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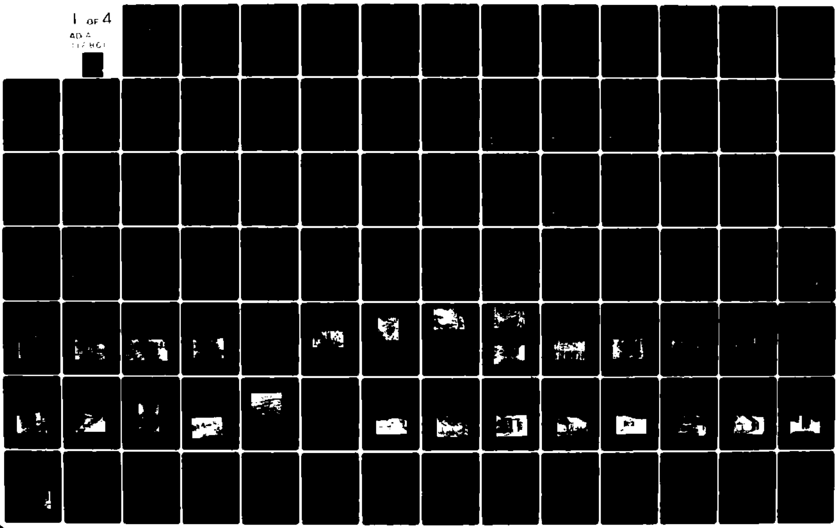

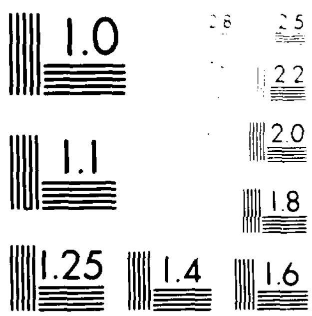
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ENVIRONMENTAL INVENTORY

LITTLE SOUTH FORK CUMBERLAND RIVER

JANUARY 1982

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle) Environmental Inventory: Little South Fork Wild River, Kentucky	5. TYPE OF REPORT & PERIOD COVERED Final Sep 80 - Apr 81
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Millican Associates, Inc. Miller/Wihry/ Lee Inc. Ocean Data Systems, Inc. Coastal Zone Resources Div.	8. CONTRACT OR GRANT NUMBER(s) DACW27-80-C-0118
9. PERFORMING ORGANIZATION NAME AND ADDRESS Millican Associates, Inc.	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS USAED, Louisville (ORLPD F)	12. REPORT DATE November 1981
	13. NUMBER OF PAGES 2 vol.
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) Commonwealth of Kentucky, Bureau of Natural Resources Division of Water Resources, Wild River Section	15. SECURITY CLASS. (of this report) Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover title: Environmental Inventory Little South Fork Cumberland River

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Cultural resources	History	Geomorphology	Wayne County, KY
Natural resources	Climate	Geology	McCreary County, KY
Land use	Topography	Soils	
Archaeology	Hydrology	Biology	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Environmental inventory of the 10.4 mile Wild River section of the Little South Fork Cumberland River was performed to provide a data base for subsequent master planning. The inventory report addresses the cultural and natural resources of area, including location, access, ownership, land use, archaeology and history, climate, topography, hydrology, geomorphology, geology, soils terrestrial biology and aquatic biology.

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The inventory identified 22 sites of prehistoric occupation and two historic sites.

Unpublished preliminary soils information for the Wayne County side of the river was obtained from the Soil Conservation Service and is included in the Soils Map Folio set.

Numerous rare, threatened or endangered species of plants and several species of animals were identified as potential inhabitants of the area.

Aquatic sampling found the stream supporting several rare, threatened and endangered species of fish.

17

ENVIRONMENTAL INVENTORY

LITTLE SOUTH FORK

WILD RIVER, KENTUCKY

Prepared by

Millican Associates, Inc.
Miller/Wihry/Lee Inc.
Ocean Data Systems, Inc
Coastal Zone Resources Division

For

U. S. Army Engineer District, Louisville, Kentucky

U. S. Army Engineer District, Nashville, Tennessee

and

Commonwealth of Kentucky
Department for Natural Resources and Environmental Protection
Bureau of Natural Resources
Division of Water Resources
Wild Rivers Section

January 1982

ABSTRACT

The Little South Fork Wild River Environmental Inventory was prepared for the Kentucky Department for Natural Resources and Environmental Protection, Division of Water Resources, Wild Rivers Section, with funding and contractual arrangements through the U.S. Army Corps of Engineers, Louisville District. The purpose of the Inventory was to locate and assess important ecological, cultural and aesthetic features of the designated Little South Fork Wild River, with the objective of providing a data base for subsequent master planning. The contract to prepare the Inventory was awarded to Millican Associates, Inc., Miller/Wihry/Lee, Inc. and Coastal Zone Resources Division of Ocean Data Systems, Inc. in September 1980. Field investigations were conducted in the period beginning with the third week of October 1980, and ending in the second week of April 1981. The Inventory report addresses the cultural and natural resources of the project study area, including Location, Access, Ownerhip, Land Use, Archaeology and History, Climate, Topography, Hydrology, Geomorphology, Geology, Soils Terrestrial Biology and Aquatic Biology. A separate 1:4800 scale map was used to locate the natural and cultural resources identified.

The 10.4 mile Wild River section of the Little South Fork Cumberland River is located in Wayne and McCreary counties in southeastern Kentucky between the Kentucky Highway 92 bridge and the backwaters of Lake Cumberland. Highway 92 provides the principal means of access to the Wild River with access to interior portions of the study segment limited chiefly to dirt and gravel roadways and logging roads. These, however, are extensive and except in inclement weather, a majority of the Wild River study area is accessible by this means, with only moderate difficulty due to the roughness of the roads. In inclement weather, much of the area requires the use of four-wheel drive vehicles, and some areas are impassable. Except for the Highway 92 bridge, all streamcrossings in the Wild River segment are fords.

The study area is approximately 62 percent forested, with approximately 38 percent of the area in non-forest land use. Non-forest land is mainly agricultural land (chiefly pasture), but also includes habitations, churches, cemeteries and utility corridors.

The inventory of archaeological and historical sites identified 22 sites of prehistoric occupation including 18 rockshelters and four open bottomland sites. Two historic sites were identified.

The climate of the study area is influenced to a degree by regional and local physiography. The most significant climatic influences affecting the use of the area are thunderstorms, occurring mainly in the summer months, and snow, ice and cold temperatures in winter.

The river valley is variable in cross section, but is generally rather broad, with the steepest slopes often being the lower slopes near the river, and the sideslopes and ridges often having more moderate slope angles. Maximum topographic relief, from water surface to ridge crest, ranges between 300 and 500 feet.

The geologic formations underlying the study area are principally limestone and shale strata of Mississippian-age. Pennsylvanian sandstone strata are sparingly present at the highest elevations. The geology of the study area is depicted on the Geology Map Folio Set. The geomorphology section describes geologic features in the study corridor such as rockshelters, ledges, cliffs and rock hollows (small cave-like recesses).

Published soils information was available for the McCreary County side of the study corridor, but unpublished, preliminary information for the Wayne County side of the river was obtained from the Soil Conservation Service in Somerset so that the Soils Map Folio Set could be completed.

Six major habitat types were identified in the study area during the Inventory and mapped on the Land Cover Map Folio Set. Lists of the principal species of plants and animals occurring in the area were assembled and presented in tabular form. One plant element of natural diversity of concern to the Kentucky Nature Preserves Commission, Shining Ladies'-tresses (Spiranthes lucida), is known to occur in the study corridor. It is considered a threatened species in Kentucky. Numerous other rare, threatened or endangered species of plants, and several species of animals, were identified as potential inhabitants of the study area.

The aquatic sampling program found the stream supporting a diverse fish and macroinvertebrate fauna that included several rare, threatened and endangered species of fish including: the ashy darter (Etheostoma cinereum), spotted darter (E. maculatum), blotched chub (Hybopsis insignis), popeye shiner (Notropis ariommus), and two undescribed shiners, the sawfin and palezone shiners. Among the mussels that were collected was the Cumberland bean pearly mussel (Villosa trabalis), a Federal endangered species; a Kentucky endangered species proposed for inclusion on the federal list (Pegias fabula), and another Kentucky endangered species (Ptychobranchus subtentum).

The concluding section of the inventory presents special features of cultural, ecological, and scenic importance that have been identified and discussed throughout the inventory report. The point locations of these items are illustrated on the Special Features Map Folio Set.

PREFACE

The Little South Fork Wild River Environmental Inventory was prepared by a multidisciplined team of environmental professionals. The objective of the inventory was to provide Kentucky Wild River Program planners with a natural and cultural resources data base for future master planning. The inventory required thorough literature searches, special field studies, data analysis and presentation of findings in narrative and graphic form.

The inventory report which follows is presented in four sections: (1) Introduction, (II) Cultural Resources, (III) Natural Resources, and (IV) Special Features. The references are presented at the end of the report. Numerous graphic representations appear throughout the text, and topical resource data for Access and Ownership, Soils, Geology, Land Cover, and Special Features are presented on separate special project maps, Map Folio Sets A through E, respectively. Map Folio Set F, Archaeology and History, is presented under separate cover to protect the integrity of cultural sites.

The multidisciplined team assembled for this inventory included management personnel, environmental professionals, environmental technicians, and administrative staff. A list of primary contributors to the inventory is presented below:

Alvin A. Millican	Project Manager
Hunter G. Louis	Associate Project Manager
Bruce W. Bolick	Associate Project Manager - Aquatic Biology
Glen A. Early	Biologist/Ecologist
Dr. Branley A. Branson	Biologist
Dr. Guenter A. Schuster	Biologist
Dr. Joffre L. Coe	Principal Archaeologist
Wesley K. Hall	Archaeologist
Tucker R. Littleton	Archaeologist/Historian
Ernest R. Shelton	Technician
Catherine E. Boucher	Typist
Jane K. Thompson	Typist
Richard A. Graft	Graphic Artist
John H. Miller	Graphic Artist
David R. Peterson	Graphic Artist
Thomas E. Clemmons	Graphic Artist

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SECTION I

INTRODUCTION

1.1 AUTHORITY

The initial authorization for the Environmental Inventory of the Little South Fork of the Cumberland River Wild River was an integral part of the Kentucky Wild Rivers Act (Kentucky Revised Statutes 146.200 to 146.350). Funding and technical assistance has been provided by the U.S. Army Corps of Engineers, Louisville District, as authorized in Section 22 of the Water Resources Development Act of 1974 entitled, "Planning Assistance to States" (PL 93-251). The Kentucky Department for Natural Resources and Environmental Protection initiated the request for federal funding and a contract (DACW 27-80-C-0118) was awarded to Millican Associates, Inc. of Louisville, Kentucky, Miller/Wihry/Lee Inc., also of Louisville, and Ocean Data Systems, Inc., Coastal Zone Resources Division of Wilmington, North Carolina in September, 1980.

1.2 WILD RIVER PURPOSE

The intent of the 1976 Kentucky General Assembly, in passing the Wild Rivers Act, was to complement dam construction and other water resource development projects in Kentucky with preservation of certain streams, or portions thereof, in their free-flowing condition because their natural, scenic, recreational, scientific and aesthetic values outweigh their value for water development and control purposes now and in the future. Highest priority was given to preserving the unique primitive character of streams in Kentucky which still retain a major portion of their natural and scenic beauty, and to prevent future infringement on that beauty by impoundments or other manmade works.

Other objectives of the Act were: to provide the citizens of the Commonwealth an opportunity to enjoy natural streams; to attract visitors from other states; to benefit the state's tourist industry, and to preserve for future generations the beauty of certain areas untrammeled by man (KRS 146.220).

Specifically, the purpose of the Wild Rivers Act was to establish a wild rivers system by designating certain streams for immediate inclusion in the system, and to prescribe procedures and criteria for administering the system. Portions of the Red River, Rockcastle River, Cumberland River, Green River and Big South Fork Cumberland River were included in the system in 1972. Then, in 1974, portions of Rock Creek, Martins Fork, and the Little South Fork Cumberland River were added to the system. The portion of the Little South Fork that was designated a Wild River in 1974 is the segment that extends from the backwaters of Lake Cumberland (mile 4.1) to the Kentucky Highway 92 Bridge (mile 14.5) in Wayne and McCreary counties. It is this 10.4 mile long segment of the stream that is the focus of this environmental inventory.

Criteria set forth in the Wild Rivers Act for assessing the eligibility of a stream for inclusion in the system are as follows (KRS 146.230):

(1) Streams or sections of streams that are essentially freeflowing, with shorelines and scenic vistas essentially primitive and unchanged, free from evidence of the works of man and pleasing to the eye.

(2) Streams not polluted beyond feasible correction.

(3) Streams and adjacent lands that provide high quality fish and wildlife habitat, and that may contain one or more unique or rare species for sport or observation.

(4) Streams and adjacent lands that may provide opportunities for scientific study or appreciation of essentially undisturbed ecological, geological or archaeological conditions.

(5) Streams that can provide wilderness type recreation such as canoeing and hiking, or specialized uses without disturbing the primitive character of the area.

The adjacent lands encompassed by the boundaries of the designated Wild River areas were established by the Secretary of the Kentucky Department for Natural Resources and Environmental Protection in such a way that the boundaries encompass at least the visual horizon from the stream, but do not extend beyond 2,000 feet from the center of the stream. The boundary of the Little South Fork Wild River, as depicted on maps in this inventory, was approved by Natural Resources Secretary Robert D. Bell on July 21, 1976. The corridor defined by the Little South Fork boundary encompasses approximately 1,398 acres of land.

1.3 ENVIRONMENTAL INVENTORY PURPOSE

The Wild Rivers Act assigned responsibility for administering the Wild Rivers System to the Kentucky Department for Natural Resources and Environmental Protection. Within the Department, the program is assigned to the Bureau of Natural Resources, Division of Water, Wild Rivers Section.

Part of the administrative responsibility for the Wild Rivers System, as stated in the Act (KRS 146.270), is the development of a management plan for each stream area which will establish varying degrees or intensities of protection and use, based upon the special attributes of each stream area. The identification and analysis of the special attributes of the Little South Fork Cumberland Wild River is the purpose of this environmental inventory.

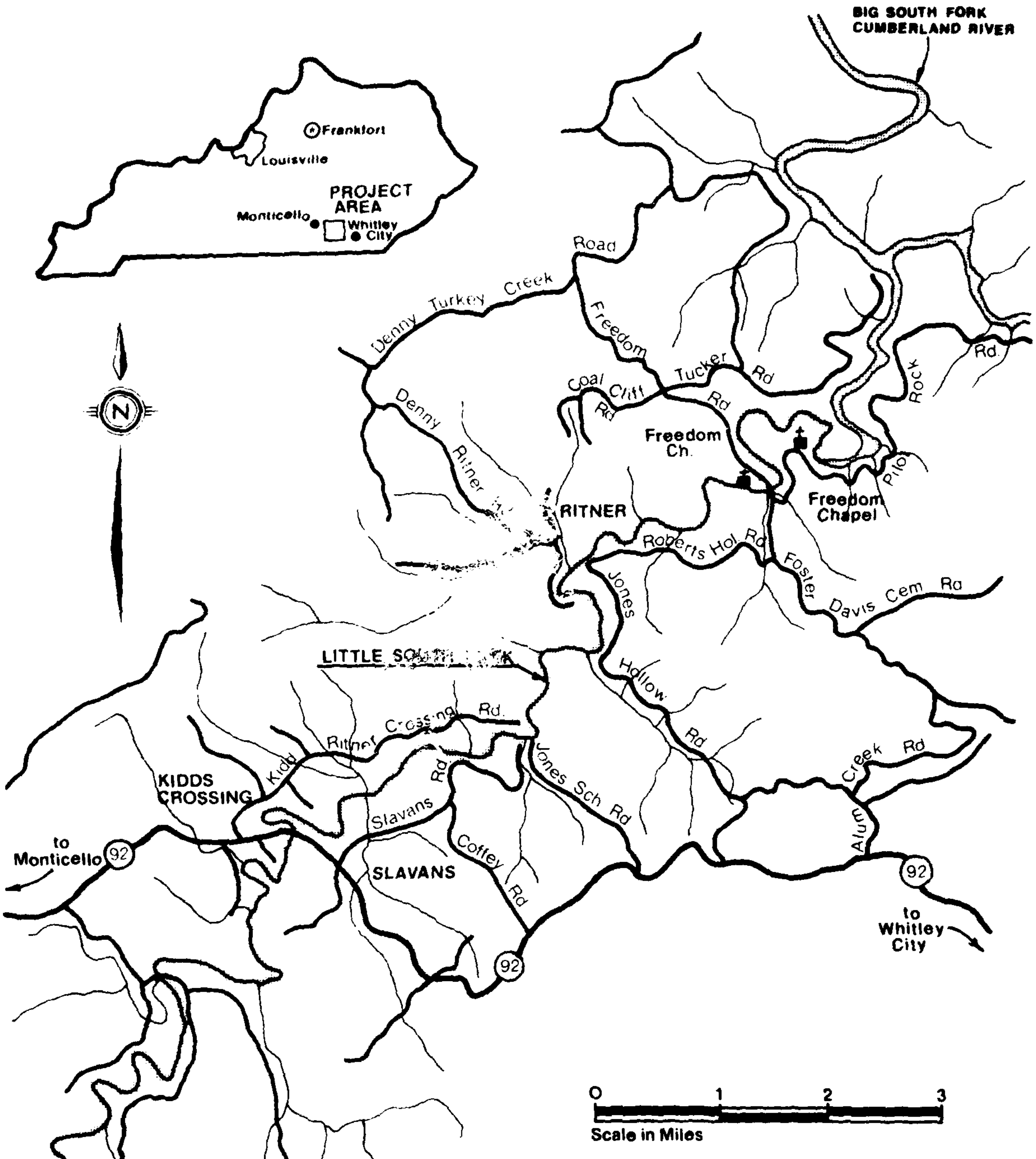
This report seeks to emphasize the most important ecological, cultural and aesthetic features identified in the Little South Fork Wild River corridor relevant to the development of a management plan for the stream area. The data presented in this inventory were obtained from a range of sources, including: published and unpublished agency reports and files, scientific journals, personal communications (letters, telephone conversations, interviews) and actual field analyses by environmental professionals from various disciplines. The majority of existing data were obtained from the offices of various federal, state, and local governmental offices and from regional colleges and universities. The analysis of data gathered for the inventory was geared to providing a data baseline for assessing the significance, for management purposes, of the ecological, cultural and aesthetic features identified.

1.4 LOCATION AND ACCESSIBILITY

The headwaters of the Little South Fork Cumberland River are in Pickett County, Tennessee. From the headwaters, the river flows northeastward to join the Big South Fork Cumberland River four miles downstream of the designated Wild River segment. In Kentucky, the Little South Fork is the southwestern Proclamation Boundary of the Daniel Boone National Forest. The study area location and its relationship to major transportation arteries, urban centers and political boundaries is illustrated in Figure 1.

The Little South Fork enters Kentucky in Wayne County and, a few miles upstream of the Wild River segment, becomes the politcal boundary between Wayne and McCreary counties. The upstream terminus of the Wild River segment is the Kentucky Highway 92 Bridge located approximately mid-way between the towns of Monticello and Whitley City. The downstream terminus is the backwater of Lake Cumberland, which is considered to begin at mile 4.1. This point on the stream corresponds approximately to the location of Freedom Chapel, a church site identified on the United States Geological Survey (USGS) Nevelsville topographic quadrangle map. The Wild River boundaries are illustrated on Figures 2 and 3 as they appear on the official graphic accompanying KRS 146.200-146.360. The maps that comprise the Map Folio Set include the official boundary and some adjacent lands. The Map Folio Set was prepared from maps provided by the Louisville District, U.S. Army Corps of Engineers, and provide topographic information for a corridor 4,000 feet wide and one mile longer than the official Wild River corridor. The study area, for the purpose of this Environmental Inventory, is the area encompassed by the Map Folio Set.

The principal transportation arteries providing access to the vicinity of the Little South Fork Wild River are Interstate 75 (I-75), U.S. Highway 27 (US-27) and Kentucky Highways 90 and 92 (KY-90 and KY-92). The Wild River is 38 miles west of Williamsburg, Kentucky which is 107 miles south of Lexington on I-75, and 77 miles north of Knoxville, Tennessee via I-75. US-27 is 17 miles east of the Wild River and links the Wild River vicinity with Whitley City and Stearns, Kentucky at the junction of US-27 and KY-92, General Burnside State Park located on US-27 twenty miles north of Whitley City, and with Somerset, which is eight miles north of General Burnside State Park. The Cumberland Parkway (toll road) extends westward from Somerset to a junction with I-65 near Mammoth Cave National Park and Bowling Green, Kentucky. Cumberland Falls State Resort Park is 33 miles east of the Wild River via KY-90, US-27 and KY-92. Thirteen miles west of the Wild River on KY-92 is Monticello, Kentucky and a few miles west of Monticello is Lake Cumberland.



MILLICAN ASSOCIATES

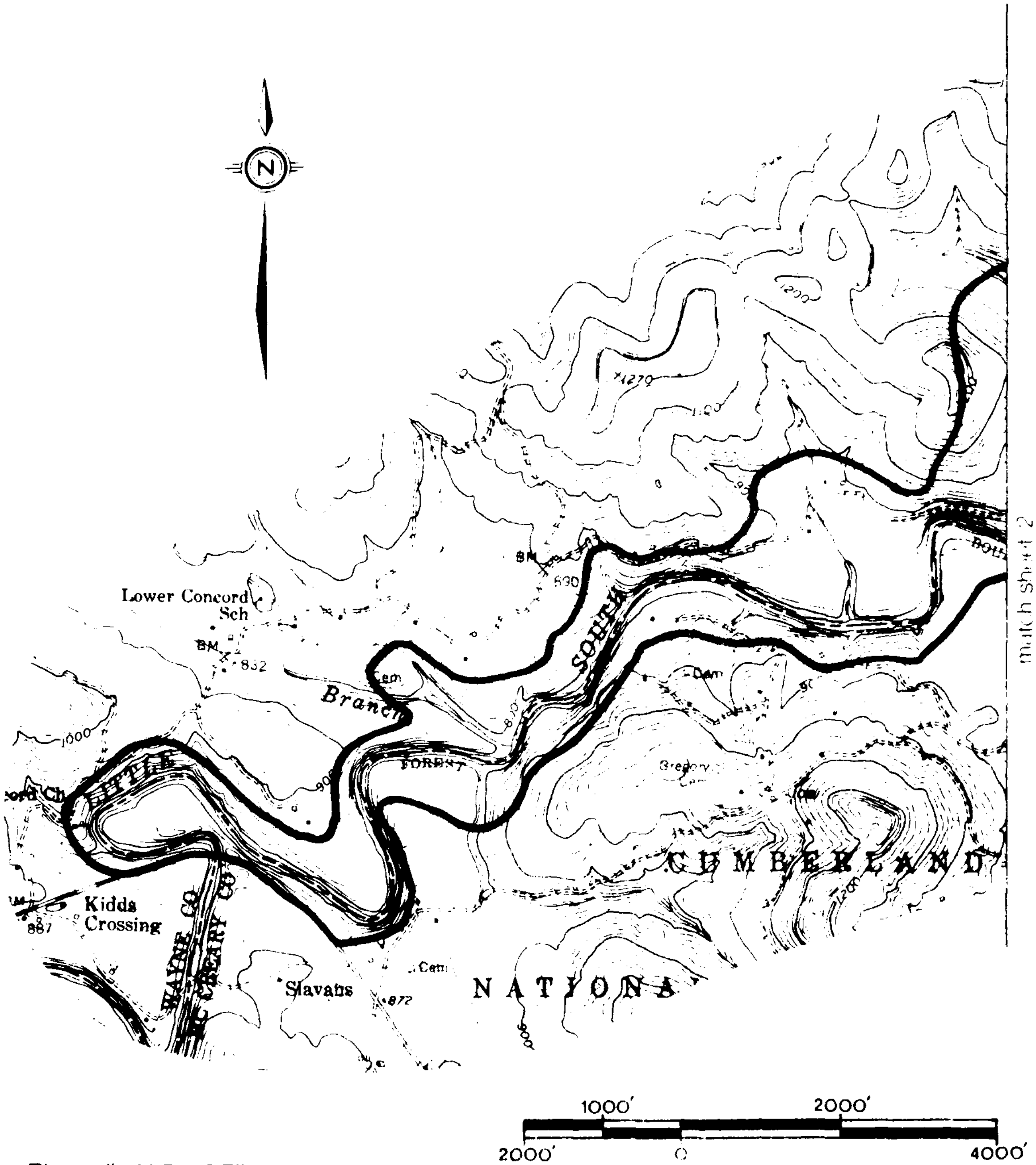
MILLER WIHRY LEE INC

COASTAL ZONE
RESOURCES DIVISION

Environmental Inventory
Little South Fork Wild River

Figure Number 1

Project Location



River mile 14.5 – 10.75
Sheet 1 of 2

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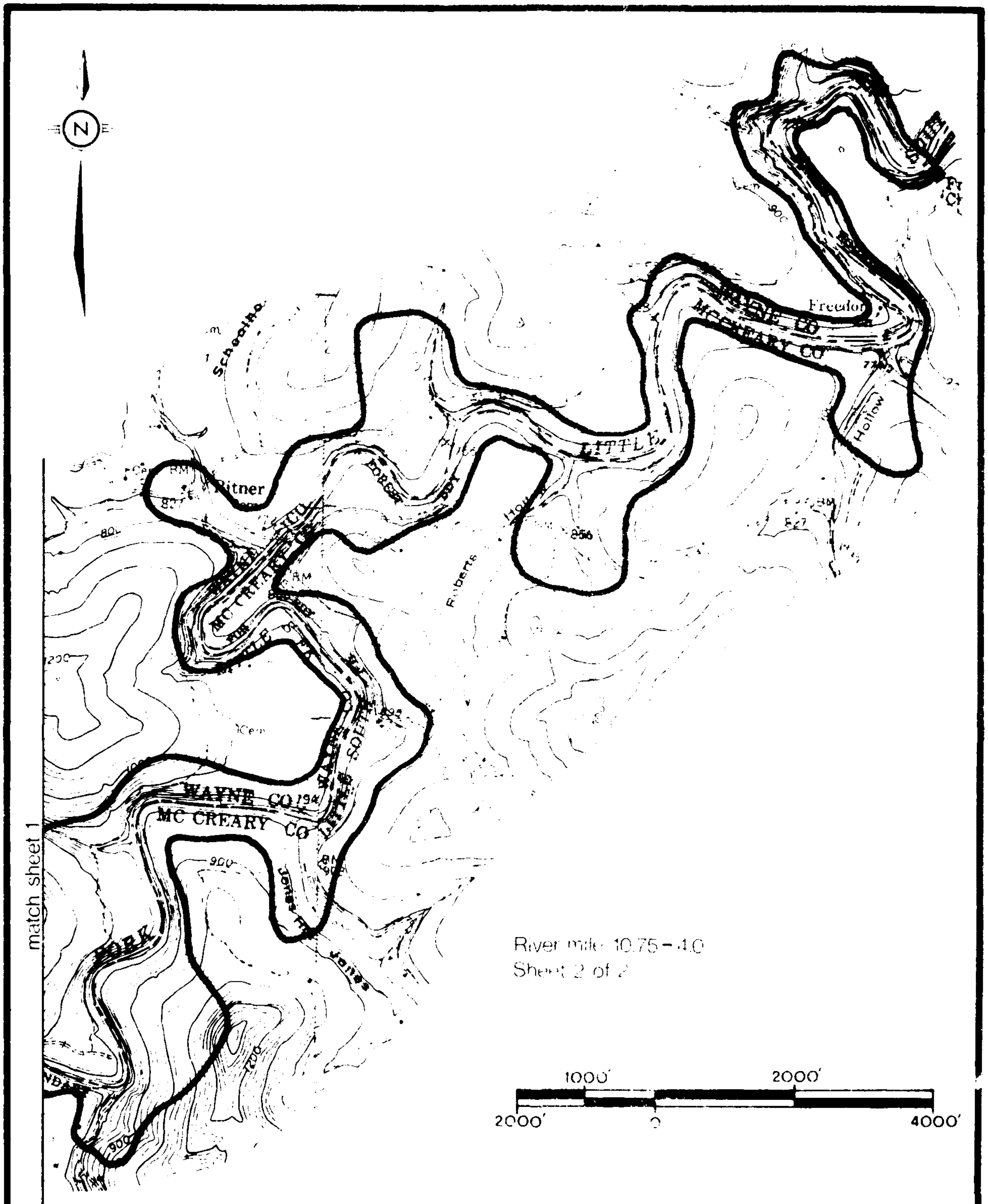
Environmental Inventory
Little South Fork Wild River

Figure Number 2

Designated Wild River



MILLICAN ASSOCIATES

MILLER WIHRY LEE INC

COASTAL ZONE
RESOURCES DIVISION

Environmental Inventory
Little South Fork Wild River

Figure Number 3

Designated Wild River

The only hard-surfaced roadway servicing the Wild River corridor is KY-92 which crosses the stream 13 miles east of Monticello. The KY-92 bridge, which marks the upstream boundary of the Wild River, is the only bridge, other than footbridges (of which there are two), crossing the Wild River. All other road crossings ford shallow sections of the river on the limestone substrate.

Secondary roads providing access to the Wild River corridor are gravel-surfaced or dirt and most are privately maintained. On the McCreary County side of the river, some of the roads are maintained by the Forest Service. Forest Service Road 650 (FS-650) connects KY-92 with Ritner in the center of the Wild River corridor. FS-650 begins as a blacktop road, but becomes a well-maintained gravel road within a half-mile of KY-92. Near Ritner ford, the road becomes considerably rougher. Other gravel and dirt roads on the McCreary County side of the Wild River include: Slavans-Jones School Road, Little Coffey Road, Jones Hollow Road, Roberts Hollow Road, and Freedom Chapel-Pilot Rock Road (Kentucky Department of Transportation 1976). The latter roadway is dirt, and was so deeply rutted in fall of 1980 as to be impassable even in a four-wheel drive vehicle. In general, the roads on both sides of the river become narrower, rougher and more difficult to negotiate as one progresses toward the downstream terminus of the Wild River. A four-wheel drive vehicle is a virtual necessity in the final mile of the corridor, and at various locations throughout the study corridor in inclement weather.

On the Wayne County side of the river, the secondary roads that provide access to the Wild River corridor are: Kidd's Crossing-Ritner Road and Freedom Church Road (Kentucky Department of Transportation 1977). Portions of the Kidd's Crossing-Ritner Road traverse private property, and this roadway was barricaded by a padlocked metal bar gateway in the fall of 1980.

Besides the gravel and dirt surfaced roadways in the Wild River corridor, access may be obtained, with the landowner's permission, via numerous logging traces, game trails, footpaths, and a utility corridor which bisects the stream near Ritner.

1.5 LAND OWNERSHIP

Although the land on the east side of the Little South Fork lies within the Proclamation Boundary of the Daniel Boone National Forest, the Forest Service owns no property along the Wild River segment. The U.S. Army Corps of Engineers owns a narrow strip of land on both banks of the river within the corridor as part of the floodplain easement for Lake Cumberland (see Map Set A, Ownership and Access). In a recent transaction, the Corps of Engineers transferred ownership of a parcel of land on the Little South Fork to the U.S. Department of Agriculture, Forest Service, but this parcel is located approximately 1.5 miles downstream of the Wild River segment (Corps of Engineers, personal communication).

Title to most of the land in the Wild River corridor is held by approximately 57 private land owners and at least two corporations. The corporations are landholding or development interests. Private parcels range in size from half an acre to 200 or more acres. Complete information on land ownership within the corridor is not readily available due to the absence of property ownership maps in the county tax or property valuation offices. Without such maps, it is difficult to ascertain ownership within the corridor with a high degree of certainty.

Map Set A depicts land ownership in the Wild River corridor. The numbers on the map are keyed to the information contained in Table 1, Partial List of Landowners in the Little South Fork Wild River Study Area. The ownership information depicted on Map Set A was gathered from the following sources: the Property Valuation Administration Offices in Wayne and McCreary counties; the U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service offices in both counties; the Nashville District, U.S. Army Corps of Engineers; and from telephone conversations with the Stearns District, U.S. Forest Service office. Local land owners, too, were consulted regarding ownership and areal extent of their lands and adjacent properties. Because some of the documented land ownership information in both federal and local agency offices is out-of-date, and because other information is based upon recollections of private individuals, the ownership information in Table 1 contains inaccuracies which cannot be corrected within the scope of this Environmental Inventory. The information in Table 1 is the most complete up-to-date that is currently available. Likewise, the property boundaries depicted on Map Set A are to be considered as only approximations. Most of the boundary information was obtained from aerial photos and maps at various scales, and in some instances, modifications or additions to this information were made by land owners on maps carried into the area.

TABLE NO. 1

PARTIAL LIST OF
LANDOWNERS IN THE LITTLE SOUTH FORK
WILD RIVER STUDY AREA

Map Key*	Landowner	Address	Status of Contact *
1	Worley, Oscar	Pine Knot, Kentucky	No contact
2	Burke, Wilburn	Pine Knot, Kentucky	Contacted
3	Kentucky Associates, Inc.	Whitley City, Kentucky	
4	Kidd, Robert D.	Rt. 572, Box 68 Monticello, Kentucky	
5	The Concord Baptist Church	S. Burke Road Coopersville, Kentucky 42166	
6	Gregory, Aught	Coopersville, Kentucky	
7	Anderson, Milford	S. Burke Road Coopersville, Kentucky 42611	
8	Clanton, Henry	Coopersville, Kentucky	Contacted
9	Jones, Chyle	Ritner, Kentucky	
10	Haynes, Nathan & Lawrence	Ritner, Kentucky 42639	
11	Thornberry & Thornberry et al.	Corbin, Kentucky	
12	Jones, Floyd V. c/o Osborne Jones	Ritner, Kentucky 42639	
13	Hickman, Harold J.	Box 25 Pine Knot, Kentucky 42635	
14	Augustine, Melton L.	3812 N. Goodrick Ave. Sarasota, Florida	
15	Grant, James E., Jr.	Box 2324 Sarasota, Florida	
16	Kentucky Associates, Inc.	Whitley City, Kentucky	

Table 1 (continued)

Map Key*	Landowner	Address	Status of Contact *
17	Beiter, David	Ritner, Kentucky 42639	Contacted; no trespassing
18	U.S. Army Corps of Engineers	Nashville District Nashville, Tennessee	Contacted
19	Jones, Everett	c/o Ritner P.O. Monticello, Kentucky 42633	
20	Bedwell, Clorie	Rt. 2 Monticello, Kentucky	Contacted
21	Jones, Soree	Rt. 2 Monticello, Kentucky	Contacted
22	Forster, Finley	Rt. 2 Monticello, Kentucky	
23	Phillips, Claude	Delta, Kentucky	
24	Clark, Henry	Ritner, Kentucky 42639	
25	Williams, Donald E.	1912 Kemper Lane Cincinnati, Ohio	
26	Trustees, Second Freedom Baptist Church	Ritner, Kentucky 42639	
27	Forster, Raymond	Rt. 2 Monticello, Kentucky	
28	Branscum, Dillie M., et al.	Rt. 1 Stearns, Kentucky	
29	Hickman, Albert	Pine Knot, Kentucky 42635	
30	Stevens, Howard Stevens, Ernest	Ritner, Kentucky 42639	
31	Hudson, James	Nashville, Tennessee	Contacted
32	Tucker, James	Ritner, Kentucky	

Table 1 (continued)

Map Key*	Landowner	Address	Status of Contact *
33	Matthews, Oscar	Rt. 1 Stearns, Kentucky	
34	Tucker, James	Ritner Kentucky 42639	
35	Mason, Loren	Ritner, Kentucky 42639	Contacted
36	Tucker, Clarence	Ritner, Kentucky 42639	
37	Tucker, James	Ritner, Kentucky 42639	
38	Bedwell, Clorie	Rt. 2 Monticello, Kentucky	Contacted
39	Jones, O. B.	Ohio c/o Everett Jones Ritner P.O. Monticello, Kentucky 42633	
40	Stiffler, Ruby	Ritner, Kentucky	
41	Branscum, Robert	Rt. 1 Stearns, Kentucky	
42	Phillips, Boyce D.	Ritner, Kentucky	Contacted
43	Jones, Alvin	Monticello, Kentucky	
44	Boston, Bill	Route 1 Stearns, Kentucky	
45	Vaughn, Harold	Route 1 Stearns, Kentucky	Contacted
46	Jones, Theodore	Rt. 1 Stearns, Kentucky	
47	Vaughn, Janie	Rt. 1 Stearns, Kentucky	Contacted
48	Vaughn, James E.	Rt. 1 Stearns, Kentucky	

Table 1 (continued)

Map Key*	Landowner	Address	Status of Contact *
49	Reynolds, Owen	Betsey, Kentucky	
50	Clark, Grant	Rt. 2 Monticello, Kentucky	
51	Gregory, Schyler, op.	Rt. 1, Stearns, Kentucky	
52	Vaughn, Anna Lee, op. Rhoda Vaughn Heirs, c/o Anna Lee Vaughn	Rt. 1 Stearns, Kentucky	
53	Gregory, Hayden	Rt. 1 Stearns, Kentucky	
54	Gregory, Cox	No listing	
55	Gregory, Lewis	Rt. 1, Stearns, Kentucky	
56	Vaughn, Ernie	Rt. 1 Stearns, Kentucky	
57	Bybee, Euell & Mary	Rt. 1, Box 224 Stearns, Kentucky	Contacted
58	Bell, Mr. & Mrs. Ronzo	Rt. 1 Stearns, Kentucky	Contacted
59	Hamilton, Phil	Rt. 1 Stearns, Kentucky	Contacted
60	Burke, Sylvester	No listing	

1.6 COORDINATION WITH OTHER AGENCIES

Numerous agencies, institutions and individuals were contacted prior to initiating, and during the course of, this Environmental Inventory. The purpose of these contacts was to make official notice of the project and to make a request for relevant project data. The entities contacted are listed in Table 2, and many are also cited in the body of this report as specific references. As the project progressed, additional agencies and individuals were identified and contacted for assistance in gathering project data. Contacts were accomplished by letter, telephone, meetings, and personal interviews.

TABLE 2

COORDINATION WITH OTHER AGENCIES

	Contacted by		
Agency	Letter	Meeting	Phone
Federal Agencies			
Corps of Engineers, Louisville			
Mr. Jim Duck	x	x	x
Mr. Dick Schwab	x	x	x
Mr. Rick Garmon		x	x
Mr. Don Ball	x	x	x
Corps of Engineers, Nashville			
Mr. Joe Cathey	x		x
Mr. Morris Simpson			x
Mr. Jim Sharper			x
Daniel Boone National Forest, Headquarters			
Mr. Michael Miller			x
Daniel Boone National Forest, Stearns District			
Mr. Bob West			x
Geologic Survey, Water Resources Division			
Mr. Phil Emery			x
Soil Conservation Service, Lexington			
Staff			x
Soil Conservation Service, Monticello			
Mr. Keith Easter	x	x	x
Mr. Leonard Adams	x	x	x
Soil Conservation Service, Somerset			
Mr. Jim Fehr	x		x
Mr. Jerry Richardson			x

TABLE 2 (continued)

Agency	Letter	Contacted by Meeting	Phone
State Agencies (Kentucky)			
Archaeological Survey			
Dr. Berle Clay		x	x
Fish and Wildlife Resources			
Mr. Joe Bruna			x
Mr. Lauren Schaaf			x
Heritage Commission			
Mrs. Donna C. Hopkins		x	
National Oceanographic and Atmospheric Administration			
Weather Service Office, Louisville			
Staff		x	x
Weather Service Office, Somerset			
Staff			x
Nature Preserves Commission			
Mr. Don Harker	x	x	x
Mr. Max Medley	x	x	x
Mr. Wayne Houtcooper	x	x	x
Mr. Melvin L. Warren	x	x	x
Department for Natural Resources and Environmental Protection			
Division of Water Resources			
Mr. David Rosenbaum		x	
Mr. Bob Gunkler	x	x	x
Mr. Jim Fries		x	x
Division of Forestry			
Mr. T. S. Bergman	x		x
Bureau of Surface Mining and Reclamation			
Permit Section, Frankfort			
Mr. Larry Fish			x
Orphaned Lands, Frankfort			
Mr. Rogert Horstman			x
Regional Office, London			
Mr. Robert Wittenback			x
Institutional and Local			
Eastern Kentucky University, Biology			
Dr. Guenter A. Schuster	x	x	x
Dr. Branley A. Branson	x	x	x

TABLE 2 (continued)

Agency	Contacted by Letter	Contacted by Meeting	Contacted by Phone
University of Louisville, Biology Department			
Dr. Arland Hotchkiss		x	
Dr. Stanley Davis		x	
Dr. Arnold Karpoff		x	
Mr. Harry Woodward		x	
Local Citizens			
Mr. Jim Hudson	x	x	
Mr. Garnet Walker		x	
Mr. Euell Bybee		x	
Mr. Loren Mason			x
Mr. Boyce Phillips		x	
Mr. Donald Jones		x	

SECTION II

CULTURAL RESOURCES

2.1 LAND USE

2.1.1 REGIONAL PERSPECTIVE

The Little South Fork Wild River lies along the dividing line between two major physiographic regions, both of which have a direct bearing on land use developments. Westward is the Pennyroyal section of the Mississippian Plateau Physiographic Region (see Section 3.1 for a more detailed description of the physiography of the area), an undulating plateau similar in some locations to the Outer Bluegrass Physiographic Region and having relatively few land use limitations. Much of the Pennyroyal has been cleared and cultivated since the late eighteenth and early nineteenth centuries, and small towns and rural farm communities dot the landscape. East of the Wild River is the Cumberland Plateau Physiographic Province where land use development has been constrained by several factors including: (1) rugged terrain largely unsuited to cultivation and unamenable to urbanization except in the narrow valley floors; (2) a paucity of major transportation facilities until relatively recently, and (3) a major portion of the land surface in public ownership in the Daniel Boone National Forest (Soil Systems, Incorporated 1979). The division between these two regions in the vicinity of the Little South Fork Wild River is visible on topographic maps or on photographs of the area. In either, the greater ruggedness of the land east of the Wild River, and the smaller amount of cleared land is clearly evident.

Detailed consideration of regional land use, for purposes of this inventory, is limited to a discussion of existing land use in Wayne and McCreary counties. Acreage estimates of current and projected land uses for these counties are presented in Table 3, and the existing pattern of land use in the two-county area is graphically depicted in Figure 4. The principal source of information for both Table 3 and Figure 4 is the River Basin Water Quality Management Plan for Kentucky: Upper Cumberland River Basin (Kentucky Department for Natural Resources and Environmental Protection 1975). The vaules in Table 3 were modified and updated based upon information obtained from the Kentucky Department for Natural Resources and Environmental Protection, Bureau of Surface Mining and Reclamation.

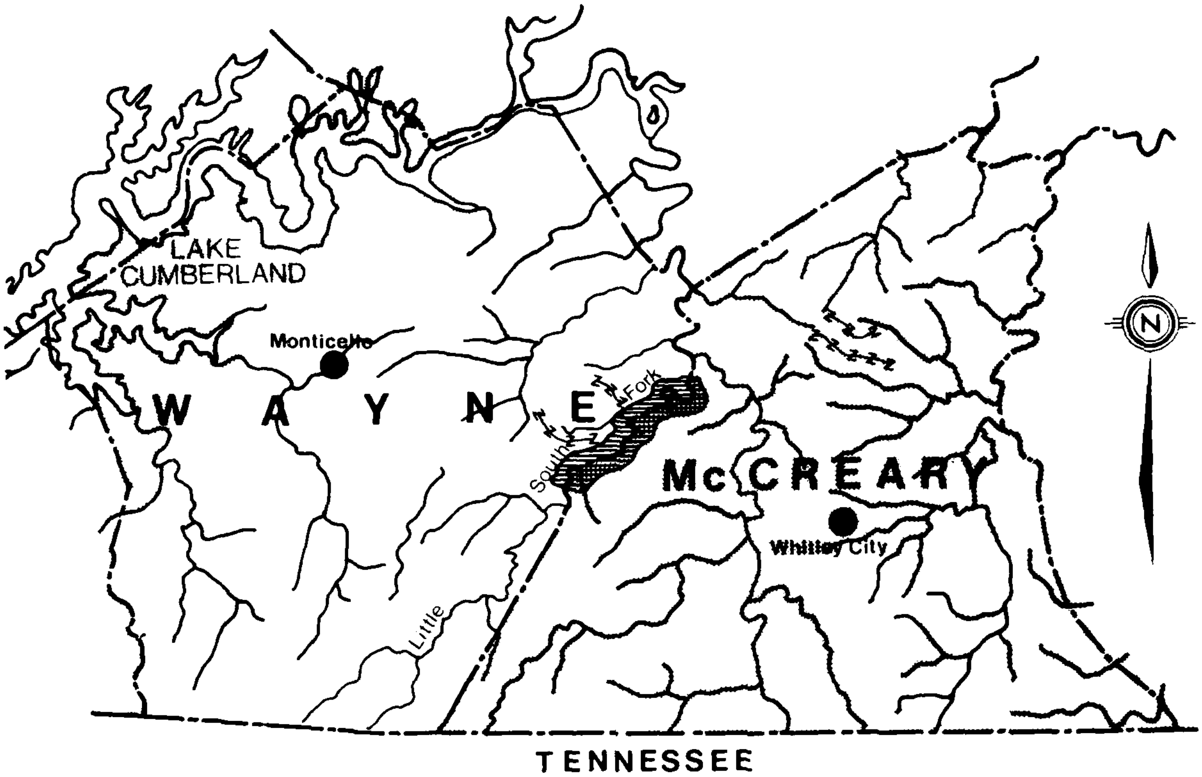
2.1.1.1 Urban Uses

The principal urban center of Wayne County is Monticello, the county seat, located 14 miles west of the Wild River via Kentucky Highway 92. Commercial, residential and industrial uses are concentrated in Monticello, and along Kentucky Highways 200, 90 and 92 in the vicinity of Monticello. Residential and commercial development is most concentrated in Monticello and in the northwestern portion of Wayne County because of the attraction of the dominant feature of that part of the county, Lake Cumberland.

TABLE 3
LAND USE TRENDS AND PROJECTIONS
1970-1995
FOR
WAYNE AND McCREARY COUNTIES, KENTUCKY

County/Category of use	Coverage (Area in Square Miles) 1970	1975	1980	1995
Wayne County				
Rural	481.6	481.5	481.4	481.2
Agriculture	48.2	48.2	48.2	48.3
Silviculture	433.4	432.3	429.7	429.3
Mining	0	0.9	3.4	3.4
Construction	0	0.1	0.1	0.2
Urban	2.4	2.5	2.6	2.8
Total	484.0	484.0	484.0	484.0
McCreary County				
Rural	419.3	419.2	419.2	419.2
Agriculture	20.9	20.9	20.9	20.9
Silviculture	396.6	396.4	392.4	392.4
Mining	1.8	1.8	5.9	5.9
Construction	0	0.1	0	0
Urban	1.7	1.8	1.8	1.8
Total	421.0	421.0	421.0	421.0

Source: Kentucky Department for Natural Resources and Environmental Protection. 1975. The River Basin Water Quality Management Plan for Kentucky: Upper Cumberland River Basin. Exhibit 3.8t, p. 3-22.
and
Adams, Wm. 1975. Inventory of Surface Mined Lands in Eastern Kentucky. Eastern Kentucky University, Geography Department. map.



— - — COUNTY LINE
LITTLE SOUTH FORK WILD RIVER
URBAN
MINING RELATED
RIVERS
AGRICULTURE
SILVICULTURE

0 5 10 15
miles

MILLICAN ASSOCIATES
Landscape Architects & Planners
Louisville, Ky.

MILLER WIHRY LEE INC
Landscape Architects, Engineers, Planners

COASTAL ZONE
RESOURCES DIVISION

Environmental Inventory
Little South Fork Wild River

Figure Number 4

Regional Land Use

In McCreary County, urbanization has followed U.S. Highway 27, the Southern Railroad which parallels U.S. 27, and Kentucky Highway 92 near its intersection with U.S. 27 and the railroad. In the south central half of the county, along these transportation arteries, the communities of Whitley City, Stearns, Revelo and Pine Knot blend into one another to form one nearly-continuous urban center. These, and smaller satelite communities such as Strunk, Marshes, Siding and Gilbreath are coal towns. Residential densities outside these linear urban corridors are lower than in adjacent Wayne County, due principally to the rugged topography and National Forest influence.

2.1.1.2 Extractive Activities

Extractive activities in Wayne County consist largely of coal mining, logging, petroleum production and limestone quarrying. In McCreary County, coal mining and logging are the principal extractive activities, with quarrying and petroleum production being less important than in adjacent Wayne County. In Wayne County, the most important tree species cut for timber are white oak, red oak, hickory, yellow poplar, yellow pine, beech and hard maple (Kentucky Department of Commerce 1975).

2.1.1.3 Future Land Use

Table 3 contains land use projections for Wayne and McCreary counties from the River Basin Water Quality Management Plan for Kentucky: Upper Cumberland River Basin (Kentucky Department for Natural Resources and Environmental Protection 1975), modified by information obtained from the Bureau of Surface Mining and Reclamation. The figures in Table 3 indicate relatively minor change in the interval 1970-1995, with both counties remaining predominantly rural in character. The table indicates the conversion, by 1995, of 256 acres of agricultural and silvicultural land in Wayne County to urban use, and the conversion, in McCreary County, of only 64 acres of silvicultural land to urban land use in the same time period. Increases in mining activity, and associated loss of silvicultural land, is projected to amount to 2,176 acres in Wayne County in the period 1970-1995, and 2,624 acres in McCreary County in the same period. The most rapid increase in mining activity, in both counties, took place between 1975 and 1980.

The values in Table 3, however, are somewhat suspect for several reasons. First, Table 3 indicates that 88.8 percent of Wayne County is devoted to silviculture and only about 10 percent is agricultural land. Figure 4, on the other hand, indicates that Wayne County is mostly agricultural, with silvicultural land use centered mainly around Lake Cumberland. Other sources of information, such as the Kentucky Department of Commerce's 1975 industrial resources brochure for Monticello, Kentucky, indicates that 64.4 percent of Wayne County is farmland. This is roughly in agreement with Figure 4 and sharply contradicts the values in Table 3.

Second, prior to updating the information in Table 3, no mining activity was indicated in Wayne County, and only one square mile (640 acres) of land surface disturbed by mining was indicated for McCreary County through 1995. During the field reconnaissance for this inventory, a rather large surface mine was noted in Wayne County just outside the Wild River corridor, and a significant amount of mining activity appears to be occurring in McCreary County. It became apparent that the one square mile value had surely already been exceeded in 1970, and will be vastly exceeded by 1995. Consequently, an effort was made to obtain updated information regarding surface mine activity in these two counties. The Permits Section and Orphaned Lands Section of the Bureau of Surface Mining and Reclamation in Frankfort were contacted and acreage values for 1975 and 1980 were obtained. These were used to modify Table 3 to the form that is presented in the preceding text. Since no projected data was available, the values for surface mining in 1980 are repeated in the 1995 column. Undoubtedly, surface mine activity in these two counties will progress beyond 1980 levels by 1995, but computation of the amount of increase is beyond the scope of this report.

2.1.2 STUDY AREA LAND USE

The principal types of land uses that occur within the study area are listed in Table 4 accompanied by approximate acreage and percent figures. The values in Table 4 were obtained by planimetering each land use type as depicted on Sheets 1-8 of the Map Folio Set. Aerial photographs, USGS topographic maps and notes taken in the field were utilized in the identification and verification of the different types of land uses. The areal extent of rights-of-way and the stream itself were calculated by first measuring the length of these features, and then multiplying the length by the average width and converting the resulting figures to acres. The average width of the stream was determined to be 65 feet. The widths of rights-of-way varied from 30 to 100 feet.

Almost two-thirds of the land in the study area is forest and woodland (62.5 percent). The right bank or McCreary County side of the study area has a greater percentage of forested land than the left bank or Wayne County side (71.3 percent for McCreary County as compared with 58.2 percent for Wayne County). The forest and woodland land use amounts to approximately 2,355.6 acres.

Most of the non-forested land in the study area is in use for agriculture. This land use category as used here, includes pasture and hayfields (the prevalent agricultural use), fields planted to row crops (especially corn or soybeans), old fields, abandoned pastures, farm ponds and farm residences. Three churchyards are also included in the agricultural land use category because their combined acreage was too small to justify the creation of a separate land use category.

TABLE 4

LAND USES WITHIN THE LITTLE SOUTH FORK WILD RIVER STUDY AREA

LAND USE	APPROXIMATE ACREAGE TOTAL	APPROXIMATE ACREAGE WAYNE COUNTY	APPROXIMATE ACREAGE McCREARY COUNTY	PERCENT TOTAL	PERCENT WAYNE COUNTY	PERCENT McCREARY COUNTY
FOREST & WOODLAND	2,355.6	1,143.9	1,206.7	62.5	58.3	71.3
NON-FORESTED LAND:	1,310.9	825.3	485.6	34.8	41.8	28.7
Agricultural[1]	1,103.7	712.1	390.4	29.3	36.1	23.1
Surface Mine	9.4	9.4	-	0.25	0.5	-
Cemetery	2.8	2.8	-	0.07	0.1	-
Roads and Rights-of-Way[2]	195.0	101.0	94.0	5.2	5.1	5.6
STREAM[3] (Surface Acres)	101.8	-	-	2.7	-	-
TOTAL	3,768.3	1,974.2	1,692.3	100.0	100.0	100.0

SOURCES: Base maps provided by the Corps of Engineers at a scale of 1"= 400'; black and white aerial photographs dated April 8, 1978 and at a scale of 1"=1,000'; color aerials at a scale of 1"= 2,000' dated March 23, 1977; the Coopersville and Nevelsville USGS topographic quadrangles (1"=2,000') dated 1954, and notes taken in the field in the fall of 1980 and the spring of 1981.

1 - Agricultural land use includes row crops, pasture, hayfields, old fields, abandoned pastures, fencerow habitat, farm ponds, churches and rural residential property.

2 - Roads and rights-of-way include all road and trail corridors, and all telephone and power rights-of-way depicted on the 400-scale base map provided by the Corps.

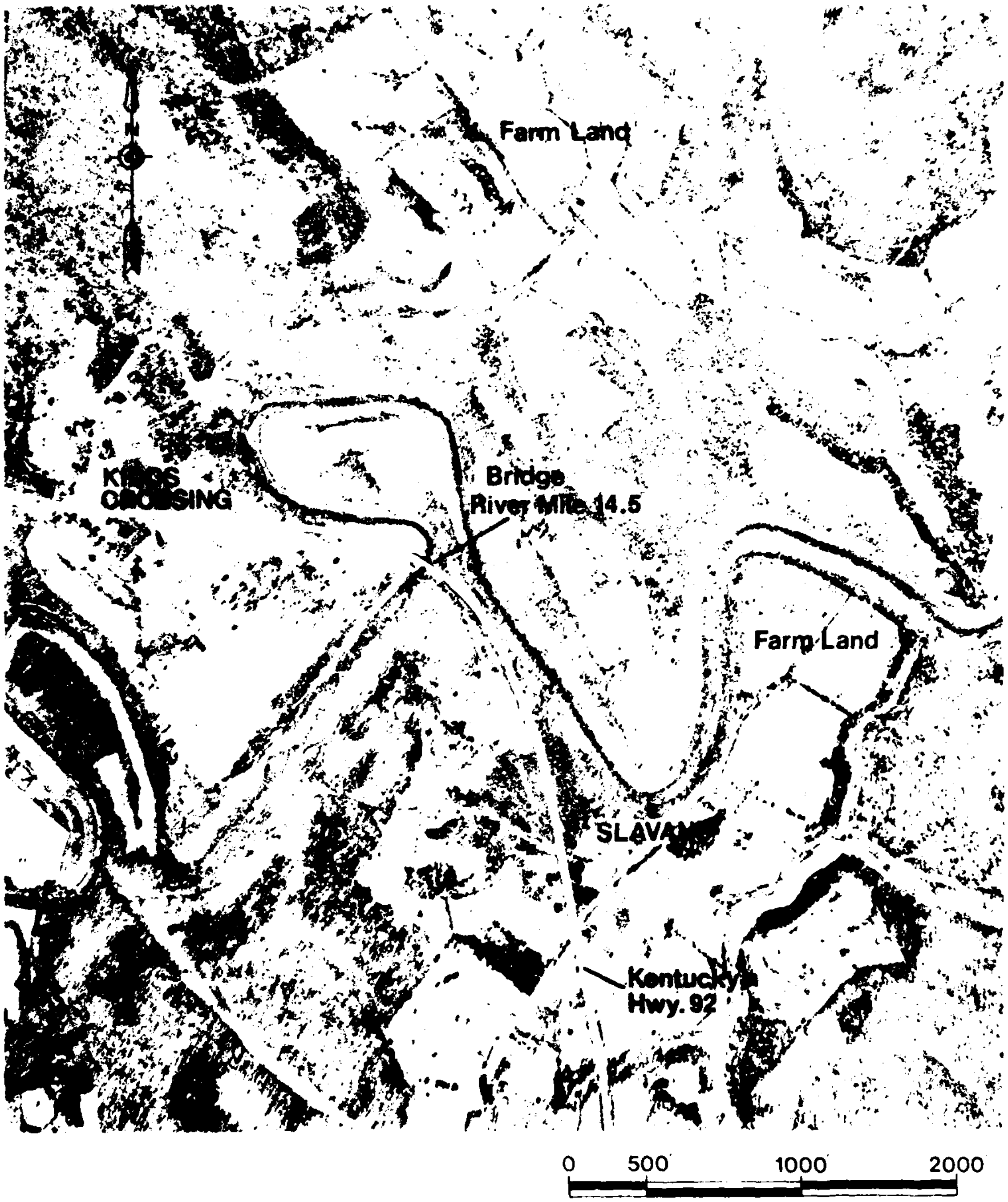
3 - Stream includes the Little South Fork and its tributaries, as depicted on the 400-scale base maps.

Roads and rights-of-way constitute a significant land use in the study area. The nearly 32 miles of paved and unpaved roads, electric transmission line rights-of-way and local telephone rights-of-way account for approximately 195 acres of land, or five percent of the area.

Surface mining activity was observed in Wayne County Just outside the official Wild River boundary, but penetrating the area encompassed by the Map Folio Set. On Sheet 4 of the Map Folio Set, 9.4 acres of surface mined land is indicated on the Wayne County side of the stream. The area illustrated at the endge of Sheet 4 is continuous with a contouring operation of considerable size just outside the study area.

Four small cemeteries were observed in the study area; their combined acreage amounts to only 2.8 acres or 0.07 percent of the study area. All four cemeteries were in Wayne County.

Land use within the study area is presented in Map Folio Set D, Land Cover. Examples of the regional and study area land uses are also illustrated in Figures 5 and 6.



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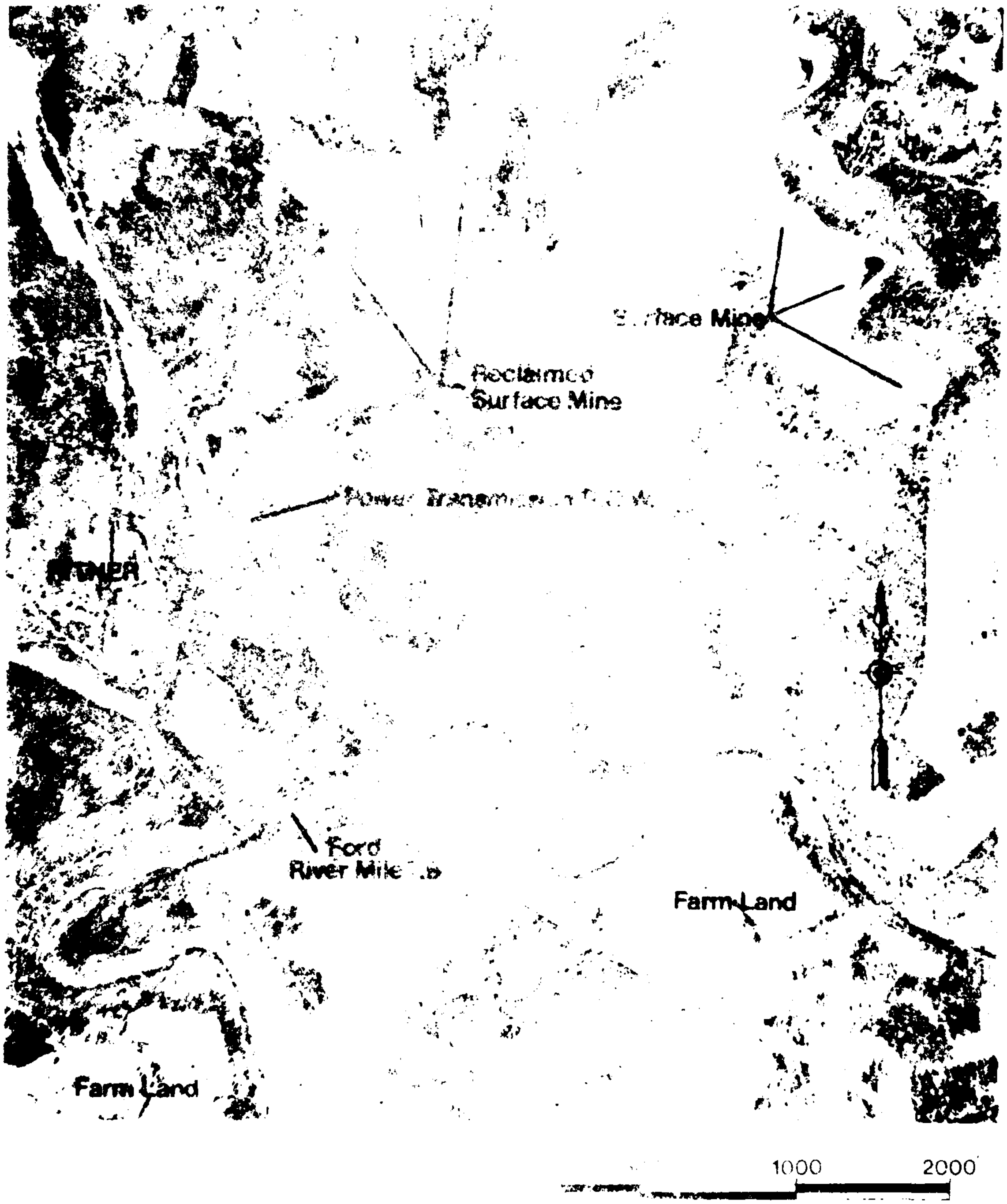
Environmental Inventory
Little South Fork Wild River

Figure Number 5

Aerial Photograph, April 1978



Environmental Inventory
of the South Fork Wild River
Figure Number 6
Aerial Photograph, April 1978

2.2 HISTORY AND ARCHAEOLOGY

2.2.1 INTRODUCTION

Coastal Zone Resources Division of Ocean Data Systems, Inc., conducted a cultural resources reconnaissance within the established boundaries of the Little South Fork, Cumberland River Wild River study area during the period November 1980 through April 1981. A brief visit to the study area for the purpose of planning and logistics considerations was made in early December 1980. Contacts with the State Historic Preservation Officer and State Archaeologist and initial literature and archival research were made in November and early December. The in-field reconnaissance of the study area began in late January 1981 but was discontinued due to snowfall; subsequent trips to complete the reconnaissance were conducted in March and April 1981. The Principal Investigator for the reconnaissance was Dr. Joffre L. Coe, Director of the Research Laboratory of Anthropology at the University of North Carolina at Chapel Hill. Mr. Wesley K. Hall, Archaeologist; Mr. Tucker R. Littleton, Archaeologist/Historian; and Mr. Ernest R. Shelton, Technician, participated in the reconnaissance.

The reconnaissance tasks included 1) literature, archival, and historical research (including coordination with the State Historic Preservation Officer and State Archaeologist and examination of the National Register of Historic Places) and 2) an in-field reconnaissance and description of both prehistoric and historic period sites and structures.

2.2.2 METHODOLOGY

The cultural resources reconnaissance was initiated by contacting the Kentucky Heritage Commission, State Historic Preservation Officer, and the Office of State Archaeology. A record of previously recorded structures for Wayne and McCreary counties was provided by the Kentucky Heritage Commission and information regarding previous archaeological studies and site records was gathered at the State Archaeologist's office. Additional literature research of the area's cultural resources was conducted at the University of Kentucky library, the Eastern Kentucky University library, the Wayne County Library, and the McCreary County Library. Local residents and historians were interviewed for pertinent information regarding the history of the Little South Fork region.

A field reconnaissance of the Wild River study area was initiated in January 1981 but was interrupted by snowfall. The field reconnaissance was completed on subsequent trips in March and early April 1981. Referring to aerial photographs, USGS topographic maps, a project area boundary map, and U. S. Army Corps of Engineers project maps, the field team conducted a pedestrian reconnaissance of the study area. The field team searched all types of terrain in the study area for archaeological sites, but particular emphasis was placed on bottomlands and on overhanging rock formations which may have served as rockshelters for prehistoric peoples. The team examined all overhangs and bottomland areas encountered during the reconnaissance. The field team searched for surface evidence of prehistoric utilization and conducted shovel tests in each site encountered to determine if buried material was present and the depth of cultural deposits. In those overhangs in which no cultural material was located on the surface but which exhibited characteristics of a rockshelter (i.e. were large enough to be utilized for protection and were at least partially dry) shovel tests were conducted for evidence of buried deposits. Field notes, including such information as site dimensions, location, types of cultural material, site condition, and other pertinent information, were recorded for each site. These field notes were later transferred to Kentucky Archaeological Site Survey Forms. All archaeological sites located during the reconnaissance were assigned a formal Smithsonian trinomial site number in coordination with the State Archaeologist. Photographs were taken of all archaeological sites.

Cultural materials collected at each site were placed in bags which were assigned field numbers keyed to the site location. An artifact analysis was then conducted in which collected material was cleaned, sorted and classified, and diagnostic materials were placed in type categories. Information resulting from this analysis was included in each site description.

All structures or structural remains encountered during the reconnaissance were photographed, their locations mapped, and brief field notes recorded.

2.2.3 PREVIOUS VICINITY ARCHAEOLOGICAL INVESTIGATIONS

Of the limited previous archaeological investigations conducted in Wayne and McCreary counties, none were within the Wild River study area boundaries and no sites had been previously recorded in the study area. Thirty-six archaeological sites had been previously recorded in Wayne County and 83 sites had been previously recorded in McCreary County (Personal communication, 9 December 1980, Dr. R. Berle Clay, Kentucky State Archaeologist). No major excavations or in-depth research have been conducted in the area. The limited archaeological reconnaissances or surveys conducted in Wayne and McCreary counties have added very little to the present knowledge of prehistoric resources in the region.

Funkhouser and Webb (1932) reported the first sites for Wayne and McCreary counties as part of a state-wide survey. Although they reported that the environment of the area would suggest an extensive aboriginal population they reported only four sites for Wayne County and three for McCreary County; six of these seven total sites were caves or rockshelters. One of these caves was the Hines Cave. In their book, Ancient Life in Kentucky, Funkhouser and Webb (1928) say:

"Hines Cave, about six miles from Monticello, yielded the most remains of any in Kentucky. The cave is spacious and well drained. The entrance is protected from wind, rain, and snow by high cliffs, yet well lighted for some distance. The bottom is level and dry and this must have been a desirable shelter to the people who occupied it. There were remains from many fires and in the graves were many artifacts, awls, needles, and skinning knives; in the ash beds were bones of many animals. In one grave was found the skeleton of a young woman with a round piece of shining mica of the type that comes from North Carolina. Many skeletons were found and many more artifacts, stone hoes, flint arrowheads, pipes, pottery, and textiles. Animal bones were those of wolf, bear, wildcat, raccoon, fox, deer, buffalo, beaver, rabbit, turkey, quail, turtle shells, and mussel shells. Many other caves in this section indicate they were the homes of the cave dwellers or Indians who lived in caves in prehistoric times."

Since Funkhouser and Webb's work, a number of small scale surveys have been made. These previous investigations in Wayne and McCreary counties are listed in the References section of this report. In Wayne County, archaeological surveys were conducted preliminary to either lake or highway projects. In 1947, William G. Haag conducted archaeological investigations in Wayne, McCreary, Pulaski, Russell, and Clinton counties. A number (14) of sites were recorded but none were located in either Wayne or McCreary counties. Douglas W. Schwartz conducted a small survey of Lake Cumberland shoreland in 1967; however, no sites were recorded. In 1971, Jack M. Schock and Mary L. Bowman conducted a survey for the realignment of Highway 90 in northern Wayne County. Nine site locations were recorded and one site tested with no significant findings. Terry L. Weis and Jack M. Schock conducted a survey of the Monticello By-Pass for Highway 90 in 1976. Four sites were recorded along with two "spot finds." Although further investigation was recommended for one of the sites, there is no indication that any further investigation was ever conducted.

In McCreary County, surveys have been primarily associated with the Daniel Boone National Forest, highway improvements, and mining and oil leases. Following Haag's 1947 survey, the next formal archaeological investigation in McCreary County was by Wesley C. Cowan in 1975. Cowan surveyed three tracts of Forest Service land and located only a small site of undetermined cultural affiliation. In 1975, Jack Schock conducted a survey for the relocation of Highway 27, Greenwood to Flatrock, but only four sites or localities were recorded. In 1976, Jack M. Schock and Gary Foster conducted archaeological investigations along another portion of the realignment of Highway 27. Four localities of restricted prehistoric activity were recorded. An Archaic projectile point was recovered at one of these. In 1977, Michael Barker surveyed a 73-acre tract of Forest Service land but failed to locate any sites. A survey by Ball and Chapman in 1977 of a proposed gas well site as well as a survey by Turnbow and Allen (1977) of 402 acres of Forest Service land also failed to locate any sites. A survey by Michael Barber of the

Beaver Creek Wilderness area in 1977 did locate 11 sites. Eight of these sites were prehistoric. The majority of these sites were rock-shelters which contained material which indicated occupation during the Archaic and early Woodland periods. A survey by Roger C. Allen in 1978 of a proposed coal processing facility located four rockshelter sites. Two of these shelters contained material which suggested occupation during the Woodland period. A number of other surveys have been conducted in McCreary County in recent years, however, most failed to locate any archaeological sites or had only limited results.

One limited test excavation of a rockshelter in northern McCreary County by the University of Kentucky (Ison and Sorensen 1979) provides some data which, after further investigation, may compare with rockshelters along the Little South Fork. Investigators noted that the distribution of classes of cultural material located in the site appeared to be separated according to activity. Cultural debris located in the open areas near the edge of the terrace suggested that primarily maintenance activity such as animal and plant food processing took place there. Within the shelter no evidence of similar maintenance practices were noted, indicating perhaps such activities were avoided in the interior of the shelter. Charred nuts and the placement of hearths within the shelter led the investigators to believe that the site may have been occupied seasonally during the fall and winter. Cultural material suggests a late Archaic occupation period.

2.2.4 PREHISTORIC BACKGROUND

Due to a complete lack of previous prehistoric site information for the Wild River study area and only limited archaeological data for the surrounding areas of Wayne and McCreary counties, little is known of the prehistoric cultural sequence of the area. The cultural chronology which is presented below is typical of much of eastern North America with modifications made to reflect Kentucky prehistory and regional variations within the state. The cultural sequence is divided into four major cultural traditions which are 1) the Paleo-Indian, 2) Archaic, 3) Woodland, and 4) Mississippian. These traditions were previously described in detail in the Environmental Inventory, Rockcastle Wild River, Kentucky prepared by Soil Systems, Inc.; some additional prehistoric and historic information beyond that presented here may be found in that document.

2.2.4.1 Paleo-Indian Tradition

The Paleo-Indian tradition is the earliest, and least understood, cultural period which extended from approximately 15,000 years before present (BP) until approximately 10,000 years BP. The people of this period led a nomadic lifestyle hunting large game such as mastodon, bison, giant ground sloth, and other animals which are now extinct. The tool assemblage of this period is characterized by fluted and lanceolate projectile points. These forms have been found widely scattered across North America.

The large, lanceolate-shaped fluted point is the most representative of the Paleo-Indian period. In Kentucky, there have been many isolated finds of Paleo-Indian points with the highest concentration occurring in the Bluegrass region and the lowest density in the Eastern mountains (Rolingson 1964). The Clovis-type point common to the Western United States was adapted regionally into the Cumberland, Quad, and Dalton type points as man migrated from the plains to the east in pursuit of forest dwelling mastodons (Willey 1966).

The few known artifacts of Paleo-Indian affiliation from the general Eastern Mountain region indicate that there was a relatively low population using the area (Ison and Sorensen 1979). No Paleo-Indian sites or isolated finds are known for the Wild River study area or surrounding Wayne and McCreary counties. The earliest evidence of occupation based on sites in Wayne and McCreary counties begins with the Archaic tradition.

2.2.4.2 Archaic Tradition

The Archaic tradition in Kentucky began approximately 10,000 years BP and extended until approximately 3,500 years BP. Along with the new post-glacial environment, many modern species of flora and fauna not previously available were exploited as many Ice Age species became extinct or followed retreating ice sheets north. People gradually changed from the nomadic lifestyle of the Paleo-Indian to a less nomadic, more localized subsistence based not only on hunting but on the gathering of a variety of nuts and plant foods and the exploitation of aquatic species. The Archaic subsistence pattern included a wide variety of animals and plants, with the white-tailed deer and various species of nuts being especially important. The Archaic people moved from season to season between ecosystems to exploit seasonally available food resources. With a lifestyle oriented toward hunting and gathering, Archaic peoples' settlements were usually temporary sites such as small hunting camps or rockshelters usually located near plant, animal, lithic, or other needed resources (Ison and Sorensen 1979, Dragoo 1976).

The change in game species and hunting techniques from the Paleo-Indian to the Archaic was accompanied by an adaptation of hunting tools. The atlatl, or spear thrower, was developed and projectile points were diversified into notched and stemmed forms. Specialized tools for cutting, scraping, drilling, and perforating were made from bone and stone. Manufacturing of ground stone objects such as axes, pipes, and atlatl weights became common. Mortars, grinding slabs, and pitted nutting stones appeared; such special plant food processing tools attest to a new reliance on plant foods (Ison and Sorensen 1979).

Archaic cultures are well represented throughout Kentucky. The Archaic subsistence system was well suited to the rugged terrain and resources of the Eastern Mountain region of Kentucky and appears to have been the basis for all succeeding traditions. There are indications that the Archaic lifestyle persisted relatively unchanged until historic times in some eastern Kentucky areas. Two basic kinds of sites, rockshelters and bottomland sites, are found in this area, but the relationship, roles, and functions of these sites are not yet understood (Ison and Sorensen 1979, Wyss and Wyss 1977, Purrington 1967).

2.2.4.3 Woodland Tradition

The beginning of the Woodland tradition around 3,000 to 3,500 years BP was defined by three important cultural traits which separated it from the lifestyles of earlier hunters and gatherers. These were 1) the beginning of pottery manufacturing, 2) increasing burial ceremonialism (e.g. construction of elaborate tombs, burial mounds, and earth works), and 3) the use of horticulture to enhance and stabilize sources of food plants (Ison and Sorensen 1979, Willey 1966, Griffin 1952).

The Woodland patterns for environmental exploitation were very similar to the Archaic. However, in addition to utilizing wild plants, Woodland peoples cultivated native plants such as sunflower, marshelder, canary grass, and goosefoot and non-native varieties such as squash, pumpkin, gourds, and corn (Ison and Sorensen 1979, Dragoo 1976, Yarnell 1964).

Fired ceramic vessels for food processing and storage replaced earlier stone vessels. The earlier Woodland ceramics were characteristically thick with smooth or cordmarked surfaces and were made of clay tempered with crushed stone or sand. The vessel forms were limited to bowls or simple jars. As the technology progressed, vessels became thinner and increased in variety of shapes and surface decorations (Ison and Sorensen 1979, Willey 1966).

The most culturally stimulating result of the advent of horticulture to prehistoric man was the development of a sedentary subsistence base which supported a larger more completely organized population. More time was devoted to nonutilitarian activities so that more ornamental objects are evident in the cultural material from the period. Trade networks developed over long distances which resulted in the expansion of an economic base and dissemination of ideas and beliefs. The expansion of trade and ideas may have contributed to the emphasis on more complex religious practices such as mortuary ceremonialism which originated in the Archaic period and later became a major component of Woodland life (Soil Systems, Inc. 1979).

In the middle Ohio River Valley, which includes northeastern Kentucky, a distinctive culture developed known today as Adena. The Adena culture is characterized primarily by its mortuary practices which included earth and rock filled mounds that covered log-lined tombs or cremation pits. These elaborate tombs often contained offerings of copper, cut mica, and shell-items that reflected long distance trade or transport from other areas.

While the Adena culture was prevalent in northern Kentucky, there have been fewer indications for its expansion into southern Kentucky. The elaborate burial practices of the Woodland tradition have been seldom found in the Eastern Mountain region. Woodland influence here is eviԝenced mostly by the presence of pottery, trade items, and projectile point types, and the history of Woodland cultures in this area is only superficially understood. In many places the Archaic tradition persisted with only the addition of a few Early Woodland innovations (Ison and Sorensen 1979, Soil Systems, Inc. 1979).

Studies have consistently shown that Woodland period people occupied rockshelters and rarely have Woodland ceramics been found at bottomland sites. Bottomland sites were most often occupied by a low subsistence base hunting and gathering people characteristic of the Archaic period (Soil Systems, Inc. 1979).

2.2.4.4 Mississippian Tradition

The last cultural influence on the prehistoric cultures of eastern Kentucky was the Mississippian tradition that developed in the central Mississippi Valley. This cultural tradition, beginning approximately 1000 years BP, was the most sophisticated to develop north of Mexico. The Mississippian subsistence was heavily based on cultivation; however, hunting and gathering of localized resources was still important. The Mississippian cultures were dependent upon deep, fertile alluvial soils whose productivity provided the economic stability for a sedentary village life. The lifestyle of the inhabitants was highly organized and villages were often situated around a plaza and rectangular earthen mounds. The villages were sometimes surrounded by wooded palisades or defensive moats (Ison and Sorensen 1979).

The artifacts associated with the period were often highly ornamental. Shell and copper were often used as ceremonial objects. Other artifacts commonly associated with the Mississippian tradition include chipped stone hoes, small triangular projectile points, ground stone celts, and unique pipes. Ceramic technology advanced considerably and Mississippian cultures manufactured a vast assortment of shell tempered pottery. Many new forms appeared including bottles, bowls, plates, jars with straps, and many types of jars molded into animal effigies or human heads (Ison and Sorensen 1979).

A large portion of the central United States was influenced by the Mississippian culture during the prehistoric contact period; however, the people of eastern Kentucky continued essentially living an Archaic lifestyle with only a few acquired Woodland traits. Where soil conditions permitted, intrusions of the Mississippian subsistence system occurred along major drainages such as the Cumberland River. However, in rugged terrain away from the major valleys the most common characteristics of the Mississippian period are shell-tempered pottery sherds and small triangular projectile points (Ison and Sorensen 1979).

2.2.5 HISTORICAL BACKGROUND

Southeastern Kentucky has a rich and interesting history which has been well described by extensive literature works. Likewise, such historic accounts as A Century of Wayne County 1800-1900 (Johnson 1939), Exploring Wayne County (Walker 1966), McCreary Conquest: A Narrative History (Perry 1979) and other county histories and records located at the University of Kentucky library, the Eastern Kentucky library, and the Wayne County and McCreary County libraries, describe the history of the area surrounding the Little South Fork. However, very little specific historical information exists relative to the Wild River study area portion of the Little South Fork.

2.2.5.1 Historical Settlement and Political Development

The Wild River study area along the Little South Fork lies in southeastern Kentucky, where recorded European settlement is somewhat recent when compared to the Atlantic seaboard states. The first European credited with the discovery of Kentucky was a Virginian named Gabriel Arthur, who in 1674 crossed over into the area now known as Kentucky. The first Europeans to reach the area which later became Wayne County, Kentucky appear, so far as records reveal, to have been the "Long Hunters" who came in the summer of 1770 and camped near the present-day location of Mill Springs (Johnson 1939). A prosperous fur trade with the Indians prompted the early trappers and traders to explore eastern Kentucky and exploit the resources there.

For the first three or four decades of European settlement in the Little South Fork area, the white settlers lived amidst Indian neighbors. An account of such times based partly on fact and partly fiction is Legion of the Lost Mine: Stories of the Cumberland (Troxel 1958). One of the main characters in this account was Chief Doublehead, the Cherokee chief whose real name was Chief Chugualatague. Born in 1750 in the vicinity of what is now Somerset, Kentucky, he was the last great Indian chief to occupy and rule over the great Cumberland Plateau.

In 1779 the Virginia Assembly opened Kentucky County to general settlement by survey, entry, and residence. In the same year, the Assembly passed an act for marking and opening a road over the Cumberland Mountains into Kentucky; in due time the road came to be known as the Wilderness Road, over which a great tide of settlers emigrated into Kentucky between 1780 and 1790 (Johnson 1939).

The earliest substantial settlement of the Little South Fork area was largely by Revolutionary War soldiers from North Carolina and Virginia, who moved into the region to take up military land grants. The settlers were chiefly Baptists in search of greater religious freedom. Most of the land grants in Wayne County between 1803 and 1853 were for land along the Little South Fork which seems to have been the section of Wayne County where the oldest settlement took place. Records indicate that there was a settlement at Parmleysville as early as 1780 (Walker 1966, Johnson 1939).

As pioneers began to venture toward Kentucky in increasing numbers, the administration of government had to be extended into the new territory. In the winter of 1775, Kentucky County was formed as a political subdivision of Virginia (Allen 1872). On 1 November 1780 Kentucky County, Virginia, was divided into the three counties of Fayette, Lincoln, and Jefferson. Later Green County was taken out of Lincoln County, Cumberland County out of Green County, and finally Wayne County was formed out of parts of Cumberland and Pulaski counties (Bork 1972). Then on 4 February 1791 Congress agreed to admit Kentucky into the Union, and on 1 June 1792 Kentucky's statehood became a reality (Allen 1872).

When Wayne County was created on 13 December 1800, it was named for General Anthony Wayne of Revolutionary War fame (Collins 1847). It was not until 1805 that the Cherokee Indians ceded to the United States their claimed lands in Tennessee and Kentucky, which included the strip of land along the eastern border of Wayne County known as "the Tellico lands" (Johnson 1939). That part of McCreary County within the study area was in Wayne County from 1800 to 1912. As early as 1893 the idea of a separate county was suggested, and in 1903 the people living in the area of present-day McCreary County petitioned for a new county. Nevertheless, the petition had to wait nine years for favorable action (McGuffey 1916). On 2 January 1912, McCreary County, named for then Governor James B. McCreary of Kentucky, was created out of parts of Pulaski, Whitley, and Wayne counties (Perry 1979, McGuffey 1916). The area of McCreary County before it became a separate county was backward and very remote and inaccessible from existing county seats and population centers. Lawlessness and crime were rampant because administration of justice was ineffective. Bootleggers abounded in the area (McGuffey 1916).

2.2.5.2 Population

Population in the Little South Fork and surrounding area has consistently been low when compared to central and northern Kentucky, and the historical records reflect the lack of population. In 1820 the federal census of Wayne County reported 7,393 whites, 553 slaves, and only 8 free blacks, totaling 7,954 (Bork 1972). Twenty years later the census of 1840 was reported by Collins (1847) as showing that the population had more than doubled since 1820, probably due to the increasing Western migration. The 1840 population of Wayne was 15,446. After another 20 years had passed, the 1860 census revealed a loss of population in Wayne County and reported a total amount of only 10,259. The population loss was likely due to the great Southern and Western migrations. In 1870 the census showed a population gain of only 341 persons over the 10-year period from 1860 to 1870 (Allen 1872). About 1939 it was reported that Wayne, supporting an almost pure Anglo-Saxon population, had only about 17,000 people; this figure, of course, represented the population after McCreary County had been taken out of Wayne. Population density in 1940 was, therefore, about 36 people per square mile (Johnson 1939). The rugged, steep lands within the Little South Fork Wild River study area have been, and will continue to be very sparsely populated.

2.2.5.3 Economics of the Area

Most of the first white men to appear in the Wayne County area were hunters and traders who dealt in furs. They were soon followed by settlers who cleared the virgin timber, burned much of it, cultivated the land until the soil was exhausted, and then moved to clear and cultivate more land. Such poor land use caused severe erosion and soil loss and associated problems (Walker 1966).

The early settlers were largely self-sufficient--they produced and made most of the things they needed in the way of food, clothing, and shelter. They worked the fields with wooden plows or instruments drawn by oxen. They did much of the farm work, such as cutting and threshing wheat, by hand. Much of the corn not used for home food or fed to livestock was made into whiskey. Wild game supplied much of the family food (Walker 1966).

The early settler's farm was also a place where a variety of products were crafted. Soap was made from the lye of wood ashes and animal fats. Many of the tools, chairs, brooms, and other necessities were made in the home. The spinning wheel and loom were used to make clothing from wool, cotton, and flax. In the spring, maple sugar was obtained from the sap of maple trees. Apples were made into cider, apple sauce, and apple butter (Walker 1966).

Subsistence agriculture was the primary pursuit of settlers in the area throughout most of the 19th century. Primary crops were corn, wheat, and tobacco. Corn was the major food crop and a portion of the corn crop was often used to manufacture whiskey. In the late 1800's and early 1900's, the manufacture of whiskey, much of it illegal, was one of the chief industries in the area that became McCreary County. McGuffey (1916) relates that there were a dozen government distilleries and forty-nine "blind tigers" within the present bounds of McCreary County, and that "bootleggers" were numerous. The need to combat the illegal whiskey problem was one reason for the establishment of McCreary County and was one of the chief problems confronting the county in its beginning in 1912. The McCreary County Sheriff and courts quickly worked to eliminate the problem (McGuffey 1916). Circa 1939, approximately three-fourths of Wayne County was farmland and one-fourth was unimproved, thus indicating the continued importance of farming (Johnson 1939).

In the early 1800's salt, like many other necessities of life, was especially scarce and high-priced ($25 per barrel). With a return to peace after the War of 1812 came a revival in salt manufacture and wells were bored for saltwater in Wayne County. The Beaty Salt Well located along the Big South Fork in what is now McCreary County was drilled in 1817 and produced until the works was shut down in 1840. While another salt well was being drilled on the Beaty Salt Well Tract in 1819, oil was discovered. Johnson (1939) states this was not only the first oil well drilled in the United States but the first in the world. Subsequent deepening of other salt wells also produced oil or salt brine too contaminated with oil for salt production.

Beginning in the 1880's, many holes were drilled for oil and gas in the area surrounding the upstream end of the Wild River study area and to the south and west. The northern extension of the Slavans Oil Field intercepts the Wild River study area and contains at least five producing oil pools, three of which underlie the Wild River study area at Slavans. The maximum production of oil in the area occurred between 1900 and 1912, but intermittent drilling continued after 1912 and several new holes have been drilled in recent years (Miller, Wihry & Lee, Inc. 1980).

Lumbering and mining have been two of the chief industries in Wayne and McCreary counties. McGuffey (1916) states that, in 1916, mining (on a small scale) and lumbering were the chief industries in McCreary County. The county's mineral products included coal, oil, gas, sulphur pyrites, and iron pyrites. The output of coal at that time averaged about thirty-five hundred tons daily. All of the county's industries were young and not yet highly developed, and the county foresaw increased coal output, modernization of farming, and opening up of the oil fields (McGuffey 1916). Increased coal production and development of agriculture in the area have come about since that time but little additional oil development occurred until recent years. In 1974, a strip mine for coal began operation adjacent to the Wild River study area near the head of Lick Creek, a small tributary stream that empties into the Little South Fork at Ritner.

Timber production has been important to both Wayne and McCreary counties. When settlers first came to the Wayne County area, three-fourths of the county was covered in virgin forest. Settlers cleared much of the timber, using some for building log cabins, barns, cribs, and rail fences, and burned what was not needed to make room for crops. The first sawmill in Wayne County is believed to have been started by W. T. Frances at Mt. Pisgah circa the Civil War and Ike Hurt owned a sawmill at Mt. Pisgah about 1890. About the same time a combination sawmill and grist mill was built at Parmleysville and operated by water power. As early as 1890 poplar logs and later sawed oak staves were floated down the South Fork to Burnside. After 1900, many sawmills were set up across Wayne County. Most of the early sawyers worked for a lumber trader in Monticello, and power planing mills operated there to furnish finished lumber products to residents. With the coming of good roads, large trucks, and the lumber demand of World War II, timber was removed from Wayne County at a fast rate. In the mid-1960's the lumber industry exceeded an estimated $10,000,000 annually and left about one-fourth of Wayne County as cut-over timber land (Walker 1966).

2.2.6 RECONNAISSANCE FINDINGS

2.2.6.1 Results of the Archaeological Reconnaissance

The cultural resource reconnaissance produced a total of 24 archaeological sites including eighteen rockshelters, four open bottomland sites, and two historic sites. The following individual site descriptions are presented in order of discovery:

Indicated ... State Road 9?
bridge ... County side.
The shelter ... foot protection
to the north ... approximately 9 x 2
meters and ... "potholes."
Concentrations of ... and unconsoli-
dated ... a portion of the
site has been ... through the site
has been ... of material was
found on the surface ... that the site
was ...

... point ...

1oMcy85 is a [illegible] ... [illegible] from the backwater of [illegible] ... [illegible] of the [illegible]ittle South Fork River. The [illegible] ... [illegible] has a floor area of approximately [illegible] ... [illegible] of at least one large collector's [illegible] ... [illegible] portion of the site. The remainder of the [illegible] ... [illegible] disturbed. Shovel testing and a [illegible] ... [illegible] surface at the site indicated a presence of [illegible] ... [illegible] flakes, bone, and shell). Soil depth var[illegible] ... [illegible] centimeters in shovel tests performed on-site. [illegible] ... [illegible] the site represents at least a late [illegible]

Cultural [illegible]terial: [illegible] ... [illegible], Hamilton

Plate [illegible] - Site [illegible] - [illegible]

15Wn22 is a rockshelter located [illegible] river miles upstream from the backwater of Lake Cumberland on the Wayne County side of the Little South Fork River. The rockshelter is situated on a long south-facing bluff line. The overhang of the shelter is long but not wide, providing a narrow floor area approximately [illegible] x 12 meters. The site is virtually undisturbed; however, no cultural material was noted in shovel tests and only a few flakes were found in the surface examination. Soil depth varied between 2[illegible] and [illegible]0 centimeters in shovel tests performed on site. No diagnostic material was located during the site examination.

Cultural Material: 4 waste flakes

Plate 3 - Site 15Wn22 -- Rockshelter

[illegible]McyBo is a rockshelter [illegible] located [illegible] river miles upstream from the backwater [illegible] on the McCreary County side of the Little South Fork River. The [illegible] situated only 1[illegible] feet above the high water line [illegible]. [illegible] a large shelter for the study area with a floor area of [illegible] meters. The north end of the shelter has [illegible] for about one quarter of the site. There are [illegible] "potholes" in portions of the site but in general the site [illegible] condition. Shovel tests recover[illegible] material [illegible] control testing [illegible] comparatively heavy [illegible] collection. Diagnostic [illegible] Late Woodland [illegible]

[illegible] Material [illegible] [illegible]lar

[illegible] Madison

[illegible]

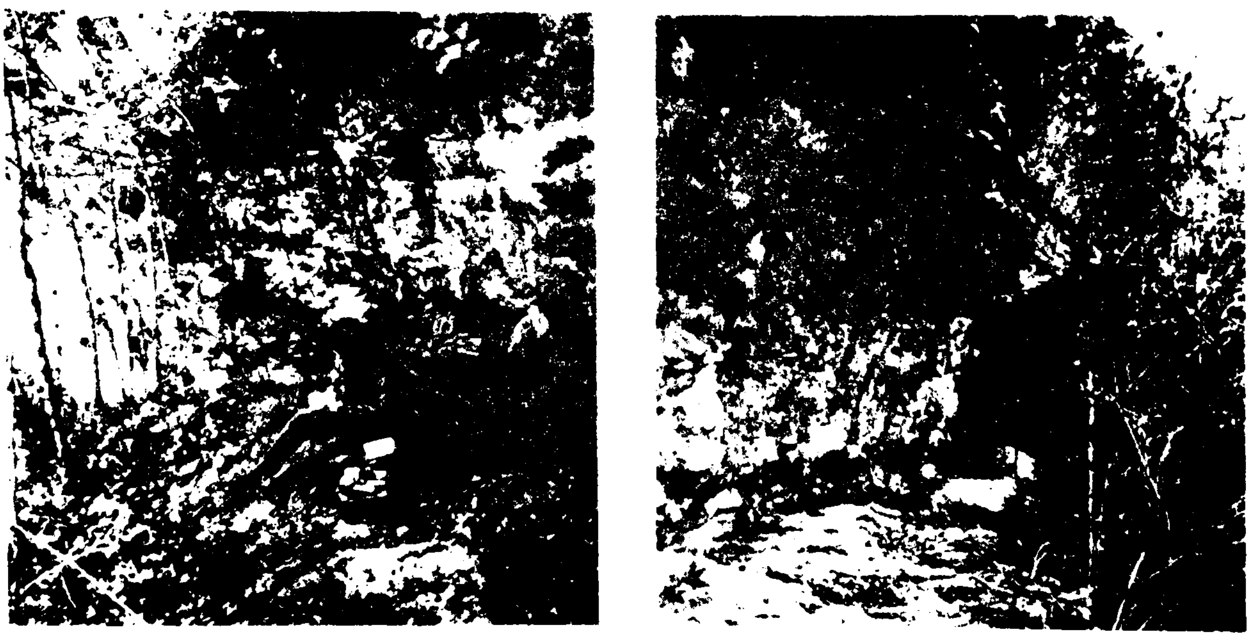


Plate 4 - Site 15McyBo -- Rockshelter

14Wn [illegible] river miles upstream [illegible] County side of the Little [illegible] along a bluff on an outside bend [illegible]. The site is essentially a cave [illegible]. The floor area tapers back [illegible] to an approximately 4 meter wide backwall [illegible]. The ceiling of the cave tapers back [illegible] at the backwall. Almost the entire floor [illegible] wide strip along the south [illegible] spring which originates [illegible] mostly hidden from the [illegible] traveling along [illegible] account for the excellent [illegible] activity was noted in the cave, only [illegible] visitors. Soil depth [illegible] centimeters in some portions [illegible] area located in situ cultural [illegible] the site may represent [illegible].

Cultural Materials: [illegible] finish,

[illegible]

[illegible]

15Wn24 is an open site located on a steep knoll approximately 11.09 river miles upstream from the backwater of Lake Cumberland and 100 meters west of the Little South Fork River on the Wayne County side. The site is situated in a cultivated field. Only a light surface scatter of lithic debris marks the site. The size of the site is undetermined due to the limited amount of cultural material present in surface collections. No diagnostic material was represented in the surface collection. The setting of the site along with the slight amount of cultural debris, even though the site is cultivated and ground surface visibility good, tends to indicate limited activity.

Cultural Material: 9 waste flakes

15Wn25 is an open site located approximately 11.2 river miles upstream from the backwater of Lake Cumberland on the Wayne County side of the Little South Fork River. The site is situated in an inside bend of the river. Cultural material, consisting primarily of lithic debris, is scattered over an area 40 x 100 meters roughly parallel to the river along a level area between the base of a hill and the river. Shovel tests located no cultural material below plow zone; however, controlled testing may encounter intact cultural features and material below the plow zone. Diagnostic material suggests a middle Woodland occupation/utilization.

Cultural Material: 1 projectile point (triangular, Madison style reworked into a scraper)
43 waste flakes

15Wn26 is located approximately 12.3 river miles upstream from the backwater of Lake Cumberland on the Wayne County side of the Little South Fork River. The site is situated on a south-facing bluff line and has a floor area of approximately 1.5 x 5 meters. The site is in close proximity to 15Wn27, a larger better protected rockshelter. Only a slight amount of cultural material was recovered from the surface examination. No cultural material was located in shovel tests. No indication of disturbance was noted at the site.

Cultural Material: 2 bifacially worked flakes
1 uniface scraper
4 waste flakes

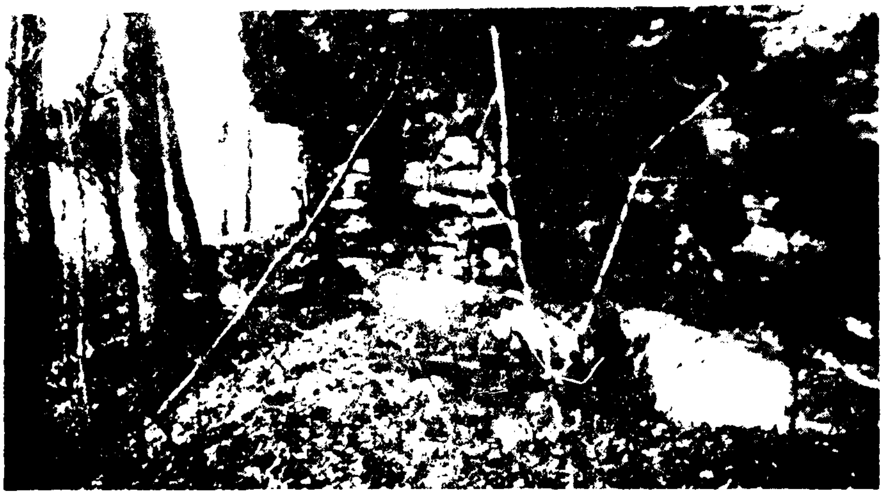


Plate [illegible] - Site 15Wn27 -- Rockshelter

15Wn27 is a rockshelter located approximately [illegible] river miles from the backwater of Lake Cumberland on the Wayne County side of the Little South Fork River. The shelter is situated on a south-facing bluff approximately 30 feet above the [illegible] water line. The floor area of the shelter is approximately [illegible] x [illegible] meters. The site is in good condition with no indication of more than surface disturbance. In situ cultural materials were present in two of three shovel tests. Diagnostic material collected at the site may represent a [illegible] Woodland utilization.

Cultural Material: 1 projectile point base (triangular, Madison style)
4 projectile point fragments
2 shell fragments
97 waste flakes and debitage

Plate 7 - Site 15Wn27 -- Rockshelter

15Wn28 is an open site located approximately 12.42 river miles upstream from the backwater of Lake Cumberland on the Wayne County side at the confluence of Bakers Branch and the Little South Fork River. The site is situated on a level strip of cultivated ground north of Bakers Branch between a hill and the river. Cultural material is lightly scattered over an area 30 x 75 meters with a general concentration of lithic debris on a slight rise nearest Bakers Branch. No diagnostic material was collected.

Cultural Material: 20 waste flakes

15Wn29 is a rockshelter located approximately 9.3 river miles upstream from the backwater of Lake Cumberland on the Wayne County side of the Little South Fork River. The site is situated along a south-facing bluff on a straight stretch of river. The floor area of the shelter is approximately 2 x 7 meters with about 60 percent of the entire floor area being exposed rock. Surface material was primarily located in the drip line and down slope from the site. No indication of more than surface disturbance was noted at the site. Shovel tests failed to produce buried cultural material.

Cultural Material: 6 waste flakes

Plate 8 - Site 15Wn29 -- Rockshelter

15Wn30 is a rockshelter located approximately 9.45 river miles upstream from the backwater of Lake Cumberland on the Wayne County side of the Little South Fork River. The site is situated along a south-facing bluff line on a relatively straight portion of the river. The floor area of the shelter is approximately 2 x 12 meters and exhibits no indication of more than surficial disturbance. Shovel tests to a depth of 35 centimeters located in situ cultural material in at least two levels. Diagnostic material at the site is characteristic of the Woodland period.

Cultural Material:
1 drill (triangular, concave base)
1 biface (projectile point tip)
2 bone fragments
3 shell fragments
98 waste flakes or debitage

Plate 9 - Site Wn30 -- Rockshelter

15Wn31 is a rockshelter located approximately 9.55 river miles upstream from the backwater of Lake Cumberland on the Wayne County side of the Little South Fork River. The site is situated on a straight portion of the river along a south-facing bluff line. The floor area of the site is about 2 x 8 meters with only the center and back portion of the shelter protected by the overhang. No indications of more than surface disturbance were noted at the site. Shovel tests failed to locate buried cultural material. Diagnostic material collected at the site may represent an early to middle Woodland utilization.

Cultural Material: 1 sherd (cord marked, sandstone tempered)
12 waste flakes or debitage

Plate 10 - Site 15Wn31 -- Rockshelter

15Mcy87 is a rockshelter located approximately [illegible] river miles upstream from the backwater of Lake Cumberland on the McCreary County side of the Little South Fork River. The shelter is situated on a straight portion of the river along a northwest-facing bluff line. The floor of the shelter is as much as 12 meters wide and goes into the bluff 6 meters from the front terrace. The interior portion of the shelter is only about a meter high but is extremely dry. No indication of more than surface disturbance was noted at the site. Shovel tests in the exterior and interior of the shelter located buried lithic material 10 to 20 centimeters below the surface. No diagnostic material was collected.

Cultural Material: 1 bone fragment

7 waste flakes

Plate 11 - Site 15Mcy87 -- Rockshelter

15Wn32 is a [illegible] river miles upstream from the [illegible] the Wayne County side of the [illegible] is situated along a low [illegible] outside bend in the river. The floor [illegible] ately 2.5 x 7 meters and is well [illegible] indications of more than surface [illegible] site. Two shovel tests reached depths of about [illegible] and recovered only one flake. Found on the [illegible] surprisingly enough, were two pieces of a [illegible] fragments of the strap are [illegible] original from at least a [illegible]. Other diagnostic material [illegible] Woodland utilization.

Cultural [illegible]

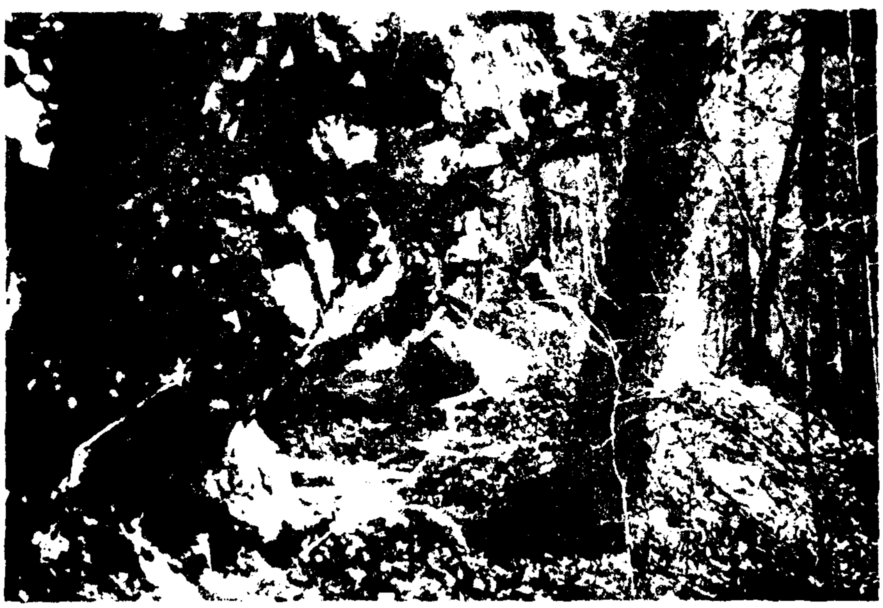


Plate [illegible]

[illegible] river miles [illegible] Wayne County side [illegible] facing south at the base [illegible] the river. The floor area is [illegible] unusually high overhang or ceiling [illegible] and has attracted quite [illegible] disturbance was noted [illegible] site appears to be [illegible] cultural material, [illegible] cultural material was [illegible]

[illegible]

[illegible] Dawn -- Rockshelter

1-Wn34 is a ... miles upstream from the backwater ... county side of the Little South ... high south-facing bluff (approximately ...) and 125 meters northwest of ... shelter is 2.5 x 15 meters. No in... ...erance were noted at the site. Cultural ... from the drip line. One flake was re...

Cultural ...

[illegible] is [illegible] upstream from the backwater [illegible] side of the Little South Fork [illegible] portion of the river along [illegible] area of the shelter is relatively [illegible] tected. There are no signs of [illegible] the floor area is a commonly used [illegible] evidence of buried cultural mater[illegible]

Cultura[illegible]

15Wn36 is [illegible] river miles upstream from the [illegible] County side of the Little South [illegible] South along a bluff in the [illegible] the river. The floor area of the [illegible] and [illegible] well protected. There is no [illegible] at the site, only surface disturbance. [illegible] in the drip line. Shovel test [illegible] two [illegible] in situ.

[illegible]

Plate [illegible] - Site 15Wn36 -- Rockshelter

15Wn37 is a rockshelter located approximately 3.[illegible] river miles upstream from the backwater of Lake Cumberland on the Wayne County side of the Little South Fork River. The shelter is situated on a long south-facing bluff line on a straight portion of the river. The floor area of the shelter is approximately 3 x [illegible] meters with little or no disturbance apparent. No cultural material was recovered in shovel tests.

Cultural Material: [illegible] waste flakes

Plate 17 - Site 15Wn37 -- Rockshelter

15Wn38 is a rocksh[illegible] river miles upstream from the backwater [illegible] County side of the Little South Fork Ri[illegible] [illegible]ed facing southeast along a bluff on th[illegible] [illegible] bend in the river. The floor area of the [illegible] and is well protected and dry. A large [illegible] end of the shelter. The site is in [illegible] of disturbance is evident. Shove[illegible] [illegible]ed in situ cultural material.

Cultural Mat[illegible]

Plate [illegible]

15Mcy88 is an open site located approximately 12.58 river miles upstream from the backwater of Lake Cumberland on the McCreary County side of the Little South Fork River. Cultural debris is scattered over a knoll situated at the confluence of a small branch (Corder Creek) and the river. Lithic material was found scattered in eroded areas as well as downslope adjacent to the river. A portion of the site has been eroded away by vehicle traffic; however, a good portion of the site is intact. A relatively heavy scatter of waste flakes is present at the site. The extent of the site is unknown.

Cultural Material: 28 waste flakes
3 shell fragments

15Wn39 is an historic site located 7.81 river miles upstream from the backwater of Lake Cumberland on the Wayne County side of the Little South Fork River. The site is located approximately 60 meters upstream from where the Ritner Ford enters the Little South Fork. All that now remains of the mill is the piled rock mill race and scattered portions of the rock dam across the river which still backs up a certain amount of water. Local informants say that the mill was the first in the area and was constructed by Jerry Denney in the late 1700's or early 1800's. Jerry Denney was one of the first inhabitants of the area and many of his descendants still live close to the Little South Fork. The mill was used to grind grain, both wheat and corn, and was reportedly still in use up to 50 years ago. According to local informants, a broken mill-stone from the mill is in the river between the mill site and Lick Creek. A man by the name of Coffey was the last person to operate the mill in the early 1900's.

Plate 19 - Site 15Wn39 -- Site of Dam and Mill Race of Past Grist Mill

15Mcy196 is a historic site located 3.35 river miles upstream from the backwater of Lake Cumberland on the McCreary County side of the Little South Fork River. The site consists of four hewn base logs of what appears to have been a log dwelling. No buried cultural features likely occur at the site since the base logs are set on a relatively flat natural rock surface. Only 1 to 3 inches of humus covers the rock surface over the entire site. No collection was made. No further work is recommended.

Plate 20 - Site 15Mcy196 -- Log Dwelling, Base Logs

2.2.6.2 Interpretation of Archaeological Findings

The archaeological reconnaissance of the Little South Fork Wild River study area identified 22 prehistoric archaeological sites but added little in the form of new definitive information regarding the prehistoric inhabitants of the area. However, from the reconnaissance a number of similarities emerge which can be correlated with present knowledge about prehistory in the eastern United States and the Cumberland Plateau region. Subsequent Phase II: Intensive Survey testing will likely yield additional information specific to how prehistoric peoples lived in the Little South Fork area.

During the reconnaissance small triangular projectile point forms characteristic of the middle to late Woodland and the Mississippian traditions in the eastern United States (Vento et al. 1980, Coe 1964, Kneberg 1956, Cambron 1973, Ritchie 1961) were found at sites 15Mcy86, 15Mcy87, 15Wn25, and 15Wn27. Sandstone tempered potsherds also associated with the middle to late Woodland period (Haag 1942, Vento et al. 1980) were found in surface collections at 15Mcy86, 15Wn31, and 15Wn32. One shell-tempered potsherd was found at site 15Wn23. Shell-tempered pottery is generally associated with a late Woodland/Mississippian tradition. Although these diagnostic artifacts are a relatively small sample, the evidence suggests an occupation/utilization of the Little South Fork area around 2000 years before the present.

No definitive evidence of an Archaic tradition was encountered in the reconnaissance. However, it is almost certain that peoples of the Archaic period utilized the area. The Archaic subsistence pattern of hunting and gathering was well suited for the Little South Fork area. It is possible that the bottomland sites encountered during this survey are Archaic sites or have an Archaic component. Further, Archaic sites have been reported for McCreary County (Ison and Sorensen 1979) within 20 miles of the study area. The majority of the sites had evidence of buried cultural material and it is likely that further testing of those sites will add the Archaic tradition to the sequence of prehistoric cultures in the area.

The rockshelter sites along the Little South Fork exhibit a number of traits which seem to be characteristic of other shelters in the region. There was an obvious lack of primary flakes in the surface collections and shovel tests. Debitage collected in the sites was almost all secondary flaking; this may indicate that bifaces were not manufactured in the shelters. This trait was also noted by Ison and Sorensen (1979) in their test excavations of a rockshelter in northern McCreary County. They suggested that flint knapping in the shelter centered around maintenance of finished bifaces rather than manufacture of new ones.

Evidence of dietary habits were present in most of the rockshelter sites recorded by this reconnaissance. Charred bone fragments, primarily long bones from deer, were commonly noted at shelter sites as were mussel shells and charred nut fragments. Of the food remains, the charred nuts may be the only indicator of the seasonal use of the shelter. Since nuts are harvested in the fall, it is reasonable to assume that the shelters were utilized in cold weather seasons.

In further support of a cold weather occupation of rockshelters is the fact that, of the overhangs investigated, none with a direct northern exposure contained prehistoric cultural debris. In fact, the majority of the rockshelters located had a southern exposure. Very few of the sites located were oriented such that they were not somewhat protected to the north.

2.2.6.3 Structures

There are no historic structures listed on the National Register of Historic Places for the Little South Fork Wild River study area (Department of Interior 1976). No historic structures have been identified in or adjacent to the Little South Fork Wild River area by the Kentucky Heritage Commission; however, the historic site surveys of Wayne and McCreary counties are ongoing and incomplete (letter dated December 2, 1980, to Coastal Zone Resources Division from the Kentucky Heritage

Commission, Mrs. Donna C. Hopkins, Acting Executive Director and Acting State Historic Preservation Officer). CZR has identified the location of various structures within the Wild River study area boundaries. Eight of these structures are considered historic (i.e. 50 years or older). These structures are indicated on the project maps (Map Set F) and are briefly described below. None of the structures listed below are considered historically or architecturally important.

1) <u>The Ritner Post Office</u>

The Ritner Post Office is located on the Wayne County side of the Little South Fork approximately 7.9 river miles upstream from the backwater of Lake Cumberland and one-quarter of a mile northwest of Ritner Ford. According to the Ritner Postmaster, Donald Jones, the primary frame structure was built by his grandfather in the early 20th century. Since then there have been at least two additions. The building served as a general store as well as the Post Office for the inhabitants of the Abbotts Hollow, Lick Creek and Roberts Hollow areas of Wayne and McCreary County until 1978 when the store portion was closed.

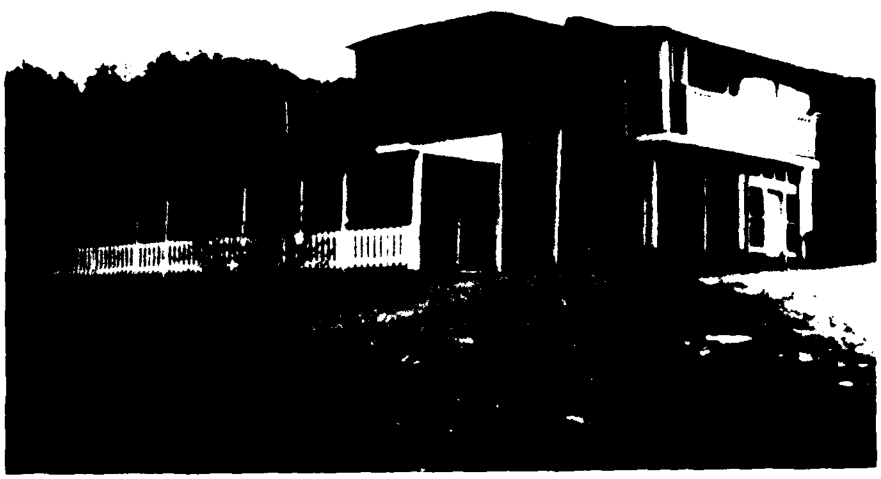


Plate 21 - Ritner Post Office

2) Soree Jones House

The Soree Jones house is located on the Wayne County side of the Little South Fork approximately 7.15 river miles upstream from the backwater of Lake Cumberland and approximately three-quarters of a mile east of Ritner on a hill 300 feet west of the river.

The original structure was a single-room hewn rectangular log dwelling (as defined by Glassie 1968b:353 in Riedl et al. 1976) constructed circa 1880 by Soree Jones' grandfather. A log addition was built approximately 25 years ago by Soree Jones and her mother.

Plate 22 - Soree Jones House

3) Log Dwelling Ruins

The ruins of this rectangular log dwelling (Glassie 1968b:353 in Riedl et al. 1976) are located on the McCreary County side of the Little South Fork approximately 5.4 river miles upstream from the backwater of Lake Cumberland and approximately 800 feet south of Freedom Church Ford. This dwelling is rectangular and of hewn log construction with a frame addition. The owner is unknown.

Plate 23 - Ruins of a Log Dwelling

4) James Vaughn House

The James Vaughn House is located on the McCreary County side of the Little South Fork approximately 10.7 river miles upstream from the backwater of Lake Cumberland and approximately 350 feet southwest of Jim Vaughn Ford. This one-and-one-half story rectangular log dwelling (Glassie 1968b:353 in Riedl et al. 1976) was constructed in the late 19th century. The structure has been partially remodeled.

Plate 24 - James Vaughn House

5) Cora Haynes House

The Cora Haynes House is located on the Wayne County side of the Little South Fork approximately 11.25 river miles upstream from the backwater of Lake Cumberland and two-thirds of a mile west of the Jim Vaughn Ford. The house is at the east end of what is (Kniffen 1936: 185-186 and Newton 1971:10 in Riedl et al. 1976) locally known as the Concord Road. This is a 1 1/2-story house with rear addition and was constructed by Emer Anderson in the early part of this century. The Anderson family owned the property until purchase by the Haynes in the mid-50's.

Plate 25 - Cora Haynes House

[illegible] Haynes [illegible]

The Haynes [illegible] is located approximately [illegible] southeast of the Cora Haynes House. [illegible] is a single [illegible] barn with additions (Glassie [illegible]) and was constructed in the late 19th [illegible] Anderson, according to the present owner [illegible].

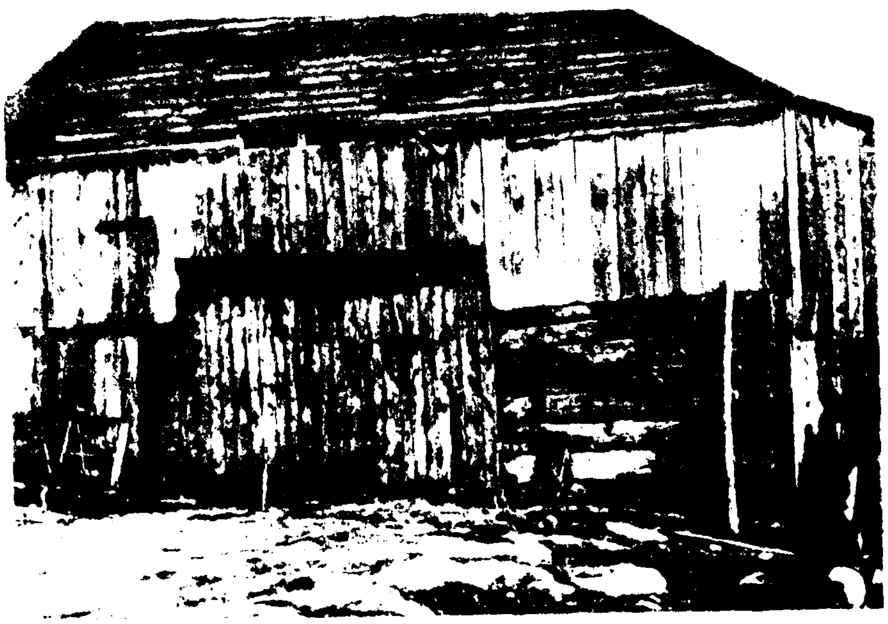


Plate [illegible] - Haynes [illegible]

7) Freedom United Baptist Church

The Freedom United Baptist Church is located on the Wayne County side of the Little South Fork approximately 5.25 river miles upstream from the backwater of Lake Cumberland and 250 feet west of the Freedom Church Ford footbridge across the Little South Fork. The structure is a rectangular single story frame building and was constructed after the original church building burned in the early 1930's.

Plate 27 - Freedom United Baptist Church

8) Concord Baptist Church

The Concord Baptist Church is located on the Wayne County side of the Little South Fork approximately 14.2 river miles upstream from the backwater of Lake Cumberland and approximately one-third of a mile north of Highway 92 on the south side of Concord Road. The building is single story rectangular frame construction with a bell tower and a single addition. According to Hubert Corder, local resident and Deacon of the church, the present building is at least 60 years old and perhaps older and is the third church building since the Concord Baptist Church was first organized in 1824.

Plate 28 - Concord Baptist Church

[illegible] Cemetery

One historic cemetery was located during the reconnaissance. It is located 11.[illegible] river miles upstream from the backwater of Lake Cumberland on the Wayne County side of the Little South Fork. The cemetery is on property owned by Lawrence Haynes but is locally known as the Anderson Cemetery and is not associated with any past or present church. There are 11 marked graves at the location. Several other graves are present but lack permanent markers. Following is a list of inscriptions recorded from photographs of the markers. Some of the markers had no inscription.

- [illegible]
  [illegible] 1, [illegible]
  July [illegible], 19[illegible]

- [illegible] M. Anderson
  [illegible]
  February [illegible]

- [illegible] Anderson
  [illegible]ber [illegible], 1[illegible]
  July [illegible]

- Luke Anderson
  November 9, 1882
  November [illegible], 192[illegible]

- Roger D. Anderson
  June 26, 1946
  July 16, 1946

- Susie Vaughn Anderson
  [illegible] [illegible]1, 1[illegible]
  October [illegible], 1948

- [illegible]zzie Coffey
  September 17, 1869
  October 2, 1955

- [illegible] Coffey
  September 16, 1875
  February 21, 1935

Plate 29 - Anderson Cemetery

2.2.7 RECOMMENDATIONS

The reconnaissance of the Little South Fork Wild River study area identified 22 prehistoric archaeological sites and two historic archaeological sites. Fourteen of the prehistoric sites appear to be in relatively undisturbed condition. The remaining sites have been disturbed to some degree by relic hunters, cultivation, camp ing activity, or other human disturbance. However, many of the disturbed sites still have potential to contribute additional knowledge about the prehistoric use of the area.

According to local historian Mr. Garnet Walker of Monticello, relic hunters regularly dig for artifacts in archaeological sites, primarily rockshelters, in both Wayne and McCreary counties. He suggests that every easily accessible rockshelter or known open site in the two-county area has been disturbed by relic hunters. Those sites which are less accessible and undisturbed, such as many of those located by this reconnaissance, will not likely remain so much longer. As access improves and public use increases in the Wild River corridor, those sites which have survived unmolested until the present will soon be disturbed and perhaps made archaeologically useless by the untrained public.

The need for a Phase II: <u>Intensive Survey</u> is evident and such a survey is recommended for the Wild River study area as soon as possible. Although by definition, a Phase I: <u>Reconnaissance</u> is not designed to furnish complete project coverage and usually involves a selective examination of the project area within an explicit sampling framework, CZR's reconnaissance included relatively complete ground coverage of the project area. This coverage approached the level normally done in a Phase II: <u>Intensive Survey</u>. Therefore, additional pedestrian survey coverage of the area would likely only produce limited results and is not recommended. The main emphasis of the Phase II: <u>Intensive Survey</u> should be to test known sites to document each site's potential to yield archaeological information.

The recommended Phase II: <u>Intensive Survey</u> procedure would be controlled excavation of at least one (and preferably more in larger sites) appropriately sized test square at all of the prehistoric archaeological sites recorded during this reconnaissance. At least two major benefits would be gained from such a testing program. First, each site's true potential as an archaeological resource could be judged and evaluated in terms of <u>National Register</u> criteria. Second, at least a portion of the archaeological information contained in each site would be salvaged and protected even if the site warranted no additional testing.

If time and budget restrictions will <u>not</u> permit such a comprehensive testing program as that outlined above, the following list of sites have been arranged in descending order of importance. Those sites listed first are most highly recommended for testing based on information gained from the reconnaissance.

15Wn23
15Wn32
15Wn30
15Wn38
15Wn27
15Mcy86
15Mcy85
15Wn33
15Wn34
15Mcy87
15Wn36
15Wn31
15Wn25
15Wn28
15Mcy84
15Wn37
15Wn29
15Wn22
15Mcy88
15Wn35
15Wn26
15Wn24

Taken into consideration in preparation of this list were factors such as the presence of buried cultural material, the degree of disturbance at each site, site size, site type (rockshelter or bottomland), the surface-collected cultural material, and the general setting of the site in terms of location, accessibility, and visibility.

Subsequent Phase III: Mitigation efforts will also likely be appropriate for some of the sites. Those sites which, based on the Phase II: Intensive Survey testing results, meet the criteria for nomination on the National Register of Historic Places may warrant subsequent management such as 1) avoidance, 2) preservation through protection, or 3) mitigation through excavation.

No further work is recommended for the two historic archaeological sites, Site 15Wn39 which is an old grist mill site and Site 15Mcy89 which is the hewn base logs of what appears to have been a log dwelling.

Eight historic structures were identified during the reconnaissance and photographs and brief descriptions of each structure were included in this report. Although it is CZR's opinion, based on the reconnaissance findings, that none of the structures are potentially eligible for the National Register of Historic Places, CZR recommends that Phase II: Intensive Survey efforts include the architectural and historical evaluations of the structures in sufficient detail to definitely determine the structures' eligibility.

2.2.8 OTHER CULTURAL FEATURES OF POTENTIAL INTEREST TO AN INTERPRETIVE PROGRAM

Various cultural features of potential interest to an interpretive program are located within the Wild River study area. These features are located on the project maps (Map Set F) and photographs and slides of each are provided. Two churches occur within the study area. The Concord Baptist Church, located in Wayne County in the upstream portion of the Wild River corridor, was constituted on 8 October 1825 (Bork 1978) and the Freedom United Baptist Church, located in Wayne County toward the downstream end of the Wild River corridor, is of about the same age (Personal communication, 2 April 1981, Mr. Garnet Walker, Local Historian, Monticello, KY). The building presently used by Concord Baptist Church was reportedly built in the early 1900's and the Freedom Baptist Church building was constructed in 1933-34 after a fire had destroyed the previous church building.

Three fords cross the Little South Fork in the Wild River corridor. The two major fords are the Ritner Ford and the Freedom Church Ford; however, a lesser used and more difficult to traverse ford is the Jim Vaughn Ford. Associated with Ritner Ford and the Freedom Church Ford are footbridges, constructed of suspended cables and one-inch thick wood flats. The footbridges allow pedestrian access across the river even in times of high water when vehicular crossings of the fords are prevented. The Freedom Church Footbridge was constructed circa 1920 and the Ritner Footbridge was constructed circa 1940.

Near Ritner Ford is located the little post village of Ritner which was established on 29 April 1890 with Isaac Jones as its first postmaster. At present, Ritner contains only the postmaster's residence and the post office which is located in a building formerly used as a store.

Five silt dams, referred to as "bottoms" by some local residents, occur in the area. One of these structures is made of rocks and is located at the lower end of Jones Hollow in McCreary County. Another is constructed of rock and cedar logs and is located just south of Ritner on Lick Creek in Wayne County. Another composed of rocks and logs is located on Baker Branch in Wayne County north of the Highway 92 bridge, and the last two, both constructed entirely of rock, are located in McCreary County. One is near the mouth of Corder Creek and the other is in Worley Hollow near its union with Morrow Hollow. The dams were constructed and filled or allowed to fill with earth and silt to provide suitable areas for farming.

The ruins of an old grist mill are located on the Wayne County side of the Little South Fork approximately 60 meters upstream from Ritner Ford. All that now remains of the mill is the piled rock mill race and scattered portions of the rock dam across the river which still backs up a certain amount of water. Local informants say that the mill was the first in the area and was constructed by Jerry Denney in the late 1700's or early 1800's. Jerry Denney was one of the first inhabitants of the area and many of his descendants still live close to the Little South

Fork. The mill was used to grind grain, both wheat and corn, and was reportedly still in use up to 50 years ago. According to local informants, a broken millstone from the mill is in the river between the mill site and Lick Creek. A man by the name of Coffey was the last person to operate the mill in the early 1900's.

SECTION III

NATURAL RESOURCES

3.1 PHYSIOGRAPHY

Physiography literally means a description of nature or of natural phenomena in general. In a more restriced sense, it is roughly equivalent to physical geography. That is, physiography concerns the study of the earth's exterior features and the changes that occur in these features. It embraces several more narrow scientific disciplines including geology, geomorphology, pedology, meteorology and hydrology, and the interaction of these. For example, geomorphology, climate and hydrology interact to produce the topography and soils of any given area. This physical system can assume an infinite variety of forms, which interact with the biological environment within and around it to form a physical/ biological systems combination uniquely adapted to the total environment. Finally, man and his settlement patterns are influenced and in turn influence the physiography of an area.

This section of this environmental inventory concerns the physiography of the Little South Fork Cumberland River, a unique riverine environment in southeastern Kentucky. The elements of physiography to be considered herein, include: topography, geology, geomorphology, pedology,climate, hydrology and soils. The following paragraphs are an abbreviated summary of these topics, which will be followed by a more detailed treatment of each element.

The Little South Fork Cumberland River lies along the boundary between two major Physiographic Regions: the Mississippian Plateau and the Cumberland Plateau (Lobeck, undated). The Mississippian Plateau is a vast upland carved by erosion of Mississippian age rock strata, most of which are limestone strata. It has two levels: the upper level is the Mammoth Cave Upland in western Kentucky, and the lower level is the Pennyroyal Plateau which includes much of the central and southern portions of the state (McFarlan, 1958). The Little South Fork lies at the eastern edge of the Pennyroyal Plateau where it intergrades with the Pottsville Escarpment, which is the western edge of the Cumberland Plateau. The Escarpment developed because the sandstones and conglomerates (Pottsville Conglomerate of earlier workers; now known as the Rockcastle Conglomerate) of the Pennsylvanian-aged strata of the eastern Kentucky region are massive and highly resistant to erosion. The zone of transition between these two regions is comparatively rugged. The sedimentary strata of the Cumberland Plateau were uplifted in the distant geologic past in a manner that caused only minor warping and deformation of the rock units.

Average annual temperature in the Little South Fork region is 56°F and annual average precipitation is 49 inches. The precipitation combines with groundwater conditions and topography to determine the hydrology of the streams. The relatively mild variations in daily and weekly temperature cycles are of only minor importance in the formation of the area's topography. Fractures, jointing, gravity and the undercutting action of area streams are far more important factors in the development of the topography of the region than rock expansion/contraction cycles due to temperature variations. Climatic factors combine with weathered geologic material and organic materials acted upon by micro-organisms to form soils, which are in turn, suitable environments for many types of plants, especially hardwood trees.

3.2 TOPOGRAPHY

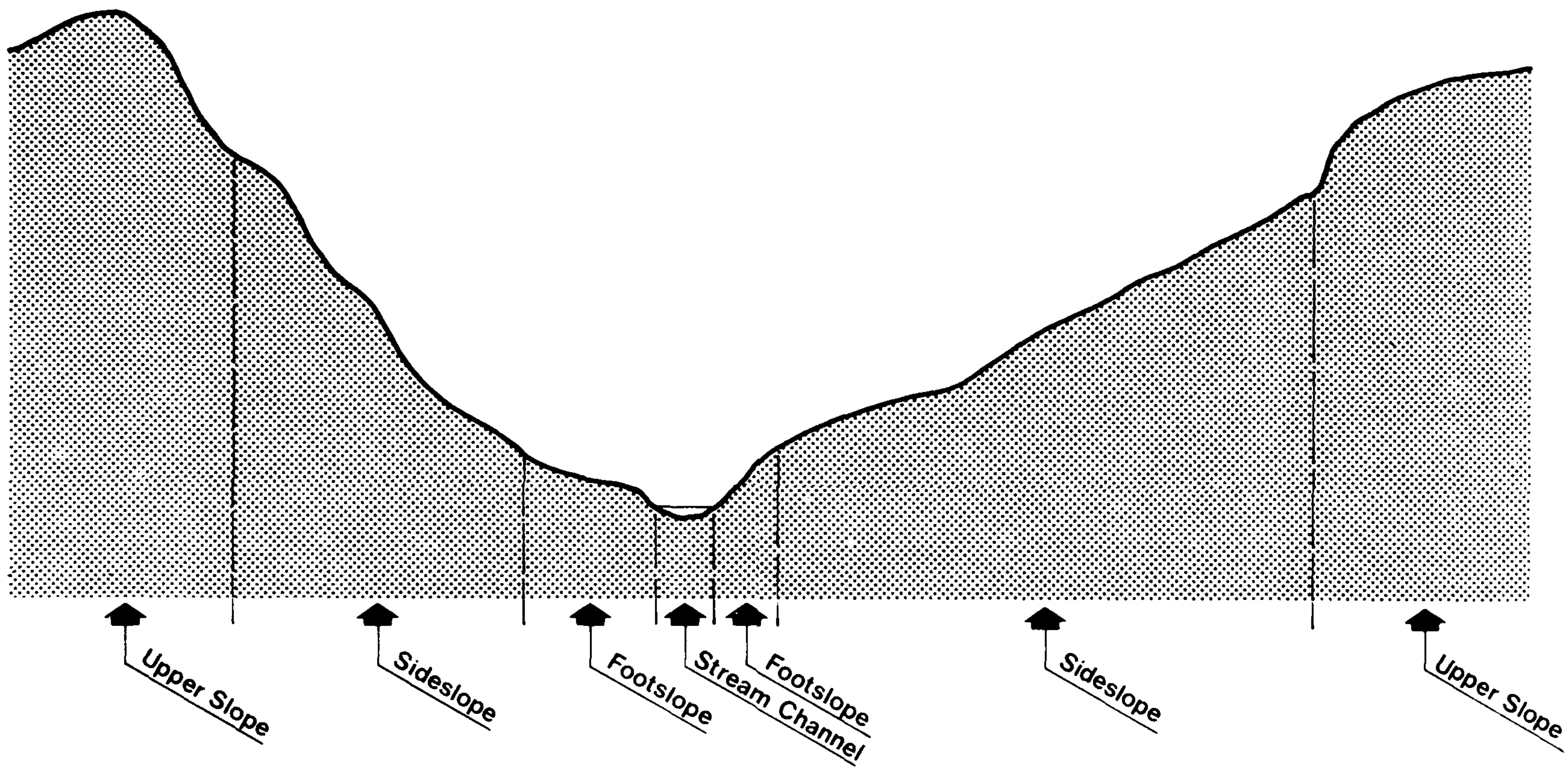
The Little South Fork flows generally in a northeasterly direction from its headwaters in Tennessee to its confluence with the Big South Fork Cumberland River four miles downstream of the Wild River segment. The valley through which it flows is moderately deep and steep, but cannot be characterized as gorge-like. There are no spectacular sandstone cliffs rimming the valley as there are along the Rockcastle River and the Cumberland Below the Falls. The Little South Fork flows primarily over limestone strata. The Pennsylvanian sandstone strata that produce the spectacular scenery of the Rockcastle and Red River gorges lie at elevations that usually place them outside the Little South Fork study area.

Typical ground surface elevations in the study area are in the range of 830 to 1,000 feet above mean sea level. In the upstream half of the study area, rounded hills with a typical relief of between 100 and 200 feet are the dominant landform. Near the downstream end of the study area, the hills tend to lengthen into narrow saddle-shaped ridges with rounded crests. Maximum change in elevation, from the edge of the stream to the highest point in the vicinity, ranges from approximately 300 feet at the upstream terminus of the study area to approximately 500 feet at the downstream end. Slope ranges typically from 10 to 15 degrees over most of the study area, but exceeds 25 degrees in many locations. Drainage patterns of small tributary basins are dendritic. The tributaries intersect the main stem of the stream at nearly right angles, and relatively few tributaries occur.

The valley through which the study segment of the Little South Fork flows is relatively wide, averaging approximately 3,500 feet between the crests of hills and ridges on opposite sides of the stream. Valley depth ranges from approximately 300 feet near the upstream terminus to approximately 500 feet at the downstream end, and averages 390 feet. Along the mainstem, the valley profile is quite often rugged and steep. Near the mouths of tributaries, the valley profile is not nearly so steep as a consequence of incisement by the tributary. At these locations, slopes of less than 10 degrees are common and the land has usually been cleared and cultivated.

An idealized cross section of the Little South Fork valley is presented in Figure 7. The topographic features of the valley are the stream channel in the valley floor, the footslopes, the sideslopes, and the upper slopes.

The Wild River segment of the Little South Fork virtually lacks a floodplain. The Coopersville and Nevelsville Geologic Quadrangle Maps show an absence of Quaternary alluvial deposits along the study segment. Typically, the stream channel is limestone bedrock, and the valley walls



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COASTAL ZONE
RESOURCES DIVISION

Environmental Inventory
Little South Fork Wild River
Figure Number 7
Idealized Topographic Cross Section of the Little South Fork River Valley

rise from the water's edge. There is usually a footslope that rises at an angle of 20 to 35 degrees or more to a height of between 30 and 100 feet above the stream bed. Typically, the footslope grades into the sideslope approximately 70 feet above the level of the stream. In many locations there is a line of low cliffs forming a bluff at the junction of the footslope with the sideslope. Occasionally, there is no footslope, and the valley wall rises 300 feet or more from the edge of the stream on a continuous slope angle of about 35 degrees.

The steepness of sideslopes varies widely, but generally is in the range of 2 degrees to 30 degrees with 20-25 degrees representing a typical sideslope. Sideslopes usually undergo a change in elevation of 100 to 200 feet before grading into the upper slope.

The upper slope varies considerably from location to location in the study area. In most places, and especially in the upstream half of the study area, the upper slope takes the form of a gentle slope forming a rounded hilltop. In the downstream half of the study corridor, there is frequently one or two nearly level benches marking the transition from the sideslope to the upper slope. The lower bench marks the subsurface transition from rocks of the Mississippian Period to Pennsylvanian-aged strata. The upper bench, when present, is usually associated with an unnamed coal bed in the Pennsylvanian strata.

In other locations, especially in the downstream half of the area, the upper slope is quite short and steep as it forms part of a narrow, rounded ridgetop. Often, the upper slope is beyond the lateral limits of the official Wild River boundary, and even beyond the limits of the broader study area illustrated in the Map Folio Set.

3.3 GEOLOGY

3.3.1 REGIONAL GEOLOGY

The Little South Fork Wild River lies along the zone of transition between two geologic provinces: the Mississippian Plateau and the Eastern Coal Field. Geologic materials in both provinces are sedimentary rocks. The Mississippian Plateau is composed predominantly of limestone strata while the Eastern Coal Field consists primarily of sandstone, siltstone, shale, coal and also some limestone. The transitional character of the study area's location can be appreciated by placing the Coopersville and Nevelsville Geologic Quadrangle Maps, which encompass the study area, side by side. Color patterns representing Mississippian strata dominate the Coopersville quadrangle, which includes the western one-half of the study area, while the Nevelsville quad is almost entirely covered by a color pattern representing Pennsylvanian strata.

3.3.2 SITE GEOLOGY

3.3.2.1 Stratigraphy

Rock units that outcrop within the Little South Fork study area are, in ascending order: the Monteagle Limestone, the Hartselle Formation, the Bangor Limestone and the Pennington Formation, all of Mississippian age (see Tables 5 and 6); and the Breathitt and Lee Formations of Pennsylvanian age (Lewis and Taylor 1976; Smith 1976). The Monteagle Limestone contains two members: the Ste. Genevieve Limestone Member, which is the lowermost and underlies the stream from Freedom Chapel to Ritner in the center of the Wild River corridor; and the Kidder Limestone Member which underlies the stream from Ritner to the Kentucky Highway 92 Bridge. The Rockcastle Sandstone (Conglomerate) Member of the Lee Formation occurs at elevations in the Little South Fork vicinity that place it outside of the lateral limits of the study area.

TABLE 5

THE GEOLOGIC TIME SCALE

Era	Period	Epoch	Age of beginning, in millions of years before the present
	Quaternary	Holocene	0.011
		Pleistocene	2.5
Cenozoic		Plicoene	13
		Miocene	26
	Tertiary	Oligocene	38
		Eocene	54
		Paleocene	65
	Cretaceous		136
Mesozoic	Jurassic		193
	Triassic		225
	Permian		280
	Pennsylvanian (Upper Carboniferous)		320
	Mississippian		345
Paleozoic	(Lower Carboniferous)		
	Devonian		395
	Silurian		435
	Ordovician		500
	Cambrian		570
	Precambrian		

SOURCE: Seyfert, C.K. and L.A. Sirkin. 1973. Earth History and Plate Tectonics. Harper and Row, New York. 504pp.

TABLE 6

LITTLE SOUTH FORK STUDY AREA LITHOSTRATIGRAPHY
ADAPTED FROM LEWIS AND TAYLOR (1976) AND SMITH (1976)

Age	Formation	Member	Description
Pennsylvanian	Lee	Rockcastle Sandstone (Conglomerate)	Light yellowish-gray to grayish-brown sandstone weathering yellowish-brown to grayish-orange; fine to coarse grained, quartzose, thin to thick bedded and locally crossbedded; locally contains scattered quartz pebbles less than ½-inch in diameter. Seams of sandstone commonly less than one inch thick cemented by iron oxide occur. Conglomerate is yellowish-gray to grayish-brown, weathering light brown to dark yellowish-orange; consists of white quartz pebbles about ¼-inch in diameter in a matrix of medium to coarse grained sandstone; locally contains thin bands and irregular masses of dusky-brown, iron-stained sandstone; lower 15 feet of member often weathers to a honeycomb appearance.
	Breathittt		Shale, siltstone, sandstone and coal: the shale is yellowish-gray to grayish-brown, weathering yellowish-brown to yellowish-orange; sandy and carbonaceous; locally contains stringers and lenses of iron-stained siltstone and fine grained sandstone; discoidal and ellipsoidal ironstone concretions 1 to 2 inches thick and 5 to 10 inches long are scattered along fractures and bedding planes. Siltstone is medium to light gray, carbonaceous, thin to thick-bedded; in part crossbedded. Sandstone is light gray to light olive gray, weathering to yellowish-gray; thin bedded, quartzose, locally slightly micaceous and containing some ferromagnetic minerals; interbedded with lenses of shale. Fragments of the fossil plants *Lepidodendron* and *Calamites* are locally

TABLE 6
(continued)

Age	Formation	Member	Description
Pennsylvanian (continued)			mon. Coal is banded bituminous variety variety; locally contains shale splits and irregular masses of iron sulfide. Thickest coal bed, one of two in unnamed coal zone near base of unit is locally as thick as 48 inches. Unnamed coal zone may be equivalent to the Stearns coal zone mapped in the Barhell mapped in the Barthell quadrangle (Pomerene, 1964) to the southeast. Basal contact poorly exposed; position marked by a break between upper steeper slope and lower more gentle slope underlain by slumped material of the less stable Pennington Formation.
Mississippian	Pennington		Clay shale, limestone, sandstone and siltstone: Clay shale is light greenish-brown to olive-gray and bluish-green; upper part contains some light reddish-brown and dusky red beds; weathers to red, yellow, brown and green clay; very plastic when wet. The limestone is medium gray to dark gray, micrograined to coarse grained; medium to thick bedded; contains some bioclastic and oolitic beds; bioclastic beds contain calyx plates and rare calyces and several crinoid species, particularly Pterotocrinus; fragments and plates of blastoids, such as Pentrimites, and fragments of bryozoans and small brachiopods. Sandstone is olive gray to yellowish-brown, very fine to medium grained, thin bedded and wavy bedded, quartzose and micaceous. Siltstone is brown to medium or light gray, in lenses and thin beds with shale. Basal contact sharp, but commonly poorly exposed; marked by a bench formed on the underlying Bangor Lime-

TABLE 6
(continued)

Age	Formation	Member	Description
Mississippian (continued)	Pennington (continued)		stone. Subject to landsliding when wet; especially where the toe of a slope has been cut. Forms a hummocky surface on most slopes as a result of slumping and sliding.
	Bangor Limestone		Dark to medium-gray, very fine to coarse grained limestone. Lower part thick bedded, grading upward to thinner beds with thin clay shale partings along bedding planes. Brachiopods and bryozoans abundant, particularly in upper part. Poorly exposed on hillsides. Mapped with the underlying Hartselle Formation.
	Hartselle		Shale and sandstone: the shale is greenish-gray to bluish-green, thin and even bedded; in part calcareous; clayey, plastic when wet. The sandstone is quartzose, greenish-gray to olive green, very fine to fine grained in very thin, even to wavy beds; the base of the formation commonly forms a bench on the underlying limestone. The basal contact is sharp and is well exposed on many hillsides.
	Monteagle Limestone	Kidder Limestone	Limestone, siltstone and shale: The limestone is medium to light gray, bluish-gray and yellowish-gray, micrograined to medium grained, commonly oolitic, thin to thick bedded; generally structureless, in part cross-bedded, and some shale and siltstone interbedded. Contains abundant small brachiopods, blastoids and crinoids. Basal and radial plates of the crinoid _Talarocrinus_ are locally abundant in the lower 1/2 of the member. Basal plates of _Agassizocrinus_ are common in the upper half. Large stem fragments, an inch or more in diameter, of an unidentified crinoid genus are common.

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ENVIRONMENTAL INVENTORY: LITTLE SOUTH FORK CUMBERLAND RIVER.(U)
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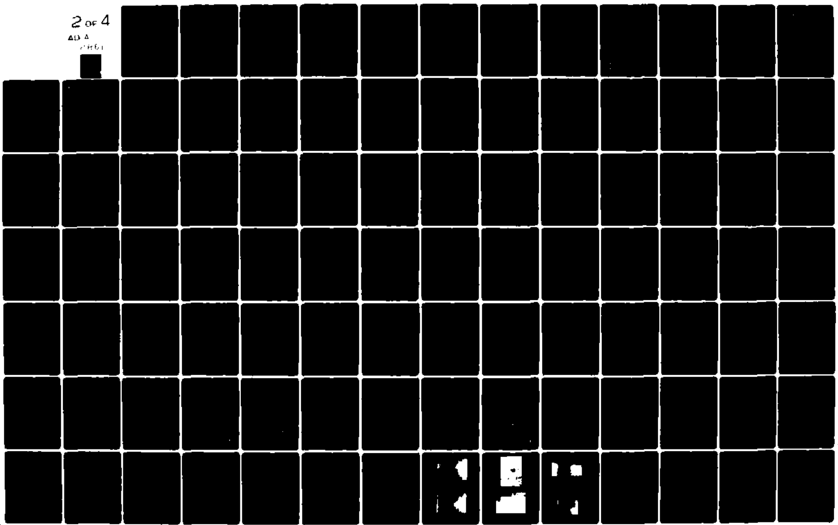


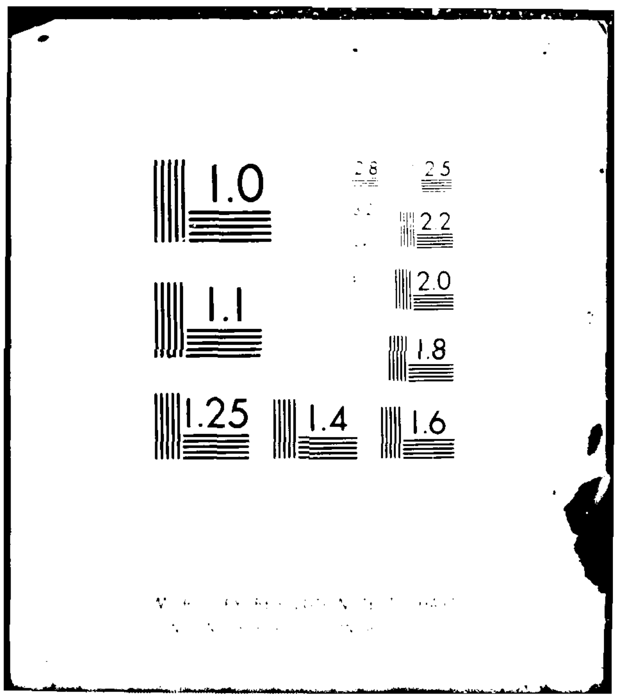

1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8

TABLE 6
(continued)

Age	Formation	Member	Description
Mississippian (continued)	Monteagle Limestone (continued)	Kidder Limestone (continued)	In a zone 6 to 8 feet thick in thick-bedded limestone about 30 to 40 feet below the top of the unit; zone is commonly underlain by olive green to gray shale 1/2 to 2 feet thick, which is in turn underlain by a bed of dolomitic micrite. Chert nodules are common near the top of the unit. The member is well exposed only in road cuts such as that at the Kentucky Highway 92 bridge. The basal contact is difficult to locate because of similar rock types in this and the underlying unit.
		Ste. Genevieve Limestone	Limestone and chert: Medium to light gray, commonly bluish-gray limestone weathers very light gray; micrograined to medium grained, commonly oolitic, sandy and silty, thick to thin bedded, commonly crossbedded; contains a few 2 - 4 inch thick beds of clay shale. Uppermost bed is limestone breccia. Chert stringers and black and gray chert nodules 3 to 4 inches in diameter are common in a zone 2 to 3 feet thick about 20 feet below the top of the unit. Unit contains abundant microfossils, some brachiopods, horn corals, blastoids, crinoids and rare colonial corals formerly referred to as *Lithostrotion harmodites* and now called *Siphonodendron* ? aff. *S. genevievensis* Easton. Stem segments of the crinoid *Platycrinites* occur locally. Member forms ledges in slopes. Base not exposed.

Most of the rock units in the study area are horizontal or near-horizontal, parallel strata composed mostly of limestone, sandstone and shale. Lesser constituents include siltstone, chert, coal and clay shale. The contact between the Mississippian strata (Pennington Formation) and the Pennsylvanian strata (Breathitt Formation) is poorly exposed in the study area, but is marked by an abrupt change from a steep upper slope to a more gentle lower slope or sideslope. The contact between different formations and members of Mississippian strata is frequently marked by narrow benches or by ledges outcropping on hillsides (Lewis and Taylor 1976).

The pattern and areal extent of the geologic formations in the study area is illustrated in Map Folio Sec C, Geology. Table 6 contains a lithostratigraphic description of each unit.

3.3.2.2 Structure

The sedimentary strata of the study area were originally planar and nearly horizontal beds of sand, silt and clay deposited in water which underwent burial, dewatering and lithifaction over a time span of millions of years. Forces from within the earth, during this time period, have folded the originally planar surfaces to a moderate degree which has resulted in a gently undulating subsurface structure in the immediate study area. Faulting has not been reported in either of the geologic quadrangles that encompass the Wild River study area and jointing is infrequent (Lewis and Taylor 1976; Smith 1976).

The dominant structural elements influencing the strata of the Wild River corridor are periclinal structures: the Ritner Anticline, which crests just north of the center of the Wild River corridor, and the Turkey Creek Syncline north of that. The axis of the Ritner Anticline is oriented on a compass direction of approximately 045° near the upstream terminus of the Wild River, but curves eastward to approximately 075° at Freedom Chapel. The total relief of the Ritner Anticline is approximately 100 feet.

The portion of the anticline within the study area, however, has a relief of only 40 feet. That is, the crestline plunges 40 feet in a southeasterly direction between Ritner and Kidds Crossing, and 40 feet in an east-northeasterly direction between Ritner and Freedom Chapel.

The rock strata of the study area between Kidd's Crossing and Ritner dip to the southeast at an angle of approximately 0.3° (25 feet per mile). From Ritner to Freedom Church, the dip of the rocks is south-southeast at approximately 0.4° (35 feet per mile). Near Freedom Church, the Little South Fork bends northward, crossing the crestline of the Ritner Anticline. The dip of the strata in the final mile of the study area is, therefore, north-northwest at approximately 0.6° (60 feet per mile).

Rock strata north of Ritner dip to the north-northwest into the Turkey Creek Syncline. The axis of the troughline of the Turkey Creek Syncline is parallel to the axis of the Ritner Anticline, and is about two miles north of the study area. South of Ritner, the rock strata dip to the south-southeast to beyond the limits of the Coopersville and Nevelsville quadrangle maps. A minor subsurface basin underlies the Wild River at Kidd's Crossing.

3.3.2.3 Economic Deposits

The most important mineral resources of the study area and the region are coal, oil and gas. Of lesser economic importance, but occurring in greater abundance, are limestone, sandstone and shale.

Coal is of the banded bituminous variety and is typically found near the tops of the ridges in the area, generally at elevations above 1100 feet. Named coal beds in these formations include the Barren Fork coal bed and the Stearns coal zone. In addition to these there are several unnamed coal beds. Number and thickness of coal beds in the Stearns coal zone are variable. Thickness is reported to range from 6 to 50 inches (Smith 1976). In 1974, stripping of a coal bed 48 inches thick was begun about two miles northwest of Ritner near the head of Lick Creek, a small tributary stream that empties into the Little South Fork at Ritner, Kentucky (Lewis and Taylor 1976). This mine site is now extensive (Harker et al. 1979). Northeast of Ritner, coal seams along Cindy Cliff, Coal Cliff, Sand Cliff and Balls Cliff are being mined by the Greenwood Land and Mining Company of Somerset and Parkers Lake, Kentucky and the Freedom Coal Company of Somerset, Kentucky. Near Cindy Cliff and Balls Cliff the surface mining activity lies within 1000 feet of the official Wild River boundary.

Beginning in the 1880's, many holes were drilled for oil and gas in the area surrounding the upstream end of the study area and to the south and west. The northern extension of the Slavans Oil Field intercepts the study area. This field contains at least five producing oil pools (Wilson and Sutton 1973), three of which underlie the Wild River corridor at Slavans, Kentucky. Maximum production of oil occurred between 1900 and 1912. Intermittent drilling continued after 1912 (Lewis and Taylor 1976), and several new holes have been drilled in recent years.

Most of the oil and gas from the Slavans Oil Field came from what drillers call "the Beaver Creek sand" or "Beaver sand" in the lower part of the Fort Payne Formation of Early Mississippian age at elevations between 400 and 500 feet above mean sea level. Future production in the area, from holes drilled to depths of 200 to 700 feet in the Beaver Creek sand, may amount to a few barrels per day with low hole pressure. Long-sustained yields should not be expected (Lewis and Taylor 1976).

There are no stone quarries in the study area or in the immediate [illegible]ity. However, large amounts of limestone suitable for agricul[illegible] limestone, concrete aggregate and road construction are available from Mississippian-aged formations (Lewis and Taylor 1976). The Monteagle Limestone in particular consists mostly of high-calcium limestone with few impurities and is a potential source of industrial or chemical grade calcium carbonate (Smith 1976).

Shale in the Pennington and Breathitt Formations is believed to be suitable for use in the manufacture of various clay products such as brick, tile and lightweight aggregate (Lewis and Taylor 1976). In addition, most of the shale in the Breathitt Formation is suitable for use as fill material (Smith 1976), and shale of the Pennington Formation is said to make a good base for farm ponds (Lewis and Taylor 1976).

Sandstone beds in the upper part of the Rockcastle Sandstone Member of the Lee Formation are commonly three to six inches thick and are separated from each other by thin shale partings which facilitate quarrying. Stone cut from the Rockcastle Sandstone has been used in the past in the construction of public buildings in both Wayne and McCreary counties (Smith 1976).

3.3.2.4 Physiographic Features

Physiographic features, as used here, refers to geologic or geomorphic features of special recreational, educational, aesthetic or interpretive value. In the course of this inventory, the locations of typical examples of such features, as well as the location and identification of sensitive areas requiring special management, protection or preservation were determined, and these loci were mapped in Map Folio Set E, Special Features.

Geologic features of special interest described in this section and located in Map Folio Set E include features with an interesting or unusual mineral composition, texture or structure, or localities where certain strata contain either an abundance of fossil remains or a few fossils of an unusual nature. Special geomorphic features include, for example, rock outcrops, sinkholes, cliffs and benches. Locations where the contact between different sedimentary formations is well exposed are also noted and discussed. A verbal location and short description of each feature mapped in Map Folio Set E, Special Features, is contained in Table 27 of Section IV of this report.

Nearly all of the physiographic features identified in the study area are Mississippian-aged sedimentary strata, and chiefly limestone. There are numersous localities where students involved in an environmental education program revolving around field studies of the characteristics of Mississippian sedimentary strata would have access to relatively good examples of two or three different types of rocks, and the contacts between them. Access is best in the roadcut along Kentucky Highway 92 at the upstream terminus of the Wild River, and along gravel roads in the upper half of the study area.

Pennsylvanian strata, including the Rockcastle Sandstone Member of the Lee Formation, generally occur at elevations that often place them beyond the limits of the official Wild River boundary and even beyond the larger study area depicted in the Map Folio Set. Where Pennsylvanian strata are present, they are moderately difficult to reach, being at the highest elevations on the tops of ridges.

3.4 CLIMATE

3.4.1 REGIONAL CLIMATE

The following general description of the regional climate of the study area is paraphrased from the Climatological Summary for the National Weather Service station at Somerset, Kentucky, the nearest station for which a published summary is available. There are National Weather Service stations at Monticello, and also at Stearns, but published summaries are not available for these stations. Further, the records for the Stearns station are incomplete, with data for some months in each year typically missing. The Stearns station has been established for only 11 years. Records of precipitation at Monticello have been kept for 44 years, and temperature for 24 years. At Somerset, there are actually two stations: one which has recorded temperature and precipitation data for 38 years, and another which was established only six years ago, and records only precipitation. The most recent published climatological summary for the older Somerset station is for the period of record, 1943 to 1966. Some of the data contained in this summary are presented in Tables 7 and 8 on the following pages. Table 9 presents precipitation data for Monticello, Kentucky for comparison. The data in Table 10 were obtained from monthly climatological data summaries for 1979 for the State of Kentucky.

The climate of the Little South Fork study area is characterized as temperate, with moderately cold winters and warm humid summers. The weather in all seasons of the year is characterized by relatively sudden changes in local weather conditions resulting from frontal activity associated with the movements of high and low pressure air masses. Frontal activity is greatest in the winter and early spring, somewhat less in the fall, and least in the late spring and summer.

Precipitation is relatively evenly distributed throughout the year without a wet or dry season per se. However, the months of January through June average nearly an inch more precipitation per month than the months of July through December. In a typical year, March is the wettest month, and October is the driest. Annual free-water evaporation, that is evaporation from shallow lakes and from ponds, averages about 36 inches, or about 13 inches less than the average annual precipitation. About 75 percent of this evaporation occurs during the six-month period of May through October (Elam 1968).

A pattern of cyclical fluctuation in monthly precipitation is evident in the historical data for the Somerset station. Of the mid-seasonal months, January has less than 35% of average precipitation approximately once every 10 years, and April, July and October have less than 26 to 45% of average precipitation once in every 10 years. On the other hand, once in every 10 years, January has an amount greater than 1.8 times average, and the other mid-seasonal months have amounts greater than 1.4 to 1.7 times average (Elam 1968).

A statistical study of amounts of heavy precipitation occurring in just a few hours time in the Somerset area indicates the probability of occurrence of amounts at least as great as the following:

Frequency in 100 years	Inches in 1 hour	6 hours	12 hours
1	2.9	4.6	5.5
4	2.4	3.8	4.5
20	1.8	2.9	3.5
100	1.2	2.0	2.4

Amount of annual snowfall varies considerably, with little or none occurring in some years. Ordinarily, snowfall occurs in the months of

TABLE 7
SOMERSET, KENTUCKY, TEMPERATURE DATA

Month	Average	Average Daily Maximum	Average Daily Minimum	Highest Recorded	Year	Lowest Recorded	Year
Jan	36.4	46.4	26.4	78	1943	- 28	1963
Feb	39.4	50.4	28.3	76	1962+	- 15	1965
Mar	46.2	57.7	34.7	83	1963+	- 4	1960
Apr	56.5	68.8	44.2	88	1965	22	1966+
May	65.0	77.6	52.4	92	1962	26	1963
Jun	72.3	84.3	60.3	101	1944	34	1966
Jul	75.3	87.1	63.5	103	1952	44	1961+
Aug	74.4	86.5	62.2	102	1943	40	1946
Sep	68.5	81.3	55.6	101	1954	31	1949
Oct	57.5	71.1	43.9	90	1959+	18	1962+
Nov	46.3	57.8	34.7	82	1946	- 2	1950
Dec	37.5	47.7	27.3	73	1964	- 17	1962
Annual	56.3	68.1	44.5	103	July 1952	- 28	Jan 1963

Based on 24 years of record, 1943 to 1966, from the Somerset, Kentucky weather station (Elam 1968).

All temperatures are in degrees Fahrenheit.

+: Also on earlier, dates, months or years.

TABLE 8

SOMERSET, KENTUCKY, PRECIPITATION DATA

Month	Average Rainfall	Snowfall Average	Snowfall Rainfall Equivalent[a]	Total Average Precipitation	Average Number of Days 0.1 inch[b]
Jan	4.88	5.8	0.54	5.42	9
Feb	4.75	2.9	0.29	5.04	8
Mar	5.07	2.5	0.25	5.32	9
Apr	4.16	T	0	4.16	8
May	3.97	0	0	3.97	8
Jun	4.73	0	0	4.73	7
Jul	4.63	0	0	4.63	9
Aug	3.70	0	0	3.70	6
Sep	3.25	0	0	3.25	5
Oct	2.29	T	0	2.29	5
Nov	3.87	0.6	0.06	3.93	7
Dec	3.99	3.3	0.33	4.32	7
Annual	49.29	14.7	1.47	50.76	88

Based upon 24 years of record, 1943 to 1966, for rainfall and precipitation greater than 0.1 inch, and 8 years of record, 1943-1950, for average snowfall. Records of the Somerset, Kentucky, weather station (Elam 1968).

All precipitation values are given in inches.

[a]: Using a standard coversion factor of 10 inches of snowfall = 1 inch of rain.

[b]: Average number of precipitation events equal to or greater than 0.1 inch in each month for the period of record.

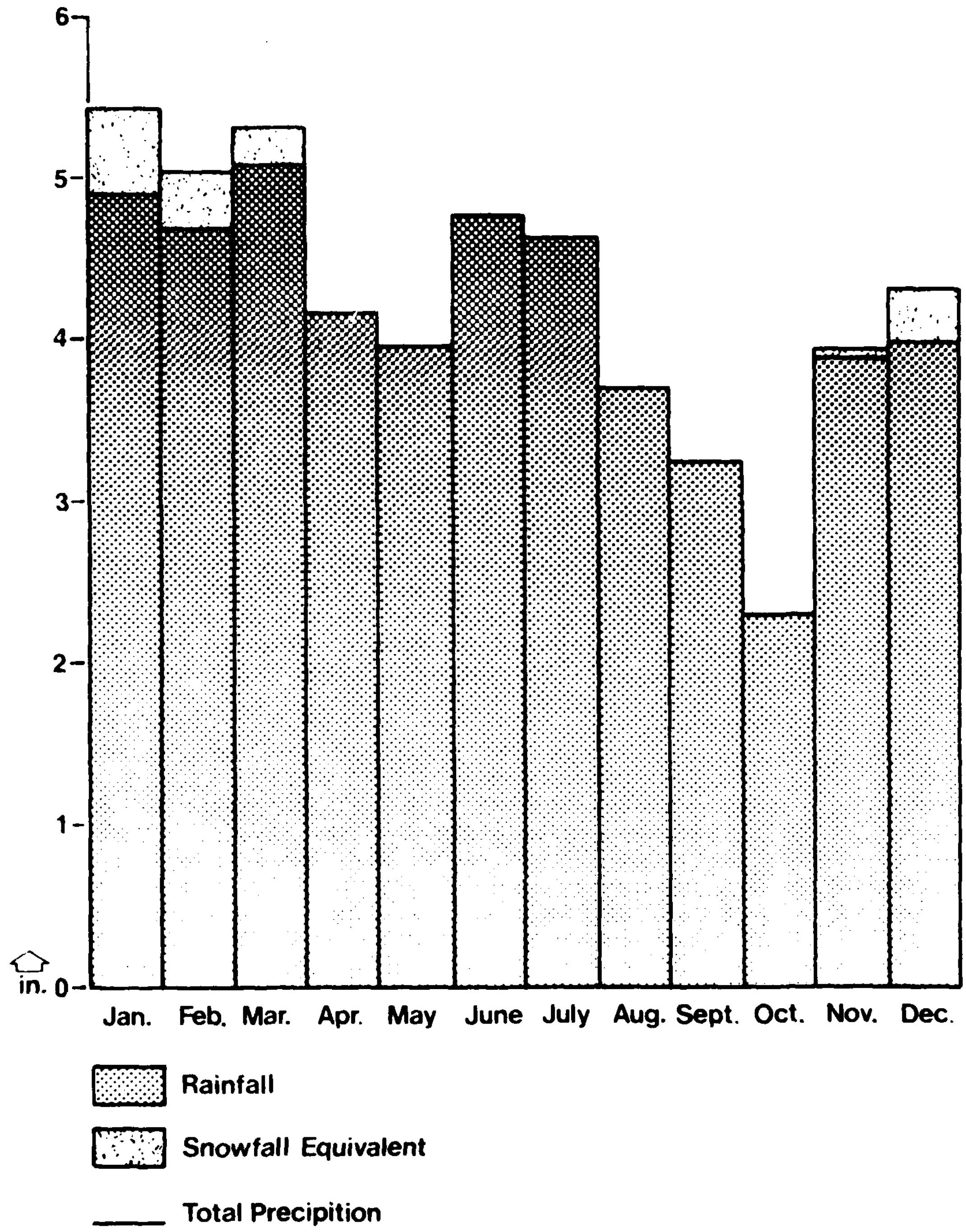
T: Trace amount.

TABLE 9

MONTICELLO, KENTUCKY, RAINFALL DATA

Month	Average Rainfall
January	4.63
February	4.30
March	5.03
April	4.03
May	3.85
June	4.45
July	4.52
August	3.58
September	3.39
October	2.45
November	3.97
December	4.11
Annual	48.31

Based on 43 years of record, 1937 to 1979, from the Monticello, Kentucky weather station (EDIS 1979). All precipitation values are given in inches.



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Environmental Inventory
Little South Fork Wild River

Figure Number 8

Precipitation Pattern, Somerset, Kentucky

November through March, with trace amounts occurring in April and October. Nearly 60 percent of total annual rainfall occurs in the months of December and January in an average year. One of the greatest annual totals recorded was 30 inches in 1948 (Elam 1968).

Thunderstorms occur on an average of about 50 days each year. They are most frequent in the spring and summer months, but can occur in any month of the year. They are responsible for most of the short-duration, high-intensity type of rainfall indicated in the table above (Elam 1968).

Wind, sunshine and relative humidity are not available for the Somerset station, but estimates of these weather factors are available based upon records kept at other stations in the region. These data indicate that prevailing winds are typically from a southerly direction and average approximately six to eight miles per hour (mph) from June through October, and about nine to 11 mph from November through May. Possible sunshine for the mid-season months averages about 41% for January, 56% for April, 65% for July, and 60% in October. Relative humidity rises and falls in a manner opposite to that of temperature in a typical day, with the highest humidity usually occurring with the minimum temperature, and vice versa. Humidity readings in the mid-season months, at 7 a.m. and 1 p.m., respectively, average about: January, 82% and 68%; April, 75% and 54%; July, 81% and 55%; and October, 82% and 52% (Elam 1968).

The growing season (defined as the number of days between the last spring and the first fall temperature of 32° F) averages about 179 days. The season is about 200 days or more in 10% of the years; 190 days or more in 25% of the years; less than 168 days in 25% of the years, and less than 158 days in 10% of the years (Elam 1968). Average annual temperature is 56.3 degrees F, with an average daily maximum of 68.1 degrees and a minimum of 44.5 degrees. Monthly averages are presented in Table 7. The highest temperature recorded in the period of record, 1943 to 1966, was 103 degrees in July 1952. The lowest temperature recorded in the same period was 28 degrees in 1963.

3.4.2 MICROCLIMATE

The Little South Fork valley is generally wide and deep enough to modify local weather conditions to a degree sufficient to establish a microclimate in the valley bottom that differs significantly from conditions at or beyond the valley limits. While factual material in the form of weather data recorded in the valley itself is not available to document this phenomenon, some generalizations may be advanced to describe it.

The Little South Fork has incised its channel deeper into the bedrock than tributaries and streams immediately east or west. Consequently, the valley constitutes a relatively sharp deviation in local topography that serves to either channel the prevailing winds along the axis of the valley, or break them against the valley margins, depending upon the velocity and orientation of the wind at the time. If the winds break against the valley walls, they lose their prevailing compass orientation, and most of their velocity.

Being the largest body of flowing water in the immediate vicinity, the tree-lined stream tends to moderate extremes of temperature in the valley bottom and will typically cause the humidity there to be slightly higher than in surrounding areas.

3.4.3 RECREATIONAL CONSIDERATIONS

In general, the climate of the study area, with respect to outdoor recreation, is moderate and favorable with the fall season having perhaps the mildest and most favorable weather for nearly all outdoor activites. Unfortunately, flow conditions in the stream are usually at their lowest in the fall, which is not conducive to canoeing or good fishing, two of the most important recreation pursuits on the stream.

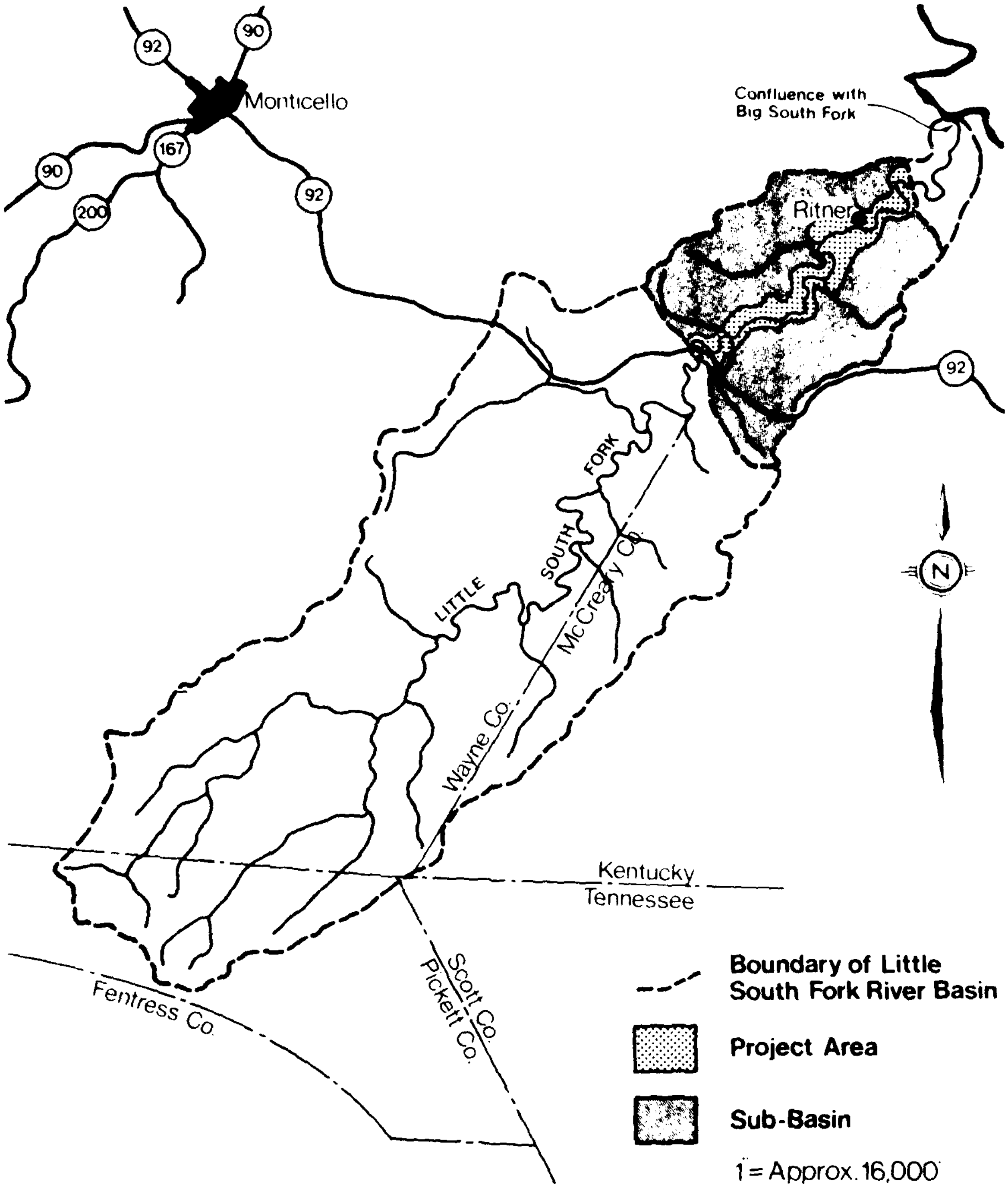
According to Sehlinger (1978), the Little South Fork is typically canoeable from November to mid-May in most years. Temperatures in the period from mid-November to at least mid-March, however, will often be less than 32°F, and the months of greatest precipitation are the months of January through April. Thunderstorms are most frequent in the months of March through July.

In consideration of all the above, but with special emphasis placed on warm temperatures and the highest percent of sunshine, it is suggested that the primary season for outdoor recreation in most years will be the period from April 1st to October 31st. Thunderstorm events and other periods of heavy precipitation will be the principal limiting factor during the 214-day recreation season, with occasional temperatures of 32 degrees or less in early April or late October being a limiting factor of secondary importance.

3.5 HYDROLOGY

3.5.1 SURFACE WATER

The Little South Fork is a tributary of the Big South Fork Cumberland River, entering the Big South Fork south of General Burnside Island State Park at Big South Fork mile 26. The mainstem of the Little South Fork is 42 miles long, and drains a total watershed area of 115 square miles. The watershed of the Wild River segment of the stream is 113 square miles in extent and is roughly rectangular in outline with a long axis of 21 miles, a maximum width of 7.5 miles, and an average width of approximately five miles (see Figure 9). Approximately 65% of the watershed is forested, with some agricultural activities on gentle slopes and on the floodplain, where a floodplain exists. An extensive, recent strip mine is located along Lick Creek which enters Little South Fork at Ritner, Kentucky. Small timber removal operations occur in the watershed and numerous oil wells are indicated on topographic maps of the area (Harker et al. 1979). Abandoned wells, pipelines, and possible seeps contribute continuous pollution to the Little South Fork, especial-



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Little South Fork Wild River

Figure Number 9

Little South Fork Drainage Basin

ly upstream of the Wild River segment near Mt. Pisgah and Coopersville. Recent drillings and re-opening of old wells may also be a contributing factor. Field observations by Kentucky Nature Preserves Commission personnel indicate that activity in the oilfields of the region is on the increase, and thus, the potential for further contamination is high (Harker et al. 1980).

A relatively small number of first, second and third order tributaries enter the Wild River segment of the Little South Fork. The Little South Fork is, itself, a fourth order stream. The Wild River and some of its tributaries are perennial streams. The average gradient of the perennial tributaries is 76 feet per mile and ranges between 46 and 100 feet per mile.

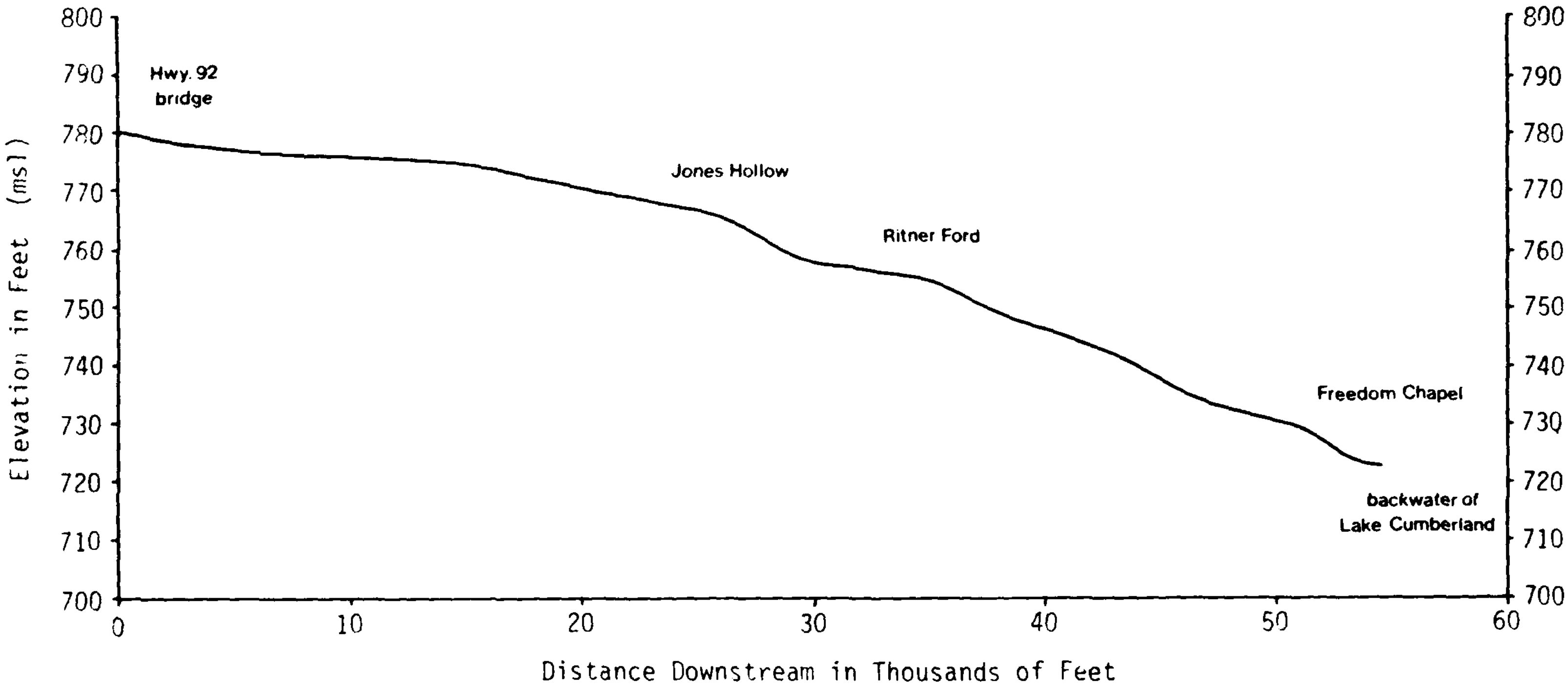
The gradient of the mainstem of the Little South Fork itself is 3.8 feet per mile in the upper half (between the KY Hwy 92 Bridge and Ritner), and 6.7 feet per mile in the downstream segment between Ritner and Freedom Church. The average gradient is 5.3 feet per mile. The gradient of the mainstem of the stream is graphically depicted on the modified thalweg shown in Figure 10. The average width of the stream is 30 to 35 feet in the upstream half of the study area, widening to an average of approximately 55 or 60 feet towards the downstream end. Under normal flow conditions, depth ranges from only a few inches in riffles to over four feet in pools.

There are no permanent, continuously operating water quality or discharge monitoring stations on the Little South Fork. The United States Geological Survey has partial records of low-flow discharge measurements collected at mile 27.6, thirteen miles upstream of the Wild River segment near Griffin, Kentucky from 1975 to the present. The low-flow discharge measurements collected at this station are presented in the following table:

TABLE 10
LOW-FLOW DISCHARGE MEASUREMENTS AT THE
GRIFFIN, KENTUCKY PARTIAL RECORD STATION
1975 - 1979

DATE	LOW FLOW DISCHARGE (Cubic Feet Per Second)
July 22, 1975	4.48
November 5, 1975	18.80
April 8, 1976	78.10
August 19, 1976	5.65
July 5, 1977	11.90
August 23, 1977	9.31
September 1, 1977	7.43
June 20, 1978	17.30
September 9, 1979	11.30

SOURCE: USGS Water Data Reports KY-75-1 through KY-79-1



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Environmental Inventory
Little South Fork Wild River
Figure Number 10
Modified Thalweg,
Little South Fork Wild River

The watershed upstream of the partial record station at Griffin, Kentucky encompasses an area of 56.4 square miles.

The watersheds of tributaries that enter the study segment of the Little South Fork total approximately 17.7 square miles; 8.6 square miles of this total is in Wayne County and the remaining 9.1 square miles is in McCreary County.

A total of 10 perennial tributaries enter the segment of Little South Fork between the Kentucky Highway 92 Bridge and Freedom Chapel, based upon the 7.5-minute topographic quadrangle maps published by the USGS. Five of these enter the stream from the west side or Wayne County side, and the remaining five enter from the east or McCreary County side of the stream. Only three of these perennial tributaries are of sufficient size and local importance to bear names. They are: Corder Creek, Baker Branch and Lick Creek. Both Baker Branch and Lick Creek are on the Wayne County (west) side of the stream; Corder Creek is on the east or McCreary County side of the stream.

Intermittent streams that enter the Wild River were also counted, and a ratio of intermittent to perennial streams was calculated as a measure of the relative importance of surface runoff to flow in the mainstem of the Wild River segment. The number of intermittent streams was obtained from a combination of five sources: USGS 7.5 minute topographic maps; tographic maps at a scale of 1"=400'; color aerial photographs at a scale of 1"=2000'; black and white aerial photographs at 1"=1000'; and from a partial field reconnaissance. A total of 14 intermittent streams were found to enter the mainstem of the Wild River; nine from the west (Wayne County), and five from the east (McCreary County). The intermittent/ perennial stream ratio is 14/10, or 1.4, indicating that the contribution of surface runoff to the flow conditions in the stream is only slightly greater than groundwater recharge. The ratio for the west side of the stream is 9/5 = 1.9, and for the east side it is 5/5 = 1. The difference in the ratios for the two sides of the river is perhaps explained by the slightly larger drainage area on the McCreary County side of the stream, and the greater percentage of forest land on the McCreary County side. A larger drainage area results in greater amounts of water stored in the soil and in bedrock formations beneath the soil after rainfall events. The stored water is then slowly released to the streams in the vicinity resulting in stream flow even during periods of no precipitation. If the groundwater storage is large enough, the streams fed by it are perennial.

More of the land surface in watersheds of tributaries on the west (Wayne County) side of the stream has been cleared for agricultural use or for surface mining than on the east (McCreary County) side. Runoff from agricultural land is generally greater than from a comparable forested area (Marsh 1978). This is because trees are most efficient at both breaking the force of the falling rain, and reducing the amount that reaches the surface of the ground. Surface mining involves the removal of soil and weathered rock (overburden), as well as the removal of the coal, usually down to a layer of shale that often underlies the coal.

This has the effect of greatly reducing the groundwater storage capacity of the land surface, and sharply increases the quantity of surface run-off.

The chemical, physical, and biological characteristics of the stream were surveyed at several locations in August and October of 1968 by the Kentucky Department of Fish and Wildlife Resources, Fisheries Division. Spot water quality sampling performed in the field at that time indicated the water to be very clear, with pH ranging from 7.3 to 7.5, a dissolved oxygen concentration of 6.8 to 8.4 parts per million (ppm), and a total alkalinity ranging from 125 to 180 ppm. Secchi disk measurements of the clarity of the water showed the water to be clear to a depth of 48 inches. The Fisheries Division report described Little South Fork at that time as being one of the highest water quality streams in the upper Cumberland River drainage area. There was a diverse fish fauna, a variety of submerged and emergent aquatic vascular plants, and pollution intolerant aquatic invertebrates including mayflies (Carter and Jones 1969).

The most recent water quality investigations prior to this inventory were conducted by the Kentucky Nature Preserves Commission in 1978 and 1979 as part of an Aquatic Biota and Water Quality Survey of the Appalachian Province, Eastern Kentucky (Harker et al. 1979), and a similar Aquatic Biota and Water Quality Survey of the Upper Cumberland River Basin (Harker, et al. 1980) The Nature Preserves Commission surveyed the stream at several points upstream from the Wild River segment and also at Ritner, Kentucky, which is within the Wild River corridor. Tabulations of specific water quality values collected by Harker, et al. (1979 and 1980) are presented in Table 11.

At an upstream location, at the Kentucky Highway 167 bridge one mile southeast of Mt. Pisgah, Kentucky which has been a quarterly sampling station since 1978, the Nature Preserves Commission found chemical water quality values for specific conductance, calcium, bicarbonate, sodium and sulfate ions that were similar to streams in the Cumberland River drainage that have been impacted by surface mining. However, the Commission noted that elevated values for alkalinity, calcium and bicarbonate may be natural in origin -- a consequence of the limestone bedrock underlying the region. The chloride ion concentration in this section of Little South Fork was one of the highest encountered by the Commission in the Cumberland River basin, and according to the Commission, may be the result of brine from oil wells in the watershed. Despite the high concentrations of certain chemical parameters, this segment of the river supported a moderately speciose flora and fauna. While the algal flora was not especially diverse, there was a diverse macroinvertebrate fauna (Harker et al. 1979).

TABLE 11

PHYSICAL AND CHEMICAL WATER QUALITY PARAMETERS
AT THREE STATIONS ON THE LITTLE SOUTH FORK CUMBERLAND
RIVER IN JUNE AND SEPTEMBER 1978 AND JULY 1979

PHYSICAL PARAMETERS
MEASURED AT
RITNER FORD *

PARAMETER		June 7, 1978	Sept. 20, 1978
Air Temperature (°C)		24	26
Water Temperature (°C)		21	24
Width - Range (m)	Pool	15-30	5-25
	Riffle	5-10	2-7
Depth - Range (m)	Pool	0.6-2.0	0-6-2.0
	Riffle	0.2-0.5	0.15-0.5
Velocity (m/s)	Rifle	0.984	0.413
Depth (m)		0.35	0.33
Width (m)		7.5	4.5
Discharge (Volume) (m^3/s)		2.580	0.613
Turbidity (NTU)		16.0	3.5
Suspended Solids (mg/1)		ND	2.5
Conductivity (umhos)		429	524
Dissolved Oxygen (mg/1)		8.3	8.0

* Source: Harker, et al. (1979); Site KC01WAY, in the Wild River study area at mile 7.8.

TABLE 11
(continued)
CHEMICAL PARAMETERS
MEASURED AT
RITNER FORD *

PARAMETER (mg/1)	June 7, 1978	Sept. 20, 1978	PARAMETER (mg/1)	June 7, 1978	Sept. 20, 1979
Alkalinity			K	2.52	1.93
(mg/1 $CaCO_3$)	ND	171	Ti	0.15	0.00
Cl	33.8	39.7	Cr	0.11	0.01
SO_4	37.6	59.5	Pb	0.05	0.09
NO_3	1.6	0.2	Ge	0.00	0.00
B	0.04	0.02	Cd	0.02	0.01
Si	0.97	1.69	Se	0.08	0.00
Hg	0.07	0.00	As	0.99	0.19
Zn	0.29	0.03	Be	0.00	0.00
P	0.00	0.06	Sn	0.14	0.02
Fe	0.12	0.23	Mo	0.01	0.00
Cu	0.00	0.00	Ag	0.00	0.00
Mn	0.10	0.08	Li	0.30	0.23
Mg	8.15	9.07	Ba	0.03	0.05
Na	14.60	29.26	Sr	0.48	0.89
Co	0.04	0.00	V	0.00	0.00
Al	0.14	0.41	Anion/Cation		
Ni	0.01	0.01	Ratio	1.04	0.82
Ca	49.61	74.25	Ph	8.2	7.6

* Source: Harker; et al. (1979); Site KC01WAY, in the Wild River study area at mile 7.8.

TABLE 11

(continued)

PHYSICAL PARAMETERS

MEASURED AT BRIDGE ON

KY 167 NEAR

MT. PISGAH, KENTUCKY *

PARAMETER		June 8, 1978	Sept. 21, 1978
Air Temperature (°C)		20	22
Water Temperature (°C)		16	21
Width Range (m)	Pool	10-12	4-7
	Riffle	3-8	1-3
Depth - Range (m)	Pool	0.15-1.0	0.15-1.0
	Riffle	0.75-0.3	0.75-0.15
Velocity (m/s)	Riffle	0.669	0.612
Depth (m)		0.25	0.15
Width (m)		4	3
Discharge (Volume) (m^3/s)		0.669	0.275
Turbidity (NTU)		18.0	0.8
Suspended Solids (mg/1)		ND	5.0
Conductivty (umhos)		479	859
Dissolved Oxygen (mg/1)		8.5	8.6

* Source: Harker et al. (1979); Site KC02WAY, upstream of the Wild River stream segment.

TABLE 11

(continued)

CHEMICAL PARAMETERS

MEASURED AT BRIDGE ON

KY 167 NEAR

MT. PISGAH, KENTUCKY *

PARAMETER (mg/l)	June 7, 1978	Sept. 20, 1978	PARAMETER (mg/l)	June 7, 1978	Sept. 20, 1979
Alkalinity			K	1.80	2.34
(mg/l $CaCO_3$)	ND	188	Ti	0.08	0.01
Cl	26.2	62.8	Cr	0.07	0.02
SO_4	78.0	225.0	Pb	0.02	0.18
NO_3	1.0	0.4	Ge	0.01	0.00
B	0.02	0.05	Cd	0.03	0.01
Si	2.71	2.91	Se	0.00	0.00
Hg	0.02	0.00	As	0.20	0.22
Zn	0.04	0.03	Be	0.00	0.00
P	0.00	0.03	Sn	0.08	0.02
Fe	0.10	0.09	Mo	0.00	0.02
Cu	0.00	0.00	Ag	0.00	0.00
Mn	0.03	0.10	Li	0.22	0.40
Mg	9.69	10.40	Ba	0.04	0.06
Na	18.60	53.35	Sr	1.13	2.19
Co	0.03	0.00	V	0.01	0.01
Al	0.16	0.42	Anion/Cation		
Ni	0.00	0.01	Ratio	0.88	1.01
Ca	75.13	118.80	Ph	8.4	7.4

* Source: Harker; et al. (1979); Site KC02WAY, in the Wild River study area at mile 7.8.

TABLE 11
(continued)
PHYSICAL PARAMETERS
MEASURED AT BRIDGE ON PRIVATE ROAD
OFF MT. PISGAH-PARMLEYSVILLE ROAD **

PARAMETER		July 10, 1979
Air Temperature (°C)		21
Water Temperature (°C)		15.5
Width - Range (m)	Pool	12-15
	Riffle	10-15
Depth - Range (m)	Pool	0.45-1.3
	Riffle	0.15-0.45
Velocity (m/s)	Riffle	0.[illegible]
Depth (m)		[illegible]
Width (m)		14[illegible]
Discharge (Volume) (m^3/s)		[illegible]
Turbidity (NTU)		15
Relative Sediment Index		3
Conductivity (umhos)		261 *(341.0)
Dissolved Oxygen (mg/1)		9

* Laboratory measurement

** Source: Harker, et al. (1980); Site KC03WAY.

TABLE 11
(continued)
CHEMICAL PARAMETERS
MEASURED AT BRIDGE ON PRIVATE ROAD
OFF MT. PISGAH-PARMLEYSVILLE ROAD **

PARAMETER (mg/l)	July 10, 1979	PARAMETER (9mg/l)	July 10, 1979
Cl	8.1	Pb	0.05
SO_4	28.5	Ge	0.02
NO_3	0.4	Cd	0.07
B	0.01	Se	0.30
Si	2.79	As	0.59
Hg	0.00	Be	0.00
Zn	0.01	Sn	0.25
Fe	0.18	Mo	0.05
Cu	0.00	Ag	0.00
Mn	0.02	Li	0.37
Mg	6.01	Ba	0.02
Na	10.30	Sr	0.28
Co	0.00	V	0.03
Al	0.22	Total Acidity ($mg/l\ CaCO_3$)	ND
Ni	0.05	Total Alkalinity ($mg/l\ CaCO_3$)	151.8 *(140)
Ca	54.67		
K	1.14	Total Hardness ($mg/l\ CaCO_3$)	ND *(200)
Ti	0.03		
Cr	0.00	Anion/Cation Ratio	0.89
		Ph	8.4 *(8.0)

* Field measurement

** Source: Harker, et al. (1980); Site KC03WAY

At the sampling location in the Wild River corridor at Ritner, the Commission found no indication of any obvious water quality impacts. Alkalinity, calcium, magnesium and bicarbonate were again elevated, but this was an expected phenomenon considering the location in a limestone region. Chloride ion concentrations were elevated at this station also, and again, the numerous oil wells in the drainage may be responsible. The algal flora at this location was moderately diverse, and so also were the macroinvertebrate and fish faunas. Additional information on water quality is presented in the Aquatic Biology section of this report.

The Wild River segment of Little South Fork, together with the other streams in the Wild Rivers system, are classified as "outstanding resource waters" under the terms of the State Water Quality Standards issued December 5, 1979. 401 KAR 5:029, Section 2 of the new water quality regulations is a non-degradation section that provides for the protection of existing water quality in outstanding resource waters; that is, introduction of specific pollutants exceeding legitimate beneficial uses of these waters is forbidden. Existing water quality conditions must be maintained or enhanced. The new regulations are to be implemented and enforced through the system of permits regulating point source discharges in the waters of the Commonwealth. In addition, non-point sources also come under regulation where they will affect outstanding resource waters.

Criteria establishing "legitimate beneficial uses" of outstanding resource waters have yet to be developed. In the interim, criteria for aquatic life and recreational waters are applicable to Little South Fork.

3.5.2 GROUNDWATER

The availability of groundwater in southeastern Kentucky has been investigated by Kilburn, Price and Mull (1962) and by Lambert and Brown (1963). Maps of groundwater availability produced by these investigators indicate that, in the Wild River study area, most drilled wells in the Mississipian-aged Monteagle Limestone are adequate for domestic supply with a power pump and yield more than 500 gallons per day (gpd). Adequate wells are drilled as deep as 200 feet below the ground surface. Wells that happen to penetrate large solution channels in the Mississippian limestone aquifer sometimes yield more than five gallons per minute (gpm). Nearly all drilled wells yield more than 100 gpd, making them adequate for a domestic supply (Lambert and Brown 1963).

Most dug wells in which the water level is close to perennial stream level yield more than 100 gpd and are adequate for a domestic supply with bailer or bucket, and a few are adequate for a domestic supply with a power pump.

Wells on ridgetops and steep hillsides yield smaller quantities of water (Kilburn, Price and Mull 1962). Only about half of the drilled wells on ridgetops and hillsides in the Pennington Formation yield enough water for a domestic supply (more than 100 gpd), and very few dug wells in these locations yield enough water for a domestic supply. Most wells in the Pennsylvanian strata on ridgetops, whether drilled or dug, are inadequate for a domestic supply, generally yielding less than 100 gpd.

Water from most wells drilled in this region of Kentucky is hard and contains noticeable amounts of iron (Kilburn, Price and Mull 1962).

Small springs discharge from perched water bodies at several horizons in the Missippian limestones of the area. Most springs have flows of less than five gallons per minute and are generally inadequate for domestic use (Lambert and Brown 1963).

Likewise, springs of low yield are common at the base of the Pennsylvanian sandstone strata and along horizons of coal beds in the Pennsylvanian strata. Springs emanating from coal horizons commonly contain undesirable amounts of sulfur (Smith 1976).

3.6 GEOMORPHOLOGY

3.6.1 INTRODUCTION

Geomorphology can be defined as the description and interpretation of land forms. It is approximately equivalent to physical geography and embraces elements of geology, geography, physiography, climatology and hydrology. Some of the landscape features and geologic or hydrologic phenomena mentioned in preceding sections of this report will be further discussed below.

3.6.2 FEATURES

3.6.2.1 The River Valley

The dominant landform in the study area is the valley through which the river flows. Five factors are of utmost importance in the formation of a river valley. These factors are:

1) the composition and orientation of the bedrock underlying the valley;
2) elevation above mean sea level;
3) the discharge rate or flow volume of the stream;
4) the climate, and
5) time.

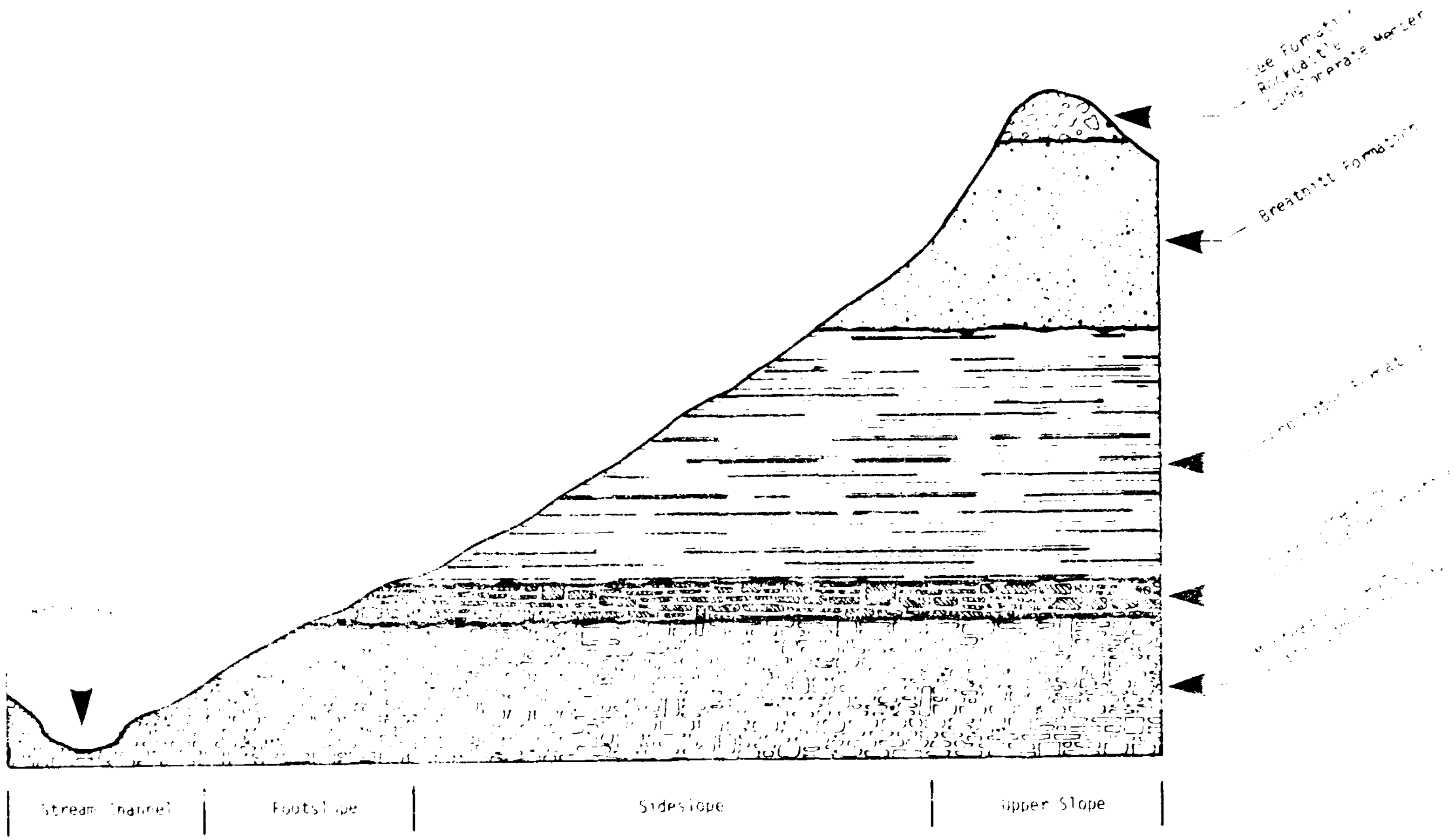
The composition and orientation of the bedrock underlying the stream, the elevation above mean sea level and the climate were discussed in previous sections of this report. Discharge rate or flow volume is not well documented since there is no continuously operating gauging station on the Little South Fork. Flow volume data, to the present, are limited to instantaneous flow measurements made at irregular intervals. The time of development of the Little South Fork valley is not precisely known, but may have begun with uplift in the Middle Tertiary, approximately 40 million years ago.

According to McFarlan (1958), Kentucky was a near-peneplain in the Early Tertiary (approximately 60 million years ago). An incipient Cumberland River was present even then, and had developed a course following the natural slope of the land, but because the land was a low plain, the stream was slow and not actively eroding away the bedrock. Then, in Mid-Tertiary, the land was uplifted and the stream rejuvenated. Active erosion began. This new cycle of erosion may have signalled the origin of the valley of the Little South Fork.

The slope of the valley is influenced more by the type of rock underlying it than any other single factor. In its position on the eastern edge of the Mississippian Plateau, the Little South Fork is underlain predominantly by Mississippian-aged limestones and shale (Lewis and Taylor 1976, Smith 1976). These strata erode more readily than some of the Pennsylvanian sandstone strata on the Cumberland Plateau to the east; notably, the Rockcastle Conglomerate Member of the Breathitt and Lee Formations is especially resistant to erosion and has formed such regionally significant features as Cumberland Falls, and the spectacular cliffs and rockshelters of the Rockcastle River. These Pennsylvanian strata, however, are located at elevations that place them barely within the limits of the study area, or more often, well beyond the study area boundary. Most of the upper slopes in the study area are underlain, instead, by the Mississippian-aged Pennington Formation, which is composed primarily of clay shale, with some limestone, sandstone and siltstone. Shale formations have a tendency to break up into small fragments that are easily removed by the process of erosion. Thus, slopes underlain by shale often have a low slope angle. The relationship, in cross section, of the different rock strata underlying the study area is graphically depicted on Figures 11 and 12.

The Pennington Formation is subject to landsliding when the natural slope is disturbed or when water-saturated. As a consequence, most slopes underlain by the Pennington Formation have a hummocky surface. The erodibility of the Pennington Formation, and the scarcity or absence of the Rockcastle Conglomerate Member within the study area explains the near-absence of a gorge-like line of cliffs along the higher elevations of the study segment of the Little South Fork. Such a cliffline is characteristic of the Big South Fork, however, where the Rockcastle Conglomerate is more prevalent.

The Bangor Limestone, which underlies lower sideslopes in the study area, forms a line of low cliffs at several locations. The Bangor Limestone is typically no more than 20 to 40 feet thick, and consequently, these limestone cliffs seldom exceed 30 feet in height and are sometimes no more than 10 or 20 feet high. Usually, the base of this cliffline is within 100 to 150 feet of the banks of the Little South Fork.



Environmental Inventory
Little South Fork Wild River
Figure Number 11
Idealized Geologic Cross Section, Upper Section of the Wild River

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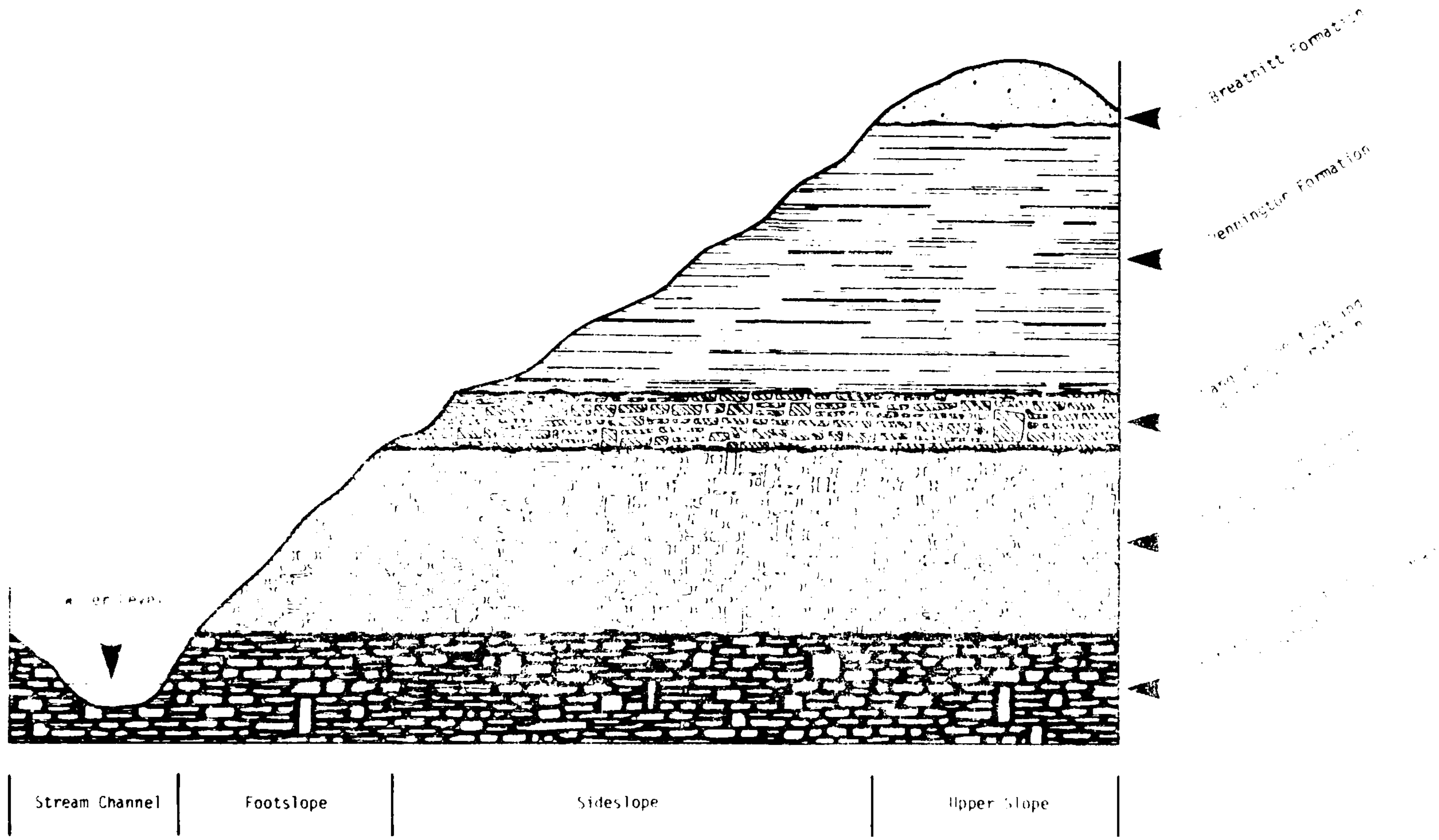
MILLER WIHRY LEE INC
COASTAL ZONE RESOURCES DIVISION



Environmental Inventory
Little South Fork Wild River

Figure Number 12

Idealized Geologic Cross Section, Lower Section of the Wild River

MILLICAN ASSOCIATES

MILLER WIHRY LEE INC

COASTAL ZONE RESOURCES DIVISION

These low cliffs form because the underlying Hartselle Formation is in very thin beds, and is clayey and plastic when wet. The Hartselle Formation, which is only four to 12 feet thick, has fallen away from the Bangor Limestone through erosion and slumping, leaving behind the aforementioned line of low cliffs. The basal contact between the Hartselle Formation and the underlying Monteagle Limestone is typically marked by the presence of a narrow bench.

The Kidder Limestone Member of the Monteagle Limestone is well-exposed in the study area in road cuts, as for example, at the Highway 92 bridge, at various points along the upper segment of the stream, and in a few pastures in the upper half of the study area corridor. The underlying Ste. Genevieve Limestone Member commonly forms ledges in slopes in the lower half of the study area, and is exposed in a few low pastures and footslopes where it sometimes forms yellowish-gray to chalky-white, smooth, rounded surfaces. Beginning just downstream of Ritner there are riffles in the stream that approach Class II on the International Scale of River Difficulty (Sehlinger 1978). The riffles represent locations where abrupt changes in the gradient of the bedrock (the Ste. Genevieve Limestone Member) occur. Near Freedom Chapel, the Ste. Genevieve Limestone and the Kidder Limestone form gorge-like cliffs along both sides of the stream.

Jointing is not common in the study area, and the orientation of joint sets was not reported on the geologic quadrangles of the area prepared by Lewis and Taylor (1976) or Smith (1976). Joint orientations observed in the field by the consultant most commonly included 110° and 45°. Some linear segments of the stream correspond approximately with these joint orientations, but whether the degree of correspondence is indeed the result of an interrelationship with jointing could not be established. The common joint orientations observed in the field approximate the orientation of the crestline and plunge of the Ritner Anticline.

3.6.2.2 Caves

No true caves were discovered in the study area during the course of this inventory. The National Speleological Society's (NSS) criteria for caves were utilized to determine whether subsurface geologic structures observed in the study area should or should not be classified as caves. To be classified as a cave, according to the NSS criteria, a subsurface structure must meet one of the following:

1) It must be at least 50 feet in length;
2) contain areas having no observable daylight;
3) be over 50 feet in length; or
4) contain true cave fauna.

While the field investigations conducted for archaeological sites, terrestrial habitats, geologic features and other elements of the natural environment were thorough, it is possible that some caves and cave-like features are present in the study area which were not discovered in this inventory. However, it is unlikely that such undiscovered features are very numerous.

The term "rock hollows" will be used in this section to describe features observed in the study area that, while not strictly meeting the criteria for classification as caves, are cave-like in appearance. Five rock hollows were discovered in the course of this inventory. Their locations are mapped on Map Set E, Special Features.

All of the rock hollows are in bluffs and hollows where the Kidder Limestone Member of the Monteagle Limestone is exposed. Three of the five rock hollows are on the Wayne County side of the river; the other two are in McCreary County. The rock hollows range in size from approximately three feet tall by seven feet wide by only a few feet in horizontal penetration to one measuring approximately eight feet high by 20 feet wide by approximately 45 feet in horizontal penetration. The rock hollows are associated with springs issuing from the limestone and flowing across the floor of the rock hollow. They are, therefore, solution features.

Springs not associated with cliff-like features were noted during the field reconnaissance also, and they, along with waterfalls and the aforementioned rock hollows, are mapped on Map Set E, Special Features.

Other solution features occurring in the study area include sink-holes. The largest of these are depicted on the Coopersville 7.5-minute geologic and topographic quadrangles. They are clustered in a karst landscape on the Wayne County side of the river just south of Ritner. Small sinkholes generally too small to be depicted on maps, are relatively common in the study area.

3.6.2.3 Rockshelters

Rockshelters are also known as overhangs. They are distinguished from rock hollows by their limited depth of penetration. A feature is a rockshelter if either its height or width exceeds its horizontal depth of penetration of the bluff face. Most of the rockshelters in the LIttle South Fork study area have a very shallow depth of penetration; they are usually just sufficient for perhaps two or three people to sit in.

A total of 22 rockshelters were discovered in the course of this inventory, and while the ground reconnaissance was thorough, it is possible that there are other rockshelters which were not discovered. Most of the rockshelters are on the Wayne County side of the river, and are usually associated with bluffs formed in the Kidder Member of the Monteagle Limestone. However, at the upstream end of the study area, four rockshelters in a sandstone of the Pennington Formation were discovered at elevations near the limits of the study area boundary. Some rockshelters were in the Bangor Limestone and Hartselle Formation, and in the downstream half of the study area, one or two shelters were in the Ste. Genevieve Limestone Member of the Monteagle Limestone.

The rockshelters in the study area have been formed at the interface of a limestone or sandstone stratum with siltstone or shale. The latter strata weather away more quickly and leave a vertical section of limestone or siltstone exposed. Then, the action of the wind and water (especially water) erodes the exposed rock face. Frost-heave accomplished by water in horizontal fissures parallel with the plane of bedding in the limestone or sandstone strata, and the force of gravity, also play a part in the formation of the rockshelters.

The locations of rockshelters in the study area are mapped in Map Set F, Special Features.

3.7 SOILS

3.7.1 INTRODUCTION

The principal source of information for this section of the report was the Soil Survey of the McCreary-Whitley Area (Byrne et al. 1970). The soils of Wayne County are in the process of being surveyed at this time, with the survey focusing initially around Lake Cumberland. However, the published soils report will not be available for several years (Soil Conservation Service, personal communication). However, the soil scientist engaged in the mapping of soils in Wayne County made, at the request of the consultant, an initial reconnaissance of the Little South Fork Wild River study area. The field sheets from this reconnaissance were then made available to the consultant with the understanding that these findings were preliminary, and some of the soil series designations on the field sheets may undergo change before the Wayne County Soil Survey (Fehr and Richardson, in progress) report is published.

The soils information presented in this environmental inventory is sufficient for general planning purposes, and may serve as a guide for farmers, foresters, wildlife managers, engineers and planners in selecting the soil types that are most suited to the intended use, and in understanding the problems and limitations associated with the soils of the area. The level of detail presented, however, is not sufficient to supplant detailed on-site soils investigations necessary for certain uses, as for example, engineering testing prior to road or building construction. For more detailed, site-specific soils information, assistance should be obtained from the State Soil Scientist, Soil Conservation Service, Lexington, Kentucky or a geotechnical consulting firm.

The study area lies at the boundary between the Mississippian Plateau and Cumberland Plateau Physiographic Provinces and is underlain principally by Mississippian limestone except at the highest elevations where Pennsylvanian sandstone and shale formmations predominate. Incisement by the Little South Fork and its tributaries has created a moderately deep, moderately steep-walled valley with soils developed in deep, acid colluvium. Colluvium is soil material, rock fragments, or both, moved by creep, slide or local wash and deposited at the base of steep slopes (Bryne et al. 1970).

The approximate location and areal extent of the soils of the study area is graphically depicted in the Map Folio, Map Set B, Soils. Each map unit is designated by a symbol keyed to the alphabetized list of symbols in the Map Folio Legend Sheet and to the tables of information included in the text which follows.

3.7.2 OVERVIEW OF THE SOILS

Soils in the Little South Fork Wild River study area are in the Tate-Shelocta Association (Byrne et al. 1970). An association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils for which it is named, and at least one minor soil. The soils in one association may occur in another, but in a different pattern.

The Tate-Shelocta Association consists of deep, well-drained, sloping to steep soils on benches and sideslopes underlain by calcareous shale and limestone. In most places scattered stones and boulders cover from three to 20 percent of the surface. The Tate and Shelocta soils together comprise about 65 percent of this association, and minor soils the remainder (Byrne et al. 1970). The Tate and Shelocta soils are strongly acid to medium acid. They developed in deep acid colluvium. The Tate soils are generally above the Shelocta soils and have a clay loam subsoil. The subsoil of the Shelocta soils is generally silty clay loam. Tate soils typically occur on side slopes that have a sandstone cliff at or near the upper part, but they also occur on stream terraces. Shelocta soils generally occur on side slopes. Minor soils in this association include the neutral Colbert, mostly on the higher lying benches, the DeKalb on ridgetops, the Huntington on floodplains, the very strongly acid Muse soils on the upper side slopes, the medium acid Talbott soils in the lower bench positions, and the very strongly acid Trappist soils on ridgetops and side slopes. A more detailed description of the soils of the study area is presented in the next section of this report.

3.7.3 DESCRIPTIONS OF THE SOILS

The following text is paraphrased from Byrne et al. (1970) and Fehr and Richardson (in progress) and describes the soil series and mapping units of the Little South Fork study area. A description of each soil series is given, followed by brief descriptions of the mapping units in that series. It is necessary to read both the description of the soil series and the mapping unit in order to obtain a full understanding of a particular soil. The discussion of each soil series includes a brief, non-technical description of the soil profile, the sequence of layers beginning at the surface and continuing downward to the depth beyond which the roots of most plants do not penetrate. The soil profile is an essential part of the description of any given soil series.

3.7.3.1 Caneyville Series

The Caneyville Series consists of moderately deep, well drained soils on sideslopes and ridgetops. Limestone outcrops cover about five to 10 percent of the ground surface.

Typically, the surface layer is brown, friable silt loam about eight inches thick. The subsoil extends to a depth of about 23 inches and is yellowish-brown, firm silty clay loam in the upper part and yellowish-red, very firm silty clay in the lower part. The substratum is soft siltstone and shale fragments to a depth of about 30 inches. Below this is gray limestone.

Caneyville soils have moderately slow permeability and moderate available water capacity. The root zone is moderately deep and the organic matter content is low. They are somewhat difficult to till because of the rock outcrops. Reaction is very strongly acid to medium acid in the upper part of the soil and medium acid to mildly alkaline in the lower part. Runoff is medium. The seasonal high water table is more than six feet below the surface. Depth to bedrock is 20 to 40 inches and shrink-swell potential is moderate.

Caneyville silt loam, very rocky, 6 to 12 percent slopes (CaC)

This moderately deep, well drained, sloping soil is on sideslopes and ridgetops. Limestone outcrops cover about five to 10 percent of the surface. This soil was represented as soil 17C on the field sheets provided by the Soil Conservation Service.

Included with this soil in mapping are small areas of Frederick soils, and some small areas that are deeper than 40 inches to bedrock.

After the name of each soil series in the text that follows there is a symbol in parentheses. The symbol identifies the map unit as depicted on Map Set B, Soils.

At the end of the description of each mapping unit, the woodland suitability group to which the unit is assigned is given. The woodland suitability group description is keyed to the information in Table 12, Woodland Interpretations by Woodland Suitability Groups.

Most of the acreage of this Caneyville soil is used for hay and pasture; a few areas are in cultivated crops and woodland.

This soil is not suited to cultivated crops; it is moderately well suited to all hay and pasture plants that are commonly grown in the County. Overgrazing or grazing when the soil is too wet will cause compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain grassland and soil tilth.

This soil has severe limitations for nearly all urban uses because of depth to bedrock and moderately slow permeability.

This soil is moderately well suited to trees. Equipment limitation, seedling mortality rate, and plant competition is moderate. There are no other significant limitations for woodland use or management. Woodland suitability group 5.

Caneyville silt loam, very rocky, 12 to 20 percent slopes (CaD)

This moderately deep, well drained moderately steep soil is on sideslopes and ridgetops. Limestone outcrops cover about 5 to 10 percent of the surface.

This soil was mapped as soil 17D on the field sheets provided by the Soil Conservation Service. Included with this soil in mapping are small areas of Frederick soils, some small areas that are deeper than 40 inches to bedrock, and a few areas with more than 20 percent slopes.

Most of the acreage of this Caneyville soil is used for hay and pasture; a few areas are in cultivated crops and woodland.

This soil is not suited to cultivated crops because of steepness of slope, depth to bedrock and rock outcrops.

This soil is moderately well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain grasslands and soil tilth.

This soil has severe limitations for nearly all urban uses because of depth to bedrock, moderately slow permeability and steepness of slope.

This soil is moderately well suited to trees. Erosion hazard and equipment limitation are severe, and seedling mortality rate is moderate. There are no other significant limitations for woodland use or management. Woodland suitability group 5.

3.7.3.2 Clymer Series

The Clymer series consists of moderately deep to deep, well-drained soils on slightly convex ridgetops and broad, rolling flats. They formed in material that weathered from sandstone.

In a typical profile, the surface layer is about 11 inches thick. It is dark grayish-brown fine sandy loam in the upper part and light yellowish-brown sandy loam in the lower part. The subsoil is yellowish-brown loam in the upper part and strong-brown clay loam and sandy clay loam in the lower part. Sandstone bedrock is at a depth of about 37 inches.

The Clymer soils are very strongly acid and have moderately low natural fertility. Permeability is moderate. These soils can be tilled throughout a wide range of moisture content. They have moderate to high available moisture capacity.

Most areas of these soils are farmed or pastured, but the smaller, rougher areas are forested, primarily with shortleaf pine. Small areas of the Clymer soils were included with the DeKalb series in mapping. Except for these inclusions, the Clymer soils do not occur in the Little South Fork study area.

3.7.3.3 Colbert Series

The Colbert series consists of moderately deep to deep, well-drained soils occupying wide, convex benches on hillsides and moderately wide ridgetops. They formed in material that weathered from multicolored, calcareous clay shale.

In a typical profile, the surface layer is very dark grayish-brown silty clay loam about three inches thick. The subsoil extends to a depth of about 20 inches. It is yellowish-brown clay in the upper part and light olive-brown clay in the lower part. The underlying material is grayish-brown and olive-gray silty clay. Calcareous shale is at a depth of about 38 inches.

The Colbert soils are neutral and have moderate natural fertility. Because the subsoil is plastic clay, permeability is slow and root growth is restricted. During normally dry periods in the growing season, droughtiness restricts plant growth.

Colbert silty clay loam, 6 to 20 percent slopes (CoD)

This soil has the profile described as typical for the Colbert series.

Small areas of Rock land and of Talbott, Tate, Shelocta, and Muse soils were included with this soil in mapping. Also included were small areas of soil that developed in maroon-colored material from the underlying shale and that is similar to this soil but is much redder, and also a few moderately steep and steep areas on hillsides.

This soil is not well suited to row crops, but where slopes are less than 8 percent, it can be cultivated occasionally. Growth of crops generally is poor. Runoff is rapid, and the hazard of erosion is very high. Woodland suitability group 4.

3.7.3.4 Cutshin Series

The Cutshin series consists of deep, well drained soils on steep slopes, benches and coves.

In a typical profile, the surface layer is a friable, dark grayish-brown loam. The subsoil extends to a depth of about 48 inches and is a friable, dark brown loam in the upper part and a friable sandy clay loam in the lower portion.

In the study area, Cutshin soils occur only in an inseparable complex with Shelocta and Muse soils.

3.7.3.5 Dekalb Series

The Dekalb series consists of moderately deep to deep, somewhat excessively drained, sloping to steep soils on backbone-like ridgetops. They formed in residuum that weathered from sandstone.

In a typical profile, the surface layer is friable sandy loam about seven inches thick. It is dark grayish-brown in the upper part and yellowish-brown in the lower part. The subsoil extends to a depth of about 25 inches and consists of about 10 inches of yellowish-brown, friable sandy loam and about eight inches of yellowish-brown to strong brown, friable sandy loam. Sandstone bedrock is at a depth of about 25 inches.

The Dekalb soils are very strongly acid and have low natural fertility and organic matter content. Available moisture capacity is low to moderate, and permeability is moderately rapid. Consequently, plant growth is restricted during short dry periods.

Dekalb fine sandy loam, 6 to 12 percent slopes (DeC)

This soil occupies smooth or slightly convex, narrow ridgetops. Its profile is deeper than the profile described as typical for the Dekalb series, and the surface layer is mainly fine sandy loam.

Small areas of Clymer soils were included with this soil in mapping. Other included soils were the Ramsey on narrow ridgetops and the Muse on the higher elevations and narrow saddles.

Under good management, pasture plants grow well on this soil. Because the hazard of erosion is very high in cultivated areas, this soil is suited to only an occasional row crop. Growth of cultivated crops generally is poor. Woodland suitability group 12.

Dekalb and Ramsey sandy loams, 12 to 20 percent slopes (DrD)

This undifferentiated group of soils occupies narrow ridgetops and the upper part of the side slopes. The soils in this group formed in residuum that weathered from acid sandstone.

Generally, about 60 to 70 percent of this group is the moderately deep, somewhat excessively drained Dekalb soil; about 20 to 30 percent is the shallow, excessively drained Ramsey soil; and the remaining 10 percent is included soils. Some areas are made up of only Dekalb soil, some areas of only Ramsey soil, and some areas of both soils. A profile typical for the Dekalb and Ramsey soils is described under the respective series. Included in mapped areas of this group are small areas of Clymer and Muse soils and outcrops of sandstone.

Except that the Ramsey soil has a thinner root zone and is more drougi ty, the Dekalb and Ramsey soils have similar qualities. Also, added lime and fertilizer are effective for a shorter period on the Ramsey soil.

Under good management, pasture and hay crops grow fairly well on the soils of this group. These soils are not suited to cultivated crops, because of the hazard of erosion and poor growth of crops. Woodland suitability group 12.

3.7.3.6 Elk Series

The Elk series consists of deep, well-drained, nearly level, acid soils. These soils occupy low stream terraces and are occasionally flooded. They formed in deep silty sediment that washed from soils derived from shale and siltstone.

In a typical profile, the surface layer is friable, dark yellowish-brown silt loam about eight inches thick. The subsoil extends to a depth of about 39 inches. It consists of about seven inches of dark yellowish-brown silt loam, about seven inches of strong brown silty clay loam, and about 10 inches of yellowish-brown silty clay loam. Elk soils are strongly acid and have high natural fertility and available moisture capacity. Permeability of the subsoil is moderate. The plow layer is easily tilled throughout a wide range of moisture content.

In the study area, small acreages of Elk soils were included in mapping with soils in the Tate series.

3.7.3.7 Frederick Series

The Frederick series consists of deep, well drained soils on sloping upland sideslopes and convex ridgetops.

Typically, the surface layer is brown, friable silt loam about eight inches thick. The subsoil extends to a depth of more than 65 inches, and is yellowish-red, firm, silty clay in the upper part and yellowish-red, firm clay in the lower part.

This soil has moderate permeability and high available water capacity. The root zone is deep and the organic matter content is moderate. This soil is easily tilled. Reaction is very strongly acid or strongly acid. Runoff is medium. The seasonal high water table is more than six feet below the surface. Depth to bedrock is more than 60 inches, and shrink-swell potential is high.

Frederick silt loam, 6 to 12 percent slopes (FdC)

This deep, well drained soil is on sloping upland sideslopes and convex ridgetops. It was mapped as soil 26C on the field sheets provided by the Soil Conservation Service.

Included with this soil in mapping are small areas of Caneyville soils.

Most of the acreage of this Frederick soil is used for cultivated crops, hay, and pasture; a few .reas are in woodland.

This soil is well suited to corn, soybeans, small grain, and tobacco. The erosion hazard is severe when cultivated and a combination of cropping systems and erosion control practices are needed to slow runoff and to control erosion. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and growing grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain grassland and soil tilth.

This soil has severe limitations for nearly all urban uses because of high shrink-swell potential and steepness of slope. It has moderate limitations for septic tank filter fields because of moderate permeability.

This soil is well suited to trees. The equipment limitation and plant competition are moderate. There are no significant limitations for woodland use or management. Woodland suitability group 6.

3.7.3.8 Grigsby Series

The Grigsby series consists of deep, well drained soils formed in mixed alluvium on floodplains. Permeability is moderate or moderately rapid. Slopes range from 0 to 4 percent.

In a representative profile, the surface layer is a very friable brown loam about seven inches thick. The subsoil extends to a depth of about 60 inches and is a very friable dark yellowish-brown loam. These are well drained soils with moderate or moderately rapid permeability.

Grigsby loam is represented on Map Set B, Soils by the symbol Gr. Grigsby loam was identified on the preliminary Soil Conservation Service field sheets (Fehr and Richardson, in progress) as soil number 2. Woodland suitability group 2.

3.7.3.9 Huntington Series

The Huntington series consists of deep, well-drained, nearly level soils on narrow flood plains along the Little South Fork Cumberland River and its tributaries. They formed in nonacid sediments that washed from soils derived from limestone and calcareous shale.

In a typical profile, the surface layer is friable, dark-brown silt loam about 18 inches thick. The subsoil extends to a depth of about 40 inches. It consists of about 12 inches of friable, dark-brown silt loam and about 10 inches of friable, dark-brown loam. The underlying material is dark-brown sandy loam.

The Huntington soils have a thick, moderately permeable root zone. Their available moisture capacity and natural fertility are high. The organic matter content is adequate for maintaining good tilth, and the plow layer is easily worked without clodding or crusting. Most areas are flooded during winter, but damage to crops from flooding during the growing season is infrequent.

Huntington silt loam, (0 to 4 percent slopes) (Hu)

This soil occupies areas along streams and in depressions around sinkholes.

Included with this soil in mapping were small areas of Tate soils and of a moderately well drained soil that is similar to this soil in texture and origin.

This Huntington soil is suited to intensive use for all row crops commonly grown in the area. Woodland suitability group 2.

3.7.3.10 Muse Series

The Muse series consists of deep, well-drained soils on convex ridgetops, benches, foot slopes, colluvial fans and convex to smooth side slopes throughout the uplands of the area. They formed in residuum that weathered from interbedded acid shale and thin sandstone or in colluvium moved down from soils derived from shale.

In a typical profile, the surface layer consists of about two inches of friable, brown silt loam over about six inches of friable, yellowish-brown silty clay loam. The subsoil extends to a depth of about 46 inches. It is yellowish-brown and strong brown silty clay loam in the upper part and yellowish-red silty clay in the lower part. The underlying material is mottled, yellowish-red silty clay.

The Muse soils have a thick root zone. They are very strongly acid and have moderate natural fertility. Available moisture capacity is high, and permeability is moderately slow.

Muse silt loam, 6 to 12 percent slopes (MeC)

This soil occupies convex ridgetops. Except for a slightly thicker surface layer and fewer coarse fragments, the profile of this soil is similar to the profile described as typical for the Muse series.

Small areas of Wellston, Clymer, and Dekalb soils were included with this soil in mapping. Also included were some eroded areas and some areas that are nearly level.

This soil can be tilled throughout a wide range of moisture content. The organic-matter content is medium. All crops commonly grown in the area are suited, but the hazard of erosion is high in cultivated areas. Woodland suitability group 6.

Muse silt loam, 12 to 20 percent slopes (MeD)

This soil is in the uplands. It has the profile described as typical for the Muse series.

Small areas of Wellston, Dekalb, and Tate soils were included with this soil in mapping. Also included were some eroded areas and some areas that are only moderately sloping.

This soil is suited to most crops commonly grown in the area. Because the hazard of erosion is very high in cultivated areas, this soil is suited to only an occasional row crop, but is well suited to pasture and hay. The organic matter content of the plow layer is medium, and this soil can be tilled throughout a wide range of moisture content. Woodland suitability group 6.

Muse-Trappist silt loams, 20 to 30 percent slopes (MpE)

This complex is on benched, smooth landscapes. About 60 to 70 percent of the complex is Muse soil and about 30 to 40 percent is Trappist and included soils. All of these soils are so intermingled that separating them on a soil map is not practical. The profiles of these soils are similar to the profiles described as typical for the respective series.

Some small areas of Shelocta soils; of deep, dark-colored soils on north-facing slopes; of shallow soils on narrow ridgetops; and of steep soils on side slopes were included with this complex in mapping.

Because of the hazard of erosion and steepness, the soils in this complex are not suited to cultivated crops. Under good management, pasture and hay crops grow well. Woodland suitability group 6.

Muse-Trappist silt loams, 30 to 50 percent slopes (MpF)

This complex is on benched, smooth landscapes. About 50 to 60 percent of the acreage is Muse soil, and about 40 to 50 percent is Trappist and included soils. All of these soils are so closely intermingled that separating them on a soil map is not practical. The profiles of these soils are similar to the profiles described as typical for the respective series.

Some small areas of Shelocta soils; of deep, dark-colored soils on the lower part of the north-facing slopes; of shallow soils on narrow ridgetops; and of very steep soils on side slopes were included with this complex in mapping.

Because of the hazard of erosion and steepness, the soils in this complex are not suited to cultivated crops. They are suited to limited grazing but are better suited as woodland or wildlife habitat. Woodland suitability group 7.

3.7.3.11 Nolin Series

The Nolin series consists of deep, well drained, nearly level soils on floodplains.

In a typical profile, the surface is brown, friable silt loam about 10 inches thick. The subsoil extends to a depth of about 45 inches and is brown, friable, silt loam. The underlying material is brown, gravelly silt loam to more than 60 inches.

Nolin soils have moderate permeability and high available water capacity. The root zone is deep and the organic matter content is moderate. They are easily tilled. Reaction is medium acid to moderately alkaline. Runoff is slow. The seasonal high water table is three to six feet below the surface. Depth to bedrock is more than 60 inches. This soil is subject to common flooding.

Nolin silt loam, 0 to 2 percent slopes (No)

Nolin silt loam is designated as soil number 10 on the field sheets provided by the Soil Conservation Service. It is a deep, well drained, nearly level soil on floodplains.

Most of the acreage of this Nolin soil is used for cultivated crops and hay; a few areas are in pasture and woodland.

This soil is well suited to corn, soybeans, and small grains. The erosion hazard is slight. Because of occasional flooding during winter and early spring, tillage operations may be delayed, except where protected. Tilth can be maintained and improved by returning crop residues to the soil, growing green manure and cover crops, using minimum tillage, and growing grasses and legumes in the cropping system. Crops on this soil respond well to lime and fertilizer.

This soil is well suited to hay and pasture plants that can tolerate flooding for brief periods. Overgrazing or grazing when too wet will cause soil compaction and excessive runoff. Restricting use when wet, proper stocking, and rotation grazing will help maintain grassland and soil cilth.

This soil has severe limitations for nearly all urban uses because of flooding.

This soil is well suited to trees. Plant competition is severe. There are no other significant limitations for woodland use or management. Woodland suitability group 2.

3.7.3.12 Pope Series

The Pope series consists of deep, well-drained, gently sloping to strongly sloping soils. These soils are on flood plains and streambanks and are flooded annually. They formed in acid sediment that washed from weathered sandstone and shale.

In a typical profile, the surface layer is drak grayish-brown and dark brown silt loam about eight inches thick. The next layer is yellowish-brown fine sandy loam that is underlain by dark yellowish-brown sandy loam to a depth of more than 63 inches.

The Pope soils are strongly acid and have moderately high natural fertility. Permeability is moderate to moderately rapid, and the available moisture capacity is high. These soils have a thick root zone and can be tilled throughout a wide range of moisture content without clodding or crusting. Most of the acreage is cleared and farmed. Although these soils are flooded annually, flooding rarely occurs during the growing season.

Small areas of Pope soils were included in mapping with soils in the Tate series.

3.7.3.13 Ramsey Series

The Ramsey series consist of shallow to moderately deep, somewhat excessively drained soils. These soils occupy narrow ridgetops near sandstone cliffs throughout the area. They formed in residuum that weathered from sandstone. Slopes range from 12 to 20 percent.

In a typical profile, the surface layer is very dark, grayish-brown and yellowish-brown sandy loam about five inches thick. The subsoil is brownish-yellow loamy sand that contains some coarse fragments and that is about seven inches thick. The substratum is yellowish-brown loamy sand. Soft sandstone is at a depth of about 18 inches.

The Ramsey soils are very strongly acid. Availabile moisture holding capacity is low, and permeability is moderately rapid to rapid. These soils have a thick root zone.

Small areas of Ramsey soils were included in mapping with soils of the Dekalb series.

3.7.3.14 Rigley Series

The Rigley series consists of deep, well drained soils on very steep slopes, benches and narrow ridgetops. In the study area, Rigley soils occur as an inseparable complex with Shelocta and Muse soils. On the field sheets provided by the Soil Conservation Service, this complex was designated as soil 14F.

Rigley-Shelocta-Muse Complex, 20 to 60 percent slopes (RmF)

This mapping unit consists of areas of Rigley, Shelocta and Muse soils that are so intermingled that they could not be separated in mapping. They are deep and well drained soils on very steep mountain slopes, benches and narrow ridgetops with compass orientations ranging from from 140° to 320°. This range of compass orientations gives the complex a hot, dry aspect.

Rigley soils make up 35 to 45 percent of this unit. Typically, the surface layer is friable, dark grayish-brown loam about one inch thick. The subsurface layer is friable, brown, fine sandy loam to a depth of about 12 inches. The subsoil extends to a depth of about 41 inches and is friable, yellowish-brown sandy loam. The underlying material is yellowish-brown sandy clay loam to a depth of about 72 inches.

Rigley soils have moderately rapid permeability and moderate available moisture capacity. The root zone is deep and organic matter content is low. Reaction is strongly acid to extremely acid and runoff is medium to rapid. The seasonal high water table is three to six feet below the surface and depth to bedrock is more than 40 inches.

Shelocta soils make up 15 to 25 percent of the unit. Typically, the surface layer is friable, dark brown silt loam about one inch thick. The surface layer is friable, yellowish-brown, silt loam to a depth of about nine inches. The subsoil extends to a depth of about 42 inches. It is friable yellowish-brown, silty clay loam in the top 15 inches and firm, strong brown silty clay loam in the lower 18 inches. The underlying material extends to more than 60 inches and is yellowish-brown silty clay loam.

Shelocta soils have moderate permeability and high available water capacity. The root zone is deep and organic matter content is moderate. Reaction is strongly acid to extremely acid and runoff is medium to rapid. The seasonal high water table is more than six feet below the surface and depth to bedrock is more than 48 inches.

Muse soils make up 15 to 20 percent of the unit. Typically, the surface layer is friable, dark brown, silt loam about one inch thick. The subsurface layer extending to about four inches is friable, strong brown silt loam. The subsoil extends to a depth of about 40 inches and is friable, strong brown, silty clay loam in the upper 18 inches and firm strong brown, silty clay in the lower 18 inches. The substratum extends to a depth of about 47 inches and is variegated yellowish-red and light gray clay. Below this is red and gray clay shale.

Muse soils have slow permeability and high available water capacity. The root zone is deep and organic matter content is moderate. Reaction is strongly acid to extremely acid and runoff is medium. The seasonal high water table is six feet below the surface and depth to bedrock is more than 40 inches. Shrink-swell potential is moderate.

Including in mapping are small areas of soils that are less than 40 inches to bedrock and rock outcrop. Also included are small areas of soils that contain more silt, soils that contain more than 35 percent coarse fragments, and small areas that have a dark colored surface horizon. There are a few small areas with slopes of less than 20 percent and over 60 percent.

Most of the acreage of these soils is used for woodland. Small areas are used for cultivated crops or grass.

This mapping unit is not suited to cultivated crops because of steepness of slopes, and is poorly suited to hay and pasture.

This mapping unit has severe limitations for most urban uses because of steepness of slopes.

The unit is moderately well suited to trees. On the Rigley and Muse soils, the erosion hazard and equipment limitations are moderate on slopes less than 35 percent and severe on slopes over 35 percent. Plant competition is moderate. On the Shelocta soils, the equipment limitation is moderate on slopes of less than 35 percent and severe on slopes over 35 percent. The erosion hazard and plant competition is moderate. There are no other significant limitations for woodland use or management. Woodland suitability group 14.

3.7.3.15 Rock Land-Caneyville Complex

This mapping unit consists of areas of rock outcrop and Caneyville soils that are so intermingled that they could not be separated in mapping. It is designated in Map Set B, Soils, as RuE. This complex is designated as soil type 23F on the field sheets provided by the Soil Conservation Service.

Soils in this complex are very shallow to moderately deep on the lower mountain sideslopes and in low saddles. Rock outcrop generally makes up about 40 percent of the complex. In some areas, however, it makes up only 15 percent of the complex and in other places it makes up as much as 75 percent. Typically, rock outcrop consists of exposed areas of limestone that occur at random. Slope ranges from 20 to 50 percent.

Caneyville soils make up about 25 percent of the complex but they make up 15 to 50 percent in some areas.

Typically, the surface layer is brown, friable silt loam about eight inches thick. The subsoil extends to a depth of about 23 inches and is yellowish-brown, firm silty clay loam in the upper part and yellowish-red, very firm silty clay in the lower part. The substratum is soft siltstone and shale fragments to a depth of about 30 inches. Below this is gray limestone.

This soil has moderately slow permeability and moderate available water capacity. The root zone is moderately deep and the organic matter content is low. This soil is somewhat difficult to till because of the rock outcrops. Reaction is very strongly acid to medium acid in the upper part and medium acid to mildly alkaline in the lower part. Runoff is medium. The seasonal high water table is more than six feet below the surface. Depth to bedrock is 20 to 40 inches and shrink-swell potential is moderate.

Included in mapping are small areas of soils that are more acid and loamy in the upper two feet. Close to and surrounding the rock outcrops, the soils are shallow to bedrock. Also included are small areas of soils that are deeper than 40 inches to bedrock.

Most of the acreage of these soils is used for woodland. Small areas are used for cultivated crops or grass.

The unit is not suited to cultivated crops because of steepness of slopes and rock outcrop, and is poorly suited to hay and pasture.

This mapping unit is moderately well suited to trees. Erosion hazard and equipment limitation is severe, seedling mortality rate is moderate on hot slopes and plant competition is moderate on cool slopes. There are no other significant limitations for woodland use and management. Woodland suitability group 14.

3.7.3.16 Rock Land-Talbott Complex

Rock Land-Talbott complex (Rt) consists of areas where outcrops of limestone cover 25 percent or more of the surface of the Talbott soil. Rock land generally makes up 50 to 70 percent of the acreage in this complex, and the rest is Talbott soil. This complex occurs along the

South Fork Cumberland River and Little South Fork drainageways. Slopes commonly range from 5 to 30 percent, but in places adjacent to streams they are 60 percent or more. Except for a thinner surface layer and more rockiness, the profile of the Talbott soil in this complex is similar to the profile described for the Talbott series.

Included in mapped areas of this complex are areas of dark brown to olive, clayey soils derived largely from limestone. These included soils are neutral or slightly acid and range from one inch to 40 inches in depth, depending on the depth of the crevices or holes in or between the rock outcrops. Also included in deep draws are small areas of yellowish or brownish soils derived from medium-textured acid colluvium.

Because of rock outcrops, steepness, and past erosion, this complex is not suited to cultivated crops. It provides limited grazing but is better suited as woodland or wildlife habitat. Woodland suitability group 14.

3.7.3.17 Shelocta Series

The Shelocta series consists of deep, well-drained steep to very steep soils. These soils occupy wide slopes along the tributaries. They formed in acid colluvium that has been moved downslope from adjacent areas.

In a typical series profile, the surface layer is dark brown and yellowish-brown silt loam about seven inches thick. The subsoil extends to a depth of 47 inches. The major part of the subsoil is strong brown and yellowish-brown silty clay loam. The substratum is reddish-brown silty clay.

The Shelocta soils are strongly acid and have moderate, natural fertility. The available moisture capacity is high, and permeability is moderate. These soils have a thick root zone. Most of the acreage is in hardwood forest.

In the study area Shelocta soils are mapped only in complexes or groups with the Muse and Tate soils.

Shelocta-Muse-Cutshin Complex, 20 to 60 percent slopes (SoF)

This mapping unit consists of Shelocta, Muse and Cutshin soils that are so intermingled that they could not be separated in mapping. They are deep and well drained soils on very steep mountain slopes, benches and coves with cool aspects, ranging from compass orientations of 320° to 140°. On the field sheets provided by the Soil Conservation Service this complex was designated as soil type 15F.

Shelocta soils make up 20 to 30 percent of this unit. Typically, the surface layer is friable, dark brown silt loam about one inch thick. The subsurface layer is friable, yellowish-brown, silt loam to a depth of about nine inches. The subsoil extends to a depth of about 42 inches. It is friable yellowish-brown, silty clay loam in the top 15 inches and firm, strong brown silty clay loam in the lower 18 inches. The underlying material extends to more than 60 inches and is yellowish-brown silty clay loam.

Shelocta soils have moderate premeability and high available moisture capacity. The root zone is deep and organic matter content is moderate. Reaction is strongly acid to extremely acid and runoff is medium to rapid. The seasonal high water table is more than six feet below the surface and depth to bedrock is more than 48 inches.

Muse soils make up 15 to 25 percent of the unit. Typically, the surface layer is friable, dark brown silt loam about one inch thick. The subsurface layer extending to about four inches is friable, strong brown silt loam. The subsoil extends to a depth of about 40 inches and is friable, strong brown, silty clay loam in the upper 18 inches and firm strong brown silty clay in the lower 18 inches. The substratum extends to a depth of about 47 inches and is variegated yellowish-red and light gray clay. Below this is red and gray clay shale.

Muse soils have slow permeability and high available water capacity. The root zone is deep and organic matter content is moderate. Reaction is strongly acid to extremely acid and runoff is medium. The seasonal high water table is more than six feet below the surface and depth to bedrock is more than 40 inches. Shrink-swell potential is moderate.

Cutshin soils make up 15 to 20 percent of the mapping unit. Typically, the surface layer is friable, dark grayish-brown loam about one inch thick. The subsurface layer is friable, dark brown loam to a depth of about eight inches. The subsoil extends to a depth of about 48 inches and is friable, dark brown loam in the upper 10 inches and friable brown sandy clay loam in the lower 30 inches. The substratum is strong brown, sandy clay and extends to a depth of about 60 inches. Below this is sandstone and shale bedrock.

Cutshin soils have moderate permeability and moderate available moisture capacity. The root zone is deep and organic matter content is moderate to high. Reaction is very strongly acid to neutral and runoff is medium or rapid. The seasonal high water table is more than five feet below the surface and depth to bedrock is more than 40 inches.

Included in mapping are small areas that are less than 40 inches to bedrock and rock outcrop. Also included are small areas of soils that contain more silt, soils that contain more sand and soils that contain more than 35 percent coarse fragments. There are a few small areas with slopes of less than 20 percent and over 60 percent.

Most of the acreage of these soils is used for woodland. Small areas are used for cultivated crops or grass.

The mapping unit is not suited to cultivated crops because of steepness of slopes and is poorly suited to hay and pasture.

This mapping unit has severe limitations for most urban uses because of steepness of slopes.

The unit is moderately well suited to trees. On the Shelocta soils the equipment limitation is moderate on slopes less than 35 percent. On the Muse soils the erosion hazard and plant competition are moderate on slopes less than 35 percent and severe on slopes over 35 percent. Plant competition is moderate. On the Cutshin soils erosion hazard and equipment limitation are moderate on slopes less than 35 percent and severe on slopes over 35 percent. Plant competition is severe. There are no other significant limitations for woodland use or management. Woodland suitability group 14.

3.7.3.18 Strip Mines

Strip mines (St) consist of areas where the material above a coal seam has been removed to allow open pit mining. Some of the surface mined areas in the vicinity of the study area have been reclaimed for pasture and hay.

3.7.3.19 Talbott Series

The Talbott series consists of moderately deep to deep, well-drained, rolling to hilly soils on convex side slopes, ridgetops, and benches along the Little South Fork Cumberland River and its tributaries. They formed in residuum derived from limestone.

In a typical profile, the surface layer is mainly light yellowish-brown silt loam about four inches thick, and the subsoil extends to a depth of 33 inches. The major part of the subsoil is yellowish-red silty clay and clay. Limestone bedrock is at a depth of about 33 inches.

The Talbott soils are strongly acid and have moderately high natural fertility. Permeability is moderately slow, and available moisture capacity is moderate to low. The root zone is moderately thick. Rock outcrops and the hazard of erosion are the main limitations to use.

Most of the acreage of Talbott soils is in pasture or has a sparse stand of redcedar, oak, hickory, buckeye and elm.

Talbott rocky silt loam, 6 to 12 percent slopes (TaC)

This soil occupies rolling, karst landscapes where rock outcrops make up three to eight percent of the surface. Except for disturbed areas that have a brown A horizon, the profile of this soil is similar to the profile described as typical for the Talbott series.

Included with this soil in mapping were small areas of Huntington soils in depressions around sinkholes. Also included were small areas of very dark colored, fine-textured, very plastic soils; of severaly eroded soils: of nonrocky soils; and of soils consisting of 15 to 50 percent limestone outcrops.

Because of many rock outcrops, this soil is not well suited to cultivated crops. It is better suited as pasture or as woodland or wildlife habitat. Woodland suitability group 4.

Talbott rocky silt loam 12 to 20 percent slopes, (TaD)

This soil occupies convex side slopes, karst ridgetops, and benches. Rock outcrops make up three to eight percent of the surface.

Included with this soil in mapping were small areas of Huntington soils in depressions. Also included were small areas of severely eroded soils; of very dark colored, very plastic soils; and areas that are more than eight percent rock outcrops.

Because of rockiness and the hazard of erosion, this soil is not suited to cultivated crops. It is better suited as pasture or as woodland or wildlife habitat. Woodland suitability group 4.

Talbott very rocky silty clay, 12 to 20 percent slopes, severely eroded, (TbD3)

This soil is on convex side slopes, karst ridgetops, and benches. Rock outcrops make up 10 to 25 percent of the surface. Except for a silty clay surface layer and less depth to bedrock, the profile of this soil is similar to the profile described as typical for the Talbott series.

Included with this soil in mapping were small areas of uneroded soils, of gullied soils, and of Huntington soils in depressions.

Most of the original surface layer of this Talbott soil has been washed away. Because of past erosion, rockiness, poor workability, droughtiness, and the hazard of further erosion, this soil is not suited to cultivated crops, hay or pasture. It is better suited as woodland or wildlife habitat. Woodland suitability group 4.

3.7.3.20 Tate Series

The Tate series consists of deep, well-drained, mainly moderately steep or steep soils on side slopes that have a sandstone cliff at or near the upper part. These soils are gently sloping and strongly sloping in a small acreage on stream terraces. Tate soils are the most extensive soils in McCreary county. They formed in colluvium that moved downslope from soils derived from acid sandstone and shale.

In a typical profile, the surface layer is friable, brown and yellowish-brown loam about eight inches thick. The subsoil extends to a depth of more than 48 inches and is underlain by shale. The subsoil consists of aboiut six inches of yellowish-brown loam underlain by yellowish-brown and strong-brown clay loam.

The Tate soils are very strongly acid and have moderate natural fertility. Permeability is moderate to moderately rapid. The root zone is deep, and available moisture capacity is high. Except in stony areas, tillage is easy. These soils can be worked throughout a wide range of moisture content without clodding or crusting.

Most of the steep areas are forested. Tulip-poplar and other hardwoods grow on slopes facing north, and mixed oak and hickory grow on slopes facing south. Most of the acreage on stream terraces is used for pasture.

Tate fine sandy loam, 0 to 6 percent slopes (TeB)

This soil occupies second bottoms. Some areas are so high above normal flood stage that they are infrequently flooded. In most places the surface layer is darker colored, is slightly coarser textured, and has ..eaker structure than that in the profile described as typical for the Tate series. Also, this soil is fairly free of coarse fragments to a depth of 40 inches, but below this depth pebbles and cobblestones are common.

Included with this soil in mapping were small areas of Pope and Elk soils and, in places, small areas that have slopes of more than six percent.

Natural fertility is moderate, and infiltration and permeability are moderately rapid.

This soil is well suited to hay and pasture. Growth of most crops is good if management is good. Where this soil is cultivated, the hazard of erosion is slight to moderate. Woodland suitability group 2.

Tate-Trappist stony complex, 25 to 45 percent slopes (TnF)

This complex is on benched or irregular landscapes. Generally, about 60 percent of the complex is Tate soil, about 30 percent is Trappist soil, and the remaining 10 percent is included soils. All of these soils are so intermingled that separating them on a soil map is not practical.

The Tate soil developed in colluvium on concave or smooth slopes at the head of drainageways, on benches, or on the lower part of side slopes. In contrast, the Trappist soil developed on strongly convex landforms that project a short distance out from the side slopes. The Trappist soil is five to seven percent steeper than the Tate soil.

The Tate and Trappist soils are unlike in appearance. The profile of the Tate soil in this complex is similar to the profile described as typical for the series but has a higher content of coarse fragments and is underlain by weathered clay shale at a depth of three to four feet. The profile of the Trappist soil is slightly thicker above shale than the profile described as typical for the series and contains fewer coarse fragments in the subsoil. Also, the Trappist soil is capped with moderately coarse textured colluvium about five inches thick. In this complex, however, stones cover from three to 15 percent of the surface. Included in mapped areas of this complex are small areas of Cotaco soils or a dark-colored soil. Rock outcrops are common on abrupt slope breaks.

Stoniness and steepness severely restrict the use of soils in this complex. These soils are suitable for limited grazing but are more suitable as woodland and for providing wildlife food and cover. Woodland suitability group 13.

Tate, Shelocta and Muse stony soils, 12 to 35 percent slopes (ToE)

This undifferentiated group of soils occupies benched landforms that have an overall concave appearance.

The soils in this group developed in acid colluvium that weathered from siltstone, sandstone, and shale. This colluvium ranges from three to five feet in thickness and overlies red, greenish-gray, and gray, calcareous clay shale and some limestone. Typically, stones cover from 10 to 30 percent of the surface.

Some areas are made up of only Tate soil, some areas of only Shelocta soil, some areas of only Muse soil, and some areas of all three of these soils. The profile of the Tate soil in this group has coarser texture and contains more coarse fragments than the profile described as typical for the Tate series. The profile of the Shelocta soil is similar to the one described as typical for the Shelocta series. Except for more coarse fragments in the surface layer, the profile of the Muse soil is similar to the one described as typical for the Muse series.

Included in mapped areas of these soils in some places are small areas of Colbert, Talbott, or dark-colored soils.

The large amount of stones on the surface severely restricts the use of the soils in this group. These soils can be used as woodland and for producing wildlife food and cover. The operation of farm machinery is extremely difficult. Because of the underlying shale, these soils are likely to slump in some places if they are used for engineering. Woodland suitability group 5.

3.7.3.21 Wellston Series

The Wellston series consists of well-drained, gently sloping to sloping soils on broad ridgetops throughout the area. These soils formed partly in residuum from acid shale and sandstone and partly in thin loess.

In a typical profile, the surface layer is dark-brown and yellowish-brown silt loam about seven inches thick. The subsoil extends to a depth of about 34 inches and abruptly overlies fine-grained sandstone. The major part of the subsoil is yellowish-brown silt loam and silty clay loam.

The Wellston soils are very strongly acid and have moderate natural fertility. Permeability is moderate, and available moisture capacity is high. The Wellston soils have a thick root zone. They are easily tilled and can be worked throughout a wide range of moisture content without clodding or crusting.

Wellston silt loam, 6 to 12 percent slopes (WeC)

This soil occupies wide, smooth, convex ridgetops.

Included with this soil in mapping were small areas of Muse and Clymer soils. Also included were some areas that are nearly level and some that are strongly sloping.

This soil is suited to all crops commonly grown in the study area. In cultivated areas the hazard of erosion is high. This soil is well suited to pasture and hay crops. Woodland suitability group 3.

3.7.4 USE OF THE SOILS AS WOODLAND

Approximately 62 percent of the study area is forested. The original forest of the area consisted of approximately a dozen species of hardwoods. The dominant species, however, were oak (*Quercus* spp.), tulip-poplar (*Liriodendron tulipifera*), and hickory (*Carya* spp.). Some hemlock (*Tsuga canadensis*) grew on sideslopes and on bottom lands in steep coves and deep ravines. Virginia, shortleaf and pitch pine (*Pinus virginiana*, *P. echinata*, and *P. rigida*, respectively) were minor constituents of the original forest and grew near cliffs and on sandy and rocky ridgetops (Byrne et al. 1970).

Following settlement of the area, the original forest was first selectively logged and then was clearcut. The first logging occurred in the period between 1880 and 1920 (Byrne et al. 1970). Some of the cleared land was farmed, then later abandoned and allowed to revert to forest through the process of natural succession. At one time or another since the area was settled, practically all of the forest land has been burned over, either by wildfire, or by fires intentionally set by farmers to encourage growth of herbaceous plants for grazing livestock (Byrne et al. 1970). Burning of woodlands for this purpose was formerly a common practice, and is still practiced to a certain extent today.

The existing vegetation of the study area reflects past management practices, but is a rather poor indicator of the original natural forest community. On moist sideslopes today, the principal species include American beech (*Fagus grandifolia*), northern red oak (*Quercus rubra*), black oak (Q. velutina), tulip poplar, white ash (Fraxinus americana), basswood (Tilia heterophylla), bitternut hickory (Carya cordiformis), pignut hickory (C. glabra), black gum (Nyssa sylvatica), dogwood (Cornus florida) and pawpaw (Asimina triloba). On drier sites, the principal species are scarlet oak (Q. coccinea), black oak, white oak (Q. alba), post oak (Q. stellata), chestnut oak (Q. montana), black gum and mockernut hickory (C. tomentosa). The number of shortleaf and Virginia pines has increased on these drier sites since the area was first logged and since the abandonment of the subsequent farmland (Byrne et al. 1970).

Hardwoods tend to replace pines under natural conditions in the McCreary/Whitley county area (Byrne et al. 1970). The rate at which replacement progresses is related to soil characteristics. Dekalb, Ramsey and other soils that provide a dry site remain in a forest type of pine or pine-oak for a long time. Wellston and other moist soils revert rather rapidly to an oak-hickory forest type with a few scattered pines. Tate soils on north-facing slopes revert rapidly to hardwood forest (Byrne et al. 1970).

3.7.4.1 Woodland Suitability Grouping of Soils

Byrne et al. (1970) classified the soils of the McCreary/Whitley county area into 14 suitability groups based upon: (1) site index, or potential productivity; (2) existing tree species; (3) species preferred in future stands; (4) species suitable for planting, and (5) limitations and hazards to management. Each group consists of soils that have approximately the same suitability for wood crops, require about the same management, and have about the same potential productivity. Only nine of the 14 woodland suitability groups in the McCreary/Whitley county area occur in the Little South Fork study area.

The site index is an index to the productivity of a soil for a specified species of tree. Byrne et al. (1970) measured the site index on the Muse, Tate, Dekalb, Clymer, Wellston, Tilsit and Shelocta soils and interpolated the site index for the other soils in the McCreary/Whitley county area. The site index is the average height, in feet, of the dominant and codominant upland oaks at 50 years of age. In each woodland suitability group, generally two of every three trees measured varies less than 10 percent from the indicated site index. Although site index gives a good indication of potential productivity, the measurements made on trees now growing probably will cause underestimation of the growth potential. This underestimation results from trees now growing in the forests that reestablished in the area after logging, burning, grazing and other practices had damaged the soils and caused erosion (Byrne, et al. 1970).

Table 12 on the pages that follow lists the 14 woodland suitability groups in the McCreary/Whitley county area, as described by Byrne et al. (1970). An asterisk appears beside the groups that occur in the Little South Fork Wild River study area. Besides a brief description of each suitability group, Table 12 also includes the following information:

potential productivity in terms of forest type and site index; the tree species in existing stands; preferred tree species in these stands; tree species suitable for planting, and hazards and limitations to management including plant competition, seedling mortality, erosion and equipment limitations.

Plant competition refers to encroachment by annuals, shrubs, and other undesirable plants and the rate at which these undesirable species invade or colonize cleared or open areas. A rating of slight means that the early growth of desirable species of trees is essentially unhindered by competing plants. A moderate rating means that early growth of desirable tree species is satisfactory, but minor treatment is necessary to aid the establishment of these desirable species. Otherwise, their establishment may be hindered by weed species. Severe means that strong management treatment is necessary to protect desirable species from weed encroachment that would otherwise preclude their establishment (Byrne et al. 1970).

Seedling mortality refers to loss of natural or planted seedlings as a result of frost heaving or of too much or too little moisture at the time of germination. The seedling mortality rating in Table 12 assumes that there is a sufficient amount of viable seed of the preferred tree species to begin with. The rating of slight means that establishment of desired secies is not a problem. Moderate means that natural regeneration cannot be relied on for adequate stocking, or that between 25 and 50 percent of the planted seedlings die. A rating of severe means that natural regeneration cannot be relied on, or that less than 50 percent of the planting seedlings survive. On soils rated severe, herbicide sprays to reduce competition from hardwoods or scarification to prepare a better seedbed is necessary for the establishment of pines (Byrne et al. 1970).

Erosion hazard indicates the susceptibility of a particular soil to movement by running water and discounts the influence of the ground cover vegetation. A rating of slight means that the hazard of erosion is only minor. Timber management operations are curtailed only during rainy periods, and waterbars are needed only at critical locations. A rating of moderate means that special practices are needed to keep much-used areas dry so as to avoid concentration of running water in disturbed areas and to keep water from accumulating. On soils rated moderate, filter zones between logging roads and streams are needed. Severe means that detailed planning is needed to control erosion where the surface layer of the soil is disturbed. Water cannot be allowed to accumulate and the filter zone between streams and logging roads must be wide. Skidding of logs should be on the level or in an uphill direction, but not downhill. A very severe rating means that erosion is the main concern of management. On soils rated very severe, erosion can be so rapid that any disturbance of the soil causes serious problems unless ao intensive erosion control practices are used before, during, and after all timber management or hravest operations. Logging must be uphill and by cable or arch. Skid trails can withstand only a few passes without serious problems developing. Where roads or other im-

TABLE 12
WOODLAND MANAGEMENT INTERPRETATIONS BY WOODLAND SUITABILITY GROUPS

Woodland Suitability Group	Potential Productivity: Forest Type	Potential Productivity: Site Index [1]	Tree Species In Existing Stands
Group 1: Nearly level, somewhat poorly drained, acid soils on bottom lands and low terraces; shallow root zone above high water table or fragipan; flooded annually.	Sweetgum Cottonwood	90 100	River birch, pin oak, sweetgum, sycamore, cottonwood and red maple
*Group 2: Nearly level to gently sloping, moderately well drained to well drained soils on bottom lands, low terraces, toe slopes, and colluvial fans; seasonal high water table or occasional flooding in places.	Upland oak Tulip-poplar	80 95	Tulip-poplar, black walnut, red oak, white oak, elm, and river birch.
*Group 3: Nearly level to gently sloping, moderately well drained to well drained soils on high terraces and uplands; fragipan in places.	Upland oak Shortleaf pine	72 70	Scarlet oak, black oak, blackgum, shortleaf pine, and Virginia pine.
*Group 4: Gently sloping to moderately steep, well-drained, residual soils on uplands; derived from limestone or calcareous shale; some areas are rocky.	Upland Oak	74	White oak, post oak, redcedar, winged elm, Virginia pine, black cherry, shagbark hickory, bitternut hickory, and buckeye.
*Group 5: Moderately steep to steep, well-drained, acid, stony soils on uplands developed in colluvium over calcareous substratum	Upland oak Tulip-poplar	[2] 85 [3] 75 [2] 96 [3] 87	White oak, black oak, scarlet oak, red oak, rock elm, buckeye, tulip poplar, black cherry, shagbark hickory and bitternut hickory.
*Group 6: Sloping to moderately steep, mostly well-drained, acid, clayey soils on uplands.	White oak Shortleaf pine Scarlet oak Upland oak	62 68 70 66	Scarlet oak, white oak, blackgum, shortleaf pine, Virginia pine, blackgum, pignut hickory, and mockernut hickory.
*Group 7: Steep to very steep, well-drained, acid, loamy or clayey soils on uplands.	Upland oak Upland oak	[2] 75 [3] 66	White oak, black oak, chestnut oak, scarlet oak, shortleaf pine, Virginia pine, blackgum, pignut hickory, and mockernut hickory.
Group 8: Stony, loamy, or clayey, acid soils that have long, steep to very steep slopes and are on uplands.	Upland oak	[2] 75 [3] 64	Scarlet oak, chestnut oak, white oak, shortleaf pine, Virginia pine, red maple, blackgum, and mockernut hickory.
Group 9: Very steep, slightly acid to neutral, stony soils in the upper part of coves facing north.	Tulip-poplar Upland oak	95 83	Buckeye, basswood, tulip-poplar, red oak, beech, and sugar maple.
Group 10: Moderately steep to steep, moderately coarse textured, well-drained or somewhat excessively drained soils on uplands.	Shortleaf pine	[2] 68 [3] 55	Shortleaf pine, pitch pine, Virginia pine, post oak, chestnut oak, blackjack oak, southern red oak, scarlet oak, blackgum, sourwood, and mockernut hickory.
Group 11: Strongly sloping to steep, medium-textured, well-drained soils on uplands; developed in deep colluvium.	Upland oak	[2] 78 [3] 70	Red oak, [2] white oak, black oak, [2] scarlet oak, blackgum, shortleaf pine, tulip-poplar, and mockernut hickory.
*Group 12: Gently sloping to strongly sloping, moderately coarse textured, well-drained to somewhat excessively drained soils on uplands; some areas are shallow.	Virginia pine Shortleaf pine	73 64	Shortleaf pine, Virginia pine, pitch pine, black oak, white oak, post oak, southern red oak, scarlet oak, and blackgum.
*Group 13: Strongly sloping to steep, stony acid soils, mainly below cliffs in the uplands; mainly moderately coarse textured but small areas are fine textured.	Upland oak	[2] 75 [3] 65	Red oak, [2] white oak, black oak, chestnut oak, scarlet oak, shortleaf pine, tulip-poplar, blackgum, mockernut hickory, and pignut hickory.
*Group 14: Land types and soil complexes that are extremely variable in texture, slope, and other characteristics.	([4]) -------------	([4])	([4])--------------------------

[1] Site index is based on height of 30 ye... of age for cottonwood; site index for all other species is based on height at 50 years of age. ...erally, two of every three trees measured will vary less than 10 percent from the site index (Byrne et al. 1970).

[2] On the lower one-third of slopes on all aspects and the upper two-thirds of slopes that have aspects of 340 to 125 degrees (Byrne et al. 1970).

Preferred in Stands	Suitable for Planting	Potential Productivity Plant Competition	Seedling Mortality	Tree Species Erosion Hazard	Equipment Limitation
Sweetgum, pin oak, and cottonwood.	Cottonwood, pin oak, and sweetgum	Severe	Severe	Slight	Moderate to severe.
Tulip-poplar, red oak, black oak, and white oak.	White pine, tulip-poplar, black walnut, shortleaf pine, and red oak.	Severe	Slight	Slight	Slight
Shortleaf pine, black oak, and scarlet oak.	White pine a rt-leaf pine.	Moderate	Moderate	Slight	Slight
White oak, red oak, black oak, and scarlet oak.	Shortleaf pine, Virginia pine, and redcedar.	Severe	Severe	Severe	Severe
Tulip-poplar, red oak, black oak, white oak, and black walnut.	Tulip-poplar, shortleaf pine and white pine.	Moderate to severe.	Moderate	Severe	Severe
Scarlet oak, white oak, black oak, and shortleaf pine.	Shortleaf pine and Virginia pine.	Moderate to severe	Moderate	Moderate to severe	Moderate to severe
Black oak, red oak,[2] scarlet oak, white oak, shortleaf pine, white ash,[2], and tulip poplar.[2]	Shortleaf pine and Virginia pine.	Moderate	Moderate	Very severe	Severe
Red oak,[2] black oak, chestnut oak, white oak, tulip-poplar[2] and white ash[2].	Shortleaf pine, Virginia pine, white pine,[2] and tulip-poplar.	Moderate	Moderate	Very severe	Severe
Tulip-poplar, red oak, and black oak.	Tulip-poplar, white pine and black walnut.	Moderate	Slight	Very severe	Severe
Shortleaf pine, white oak, scarlet oak, and chestnut oak.	Shortleaf pine and Virginia pine.	Slight	Slight	Severe	Severe
White oak,[3] red oak, black oak, tulip-poplar, and shortleaf pine.	Tulip-poplar,[2] shortleaf pine, and white pine.	Moderate	Moderate	Moderate to severe	Moderate to severe
Shortleaf pine and Virginia pine.	Shortleaf pine and Virginia pine.	Moderate	Slight	Slight to moderate	Slight to moderate
White oak, black oak, scarlet oak, shortleaf pine, and tulip-poplar.[2]	Shortleaf pine, Virginia pine, white pine and tulip-poplar.[2]	Moderate	Moderate to severe	Severe	Moderate to very severe
([4]) ----------------------	([4]) ----------------	Moderate	Moderate	Very severe	Severe

3 On ridgetops and the upper two-thirds of slopes that have aspects of 125 to 340 degrees.
4 Data not available.
* Occurs in the Little South Fork Wild River Study Area.

provements are built on soils with a very severe rating, slides and slips are common (Byrne et al. 1970).

An equipment limitation refers to the relative degree that theuse of wheeled or crawler type equipment is prohibited or restricted by soil characteristics. The limitation is slight if there is no restriction on the type of equipment that can be used; moderate if the type of equipment and the time it can be used are somewhat restricted, and severe if there are severe restrictions on the type of equipment tha can be used or the time of the year that the equipment can be used. On soils that are rated severe, special equipment, such as cable or arch logging equipment is generally required (Byrne et al. 1970).

3.7.5 USE OF THE SOILS FOR WILDLIFE

This section of the report assesses the suitability of the soils of the study area for wildlife management purposes. Successful wildlife management depends upon providing the indigenous wildlife of an area with ample food, cover and water in suitable locations. Wildlife habitats that provide these basic needs can be created, improved or maintained by planting or managing existing vegetation on the soils of the area to promote the growth of plant species that are most desirable for wildlife use. The estimated suitability of the soils of the Little South Fork study area for different kinds of wildlife and for "producing wildlife habitat elements" is evaluated in Table 13 on the pages that follow.

Accordint to Byrne et al. (1970), white-tailed deer, ruffed grouse, gray squirrel, fox squirrel, cottontail rabbit, bobwhite and wild turkey are common in many places in the McCreary/Whitley county area. Personal communication with wildlife biologists in the Kentucky Department of Fish and Wildlife Resources in Frankfort indicates that this statement is still applicable. The information in the text and tables of this section of the report is useful in assisting game managers in determining which species of game to encourage in a particular habitat and in identifying specific sites for the development, protection and enhancement of important elements of wildlife habitat. The kinds of wildlife habitat suitable for the soils in the Tate-Shelocta Association, the soil association that includes the Wild River study area, is discussed below.

The Tate-Shelocta Association, which is largely forested, occupies the lower slopes and benches along the Big South Fork and its main western tributaries including the Little South Fork. Along the Wild River segment of the Little South Fork, small farms and abandoned fields are common on these lower slopes and benches. Cliffs that are common in adjacent soil associations hinder access to this association for both hunters and whitetailed deer (Byrne et al. 1970).

According to Byrne et al. (1970), the Tate-Shelocta Association probably has the best potential for supporting wildlife of any soil association in the McCreary/Whitley county area. Plants grown on the soils of the

TABLE 13
SUITABILITY OF SOILS FOR ELEMENTS OF WILDLIFE HABITATS AND KINDS OF WILDLIFE

Mapping Unit and Symbol	Wildlife Habitat Elements		
	Grains and Seed Crops	Grasses and Legumes	Wild Herbaceous Upland Plants
Caneyville silt loam, very rocky, 6 to 12 percent slopes (CaC)	Poor	Fair	Fair
Caneyville silt loam, very rocky, 12 to 20 percent slopes (CaD)	Poor	Fair	Fair
Colbert silty clay loam, 6 to 20 percent slopes (CoD)	Poor	Fair	Fair
Dekalb fine sandy loam, 6 to 12 percent slopes (DeC)	Fair	Fair	Fair
Dekalb and Ramsey sandy loams, 12 to 20 percent slopes (DrD):			
Dekalb soil	Poor	Fair	Fair
Ramsey soil	Unsuited	Poor	Poor
Frederick silt loam, 6 to 12 percent slopes (FdC)	Good	Good	Good
Grigsby loam (Gr)	Fair	Good	Good
Huntington silt loam (Hu)	Fair	Good	Good
Muse silt loam, 6 to 12 percent slopes (MeC)	Fair	Good	Good
Muse silt loam, 12 to 20 percent slopes (MeD)	Poor	Fair to good	Good
Muse-Trappist silt loams, 20 to 30 percent slopes (MpE)	Unsuited	Poor	Good
Muse-Trappist silt loams, 30 to 50 percent slopes (MpF)	Unsuited	Unsuited	Fair
Nolin silt loam, 0 to 2 percent slopes (No)	Good	Good	Fair
Rigley - Shelocta-Muse Complex, 20 to 60 percent slopes (RmF)	Unsuited	Poor	Poor
Rock land - Caneyville Complex (RuE):			
Rock land	Unsuited	Unsuited	Poor
Caneyville soil	Poor	Poor	Fair
Rock land-Talbott complex (Rt):			
Rock land	Unsuited	Unsuited	Poor
Talbott soil	Poor	Fair	Good
Shelocta-Muse-Cutshin Complex, 20 to 60 percent slopes (SoF)	Unsuited	Poor	Fair
Strip Mines (St)	Unsuited	Unsuited	Poor
Talbott rocky silt loam, 6 to 12 percent slopes (TaC)	Poor	Fair	Good
Talbott rocky silt loam, 12 to 20 percent slopes (TaD)	Poor	Fair	Good
Talbott very rocky silty clay, 12 to 20 percent slopes severely eroded (TbD3)	Unsuited	Poor	Fair
Tate fine sandy loam, 0 to 6 percent slopes (TeB)	Fair	Good	Good
Tate-Trappist stony complex, 25 to 45 percent slopes (TnF):			
Tate soil	Unsuited	Unsuited	Fair
Trappist soil	Unsuited	Unsuited	Fair
Tate, Shelocta, and Muse stony soils, 12 to 35 percent slopes (ToE)	Unsuited	Unsuited	Fair
Wellston silt loam, 6 to 12 percent slopes (WeC)	Fair	Good	Good

Wildlife Habitat Elements (continued)				Kinds of Wildlife	
Hardwood Woody Plants	Evergreen Woody Plants	Shallow Water Developments	Excavated Ponds	Open Wildlife	Woodland Wildlife
Fair	Fair	Fair	Fair	Fair	Fair
Fair	Fair	Poor	Poor	Fair	Fair
Fair	Fair	Unsuited	Unsuited	Fair	Fair
Fair	Fair	Unsuited	Unsuited	Fair	Fair
Poor	Fair	Unsuited	Unsuited	Poor	Poor
Fair	Good	Unsuited	Unsuited	Poor	Fair
Good	Good	Unsuited	Unsuited	Good	Good
Good	Poor	Unsuited	Unsuited	Good	Good
Good	Poor	Fair	Poor	Good	Good
Good	Poor	Unsuited	Unsuited	Fair	Good
Good	Good	Unsuited	Unsuited	Good	Good
Good	Poor	Unsuited	Unsuited	Poor	Fair
Good	Poor	Unsuited	Unsuited	Poor	Fair
Good	Poor	Unsuited	Unsuited	Good	Good
Fair	Good	Unsuited	Unsuited	Poor	Fair
Fair	Fair	Unsuited	Unsuited	Unsuited	Fair
Fair	Good	Unsuited	Unsuited	Poor	Fair
Fair	Fair	Unsuited	Unsuited	Unsuited	Fair
Poor	Good	Unsuited	Unsuited	Fair	Poor
Fair	Good	Unsuited	Unsuited	Poor	Fair
Poor	Good	Unsuited	Unsuited	Unsuited	Poor
Good	Poor	Unsuited	Unsuited	Unsuited	Good
Good	Poor	Unsuited	Unsuited	Fair	Good
Fair	Fair	Unsuited	Unsuited	Poor	Fair
Good	Poor	Unsuited	Unsuited	Good	Good
Good	Fair	Unsuited	Unsuited	Poor	Fair
Good	Fair	Unsuited	Unsuited	Poor	Fair
Fair	Fair	Unsuited	Unsuited	Poor	Fair
Good	Poor	Poor	Poor	Good	Good

Tate-Shelocta Association are generally higher in nutritive value than plants grown on other soils (Byrne et al. 1970). While permanent openings (small forest clearings established in sod) that are needed by turkeys are relatively scarce in the area, den trees for squirrels and permanent sources of water for deer and turkeys are abundant.

In most locations, the soils in the Tate-Shelocta Association provide good habitat for turkeys and excellent habitat for squirrels. The habitat could be improved for both white-tailed deer and turkeys if small areas of Huntington and Pope soils on floodplains of small streams were cleared and established in sod. Along the Little South Fork north of Slavans, the habitat for deer and grouse is fair to good. The reason the habitat in this area is not better for deer is that browse is generally scarce in the sparse stand of shrubs among the hardwoods. More browse occurs where intermediate cuttings are made, but the plants soon grow too tall to be reached by deer (Byrne et al. 1970).

The ratings for suitability of soils for elements of wildlife habitat in Table 13 do not take into account present land use, the relationship of soils to adjoining areas, and the movements of wildlife. A rating of good means that habitats are generally easily created, improved or maintained on the soil in question; there are few or no soil limitations to habitat management, and satisfactory results can be expected. A rating of fair means that habitats can be created, improved or maintained, but there are moderate soil limitations that affect management. Moderately intensive management and fairly frequent attention are required for satisfactory results. A rating of poor means that habitats can generally be created, improved or maintained, but soil limitations are severe. Management of habitat is difficult, expensive and requires intensive effort. A rating of unsuited means that habitats cannot be created, improved or maintained, or that these practices are not feasible under prevailing soil conditions (Byrne et al. 1970).

3.7.5.1 Elements of Wildlife Habitat

The following paragraphs briefly describe the elements of wildlife habitat that are rated in Table 13.

Grain and seed crops are areas of domestic grains or seed-producing annual herbaceous plants that have been planted to produce food for wildlife. Suitable plants include corn, sorghum, wheat, oats, millet, buckwheat, soybeans and sunflowers.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that have been planted to provide wildlife food and cover. Suitable plants include fescue, bromegrass, bluegrass, timothy, redtop, orchardgrass, reed canarygrass, clover, trefoil, alfalfa and sericea lespedeza.

Wild herbaceous upland plants are native or introduced perennial grasses and weeds preferred by wildlife on uplands that provide food and cover and that are established mainly through natural processes. Examples of these plants include: beggarweed, wild bean, goldenrod, wild ryegrass, oatgrass, pokeweed, wild strawberry, and lespedeza. Ratings in this category are based on the estimated number, variety and vigor of desirable species that are native to each soil.

Hardwood woody plants are vigorous sprouts or dependable, naturally occurring food-producing hardwood trees, shrubs or woody vines that are preferred by wildlife. Examples include: oak, hickory, dogwood, maple, grape, blueberry, brier, greenbrier, cherry and viburnum.

Evergreen woody plants are coniferous trees and slower growing evergreen shrubs that are commonly established through natural processes and that are important to wildlife mainly as cover, but also for food. Examples include: Virginia pine, shortleaf pine, pitch pine, redcedar, hemlock, mountain laurel, American holly, and rhododendron.

Shallow water developments are areas of standing water in impoundments or excavations that generally do not exceed five feet in depth. Such structures include shallow dugout ponds, low dikes and levees. Several of these occur in the study area, although some contain water only during wet weather.

Excavated ponds are dugout water areas or combinations of dugout ponds and low dikes or dams that hold enough water of suitable quality and depth to support fish or other wildlife. These are ponds of one-tenth acre or more that are built on nearly level land and that have an average depth of six feet or more over at least one-fourth of the area. A dependable source of unpolluted water of low acidity is needed for producing fish (Byrne et al. 1970). Twenty-three farm ponds, some of which are in this category and some of which are shallow water developments, occur in the study area. Most of these are livestock watering ponds. Sixteen of these are on the Wayne County side of the study area, and the remaining seven are on the mcCreary County side. Ponds are located in the Map Folio Set, Map Set D, Land Cover.

3.7.5.2 Kinds of Wildlife

The kinds of wildlife addressed in Table 13 are described below. Byrne et al. (1970) did not consider wetland wildlife to be an important class of wildlife in the McCreary/Whitley county area because of a lack, in that area, of large bodies of water. For this reason, wetland wildlife are not included in Table 13, which is adapted from Byrne et al. (1970). Lake Cumberland, however, lies west of the Wild River study area in Wayne County. Lake Cumberland does have significant wetland wildlife populations. Wetland wildlife consists primarily of birds and mammals that inhabit lakes, ponds, marshes and swamps. Examples include ducks, geese, herons, shorebirds, mink, muskrat and opossum. Some of these species do occur, at least seasonally, on and along the Little South Fork, but they are few in number. More important classes of wildlife in the Little South Fork study area are open land wildlife and woodland wildlife.

Open land wildlife consists of birds and mammals that normally frequent cropland, pasture, meadows, lawns and areas that are overgrown with grasses, herbs and shrubs. Examples include quail, meadowlark, dove, cottontail rabbit, red fox and woodchuck.

Woodland wildlife consists of birds and mammals that normally frequent woodland made up of hardwoods, shrubs, and vines; coniferous trees and shrubs, or a mixture of both type of woodland. Examples of woodland wildlife include ruffed grouse, gray squirrel, fox squirrel, gray fox, white-tailed deer, raccoon and wild turkey.

3.7.6 USE OF THE SOILS FOR PLANNING

Knowledge of soil limitations is a valuable aid in planning for recreation facilities and community developments including selection of suitable sites for buildings and plan areas. Table 14 on the pages that follow presents the ratings of the estimated degree and kind of limitations of each soil in the study area for selected recreational facilities and community developments. Whether or not such facilities are ever planned for development in the Wild River study area, the information in TAble 14 is valuable to managers of the Wild River since it provides understanding of which soils, and thus, which areas in the study corridor are most sensitive to disturbance by recreationists, and which areas should be capable of withstanding such use with minimal effect on the natural environment.

In Table 14, a rating of slight indicates that the soil has few limitations and that they are easily overcome. A soil rated moderate has limitations that can be overcome by implementing special management practices. A rating of severe indicates serious limitations exist which can be overcome only by the use of intensive management practices. A severe rating does not mean that the soil cannot be used for the stated purposes; what it means is that the cost involved in overcoming the soil limitations may be prohibitive, and the effort to use the soils for the stated purpose may not be justifiable on the basis of cost. The information contained in Table 14 does not obviate the need for site-specific soil investigations for many of the uses in the table which require only a small area. Rather, this information is intended for use as a guide in screening potential sites and in planning more detailed investigations.

In Table 14, the kinds of limitations, expressed in terms of soil characteristics or properties, are given only if the degree of limitation is rated at more than slight.

The criteria used to determine the degree and kind of limitation vary according to the intended use. Limitations of soils for use as a septic tank filter field, for example, are steep slopes, seasonally high water table, flooding, shallow depth to bedrock, stoniness and slow permeability. A rating of moderate indicates that the soil has borderline limitations making it only marginally suited to the use and indicating that a thorough investigation should be made at the proposed site.

TABLE 14 - LIMITATIONS OF SOILS FOR RECREATIONAL AND COMMUNITY DEVELOPMENTS

Mapping Unit and Symbol	Estimated Degree and Kind of Limitations If Limitation Is Moderate or Severe		
	Septic Tank Filter Fields	Impoundments and Sewage Lagoons	Buildings With Basements
Caneyville silt loam, very rocky, 6 to 12 percent slopes (CaC)	Severe: shallow depth to bedrock; moderately slow permeability.	Severe: shallow depth to bedrock; moderately slow permeability.	Severe: shallow depth to bedrock.
Caneyville silt loam, very rocky, 12 to 20 percent slopes (CaD)	Severe: shallow depth to bedrock; moderately slow permeability.	Severe: shallow depth to bedrock; moderately slow permeability.	Severe: shallow depth to bedrock.
Colbert silty clay loam, 6 to 20 percent slopes (CoD).	Severe: bedrock at a depth of 2½ to 3½ feet; slow permeability; slope.	Severe: slope; bedrock at a depth of 2½ to 3½ feet; poor material.	Moderate: bedrock at depth of 2½ to 3½ feet; slope.
Dekalb fine sandy loam, 6 to 12 percent slopes (DeC)	Moderate: bedrock at a depth of 2 to 3 feet; slope.	Severe: slope; pervious substratum.	Moderate: bedrock at depth of 2 to 3 feet; slope.
Dekalb and Ramsey sandy loams, 12 to 20 percent slopes (DrD):			
Dekalb soil ------------------------	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: slope; pervious substratum.	Moderate: bedrock at a depth of 2 to 3 feet; slope.
Ramsey soil --------------------	Severe: bedrock at a depth of 1 to 1½ feet; slope.	Severe: bedrock at a depth of 1 to 1½ feet slope.	Severe: bedrock at a depth of 1 to 1½ feet; slope.
Frederick silt loam, 6 to 12 percent slopes (FdC)	Moderate: moderately slow permeability.	Moderate: moderately slope permeability.	Severe: slope; high shrink-swell potential.
Grigsby loam (Gr)	Severe: flooding hazard.	Severe: flooding hazard.	Severe: flooding hazard.
Huntington silt loam (Hu)	Severe: flooding hazard.	Severe: flooding hazard.	Severe: flooding hazard.
Muse silt loam, 6 to 12 percent slopes (MeC)	Severe: moderately slow permeability.	Severe: slope.	Moderate: slope.
Muse silt loam, 12 to 20 percent slopes (MeD)	Severe: slope; moderately slow permeability.	Severe: slope.	Moderate: slope.
Muse-Trappist silt loams, 20 to 30 percent slopes (MpE)	Severe: slope; stoniness in some areas.	Severe: slope.	Severe: slope; stoniness in some areas.
Muse-Trappist silt loams, 30 to 50 percent slopes (MpF)	Severe: slope; stoniness in some areas.	Severe: slope.	Severe: slope; stoniness in some areas.
Nolin silt loam, 0 to 2 percent slopes (No).	Severe: flooding hazard.	Severe: flooding hazard.	Severe: flooding hazard.
Rigley-Shelocta-Muse Complex, 20 to 60 percent slopes (RmF)	Severe: slope.	Severe: slope.	Severe: slope.
Rockland-Caneyville Complex (RuE):			
Rockland -------------------------	Severe: rockiness.	Severe: rockiness.	Severe: rockiness.
Caneyville soil ------------------	Severe: slope; rockiness.	Severe: slope, rockiness.	Severe: slope; rockiness.
Rockland-Talbott complex (Rt):			
Rockland -------------------------	Severe: rockiness.	Severe: rockiness.	Severe: rockiness.
Talbott soil ---------------------	Severe: slope; moderately slow permeability; rockiness.	Severe: slope; rockiness.	Severe: rockiness.

Source: Byrne, et al. (1970) Soil Survey of the McCreary-Whitley Area, Kentucky.

Estimated Degree and Kind of Limitations If Limitation is Moderate or Severe-(continued)

Roads	Athletic Fields	Play and Picnic Areas	Campsites	
			Tents	Trailers
Moderate: shallow depth to bedrock.	Severe: slope; moderately slow permeability.	Severe: slope; moderately slow permeability.	Moderate: slope; moderately slow permeability.	Severe: slope moderately slow permeability.
Severe: slope shallow depth to bedrock.	Severe: slope moderately slow permeability.	Severe: slope moderately slow permeability.	Severe: slope; moderately slow permeability.	Severe: slope moderately slow permeability.
Severe: slope.	Severe: slope; slow permeability.	Severe: slope.	Severe: slope: slow permeability.	Severe: slope; slow permeability.
Moderate: bedrock at a depth of 2 to 3 feet; slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.
Severe: slope.	Severe. slope.	Severe: slope.	Severe: slope.	Severe: slope.
Severe: bedrock at a depth of 1 to 1½ feet; slope.	Severe: bedrock at a depth of 1 to 1½ feet; slope.	Severe: bedrock at a depth of 1 to 1½ feet; slope.	Severe: bedrock at a depth of 1 to 1½ feet; slope.	Severe: bedrock at a depth of 1 to 1½ feet; slope.
Severe: slope; high shrink-swell potential.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Severe: flooding hazard.	Moderate: flooding hazard.	Moderate: flooding hazard.	Moderate: flooding hazard.	Moderate: flooding hazard.
Severe: slope; high shrink-swell potential.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Severe: flooding hazard.	Moderate: flooding hazard.	Moderate: flooding hazard.	Moderate: flooding hazard.	Moderate: flooding hazard.
Moderate: slope; high shrink-swell potential.	Severe: slope.	Moderate: slope; silt loam surface layer.	Moderate: slope; moderately slow permeability.	Severe: slope.
Severe: slope.	Severe: slope; stoniness in some areas.	Severe: slope.	Severe slope.	Severe: slope; stoniness in some areas.
Severe: slope.	Severe: slope; stoniness in some areas.	Severe: slope.	Severe: slope.	Severe: slope; stoniness in some areas.
Severe: flooding hazard.	Moderate: flooding hazard.	Moderate: flooding hazard.	Moderate: flooding hazard.	Moderate: flooding hazard.
Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Severe: rockiness.	Severe: rockiness.	Severe: rockiness.	Severe: rockiness.	Severe: rockiness.
Severe: slope; rockiness.	Severe: slope; rockiness.	Severe: slope; rockiness.	Severe: slope; rockiness.	Severe: slope; rockiness.
Severe: rockiness.	Severe: rockiness.	Severe: rockiness.	Severe rockiness.	Severe: rockiness.
Severe: slope, rockiness.	Severe: rockiness.	Severe: rockiness.	Severe: rockiness.	Severe: rockiness.

TABLE 14 - Continued

Mapping Unit and Symbol	Estimated Degree and Kind of Limitations If Limitation Is Moderate or Severe		
	Septic Tank Filter Fields	Impoundments and Sewage Lagoons	Buildings With Basements
Shelocta-Muse-Cutshin Complex, 20 to	Severe: slope.	Severe: slope.	Severe: slope.
Talbott rocky silt loam, 6 to 12 percent slopes (TaC).	Severe: bedrock at a depth of 2 to 3½ feet; moderately slow permeability.	Severe: slope.	Moderate: slope; rockiness.
Talbott rocky silt loam, 12 to 20 percent slopes (TaD).	Severe: slope; moderately slow permeability	Severe: slope.	Moderate: slope; rockiness.
Talbott very rocky silty clay loam, 12 to 20 percent slopes, severely eroded (TbD3).	Severe: slope; moderately slow permeability, rockiness.	Severe: slope; rockiness.	Severe: rockiness.
Tate fine sandy loam, 0 to 6 percent slopes (TeB).	Slight.	Severe: pervious substratum.	Slight.
Tate-Trappist stony complex, 25 to 45 percent slopes (TnF):			
Tate soil ------------------------	Severe: slope; stoniness.	Severe: slope.	Severe: slope; stoniness.
Trappist soil---------------------	Severe: depth to rock slope.	Severe: slope; depth to rock.	Severe: slope; stoniness.
Tate, Shelocta, and Muse stony soils, 12 to 35 percent slopes (ToE):			
Tate soil --------------------------	Severe: slope; stoniness.	Severe: slope.	Severe: slope; stoniness.
Shelocta soil ----------------------	Severe: slope; stoniness in some areas.	Severe: slope.	Severe: slope; stoniness in some areas.
Muse soil -------------------------	Severe: slope; stoniness in some areas.	Severe: slope.	Severe: slope; stoniness in some areas.
Wellston silt loam, 6 to 12 percent slopes (WeC).	Moderate: slope; bedrock at a depth of 3 to 5 feet.	Severe: slope.	Moderate: slope; bedrock at a depth of of 3 to 5 feet.

Estimated Degree and Kind of Limitations If Limitation is Moderate or Severe-(continued)

Roads	Athletic Fields	Play and Picnic Areas	Campsites: Tents	Campsites: Trailers
Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Slight.	Slight.	Slight.	Slight.	Slight.
Severe: slope; stoniness.	Severe: slope; stoniness.	Severe: slope; stoniness.	Severe: slope stoniness.	Severe: slope; stoniness.
Severe: slope.	Severe: slope; stoniness.	Severe: slope; stoniness.	Severe: slope; stoniness.	Severe: slope; stoniness.
Severe: slope, stoniness.	Severe: slope; stoniness.	Severe: slope; stoniness.	Severe: slope; stoniness.	Severe: slope; stoniness.
Severe: slope.	Severe: slope; stoniness in some areas.	Severe: slope; stoniness.	Severe: slope; stoniness.	Severe: slope; stoniness in some areas.
Severe: slope.	Severe: slope; stoniness in some areas.	Severe: slope; stoniness.	Severe: slope; stoniness.	Severe: slope; stoniness in some areas.
Moderate: slope; bedrock at a depth of 3 to 5 feet.	Severe: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.
Moderate: shallow depth to bedrock.	Severe: slope; moderately slow permeability.	Severe: slope; moderately slow permeability.	Moderate. slope; moderately slow permeability.	Severe: slope; moderately slow permeability.
Severe: slope shallow depth to bedrock.	Severe: slope; moderately slow permeability.	Severe: slope moderately slow permeability.	Severe: slope; moderately slow permeability.	Severe: slope moderately slow permeability.
Severe: slope; high shrink-swell potential.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

Soil characteristics limiting the development of impoundments and sewage lagoons are steep slopes, flooding, rapid permeability of the subsoil, and shallowness to bedrock. The impoundments discussed here are shallow water developments that can be used for boating, fishing, swimming and other kinds of recreation. They require a surface area of at least 0.1 acre of water and a depth of six feet or more over one-fourth of the area. Sewage lagoons are shallow ponds that are built to dispose of sewage in areas where septic tanks or other sewage systems are not feasible.

Limitations for service buildings and homesites were rated for buildings of three stories or less that have basements. Soil features limiting the use of these sites are a seasonally high water table, flood hazard, steep slopes, depth to and kind of bedrock and the need for cut and fill operations, grading or other landscape modification. If buildings do not have basements, depth to bedrock and seasonally high water table are not as limiting as stated in the table.

The limitations of soils for roads are rated for light and medium traffic. Soil characteristics that limit the use of soils for roads are steepness, seasonally high water table, flooding, depth to and kind of bedrock, and stoniness. Development of bridle paths, nature trails and footpaths are less restricted by these soil features.

Soil characteristics that limit use of the soils for athletic fields are a clayey or gravelly surface layer, stoniness or rockiness, a high water table, steep slopes and flooding. Athletic fields include small, nearly level areas intensively used for baseball, tennis, football and other sports.

Soil characteristics that affect the use of soils for picnic and play areas are steep slopes, flooding, a high water table, rockiness and stoniness, and texture. Steep, rocky or stony areas are important for their scenic value or as nature trails. Campsites for tents and trailers are limited by the same soil characteristics as picnic and play areas, though tent campsites can be located on steeper soils than trailer campsites. Steep slopes, a high water table, flooding, soil texture and permeability, depth to and kind of bedrock, and rock outcrops or stones are the main limiting characteristics (Byrne et al. 1970).

3.8 TERRESTRIAL BIOLOGY

3.8.1 INTRODUCTION

3.8.1.1 Purpose of Study

The purpose of studying the terrestrial biology of the project area is to obtain an inventory of the important floral and faunal elements that occur along the Wild River, and to analyze and interpret the significance of the terrestrial biota with respect to the formulation of regulations and management plans directing future use of the area. Each of the prevalent plant communities found within the designated boundaries of the Wild River area is described and the associated fauna is identified and discussed in this section of the report. Locations and descriptions of plant and animal communities of outstanding value or interest are presented also, and the vulnerability of these communities to human disturbance is discussed in relation to regulation and management requirements. Outstanding terrestrial communities are those which represent the best example in the study area of a particular type of habitat; those which are scenically, biologically or recreationally unique; or those which are very sensitive to disruption by human activities such as those containing rare, threatened or endangered species of plants or animals. Species that are considered rare, threatened or endangered in this report are: those that are listed by the U.S. Fish and Wildlife Service on the federal endangered species list; those that have been proposed for inclusion on the Federal list by the Fish and Wildlife Service or the Smithsonian Institution; and those species whose status in Kentucky is being monitored by the Kentucky Nature Preserves Commission. Other species that are considered by persons knowledgeable of the terrestrial ecosystems of Kentucky to be unusual or deserving of special concern or recognition are also discussed. Annotated lists of all of the plants and animals identified in this inventory, along with the species of plants and animals expected, by virtue of published accounts of their distributions, to be present along the Wild River are presented in tabulated form. There is a separate listing of unusual, rare, threatened and endangered species that are likely to occur in the area. Another table lists the most outstanding individual trees of selected species encountered during the inventory, with the diameter and approximate height of each, and its location in the study area. Other aspects of the terrestrial environment discussed in this section of the report include vector biology, forestry practices and forest fires.

3.8.1.2 Literature Review

Relatively little information specifically in reference to the terrestrial ecosystems of the study section of the Little South Fork is currently available. This is most likely due largely to three factors: first, the Little South Fork is not in close proximity to a major university. Second, there is very little public land along the study segment of the stream, and finally, access is difficult except at the State Route 92 bridge which is at the upstream terminus of the study segment.

As a consequence of the relative lack of specific information on the terrestrial environment of the Little South Fork, general references were utilized extensively in preparing for the field survey and in the preparation of this report. In particular, E. Lucy Braun's Deciduous Forests of Eastern North America (1950) was relied upon for a general descriptive overview of the vegetation of the entire area. Other references that were utilized in the identification of specimens, and for information on life history, habitat preference and geographic distribution included: A Guide to the Wildflowers and Ferns of Kentucky (Wharton and Barbour, 1971); Trees and Shrubs of Kentucky (Wharton and

Barbour, 1971); Wild Flowers of the United States (Rickett, 1966); Manual of Vascular Plants of Northeastern United States and Adjacent Canada (Gleason and Cronquist, 1963); Mammals of Kentucky (Barbour and Davis, 1974); Kentucky Birds: A Finding Guide (Barbour et al., 1973); and Amphibians and Reptiles of Kentucky (Barbour, 1971). Many other references were utilized in preparing this report including most of the standard field guides and general texts including Conant (1958), Peterson (1947), Murie (1954), Burt and Grossenneider (1952), Harlow and Harrar (1969), Muenscher (1950) and Muenscher (1944). The terrestrial environment of the Little South Fork is similar in some ways to the Rockcastle River, and the recently completed Environmental Inventory of the Rockcastle Wild River, Kentucky, prepared for the Corps of Engineers by Soils Systems, Inc. (1979) of Marietta, Georgia was another useful source of information. A complete listing of the sources that were reviewed for this study is presented at the end of this section of the report.

The advice and assistance of the following persons is gratefully acknowledged: Mr. Max Medley, Mr. Wayne Houtcooper, and Mr. Melvin Warren of the Kentucky Nature Preserves Commission, were most helpful in providing information on plant and animal elements of natural diversity occurring in, or likely to occur in, the Wild River area. Dr. William S. Davis and Dr. Arland Hotchkiss, professors of biology at the University of Louisville, offered advice on regional contacts and on plant distribution, and Mr. Harry Woodward of the University of Louisville Herbarium assisted in plant identification and curation of plant specimens.

3.8.2 METHODS AND PROCEDURES

3.8.2.1 Literature Search

The literature search conducted for this study involved the acquisition of previous studies (impact statements, fishery bulletins, etc.) prepared for other projects in eastern and southeastern Kentucky, review of in-house bibliographies and literature, and a library literature search. From the list of sources thus compiled, an effort was made to obtain the pertinent publications from the publisher or the originating agency, individual or institution. Some of the information gathered for use in this report, or in preparing for the field survey, was obtained by telephone contact or by personal interview. As soon as preliminary literature acquisition had been accomplished, the process of review and analysis was begun.

3.8.2.2 Land Cover Mapping

Prior to the field investigation, a land cover map depicting the major vegetation types in the study area was prepared from black and white aerial photographs, dated April 3, 1978, at a scale of approximately one inch equals 1,000 feet. These photographs were compared, during the mapping, with full-color aerial photographs, dated March 23, 1977, at a scale of approximately one inch equals 2,000 feet, and with the Coopersville and Nevelsville 7.5-minute topographic quadrangles for interpretation of specific topographic and man-related features observed in the photographs. The information obtained from these three sources was transferred to a series of eight base maps, each at a scale of approximately one inch equals 400 feet, and each covering a different segment of the Wild River study area.

Since both the color and black and white aerial photographs were taken during early spring, the distinction between evergreem (pine and red cedar) forest communities and stands of pure hardwoods was sharp and easily discernible. However, the leafless character of the hardwoods, coupled with shadows cast by terrain features in some of the steeper areas, made distinguishing different hardwood types very difficult, and sometimes made it difficult to distinguish hemlock-mixed mesophytic forest stands from all-deciduous stands. As a consequence of these difficulties, the land cover maps should not be depended upon to give a precise estimation of the acreage or areal extent of each mapped forest cover type, or be used to determine exact lineal distances from a fixed reference point to the boundary of a given forest cover type. The maps are, however, good representations of the vegetative patterns that occur in the Wild River study area, and of their approximate location and approximate areal extent. The initial photointerpretations of land cover types were later field checked for accuracy, and revised and refined based upon notes taken in the field.

3.8.2.3 Preparation for Field Survey

Preparation for the field survey involved the selection of prime sample sites on the newly completed land cover map. Prime sites are those believed, on the basis of information obtained in the photo-mapping process, to represent the best examples of a particular land cover type, and which would provide the most representative sample of the flora and fauna of the area if no other sites were visited. Ideally, the entire Wild River corridor would be traversed, with emphasis placed on sampling the prime sites. In the event of time loss due to bad weather or other unforeseen circumstances, every effort would be made to sample at least the prime sites.

Topography, including especially slope, and geologic formations, aspect (compass orientation), land cover type (determined by photointerpretation), and accessibility were the factors of principal importance in identifying prime sample sites.

3.8.2.4 Field Survey

The field survey was conducted in three parts: the first part took place during the week of October 17, 1980; the second during the week of November 10, 1980; and the third during the week of April 6, 1981. Rain occurred on at least one day during each of the three field visits. Temperatures, however, were mild during all of the site vitis. Rainfall during the October and November field dates was light and did not cause any appreciable rise in the water level of the stream. The stream could be forded easily. In April, however, a significant rain occurred the evening of the first day in the field and intermittent rain occurred throughout the remainder of the visit. By mid-morning of the second day in the field, the stream could no longer be forded and travel by both foot and motor vehicle was difficult and treacherous.

Qualitative sampling transects were run in all habitat types occurring in the study area. The configuration of the qualitative sampling transects is depicted on Figures 13 and 14.

The following tasks were accomplished during the field survey:

1. The land cover maps, prepared on the basis of initial photo-interpretations, were field-checked for accuracy and notations of significant changes were made.

2. Notes were taken describing the flora and fauna of different habitat types within prime sites, and at other locations of interest noted in the field.

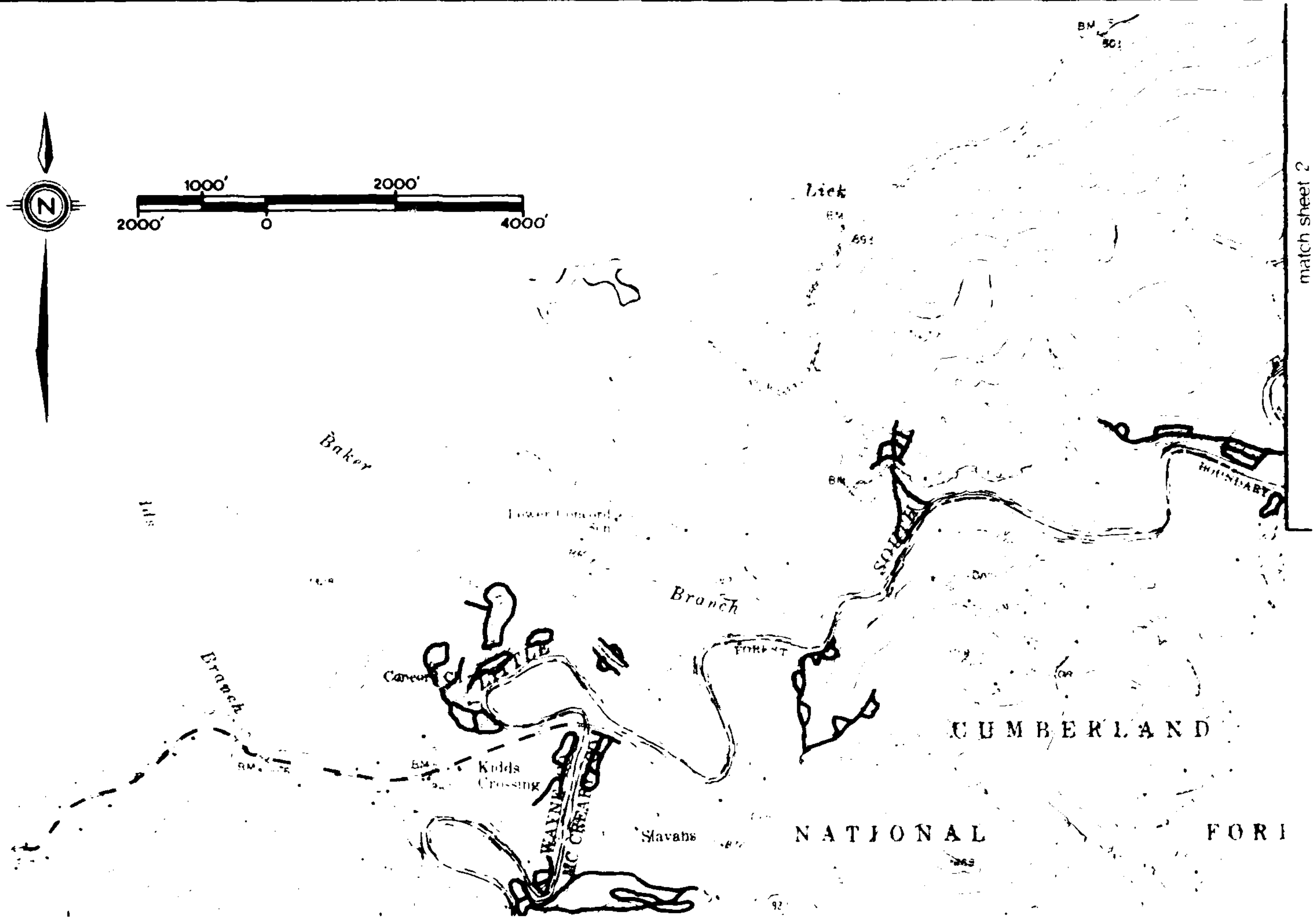
3. The circumference of specimen trees was measured with a diameter tape; their heights were measured with a clinometer or estimated, and their approximate locations were mapped.

4. Plant specimens were collected and pressed for later identification.

5. Photographs were taken of representative habitats, plants, animals and scenic views; and

6. Biological features were noted which were significant from a scenic, recreational or interpretive point of view, as for example, areas with an abundance of wildflowers, or with a diverse habitat or apparent abundance of wildlife, or that were considered to be especially good examples of a particular habitat type.

The time of the field reconnaissance was influenced by the project schedule beginning with the letting of the contract in September 1980, and a mid-May deadline for submittal of the first draft. As a consequence, the initial field site visits in fall of 1980 were too late to detect the presence of some spring and summer-blooming species of plants. Likewise, the spring submittal deadline for the draft inventory report made it necessary to conclude the spring field reconnaissance before some late spring and early summer species of plants had yet appeared. Consequently, the observations of plant species occurring in the study area (Table 15) are somewhat biased in favor of species characteristic of late fall and early spring, and must be considered as only a partial listing of the total plant species diversity of the area.



Environmental Inventory
Little South Fork Wild River

Figure Number 13

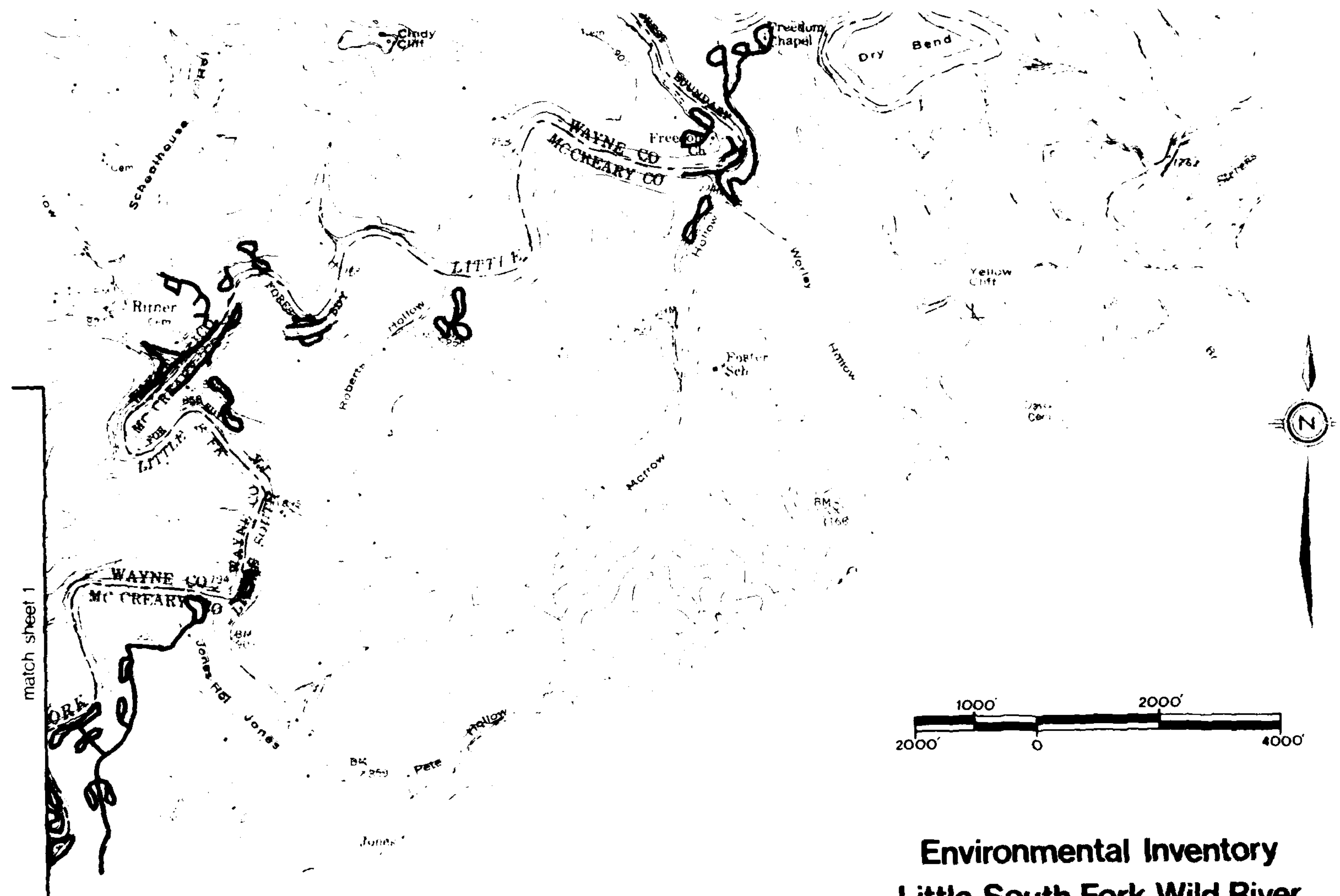
Terrestrial Biology Survey Segments

Sheet 1 of 2

MILLICAN ASSOCIATES

MILLER WIHRY LEE INC

COASTAL ZONE RESOURCES DIVISION



Environmental Inventory
Little South Fork Wild River

Figure Number 14

Terrestrial Biology Survey Segments
Sheet 2 of 2

MILLICAN ASSOCIATES

MILLER WIHRY LEE INC

COASTAL ZONE RESOURCES DIVISION
OCEAN DATA SYSTEMS INC.

3.8.2.5 Report Preparation

Upon return from the field, notes taken in the field were compiled and organized, plants were identified, and the pressed specimens were curated at the University of Louisville. Subsequently, lists of plants, amphibians, reptiles, birds and mammals occurring, or likely to occur in the study area were assembled and typed (Tables 15, 16, 17 and 18, respectively). The Land Cover Maps (Map Folio Set D) were corrected and put in final form, and other mapped information obtained during the field survey was transferred to Map Folio Set E, Special Features. Finally, each habitat type occurring in the study area was described and discussed in relation to its physical characteristics and typical flora and fauna. Rare, threatened or endangered flora or fauna occurring in, or possibly occurring in, the study area were listed and discussed, and specimen-sized trees located during the survey were included in a table compared against current state record-sized trees. The findings of this survey are presented in the paragraphs below, followed by the aforementioned tables.

3.8.3 TERRESTRIAL HABITATS

3.8.3.1 Overview

E. Lucy Braun mapped the forest regions and sections of eastern United States in her book, Deciduous Forests of Eastern North America (1950). Braun's map depicts the Little South Fork as the physical boundary line between the Cumberland Plateau section of the Mixed Mesophytic Forest Region and the Mississippian Plateau section of the Western Mesophytic Forest Region.

The Mixed Mesophytic Forest Region, according to Braun, includes all of the Cumberland Mountains, the southern part of the Allegheny Mountains, all but the northeast arm of the Unglaciated Allegheny Plateau, and all but the southernmost end of the Cumberland Plateau. The Mixed Mesophytic association (Braun used the term "association" to mean a major climax unit of the forest formation; e.g., Beech-Maple association), which characterizes the region, is the most complex and the oldest association of the Deciduous Forest Formation. According to Braun, the Mixed Mesophytic Forest was, until the arrival of the white man, an essentially undisturbed direct descendant of the mixed forest of the Tertiary Period (the Tertiary began approximately 65 million years ago).

The Mixed Mesophytic association is a climax forest in which dominance is shared by a number of species including: beech (Fagus grandifolia), tulip poplar (Liriodendron tulipifera), basswood (T. heterophylla, T. h. var. Michauxii, T. floridana, and T. neglecta), sugar maple (Acer saccharum), sweet buckeye (Aesculus octandra), red oak (Quercus rubra), white oak (Q. alba), and hemlock (Tsuga canadensis). Chestnut (Castanea dentata), until decimated by the chestnut blight, was also a dominant in the Mixed Mesophytic Forest. Today, it is represented mostly by dead, hollow stumps and by saplings and/or stump sprouts that never reach maturity. Additional species that are more or less abundant in the Mixed

Mesophytic Forest include: birch (Betula lenta, B. lutea var. alleghenienensis), black cherry (Prunus serotina), cucumber tree (Magnolia acuminata), white ash (Fraxinus americana), and red maple (Acer rubrum).

The Little South Fork is the western boundary of the Cumberland Plateau, and lies along the portion of the Plateau Braun (1950) called the "Cliff Section" because of the bold cliffs of Pottsville sandstone or conglomerate (now called the Rockcastle Conglomerate) that characterize most of it. Pine, pine-oak, and oak-pine woodlands generally dominate the narrow ridgetops and caprocks above the sheer sandstone cliffs. On the rolling interstream uplands on the broader ridges, oak-hickory or oak-tulip poplar forests often predominate. Below the cliffs, the steep valley slopes support the true Mixed Mesophytic forest type, in two distinct phases: an all-deciduous mixed mesophytic forest type, and a hemlock-mixed mesophytic forest type. Both phases of the Mixed Mesophytic Forest association are evident along Highway 92 east of the Little South Fork, and especially in proximity to the Big South Fork. Driving westward, however, the character of the forest changes noticeably, even abruptly, near the Little South Fork.

West of the Little South Fork is the eastern edge of the Highland Rim of the Mississippian Plateau Section of the Western Mesophytic Forest Region. According to Braun (1950), the Western Mesophytic Forest Region is a region extending from the western escarpment of the Cumberland Plateau to the loess bluffs along the Mississippi River at the eastern limit of the Mississippi alluvial plain, and from northern Alabama and Mississippi northward to the southern boundary of Wisconsin glaciation in Ohio and eastern Indiana. The region, according to Braun, has no characteristic climax type. Instead, the major vegetation types of the region form a complex mosaic which is a reflection of both present and past influences. In the eastern part of the region, mixed mesophytic forests are frequent in occurrence, although less luxuriant than are those of the Mixed Mesophytic Forest Region proper, due presumably to the influence of a bedrock geology of shale and limestone rather than sandstone conglomerate. Moving westward, a gradual change occurs in the extent of Mixed Mesophytic forests, and in the frequency of forest communities dominated by oaks. The Western Mesophytic Forest Region is, therefore, a region of transition between the Mixed Mesophytic Forest of the east, and the Oak-Hickory Forest Region lying west of the Mississippi River.

Of the dissected Eastern Highland Rim (along which the Little South Fork flows), Braun (1950) said that the nature and extent of the mixed mesophytic forest communities was such as to make the Highland Rim essentially a part of the Mixed Mesophytic Forest Region. Beech, however, was dominant in most mixed mesophytic stands, and the abundance of Pachysandra in the herbaceous layer was distinctive of the area. Oak, oak-hickory, and in Braun's time, oak-chestnut and related forest types occupied the drier slopes and ridges. This description is still applicable to many sites in the study area, based upon the field reconnaissance for this inventory, with the exception, of course, of the near-total absence of chestnut. Pachysandra was abundant in the herbaceous layer on many slopes in the study area in the spring of 1981, and beech was a dominant tree in some mixed mesophytic stands.

Few of the mixed mesophytic stands, as Braun suggested, were as "luxuriant" as those a few miles eastward along the Big South Fork. Hemlock was extremely scarce in the study area, and so too was *Magnolia*.

In the upper half of the study segment of the river, the prevalence of limestone, including areas of shallow soils over limestone and limestone outcrops, has resulted in the occurrence of vegetation types similar to those of the area farther west of the Little South Fork that Braun (1950) calls the "Limestone Hills" section. In the Limestone Hills, forests in which beech and white oak are abundant occur on some of the more southerly slopes, and have a xeric aspect accentuated by the local occurrence of limestone xerophytes where rock outcrops on the slopes. This description is applicable to a number of forested stands in the Slavans and Kidds Crossing vicinity of the upstream end of the study area.

Braun (1950) noted that limestone ledges in most of the limestone hills afforded suitable habitat for a variety of xerophytic herbs and shrubs, at least some of which are plants commonly occurring in prairie communities such as *Andropogon scoparius*, *Agave virginica*, *Euphorbia corollata*, *Gaura filipes*, *Aster oblongifolius*, and *Silphium trifoliatum*, and that a red cedar-prairie community (the "cedar barrens") forms a band around many of these limestone hills. Several of these red cedar-prairie or cedar barrens habitats were observed in the upstream half of the study area, especially on the Wayne County side of the river. All were small and very local in extent. While some were in rocky pastures, others occurred along roadsides. In addition to red cedar, *Agave virginica*, and *Aster oblongifolius*, another xerophyte common in the study area cedar barrens habitats was *Nothoscordum bivalve*. *Opuntia humifusa* was present at one location.

Braun (1950) notes that there was once an extensive "barrens" in Wayne County, Kentucky, and that the only remaining evidence of this is the abundance of prairie species on roadsides and dry slopes. She also notes that after lumbering took place in the area in the late 19th and early 20th century, the slopes eroded badly and most of the A horizon of the soil washed away. The result was that conditions became unsuitable for re-colonization of the slopes by the original mesophytic assemblage of species, and the xerophytic species formerly confined to the limestone ledges spread onto the dry slopes and the roadsides. Red cedar took over many of the driest slopes, often forming broken bands around the hills. Intermingled with the cedars are the more xerophytic oaks and hickories, together with redbud (*Cercis canadensis*), persimmon (*Diospyros virginiana*), dogwood (*Cornus florida*) and a few shrubs (*Rhus aromatica*, *Celtis pumila*, *Rhamnus caroliniana* and *Bumelia lycioides*). Near the upstream terminus of the Little South Fork Wild River study area, an assemblage of species very similar to that described above was found.

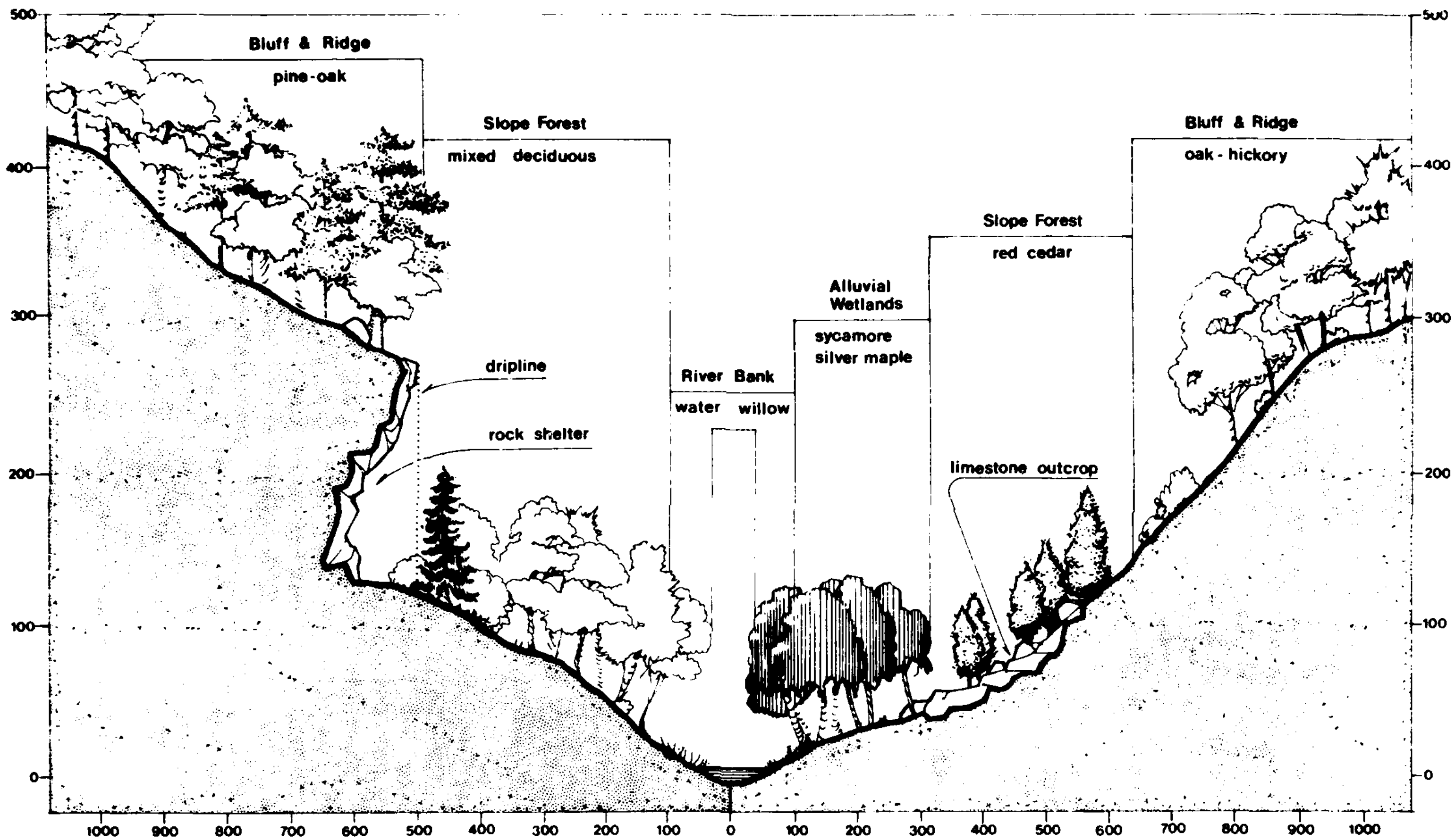
For the purpose of describing the vegetation of the study area in a context that will relate in a more meaningful way to the Wild River environment than the broader concept of Mixed Mesophytic or Western

Mesophytic Forests, the study area will be divided into six general habitat types based primarily on position in the topography, slope, drainage and aspect (compass orientation of a slope). The discussion to follow will generally proceed through these habitat types, describing each and the variations within each, from the type occupying the lowest elevations in the study area upwards to the highest elevations. The one principal departure from this will be the discussion of disturbed habitats, which occur at all elevations and are a major habitat type in the Little South Fork Wild River study area. A quick-reference number is provided in parentheses after the common names of plants the first time that they appear in the text. The number is provided to assist the reader in quickly locating the plant in Table 15 if more information, such as scientific name, distribution or abundance in the study area, is desired.

The six habitat types discussed in the paragraphs that follow are, in order of ascending topographic elevation: river bank, alluvial woods, slope forest, cliff, and bluff and ridge. The sixth habitat type is disturbed habitat which, as previously mentioned, occurs at all elevations. These principal habitat-types, minus disturbed habitats, are illustrated schematically on Figure 15. It should be realized that the schematic cross section of the stream in Figure 15 is idealized. The actual cross section of the stream, and with it, the type of terrestrial habitat, varies considerably from one place to the next in the study area. The alluvial woods, for example, a habitat-type characteristic of floodplains, is not everywhere present because the floodplain is discontinuous. Cliff habitat, likewise, is not universally present. Cliffs, in fact, are spotty in distribution in the study area. Still, Figure 15 provides a general conceptual overview that should help to visualize the different types of habitats discussed below.

3.8.3.2 Riverbanks (RB)

Riverbanks are a diverse habitat type in the study area. In many locations, the banks are, in large part, composed of outcroppings of the Monteagle Limestone. From one location to the next, the outcroppings in the banks may take the form of ledges, sheer rock walls, cobble-sized rubble, or scattered boulder-sized slabs of limestone amid muddy embankments. Occasionally, the banks are mud, formed out of the soils of the Huntington silt loam series. Bars of sand and gravel occur in some locations, although they do not occur as frequently as on the Big South Fork or the Rockcastle River, and small islands in the center of the stream are common. All of these microenvironments are included in the category of riverbanks, and are designated, collectively, as habitat "RB" in Table 15. Plates 36 through 44 in the Aquatic Biology section of this report illustrate the various types of riverbank habitat present at the aquatic sampling sites visited during the field reconnaissance for this inventory, and are generally representative of the range of riverbank habitats in the study area.



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Environmental Inventory
Little South Fork Wild River

Figure Number 15

Schematic Cross Section of Terrestrial Habitats

The occasional sand and gravel bars at the edge of the stream, and the small islands within it, are frequently inundated by the rise of the stream after heavy rains. Plants found in these aquatic habitats include mainly water willow (117), and occasionally some black willow trees (187) and shrubby sandbar willows (186). The water willow, however, is by far the most abundant plant of these habitats, forming extensive colonies in shallow water practically everywhere along the stream. In addition to the black willow and sandbar willow, other woody species found on sandbar and island habitats include seedling and sapling sycamores (152), silver maples (3), and occasionally, buttonbush (56). The latter species was observed during this reconnaissance at Ritner ford, at Vaughn's ford (approximately river mile 10.7), and along Corder Creek. Ritner ford supports a particularly good assemblage of aquatic species, including all of the aforementioned, plus pondweed (161), smartweed (156), lizard's-tail (190), coontail (57), spike rush (83) and bulrushes (191, 192). Pondweed and coontail were observed only at the Ritner ford locality during this survey, while the other species were observed at one or more other locations.

Above the sandbars and islands, extending to the bases of the line of trees at the inflection point of the bank, and also frequently inundated by storms and heavy rains, is the riverbank proper. This habitat is occupied principally by sycamore, silver maple, and box elder (1), and occasional black willows. Shrubs once again include buttonbush, and also, silky dogwood (71). Herbaceous plants observed in this habitat often included blue lobelia (127), white snakeroot (91) and autumn sneezeweed. At Ritner Ford, a relative of blue lobelia, cardinal flower (126), was observed.

The Kentucky Nature Preserves Commission (KNPC) has reported the occurrence of one Kentucky threatened species (Branson et al in press) in the riverbank environment of the Little South Fork. It is shining ladies' tresses (Spiranthes lucida), a member of the orchid family, and has been found in a moist habitat in the study area at Ritner Ford, according to KNPC records (KNPC, personal communication).

Another species, considered to be a species deserving special concern in Kentucky (Branson et al. in press), may possibly be present in swampy ground along the river, and/or on limestone outcrops in the study area (KNPC personal communication). It is northern white-cedar (Thuja occidentalis), a species of tree whose occurrence in Kentucky represents a separation from the rest of its range of distribution which includes southern Canada, the Great Lakes Region, the northwestern United States, and the Appalachian Mountains (Harlow and Harrar 1969). White cedar was not observed in the course of this inventory, but its possible occurrence in the study area is indicated by the recent discovery of specimens in other parts of the region including the Big South Fork, Buck Creek, and Lake Cumberland (KNPC, personal communication).

Similarly, golden club (Orontium aquaticum), a Kentucky threatened species (Branson et al. in press) is potentially present in shallow water, and on wet banks (Rickett 1966) in the study area. It has been collected along the Big South Fork recently (KNPC personal communication).

Stiff gentian (Gentiana quinquefolia), said to be rare in Kentucky, according to Wharton and Barbour (1971), was collected during this inventory from the riverbank environment at Ritner Ford, on the McCreary County side of the river. While this probably represents the first report of stiff gentian from this part of Kentucky, its presence is to be expected. Rickett (1966) reports the distribution of stiff gentian as extending from Maine to western New York, southern Ontario and Minnesota, and southward to Florida, Tennessee and Missouri.

The fauna of the riverbank habitat is not especially diverse. This is due largely to the hazards associated with a fluctuating water level; the habitat may be aquatic at one time, and extremely xeric only a few days or weeks later when the water level recedes.

Nonetheless, amphibians including the southern leopard frog, pickerel frog, bullfrog, cricket frog, two-lined salamander and dusky salamander may be found among the rocks of the streambank.

The most characteristic reptile of the riverbank habitat is the common water snake. The spiny softshell turtle is present also, but is fully aquatic, and its presence is less evident than the common water snake, which may occasionally be seen basking on rocks along the river.

Birds occurring in the riverbank habitat include the green heron, the killdeer, the northern waterthrush and the kingfisher. Waterfowl, such as the wood duck, mallard, black duck, or blue-winged teal may occur seasonally, but their numbers on the Little South Fork are never large, due to the size and nature of the stream and its distance from main waterfowl flyways.

Mammals present in the riverbank habitat include the raccoon, opossum, long-tailed weasel, muskrat and mink. These might be observed along the stream at any time, but especially at dusk and after dark, or in the early morning. These may be considered as residents within this habitat, as they do most of their hunting and feeding along the riverbanks. Other mammals, including the rabbit, gray squirrel, and white-tailed deer are coincidental in the riverbank environment. They pass through it to reach the source of drinking water, but spend most of their time in adjacent habitats.

3.8.3.3 Alluvial Woods (AW)

The alluvial woods habitat type (designated "AW" in Table 15) includes the floodplain of the Wild River. This habitat type is not continuous throughout the length of the study area corridor; the floodplain is often non-existent, or even when present, it is sometimes very narrow and poorly developed.

The dominant tree species in the alluvial woods is the sycamore (152). Associated species include: silver maple, box elder, sweetgum (123), white ash (95), red maple (2), black gum (135), hackberry (55), American elm (220), ironwood (48) and tulip poplar (124). Sycamore is the most abundant tree along the top of the streambank at the edge of the floodplain in most locations. In winter, its distinctive light-colored bark creates a bold contrast against the starkness of the slopes beyond the river bank. Silver maple, and then box elder are second and third in abundance respectively, in lining the streambank. Ash, elm, maple and tulip poplar increase in abundance on the floodplain away from the inflection point of the bank. Sweetgum and black gum are very infrequent constituents of the alluvial woods habitat of the Little South Fork study area.

Shrubs in the alluvial woods habitat include spicebush (122), silky dogwood (71), wild hydrangea (108), pawpaw (31), American holly (110) and strawberry-bush (87). Vines frequently observed in the alluvial woods habitat include crossvine (21), Virginia creeper (141), muscadine grape (231) and frost grape (232). Poison ivy (178) is the most abundant vine in the alluvial woods in many locations.

The herbaceous layer of the alluvial woods habitat includes a few colorful species of wildflowers including Virginia bluebells (131), mistflower (89) and golden ragwort (194). In most locations, it also includes a considerable number of species characteristic of sunny, open low ground including naturalized European and Asian weed species. This is because level floodplain habitat along the Little South Fork Wild River has usually been cleared and tilled for agriculture at some point in the past. The remaining alluvial woods is along the top of the streambank on the one hand, and along the toe of the valley footslope on the other. Species present along the edge of these alluvial woodland clearings include: zigzag goldenrod (202), rough goldenrod(203), ironweed (225), white wood aster (38), yellow ironweed (7), autumn sneezeweed, common violet (227), white snakeroot, and false sunflower (104).

Representative alluvial woods habitat environments occur on the Wayne County side of the Little South Fork just upstream of the Highway 92 bridge; upstream of the mouth of Corder Creek along the McCreary County side of the river; downstream of Baker Branch in Wayne County, and upstream of Vaughn's ford in McCreary County.

Wildlife in the alluvial woods environment is more diverse than in the preceding habitat. Amphibians present in the alluvial woods include the American toad, Fowler's toad, spring peeper, gray treefrog, zigzag salamander, and efts of the red-spotted newt. Reptiles include the black racer, hognose snake, ground skink and black rat snake. Birds present will include the yellow-billed cuckoo, red-bellied woodpecker, acadian flycatcher, whip-poor-will, green heron, and American woodcock. The mammals occurring in the preceding habitat occur here also, along with such species as the eastern mole, southeastern pipistrelle and red bat.

A possible inhabitant of the alluvial woodlands of the study area, according to the Kentucky Nature Preserves Commission (personal communication), is the masked shrew (_Sorex cinereus_). Formerly known in Kentucky only from Big Black Mountain in Harlan County (Barbour and Davis

1974), it was first collected in western Kentucky in 1976 (French 1978). Barbour and Davis (1974) suggested that it might occur in northern Kentucky, based on records from adjacent Indiana and Ohio, and a record of a specimen collected in Fentress County, Tennessee (KNPC personal communication) suggests its possible occurrence in southeastern Kentucky. The masked shrew is considered to be a threatened species in Kentucky, according to the Kentucky Nature Preserves Commission.

Other small mammals of interest to the Nature Preserves Commission that are unlikely, yet still possible inhabitants of the Little South Fork Wild River study area, are the pigmy shrew (Microsorex hoyi), the cloudland deermouse (Peromyscus maniculatus nubiterrae) and woodland jumping mouse (Napeozapus insignis) (KNPC personal communication). The shrews are considered to be endangered species in Kentucky by the KNPC; the cloudland deermouse is assigned threatened status, and the woodland jumping mouse is classified as a species deserving special concern.

3.8.3.4 Slope Forest (SF)

The slope forest habitat (designated "SF" in Table 15) includes all habitat types on the valley sideslopes exclusive of disturbed habitats, beginning with the inflection point of the lower slope at the edge of the alluvial woods upward to the base of a cliff or, in the absence of a cliff, to the inflection point near the top of the sideslope.

The character of the slope forest varies considerably in accordance with terrain features and slope aspect (compass orientation). Lower slopes are often very steep, and where no floodplain exists, they extend to the water's edge. These are usually underlain by Monteagle Limestone and are often very rocky, including rock outcroppings and low cliffs and ledges. These rocky slopes may be very dry, especially if they have a southerly orientation, or cool and moist if they are north-facing, or in steep coves and deep ravines.

Sideslopes are usually less steep than lower slopes, but the degree of slope varies considerably from place to place. Benches, ledges and even low cliffs may occur in middle elevations of sideslopes in the study area, often in association with the Bangor Limestone and Hartselle Formations, and at the contact between these formations and formations above and below them. Some of the most moderate sideslopes are underlain by the Pennington Formation, which is largely shale. Where steep slopes are underlain by the Pennington Formation, the surface is sometimes hummocky, indicating previous slumping and sliding. An old slope failure with a hummocky surface is present in the study area on the McCreary County side of the river opposite river mile 9.1.

Very little talus slope habitat occurs in the study area. Talus slope is defined as a steep slope strewn with various sizes and shapes of sandstone and conglomerate boulders with little or no ground exposure. The scarcity of talus slope is a consequence of the near absence of the Breathitt and Lee Formations within the study area boundary. The amount of talus slope habitat in the study area was not thought sufficient to justify creation of a separate column in Table 15. The limestone cliffs in the study area do not generally weather in such a way as to create a limestone talus slope equivalent to the sandstone talus, and thus, plants associated with the minimal amount of talus in the study area are included in the discussion of the slope forest and the cliff habitat.

Canopy trees on dry rocky slopes in the study area include white oak (166), northern red oak (169), scarlet oak, chestnut oak (168), southern red oak (167), shortleaf pine (146), pitch pine (145), Virginia pine (149), pignut and shagbark hickory (49 and 50 respectively), and usually, scattered red cedar (116). The pine are occasionally dominant, but in other, less xeric circumstances, they may be almost entirely absent. Slope forests on rocky south and west-facing exposures usually have some permutation or other of the forest type described above. If pine predominates, the habitat type is pine or pine-oak. This is a more frequent habitat type in the bluff and ridge forest than on sideslopes, but does occur on sideslopes also. If oak predominates, but scattered pines are present, the forest habitat is designated oak-pine. If pine is absent or an insignificant component of the canopy, the habitat is characterized as oak-hickory. All of these habitat types occurring on relatively dry slopes are included in the SF column of Table 15. They are segregated by type on Map Set D, Land Cover where PO is pine-oak forest, OP is oak-pine and OH is oak-hickory.

Understory in the dry, rocky slope forest usually consists largely of dogwood (70), but often includes sassafras as well, and saplings of the dominants. The shrub layer may include farkleberries (223), burning bush (88), and greenbriers (195, 196, 198).

The herbaceous layer is not especially luxuriant on dry rocky slopes, but may include ebony spleenwort (34), cutleaf toothwort (78), spring beauty (65), wooly blue violet (229), three-lobed violet (230), and perhaps birdfoot violet (Viola pedata).

Steep, rocky slopes with a north exposure or sometimes, an easterly orientation; steep slopes in deep, narrow coves and ravines, or moderate slopes on northerly or easterly oriented slope faces usually have a different slope forest type of vegetation established on them. On slopes of this nature, the dominants are often beech (92), sugar maple (4), white oak, buckeye (9), red maple (2), basswood (213), and tulip poplar. Other species of oak besides white oak and hickories are usually present, but do not dominate the stand. Pine and red cedar are either absent or an insignificant stand component.

Hemlock (218) is sparingly present, low on north-facing slopes and in coves. Hemlock was observed in only a handful of sites in the study area, including a slope forest near Vaughn's ford.

White pine (148) was observed at two locations in the study area; both at middle and upper elevations on sideslopes in association with beech and other species of pines. One location was below a cliff on Mr. Ronzo Bell's farm. This site is within the broader study area depicted in the

Map Folio Set, but is upstream of the official Wild River boundary. The other location was on the Vaughn property, on the slope alongside the road leading to Vaughn's ford.

Both black walnut (115) and butternut (114) were observed in mesic slope forests in the study area, but both were infrequent. The butternut was especially rare. It was observed in only one location.

Understory in the mesic slope forest includes redbud (58), serviceberry (17), dogwood, American holly (110) and ironwood (48). In just a few stands, umbrella magnolia (130) was present in the understory as well. The shrub layer includes spicebush (122), wild hydrangea and pawpaw. Rhododendron (175) and mountain laurel (118) were very sparingly present. Vines present consisted mainly of Virginia creeper and poison ivy.

The herbaceous flora of mesic slopes was the most diverse of all of the habitat types in the study area. Assemblages of wildflowers were most diverse and most abundant on lower slopes, in coves, ravines, and on sideslopes above small tributary streams and watercourses. Particularly fine assemblages of wildflowers were observed on the McCreary County side of the river in Jones Hollow, Morrow Hollow and Worley Hollow.

Species of plants present in the ground cover layer of mesic slopes include: bloodroot (188), maidenhair fern (8), Christmas fern (158), mayapple (154), white baneberry (6), rue anemone (20), putty-root (23), wild ginger (29), blue wood aster (37), white wood aster (38), calico aster (39), blue cohosh (54) , striped pipsissiwa (59), spring beauty, slender toothwort (77), cutleaf toothwort, wild comfrey (72), yellow trout-lily (86), twinleaf (113), wild geranium (98), rattlesnake plantain (200), hepatica (105), American alumroot (106), mountain spurge (140), blue phlox (144), crested dwarf iris (112), star chickweed (208), Solomon's seal (155), long-spur violet (228), yellow trillium (217) and wedge-shaped trillium (216).

Wildlife in the slope forest habitat include, among amphibians present, the marbled and the slimy salamander, the American toad, efts of the red-spotted newt, and upland chorus frogs in wet depressions on benches. Reptiles include the fence lizard, copperhead, worm snake, and box terrapin. Birds include the great horned owl, Cooper's hawk, eastern wood pewee, tufted titmouse, black-capped chickadee, veery, downy woodpecker, pileated woodpecker, red-eyed vireo, Kentucky warbler, worm-eating warbler, northern parula warbler, ovenbird and American redstart. Mammals present will include the gray squirrel, southern flying squirrel, chipmunk, gray fox, white-footed mouse, striped skunk, raccoon, opossum, hairy-tailed mole, smoky shrew and short-tailed shrew.

An unusual habitat on gentle to moderate slopes in the upstream half of the study area, and especially on the Wayne County side of the river, is the occasional small "cedar barrens". These are often in association with farmland or other disturbed habitats such as road corridors through woodlands or utility rights-of-way, but some occur on limestone outcrops surrounded by xeric woodland habitats, and so, are presented in this section on Slope Forests.

The term "cedar barrens" was coined by the pioneers to describe areas encountered by them that were treeless except for open stands of red cedar and scrubby specimens of pine or oak. Prairie species of herbaceous plants dominated the ground cover layer. True cedar barrens were concentrated mainly in a narrow band in the western half of Kentucky, with outlying patches in other locations, including Wayne County, according to Braun (1950). They were eastward extensions of the midwestern prairies, and probably developed as a consequence of climatic and edaphic factors, perhaps influenced by man (fires intentionally set by Indians and/or the early settlers of Kentucky). The cedar barrens or cedar barrens-like habitats in the study area did not likely originate in this way. Instead, they are more likely to have originated more recently after the forests of the area were timbered out as a consequence of the subsequent erosion of the A soil horizon and the coincidental occurrence of xeric species on outcrops of the Monteagle Limestone. The small size of cedar barren-like habitats in the study area, and their proximity to disturbed habitats suggests their recent origin as a result of poor land use practices rather than as surviving remnants of a once vast, naturally-occurring habitat type in this area.

In addition to red cedar, the cedar barren-like habitats in the study area also support scattered oaks (white, northern red, southern red and scarlet), winged elm and Virginia pine.

On Map Set D, Land Cover, stands dominated almost exclusively by red cedar are designated by the letters RC. Some of these stands are cedar barrens habitat in woodlands and some are old fields or abandoned pastures. Where pine and oak are mixed with the red cedar, the symbol RP is used, and where hardwoods are a significant constituent, but pines are absent or nearly absent, the letters RH are used.

Shrubs in cedar barren-like habitat in the study area include redbud and fragrant sumac (176). Xeric herbaceous plants in these habitats included false garlic (134), false aloe (10), hoary puccoon (125) and, in one location, prickly pear cactus (136).

The fence lizard (Sceloporus undulatus) is frequently encountered in cedar barrens habitats, and is a permanent resident, living in small crevices in or beneath the outcrops of Limestone.

3.8.3.5 Cliffs (CL)

Cliff habitat is designated in Table 15 by the letters "CL." This habitat is not continuously present along the study segment of the Little South Fork. The cliffline occurs as broken segments on either side of the river, and at different elevations above the river. The height of the cliffs varies, too, from only 10 to 12 feet to 40 or 45 feet.

Most of the cliffs are exposed limestone, either the Monteagle Limestone or the Bangor Limestone. Those of the Kidder Member of the Monteagle Limestone form low cliffs not far upslope from the riverbank, and in the downstream segment, the Ste. Genevieve member forms sheer cliffs at the river's edge. Cliffs formed of Bangor Limestone are farther upslope, to middle elvations on the sideslopes.

Sandstone cliffs are less frequent in the study area, and occur at the highest elevations, at the limits of the study area boundary where the Breathitt and Lee Formations outcrop above the Pennington Shale Formation.

The cliff habitat includes several microhabitats, each with a distinctive flora. The microhabitats are: crevices, ledges, rockshelters and driplines.

Crevices are vertical fractures in the cliff face filled with loose soil and capable of supporting small shrubs or herbaceous species such as serviceberry (17), mountain laurel (118), rue anemone (20), mountain spleenwort (32), blackstem spleenwort (35), and marginal woodfern (Dryopteris marginalis).

Ledges are exposed horizontal projections of the cliff face, and have greatly variable soil depths depending on their size and formation. Ledges support such shrub and herbaceous species as mountain pepperbush (66), mountain laurel, spring beauty, round-leaved firepink (Silene rotundifolia), and walking-fern (36).

Rockshelters are overhangs or concave surfaces in the cliff face, often with springs, intermittent springs, or seeps, issuing from their bases. Except where there are springs or seeps, the environment under the rockshelter can be very dry, and depending on the depth of penetration of the shelter into the cliff face, may have dim light. Species observed in rockshelters in the Little South Fork study area consisted principally of fragile fern (74), marginal woodfern, and mountain spleenwort.

In front of a rockshelter or overhang is the "dripline," marked by a wet or moist, pock-marked outline where water drips from the edge of the overhanging rock. The drip line is in the zone of transition between the dimly-lit shelter with its dry, dusty or rocky floor, and the slope forest, with or without talus, below the shelter rim. By contrast to the rockshelter, the microhabitat of the dripline has a thin layer of mull humus, and receives direct sunlight, rain and drip. Plants commonly occurring in this environment include: cutleaf toothwort (78), columbine (24), spring beauty, long-spur violet and rue anemone.

Amphibians likely to be occupying the cliff habitat may include, the cave salamander and mountain salamander in moist crevices in the cliff. The most frequently observed reptile, especially on the dry, hot, sunny environment above the cliff, is the fence lizard. Other reptiles that may be present include the only two species of venomous snakes known to occur in the area; the northern copperhead and the timber rattlesnake.

Species of birds that are likely to occur in the cliff habitat include the ruffed grouse, eastern phoebe, rough-winged swallow and the Carolina wren. Certain raptors, such as the red-tailed hawk and sparrow hawk, both of which were observed in the study area, and the turkey vulture, prefer the cliff habitat for nesting and roosting. These birds, however, would be drawn more to the occasional sandstone cliff at the highest elevations, rather than the low limestone cliffs closer to the river. No nest sites were observed in the cliff habitats visited in the study area.

Among the mammals in the study area, the bats are among the most likely inhabitants of the crevices, ledges, shelters and hollows in the cliff face. The more common bat species such as the little brown bat, big brown bat and southeastern pipistrelle most likely roost during the day in crevices in the cliff environment. The occurrence of cave bats, per se, is unlikely in the study area due to the lack of true caves. Other mammal species that may utilize rocky environments such as cliffs, ledges and shelters include the cottontail, groundhog, eastern chipmunk, white-footed mouse, cave rat, red fox, gray fox, long-tailed weasel, eastern spotted skunk and bobcat. A few den sites in some cliffs were observed, but all appeared, by their small size and manner of construction, to be groundhog and rabbit dens. Signs of cave rat occupancy, or of occupation by larger mammals such as fox or bobcat, were lacking.

3.8.3.6 Bluff and Ridge Forests (BR)

A bluff, as the term is used here, means the environment immediately above a cliff. It is generally a hot, dry, rocky environment with thin soils, or in places, no soil -- only exposed rock. The plants nearest the edge of bluffs in the study area were mosses and lichens, including reindeer lichen (64) which forms small mats or cushions in very thin soil near the edges of the bluffs. Farther from the edge of the bluff, where the thin layer of soil deepens, pipsissewa, teaberry, ebony spleenwort and grasses appear. Farther still, where the soil is deep enough, mountain pepperbush, mountain laurel and blueberries (*Vaccinium* spp.) appear. At or beyond this point, trees make their first appearance. Pines, including shortleaf, pitch and Virginia are common as are oaks, including especially chestnut oak, post oak (170) and scarlet oak.

Ridge forest, as opposed to the bluff habitat, is the woodland vegetation on ridgetops, irregardless of the presence of a cliff below the ridgetop. In the absence of a cliff, the boundary between the ridge forest and the slope forest is determined by the increase in xeric tree species; the occurence of the more xeric forest type -- typically oak-hickory, oak-pine or pine-oak; and/ or by a pronounced point of inflection near the top of the sideslope.

Ridge forests include the same tree species encountered near the bluff, but also, white oak, northern red oak, black oak, pignut hickory, mockernut hickory, black gum, sassafras and sourwood. The understory includes flowering dogwood (70) and redbud (58). Shrubs are mainly those encountered at the bluff, plus burning bush, catbriers and sawbriers. In addition to the herbaceous species observed at the bluff, the ground cover vegetation of the ridge forests may also include wood-betony (142), tall anemone (19), may-apple, cutleaf toothwort, wooly blue violet, three-lobed violet, yellow trillium, pussy-toes (22), bluets (107), dwarf cinquefoil (160), and wood vetch (226).

The only amphibians actually observed in bluff and ridge environments in the study area were Fowler's toad and the slimy salamander. Others that can be expected in this habitat are efts of the red-spotted newt, the ravine salamander, the American toad, the gray treefrog, and the mountain chorus frog. The occurrence of all but the slimy and ravine salamanders depends upon the presence, somewhere in the vicinity, of shallow pools of water for breeding. During the spring reconnaissance for this inventory, toads and mountain chorus frogs were found to be using puddles in logging roads, both on sideslopes and ridgetops, as breeding sites. The slimy and ravine salamanders are more strongly adapted for terrestrial microhabitats and do not require standing water.

Reptiles observed in the bluff and ridge environment during this inventory were the box terrapin and fence lizard. Other likely reptilian inhabitants are: the southeastern five-lined skink, broad-headed skink, northern coal skink, slender glass lizard, and most of the snakes in Table 16.

Many birds occur in the bluff and ridge forest including the yellow-shafted flicker, red-headed woodpecker, Carolina chickadee, white-breasted nuthatch, summer tanager, scarlet tanager, and during spring and fall, several migratory warblers.

Mammals in the bluff and ridge environment include the gray squirrel, cottontail, white-tailed deer, gray fox, chipmunk, white-footed mouse and meadow mouse.

3.8.3.7 Disturbed Habitats

Disturbed habitats in the study area include human habitations (farm residences, commercial structures, churches), cemeteries, agricultural land (pasture, hay field, row crop, old field and abandoned pasture), surface mines (active and reclaimed or abandoned surface coal mines), and rights-of-way (overhead electric and/or telephone, underground pipeline and road corridor). These are designated, collectively, by the letters "DH" in Table 15. In the Map Folio Set, Map Set D, Land Cover, some of the different kinds of disturbed habitats are identified by the use of several different letter abbreviations explained in the map legend.

Disturbed habitats are a significant constituent of the environment of the Little South Fork Wild River study area. Agricultural land in particular, consisting mainly of pasture and hayfields, is a major land use type within the study area boundary. The vegetation of these agricultural areas, of course, consists mainly of cultivated grasses and legumes with invading "undesirable" species of grasses and broadleaved weeds constituting an inevitable but unwanted minor percentage of the total ground cover. Row crops, including chiefly corn, soybeans and tobacco, are not extensive in occurrence in the study area due to the unsuitability of most of the soils to this use. Limiting edaphic factors are steep slopes and rockiness. The presence of agricultural lands, including those no longer cultivated (old fields and abandoned pastures in various successional stages), contribute to the overall habitat diversity of the study area and are beneficial from a game species standpoint. Populations of cottontail rabbit, bobwhite quail, mourning dove, fox squirrel and white-tailed deer in the study area would all undoubtedly be smaller than they currently are if there were no agricultural lands.

Besides the domestic livestock for which pasture is created, and domestic dogs and cats, other wildlife in addition to the game species mentioned above utilize agricultural disturbed habitats. Amphibians found in agricultural lands include both the American and Fowler's toads. Stock watering ponds on farm land usually support populations of ranid frogs including the bullfrog, southern leopard frog and green frog. Reptiles usually present include the fence lizard and five-lined skink, the black racer, black rat snake, garter snake, and milk snake. Ponds provide habitat for additional reptilian species including the common water snake, common snapping turtle and stinkpot turtle.

Many species of birds are also attracted to agricultural habitats. Commonly observed species are the common crow, eastern meadowlark, brownheaded cowbird, starling, house sparrow, cardinal, blue jay, robin, indigo bunting, rufous-sided towhee, bluebird, barn swallow, American goldfinch and sparrow hawk.

Fields, fencerows and forest edges support a variety of mammals including, in addition to the game species already mentioned: the groundhog, eastern harvest mouse, golden mouse, meadow mouse, red fox, least shrew, big brown bat, Norway rat and house mouse. Farm ponds provide habitat for an additional species, the muskrat.

Many or most of the wildlife species mentioned above also inhabit the other narrow, linear disturbed habitats within the study area -- the rights-of-way. Common species of herbaceous plants along roadsides and in electric transmission corridors and other rights-of-way in the study area include Queen Anne's lace, dandelion, common teasel, wild garlic, henbit, tall goldenrod, frostweed aster, self-heal, garlic-mustard, ironweed, yarrow, yellow rocket, ragweed, ox-eye daisy, polk, lespedeza and wooly mullein. These same species invade old fields and pastures in the area. Most are naturalized European or Asian plants.

Shrubs and vines in disturbed habitats frequently include pasture rose, multiflora rose, blackberries, raspberries, coralberry, crossvine, Japanese honeysuckle, trumpet creeper and sumac. Trees invading disturbed habitats most often include black locust, honey locust, redcedar, black cherry, slippery elm, box elder, persimmon and Virginia pine.

Surface mining for coal is occurring in the area surrounding the Wild River study area. An active mine is in Wayne County outside the limits of the official Wild River boundary, but one cleared area penetrates the broader study area depicted in the Map Folio Set. This cleared area, shown on Sheet 4 in the Map Folio Set and seen in the background in Plate 34, has recently been reclaimed in grass. Another cleared area, also depicted on Sheet 4, on the McCreary County side of the river, is an older reclaimed mine site, also established in grass, broadleaved weeds and seedling and sapling trees.

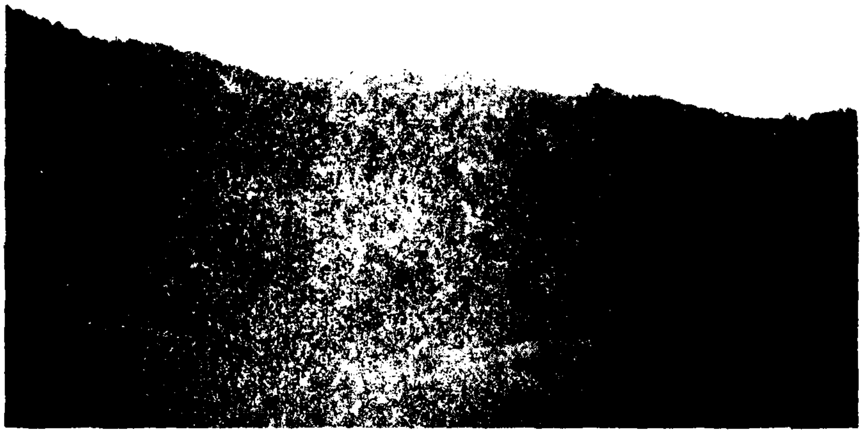
Plates 30 through 35, on the pages that follow, illustrate some of the terrestrial habitats discussed in the preceding sections of text.

Alluvial Woods

Forest Habitat

Plate 32: Wedge-shaped Trillium
(*Trillium cuneatum*)

Plate 33: Cliff Habitat



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3.8.4 Guide for Use of the Flora of the Little South Fork Wild River, Kentucky

Table 15 shows which plants grow in each habitat in the study area, and with what frequency. Common and scientific names are given, as is the plant form (i.e., tree, shrub, vine, etc.). The primary source for the nomenclature of listed plants is the Manual of Vascular Plants of Northeastern United States and Adjacent Canada by Gleason and Cronquist. The pteridophytes (ferns and fern allies) are the only exceptions. Nomenclature for this group is based primarily on Ferns and Fern Allies of Kentucky by Cranfill (1980).

The first column, entitled "Ref. No." (Reference Number), assigns a different number to each species, which is used as a cross-reference between the text and Table 15. This enables the reader, who may not have knowledge of the scientific name of a plant, to easily locate the species in the table when information other than what is provided in the text is needed (e.g. scientific name, plant form, or additional distributional and abundance data).

The column entitled "Form" gives the general growth habit or type of plant according to the following scheme:

T - Tree
S - Shrub
V - Vine
H - Herb
F - Fern
G - Grass
P - Parasite
L - Lichen
M - Moss
C - Cactus

The occurrence of each species within the corridor is described by both habitat and relative abundance. The determination of these characteristics was based solely on interpretation of field data collected during this study. The habitats which correspond to the symbols in the top line of this portion of the chart depicted by letter couplets, represent groupings of the major geologic, soil, slope, aspect, and hydrologic features of the Study Area, with an attempt to be concise in doing so. Variations within these major groupings are more thoroughly described in the body of the terrestrial biota section of this report. Abundance data are based solely on qualitative field interpretations. The following are explanations of the symbols used in the table:

Habitats

RB - Riverbanks: includes gravel and sand bars, islands and both rocky and muddy banks.

AW - Alluvial Woods: includes floodplains and terraces, sloughs, and silt banks, and river edge emergents not associated with habitat RB.

SF - Slope Forest: lacking rocky talus, boulders scattered or absent; weathered from less resistant rock, associated cliff usually small;

CL - Cliffs: includes crevices, ledges, rockshelters, and drip-line.

BR - Bluff and Ridge Forest: generally includes everything from the highest cliff line to the ridge crest; in the absence of cliffs the extent of the drier association, usually oak-hickory, oak-pine, or pine-oak, is used to delimit the area.

DH - Distured Habitats: agricultural, including old fields and abandoned pastures, active and abandoned surface mines, and road, pipeline or other utility rights-of-way.

Abundance*

A - Abundant: usually present in quantity and indicative of the habitat.

F - Frequent: present in some quantity, however small, throughout a particular habitat within the corridor.

I - Infrequent: occurring irregularly in a particular habitat with varying degrees of abundance.

R - Rare: occurrence unpredictable; usually only a few individuals present in any one locality.

V - Very Rare: located three times or less during the survey; population sizes vary greatly.

? - Occurrence possible and/or positive identification of species not possible during survey; abundance not known.

A hyphen indicates that a species was not observed in that particular habitat during the survey.

*These relative occurences are somewhat biased by the time of year. Some late spring and summer blooming plants may still have been obscure at this time of year.

Abbreviations

adj.	-	adjacent
ck.	-	creek
Co.	-	County
esp.	-	especially
Hwy.	-	highway
KNPC	-	Kentucky Nature Preserves Commission
Ky.	-	Kentucky
Mc.	-	McCreary
sp.	-	species
spp.	-	two or more species, usually followed by parentheses giving exact number
v.	-	very
w/	-	with
Wyn	-	Wayne
yg.	-	young

TABLE 15

FIELD OBSERVATIONS ON THE FLORA
OF THE LITTLE SOUTH FORK WILD RIVER, KENTUCKY

No.	Form	Scientific Name	Common Name	Habitat and Abundance					
				RB	AW	SF	CL	BR	DH
1	T	Acer negundo	Box Elder	I	F	-	-	-	F
2	T	A. rubrum	Red Maple	-	F	-	-	-	I
3	T	A. saccharinum	Silver Maple	I	F	-	-	-	I
4	T	A. saccharum	Sugar Maple	-	F	-	-	-	I
5	H	Achillea millefolium	Yarrow	-	-	-	-	-	F
6	H	Actaea pachypoda	White Baneberry	-	-	F	-	-	-
7	H	Actinomeris alternifolia	Yellow Ironweed	I	F	-	-	-	I
8	F	Adiantum pedatum	Northern Maidenhair Fern	-	I	I	-	-	-
9	T	Aesculus octandra	Yellow Buckeye	-	-	I	-	-	-
10	H	*Agave virginica	False Aloe	-	-	-	-	-	V
11	H	Agrimonia microcarpa	Agrimony	-	-	I	-	I	-
12	H	A. parviflora	Harvest Lice	-	I	I	-	-	I
13	H	Alliaria officinalis	Garlic-Mustard	-	-	-	-	-	I
14	H	Allium vineale	Wild Garlic	-	-	-	-	-	F
15	H	Ambrosia artemisiifolia	Ragweed	-	-	-	-	-	I
16	H	A. trifida	Giant Ragweed	I	R	-	-	-	-
17	T	Amelanchier arborea	Serviceberry	-	-	F	-	I	I
18	G	Andropogon virginicus	Broomsedge	-	-	-	-	-	F
19	H	Anemone virginiana	Tall Anemone	-	I	I	-	I	-
20	H	*Anemonella thalictroides	Rue Anemone	-	-	F	-	-	-
21	V	*Anisostichus capreolata	Crossvine	-	F	F	-	-	F
22	H	Antennaria plantaginifolia	Pussytoes	-	-	I	I	F	I
23	H	*Aplectrum hyemale	Putty-root	-	-	I	-	-	-
24	H	*Aquilegia canadensis	Columbine	-	-	-	I	-	-
25	H	*Arabis laevigata	Smooth Rock-cress	-	I	I	-	-	-
26	S	Aralia spinosa	Devil's Walking-Stick	-	R	I	R	I	I
27	H	Arctium minus	Burdock	-	-	-	-	-	I
28	G	Arundinaria gigantea	Cane	-	I	-	-	-	F
29	H	Asarum canadense	Wild Ginger	-	-	I	-	-	-
30	H	Asclepias variegata	Common Milkweed	-	-	-	-	-	F

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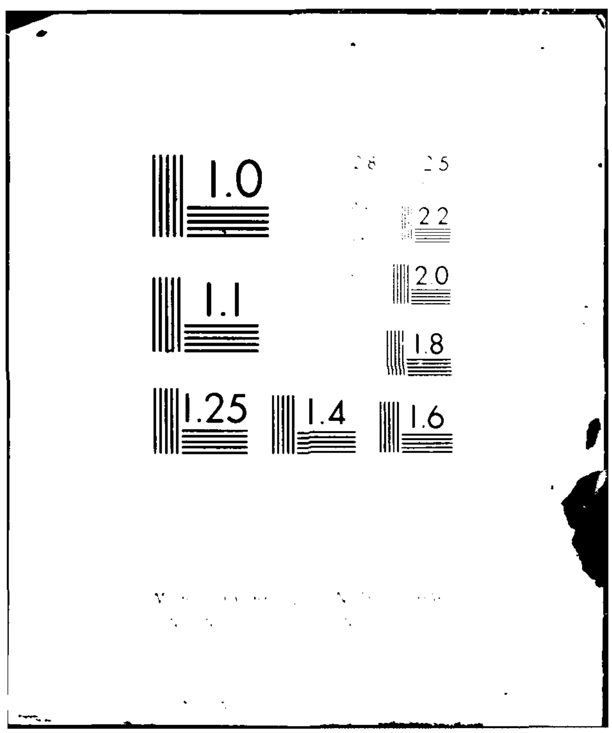
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TABLE 15
(continued)

No.	Form	Scientific Name	Common Name	Habitat and Abundance RB	AW	SF	CL	BR	DH
31	S	Asimina triloba	Pawpaw	-	I	F	R	I	-
32	F	*Asplenium montanum	Mountain Spleenwort	-	-	I	I	-	-
33	F	*A. pinnatifidum var. trudellii	Trudell's Spleenwort	-	-	I	I	-	-
34	F	*A. platyneuron	Ebony Spleenwort	-	-	F	I	I	F
35	F	*A. resiliens	Blackstem Spleenwort	-	-	I	I	-	-
36	F	*A. rhizophyllum	Walking Fern	-	-	I	-	-	-
37	H	Aster cordifolius	Blue Wood Aster	-	I	I	-	-	-
38	H	A. divaricatus	White Wood Aster	-	F	F	-	-	I
39	H	A. lateriflorus	Calico Aster	-	I	I	-	I	I
40	H	A. pilosus var. demotus	Frost-Weed Aster	-	-	-	-	-	A
41	H	A. sagittifolius	Arrow-leaf Aster	-	-	F	-	-	I
42	G	*A. surculosus	Creeping Aster	-	-	I	-	I	I
43	H	Barbarea vulgaris	Winter Cress	-	-	-	-	-	F
44	H	Bidens sp.	Tickseed	-	I	i	-	I	I
45	V	Campsis radicans	Trumpet Creeper	-	-	-	-	-	I
46	H	Capsella bursa-pastoris	Shepherd's Purse	-	-	-	-	-	F
47	H	Cardamine hirsuta	Bitter Cress	-	-	-	-	-	F
48	T	Carpinus caroliniana	Ironwood	-	I	F	-	-	-
49	T	Carya glabra	Pignut Hickory	-	-	I	-	I	-
50	T	C. ovata	Shagbark Hickory	-	-	I	-	I	-
51	T	C. tomentosa	Mockernut Hickory	-	-	I	-	F	-
52	T	Castanea dentata	American Chestnut	-	-	R	-	R	-
53	T	Catalpa speciosa	Catalpa	-	-	-	-	-	I
54	H	Caulophyllum thalictroides	Blue Cohosh	-	-	F	-	-	-
55	T	Celtis occidentalis	Hackberry	-	I	-	-	-	I
56	S	Cephalanthus occidentalis	Buttonbush	I	-	-	-	-	-
57	H	Ceratophyllum demersum	Coontail	I	-	-	-	-	-
58	T	Cercis canadensis	Redbud	-	-	F	-	I	I
59	H	*Chimaphila maculata	Striped Pipsissiwa	-	-	i	-	-	-
60	H	Chrysanthemum leucanthemum	Ox-eye Daisy	-	-	-	-	-	F

TABLE 15
(continued)

No.	Form	Scientific Name	Common Name	Habitat and Abundance					
				RB	AW	SF	CL	RR	DH
61	H	Chrysopsis mariana	Maryland Golden Aster	-	-	I	-	F	-
62	H	Cirsium altissimum	Tall Thistle	-	-	-	-	-	I
63	H	C. vulgare	Common Thistle	-	-	-	-	-	F
64	L	Cladina rangiferina	Reindeer Lichen	-	-	-	-	I	I
65	H	Claytonia virginica	Spring-Beauty	-	-	F	-	-	-
66	S	Clethra acuminata	Mountain Pepperbush	-	-	I	F	I	-
67	H	Convolvulus sepium	Small Bindweed	-	-	-	-	-	I
68	H	Conyza canadensis	Horseweed	-	-	-	-	-	F
69	H	Coreopsis major	Large Coreopsis	-	-	I	-	I	I
70	T	Cornus florida	Flowering Dogwood	-	-	F	-	I	-
71	S	*C. obliqua	Silky Dogwood	F	F	-	-	-	-
72	H	Cynoglossum virginianum	Wild Comfrey	-	-	I	-	I	-
73	H	Cyperus strigosus	Umbrella Sedge	I	I	-	-	-	-
74	F	*Cystoperis fragilis	Fragile Fern	-	-	I	-	-	I
75	G	Dactylis glomerata	Orchard Grass	-	-	-	-	-	I
76	H	Daucus carota	Queen Anne's Lace	-	-	-	-	-	F
77	H	*Dentaria heterophylla	Slender Toothwort	-	-	I	-	I	-
78	H	*D. laciniata	Cutleaf Toothwort	-	I	F	-	I	-
79	H	Desmodium sp.	Tick-trefoil	-	I	I	-	I	F
80	V	*Dioscorea quaternata	Wild Yam	-	-	I	-	-	-
81	T	Diospyros virginiana	Persimmon	-	-	-	-	I	I
82	H	Duchesnea indica	Mock Strawberry	-	-	-	-	-	F
83	H	Eleocharis obtusa	Spike Rush	I	I	-	-	-	-
84	G	*Elymus sp.	Wild Rye	-	-	-	-	-	F
85	H	Erigeron pulchellus	Robin's-plantain	-	-	I	-	-	I
86	H	*Erythronium americanum	Yellow Trout-lily	-	F	F	-	-	-
87	S	*Euonymus americanus	Strawberry Bush	-	F	I	-	-	-
88	S	E. atropurpureus	Eastern Burningbush	-	I	I	I	I	-
89	H	Eupatorium coelestinum	Mistflower	I	-	-	-	-	-
90	H	E. fistulosum	Joe-Pye Weed	-	I	-	-	-	I

TABLE 15
(continued)

No.	Form	Scientific Name	Common Name	Habitat and Abundance RB	AW	SF	CL	BR	DH
91	H	E. rugosum	White Snakeroot	I	F	I	-	-	I
92	T	Fagus grandifolia	American Beech	-	I	F	-	-	-
93	G	Festuca sp.	Fescue	-	-	-	-	-	A
94	H	Fragaria virginiana	Wild Strawberry	-	-	-	-	-	F
95	T	Fraxinus americana	White Ash	-	F	-	-	-	-
96	H	Galium aparine	Cleavers	-	F	F	-	F	F
97	H	*Gentiana quinquefolia	Stiff Gentian	-	R	-	-	-	-
98	H	*Geranium maculatum	Wild Geranium	-	I	F	-	I	-
99	T	Gleditsia triacanthos	Honey Locust	-	-	-	-	R	I
100	H	Goodyera pubescens	Rattlesnake Plantain	-	-	I	-	-	-
101	H	Hedeoma pulegioides	American Pennyroyal	-	-	-	-	-	F
102	H	Helenium autumnale	Autumn Sneezeweed	I	F	-	-	-	I
103	H	Helianthus sp.	Sunflower	-	F	-	-	-	F
104	H	*Heliopsis helianthoides	False Sunflower	-	I	-	-	-	I
105	H	Hepatica acutiloba	Hepatica	-	-	F	-	-	-
106	H	*Heuchera americana	American Alumroot	-	-	I	-	-	-
107	H	Houstonia caerulea	Bluets	-	-	I	-	I	I
108	S	Hydrangea arborescens	Wild Hydrangea	-	F	I	-	-	-
109	H	Hypoxis hirsuta	Yellow Stargrass	-	-	I	-	I	-
110	T	Ilex opaca	American Holly	-	I	I	-	-	-
111	H	Ipomoea pandurata	Wild Potato Vine	-	-	-	-	-	I
112	H	Iris cri[illegible]ta	Crested Dwarf Iris	-	F	F	-	-	-
113	H	*Jeffers[illegible]a diphylla	Twinleaf	-	-	R	-	-	-
114	T	Juglan[illegible]orea	Butternut	-	-	I	-	-	-
115	T	J. ni[illegible]	Black Walnut	-	-	R	-	-	I
116	T	Juniperus virginiana	Eastern Redcedar	-	I	F	I	F	A
117	H	Justicia americana	Water Willow	A	-	-	-	-	-
118	S	Kalmia latifolia	Mountain Laurel	-	-	I	I	I	-

TABLE 15
(continued)

No.	Form	Scientific Name	Common Name	Habitat and Abundance RB	AW	SF	CL	BR	DH
119	H	Krigia biflora	Dwarf Dandelion	-	-	-	-	-	-
120	H	Lamium amplexicaule	Henbit	-	-	-	-	-	F
121	H	Lespedeza cuneata	Silky Lespedeza	-	-	-	-	-	I
122	S	Lindera benzoin	Spicebush	-	F	F	-	-	-
123	T	Liquidambar styraciflua	Sweetgum	-	R	-	-	-	I
124	T	Liriodendron tulipifera	Tulip Poplar	-	F	F	-	-	I
125	H	*Lithospermum canescens	Hoary Puccoon	-	-	R	-	-	-
126	H	Lobelia cardinalis	Cardinal Flower	V	V	-	-	-	-
127	H	L. puberula	Blue Lobelia	I	F	-	-	-	-
128	V	Lonicera japonica	Japanese Honeysuckle	-	I	I	-	I	A
129	T	Magnolia acuminata	Cucumber Tree	-	-	V	-	-	-
130	T	M. tripetala	Umbrella Magnolia	-	-	R	-	-	-
131	H	Mertensia virginica	Virginia Bluebells	-	F	-	-	-	I
132	H	Mitchella repens	Partridge-Berry	-	-	I	I	I	-
133	G	*Muhlenbergia sobolifera	Muhly	-	-	-	-	-	-
134	H	*Nothoscordum bivalve	False Garlic	-	-	I	-	I	I
135	T	Nyssa sylvatica	Blackgum	-	I	I	-	I	-
136	C	Opuntia humifusa	Prickly Pear	-	-	-	-	-	V
137	T	Ostrya virginiana	Hophornbeam	-	-	I	-	I	-
138	H	Oxalis stricta	Oxalis	-	-	-	-	-	I
139	T	Oxydendrum arboreum	Sourwood	-	-	-	-	I	-
140	H	*Pachysandra procumbens	Mountain Spurge	-	-	F	-	-	-
141	V	Parthenocissus quinquefolia	Virginia Creeper	-	F	F	-	I	I
142	H	Pedicularis canadensis	Wood-betony	-	-	I	-	I	-
143	F	*Pellaea glabella	Smooth Cliffbrake	-	-	-	R	-	-
144	H	*Phlox divaricata	Blue Phlox	-	-	F	-	I	I
145	H	Phytolacca americana	Polk	-	I	I	-	-	F
146	T	Pinus echinata	Shortleaf Pine	-	-	-	-	F	-
147	T	P. rigida	Pitch Pine	-	-	-	-	F	-
148	T	P. strobus	White Pine	-	-	I	-	-	-

TABLE 15
(continued)

No.	Form	Scientific Name	Common Name	Habitat and Abundance					
				RB	AW	SF	CL	BR	DH
149	T	P. virginiana	Virginia Pine	-	-	-	-	F	F
150	H	Plantago lanceolata	Narrow-leaved Plantain	-	-	-	-	-	I
151	H	P. major	Broad-leaved Plantain	-	-	-	-	-	I
152	T	Platanus occidentalis	Sycamore	F	A	I	-	-	I
153	G	*Poa pratensis	Bluegrass	-	-	-	-	-	F
154	H	Podophyllum peltatum	May-Apple	-	I	F	-	I	-
155	H	Polyganatum biflorum	Solomon's Seal	-	F	F	-	-	-
156	H	Polygonum sp.	Smartweed	F	I	-	-	-	I
157	F	*Polypodium virginianum	Rockcap Fern	-	-	-	I	-	V
158	F	*Polystichum acrostichoides	Christmas Fern	-	I	F	-	-	-
159	T	Populus alba	White Poplar	-	-	-	-	-	I
160	H	Potentilla canadensis	Dwarf Cinquefoil	-	-	F	-	I	-
161	H	Potomogeton crispus	Pondweed	I	-	-	-	-	-
162	H	Prunella vulgaris	Self-heal	-	F	I	-	-	F
163	T	Prunus serotina	Wild Black Cherry	-	-	I	-	-	I
164	V	Pueraria ovata	Kudzu-vine	-	-	-	-	-	I
165	T	*Pyrus coronaria	Wild Crab	-	-	R	-	-	-
166	T	Quercus alba	White Oak	-	-	F	-	A	-
167	T	Q. falcata	Southern Red Oak	-	-	I	-	I	-
168	T	Q. prinus	Chestnut Oak	-	-	-	-	F	-
169	T	Q. rubra	Northern Red Oak	-	-	F	-	F	-
170	T	Q. stellata	Post Oak	-	-	-	-	I	-
171	T	Q. velutina	Black Oak	-	-	I	-	I	-
172	H	Ranunculus abortivus	Small-flowered Crowfoot	-	I	I	-	-	I
173	H	R. hispidus	Hairy Buttercup	-	I	F	-	-	-
174	T	*Rhamnus caroliniana	Carolina Buckthorn	-	V	-	-	-	-
175	S	Rhododendron maximum	Great Rhododendron	-	-	I	I	I	-
176	S	Rhus aromatica	Fragrant Sumac	-	-	-	i	-	-
177	S	R. glabra	Smooth Sumac	-	-	-	-	-	I
178	V	R. radicans	Poison Ivy	-	A	F	I	F	F

TABLE 15
(continued)

No.	Form	Scientific Name	Common Name	Habitat and Abundance RB	AW	SF	CL	BR	DH
179	T	Robinia pseudo-acacia	Black Locust	-	-	I	-	I	I
180	S	Rosa carolina	Wild Rose	-	I	I	-	I	F
181	V	Rubus occidentalis	Black Raspberry	-	-	-	-	-	I
182	V	R. spp.	Blackberries, Dewberries	-	-	-	-	-	F
183	H	Rudbeckia laciniata	Goldenglow	-	A	-	-	-	F
184	H	R. triloba	Brown-eyed Susan	-	I	-	-	-	I
185	H	Rumex acetosella	Sheep Sorrel	-	-	-	-	-	I
186	S	Salix interior	Sandbar Willow	I	-	-	-	-	-
187	T	S. nigra	Black Willow	I	I	-	-	-	-
188	H	Sanguinaria canadensis	Bloodroot	-	-	F	-	-	-
189	T	Sassafras albidum	Sassafras	-	-	I	-	I	F
190	H	Saururus cernuus	Lizard's-Tail	I	-	-	-	-	-
191	H	Scirpus americanus	Three-Square	I	-	-	-	-	-
192	H	S. validus	Great Bulrush	I	-	-	-	-	-
193	H	*Sedum ternatum	White Stonecrop	-	-	I	-	-	-
194	H	*Senecio aureus	Golden Ragwort	-	F	F	-	-	-
195	V	Smilax bona-nox	Catbrier	-	F	I	-	F	A
196	V	S. glauca	Sawbrier	-	I	I	-	F	F
197	V	S. hispida	Hispid Greenbrier	-	-	-	-	-	R
198	V	S. rotundifolia	Common Greenbrier	-	F	I	-	I	F
199	H	Solanum carolinense	Horse-nettle	-	-	-	-	-	I
200	H	Solidago altissima	Tall Goldenrod	-	-	-	-	-	F
201	H	S. caesia	Wreath Goldenrod	-	I	I	-	I	-
202	H	S. flexicaulis	Zig Zag Goldenrod	-	A	F	-	-	-
203	H	S. rugosa	Rough Goldenrod	-	F	I	-	-	I
204	H	S. ulmifolia	Elm-leaved Goldenrod	-	-	I	-	I	-
205	H	Sonchus sp.	Sow Thistle	-	-	-	-	-	I
206	M	*Sphagnum sp.	Moss	-	-	I	I	-	-
207	H	Stellaria media	Common Chickweed	-	-	-	-	-	I
208	H	*S. pubera	Star Chickweed	-	-	I	-	-	-

TABLE 15
(continued)

No.	Form	Scientific Name	Common Name	Habitat and Abundance					
				RB	AW	SF	CL	BR	DH
209	H	*_Swertia caroliniensis_	American Columbo	-	I	F	-	-	-
210	S	_Symphoricarpos orbiculatus_	Coralberry	-	I	-	-	-	F
211	H	_Taraxacum officinale_	Dandelion	-	-	-	-	-	F
212	H	_Thalictrum polygonatum_	Tall Meadow Rue	-	I	-	-	-	I
213	T	_Tilia heterophylla_	Basswood	-	I	I	-	-	-
214	H	_Trifolium pratense_	Red Clover	-	-	-	-	-	F
215	H	_T. repens_	White Dutch Clover	-	-	-	-	-	I
216	H	*_Trillium cuneatum_	Wedge-shaped Trillium	-	-	F	-	-	-
217	H	*_T. luteum_	Yellow Trillium	-	-	A	-	-	-
218	T	_Tsuga canadensis_	Hemlock	-	-	R	-	-	-
219	T	_Ulmus alata_	Winged Elm	-	F	I	-	-	-
220	U	_U. americana_	American Elm	-	F	F	-	-	-
221	T	_U. rubra_	Slippery Elm	-	F	R	-	-	-
222	H	_Uvularia perfoliata_	Wood Merrybells	-	I	I	-	-	-
223	S	*_Vaccinium arboreum_	Farkleberry	-	-	-	-	R	-
224	H	_Verbascum thapsus_	Wooly Mullein	-	-	-	-	-	I
225	H	_Vernonia altissima_	Ironweed	-	-	-	-	-	F
226	H	_Vicia caroliniana_	Wood Vetch	-	-	I	-	I	-
227	H	_Viola papilionacea_	Common Blue Violet	-	-	-	-	-	F
228	H	*_V. rostrata_	Long-spurred Violet	-	-	F	-	I	I
229	H	_V. sororia_	Wooly Blue Violet	-	-	I	-	F	-
230	H	_V. triloba_	Three-lobed Violet	-	-	I	-	I	-
231	V	_Vitis rotundifolia_	Muscadine Grape	-	F	-	-	-	-
232	V	_V. vulpina_	Frost Grape	-	F	F	-	-	-

* Specimen curated at the University of Louisvile Herbarium.

3.8.5 Guide for Use of the Animal Inventories of the Little South Fork Wild River, Kentucky

Table 16, 17 and 18 include only species which were observed during the survey, reported from the study area in literature, or determined to be potential inhabitants of the study area based upon interpretation of published habitat and distribution data. The principal references and the guides to the nomenclature in the tables were: Kentucky Birds (Barbour et. al. 1973), Mammals of Kentucky (Barbour and Davis 1974), and Reptiles and Amphibians of Kentucky (Barbour 1971). Those species identified as definitely occurring in the study area, either through field observations or literature search, are indicated with an asterisk (*) beside the common name. Field identifications were made by sight, sign or sound.

In determining which species to include in the tables, the most heavily weighted factors were habitat, distribution, and abundance. Most shore and wading birds were excluded from Table 17 because they generally require large impoundments or large rivers with sluggish water and often with associated marshes. Since the Little South Fork is a narrow, fourth order stream, lacking marshes, and since the Wild River ends at the backwaters of Lake Cumberland, this habitat is lacking in the study area. Some water birds which may be found in smaller rivers were included in this list.

A given bird occurs in a given area during a particular season for many different reasons with varying degrees of frequency. This aspect of bird distribution is explained in the column entitled "Seasonal Abundance and Occurrence". The "Spr., Sum., Fll., and Wtr." in the title block stand for the four seasons. The couplet which appears in each column gives the abundance and the explanation of occurrence, respectively, according to the following scheme:

a - abundant - regularly found in large numbers
c - common - always present
u - uncommon - generally frequent but in small numbers
r - rare - irregular occurence and usually small numbers

R - resident - regularly reported during a period
T - transient - passes through, does not reside
V - visitant - occurring outside its normal range, but not unusual
V - vagrant - occurrence unusual, often far removed from its normal range

The inventories of reptiles, amphibians, and mammals have a single column to describe abundance, labelled "Abund." The same symbols shown in the first quartet above are used in this column, but are represented by capital rather than lower case letters. There is no need for an explanation of the seasonal occurrence of these animals because with the exception of the bats, they are not migratory. Notes in the "remarks" column discuss pertinent information concerning the seasonal occurrence of the bats. If, in the bird inventory, an "X" appears in the column labelled "Breed", the bird is known or expected to breed in the study area. If an "H" appears in this column, only historical breeding records occur for the species in the general region.

The habitat descriptions which appear in the table include only descriptions of areas which occur in the study area. Many animals occur in habitats other than those appearing in the tables, but these habitats do not occur in the study area. Nesting habitat and/or nest placement, indicated by "N-" followed by a verbal description, are given only for those birds which have an "X" or "H" in the column labelled "Breed". In cases where the breeding habitat for reptiles, amphibians, and mammals differs from the pre- or post-breeding habitat, both habitats are indicated in the table.

If an animal is listed on either the Fish and Wildlife Service's or the Smithsonian Institution's list of "Threatened or Endangered Species" it is indicated in the "Habitat and Remarks" column by use of the symbols "FW" or "S" followed by a hyphen and a "T" or "E" indicating the status. The Kentucky Nature Preserves Commission is studying the status of these federally listed, as well as many other rare, peripheral, declining, etc., species within the state. Animals (Elements) being studied by this agency are denoted by the abbreviation E-KNPC.

TABLE 16

REPTILES AND AMPHIBIANS OF THE LITTLE SOUTH FORK WILD RIVER, KENTUCKY

Taxonomy		Abund.	Habitat and Remarks
ORDER CAUDATA: Salamanders			
Family Cryptobranchidae - Giant Salamanders			
Cryptobranchus a. alleganiensis	Hellbender	U	Rivers or streams w/stony bottoms
Family Ambystomatidae - Mole Salamanders			
Ambystoma maculatum	Spotted Salamander	C	Woodlands; breed-woodland pools
A. opacum	Marbled Salamander	U	Woodlands; from marshy spots to relatively dry hillsides
A. texanum	Small-mouthed Salamander	U	Underground in woods; breed-streams, ponds and springs
A. tigrinum	Tiger Salamander	R	Forest, grassland, and wetlands; uses crayfish burrows for shelter; at E. edge of range in study area
Family Salamandridae - Newts			
Notopthalmus v. viridescens	*Red-spotted Newt	C	Woods and woodland pools
Family Plethodontidae - Woodland Salamanders			
Aneides aeneus	Green Salamander	U	Crevices in sandstone cliffs or tree bark
Desmognathus f. fuscus	Northern Dusky Salamander	C	Small rocky woodland streams
D. m. monticola	Seal Salamander	C	Small wooded streams and springs, often muddy
D. ochrophaeus	Mountain Salamander	C	Moist woodlands
Eurycea bislineata	Two-lined Salamander	C	Rocky streams in shade or open
E. l. longicauda	Long-tailed Salamander	U	Moist shale banks or rocky woodland springs

TABLE 16
(continued)

Taxonomy		Abun.	Habitat and Remarks
E. lucifuga	Cave Salamander	U	Prefer limestone caves, also sandstone or woodland shelters
Gyrinophilus porphyriticus duryi	Kentucky Spring Salamander	U	Rocky woodland streams or springs
Hemidactylium scutatum	Four-toed Salamander	R	Woodlands; larvae aquatic; E-KNPC
Plethodon r. richmondi	Ravine Salamander	U	Rocky open woods; completely terrestrial
P. d. dorsalis	Zigzag Salamander	U	Rocky open woods
P. g. glutinosus	*Slimy Salamander	C	Woodlands
Pseudotriton r. ruber	Northern Red Salamander	C	Clear, cold, rocky streams or spring; more terrestrial in summer
P. montanus diastictus	Mud Salamander	U	Muddy areas in sluggish stream or spring
ORDER ANURA: Frogs and Toads			
Family Ranidae - True Frogs			
Rana catesbeiana	*Bullfrog	C	Permanent water
R. clamitans melanota	Green Frog	U	All aquatic habitats; woods and fields in summer
R. palustris	Pickerel Frog	R	Cool, clear water; woods or grassy fields in summer; often enter caves
R. p. pipiens	*Northern Leopard Frog	C	Permanent water or meadows in summer
R. sylvatica	Wood Frog	U	Moist woods w/at least semi-permanent water
Family Microhylidae - Narrow-mouthed Toads			
Gastrophryne carolinensis	Eastern Narrow-mouthed Toad	U	Moist shady areas; breed-swampy areas
Family Bufonidae - Toads			
Bufo a. americanus	*American Toad	C	Most habitats
B. woodhousei fowleri	*Fowler's Toad	C	Same as above

TABLE 16
(continued)

Taxonomy		Abund.	Habitat and Remarks
Family Hylidae - Hylid Frogs			
Acris crepitans blanchardi	Blanchard's Cricket Frog	U	Sunny mud flats and shallow water w/vegetative cover
Hyla c. crucifer	*Northern Spring Peeper	C	Woods, thickets; breed-lakes, ponds and quiet streams
H. v. versicolor	Eastern Gray Treefrog	C	Trees, brush; breed-woodland pools or streams
Pseudacris brachyphona	*Mountain Chorus Frog	C	Woodlands; breed-springs and pools
P. triseriata feriarum	*Upland Chorus Frog	U	Grasslands; breed-marshy areas
Family Proteidae - Mudpuppies and Waterdogs			
Necturus maculosus maculosus	Mudpuppy	U	Large streams; completely aquatic
ORDER SQUAMATA: Lizards and Snakes			
Family Iquanidae - Iguanid Lizards			
Sceloporus undulatus hyacinthinus	*Northern Fence Lizard	C	Dry, open, sunny woodlands, esp on hillsides; also, rock outcrops, piles of logs, fence posts and abandoned buildings

TABLE 16
(continued)

Taxonomy		Abund.	Habitat and Remarks
Family Scincidae - Skinks			
Eumeces a. anthracinus	Northern Coal Skink	R	Woodlands and abandoned disturbed areas; E-KNPC
E. fasciatus	Five-lined Skink	C	Mesic disturbed areas or dwellings
E. inexpectatus	S.E. Five-lined Skink	R	Mesic to xeric woods and disturbed areas
E. laticeps	Broad-headed Skink	R	Upland woods, rarely lowlands; v. arboreal
Lygosoma laterale	Ground Skink	C	Wooded areas near streams
Family Anguidae - Glass Lizards			
Ophisaurus attenuatus longicaudus	E. Slender Glass Lizard	R	Dry upland open woods; grassy fields and brushy areas; E-KNPC
Family Colubridae - Nonvenomous Snakes			
Carphophis a. amoenus	Eastern Worm Snake	C	Open woods w/good cover
C. amoenus helenae	Midwest Worm Snake	U	Same as above
Cemophora coccinea copei	Northern Scarlet Snake	R	Woodlands, usually dry; burrower; E-KNPC
Coluber c. constrictor	*Northern Black Racer	C	Most habitats; somewhat arboreal
Diadophis punctatus edwardsi	Northern Ringneck Snake	C	Woodlands w/good cover
Elaphe o. obsoleta	Black Rat Snake	C	Most habitats; good climber
Heterodon p. platyrhinos	Eastern Hognose Snake	C	Wooded hillsides, esp. woodland edges
Lampropeltis getulus niger	Black Kingsnake	U	Dry open woods and edges
L. t. triangulum	Eastern Milk Snake	C	Most habitats; good climber
L. t. elapsoides	Scarlet Kingsnake	R	Same as above; E-KNPC
Natrix s. sipedon	*Northern Water Snake	C	Any aquatic habitat
Opheodrys aestivus	Rough Green Snake	R	Woodlands, esp. edge; arboreal
Pituophis m. melanoleucus	Northern Pine Snake	R	Dry sandy ridges, esp. piney; burrower, but will climb; E-KNPC

TABLE 16
(continued)

Taxonomy		Abund.	Habitat and Remarks
Regina septemvittata	Queen Water Snake	R	Small rocky streams in wooded areas
Storeria d. dekayi	Northern Brown Snake	R	Most habitats
S. o. occipitomaculata	Northern Red-bellied Snake	U	Woodlands
Tantilla c. coronata	Crowned Snake	R	Dry, rocky, southern exposures in open woods or wooded edges
Thamnophis s. sauritus	Eastern Ribbon Snake	R	Most habitats but near permanent water
T. s. sirtalis	*Eastern Garter Snake	C	Most mesic habitats
Virginia v. valeriae	Eastern Smooth Earth Snake	R	Woodlands
Family Viperidae - Vipers, Venomous Snakes			
Agkistrodon contortrix mokeson	*Northern Copperhead	C	Woodlands, esp. rocky hillsides or bluffs and rocky stream banks
Crotalus h. horridus	*Timber Rattlesnake*	U	Woodlands, usually of dry ridges or hillsides

TABLE 16
(continued)

Taxonomy		Abund.	Habitat and Remarks
ORDER TESTUDINATA: Turtles			
Family Chelydridae - Snapping Turtles			
Chelydra s. serpentina	Common Snapping Turtle	U	Streams, ponds, etc.; aquatic
Family Kinosternidae - Mud and Musk Turtles			
Sternotherus odoratus	Common Musk Turtle (Stinkpot)	C	Permanent water; aquatic.
Family Emydidae - Emydid Turtle			
Chrysemys picta marginata	Midland Painted Turtle	R	Sluggish shallow water, esp. marshy areas
C. scripta troosti	Cumberland Turtle	R	Quiet, larger bodies of water and farm ponds; aquatic; basker
Graptemys geographica	Map Turtle	R	Large rivers or swift streams; aquatic; basker
Terrapene c. carolina	*Eastern Box Turtle	C	Woodlands
Family Trionychidae - Softshell Turtles			
Trionyx m. muticus	Midland Smooth Softshell	U	Clear sandy bottomed creeks
T. s. spinifer	Eastern Spiny Softshell	U	Clear streams and rivers, esp. w/sandbars

TABLE 17
BIRDS OF THE LITTLE SOUTH FORK WILD RIVER, KENTUCKY

Taxonomy		Abundance and Occurrence Spr	Sum	Fll	Wtr	Breed	Habitat and Remarks
ORDER CICONIIFORMES: Long-legged Waders							
Family Ardeidae - Herons, Bitterns and Allies							
Ardea herodias	Great Blue Heron	c-T	r-V	c-T	r-R		Riparian; E-KNPC
Butorides virescens	*Green Heron	-	c-R	-	r-R	X	Riparian; N-Low in tree or shrub
Florida caerula	Little Blue Heron	r-V	r-V	r-T	-		Riparian
Bubulcus ibis	Cattle Egret	r-V	r-V	r-V	-		Pastures, farm ponds
Casmerodius albus	Common Egret	u-T	c-V	-	-		Riparian
Nycticorax nycticorax	Black-crowned Night Heron	u-T	-	u-T	u-R		Riiparian
ORDER ANSERIFORMES: Waterfowl							
Family Anatidae - Swans, Geese and Ducks							
Anas platyrhynchos	Mallard	u-T	-	u-T	r-R		Riparian
A. rubripes	Black Duck	u-T	-	u-T	r-R		Riparian
A. acuta	Pintail	u-T	-	r-T	r-R		Riparian
A. discors	Blue-Winged Teal	c-T	r-R	c-T	-	X	Riparian; N-ground
Spatula elypeata	Shoveler	c-T	-	r-T	r-R		Ponds, mud flats, rivers
Aix sponsa	Wood Duck	-	r-R	-	-	X	Riparian; N-hollow tree
Aythya collaris	Ring-necked Duck	c-T	-	c-T	u-R		Riparian
A. affinis	Lesser Scaup	c-T	-	c-T	u-R		Riparian
Oxyura jamaicensis	Ruddy Duck	u-T	r-R	u-T	r-R		Riparian
Lophodytes cucullatus	Hooded Merganser	c-T	-	c-T	c-R		Rivers, bottomlands
ORDER FALCONIFORMES: Diurnal Birds of Prey							
Family Cathartidae - American Vultures							
Cathartes aura	*Turkey Vulture	c-R	c-R	c-R	u-R	X	Most habitats; N-crevice in cliff or rocky woods
Coragyps atratus	Black Vulture	r-R	r-R	r-R	r-R	X	Same as above

TABLE 17
(continued)

Taxonomy		Abundance and Occurrence Spr	Sum	Fll	Wtr	Breed	Habitat and Remarks
Family Accipitridae - Hawks, Old World Vultures, Harriers							
Accipter striatus	Sharp-shinned Hawk	u-T	r-R	u-T	-	X	Woodlands; N-conifer
A. cooperii	Cooper's Hawk	c-R	u-R	c-R	u-R	X	Woodlands; N-tall tree
Buteo jamaicensis	*Red-tailed Hawk	c-R	u-R	c-R	u-R	X	Woodlands; N-cliff
B. lineatus	Red-shouldered Hawk	u-R	u-R	u-R	u-R	X	Floodplains; N-tall tree; E-KNPC
B. platypterus	Broad-winged Hawk	r-T	u-R	r-T	-	X	Upland woods; N-tree
Aquila chrysaetos	Golden Eagle	-	-	-	r-R	H	Near major impoundments; E-KNPC
Haliaeetus leucocephalus	Bald Eagle	r-T	r-V	r-T	r-R	H	Large rivers; impoundments; FW-E
Circus cyaneus	Marsh Hawk	u-T	-	u-T	u-R	H	Open fields, lowlands; E-KNPC
Family Falconidae - Caracaras and Falcons							
Falco perigrinus	Perigrine Falcon	r-T	r-R	r-T	r-R	H	Cliffs near water; n-cliff; poss. extinct in Ky.; FW-E
F. columbarius	Merlin	r-T	-	u-T	r-R		Woodland openings
F. sparverius	*Sparrow Hawk	u-R	u-R	u-R	c-R	X	Fields; N-cliff
ORDER GALLIFORMES: Gallinaceous Birds							
Family Tetraonidae - Grouse							
Bonasa umbellus	Ruffed Grouse	u-R	u-R	u-R	u-R	X	Wooded gorges; N-sheltered ground
Family Phasianidae - Quails and Pheasants							
Colinus virginianus	Bobwhite	c-R	c-R	c-R	c-R	X	Wooded hillsides, brush; N-ground

TABLE 17
(continued)

Taxonomy		Abundance and Occurrence				Breed	Habitat and Remarks
		Spr	Sum	Fll	Wtr		
Family Meleagrididae - Turkeys							
Meleagris gallopavo	Turkey	r-R	r-R	r-R	r-R	X	Oak woodlands; N-ground E-KNPC
ORDER CHARADRIIFORMES: Shorebirds, Gulls, Terns							
Family Charadriidae - Plovers and Turnstones							
Charadrius vociferus	*Killdeer	c-R	c-R	c-R	u-R	X	Fields, sand bars; N-ground
Arenaria interpres	Ruddy Turnstone	r-T	-	r-T	-		Rocks and sandbars in river
Family Scolopacidae - Woodcock, Snipe, and Sandpipers							
Philohela minor	American Woodcock	c-T	u-R	c-T	r-R	X	Wet thickets; N-ground
Capella gallinago	Common Snipe	u-T	-	r-T	-		Marshy areas
Actitis macularia	Spotted Sandpiper	c-T	r-R	c-T	-	X	Stream borders; N-ground
Tringa solitaria	Solitary Sandpiper	c-T	r-R	c-T	-		Riparian
Totanus melanoleucus	Greater Yellowlegs	u-T	r-R	u-T	-		Riparian
Calidris canutus	Knot	r-T	-	r-T	-		Riparian
Erolia fuscicollis	White-rumped Sandpiper	r-T	-	r-T	-		Riparian
E. bairdii	Baird's Sandpiper	r-T	-	r-T	-		Riparian
E. alpina	Dunlin	r-T	-	u-T			Riparian
Ereunetes pusillus	Semipalmated Sandpiper	r-T	-	r-T	-		Riparian
E. mauri	Western Sandpiper	r-T	-	r-T	-		Riparian
Family Phalaropodidae - Phalaropes							
Steganopus tricolor	Wilson's Phalarope	r-T	-	r-T	-		Riparian
Family Laridae - Gulls and Terns							
Sterna forsteri	Foster's Tern	r-T	-	r-T	-		Riparian
S. hirundo	Common Tern	r-T	-	r-T	-		Riparian

TABLE 17
(continued)

Taxonomy		Abundance and Occurrence				Breed	Habitat and Remarks
		Spr	Sum	Fll	Wtr		
ORDER COLUMBIFORMES: Pigeons and Doves							
Family Columbidae - Pigeons and Doves							
Zenaidura macroura	*Mourning Dove	u-R	c-R	c-R	r-R	X	Fields; N-low conifer or shrub
ORDER CUCULIFORMES: Cuckcoos							
Family Cuculidae - Cuckoos							
Coccyzus americanus	Yellow-billed Cuckoo	-	c-R	-	-	X	Woodlands; N-thicket
C. erythropthalmus	Black-billed Cuckoo	c-T	u-R	c-T	-	X	Woodlands; N-thicket
ORDER STRIGIFORMES: Owls							
Family Tytonidae - Barn Owls							
Tyto alba	Barn Owl	r-R	r-R	r-R	r-R	X	Open areas; N-structures
Otus asio	Screech Owl	r-R	r-R	r-R	r-R	X	Wooded edges; N-any cavity
Bubo virginianus	*Great Horned Owl	u-R	u-R	u-R	r-R	X	Deep woodlands; N-crotch or hollow in large tree
Strix varia	Barred Owl	u-R	u-R	u-R	r-R	X	Wooded stream valleys; N-large hollow tree
Asio otus	Long-eared Owl	Status Unknown					Woodlands, esp. coniferous
Aegolius acadicus	Saw-whet Owl	-	-	-	r-R		Woodlans, esp. coniferous
ORDER CAPRIMULGIFORMES: Goatsuckers							
Family Caprimulgiadae - Goatsuckers							
Caprimulgus carolinensis	Chuck-Will's-Widow	-	u-R	-	-	X	Upland woods; N-ground
C. vociferus	Whip-Poor-Will	-	u-R	-	-	X	Mesic woodlands; N-ground

TABLE 17
(continued)

Taxonomy		Spr	Sum	Fll	Wtr	Breed	Habitat and Remarks
		Abundance and Occurrence					
ORDER APODIFORMES: Swifts and Hummingbirds							
Family Apodidae - Swifts							
Chaetura pelagica	Chimney Swift	-	u-R	-	-	X	Open places; N-chimneys
Family Trochilidae - Hummingbirds							
Archilochus colubris	Ruby-throated Hummingbird	-	c-R	-	-	X	Most habitats: N-top of branch
ORDER CORACIIFORMES: Kingfishers and Allies							
Family Alcedinidae - Kingfishers							
Megaceryle alcyon	*Belted Kingfisher	c-R	c-R	c-R	u-R	X	Stream margins; N-hole in stream bank
ORDER PICIFORMES: Woodpeckers and Allies							
Family Picidae - Woodpeckers							
Colaptes auratus	*Yellow-shafted Flicker	c-R	c-R	c-R	c-R	X	Most habitats; N-hole in tree
Dryocopus pileatus	*Pileated Woodpecker	c-R	c-R	c-R	c-R	X	Dense forests; N-hole in tree
Centurus carolinus	*Red-bellied Woodpecker	c-r	c-R	c-R	c-R	X	Most habitats; N-hole in tree
Melanerpes erythrocephalus	Red-headed Woodpecker	u-R	u-R	u-R	r-R	X	Open woodlands; N-hole in dead tree
Sphyrapicus varius	Yellow-Bellied Sapsucker	c-T	-	c-T	c-R		Open woodlands
Dendrocopos villosus	Hairy Woodpecker	u-R	u-R	u-R	u-R	X	Forested watercourses; N-hole in snag
D. pubescens	*Downy Woodpecker	c-R	c-R	c-R	c-R	X	Woodlands; N-hole in dead tree
Picoides borealis	Red-cockaded Woodpecker	r-R	r-R	r-R	r-R	X	Pine-oak woods; N-hole in mature pine w/red heart disease; FW-E

TABLE 17
(continued)

Taxonomy		Spr	Sum	Fll	Wtr	Breed	Habitat and Remarks
		Abundance and Occurrence					
ORDER PASSERIFORMES: Perching Birds							
Family Tyrannidae - Tyrant Flycatchers							
Tyrannus tyrannus	Eastern Kingbird	-	u-R	-	-	X	Open country; N-tip of branch
Myiarchus crinitus	Great Crested Flycatcher	-	c-R	-	-	X	Open woods; N-hole in tree
Sayornis phoebe	Eastern Phoebe	-	c-R	-	-	X	Most habitats; N-structure or cliff
Empidonax flaviventris	Yellow-bellied Flycatcher	r-T	-	u-T	-	X	Deep woods or thickets
E. virescens	Acadian Flycatcher	-	u-R			X	Forested watercourse; N-tip of branch
E. traillii	Traill's Flycatcher	r-T	r-R	r-T	-	X	Shrubby streambanks; N-shrub
E. minimus	Least Flycatcher	u-T	-	u-T	-		Open country w/scattered trees
Contopus virens	Eastern Wood Pewee	-	c-R	-	-	X	Woodlands; N-treelimb
Nuttallornis borealis	Olive-sided Flycatcher	r-T	-	r-T	-	X	Woodland edges
Family Hirundinidae - Swallows							
Iridoprocne bicolor	Tree Swallow	u-T		r-T	-	X	Watercourses
Riparia riparia	Bank Swallow	u-T	r-R	u-T	-	X	Watercourses; N-hole in bank
Stelgidopteryx ruficollis	Rough-winged Swallow	-	c-R	-	-	X	Cliffs, banks, abutments; N-natural cavity in one of these exposures
Hirundo rustica	*Barn Swallow	-	c-R	-	-	X	Open lands; structures; N-any vertical surface
Petrochelidon pyrrhonota	Cliff Swallow	-	r-R	-	-	X	Bridges; N-vertical surfaces
Progne subis	Purple Martin	-	u-R	-	-	X	Rural residential areas; N-artifical shelters
Family Corvidae - Jays and Crows							
Cyanocitta cristata	*Blue Jay	c-R	c-R	c-R	c-R	X	Most habitats; N-tree
Corvus brachyrhynchos	*Common Crow	c-R	c-R	c-R	c-R	X	Mixed farm and woodland; vertical surface

TABLE 17
(continued)

Taxonomy		Spr	Sum	Fll	Wtr	Breed	Habitat and Remarks
		Abundance and Occurrence					
Family Paridae - Titmice							
Parus carolinensis	*Carolina Chickadee	c-R	c-R	c-R	c-R	X	Forest and edge; N-natural cavity
P. bicolor	*Tufted Timouse	c-R	c-R	c-R	c-R	X	Woodlands; N-artificial or natural cavities
Family Sittidae - Nuthatches							
Sitta carolinensis	White-breasted Nuthatch	u-R	u-R	u-R	u-R	X	Upland woods; N-cavity in tree
S. canadensis	Red-breasted Nuthatch	u-T	-	u-T	u-R		Dry oak-pine woods
Family Certhidae - Creepers							
Certhia familiaris	Brown Creeper	c-T	-	c-T	c-R		Mature forests
Family Troglodytidae - Wrens							
Troglodytes aedon	Winter Wren	c-T	-	c-T	c-R		Tangles and thickets in bottomland forests
Thryomanes bewickii	Bewick's Wren	-	c-R	-	u-R	X	Farmlands and clearings; N-any cavity; E-KNPC
Thryothorus ludovicianus	Carolina Wren	c-R	c-R	c-R	c-R	X	Forest edge; N-any cavity
Family Mimidae - Mockingbirds							
Mimus polyglottos	*Mockingbird	u-R	u-R	u-R	u-R	X	Open or shrubby areas; N-shrub, vine or tree
Dumetella carolinensis	Gray Catbird	-	c-R	-	r-R	X	Dense shrubs; N-shrub
Toxostoma rufum	Brown Thrasher	-	c-R	-	r-R	X	Brush or forest edge; N-shrub
Family Turdidae - Thrushes							
Turdus migratorius	*American Robin	c-R	c-R	c-R	c-R	X	Woodlands w/clearings; N-crotch of tree or shrub
Hylocichla mustelina	*Wood Thrush	-	c-R	-	-	X	Woodlands; N-same as above
H. guttatus	Hermit Thrush	c-T	-	c-T	u-R		Wooded ravines
H. ustulata	Swainson's Thrush	c-T	-	u-T	-		Woodlands

TABLE 17
(continued)

Taxonomy		Abundance and Occurrence Spr	Sum	Fll	Wtr	Breed	Habitat and Remarks
H. minimus	Gray-cheeked Thrush	c-T	-	c-T	-		Woodlands and dense brush
H. fuscescens	*Veery	c-T	-	u-T	-		Brush edges
Sialia sialis	*Eastern Bluebird	u-T	u-R	u-R	r-R	X	Open areas and woods clearings; N-any cavity
Family Sylviidae - Gnatcatchers and Kinglets							
Polioptila caerula	*Blue-gray Gnatcatcher	-	u-R	-	-	X	Open woods and edge; N-small tree
Regulus satrapa	Golden-crowned Kinglet	c-T	-	c-T	u-R		Coniferous woodlands
R. calendula	Ruby-crowned Kinglet	c-T	-	c-T	r-R		Woodlands
Family Bombycillidae - Waxwings							
Bombycilla cedrorum	*Cedar Waxwing*	*u-R*	*u-R*	*u-R*	*r-R*	X	*Rarely in open woods;* N-high branch
Family Sturnidae - Starlings							
Sturnus vulgaris	Starling	c-R	c-R	c-R	c-R	X	Most habitats, prefers agricultural areas; N-any cavity
Family Vireonidae - Vireos							
Vireo griseus	White-Eyed Vireo	-	u-R	-	-	X	Shrubs of forest edge and openings; N-dense shrub
V. flavifrons	Yellow-throated Viero	-	u-R	-	-	X	Mature woodlands; N-tree
V. solitarius	Solitary Vireo	u-T	-	u-T	-		Open woods and edge
V. olivaceus	*Red-eyed Vireo	-	a-R	-	-	X	Deciduous woodlands; N-tip of branch
V. philadelphicus	Philadelphia Vireo	u-T	-	c-T	-		Woodlands

TABLE 17
(continued)

Taxonomy		Spr	Sum	Fll	Wtr	Breed	Habitat and Remarks
		Abundance and Occurrence					
Family Parulidae - Wood Warblers							
Minotilta varia	Black-and-White-Warbler	c-T	c-R	c-T	-	X	Mixed mesophytic woodlands; N-ground
Limnothlypis swainsonii	Swainson's Warbler	-	u-R	-	-	X	Mixed mesophytic woodlands; N-high in dense vegetation
Helmitheros vermivorus	*Worm-eating Warbler	-	c-R	-	-	X	Mixed mesophytic woodlands; N-ground
Vermivora chrysoptera	Golden-winged Warbler	u-T	r-R	r-T	-	X	Deciduous woodlands; N-ground
V. pinus	Blue-winged Warbler	r-t	u-r	r-T	-	X	Shrubby woodlands; N-ground
V. bachmanii	Bachman's Warbler	-	?-R	-	-		Possibly alluvial woods; may be extirpated; FW-E
V. peregrina	*Tennessee Warbler	c-T	-	a-T	-		Woodlands
V. ruficapilla	Nashville Warbler	u-T	-	u-T	-		Young brushy forests
Parula americana	*Parula Warbler	-	c-R	-	-	X	Mixed mesophytic woods; N-twig
Dendroica petechia	Yellow Warbler	c-T	c-R	?	-	X	Yg. willow, sycamore and alder; N-shrub or small tree thicket
D. magnolia	Magnolia Warbler	c-T	-	c-T	-		Woodlands
D. tigrina	Cape May Warbler	r-T	-	r-T	-		Woodlands
D. caerulescens	Blue-throated Blue Warbler	r-T	-	r-T	-		Brush woodland edges
D. coronata	*Myrtle Warbler	c-T	-	c-T	r-R		Most habitats
D. virens	Black-throated Green	c-T	c-R	c-T	-	X	Wooded ravines; N-large trees, esp. conifers
D. cerulea	Cerulean Warbler	-	u-R	-	-	X	Mixed mesophytic woodlands; N-tall tree
D. fusca	Blackburnian Warbler	u-T	-	c-T	-		Woodlands
D. dominica	Yellow-throated Warbler	-	u-R	-	-	X	Mature forest; N-large tree

TABLE 17
(continued)

Taxonomy		Spr	Sum	Fll	Wtr	Breed	Habitat and Remarks
		Abundance and Occurrence					
D. pensylvanica	Chestnut-sided Warbler	u-T	-	c-T	-		Woodlands clearings and brush
D. castanea	Bay-breasted Warbler	u-T	-	c-T	-		Woodlands
D. striata	Blackpoll Warbler	u-T	-	r-T	-		Woodlands
D. pinus	Pine Warbler	-	u-R	-	-	X	Pine woods; N-pine branch
D. kirtlandii	Kirtland's Warbler	r-T	-	r-T	-		Most likely pines; one spring record; FW-E
D. discolor	Prairie Warbler	-	c-R	-	-	X	Open woodlands and shrubs; N-sapling
D. palmarum	Palm Warbler	u-T	-	u-T	-		Forest clearings
Seiurus aurocapillus	Ovenbird	u-T	c-R	c-T	-	X	Mixed mesophytic woodlands; N-ground
S. noveboracensis	*Northern Waterthrush	u-T	-	c-T	-		Aulluvial Woodlands
S. motacilla	Louisiana Waterthrush	-	c-R	-	-	X	Shaded rocky stream margins; N-ground on steep bank
Oporornis formosus	Kentucky Warbler	-	c-R	-	-	X	Mixed mesophytic woods; N-ground
O. agilis	Connecticut Warbler	r-T	-	r-T	-		Underbrush in open woods
O. philadelphia	Mourning Warbler	r-T	-	r-T	-		Lowland brush
Geothylpis trichas	Yellowthroat	-	c-R	-	-	X	Streambank thickets; N-thicket
Icteria virens	Yellow-breasted Chat	-	c-R	-	-	X	Early successional areas; N-low brush
Wilsonia citrina	Hooded Warbler	r-T	c-R	r-T	-	X	Mesic woodlands; N-shrub in dense woods
W. pusilla	Wilson's Warbler	u-T	-	u-T	-		Open woodlands and thickets
W. canadensis	Canada Warbler	u-T	-	c-T	-		Brushy woodland edge; N-ground
Setophaga ruticilla	*American Redstart	c-t	c-R	c-T	-	X	Edges in mixed mesophytic forest; N-low in crotch or branch

TABLE 17
(continued)

Taxonomy		Abundance and Occurrence Spr	Sum	Fll	Wtr	Breed	Habitat and Remarks
Family *Ploceidae* - *Weaver Finches, Old World Sparrows*							
Passer domesticus	*House Sparrow	c-R	c-R	c-R	c-R	X	Open woodlands, farms, human habitations, N-any cavity
Family Icteridae - Meadowlarks, Blackbirds and Orioles							
Sturnella magna	*Eastern Meadowlark	u-R	u-R	u-R	u-R	X	Meadows & cultivated fields; N-ground
Agelaius phoeniceus	*Red-winged Blackbird	u-R	u-R	u-R	r-R	X	Open country; N-marsh grasses
Icterus spurius	Orchard Oriole	-	u-R	-	-	X	Forest edges; N-large tree
I. galbula	Baltimore Oriole	c-T	r-R	r-T	-	X	Open country; N-large tree
Quiscalus quiscula	*Common Grackle	u-T	-	u-T	-		Open country & streambanks
Molothrus ater	*Brown-headed Cowbird	-	u-R	-	-	X	Open country; N-other birds nests
Family Thraupidae - Tanagers							
Piranga olivacea	Scarlet Tanager	-	c-R	-	-	X	Upland woods; N-tree
P. rubra	Summer Tanager		-	c-R	-	X	Open woodlands; N-tip of branch in open
Family Fringillidae - Grosbeaks, Finches, New World Sparrows and Buntings							
Richmondena cardinalis	*Cardinal	c-R	c-R	c-R	c-R	X	Woodland edges, brush; N-
Pheucticus ludovicianus	Rose-breasted Grosbeak	u-T	-	c-T	-		Mature forests
Guiraca caerulea	Blue Grosbeak	r-T	-	r-T	-		Streamside thickets
Passerina cyanea	*Indigo Bunting*	-	a-R	-	r-R	X	Most habitats; N-low in shrub grass, or small tree
Carpodacus purpureus	Purple Finch	u-T	-	u-T	r-R		Brushy open woods
Spinus pinus	Pine Siskin	-	-	-	r-R		Open woods
S. tristis	*American Goldfinch	u-R	u-R	u-R	u-R	X	Old fields w/brush; N-low in woods, shrub or small tree

TABLE 17
(continued)

Taxonomy		Abundance and Occurrence Spr	Sum	Fll	Wtr	Breed	Habitat and Remarks
Loxia curvirostra	Red Crossbill	-	-	-	r-V		Coniferous woods
Pipilo erythrophthalmus	Rufous-sided Towhee	u-R	u-R	u-R	u-R	X	Brush young woodlands; N-low in thicket or tangle
Passerculus sandwichensis	Savannah Sparrow	c-T	r-R	c-T	-		Weed fields and pastures
Chondestes grammacus	Lark Sparrow	-	u-R	-	-	X	Grasslands w/exposed rock (strip mines); N-low on ground or shrub
Aimophila aestivalis	Bachman's Sparrow	-	r-R	-	-	X	Same as above; E-KNPC
Junco hyemalis	*Slate-colored Junco	c-T	-	c-T	c-R	X	Open woodlands or brushy fields
Spizella arborea	Tree Sparrow	-	-	-	u-R		Woodland edges and old fields
S. passerina	Chipping Sparrow	-	u-R	-	-	X	Open woodlands; N-low in evergreens
S. pusilla	Field Sparrow	u-R	u-R	u-R	u-R	X	Old fields; N-ground or low shrubs
Zonotrichia leucophrys	*White-Crowned Sparrow	-	-	-	c-R		Brushy habitats and woodland edges
Z. albicollis	White-throated Sparrow	c-T	-	c-T	u-R		Open woodlands, edges, old fields
Passerella iliaca	Fox Sparrow	u-T	-	u-T	-		Same as above, esp. near water
Melospize lincolnii	Lincoln's Sparrow	u-T	-	u-T	-		Old fields and edges
M. georgiana	Swamp Sparrow	u-T	-	u-T	-		Old fields (wet), edges, and brushy streambanks
M. melodia	*Song Sparrow	c T	c-R	c-R	c-R	X	Brushy streambanks & forest edge; N-ground or low shrub

TABLE 18

MAMMALS OF THE LITTLE SOUTH FORK WILD RIVER, KENTUCKY

Taxonomy		Abund.	Habitat and Remarks
ORDER MARSUPIALIA: Marsupials			
Family Didelphidae - New World Opossums			
Didelphis virginiana virginiana	*Virginia Opossum	C	Most habitats; primarily nocturnal
ORDER INSECTIVORA: Insectivores			
Family Soricidae - Shrews			
Blarina brevicauda kirtlandi	Short-Tailed Shrew	A	Mixed hardwood forest; constantly active
Cryptotis p. parva	Least Shrew	R	Open grasslands near agriculture; prolific
S. f. fumeus	Smoky Shrew	R	Moist Woodland
Family Talpidae - Moles			
Parascalops breweri	Hairy-tailed Mole	C	Woodlands & most high ground
Scalopus aquaticus machrinus	Eastern Mole	U	Loose soil, floodplains & streambanks
ORDER CHIROPTERA: Bats			
Family Vespertilionidae - Vespertilionid Bats			
Eptesicus f. fuscus	Big Brown Bat	A	Caves & buildings
Lasionycteris noctivagans	Silver-haired Bat	R	Trees near water; winter resident & migrant; E-KNPC
Lasiurus b. borealis	Red Bat	A	Trees & shrubs; consumes large quantities of insects
L. c. cinereus	Hoary Bat	R	Trees & shrubs; mostly migrants & summer females; E-KNPC
M. grisescens	Gray Bat	R	Caves; unlikely in study area, vanishing; FW-E

TABLE 18
(continued)

Taxonomy		Abund.	Habitat and Remarks
M. keenii septentrionalis	Keen's Bat	R	Caves; very poorly known, local; E-KNPC
M. leibii leibii	Small-footed Myotis	R	Caves; very poorly known; common western sp.; E-KNPC
Myotis l. lucifugus	Little Brown Bat	U	Dense woods, caves, & rock crevices; more common in summer
M. sodalis	Indiana Bat	R	Caves; unlikely in study area; FW-E
Nycticeius h. humeralis	Evening Bat	R	Trees; absent in winter; poorly known in Kentucky; E-KNPC
Pipistrellus s. subflavus	Eastern Pipistrelle	A	Forest edge; very small bat
Plecotus rafinesquii	Eastern Big-eared Bat	R	Caves; migrants and summer females; E-KNPC
ORDER LAGOMORPHA: Rabbits			
Family Leporidae - Rabbits			
Sylvilagus floridanus mearnsii	*Cottontail Rabbit	C	Most habitats; very prolific
ORDER RODENTIA: Rodents			
Family Sciuridae - Squirrels and Relatives			
Glaucomys v. volans	Southern Flying Squirrel	C	Woodlands, esp. near streams; nocturnal; cavity during day
Marmota m. monax	*Woodchuck	U	Edges of fields & forest; third ranking game mammal in Ky.
Sciurus c. carolinensis	*Gray Squirrel	C	Hardwood stands, mostly oak-hickory; this & next sp. no. one Kentucky game mammal
S. niger rufiventer	Fox Squirrel	U	Forest edge, fields, woodlots
Tamias s. striatus	*Eastern Chipmunk	C	Hardwood associations w/cliffs, logs brush, etc.

TABLE 18
(continued)

Taxonomy		Abund.	Habitat and Remarks
Family Castoridae - Beavers			
Castor canadensis carolinensis	American Beaver	R	Streams & rivers; burrow in river bank; furbearer
Family Cricetidae - New World Rats and Mice			
M. ochrogaster ohionensis	Prairie Vole	R	Open fields, and other grassy habitat
Microtus pinetorum carbonarius	Woodland Vole	C	Any habitat w/friable soil & cover
Neotoma floridana magister	Cave Rat; Pack Rat	C	Rocks crevices & caves, esp. in sandstone
Ochrotomys nuttalli aureolus	Golden Mouse	C	Greenbrier thickets, arboreal nester and feeder
Ondatra z. zibethicus	Muskrat	U	Streams & rivers; nest cavity in bank
Peromyscus leucopus novaboracensis	White-footed Mouse	A	Most habitats with trees and shrubs
Reithrodontomys h. humulis	Eastern Harvest Mouse	U	Weedy fields
Synaptomys cooperi	Southern Bog Lemming	R	Grassy and shrubby habitats; local; small colonies
Family Muridae - Old World Rats and Mice			
Mus musculus	House Mouse	U	Same as above
Rattus norvegicus	Norway Rat	U	Around dwellings; pest, v. destructive
Family Zapodidae - Jumping Mice			
Napaeozapus insignis	Woodland Jumping Mouse	R	Cool, moist woods with dense herbaceous ground cover; esp. near streams and springs bordered by grass and draining north slopes; nocturnal; hibernates

TABLE 18
(continued)

Taxonomy		Abund.	Habitat and Remarks
ORDER CARNIVORA: Carnivores			
Family Canidae - Wolves, Coyotes, and Foxes			
Urocyon c. cinereoargenteus	Eastern Gray Fox	C	Hardwood forests, wooded fields & farmlands, den in woodchuck hole or rock crevice; nocturnal; furbearer
Vulpes vulpes fulva	Red Fox	U	Wooded fields & farmlands; den in woodchuck hole or rock crevice; nocturnal; furbearer
Family *Procyonidae - Raccoons*			
Procyon l. lotor	*Raccoon	A	Dense woods, esp. alluvial; cavity in tree is home; mostly nocturnal; furbearer; game species
Family Mustelidae - Minks, Weasels, Otters, and Skunks			
Lontra c. canadensis	River Otter	?	Water courses; not likely in study area; fur trade regulated; historical occurrence possible; E-KNPC
Mephitis mephitis nigra	Striped Skunk	C	Most habitats, rugged favored; den in ground; nocturnal; furbearer
Mustela frenata noveboracensis	Long-tailed Weasel	C	Forest edge & streambanks; crevice or hole in anything for nest; nocturnal; furbearer
M. vison mink	Mink	C	Along streams & creeks; any burrow or cavity; mostly nocturnal; furbearer
Spilogale p. putorius	Eastern Spotted Skunk	R	Rugged terrain; den in crevice at cliff base; primarily nocturnal; E-KNPC

TABLE 18
(continued)

Taxonomy		Abund.	Habitat and Remarks
Family Felidae - Cats			
Lynx _r._ _rufus_	Bobcat	R	Heavily forested woodlands; den in rock crevice or hollow tree; nocturnal; fur trade regulated; E-KNPC
ORDER ARTIODACTYLA: Even-toed Ungulates			
Family Cervidae - Deer			
Odocoileus _v._ _virginianus_	*White-tailed Deer	U	Regrowth forests, edge, & clearings; second ranking game mammal in Ky.

TABLE 19

KENTUCKY NATURE PRESERVES COMMISSION PLANT STUDY ELEMENTS WHICH MAY OCCUR IN THE LITTLE SOUTH FORK WILD RIVER, KENTUCKY

Scientific Name	Common Name	Remarks
Acer spicatum	Mountain Maple	Cool moist ravines; formerly in 4 plateau counties, now only Carter Co., southern range shrinking.
Aconitum uncinatum	Monkshood	Moist silty streambanks.
Amianthium muscaetoxicum	Fly-poison	Dry sandstone ridge in burned over woods in Harlan Co.
Aronia melanocarpa	Black Chokeberry	Bluff and ridge forest; found along Rockcastle River north of study area.
Boykinia aconitifolia	Boykinia	Wet sandstone or riverbanks; usually in mountains; McCreary Co.
Calycanthus floridus	Sweetshrub	Moist woods and riverbanks; known formerly only from Cumberland Mountains, recently found in McCreary Co.
Carex purpurifera	Sedge	Steep slopes on calcareous soil in mesophytic woods, usually in mountains; Cumberland Co.
Castanea dentata	American Chestnut	Slope forests and bluffs; decimated by blight; mostly stump sprouts.
Chrysosplenium americanum	American Goldsaxifrage	Springy or muddy soil in shade; under hemlock in Bell Co.
Cladrastis lutea	Yellow-wood	Rich woods and rocky bluffs, usually limestone; Whitley Co.; ST
Conradina verticillata	Cumberland Rosemary	Sandy riverbanks; McCreary Co.; SE/FWE

TABLE 19
(continued)

Scientific Name	Common Name	Remarks
Cymophyllus fraseri	Fraser's Sedge	Rich wooded slopes, usually in mountains; Pine Mountain, Letcher Co.; ST.
Cypripedium daultoni (nomen nudum)	Cream Yellow Lady's Slipper	Young alluvial forests; along Rockcastle River in Pulaski and Laurel Counties.
Gaylussacia brachycera	Box Huckleberry	Oak-pine ridges and pine bluffs.
Gentiana decora	Showy Gentian	Mesic woods, usually in mountains; known only from Cumberland mountains in Harlan and Letcher Cos.
Gymnopogon brevifolius	Gymnopogon	Rocky banks and poss. sandy ridges; known from Laurel Co. and adj. McCreary Co.
Halesia carolina	Silverbell	Rich mesophytic woodlands; Black Mountain, Harlan Co.
Hydrastis canadensis	Goldenseal	Rich mesic woods; nearly extirpated from Ky. by digging roots for medicine; ST.
Isoetes engelmanni	Appalachian Quillwort	Amphibious plant growing in muddy sloughs; known from north of study area, along Rockcastle River tributaries.
Maianthemum canadense	Wild Lily of the Valley	Moist woods, usually mountains; Red River Gorge area, Powell and Menifee Cos. and Black Mtn., Harlan Co.
Monotropsis odorata	Sweet Pinesap	Dry to mesic woods; Red River Gorge area and Black Mtn. in Letcher Co.

TABLE 19
(continued)

Scientific Name	Common Name	Remarks
Orontium aquaticum	Goldenclub	Usually in swamps and shallow water, but on rocky banks of Big S. Fork of Cumberland River in McCreary Co.
Oxalis acetosella	Common Wood Sorrel	Wet, mossy, often dripping boulders.
Panax quinquefolium	Ginseng	Slope forests; declining due to digging of roots for monetary gain.
Parnassia asarifolia	Grass of Parnassus	Streambanks and springy or boggy soil.
P. grandifolia	Grass of Parnassus	Wet calcareous soil; either this or preceding species occurs on wet limestone rock in Clinton Co.
Philadelphus hirsutus	Mock Orange	Cliffs and rocky slopes; in Pulaski Co., also in Bell Co.
Platanthera cristata	Crested Fringed Orchid	Wet acid soil; McCreary Co., probably extirpated in Ky.
P. flava	Tubercled Orchid	Boggy ground of floodplains; Laurel Co., ST.
P. integrilabia	White Fringeless Orchid	Wet acid soil; McCreary Co.
P. peramoena	Purple Fringeless Orchid	Damp or wet soil; known from Laurel Co.; ST.
P. psycodes	Purple Fringed Orchid	Wet meadows and wet open woods; only one location in Cumberland Plateau in Powell Co.
Sambucus pubens	Red-berried Elder	Rich mesic woods; in Menifee Co. in Red River Gorge, also on Black Mtn.

TABLE 19
(continued)

Scientific Name	Common Name	Remarks
Schwalbea americana	Schwalbea	Moist sandy soil of ridgetops; in McCreary Co.; ST.
Silphium brachiatum	Silphium	Clearings on sticky soil over limestone, usually rocky, in mixed hardwood, often open w/_Juniperus_; in Clay and Pike Cos.; ST/FWE.
Solidago curtissii	Goldenrod	Open areas in mesophytic woods; Black Mtn., in Harlan and Letcher Counties.
S. roanensis	Roan Mountain Goldenrod	Oak-pine woods in Bell Co.
Spiranthes lucida	Shining Ladies Tresses	Wet streambanks in Wolfe and McCreary Cos.; one location in study area; KNPC
Taxus canadensis	American Yew	On limestone in cool moist ravines; three stations in Cumberland Plateau, nearest is in Red River Gorge.
Tephrosia spicata	Goat's Rue	Sandy open woods and rocky banks; just s. of study area in McCreary Co.
Thuja occidentalis	Northern White Cedar	Sandstone boulders and limestone bluffs along streams on Big S. Fork of Cumberland River in McCreary Co. and in Pulaski Co
Synandra hispidula	Synandra	Mesic lower slopes and stream terraces; ST.
Woodsia scopulina	Appalachian Cliff Fern	Cliffs and rocky slopes; esp. outcropped sandstone in Ky., in Bell Co.

NOTES: Remarks based on information obtained from: Braun (1943 and 1950), Medley (1979 and 1980), Soil Systems, Inc. (1979), and Wharton and Barbour (1971 and 1973).
ST - Smithsonian Threatened
FWE - U.S. Fish and Wildlife Endangered

TABLE 20

SELECTED BIG TREES OF THE LITTLE SOUTH FORK WILD RIVER, KENTUCKY

Map Code	Common Name	Little South Fork Record		State Record*		Location in Study Area
		DBH	Height	DBH	Height	
T 1	Tulip Poplar	1'-11"	50'-60'	5'-7"	174'	Below cliff in slope forest near Slavens upstream of Hwy 92; McCreary Co.
T 2	Northern Red Oak	2'-9"	91'	7'-6"	86'	Along road in slope forest N of Concord Church; Wayne Co.
T 3	White Ash	2'-8"	75'-85'	5'-2"	101'	In fence row by road N of Concord Church; Wayne Co.
T 4	Virginia Pine	1'-8"	50'-60'	2'-11"	60'	In woods east of river hear Baker Branch; Wayne Co.
T 5	Post Oak	2'-11"	80'-90'	4'-2"	85'	In fence row by road near Baker Branch; Wayne Co.
T 6	White Oak	3'-10"	90'-100'	6'-7"	96'	In fence row by road near Baker Branch; Wayne Co.
T 7	Red Cedar	2'-0"	40'-50'	3'-5"	56'	In pasture near barn along Kidd's Crossing - Ritner Rd; Wayne Co.
T 8	White Pine	1'-2"	60'-70'	3'-10"	127'	In woods by road to Vaughn ford; McCreary Co.
T 9	American Beech	3'-1"	80'-90'	4'-4"	125'	Upslope at road east of bend in river downstream of Jones Hollow; McCreary Co.

Notes: State records are from Bergman, 1981.
Code references Map Set E, Special Features.
DBH - Diameter breast height (4'-6" above mean ground level)

* The diameters of state record trees were calculated from circumference measurements by the formula, diameter equals circumference (in inches) divided by pi (3.1416), and expressed in feet and inches.

3.8.6 VECTOR BIOLOGY

3.8.6.1 Introduction

Vector biology may be defined as the study of vector-borne diseases, in this case, in the human population. A vector is an organism which transmits parasites to another organism.

No data was found detailing the occurrence of vector-borne diseases specifically in the Little South Fork study area. It is unlikely, however, that the Little South Fork area is free of these diseases. In fact, the incidence of vector-borne diseases anywhere in the United States is probably greater than records indicate. Diagnosis is a problem in rural areas, as is surveillance and reporting of cases. Kentucky, in particular, is far down on the list of states with the facilities and staff to monitor and diagnose these vector diseases (Kappus 1979; Soil Systems, Inc. 1979).

In general, the major diseases whose vectors are included in the study area are St. Louis Encephalitis (SLE) and Rocky Mountain Spotted Fever (RMSF). Other vector-borne diseases which might occur in the area include California Encephalitis, Tick Bite Paralysis, Rabies and possibly Tularemia and Q Fever. These latter five diseases would all be quite rare in the study area.

3.8.6.2 St. Louis Encephalitis (SLE)

St. Louis Encephalitis virus exists primarily as an infection of birds which is transmitted by mosquitoes. The infection may be enzootic (confined to a particular population or species of an area) or epizootic (epidemic, infecting a large percentage of the birds of an area). Many species of birds, both wild and domestic, may become infected. The most important species in the transmission or amplification of the disease are primarily house sparrows; with pigeons, blue jays, and robins important as well. These birds develop the levels of viremia needed to infect mosquitoes but do not suffer ill effects themselves. This viremia lasts only a short time, after which mosquitoes feeding on the birds cannot become infected. Both humans and horses may contract the SLE virus from mosquitoes but do not seem to develop a sufficient viremia to infect mosquitoes that feed upon them (Center for Disease Control 1976).

Four mosquitoes may be vectors of SLE in the Study Area: *Culex pipiens pipiens*, *C. tarsalis*, *C. salinarius*, and *C. restuans*. *C. p. pipens* is more common north of the study area and prefers urban areas or dwellings, making it somewhat insignificant in the vicinity of the Wild River. *C.* tarsalis, an important western vector, would also be of only moderate importance this far east. *C. salinarius* and *C. restuans* are the more important vectors in the study area, with the latter likely being the most important due to its preference for woodland pools and pools in streams. Both mosquitoes are widely distributed in the East and prefer to feed outdoors at dusk and sporadically into the night (CDC 1976).

The number of cases of encephalitis in Kentucky from 1971 through 1976 was 151, with a low of four in 1974. In 1975 the worst nationwide outbreak occurred with over 2000 cases, of which 99 were in Kentucky. The worst Kentucky outbreak was in Louisville in 1956 when 110 cases were reported, resulting in twelve deaths. Most of these cases were SLE; however, rare cases of California Encephalitis have also been recorded in the state. Most encephalitis occurs in or around major cities, and in Kentucky the Ohio River basin is the area of greatest incidence (CDC 1976). There were 18 cases of encephalitis in Kentucky in 1978 (CDC 1979).

3.8.6.3 Rocky Mountain Spotted Fever (RMSF)

RMSF is a febrile disease caused by *Rickettsia rickettsii*. Ticks, rodents, and other wild animals are the reservoirs of the disease. The tick larvae and nymphs feed on these animals and the adult ticks parasitize man. The virus may be transmitted to the egg (transovarial) or any developmental stage (transtadial transmission) of the tick. In the Little South Fork Wild River area the major vector of this disease would be the American dog tick (*Dermacentor variabilis*) and to a lesser extent the lone star tick (*Amblyomma americanum*). The highest concentration of ticks occurs in recently disturbed areas where dense regrowth vegetation occurs (CDC 1978).

A steady rise in the incidence of RMSF has occurred since the early 1960's to a high of 1115 cases nationwide in 1977. During this period there has been a shift in the geographical distribution from the West to the East and South Atlantic states. Only one to five cases were reported for a county north of the study area in 1976. No occurrence was reported from the study area during that year (CDC 1978). Only two cases had been reported in the state by the end of September 1981 (CDC 1981).

3.8.6.4 Tularemia

Tularemia (rabbit fever) is a bacterial (*Pastuerella tularensis*) disease of rabbits and rodents which may be transmitted to man by ticks of the genus *Dermacentor*, *Amblyomma* and *Haemephysalis*. This disease is also subject to transovarial and transtadial transmission. Humans may acquire the disease by contact with infected animals or tick feces and by tick bite. Other arthropods, such as the deer fly, may be important in the spread of the disease. Tularemia occurrence has been declining steadily since 1950 and is rare in Kentucky. The nearest epicenter of incidence is in Arkansas (CDC 1978). Three cases of tularemia were reported in Kentucky between January 1 and September 26, 1981 (CDC 1981).

3.8.6.5 Q Fever

Q Fever, originally described from Australia, and not likely to be of consequence in the study area, is a rickettsial disease caused by *Coxiella burneti*. This disease has been recorded in veterinarians and farmers in the United States. The Rocky Mountain wood tick (Dermacentor andersoni), lone star tick, spinose ear tick (Otobius megnini) and many other species may transmit the virus. Tick tissue and feces become massively infected with this rickettsial agent and it is thought that humans may inhale the disease organisms with dust and droplets contaminated with material from infected animals (CDC 1978).

3.8.6.6 Tick Bite Paralysis

Tick bite paralysis is a progressive, ascending motor weakness caused by a neurotoxic substance in the saliva of the female hard tick. Studies indicate that five to six days of engorgement are necessary for paralysis to result. Starting in the extremities, progressive flaccidity may extend to the face, tongue, pharynx and can occassionally result in respiratory failure and death. The disease is most frequent in children; in adults the disorder rarely progresses to full paralysis. Removal of the tick usually results in complete recovery within 24 to 72 hours. In the study area, the American dog tick would likely be the most common cause of the disorder. This disease also occurs in cattle, sheep, horses, and dogs (CDC 1978).

3.8.6.7 Rabies

Rabies is a viral infection transmitted by the bite of an infected animal or by contact with the saliva of an infected animal. Many species of animals are susceptible to the infection. Kentucky has one of the highest incidences of animal rabies in the nation. There were 138 reported cases of animal rabies in Kentucky in 1979 (CDC 1980) and 104 cases had been reported by the end of September 1981 (CDC 1981). Of the 138 cases reported in 1979, 107 were rabid skunks, 14 were foxes, 12 were dogs, three were cattle, and 2 were bats. Five persons died of rabies in the U.S. in 1979, one of whom was a Kentuckian -- a resident of Frankfort (Courier Journal 1979).

3.8.6.8 Summary

Although data specific to the Little South Fork study area is lacking, some or all of the vector-borne diseases discussed in the preceding paragraphs may occasionally occur among the human or animal populations of the study area. The incidence, however, is likely to remain low if for no other reason than that the area is very sparsely populated. Extraordinary precautions against these diseases, therefore, do not seem warranted. Residents or visitors to the area may be assured of reasonable safety and comfort if, when outdoors in warm weather, they use insect repellent to repel mosquitoes and carefully remove any ticks from their clothing or person upon discovery. After an outing, a careful search should be made for ticks that have eluded discovery. Also, residents and visitors should stay away from wild animals (skunks, foxes, rabbits, etc.) that are behaving peculiarly, such as showing no apparent fear of being approached, as these animals could be rabid.

3.8.7 FOREST MANAGEMENT

Although the McCreary County side of the study area is within the Proclamation Boundary of the Daniel Boone National Forest, the Forest Service owns no land in or immediately adjacent to the Wild River corridor. The Stearns Ranger District, which administers Forest Service property in the McCreary County area, has divided the western margin of the district into forestry compartments with the study area falling within the limits of compartments 6084, 6085, 6086 and 6094. However, since all land within the study area portions of these compartments is privately-owned, no information is available on stand composition, acres or age of the timber in the compartments. The particulars of silvicultural activities carried out by private land owners in the compartments are unknown, as are planned or programmed future silvicultural actions (USFS 1980).

3.9 AQUATIC BIOLOGY

3.9.1 INTRODUCTION AND LITERATURE REVIEW

The aquatic inventory of the section of Little South Fork of the Cumberland River from river mile 4.1 to 14.5 was conducted by biologists of Coastal Zone Resources Division of Ocean Data Systems, Inc., assisted by Dr. Branley A. Branson and Dr. Guenter A. Schuster of Eastern Kentucky University. The aquatic inventory was concerned with three major objectives:

1) enumeration of fishes and macroinvertebrates present with attention to relative abundance,

2) determination of major habitat types occupied, and

3) notation of evidence of possible effects of environmental perturbations within the watershed on the abundance and diversity of aquatic organisms.

The information obtained during the field sampling was combined with published information and with unpublished data compiled from state agency contacts and regional authorities to fulfill the above objectives. Particular attention was paid to the occurrence of federally listed endangered and threatened species and those species listed as rare, threatened, endangered, or of special concern by the Kentucky Nature Preserves Commission. (Note: A new listing of such species is being prepared by the Kentucky Nature Preserves Commission and the Kentucky Academy of Science.)

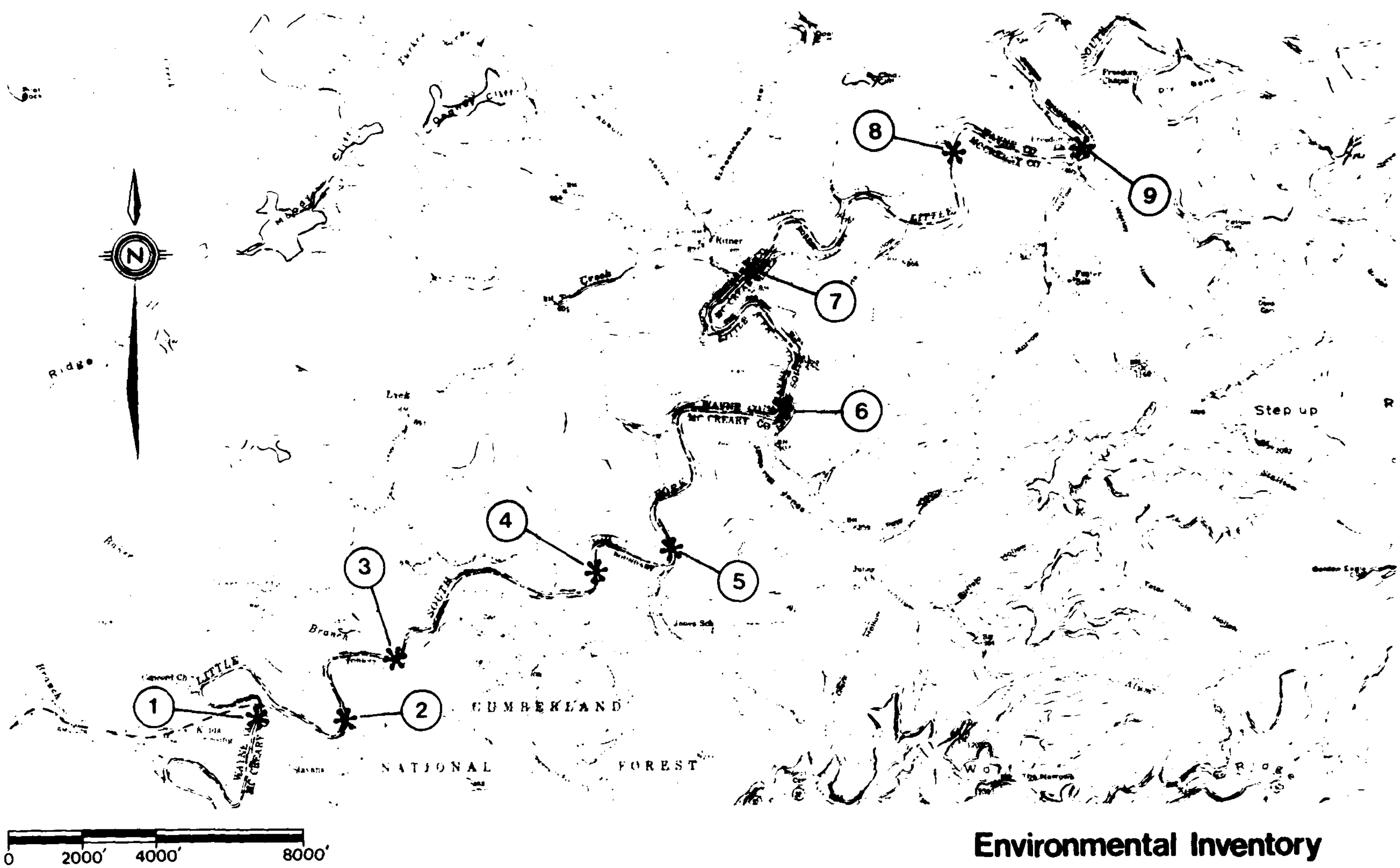
The fish fauna of the Little South Fork of the Cumberland River has never been thoroughly investigated from headwaters to mouth, and some of the early ichthyologists failed to sample the fauna entirely. For example, Woolman (1892) did not report records from the Little South Fork. Kirsch (1893) made a few collections from the stream, particularly from the mouth of Canada(=Kennedy) Creek, reporting three species which have not been collected since (see discussion below). Evermann's (1918) work simply reiterated the species reported by Kirsch (1893). Utilizing chemical collecting methods, Carter and Jones (1969) secured fishes from three Little South Fork sites, all from stretches of the stream lying outside the study area. The most extensive survey of the Little South Fork fishes is that of Comiskey and Etnier (1972); their comments on certain species are included below in the systematic accounts of the fishes. A few additional sites were visited by field representatives of the Kentucky Nature Preserves Commission (Harker et al. 1979 and 1980), and various workers (Branson 1971, Gilbert 1969, Lachner and Jenkins 1967, and Zorach and Raney 1967) have included scattered records from the stream, mostly from easily accessible points off main roadways.

Like the fish fauna, the macroinvertebrate fauna of the Little South Fork of the Cumberland River has never been extensively surveyed. Two recent studies (Harker et al. 1979 and 1980) presented lists of macroinvertebrate species from various sites within the Little South Fork drainage system. Harker et al. (1979) sampled two sites in the main channel of the river. One of these sites was at Ritner Ford, which was also surveyed in the present study (Station 7). The other locality examined was 1.8 km southeast of Mt. Pisgah at Kentucky Highway 167; this site is upstream from the designated wild river study area. The sites reported on by Harker et al. (1980) included one locality in the Little South Fork upstream from the present study area, and one site in Kennedy Creek, a tributary stream. The 1979 report by Harker et al. was based on two collection periods, one in June and the other in September 1978. The collections reported on by Harker et al. (1980) were made in July (main channel site) and August (Kennedy Creek) 1979.

3.9.2 METHODS

Fishes were collected at nine sites (Table 21 and Figure 16 amd Plates 16 to 44) distributed throughout the study area during the last week in October and the first week in November 1980. At that time, the river was extremely low, maintaining only minimal flow between nearly standing pools. At each locality, efforts were made to sample all obvious habitat types (i.e., riffles, chutes, pools, and backwaters) utilizing various sizes of seines. All fishes collected were preserved in the field in 10 percent formalin. During laboratory analysis of the samples, the specimens were washed with water and then preserved in 50 percent isopropyl alcohol.

Macroinvertebrates were sampled both quantitatively and qualitatively from Stations 1, 3, 5, 7, and 9 (Table 24 and Figure 16). Qualitative samples were taken with the use of a triangular aquatic dip net (Turtox Indestructible Net). The net was used as a kick net in that it was placed downstream while the substrate upstream was actively disturbed thereby dislodging organisms which were swept into the net by the current. The net was also used as a scoop in areas where the substrate could be sieved through the net and under overhangs along the shoreline which are otherwise difficult to sample. In addition, rocks, submerged logs, and other debris were hand-sampled in order to collect those macroinvertebrate species which adhere on these objects and are not easily dislodged. At each locality all evidently different types of habitats were sampled in order to ensure that a good cross-section of the fauna had been collected. The specimens were preserved in Kahle's Preservative (Wiggins 1977) and later transferred into 70 percent ethanol.



Environmental Inventory
Little South Fork Wild River
Figure Number 16
Aquatic Biology Sampling Stations

MILLICAN ASSOCIATES
Landscape Architects & Planners
Louisville, Ky.

MILLER WIHRY LEE INC
Landscape Architects, Engineers, Planners
Louisville, Nashville, Washington

COASTAL ZONE
RESOURCES DIVISION
OCEAN DATA SYSTEMS INC
Wilmington, N.C.

TABLE 21

SAMPLE STATION LOCALES FOR FISHES AND MACROINVERTEBRATES

Station Number	Location
1	Little South Fork at river mile 14.5; under Highway 92 bridge and upstream for approximately 500 feet. Fish sample and macroinvertebrate sample.
2	Little South Fork at river mile 13.2. Fish sample only.
3	Little South Fork at river mile 12.5; from the mouth of Corder Creek downstream approximately 700 feet. Fish sample and macroinvertebrate sample.
4	Little South Fork at river mile 11.2. Fish sample only.
5	Little South Fork at river mile 10.6; from Jones School ford downstream approximately 400 feet. Fish sample and macroinvertebrate sample.
6	Little South Fork at river mile 9.1. Fish sample only.
7	Little South Fork at river mile 7.9; just above and below the ford near Ritner. Fish sample and macroinvertebrate sample.
8	Little South Fork at river mile 6.1. Fish sample only.
9	Little South Fork at river mile 5.4; just above and below the Freedom Church ford. Fish sample and macroinvertebrate sample.

The quantitative macrobenthic samples were collected with the use of a one-square foot Surber Sampler. At each station three Surber samples were taken and were preserved in 10 percent formalin. The specimens, after they were identified, were transferred into 70 percent ethanol.

Macroinvertebrate specimens were identified with the aid of a number of taxonomic publications. The major publications referred to for each of the taxonomic groups included the following: Aquatic insects in general Usinger (1956), Merritt and Cummins (1978); Ephemeroptera--Edmunds et al. (1976); Plecoptera--Stark and Gaufin (1976); Trichoptera--Wiggins (1977), Schuster and Etnier (1978); Odonata--Needham and Westfall (1954), Huggins and Brigham (in press); Hemiptera--Bobb (1974), Usinger (1956); Coleoptera--Merritt and Cummins (1978), Usinger (1956), and Brown (1972); Diptera--Merritt and Cummins (1978), Usinger (1956); Megaloptera--Tarter (1976); Bivalvia--Burch (1975); Crayfishes--Hobbs (1972), Bouchard (1974), Hobbs and Bouchard (1973).

3.9.3 FISHES

Thirty-five species of fishes were collected from the nine sample stations in the Little South Fork study area. The sample collections are deposited in the museum collections at Eastern Kentucky University. The results of the inventory are summarized in Table 22. The total number of each species collected is listed for each station, and the total number of fishes collected at each station is listed beneath each column along with abundance and diversity rankings. The abundance ranking for each species is presented in the right-hand column of the table. Species reported in the literature but not collected during the present survey are discussed in the SYSTEMATIC DISCUSSION section below.

3.9.3.1 Dominant Fish Species

Discussions of dominancy or lack thereof are often a bit misleading when fluviatile populations are being considered. Huge numbers of one species may congregate in an optimum habitat from which they are easily captured, whereas elsewhere they may occur in small numbers. This may skew numerical data to such an extent that the species appears to be the dominant form throughout a given stream. For example, the undescribed palezone shiner completely dominated Station 6 by its numbers, whereas the species was completely absent from the two upstream sites (Stations 1 and 2) and was sparsely represented at stations 3, 4, and 5 as well. Such considerations must be borne in mind when interpreting the data of Table 22.

However, certain trends of dominancy are obvious. For example, the members of the family Cyprinidae (minnows) dominated the sampled section of Little South Fork, both in number of species (15) present and in total number of individuals collected. Percids (darters) were of second-rank importance in number of species (10), and the Centrarchidae (sunfishes) were third (5). The suckers (2 species), cyprinodonts (1 species), sculpins (1 species), and silversides (1 species) ranked very low.

The dominant species collected were the telescope shiner (Notropis telescopus) and the undescribed palezone shiner, both of which occurred in sluggish to flowing pools. The riffles were dominated by darters, principally the speckled darter (Etheostoma stigmaeum) and barcheek darter (Etheostoma obeyense) over sandy stretches and the rainbow darter (Etheostoma caeruleum) over gravel and rocks; the greenside darter (Etheostoma blennioides) dominated the vegetated riffles. Backwater pools were dominated by the common shiner (Notropis cornutus) and bluntnose minnow (Pimephales notatus). Certain species, such as the creek chub (Semotilus atromaculatus) which often forms dominant populations in extreme headwater streams, were present in very low numbers and other headwater species, such as the southern redbelly dace (Phoxinus erythrogaster), were absent entirely. Big-water species such as the largemouth bass (Micropterus salmoides), crappie (Pomoxis sp.), catfishes (Ictalurus spp.), and most suckers were not collected in the present inventory; however, some of these fishes have been collected previously in the Wild River area and these fishes are more numerous downstream.

TABLE 22

ABUNDANCE, DIVERSITY, AND DISTRIBUTION OF FISH SPECIES
BY STATION IN THE
LITTLE SOUTH FORK OF THE CUMBERLAND RIVER, KENTUCKY

Species	Collecting Stations									Total Collected	Abundance Rank
	1	2	3	4	5	6	7	8	9		
Campostoma anomalum	2	-	34	1	11	-	19	2	9	78	13
Notropis telescopus	64	-	298	20	136	29	170	100	183	1000	1
Notropis galacturus	-	-	5	-	7	4	46	7	21	90	12
Notropis ariommus	5	-	5	1	2	-	-	-	-	13	20
Notropis ardens	6	-	64	2	43	6	2	1	3	127	9
Notropis rubellus	26	1	30	86	75	50	22	7	5	302	4
Notropis cornutus	64	5	135	20	42	6	12	-	2	286	5
Sawfin Shiner	-	-	43	-	16	54	24	-	6	143	7
Palezone Shiner	-	-	5	10	9	232	83	62	145	546	2
Notropis photogenis	-	-	-	-	4	-	-	-	-	4	27
Notropis volucellus	18	1	-	-	-	-	-	-	-	19	17
Pimephales notatus	20	19	56	31	38	55	8	-	18	245	6
Hybopsis dissimilis	-	-	-	-	-	1	-	1	-	2	28
Hybopsis insignis	-	-	2	-	1	-	-	-	1	4	27

TABLE 22 (continued)

Species	Collecting Stations									Total	Abundance
	1	2	3	4	5	6	7	8	9	Collected	Rank
Semotilus atromaculatus	-	-	6	-	-	-	-	-	-	6	25
Hypentelium nigricans	-	-	1	1	1	1	4	-	2	10	23
Catostomus commersoni	-	-	2	-	-	-	-	-	-	2	28
Fundulus catenatus	3	-	1	1	1	-	2	-	1	9	24
Ambloplites rupestris	13	1	3	1	2	-	-	-	-	20	16
Lepomis megalotis	53	12	10	1	6	23	3	2	3	113	11
Lepomis macrochirus	-	4	1	-	-	-	-	-	-	5	26
Micropterus dolomieui	1	-	1	-	-	-	2	1	-	5	26
Micropterus punctulatum	-	-	2	-	-	-	-	2	-	4	27
Labidesthes sicculus	1	-	-	-	2	45	4	2	6	60	15
Percina caprodes	1	-	-	-	-	-	-	-	-	1	29
Etheostoma blennioides	1	-	12	6	6	10	19	4	6	64	14
Etheostoma zonale	-	-	-	-	-	-	1	4	-	5	26
Etheostoma maculatum	1	-	3	2	2	-	2	2	-	12	21
Etheostoma camurum	-	-	7	3	-	-	2	1	2	15	18
Etheostoma stigmaeum	20	3	18	18	12	29	23	-	10	133	8

TABLE 22 (continued)

Species	Collecting Stations									Total	Abundance
	1	2	3	4	5	6	7	8	9	Collected	Rank
Etheostoma caeruleum	41	1	155	34	57	2	23	33	39	385	3
Etheostoma obeyense	34	2	24	5	4	31	4	-	8	112	10
Etheostoma flabellare	-	-	6	2	3	-	-	-	-	11	22
Etheostoma cinereum	1	-	-	-	-	-	-	-	-	1	29
Cottus carolinae	-	-	10	1	-	-	2	1	-	14	19
TOTALS:	375	49	939	246	480	578	477	232	470	3846	
STATION ABUNDANCE RANK	6	9	1	8	3	2	4	7	5		
TOTAL NUMBER OF SPECIES	20	10	28	20	23	16	22	17	19		
STATION DIVERSITY RANK	4	8	1	4	2	7	3	6	5		

3.9.3.2 Sensitive Species

The Little South Fork, because of its very high-quality water and clean habitats, has been able to retain a rather diverse biota, including fishes. Although some species found in other portions of the Cumberland River drainage are lacking, the Little South Fork fish fauna as a total assemblage is diverse and relatively rich as compared with the larger Rockcastle River, and some species are more or less restricted to it. No federally listed threatened or endangered fishes are known to occur; however, four minnows and three darters are listed in Endangered, Threatened and Rare Animals and Plants of Kentucky (Branson et al. in press):

1) Notropis ariommus (popeye shiner): extirpated from Georgia and Alabama and listed as undetermined in Kentucky. The species is rare throughout most of its range. The closely related Notropis telescopus has been delisted in Kentucky.

2) Notropis species (sawfin shiner): listed as threatened peripheral.

3) Notropis species (palezone shiner): listed as an endangered endemic.

4) Hybopsis insignis (blotched chub): listed as of special concern.

5) Etheostoma cinereum (ashy darter): listed as endangered

6) Percina macrocephala (longhead darter): listed as threatened.

7) Percina burtoni (blotchside logperch): listed as endangered.

3.9.3.3 Systematic Discussion

In the following annotations, species reported by other authors are indicated by an asterisk (*) to distinguish them from the species collected by the present inventory.

PETROMYZONTIDAE--LAMPREYS

*Ichthyomyzon bdellium (Jordan) Ohio Lamprey

Comiskey and Etnier (1972) collected one specimen of this parasitic lamprey at Ritner Ford (Station 7). Lampreys move upstream to riffles during the spring breeding season, spawn, and die. Adults are not encountered in such situations at other times of the year, hence the scarcity of lampreys in collections.

*Ichthyomyzon greeleyi Hubbs and Trautman--Allegheny Brook Lamprey

The single specimen captured in Little South Fork near Mount Pisgah by Comiskey and Etnier (1972) is the only record for this nonparasitic lamprey from the Cumberland River drainage. The ammocoetes live in burrows in silty sand of creeks and small rivers, whereas the adults die after spawning. The life cycle and biology of this species is poorly understood.

LEPISOSTEIDAE--GARS

Lepisosteus osseus (Linnaeus)--Longnose Gar

The specimen collected by Carter and Jones (1969) from the mouth of Kennedy Creek and from the Parmleysville bridge area are the only reports for gars in the Little South Fork drainage. The habitat at both sites is out of character for this predator. Normally, they prefer deeper water in large streams and lakes, where small fishes make up most of their diet.

CYPRINIDAE--MINNOWS

As demonstrated by Table 22, the minnow family dominates the fish populations of the Little South Fork, both in number of species and in biomass. Minnows comprised 74 percent of the total number of individuals collected and 43 percent of the species. Most of the species are adapted for life in flowing pools and backwaters, although the stoneroller characteristically occupies riffles.

Most of the minnows collected are predaceous upon insects and crustaceans, although *Pimephales* eats large quantities of vegetable matter and the stoneroller feeds upon detritus and microscopic life in the bottom ooze and incrustations on rocks and debris. Several species build nests for spawning, but others breed in large congresses over rocky bottoms. *Pimephales* deposits eggs on the underside of objects, the male guarding the nest sites. Minnows, of course, are exceptionally important forage species in stream habitats.

Campostoma anomalum (Rafinesque)--Stoneroller

Collecting sites: 1, 3, 4, 5, 7, 8, 9; 78 specimens. Rank: 13.

Stonerollers are widely distributed throughout the Cumberland River system except where pollution has extirpated them. Typically, they breed over riffles in spring and migrate into pools for feeding and overwintering. The eggs are deposited in excavations just above pools. The food, consisting principally of algae and bottom ooze, is scraped off rocks and other items by means of a highly specialized mouth. Thus, stonerollers are classified as primary consumers and are sensitive to both acid and sediment pollution.

Cyprinus carpio Linnaeus--Carp

The only Little South Fork record for this species is that of Carter and Jones (1969). The carp is not normally encountered throughout the Upper Cumberland River drainage except in impoundments.

*<u>Hybopsis</u> <u>amblops</u> (Rafinesque)--Bigeye Chub

The bigeye chub was collected by Kirsch (1893) from the mouth of Canada Creek (Kennedy Creek) and has not been reported from the Little South Fork system since that time. In fact, the species is nowhere common in the Big South Fork system (Comiskey and Etnier 1972). Recent records from Rock Creek in McCreary County apparently represent the first time this species has been recorded in the Kentucky portion of the Big South Fork since 1893 (Harker et al. 1979).

<u>Hybopsis</u> <u>dissimilis</u> (Kirtland)--Streamline Chub

Collecting sites: 6, 8; 2 specimens. Rank: 28.

The streamline chub typically inhabits small and large rivers with moderate current and gravel bottoms, where it breeds in late spring and early summer. In the Big South Fork drainage, the species is apparently restricted to the Little South Fork (Comiskey and Etnier 1972), but it is not common there.

<u>Hybopsis</u> <u>insignis</u> Hubbs and Crowe--Blotched Chub

Collecting sites: 3, 5, 9; 4 specimens. Rank: 27.

This minnow, modified for relatively swift currents, has often been confused with the streamline chub. It is uncommon in the Little South Fork, where it is a relict, and apparently does not occur in the Big South Fork at all (Comiskey and Etnier 1972). The food is principally aquatic insects, and spawning occurs in late spring over clean gravel. The blotched chub is listed as of special concern in Kentucky.

*<u>Nocomis</u> <u>effusus</u> Lachner and Jenkins--Redtail Chub

Inhabiting riffles and swift pools in main rivers and larger creeks (Lachner and Jenkins 1967) with rocky or gravel bottoms, this fish feeds mostly upon insects and small amounts of plant materials. Spawning occurs in late spring in shallow runs in specially constructed nests. The species is not common in the Little South Fork (Lachner and Jenkins 1967) and does not occur in the Big South Fork (Comiskey and Etnier 1972). Lachner and Jenkins (1967) reported a few specimens from the mouths of Kennedy (Canada) Creek and from the Little South Fork at Parmleysville. More recently, this species was reported upstream of the Wild River area at the Highway 167 bridge (Harker et al. 1979) and in Kennedy Creek (Harker et al. 1980).

The redtail chub is often confused with the river chub (<u>Nocomis</u> <u>micropogon</u> Cope). Although Carter and Jones (1969) reported specimens of the river chub from the mouth of Kennedy Creek and from Parmleysville, that species probably does not occur in the Little South Fork (Comiskey and Etnier 1972).

Notropis ardens (Cope)--Rosefin Shiner

Collecting sites: 1, 3, 4, 5, 6, 7, 8, 9; 127 specimens.
Rank: 9.

Widely distributed in the Cumberland River drainage, the rosefin shiner lives mostly in large creeks and small, clear rivers. The usual habitat is flowing pools over gravel or rock bottoms where it feeds mostly upon insects and small crustaceans. Breeding occurs over gravel. The fish is sometimes confused with the emerald shiner (Notropis atherinoides Rafinesque), but that species is rare in the Big South Fork system (Comiskey and Etnier 1972).

Notropis ariommus (Cope)--Popeye Shiner

Collecting sites: 1, 3, 4, 5; 13 specimens. Rank: 20.

Listed as undetermined in Kentucky, this minnow is uncommon to rare throughout its range, having been extirpated or heavily depleted by the effects of strip mining in much of its Kentucky distribution. The fish has a strong preference for pools over gravel bottoms, where breeding occurs in late spring, and its food is principally drifting invertebrates.

*Notropis boops Gilbert--Bigeye Shiner

Since this minnow has not been collected by other workers in the system, including the present inventory, Carter and Jones' (1969) record, based upon a single specimen from Parmleysville, needs verification. The fish is sometimes confused with other bigeyed species.

Notropis cornutus (Mitchill)--Common Shiner

Collecting sites: 1, 2, 3, 4, 5, 6, 7, 9; 286 specimens.
Rank: 5.

The fifth most common species encountered in the study area, the common shiner utilizes both pools and slower riffles as habitat, feeding principally upon terrestrial and aquatic invertebrates. Spawning occurs in late spring and early summer over the nests of other fishes, mostly other minnows and sunfishes. (Note: Some ichthyologists classify this fish as the striped shiner, Notropis chrysocephalus.)

Notropis galacturus (Cope)--Whitetail Shiner

Collecting sites: 3, 5, 6, 7, 8, 9; 90 specimens. Rank: 12.

The whitetail shiner was more common at downstream sites in the Little South Fork, and it is uncommon in other parts of the Cumberland River system. It prefers flowing pools over rocks and gravel where it feeds mostly on drifting invertebrates. Breeding occurs in late spring over rocks or other submerged items.

Notropis leuciodus (Cope)--Tennessee Shiner

The only known record, which should be verified, for this species in the Little South Fork is that of Comiskey and Etnier (1972), who also reported it from Clear Fork. The Tennessee shiner has stream requirements similar to those of the rosyface shiner (*Notropis rubellus*) and is often found swimming with that species.

Notropis photogenis (Cope)--Silver Shiner

Collecting sites: 5; 4 specimens. Rank: 27.

The silver shiner must be listed as rare in the study area, and it is very scarce in other Cumberland River tributaries. Typically, the fish inhabits large, clean streams and rivers over gravel and rocky bottoms. Reproduction occurs in late spring, but the biology of the species is poorly known.

Notropis species--Sawfin Shiner

Collecting sites: 3, 5, 6, 7, 9; 143 specimens. Rank: 7.

This undescribed species, probably most closely related to the mirror shiner, *Notropis spectrunculus* (Cope), inhabits pools with moderate current over gravel and rocks. The biology is unknown but the species is being considered by Dr. John S. Ramsey of Auburn University. It is listed as threatened peripheral in Kentucky. Comiskey and Etnier reported it from the Little South Fork and from western tributaries emptying into the Big South Fork in Tennessee. Melvin L. Warren, Jr., ichthyologist with the KNPC, also has definite records from Pitman and Rock Creeks outside the study area.

Notropis species--Palezone Shiner

Collecting sites: 3, 4, 5, 6, 7, 8, 9; 546 specimens.
Rank: 2.

Ranking second only to the telescope shiner in abundance during this inventory, the palezone shiner (being described by Dr. R. E. Jenkins of Roanoke College Virginia) is another undescribed species, probably most closely related to the swallowtail shiner (*Notropis procne* Cope). The species prefers pools with considerable current but very little is known about the biology of the fish. It is endemic to the Little South Fork and is considered a relict (Comiskey and Etnier 1972). The species is listed as an endangered endemic.

Notropis rubellus (Agassiz)--Rosyface Shiner

Collecting sites. 1, 2, 3, 4, 5, 6, 7, 8, 9; 302 specimens.
Rank: 4.

This species apparently maintains its largest populations near the middle of the Little South Fork study area, dropping off in numbers above and below that area. The habitat is pools below riffles with strong current, where spawning normally occurs in May. It feeds mostly upon small invertebrates and, in turn, is an important forage fish for the larger predators.

*Notropis atherinoides Rafinesque--Emerald Shiner

The emerald shiner was reported from the ford at Ritner by Harker et al. (1979). Primarily a species of lakes and large streams, it ascends smaller streams and may be abundant in them at times. It is usually found in the middle or upper layers of water. When the water is deep, this shiner occurs over all types of bottom but when the water is shallow, it prefers clean, firm bottoms. It feeds largely on small insects (Clay 1975).

Notropis telescopus (Cope)--Telescope Shiner

Collecting sites: 1, 3, 4, 5, 6, 7, 8, 9; 1,000 specimens.
Rank: 1.

Previously listed as of special concern by KNPC, the telescope shiner has been delisted because of the relatively large populations in various parts of the Cumberland River system. It was the most abundant minnow during the present inventory, being found mostly in fairly swift water over gravel and rocky bottoms. It feeds upon aquatic insects. Breeding occurs in May to early June.

Notropis volucellus (Cope)--Mimic Shiner

Collecting sites: 1, 2; 19 specimens. Rank: 17.

This schooling species is a large-river fish that is encountered in smaller numbers in rivers like the Little South Fork. The mimic shiner expresses a diurnal movement from deep water into the shallows, where feeding occurs on aquatic and terrestrial invertebrates. Breeding occurs in pools during late May or early June. The species is not well-adapted for small-stream life.

*Phenacobius mirabilis (Girard)--Suckermouth Minnow

It is unfortunate that the single specimen reported by Carter and Jones (1969) from the Little South Fork at the mouth of Kennedy Creek was not preserved. However, the presence of this species in the Upper Cumberland River seems highly unlikely since it is mostly a lowland species (Clay 1975), and it is unknown in the range of the stargazing minnow (Phenacobius uranops Cope).

*Phoxinus erythrogaster (Rafinesque)--Southern Redbelly Dace

This species is an extreme headwaters and small-spring species seldom encountered at downstream or main-channel localities. The species does occur in a number of Little South Fork headwater springs.

Pimephales notatus (Rafinesque)--Bluntnose Minnow

Collecting sites: 1, 2, 3, 4, 5, 6, 7, 9; 245 specimens.
Rank: 6.

One of the most widely distributed fishes in Kentucky, the bluntnose minnow sometimes produces prodigious populations in pooled areas of streams possessing vegetation and/or decaying wood. It is an omnivore but eats mostly aquatic invertebrates. Breeding occurs throughout late spring and summer, most of the activity occuring during the period May through June. The eggs are deposited on the underside of rocks and are guarded by nuptial males. It is an important forage fish.

*Pimephales promelas Rafinesque--Fathead Minnow

The single specimen reported from the lower end of the Little South Fork by Comiskey and Etnier (1972) was considered the result of bait introduction.

*Rhinichthys atratulus (Hermann)--Blacknose Dace

This species is found only in extreme headwater tributaries (Comiskey and Etnier 1972).

Semotilus atromaculatus (Mitchill)--Creek Chub

Collecting sites: 3; 6 specimens. Rank: 25.

Normally a headwater (first and second order) fish, the creek chub decreases in numbers downstream. Our six specimens were secured from a side spring. Creek chubs feed principally upon aquatic and terrestrial invertebrates. Spawning is prolonged, but the peak comes in May to June. A nest is constructed by the males of small stones, and both eggs and young are guarded. The creek chub is somewhat resistant to silt and turbidity.

CATOSTOMIDAE--SUCKERS

Even though suckers are difficult to collect by seining, under the conditions of the Little South Fork River during the present inventory members of the genus Moxostoma were not observed in the shallow, very clear water. Redhorses (Moxostoma) are seasonally abundant fishes, making spawning runs upstream to riffles then retiring to deeper waters for the summer and winter.

Catostomus commersoni (Lacèpède)--White Sucker

Collecting sites: 3; 2 specimens. Rank 28.

White suckers are normal constituents of headwater populations and are not often collected far downstream. They are more or less omnivorous, feeding mostly from the bottom, and their young form a minor element in the diet of the large predators. Spawning occurs in late April through early May in pools at the foot of riffles.

Hypentelium nigricans (Lesueur)--Northern Hog Sucker

Collecting sites: 3, 4, 5, 6, 7, 9; 10 specimens. Rank: 23.

The hogsucker is a characteristic fish of the Cumberland River system and elsewhere, being widespread but never in large numbers at any given locality. The habitat is relatively swift water in pools over gravel or rock bottoms. The fish lives on the bottom, feeding on insects, crustaceans, and considerable amounts of detritus and plant materials. Breeding occurs in April to May in riffles.

**Lagochila lacera* Jordan and Brayton--Harelip Sucker

Kirsch (1893) collected this species from the mouth of Canada Creek in 1891, but the species has not been seen in North America since 1895 and is considered to be extinct. However, because of the high-quality water in the Little South Fork, there is always the possibility of a small, residual population.

**Moxostoma duquesnei* (Lesueur)--Black Redhorse

Carter and Jones (1969) recorded this species from Parmleysville and Harker et al. (1979) reported it from Ritner, within the Wild River area. The black redhorse lives mostly in clear streams running over rocks and gravel. It breeds in riffles, often in large congresses, principally at night.

**Moxostoma erythrurum* (Lesueur)--Golden Redhorse

The golden redhorse has been reported from the mouth of Kennedy Creek (Carter and Jones 1969). The fish spends most of its time in pools and backwaters of low current, feeding mostly upon aquatic invertebrates. It migrates, mostly at night, to riffles for spawning in April to early May.

ICTALURIDAE--FRESHWATER CATFISH

Catfishes are not abundant in either the Big South Fork (Comiskey and Etnier 1972) or the Little South Fork. Only three species, based upon small samples, have been recorded thus far.

**Ictalurus natalis* (Lesueur)--Yellow Bullhead

Carter and Jones (1969) collected one specimen by means of chemicals at the mouth of Kennedy Creek.

**Ictalurus punctatus* (Rafinesque)--Channel Catfish

Harker et al. (1979) reported the channel catfish from Ritner Ford. There is minimal habitat for the channel catfish throughout much of the Little South Fork, the best being just above the mouth.

Noturus flavus Rafinesque--Stonecat

Carter and Jones (1969) recorded this species from Parmleysville and Harker et al. (1980) collected it from Kennedy Creek.

CYPRINODONTIDAE--KILLIFISH

Fundulus catenatus (Storer)--Northern Studfish

Collecting sites: 1, 3, 4, 7, 9; 9 specimens. Rank: 24.

The studfish is not a common inhabitant of much of the Upper Cumberland River system. Comiskey and Etnier (1972), for example, found the species to be restricted to the Little South Fork in the Big South Fork system. Unlike many other species of *Fundulus*, this species lives at midwater in clean streams over various types of bottoms. It feeds upon small drifting invertebrates and breeds in late spring to early summer.

ATHERINIDAE--SILVERSIDES

Labidesthes sicculus (Cope)--Brook Silverside

Collecting sites: 1, 5, 6, 7, 8, 9; 60 specimens. Rank: 15.

Apparently uncommon in other Cumberland River tributaries, this nearly transparent fish develops its largest populations in back-waters and lakes or in small clear upland tributaries. The species cannot withstand turbidity since it is principally a visual feeder. Reproduction occurs in open water during spring.

PERCICHTHYIDAE--TEMPERATE BASSES

**Morone chrysops* (Rafinesque)--White Bass

The only published record for this predaceous fish from the Little South Fork drainage is that of Carter and Jones (1969) from the mouth of Kennedy Creek, a highly unlikely habitat for this large river and lake species.

CENTRARCHIDAE--SUNFISHES

Seven species of centrarchid fishes are known from the Little South Fork drainage; five of the seven species were collected during the present inventory.

Ambloplites rupestris (Rafinesque)--Rockbass

Collecting sites: 1, 2, 3, 4, 5; 20 specimens. Rank: 16.

The rockbass is widespread in the Cumberland River basin, most commonly in large clear creeks with gravel and rock bottoms and with an abundance of crayfish, its principal food organism. The species is a crepuscular feeder, spending most of the day in hiding beneath rocks, under logs, or similar haunts. Breeding occurs mostly in June at these latitudes; the males excavate nests and guard the eggs and young. Large populations of adults are not maintained at any given site, probably because of competitive exclusion. The rockbass, also known locally as "redeye" and "goggle-eye," is a fine food fish eagerly sought by anglers.

Lepomis macrochirus (Rafinesque)--Bluegill

Collecting sites: 2, 3; 5 specimens. Rank: 26.

It was not surprising that the bluegill was collected in small numbers, since the species is not characteristically a member of upland streams but lives in backwaters, ponds, and lakes instead.

Lepomis megalotis (Rafinesque)--Longear Sunfish.

Collecting sites: 1, 2, 3, 4, 5, 6, 7, 8, 9; 113 specimens. Rank: 11.

This is the most abundant *Lepomis* in most of the tributaries of the Cumberland River, including the Big South Fork and Little South Fork.

The preferred habitat is flowing pools with an abundance of gravel and rocks, where nest-building occurs in May through July. The brilliantly colored males guard the nests. Because of its small size, the longear sunfish is of little angling interest.

Micropterus dolomieui Lacépède--Smallmouth Bass.

Collecting sites: 1, 3, 7, 8; 5 specimens. Rank: 26.

The smallmouth bass, and the next species, the spotted bass, are the dominant predators in the Little South Fork, but neither species maintain large populations at given localities because of competitive exclusion. The smallmouth prefers clear, relatively deep pools beneath riffles where it feeds upon large invertebrates and fishes. Breeding occurs from April to May in nests near the shore or around submerged objects. The males guard the eggs and young until the latter can forage for themselves.

Micropterus punctulatus (Rafinesque)--Spotted Bass

Collecting sites: 3, 8; 4 specimens. Rank: 27.

The spotted bass has habitat requirements and breeding habits similar to those of the smallmouth bass although it seems to prefer stream segments of lower gradient. Breeding migration upstream usually occurs when the water temperatures reach 50°F (Trautman 1957). Nest-building and breeding usually occur in sluggish pools near riffles.

Micropterus salmoides (Lacépède)--Largemouth Bass

The only record from the Little South Fork is that of Harker et al. (1979), which is understandable since this is a predominately lowland form adapted for life in backwaters, ponds, and lakes. Little South Fork provides only minimal acceptable habitat for the largemouth bass.

PERCIDAE--PERCHES

Etheostoma atripinne (Jordan)--Cumberland Snubnose Darter

Kirsch (1893) collected a single specimen of this species from the Little South Fork, the identity of which was verified by Etnier (Comiskey and Etnier 1972). The species does not occur in the Big South Fork, and has not been collected from the study area during the last 95 years. *E. atripinne* is replaced in the rest of the system by an undescribed *Ulocentra* (i.e., "emerald darter"). The most upstream extant population of *E. atripinne* in the Cumberland River is in Fishing Creek (Fallo and Warren, in prep). Although the "emerald darter" occurs in the Big South Fork Cumberland River and tributaries, it does not occur in the Little South Fork.

Etheostoma blennioides Rafinesque--Greenside Darter

Collecting sites: 1, 3, 4, 5, 6, 7, 8, 9; 64 specimens.
Rank: 14.

This large darter is widely distributed in the Cumberland River, principally in vegetated riffles of moderate to swift current. Its main food is invertebrates. Breeding occurs in mid-April when the males and females migrate to deep, swift riffles over gravel and rocks. The males are briefly territorial during this time and both sexes have definable home ranges.

Etheostoma caeruleum Storer--Rainbow Darter

Collecting sites: 1, 2, 3, 4, 5, 6, 7, 8, 9; 385 specimens.
Rank: 3.

The rainbow darter was the third most abundant fish in the survey and the most abundant darter encountered in the slow- to moderate-current riffles, mostly in shallow water over rocks and gravel. During the April breeding season, prodigious numbers of rainbow darters congregate on the riffles. Following the breeding season they redistribute themselves over the riffles and pools. They are predaceous upon benthic invertebrates.

Etheostoma camurum (Cope)--Bluebreast Darter

Collecting sites: 3, 4, 7, 8, 9; 15 specimens. Rank: 18.

This darter was collected primarily from the deeper riffles over gravel and rocks, a site where breeding occurs in late April and early May. The range of the bluebreast darter in the Kentucky River system and in parts of the Cumberland drainge is shrinking.

Etheostoma cinereum Storer--Ashy Darter

Collecting sites: 1; 1 specimen. Rank: 29.

This is one of the rarest darter in Kentucky and is listed as endangered. The habitat is in sluggish waters about 1.8 m deep over silty gravel or muddy gravel along the margins of riffles or in backwaters with some vegetation. The biology is very poorly understood.

Etheostoma flabellare Rafinesque--Fantail Darter

Collecting sites: 3, 4, 5; 11 specimens. Rank: 22.

In the Big South Fork drainage, the fantail darter is apparently restricted to the Little South Fork (Comiskey and Etnier 1972), mostly near the middle of the stream's length according to the present records. The species lives mostly in shallow riffles throughout the warm part of the year but retires to pools during the winter. It is entirely predaceous upon small aquatic invertebrates. Breeding occurs in May to early June.

**Etheostoma kennicotti* (Putnam)--Stripetail Darter

The presence of this species is based upon specimens collected from a site one mile above Mt. Pisgah (Carter and Jones 1969). This may be the result of a misidentification of the barcheek darter (*Etheostoma obeyense*) (see below), as Comiskey and Etnier (1972) did not collect the species and Dr. Branley A. Branson has never taken it from any Big South Fork tributary.

Etheostoma maculatum Kirtland--Spotted Darter

Collecting sites: 1, 3, 4, 5, 7, 8; 12 specimens.
Rank: 21.

The spotted darter was listed by KNPC as of special concern but has been delisted on the most recent list (Branson et al., in press). Characteristically, the habitat is in deep, swift riffles over gravel, rocks, and boulders. Breeding occurs in May to June. The species is very sensitive to turbidity, acid, and settleable solids. The Big South Fork population belongs to the subspecies *Etheostoma maculatum sanguifluum* (Cope) (Zorach and Raney 1967), the young of which are easily misidentified as the Tippecanoe darter (*Etheostoma tippecanoe* Jordan and Evermann), a rare species which apparently does occur in the Big South Fork (Personal communication, Melvin L. Warren, Jr., Ichthyologist, Kentucky Nature Preserves Commission, Frankfort, KY).

Etheostoma obeyense Kirsch--Barcheek Darter

Collecting sites: 1, 2, 3, 4, 5, 6, 7, 9; 112 specimens.
Rank: 10.

The third most common darter encountered in the study area, the barcheek darter was taken principally from low-velocity riffles and flowing pools over small gravel and sand. The species is relatively widespread in various drainages of the Cumberland River system, replacing the striped darter (Etheostoma virgatum) in most of the larger streams. The two species are easily mistaken for one another. Breeding occurs in May.

Etheostoma spectabile (Agassiz)--Orangethroat Darter

Comiskey and Etnier (1972) reported an isolated population of the orangethroat darter in Kennedy Creek. In the off-breeding season, the orangethroat darter (Etheostoma spectabile) is easily confused with the rainbow darter (Etheostoma caeruleum), the principal distinguishing feature being an interrupted infraorbital lateral-line canal in the orangethroat darter as compared with a complete one in the rainbow darter. In breeding males, of course, there are many color differences.

Etheostoma stigmaeum (Jordan)--Speckled Darter

Collecting sites: 1, 2, 3, 4, 5, 6, 7, 9; 133 specimens.
Rank: 8.

The speckled darter was the second most frequently encountered darter, occurring almost entirely in slower riffles and pools over small gravel and sand. The fish spawns mostly in May, the eggs being buried in the substrate in the males' territories.

Etheostoma zonale (Cope)--Banded Darter

Collecting sites: 7, 8; 5 specimens. Rank: 26.

The banded darter is principally a large-stream species, occupying deep, swift riffles over gravel and rocks. It breeds in May to June on riffles above vegetated areas. The young fish live mostly in quieter waters than the adults.

Although the sampling team sought the undescribed emerald darter, a related species found in various sections of the Cumberland River system and in the Kentucky River drainage as well, the species was not encountered, nor has it been reported by other workers.

*Percina burtoni Fowler--Blotchside Logperch

Long considered a subspecies of the common logperch, this species has been found living with the latter species in various places (Comiskey and Etnier 1972). The only verified record of the blotchside logperch from Kentucky is based upon a single specimen collected from the Little South Fork by Kirsch (1893). The habitat is swift, deep riffles over rocks and boulders. Very little is known about the life cycle and other biological aspects of this large darter, which is listed as endangered by KNPC.

Percina caprodes (Rafinesque)--Logperch

Collecting sites: 1; 1 specimen. Rank: 29.

The logperch is not abundant in the Little South Fork although Comiskey and Etnier (1972) state that it is very common in a variety of large-stream and river habitats in the Big South Fork system. Kirsch (1893) reported the species from the stream; however, one of his specimens was actually the blotchside logperch (*Percina burtoni*), as verified by R. E. Jenkins (Comiskey and Etnier 1972). The typical habitat includes riffles with considerable rock rubble and vegetation, where the long-snouted fish forages for invertebrate food items by overturning rocks. Breeding occurs in May, usually on riffles.

**Percina macrocephala* (Cope)--Longhead Darter

Comiskey and Etnier (1972) recorded a single specimen from the Little South Fork which also represents the only known record for this rare species from the entire Big South Fork drainage. The habitat is high-gradient streams of clear water over gravel and rocks. Very little is known about the biology of the species, and it is listed as threatened by KNPC.

COTTIDAE--SCULPINS

Cottus carolinae (Gill)--Banded Sculpin

Collecting sites: 3, 4, 7, 8; 14 specimens. Rank: 19.

This bottom-dwelling predator species prefers riffles over rock rubble as habitat although it is sometimes found in pools. Its diet consists of insects, small crayfish, and fishes, including members of the same species. Reproduction occurs in May on the underside of flat rocks.

3.9.4 MACROINVERTEBRATES

3.9.4.1 Macroinvertebrate Sampling Results

Twenty-five species of mussels and 60 species of other macroinvertebrates were collected from five sample stations (Stations 1, 3, 5, 7, and 9--see Table 23 and Figure 16). The samples are deposited in the collections of Eastern Kentucky University.

The results of the mussel inventory are summarized in Table 23. The total number of each species is listed according to station, and the total number of individuals collected at each locality is given beneath each column along with abundance and diversity rankings. The abundance ranking for each species is presented in the right-hand column of the table. Species reported in the literature for the Little South Fork study area or from nearby upstream locations but not collected during the present survey are discussed in the SYSTEMATIC DISCUSSIONS section below.

The other invertebrate species which were collected during this inventory are listed by locality in Table 24. Also, given for each species or genus is the trophic web position in the community. The tabulated results of the Surber samples are given in Table 25. This table lists the species collected from each of the three Surber samples taken at each of the five sampling stations. In addition, the number of individuals of each species is given as well as total numbers collected from each station and the mean number of individuals per species per square foot.

The species diversity (d) and equitability (e) were calculated according to Weber (1973). Weber (1973) states that a sample of at least 100 individuals must be used in order to obtain statistically reliable values for d and e; because the combined Surber samples at some stations did not yield 100 specimens, both quantitative and qualitative samples were combined to calculate d and e. The Surber Sampler has certain drawbacks which allow its use only in habitats that have a fairly strong current, thereby species diversity and equitability values are biased if they are calculated only on the basis of Surber samples. It is felt a more reasonable estimate of d and e is obtained with the inclusion of the qualitative samples since all types of habitats were collected not just certain ones. The results of the calculations of d and e are given in Table 23 and are discussed below.

It may be suggested that a major bias encountered during qualitative collecting is the preference of the collector for certain species and less preference for others. This bias may skew the total number of individuals of certain species so that the count is not representative of their actual numbers. In this study, all specimens captured in the net were preserved in an effort to overcome this bias.

TABLE 23

ABUNDANCE, DIVERSITY, AND DISTRIBUTION OF MUSSELS BY STATION IN THE LITTLE SOUTH FORK, CUMBERLAND RIVER STUDY AREA

Species	Collecting Stations					Total	Abundance
	1	3	5	7	9	Collected	Rank
Actinonaias carinata	-	1	2	-	-	3	14
Actinonaias pectorosa	-	-	1	-	-	1	16
Alasmidonta marginata	-	2	1	2	-	5	13
Anodonta grandis	1	-	-	1	-	2	15
Carunculina lividus	-	5	1	2	1	9	11
Corbicula manilensis	25	25	25	25	25	125	1
Cyclonaias tuberculata	-	1	-	-	-	1	16
Dysnomia triquetra	1	-	-	1	-	2	15
Elliptio dilatatus	1	6	9	2	1	19	7
Unidentified species [1]	-	-	-	-	1	1	16
Lampsilis fasciola	8	11	11	7	-	37	4
Lampsilis ovata	2	2	-	1	1	6	12
Lasmigona costata	-	3	3	5	-	11	9
Leptodea fragilis	2	4	2	2	-	10	10

[1] The identification of this one specimen is in question and has not been verified. It is thought to be either *Pleurobema oviforme*, which has been collected in the Little South Fork, or *Lexingtonia dolabelloides*, which has not previously been reported from the Little South Fork.

TABLE 23 (continued)

Species	Collecting Stations					Total Collected	Abundance Rank
	1	3	5	7	9		
Medionidus conradicus	5	23	-	4	4	36	5
Obovaria subrotunda	5	11	3	2	-	21	6
Pegias fabula	-	24	8	4	-	36	5
Pleurobema cordatum	1	-	-	2	-	3	14
Proptera alata	2	4	1	2	-	9	11
Ptychobranchus fasciolare	5	10	3	1	-	19	7
Ptychobranchus subtentum	9	12	29	8	2	60	2
Strophitus undulatus	-	-	-	2	-	2	15
Villosa iris	1	5	6	2	2	16	8
Villosa taeniata	8	13	23	4	1	49	3
Villosa trabalis	3	2	1	5	-	11	9
TOTALS:	79	164	129	84	38	494	
STATION ABUNDANCE RANK	4	1	2	3	5		
TOTAL NUMBER OF SPECIES	16	19	17	21	9	25	
STATION DIVERSITY RANK	4	2	3	1	5		

TABLE 24

MACROINVERTEBRATE SPECIES (OTHER THAN MUSSELS) COLLECTED ACCORDING TO LOCALITY AND THEIR TROPHIC WEB POSITION IN THE LITTLE SOUTH FORK, CUMBERLAND RIVER STUDY AREA

Taxa	Collecting Stations					Trophic Web
	1	2	3	7	9	Position
ODONATA						
Aeschnidae						
Basiaeschna janata	x	x	x			Predator
Boyeria sp.	x	x	x	x		Predator
Calopterygidae						
Calopteryx angustipennis	x	x			x	Predator
Calopteryx dimidiata		x				Predator
Coenagrionidae						
Argia sp.	x	x	x	x		Predator
Enallagma sp.	x	x		x	x	Predator
Corduliidae						
Epitheca princeps/regina group	x					Predator
Gomphidae						
Hagenius brevistylus	x	x	x		x	Predator
Lanthus albistylus	x					Predator
Ophiogomphus sp.	x	x			x	Predator
Progomphus sp.		x		x		Predator
Libellulidae						
Celithemis sp.		x				Predator
Macromiidae						
Macromia sp.	x					Predator

TABLE 24 (continued)

Taxa	Collecting Stations 1	3	5	7	9	Trophic Web Position
PLECOPTERA						
Perlidae						
Acroneuria sp.	x	x	x	x	x	Predator
Neoperla sp.				x		Herbivore
Paragnetina sp.		x	x	x	x	Herbivore
Phasgonophora sp.			x			Herbivore
EPHEMEROPTERA						
Baetidae						
Baetis sp.			x			Herbivore
Pseudocloeon sp.					x	Herbivore
Ephemeridae						
Ephemera sp.	x	x		x		Herbivore
Heptag^niidae						
Stenonema sp.		x	x	x	x	Herbivore
Leptophlebiidae						
Paraleptophlebia sp.				x		Herbivore
Siphlonuridae						
Isonychia sp.	x	x	x	x	x	Filter Feeder
TRICHOPTERA						
Helicopsychidae						
Helicopsyche borealis	x	x	x	x		Herbivore

TABLE 24 (continued)

Taxa	Collecting Stations 1	3	5	7	9	Trophic Web Position
TRICHOPTERA (continued)						
Hydropsychidae						
Cheumatopsyche sp.	x	x	x	x	x	Filter Feeder
Hydropsyche dicantha				x	x	Filter Feeder
Hydropsyche scalaris		x		x	x	Filter Feeder
Symphitopsyche sparna				x		Filter Feeder
Hydroptilidae						
Hydroptila sp.					x	Herbivore
Limnephilidae						
Pycnopsyche sp.				x		Herbivore
Odontoceridae						
Psilotreta sp.		x				Herbivore
Philopotamidae						
Chimarra sp.		x	x	x	x	Filter Feeder
Polycentropodidae						
Polycentropus sp.				x		Filter Feeder
COLEOPTERA						
Dryopidae						
Helichus sp.		x	x		x	Herbivore
Dytiscidae						
Hydrovatus sp.		x				Predator

TABLE 24 (continued)

Taxa	Collecting Stations					Trophic Web Position
	1	3	5	7	9	
COLEOPTERA (continued)						
Elmidae						
Microcylloepus pusillus		x	x			Herbivore
Optioservus sp.	x	x	x			Herbivore
Stenelmis sp.	x	x	x	x	x	Herbivore
Gyrinidae						
Dineutus sp.	x	x	x	x		Predator
Gyrinus sp.	x			x	x	Predator
Haliplidae						
Peltodytes sp.		x		x		Omnivore
Psephenidae						
Psephenus herricki	x	x	x	x		Herbivore
LEPIDOPTERA						
Pyraulidae						
Paragyractis sp.					x	Herbivore
HEMIPTERA						
Nepidae						
Ranatra sp.		x	x	x		Predator
Belostomatidae						
Belostoma sp.		x				Predator

TABLE 24 (continued)

Taxa	Collecting Stations					Trophic Web Position
	1	3	5	7	9	
MEGALOPTERA						
Corydalidae						
Corydalus cornutus		x	x	x	x	Predator
Nigronia serricornis	x	x	x			Predator
Sialidae						
Sialis sp.	x	x			x	Predator
DIPTERA						
Chironomidae spp.	x	x		x	x	Detritivore
Simuliidae						
Cnephia sp.		x				Filter Feeder
Simulium sp.	x		x		x	Filter Feeder
Tabanidae sp.	x			x		Predator
Tipulidae						
Pedicia sp.		x	x			Omnivore
DECAPODA						
Astacidae						
Cambarus cumberlandensis		x	x			Omnivore
Cambarus distans		x	x	x		Omnivore
Orconectes putmani	x	x	x	x	x	Omnivore

TABLE 24 (continued)

Taxa	Collecting Stations					Trophic Web
	1	3	5	7	9	Position
GASTROPODA						
Pleuroceridae						
Goniobasis spp.	x	x	x	x	x	Herbivore
Viviparidae						
Campeloma rubrum	x	x	x			Herbivore
OLIGOCHAETA	x					Detritivore

TABLE 25

SURBER SAMPLE ANALYSIS OF EACH STATION WITH NUMBERS OF INDIVIDUALS PER SPECIES AND DENSITY OF EACH PER SQUARE FOOT

STATION 1

Taxa	Samples A	Samples B	Samples C	Total Number of Individuals	Mean Number Per Square Foot
Mollusca					
Corbicula manilensis	2	15	-	17	5.66
Goniobasis spp.	2	7	8	17	5.66
Insecta					
Trichoptera					
Helicopsyche borealis	1	-	-	1	0.33
Pycnopsyche sp.	-	1	-	1	0.33
Coleoptera					
Optioservus sp.	31	10	-	41	13.66
Psephenus herricki	-	6	-	6	2.00
Stenelmis sp.	1	2	-	3	1.00
Megaloptera					
Nigronia serricornis	1	1	-	2	0.66
Diptera					
Chironomidae sp.	1	-	-	1	0.33
Tabanidae sp.	-	-	1	1	0.33

TABLE 25 (continued)

STATION 3

Taxa	Samples A	B	C	Total Number of Individuals	Mean Number Per Square Foot
Mollusca					
Corbicula manilensis	9	2	23	34	11.33
Goniobasis spp.	110	4	87	201	67.00
Villosa trabalis	-	1	-	1	0.33
Insecta					
Trichoptera					
Cheumatopsyche sp.	1	-	-	1	0.33
Ephemeroptera					
Isonychia sp.	1	-	-	1	0.33
Coleoptera					
Optioservus sp.	-	1	-	1	0.33
Psephenus herricki	-	13	-	13	4.33
Stenelmis sp.	-	2	-	2	0.66
Odonata					
Argia sp.	-	3	-	3	1.00
Megaloptera					
Nigronia serricornis	-	2	-	2	0.66
Diptera					
Simulium sp.	1	-	-	1	0.33
Tipula sp.	1	1	-	2	0.66

TABLE 25 (continued)

STATION 3

Taxa	Samples A	Samples B	Samples C	Total Number of Individuals	Mean Number Per Square Foot
Insecta (continued)					
Decapoda					
<u>Orconectes</u> <u>putmani</u>	-	1	-	1	0.33
TOTALS PER SAMPLE	123	30	110	263	87.66

STATION 5

Taxa	Samples A	Samples B	Samples C	Total Number of Individuals	Mean Number Per Square Foot
Mollusca					
<u>Corbicula</u> <u>manilensis</u>	2	1	-	3	1.00
<u>Goniobasis</u> spp.	11	5	22	38	12.66
Insecta					
Trichoptera					
<u>Cheumatopsyche</u> sp.	-	-	18	18	6.00
<u>Chimarra</u> sp.	-	-	8	8	2.66
<u>Helicopsyche</u> <u>borealis</u>	1	-	-	1	0.33
Ephemeroptera					
<u>Baetis</u> sp.	-	-	1	1	0.33
<u>Isonychia</u> sp.	-	-	4	4	1.33
<u>Stenonema</u> sp.	=	-	4	4	1.33

TABLE 25 (continued)
STATION 5

Taxa	Samples A	B	C	Total Number of Individuals	Mean Number Per Square Foot
Insecta (continued)					
Plecoptera					
Phasgonophora sp.	-	-	5	5	1.66
Coleoptera					
Helichus sp.	-	-	1	1	0.33
Optioservus sp.	-	-	1	1	0.33
Psephenus herricki	1	-	2	3	1.00
Stenelmis sp.	-	-	10	10	3.33
Odonata					
Enallagma sp.	2	-	-	2	0.66
Megaloptera					
Corydalus cornutus	-	-	2	2	0.66
Nigronia serricornis	-	-	1	1	0.33
Diptera					
Pedicia sp.	-	-	1	1	0.33
Simulium sp.	-	-	2	2	0.66
Decapoda					
Orconectes putmani	-	1	-	1	0.33
TOTALS PER SAMPLE	17	7	82	106	35.33

TABLE 25 (continued)

STATION 7

Taxa	Samples A	Samples B	Samples C	Total Number of Individuals	Mean Number Per Square Foot
Mollusca					
Corbicula manilensis	2	-	-	2	0.66
Goniobasis spp.	5	1	13	19	6.33
Insecta					
Trichoptera					
Cheumatopsyche sp.	-	-	4	4	1.33
Chimarra sp.	-	-	1	1	0.33
Polycentropus sp.	1	-	-	1	0.33
Ephemeroptera					
Ephemera sp.	-	1	-	1	0.33
Isonychia sp.	-	-	2	2	0.66
Paraleptophlebia sp.	1	-	-	1	0.33
Stenonema sp.	-	-	2	2	0.66
Plecoptera					
Acroneuria sp.	-	-	1	1	0.33
Neoperla sp.	3	-	-	3	1.00
Coleoptera					
Psephenus herricki	6	4	-	10	3.33
Stenelmis sp.	2	2	-	4	1.33
Odonata					
Argia sp.	-	1	-	1	0.33

TABLE 25 (continued)

STATION 7

Taxa	Samples A	Samples B	Samples C	Total Number of Individuals	Mean Number Per Square Foot
Diptera					
Chironomidae spp.	1	1	-	2	0.66
TOTALS PER SAMPLE	21	10	23	54	18.00

STATION 9

Taxa	Samples			Total Number of	Mean Number Per
Mollusca					
Goniobasis spp.	1	-	3	4	1.33
Insecta					
Trichoptera					
Chimarra sp.	-	-	5	5	1.66
Hydroptila sp.	3	-	-	3	1.00
Ephemeroptera					
Isonychia sp.	-	1	-	1	0.33
Coleoptera					
Stenelmis sp.	2	-	-	2	0.6[illegible]

TABLE 25 (continued)

STATION 9

Taxa	Samples A	Samples B	Samples C	Total Number of Individuals	Mean Number Per Square Foot
Insecta (continued)					
Odonata					
Enallagma sp.	-	1	-	1	0.33
Diptera					
Chironomidae spp.	-	2	-	2	0.66
Oligochaeta sp.	-	-	1	1	0.33
TOTALS PER SAMPLE	6	4	9	19	6.33

3.9.4.2 Systematic Discussions

3.9.4.2.1 Molluscs (Mussels and Snails)

The mussel fauna of almost every medium to large size stream in Eastern North America is of special interest because of the susceptibility of these organisms to various types of pollution. Mussels are also among the few invertebrate groups which have species on the federal endangered species list. The fauna of the Little South Fork of the Cumberland River is especially interesting due to its diverse mussel fauna which includes one species on the federal endangered species list, Villosa (=Micromyia) trabilis, and another species, Pegias fabula, which has been proposed for the list (Stansbery 1976). These two species, plus Ptychobranchus subtentum, are listed as endangered in Endangered, Threatened and Rare Animals and Plants of Kentucky (Branson et al. in press); Carunculina (=Toxolasma) lividus is also listed as undetermined. In addition, there are a number of species including Actinonaias pectorosa, Carunculina (=Toxolasma) lividus, Ptychobranchus subtentum, and Medionidus conradicus which are restricted to the Cumberland and Tennessee River systems. Thus, the mussel fauna of the Little South Fork is of noted interest.

TABLE 26

MACROINVERTEBRATE SPECIES DIVERSITY AND EQUITABILITY VALUES FROM EACH STATION

	Collecting Stations				
	1	3	5	7	9
d	4.493	4.6296	4.6469	4.6902	4.4728
e	.73	.58	.76	.84	.94

This inventory resulted in the collection of 25 species of unionid clams from five localities (Stations 1, 3, 5, 7, and 9). A mussel survey of the same Wild River area by Dr. Art Bogan in 1979 yielded virtually the same information; no additional species were found by Dr. Bogan. Dr. Bogan's findings will be published sometime in 1981 (Personal communication, 10 February 1981, Dr. Art E. Bogan, Academy of Natural Sciences of Philadelphia, Philadelphia, PA). Starnes and Starnes (1980) reported Fusconaia subrotunda and Harker et al. (1979 and 1980) reported Pleurobema oviforme, Alasmidonta viridis, and Lampsilis ventricosa, none of which were collected in this study. Therefore, the total number of known species from the Little South Fork system is 29, and with more extensive surveying additional species may be found.

The results of the mussel survey are reported in Table 23. One part of the table is slightly misleading and needs some explanation; Station 7 (Ritner Ford) has a Station Diversity Ranking of 1 and a Station Abundance Ranking of 3, but this does not represent the true picture. Three weeks prior to this survey a Malacology class from Eastern Kentucky University sampled this station and their results are included in the table. When the present survey was done there were very few shells found (5 specimens and 5 species, except for the ubiquitous Corbicula manilensis), and when the Malacology class' samples are included the combined efforts resulted in 21 species and 84 specimens. However, all of the specimens examined from this station were old and nearly relic shells, and no live specimens were found even though considerable effort was expended to obtain them. All of this indicates that at one time the Ritner Ford locality had a diverse and abundant fauna but in recent years has had serious setbacks. It was noted that there was a large accumulation of silt on the bottom especially in areas where the current is slowed. It is probable that this silt is more than partially responsible for the apparent demise of the mussel fauna. A large stip mining operation located along Lick Creek, which enters Little South Fork 400 meters above the Ritner Ford sampling site, may be the source of siltation responsible for the decline in the mussel fauna.

There is also a great decrease in the number of species of clams found at Station 9 which is 2.5 miles downstream from Ritner Ford. The decrease in diversity at Station 9 may not be attributed directly to the same factors which seem to affect Ritner Ford. Station 9 showed the greatest change in habitat from all the other macroinvertebrate stations. The substrate at Station 9 consisted almost soley of limestone bedrock which simply cannot support a significant mussel fauna. The substrate of the other four stations consisted of a mixture of rubble and coarse sand into which the clams can burrow.

Almost the same number of shells were collected from Station 1 and Station 7, but there is a vast difference in the two sites. As stated above, no live clams were collected at Station 7 while at Station 1 numerous live specimens were observed. Stations 3 and 5 had the greatest abundance of clams and appeared to have the healthiest community of clams; at both of these stations many live clams were observed and many muskrat middens were encountered along the shoreline. Station 3 possessed the best population of Pegias fabula and, other than Corbicula manilensis and Medionidus, it was the most abundant species present. Villosa trabalis was not common at any of the stations collected. This should be noted with special interest in relation to its endangered species status. Corbicula manilensis, the Asiatic clam, is by far the most abundant and successful species of clam in the river. It was observed in especially large numbers at Stations 3 and 5 (although it was collected in equal numbers at each station).

Four recognizably different species of snails were collected from the Little South Fork. Three species belong to the genus Goniobasis and the fourth is Campeloma rubrum. There was no attempt to identify the Goniobasis specimens to the species level, and they are therefore treated as a single taxon in the tables. The taxonomy of this group is in great disarray and species are extremely difficult to identify. Even the experts of this group have little agreement as to the number of species in the genus.

To date several hundred species names have been published, but no single reference can be used to reliably identify specimens of this genus.

In any case Goniobasis spp. were very common at all five stations. This is exemplified by the fact that 110 and 87 were respectively collected from two Surber samples at Station 3. Campeloma rubrum was not nearly as common as Goniobasis spp., but was collected at three of the five sites. It was predominantly collected along the shoreline where it was found dug into the sandy or muddy substrate. Goniobasis spp. were found on the exposed surfaces of rocks and submerged objects directly in the current.

3.9.4.2.2 Decapods
(Crayfishes)

The survey resulted in the collection of three species of crayfishes from the Little South Fork study area. They are Orconectes putmani, Cambarus cumberlandensis, and Cambarus distans. Of these three, the most abundant by far is Orconectes putmani, which was the only one of the three species collected from all five stations. The only species recorded from the Little South Fork by Harker et al. (1979) was Orconectes putmani; however, Harker et al. (1980) reported Cambarus sphenoides from the Little South Fork main channel upstream from the study area and Cambarus cumberlandensis from Kennedy Creek.

Orconectes putmani is a common species of crayfish found in streams draining the Cumberland Mountains (Bouchard 1974). Cambarus cumberlandensis was described in 1973 (Hobbs and Bouchard 1973) and, as its name implies, it is found primarily in the Cumberland River drainage. It has also been collected in adjacent tributaries of the Green River (Hobbs and Bouchard 1973). Cambarus distans is common in smaller to medium size streams of the Cumberland Plateau, and is not uncommon in the Cumberland River drainage of southeastern Kentucky (Hobbs 1974).

3.9.4.2.3 Odonata
(Dragonflies and Damselflies)

Nymphs of 13 odonate species were collected during the aquatic inventory of the study area. Of these, only Macromia sp. was collected from all five sites. Hagenius brevistylus, Boyeria sp., Argia sp., and Enallagma sp. were collected from four of the stations. The stations with the largest diversity of odonates were Stations 1 and 3, with 10 and 11 species respectively.

Harker et al. (1979) listed eight odonate species from the Ritner Ford locality (Station 7), while the present study produced five species from this site. The species they cited which were not collected in this survey from Ritner Ford were Dromogomphus sp., Lanthus sp., Ophiogomphus sp., and Calopteryx (=Agrion) sp. Progomphus sp. was collected during this study, but was not reported by Harker et al. (1979). Harker et al. (1980) also reported Cordulegaster sp. from the main channel upstream from the study area; it was not collected during the present study.

3.9.4.2.4 Ephemeroptera (Mayflies)

Six species of mayflies were collected in the course of this study. Of these six, only Isonychia sp. was collected from all localities. It is a common mayfly genus found in streams of Kentucky and since it is a strong swimmer it is usually found in the main current. Stenonema, another common mayfly genus, was collected from four sites. It undoubtedly should be found at Station 1, but was not collected there.

Harker et al. (1979) reported 15 species of Ephemeroptera from Ritner Ford (Station 7) while the present survey collected only four species at this site. If one examines their results, 13 of the 15 species that they reported were collected in June, and of these, 10 were collected exclusively at this time. It is more than likely that the paucity of mayfly species found in the present study is due to the time of year these collections were made (November). Many species overwinter in the egg stage or an early nymphal instar stage which due to their small size are difficult to collect or may be easily overlooked.

From a main channel site upstream from the study area, Harker et al. (1980) reported two species of Ephemerella and a single species of each of the following genera: Heptagenia, Cloeon, Stenacron, and Tricorythodes. They also reported Habrophleboides sp. from Kennedy Creek. None of these were collected during the present study.

3.9.4.2.5 Plecoptera (Stoneflies)

The plecopteran fauna of Kentucky is not well known; however, the genera collected during this study from the Little South Fork are commonly found in cool, well oxygenated, and pollution-free streams of the southeastern United States. Acroneuria, collected at all five localities, is particularly common in clean streams in Kentucky.

Harker et al. (1979) reported six plecopteran species from Ritner Ford (Station 7). Of these six, Perlesta placida, Phasgonophora capitata, and Nemoura delosa were not collected during the present study. Paragnetina sp. was collected from Ritner Ford during this inventory, but was not reported by Harker et al. (1979) from Ritner Ford. Therefore, at the present time, seven species of Plecoptera are known to occur in the main channel of the Little South Fork. Undoubtedly additional species will be discovered with more concentrated collecting in the future. Harker et al. (1980) reported a single species of Leuctra from Kennedy Creek, but reported no additional taxa from the main channel of the river.

3.9.4.2.6 Trichoptera (Caddisflies)

Ten species of caddisflies were collected from the Little South Fork during the study. This probably is a very conservative estimate of the actual diversity of the trichopteran fauna living in this stream. Except for Psilotreta sp., all of the genera collected are common and widespread. Psilotreta are much less common, but are found in clean, cool and well-oxygenated streams throughout the Appalachians. Helicopsyche borealis, although not uncommon, also prefers clean and cool streams. It is generally not found in streams where there is a great deal of organic pollution. The ubiquitous Cheumatopsyche was the only trichopteran found at all five localities.

Harker et al. (1979) collected nine species from the Ritner Ford locality, but of those nine, three (Glossosoma sp , Ceraclea sp., and Dolophilodes sp.) were not collected during the present study. Polycentropus sp. was collected in this study from Ritner Ford, but was not reported by Harker et al. (1979). In addition to the above records, Harker et al. (1980) reported Neophylax sp. and Goera sp. from the main channel of the river upstream from the study area.

3.9.4.2.7 Diptera (True Flies)

The number of individuals which were collected from this group of insects was not nearly as many as one would expect. Usually both of the families Simuliidae and Chironomidae are represented by a sizeable number of individuals. The low numbers and diversity is probably due somewhat to the time of year (November) the collections were made.

The present survey, nevertheless, did include all of the taxa that were reported by Harker et al. (1979). In addition, the tipulid genus, Pedicia, was also collected (Stations 3 and 5). The cranefly, Hexatoma sp., and the deerfly, Chrysops sp., were reported by Harker et al. (1980) from the main channel of the Little South Fork upstream; they reported no additional dipteran taxa from Kennedy Creek.

3.9.4.2.8 Coleoptera (Aquatic Beetles)

This survey collected six families and nine genera of beetles. As might be expected, the most abundant family represented was the riffle beetle family, Elmidae. Within the elmids, the most common was the genus Stenelmis. It was present in good numbers both as adults and larvae.

Harker et al. (1979) collected 10 species of beetles from Ritner Ford. The genus Gyrinus was not reported by them; however, they did record the genera Dubiraphia, Macronychus, Optioservus, and Ectopria which were not collected during the present survey of this site. In addition to the above records, Harker et al. (1980) reported Hydroporus sp. and Laccophilus fasciatus from the main channel of the river upstream, and Ancyronyx variegata from Kennedy Creek.

3.9.4.2.9 Megaloptera (Hellgrammites and Alderflies)

The megalopteran larva Corydalus cornutus is ubiquitous in Kentucky and is especially common in medium to large rivers. Two other species of

Megaloptera were also collected from the Little South Fork; Nigronia serricornis and Sialis sp. Both of these taxa are not uncommon in clean and cool streams in Kentucky.

3.9.4.2.10 Hemiptera (True Bugs)

This survey collected only two species of bugs, Ranatra sp. and Belostoma sp. Additional collections at different times of the year would probably yield several more species of Hemiptera. Harker et al. (1979) reported Belostoma lutarium from Ritner Ford, but it was not collected at this site during the present inventory. Metrobates sp., Rheumatobates sp., and Rhagovelia sp. were reported by Harker et al. (1980) from Kennedy Creek; they reported no additional hemipteran species from their main channel sampling site upstream.

3.9.4.2.11 Lepidoptera (Aquatic Moths)

These are not frequently collected aquatic insects, although they are not uncommon in rocky bottom streams. The reason they are not frequently collected is because the larval retreats are extremely camouflaged in the crevices and convoluted surfaces of rocks. It takes an experienced collector to recognize them.

Only one genus, Paragyractis, was collected in this survey and it was collected only from Station 9. Harker et al. (1979) reported Parapoynx sp. from Ritner Ford, but it was not collected during the present study.

3.9.4.3 Discussion of Quantitative Samples and Species Diversity

From the results of the quantitative sampling of the Little South Fork given in Table , it is evident that the station which shows the largest number of individuals per area is Station 3. The greatest bulk of this was the result of the very large populations of Goniobasis spp. and the abundance of Corbicula at this site. Station 3 not only ranked high with regard to the quantitative sampling, but also showed the greatest diversity of species of all five sites. A total of 62 species were collected from this site. The following number of species were collected from each of the stations: Station 1, 47; Station 3, 62; Station 5, 47; Station 7, 52; Station 9, 34. In terms of number of species collected Stations 1, 5, and 7 were relatively equal while Station 9 had significantly fewer species. This, as was discussed previously, may be a result of the substrate (bedrock) at this locality. Bedrock substrates do not present the multitude of microhabitats that a rubble substrate does. This reduces both habitat and resource partitioning and, consequently, fewer species can be supported.

When all of the data collected are translated into species diversity (d) and equitability (e) (Table), one can see that the Little South Fork is a very healthy stream. Weber (1973) suggests that d values greater than 3 and e values greater than .6 represent a stream that has not been affected to any extent by environmental perturbations. The values for the Little South Fork sampling stations definitely show that to be the case for that stream. However, as was pointed out in the discussion of the mussel fauna, signs of deterioration (due primarily to sedimentation) at Station 7 are beginning to show. This particular locality should be further studied in an attempt to locate the source of the siltation, and attempts should be made to study the feasibility of reducing or preventing further siltation of the stream at this site.

3.9.5 GENERAL OVERVIEW OF AQUATIC BIOLOGY

The Little South Fork of the Cumberland River is a moderate-gradient river with long, deep pools and occasional well-developed riffles and shoals. Carter and Jones (1969) described the Little South Fork as one of the highest water quality streams in the upper Cumberland River drainage area. Recent sampling efforts (Harker et al. 1979 and 1980) by the Kentucky Nature Preserves Commission (KNPC) indicate continued high water quality (also see section 3.5.1 SURFACE WATER).

The Little South Fork supports a fair smallmouth bass and rock bass fishery, and rainbow trout are stocked by the Kentucky Department of Fish and Wildlife Resources. Other gamefish, such as the largemouth bass, spotted bass, and longear sunfish also occur. The river supports a localized spring sucker fishery (Harker et al. 1979).

From historic sampling efforts and recent inventories (including sampling from four stations in or upstream of the Wild River study area by the KNPC in 1978 and 1979, and the fish and macroinvertebrate inventory of the 10.4-mile Wild River study area by Coastal Zone Resources Division (CZR) of Ocean Data Systems, Inc., in October and November 1980), the Little South Fork has been shown to support a diverse and most interesting fauna which deserves special recognition. Thirty-five species of fishes were collected from nine stations within the Wild River study area during this inventory and at least 24 additional species have been reported from the Little South Fork. These fishes include two undescribed species, the palezone shiner and the sawfin shiner. Seven of these species are listed in Endangered, Threatened and Rare Animals and Plants of Kentucky (Branson et al. in press). The ashy darter and blotchside logperch are listed as endangered and the palezone shiner as an endangered endemic. The longhead darter is listed as threatened and the sawfin shiner as threatened peripheral. The blotched chub is listed as of special concern and the popeye shiner as undetermined. Some biologists are hopeful that the harelip sucker, a species which many biologists believe is extinct, may still be present in isolated segments of Little South Fork. It was collected by Kirsch (1893) from the mouth of Canada (=Kenedy) Creek in 1891, but has not been seen in North America since 1895.

The macroinvertebrate fauna of the Little South Fork is also quite diverse. This inventory collected 25 species of mussels and 60 species of other macroinvertebrates, and other species have been recently collected by the KNPC (Harker et al. 1979 and 1980). The mussel fauna includes one species, *Villosa trabalis*, on the federal endangered species list and another, Pegias fabula, which has been proposed for that list. Branson et al. (in press) lists these two species plus Ptychobranchus subtentum as endangered and lists Carunculina (= Toxolasma) lividus as undetermined. A number of mussel species including Actinonaias pectorosa, Carunculina lividus, Ptychobranchus subtentum, and Medionidus conradicus are restricted to the Cumberland and Tennessee River systems.

Thus, the Little South Fork remains one of the highest water quality streams in the Cumberland River drainage and in eastern Kentucky, and its diverse flora and fauna is representative of that which would be expected under pristine conditions. However, the quality of this stream and the pollution sensitive species which inhabit it could be adversely affected by man's activities if such activities are not properly monitored and controlled. Although farming, timber cutting, and other activities could have some effects, the two activities most likely to adversely affect the fauna of the stream are 1) strip mining and 2) oil and gas well drilling and operation. An extensive strip mine is located along Lick Creek which enters Little South Fork 400 meters above the Ritner Ford sampling site which was sampled by the KNPC in 1978 (Harker et al. 1979), by Dr. Art Bogan in the fall of 1979 (Personal communication), and by CZR during this aquatic inventory. Harker et al. (1979) noted that "this site does not appear to be significantly impacted in terms of siltation." However, Dr. Art Bogan noted deterioration at this site in 1979 and, as discussed in section 3.9.4.2.1 Molluscs, sampling by CZR in October and November 1980 indicated that the diverse and abundant mussel fauna at Ritner Ford had suffered serious setbacks, *apparently due to the effects of siltation within the past two years.* The nearby strip-mining operation would be the most logical source of this siltation. The source of the siltation needs to be verified and steps taken to reduce or prevent further siltation of the stream.

At present, only minor pollution problems have been attributed to the oil and gas wells in the watershed. However, oil and gas drilling have caused serious pollution problems in similar areas, and activity in the oilfields of the region is increasing. Thus, the potential for further contamination is high (Harker et al. 1980).

Plate 36: Aquatic Sampling Station 1 at the Highway 92 Bridge

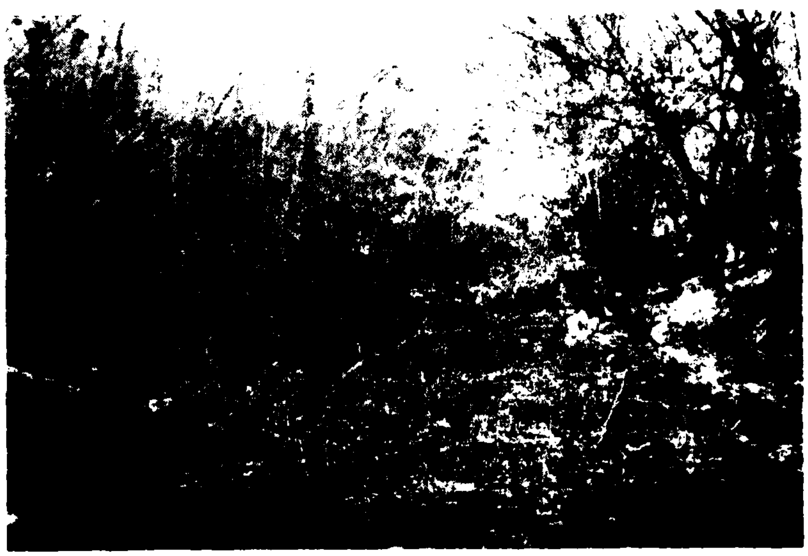


Plate 37: Aquatic Sampling Station 2

Plate 38: Riffles at Aquatic Sampling Station

Plate 39: Riffles and Pools at Aquatic Sampling Station 4

Plate 40: Aquatic Sampling Station 5 at Jim Vaughn Ford

Plate 41: Sampling Pool at Aquatic Sampling Station 6. (Note the extremely low water conditions. No surface flow was evident and this area was a series of pools and dry rock beds.)

Plate 42: Aquatic Sampling Station 8 at Ritner Ford

Plate 43: Riffles and Pool at Aquatic Sampling Station 8

Plate 44: Aquatic Sampling Station 9 -- View Upstream from Freedom Church Ford

SECTION IV

SPECIAL FEATURES

4.1 INTRODUCTION

This section of the inventory presents the cultural, physiographic and biological features which have been determined to be of special interest to the recreational and educational use of the Little South Fork Wild River. With the exception of several scenic views, these special features have been discussed and referenced throughout the text. The special features are brought together in this section and are presented in Table 27 for ease of locating and analyzing the recreational and educational values of the river. Map Set E, Special Features, illustrates the location of all identified special features, with the exception of archaeological and historical sites, for reasons of site protection. The following paragraphs briefly discuss the relationship between cultural, physiographic and biological resources identified and the recreational use of the Little South Fork.

4.2 CULTURAL FEATURES

Cultural features that are located on Map Set E, Special Features, and described in Table 27 are swinging footbridges and silt retention dams.

Two swinging bridges and the silt dams are features of interest for recationists in the area to explore, and have some scenic and/or aesthetic appeal as well. The swinging bridges, however, can also be a hazard. The bridge at Ritner Ford has boards missing in its floor, and others apparently ready to rot out. The bridge at Freedom Church is in somewhat better condition.

Other contemporary cultural features that appear on Map Set E as part of the base information, but not specifically identified or listed in Table 27, include: residences, commercial structures, barns and other farm structures, abandoned structures now in ruins, fords, and roadways (including dirt logging roads and trails). The logging roads, trails and fords would likely represent important features in any planned future recreation use of the area. Likewise, if any of the private land along the river were ever to be acquired, previously disturbed sites and habitation sites should be selected to receive the most intensive use, rather than natural habitats.

Areas utilized by man today, in many cases, were utilized by historic and prehistoric man also. This, in conjunction with the fact that most study area archaeological sites have been degraded by amateur collectors, places a great deal of importance on the sites which remain relatively undisturbed. For this reason, the locations of archaeological and historical sites identified in the study area are not presented as Special Features.

The importance of archaeological and historical resources lies primarily in their educational value and their contributions to the knowledge of the history of local and regional cultures. This report provides the Wild River user with a narrative account of prehistory and history of the area. To date, no sites have been identified that warrant special on-site interpretation. Precautions must be taken, however, to prevent uncontrolled "artifact collection", which could result in the degradation of potentially significant sites as a result of increased recreational use of the Wild River (Soil Systems, Inc. 1979).

4.3 PHYSIOGRAPHIC FEATURES

It is the interrelation of climate, topography, hydrology, geology, geomorphology and soils that produces the physiographic features which are the basis of the Wild River. The results of this formative process have produced a remote, rugged, natural landscape which meets the criteria of a Kentucky Wild River (Soil Systems, Inc., 1979).

Although climate cannot be mapped as a special feature, it does influence the recreational use of the Wild River. The spring, summer, and fall seasons extend from April to October, providing a lengthy primary recreation season. The early and late season temperature variations in the river valley can be very uncomfortable for the ill-prepared user. This same microclimatic effect can also produce dense patches of ground fog which can completely obscure a canoeist's view of the river (Soil Systems, Inc. 1979).

The importance of rainfall on river staging is also an important use consideration. Above a certain discharge rate (flood stage), the river is too swift and cannot be safely canoed. Below a discharge rate of 200 cubic feet per second (cfs), according to Sehlinger (1978), the stream is too low, and portages over the slippery limestone substrate are a too frequent necessity.

High water levels discourage other recreation use also. They make it impossible to use the fords, and thus, getting from one location to another in the corridor is more difficult and time-consuming than usual. Also, when the water is high and swift, it is usually also turbid, and this ruins fishing.

4.4 BIOLOGICAL FEATURES

The degree of man-related disturbance in the study area is such that no areas of virgin habitat exist. Five main categories of natural habitats were identified and discussed, and while some areas within each category can be found that are relatively undisturbed, the influence of man is noticeable in most.

Fishing is the recreation activity associated with the stream bank habitat. Being only an Order 4 stream, and prone to be turbid for short periods following heavy rains, the Little South Fork is rated as only fair as a fishery resource.

Gray squirrel and cottontail rabbit were relatively common in the study area during this inventory, and deer sign were observed in some woodlands adjacent to farm land. Use of the area for hunting, however, is contingent upon obtaining the landowner's permission. The only public land belongs to the Corps of Engineers, and occurs in a narrow zone on both banks of the river from Ritner downstream.

The study area provides opportunities for botanical and faunal research projects. Several species of rare, threatened and endangered animals, including a mussel on the Federal endangered species list, are present in the stream, and various other rare and unusual species of animals occur, or could potentially occur, either in the stream or in adjacent terrestrial habitats. One plant element of concern to the Kentucky Nature Preserves Commission is known to occur in the study area, and a sizeable assortment of others are potentially present. All of these afford a wealth of opportunities for scientific research within the study area corridor.

4.5 USERS NOTES: MAP FOLIO SET E, SPECIAL FEATURES

The special features listed in Table 27 are illustrated on Map Folio Set E according to the following classifications: educational outcrops - denoted by "E"; fossils - denoted by "F"; geologic features denoted by "G"; waterfalls - denoted by "W"; rapids - denoted by "R"; scenic views - denoted by "S"; rare or interesting plants - denoted by "P"; rare or unusual animals -denoted by "A"; big trees - denoted by "T"; significant habitats - denoted by "RB"; "AW"; "SF"; and "CL"; footbridges - denoted by "B"; and silt retention dams - denoted by "D".

Only those special features sites in the study area which are particularly outstanding, typical, or within easy access are presented in Table 27. Educational outcrops include locations exhibiting typical or somewhat unusual contacts and sections representative of the rock types and stratigraphic units presented in the study area. Fossil localities include most of the better sites discovered during the field survey; however, any location with a good exposure of limestone bedrock is a potential site.

Geologic features include unusual cliff colorations, rock hollows, cliffs, rockshelters, ledges, and springs. Waterfalls include only a small sample of all potential sites. Potential waterfall locations are numerous, depending upon tributary incisement and water flow characteristics. Rapids and riffles are present but most show whitewater only at a particular river stage. Only the major rapids have been illustrated. Scenic views include vantage points from which the river and the general landscape can be viewed. Many of the views are of other special features noted in this section. Rare and unusual species locations include plants, fish and birds. Nine large trees are illustrated as well as the most significant examples of the naturally occurring terrestrial habitats.

Table 27 gives the map code, name and brief description, sheet number and approximate river mile location. An "E" or "W" appears after the river mile to indicate the side of the river on which that feature may be found. An "E" indicates the east, or McCreary County side, and a "W" indicates the west, or Wayne County side, of the river. If no symbol appears after the river mile, the feature is located either in, or on both sides of the river. The former applies to fish, rapids and some geologic features.

TABLE 27

SPECIAL FEATURES

Map Code	Description	Map Set Sheet No.	River Mile Location
	Educational Outcrops		
E 1	Outcrop of sandstone resembling the Lee Formation in the Pennington Formation; boulder separated from cliff has interesting pattern on the surface that faces the cliff; resembles rectangular plates, or overlapping rectangular scale-like plates; red-stained strata at one location of cliff.	1	24.1W
E 2	Kidder Member of the Monteagle Limestone exposed in road cut; chert nodules and a few fossils.	1	14.5E
E 3	Contact between Kidder Member of Monteagle Limestone and Bangor and Hartselle Formation exposed.	1	14.2W
E 4	Contact between Bangor Limestone and base of Pennington Formation exposed.	1	14.1W
E 5	Small cliff in which the contact between the Ste. Genevieve and Kidder Members of the Monteagle Limestone is exposed.	6	7.8W
E 6	Contact between the Hartselle Formation and Kidder Member of the Monteagle Limestone is exposed.	6	7.2E
E 7	Contact between the Ste. Genevieve and Kidder Members of the Monteagle Limestone exposed in small cove.	7	6.1W
E 8	Sandstone of the Breathitt Formation exposed in cliff.	8	6.0E

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ENVIRONMENTAL INVENTORY: LITTLE SOUTH FORK CUMBERLAND RIVER.(U)
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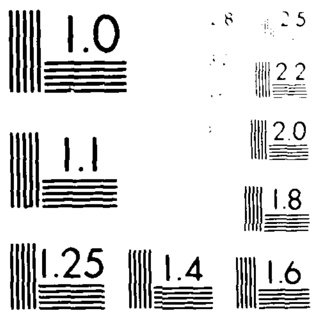

MICROCOPY RESOLUTION TEST CHART

TABLE 27
(continued)

Map Code		Description	Map Set Sheet No.	River Mile Location
		Fossils		
F	1	Exposed limestone in road cut contains a few brachiopods and crinoid stems in lower strata.	1	14.5E
F	2	Limestone outcrop includes fragmented brachiopods and some whole fossils.	1	14.2W
F	3	Limestone exposed at Ritner ford contains fossils, microfossils and fossil fragments.	6	7.8
F	4	Limestone exposed at Freedom Church ford contains whole fossils, fossil fragments and microfossils.	8	5.4
		Geologic Features		
G	1	Rockshelter in SE facing cliff.	1	15.0E
G	2	Rockshelter in SE facing cliff; adjacent to G1 above.	1	15.0E
G	3	Rockshelter in NE face of cliff below overhead electric transmission line; contemporary campsite.	1	15.0E
G	4	Rockshelter in NE face of cliff adjacent to G3 above; contemporary campsite.	1	15.0E
G	5	"Dry falls" -- exposure of Kidder Member of Monteagle Limestone in a rill or wet-weather swale.	1	14.8E
G	6	Small rockshelter and ledge; a spring emerges from the base of the rockshelter.	1	14.5E
G	7	Large dry falls and limestone bluffs.	1	14.1W
G	8	Small spring emerges from a 4" x 12", rectangular opening in the limestone bedrock; feeds an intermittent stream.	1	14.2W

TABLE 27
(continued)

Map Code	Description	Map Set Sheet No.	River Mile Location
G 9	Small spring or seep emerges from slope into dirt roadway.	1	14.0W
G 10	Small dry falls with an overhang.	1	13.8W
G 11	Slope strewn with rocks mimics talus, but was created by farmer discarding rocks in his field in order to plow.	1	13.3E
G 12	Spring or seep emerges from pasture slope near woods margin; feeds stock watering pond downslope via natural swale.	1	14.8E
G 13	Bluff formed on the Kidder Member of the Monteagle Limestone.	1	14.4E
G 14	Rockshelter along Corder Creek	1	12.6E
G 15	Dry falls in wet-weather swale.	2	12.3E
G 16	Small cave-like recess in bluff; 3' high by 7' wide; only a few feet deep.	2	12.2E
G 17	Spring emerges from crevices in exposed bedrock.	3	12.0W
G 18	Slope underlain by Pennington Formation where human disturbance of the vegetative cover appears to have precipitated a slope failure at some previous time. Hummocky surface downslope of road.	5	9.1E
G 19	Sinkhole; numerous sinkholes occur in this karst area in the bend of the river developed on the Monteagle Limestone.	5	8.9W
G 20	The Ste. Genevieve Limestone Member is exposed in the stream bed and banks at Ritner Ford.	6	7.8
G 21	A large spring issues from a hidden cave-like recess.	6	7.7W

TABLE 27
(continued)

Map Code	Description	Map Set Sheet No.	River Mile Location
G 22	Sandstone cliff on west face of ridge crest.	8	6.0E
G 23	The Ste. Genevieve Limestone is exposed in the stream bed and banks at Freedom Church ford.	8	5.4
G 24	Low, wet field at this location is the result of solution features in the Kidder Member of the Monteagle Limestone.	8	4.6W
G 25	A small, cave-like recess occurs in this cove in the bend in the river.	8	4.6W
	<u>Waterfalls</u>		
W 1	Waterfall with small, low cave-like recess beneath.	3	11.7E
W 2	Small waterfall in cove with low cave-like recess beneath.	7	6.7E
	<u>Rapids</u>		
R 1	A sudden change in gradient creates a Class I+ rapid at this location.	6	7.4
R 2	A Class I rapids at this location.	8	5.2
R 3	The bluffs and ledges at this location create a "narrows."	8	4.4
R 4	A Class I+ rapids at this location.	8	4.3
	<u>Scenic Views</u>		
S 1	View of a bend in the river just upstream of Hwy 92 bridge; electric transmission right-of-way; cliff; farmland.	1	15.0E

TABLE 27
(continued)

Map Code	Description	Map Set Sheet No.	River Mile Location
S 2	Break in the vegetation caused by failed slope provides unobstructed view of river and forested slopes on opposite bank.	5	9.1E
S 3	The clearing created by an overhead electric transmission corridor provides a scenic view of the valley.	6	7.7W
S 4	This is the view from the opposite side of the valley in the electric transmission corridor.	6	7.7E
S 5	Scenic view of Freedom Church from road along the bluff above the river. The view is partially obstructed by vegetation during the growing season.	8	5.3E
	Plants [1]		
P 1	Goodyera pubescens - rattlesnake Plantain; Pinus strobus - White Pine, and Juglans cinerea - Butternut among plants in slope forest downslope of cliff.	1	15.0E
P 2	Lithospermum canescens - Hoary Puccoon on limestone outcrop.	1	14.2E
P 3	Jeffersonia diphylla - Twinleaf and Asplenium rhizophyllum - Walking Fern among plants on slope at this location.	2	12.6E
P 4	Sanguinaria canadensis - Bloodroot and Erythronium americanum - Yellow trout-lily in large colonies with other colorful wildflowers along this slope.	2	12.6E
P 5	Nothoscordum bivalve - False Garlic and Agave virginica - False Aloe in small cedar/barrens-like habitat on rock outcrop.	3	12.0W

TABLE 27
(continued)

Map Code	Description	Map Set Sheet No.	River Mile Location
P 6	_Opuntia humifusa_ - Prickly Pear Cactus on rock outcrop beside road.	3	11.6W
P 7	_Tsuga canadensis_ - Hemlock in slope forest near old ford site.	4	10.7E
P 8	_Pinus strobus_ - White Pine in slope forest near river.	5	9.3E
P 9	_Spiranthes lucida_ - Shining Ladies' Tresses: threatened species in Kentucky is reported from the river bank at this location.	6	7.8E
	Animals [2]		
A 1	_Notropis ariommus_ - Popeye Shiner: status special concern in Ky., 5 specimens taken; _Etheostoma maculatum_ - Spotted Darter: status special concern in Ky., 1 specimen taken; _Etheostoma cinereum_ - Ashy Darter: status endangered in Ky., 1 specimen taken; _Villosa trabalis_ - Cumberland Bean Pearly Mussel: Federal endangered species, 3 specimens taken; _Ptychobranchus subtentum_ - Fluted Kidney Shell Pearly Mussel: endangered species in Ky., 9 specimens taken.	1	14.5
A 2	_Cathartes aura_ - Turkey Vulture; populations declining in neighboring states.	1	14.1W
A 3	_Falco sparverius_ - Sparrow Hawk; a small raptor.	1	13.4W
A 4	_Buteo jamaicensis_ - Red-tailed Hawk; perched in trees atop bluff.	1	14.4E
A 5	_Notropis ariommus_ - Popeye Shiner: status undetermined, 5 specimens taken; _N._ sp. - Sawfin Shiner: status special concern in Ky., 43 specimens taken; _N._ sp. - Palezone Shiner: status endangered endemic in Ky., 5 specimens	2	12.5

TABLE 27
(continued)

Map Code	Description	Map Set Sheet No.	River Mile Location
	taken; Hybopsis insignis - Blotched Chub: status special concern in Ky., 2 specimens taken; Villosa trabalis - Cumberland Bean Pearly Mussel: status Federal endangered species, 2 specimens taken; Pegias fabula - Little Winged Pearly Mussel: status endangered in Ky., proposed Federal endangered, 24 specimens taken; Ptychobranchus subtentum - Fluted Kidney Shell Pearly Mussel: status endangered in Ky., 12 specimens taken.		
A 6	Sialia sialis - Eastern Bluebird; on the decline in some states.	2	12.2W
A 7	Notropis ariommus - Popeye Shiner: status undetermined in Ky., 1 specimen taken; N. sp. - Palezone Shiner: status speciam concern in Ky., 10 specimens taken.	3	11.2
A 8	Notropis ariommus - Popeye Shiner: status undetermined, 2 specimens taken; N. sp. - Sawfin Shiner: special concern, 16 species; N. sp. - Palezone shiner: special concern, 9 specimens; Hybopsis insignis Blotched Chub: special concern, 1 specimen taken; Etheostoma maculatum - Spotted Darter: special concern, 2 specimens taken; Villosa trabalis - Cumberland Bean Pearly Mussel: Federal endangered, 1 specimen taken; Pegias fabula - Little Winged Pearly Mussel: Ky. endangered and proposed for Federal list, 8 specimens; Ptychobranchus subtentum - Fluted Kidney Shell Pearly Mussel; Ky. endangered, 29 specimens.	4	10.6
A 9	Notropis sp. - Sawfin Shiner: special concern, 54 specimens; N. sp. - Palezone Shiner: special concern, 232 specimens taken.	5	9.1

TABLE 27
(continued)

Map Code	Description	Map Set Sheet No.	River Mile Location
A 10	Notropis sp. - Sawfin Shiner: special concern, 24 specimens; N. sp. - Palezone Shiner: special concern, 83 specimens; Etheostoma maculatum - Spotted Darter: special concern, 2 specimens; Villosa trabalis - Cumberland Bean Pearly Mussel; Federal endangered species, 5 specimens; Pegias fabula - Little Winged Pearly Mussel: Ky. endangered, proposed Federal endangered, 4 specimens; Ptychobranchus subtentum - Fluted Kidney Shell Pearly Mussell: Ky. endangered, 8 specimens.	6	7.9
A 11	Notropis sp. - Palezone Shiner: special concern, 62 specimens.	7	6.1
A 12	Notropis sp. - Sawfin Shiner: special concern, 6 specimens; N. sp. - Palezone Shiner: special concern, 145 specimens; Hybopsis insignis - Blotched Chub: special concern, 1 specimen; Ptychobranchus subtentum - Fluted Kidney Shell Pearly Mussel: Ky. endangered species, 2 specimens.	8	5.4
	Trees [3]		
T 1	Liriodendron tulipfera - Tulip Poplar; larger specimens probably occur in the river corridor.	1	15.0E
T 2	Quercus rubra - Northern Red Oak	1	14.0W
T 3	Fraxinus americana - White Ash	1	14.0W
T 4	Pinus virginiana - Virginia Pine	1	13.4W
T 5	Quercus stellata - Post Oak	2	12.5W
T 6	Quercus alba - White Oak	2	12.5W
T 7	Juniperus virginiana - Red Cedar	2	12.5W

TABLE 27
(continued)

Map Code	Description	Map Set Sheet No.	River Mile Location
T 8	*Pinus strobus* - White Pine	4	10.6E
T 9	*Fagus grandifolia* - American Beech	5	9.2E
	Significant Habitats [4]		
CL 1	Cliff Habitat with rhododendron, mountain laurel and mountain pepperbush.	1	15.0E
SF 1	Slope Forest Habitat: Mixed Mesophytic Forest with beech, maple, tulip poplar, oak, umbrella magnolia, holly and a few hemlock.	4	10.1E
CL 2	Cliff habitat: line of low cliffs near the river on a southwesterly oriented slope.	4	10.3W
CL 3	Cliff Habitat: line of low cliffs like CL 3 with south-facing exposure.	4	9.7W
BR 1	Ridgetop Habitat: oak hickory woodland, some red cedar and pine interspersed.	5	8.5E
CL 4	Cliff Habitat: cliffs at outside of bend in the river; south-facing.	6	7.5W
CL 5	Cliff Habitat: cliffs at another outside bend; north-facing.	6	7.2E
CL 6	Large river bluffs and associated cliff habitat.	7	7.0W
CL 7	Large river bluffs and associated cliff habitat.	7	6.4E
BR 2	Ridgetop forest; most oak-hickory; some pine-oak.	7	6.4E
CL 8	Small sandstone cliff and associated habitat atop a conical prominence.	8	6.0E

TABLE 27
(continued)

Map Code	Description	Map Set Sheet No.	River Mile Location
CL 9	Steep bluff and cliff habitat in this west-facing bend of the river.	8	5.3E
CL 10	Large bluff and cliff habitat above narrows and rapids in the river; westerly-facing.	8	4.3W
SF 2	Mixed Mesophytic Forest on lower side-slopes of Morrow Hollow; outstanding assemblage of spring wildflowers.	8	5.4E
	Man-Related Features		
D 1	Silt retention dam; composed of logs in center portion; stone construction at sides.	1	13.5W
D 2	Silt retention dam; composed of stones; some of the stones are boulder-sized rectangular slabs.	2	12.6E
D 3	Rock wall; silt dam.	3	11.4W
D 4	Silt retention dam with wood crosswalk atop it.	5	9.3E
D 5	Silt retention dam and stone wall along road.	6	7.9W
B 1	Swinging footbridge at Ritner Ford.	6	7.8
D 6	Silt retention dam of stone in Worley Hollow.	8	5.4E
B 2	Swinging footbridge at Freedom Church ford.	8	5.3

[1] See Tables 15 and 19 for additional data.

[2] See Tables 17 and 22 and Section 3.9.3.2 for additional information.

[3] See Table 19 for comparison with state record.

[4] Letter codes refer to habitat description in text.

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