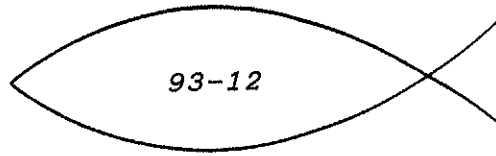
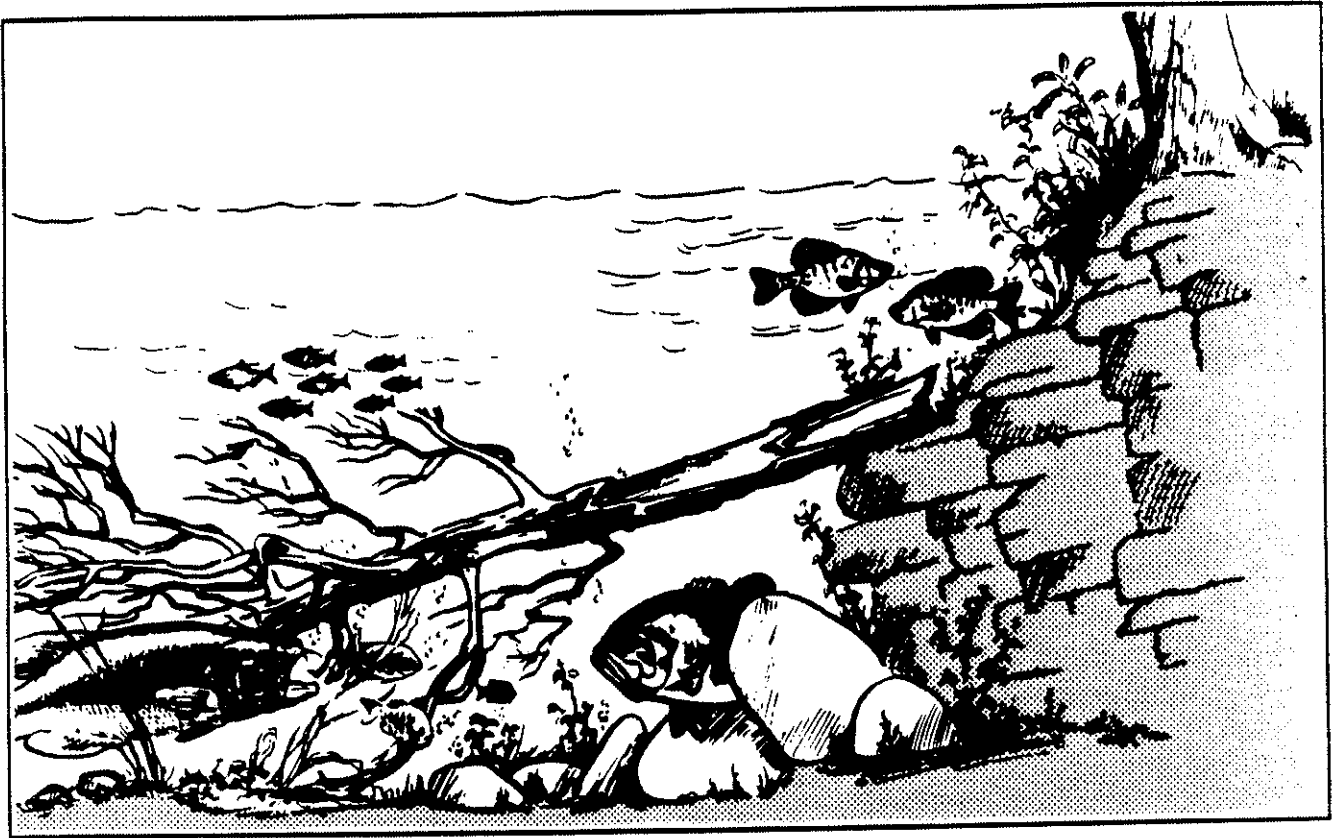


FISHERIES REPORT



ANNUAL STREAM FISHERY
DATA COLLECTION REPORT
REGION IV
1991



Prepared by

*Rick D. Bivens
Mark T. Fagg
and
Carl E. Williams*

Tennessee Wildlife  Resources Agency

This report contains progress and accomplishments for the following TWRA Projects: "Stream Survey".

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REGION IV STREAM FISHERY DATA COLLECTION REPORT

1991

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TENNESSEE WILDLIFE RESOURCES AGENCY

December, 1992

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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 is a greater number 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 fifth 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 Database 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 mi of streams that total approximately 14,111 acres. There are approximately 800 mi 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 are also included in these accounts.

METHODS

The streams to be sampled and the methods required are outlined in TWRA Field Request No. 91-4. Three streams on this list were not sampled this year due to scheduling problems. However, eight additional streams were sampled and are included in this report. Field work was conducted from June to November, 1991. Twenty fish samples and 12 benthic samples from sixteen streams were collected.

Qualitative fish data were collected using standard electrofishing techniques. Streams were sampled with gasoline-powered backpack electrofishing units capable of producing 120-700 volts AC. They 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.

Sample length ranged from 100 ft to 900 ft. Most were 400 ft, 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 after being weighed and measured, 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. Others were 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 anesthetized with tricaine methanesulfonate (MS-222) and measured to the nearest mm total length and weighed to the nearest g on electronic scales. Non-game fish (suckers, catfish, carp, goldfish, and large shad) and forage fish (minnows, darters, sculpin, and small shad) were enumerated, batch weighed by species, and a length range was obtained. In some cases, only numbers were determined. The length and weight data were later converted to equivalent English units and recorded on Fish Data Forms for the purpose of this report. The letter "t" is recorded where the weight was represented by only a trace amount (less than 0.01 lb).

The fish samples are divided into categories of game fish by species, non-game 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 field data 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 by selected pickings from as many different habitats as possible within the sample area. They were, for the most part, timed sampling efforts of 1 h duration and generally made by three collectors, resulting in a total of 3 man-h expended at each site. Taxa richness and relative abundance are the primary considerations of this type of sampling. 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 possible. Many were identified to genus, and most were identified at least to family. Dr. David A. Etnier, University of Tennessee, examined problematic specimens and either made the determination or confirmed our 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.

Basic 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 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 other habitat data were recorded on Field Physiochemical Data Forms and included with each stream account.

Sampling locations were delineated on 7.5 min topographical maps and copies of these have been included in the stream accounts. Tennessee Aquatic Database System (TADS) river reach numbers and quadrangle map coordinates were recorded for all sample sites.

STREAM ACCOUNTS

Buffalo Creek

Two qualitative fishery surveys were conducted in June 1991:

Location and Length - Tributary to Hinds Creek (Clinch River trib.). Sample Site 1 was located at the bridge crossing on Buffalo Creek Road, near stream mi 0.65. It was 300 ft in length and averaged 17.0 ft in width. Sample Site 2 was located just north of Andersonville at the bridge crossing on Lambdin Road. It was 300 ft in length and averaged 14.2 ft in width. Both sites were sampled on 19 June 1991, and were in Anderson County (Norris Quadrangle).

Sampling Methodology - Both sites were sampled using two backpack electrofishing units operating at 120 volts AC.

Water Quality - Data were collected from midstream at mid-depth at each site on 19 June 1991. Site 1: DO - 7.7 ppm, pH - 8.0, Temperature - 67.5 F, Conductivity - 345 micromhos/cm. Site 2: DO - 7.4 ppm, pH - 7.7, Temperature - 67 F, Conductivity - 380 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample at each site. Site 1 sample contained 275 organisms representing 34 taxa. Site 2 sample contained 208 organisms representing 35 taxa.

Fish Collected:

Species	<u>Site 1</u>				<u>Site 2</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Rainbow trout	1	0.1	0.23	1.6				
Largemouth bass	12	1.7	0.37	2.6				
Rock bass	20	2.9	2.74	19.5	13	3.5	2.01	24.8
Redbreast sunfish	54	7.8	2.82	20.0	50	13.4	1.31	16.2
Bluegill	1	0.1	0.02	0.1	2	0.5	0.02	0.2
Non-game Fish	14	2.0	2.18	15.5	21	5.6	2.25	27.8
Forage Fish	590	85.3	5.71	40.6	287	76.9	2.50	30.9
Total	692		14.07		373		8.09	

Comments - This stream was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. We were also interested in looking at effects of the highway construction, that was going on upstream near I-75, on the fish population and benthic community. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 692 fish weighing 14.07 lb and comprising 16 species from Site 1. Three native game species, largemouth bass (*Micropterus salmoides*), rock bass (*Ambloplites rupestris*), and bluegill (*Lepomis macrochirus*) along with the exotic redbreast sunfish (*L. auritus*) and a single specimen of rainbow trout (*Oncorhynchus mykiss*) were collected. Largemouth bass were represented by small individuals with the largest being in the 7-in class and only one bluegill was collected. The rainbow trout most probably migrated upstream from the Clinch River tailwaters. Therefore, comparison of inch class distribution was made for rock bass and redbreast sunfish only (Fig. 1). Rock bass made up about 3% compared to about 8% by redbreast sunfish, of the total number of fish collected. However, each contributed about the same (around 20%) to the total weight collected. Two non-game and nine forage species were also collected here and these comprised about 87% of the total number and 56% of the total weight. Most of these were fairly tolerant species with the exception of the redline darter (*Etheostoma rufilineatum*). However, only four specimens of the redline darter were collected. The greenside darter (*E. blennioides*) and the snubnose darter (*E. simoterum*) were the only other darters collected. Most species were also collected in small numbers except for the stoneroller (*Campostoma anomalum*). Stonerollers were the most abundant species present and accounted for almost 62% of the total number of fish collected.

At Site 2 we collected a total of 373 fish weighing 8.09 lb and comprising 12 species. Game fish from this site included rock bass, redbreast sunfish, and bluegill. Only two bluegills were collected, therefore, comparison of inch class distribution was made for rock bass and redbreast sunfish (Fig. 3). Rock bass made up about 4% compared to about 13% by redbreast sunfish, of the total number of fish collected. However, rock bass contributed about 25% as compared to 16% by redbreast sunfish to the total weight collected. Two non-game and seven forage fish were also collected here and with the exception of the stripetail darter (*Etheostoma kennicotti*), all were collected at the downstream site. These comprised about 82% of the total number and 62% of the total weight collected at this site. Blacknose dace (*Rhinichthys atratulus*) and the striped shiner (*Luxilus chrysocephalus*) were the most abundant species collected at this site.

Buffalo Creek is a low gradient stream that is fairly heavily silted from non-point sources along the watershed and the fish species assemblage is typical for streams with this type of pollution. Based on fish species occurrence, it is difficult to note much difference between sample sites and any recent impairment caused by the highway construction is probably overshadowed by long standing non-point source pollution.

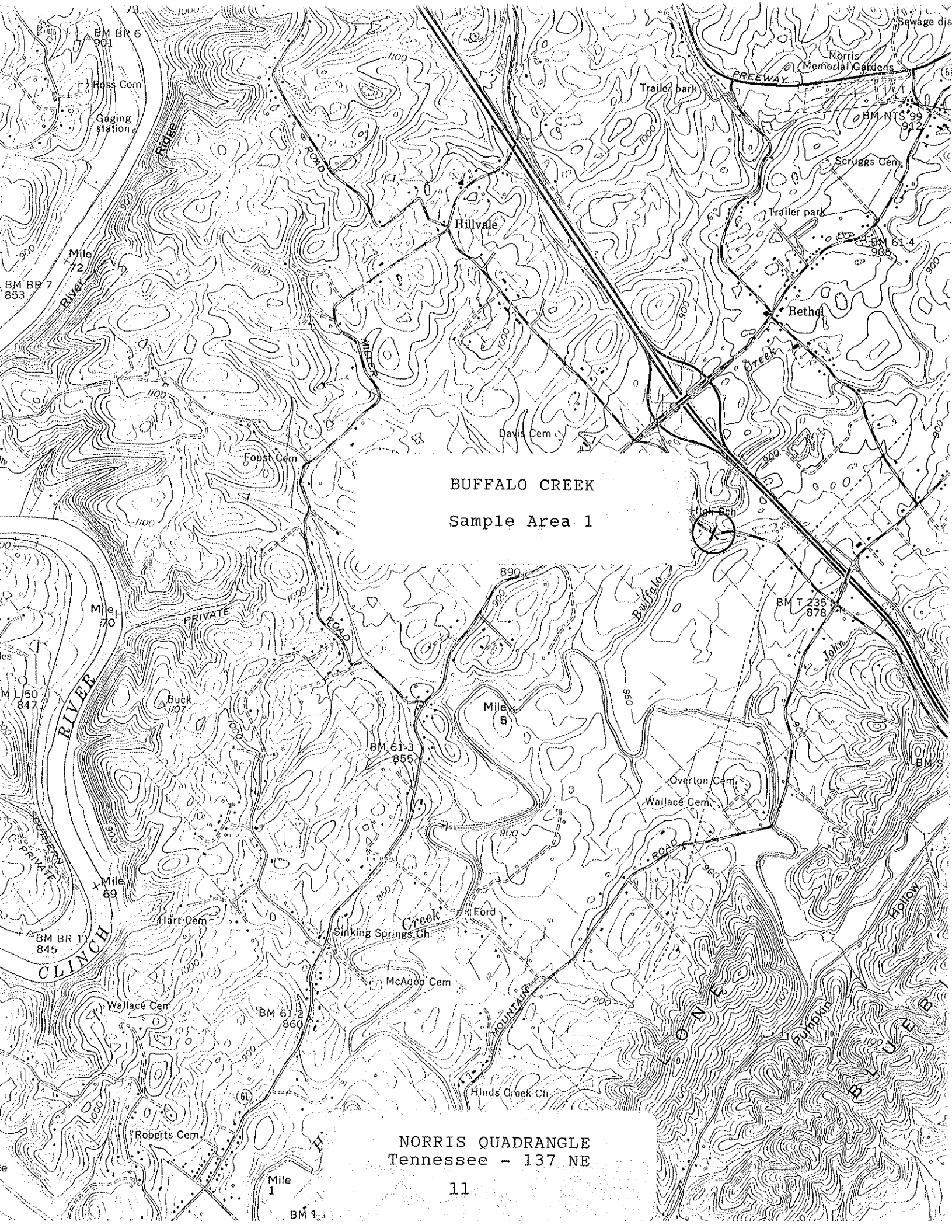
Benthic macroinvertebrates from our sample at Site 1 included Baetidae, Caenidae, Ephemerellidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, hydropsychid

caddisflies, and Elmidae, Hydrophilidae, and Psephenidae beetles. No stoneflies were present. The Asian clam (*Corbicula fluminea*) and fingernail clam (*Sphaerium*) were present. Relic *Villosa iris* and *V. vanuxemensis* were collected. Two species of crayfish, *Cambarus longirostris* and *Orconectes forceps* were also collected. Trichopterans represented about 33%, ephemeropterans about 15%, isopods about 10%, megalopterans about 10%, and coleopterans about 8% of the total number of organisms collected (Fig. 2). A total of 34 taxa was collected at this site.

Benthic macroinvertebrates from our sample at Site 2 included Baetidae, Caenidae, Heptageniidae, and Leptophlebiidae mayflies, the perlid stonefly *Acroneuria*, hydropsychid caddisflies, and Dryopidae, Dytiscidae, Elmidae, Hydrophilidae, and Psephenidae beetles. Fingernail clams were present along with pleurocerid snails. *Cambarus longirostris* was the only crayfish species collected here. Dipterans represented about 19%, coleopterans about 15%, ephemeropterans about 12%, isopods about 12%, hemipterans about 9%, and odonates about 8% of the total number of organisms collected (Fig. 4). Trichopterans represented only about 4% of the total. A total of 35 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. Based on fish and macroinvertebrate species assemblages it is difficult to note much difference between sample sites. Both sites had similar species, most of which were tolerant forms. Any impairment caused by the highway construction was not evident, but it was probably overshadowed by the long standing non-point source pollution.



BUFFALO CREEK
Sample Area 1

NORRIS QUADRANGLE
Tennessee - 137 NE

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Buffalo Creek Date: 19 June 1991
Watershed: Clinch River County: Anderson
Area: Site # 1 Sample Length: 300 ft
Lat-Long: 360937N - 840447W Reach: 06010207-18,0
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 17.0 ft Avg. Depth 0.8 ft Max. Depth 2.2 ft
2. Estimated Percent of Stream in Pools is 55%.
3. Estimated Percent Pool Bottom is Silt 15% Sand 5% Gravel 10% Rubble 25% Boulders 35% Bedrock 10%.
4. Estimated Percent Riffle Bottom is Silt 10% Sand 10% Gravel 10% Rubble 35% Boulders 35%.
5. Abundance of Littoral Aquatic Plants is Scarce.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 60% of the Stream, Average in 30%, Poor in 10%.
7. Shade or Canopy Good over 80% of Stream.
8. Flow (CFS) 12.7: Compared to Normal: Slightly High
9. Present Weather: Overcast with light rain; high humidity
Air temperature 85 F @ 9:45 am.
10. Weather (last 24 h): Overcast with light rain.
11. pH 8.0 Temp. 67.5 F Conductivity 345 micromhos/cm
D.O. 7.7 ppm Saturation 84%
12. Comments: Sample area location was at bridge crossing on
Buffalo Road. Recent, new silt on substrate from
construction upstream. Good habitat for game fish.

FISH DATA

Stream: Buffalo Creek Date: 19 June 1991
 Watershed: Clinch River County: Anderson
 Area: Site # 1 Sample Length: 300 ft
 Lat-Long: 360937N - 840447W Reach: 06010207-18,0
 Type of Sampling: Electrofishing Elevation: 840 ft
 Gear Type: 2 Backpack Units Time: 1225 - 1325

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Oncorhynchus mykiss</i>	353	1	8	0.23
<i>Micropterus salmoides</i>	220	9	1	0.04
" "	"	1	4	0.04
" "	"	1	6	0.12
" "	"	1	7	0.17
<i>Ambloplites rupestris</i>	13	2	2	0.02
" "	"	3	3	0.11
" "	"	6	4	0.43
" "	"	1	5	0.13
" "	"	3	6	0.62
" "	"	5	7	1.39
<i>Lepomis auritus</i>	201	9	1	0.03
" "	"	18	2	0.19
" "	"	7	3	0.19
" "	"	9	4	0.51
" "	"	5	5	0.63
" "	"	5	6	0.96
" "	"	1	7	0.23
<i>L. macrochirus</i>	206	1	3	0.02
<i>Catostomus commersoni</i>	32	4	7-12	1.81
<i>Hypentelium nigricans</i>	166	10	3-6	0.37

Site located at bridge on Buffalo Road. Shocking at 120 volts AC. Black grub on stonerollers and striped shiners, leeches on caudal fins of redbreast, anchor worm on bluegill.

Collectors: R.D. Bivens, M.T. Fagg, C.E. Williams, and W. Schacher

FISH DATA (continued)

Stream: Buffalo Creek Date: 19 June 1991
 Watershed: Clinch River County: Anderson
 Area: Site # 1 Sample Length: 300 ft
 Lat-Long: 360937N - 840447W Reach: 06010207-18,0
 Type of Sampling: Electrofishing Elevation: 840 ft
 Gear Type: 2 Backpack Units Time: 1225 - 1325

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Campostoma anomalum</i>	25	427	1-5	5.03
<i>Hybopsis amblops</i>	155	8	2	0.03
<i>Luxilus chrysocephalus</i>	249	11	2-5	0.23
<i>Pimephales notatus</i>	334	71	1-3	0.21
<i>Rhinichthys atratulus</i>	351	18	1-2	0.05
<i>Etheostoma blennioides</i>	81	16	1-3	0.05
<i>E. rufilineatum</i>	108	4	1-2	0.02
<i>E. simoterum</i>	111	15	1-2	0.04
<i>Cottus carolinae</i>	40	20	1-2	0.05

Site located at bridge on Buffalo Road. Shocking at 120 volts AC. Black grub on stonerollers and striped shiners, leeches on caudal fins of redbreast, anchor worm on bluegill.

Collectors: R.D. Bivens, M.T. Fagg, C.E. Williams, and W. Schacher

GAME FISH FROM BUFFALO CREEK
 SITE 1
 INCH CLASS DISTRIBUTION

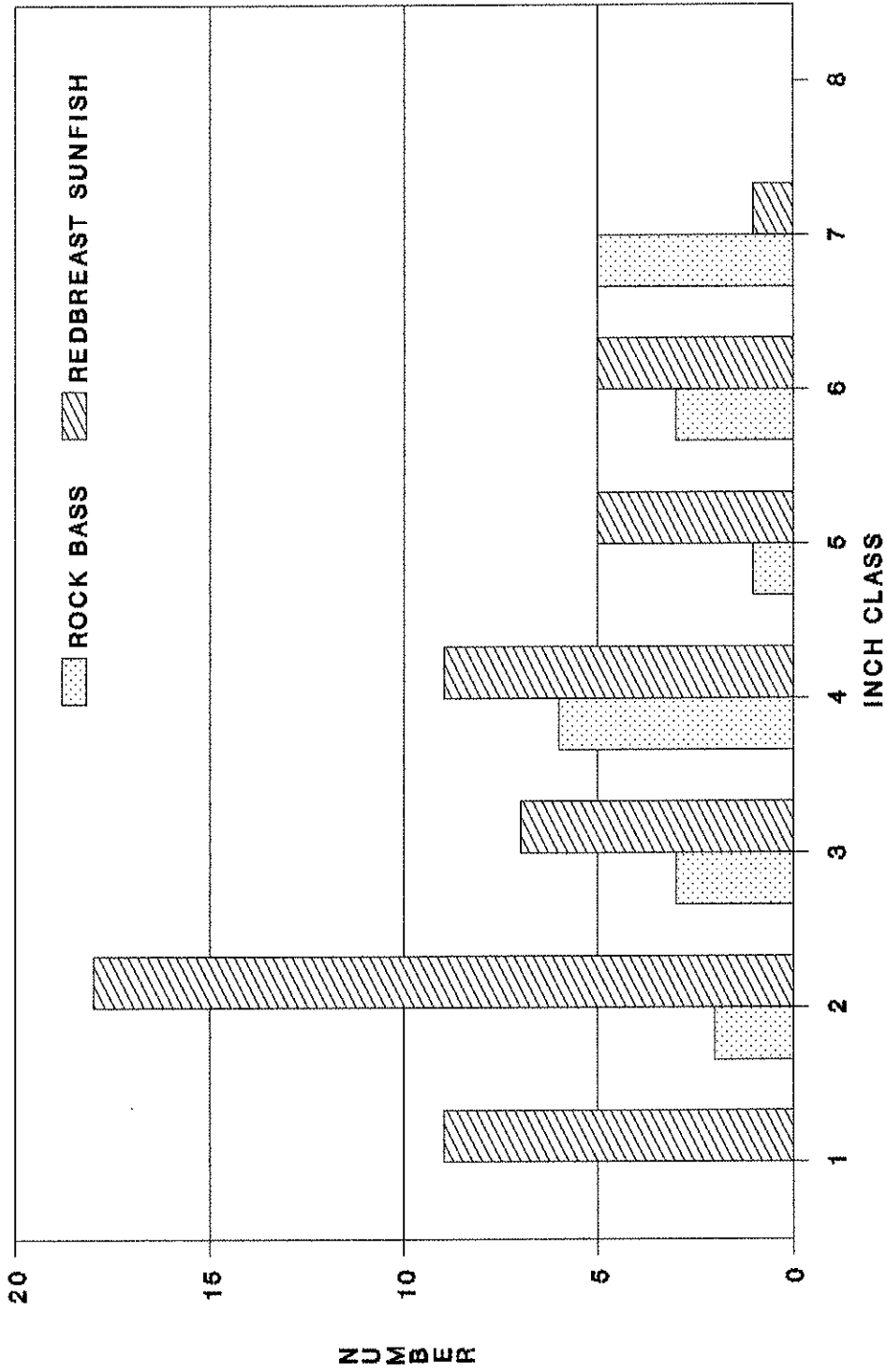


Figure 1.

Buffalo Creek: Site # 1, Qualitative Benthic Sample

19 June 1991

Field # 291

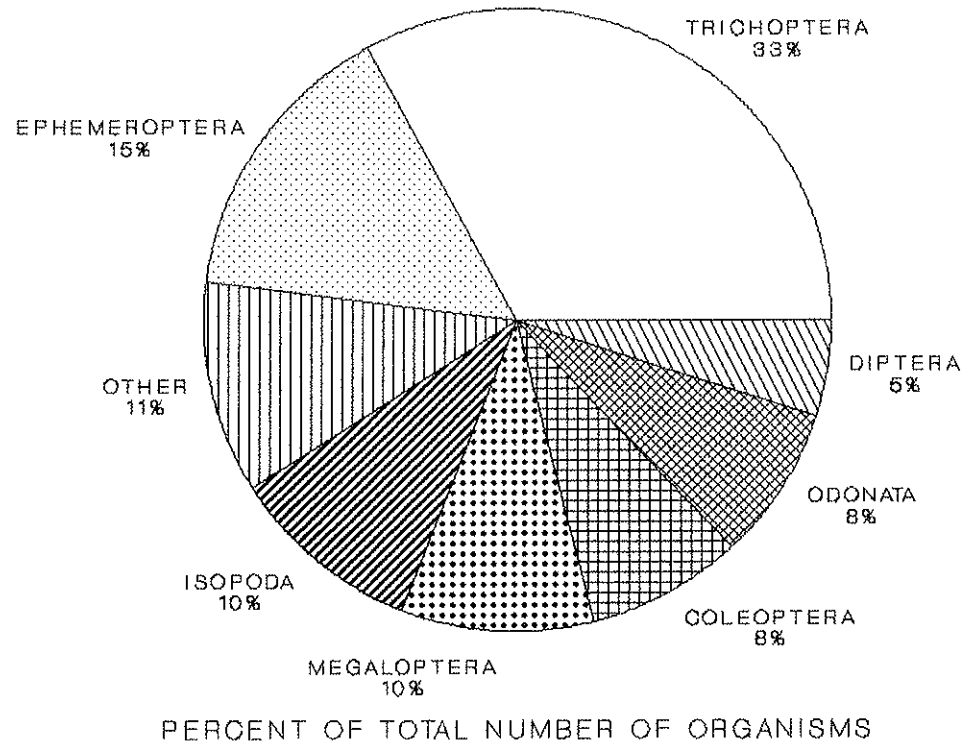
Anderson Co., TN; At the bridge crossing on Buffalo Creek Road.
 Coordinates: 360937N - 840447W. Norris, Tenn., # 137 NE Quad.
 Reach # 06010207-18,0.

<u>TAXA</u>	<u>NUMBER</u>
ANNELIDA:	
Oligochaeta	4
COLEOPTERA:	
Elmidae/ <i>Stenelmis</i> larva	1
<i>Stenelmis</i> adults	15
Hydrophilidae/ <i>Anacaena limbata</i> adult	1
<i>Hydrobius</i> adult	1
<i>Sperchopsis tessellatus</i> adult	1
<i>Tropisternus b. blatchleyi</i> adults	2
Psephenidae/ <i>Psephenus herricki</i> larvae	2
DECAPODA:	
Cambaridae/ <i>Cambarus longirostris</i> 1st form male	1
<i>Cambarus longirostris</i> 2nd form males	2
<i>Cambarus longirostris</i> female	1
<i>Orconectes forceps</i> 2nd form males	3
<i>Orconectes forceps</i> females	3
DIPTERA:	
Chironomidae	14
EPHEMEROPTERA:	
Baetidae/ <i>Baetis</i>	5
Caenidae/ <i>Caenis</i>	5
Ephemerellidae/ <i>Eurylophella</i>	1
Ephemeridae/ <i>Hexagenia</i>	3
Heptageniidae/ <i>Heptagenia</i>	6
<i>Stenacron interpunctatum</i>	4
<i>Stenonema</i>	1
<i>Stenonema exiguum</i>	1
<i>S. femoratum</i>	1
<i>S. mediopunctatum</i>	9
Oligoneuriidae/ <i>Isonychia</i>	6
GASTROPODA:	
Ancyliidae/ <i>Ferrissia</i>	1

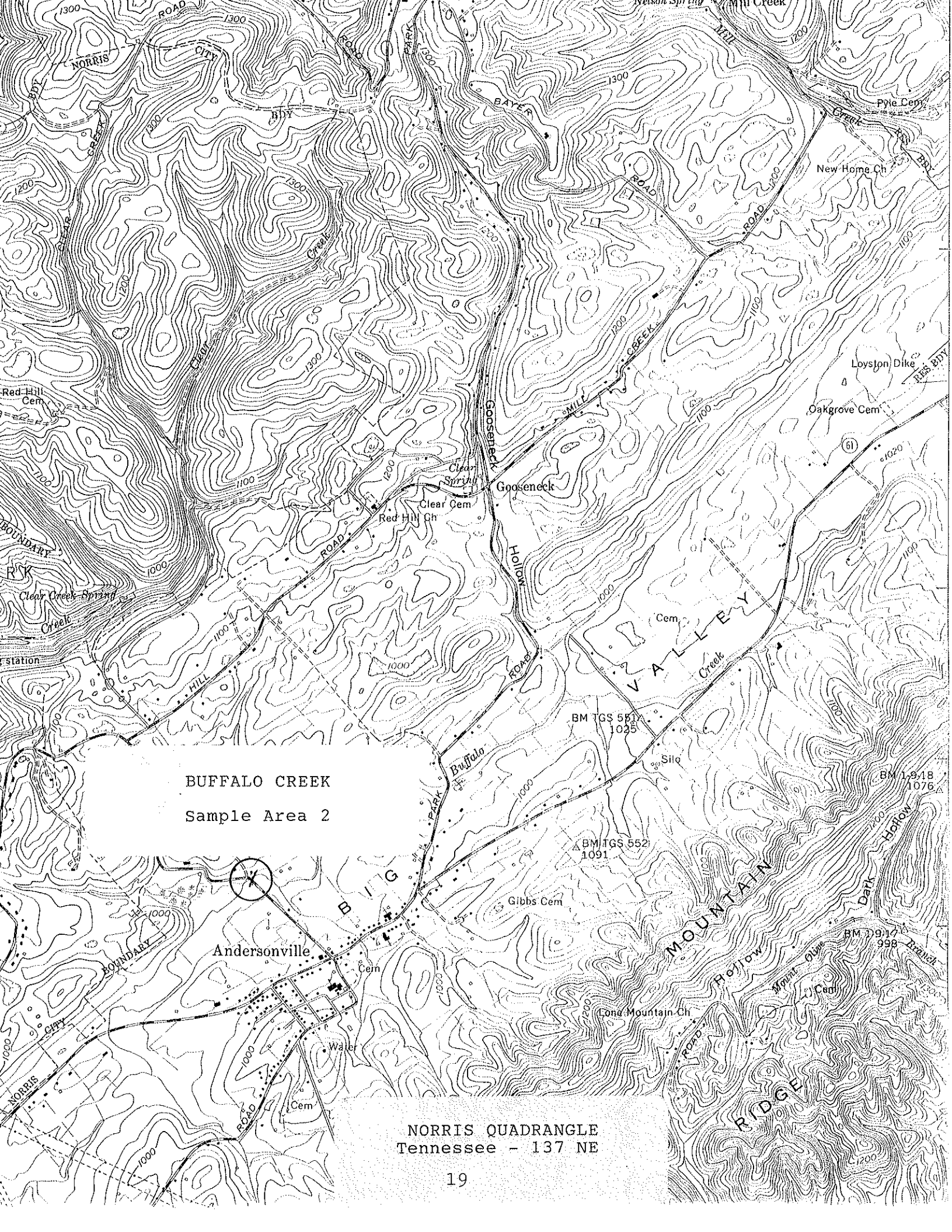
Buffalo Creek: Site # 1, Qualitative Sample cont.

<u>TAXA</u>	<u>NUMBER</u>
HEMIPTERA:	
Corixidae	1
Gerridae/ <i>Gerris</i> nymphs	3
<i>Gerris remigis</i> female	1
Veliidae/ <i>Microvelia</i>	1
<i>Rhagovelia obesa</i> males	2
<i>Rhagovelia obesa</i> females	2
ISOPODA:	
Asellidae/ <i>Lirceus</i>	27
MEGALOPTERA:	
Corydalidae/ <i>Nigronia serricornis</i>	23
Sialidae/ <i>Sialis</i>	3
ODONATA:	
Aeshnidae/ <i>Boyeria vinosa</i>	4
Coenagrionidae/ <i>Argia</i>	18
PELECYPODA:	
Corbiculidae/ <i>Corbicula fluminea</i>	4
Sphaeriidae/ <i>Sphaerium</i>	1
Unionidae/ <i>Villosa iris</i> relics	
<i>V. vanuxemensis</i> relics	
TRICHOPTERA:	
Hydropsychidae/ <i>Cheumatopsyche</i>	31
<i>Hydropsyche betteni/depravata</i> larvae	58
<i>Hydropsyche betteni/depravata</i> pupae	2
	275

**BUFFALO CREEK
SITE 1
BENTHIC MACROINVERTEBRATES**



**n = 275
TAXA RICHNESS = 34
Figure 2.**



BUFFALO CREEK
Sample Area 2

NORRIS QUADRANGLE
Tennessee - 137 NE

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Buffalo Creek Date: 19 June 1991
Watershed: Clinch River County: Anderson
Area: Site # 2 Sample Length: 300 ft
Lat-Long: 361207N - 840231W Reach: 06010207-18,0
Data Collected By: Rick D. Bivens, Mark T. Fagg,
Carl E. Williams, and Wayne Schacher

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 14.2 ft Avg. Depth 0.8 ft Max. Depth 2.8 ft
2. Estimated Percent of Stream in Pools is 75%.
3. Estimated Percent Pool Bottom is Silt 20% Sand 20% Gravel 40% Rubble 15% Boulders 5%.
4. Estimated Percent Riffle Bottom is Silt 10% Sand 15% Gravel 60% Rubble 10% Boulders 5%.
5. Abundance of Littoral Aquatic Plants is Scarce.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 80% of the Stream, Average in 15%, Poor in 5%.
7. Shade or Canopy Good over 85% of Stream.
8. Flow (CFS) 4.2: Compared to Normal: Normal
9. Present Weather: Partly cloudy. Air temperature - 85 F @ 3:05 pm.
10. Weather (last 24 h): Overcast and light rain.
11. pH 7.7 Temp. 67 F Conductivity 380 micromhos/cm
D.O. 7.4 ppm Saturation 80%
12. Comments: Sample area was just north of Andersonville at bridge on Lambdin Road. Cattle observed in the stream. Mostly gravel riffles. Pools look fair for game fish.

FISH DATA

Stream: Buffalo Creek Date: 19 June 1991
 Watershed: Clinch River County: Anderson
 Area: Site # 2 Sample Length: 300 ft
 Lat-Long: 361207N - 840231W Reach: 06010207-18,0
 Type of Sampling: Electrofishing Elevation: 940 ft
 Gear Type: 2 Backpack Units Time: 1640 - 1730

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Ambloplites rupestris</i>	13	1	2	0.01
" "	"	3	4	0.10
" "	"	2	5	0.11
" "	"	4	6	0.75
" "	"	2	7	0.56
" "	"	1	8	0.48
<i>Lepomis auritus</i>	201	3	1	0.01
" "	"	25	2	0.27
" "	"	15	3	0.40
" "	"	5	4	0.27
" "	"	2	6	0.36
<i>L. macrochirus</i>	206	2	2	0.02
<i>Catostomus commersoni</i>	32	19	2-12	1.91
<i>Hypentelium nigricans</i>	166	2	1-8	0.34
<i>Campostoma anomalum</i>	25	53	1-4	0.35
<i>Luxilus chrysocephalus</i>	249	72	1-4	1.38
<i>Pimephales notatus</i>	334	1	2	t
<i>Rhinichthys atratulus</i>	351	100	1-3	0.55
<i>Etheostoma kennicotti</i>	98	1	1	0.01
<i>E. simoterum</i>	111	15	1	0.02
<i>Cottus carolinae</i>	40	45	1-3	0.19

Site located at bridge on Lambdin Road. Shocking at 120 volts AC. One striped shiner with deformed spine.

Collectors: R.D. Bivens, M.T. Fagg, C.E. Williams, and Wayne Schacher

GAME FISH FROM BUFFALO CREEK
 SITE 2
 INCH CLASS DISTRIBUTION

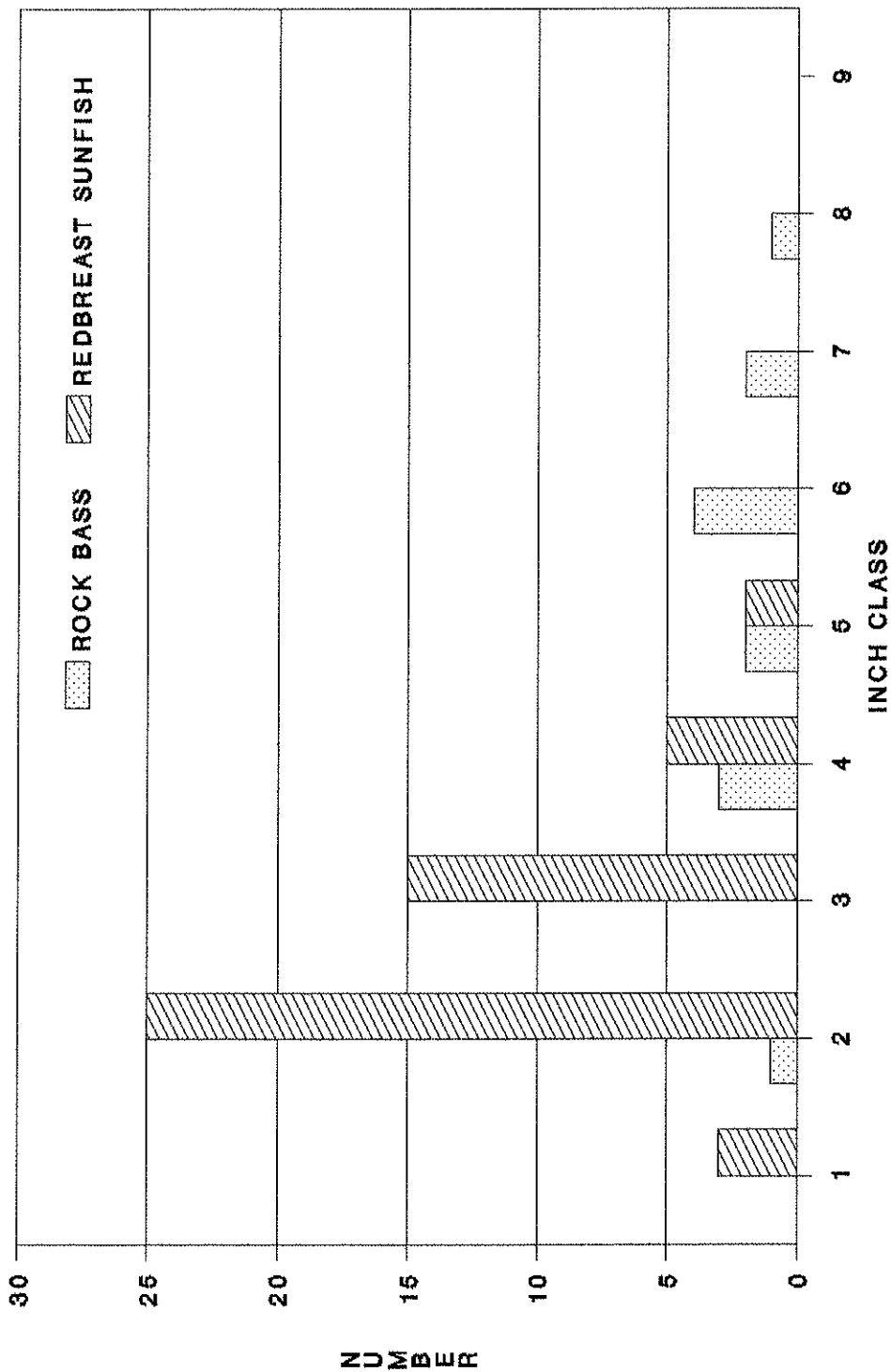


Figure 3.

Buffalo Creek: Site # 2, Qualitative Benthic Sample

19 June 1991

Field # 292

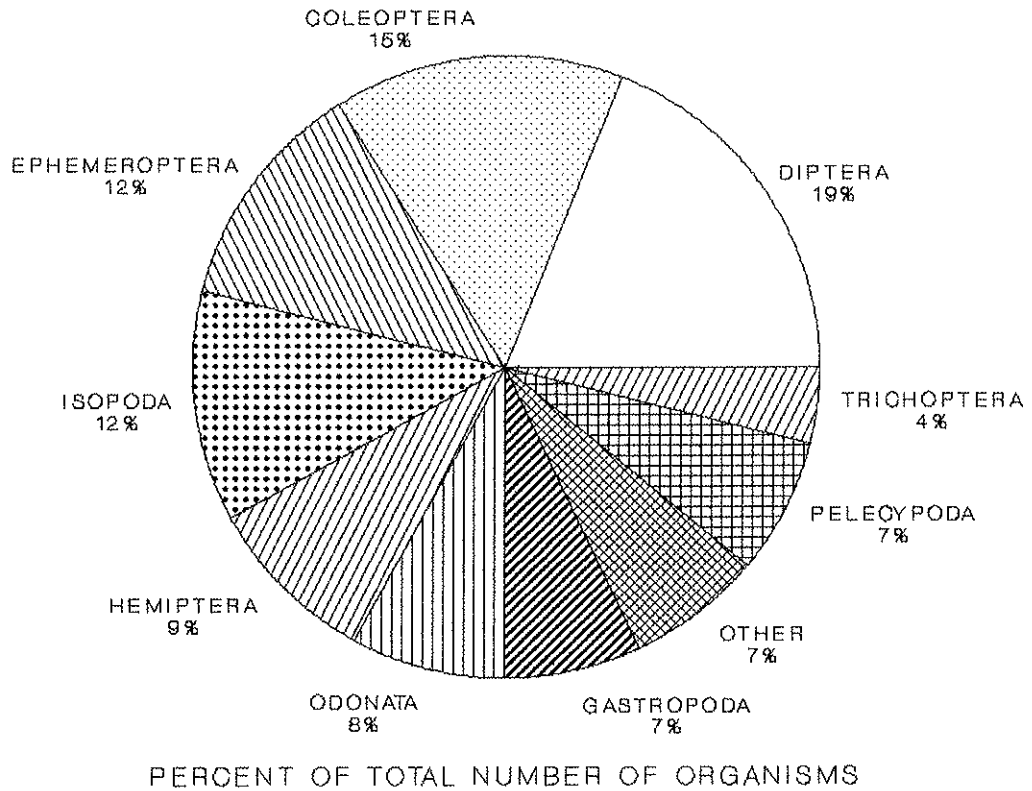
Anderson Co., TN; At the bridge crossing on Lambdin Road.
Coordinates: 361207N - 840231W. Norris, Tenn., # 137 NE Quad.
Reach # 06010207-18,0.

<u>TAXA</u>	<u>NUMBER</u>
ANNELIDA:	
Oligochaeta	3
COLEOPTERA:	
Dryopidae/ <i>Helichus</i> adult	1
Dytiscidae/ <i>Hydroporus</i>	9
Elmidae/ <i>Dubiraphia</i> adults	4
<i>Stenelmis</i>	14
Hydrophilidae/ <i>Sperchopsis tessellatus</i> adult	1
Psephenidae/ <i>Psephenus herricki</i> larvae	3
DECAPODA:	
Cambaridae/ <i>Cambarus longirostris</i> juveniles	3
DIPTERA:	
Chironomidae larvae	15
Chironomidae pupae	6
Dixidae/ <i>Dixa</i>	1
Simuliidae	6
Tabanidae	2
Tipulidae/ <i>Hexatoma</i>	7
<i>Limnophila</i>	2
EPHEMEROPTERA:	
Baetidae/ <i>Baetis</i>	2
Caenidae/ <i>Caenis</i>	1
Heptageniidae/ <i>Stenacron interpunctatum</i>	10
<i>Stenonema femoratum</i>	2
<i>S. mediopunctatum</i>	1
Leptophlebiidae/ <i>Choroterpes</i>	9
GASTROPODA:	
Pleuroceridae	14

Buffalo Creek: Site # 2, Qualitative Sample cont.

<u>TAXA</u>	<u>NUMBER</u>
HEMIPTERA:	
Belostomatidae/ <i>Abedus/Belostoma</i> nymphs	2
Gerridae/ <i>Gerris remigis</i> nymph	1
<i>Gerris remigis</i> adult males	2
<i>Gerris remigis</i> adult females	2
<i>Rheumatobates rileyi</i> nymph	1
<i>Rheumatobates rileyi</i> adult males	2
<i>Rheumatobates rileyi</i> adult females	4
<i>Trepobates</i> nymphs	2
<i>Trepobates pictus</i>	1
Veliidae/ <i>Rhagovelia obesa</i> female	1
ISOPODA:	
Asellidae/ <i>Lirceus</i>	26
MEGALOPTERA:	
Sialidae/ <i>Sialis</i>	8
ODONATA:	
Aeshnidae/ <i>Boyeria vinosa</i>	5
Coenagrionidae/ <i>Argia</i>	10
Gomphidae/ <i>Gomphus lividus</i>	1
PELECYPODA:	
Sphaeriidae/ <i>Sphaerium</i>	15
PLECOPTERA:	
Perlidae/ <i>Acroneuria</i>	1
TRICHOPTERA:	
Hdropsychidae/ <i>Cheumatopsyche</i>	7
<i>Hydropsyche betteni/depravata</i>	1
	<hr/>
	208

**BUFFALO CREEK
SITE 2
BENTHIC MACROINVERTEBRATES**



n = 208
TAXA RICHNESS = 36
Figure 4.

North Fork Clinch River

One qualitative fishery survey was conducted in June 1991:

Location and Length - Tributary to the Clinch River. The sample site was located at Manis Ford, just off Manis Circle Road, near North Fork Clinch River mi 1.5 and was sampled on 11 June 1991. It was 400 ft in length and averaged 35.1 ft in width. The site was in Hancock County (Looneys Gap Quadrangle).

Sampling Methodology - The site was sampled using two backpack electrofishing units operating at 120 volts AC.

Water Quality - Data were collected from midstream at mid-depth on 11 June 1991: DO - 9.4 ppm, pH - 8.0, Temperature - 65 F, Conductivity - 250 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample. The sample contained 322 organisms representing 45 taxa.

Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by</u>	
		<u>No.</u>	<u>Wt.</u>
Smallmouth bass	7	1.5	2.58
Rock bass	38	8.2	5.61
Longear sunfish	28	6.0	2.08
Redbreast sunfish	4	0.9	0.65
Non-game Fish	20	4.3	7.98
Forage Fish	365	78.8	3.87
Total	462		22.77

Comments - This stream was surveyed primarily to develop a fish species list for TADS. The Agency has made no previous studies or fish collections from this stream. The stream heads up in Virginia and flows southwest into the Clinch River. About 2.2 mi of the lower stream flows into Tennessee where it joins the Clinch River at river mi 192.

We collected a total of 462 fish weighing 22.77 lb and comprising 32 species from our sample site. Three native game species, smallmouth bass (*Micropterus dolomieu*), rock bass (*Ambloplites rupestris*), and longear sunfish (*Lepomis megalotis*) along with the exotic redbreast sunfish (*L. auritus*) were found. A 17-in channel catfish (*Ictalurus punctatus*) was also collected. Only four redbreast sunfish were collected, therefore, comparison

of inch class distribution was made for smallmouth bass, rock bass, and longear sunfish (Fig. 5). Rock bass made up about 8% compared to about 6% by longear sunfish and about 2% by smallmouth bass of the total number of fish collected. Rock bass also contributed about 25% of the total weight as compared to 11% by smallmouth bass and 9% by longear sunfish. Three non-game and 25 forage species were also collected here and these comprised about 83% of the total number and 52% 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 six specimens of the stargazing minnow were collected. Of special interest was the occurrence of a specimen of the mountain shiner (*Lythrurus lirus*). The mountain shiner is of common occurrence in the Clinch River system in Virginia (Snelson 1980), however our collection is the first record of this species from the upper Clinch River in Tennessee (David A. Etnier, personal communication) and the specimen was deposited in the University of Tennessee Research Collection of Fishes (UT Cat. No. 44.5456). Eight darter species, the greenside (*Etheostoma blennioides*), fantail (*E. flabellare*), redline (*E. rufilineatum*), snubnose (*E. simoterum*), blueside (*E. stigmaeum jessiae*), tangerine (*Percina aurantiaca*), logperch (*P. caprodes*), and the gilt (*P. evides*), were also collected. River chubs (*Nocomis micropogon*), and warpaint and Tennessee shiners were the most abundant forage species present. A single mountain madtom (*Noturus eleutherus*) was also collected here.

Based on fish species occurrence, this stream appears to be an excellent quality Ridge and Valley stream. A total of 32 species was collected and as stated above, several were fairly intolerant forms, even though the stream probably receives considerable run-off from agricultural and other activities in the watershed. The occurrence of eight darter species further attests to good water quality. Smallmouth bass and rock bass are the primary game species present and it appears to support a good to excellent fishery. It is also 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).

Benthic macroinvertebrates from our sample site included Baetidae, Ephemerellidae, Ephemeridae, Heptageniidae, Oligoneuriidae, and Tricorythidae mayflies, the perlid stonefly *Perlesta placida*, Brachycentridae, Hydropsychidae, Leptoceridae, Uenoidae, and Polycentropodidae caddisflies, and Elmidae and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) was present and relic *Elliptio dilatata*, *Fusconaia barnesiana*, *Lampsilis fasciola*, *Potamilus alatus*, and *Villosa iris* were collected. Gastropods included unidentified pleurocerids, *Anculosa subglobosa*, and the mud snail (*Campeloma*). *Cambarus*

longirostris and an unidentified *Orconectes* sp. were the only crayfish collected. Ephemeropterans represented about 29%, coleopterans about 16%, trichopterans about 14%, odonates about 13%, and plecopterans about 7% of the total number of organisms collected (Fig. 6). A total of 45 taxa was collected at this site. Of special interest is the collection of the ephemereid mayfly *Attenella attenuata*. The occurrence of this species is uncommon in Tennessee and this is our first collection record.

Management Recommendations:

1. The fish species diversity and taxa richness of benthic 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. Consider conducting more intensive population surveys in the future, i.e., quantitative three-pass electrofishing samples along with age and growth characteristics.

4357 11 NE
(Box Hw 170-NE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

83°00' 36°37'30" VA. 680,000 FEET 322000m E. 323 324 57°30' 325

4054000m N.

4053

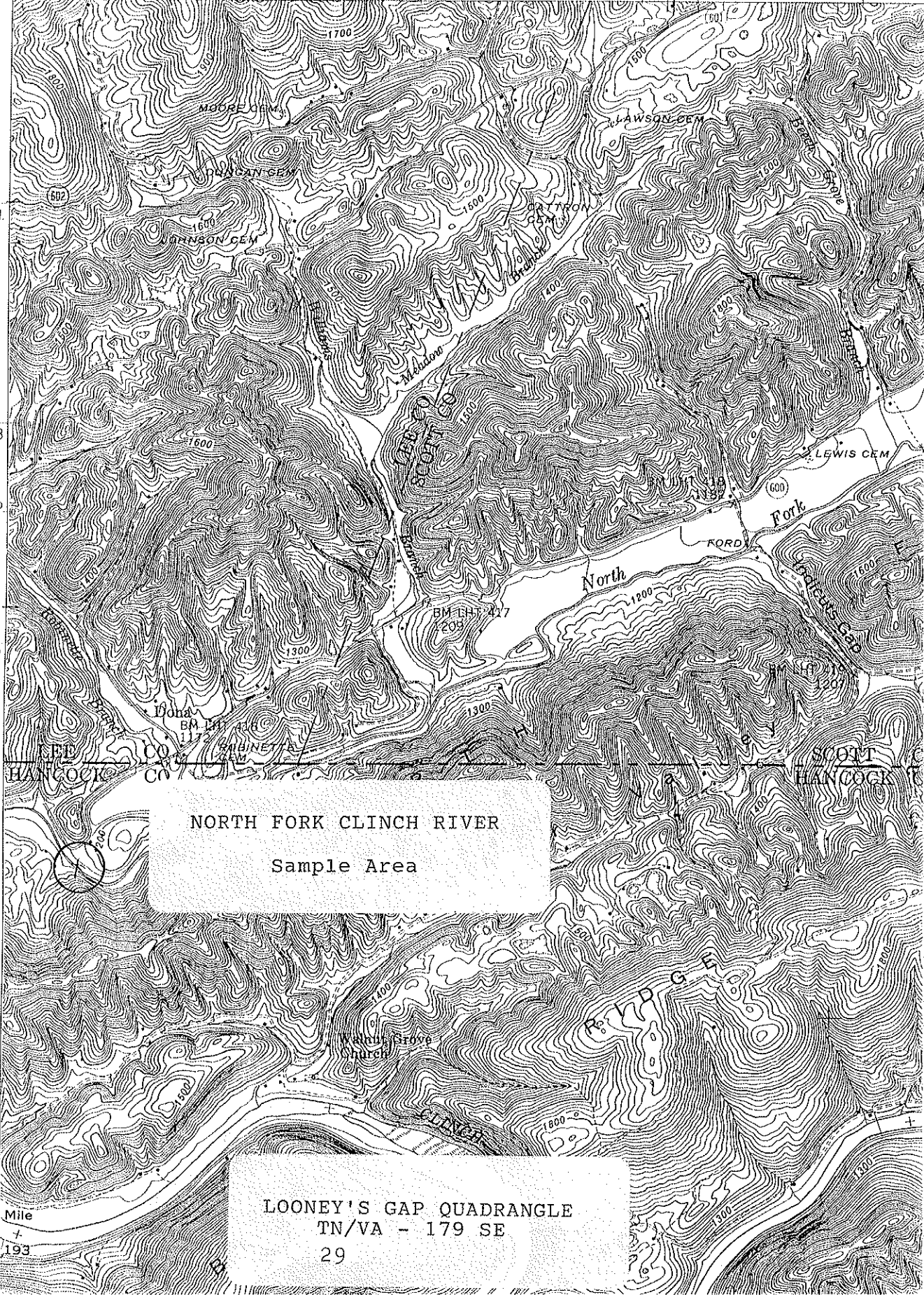
VA. 130,000 FEET

4052

4051

35'

4050



NORTH FORK CLINCH RIVER
Sample Area

LOONEY'S GAP QUADRANGLE
TN/VA - 179 SE
29

Mile
+
193

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: North Fork Clinch River Date: 11 June 1991
Watershed: Clinch River County: Hancock
Area: See comments Sample Length: 400 ft
Lat-Long: 363523N - 835947W Reach: 06010205-56,0
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 35.1 ft Avg. Depth 1.0 ft Max. Depth 3.3 ft
2. Estimated Percent of Stream in Pools is 50%.
3. Estimated Percent Pool Bottom is Silt 10% Sand 20% Gravel 25% Rubble 25% Boulders 20%.
4. Estimated Percent Riffle Bottom is Silt 5% Sand 25% Gravel 30% Rubble 30% Boulders 10%.
5. Abundance of Littoral Aquatic Plants is Average (*Dianthera americana*).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 30% of the Stream, Average in 50%, Poor in 20%.
7. Shade or Canopy Good over 80% of Stream.
8. Flow (CFS) 49.7: Compared to Normal: Normal
9. Present Weather: Overcast. Air temperature - 81 F @ 9:50 am.
10. Weather (last 24 h): Overcast.
11. pH 9.0 Temp. 65 F Conductivity 250 micromhos/cm
D.O. 9.4 ppm Saturation 101%
12. Comments: Sample area location was at Manis Ford., just off Manis Circle Road.

FISH DATA

Stream: North Fork Clinch River Date: 11 June 1991
 Watershed: Clinch River County: Hancock
 Area: See comments Sample Length: 400 ft
 Lat-Long: 363523N - 835947W Reach: 06010205-56,0
 Type of Sampling: Electrofishing Elevation: 1,140 ft
 Gear Type: 2 Backpack Units Time: 1420 - 1530

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Micropterus dolomieu</i>	218	1	3	0.02
" "	"	2	7	0.36
" "	"	1	8	0.26
" "	"	1	9	0.43
" "	"	1	10	0.62
" "	"	1	12	0.89
<i>Ambloplites rupestris</i>	13	2	2	0.01
" "	"	6	3	0.24
" "	"	8	4	0.51
" "	"	6	5	0.78
" "	"	9	6	1.75
" "	"	4	7	1.12
" "	"	3	8	1.20
<i>Lepomis auritus</i>	201	2	5	0.22
" "	"	1	6	0.16
" "	"	1	7	0.27
<i>L. megalotis</i>	208	14	3	0.46
" "	"	8	4	0.68
" "	"	6	5	0.94
<i>Ameiurus natalis</i>	174	1	11	1.05
<i>Ictalurus punctatus</i>	176	1	17	1.84
<i>Noturus eletherus</i>	283	1	1	t
<i>Hypentelium nigricans</i>	166	7	2-12	1.85
<i>Moxostoma duquesnei</i>	229	11	3-14	3.24

Site located at Manis Ford; off Manis Circle Road. Shocking at 480 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

FISH DATA (continued)

Stream: North Fork Clinch River Date: 11 June 1991
 Watershed: Clinch River County: Hancock
 Area: See comments Sample Length: 400 ft
 Lat-Long: 363523N - 835947W Reach: 06010205-56,0
 Type of Sampling: Electrofishing Elevation: 1,140 ft
 Gear Type: 2 Backpack Units Time: 1420 - 1530

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Campostoma anomalum</i>	25	18	2-4	0.29
<i>Cyprinella galactura</i>	253	1	2	t
<i>Erimystax dissimilis</i>	157	13	3-4	0.18
<i>Hybopsis amblops</i>	155	11	2	0.04
<i>Luxilus coccogenis</i>	248	65	1-5	0.62
<i>L. chrysocephalus</i>	249	38	1-4	0.46
<i>Lythrurus lirus</i> *	237	1	1	t
<i>Nocomis micropogon</i>	234	41	1-8	1.45
<i>Notropis leuciodus</i>	255	50	1-2	0.16
<i>Notropis</i> sp. cf. <i>N. spectrunculus</i>	266	18	1-2	0.04
<i>N. telescopus</i>	272	13	1-2	0.04
<i>N. volucellus</i>	277	3	1	t
<i>Phenacobius uranops</i>	330	6	3-4	0.06
<i>Pimephales notatus</i>	334	1	3	0.01
<i>Etheostoma blennioides</i>	81	16	1-3	0.15
<i>E. flabellare</i>	92	1	2	t
<i>E. rufilineatum</i>	108	18	1	0.03
<i>E. simoterum</i>	111	18	1-2	0.04
<i>E. stigmaeum jessiae</i>	96	7	1-2	0.02
<i>Percina aurantiaca</i>	304	4	4-5	0.15
<i>P. caprodes</i>	306	2	3-4	0.06
<i>P. evides</i>	310	4	1-2	0.02
<i>Cottus carolinae</i>	40	15	1-2	0.05

* Specimen went to University of Tennessee Research Collection of Fishes (UT Cat. No. 44.5456).

Site located at Manis Ford; off Manis Circle Road. Shocking at 120 volts AC.

Collectors: R.D. Bivens, Mark T. Fagg, and C.E. Williams

GAME FISH FROM NORTH FORK CLINCH RIVER
INCH CLASS DISTRIBUTION

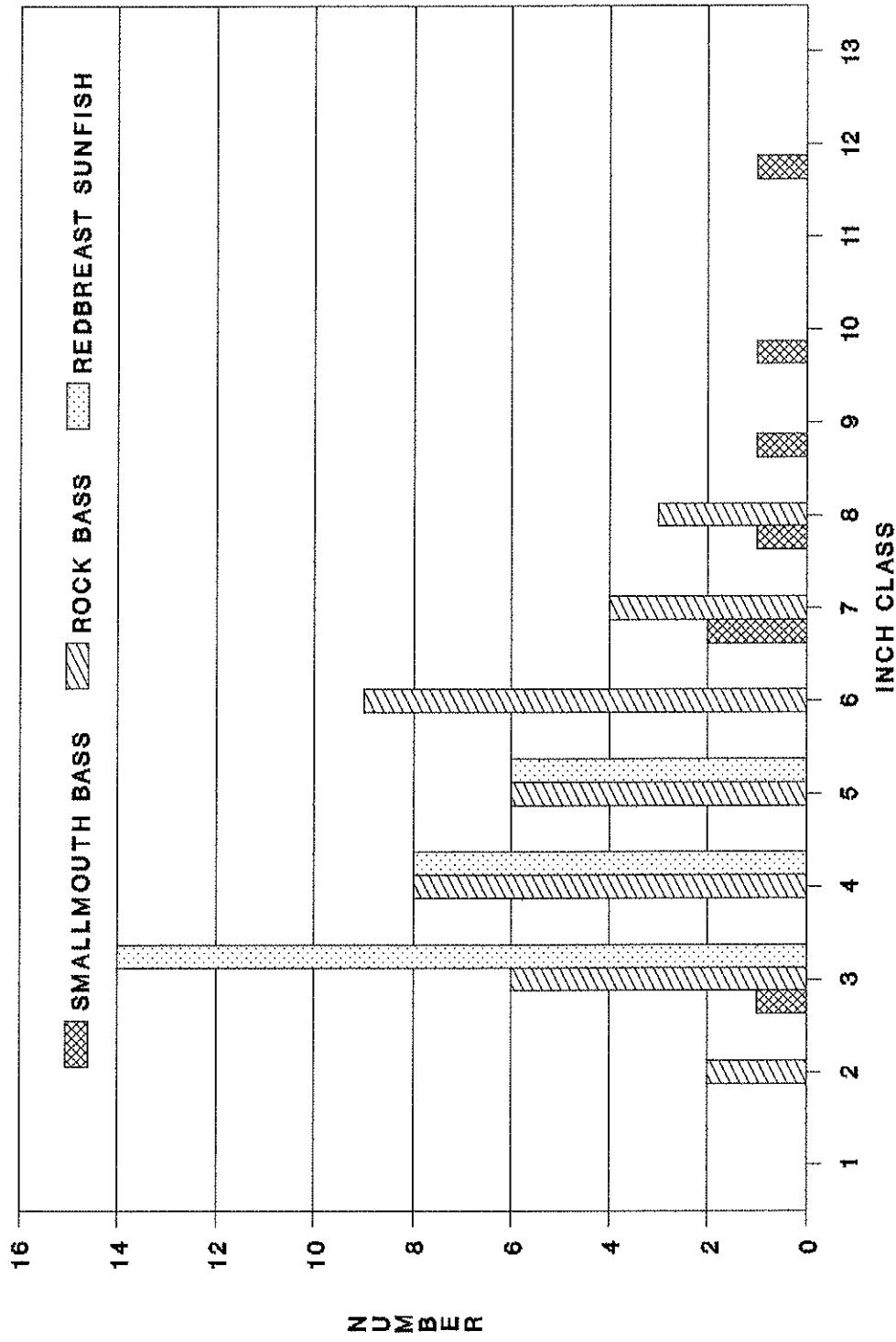


Figure 5.

North Fork Clinch River: Qualitative Benthic Sample

11 June 1991

Field # 285

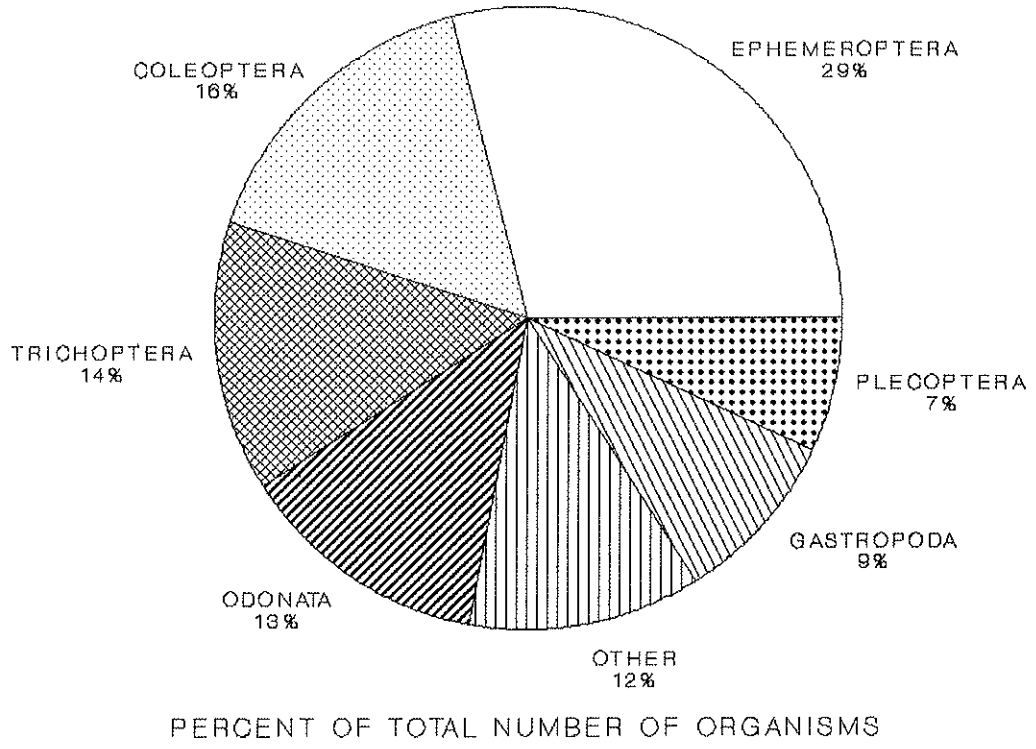
Hancock Co., TN; At Manis Ford, just off Manis Circle Road.
 Coordinates: 363523N - 835947W. Looneys Gap, Tenn., # 179 SE
 Quad. Reach # 06010205-56,0.

<u>TAXA</u>	<u>NUMBER</u>
COLEOPTERA:	
Elmidae/ <i>Dubiraphia</i> larva	1
<i>Dubiraphia</i> adults	15
<i>Macronychus glabratus</i> larvae	2
<i>Macronychus glabratus</i> adults	21
<i>Optioservus trivittatus</i> adult	1
<i>Stenelmis</i> adult	1
Psephenidae/ <i>Psephenus herricki</i> larvae	6
<i>Psephenus herricki</i> adults	4
DECAPODA:	
Cambaridae/ <i>Cambarus longirostris</i> female	1
<i>Orconectes</i> juvenile female	1
DIPTERA:	
Chironomidae	4
Simuliidae	1
Tipulidae/ <i>Antocha</i>	1
EPHEMEROPTERA:	
Baetidae/ <i>Baetis</i>	8
Ephemerellidae/ <i>Attenella attenuata</i>	1
<i>Eurylophella</i>	15
Ephemeridae/ <i>Hexagenia</i>	41
Heptageniidae/ <i>Stenacron interpunctatum</i>	1
<i>Stenonema</i>	5
Oligoneuriidae/ <i>Isonychia</i>	22
Tricorythidae/ <i>Tricorythodes</i>	1
GASTROPODA:	
Pleuroceridae/ <i>Anculosa subglobosa</i>	17
Unid.	13
Viviparidae/ <i>Campeloma</i>	3
HEMIPTERA:	
Veliidae/ <i>Microvelia</i> nymph	1
<i>Rhagovelia obesa</i> male	1
<i>Rhagovelia obesa</i> females	2

North Fork Clinch River: Qualitative Sample cont.

<u>TAXA</u>	<u>NUMBER</u>
MEGALOPTERA:	
Corydalidae/ <i>Corydalus cornutus</i>	1
<i>Nigronia serricornis</i>	6
Sialidae/ <i>Sialis</i>	4
ODONATA:	
Aeshnidae/ <i>Boyeria vinosa</i>	10
Calopterygidae/ <i>Calopteryx</i>	4
Coenagrionidae/ <i>Argia</i>	7
<i>Enallagma</i>	5
Gomphidae/ <i>Dromogomphus spinosus</i>	5
<i>Gomphurus lineatifrons</i>	2
<i>Gomphus lividus</i>	2
<i>G. quadricolor</i>	1
<i>Hagenius brevistylus</i>	2
<i>Ophiogomphus mainensis</i>	2
Macromiidae/ <i>Macromia</i>	2
PLECOPTERA:	
Perlidae/ <i>Perlesta placida</i> nymphs	20
<i>Perlesta placida</i> adult	1
PELECYPODA:	
Corbiculidae/ <i>Corbicula fluminea</i>	12
Unionidae/ <i>Elliptio dilatata</i> relics	
<i>Fusconaia barnesiana</i> relics	
<i>Lampsilis fasciola</i> relics	
<i>Potamilus alatus</i> relic	
<i>Villosa iris</i> relics	
TRICHOPTERA:	
Brachycentridae/ <i>Brachycentrus</i>	3
Hydropsychidae/ <i>Cheumatopsyche</i>	8
<i>Hydropsyche</i>	2
<i>Hydropsyche betteni/depravata</i>	21
<i>Symphitopsyche bronta</i>	7
Leptoceridae/ <i>Oecetis</i>	1
Uenoidae/ <i>Neophylax</i>	3
Polycentropodidae/ <i>Neureclipsis</i>	1
	322

**NORTH FORK CLINCH RIVER
BENTHIC MACROINVERTEBRATES**



n = 322
TAXA RICHNESS = 45
Figure 6.

Gallagher Creek and Tributaries

One qualitative fishery survey was conducted on Gallagher Creek and two samples on two of its tributaries in June 1991:

Location and Length - Tributary to the Tennessee River (Fort Loudoun Reservoir). The sample site was located at the bridge crossing on Unitia Road and was sampled on 18 June 1991. It was 400 ft in length and averaged 19.4 ft in width. The site was in Blount County (Concord Quadrangle). (See accompanying maps showing tributary sample locations).

Sampling Methodology - The site was sampled using two backpack electrofishing units operating at 110 volts AC.

Water Quality - Data were collected from midstream at mid-depth on 18 June 1991: DO - 10.4 ppm, pH - 8.2, Temperature - 64 F, Conductivity - 275 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample. The sample contained 450 organisms representing 41 taxa.

Fish Collected:

<u>Species</u>	% by		% by	
	<u>No.</u>	<u>No.</u>	<u>Wt.</u>	<u>Wt.</u>
Largemouth bass	5	1.6	0.96	2.4
Green sunfish	34	10.6	1.40	3.4
Bluegill	52	16.3	1.40	3.4
Redbreast sunfish	53	16.6	1.93	4.7
Non-game Fish	45	14.1	32.38	79.5
Forage Fish	131	41.0	2.64	6.5
Total	320		40.71	

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

Comments - We sampled one site on Gallagher Creek proper and two sites on its tributaries primarily to develop a fish species list and to collect stream data for TADS. We were also interested in checking the possible occurrence of the flame chub (*Hemitremia flammea*) from some of the spring tributaries in the watershed. The Agency has made no previous studies or fish collections from this stream.

We collected 320 fish weighing 40.71 lb and comprising 16 species from the mainstream sample site. Three native game fish

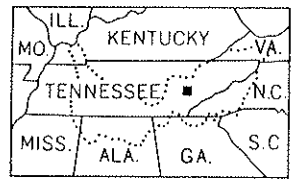
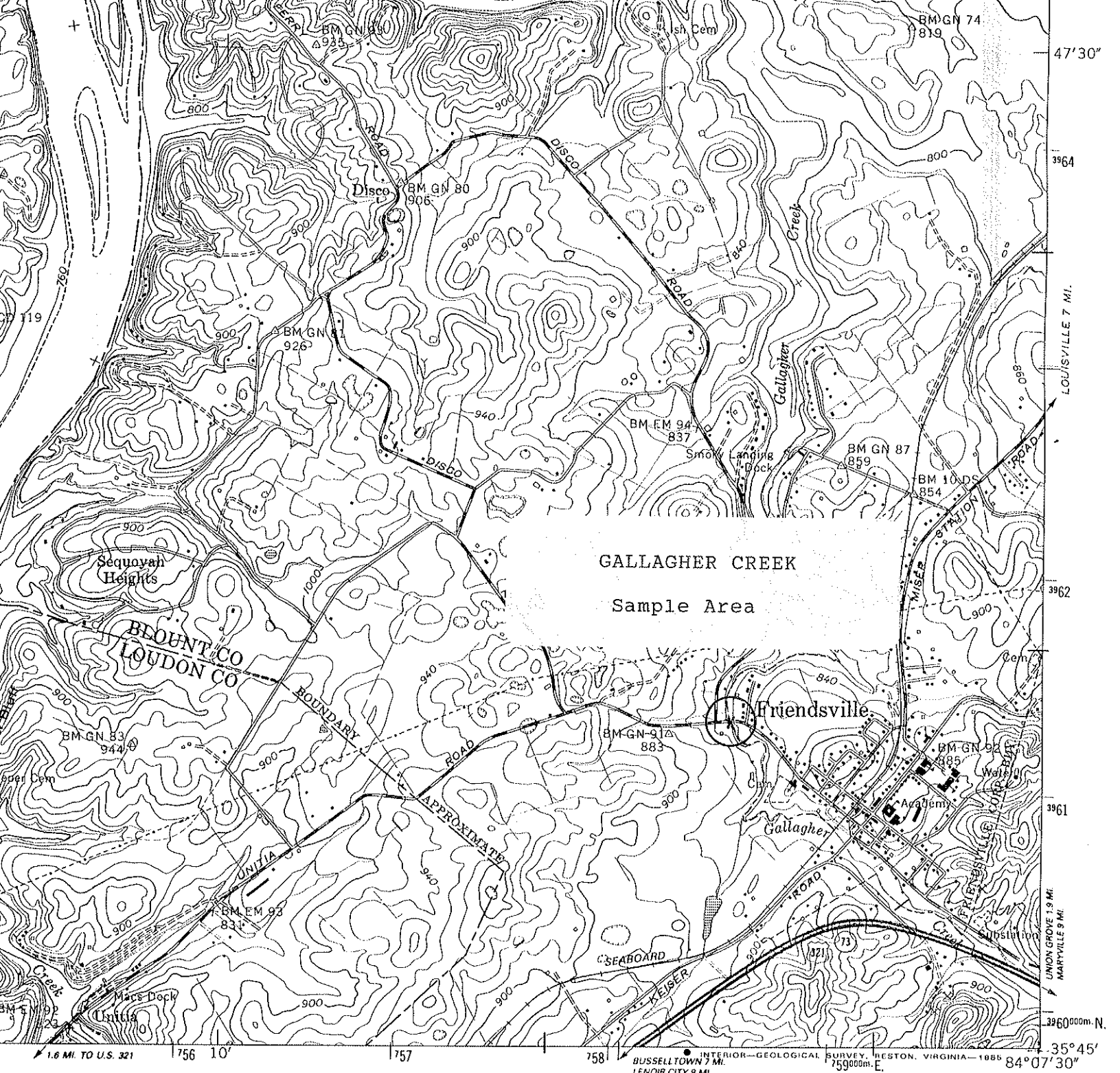
species, largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), and bluegill (*L. macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were collected. Except for one 13-in specimen, all largemouth bass were YOY, therefore, comparison of inch class distribution was made for redbreast sunfish, green sunfish, and bluegill only (Fig. 7). Bluegill made up about 11% as compared to about 16% by both redbreast and green sunfish of the total number of fish collected. Redbreast sunfish contributed about 5% of the total weight compared to 3% each by bluegill and green sunfish. Six non-game and six forage species were also collected and these comprised 55% of the total number and 86% of the total weight. Nine common carp (*Cyprinus carpio*) alone, accounted for 60% of the total weight collected. Forage fish made up only about 40% of all fish collected and were represented by fairly tolerant forms. The spotfin shiner (*Cyprinella spiloptera*) was the only shiner species found and the snubnose (*Etheostoma simoterum*) and logperch (*Percina caprodes*) were the only darter species collected.

No flame chubs were found in the tributary samples and the blacknose dace (*Rhinichthys atratulus*) was the only additional species encountered in the tributaries but not in the main stream sample. In all, only 17 species were collected from the three sample sites. Gallagher Creek is a low gradient stream that has been heavily impacted by non-point source pollution, mainly agricultural activities, throughout the watershed. The fish species assemblage were typical components of streams with polluted conditions and as stated above, no intolerant forms were collected.

Benthic macroinvertebrates from our sample included Baetidae, Ephemerellidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, Leuctridae and Perlidae stoneflies, Brachycentridae, Hydropsychidae, Limnephilidae, Philopotamidae, and Uenoidae caddisflies, and Elmidae and Haliplidae beetles. The Asian clam (*Corbicula fluminea*) was present along with pleurocerid snails. Three species of crayfish, *Cambarus longirostris*, *Orconectes erichsonianus*, and *O. forceps* were present in the mainstream sample and *C. bartonii* was collected from the Big Springs site. Ephemeropterans represented about 42%, trichopterans about 29%, gastropods about 7%, and plecopterans about 4% of the total number of organisms collected (Fig. 8). A total of 41 taxa was collected at this site, but many were tolerant forms.

Management Recommendations:

1. No specific management can be suggested at present. However, anything to abate the non-point source pollution would be beneficial.



QUADRANGLE LOCATION

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

CONCORD, TENN.
35084-G2-TF-024

1968
PHOTOREVISED 1984
DMA 4155 I SW-SERIES V841

DS
A 22092,
ASHVILLE, TENN., 37219
KNOXVILLE, TENN., 37902
E ON REQUEST

2000
1984
and
2000
2000

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Gallagher Creek Date: 18 June 1991
Watershed: Tennessee River County: Blount
Area: See comments Sample Length: 400 ft
Lat-Long: 354549N - 840826W Reach: 06010201-
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 19.4 ft Avg. Depth 0.8 ft Max. Depth 2.4 ft
2. Estimated Percent of Stream in Pools is 24%.
3. Estimated Percent Pool Bottom is Silt 25% Sand 5% Gravel 5% Rubble 5% Boulders 25% Bedrock 35%.
4. Estimated Percent Riffle Bottom is Silt 10% Sand 5% Gravel 5% Rubble 10% Boulders 35% Bedrock 35%.
5. Abundance of Littoral Aquatic Plants is Scarce (some water-cress and rush).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25% of the Stream, Average in 65%, Poor in 10%.
7. Shade or Canopy Good over 90% of Stream.
8. Flow (CFS) 9.3: Compared to Normal: Normal
9. Present Weather: Cloudy to partly cloudy. Air temperature - 85 F @ 10:30 am.
10. Weather (last 24 h): Partly cloudy with scattered rain.
11. pH 8.2 Temp. 64 F Conductivity 275 micromhos/cm
D.O. 10.4 ppm Saturation 109%
12. Comments: Sample area location was upstream of bridge on Unitia Road in Friendsville. Siltation heavy in pool areas. Not a lot of pool area and cover is limited for fish, but boulders offer some good habitat.

FISH DATA

Stream: Gallagher Creek Date: 18 June 1991
 Watershed: Tennessee River County: Blount
 Area: See comments Sample Length: 400 ft
 Lat-Long: 354549N - 840826W Reach: 06010201-
 Type of Sampling: Electrofishing Elevation: 820 ft
 Gear Type: 2 Backpack Units Time: 1335 - 1435

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Micropterus salmoides</i>	220	2	1	0.02
" "	"	1	2	0.01
" "	"	1	3	0.01
" "	"	1	13	0.92
<i>Lepomis auritus</i>	201	14	2	0.18
" "	"	28	3	0.72
" "	"	7	4	0.39
" "	"	1	5	0.13
" "	"	3	6	0.51
<i>L. cyanellus</i>	202	11	2	0.14
" "	"	12	3	0.27
" "	"	6	4	0.36
" "	"	4	5	0.47
" "	"	1	6	0.16
<i>L. macrochirus</i>	206	18	2	0.22
" "	"	23	3	0.54
" "	"	10	4	0.52
" "	"	1	5	0.12
<i>Ameiurus natalis</i>	174	2	5-8	0.41
<i>Aplodinotus grunniens</i>	20	4	10-11	1.94
<i>Hypentelium nigricans</i>	166	22	3-13	4.56
<i>Moxostoma erythrurum</i>	230	2	4-5	0.14
<i>Dorosoma cepedianum</i>	48	6	7-8	0.83

Site located at the bridge on Unitia Road in Friendsville.
 Shocking at 110 volts AC. Siltation was fairly heavy along the
 stream course.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

FISH DATA (continued)

Stream: Gallagher Creek Date: 18 June 1991
 Watershed: Tennessee River County: Blount
 Area: See comments Sample Length: 400 ft
 Lat-Long: 354549N - 840826W Reach: 06010201-
 Type of Sampling: Electrofishing Elevation: 820 ft
 Gear Type: 2 Backpack Units Time: 1335 - 1435

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Campostoma anomalum</i>	25	39	1-5	1.20
<i>Cyprinella spiloptera</i>	269	9	2-4	0.18
<i>Cyprinus carpio</i>	47	9	13-19	24.50
<i>Notemigonus crysoleucas</i>	235	2	3-4	0.06
<i>Etheostoma simoterum</i>	111	3	1-2	0.02
<i>Percina caprodes</i>	306	21	3-5	0.42
<i>Cottus carolinae</i>	40	57	1-4	0.76

Site located at the bridge on Unitia Road in Friendsville.
 Shocking at 110 volts AC. Siltation was fairly heavy along the
 stream course.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

GAME FISH COLLECTED FROM GALLAGHER CREEK
INCH CLASS DISTRIBUTION

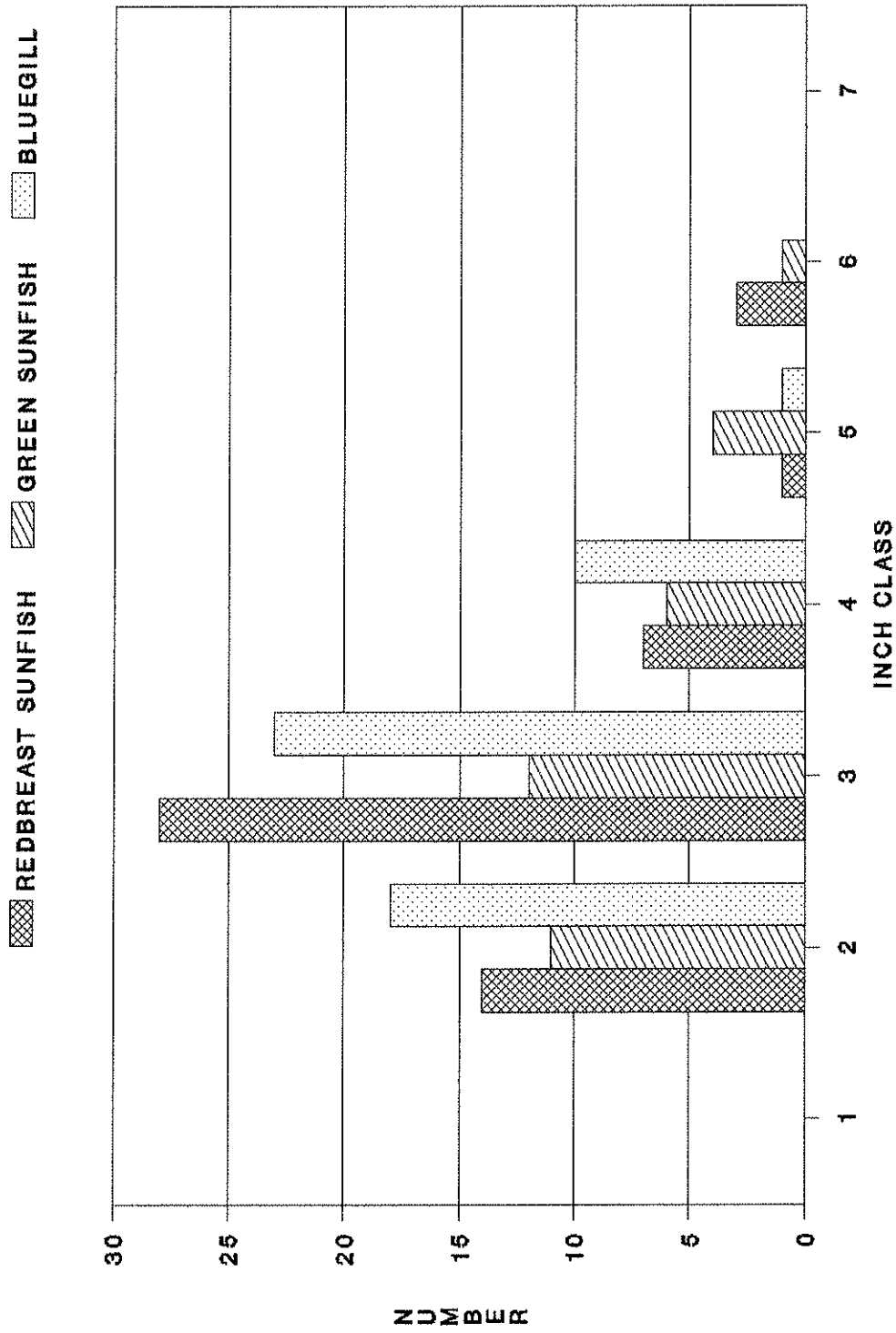


Figure 7.

Gallagher Creek: Qualitative Benthic Sample

18 June 1991

Field # 287

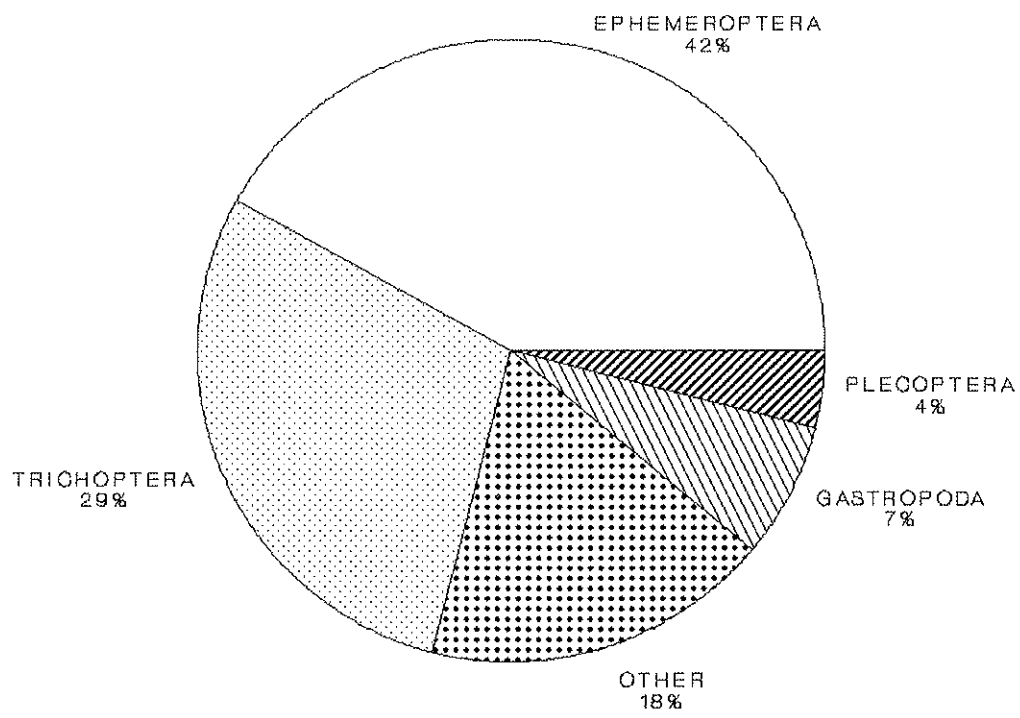
Blount Co., TN; At the bridge on Unitia Road. Coordinates:
354549N - 840826W. Concord, Tenn., # 138 SW Quad. Reach #
06010201-.

<u>TAXA</u>	<u>NUMBER</u>
ANNELIDA:	
Hirudinea	1
Oligochaeta	1
COLEOPTERA:	
Elmidae/ <i>Macronychus glabratus</i> adults	2
<i>Stenelmis</i> larvae	4
<i>Stenelmis</i> adults	3
Haliplidae/ <i>Peltodytes</i> adult	1
DECAPODA:	
Cambaridae/ <i>Cambarus longirostris</i> 1st form male	1
<i>Cambarus longirostris</i> females	2
<i>Orconectes erichsonianus</i> 2nd form males	2
<i>Orconectes erichsonianus</i> females	2
<i>O. forceps</i> 2nd form males	3
<i>O. forceps</i> females	2
DIPTERA:	
Chironomidae	3
Simuliidae	1
Tipulidae/ <i>Antocha</i>	1
<i>Hexatoma</i>	1
<i>Tipula</i>	3
EPHEMEROPTERA:	
Baetidae/ <i>Baetis</i>	47
Ephemerellidae/ <i>Ephemerella</i>	4
Ephemeridae/ <i>Hexagenia</i>	2
Heptageniidae/ <i>Heptagenia</i>	10
<i>Stenacron</i>	6
<i>Stenacron interpunctatum</i>	10
<i>Stenonema</i>	24
<i>Stenonema mediopunctatum</i>	7
Oligoneuriidae/ <i>Isonychia</i>	78
GASTROPODA:	
Pleuroceridae	33

Gallagher Creek: Qualitative Sample cont.

<u>TAXA</u>	<u>NUMBER</u>
HEMIPTERA:	
Gerridae/ <i>Gerris remigis</i> male	1
<i>Gerris remigis</i> females	2
<i>Microvelia</i>	1
<i>Rhagovelia obesa</i> male	1
<i>Rhagovelia obesa</i> females	12
HYDRACARINA:	1
ISOPODA:	
Asellidae/ <i>Lirceus</i>	3
MEGALOPTERA:	
Corydalidae/ <i>Nigronia serricornis</i>	5
Sialidae/ <i>Sialis</i>	1
ODONATA:	
Aeshnidae/ <i>Boyeria vinosa</i>	7
Calopterygidae/ <i>Calopteryx</i>	3
Gomphidae/ <i>Hagenius brevistylus</i>	1
PELECYPODA:	
Corbiculidae/ <i>Corbicula fluminea</i>	6
PLECOPTERA:	
Leuctridae	3
Perlidae/ <i>Paragnetina media</i>	17
TRICHOPTERA:	
Brachycentridae/ <i>Brachycentrus</i>	6
Hydropsychidae/ <i>Cheumatopsyche</i>	22
<i>Hydropsyche betteni/depravata</i>	79
Limnephilidae/ <i>Pycnopsyche</i>	1
Philopotamidae/ <i>Chimara</i>	2
Psychomyiidae/ <i>Psychomia flavida</i>	1
Uenoidae/ <i>Neophylax</i>	21
	450

**GALLAGHER CREEK
BENTHIC MACROINVERTEBRATES**



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 450
TAXA RICHNESS = 41
Figure 8.

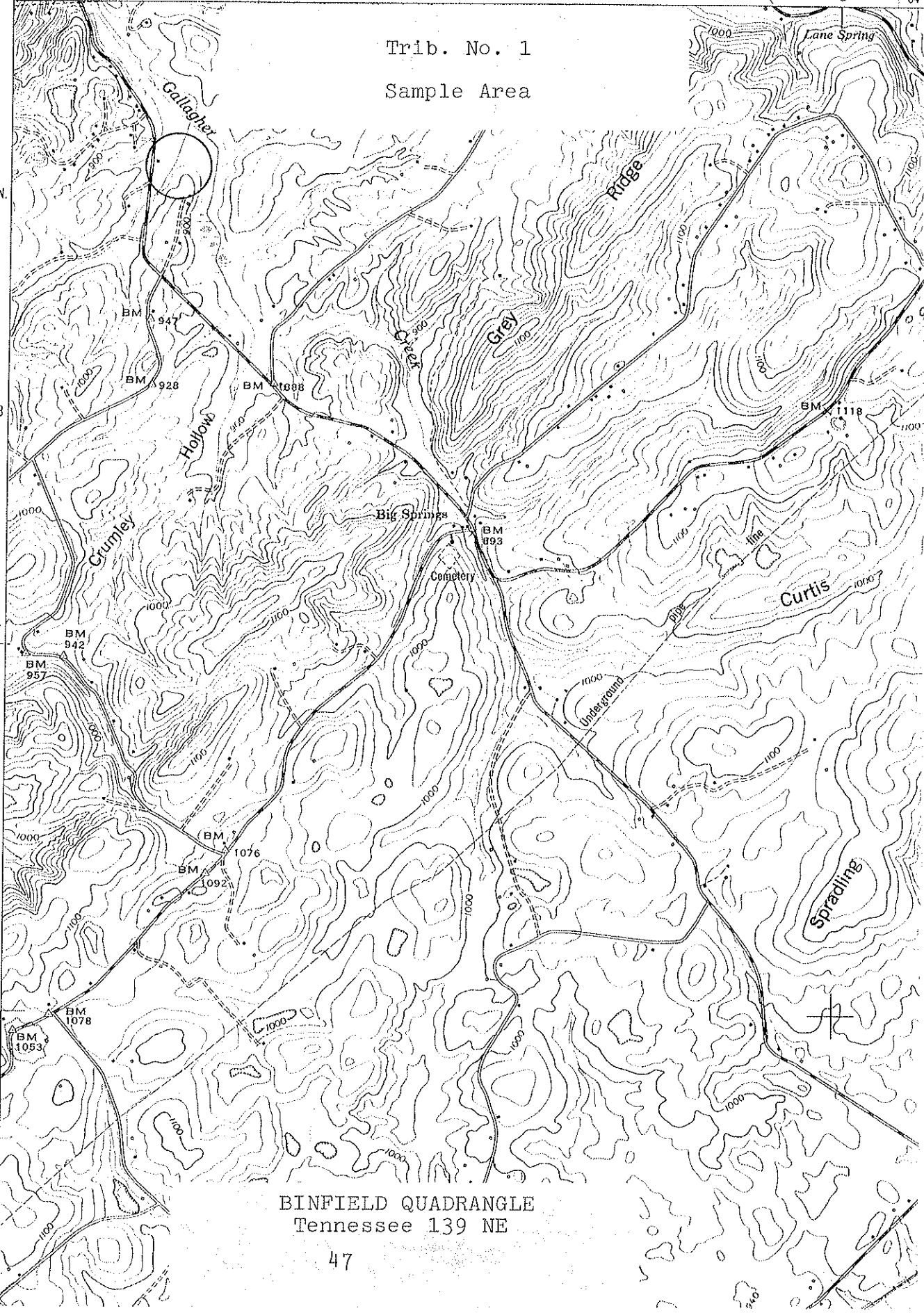
41.55 / SW
CONCORD 138-SW

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

84°07'30" FRIENDSVILLE 1.1 MI. 762000m E. UNION GROVE 0.4 MI. 5' 764

Trib. No. 1
Sample Area

3959000m N.
3958
3957
3956
42'30"
3955
3954



BINFIELD QUADRANGLE
Tennessee 139 NE

FISH DATA

Stream: Trib. to Gallagher Creek Date: 18 June 1991
 Watershed: Tennessee River County: Blount
 Area: See comments Sample Length: 100 ft
 Lat-Long: 354436N - 840701W Reach: 06010101-
 Type of Sampling: Electrofishing Elevation: 860 ft
 Gear Type: 1 Backpack Unit Time: PM sampling

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Campostoma anomalum</i>	25	(Present but not counted)		
<i>Rhinichthys atratulus</i>	351	(Present but not counted)		
<i>Cottus carolinae</i>	40	(Present but not counted)		

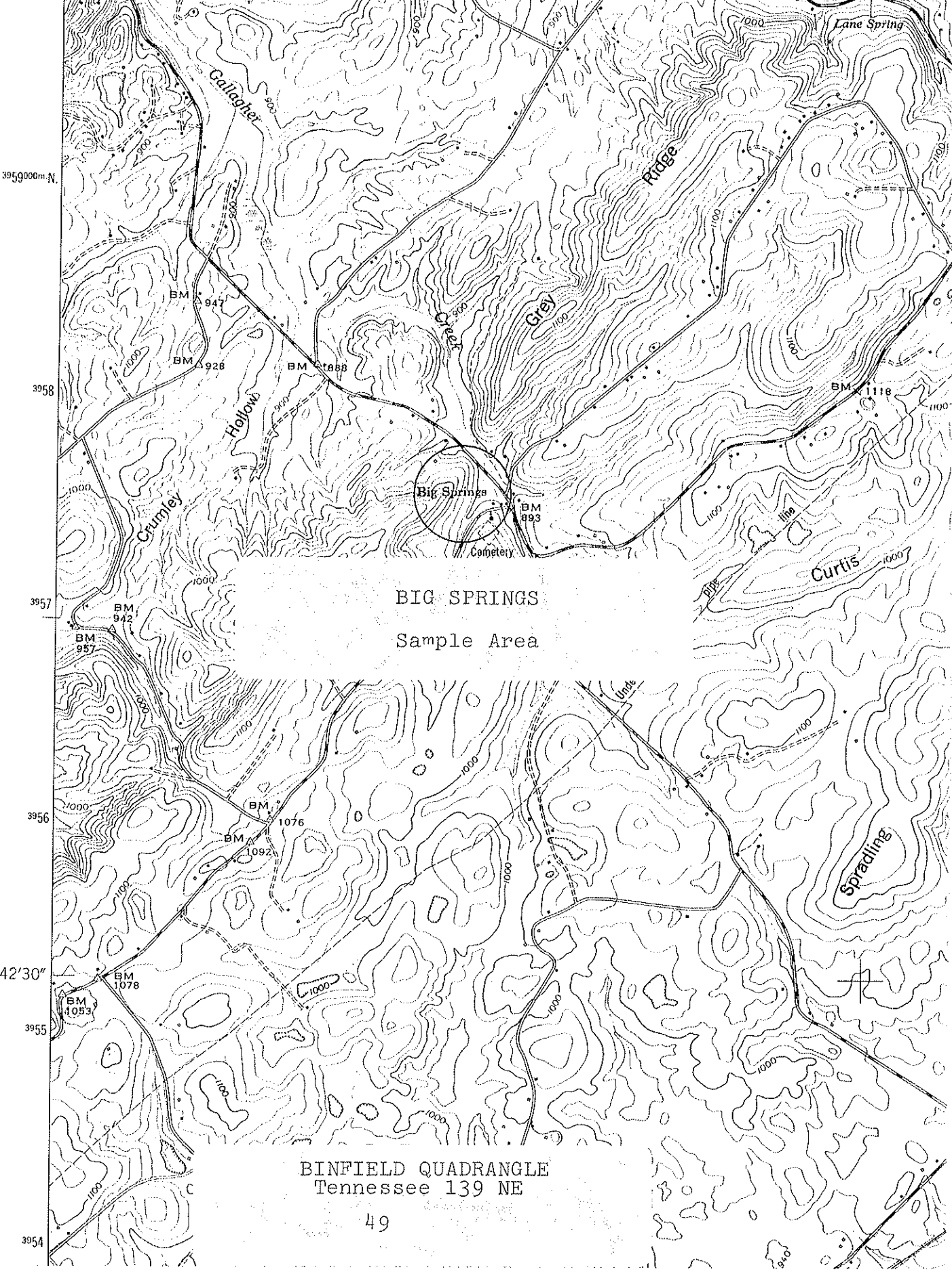
Tributary site was located off Big Springs Road on Bivens' Farm property, approximately 1.2 mi NW of Big Springs. Shocking at 120 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

4155 1 SW
CONCORD 139 SW

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

84°07'30" FRIENDSVILLE 1.1 MI. 762000m.E. UNION GROVE 0.4 MI. 5' 764



BIG SPRINGS
Sample Area

BINFIELD QUADRANGLE
Tennessee 139 NE

FISH DATA

Stream: Big Springs
Trib. to Gallagher Creek Date: 18 June 1991
 Watershed: Tennessee River County: Blount
 Area: See comments Sample Length: 200 ft
 Lat-Long: 354343N - 840610W Reach: 06010201-
 Type of Sampling: Electrofishing Elevation: 890 ft
 Gear Type: 1 Backpack Unit Time: PM sampling

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Lepomis cyanellus</i>	202	(Present but not counted)		
<i>Campostoma anomalum</i>	25	(Present but not counted)		
<i>Rhinichthys atratulus</i>	351	(Present but not counted)		
<i>Cottus carolinae</i>	40	(Present but not counted)		
<i>Cambarus bartonii</i>		(Present)		
<i>Goniobasis</i> sp.		(Abundant)		

Site was located at Big Springs, the source of Gallagher Creek. Shocking at 120 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

Turkey Creek

One qualitative fishery survey was conducted in June 1991:

Location and Length - Tributary to the Tennessee River (Fort Loudoun Reservoir). The sample site was located just upstream of the intersection of Hwy. 11 and Concord Road and was sampled on 27 June 1991. It was 400 ft in length and averaged 15.0 ft in width. The site was in Knox County (Lovell Quadrangle).

Sampling Methodology - The site was sampled using a single backpack electrofishing unit operating at 120 volts AC.

Water Quality - Data were collected from midstream at mid-depth on 27 June 1991: DO - 7.7 ppm, pH - 7.6, Temperature 63 F, Conductivity - 315 micromhos/cm.

Benthos Collection - No collection was made.

Fish Collected:

<u>Species</u>	<u>No.</u>	<u>% by No.</u>
Green sunfish	43	20.6
Bluegill	9	4.3
Non-game Fish	20	9.6
Forage Fish	137	65.6
Total	209	

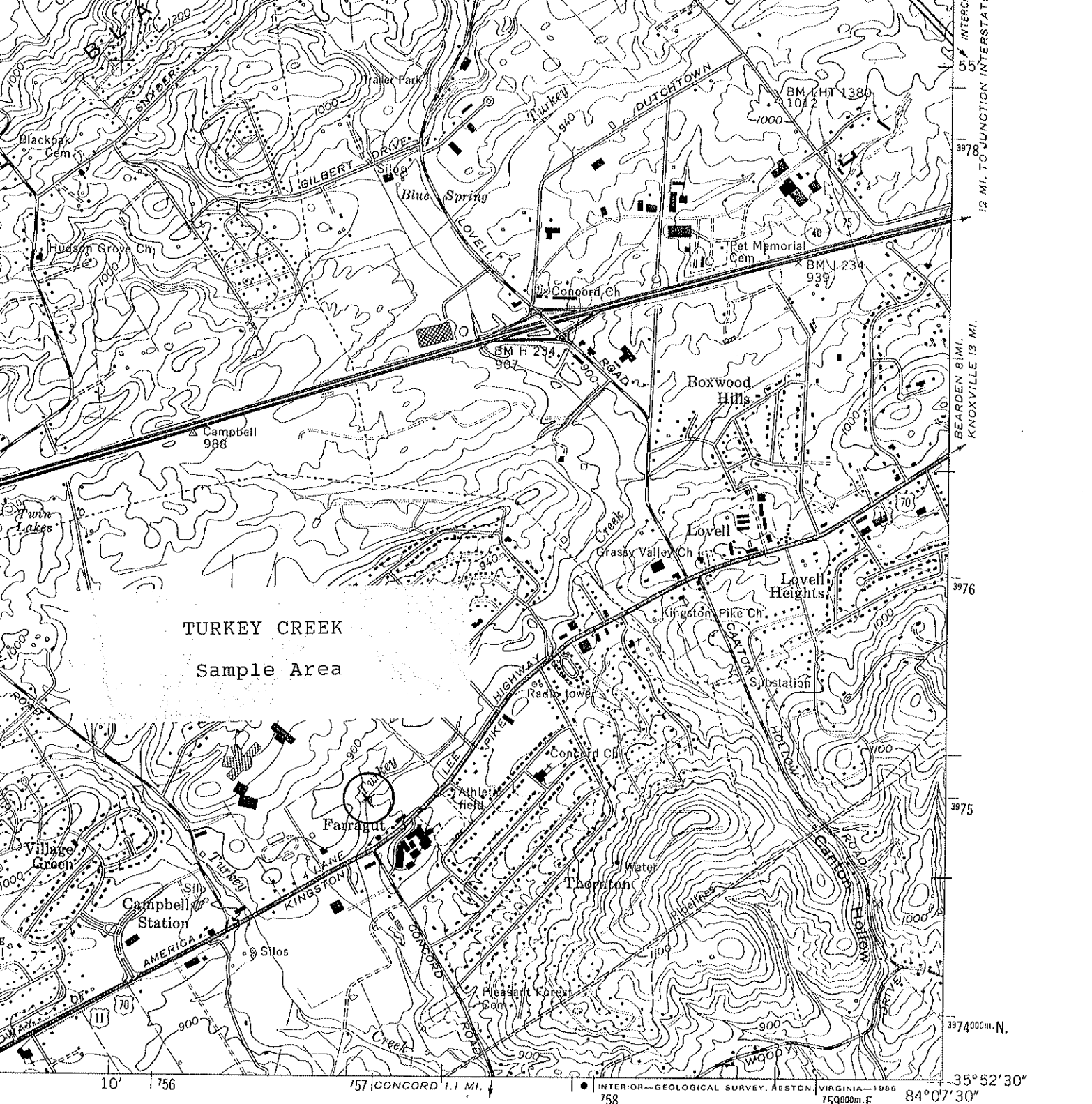
Comments - We went to Turkey Creek on 27 June 1991 in response to an oil spill and possible fish kill. Oil was spilled in the stream near the I-40/I-75 - Lovell Road interchange and flowed to the Turkey Creek embayment of Fort Loudoun Reservoir where it was contained. We walked the stream from the reservoir to the junction of Turkey Creek and the North Fork of Turkey Creek and found no dead fish at all. We did observe oil on the vegetation in and near the water and an oily sheen in the runs, pools, and back eddies.

After investigating the lower stream, we decided to return to the same site where the stream had been sampled in 1990 (Bivens and Williams 1991) and make a fish collection. We collected a total of 209 fish comprising 10 species from this site. Species absent from this collection that had been present the year before included smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), flame chub (*Hemitremia flammea*), fathead minnow (*Pimephales promelas*), and mosquitofish (*Gambusia*

affinis). Additional species collected this time included a single fantail darter (*Etheostoma kennicotti*) and three logperch (*Percina caprodes*).

A fairly significant change in species occurrence and total overall numbers was noted. This may not be directly related to the oil spill, however, as species such as the flame chub, fathead minnow, and mosquitofish were collected as single specimens or very low numbers in the 1990 survey. Also, the difference in time of year sampling may account for some of the difference in total numbers.

Summary - Apparently oil spills of this nature (where heavy oil remains on the surface) cause very little initial damage to fish or benthic populations. Throughout the investigation and subsequent sampling we found no dead fish or benthic organisms. However, long term impairment of both communities beginning with loss of benthic organisms, will probably go unnoticed.



TURKEY CREEK
Sample Area

12 MI. TO JUNCTION INTERSTATE

BEARDEN 8 MI. KNOXVILLE 13 MI.

3976

3975

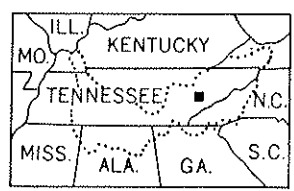
3974000m. N.

35°52'30" 84°07'30"

(LOUISVILLE 138-SE)
4155 1 SE

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



QUADRANGLE LOCATION

There may be pri
the National or S

LOVELL QUADRANGLE
Tennessee - 138 NW

LOVELL, TENN.
35084-H2-TF-024

1968
PHOTOREVISED 1980
DMA 4155 1 NW-SERIES V841

NIA 22092
37902

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Turkey Creek Date: 27 June 1991
Watershed: Tennessee River County: Knox
Area: See comments Sample Length: 400 ft
Lat-Long: 355241N - 840914W Reach: 06010201-95,0
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 15.0 ft Avg. Depth 0.5 ft Max. 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%.
4. Estimated Percent Riffle Bottom is Silt 10% Sand 20% Gravel
20% Rubble 40% Boulders 10%.
5. Abundance of Littoral Aquatic Plants is Average (moss, water
willow, and water cress).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is
Good in 20% of the Stream, Average in 40%, Poor in 40%.
7. Shade or Canopy Good over 10% of Stream.
8. Flow (CFS): Not determined at this site.
9. Present Weather: Overcast. Air temperature - 74 F
@ 11:00 pm.
10. Weather (last 24 h): Overcast with light rain.
11. pH 7.6 Temp. 63 F Conductivity 315 micromhos/cm
D.O. 7.7 ppm Saturation 80%
12. Comments: Sample area location was upstream of intersection
of Hwy. 11 and Concord Road. Stream receives considerable
run-off from urban areas, construction, and from truck stops
at I-40/75.

FISH DATA

Stream: Turkey Creek Date: 27 June 1991
 Watershed: Tennessee River County: Knox
 Area: See comments Sample Length: 400 ft
 Lat-Long: 355241N - 840914W Reach: 06010201-95,0
 Type of Sampling: Electrofishing Elevation: 875 ft
 Gear Type: 1 Backpack Unit Time: 1125 - 1215

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Lepomis cyanellus</i>	202	43		
<i>L. macrochirus</i>	206	9		
<i>Catostomus commersoni</i>	32	20		
<i>Campostoma anomalum</i>	25	59		
<i>Rhinichthys atratulus</i>	351	35		
<i>Semotilus atromaculatus</i>	360	10		
<i>Etheostoma kennicotti</i>	98	1		
<i>E. simoterum</i>	111	2		
<i>Percina caprodes</i>	306	3		
<i>Cottus carolinae</i>	40	27		
<i>Cambarus longirostris</i> and <i>Orconectes erichsonianus</i>		47 (Combined total)		
<i>Cambarus bartonii</i>		1 (Only one collected)		

No lengths or weights recorded, numbers only.

Site was located just upstream of the intersection of Hwy. 11 and Concord Road. Shocking at 120 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

Cove Creek

Two qualitative fishery surveys were conducted in June 1991:

Location and Length - Tributary to Walden Creek (West Prong Little Pigeon River trib.). Sample Site 1 was located at the mouth of Valley Branch near Little Valley Road and was sampled on 25 June 1991. It was 400 ft in length and averaged 21.0 ft in width. Sample Site 2 was located at the bridge (culvert) on Round Top Drive and sampled on 28 June 1991. It was 400 ft in length and averaged 11.2 ft in width. Both sites were in Sevier County (Site 1, Walden Creek Quadrangle; Site 2, Wears Cove Quadrangle).

Sampling Methodology - Both sites were sampled using backpack electrofishing equipment operating at 120 volts AC. Site 1 was sampled using 2 backpack units while Site 2 was sampled with a single backpack unit. Additional collections were made at both sites by shocking into a 10 ft seine.

Water Quality - Data were collected from midstream at mid-depth at each site. Site 1, on 25 June 1991: DO - 9.3 ppm, pH - 7.9, Temperature - 67 F, Conductivity - 150 micromhos/cm. Site 2, on 28 June 1991: DO - 9.0 ppm, pH - 7.7, Temperature - 66 F, Conductivity - 125 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample at each site. Site 1 sample contained 367 organisms representing 56 taxa. Site 2 sample contained 573 organisms and represented 36 taxa.

Fish Collected:

<u>Species</u>	<u>Site 1</u>				<u>Site 2</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Smallmouth bass	8	0.7	1.54	6.2				
Spotted bass	2	0.2	t					
Rock bass	11	0.9	0.93	3.6	1	0.3	0.39	10.6
Redbreast sunfish	13	1.1	1.33	5.4				
Green sunfish	2	0.2	0.19	0.8				
Bluegill	5	0.4	0.15	0.6	30	9.0	0.55	14.9
Non-game Fish	69	5.7	11.97	48.4				
Forage Fish	1091	90.8	8.64	34.9	303	90.7	2.74	74.5
Total	1201		24.75		334		3.68	

Comments - This stream was surveyed primarily to develop a fish species list for TADS. The Agency has made no previous studies or fish collections from this stream. However, an intensive study and inventory of fishes and benthic macroinvertebrates was conducted by the University of Tennessee in 1991 for the proposed Foothills Parkway Extension project (Etnier 1992).

We collected a total of 1,201 fish weighing 24.75 lb and comprising 25 species from Site 1. Five native game species, smallmouth bass (*Micropterus dolomieu*), spotted bass (*M. punctulatus*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), and bluegill (*L. macrochirus*), along with the exotic redbreast sunfish (*L. auritus*) were found. Only two small spotted bass, two green sunfish, and five small bluegill were collected at this site, therefore, comparison of inch class distribution was made for smallmouth bass, rock bass, and redbreast sunfish (Fig. 9). Redbreast sunfish made up about 13% compared to about 11% by rock bass and about 8% by smallmouth bass, of the total number of fish collected. Smallmouth bass, however, contributed about 6% of the total weight as compared to 5% by redbreast sunfish and about 4% by rock bass. Three non-game and 16 forage species were also collected here and these comprised about 97% of the total number and 83% of the total weight. Of particular interest is the occurrence of fairly intolerant species such as the telescope shiner (*Notropis telescopus*) and the redline darter (*Etheostoma rufilineatum*) as both were fairly abundant. Other darter species included the greenside (*E. blennioides*), snubnose (*E. simoterum*), and blueside (*E. stigmaeum jessiae*). Another species of interest was the northern studfish (*Fundulus catenatus*). Although it is widely distributed, it is not commonly encountered in east Tennessee streams. Stonerollers (*Campostoma anomalum*) and banded sculpin (*Cottus carolinae*) were the most abundant forage species present.

At Site 2 we collected a total of 334 fish weighing 3.68 lb and comprising six species. Game fish from this site included rock bass and bluegill. Only one 8-in rock bass was collected along with 30 bluegill, most of which were in the 1 to 2-in class. Bluegill made up about 9% of the total number of fish collected. The remaining 91% were forage fish and no non-game species were found. Game fish contributed about 25% of the total weight however. The only species collected here, but not at the downstream site, was *Etheostoma swannanoa*, the Swannanoa darter. Stonerollers were again the most abundant forage species present. With the exception of redbreast sunfish, warpaint shiner (*Luxilus coccogenis*), and saffron shiner (*Notropis rubricroceus*), our species list for this site compares fairly well with that reported by Etnier (1992) for collections made in May and June of 1991. However, our sample site was further upstream and the stream was high and dingy at the time we sampled.

Cove Creek for most of its length is a low gradient stream that probably receives considerable non-point pollution, mostly from agricultural sources, where it flows through Wears Valley.

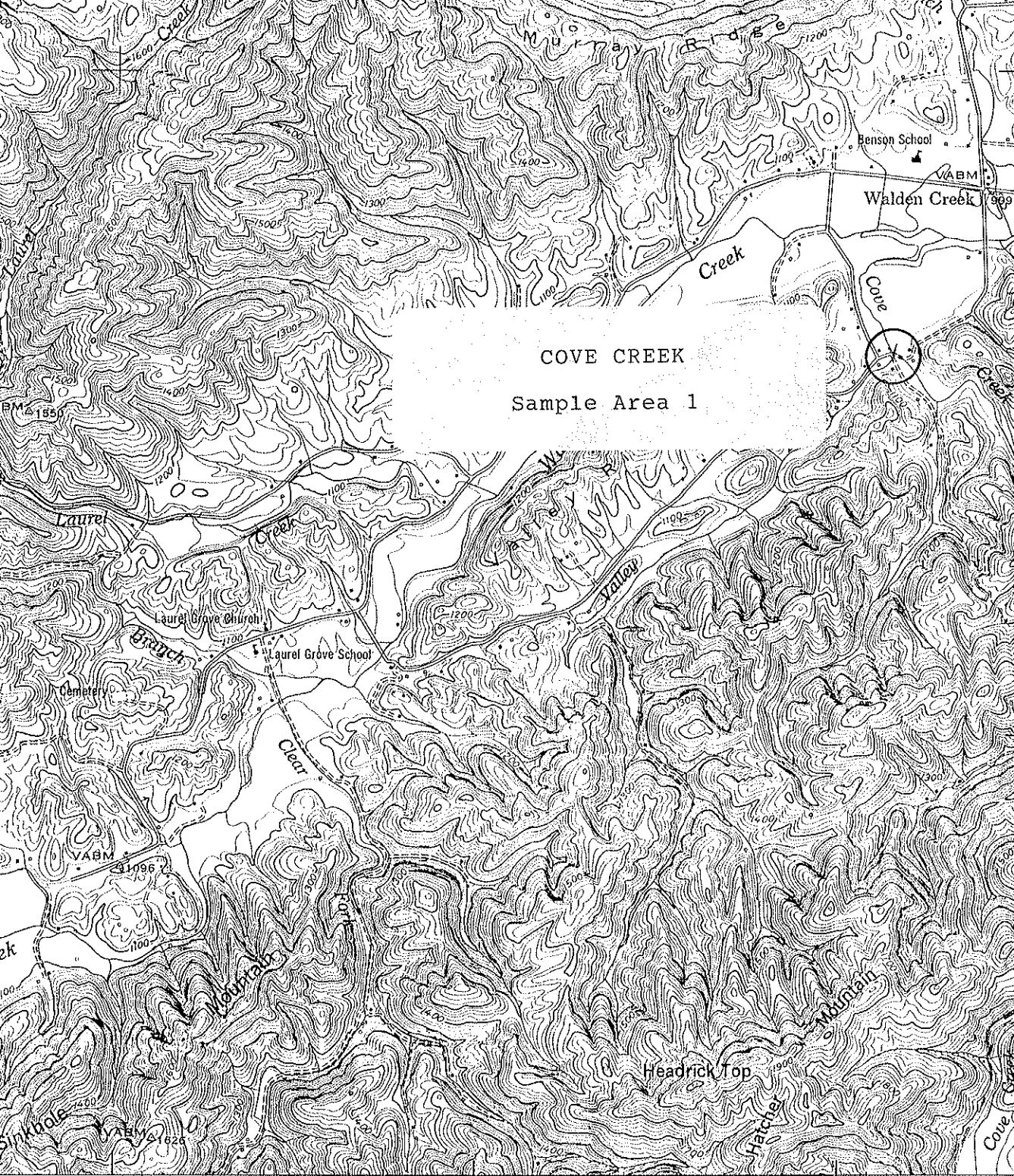
Also, it may possibly have been impacted by the construction of the Foothills Parkway as well as by other development in Wears Valley. Based on fish species occurrence, this stream still appears to be in fair condition. A total of 26 fish species were collected from both sites combined, and as stated above, some were fairly intolerant forms. The occurrence of five darter species further attests to good water quality. Smallmouth bass and rock bass are the primary game species present in the lower reach of the stream.

Benthic macroinvertebrates from our sample at Site 1 included Baetidae, Caenidae, Ephemerellidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, Peltoperlidae and Perlidae stoneflies, Hydropsychidae, Hydroptilidae, Philopotamidae, and Rhyacophilidae caddisflies, and Elmidae, Gyrinidae, Hydrophilidae, and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) and fingernail clam (*Sphaerium*) were present. One relic *Villosa vanuxemensis* was collected. Three species of crayfish, *Cambarus longirostris*, *Orconectes erichsonianus*, and *O. forceps* were also collected. Ephemeropterans represented about 49%, dipterans about 20%, trichopterans about 8%, odonates about 6%, and plecopterans about 1% of the total number of organisms collected (Fig. 10). A total of 56 taxa was collected at this site.

Benthic macroinvertebrates from our sample at Site 2 included Baetidae, Ephemerellidae, Heptageniidae, and Leptophlebiidae mayflies, *Perlesta* stoneflies, Hydropsychidae and Philopotamidae caddisflies, and Elmidae, Hydrophilidae, and Psephenidae beetles. The fingernail clam was present along with *Physa* snails. *Cambarus longirostris* and *Orconectes erichsonianus* were the only crayfish collected. Coleopterans and trichopterans represented about 30% each, dipterans about 13%, ephemeropterans about 10%, odonates about 7%, and plecopterans about 4% of the total number of organisms collected (Fig. 11). A total of 36 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. Based on fish and macroinvertebrates species assemblages it appears that this stream is still in fair condition. Some evidence of impairment, based mainly on macroinvertebrates, is noted at Site 2. Lower total taxa and high numbers of tolerant forms were collected here as compared to Site 1.
3. Protection of this watershed should be of high priority as this area is subject to possible accelerated development due to its proximity to Gatlinburg and Pigeon Forge



COVE CREEK
Sample Area 1

3964
47'30"
3.4 MI. TO U.S. 441
SEVIERVILLE 8.5 MI.

3962

3961000m.N.

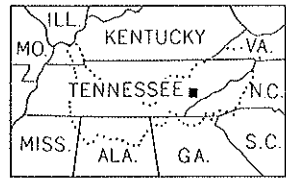
5.7 MI. TO U.S. 441
SEVIERVILLE 11 MI.

35°45'
83°37'30"

● INTERIOR GEOLOGICAL SURVEY, RESTON, VIRGINIA - 1975
261000m.E. HATCHERTOWN 1.1 MI. TOWNSEND 10 MI. (TVA 156-SW)

ROAD CLASSIFICATION

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



QUADRANGLE LOCATION

WALDEN CREEK, TENN.
N3545-W8337.5/7.5

1953
PHOTOREVISED 1971
AMS 4255 1 SW-SERIES V84I

(GATLINBURG 157-NE)
4255 11 NE

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Cove Creek Date: 25 June 1991
Watershed: French Broad River County: Sevier
Area: Site # 1 Sample Length: 400 ft
Lat-Long: 354652N - 833750W Reach: 06010107-13,0
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 21.0 ft Avg. Depth 0.6 ft Max. Depth 3.2 ft
2. Estimated Percent of Stream in Pools is 30%.
3. Estimated Percent Pool Bottom is Silt 15% Sand 15% Gravel 30% Rubble 30% Boulders 5% Bedrock 5%.
4. Estimated Percent Riffle Bottom is Silt 15% Sand 15% Gravel 20% Rubble 25% Boulders 25%.
5. Abundance of Littoral Aquatic Plants is Scarce.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 10% of the Stream, Average in 20%, Poor in 70%.
7. Shade or Canopy Good over 10% of Stream.
8. Flow (CFS) 24.1: Compared to Normal: High
9. Present Weather: Overcast and light rain. Air temperature - 73 F @ 10:05 am.
10. Weather (last 24 h): Overcast and light rain.
11. pH 7.9 Temp. 67 F Conductivity 150 micromhos/cm
D.O. 9.3 ppm Saturation 101%
12. Comments: Sample area location was at the mouth of Valley Branch on Little Valley Road. The stream was quite dingy when sampled. Riffle areas upstream and downstream of the pool area were sampled with backpack shocker in combination with seine.

FISH DATA

Stream: Cove Creek Date: 25 June 1991
 Watershed: French Broad River County: Sevier
 Area: Site # 1 Sample Length: 400 ft
 Lat-Long: 354237N - 833908W Reach: 06010107-13,0
 Type of Sampling: Electrofishing Elevation: 1,010 ft
 Gear Type: 2 Backpack Units Time: 1405 - 1505

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Micropterus dolomieu</i>	218	1	3	0.02
" "	"	2	4	0.07
" "	"	1	5	0.07
" "	"	2	8	0.48
" "	"	1	9	0.34
" "	"	1	10	0.56
<i>M. punctulatus</i>	219	2	1	t
<i>Ambloplites rupestris</i>	13	1	1	t
" "	"	6	2	0.06
" "	"	1	3	0.02
" "	"	2	6	0.32
" "	"	1	9	0.53
<i>Lepomis auritus</i>	201	1	1	t
" "	"	1	3	0.03
" "	"	4	4	0.26
" "	"	3	5	0.29
" "	"	4	6	0.75
<i>L. cyanellus</i>	202	1	4	0.06
" "	"	1	5	0.13
<i>L. macrochirus</i>	206	2	2	0.02
" "	"	2	3	0.05
" "	"	1	5	0.08
<i>Hypentelium nigricans</i>	166	29	1-16	4.27
<i>Moxostoma duquesnei</i>	229	8	3-4	0.21
<i>M. erythrurum</i>	230	32	3-12	7.49

Site was located at the mouth of Valley Branch on Little Valley Road. The stream was dingy when sampled. Shocking at 120 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

FISH DATA (continued)

Stream: Cove Creek Date: 25 June 1991
 Watershed: French Broad River County: Sevier
 Area: Site # 1 Sample Length: 400 ft
 Lat-Long: 354237N - 833908W Reach: 06010107-13,0
 Type of Sampling: Electrofishing Elevation: 1,010 ft
 Gear Type: 2 Backpack Units Time: 1405 - 1505

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Campostoma anomalum</i>	25	448	1-6	4.55
<i>Cyprinella galactura</i>	253	37	1-4	0.22
<i>Erimystax insignis</i>	160	1	2	0.01
<i>Hybopsis amblops</i>	155	117	1-3	0.36
<i>Luxilus chrysocephalus</i>	249	65	2-5	0.90
<i>Lythrurus lirus</i>	256	1	2	t
<i>Notropis stramineus</i>	271	20	1-2	0.08
<i>N. telescopus</i>	272	44	2-3	0.20
<i>Rhinichthys atratulus</i>	351	3	1	t
<i>Semotilus atromaculatus</i>	360	3	1-2	0.01
<i>Etheostoma blennioides</i>	81	1	4	0.04
<i>E. rufilineatum</i>	108	148	1-2	0.52
<i>E. simoterum</i>	111	16	1-2	0.05
<i>E. stigmaeum jessiae</i>	96	5	1-2	0.02
<i>Cottus carolinae</i>	40	177	1-4	1.66
<i>Fundulus catenatus</i>	137	5	1-3	0.02

Site was located at the mouth of Valley Branch on Little Valley Road. The stream was dingy when sampled. Shocking at 120 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

GAME FISH FROM COVE CREEK
 SITE 1
 INCH CLASS DISTRIBUTION

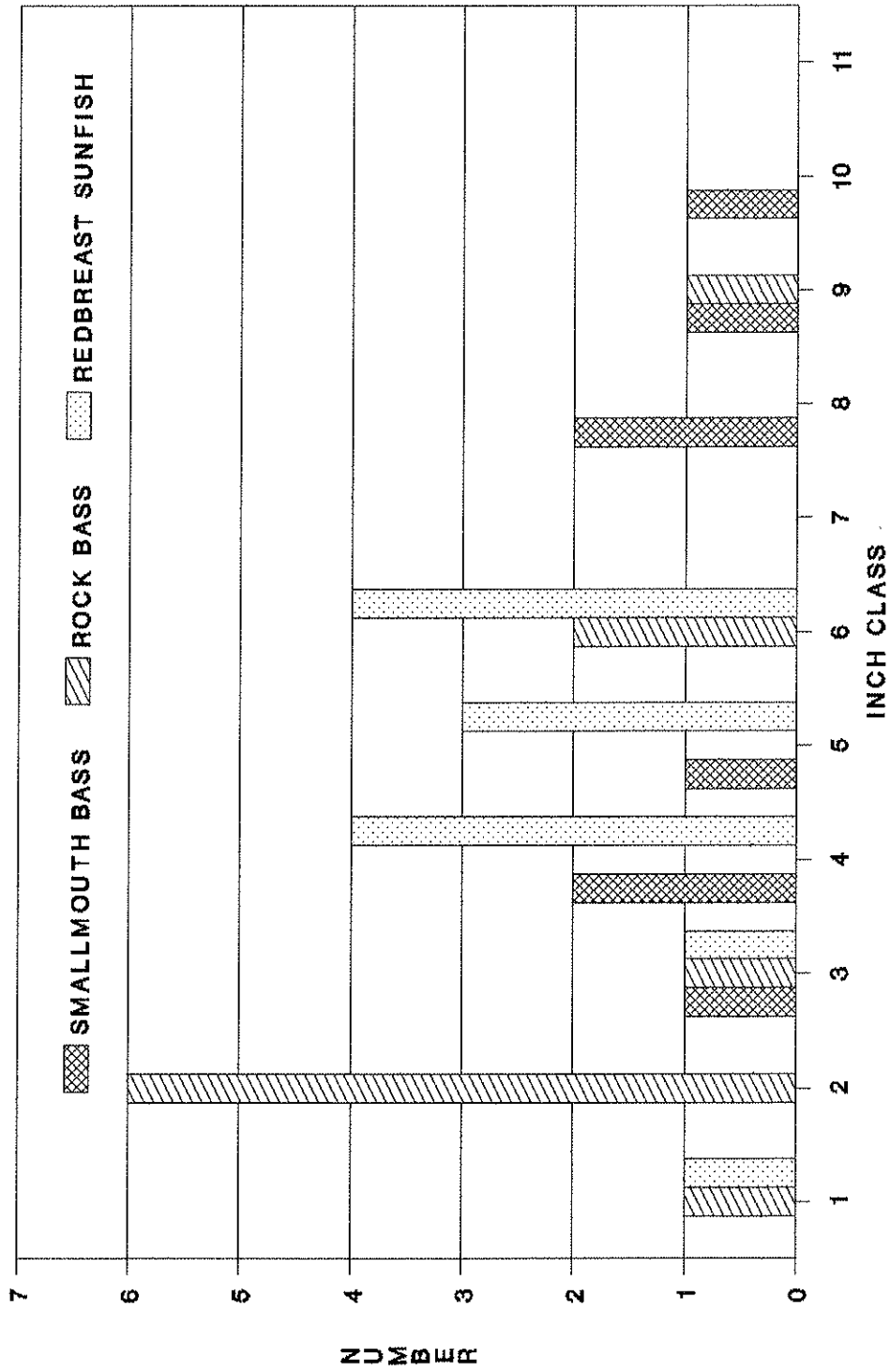


Figure 9.

Cove Creek: Site # 1, Qualitative Benthic Sample

25 June 1991

Field # 293

Sevier Co., TN; At the mouth of Valley Branch. Coordinates:
354652N - 833750W. Walden Creek, Tenn., # 156 SW Quad.
Reach # 06010107-13,0.

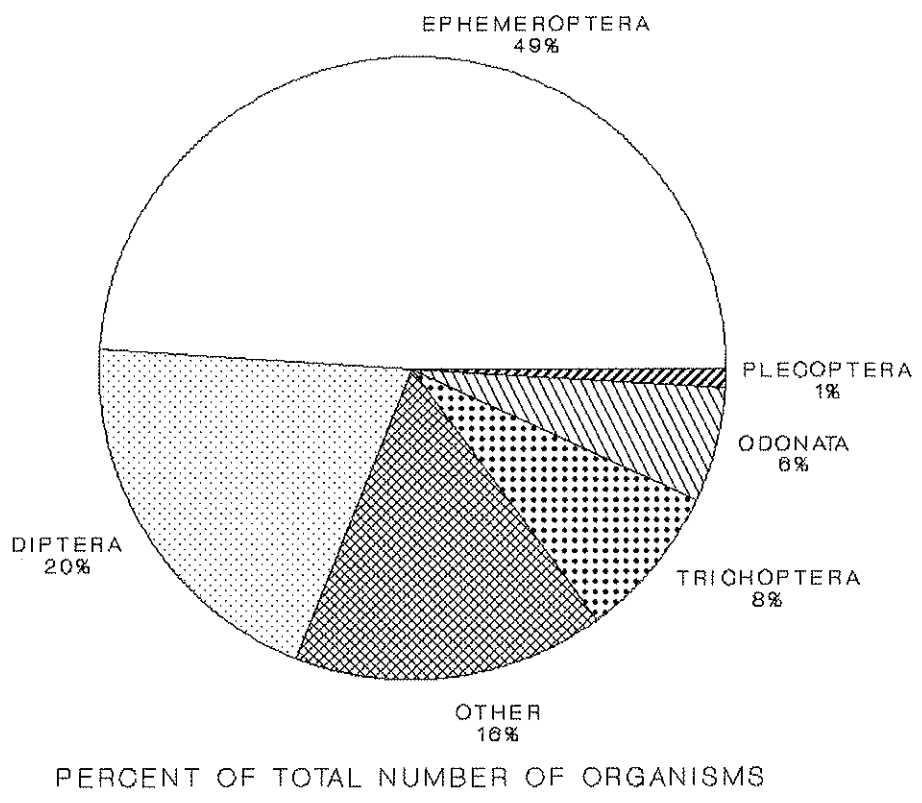
<u>TAXA</u>	<u>NUMBER</u>
ANNELIDA:	
Hirudinea	2
Oligochaeta	3
COLEOPTERA:	
Elmidae/ <i>Dubiraphia</i> adult	1
<i>Optioservus</i> larva	1
<i>O. ovalis</i> adults	3
<i>Stenelmis</i> adults	2
Gyrinidae/ <i>Dineutus discolor</i> adult females	2
Hydrophilidae/ <i>Sperchopsis tessellatus</i> larva	1
adult	1
Psephenidae/ <i>Psephenus herricki</i> larva	1
adults	2
DECAPODA:	
Cambaridae/ <i>Cambarus longirostris</i> 1st form male	1
<i>Cambarus longirostris</i> 2nd form male	1
<i>Orconectes erichsonianus</i> 2nd form male	1
<i>O. forceps</i> 2nd form males	3
DIPTERA:	
Athericidae/ <i>Atherix lantha</i>	4
Ceratopogonidae/ <i>Atrichopogon</i>	1
Chironomidae larvae	10
Simuliidae larvae	51
pupa	1
Tipulidae/ <i>Hexatoma</i>	3
EPHEMEROPTERA:	
Baetidae/ <i>Baetis</i>	15
Caenidae/ <i>Caenis</i>	6
Ephemerellidae/ <i>Eurylophella</i>	4
Ephemeridae/ <i>Hexagenia</i>	7
Heptageniidae/ <i>Epeorus rubidus/subpallidus</i>	7
<i>Heptagenia</i>	3
<i>Stenacron interpunctatum</i>	5
<i>Stenonema</i>	52
Oligoneuriidae/ <i>Isonychia</i>	80
GASTROPODA:	
Physidae/ <i>Physa</i>	2
Pleuroceridae	11

Cove Creek: Site # 1, Qualitative Sample cont.

<u>TAXA</u>	<u>NUMBER</u>
HEMIPTERA:	
Gerridae/ <i>Gerris</i> nymph	1
<i>G. remigis</i> male	1
<i>G. remigis</i> female	1
<i>Trepobates pictus</i> male	1
Veliidae/ <i>Rhagovelia obesa</i>	2
LEPIDOPTERA: Noctuidae	
	1
MEGALOPTERA:	
Corydalidae/ <i>Corydalus cornutus</i>	6
<i>Nigronia serricornis</i>	4
Sialidae/ <i>Sialis</i>	6
ODONATA:	
Aeshnidae/ <i>Basiaeschna janata</i>	1
<i>Boyeria vinosa</i>	2
Calopterygidae/ <i>Calopteryx</i>	4
Coenagrionidae/ <i>Argia</i>	1
Cordulegastridae/ <i>Cordulegaster maculata</i>	3
Cordulidae	1
Gomphidae/ <i>Dromogomphus spinosus</i>	1
<i>Gomphus lividus</i>	6
<i>Stylogomphus albistylus</i>	2
PELECYPODA:	
Corbiculidae/ <i>Corbicula fluminea</i> relic	
Sphaeriidae/ <i>Sphaerium</i>	1
Unionidae/ <i>Villosa vanuxemensis</i> relic	
PLECOPTERA:	
Peltoperlidae/ <i>Peltoperla</i>	1
Perlidae/ <i>Eccoptura xanthenes</i>	1
<i>Paragnetina media</i>	1
TRICHOPTERA:	
Hydropsychidae/ <i>Cheumatopsyche</i>	15
<i>Hydropsyche betteni/depravata</i>	2
<i>H. frisoni</i>	1
<i>Symphitopsyche bronta</i>	1
<i>S. morosa</i>	1
<i>S. sparna</i>	2
Hydroptilidae pupa	1
<i>Leucotrichia pictipes</i>	4
Philopotamidae/ <i>Chimara</i>	1
Rhyacophilidae/ <i>Rhyacophila fuscula</i>	1

367

COVE CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



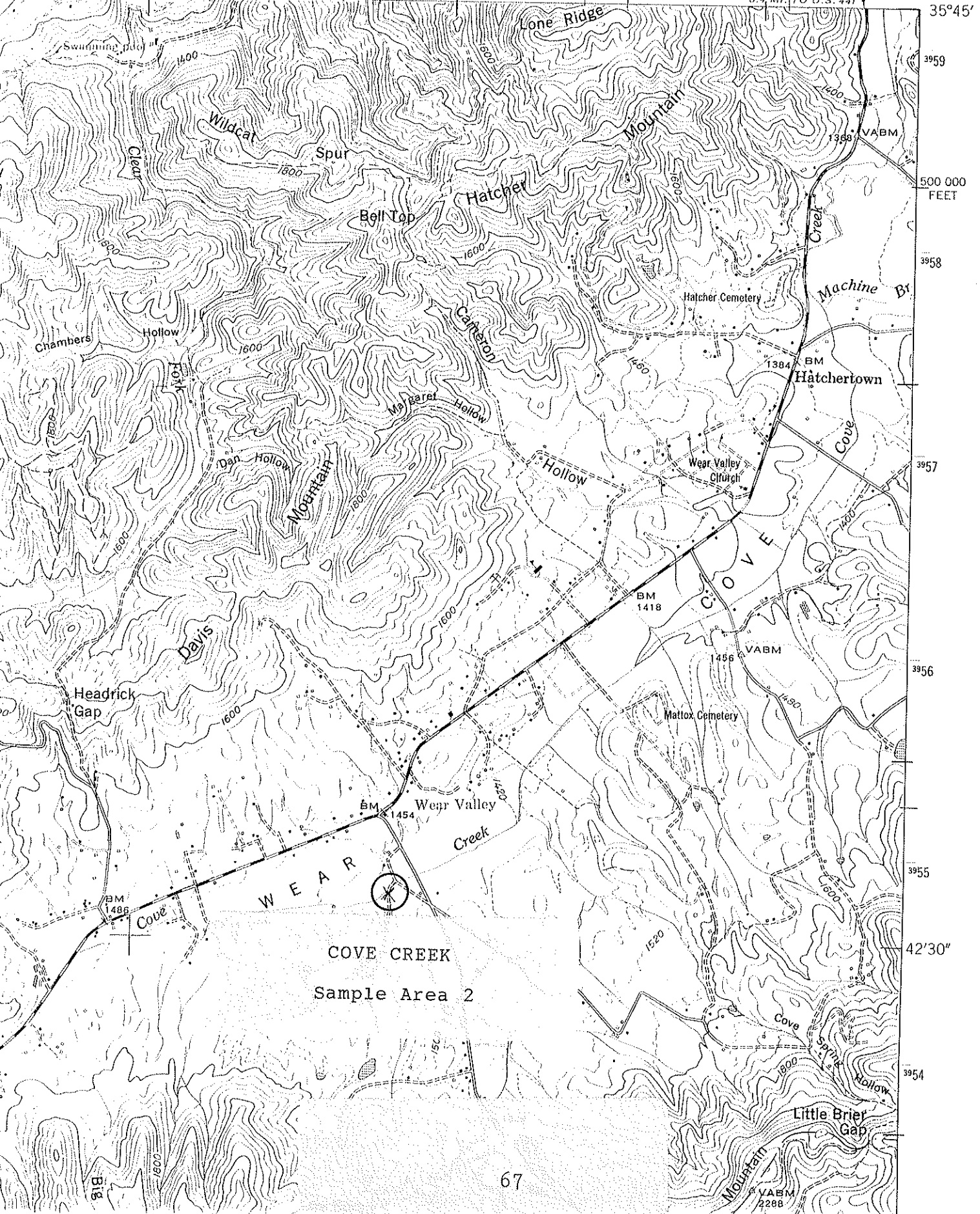
n = 367
TAXA RICHNESS = 56
Figure 10.

WEAR COVE QUADRANGLE
TENNESSEE

7.5 MINUTE SERIES (TOPOGRAPHIC) 157-NW

4255 1 SE
PIGEON FORGE 156

40' 259 260 2 700 000 FEET SEVIerville 12 MI. 6.4 MI. TO U.S. 441 83°37'30" 35°45'



WEAR
COVE CREEK
Sample Area 2

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Cove Creek Date: 28 June 1991
Watershed: French Broad River County: Sevier
Area: Site # 2 Sample Length: 400 ft
Lat-Long: 354237N - 833908W Reach: 06010107-13,0
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 11.2 ft Avg. Depth 0.5 ft Max. Depth 3.1 ft
2. Estimated Percent of Stream in Pools is 30%.
3. Estimated Percent Pool Bottom is Mud 10% Silt 10% Sand 30%
Gravel 30% Rubble 20%.
4. Estimated Percent Riffle Bottom is Silt 15% Sand 35% Gravel
35% Rubble 15%.
5. Abundance of Littoral Aquatic Plants is Scarce (some
Dianthera americana).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is
Good in 25% of the Stream, Average in 60%, Poor in 15%.
7. Shade or Canopy Good over 10% of Stream.
8. Flow (CFS) 4.6: Compared to Normal: High
9. Present Weather: Clear, sunny and hot. Air temperature -
79 F @ 10:30 am.
10. Weather (last 24 h): Partly cloudy and hot.
11. pH 7.7 Temp. 66 F Conductivity 125 micromhos/cm
D.O. 9.0 ppm Saturation 96%
12. Comments: Sample area location was at culvert on Round
Top Drive near Lyons Road (Greenbriar Road on sign). The
stream was high and dingy. Cattle observed in stream.

FISH DATA

Stream: Cove Creek Date: 28 June 1991
 Watershed: French Broad River County: Sevier
 Area: Site # 2 Sample Length: 400 ft
 Lat-Long: 354237N - 833908W Reach: 06010107-13,0
 Type of Sampling: Electrofishing Elevation: 1,380 ft
 Gear Type: 1 Backpack Unit Time: 1245 - 1345

FISH DATA

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Ambloplites rupestris</i>	13	1	8	0.39
<i>Lepomis macrochirus</i>	206	5	1	0.01
" "	"	18	2	0.13
" "	"	3	3	0.07
" "	"	2	4	0.11
" "	"	2	5	0.23
<i>Campostoma anomalum</i>	25	189	1-4	1.15
<i>Rhinichthys atratulus</i>	351	57	1-4	0.34
<i>Semotilus atromaculatus</i>	360	54	1-7	1.21
<i>Etheostoma swannanoa</i>	129	3	2	0.04

Site was located at bridge on Round Top Drive. Shocking at 120 volts AC. Made six seine hauls in combination with the backpack shocker using a 10 ft seine.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

Cove Creek: Site # 2, Qualitative Benthic Sample

28 June 1991

Field # 296

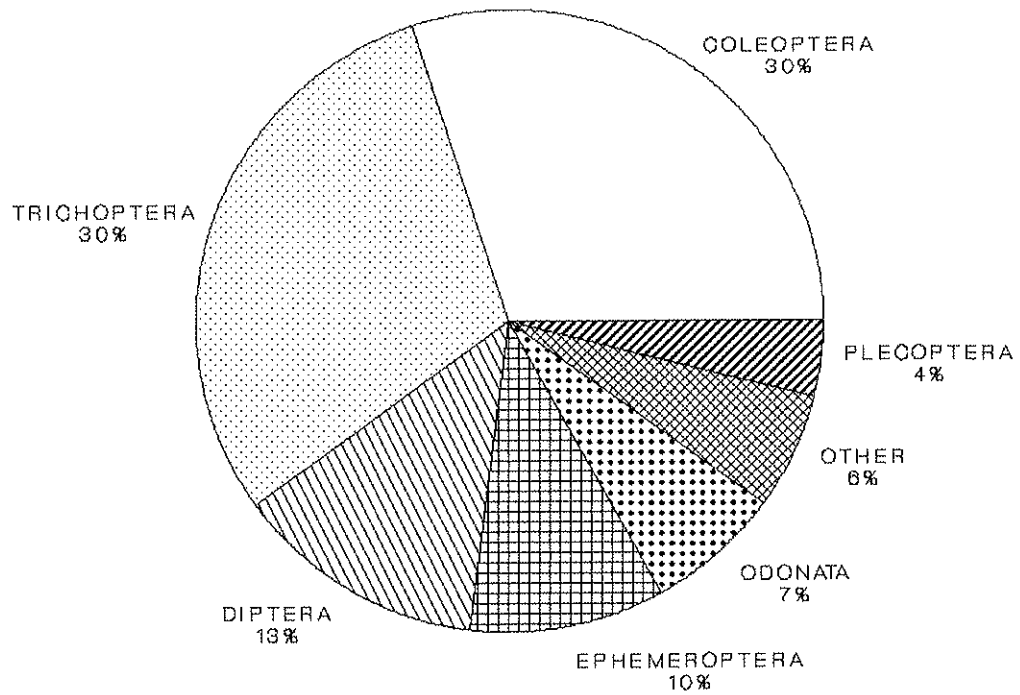
Sevier Co., TN; At the bridge on Road Top Drive. Coordinates:
354237N - 833908W. Wear Cove, Tenn., # 157 NW Quad. Reach #
06010107-13,0.

<u>TAXA</u>	<u>NUMBER</u>
ANNELIDA:	
Hirudinea	1
Oligochaeta	16
COLEOPTERA:	
Elmidae/ <i>Dubiraphia</i> adult	1
<i>Optioservus</i> larvae	63
<i>O. ovalis</i> adults	84
<i>Oulimnius latiusculus</i> larvae	5
<i>Oulimnius latiusculus</i> adult	1
<i>Stenelmis</i> larvae	9
<i>Stenelmis</i> adults	7
Hydrophilidae/ <i>Tropisternus b. blatchleyi</i> adult	1
<i>T. lateralis nimbatus</i> adult	1
Psephenidae/ <i>Psephenus herricki</i> larva	1
DECAPODA:	
Cambaridae/ <i>Cambarus longirostris</i> 1st form male	1
<i>Cambarus longirostris</i> 2nd form males	2
<i>Orconectes erichsonianus</i> 2nd form males	3
<i>Orconectes erichsonianus</i> females	2
DIPTERA:	
Chironomidae larvae	58
Chironomidae pupa	1
Dixidae/ <i>Dixa</i>	1
Empididae	2
Simuliidae	4
Tabanidae/ <i>Chrysops</i>	1
Tipulidae/ <i>Antocha</i>	6
<i>Hexatoma</i>	1
<i>Tipula</i>	1
EPHEMEROPTERA:	
Baetidae/ <i>Baetis</i>	30
Ephemerellidae/ <i>Serratella deficiens</i>	1
Heptageniidae/ <i>Stenonema</i>	8
<i>Stenonema pudicum</i>	2
Leptophlebiidae/ <i>Habrophlebiodes</i> nymphs	17
<i>Habrophlebiodes</i> adult	1

Cove Creek: Site # 2, Qualitative Sample cont.

<u>TAXA</u>	<u>NUMBER</u>
GASTROPODA:	
Physidae/ <i>Physa</i>	12
MEGALOPTERA:	
Sialidae/ <i>Sialis</i>	1
ODONATA:	
Aeshnidae/ <i>Boyeria vinosa</i>	10
Calopterygidae/ <i>Calopteryx</i>	13
Cordulegastridae/ <i>Cordulegaster maculata</i>	7
Gomphidae/ <i>Gomphus</i>	1
<i>Stylogomphus albistylus</i>	1
PELECYPODA:	
Sphaeriidae/ <i>Sphaerium</i>	1
PLECOPTERA:	
Perlidae/ <i>Perlesta</i> nymphs	22
<i>Perlesta</i> adult	1
TRICHOPTERA:	
Hydropsychidae/ <i>Cheumatopsyche</i>	98
<i>Hydropsyche betteni/depravata</i> larvae	58
<i>Hydropsyche betteni/depravata</i> pupae	2
<i>Symphitopsyche sparna</i>	2
Philopotamidae/ <i>Chimara</i>	12
	<hr/> 573

COVE CREEK
SITE 2
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 573
TAXA RICHNESS = 36
Figure 11.

Sweetwater Creek

One qualitative fishery survey was conducted in July 1991:

Location and Length - Tributary to the Pigeon River. The sample site was located near the junction of Hwy. 73 and Sweetwater Road and was sampled on 9 July 1991. It was about 300 ft in length and averaged around 5 to 8 ft in width. The site was in Cocke County (Newport Quadrangle).

Sampling Methodology - The site was sampled using a single backpack electrofishing unit operating at 120 volts AC.

Water Quality - (See data sheet for temperature and conductivity)

Benthos Collection - No collection was made.

Fish Collected - (See data sheet for species list)

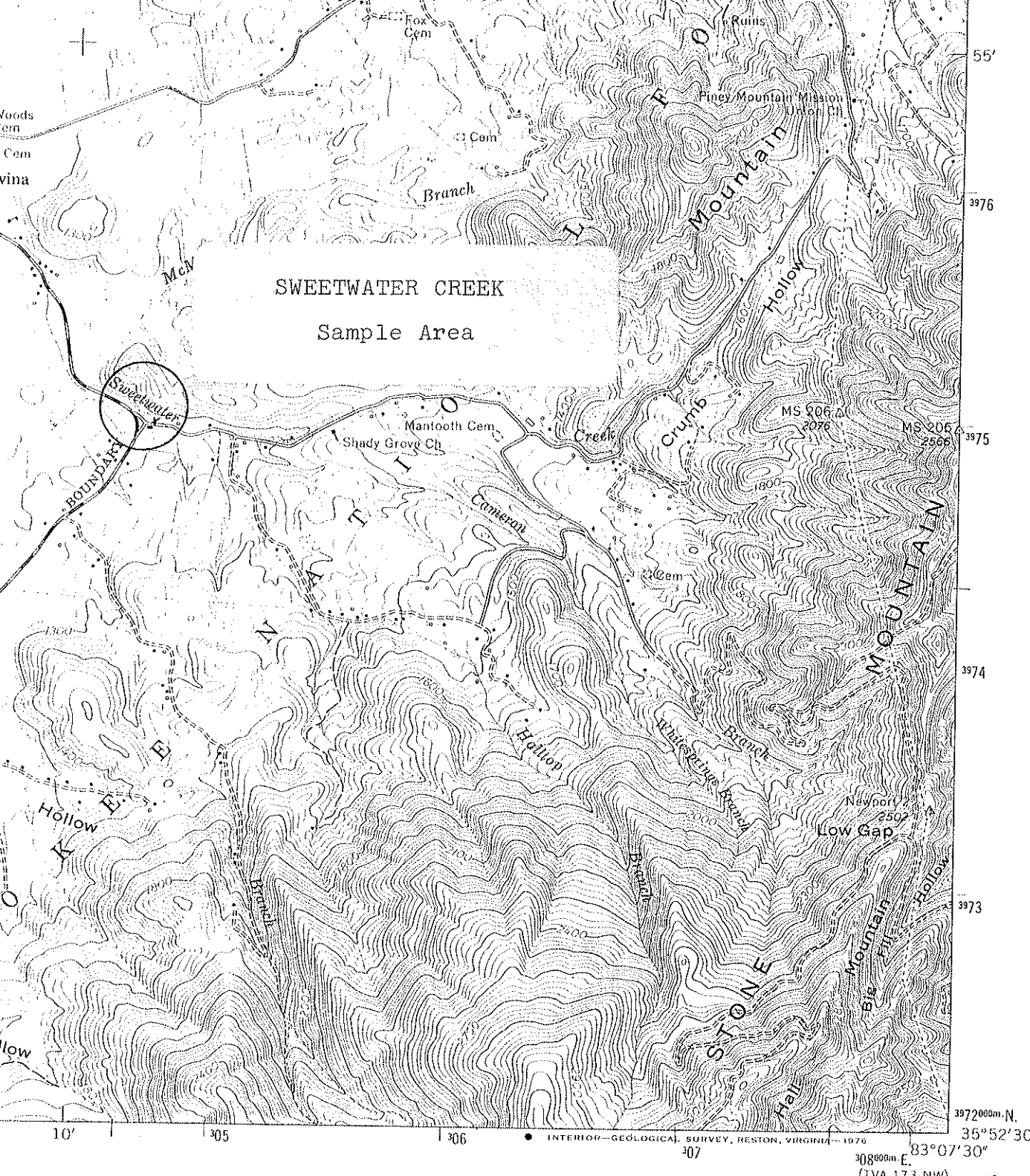
Comments - This stream was sampled primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted near the mouth of this stream and emphasis was placed on the fish species present and their relative abundance. The Agency has made no previous studies or fish collections from this stream.

A total of 143 fish comprising seven species was collected. Three rainbow trout (*Oncorhynchus mykiss*) were the only game fish collected. The trout appeared to be stream reared fish and the largest one was 12-in. Blacknose dace (*Rhinichthys atratulus*) and banded sculpin (*Cottus carolinae*) were the most abundant species present. Six snubnose darters (*Etheostoma simoterum*) and a single specimen of the Swannanoa darter (*E. swannanoa*) were also collected.

The stream is fairly small and has a gravel-rubble-boulder substrate and appeared to be a nice clean little stream. The occurrence of trout further attests to its water quality. No benthic collection was made but periwinkle snails (*Goniobasis* sp.) were abundant. We also collected crayfish. Three species, the Appalachian brook crayfish (*Cambarus bartonii*), *C. longirostris*, and the virile crayfish (*Orconectes virilis*) were present. 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 in this stream is many miles upstream of that locality and is our first collection of the species in the Pigeon River watershed. This species may be replacing some native crayfish because of its aggressiveness.

Management Recommendations:

1. This stream appears to have good to excellent water quality and 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.

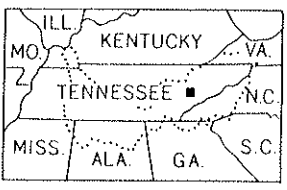


SWEETWATER CREEK
Sample Area

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1976
307
3080000 E 83°07'30"
3972000 N 35°52'30"
(TVA 173-NW)

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



QUADRANGLE LOCATION

173-NW
NEWPORT, TENN.
N3552.5—W8307.5/7.5

1961

AMS 4355 1 NW-SERIES V84I

(WATERVILLE 173-SE)
4355 1 SE

FISH DATA

Stream: Sweetwater Creek Date: 9 July 1991
 Watershed: Pigeon River County: Cocke
 Area: See comments Sample Length: 300 ft
 Lat-Long: 355407N - 830946W Reach: 06010106-
 Type of Sampling: Electrofishing Elevation: 1,140 ft
 Gear Type: 1 Backpack Unit Time: 1515 - 1605

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Oncorhynchus mykiss</i>	353	3	(largest was 12-in)	
<i>Hypentelium nigricans</i>	166	1		
<i>Campostoma anomalum</i>	25	5		
<i>Rhinichthys atratulus</i>	351	69		
<i>Etheostoma simoterum</i>	111	6		
<i>E. swannanoa</i>	129	1		
<i>Cottus carolinae</i>	40	58		

Cambarus bartonii - 2 Form II males & 1 female
C. longirostris - 2 Form II males
Orconectes virilis - 2 Form II males

Water temperature - 62 F
 Conductivity - 210 micromhos/cm
 Avg. width - 5 to 8 ft
 Avg. depth - 0.4 ft
 Gravel - rubble - boulder substrate.
 Periwinkle snails (*Goniobasis* sp.) abundant.

Site was located near the junction of Hwy. 73 and Sweetwater Road in the Edwina community. Shocking at 120 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

Mossy Creek

Two qualitative fishery surveys were conducted in November 1991:

Location and Length - Tributary to the Holston River (Cherokee Reservoir). Sample Site 1 was located in Jefferson City, approximately 95 ft upstream of the bridge crossing on East Main Street, extending upstream to the bridge crossing on Old Hwy. 11-E. It was 300 ft in length and averaged 22.3 ft in width. Sample Site 2 was located just upstream of Hwy. 11-E, near the source of Mossy Springs, at the old pump house. It was 300 ft in length and averaged 21.3 ft in width. Both sites were sampled on 6 November 1991 and were in Jefferson County (Site 1, Talbott Quadrangle; Site 2, Jefferson City Quadrangle).

Sampling Methodology - Both sites were sampled using two backpack electrofishing units operating at 120 volts AC.

Water Quality - Data were collected from midstream at mid-depth at each site on 6 November 1991. Site 1: DO - 8.9 ppm, pH - 7.8, Temperature - 52 F, Conductivity - 415 micromhos/cm. Site 2: DO - 8.5 ppm, pH - 7.2, Temperature - 57 F, Conductivity - 415.

Benthos Collection - Benthic organisms were collected by conducting a 2.25 man-h qualitative sample at each site. Site 1 sample contained 59 organisms representing 7 taxa. Site 2 sample contained 234 organisms representing 16 taxa.

Fish Collected:

<u>Species</u>	<u>Site 1</u>				<u>Site 2</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Rainbow trout	21	8.3	1.48	13.7	2	0.4	0.14	0.4
Brown trout	4	1.6	0.33	3.1	1	0.2	0.05	0.2
Bluegill	5	2.0	0.14	1.3	13	2.9	0.21	0.6
Non-game Fish	14	5.5	5.88	54.4	23	5.2	29.18	88.7
Forage Fish	209	82.6	2.97	27.5	407	91.3	3.32	10.1
Total	253		10.80		446		32.90	

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 were also interested in following up on the results of recent trout stocking by the Agency and past stocking by private individuals.

We collected a total of 253 fish weighing 10.8 lb and comprising 11 species from Site 1. Bluegill (*Lepomis macrochirus*) was the only native game fish present, and only five 2 to 4-in individuals were collected. Also, 21 rainbow trout (*Oncorhynchus mykiss*) and 4 brown trout (*Salmo trutta*) from a September 1991 stocking were recovered. Average coefficient of condition (K) for the 21 rainbow trout was 0.88 and ranged from 0.71 to 1.30 with several fish looking emaciated. Brown trout average K was similar at 0.89. Three non-game and five forage species were also collected here and these comprised about 88% of the total number and 82% of the total weight of all fish collected. All of these were fairly tolerant species and the logperch (*Percina caprodes*) was the only darter species collected. Blacknose dace was the most abundant forage species present and accounted for about 62% of the total number of fish collected.

At Site 2 we collected a total of 446 fish weighing 32.9 lb and comprising 10 species. With the exception of the northern hog sucker (*Hypentelium nigricans*), the same species as collected at Site 1 were collected here. Thirteen 2 to 3-in bluegill were collected, but, only two rainbow trout and one brown trout were found. Average K for the two rainbows was 0.87 while the brown trout had a condition factor of 1.14. Two non-game and five forage species comprised about 97% of the total number and about 99% of the total weight of all fish collected. Eleven large common carp (*Cyprinus carpio*) accounted for almost 86% of the total weight of all fish collected. Blacknose dace was again the most abundant forage species present and accounted for about 81% of the total number of fish collected.

Mossy Creek is a spring fed stream that was once the source of water for Jefferson City. It appears to be severely impaired from as yet an unknown source. The stream has a tremendous silt load and on the day we sampled, it had a very cloudy appearance. This cloudy appearance could possibly be calcium sulfate that may be associated with the mining that occurs in the area. Based on the fish species occurrence, it is difficult to note much difference between our two sample sites except for total numbers and weights as described above. The upstream site had a higher overall number and total weight of fish, but these were accounted for by large differences in only a couple of species. With the exception of stocked trout, all species were generally tolerant forms. Overall, trout had survived for about two months but several appeared in emaciated condition.

Benthic macroinvertebrates from our sample at Site 1 included primarily oligochaets, tipulids, and hemipterans. No ephemeropterans, plecopterans, and trichopterans (EPTs) were collected at all. Only relic pleurocerid snails and fingernail clams (*Sphaerium*) were found and the Appalachian brook crayfish (*Cambarus bartonii*) was the only crayfish collected. Dipterans represented about 42%, hemipterans about 36%, and annelida about 14% of the total number of organisms collected (Fig. 12). A

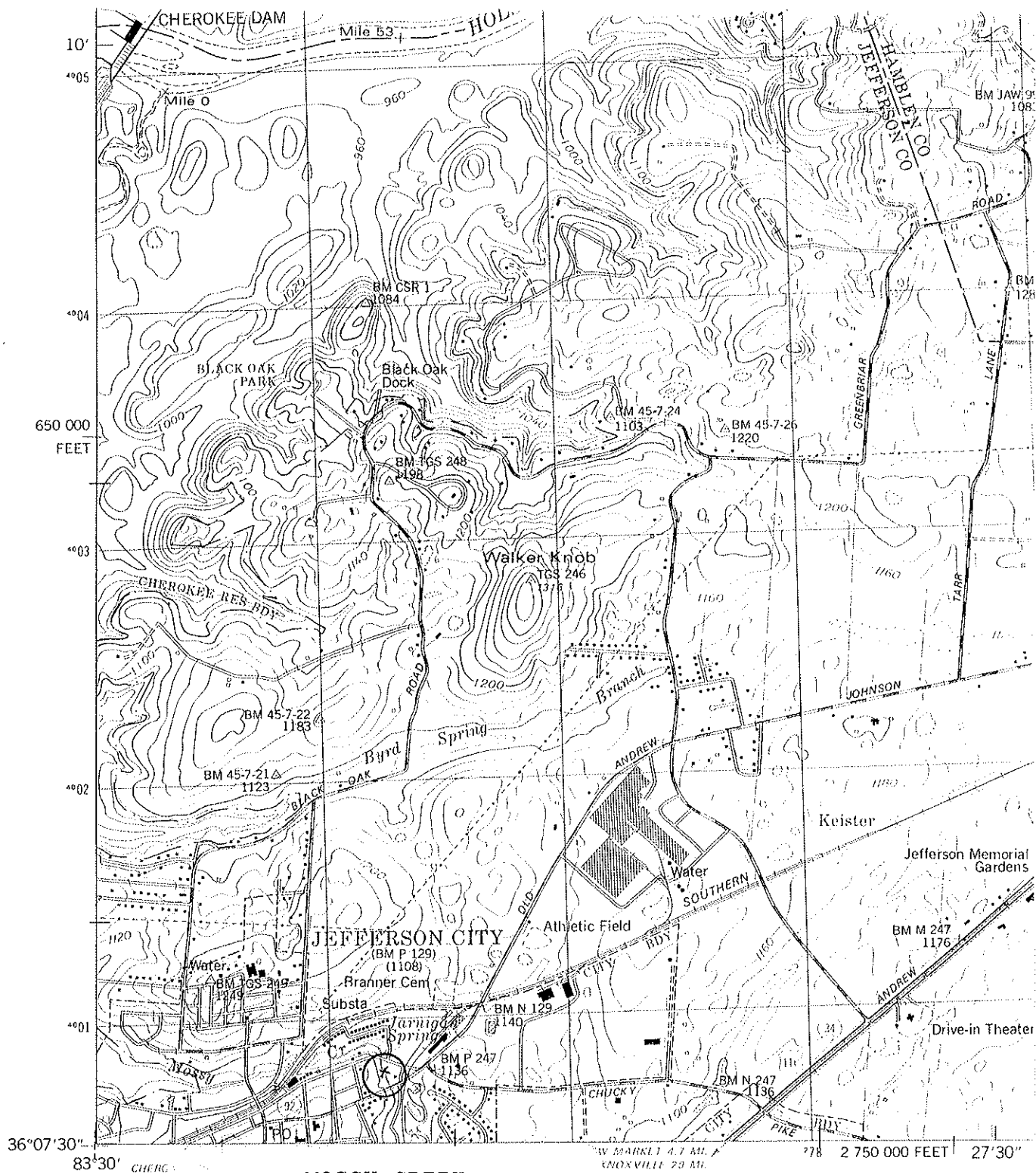
total of only 59 organisms representing seven taxa was collected at this site.

Benthic macroinvertebrates from our sample at Site 2 included baetid mayflies, hydropsychid caddisflies, and gyrid beetles. No stoneflies were present. Gastropods included the limpet (*Ferrissia*) and *Physa* snails. Trichoptera represented about 60%, dipterans about 13%, amphipods about 10%, and ephemeropterans about 6% of the total number of organisms collected (Fig. 13). Almost all (96%) of the caddisflies collected were *Hydropsyche betteni/depravata*, a species complex that is generally considered to be a tolerant form and commonly found in silt polluted streams. Although a greater total number of organisms were collected at Site 2 as compared to Site 1, almost 58% of this was accounted for by *H. betteni/depravata*. A total of only 16 taxa was collected at this site.

The degree of impairment is obvious when looking at the benthic community. Both sites showed a very degraded status and were in what is probably the worst condition of any east Tennessee stream we have observed to date. The low taxa richness and absence of pollution sensitive species (EPT taxa), especially at Site 1, indicates a severely impaired aquatic community. A combined total of only 19 taxa were collected from both sites, and the majority of these were represented by tolerant forms.

Management Recommendations:

1. The cause of the pollution should be further investigated. The Tennessee Department of Health and Environment was advised of our findings.
2. The stocking of fingerling trout should cease until the pollution is corrected. Under current conditions, the only suitable factor for trout is cold water with adequate dissolved oxygen. Stocking small numbers of catchable size trout may be an option.



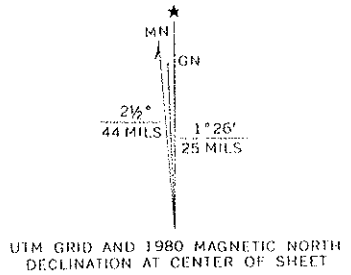
(NEW MARKET 155-SE)
4255 11 SE

Mapped
Published
Control by
Revised b
aerial photographs taken 1978 and by reference to TN 6500
quadrangle dated 1960. Map field checked by TVA, 1978
Map edited 1980

Polyconic projection. 10,000-foot grid ticks based on Tennessee coordinate system. 1000-meter Universal Transverse Mercator grid, zone 17. 1927 North American Datum. To place on the predicted North American Datum 1983 move the projection lines 7 meters south and 9 meters west as shown by dashed corner ticks

Fine red dashed line
visible on aerial photo
Red tint indicates ar

TALBOTT QUADRANGLE
Tennessee - 163 NW



PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Mossy Creek Date: 6 November 1991
Watershed: Holston River County: Jefferson
Area: Site # 1 Sample Length: 300 ft
Lat-Long: 360740N - 832913W Reach: 06010104-24,0
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 22.3 ft Avg. Depth 0.5 ft Max. Depth 2.5 ft
2. Estimated Percent of Stream in Pools is 30%.
3. Estimated Percent Pool Bottom is Silt 25% Sand 15% Gravel 15% Rubble 15% Boulders 25% Bedrock 5%.
4. Estimated Percent Riffle Bottom is Silt 20% Sand 10% Gravel 10% Rubble 15% Boulders 40% Bedrock 5%.
5. Abundance of Littoral Aquatic Plants is Average (moss on rocks).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 30% of the Stream, Average in 40%, Poor in 30%.
7. Shade or Canopy Good over 80% of Stream.
8. Flow (CFS) 21.1: Compared to Normal: Normal
9. Present Weather: Clear and cold. Air temperature - 34 F @ 9:15 am.
10. Weather (last 24 h): Clear and cold overnight.
11. pH 7.8 Temp. 52 F Conductivity 415 micromhos/cm
D.O. 8.9 ppm Saturation 80%
12. Comments: Sample area location was at the bridge on East Main Street upstream to the bridge on Old Hwy. 11-E in Jefferson City. Lots of silt, stream was very cloudy. The stream has been severely impaired from an unknown source.

FISH DATA

Stream: Mossy Creek Date: 6 November 1991
 Watershed: Holston River County: Jefferson
 Area: Site # 1 Sample Length: 300 ft
 Lat-Long: 360740N - 832913W Reach: 06010103-10,0
 Type of Sampling: Electrofishing Elevation: 1,080 ft
 Gear Type: 2 Backpack Units Time: 1120 - 1155

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Oncorhynchus mykiss</i>	353	3	4	0.11
" "	"	8	5	0.45
" "	"	7	6	0.55
" "	"	3	7	0.37
<i>Salmo trutta</i>	355	1	5	0.04
" "	"	2	6	0.16
" "	"	1	7	0.13
<i>Lepomis macrochirus</i>	206	4	2	0.06
" "	"	1	4	0.08
<i>Catostomus commersoni</i>	32	11	2-8	0.46
<i>Hypentelium nigricans</i>	166	2	14	2.42
<i>Campostoma anomalum</i>	25	16	2-7	0.65
<i>Cyprinus carpio</i>	47	1	18	3.00
<i>Pimephales notatus</i>	334	25	2-3	0.27
<i>Rhinichthys atratulus</i>	351	157	1-4	1.81
<i>Percina caprodes</i>	306	2	2-4	0.04
<i>Cottus carolinae</i>	40	9	1-4	0.20

All trout were stocked fish.

Site was located between old Hwy. 11-E bridge and the East Main Street bridge in Jefferson City. Shocking at 120 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

Mossy Creek: Site # 1, Qualitative Benthic Sample

6 November 1991

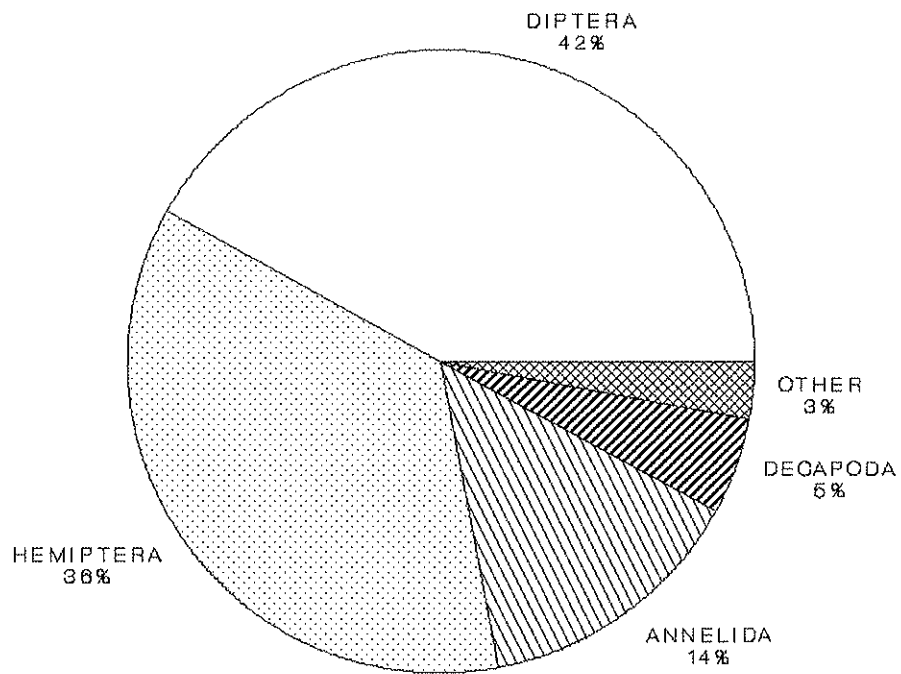
Field # 332

Jefferson Co., TN; At the bridge crossing on East Main Street.
Coordinates: 360740N - 832913W. Talbott, Tenn., # 163 NW Quad.
Reach # 06010104-24,0.

<u>TAXA</u>	<u>NUMBER</u>
ANNELIDA:	
Oligochaeta	8
DECAPODA:	
Cambaridae/ <i>Cambarus bartonii</i> 1st form males	2
<i>Cambarus bartonii</i> 2nd form male	1
DIPTERA:	
Chironomidae larvae	3
Chironomidae adult	1
Tipulidae/ <i>Tipula</i>	21
GASTROPODA:	
Pleuroceridae relics	
HEMIPTERA:	
Gerridae/ <i>Gerris remigis</i> males	2
<i>Gerris remigis</i> female	1
Veliidae/ <i>Rhagovelia obesa</i> males	13
<i>Rhagovelia obesa</i> females	5
MEGALOPTERA:	
Sialidae/ <i>Sialis</i>	2
PELECYPODA:	
Sphaeriidae/ <i>Sphaerium</i> - 26 relics	

59

MOSSY CREEK
SITE 1
BENTHIC MACROINVERTEBRATES

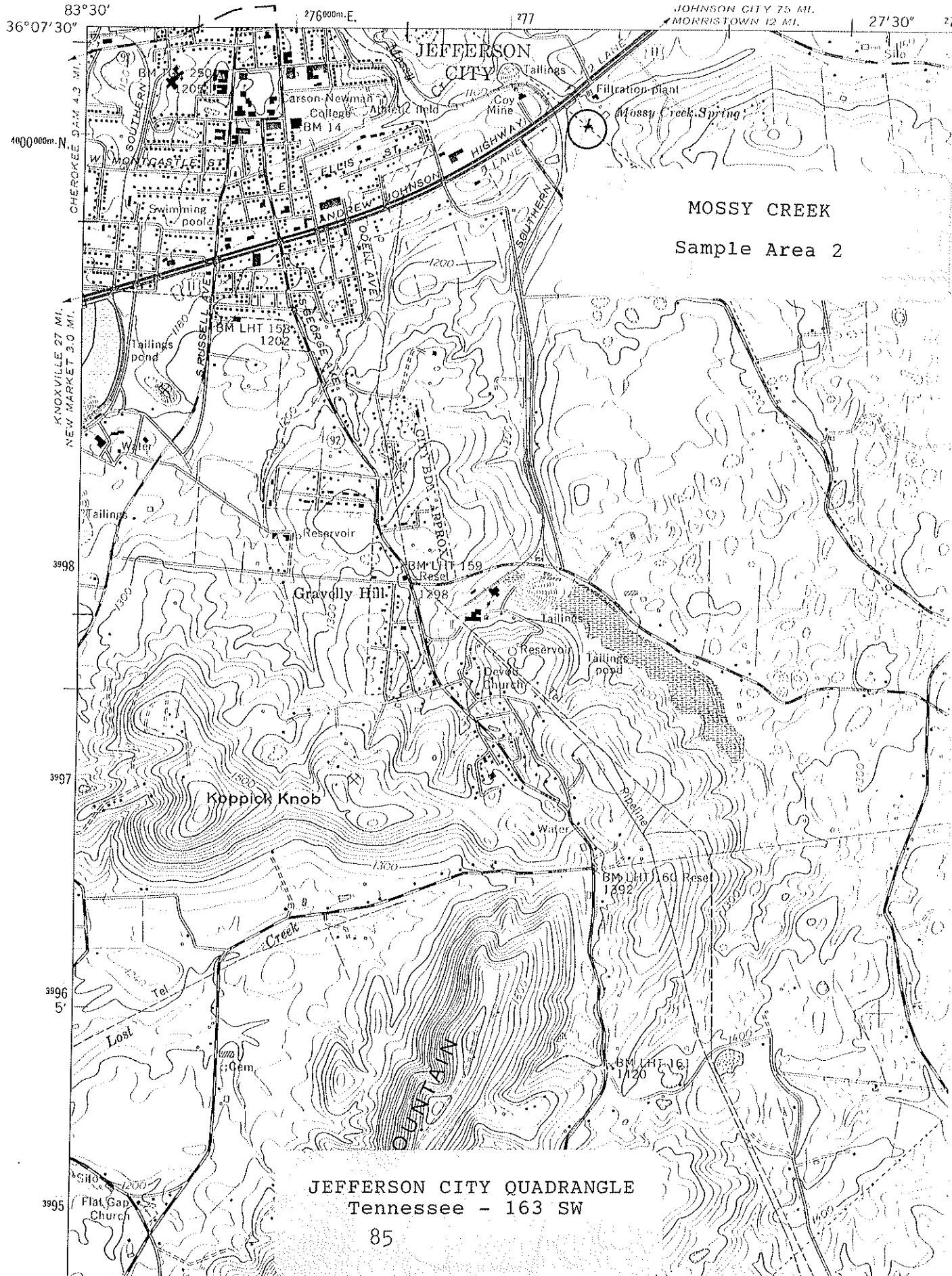


PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 69
TAXA RICHNESS = 7
Figure 12.

4256 11 NE
(UOPPA 155-NE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



JEFFERSON CITY QUADRANGLE
Tennessee - 163 SW

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Mossy Creek Date: 6 November 1991
Watershed: Holston River County: Jefferson
Area: Site # 2 Sample Length: 300 ft
Lat-Long: 360715N - 832826W Reach: 06010104-25,0
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 21.3 ft Avg. Depth 1.0 ft Max. Depth 3.7 ft
2. Estimated Percent of Stream in Pools is 60%.
3. Estimated Percent Pool Bottom is Silt 15% Sand 25% Gravel 30% Rubble 30%.
4. Estimated Percent Riffle Bottom is Silt 10% Sand 20% Gravel 35% Rubble 35%.
5. Abundance of Littoral Aquatic Plants is Average.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 40% of the Stream, Average in 40%, Poor in 20%.
7. Shade or Canopy Good over 40% of Stream.
8. Flow (CFS) 20.0: Compared to Normal: Normal
9. Present Weather: Sunny, clear and cool. Air temperature - 52 F @ 1:30 pm.
10. Weather (last 24 h): Clear and cold.
11. pH 7.2 Temp. 57 F Conductivity 415 micromhos/cm
D.O. 8.5 ppm Saturation 83%
12. Comments: Sample area location was upstream of Hwy. 11-E at the old pumphouse. Lots of silt present, even in the riffle areas.

FISH DATA

Stream: Mossy Creek Date: 6 November 1991
 Watershed: Holston River County: Jefferson
 Area: Site # 2 Sample Length: 300 ft
 Lat-Long: 360715N - 832826W Reach: 06010104-25,0
 Type of Sampling: Electrofishing Elevation: 1,095 ft
 Gear Type: 2 Backpack Units Time: 1505 -1535

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Oncorhynchus mykiss</i>	353	1	5	0.06
" "	"	1	6	0.08
<i>Salmo trutta</i>	355	1	5	0.05
<i>Lepomis macrochirus</i>	206	7	2	0.07
" "	"	6	3	0.14
<i>Catostomus commersoni</i>	32	12	3-18	0.98
<i>Cyprinus carpio</i>	47	11	15-18	28.20
<i>Campostoma anomalum</i>	25	8	2-7	0.33
<i>Pimephales notatus</i>	334	2	2-3	0.02
<i>Rhinichthys atratulus</i>	351	360	1-4	2.32
<i>Percina caprodes</i>	306	10	3-4	0.16
<i>Cottus carolinae</i>	40	27	1-4	0.49

All trout were stocked fish.

Site was located at the old pumping station upstream of Hwy. 11-E. in Jefferson city. Shocking at 120 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

Mossy Creek: Site # 2, Qualitative Benthic Sample

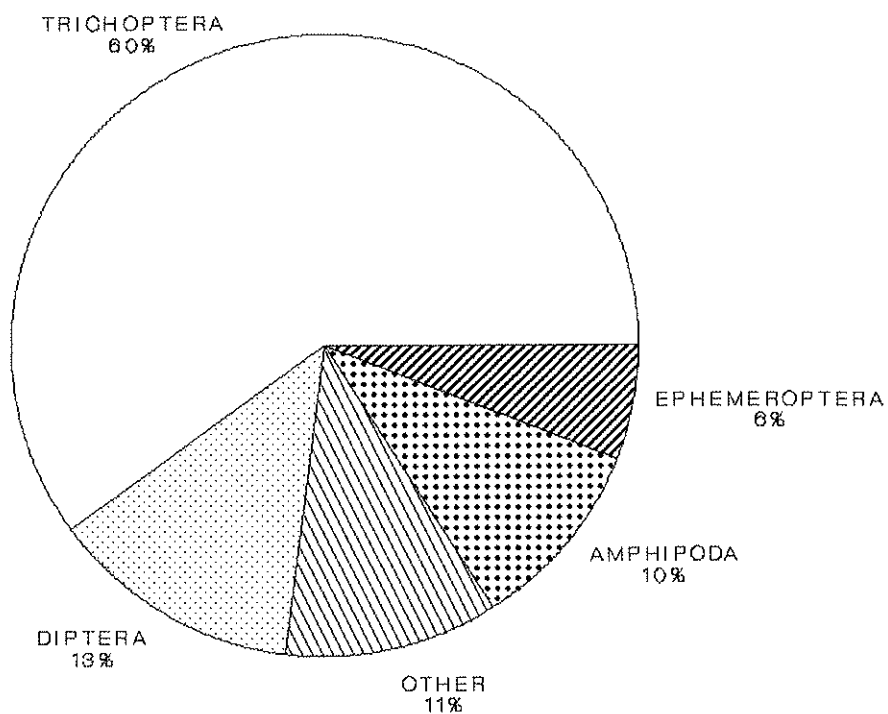
6 November 1991

Field # 333

Jefferson Co., TN; Near Mossy Springs at the old pump house.
 Coordinates: 360715N - 832826W. Jefferson City, Tenn., # 163 SW
 Quad. Reach # 06010104-25,0.

<u>TAXA</u>	<u>NUMBER</u>
AMPHIPODA:	
<i>Talitridae/Hyalella azteca</i>	24
ANNELIDA:	
<i>Oligochaeta</i>	4
COLEOPTERA:	
<i>Gyrinidae/Dineutus assimilis</i> male	1
<i>Dineutus assimilis</i> female	1
DIPTERA:	
Chironomidae larvae	26
Tipulidae/Tipula	4
EPHEMEROPTERA:	
Baetidae/Baetis	15
GASTROPODA:	
Ancyliidae/Ferrissia	1
Physidae/Physa	6
HEMIPTERA:	
Belostomatidae/Belostoma flumineum adult	1
Corixidae	1
MEGALOPTERA:	
Sialidae/Sialis	1
NEMATODA:	2
ODONATA:	
Calopterygidae/Calopteryx	6
Corduliidae/Somatochlora	1
TRICHOPTERA:	
Hydropsychidae/Cheumatopsyche	5
<i>Hydropsyche betteni/depravata</i>	135
Psychomyiidae/Lype diversa adult male (1)	
	234

MOSSY CREEK
SITE 2
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 234
TAXA RICHNESS = 16
Figure 13.

Reedy Creek

One qualitative fishery survey was conducted in July 1991:

Location and Length - Tributary to the South Fork Holston River. The sample site was located just downstream of the Anderson Bridge on Orebank Road and was sampled on 2 July 1991. It was 400 ft in length and averaged 24.2 ft in width. The site was in Sullivan County (Indian Springs Quadrangle).

Sampling Methodology - The site was sampled using two backpack electrofishing units operating at 120 volts AC. Additional collections were made from the riffle areas by shocking into a 20 ft seine.

Water Quality - Data were collected from midstream at mid-depth on 2 July 1991: DO - 8.8 ppm, pH - 8.2, Temperature - 72 F, Conductivity - 390 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample. The sample contained 250 organisms representing 43 taxa.

Fish Collected:

<u>Species</u>	% by		% by	
	<u>No.</u>	<u>No.</u>	<u>Wt.</u>	<u>Wt.</u>
Spotted bass	1	0.5	t	
Largemouth bass	1	0.5	0.14	1.8
Rock bass	4	1.8	1.11	12.5
Redbreast sunfish	12	5.4	0.83	9.3
Green sunfish	2	0.9	0.09	1.0
Warmouth	7	3.2	0.38	4.3
Bluegill	34	15.4	0.89	10.0
Non-game Fish	17	7.7	3.20	35.9
Forage Fish	143	64.7	2.27	25.5
Total	221		8.91	

Comments - This stream was surveyed primarily to develop a fish species diversity list and collect stream information for TADS. The Agency has previous fish collections, benthic studies, and a fish kill investigation from this stream dating back to late 1960's and early 1970's (TWRA file data). We were interested in updating this information and documenting current stream conditions.

We collected a total of 221 fish weighing 8.91 lb and comprising 16 species from our sample site. Six native game species, spotted bass (*Micropterus punctulatus*), largemouth bass

(*M. salmoides*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), warmouth (*L. gulosus*), and bluegill (*L. macrochirus*), along with exotic redbreast sunfish (*L. auritus*) were collected. Spotted bass and largemouth bass were represented by single specimens and only two green sunfish were collected. Therefore, comparison of inch class distribution was made for rock bass, redbreast sunfish, warmouth, and bluegill (Fig. 14). Bluegill made up about 15% compared to 5% by rock bass, 3% by warmouth, and about 2% by rock bass, of the total number of fish collected. However, rock bass contributed about 13% of the total weight as compared to 10% by bluegill, 9% by redbreast sunfish, and 4% by warmouth. Two non-game and seven forage species were also collected here and these comprised about 72% of the total number and 61% of the total weight. The banded sculpin (*Cottus carolinae*) was the most abundant forage species present. About 22 species are reported from earlier surveys of Reedy Creek, however the occurrence of a couple of those reported species is very questionable and were most probably mistaken identifications at that time. Our species list compares fairly well with those earlier surveys. We collected four species, spotted bass, largemouth bass, green sunfish, and warmouth, not found then and they reported at least nine species, longear sunfish (*L. megalotis*), white sucker (*Catostomus commersoni*), bigeye chub (*Hybopsis amblops*), river chub (*Nocomis micropogon*), saffron shiner (*Notropis rubricroceus*), bluntnose minnow (*Pimephales notatus*), blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*), and fantail darter (*Etheostoma flabellare*) that we did not collect. They reported saffron shiners as abundant and bigeye chubs as very abundant at that time, however, we collected none. It is also interesting to note that the longear sunfish was collected then. We collected only redbreast sunfish, a presumed exotic species that is ecologically similar to the longear sunfish and is apparently replacing it in the upper Tennessee River drainage (Etnier et al. 1983).

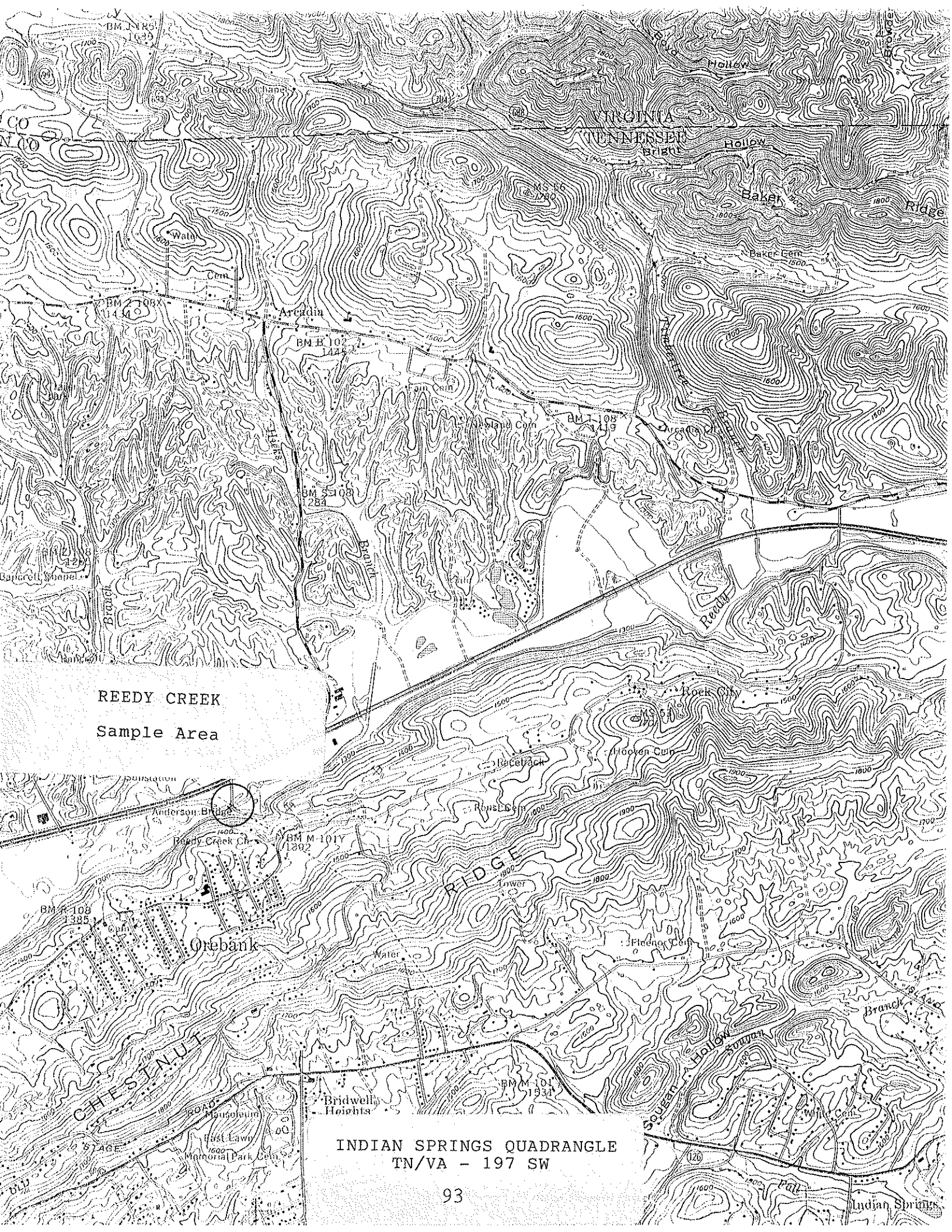
Reedy Creek is a low gradient stream that has long been subject to heavy flooding, siltation, domestic rubbish, and pollution associated with commercial development, especially along the lower reach of the stream course. In 1969, a sizable fish kill occurred in the lower three miles of the stream, which was traced to high acid resulting from a fire involving tan bark on the city dump. The stream has been heavily impacted from past and present pollution and only 16 fish species were collected from our sample area. Most were typical components of streams with polluted conditions, however, a couple of fairly intolerant forms were also found.

Benthic macroinvertebrates from our sample included Baetidae, Caenidae, Ephemerellidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, Leuctridae and Peltoperlidae stoneflies, Hydropsychidae and Leptoceridae caddisflies, and Elmidae and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) was present along with limpets (*Ferrissia*) and *Physa* and pleurocerid

snails. Two crayfish species, *Cambarus longirostris* and *Orconectes rusticus* were collected. *O. rusticus* is an introduced species that is becoming established in both the Holston River and Nolichucky River drainages and is expanding its range in east Tennessee. The rusty crayfish may be replacing some of our native crayfish species due to its adaptive capability. Trichopterans represented about 32%, coleopterans about 18%, ephemeropterans about 17%, odonates about 9%, hemipterans about 5%, and plecopterans about 2% of the total number of organisms collected (Fig. 15). *Hydropsyche betteni/depravata*, a species complex generally considered to be a tolerant form commonly found in silt polluted streams, accounted for about 66% of the total number of caddisflies. A total of 43 taxa was collected at this site.

Management Recommendations:

1. No specific management can be suggested at present. However, anything to abate pollution would be beneficial.



REEDY CREEK
Sample Area

INDIAN SPRINGS QUADRANGLE
TN/VA - 197 SW

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Reedy Creek Date: 2 July 1991
Watershed: South Fork Holston River County: Sullivan
Area: See comments Sample Length: 400 ft
Lat-Long: 363342N - 822737W Reach: 06010102-46,0
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 24.2 ft Avg. Depth 0.9 ft Max Depth 3.3 ft
2. Estimated Percent of Stream in Pools is 35%.
3. Estimated Percent Pool Bottom is Silt 15% Sand 5% Gravel 10% Rubble 20% Boulders 25% Bedrock 25%.
4. Estimated Percent Riffle Bottom is Silt 10% Sand 10% Gravel 15% Rubble 20% Boulders 20% Bedrock 25%.
5. Abundance of Littoral Aquatic Plants is Scarce.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 40% of the Stream, Average in 50%, Poor in 10%.
7. Shade or Canopy Good over 90% of Stream.
8. Flow (CFS) 19.0: Compared to Normal: Normal
9. Present Weather: Clear, hot and humid. Air temperature - 90 F @ 11:10 am.
10. Weather (last 24 h): Overcast warm and humid.
11. pH 8.2 Temp. 72 F Conductivity 390 micromhos/cm
D.O. 8.8 ppm Saturation 102%
12. Comments: Sample area location was just downstream of Anderson Bridge on Orebank Road. Silt coating on substrate was evident everywhere. Industrial developments on the north side of the creek and recent construction could further impact this stream.

FISH DATA

Stream: Reedy Creek Date: 2 July 1991
 Watershed: South Fork Holston River County: Sullivan
 Area: See comments Sample Length: 400 ft
 Lat-Long: 363342N - 822737W Reach: 06010102-46,0
 Type of Sampling: Electrofishing Elevation: 1,240 ft
 Gear Type: 2 Backpack Units Time: 1410 - 1520

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Micropterus punctulatus</i>	219	1	1	t
<i>M. salmoides</i>	220	1	7	0.14
<i>Ambloplites rupestris</i>	13	1	5	0.13
" "	"	2	7	0.66
" "	"	1	8	0.32
<i>Lepomis auritus</i>	201	6	3	0.18
" "	"	2	4	0.12
" "	"	3	5	0.33
" "	"	1	6	0.20
<i>L. cyanellus</i>	202	1	3	0.03
" "	"	1	4	0.06
<i>L. gulosus</i>	204	3	1	t
" "	"	1	3	0.05
" "	"	2	4	0.16
" "	"	1	5	0.17
<i>L. macrochirus</i>	206	1	1	t
" "	"	14	2	0.16
" "	"	11	3	0.28
" "	"	8	4	0.43
<i>Hypentelium nigricans</i>	166	16	3-12	2.48
<i>Moxostoma erythrurum</i>	230	1	12	0.72
<i>Campostoma anomalum</i>	25	16	1-6	0.14
<i>Luxilus chrysocephalus</i>	249	25	1-6	1.03
<i>L. coccogenis</i>	248	2	4	0.07
<i>Etheostoma blennioides</i>	81	22	1-4	0.25
<i>E. rufilineatum</i>	108	28	1-2	0.14
<i>E. simoterum</i>	111	9	1-2	0.01
<i>Cottus carolinae</i>	40	41	1-4	0.63

Site was located at Anderson Bridge on Orebank Road. Shocking at 120 volts AC. Made 15 seine hauls in combination with backpack shocker in the riffle areas.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

GAME FISH FROM REEDY CREEK
INCH CLASS DISTRIBUTION

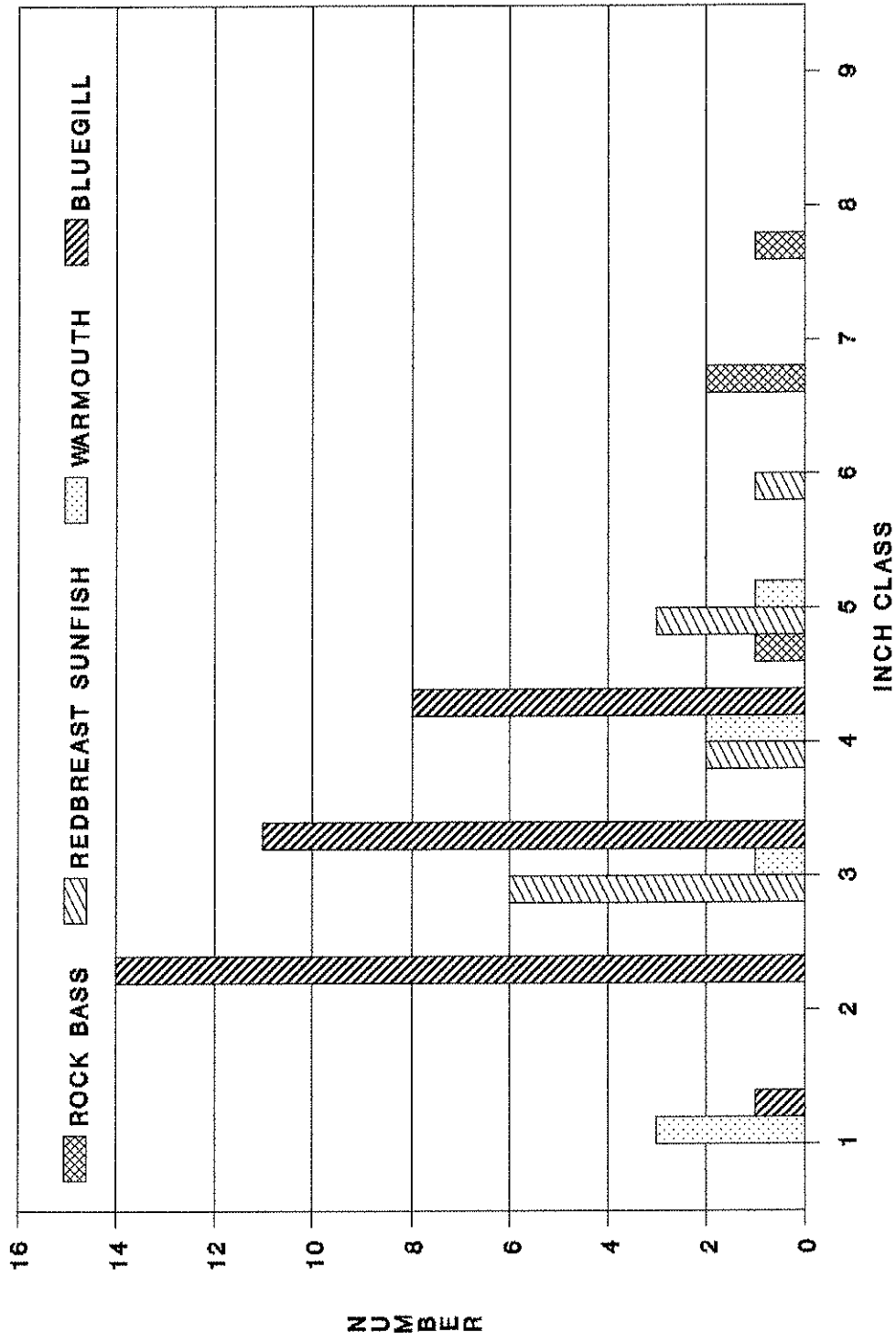


Figure 14.

Reedy Creek: Qualitative Benthic Sample

2 July 1991

Field # 297

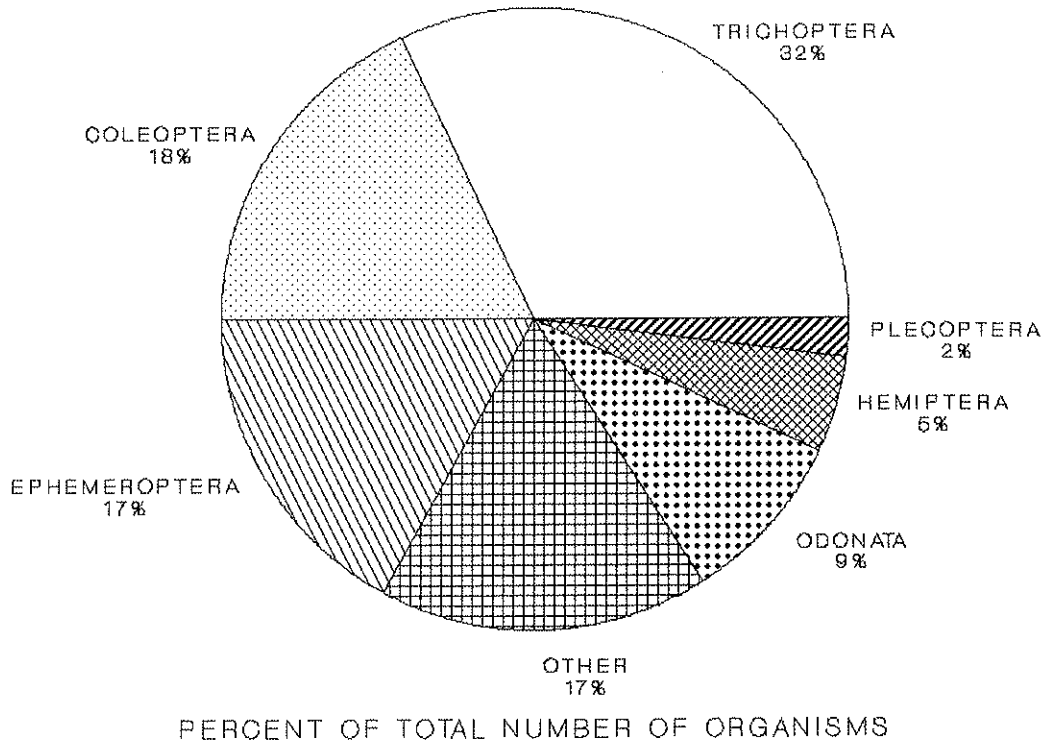
Sullivan Co., TN; Just downstream of Anderson Bridge on Orebank Road. Coordinates: 363342N - 822737W. Indian Springs, Tenn.-Va., 197 SW Quad. Reach # 06010102-46,0.

<u>TAXA</u>	<u>NUMBER</u>
COLEOPTERA:	
Elmidae/ <i>Ancyronyx variegatus</i> adults	2
<i>Dubiraphia</i> adults	10
<i>Optioservus ovalis</i> adult	1
<i>O. trivittatus</i> adults	7
<i>Promoresia elegans</i> adult	1
<i>Stenelmis</i> larvae	2
<i>Stenelmis</i> adults	19
Psephenidae/ <i>Psephenus herricki</i> larvae	2
<i>Psephenus herricki</i> adults	2
DECAPODA:	
Cambaridae/ <i>Cambarus longirostris</i> 2nd form male	1
<i>Orconectes rusticus</i> 1st form male	1
<i>Orconectes rusticus</i> females	3
DIPTERA:	
Chironomidae	4
Dixidae/ <i>Dixa</i>	1
Tipulidae/ <i>Tipula</i>	1
EPHEMEROPTERA:	
Baetidae/ <i>Baetis</i>	7
Caenidae/ <i>Caenis</i>	1
Ephemerellidae/ <i>Eurylophella</i>	2
Ephemeridae/ <i>Hexagenia</i>	4
Heptageniidae/ <i>Stenacron interpunctatum</i>	7
<i>Stenonema</i>	1
<i>Stenonema mediopunctatum</i>	7
<i>S. terminatum</i>	2
Oligoneuriidae/ <i>Isonychia</i>	11
GASTROPODA:	
Ancylidae/ <i>Ferrissia</i>	2
Physidae/ <i>Physa</i>	1
Pleuroceridae	9
HEMIPTERA:	
Corixidae	1
Gerridae/ <i>Rheumatobates rileyi</i> adult male	1
Unid. nymphs	2
Veliidae/ <i>Rhagovelia obesa</i> nymphs	9

Reedy Creek: Qualitative Sample cont.

<u>TAXA</u>	<u>NUMBER</u>
ISOPODA:	
Asellidae/ <i>Lirceus</i>	4
MEGALOPTERA:	
Sialidae/ <i>Sialis</i>	4
NEMATOMORPHA:	1
ODONATA:	
Aeshnidae/ <i>Boyeria vinosa</i>	6
Coenagrionidae/ <i>Argia</i>	6
Gomphidae/ <i>Gomphus</i>	1
<i>Hagenius brevistylus</i>	2
<i>Ophiogomphus mainensis</i>	1
<i>Stylogomphus albistylus</i>	3
Macromiidae/ <i>Macromia</i>	4
PELECYPODA:	
Corbiculidae/ <i>Corbicula fluminea</i>	9
PLECOPTERA:	
Leuctridae/ <i>Leuctra</i>	2
Peltoperlidae/ <i>Peltoperla</i>	4
TRICHOPTERA:	
Hydropsychidae/ <i>Cheumatopsyche</i>	25
<i>Hydropsyche betteni/depravata</i> larvae	53
<i>Hydropsyche betteni/depravata</i> pupa	1
Leptoceridae/ <i>Triaenodes</i> pupa	1
	250

REEDY CREEK
BENTHIC MACROINVERTEBRATES



n = 250
TAXA RICHNESS = 43
Figure 15.

Timbertree Branch

One qualitative fishery survey was conducted in July 1991:

Location and Length - Tributary to Reedy Creek (South Fork Holston River trib.). The sample area was located at the bridge on McClain Road, just off Timbertree Branch Road and was sampled on 2 July 1991. It was approximately 200 ft in length and averaged 10 to 12 ft in width. The site was in Sullivan County (Indian Springs Quadrangle).

Sampling Methodology - The site was sampled with a single backpack electrofishing unit operating at 120 volts AC.

Water Quality - No data collected.

Benthos Collection - No collection was made.

Fish Collected - (See data sheet for species list)

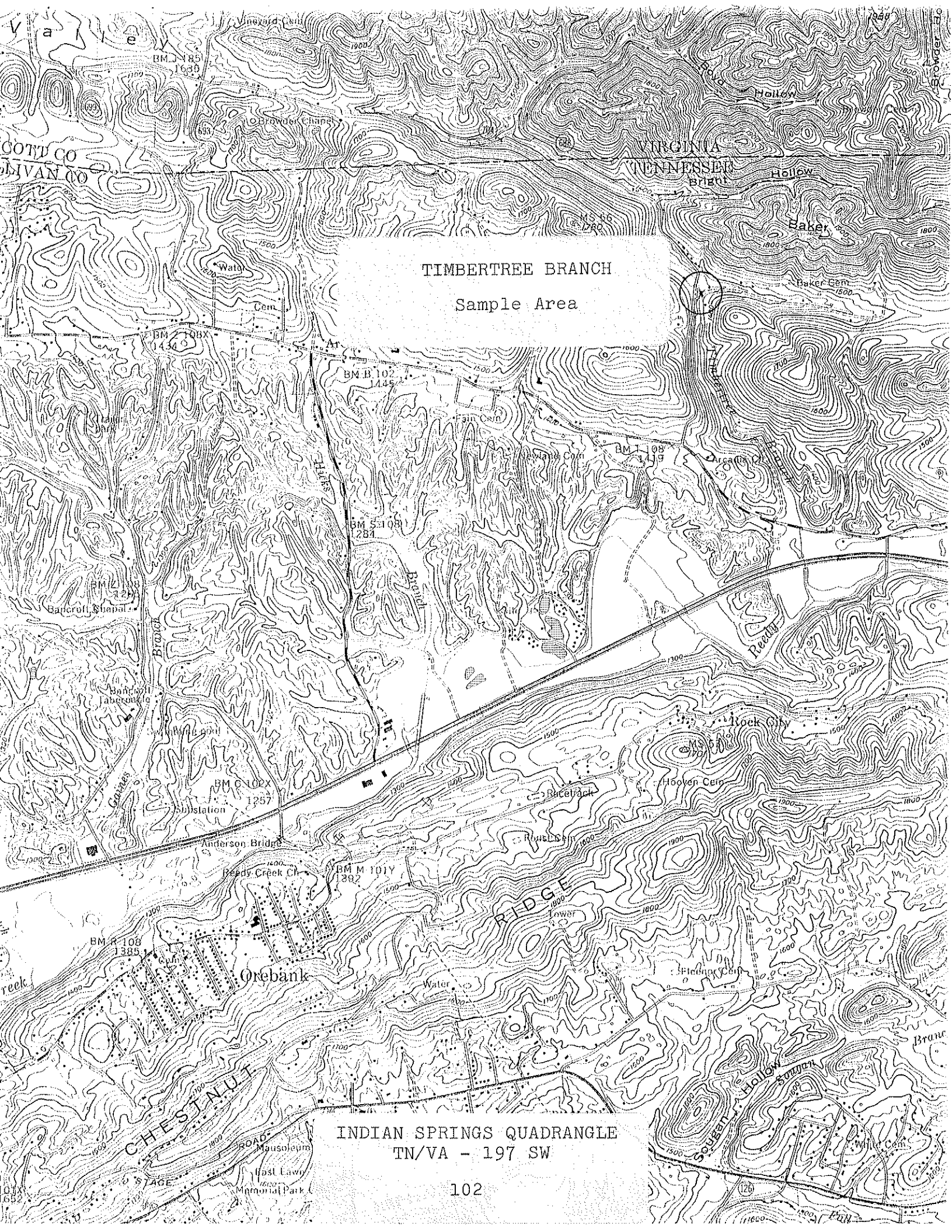
Comments - This stream was surveyed primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted and emphasis was placed on the fish species present and their relative abundance. The Agency has made no previous studies or fish collections from this stream.

A total of 221 fish comprising 12 species was collected. Rock bass (*Ambloplites rupestris*) was the only native game species present. One redbreast sunfish (*Lepomis auritus*) was also collected. Stonerollers (*Campostoma anomalum*) and blacknose dace (*Rhinichthys atratulus*) were the most abundant species present. Two darter species, fantail (*Etheostoma flabellare*) and snubnose (*E. simoterum*) were also collected. Of special interest is the presence of the Tennessee dace (*Phoxinus tennesseensis*). This species, until recently, had 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. We collected eight Tennessee dace at this site, all of which were preserved as voucher specimens. We retained four of these for our reference collection. The remaining four specimens were deposited in the University of Tennessee Research Collection of Fishes. This population represents a new record of the species from this locality.

The stream, at the area we sampled, is small and has a gravel-rubble-bedrock substrate with some boulders. It appears to have good to excellent water quality. No benthic sample was made but we did collect one crayfish species, *Cambarus longirostris*.

Management Recommendations:

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



TIMBERTREE BRANCH
Sample Area

INDIAN SPRINGS QUADRANGLE
TN/VA - 197 SW

FISH DATA

Stream: Timbertree Branch Date: 2 July 1991
 Watershed: South Fork Holston River County: Sullivan
 Area: See comments Sample Length: 200 ft
 Lat-Long: 363517N - 822603W Reach: 06010102-27,0
 Type of Sampling: Electrofishing Elevation: 1,360 ft
 Gear Type: 1 Backpack Unit Time: 1710 - 1740

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Ambloplites rupestris</i>	13	11		
<i>Lepomis auritus</i>	201	1		
<i>Catostomus commersoni</i>	32	2	1-4	0.04
<i>Hypentelium nigricans</i>	166	5		
<i>Campostoma anomalum</i>	25	82		
<i>Luxilus chrysocephalus</i>	249	21		
<i>Notropis rubricroceus</i>	262	4	1-2	0.01
<i>Phoxinus tennesseensis</i>	333	8	1-2	0.04
<i>Rhinichthys atratulus</i>	351	45		
<i>Semotilus atromaculatus</i>	360	5		
<i>Etheostoma flabellare</i>	92	22		
<i>E. simoterum</i>	111	15	1-2	0.03
<i>Cambarus longirostris</i>		1		

Water temperature - 77 F
 Conductivity - 335 micromhos/cm
 Avg. width - 10 to 12 ft
 Avg. depth - 0.4 ft
 Gravel - rubble - bedrock substrate with some boulders.

Site was located at the bridge on McClain Road just off
 Timbertree Branch Road. Shocking at 120 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

Montgomery Fork and Tributaries

One qualitative fishery survey was conducted on Montgomery Fork and two samples on two of its tributaries in July 1991:

Location and Length - Tributary to New River (Big South Fork Cumberland River trib.). The sample site was located at the mouth of McKinney Fork near stream mi 3.2 and was sampled on 16 July 1991. It was 500 ft in length and averaged 16.6 ft in width. The site was in Campbell County (Block Quadrangle). (See accompanying maps showing tributary sample locations)

Sampling Methodology - The site was sampled using two backpack electrofishing units operating at 120 volts AC.

Water Quality - Data were collected from midstream at mid-depth on 16 July 1991: DO - 8.7 ppm, pH - 8.2, Temperature - 70.7, Conductivity - 285 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 2.5 man-h qualitative sample. The sample contained 326 organisms representing 37 taxa.

Fish Collected:

<u>Species</u>	<u>No.</u>	% by	<u>Wt.</u>	% by
		<u>No.</u>		<u>Wt.</u>
Non-game Fish	17	4.3	1.95	30.5
Forage Fish	374	95.7	4.45	69.5
Total	391		6.40	

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

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 surveyed to gather baseline data on streams in the recently established Royal Blue Wildlife Management Area. The Agency has made no previous studies or fish collections from this stream.

We surveyed one site on Montgomery Fork proper and made fish collections on two of its tributaries. These were Puncheon Camp Creek and McKinney Fork. We collected a total of 391 fish weighing 6.4 lb and comprising 11 species from the Montgomery Fork sample. No game species were collected or observed and the fish population consisted of two non-game and nine forage species. White suckers (*Catostomus commersoni*) and northern hog suckers (*Hypentelium nigricans*) made up about 4% of the total number of fish collected while forage species comprised about 96%

of the total number and also about 70% of the total weight. The stoneroller (*Campostoma anomalum*) and creek chub (*Semotilus atromaculatus*) were the most abundant species present and together they accounted for almost 82% of the total number of fish collected. Four darter species, the emerald (*Etheostoma baileyi*), the greenside (*E. blennioides*), the rainbow (*E. caeruleum*), and the blackside (*Percina maculata*) were collected here. The emerald darter was recently added to the list of fish in need of management (TWRA 1991) and only one specimen was collected. 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). No additional species were found in the tributary samples and the creek chub was the most abundant species collected.

Many streams in Campbell County have suffered degradation from sedimentation and acid mine drainage associated with surface and deep coal mined areas. 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 mi of streams that are impacted by mining in the state. Campbell County has been one of the most severely affected counties with approximately 478 mi of streams polluted by sedimentation and 160 mi polluted by acid drainage (Tennessee Department of Public Health 1978).

Like other streams in the county, Montgomery Fork 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. However, the stream has apparently lost all of its native game species (at least in the reach we sampled). The stream is heavily silted and most of the 12 fish species collected are fairly tolerant forms. It is evident that the system is improving, however, it is far from a complete recovery. With its inclusion in the Royal Blue Wildlife Management Area the watershed should be protected from further degradation.

Benthic macroinvertebrates from our sample included Baetidae, Caenidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, perlid stoneflies, hydropterygids caddisflies, and Dryopidae, Dytiscidae, Elmidae, and Psephenidae beetles. *Cambarus distans* was the only crayfish collected and no gastropods were found. Dipterans represented about 53%, ephemeropterans about 21%, trichopterans about 8%, coleopterans and hemipterans 6% each, and plecopterans about 1% of the total

number of organisms collected (Fig. 16). A total of 37 taxa was collected at this site and many were fairly tolerant forms.

Management Recommendations:

1. Consider making additional fish and benthic surveys in the lower reach of the stream.
2. Try to reestablish native game species such as rock bass (*Ambloplites rupestris*) and longear sunfish (*Lepomis megalotis*).
3. Consider stocking rainbow trout (*Oncorhynchus mykiss*) while re-introducing native game species. Any trout management should be directed at a 3 or 4 month put-and-take fishery in the spring, using adult fish.
4. Fish habitat appears somewhat lacking. Consider habitat improvements and structures. As this stream is in one of our Wildlife Management Areas, the Agency could experiment with, as well as maintain these structures.



MONTGOMERY FORK
Sample Area

BLOCK QUADRANGLE
Tennessee - 128 SE

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Montgomery Fork Date: 16 July 1991
Watershed: New River County: Campbell
Station: See comments Sample Length: 500 ft
Lat-Long: 361912N - 841843W Reach: 05130104-64,0
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 16.6 ft Avg. Depth 0.6 ft Max. Depth 3.8 ft
2. Estimated Percent of Stream in Pools is 50%.
3. Estimated Percent Pool Bottom is Silt 20% Gravel 15% Rubble 25% Boulders 25% Bedrock 15%.
4. Estimated Percent Riffle Bottom is Silt 15% Sand 5% Gravel 20% Rubble 25% Boulders 25% Bedrock 10%.
5. Abundance of Littoral Aquatic Plants is Scarce.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 5% of the Stream, Average in 10%, Poor in 85%.
7. Shade or Canopy Good over 75% of Stream.
8. Flow (CFS) 2.1: Compared to Normal: Low
9. Present Weather: Sunny, clear and hot. Air temperature - 81 F @ 12:00 pm.
10. Weather (last 24 h): Sunny, clear and hot.
11. pH 8.2 Temp. 70.7 F Conductivity 285 micromhos/cm
D.O. 8.7 ppm Saturation 98%
12. Comments: Sample area location was at the mouth of McKinney Fork.

FISH DATA

Stream: Montgomery Fork Date: 16 July 1991
 Watershed: New River County: Campbell
 Area: See comments Sample Length: 500 ft
 Lat-Long: 361912N - 841843W Reach: 05130104-64,0
 Type of Sampling: Electrofishing Elevation: 1,400 ft
 Gear Type: 2 Backpack Units Time: 1400 - 1450

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Catostomus commersoni</i>	32	8	3-6	1.24
<i>Hypentelium nigricans</i>	166	9	1-7	0.71
<i>Campostoma anomalum</i>	25	161	1-5	2.78
<i>Luxilus chrysocephalus</i>	249	1	3	0.02
<i>Notropis rubellus micropteryx</i>	260	10	2	0.05
<i>N. stramineus</i>	271	12	1-2	0.05
<i>Semotilus atromaculatus</i>	360	158	1-7	1.43
<i>Etheostoma baileyi</i>	117	1	1	t
<i>E. blennioides</i>	81	2	2-3	0.02
<i>E. caeruleum</i>	84	27	1-2	0.09
<i>Percina maculata</i>	312	2	2	0.01

Site was located at the mouth of McKinney Fork. Shocking at 120 volts AC. No game fish collected or observed.

Collectors: Rick D. Bivens, Mark T. Fagg, and Carl E. Williams

Montgomery Fork: Qualitative Benthic Sample

16 July 1991

Field # 303

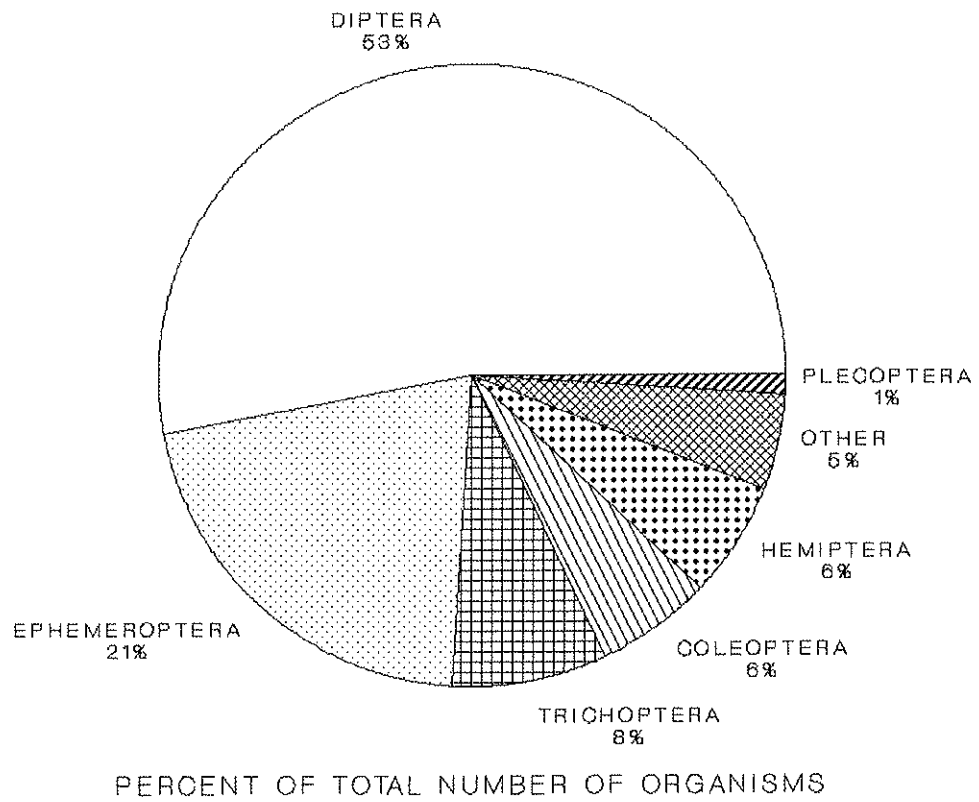
Campbell Co., TN; At the mouth of McKinney Fork. Coordinates:
361912N - 841843W. Block, Tenn., # 128 SE Quad. Reach #
05130104-64,0.

<u>TAXA</u>	<u>NUMBER</u>
ANNELIDA:	
Oligochaeta	1
COLEOPTERA:	
Dryopidae/ <i>Helichus</i>	9
Dytiscidae/ <i>Hydroporus</i> adult	1
Elmidae/ <i>Dubiraphia</i> adult	1
Psephenidae/ <i>Psephenus herricki</i> larvae	7
DECAPODA:	
Cambaridae/ <i>Cambarus distans</i> juveniles	4
<i>Cambarus distans</i> adult females	2
DIPTERA:	
Athericidae/ <i>Atherix lantha</i>	10
Chironomidae larvae	16
Chironomidae pupa	1
Simuliidae	143
Tabanidae/ <i>Chrysops</i>	1
Tipulidae/ <i>Antocha</i>	1
EPHEMEROPTERA:	
Baetidae/ <i>Baetis</i>	22
Caenidae/ <i>Caenis</i>	1
Ephemerae/ <i>Ephemera</i>	7
Heptageniidae/ <i>Epeorus rubidus/subpallidus</i>	11
<i>Heptagenia</i>	3
<i>Stenacron pallidum</i>	3
<i>Stenonema modestum</i>	1
<i>S. vicarium</i>	15
Oligoneuriidae/ <i>Isonychia</i>	6
HEMIPTERA:	
Gerridae/ <i>Gerris</i> nymphs	5
<i>Gerris remigis</i> adult males	4
<i>Gerris remigis</i> adult females	6
<i>Trepobates pictus</i> female	1
Veliidae/ <i>Microvelia</i>	1
<i>Rhagovelia obesa</i> female	1

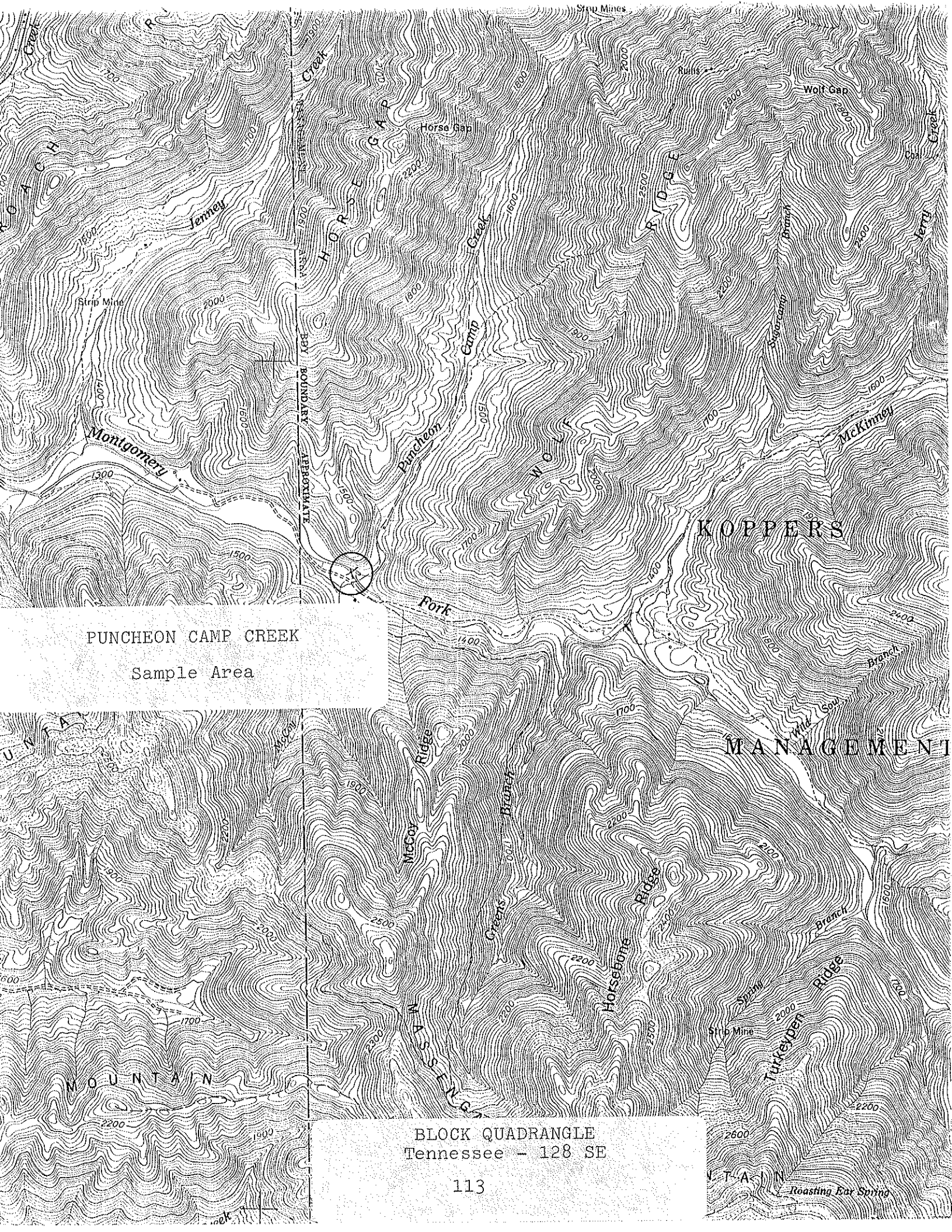
Montgomery Fork: Qualitative Sample cont.

<u>TAXA</u>	<u>NUMBER</u>
MEGALOPTERA:	
Corydalidae/ <i>Nigronia serricornis</i>	2
Sialidae/ <i>Sialis</i>	1
ODONATA:	
Aeshnidae/ <i>Boyeria grafiana</i>	2
Calopterygidae	1
Cordulegastridae/ <i>Cordulegaster erronea</i>	1
<i>C. maculata</i>	1
Gomphidae/ <i>Gomphus</i>	1
<i>Stylogomphus albistylus</i>	3
Macromiidae/ <i>Macromia</i>	1
PLECOPTERA:	
Perlidae/ <i>Acroneuria abnormis</i>	1
<i>A. carolinensis</i>	2
TRICHOPTERA:	
Hydropsychidae/ <i>Cheumatopsyche</i> larvae	16
<i>Cheumatopsyche</i> pupa	1
<i>Symphitopsyche sparna</i>	9
	326

**MONTGOMERY FORK
BENTHIC MACROINVERTEBRATES**



n = 326
TAXA RICHNESS = 37
Figure 16.



PUNCHEON CAMP CREEK
Sample Area

BLOCK QUADRANGLE
Tennessee - 128 SE

FISH DATA

Stream: Puncheon Camp Creek Date: 16 July 1991
 Watershed: New River County: Campbell
 Area: See comments Sample Length: 200 ft
 Lat-Long: 361924N - 841942W Reach: 05130104-
 Type of Sampling: Electrofishing Elevation: 1,300 ft
 Gear Type: 1 Backpack Unit Time: 15 min

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Campostoma anomalum</i>	25	7 *		
<i>Semotilus atromaculatus</i>	360	31 *		
<i>Etheostoma caeruleum</i>	84	7	1-2	0.02
<i>Percina maculata</i>	312	2	2	0.01

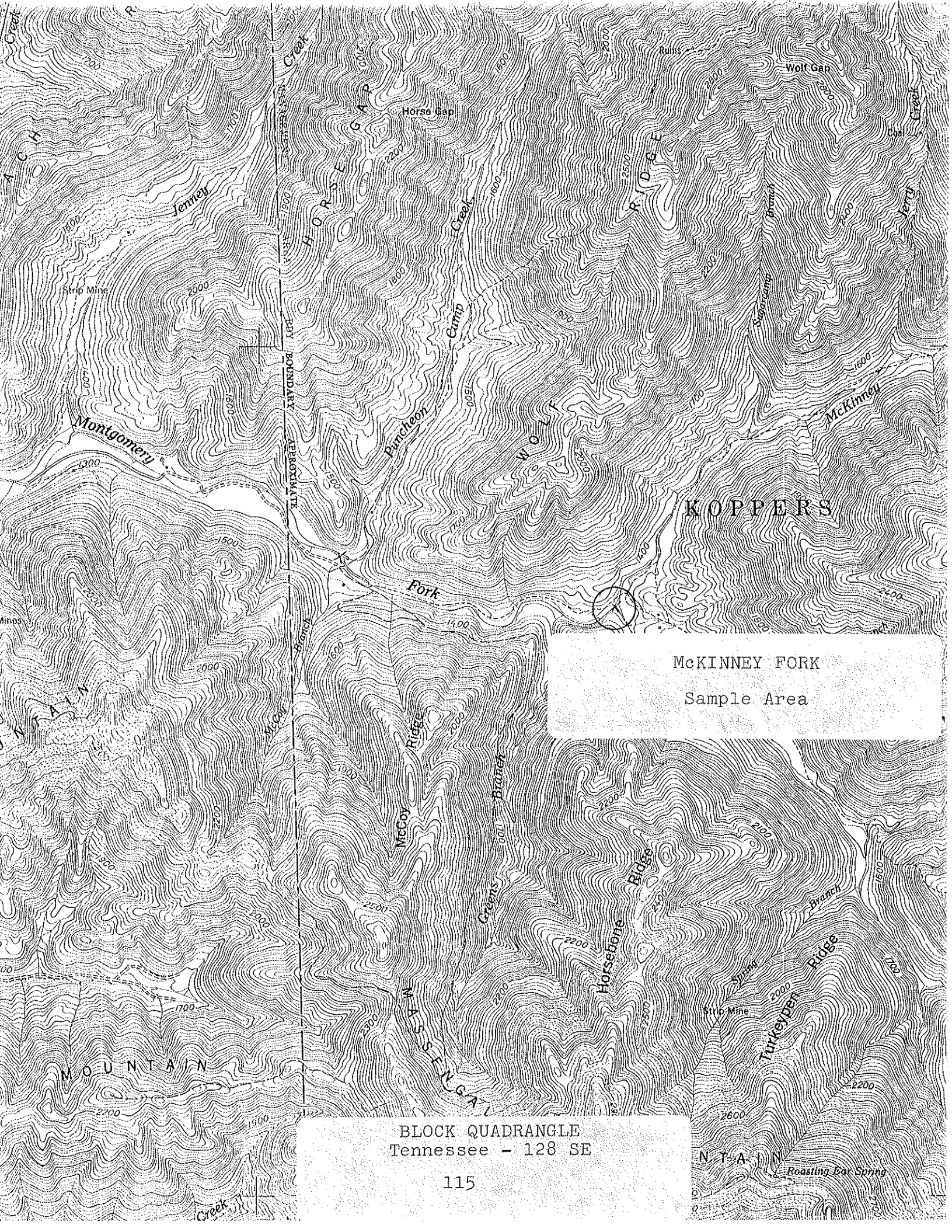
Cambarus sp. 1

Water temperature - 75 F
 Conductivity - 300 micromhos/cm
 Avg. width - 5 to 8 ft
 Avg. depth - 0.3 ft
 Rubble - boulder substrate.

* Numbers only, lengths and weights not recorded.

Site location was just upstream of the mouth of the stream at about 1,300 ft elevation. Shocking at 120 volts AC. This stream appears less impacted than Montgomery Fork and McKinney Fork, but still has heavy siltation present.

Collectors: R.D. Bivens, M.T. Fagg, C.E. Williams, and J. Arnold



KOPPERS

McKINNEY FORK
Sample Area

BLOCK QUADRANGLE
Tennessee - 128 SE

FISH DATA

Stream: McKinney Fork Date: 16 July 1991
 Watershed: New River County: Campbell
 Area: See comments Sample Length: 200 ft
 Lat-Long: 361917N - 841841W Reach: 05130104-
 Type of Sampling: Electrofishing Elevation: 1,360 ft
 Gear Type: 1 Backpack Unit Time: 15 min

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Catostomus commersoni</i>	32	2 *		
<i>Hypentelium nigricans</i>	166	5 *		
<i>Campostoma anomalum</i>	25	8 *		
<i>Semotilus atromaculatus</i>	360	46 *		

Cambarus sp. few

Water temperature - 71 F
 pH - 8.1
 Conductivity - 310 micromhos/cm
 Avg. width - 8 to 10 ft
 Avg. depth - 0.4 ft
 Max. depth - 3.0 ft
 Rubble - boulder - bedrock substrate.

* Numbers only, lengths and weights not recorded.

Site location was near the mouth, just upstream of the road crossing at about 1,360 ft elevation. Shocking at 120 volts AC. Heavy siltation present.

Collectors: R.D. Bivens, M.T. Fagg, C.E. Williams, and J. Arnold

Capuchin Creek

One qualitative fishery survey was conducted in November 1991:

Location and Length - Tributary to Jellico Creek (Cumberland River trib.). The sample site was located just upstream of new bridge on Whistle Creek Road, 1st bridge downstream of the mouth of Trammel Branch (near stream mi 2.0), and was sampled on 1 November 1991. It was approximately 600 to 900 ft in length. The site was in Campbell County (Jellico West Quadrangle).

Sampling Methodology - The site was sampled using a single backpack electrofishing unit operating at 110 volts 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. Specifically we were interested in collecting specimens of the upper Cumberland River johnny darter subspecies (*Etheostoma nigrum susanae*) reported from this section of stream (O'Bara 1988). Only a limited survey was conducted and emphasis was placed on the fish species present.

In all, a total of 14 species was collected from this site. Three native game species, spotted bass (*Micropterus punctulatus*), rock bass (*Ambloplites rupestris*), and longear sunfish (*Lepomis megalotis*), along with the exotic redbreast sunfish (*L. auritus*) were collected. One non-game and nine forage species were also collected here. Of special interest is the occurrence of the northern form of the rosyface shiner (*Notropis rubellus rubellus*). This species 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 upstream of Cumberland Falls in Campbell County. We collected 31 specimens of the rosyface subspecies from our sample. The arrow darter (*Etheostoma sagitta*) is another species listed in need of management. This is also an upper Cumberland River species confined to streams in Campbell, Claiborne, and Scott counties in Tennessee. We collected 11 specimens of the arrow darter from this site. Another species recently added to the list of fish in need of management (TWRA 1991) and collected in our sample is the emerald darter (*E. baileyi*). Three other darter species, the stripetail (*E. kennicotti*), the 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). We failed to find or collect *Etheostoma nigrum susanae* from this locality. It was reportedly collected near this area in 1987 (O'Bara 1988). The U.S. Fish and Wildlife Service is reviewing this species to determine if it should be provided protection under the Federal Endangered Species Act (Cole 1988).

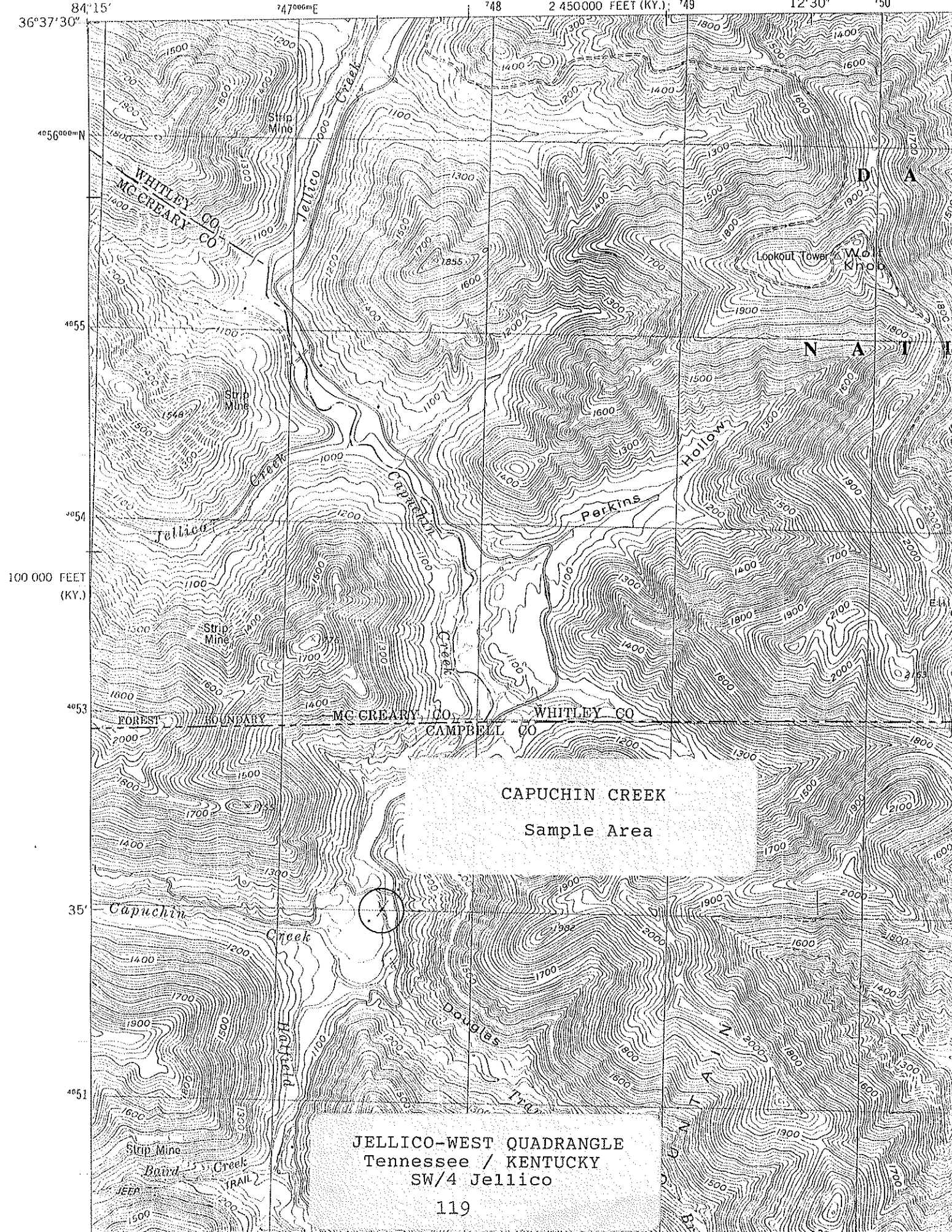
Management Recommendations:

1. No specific management is suggested other than protection of the watershed.
2. Further sampling would be warranted to confirm the status and occurrence of *Etheostoma nigrum susanae*. Fourteen specimens were collected at the Whitley County, Kentucky/Campbell County, Tennessee border in 1987 (O'Bara 1988).

747000mE



84°15' 36°37'30" 747000mE 748 2 450000 FEET (KY.); '49 12'30" '50



CAPUCHIN CREEK
Sample Area

JELICO-WEST QUADRANGLE
Tennessee / KENTUCKY
SW/4 Jellico

FISH DATA

Stream: Capuchin Creek Date: 1 November 1991
 Watershed: Cumberland River County: Campbell
 Area: See comments Sample Length: 900 ft
 Lat-Long: 363500N - 841400W Reach: 05130101-
 Type of Sampling: Electrofishing Elevation: 1,040 ft
 Gear Type: 1 Backpack Unit Time: 1700 - 1800

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Micropterus punctulatus</i>	219	2	1	0.01
" "	"	1	2	t
" "	"	1	3	0.02
<i>Ambloplites rupestris</i>	13	1	3	0.03
<i>Lepomis auritus</i>	201	(Common - but kept none)*		
<i>L. megalotis</i>	208	4	1	0.01
<i>Hypentelium nigricans</i>	166	18	2-7	0.77
<i>Campostoma anomalum</i>	25	16	2-4	0.23
<i>Notropis rubellus rubellus</i>	261	31	1-2	0.12
<i>Pimephales notatus</i>	334	8	1-2	0.02
<i>Semotilus atromaculatus</i>	360	11	1-2	0.06
<i>Etheostoma baileyi</i>	117	29	1	0.07
<i>E. kennicotti</i>	98	16	1-2	0.04
<i>E. sagitta</i>	110	11	2-3	0.06
<i>Percina caprodes</i>	306	1	3	0.02
<i>P. maculata</i>	312	2	2	0.01

* With the exception of *L. auritus*, all the above are preserved specimens.

Site location was upstream of the new bridge on Whistle Creek Road (1st. bridge downstream of the mouth of Trammel Branch). Shocking at 110 volts AC. Collected fish from various areas of a section that was 600 to 900 ft long.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

Elk Fork

Two qualitative fishery surveys were conducted in July and November 1991:

Location and Length - Tributary to the Clear Fork Cumberland River. Sample Site 1 was located both upstream and downstream of the bridge on the entrance road to Indian Mountain State Park in Jellico, near stream mi 2.7, and was sampled on 17 July 1991. It was 500 ft in length and averaged 23.2 ft in width. Sample Site 2 was located along Hwy. 297, just downstream of the closed bridge (William Manis Bridge) on Lone Road, near stream mi 9.4 and was sampled on 1 November 1991. It was 300 ft in length and averaged 34.0 ft in width. Both sites were in Campbell County (Jellico West Quadrangle).

Sampling Methodology - Both sites were sampled using two backpack electrofishing units operating at 110 volts AC.

Water Quality - Data were collected from midstream at mid-depth at each site. Site 1, 17 July 1991: DO - 7.0 ppm, pH - 7.6, Temperature - 73.6 F, Conductivity - 310 micromhos/cm. Site 2, 1 November 1991: DO - 6.3 ppm, pH - 7.4, Temperature - 58.5 F, Conductivity - 240 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample at each site. Site 1 sample contained 187 organisms representing 39 taxa. Site 2 sample contained 212 organisms representing 29 taxa.

Fish Collected:

<u>Species</u>	<u>Site 1</u>				<u>Site 2</u>			
	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>	<u>No.</u>	<u>% by No.</u>	<u>Wt.</u>	<u>% by Wt.</u>
Spotted bass	4	1.7	1.26	11.7	1	0.3	1.03	14.7
Smallmouth bass					1	0.3	0.09	1.3
Largemouth bass					1	0.3	0.01	0.1
Rock bass					4	1.1	0.87	12.4
Redbreast sunfish	39	16.3	3.46	32.1	2	0.6	0.04	0.6
Green sunfish	13	5.4	0.87	8.1	1	0.3	0.01	0.1
Bluegill	3	1.3	0.02	0.2	4	1.1	0.08	1.1
Longear sunfish	14	5.9	1.16	10.8	30	8.6	0.94	13.4
Non-game Fish	41	17.1	2.62	24.3	25	7.2	1.31	18.7
Forage Fish	125	52.3	1.39	12.9	279	80.2	2.61	37.3
Total	239		10.78		348		6.99	

Comments - This stream was surveyed primarily to address the Agency's almost total lack of fish or benthic data from Campbell County streams. The Agency has made no prior studies or fish collections from this stream.

Many streams in Campbell County have suffered degradation and sedimentation and acid mine drainage associated with surface and deep coal mined areas. 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 mi of streams that are impacted by mining in the state. Campbell County has been one of the most severely affected counties with approximately 478 mi of streams polluted by sedimentation and 160 mi polluted by acid drainage (Tennessee Department of Public Health 1978).

We collected a total of 239 fish weighing 10.78 lb and comprising 18 species from Site 1. Four native game species, spotted bass (*Micropterus punctulatus*), green sunfish (*Lepomis cyanellus*), bluegill (*L. macrochirus*), and longear sunfish (*L. megalotis*) along with the exotic redbreast sunfish (*L. auritus*) were collected. Only three small bluegill were collected, therefore, comparison of inch class distribution was made for spotted bass, green sunfish, redbreast sunfish, and longear sunfish (Fig. 17). Redbreast sunfish made up about 16% compared to about 6% by longear sunfish, 5% by green sunfish, and 2% by spotted bass, of the total number of fish collected. Redbreast sunfish contributed about 32% as compared to 12% by spotted bass, 11% by longear sunfish, and 8% by green sunfish, to the total weight collected. Two non-game and 11 forage fish were also collected here and these comprised about 69% of the total number and 37% of the total weight. We collected 10 specimens of the northern form of the rosyface shiner (*Notropis rubellus rubellus*). This species 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 upstream of Cumberland Falls in Campbell County. 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*). Rainbow darters (*E. caeruleum*) and stonerollers (*Campostoma anomalum*) were the most abundant species present. Three other darter species, the greenside (*E. blennioides*), stripetail (*E. kennicotti*), and logperch (*Percina caprodes*) were also collected here. Most of the species collected at this site were fairly tolerant forms.

At Site 2 we collected a total of 348 fish weighing 6.99 lb and comprising 22 species. Five additional species were

collected here but not at the downstream site. These included smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), rock bass (*Ambloplites rupestris*), arrow darter (*Etheostoma sagitta*), and blackside darter (*Percina maculata*). The only species collected at the downstream site but not at this site was the spotfin shiner (*Cyprinella spiloptera*). Smallmouth bass, spotted bass, largemouth bass, and green sunfish were represented by single specimens and only two redbreast sunfish and four small bluegill were collected here. Therefore, comparison of inch class distribution was made for rock bass and longear sunfish only (Fig. 19). Longear sunfish made up about 7% compared to only 1% by rock bass of the total number of fish collected. However, rock bass contributed about 12% as compared to 13% by longear sunfish to the total weight collected. Two non-game and 12 forage fish were also collected here and with the exception of spotfin shiner as mentioned above, all were collected at the downstream site. These comprised about 87% of the total number and 56% of the total weight collected at this site. The rosyface shiner and the rainbow darter were the most abundant species collected here. The arrow darter is species that is listed as in need of management, and we collected six specimens at this site. This is another upper Cumberland River species confined to streams in Campbell, Claiborne, and Scott counties in Tennessee. The blackside darter, although not listed, 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). We collected only one specimen of the blackside darter at this location. Most of the species collected at this site were also fairly tolerant forms.

Elk Fork, like most of the streams in Campbell County, has suffered decades of pollution and degradation mainly from coal mining activities. It has been impacted by sedimentation and siltation appeared medium to heavy at both sites sampled. The recent decline of coal mining in the area along with more stringent environmental controls has resulted in some recovery of the stream. In all, a total of 23 species were collected from our samples and although most were fairly tolerant forms, three were species that are listed in need of management. One listed species, the rosyface shiner was the most abundant species collected at Site 2 and based on fish species occurrence, it appears that the upstream site (Site 2) may have better water quality than the lower reach of the stream. Based on actual numbers collected, the redbreast sunfish was the dominant game species at Site 1 while the longear sunfish was the prevalent game fish at Site 2.

Benthic macroinvertebrates from our sample at Site 1 included Baetidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, the perlid stonefly *Acroneuria*, Hydropsychidae, Leptoceridae, Polycentropodidae, and Psychomyiidae caddisflies, and Dryopidae, Elmidae, and Gyrinidae beetles. The Asian clam (*Corbicula fluminea*) and pleurocerid snails were present. A

Lampsilis fasciola relic was also found. *Orconectes putnami* was the only crayfish species collected. Ephemeropterans and coleopterans represented about 16% each, gastropods about 14%, odonates about 12%, trichopterans about 10%, and plecopterans about 2% of the total number of organisms collected (Fig. 18). A total of 39 taxa was collected at this site.

Benthic macroinvertebrates from our sample at Site 2 included Ephemeriidae, Heptageniidae, and Oligoneuriidae mayflies, Capniidae, Perlidae, and Taeniopterygidae stoneflies, Hydropsychidae, Limnephilidae, and Philopotamidae caddisflies, and Elmidae and Psephenidae beetles. Fingernail clams (*Sphaerium*) and pleurocerid snails were present and a single *Elliptio dilatata* relic was collected. Ephemeropterans represented about 43%, trichopterans about 12%, odonates 11%, pelecypods about 10%, dipterans about 9%, coleopterans about 5%, and plecopterans only 2% of the total number of organisms collected (Fig. 20). A total of only 29 taxa was collected at this site.

Management Recommendations:

1. No specific management can be suggested at present. Anything to abate the non-point source pollution would be beneficial.
2. The occurrence of three species of protected fish from this stream should warrant an extra measure of protection.

JELICO WEST QUADRANGLE
TENNESSEE-KENTUCKY
7.5 MINUTE SERIES (TOPOGRAPHIC)

SW/4 JELICO 15' QUADRANGLE

4157 W 1
15AX

753

10'

2 540 000 FEET (TENN.)

756

84°07'30"

36°37'



810 000
(TENN.)

4054

4054

4054

25 W

25 W

35'

4052

4052

4052

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Elk Fork Date: 17 July 1991
Clear Fork
Watershed: Cumberland River County: Campbell
Area: Site # 1 Sample Length: 500 ft
Lat-Long: 363457N - 840817W Reach: 05130101-14,0
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 23.2 ft Avg. Depth 0.9 ft Max. Depth 3.8 ft
2. Estimated Percent of Stream in Pools is 60%.
3. Estimated Percent Pool Bottom is Silt 15% Sand 10% Gravel 30% Rubble 30% Bedrock 15%.
4. Estimated Percent Riffle Bottom is Silt 10% Sand 10% Gravel 40% Rubble 40%.
5. Abundance of Littoral Aquatic Plants is Average (*Dianthera americana*, *Betula nigra*, and *Alnus rugosa*).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 35% of the Stream, Average in 60%, Poor in 5%.
7. Shade or Canopy Good over 85% of Stream.
8. Flow (CFS) 11.2: Compared to Normal: Normal
9. Present Weather: Overcast and warm. Air temperature - 79 F @ 9:30 am.
10. Weather (last 24 h): Sunny and hot.
11. pH 7.6 Temp. 73.6 F Conductivity 310 micromhos/cm
D.O. 7.0 ppm Saturation 81%
12. Comments: Sample area location was at the bridge at the entrance to Indian Mountain State Park in Jellico. *Corbicula fluminea* abundant.

FISH DATA

Stream: Elk Fork Date: 17 July 1991
 Watershed: Clear Fork Cumberland River County: Campbell
 Area: Site # 1 Sample Length 500 ft
 Lat-Long: 363457N - 840817W Reach: 05130101-14,0
 Type of Sampling: Electrofishing Elevation: 900 ft
 Gear Type: 2 Backpack Units Time: 1300 - 1350

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Micropterus punctulatus</i>	219	1	1	t
" "	"	1	6	0.12
" "	"	1	9	0.38
" "	"	1	11	0.76
<i>Lepomis auritus</i>	201	6	1	0.02
" "	"	11	2	0.11
" "	"	1	3	0.02
" "	"	6	4	0.33
" "	"	6	5	0.56
" "	"	3	6	0.56
" "	"	4	7	1.03
" "	"	2	8	0.83
<i>L. cyanellus</i>	202	7	1	0.02
" "	"	1	2	0.01
" "	"	2	3	0.37
" "	"	1	4	0.22
" "	"	1	5	0.09
" "	"	1	6	0.16
<i>L. macrochirus</i>	206	1	1	t
" "	"	2	2	0.02
<i>L. megalotis</i>	208	1	2	0.01
" "	"	9	3	0.78
" "	"	1	4	0.06
" "	"	3	5	0.31

Site was located at the bridge on Indian Mountain Road at Indian Mountain State Park in Jellico. Shocking at 120 volts AC. Stream was dingy and the recovery of fish was probably poor. Made 17 seine hauls, 14 in combination with backpack shocker using a 10 ft seine.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

FISH DATA (continued)

Stream: Elk Fork Date: 17 July 1991
 Watershed: Clear Fork Cumberland River County: Campbell
 Area: Site # 1 Sample Length: 500 ft
 Lat-Long: 363457N - 840817W Reach: 05130101-14,0
 Type of Sampling: Electrofishing Elevation: 900 ft
 Gear Type: 2 Backpack Units Time: 1300 - 1350

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Hypentelium nigricans</i>	166	28	1-12	2.27
<i>Moxostoma erythrurum</i>	230	13	3-4	0.35
<i>Campostoma anomalum</i>	25	38	1-5	0.77
<i>Cyprinella spiloptera</i>	269	1	4	0.03
<i>Luxilus chrysocephalus</i>	249	4	3-6	0.24
<i>Notropis rubellus rubellus</i>	261	10	1-2	0.05
<i>Pimephales notatus</i>	334	11	1-3	0.07
<i>Semotilus atromaculatus</i>	360	3	1-3	0.02
<i>Etheostoma baileyi</i>	117	5	1	0.01
<i>E. blennioides</i>	81	1	4	0.03
<i>E. caeruleum</i>	84	47	1	0.09
<i>E. kennicotti</i>	98	2	1	t
<i>Percina caprodes</i>	306	3	3-5	0.08

Site was located at the bridge on Indian Mountain Road at Indian Mountain State Park in Jellico. Shocking at 120 volts AC. Stream was dingy and the recovery of fish was probably poor. Made 17 seine hauls, 14 in combination with backpack shocker using a 10 ft seine.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

GAME FISH FROM ELK FORK
SITE 1
INCH CLASS DISTRIBUTION

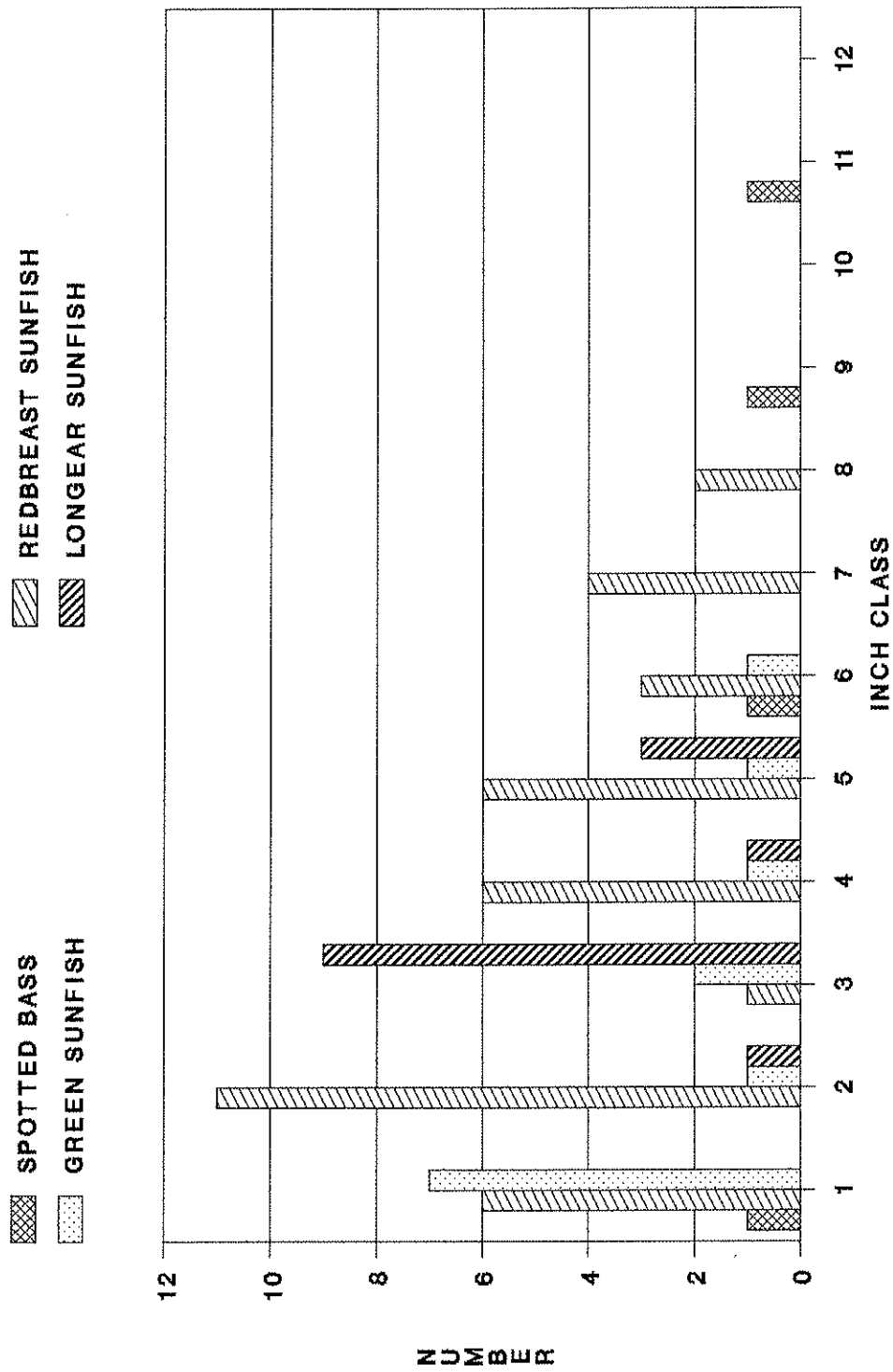


Figure 17.

Elk Fork: Site # 1, Qualitative Benthic Sample

17 July 1991

Field # 306

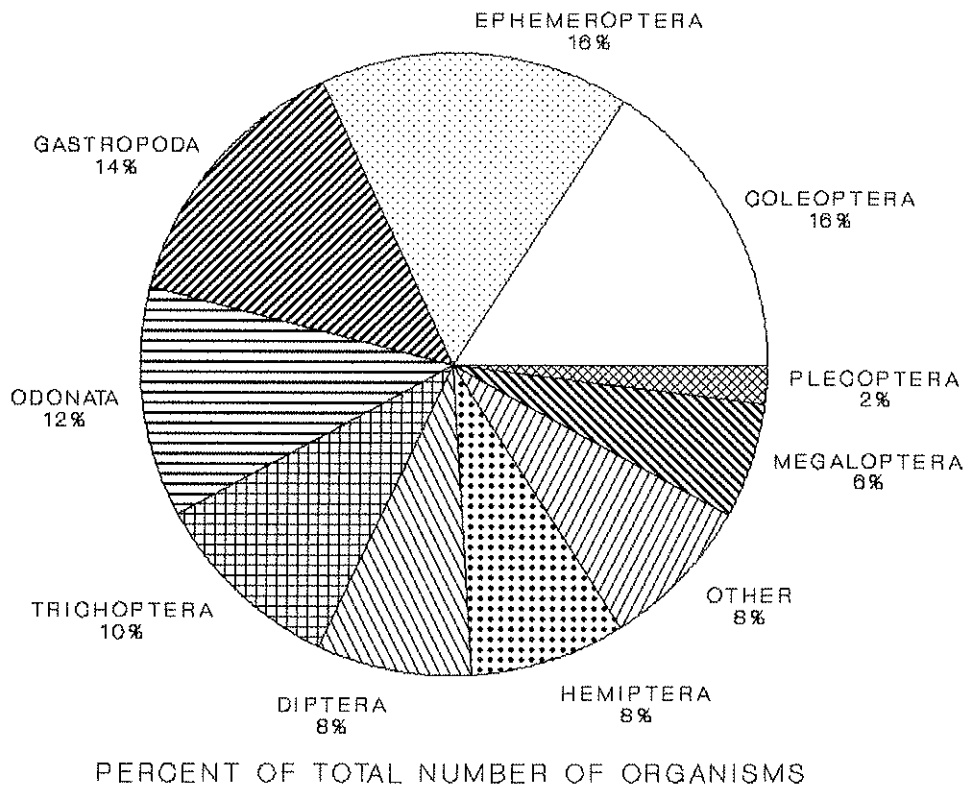
Campbell Co., TN; At the bridge crossing on the entrance road to Indian Mountain State Park. Coordinates 363457N - 840817W.
Jellico West, Tenn.-Ky., # 4157 SW Quad. Reach # 05130101-14,0.

<u>TAXA</u>	<u>NUMBER</u>
ANNELIDA:	
Oligochaeta	2
COLEOPTERA:	
Dryopidae/ <i>Helichus</i> adults	6
Elmidae/ <i>Dubiraphia</i> adults	6
<i>Macronychus glabratus</i>	5
<i>Microcylloepus pusillus</i>	1
Optioservus larvae	2
<i>O. ovalis</i> adult	1
Gyrinidae/ <i>Dineutus discolor</i> males	5
<i>Dineutus discolor</i> females	3
DECAPODA:	
Cambaridae/ <i>Orconectes putnami</i> 2nd form male	1
<i>Orconectes putnami</i> females	4
DIPTERA:	
Athericidae/ <i>Atherix lantha</i>	8
Chironomidae	5
Tipulidae/ <i>Hexatoma</i>	1
EPHEMEROPTERA:	
Baetidae/ <i>Baetis</i>	2
Ephemeridae/ <i>Hexagenia</i>	1
Heptageniidae/ <i>Stenacron</i>	2
<i>Stenonema</i>	5
<i>Stenonema vicarium</i>	2
Oligoneuriidae/ <i>Isonychia</i>	18
GASTROPODA:	
Pleuroceridae	26
HEMIPTERA:	
Gerridae/ <i>Metrobates hesperius</i>	11
<i>Rheumatobates rileyi</i>	1
Veliidae/ <i>Rhagovelia obesa</i> nymph	1
<i>Rhagovelia obesa</i> adult males	2
MEGALOPTERA:	
Corydalidae/ <i>Corydalus cornutus</i>	4
<i>Nigrionia serricornis</i>	7

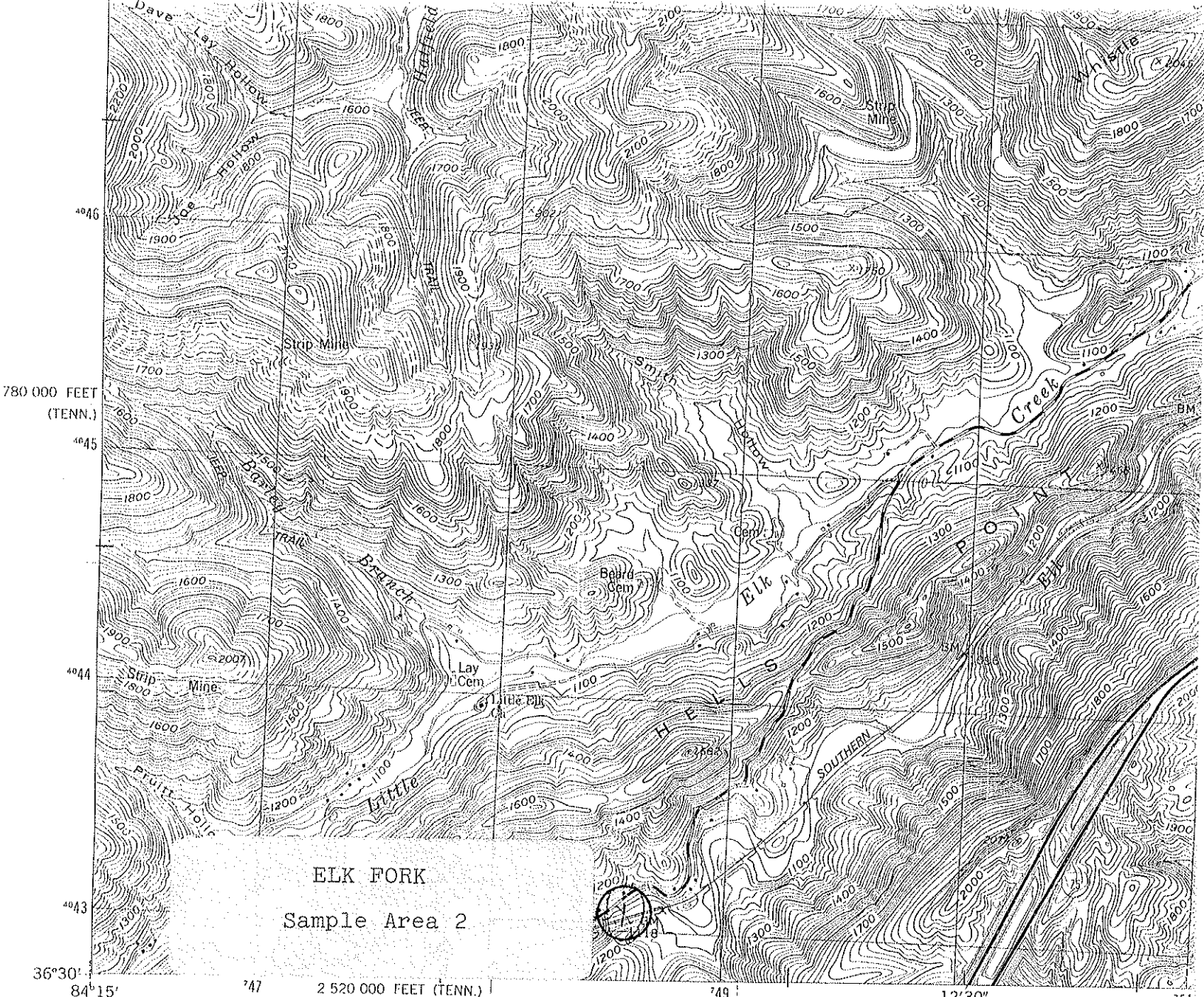
Elk Fork: Site 1, Qualitative Sample cont.

<u>TAXA</u>	<u>NUMBER</u>
ODONATA:	
Aeshnidae/ <i>Basiaeshna janata</i>	1
<i>Boyeria vinosa</i>	7
Calopterygidae/ <i>Calopteryx</i>	1
Coenagrionidae/ <i>Argia</i>	3
Gomphidae/ <i>Gomphus lividus</i>	1
<i>Hagenius brevistylus</i>	1
<i>Stylogomphus albistylus</i>	2
<i>Stylurus</i>	1
Macromiidae/ <i>Didymops transversa</i>	2
<i>Macromia</i>	3
PELECYPODA:	
Corbiculidae/ <i>Corbicula fluminea</i>	10
Unionidae/ <i>Lampsilis fasciola relic</i>	1
PLECOPTERA:	
Perlidae/ <i>Acroneuria</i>	4
TRICHOPTERA:	
Hydropsychidae/ <i>Cheumatopsyche</i>	6
<i>Hydropsyche betteni/depravata</i>	10
Leptoceridae/ <i>Triaenodes</i>	1
Polycentropodidae/ <i>Polycentropus</i>	1
Psychomyiidae/ <i>Lype diversa</i>	1
	<hr/> 187

ELK FORK
SITE 1
BENTHIC MACROINVERTEBRATES



n = 187
TAXA RICHNESS = 39
Figure 18.



ELK FORK
Sample Area 2

Mapped, edited, and published by the Geological Survey in cooperation with State of Tennessee Agencies and Kentucky Geological Survey

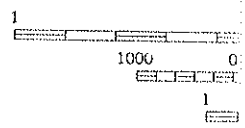
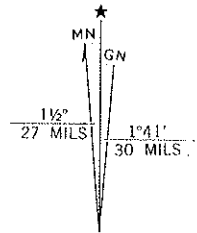
Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1951. Field checked 1953. Revised from aerial photographs taken 1976. Field checked 1977. Map edited 1979

Polyconic projection. 1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 6 meters south and 7 meters west as shown by dashed corner ticks
10,000-foot grid ticks based on Tennessee coordinate system and Kentucky coordinate system, south zone
1000-meter Universal Transverse Mercator grid, zone 16

There may be private inholdings within the boundaries of the National or State reservations shown on this map
Dashed contours in strip mine areas not revised

12°30' BUCKEYE EXIT 8 MI.
KNOXVILLE 57 MI.



UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

THE
FOR SA
KENTU
KENTUCKY
AND TENN
A FOLDER DESC

JELlico-WEST QUADRANGLE
Tennessee / Kentucky
SW/4 Jellico

PHYSIOCHEMICAL DATA

A. LOCATION:

Stream: Elk Fork Date: 1 November 1991
Watershed: Clear Fork Cumberland River County: Campbell
Area: Site # 2 Sample Length: 300 ft
Lat-Long: 363008N - 841328W Reach: 05130101-14,1
Data Collected By: Rick D. Bivens, Mark T. Fagg, and
Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 34.0 ft Avg. Depth 0.8 ft Max. Depth 3.8 ft
2. Estimated Percent of Stream in Pools is 85%.
3. Estimated Percent Pool Bottom is Silt 10% Sand 20% Gravel 30% Rubble 30% Boulders 10%.
4. Estimated Percent Riffle Bottom is Silt 5% Sand 15% Gravel 25% Rubble 50% Boulders 5%.
5. Abundance of Littoral Aquatic Plants is Scarce.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 60% of the Stream, Average in 30%, Poor in 10%.
7. Shade or canopy Good over 85% of Stream.
8. Flow (CFS) 1.6: Compared to Normal: Normal
9. Present Weather: Cloudy and cool with occasional rain.
Temperature not recorded. Time-10:45 am.
10. Weather (last 24 h): Partly cloudy and cool.
11. pH 7.4 Temp. 58.5 F Conductivity 240 micromhos/cm
D.O. 6.3 ppm Saturation 62%
12. Comments: Sample area location was just downstream of
the closed bridge on Lone Road, southwest of Newcomb on
Hwy. 297.

FISH DATA

Stream: Elk Fork Date: 1 November 1991
 Watershed: Clear Fork Cumberland River County: Campbell
 Area: Site # 2 Sample Length: 300 ft
 Lat-Long: 363008N - 841328W Reach: 05130101-14,1
 Type of Sampling: Electrofishing Elevation: 1,100 ft
 Gear Type: 2 Backpack Units Time: 1310 - 1410

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Micropterus dolomieu</i>	218	1	6	0.09
<i>M. punctulatus</i>	219	1	13	1.03
<i>M. salmoides</i>	220	1	2	0.01
<i>Ambloplites rupestris</i>	13	1	4	0.04
" "	"	1	5	0.10
" "	"	1	6	0.22
" "	"	1	8	0.51
<i>Lepomis auritus</i>	201	2	3	0.04
<i>L. cyanellus</i>	202	1	2	0.01
<i>L. macrochirus</i>	206	1	2	0.01
" "	"	3	3	0.07
<i>L. megalotis</i>	208	2	1	0.01
" "	"	7	2	0.08
" "	"	14	3	0.36
" "	"	6	4	0.35
" "	"	1	5	0.14

Site was located at the closed bridge (William Manis Bridge) on Lone Road. Shocking at 110 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

FISH DATA (continued)

Stream: Elk Fork Date: 1 November 1991
 Watershed: Clear Fork Cumberland River County: Campbell
 Area: Site # 2 Sample Length: 300 ft.
 Lat-Long: 363008N - 841328W Reach: 05130101-14,1
 Type of Sampling: Electrofishing Elevation: 1,100 ft
 Gear Type: 2 Backpack Units Time: 1310 - 1410

<u>Species</u>	<u>TADS Code</u>	<u>Total Number</u>	<u>Inch Class</u>	<u>Total Weight</u>
<i>Hypentelium nigricans</i>	166	21	3-10	1.11
<i>Moxostoma erythrurum</i>	230	4	4-5	0.20
<i>Campostoma anomalum</i>	25	19	2-4	0.29
<i>Luxilus chrysocephalus</i>	249	51	2-7	1.24
<i>Notropis rubellus rubellus</i>	237	68	1-3	0.19
<i>Pimephales notatus</i>	334	31	1-3	0.15
<i>Semotilus atromaculatus</i>	360	19	2-6	0.39
<i>Etheostoma baileyi</i>	117	8	1	0.02
<i>E. blennioides</i>	81	3	3-4	0.06
<i>E. caeruleum</i>	84	56	1-2	0.18
<i>E. kennicotti</i>	98	16	1-2	0.04
<i>E. sagitta</i>	110	6	1-3	0.04
<i>Percina caprodes</i>	306	1	3	0.01
<i>P. maculata</i>	312	1	2	t

Site was located at the closed bridge (William Manis Bridge) on Lone Road. Shocking at 110 volts AC.

Collectors: R.D. Bivens, M.T. Fagg, and C.E. Williams

GAME FISH FROM ELK FORK
 SITE 2
 INCH CLASS DISTRIBUTION

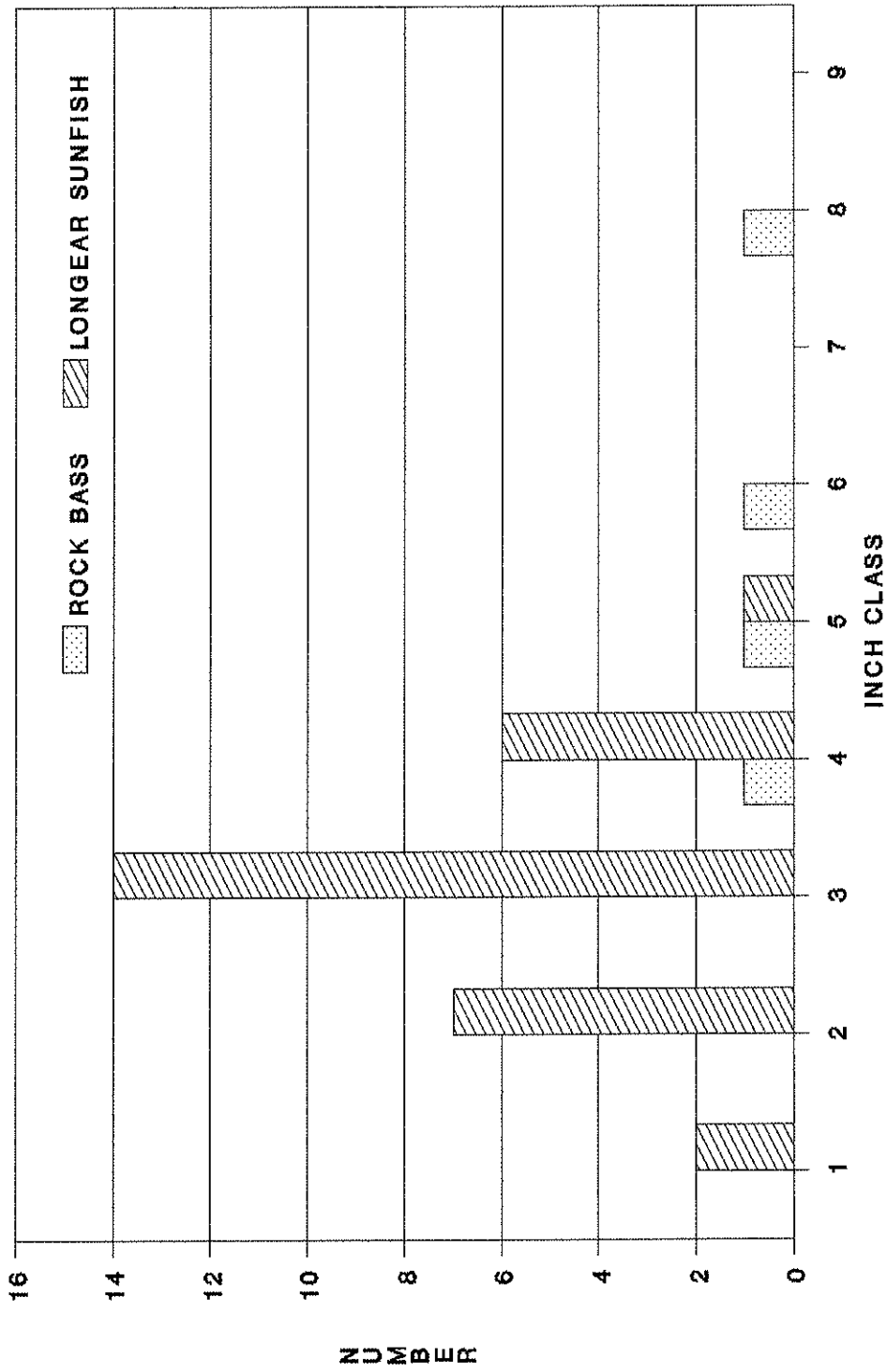


Figure 19.

Elk Fork: Site # 2, Qualitative Benthic Sample

1 November 1991

Field # 330

Campbell Co., TN; At the bridge crossing on Lone Road.

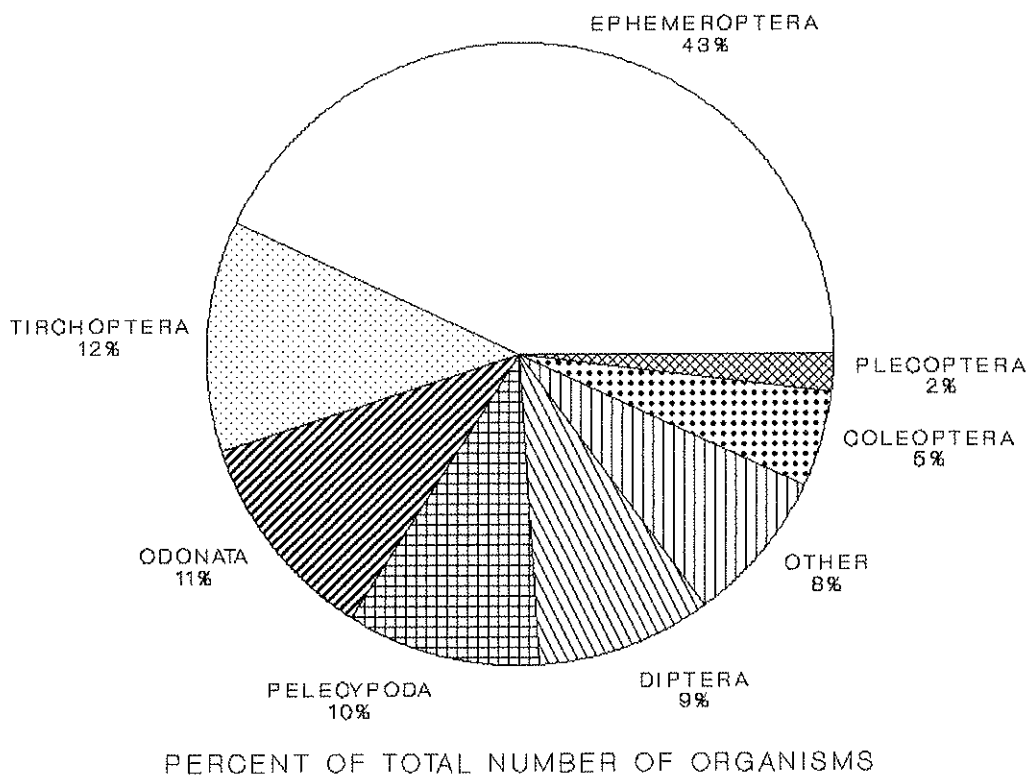
Coordinates: 363008N - 841328W. Jellico West, Tenn.-Ky., # 4157
SW Quad. Reach # 05130101-14,1.

<u>TAXA</u>	<u>NUMBER</u>
COLEOPTERA:	
Elmidae/ <i>Macronychus glabratus</i> adults	9
Psenphenidae/ <i>Psephenus herricki</i> larvae	2
DIPTERA:	
Athericidae/ <i>Atherix lantha</i>	6
Chironomidae	4
Simuliidae	2
Tipulidae/ <i>Tipula</i>	7
EPHEMEROPTERA:	
Ephemeridae/ <i>Ephemera</i>	1
Heptageniidae/ <i>Stenacron</i>	1
<i>Stenonema</i>	11
<i>Stenonema femoratum</i>	1
<i>S. vicarium</i>	34
Oligoneuriidae/ <i>Isonychia</i>	44
GASTROPODA:	
Pleuroceridae	11
MEGALOPTERA:	
Corydalidae/ <i>Nigronia serricornis</i>	4
ODONATA:	
Aeshnidae/ <i>Basiaeshna janata</i>	2
<i>Boyeria vinosa</i>	3
Coenagrionidae/ <i>Argia</i>	3
<i>Enallagma</i>	5
Cordulegastridae/ <i>Cordulegaster</i>	2
Gomphidae/ <i>Gomphurus lineatifrons</i>	1
<i>Gomphus</i>	2
Macromiidae/ <i>Macromia</i>	6
PELECYPODA:	
Sphaeriidae/ <i>Sphaerium</i>	21
Unionidae/ <i>Elliptio dilatata</i> relic	1

Elk Fork: Site # 2, Qualitative Sample cont.

<u>TAXA</u>	<u>NUMBER</u>
PLECOPTERA:	
Capniidae	1
Perlidae/ <i>Acroneuria evoluta</i>	1
Taeniopterygidae/ <i>Taeniopteryx</i>	2
TRICHOPTERA:	
Hydropsychidae/ <i>Cheumatopsyche</i>	9
<i>Hydropsyche betteni/depravata</i>	12
Limnephilidae/ <i>Pycnopsyche</i>	1
Philopotamidae/ <i>Chimara</i>	4
	<hr/>
	212

ELK FORK
SITE 2
BENTHIC MACROINVERTEBRATES



n = 212
TAXA RICHNESS = 29
Figure 20.

REFERENCES

REFERENCES

- Bivens, R. D., and C. E. Williams. 1991. Region IV stream fishery data collection report: 1990. Tennessee Wildlife Resources Agency, Nashville.
- Bouchard, R. W. 1972. A contribution to the knowledge of Tennessee crayfish. Doctoral dissertation. The University of Tennessee, Knoxville.
- Brigham, A. R., W. U. Brigham, and A. Gnilka, editors. 1982. Aquatic insects and oligochaetes of North and South Carolina. Midwest Enterprises, Mahomet, Illinois.
- Cole, B. P. 1988. Notification of status review: upper Cumberland River johnny darter (*Etheostoma nigrum susanae*). U. S. Fish and Wildlife Service, Asheville, North Carolina.
- Etnier, D. A. 1992. Benthic macroinvertebrates and fishes collected along the right-of-way for the proposed Foothills Parkway extension. Appendix D, prepared under subcontract with Oak Ridge National Laboratory. Department of Zoology, The University of Tennessee, Knoxville.
- Etnier, D. A., D. L. Bunting, W. O. Smith, and G. A. Vaughan. 1983. Tennessee baseline stream survey. Tennessee Water Resources Research Center, Research Report No. 95. The University of Tennessee, Knoxville.
- Etnier, D. A., and W. C. Starnes. In press. The fishes of Tennessee. The University of Tennessee Press, Knoxville.
- O'Bara, C. J. 1988. Current distribution, habitat requirements, and potential threats of the upper Cumberland River johnny darter (*Etheostoma nigrum susanae*). Tennessee Technological University, Tennessee Cooperative Fishery Research Unit, Department of Biology, Cookeville.
- Orth, D. J. 1983. Aquatic habitat measurements. Pages 61-84 in L. A. Nielsen and D. L. Johnson, editors. Fisheries techniques. American Fisheries Society, Bethesda, Maryland.
- Robins, C. R., R. M. Bailey, C. E. Bond, J. R. Brooker, E. A. Lachner, R. N. Lea, and W. B. Scott. 1991. Common and scientific names of the fishes from the United States and Canada (fifth edition). American Fisheries Society Special Publication No. 20. Bethesda, Maryland.
- Snelson, F. F. 1980. *Notropis lirus* (Jordan), mountain shiner. p. 282 in D. S. Lee, et al. Atlas of North American freshwater fishes. North Carolina State Museum of Natural History, Raleigh.

- Starnes, W. C., and D. A. Etnier. 1980. Fishes. In D. C. Eager and R. M. Hatcher, editors. Tennessee's rare wildlife, volume I: the vertebrates. Tennessee Wildlife Resources Agency and Tennessee Conservation Department, Nashville.
- Starnes, W. C., and R. E. Jenkins. 1988. A new cyprinid fish of the genus *Phoxinus* (Pisces: Cypriniformes) from the Tennessee River drainage with comments on relationships and biogeography. Proceedings of the Biological Society of Washington. 101:(3):517-529.
- Stewart, K. W., and B. P. Stark. 1988. Nymphs of North American stonefly genera (Plecoptera). Entomological Society of America. Volume 12.
- Talak, A. 1977. The recovery of stream benthic insect communities following coal strip mining in the Cumberland Mountains of Tennessee. Master's thesis. The University of Tennessee, Knoxville.
- Tennessee Department of Public Health. 1978. Information obtained in conjunction with the Tennessee Wildlife Resources Agency, February, 1978. Tennessee Water Quality Control.
- Tennessee Wildlife Resources Agency. 1990. A strategic plan for wildlife resources management for the 1990's. Tennessee Wildlife Resources Agency, Nashville.
- Tennessee Wildlife Resources Agency. 1991. Tennessee Wildlife Resources Commission Proclamation of wildlife in need of management. Proclamation No. 86-29, Section I amended by Proclamation No. 90-2 and No. 91-4. Tennessee Wildlife Resources Agency, Nashville.

APPENDIX A

Distribution of Fishes Collected During 1991 Stream Surveys

APPENDIX B

1991 Summary of Stream Strategic Plan Activities

1991 SUMMARY OF STREAMS STRATEGIC PLAN ACTIVITIES

	Completed		Number
	(Yes	No)	
Coordinate enforcement of pollution laws	Yes		2
Estimate monitoring system for compliance monitoring			
Provided environmental in-service			
Draft legislation to change TCA 70-4-206			
Draft legislation for tax incentives			
Draft legislation for siviculture and agriculture			
Determine criteria and list streams for scenic river			
Write magazine article			
Assimilate slide show	Yes		1
Wrote program to enhance landowner-user relations		Contacts	5
Conducted compliance inspections			
Developed demonstration report (demonstrations)	Yes		3
Participated in Tennessee Restoration Project	Yes		3
Completed streams surveys	Yes		16
Developed method to quantify siltation			
Obtained access sites			
Improved access sites			
Developed DOT agreement to build access sites			
Developed streams information for brochure			
Wrote news release			
Coordinated C.E.N.T.S. program in schools			
Developed aquatic education curriculum			

