimen (*Lepomis macrochirus*) was the only game fish species found. Blacknose dace (*Rhinichthys atratulus*) and creek chub (*Semotilus atromaculatus*) were the only other species collected and blacknose dace accounted for 80% of the total number of fish collected. These species typify the small stream habitat from which they were collected.

The stream, at the area we sampled, is small and has a gravel-rubble-sand type substrate and was very silty. No benthic sample was made but we did collect crayfish. Two species, the Appalachian brook crayfish (*Cambarus bartonii*) and *C. longirostris* were present.

**Management Recommendations:**

1. No specific management is suggested. The stream, at the point we sampled, is currently going through further degradation due to the expansion-construction of Highway 68.
2. Suggest additional sampling, both fish and benthic, downstream near the mouth (Tellico Reservoir).



Notchy Creek  
Sample Area

MOUNT VERNON QUADRANGLE  
Tennessee - 132 NE

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Notchy Creek Lat-Long 352636N - 842213  
 Watershed Little Tennessee River Date 30 October 1990  
 County Monroe Reach 06010204-45,1  
 Type of Sampling Electrofishing Pool Elevation 857 ft.  
 Gear Type One backpack shocker @ Time 1600 - 1630  
120 v. AC

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Lepomis macrochirus</i>		206	1					
<i>Rhinichthys atratulus</i>		351	157					
<i>Semotilus atromaculatus</i>		360	38					
Crayfish and snails common.								
<i>Cambarus bartonii</i>								
<i>C. longirostris</i>								
<i>Goniobasis</i>								
Avg. width - 3 to 4 ft.								
Avg. depth - 4 in.								
Gravel-rubble-sand substrate.								
Very silty.								

Field Notes: Sample location at old quarry site along hwy. 68. Approx. 200 ft. sample length.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Jim W. Habera

WR-0525

## Henderson Branch

One qualitative fishery survey was conducted in April 1990:

**Location and Length** - Tributary to Bald River. The sample area was located at the mouth and was sampled on 28 April 1990. It was 500 ft. in length and averaged 13.5 ft. in width. The site was in Monroe County. Bald River Falls Quadrangle.

**Gear Type** - The site was sampled using a single backpack electrofishing unit operating at 700 v. AC.

**Water Quality** - Data were taken from midstream on 28 April 1990: DO - 8.9 ppm, pH - 6.9, Temperature - 61.3 F, Conductivity - 10 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a sixty minute qualitative sample. The sample contained 151 organisms and represented 41 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Rainbow trout	11	28.2	1.42	31.6
Brown trout	3	7.7	1.07	23.8
Brook trout	2	5.1	0.24	5.3
Nongame Fish	6	15.4	1.09	24.2
Forage Fish	17	43.5	0.68	15.1
TOTAL	39		4.5	

**Comments** - This stream was surveyed primarily to assess its trout population. It has long been listed as a brook trout (*Salvelinus fontinalis*) stream (Bivens 1984) and the last reported survey was by the U. S. Forest Service (Barb 1978). We cooperated with the Smoky Mountain Chapter of Trout Unlimited in their habitat enhancement project by doing an initial stream survey. This was also an opportunity to update and expand our stream information for TADS. With assistance from Trout Unlimited we conducted a qualitative survey of both fish and benthic macroinvertebrates from one site near the mouth of the stream.

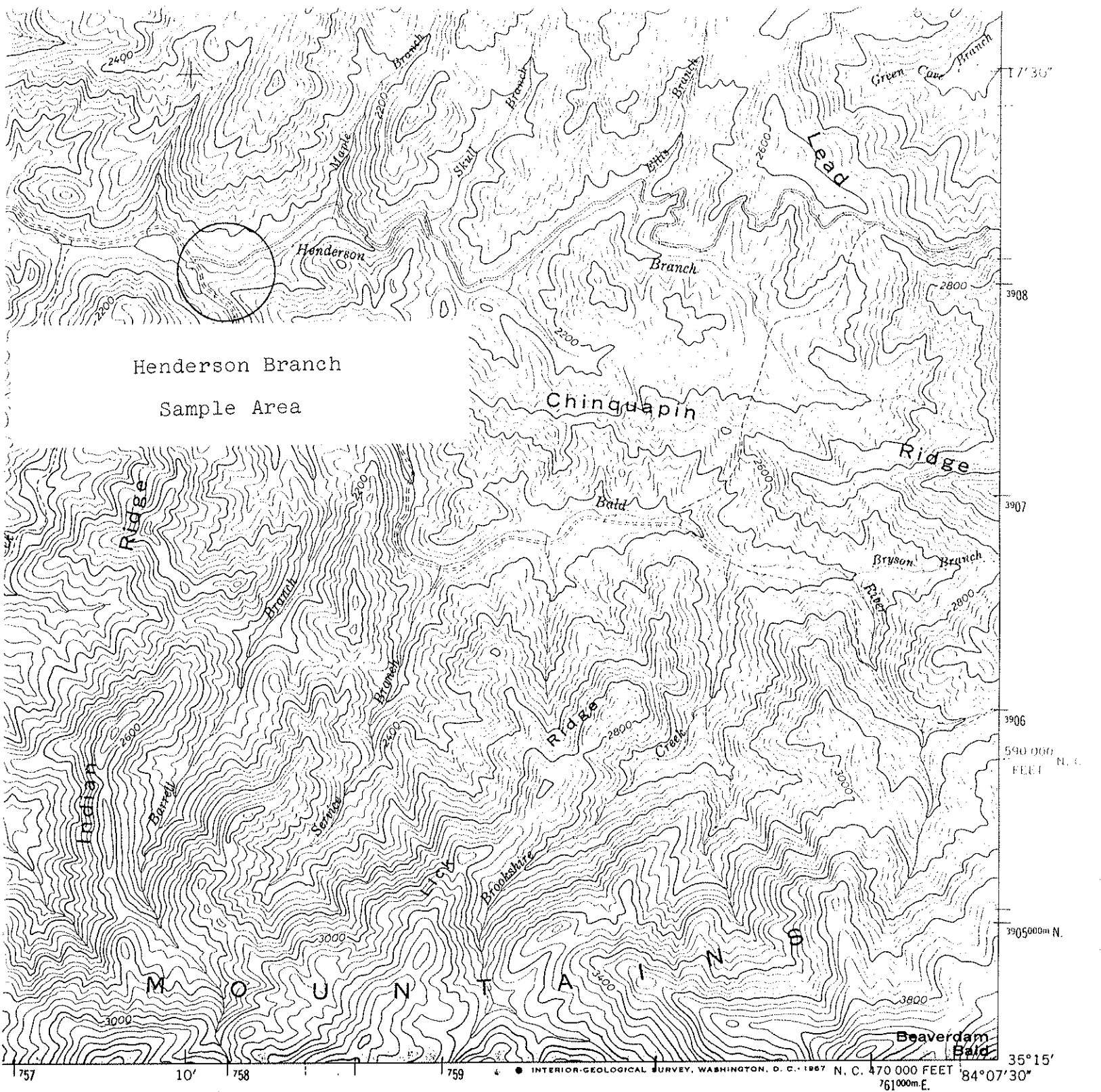


We collected a total of 39 fish weighing 4.5 lb. and comprising six species. Two brook trout along with several rainbow trout (*Oncorhynchus mykiss*) and three brown trout (*Salmo trutta*) were collected (Fig. 14). Blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*), and northern hog suckers (*Hypentelium nigricans*) were the only other species collected. All species were collected in lower numbers than expected. The stream was dingy at the time of sampling and we were experiencing trouble with our electrofishing unit which probably accounts to some extent for the low numbers.

Benthic macroinvertebrates from our sample included Baetidae, Ephemerellidae, Ephemeridae, Heptageniidae, Leptophlebiidae, and Oligoneuriidae mayflies, Leuctridae, Nemouridae, Peltoperlidae, Perlidae and Pteronarcyidae stoneflies, and Calamoceratidae, Hydropsychidae, Lepidostomatidae, Limnephilidae, Polycentropodidae, Psychomyiidae, Rhyacophilidae caddisflies. The elmid beetle *Oulimnius latiusculus* was present. Also, fingernail clams (*Sphaerium*) were collected. Ephemeropterans represented about 35%, plecopterans 23%, and trichopterans 16% of the total number of organisms collected (Fig. 15). A total of 41 taxa was collected at this site. About 53% of these were mayfly and caddisfly taxa and plecopterans accounted for no less than seven distinct taxa.

#### Management Recommendations:

1. Management efforts should be targeted at protection of the brook trout population. This would probably include rainbow trout removal.
2. A brook trout population survey should be conducted at sites further upstream.
3. Siltation from Bald River road has been a source of pollution past and present, and efforts should be made to reduce this problem.



Henderson Branch  
Sample Area

Chinguapin

Lead

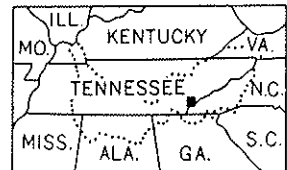
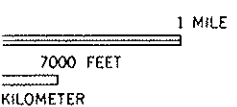
Indian

Ridge

M O U N T A I N S

Beaverdam  
Bald

757 10' 758 759 INTERIOR GEOLOGICAL SURVEY, WASHINGTON, D. C. 1967 N. C. 470 000 FEET 761000m E. 35°15' 84°07'30"



QUADRANGLE LOCATION

ROAD CLASSIFICATION

- Heavy-duty ..... —————
- Medium-duty ..... ————
- Light-duty ..... —————
- Poor motor road ..... =====
- U. S. Route (square symbol)
- State Route (circle symbol)

BALD RIVER FALLS, TENN.-N.C.

N3515-W8407.5/7.5

20242,  
VILLE, TENN. 37902,  
E 37219  
N REQUEST

(MC DANIEL & SA)

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Henderson Branch Lat-Long 351701N - 840995W  
Watershed Little Tennessee River Length of Sample 500 ft.  
Station At the mouth of the stream. Reach 06010204-  
County Monroe Date/Time 28 April 1990/1100  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 13.5 ft. Average Depth 0.5 ft. Maximum Depth 1.9 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud - % Silt 10 % Sand 25 % Clay - %  
Gravel 25 % Rubble 30 % Boulders 10 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt - % Sand 20 % Clay - %  
Gravel 20 % Rubble 50 % Boulders 10 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average \_\_\_\_\_ Scarce X
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 40 %, Poor in 35 %
7. Shade or Canopy Good over 80 % of Stream.
8. Flow (CFS) 7.6: Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Cloudy, occasional rain, cool; air temp. - 66°F.
10. Past Weather (last 24 hours) Clear and warm.
11. pH 6.9 Temp. 58°F Conductivity 10 D.O. 8.9 % Saturation 88
12. Comments: Stream was slightly dingy due to rain. The road along  
the stream contributes considerable siltation. The stream lacks  
good cover for fish at this point, it is mostly sand and rubble  
with only a few boulders.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Henderson Branch Lat-Long 351701N - 840995W  
 Watershed Little Tennessee River Date 28 April 1990  
 County Monroe Reach 06010204-  
 Type of Sampling Electrofishing Pool Elevation 1910 ft.  
 Gear Type One backpack @ 700 v. AC Time 1100-1140

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Oncorhynchus mykiss</i>		353	2	5	0.14			
"	"	"	3	6	0.25			
"	"	"	4	7	0.56			
"	"	"	2	8	0.47			
<i>Salmo trutta</i>		355	1	8	0.23			
"	"	"	1	9	0.32			
"	"	"	1	10	0.52			
<i>Salvelinus fontinalis</i>		356	1	4	0.04			
"	"	"	1	8	0.20			
<i>Hypentelium nigricans</i>		166	6	4-11	1.09			
<i>Rhinichthys atratulus</i>		351	6	2-3	0.06			
<i>Semotilus atromaculatus</i>		360	11	2-7	0.62			

Field Notes: 500 ft. sample. Stream was dingy at time of sampling; may have missed several fish.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, & TU members

WR-0525

TROUT FROM HENDERSON BRANCH  
INCH CLASS DISTRIBUTION

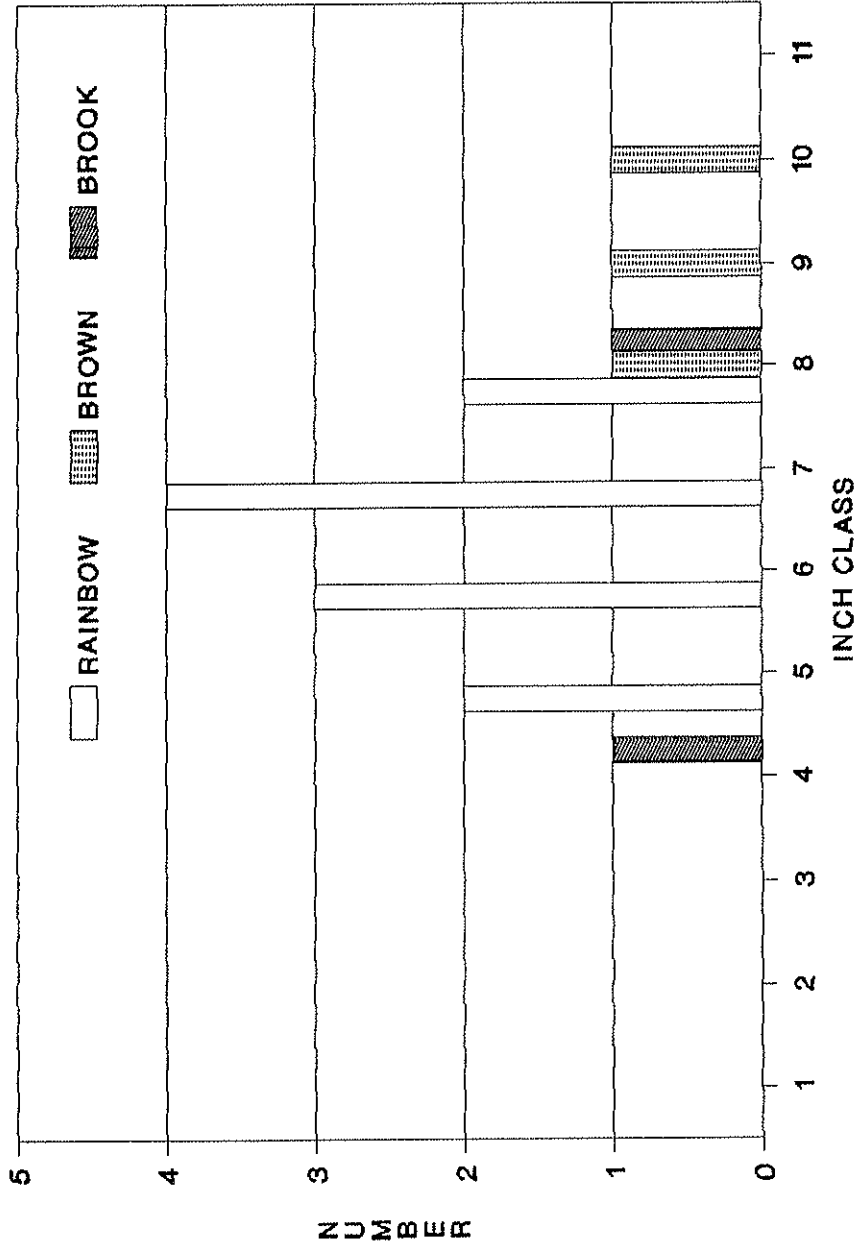


Figure 14.

Henderson Branch: Qualitative Benthic Sample

28 April 1990

Field # 202

Monroe Co., TN; At the mouth of the stream. Coordinates:  
351701N - 840995W. Bald River Falls, Tenn.-N.C., # 140 SW  
Quad. Reach # 06010204-.

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	2
COLEOPTERA:	
Elmidae/ <u>Oulimnius latiusculus</u> larvae	2
DIPTERA:	
Ceratopogonidae/ <u>Palpomyia</u> complex	4
Chironomidae larvae	18
Chironomidae pupae	2
Simuliidae larva	1
Tipulidae/ <u>Dicranota</u>	3
<u>Limniphila</u>	1
EPHEMEROPTERA:	
Baetidae/ <u>Pseudocloeon</u>	2
Ephemerellidae/ <u>Dannella lita</u>	7
<u>Ephemerella</u>	13
Ephemeridae/ <u>Ephemera</u> (Unid. early instar)	1
<u>E. (Ephemera) varia</u>	3
Heptageniidae/ <u>Epeorus (Iron) dispar</u>	1
<u>E. (I.) pleuralis</u>	1
<u>Stenacron</u>	1
<u>Stenonema</u>	14
Leptophlebiidae/ <u>Habrophlebia vibrans</u>	1
<u>Habrophlebiodes</u>	1
<u>Paraleptophlebia</u>	4
Oligoneuriidae/ <u>Isonychia</u>	4
ODONATA:	
Calopterygidae/ <u>Calopteryx</u>	1
Cordulegastriidae/ <u>Cordulegaster maculata</u>	1
Gomphidae/ <u>Gomphus (Genus A rogersi) *</u>	1
<u>Lanthus vernalis</u>	1

\* (from Louton 1982)

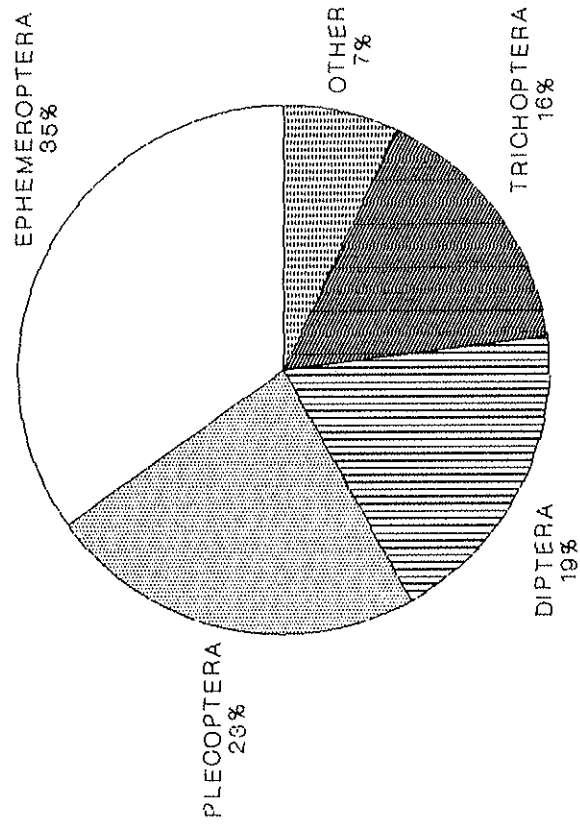
Henderson Branch: Qualitative Benthic Sample cont.

TAXA	NUMBER
PELECYPODA:	
Sphaeriidae/ <u>Sphaerium</u>	2
PLECOPTERA:	
Leutridae/ <u>Leuctra</u>	1
Nemouridae/ <u>Amphinemura wui</u>	4
Peltoperlidae/ <u>Peltoperla</u>	11
Perlidae/ <u>Acroneuria abnormis</u>	3
Perlodidae/ <u>Remenus bilobatus</u>	8
<u>Yugus bulbosus</u>	4
Pteronarcyidae/ <u>Pteronarcys</u>	4
TRICHOPTERA:	
Calamoceratidae/ <u>Heteroplectron americanum</u>	1
Hydropsychidae/ <u>Diplectrona modesta</u>	10
Lepidostomatidae/ <u>Lepidostoma</u>	5
Limnephilidae/ <u>Pycnopsyche</u>	1
Polycentropodidae/ <u>Nyctiophylax</u>	1
<u>Phylocentropus</u>	1
Psychomyiidae/ <u>Lype diversa</u>	1
Rhyacophilidae/ <u>Rhyacophila</u> sp. cf. <u>R. carolina</u>	1
<u>R. fuscula</u>	1
<u>R. glaberrima</u>	2

---

151

HENDERSON BRANCH  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 151  
TAXA RICHNESS = 41

Figure 15.



## Brookshire Creek Renovation

Renovation of lower segment was conducted in August 1990:

**Location and Length** - Tributary to Bald River. The treatment area was located from the mouth upstream to the first trail crossing of the stream at about 2,420 ft. elevation and also between the falls on Bald River at the mouth of Brookshire Creek. Renovation took place on 19, 20, and 21 August 1990. Approximately 0.5 mi. of stream was renovated. The site was in Monroe County. Bald River Falls Quadrangle.

**Gear Type** - Electrofishing units were employed on the first two days of the project. On day 3, a rotenone drip station was set up at the trail crossing of the stream at about 2,420 ft. elevation with a neutralization station at the big falls located on Bald River just downstream of the mouth of Brookshire Creek. Rotenone was applied on Brookshire Creek at a rate of 5 ppm for 1 hour, along with a dye, and neutralized with potassium permanganate. A second drip station was set up on Bald River at the small falls just upstream of the mouth of Brookshire Creek and rotenone was applied at a rate of 2 ppm for 30 minutes. This second station was started after the Brookshire Creek station had finished.

**Water Quality** - No data collected.

**Benthos Collection** - No collection was made.

**Fish Collected** - (See data sheets)

**Comments** - We cooperated with the U. S. Forest Service and Appalachian Chapter of Trout Unlimited to renovate the lower segment of this stream through a combination of electrofishing and chemical treatment. An effort that involved removing as many trout as possible by electrofishing and relocating them, followed by treatment with rotenone, was conducted over a three day period in August 1990.

Prior to 1950, Brookshire Creek was a native brook trout (*Salvelinus fontinalis*) stream, but by the late 1970's only rainbow trout (*Oncorhynchus mykiss*) were collected in surveys of the stream. A renovation project in the fall of 1982 by TWRA and Forest Service personnel using cresol and electrofishing removed

rainbows upstream of a natural barrier near the mouth. A population of brook trout was then re-established in the stream by transporting native fish from Bald River and Henderson Branch (Bivens 1984).

We returned to Brookshire Creek in 1988 (Bivens 1989) and found that the earlier renovation had not been successful as both brook and rainbow trout existed in the stream. Immediate rainbow removal efforts, modification of the barrier falls, or renovation of both Brookshire Creek and upper Bald River, were management recommendations advanced at the time.

In its Environmental Assessment (EA) the Forest Service addressed these recommendations along with other alternatives. The Forest Service preferred alternative C of the EA. This provided for temporary control of rainbow trout in a small segment and allowed for the effectiveness of chemical treatment to be evaluated. A headwater segment was renovated in 1989 and is reported in last year's stream report (Bivens and Williams 1990).

In May of 1990 we assisted the Forest Service in evaluating the effectiveness of the 1989 rotenone treatment on Brookshire Creek by electrofishing the treated segment. At that time we determined that the rotenone procedure had been successful and it was decided to continue with part E of the EA. This alternative called for the same combination of electrofishing and chemical treatment to be employed on the remaining portion of Brookshire Creek along with a portion of Bald River upstream of the large falls. At that time we also electrofished upstream of the second falls on Bald River and found only brook trout in that portion of the stream. Between the 1989 and 1990 treatments of Brookshire Creek, the Forest Service contracted to have the lower segment of Brookshire Creek electrofished and rainbows removed.

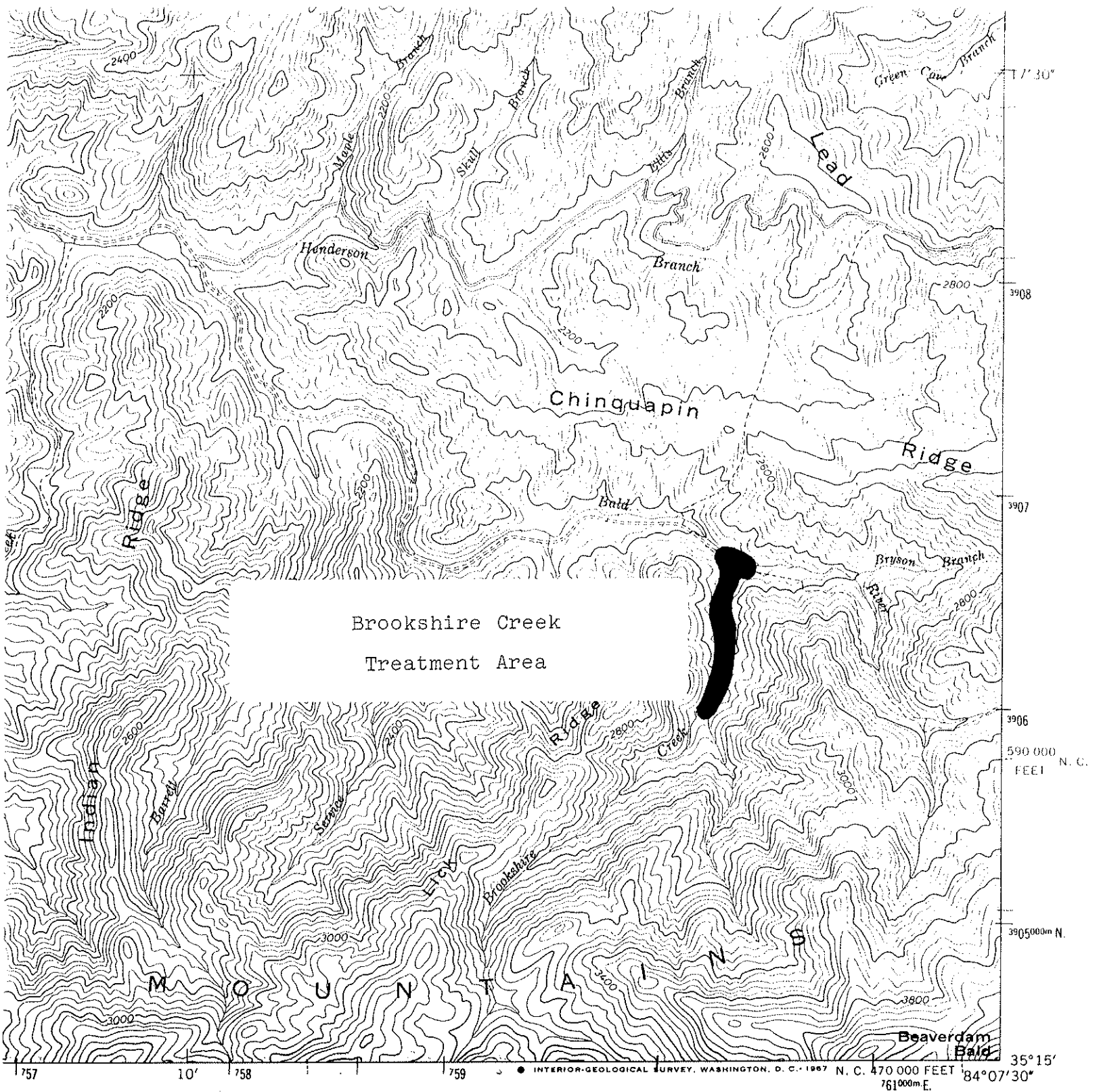
The first day of the 1990 renovation project involved electrofishing a section of stream between 2,680 feet and 3,040 feet elevation. This section started approximately 1.0 mile upstream of the mouth. Three backpack shocking crews collected 115 brook trout from this segment and no rainbow trout were found. On the second day, the segment from 2,420 feet to 2,480 feet elevation was electrofished. Another 52 brook trout were collected from this segment and again no rainbow trout were found. The crew then concentrated on the 0.5 mile segment from the mouth up to 2,420 feet elevation. Eighty-four brook trout were taken from

this segment and moved upstream above 2,420 feet elevation and 106 rainbow were removed and carried downstream to Bald River below the falls and released. The segment on Bald River between the falls was also electrofished at this time.

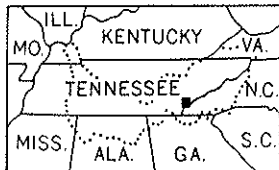
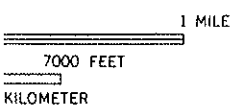
On the third day of the project, rotenone was applied to the lower 0.5 mile of stream starting at the trail crossing at 2,420 feet elevation at a rate of 5 ppm for a 1 hour period. A dye block was placed in the stream at the beginning of the rotenone application. This allowed two people to work downstream with backpack sprayers, applying rotenone to eddies and small tributaries where the dye was not observed. It also signaled the beginning and end points for neutralization. Potassium permanganate was applied at the downstream area to neutralize the rotenone. Following the treatment on Brookshire Creek, we moved the rotenone station to the upper falls on Bald River and treated that segment for another 30 minutes at a rate of 2 ppm.

We picked up a total of 61 dead fish from the treated area. Twenty-two of these were brook trout and 39 were rainbow trout. Another 17 dead trout, one of which was a brook trout were picked up in the Bald River segment. All dead trout were preserved for later analysis. Length and weight information on all fish collected is summarized in the accompanying data sheets. Figure 16 shows the inch class distribution of 273 brook trout and 145 rainbow trout collected from Brookshire Creek over the 3 day project period.

By treating the Bald River segment it is hoped that we eliminated the avenue by which rainbow trout were able to invade Brookshire Creek in years following the 1982 renovation. We will need to continue to monitor this stream in the future.



Brookshire Creek  
Treatment Area



QUADRANGLE LOCATION

ROAD CLASSIFICATION

Heavy-duty .....	Light-duty .....
Medium-duty .....	Poor motor road .....
U. S. Route	State Route

BALD RIVER FALLS, TENN.-N.C.  
N3515-W8407.5/7.5

20242,  
VILLE, TENN. 37902,  
E 37219  
REQUEST

(MC DANIEL 4/54)

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Brookshire Creek Lat-Long Not Recorded  
 Watershed Little Tennessee River Date 19 to 21 August 1990  
 County Monroe Reach 06010204-  
 Type of Sampling Combined Pool Elevation Mouth to 3040 ft.  
 Gear Type Electrofishing - Toxicant Time 3 Day Period

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Salvelinus fontinalis</i>		356	7	2	0.11			
"	"	"	34	3	0.69			
"	"	"	43	4	1.41			
"	"	"	83	5	4.08			
"	"	"	48	6	4.04			
"	"	"	37	7	5.10			
"	"	"	16	8	3.15			
"	"	"	5	9	1.26			
<i>Oncorhynchus mykiss</i>		353	7	2	0.07			
"	"	"	7	3	0.14			
"	"	"	8	4	0.30			
"	"	"	30	5	1.88			
"	"	"	33	6	3.13			
"	"	"	32	7	4.50			
"	"	"	18	8	3.41			
"	"	"	5	9	1.41			
"	"	"	5	10	1.69			

n = 418 Brook trout = 273 Rainbow trout = 145

Field Notes: 3 day summary of all trout collected from the mouth up to 3040 ft. elev. during brook trout renovation project.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, Jim Herrig & USFS Personnel, and Appalachian Chapter TU members

WR-0525

FISH FIELD DATA FORM  
 TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Brookshire Creek Lat-Long Not Recorded  
 Watershed Little Tennessee River Date 19 August 1990  
 County Monroe Reach 06010204-  
 Type of Sampling Electrofishing Pool Elevation 2680 ft. to 3040 ft.  
 Gear Type 3 Backpack Shocking Crews Time PM

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Salvelinus fontinalis</i>		356	2	2	0.04			
"	"	"	19	3	0.38			
"	"	"	15	4	0.32			
"	"	"	31	5	0.72			
"	"	"	20	6	1.16			
"	"	"	18	7	1.74			
"	"	"	6	8	1.10			
"	"	"	4	9	0.97			

Field Notes: Area started approx. 1.0 mi. upstream of the mouth.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, Jim Herrig, and  
 Appalachian Chapter TU members

WR-0525

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Brookshire Creek Lat-Long Not Recorded  
 Watershed Little Tennessee River Date 20 August 1990  
 County Monroe Reach 06010204-  
 Type of Sampling Electrofishing Pool Elevation Mouth to 2420 ft.  
 Gear Type Backpack Shocking Crews Time PM

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Salvelinus fontinalis</i>		356	3	2	0.04			
"	"	"	7	3	0.17			
"	"	"	16	4	0.61			
"	"	"	32	5	2.11			
"	"	"	13	6	1.31			
"	"	"	7	7	1.08			
"	"	"	5	8	0.95			
"	"	"	1	9	0.29			
<i>Oncorhynchus mykiss</i>		353	6	2	0.06			
"	"	"	6	3	0.11			
"	"	"	8	4	0.30			
"	"	"	22	5	1.40			
"	"	"	25	6	2.43			
"	"	"	21	7	3.05			
"	"	"	15	8	2.92			
"	"	"	2	9	0.61			
"	"	"	1	10	0.29			

Field Notes: Area started at the mouth and went to the 1st. trail crossing.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, Jim Herrig & USFS  
Personnel, and Appalachian Chapter TU members  
 WR-0525

FISH FIELD DATA FORM  
 TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Brookshire Creek Lat-Long Not Recorded  
 Watershed Little Tennessee River Date 20 August 1990  
 County Monroe Reach 06010204-  
 Type of Sampling Electrofishing Pool Elevation 2420 ft. to 2480 ft.  
 Gear Type Backpack Shocking Crews Time AM

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Salvelinus fontinalis</i>		356	1	2	0.02			
"	"	"	5	3	0.08			
"	"	"	8	4	0.34			
"	"	"	13	5	0.90			
"	"	"	11	6	1.21			
"	"	"	10	7	1.48			
"	"	"	4	8	0.88			

Field Notes: Area upstream of 1st. trail crossing - 3 brooks found in tributary.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, Jim Herring & USFS Personnel, and Appalachian Chapter TU members

WR-0525



FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Bald River Lat-Long Not Recorded  
 Watershed Little Tennessee River Date 20 August 1990  
 County Monroe Reach 06010204-  
 Type of Sampling Electrofishing Pool Elevation 2240 ft.  
 Gear Type Backpack Shocking Time AM

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Salvelinus fontinalis</i>		356	2	3	0.04			
"	"	"	3	5	0.08			
"	"	"	1	6	0.04			
"	"	"	1	7	0.04			
<i>Oncorhynchus mykiss</i>		353	3	3	0.06			
"	"	"	1	6	0.02			
"	"	"	4	7	0.31			
"	"	"	3	8	0.46			
"	"	"	1	9	0.31			

Field Notes: Area between falls on Bald River at the mouth of Brookshire Creek. Weight data is not valid.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, Jim Herrig & USFS Personnel, and Appalachian Chapter TU members

WR-0525

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Brookshire Creek Lat-Long Not Recorded  
 Watershed Little Tennessee River Date 21 August 1990  
 County Monroe Reach 06010204-  
 Type of Sampling Toxicant Pool Elevation Mouth to 2420 ft.  
 Gear Type Rotenone Time PM

SPECIES		CODE	NUMBER	LENGTH	WT.			
Name								
<i>Salvelinus fontinalis</i>		356	1	2	0.01			
"	"	"	3	3	0.06			
"	"	"	4	4	0.14			
"	"	"	7	5	0.35			
"	"	"	4	6	0.36			
"	"	"	2	7	0.28			
"	"	"	1	8	0.22			
<i>Oncorhynchus mykiss</i>		353	1	2	0.01			
"	"	"	1	3	0.03			
"	"	"	8	5	0.48			
"	"	"	8	6	0.70			
"	"	"	11	7	1.45			
"	"	"	3	8	0.49			
"	"	"	3	9	0.80			
"	"	"	4	10	1.40			

Field Notes: The above are dead fish collected from the renovation of the lower 0.5 mi. of the stream with rotenone.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, Jim Herrig & USFS

WR-0525 Personnel, and Appalachian Chapter TU members

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Bald River Lat-Long Not Recorded  
 Watershed Little Tennessee River Date 21 August 1990  
 County Monroe Reach 06010204-  
 Type of Sampling Toxicant Pool Elevation 2240 ft.  
 Gear Type Rotenone Time PM

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Salvelinus fontinalis</i>		356	1	5	0.07			
<i>Oncorhynchus mykiss</i>		353	1	3	0.02			
"	"	"	1	4	0.04			
"	"	"	3	5	0.16			
"	"	"	7	6	0.61			
"	"	"	3	7	0.35			
"	"	"	1	9	0.18			

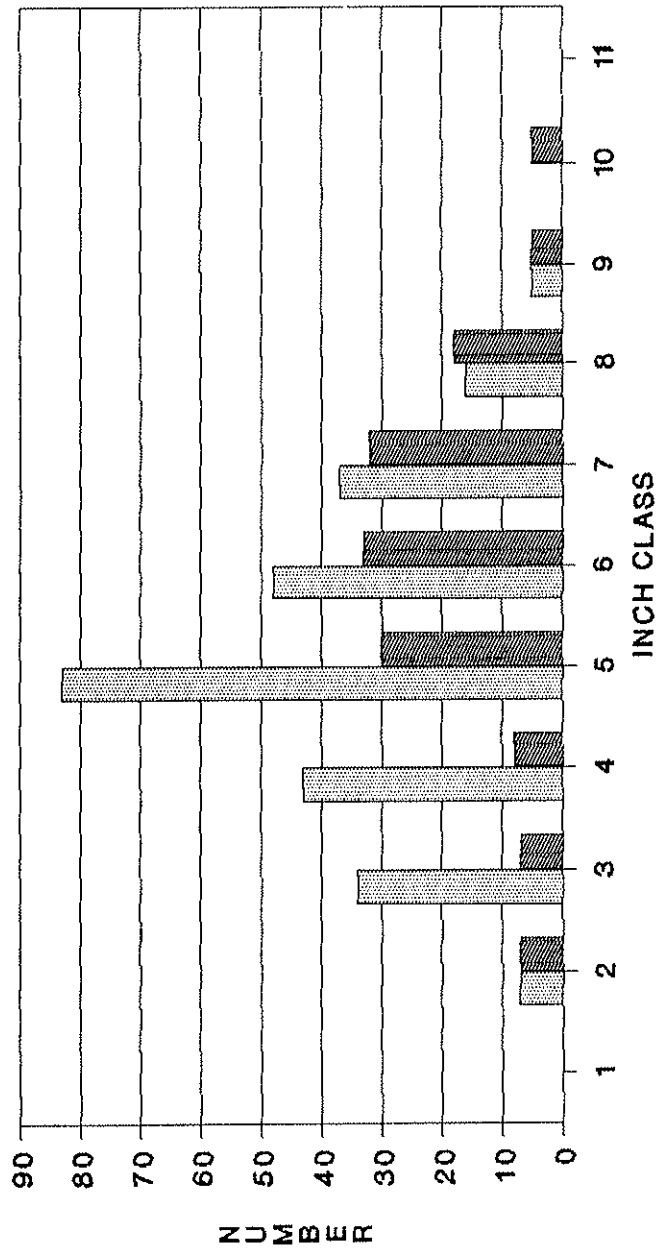
Field Notes: Dead fish collected between falls on Bald River at the mouth of Brookshire Creek. Rotenone renovation project.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, Jim Herrig & USFS Personnel, and Appalachian Chapter TU members

WR-0525

TROUT FROM BROOKSHIRE CREEK  
 RENOVATION PROJECT  
 INCH CLASS DISTRIBUTION

 BROOK TROUT
  RAINBOW TROUT



$n = 418$   
 BROOK = 273  
 RAINBOW = 145

Figure 16.

## Sycamore Creek

Two qualitative fishery surveys were conducted in March and October 1990:

**Location and Length** - Tributary to Tellico River. Sample area 1 was located at the upper end of an island that is just upstream of the Tellico Hatchery dam and was sampled on 30 October 1990. It was 400 ft. in length and averaged 26.4 ft. in width. Sample area 2 was located at the last switchback in the road near elevation 3,600 ft. and was sampled on 29 March 1990. It was approximately 550 ft. in length. Both sites were in Monroe County. Big Junction Quadrangle.

**Gear Type** - Both sites were sampled using backpack electrofishing equipment. Site 1 was sampled using two backpack electrofishing units operating at 750 v. AC. Site 2 was sampled using a single backpack electrofishing unit operating at 700 v. AC.

**Water Quality** - Data were taken from midstream on 30 October 1990 at site 1 only: DO - 10.6 ppm, pH - 7.1, Temperature - 48.6 F, Conductivity - 8 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected at each site. A 90 minute qualitative survey was conducted at site 1. The sample contained 221 organisms and represented 33 taxa. Benthic organisms were collected from all major habitat types at site 2. The sample contained 176 organisms and represented 21 taxa.

### Fish Collected:

<u>Species</u>	<u>Site 1</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Rainbow trout	52	96.3	3.35	90.3
Nongame Fish	1	1.9	0.35	9.4
Forage Fish	1	1.9	0.01	0.3
TOTAL	54		3.71	

## Site 2

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Rainbow trout	1	25.0	0.32	22.9
Brook trout	3	75.0	1.08	77.1
TOTAL	4		1.4	

**Comments** - This stream was surveyed primarily to assess its trout population. Its brook trout (*Salvelinus fontinalis*) population was reportedly eliminated by rainbow trout (*Oncorhynchus mykiss*) in the early 1950's and it apparently never had any trout in above a large falls located in the headwaters (Bivens 1984). This section above the falls was stocked with Owhi strain hatchery brook trout fingerlings in 1984 and again in 1987. We surveyed this area to follow up on these stockings and see if any brook trout had survived or reproduced. We also conducted a qualitative survey of both fish and macroinvertebrates from one site near the mouth of the stream.

A total of 54 fish weighing 3.71 lb. and comprising three species was collected at Site 1. Fifty-two of these were rainbow trout and they ranged from 3 to 8 in. (Fig. 17). All these appeared to be stream reared fish. A single specimen each of the northern hog sucker (*Hypentelium nigricans*) and the rosyside dace (*Clinostomus funduloides*) were the only other fish collected. It is interesting to note this occurrence of the rosyside dace. This is an undescribed subspecies of *C. funduloides* of the upland tributaries of the Little Tennessee River. It is common in portions of the Little Tennessee system in North Carolina, but is uncommon and of spotty occurrence in Tennessee (Etnier and Starnes in press). To our knowledge, it has never been collected from Sycamore Creek before.

At about 3,600 ft. elevation we sampled around 500 to 600 ft. of stream and collected only four trout total. This area was above the falls and is the general area where brook trout have been stocked. Three of the trout were brooks and one was a rainbow. We saw at least one trout escape capture but could not tell what it was. All the fish collected were 9 to 10 in. and subsequent scale analysis revealed that they were at least three year old fish. This means they were probably survivors of the 1987 stocking but apparently no reproduction had taken

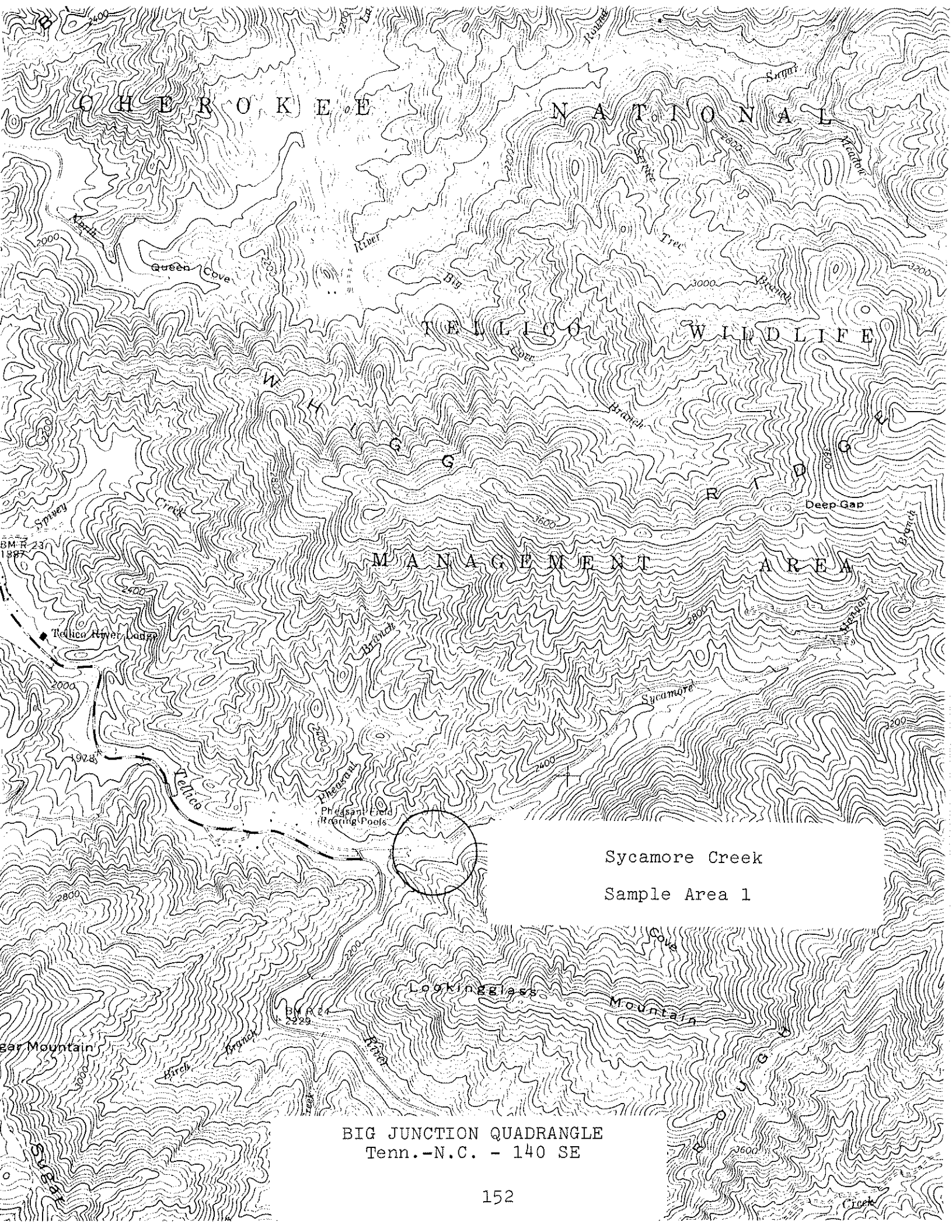
place as no young-of-year or intermediate size fish were found. It is quite possible that the fingerling hatchery brook trout stocked in 1987 may have had a few rainbow trout mixed in with them. That is probably why we found the one rainbow trout at this site.

Benthic macroinvertebrates from our sample at Site 1 included Heptageniidae, and Leptophlebiidae mayflies, Peltoperlidae, Perlidae, Perlodidae, and Pteronarcyidae stoneflies, Glossosomatidae, Hydropsychidae, Limnephilidae, Molannidae, Odontoceridae, Philopotamidae, Polycentropodidae, Psychomyiidae, and Sericostomatidae caddisflies, and Elmidae and Eubriidae beetles. Trichopterans represented about 42%, plecopterans 28% and ephemeropterans about 15% of the total number of organisms collected (Fig. 18). A total of 33 taxa was collected at this site. Almost half of these were caddisfly taxa.

At Site 2 we also made a qualitative benthic sample from all major habitat types. However, we did not sample as intensively at this site as we did at Site 1. Several of the same families were collected here also. Additional ones collected here but not downstream included Baetidae, Ephemerellidae, and Siphonuridae mayflies, Nemouridae and Taeniopterygidae stoneflies, and Rhyacophilidae caddisflies. There were, however, six months between sampling periods. Ephemeropterans represented about 60%, plecopterans 27% and trichopterans only 4% of the total number of organisms collected (Fig. 19). A total of 21 taxa was collected at this site.

#### **Management Recommendations:**

1. Need to conduct population surveys (three-pass depletion method) to determine standing crop and population density of the wild trout population.
2. The upper reach (upstream of falls) would be a good location to manage for southern strain brook trout.
3. Since this stream no longer receives hatchery fish it should be managed as a wild trout stream. It currently falls under the same regulation as Tellico River. The first two items in this section should be addressed prior to any regulation change.



C H E R O K E E N A T I O N A L

W I L D L I F E

M A N A G E M E N T A R E A

Sycamore Creek  
Sample Area 1

BIG JUNCTION QUADRANGLE  
Tenn.-N.C. - 140 SE



TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Sycamore Creek Lat-Long 351717N - 840530W  
Watershed Little Tennessee River Length of Sample 400 ft.  
Station Site # 1 Reach 06010204-  
County Monroe Date/Time 30 October 1990/1030  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 26.4 ft. Average Depth 0.7 ft. Maximum Depth 2.5 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud - % Silt 5 % Sand 15 % Clay - %  
Gravel 20 % Rubble 35 % Boulders 25 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 5 % Sand 15 % Clay - %  
Gravel 25 % Rubble 30 % Boulders 20 % Bedrock 5 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average \_\_\_\_\_ Scarce X
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 40 %  
of stream, Average in 40 %, Poor in 20 %
7. Shade or Canopy Good over 95 % of Stream.
8. Flow (CFS) 41.4 : Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Cool and clear; air temp. - 50°F.
10. Past Weather (last 24 hours) Clear and cool, cold overnight.
11. pH 7.1 Temp. 48.6° F Conductivity 8 D.O. 10.6 % Saturation 93
12. Comments: Sample location was at the upper end of an island that is just upstream of the Tellico Hatchery dam. Some siltation in side pools, riffle areas clean, good cover for fish.

FISH FIELD DATA FORM

Site #1 - Island upstream  
of hatchery dam

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Sycamore Creek Lat-Long 351717N - 840530W  
 Watershed Little Tennessee River Date 30 October 1990  
 County Monroe Reach 06010204-  
 Type of Sampling Electrofishing Pool Elevation 2140 ft.  
 Gear Type Two backpack shockers @ Time 1330 - 1400  
750 v. AC

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Oncorhynchus mykiss</i>		353	8	3	0.15			
"	"	"	15	4	0.46			
"	"	"	14	5	0.92			
"	"	"	8	6	0.77			
"	"	"	6	7	0.76			
"	"	"	1	8	0.29			
<i>Hypentelium nigricans</i>		166	1	9	0.35			
* <i>Clinostomus funduloides</i>		-	1	3	0.01			

\* Undescribed subspecies of *C. funduloides* of the upland tributaries of the Little Tennessee River.

Field Notes: 400 ft. sample length.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Jim Habera

WR-0525

RAINBOW TROUT FROM SYCAMORE CREEK  
SITE # 1  
INCH CLASS DISTRIBUTION

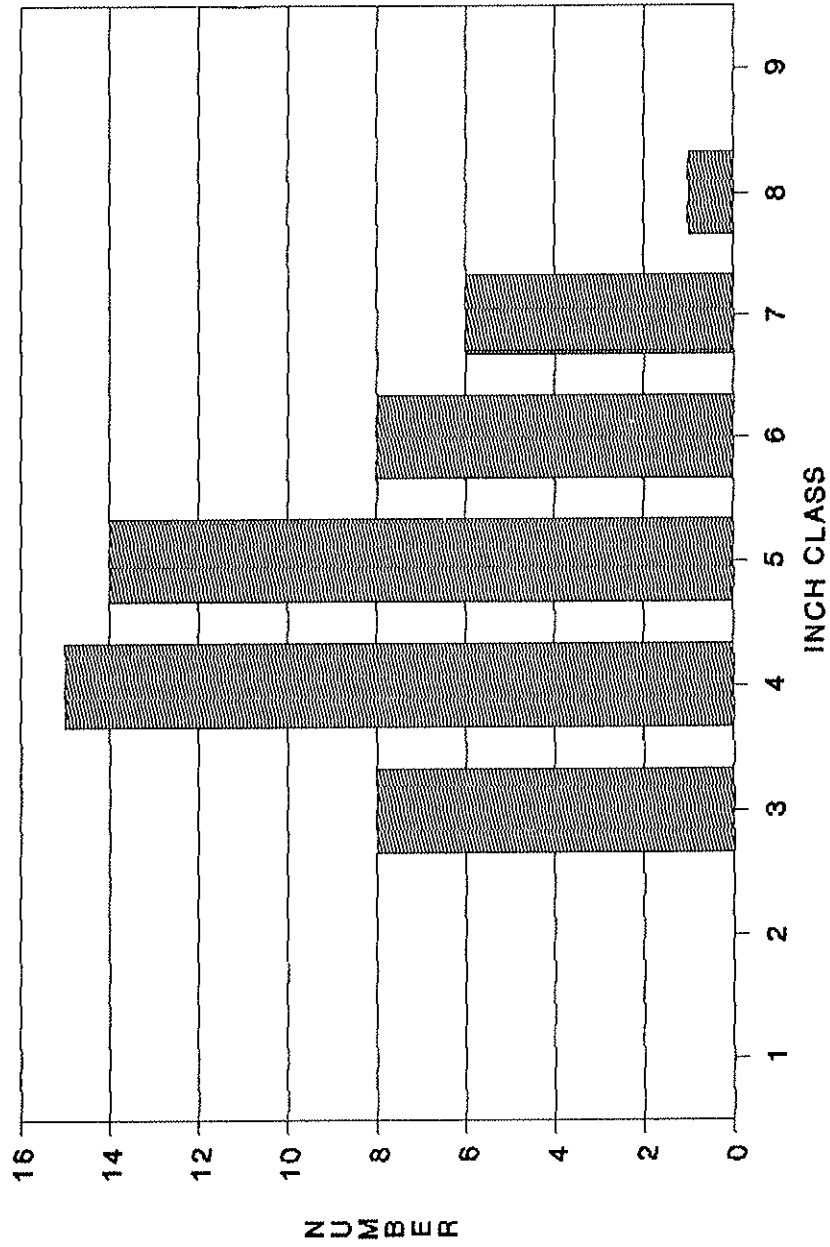


Figure 17.

Sycamore Creek: Site # 1, Qualitative Benthic Sample

30 October 1990

Field # 268

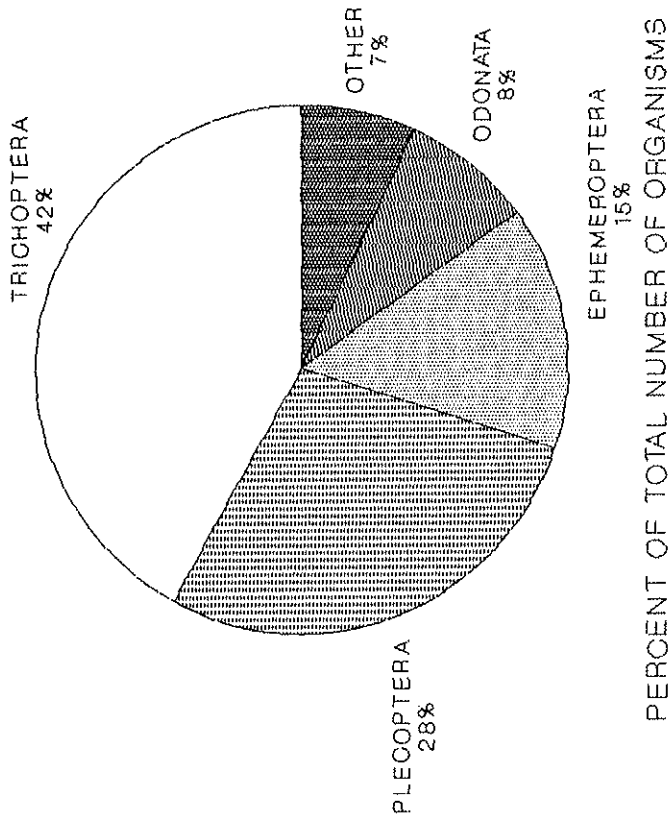
Monroe Co., TN; At upper end of island that is just upstream  
of the Tellico Hatchery dam. Coordinates: 351717N - 840530W.  
Big Junction, Tenn.-N.C., # 140 SE Quad. Reach # 06010204-.

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	1
COLEOPTERA:	
Elmidae/ <u>Oulimnius latiusculus</u> adult	1
Eubriidae/ <u>Ectopria</u> larva	1
DIPTERA:	
Athericidae/ <u>Atherix lantha</u>	2
Chironomidae	4
Tipulidae/ <u>Tipula</u>	2
EPHEMEROPTERA:	
Heptageniidae/ <u>Epeorus dispar</u>	12
<u>Stenonema carlsoni</u>	3
<u>S. pudicum</u>	16
Leptophlebiidae/ <u>Paraleptophlebia</u>	2
HEMIPTERA:	
Gerridae/ <u>Gerris (Aquarius) remigis</u> nymph	1
<u>Gerris (Aquarius) remigis</u> adult females	5
MEGALOPTERA:	
Corydalidae/ <u>Nigronia serricornis</u>	1
ODONATA:	
Cordulegastridae/ <u>Cordulegaster erronea</u>	1
Gomphidae/ <u>Lanthus vernalis</u>	16
PLECOPTERA:	
Peltoperlidae/ <u>Peltoperla</u>	19
Perlidae/ <u>Acroneuria abnormis</u>	12
Perlodidae/ <u>Isoperla marlynia</u>	1
<u>Malirekus hastatus</u>	11
Pteronarcyidae/ <u>Pteronarcys</u>	19

Sycamore Creek: Site # 1, Qualitative Benthic Sample cont.

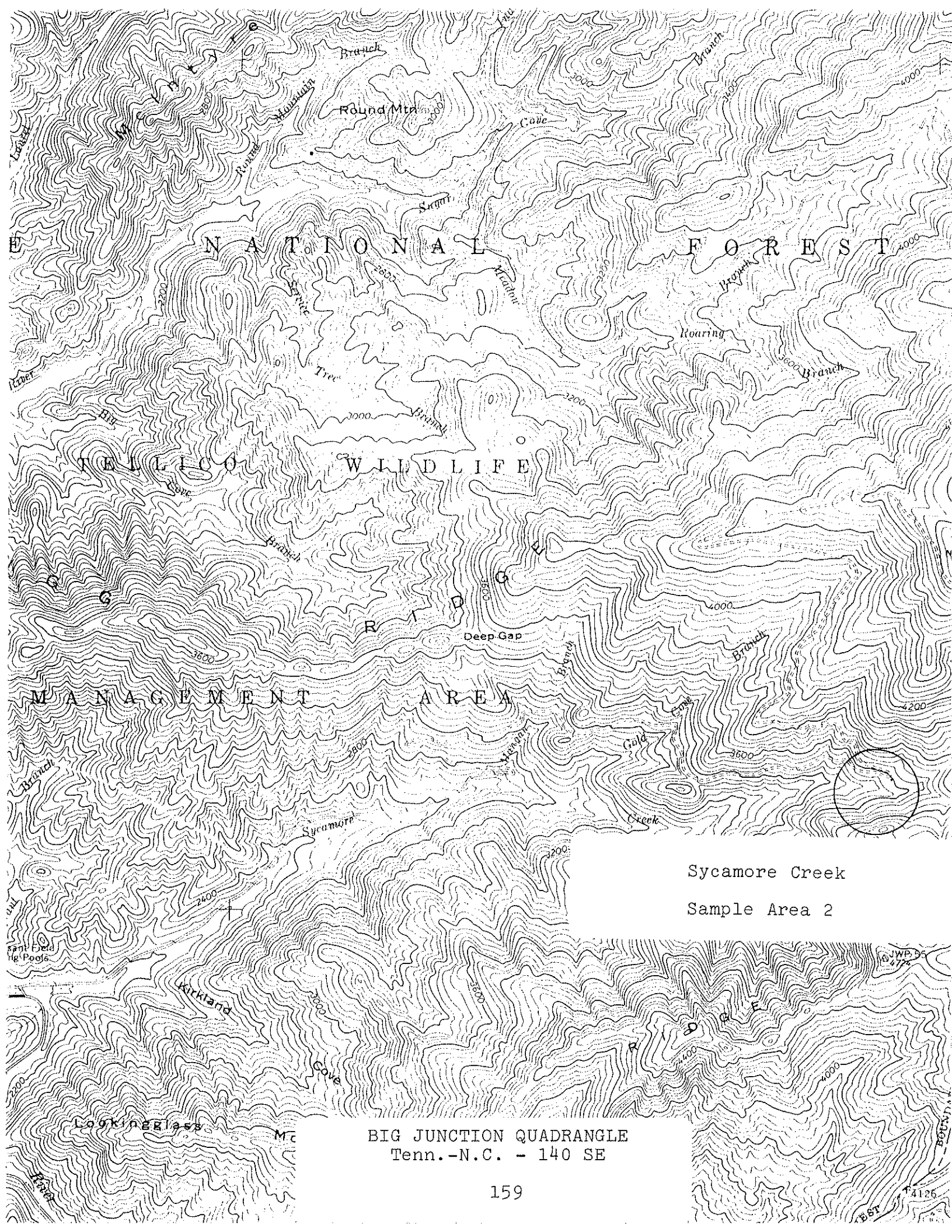
TAXA	NUMBER
TRICHOPTERA:	
Glossosomatidae/ <u>Glossosoma</u>	3
Hydropsychidae/ <u>Arctopsyche irrorata</u>	10
<u>Diplectrona modesta</u>	19
<u>Parapsyche cardis</u>	3
<u>Symphitopsyche macleodi</u>	44
<u>S. (probably sparna)</u>	1
Limnephilidae/ <u>Pycnopsyche</u>	1
Molannidae/ <u>Molanna</u>	1
Odontoceridae/ <u>Psilotreta frontalis</u>	2
<u>P. rufa</u>	1
Philopotamidae/ <u>Dolophilodes</u>	3
Polycentropodidae/ <u>Nyctiophylax</u>	1
Psychomyiidae/ <u>Lype diversa</u>	2
Sericostomatidae/ <u>Fattigia pele</u>	1
	221

SYCAMORE CREEK  
SITE 1  
BENTHIC MACROINVERTEBRATES



$n = 221$   
TAXA RICHNESS = 33

Figure 18.



NATIONAL FOREST

WILDLIFE MANAGEMENT AREA

MANAGEMENT AREA

Sycamore Creek  
Sample Area 2

BIG JUNCTION QUADRANGLE  
Tenn.-N.C. - 140 SE

JWP  
4772

4126

FISH FIELD DATA FORM

Site #2 - At last switch-back in road

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Sycamore Creek Lat-Long 351751N - 840235W  
 Watershed Little Tennessee River Date 29 March 1990  
 County Monroe Reach 06010204-  
 Type of Sampling Electrofishing Pool Elevation 3600 ft.  
 Gear Type One backpack shocker @ 700 v. AC Time 1130 - 1230

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Oncorhynchus mykiss</i>		353	1	9	0.32			
<i>Salvelinus fontinalis</i>		356	2	9	0.65			
"	"	"	1	10	0.43			

Saw one other trout escape capture.

Field Notes: Sample location was at the last switchback in the road near elevation 3600 ft. Sampled approx. 500 to 600 ft. of stream.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Vic Coppin

WR-0525



Sycamore Creek: Site # 2, Qualitative Benthic Sample

29 March 1990

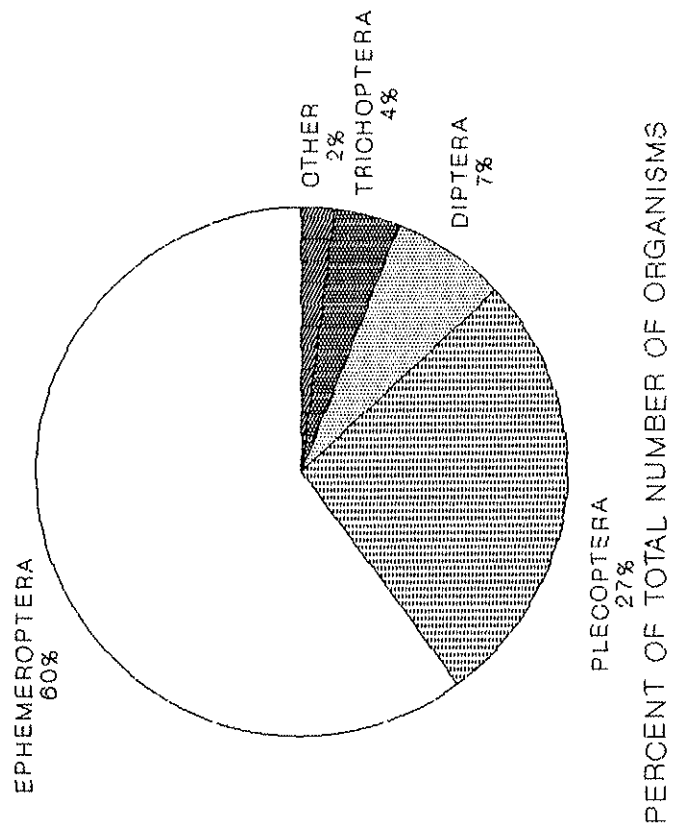
Field # 198

Monroe Co., TN; Near the last switchback in the road at about 3,600 ft. elevation. Coordinates: 351751N - 840235W. Big Junction, Tenn.-N.C., # 140 SE Quad. Reach # 06010204-.

TAXA	NUMBER
DIPTERA:	
Blephariceridae/ <u>Blepharicera</u>	3
Chironomidae	6
Tipulidae/ <u>Antocha</u>	1
<u>Tipula</u>	3
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	3
Ephemere <del>ll</del> idae/ <u>Ephemerella</u>	3
Heptageniidae/ <u>Epeorus</u>	80
<u>Epeorus dispar</u>	6
<u>Heptagenia</u>	1
<u>Stenonema carlsoni</u>	3
Siphonuridae/ <u>Ameletus cryptostimulus</u>	10
HEMIPTERA:	
Gerridae/ <u>Gerris (Aquadirus) remigis</u>	2
PLECOPTERA:	
Nemouridae/ <u>Amphinemura</u>	1
Peltoperlidae/ <u>Peltoperla</u>	10
Perlodidae/ <u>Isoperla</u>	1
<u>Malirekus hastatus</u>	12
<u>Yugus bubosus</u>	2
Taeniopterygidae/ <u>Taenionema atlanticum</u>	20
<u>Taenionema unid. adult</u>	1
TRICHOPTERA:	
Hydropsychidae/ <u>Diplectrona modesta</u>	1
<u>Parapsyche cardis</u>	4
<u>Symphitopsyche macleodi</u>	1
Rhyacophilidae/ <u>Rhyacophila</u>	1
<u>Rhyacophila carolina complex</u>	1

176

SYCAMORE CREEK  
SITE 2  
BENTHIC MACROINVERTEBRATES



n = 176  
TAXA RICHNESS = 21

Figure 19.

## French Broad River

Two qualitative fishery surveys were conducted in June and November 1990:

**Location and Length** - The sample area was located from Highway 321 bridge to the upper end of Boyer Island at French Broad River mi. 78 and was sampled on 18 June and again on 1 November 1990. It was 3,200 ft. in length and averaged 283.3 ft. in width. The site was in Cocke County. Newport Quadrangle.

**Gear Type** - The site was sampled using both boat and backpack electrofishing equipment. A boat shocking unit was used where deeper water permitted. The shorelines were sport shocked using a backpack electrofishing unit operating at 240 v. AC. The riffle areas were sampled using a backpack electrofishing unit and shocking into a 20 ft. seine. Fish were also collected by hauling a 20 ft. seine through shallow eddy areas.

**Water Quality** - Data were taken from midstream on 1 November 1990: DO - 11.4 ppm, pH - 7.6, Temperature 50.5 F, Conductivity - 52 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey. The sample contained 320 organisms and represented 34 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Smallmouth bass	3	0.8	3.02	2.9
Spotted bass	1	0.3	0.10	0.1
Largemouth bass	1	0.3	t	-
White bass	2	0.5	1.12	1.1
Sauger	1	0.3	1.18	1.1
Redbreast sunfish	7	1.8	0.51	0.5
Bluegill	4	1.0	0.25	0.2
Nongame Fish	63	16.4	96.07	92.4
Forage Fish	303	78.7	1.70	1.6
TOTAL	385		103.97	

**Comments** - We made two qualitative samples at the same site on the French Broad in 1990. One sample was conducted in conjunction with the TVA's Index of Biotic Integrity (IBI) survey in June, when we collected only fish data. We returned to the same site in November to obtain additional fish data, collect stream information for TADS, and conduct a qualitative benthic sample.

The French Broad has a long history of being severely polluted from both industrial and domestic sources and from siltation. To our knowledge, TWRA has never made any fish collections from the upper river section, at least not recently. Probably the most recent and certainly the most comprehensive survey was that made by the TVA in the late 1970's (Harned 1979).

We sampled approximately 0.6 mi. of stream using a combination of electrofishing techniques over the two sampling periods. A total of 385 fish weighing 103.97 lbs. and comprising 30 species was collected (samples combined). Six native game species, smallmouth bass (*Micropterus dolomieu*), spotted bass (*M. punctulatus*), largemouth bass (*M. salmoides*), white bass (*Morone chrysops*), sauger (*Stizostedion canadense*) and bluegill (*Lepomis macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were found. Two white bass were collected and spotted bass, largemouth bass and sauger were represented by single specimens. Only three smallmouth bass were collected but one was in the 17 in. class and weighed over 2 lbs. Both bluegill and redbreast sunfish were collected in low numbers and small size. All gamefish combined made up only 5% by number and 6% by weight of all fish collected. Twenty-four nongame and forage species were also collected and these made up about 95% of the total number and 94% of the total weight. Of these, 10 forage species comprised about 78% of the total number, but nongame fish accounted for more than 90% of the total weight. This was due mainly to several large river carpsuckers (*Carpionodes carpio*) and common carps (*Cyprinus carpio*) in the sample. These two species alone accounted for 74% of the total weight collected. Only two darters, the redline (*Etheostoma rufilineatum*) and the logperch (*Percina caprodes*) were present and almost all other fish collected were tolerant forms. Our species list compares well with that of the 1977 TVA survey (Harned 1979). They collected 28 species in the same area of the river compared to our 30 species. They collected five species that we did not collect in our sample and we collected seven species that they did not collect.

The French Broad River in Coker County upstream of Douglas Reservoir is for the most part a turbid, big-river system. It has been heavily polluted in the past by urban and industrial development mostly at upstream sites. It continues to carry a heavy silt load and the day we sampled in November, it was dingy and appeared to be carrying a heavy load of very fine sand. The occurrence of a lower number of fish species, most of which are tolerant forms, than what should be expected from a big-river type habitat indicates that the French Broad is still being adversely impacted or has failed to recover very much.

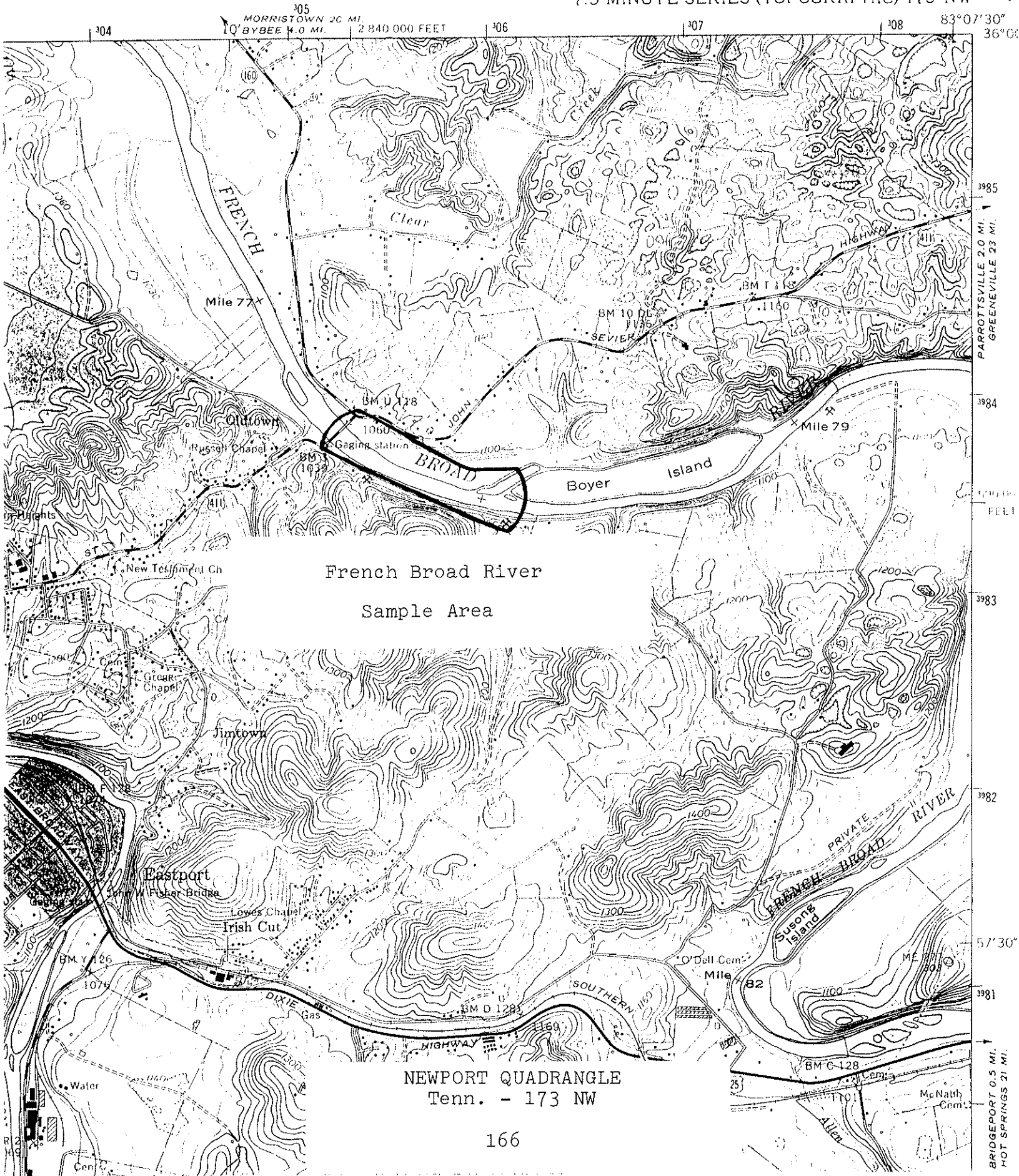
Benthic macroinvertebrates from our sample included Heptageniidae, Oligoneuriidae and Tricorythidae mayflies, Pteronarcyidae stoneflies, Hydropsychidae, and Polycentropodidae caddisflies, and Elmidae and Gyrinidae beetles. Asian clams (*Corbicula fluminea*), limpets (*Ferrissia*) and *Physa* snails were also present. Two crayfish species, *Orconectes erichsonianus* and *O. forceps*, were found. Trichopterans represented about 38%, ephemeropterans 19% and mollusks about 11% of the total number of organisms collected (Fig. 20). A total of only 34 taxa was collected at this site, most of which were tolerant forms.

**Management Recommendations:**

1. No specific management can be suggested based on our limited survey.
2. Should encourage appropriate North Carolina officials to help with pollution sources upstream.
3. Conduct more intensive surveys of the upper river and continue to monitor for recovery of the system.

ITY

NEWPORT QUADRANGLE  
 TENNESSEE-COCKE CO.  
 7.5 MINUTE SERIES (TOPOGRAPHIC) 173-NW



TENNESSEE WILDLIFE RESOURCES AGENCY

PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream French Broad River Lat-Long 355845N - 830905W  
 Watershed French Broad River Length of Sample 0.6 mi.  
 Station (See comments) Reach 06010105-1,1  
 County Cocke Date/Time 1 November 1990/1130  
 Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 283.3 ft. Average Depth 3.5 ft. Maximum Depth 8.5 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud 10 % Silt 10 % Sand 70 % Clay - %  
 Gravel 5 % Rubble - % Boulders 5 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
 Gravel 10 % Rubble 20 % Boulders 50 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
 Average \_\_\_\_\_ Scarce  Some river weed \_\_\_\_\_

6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
 of stream, Average in 35 %, Poor in 40 %
7. Shade or Canopy Good over 20 % of Stream.

\* 8. Flow (CFS) 1899 : Compared to Normal: Low \_\_\_\_\_ Normal  High \_\_\_\_\_

9. Present Weather Clear and mild; air temp. - 66°F.

10. Past Weather (last 24 hours) Clear and mild, cool overnight.

11. pH 7.6 Temp. 50.5°F Conductivity 52 D.O. 11.4 % Saturation 102

12. Comments: Sample location was from Highway 321 bridge to the upper  
end of Boyer Island. Water was dingy, it appears to be carrying  
a load of very fine sand. \* Flow was from the TVA gauging station  
at Newport for 1 November 1990.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream French Broad River Lat-Long 355845N - 830905W  
 Watershed French Broad River Date 18 June 1990 & 1 November 1990  
 County Cocke Reach 06010105-1,1  
 Type of Sampling Electrofishing Pool Elevation 1017 ft.  
 Gear Type Boat, backpack shocker, Time 1230 - 1730 & 1500 - 1600  
and backpack with seine

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	1	9	0.33			
"	"	"	1	10	0.59			
"	"	"	1	17	2.10			
<i>M. punctulatus</i>		219	1	6	0.12			
<i>M. salmoides</i>		220	1	1	t			
<i>Morone chrysops</i>		222	2	10	1.12			
<i>Stizostedion canadense</i>		361	1	15	1.18			
<i>Lepomis auritus</i>		201	3	2	0.03			
"	"	"	1	4	0.07			
"	"	"	2	5	0.23			
"	"	"	1	6	0.18			
<i>L. macrochirus</i>		206	1	2	0.01			
"	"	"	1	3	0.02			
"	"	"	1	4	0.06			
"	"	"	1	5	0.16			
<i>Lepisosteus osseus</i>		198	1	26	1.06			
<i>Dorosoma cepedianum</i>		48	2	11-13	1.27			
<i>Aplodinotus grunniens</i>		20	11	8-11	4.72			
<i>Ictalurus punctatus</i>		176	3	9-16	2.49			
<i>Noturus eleutherus</i>		283	16	2	0.13			
<i>Pylodictus olivaris</i>		346	5	2-11	1.07			
Continued on next page								

Field Notes: Approx. 0.6 mi. sample length. IBI survey with TVA and  
qualitative fish collection with backpack shocker.

Name of Collector(s): TVA crew - Rick Bivens and Carl E. Williams

WR-0525



FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream French Broad River Lat-Long 355845N - 830905W  
 Watershed French Broad River Date 18 June 1990 & 1 November 1990  
 County Cocke Reach 06010105-1,1  
 Type of Sampling Electrofishing Pool Elevation 1017 ft.  
 Gear Type Boat, backpack shocker, Time 1230 - 1730 & 1500 - 1600  
and backpack with seine

Name	SPECIES CODE	NUMBER	LENGTH	WT.			
<i>Carpionodes carpio</i>	28	18	13-17	29.88			
<i>C. cyprinus</i>	29	2	15-16	3.20			
<i>Hypentelium nigricans</i>	166	4	3	0.06			
<i>Ictiobus bubalus</i>	177	1	12	1.01			
<i>Moxostoma carinatum</i>	228	1	20	2.50			
<i>M. erythrurum</i>	230	3	2-13	1.71			
<i>Campostoma anomalum</i>	25	5	2-4	0.09			
<i>Cyprinella galactura</i>	253	48	1-3	0.21			
<i>C. spiloptera</i>	269	114	1-3	0.45			
<i>Cyprinus carpio</i>	47	12	16-23	47.10			
<i>Hybopsis amblops</i>	155	4	1-2	0.02			
<i>Nocomis micropogon</i>	234	7	2-6	0.18			
<i>Notropis rubellus</i>							
<i>micropteryx</i>	260	24	1-2	0.06			
<i>Pimephales vigilax</i>	336	1	3	0.02			
<i>Etheostoma rufilineatum</i>	108	51	1-2	0.23			
<i>Percina caprodes</i>	306	7	1-5	0.17			
<i>Cottus caroliniae</i>	40	26	1-3	0.14			

Field Notes: Approx. 0.6 mi. sample length. IBI survey with TVA and  
qualitative fish collection with backpack shocker.

Name of Collector(s): TVA crew - Rick Bivens and Carl E. Williams

French Broad River: Qualitative Benthic Sample

1 November 1990

Field # 270

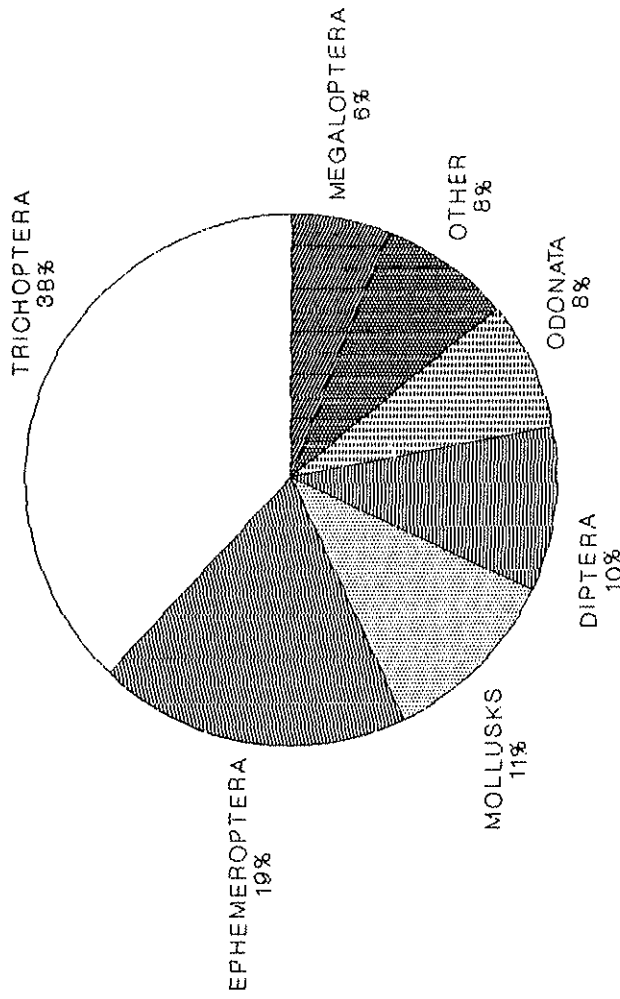
Cocke Co., TN; Near river mi. 78, around Boyer Island.  
 Coordinates: 355845N - 830905W. Newport, Tenn., # 173 NW  
 Quad. Reach # 06010105-1,1.

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	5
COLEOPTERA:	
Elmidae/ <u>Promoesia tardella</u> larva	1
<u>Stenelmis</u> larva	1
Gyrinidae/ <u>Dineutus discolor</u>	5
DECAPODA:	
Cambaridae/ <u>Orconectes erichsonianus</u> males 1st.	3
<u>Orconectes erichsonianus</u> females	4
<u>O. forceps</u> male 1st.	1
<u>O. forceps</u> females	2
DIPTERA:	
Chironomidae	2
Simuliidae	29
Tipulidae/ <u>Tipula</u>	1
EPHEMEROPTERA:	
Heptageniidae/ <u>Stenacron interpunctatum</u>	2
<u>Stenonema mediopunctatum</u>	8
<u>S. modestum</u>	4
Oligoneuriidae/ <u>Isonychia</u>	44
Tricorythidae/ <u>Tricorythodes</u>	3
GASTROPODA:	
Ancyliidae/ <u>Ferrissia</u>	5
Physidae/ <u>Physa</u>	2
LEPIDOPTERA:	
Pyralidae/ <u>Petrophila</u>	1
MEGALOPTERA:	
Corydalidae/ <u>Corydalus cornutus</u>	17
<u>Nigronia</u>	1

French Broad River: Qualitative Benthic Sample cont.

TAXA	NUMBER
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	7
Calopterygidae/ <u>Calopteryx</u>	1
<u>Hetaerina americana</u>	10
Coenagrionidae/ <u>Argia</u>	3
Corduliidae/ <u>Neurocordulia obsoleta</u>	1
Gomphidae/ <u>Erpetogomphus designatus</u>	1
<u>Gomphus (Stylurus) laurae</u>	2
Macromiidae/ <u>Macromia</u>	2
PELECYPODA:	
Corbiculidae/ <u>Corbicula fluminea</u>	29
PLECOPTERA:	
Pteronarcyidae/ <u>Pteronarcys</u>	1
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	22
<u>Hydropsyche pahlerata</u>	3
<u>H. venularis</u>	66
<u>Symphitopsyche morosa</u>	29
Polycentropodidae/ <u>Neureclipsis crepuscularis</u>	2
	320

FRENCH BROAD RIVER  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 320  
TAXA RICHNESS = 34

Figure 20.

## Tuckahoe Creek

One qualitative fishery survey was conducted in May 1990:

**Location and Length** - Tributary to the French Broad River. The sample site was located at the bridge on Midway Road near the old Midway School and was sampled on 16 May 1990. It was 300 ft. in length and averaged 20.3 ft. in width. The site was in Knox County. Boyds Creek Quadrangle.

**Gear Type** - The site was sampled using two backpack electro-fishing units operating at 110 v. AC.

**Water Quality** - Data were taken from midstream on 16 May 1990: DO - 7.9 ppm, pH - 8.1, Temperature - 65.3 F, Conductivity - 370 microhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 60 minute qualitative sample. The sample contained 871 organisms and represented 48 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Rock bass	19	8.7	3.99	25.1
Redbreast sunfish	38	17.4	3.22	20.2
Bluegill	19	8.7	0.29	1.8
Nongame Fish	6	2.7	6.77	42.5
Forage Fish	137	62.6	1.65	10.4
TOTAL	219		15.92	

**Comments** - This stream was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 219 fish weighing 15.92 lb. and comprising 17 species from our sample site. Two native game species, rock bass (*Amloplites rupestris*) and bluegill (*Lepomis macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were collected. Bluegill were fairly well represented by numbers but they were all small (1 to 4 in.). Therefore, comparison of inch class distributions was made for rock bass and redbreast sunfish only (Fig. 21).

Rock bass made up about 9%, compared to about 17% by redbreast sunfish, of the total number of fish collected. However, rock bass comprised about 25% and redbreast sunfish about 20% of the total weight. Several of the rock bass were in the 8 in. class.

Tuckahoe Creek is a low gradient stream that is fairly heavily silted from non-point sources and most of the fish species collected are typical of this type pollution. The only interesting occurrence was two specimens of blackstripe topminnow (*Fundulus notatus*), a species that is not commonly encountered in east Tennessee streams. Only two darter species, the redline (*Etheostoma rufilineatum*) and the snubnose (*E. simoterum*) were collected. All forage species were very low in numbers and represented only 10% of the total weight of all fish collected. The stream was dingy at the time we sampled though, which may account to some extent for the low numbers.

Benthic macroinvertebrates from our sample included Baetidae, Ephemerellidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, Nemouridae and Perlidae stoneflies, Hydropsychidae, Hydroptilidae, Leptoceridae, and Limnephilidae caddisflies, and Elmidae and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) and fingernail clam (*Sphaerium*) were present along with the pleurocerid snail *Pleurocera canaliculatum*. Two species of crayfish, *Cambarus longirostris* and *Orconectes forceps* were also collected. Trichopterans represented about 38% of the total number of organisms we collected. In this case, however, the vast majority (72%) were *Hydropsyche betteni/depravata*, a species complex that is generally considered to be a tolerant form and commonly found in silt polluted streams. Therefore, Figure 22 could be misleading without considering the taxa involved. A total of no less than 48 taxa was collected at this site.

#### **Management Recommendations:**

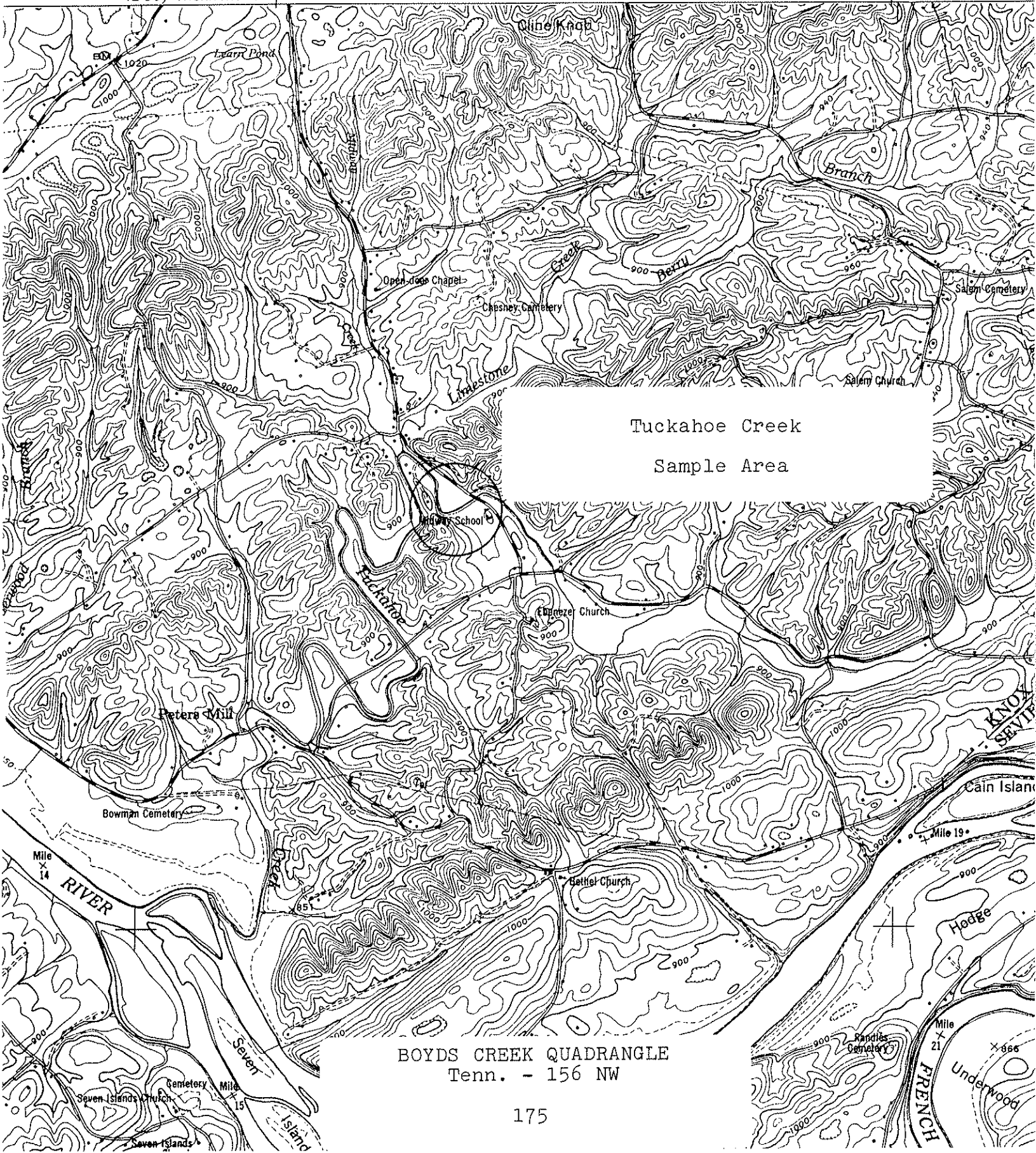
1. No specific management can be suggested at present. However, anything to abate the non-point source pollution would be beneficial.
2. The rock bass would be the primary game species to target for any specific management.

UNITED STATES  
TENNESSEE VALLEY AUTHORITY  
MAPS AND SURVEYS BRANCH

42°30' 3.0 MI. TO U.S. 25W AND 70  
THORNGROVE 0.9 MI.

(MASCOT 155-SW)

140'



Tuckahoe Creek  
Sample Area

BOYDS CREEK QUADRANGLE  
Tenn. - 156 NW

TENNESSEE WILDLIFE RESOURCES AGENCY

PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Tuckahoe Creek Lat-Long 355840N - 834121W  
 Watershed French Broad River Length of Sample 300 ft.  
 Station Bridge on Midway Road Reach 06010107-61,0  
 County Knox Date/Time 16 May 1990/1030  
 Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 20.3 ft. Average Depth 0.5 ft. Maximum Depth 2.1 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud 10 % Silt 10 % Sand 20 % Clay 5 %  
 Gravel 15 % Rubble 35 % Boulders 5 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
 Gravel 30 % Rubble 40 % Boulders 10 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
 Average X Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
 of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 75 % of Stream.
8. Flow (CFS) 11.8 : Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy, warm and humid. Air temp. - 75° F.
10. Past Weather (last 24 hours) Partly cloudy, warm and humid.
11. pH 8.1 Temp. 65.3° F Conductivity 370 D.O. 7.9 % Saturation 84
12. Comments: Sample location at bridge on Midway Road near the old  
Midway School. Low gradiet stream. Fairly heavily silted.



FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Tuckahoe Creek Lat-Long 355840N - 834121W  
 Watershed French Broad River Date 16 May 1990  
 County Knox Reach 06010107-61,0  
 Type of Sampling Electrofishing Pool Elevation 858 ft.  
 Gear Type Two backpacks @ 110 v.AC Time 1330-1430

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Ambloplites rupestris</i>		13	1	2	0.01			
"	"	"	2	3	0.05			
"	"	"	2	4	0.12			
"	"	"	1	5	0.10			
"	"	"	4	6	0.73			
"	"	"	3	7	0.81			
"	"	"	6	8	2.17			
<i>Lepomis auritus</i>		201	6	2	0.07			
"	"	"	9	3	0.26			
"	"	"	7	4	0.40			
"	"	"	10	5	1.13			
"	"	"	3	6	0.51			
"	"	"	3	7	0.85			
<i>L. macrochirus</i>		206	4	1	0.01			
"	"	"	8	2	0.05			
"	"	"	6	3	0.16			
"	"	"	1	4	0.07			
<i>Aplodinotus grunniens</i>		20	4	8-11	1.00			
<i>Hypentelium nigricans</i>		166	1	8	0.27			
<i>Campostoma anomalum</i>		25	12	2-6	0.46			
<i>Cyprinus carpio</i>		47	1	20	5.50			
<i>Cyprinella spiloptera</i>		269	2	2-3	0.03			
Continued on next page								

Field Notes: 300 ft. sample area. Water was dingy. Collected two spiny softshell turtles (*Trionyx spiniferus spiniferus*) at this site.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Tuckahoe Creek Lat-Long 355840N - 834121W  
 Watershed French Broad River Date 16 May 1990  
 County Knox Reach 06010107-61,0  
 Type of Sampling Electrofishing Pool Elevation 858 ft.  
 Gear Type Two backpacks @ 110 v.AC Time 1330-1430

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Hybopsis</i>	<i>amblops</i>	155	4	2-3	0.04			
<i>Luxilus</i>	<i>chrysocephalus</i>	249	3	1-3	0.03			
<i>Notemigonus</i>	<i>crysoleucas</i>	235	1	2	0.01			
<i>Notropis</i>	<i>stramineus</i>	271	2	2	0.02			
<i>Pimephales</i>	<i>notatus</i>	334	11	2-3	0.10			
<i>Fundulus</i>	<i>notatus</i>	139	2	2	0.02			
<i>Etheostoma</i>	<i>rufilineatum</i>	108	3	2	0.02			
<i>E.</i>	<i>simoterum</i>	111	17	1-2	0.06			
<i>Cottus</i>	<i>carolinae</i>	40	80	1-4	0.86			

Field Notes: 300 ft. sample length.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

GAME FISH FROM TUCKAHOE CREEK  
INCH CLASS DISTRIBUTION

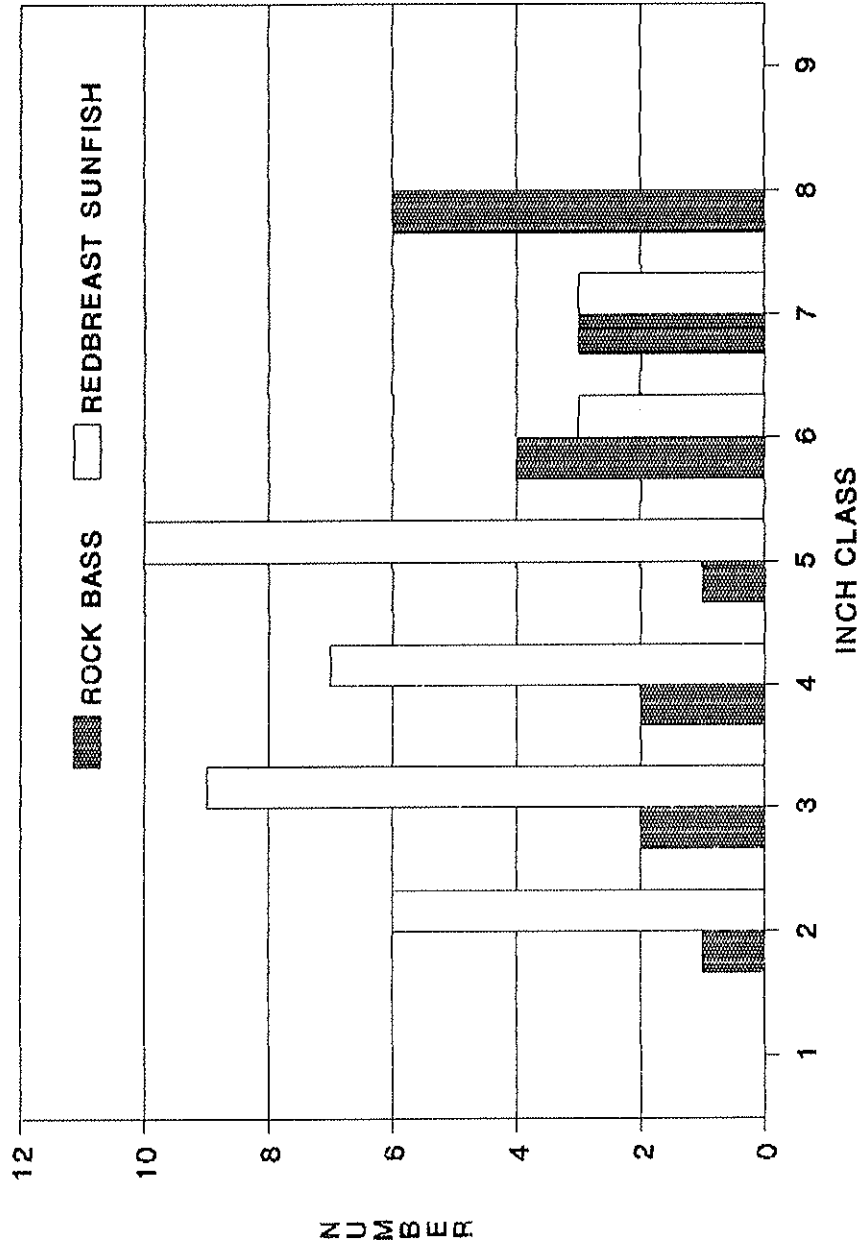


Figure 21.

Tuckahoe Creek: Qualitative Benthic Sample

16 May 1990

Field # 206

Knox Co., TN; At the bridge on Midway Road near the old Midway School. Coordinates: 355840N - 834121W. Boyds Creek, Tenn., # 156 NW Quad. Reach # 06010107-61,0.

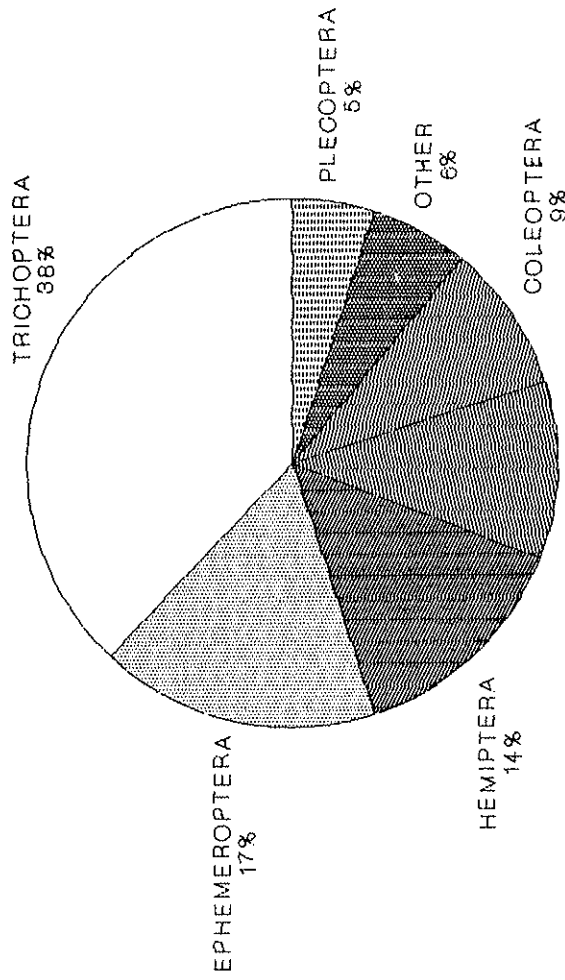
TAXA	NUMBER
ANNELIDA:	
Oligochaeta	4
COLEOPTERA:	
Elmidae/Dubiraphia larva	1
Macronychus glabratus adults	2
Optioservus larva	1
O. ovalis adult	1
Promoresia tardella larvae	2
Stenelmis larvae	54
Stenelmis adults	12
Psephenidae/Psephenus herricki larvae	7
DECAPODA:	
Cambaridae/Cambarus (Hiaticambarus) longirostris male 1st.	1
Orconectes forceps males 2nd.	5
DIPTERA:	
Chironomidae larvae	46
Chironomidae pupae	7
Empididae larva	1
Empididae pupae	2
Simuliidae larvae	2
Tabanidae/Tabanus	4
Tipulidae/Antocha	36
Hexatoma	1
EPHEMEROPTERA:	
Baetidae/Baetis	18
Pseudocloeon	4
Ephemerellidae/Dannella lita	5
Eurylophella	4
Ephemeridae/Hexagenia	6
Heptageniidae/Heptagenia	3
Stenacron interpunctatum	7
Stenonema (prob. exiguum)	75
Stenonema (Stenonema) femoratum	3
Leptophlebiidae/Habrophlebiodes	2
Oligoneuriidae/Isonychia	20

Tuckahoe Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
GASTROPODA:	
Pleuroceridae/ <u>Pleurocera canaliculatum</u>	11
HEMIPTERA:	
Gerridae/ <u>Gerris (Aquarius) conformis</u> adult females	3
Veliidae/ <u>Rhagovelia obesa</u> nymphs	56
<u>Rhagovelia obesa</u> adult males	37
<u>Rhagovelia obesa</u> adult females	23
ISOPODA:	
Asellidae/ <u>Lirceus</u>	4
MEGALOPTERA:	
Corydalidae/ <u>Nigronia serricornis</u> larva	1
<u>Nigronia serricornis</u> adults	4
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	3
Calopterygidae/ <u>Calopteryx</u>	1
Coenagrionidae/ <u>Argia</u>	1
Gomphidae/ <u>Gomphus</u>	2
<u>Ophiogomphus mainensis</u>	3
PELECYPODA:	
Corbiculidae/ <u>Corbicula fluminea</u>	9
Sphaeriidae/ <u>Sphaerium</u>	2
PLECOPTERA:	
Nemouridae/ <u>Amphinemura delosa</u>	2
Perlidae/ <u>Acroneuria evoluta</u>	5
<u>Perlesta</u>	36
TRICHOPTERA:	
Glossosomatidae/ <u>Glossosoma</u> pupa	1
Hydropsychidae/ <u>Cheumatopsyche</u>	82
<u>Hydropsyche betteni/depravata</u> larvae	236
<u>Hydropsyche betteni/depravata</u> pupa	1
Hydroptilidae/ <u>Hydroptila</u>	5
Leptoceridae/ <u>Oecetis</u>	1
Limnephilidae/ <u>Neophylax mitchelli</u>	5
URODELA:	
Plethodontidae/ <u>Desmognathus fuscus conanti</u>	1

871

TUCKAHOE CREEK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

$n = 871$   
TAXA RICHNESS = 48

Figure 22.

## Tobes Creek

One qualitative fishery survey was conducted in May 1990:

**Location and Length** - Tributary to the Pigeon River. The sample area was located just upstream of the mouth near the Waterville exit of Interstate 40 and was sampled on 24 May 1990. It was 200 ft. in length and averaged 10 ft. in width. The site was in Cocke County. Waterville Quadrangle.

**Gear Type** - The site was sampled using a single backpack electrofishing unit operating at 700 v. AC.

**Water Quality** - Data were taken from midstream on 24 May 1990: Temperature - 56.3 F, Conductivity - 32 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 60 minute qualitative sample. The sample contained 288 organisms and represented 33 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Rainbow trout	42	42.4	1.45	69.4
Brown trout	1	1.0	0.19	9.1
Nongame Fish				
Forage Fish	56	56.6	0.45	21.5
TOTAL	99		2.09	

**Comments** - This stream was sampled primarily to develop a species diversity list for TADS. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 99 fish weighing 2.09 lb. and comprising only three species. Rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*) were the only game species collected. Of the 42 rainbow trout collected, 30 were young-of-year fish. The largest rainbow trout was in the 10 in. class and only one brown trout was collected. The only other species collected was the blacknose dace (*Rhinichthys atratulus*).

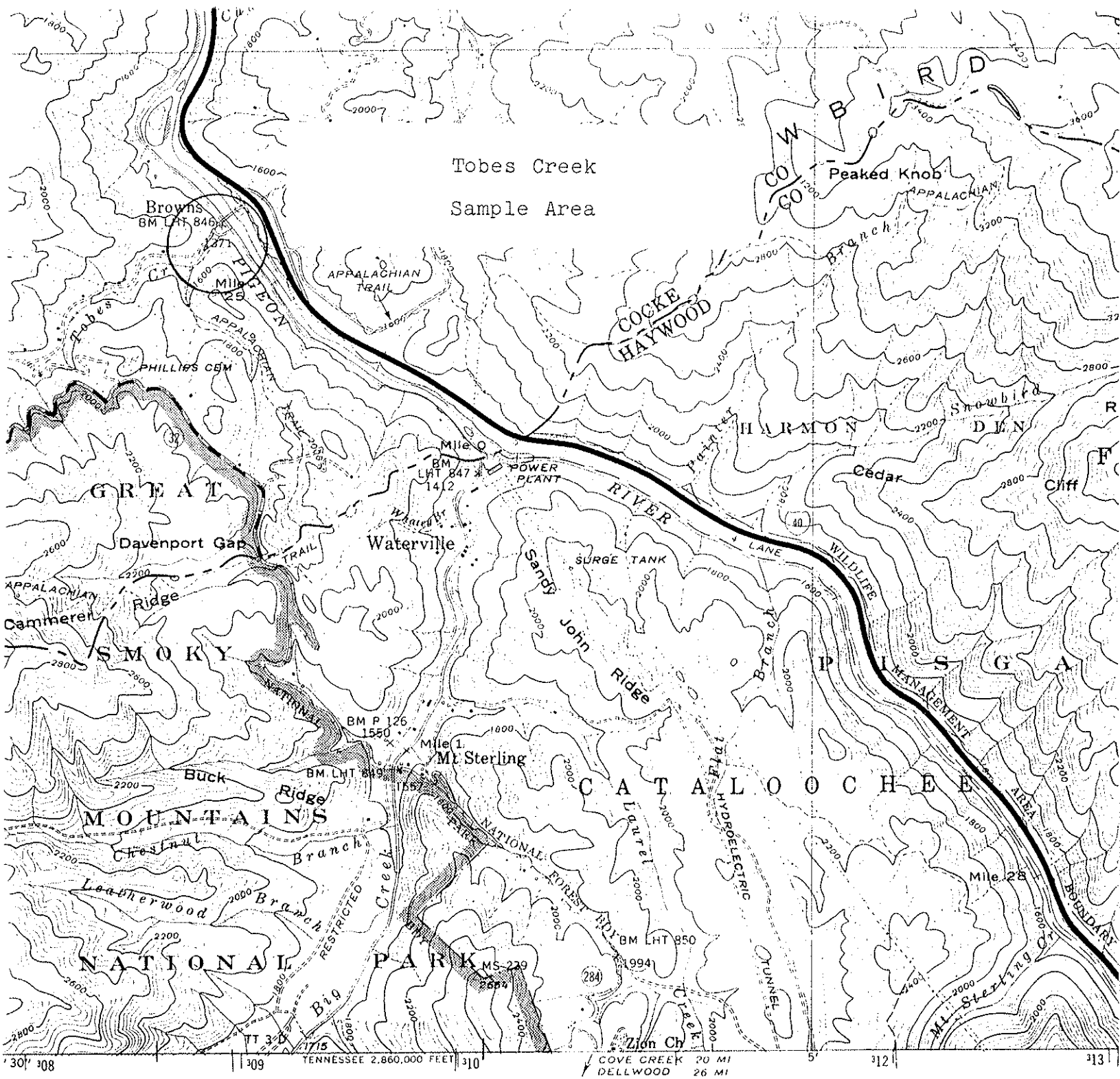
Benthic macroinvertebrates from our sample included Baetidae, Ephemerellidae, Heptageniidae, Leptophlebiidae, and Oligoneuriidae mayflies, Perlidae, Perlodidae, and Pteronarcyidae stoneflies, Glossosomatidae, Hydropsychidae, Lepidostomatidae, Philopotamidae, and Rhyacophilidae caddisflies, and Psephenidae beetles. Periwinkle snails (*Goniobasis*) were present. Ephemeropterns represented about 43% and trichopterans about 36% of the total number of organisms collected (Fig. 23). A total of 38 taxa was collected at this site. About 53% of these were mayfly and caddisfly taxa. Plecopterans accounted for no less than five distinct taxa.

The stream heads up on the Great Smoky Mountains National Park and flows through mostly forested areas into the Pigeon River. Although small, it is a high quality tributary to the Pigeon and may be a trout stream for most of its length.

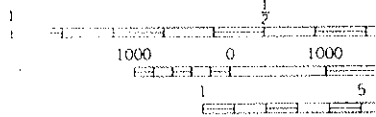
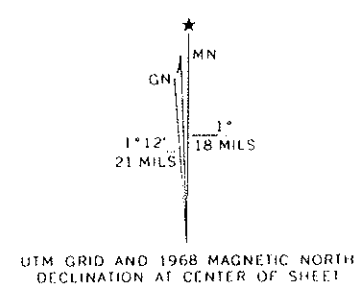
**Management Recommendations:**

1. No specific management is suggested other than protection of the watershed.
2. Larval drift of benthic organisms from this tributary would influence recovery of the Pigeon River if pollution is reduced in that stream.





lapped and edited by Tennessee Valley Authority  
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 ontrol by USC&GS, USGS, and TVA  
 opography by USGS by photogrammetric methods.  
 ap field checked by TVA, 1940  
 ylonic projection, 1927 North American datum  
 0,000 foot grid based on Tennessee and  
 orth Carolina rectangular coordinate systems  
 000 meter Universal Transverse Mercator Grid ticks,  
 one 17, shown in blue  
 evisions shown in purple and recompilation of woodland  
 eas compiled by the Tennessee Valley Authority from aerial  
 otographs taken 1968. This information not field checked  
 ne purple dashed lines indicate selected fence and field lines  
 sible on aerial photography. This information is unchecked



UTM GRID AND 1968 MAGNETIC NORTH  
 DECLINATION AT CENTER OF SHEET

WATERVILLE QUADRANGLE  
 Tenn.-N.C. - 173 SE

FOR SALE BY U. S. G  
 U. S. TENNESSEE VALLEY AUTHORITY  
 AND TENNESSEE DIVISION  
 A FOLDER DESCRIBING TOPOGRAPHY

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Tobes Creek Lat-Long 354704N - 830648W  
 Watershed Pigeon River Date 24 May 1990  
 County Cocke Reach 06010106-  
 Type of Sampling Electrofishing Pool Elevation 1370 ft.  
 Gear Type One backpack @ 700 v. AC Time 1015-1045

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Oncorhynchus mykiss</i>		353	30	1-2	0.04			
"	"	"	6	5	0.38			
"	"	"	3	6	0.25			
"	"	"	1	7	0.12			
"	"	"	1	8	0.18			
"	"	"	1	10	0.48			
<i>Salmo trutta</i>		355	1	8	0.19			
<i>Rhinichthys atratulus</i>		351	56	1-3	0.45			
Temperature - 56.3°F								
Conductivity - 32 micromho/cm								
Avg. width - 10 ft.								
Avg. depth - 0.4 ft.								
Gravel-rubble-boulder substrate.								
Some siltation present, probably from gravel road.								

Field Notes: Sample location was just upstream of the mouth. Sample length was approx. 200 ft.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

Tobes Creek: Qualitative Benthic Sample

24 May 1990

Field # 207

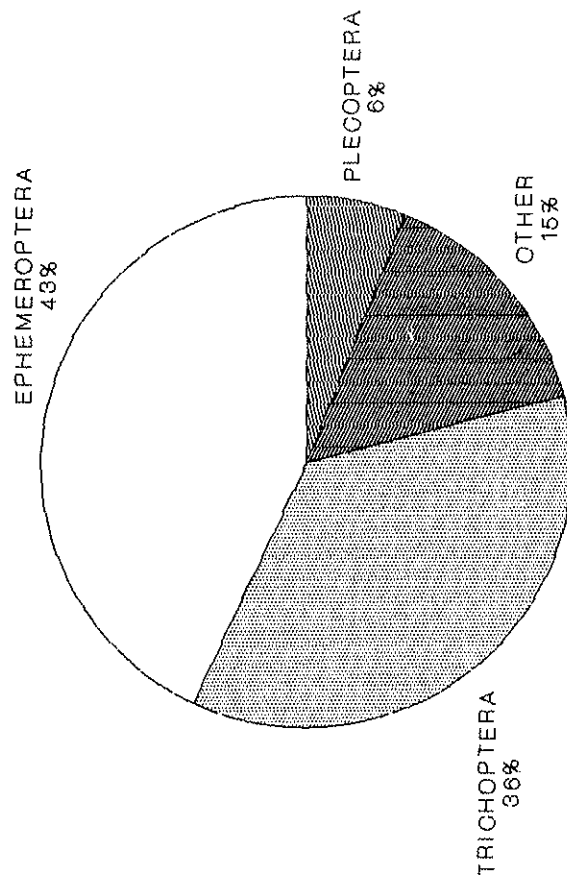
Cocke Co., TN; Just upstream of the mouth of the stream.  
 Coordinates: 354704N - 830648W. Waterville, Tenn.-N.C.,  
 # 173 SE Quad. Reach # 06010106-.

TAXA	NUMBER
<b>AMPHIPODA:</b>	
Gammaridae	1
<b>ANNELIDA:</b>	
Branchiobdellida	1
Oligochaeta	7
<b>COLEOPTERA:</b>	
Psephenidae/ <u>Psephenus herricki</u> larvae	7
<b>DIPTERA:</b>	
Athericidae/ <u>Atherix lantha</u>	1
Blephariceridae/ <u>Blepharicera</u> larva	1
<u>Blepharicera</u> pupa	1
Simuliidae larva	1
Simuliidae pupae	5
Tipulidae/ <u>Tipula</u>	1
<b>EPHEMEROPTERA:</b>	
Baetidae/ <u>Pseudocloeon</u>	2
Ephemerellidae/ <u>Drunella cornuta</u>	63
<u>Ephemerella</u>	5
<u>E. rossi</u>	2
<u>Eurylophella</u>	1
Heptageniidae/ <u>Epeorus (Iron) dispar</u>	4
<u>E. (I.) pleuralis</u>	1
<u>E. (I.) rubidus/subpallidus</u>	13
<u>Rhithrogena (prob. fuscifrons)</u>	1
<u>Stenonema</u>	4
<u>Stenonema (Maccaffertium) carlsoni</u>	1
<u>S. (M.) pudicum</u>	22
Leptophlebiidae/ <u>Paraleptophlebia</u>	2
Oligoneuriidae/ <u>Isonychia</u>	2
<b>GASTROPODA:</b>	
Pleuroceridae/ <u>Goniobasis</u>	4
<b>HEMIPTERA:</b>	
Gerridae/ <u>Gerris (Aquarius) remigis</u> adult male	1
<u>Gerris (Aquarius) remigis</u> adult females	2

Tobes Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
MEGALOPTERA:	
Corydalidae/ <u>Nigronia serricornis</u> adult	1
ODONATA:	
Cordulegastridae/ <u>Cordulegaster erronea</u>	1
Gomphidae/ <u>Lanthus</u>	11
PLECOPTERA:	
Perlidae/ <u>Acroneuria abnormis</u>	6
<u>Paragnetina immarginata</u>	1
<u>Perlesta</u>	1
Perlodidae/ <u>Isoperla holochlora</u>	4
Pteronarcyidae/ <u>Pteronarcys</u>	5
TRICHOPTERA:	
Glossosomatidae/ <u>Glossosoma</u> larvae	7
<u>Glossosoma</u> pupae	2
Hydropsychidae/ <u>Diplectrona modesta</u> larvae	74
<u>Diplectrona modesta</u> pupa	1
<u>Symphitopsyche sparna</u>	1
Lepidostomatidae/ <u>Lepidostoma</u>	1
Limnephilidae/ <u>Pycnopsyche</u>	1
Philopotamidae/ <u>Dolophilodes distinctus</u>	9
Rhyacophilidae/ <u>Rhyacophila</u> sp. cf. <u>R. carolina</u>	3
<u>R. fuscula</u>	3
	288

**TOBES CREEK  
BENTHIC MACROINVERTEBRATES**



PERCENT OF TOTAL NUMBER OF ORGANISMS

**n = 288  
TAXA RICHNESS = 38**

Figure 23.

## Long Creek

One qualitative fishery survey was conducted in June 1990:

**Location and Length** - Tributary to the Nolichucky River. The sample area was located at the low water bridge on Long Creek Road and was sampled on 6 June 1990. It was 300 ft. in length and averaged 35.7 ft. in width. The site was in Hamblen County. Springvale Quadrangle.

**Gear Type** - The site was sampled using two backpack electrofishing units operating at 110 v. AC.

**Water Quality** - Data were taken from midstream on 6 June 1990: DO - 9.0 ppm, pH - 8.3, Temperature - 64.4 F, Conductivity - 360 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 60 minute qualitative sample. The sample contained 290 organisms and represented 32 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Smallmouth bass	1	0.3	0.23	0.6
Largemouth bass	25	7.3	7.10	18.6
Rock bass	66	19.2	7.04	18.4
Redbreast sunfish	29	8.4	1.81	4.7
Green sunfish	2	0.6	0.11	0.3
Bluegill	33	9.6	1.34	3.5
Redear sunfish	1	0.3	0.04	0.1
Nongame Fish	22	6.4	16.02	41.9
Forage Fish	165	48.0	4.51	11.8
TOTAL	344		38.20	

**Comments** - This stream was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 344 fish weighing 38.2 lb. and comprising 22 species from our sample site. Six native game species, smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), bluegill (*L. macrochirus*), and redear sunfish (*L. microlophus*), along with exotic redbreast sunfish (*L. auritus*) were collected. Smallmouth bass and redear sunfish were represented by single specimens each and only two small green sunfish were collected. Therefore, comparison of inch class distributions was made for largemouth bass, rock bass, redbreast sunfish and bluegill (Fig. 24). Largemouth bass made up 7%, compared to about 19% by rock bass, of the total number of fish collected and both contributed about 18% each of the total weight. Both redbreast sunfish and bluegill were collected in similar numbers and weights and ranged from the 2 to 6 in. class. There were 20 largemouth bass collected over 8 in. long with the largest being 10 in.

Long Creek is a low gradient stream that is fairly heavily impacted by silt from non-point sources and most of the fish species collected are typical of this type pollution. Only two darter species, the snubnose (*Etheostoma simoterum*) and the logperch (*Percina caprodes*) were collected. Forage species were very low in numbers and represented only 12% of the total weight of all fish collected. Several were collected as single specimens and only banded sculpin (*Cottus carolinae*) were collected in large numbers. The stream was dingy at the time we sampled though, which may account to some extent for the low numbers.

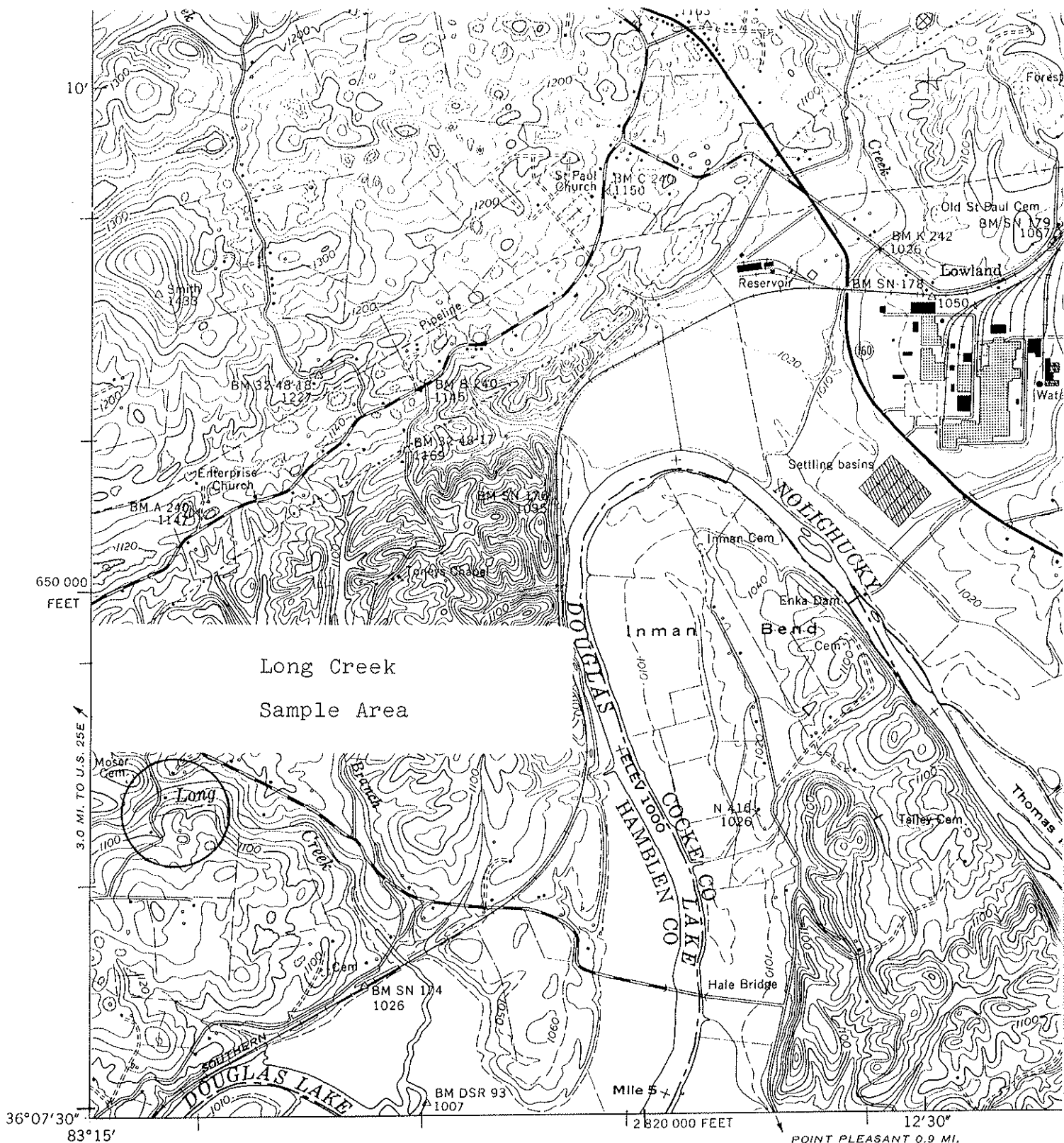
Benthic macroinvertebrates from our sample included Baetidae, Ephemerellidae, Heptageniidae, and Oligoneuriidae mayflies, the perlid stonefly *Perlesta placida*, hydroptychid caddisflies, and Elmidae and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) and fingernail clam (*Sphaerium*) were present along with periwinkle snails (*Goniobasis*). Only juvenile *Orconectes* crayfish were present in our sample. In early 1991, we collected a form I male *Orconectes virilis* from this same site while conducting an Index of Biotic Integrity survey with TVA. This represents a range extension for *O. virilis*. It has a native range north of the Ohio River and has been introduced into Douglas Reservoir. A 1969 survey found *O. virilis* limited to tributaries of the western shore of Douglas Reservoir between Goose Creek and Koontz Creek near Dandridge (Bouchard 1972). Our collection of Long Creek is several miles upstream of that locality. This species may be replacing some native crayfish because of its aggressiveness.

Ephemeropterans represented about 34%, coleopterans about 19% and trichopterans about 12% of the total number of organisms collected (Fig. 25). A total of 32 taxa was collected at this site, many of which are tolerant forms commonly found in silt polluted streams.

**Management Recommendations:**

1. No specific management can be suggested at present. However, anything to abate the non-point source pollution would be beneficial.
2. It is interesting that largemouth bass make up a significant portion of the game fish present. This is probably somewhat unusual in that largemouth are generally incidental in occurrence in stream fisheries. Largemouth bass along with rock bass would be the primary game species to target for any specific management.





(WHITE PINE 163-SE)

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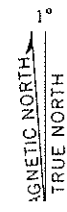
Revised by TVA in 1961 by photogrammetric methods using  
 aerial photographs taken 1959 and by reference to TVA-USGS  
 quadrangle dated 1939. Map field checked by TVA, 1961

Polyconic projection. 1927 North American datum  
 10,000-foot grid based on Tennessee rectangular  
 coordinate system

1000 meter Universal Transverse Mercator  
 Zone 17, shown in blue

Fine red dashed lines indicate selected features  
 visible on aerial photographs. This information

**SPRINGVALE QUADRANGLE**  
 Tenn. - 172 NW



TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Long Creek Lat-Long 360818N - 831448W  
Watershed Nolichucky River Length of Sample 300 ft.  
Station Bridge on Long Creek Road Reach 06010108-4,3  
County Hamblen Date/Time 6 June 1990/1030  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 35.7 ft. Average Depth 1.0 ft. Maximum Depth 3.3 ft.
2. Estimated Percent of Stream in Pools is 25 %
3. Estimated Percent Pool Bottom is Mud 5 % Silt 10 % Sand 10 % Clay - %  
Gravel 25 % Rubble 20 % Boulders 20 % Bedrock 5 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 15 % Clay - %  
Gravel 20 % Rubble 20 % Boulders 20 % Bedrock 15 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous X (*Dianthera americana*)  
Average \_\_\_\_\_ Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 30 %  
of stream, Average in 50 %, Poor in 20 %
7. Shade or Canopy Good over 75 % of Stream.
8. Flow (CFS) 47.5: Compared to Normal: Low \_\_\_\_\_ Normal \_\_\_\_\_ High X
9. Present Weather Partly cloudy and warm.
10. Past Weather (last 24 hours) Partly cloudy, warm, cool overnight.
11. pH 8.3 Temp. 64°F Conductivity 360 D.O. 9.0 % Saturation 96
12. Comments: Fairly silty, lots of bedrock-boulder substrate.  
Agricultural activities appear to impact this stream significantly.  
The stream was high and dingy due to recent rain.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Lohg Creek Lat-Long 360818N - 831448W  
 Watershed Nolichucky River Date 6 June 1990  
 County Hamblen Reach 06010108-4,3  
 Type of Sampling Electrofishing Pool Elevation 1038 ft.  
 Gear Type Two backpacks @ 110 v. AC Time 1320-1350 and 1500-1530

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	1	8	0.23			
<i>M. salmoides</i>		220	2	1	t			
"	"	"	1	6	0.17			
"	"	"	2	7	0.38			
"	"	"	10	8	2.63			
"	"	"	9	9	3.45			
"	"	"	1	10	0.47			
<i>Ambloplites rupestris</i>		13	18	3	0.61			
"	"	"	23	4	1.48			
"	"	"	11	5	1.29			
"	"	"	6	6	1.11			
"	"	"	8	7	2.55			
<i>Lepomis auritus</i>		201	2	2	0.02			
"	"	"	12	3	0.37			
"	"	"	9	4	0.53			
"	"	"	5	5	0.68			
"	"	"	1	6	0.21			
<i>L. cyanellus</i>		202	1	3	0.05			
"	"	"	1	4	0.06			
<i>L. macrochirus</i>		206	2	2	0.02			
"	"	"	17	3	0.45			
"	"	"	12	4	0.61			
"	"	"	2	5	0.26			

Continued on next page.

Field Notes: 300 ft. sample length, 150 ft. downstream and 150 ft. upstream of bridge crossing. Water was dingy - hard to recover fish.

Name of Collector(s): R.D. Bivens, C.E. Williams, M.T. Fagg, & B.L. Carter

WR-0525

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Lohg Creek Lat-Long 360818N - 831448W  
 Watershed Nolichucky River Date 6 June 1990  
 County Hamblen Reach 06010108-4,3  
 Type of Sampling Electrofishing Pool Elevation 1038 ft.  
 Gear Type Two backpacks @ 110 v. AC Time 1320-1350 and 1500-1530

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Lepomis microlophus</i>		209	1	4	0.04			
<i>Aplodinotus grunniens</i>		20	7	9-13	5.23			
<i>Ameiurus natalis</i>		174	1	4	0.07			
<i>Catostomus commersoni</i>		32	5	6-13	2.61			
<i>Hypentelium nigricans</i>		166	5	4-13	2.13			
<i>Moxostoma carinatum</i>		228	1	23	4.25			
<i>M. erythrurum</i>		230	2	11-13	1.27			
<i>Campostoma anomalum</i>		25	19	4-6	1.23			
<i>Cyprinus carpio</i>		47	1	8	0.46			
<i>Luxilus chrysocephalus</i>		249	33	3-6	1.19			
<i>Nocomis micropogon</i>		234	15	2-7	1.01			
<i>Rhinichthys atratulus</i>		351	1	1	t			
<i>Gambusia affinis</i>		147	1	1	t			
<i>Cottus carolinae</i>		40	82	1-4	1.01			
<i>Etheostoma simoterum</i>		111	13	2-3	0.05			
<i>Percina caprodes</i>		306	1	3	0.02			

Field Notes: 300 ft. sample length.

Name of Collector(s): R.D. Bivens, C.E. Williams, M.T. Fagg, & B.L. Carter

GAME FISH FROM LONG CREEK  
INCH CLASS DISTRIBUTION

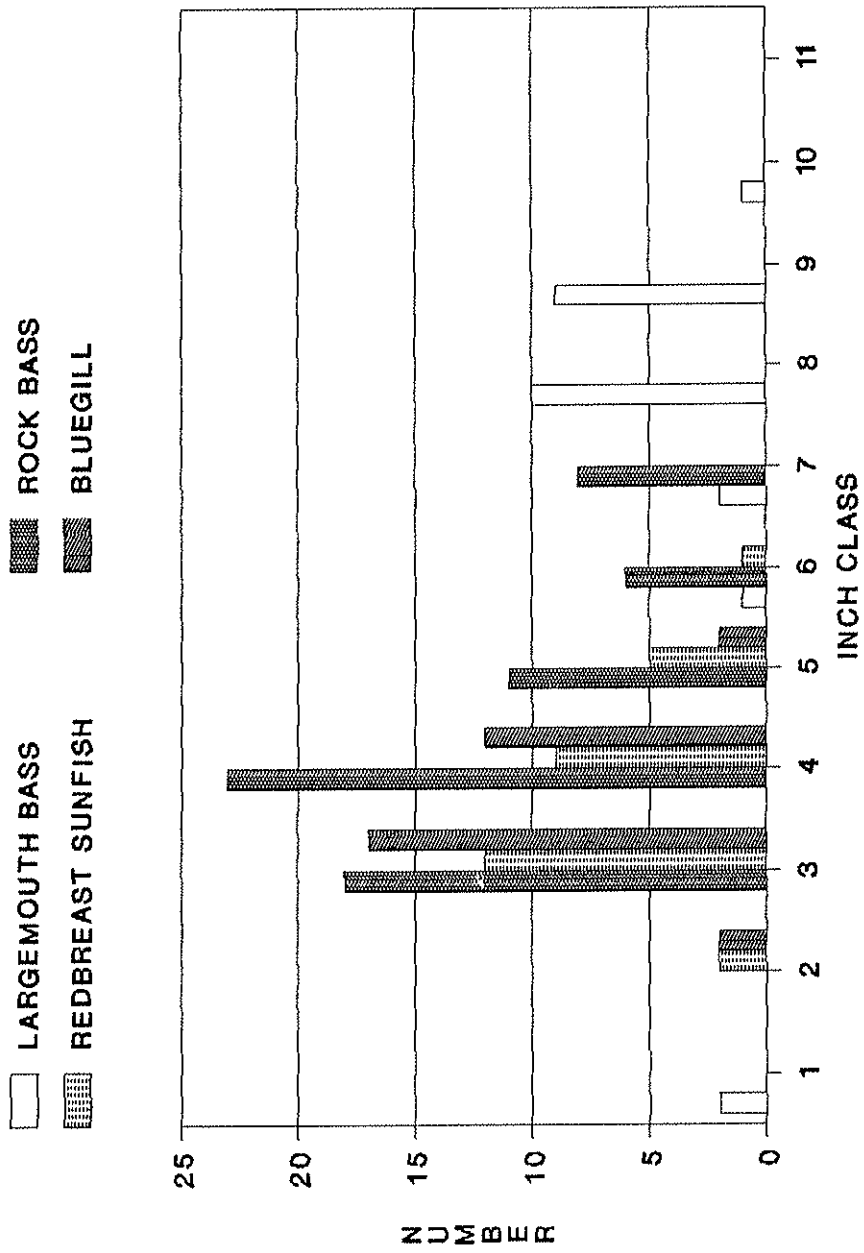


Figure 24.

Long Creek: Qualitative Benthic Sample

6 June 1990

Field # 211

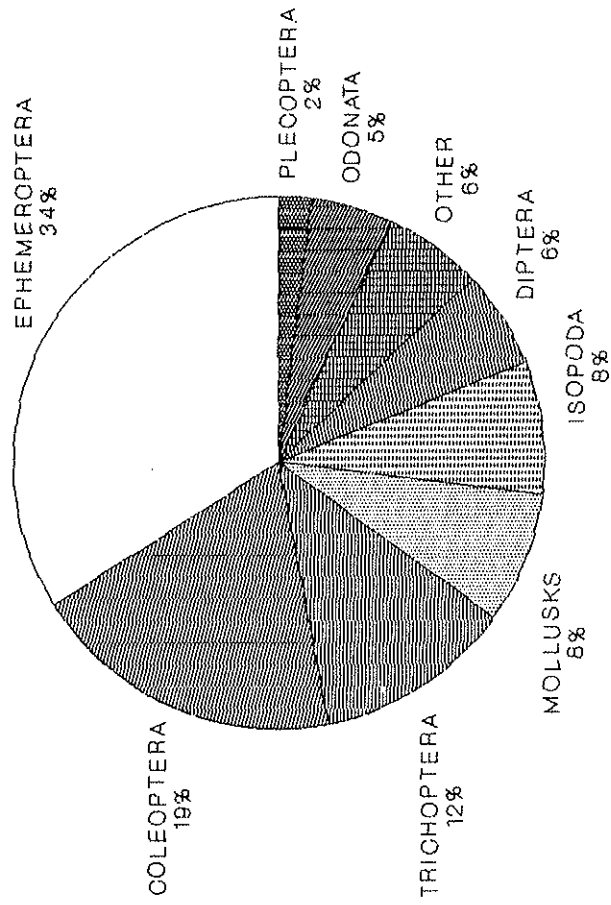
Hamblen Co., TN; At the low-water bridge on Long Creek Road.  
 Coordinates: 360818N - 831448W. Springvale, Tenn., # 172  
 NW Quad. Reach # 06010108-4,3.

TAXA	NUMBER
<b>ANNELIDA:</b>	
Oligochaeta	1
<b>COLEOPTERA:</b>	
Elmidae/ <u>Dubiraphia</u> adult	1
<u>Macronychus glabratus</u> adults	8
<u>Stenelmis</u> larvae	8
<u>Stenelmis</u> adults	19
Psephenidae/ <u>Psephenus herricki</u> larvae	17
<u>Psephenus herricki</u> adults	2
<b>DECAPODA:</b>	
Cambaridae/ <u>Orconectes</u> juvenile males	10
<u>Orconectes</u> juvenile females	3
<b>DIPTERA:</b>	
Chironomidae larvae	4
Simuliidae larvae	11
Tabanidae/ <u>Tabanus</u>	1
Tipulidae/ <u>Hexatoma</u>	1
<b>EPHEMEROPTERA:</b>	
Baetidae/ <u>Baetis</u>	44
Ephemerelellidae/ <u>Serratella deficiens</u>	6
Heptageniidae/ <u>Heptagenia</u>	5
<u>Stenacron interpunctatum</u>	15
<u>Stenonema</u>	15
Leptophlebiidae/ <u>Habrophlebiodes</u>	1
Oligoneuriidae/ <u>Isonychia</u>	13
<b>GASTROPODA:</b>	
Pleuroceridae/ <u>Goniobasis</u>	11
<b>HEMIPTERA:</b>	
Notonectidae/ <u>Notonecta</u> ( <u>Paranecta</u> ) <u>undulata</u>	1

Long Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
ISOPODA:	
Asellidae/ <u>Asellus</u>	1
<u>Lirceus</u>	22
MEGALOPTERA:	
Corydalidae/ <u>Corydalus cornutus</u>	2
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	6
Calopterygidae/ <u>Calopteryx</u>	3
Coenagrionidae/ <u>Enallagma exsulans</u>	5
Macromiidae/ <u>Macromia</u> (early instar)	1
PELECYPODA:	
Corbiculidae/ <u>Corbicula fluminea</u>	10
Sphaeriidae/ <u>Sphaerium</u>	1
Unionidae/ <u>Villosa vanuxemensis vanuxemensis</u> relic	1
PLECOPTERA:	
Perlidae/ <u>Perlesta placida</u>	5
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	10
<u>Hydropsyche betteni/depravata</u> larvae	23
<u>Hydropsyche betteni/depravata</u> pupa	1
<u>H. frisoni</u>	2
	290

LONG CREEK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 290  
TAXA RICHNESS = 32

Figure 25.



## Flat Creek

Two qualitative fishery surveys were conducted in June 1990:

### Location and Length - Tributary to the Nolichucky River.

Sample area 1 was located at the bridge on Chucky River Road. It was 400 ft. in length and averaged 21.3 ft. in width. Sample area 2 was located further upstream, between the bridge on Highway 160 and the bridge on Talley Road and was 400 ft. in length. Both sites were sampled on 5 June 1990 and were in Hamblen County. Springvale Quadrangle.

**Gear Type** - Both sites were sampled using two backpack electrofishing units operating at 110 v. AC.

**Water Quality** - Data were taken from midstream on 5 June 1990, at sample area 1 only: DO - 9.1 ppm, pH - 8.0, Temperature - 60 F, Conductivity - 350 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected at sample area 1 only. A 60 minute qualitative sample was conducted. The sample contained 890 organisms and represented 45 taxa.

### Fish Collected:

<u>Species</u>	<u>Site 1</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Spotted bass	1	0.2	0.07	0.3
Largemouth bass	5	0.9	1.25	5.3
Rock bass	24	4.4	3.94	16.7
Redbreast sunfish	41	7.5	5.60	23.7
Warmouth	2	0.4	0.08	0.3
Bluegill	42	7.7	1.09	4.6
Nongame Fish	15	2.8	6.67	28.3
Forage Fish	413	76.0	4.90	20.8
TOTAL	543		23.60	

## Site 2

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Redbreast sunfish	2	0.2	0.03	0.2
Bluegill	4	0.5	0.25	1.3
Redear sunfish	1	0.1	0.02	0.1
Nongame Fish	41	4.8	5.26	27.5
Forage Fish	815	94.5	13.55	70.9
TOTAL	863		19.11	

**Comments** - Flat Creek near its mouth, and downstream of the BASF's (formerly American Enka Corporation) discharge has had a long history of pollution and stream degradation. In the past, this discharge has also severely impacted the Nolichucky River segment downstream of the mouth of Flat Creek. Less than a mile upstream of the mouth, and upstream of this discharge, Flat Creek has been described as having a healthy and stable biological community (Tennessee Department of Public Health 1977, 1981). This was based primarily on the diversity and relative densities of macroinvertebrates. We wanted to update and expand on this, and to develop a fish species diversity list and collected stream information for TADS. TWRA has had no previous fish collection records from this stream. So in June 1990, we conducted two surveys, both upstream of the BASF discharge.

Sample area 1 was located at the bridge on Chucky River Road about 0.8 mi. upstream of the mouth, and is the same site used in previous macroinvertebrate samples made by the Tennessee Department of Public Health (1977, 1981). At this site we collected a total of 543 fish weighing 23.6 lb. and comprising 15 species. Five native game species, spotted bass (*Mictopterus punctulatus*), largemouth bass (*M. salmoides*), rock bass (*Ambloplites rupestris*), war-mouth (*Lepomis gulosus*), and bluegill (*L. macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were present. Of these, only rock bass and redbreast sunfish were collected in any numbers or size. Rock bass comprised about 4% by numbers and 16% by weight, while redbreast sunfish were around 7% by numbers and 23% by weight of all fish collected. There were also several 7 and 8 in. redbreast sunfish (Fig. 26). Bluegill were fairly numerous but all were small. Five largemouth bass, 7 to 9 in., were also collected. the snubnose darter (*Etheostoma simoterum*) was the only darter species collected. Banded sculpin (*Cottus*

*carolinae*) were very abundant and made up about 63% of all forage fish collected at this site.

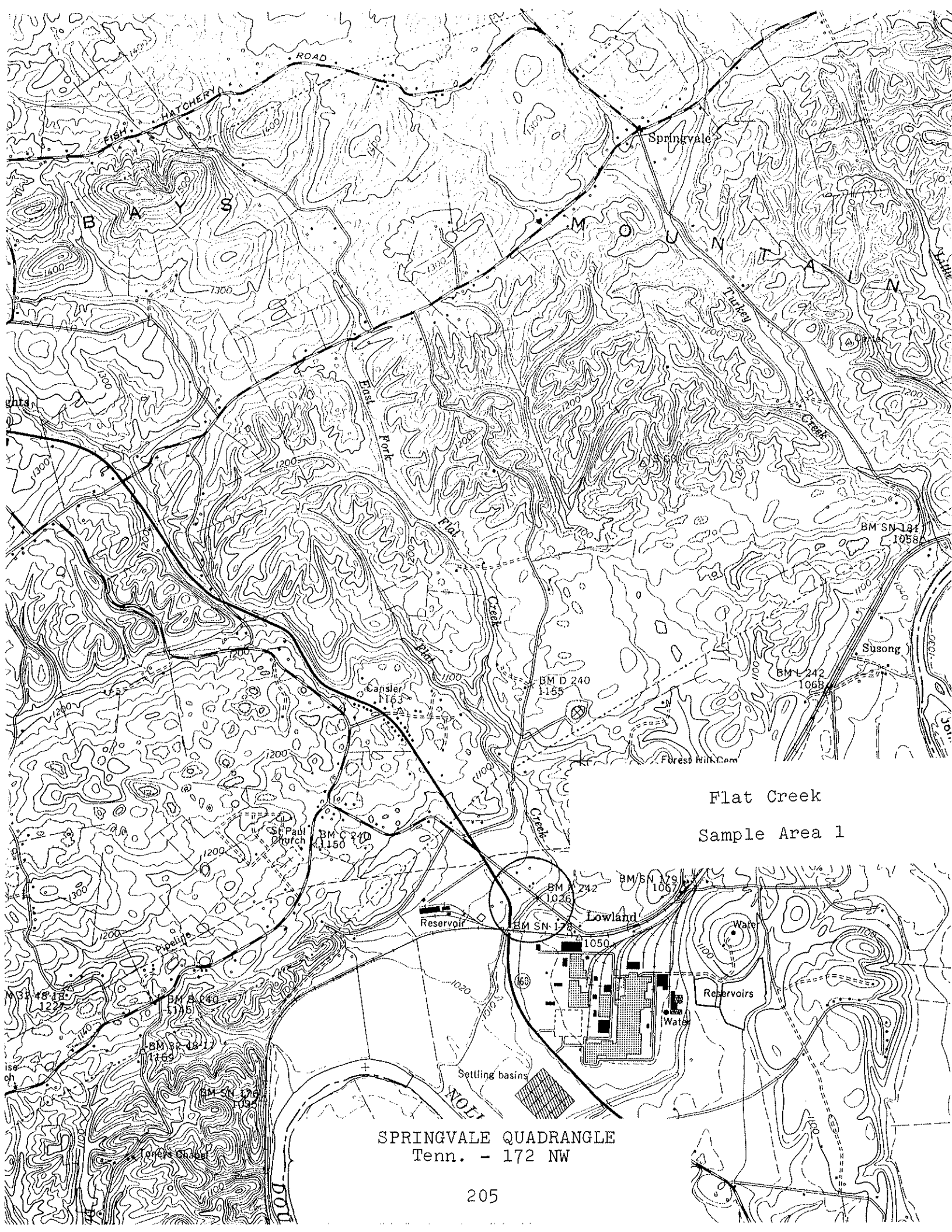
At the upstream site we collected 863 fish weighing 19.11 lbs. and comprising 10 species. A few small redbreast sunfish and bluegill along with a single small specimen of the redear sunfish (*Lepomis microlophus*) were the only game fish collected. Forage fish made up about 95% of all the fish collected and out of these, stonerollers (*Campostoma anomalum*), blacknose dace (*Rhinichthys atratulus*), and banded sculpin were the most abundant. Four species were collected here but not at the downstream site. These were the redear sunfish, blacknose dace, creek chub (*Semotilus atromaculatus*), and a single mosquitofish (*Gambusia affinis*). This makes a total of 19 species collected from both sites combined and are typical species components of streams with medium non-point source pollution.

Benthic macroinvertebrates were collected at the downstream site only. Included in this sample were Baetidae, Ephemerellidae, Ephemeridae, Heptageniidae, Leptophlebiidae, and Oligoneuriidae mayflies, perlid stoneflies, Hydropsychidae, Limnephilidae, and Philopotamidae caddisflies, and Elmidae and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) and the pleurocerid snails *Goniobasis* and *Pleurocera canaliculatum* were present. Two species of crayfish, *Cambarus longirostris* and *Orconectes virilis* were also collected. This represents a range extension for *O. virilis*. It has a native range of north of the Ohio River and has been introduced into Douglas Reservoir. A 1969 survey found *O. virilis* limited to tributaries of the western shore of Douglas Reservoir between Goose Creek and Koontz Creek near Dandridge (Bouchard 1972). Our collection on Flat Creek is several miles upstream of that locality. This species may be replacing some native crayfish because of its aggressiveness. Ephemeropterans represented about 41% and trichopterans about 16% of the total number of organisms collected (Fig. 27). Isopods were also numerous and made up about 18% of the total. A total of no less than 45 taxa was collected. Crayfish were noted to be abundant at both sample areas while periwinkle snails (*Goniobasis*) were abundant at the upper site only.

#### Management Recommendations:

1. Based on our surveys, Flat Creek still has a fairly diverse fish and macroinvertebrate fauna and apparently maintains reasonably good water quality even though it receives considerable non-point source

pollution from agriculture activities within the watershed. Protection of this watershed is the only management suggested.



Flat Creek  
Sample Area 1

SPRINGVALE QUADRANGLE  
Tenn. - 172 NW

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Flat Creek Lat-Long 360936N - 831239W  
Watershed Nolichucky River Length of Sample 400 ft.  
Station Site # 1 Reach 06010108-9,7  
County Hamblen Date/Time 5 June 1990/0900  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 21.3 ft. Average Depth 0.8 ft. Maximum Depth 2.5 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud 5 % Silt 10 % Sand 10 % Clay 5 %  
Gravel 20 % Rubble 40 % Boulders 5 % Bedrock 5 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 25 % Rubble 40 % Boulders 10 % Bedrock 5 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average X Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 50 % of Stream.
8. Flow (CFS) 14.9 : Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy, clear and mild; air temp. - 62°F.
10. Past Weather (last 24 hours) Same but cool overnight.
11. pH 8.0 Temp. 60° F Conductivity 350 D.O. 9.1 % Saturation 93
12. Comments: Stream was slightly high, dingy in color. Typical  
fairly silty stream. Has shifting substrate just downstream of  
bridge. Sample area at the bridge on Chucky River Road.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Flat Creek Lat-Long 360936N - 831239W  
 Watershed Nolichucky River Date 5 June 1990  
 County Hamblen Reach 06010104-9,7  
 Type of Sampling Electrofishing Pool Elevation 1023 ft.  
 Gear Type Two backpack shockers at 110 v. AC and seine. Time 1040-1200

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus punctulatus</i>		219	1	4	0.07			
<i>M. salmoides</i>		220	2	7	0.35			
"	"	"	2	8	0.56			
"	"	"	1	9	0.34			
<i>Ambloplites rupestris</i>		13	1	2	0.02			
"	"	"	3	3	0.13			
"	"	"	8	4	0.55			
"	"	"	5	5	0.56			
"	"	"	5	7	1.61			
"	"	"	1	8	0.58			
"	"	"	1	9	0.49			
<i>Lepomis auritus</i>		201	3	2	0.05			
"	"	"	15	3	0.49			
"	"	"	6	4	0.40			
"	"	"	4	5	0.54			
"	"	"	6	6	1.09			
"	"	"	3	7	1.15			
"	"	"	4	8	1.88			
<i>L. gulosus</i>		204	2	3	0.08			
<i>L. macrochirus</i>		206	16	2	0.26			
"	"	"	24	3	0.71			
"	"	"	2	4	0.12			
Continued on next page								

Field Notes: 400 ft. sample length. Stream dingy; hard to collect fish.  
Crayfish were abundant.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, Wayne H. Schacher,  
Mark T. Fagg, and Barry L. Carter

WR-0525

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Flat Creek Lat-Long 360936N - 831239W  
Watershed Nolichucky River Date 5 June 1990  
County Hamblen Reach 06010104-9,7  
Type of Sampling Electrofishing Pool Elevation 1023 ft.  
Gear Type Two backpack shockers at Time 1040-1200  
110 v. AC and seine

Species Name	CODE	NUMBER	LENGTH	WT.			
<i>Aplodinotus grunniens</i>	20	1	12	0.67			
<i>Catostomus commersoni</i>	32	1	10	0.60			
<i>Hypentelium nigricans</i>	166	13	3-15	5.40			
<i>Campostoma anomalum</i>	25	82	1-6	2.42			
<i>Cyprinella spiloptera</i>	269	3	2	0.02			
<i>Hybopsis amblops</i>	155	1	2	t			
<i>Luxilus chrysocephalus</i>	249	40	2-5	0.64			
<i>Etheostoma simoterum</i>	111	28	1-2	0.13			
<i>Cottus carolinae</i>	40	259	1-3	1.69			

Field Notes: 400 ft. sample length.

Name of Collector(s): R.D. Bivens, C.E. Williams, W.H. Schacher, M.T. Fagg,  
and B.L. Carter



GAME FISH FROM FLAT CREEK  
 SITE 1  
 INCH CLASS DISTRIBUTION

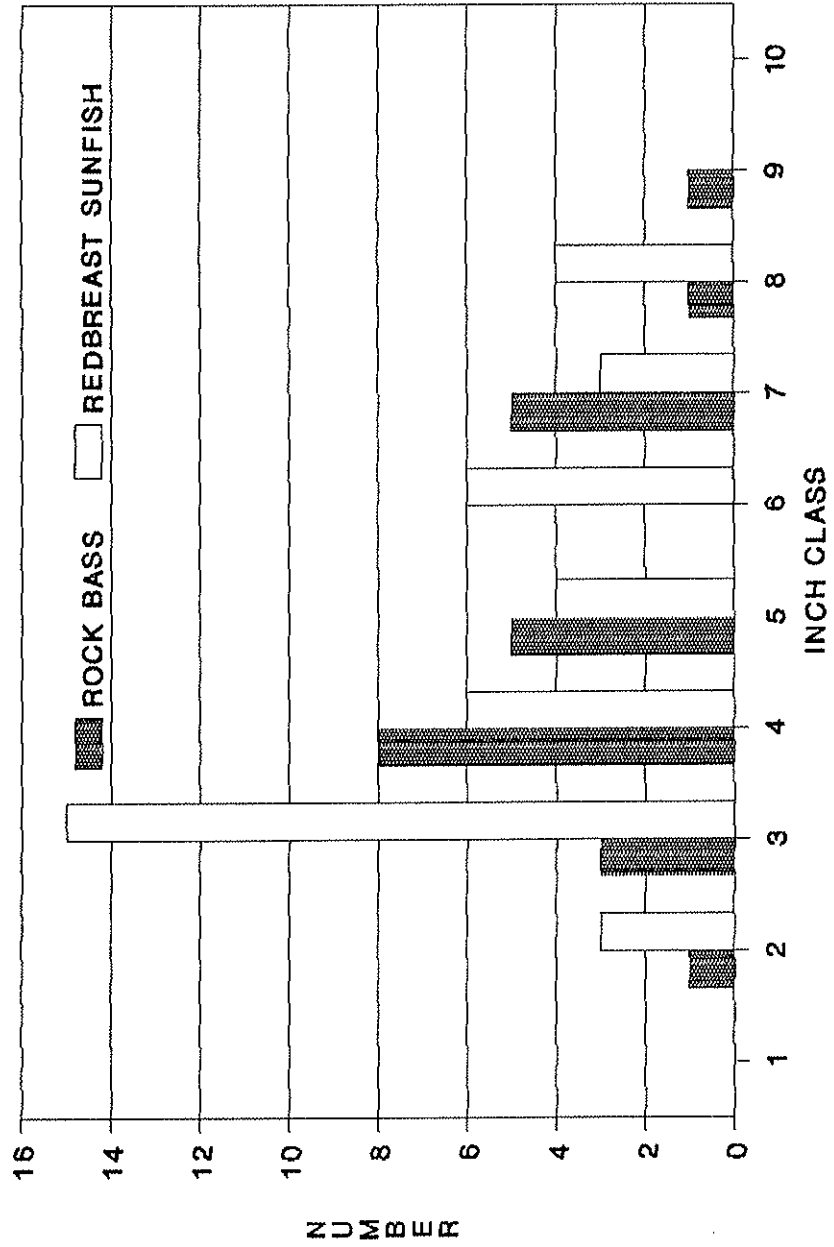


Figure 26.

Flat Creek: Qualitative Benthic Sample

5 June 1990

Field # 209

Hamblen Co., TN; At the bridge on Chucky River Road.  
 Coordinates: 360936N - 831239W. Springvale, Tenn., # 172  
 NW Quad. Reach # 06010108-9,7.

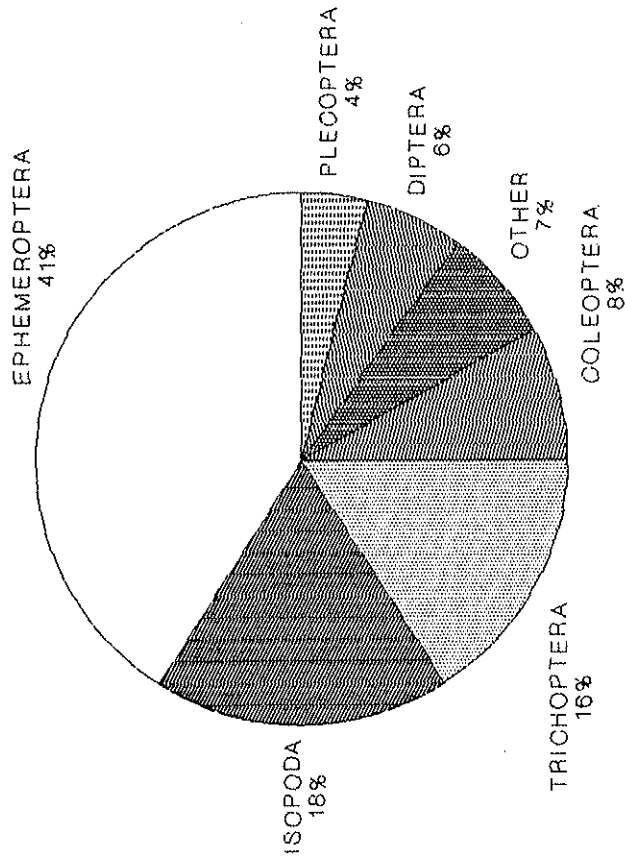
TAXA	NUMBER
ANNELIDA:	
Branchiobdellida	1
Oligochaeta	6
COLEOPTERA:	
Dytiscidae/Hydroporus adult	1
Elmidae/Dubiraphia larvae	3
<u>D. vittata</u> adults	8
<u>Optioservus</u> larvae	6
<u>O. ovalis</u> adults	2
<u>Stenelmis</u> larvae	4
<u>Stenelmis</u> adults	27
Psephenidae/ <u>Psephenus herricki</u>	19
DECAPODA:	
Cambaridae/Cambarus ( <u>Hiaticambarus</u> ) <u>longirostris</u>	
juvenile female	1
<u>Orconectes</u> juvenile males	3
<u>Orconectes</u> juvenile females	7
<u>Orconectes virilis</u> male 1st.	1
DIPTERA:	
Chironomidae larvae	48
Simuliidae larvae	2
Tipulidae/ <u>Antocha</u> larvae	2
<u>Antocha</u> pupa	1
<u>Hexatoma</u>	1
EPHEMEROPTERA:	
Baetidae/Baetis	111
Ephemerellidae/ <u>Serratella deficiens</u>	22
Ephemeridae/Ephemera	56
Heptageniidae/ <u>Heptagenia</u>	26
<u>Stenacron interpunctatum</u>	18
<u>Stenonema</u>	22
<u>Stenonema (Stenonema) femoratum</u>	2
Leptophlebiidae/ <u>Habrophlebiodes</u>	20
Oligoneuriidae/ <u>Isonychia</u>	84

Flat Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
<b>GASTROPODA:</b>	
Ancylidae/ <u>Ferrissia relic</u>	1
Physidae/ <u>Physa</u>	1
Planorbidae relic	1
Pleuroceridae/ <u>Goniobasis</u>	2
<u>Pleurocera canaliculatum</u>	1
<b>HEMIPTERA:</b>	
Corixidae/ <u>Sigara</u>	2
<u>Trichocorixa</u>	1
Gerridae/ <u>Gerris nymph</u>	1
<u>G. (Aquarius) remigis</u> adult males	2
Veliidae/ <u>Rhagovelia obesa</u> nymph	1
<u>R. obesa</u> adult males	3
<u>R. obesa</u> adult female	1
<b>ISOPODA:</b>	
Asellidae/ <u>Lirceus</u>	156
<b>MEGALOPTERA:</b>	
Corydalidae/ <u>Corydalis cornutus</u>	3
<u>Nigronia serricornis</u>	1
<b>ODONATA:</b>	
Aeshnidae/ <u>Boyeria vinosa</u>	4
Calopterygidae/ <u>Calopteryx</u>	12
Coenagrionidae/ <u>Argia</u>	1
Gomphidae/ <u>Gomphus (prob. lividus)</u>	6
<b>PELECYPODA:</b>	
Corbiculidae/ <u>Corbicula fluminea</u>	12
<b>PLECOPTERA:</b>	
Perlidae/ <u>Acroneuria evoluta</u>	1
<u>Perlesta</u>	31
<b>TRICHOPTERA:</b>	
Hydropsychidae/ <u>Cheumatopsyche</u>	74
<u>Hydropsyche betteni/depravata</u>	41
Limnephilidae/ <u>Neophylax mitchelli</u>	24
<u>Pycnopsyche</u>	1
Philopotamidae/ <u>Chimarra</u>	1
<b>URODELA:</b>	
Unid. juvenile salamander	1

890

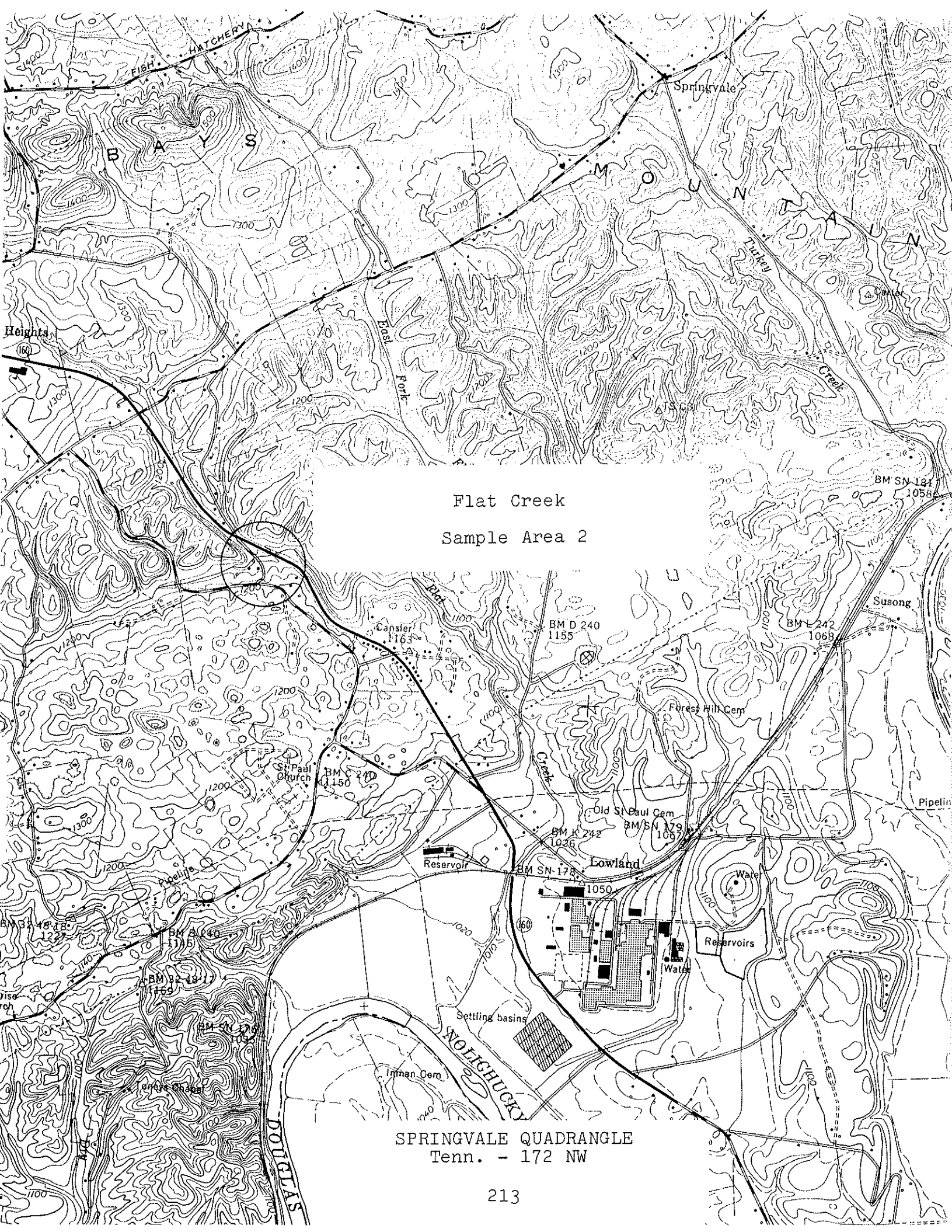
FLAT CREEK  
SITE 1  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

$n = 890$   
TAXA RICHNESS = 45

Figure 27.



Flat Creek  
Sample Area 2

SPRINGVALE QUADRANGLE  
Tenn. - 172 NW

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Flat Creek Lat-Long 361023N - 831343W  
 Watershed Nolichucky River Date 5 June 1990  
 County Hamblen Reach 06010104-9,7  
 Type of Sampling Electrofishing Pool Elevation 1130 ft.  
 Gear Type Two backpack shockers at 110 v. AC Time 1530-1615

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Lepomis auritus</i>		201	1	2	0.01			
" "		"	1	3	0.02			
<i>L. macrochirus</i>		206	1	2	0.01			
" "		"	2	6	0.84			
" "		"	1	7	0.25			
<i>L. microlophus</i>		209	1	2	0.02			
<i>Catostomus commersoni</i>		32	41	1-12	5.26			
<i>Campostoma anomalum</i>		25	359	1-6	7.15			
<i>Rhinichthys atratulus</i>		351	162	1-3	0.86			
<i>Semotilus atromaculatus</i>		360	98	1-7	2.75			
<i>Etheostoma simoterum</i>		111	36	1-2	0.14			
<i>Cottus carolinae</i>		40	159	1-4	2.65			
<i>Gambusia affinis</i>		147	1	1	t			
Avg. width - 10 to 12 ft.								
Avg. depth - 0.5 ft.								
Boulder-rubble-bedrock substrate.								
Fairly silty from agriculture activities (dairy farms etc.).								
Some water cress present.								
Crayfish and snails ( <i>Elimia</i> sp.) abundant.								

Field Notes: 400 ft. sample length.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, Wayne H. Schacher,  
Mart T. Fagg, and Barry L. Carter

WR-0525

## Sinking Creek

Two qualitative fishery surveys were conducted in October 1990:

**Location and Length** - Tributary to the Nolichucky River. Sample area 1 was located near the feed mill downstream of the railroad trestle at Afton. It was 400 ft. in length and averaged 18.2 ft. in width. Sample area 2 was located approximately 1.0 air mi. upstream of the railroad track at Afton and approximately 0.3 mi. downstream of the cave spring. It was 400 ft. in length and averaged 17.6 ft. in width. Both sites were sampled on 23 October 1990, and were in Greene County. Chucky Quadrangle.

**Gear Type** - Both sites were sampled using two backpack electrofishing units operating at 120 v. AC.

**Water Quality** - Data were taken from midstream at each site on 23 October 1990: Area 1: DO - 8.7, pH - 8.1, Temperature - 61 F, Conductivity - 800 micromhos/cm. Area 2: DO - 8.8, pH - 8.1, Temperature - 58.8 F, Conductivity - 350 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a one hour thirty minute qualitative sample at area 1 and a two hour qualitative sample at area 2. Area 1 sample contained 261 organisms and represented 33 taxa. Area 2 sample contained 867 organisms and represented 42 taxa.

### Fish Collected:

<u>Species</u>	<u>Site 1</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Spotted bass	3	1.2	0.03	0.1
Redbreast sunfish	47	19.3	2.95	9.1
Bluegill	5	2.1	0.27	0.8
Redbreast sunfish x Bluegill hybrid	3	1.2	0.24	0.7
Nongame Fish	57	23.4	25.90	80.1
Forage Fish	129	52.9	2.93	9.1
TOTAL	244		32.32	

## Site 2

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Redbreast sunfish	1	0.3	0.03	0.5
Rock bass	19	5.2	1.74	26.6
Nongame Fish	13	3.6	1.28	19.6
Forage Fish	332	91.0	3.47	53.1
TOTAL	365		6.52	

**Comments** - Sinking Creek has had a long history of pollution problems. It has been impacted by non-point source pollution and by discharge from Ball Zinc, Inc. The Tennessee Division of Water Pollution Control has documented that fish and macroinvertebrate populations downstream of Ball Zinc's discharge have been suppressed since the early 1980's (Tennessee Department of Public Health 1982, 1985a, 1985b, 1989). In October, 1990, we assisted personnel of the Tennessee Division of Water Pollution Control in conducting an intensive survey to determine if the stream continues to be impacted by pollution. Two areas, one upstream and the other downstream of Ball Zinc's discharge, were sampled. These were the same sites used in past studies of the stream.

We collected a total of 244 fish weighing 32.32 lb. and comprising 12 species from the sample site downstream of Ball Zinc's discharge. Two native game species, spotted bass (*Micropterus punctulatus*) and bluegill (*Lepomis macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were present. Also, three *L. auritus* x *macrochirus* hybrids were collected. Redbreast sunfish were the only game fish collected in any numbers and the three spotted bass were all young-of-year fish. Redbreast sunfish comprised about 19% by number and 9% by weight of all fish collected. Their inch class distribution along with that of the bluegill collected is shown in figure 28. Other fish collected here included primarily tolerant forms and by far, the most biomass was tied up in 12 common carp (*Cyprinus carpio*) that weighed 21.6 lb. or 67% of the total weight collected. The snubnose (*Etheostoma simoterum*) was the only darter species collected and was represented by only three specimens.

At the upstream area we collected a total of 332 fish weighing 6.52 lb. and comprising 12 species. Rock bass (*Ambloplites rupestris*) was the only game species collected except for a single redbreast sunfish. Rock bass made up about 5% by number and 27% by weight, of



all fish collected. The largest rock bass was in the 8 in. class (Fig. 30). Although the same number of species was collected at both sites, the species composition changed considerably. Four species were collected at the upstream site that were not found downstream of Ball Zinc's discharge. Of these, two species, rock bass and the warpaint shiner (*Luxilus coccogenis*), are fairly pollution intolerant and both were present in large numbers. These two species have been noted absent from the downstream site in past surveys also (Tennessee Department of Public Health 1982, 1985b). The snubnose was again, the only darter species collected. However, they were present in greater numbers as were banded sculpin (*Cottus carolinae*).

Benthic macroinvertebrates from our sample at Site 1 included Hydropsychidae and Polycentropodidae caddisflies, Elmidae, Eubriidae, Gyrimidae, and Psephenidae beetles, no stoneflies, and only one very bad specimen of baetid mayfly. The Asian clam (*Corbicula fluminea*) and single specimens each of limpet (*Ferrissia*) and the pleurocerid snail *Pleurcoera canaliculatum* were present. Two species of crayfish, *Cambarus bartonii* and *C. longirostris* were also collected. Tricoptera represented about 39% of the total number of organisms we collected (Fig. 29). However, a great number of these were *Hydropsyche betteni/depravata*, a species complex generally considered to be a tolerant form. A total of only 33 taxa was collected at this site.

A total of no less than 42 taxa was collected at the upper site. These included Baetidae, Caenidae, Ephemerellidae, Heptageniidae, and Oligoneuriidae mayflies, perlid stoneflies, Hydropsychidae, Philopotamidae, and Rhyacophilidae caddisflies, and Elmidae, Eubriidae, Psephenidae, and Ptilodactylidae beetles. The Asian clam and fingernail clam (*Sphaerium*) were present along with the periwinkle snail (*Goniobasis*). *Cambarus bartonii* and *C. longirostris* were also collected at this site along with a single female specimen of *Orconectes* that was most probably *O. erichsonianus*. Both periwinkle snails and crayfish were abundant. Ephemeroptera represented 52% of the total number of organisms collected (Fig. 31). This further attests to the impaired conditions at the downstream site. Both taxa richness and numbers of organisms were reduced downstream.

Of special interest is the collection of 11 specimens of *Hydropsyche rotosa* at the upstream site. This makes

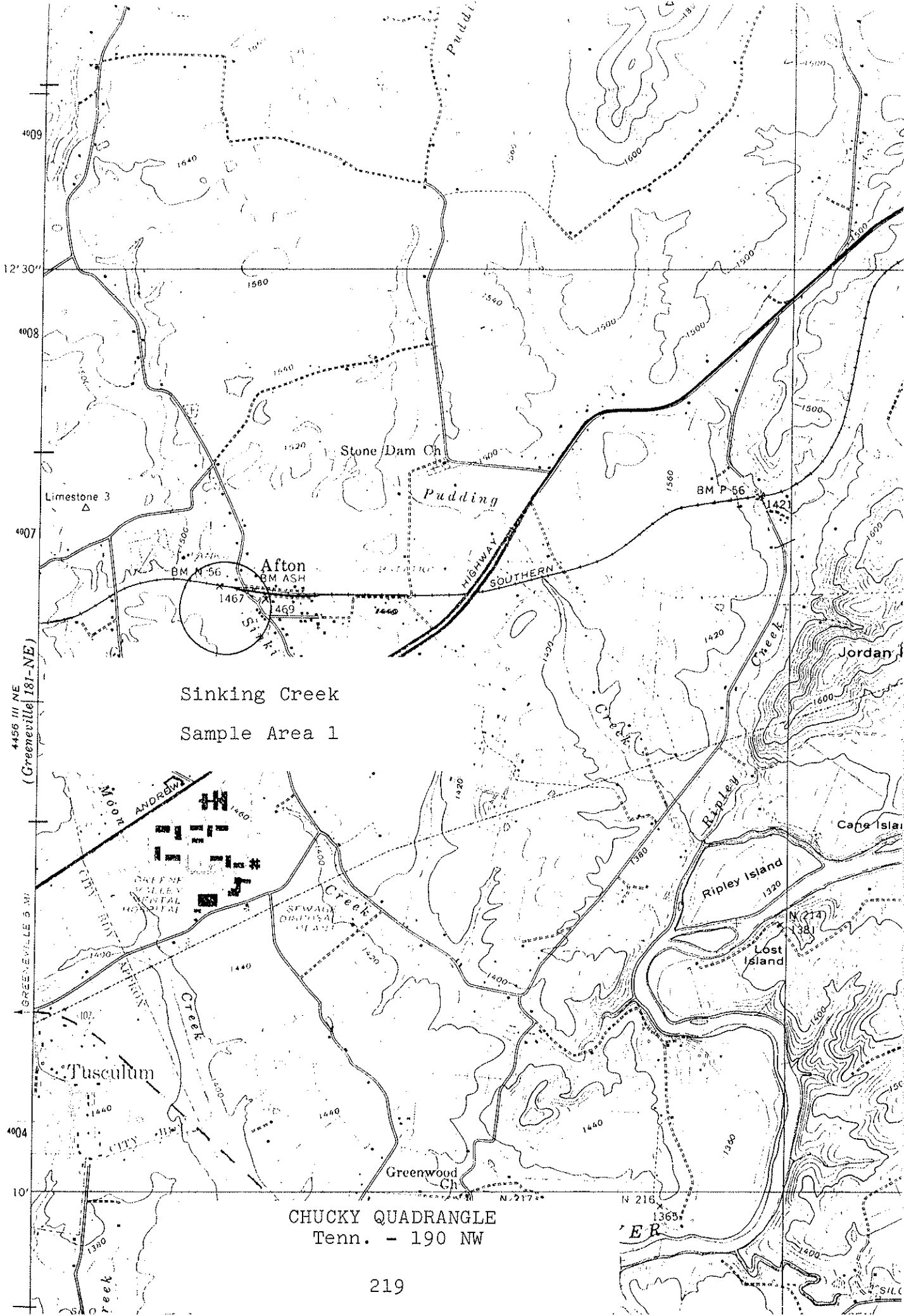
only our third occasion to collect this species. However, it was not surprising to collect *H. rotosa* here as it is listed in past collections (Tennessee Department of Public Health 1982, 1985a, 1985b, 1989) and its type locality is near Tusculum College in Greene County (Etnier and Schuster 1979). Also of interest is the collection of four specimens of *Anchytarsus bicolor* larvae. Aquatic ptilodactylids are considered quite rare and their distribution is sporadic, even in streams where they are known to occur (Brigham et al. 1982). *Anchytarsus bicolor* is the only species known from eastern North America and the larvae are generally found in small, cool streams and spring brooks where they may be locally common.

Basic water quality parameters were quite similar at both sites except for conductivity. The conductivity reading at the downstream site was more than double that of the upstream site. Past studies have documented similar conductivity readings along with elevated levels of copper and zinc, all attributed to metal salts from Ball Zinc's discharge (Tennessee Department of Public Health 1985b).

Both fish and macroinvertebrate populations showed an overall decrease in total numbers, intolerant forms, and taxa richness between the upstream and downstream sites. Based on the data we collected, it appears that the stream is still being adversely impacted downstream of Ball Zinc's discharge.

#### **Management Recommendations:**

1. No specific management can be suggested at present. Obviously, anything to abate the point source discharge would be beneficial.
2. Upstream of Afton, the stream is impacted to a lesser extent by typical agricultural non-point source pollution and efforts should be directed at protecting it from any further habitat deterioration.



Sinking Creek  
Sample Area 1

CHUCKY QUADRANGLE  
Tenn. - 190 NW

TENNESSEE WILDLIFE RESOURCES AGENCY

PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Sinking Creek Lat-Long 361136N - 824422W  
 Watershed Nolichucky River Length of Sample 400 ft.  
 Station Site # 1 Reach 06010108-81  
 County Greene Date/Time 23 October 1990/1400  
 Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 18.2 ft. Average Depth 0.9 ft. Maximum Depth 2.4 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud 5 % Silt 10 % Sand 10 % Clay - %  
 Gravel 10 % Rubble 30 % Boulders 15 % Bedrock 20 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
 Gravel 10 % Rubble 30 % Boulders 10 % Bedrock 20 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
 Average X \_\_\_\_\_ Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
 of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 50 % of Stream.
8. Flow (CFS) 15.2 : Compared to Normal; Low \_\_\_\_\_ Normal \_\_\_\_\_ High X
9. Present Weather Overcast with scattered rain.
10. Past Weather (last 24 hours) Overcast with scattered rain.
11. pH 8.1 Temp. 61° F Conductivity 800 D.O. 8.7 % Saturation 89
12. Comments: Sample area location was at Feed Mill downstream of the  
railroad trestle at Afton. Corresponds to TDHE/WPC Station 2F.  
The stream was slightly high and dingy at the time of sampling.

FISH FIELD DATA FORM

Site # 1 - downstream of  
r.r. trestle  
at Afton.

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Sinking Creek  
Watershed Nolichucky River  
County Greene  
Type of Sampling Electrofishing  
Gear Type 2 backpacks @ 120 v. AC

Lat-Long 361136N - 824422W  
Date 23 October 1990  
Reach 06010108-81  
Pool Elevation 1440 ft.  
Time 1540-1620

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus punctulatus</i>		219	3	2	0.03			
<i>Lepomis auritus</i>		201	2	1	0.01			
"	"	"	4	2	0.04			
"	"	"	10	3	0.30			
"	"	"	14	4	0.73			
"	"	"	11	5	0.93			
"	"	"	6	6	0.94			
<i>L. macrochirus</i>		206	2	3	0.08			
"	"	"	3	4	0.19			
* Hybrid sunfish			1	4	0.06			
"	"		2	5	0.18			
<i>Ameiurus natalis</i>		174	1	5	0.09			
<i>Hypentelium nigricans</i>		166	44	3-13	4.21			
<i>Campostoma anomalum</i>		25	60	2-6	1.44			
<i>Cyprinus carpio</i>		47	12	13-18	21.60			
<i>Luxilus chrysocephalus</i>		249	48	1-6	1.34			
<i>Rhinichthys atratulus</i>		351	3	2-3	0.01			
<i>Semotilus atromaculatus</i>		360	1	3	0.01			
<i>Etheostoma simoterum</i>		111	3	2	0.02			
<i>Cottus carolinae</i>		40	14	2-3	0.11			

\* *Lepomis auritus* x *macrochirus*

Field Notes: 400 ft. sample length. Water slightly high and dingy.

Name of Collector(s): R.D. Bivens, C.E. Williams, and W.H. Schacher

WR-0525

GAME FISH FROM SINKING CREEK  
SITE 1  
INCH CLASS DISTRIBUTION

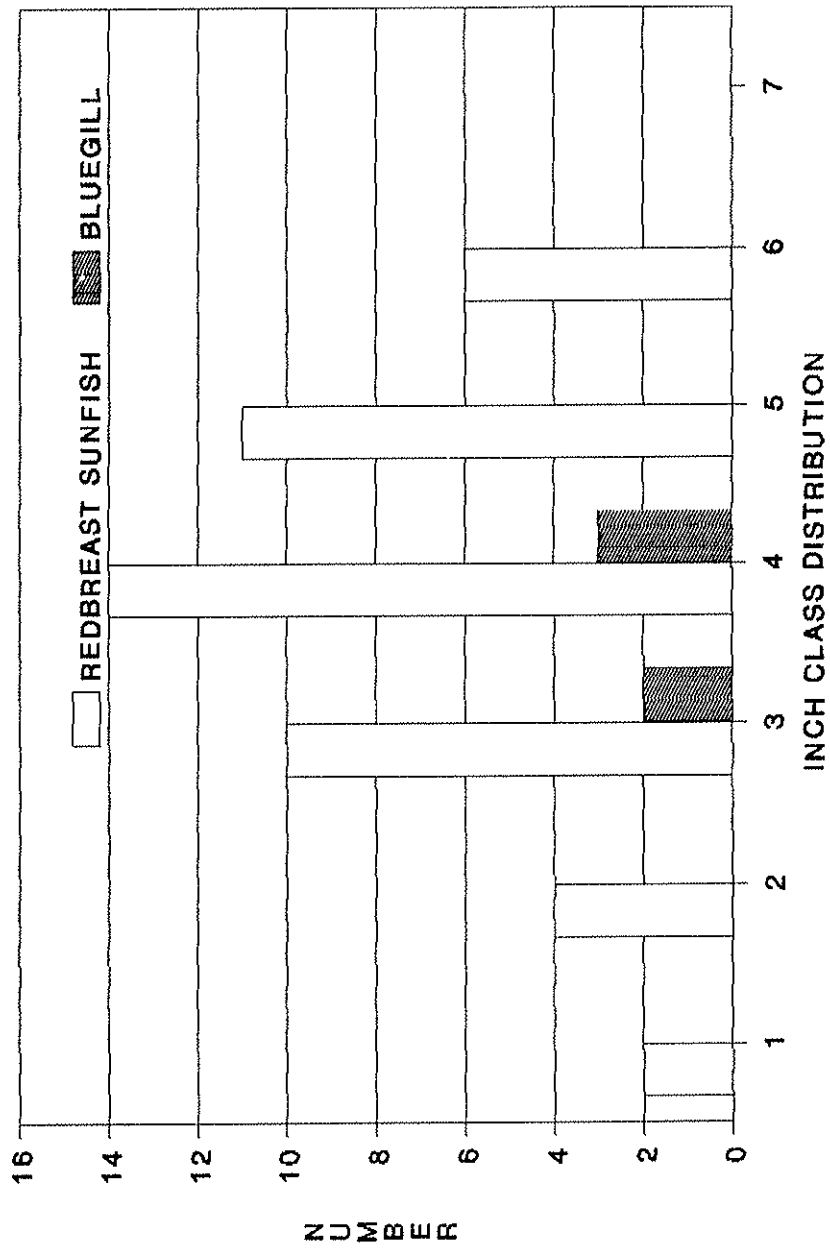


Figure 28.

Sinking Creek: Site # 1, Qualitative Benthic Sample

23 October 1990

Field # 265

Greene Co., TN; Downstream of railroad trestle at Afton.  
Coordinates: 361136N - 824422W. Chuckey, Tenn., # 190 NW  
Quad. Reach # 06010108-81.

TAXA	NUMBER
AMPHIPODA:	1
ANNELIDA:	
Oligochaeta	3
COLEOPTERA:	
Elmidae/ <u>Dubiraphia</u> larva	1
<u>Stenelmis</u> larvae	29
<u>Stenelmis</u> adults	3
Eubriidae/ <u>Ectopria</u> larva	1
Gyrinidae/ <u>Gyrinus</u> adults	2
Haliplidae/ <u>Peltodytes duodecimpunctatus</u> adult	1
Psephenidae/ <u>Psephenus herricki</u> larvae	5
DECAPODA:	
Cambaridae/ <u>Cambarus</u> ( <u>Cambarus</u> ) <u>bartonii</u> male 2nd.	1
<u>Cambarus</u> ( <u>Cambarus</u> ) <u>bartonii</u> females	6
<u>C.</u> ( <u>Hiaticambarus</u> ) <u>longirostris</u> male 1st.	1
<u>C.</u> ( <u>Hiaticambarus</u> ) <u>longirostris</u> males 2nd.	4
<u>C.</u> ( <u>Hiaticambarus</u> ) <u>longirostris</u> female	1
DIPTERA:	
Chironomidae	11
Culicidae/ <u>Anopheles</u> ( <u>Anopheles</u> ) <u>perplexens</u> / <u>punctipennis</u>	1
Tipulidae/ <u>Tipula</u>	9
EPHEMEROPTERA:	
Baetidae (very bad specimen)	1
GASTROPODA:	
Ancyliidae/ <u>Ferrissia</u>	1
Pleuroceridae/ <u>Pleurocera canaliculatum</u>	1
HEMIPTERA:	
Veliidae/ <u>Microvelia</u> ( <u>Kirkaldya</u> ) <u>buenoi</u> adult male	1
<u>Rhagovelia</u> <u>obesa</u> adult males	3

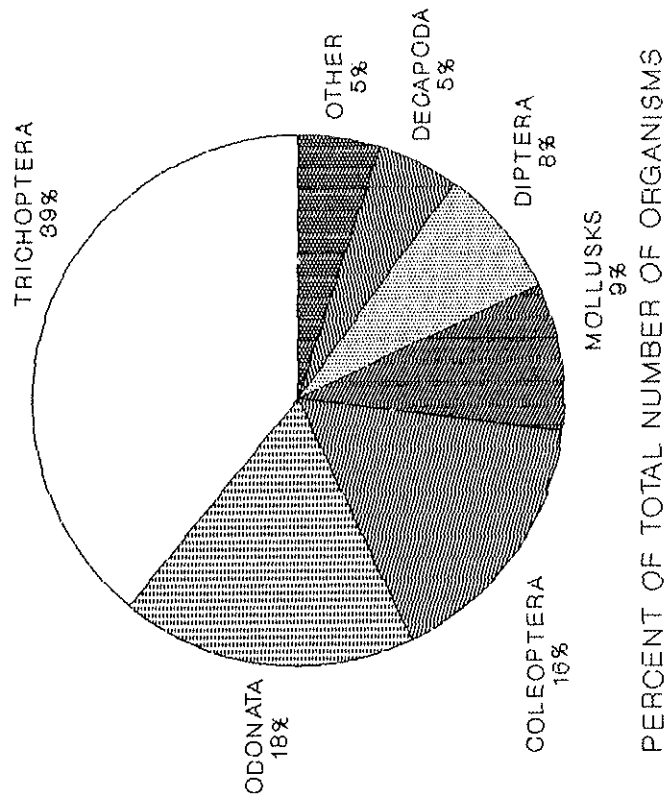
cont.

Sinking Creek: Site # 1, Qualitative Benthic Sample cont.

TAXA	NUMBER
ISOPODA:	
Asellidae/ <u>Lirceus</u>	3
MEGALOPTERA:	
Corydalidae/ <u>Nigronia serricornis</u>	1
Sialidae/ <u>Sialis</u>	2
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	5
Calopterygidae/ <u>Calopteryx</u> (prob. <u>maculata</u> )	11
Coenagrionidae/ <u>Argia</u>	20
<u>Enallagma divagans</u>	9
Gomphidae/ <u>Dromogomphus spinosus</u>	1
PELECYPODA:	
Corbiculidae/ <u>Corbicula fluminea</u>	13
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	43
<u>Hydropsyche betteni/depravata</u>	57
Polycentropodidae/ <u>Polycentropus</u>	1
	252

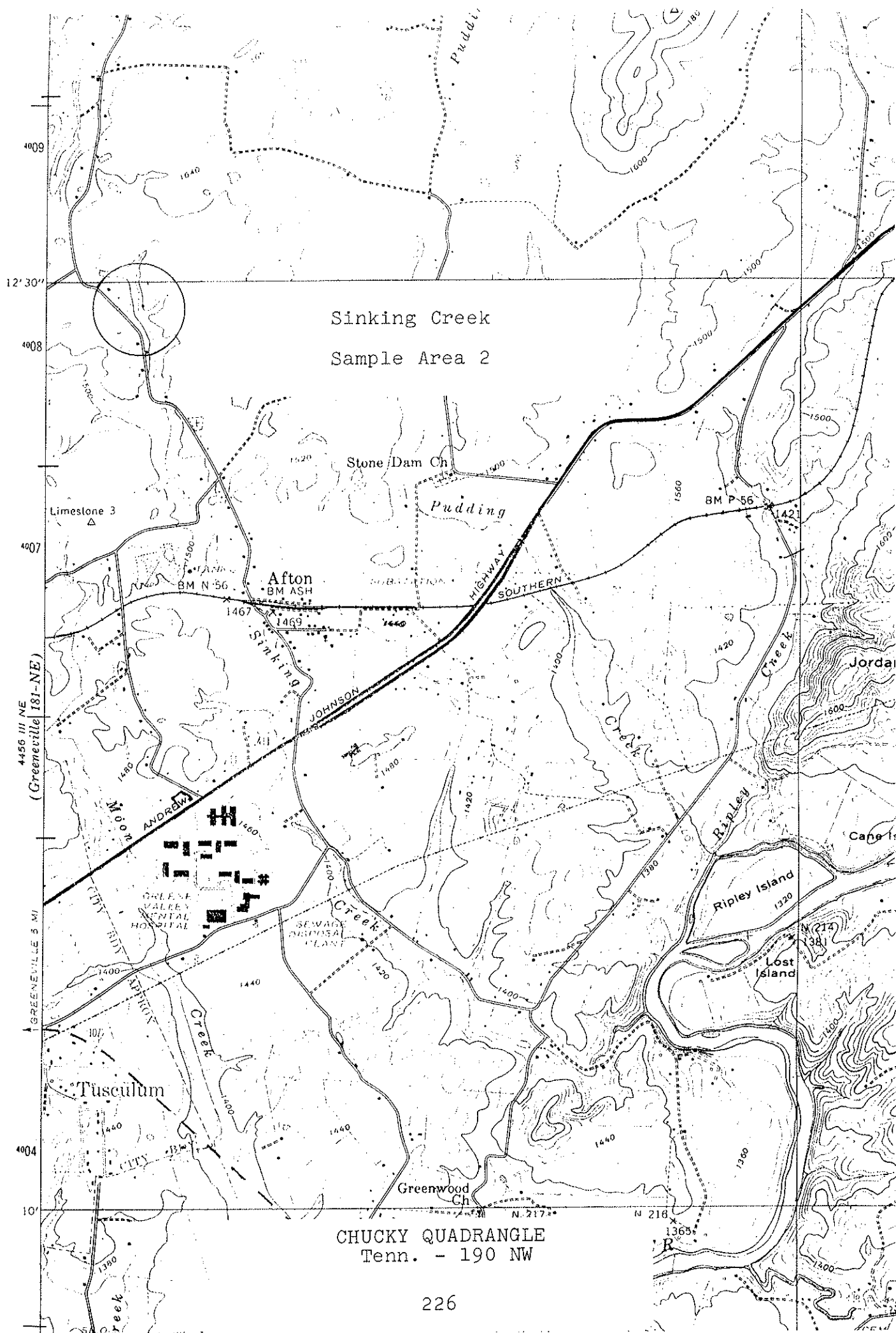


SINKING CREEK  
SITE 1  
BENTHIC MACROINVERTEBRATES



n = 261  
TAXA RICHNESS = 33

Figure 29.



Sinking Creek  
Sample Area 2

CHUCKY QUADRANGLE  
Tenn. - 190 NW

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Sinking Creek Lat-Long 361226N - 824443W  
Watershed Nolichucky River Length of Sample 400 ft.  
Station Site # 2 Reach 06010108-81  
County Greene Date/Time 23 October 1990/0930  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 17.6 ft. Average Depth 0.5 ft. Maximum Depth 2.0 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud 5 % Silt 10 % Sand 20 % Clay - %  
Gravel 15 % Rubble 30 % Boulders 10 % Bedrock 10 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 5 % Sand 10 % Clay - %  
Gravel 20 % Rubble 30 % Boulders 20 % Bedrock 15 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average X \_\_\_\_\_ Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 70 % of Stream.
8. Flow (CFS) 12.1 : Compared to Normal: Low \_\_\_\_\_ Normal \_\_\_\_\_ High X
9. Present Weather Overcast with drizzle; air temp. - 57°F.
10. Past Weather (last 24 hours) Overcast with scattered rain.
11. pH 8.1 Temp. 58.8°F Conductivity 350 D.O. 8.8 % Saturation 88
12. Comments: Sample area location was approx. 1.0 air mi. upstream of the railroad track at Afton and approx. 0.3 mi. downstream of the cave spring. Corresponds to TDHE/WPC Station 1F. Typical non-point pollution from agricultural sources upstream. Stream was slightly high and dingy from rainfall.

FISH FIELD DATA FORM

Site # 2 - 0.3 mi.  
downstream  
of cave.

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Sinking Creek Lat-Long 361226N - 824443W  
 Watershed Nolichucky River Date 23 October 1990  
 County Greene Reach 06010108-81  
 Type of Sampling Electrofishing Pool Elevation 1490 ft.  
 Gear Type 2 backpacks @ 120 v. AC Time 1115-1200

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Ambloplites rupestris</i>		13	3	1	0.01			
"	"	"	4	3	0.14			
"	"	"	2	4	0.13			
"	"	"	5	5	0.51			
"	"	"	4	6	0.64			
"	"	"	1	8	0.32			
<i>Lepomis auritus</i>		201	1	3	0.03			
<i>Catostomus commersoni</i>		32	1	6	0.11			
<i>Hypentelium nigricans</i>		166	12	4-11	1.17			
<i>Campostoma anomalum</i>		25	28	1-5	0.27			
<i>Luxilus chrysocephalus</i>		249	74	1-5	1.21			
<i>L. coccogenis</i>		248	66	1-3	0.26			
<i>Nocomis micropogon</i>		234	16	1-8	0.48			
<i>Rhinichthys atratulus</i>		351	1	3	0.01			
<i>Semotilus atromaculatus</i>		360	9	2-7	0.51			
<i>Etheostoma simoterum</i>		111	35	1-2	0.16			
<i>Cottus carolinae</i>		40	103	1-3	0.57			

Field Notes: 400 ft. sample length. Water dingy and slightly high.  
Crayfish and snails abundant.

Name of Collector(s): R.D. Bivens, C.E. Williams, W.H. Schacher, and  
Beverly Brown (TDHE)

WR-0525

ROCK BASS FROM SINKING CREEK  
SITE 2  
INCH CLASS DISTRIBUTION

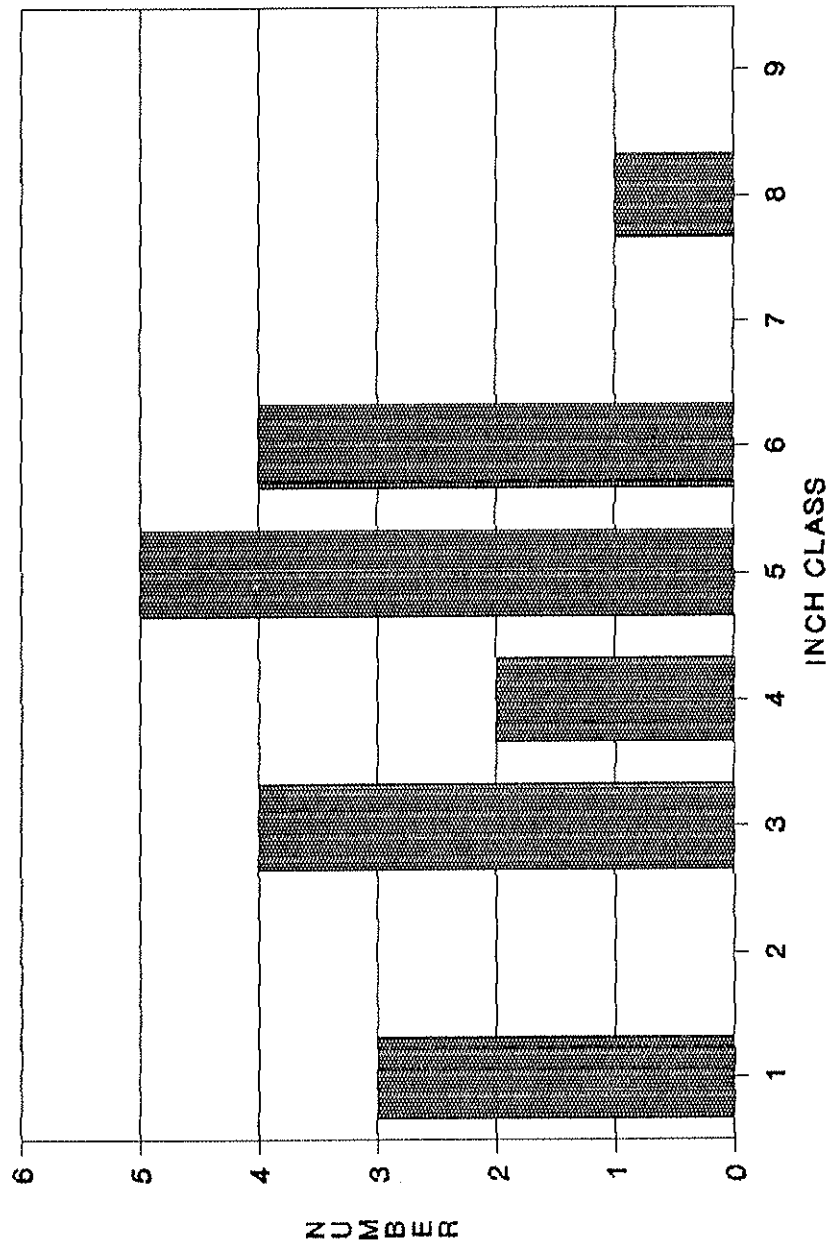


Figure 30.

Sinking Creek: Site # 2, Qualitative Benthic Sample

23 October 1990

Field # 266

Greene Co., TN; Approx. 0.3 mi. downstream of the cave  
spring. Coordinates: 361226N - 824443W. Chuckey, Tenn.,  
# 190 NW Quad. Reach # 06010108-81.

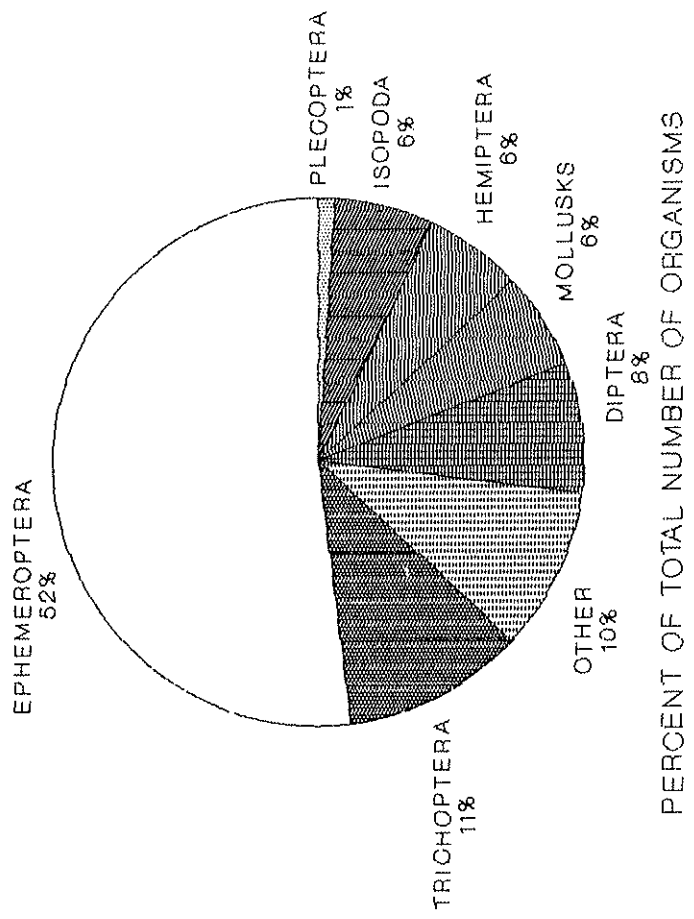
TAXA	NUMBER
AMPHIPODA:	1
ANNELIDA:	
Oligochaeta	2
COLEOPTERA:	
Elmidae/ <u>Stenelmis</u> larvae	2
<u>Stenelmis</u> adults	2
Eubriidae/ <u>Ectopria</u> larva	1
Psephenidae/ <u>Psephenus herricki</u> larvae	19
Ptilodactylidae/ <u>Anchytarsus bicolor</u> larvae	4
DECAPODA:	
Cambaridae/ <u>Cambarus</u> ( <u>Cambarus</u> ) <u>bartonii</u> males 1st.	2
<u>Cambarus</u> ( <u>Cambarus</u> ) <u>bartonii</u> male 2nd.	1
<u>Cambarus</u> ( <u>Cambarus</u> ) <u>bartonii</u> females	4
<u>C.</u> ( <u>Hiaticambarus</u> ) <u>longirostris</u> males 1st.	8
<u>C.</u> ( <u>Hiaticambarus</u> ) <u>longirostris</u> males 2nd.	2
<u>C.</u> ( <u>Hiaticambarus</u> ) <u>longirostris</u> females	3
<u>Orconectes erichsonianus</u> female	1
DIPTERA:	
Chironomidae larvae	11
Chironomidae pupa	1
Simuliidae larvae	15
Simuliidae pupa	1
Tipulidae/ <u>Hexatoma</u>	3
<u>Tipula</u>	40
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	23
Caenidae/ <u>Caenis</u>	1
Ephemerelellidae/ <u>Serratella</u> (early instars)	71
Heptageniidae/ <u>Stenacron</u>	26
<u>Stenonema</u>	131
Oligoneuriidae/ <u>Isonychia</u>	201

cont.

Sinking Creek: Site # 2, Qualitative Benthic Sample cont.

TAXA	NUMBER
GASTROPODA:	
Pleuroceridae/ <u>Goniobasis</u>	50
HEMIPTERA:	
Gerridae/ <u>Gerris</u> nymph	1
<u>G. (Aquarius) remigis</u> adult male	1
<u>Trepobates pictus</u> adult males	2
<u>Trepobates pictus</u> adult female	1
Veliidae/ <u>Microvelia</u> nymph	1
<u>Rhagovelia obesa</u> adult males	22
<u>Rhagovelia obesa</u> adult females	20
ISOPODA:	
Asellidae/ <u>Lirceus</u>	52
MEGALOPTERA:	
Corydalidae/ <u>Corydalus cornutus</u>	4
<u>Nigronia serricornis</u>	9
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	6
Calopterygidae/ <u>Calopteryx</u> (prob. <u>maculata</u> )	5
Coenagrionidae/ <u>Argia</u>	2
Gomphidae/ <u>Gomphus</u> (Genus A <u>consanguis</u> ) *	1
<u>G. (prob. exilis)</u>	4
PELECYPODA:	
Corbiculidae/ <u>Corbicula fluminea</u>	3
Sphaeriidae/ <u>Sphaerium</u>	2
PLECOPTERA:	
Perlidae/ <u>Acroneuria abnormis</u>	6
<u>Paragnetina media</u>	4
<u>Perlinella</u> (early instar)	1
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	37
<u>Hydropsyche betteni/depravata</u>	19
<u>H. rotosa</u>	11
<u>H. venularis</u>	7
Philopotamidae/ <u>Chimarra</u>	16
Rhyacophilidae/ <u>Rhyacophila</u> sp. cf. <u>R. carolina</u>	1
URODELA:	
Unid. juvenile salamanders	3
* (from Louton 1982)	867

SINKING CREEK  
SITE 2  
BENTHIC MACROINVERTEBRATES



n = 867  
TAXA RICHNESS = 42

Figure 31.



## Cloud Creek

Two qualitative fishery surveys were conducted in May and July 1990

**Location and Length** - Tributary to the Holston River (Cherokee Reservoir). Sample area 1 was located at the bridge on Prices Road and was sampled on 27 July 1990. It was 400 ft. in length and averaged 10.4 ft. in width. Sample area 2 was located along the gravel road ascending Short Mountain, approximately 2.1 mi. upstream (by road) of Pleasant Hill Church and was sampled on 8 May 1990. It was approximately 300 ft. in length and averaged 9 ft. in width. Both sites were in Hawkins County. Lee Valley Quadrangle.

**Gear Type** - Both sites were sampled using a single backpack electrofishing unit operating at 110 v. AC.

**Water Quality** - Data were taken from midstream at each site. Area 1, on 27 July 1990: DO - 7.7 ppm, pH - 8.1, Temperature - 68.4 F, Conductivity - 280 micromhos/cm. Area 2, on 8 May 1990: pH - 8.5, Temperature - 59 F, Conductivity - 160 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey at site 1 only. The sample contained 463 organisms and represented 45 taxa.

### Fish Collected:

<u>Species</u>	<u>Site 1</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Spotted bass	5	1.4	0.03	0.2
Rock bass	1	0.3	0.18	1.1
Redbreast sunfish	28	8.0	1.99	12.5
Green sunfish	142	40.7	3.67	23.0
Hybrid sunfish	1	0.3	0.08	0.5
Bluegill	15	4.3	0.52	3.3
Nongame Fish	17	4.9	7.72	48.4
Forage Fish	140	40.0	1.75	11.0
TOTAL	349		15.94	

Site 2

<u>Species</u>	<u>No.</u>	<u>% by</u>
		<u>No.</u>
Forage Fish	123	100
TOTAL	123	

Comments - This stream was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 349 fish weighing 15.94 lb. and comprising 16 species from sample site 1. Four native game species, spotted bass (*Micropterus punctulatus*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), and bluegill (*L. macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were collected. Only five small spotted bass (2 in. class) were found and rock bass were represented by a single specimen. Comparison of inch class distributions was made for redbreast sunfish, green sunfish, and bluegill (Fig. 32). Green sunfish made up about 41% by number and 23% by weight of all fish collected. However, 67% of these were 2 in. and under. Redbreast sunfish accounted for 8% by number and about 12% by weight while bluegill made up only 4% by number and 3% by weight of all fish collected. All game fish combined made up 55% by number and about 41% by weight. Eleven nongame and forage species were also collected and these made up about 45% of the total number and 59% of the total weight. Of these, six forage species comprised 40% of the total number, but nongame fish accounted for 48% of the total weight. The snubnose darter (*Etheostoma simoterum*) was the only darter species collected.

At the upstream site we collected only blacknose dace (*Rhinichthys atratulus*) and creek chub (*Semotilus atromaculatus*). Both species were collected at the downstream site also, and therefore, do not add to the overall number of species collected from the stream. These species are typical of the small stream habitat found at site 2.

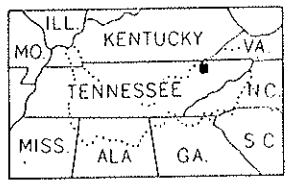
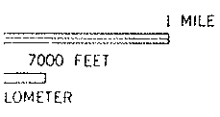
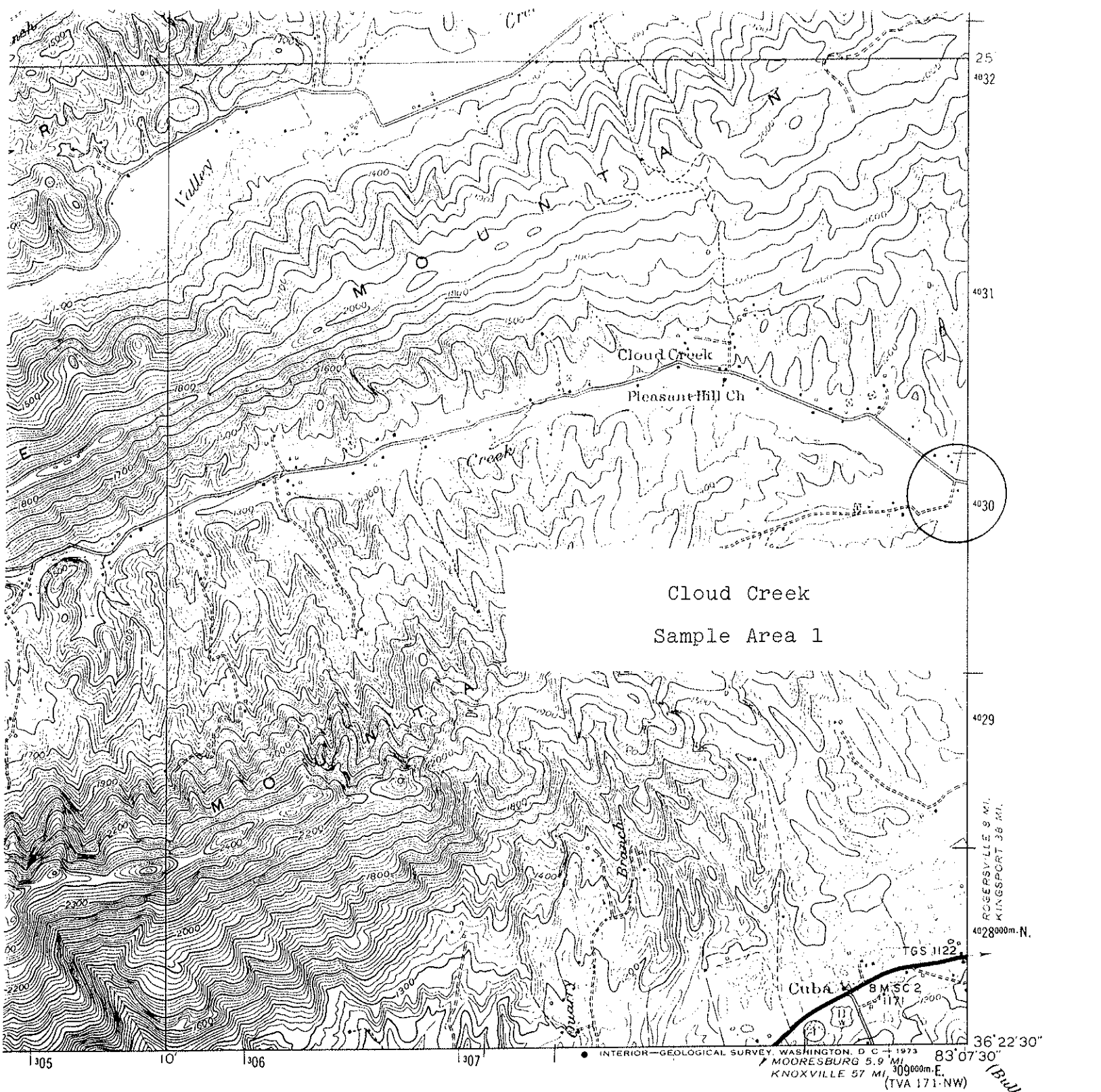
Cloud Creek is a small, shallow stream that is fairly silty. It probably receives non-point source pollution from agricultural activities in the watershed. The upstream site was notably impacted by siltation, but we did not locate a specific source. Except for the siltation, the stream at this point is a nice little

woodland, almost mountain-type stream, with complete forest canopy. Almost all fish species present were tolerant forms and one hybrid green-redbreast sunfish was collected at the downstream site.

Benthic macroinvertebrates were collected from the downstream site only and included Baetidae, Heptageniidae, Leptophlebiidae, and Oligoneuriidae mayflies, Capniidae and Peltoperlidae stoneflies, Hydropsychidae and Philopotamidae caddisflies, and Dytiscidae, Elmidae, Helodidae, and Psephenidae beetles. Fingernail clams (*Sphaerium*) and *Physa* and periwinkle snails (*Goniobasis*) were present. *Orconectes rusticus* was the only crayfish collected. Ephemeropterans represented about 38%, coleopterans 14%, isopods 10%, and trichopterans about 9% of the total number of organisms collected (Fig. 33). A total of 45 taxa was collected at this site.

**Management Recommendations:**

1. No specific management can be suggested other than trying to reduce siltation.



QUADRANGLE LOCATION

ROAD CLASSIFICATION

- Heavy-duty ..... ————
- Medium-duty ..... ————
- Light-duty ..... ————
- U. S. Route
- Poor motor road ..... =====
- Wagon and jeep track ..... - - - - -
- Foot trail ..... - - - - -
- State Route

LEE VALLEY, TENN.  
 N3622.5-W8307.5/7.5

1939  
 PHOTOREVISED 1971  
 AMS 4356 I NW-SERIES V84I

(Bulls Gap T21-SE)  
 4356 I SE

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Cloud Creek Lat-Long 362352N - 830734W  
Watershed Holston River Length of Sample 400 ft.  
Station Site # 1 Reach 06010104-50,1  
County Hawkins Date/Time 27 July 1990/0930  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 10.4 ft. Average Depth 0.4 ft. Maximum Depth 2.7 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud 15 % Silt 15 % Sand 10 % Clay - %  
Gravel 20 % Rubble 30 % Boulders 10 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 30 % Rubble 40 % Boulders 10 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average X Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 80 % of Stream.
8. Flow (CFS) 0.9: Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Clear, warm and humid; air temp. - 74°F.
10. Past Weather (last 24 hours) Clear, warm and humid.
11. pH 8.1 Temp. 68.4°F Conductivity 280 D.O. 7.7 % Saturation 85.4
12. Comments: Sample location was at the bridge on Prices Road. There  
was considerable siltation present, most probable source is from  
agricultural practices in the watershed.

FISH FIELD DATA FORM

Site #1 - Bridge on  
Prices Rd.

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Cloud Creek Lat-Long 362352N - 830734W  
 Watershed Holston River Date 27 July 1990  
 County Hawkins Reach 06010104-50,1  
 Type of Sampling Electrofishing Pool Elevation 1125 ft.  
 Gear Type 1 Backpack @ 110 v. AC Time 1315-1415

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus punctulatus</i>		219	5	2	0.03			
<i>Ambloplites rupestris</i>		13	1	6	0.18			
<i>Lepomis auritus</i>		201	10	3	0.33			
"	"	"	9	4	0.46			
"	"	"	5	5	0.55			
"	"	"	4	6	0.65			
<i>L. cyanellus</i>		202	66	1	0.23			
"	"	"	29	2	0.32			
"	"	"	18	3	0.59			
"	"	"	18	4	0.98			
"	"	"	9	5	1.03			
"	"	"	1	6	0.20			
"	"	"	1	7	0.32			
Hybrid sunfish *		-	1	4	0.08			
<i>L. macrochirus</i>		206	2	2	0.02			
"	"	"	8	3	0.15			
"	"	"	4	4	0.19			
"	"	"	1	6	0.16			
<i>Ameiurus natalis</i>		174	6	1-9	1.22			
<i>Catostomus commersoni</i>		32	8	5-13	3.47			
<i>Hypentelium nigricans</i>		166	1	10	0.49			
<i>Moxostoma duquesnei</i>		229	1	7	0.14			
<i>M. erythrurum</i>		230	1	18	2.40			
Continued on next page								

\* *Lepomis cyanellus* x *auritus*

Field Notes: 400 ft. sample length.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

FISH FIELD DATA FORM

Site #1 - Bridge on  
Prices Rd.

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Cloud Creek Lat-Long 362352N - 830734W  
 Watershed Holston River Date 27 July 1990  
 County Hawkins Reach 06010104-50,1  
 Type of Sampling Electrofishing Pool Elevation 1125 ft.  
 Gear Type 1 Backpack @ 110 v. AC Time 1315-1415

Name	SPECIES CODE	NUMBER	LENGTH	WT.			
<i>Campostoma anomalum</i>	25	80	1-5	0.83			
<i>Luxilus chrysocephalus</i>	249	12	2-6	0.53			
<i>Pimephales notatus</i>	334	29	1-3	0.15			
<i>Rhinichthys atratulus</i>	351	8	1-2	0.02			
<i>Semotilus atromaculatus</i>	360	9	1-7	0.22			
<i>Etheostoma simoterum</i>	111	2	1	t			

Field Notes: 400 ft. sample length.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

GAME FISH FROM CLOUD CREEK  
 SITE 1  
 INCH CLASS DISTRIBUTION

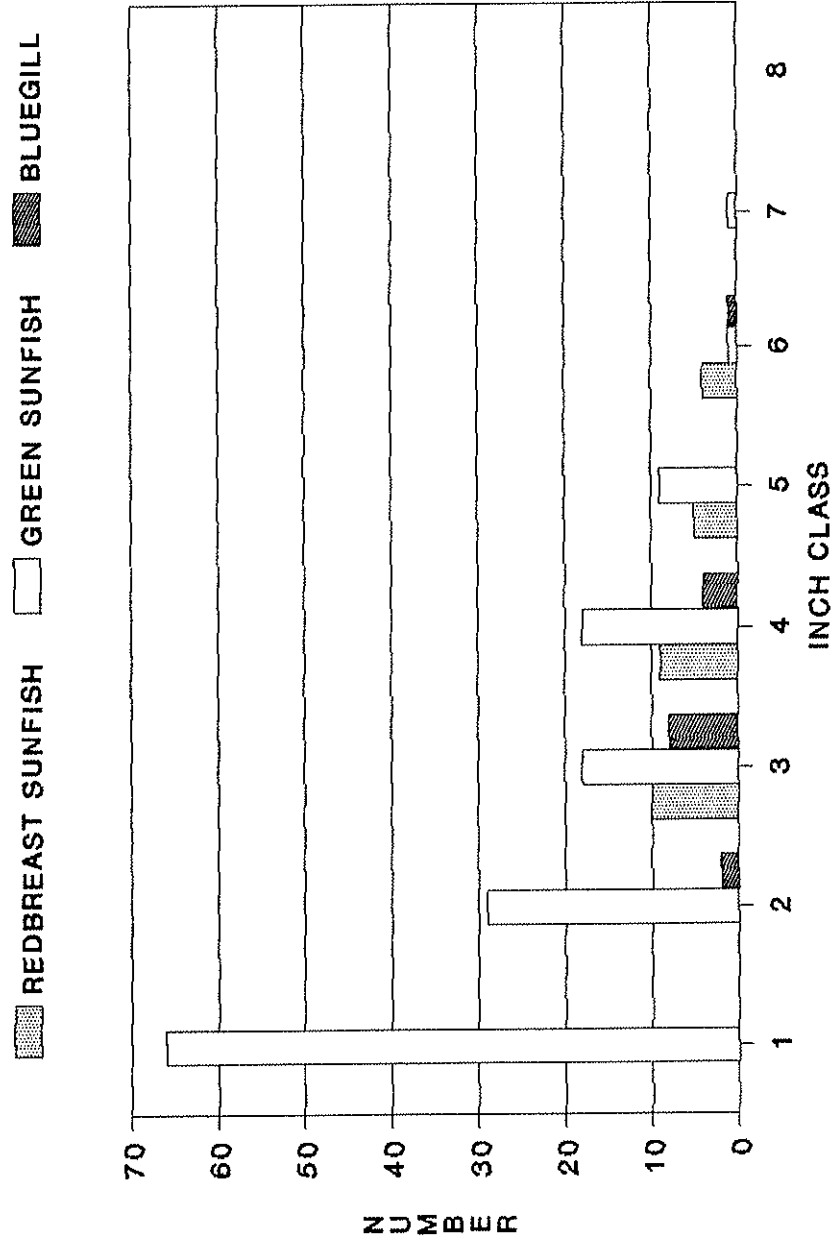


Figure 32.



Cloud Creek: Site # 1 Qualitative Benthic Sample

27 July 1990

Field # 228

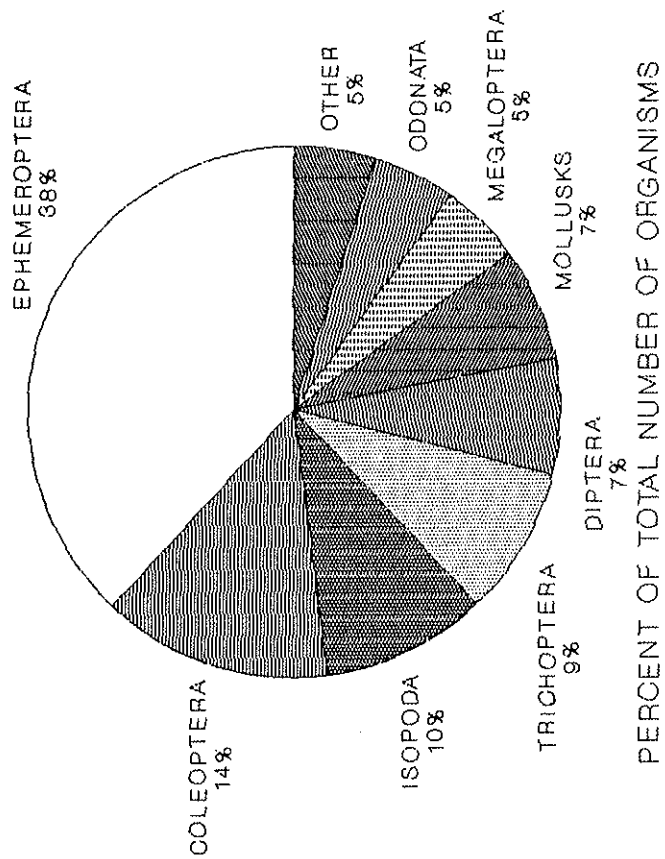
Hawkins Co., TN; Bridge crossing on Prices Road.  
Coordinates: 362352N - 830734W. Lee Valley, Tenn., # 171  
NW Quad. Reach # 06010104-50,1.

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	3
COLEOPTERA:	
Dytiscidae/ <u>Hydroporus</u> adult	1
Elmidae/ <u>Dubiraphia</u> larvae	2
<u>Microcylloepus pusillus</u> adult	1
<u>Optioservus</u> larvae	2
<u>O. ovalis</u> adult	1
<u>O. trivittatus</u> adult	1
<u>Stenelmis</u> larvae	22
<u>Stenelmis</u> adults	23
Helodidae/ <u>Prinocyphon</u> larva	1
Psephenidae/ <u>Psephenus herricki</u> larvae	6
<u>Psephenus herricki</u> adults	3
DECAPODA:	
Cambaridae/ <u>Orconectes rusticus</u> males 1st.	3
<u>Orconectes rusticus</u> male 2nd.	1
DIPTERA:	
Chironomidae	18
Simuliidae	2
Stratiomyidae/ <u>Stratiomys</u> larvae	8
Tipulidae/ <u>Hexatoma</u>	5
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	63
Heptageniidae/ <u>Heptagenia</u>	31
<u>Stenacron interpunctatum</u>	2
<u>Stenonema (Maccaffertium) ithaca</u>	10
<u>Stenonema</u>	30
Leptophlebiidae/ <u>Habrophlebiodes</u>	2
Oligoneuriidae/ <u>Isonychia</u>	40
GASTROPODA:	
Physidae/ <u>Physa</u>	6
Pleuroceridae/ <u>Goniobasis</u>	26

Cloud Creek: Site # 1 Qualitative Benthic Sample cont.

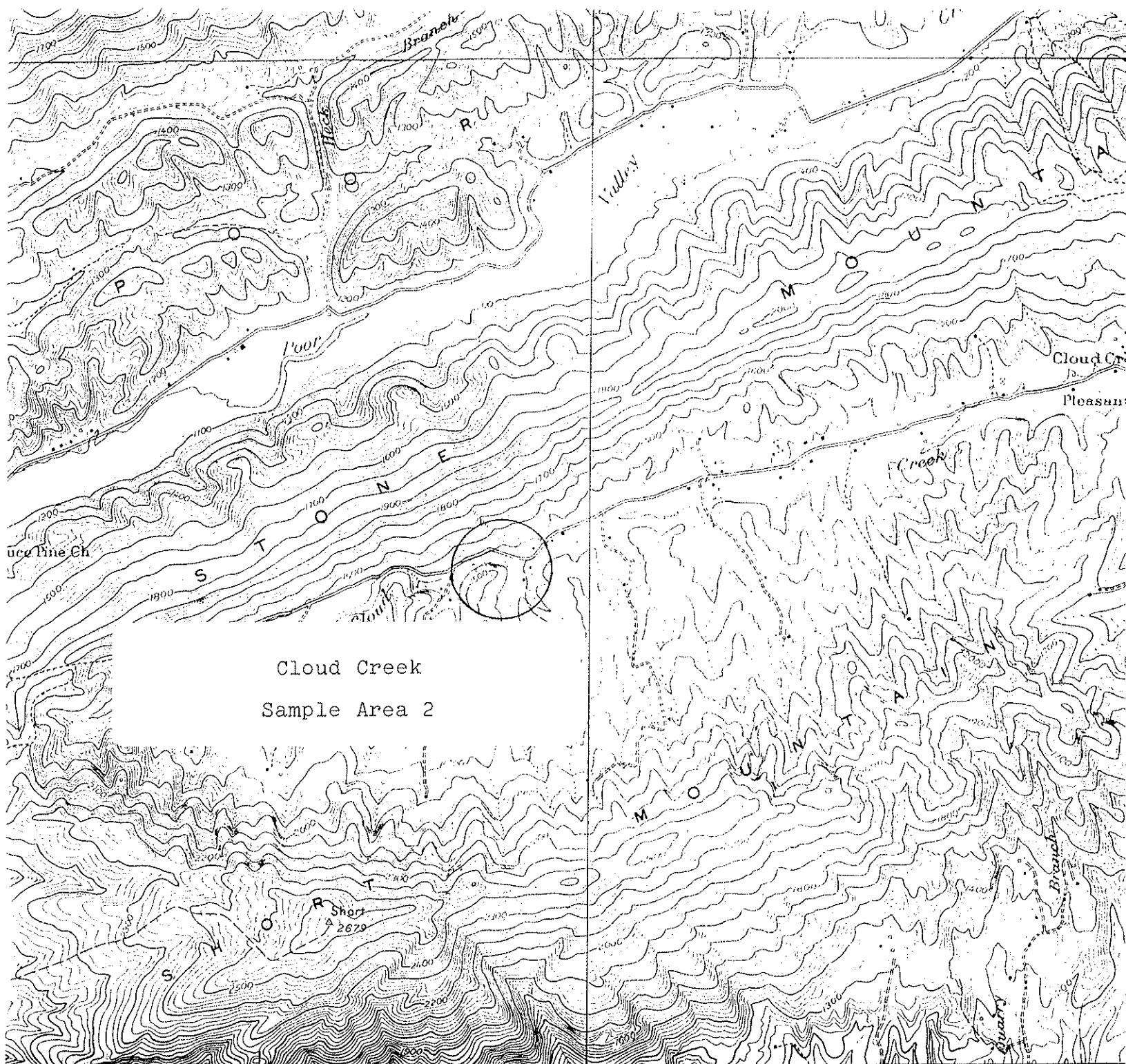
TAXA	NUMBER
<b>HEMIPTERA:</b>	
Corixidae adult	1
Gerridae/ <u>Gerris (Aquarius) remigis</u> adult female	1
<u>Trepobates</u> nymph	1
Hydrometridae/ <u>Hydrometra</u>	1
Veliidae/ <u>Microvelia</u> adults	2
<u>Rhagovelia</u> <u>obesa</u> nymph	1
<u>Rhagovelia</u> <u>obesa</u> adult female	1
<b>ISOPODA:</b>	
Asellidae/ <u>Lirceus</u>	45
<b>MEGALOPTERA:</b>	
Corydalidae/ <u>Corydalus</u> <u>cornutus</u>	9
<u>Nigronia</u> <u>serricornis</u>	14
Sialidae/ <u>Sialis</u>	1
<b>ODONATA:</b>	
Aeshnidae/ <u>Basiaeschna</u> <u>janata</u>	3
<u>Boyeria</u> <u>vinosa</u>	11
Calopterygidae/ <u>Calopteryx</u>	2
Coenagrionidae/ <u>Argia</u>	1
Cordulegastridae/ <u>Cordulegaster</u> <u>maculata</u>	5
Gomphidae/ <u>Gomphus</u> <u>lividus</u>	2
<u>Stylogomphus</u> <u>albistylus</u>	1
<b>PELECYPODA:</b>	
Sphaeriidae/ <u>Sphaerium</u>	2
<b>PLECOPTERA:</b>	
Capniidae	2
Peltoperlidae/ <u>Peltoperla</u>	3
<b>TRICHOPTERA:</b>	
Hydropsychidae/ <u>Cheumatopsyche</u>	16
<u>Hydropsyche</u> <u>betteni</u> / <u>depravata</u>	13
Philopotamidae/ <u>Chimarra</u> larvae	9
<u>Chimarra</u> pupae	2
<u>Chimarra</u> adult male	1
	463

CLOUD CREEK  
SITE 1  
BENTHIC MACROINVERTEBRATES

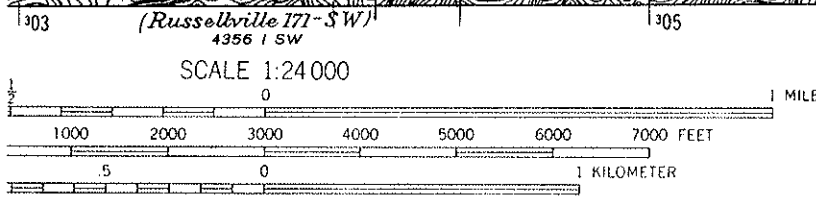


n = 463  
TAXA RICHNESS = 45

Figure 33.



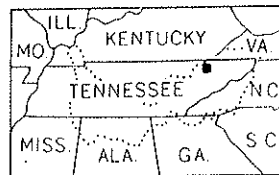
Cloud Creek  
Sample Area 2



SCALE 1:24 000

CONTOUR INTERVAL 20 FEET

DASHED LINES REPRESENT HALF-INTERVAL CONTOURS  
DATUM IS MEAN SEA LEVEL



QUADRANGLE LOCATION

LEE VALLEY QUADRANGLE  
Tennessee - 171 NW

BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20242,  
SEE DIVISION OF GEOLOGY, NASHVILLE, TENN. 37219,  
AUTHORITY, CHATTANOOGA, TENN. 37401 OR KNOXVILLE,  
DISTRIBUTING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQU

RO  
Heavy-duty .....  
Medium-duty .....  
Light-duty .....  
U. S. Re

FISH FIELD DATA FORM

Site #2 - Along gravel road on Short Mtn.

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Cloud Creek Lat-Long 362346N - 831019W  
 Watershed Holston River Date 8 May 1990  
 County Hawkins Reach 06010104-50,1  
 Type of Sampling Electrofishing Pool Elevation 1360 ft.  
 Gear Type 1 Backpack @ 110 v. AC Time 1500-1530

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Rhinichthys atratulus</i>		351	54					
<i>Semotilus atromaculatus</i>		360	69					
Temperature - 59°F								
pH - 8.5								
Conductivity - 160 micromho/cm								
Avg. width - 8 to 10 ft.								
Avg. depth - 0.5 ft.								
Rubble-boulder-bedrock substrate.								
Stream appears to be impacted by an unknown source of siltation from Short Mountain.								
Nice little woodland stream, almost mountain-type, with complete canopy at this point.								

Field Notes: 300 ft. sample area. Location was along gravel road going up Short Mtn., approx. 2.1 mi. upstream (by road) of Pleasant Hill Church.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

## Beech Creek

Two qualitative surveys were conducted in June 1990:

### Location and Length - Tributary to the Holston River.

Sample area 1 was located at the bridge on the gravel road near Keplar School at stream mi. 6.6 and was sampled on 13 June 1990. It was 400 ft. in length and averaged 28 ft. in width. Sample area 2 was located at the 1st bridge crossing on Highway 347 about 1.1 mi. upstream of the intersection of Van Hill Road and Highway 347 and was sampled on 14 June 1990. It was 300 ft. in length and averaged 15.9 ft. in width. Both sites were in Hawkins County. Area 1, Burem Quadrangle. Area 2, Stony Point Quadrangle.

**Gear Type** - Both sites were sampled using two backpack electrofishing units operating at 110 v. AC.

**Water Quality** - Data were taken from midstream at each site. Area 1 on 13 June 1990: DO - 8.8 ppm, pH - 8.2, Temperature - 68.4 F, Conductivity - 255 micromhos/cm. Area 2 on 14 June 1990: DO - 9.5 ppm, pH - 8.2, Temperature - 69.6 F, Conductivity - 325 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 60 minute qualitative sample at each site. Area 1 sample contained 614 organisms and represented 52 taxa. Area 2 sample contained 384 organisms and represented 39 taxa.

### Fish Collected:

<u>Species</u>	<u>Site 1</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Smallmouth bass	4	0.6	0.80	2.8
Spotted bass	2	0.3	0.10	0.4
Rock bass	58	9.0	10.03	35.3
Redbreast sunfish	41	6.4	3.66	12.9
Bluegill	1	0.2	0.03	0.1
Nongame Fish	24	3.7	4.55	16.0
Forage Fish	513	80.0	9.22	32.2
TOTAL	643		28.39	

Site 2

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Smallmouth bass	2	0.3	1.97	7.5
Rock bass	90	14.1	10.77	41.2
Redbreast sunfish	74	11.6	5.30	20.3
Nongame Fish	6	0.9	0.31	1.2
Forage Fish	464	72.8	7.77	29.7
TOTAL	636		26.12	

**Comments** - We surveyed two sites on this stream primarily to develop a fish species list and to collect stream data for TADS. This stream is locally known as a good smallmouth bass (*Micropterus dolomieu*) and rock bass (*Ambloplites rupestris*) stream and probably receives a fair amount of fishing pressure. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 643 fish weighing 28.39 lb. and comprising 25 species from site 1. Four native game species, smallmouth bass, spotted bass (*Micropterus punctulatus*), rock bass, and bluegill (*Lepomis macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were collected. Only two small spotted bass and one bluegill were collected. Therefore, comparison of inch class distribution was made for smallmouth bass, rock bass, and redbreast sunfish (Fig. 34). Smallmouth bass made up about 1% compared to about 9% by rock bass, and 6% by redbreast sunfish, of the total number of fish collected. Rock bass contributed about 35% as compared to 3% by smallmouth bass, and 13% by redbreast sunfish, of the total weight. Twenty nongame and forage species were also collected and these comprised about 84% of the total number and 48% of the total weight. Of particular interest were the fairly intolerant shiner species such as warpaints (*Luxilus coccogenis*) and telescopes (*Notropis telescopus*) as these were fairly abundant. Also, two specimens of the rosefin shiner (*Lythrurus ardens*) and five specimens of the sand shiner (*Notropis stramineus*) were collected. The former being very localized in Ridge and Valley streams and the other spotty in occurrence in the upper Tennessee River drainage (Etnier and Starnes in press). Seven darter species, the greenside (*Etheostoma blennioides*), fantail (*E. flabellare*), redline (*E. rufilineatum*), snubnose (*E. simotereum*), blueside (*E. stigmaeum jessiae*), banded (*E. zonale*), and the logperch (*Percina caprodes*) were also collected here.

At the upstream site we collected 636 fish weighing 26.12 lb. and comprising 19 species. Game fish from this site included smallmouth bass, rock bass, and redbreast sunfish only (Fig. 36). Smallmouth bass made up less than 1% compared to about 14% by rock bass, and 12% by redbreast sunfish, of the total number of fish collected. Rock bass contributed about 41% as compared to 7% by smallmouth bass, and 20% by redbreast sunfish, of the total weight. Sixteen nongame and forage species were collected here and these comprised about 74% of the total number and 31% of the total weight. Most were the same as collected at the downstream site. Again, warpaint and telescope shiners were present as were rosefin and sand shiners. Three additional species, the white sucker (*Catostomus commersoni*), and mimic shiner (*Notropis volucellus*), and blacknose dace (*Rhinichthys atratulus*) were collected here but not at the downstream site. Also, four darter species, the greenside, fantail, redline, and snubnose were represented here.

Of the five game fish collected, it appears that smallmouth bass, rock bass, and redbreast sunfish are the most important species to the fishery. And, based on the data from our limited sampling effort, that the rock bass is the primary game species, redbreast sunfish second, and smallmouth last. However, the presence of 12 and 13 in. smallmouth bass in a stream this size should not be dismissed as insignificant. A total of 28 species was collected from both sites combined. Several of these are fairly intolerant forms even though the stream receives considerable run-off from agricultural activities along the watershed. The occurrence of seven darter species further attests to good water quality.

Benthic macroinvertebrates from our sample at site 1 included Baetidae, Ephemerellidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, perlid stoneflies, Helicopsychidae, Hydropsychidae, Hydroptilidae, Philopotamidae, and Psychomyiidae caddisflies, and Dryopidae, Elmidae, Hydrophilidae, and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) and fingernail clam (*Sphaerium*) were present along with limpets (*Ferrissia*). Snails included periwinkle (*Goniobasis*), *Pleurocera canaliculatum*, and *Campeloma*. At least eight species of mussels were represented, all by relics collected at the site. One of these, the Cumberland bean pearly mussel (*Villosa trabalis*) is endangered (Bogan and Parmalee 1983) and another, the purple bean mussel (*V. perpurpurea*) is soon



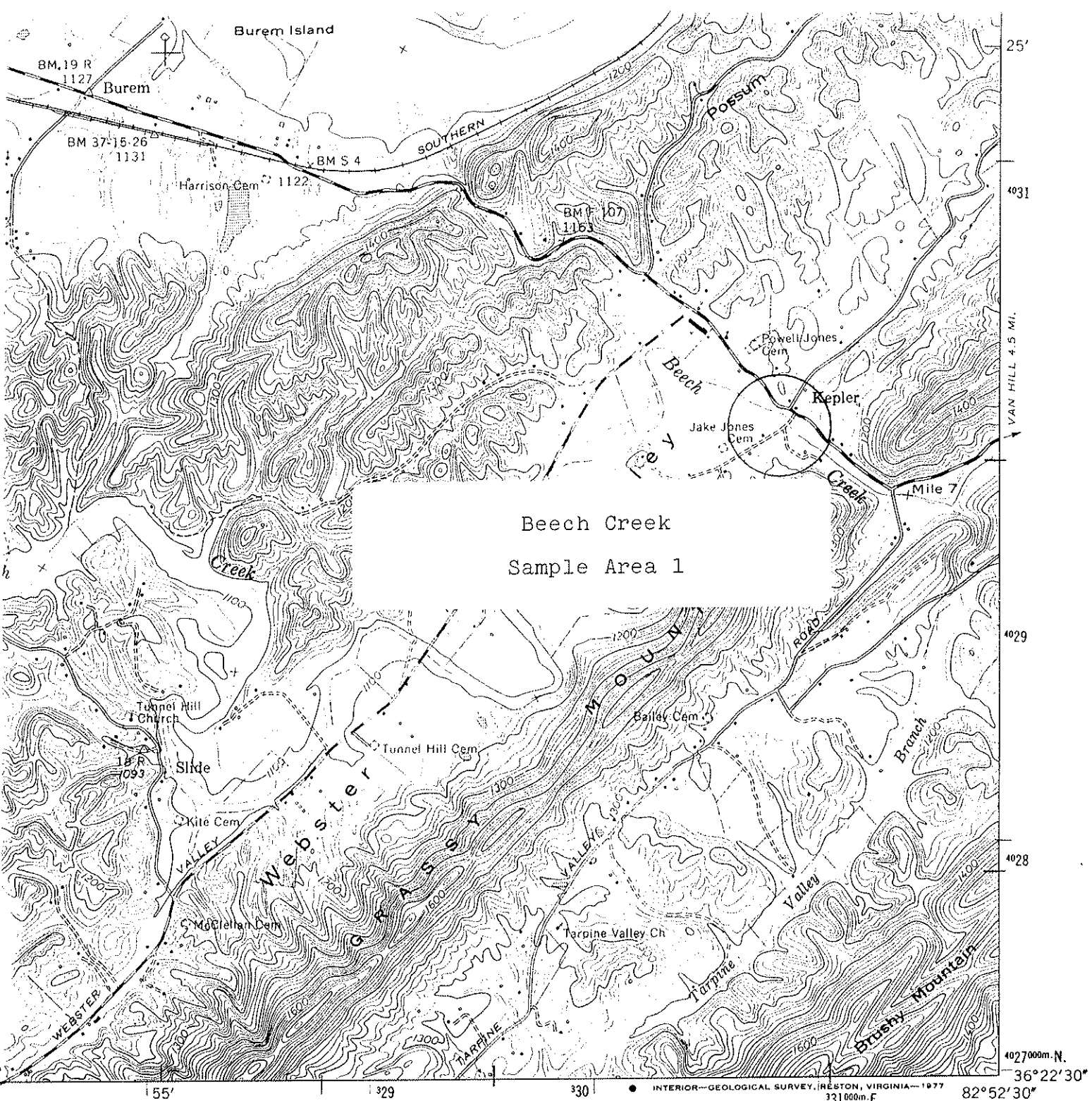
to be listed (Cole 1989). Beech Creek is one of only two localities in Tennessee where *V. perpurpurea* still occurs. Other mussels included *Fusconaia barnesiana*, *Lampsilis fasciola*, *Lasmigona holstonia*, *Pleurobema oviforme*, *Villosa iris*, and *V. vanuxemensis*. *Orconectes rusticus* was the only crayfish in our sample. Of particular interest is the collection of the only eastern helicopsychid caddisfly, *Helicopsyche borealis*. This species is widespread in middle Tennessee but is found only in a few localities in east Tennessee (Etnier and Schuster 1979). We have also collected this species in two other Hawkins County streams, Stanley Creek (Bivens 1989), and the North Fork Holston River (Bivens and Williams 1990). Trichopterans represented about 29%, dipterans about 22%, ephemeropterans 20%, and coleopterans about 16% of the total number of organisms collected (Fig. 35). A total of 52 taxa was collected at this site.

Benthic macroinvertebrates from our sample at site 2 included Baetidae, Ephemerellidae, Ephemeridae, Heptageniidae, and Leptophlebiidae mayflies, Peltoperlidae and Perlidae stoneflies, Hydropsychidae, Hydroptilidae, and Leptoceridae caddisflies, and Dryopidae, Elmidae, Helodidae, and Psephenidae beetles. The Asian clam, fingernail clam and limpets were present here also. *Pleurocera canaliculatum* was the only snail collected. Mussel relics collected at this site included *Fusconaia barnesiana*, *Medionidus conradicus*, *Villosa iris*, *V. perpurpurea*, and *V. trabalis*. *Medionidus conradicus* was the only species collected here but not at the downstream site. Ephemeropterans represented about 31% and trichopterans about 30% of the total number of organisms collected (Fig. 37). A total of 39 taxa was collected at this site.

#### Management Recommendations:

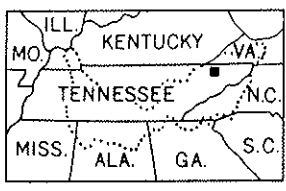
1. The fish species diversity and taxa richness of macroinvertebrates and the presence of many intolerant forms indicate that this is a good to excellent quality Ridge and Valley stream that merits extra protection from any source of pollution or habitat destruction.
2. The diverse mussel fauna further strengthens the need to protect this stream as many of the species found here are restricted to smaller rivers and streams and need clean, fast-flowing water, free from pollution to survive. The presence of federally listed (or soon to be) species such as *Villosa trabalis* and *V. perpurpurea* also warrants an extra measure of protection.

3. Consider this stream to conduct more intensive fish population surveys in the future, i.e., three-pass depletion electrofishing samples and age structures.



Beech Creek  
Sample Area 1

MI. TO TENNESSEE TO



QUADRANGLE LOCATION

INTERIOR GEOLOGICAL SURVEY, RESTON, VIRGINIA—1977  
31°000m. E.

(TVA 180-NW)

ROAD CLASSIFICATION

- Heavy-duty ..... ————
- Medium-duty ..... ————
- Light-duty ..... ————
- U. S. Route
- Poor motor road .... = = = = =
- Wagon and jeep track - - - - -
- Foot trail ..... - - - - -
- State Route

In developed areas, only through roads are classified

BUREM, TENN.  
N3622.5—W8252.5/7.5

1961  
PHOTOREVISED 1976  
AMS 4456 IV NW-SERIES V84I

TENN. 37902.  
EST

(BAILEYTON 180-SE)  
4.55 IV SE

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Beech Creek Lat-Long 362406N - 825307W  
Watershed Holston River Length of Sample 400 ft.  
Station Site # 1 Reach 06010104-12,0  
County Hawkins Date/Time 13 June 1990/1030  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 28 ft. Average Depth 0.6 ft. Maximum Depth 2.1 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud 5 % Silt 10 % Sand 10 % Clay - %  
Gravel 10 % Rubble 35 % Boulders 10 % Bedrock 20 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 25 % Rubble 25 % Boulders 25 % Bedrock 5 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous X (*Dianthera americana*)  
Average \_\_\_\_\_ Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20 %  
of stream, Average in 50 %, Poor in 30 %
7. Shade or Canopy Good over 10 % of Stream.
8. Flow (CFS) 18.7 : Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Clear, hot & humid; air temp. - 78°F.
10. Past Weather (last 24 hours) Same but cool overnight.
11. pH 8.2 Temp. 68.4°F Conductivity 255 D.O. 8.8 % Saturation 97
12. Comments: Sample location at the bridge on the gravel road near Kepler School; stream mi. 6.6. Siltation is apparent and probably comes from agricultural activities along the entire watershed.

FISH FIELD DATA FORM

Site #1 - Stream mi.  
6.6

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Beech Creek Lat-Long 362406N - 825307W  
 Watershed Holston River Date 13 June 1990  
 County Hawkins Reach 06010104-12,0  
 Type of Sampling Electrofishing Pool Elevation 1110 ft.  
 Gear Type 2 backpacks @ 110 v. AC Time 1315-1415

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	1	5	0.07			
"	"	"	2	7	0.35			
"	"	"	1	10	0.38			
<i>M. punctulatus</i>		219	1	4	0.04			
"	"	"	1	5	0.06			
<i>Ambloplites rupestris</i>		13	11	3	0.35			
"	"	"	11	4	0.67			
"	"	"	5	5	0.53			
"	"	"	9	6	1.76			
"	"	"	18	7	5.11			
"	"	"	3	8	1.08			
"	"	"	1	9	0.53			
<i>Lepomis auritus</i>		201	2	2	0.04			
"	"	"	15	3	0.42			
"	"	"	10	4	0.58			
"	"	"	7	5	0.77			
"	"	"	2	6	0.36			
"	"	"	5	7	1.49			
<i>L. macrochirus</i>		206	1	3	0.03			
<i>Ictalurus punctatus</i>		176	1	6	0.09			
<i>Hypentelium nigricans</i>		166	23	1-13	4.46			
<i>Camptostoma anomalum</i>		25	61	2-6	3.04			
Continued on next page.								

Field Notes: 400 ft. sample length.

Name of Collector(s): R.D. Bivens, C.E. Williams, M.T. Fagg, & M.H. Hughes

WR-0525

FISH FIELD DATA FORM

Site #1 - Stream mi.  
6.6

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Beech Creek Lat-Long 362406N - 825307W  
 Watershed Holston River Date 13 June 1990  
 County Hawkins Reach 06010104-12,0  
 Type of Sampling Electrofishing Pool Elevation 1110 ft.  
 Gear Type 2 backpacks @ 110 v. AC Time 1315-1415

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Cyprinella galactura</i>	253	10	1-3	0.05			
<i>C. spiloptera</i>	269	5	2-3	0.05			
<i>Hybopsis amblops</i>	155	50	2-3	0.32			
<i>Luxilus chrysocephalus</i>	249	97	1-7	3.31			
<i>L. coccogenis</i>	248	72	1-3	0.39			
<i>L. chrysocephalus x</i> <i>coccogenis</i> hybrid		1	3	0.02			
<i>Lythrurus ardens</i>	237	2	1-2	0.01			
<i>Nocomis micropogon</i>	234	38	1-6	0.80			
<i>Notropis stramineus</i>	271	5	2	0.03			
<i>N. telescopus</i>	272	49	1-3	0.27			
<i>Pimephales notatus</i>	334	9	1-2	0.03			
<i>Etheostoma blenniodes</i>	79	23	1-4	0.46			
<i>E. flabellare</i>	92	16	1-2	0.07			
<i>E. rufilineatum</i>	108	38	1-2	0.17			
<i>E. simoterum</i>	111	32	1-2	0.11			
<i>E. stigmaeum jessiae</i>	96	2	2	0.01			
<i>E. zonale</i>	135	2	1-2	0.01			
<i>Percina caprodes</i>	306	1	5	0.07			

Field Notes: 400 ft. sample length.

Name of Collector(s): R.D. Bivens, C.E. Williams, M.T. Fagg, & M.H. Hughes

WR-0525

GAME FISH FROM BEECH CREEK  
SITE 1  
INCH CLASS DISTRIBUTION

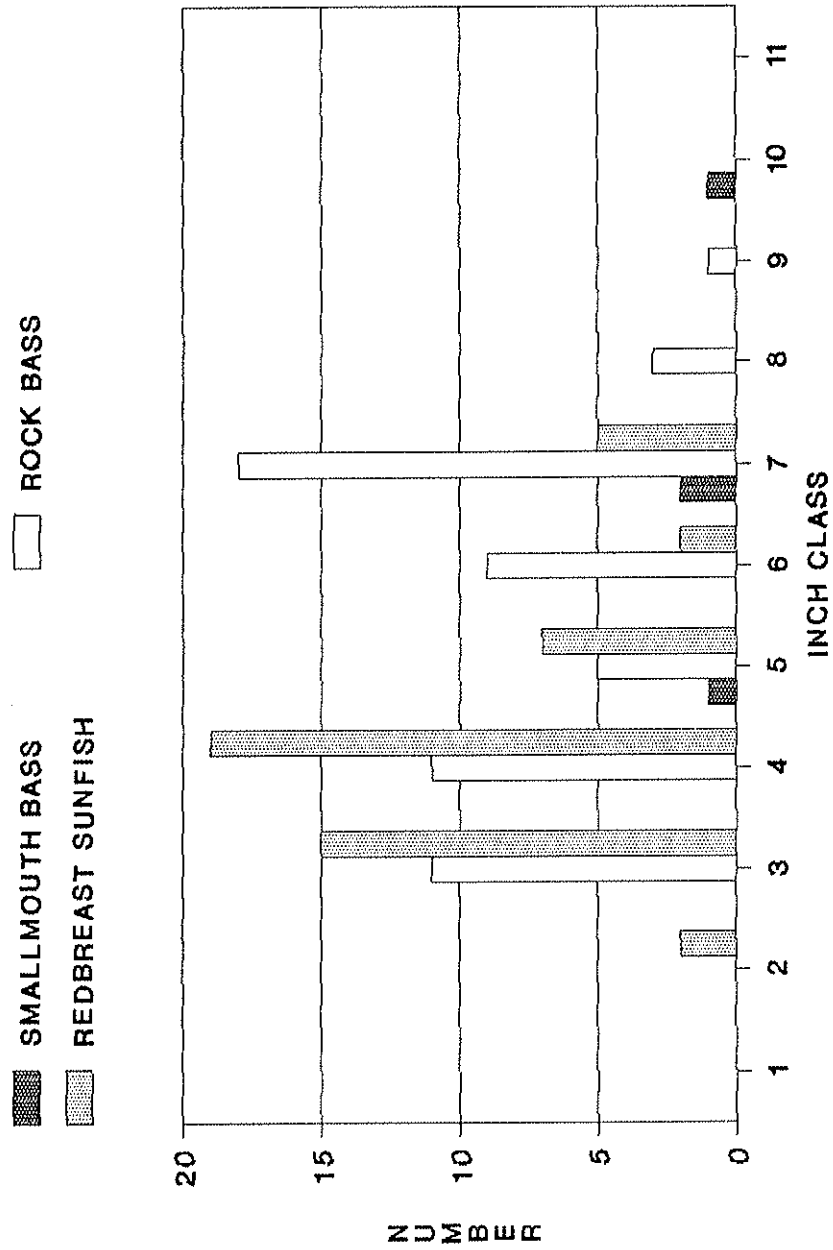


Figure 34.

Beech Creek: Site # 1, Qualitative Benthic Sample

13 June 1990

Field # 212

Hawkins Co., TN; At the bridge on the gravel road near Kepler School; stream mi. 6.6. Coordinates: 362406N - 825307W.  
Burem, Tenn., # 180 NW Quad. Reach # 06010104-12,0.

---

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	2
COLEOPTERA:	
Dryopidae/ <u>Helichus</u> adults	2
Elmidae/ <u>Dubiraphia</u> larva	1
<u>D. vittata</u> adults	8
<u>Macronychus glabratus</u> larva	1
<u>Macronychus glabratus</u> adults	24
<u>Optioservus</u> larva	1
<u>O. trivittatus</u> adults	3
<u>Stenelmis</u> larvae	7
<u>Stenelmis</u> adults	25
Hydrophilidae/ <u>Tropisternus blatchleyi</u> <u>blatchleyi</u>	2
Psephenidae/ <u>Psephenus herricki</u> larvae	21
<u>Psephenus herricki</u> adults	
DECAPODA:	
Cambaridae/ <u>Orconectes</u> juvenile female	1
<u>O. rusticus</u> male 1st.	1
DIPTERA:	
Athericidae/ <u>Atherix lantha</u>	4
Chironomidae larvae	74
Chironomidae pupae	5
Empididae	2
Simuliidae larvae	21
Simuliidae pupae	4
Tabanidae/ <u>Tabanus</u>	1
Tipulidae/ <u>Antocha</u> larvae	17
<u>Antocha</u> pupa	1
<u>Hexatoma</u>	7
<u>Tipula</u>	1



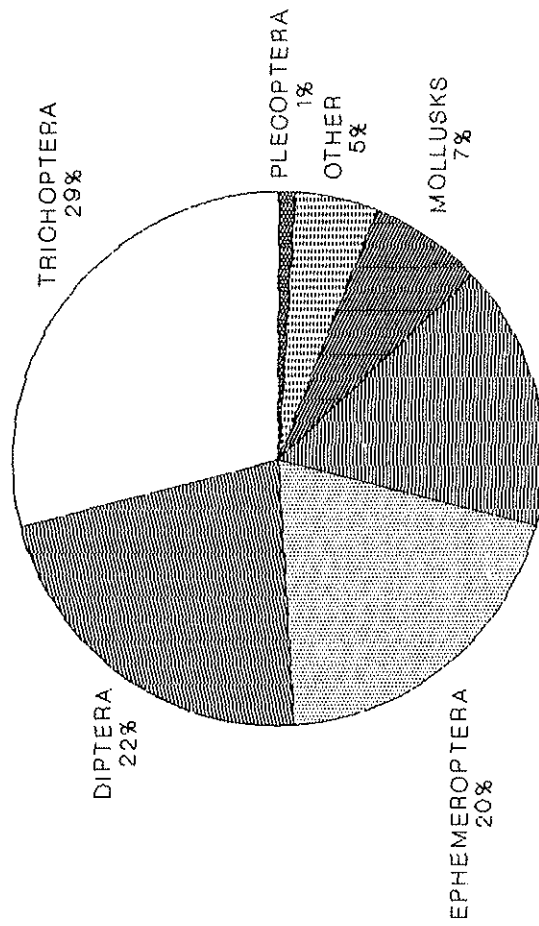
Beech Creek: Site # 1, Qualitative Benthic Sample cont.

TAXA	NUMBER
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	81
<u>Pseudocloeon</u>	7
Ephemerellidae/ <u>Eurylophella</u>	5
<u>Serratella deficiens</u>	6
Ephemeridae/ <u>Hexagenia</u>	2
Heptageniidae/ <u>Heptagenia</u>	1
<u>Stenacron interpunctatum</u>	1
<u>Stenonema</u>	10
Oligoneuriidae/ <u>Isonychia</u>	8
GASTROPODA:	
Ancylidae/ <u>Ferrissia</u>	1
Pleuroceridae/ <u>Goniobasis</u>	3
<u>Pleurocera canaliculatum</u>	2
Viviparidae/ <u>Campeloma</u>	3
HEMIPTERA:	
Veliidae/ <u>Rhagovelia obesa</u> adult male	1
ISOPODA:	
Asellidae/ <u>Lirceus</u>	7
MEGALOPTERA:	
Corydalidae/ <u>Corydalis cornutus</u>	5
<u>Nigronia serricornis</u>	1
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	6
Coenagrionidae/ <u>Enallagma divagans</u>	1
Gomphidae/ <u>Dromogomphus spinosus</u>	2
<u>Gomphus</u> (early instar)	1
<u>G. lividus</u>	1
<u>Hagenius brevistylus</u> (exuvia)	1
<u>Stylogomphus albistylus</u>	2

Beech Creek: Site # 1, Qualitative Benthic Sample cont.

TAXA	NUMBER
PELECYPODA:	
Corbiculidae/ <u>Corbicula fluminea</u>	6
Sphaeriidae/ <u>Sphaerium</u>	1
Unionidae/ <u>Fusconaia barnesiana</u> (relics)	3
<u>Lampsilis fasciola</u> (relic)	1
<u>Lasmigona holstonia</u> (relic)	1
<u>Pleurobema oviforme</u> (relics)	4
<u>Villosa iris</u> (relics & 1 live)	14
<u>V. perpurpurea</u> (relics)	2
<u>V. trabalis</u> (relics)	2
<u>V. vanuxemensis vanuxemensis</u> (relics)	2
PLECOPTERA:	
Perlidae/ <u>Neoperla</u>	2
<u>Perlesta</u>	4
TRICHOPTERA:	
Helicopsychidae/ <u>Helicopsyche borealis</u> pupa	1
Hydropsychidae/ <u>Cheumatopsyche</u>	29
<u>Hydropsyche betteni/depravata</u>	118
<u>H. frisoni</u>	14
Hydroptilidae/ <u>Unid.</u> pupa	1
<u>Hydroptila</u>	2
Philopotamidae/ <u>Chimarra</u>	2
Psychomyiidae/ <u>Psychomyia flavida</u>	9
	614

BEECH CREEK  
SITE 1  
BENTHIC MACROINVERTEBRATES



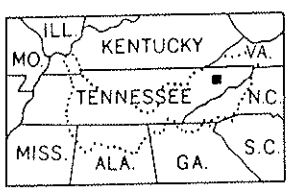
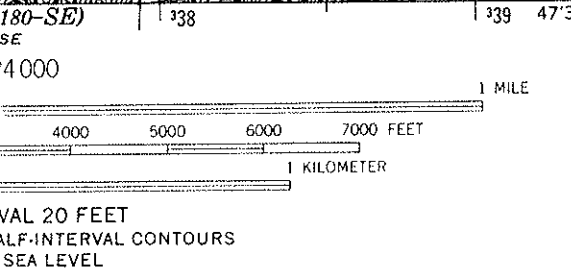
PERCENT OF TOTAL NUMBER OF ORGANISMS

$n = 614$   
TAXA RICHNESS = 52

Figure 35.



Beech Creek  
Sample Area 2



QUADRANGLE LOCATION

ROAD CLASSIFICATION

Heavy-duty .....	—————	Poor motor road .
Medium-duty .....	—————	Wagon and jeep tra
Light-duty .....	—————	Foot trail .....
	□ U. S. Route	○ State Rout

In developed areas, only through roads are classi

VEY, WASHINGTON, D.C. 20242,  
Y, NASHVILLE, TENN. 37219,  
GA, TENN. 37401 OR KNOXVILLE, TENN. 37902  
ND SYMBOLS IS AVAILABLE ON REQUEST

STONY POINT QUADRANGLE  
Tennessee - 180 NE

STONY POINT  
N3622.5-W824

1939  
PHOTOREVISED  
AMS 4456 IV NE-SE

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Beech Creek Lat-Long 362341N - 824737W  
Watershed Holston River Length of Sample 300 ft.  
Station Site # 2 Reach 06010104-12,1  
County Hawkins Date/Time 14 June 1990/1230  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 15.9 ft. Average Depth 0.8 ft. Maximum Depth 2.5 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 10 % Rubble 25 % Boulders 15 % Bedrock 30 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 10 % Rubble 20 % Boulders 10 % Bedrock 40 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous X (Dianthera americana)  
Average \_\_\_\_\_ Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20 %  
of stream, Average in 50 %, Poor in 30 %
7. Shade or Canopy Good over 50 % of Stream.
8. Flow (CFS) 4.2 : Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy, hot and humid; air temp. - 80°F.
10. Past Weather (last 24 hours) Partly cloudy, hot and humid.
11. pH 8.2 Temp. 69.6°F Conductivity 325 D.O. 9.5 % Saturation 109
12. Comments: Sample location at the 1st. bridge crossing on hwy. # 347  
about 1.1 mi. upstream of intersection of Van Hill Road and hwy.  
# 347.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Site #2 - 1st. bridge  
c.a. 1.1 mi.  
upstream of  
Van Hill Rd.  
intersection

Stream Beech Creek Lat-Long 362341N - 824737W  
 Watershed Holston River Date 14 June 1990  
 County Hawkins Reach 06010104-12,1  
 Type of Sampling Electrofishing Pool Elevation 1230 ft.  
 Gear Type Two backpacks @ 110 v. AC Time 1430-1530

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	1	12	0.76			
"	"	"	1	13	1.21			
<i>Ambloplites rupestris</i>		13	1	1	0.01			
"	"	"	2	2	0.03			
"	"	"	26	3	0.86			
"	"	"	10	4	0.62			
"	"	"	21	5	2.09			
"	"	"	11	6	1.90			
"	"	"	16	7	4.13			
"	"	"	3	8	1.13			
<i>Lepomis auritus</i>		201	1	1	t			
"	"	"	11	2	0.15			
"	"	"	32	3	0.97			
"	"	"	12	4	0.78			
"	"	"	7	5	0.79			
"	"	"	6	6	1.08			
"	"	"	5	7	1.53			
<i>Hypentelium nigricans</i>		166	4	4-5	0.17			
<i>Catostomus commersoni</i>		32	2	5	0.14			
<i>Campostoma anomalum</i>		25	236	1-6	5.99			
<i>Cyprinella galactura</i>		253	8	2-4	0.07			
Continued on next page.								

Field Notes: 300 ft. sample length.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, & Mark T. Fagg

WR-0525

Site #2 - 1st. bridge  
 c.a. 1.1 mi.  
 upstream of  
 Van Hill Rd.  
 intersection

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Beech Creek Lat-Long 362341N - 824737W  
 Watershed Holston River Date 14 June 1990  
 County Hawkins Reach 06010104-12,1  
 Type of Sampling Electrofishing Pool Elevation 1230 ft.  
 Gear Type Two backpacks @ 110 v. AC Time 1430-1530

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Luxilus chrysocephalus</i>	249	57	1-5	1.03			
<i>L. coccogenis</i>	248	2	2-3	0.02			
<i>Lythrurus ardens</i>	237	7	1-2	0.02			
<i>Notropis stramineus</i>	271	2	1	t			
<i>N. telescopus</i>	272	45	2-3	0.23			
<i>N. volucellus</i>	277	38	1-2	0.10			
<i>Pimephales notatus</i>	334	16	1-3	0.09			
<i>Rhinichthys atratulus</i>	351	1	2	t			
<i>Etheostoma blenniodes</i>	79	3	2-4	0.06			
<i>E. flabellare</i>	92	7	1-2	0.03			
<i>E. rufilineatum</i>	108	3	1-2	0.01			
<i>E. simoterum</i>	111	39	1-2	0.12			

Field Notes: 300 ft. sample area.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, & Mark T. Fagg

WR-0525

GAME FISH FROM BEECH CREEK  
SITE 2  
INCH CLASS DISTRIBUTION

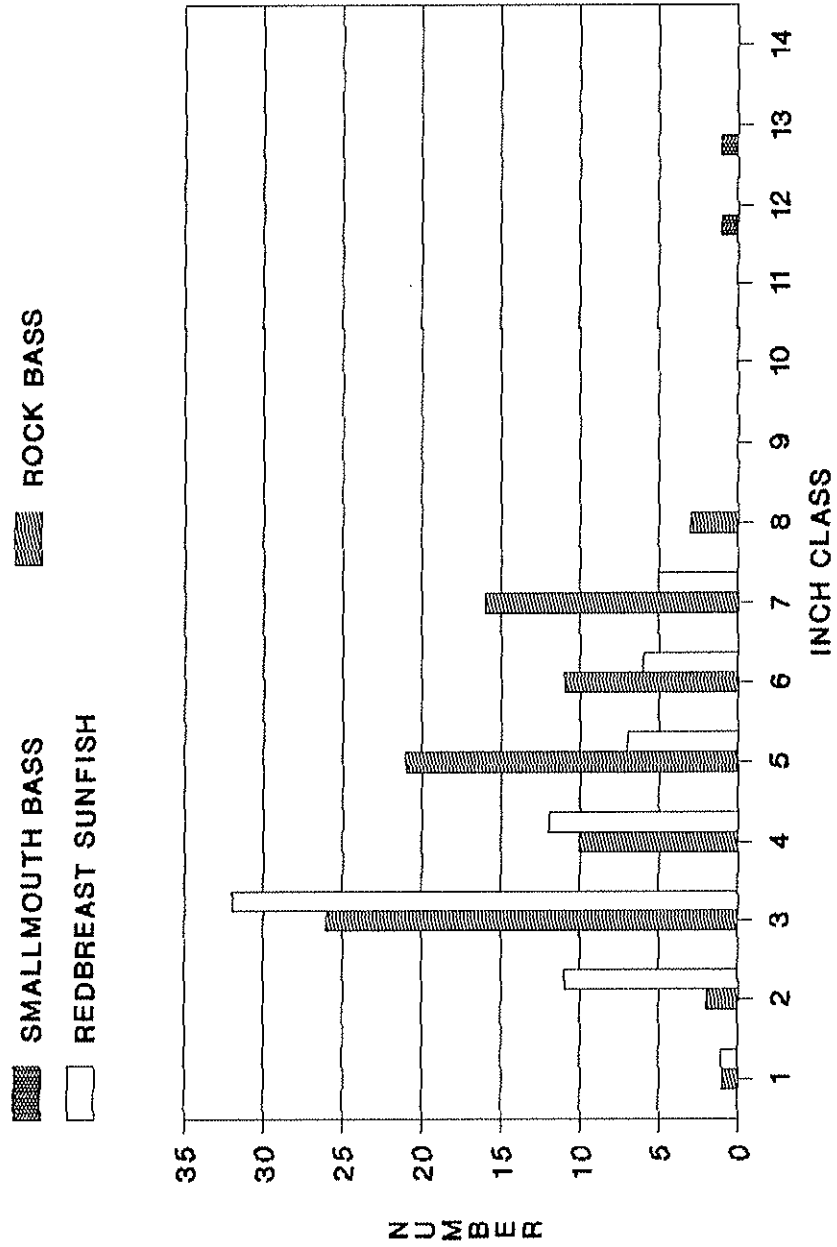


Figure 36.



Beech Creek: Site # 2, Qualitative Benthic Sample

Hawkins Co., TN; At the bridge on hwy. 347 about 1.1 mi. upstream of Van Hill Rd. intersection. Coordinates: 362341N - 824737W. Stony Point, Tenn., # 180 NE Quad. Reach # 06010104-12,1.

TAXA	NUMBER
COLEOPTERA:	
Dryopidae/ <u>Helichus</u> adults	2
Elmidae/ <u>Dubiraphia quadrinotata</u> adults	3
<u>D. vittata</u>	7
<u>Stenelmis</u> larvae	3
<u>Stenelmis</u> adults	15
Helodidae/ <u>Cyphon</u> larva	1
Psephenidae/ <u>Psephenus herricki</u>	5
DECAPODA:	
Cambaridae/ <u>Orconectes</u> juvenile female	1
DIPTERA:	
Chironomidae	9
Tipulidae/ <u>Antocha</u> larvae	2
<u>Antocha</u> pupa	1
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	55
Ephemerelellidae/ <u>Eurylophella doris</u> complex	30
<u>Serratella deficiens</u>	1
Ephemeridae/ <u>Ephemera</u> (early instar)	1
Heptageniidae/ <u>Stenacron interpunctatum</u>	1
<u>Stenonema mediopunctatum</u>	19
Leptophlebiidae/ <u>Habrophlebiodes</u>	7
<u>Paraleptophlebia</u>	5
GASTROPODA:	
Ancylidae/ <u>Ferrissia</u>	1
Pleuroceridae/ <u>Pleurocera canaliculatum</u>	5
HEMIPTERA:	
Gerridae nymphs	2
Veliidae/ <u>Rhagovelia obesa</u> adult male	1
<u>Rhagovelia obesa</u> adult females	2

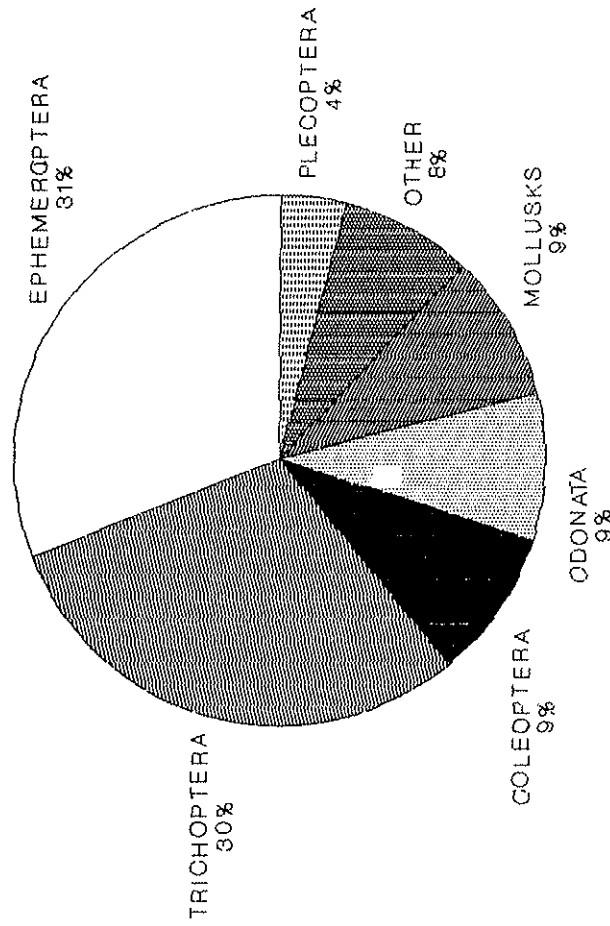
Beech Creek: Site # 2, Qualitative Benthic Sample cont.

TAXA	NUMBER
MEGALOPTERA:	
Corydalidae/ <u>Corydalus cornutus</u>	3
<u>Nigronia serricornis</u>	1
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	8
Calopterygidae/ <u>Calopteryx</u>	1
Coenagrionidae/ <u>Argia</u>	13
<u>Enallagma divagans</u>	2
<u>E. exsulans</u>	5
Gomphidae/ <u>Dromogomphus spinosus</u>	1
<u>Gomphus</u> (early instar)	3
<u>Hagenius brevistylus</u>	1
PELECYPODA:	
Corbiculidae/ <u>Corbicula fluminea</u>	4
Sphaeriidae/ <u>Sphaerium</u>	1
Unionidae/ <u>Fusconaia barnesiana</u> (relics)	4
<u>Medionidus conradicus</u> (relics)	5
<u>Villosa iris</u> (relics)	17
<u>V. perpurpurea</u> (relic)	1
<u>V. trabalis</u> (relic)	1
PLECOPTERA:	
Peltoperlidae/ <u>Peltoperla</u>	2
Perlidae/ <u>Perlesta placida</u>	14
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	19
<u>Hydropsyche betteni/depravata</u> larvae	85
<u>Hydropsyche betteni/depravata</u> pupa	1
Hydroptilidae/ <u>Hydroptila</u>	4
Leptoceridae/ <u>Triaenodes</u> larvae	6
<u>Triaenodes</u> pupa	1
URODELA:	
Unid. juvenile salamanders	2

---

384

BEECH CREEK  
SITE 2  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 384  
TAXA RICHNESS = 39

Figure 37.

## Terrill Creek

One qualitative fishery survey was conducted in June 1990:

**Location and Length** - Tributary to the Holston River. The sample area was located approximately 3.0 mi. SSE of old U. S. Rt. 11W, along Long Bend Road where it cuts through the gap of Hennard Mountain and River Mountain and was sampled on 13 June 1990. It was approximately 100 ft. in length and averaged 5 ft. in width. The site was in Hawkins County. Stony Point Quadrangle.

**Gear Type** - The site was sampled with a single backpack electrofishing unit operating at 340 v. DC.

**Water Quality** - No data collected.

**Benthos Collection** - No collection was made.

**Fish Collected** - (See data sheet for species list)

**Comments** - We sampled this stream primarily to collect specimens of the recently described Tennessee dace (*Phoxinus tennesseensis*). This species had previously been considered a subspecies of the mountain redbelly dace (*P. oreas*). Starnes and Jenkins (1988) distinguished it as a taxon separate from *P. oreas* and described it as a new species endemic to the upper Tennessee River drainage of Tennessee and Virginia.

Paratype specimens were collected from the same locality on Terrill Creek in 1975 and 1976. From these collections, five specimens collected 15 May 1975 are deposited in the Florida State Museum, University of Florida (UF Cat. No. 21802) and six specimens collected 29 April 1976 are deposited at the University of Alabama (UAIC Cat. No. 5230.01).

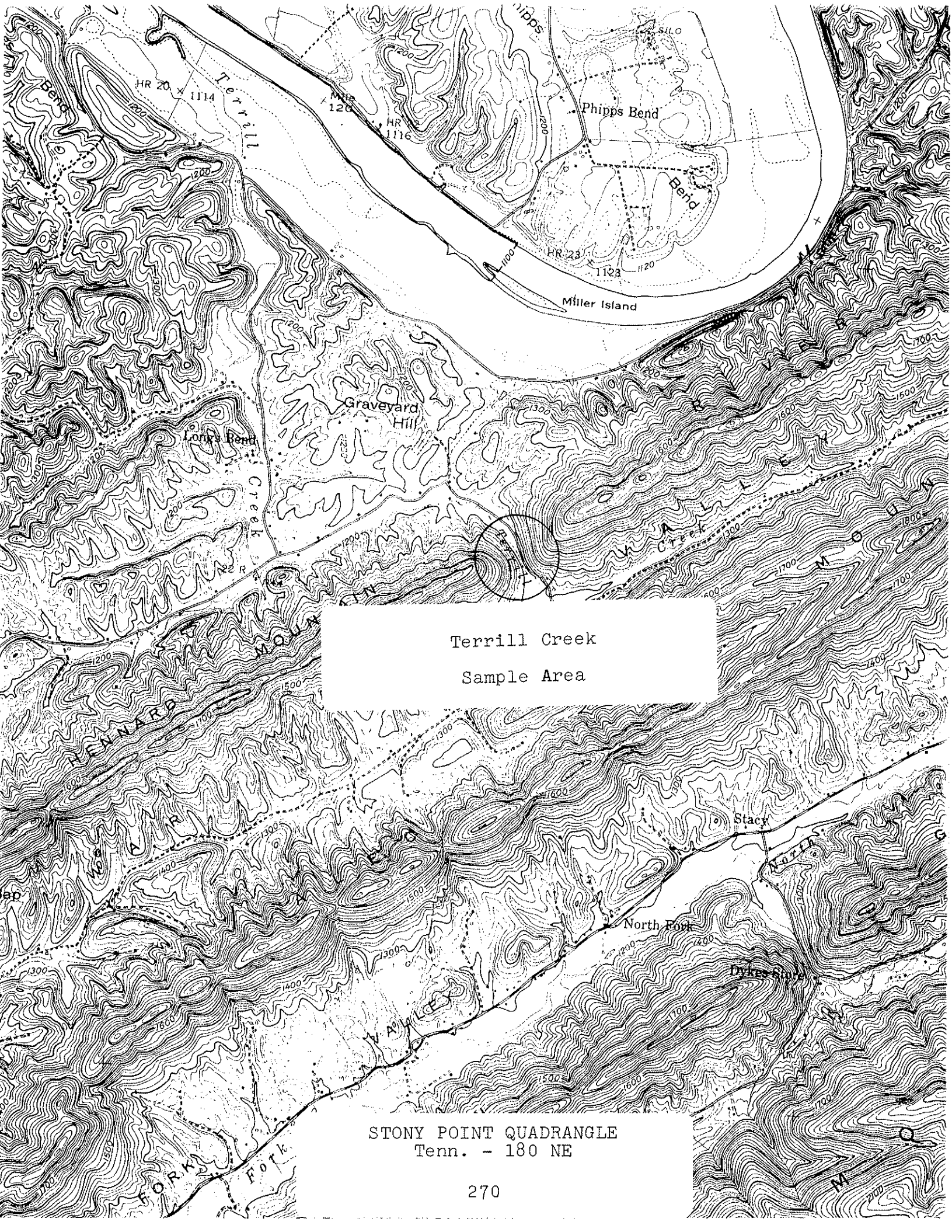
We wanted to check the status of the species from this site as Starnes and Jenkins (1988) speculated that several of the formerly known populations may now be extirpated. We also wanted to collect voucher specimens for our reference collection from this stream.

Our recent sampling produced 31 specimens of the Tennessee dace from this same locality, indicating that apparently no severe habitat alteration or other human impact has occurred. Other species

collected at this site included *Campostoma anomalum*,  
*Rhinichthys atratulus*, *Semotilus atromaculatus*,  
*Etheostoma kennicotti*, *Cottus carolinae*, and  
redbreast sunfish (*Lepomis auritus*).

**Management Recommendations:**

1. Protection of this habitat as *Phoxinus tennesseensis* has been listed as a species Deemed in Need of Management by the State of Tennessee, and of Special Concern by the Tennessee Heritage Program (Starnes and Etnier 1980).



Terrill Creek  
Sample Area

STONY POINT QUADRANGLE  
Tenn. - 180 NE

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Terrill Creek Lat-Long 362637N - 824840W  
 Watershed Holston River Date 13 June 1990  
 County Hawkins Reach 06010104-  
 Type of Sampling Electrofishing Pool Elevation 1170 ft.  
 Gear Type One backpack at 340 v. DC @ 550 pps Time 1815-1830

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Lepomis auritus</i>		201	5	2	0.06			
"	"	"	1	3	0.03			
<i>Campostoma anomalum</i>		25	1	3	0.02			
<i>Phoxinus tennesseensis</i>		333	31	1-2	0.11			
<i>Rhinichthys atratulus</i>		351	22	1-3	0.14			
<i>Semotilus atromaculatus</i>		360	16	2-4	0.15			
<i>Etheostoma kenneicotti</i>		92	1	2	0.02			
<i>Cottus carolinae</i>		40	1	4	0.07			
Avg. width - 4 to 6 ft.								
Avg. depth - 4 in.								
Gravel - rubble - boulder - bedrock substrate.								
Fairly silty, no water quality data collected.								

*P. tennesseensis* collected only in pools. 100 ft. sample length.  
 Field Notes: Location was approx. 3.0 mi. SSE of old US Rt. 11W, along Long Bend Rd. where it cuts through gap of Hennard Mtn. & River Mtn.  
 Name of Collector(s): R.D. Bivens, C.E. Williams, M.T. Fagg, & M. Hughes

WR-0525

## Fall Creek

One qualitative fishery survey was conducted in November 1990:

**Location and Length** - Tributary to the South Fork Holston River (Fort Patrick Henry Reservoir). The sample area was located 0.3 mi. due south of Gallaway Cemetary and was sampled on 21 November 1990. It was 500 ft. in length and averaged 16.2 ft. in width. The site was in Sullivan County. Indian Springs Quadrangle.

**Gear Type** - The site was sampled using a single backpack electrofishing unit operating at 120 v. AC.

**Water Quality** - Data were taken from midstream on 21 November 1990: DO - 11.6 ppm, pH - 8.2, Temperature - 48.5 F, Conductivity - 335 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey. The sample contained 461 organisms and represented 46 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Largemouth bass	1	0.1	0.01	0.1
Rock bass	4	0.6	0.08	0.5
Redbreast sunfish	1	0.1	0.04	0.2
Bluegill	1	0.1	0.31	1.8
Nongame Fish	53	7.5	7.38	43.9
Forage Fish	647	91.5	9.00	53.5
TOTAL	707		16.82	

**Comments** - This stream was surveyed primarily at the request of Glen Johnson, Area 43 Law Enforcement Supervisor. He has observed trout caught from this stream that have migrated from Fort Patrick Henry Reservoir, and wanted to see if we could document that they are using the stream to spawn. This was also an opportunity to develop a fish species list and collect stream information for TADS. The Agency has made no previous studies or fish collection from this stream.

We collected a total of 707 fish weighing 16.82 lb. and comprising 11 species. Three native game species,



largemouth bass (*Micropterus salmoides*), rock bass (*Ambloplites rupestris*), and bluegill (*Lepomis macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were collected. Largemouth bass, redbreast sunfish, and bluegill were each represented by single specimens and only four small rock bass were collected. All game fish combined made up only 1% by number and about 3% by weight of all fish collected. Seven nongame and forage species were also collected and these made up 99% of the total number and 97% of the total weight. Of these, five forage species comprised 91% of the total number and 53% of the total weight. Stonerollers (*Campostoma anomalum*), blacknose dace (*Rhinichthys atratulus*), and snubnose darters (*Etheostoma simotermum*) were the most abundant species present. All fish collected with the exception of rock bass, are fairly tolerant forms and the snubnose was the only darter species collected. No trout were collected or observed at all from our 500 ft. sample area.

This is a small to medium size stream that for the most part is in shallow riffle areas, but it also has some good pool development. It is a fairly clean stream with some siltation from agricultural activities and probably from the sewer line construction that was going on upstream at the time we sampled. Habitat and stream conditions appeared good and we have no explanation for the low number of game fish found.

Benthic macroinvertebrates from our sample included Baetidae, Caenidae, Ephemerellidae, Ephemeridae, Heptageniidae, Leptophlebiidae, and Oligoneuriidae mayflies, Capniidae and Perlidae stoneflies, Hydropsychidae, Limnephilidae, Philopotamidae, and Rhyacophilidae caddisflies, and Elmidae, Hydrophilidae, Psephenidae, and Ptilodactylidae beetles. Fingernail clams (*Sphaerium*) and *Physa* and periwinkle snails (*Goniobasis*) were present. Two crayfish species, *Cambarus longirostris* and *Orconectes rusticus* were collected. Ephemeropterans represented about 32%, trichopterans 21%, dipterans 13%, and plecopterans about 8% of the total number of organisms collected (Fig. 38). A total of 46 taxa was collected at this site.

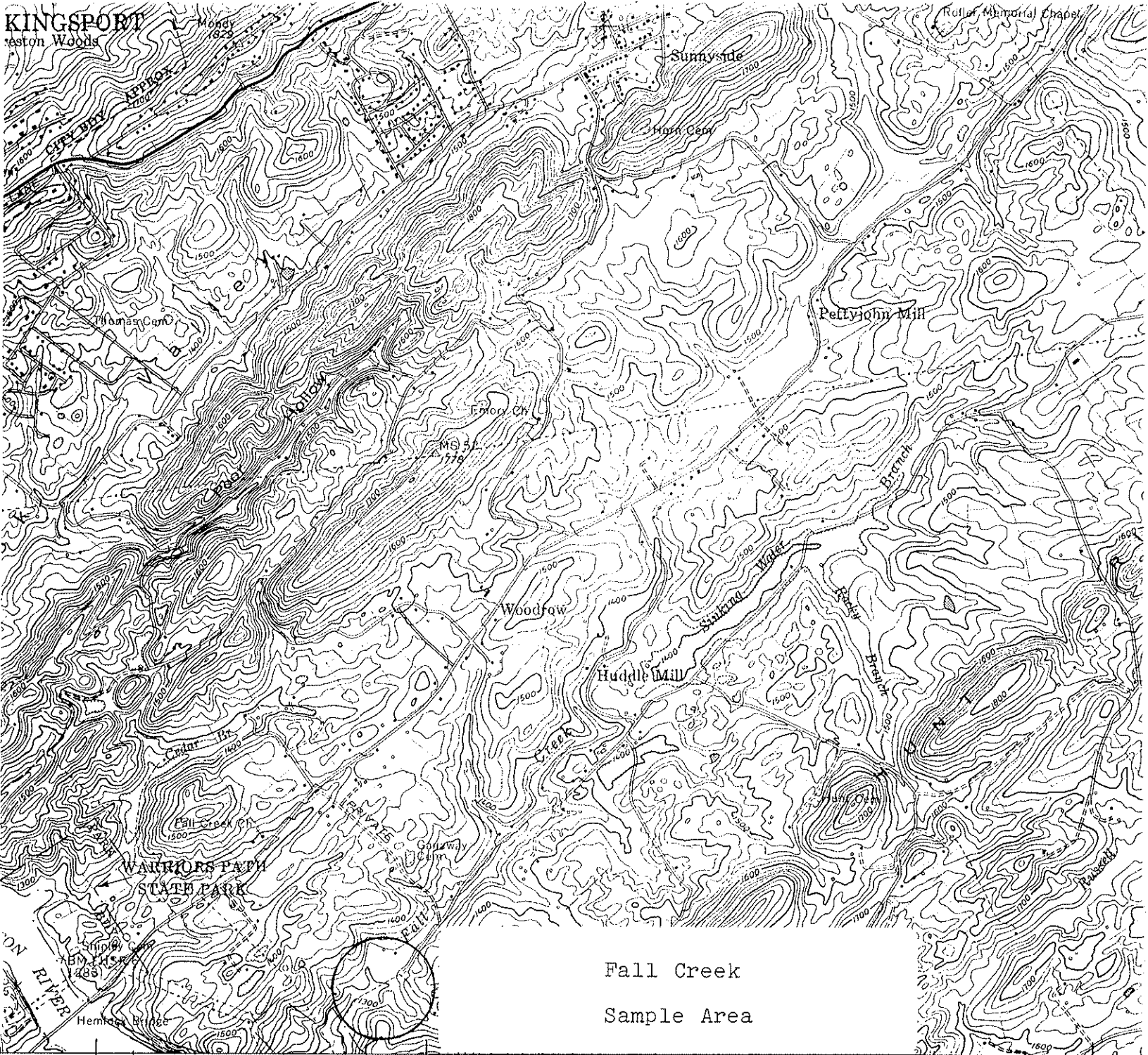
Of special interest is the collection of 39 specimens of *Hydropsyche rotosa* at this site. This makes the first stream in the Holston River system where we have collected this species. It also makes the third stream where we have collected it during this report period. Prior to our collecting *H. rotosa* in Puncheon Camp Creek in Grainger County in 1989 (Bivens and Williams

1990), it was known only from its type locality near Tusculum College in Greene County, Tennessee (Etnier and Schuster 1979). This now makes four streams and three different river systems from which we have taken *H. rotosa*.

Also of interest is the collection of a specimen of *Anchytarsus bicolor* larva. Aquatic ptilodactylids are considered quite rare and their distribution is sporadic, even in streams where they are known to occur (Brigham et al. 1982). *Anchytarsus bicolor* is the only species known from eastern North America and the larvae are generally found in small, cool streams and spring brooks where they may be locally common.

**Management Recommendations:**

1. No specific management can be suggested other than protection of the watershed.
2. Need to survey again for trout, sometime in January or February.



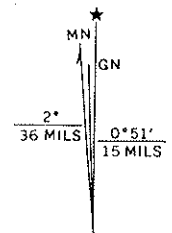
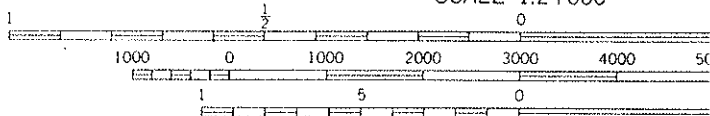
Fall Creek  
Sample Area

367 368 369 27'30" 370 (BOONE DAM 198-NW) 4556 IV NW

Tennessee Valley Authority  
Survey

SCALE 1:24 000

Asymmetric methods using  
by reference to TVA-USGS  
checked by TVA, 1959



UTM GRID AND 1968 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 20 FEET  
DASHED LINES REPRESENT HALF-INTERVAL CON  
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY

FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON  
TENNESSEE DIVISION OF GEOLOGY, NASHVILLE,  
MINNIA DIVISION OF MINERAL RESOURCES, CHARLOTTE,  
TENNESSEE VALLEY AUTHORITY, CHATTANOOGA, TENN. 37401  
FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS A'

INDIAN SPRINGS QUADRANGLE  
Tenn.-VA. - 197 SW

Red fence and field lines  
information is unchecked

P  
o  
v  
1

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Fall Creek Lat-Long 363014N - 822807W  
Watershed South Fork Holston River Length of Sample 500 ft.  
Station (See comments) Reach 06010102-45,0  
County Sullivan Date/Time 21 November 1990/1100  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 16.2 ft. Average Depth 0.6 ft. Maximum Depth 2.9 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud 5 % Silt 10 % Sand 20 % Clay - %  
Gravel 15 % Rubble 25 % Boulders 25 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 25 % Rubble 25 % Boulders 25 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average X some water cress \_\_\_\_\_ Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 30 %  
of stream, Average in 50 %, Poor in 20 %
7. Shade or Canopy Good over 40 % of Stream.
8. Flow (CFS) 5.0 : Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy and mild; air temp. - 58° F.
10. Past Weather (last 24 hours) Partly cloudy; cold overnight.
11. pH 8.2 Temp. 48.5° F Conductivity 335 D.O. 11.6 % Saturation 100
12. Comments: Sample location was 0.3 mi. due south of Gallaway Cemetery. Fairly clean stream with some siltation from agricultural practices (cows observed in stream) and probably from the sewer line construction that was going on upstream at the time.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Fall Creek Lat-Long 363014N - 822807W  
 Watershed South Fork Holston River Date 21 November 1990  
 County Sullivan Reach 06010102-45,0  
 Type of Sampling Electrofishing Pool Elevation 1303 ft.  
 Gear Type One backpack shocker @ Time 1415 - 1530  
120 v. AC

Name	SPECIES	CODE	NUMBER	LENGTH	WT.		
<i>Micropterus salmoides</i>		220	1	2	0.01		
<i>Ambloplites rupestris</i>		13	2	1	0.01		
"	"	"	1	3	0.02		
"	"	"	1	4	0.05		
<i>Lepomis auritus</i>		201	1	4	0.04		
<i>L. macrochirus</i>		206	1	5	0.31		
<i>Catostomus commersoni</i>		32	34	2-12	3.36		
<i>Hypentelium nigricans</i>		166	19	1-13	4.02		
<i>Campostoma anomalum</i>		25	245	1-5	4.06		
<i>Luxilus chrysocephalus</i>		249	4	4-5	0.18		
<i>Rhinichthys atratulus</i>		351	217	1-3	1.38		
<i>Semotilus atromaculatus</i>		360	44	3-9	3.04		
<i>Etheostoma simoterum</i>		111	137	1-2	0.34		

Field Notes: 500 ft. sample length.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

Fall Creek: Qualitative Benthic Sample

21 November 1990

Field # 275

Sullivan Co., TN; Approx. 0.3 mi. due south of Gallaway Cemetery. Coordinates: 363014N - 822807W. Indian Springs, Tenn.-VA., # 197 SW Quad. Reach # 06010102-34,0.

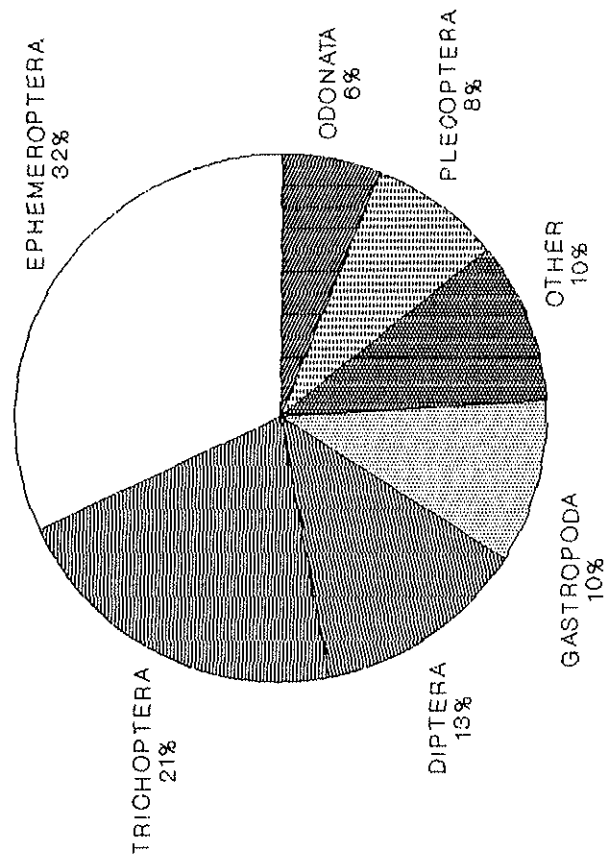
TAXA	NUMBER
AMPHIPODA:	
Gammaridae	1
ANNELIDA:	
Oligochaeta	3
COLEOPTERA:	
Elmidae/ <u>Stenelmis</u> larvae	6
<u>Stenelmis</u> adults	3
Hydrophilidae/ <u>Tropisternus blatchleyi</u> adults	2
Psephenidae/ <u>Psephenus herricki</u> larvae	4
Ptilodactylidae/ <u>Anchytarsus bicolor</u> larva	1
DECAPODA:	
Cambaridae/ <u>Cambarus (Hiaticambarus) longirostris</u> male 1st.	1
C. (H.) <u>longirostris</u> males 2nd.	3
C. (H.) <u>longirostris</u> females	2
<u>Orconectes rusticus</u> males 1st.	2
O. <u>rusticus</u> males 2nd.	3
O. <u>rusticus</u> female	1
DIPTERA:	
Chironomidae	19
Empididae	1
Simuliidae	5
Tabanidae/ <u>Chrysops</u>	2
Tipulidae/ <u>Antocha</u>	21
<u>Tipula</u>	10
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	21
Caenidae/ <u>Caenis</u>	1
Ephemerellidae/ <u>Ephemerella</u>	2
Ephemeridae/ <u>Ephemera</u>	2
Heptageniidae/ <u>Stenacron</u>	13
<u>Stenonema</u>	67
<u>Stenonema (Stenonema) femoratum</u>	1
Leptophlebiidae/ <u>Habrophlebiodes</u>	1
<u>Leptophlebia</u>	3
Oligoneuriidae/ <u>Isonychia</u>	37

Fall Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
GASTROPODA:	
Physidae/ <u>Physa</u>	9
Pleuroceridae/ <u>Goniobasis</u>	38
HEMIPTERA:	
Veliidae/ <u>Rhagovelia obesa</u> adult female	1
<u>Rhagovelia obesa</u> adult males	2
MEGALOPTERA:	
Corydalidae/ <u>Nigronia serricornis</u>	6
Sialidae/ <u>Sialis</u>	3
ODONATA:	
Aeshnidae/ <u>Basiaeschna janata</u>	1
<u>Boyeria vinosa</u>	3
Calopterygidae/ <u>Calopteryx</u>	15
Coenagrionidae/ <u>Argia</u>	5
Gomphidae/ <u>Gomphus</u> (Genus A <u>rogersi</u> ) *	4
<u>Gomphus lividus</u>	2
PELECYPODA:	
Sphaeriidae/ <u>Sphaerium</u>	1
PLECOPTERA:	
Capniidae/ <u>Allocapnia</u> nymphs	14
<u>Allocapnia</u> adults	5
Perlidae/ <u>Paragnetina media</u>	17
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	20
<u>Hydropsyche betteni/depravata</u>	4
<u>H. rotosa</u>	39
<u>Symphitopsyche bronta</u>	13
Limnephilidae/ <u>Neophylax</u>	1
<u>Pycnopsyche</u>	3
Philopotamidae/ <u>Chimarra</u>	12
Rhyacophiliidae/ <u>Rhyacophila fuscula</u>	3
URODELA:	
Plethodontidae/ <u>Desmognathus fuscus</u>	1
	461

\* (from Louton 1982)

FALL CREEK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

$n = 461$   
TAXA RICHNESS = 46

Figure 38.



## Cedar Creek

One qualitative fishery survey was conducted in October 1990:

**Location and Length** - Tributary to Beaver Creek (South Fork Holston River). The sample area was located approximately 300 ft. upstream of the bridge on Grovedale Road and was sampled on 17 October 1990. It was 400 ft. in length and averaged 19.9 ft. in width. The site was in Sullivan County. Bristol Quadrangle.

**Gear Type** - The site was sampled by making one pass with two backpack electrofishing units operating at 120 v. AC.

**Water Quality** - Data were taken from midstream on 17 October 1990: DO - 9.9 ppm, pH - 8.3, Temperature - 57 F, Conductivity - 435 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative sample. The sample contained 287 organisms and represented 31 taxa.

### Fish Collected :

<u>Species</u>	<u>No.</u>	<u>% by</u>		<u>% by</u>	
		<u>No.</u>	<u>Wt.</u>	<u>Wt.</u>	<u>Wt.</u>
Largemouth bass	2	0.9	0.14	1.2	
Redbreast sunfish	14	6.3	1.12	9.6	
Green sunfish	1	0.4	0.03	0.3	
Bluegill	4	1.8	0.05	0.4	
Nongame Fish	113	50.4	8.51	72.8	
Forage Fish	90	40.2	1.84	15.7	
TOTAL	224		11.69		

**Comments** - This stream was surveyed primarily at the request of the owners of a portion of the stream that were interested in its recovery from past pollution and potential for trout. We also wanted to develop a fish species diversity list and collect information for TADS. Cedar Creek heads up in downtown Bristol and for most of its length flows within the city limits. Like most urban streams, it has been degraded

from various past (and probably from present) sources of pollution. Our survey was conducted primarily to document stream conditions at the present time.

We collected a total of 224 fish weighing 11.69 lb. and comprising 14 species. Three native game species, largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), and bluegill (*L. macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were present. Only two small largemouth bass, one small green sunfish, and five small bluegill were collected and the redbreast sunfish was the only game fish found in any size or numbers. They made up about 6% by number and about 10% by weight of all fish collected. Ten nongame and forage species were also collected and these comprised about 91% of the total number and 88% of the total weight. Forage species made up about 41% of all fish collected and were represented by fairly tolerant forms. The greenside darter (*Etheostoma blennioides*) was the only darter species collected. Sculpin (*Cottus sp.*), snubnose darters (*E. simotermum*), and rock bass (*Amploplites rupestris*) were conspicuous in their absence.

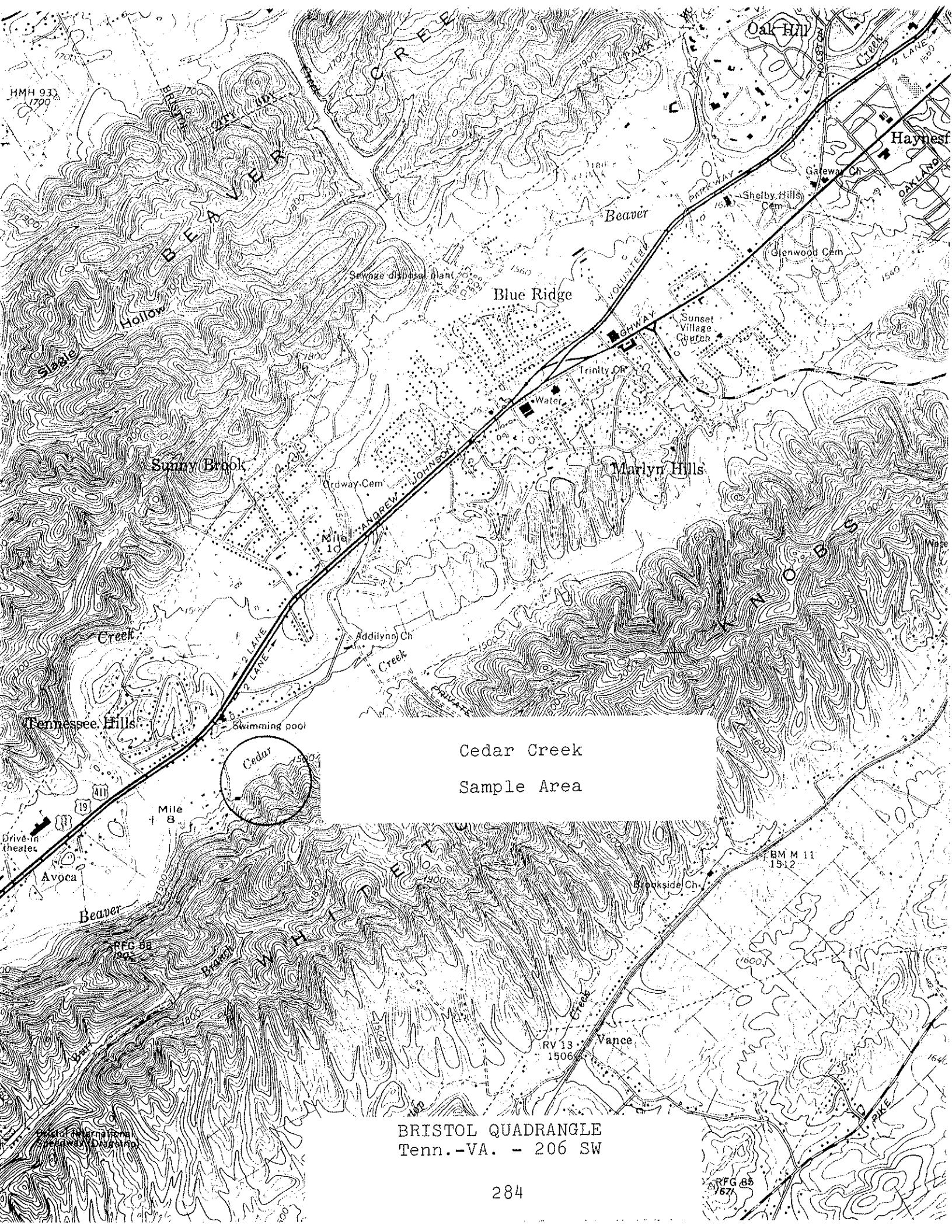
Cedar Creek, at the site we sampled, is a low gradient stream that is fairly wide and shallow. It has very few boulders, logs, or root wads and overall cover for fish is not very good. It is also fairly silty. The fish species present were typical components of polluted conditions and no intolerant forms were collected. Also, there was a notable incidence of black grub, fin rot, anchor parasites and leeches further indicating a stressed environment.

Benthic macroinvertebrates from our sample included Baetidae and Heptageniidae mayflies, Hydropsychidae and Philopotamidae caddisflies, and Elmidae and Hydrophilidae beetles. No plecopterans were collected at all and limpets (*Ferrissia*) were the only gastropod present. Two species of crayfish, *Cambarus bartonii* and *C. longirostris*, were present. Ephemeropterans represented about 29%, trichopterans 23%, and dipterans about 17% of the total number of organisms collected (Fig. 39). A total of only 31 taxa was collected at this site, most of which were tolerant forms.

Both fish and macroinvertebrate populations had low total numbers, low species diversities, and were comprised mostly of tolerant forms. It appears that the stream is still being adversely impacted by pollution or has yet had time to recover from degradation.

Management Recommendations:

1. No specific management other than trying to reduce pollution can be suggested at this time.
2. The stream was not sampled at the right time of year to determine if water temperature was adequate for trout, however, based on the above described conditions trout management is not suggested.



HMH 933  
1700

Cedar Creek  
Sample Area

BRISTOL QUADRANGLE  
Tenn.-VA. - 206 SW

RFG 85  
167

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Cedar Creek Lat-Long 363208N - 821405W  
Watershed South Fork Holston River Length of Sample 400 ft.  
Station See Comments: Reach 06010102-43,0  
County Sullivan Date/Time 17 October 1990/1045  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 19.9 ft. Average Depth 0.3 ft. Maximum Depth 2.5 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud 5 % Silt 10 % Sand 20 % Clay 5 %  
Gravel 25 % Rubble 30 % Boulders 5 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 5 % Sand 15 % Clay 5 %  
Gravel 25 % Rubble 40 % Boulders 5 % Bedrock 5 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average \_\_\_\_\_ Scarce X
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 40 %, Poor in 35 %
7. Shade or Canopy Good over 35 % of Stream.
8. Flow (CFS) 6.8 : Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy and mild; air temp. - 62°F.
10. Past Weather (last 24 hours) Partly cloudy and mild, cool overnight.
11. pH 8.3 Temp. 57°F Conductivity 435 D.O. 9.9 % Saturation 97
12. Comments: Sample location was approximately 300 ft. upstream of the  
bridge on Grovedale Road. The stream is fairly silty. There is  
not a lot of cover for fish; very few boulders, logs, roots, etc.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Cedar Creek Lat-Long 363208N - 821405W  
 Watershed South Fork Holston River Date 17 October 1990  
 County Sullivan Reach 06010102-43,0  
 Type of Sampling Electrofishing Pool Elevation 1445 ft.  
 Gear Type Two backpacks @ 120 v. AC Time 1330 - 1400

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus salmoides</i>		220	1	2	0.01			
"	"	"	1	6	0.13			
<i>Lepomis auritus</i>		201	4	3	0.11			
"	"	"	6	4	0.30			
"	"	"	2	5	0.18			
"	"	"	1	6	0.21			
"	"	"	1	7	0.32			
<i>L. cyanellus</i>		202	1	3	0.03			
<i>L. macrochirus</i>		206	1	1	t			
"	"	"	1	2	0.01			
"	"	"	2	3	0.04			
<i>Ameiurus natalis</i>		174	1	5	0.11			
<i>Catostomus commersoni</i>		32	10	2-8	0.91			
<i>Hypentelium nigricans</i>		166	100	2-8	5.13			
<i>Campostoma anomalum</i>		25	26	1-5	0.46			
<i>Cyprinella galactura</i>		253	20	1-5	0.17			
<i>Cyprinus carpio</i>		47	2	9-15	2.36			
<i>Luxilus chrysocephalus</i>		249	16	2-8	0.25			
<i>Rhinichthys atratulus</i>		351	1	1	t			
<i>Semotilus atromaculatus</i>		360	23	1-8	0.85			
<i>Etheostoma blennioides</i>		81	4	2-4	0.11			

Field Notes: 400 ft. sample length. Several fish with black grub, fin rot, anchor parasites, and leeches.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Wayne H. Schacher

WR-0525

Cedar Creek: Qualitative Benthic Sample

17 October 1990

Field # 263

Sullivan Co., TN; Approx. 300 ft. upstream of the bridge on Grovedale Rd. Coordinates: 363208N - 821405W. Bristol, Tenn.-VA., # 206 SW Quad. Reach # 06010102-43,0.

TAXA	NUMBER
ANNELEIDA:	
Oligochaeta	3
COLEOPTERA:	
Elmidae/ <u>Dubiraphia</u> larvae	2
<u>Optioservus</u> larvae	9
<u>Optioservus ovalis</u> adults	6
<u>Stenelmis</u> larvae	5
<u>Stenelmis</u> adults	3
Hydrophilidae/ <u>Sperchopsis tessellatus</u> larva	1
DECAPODA:	
Cambaridae/ <u>Cambarus (Cambarus) bartonii</u> female	1
<u>C. (Hiaticambarus) longirostris</u> females	3
<u>C. (Hiaticambarus) longirostris</u> juvenile	1
DIPTERA:	
Chironomidae	9
Empididae	1
Simuliidae larvae	20
Simuliidae pupa	1
Tabanidae/ <u>Tabanus</u>	1
Tipulidae/ <u>Antocha</u> larvae	2
<u>Tipula</u> larvae	15
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	7
Heptageniidae/ <u>Stenacron interpunctatum</u>	38
<u>Stenonema</u>	39
GASTROPODA:	
Ancyliidae/ <u>Ferrissia</u>	12
HEMIPTERA:	
Corixidae adult	1
Gerridae/ <u>Gerris</u> nymphs	3
<u>Gerris (Aquarius) remigis</u> adults	10
Veliidae/ <u>Rhagovelia obesa</u> nymph	1

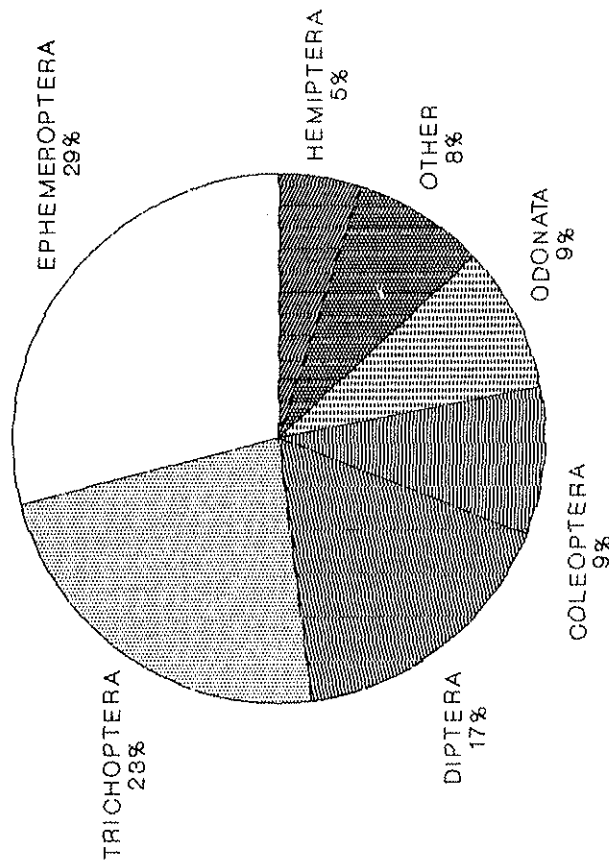
Cedar Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
ISOPODA:	
Asellidae/ <u>Asellus</u>	3
ODONATA:	
Aeshnidae/ <u>Basiaeschna janata</u>	2
<u>Boyeria vinosa</u>	8
Calopterygidae/ <u>Calopteryx</u>	11
Coenagrionidae/ <u>Argia</u>	1
Cordulegastridae/ <u>Cordulegaster maculata</u>	1
Gomphidae/ <u>Stylurus</u> nymphs	2
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	32
<u>Hydropsyche betteni/depravata</u>	31
<u>H. frisoni</u>	1
Philopotamidae/ <u>Chimara</u>	1
	287

Unionidae relics of Fusconaia barnesiana and Lasmigona holstonia were collected at this site.



**CEDAR CREEK  
BENTHIC MACROINVERTEBRATES**



PERCENT OF TOTAL NUMBER OF ORGANISMS

**n = 287  
TAXA RICHNESS = 31**

Figure 39.

## Elk River

One qualitative fishery survey was conducted on the Elk River in November 1990.

**Location and Length** - Tributary to the Watauga River (Watauga Reservoir). The sample area was located at the first bridge on Poga Rd. upstream of Elk Mills and was sampled on 14 November 1990. It was 800 ft. in length and averaged 91.0 ft. in width. The site was in Carter County. Elk Mills Quadrangle.

**Gear Type** - The site was sampled using a backpack electrofishing unit operating at 240 v. AC and shocking into a 20 ft. seine. Fish were also collected by sport shocking along each shoreline and a 20 ft. seine was pulled through the shallow eddy areas. The upper pool area was sampled using a fish toxicant (Sodium cyanide) and the lower pool area with explosives (primacord).

**Water Quality** - Data were taken from midstream on 7 November 1990: DO - 11.5 ppm, pH - 7.7, Temperature - 47.0 F, Conductivity - 32 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected on 7 November 1990 by conducting a 120 minute qualitative survey. The sample contained 307 organisms and represented 45 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by</u>		<u>% by</u>	
		<u>No.</u>	<u>Wt.</u>	<u>Wt.</u>	<u>Wt.</u>
Smallmouth bass	3	0.3	0.18	0.7	
Rock bass	32	3.3	4.02	16.0	
Bluegill	63	6.5	3.11	12.3	
Brook trout	1	0.1	0.13	0.5	
Nongame Fish	27	2.8	8.09	32.1	
Forage Fish	842	87.0	9.66	38.3	
TOTAL	968		25.19		

**Comments** - The Elk River was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. Only about 8.8 mi. of free flowing river exists in the state upstream of the

backwater of Watauga Reservoir to the North Carolina state line. The Agency has made no previous studies or fish collections from this stream.

We sampled approximately 800 ft. of stream using a combination of toxicant and explosive methods. A total of 968 fish weighing 25.19 lb. and comprising 21 species was collected. Four native game species, smallmouth bass (*Micropterus dolomieu*), rock bass (*Ambloplites rupestris*), bluegill (*Lepomis macrochirus*), and brook trout (*Salvelinus fontinalis*) were present. Only rock bass and bluegill were collected in any numbers or size (Fig. 40) and only three smallmouth bass and a single specimen of brook trout were found. The collection of brook trout was unexpected, however, they do occur in at least one tributary to the Elk River (Bivens 1984). Rock bass made up about 3% by number and 16% by weight while bluegill comprised about 7% by number but only 12% by weight of all fish collected. This was due to a large number of 2 and 3 in. bluegill. Seventeen nongame and forage species were also collected and these made up about 90% of the total number and 70% of the total weight. Of particular interest were the fairly intolerant shiner species such as the warpaint (*Luxilus coccogenis*), the Tennessee (*Notropis leuciodus*), and the telescope (*N. telescopus*) as these were fairly abundant. Also, three specimens of the fatlips minnow (*Phenacobius crassilabrum*) were collected. Five darter species, the greenside (*Etheostoma blennioides*), greenfin (*E. chlorobranchium*), redline (*E. rufilineatum*), Swannanoa (*E. swannanoa*), and banded (*E. zonale*) were also collected here. With the exception of mirror shiner (*Notropis spectrunculus*), sawfin shiner (*Notropis* sp. cf. *N. spectrunculus*), and fantail darter (*Etheostoma flabellare*) our species list compares well with that of the TVA 1940 survey (Etnier 1978).

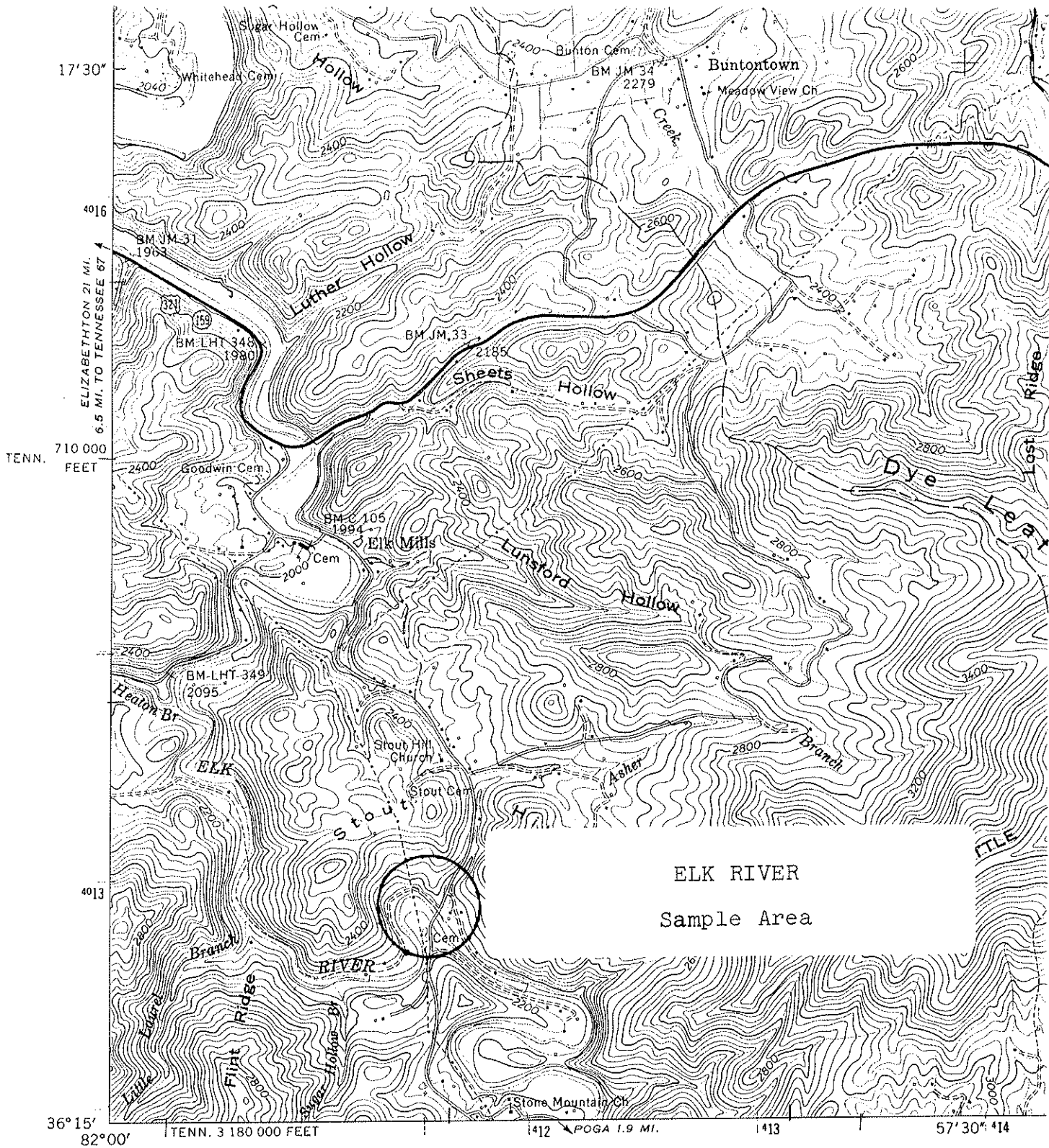
This is probably a high quality Blue Ridge stream even though it is being adversely impacted by development upstream in North Carolina (Charles F. Saylor, TVA, personal communication). We observed that siltation was fairly heavy in side pools and sand deposits were deep in places where the current slows. On the day we sampled for fish, the stream was dingy. The occurrence of several intolerant forms, as stated above, still indicates fairly good water quality though.

Benthic macroinvertebrates from our sample included Baetidae, Ephemerellidae, and Ephemeridae mayflies, Capniidae, Pteronarcyidae, and Taeniopterygidae stoneflies, Glossosomatidae, Hydropsychidae,

Limnephilidae, Philopotamidae, Polycentropodidae, and Rhyacophilidae caddisflies, and Elmidae and Psephenidae beetles. Limpets (*Ferrissia*) and Physidae and Pleuroceridae snails were also present. Crayfish included an undetermined *Cambarus* sp. and *Orconectes spinosus*. Dipterans and trichopterans both represented about 34%, gastropods 13%, and plecopterans about 5% of the total number of organisms collected (Fig. 41). A total of 45 taxa was collected at this site. Of special interest is the collection of eight specimens of undetermined *Hydropsyche* larvae. These appeared so different that Dr. David A. Etnier (University of Tennessee) suggested that they may possibly be an undescribed species.

**Management Recommendations:**

1. The fish species assemblage and taxa richness of macroinvertebrates indicate that this is a good to excellent quality Blue Ridge stream that merits protection from any further degradation.
2. Should encourage appropriate North Carolina officials to help with pollution sources from upstream.



Mapped and edited by Tennessee Valley Authority  
 Published by the Geological Survey

Control by USC&GS, USGS, and TVA

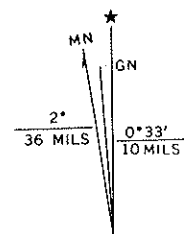
Revised by TVA in 1959 by photogrammetric methods using  
 aerial photographs taken 1958 and by reference to TVA-USGS  
 quadrangle dated 1938. Map field checked by TVA, 1959

Polyconic projection, 1927 North American datum  
 10,000-foot grid based on Tennessee and  
 North Carolina rectangular coordinate systems

1000 meter Universal  
 Zone 17, shown in b

Fine red dashed line:  
 visible on aerial phot

ELK MILLS QUADRANGLE  
 Tenn.-N.C. - 214 SW



AND 1960 MAGNETIC NORTH  
 10N AT CENTER OF SHEET

(WHITE ROCKS MTN. 208-NE)  
 4556 II NE

AND B

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Elk River Lat-Long 361532N - 815904W  
Watershed Watauga River Length of Sample 800 ft.  
Station (See comments) Reach 06010103-27.0  
County Carter Date/Time 7 November 1990/1230  
Data Collected By Rick D. Bivens, Carl E. Williams, and David E. Lane

B. PHYSICAL CHARACTERISTICS

1. Average Width 91.0 ft. Average Depth 1.0 ft. Maximum Depth Approx. 5-6 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud - % Silt 10 % Sand 40 % Clay - %  
Gravel 20 % Rubble 10 % Boulders 15 % Bedrock 5 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 15 % Clay - %  
Gravel 20 % Rubble 20 % Boulders 30 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average \_\_\_\_\_ Scarce X
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 40 % of Stream.
8. Flow (CFS) 124.6 : Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy and cool; air temp. - 55°F.
10. Past Weather (last 24 hours) Partly cloudy; cold overnight.
11. pH 7.7 Temp. 47°F Conductivity 32 D.O. 11.5 % Saturation 98
12. Comments: Sample location was at the first bridge on Poga Road  
upstream of Elk Mills. Siltation was fairly heavy in side pools,  
sand was heavy and deep in the pools.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Elk River Lat-Long 361532N - 815904W  
 Watershed Watauga River Date 14 November 1990  
 County Carter Reach 06010103-27,0  
 Type of Sampling Various Methods Pool Elevation 2095 ft.  
 Gear Type See field notes below. Time 1300 - 1730

SPECIES		CODE	NUMBER	LENGTH	WT.			
Name								
<i>Micropterus dolomieu</i>		218	2	2	0.03			
"	"	"	1	6	0.15			
<i>Ambloplites rupestris</i>		13	5	1	0.01			
"	"	"	2	3	0.07			
"	"	"	6	4	0.44			
"	"	"	7	5	0.82			
"	"	"	8	6	1.54			
"	"	"	4	7	1.14			
<i>Lepomis macrochirus</i>		206	26	3	0.89			
"	"	"	32	4	1.63			
"	"	"	4	5	0.41			
"	"	"	1	6	0.18			
<i>Salvelinus fontinalis</i>		356	1	6	0.13			
<i>Hypentelium nigricans</i>		166	14	1-9	0.86			
<i>Moxostoma duquesnei</i>		229	13	2-14	7.23			
<i>Campostoma anomalum</i>		25	60	1-8	4.37			
<i>Cyprinella galactura</i>		253	16	1	0.02			
<i>Hybopsis amblops</i>		155	45	1-3	0.10			
<i>Luxilus coccogenis</i>		248	334	1-4	1.21			
<i>Nocomis micropogon</i>		234	68	1-7	1.76			
<i>Notemigonus crysoleucas</i>		235	3	4-5	0.17			
<i>Notropis leuciodus</i>		255	143	1-3	0.43			
<i>N. telescopus</i>		272	68	1-3	0.19			
Continued on next page								

The water was dingy and fish recovery was probably poor.

Field Notes: 800 ft. sample length. Fish collected with primacord, sodium cyanide, and by electrofishing, seining, and backpack shocker with seine.

Name of Collector(s): R.D. Bivens, C.E. Williams, D.E. Lane, J.W. Habera,  
C.F. Saylor, and G. Saylor

WR-0525

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Elk River Lat-Long 361532N - 815904W  
 Watershed Watauga River Date 14 November 1990  
 County Carter Reach 06010103-27,0  
 Type of Sampling Various Methods Pool Elevation 2095 ft.  
 Gear Type See field notes below. Time 1300 - 1730

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Phenacobius</i>								
<i>crassilabrum</i>		328	3	2	0.01			
<i>Etheostoma blennioides</i>		81	13	3-5	0.44			
<i>E. chlorobranchium</i>		86	1	3	0.02			
<i>E. rufilineatum</i>		108	7	1-2	0.05			
<i>E. swannanoa</i>		129	11	1-3	0.09			
<i>E. zonale</i>		134	31	1-3	0.17			
<i>Cottus bairdi</i>		39	39	1-4	0.63			

Field Notes: 800 ft. sample length. Fish collected with primacord, sodium cyanide, and by electrofishing, seining, and backpack shocker with seine.

Name of Collector(s): R.D. Bivens, C.E. Williams, D.E. Lane, J.W. Habera,  
C.E. Saylor, and G. Saylor

WR-0525



GAME FISH FROM ELK RIVER  
INCH CLASS DISTRIBUTION

█ ROCK BASS    □ BLEUGILL

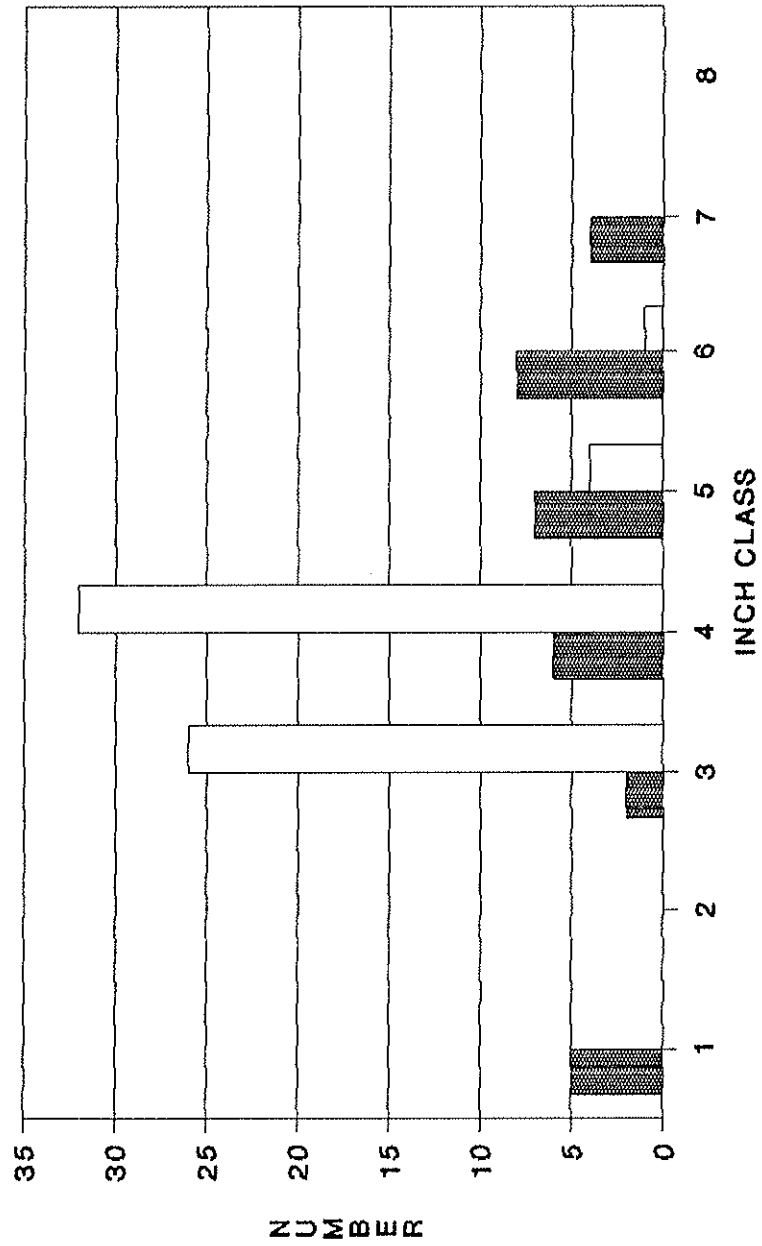


Figure 40.

Elk River: Qualitative Benthic Sample

7 November 1990

Field # 272

Carter Co., TN; At 1st. bridge on Poga Road, upstream of Elk Mills. Coordinates: 361532N - 815904W. Elk Mills, Tenn.- N.C., # 214 SW Quad. Reach # 06010103-27,0.

TAXA	NUMBER
ANNELEIDA:	
Oligochaeta	3
COLEOPTERA:	
Elmidae/ <u>Optioservus</u> larva	1
<u>Promoresia elegans</u> larvae	2
<u>Promoresia elegans</u> adult	1
Psephenidae/ <u>Psephenus herricki</u> larvae	2
DECAPODA:	
Cambaridae/ <u>Cambarus</u> female	1
<u>Orconectes spinosus</u> males 1st.	2
<u>O. spinosus</u> females	2
DIPTERA:	
Athericidae/ <u>Atherix lantha</u>	18
Blephariceridae/ <u>Blepharicera</u>	12
Chironomidae	41
Empididae	2
Simuliidae larvae	20
Simuliidae pupa	1
Tipulidae/ <u>Tipula</u>	10
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	5
Ephemerellidae/ <u>Ephemerella</u>	3
Ephemeridae/ <u>Ephemera</u>	1
<u>Hexagenia</u>	1
GASTROPODA:	
Ancylidae/ <u>Ferrissia</u>	8
Physidae/ <u>Physa</u>	4
Pleuroceridae/ <u>Anculosa subglobosa</u>	18
<u>Goniobasis</u>	9
MEGALOPTERA:	
Corydalidae/ <u>Corydalus cornutus</u>	3
<u>Nigronia serricornis</u>	3
Sialidae/ <u>Sialis</u>	2

Elk River: Qualitative Benthic Sample cont.

TAXA	NUMBER
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	2
Calopterygidae/ <u>Calopteryx</u>	2
Coenagrionidae/ <u>Enallagma</u>	1
Gomphidae/ <u>Gomphus</u> (Genus A <u>consanguis</u> ) *	1
<u>G. lividus</u>	5
<u>G. (Hylogomphus)</u>	1
<u>Lanthus vernalis</u>	1
PLECOPTERA:	
Capniidae early instar	7
Pteronarcyidae/ <u>Pteronarcys</u>	1
Taeniopterygidae/ <u>Taeniopteryx</u>	8
TRICHOPTERA:	
Glossosomatidae/ <u>Glossosoma</u>	8
Hydropsychidae/ <u>Cheumatopsyche</u>	14
<u>Hydropsyche frisoni</u>	1
<u>Hydropsyche</u> (undetermined) **	8
<u>Symphitopsyche bronta</u>	2
<u>S. cheilonis</u>	10
<u>S. sparna</u>	36
Limnephilidae/ <u>Pycnopsyche</u>	14
Philopotamidae/ <u>Chimarra</u>	1
<u>Dolophilodes</u>	7
Polycentropodidae (bad specimen)	1
Rhyacophilidae/ <u>Rhyacophila fuscula</u>	1

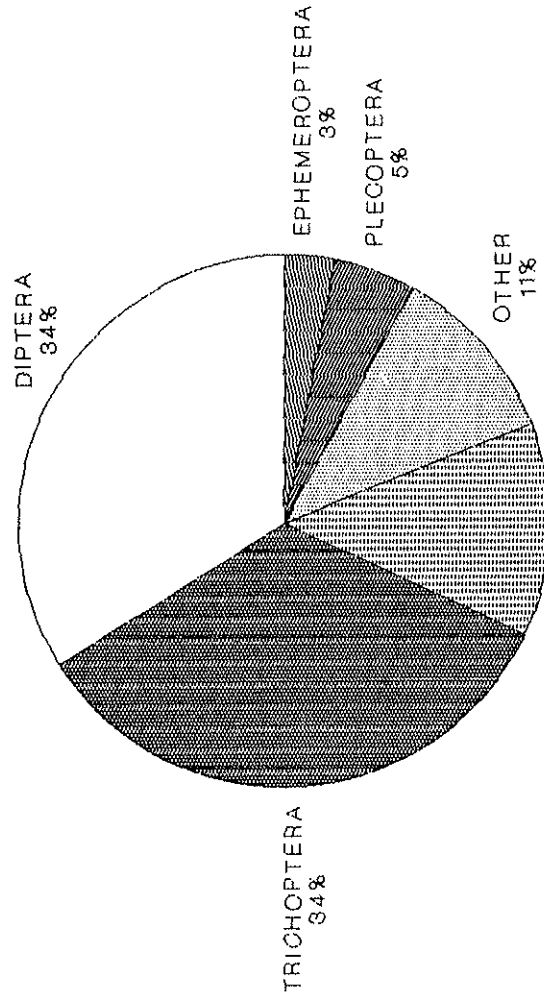
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307

\* (from Louton 1982)

\*\* Possibly an undescribed species.

ELK RIVER  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 307  
TAXA RICHNESS = 45

Figure 41.

## Clear Fork Cumberland River and Tributaries

One qualitative survey was conducted on Clear Fork and fish collections were made on four of its smaller tributaries in August 1990:

### Location and Length - Tributary to the Cumberland River.

The sample area was located at the mouth of Primroy Creek and was sampled on 9 August 1990. It was 700 ft. in length and averaged 100.5 ft. in width. The site was in Campbell County, Jellico East Quadrangle. (See accompanying maps showing tributary sample locations.)

**Gear Type** - The site was sampled using electrofishing equipment. A shocker boat was used where deep water permitted. The riffle areas were sampled using a backpack electrofishing unit operating at 110 v. AC and shocking into a seine. A 10 ft. seine was hauled through shallow pools along the shoreline.

**Water Quality** - Data were taken from midstream on 9 August 1990: DO - 8.5 ppm, pH - 7.9, Temperature - 68.7 F, Conductivity - 365 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey. The sample contained 221 organisms and represented 39 taxa.

### Fish Collected:

Species	No.	% by	Wt.	% by
		No.		Wt.
Smallmouth bass	5	2.3	0.95	5.0
Spotted bass	7	3.3	0.06	0.3
Largemouth bass	1	0.5	0.04	0.2
Rock bass	6	2.8	1.01	5.3
Redbreast sunfish	6	2.8	0.39	2.0
Green sunfish	2	0.9	0.09	0.5
Longear sunfish	11	5.2	1.10	5.8
Bluegill	3	1.4	0.07	0.4
Nongame Fish	58	27.2	15.02	78.9
Forage Fish	114	53.5	0.31	1.6
TOTAL	213		19.04	

(See accompanying data sheets for fish species collected from tributaries)

Comments - The Clear Fork of the Cumberland River and most of its tributaries in Campbell County have suffered degradation from sedimentation and acid mine drainage associated with surface and deep coal mined areas in the watershed. This mining started in the early 1900's, peaked in the middle 1940's, and has continued to the present although it has declined in recent years.

In Tennessee, stream siltation is the major pollution problem associated with surface mining. Acid mine drainage has the most damaging effects on aquatic ecosystems but is generally associated with deep mines and the incidence of occurrence of acid mine drainage decreases toward the southwest section of the Appalachian region. The contour or strip mine is the type of surface mine most often used in the Cumberland Mountains of Tennessee (Talak 1977) and there is an estimated 1,870 miles of streams that are impacted by mining in the state. Campbell County has been one of the most severely affected counties with approximately 478 miles of streams polluted by sedimentation and 160 miles polluted by acid drainage (Tennessee Department of Public Health 1978). The Clear Fork drainage basin in Campbell and Claiborne Counties, has been reported as severely polluted and significantly degraded by mine drainage (Appalachian Regional Commission 1969).

We surveyed one site on Clear Fork proper and made fish collections on four of its smaller tributaries in 1990. Three of these tributaries were in Claiborne County and one was in Campbell County. We also conducted surveys on three of its larger Campbell County tributaries during this same period. These were Laurel Fork, Stinking Creek, and Tackett Creek and they are covered under separate accounts in this report. These surveys were conducted primarily to address the Agency's almost total lack of fish or benthic macroinvertebrate data from Campbell County streams. It was also done at the request of Campbell County Wildlife Officer Jim Arnold, who is interested in the fishery management potential of recovering streams.

We collected a total of 213 fish weighing 19.04 lb. and comprising 25 species from the Clear Fork sample. Seven native game species, smallmouth bass (*Micropterus dolomieu*), spotted bass (*M. punctulatus*), largemouth bass (*M. salmoides*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), longear sunfish (*L. megalotis*), and bluegill (*L. macrochirus*), along

with exotic redbreast sunfish (*L. auritus*) were collected. Largemouth bass and green sunfish were each represented by single specimens, and only three bluegill were found. Smallmouth bass, spotted bass, rock bass, redbreast sunfish, and longear sunfish were collected in either low numbers or small size (Fig. 42). All game fish combined made up 19% by number and about 20% by weight of all fish collected. Eighteen nongame and forage species were also collected and these made up about 81% of the total number and 80% of the total weight. Of these, 12 forage species comprised about 54% of the total number, but nongame fish accounted for 79% of the total weight. Channel catfish (*Ictalurus punctatus*) and flathead catfish (*Pylodictus olivaris*) were also collected and they made up about 23% of the total weight collected.

Several species of fish are listed as threatened, of special concern, or in need of management from the Clear Fork drainage in Tennessee. Of these, we collected two species from the Clear Fork proper. The northern form of the rosyface shiner (*Notropis rubellus rubellus*) is deemed in need of management (Starnes and Etnier 1980) because of its peripheral nature to the state and restricted Tennessee distribution to tributaries of the Cumberland River above Cumberland Falls in Campbell County. We collected 25 specimens of the rosyface subspecies from our sample. Another species recently added to the list of fish in need of management (TWRA 1991) and collected in our sample is the emerald darter (*Etheostoma baileyi*). Five other darter species, the greenside (*E. blennioides*), the rainbow (*E. caeruleum*), stripetail (*E. kennicotti*), logperch (*Percina caprodes*), and the blackside (*P. maculata*) were also collected here. Although it is not listed, the blackside darter is uncommon to rare in Tennessee except in the Big South Fork and upper Cumberland drainage and it is apparently tolerant of considerable siltation (Etnier and Starnes in press).

Four additional species were collected from the tributary samples. These included blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*), yellow bullhead (*Ameiurus natalis*), and the arrow darter (*Etheostoma sagitta*). The arrow darter is another species listed in need of management and it was collected in three of the four tributary samples. This is also an upper Cumberland River species confined to streams in Campbell, Claiborne, and Scott counties in Tennessee. Other listed species occurring in the Clear Fork drainage but not found in our samples are the blackside dace (*Phoxinus Cumberlandensis*) and the silverjaw minnow

(*Ericymba buccata*). The blackside dace is a federally threatened species that is restricted to the upper Cumberland drainage also. There is a record of this fish from Buffalo Creek in Claiborne County (U. S. Fish and Wildlife Service 1988), one of the Clear Fork tributaries that we sampled this year. The silverjaw minnow also occurs only in the upper Cumberland drainage and has been collected only three times in Tennessee. The third collection of this species was in May of 1991 and it came from the Clear Fork at the mouth of Valley Creek in Claiborne County (Etnier 1991).

The Clear Fork has been one of the most heavily mined watersheds in the state and has suffered decades of degradation. Currently though, the recent decline of coal mining in the area along with more stringent environmental controls have resulted in some recovery of the system. And, with the collection of 29 fish species in our limited survey it is evident that the system is improving, although it is far from a complete recovery.

Benthic macroinvertebrates from our sample included Baetidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, the perlid stonefly *Acroneuria abnormis*, Glossosomatidae, Hydropsychidae, and Hydroptilidae caddisflies, and Dryopidae, Elmidae, and Gyrinidae beetles. Asian clams (*Corbicula fluminea*) and planorbid and periwinkle snails (*Goniobasis*) were present. An unidentified *Orconectes* sp. was the only crayfish in our benthic sample from the Clear Fork proper. However, on two of the tributary samples in Claiborne County, Buffalo Creek and Valley Creek, we collected form I males that Dr. Raymond W. Bouchard, Academy of Natural Science, Philadelphia, later determined as *Orconectes putnami*. This is the first time we have encountered this species; in Region IV it occurs only in the Cumberland River system.

Ephemeropterans represented about 42%, mollusks 12%, coleopterans, hemipterans, and odonates each 8%, trichopterans 4% and plecopterans about 3% of the total number of organisms collected (Fig. 43). A total of 39 taxa was collected at this site.

#### Management Recommendations:

1. Our qualitative sample was too limited to base any management decisions on. The river was high and dingy at the time of sampling and we were experiencing trouble with our electrofishing equipment. Therefore, more extensive samples of the Clear Fork should be



considered in future work plans.

2. We don't recommend that any stocking of game fish should be done based on our limited information.
3. The occurrence of at least five species of protected fish from this watershed should warrant an extra measure of protection.



KENTUCKY  
TENNESSEE

WHITE

Gravelly Gap

CLEAR FORK  
Sample Area

JELICO EAST QUADRANGLE  
Tenn.-KY. - 4157 II SE

Tackett

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Clear Fork Cumberland River Lat-Long 363427N - 840209W  
Watershed Cumberland River Length of Sample 700 ft.  
Station (See comments) Reach 05130101-  
County Campbell Date/Time 9 August 1990/1100  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 100.5 ft. Average Depth 1.9 ft. Maximum Depth 10.0 ft.
2. Estimated Percent of Stream in Pools is 30 %
3. Estimated Percent Pool Bottom is Mud 10 % Silt 20 % Sand 20 % Clay - %  
Gravel 10 % Rubble 25 % Boulders 15 % Bedrock - % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 20 % Sand 10 % Clay - %  
Gravel 10 % Rubble 40 % Boulders 20 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average X *Dianthera americana* Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 20 % of Stream.
8. Flow (CFS) 182.4 : Compared to Normal; Low \_\_\_\_\_ Normal \_\_\_\_\_ High X
9. Present Weather Partly cloudy, warm, and humid; air temp. - 75°F.
10. Past Weather (last 24 hours) Partly cloudy, warm; fairly heavy rain.
11. pH 7.9 Temp. 68.7°F Conductivity 365 D.O. 8.5 % Saturation 95
12. Comments: Sample location was at the mouth of Primroy Creek. The river was muddy due to overnight rain and slightly high. Heavy siltation was evident.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Clear Fork Cumberland River Lat-Long 363427N - 840209W  
 Watershed Cumberland River Date 9 August 1990  
 County Campbell Reach 05130101-  
 Type of Sampling Electrofishing Pool Elevation 983 ft.  
 Gear Type Boat; backpack w/seine, Time 1330 - 1530  
and seining w/10 ft. seine

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	2	1	0.01			
"	"	"	1	2	t			
"	"	"	1	8	0.31			
"	"	"	1	10	0.63			
<i>M. punctulatus</i>		219	4	1	0.01			
"	"	"	1	2	t			
"	"	"	1	3	0.01			
"	"	"	1	4	0.04			
<i>M. salmoides</i>		220	1	4	0.04			
<i>Ambloplites rupestris</i>		13	1	2	0.02			
"	"	"	2	3	0.07			
"	"	"	1	6	0.19			
"	"	"	1	7	0.35			
"	"	"	1	8	0.38			
<i>Lepomis auritus</i>		201	2	1	t			
"	"	"	2	3	0.05			
"	"	"	1	5	0.10			
"	"	"	1	7	0.24			
<i>L. cyanelus</i>		202	2	3	0.09			
<i>L. megalotis</i>		208	1	3	0.04			
"	"	"	4	4	0.29			
"	"	"	6	5	0.77			
<i>L. macrochirus</i>		206	2	2	0.04			
"	"	"	1	3	0.03			

Continued on next page

Field Notes: 700 ft. sample length. Stream dingy; shocker efficiency was low as the generator frequently tripped the circuit breaker.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Wayne H. Schacher

WR-0525

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Clear Fork Cumberland River Lat-Long 363427N - 840209W  
 Watershed Cumberland River Date 9 August 1990  
 County Campbell Reach 05130101-  
 Type of Sampling Electrofishing Pool Elevation 983 ft.  
 Gear Type Boat; backpack w/seine, Time 1330 - 1530  
and seining w/10 ft. seine

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Ictalurus punctatus</i>	176	5	1-14	1.78			
<i>Pylodictus olivaris</i>	346	9	1-14	2.61			
<i>Catostomus commersoni</i>	32	1	2	0.01			
<i>Hypentelium nigricans</i>	166	9	1-8	0.73			
<i>Moxostoma erythrurum</i>	230	34	1-13	9.89			
<i>Campostoma anomalum</i>	25	4	1-2	0.02			
<i>Cyprinella galactura</i>	253	3	2-3	0.02			
<i>Luxilus chrysocephalus</i>	249	2	1	t			
<i>Notropis rubellus</i>							
<i>rubellus</i>	261	25	1-2	0.06			
<i>N. volucellus</i>	277	4	1	t			
<i>Pimephales notatus</i>	334	29	1-2	0.06			
<i>Etheostoma baileyi</i>	117	6	1	0.01			
<i>E. blennioides</i>	81	26	1-4	0.09			
<i>E. caeruleum</i>	84	1	1	t			
<i>E. kennicotti</i>	98	7	1-2	0.02			
<i>Percina caprodes</i>	306	4	2-3	0.03			
<i>P. maculata</i>	312	3	1	t			

Field Notes: 700 ft. sample area.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Wayne H. Schacher

WR-0525

GAME FISH FROM  
CLEAR FORK CUMBERLAND RIVER  
INCH CLASS DISTRIBUTION

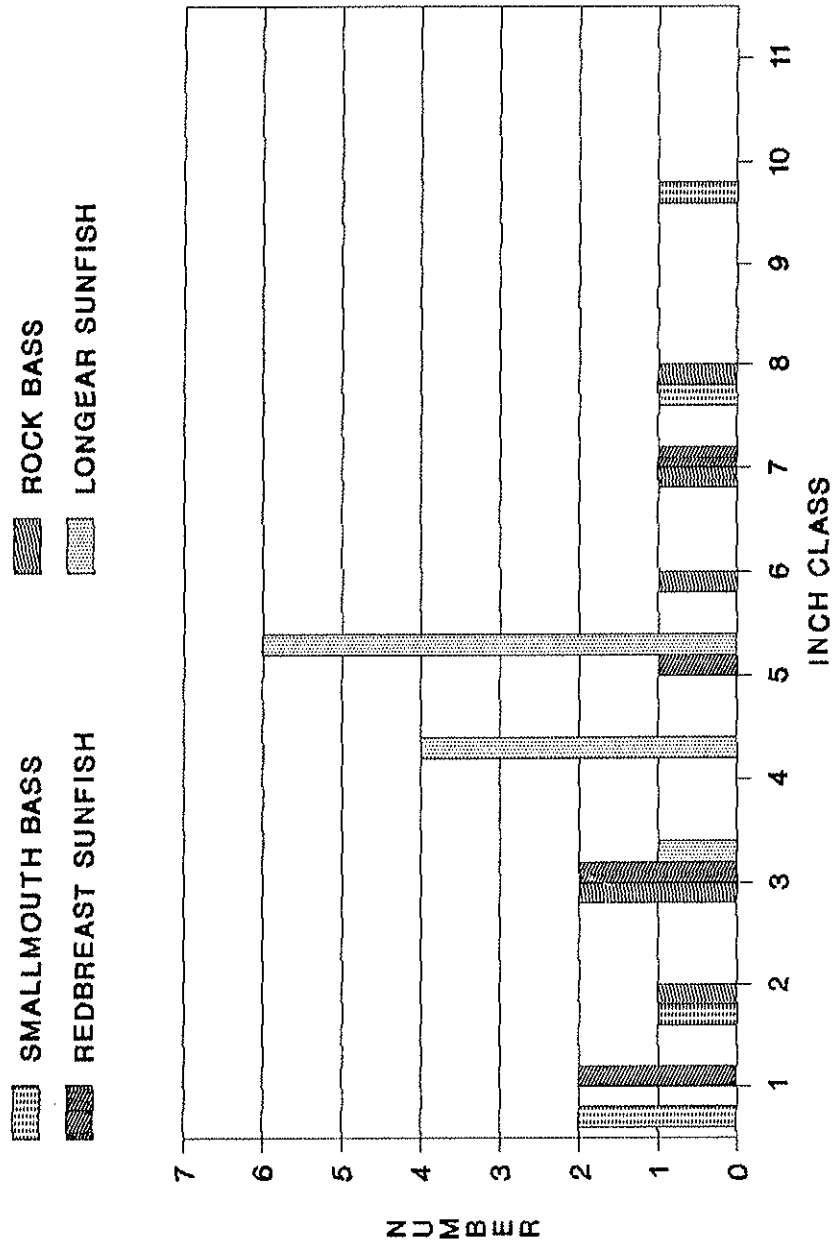


Figure 42.

Clear Fork Cumberland River: Qualitative Benthic Sample

9 August 1990

Field # 232

Campbell Co., TN; At the mouth of Primroy Creek. Coordinates:  
 363427N - 840209W. Jellico East, Tenn.-Ky., # 4157 II SE  
 Quad. Reach # 05130101-.

TAXA	NUMBER
ANNELIDA:	
Hirudinea	1
Oligochaeta	2
COLEOPTERA:	
Dryopidae/ <u>Helichus</u> adults	4
Elmidae/ <u>Ancyronyx variegatus</u> adults	3
<u>Macronychus glabratus</u> adult	1
Gyrinidae/ <u>Dineutus discolor</u> males	3
<u>Dineutus discolor</u> females	6
DECAPODA:	
Cambaridae/ <u>Orconectes</u>	1
DIPTERA:	
Athericidae/ <u>Atherix lantha</u>	4
Chironomidae	1
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	14
<u>Pseudocloeon</u>	10
Ephemeridae/ <u>Ephemera</u>	1
<u>Hexagenia</u>	1
Heptageniidae/ <u>Stenacron interpunctatum</u>	8
<u>Stenonema mediopunctatum</u>	30
<u>S. vicarium</u>	13
Oligoneuriidae/ <u>Isonychia</u>	15
GASTROPODA:	
Planorbidae	3
Pleuroceridae/ <u>Goniobasis</u>	16
HEMIPTERA:	
Gerridae/ <u>Metrobates hesperius</u>	9
<u>Rheumatobates rileyi</u>	1
<u>Trepobates inermis</u> male	1
Veliidae/ <u>Rhagovelia obesa</u> males	4
<u>Rhagovelia obesa</u> females	2

Clear Fork Cumberland River: Benthic Sample cont.

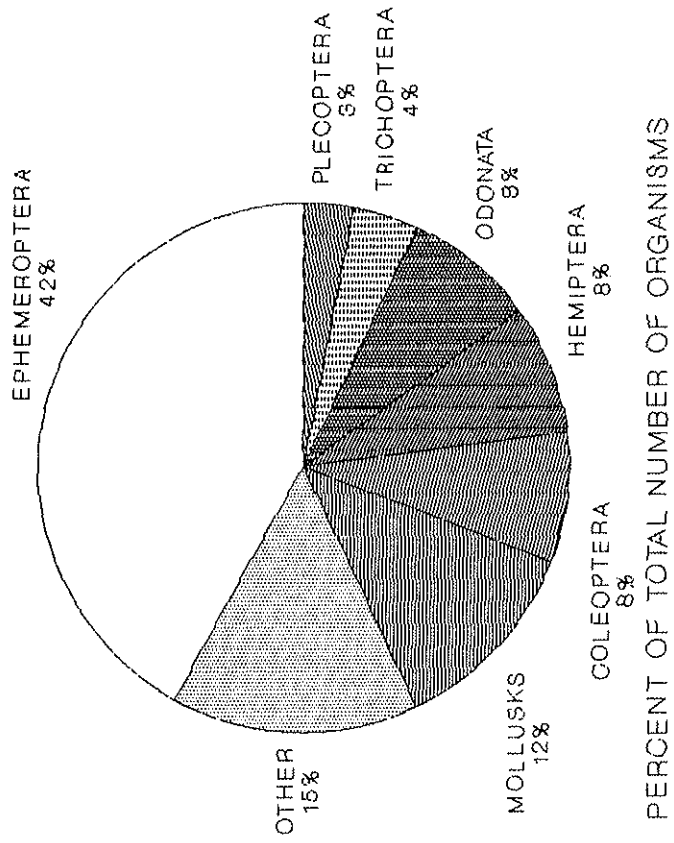
TAXA	NUMBER
LEPIDOPTERA:	
Pyralidae/ <u>Petrophila</u> larvae	9
<u>Petrophila</u> pupae	3
MEGALOPTERA:	
Corydalidae/ <u>Corydalis</u> <u>cornutus</u>	6
<u>Nigronia</u> <u>serricornis</u>	7
ODONATA:	
Aeshnidae/ <u>Boyeria</u> <u>vinosa</u>	5
Gomphidae/ <u>Dromogomphus</u> <u>spinosus</u>	2
<u>Gomphus</u>	3
<u>Gomphus</u> ( <u>Stylurus</u> )	2
<u>Hagenius</u> <u>brevistylus</u>	1
<u>Stylogomphus</u> <u>albistylus</u>	1
Macromiidae/ <u>Didymops</u> <u>transversa</u>	2
<u>Macromia</u>	2
<u>Macromia</u> <u>illinoiensis</u>	1
PELECYPODA:	
Corbiculidae/ <u>Corbicula</u> <u>fluminea</u>	8
PLECOPTERA:	
Perlidae/ <u>Acroneuria</u> <u>abnormis</u>	6
TRICHOPTERA:	
Glossosomatidae/ <u>Protoptila</u>	1
Hydropsychidae/ <u>Hydropsyche</u> <u>dicantha</u>	6
Hydroptilidae/ <u>Hydroptila</u>	1
<u>Leucotrichia</u> <u>pictipes</u>	1

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221

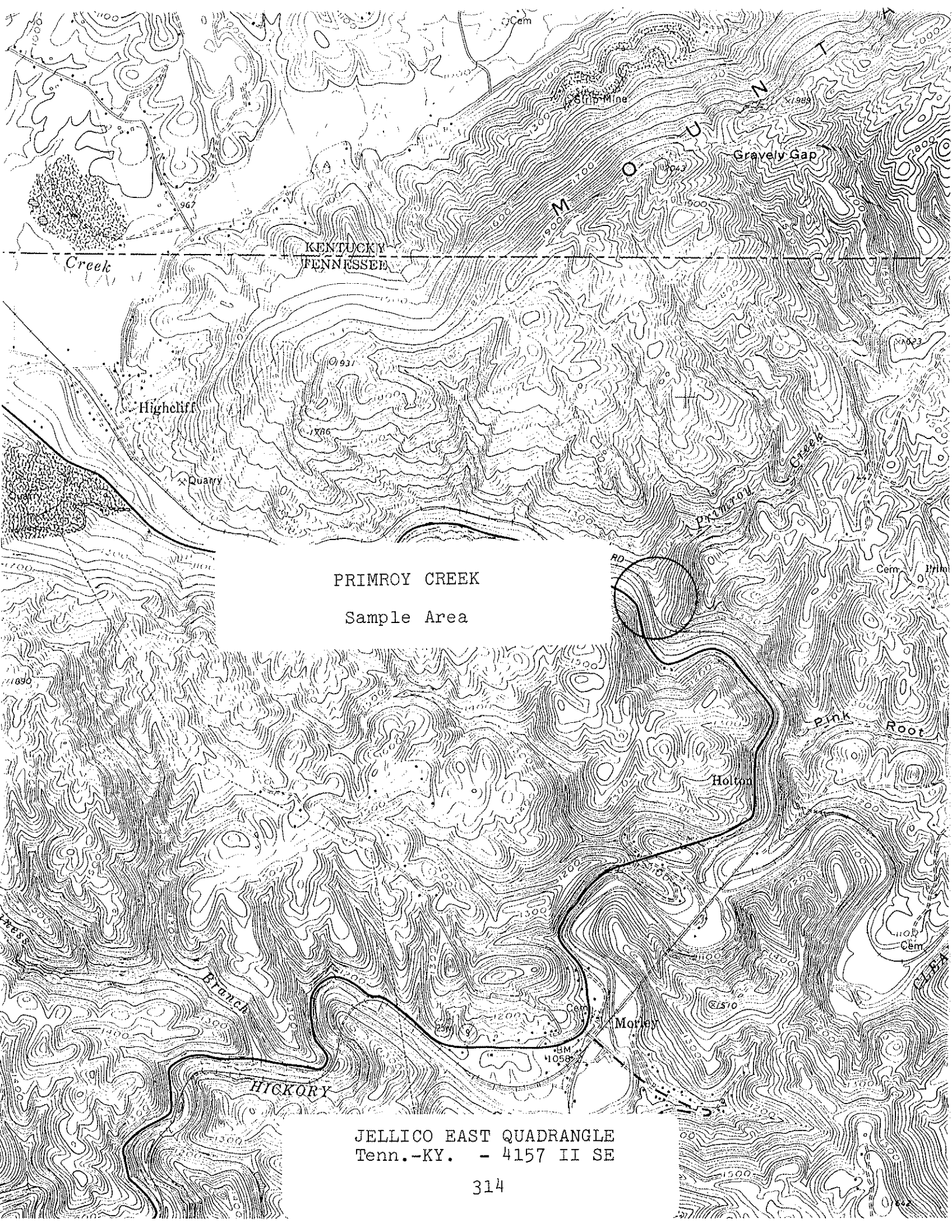


CLEAR FORK CUMBERLAND RIVER  
BENTHIC MACROINVERTEBRATES



n = 221  
TAXA RICHNESS = 39

Figure 43.



KENTUCKY  
TENNESSEE

MOUNTAIN

Gravelly Gap

Creek

Highcliff

Quarry

PRIMROY CREEK

Sample Area

RD

Pink Root

Holton

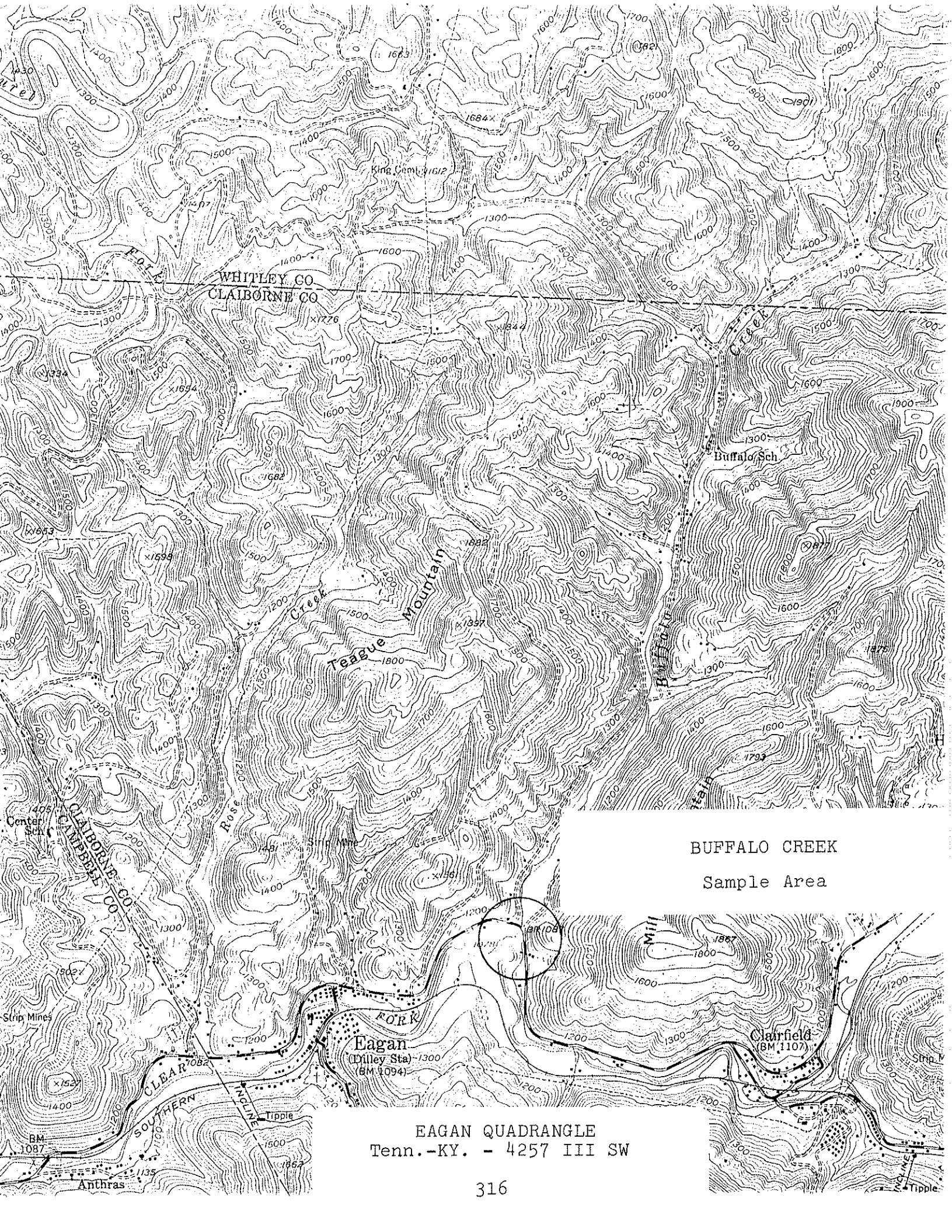
Morley

Branch

HICKORY

JELLICO EAST QUADRANGLE  
Tenn.-KY. - 4157 II SE





WHITLEY CO  
CLAIBORNE CO

Teague Mountain

BUFFALO CREEK  
Sample Area

EAGAN QUADRANGLE  
Tenn.-Ky. - 4257 III SW

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

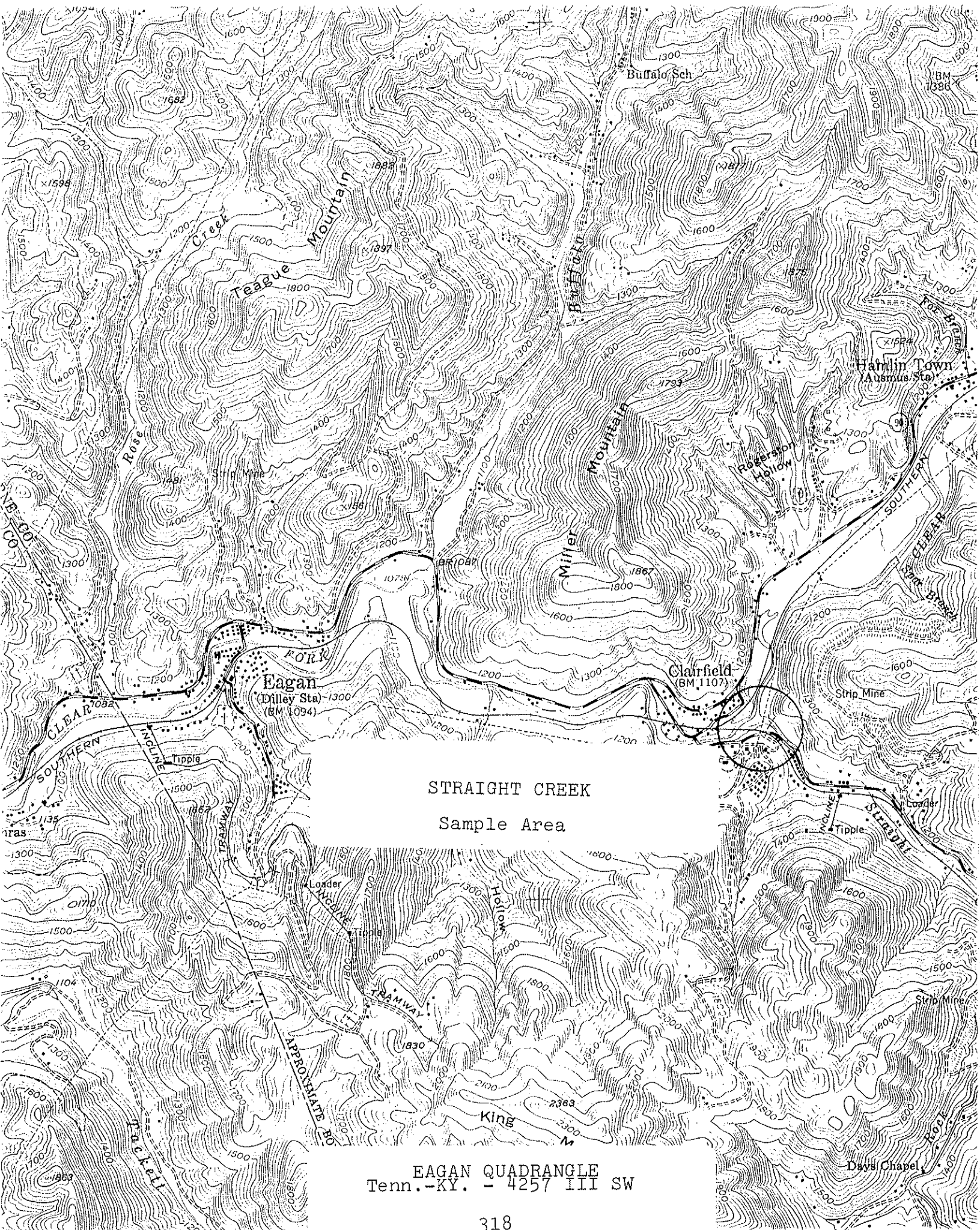
Stream Buffalo Creek Lat-Long 363324N - 835752W  
 Watershed Clear Fork Cumberland R. Date 10 August 1990  
 County Claiborne Reach 05130101-  
 Type of Sampling Electrofishing Pool Elevation 1080 ft.  
 Gear Type One backpack shocker @ Time 1515 - 1545  
110 v. AC

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	1					
<i>M. punctulatus</i>		219	1					
<i>Lepomis cyanellus</i>		202	4					
<i>Ameiurus natalis</i>		174	3					
<i>Catostomus commersoni</i>		32	3					
<i>Hypentelium nigricans</i>		166	23					
<i>Campostoma anomalum</i>		25	34					
<i>Rhinichthys atratulus</i>		351	98					
<i>Semotilus atromaculatus</i>		360	152					
<i>Etheostoma baileyi</i>		117	1					
<i>E. kenneicotti</i>		98	36					
<i>Orconectes putnami</i>								
Crayfish abundant.								
Temperature - 71.6° F								
Conductivity - 600 micromho/cm								
Avg. width - 10 ft.								
Avg. depth - 4 in.								
Gravel-rubble substrate, heavy siltation.								

Field Notes: Sample location was just upstream of the bridge at hwy. 90.  
Sample length was approx. 200 ft.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525



STRAIGHT CREEK  
Sample Area

EAGAN QUADRANGLE  
Tenn.-KY. - 4257 III SW

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

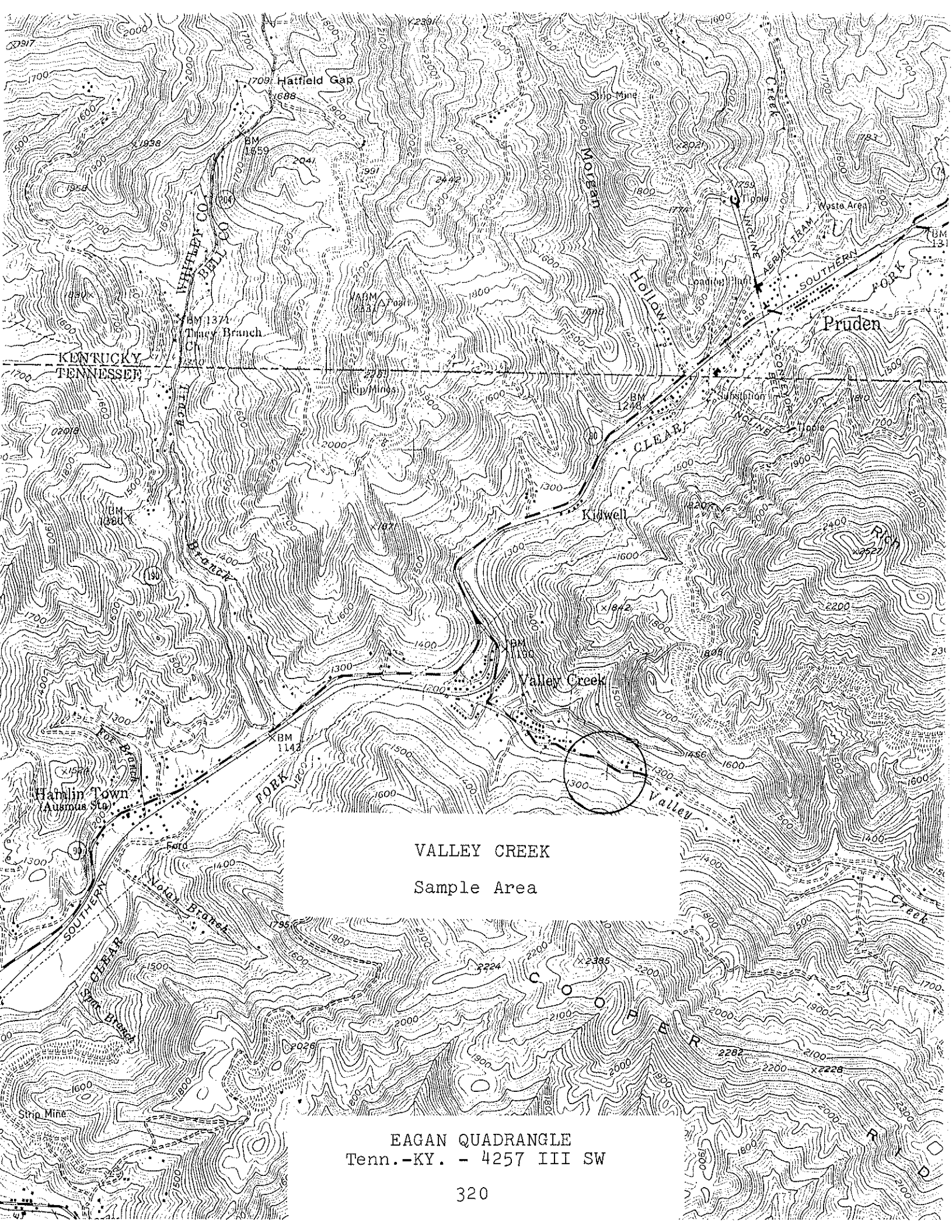
Stream Straight Creek Lat-Long 353300N - 835641W  
 Watershed Clear Fork Cumberland R. Date 10 August 1990  
 County Claiborne Reach 05130101-  
 Type of Sampling Electrofishing Pool Elevation 1100 ft.  
 Gear Type One backpack shocker @ Time 1345 - 1415  
110 v. AC

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus punctulatus</i>		219	1	2				
"	"	"	2	8				
<i>Lepomis cyanellus</i>		202	3					
<i>L. macrochirus</i>		206	2					
<i>Catostomus commersoni</i>		32	1					
<i>Hypentelium nigricans</i>		166	10					
<i>Campostoma anomalum</i>		25	45					
<i>Lucilus chrysocephalus</i>		249	4					
<i>Pimephales notatus</i>		334	13					
<i>Rhinichthys atratulus</i>		351	6					
<i>Semotilus atromaculatus</i>		360	23					
<i>Etheostoma kennicotti</i>		98	6					
<i>E. sagitta</i>		110	4					
Crayfish fairly abundant.								
Temperature - 70°F								
pH - 8.4								
Conductivity - 450 microcho/cm								
Avg. width - 12 ft.								
Avg. depth - 8 in. (several deep pools)								
Mostly gravel-rubble substrate with few boulders; pools with sand and mud; very heavy siltation.								

Field Notes: Sample location was at off road crossing near the powerline crossing upstream of the mouth. Sample length was approx. 200 ft.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525



VALLEY CREEK  
Sample Area

EAGAN QUADRANGLE  
Tenn.-KY. - 4257 III SW



FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Valley Creek Lat-Long 363404N - 835418W  
 Watershed Clear Fork Cumberland R. Date 10 August 1990  
 County Claiborne Reach 05130101-  
 Type of Sampling Electrofishing Pool Elevation 1190 ft.  
 Gear Type One backpack shocker @ Time 1045 - 1115  
110 v. AC

SPECIES		NUMBER	LENGTH	WT.			
Name	CODE						
<i>Lepomis cyanellus</i>	202	1					
<i>Catostomus commersoni</i>	32	1					
<i>Hypentelium nigricans</i>	166	4					
<i>Camptostoma anomalum</i>	25	178					
<i>Notropis rubellus</i>							
<i>rubellus</i>	261	1					
<i>Pimephales notatus</i>	334	6					
<i>Rhinichthys atratulus</i>	351	211					
<i>Semotilus atromaculatus</i>	360	22					
<i>Etheostoma baileyi</i>	117	1					
<i>E. kennicotti</i>	98	1					
<i>E. sagitta</i>	110	7					
<i>Orconectes putnami</i>							
Crayfish fairly abundant.							
Temperature - 63.5°F							
Conductivity - 510 micromho/cm							
Avg. width - 12 to 15 ft.							
Avg. depth - 4 in.							
Gravel-rubble substrate with lots of boulders.							
Very heavy siltation, mining still going on upstream.							

Field Notes: Sample location was along gravel road approx. 0.5 mi. upstream of Clear Fork, and upstream of coal yard. Sample length was approx. 200 ft.

Name of Collector(s): Rick D. Bivens and Carl E. Williams

WR-0525

## Stinking Creek

Two qualitative fishery surveys were conducted in August 1990:

**Location and Length** - Tributary to the Clear Fork Cumberland River. Sample area 1 was located at the secondary road bridge, just upstream of Stinking Creek School and was sampled on 2 August 1990. It was 500 ft. in length and averaged 24.3 ft. in width. Sample area 2 was located just upstream of the wooden bridge at New Liberty Church and was sampled on 3 August 1990. It was 300 ft. in length and averaged 25.3 ft. in width. Both sites were in Campbell County. Area 1, Jellico West Quadrangle. Area 2, Ivydell Quadrangle.

**Gear Type** - Both sites were sampled using a single backpack electrofishing unit operating at 110 v. AC.

**Water Quality** - Data were taken from midstream at each site. Area 1 on 2 August 1990: DO - 8.3 ppm, pH - 7.9, Temperature - 70 F, Conductivity - 305 micromhos/cm. Area 2, on 3 August 1990: DO - 8.1 ppm, pH - 7.4, Temperature - 67.6 F, Conductivity - 95 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey at each site. Area 1 sample contained 168 organisms and represented 37 taxa. Area 2 sample contained 314 organisms and represented 48 taxa.

### Fish Collected:

<u>Species</u>	<u>Site 1</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Smallmouth bass	11	1.7	0.87	6.1
Spotted bass	19	2.9	3.66	25.6
Rock bass	8	1.2	1.57	11.0
Redbreast sunfish	7	1.1	1.18	8.2
Green sunfish	3	0.5	0.11	0.8
Bluegill	10	1.5	0.74	5.2
Longear sunfish	6	0.9	0.43	3.0
Nongame Fish	82	12.5	2.83	19.8
Forage Fish	509	77.9	2.93	20.5
TOTAL	655		14.32	

## Site 2

<u>Species</u>	<u>No.</u>	% by <u>No.</u>	<u>Wt.</u>	% by <u>Wt.</u>
Smallmouth bass	5	2.9	0.66	8.7
Rock bass	16	9.3	1.76	23.1
Redbreast sunfish	19	11.0	1.71	22.4
Bluegill	1	0.6	0.05	0.7
Longear sunfish	22	12.8	0.57	7.5
Nongame Fish	9	5.2	1.35	17.7
Forage Fish	100	58.1	1.52	19.9
TOTAL	172		7.62	

**Comments** - This stream was surveyed primarily to address the Agency's almost total lack of fish or benthic macroinvertebrate data from Campbell County streams. A list of fish collected by TWRA from the upper reach of the stream in 1973 is the only information on file (TWRA file data). It was also surveyed at the request of Campbell County Wildlife Officer Jim Arnold, who is interested in the possibility of managing the stream for trout.

We collected a total of 655 fish weighing 14.32 lb. and comprising 20 species from site 1. Six native game species, smallmouth bass (*Micropterus dolomieu*), spotted bass (*M. punctulatus*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), bluegill (*L. macrochirus*), and longear sunfish (*L. megalotis*), along with exotic redbreast sunfish (*L. auritus*) were collected. Green sunfish, bluegill, and longear sunfish were found in either low numbers or small size, so comparison of inch class distribution was made for smallmouth bass, spotted bass, rock bass, and redbreast sunfish (Fig. 44). Of the four, smallmouth and spotted bass made up about 2% and 3% respectively by numbers, and smallmouth bass contributed only 6% as compared to 25% by spotted bass, of the total weight collected. Five of the spotted bass were in the 10 to 12 inch class. Rock bass and redbreast sunfish each comprised about 1% by numbers but rock bass made up 11% compared to 8% by redbreast sunfish of the total weight. All game fish combined made up 10% by number and about 60% by weight. Thirteen nongame and forage species were also collected and these made up about 90% of

the total number and 40% of the total weight. Of these, 11 forage species comprised 78% of the total number and about 20% of the total weight.

Three protected species were collected from site 1 on Stinking Creek. The northern form of the rosyface shiner (*Notropis rubellus rubellus*) is deemed in need of management (Starnes and Etnier 1980) because of its peripheral nature to the state and restricted Tennessee distribution to tributaries of the Cumberland River above Cumberland Falls in Campbell County. We collected 49 specimens of the rosyface subspecies from our sample. Another species recently added to the list of fish in need of management (TWRA 1991) and collected in our sample is the emerald darter (*Etheostoma baileyi*). The arrow darter (*E. sagitta*), also listed in need of management, was collected from this site. Two other darter species, the stripetail (*E. kennicotti*) and the blackside (*Percina maculata*) were also collected here. Although it is not listed, the blackside darter is uncommon to rare in Tennessee except in the Big South Fork and upper Cumberland drainage and it is apparently tolerant of considerable siltation (Etnier and Starnes in press).

At the upstream site we collected 172 fish weighing 7.62 lb. and comprising 15 species. With the exception of spotted bass and green sunfish, the same game species as collected at site 1 were found here also. Bluegill at this site were represented by a single small specimen, and comparison of inch class distribution was made for smallmouth bass, rock bass, redbreast sunfish, and longear sunfish (Fig. 46). Of the four, smallmouth bass and rock bass made up about 3% and 9% respectively by numbers, and smallmouth bass contributed only 8% as compared to 23% by rock bass, of the total weight collected. Redbreast sunfish comprised about 11% and longear sunfish 13% by numbers but redbreast sunfish made up 22% compared to only 7% by longear sunfish of the total weight. All game fish combined made up about 40% by number and 62% by weight. Ten nongame and forage species were also collected and these made up 60% of the total number and about 38% of the total weight. Of these, nine forage species comprised 58% of the total number and about 20% of the total weight.

Only two protected species, the rosyface shiner and the arrow darter, were collected at the upstream site. Only one specimen of the rosyface shiner subspecies was found here, but eleven arrow darters were collected. The emerald and blackside darter were not collected here but the stripetail darter was present. A species

collected at this site but not at site 1 was the greenside darter (*Etheostoma blennioides*). This addition makes a total of 21 species collected from both sites combined. All the species found in the 1973 collection were also present in our survey.

Stinking Creek, like most of the streams in Campbell County and the Clear Fork drainage, has suffered decades of pollution and degradation from coal mining activities. It has been impacted by both sedimentation and acid mine drainage, and pH values as low as 4.2 have been reported in the past (Appalachian Regional Commission 1969). However, the upper reach, upstream of Adams Hollow, has been one of the few relatively unpolluted streams in the county. The recent decline of coal mining in the area along with more stringent environmental controls has resulted in some recovery of the stream, although it is far from complete. Siltation appeared medium to heavy at both sites and the stream probably receives domestic sewage from house trailers along the watershed (personal communication with county wildlife officer).

Benthic macroinvertebrates from our sample at site 1 included Baetidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, Hydropsychidae, Leptoceridae, Limnephilidae, and Philopotamidae caddisflies, and Dryopidae, and Elmidae beetles. No stoneflies were collected at all. No gastropods or pelecypods were found either, and unidentified *Orconectes* juveniles were the only crayfish in the sample. Trichopterans represented about 32%, ephemeropterans 21%, odonates 18%, and dipterans and megalopterans each about 8% of the total number of organisms collected (Fig. 45). A total of 37 taxa was collected at this site.

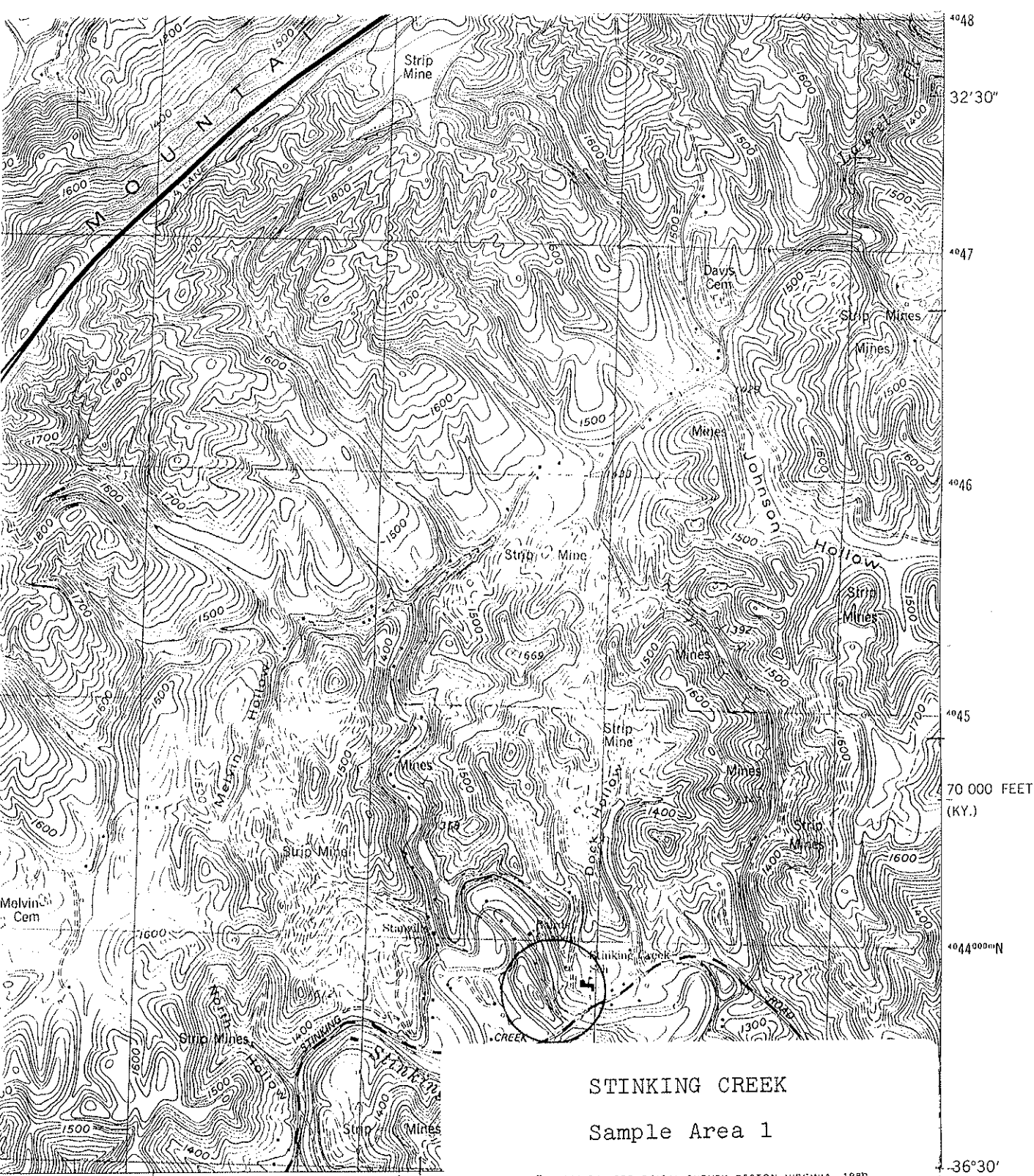
Benthic macroinvertebrates from our sample at site 2 included Baetidae, Heptageniidae, and Oligoneuriidae mayflies, perlid stoneflies, Glossosomatidae, Hydropsychidae, Leptoceridae, Limnephilidae, and Philopotamidae caddisflies, and Dryopidae, Elmidae, Hydrophilidae, and Ptilodactylidae beetles. Fingernail clams (*Sphaerium*) and planorbid and periwinkle snails (*Goniobasis*) were present. We also collected two live specimens of the spike mussel (*Elliptio dilatata*) from this site. An unidentified form II male *Cambarus* sp. was the only crayfish collected. Ephemeropterans represented about 24%, dipterans and mollusks each 16%, trichopterans 13%, and plecopterans about 2% of the total number of organisms collected (Fig. 47). A total of 48 taxa was collected at site 2.

Of special interest is the collection of two specimens of *Anchytarsus bicolor* larvae at the upstream site. Aquatic ptilodactylids are considered quite rare and their distribution is sporadic, even in streams where they are known to occur (Brigham et al. 1982). *Anchytarsus bicolor* is the only species known from eastern North America and the larvae are generally found in small, cool streams and spring brooks where they may be locally common.

As stated above, the upper reach of Stinking Creek has been relatively unpolluted. This is most evident when comparing benthic samples. Both taxa richness and numbers of organisms were reduced at the downstream site. Sensitive taxa such as plecopterans were also absent at site 1 but were represented upstream. Also, out of the nine collections we made in the Clear Fork drainage in 1990, this upper section of Stinking Creek is the only place we found any mussels at all.

#### **Management Recommendations:**

1. Due to summer water temperature exceeding the maximum of the optimum range for trout, the siltation, and the presence of a fairly diverse and well established warm water game fish population, stocking of fingerling trout is not recommended.
2. Any trout management should be directed at a 3 or 4 month put-and-take fishery in the spring, using adult fish.
3. No brown trout (*Salmo trutta*) should be stocked in Stinking Creek or in the Clear Fork drainage. Brown trout can tolerate higher temperatures and might become established. They tend to be more difficult to be caught by fisherman, grow large, and become more piscivorous. Given the number of protected fish species occurring along with an already existing diverse game fish population, Stinking Creek and the Clear Fork drainage does not need another predator.



STINKING CREEK

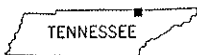
Sample Area 1

• INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1989  
756 757000mE

ROAD CLASSIFICATION

Primary highway, hard surface ..... Light-duty road, hard or improved surface .....  
 Secondary highway, hard surface ..... Unimproved road .....

○ Interstate Route    □ U. S. Route    ○ State Route



QUADRANGLE LOCATION

JELICO WEST, TENN.—KY.

SW/4 JELICO 15' QUADRANGLE  
N3630—W8407.5/7.5

1979

327

DMA 4157 II SW—SERIES V853

(U.S. FOLLETS 136-NE)  
4156 I NE

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Stinking Creek Lat-Long 363025N - 840806W  
Watershed Clear Fork Cumberland River Length of Sample 500 ft.  
Station Site # 1 Reach 05130101-19,0  
County Campbell Date/Time 2 August 1990/1000  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 24.3 ft. Average Depth 0.7 ft. Maximum Depth 1.9 ft.
2. Estimated Percent of Stream in Pools is 20 %
3. Estimated Percent Pool Bottom is Mud - % Silt 15 % Sand 10 % Clay - %  
Gravel 10 % Rubble 10 % Boulders 10 % Bedrock 45 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 10 % Rubble 40 % Boulders 20 % Bedrock 10 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average X-some *Dianthera americana* Scarce \_\_\_\_\_
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20 %  
of stream, Average in 40 %, Poor in 40 %
7. Shade or Canopy Good over 40 % of Stream.
8. Flow (CFS) 2.5 : Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy, warm, & humid; air temp. - 78°F
10. Past Weather (last 24 hours) Partly cloudy, warm, and humid.
11. pH 7.9 Temp. 70°F Conductivity 305 D.O. 8.3 % Saturation 95
12. Comments: Sample location was at secondary road bridge, just upstream of Stinking Creek School. Non-point siltation pollution is medium to heavy, and this section has been hit heavy in the past with mining. Possible domestic sewage from trailers along watershed according to county wildlife officer Jim Arnold.



## FISH FIELD DATA FORM

Site #1 - Bridge upstream  
of Stinking Cr.  
School

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Stinking Creek  
Watershed Clear Fork Cumberland R.  
County Campbell  
Type of Sampling Electrofishing  
Gear Type One backpack shocker @  
110 v. ACLat-Long 363025N - 840806W  
Date 2 August 1990  
Reach 05130101-19,0  
Pool Elevation 1180 ft.  
Time: 1330 - 1530

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	4	1	0.02			
"	"	"	4	2	0.03			
"	"	"	1	3	0.01			
"	"	"	1	9	0.31			
"	"	"	1	10	0.50			
<i>M. punctulatus</i>		219	4	1	0.01			
"	"	"	8	2	0.05			
"	"	"	1	3	0.01			
"	"	"	1	9	0.35			
"	"	"	3	10	1.64			
"	"	"	1	11	0.72			
"	"	"	1	12	0.88			
<i>Ambloplites rupestris</i>		13	1	4	0.01			
"	"	"	1	5	0.13			
"	"	"	4	6	0.80			
"	"	"	1	7	0.29			
"	"	"	1	8	0.34			
<i>Lepomis auritus</i>		201	2	4	0.13			
"	"	"	1	5	0.10			
"	"	"	2	6	0.32			
"	"	"	2	7	0.63			
<i>L. cyanellus</i>		202	1	2	0.02			
"	"	"	1	3	0.03			
"	"	"	1	4	0.06			

Continued on next page

Field Notes: 500 ft. sample length. Several game fish appeared to be going  
blind. Several crayfish but no snails.Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Jim E. Arnold

WR-0525

FISH FIELD DATA FORM

Site #1 - Bridge upstream  
of Stinking Cr.  
School

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Stinking Creek Lat-Long 363025N - 840806W  
 Watershed Clear Fork Cumberland R. Date 2 August 1990  
 County Campbell Reach 05130101-19,0  
 Type of Sampling Electrofishing Pool Elevation 1180 ft.  
 Gear Type One backpack shocker @ Time 1330 - 1530  
110 v. AC

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Lepomis macrochirus</i>		206	3	2	0.04			
"	"	"	2	3	0.06			
"	"	"	2	4	0.12			
"	"	"	1	5	0.10			
"	"	"	2	6	0.42			
<i>L. megalotis</i>		208	2	3	0.10			
"	"	"	3	4	0.22			
"	"	"	1	5	0.11			
<i>Moxostoma erythrurum</i>		230	16	1	0.03			
<i>Hypentelium nigricans</i>		166	66	1-9	2.80			
<i>Campostoma anomalum</i>		25	331	1-6	2.18			
<i>Cyprinella galactura</i>		253	8	1-4	0.09			
<i>Lythrurus ardens</i>		237	2	1-2	0.01			
<i>Notropis rubellus</i>								
	<i>rubellus</i>	261	49	1-3	0.17			
<i>Pimephales notatus</i>		334	70	1-3	0.34			
<i>Rhinichthys atratulus</i>		351	10	1-2	0.04			
<i>Semotilus atromaculatus</i>		360	8	1	0.02			
<i>Etheostoma baileyi</i>		117	8	1	0.01			
<i>E. kennicotti</i>		98	20	1-2	0.06			
<i>E. sagitta</i>		110	2	1	t			
<i>Percina maculata</i>		312	1	2	0.01			

Field Notes: 500 ft. sample length.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Jim E. Arnold

WR-0525

GAME FISH FROM STINKING CREEK  
 SITE 1  
 INCH CLASS DISTRIBUTION

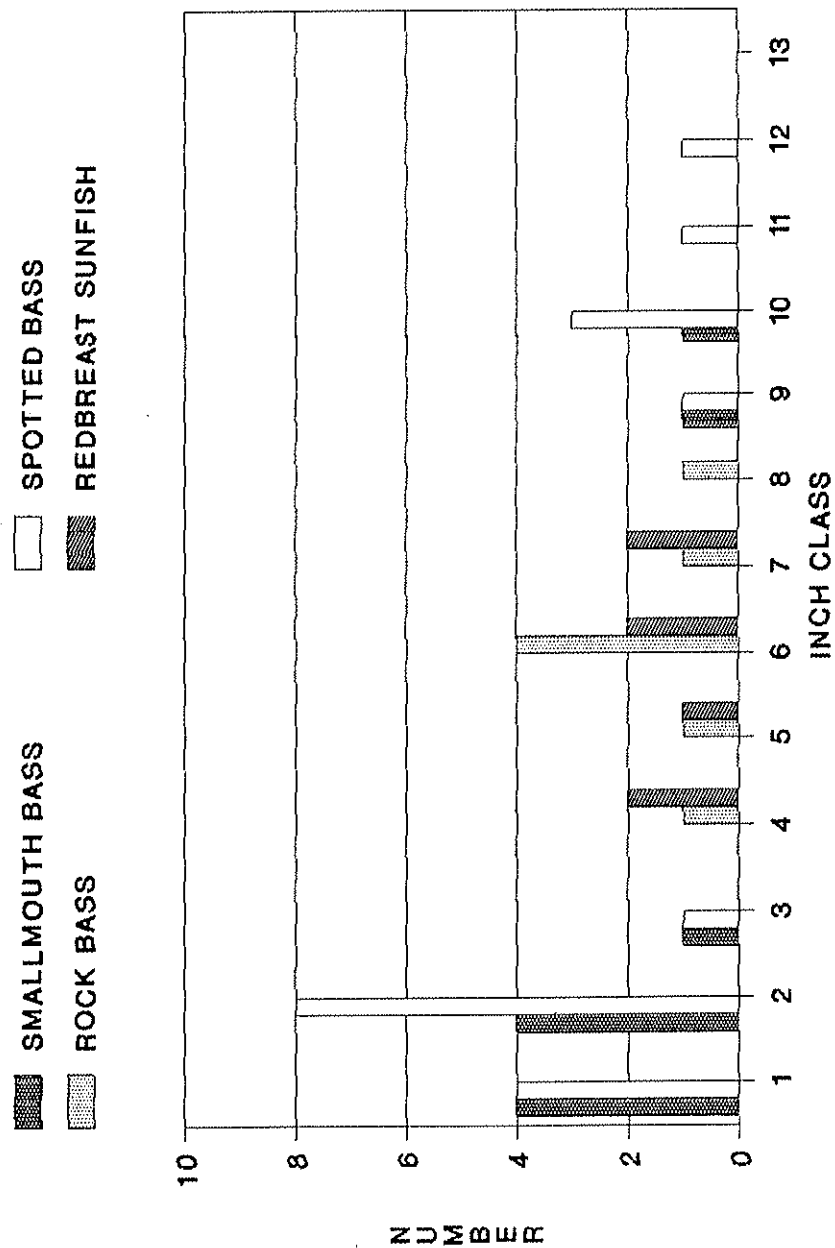


Figure 44.

Stinking Creek: Site # 1, Qualitative Benthic Sample

2 August 1990

Field # 230

Campbell Co., TN; At the bridge on the secondary road, just upstream of Stinking Cr. School. Coordinates: 363025N - 840806W. Jellico West, Tenn.-KY., # 4157 II SW Quad. Reach # 05130101-19,0.

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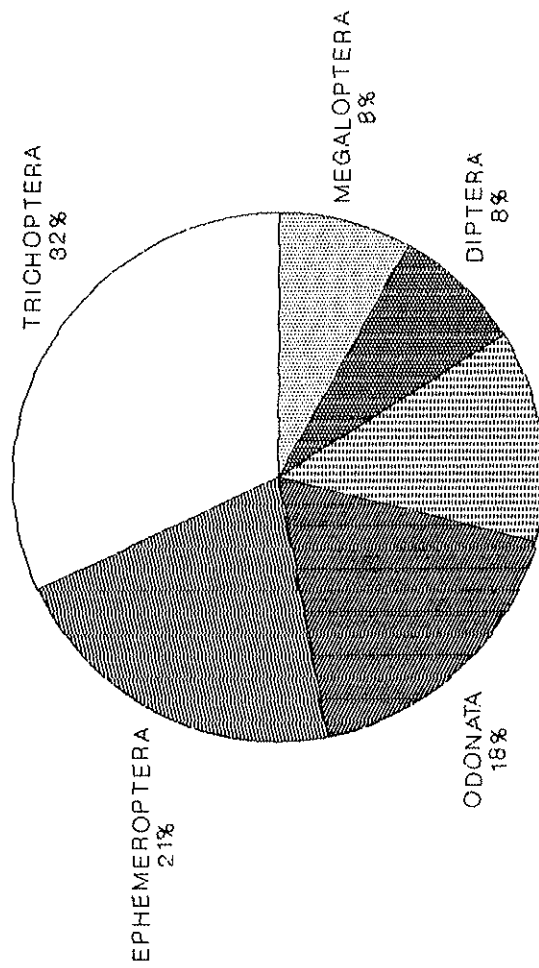
TAXA	NUMBER
ANNELIDA:	
Oligochaeta	5
COLEOPTERA:	
Dryopidae/ <u>Helichus</u>	3
Elmidae/ <u>Optioservus</u> larvae	1
DECAPODA:	
Cambaridae/ <u>Orconectes</u> juvenile females	3
DIPTERA:	
Athericidae/ <u>Atherix lantha</u>	4
Chironomidae	9
Simuliidae	1
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	2
<u>Pseudocloeon</u>	5
Ephemeridae/ <u>Hexagenia</u>	1
Heptageniidae/ <u>Epeorus</u>	2
<u>Stenonema</u>	7
<u>Stenonema mediopunctatum</u>	1
<u>S. vicarium</u>	11
Oligoneuriidae/ <u>Isonychia</u>	7
HEMIPTERA:	
Gelastocoridae/ <u>Gelastocoris oculatus oculatus</u> nymph	1
Gerridae/ <u>Gerris</u> nymph	1
<u>Gerris conformis</u>	2
<u>Metrobates hesperius</u>	3
Veliidae/ <u>Rhagovelia obesa</u> adult male	1
MEGALOPTERA:	
Corydalidae/ <u>Corydalus cornutus</u>	7
Sialidae/ <u>Sialis</u>	7

Stinking Creek: Site # 1, Qualitative Benthic Sample cont.

TAXA	NUMBER
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	3
Cordulegasteridae/ <u>Cordulegaster</u> early instar	1
<u>Cordulegaster maculata</u>	1
Corduliidae/ <u>Helocordulia uhleri</u>	2
Gomphidae/ <u>Gomphus</u> early instars	
<u>Gomphus</u> (Genus A) <u>rogersi</u> *	1
<u>G.</u> ( <u>Stylurus</u> ) <u>spiniceps</u>	1
<u>Lanthus</u> (probably <u>vernalis</u> )	1
<u>Progomphus obscurus</u>	1
<u>Stylogomphus albistylus</u>	4
Macromiidae/ <u>Macromia</u> early instars	8
<u>Macromia alleghaniensis</u>	1
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	1
<u>Hydropsyche betteni/depravata</u>	10
<u>H. dicantha</u>	6
<u>Symphitopsyche bronta</u>	3
<u>S. sparna</u>	11
Leptoceridae/ <u>Oecetis</u>	1
Limnephilidae/ <u>Pycnopsyche</u>	1
Philopotamidae/ <u>Chimarra</u>	21
	168

\* (from Louton 1982)

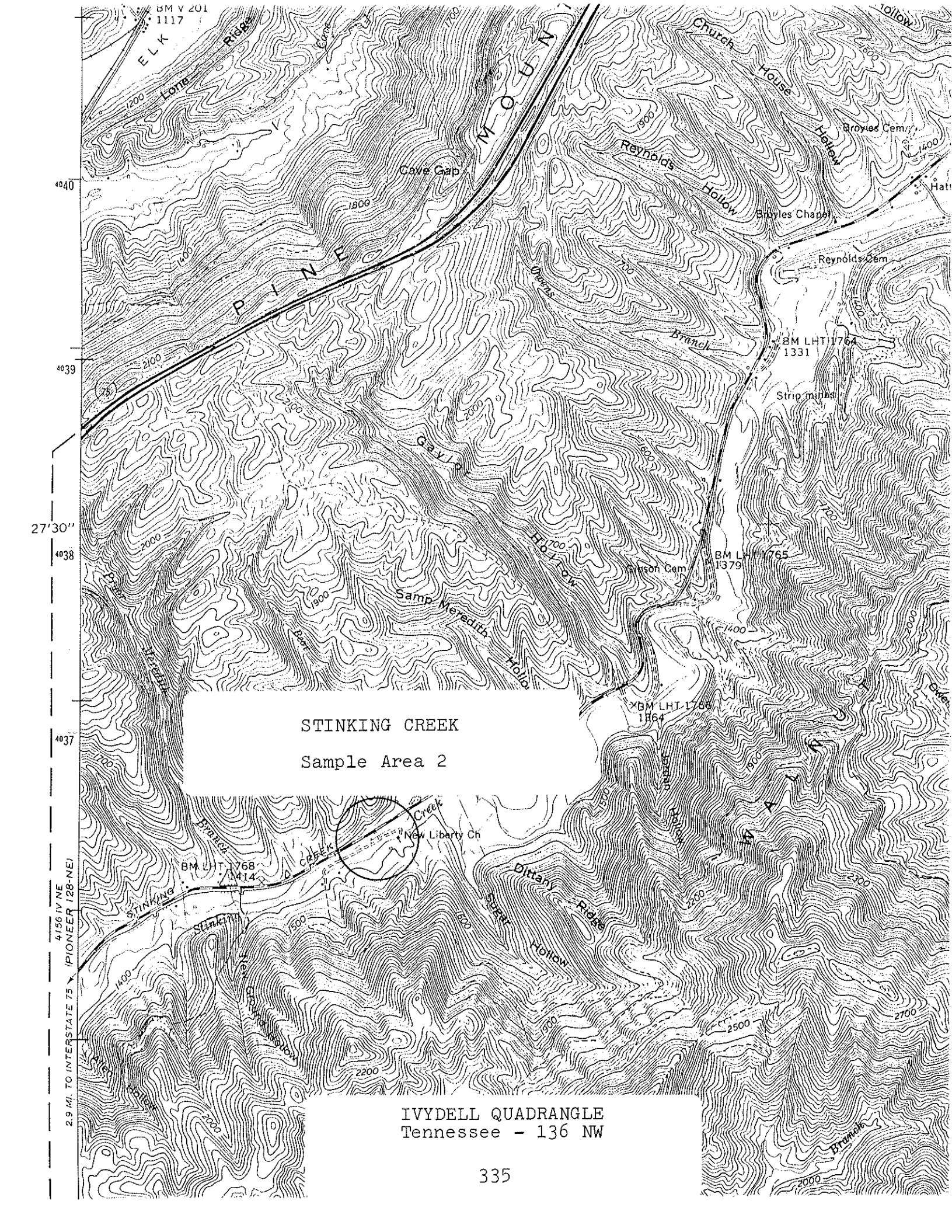
STINKING CREEK  
SITE 1  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 168  
TAXA RICHNESS = 37

Figure 45.



BM V 201  
1117

ELK  
Long  
Ridge  
Cave

M O H W

Church  
House  
Hollow  
Broyles Cem  
Broyles Chapel

4040

Cave Gap

Reynolds  
Hollow

4039

P I N E

Reynolds Cem

27'30"

4038

Gaults

Branch

BM LHT 1764  
1331

Strip mine

4037

STINKING CREEK  
Sample Area 2

Iron Cem

BM LHT 1765  
1379

XBM LHT 1766  
1864

4156 IV NE  
2.9 MI. TO INTERSTATE 75 (PIONEER 128-NE)

BM LHT 1768  
1414

New Liberty Ch

Dittany  
Ridge  
Hollow

IVYDELL QUADRANGLE  
Tennessee - 136 NW

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Stinking Creek Lat-Long 362635N - 841356W  
Watershed Clear Fork Cumberland River Length of Sample 300 ft.  
Station Site # 2 Reach 05130101-19.0  
County Campbell Date/Time 3 August 1990/0930  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 25.3 ft. Average Depth 0.5 ft. Maximum Depth 1.5 ft.
2. Estimated Percent of Stream in Pools is 20 %
3. Estimated Percent Pool Bottom is Mud - % Silt 15 % Sand 10 % Clay - %  
Gravel 5 % Rubble 5 % Boulders 10 % Bedrock 55 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 20 % Rubble 40 % Boulders 20 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average \_\_\_\_\_ Scarce X
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20 %  
of stream, Average in 40 %, Poor in 40 %
7. Shade or Canopy Good over 80 % of Stream.
8. Flow (CFS) 0.9: Compared to Normal; Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy, warm, & humid; air temp. - 70°F
10. Past Weather (last 24 hours) Partly cloudy, warm, and humid.
11. pH 7.4 Temp. 67.6°F Conductivity 95 D.O. 8.1 % Saturation 86
12. Comments: Sample location was upstream of wooden bridge at New Liberty Church. Siltation was medium to heavy. Iron oxide observed in places along the stream bank. Water temperature rose from 68°F at 0930 to 76°F at 1615.



FISH FIELD DATA FORM

Site #2 - Wooden Bridge  
at New Liberty  
Church

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Stinking Creek Lat-Long 362635N - 841356W  
 Watershed Clear Fork Cumberland R. Date 3 August 1990  
 County Campbell Reach 05130101-19,0  
 Type of Sampling Electrofishing Pool Elevation 1375 ft.  
 Gear Type One backpack shocker @ Time 1330 - 1430  
110 v. AC

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	2	1	t			
"	"	"	1	2	t			
"	"	"	1	8	0.24			
"	"	"	1	9	0.42			
<i>Ambloplites rupestris</i>		13	2	2	0.04			
"	"	"	2	3	0.04			
"	"	"	3	4	0.19			
"	"	"	5	5	0.60			
"	"	"	3	6	0.61			
"	"	"	1	7	0.28			
<i>Lepomis auritus</i>		201	1	2	0.01			
"	"	"	4	3	0.10			
"	"	"	5	4	0.27			
"	"	"	6	5	0.56			
"	"	"	1	6	0.17			
"	"	"	2	7	0.60			
<i>L. macrochirus</i>		206	1	4	0.05			
<i>L. megalotis</i>		208	2	1	0.02			
"	"	"	11	2	0.14			
"	"	"	4	3	0.08			
"	"	"	5	4	0.33			
<i>Hypentelium nigricans</i>		166	9	2-10	1.35			
Continued on next page								

Field Notes: 300 ft. sample length. Several game fish appeared to be going blind. Crayfish and snails abundant.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Jim E. Arnold

WR-0525



GAME FISH FROM STINKING CREEK  
 SITE 2  
 INCH CLASS DISTRIBUTION

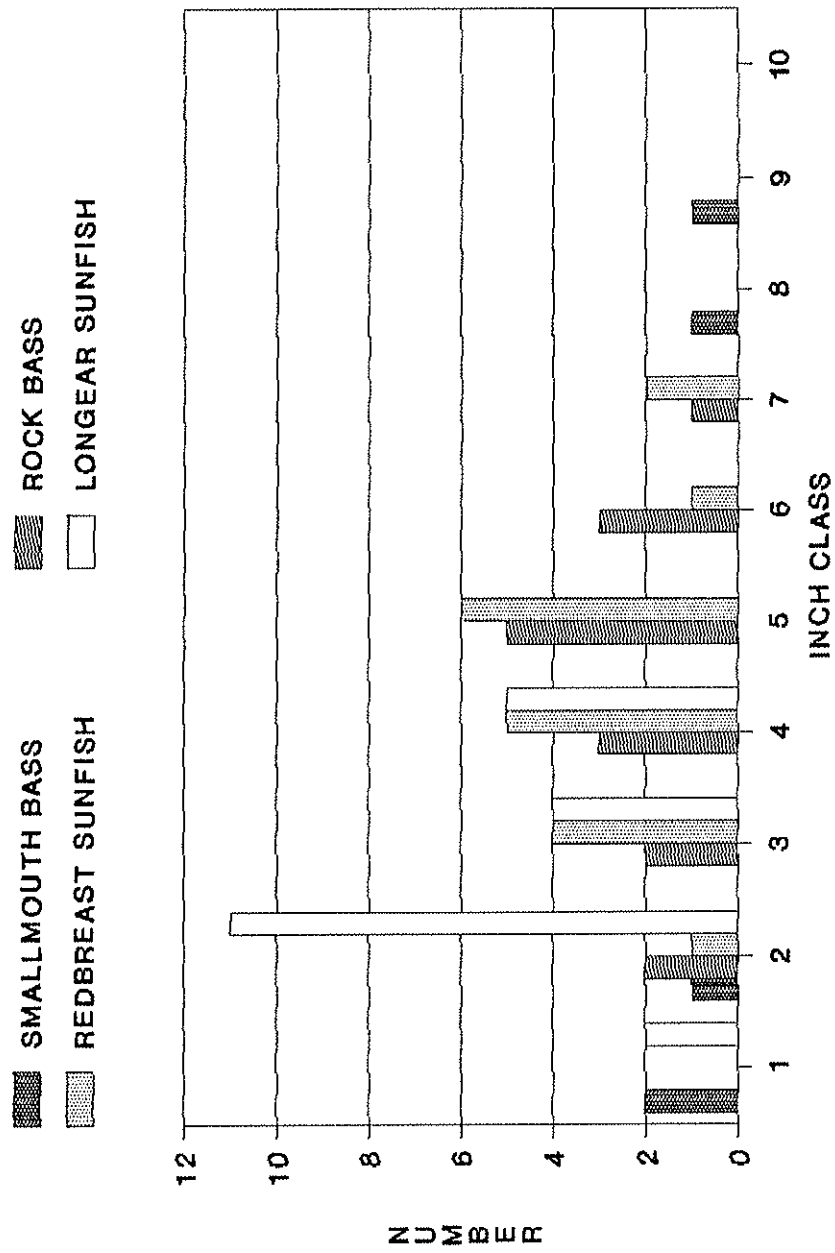


Figure 46.

Stinking Creek: Site # 2, Qualitative Benthic Sample

3 August 1990

Field # 231

Campbell Co., TN; Upstream of the wooden bridge on New  
Liberty Church Rd. Coordinates: 362635N - 841356W.  
Ivydell, Tenn., # 136 NW Quad. Reach # 05130101-19,0.

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TAXA	NUMBER
ANNELIDA:	
Oligochaeta	1
COLEOPTERA:	
Dryopidae/ <u>Helichus</u> adult	1
Elmidae/ <u>Optioservus</u> larvae	17
<u>Optioservus ovalis</u> adults	12
<u>Oulimnius latiusculus</u> adult	1
Hydrophilidae/ <u>Cymbiodyta rotunda</u>	2
<u>Laccobius</u>	1
Ptilodactylidae/ <u>Anchytarsus bicolor</u> larvae	2
DECAPODA:	
Cambaridae/ <u>Cambarus</u> male 2nd.	1
DIPTERA:	
Athericidae/ <u>Atherix lantha</u>	34
Chironomidae	12
Simuliidae	1
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	2
<u>Pseudocloeon</u>	1
Heptageniidae/ <u>Epeorus rubidus/subpallidus</u>	3
<u>Stenonema</u>	31
<u>Stenonema vicarium</u>	3
Oligoneuriidae/ <u>Isonychia</u>	33
GASTROPODA:	
Planorbidae	7
Pleuroceridae/ <u>Goniobasis</u>	19
HEMIPTERA:	
Gerridae/ <u>Gerris</u> nymphs	3
<u>Gerris conformis</u>	3
<u>Metrobates hesperius</u>	4
<u>Trepobates pictus</u>	1
Notonectidae/ <u>Notonecta irrorata</u> adult	2
Veliidae/ <u>Microvelia</u> adult	1
<u>Rhagovelia obesa</u> nymph	1
<u>Rhagovelia obesa</u> adults	6

Stinking Creek: Site # 2, Qualitative Benthic Sample cont.

TAXA	NUMBER
MEGALOPTERA:	
Corydalidae/ <u>Corydalus cornutus</u>	3
<u>Nigronia fasciatus</u>	1
<u>N. serricornis</u>	3
Sialidae/ <u>Sialis</u>	2
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	3
Cordulegasteridae/ <u>Cordulegaster maculata</u>	1
Corduliidae/ <u>Helocordulia uhleri</u>	1
Gomphidae/ <u>Gomphus lividus</u>	7
<u>Gomphus (Genus A) rogersi</u> *	1
<u>Hagenius brevistylus</u>	3
<u>Lanthus vernalis</u>	1
<u>Progomphus obscurus</u>	12
Macromiidae/ <u>Macromia</u>	4
PELECYPODA:	
Sphaeriidae/ <u>Sphaerium</u>	19
Unionidae/ <u>Elliptio dilatata</u>	2
PLECOPTERA:	
Perlidae/ <u>Acroneuria abnormis</u>	7
<u>A. carolinensis</u>	1
TRICHOPTERA:	
Glossosomatidae/ <u>Glossosoma</u>	6
Hydropsychidae/ <u>Cheumatopsyche</u>	5
<u>Hydropsyche dicantha</u>	1
<u>Symphitopsyche sparna</u>	22
Leptoceridae/ <u>Oecetis</u>	1
Limnephilidae/ <u>Goera calcarata</u> larva	1
<u>Coera calcarata</u> pupa	1
Philopotamidae/ <u>Chimarra</u>	1

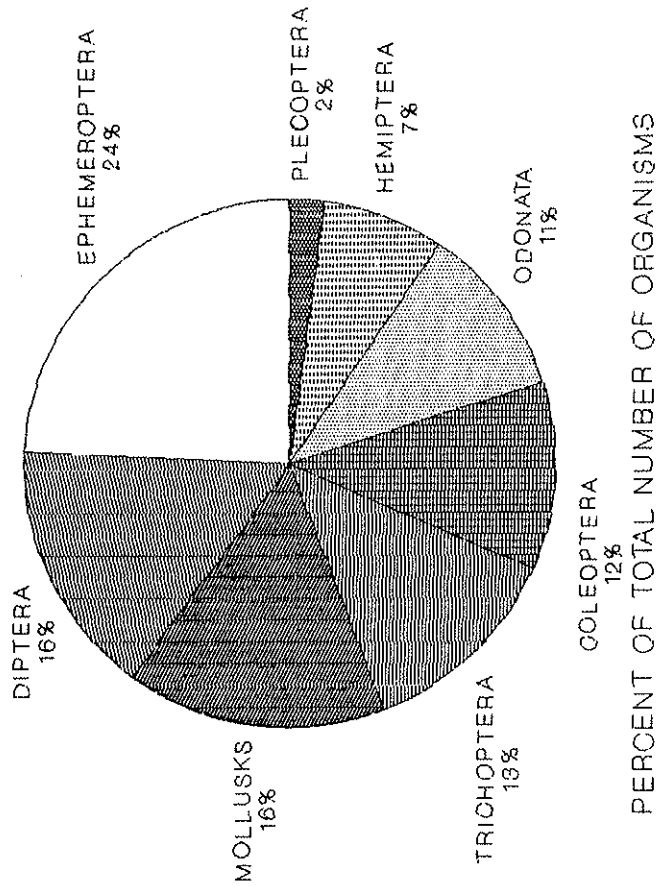
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314

\* (from Louton 1982)

Unionidae relics of Alasmidonta viridis and Strophitus undulatus were collected at this site.

STINKING CREEK  
SITE 2  
BENTHIC MACROINVERTEBRATES



n = 314  
TAXA RICHNESS = 48

Figure 47.

## Laurel Fork

One qualitative fishery survey was conducted in August 1990:

**Location and Length** - Tributary to the Clear Fork River.

The sample area was located just downstream of the first bridge crossing that is approximately 1.0 mi. upstream of the mouth and was sampled on 1 August 1990. It was 500 ft. in length and averaged 26.2 ft. in width. The site was in Campbell County. Jellico East Quadrangle.

**Gear Type** - The site was sampled using one backpack electrofishing unit operating at 110 v. AC.

**Water Quality** - Data were taken from midstream on 1 August 1990: DO - 8.7 ppm, pH - 8.3, Temperature 72.1 F, Conductivity - 485 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey at the site. The sample contained 234 organisms and represented 47 taxa.

**Fish Collected:**

<u>Species</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Smallmouth bass	15	5.5	0.35	3.7
Spotted bass	3	1.1	0.01	0.1
Rock bass	8	2.9	0.70	7.4
Green sunfish	1	0.4	0.04	0.4
Bluegill	2	0.7	0.16	1.7
Longear sunfish	4	1.5	0.31	3.3
Nongame Fish	20	7.3	5.50	58.1
Forage Fish	222	80.7	2.39	25.3
TOTAL	275		9.46	

**Comments** - This stream was surveyed primarily to address the Agency's almost total lack of fish or benthic macroinvertebrate data from Campbell County streams. It was also done at the request of Campbell County Wildlife Officer Jim Arnold, who is interested in the possibility of managing the stream for trout. To our knowledge, TWRA has made no previous studies or fish collections from Laurel Fork.

We collected a total of 275 fish weighing 9.46 lb. and comprising 20 species from our sample site. Six native game species, smallmouth bass (*Micropterus dolomieu*), spotted bass (*M. punctulatus*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), bluegill (*L. macrochirus*), and longear sunfish (*L. megalotis*) were collected. Green sunfish were represented by a single specimen only and spotted bass, bluegill, and longear sunfish were found in either low numbers or small size. Comparison of inch class distribution was made for smallmouth bass and rock bass only (Fig. 48). Smallmouth bass made up about 5% by number but 4% by weight while rock bass comprised only 3% by number but 7% by weight of all fish collected. All game fish combined made up 12% by number and about 17% by weight. Fourteen nongame and forage species were also collected and these made up about 88% of the total number and 83% of the total weight. Of these, 11 forage species comprised 81% of the total number, but nongame fish accounted for 58% of the total weight. Two channel catfish (*Ictalurus punctatus*) were also collected and they made up about 30% of the total weight collected.

Two protected species were collected from our Laurel Fork sample. The northern form of the rosyface shiner (*Notropis rubellus rubellus*) is deemed in need of management (Starnes and Etnier 1980) because of its peripheral nature to the state and restricted Tennessee distribution to tributaries of the Cumberland River above Cumberland Falls in Campbell County. We collected 61 specimens of the rosyface subspecies from our sample. Another species recently added to the list of fish in need of management (TWRA 1991) and collected in our sample is the emerald darter (*Etheostoma baileyi*). The arrow darter (*E. sagitta*), also listed in need of management, was expected from this stream. One specimen was probably observed but we failed to capture it. Three other darter species, the greenside (*E. blennioides*), stripetail (*E. kennicotti*), and the logperch (*Percina caprodes*) were collected.

Laurel Fork is generally shallow and wide and pool habitat in the area we sampled was mostly silty bedrock areas without much cover for fish. Overall, the stream is fairly silty, possibly from logging activities upstream in Kentucky. Several of the fish collected had black grub, leeches, anchor parasites, and other abnormalities that may indicate a stressed environment.



Benthic macroinvertebrates from our sample included Baetidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, Leuctridae and Perlidae stoneflies, Leptoceridae, Limnephilidae, Hydropsychidae, and Philopotamidae caddisflies, and Dryopidae, Elmidae, Gyrinidae, and Psephenidae beetles. Limpets (*Ferrissia*) along with *Physa*, planorbid, and periwinkle snails (*Goniobasis*) were present. Unidentified *Orconectes* juveniles were the only crayfish in our sample. Trichopterans represented about 19%, ephemeropterans 15%, coleopterans and gastropods each 14%, and plecopterans about 5% of the total number of organisms collected (Fig. 49). A total of 47 taxa was collected at this site.

#### **Management Recommendations:**

1. Due to summer water temperatures exceeding the maximum of the optimum range for trout, siltation, and the presence of a fairly diverse and well established warm water game fish population, stocking of fingerling trout is not recommended.
2. Any trout management should be directed at a 3 or 4 month put-and-take fishery in the spring using adult fish.
3. No brown trout (*Salmo trutta*) should be stocked in Laurel Fork or in the Clear Fork drainage. Brown trout can tolerate higher temperatures and might become established. They tend to be more difficult to be caught by fishermen, grow large, and become more piscivorous. Given the number of protected fish species occurring along with an already existing diverse game fish population, Laurel Fork and the Clear Fork drainage does not need another predator.

JELLICO EAST QUADRANGLE  
Tenn.-KY. - 4157 II SE

346

90  
EAGAN 7 MI.

4049

4050

(EAGAN)  
4257 III SW

4051

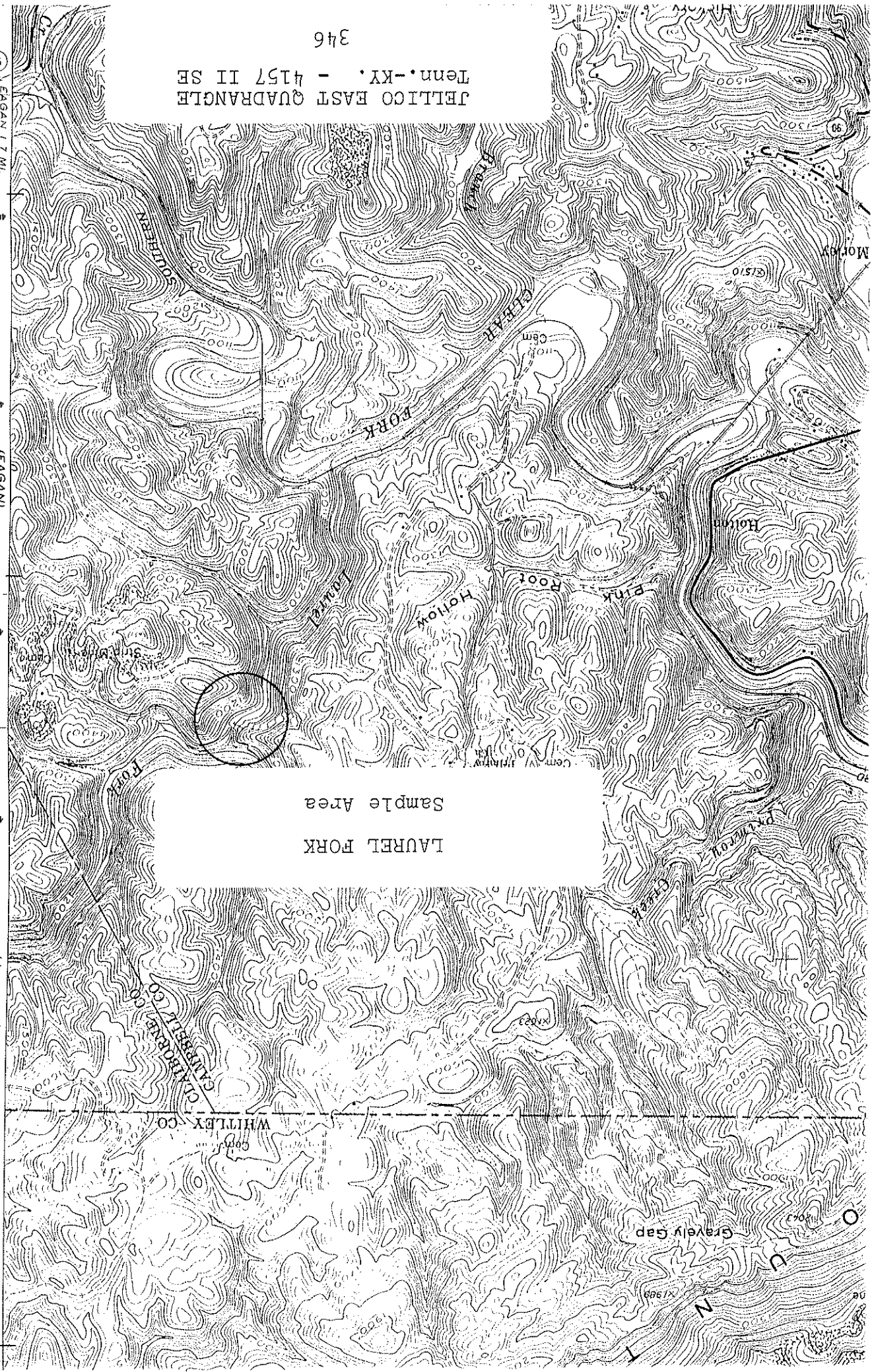
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35

4053

4054

(TENN.)



LAUREL FORK  
Sample Area

WHITLEY CO.

CLARKSBURG CO.

Gravelly Gap

SOUTHERN

LAUREL FORK

HOLLOX

Pink Root

Gravelly Gap

N

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Laurel Fork Lat-Long 363422N - 840047W  
Watershed Clear Fork River Length of Sample 500 ft.  
Station (see below) Reach 05130101-106,0  
County Campbell Date/Time 1 August 1990/1130  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 26.2 ft., Average Depth 0.8 ft., Maximum Depth 4.9 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud - % Silt 15 % Sand 10 % Clay - %  
Gravel 10 % Rubble 10 % Boulders 20 % Bedrock 35 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 10 % Clay - %  
Gravel 10 % Rubble 30 % Boulders 30 % Bedrock 10 % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average X (*Dianthera americana*) Scarce
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25 %  
of stream, Average in 50 %, Poor in 25 %
7. Shade or Canopy Good over 75 % of Stream.
8. Flow (CFS) 8.4 : Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Clear and warm; air temp. - 72°F.
10. Past Weather (last 24 hours) Partly cloudy, hot, and humid.
11. pH 8.3 Temp. 72.1°F Conductivity 485 D.O. 8.7 % Saturation 100
12. Comments: Sample area location was just downstream of the first  
bridge crossing that is approx. 1.0 mi. upstream of the mouth.  
Stream is fairly silty, most probably from logging activities  
upstream. Pool habitat in the sample area was mostly silty bed-  
rock areas without much cover for fish.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Laurel Fork Lat-Long 363422N - 840047W  
 Watershed Clear Fork River Date 1 August 1990  
 County Campbell Reach 05130101-106,0  
 Type of Sampling Electrofishing Pool Elevation 1070 ft.  
 Gear Type 1 backpack @ 110 v. AC Time 1500-1630

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	8	1	0.02			
"	"	"	1	2	t			
"	"	"	2	3	0.04			
"	"	"	3	4	0.09			
"	"	"	1	7	0.20			
<i>M. punctulatus</i>		219	3	1	0.01			
<i>Ambloplites rupestris</i>		13	1	1	t			
"	"	"	1	2	0.01			
"	"	"	1	4	0.05			
"	"	"	3	5	0.33			
"	"	"	2	6	0.31			
<i>Lepomis cyanellus</i>		202	1	3	0.04			
<i>L. macrochirus</i>		206	1	3	0.03			
"	"	"	1	5	0.13			
<i>L. megalotis</i>		208	2	3	0.09			
"	"	"	1	4	0.09			
"	"	"	1	5	0.13			
<i>Ictalurus punctatus</i>		176	2	14-18	2.88			
<i>Moxostoma erythrurum</i>		230	1	1	t			
<i>Hypentelium nigricans</i>		166	17	1-12	2.62			
<i>Campostoma anomalum</i>		25	41	1-6	1.25			
<i>Cyprinella galactura</i>		253	77	1-3	0.46			
Continued on next page.								

Field Notes: 500 ft. sample area. Several fish with black grub, leeches, anchor parasites, and other abnormalities. Crayfish & snails abundant.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, & Jim E. Arnold

WR-0525



GAME FISH FROM LAUREL FORK  
INCH CLASS DISTRIBUTION

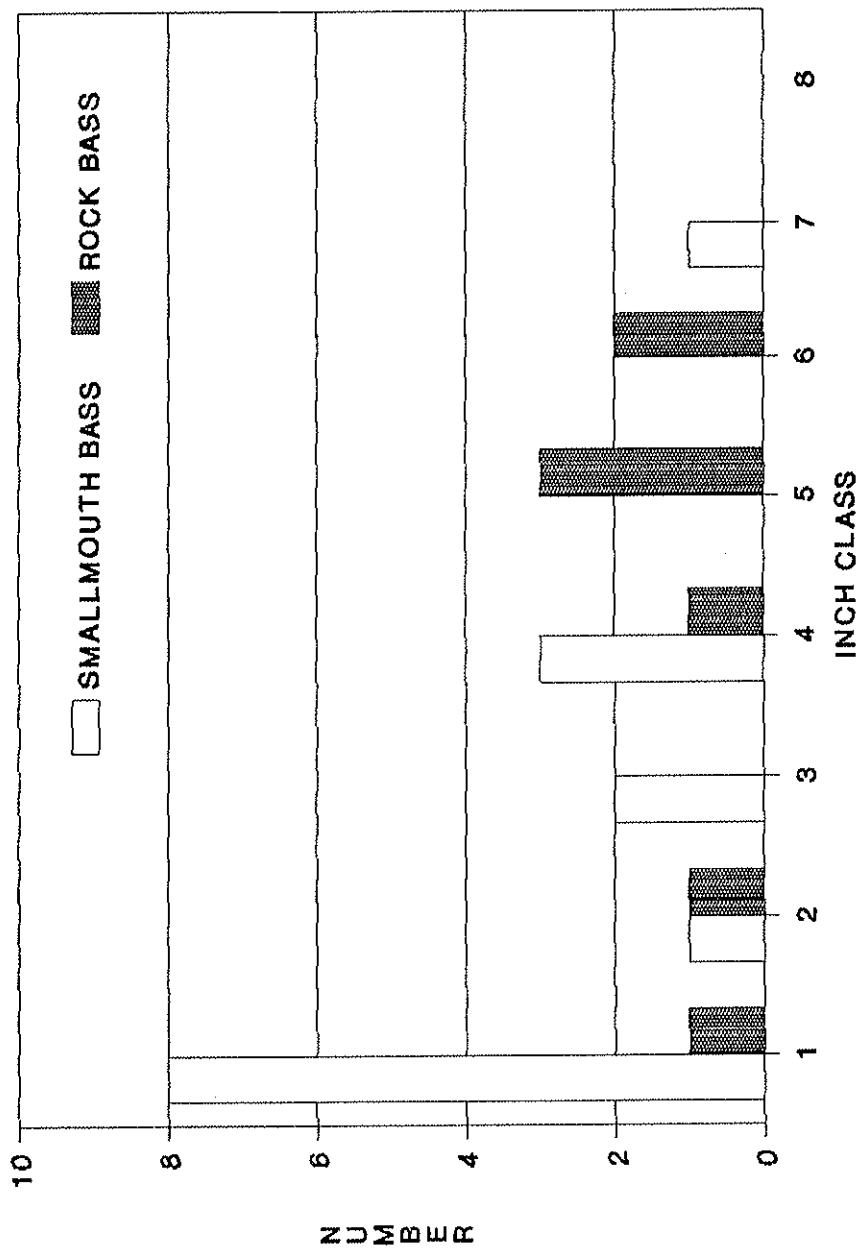


Figure 48.

Laurel Fork: Qualitative Benthic Sample

1 August 1990

Field # 229

Campbell Co., TN; Just downstream of the 1st. bridge crossing that is approx. 1.0 mi. upstream of the mouth. Coordinates: 333422N - 840047W. Jellico East, Tenn.-Ky., # 4157 II SE Quad. Reach # 05130101-106,0.

TAXA	NUMBER
COLEOPTERA:	
Dryopidae/ <u>Helichus</u>	9
Elmidae/ <u>Dubiraphia vittata</u>	5
<u>Macronychus glabratus</u>	5
<u>Optioservus larva</u>	1
<u>Optioservus trivittatus</u>	2
Gyrinidae/ <u>Dineutus assimilis</u> males	4
<u>Dineutus assimilis</u> female	1
Psephenidae/ <u>Psephenus herricki</u> larvae	4
<u>Psephenus herricki</u> adults	6
DECAPODA:	
Cambaridae/ <u>Orconectes</u> juveniles	5
DIPTERA:	
Athericidae/ <u>Atherix lantha</u>	20
Chironomidae larvae	2
Chironomidae pupa	1
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	7
Ephemeridae/ <u>Ephemera varia</u>	1
<u>Hexagenia atrocaudata</u>	2
Heptageniidae/ <u>Stenacron</u>	1
<u>Stenonema</u>	1
<u>Stenonema mediopunctatum</u>	10
<u>S. pulchellum</u>	1
<u>S. vicarium</u>	10
Oligoneuriidae/ <u>Isonychia</u>	3
GASTROPODA:	
Ancylidae/ <u>Ferrissia</u>	1
Physidae/ <u>Physa</u>	3
Planorbidae	4
Pleuroceridae/ <u>Goniobasis</u>	24

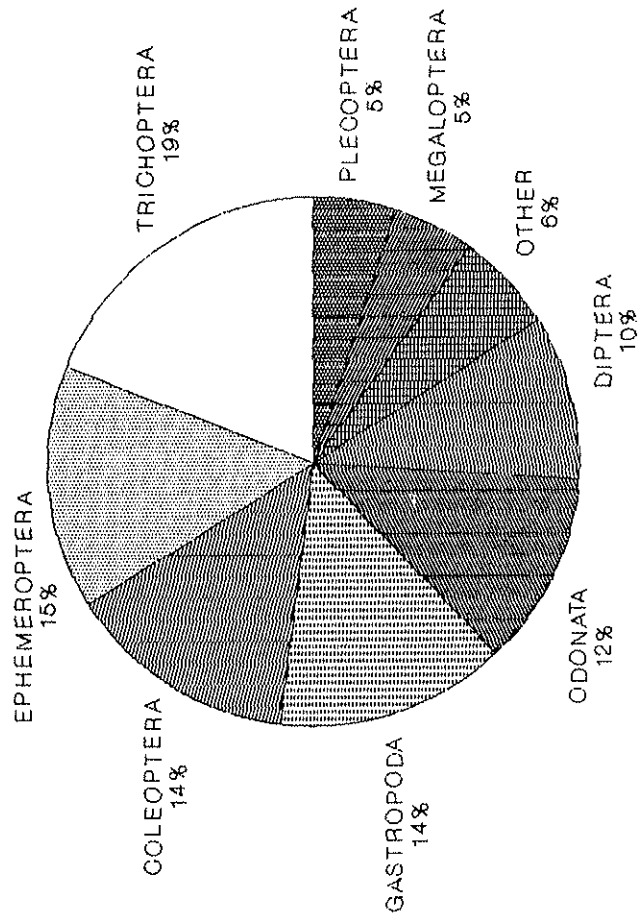
Laurel Fork: Qualitative Benthic Sample cont.

TAXA	NUMBER
HEMIPTERA:	
Gerridae/ <u>Gerris</u> nymphs	4
<u>Gerris conformis</u> adult females	2
Veliidae/ <u>Rhagovelia</u> <u>obesa</u> nymph	1
<u>Rhagovelia</u> <u>obesa</u> adult females	2
ISOPODA:	
Asellidae/ <u>Lirceus</u>	1
MEGALOPTERA:	
Corydalidae/ <u>Corydalus</u> <u>cornutus</u>	5
<u>Nigronia</u> <u>fasciatus</u>	1
<u>N. serricornis</u>	6
ODONATA:	
Aeshnidae/ <u>Basiaeshna</u> <u>janata</u>	3
<u>Boyeria</u> <u>vinosa</u>	4
Calopterygidae/ <u>Hetaerina</u> <u>americana</u>	4
Coenagrionidae/ <u>Argia</u>	1
Cordulegastridae/ <u>Cordulegaster</u> <u>maculata</u>	3
Gomphidae/ <u>Gomphus</u> <u>lividus</u>	3
<u>Hagenius</u> <u>brevistylus</u>	1
<u>Progomphus</u> <u>obscurus</u>	2
<u>Stylogomphus</u> <u>albistylus</u>	2
Macromiidae/ <u>Macromia</u>	4
<u>Macromia</u> <u>illinoiensis</u>	1
PLECOPTERA:	
Leuctridae/ <u>Leuctra</u>	1
Perlidae/ <u>Acroneuria</u> <u>abnormis</u>	10
TRICHOPTERA:	
Leptoceridae/ <u>Mystacides</u>	1
Limnephilidae/ <u>Pycnopsyche</u>	2
Hydropsychidae/ <u>Cheumatopsyche</u>	8
<u>Hydropsyche</u> <u>betteni</u> / <u>depravata</u>	1
<u>H. dicantha</u>	15
<u>Symphitopsyche</u> <u>chielonis</u>	3
<u>S. sparna</u>	10
Philopotamidae/ <u>Chimarra</u>	4

234



LAUREL FORK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

$n = 234$   
TAXA RICHNESS = 47

Figure 49.

## Tackett Creek

One qualitative fishery survey was conducted in October 1990:

**Location and Length** - Tributary to the Clear Fork Cumberland River. The sample area was located approximately 0.6 mi. by road upstream of Hwy. 90 at an old ford site and was sampled on 26 October 1990. It was 400 ft. in length and averaged 32.2 ft. in width. The site was in Campbell County. Jellico East Quadrangle.

**Gear Type** - The area was sampled using two backpack electro-fishing units operating at 120 v. AC.

**Water Quality** - Data were taken from midstream on 26 October 1990: DO - 11.4 ppm, pH - 8.0, Temperature - 46.8 F, Conductivity - 180 micromhos/cm.

**Benthos Collection** - Benthic organisms were collected by conducting a 90 minute qualitative survey. The sample contained 428 organisms and represented 47 taxa.

### Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by</u>		<u>% by</u>	
		<u>No.</u>	<u>Wt.</u>	<u>Wt.</u>	<u>Wt.</u>
Smallmouth bass	18	3.9	0.37	2.6	
Spotted bass	2	0.4	0.02	0.1	
Rock bass	13	2.8	2.22	15.4	
Green sunfish	3	0.7	0.12	0.8	
Bluegill	5	1.1	0.36	2.5	
Longear sunfish	5	1.1	0.26	1.8	
Nongame Fish	49	10.7	7.98	55.3	
Forage Fish	361	79.1	3.11	21.5	
TOTAL	456		14.44		

**Comments** - This stream was surveyed primarily to address the Agency's almost total lack of fish and benthic macroinvertebrate data from Campbell County streams. A 1976 TWRA stream survey of a headwater portion of Tackett Creek in Claiborne County is the only Agency data on file (TWRA file data). It was also done at the request of Campbell County Wildlife Officer Jim Arnold, who is interested in the possibility of managing the stream for trout.

We collected a total of 456 fish weighing 14.44 lb. and comprising 20 species from our sample site. Six native game species, smallmouth bass (*Micropterus dolomieu*), spotted bass (*M. punctulatus*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), bluegill (*L. macrochirus*), and longear sunfish (*L. megalotis*) were collected. Spotted bass, green sunfish, bluegill, and longear sunfish were found in either low numbers or small size so comparison of inch class distribution was made for smallmouth bass and rock bass only (Fig. 50). Smallmouth bass made up about 4% by number and 2% by weight while rock bass comprised about 3% by number but 15% by weight of all fish collected. All game fish combined made up 10% by number and about 23% by weight. Fourteen nongame and forage species were also collected and these made up about 90% of the total number and 77% of the total weight. Of these, 11 forage species comprised 79% of the total number, but nongame fish accounted for 55% of the total weight.

Three protected species were collected from our Tackett Creek sample. The northern form of the rosyface shiner (*Notropis rubellus rubellus*) is deemed in need of management (Starnes and Etnier 1980) because of its peripheral nature to the state and restricted Tennessee distribution to tributaries of the Cumberland River above Cumberland Falls in Campbell County. We collected 27 specimens of the rosyface subspecies from our sample. Another species recently added to the list of fish in need of management (TWRA 1991) and collected in our sample is the emerald darter (*Etheostoma baileyi*). The arrow darter (*E. sagitta*), also listed in need of management, was collected from this stream. It was represented by a single specimen only. Three other darter species, the rainbow (*E. caeruleum*), stripetail (*E. kennicotti*), and the logperch (*Percina caprodes*) were also present.

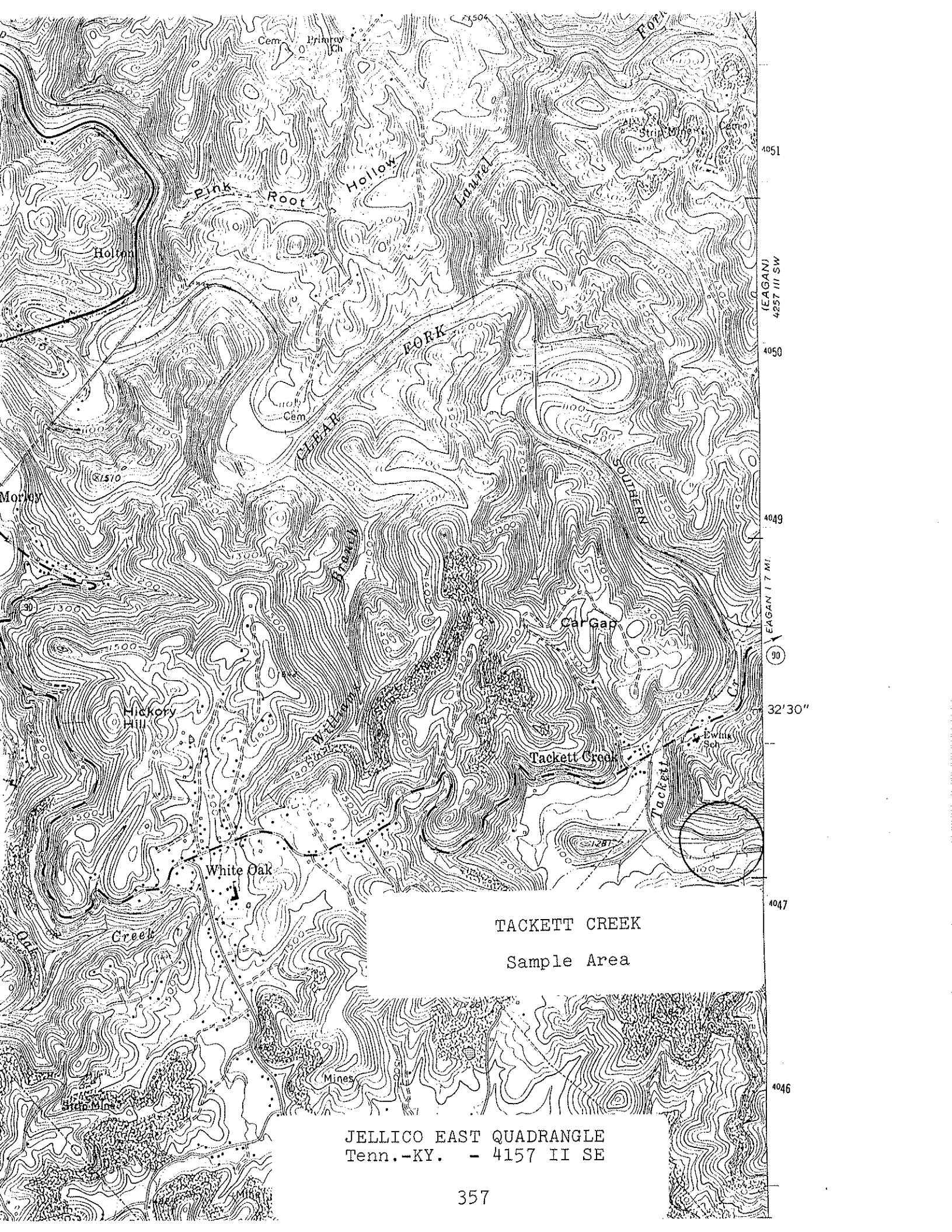
Tackett Creek, like most of the streams in Campbell County and the Clear Fork drainage, has suffered decades of pollution and degradation from coal mining activities. The recent decline of coal mining in the area along with more stringent environmental controls has resulted in some recovery of the stream, although it is far from complete. Siltation is apparent but not extremely heavy and cover and habitat for fish looks good.

Benthic macroinvertebrates from our sample included Baetidae, Baetiscidae, Ephemeridae, Heptageniidae, Leptophebiidae, and Oligoneuriidae mayflies, perlid stoneflies, Hydropsychidae, Leptoceridae,

Philopotamidae, and Polycentropodidae caddisflies, and Dryopidae, Elmidae, and Psephenidae beetles. *Physa*, planorbid, and *Pleurocera* snails were present. Unidentified *Orconectes* females were the only crayfish in our sample. Ephemeropterans represented about 27%, plecopterans 21%, trichopterans 14%, and coleopterans about 9% of the total number of organisms collected (Fig. 51). A total of 47 taxa was collected at this site. Plecopterans were one of the primary riffle groups present and *Acroneuria abnormis* alone accounted for almost 20% of the total number of organisms collected.

#### Management Recommendations:

1. This stream was sampled too late in the year to determine if water temperatures were adequate for trout. However, due to the amount of siltation and the presence of a fairly diverse and well established warm water game fish population, stocking of fingerling trout is not recommended.
2. Any trout management should be directed at a 3 or 4 month put-and-take fishery in the spring, using adult fish.
3. No brown trout (*Salmo trutta*) should be stocked in Tackett Creek or in the Clear Fork drainage. Brown trout can tolerate higher temperatures and might become established. They tend to be more difficult to be caught by fishermen, grow large, and become more piscivorous. Given the number of protected fish species occurring along with an already existing diverse game fish population, Tackett Creek and the Clear Fork drainage does not need another predator.
4. Need to conduct additional surveys in the Tackett Creek watershed.



TACKETT CREEK  
Sample Area

JELICO EAST QUADRANGLE  
Tenn.-KY. - 4157 II SE

TENNESSEE WILDLIFE RESOURCES AGENCY  
PHYSIOCHEMICAL STREAM SURVEY FORM

A. LOCATION

Stream Tackett Creek Lat-Long 363208N - 840001W  
Watershed Clear Fork Cumberland River Length of Sample 400 ft.  
Station (See below) Reach 05130101-24,0  
County Campbell Date/Time 26 October 1990/1045  
Data Collected By Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS

1. Average Width 32.2 ft. Average Depth 1.1 ft. Maximum Depth 3.5 ft.
2. Estimated Percent of Stream in Pools is 40 %
3. Estimated Percent Pool Bottom is Mud - % Silt 10 % Sand 20 % Clay - %  
Gravel 25 % Rubble 30 % Boulders 10 % Bedrock 5 % Other - %
4. Estimated Percent Riffle Bottom is Mud - % Silt 10 % Sand 20 % Clay - %  
Gravel 20 % Rubble 30 % Boulders 20 % Bedrock - % Other - %
5. Abundance of Littoral Aquatic Plants is Numerous \_\_\_\_\_  
Average \_\_\_\_\_ Scarce X (some moss on rocks)
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 30 %  
of stream, Average in 50 %, Poor in 20 %
7. Shade or Canopy Good over 50 % of Stream.
8. Flow (CFS) 40.7 : Compared to Normal: Low \_\_\_\_\_ Normal X High \_\_\_\_\_
9. Present Weather Partly cloudy and very cool; air temp. - 46°F.
10. Past Weather (last 24 hours) Overcast to partly cloudy and cold overnight.
11. pH 8.0 Temp. 46.8°F Conductivity 180 D.O. 11.4 % Saturation 97
12. Comments: Sample location was approximately 0.6 mi. (by gravel road)  
upstream of Hwy. 90 at an old ford site. Siltation is apparent  
but not extremely heavy. Cover and habitat for fish looks good.

FISH FIELD DATA FORM

TENNESSEE WILDLIFE RESOURCES AGENCY

Stream Tackett Creek Lat-Long 363208N - 840001W  
 Watershed Clear Fork Cumberland R. Date 26 October 1990  
 County Campbell Reach 05130101-24.0  
 Type of Sampling Electrofishing Pool Elevation 1070 ft.  
 Gear Type Two backpacks @ 120 v. AC Time 1330 - 1500

Name	SPECIES	CODE	NUMBER	LENGTH	WT.			
<i>Micropterus dolomieu</i>		218	9	2	0.07			
"	"	"	4	3	0.04			
"	"	"	3	4	0.12			
"	"	"	2	5	0.14			
<i>M. punctulatus</i>		219	2	2	0.02			
<i>Ambloplites rupestris</i>		13	1	3	0.03			
"	"	"	3	4	0.16			
"	"	"	3	5	0.35			
"	"	"	2	6	0.39			
"	"	"	3	7	0.82			
"	"	"	1	9	0.47			
<i>Lepomis cyanellus</i>		202	2	2	0.04			
"	"	"	1	4	0.08			
<i>L. macrochirus</i>		206	2	4	0.10			
"	"	"	2	5	0.15			
"	"	"	1	6	0.11			
<i>L. megalotis</i>		208	3	3	0.09			
"	"	"	1	4	0.07			
"	"	"	1	5	0.10			
<i>Ameiurus natalis</i>		174	3	10-11	2.16			
<i>Moxostoma erythrurum</i>		230	7	2-3	0.11			
<i>Hypentelium nigricans</i>		166	39	2-12	5.71			
Continued on next page								

Field Notes: 400 ft. sample length. Not many crayfish at all, but lots of stoneflies. Not many game fish for amount of habitat covered.

Name of Collector(s): Rick D. Bivens, Carl E. Williams, and Wayne H. Schacher

WR-0525





GAME FISH FROM TACKETT CREEK  
INCH CLASS DISTRIBUTION

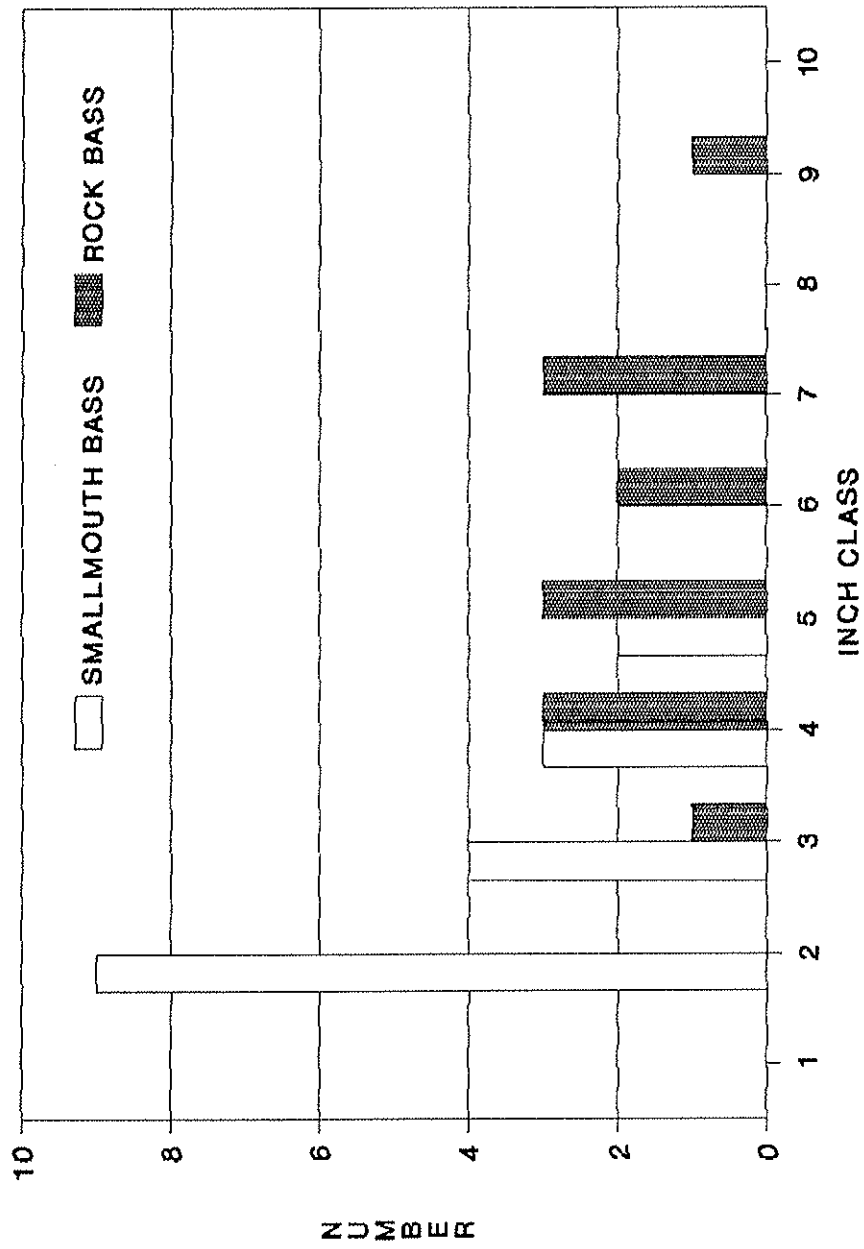


Figure 50.

## Tackett Creek: Qualitative Benthic Sample

26 October 1990

Field # 267

Campbell Co., TN; Approx. 0.6 mi. upstream (by road) of hwy.  
90 at ford. Coordinates: 360208N - 840001W. Jellico East,  
Tenn.-KY., # 4157 II SE Quad. Reach # 05130101-24,0.

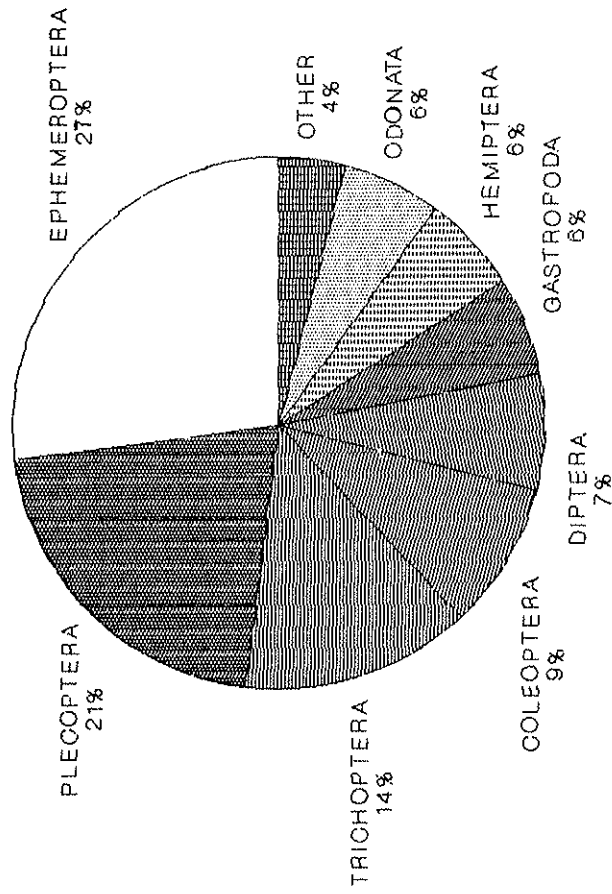
TAXA	NUMBER
ANNELIDA:	
Oligochaeta	2
COLEOPTERA:	
Dryopidae/ <u>Helichus</u> adult	1
Elmidae/ <u>Dubiraphia</u> larvae	2
<u>Macronychus glabratus</u> adult	1
<u>Optioservus</u> larvae	20
<u>Optioservus trivittatus</u> adults	2
<u>Oulimnius latiusculus</u> adult	1
Psephenidae/ <u>Psephenus herricki</u> larvae	10
DECAPODA:	
Cambaridae/ <u>Orconectes</u> females	3
DIPTERA:	
Athericidae/ <u>Atherix lantha</u>	22
Chironomidae	4
Tipulidae/ <u>Tipula</u>	3
EPHEMEROPTERA:	
Baetidae/ <u>Baetis</u>	3
<u>Pseudocloeon</u>	3
Baetiscidae early instars/ <u>Baetisca gibbera</u>	2
Ephemeridae/ <u>Ephemera</u>	6
<u>Hexagenia</u>	6
Heptageniidae/ <u>Stenonema mediopunctatum</u>	25
<u>S. vicarium</u>	28
Leptophlebiidae/ <u>Paraleptohlebia</u>	3
Oligoneuriidae/ <u>Isonychia</u>	41
GASTROPODA:	
Physidae/ <u>Physa</u>	2
Planorbidae	4
Pleuroceridae/ <u>Pleurocera</u>	21
HEMIPTERA:	
Gerridae/ <u>Metrobates hesperius</u>	5
Veliidae/ <u>Rhagovelia obesa</u> nymph	1
<u>Rhagovelia obesa</u> adults	22

Tackett Creek: Qualitative Benthic Sample cont.

TAXA	NUMBER
ISOPODA:	
Asellidae/ <u>Lirceus</u>	2
LEPIDOPTERA:	
Pyralidae/ <u>Petrophila</u>	1
MEGALOPTERA:	
Corydalidae/ <u>Corydalis cornutus</u>	4
<u>Nigronia serricornis</u>	6
ODONATA:	
Aeshnidae/ <u>Boyeria vinosa</u>	5
Calopterygidae/ <u>Calopteryx</u>	1
Coenagrionidae/ <u>Argia</u>	7
Gomphidae/ <u>Gomphus (Gomphurus) lineatifrons</u>	2
<u>Hagenius brevistylus</u>	2
<u>Stylogomphus albistylus</u>	2
Macromiidae/ <u>Didymops transversa</u>	6
PLECOPTERA:	
Perlidae/early instar	1
<u>Acroneuria abnormis</u>	85
<u>A. carolinensis</u>	1
<u>Paragnetina immarginata</u>	1
TRICHOPTERA:	
Hydropsychidae/ <u>Cheumatopsyche</u>	15
<u>Hydropsyche dicantha</u>	36
<u>Symphitopsyche bronta</u>	2
<u>S. cheilonis</u>	1
Leptoceridae/ <u>Trienodes</u>	1
Philopotamidae/ <u>Chimarra</u>	1
Polycentropodidae/ <u>Neureclipsis crepuscularis</u>	2
<u>Nyctiophylax</u>	1

428

TACKETT CREEK  
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

$n = 428$   
TAXA RICHNESS = 47

Figure 51.

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