FISHERIES REPORT

94-19

ANNUAL STREAM FISHERY DATA COLLECTION REPORT

REGION IV

1993

Prepared by

Rick D. Bivens
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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TENNESSEE WILDLIFE RESOURCES AGENCY

November, 1994

TABLE OF CONTENTS

LIST OF FIGURES

FIGURE Page

INTRODUCTION

The fish fauna of Tennessee is one of the most diverse in the United States with approximately 297 species of native fish and about 26-29 introduced species occurring in waters within the state's borders (Etnier and Starnes 1993). 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. In their natural state, streams afford a variety of recreational opportunities such as fishing, canoeing, swimming, and others that are unmatched by other aquatic environments. Streams 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 seventh annual report on stream fishery data collection in TWRA's 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 in 21 east Tennessee counties. There are approximately 800 mi classified as coldwater streams (TWRA 1990). Streams in Region IV, except for a few in Anderson, Campbell, and Claiborne counties that drain into the Cumberland River system, are in the Ridge and Valley and Blue Ridge physiographic provinces of the upper Tennessee River drainage basin. 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. 93-4. In addition to this list, we sampled nineteen other streams that are included in this report. Field work was conducted from January to November, 1993. Forty-one fish samples and 18 benthic samples from twenty-nine 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, seines, 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 lengths ranged from 100 ft to 1,000 ft. Most were 300 ft, which is generally enough to include both riffle and pool habitats on the smaller and medium size streams.

Generally, fish were identified in the field and released after being weighed and measured. 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 (1993).

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 two-three collectors, resulting in a total of 2-3 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 and a YSI model 33 S-C-T meter. Scientific Products™ pH indicator strips were used to measure pH. Both wide- (4.5-10.0 x 0.5 units) and narrow-range (6.0-7.7 and 5.1-7.2 x 0.3 units) indicators were used to measure pH as accurately as possible. 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 Physicochemical 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

Clear Creek

One qualitative fishery survey was conducted on Clear Creek in August 1993:

Location and Length - Tributary to the Clinch River (Norris Tailwater). The sample area was located just downstream of the first small dam along the Clear Creek road. It was approximately 200 ft in length and was sampled on 10 August 1993. It was in Anderson County (Norris Quadrangle).

Sampling Methodology - The site was sampled using one 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 sampled 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. The Agency has made no previous studies or fish collections from this stream.

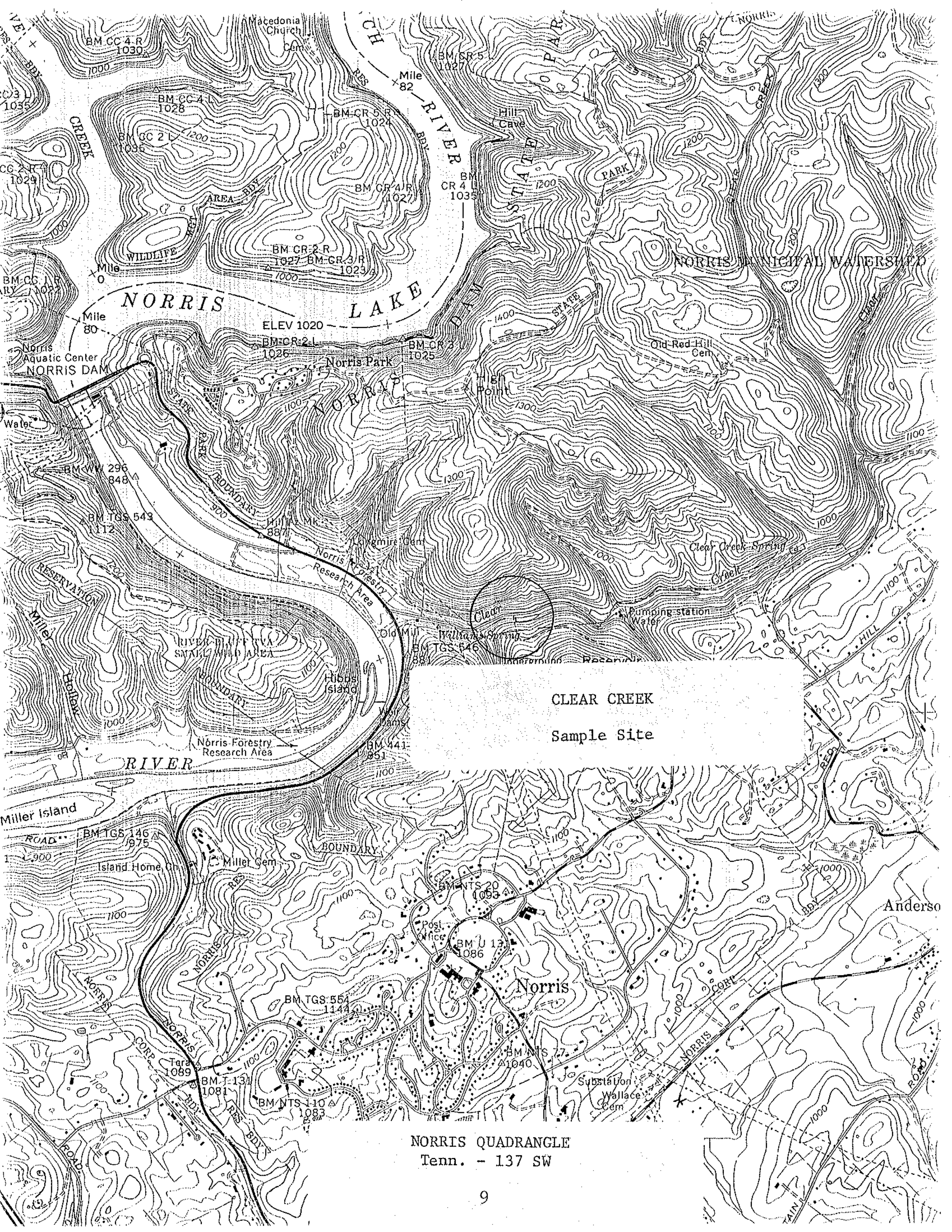
A total of 8 fish species was collected. One native game species, rock bass (*Ambloplites rupestris*), along with introduced rainbow trout (*Oncorhynchus mykiss*) were collected. All of the trout were YOY's. One non-game and 5 forage species were also collected here. Crayfish species included *Cambarus angularis*, *C. buntingi*, and *C. distans*.

The native fish species collected are typical components of warmwater stream systems and the occurrence of rainbow trout is due to the proximity of the Clinch River tailwaters. It has been observed for several years that trout move into this stream in the fall and winter months to spawn. On the date we sampled, the water temperature, at 72 F, was approaching the maximum tolerance for trout and is not considered year-round trout habitat.

Management Recommendations:

1. This stream appears to be a fair to good quality Ridge and Valley stream that should merit protection from any source of pollution or habitat destruction.

2. Due to recent (and planned) work by TVA biologists and trout fishermen groups, the Agency should consider management strategies to encourage trout reproduction in this stream.



CLEAR CREEK

Sample Site

NORRIS QUADRANGLE
Tenn. - 137 SW

FISH DATA

Stream: Clear Creek
Date: 10 August 1993

Watershed: Clinch River
County: Anderson

Area: See Comments
Sample Length: 200 ft

Lat-Long: 361248N - 840401W
Reach: 06010207-

Type of Sampling: Electrofishing
Elevation: 870 ft

Gear Type: One Backpack Unit
Time: 1430 - 1500

Species	TADS Code	Total Number	Inch Class	Total Weight
Oncorhynchus mykiss	353	7	1	-
" "	"	4	2	-
Ambloplites rupestris	13	1	1	-
" "	"	1	3	-
" "	"	1	6	-
" "	"	1	8	-
Catostomus commersoni	32	1	-	-
Campostoma anomalum	25	4	-	-
Luxilus chrysocephalus	249	23	-	-
Pimephales notatus	334	3	-	-
Rhinichthys atratulus	155	15	-	-
Cottus carolinae	40	19	-	-

Cambarus angularis
C. buntingi
C. distans

Pleurocerid snails (Periwinkle) abundant.

Avg. width - approx. 8 to 10 ft
Avg. depth - 0.3 ft
Water temperature - 72 F @ 1520
Air temperature - 85 F @ 1520
Gravel-cobble-boulder-bedrock substrate.
Stream was very low.

Site was located upstream of Hwy. 441, along gravel road, and started about 200 ft downstream of the first dam. Shocking at 120 volts AC.

Collectors: R.D. Bivens and C.E. Williams

Big Sycamore Creek

Two qualitative fishery surveys were conducted on Big Sycamore Creek in August 1993:

Location and Length - Tributary to the Clinch River (Norris Reservoir). Sample Site 1 was located approx. 300 ft downstream of the first bridge crossing upstream of Norris Reservoir on Hwy. 33 and was sampled on 24 August 1993. It was 600 ft in length and averaged 21.7 ft in width. Site 2 was located upstream of the first bridge crossing on Snake Hollow Road and was sampled on 25 August 1993. It was 300 ft in length and averaged 10.1 ft in width. Both sites were in Claiborne County (Howard Quarter Quadrangle).

Sampling Methodology - Site 1 was sampled using two backpack electrofishing units operating at 120 volts AC. Site 2 was sampled with one backpack unit operating at 120 volts AC.

Water Quality - Data were collected from midstream at mid-depth at each site. Site 1, 24 August 1993: DO - 8.7 ppm, pH - 8.1, Temperature - 70.7 F, Conductivity - 270 micromhos/cm. Site 2, 25 August 1993: DO - 8.9 ppm, pH - 7.6, Temperature - 71.6 F, Conductivity - 195 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample at each site. Site 1 sample contained 351 organisms representing 44 taxa. Site 2 sample contained 252 organisms representing 43 taxa.

Fish Collected:

	Site 1				Site 2			
Species	No.	% by No.	Wt.	% by Wt.	No.	% by No.	Wt.	% by Wt.
Largemouth bass	55	4.5	0.62	4.4				
Smallmouth bass					1	0.2	0.05	1.0
Rock bass	12	1.0	1.78	12.7	7	1.0	0.58	11.3
Bluegill	4	0.3	0.21	1.5	1	0.2	0.04	0.7
Non-game Fish	97	7.9	1.46	10.4	9	1.4	0.25	4.9
Forage Fish	1,060	86.3	9.92	70.9	626	97.2	4.22	82.1
Total	1,228		13.99		644		5.14	

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 west

of Newman Ridge and flows southwest into the Clinch River (Norris Reservoir).

We collected a total of 1,228 fish weighing 13.99 lb and comprising 21 species from Site 1. Three native game species, largemouth bass (*Micropterus salmoides*), rock bass (*Ambloplites rupestris*), and bluegill (*Lepomis macrochirus*) were found. Although a large number of largemouth bass were collected, they were all in the 2 to 3-in class. Twelve rock bass and five bluegills were also collected. All game fish represented < 6% of the total number of fish collected and about 19% of the total weight of all fish collected. Four non-game and 14 forage species were also collected here and these comprised about 94% of the total number and 81% of the total weight. Some were represented by few specimens while others were fairly abundant. Warpaint shiners (*Luxilus coccogenis*) were the only moderately intolerant shiner species collected. However, six darter species, the greenside (*Etheostoma blennioides*), rainbow (*E. caeruleum*), fantail (*E. flabellare*), redline (*E. rufilineatum*), snubnose (*E. simoterum*), and blueside (*E. stigmaeum meadiae*), were present. Central stonerollers (*Campostoma anomalum*) were the most abundant forage species present. Greenside, rainbow, and snubnose darters were also fairly abundant here. It is interesting to note the occurrence of the rainbow darter in this stream. The rainbow darter is not very common in east Tennessee, its distribution is sporadic in the Ridge and Valley, and upstream of Knoxville is known from only a few localities in the Clinch-Powell and upper Holston river systems (Etnier and Starnes 1993).

At Site 2 we collected a total of 644 fish weighing 5.14 lb and comprising 15 species. Game fish from this site included smallmouth bass (*Micropterus dolomieu*), rock bass, and bluegill. However, only one 4-in smallmouth bass, one small bluegill and seven rock bass were found. Game fish comprised < 2% of the total number of fish collected, but they accounted for about 13% of the total weight collected. Two non-game and 10 forage species were also collected here and these comprised about 98% of the total number and 87% of the total weight. Forage species made up about 97% of the total number and 82% of the total weight. Additional species collected here but not at the downstream site included only black redhorse (*Moxostoma duquesnei*). Of particular interest, as with Site 1, is the occurrence of the rainbow darter at this site. Other darters included fantail, redline, and snubnose. Central stonerollers were the most abundant forage species present at this site also.

Based on fish species occurrence, this stream appears to be a fair to medium quality Ridge and Valley stream. A total of 22 species was collected, some of which were fairly intolerant forms. The occurrence of six darter species further attests to good water quality. The stream has medium to heavy siltation and probably receives considerable run-off from agricultural practices and other activities in the watershed. The rock bass

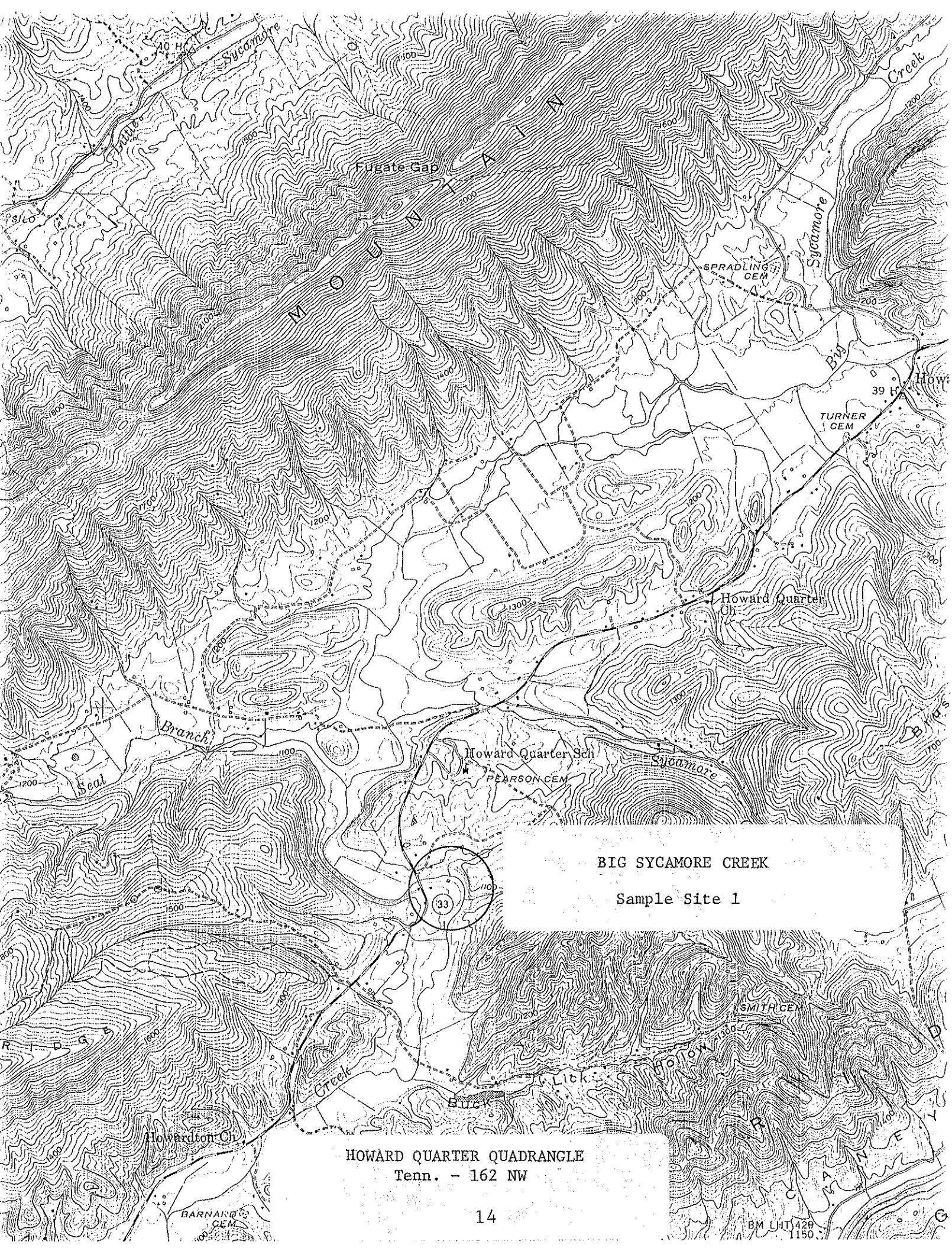
is the primary game species present but based on our surveys it appears to support only a limited fishery.

Benthic macroinvertebrates from sample Site 1 included Baetidae, Caenidae, Heptageniidae, and Oligoneuriidae mayflies, the perlid stonefly *Acroneuria evoluta*, Hydropsychidae, Leptoceridae, Limnephilidae, Polycentropodidae, and Uenoidae caddisflies, and Dryopidae, Elmidae, and Psephenidae beetles. Gastropods included limpets (*Ferrissia*) and Pleuroceridae snails. Relic *Medionidus conradicus*, *Villosa iris* and *V. vanuxemensis* were found. Crayfish species included the native Appalachian brook crayfish (*Cambarus bartonii*) and *C. longirostris*, along with the introduced rusty crayfish (*Orconectes rusticus*), and an unidentified *Orconectes* species. *O. rusticus* is an introduced species that is becoming established in east Tennessee and may be replacing some of our native crayfish species due to its adaptive capability. It is already well established in the Holston River and Nolichucky River systems. Gastropods represented about 28%, ephemeropterans about 26%, coleopterans about 16%, odonates about 8%, and trichopterans about 3% of the total number of organisms collected (Fig. 1). A total of 44 taxa was collected at this site.

Benthic macroinvertebrates from sample Site 2 included Baetidae, Caenidae, Heptageniidae, and Oligoneuriidae mayflies, the perlid stoneflies *Acroneuria abnormis* and *A. evoluta*, Hydropsychidae and Limnephilidae caddisflies, and Dryopidae, Elmidae, and Psephenidae beetles. Gastropods included limpets (*Ferrissia*) and *Physa* snails. One juvenile *Lasmigona* sp. cf. *L. holstonia* was found at this site. Crayfish species included the native Appalachian brook crayfish (*Cambarus bartonii*) and *C. longirostris*, along with the introduced rusty crayfish (*Orconectes rusticus*), and an unidentified *Orconectes* species. *O. rusticus* appears to be well established in this stream. Coleopterans represented about 31%, ephemeropterans about 27%, megalopterans about 10%, odonates about 8%, and trichopterans about 3% of the total number of organisms collected (Fig. 2). A total of 43 taxa was collected at this site.

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 fair to medium quality Ridge and Valley stream that merits protection from pollution or habitat destruction.



BIG SYCAMORE CREEK

Sample Site 1

HOWARD QUARTER QUADRANGLE
Tenn. - 162 NW

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Big Sycamore Creek — Date: 24 August 1993

Watershed: Clinch River — County: Claiborne

Area: Site # 1 — Sample Length: 600 ft

Lat-Long: 362700N - 832613W — Reach: 06010205-60.0

Data Collected By: Rick D. Bivens, Carl E. Williams, Bob Robertson, and Ernie Poore

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 21.7 ft Avg. Depth 0.4 ft Max. Depth 2.2 ft
2. Estimated Percent of Stream in Pools is 30%.
3. Estimated Percent **Pool** Bottom is Silt 10% Sand 10% Gravel 10% Rubble 10% Boulders 20% Bedrock 40%.
4. Estimated Percent **Riffle** Bottom is Silt 5% Sand 5% Gravel 10% Rubble 30% Boulders 40% Bedrock 10%.
5. Abundance of Littoral Aquatic Plants is Average (*Dianthera americana*).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25% of the Stream, Average in 50%, Poor in 25%.
7. Shade or Canopy Good over 50% of Stream.
8. Flow (CFS) 2.0: Compared to Normal: Low
9. Present Weather: Partly cloudy, warm and humid. Air temperature - 83 F @ 10:30 am.
10. Weather (last 24 h): Partly cloudy to clear, hot and humid.
11. pH 8.1 Temp. 70.7 F Conductivity 270 micromhos/cm D.O. 8.7 ppm Saturation 95%
12. Comments: Sample area location was approx. 300 ft downstream of the bridge crossing on Hwy. 33. Stream was low. Siltation medium to heavy; agricultural practices, cattle in stream, etc., auto junk yard adjacent to sample area.

FISH DATA

Stream: Big Sycamore Creek
Date: 24 August 1993
Watershed: Clinch River
County: Claiborne
Area: Site # 1
Sample Length: 600 ft
Lat-Long: 362700N - 832613W
Reach: 06010205-60,0
Type of Sampling: Electrofishing
Elevation: 1,050 ft
Gear Type: Two Backpack Units
Time: 1320 - 1420

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus salmoides	220	35	2	0.28
" "	"	19	3	0.27
" "	"	1	5	0.07
Ambloplites rupestris	13	1	2	0.01
" "	"	5	5	0.60
" "	"	4	6	0.57
" "	"	2	7	0.60
Lepomis macrochirus	206	2	3	0.07
" "	"	1	4	0.05
" "	"	1	5	0.09
Ameiurus natalis	174	3	2-3	0.03
Hypentelium nigricans	166	89	3-7	1.27
Moxostoma erythrurum	230	4	2	0.02
Campostoma anomalum	25	595	1-5	5.98
Cyprinus carpio	47	1	5	0.14
Luxilus chrysocephalus	249	54	1-5	0.87
L. coccogenis	248	27	3-4	0.38
Pimephales notatus	334	35	1-3	0.16
Rhinichthys atratulus	351	9	2-3	0.08
Semotilus atromaculatus	360	6	1-5	0.17

Site was located approx. 300 ft downstream of the Hwy. 33 bridge crossing (first bridge crossing on Hwy. 33 upstream of Norris Reservoir). Shocking at 120 volts AC.

Collectors: R.D. Bivens, C.E. Williams, B. Robertson, and E. Poore

FISH DATA (continued)

Stream: Big Sycamore Creek
Date: 24 August 1993
Watershed: Clinch River
County: Claiborne
Area: Site # 1
Sample Length: 600 ft
Lat-Long: 362700N - 832613W
Reach: 06010205-60,0
Type of Sampling: Electrofishing
Elevation: 1,050 ft
Gear Type: Two Backpack Units
Time: 1320 - 1420

Species	TADS Code	Total Number	Inch Class	Total Weight
Etheostoma blennioides	80	61	1-4	0.53
E. caeruleum	84	67	1-2	0.25
E. flabellare	92	3	1-3	0.02
E. rufilineatum	108	17	1-2	0.10
E. simoterum	111	91	1-2	0.27
E. stigmaeum meadiae	96	4	1-2	0.02
Percina caprodes	306	2	4	0.05
Cottus carolinae	40	89	1-4	1.04
Cambarus bartonii		4		
C. longirostris		22		
Orconectes rusticus		20		
Orconectes sp.		2		

Site was located approx. 300 ft downstream of the Hwy. 33 bridge crossing (first bridge crossing on Hwy. 33 upstream of Norris Reservoir). Shocking at 120 volts AC.

Collectors: R.D. Bivens, C.E. Williams, B. Robertson, and E. Poore

Big Sycamore Creek: Site # 1, Qualitative Benthic Sample

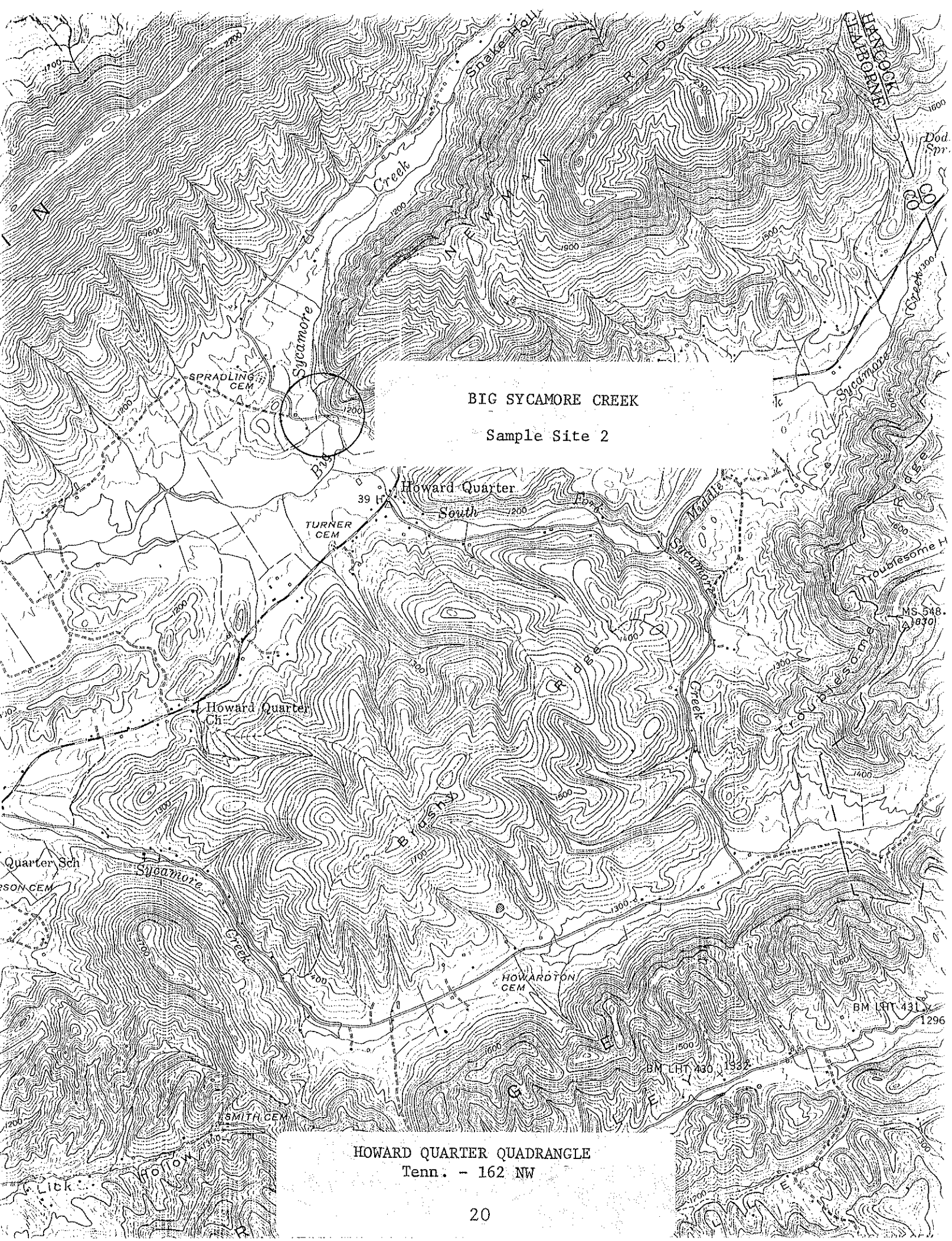
24 August 1993 Field # 464

Claiborne Co., TN; Approx. 300 ft downstream of the Hwy. 33 bridge crossing (1st crossing upstream of Norris Res.). Coordinates: 362700N - 832613W. Howard Quarter, Tenn., # 162 NW Quad. Reach # 06010205-60,0.

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	2
COLEOPTERA:	
Dryopidae/*Helichus* adults	8
Elmidae/*Dubiraphia* adult	13
Macronychus glabratus larvae	2
Macronychus glabratus adults	2
Optioservus ovalis adult	1
Promoresia elegans adult	1
Stenelmis adults	8
Psephenidae/*Psephenus herricki*	21
DIPTERA:	
Athericidae/*Atherix lantha*	15
Chironomidae	10
Simuliidae	1
EPHEMEROPTERA:	
Baetidae/*Baetis*	14
Caenidae/*Caenis*	1
Heptageniidae/*Epeorus*	2
Heptagenia	1
Stenacron	16
Stenonema sp.	26
Stenonema femoratum	20
Oligoneuriidae/*Isonychia*	3
GASTROPODA:	
Ancylidae/*Ferrissia*	4
Pleuroceridae	93

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

TAXA	NUMBER
HEMIPTERA:	
Nepidae/*Ranatra*	1
Veliidae/*Microvelia*	1
Rhagovelia obesa females	2
Rhagovelia obesa males	2
ISOPODA:	
Asellidae/*Lirceus*	1
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	12
Nigronia serricornis	7
Sialidae/*Sialis*	3
ODONATA:	
Aeshnidae/*Basiaeschna janata*	2
Boyeria vinosa	2
Calopterygidae/*Calopteryx*	3
Coenagrionidae/*Argia*	4
Enallagma	1
Gomphidae/*Gomphus lividus*	6
Hagenius brevistylus	3
Macromiidae/*Didymops transversa*	2
Macromia	6
PELECYPODA:	
Shpaeriidae/*Sphaerium*	2
Unionidae/*Medionidus conradicus* relics	
Villosa iris and *V. vanuxemensis* relics	
PLECOPTERA:	
Perlidae/*Acroneuria evoluta*	5
TRICHOPTERA:	
Hydropsychidae/*Hydropsyche betteni/depravata*	7
Leptoceridae/*Triaenodes*	1
Limnephilidae/*Pycnopsyche*	2
Polycentropodidae/*Polycentropus*	1
Uenoidae/*Neophylax*	1
	351



HOWARD QUARTER QUADRANGLE
Tenn. - 162 NW

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Big Sycamore Creek — Date: 25 August 1993

Watershed: Clinch River — County: Claiborne

Area: Site # 2 — Sample Length: 300 ft

Lat-Long: 362841N - 832452W — Reach: 06010205-60,0

Data Collected By: Rick D. Bivens, Carl E. Williams, Bob Robertson, and Ernie Poore

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 10.1 ft Avg. Depth 0.3 ft Max. Depth 1.2 ft
2. Estimated Percent of Stream in Pools is 20%.
3. Estimated Percent **Pool** Bottom is Silt 10% Sand 10% Gravel 20% Rubble 40% Boulders 20%.
4. Estimated Percent **Riffle** Bottom is Silt 5% Sand 10% Gravel 15% Rubble 40% Boulders 30%.
5. Abundance of Littoral Aquatic Plants is Average.
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 30% of Stream.
8. Flow (CFS) 0.4: Compared to Normal: Low
9. Present Weather: Partly cloudy, warm and humid. Air temperature - 79 F @ 9:45 am.
10. Weather (last 24 h): Partly cloudy to clear, hot and humid.
11. pH 7.6 Temp. 71.6 F Conductivity 195 micromhos/cm D.O. 8.9 ppm Saturation 103%
12. Comments: Sample area location at the bridge crossing on Snake Hollow Road (area was upstream of the bridge). This site had somewhat cleaner substrate than at Site # 1, but there is still a lot of agricultural practices along the watershed.

FISH DATA

Stream: Big Sycamore Creek
Date: 25 August 1993

Watershed: Clinch River
County: Claiborne

Area: Site # 2
Sample Length: 300 ft

Lat-Long: 362841N - 832452W
Reach: 06010205-60,0

Type of Sampling: Electrofishing
Elevation: 1,110 ft

Gear Type: One Backpack Unit
Time: 1230 - 1315

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus dolomieu	218	1	4	0.05
Ambloplites rupestris	13	1	3	0.02
" "	"	3	4	0.19
" "	"	2	5	0.18
" "	"	1	6	0.19
Lepomis macrochirus	206	1	4	0.04
Hypentelium nigricans	166	6	1-7	0.24
Moxostoma duquesnei	229	3	1-2	0.01
Campostoma anomalum	25	413	1-4	2.00
Luxilus chrysocephalus	249	22	1-5	0.30
Pimephales notatus	334	2	2-3	0.01
Rhinichthys atratulus	351	36	1-3	0.11
Semotilus atromaculatus	360	44	1-8	1.20
Etheostoma caeruleum	84	28	1-2	0.08
E. flabellare	92	24	1-2	0.07
E. rufilineatum	108	11	1-2	0.04
E. simoterum	111	15	1-2	0.03
Cottus carolinae	40	31	1-4	0.38
Cambarus longirostris		2		
Orconectes rusticus		10		
Orconectes sp.		2		

Site located upstream of the first bridge crossing on Snake Hollow Road. Shocking at 120 volts AC.

Collectors: R.D. Bivens, C.E. Williams, B. Robertson, and E. Poore

Big Sycamore Creek: Site # 2, Qualitative Benthic Sample

25 August 1993 Field # 465

Claiborne Co., TN; Upstream of the bridge on Snake Hollow Road. Coordinates 362841N - 832452W. Howard Quarter, Tenn., # 162 NW Quad. Reach # 06010205-60,0.

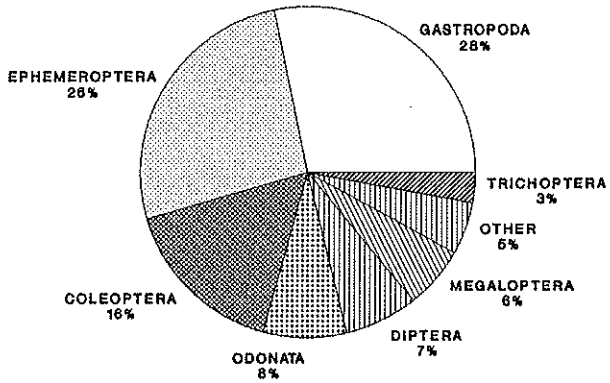
TAXA	NUMBER
COLEOPTERA:	
Dryopidae/*Helichus* adults	10
Elmidae/Dubiraphia	24
Macronychus glabratus adult	1
Optioservus larvae	2
Optioservus ovalis adults	8
Stenelmis adults	3
Psephenidae/*Psephenus herricki*	30
DIPTERA:	
Athericidae/*Atherix lantha*	5
Chironomidae	10
Tabanidae/*Tabanus*	1
Tipulidae/*Dicranota*	1
Hexatoma	2
EPHEMEROPTERA:	
Baetidae/*Baetis*	7
Centroptilum	2
Caenidae/*Caenis*	3
Heptageniidae/*Epeorus rubidus/subpallidus*	4
Heptagenia	6
Stenacron	4
Stenonema sp.	8
Stenonema femoratum	18
S. vicarium	6
Oligoneuriidae/*Isonychia*	10
GASTROPODA:	
Ancylidae/*Ferrissia*	12
Physidae/*Physa*	3
HEMIPTERA:	
Gerridae/*Gerris remigis* female	1
Trepobates inermis females	2
HYDRACARINA:	1
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	14
Nigronia serricornis	10
Sialidae/*Sialis*	1

Big Sycamore Creek: Site 2, Qualitative Sample cont.

TAXA	NUMBER
ODONATA:	
Aeshnidae/*Boyeria vinosa*	2
Calopterygidae/*Calopteryx*	3
Coenagrionidae/*Argia*	2
Gomphidae/*Gomphus* (Genus A *consanguis*) *	1
Gomphus lividus	2
Hagenius brevistylus	1
Lanthus vernalis	1
Stylogomphus albistylus	9
PELECYPODA:	
Unionidae/*Lasmigona* sp. cf. *L. holstonia* juvenile	1
PLECOPTERA:	
Perlidae/*Acroneuria abnormis*	8
A. evoluta	5
TRICHOPTERA:	
Hydropsychidae/*Cheumatopsyche*	4
Hydropsyche betteni/depravata	1
Limnephilidae/*Pycnopsyche*	3
	252

* (from Louton 1982)

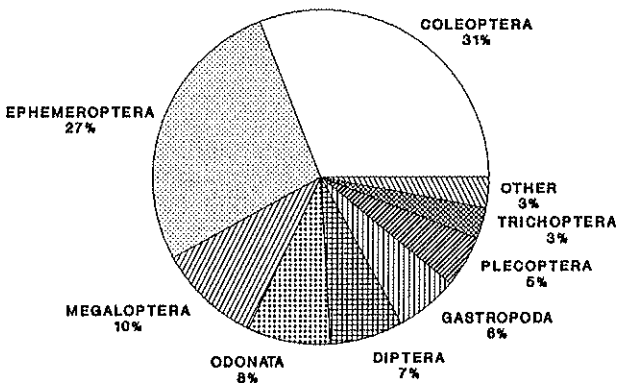
BIG SYCAMORE CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 351
TAXA RICHNESS = 44
Figure 1.

BIG SYCAMORE CREEK
SITE 2
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 252
TAXA RICHNESS = 43
Figure 2.

Joe Mill Creek

One qualitative fishery survey was conducted on Joe Mill Creek in May 1993:

Location and Length - Tributary to Indian Creek (Clinch River tributary). The sample area was located along Joe Mill Creek Road about 1.6 mi (by road) upstream of the Indian Creek bridge on Falls Road, and just downstream of the entrance to Clinch Valley Mining. It was approximately 200 ft in length and was sampled on 6 May 1993. It was in Grainger County (Avondale Quadrangle).

Sampling Methodology - The site was sampled using one 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)

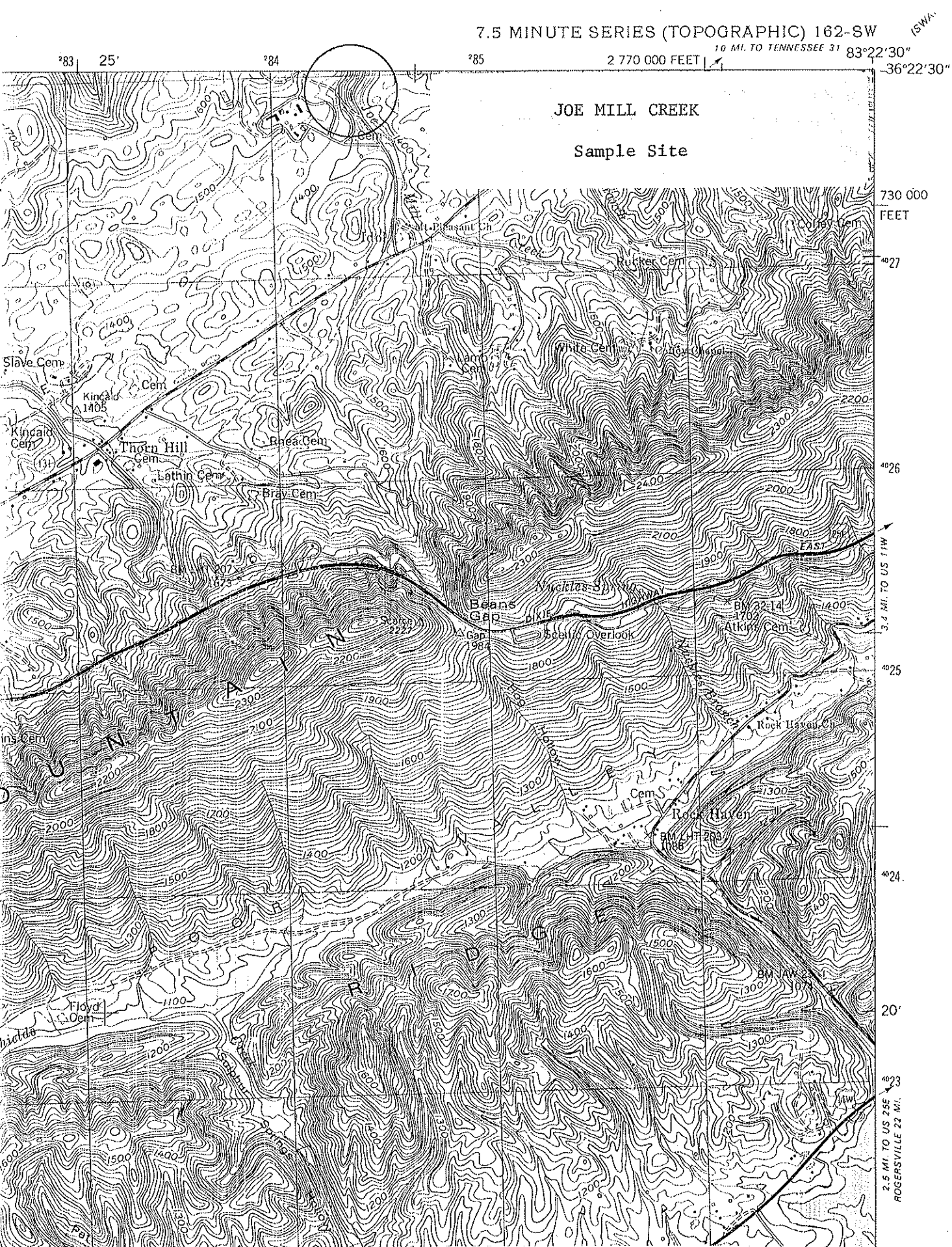
Comments - This stream was sampled primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted and emphasis was placed on the fish species present. The Agency has made no previous studies or fish collections from this stream.

A total of only 2 fish species, central stonerollers (*Campostoma anomalum*) and blacknose dace (*Rhinichthys atratulus*), was collected. The Appalachian brook crayfish (*Cambarus bartonii*) was the only crayfish species collected.

At the sample location, the stream was extremely silty along with heavy algal growth. The occurrence of only two species may to some extent be a function of small stream size, however 3 to 4 additional species should have been present.

Management Recommendations:

1. This stream appears heavily impacted, probably from Clinch Valley Mining. Additional investigation is suggested.


7.5 MINUTE SERIES (TOPOGRAPHIC) 162-SW
10 MI. TO TENNESSEE 31
83°22'30"
36°22'30"
2 770 000 FEET
730 000 FEET
JOE MILL CREEK
Sample Site
Mt. Pleasant Ch
Corley Cem
Rucker Cem
White Cem
Corley Chapel
Lamb Cem
Slave Cem
Kincaid Cem
Kincaid 1405
Thorn Hill Cem
Rhea Cem
Lathin Cem
Bray Cem
BM LHT 207
1673
Beans Gap
Gap 1984
Scenic 2227
Scenic Overlook
Nuckles Spring
Parkway
BM 32-14
1702
Atkins Cem
EAST
3.4 MI. TO US 11W
Rock Haven Ch
Rock Haven Cem
BM LHT 203
1086
BM LHT 23
1074
Floyd Cem
Williams Cem
2.5 MI. TO US 25E
ROGERSVILLE 22 MI.
AVONDALE QUADRANGLE
Tenn. - 162 SW

FISH DATA

Stream: Joe Mill Creek
Date: 6 May 1993
Watershed: Clinch River
County: Grainger
Area: See Comments
Sample Length: 200 ft
Lat-Long: 362226N - 832413W
Reach: 06010205-
Type of Sampling: Electrofishing
Elevation: 1,310 ft
Gear Type: One Backpack Unit
Time: 1230 - 1300

Species	TADS Code	Total Number	Inch Class	Total Weight
Campostoma anomalum	25	2	-	-
Rhinichthys atratulus	351	111	-	-

Cambarus bartonii - several

Pleurocerid snails (Periwinkle) abundant.

Avg. width - approx. 6 to 8 ft
Avg. depth - 2 to 4 in
Water temperature - 65 F @ 1340
Bedrock-cobble-gravel-boulder substrate.
Stream was very, very silty with heavy algal growth.

Site was located along Joe Mill Creek Road about 1.6 mi (by road) upstream of the Indian Creek bridge on Falls Road near where the pavement starts, and just downstream of the entrance to Clinch Valley Mining. Shocking at 120 volts AC.

Collector: R.D. Bivens

Machine Branch

One qualitative fishery survey was conducted on Machine Branch in May 1993:

Location and Length - Tributary to Indian Creek (Clinch River tributary). The sample area was located along Dry Creek Road about 0.2 mi upstream of Indian Creek Road. It was approximately 200 ft in length and was sampled on 6 May 1993. It was in Grainger County (Howard Quarter Quadrangle).

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

Water Quality - No data collected.

Benthos Collection - No collection was made.

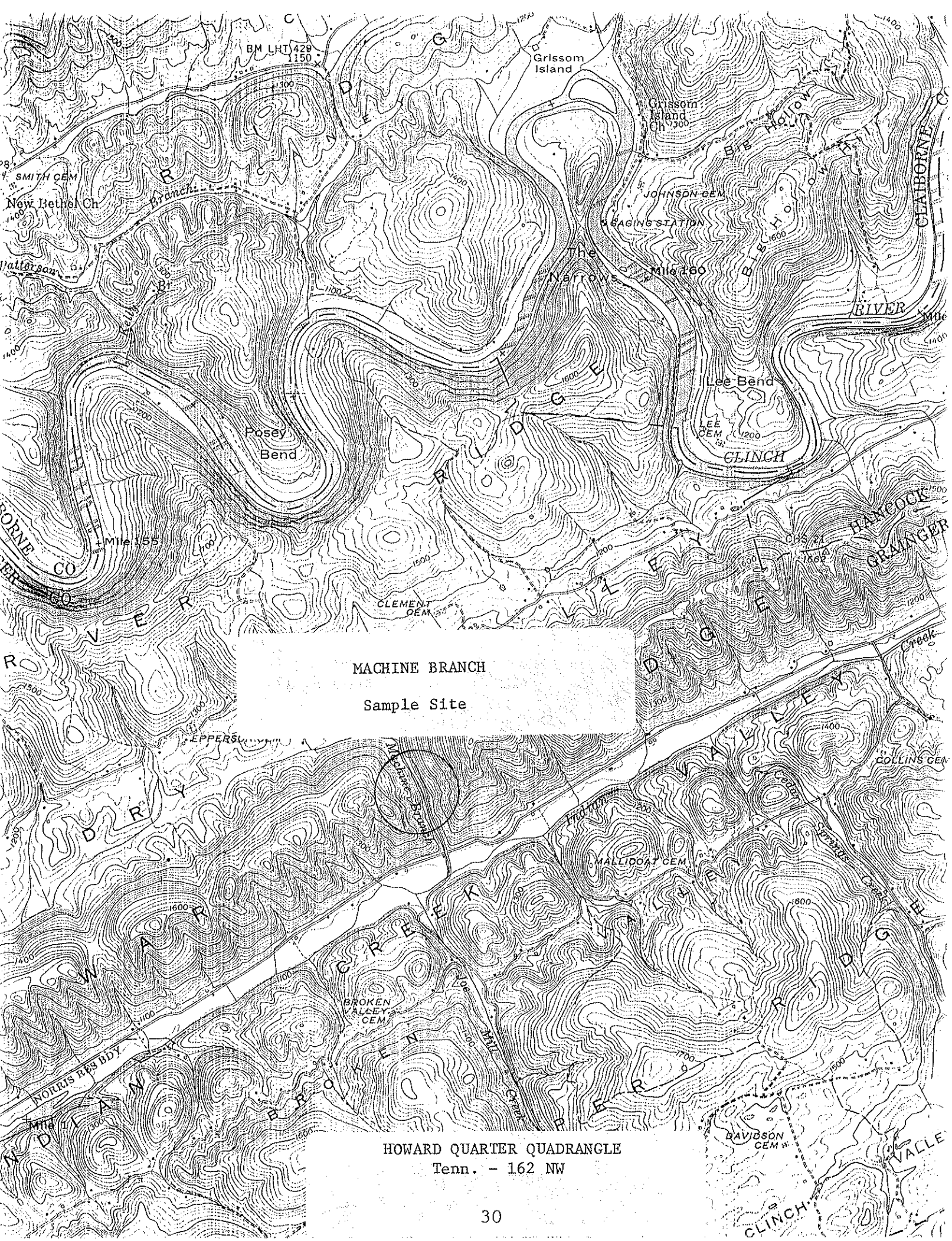
Fish Collected - (See data sheet for species list)

Comments - This stream was sampled 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. The Agency has made no previous studies or fish collections from this stream.

A total of 7 fish species was collected, none of which were game fish. Three darter species were collected, rainbow darter (*Etheostoma caeruleum*), fantail darter (*E. flabellare*), and snubnose darter (*E. simoterum*). Blacknose dace (*Rhinichthys atratulus*) and fantail darters were the most abundant species present. The native Appalachian brook crayfish (*Cambarus bartonii*) along with one specimen of the rusty crayfish (*Orconectes rusticus*) were collected. *O. rusticus* is an introduced species that is becoming established in east Tennessee and may be replacing some of our native crayfish species due to its adaptive capability.

Management Recommendations:

1. This stream appears to be a fair to good quality Ridge and Valley stream that should merit protection from any source of pollution or habitat destruction.



HOWARD QUARTER QUADRANGLE
Tenn. - 162 NW

FISH DATA

Stream: Machine Branch
Date: 6 May 1993
Watershed: Clinch River
County: Grainger
Area: See Comments
Sample Length: 200 ft
Lat-Long: 362350N - 832432W
Reach: 06010205-
Type of Sampling: Electrofishing
Elevation: 1,080 ft
Gear Type: One Backpack Unit
Time: 1015 - 1045

Species	TADS Code	Total Number	Inch Class	Total Weight
Campostoma anomalum	25	7	-	-
Luxilus chrysocephalus	249	2	-	-
Rhinichthys atratulus	351	36	-	-
Etheostoma caeruleum	84	1	-	-
E. flabellare	92	23	-	-
E. simoterum	111	6	-	-
Cottus carolinae	40	7	-	-

Cambarus bartonii - very abundant
Orconectes rusticus - 1 female

Pleurocerid snails (Periwinkle) very abundant.

Avg. width - approx. 8 to 10 ft
Avg. depth - 4 to 6 in
Water temperature - 60 F @ 1000
Cobble-gravel-boulder substrate with lots of bedrock.
Siltation was medium; some domestic rubbish along stream.
Canopy cover about 70%.

Site was located along Dry Creek Road, 0.2 mi upstream of Indian Creek Road. Shocking at 120 volts AC.

Collector: R.D. Bivens

Mulberry Creek

Two qualitative fishery surveys were conducted on Mulberry Creek in August 1993:

Location and Length - Tributary to the Powell River. Sample Site 1 was located 0.4 mi downstream of Little Mulberry Creek, along Hwy. 63. It was 300 ft in length and averaged 30.0 ft in width. Site 2 was located at the mouth of Painter Branch, along Hwy. 63. It was approx. 200 ft in length and averaged approx. 10 to 12 ft in width. Both sites were sampled on 26 August 1993 and both sites were in Hancock County (Back Valley Quadrangle).

Sampling Methodology - Site 1 was sampled using two backpack electrofishing units operating at 120 volts AC. Site 2 was sampled with one backpack unit operating at 120 volts AC.

Water Quality - Data were collected from midstream at mid-depth at each site on 26 August 1993. Site 1: DO - 8.8 ppm, pH - 7.7, Temperature - 71.6 F, Conductivity - 300 micromhos/cm. Site 2: Temperature - 78.8 F, Conductivity - 310 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample at Site 1. Site 1 sample contained 628 organisms representing 55 taxa.

Fish Collected:

	Site 1				Site 2			
Species	No.	% by No.	Wt.	% by Wt.	No.	% by No.	Wt.	% by Wt.
Smallmouth bass	21	1.3	0.45	1.8				
Rock bass	14	0.9	2.07	8.4	2	0.2	0.55	5.2
Green sunfish	2	0.1	0.07	0.3				
Non-game Fish	81	5.0	2.26	9.2	7	0.9	1.02	9.9
Forage Fish	1,487	92.6	19.73	80.3	817	98.9	8.73	84.8
Total	1,605		24.58		817		10.29	

Comments - We sampled two sites on this stream primarily to develop a fish species list and to collect stream data for TADS. The Agency has made no previous studies or fish collections from this stream. However, one site on Mulberry Creek was included in the 1968 TVA survey of the Powell River drainage basin (Tennessee Valley Authority 1970).

We collected 1,605 fish weighing 24.58 lb and comprising 27 species from Site 1. Three native game fish species, smallmouth bass (*Micropterus dolomieu*), rock bass (*Ambloplites rupestris*), and green sunfish (*Lepomis cyanellus*) were collected. Smallmouth bass and rock bass each made up about 1% of the total number of fish collected. However rock bass made up about 8%, compared to only about 2% by smallmouth bass, of the total weight of all fish collected. This was due to a proportionally large number of smallmouth bass < 3-in in the sample (Fig. 3). Four non-game and 20 forage species were also collected and these comprised 98% of the total number and 89% of the total weight. Forage fish made up about 93% of the total number and about 80% of the total weight. Of particular interest is the occurrence of fairly intolerant species such as the warpaint shiner (*Luxilus coccogenis*), Tennessee shiner (*Notropis leuciodus*), telescope shiner (*N. telescopus*), and the stargazing minnow (*Phenacobius uranops*). Warpaint shiners were fairly abundant while both Tennessee and telescope shiners were somewhat less abundant but collected in equal numbers. Darter species included the greenside (*Etheostoma blennioides*), snubnose (*E. simoterum*), speckled (*E. stigmaeum meadiae*) and Swannanoa (*E. swannanoa*). Of special interest was the occurrence of 15 specimens of *E. swannanoa*. The Swannanoa darter occurs in a few tributaries of the Powell River in Virginia (Jenkins and Burkhead 1994), however our collection is the first record of this species in the upper Powell River system in Tennessee (D. A. Etnier, personal communication) and the specimens were deposited in the University of Tennessee Research Collection of Fishes (UT Cat. No. 91.4407). Central stonerollers (*Campostoma anomalum*) and bigeye chubs (*Hybopsis amblops*) were the most abundant forage species present.

At Site 2 we collected a total of 817 fish weighing 10.29 lb and comprising 12 species. Game fish from this site included only two rock bass. Two non-game and 9 forage species were also collected here and these comprised 99.8% of the total number and about 95% of the total weight of all fish collected. Forage species made up about 99% of the total number and 85% of the total weight. Additional species collected here but not at the downstream site included creek chubs (*Semotilus atromaculatus*) and the fantail darter (*Etheostoma flabellare*). Central stonerollers were the most abundant forage species present at this site.

Based on fish species occurrence, this stream appears to be an excellent quality Ridge and Valley stream. A total of 29 species was collected from the two sample sites combined, and as stated above, several were fairly intolerant forms. The occurrence of five darter species further attests to good water quality.

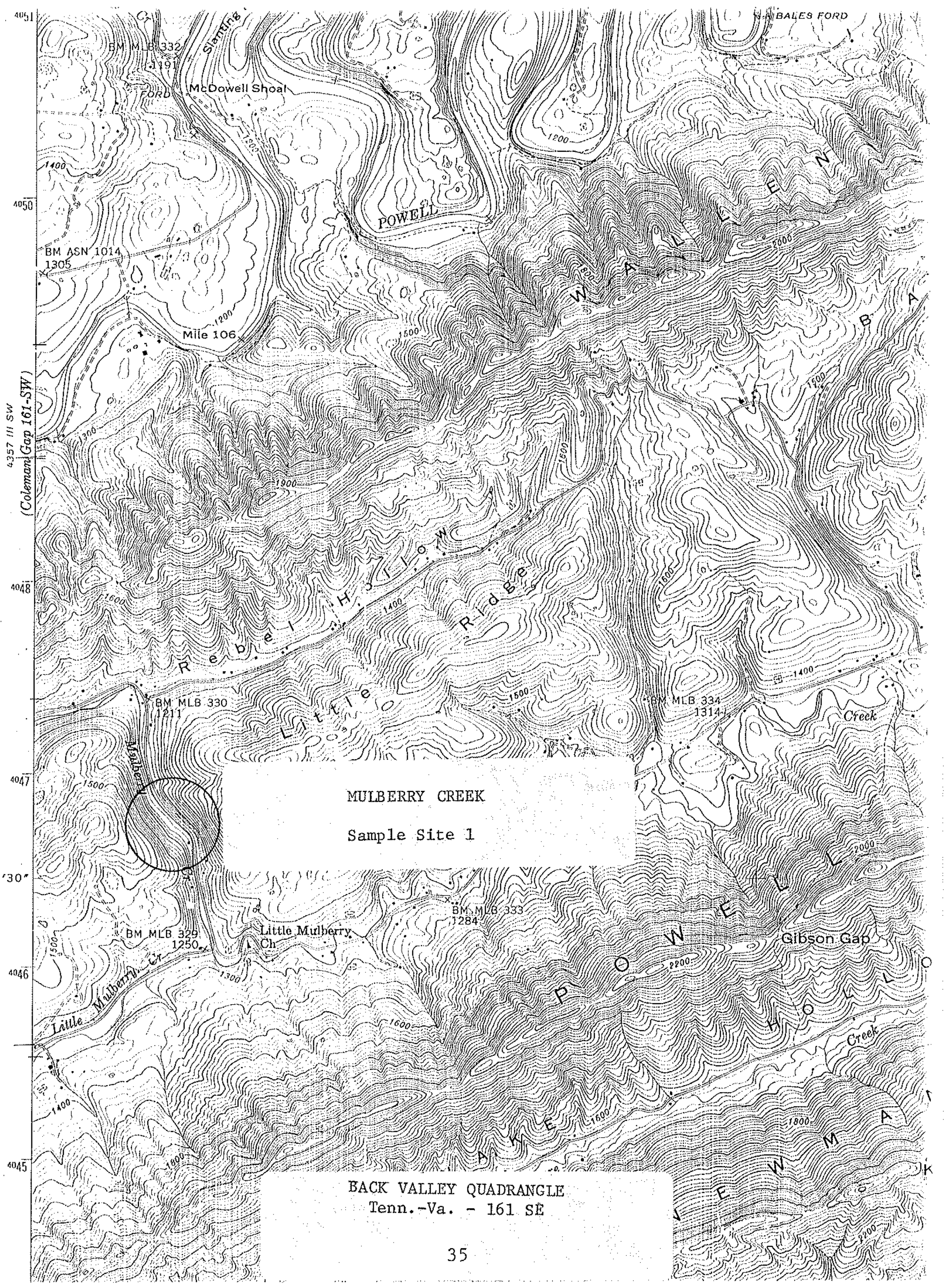
With the exception of about nine species, our species list compares fairly well with that of the 1968 TVA survey (Tennessee Valley Authority 1970). They collected 20 species from one sample site compared to our 29 from two sites. They collected

two species that we did not collect in our samples and we collected eleven species that they did not collect. Most of these eleven different species that we collected, occurred in small numbers (generally 1 to 3 specimens each). Smallmouth bass and rock bass are the primary game species present but the stream appears to support only a fair to marginal fishery, especially for smallmouth bass. This limitation may be due in part to the extensive bedrock type habitat exhibited at our sample site along with overall small stream size.

Benthic macroinvertebrates from our sample at Site 1 included Baetidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, Hydropsychidae, Leptoceridae, Limnephilidae, Philopotamidae, and Polycentropodidae caddisflies, and Elmidae, Haliplidae, and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) and fingernail clams (*Sphaerium*) were present along with limpets (*Ferrissia*) and Lymnaeidae, Physidae, and Pleuroceridae snails. A single juvenile *Lampsilis fasciola* was also collected. *Cambarus longirostris* was the only crayfish species collected (however, *C. bartonii* was collected from Site 2). Trichopterans represented about 49%, ephemeropterans about 18%, gastropods about 10%, odonates about 8%, and dipterans about 5% of the total number of organisms collected (Fig. 4). A total of 55 taxa was collected at this site.

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.



MULBERRY CREEK

Sample Site 1

BACK VALLEY QUADRANGLE
Tenn.-Va. - 161 SE

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Mulberry Creek — Date: 26 August 1993

Watershed: Powell River — County: Hancock

Area: Site # 1 — Sample Length: 300 ft

Lat-Long: 363246N - 832204W — Reach: 06010206-33,0

Data Collected By: Rick D. Bivens, Carl E. Williams, Mark T. Fagg, and Ernie Poore

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 30.0 ft Avg. Depth 0.6 ft Max. Depth 1.8 ft
2. Estimated Percent of Stream in Pools is 20%.
3. Estimated Percent **Pool** Bottom is Mud 5% Silt 10% Sand 10% Gravel 15% Rubble 10% Boulders 10% Bedrock 40%.
4. Estimated Percent **Riffle** Bottom is Silt 5% Sand 10% Gravel 10% Rubble 20% Boulders 15% Bedrock 40%.
5. Abundance of Littoral Aquatic Plants is Average.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25% of the Stream, Average in 35%, Poor in 40%.
7. Shade or Canopy Good over 50% of Stream.
8. Flow (CFS) 8.8: Compared to Normal: Normal
9. Present Weather: Partly cloudy, warm and humid. Air temperature - 80 F @ 10:30 am.
10. Weather (last 24 h): Partly cloudy, hot and humid. Scattered showers.
11. pH 7.5 Temp. 71.6 F Conductivity 300 micromhos/cm D.O. 8.8 ppm Saturation 101%
12. Comments: Sample area location was approx. 0.4 mi downstream of Little Mulberry Creek along Hwy. 63. Siltation medium to heavy, stream slightly dingy; cattle in the stream; lots of domestic rubbish along the stream course near the highway.

FISH DATA

Stream: Mulberry Creek
Date: 26 August 1993
Watershed: Powell River
County: Hancock
Area: Site # 1
Sample Length: 300 ft
Lat-Long: 363246N - 832204W
Reach: 06010206-33.0
Type of Sampling: Electrofishing
Elevation: 1,210 ft
Gear Type: Two Backpack Units
Time: 1315 - 1415

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus dolomieu	220	3	1	0.01
" "	"	10	2	0.07
" "	"	5	3	0.08
" "	"	2	4	0.07
" "	"	1	7	0.22
Ambloplites rupestris	13	1	2	0.01
" "	"	2	3	0.04
" "	"	3	4	0.18
" "	"	3	5	0.37
" "	"	3	6	0.56
" "	"	1	8	0.40
" "	"	1	9	0.51
Lepomis cyanellus	202	2	3	0.07
Ameiurus natalis	174	1	5	0.08
Catostomus commersoni	32	2	6-8	0.35
Hypentelium nigricans	166	24	2-10	1.15
Moxostoma duquesnei	229	54	2-5	0.68
Campostoma anomalum	25	813	1-6	14.90
Cyprinella galactura	253	8	2-3	0.04
C. spiloptera	269	3	1-2	0.01
Erimystax insignis	160	1	2	t
Hybopsis amblops	155	141	1-3	0.60
Luxilus chrysocephalus	249	55	1-5	0.65
L. coccogenis	248	131	1-5	1.18
Nocomis micropogon	234	10	1-7	0.28

Site located along Hwy. 63 approx. 0.4 mi downstream of the mouth of Little Mulberry Creek. Shocking at 120 volts AC.

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

FISH DATA (continued)

Stream: Mulberry Creek
Date: 26 August 1993
Watershed: Powell River
County: Hancock
Area: Site # 1
Sample Length: 300 ft
Lat-Long: 363246N - 832204W
Reach: 06010206-33,0
Type of Sampling: Electrofishing
Elevation: 1,210 ft
Gear Type: Two Backpack Units
Time: 1315 - 1415

Species	TADS Code	Total Number	Inch Class	Total Weight
Notropis leuciodus	255	36	1-2	0.07
N. sp. cf. *N. spectrunculus*	266	3	1-2	0.01
N. telescopus	272	36	1-2	0.11
N. volucellus	277	1	1	t
Phenacobius uranops	330	12	2-3	0.11
Pimephales notatus	334	41	2-3	0.32
Rhinichthys atratulus	351	4	1-2	0.03
Etheostoma blennioides	80	114	1-3	0.97
E. simoterum	111	26	1-2	0.04
E. stigmaeum meadiae	96	2	1-2	0.01
E. swannanoa	129	15	1	0.04
Cottus carolinae	40	38	1-3	0.37
Cambarus longirostris		3		

Site located along Hwy. 63 approx. 0.4 mi downstream of the mouth of Little Mulberry Creek. Shocking at 120 volts AC.

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

Mulberry Creek: Site # 1, Qualitative Benthic Sample

26 August 1993 Field # 466

Hancock Co., TN; Located 0.4 mi downstream of the mouth of Little Mulberry Creek along Hwy. 63. Coordinates: 363246N - 832204W. Back Valley, Tenn.-V.A., # 161 SE Quad. Reach # 06010206-33,0.

TAXA	NUMBER
ANNELIDA:	
Hirudinea	1
Oligochaeta	1
COLEOPTERA:	
Elmidae/*Dubiraphia* adults	6
Macronychus glabratus adults	2
Stenelmis larva	1
Stenelmis adults	3
Haliplidae/*Peltodytes* adult	1
Psephenidae/*Psephenus herricki* larvae	14
DIPTERA:	
Chironomidae larvae & pupa	18
Simuliidae	6
Tabanidae/*Chrysops*	2
Tipulidae/*Antocha*	2
Hexatoma	1
EPHEMEROPTERA:	
Baetidae/*Baetis*	78
Ephemeridae/*Hexagenia*	1
Heptageniidae/*Epeorus rubidus/subpallidus*	1
Heptagenia	3
Stenacron	6
Stenonema	3
Oligoneuriidae/*Isonychia*	13
GASTROPODA:	
Ancylidae/*Ferrissia*	4
Lymnaeidae	2
Physidae/*Physa*	2
Pleuroceridae/*Anculosa subglobosa*	26
Unidentified	32
HEMIPTERA:	
Gerridae/*Rheumatobates rileyi* male and females	3
Trepobates pictus males	2
females	6
Veliidae/*Rhagovelia obesa* male	1

Mulberry Creek: Site # 1, Qualitative Sample cont.

TAXA	NUMBER
LEPIDOPTERA:	
Pyralidae/*Petrophila*	6
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	2
Nigronia serricornis	2
Sialidae/*Sialis*	17
ODONATA:	
Aeshnidae/*Basiaeschna janata*	3
Boyeria vinosa	5
Calopterygidae/*Calopyteryx*	4
Coenagrionidae/*Argia*	1
Enallagma	1
Gomphidae/*Dromogomphus spinosus*	2
Gomphus early instars	7
Gomphus (Genus A *consanguis*) *	9
G. lividus	6
Hagenius brevistylus	8
Stylurus spiniceps	1
Macromiidae/*Macromia*	2
PELECYPODA:	
Corbiculidae/*Corbicula fluminea*	3
Sphaeriidae/*Sphaerium*	4
Unionidae/*Lampsilis fasciola* live juvenile	1
TRICHOPTERA:	
Hydropsychidae/*Ceratopsyche cheilonis*	6
C. sparna	9
Cheumatopsyche	12
Hydropsyche early instars	34
Hydropsyche betteni/depravata	234
H. frisoni (most prob. det.)	2
Leptoceridae/*Triaenodes*	1
Limnephilidae/*Pycnopsyche*	1
Philopotamidae/*Chimara*	3
Polycentropodidae/*Polycentropus*	1
	628

* (from Louton 1982)

GAME FISH FROM MULBERRY CREEK
SITE 1
INCH CLASS DISTRIBUTION

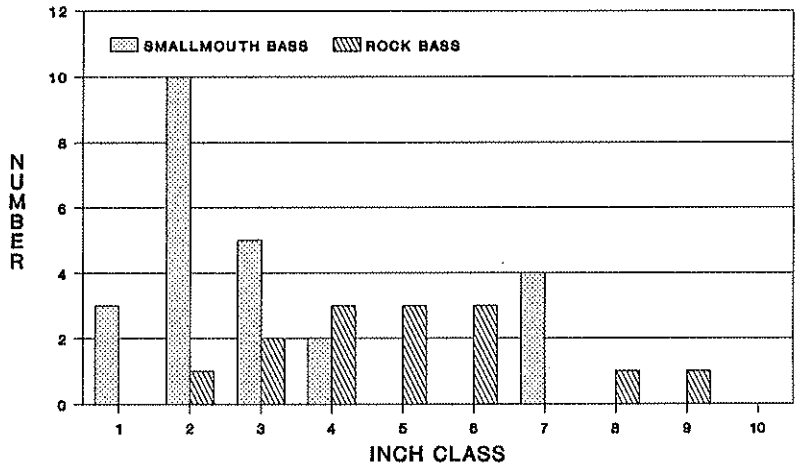
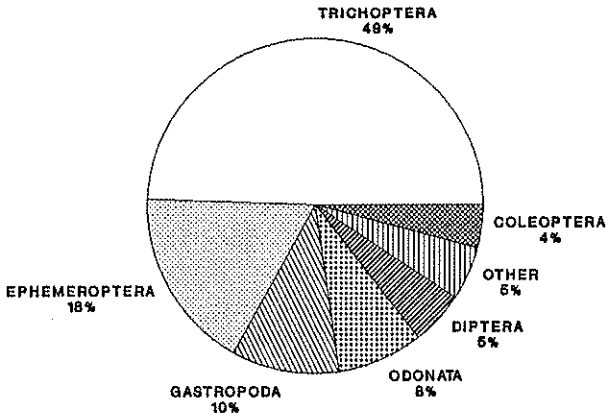


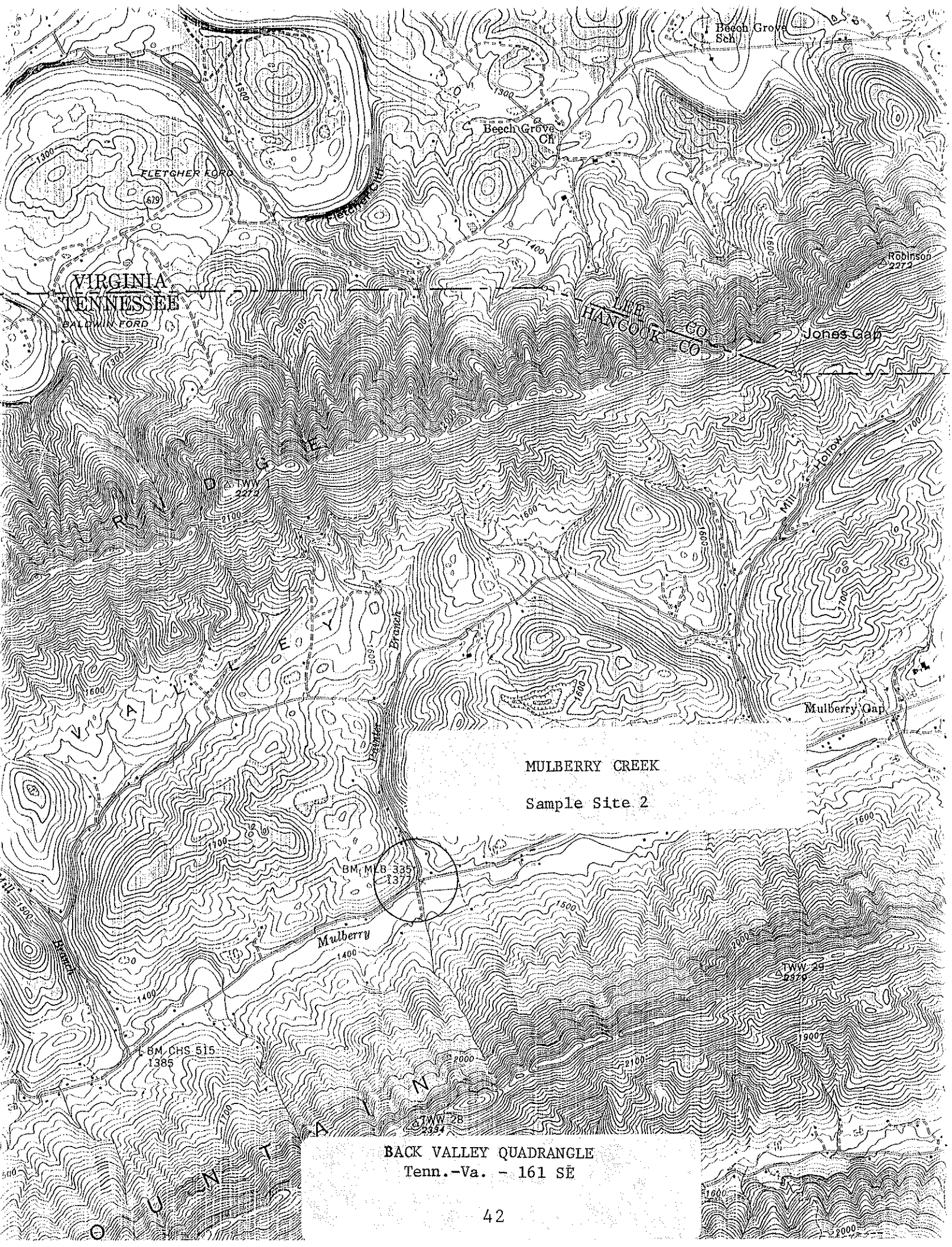
Figure 3.

MULBERRY CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 628
TAXA RICHNESS = 55
Figure 4.



MULBERRY CREEK

Sample Site 2

BACK VALLEY QUADRANGLE
Tenn.-Va. - 161 SE

FISH DATA

Stream: Mulberry Creek
Date: 26 August 1993
Watershed: Powell River
County: Hancock
Area: Site # 2
Sample Length: 200 ft
Lat-Long: 363408N - 831702W
Reach: 06010206-33,0
Type of Sampling: Electrofishing
Elevation: 1375 ft
Gear Type: One Backpack Unit
Time: 1730 - 1800

Species	TADS Code	Total Number	Inch Class	Total Weight
Ambloplites rupestris	13	1	5	0.05
" "	"	1	8	0.41
Catostomus commersoni	32	3	3-4	0.05
Hypentelium nigricans	166	4	2-10	0.97
Campostoma anomalum	25	357	1-5	6.33
Luxilus chrysocephalus	249	4	3-4	0.10
L. coccogenis	248	1	3	0.02
Nocomis micropogon	234	1	1	t
Rhinichthys atratulus	351	264	1-3	1.30
Semotilus atromaculatus	360	16	2-4	0.16
Etheostoma flabellare	92	8	1-2	0.02
E. simoterum	111	24	1-2	0.05
Cottus carolinae	40	133	1-3	0.75

Cambarus bartonii

Avg. width - 10 to 12 ft
Avg. depth - 0.3 ft Max. depth - 1.5 ft
Water temperature - 78.8 F
Conductivity - 310 micromhos/cm
Riffles: gravel-cobble-rubble-boulder substrate.
Pools: silt-mud-rubble-gravel with few boulders.
Siltation heavy in pools.
Canopy cover approx. 25%.
Open farm land, crops, cattle in stream, etc.

Site located at the mouth of Painter Branch; just off Hwy. 33.
Shocking at 120 volts AC.

Collectors: R.D. Bivens, C.E. Williams, and E. Poore

Muddy Creek

One qualitative fishery survey was conducted on Muddy Creek in May 1993:

Location and Length - Tributary to the Tennessee River (Fort Loudoun Tailwater). The sample area was located off Muddy Creek Road at the pipeline crossing, near McNeely Spring. It was approximately 300 ft in length and was sampled on 3 May 1993. It was in Loudon County (Concord Quadrangle).

Sampling Methodology - The site was sampled using a 10 ft. seine.

Water Quality - No data collected.

Benthos Collection - No collection was made.

Fish Collected - (See data sheet for species list)

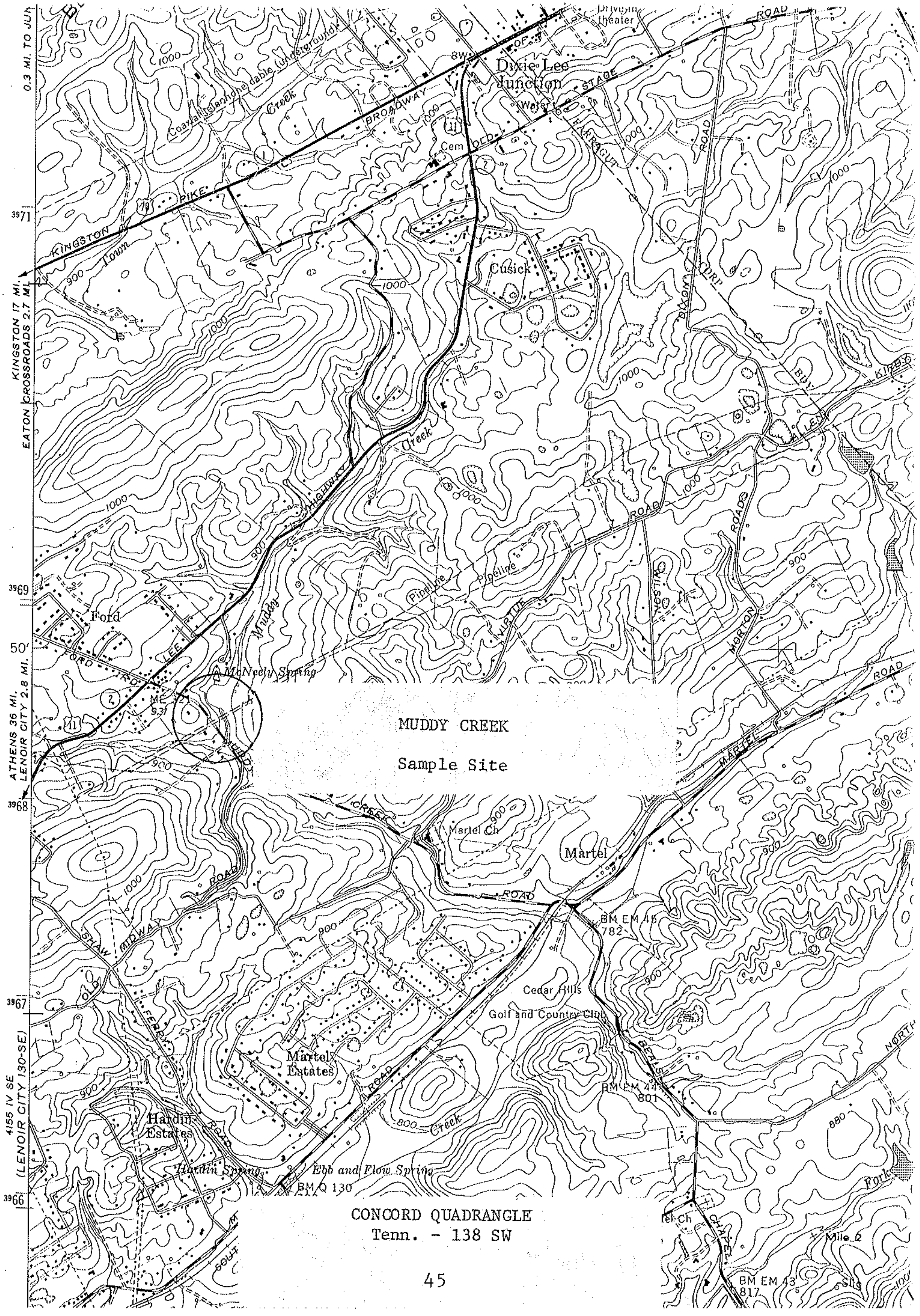
Comments - This stream was sampled primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted in the headwaters and emphasis was placed on the fish species present. We were also interested in checking on the possible occurrence of the flame chub (*Hemitremia flammea*) from the McNeely Spring area. The Agency has made no previous studies or fish collections from this stream.

A total of only 2 fish species, blacknose dace (*Rhinichthys atratulus*) and banded sculpin (*Cottus carolinae*) was collected. The Appalachian brook crayfish (*Cambarus bartonii*) was the only crayfish species collected. Periwinkle snails (Pleuroceridae) were abundant.

At the sample location, the stream had clean cobble-gravel substrate with water cress and algae present. The occurrence of only two species may to some extent be a function of small stream size.

Management Recommendations:

1. Additional sampling is suggested in the lower stream to adequately reflect species diversity of this stream reach. Also, two other spring areas (Hardin Spring and Ebb and Flow Spring) should be checked for the possible occurrence of the flame chub (*Hemitremia flammea*) within this watershed.



MUDDY CREEK

Sample Site

CONCORD QUADRANGLE
Tenn. - 138 SW

FISH DATA

Stream: Muddy Creek
Date: 3 May 1993

Watershed: Tennessee River
County: Loudon

Area: See Comments
Sample Length: 300 ft

Lat-Long: 354949N - 841421W
Reach: 06010201-

Type of Sampling: Seining
Elevation: 830 ft

Gear Type: 10 ft Seine
Time: 1445 - 1515

Species	TADS Code	Total Number	Inch Class	Total Weight
Rhinichthys atratulus	351	few	-	-
Cottus carolinae	40	few	-	-

Cambarus bartonii

Pleurocerid snails (Periwinkle) abundant

Avg. width - approx. 4 to 6 ft
Avg. depth - 2 to 4 in
Cobble-gravel and clean substrate with few boulders.
Water cress and algae present.

Site was located off Muddy Creek Road at pipeline crossing, near McNeely Spring. Made about 10 seine hauls with 10 ft seine.

Collector: Rick D. Bivens and Mark T. Fagg

Little Turkey Creek

One qualitative fishery survey was conducted on Little Turkey Creek in May 1993:

Location and Length - Tributary to the Tennessee River (Fort Loudoun Reservoir). The sample area was located at the bridge on Union Road, west of Everett Road and north of Kingston Pike (Hwy. 11/70). It was approximately 100 ft in length and was sampled on 3 May 1993. It was in Knox County (Concord Quadrangle).

Sampling Methodology - The site was sampled using a 10 ft. seine.

Water Quality - No data collected.

Benthos Collection - No collection was made.

Fish Collected - (See data sheet for species list)

Comments - This stream was sampled primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted and emphasis was placed on the fish species present. We were also interested in checking on the possible occurrence of the flame chub (*Hemitremia flammea*) from this stream. The Agency has made no previous studies or fish collections from this stream.

A total of 7 fish species was collected, one of which was the flame chub. Seven specimens of the flame chub were collected downstream of the bridge crossing and probably represent a new collection record for the species (D. A. Etnier, personal communication) however, it has recently been collected in Turkey Creek (Bivens and Williams 1991) and is fairly abundant in the Blue Spring tributary to Turkey Creek (TDEC [53 specimens in April 1993] and TWRA [31 specimens in May 1993] collections. This species occurs exclusively in springs and spring runs from the vicinity of Knoxville southward (Etnier and Starnes 1993) and is considered in need of management in Tennessee (Starnes and Etnier 1980).

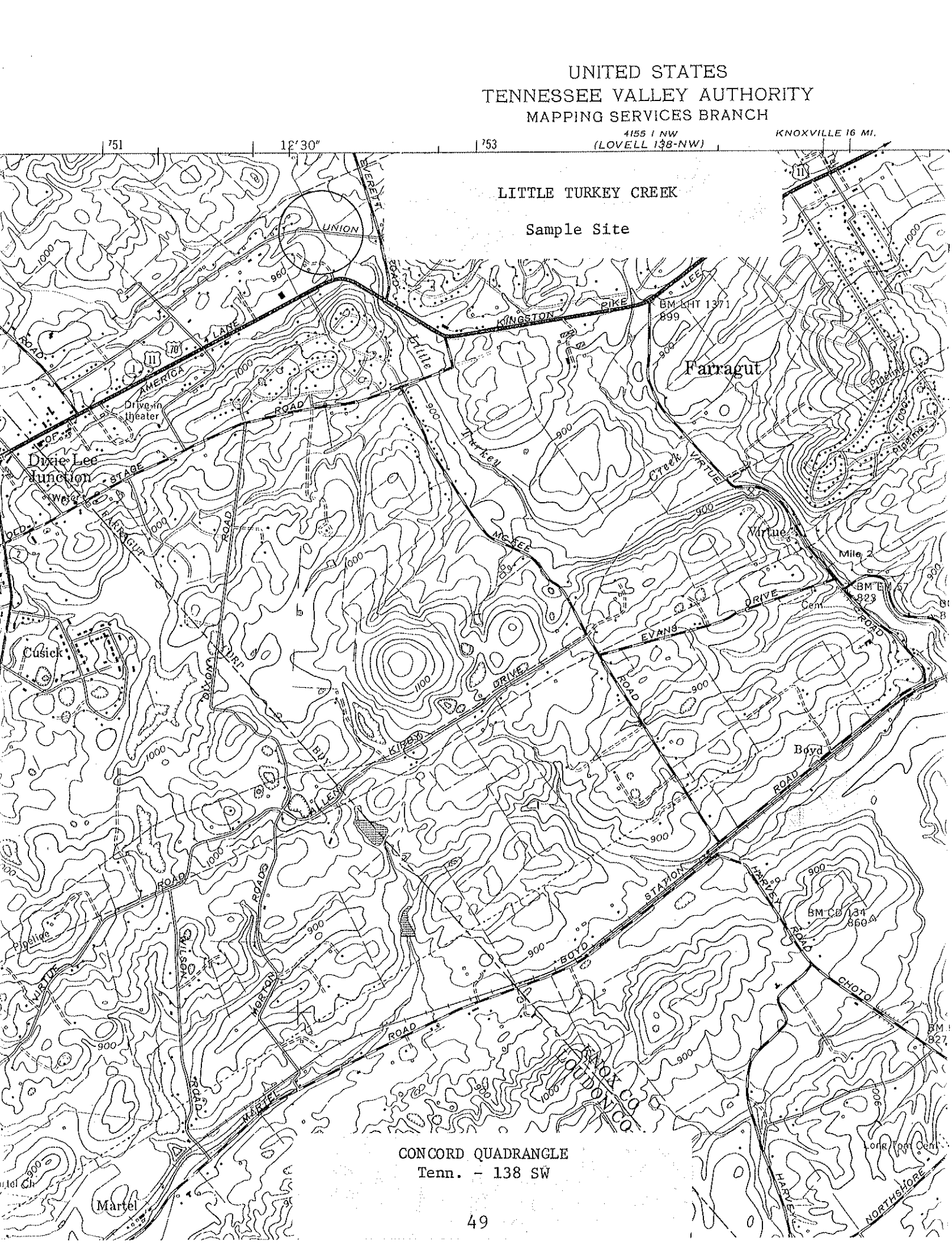
Other species include: bluegill (*Lepomis macrochirus*), central stoneroller (*Campostoma anomalum*), blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*), snubnose darter (*Etheostoma simoterum*), and banded sculpin (*Cottus carolinae*).

At the sample location, the stream had extremely heavy siltation along with a heavy growth of algal mats. Since the early 1980's the stream has been severely impacted by urbanization of the Farragut area. It has received considerable siltation from the construction of housing developments in this area.

Management Recommendations:

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

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



CONCORD QUADRANGLE
Tenn. - 138 SW

FISH DATA

Stream: Little Turkey Creek
Date: 3 May 1993

Watershed: Tennessee River
County: Knox

Area: See Comments
Sample Length: 100 ft

Lat-Long: 355216N - 841226W
Reach: 06010201-37,0

Type of Sampling: Seining
Elevation: 915 ft

Gear Type: 10 ft Seine
Time: 1400 - 1430

Species	TADS Code	Total Number	Inch Class	Total Weight
Lepomis macrochirus	206	1	1	t
" "	"	1	1	t
Campostoma anomalum	25	5	1-3	0.04
Hemitremia flammea	148	7	1	0.01
Rhinichthys atratulus	351	26	1-2	0.07
Semotilus atromaculatus	360	2	1-2	0.01
Etheostoma simoterum	111	2	1	t
Cottus carolinae	40	3	1-2	0.01

Avg. width - approx. 8 to 10 ft
Avg. depth - 4 to 6 in
Siltation extremely heavy.
Heavy growth of algal mats.

Site was located at the bridge on Union Road, west of Everett Road and north of Kingston Pike (Hwy. 11/70). Made 7 to 8 seine hauls with 10 ft seine starting about 50 ft downstream of the bridge to approx. 50 ft upstream of bridge.

Collector: Rick D. Bivens and Mark T. Fagg

Crooked Creek

Two qualitative fishery surveys were conducted on Crooked Creek in August and October 1993:

Location and Length - Tributary to Little River (Tennessee River tributary). Sample Site 1 was located approx. 100 ft downstream of the bridge on Whites Mill Road; TWRA Whites Mill Wetlands Area. It was 400 ft in length and averaged 20.0 ft in width and was sampled on 12 October 1993. Site 2 was located just downstream of the bridge crossing on Wilkerson Pike; where the North and South Forks junction to start Crooked Creek. It was 300 ft in length and averaged 15.8 ft in width and was sampled on 12 August 1993. Both sites were in Blount County (Blockhouse Quadrangle).

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

Water Quality - Data were collected from midstream at mid-depth at both sites. Site 1 on 12 October 1993: DO - 10.3 ppm, pH - 7.2, Temperature - 53.6 F, Conductivity - 205 micromhos/cm. Site 2 on 12 August 1993: DO - 8.4 ppm, pH - 8.3, Temperature - 68.9 F, Conductivity - 230 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 2 man-h qualitative sample at each site. Site 1 sample contained 211 organisms representing 32 taxa. Site 2 sample contained 114 organisms representing 32 taxa.

Fish Collected:

	Site 1				Site 2			
Species	No.	% by No.	Wt.	% by Wt.	No.	% by No.	Wt.	% by Wt.
Largemouth bass					1	1.5	0.85	2.6
Redbreast sunfish	2	0.5	t	-	6	8.9	0.53	1.6
Green sunfish	1	0.3	0.32	12.2				
Redear sunfish					1	1.5	0.07	0.2
Warmouth					3	4.5	0.25	0.8
Bluegill					19	28.2	0.76	2.3
Non-game Fish	11	2.9	0.42	16.0	21	31.3	29.63	91.1
Forage Fish	361	96.3	1.88	71.8	16	23.9	0.42	1.3
Total	375		2.62		67		32.51	

Comments - We sampled two sites on Crooked Creek, primarily to develop a fish species list and to collect stream data for TADS.

The Agency has made no previous studies or fish collections from this stream.

We collected a total of 375 fish weighing 2.62 lb and comprising 13 species from Site 1. One native game species, green sunfish (*Lepomis cyanellus*), along with the introduced redbreast sunfish (*L. auritus*) were found. However, only one 8-in green sunfish and two 1-in redbreast sunfish were collected. Game fish accounted for < 1% by number and about 12% by weight of all fish collected. One non-game and 10 forage species were collected here and these comprised about 99% of the total number and 88% of the total weight. Forage species made up over 96% of the total number and 71% of the total weight. All were tolerant forms, however, three darter species, the greenside (*Etheostoma blennioides*), snubnose (*E. simoterum*), and the dusky (*Percina sciera*) were collected. Most species were collected in small numbers except for central stonerollers (*Campostoma anomalum*). They were the most abundant species present and accounted for 76% of the total number of fish collected.

At Site 2 we collected only 67 fish comprising 13 species. Four additional game fish species were collected here that were not found at Site 1 and these included largemouth bass (*Micropterus salmoides*), warmouth (*Lepomis gulosus*), bluegill (*L. macorchirus*), and redear sunfish (*L. microlophus*), along with redbreast sunfish. Green sunfish were not collected here. Game fish were found in greater numbers here than at Site 1 and they accounted for about 45% of the total number of fish collected. Four non-game and four forage fish were also collected here. Non-game fish included gizzard shad (*Dorosoma cepedianum*), golden redhorse (*Moxostoma erythrurum*), and carp (*Cyprinus carpio*) while only the northern hog sucker (*Hypentelium nigricans*) was collected at both sites. These two groups comprised about 55% of the total number collected at this site. Carp along accounted for about 87% of the total weight of fish collected and the number of forage species present was extremely low. Forage species collected here but not a Site 1 included the bigeye chub (*Hybopsis amblops*) and mosquitofish (*Gambusia affinis*).

A total of 22 fish species was collected from the two sample sites combined, however, many of these were tolerant forms, and all were collected in low numbers with the exception of central stonerollers at Site 1. Crooked Creek is a low gradient stream that has been heavily impacted by non-point source pollution, mainly agricultural activities, throughout the watershed. The stream has open and eroding banks and is very silty and dingy. The fish species assemblage were typical components of streams with polluted conditions and few intolerant forms were collected. The overall low numbers of even the tolerant fish species found in our survey indicates a severely impaired system.

Benthic macroinvertebrates from our sample at Site 1 included Baetidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, Hydropsychidae and Limnephilidae caddisflies, and

Elmidae and Gyrinidae beetles. The Asian clam (*Corbicula fluminea*) was present along with pleurocerid snails. Crayfish species included *Cambarus longirostris*, *Orconectes forceps*, and *O. erichsonianus*. Ephemeropterans represented about 30%, trichopterans about 13%, coleopterans and odonates each about 12%, hemipterans about 11%, gastropods about 7%, and megalopterans about 6% of the total number of organisms collected (Fig. 5). A total of only 32 taxa was collected at this site, most of which were tolerant forms.

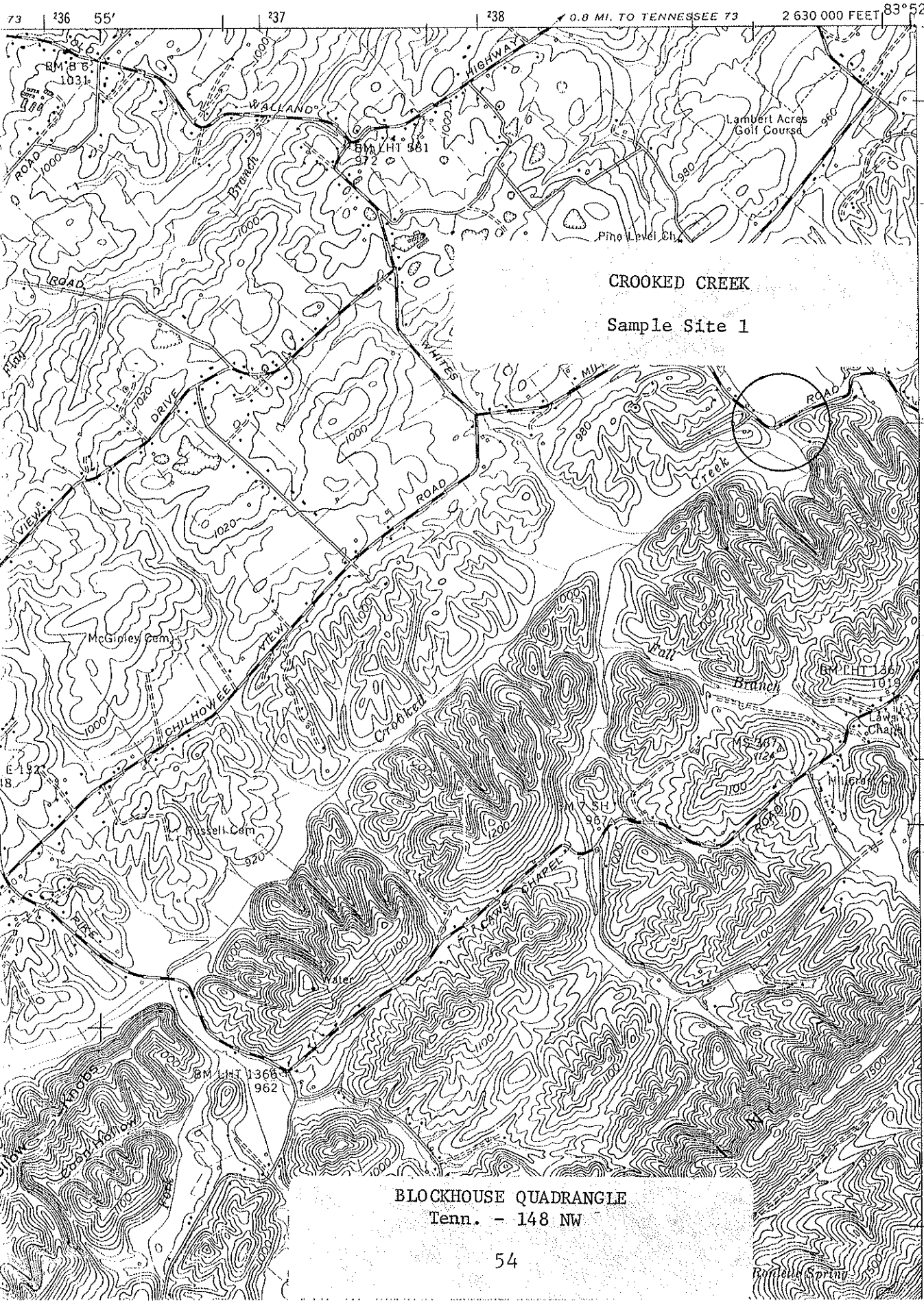
Benthic macroinvertebrates from our sample at Site 2 included Baetidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, hydropsychid caddisflies, and Elmidae, Gyrinidae, Hydrophilidae, and Staphylinidae beetles. The Asian clam (*Corbicula fluminea*) was present. *Orconectes erichsonianus* was the only crayfish species collected. Hemipterans represented about 25%, coleopterans about 19%, ephemeropterans about 16%, odonates about 12%, pelecypods about 10%, and megalopterans about 6% of the total number of organisms collected (Fig. 6). A total of only 32 taxa was also collected at this site, and again, most were tolerant forms.

Management Recommendations:

1. This stream is being adversely impacted by non-point pollution from agricultural sources and no management other than trying to reduce this pollution can be suggested at this time.

BLOCKHOUSE QUADRANGLE
TENNESSEE-BLOUNT CO.
7.5 MINUTE SERIES (TOPOGRAPHIC) 148-NW

4255 IV SE
(WILDWOOD 147-SE)



PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Crooked Creek — Date: 12 October 1993

Watershed: Tennessee River — County: Blount

Area: Site # 1 — Sample Length: 400 ft

Lat-Long: 354360N - 835254W — Reach: 06010201-28,2

Data Collected By: Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 20.0 ft Avg. Depth 0.7 ft Max. Depth 3.3 ft
2. Estimated Percent of Stream in Pools is 20%.
3. Estimated Percent **Pool** Bottom is Mud 10% Silt 30% Sand 15% Clay 5% Gravel 5% Rubble 5% Bedrock 30%.
4. Estimated Percent **Riffle** Bottom is Silt 20% Sand 10% Clay 5% Gravel 10% Rubble 10% Boulders 5% Bedrock 40%.
5. Abundance of Littoral Aquatic Plants is Scarce.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20% of the Stream, Average in 30%, Poor in 50%.
7. Shade or Canopy Good over 50% of Stream.
8. Flow (CFS) 9.0: Compared to Normal: Low
9. Present Weather: Cool - overcast and cloudy.
   Air temperature 52 F @ 11:30 am.
10. Weather (last 24 h): Partly cloudy, breezy, cool, showers overnight.
11. pH 7.2 Temp. 53.6 F Conductivity 205 micromhos/cm
    D.O. 10.3 ppm Saturation 95%
12. Comments: Sample area location was downstream of the bridge on Whites Mill Road; TWRA Whites Mill Wetlands Area. Heavy siltation; agricultural practices all along watershed, cows in the stream, etc.; shallow bedrock areas predominate.

FISH DATA

Stream: Crooked Creek
Date: 12 October 1993

Watershed: Tennessee River
County: Blount

Area: Site # 1
Sample Length: 400 ft

Lat-Long: 354360N - 835254W
Reach: 06010201-28,2

Type of Sampling: Electrofishing
Elevation: 903 ft

Gear Type: One Backpack Unit
Time: 1420 - 1520

Species	TADS Code	Total Number	Inch Class	Total Weight
Lepomis auritus	201	2	1	t
Lepomis cyanellus	202	1	8	0.32
Hypentelium nigricans	166	11	2-7	0.42
Campostoma anomalum	25	285	1-5	1.54
Cyprinella galactura	253	1	1	t
C. spiloptera	269	3	1	t
Luxilus chrysocephalus	249	4	1-2	0.01
Rhinichthys atratulus	351	6	1-2	0.01
Semotilus atromaculatus	360	3	1-2	0.01
Etheostoma blennioides	80	24	1-4	0.19
E. simoterum	111	27	1-2	0.06
Percina sciera	317	2	2	0.01
Cottus carolinae	40	6	1-3	0.05
Cambarus longirostris		present		
Orconectes forceps		"		
O. erichsonianus		"		

Site located approx. 100 ft downstream of the bridge on Whites Mill Road; TWRA Whites Mill Wetlands Area. Shocking at 120 volts AC.

Collectors: R.D. Bivens and C.E. Williams

Crooked Creek: Site # 1, Qualitative Benthic Sample

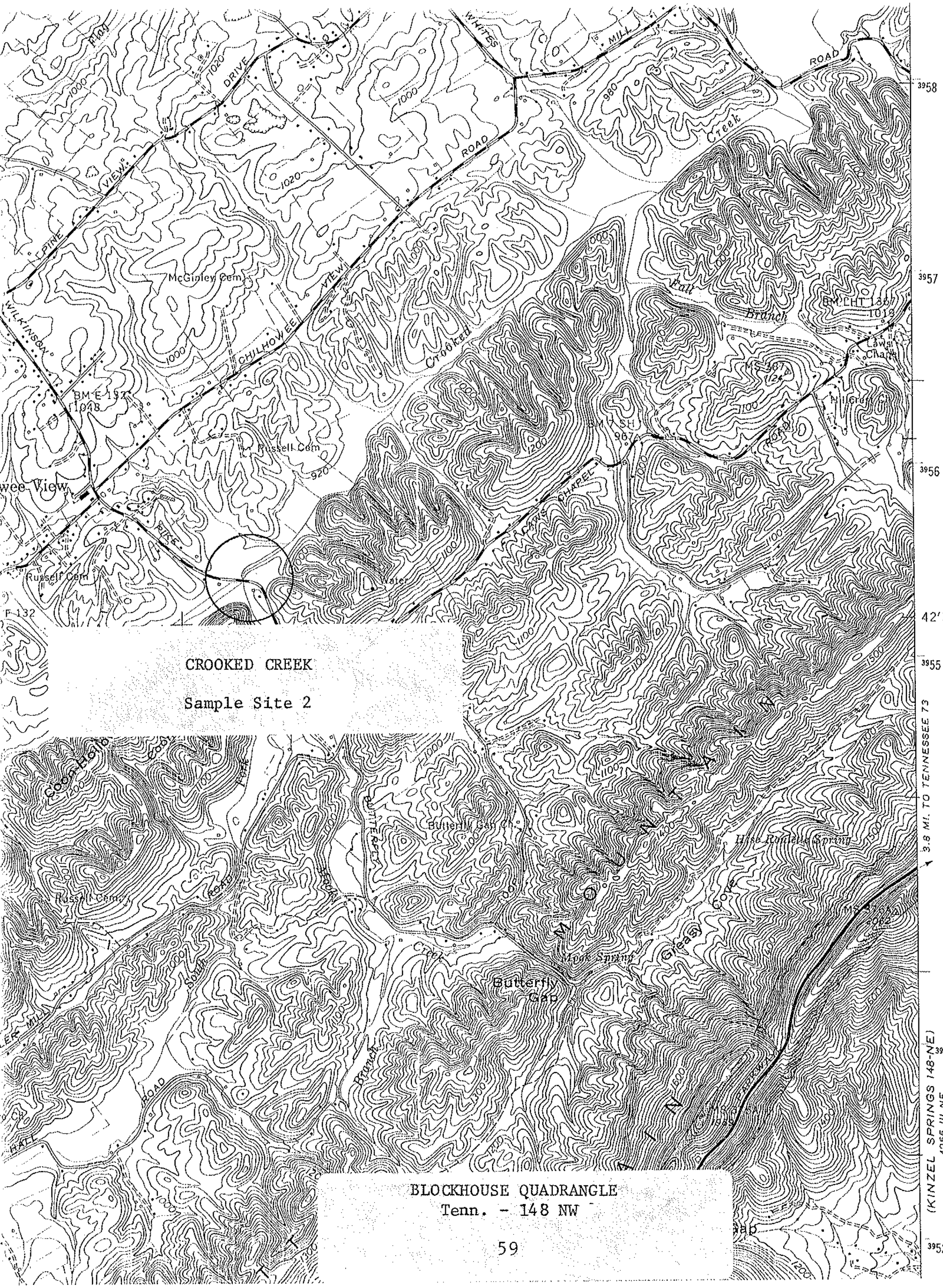
12 October 1993 Field # 498

Blount Co., TN; Located approx. 100 ft downstream of the bridge Whites Mill Road; on Whites Mill Wetlands Area; TWRA property. Coordinates: 354360N - 835254W. Blockhouse, Tenn., # 148 NW Quad. Reach # 06010201-28,2.

TAXA	NUMBER
COLEOPTERA:	
Elmidae/*Dubiraphia* adult	1
Microcylloepus pusillus pusillus larvae	2
adults	2
Optioservus larvae	8
Optioservus ovalis adults	2
Stenelmis larva	7
Stenelmis adult	2
Gyrinidae/*Dineutus discolor*	1
DIPTERA:	
Athericidae/*Atherix lantha*	1
Chironomidae	3
Simuliidae	1
Tipulidae/*Antocha*	1
Tipula	5
EPHEMEROPTERA:	
Baetidae/*Baetis*	9
Ephemeridae/*Hexagenia*	2
Heptageniidae/*Stenacron*	2
Stenonema	47
Oligoneuriidae/*Isonychia*	3
GASTROPODA:	
Pleuroceridae	16
HEMIPTERA:	
Corixidae	2
Gerridae/*Gerris remigis* female	1
Nepidae/*Ranatra*	1
Veliidae/*Rhagovelia obesa* males	9
Rhagovelia obesa females	20
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	6
Nigronia serricornis	6

Crooked Creek: Site # 1, Qualitative Sample cont.

TAXA	NUMBER
ODONATA:	
Aeshnidae/*Basiaeschna janata*	1
Boyeria vinosa	4
Calopterygidae/*Calopteryx*	17
Coenagrionidae/*Argia*	1
Gomphidae/*Gomphus lividus*	1
Stylogomphus albistylus	1
PELECYPODA:	
Corbiculidae/*Corbicula fluminea*	8
TRICHOPTERA:	
Hydropsychidae/*Cheumatopsyche*	12
Hydropsyche betteni/depravata	14
Limnephilidae/*Pycnopsyche* pupa	1
	211



CROOKED CREEK

Sample Site 2

BLOCKHOUSE QUADRANGLE
Tenn. - 148 NW

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Crooked Creek Date: 12 August 1993

Watershed: Tennessee River County: Blount

Area: Site # 2 Sample Length: 300 ft

Lat-Long: 354235N - 835443W Reach: 06010201-28,2

Data Collected By: Rick D. Bivens, Carl E. Williams, and Dwain E. Bivens

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 15.8 ft Avg. Depth 0.6 ft Max. Depth 3.5 ft
2. Estimated Percent of Stream in Pools is 50%.
3. Estimated Percent **Pool** Bottom is Mud 40% Silt 10% Sand 30% Clay 10% Gravel 5% Rubble 5%.
4. Estimated Percent **Riffle** Bottom is Mud 10% Silt 10% Sand 60% Clay 10% Gravel 5% Rubble 5%.
5. Abundance of Littoral Aquatic Plants is Average.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25% of the Stream, Average in 35%, Poor in 40%.
7. Shade or Canopy Good over 60% of Stream.
8. Flow (CFS) 4.8: Compared to Normal: Normal
9. Present Weather: Cloudy to overcast with widely scattered showers, warm and humid.
   Air temperature - 76 F @ 10:30 am.
10. Weather (last 24 h): Same; with scattered rain.
11. pH 8.3 Temp. 68.9 F Conductivity 230 micromhos/cm
    D.O. 8.4 ppm Saturation 93%
12. Comments: Sample area was located just downstream of the bridge crossing on Wilkerson Pike; where the North and South Forks junction to start Crooked Creek. The stream is very silty and muddy; actively eroding stream banks; agricultural practices along stream course, cows in stream, etc.; mud and silt very deep; non-point source pollution is severe.

FISH DATA

Stream: Crooked Creek
Date: 12 August 1993

Watershed: Tennessee River
County: Blount

Area: Site # 2
Sample Length: 300 ft

Lat-Long: 354235N - 835443W
Reach: 06010201-28,2

Type of Sampling: Electrofishing
Elevation: 920 ft

Gear Type: One Backpack Unit
Time: 1330 - 1400

Species	TADS Code	Total Number	Inch Class	Total Weight	
Micropterus salmoides	220	1	12	0.85	
Lepomis auritus	201	2	3	0.05	
" "	"	1	4	0.07	
" "	"	1	5	0.13	
" "	"	2	6	0.28	
L. gulosus	204	1	3	0.04	
" "	"	2	5	0.21	
L. macrochirus	206	4	2	0.03	
" "	"	7	3	0.17	
" "	"	5	4	0.27	
" "	"	3	5	0.29	
L. microlophus	209	1	4	0.07	
Dorosoma cepedianum	48	4	6-7	0.38	
Hypentelium nigricans	166	3	2-5	0.06	
Moxostoma erythrurum	230	7	4-9	1.00	
Cyprinella spiloptera	269	4	3-4	0.04	
Cyprinus carpio	47	11	13-21	28.57	
Hybopsis amblops	155	1	-	-	*
Gambusia affinis	147	3	1	t	
Cottus carolinae	40	4	1	t	
Orconectes erichsonianus		2			

* One *H. amblops* positively identified during collection, but lost before the weighing and measuring process.

Site located just downstream of the bridge crossing on Wilkerson Pike at the confluence of the North and South Fork where Crooked Creek begins. Shocking at 120 volts AC.

Collectors: R.D. Bivens, C.E. Williams, and D.E. Bivens

Crooked Creek: Site # 2, Qualitative Benthic Sample

12 August 1993 Field # 460

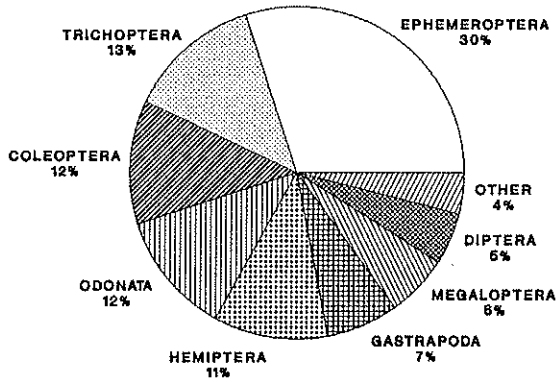
Blount Co., TN; Bridge on Wilkerson Pike near Chilhowee View, just downstream of the bridge, at confluence of North and South Forks. Coordinates: 354235N - 835443W. Blockhouse, Tenn., # 148 NW Quad. Reach # 06010201-28,2

TAXA	NUMBER
ANNELIDA:	
Hirudinea	1
Oligochaeta	1
COLEOPTERA:	
Elmidae/*Dubiraphia* adult	1
Stenelmis larvae	2
Gyrinidae/*Dineutus* sp. female	1
Dineutus discolor males	3
Dineutus discolor females	3
Gyrinus	2
Hydrophilidae/*Enochrus* adult	1
Laccobius adult	1
Staphylinidae/*Stenus* adults	5
DIPTERA:	
Chironomidae	4
EPHEMEROPTERA:	
Baetidae/*Baetis*	4
Ephemeridae/*Hexagenia*	2
Heptageniidae/*Stenonema*	11
Oligoneuriidae/*Isonychia*	1
GASTROPODA:	
Ancylidae/*Ferrissia*	1
HEMIPTERA:	
Corixidae	15
Gerridae/*Gerris conformis* females	3
Gerris remigis female	1
Trepobates pictus males	2
Hydrometridae/*Hydrometra martini*	1
Veliidae/*Rhagovelia obesa* nymphs	2
Rhagovelia obesa males	3
Rhagovelia obesa females	2
MEGALOPTERA:	
Corydalidae/*Nigronia serricornis*	1
Sialidae/*Sialis*	6

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

TAXA	NUMBER
ODONATA:	
Aeshnidae/*Boyeria vinosa*	2
Calopterygidae/*Calopteryx*	1
Coenagrionidae/*Argia*	7
Gomphidae/*Gomphus* sp.	1
Progomphus obscurus	2
Stylurus laurae	1
PELECYPODA:	
Corbiculidae/*Corbicula fluminea*	12
TRICHOPTERA:	
Hydropsychidae/*Cheumatopsyche*	4
Hydropsyche betteni/depravata	1
	114

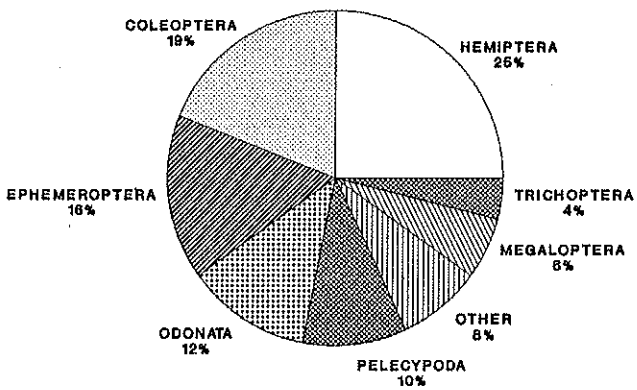
CROOKED CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 211
TAXA RICHNESS = 32
Figure 5.

CROOKED CREEK
SITE 2
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 114
TAXA RICHNESS = 32
Figure 6.

Mook Creek

One qualitative fishery survey was conducted on Mook Creek in August 1993:

Location and Length - Tributary to Crooked Creek (Little River tributary). The sample area was located upstream of the culvert on Greasy Cove Road near the old picnic pavilion along the Butterfly Gap road. It was approximately 100 ft in length and was sampled on 12 August 1993. It was in Blount County (Blockhouse Quadrangle).

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

Water Quality - Conductivity was 245 micromhos/cm.

Benthos Collection - No collection was made.

Fish Collected - (See data sheet for species list)

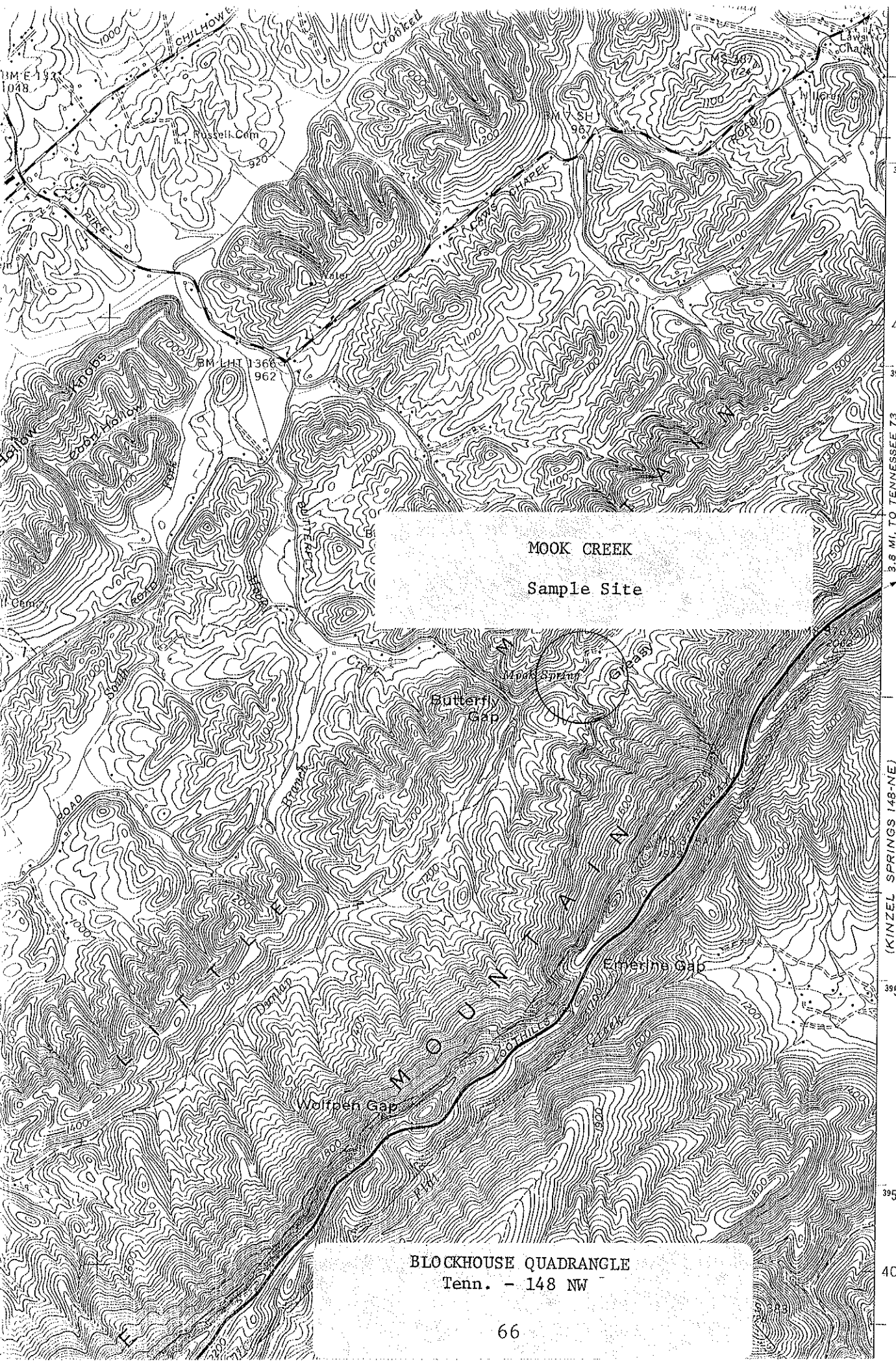
Comments - This stream was sampled primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted and emphasis was placed on the fish species present. The Agency has made no previous studies or fish collections from this stream.

A total of only 2 fish species, blacknose dace (*Rhinichthys atratulus*) and creek chub (*Semotilus atromaculatus*) was collected. Periwinkle snails (Pleuroceridae) were abundant and *Orconectes forceps* was the only crayfish species collected.

At the sample location, the stream had fairly clean gravel-rubble-small boulder substrate with some siltation. The occurrence of only two fish species may be primarily a function of small stream size.

Management Recommendations:

1. No specific management, other than protection of the watershed, can be suggested at this time.


MOOK CREEK
Sample Site
Butterfly Gap
Emerine Gap
Wolfpen Gap
LITTLE MOUNTAIN
BLOCKHOUSE QUADRANGLE
Tenn. - 148 NW
(KINZEL SPRINGS 148-NE)
4255 III NE
3.8 MI. TO TENNESSEE 73
42'30"
40'
3956
3955
3953
3952
3951

FISH DATA

Stream: Mook Creek
Date: 12 August 1993

Watershed: Tennessee River
County: Blount

Area: See Comments
Sample Length: 100 ft

Lat-Long: 354146N - 835335W
Reach: 06010201-

Type of Sampling: Electrofishing
Elevation: 1,100 ft

Gear Type: One Backpack Unit
Time: 1610 - 1625

Species	TADS Code	Total Number	Inch Class	Total Weight
Rhinichthys atratulus	351	114	-	-
Semotilus atromaculatus	360	4	-	-
Orconectes forceps		3		

Pleurocerid snails (Periwinkle) abundant

Avg. width - approx. 3 to 4 ft
Avg. depth - 0.1 ft
Water temperature - 75.2 F @ 1630
Conductivity - 245 micromhos/cm
Gravel-rubble-small boulder substrate with silt.

Site was located upstream of culvert on Greasy Cove Road near the old picnic pavilion near junction with Butterfly Gap Road.
Shocking at 120 volts AC.

Collector: R.D. Bivens, C.E. Williams, and D.E. Bivens

Citico Creek

Two qualitative fishery surveys were conducted on Citico Creek in October 1993:

Location and Length - Tributary to the Little Tennessee River (Tellico Reservoir). Sample Site 1 was located near the mouth of Duncan Branch; Citico Creek mi 2.5 and was sampled on 25 October 1993. It was 500 ft in length and averaged 38.4 ft in width. Site 2 was located at the mouth of Caney Branch and was sampled on 27 October 1993. It was 400 ft in length and averaged 45.3 ft in width. Both sites were in Monroe County (Site 1, Tallassee Quadrangle and Site 2, Whiteoak Flats Quadrangle).

Sampling Methodology - Both sites were sampled using two backpack electrofishing units operating at 360 volts AC.

Water Quality - Data were collected from midstream at mid-depth at each site. Site 1, 25 October 1993: DO - 11.1 ppm, pH - 6.7, Temperature - 51.8 F, Conductivity - 35 micromhos/cm. Site 2, 27 October 1993: DO - 12.4 ppm, pH - 7.0, Temperature - 53.6 F, Conductivity - 35 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample at each site. Site 1 sample contained 446 organisms representing 46 taxa. Site 2 sample contained 434 organisms representing 44 taxa.

Fish Collected:

	Site 1				Site 2			
Species	No.	% by No.	Wt.	% by Wt.	No.	% by No.	Wt.	% by Wt.
Largemouth bass	1	0.1	0.04	0.2				
Smallmouth bass	11	0.6	0.37	1.6	6	0.5	0.10	0.6
Rock bass	11	0.6	0.58	2.4	5	0.4	0.46	2.8
Redbreast sunfish	20	1.2	1.03	4.3	1	0.1	0.11	0.7
Bluegill	5	0.3	0.10	0.4				
Non-game Fish	121	7.0	11.48	48.3	55	4.8	5.65	34.2
Forage Fish	1,552	90.2	10.19	42.8	1,082	94.2	10.19	61.7
Total	1,721		23.79		1,149		16.51	

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 lower stream reach, however we have collected fish from an upper stream site.

Citico Creek is a high quality stream with a diverse fish fauna. Over 40 species are known to inhabit the stream while the historical records list at least 53 species (Dinkins 1984), some of which may now be extirpated. Three species, the duskytail darter (*Etheostoma percnurum*), smoky madtom (*Noturus baileyi*), and yellowfin madtom (*N. flavipinnis*) are federally listed species. The smoky madtom is known only from a 2.6 mi lower segment of Citico Creek (Etnier and Starnes 1993) that is designated critical habitat for the species (Biggins 1985). In addition, TWRA also intensively manages a 9.4 mi upstream portion of Citico Creek with hatchery reared rainbow trout (*Oncorhynchus mykiss*) and the stream is considered one of the state's prime "put-and-take" trout streams. While supportive data is not currently available, it is speculated that an "underlying wild population" of rainbow and brown trout (*Salmo trutta*) also exists in upper Citico Creek.

We collected a total of 1,721 fish weighing 23.79 lb and comprising 33 species from Site 1. Four native game species, largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieu*), rock bass (*Ambloplites rupestris*), and bluegill (*Lepomis macrochirus*), along with the introduced redbreast sunfish (*L. auritus*), were found. Only one 4-in largemouth bass and five small bluegill (2 to 3-in class) were collected. Eleven smallmouth bass and 11 rock bass, along with 20 redbreast sunfish were also collected (Fig. 7). However, all game fish represented < 3% of the total number of fish collected and about 10% of the total weight of all fish collected. Four non-game and 24 forage species were also collected here and these comprised about 97% of the total number and 91% of the total weight. Of interest is the occurrence of moderately intolerant species such as the warpaint shiner (*Luxilus coccogenis*), Tennessee shiner (*Notropis leuciodus*), telescope shiner (*N. telescopus*), and blotched chub (*Erimystax insignis*), most of which were fairly abundant. Darter species included the greenside (*Etheostoma blennioides*), redline (*E. rufilineatum*), snubnose (*E. simoterum*), blueside (*E. stigmaeum jessiae*), banded (*E. zonale*), logperch (*Percina caprodes*), and gilt darter (*P. evides*). Of particular interest is the occurrence of the duskytail darter (*Etheostoma percnurum*). This newly described species (by R.E. Jenkins *in* Jenkins and Burkhead 1994) is a federally listed species that is restricted to three known Tennessee populations. One of these is the lower Citico Creek population, where it is rare (Etnier and Starnes 1993). Central stonerollers (*Campostoma anomalum*), river chub (*Nocomis micropogon*), and Tennessee shiners were the most abundant forage species present. Redline darters were the most abundant darter species at this site.

At Site 2 we collected a total of 1,149 fish weighing 16.51 lb and comprising 18 species. Game fish from this site included smallmouth bass, rock bass, and redbreast sunfish. However, only six 2 to 4-in smallmouth bass, one redbreast sunfish, and five rock bass were found (Fig. 8). Game fish comprised 1% of the total number of fish collected and about 4% of the total weight

collected. One non-game and 14 forage species were also collected here and these comprised 99% of the total number and about 96% of the total weight. Forage species made up about 94% of the total number and 62% of the total weight. Additional species collected here but not at the downstream site included only the smoky madtom (*Noturus baileyi*). As stated above, the smoky madtom is a federally listed species and is known only from a 2.6 mi segment of Citico Creek. Prior to 1980, it was known only from 5 preserved specimens collected from Abrams Creek in 1957. In 1980, the smoky madtom was rediscovered in lower Citico Creek in collections made by the University of Tennessee (Bauer et al. 1983). Central stonerollers and Tennessee shiners were the most abundant forage species present.

Based on fish species occurrence, Citico Creek is a high quality Blue Ridge stream. A total of 34 species was collected from the two sample sites combined, and many of were fairly intolerant forms. The occurrence of eight darter species further attests to good water quality. The rock bass is the primary game species present but as with other game species present, they were collected in relatively low numbers. This may have been due, in part, to the shallow and wide cobble-bedrock areas that were extensive at our sample sites.

Benthic macroinvertebrates from sample Site 1 included Baetidae, Heptageniidae, and Oligoneuriidae mayflies, perlid stoneflies, Brachycentridae, Glossosomatidae, Hydropsychidae, Leptoceridae, Philopotamidae, and Uenoidae caddisflies, and Elmidae, Gyrinidae, and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) were present along with pleurocerid snails. A juvenile *Villosa iris* was also found. Crayfish species included *Cambarus longirostris* and *Orconectes erichsonianus*. Trichopterans represented about 36%, ephemeropterans about 25%, coleopterans about 17%, dipterans about 8%, and plecopterans about 6% of the total number of organisms collected (Fig. 9). A total of 46 taxa was collected at this site.

Benthic macroinvertebrates from sample Site 2 included Baetidae, Ephemerellidae, Heptageniidae, and Oligoneuriidae mayflies, Perlidae, Perlodidae, and Pteronarcyidae stoneflies, Brachycentridae, Glossosomatidae, Hydropsychidae, Leptoceridae, Limnephilidae, Philopotamidae, Polycentropodidae, and Rhyacophilidae caddisflies, and Elmidae, Eubriidae, Gyrinidae, and Psephenidae beetles. No gastropods or pelecypods were collected at this site. Crayfish species included *Cambarus longirostris* and *Orconectes forceps*. Trichopterans represented about 41%, ephemeropterans about 20%, dipterans about 11%, plecopterans and odonates each about 8%, and coleopterans about 6% of the total number of organisms collected (Fig. 10). A total of 44 taxa was collected at this site.

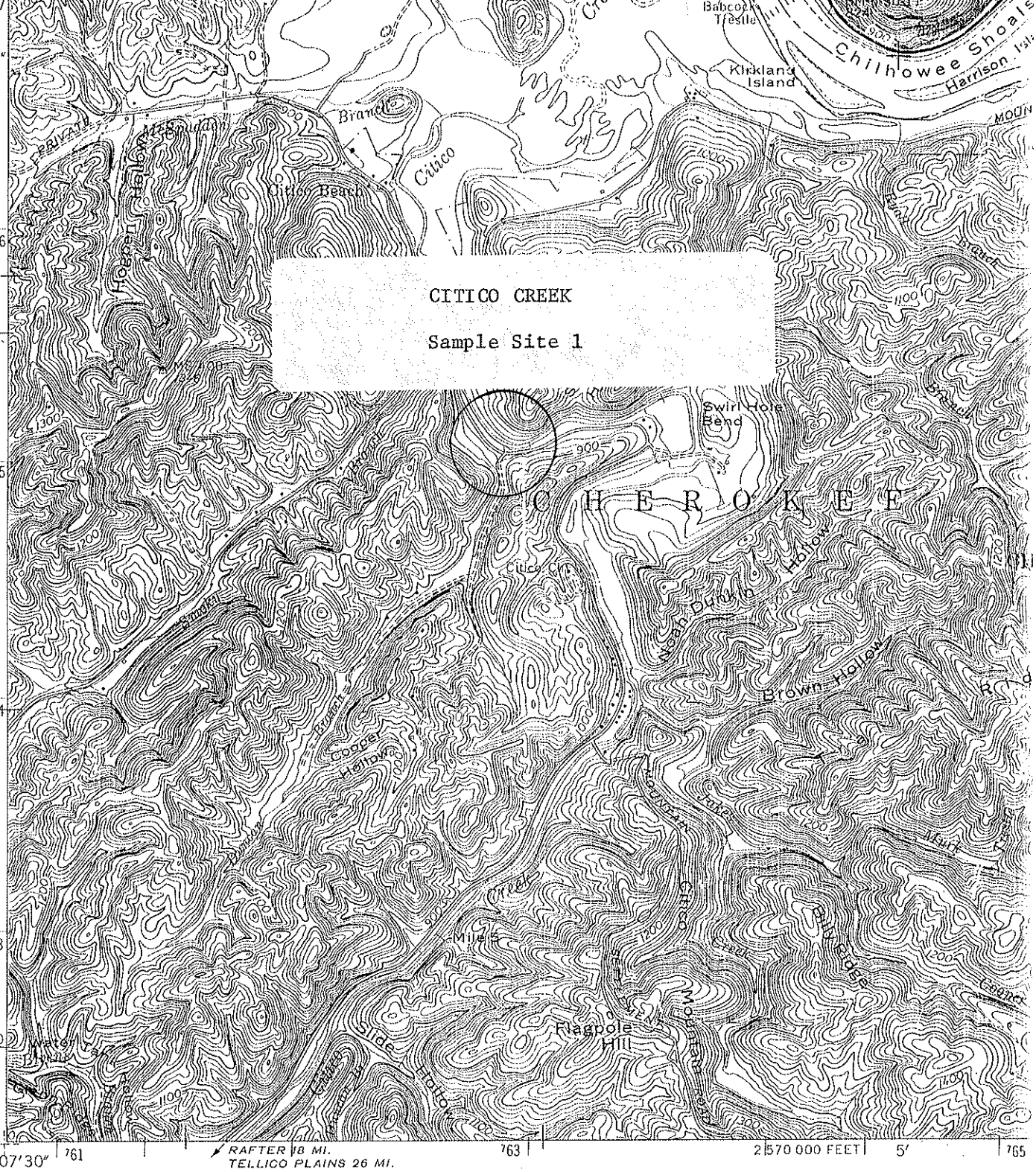
Management Recommendations:

1. The fish species diversity and taxa richness of benthic

macroinvertebrates and the presence of many intolerant forms indicate that this is an excellent quality Blue Ridge stream that merits extra protection from pollution or habitat destruction.

2. The occurrence of three federally listed species in this stream further attests to the continued need for future monitoring of fish populations and water quality.

3. Consider conducting intensive surveys of the upstream area for possible wild trout populations.



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

Control by NOS/NOAA, USGS, and TVA

Revised by TVA in 1964 by photogrammetric methods from aerial photographs taken 1964 and by reference to TVA-USGS quadrangle dated 1941. Map field checked by TVA, 1966

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

Fine red dashed lines indicate select
generally visible on aerial photograph

There may be private inholdings wit
the National or State reservations sh

(RAFTER 140-NW)
4154 I NW

MN GN
2½° 44 MILS
1°43' 31 MILS

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

TALLASSEE QUADRANGLE
Tenn. - 139 SE

TENNESSE
AND U. S. TE

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Citico Creek — Date: 25 October 1993

Watershed: Little Tennessee River — County: Monroe

Area: Site # 1 — Sample Length: 500 ft

Lat-Long: 353136N - 840606W — Reach: 06010204-18,0

Data Collected By: Rick D. Bivens, Carl E. Williams, Bob Robertson, Freddy Kelly , and Jim Habera

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 38.4 ft Avg. Depth 0.8 ft Max. Depth 3.4 ft
2. Estimated Percent of Stream in Pools is 50%.
3. Estimated Percent **Pool** Bottom is Silt 10% Sand 30% Gravel 20% Rubble 15% Boulders 10% Bedrock 15%.
4. Estimated Percent **Riffle** Bottom is Silt 5% Sand 20% Gravel 15% Rubble 30% Boulders 10% Bedrock 20%.
5. Abundance of Littoral Aquatic Plants is Average (*Dianthera americana*).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20% of the Stream, Average in 50%, Poor in 30%.
7. Shade or Canopy Good over 40% of Stream.
8. Flow (CFS): 12.4: Compared to Normal: Low
9. Present Weather: Partly cloudy and cool. Air temperature - 52 F @ 10:00 am.
10. Weather (last 24 h): Clear to partly cloudy; cold overnight.
11. pH 6.7 Temp. 51.8 F Conductivity 35 micromhos/cm D.O. 11.1 ppm Saturation 98%
12. Comments: Sample area location was at the mouth of Duncan Branch. Lots of shallow, wide, cobble to bedrock areas at this site.

FISH DATA

Stream: Citico Creek
Date: 25 October 1993
Watershed: Little Tennessee River
County: Monroe
Area: Site # 1
Sample Length: 500 ft
Lat-Long: 353132N - 840616W
Reach: 06010204-18,0
Type of Sampling: Electrofishing
Elevation: 818 ft
Gear Type: Two Backpack Units
Time: 1300 - 1620

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus salmoides	220	1	4	0.04
M. dolomieu	218	4	2	0.04
" "	"	4	3	0.04
" "	"	3	6	0.29
Ambloplites rupestris	13	1	1	t
" "	"	2	2	0.03
" "	"	3	3	0.06
" "	"	5	5	0.49
Lepomis auritus	201	4	1	0.01
" "	"	1	2	0.01
" "	"	6	3	0.11
" "	"	3	4	0.16
" "	"	3	5	0.30
" "	"	3	6	0.44
L. macrochirus	206	1	2	t
" "	"	4	3	0.10
Ameiurus natalis	174	1	7	0.18
Hypentelium nigricans	166	95	2-10	9.22
Moxostoma duquesnei	229	15	3-10	1.38
M. erythrurum	230	10	3-7	0.70
Labidesthes sicculus	189	19	2-3	0.06
Campostoma anomalum	25	800	1-6	5.69
Cyprinella galactura	253	26	1-4	0.10
C. spiloptera	269	49	1-3	0.13
Erimystax insignis	160	22	2-3	0.15

Site located near the mouth of Duncan Branch; Citico Creek mi 2.5. Fish collection was made in two runs: one 430 ft sample downstream and one 70 ft sample upstream of the mouth of Duncan Branch. Shocking at 360 volts AC. Lots of shallow, wide, cobble to bedrock areas at this site.

Collectors: R.D. Bivens, C.E. Williams, B. Robertson, F. Kelley, and J. Habera

FISH DATA (continued)

Stream: Citico Creek
Date: 25 October 1993
Watershed: Little Tennessee River
County: Monroe
Area: Site # 1
Sample Length: 500 ft
Lat-Long: 353132N - 840616W
Reach: 06010204-18,0
Type of Sampling: Electrofishing
Elevation: 818 ft
Gear Type: Two Backpack Units
Time: 1300 - 1620

Species	TADS Code	Total Number	Inch Class	Total Weight
Hybopsis amblops	155	60	1-3	0.26
Luxilus coccogenis	248	77	1-4	0.57
L. chrysocephalus	249	19	1-6	0.61
Lythrurus lirus	256	2	1	t
Nocomis micropogon	234	111	1-6	1.28
Notropis leuciodus	255	122	1-3	0.32
N. telescopus	272	26	1-3	0.11
Fundulus catenatus	137	5	1-3	0.03
Etheostoma blennioides	80	32	1-4	0.21
E. percnurum	114	9	1-2	0.02
E. rufilineatum	108	85	1-2	0.20
E. simoterum	111	29	1-2	0.09
E. stigmaeum jessiae	96	4	2	0.02
E. zonale	134	3	1-2	0.01
Perca flavescens	302	1	4	0.02
Percina caprodes	306	14	1-4	0.18
P. evides	310	17	1-2	0.06
Cottus bairdi	39	6	1-2	0.02
C. carolinae	40	14	1-2	0.05
Orconectes erichsonianus				
O. forceps				

Site located near the mouth of Duncan Branch; Citico Creek mi 2.5. Fish collection was made in two runs: one 430 ft sample downstream and one 70 ft sample upstream of the mouth of Duncan Branch. Shocking at 360 volts AC. Lots of shallow, wide, cobble to bedrock areas at this site.

Collectors: R.D. Bivens, C.E. Williams, B. Robertson, F. Kelley, and J. Habera

Citico Creek: Site # 1, Qualitative Benthic Sample

25 October 1993 Field # 508

Monroe Co., TN; Near the mouth of Duncan Branch; Citico Creek mi 2.5. Coordinates: 353136N - 840606W. Tallassee, Tenn., # 139 SE Quad. Reach # 06010204-18,0.

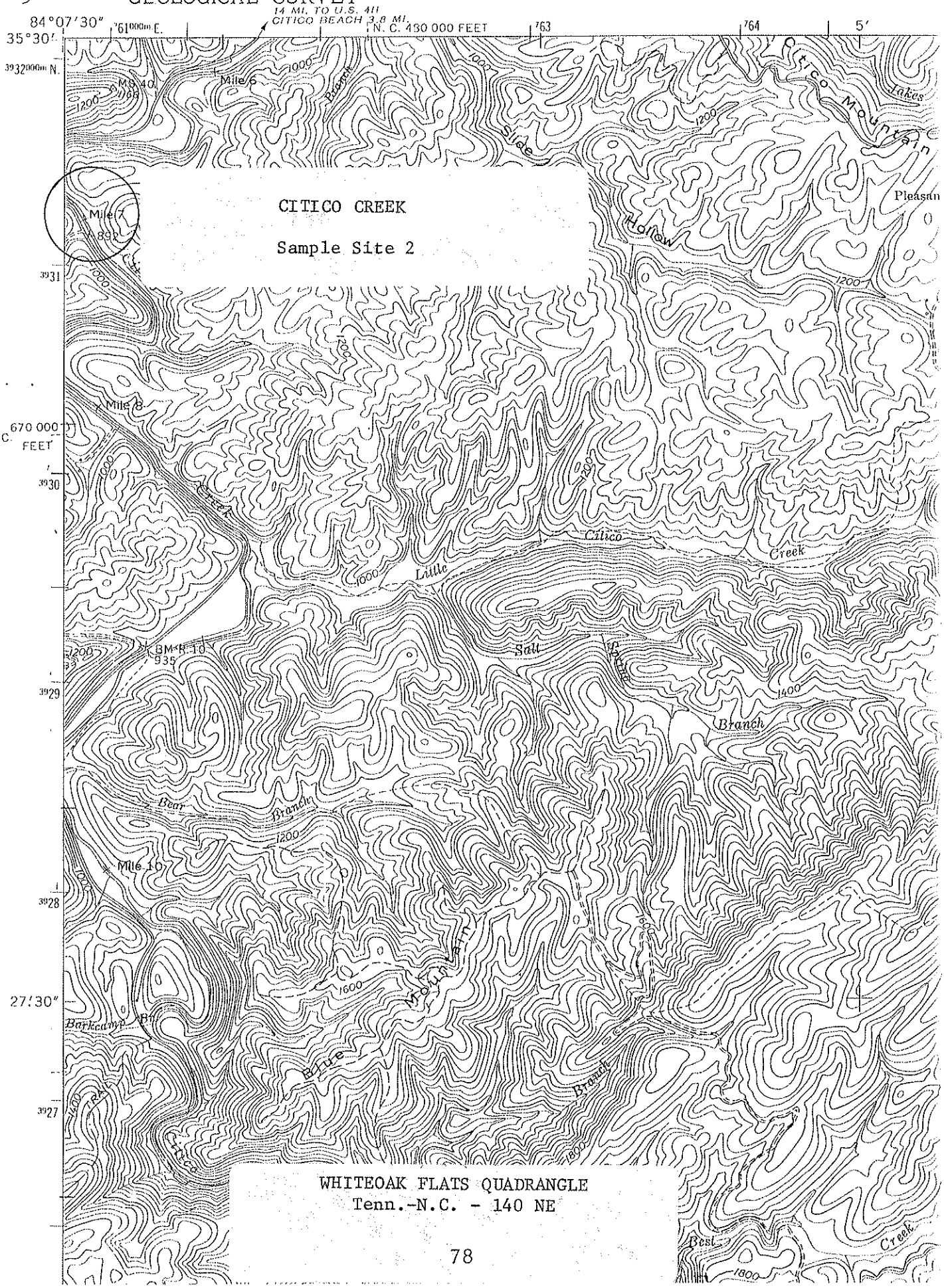
TAXA	NUMBER
ANNELIDA:	
Oligochaeta	6
COLEOPTERA:	
Elmidae/*Optioservus* larva	14
Optioservus trivittatus adults	2
Promoresia larvae	13
Promoresia elegans adult	1
P. tardella adult	1
Stenelmis larvae	18
adults	19
Gyrinidae/*Dineutus discolor* male and females	4
Psephenidae/*Psephenus herricki*	2
DIPTERA:	
Chironomidae	8
Simuliidae	27
Tipulidae/*Tipula*	1
EPHEMEROPTERA:	
Baetidae/*Baetis*	37
Heptageniidae/*Heptagenia*	1
Stenacron	2
Stenonema	40
Oligoneuriidae/*Isonychia*	30
GASTROPODA:	
Pleuroceridae	3
HEMIPTERA:	
Gelastocoridae/*Gelastocoris o. oculatus* adult	1
Gerridae/*Metrobates hesperius*	1
Nepidae/*Ranatra*	1
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	8

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

TAXA	NUMBER
ODONATA:	
Calopterygidae/*Calopteryx*	3
Hetaerina americana	4
Coenagrionidae/*Argia*	3
Enallagma	2
Corduliidae/*Helocordulia uhleri*	1
Gomphidae/*Dromogomphus spinosus*	1
Gomphus lividus	1
Macromiidae/*Macromia*	3
PELECYPODA:	
Corbiculidae/*Corbicula fluminea*	4
Unionidae/*Villosa iris* juvenile live	1
PLECOPTERA:	
Chloroperlidae	1
Perlidae/*Acroneuria abnormis*	4
A. lycorias	16
Taeniopterygidae/*Taeniopteryx* early instar	1
TRICHOPTERA:	
Brachycentridae/*Brachycentrus*	1
Micrasema sp.	6
Micrasema rickeri	10
Glossosomatidae/*Glossosoma*	3
Hydropsychidae/*Ceratopsyche morosa*	5
C. sparna	21
Cheumatopsyche	61
Hydropsyche early instars	12
Hydropsyche betteni/depravata	1
H. venularis	12
Leptoceridae/*Ceraclea*	1
Philopotamidae/*Chimara*	25
Uenoidae/*Apatania*	3
	446

4155 II SW
(NONORE 139-SW)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



CITICO CREEK

Sample Site 2

WHITEOAK FLATS QUADRANGLE
Tenn.-N.C. - 140 NE

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Citico Creek — Date: 27 October 1993

Watershed: Little Tennessee River — County: Monroe

Area: Site # 2 — Sample Length: 400 ft

Lat-Long: 352929N - 840735W — Reach: 06010204-18,0

Data Collected By: Rick D. Bivens, Carl E. Williams, Bob Robertson, Danny Akins , and Jim Habera

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 45.3 ft Avg. Depth 0.5 ft Max. Depth 3.0 ft
2. Estimated Percent of Stream in Pools is 40%.
3. Estimated Percent **Pool** Bottom is Silt 10% Sand 10% Gravel 10% Rubble 15% Boulders 5% Bedrock 50%.
4. Estimated Percent **Riffle** Bottom is Silt 5% Sand 10% Gravel 15% Rubble 30% Boulders 10% Bedrock 30%.
5. Abundance of Littoral Aquatic Plants is Scarce (some *Dianthera americana*).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20% of the Stream, Average in 60%, Poor in 20%.
7. Shade or Canopy Good over 45% of Stream.
8. Flow (CFS): 12.4: Compared to Normal: Low
9. Present Weather: Partly cloudy and cool. Air temperature - 55 F @ 10:45 am.
10. Weather (last 24 h): Partly cloudy; cool overnight.
11. pH 7.0 Temp. 53.6 F Conductivity 35 micromhos/cm D.O. 12.4 ppm Saturation 110%
12. Comments: Sample area location was at the mouth of Caney Branch.

FISH DATA

Stream: Citico Creek
Date: 27 October 1993

Watershed: Little Tennessee River
County: Monroe

Area: Site # 2
Sample Length: 400 ft

Lat-Long: 352929N - 840735W
Reach: 06010204-18,0

Type of Sampling: Electrofishing
Elevation: 910 ft

Gear Type: Two Backpack Units
Time: 1245 - 1345

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus dolomieu	218	2	2	0.02
" "	"	3	3	0.05
" "	"	1	4	0.03
Ambloplites rupestris	13	1	1	t
" "	"	1	3	0.03
" "	"	1	4	0.05
" "	"	1	5	0.10
" "	"	1	7	0.28
Lepomis auritus	201	1	5	0.11
Hypentelium nigricans	166	55	2-11	5.65
Campostoma anomalum	25	508	1-5	7.09
Cyprinella spiloptera	269	30	1-4	0.12
Erimystax insignis	160	14	2-3	0.11
Luxilus coccogenis	248	47	1-4	0.30
Nocomis micropogon	234	44	1-7	0.72
Notropis leuciodus	255	197	1-2	0.59
N. telescopus	272	62	1-3	0.24
Etheostoma blennioides	80	24	2-4	0.31
E. rufilineatum	108	61	1-2	0.19
E. simoterum	111	30	1-2	0.09
E. zonale	134	6	1-2	0.03
Percina evides	310	19	1-2	0.08
Noturus baileyi	281	2	1	0.01
Cottus bairdi	39	38	1-3	0.31

Cambarus longirostris
Orconectes forceps

Site located near the mouth of Caney Branch. Shocking at 360 volts AC.

Collectors: R.D. Bivens, C.E. Williams, B. Robertson, D. Akins, and J. Habera

Citico Creek: Site # 2, Qualitative Benthic Sample

27 August 1993 Field # 510

Monroe Co., TN; At the mouth of Caney Branch; Citico Creek mi 7. Coordinates: 352929N - 840726W. Whiteoak Flats, Tenn.-N.C. # 140 NE Quad. Reach # 06010204-18,0.

TAXA	NUMBER
COLEOPTERA:	
Elmidae/*Promoresia* larvae	5
Stenelmis larvae	3
adults	10
Eubriidae/*Ectopria*	1
Gyrinidae/*Dineutus discolor* males	2
females	2
Psephenidae/*Psephenus herricki*	4
DIPTERA:	
Athericidae/*Atherix lantha*	22
Chironomidae	22
Simuliidae	4
Tipulidae/*Tipula*	2
EPHEMEROPTERA:	
Baetidae/*Baetis*	7
Ephemerellidae/*Serratella*	1
Heptageniidae/*Heptagenia*	2
Stenacron	5
Stenonema	29
Oligoneuriidae/*Isonychia*	45
HEMIPTERA:	
Veliidae/*Rhagovelia obesa* male and females	3
HYDRACARINA:	1
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	12
Nigronia fasciatus	1
N. serricornis	2
ODONATA:	
Aeshnidae/*Boyeria vinosa*	6
Calopterygidae/*Calopteryx*	9
Hetaerina americana	3
Coenagrionidae/*Argia*	3
Enallagma	7
Corduliidae/*Helocordulia* early instar	1
Gomphidae/*Stylogomphus albistylus*	1
Macromiidae/*Macromia*	7

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

TAXA	NUMBER
PLECOPTERA:	
Perlidae/*Acroneuria abnormis*	19
A. lycorias	5
Perlodidae/*Helopicus subvarians*	8
Pteronarcyidae/*Pteronarcys*	1
TRICHOPTERA:	
Brachycentridae/*Micrasema* sp.	2
Micrasema rickeri	10
Glossosomatidae/*Glossosoma*	2
Hydropsychidae/*Ceratopsyche morosa*	12
C. sparna	42
Cheumatopsyche	63
Hydropsyche venularis	5
Leptoceridae/*Triaenodes*	3
Limnephilidae/*Goera fuscula*	1
Unidentified early instar	1
Philopotamidae/*Chimara*	34
Polycentropodidae/*Polycentropus*	2
Rhyacophilidae/*Rhyacophila fuscula*	2
	434

GAME FISH FROM CITICO CREEK
SITE 1
INCH CLASS DISTRIBUTION

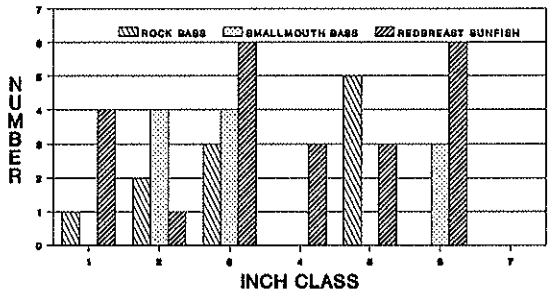


Figure 7.

GAME FISH FROM CITICO CREEK
SITE 2
INCH CLASS DISTRIBUTION

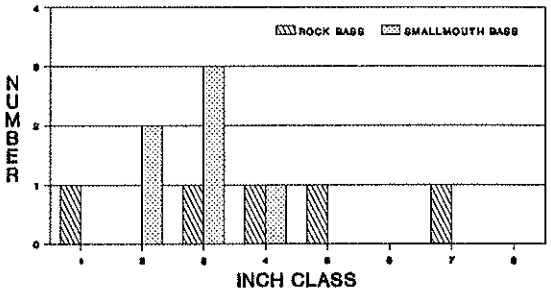
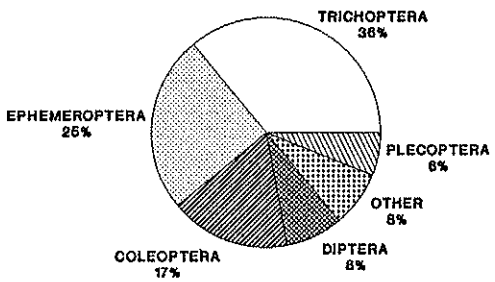


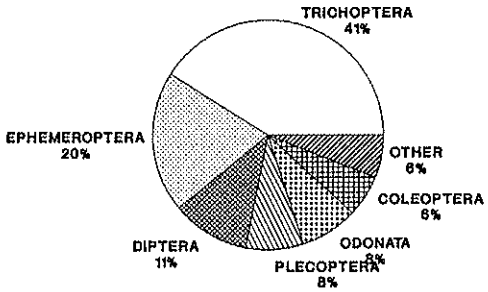
Figure 8.

CITICO CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS
n = 446
TAXA RICHNESS = 46
Figure 9.

CITICO CREEK
SITE 2
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS
n = 434
TAXA RICHNESS = 44
Figure 10.

Smoky Branch

One qualitative fishery survey was conducted on Smoky Branch in October 1993:

Location and Length - Tributary to Citico Creek (Little Tennessee tributary). The sample area was located about 0.1 mi upstream of the Citico Road crossing of Smoky Branch, along Smoky Branch Road. It was approximately 300 ft in length and was sampled on 27 October 1993. It was in Monroe County (Tallassee Quadrangle).

Sampling Methodology - The site was sampled using one backpack electrofishing unit operating at 360 volts AC.

Water Quality - No data collected.

Benthos Collection - No collection was made.

Fish Collected - (See data sheet for species list)

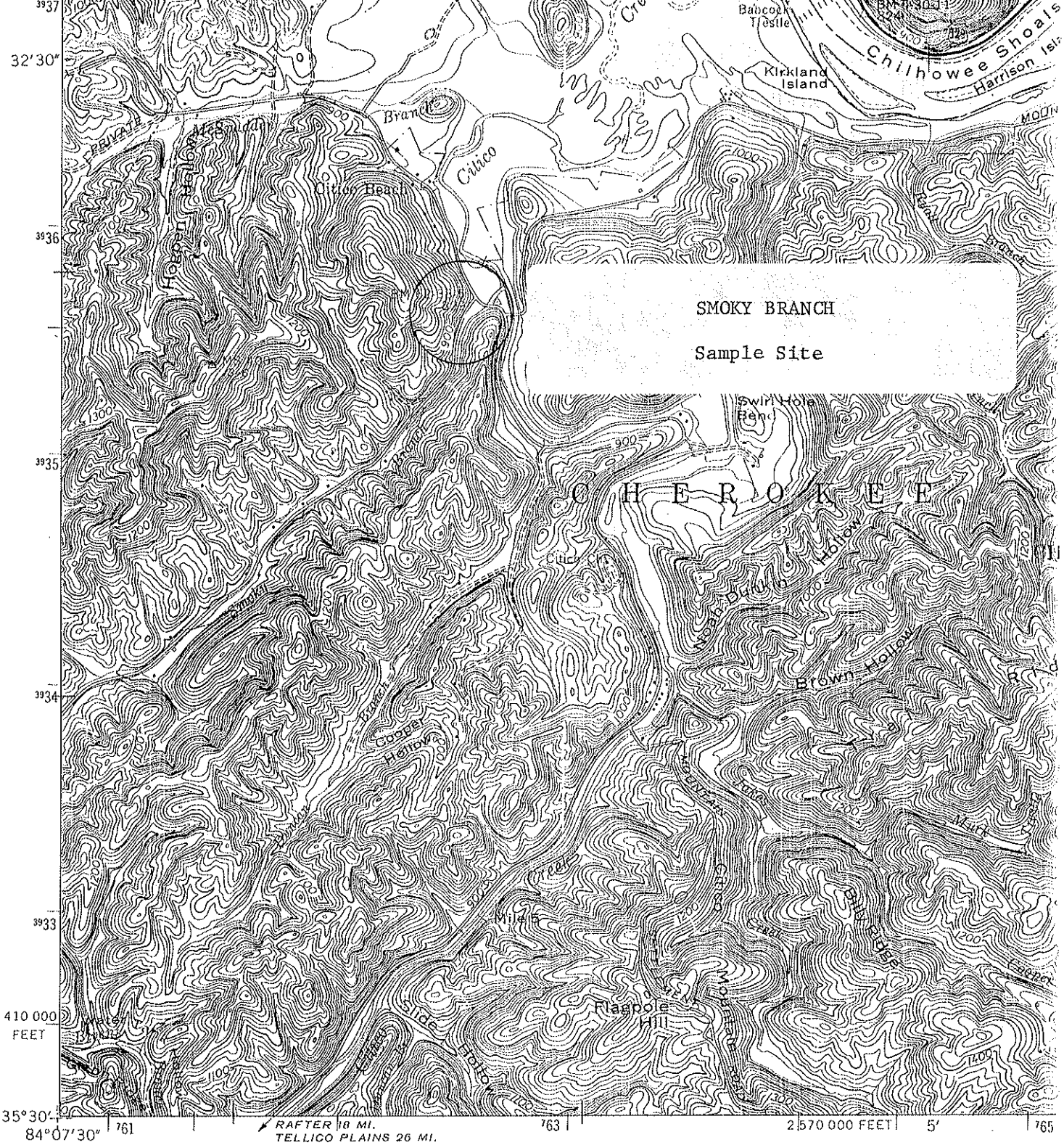
Comments - This stream was sampled primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted and emphasis was placed on the fish species present. The Agency has made no previous studies or fish collections from this stream.

A total of 12 fish species was collected from the sample area. A single 1-in specimen of the redbreast sunfish (*Lepomis auritus*) was the only game fish present. Central stonerollers (*Campostoma anomalum*), striped shiners (*Luxilus chrysocephalus*), creek chubs (*Semotilus atromaculatus*), and blacknose dace (*Rhinichthys atratulus*) were the most abundant species collected. A single white sucker (*Catostomus commersoni*) was collected here, however, none were found in the Citico Creek samples.

At the sample location, the stream was fairly silty, however the occurrence of 12 species indicates a fairly diverse fish population.

Management Recommendations:

1. This stream appears have fairly good water quality and should be protected from any source of pollution or habitat alteration.



(RAFTER 140-NW)
4154 I NW

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

Control by NOS/NOAA, USGS, and TVA

Revised by TVA in 1964 by photogrammetric methods from aerial photographs taken 1964 and by reference to TVA-USGS quadrangle dated 1941. Map field checked by TVA, 1966

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

Fine red dashed lines indicate generally visible on aerial phot

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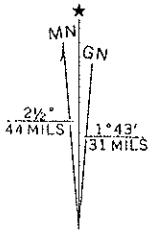


UTM GRID AND 1985 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

TALLASSEE QUADRANGLE
Tenn. - 139 SE

TENNESSE
AND U. S. TE
A

FISH DATA

Stream: Smoky Branch
Date: 27 October 1993

Watershed: Little Tennessee River
County: Monroe

Area: See Below
Sample Length: 300 ft

Lat-Long: 353150N - 840622W
Reach: 06010204-

Type of Sampling: Electrofishing
Elevation: 835 ft

Gear Type: One Backpack Unit
Time: 1715 - 1745

Species	TADS Code	Total Number	Inch Class	Total Weight
Lepomis auritus	201	1	1	-
Ameiurus natalis	174	1	-	-
Catostomus commersoni	32	1	-	-
Hypentelium nigricans	166	1	-	-
Campostoma anomalum	25	66	-	-
Cyprinella spiloptera	269	4	-	-
Luxilus chrysocephalus	249	23	-	-
Rhinichthys atratulus	351	14	-	-
Semotilus atromaculatus	360	18	-	-
Fundulus catenatus	137	3	-	-
Etheostoma simoterum	111	5	-	-
Cottus bairdi	39	1	-	-

Avg. width - 6 to 8 ft
Avg. depth - 0.2 ft
Water temperature - 59 F
pH - 7.0
Conductivity - 95 micromhos/cm
Silty - gravel - rubble - boulder substrate.

Site located along Smoky Branch Road about 0.1 mi upstream of Citico Road. Shocking at 360 volts AC.

Collectors: R.D. Bivens, C.E. Williams, B. Robertson, D. Akins and J. Habera

Duncan Branch

One qualitative fishery survey was conducted on Duncan Branch in October 1993:

Location and Length - Tributary to Citico Creek (Little Tennessee tributary). The sample area was located near the mouth, just upstream of the Citico Road crossing of the stream. It was approximately 50 ft in length and was sampled on 25 October 1993. It was in Monroe County (Tallassee Quadrangle).

Sampling Methodology - The site was sampled using one backpack electrofishing unit operating at 360 volts AC.

Water Quality - No data collected.

Benthos Collection - No collection was made.

Fish Collected - (See data sheet for species list)

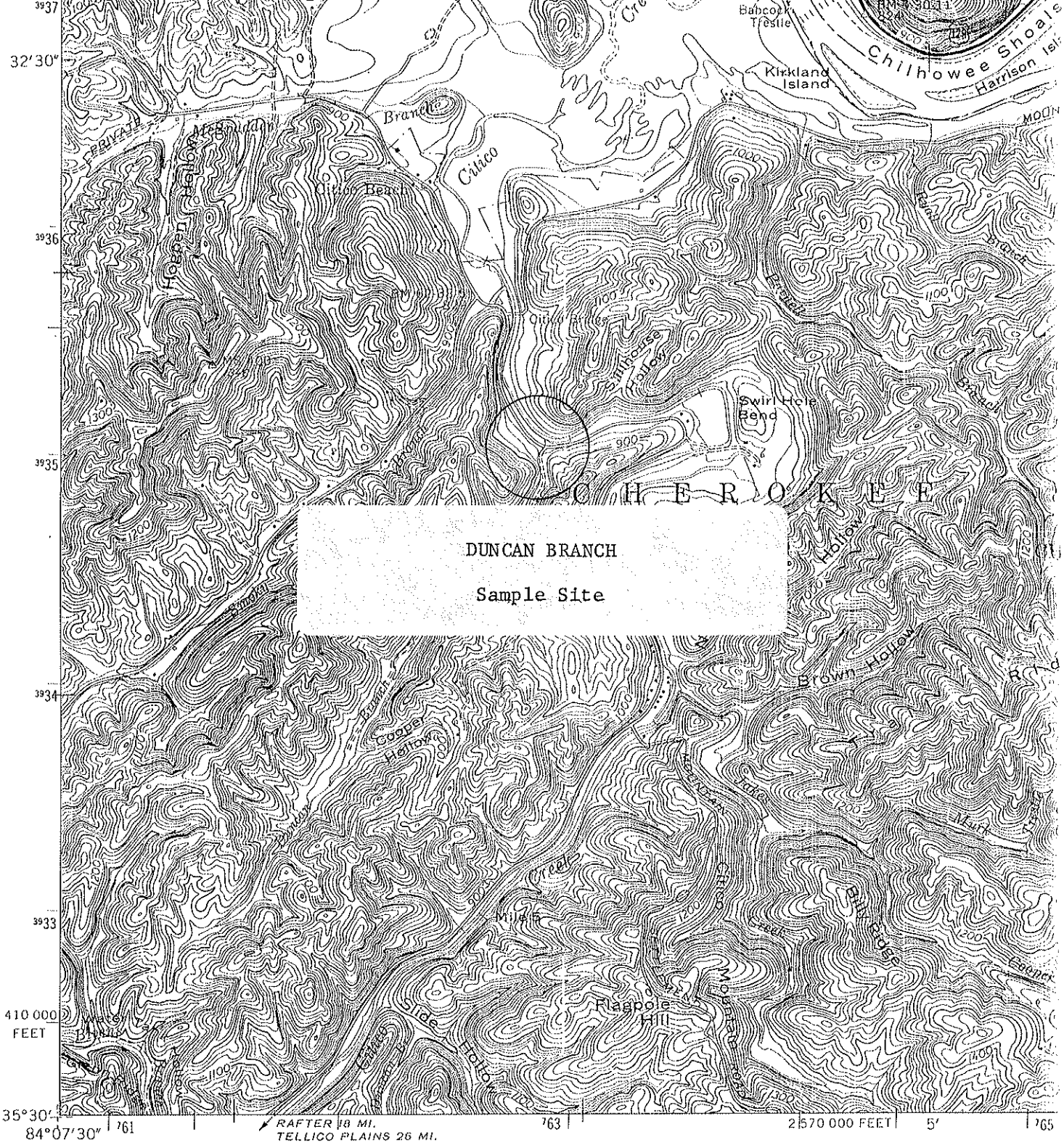
Comments - This stream was sampled primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted and emphasis was placed on the fish species present. The Agency has made no previous studies or fish collections from this stream.

A total of 10 fish species was collected from the sample area. A single 5-in specimen of the rock bass (*Ambloplites rupestris*) was the only game fish present. Central stonerollers (*Campostoma anomalum*), creek chubs (*Semotilus atromaculatus*), and blacknose dace (*Rhinichthys atratulus*) were the most abundant species collected. Of special interest is the occurrence of the Tennessee dace (*Phoxinus tennessensis*). 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 two Tennessee dace at this site, both of which were preserved as voucher specimens, as this may represent a new collection record for the species.

The Appalachian brook crayfish (*Cambarus bartonii*) was the only crayfish species collected at this site.

Management Recommendations:

1. The occurrence of the Tennessee dace in this stream warrants an additional measure of protection as this species has been listed as a species Deemed in Need of Management and of Special Concern (Starnes and Etnier 1980)



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

Control by NOS/NOAA, USGS, and TVA

Revised by TVA in 1964 by photogrammetric methods from aerial photographs taken 1964 and by reference to TVA-USGS quadrangle dated 1941. Map field checked by TVA, 1966

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

Fine red dashed lines indicate sele
generally visible on aerial photogra

There may be private inholdings w
the National or State reservations

(RAFTER 140-NW)
4154 I NW

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44 MILS
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31 MILS

UTM GRID AND 1965 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

TALLASSEE QUADRANGLE
Tenn. - 139 SE

TENNESSE
AND U. S. TE
A

FISH DATA

Stream: Duncan Branch
Date: 25 October 1993
Watershed: Little Tennessee River
County: Monroe
Area: See Below
Sample Length: 50 ft
Lat-Long: 353134N - 840606W
Reach: 06010204-
Type of Sampling: Electrofishing
Elevation: 820 ft
Gear Type: One Backpack Unit
Time: 1650 - 1705

Species	TADS Code	Total Number	Inch Class	Total Weight
Ambloplites rupestris	13	1	5	-
Hypentelium nigricans	166	1	-	-
Campostoma anomalum	25	94	-	-
Cyprinella spiloptera	269	2	-	-
C. galactura	253	3	-	-
Luxilus coccogenis	248	1	-	-
Nocomis micropogon	234	5	-	-
Phoxinus tennesseensis	333	2	-	-
Rhinichthys atratulus	351	54	-	-
Semotilus atromaculatus	360	17	-	-
Cambarus bartonii		1		
Gyrinophilus sp.		1		

Avg. width - 3 ft

Site located upstream of the Citico Road crossing. Shocking at 360 volts AC.

Collectors: B. Robertson and F. Kelley

Caney Branch

One qualitative fishery survey was conducted on Duncan Branch in October 1993:

Location and Length - Tributary to Citico Creek (Little Tennessee tributary). The sample area was located near the mouth, at the bridge crossing on Citico Road, and went upstream for about 0.25 mi, sampling mainly in the pool areas only. It was sampled on 27 October 1993. It was in Monroe County (Whiteoak Flats Quadrangle).

Sampling Methodology - The site was sampled using one backpack electrofishing unit operating at 360 volts AC.

Water Quality - Conductivity was 87 micromhos/cm, pH - 7.0.

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 and emphasis was placed on the fish species present. The Agency has made no previous studies or fish collections from this stream.

A total of 13 fish species was collected from the sample area. A single 4-in specimen of smallmouth bass (*Micropterus dolomieu*) was the only game fish present. Spotfin shiners (*Cyprinella spiloptera*), central stonerollers (*Campostoma anomalum*), and warpaint shiners (*Luxilus coccogenis*) were the most abundant species collected. Of special interest is the occurrence of the Tennessee dace (*Phoxinus tennessensis*). 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 a single Tennessee dace at this site, which was preserved as a voucher specimen. Previous records list *P. tennessensis* from this stream (TVA Regional Natural Heritage Project data).

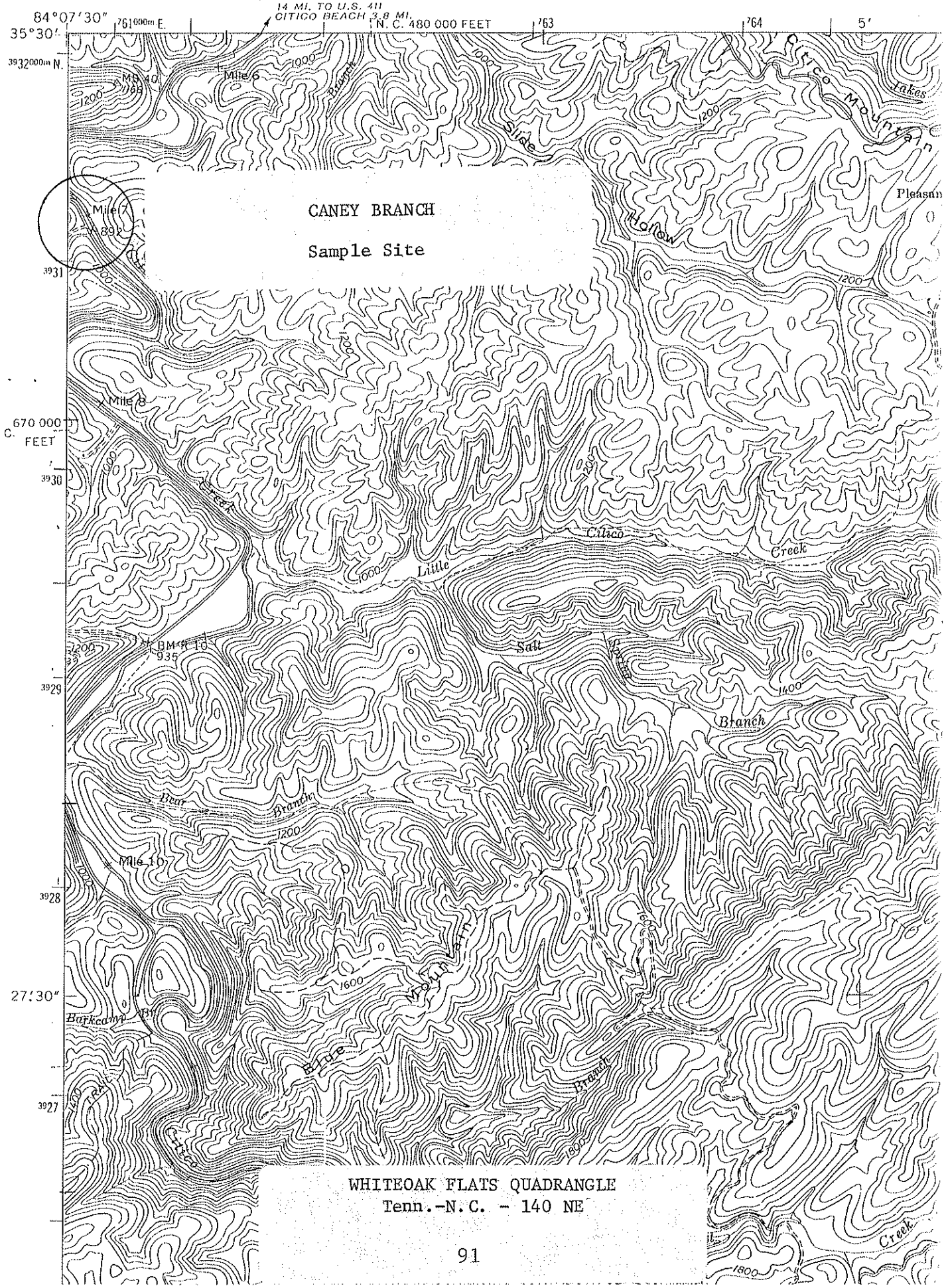
The Appalachian brook crayfish (*Cambarus bartonii*) was the only crayfish species collected at this site.

Management Recommendations:

1. The occurrence of the Tennessee dace in this stream warrants an additional measure of protection as this species has been listed as a species Deemed in Need of Management and of Special Concern (Starnes and Etnier 1980)

4155 II SW
(NONORE 139-SW)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



WHITEOAK FLATS QUADRANGLE
Tenn.-N.C. - 140 NE

FISH DATA

Stream: Caney Branch
Date: 27 October 1993

Watershed: Little Tennessee River
County: Monroe

Area: See Below
Sample Length: See Below

Lat-Long: 352927N - 840728W
Reach: 06010204-

Type of Sampling: Electrofishing
Elevation: 915 ft

Gear Type: One Backpack Unit
Time: 1600 - 1630

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus dolomieu	218	1	4	-
Hypentelium nigricans	166	6	-	-
Campostoma anomalum	25	98	-	-
Cyprinella spiloptera	269	114	-	-
Luxilus coccogenis	248	50	-	-
Nocomis micropogon	234	19	-	-
Notropis leuciodus	255	17	-	-
N. telescopus	272	12	-	-
Phoxinus tennesseensis	333	1	-	-
Rhinichthys atratulus	351	34	-	-
Semotilus atromaculatus	360	29	-	-
Etheostoma simoterum	111	6	-	-
Cottus bairdi	39	3	-	-
Cambarus bartonii		1		

Avg. width - 6 to 8 ft
Avg. depth - 0.3 ft
Water temperature - 57 F
pH - 7.0
Conductivity - 87 micromhos/cm
Fairly silty: with gravel - rubble - bedrock - boulder substrate.
Eroding stream banks.

Site located at bridge crossing on Citico Road. Started at bridge and went upstream for about 0.25 mi shocking mainly in he pool areas only. Shocking at 360 volts AC.

Collectors: R.D. Bivens, C.E. Williams, B. Robertson, D. Akins and J. Habera

Midway Creek

One qualitative fishery survey was conducted on Midway Creek in June 1993:

Location and Length - Tributary to Tuckahoe Creek (French Broad River tributary). The sample area was located about 50 to 75 ft upstream of the mouth. It was approximately 200 ft in length and was sampled on 28 June 1993. It was in Knox County (Boyds Creek Quadrangle).

Sampling Methodology - The site was sampled using one 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)

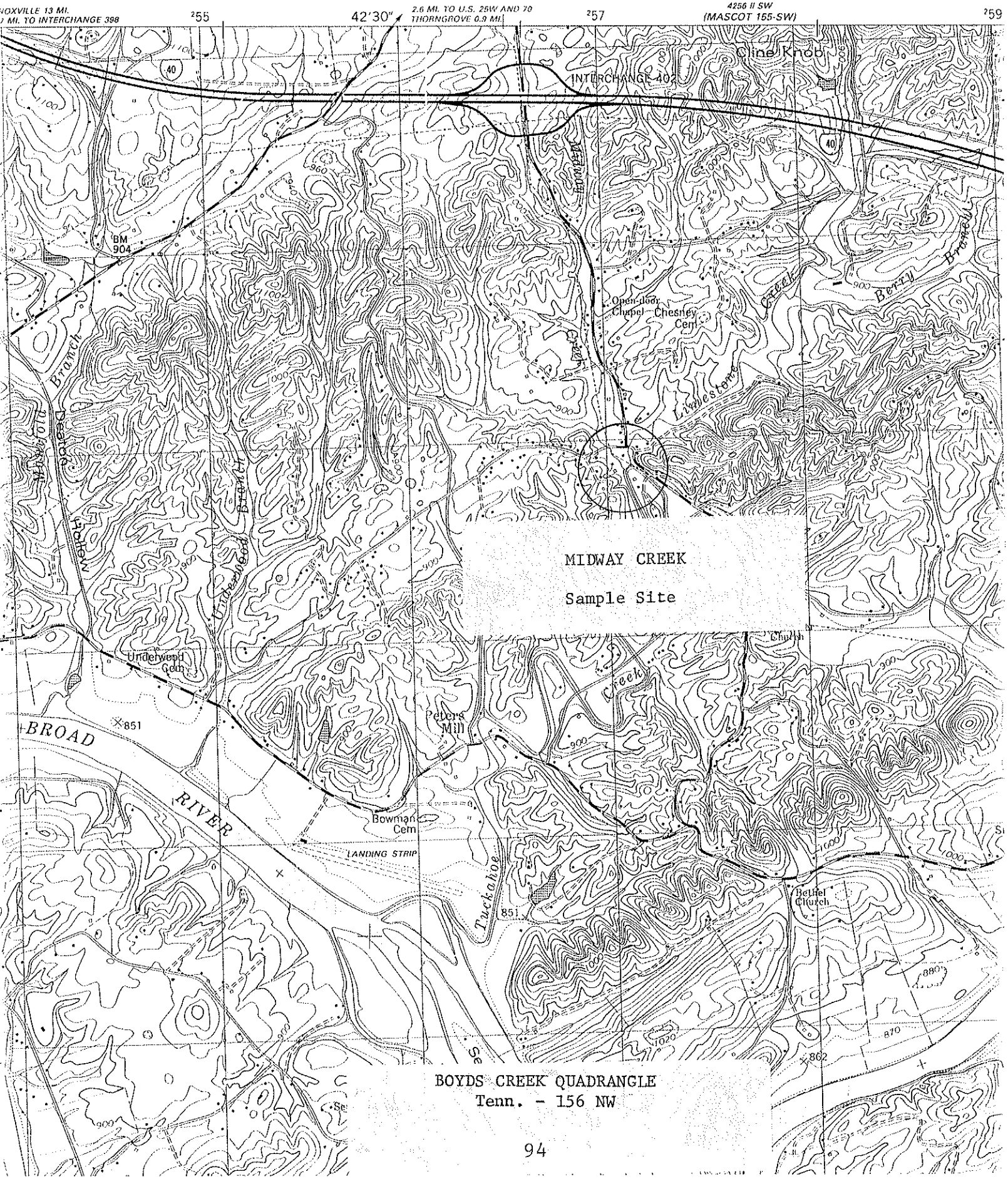
Comments - This stream was sampled primarily to develop a fish species diversity list for TADS. Only a limited survey was conducted and emphasis was placed on the fish species present. The Agency has made no previous studies or fish collections from this stream.

A total of 6 fish species was collected from this stream. Two game species, redbreast sunfish (*Lepomis auritus*) and bluegill (*L. macrochirus*) were found. Blacknose dace (*Rhinichthys atratulus*), fantail darters (*Etheostoma kennicotti*), snubnose darters (*E. simoterum*), and banded sculpin (*Cottus carolinae*) were the other species present. *Orconectes erichsonianus* was the only crayfish species found. Relics of *Lasmigona holstonia* were also collected.

Management Recommendations:

1. This stream is very silty and is being adversely impacted by non-point pollution and no management other than trying to reduce this pollution can be suggested at this time.

UNITED STATES
TENNESSEE VALLEY AUTHORITY
MAPPING SERVICES BRANCH



BOYDS CREEK QUADRANGLE
Tenn. - 156 NW

FISH DATA

Stream: Midway Creek
Date: 28 June 1993

Watershed: French Broad River
County: Knox

Area: See comments
Sample Length: 200 ft

Lat-Long: 355847N - 834137W
Reach: 06010107-

Type of Sampling: Electrofishing
Elevation: 880 ft

Gear Type: One Backpack Unit
Time: 1715 - 1730

Species	TADS Code	Total Number	Inch Class	Total Weight
Lepomis auritus	201	-	-	-
L. macrochirus	206	-	-	-
Rhinichthys atratulus	351	-	-	-
Etheostoma kennicotti	98	-	-	-
E. simoterum	111	-	-	-
Cottus carolinae	40	-	-	-

Orconectes erichsonianus

Avg. width - 4 to 8 ft
Avg. depth - 0.3 ft
Flow was a trickle.
Gravel - rubble - bedrock substrate.
Very silty.

Site was located about 50 to 75 ft upstream of the mouth.
Shocking at 120 volts AC.

Collectors: R.D. Bivens and C.E. Williams

Limestone Creek

Two qualitative fishery surveys were conducted on Limestone Creek in June 1993:

Location and Length - Tributary to Tuckahoe Creek (French Broad River tributary). Sample Site 1 was located at the mouth near the bridge crossing on Midway Road and was sampled on 28 June 1993. It was 300 ft in length and averaged 17.4 ft in width. Site 2 was located along Thorngrove Pike, 0.15 mi upstream of bridge crossing on Smith School Road and was sampled on 18 June 1993. It was 300 ft in length and averaged 12.4 ft in width. Both sites were in Knox County (Site 1, Boyds Creek Quadrangle and Site 2, Mascot Quadrangle).

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

Water Quality - Data were collected from midstream at mid-depth at each site. Site 1, 28 June 1993: DO - 10.6 ppm, pH - 8.4, Temperature - 60.3 F, Conductivity - 350 micromhos/cm. Site 2, 18 June 1993: DO - 10.4 ppm, pH - 7.9, Temperature - 57.7 F, Conductivity - 320 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 2 man-h qualitative sample at each site. Site 1 sample contained 408 organisms representing 27 taxa. Site 2 sample contained 231 organisms representing 23 taxa.

Fish Collected:

	Site 1				Site 2			
Species	No.	% by No.	Wt.	% by Wt.	No.	% by No.	Wt.	% by Wt.
Rainbow trout					11	20.4	10.96	89.1
Largemouth bass					1	1.9	0.27	2.3
Rock bass	1	0.8	0.16	3.2				
Bluegill	13	10.2	1.11	22.4				
Redbreast sunfish	8	6.3	0.48	9.7				
Hybrid sunfish	1	0.8	0.14	2.8				
Non-game Fish	2	1.6	0.55	11.1				
Forage Fish	102	80.3	2.51	50.7	42	77.8	1.07	8.7
Total	127		4.95		54		12.30	

Comments - Two sites were surveyed on this stream. The lower site primarily to develop a fish species list for TADS and the

upper site at the request of a landowner. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 127 fish weighing 4.95 lb and comprising 11 species from Site 1. Two native game species, rock bass (*Ambloplites rupestris*) and bluegill (*Lepomis macrochirus*) were found along with the introduced redbreast sunfish (*L. auritus*). Only one 6-in rock bass, 13 small bluegills, and 8 redbreast sunfish along with one hybrid sunfish were collected. All game fish represented about 18% of the total number of fish collected and about 38% of the total weight of all fish collected. Two non-game and six forage species were also collected here and these comprised about 82% of the total number and 62% of the total weight. Most were represented by few specimens and banded sculpin (*Cottus carolinae*) and central stonerollers (*Campostoma anomalum*) were the most abundant species collected. Three darter species, the greenside (*Etheostoma blennioides*), redline (*E. rufilineatum*), and snubnose (*E. simoterum*), were present.

At Site 2 we collected a total of only 54 fish weighing 12.30 lb and comprising 4 species. Game fish from this site included largemouth bass (*Micropterus salmoides*) and rainbow trout (*Oncorhynchus mykiss*). Only one 8-in largemouth bass and eleven rainbow trout ranging from 7 to 15-in were found. Game fish comprised 22% of the total number of fish collected, but they accounted for about 91% of the total weight collected. Only two forage species were collected here and they made up about 78% of the total number and 9% of the total weight. The occurrence of rainbow trout at this site is due to stocking and feeding by the landowner. Limestone Creek begins at a large spring named Mill Pond on the Mascot Quadrangle. This spring has enough volume to provide habitat for trout along an undetermined section of its length, possibly to its mouth.

Based on fish species occurrence and relative abundance, this stream appears to be at best only a fair quality Ridge and Valley stream. A total of 13 species was collected, most of which were fairly tolerant forms found in low numbers. Only three darter species were collected and all occurred in low numbers. Probably the cold water influence of the spring inflow prohibits optimal conditions for warmwater fish. Also, the stream has very heavy siltation along with heavy filamentous algal mats. Stream bank erosion was observed and the stream probably receives considerable run-off from agricultural practices and other activities in the watershed.

Benthic macroinvertebrates from sample Site 1 included Baetidae, Heptageniidae, and Oligoneuriidae mayflies, Nemouridae and Perlidae stoneflies, Hydropsychidae, Hydroptilidae, and Uenoidae caddisflies, and Elmidae beetles. Gastropods included pleurocerid snails. The Asian clam (*Corbicula fluminea*) was present and a relic *Lasmigona holstonia* was found. Crayfish species included *Cambarus longirostris* and *Orconectes*

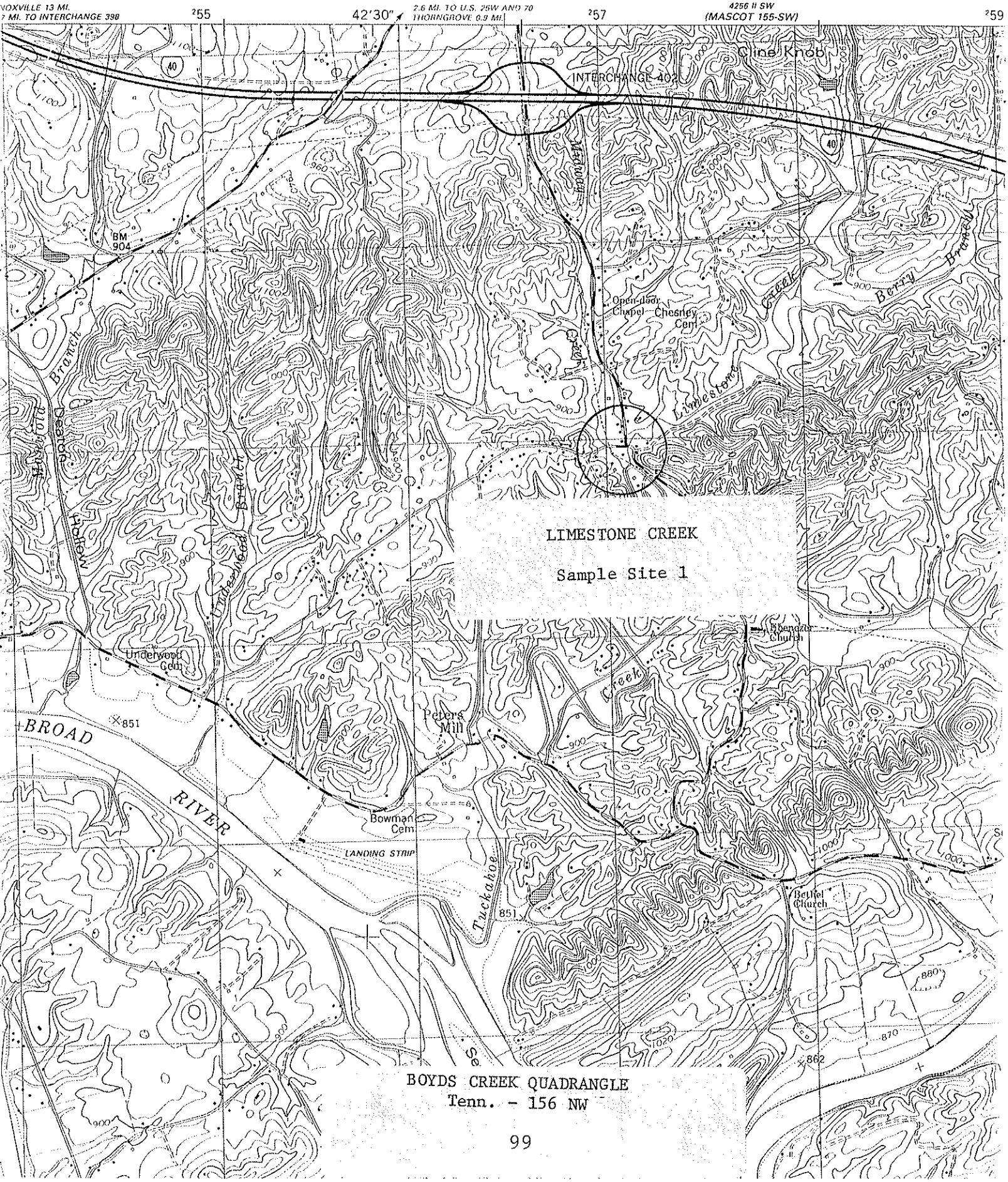
erichsonianus. Trichopterans represented about 33%, gastropods about 27%, ephemeropterans about 16%, dipterans about 12%, and coleopterans about 5%, of the total number of organisms collected (Fig. 11). A total of 27 taxa was collected at this site, many of which were tolerant forms.

Benthic macroinvertebrates from sample Site 2 included Baetidae, Ephemerellidae, and Oligoneuriidae mayflies, *Perlesta* stoneflies, Glossosomatidae, Hydropsychidae and Hydroptilidae caddisflies, and Elmidae and Hydrophilidae beetles. Gastropods included pleurocerid snails. Fingernail clams (*Sphaerium*) were the only pelecypod found. The Appalachian brook crayfish (*Cambarus bartonii*) was the only crayfish species collected. Tricopterans represented about 42%, gastropods about 20%, ephemeropterans about 13%, dipterans about 8%, coleopterans about 5%, and plecopterans about 4% of the total number of organisms collected (Fig. 12). A total of 23 taxa was collected at this site.

Management Recommendations:

1. The low fish species diversity and taxa richness of benthic macroinvertebrates and the presence of mainly tolerant forms indicate that this is probably a stressed system. This may be in part due to the cold water influence. However, very heavy siltation and enrichment are contributing factors. The only management that can be suggested at this time is to reduce the non-point-source pollution in the watershed.

UNITED STATES
TENNESSEE VALLEY AUTHORITY
MAPPING SERVICES BRANCH



BOYDS CREEK QUADRANGLE
Tenn. - 156 NW

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Limestone Creek — Date: 28 June 1993

Watershed: French Broad River — County: Knox

Area: Site # 1 — Sample Length: 300 ft

Lat-Long: 355849N - 834137W — Reach: 06010107-

Data Collected By: Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 17.4 ft Avg. Depth 0.5 ft Max. Depth 1.4 ft
2. Estimated Percent of Stream in Pools is 20%.
3. Estimated Percent **Pool** Bottom is Mud 10% Silt 20% Sand 20% Clay 20% Gravel 10% Rubble 10% Boulders 10%.
4. Estimated Percent **Riffle** Bottom is Mud 5% Silt 10% Sand 10% Clay 10% Gravel 15% Rubble 20% Boulders 30%.
5. Abundance of Littoral Aquatic Plants is Average (water cress).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25% of the Stream, Average in 50%, Poor in 25%.
7. Shade or Canopy Good over 40% of Stream.
8. Flow (CFS) 7.9: Compared to Normal: Normal
9. Present Weather: Partly cloudy hot and humid.
   Air temperature - 90 F @ 1:30 pm.
10. Weather (last 24 h): Partly cloudy; mild to hot.
11. pH 8.4 Temp. 60.3 F Conductivity 350 micromhos/cm
    D.O. 10.6 ppm Saturation 108%
12. Comments: Sample area location was from the mouth upstream to the bridge on Midway Road. Very heavy siltation and enrichment; filamentous algae is heavy. Stream bank erosion and cattle in the stream.

FISH DATA

Stream: Limestone Creek
Date: 28 June 1993

Watershed: French Broad River
County: Knox

Area: Site # 1
Sample Length: 300 ft

Lat-Long: 355849N - 834137W
Reach: 06010107-

Type of Sampling: Electrofishing
Elevation: 880 ft

Gear Type: One Backpack Unit
Time: 1530 - 1600

Species	TADS Code	Total Number	Inch Class	Total Weight
Ambloplites rupestris	13	1	6	0.16
Lepomis auritus	201	3	2	0.04
" "	"	2	4	0.12
" "	"	3	5	0.32
L. macrochirus	206	1	5	0.01
" "	"	2	2	0.01
" "	"	2	3	0.05
" "	"	1	4	0.04
" "	"	3	7	1.00
L. macrochirus x L. auritus	-	1	5	0.14
Catostomus commersoni	32	1	11	0.50
Hypentelium nigricans	166	1	5	0.05
Campostoma anomalum	25	18	3-6	0.96
Rhinichthys atratulus	351	3	2-3	0.03
Etheostoma blennioides	80	1	5	0.03
E. rufilineatum	108	2	2-3	0.02
E. simoterum	111	6	2	0.03
Cottus carolinae	40	72	1-5	1.44
Cambarus longirostris		1		
Orconectes erichsonianus		4		

Site located from the mouth, upstream to the bridge on Midway Road. Shocking at 120 volts AC. Very heavy siltation and enrichment; filamentous algae is heavy. Stream bank erosion; cattle in stream, etc.

Collectors: R.D. Bivens and C.E. Williams

Limestone Creek: Site # 1, Qualitative Benthic Sample

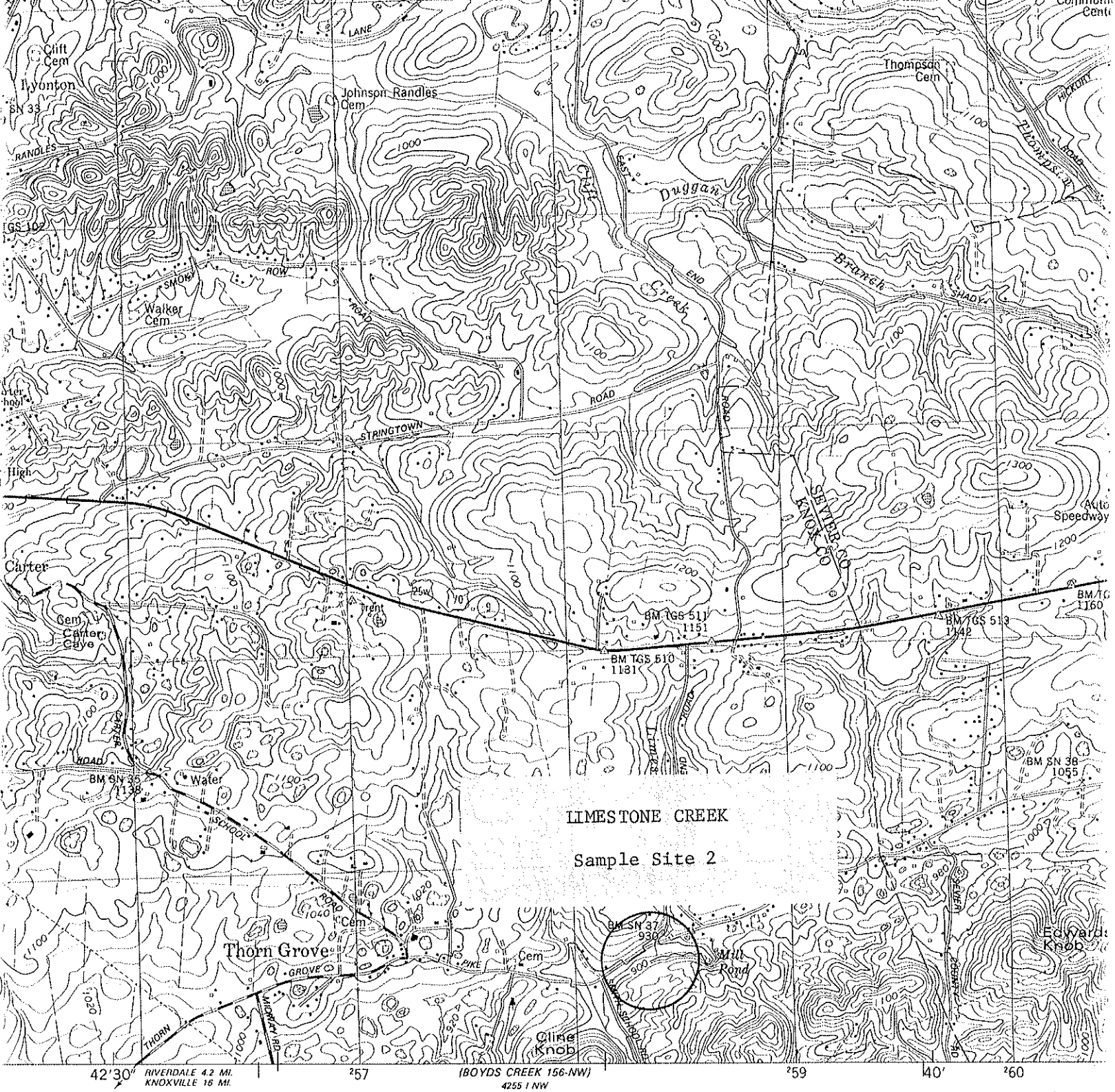
28 June 1993 Field # 439

Knox Co., TN; Near the mouth; at the bridge on Midway Road. Coordinates: 355849N - 834137W. Boyds Creek, Tenn., # 156 NW Quad. Reach # 06010107-.

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	1
COLEOPTERA:	
Elmidae/*Dubiraphia* adult	1
Optioservus larva	10
Optioservus ovalis adult	1
Stenelmis larvae	4
adults	5
DIPTERA:	
Chironomidae	11
Simuliidae	28
Tipulidae/*Antocha* larvae and pupa	3
Tipula	7
EPHEMEROPTERA:	
Baetidae/*Baetis*	23
Heptageniidae/*Stenonema*	5
Oligoneuriidae/*Isonychia*	38
GASTROPODA:	
Pleuroceridae sp. 1	99
sp. 2	7
sp. 3	6
HEMIPTERA:	
Corixidae	1
HYDRACARINA:	1
ISOPODA:	
Asellidae/*Asellus*	1
Lirceus	6
ODONATA:	
Aeshnidae/*Boyeria vinosa*	5
Gomphidae/*Ophiogomphus mainensis*	3
PELECYPODA:	
Corbiculidae/*Corbicula fluminea*	4
Unionidae/*Lasmigona holstonia* relic	

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

TAXA	NUMBER
PLECOPTERA:	
Nemouridae/*Amphinemura delosa*	1
Perlidae/*Perlesta placida*	1
TRICHOPTERA:	
Hydropsychidae/*Cheumatopsyche*	65
Hydropsyche betteni/depravata	64
Hydroptilidae/*Hydroptila*	1
Uenoidae/*Neophylax*	6
	408



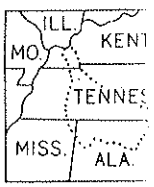
SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



QUADRANGL

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MASCOT QUADRANGLE
Tenn. - 155 SW

RGINIA 22092
TENN. 37219
.E, TENN. 37902
:ST

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Limestone Creek — Date: 18 June 1993

Watershed: French Broad River — County: Knox

Area: Site # 2 — Sample Length: 300 ft

Lat-Long: 360015N - 834055W — Reach: 06010107-

Data Collected By: Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 12.4 ft Avg. Depth 0.7 ft Max. Depth 2.3 ft
2. Estimated Percent of Stream in Pools is 25%.
3. Estimated Percent **Pool** Bottom is Mud 5% Silt 10% Sand 40% Clay 20% Gravel 10% Rubble 15.
4. Estimated Percent **Riffle** Bottom is Silt 10% Sand 30% Clay 30% Gravel 10% Rubble 10% Boulders 5% Bedrock 5%.
5. Abundance of Littoral Aquatic Plants is Average (moss to Numerous (water cress).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 20% of the Stream, Average in 50%, Poor in 30%.
7. Shade or Canopy Good over 60% of Stream.
8. Flow (CFS) 8.3: Compared to Normal: Normal
9. Present Weather: Partly cloudy hot and humid.
   Air temperature - 81 F @ 12:30 pm.
10. Weather (last 24 h): Clear to partly cloudy; hot and humid.
11. pH 7.9 Temp. 57.7 F Conductivity 320 micromhos/cm
    D.O. 10.4 ppm Saturation 102%
12. Comments: Sample area location was along Thorngrove Pike, 0.15 mi upstream of bridge crossing on Smith School Road. Steven Randles' property. Site was downstream of a large spring called "Mill Pond" on the quad. map.

FISH DATA

Stream: Limestone Creek
Date: 18 June 1993
Watershed: French Broad River
County: Knox
Area: Site # 2
Sample Length: 300 ft
Lat-Long: 360015N - 834055W
Reach: 06010107-
Type of Sampling: Electrofishing
Elevation: 885 ft
Gear Type: One Backpack Unit
Time: 1530 - 1600

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus salmoides	220	1	8	0.27
Oncorhynchus mykiss	353	1	7	0.13
" "	"	1	10	0.49
" "	"	1	11	0.43
" "	"	5	14	5.75
" "	"	3	15	4.16
Etheostoma simoterum	111	1	2	0.01
Cottus carolinae	40	41	1-5	1.06
Cambarus bartonii		6		

Site was located along Thorngrove Pike, 0.15 mi upstream of the bridge crossing on Smith School Road: Steven Randles' property. Shocking at 120 volts AC. Trout were stocked and fed.

Collectors: R.D. Bivens and C.E. Williams

Limestone Creek: Site # 2, Qualitative Benthic Sample

18 June 1993 Field # 430

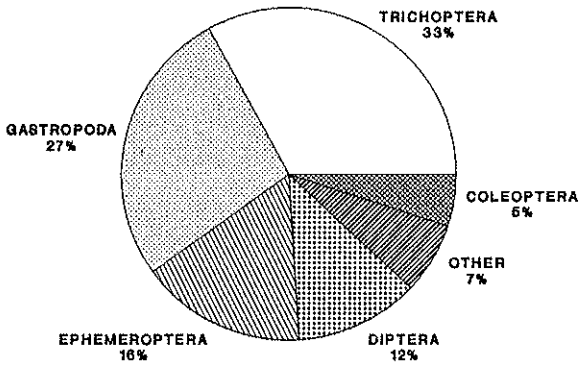
Knox Co., TN; Approx. 0.15 mi upstream of the bridge crossing on Smith School Road. Coordinates: 360015N - 834055W. Mascot, Tenn., # 155 SW Quad. Reach # 06010107-.

TAXA	NUMBER
AMPHIPODA:	
Gammaridae/*Gammarus*	7
ANNELIDA:	
Oligochaeta	1
COLEOPTERA:	
Elmidae/*Optioservus* larva	7
Optioservus ovalis adults	4
Hydrophilidae/*Anacaena limbata* adult	1
DIPTERA:	
Chironomidae	4
Dixidae/*Dixa*	1
Simuliidae	5
Tabanidae/*Chrysops*	1
Tipulidae/*Antocha*	2
Tipula	5
EPHEMEROPTERA:	
Baetidae/*Baetis*	4
Ephemerellidae/*Ephemerella*	26
Oligoneuriidae/*Isonychia*	1
GASTROPODA:	
Pleuroceridae	46
ISOPODA:	
Asellidae/*Asellus*	3
Lirceus	3
ODONATA:	
Calopterygidae/*Calopteryx*	3
PELECYPODA:	
Sphaeriidae/*Sphaerium*	2
PLECOPTERA:	
Perlidae/*Perlesta placida*	1
Perlesta sp.	7

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

TAXA	NUMBER
TRICHOPTERA:	
Glossosomatidae/*Glossosoma* larvae	34
pupae	10
Hydropsychidae/*Cheumatopsyche*	6
Hydropsyche betteni/depravata	40
Hydroptilidae/*Hydroptila* larvae	7
pupa	1
	231

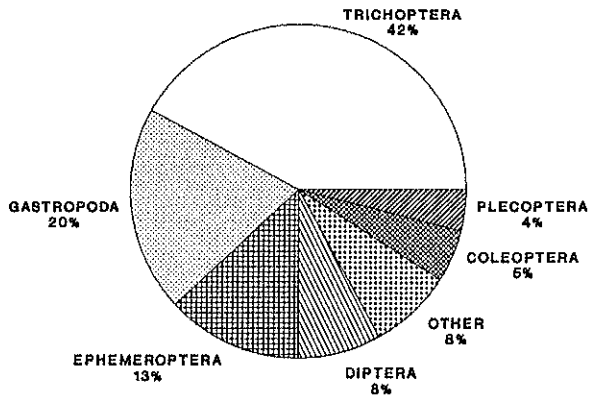
LIMESTONE CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 408
TAXA RICHNESS = 27
Figure 11.

LIMESTONE CREEK
SITE 2
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 231
TAXA RICHNESS = 23
Figure 12.

Boyds Creek

Two qualitative fishery surveys were conducted on Boyds Creek in August and October 1993:

Location and Length - Tributary to the French Broad River. Sample Site 1 was located at the mouth of Knob Creek and was sampled on 20 August 1993. It was 300 ft in length and averaged 17.7 ft in width. Site 2 was located downstream of the bridge crossing on North Shiloh Road and was sampled on 14 October 1993. It was 300 ft in length and averaged 13.8 ft in width. Both sites were in Sevier County (Boyds Creek Quadrangle).

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

Water Quality - Data were collected from midstream at mid-depth at each site. Site 1, 20 August 1993: DO - 8.2 ppm, pH - 8.2, Temperature - 73.4 F, Conductivity - 350 micromhos/cm. Site 2, 14 October 1993: DO - 10.1 ppm, pH - 7.3, Temperature - 58.1 F, Conductivity - 325 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample at Site 1 and a 2 man-h sample at Site 2. Site 1 sample contained 425 organisms representing 38 taxa. Site 2 sample contained 335 organisms representing 37 taxa.

Fish Collected:

	Site 1				Site 2			
Species	No.	% by No.	Wt.	% by Wt.	No.	% by No.	Wt.	% by Wt.
Spotted bass	2	0.8	0.17	1.2				
Rock bass	4	1.7	0.62	4.2				
Bluegill	4	1.7	0.27	1.8	1	0.5	0.06	2.6
Redbreast sunfish	15	6.3	1.40	9.5	7	3.2	0.01	0.4
Hybrid sunfish	1	0.4	0.13	0.9				
Non-game Fish	14	5.8	9.68	65.9	50	22.8	1.43	63.0
Forage Fish	199	83.3	2.42	16.5	161	73.5	0.77	33.9
Total	239		14.69		219		2.27	

Comments - Two sites were surveyed on this stream primarily to develop a fish species list for TADS. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 239 fish weighing 14.69 lb and comprising 16 species from Site 1. Three native game species, spotted bass (*Micropterus punctulatus*), rock bass (*Ambloplites rupestris*) and bluegill (*Lepomis macrochirus*) were found, along with the introduced redbreast sunfish (*L. auritus*). One redear sunfish (*L. microlophus*) x bluegill hybrid sunfish was also collected. With the exception of redbreast sunfish, all game fish were collected in low numbers and they represented about 11% of the total number of fish collected and about 18% of the total weight of all fish collected. Five non-game and seven forage species were also collected here and these comprised about 89% of the total number and 82% of the total weight. One large channel catfish (*Ictalurus punctatus*) and one large common carp (*Cyprinus carpio*) accounted for about 75% of the total non-game fish weight. Most were represented by few specimens and central stonerollers (*Campostoma anomalum*) and banded sculpin (*Cottus carolinae*) were the most abundant species collected. *Etheostoma simoterum* was the only darter species present.

At Site 2 we collected a total of 219 fish weighing only 2.27 lb and comprising 13 species. Game fish from this site included only bluegill and redbreast sunfish. Only one 4-in bluegill and seven 1 to 2-in redbreast sunfish were found and they comprised <4% of the total number of fish collected and accounted for only 3% of the total weight collected. Three non-game and eight forage species were collected here and they made up about 96% of the total number and 97% of the total weight. Five species were collected here that were not collected at the downstream site. These were: white sucker (*Catostomus commersoni*), striped shiner (*Luxilus chrysocephalus*), creek chub (*Semotilus atromaculatus*), stripetail darter (*Etheostoma kennicotti*), and the western mosquitofish (*Gambusia affinis*). Banded sculpin and snubnose darters were the most abundant forage species collected.

Based on fish species occurrence and relative abundance, this stream appears to be at best only a fair quality Ridge and Valley stream. A total of 21 species was collected, most of which were fairly tolerant forms found in low numbers. Only two darter species were collected. The stream has very heavy siltation and is normally dingy. Stream bank erosion was observed and the stream receives considerable run-off from agricultural practices and other activities in the watershed. Lots of domestic rubbish was observed along the stream course.

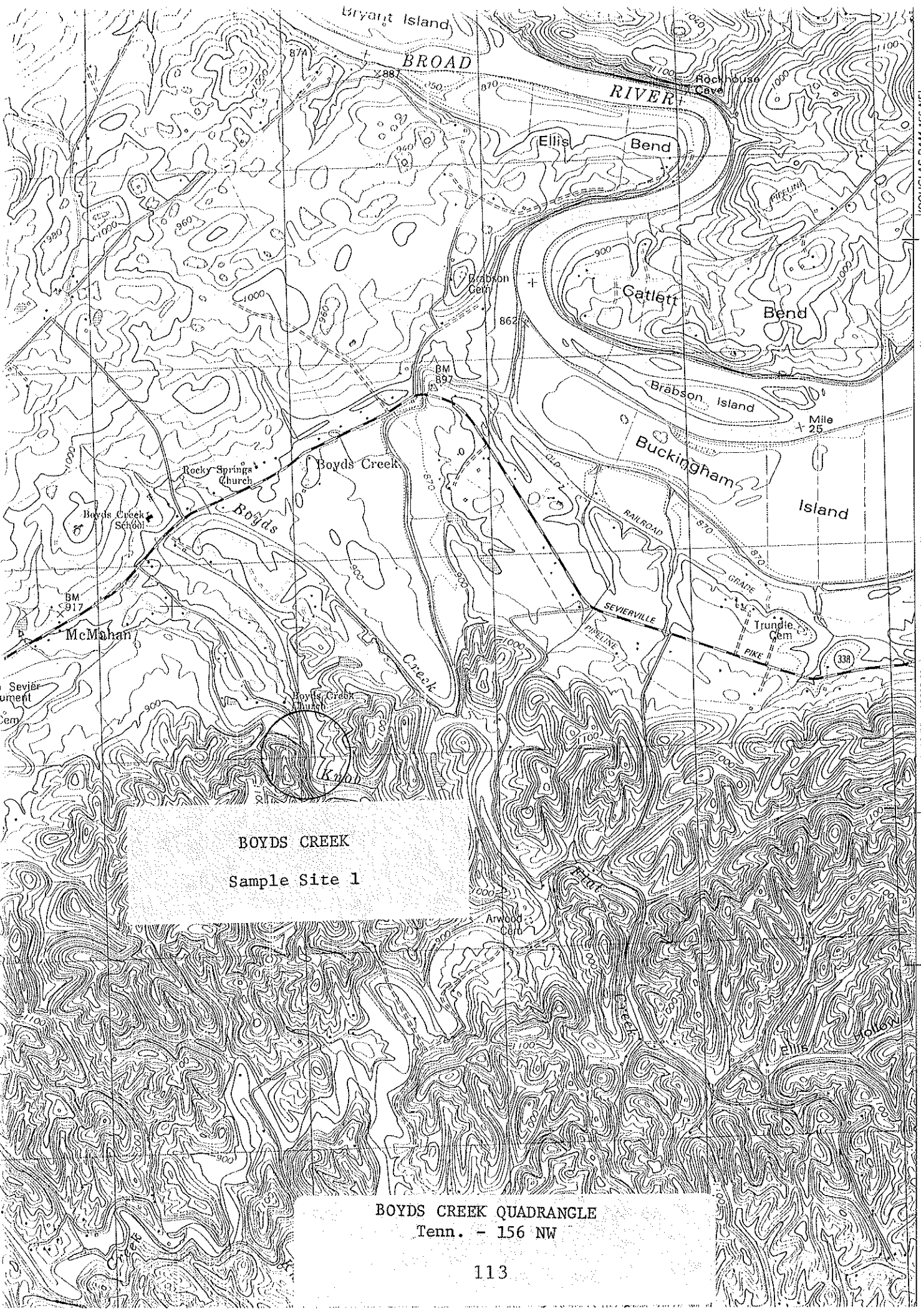
Benthic macroinvertebrates from sample Site 1 included Baetidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, no stoneflies, Hydropsychidae, Leptoceridae, Limnephilidae, and Uenoidae caddisflies, and Dryopidae, Elmidae, Gyrinidae, and Psephenidae beetles. Gastropods included pleurocerid snails and the Asian clam (*Corbicula fluminea*) was present. Relic *Villosa vanuxemensis* were also collected. Crayfish species included *Cambarus longirostris*, *Orconectes erichsonianus*, and *O. forceps*. Ephemeropterans represented about

34%, trichopterans about 30%, gastropods about 15%, coleopterans about 7%, and hemipterans about 5% of the total number of organisms collected (Fig. 13). A total of 38 taxa was collected at this site, many of which were tolerant forms.

Benthic macroinvertebrates from sample Site 2 included Baetidae, Ephemeridae, Heptageniidae, Leptophlebiidae, and Oligoneuriidae mayflies, Capniidae and Perlidae stoneflies, hydropsychid caddisflies, and Elmidae and Psephenidae beetles. Gastropods included pleurocerid snails and limpets (*Ferrissia*). Fingernail clams (*Sphaerium*) and the Asian clam (*Corbicula fluminea*) were present. Crayfish species included *Cambarus longirostris*, *Orconectes erichsonianus*, and *O. forceps*. Ephemeropterans represented about 34%, gastropods about 17%, trichopterans about 13%, hemipterans about 10%, pelecypods about 9% and coleopterans about 6% of the total number of organisms collected (Fig. 14). A total of 37 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.



BOYDS CREEK

Sample Site 1

BOYDS CREEK QUADRANGLE
Tenn. - 156 NW

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Boyds Creek

Date: 20 August 1993

Watershed: French Broad River

County: Sevier

Area: Site # 1

Sample Length: 300 ft

Lat-Long: 355439N - 833932W

Reach: 06010107-4,0

Data Collected By: Rick D. Bivens, Carl E. Williams, and Bob Robertson

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 17.7 ft Avg. Depth 0.7 ft Max. Depth 1.8 ft
2. Estimated Percent of Stream in Pools is 60%.
3. Estimated Percent **Pool** Bottom is Mud 10% Silt 20% Sand 30% Gravel 10% Rubble 20% Boulders 10%.
4. Estimated Percent **Riffle** Bottom is Mud 20% Silt 20% Sand 40% Gravel 10% Rubble 5% Boulders 5%.
5. Abundance of Littoral Aquatic Plants is Average.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25% of the Stream, Average in 50%, Poor in 25%.
7. Shade or Canopy Good over 75% of Stream.
8. Flow (CFS) 9.8: Compared to Normal: Normal
9. Present Weather: Clear, warm and humid.
   Air temperature - 71 F @ 11:30 am.
10. Weather (last 24 h): Partly cloudy, hot and humid.
11. pH 8.2 Temp. 73.4 F Conductivity 350 micromhos/cm
    D.O. 8.2 ppm Saturation 95%
12. Comments: Sample area location was at the mouth of Knob Creek on Mr. James Wilson's property. Stream is very silty, water normally dingy, lots of domestic rubbish along the stream course, agriculture along entire stream course, cattle in the stream, etc.

FISH DATA

Stream: Boyds Creek
Date: 20 August 1993
Watershed: French Broad River
County: Sevier
Area: Site # 1
Sample Length: 300 ft
Lat-Long: 355439N - 833932W
Reach: 06010107-4,0
Type of Sampling: Electrofishing
Elevation: 870 ft
Gear Type: One Backpack Unit
Time: 1500 - 1530

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus punctulatus	219	1	4	0.04
" "	"	1	6	0.13
Ambloplites rupestris	13	1	4	0.07
" "	"	1	5	0.09
" "	"	1	6	0.21
" "	"	1	7	0.25
Lepomis auritus	201	2	3	0.05
" "	"	6	4	0.31
" "	"	3	5	0.30
" "	"	3	6	0.52
" "	"	1	7	0.22
L. macrochirus	206	1	3	0.03
" "	"	1	4	0.07
" "	"	2	5	0.17
L. microlophus x L. macrochirus	-	1	5	0.13
Ictalurus punctatus	176	1	20	2.98
Hypentelium nigricans	166	8	2-8	0.52
Moxostoma duquesnei	229	1	2	t
M. erythrurum	230	3	9-13	1.85

Sample location was at the mouth of Knob Creek on Mr. James Wilson's property. Shocking at 120 volts AC. The stream was very silty; water normally dingy; lots of domestic rubbish along the stream course, and agriculture practices along the entire stream course; cattle in the stream, etc.

Collectors: R.D. Bivens, C.E. Williams, and B. Robertson

FISH DATA (continued)

Stream: Boyds Creek
Date: 20 August 1993
Watershed: French Broad River
County: Sevier
Area: Site # 1
Sample Length: 300 ft
Lat-Long: 355439N - 833932W
Reach: 06010107-4,0
Type of Sampling: Electrofishing
Elevation: 870 ft
Gear Type: One Backpack Unit
Time: 1500 - 1530

Species	TADS Code	Total Number	Inch Class	Total Weight
Campostoma anomalum	25	112	1-5	1.54
Cyprinella spiloptera	269	6	2-3	0.06
Cyprinus carpio	47	1	20	4.33
Hybopsis amblops	155	2	2	0.02
Pimephales notatus	334	5	1-3	0.02
Rhinichthys atratulus	351	1	1	t
Etheostoma simoterum	111	14	1-2	0.03
Cottus carolinae	40	59	1-4	0.75
Cambarus longirostris		1		
Orconectes erichsonianus		3		
O. forceps		4		

Sample location was at the mouth of Knob Creek on Mr. James Wilson's property. Shocking at 120 volts AC. The stream was very silty; water normally dingy; lots of domestic rubbish along the stream course, and agriculture practices along the entire stream course; cattle in the stream, etc.

Collectors: R.D. Bivens, C.E. Williams, and B. Robertson

Boyds Creek: Site # 1, Qualitative Benthic Sample

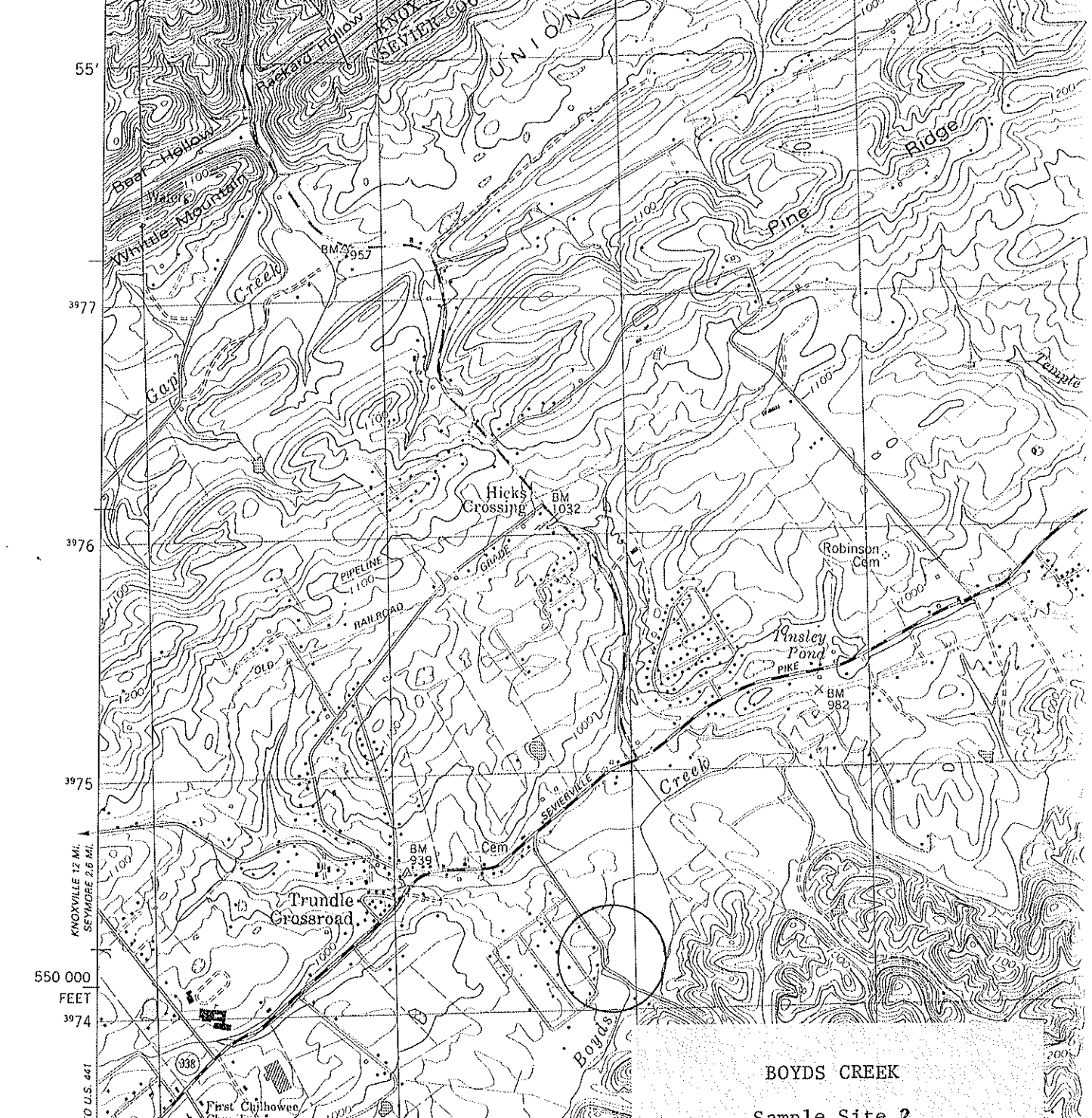
20 August 1993 Field # 463

Sevier Co., TN; At the mouth of Knob Creek. Coordinates: 355439N - 833932W. Boyds Creek, Tenn., #156 NW Quad. Reach # 06010107-4,0.

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	2
COLEOPTERA:	
Dryopidae/*Helichus* adult	2
Elmidae/*Macronychus glabratus* adult	8
Stenelmis larvae	3
Stenelmis adults	9
Gyrinidae/*Dineutus discolor* adult females	2
Psephenidae/*Psephenus herricki*	8
DIPTERA:	
Chironomidae	1
Empididae pupa	1
EPHEMEROPTERA:	
Baetidae/*Baetis*	5
Ephemeridae/*Hexagenia*	1
Heptageniidae/*Heptagenia*	1
Stenacron	34
Stenonema	50
Stenonema mediopunctatum	5
Oligoneuriidae/*Isonychia*	50
Tricorythidae/*Tricorythodes*	1
GASTROPODA:	
Lymnaeidae	1
Pleuroceridae	61
HEMIPTERA:	
Corixidae	1
Gerridae/*Gerris* nymph	1
Rheumatobates females	6
Rheumatobates tenuipes male	1
R. trulliger males	11
ISOPODA:	
Asellidae/*Lirceus*	2
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	6
Nigronia serricornis	2

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

TAXA	NUMBER
ODONATA:	
Aeshnidae/*Basiaeschna janata*	2
Boyeria vinosa	9
Calopterygidae/*Calopteryx*	2
Gomphidae/*Dromogomphus spinosus*	1
Gomphus lividus	1
Ophiogomphus sp. early instar	1
Macromiidae/*Macromia*	1
PELECYPODA:	
Corbiculidae/*Corbicula fluminea*	7
TRICHOPTERA:	
Hydropsychidae/*Cheumatopsyche*	52
Hydropsyche pupa	1
Hydropsyche betteni/depravata	63
H. frisoni	3
Leptoceridae/*Triaenodes*	2
Limnephilidae/*Pycnopsyche*	3
Uenoidae/*Neophylax*	2
	425



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

Control by NOS/NOAA, USGS, and TVA

Revised by TVA in 1952 by photogrammetric methods using aerial photographs taken 1952 and by reference to TVA-USGS quadrange dated 1940. Map field checked by TVA, 1953

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 purple dashed lines generally visible on aeria

MN
GN
3° 53 MILS
1°35' 28 MILS

UTM GRID AND 1986 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

BOYDS CREEK QUADRANGLE
Tenn. - 156 NW

FOR TENN AND U.

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Boyds Creek — Date: 14 October 1993

Watershed: French Broad River — County: Sevier

Area: Site # 2 — Sample Length: 300 ft

Lat-Long: 355259N - 834334W — Reach: 06010107-4,0

Data Collected By: Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 13.8 ft Avg. Depth 0.3 ft Max. Depth 1.7 ft
2. Estimated Percent of Stream in Pools is 30%.
3. Estimated Percent **Pool** Bottom is Mud 10% Silt 20% Sand 30% Gravel 20% Rubble 15% Boulders 5%.
4. Estimated Percent **Riffle** Bottom is Silt 10% Sand 30% Gravel 30% Rubble 20% Boulders 5% Bedrock 5%.
5. Abundance of Littoral Aquatic Plants is Scarce.
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 60% of Stream.
8. Flow (CFS) 2.6: Compared to Normal: Low
9. Present Weather: Clear and mild.
   Air temperature - 68 F @ 2:00 pm.
10. Weather (last 24 h): Partly cloudy and mild, cool overnight.
11. pH 7.3 Temp. 58.1 F Conductivity 325 micromhos/cm
    D.O. 10.1 ppm Saturation 97%
12. Comments: Sample area location was downstream of the bridge on North Shiloh Road. Heavy siltation, shallow, wide areas without a lot of cover for fish. Agricultural use along the stream course, cattle in stream, eroding stream banks, etc.

FISH DATA

Stream: Boyds Creek
Date: 14 October 1993
Watershed: French Broad River
County: Sevier
Area: Site # 2
Sample Length: 300 ft
Lat-Long: 355259N - 834334W
Reach: 06010107-4,0
Type of Sampling: Electrofishing
Elevation: 935 ft
Gear Type: One Backpack Unit
Time: 1600 - 1630

Species	TADS Code	Total Number	Inch Class	Total Weight
Lepomis auritus	201	6	1	t
" "	"	1	2	0.01
L. macrochirus	206	1	4	0.06
Catostomus commersoni	32	37	1-11	1.00
Hypentelium nigricans	166	9	1-4	0.14
Moxostoma erythrurum	230	4	2	0.01
Campostoma anomalum	25	26	1-4	0.28
Luxilus chrysocephalus	249	2	2	0.01
Rhinichthys atratulus	351	8	1-2	0.01
Semotilus atromaculatus	360	27	1-3	0.12
Etheostoma kennicotti	98	3	1-2	0.01
E. simoterum	111	40	1-2	0.06
Gambusia affinis	147	13	1	0.01
Cottus carolinae	40	42	1-4	0.55
Cambarus longirostris		abundant		
Orconectes erichsonianus		common		
O. forceps		common		

Sample location was at the mouth of Knob Creek on Mr. James Wilson's property. Shocking at 120 volts AC. The stream was very silty; water normally dingy; lots of domestic rubbish along the stream course, and agriculture practices along the entire stream course; cattle in the stream, etc.

Collectors: R.D. Bivens, C.E. Williams, and B. Robertson

Boyds Creek: Site # 2, Qualitative Benthic Sample

14 October 1993 Field # 501

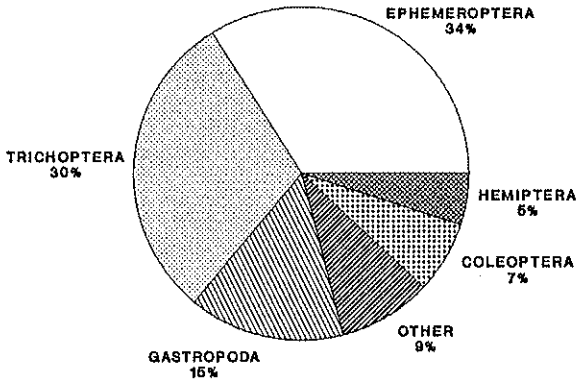
Sevier Co., TN; Located downstream of the bridge on North Shiloh Road. Coordinates: 355259N - 834334W. Boyds Creek, Tenn., # 156 NW Quad. Reach # 06010107-4,0.

TAXA	NUMBER
ANNELIDA:	
Hirudinea	1
COLEOPTERA:	
Elmidae/*Optioservus* larvae	5
Optioservus ovalis adults	3
Stenelmis larvae	2
Stenelmis adults	7
Psephenidae/*Psephenus herricki*	3
DIPTERA:	
Chironomidae larvae and pupa	9
Simuliidae	1
Tabanidae/*Chrysops*	1
Tipulidae/*Hexatoma*	1
EPHEMEROPTERA:	
Baetidae/*Baetis*	10
Ephemeridae/*Hexagenia*	4
Heptageniidae/*Stenacron*	28
Stenonema sp.	27
Stenonema femoratum	1
Leptophlebiidae/*Paraleptophlebia*	8
Oligoneuriidae/*Isonychia*	35
GASTROPODA:	
Ancylidae/*Ferrissia*	2
Pleuroceridae	56
HEMIPTERA:	
Corixidae	1
Gerridae/*Gerris remigis* adult female	1
Veliidae/*Rhagovelia obesa* adult females	12
Rhagovelia obesa adult males	10
Rhagovelia obesa nymph	8
ISOPODA:	
Asellidae/*Lirceus*	1
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	1
Nigronia serricornis	3
Sialidae/*Sialis*	2

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

TAXA	NUMBER
ODONATA:	
Aeshnidae/*Basiaeschna janata*	1
Boyeria vinosa	2
Calopterygidae/*Calopteryx*	9
Coenagrionidae/*Argia*	3
Gomphidae/*Gomphus lividus*	1
Ophiogomphus mainensis	2
PELECYPODA:	
Corbiculidae/*Corbicula fluminea*	27
Sphaeriidae/*Sphaerium*	2
Unionidae/*Villosa vanuxemensis* relics	
PLECOPTERA:	
Capniidae	1
Perlidae/*Perlinella*	1
TRICHOPTERA:	
Hydropsychidae/*Cheumatopsyche*	37
Hydropsyche betteni/depravata	5
Uenoidae/*Neophylax* pupa	1
	335

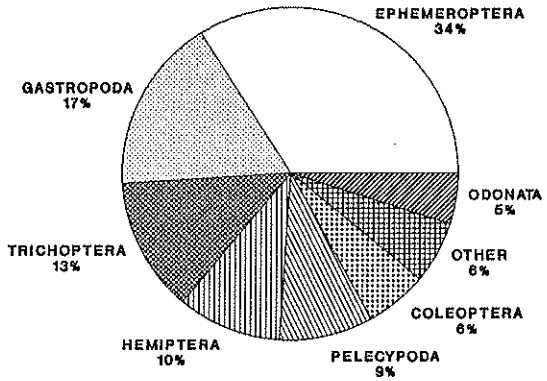
BOYDS CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 425
TAXA RICHNESS = 38
Figure 13.

BOYDS CREEK
SITE 2
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 335
TAXA RICHNESS = 37
Figure 14.

Webb Creek

One qualitative fishery survey was conducted in July 1993:

Location and Length - Tributary to (Middle Prong) Little Pigeon River. The sample site was located along Webb Creek Road, near the mouth, across from the Pittman Center City Hall and was sampled on 20 July 1993. It was 400 ft in length and averaged 22.5 ft in width. It was in Sevier County (Richardson Cove Quadrangle).

Sampling Methodology - The site was sampled using two backpack electrofishing units operating at 360 volts AC.

Water Quality - Data were collected from midstream at mid-depth on 20 July 1993: DO - 8.2 ppm, pH - 7.9, Temperature - 71.6 F, Conductivity - 50 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample. The sample contained 375 organisms representing 60 taxa.

Fish Collected:

Species	No.	% by No.	Wt.	% by Wt.
Rainbow trout	2	0.5	0.69	3.0
Smallmouth bass	5	1.3	0.67	2.9
Largemouth bass	1	0.3	0.37	1.6
Rock bass	18	4.6	3.33	14.4
Bluegill	3	0.7	0.21	0.9
Non-game Fish	19	4.8	9.35	40.3
Forage Fish	347	87.8	8.58	36.9
Total	395		23.20	

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

We collected a total of 395 fish weighing 23.20 lb and comprising 18 species from our sample site. Four native game species, smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), rock bass (*Ambloplites rupestris*), and bluegill (*Lepomis macrochirus*), along with two rainbow trout (*Oncorhynchus mykiss*) were collected here. Only one 8-in largemouth bass was collected while five smallmouth bass ranging from 1 to 9-in were present in the sample. Rock bass made up about 5% compared to 1% by smallmouth bass, of the total number of fish collected. Rock bass also contributed about 14% of the total weight as compared

to about 3% by smallmouth bass. One of the rainbow trout was a 11-in stocker while the other was a 4-in fish that appeared to be stream reproduction. The Agency routinely stocks the (Middle Prong) Little Pigeon River with catchable size rainbow trout and our sample site was near the mouth of the stream in close proximity to the river. Two non-game and 11 forage species were also collected here and these comprised about 93% of the total number and 77% of the total weight. Of this, forage fish accounted for about 88% of the total number and 37% of the total weight. Of particular interest is the occurrence of moderately intolerant species such as the warpaint shiner (*Luxilus coccogenis)*, Tennessee shiner (*Notropis leuciodus*), saffron shiner (*N. rubricroceus*), and telescope shiner (*N. telescopus*), most of which were fairly abundant. Three darter species, the fantail (*Etheostoma flabellare*), snubnose (*E. simoterum*), and Swannanoa (*E. swannanoa*) were collected, however, in low numbers. Central stonerollers (*Campostoma anomalum*), warpaint shiners, river chub (*Nocomis micropogon*), and banded sculpin (*Cottus carolinae*) were the most abundant forage species present.

Based on fish species occurrence, this stream appears to be a good to excellent quality Blue Ridge stream. The occurrence of several intolerant forms and three darter species further attests to good water quality. Smallmouth bass and rock bass were the primary game species collected in this reach, but were found in relatively low numbers. This may indicate a transition from coolwater to coldwater habitat. The occurrence of species such as the saffron shiner, Swannanoa darter, longnose dace (*Rhinichthys cataractae*), along with apparent reproduction of rainbow trout also tends to indicate a transition toward coldwater species.

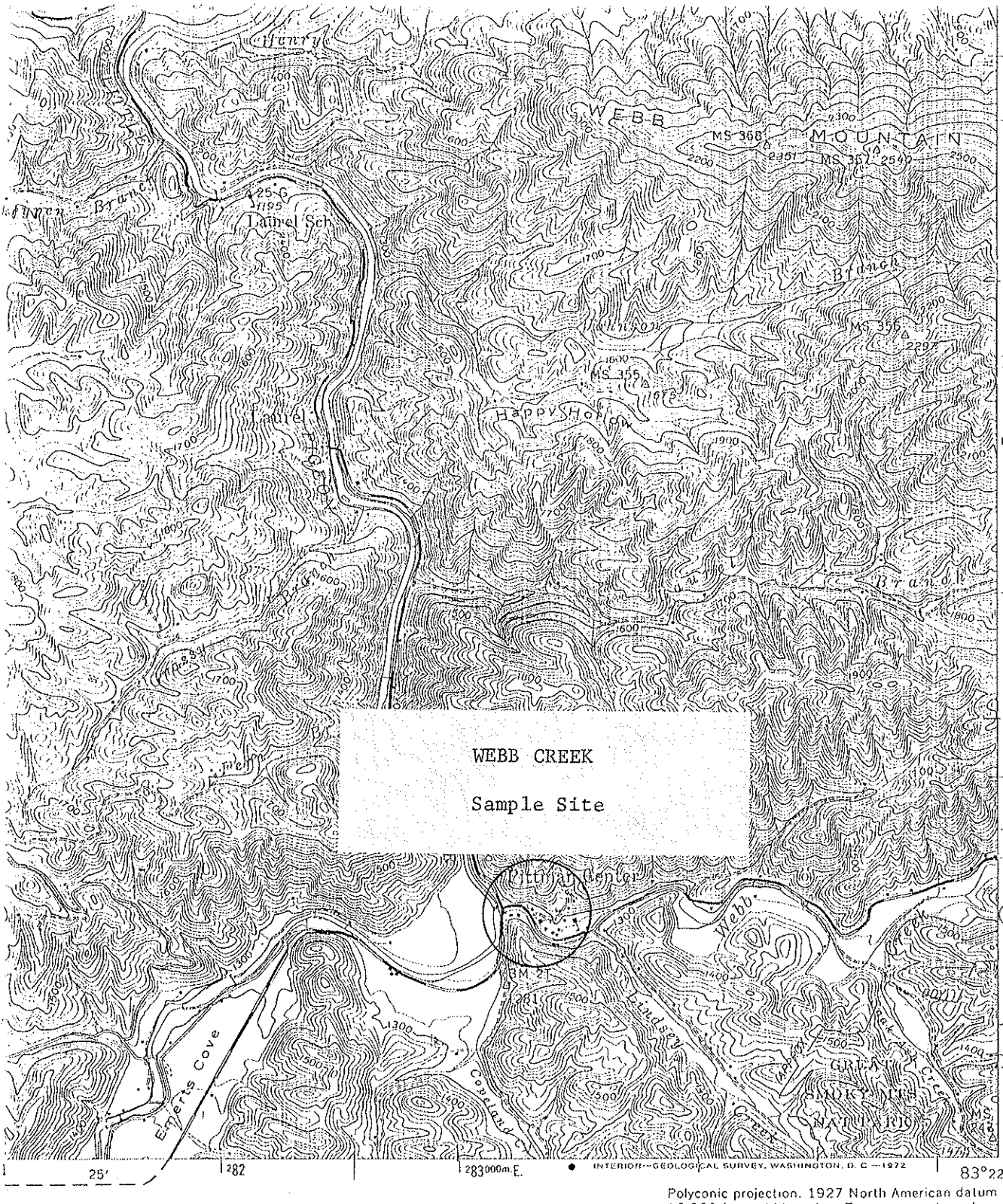
Benthic macroinvertebrates from our sample site included Baetidae, Caenidae, Ephemerellidae, Heptageniidae, Leptophlebiidae, Neoephemeridae, and Oligoneuriidae mayflies, Chloroperlidae, Leuctridae, Peltoperlidae, Perlidae, and Pteronarcyidae stoneflies, Brachycentridae, Hydropsychidae, Lepidostomatidae, Leptoceridae, Limnephilidae, Philopotamidae, Polycentropodidae, and Rhyacophilidae caddisflies, and Dryopidae, Elmidae, Gyrinidae, and Psephenidae beetles. Limpets (*Ferrissia*) and pleurocerid snails were present along with the Asian clam (*Corbicula fluminea*). One specimen of fingernail clam (*Sphaerium*) was also found. *Cambarus longirostris* and *Orconectes forceps* were the only crayfish species collected. Ephemeropterans represented about 34%, trichopterans about 19%, coleopterans about 17%, odonates about 12%, and plecopterans about 5% of the total number or organisms collected (Fig. 15). A total of 60 taxa was collected at this site and more than 50% of these were EPT taxa.

Management Recommendations:

1. Based on fish and macroinvertebrates species assemblages it appears that this stream probably still has good to

excellent water quality that merits extra protection from any source of pollution or habitat destruction.

2. 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.



Polyconic projection. 1927 North American datum
10,000 foot grid based on Tennessee rectangular coordinate system
1000-meter Universal Transverse Mercator grid ticks, Zone 17, shown in blue

ROUTES USUALLY TRAVELED

HARD, IMPERVIOUS SURFACES ——————

OTHER SURFACE IMPROVEMENTS —— ——

(25) *U. S. ROUTE* (35) *STATE ROUTE*

RICHARDSON COVE, TENN

164 - SW

N3545-W8322.5/7.5

1940

AMS 4355 IV SW—SERIES V841

(Mt. Guyot 165-NE)
4355 III NE

092
243

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Webb Creek

Date: 20 July 1993

Watershed: French Broad River

County: Sevier

Area: See comments

Sample Length: 400 ft

Lat-Long: 354529N - 832337W

Reach: 06010107-24,0

Data Collected By: Rick D. Bivens, Carl E. Williams, and Mark T. Fagg

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 22.5 ft Avg. Depth 0.7 ft Max. Depth 2.3 ft
2. Estimated Percent of Stream in Pools is 20%.
3. Estimated Percent **Pool** Bottom is Silt 5% Sand 20% Gravel 20% Rubble 40% Boulders 15%.
4. Estimated Percent **Riffle** Bottom is Sand 20% Gravel 20% Rubble 30% Boulders 20% Bedrock 10%.
5. Abundance of Littoral Aquatic Plants is Scarce.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25% of the Stream, Average in 50%, Poor in 25%.
7. Shade or Canopy Good over 75% of Stream.
8. Flow (CFS) 17.2: Compared to Normal: Normal
9. Present Weather: Partly cloudy to overcast, warm and humid. Air temperature - 80 F @ 9:45 am.
10. Weather (last 24 h): Partly cloudy, very hot and humid.
11. pH 7.9 Temp. 71.6 F Conductivity 50 micromhos/cm
    D.O. 8.2 ppm Saturation 92%
12. Comments: Sample area location was along Webb Creek Road near the mouth, across from Pittman Center City Hall.

FISH DATA

Stream: Webb Creek
Date: 20 July 1993
Watershed: French Broad River
County: Sevier
Area: See comments
Sample Length: 400 ft
Lat-Long: 354529N - 832337W
Reach: 06010107-24,0
Type of Sampling: Electrofishing
Elevation: 1,250 ft
Gear Type: Two Backpack Units
Time: 1330 - 1415

Species	TADS Code	Total Number	Inch Class	Total Weight
Oncorhynchus mykiss	353	1	4	0.02
" "	"	1	11	0.67 *
Micropterus dolomieu	218	1	1	t
" "	"	2	2	0.01
" "	"	1	7	0.22
" "	"	1	9	0.44
M. salmoides	220	1	8	0.37
Ambloplites rupestris	13	1	4	0.07
" "	"	10	5	0.93
" "	"	1	6	0.13
" "	"	3	7	0.87
" "	"	2	8	0.84
" "	"	1	9	0.49
Hypentelium nigricans	166	14	3-12	5.61
Moxostoma duquesnei	229	5	9-16	3.74
Campostoma anomalum	25	76	1-7	3.68
Luxilus coccogenis	248	73	1-5	0.96
Nocomis micropogon	234	57	1-7	2.16
Notropis leuciodus	255	26	2-3	0.18
N. rubricroceus	262	20	1-2	0.10
N. telescopus	272	8	2-3	0.07
Rhinichthys cataractae	352	5	1-3	0.04
Etheostoma flabellare	92	5	2-3	0.03
E. simoterum	111	1	2	0.01
E. swannanoa	129	2	1-3	0.03
Cottus carolinae	40	74	1-4	1.32

* Stocked fish

Site was located adjacent to the road, across from Pittman Center City Hall. Shocking at 360 volts AC.

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

Webb Creek: Qualitative Benthic Sample

20 July 1993 Field # 450

Sevier Co., TN; Along Webb Creek Road near the mouth, across from the Pittman Center City Hall. Coordinates: 354529N - 832337W. Richardson Cove, Tenn., # 164 SW Quad. Reach # 06010107-24,0.

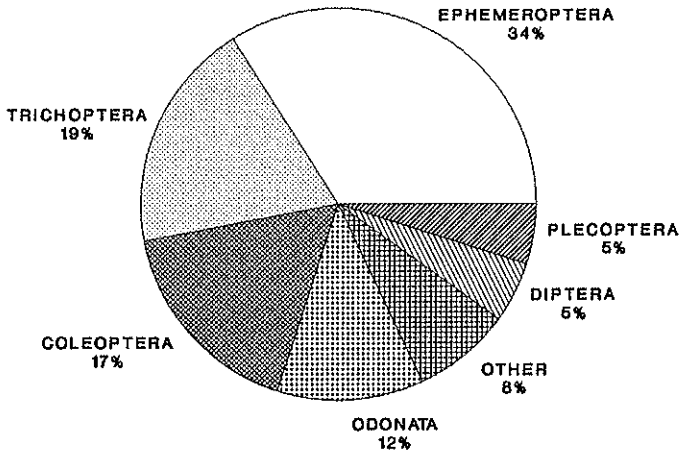
TAXA	NUMBER
ANNELIDA:	
Oligochaeta	2
COLEOPTERA:	
Dryopidae/*Helichus* adults	8
Elmidae/*Macronychus glabratus* larvae & adult	3
Optioservus ovalis adult	1
Promoresia elegans larva & adults	24
P. tardella adults	9
Stenelmis larvae	2
Gyrinidae/*Dineutus discolor* adult female	1
Psephenidae/*Psephenus herricki* larvae & adult	16
DIPTERA:	
Athericidae/*Atherix lantha*	8
Chironomidae	2
Simuliidae	3
Tabanidae/*Chrysops* larva & pupa	2
Tipulidae/*Hexatoma*	1
Tipula	2
EPHEMEROPTERA:	
Baetidae/*Baetis*	5
Caenidae/*Caenis*	4
Ephemerellidae/*Drunella*	1
Ephemerella	3
Serratella sp.	2
S. deficiens	10
Heptageniidae/*Epeorus rubidus/subpallidus*	38
Heptagenia	1
Stenonema sp.	6
S. ithica	1
Leptophlebiidae/*Paraleptophlebia*	2
Neoephemeridae/*Neoephemera purpurea*	1
Oligoneuriidae/*Isonychia*	53
GASTROPODA:	
Ancylidae/*Ferrissia*	8
Pleuroceridae	5
HEMIPTERA:	
Veliidae/*Rhagovelia obesa* male & female	2

Webb Creek: Qualitative Sample cont.

TAXA	NUMBER
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	6
Nigronia serricornis	4
ODONATA:	
Aeshnidae/*Boyeria vinosa*	25
Calopterygidae/*Calopteryx*	3
Gomphidae/*Gomphus lividus*	3
Gomphus (Genus A *rogersi*) *	2
Hagenius brevistylus	2
Lanthus	1
Stylogomphus albistylus	8
PELECYPODA:	
Corbiculidae/*Corbicula fluminea*	5
Sphaeriidae/*Sphaerium*	1
PLECOPTERA:	
Chloroperlidae	1
Leuctridae	2
Peltoperlidae/*Peltoperla*	7
Perlidae/*Acroneuria abnormis*	4
Agnetina capitata	1
Paragnetina immarginata	1
Perlesta	2
Pteronarcyidae/*Pteronarcys*	3
TRICHOPTERA:	
Brachycentridae/*Micrasema*	1
Hydropsychidae/*Ceratopsyche bronta*	2
C. morosa	2
C. sparna	32
Cheumatopsyche	13
Lepidostomatidae/*Lepidostoma*	1
Limnephilidae/*Goera* pupa	1
Goera calcarata	5
Pycnopsyche	4
Philopotamidae/*Dolophilodes distinctus*	5
Polycentropodidae/*Polycentropus*	1
Rhyacophilidae/*Rhyacophila fuscula*	1
	375

* (from Louton 1982)

WEBB CREEK
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 375
TAXA RICHNESS = 60
Figure 15.

Dunn Creek

One qualitative and one quantitative fishery survey was conducted on Dunn Creek in July 1993:

Location and Length - Tributary to East Fork (Middle Prong of the Little Pigeon River tributary). Sample Site 1 was located along Pearl Valley Road across from Pearl Valley Church and was sampled on 22 July 1993. It was 400 ft in length and averaged 24.7 ft in width. Site 2 was located along Rocky Flats Road, approx. 0.25 mi. upstream of the mouth of Matthew Creek and was sampled on 21 October 1993. It was 387 ft (118 m) in length and averaged 14.3 ft in width. Both sites were in Sevier County (Jones Cove Quadrangle).

Sampling Methodology - Sites 1 was sampled using one backpack electrofishing unit operating at 240 volts AC. At Site 2, three electrofishing passes were made with backpack units operating side by side at 360-400 volts AC. A block net was employed at the downstream end of the sample area.

Water Quality - Data were collected from midstream at mid-depth at each site. Site 1, 22 July 1993: DO - 9.7 ppm, pH - 8.3, Temperature - 72.3 F, Conductivity - 85 micromhos/cm. Site 2, 21 July 1993: DO - 9.0 ppm, pH - 6.3, Temperature - 63.2 F, Conductivity - 25 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 2 man-h qualitative sample at Site 1 and a 3 man-h qualitative sample at Site 2. Site 1 sample contained 454 organisms representing 43 taxa. Site 2 sample contained 383 organisms representing 49 taxa.

Fish Collected:

	Site 1				Site 2			
Species	No.	% by No.	Wt.	% by Wt.	No.	% by No.	Wt.	% by Wt.
Rock bass	14	2.1	2.91	12.5				
Redbreast sunfish	15	2.2	0.90	3.9				
Rainbow trout	1	0.1	0.01	-	13	2.0	0.85	7.1
Non-game Fish	40	6.0	6.38	27.4	11	1.7	2.17	18.2
Forage Fish	597	89.5	13.06	56.1	624	96.3	8.89	74.6
Total	667		23.26		648		11.91	

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.

We collected a total of 667 fish weighing 23.26 lb and comprising 21 species from Site 1. One native game species, rock bass (*Ambloplites rupestris*), along with the introduced redbreast sunfish (*Lepomis auritus*), and one 3-in rainbow trout (*Oncorhynchus mykiss*) were found. Fourteen rock bass ranging from 4 to 8-in and 15 redbreast sunfish ranging from 3 to 6-in were collected (Fig. 16). All game fish represented < 5% of the total number of fish collected and about 16% of the total weight of all fish collected. Two non-game and 16 forage species were also collected here and these comprised about 95% of the total number and 84% of the total weight. Of interest is the occurrence of fairly intolerant species such as the warpaint shiner (*Luxilus coccogenis*), Tennessee shiner (*Notropis leuciodus*), saffron shiner (*N. rubricroceus*). Darter species included the greenside (*Etheostoma blennioides*), stripetail (*E. kennicotti*), redline (*E. rufilineatum*), and snubnose (*E. simoterum*). Central stonerollers (*Campostoma anomalum*) and redline darters were the most abundant forage species present.

At Site 2 we collected a total of 648 fish weighing 11.91 lb and comprising 10 species. Thirteen rainbow trout ranging from 2 to 7-in were the only game fish collected at this site (Fig. 17). Rainbow trout made up about 2% of the total number of fish collected and about 7% of the total weight collected. Rainbow trout density was estimated at 77 fish/acre while the standing crop estimate was 5.05 lb/acre (Strange and Habera 1994). One non-game and 8 forage species were also collected here and these comprised 98% of the total number and about 93% of the total weight. Forage species made up about 96% of the total number and 75% of the total weight. Additional species collected here but not at the downstream site included blacknose dace (*Rhinichthys atratulus*), longnose dace (*R. cataractae*), fantail darter (*Etheostoma flabellare*), and mottled sculpin (*Cottus bairdi*). Blacknose dace, mottled sculpin, and central stonerollers were the most abundant forage species present.

Based on fish species occurrence, this stream appears to be a good quality Blue Ridge stream. A total of 25 species was collected from the two sample sites combined. The occurrence of several intolerant forms and four darter species further attests to good water quality. Rock bass, redbreast sunfish, and one rainbow trout were the only game species collected at the lower site while rainbow trout was the only game fish found at the upstream site and indicates a transition from coolwater to coldwater habitat. The occurrence of species such as the longnose dace, saffron shiner, and mottled sculpin at Site 2 further indicates a transition toward coldwater species.

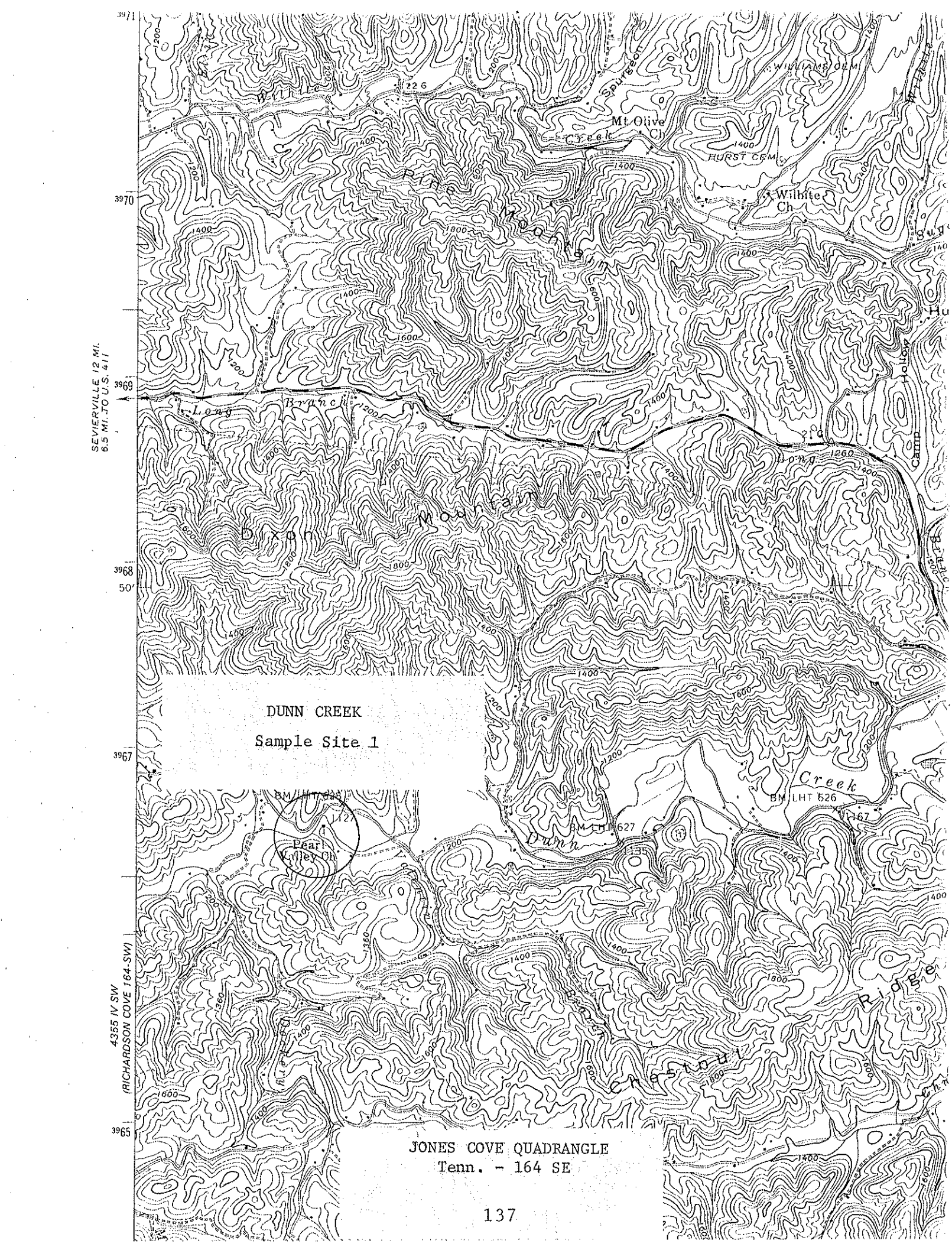
Benthic macroinvertebrates from sample Site 1 included Baetidae, Caenidae, Ephemerellidae, Ephemeridae, Heptageniidae,

and Oligoneuriidae mayflies, the perlid stonefly *Acroneuria abnormis*, Hydropsychidae, Hydroptilidae, Limnephilidae, and Philopotamidae caddisflies, and Dryopidae, Elmidae, and Psephenidae beetles. The Asian clam (*Corbicula fluminea*) was present along with pleurocerid snails and limpets (*Ferrissia*). Crayfish species included *Cambarus longirostris*, *Orconectes erichsonianus*, and *O. forceps*. Ephemeropterans represented about 57%, trichopterans about 17%, megalopterans about 10%, and hemipterans about 5% of the total number of organisms collected (Fig. 18). A total of 43 taxa was collected at this site.

Benthic macroinvertebrates from sample Site 2 included Baetidae, Ephemerellidae, Ephemeridae, Heptageniidae, Leptophlebiidae, and Oligoneuriidae mayflies, Chloroperlidae, Leuctridae, Peltoperlidae, Perlidae, Perlodidae, and Pteronarcyidae stoneflies, Hydropsychidae, Lepidostomatidae, Limnephilidae, Philopotamidae, Polycentropodidae, Rhyacophilidae, and Uenoidae caddisflies, and Dryopidae, Elmidae, Psephenidae, and Ptilodactylidae beetles. Of special interest is the collection of four specimens of *Anchytarsus bicolor* larvae. Aquatic ptilodactylids are considered quite rare and their distribution is sporadic, even in streams where they are known to occur (Brigham et al. 1982). Pleurocerid snails were the only gastropod collected at this site. Crayfish species included *Cambarus bartonii* and *C. longirostris*. Plecopterans represented about 25%, dipterans about 19%, trichopterans about 17%, coleopterans about 16%, and ephemeropterans about 13% of the total number of organisms collected (Fig. 19). A total of 49 taxa was collected at this site.

Management Recommendations:

1. The fish species diversity and taxa richness of benthic macroinvertebrates and the presence of many intolerant forms indicate that this is an high quality Blue Ridge stream that merits extra protection from pollution or habitat destruction.


DUNN CREEK
Sample Site 1
JONES COVE QUADRANGLE
Tenn. - 164 SE
SEVIERVILLE 12 MI.
6.5 MI. TO U.S. 411
4355 IV SW
(RICHARDSON COVE 164-SW)
Mt Olive Ch
Wilhite Ch
HURST CEM
Spurgeon Creek
Long Branch
Dixon Mountain
Dunn Creek
Pearl Valley Ch
BM LHT 626
BM LHT 627
Ridge
3971
3970
3969
3968
3967
3965
50'

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Dunn Creek — Date: 22 July 1993

Watershed: French Broad River — County: Sevier

Area: Site # 1 — Sample Length: 400 ft

Lat-Long: 354922N - 832150W — Reach: 06010107-26,0

Data Collected By: Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 24.7 ft Avg. Depth 0.7 ft Max. Depth 1.8 ft
2. Estimated Percent of Stream in Pools is 20%.
3. Estimated Percent **Pool** Bottom is Silt 10% Sand 30% Gravel 20% Rubble 20% Boulders 10% Bedrock 10%.
4. Estimated Percent **Riffle** Bottom is Silt 5% Sand 20% Gravel 20% Rubble 30% Boulders 20% Bedrock 5%.
5. Abundance of Littoral Aquatic Plants is Scarce.
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 50% of Stream.
8. Flow (CFS) 9.7: Compared to Normal: Normal
9. Present Weather: Clear, hot and humid.
   Air temperature - 80 F @ 10:45 am.
10. Weather (last 24 h): Clear and hot.
11. pH 8.3 Temp. 72.3 F Conductivity 85 micromhos/cm
    D.O. 9.7 ppm Saturation 113%
12. Comments: Sample area location was along Pearl Valley Road across from Pearl Valley Church. Lot of sand and fine gravel; wide shallow riffle areas without much habitat. Some agriculture use along the stream course; cattle and sheep, etc.

FISH DATA

Stream: Dunn Creek
Date: 22 July 1993

Watershed: French Broad River
County: Sevier

Area: Site # 1
Sample Length: 400 ft

Lat-Long: 354922N - 832150W
Reach: 06010107-26,0

Type of Sampling: Electrofishing
Elevation: 1,100 ft

Gear Type: One Backpack Unit
Time: 1345 - 1500

Species	TADS Code	Total Number	Inch Class	Total Weight
Ambloplites rupestris	13	2	4	0.12
" "	"	3	5	0.34
" "	"	3	6	0.53
" "	"	4	7	1.09
" "	"	2	8	0.83
Lepomis auritus	201	3	3	0.06
" "	"	8	4	0.44
" "	"	3	5	0.26
" "	"	1	6	0.12
Oncorhynchus mykiss	353	1	3	0.01
Hypentelium nigricans	166	38	1-12	4.85
Moxostoma duquesnei	229	2	11-15	1.53
Campostoma anomalum	25	366	1-6	10.06
Cyprinella galactura	253	13	1-3	0.08
Hybopsis amblops	155	10	2-3	0.08
Luxilus chrysocephalus	249	10	2-6	0.39
L. coccogenis	248	24	1-4	0.36
Nocomis micropogon	234	9	3-7	0.63
Notropis leuciodus	255	12	1-3	0.06
N. rubellus micropteryx	260	1	1	t
N. rubricroceus	262	1	2	t
N. stramineus	271	2	1-2	0.01
Semotilus atromaculatus	360	4	2-3	0.06
Etheostoma blennioides	80	15	1-4	0.30
E. kennicotti	98	22	1-2	0.08
E. rufilineatum	108	59	1-3	0.37
E. simoterum	111	27	1-2	0.11
C. carolinae	40	22	1-4	0.47

Cambarus longirostris (1), *Orconectes erichsonianus* (1), and *O. forceps (23)*

Site was located along Pearl Valley Road, across from Pearl Valley Church. Shocking at 240 volts AC.

Collectors: R.D. Bivens and C.E. Williams

Dunn Creek: Site # 1, Qualitative Benthic Sample

22 July 1993 Field # 452

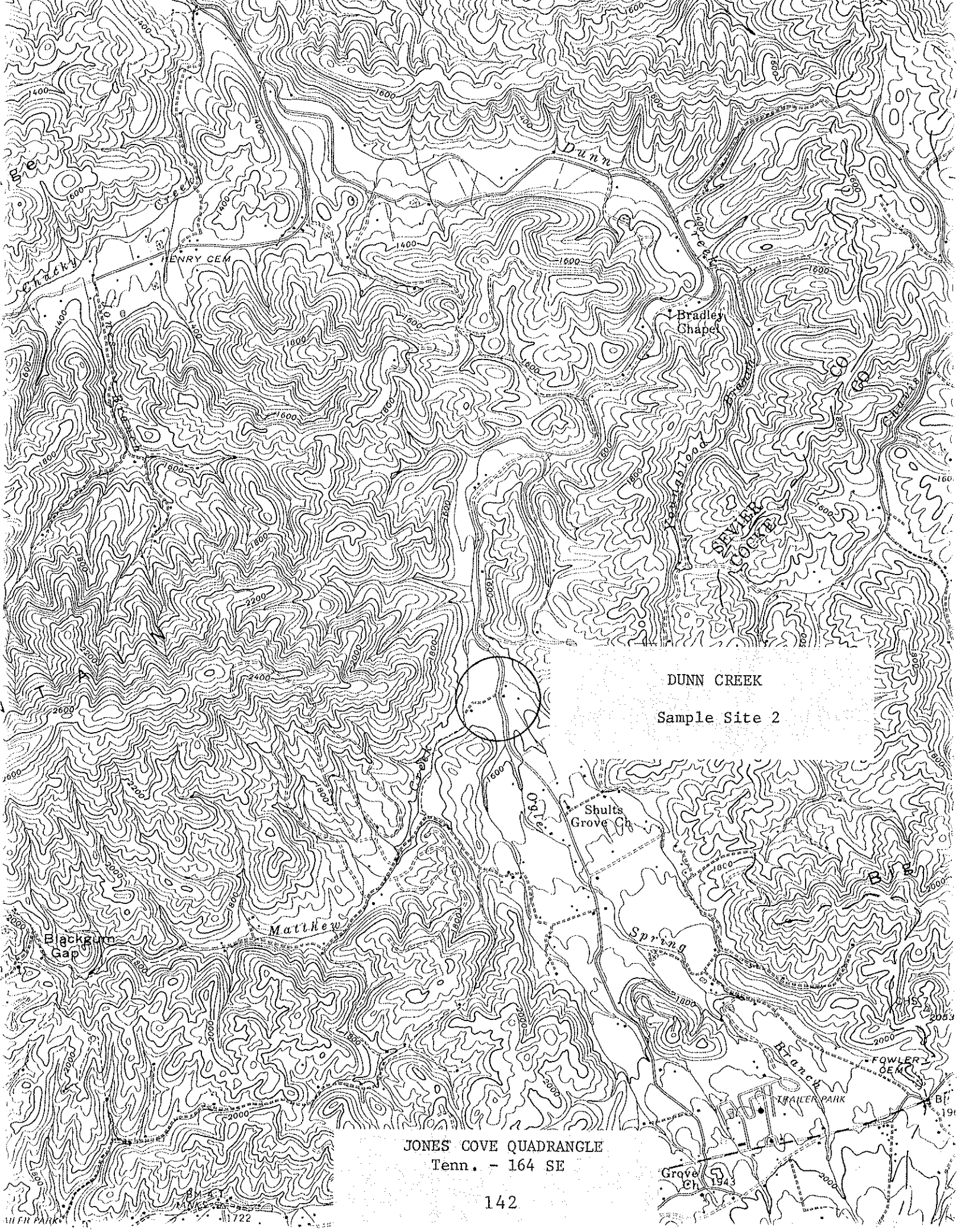
Sevier Co., TN; Along Pearl Valley Road across from Pearl Valley Church. Coordinates: 354922N - 832150W. Jones Cove, Tenn., # 164 SE Quad. Reach # 06010107-26,0

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	4
COLEOPTERA:	
Curculionidae/*Lixus morulus* adult	1
Dryopidae/*Helichus* adults	5
Elmidae/*Oulimnius latiusculus* adults	2
Promoresia elegans adult	1
Stenelmis larva & adults	4
Psephenidae/*Psephenus herricki* larvae	7
DIPTERA:	
Chironomidae	5
Empididae larvae & pupa	5
Simuliidae larva & pupa	2
Tipulidae/*Tipula*	2
EPHEMEROPTERA:	
Baetidae/*Baetis*	3
Caenidae/*Caenis*	19
Ephemerellidae/*Seretella deficiens*	2
Ephemeridae/*Hexagenia*	6
Heptageniidae/*Epeorus rubidus/subpallidus*	1
Stenacron	2
Stenonema	90
Oligoneuriidae/*Isonychia*	136
GASTROPODA:	
Ancylidae/*Ferrissia*	2
Pleuroceridae	2
HEMIPTERA:	
Veliidae/*Microvelia*	1
Rhagovelia obesa nymphs	19
Rhagovelia obesa adult male and females	3
HYDRACARINA:	1
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	29
Nigronia serricornis	13
Sialidae/*Sialis*	1

Dunn Creek: Site # 1, Qualitative Sample cont.

TAXA	NUMBER
ODONATA:	
Aeshnidae/*Boyeria vinosa*	2
Corduliidae/*Helocordulia uhleri*	1
Gomphidae/*Lanthus vernalis*	2
Gomphus (Genus A *rogersi*) *	1
Macromiidae/*Macromia*	1
PELECYPODA:	
Corbiculidae/*Corbicula fluminea*	3
PLECOPTERA:	
Perlidae/*Acroneuria abnormis*	1
TRICHOPTERA:	
Hydropsychidae/*Ceratopsyche bronta*	5
C. morosa	6
C. sparna	2
Cheumatopsyche	32
Hydropsyche betteni/depravata	10
H. frisoni	3
Hydroptilidae/*Leucotrichia pictipes* larva & pupae	5
Limnephilidae/*Goera calcarata*	1
Philopotamidae/*Chimaria*	11
	454

* (from Louton 1982)



JONES COVE QUADRANGLE
Tenn. - 164 SE

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Dunn Creek

Date: 21 July 1993

Watershed: French Broad River

County: Sevier

Area: Site # 2

Sample Length: 387 ft

Lat-Long: 354719N - 831801W

Reach: 06010107-26.0

Data Collected By: Rick D. Bivens, Carl E. Williams, and Mark T. Fagg

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 14.3 ft Avg. Depth 0.6 ft Max. Depth 2.0 ft
2. Estimated Percent of Stream in Pools is 25%.
3. Estimated Percent **Pool** Bottom is Silt 5% Sand 20% Gravel 20% Rubble 40% Boulders 10% Bedrock 5%.
4. Estimated Percent **Riffle** Bottom is Silt 5% Sand 10% Gravel 20% Rubble 20% Boulders 40% Bedrock 5%.
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 40%, Poor in 20%.
7. Shade or Canopy Good over 85% of Stream.
8. Flow (CFS) 7.1: Compared to Normal: Normal
9. Present Weather: Clear, warm, and humid.
   Air temperature - 80 F @ 10:30 am.
10. Weather (last 24 h): Partly cloudy, hot, and humid.
11. pH 6.3 Temp. 63.2 F Conductivity 25 micromhos/cm
    D.O. 9.0 ppm Saturation 96%
12. Comments: Sample area location was along Rocky Flats Road near an old abandoned house, approx. 0.25 mi. upstream of the mouth of Matthew Creek.

FISH DATA

Stream: Dunn Creek
Date: 21 July 1993

Watershed: French Broad River
County: Sevier

Area: Site # 2
Sample Length: 387 ft

Lat-Long: 354719N - 831801W
Reach: 06010107-26.0

Type of Sampling: Electrofishing
Elevation: 1,580 ft

Gear Type: Two Backpack Units
Time: 1245 - 1540

Species	TADS Code	Total Number	Inch Class	Total Weight
Oncorhynchus mykiss	353	1	2	t
" "	"	6	3	0.10
" "	"	3	6	0.26
" "	"	3	7	0.49
Hypentelium nigricans	166	11	4-10	2.17
Campostoma anomalum	25	88	3-6	3.14
Luxilus coccogenis	248	32	3-4	0.57
Nocomis micropogon	234	7	3-6	0.32
Notropis rubricroceus	262	80	1-3	0.51
Rhinichthys atratulus	351	246	1-3	1.38
R. cataractae	352	30	1-5	0.55
Etheostoma flabellare	92	21	1-3	0.11
Cottus bairdi	39	120	1-4	2.31
Cambarus bartonii		2		
C. longirostris		30		

Site was located along Rocky Flats Road, approx. 0.25 mi upstream of the mouth of Matthew Creek. Shocking at 360 and 400 volts AC.

Collectors: R.D. Bivens, C.E. Williams, M.T. Fagg, W. Perryman, J. Habera, and S. Fraley

Dunn Creek: Site # 2, Qualitative Benthic Sample

21 July 1993 Field # 451

Sevier Co., TN; Along Rocky Flats Road, approx. 0.25 mi. upstream of the mouth of Matthew Creek. Coordinates: 354719N - 831801W. Jones Cove, Tenn., # 164 SE Quad. Reach # 06010107-26,0.

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	2
COLEOPTERA:	
Dryopidae/*Helichus* adult	1
Elmidae/*Oulimnius latiusculus* adult	1
Promoresia larvae	6
Promoresia tardella adults	42
Psephenidae/*Psephenus herricki*	8
Ptilodactylidae/*Anchytarsus bicolor* larvae	4
DIPTERA:	
Athericidae/*Atherix lantha*	38
Chironomidae larvae and pupa	6
Simuliidae	1
Tipulidae/*Dicranota*	22
Tipula	6
EPHEMEROPTERA:	
Baetidae/*Baetis*	14
Cloeon rubropictum	1
Ephemerellidae/*Drunella*	2
Ephemerella	3
Serratella deficiens	2
Ephemeridae/*Ephemera*	1
Heptageniidae/*Epeorus rubidus/subpallidus*	9
Heptagenia	5
Rhithrogena	1
Stenonema	9
Leptophlebiidae/*Paraleptophlebia*	1
Oligoneuriidae/*Isonychia*	2
GASTROPODA:	
Pleuroceridae	6
HEMIPTERA:	
Gerridae/*Gerris* nymphs	4
Gerris remigis adult females	2
Gerris remigis adult males	2
Veliidae/*Rhagovelia obesa* adult females	2
Rhagovelia obesa adult males	6

Dunn Creek: Site # 2, Qualitative Sample cont.

TAXA	NUMBER
MEGALOPTERA:	
Corydalidae/*Nigronia serricornis*	3
ODONATA:	
Calopterygidae/*Calopteryx*	2
Cordulegastridae/*Cordulegaster erronea*	1
Gomphidae/*Gomphus* (Genus A *rogersi*) *	2
Lanthus vernalis	7
PLECOPTERA:	
Chloroperlidae	1
Leuctridae/*Leuctra*	5
Peltoperlidae/*Peltoperla*	36
Perlidae/*Acroneuria abnormis*	1
Paragnetina immarginata	5
Perlodidae/*Isoperla holochlora*	11
Malirekus/Yugus early instars	6
Pteronarcyidae/*Pteronarcys*	32
TRICHOPTERA:	
Hydropsychidae/*Arctopsyche irrorata*	7
Ceratopsyche sparna	11
Cheumatopsyche	3
Diplectrona modesta	7
Lepidostomatidae/*Lepidostoma*	1
Limnephilidae/*Pycnopsyche*	8
Philopotamidae/*Dolophilodes distinctus*	12
Polycentropodidae/*Polycentropus*	2
Rhyacophilidae/*Rhyacophila* pupa	1
Rhyacophila fuscula	9
Uenoidae/*Neophylax*	9
	383

* (from Louton 1982)

GAME FISH FROM DUNN CREEK
SITE 1
INCH CLASS DISTRIBUTION

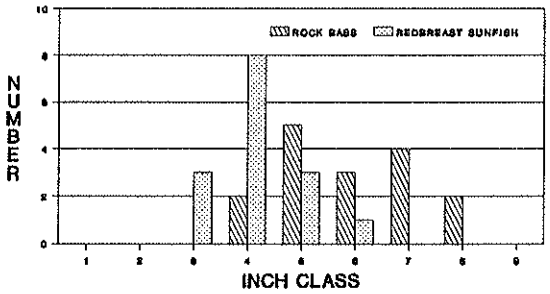


Figure 16.

RAINBOW TROUT FROM DUNN CREEK
SITE 2
INCH CLASS DISTRIBUTION

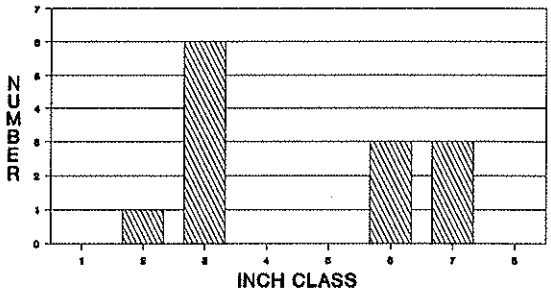
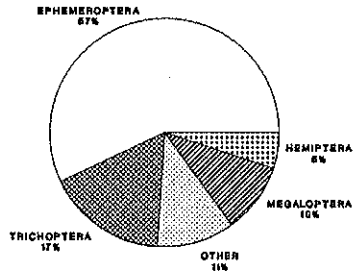


Figure 17.

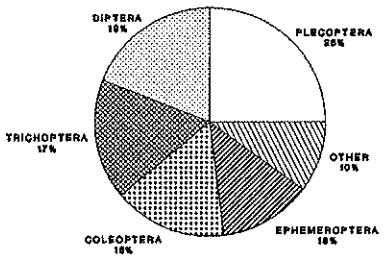
DUNN CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 454
TAXA RICHNESS = 43
Figure 18.

DUNN CREEK
SITE 2
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 383
TAXA RICHNESS = 49
Figure 19.

Clear Creek

Two qualitative fishery surveys were conducted on Clear Creek in June 1993:

Location and Length - Tributary to the French Broad River. Sample Site 1 was located near the mouth; at the bridge crossing on Hwy. 160. It was 400 ft in length and averaged 23.1 ft in width. Site 2 was located downstream of the confluence of North Fork and South Fork; near Salem. It was 300 ft in length and averaged 10 to 12 ft in width. Both sites were sampled on 23 June 1993, and both were in Cocke County (Site 1, Newport Quadrangle, Site 2, Parrottsville Quadrangle).

Sampling Methodology - Site 1 was sampled using two backpack electrofishing units and Site 2 was sampled using one unit operating at 120 volts AC.

Water Quality - Data were collected from midstream at mid-depth at each site on 23 June 1993. Site 1: DO - 8.7 ppm, pH - 8.5, Temperature - 64.6 F, Conductivity - 420 micromhos/cm. Site 2: Temperature - 73.4 F, Conductivity - 425 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample at Site 1 only. The sample contained 498 organisms representing 45 taxa.

Fish Collected:

	Site 1				Site 2			
Species	No.	% by No.	Wt.	% by Wt.	No.	% by No.	Wt.	% by Wt.
Largemouth bass	21	8.2	0.65	9.0				
Green sunfish	2	0.8	0.07	1.0	3	0.7	0.09	0.7
Bluegill	10	3.9	0.54	7.2	9	2.0	0.48	3.5
Redbreast sunfish	4	1.5	0.34	4.7	3	0.7	0.29	2.1
Non-game Fish	44	17.1	3.95	54.9	53	11.9	8.60	63.2
Forage Fish	176	68.5	1.65	22.9	379	84.8	4.15	30.5
Total	257		7.20		447		13.61	

Comments - Two sites were surveyed on this stream primarily to develop a fish species list for TADS. The Agency has made no previous studies or fish collections from this stream.

We collected a total of 257 fish weighing 7.20 lb and comprising 19 species from Site 1. Three native game species,

largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*) and bluegill (*L. macrochirus*) were found, along with the introduced redbreast sunfish (*L. auritus*). With the exception of largemouth bass, all game fish were collected in fairly low numbers. However, the vast majority of largemouth bass were in the 1 to 2-in class, with the largest one collected being 8-in. Game fish represented about 14% of the total number of fish collected and about 22% of the total weight of all fish collected. Four non-game and 11 forage species were also collected here and these comprised about 86% of the total number and 78% of the total weight. Most were represented by few specimens and banded sculpin (*Cottus carolinae*), central stonerollers (*Campostoma anomalum*), and snubnose darters (*Etheostoma simoterum*) were the most abundant species collected. Other darter species included a single specimen of the redline darter (*E. rufilineatum*) and logperch (*Percina caprodes*).

At Site 2 we collected a total of 447 fish weighing 13.61 lb and comprising nine species. Game fish from this site included green sunfish, bluegill, and redbreast sunfish. All were collected in low number and small sizes. All game fish comprised <4% of the total number of fish collected and accounted for only 6% of the total weight collected. One non-game and five forage species were collected here and they made up about 97% of the total number and 94% of the total weight. Blacknose dace (*Rhinichthys atratulus*) was the only species collected here that was not collected at the downstream site. Central stonerollers, blacknose dace, and banded sculpin were the most abundant forage species collected.

Based on fish species occurrence and relative abundance, this stream appears to be at best only a fair quality Ridge and Valley stream. A total of 20 species was collected, and with the exception of a single specimen of telescope shiner (*Notropis telescopus*) collected at Site 1, most were fairly tolerant forms. Only three darter species were collected. The stream has very heavy siltation and is probably dingy most of the time. Stream bank erosion was observed and the stream receives considerable run-off from agricultural practices, primarily dairy and beef cattle operations, and other activities in the watershed.

Benthic macroinvertebrates from sample Site 1 included Baetidae, Ephemeridae, Heptageniidae, and Oligoneuriidae mayflies, no stoneflies, Hydropsychidae, Hydroptilidae, Polycentropodidae, and Uenoidae caddisflies, and Elmidae, Eubriidae, Gyrinidae, and Psephenidae beetles. Gastropods included pleurocerid and *Physa* snails. The Asian clam (*Corbicula fluminea*) was present along with fingernail clams (*Sphaerium*). Crayfish species included *Cambarus longirostris* and the virile crayfish, *Orconectes virilis*. *O. virilis* is an introduced species that is becoming established in east Tennessee and may be replacing some of our native crayfish species due to its adaptive capability and aggressiveness. This species has been collected further upstream in the Pigeon River (Bivens et al. 1992).

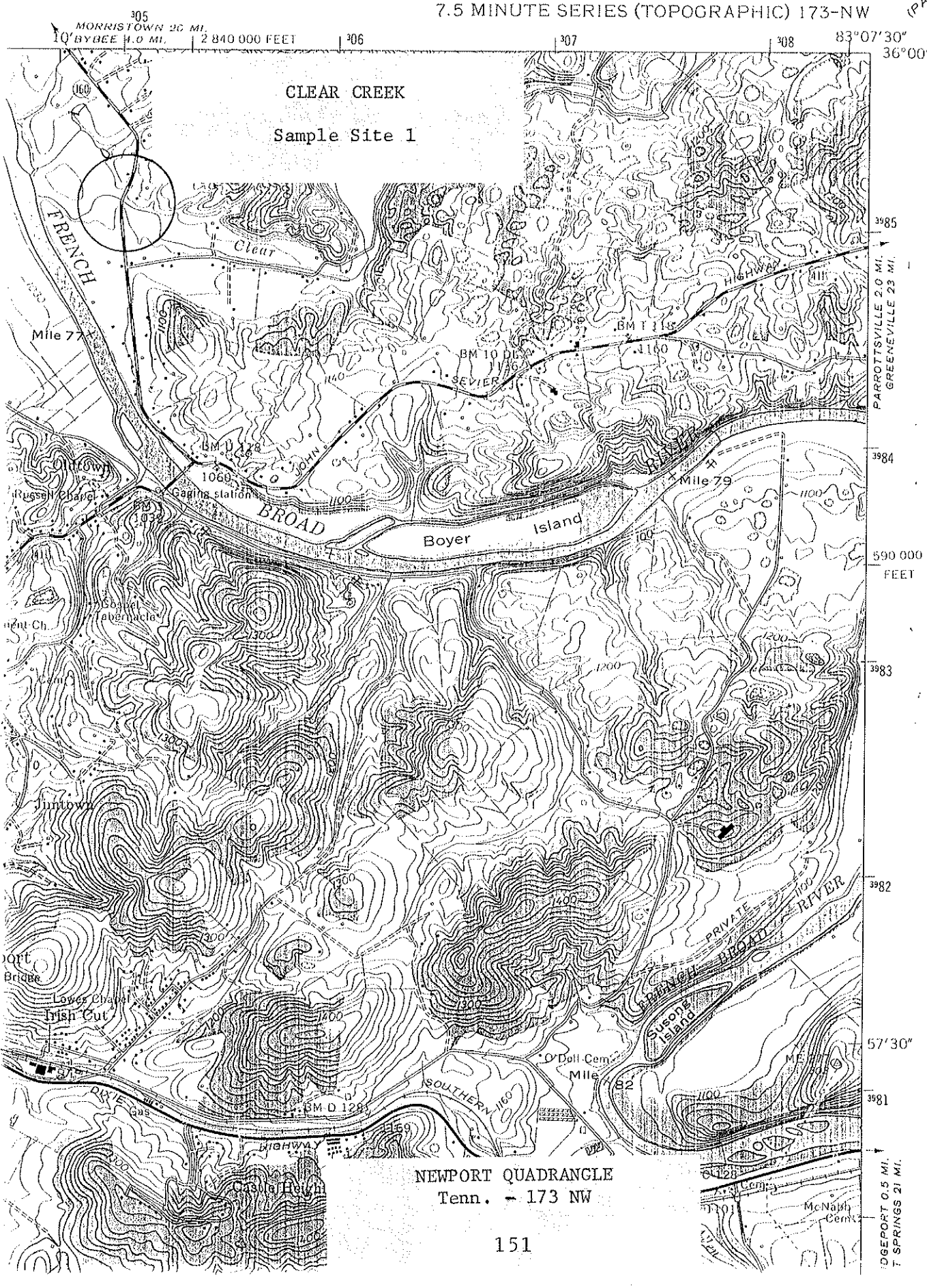
Trichopterans represented about 36%, coleopterans about 22%, ephemeropterans about 15%, odonates about 8%, dipterans about 6%, and megalopterans about 5% of the total number of organisms collected (Fig. 20). A total of 45 taxa was collected at this site, many of which were tolerant forms.

Management Recommendations:

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

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

4356 II SE
(PARROTTSVILLE 172-SE)



NEWPORT QUADRANGLE
Tenn. - 173 NW

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Clear Creek

Date: 23 June 1993

Watershed: French Broad River

County: Cocke

Area: Site # 1

Sample Length: 400 ft

Lat-Long: 355937N - 830949W

Reach: 06010105-73,0

Data Collected By: Rick D. Bivens, Carl E. Williams, and Mark T. Fagg

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 23.1 ft Avg. Depth 0.6 ft Max. Depth 2.0 ft
2. Estimated Percent of Stream in Pools is 30%.
3. Estimated Percent **Pool** Bottom is Mud 10% Silt 10% Sand 10% Gravel 10% Rubble 10% Bedrock 50%.
4. Estimated Percent **Riffle** Bottom is Silt 15% Sand 10% Gravel 10% Rubble 10% Boulders 5% Bedrock 50%.
5. Abundance of Littoral Aquatic Plants is Scarce (*Dianthera americana*, water cress, and some moss on rocks).
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 85% of Stream.
8. Flow (CFS) 7.1: Compared to Normal: Normal
9. Present Weather: Clear and mild.
   Air temperature - 74 F @ 9:30 am.
10. Weather (last 24 h): Cloudy to clearing and mild.
11. pH 8.5 Temp. 64.6 F Conductivity 420 micromhos/cm
    D.O. 8.7 ppm Saturation 93%
12. Comments: Sample area location was at the bridge on Hwy. 160; 200 ft upstream and 200 ft downstream of the bridge. The stream was possibly slightly high and very (overnight rain?). The stream is probably dingy most of the time due to agricultural use along the watershed, dairy farms, cattle in streams, etc., and actively eroding stream banks.

FISH DATA

Stream: Clear Creek

Date: 23 June 1993

Watershed: French Broad River

County: Cocke

Area: Site # 1

Sample Length: 400 ft

Lat-Long: 355937N - 830949W

Reach: 06010105-73,0

Type of Sampling: Electrofishing

Elevation: 1,030 ft

Gear Type: Two Backpack Units

Time: 1230 - 1315

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus salmoides	220	7	1	0.02
" "	"	10	2	0.04
" "	"	1	5	0.07
" "	"	2	6	0.25
" "	"	1	8	0.27
Lepomis auritus	201	2	2	0.03
" "	"	1	4	0.06
" "	"	1	6	0.25
L. cyanellus	202	1	3	0.02
" "	"	1	4	0.05
L. macrochirus	206	2	2	0.01
" "	"	3	3	0.06
" "	"	2	4	0.14
" "	"	3	5	0.33
Catostomus commersoni	32	15	1-7	0.28
Hypentelium nigricans	166	15	1-13	2.34
Moxostoma erythrurum	26	13	3-8	1.22
Dorosoma cepedianum	48	1	7	0.11
Campostoma anomalum	25	44	1-5	0.88
Cyprinella galactura	253	11	1-4	0.13
C. spiloptera	269	13	1-3	0.07
Notemigonus crysoleucas	235	3	1	0.01
Notropis rubellus micropteryx	260	2	2	0.01
N. telescopus	272	1	2	t
Semotilus atromaculatus	360	1	1	t

Site was located at bridge crossing on Hwy. 160. Shocking at 120 volts AC.

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

FISH DATA (continued)

Stream: Clear Creek
Date: 23 June 1993

Watershed: French Broad River
County: Cocke

Area: Site # 1
Sample Length: 400 ft

Lat-Long: 355937N - 830949W
Reach: 06010105-73,0

Type of Sampling: Electrofishing
Elevation: 1,030 ft

Gear Type: Two Backpack Units
Time: 1230 - 1315

Species	TADS Code	Total Number	Inch Class	Total Weight
Etheostoma rufilineatum	108	1	2	0.01
E. simoterum	111	43	1-2	0.08
Percina caprodes	306	3	3-4	0.08
Cottus carolinae	40	54	1-3	0.38
Cambarus sp.		1		
Cambarus longirostris		3		
Orconectes virilis		10		

Site was located at bridge crossing on Hwy. 160. Shocking at 120 volts AC.

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

Clear Creek: Site # 1, Qualitative Benthic Sample

23 June 1993 Field # 431

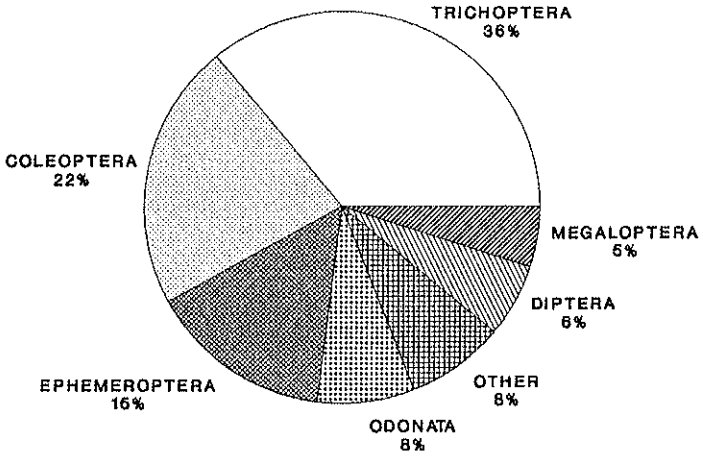
Cocke Co., TN; At the bridge crossing on Hwy. 160. Coordinates: 355937N - 830949W. Newport, Tenn., # 173 NW Quad. Reach # 06010105-73,0.

TAXA	NUMBER
COLEOPTERA:	
Elmidae/*Dubiraphia* adults	2
Macronychus glabratus adult	1
Microcylloepus pusillus pusillus adult	1
Optioservus	4
Stenelmis larvae	22
Stenelmis adults	66
Eubriidae/*Ectopria*	1
Gyrinidae/*Dineutus* larvae	2
Dineutus discolor adults	3
Psephenidae/*Psephenus herricki*	9
DIPTERA:	
Chironomidae	13
Empididae pupa	1
Simuliidae	1
Tipulidae/*Antocha* larvae and pupa	3
Hexatoma	9
Tipula	1
EPHEMEROPTERA:	
Baetidae/*Baetis*	52
Ephemeridae/*Hexagenia*	3
Heptageniidae/*Stenacron*	3
Stenonema	14
Oligoneuriidae/*Isonychia*	2
GASTROPODA:	
Physidae/*Physa*	4
Pleuroceridae	13
HEMIPTERA:	
Gerridae/*Trepobates* larvae	4
Trepobates pictus adult	1
Veliidae/*Rhagovelia obesa* male	1
Rhagovelia obesa females	2
ISOPODA:	
Asellidae/*Asellus*	3

Clear Creek: Site # 1, Qualitative Sample cont.

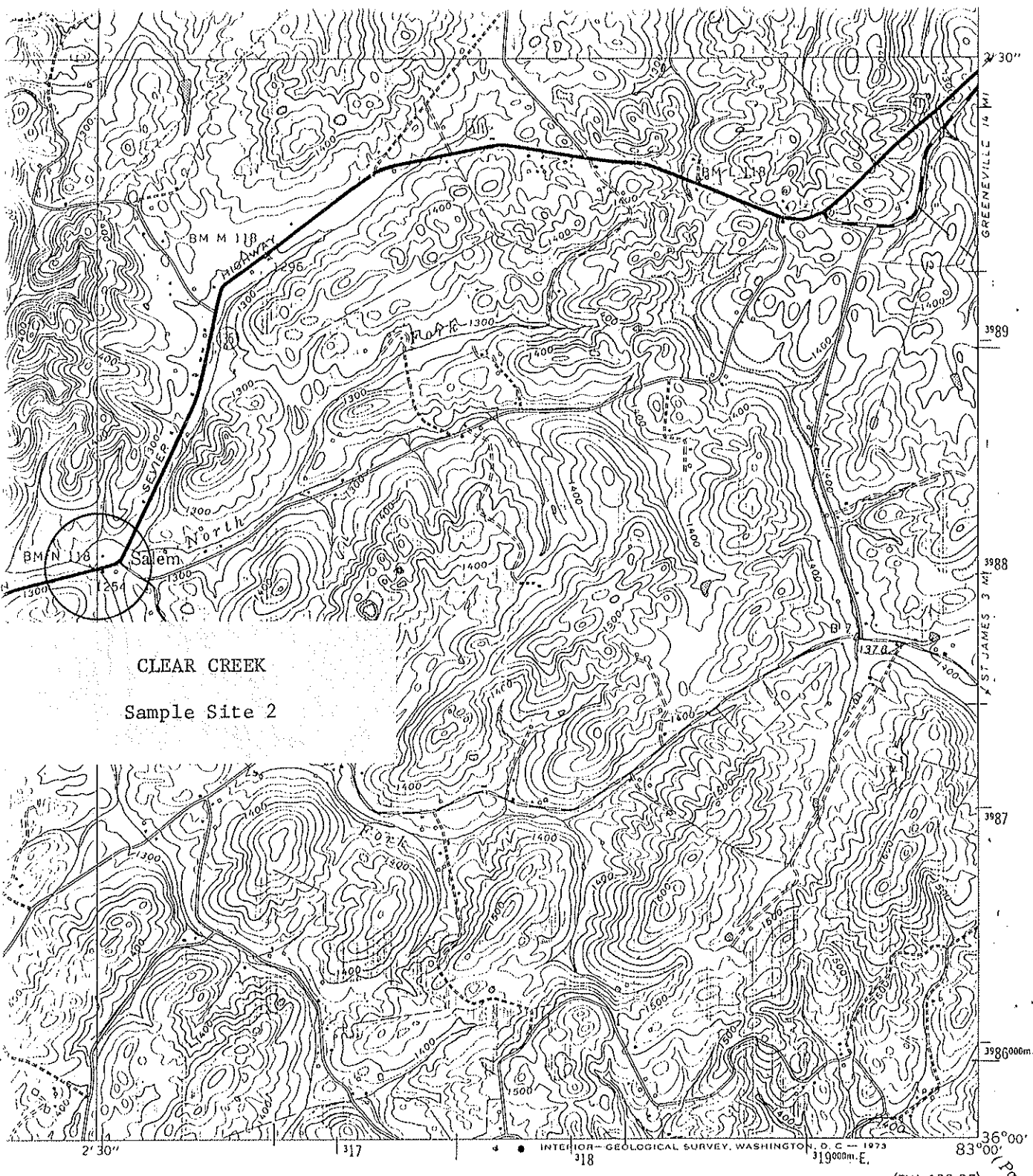
TAXA	NUMBER
MEGALOPTERA:	
Corydalidae/*Corydalus cornutus*	9
Nigronia serricornis	11
Sialidae/*Sialis*	7
ODONATA:	
Aeshnidae/Basiaeschna *janata*	1
Boyeria vinosa	3
Calopterygidae/*Calopteryx*	12
Coenagrionidae/*Argia*	8
Enallagma	5
Cordulegastridae/*Cordulegaster maculata*	1
Gomphidae/*Gomphus lividus*	7
Hagenius brevistylus	2
Stylurus sp.	1
PELECYPODA:	
Corbiculidae/*Corbicula fluminea*	5
Sphaeriidae/*Sphaerium*	3
TRICHOPTERA:	
Hydropsychidae/*Ceratopsyche sparna*	11
Cheumatopsyche	93
Hydropsyche betteni/depravata	49
H. frisoni	9
Hydroptilidae/*Hydroptila*	1
Polycentropodidae/*Polycentropus*	1
Uenoidae/*Neophylax*	18
	498

CLEAR CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 498
TAXA RICHNESS = 45
Figure 20.

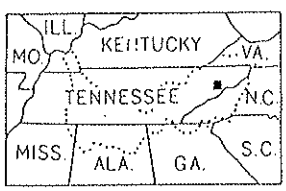


1 MILE

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

PARROTTSVILLE, TENN.

N3600-W8300/7.5

1939

PHOTOREVISED 1971

AMS 4356 II SE-SERIES V841

902.

FISH DATA

Stream: Clear Creek

Date: 23 June 1993

Watershed: French Broad River

County: Cocke

Area: Site # 2

Sample Length: 300 ft

Lat-Long: 360119N - 830234W

Reach: 06010105-73,0

Type of Sampling: Electrofishing

Elevation: 1,250 ft

Gear Type: One Backpack Unit

Time: 1530 - 1600

Species	TADS Code	Total Number	Inch Class	Total Weight
Lepomis auritus	201	2	4	0.14
" "	"	1	5	0.15
L. cyanellus	202	3	3	0.09
L. macrochirus	206	1	2	0.01
" "	"	2	3	0.06
" "	"	5	4	0.30
" "	"	1	5	0.11
Catostomus commersoni	32	53	1-14	8.60
Campostoma anomalum	25	128	2-4	1.86
Rhinichthys atratulus	351	105	1-3	0.94
Semotilus atromaculatus	360	9	1-6	0.34
Etheostoma simoterum	111	41	1-2	0.21
Cottus carolinae	40	96	1-3	0.80
Cambarus bartonii		3		
Orconectes virilis		11		

Site was located about 300 ft downstream of the confluence of North and South Fork, near Salem. Shocking at 120 volts AC.

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

Cosby Creek

Two qualitative fishery surveys were conducted on Cosby Creek in August 1993:

Location and Length - Tributary to the Pigeon River. Sample Site 1 was located approx. 300 ft upstream of the bridge on Ball Park Road. It was 400 ft in length and averaged 28.9 ft in width. Site 2 was located just upstream of the bridge on Liberty Road, near Cosby. It was 300 ft in length and averaged 10 to 15 ft in width. Both sites were sampled on 31 August 1993, and both were in Cocke County (Hartford Quadrangle).

Sampling Methodology - Site 1 was sampled using two backpack electrofishing units operating at 120 volts AC in pool areas while riffle areas were sample with one backpack shocker in combination with a 20 ft seine. Site 2 was sampled using one unit operating at 360 volts AC.

Water Quality - Data were collected from midstream at mid-depth at each site on 31 August 1993. Site 1: DO - 8.8 ppm, pH - 7.0, Temperature - 69.8 F, Conductivity - 60 micromhos/cm. Site 2: pH - 6.8, Temperature - 69.8 F, Conductivity - 19 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample at Site 1 only. The sample contained 440 organisms representing 50 taxa.

Fish Collected:

	Site 1				Site 2	
Species	No.	% by No.	Wt.	% by Wt.	No.	% by No.
Rainbow trout	5	0.9	0.23	1.4	18	10.8
Rock bass	11	2.0	2.33	14.0	2	1.2
Non-game Fish	21	3.9	3.59	21.6	1	0.6
Forage Fish	501	93.1	10.44	62.9	145	87.3
Total	538		16.59		166	

Comments - This stream was surveyed primarily to develop a fish species list for TADS. The Agency has made previous fish collections from the lower stream reach near the mouth in 1988, in conjunction with an EPA Pigeon River study (Bivens 1989).

We collected a total of 538 fish weighing 16.59 lb and comprising 17 species from Site 1. One native game species, rock

bass (*Ambloplites rupestris*), along with introduced rainbow trout (*Oncorhynchus mykiss*) was found. Eleven rock bass ranging from 4 to 8-in and five rainbow trout ranging from 4 to 5-in were collected (Fig. 21). All game fish represented <3% of the total number of fish collected and about 15% of the total weight of all fish collected. Two non-game and 13 forage species were also collected here and these comprised about 97% of the total number and 85% of the total weight. Of interest is the occurrence of moderately intolerant species such as the saffron shiner (*Notropis. rubricroceus*) and telescope shiner (*N. telescopus*). Darter species included the stripetail (*Etheostoma. kennicotti*), redline (*E. rufilineatum*), snubnose (*E. simoterum*) and Swannanoa (*E. swannanoa*). Central stonerollers (*Campostoma anomalum*), saffron shiners, and banded sculpin (*Cottus carolinae*) were the most abundant forage species present.

At Site 2 we collected a total of 166 fish comprising 9 species. Eighteen rainbow trout ranging from 2 to 7-in and two 8-in rock bass were the only game fish collected at this site and they made up about 12% of the total number of fish collected. One non-game and six forage species were also collected here and these comprised about 88% of the total number. Forage species made up about 87% of the total number collected. Additional species collected here but not at the downstream site included only the mottled sculpin (*Cottus bairdi*) which was also the most abundant forage species present.

Based on fish species occurrence, this stream appears to be a good quality Blue Ridge stream. A total of 18 species was collected from the two sample sites combined. The occurrence of intolerant forms and four darter species further attests to good water quality. Rock bass and rainbow trout were the only game species collected at both sites and rainbow trout became more abundant at the upstream site. Most of this stream is considered only marginal habitat for trout and the Agency stocks it annually, during the spring, generally with catchable size rainbow trout. Only three trout at the upstream site appeared to be stocked fish and the five trout at the downstream trout were either wild fish or fish stocked as fingerlings. Species such as trout, saffron shiners, longnose dace (*Rhinichthys cataractae*), and Swannanoa darters indicates a transition from coolwater to coldwater habitat. Also, the occurrence of these species along with the mottled sculpin and an increase in the number of wild trout at Site 2 further indicates a transition toward coldwater species.

Benthic macroinvertebrates from sample Site 1 included Baetidae, Caenidae, Ephemerellidae, Heptageniidae, Leptophlebiidae, Neoephemeridae, and Oligoneuriidae mayflies, Leuctridae, Peltoperlidae, Perlidae, Perlodidae, and Pteronarcyidae stoneflies, Hydropsychidae, Leptoceridae, Limnephilidae, Philopotamidae, Polycentropodidae, and Uenoidae caddisflies, and Dryopidae, Elmidae, and Psephenidae beetles. Single specimens each of pleurocerid and *Physa* snails were the

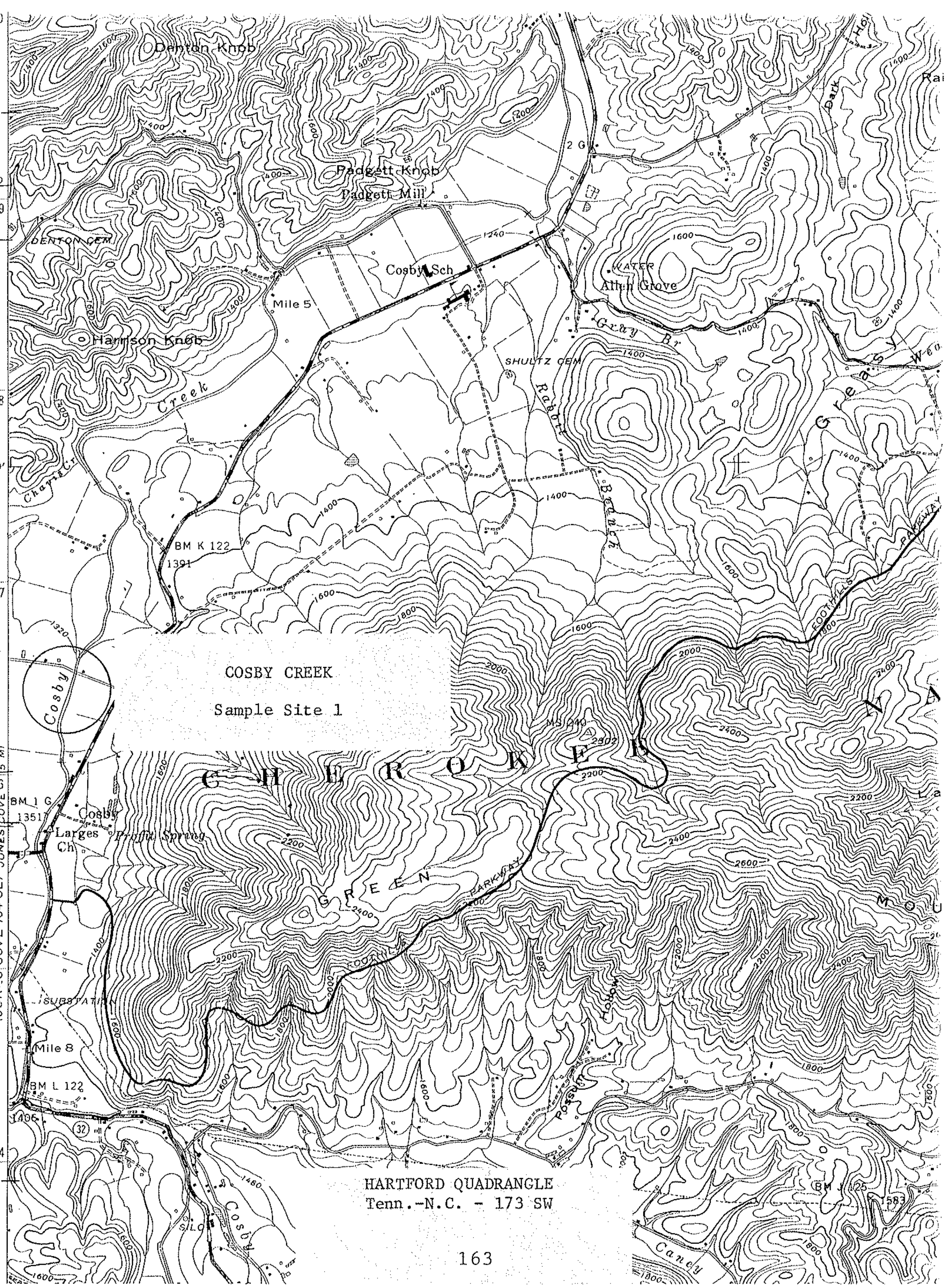
only gastropods collected. Crayfish species included *Cambarus longirostris* and *Orconectes erichsonianus*. *C. bartonii* and *C. longirostris* were collected at Site 2 and *C. longirostris* was abundant at both sites. Ephemeropterans represented about 33%, dipterans about 22%, odonates about 17%, plecopterans about 11%, coleopterans about 9%, and trichopterans about 6% of the total number of organisms collected (Fig. 22). A total of 50 taxa was collected at this site.

Management Recommendations:

1. This is a fairly large stream system that transitions from a coolwater to coldwater habitat. It is probably only marginal for trout in its lower reaches and the Agency is justified in spring stockings of trout within this reach. Likewise, it is probably marginal habitat for most cool and warmwater game species.

2. Based on fish and macroinvertebrates species assemblages it appears that this stream probably still has good to excellent water quality that merits extra protection from any source of pollution or habitat destruction.

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.



COSBY CREEK

Sample Site 1

HARTFORD QUADRANGLE
Tenn.-N.C. - 173 SW

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Cosby Creek — Date: 31 August 1993

Watershed: French Broad River — County: Cocke

Area: Site # 1 — Sample Length: 400 ft

Lat-Long: 354923N - 831445W — Reach: 06010106-6,0

Data Collected By: Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 28.9 ft Avg. Depth 0.6 ft Max. Depth 2.1 ft
2. Estimated Percent of Stream in Pools is 30%.
3. Estimated Percent **Pool** Bottom is Silt 5% Sand 10% Gravel 20% Rubble 35% Boulders 30%.
4. Estimated Percent **Riffle** Bottom is Silt 10% Sand 20% Gravel 10% Rubble 30% Boulders 30%.
5. Abundance of Littoral Aquatic Plants is Scarce.
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25% of the Stream, Average in 50%, Poor in 25%.
7. Shade or Canopy Good over 80% of Stream.
8. Flow (CFS) 22.9: Compared to Normal: Normal
9. Present Weather: Partly cloudy to overcast, warm and humid. Air temperature - 79 F @ 10:10 am.
10. Weather (last 24 h): Partly cloudy with scattered showers.
11. pH 7.0 Temp. 69.8 F Conductivity 60 micromhos/cm D.O. 8.8 ppm Saturation 98%
12. Comments: Sample area location was approx. 300 ft upstream of the bridge on Ball Park Road. Stream was slightly dingy. Domestic rubbish along the stream course.

FISH DATA

Stream: Cosby Creek
Date: 31 August 1993

Watershed: French Broad River
County: Cocke

Area: Site # 1
Sample Length: 400 ft

Lat-Long: 354923N - 831445W
Reach: 06010106-6,0

Type of Sampling: Electrofishing
Elevation: 1,330 ft

Gear Type: Two Backpack Units
Time: 1215 - 1345

Species	TADS Code	Total Number	Inch Class	Total Weight
Oncorhynchus mykiss	353	1	4	0.03 *
" "	"	4	5	0.20 *
Ambloplites rupestris	13	2	4	0.14
" "	"	3	5	0.28
" "	"	1	6	0.24
" "	"	3	7	0.84
" "	"	2	8	0.83
Hypentelium nigricans	166	20	2-11	3.40
Moxostoma duquesnei	229	1	8	3.19
Campostoma anomalum	25	117	2-6	5.04
Cyprinella galactura	253	13	2-5	0.28
Hybopsis amblops	155	2	3	0.02
Notropis rubricroceus	262	117	1-3	0.47
N. telescopus	272	3	1-2	0.01
Rhinichthys atratulus	351	6	1-2	0.02
R. cataractae	352	66	1-5	0.98
Semotilus atromaculatus	360	1	1	t
Etheostoma flabellare	92	10	1-2	0.03
E. rufilineatum	108	26	2-3	0.26
E. simoterum	111	13	1-3	0.05
E. swannanoa	129	9	1-3	0.11
Cottus carolinae	40	118	1-5	3.17
Cambarus longirostris		45		
Orconectes erichsonianus		5		

* Stocked fish

Site was located approx. 300 ft. upstream of the bridge on Ball Park Road. Shocking at 120 volts AC.

Collectors: R.D. Bivens, C.E. Williams, M.T. Fagg, J. Burr, and P. Stodola

Cosby Creek: Site # 1, Qualitative Benthic Sample

31 August 1993 Field # 470

Cocke Co., TN; Approx. 300 ft upstream of the bridge crossing on Ball Park Road. Coordinates: 354923N - 831445W. Hartford, Tenn.-N.C., # 173 SW Quad. Reach # 06010106-6,0.

TAXA	NUMBER
COLEOPTERA:	
Dryopidae/*Helichus* adults	23
Elmidae/*Microcylloepus pusillus* adults	3
Oulimnius latiusculus larvae	2
Oulimnius latiusculus adults	2
Stenelmis adults	3
Psephenidae/*Psephenus herricki*	7
DIPTERA:	
Athericidae/*Atherix lantha*	43
Ceratopogonidae/*Atrichopogon*	1
Chironomidae	29
Simuliidae larvae and pupa	24
EPHEMEROPTERA:	
Baetidae/*Baetis*	23
Caenidae/*Caenis*	4
Ephemerellidae early instar	1
Heptageniidae/*Epeorus rubidus/subpallidus*	39
Heptagenia	2
Stenonema	35
Leptophlebiidae/*Paraleptophlebia*	1
Neoephemeridae/*Neoephemera purpurea*	11
Oligoneuriidae/*Isonychia*	28
GASTROPODA:	
Physidae/*Physa*	1
Pleuroceridae	1
HEMIPTERA:	
Veliidae/*Microvelia*	2
Rhagovelia obesa nymph	1
Rhagovelia obesa adult male	1
MEGALOPTERA:	
Corydalidae/*Nigronia serricornis*	2
Sialidae/*Sialis*	1

Cosby Creek: Site # 1, Qualitative Sample cont.

TAXA	NUMBER
ODONATA:	
Aeshnidae/*Boyeria vinosa*	38
Calopterygidae/*Calopteryx*	22
Coenagrionidae/*Argia*	1
Cordulegastridae/*Cordulegaster erronea*	2
Gomphidae/early instars	5
Gomphus lividus	2
Gomphus (Genus A *rogersi*) *	2
Lanthus vernalis	1
Stylogomphus albistylus	1
PLECOPTERA:	
Leuctridae/*Leuctra*	3
Peltoperlidae/*Peltoperla*	7
Perlidae/*Acroneuria carolinensis*	6
Paragnetina immarginata	10
P. media	1
Perlodidae/*Yugus bulbosus* (prob. determination)	1
Pteronarcyidae/*Pteronarcys*	22
TRICHOPTERA:	
Hydropsychidae/*Ceratopsyche alhedra*	1
C. bronta	8
C. sparna	3
Cheumatopsyche larvae	2
Cheumatopsyche pupae	2
Hydropsyche betteni/depravata	1
Leptoceridae/*Triaenodes* pupa	1
Limnephilidae/*Goera* pupa	1
Pycnopsyche larva and pupae	3
Philopotamidae/*Chimara*	1
Polycentropodidae/*Polycentropus*	1
Uenoidae/*Neophylax*	2
	440

* (from Louton 1982)

GAME FISH FROM COSBY CREEK
SITE 1
INCH CLASS DISTRIBUTION

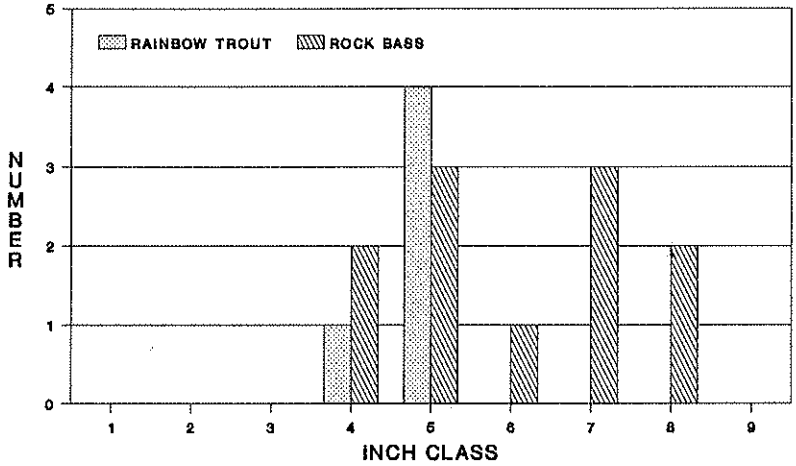
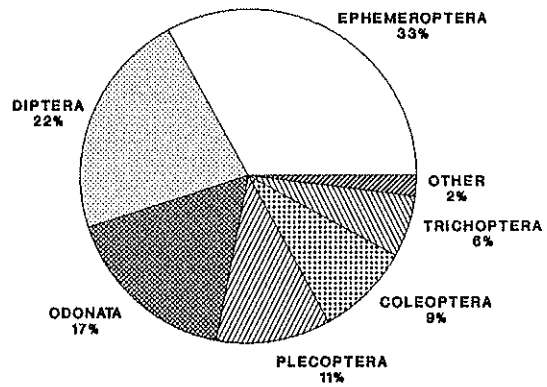


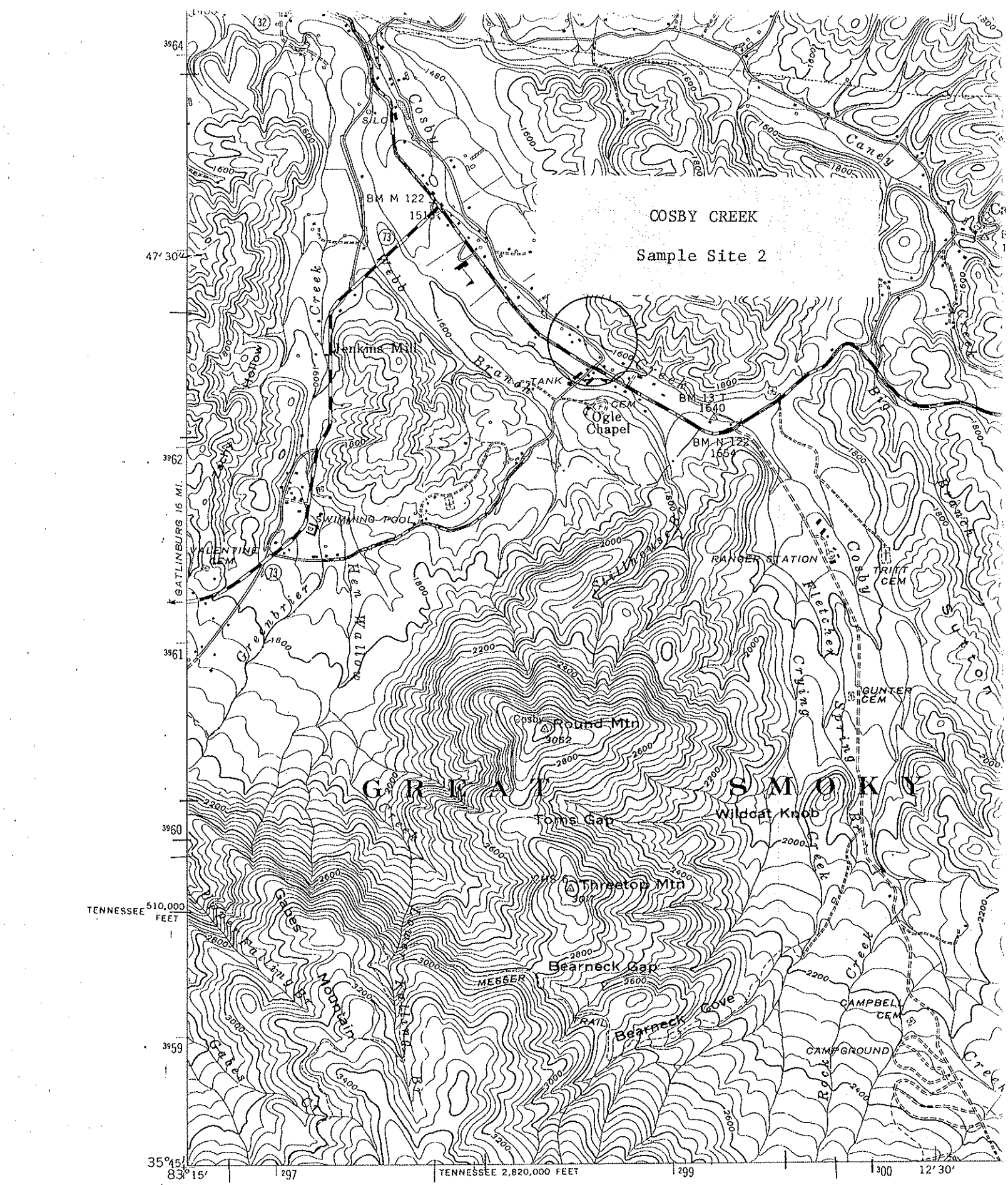
Figure 21.

COSBY CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 440
TAXA RICHNESS = 50
Figure 22.



Mapped and edited by T

Published by the Geolo;

Control by USC&GS, USGS,

Topography by USGS by pho

Map field checked by TVA, 1

Polyconic projection. 1927 N

HARTFORD QUADRANGLE
Tenn.-N.C. - 173 SW

(MOUNT GUYOT 165-NE)
4355 III NE

MN
GN
1°17'
23 MILS
1°
18 MILS

FISH DATA

Stream: Cosby Creek
Date: 31 August 1993

Watershed: French Broad River
County: Cocke

Area: Site # 2
Sample Length: 300 ft

Lat-Long: 354714N - 831334W
Reach: 06010106-8,0

Type of Sampling: Electrofishing
Elevation: 1,580 ft

Gear Type: One Backpack Unit
Time: 1630 - 1700

Species	TADS Code	Total Number	Inch Class	Total Weight	
Oncorhynchus mykiss	353	4	2	-	
" "	"	1	3	-	
" "	"	3	4	-	*
" "	"	6	5	-	*
" "	"	2	6	-	
" "	"	2	7	-	
Ambloplites rupestris	13	2	8	-	
Hypentelium nigricans	166	1	-	-	
Campostoma anomalum	25	29	-	-	
Notropis rubricroceus	262	15	-	-	
Rhinichthys atratulus	351	8	-	-	
R. cataractae	352	24	-	-	
Etheostoma swannanoa	129	2	-	-	
Cottus bairdi	39	67	-	-	
Cambarus bartonii		1			
C. longirostris		26			

Avg. width - 10 to 15 ft
Avg. depth - 0.6 ft
Water temperature - 69.8 F
Conductivity - 19 micromhos/cm
pH - 6.8
Gravel, cobble - rubble, boulder substrate.

* One 4 in & two 5 in rainbow trout appeared to be stocked fish.

Site was located just upstream of the bridge crossing on Liberty Road, near Cosby. Shocking at 360 volts AC.

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

Caney Creek

One qualitative fishery survey was conducted on Caney Creek in August 1993:

Location and Length - Tributary to Cosby Creek (Pigeon River trib.). The sample area at the culvert on Caney Creek Road, near the intersection with Catons Grove Road. It was approximately 200 ft in length and was sampled on 31 August 1993. It was in Cocke County (Hartford Quadrangle).

Sampling Methodology - The site was sampled using one backpack electrofishing unit operating at 360 volts AC.

Water Quality - On 31 August 1993: Temperature - 71.6 F, pH - 6.8, Conductivity - 50 micromhos/cm

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 and emphasis was placed on the fish species present. The Agency has made no previous studies or fish collections from this stream.

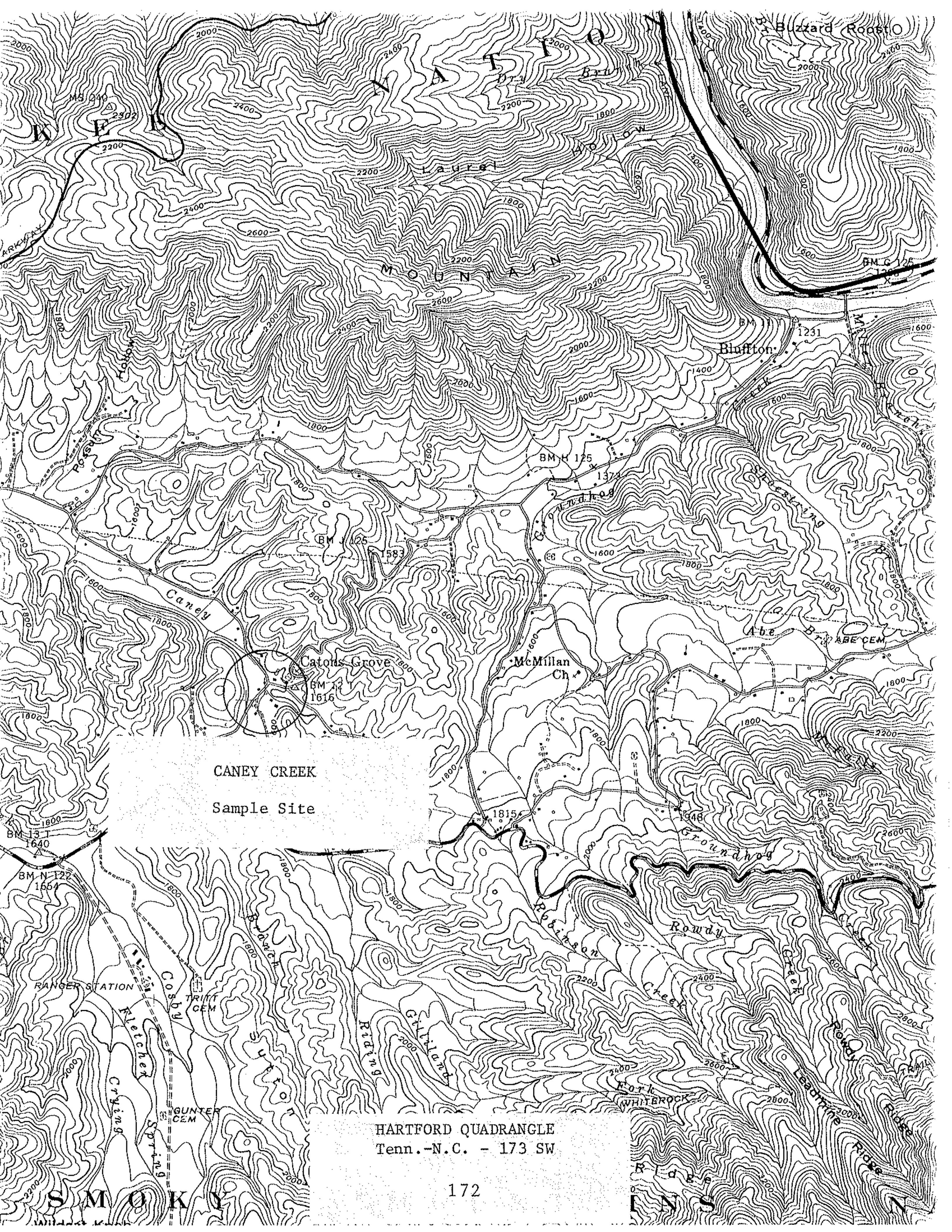
A total of 9 fish species was collected. Rainbow trout (*Oncorhynchus mykiss*) was the only game species found. A total of 19 trout ranging from 2 to 7-in were collected, and most (16) were YOY fish. One non-game and 7 forage species were also collected here. Saffron shiners (*Notropis rubricroceus*) were the most abundant forage species found. *Cambarus longirostris* was the only crayfish species collected. Pleurocerid snails (Periwinkle) were abundant.

Saffron shiners, longnose dace (*Rhinichthys cataractae*), and mottled sculpin (*Cottus bairdi*) were all collected here and are typical species components of coldwater stream systems. The occurrence of wild, stream reared rainbow trout further indicates coldwater. However, on the date we sampled, the water temperature, near 72 F, was approaching the maximum tolerance for trout.

Management Recommendations:

1. This stream appears to be a fair to good quality Blue Ridge stream that should merit protection from any source of pollution or habitat destruction.

2. This is a tributary stream that probably has no fishery potential due to its small size.



CANEY CREEK

Sample Site

HARTFORD QUADRANGLE
Tenn.-N.C. - 173 SW

FISH DATA

Stream: Caney Creek
Date: 31 August 1993

Watershed: French Broad River
County: Cocke

Area: See comments
Sample Length: 200 ft

Lat-Long: 354735N - 831223W
Reach: 06010106-

Type of Sampling: Electrofishing
Elevation: 1,580 ft

Gear Type: One Backpack Unit
Time: 1745 - 1815

Species	TADS Code	Total Number	Inch Class	Total Weight
Oncorhynchus mykiss	353	12	2	-
" "	"	4	3	-
" "	"	1	5	-
" "	"	1	6	-
" "	"	1	7	-
Hypentelium nigricans	166	4	-	-
Campostoma anomalum	25	3	-	-
Notropis rubricroceus	262	61	-	-
Rhinichthys atratulus	351	45	-	-
R. cataractae	352	8	-	-
Semotilus atromaculatus	360	3	-	-
Etheostoma simoterum	111	3	-	-
Cottus bairdi	39	41	-	-
Cambarus longirostris		12		

Pleurocerid snails (Periwinkle) abundant.

Avg. width - 6 to 8 ft
Avg. depth - 0.3 ft
Water temperature - 71.6 F
Conductivity - 50 micromhos/cm
pH - 6.8
Gravel, cobble - rubble, boulder substrate.

Site was located at the culvert on Caney Creek Road, near the intersection with Catons Grove Road. Shocking at 360 volts AC.

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

Roaring Fork

Two qualitative fishery surveys were conducted on Roaring Fork in June 1993:

Location and Length - Tributary to Lick Creek (Nolichucky River tributary). Sample Site 1 was located upstream of the bridge crossing on Roaring Fork Road and was approximately 300 ft in length. Sample Site 2 was located 300 yrds upstream of the bridge that is about 0.15 mi upstream of the old Grassy Valley School and was approximately 300 ft in length. Both sites were sampled on 16 June 1993, and were in Greene County (Greeneville Quadrangle).

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

Water Quality - No data collected.

Benthos Collection - No collection was made.

Fish Collected:

	Site 1		Site 2	
Species	No.	% by No.	No.	% by No.
Largemouth bass			1	0.5
Rock bass	8	4.4	12	6.0
Redbreast sunfish	6	3.3	5	2.5
Bluegill	4	2.2	3	1.5
Redear sunfish	1	0.5		
Non-game Fish	11	6.0	13	6.5
Forage Fish	152	83.5	166	83.0
Total	182		200	

Comments - This stream was sampled 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. The Agency has made no previous studies or fish collections from this stream.

A total of 182 fish comprising 15 fish species was collected from Site 1. Three native game species, rock bass (*Ambloplites rupestris*), bluegill (*Lepomis macrochirus*), and redear sunfish (*L. microlophus*), along with the introduced redbreast sunfish (*L. auritus*) were found. Eight rock bass ranging from 2 to 9-in, six redbreast sunfish ranging from 2 to 6-in, four small bluegill, and one 2-in redbreast sunfish were collected. Game fish

accounted for about 10% of the total number of fish collected. Three non-game and eight forage species were also collected and these comprised about 90% of the total number collected. Central stonerollers (*Campostoma anomalum*), snubnose darters (*Etheostoma simoterum*), and striped shiners (*Luxilus chrysocephalus*) were the most abundant species collected. The greenside darter (*E. blennioides*) and snubnose were the only darter species collected. A single yellow bullhead (*Ameiurus natalis*) was also collected here. Crayfish species included *Cambarus longirostris*, *Orconectes erichsonianus*, and *O. forceps*.

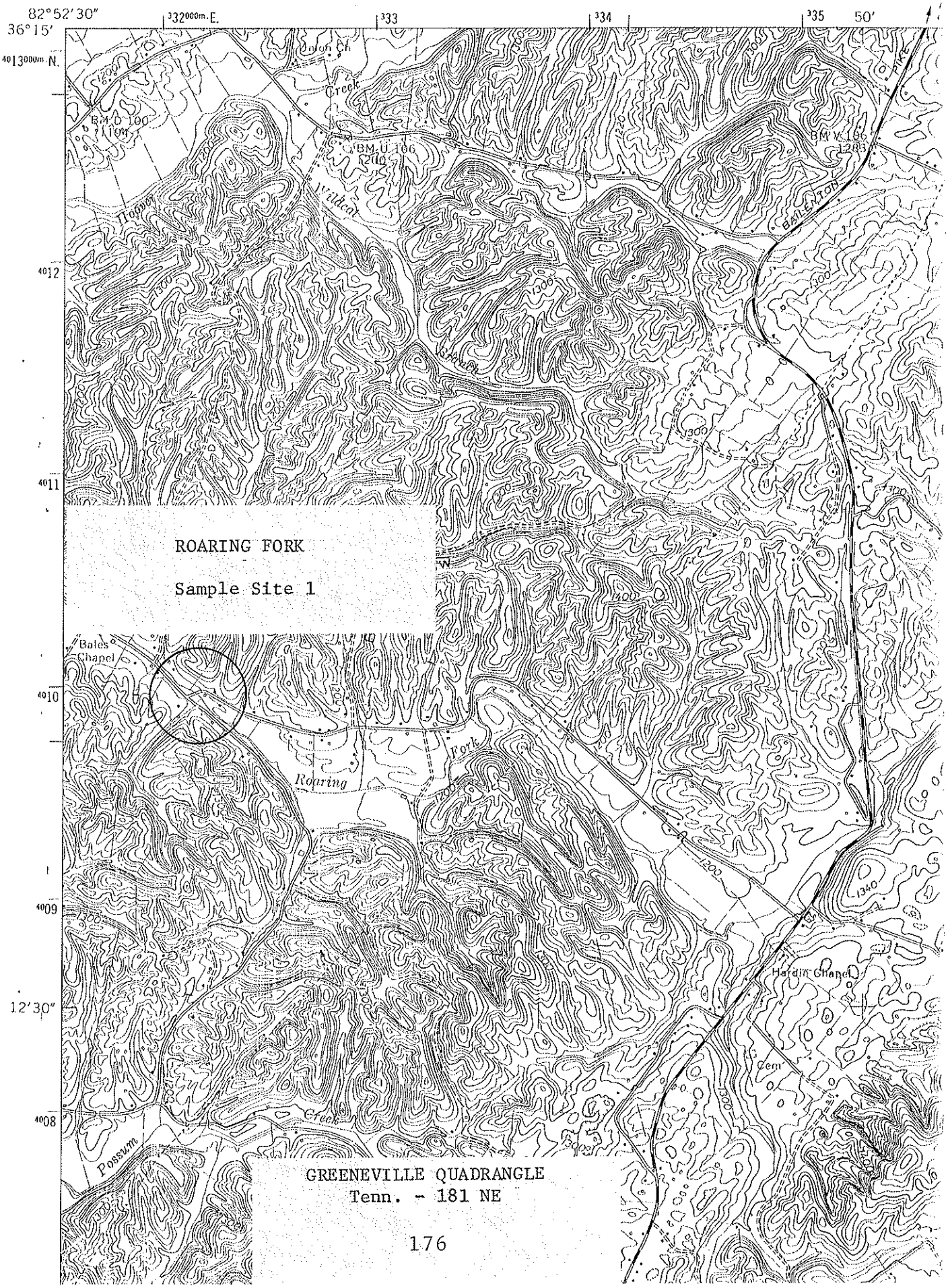
At Site 2 we collected a total of 200 fish comprising 14 species. Three native game species, largemouth bass (*Micropterus salmoides*), rock bass, and bluegill, along with the introduced redbreast sunfish were found here. Twelve rock bass ranging from 2 to 8-in, five small redbreast sunfish, one 3-in bluegill, and one 5-in largemouth bass were collected. Game fish accounted for about 10% of the total number of fish collected. Two non-game and eight forage species were also collected and these comprised about 90% of the total number collected. Banded sculpin (*Cottus carolinae*), snubnose darters, and central stonerollers were the most abundant species collected. Largemouth bass and sand shiners (*Notropis stramineus*) were the only species collected here but not at the downstream site. Crayfish species included *Cambarus longirostris* and *Orconectes erichsonianus*.

This is a medium to small size Ridge and Valley stream with gravel-rubble-cobble substrate that appears to have fair water quality. The stream was fairly silty with lots of filamentous algae, however, the combined occurrence of 17 species in the two samples indicates a fairly diverse fish population in relation to stream size. Stream bank erosion was observed and the stream receives considerable run-off from agricultural practices and other activities in the watershed.

Management Recommendations:

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



GREENEVILLE QUADRANGLE
Tenn. - 181 NE

FISH DATA

Stream: Roaring Fork
Date: 16 June 1993
Watershed: Nolichucky River
County: Greene
Area: Site # 1
Sample Length: 300 ft
Lat-Long: 361318N - 825205W
Reach: 06010108-37,1
Type of Sampling: Electrofishing
Elevation: 1,130 ft
Gear Type: One Backpack Unit
Time: 1515 - 1545

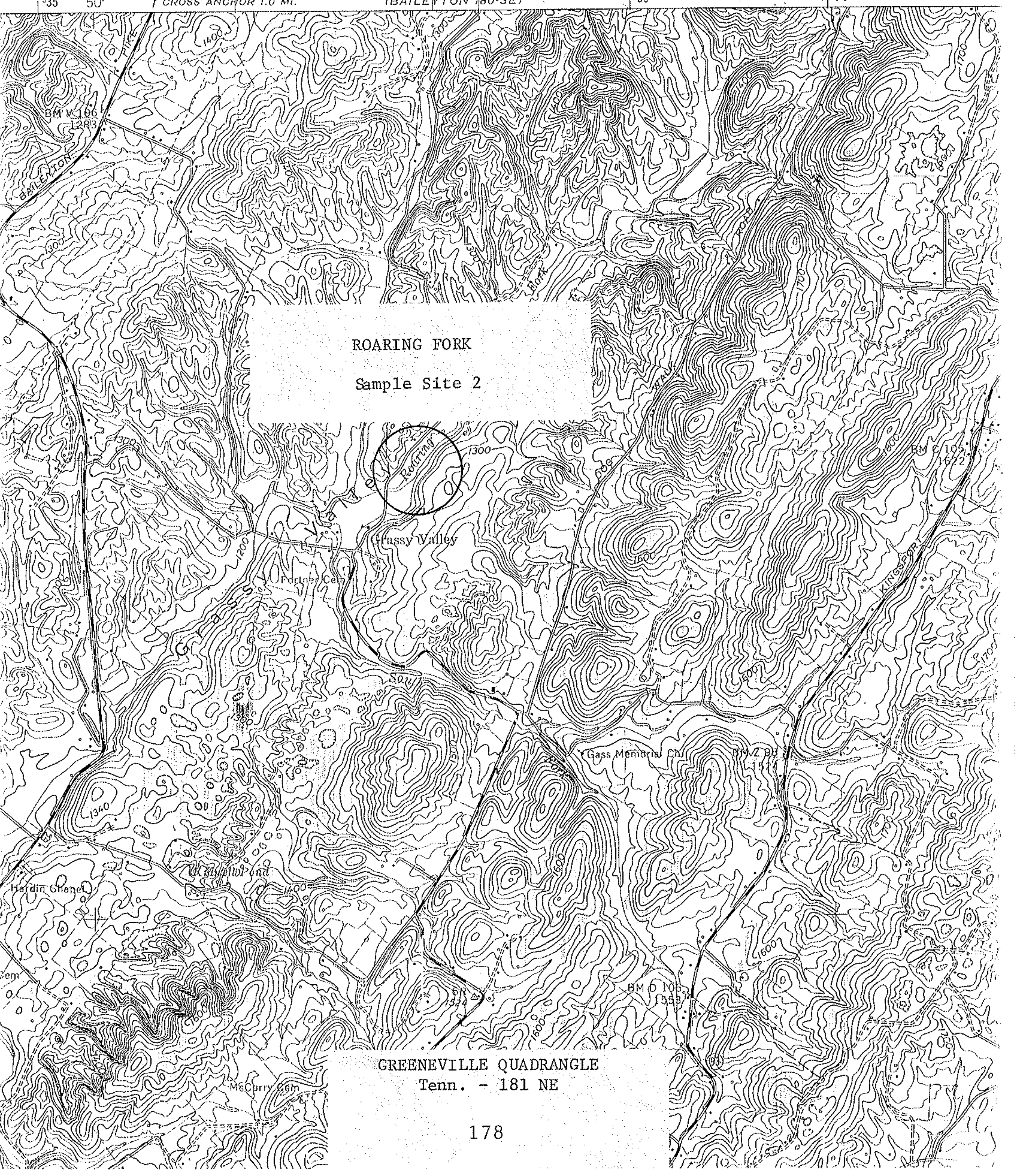
Species	TADS Code	Total Number	Inch Class	Total Weight
Ambloplites rupestris	13	1	2	-
" "	"	1	3	-
" "	"	1	6	-
" "	"	4	8	-
" "	"	1	9	-
Lepomis auritus	201	1	2	-
" "	"	1	4	-
" "	"	2	5	-
" "	"	2	6	-
L. macrochirus	206	3	3	-
" "	"	1	5	-
L. microlophus	209	1	2	-
Ameiurus natalis	174	1	-	-
Catostomus commersoni	32	1	-	-
Hypentelium nigricans	166	9	-	-
Campostoma anomalum	25	47	-	-
Cyprinella galactura	253	2	-	-
Hybopsis amblops	155	2	-	-
Luxilus chrysocephalus	249	31	-	-
Rhinichthys atratulus	351	6	-	-
Etheostoma blennioides	80	4	-	-
E. simoterum	111	34	-	-
Cottus carolinae	40	26	-	-

Cambarus longirostris, *Orconectes erichsonianus*, and *O. forceps*
Pleurocerid snails (Periwinkle) abundant.
Avg. width - 20 ft Avg. depth - 0.4 ft
Water temperature - 74 F Conductivity - 425 micromhos/cm
Bedrock, cobble - rubble, few boulder; good canopy cover.

Site was located upstream of bridge on Roaring Fork Road, near Bales Chapel. Shocking at 120 volts AC.

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

UNITED STATES
TENNESSEE VALLEY AUTHORITY
MAPS AND SURVEYS BRANCH



ROARING FORK

Sample Site 2

GREENEVILLE QUADRANGLE
Tenn. - 181 NE

FISH DATA

Stream: Roaring Fork
Date: 16 June 1993

Watershed: Nolichucky River
County: Greene

Area: Site # 2
Sample Length: 300 ft

Lat-Long: 361343N - 824855W
Reach: 06010108-37.1

Type of Sampling: Electrofishing
Elevation: 1,210 ft

Gear Type: One Backpack Unit
Time: 1700 - 1730

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus salmoides	220	1	5	-
Ambloplites rupestris	13	1	2	-
" "	"	1	5	-
" "	"	1	6	-
" "	"	4	7	-
" "	"	5	8	-
Lepomis auritus	201	3	4	-
" "	"	2	5	-
L. macrochirus	206	3	3	-
Catostomus commersoni	32	6	-	-
Hypentelium nigricans	166	7	-	-
Campostoma anomalum	25	17	-	-
Hybopsis amblops	155	9	-	-
Luxilus chrysocephalus	249	13	-	-
Notropis stramineus	271	13	-	-
Rhinichthys atratulus	351	2	-	-
Semotilus atromaculatus	360	3	-	-
Etheostoma simoterum	111	25	-	-
Cottus carolinae	40	84	-	-
Cambarus longirostris		4		
Orconectes erichsonianus		8		

Pleurocerid snails (Periwinkle) common.
Avg. width - 8 to 10 ft
Avg. depth - 0.3 ft
Riffle: gravel, rubble - cobble.
Pool: sand, silt, mud. Lots of filamentous algae.

Site was located 300 yrds. upstream of bridge that is about 0.15 mi upstream of the old Grassy Valley School. Shocking at 120 volts AC.

Collectors: R.D. Bivens and C.E. Williams

South Fork

One qualitative fishery survey was conducted on South Fork in June 1993:

Location and Length - Tributary to Roaring Fork (Lick Creek tributary). The sample site was located just upstream of the tributary on the gravel road that goes to Gass Memorial Church. It was approximately 200 ft in length and was sampled on 16 June 1993. It was in Greene County (Greeneville Quadrangle).

Sampling Methodology - The site was sampled using one 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 sampled 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. The Agency has made no previous studies or fish collections from this stream.

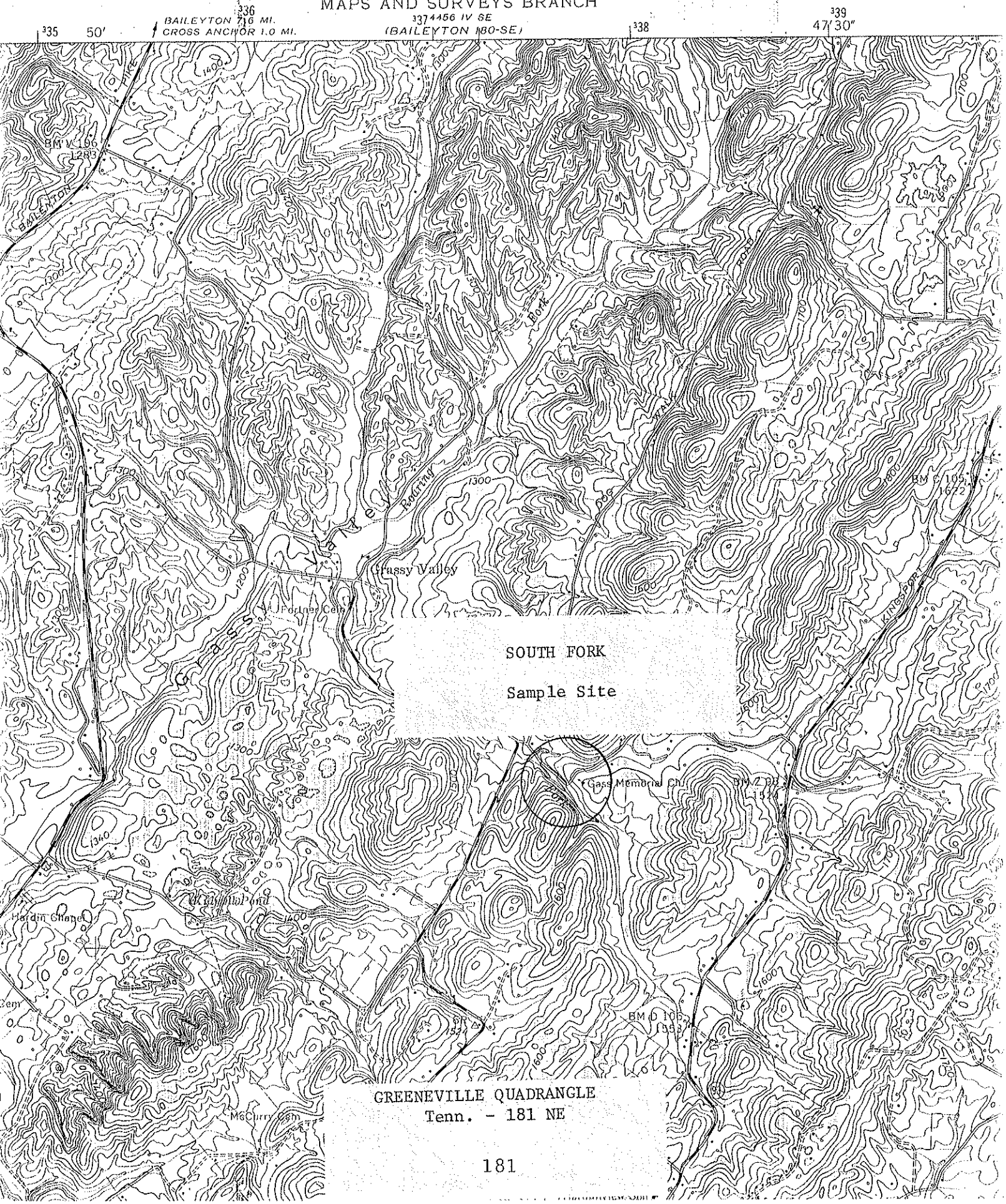
A total of only 3 fish species, bluegill (*Lepomis macrochirus*), blacknose dace (*Rhinichthys atratulus*), and creek chub (*Semotilus atromaculatus*) was collected. Crayfish species included the Appalachian brook crayfish (*Cambarus bartonii*) and *Orconectes erichsonianus*.

At the sample location, the stream was extremely silty along with heavy filamentous algal growth. The occurrence of only three species may to some extent be a function of small stream size, however 2 to 3 additional species should have been present.

Management Recommendations:

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

UNITED STATES
TENNESSEE VALLEY AUTHORITY
MAPS AND SURVEYS BRANCH



GREENEVILLE QUADRANGLE
Tenn. - 181 NE

FISH DATA

Stream: South Fork
Date: 16 June 1993

Watershed: Nolichucky River
County: Greene

Area: See comments
Sample Length: 200 ft

Lat-Long: 361258N - 824831W
Reach: 06010108-

Type of Sampling: Electrofishing
Elevation: 1,380 ft

Gear Type: One Backpack Unit
Time: 1820 - 1840

Species	TADS Code	Total Number	Inch Class	Total Weight
Lepomis macrochirus	206	1	5	-
" "	"	1	7	-
Rhinichthys atratulus	351	111	-	-
Semotilus atromaculatus	360	8	-	-
Cambarus bartonii		4		
Orconectes erichsonianus		1		

Pleurocerid snails (Periwinkle) common.
Avg. width - 4 to 6 ft
Avg. depth - 0.3 ft
Max. depth - 1.5 ft
Water temperature - 70 F

Riffle: lots of bedrock, boulder-cobble-gravel.
Pool: lots of mud and silt. Lots of filamentous algae.
Stream is significantly impacted - mostly by siltation.
Complete canopy cover.

Site was located just upstream of the tributary on the gravel road that goes up to Gass Memorial Church. Shocking at 120 volts AC.

Collectors: R.D. Bivens and C.E. Williams

South Fork Tributary

One qualitative fishery survey was conducted on this unnamed tributary to South Fork in June 1993:

Location and Length - Tributary to South Fork (Roaring Fork tributary). The sample site was located just upstream of the culvert on the gravel road that goes to Gass Memorial Church. It was approximately 150 ft in length and was sampled on 16 June 1993. It was in Greene County (Greeneville Quadrangle).

Sampling Methodology - The site was sampled using one 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 sampled 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. The Agency has made no previous studies or fish collections from this stream.

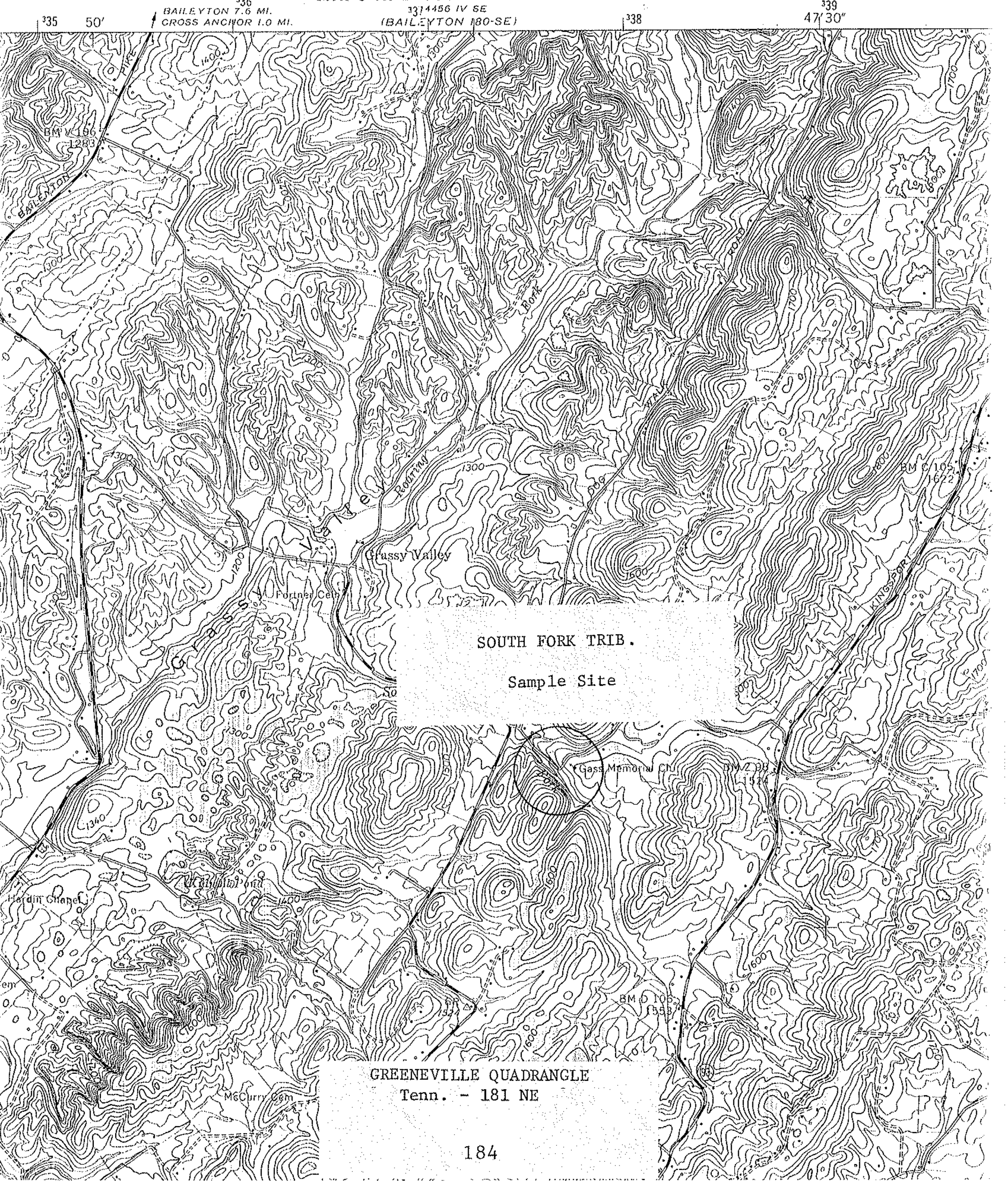
A total of only 3 fish species, central stoneroller (*Campostoma anomalum*), blacknose dace (*Rhinichthys atratulus*), and creek chub (*Semotilus atromaculatus*) was collected. The Appalachian brook crayfish (*Cambarus bartonii*) was the only crayfish species collected.

At the sample location, the stream was very silty. The occurrence of only three species may to some extent be a function of small stream size, however 2 to 3 additional species should have been present.

Management Recommendations:

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

UNITED STATES
TENNESSEE VALLEY AUTHORITY
MAPS AND SURVEYS BRANCH



FISH DATA

Stream: Trib. to South Fork
Date: 16 June 1993

Watershed: Nolichucky River
County: Greene

Area: See comments
Sample Length: 150 ft

Lat-Long: 361301N - 824831W
Reach: 06010108-

Type of Sampling: Electrofishing
Elevation: 1,380 ft

Gear Type: One Backpack Unit
Time: 1900 - 1910

Species	TADS Code	Total Number	Inch Class	Total Weight
Campostoma anomalum	25	1	-	-
Rhinichthys atratulus	351	51	-	-
Semotilus atromaculatus	360	6	-	-
Cambarus bartonii		1 (juvenile male)		

Avg. width - 6 to 10 ft
Avg. depth - 0.4 ft
Max. depth - 2 ft
Water temperature - 71 F

Riffle: bedrock-cobble-gravel-boulders.
Pool: lots of mud and silt.
Stream is significantly impacted - very silty.

Site was located from the mouth upstream to the culvert on the gravel road that goes up to Gass Memorial Church. Shocking at 120 volts AC.

Collectors: R.D. Bivens and C.E. Williams

Moon Creek

One qualitative fishery survey was conducted on Moon Creek in June 1993:

Location and Length - Tributary to the Nolichucky River. The sample site was located along side of an unnamed road, 0.5 south of the junction of the road and Hwy. 107; Sentelle property; elevation was near 1,340 ft and was sampled on 16 June 1993. It was 300 ft in length and averaged 8.3 ft in width. The site was in Greene County (Chuckey Quadrangle).

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

Water Quality - Data were collected from midstream at mid-depth on 16 June 1993: DO - 8.3 ppm, pH - 8.4, Temperature - 64.6 F, Conductivity - 430 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 2 man-h qualitative sample. The sample contained 533 organisms representing 33 taxa.

Fish Collected:

Species	No.	% by No.	Wt.	% by Wt.
Largemouth bass	1	0.7	0.27	8.1
Non-game Fish	23	16.0	1.62	48.8
Forage Fish	120	83.3	1.43	43.1
Total	144		3.32	

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

A total of 144 fish weighing 3.32 lb comprising only 5 species was collected. A single 8-in largemouth bass (*Micropterus salmoides*) was the only game fish found. One non-game and three forage species were also collected here and these comprised about 99% of the total number and 92% of the total weight. White suckers (*Catostomus commersoni*) alone accounted for about 49% of the total weight collected. Blacknose dace (*Rhinichthys atratulus*) and central stonerollers (*Campostoma anomalum*) were the most abundant species present. The only other species collected was a single banded sculpin (*Cottus carolinae*).

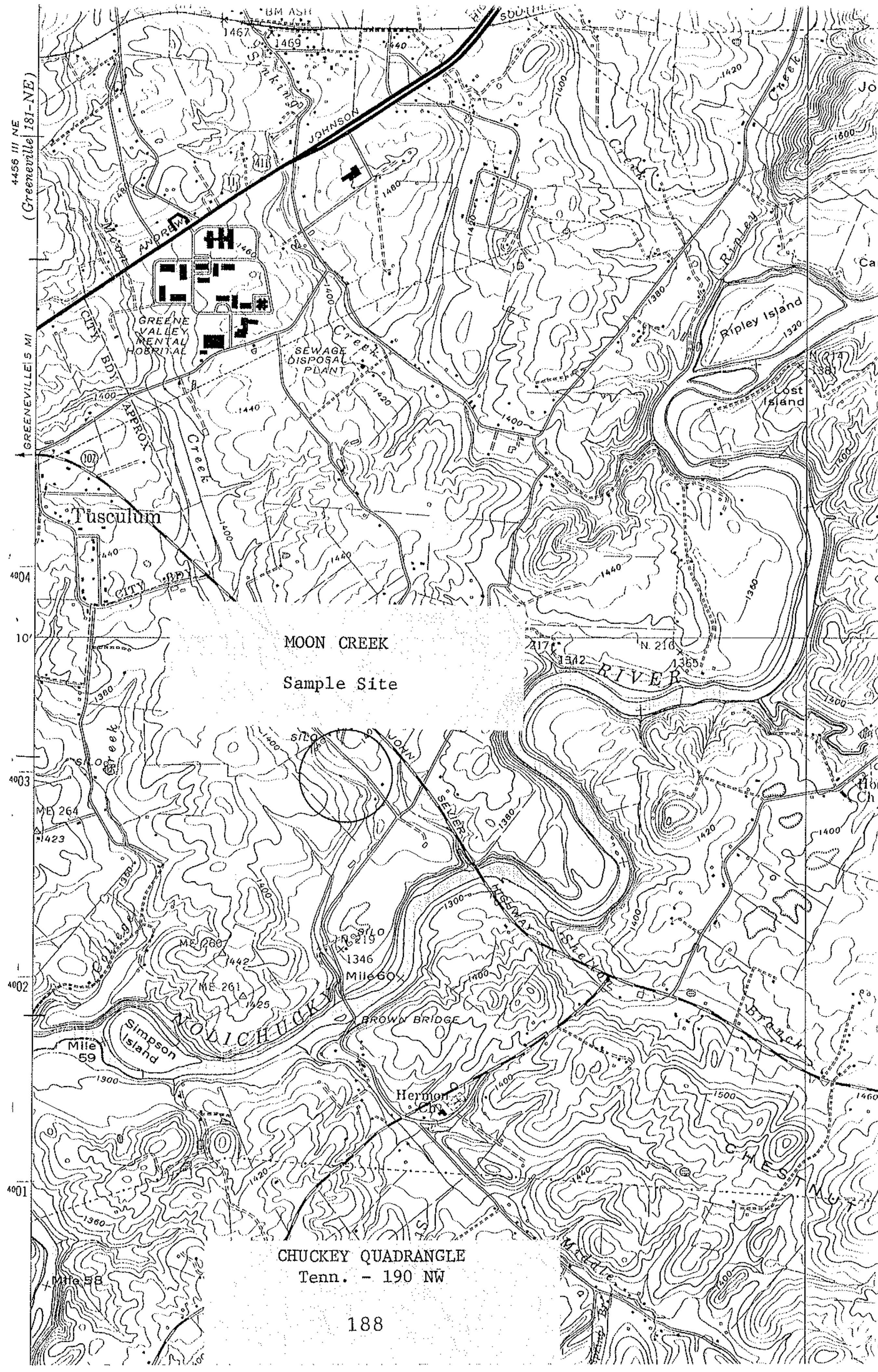
At the sample location, the stream was very silty. The occurrence of only three species may to some extent be a function

of small stream size, however 2 to 3 additional species should have been present. This is a small, low gradient stream that runs through mostly open farm land and is impacted by agricultural practices and other activities in the watershed.

Benthic macroinvertebrates from our sample included Baetidae, Ephemerellidae, Ephemeridae, and Heptageniidae mayflies, the perlid stonefly *Perlesta*, hydropsychid caddisflies, and Dytiscidae, Elmidae, Haliplidae, and Hydrophilidae beetles. A few fingernail clams (*Sphaerium*) were present along with *Physa* snails. Three crayfish species, the Appalachian brook crayfish (*Cambarus bartonii*), *C. longirostris* and *Orconectes erichsonianus*, were collected. Dipterans represented about 50%, coleopterans, hemipterans, and trichopterans each about 10%, odonates about 8%, and ephemeropterans about 7%, of the total number of organisms collected (Fig. 23). A total of 33 taxa was collected at this site, most of which were tolerant forms. Chironomids alone accounted for about 45% of the total number or organisms collected.

Management Recommendations:

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



MOON CREEK

Sample Site

CHUCKEY QUADRANGLE
Tenn. - 190 NW

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Moon Creek — Date: 16 June 1993

Watershed: Nolichucky River — County: Greene

Area: See comments — Sample Length: 300 ft

Lat-Long: 360937N - 824401W — Reach: 06010108-82

Data Collected By: Rick D. Bivens and Carl E. Williams

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 8.3 ft Avg. Depth 0.4 ft Max Depth 2.5 ft
2. Estimated Percent of Stream in Pools is 20%.
3. Estimated Percent **Pool** Bottom is Mud 30% Silt 40% Sand 5% Gravel 10% Rubble 10% Boulders 5%.
4. Estimated Percent **Riffle** Bottom is Mud 5% Silt 20% Sand 5% Gravel 20% Rubble 20% Boulders 20% Bedrock 10%.
5. Abundance of Littoral Aquatic Plants is Average (Lots of algal mats).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 10% of the Stream, Average in 50%, Poor in 40%.
7. Shade or Canopy Good over 50% of Stream.
8. Flow (CFS) 1.14: Compared to Normal: Normal
9. Present Weather: Clear, sunny, and mild.
   Air temperature - 74 F @ 9:30 am.
10. Weather (last 24 h): Partly cloudy, hot, and humid.
11. pH 8.4 Temp. 64.6 F Conductivity 430 micromhos/cm
    D.O. 8.3 ppm Saturation 89%
12. Comments: Sample area location was 0.5 mi downstream of the junction of Hwy. 107 and unnamed county road at about 1,340 ft elevation; in field on the Sentelle property. Very small stream that runs through mostly open farm land, dairy farms, etc. The stream is very silty.

FISH DATA

Stream: Moon Creek

Date: 16 June 1993

Watershed: Nolichucky River

County: Greene

Area: See comments

Sample Length: 300 ft

Lat-Long: 360937N - 824401W

Reach: 06010108-82

Type of Sampling: Electrofishing

Elevation: 1,340 ft

Gear Type: One Backpack Unit

Time: 1230 - 1300

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus salmoides	220	1	8	0.27
Catostomus commersoni	32	23	1-10	1.62
Campostoma anomalum	25	36	1-4	0.72
Rhinichthys atratulus	351	83	1-3	0.71
Cottus carolinae	40	1	1	t
Cambarus bartonii				
C. longirostris				
Orconectes erichsonianus				

Sample location was along side of an unnamed road, 0.5 mi south of the junction of the road and Hwy. 107; in the field between the barn and silo on the Sentelle property; elevation was near 1,340 ft. Shocking at 120 volts AC.

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

Moon Creek: Qualitative Benthic Sample

16 June 1993 Field # 425

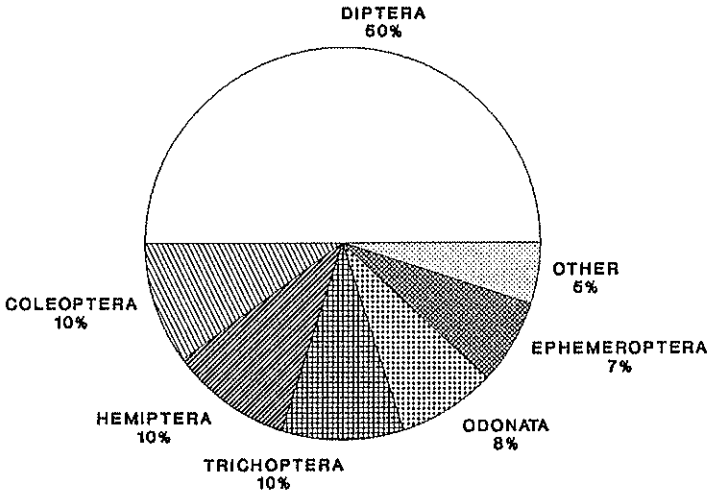
Greene Co., TN; Along an unnamed road 0.5 mi south of the junction with Hwy. 107. Coordinates: 360937N - 824401W. Chucky, Tenn., # 190 NW Quad. Reach # 06010108-82.

TAXA	NUMBER
ANNELIDA:	
Oligochaeta	1
COLEOPTERA:	
Dytiscidae/*Hydroporus*	1
Elmidae/*Dubiraphia* larvae	4
Dubiraphia adults	14
Macronychus glabratus larva and adults	10
Microcylloepus sp. adult	1
Stenelmis larvae	4
Stenelmis adults	21
Haliplidae/*Peltodytes* adult	1
Hydrophilidae/*Tropisternus collaris striolatus* adult	1
T. lateralis nimbatus adult	1
DIPTERA:	
Chironomidae larvae	232
Dixidae/*Dixa*	1
Simuliidae larvae & pupa	34
Tipulidae/*Tipula*	2
EPHEMEROPTERA:	
Baetidae/*Baetis*	16
Ephemerellidae/*Ephemerella*	2
Ephemeridae/*Hexagenia*	10
Heptageniidae/*Stenacron*	3
Stenonema	5
GASTROPODA:	
Physidae/*Physa*	8
HEMIPTERA:	
Corixidae	5
Gerridae/*Gerris remigis* adult males	4
Gerris remigis adult females	6
Veliidae/*Rhagovelia obesa* adult males	12
Rhagovelia obesa adult females	26
HYDRACARINA:	1
ISOPODA:	
Asellidae/*Asellus*	1

Moon Creek: Qualitative Sample cont.

TAXA	NUMBER
MEGALOPTERA:	
Sialidae/*Sialis*	8
ODONATA:	
Aeshnidae/*Boyeria vinosa*	11
Calopterygidae/*Calopteryx*	17
Coenagrionidae/*Argia*	9
Lestidae/*Archilestes grandis*	6
PELECYPODA:	
Sphaeriidae/*Sphaerium*	3
PLECOPTERA:	
Perlidae/*Perlesta*	5
TRICHOPTERA:	
Hydropsychidae/*Cheumatopsyche*	29
Hydropsyche early instars	8
Hydropsyche betteni/depravata	14
	533

MOON CREEK
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 533
TAXA RICHNESS = 33
Figure 23.

Little Cherokee Creek

Two qualitative fishery surveys were conducted on Little Cherokee Creek in June 1993:

Location and Length - Tributary to Cherokee Creek (Nolichucky River tributary). Sample Site 1 was located just downstream of the bridge crossing on Tommy Campbell Road and was approximately 150 ft in length. Sample Site 2 was located downstream of the bridge on Buncombe Hill Road and was approximately 200 ft in length. Both sites were sampled on 24 June 1993, and were in Washington County (Site 1, Erwin Quadrangle, Site 2, Jonesboro Quadrangle).

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

Water Quality - On 24 June 1993, Site 1: Temperature - 74 F, Conductivity - 345 micromhos/cm. Site 2: Temperature - 74 F, Conductivity - 360 micromhos/cm.

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 and emphasis was placed on the fish species present. The Agency has made no previous studies or fish collections from this stream.

A total of 9 fish species was collected at Site 1. Two native game species, rock bass (*Ambloplites rupestris*) and bluegill (*Lepomis macrochirus*) were found. Six rock bass ranging from 6 to 8-in and one 4-in bluegill were collected. Two non-game and five forage species were also collected. Central stonerollers (*Campostoma anomalum*), snubnose darters (*Etheostoma simoterum*), and blacknose dace (*Rhinichthys atratulus*) were the most abundant species collected. Both the mottled sculpin (*Cottus bairdi*) and banded sculpin (*C. carolinae*) were present. The Appalachian brook crayfish (*Cambarus bartonii*) was the only crayfish species collected.

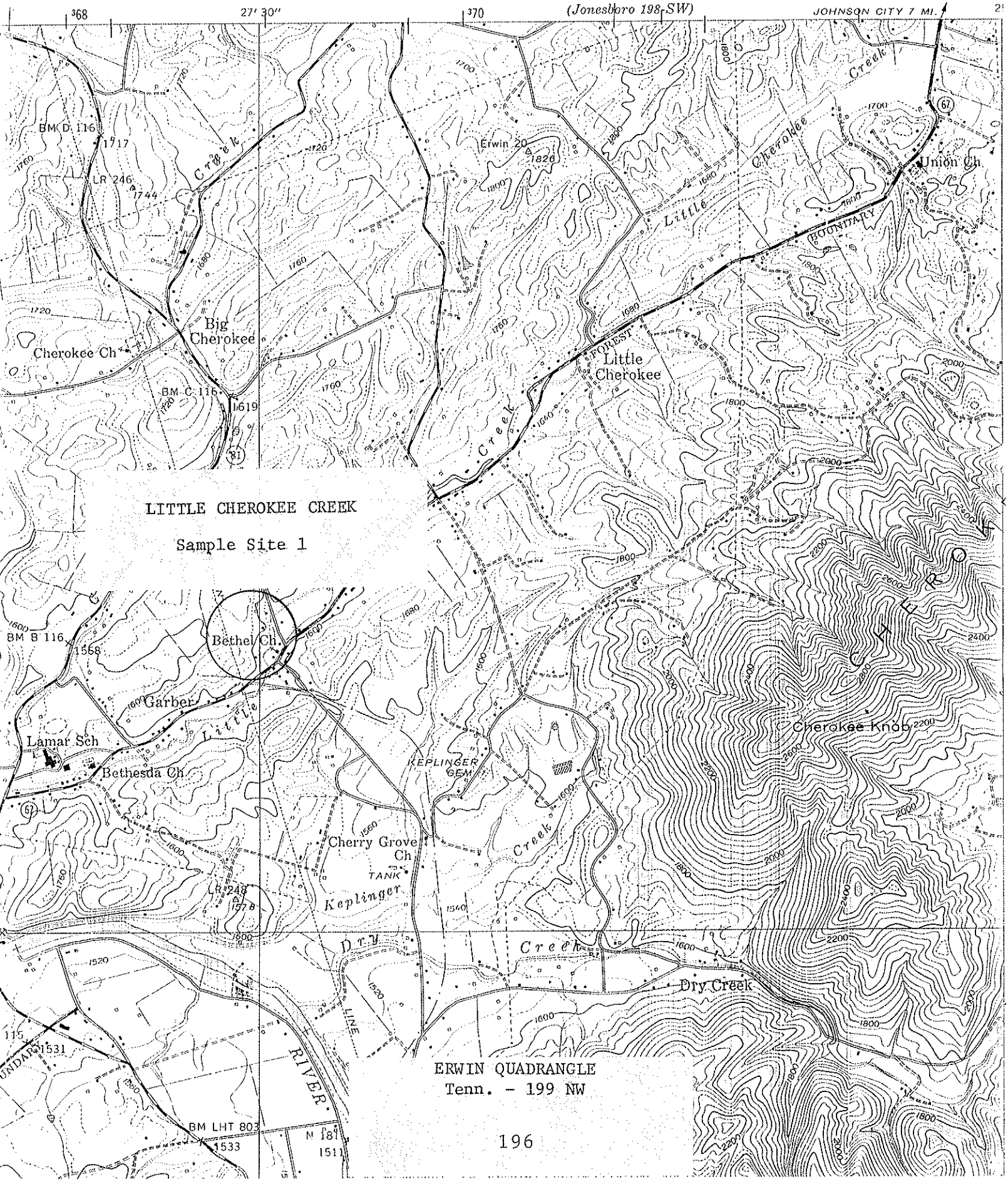
At Site 2, only six fish species were collected. One non-game and five forage species were collected, but no game fish species were found. Blacknose dace and snubnose darters were the most abundant species collected here. Both the mottled sculpin and banded sculpin were present at this site also.

This is a small, low gradient stream that has heavy siltation. It has little canopy cover and flows through mostly open cattle pastures and has actively eroding stream banks.

Management Recommendations:

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

UNITED STATES
TENNESSEE VALLEY AUTHORITY
MAPS AND SURVEYS BRANCH
4556 IV SW
(Jonesboro 198 SW)



FISH DATA

Stream: Little Cherokee Creek
Date: 24 June 1993

Watershed: Nolichucky River
County: Washington

Area: Site # 1
Sample Length: 150 ft

Lat-Long: 361321N - 822727W
Reach: 06010108-75.0

Type of Sampling: Electrofishing
Elevation: 1,580 ft

Gear Type: One Backpack Unit
Time: 1515 - 1530

Species	TADS Code	Total Number	Inch Class	Total Weight
Ambloplites rupestris	13	2	6	-
" "	"	2	7	-
" "	"	2	8	-
Lepomis macrochirus	206	1	4	-
Catostomus commersoni	32	6	-	-
Hypentelium nigricans	166	26	-	-
Campostoma anomalum	25	31	-	-
Rhinichthys atratulus	351	31	-	-
Etheostoma simoterum	111	37	-	-
Cottus bairdi	39	14	-	-
C. carolinae	40	1	-	-

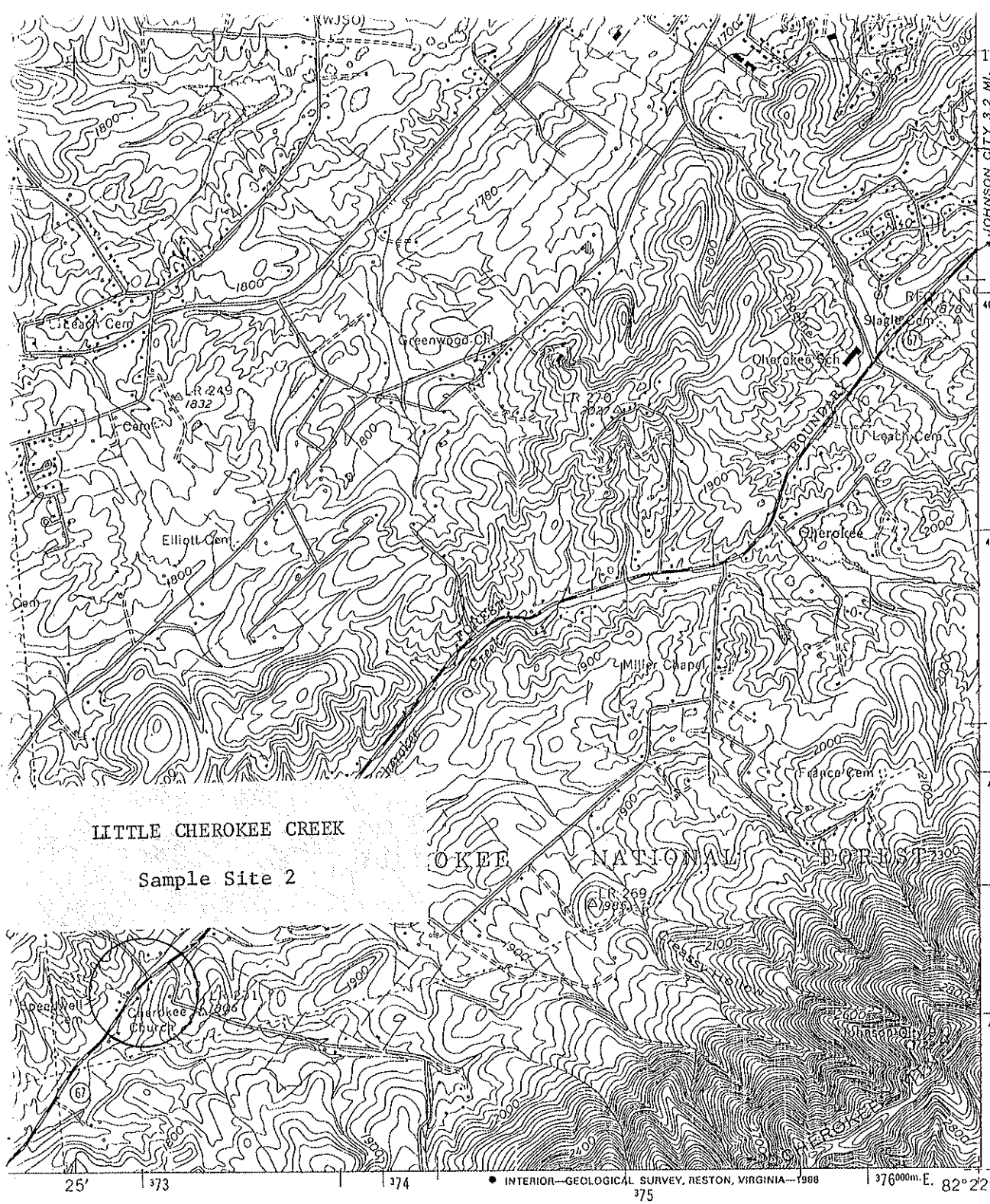
Cambarus bartonii 1 (juvenile)

Avg. width - 10 to 12 ft
Avg. depth - 0.4 to 0.5 ft
Water temperature - 74 F
Conductivity - 345 micromhos/cm

Riffles: gravel-rubble-cobble-boulder substrate.
Pools: silt and mud deep in pools.
Very silty stream at this site; runs through open fields with cattle.

Site was located just downstream of the bridge crossing on Tommy Campbell Road. Shocking at 120 volts AC.

Collectors: R.D. Bivens and C.E. Williams



• INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1968

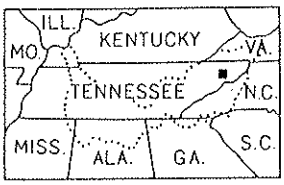
1 MILE

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

JONESBOROUGH, TN.

36082-C4-TF-024

1959

PHOTOREVISED 1968

DMA 4556 IV SW-SERIES V841

2092

37902

FISH DATA

Stream: Little Cherokee Creek
Date: 24 June 1993

Watershed: Nolichucky River
County: Washington

Area: Site # 2
Sample Length: 200 ft

Lat-Long: 361523N - 822448W
Reach: 06010108-75.0

Type of Sampling: Electrofishing
Elevation: 1,715 ft

Gear Type: One Backpack Unit
Time: 1400 - 1415

Species	TADS Code	Total Number	Inch Class	Total Weight
Catostomus commersoni	32	10	-	-
Campostoma anomalum	25	2	-	-
Rhinichthys atratulus	351	119	-	-
Etheostoma simoterum	111	22	-	-
Cottus bairdi	39	19	-	-
C. carolinae	40	2	-	-
Cambarus sp.		1		

Avg. width - 6 to 8 ft
Avg. depth - 0.3 ft
Water temperature - 74 F
Conductivity - 360 micromhos/cm

Gravel-rubble-sand-cobble with few boulders substrate.
Very silty stream at this site; runs through open fields with cattle in stream and eroding stream banks; mostly open with some canopy cover.

Site was located just downstream of the bridge crossing on Buncomb Hill Road. Shocking at 120 volts AC.

Collectors: R.D. Bivens and C.E. Williams

Love Creek Tributary

One qualitative fishery survey was conducted on and unnamed tributary to Love Creek in January 1993:

Location and Length - Tributary to Love Creek (Holston River trib.). The sample area was located between Millertown Pike and Buffat Mill Road, northeast of Spring Hill Road; just east of North Acres Church. It was approximately 600 ft in length and was sampled on 13 January 1993. It was in Knox County (John Sevier Quadrangle).

Sampling Methodology - The site was sampled using one backpack shocker operating at 120 v AC.

Water Quality - No data collected.

Benthos Collection - No collection was made.

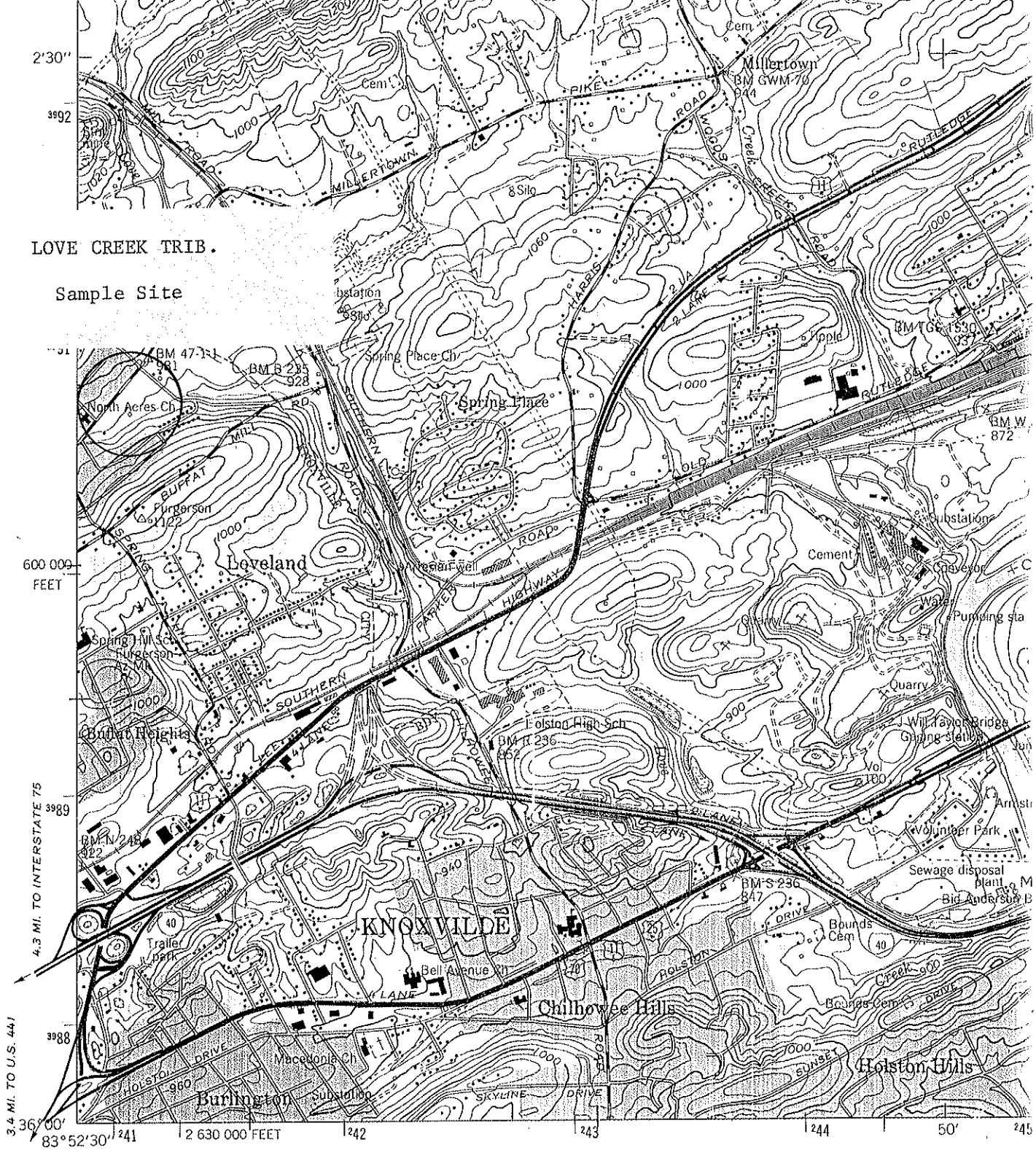
Fish Collected - (See data sheet for species list)

Comments - This stream was sampled to develop a fish species diversity list for TADS. Only a limited survey was conducted and emphasis was placed on the fish species present. We were primarily interested in checking on the possible occurrence of the flame chub (*Hemitremia flammea*) from this stream. This is area is slated for future construction of a theater complex and relocation of the existing stream channel is planned. The Agency has made no previous studies or fish collections from this stream.

A total of 1,145 fish comprising 7 species was collected. A single specimen of the introduced redbreast sunfish (*Lepomis auritus*) was the only game species found. Other species include: central stoneroller (*Campostoma anomalum*), fathead minnow (*Pimephales promelas*), blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*), and banded sculpin (*Cottus carolinae*). Blacknose dace and central stonerollers were the most abundant species collected. Crayfish species included the Appalachian brook crayfish (*Cambarus bartonii*) and *C. longirostris*.

Management Recommendations:

1. No listed species (i.e. flame chub) were found.



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

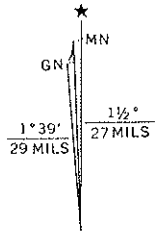
Control by NOS/NOAA, USGS, WPA, and TVA

Revised by TVA in 1976 by photogrammetric methods using aerial photographs taken 1975 and by reference to TVA-USGS quadrangle dated 1966. Map field checked by TVA, 1976
Map edited 1978.

Polyconic projection. 1927 North American datum
10,000-foot grid based on Tennessee rectangular coordinate system
1000 meter Universal Transverse Mercator Grid ticks, Zone 17, shown in blue

Fine red dashed lines indicate
visible on aerial photographs.

Red tint indicates areas in whic



UTM GRID AND 1978 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

JOHN SEVIER QUADRANGLE
Tenn. - 146 SE

FOI
TE

FISH DATA

Stream: Love Creek Tributary
Date: 13 January 1993

Watershed: Holston River
County: Knox

Area: See comments
Sample Length: 600 ft

Lat-Long: 360140N - 835220W
Reach: 06010104-

Type of Sampling: Electrofishing
Elevation: 960 ft

Gear Type: One Backpack Unit
Time: Not Recorded

Species	TADS Code	Total Number	Inch Class	Total Weight
Lepomis auritus	201	1	-	-
Catostomus commersoni	32	7	-	-
Campostoma anomalum	25	201	-	-
Pimephales promelas	335	2	-	-
Rhinichthys atratulus	351	823	-	-
Semotilus atromaculatus	360	48	-	-
Cottus carolinae	40	63	-	-
Cambarus bartonii		5		
C. longirostris		2		
Orconectes sp.		1		
Desmognathus fuscus		3		

Site was located between Millertown Pike and Buffat Mill Road, northeast of Spring Hill Road; just east of North Acres Church. Shocking at 120 volts AC.

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

Panther Creek

One qualitative fishery collection was conducted in June 1993:

Location and Length - Tributary to Holston River (Cherokee Res.). The sample area was located at the "trout pool", near the campground at Panther Creek State Park. It was approximately 150 ft in length and was sampled on 25 June 1993. The site was in Hamblen County (Talbott Quadrangle).

Sampling Methodology - The site was sampled with a single back-pack 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 sampled primarily help remove rough fish from the "trout pool" at Panther Creek State Park. While removing the rough fish, we took the opportunity to make a fish collection and develop a reasonably comprehensive fish species diversity list for TADS. Only a limited survey was conducted and emphasis was placed on the fish species present. The Agency has made no previous studies or fish collections from this stream.

A total of 12 fish species was collected. Three native game species, smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), and bluegill (*Lepomis macrochirus*) were present. Three non-game and six forage species were also collected here. These included northern hog suckers (*Hypentelium nigricans*), golden redhorse (*Moxostoma erythrurum*), common carp (*Cyprinus carpio*), central stonerollers (*Campostoma anomalum*), bluntnose minnows (*Pimephales notatus*), blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*) logperch (*Percina caprodes*), and banded sculpin (*Cottus carolinae*). All the carp and redhorse were removed from the pool and released in Cherokee Reservoir. *Cambarus longirostris* was the only crayfish species collected.

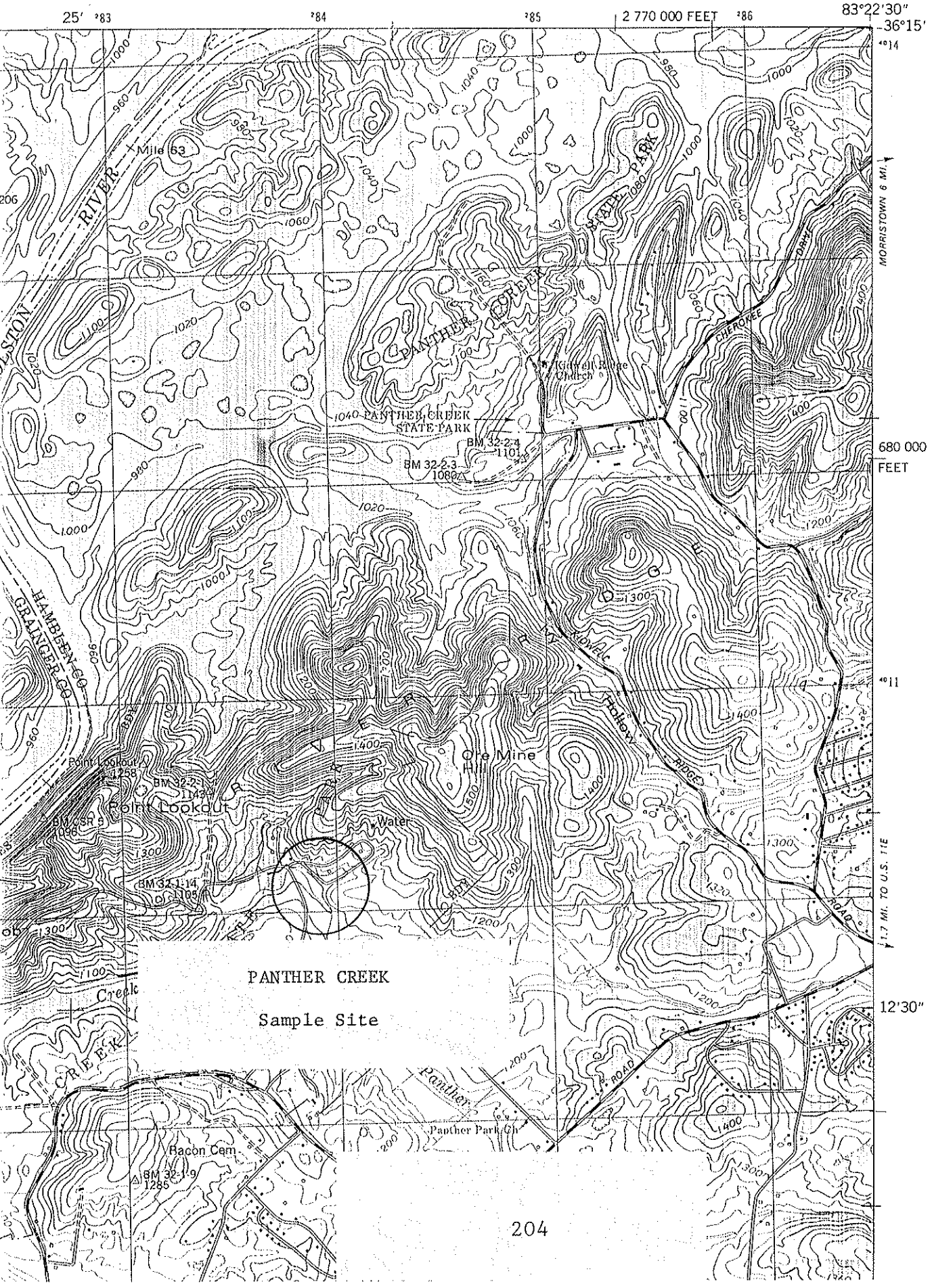
Management Recommendations:

1. No specific management can be suggested at present.

TALBOTT QUADRANGLE

TENNESSEE

7.5 MINUTE SERIES (TOPOGRAPHIC) 163-NW



FISH DATA

Stream: Panther Creek

Date: 25 June 1993

Watershed: Holston River

County: Hamblen

Area: See comments

Sample Length: 150 ft

Lat-Long: 361253N - 832419W

Reach: 06010104-28,0

Type of Sampling: Electrofishing

Elevation: 1,080 ft

Gear Type: One Backpack Unit

Time: 0900 - 1015

Species	TADS Code	Total Number	Inch Class	Total Weight
Micropterus dolomieu	218	1	-	-
M. salmoides	220	5	-	-
Lepomis macrochirus	206	3	-	-
Hypentelium nigricans	166	6	-	-
Moxostoma erythrurum	230	33 +	-	-
Campostoma anomalum	25	109	-	-
Cyprinus carpio	47	9	-	-
Pimephales notatus	334	5	-	-
Rhinichthys atratulus	351	1	-	-
Semotilus atromaculatus	360	38	-	-
Percina caprodes	306	1	-	-
Cottus carolinae	40	31	-	-
Cambarus longirostris		9		

Water temperature - 66 F @ 0930

No lengths or weights obtained. All carp and redhorse were removed from the pool and released in Cherokee Reservoir.

Site was located at the "trout pool", near campground at Panther Creek State Park. Shocking at 120 volts AC.

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

Fall Creek

Two qualitative fishery surveys were conducted in June 1993:

Location and Length - Tributary to the Holston River (Cherokee Res.). Sample Site 1 was located along Fall Creek Road, approx. 0.3 mi (by road) upstream of the junction with Three Springs Road. It was 300 ft in length and averaged 23.2 ft in width. Sample Site 2 was located at the bridge crossing on Warrensburg Road. It was 200 ft in length and averaged 6 to 8 ft in width. Both sites were sampled on 25 June 1993, and were in Hamblen County (Russellville Quadrangle).

Sampling Methodology - Site 1 was sampled using two backpack electrofishing units operating at 120 volts AC. Site 2 was sampled using one backpack electrofishing unit operating at 120 volts AC.

Water Quality - Data were collected from midstream at mid-depth on 25 June 1993. Site 1: DO - 9.9 ppm, pH - 8.5, Temperature - 62.6 F, Conductivity - 395 micromhos/cm. Site 2: Temperature - 65.3 F, Conductivity - 390 micromhos/cm.

Benthos Collection - Benthic organisms were collected by conducting a 3 man-h qualitative sample at Site 1 only. The sample contained 284 organisms representing 28 taxa.

Fish Collected:

	Site 1				Site 2	
Species	No.	% by No.	Wt.	% by Wt.	No.	% by No.
Bluegill	1	0.3	0.04	0.6		
Non-game Fish	18	5.7	2.14	32.6	4	4.0
Forage Fish	297	94.0	4.38	66.8	97	96.0
Total	316		6.56		101	

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

We collected a total of 316 fish weighing 6.56 lb and comprising six species from Site 1. A single 3-in bluegill (*Lepomis macrochirus*) was the only game fish collected. One non-game and four forage species were also collected here and these comprised about 99% of the total number and 99% of the total

weight. Blacknose dace (*Rhinichthys atratulus*) and central stonerollers (*Campostoma anomalum*) were the most abundant forage species present. No darters were collected at all.

At Site 2, the stream was very small and only a limited survey was conducted with emphasis placed on the fish species present and their relative abundance. We collected a total of 101 fish comprising five species. No game species were collected at all. One common carp (*Cyprinus carpio*) was the only species collected here, but not at the downstream site. The blacknose dace was the most abundant species present at this site and it alone accounted for about 87% of the total number of fish collected. White suckers (*Catostomus commersoni*), creek chub (*Semotilus atromaculatus*), and banded sculpin (*Cottus carolinae*) were the other species present. Again, no darters were collected at all. The Appalachian brook crayfish (*Cambarus bartonii*) and *C. longirostris* were the only crayfish species collected.

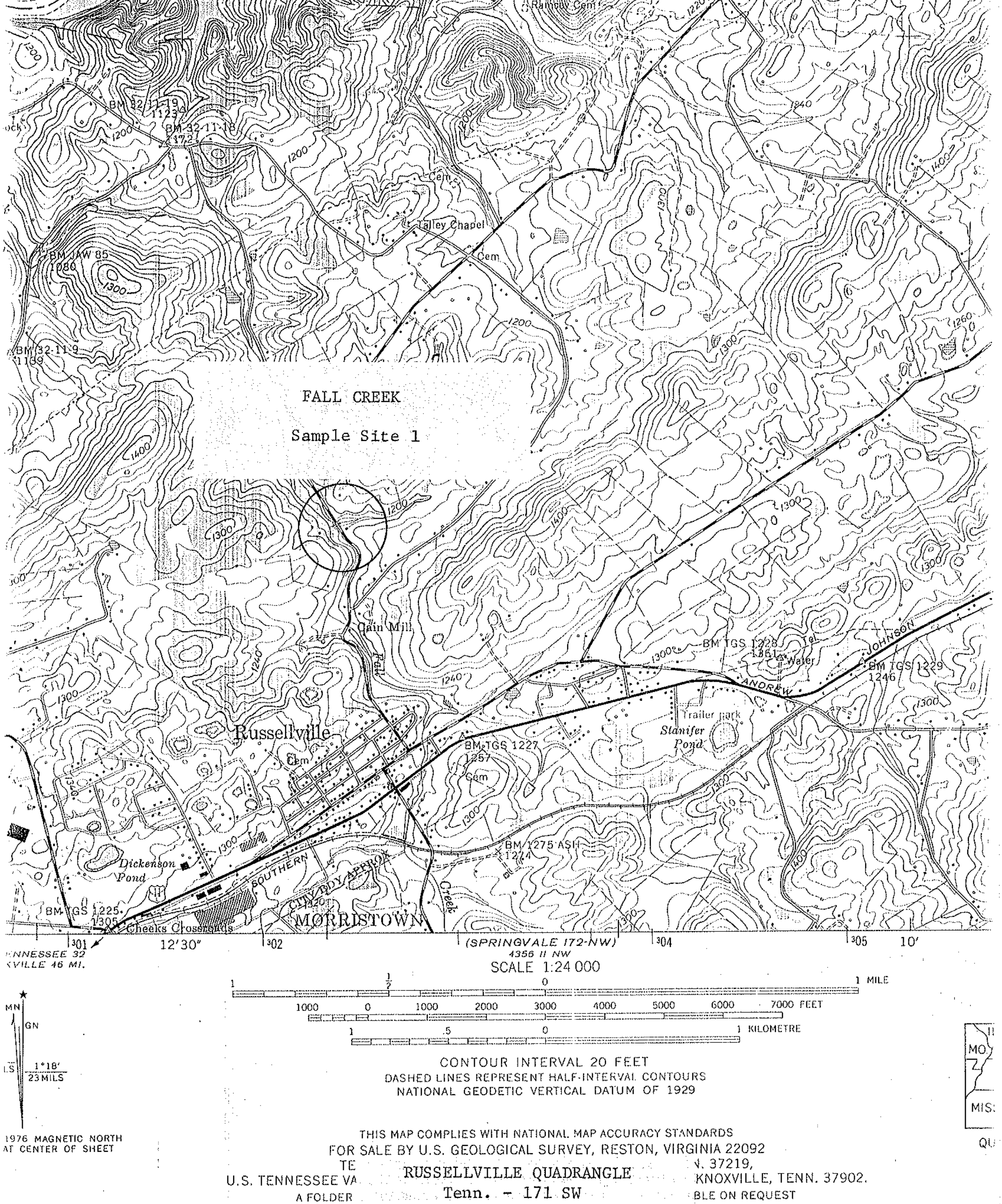
Fall Creek is a small, spring-fed stream that is apparently being impacted by non-point source pollution, mainly siltation. In all, only seven species were collected from the two sample sites and for the most part, the species assemblage was typical for streams with polluted conditions. The species components may actually reflect small stream size and predominant bedrock habitat more than any extreme level of impairment. However, as many as 10 additional fish species could be expected from this stream.

Benthic macroinvertebrates from our sample at Site 1 included Baetidae mayflies, no stoneflies, Hydropsychidae and Hydroptilidae caddisflies, and Elmidae and Hydrophilidae beetles. Two crayfish species, the Appalachian brook crayfish (*Cambarus bartonii*) and *C. longirostris* were collected. Trichopterans represented about 32%, dipterans about 26%, isopods about 15%, hemipterans about 10%, and odonates about 9% of the total number of organisms collected (Fig. 24). A total of only 28 taxa was collected at this site. Many of which were tolerant species.

Of special interest is the collection of 2 specimens of *Hydropsyche rotosa* at this site. This makes the third stream in the Holston system where we have collected this species. Prior to our collecting *H. rotosa* in Puncheon Camp Creek in Grainger County in 1989 (Bivens and Williams 1990), it was known only from its type locality near Tusculum College in Greene County, Tennessee (Etnier and Schuster 1979). This makes six streams in three different river systems from which we have taken *H. rotosa* (Bivens and Williams 1990, 1991; Bivens et al. 1993).

Management Recommendations:

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


FALL CREEK
Sample Site 1
Talley Chapel
Cain Mill
Russellville
Dickenson Pond
Stanifer Pond
Trailer park
MORRISTOWN
Cheeks Crossroads
SOUTHERN
JOHNSON
ANDREW
Fall
Creek
(SPRINGVALE 172-NW)
4356 II NW
12'30"
10'
SCALE 1:24 000
1 MILE
7000 FEET
1 KILOMETRE
CONTOUR INTERVAL 20 FEET
DASHED LINES REPRESENT HALF-INTERVAL CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929
1976 MAGNETIC NORTH
AT CENTER OF SHEET
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
KNOXVILLE, TENN. 37902.
RUSSELLVILLE QUADRANGLE
Tenn. - 171 SW

PHYSICOCHEMICAL DATA

A. LOCATION:

Stream: Fall Creek — Date: 25 June 1993

Watershed: Holston River — County: Hamblen

Station: Site # 1 — Sample Length: 300 ft

Lat-Long: 361606N - 831159W — Reach: 06010104-40.0

Data Collected By: Rick D. Bivens, Carl E. Williams, Mark T. Fagg, and Dwain E. Bivens

B. PHYSICAL CHARACTERISTICS:

1. Avg. Width 23.2 ft Avg. Depth 0.6 ft Max. Depth 1.7 ft
2. Estimated Percent of Stream in Pools is 35%.
3. Estimated Percent **Pool** Bottom is Mud 10% Silt 15% Sand 5% Gravel 5% Rubble 5% Boulders 10% Bedrock 50%.
4. Estimated Percent **Riffle** Bottom is Silt 10% Sand 5% Gravel 10% Rubble 10% Boulders 20% Bedrock 45%.
5. Abundance of Littoral Aquatic Plants is Average (moss on the rocks).
6. Cover Abundance (overhanging banks, logs, roots, etc.) is Good in 25% of the Stream, Average in 50%, Poor in 25%.
7. Shade or Canopy Good over 80% of Stream.
8. Flow (CFS) 4.2: Compared to Normal: Normal
9. Present Weather: Partly cloudy, hot, and humid. Air temperature - 81 F @ 1:00 pm.
10. Weather (last 24 h): Partly cloudy, hot, and humid.
11. pH 8.5 Temp. 62.6 F Conductivity 395 micromhos/cm D.O. 9.9 ppm Saturation 104%
12. Comments: Sample area location was along Fall Creek Road, approx. 0.3 mi (by road) upstream of the junction with Three Springs Road; at 1,150 ft elevation; at old wooden bridge at water tank. Stream is mostly bedrock substrate here; not good habitat, and siltation is heavy. The stream appears to be severely impacted from non-point source.

FISH DATA

Stream: Fall Creek
Date: 25 June 1993

Watershed: Holston River
County: Hamblen

Area: Site # 1
Sample Length: 300 ft

Lat-Long: 361606N - 831159W
Reach: 06010104-40,0

Type of Sampling: Electrofishing
Elevation: 1,150 ft

Gear Type: Two Backpack Units
Time: 1445 - 1515

Species	TADS Code	Total Number	Inch Class	Total Weight
Lepomis macrochirus	206	1	3	0.04
Catostomus commersoni	32	18	1-9	2.14
Campostoma anomalum	25	48	1-7	1.80
Rhinichthys atratulus	351	191	1-4	1.06
Semotilus atromaculatus	360	27	2-7	1.04
Cottus carolinae	40	31	1-4	0.48
Cambarus bartonii		1		
C. longirostris		23		

Site was located along Fall Creek Road, approx. 0.3 mi (by road) upstream of the junction with Three Springs Road. Shocking at 120 volts AC.

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

Fall Creek: Site # 1, Qualitative Benthic Sample

25 June 1993 Field # 437

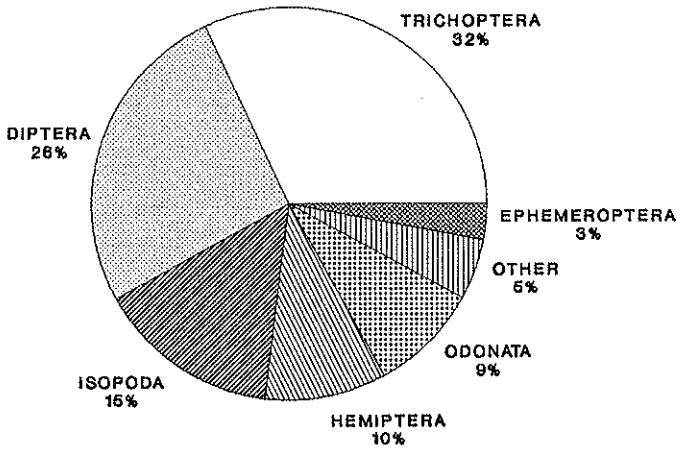
Hamblen Co., TN; Along Fall Creek road, about 0.3 mi upstream of the junction of Three Springs Road. Coordinates: 361606N - 831159W. Russellville, Tenn., # 171 SW Quad. Reach # 06010104-40,0.

TAXA	NUMBER
AMPHIPODA:	2
ANNELIDA:	
Oligochaeta	5
COLEOPTERA:	
Elmidae/*Dubiraphia* adults	6
Hydrophilidae larva	1
DIPTERA:	
Chironomidae larvae	47
pupae	2
Empididae	1
Simuliidae	8
Tipulidae/*Antocha* larvae and pupa	10
Tipula	5
EPHEMEROPTERA:	
Baetidae/*Baetis*	7
HEMIPTERA:	
Corixidae	4
Gerridae/*Gerris remigis* adult males	4
Gerris remigis adult females	3
Notonectidae/*Notonecta*	1
Veliidae/*Rhagovelia obesa* adult males	12
Rhagovelia obesa adult females	4
HYDRACARINA:	2
ISOPODA:	
Asellidae/*Lirceus*	43
MEGALOPTERA:	
Corydalidae/*Nigronia serricornis*	1

Fall Creek: Site # 1, Qualitative Sample cont.

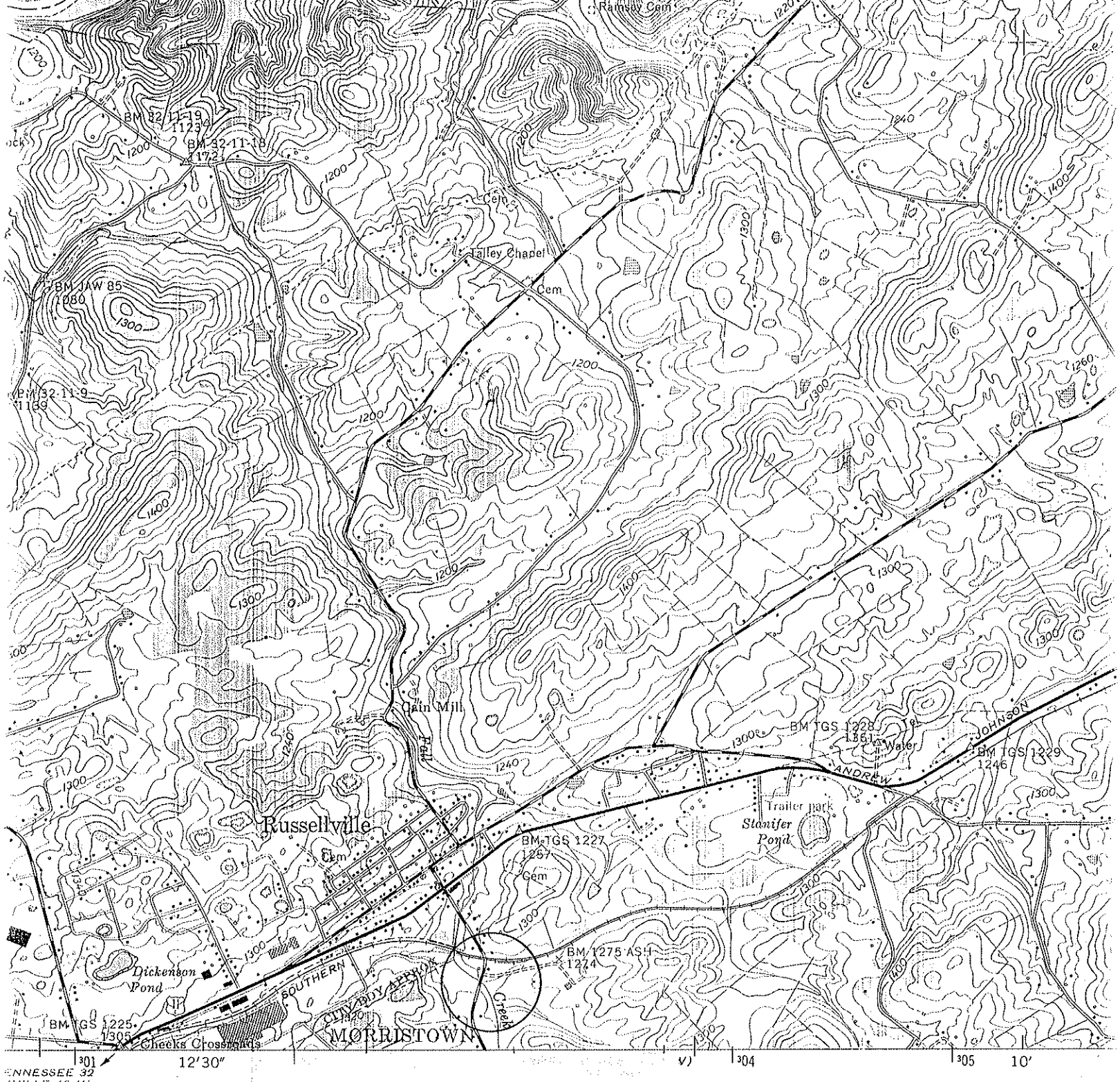
TAXA	NUMBER
ODONATA:	
Aeshnidae/*Boyeria vinosa*	2
Calopterygidae/*Calopteryx*	14
Coenagrionidae/*Argia*	3
Corduliidae	1
Gomphidae/*Gomphus lividus*	5
PELECYPODA:	
Sphaeriidae/*Sphaerium*	1
TRICHOPTERA:	
Hydropsychidae/*Ceratopsyche bronta*	1
Cheumatopsyche	3
Hydropsyche betteni/depravata	83
H. rotosa	2
Hydroptilidae/*Hydroptila*	1
	284

FALL CREEK
SITE 1
BENTHIC MACROINVERTEBRATES



PERCENT OF TOTAL NUMBER OF ORGANISMS

n = 284
TAXA RICHNESS = 28
Figure 24.



ENNESSEE 32
KVILLE 46 MI.

FALL CREEK

Sample Site 2

1 MILE
00 5000 6000 7000 FEET
1 KILOMETRE

MN
GN
1°18'
23 MILS
1976 MAGNETIC NORTH
AT CENTER OF SHEET

CONTOUR INTERVAL 20 FEET
DASHED LINES REPRESENT HALF-INTERVAL CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
TI N. 37219,
U.S. TENNESSEE V KNOXVILLE, TENN. 37902.
A FOLDER ABLE ON REQUEST

RUSSELLVILLE QUADRANGLE
Tenn. - 171 SW

MO.
MIS:
QU

FISH DATA

Stream: Fall Creek
Date: 25 June 1993

Watershed: Holston River
County: Hamblen

Area: Site # 2
Sample Length: 200 ft

Lat-Long: 361510N - 831139W
Reach: 06010104-40,0

Type of Sampling: Electrofishing
Elevation: 1,230 ft

Gear Type: One Backpack Unit
Time: 1645 - 1700

Species	TADS Code	Total Number	Inch Class	Total Weight
Catostomus commersoni	32	3	-	-
Cyprinus carpio	47	1	-	-
Rhinichthys atratulus	351	88	-	-
Semotilus atromaculatus	360	7	-	-
Cottus carolinae	40	2	-	-
Cambarus bartonii		2		
C. longirostris		4		

Pleurocerid snails abundant

Avg. width - 6 to 8 ft
Avg. depth - 0.3 to 0.4 ft
Water temperature - 65.3 F
Conductivity - 390 micromhos/cm

Gravel-rubble-sand-cobble with few boulders substrate.
Siltation medium to heavy; steep eroding stream banks; cattle in the stream, etc.
Spring-fed stream.

Site was located at the bridge crossing on Warrensburg Road.
Shocking at 120 volts AC.

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

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APPENDIX A

Distribution of Fishes Collected During 1993 Stream Surveys

		River System																														
		Clinch				Powell	Tennessee				Little Tennessee				French Broad								Nolichucky					Holston			
Family	Species	Clear Creek	Big Sycamore Cr.	Joe Mill Creek	Machine Branch	Mulberry Cr.	Muddy Creek	Little Turkey Cr.	Crooked Creek	Mook Creek	Citico Creek	Smoky Branch	Duncan Branch	Caney Branch	Midway Creek	Limestone Cr.	Boyds Creek	Webb Creek	Dunn Creek	Clear Creek	Cosby Creek	Caney Creek	Roaring Fork	South Fork	South Fork trib.	Moon Creek	Lit. Cherokee Cr.	Love Creek trib.	Panther Creek	Fall Creek
Atherinidae:	*Labidesthes sicculus*										X																				
Catostomidae:	*Catostomus commersoni*	X				X						X				X				X			X			X	X	X		X
	Hypentelium nigricans		X			X			X		X	X	X	X		X	X	X	X	X	X	X	X				X		X		
	Moxostoma duquesnei		X			X					X						X		X		X										
	M. erythrurum		X						X		X						X			X									X		
Centrarchidae:	*Ambloplites rupestris*	X	X			X					X		X			X	X	X	X		X		X				X				
	Lepomis auritus								X		X	X			X	X	X		X	X			X					X			
	L. cyanellus					X			X											X											
	L. gulosus								X																						
	L. macrochirus		X					X	X		X				X	X	X			X			X	X			X		X	X	
	L. microlophus								X														X								
	Micropterus dolomieu		X			X					X			X				X											X		
	M. punctulatus																X														
	M. salmoides		X						X		X					X		X		X			X			X			X		
Clupeidae:	*Dorosoma cepedianum*								X											X											
Cottidae:	*Cottus bairdi*										X	X		X					X		X	X					X				
	C. carolinae	X	X		X	X	X	X	X		X				X	X	X	X	X	X	X		X			X	X	X	X	X	X
Cyprinidae:	*Campostoma anomalum*	X	X	X	X	X		X	X		X	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
	Cyprinella galactura					X			X		X		X						X	X	X		X								
	C. spiloptera					X			X		X	X	X	X			X			X											
	Cyprinus carpio		X						X								X													X	X
	Erimystax insignis					X					X																				
	Hemitremia flammea							X																							
	Hybopsis amblops					X			X		X						X		X		X		X								
	Luxilus chrysocephalus	X	X		X	X			X		X	X					X		X				X								
	L. coccogenis		X			X					X		X	X				X	X												
	Lythrurus lirus										X																				
	Nocomis micropogon					X					X		X	X				X	X												
	Notemigonus crysoleucas																			X											
	Notropis leuciodus					X					X			X				X	X												
	N. rubellus micropteryx																		X	X											
	N. rubricroceus																	X	X		X	X									
	N. sp. cf. N. spectrunculus					X																									
	N. stramineus																		X				X								
	N. telescopus					X					X			X				X		X	X										
	N. volucellus					X																									
	Phenacobius uranops					X																									
	Phoxinus tennesseensis												X	X																	
	Pimephales notatus	X	X			X											X												X		
	P. promelas																											X			
	Rhinichthys atratulus	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X
	R. cataractae																	X	X		X	X									
	Semotilus atromaculatus		X			X		X		X		X	X	X			X		X	X	X	X	X	X	X			X	X	X	X
Cyprinodontidae:	*Fundulus catenatus*										X	X																			
Ictaluridae:	*Ameiurus natalis*		X			X					X	X											X								
	Ictalurus punctatus																X														
	Noturus baileyi										X																				
Percidae:	*Etheostoma blennioides*		X			X			X		X					X			X				X								
	E. caeruleum		X		X																										
	E. flabellare		X		X	X												X	X		X										
	E. kennicotti														X		X		X												
	E. percnurum										X																				
	E. rufilineatum		X								X					X			X	X	X										
	E. simoterum		X		X	X		X	X		X	X		X	X	X	X	X	X	X	X		X				X				
	E. stigmaeum jessiae										X																				
	E. s. meadiae		X			X																									
	E. swannanoa					X												X			X										
	E. zonale										X																				
	Perca flavescens										X																				
	Percina caprodes		X								X									X									X		
	P. evides										X																				
	P. sciera								X																						
Poeciliidae:	*Gambusia affinis*								X								X														
Salmonidae:	*Oncorhynchus mykiss*	X														X		X	X		X	X									

APPENDIX B

1993 Summary of Stream Strategic Plan Activities

1993 SUMMARY OF STREAM STRATEGIC PLAN ACTIVITIES

	Completed (Yes No)	Number
Coordinate enforcement of pollution laws	No	
Estimate monitoring system for compliance monitoring	No	
Provide environmental in-service	No	
Draft legislation to change TCA 70-4-206	No	
Draft legislation for tax incentives	No	
Draft legislation for silviculture and agriculture	No	
Determine criteria and list streams for scenic river	No	
Write magazine article	No	
Assimilate slide show	Yes	1
Wrote program to enhance landowner-user relations	Contacts	8
Conducted compliance inspections	No	
I & E stream demonstrations	Yes	5
Participated in Tennessee Restoration Project	Yes	1
Completed stream surveys	Yes	29
Developed method to quantify siltation	No	
Obtained access sites	No	
Improved access sites	No	
Developed DOT agreement to build access sites	No	
Developed stream information for brochure	No	
Wrote news release	No	
Coordinated C.E.N.T.S. program in schools	No	
Developed aquatic education curriculum	No	