

**COOPERATIVE INVENTORY OF  
ENDANGERED, THREATENED, SENSITIVE AND RARE SPECIES  
DANIEL BOONE NATIONAL FOREST**

**Stearns Ranger District**

**Cooperators**

**United States Forest Service  
The Nature Conservancy  
Kentucky State Nature Preserves Commission  
Kentucky Department of Fish and Wildlife Resources**

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## PROJECT PERSONNEL

### INVESTIGATORS

Julian J.N. Campbell, Botanist  
The Nature Conservancy

Allen C. Risk, Botanist  
Morehead State University

Virgil Lee Andrews, Zoologist  
University of Tennessee

Brainard Palmer-Ball, Jr., Zoologist  
Kentucky State Nature Preserves Commission

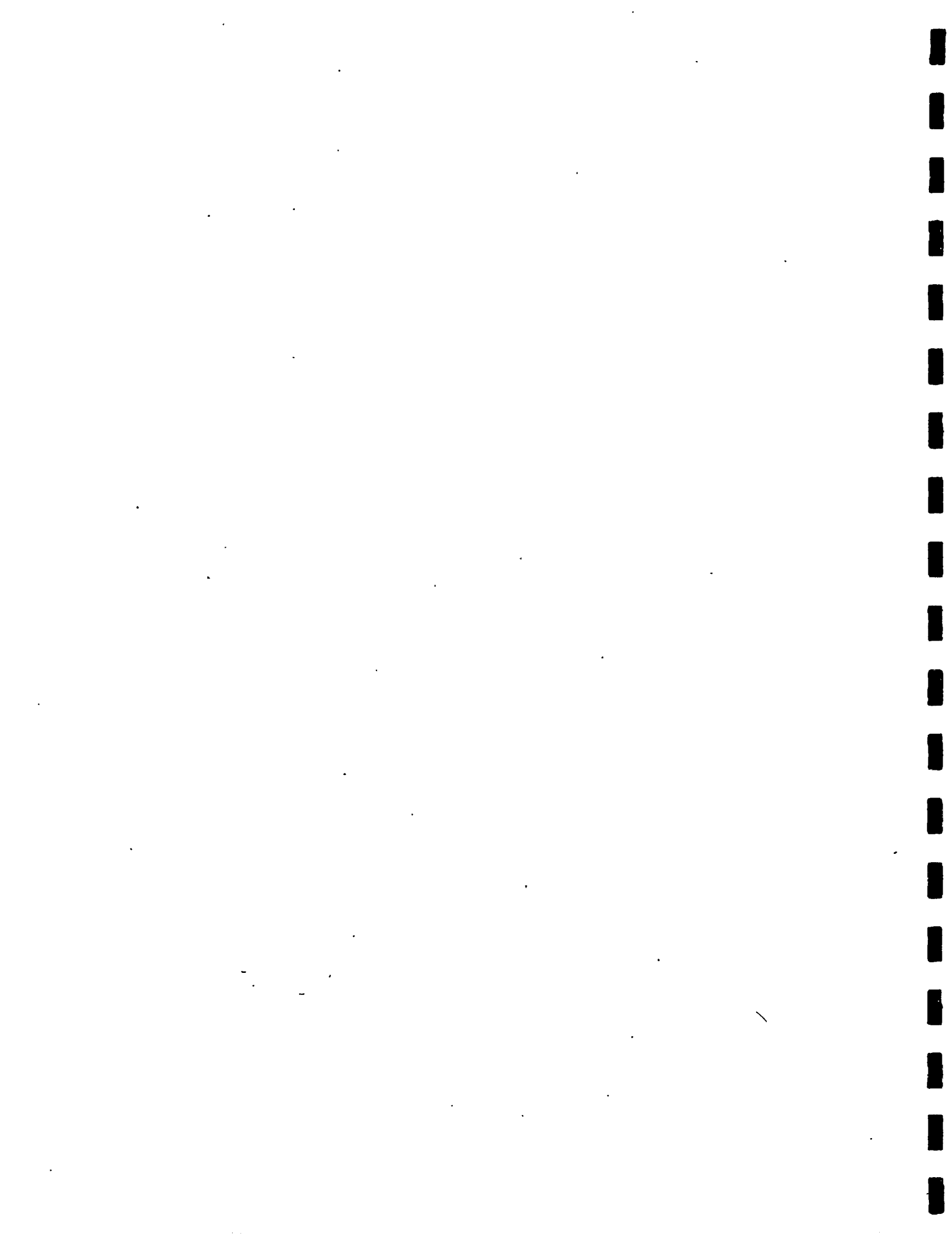
John R. MacGregor, Zoologist  
Nongame Wildlife Program  
Kentucky Department of Fish and Wildlife Resources

### PROJECT COORDINATORS

Brian Knowles  
United States Forest Service

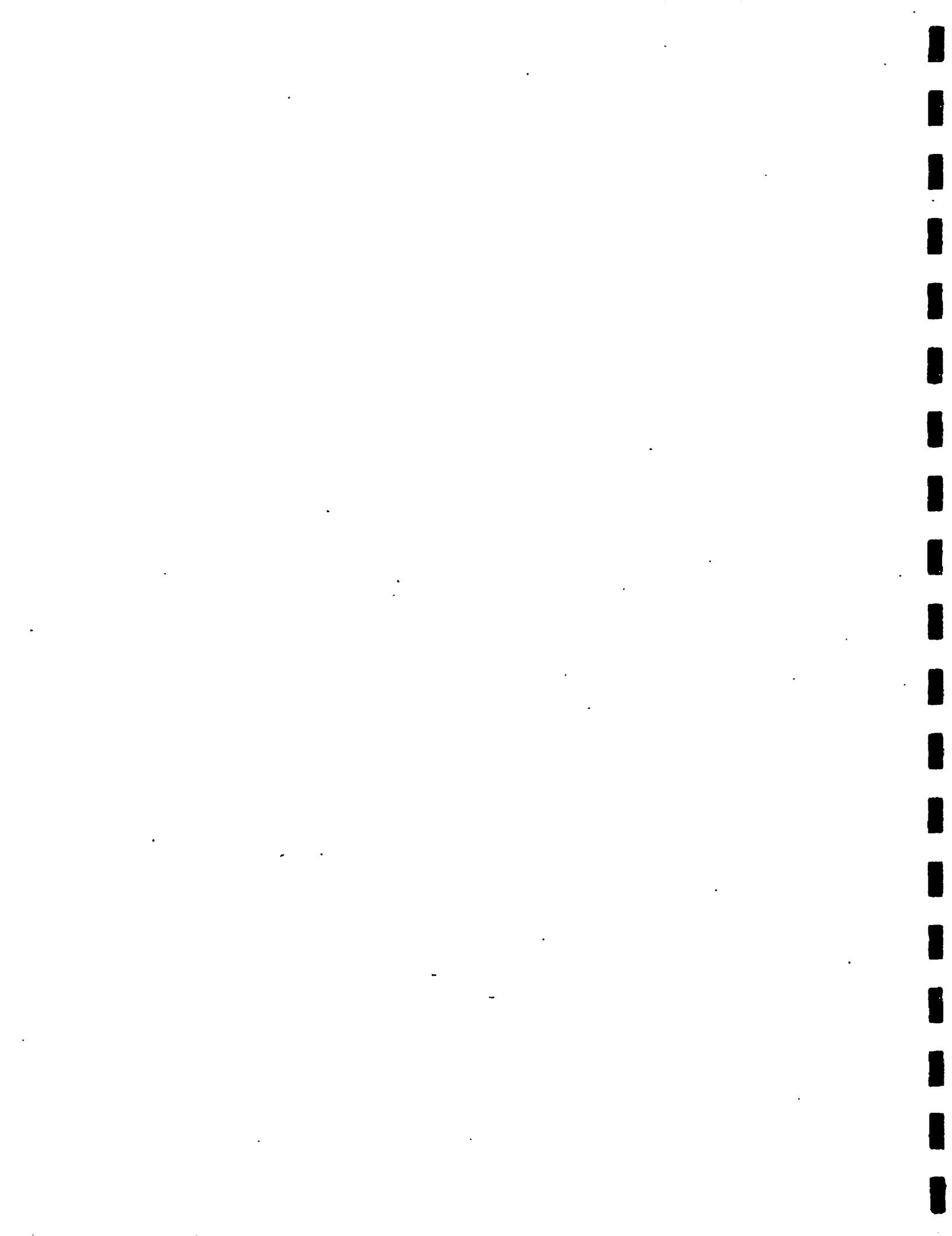
Julian J.N. Campbell  
The Nature Conservancy

Richard R. Hannan  
Kentucky State Nature Preserves Commission



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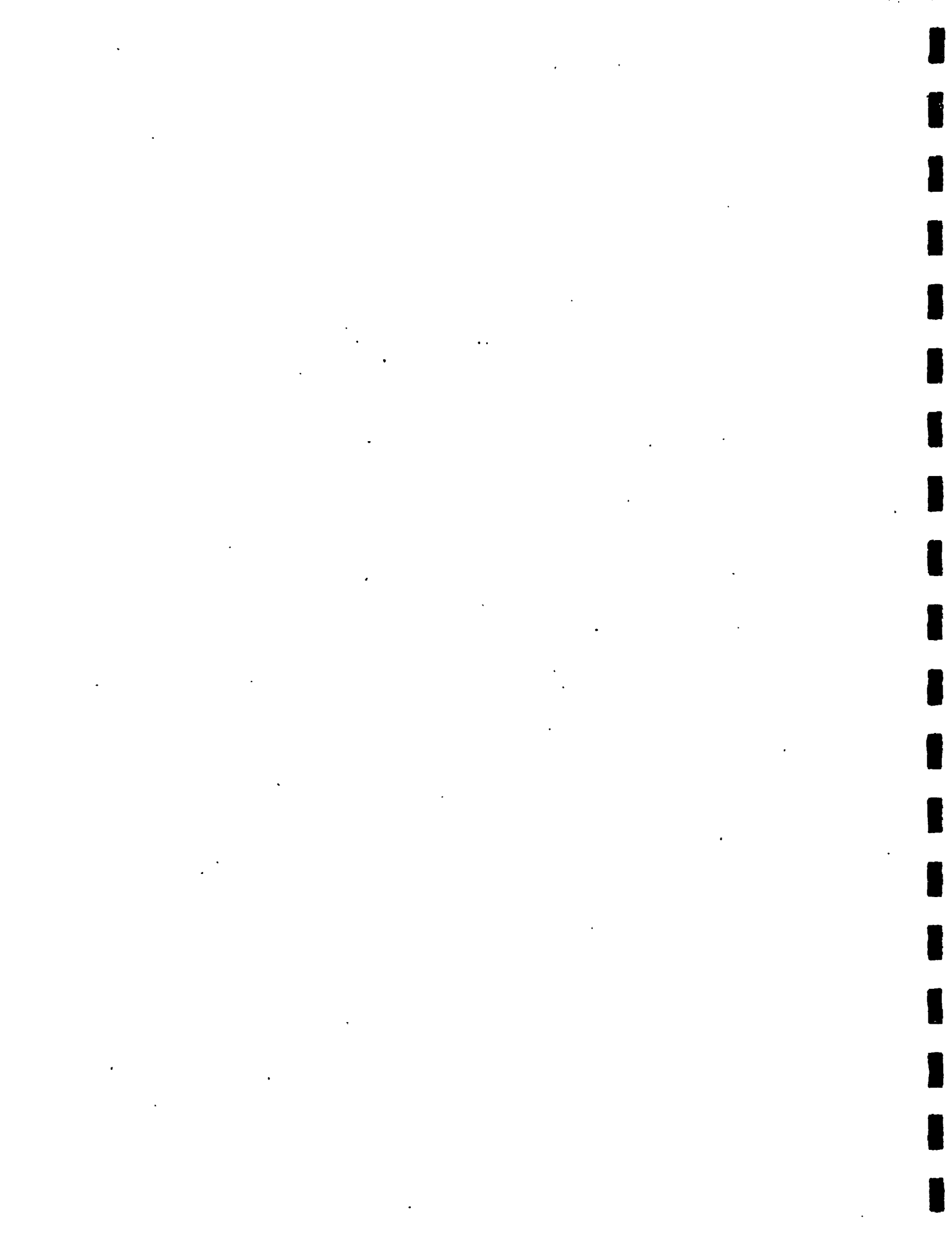
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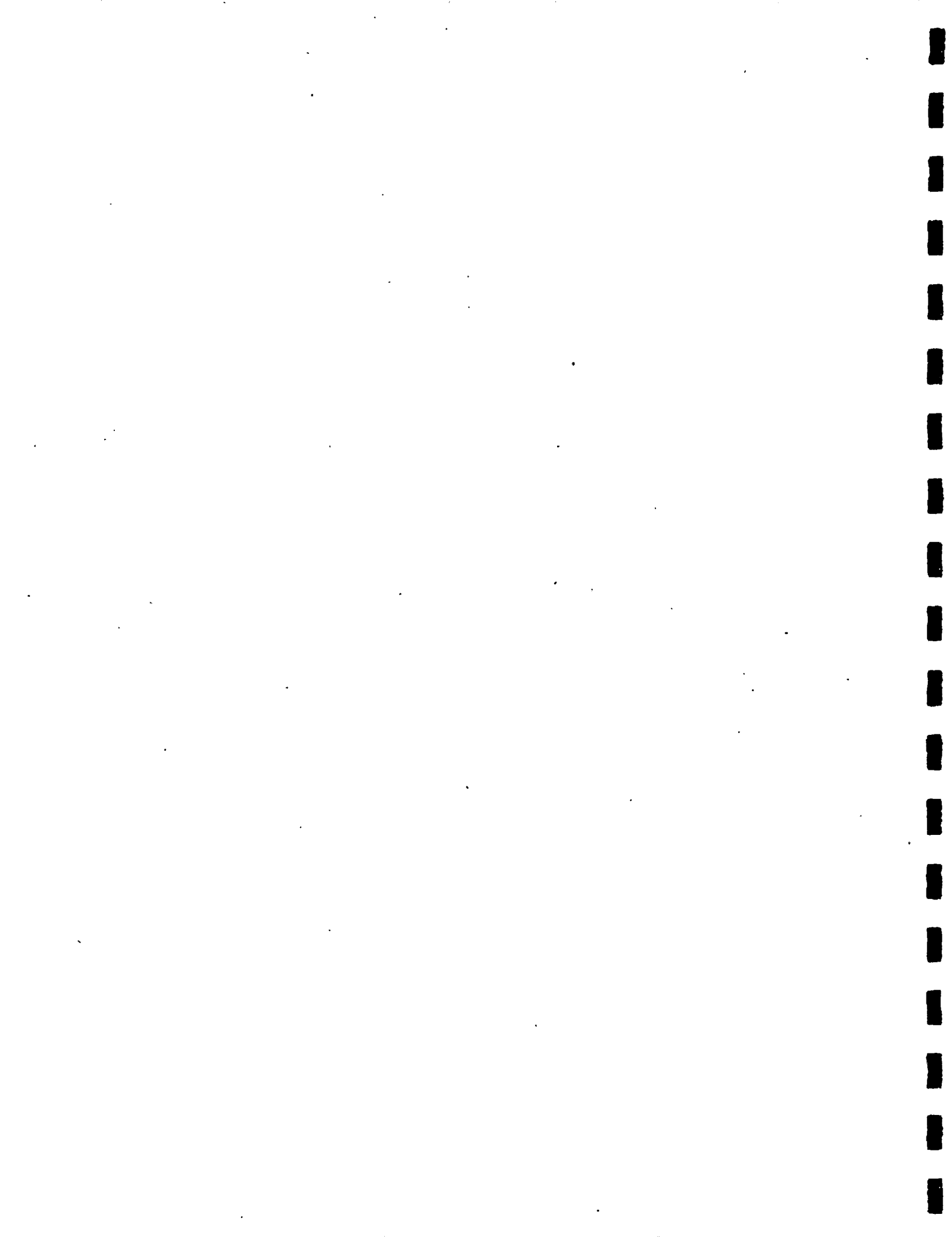


## INTRODUCTION

An important first step in the responsible stewardship of land, regardless of the purpose, is an inventory of the natural resources of the area to be managed. The information derived can be used to implement conservation goals in coordination with other uses planned for the area. The Daniel Boone National Forest (DBNF), United States Department of Agriculture Forest Service (USFS), is committed to recovering federally listed species on the Forest and to ensuring that sensitive species do not become threatened or endangered as a result of planned management activities. The Nature Conservancy (TNC) is an international conservation organization committed to preserving natural diversity by identifying and protecting lands and water supporting the best examples of all components of the natural world. These two organizations are cooperating in a effort to inventory the rare species on the seven Ranger Districts of DBNF. During 1987 and 1988, there were cooperative inventories on the Somerset and Stanton Ranger Districts (Palmer-Ball et al. 1988, Campbell et al. 1989). During 1989, the Nature Conservancy provided \$10,000, which was matched with a \$20,000 Challenge Cost Share from the U.S. Forest Service to fund an inventory of the endangered, threatened, sensitive, and rare plants and animals of the Stearns Ranger District of the Daniel Boone National Forest.

The inventory funds were used to contract two botanists and a zoologist for the inventory, and to cover travel, supplies, and expenses. Administrative coordination was provided by USFS and TNC. Stearns Ranger District staff arranged lodging for some of the biologists and assisted with some field work.

State agencies played a critical role in supporting the inventory. The Kentucky State Nature Preserves Commission (KSNPC) provided part-time zoologists for the project, coordinated data collection and the final report, and assisted with expenses. The Kentucky Department of Fish and Wildlife Resources (KDFWR) provided nongame staff for some bat inventory work and for developing nongame animal information for the District. This partnership of federal, state and private agencies for rare species inventory continues to be highly productive.



## DESCRIPTION OF THE STUDY AREA

The Stearns Ranger District is one of the seven management units in the Daniel Boone National Forest (Fig. 1). This District contains approximately 250,000 acres and lies entirely in southeastern Wayne, south-central McCreary and southwestern Whitley counties, Kentucky (Fig. 2). The USFS tracts, covering approximately 113,000 acres, are fairly contiguous throughout much of the western half of the District (within the "Cliff Section" of Braun, 1950), but there is a gap with much agricultural land ("Low Hills Belt") between this concentration of USFS land and a secondary one in the southeast ("Rugged Eastern Area"). The Kentucky portion of the Big South Fork National River Recreation Area (BSFNRA), managed by the National Park Service (NPS), is contained within the Stearns Ranger District, and consists of approximately 30,000 acres. Parts of the Little South Fork, Big South Fork and the main stem of Cumberland River are State Wild Rivers.

### PHYSICAL ENVIRONMENT

#### Physiography, Geology and Topography

The Stearns Ranger District lies almost entirely within the Cumberland Plateau subsection of the Appalachian Plateaus Physiographic Province (Fenneman 1938). The western edge lies along the Little South Fork, and approximates the transition from the Cliff Section of the Appalachian (Pennsylvanian) Plateaus to the Highland Rim subsection of the Interior Low (Mississippian) Plateaus. From west to east within the District, there are shifts among subsections of the Appalachian Plateaus, from the Cliff Section to the Low Hills Belt to the Rugged Eastern Area (Fig. 2). The eastern boundary lies along the main stem of the Cumberland River, and the Cumberland Mountains lie just beyond.

Along the western edge of the District, Mississippian shales and limestones are the predominant bedrocks, especially in the Little South Fork watershed. Further east, on low slopes along the Big South Fork valley, only the uppermost Mississippian strata are exposed--the Pennington Formation, which is mostly shale but includes some dolomitic limestone and calcareous sandstone. The remainder of the District is underlain by Pennsylvanian strata, which are mostly sandstone and shale, with some conglomerate, siltstone and coal. These Pennsylvanian rocks are divisible into the Lee Formation and the largely overlying Breathitt Formation, but these interdigitate in a complex manner, which has been described in different ways (see USGS Quadrangle Maps). The Lee Formation, which has extensive sandstone strata, especially at its upper levels, predominates in the Cliff Section. It is completely covered by the Breathitt Formation in the Rugged Eastern Area. The Breathitt Formation is mostly composed of shale, with less sandstone and more coal than the Lee Formation. There are also thin phosphatic or calcareous layers (e.g., in the Magoffin beds) at upper levels of the Breathitt Formation.



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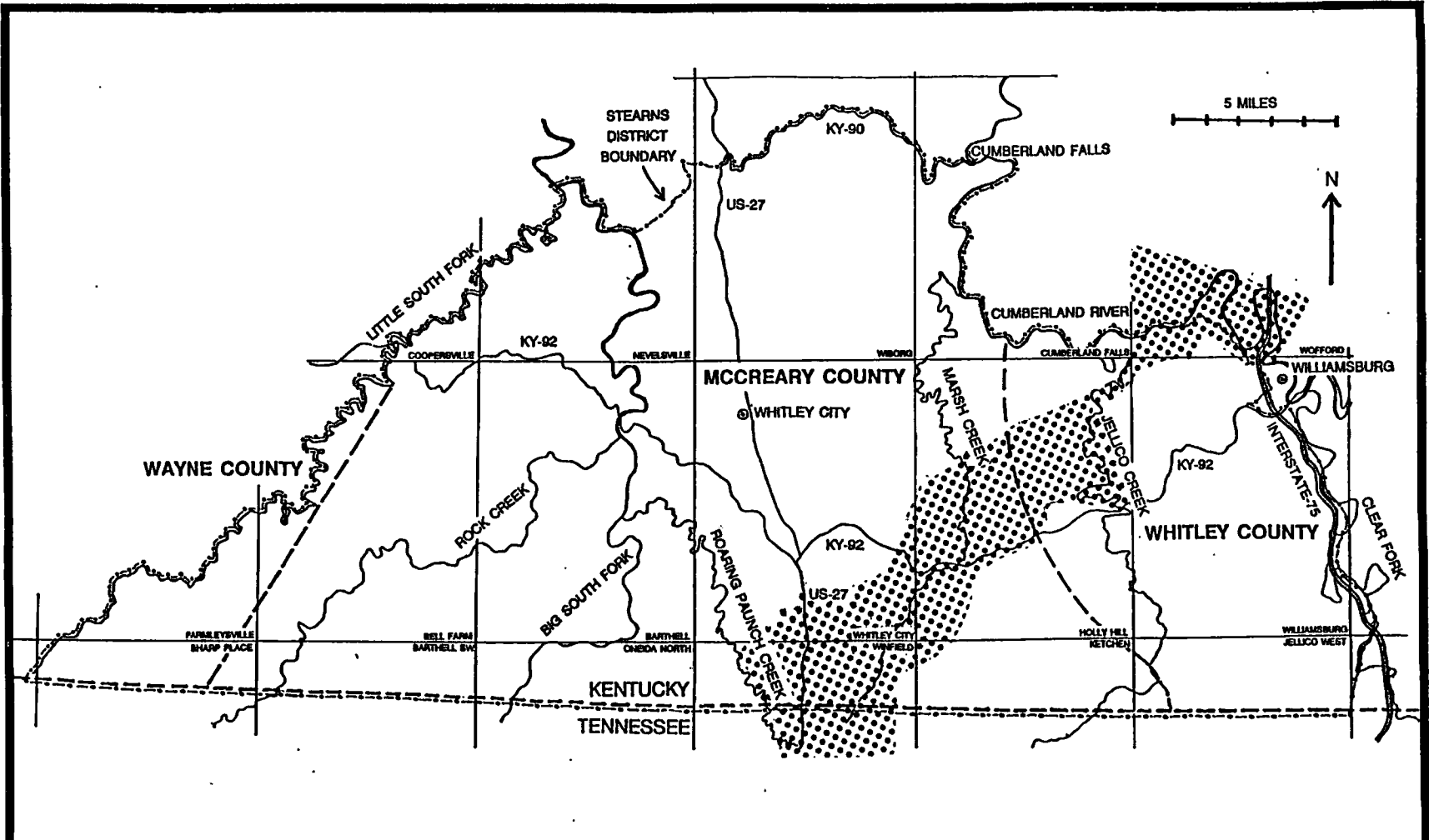


FIGURE 2: Map of the Stearns Ranger District (Proclamation Boundary) showing county boundaries, USGS Quadrangles and other important features. Stippled area corresponds to the "Low Hills Belt" of the Cumberland Plateau, which lies between the "Cliff Section" (west of stippled) and the "Rugged Eastern Area" (Braun 1950).

At the western edge of the District, the topography typically has sandstone-capped "monadnock" hills about 1100-1300 ft a.s.l., with broad limestone-based, largely deforested valleys about 800-900 ft a.s.l. In the Cliff Section, the upper ridgelines of the plateau are generally 1200-1300 ft a.s.l., and the extensive ravines, fringed with sandstone cliffs, cut down to narrow-bottomed valleys at 700-900 ft a.s.l. along the larger streams and rivers. In the Low Hills Belt, the topography is relatively flat and undissected in places, especially in south-central McCreary County, where most land is at 1100-1300 ft a.s.l., and largely deforested. In this part of Kentucky, the Rugged Eastern Area rises rather abruptly above the Low Hills Belt, and its massive hills, known locally as "The Jellico Mountains", rise to 1900-2200 ft, with no interruption by cliffs. The major valleys within the Rugged Eastern Area are mostly at 900-1100 ft a.s.l., and they are relatively broad and largely deforested.

### Climate

The climate of the Appalachian Plateaus Physiographic Province is humid mesothermal, characterized by mild temperate rainy climates with no distinct dry season (Trewartha 1954). Precipitation in this region is generally a result of moisture-bearing low pressure formations which move from the western Gulf of Mexico and travel in a northeasterly direction across Kentucky. The fall is generally the driest season and the spring the wettest. The average annual precipitation is about 47-49 inches, with little variation over the region. Average annual snowfall is about 10-15 inches, with the greater amounts falling at higher elevations in the Rugged Eastern Area. The mean annual temperature at lower elevations is about 56-58°F, and higher elevations may be 1-3°F cooler. Average July temperature is about 75-78°F, and average January temperatures is 36-40°F. The average frost free period is about 180-185 days. At Williamsburg (1100 ft a.s.l.), the average date of first fall freeze is October 21, and the average date for final spring freeze is April 19 (Byrne et al. 1970, Karan and Mather 1977).

### Soils

The Stearns Ranger District is largely covered by the 1970 soil survey of McCreary and part of Whitley Counties (Byrne et al. 1970). However, the names of several soil series in that report are now outdated. An attempt to summarize the classification of upland soils in the Stearns District is presented in Table 1. Major trends in soil characteristics are related to bedrock, from acid sandy soils to calcareous soils, and to topographic position, from residual soils of ridges to colluvial soils on lower slopes.

Braun's (1950) division of the Cumberland Plateau into three sections, which has much botanical significance, can be related to major geographic trends in upland soils. The western and eastern parts of the Cliff Section are generally typified by the catena of soils derived from sandstone (Hartsells, Dekalb and

TABLE 1. Classification of upland soil series in the Cumberland Plateau of Kentucky.

TYPICAL TOPOGRAPHY	PREDOMINANT SOIL PARENT MATERIAL					
	SANDSTONE	SANDSTONE/ ACID SHALE	ACID SHALE	CALCAREOUS SHALE + SHALE/SANDSTONE	LIMESTONE + SHALE/SANDSTONE	LIMESTONE
RESIDUUM ON BROAD RIDGES (SOME LOESS) 2-20+% SLOPES	FRAGIU DULT Monongahela loam/1- 4-5 ft (2-6% s.)	FRAGIU DULT Tilsit sil/1 3-5 ft (2-6% s.)			PALEUDULT Mountview sil/1-4 6-8 ft (2-20% s.)	PALEUDALF Pembroke sil/1-4 5-9 ft (2-12% s.)
	HAPLU DULT Hartsells fsal/1 2-4 ft (2-30% s.)	HAPLU DULT Whitley sil/1 3-5 ft (2-12% s.)			PALEUDULT Frederick sil/1-4 6-10 ft (2-50% s.)	PALEUDALF Cumberland sil/2-5 5-8 ft (2-20% s.)
RESIDUUM ON UPPER SLOPES 6-30+% SLOPES	DYSTROCHREPT Dekalb fsal/1 1.5-3.5 ft	HAPLU DULT Gilpin sil/1 1.5-3 ft	HAPLU DULT Latham sicl/1 1.5-3.5 ft	HAPLU DALF Colbert sicl/-5 2.5-3.5 ft	HAPLU DALF Talbot sicl/2-3 2-3 ft	HAPLU DALF Fredonia rsil/2-5 2-3 ft
	DYSTROCHREPT Ramsey sal/1 1-2 ft	DYSTROCHREPT Weikert sil/1 1-2 ft				
COLLUVIUM ON LOWER SLOPES 6-50+% SLOPES	HAPLU DULT Jefferson sal/1 3-10 ft	HAPLU DULT Shelocta sil/2 3-10 ft	HAPLU DULT Muse sicl/2 3-6 ft	HAPLU DALF Renox rsil/-5 3-6 ft? (N-faces)	HAPLU DALF Brookside rsil/5 5-6 ft	

\* Compiled from data in county soil surveys (Byrne et al. 1970, Ross et al. 1974), with some updated nomenclature. Soil classes are in capitals above series names. Some series names replace earlier names: Hartsells = Clymer; Whitley = Wellston; Latham = part of Trappist (or Muse?); Dekalb = Steinsburg; Jefferson = Tate (and Rigley?); also Gilpin is broadened to include part of earlier "Muse".

Typical soil texture in A horizon is coded after each series name as follows:  
sal = sandy loam; fsal = fine sandy loam; sil = silt loam; sicl = silty clay loam; rsil = rocky silt loam.

Typical pH of A horizon is coded after each series name as follows:  
1 = pH 4.5-5; 2 = pH 5-5.5; 3 = pH 5.5-6; 4 = pH 6-6.5; 5 = pH 6.5-7.

Typical depth to bedrock, in feet, is indicated below each series name.

Soils are "well-drained" except for the somewhat "excessively" w-d. dystrochrepts and the "moderately" w-d. fragiudults.

Jefferson), plus some limestone soils on western valley slopes (Talbot and Brookside). However, a large central part of the Cliff Section is typified only by colluvial soils in sandstone ravines (Jefferson) plus residual soils on shaley ridges (Latham).

The Low Hills Belt is less well defined, and may be considered a transitional zone from less dissected parts of the Cliff Section to the Rugged Eastern Area. It is generally typified by shaley soils on slopes (Muse and Latham) plus mixed sandstone-shale soil on broad ridges (Whitley). Further north, in the London District, mixed or pure sandstone soils are more widespread.

The Rugged Eastern Area is typified by slopes with soils derived from shale mixed with sandstone (Shelocta and Gilpin) or from shale alone (Muse and Latham). An interesting variant is the Renox series, which occurs on steep upper, N-facing slopes derived partly from calcareous shale. The relatively high base-status of this soil, and, to lesser extent, other soils in the Rugged Eastern Area is probably a cause of the more deciduous nature of the forests (in accord with general trends shown by Campbell, 1987).

## BIOGEOGRAPHY: FLORA AND FAUNA

### Vascular Flora

Previous botanical work in this region has already been referred to in the Somerset District Report (Palmer-Ball et al. 1987), which outlined the general mixture of northern, southern and Appalachian components in the flora. The flora of the western part of the Stearns District is similar to the Somerset District. However, several uncommon southern species have been found only in the Stearns District, e.g., *Hexastylis contracta*, *Orontium aquaticum*, *Parthenium integrifolium*, *Parnassia asarifolia*, *Platanthera cristata*, *Polygala polygama*, *Porteranthus trifoliata*, *Vernonia noveboracensis* and *Xyris torta*. Most of these species are typical of open grassy woods or streamheads in less dissected areas. Their restriction to the Stearns District may be related to the more or less continuous extension of relatively flat land from the south as far north as the Whitley City area. Further north, the Cumberland River valley and its tributaries break up the continuity of the less dissected uplands.

In the western part of the Stearns District, within the Cliff Section, there are many rare plant species. These are mostly at the edge of their range, but there are also a few Appalachian endemics. In contrast, further east in the District on the more fertile soils of the Jellico Mountains, there is a strikingly lower incidence of rare plant species. This east-west contrast is a general trend throughout the Appalachian Plateaus in Kentucky, and may be related to the lower habitat diversity in the Rugged Eastern Area (Campbell and Medley, in press). About the only

plants of biogeographic interest in this section of the Stearns District are some southern species on swampy terraces along the Cumberland River and its tributaries, e.g., *Celtis laevigata*, *Quercus phellos*, *Q. michauxii*, *Lobelia nuttallii*, *Xyris torta* and *Sabatia campanulata* (old record). There are very few rare species in the slope forests, e.g., *Cladrastis kentukea*.

The vegetation types in this region have already been described in general terms by Palmer-Ball et al. (1987). Some additional information relevant to the Stearns District is currently being synthesized into a draft vegetation classification and description for the whole Daniel Boone National Forest (available from J. Campbell). Table 2 summarizes the current distribution of pre-1900 stands in the Stearns District taken from data on file at District Headquarters.

A subject of increasing interest in DBNF is the role of fire in the past and its potential effects on vegetation. Palmer-Ball et al. (1988; Appendix on Vegetation Types) discussed some evidence that fire was formerly an important factor keeping some upland areas in an open woods or "savannah" state. Martin (1989) has recently reviewed information from throughout the DBNF, and concluded that fire was indeed a widespread influence before the modern era of fire-suppression. In the notes on rare plant species below, there are frequent references to species that are found today only on roadsides or other rights-of-way, but which probably used to occur in open, grassy woods when fire were more frequent. A more thorough assessment of these species' ecology in relation to fire history on DBNF is being presented elsewhere (J. Campbell, in preparation for "Fire and the Environment" symposium, University of Tennessee, March 1990).

#### **Terrestrial Vertebrate Fauna**

The terrestrial vertebrate fauna of the Stearns Ranger District has not previously been studied as a whole. However, smaller studies and periods of field work have been conducted by a number of investigators in the region.

The herpetofauna of McCreary County was the topic of a recent Eastern Kentucky University Masters of Science degree thesis (Stephens 1985), which included a comprehensive review of the literature. Also, Barbour (1971) included a few scattered records from McCreary, Wayne and Whitley counties. Information compiled by the Nongame Wildlife Program of the Kentucky Department of Fish and Wildlife Resources (J. MacGregor, pers. comm.) and on the Kentucky Natural Heritage Database (KSNPC 1990) account for the presence of many other species in the vicinity.

Accounts of the birdlife of McCreary, Wayne and Whitley counties was included by Mengel (1965), who listed some specific records from field work conducted on scattered dates from 1948 to 1951. In addition, known sites for former Red-cockaded Woodpecker activity have been documented through studies

by Jackson et al. (1976), Schmaltz (1981) and Murphy (1982), as well as annual field surveys by the U.S. Forest Service (S. Phillips, pers. comm.).

Information on the small mammals of the Stearns District is relatively meager in comparison to other vertebrates. Barbour and Davis (1974) included a few records for mammals from the area at a county level. Investigations of the bats in the area have been conducted by the Nongame Wildlife Program of the Kentucky Department of Fish and Wildlife Resources (J. MacGregor, pers. comm.).

The fauna of this region of Kentucky is rich and, as with plant species, the mixture of northern and southern components is pronounced. The occurrence of nesting birds exemplifies this trend. While the southern Cumberland Plateau is dominated by many temperate forest species such as Red-eyed Vireo (*Vireo olivaceus*) and Ovenbird (*Seiurus aurocapillus*), wooded areas may also harbor northern species such as Black-throated Green Warbler (*Dendroica virens*) and Ruffed Grouse (*Bonasa umbellus*) and southern species like Red-cockaded Woodpecker (*Picoides borealis*) and Swainson's Warbler (*Limnothlypis swainsoni*). Likewise, mammal species with northern affinities like the Smoky Shrew (*Sorex fumeus*) are found in the same woodlands as more southern species like the Eastern Wood Rat (*Neotoma floridana magister*).

In many cases, faunal ranges within the region do not correspond closely with specific vegetation types. While certain species are associated with more mesic forest types than xeric types, the preferences exhibited by many species are not pronounced. For the most part, faunal components are distributed independent of the soil formation, although there are some examples of species associated closely with either calcareous or non-calcareous regions. For example, the Green Salamander (*Aneides aeneus*) is found almost exclusively on sandstone. Unlike the previous two inventories on other districts of DBNF (Palmer-Ball et al. 1988, Campbell et al. 1989), the Stearns District does not contain substantial cave development due to the predominance of sandstones. For this reason, important winter hibernacula for bat species are generally not present. However, where abandoned mine portals and well-developed sandstone rockhouses along cliffines provide suitable shelter, bats are present, especially from spring through fall, and some sites appear to be locally significant.

### Aquatic Fauna

The streams within the Stearns District and the diverse and unique aquatic organisms they support have long been of considerable interest to aquatic biologists. Because many of the resulting publications have been summarized or discussed in two Kentucky State Nature Preserves Commission publications (Harker et al. 1979, 1980), the following review will focus primarily on literature published after 1980.

TABLE 2. Pre-1900 stands in the Stearns District: USFS type and distribution.\*

FOREST TYPE	NUMBER OF STANDS	ACRES (APPROX.)	NOTE ON DISTRIBUTION
Yellow pine (32)	50	860	Mostly on ridges and dry slopes, especially in Marsh Creek-Indian Creek area; almost none in Jellico Mts. region
Yellow/other pine-oak (12,15,33)	37	1060	
Chestnut oak-scarlet oak-pine (45)	39	1260	Mostly on ridges and dry slopes, especially Big South Fork, Marsh Cr-Indian Cr area; none in Jellico Mountains Region
Chestnut oak-scarlet oak (59,60)	5	150	
White/black/southern red oak-yel. pine (47)	29	890	Mostly on dry to moist slopes and ridges; none in Jellico Mountains region
Red oak-hickory-yel. pine (48)	5	260	
White oak (54)	4	100	Widespread on average slopes and moister ridges, especially in Jellico Mts.
White oak-red oak-hickory (53)	163	6540	
Hemlock-hardwood (8)	54	3150	Mostly in sandstone ravines and moister slopes, especially Big South Fk; almost none in Jellico Mts. region
Hemlock-white pine-hardwood (41)	7	230	
Yellow poplar-oak (56)	33	1460	Mostly on moist slopes, especially in Jellico Mts.
Sugar maple-beech-birch (81)	10	350	On moist calcareous slopes and in Jellico Mts. region

\* Data are from files at the Stearns Ranger District office. They refer only to land owned by USFS or NPS (BSFNRRRA). The USFS type numbers are in parentheses after each type's name. The broader ridges, typified by oaks and pines, are in private ownership (and mostly cleared) more than steeper slopes and ravines, typified by hemlock and yellow poplar. Thus, the relative importance of oak and pine types in the pre-1900 landscape is probably underestimated by these data.

Publications about the severely decimated Mollusca of the area fall into two categories: 1) definition of the fauna and its distribution, and 2) conservation of remnant taxa and communities. Starnes and Bogan (1982) surveyed the unionid mussels of the Little South Fork Cumberland River, which they described as ". . . one of the last representative extant populations of the Cumberlandian fauna in Kentucky", and Call and Parmalee (1981) reported the discovery of extant populations of *Alasmidonta atropurpurea* in Marsh and Rock creeks. Efforts to define the current distribution and status of *Villosa trabalis* and *Pegias fabula*, two rare Cumberlandian unionids, were reported by Clarke (1981) and Ahlstedt (1986), respectively. The life histories and ecological relationships of numerous unionids known from the District were reviewed by Gordon and Layzer (1989). Conservation efforts also motivated Bakaletz and Barclay (1984) and O'Bara (1988) to examine the distribution of and devise management plans for *Cambarus bouchardi*, a narrowly distributed crayfish endemic to Roaring Paunch Creek.

Studies of fishes known at least in part from the District parallel those of the Mollusca. Branson (1977) detailed the threatened fishes of the DBNF, and subsequently (1983) provided observations regarding two rare undescribed shiners known from the Little South Fork Cumberland River. O'Bara (1985, 1988) investigated the status and distribution of two rare Cumberland River endemics, *Phoxinus cumberlandensis* and *Etheostoma nigrum susanae*. Jones (1987) further defined the distribution of *P. cumberlandensis*. Distributional findings for several species were reported by Warren (1981), Branson and Schuster (1982), Fallo and Warren (1982), and O'Bara et al. (1984), but Burr and Warren (1986) thoroughly defined the known range of the state's ichthyofauna.

As previously mentioned, Harker et al. (1979, 1980) conducted in-depth aquatic biota and water quality studies of several streams within the District. These efforts were undertaken to provide background information to assess coal mining impacts and to identify the best remaining streams in the upper Cumberland River drainage of Kentucky. Additional in-depth surveys or environmental inventories of two of these high quality streams, the Big and Little South forks of Cumberland River, were reported by O'Bara et al. (1982) and Millican Associates, Inc. et al. (1982), respectively. Finally, because of their exceptional biological or physio-chemical characteristics, the Kentucky State Nature Preserves Commission recommended several streams within the Stearns District for Outstanding Resource Water status under Kentucky Surface Water Standards (Hannan et al. 1982).

## METHODS

Several sources of information were used to identify potentially significant areas. At the onset, lists of high priority species for inventory were generated using information from the Kentucky State Nature Preserves Commission's Natural Heritage Database and a literature review. These species included those federally listed Endangered or Threatened species, those under consideration for federal listing (C1 and C2 candidates of the United States Fish and Wildlife Service), and those listed as Endangered, Threatened, or Special Concern by the Kentucky Academy of Science and the Kentucky State Nature Preserves Commission (KAS/KNPC; Warren et al. 1986); and those species listed as Sensitive by the United States Forest Service (B. Knowles, pers. comm.).

Using 7.5 minute U.S. Geological Survey (USGS) topographic maps, aerial photographs, U.S. Forest Service (USFS) Continuous Inventory of Stand Conditions (CISC), Soil Survey Maps, and personal communications with USFS personnel, sites for these rare species and ecologically significant habitats were identified and ranked for inventory. Areas with wetlands, cliffs and other outcrops, sinkholes and other uncommon topographic features were identified from maps and aerial photographs. Older forest stands (at least 100 years old) were identified using CISC data and aerial photographs. Communication with USFS personnel and others familiar with the area yielded additional information identifying sites for visitation. A field schedule was then devised that prioritized the inventory effort using the lists of potential high interest species and sites.

Field inventory work commenced in April 1989 and proceeded throughout the summer with some activity continuing into the fall and early winter. Small mammal trapping continued into mid-September 1989. Approximately 100 man-days were devoted to botanical inventory. Approximately 50 man-days and eight man-days were devoted to terrestrial and aquatic zoological inventory effort, respectively.

### VASCULAR FLORA

Botanical field work was conducted in areas scattered over the entire District and in as many vegetation types as possible. The primary aim was to relocate previously recorded populations of rare species and to discover new ones. There were few repeated visits to the same sites, due to the limited time. However, through an accumulation of notes made during the year, a rudimentary quantification of the overall vegetation composition was made, with special emphasis on the areas containing rarer species. Such notes include comments on dominant species, and general species lists, though incomplete and with seasonal limitations. In addition, population estimates were made for some of the rarer species. These raw data are being incorporated into the KSNPC files.

Most rare species were concentrated along watercourses (from riverbanks to streamheads) and cliffines (with other nearby outcrops). Accordingly, most botanical field work was devoted to surveying these areas. In traveling to many of these special areas, however, much of the more typical upland forest was covered as well. In addition, many roadsides were searched for rare species, some of which were concentrated sporadically at such sites.

Plant specimens were selectively collected throughout the inventory work, focusing on the federal and KAS/KSNPC-listed species, other rare species of interest, and plants that could not be readily identified in the field. Collections are being stored initially the University of Kentucky, but duplicates of important specimens are being distributed to Eastern Kentucky University, Berea College and USFS (David Taylor). Photographs were taken of many rare species and are being deposited at the Winchester and Stearns offices of the Daniel Boone National Forest.

The vascular plant nomenclature used in this report generally follows Kartesz & Kartesz (1980). The listed rare species' names all follow this source, though a few currently used synonyms have also been given in brackets [ ], as discussed briefly in the species accounts. For the rest of the flora, no strict standard has been followed, though virtually all names preferred here have been used in at least one of the standard manuals (Fernald 1950, Gleason & Cronquist 1963, Radford, Ahles & Bell 1968). A complete floristic list is not included with this report, but updated information on the flora is currently being incorporated into the Atlas of the Kentucky Flora, a database currently being compiled by J. Campbell and others.

## TERRESTRIAL VERTEBRATE FAUNA

The number of rare animal species potentially occurring in the Stearns Ranger District was limited. Only a handful of federally listed or proposed species were known to occur within the vicinity including Red-cockaded Woodpecker, (*Picoides borealis*); Eastern Wood Rat (*Neotoma floridana magister*); and several species of bats including Indiana Myotis (*Myotis sodalis*); Small-footed Myotis (*Myotis leibii*); and Rafinesque's Big-eared Bat (*Plecotus rafinesquii*). Potential habitats for these species were given high priority for field inventory. Special emphasis was placed on the sandstone cliffines and outcrops with which the Eastern Wood Rat and bat species, most notably Rafinesque's Big-eared Bat, are associated in this region.

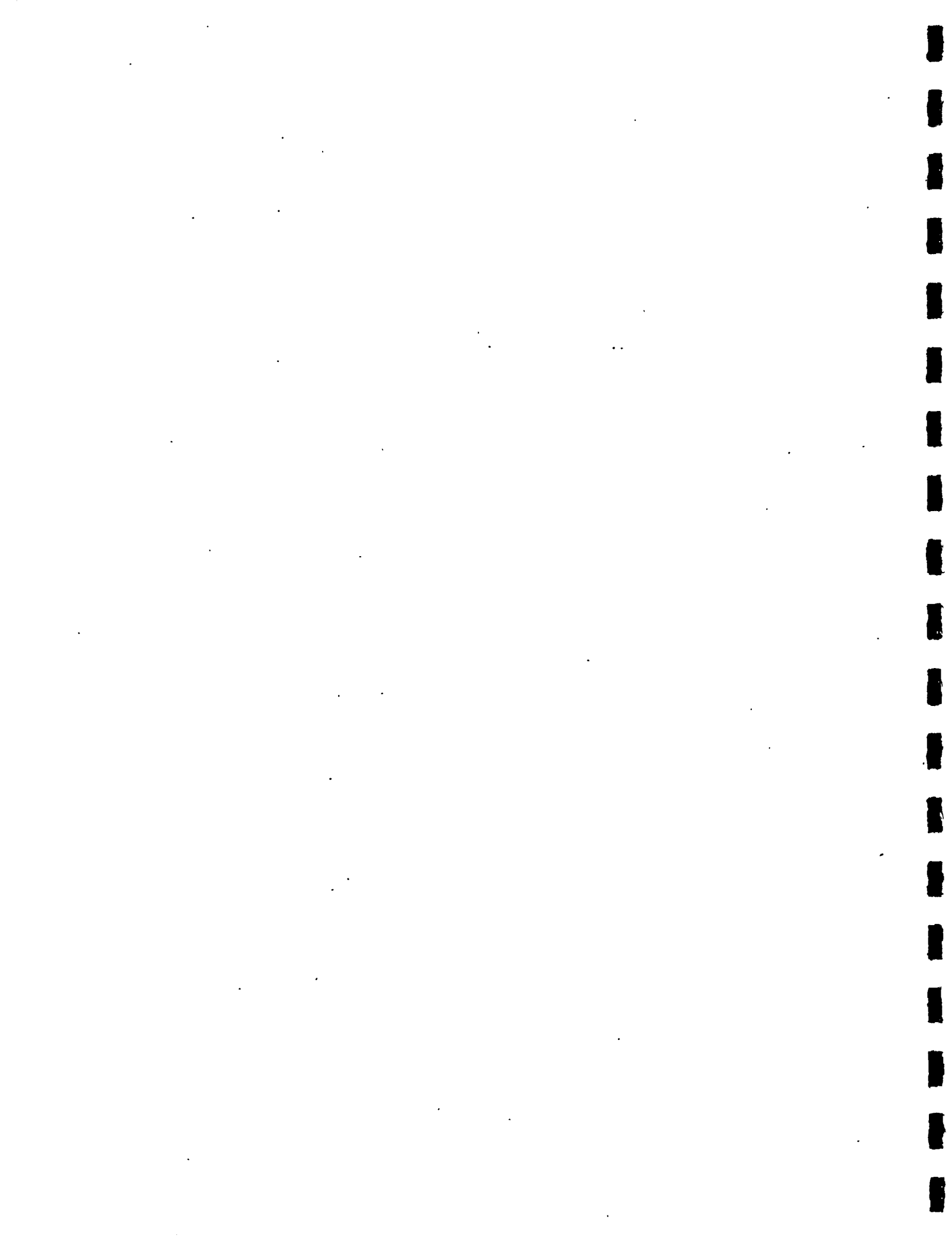
Herptiles were sampled by overturning rocks and logs in a variety of habitat types. Road killed herptile specimens were identified and collected when found in suitable condition. Herptile specimens were deposited with the University of Tennessee and with the Kentucky Department of Fish and Wildlife Resources Nongame Wildlife Program.

Bird species were recorded using visual and auditory identification. An emphasis was placed on the nesting population of the District, although migratory species were also recorded.

Small mammals were sampled using pitfall traps placed in a variety of habitat types. Pitfalls were placed at twelve sites in at least six distinct habitat types including mesic hardwood forest, mesic slope forest, sphagnum streamhead, xeric upland forest, and xeric mature and young mixed hardwood-pine forest. This effort resulted in approximately 9,620 trap-nights of sampling time. Small mammal specimens were deposited with the Kentucky Department of Fish and Wildlife Resources. Bats were surveyed by field checking suitable habitat including rockhouses and small caves identified by sources as suspected for known historical bat utilization. In addition, two sites along Marsh Creek in McCreary County were mist-netted in early July. Road killed mammal specimens were identified and collected when found in suitable condition.

#### AQUATIC FAUNA

Rare aquatic species were sought in the Stearns District on 15-18 August 1989. All habitats present at a site were sampled for mollusca by snorkeling, scanning shallows with viewing buckets, searching the bottom with hands and feet, or searching the banks for shells. Shells of each species found at a site were retained as voucher specimens and deposited at the Ohio State University Museum of Zoology, except when live specimens could not be positively field identified. Fishes were sampled by seining in available habitats, and also through observations made while snorkeling. All specimens collected were or will be deposited at Southern Illinois University at Carbondale. Distributional statements are based on Burr and Warren (1986) and Kentucky State Nature Preserves Commission (1990).



## RESULTS

### GENERAL GUIDE TO RESULTS

Prior to the inventory, the Kentucky State Nature Preserves Commission had about 100 records for 49 species of endangered, threatened, sensitive and rare plants, 44 records for 12 species of listed terrestrial vertebrates, and 141 records for 25 listed aquatic species from the Stearns Ranger District (Table 3). The inventory generated about 320 new records for listed rare plants and animals (Fig. 3), amounting to a two-fold increase in the total records and a three-fold increase in the number of plant records.

During the course of the inventory, 38 of the 50 previously known listed rare plants were recorded. In addition, 22 species were recorded that had not been previously known from the District (Table 3). This effort increased to 73 the total number of listed rare plants known from the Stearns Ranger District. Notes on these listed species are provided below. In addition, the botanists found at least seven species that were previously not well-documented from the state, and several other rarely reported species, which are noted below under "Other Species of Interest". Additional data on the flora and vegetation is being compiled into general treatments for the whole Appalachian region (drafts available from J. Campbell).

Two previously unreported rare terrestrial vertebrate species were discovered on the District during the inventory. In addition, 4 of the 12 previously known listed terrestrial vertebrate species were recorded (Table 3). As a result of field inventory work, general lists of terrestrial vertebrates were generated for the District (Appendices 1-3).

No new listed aquatic species were discovered on the District during the inventory, and only 4 of the 25 previously known rare aquatic species were recorded, in part due to limited sampling effort (Table 3). Some of the freshwater mussels formerly known to occur in the major rivers on the District have been extirpated by the impoundment of the Cumberland River and pollution, while others were probably missed due to difficulty in sampling.

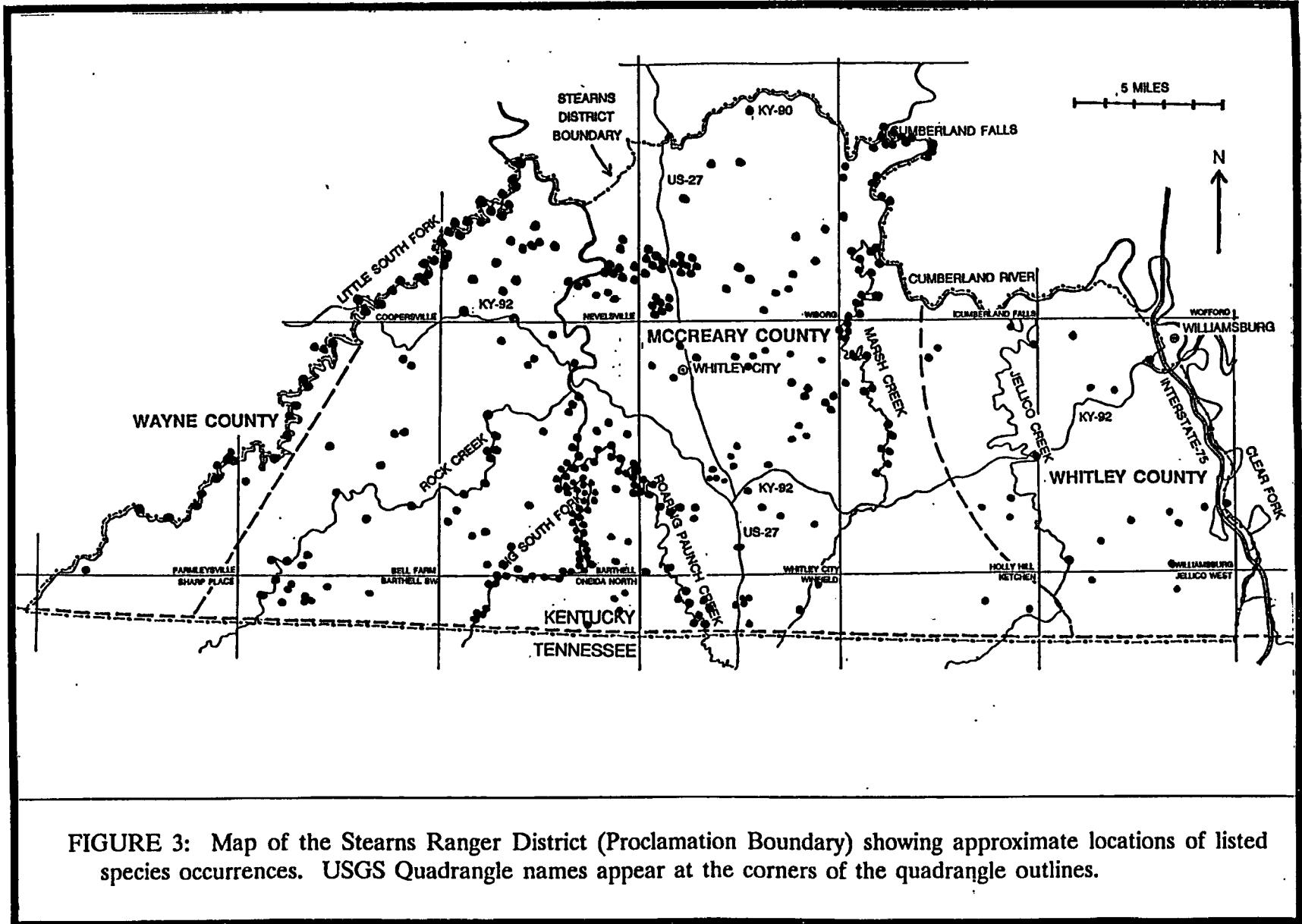


FIGURE 3: Map of the Stearns Ranger District (Proclamation Boundary) showing approximate locations of listed species occurrences. USGS Quadrangle names appear at the corners of the quadrangle outlines.

TABLE 3: USFWS and KAS-KSNPC listed species and USFS sensitive species occurrences known from the Stearns Ranger District.

Species	Number of formerly known sites	Number of sites added by inventory	Number of sites in Significant Areas*
<b>VASCULAR FLORA</b>			
<i>Aconitum uncinatum</i> Monkshood	1	1	2
<i>Agalinis decemloba</i> Purple False Foxglove	1x	--	--
<i>Arenaria cumberlandensis</i> Sandwort	1x	1	1
<i>Aster concolor</i> Aster	4x	4	1
<i>Aureolaria patula</i> False Foxglove	--	3	3
<i>Calamagrostis cinnoides</i> Cinna-like Reed Grass	2	11	8
<i>Calopogon tuberosus</i> Grass Pink	2x	--	2x
<i>Calycanthus floridus</i> Sweet Shrub	6	5	11
<i>Carex jorii</i> Sedge	1	1	1
<i>Carex picta</i> Sedge	--	15	7
<i>Carex stricta</i> Sedge	--	6	6
<i>Carex tenera</i> Sedge	--	1?	1?
<i>Castanea pumila</i> Chinquapin	1x	1?	1?
<i>Ceanothus herbaceus</i> Redroot	--	[1]	[1]
<i>Chrysogonum virginianum</i> Green and Gold	1	--	1
<i>Cladrastis kentukea</i> Yellow-wood	3	7	5
<i>Cleistes divaricata</i> Spreading Pogonia	1	5	3

TABLE 3 cont'd:

Species	Number of formerly known sites	Number of sites added by inventory	Number of sites in Sig- nificant Areas*
<i>Clematis glaucophylla</i> Leather Flower	--	11	11
<i>Comptonia peregrina</i> Sweet Fern	1	--	1
<i>Conradina verticillata</i> Cumberland Rosemary	8	5	11
<i>Coreopsis pubescens</i> Downy Coreopsis	3	15	18
<i>Cypripedium kentuckiense</i> Kentucky Lady's-Slipper	1	5	6
<i>Cystopteris fragilis</i> var. <i>mackayi</i> Mackay's Fragile Fern	--	4	4
<i>Deschampsia flexuosa</i> Hair Grass	--	1	1
<i>Dichanthelium acuminatum</i> var. <i>villosum</i> Panic Grass	--	>10	>5
<i>Dichanthelium sabulorum</i> Panic Grass	--	>10	>5
<i>Erigeron pulchellus</i> var. <i>brauniae</i> Lucy Braun's Robin Plantain	1	7	8
<i>Eupatorium luciae-brauniae</i> Lucy Braun's White Snakeroot	2	7	7
<i>Euphorbia mercurialina</i> Spurge	1	1	2
<i>Gaylussacia brachycera</i> Box Huckleberry	5	>30	>20
<i>Gratiola pilosa</i> Hedge Hyssop	2x	--	2x
<i>Gymnopogon ambiguus</i> Beardgrass	1x	--	1x
<i>Helianthus atrorubens</i> Sunflower	2	>15	>5
<i>Hexastylis contracta</i> Heart-leaf	1	2	3
<i>Hypericum stans</i> St. John's-wort	1x	--	1x

TABLE 3 cont'd:

Species	Number of formerly known sites	Number of sites added by inventory	Number of sites in Significant Areas*
<i>Liatrix microcephala</i> Blazing-star	2	>20	>10
<i>Lilium philadelphicum</i> Wood Lily	2x	3	2
<i>Lobelia nuttallii</i> Nuttall's Lobelia	2x	1	1
<i>Maianthemum canadense</i> Canada Mayflower	--	2	2
<i>Malus angustifolia</i> Crab Apple	--	10	3
<i>Marshallia grandiflora</i> Barbara's Buttons	3	4	6
<i>Minuartia glabra</i> Sandwort	--	3	3
<i>Monotropsis odorata</i> Sweet Pinesap	--	1	--
<i>Oenothera linifolia</i> Thread-leaved Sundrops	--	1	1
<i>Oenothera perennis</i> Small Sundrops	1x	--	--
<i>Orontium aquaticum</i> Golden Club	4	11	15
<i>Pachistima canbyi</i> Mountain Lover	--	1	1
<i>Panax quinquefolius</i> Ginseng	3	5	2
<i>Parnassia asarifolia</i> Ginger-leaved Grass-of-Parnassus	1	4	3
<i>Philadelphus hirsutus</i> Mock Orange	--	8	7
<i>Philadelphus inodorus</i> Mock Orange	1x	--	1x
<i>Platanthera cristata</i> Crested Fringed Orchid	4x	4	3
<i>Platanthera integrilabia</i> White Fringeless Orchid	2x	3	4

TABLE 3 cont'd:

Species	Number of formerly known sites	Number of sites added by inventory	Number of sites in Sig- nificant Areas*
<i>Podostemon ceratophyllum</i>			
Riverweed	2x	4	5
<i>Polygala cruciata</i>			
Cross Milkwort	1x	--	1x
<i>Polygala polygama</i>			
Purple Milkwort	3	3	3
<i>Rhynchospora globularis</i>			
Grass Beak Rush	--	2	2
<i>Sabatia campanulata</i>			
Rose Pink	1?	--	--
<i>Schwalbea americana</i>			
Chaffseed	1x	--	--
<i>Scleria ciliata</i>			
Nut Rush	1x	1	1
<i>Scutellaria leonardii</i>			
Small Skullcap	--	1	--
<i>Silene regia</i>			
Royal Catchfly	1?	--	--
<i>Solidago rupestris</i>			
Goldenrod	--	4	3
<i>Solidago spathulata</i>			
Goldenrod	2	7	9
<i>Sphenopholis pennsylvanica</i>			
Swamp Oats	--	2	1
<i>Spiranthes lucida</i>			
Shining Ladies' Tresses	2	4	6
<i>Sporobolus clandestinus</i>			
Dropseed	--	3	1
<i>Tephrosia spicata</i>			
Goat's-rue	2x	--	--
<i>Thuja occidentalis</i>			
Northern White Cedar	1	1	2
<i>Trichomanes boscianum</i>			
Filmy Fern	1	2	3
<i>Vallisneria americana</i>			
Tape Grass	--	11	11

TABLE 3 cont'd:

Species	Number of formerly known sites	Number of sites added by inventory	Number of sites in Sig- nificant Areas*
<i>Vernonia noveboracensis</i>			
New York Ironweed	1	3	4
<i>Viola tripartita</i>			
Yellow Violet	1	1	2
<b>TERRESTRIAL VERTEBRATE FAUNA</b>			
<b>Amphibians</b>			
<i>Aneides aeneus</i>			
Green Salamander	7+	--	6+
<b>Reptiles</b>			
<i>Eumeces a. anthracinus</i>			
Northern Coal Skink	1	--	--
<i>Lampropeltis triangulum elapsoides</i>			
Scarlet Kingsnake	1*	--	--
<i>Ophisaurus attenuatus</i>			
Slender Glass Lizard	10	2	1
<i>Pituophis melanoleucus</i>			
Pine Snake	1	--	--
<b>Birds</b>			
<i>Accipiter striatus</i>			
Sharp-shinned Hawk	--	1	--
<i>Picoides borealis</i>			
Red-cockaded Woodpecker	6	--	1
<b>Mammals</b>			
<i>Felis concolor cougar</i>			
Mountain Lion	?	1?	--
<i>Myotis [=subulatus L.] leibii</i>			
Small-footed Myotis	1	--	1

TABLE 3 cont'd:

Species	Number of formerly known sites	Number of sites added by inventory	Number of sites in Significant Areas*
<i>Myotis septentrionalis</i> [= <i>M. keenii</i> ]			
Northern Long-eared Bat	6	1	6
<i>Myotis sodalis</i>			
Indiana Myotis	1	--	1
<i>Neotoma floridana magister</i>			
Eastern Wood Rat	2+	11	12+
<i>Plecotus rafinesquii</i>			
Rafinesque's Big-eared Bat	11	2	12
<i>Sorex</i> [= <i>Microsorex</i> ] <i>hoyi winnemana</i>			
Pygmy Shrew	--	2	1
<i>Spilogale putorius</i>			
Spotted Skunk	3	--	2
<i>Ursus americanus</i>			
Black Bear	?	2	1
<b>AQUATIC FAUNA</b>			
<b>Crustaceans</b>			
<i>Cambarus bouchardi</i>			
Big South Fork crayfish	8	--	8
<i>Orconectes australis</i>			
Crayfish	1	--	--
<b>Mollusks</b>			
<i>Alasmidonta atropurpurea</i>			
Cumberland elktoe	10	2	12
<i>Alasmidonta marginata</i>			
Elktoe	6	--	6
<i>Epioblasma brevidens</i>			
Cumberland combshell	3	--	3
<i>Epioblasma capsaeformis</i>			
Oyster mussel	3	--	3
<i>Fusconaia s. subrotunda</i>			
Long-solid	1	--	1

TABLE 3 cont'd:

Species	Number of formerly known sites	Number of sites added by inventory	Number of sites in Sig- nificant Areas*
<i>Pegias fabula</i>			
Little-winged pearlymussel	12	--	12
<i>Pleurobema oviforme</i>			
Tennessee clubshell	10	--	10
<i>Ptychobranchnus subtentum</i>			
Fluted kidneyshell	14	--	14
<i>Toxolasma lividus</i>			
Purple lilliput	10	--	10
<i>Villosa lienosa</i>			
Little spectacle case	2	--	1
<i>Villosa trabalis</i>			
Cumberland bean mussel	16	--	16
<b>Fishes</b>			
<i>Etheostoma cinereum</i>			
Ashy darter	5	--	4
<i>Etheostoma nigrum susanae</i>			
Johnny darter	7	1	4
<i>Etheostoma tippecanoe</i>			
Tippecanoe darter	1	--	1
<i>Hemitremia flammea</i>			
Flame chub	1x?	--	--
<i>Hybopsis insignis</i>			
Blotched chub	5	--	5
<i>Notropis</i> sp.			
Palezone shiner	11	--	11
<i>Notropis</i> sp.			
Sawfin shiner	6	--	6
<i>Percina burtoni</i>			
Blotchside logperch	1	--	1x?
<i>Percina macrocephala</i>			
Longhead darter	1	--	1x?
<i>Percina squamata</i>			
Olive darter	1	--	1
<i>Phoxinus cumberlandensis</i>			
Blackside dace	7	4	3

TABLE 3 cont'd:

Species	Number of formerly known sites	Number of sites added by inventory	Number of sites in Significant Areas*
<b>Amphibians</b>			
<i>Cryptobranchus alleganiensis</i> Eastern Hellbender	1	1	1

Key to Table 3.

\* -- see Significant Areas section, p. 73.

[ ] -- occurrences near boundaries of district (within a 1/4 mile).

x -- species not relocated; perhaps extirpated.

? -- validity of record questionable or uncertain, or identification tentative.

The remainder of this section has been divided into discussions on the vascular flora, terrestrial vertebrate fauna, aquatic fauna, and significant areas recommended for conservation.



## VASCULAR FLORA

### Listed Species

The following accounts summarize data on 77 listed rare species that have been recorded from the Stearns District or nearby. The four species in square brackets [ ] have not been recorded in the District but there are records from within a few miles of the boundary. These bracketed notes mostly present information not already given in the Somerset District report, which should be consulted for further marginal records. One KAS/KSNPC-listed species--*Thalictrum mirabile*--was excluded for taxonomic reasons (as explained in Palmer-Ball et al. 1988, Campbell et al. 1989).

Following each species' name, its official status is shown as follows (1/2/3):

- (1) Status in Kentucky according to the Kentucky Academy of Science and the Kentucky State Nature Preserves Commission (KAS-KSNPC; Warren et al. 1986): E = Endangered; T = Threatened; S = Special Concern; "-" = not listed.
- (2) Status in Daniel Boone National Forest as listed by the USFS during 1988 and early 1989 (B. Knowles, pers. comm.); S = Sensitive; E = Endangered; "-" = not listed; "+" = KAS-KSNPC listed species that the DBNF inventory has documented on USFS land. A revised list was distributed by USFS after field work was completed. Since the species documented during the field work were those on lists that were current at the beginning of the year, the revisions are not indicated below.
- (3) Federal Status as designated by the United States Fish and Wildlife Service (1985); E = Endangered; C1 or C2 = candidate for listing, Category 1 or 2; or 3C = former C2 but dropped from consideration for listing. There are 11 of these (excluding 3C species): *Arenaria cumberlandensis* (the only Endangered Species), *Aureolaria patula*, *Conradina verticillata*, *Cypripedium kentuckiense*, *Eupatorium luciae-brauniae*, *Hexastylis contracta*, *Marshallia grandiflora*, *Pachistima canbyi*, *Platanthera integrilabia*, *Schwalbea americana* and *Silene regia*.

In parentheses, after each species' name and status, is shown the number of Kentucky counties with records, followed by the approximate total number of known occurrences. These data are based on files at Kentucky State Nature Preserves Commission and other sources reviewed by Julian Campbell and Max Medley. Such data may be used to help reassess the listed status of some species.

*Aconitum uncinatum* Monkshood: T/S/- (5/9). In Kentucky, small populations of this Appalachian species are scattered along the Cliff Section, mostly on low slopes and terraces along larger streams. There are only two records from the Stearns District, and both are post-1980. One patch, with at least 10-15 plants, was on low slopes near Big Shoals on the Big South Fork, in terrace forest with beech, hemlock and associates. The other patch, with only one clump of stems, was on a calcareous, NE-facing slope near the Little South Fork, along a dirt road well above the floodplain; canopy trees included beech, sugar maple and basswood.

*Agalinis decemloba* Purple False Foxglove: E/+/- (2/3). In Kentucky, this southern species is known from only two records in the Somerset District and one in the Stearns District, all from dry, sandy soil in open areas of the Cliff Section. The latter record, a 1930s Braun collection from "dry sandstone ridge...over Yahoo." It is likely that this species generally grew in fire-prone areas before the modern era of fire-suppression (see also Palmer-Ball et al. 1987).

*Arenaria cumberlandensis* Sandwort: E/E/E (1/2). This species is known from only 10-20 localities in the Cliff Section of Tennessee and Kentucky, all in damp, sandy soil under the overhang of sandstone cliffs. Despite considerable searching, only two sites have been found in Kentucky, but much more suitable habitat remains to be explored. The original discovery, by M.E. Medley in 1984, was on the W-facing side of a point along Rock Creek, but return visits by Medley and others since then have failed to relocate the plants. The patch in 1984 was only 2-3 ft across. The second discovery, by A. Risk during the 1989 inventory, was on the north side of Big Spring Hollow, near the Big South Fork. He found only two non-flowering plants, growing in a wet seep. The populations of this annual species in Kentucky may fluctuate greatly, perhaps involving variable seed germination, establishment and disturbance. Some trampling by wild animals or people was observed under the cliffs near both sites.

*Aster concolor* Aster: E/+/- (4/12). In Kentucky, this southern species is known only from dry sandy soils in the southeast (Cliff Section) and the southwest. During this survey, it was found at four sites, each with only 1-10 stems, all along upland roadsides in the Cliff Section. There are also four old records from the Stearns District, one of them indicating "open grassy pine woods" (Braun No. 4890 in 1950). No plants have been recorded during subsequent visits to these previously recorded localities. Before active fire-suppression, this species may have been more widespread in open, frequently burnt pine-oak woods (see also *Agalinis decemloba*).

*Aureolaria patula* False Foxglove: E/+/C1 (4/15). This southern interior species occurs in Georgia, Alabama, Tennessee and Kentucky, generally on limestone river bluffs. In Kentucky, before the DBNF inventories, it was known from only

one locality, in the Mammoth Cave National Park (Edmonson and perhaps Hart Counties). It has now been found at five sites along the South Fork of Cumberland River (Somerset District) and three sites along the Big South Fork (Stearns District). The Big South Fork plants were found only near Roaring Paunch Creek and Troublesome Creek, but this species is probably scattered elsewhere in similar habitat that exists along much the South Fork in Kentucky. The plants were restricted to the lowest slopes, where some calcareous bedrock occurs, just above the boulder-cobble bars. The forest was young and, in some places, rather open or brushy.

*Calamagrostis cinnoides* Cinna-like Reed Grass: S/+/- (5/25). In Kentucky, this southern and east-coastal species is virtually restricted to the southern Cliff Section. However, it is a consistent component of open vegetation near acid streamheads. In the Stearns District, it has been found at 12 sites scattered through the Cliff Section. The records are from seasonally wet, acid soils on broad ridges, and occasionally from shallow soil on seasonally seeping sandstone outcrops. It was generally found in the partial shade of *Acer rubrum* and other trees, but it is locally frequent in openings, especially those that appear to have some natural origin. Common associates included *Osmunda regalis*, *Ilex verticillata*, *Rubus hispidus*, *Eupatorium* spp., *Vernonia noveboracensis* and *Platanthera* spp.

*Calopogon tuberosus* Grass Pink: E/S/- (10/10). In Kentucky, this widespread eastern species is only known from seasonally wet, acid soil, especially in natural openings, within the Knobs Region, Cliff Section and the Cumberland Mountains. However, there are no currently known sites. There are two records from the Stearns District. In 1941-43, it was reported, sometimes as "abundant", in the Big Creek streamhead area by Braun (collection catalogue) and Rogers (1941), but has not been seen there since. In 1985, J. Macgregor and D. Stephens found one plant at the former "Wherry's Bog" site, but a dense thicket has grown up since then (see Significant Areas section). This is another species that may have benefitted from fire during seasons when swampy streamheads dried up.

*Calycanthus floridus* Sweet Shrub: T/S/- (2/12). In Kentucky, this southeastern to Appalachian species is largely restricted to sandy slopes along the Big South Fork valley in the Stearns District. The Appalachian plants have been distinguished as *C. floridus* var. *laevigatus* (= *C. fertilis*). It has been found at several sites along the river, and may be more or less continuous as far north as Alum Creek. Most plants were found in thickets on lower slopes just above the upper floodplain limit, but a few were found on drier slopes near the cliffline. Also, one large population, covering about an acre, was found along Marsh Creek near the KY 478 bridge in open, brushy woods (near a popular fishing spot, and probably burnt in recent past). Other frequent species included *Tsuga*, *Quercus alba*, *Pinus echinata*, *Carex lucorum* and *Andropogon scoparius*.

*Carex jorii* Sedge: E/S/- (2/4). In Kentucky, this Coastal Plain species is known from a few small seasonal ponds in the southern Cliff Section. Two sites have been found in the Stearns District; both are near roads, where the seasonal ponding may be partly artificial. It was found in the partial shade of *Acer rubrum*, *Liquidambar* and other trees.

*Carex picta* Sedge: E/+/- (7/35). In Kentucky, this south-central interior species is known from scattered localities in the west and southeast (Cliff Section), all on Pennsylvanian bedrock. During this survey, it was found at about 15 sites, mostly on moderately dry slopes in the Big South Fork watershed. The associated forest was generally an oak or successional pine type, sometimes with mesic species like beech or hemlock. It was absent from the driest pine forest near cliffs.

*Carex stricta* Sedge: E/+/- (7/20). This widespread eastern species had been reported from few sites in Kentucky before the DBNF inventories. It has now been found along most of the rivers in the southern Cliff Section, always rooted in water or wet ground in a transitional zone between *Justicia* (water willow) and the grassy vegetation on open rocky banks. In the Stearns District, it was found to be particularly frequent along the Little South Fork, and it has also been found along the Big South Fork, Roaring Paunch Creek and the Cumberland River. The plants along these rivers may be *C. stricta* var. *elongata* [= *C. emoryi*], or at least transitional between this and var. *stricta*. Another small population was found in a quite different environment--the Barren Fork streamhead area, in a small brushy opening (see Significant Areas). These plants, forming much larger tussocks, are var. *stricta*, which is known from only one other area in Kentucky, the Calloway County seeps (Woods & Fuller 1988).

*Carex tenera* Sedge: E/-/- (4/4). There are only four records of this northern species in scattered parts of Kentucky, all from wet bottomland woods or thickets. The Ovales section of *Carex* is complex and species are difficult to identify, and all the Kentucky collections need further study. The single collection made during 1989 is from a small, brushy red maple woodlot near Wolf Creek (S of Williamsburg). The other three records are from bottoms between the Knobs of Bath and Montgomery Counties, and from Ballard County.

*Castanea pumila* Chinquapin: E/+/- (7/10). In Kentucky, this southern species is largely restricted to the Cumberland Mountains, with a few old records disjunct to the west. There is one old record from the Stearns District, a 1935 Braun collection from "Yahoo Ridge". Also, during 1989, a sapling found on a small stream terrace near Isham was tentatively identified as this species. These are the only known collections from the Cliff Section in Kentucky. It is likely that this shrubby species, which is typical of dry openings further south, grew in burnt areas, and was more frequent, before the modern era of fire-suppression.

*Ceanothus herbaceus* Redroot: E/S/- (3/6). This Great Plains species was previously known from only one locality in Kentucky, along the Rockcastle River. During this inventory, it was also found at one site along the Little South Fork of the Cumberland River, on a well-drained cobble bar with abundant *Andropogon gerardii*. In this section of the stream, limestone bedrock is most frequently exposed on the banks, as opposed to unconsolidated cobbles and boulders.

*Chrysogonum virginianum* Green-and-gold: E/+/- (1/1). This southeastern species has been found at only one site in Kentucky. This site is along the Big South Fork between Bear Creek and Big Shoals, in lower slope forest near the *Aconitum* population (see above). Several patches have been found in this area.

*Cladrastis kentukea* Yellow-wood: -/S/- (11/>50). This east-central species is known from several areas of Kentucky, but it is rare except on rocky limestone slopes along the Kentucky River in the Inner Bluegrass and along the Cumberland River system in the southern Cliff Section. In the Stearns District, it was found at about five sites along the Little South Fork, on low limestone slopes. The population here was sparse, and the observed trees were no more than 10 (or rarely 20) cm dbh. This species has also been found at six localities in the Jellico Mountains (Rugged Eastern Area). At some sites, trees up to 25-50 cm dbh were seen, mostly on the steepest upper slopes or in small gullies, with N- to E-facing aspects. The best population was in Staniford Hollow, with at least 30 trees seen in a small portion of the whole area. In one spot, 10 trees were seen along 100 m of the upper slope level with small, broken cliff. Saplings and seedlings were found to be frequent near these trees and on lower slopes. At other sites in the Jellico Mountains, the populations were much smaller, with only 1-5 trees seen.

*Cleistes divaricata* Spreading Pogonia: S/+/- (11/21). In Kentucky, this southern species is known only from the Cliff Section and the Cumberland Mountains, generally in open pine-oak woods or adjacent clearings. Except in a few open areas, populations are generally small, often with just single plants observed. During this survey, it was found at four sites, each with only 1-2 non-flowering plants. The only other record is a 1935 collection of Braun (her catalogue). The sites were in pine-oak forest on upper S-SW-facing slopes, or moister forest with hemlock near cliffs, or near small streamheads. In some cases the plants were next to small trails. This is probably another species that was formerly favored by a fire-regime.

*Clematis glaucophylla* Leather Flower: E/+/- (6/16). This southern taxon has been reported from a few scattered areas of Kentucky, though it may have been often confused with *C. viorna*. Its pubescence and leaf texture are distinct from *C. viorna*, which occurs typically on limestone. *C. glaucophylla* was found along most of the larger streams and rivers, especially on or near rocky, sandstone banks. Along the more calcareous banks of Little South Fork, more hairy plants

were found, which may be typical *C. viorna* or intermediates. Slightly hairy plants were also found in a few places along Rock Creek (of Big South Fork) and Roaring Paunch Creek. *C. glaucophylla* was found mostly in thickets on lower slopes in open floodplain woods and at the back of boulder-cobble bars. A particularly large population was found in cut-over yellow poplar-sweetgum forest on the Marsh Creek bottom near the mouth of Clear Creek.

*Comptonia peregrina* Sweet Fern: E/S/- (2/2). This northern species is known from only two sites in Kentucky, along the Rockcastle River and, in the Stearns District, along the Big South Fork. The Big South Fork site is at the back of the large cobble bar at Big Shoals, in the brushy transition from open grassy vegetation to the lower slope forest. The single patch here, probably consisting of one clone, has only 5-10 large stems.

*Conradina verticillata* Cumberland Rosemary: E/-/C1 (1/11). This species occurs only along the Big South Fork and a few other rivers cutting through the Cumberland Plateau in Tennessee. In Kentucky, it has been found at 11 sites along the Big South Fork, though two of these sites were lost due to impoundment (Braun 1943). It grows among boulders or cobbles in the open, with such species as *Andropogon scoparius*, *A. gerardii*, *Solidago spathulata*, *Liatris microcephala* and *Tephrosia virginiana*.

[*Corallorhiza maculata* Spotted Coral-root: E/-/- (1/1). In Kentucky, this widespread northern species is known only from one site in the Cumberland Mountains. During 1989, a group of three plants that were probably this species were found 500 ft south of the Kentucky-Tennessee State Line. The plants were in an immature flowering stage (July 7), growing on a sandy bottom of Isham Creek, in washed out ground with *Quercus alba*, *Acer rubrum*, *Liquidambar*, *Carex debilis* and *Panicum xalapense*.]

*Coreopsis pubescens* Downy Coreopsis: S/+/- (3/20). In Kentucky, this southern species is known from a few localities in the southwest and southeast, especially along river banks in the Cliff Section. It has been found at over 15 sites along the Big South Fork and Roaring Paunch Creek, and a few sites were found during 1989 along Rock Creek (of Big South Fork), Marsh Creek and near Clear Fork of the Cumberland River. There also are some old records from the Cumberland River itself, but plants could not be relocated here during 1989. Most records refer to only 1-10 plants, but in a few places up to 100 or more were seen. The sites were generally in grassy to brushy thickets at the back of boulder-cobble bars, or on sandy banks in open forest near the upper limit of flooding. One of the largest populations was in an old abandoned bottomland field along Roaring Paunch Creek, with much *Solidago* spp., *Panicum clandestinum*, *Cirsium muticum* and *Rhus glabra*.

*Cypripedium kentuckiense* **Kentucky Lady's Slipper: S/S/C2 (11/25)**. This southern to southwestern species is recorded from 11 counties in Kentucky and at least one in Tennessee, all along medium-sized sandy streams in the Cliff Section. It is also known from scattered sites in Alabama, Arkansas, Louisiana, Mississippi, Oklahoma and Texas. In the Stearns District, it has been found only along Roaring Paunch Creek, where a total of over 100 plants, mostly in groups of 10-20 were seen between its mouth and the Kentucky-Tennessee state line. The banks of this creek may be suitable due to their relatively low height above the water level, typically about 1-2 m. In contrast, Marsh Creek, which appears to have similar habitat in many respects, may have banks too high and dry, typically about 2-3 m. The most frequent associates included *Betula nigra*, *Liquidambar*, *Alnus*, *Xanthorhiza* and *Solidago rugosa*.

*Cystopteris fragilis* var. *mackayi* [better named as *C. tenuis*, see Moran 1983] **Mackay's Fragile Fern: S/+/- (10/27)**. In Kentucky, this northern species is known from western and eastern areas with sandstone cliffs. During this survey, this taxon was found at only four scattered sites, all in rockhouses in the Big South Fork watershed.

*Deschampsia flexuosa* **Hair Grass: S/+/- (3/4)**. This northern (circumboreal) species was previously known in Kentucky from only one area, in the Cumberland Mountains. During this inventory, it was found along half a mile (0.8 km) of W- to SW-facing cliffline above Rock Creek. It was found in somewhat open pine-oak woods on dry, sandy soil 0-3 m out from the dripline below the overhanging cliffs.

*Dichanthelium acuminatum* var. *villosum* [= *Panicum villosissimum*] **Panic Grass: S/+/- (17/>30)**. This widespread eastern taxon has been found at too many sites during the DBNF inventories to be considered important in a rare species survey (see also Palmer-Ball et al. 1987, Campbell et al. 1988). It grows mostly in bare, dry, sandy soil with no shade. During this inventory, several more sites were found, mostly along paths and roads, and occasionally in natural openings near cliffs.

*Dichanthelium sabulorum* [according to Kartesz & Kartesz (1980), this includes *Panicum columbianum* var. *thinium*, which the plants here key to in existing manuals] **Panic Grass: S/+/- (7/>30)**. This north-central species has also been found at too many sites during the DBNF inventories to be considered further. It occurs in similar places to *D. acuminatum* var. *villosum*, but more often on natural rocky openings, as opposed to disturbed areas.

*Erigeron pulchellus* var. *brauniae* **Lucy Braun's Robin Plantain: S/+/- (9/25)**. This glabrous variety of the common species is virtually restricted to the Cliff Section, and most of its records come from Kentucky, on riverbanks near the upper floodplain limit in partial shade. During this survey, it was found at several sites

along the Little South Fork, Big South Fork, Rock Creek, Roaring Paunch Creek, Marsh Creek and the Cumberland River. Patches appeared to be scattered more or less continuously along the most rocky sections of these larger streams.

*Eupatorium luciae-brauniae* **Lucy Braun's White Snakeroot:** E/S/C1 (5/30). This species is restricted to sandstone rockhouses in the Cliff Section of Kentucky and Tennessee, with about 40-50 sites known in total. Ten populations are now known in the Stearns Ranger District, and much more suitable habitat remains to be explored. These sites are scattered in the most rugged areas draining into the Big South Fork; only one site is in another watershed, Indian Creek to Cumberland River. Unlike the Somerset District, where most sites are along the Cumberland River, most sites in the Stearns District are along small to medium-sized tributaries of the major rivers. Only one locality (with two nearby rockhouses) was found on the immediate slopes of the Big South Fork, though most of the Big South Fork cliffline has not yet been explored. As in the Somerset District, all populations were in forest which was dominated by deciduous species, and which was generally rather open along the cliffline, so that the rockhouses were relatively well-lit. There was no significant concentration on any particular slope aspect. The soil is generally sandy and moist to damp. None of the populations have been greatly damaged by human disturbance, though trampling (perhaps by deer) was observed at one site.

*Euphorbia mercurialina* **Spurge:** E/-/- (3/6). In Kentucky, this southeastern species is known from a few sites in the Highland Rim and the adjacent Cliff Section. It has been found on or near calcareous bedrock in moist or rather dry woods, often near openings and dirt roads. Two records (one from 1989) are from the Stearns District, on lower slopes close to boulder-cobble bars along the Big South Fork. Only 2-10 plants were seen in each case.

*Gaylussacia brachycera* **Box Huckleberry:** S/+/3C (5/>100). In Kentucky, this Appalachian species is known only in the southern Cliff Section. It is common here, and locally abundant in suitable habitat, i.e., dry upper slopes and ridges with pine-oak forest, especially in more dissected areas above sandstone clifflines (see Palmer-Ball et al. 1987). In the Stearns District, it has been found at over 30 sites in the Big South Fork watershed and a few in the Indian Creek and lower Marsh Creek watersheds, both tributaries of the Cumberland River. In several areas, it was found to cover many acres. Because of the large number of sites added by the DBNF inventories since 1987, this species will be removed from the KAS-KSNPC list.

*Gratiola pilosa* **Hedge Hyssop:** E/S/- (2/4). In Kentucky, this southern species has only four records, all from the southern Cliff Section. It grows in wet ground, near naturally open seeps or ponds. Three of the records are from the Stearns District: a 1941 record from the Big Creek streamhead area (see Significant

Areas); a 1980 record ("very rare") from the Cumberland River banks at Pitch Rapids; and a ca. 1980 record from the edge of a pond in an abandoned upland field south of Barthell (near the *Tephrosia spicata* site--M. Medley, pers. comm.). Plants could not be relocated at the first two sites during 1989, and the third was not searched for.

*Gymnopogon ambiguus* Beardgrass: S/+/- (6/11). This southeastern species is known from scattered sandy areas in southern Kentucky. There is only one record from the Stearns District, a 1934 Braun collection from sandy banks of the Big South Fork, probably opposite the mouth of Alum Creek. Despite much field work along this river since then no more plants have been found. However, this species is a relatively inconspicuous grass, and may be easily overlooked.

*Helianthus atrorubens* Sunflower: E/S/- (5/>50). In Kentucky, this southeastern and Appalachian species is known only from sandy soils in the Cliff Section and the less dissected uplands just east of the most rugged valleys. At least 30 sites are now known in the Stearns District, mostly along roads and occasionally in young open woods or along dirt roads in woods. Unlike most other southeastern species in this region that grow in upland openings, this species appears to be relatively successful in the modern disturbance-regime, without frequent fires. It is locally dominant with grasses along roads, often with no exotic species present, so that such areas may resemble the putative "barrens" or "savannah" that may have been previously maintained by fire. The much rarer *Lilium philadelphicum* grows in similar places (see below).

*Hexastylis contracta* Heart-leaf: S/-/C2 (1/3). This species is known only from the southern Cliff Section in Kentucky and Tennessee, and from a few sites in the Blue Ridge of North Carolina (Kral 1983). All verified Kentucky records are from the Stearns District in the Big South Fork watershed, along Rock Creek (2 sites located in 1989), the Big South Fork itself (1934 Braun collection, perhaps opposite Alum Creek) and Smith Fork of Roaring Paunch Creek (1989 discovery). The Rock Creek sites were found on sandy terraces in young forest or at forest edges along the road. The largest patch was found in forest dominated by young *Pinus virginiana*, with understory of *Tsuga*, *Kalmia* and *Carex lucorum*. The Smith Fork plants were found on a small stream terrace above the cliffline and on slopes nearby. Again the forest was largely evergreen, with much *Pinus virginiana*, *Tsuga*, *Kalmia*, *Gaylussacia brachycera* and *Mitchella*. In both areas, a few abnormal plants were found that might be hybrids with the widespread *Hexastylis arifolia*, which tends to occur in forest with a lower abundance of evergreen species.

*Hypericum stans* St. John's Wort [corrected in Kartesz & Kartesz (unpublished) to *H. crux-andreae*, St. Andrew's Cross]: S/+/- (8/8). In Kentucky, there are scattered records of this southern species from south-central areas, all seasonally wet grassy openings on acid soils. There is only one record from the Stearns

District, a 1940 collection (Rogers 1941) from the "edge of the Dr. Wherry Bog...Rare" (see Significant Areas). This species may have been favored by fires.

*Liatris microcephala* Blazing-star: S/+/- (2/>50). In Kentucky, this southeastern to Appalachian species is known only from McCreary County and southern Pulaski County, but it is fairly frequent in suitable habitat. It has been found at more than 30 sites in the Stearns District, mostly on ledges above sandstone cliffs or along other outcrops on narrow ridges (as described in Palmer-Ball et al. 1987). It has also been found at several sites among boulders and cobbles along some of the larger streams: the Big South Fork and, locally, Roaring Paunch Creek and Marsh Creek. Along the Big South Fork, it is locally dominant with *Andropogon scoparius* and *Solidago spathulata*. In contrast, there are no records from riverbanks in the Somerset District.

*Lilium philadelphicum* Wood Lily: S/+/- (8/12). In Kentucky, this species is known only along the Cliff Section, all as the Appalachian var. *philadelphicum*. Several populations have disappeared in the past 10-30 years. In southern counties, the species appears most often at the brushy edges of successional forest (with *Quercus* spp., *Acer rubrum*, *Pinus* spp., etc.) along roadsides on sandy ridges. In the Stearns District, it was found in 1989 along KY 92 on Wolf Ridge (3 plants, and one previous site not relocated), KY 700 near Sand Hill (at least 15 plants), and along a gravel road near Duckrun (only two plants). There is also a 1940 record from "dry pine woods at Barren Fork" (Rogers 1941), presumably near Flat Rock. This is probably another species that was formerly more frequent, and mostly in openings caused by fires.

*Lobelia nuttallii* Nuttall's Lobelia: T/-/ (3/6). In Kentucky, this southeastern species is known from a few sites on less dissected uplands just east of the Cliff Section and on bottomlands further east on the Cumberland Plateau. There are three records from the Stearns District. Two are records of Pennell in 1927-1936 from Pine Knot and "Wherry Bog" in McCreary County (McVaugh 1936, Rogers 1941). The other is a new discovery in 1989 on the Wolf Creek bottom in Whitley County, in a young forest dominated by *Liquidambar* and *Acer rubrum*, with some *Quercus phellos*. Major associates included *Lygodium*, *Chasmanthium laxa* and *Solidago rugosa*; *Xyris torta* was also present. In addition, it was found during 1989 in a wet, bottomland meadow near the Roaring Paunch Creek in Tennessee, a quarter mile south of the state line.

*Maianthemum canadense* Canada Mayflower: T/S/- (4/11). This northern species was known only from the Cumberland Mountains and Red River Gorge (Campbell et al. 1988) before this inventory. In the Stearns District, it has been found at two sites along Marsh Creek, each with at least 50-100 plants. These sites are on low slopes just above the floodplain, with frequent *Tsuga*, *Rhododendron* and some deciduous trees. Frequent herbs included *Viola blanda*, *Mitchella*, *Hexastylis arifolia*, *Medeola*, *Carex lucorum* and *Thelypteris*.

*Malus angustifolia* Crab Apple: S/+/- (6/20). This southern species is reported from scattered non-calcareous areas of Kentucky in the west and southeast. Collections need to be examined critically in comparison with the closely related, more northern species, *Malus coronaria*. There may be much intergradation, with some intermediates matching *M. coronaria* var. *lancifolia*. In the Stearns District, *M. angustifolia* or intermediates were found in at least 10 localities, mostly along roads and in young woods on uplands of the Cliff Section. Less often, it has been found on rocky riverbanks, or on bottomland thickets extending into the Rugged Eastern Area. It appears to be more common here than in the Somerset District.

*Marshallia grandiflora* Barbara's Buttons: E/S/C2 (1/7). This species is restricted to the banks of a few rivers in the Appalachian Region. In Kentucky, it has been found at seven sites along the Big South Fork, all in the Stearns District. One of these sites was lost due to the impoundment after 1950. Only 1-15 plants have been seen at each site. The sites are all on open boulder or cobble bars, generally in the grassy areas with *Andropogon* spp., but near the brushy upper edges. *Conradina* also occurs at some sites, or nearby.

*Minuartia glabra* [commonly known as *Arenaria glabra*.] Sandwort: E/+/- (3/10). In Kentucky, this Appalachian species is known from a few sandstone outcrops in the southern Cliff Section and the Cumberland Mountains. In the Stearns District, it was found in two areas. One consists of several rocky openings scattered above a quarter-mile of cliffline at the head of Railroad Fork (see Significant Areas). The other site is a clifftop near the head of Oil-Well Branch of the Big South Fork. Both areas have unusually flat outcrops, so that water does not drain as rapidly as normal on clifftops. These two areas are also the only areas where *Crotonopsis elliptica* was found in the District.

*Monotropis odorata* Sweet Pinesap: T/S/- (4/7). In Kentucky, this Appalachian species was previously known only from the Cumberland Mountains and Red River Gorge. In early 1989, Gloria Nielsen (USFS) found a few plants on the east end of the Barren Fork ridge (north of Barren Fork) in a plantation of *Pinus echinata*. This species is a saprophyte or parasite associated with pines. Since it flowers in March-May and then disappears, it may often be missed in botanical surveys.

*Oenothera linifolia* Thread-leaved Sundrops: T/-/- (4/4). In Kentucky, this southeastern species was previously known from three records in western Kentucky. It typically grows on dry, sandy soils in natural openings, and is another species that may have been favored by fire. In the Stearns District, it was found at one site on a flat sandstone outcrop by a road above the Salt Branch of the Big South Fork. The population contained only 20-30 plants, scattered within 1-2 square meters. It was growing with lichens, mosses, *Hypericum gentianoides* and grasses; a small population of *Talinum teretifolium*

was found nearby.

*Oenothera perennis* **Small Sundrops:** E/-/- (3/3). In Kentucky, this north-central species is known from a few sites scattered over the south, with only one post-1950 record. It appears to have grown in dry or wet natural openings, and it may have been another species that formerly grew in burnt areas. In the Stearns District, it was collected in 1935 (June 15) by Braun (No. 965) along the Alum Creek Road (KY 700), in "dry soil, open woods" (Braun 1943). Judging from collection labels, this site was probably on a ridge, close to the site with *Schwalbea americana* (Braun No. 967, see below). Neither species has been subsequently reported in the region.

*Orontium aquaticum* **Golden Club:** T/S/- (4/20). In Kentucky, this southern species is known only from the southeast, growing with few other plants in shallow water along the banks of rivers and larger creeks. In the Stearns District, about 15 patches have been found. In the Big South Fork, there are a few records from the 1980s, but almost none of these plants could be relocated here in 1989, perhaps due to temporary damage from the frequent flooding in that year. It has also been found along Roaring Paunch Creek (several colonies seen in 1989), Marsh Creek (several colonies found in 1989), Jellico Creek (a 1985 record, could not be relocated in 1989), and the Cumberland River (one 1980 record, not relocated in 1987-89). Apparently some tributary streams have much larger populations than the rivers.

*Pachistima canbyi* [perhaps properly spelled *Paxistima c.*, see Uttal (1986)]  
**Mountain Lover:** E/S/C2 (7/10). This Appalachian species is known only from limestone regions in Pennsylvania, West Virginia, Virginia, Ohio, Kentucky and Tennessee. In Kentucky, it is known from a few localities, mostly less than one acre, on narrow, rocky points in or near the Cliff Section. One site has been found in the Stearns District, at its NW corner by the mouth of the Little South Fork. This site has already been described by Palmer-Ball et al (1987).

*Panax quinquefolius* **Ginseng:** -/S/- (50/>100). This north-central species is known from many areas of Kentucky, but it has become increasingly hard to find due to the intensive harvesting that has occurred since settlement. During this survey, it was found at only five sites, with 1-3 plants seen in each case. There are also three older collections documented at KSNPC. In general, plants have been found on slopes with moist, fertile soil in deciduous forest, especially the yellow-poplar type. It was reportedly widespread in the Jellico Mountain region on N-facing slopes, and a diligent search in suitable habitat may still produce a few plants today. However, recently built logging roads in this area have led to rapid declines (according to Paul Campbell of Campbell's Grocery on KY 92 at Jellico Creek). It is probably rarer on the Cliff Section, which generally has less fertile soils, as also suggested by the few plants found in the Somerset Inventory (Palmer-Ball et al. 1989).

*Parnassia asarifolia* **Ginger-leaved Grass-of-Parnassus:** E/+/- (1/6). In Kentucky, this southern Appalachian species is known from only 5-6 localities in Kentucky, all in the Stearns District. It is restricted to narrow, forested stream bottoms in the less dissected uplands, mostly just east of the major ravines in the Cliff Section. It was generally found in moss 0-3 m from the streambanks, with patches of 10-50 plants. Major associates included *Acer rubrum*, *Thelypteris*, *Lorinseria* and *Carex* spp.

*Philadelphus hirsutus* **Mock Orange:** E/+/- (6/>35). This southeastern interior species is known only from a small south-central section of Kentucky, on rocky limestone slopes of the Cumberland River system, but it is frequent within suitable habitat. In the Stearns District, it has been found only along the Little South Fork, and some tributary valleys. At least eight locations for this species were found, and it is probably scattered more or less continuously along more rocky sections of this stream.

*Philadelphus inodorus* **Mock Orange:** E/+/- (3/12). In Kentucky, this Appalachian species has been reported in the wild (excluding probable escapes from cultivation) only from rocky limestone slopes of the Cumberland River system. It generally occurs in moister sites than *P. hirsutus*. Although it has been found at a few sites in the Somerset District, there is only one record from the Stearns District, a 1935 Braun collection from the "valley of Yahoo Creek" that was initially identified as *P. hirsutus*. Presumably, this was from calcareous exposures at low elevation. There are no other records of *Philadelphus* spp. from the Big South Fork valley (above the mouth of the Little South Fork).

*Platanthera cristata* **Crested Fringed Orchid:** E/+/- (1/7). This southeastern species is known from only seven sites in Kentucky, all in the Stearns District on stream bottoms in less dissected uplands of the Cliff Section. Most sites are forested, though generally young or brushy. It typically grows in moss (especially *Sphagnum*) or in slightly washed out places on the immediate banks of streams, together with the usual ferns, sedges and other species of these streamheads. Only 1-6 plants have been found in most cases, except for one population next to an artificial pond, where about 20-30 plants were seen in 1985-1989 (only 19 in 1989). At the former "Wherry's Bog" site (see Significant Areas), 10-20 plants were observed in 1980 and 1987, but none could be found in 1989. This decline may be related to the increase in shade by trees and brushy vegetation at the site.

*Platanthera integrilabia* **White Fringeless Orchid:** E/S/C2 (3/9). Most records of this southern to Appalachian species are from the Cliff Section of Tennessee, and there are scattered sites in Mississippi, Alabama, Georgia and the Carolinas. In Kentucky, there are only three currently known localities (each with 2-4 patches), plus two old records, all from the southern Cliff Section and mostly in (or near) the Stearns District. After many searches during this survey, it was found only

in two localities: near the Barren Fork-Big Creek watershed divide, and near the Pine Knot Job Corps Center (see Significant Areas). About 100-200 plants were found at the Barren Fork-Big Creek site, in three separate streamheads. About 100 were seen in flower, mostly in a small wet natural opening where two small draws come together. One patch had been browsed by deer, as also found in the Somerset District (Palmer-Ball et al. 1988). At the Pine Knot site, the plants were found in two streamheads, one recently clearcut with about 60 plants all in flower, and the other forested, with about 15 plants and only one flowering. In the 1930s it was also "abundant" at the "Wherry Bog", but the population has disappeared at this disturbed site (see Significant Areas). The Kentucky sites for this species are all on acid, mossy stream banks in less dissected areas, though apparently not in the flattest areas; adjacent slopes are generally 20-30 degrees. (Other *Platanthera* spp. in this region often occur in more washed out places with soil exposed.) The nine individual watersheds with extant populations are only 5-20 acres in size. All watersheds are entirely under USFS forestry management, though with a stand age no greater than 20 years. It is possible that human disturbances such as eutrophication, siltation, grazing and clearance have reduced the extent of this species. Associates include ferns, sedges and other herbs typical of the streamhead environment.

*Podostemon ceratophyllum* Riverweed: T/+/- (10/20). This Appalachian species has been found in several central and eastern areas of Kentucky, growing on rocks in the rapids of rivers and creeks. Most records are old, and only two streams are currently known to have large populations. Water pollution may account for much of its apparent decline (Meijer 1976). One of these streams is the Big South Fork, in the Stearns District. Four populations were found in 1989; these were restricted to the largest rapids upstream of Bear Creek. Its apparent absence between Bear Creek and the upper impoundment limit near Blue Heron, despite some suitable rapids, suggests that poorer water quality in this more intensively mined section may have been a problem. One small patch was also found in Roaring Paunch Creek, a large tributary of the Big South Fork that has relatively poor water quality. There are 1939-1940 records from the Cumberland River: "on rocks near brink of falls" (Braun No. 2623); "growing on rocks in swift water above Cumberland Falls" (Rogers 1941). These plants have not been reported subsequently and there are no other records from this river, which currently has relatively poor water quality.

*Polygala cruciata* Cross Milkwort: E/+/- (5/5). This southern species is known from a few, generally old records in Kentucky (as var. *cruciata*), mostly on flatter ground either side of the Cliff Section. The most recent records were about 1980 near Clay City, 1987 in Casey County (B. Hoagland, pers. comm.). In the Stearns District, there is only a 1940 record from "moist, sandy, boggy soil in [edge of] Wherry Bog" (Rogers 1941), an area which has been greatly disturbed and grown up in recent years (Significant Areas). This species typically grows in open places, wet pine savannahs or boggy places. Possibly, fire in dry seasons

formerly favored this species in Kentucky; or is it a sporadic invader since settlement?

*Polygala polygama* **Purple Milkwort:** E/S/- (1/6). In Kentucky, this northern and Coastal Plain species has only six records, all from the eastern edge of the southern Cliff Section along roads in the Stearns District. Most sites are on the upland ridges, but one is on a bottom along an upper section of Roaring Paunch Creek. It was found only in the open or at the edge of woods. Although native grasses, legumes and composites generally predominated at these sites, some sites had exotics like *Festuca arundinacea*, *Trifolium pratense* and *Chrysanthemum leucanthemum*. This may be another species that was favored by fire, though it appears to do relatively well in the modern roadside disturbance-regime.

[*Rhynchosia tomentosa* **Erect Rhynchosia:** E/-/- (3/3). This southern species is known from only three localities in Kentucky, in the southwest (Christian and Warren Cos.) and southeast (Whitley Co.). The latter record is from the 1940s along KY 92 east of Cumberland Falls, where it cannot be found today. It was also found in 1989 about one mile south of the Kentucky-Tennessee state line, on the open cobble bar of Big Island in the Big South Fork. This species typically grows in dry, sandy open woods and grasslands, and may have been another species that typically grew in burnt areas.]

*Rhynchospora globularis* **Grass Beak Rush:** E/+/- (5/7). This southern species is known from a few areas of Kentucky in the southwest and southeast, in various types of seasonally wet ("xerohydric") openings on acid soils. During this survey, it was found at two upland sites in or just east of the Cliff Section. One, with few plants, was in a wetter part of the sandstone outcrops at the head of Railroad Fork (with *Minuartia glabra* nearby). The other, with 20-30 plants, was in a small ridgetop depression within young pine woods near Duckrun (near *Lilium philadelphicum*). Both sites are described further in the Significant Areas section. In general, the vegetation here was open forest dominated by *Pinus* spp., but some components of seasonally wet vegetation occurred nearby, e.g., *Calamagrostis cinnoides*. A few plants were also found at the forest edge in seeping cracks on the sandstone shelf adjacent to Pitch Rapids of Cumberland River.

*Sabatia campanulata* **Rose Pink:** E/-/- (2/3). In Kentucky, this southern and east-coastal species is known from only three old records on flatter ground just east or west of the Cliff Section (most recently with *Polygala cruciata* in the 1970s near Clay City). It typically grows in open seasonal wetlands. One old record is from near the southeastern corner of the Stearns District, a 1933 collection of Braun from Kentucky "near Jellico". Braun (1943) noted the habitat as "grassy fields on white clay of wet flats, with red maple, willow oak and sour gum."

[*Salvia urticifolia* **Sage:** E/+/+ (4/4). In Kentucky, this south-central species has

a few records, mostly from the Mississippian Plateaus. In 1988, a few plants were found along an old dirt road through oak woods near the mouth of Copper Creek, close to the South Fork of Cumberland River, a few miles north of the Stearns District. This record should be appended to the Somerset District Inventory, and the species should be looked for further along the western edge of DBNF.]

*Schwalbea americana* Chaffseed: E/S/C2 (1/2). This species is restricted to the Coastal Plain from New England to Texas, except for a few old collections in Tennessee and Kentucky. In Kentucky, it is known only from two 1935 collections of Braun from sandstone flats and knobs, in the Somerset and Stearns Districts (Palmer-Ball et al. 1987). The latter was from a "sandstone knob" along the Alum Creek Road (KY 700). The species has still not been rediscovered in Kentucky. Perhaps the most likely hypothesis to explain its disappearance is that is dependent on fire, which is now generally suppressed.

*Scleria ciliata* Nut Rush: E/-/ (3/4). This southeastern species has been recorded in three scattered sites from southwest to southeast Kentucky. It typically grows in open ground or pinewoods on sandy or boggy, dry to seasonally wet soil. The only southeastern record before this survey was a 1935 Braun collection (No. 1011) from banks of the South Fork, probably near Yahoo Creek judging from other collection numbers. In 1989, A. Risk found one clump on an open, grassy boulder-cobble bar west of Barthell.

*Scutellaria leonardii* Small Skullcap: S/-/ (12/13). This mid-western species is known from at least 12 Kentucky counties, mostly on limestone in the west. It is typical of rocky prairies and cedar glades. In 1989, it was found at one site near the western edge of the Stearns District in an unusual area of eroded Mississippian shale (Pennington Formation) on a saddle. A similar eroded area (shown by Byrne et al. 1970) occurs on another saddle further north. In both cases, the forest was open for about half an acre, mostly with small trees of *Juniperus* or *Pinus virginiana*. Although human disturbance may have contributed to these openings, they may have a natural origin. The one with *S. leonardii* had seeps where deer tracks were frequent. Possibly, deer and other animals crossing these saddles and visiting licks for a long time have caused this erosion. Another site with *S. leonardii* was found 2 miles west of the District on a limestone outcrop along KY 92.

*Silene regia* Royal Catchfly: E/-/C2 (4/12). In Kentucky, this south-central interior species is known mostly from the former Big Barrens region. In the Stearns District, there is also an old record (with three collections reported) from "edge of sandy field by South Fork River at Alum Creek" (Rogers 1941). However, these collections have not been reexamined and the species has not relocated in this region. These collections were not cited in King's (1983) paper on the species. Based on data from elsewhere in Kentucky, it would more likely have

occurred in the limestone valleys along the western edge of the Stearns District.

*Solidago rupestris* Goldenrod: E/-/- (15/20). In Kentucky, most records of this east-central species are from limestone banks of the Kentucky River. However, it has probably been overlooked along other limestone streams further south, since it has been recently discovered along the Green River and, during 1989, along the Little South Fork. It was found in the most rocky section of Little South Fork downstream of KY 92, and also upstream as far as the Parmleysville area. The upstream sites were atypical in that they were in streamside forest at the base of slopes rather than in open grassy vegetation on rocky banks. However, this alluvial streamside forest zone was no more than 2-3 m wide, and the typically associated grass in more open forest edges--*Chasmanthium latifolium*--was still present. The plants of *S. rupestris* were mostly not flowering in these shadier sites. The only other possible record from the District is a tentatively identified non-flowering collection made during 1989 on the banks of Jellico Creek.

*Solidago spathulata* [eastern plants separated as *S. glutinosa* by Ringius 1985] Goldenrod: S/S/- (4/20). As the eastern subspecies *randii*, this species is known in Kentucky only along sandstone banks of the Cumberland River and its major tributaries. It has been found at many sites along the Big South Fork in the Stearns District, and also at a few sites along Roaring Paunch Creek, Marsh Creek and the Cumberland River above the Falls. It is restricted to, but abundant in, the drier open zone among cobbles and boulders. As well as growing in sandy fill with *Andropogon* spp. and other species, it also grows by itself in cracks on boulders. The Big South Fork has particularly dense stands of *S. spathulata*, and, unlike the other streams, an abundance of *Liatris microcephala* and a predominance of *A. scoparius* over *A. gerardii* in many areas. Such features may be indicative of a relatively dry environment. Plants of *S. spathulata* from the Big South Fork are typical ssp. *randii*, with hairy seeds and relatively unbranched inflorescences, in contrast to plants along the Cumberland River and its other tributaries (M. Medley, pers. comm.). The latter plants, generally with smooth seeds and more branching, may be a distinct variety, possibly similar to *S. plumosa* from the Yadkin River in North Carolina, which has not been collected recently (Cronquist 1980, p. 122).

*Sphenopholis pensylvanica* [*Trisetum p.*] Swamp Oats: E/+/- (2/5). This southeastern species had only one Kentucky record, from the Calloway County seeps, before being found in 1989 at two sites in the Stearns District. One small patch was found in the Barren Fork streamhead, just above the main concentration of *Platanthera integrilabia*, and a few plants were found in a seeping area between a sandstone cliff and the road down to Bell Farm along Rock Creek. In both cases, there was partial shade, and it was associated with *Carex* spp. typical of sandy, small streamside, especially *C. prasina*.

*Spiranthes lucida* **Shining Ladies' Tresses:** T/-/ (7/7). In Kentucky, this northern species is known only from limestone streambanks along the western edge of the Appalachian Plateaus. The best known population is along the Little South Fork at the western edge of the Stearns District, where it has been seen along about one river-mile near Ritner Ford. This section has the greatest concentration of bedrock exposure along the river bank. The plants were found in muddy cracks of the bedrock within 1-5 m of the water's edge, often with *Eleocharis* spp., and mostly in the transition from the normal streamside with *Justicia*, *Saururus* and *Salix caroliniana*, to the slightly higher outcrops with *Physostegia*, *Baptisia* and *Andropogon gerardii*.

*Sporobolus clandestinus* **Dropseed:** E/+/- (6/7). This widespread eastern species is known from a few southwestern and southeastern sites in Kentucky. During this survey, it was found in two localities, each with 2-5 patches of 10-100 sq. m. Both were along roads on or near sandstone outcrops on moderately narrow ridges above tributaries of the Big South Fork. It was locally dominant or mixed with *Andropogon scoparius* and a variety of other native grassland species. In contrast, the only site found in the Somerset District was on limestone. However, the largest patches found in the Stearns District were on sandstone that had an unusual abundance of some calciphiles (see Significant Areas).

[*Taxus canadensis* **Canadian Yew:** S/S/- (6/15). In Kentucky, this northern species is known from limestone slopes in several parts of the northern Cliff Section. However, it is also known from one site further south in the Cliff Section. This site is below a sandstone cliff in Pickett State Park, Tennessee, about 2 miles south of the state line. It should be looked for on the Kentucky side.]

*Tephrosia spicata* **Goat's-rue:** E/+/- (2/7). In Kentucky, this southeastern species is known only from McCreary and Whitley Counties. Most records are from sandy banks of the Cumberland River near the Falls, just beyond the northeast corner of the Stearns District. Two more records, dated 1941 and 1980, are from ridges both sides of Roaring Paunch Creek near Barthell. This species was not seen in 1989, though an intensive search of the Barthell area was not attempted. This species grows in open areas, and it may be currently dependent on roadside disturbance where it occurs on the uplands.

*Thuja occidentalis* **Northern White Cedar:** S/+/- (5/16). In Kentucky, this northern species is known mostly from limestone slopes in the Cumberland River system. In the Stearns District it has been found only at two sites along the Big South Fork. The rocky banks at these sites are mostly sandstone, but some calcareous material also outcrops at low elevation (Pennington Formation). One site has a single tree growing on a (sandstone?) boulder in the river, and the other has about eight small trees on a boulder-cobble bar. Better habitat appears to exist along the Little South Fork, but, surprisingly, no *Thuja* was seen there.

*Trichomanes boschianum* **Filmy Fern:** S/+/- (17/ca. 30). This Appalachian species is scattered in eastern and western areas of Kentucky, but populations are always small and restricted to deep, dark, humid cracks in sandstone cliffs, especially within rockhouses. It is known from two sites in the Stearns District, all in ravines of the Big South Fork watershed--below Yahoo Falls, along a N-facing slope by Turkey Branch of Bear Creek. These populations were relatively large, with patches stretching along 10-20 m of cracks at the base of cliffs. Also, a gametophyte population that may be this species (or perhaps another member of Hymenophyllaceae) was found in a sandstone cave at the back of a large rockhouse north of the Big South Fork at Devil's Jump. With the results of both Somerset and Stearns District surveys combined, there are only four records from over 10 miles (16 km) of explored cliffline. This species appears to be slightly more frequent in the Stanton District (Campbell et al. 1989).

*Vallisneria americana* **Tape Grass:** S/+/- (4/15). In Kentucky, this widespread eastern species was previously known only from the Ohio River (two recently observed localities), Kentucky River (an 1830s record) and Collins Fork of Goose Creek in Knox Co. (two patches found in 1979). In the Stearns District, over 20 patches were found in the Little South Fork, and two small closely spaced patches were found in Clear Creek, a tributary of Marsh Creek. The Little South Fork patches occurred in 25-75 cm of water on more stony or gravelly bottoms, generally near riffles, though not in the most rapid areas. Although its diffuse upstream limit, near Parmleysville, may be determined by the size of the stream, its abrupt downstream limit near Ritner Ford is probably related to the influx of polluted water from the strip-mined Lick Creek tributary watershed. The small population in Clear Creek was growing on a sand-silt bottom in a rather narrow, rapid section. This species' apparent absence from Marsh Creek itself might be related to acidity or low nutrient status in this sandy section of the watershed. The relationship of this species to water quality deserves further study, since it appears to be especially sensitive to acidity or related features.

*Vernonia noveboracensis* **New York Ironweed:** E/+/- (3/6). This south-central species of wet, acid meadows is known from a few sites in the Knobs and southern Cliff Section of Kentucky (all as the relatively northern var. *noveboracensis*). The four Cliff Section records are all from the Stearns District, mostly along streamheads on the more undissected ridges just east of the most rugged areas. It was generally found in or near openings that appeared to have some natural origin (see Significant Areas). The associated meadows or thickets were composed almost entirely of native species, often with *Calamagrostis cinnoides*--another uncommon species (see above). A few plants were also found on the bottoms of Marsh Creek, including the thickety old meander with *Solidago patula* (see Other Species of Interest). This species does not appear to have spread much into cleared ground, though at two well-drained roadside sites, a few plants were found that appeared to be hybrids with its common old-field congener, *V. gigantea*.

*Viola tripartita* Yellow Violet: E/+/- (4/9). In Kentucky, this southeastern to Appalachian species is known from scattered sites in the Cliff Section, all as var. *glaberrima* except for var. *tripartita* in Carter County. It is known from only two sites in the Stearns District, in moderately moist, hemlock-beech to oak-hickory forest on NW- to NE-facing sandstone slopes near the Cumberland River and Roaring Paunch Creek. Although somewhat inconspicuous, and easily confused with *V. pubescens* (sensu lato), it does appear to be truly uncommon. However, it has a wide geographic and habitat range in the Cliff Section.

## Other Species of Interest, Including New Records for Kentucky

The following 68 species are not currently listed by KAS-KSNPC (Warren et al. 1986) or the Daniel Boone National Forest (B. Knowles, pers. comm.), though several deserve consideration for listing. The six species in square brackets [ ] were not found within the Stearns District, but were found within a few miles of the proclamation boundary; for other marginal records, see the Somerset District report. The eight species in parentheses ( ) are reported here tentatively and require confirmation. The six species shown by asterisks (\*) in the left margin have no previous, well-documented, published records in Kentucky. Other species have been reported widely in the state but with a low density of records, or they are restricted to small geographic sections but are locally common. Some species are more frequent in other parts of the state, but are near the edge of their range in the Stearns District and thus of special local interest. Not all these species deserve consideration for listing, but their presence still gives extra floristic interest to the areas where they occur.

After each species' name, the number of Kentucky counties where it is known is shown in parentheses, followed by the approximate number of individual records. These data can be compared with the data for listed species in the previous section.

Several species that were considered "of interest" in the Somerset District report are now known to be more frequent, at least in the Stearns District. Therefore, they are not listed below. These are *Asclepias amplexicaulis*, *Cardamine rotundifolia*, *Carex communis*, *C. grvida*, *C. laxiculmis*, *C. lucorum*, *C. projecta*, *C. purpurifera*, *C. striatula*, *Carya pallida*, *Cirsium muticum*, *Danthonia compressa*, *Geum virginianum*, *Ilex montana* var. *beadleyi* (doubtfully distinct from var. *montana*), *Panicum yadkinense*, *Rhododendron arborescens*, *Stewartia ovata*, *Stipa avenacea* and *Viola rotundifolia*.

*Acer pensylvanicum* **Striped Maple** (5/10?). In Kentucky, this northeastern species is known from the Cumberland Mountains, where it is locally frequent, plus a few sites along the Big South Fork within the Stearns District. The latter sites are near Devil's Jump and Bear Creek, with at least 100 plants (up to 3 m tall) scattered in two areas along N-or NE-facing slopes, and near the mouth of Huling Branch, with a few plants on a NW-facing slope. The plants were generally found in sandy soil on lower slopes in forest of *Tsuga*, *Fagus*, *Liriodendron* and typical associates.

*Anemone quinquefolia* **Wood Anemone** (10/40). This northern species is restricted to more rugged sections of the Cumberland Plateau. It appears to be rare, except in the Cumberland Mountains and the southernmost Cliff Section. Although it has been documented at only two sites in the Somerset District, it is known from over 10 sites in the Stearns District, mostly along the sandy terraces of major tributaries--Wolf Creek, Rock Creek, Roaring Paunch Creek,

Bear Creek, Marsh Creek and Jellico Creek (only two sites). Patches covering 10-100 sq. m. were found in several areas, generally at the upper floodplain limit, in forest with trees such as *Tsuga*, *Pinus strobus*, *Magnolia tripetala* and *Carpinus*, with patches of *Carex lucorum* on the ground.

*Aster laevis* var. *concinus* **Smooth Aster** (5/13). In Kentucky, this southeastern variety has been recorded almost entirely from the open, grassy sandstone banks of the Cumberland River and its major tributaries (Palmer-Ball et al. 1987). The plants along these rivers appeared to be distinct from var. *laevis* in 1987, especially along the Rockcastle River. However, the taxonomic distinctiveness of these plants appeared less clear in the Stearns District during 1989. The typical variety was often found in the same riverbank habitats.

*Aster puniceus* **Purple Aster** (6/6). In Kentucky, this north-central species is known from a few scattered sites in the Appalachian region and the Highland Rim. All known plants are var. *puniceus* except for one record of var. *firmus* (*A. lucidulus*) in Bell County. It generally occurs in wet bottomland thickets. One site was discovered in the Stearns District, along Clear Creek, a tributary of Marsh Creek in the Low Hills Belt. About five plants were seen here, some within a young bottomland forest dominated by *Liquidambar*, and the others, more vigorously flowering, at the edge of this forest near an old home site.

[\**Aster radula* **Scouring Aster** (1/1). This northeastern species is the diploid relative of *A. saxicastellii*, which is hexaploid. It has not been previously reported in Kentucky. The closest record is about 75 miles to the east in the Blue Ridge of western Virginia. The Kentucky site is one mile east of the Stearns District boundary, in young (20-30 year old?) forest on a high terrace of the Cumberland River at the mouth of Clear Fork. The population contained only about 10 plants, scattered along 30 m of a narrow transition from a seasonally wet area (with *Acer rubrum* var. *trilobum*, *Liquidambar*, *Q. phellos*, *Thelypteris noveboracensis*, *Chasmanthium laxa* and *Sphagnum*) to a low gentle slope (with *Pinus echinata*, *Ilex opaca*, *Kalmia*, *Vaccinium corymbosum*, *Lycopodium digitatum* and *Polytrichum*).]

*Aster saxicastellii* **Rockcastle Aster** (2/6). This species was discovered as new to science during the inventory of the Somerset District, where it has now been found along five miles of the Rockcastle River (Campbell and Medley 1989). During 1989, it was also found at five sites along the Big South Fork of Cumberland River (all in the National River and Recreation Area); four of these sites were in McCreary County, Kentucky, and one was in Scott County, Tennessee. The Big South Fork plants appeared similar to the Rockcastle River plants, but the frequent flooding of 1989 damaged many plants. Damaged plants tended to have more branching and narrower leaves, and flowering was observed earlier than in 1987 (beginning in mid-August). Their habitat was similar to those along the Rockcastle River; almost all plants were found in brushy

transition from grassy boulder-cobble bars to the adjacent slope forests. One patch was, however, found above the normal upper floodplain limit, at the back of a high terrace. Most plants occurred in areas with freshly deposited sand.

(*Aster schreberi* **Large-leaf aster** (5/ca. 10). The distribution of this northern species is poorly documented in Kentucky, because of infrequent flowering and confusion with the closely related *A. macrophyllus*, which is more widespread. It has been found at a few sites on moist, forested limestone slopes in the northern Bluegrass and along the Cliff Section. In the Stearns District, no plants were clearly identified as this species, but along the Little South Fork there are plants with the broad leaf sinus and white flower color suggesting *A. schreberi*, but the glandular condition suggesting *A. macrophyllus*.)

*Aureolaria pectinata* **Southern Yellow Foxglove** (ca. 8/10?). This southern species (perhaps conspecific with the northern *A. pedicularia*) has been found in scattered areas of southern Kentucky, mostly on the Mississippian Plateaus. The only record from the Appalachian region is a 1939 collection (verified by F.W. Pennell) of Rogers (1941) from "dry wooded bank of Bridge Fork Pond", which is southwest of Whitley City.

*Baptisia australis* var. *australis* **Blue False Indigo** (7/ca. 30). In Kentucky, this eastern variety is largely restricted to southeastern counties, while the southwestern var. *minor* is reported from three western counties. The only large populations known occur on short rocky sections of riverbanks in the southern Cliff Section. In the Stearns District, it has been found among sandstone boulders and cobbles throughout the unimpounded section of the Big South Fork, and on exposures of limestone bedrock along 3 miles of the most rugged, downstream, unimpounded section of the Little South Fork. It was locally abundant but always restricted to the open grassy zone with codominant *Andropogon gerardii* and various tubiflorous forbs.

*Bartonia paniculata* **Screwstem** (10/20). This southern and east-coastal species is scattered over southern Kentucky in seasonally wet acid forests. In the east, the few recorded populations have generally been small, but the species is easily overlooked. In the Stearns District, the only record are 1940-41 collections from a sphagnum "bog" or "swamp" in the Big Creek-Barren Fork streamhead area (see Significant Areas). It was not seen here or elsewhere in 1989, despite much searching along the acid, mossy streamheads where it would be expected.

\**Berberis canadensis* **American Barberry** (2/2?). There is no previous, well-documented report of this Appalachian-Ozarkian species from Kentucky, though it was recently reported from Calloway County (Woods and Fuller 1988). During 1989, A. Risk found one patch on slopes along the Big South Fork near Devil's Jump. The plants were growing on a forested slope a few hundred feet above the boulder-cobble bars, about half-way up to the old railroad bed.

(\**Carex angustior* Sedge (2/2?). This northern species has not been reported from Kentucky in the literature. A collection from Powell County (Univ. of Kentucky Herbarium) and a collection from McCreary County (seeping streamhead on W end of Chestnut Ridge, above Rock Creek) are tentatively identified as this species. However, section *Stellulatae* of *Carex* is taxonomically difficult, and the specimens need further study.)

\**Carex austro-caroliniana* Sedge (3/4). This southern Appalachian species was recently discovered for the first time in Kentucky by R. Thompson (pers. comm.). With reexamination of herbarium specimens and further exploration in 1989, there are now five known localities: along the Rockcastle River in The Narrows (Pulaski County) and the nearby tributary ravine of Rock Creek (Laurel County); in the ravines of Beaver Creek (of the Cumberland River); near Yahoo Creek and along Rock Creek (tributaries of the Big South Fork). The plants were all found in moist forest on steep slopes, from the base of sandstone cliffs down to streambanks. The forest was typically a mix of *Tsuga*, *Fagus*, *Acer saccharum* and associates.

(*Carex baileyi* [= *C. lurida* var. *gracilis*] Sedge (7/20). In Kentucky, this northeastern species is known only from the Cumberland Mountains and the Cliff Section. Records from the Somerset and Stearns District remain somewhat uncertain because of the close relationship of this species with *C. lurida*. Several collections may be intermediate. About five collections may reasonably be identified as *C. baileyi* or intermediate between this and *C. lurida*. These collections are mostly from forested streambanks in sandstone ravines and in streamheads on broader ridges.)

*Carex bromoides* Sedge (8/20). This widespread eastern species is known from a few scattered sites in Kentucky, on wet acid forested sites, mostly in the Cliff Section. In the Stearns District, it was previously not well-documented, but it is now known from about five sites, all in forests along small streams on the relatively undissected uplands just east of the most rugged Cliff Section. It was generally found in somewhat open forest on the wettest, most boggy sites. Some of the sites include other rare species typical of this habitat (see Significant Areas).

(\**Carex howei* Sedge (2/2?). This eastern species (absent W of Mississippi River?) has not been reported from Kentucky in the literature. A collection from Calloway County (at Murray State University Herbarium) and a collection from McCreary County (sandy banks of Marsh Creek during this survey) are tentatively identified as this species. However, section *Stellulatae* of *Carex* is taxonomically difficult, and the specimens need further study.)

*Carex pedunculata* Sedge (7/35). This northern species was first documented in Kentucky during the 1988 survey of the Stanton Ranger District, where it was

found to be locally frequent on steep slopes in moist forest on limestone and sandstone (Campbell et al. 1989). It was subsequently found at three localities in the southern Cliff Section: Rock Creek of the Rockcastle River (London District, R. Thompson, pers. comm.); Cooper Creek of the South Fork (Somerset District); and Rock Creek of the Big South Fork (Stearns District). Although it has probably been often overlooked in this region, it does appear to much less common than in the Red River Gorge (Stanton District).

\**Carex physorhyncha* Sedge (2/4). This southern species was recently identified from sandy "barrens" (native brushy grassland) in Hardin County, Kentucky (R. Cranfill, pers. comm.). In the Stearns District, plants which appear to be this species were collected in the open *Pinus virginiana* woods on Dobbs Hill, which has an unusual vegetation composition (see Significant Areas), and also along KY 700 northeast of Indian Creek. A common associate appeared to be *Phlox amoena*. There has been little work on the difficult section *Montanae* of *Carex* in Kentucky, and further records here and elsewhere in the state may result from reexamination of herbarium specimens.

*Carex scabrata* Sedge (7/ca. 15). In Kentucky, this northern species is known mostly from the Cliff Section. In the Stearns District, it has been found only at one site (S. Phillips, pers. comm.), on a sandy stream terrace near the mouth of Buffalo Branch of Rock Creek (of the Big South Fork). Comparison with results from Somerset and Stanton Districts suggests that this species becomes increasingly rare towards the south.

(*Carex styloflexa* Sedge (5/5). This southern species is reported from five Kentucky counties, in the Knobs and the Cliff Section. However, this species is not easy to separate from *C. gracilescens*, which occurs in similar habitat--sandy streamside forest. In the Stearns District, collections that appear to be this species were made on the banks of Roaring Paunch Creek and Marsh Creek, both above the most rugged sections of these creeks. Further work on section *Laxiflorae* section of *Carex* in Kentucky is needed to clarify the status of this species in the state.)

(*Catalpa bignonioides* *Catalpa* (2/4). This status of this southern species in Kentucky is not clear. It is sometimes planted as an ornamental and may occasionally escape from cultivation. However, this species has been found on streambanks in the sandstone ravine section of the Cumberland River and its major tributary in this section, Marsh Creek. Trees were found at low density, with no more than 10 flowering individuals spotted during a canoe trip down Marsh Creek to Cumberland Falls. Planted trees of this species were not seen in this region, and it is possible that these riverbank trees are truly native. However, further research on the distribution of this species within its documented range is needed to make a better judgement.)

[*Cimicifuga americana* Mountain Bugbane (9/20). In Kentucky, this Appalachian species is known only from the Cumberland Mountains and parts of the Cliff Section. Although it is locally abundant in parts of the Stanton District, there is only one known site further south in the Cliff Section. In 1988, it was found to be frequent on a N-facing slope below sandstone cliffs along the Rockcastle River near the Narrows. This record should be appended to the Somerset District report.]

*Cirsium carolinianum* Carolina Thistle (8/ca. 20). This southern species is reported from scattered areas of Kentucky, mostly in the transition from Mississippian to Pennsylvanian bedrock. In the Stearns District, it was found at two sites: one in moderately dry, somewhat cutover woods on a S-facing slope along an upper section of Roaring Paunch Creek; the other in dry, grassy pine-oak woods on a gentle S-facing slope above the cliffs southeast of Flat Rock (see Significant Areas). Only 1-3 plants were seen in each case. Although this species has mostly been found in disturbed woods and near roads, it is clearly uncommon or rare. It may be another species that was associated with burnt areas before settlement.

\**Coreopsis verticillata* Narrow-leaved Coreopsis (2/2?). This southern species has not been previously reported as a native species in Kentucky. It is reported to be cultivated and escaped north of its true range (Cronquist 1980). It has been found, perhaps as an adventive, on a "dry hillside" in Jefferson County. In 1989, several plants were found in a goldenrod-dominated old-field on a terrace near Wolf Creek (see Significant Areas). Listed rare species with similar local and global distribution, and also narrow leaves, are *Lobelia nuttallii* and *Sabatia campanulata*. Since these three species have only been found in fields or disturbed thickets within Kentucky, their status before settlement is uncertain. However, it is possible that occasional droughts, fires, animal trails and other natural disturbances did maintain these species before settlement.

(*Cornus racemosa* Red Osier (3/3?). In Kentucky, this north-central and east-coastal species, which is sometimes combined as a subspecies with the southern *C. stricta*, has been rarely recorded in scattered sites along the Cliff Section, and perhaps elsewhere. One record is a 1935 collection of Braun (No. 1036) from "riverbank, South Fork, Cumberland River". Other collections suggest that the location was near Alum Creek; this section of the river is now impounded. The identification of this specimen was confirmed by E.J. Palmer. There is no other record of this species from the southern half of the DBNF.)

*Crataegus uniflora* Hawthorn (>2/ca. 10?). This south-central species occurs in several limestone areas of southern Kentucky, according to J. Varner (pers. comm.). However, there are few collections available. In the Stearns District, it has been found only at two sites: a S-facing limestone bank of the Little South Fork, with a single individual in an open thicket dominated by red cedar; also,

an open red cedar woods on eroded shale (Pennington Formation) near the Little South Fork east of Slavens.

*Crotonopsis elliptica* **Rushfoil** (8/ca. 10). In Kentucky, this southern species is known mostly from western regions on or near sandstone outcrops. Further east, there are only three documented localities, which are all sunny sandstone outcrops on the S- or SW-facing side of ridges along the Big South Fork. At two localities, just one clifftop population has been found (in the Somerset and Stearns Districts). At the other (in Stearns District), several patches have been found (in 1987-89 and by Braun in 1941) along one mile of the ridge between Franklin Hollow and Railroad Fork (see Significant Areas). At all sites, this species is restricted to the thinnest soil, generally with mosses, lichens, *Hypericum gentianoides*, *Minuartia glabra*, and sparse grass cover. The *Crotonopsis*, *Hypericum* and *Minuartia* are all annual species.

*Cypripedium pubescens* **Yellow Lady's-slipper** (ca. 40/>100). This widespread eastern species is known from many areas of Kentucky in forest on moist, moderately acid soil, but populations are mostly small. There is a continual danger of harvesting for ornamental and medicinal use. During the 1989 survey, it was not seen at all by J. Campbell or A. Risk. D. Stephens, a resident biologist, has seen this species at only two sites in the Stearns District, both on lower slopes along the Big South Fork or its tributaries. It appears to increase in abundance towards the north, within the Cliff Section (Palmer Ball et al. 1987, Campbell et al. 1988).

*Eupatorium hyssopifolium* var. *hyssopifolium* **Thoroughwort** (3/3). This variety is frequent on the Coastal Plain, but there are only three records from Kentucky (see also Braun 1950). In the Stearns District, it was found on an upland roadside near Blue Heron (on the edge of BSFNNRA), and in the Somerset District it was found on a cobble bar along the Rockcastle River. The var. *laciniatum* is apparently much more frequent, and generally occurs in fields and on roadsides. However, many plants are difficult to identify because lower leaves are lacking, and it is likely that var. *hyssopifolium* has been often overlooked.

(\**Gentiana cherokeensis* **Cherokee Gentian** (1/1). Kartesz & Kartesz (1980) listed this southern Atlantic Coastal Plain species as a synonym of the more widespread eastern *G. saponaria*. However, both Fernald (1950) and Gleason (1952) treated it as a distinct species. In Braun's collection catalogue, there is a specimen named *G. cherokeensis* with the following data: "4885. 10-11-50. Sandy soil between sandstone rocks on river bank, South Fork below mouth of Yahoo Creek." This section of the river is now impounded. The identity of this specimen needs to be checked.)

*Humulus lupulus* var. *lupuloides* [=*H. americanus*] **American Hops** (5/6?). In Kentucky, this north-central species has been reported from a few sites, mostly

on the banks of larger streams in or near the Cliff Section. The only records south of Red River (Menifee County) are from the Stearns District. Braun (1943) collected this species from "alluvial flats, Marsh Creek, 3 miles E of Salersville, McCreary Co.", and in 1989 a patch covering 50-100 sq. ft was found along an upper section of Roaring Paunch Creek, half a mile north of the Kentucky-Tennessee state line.

*Hydrastis canadensis* **Goldenseal** (60/>100). This north-central species is known from many forested areas of Kentucky, especially in moist to somewhat dry, moderately base-rich soil. However, it is generally rare due to harvesting for medicinal use. There was only one previously documented record of this species in the Stearns District, along an upper section of Marsh Creek in the transition from Low Hills Belt to Rugged Eastern Area. During the 1989 survey, it was found at only two sites in the Jellico Mountains: one with about 10-20 stems in one patch on a moist, N-facing upper slope above Proctor Hollow; the other also with a few plants in the central Jellico Mountain area. Comparison with other records suggests that this species is more frequent to the north, at least within the Cliff Section.

[*Hypericum hypericoides* (var. *h.*) **Shrubby St. Andrew's Cross** (5/ca. 10). In Kentucky, this southern species is known from dry to wet sandy soils in the southwest and southeast. It has been found at a few sites along the Cumberland River within a mile of the eastern boundary of the Stearns District. Most plants have been found in dry, slightly open forest on steep rocky slopes above sandstone cliffs near Cumberland Falls. One clump was also found in young *Pinus echinata* forest at the back edge of a broad terrace at the mouth of Clear Fork, near the population of *Aster radula* (see above).]

*Juncus coriaceus* **Rush** (7/10?). In Kentucky, this southern species is known from a few south-central to southeast areas. There are two records from the Stearns District (see Significant Areas): (1) a 1941 collection of Braun (confirmed by F.J. Hermann), from a "sphagnum swamp" 2.5 miles north of Whitley City, i.e., in or near the Big Creek-Barren Fork streamhead area; (2) a 1989 collection from the wet streamhead meadow at Duck Run. Also, in 1989 it was found in Tennessee a quarter mile south of the state line near Isham, in a wet meadow near Isham Creek (same site as *Lobelia nuttallii*; see listed species).

*Lespedeza capitata* (or hybrids) **Capitate Bush-clover** (10/20?). This variable south-central and mid-western species is scattered in parts of southern Kentucky. It appears to become rarer towards the east, where it may largely exist in hybrid forms. The only records from the Appalachian Region in Kentucky are some 1935-40 collections made along the Bauer Road (Somerset District) on the ridge north of Beaver Creek (Rogers 1941); on the Yahoo Ridge (Stearns District) east of the Big South Fork (Braun's collection catalogue); and another Braun (1943) record from Rowan County. Braun's plants were identified as *L.*

*simulata*, which has been interpreted as a hybrid between *capitata* and *virginica* or *intermedia*. In both cases, the plants were growing in dry, sandy soil, probably in an open pine or oak woods or "barrens" (see appendix on vegetation in Palmer-Ball et al. 1987). However, a plant without flowers was found in 1989 in a bottomland meadow near Isham Creek in Tennessee, a quarter-mile south of the state line.

*Lithospermum tuberosum* Gromwell (6/20). In Kentucky, this southern species is known only from limestone slopes in the eastern part of the Mississippian Plateau, dissected by the Cumberland River system. In the Stearns District, it is known only from the western margin, with scattered plants along more rugged sections of the Little South Fork ravine.

*Lysimachia hybrida* Swamp Loosestrife (6/6). In Kentucky, this widespread eastern species is known from only six records in various parts of the state. The only Appalachian record is a 1935 collection of Braun (No. 977) from McCreary County. There are no further data on the location, but other collection numbers suggest that it was collected near the Big South Fork at Alum Creek. From generalized habitat descriptions in manuals, it is likely that it was growing near the banks of the river, rather than in upland streamheads.

*Lysimachia tonsa* Mountain Loosestrife (ca. 10/20?). This southern Appalachian-Ozarkian species is known from several locations in southeast Kentucky, mostly in dry oak woods on ridges, but it is infrequent. The only records from the Cliff Section are from Pulaski County (near Blowing Cave, M. Medley, pers. comm.) and McCreary County (Stearns District). The latter two records are collections made in 1979 (Medley et al.) and 1989 (A. Risk) from ridges along the Big South Fork valley. There are no other records from the DBNF except in the Redbird District.

*Orbexilum pedunculatum* var. *pedunculatum* (*Psoralea psoralioides* var. *p.*) Scurf-pea (4/ca. 10). In Kentucky, this southern variety has been found only in a few southwestern and southeastern counties; elsewhere var. *eglandulosum* is the only variety present. Within the Stearns District, var. *pedunculatum* is known from several few sites, mostly on open, rocky streambanks riverbanks (at least Big South Fork, Marsh Creek and the Cumberland River). However, other collections, especially on upland roadsides, appear to be var. *eglandulosum*, and some may be intermediate. The distinctiveness and rarity of var. *pedunculatum* in Kentucky needs more study.

*Oxalis montana* Common Wood-sorrel (8/ca. 15). In Kentucky, this northern species is known only from the Cumberland Mountains and the Cliff Section. There was only one previous record from the Stearns District, in the Huling Branch Gorge (Harker et al. 1979). During 1989, it was found only at three sites along branches of Indian Creek, a tributary of Cumberland River. The

plants were largely restricted to narrow first or second order ravines, with relatively mature forest of *Tsuga* and associated species. They occurred on moist or damp (seeping) lower slopes within 50 m of sandstone cliff bases.

*Panax trifolius* **Dwarf Ginseng** (8/ca. 15). In Kentucky, this northern species is known mostly from lower slopes and terraces along larger streams in the Cliff Section. In the Stearns District, there are three previous records from the Big South Fork watershed: near Alum Creek (Rogers 1941), Natural Bridge Hollow (along Roaring Paunch Creek), and Huling Branch (Harker et al. 1979). During 1989, it was also found in a transition from a lower N-facing slope to bottomland along Rock Creek of Jellico Creek, below Angel Mountain in the Rugged Eastern Area. Another possible record is a 1939 Braun collection from "Buck Br" in Whitley County, which may have referred to Bucks Branch of Jellico Creek. There is also a 1940 record from "wet woods by South Fork River at Alum Creek" (Rogers 1941); this section of the river is now impounded.

*Panicum albomarginatum* **Panic Grass** (1/5). This southern species was unknown in Kentucky until found in the Natural Arch, Dumpling Rocks and Grassy Gap Ridge areas during the 1987 Somerset District inventory (Palmer Ball et al. 1988). Although belonging to the *Dichanthelium* subgenus, it was listed under *Panicum* by Kartesz & Kartesz (1980). In 1987 and 1989, a few plants were also found above Franklin Hollow in the Stearns District, though some were possibly hybridized with *P. columbianum*. All sites were on S-facing sandstone clifftops, with no tree cover. No further sites were found in 1989.

*Paspalum setaceum* var. *longepedunculatum* **Small Smooth Millet-grass** (4/4?). This southeastern taxon has been rarely reported in southeast Kentucky, and, as a waif, along railroads in Jefferson County (M. Medley, pers. comm.). There is one record from the Stearns District, a 1934 Braun collection from, "sandy soil, ridge, Yahoo, McCreary Co." This taxon is typical of sandy soils, especially flat woods with much pine. Possibly, it is favored by disturbance, and is able to spread beyond its native range along roads and railroads. However, more data are needed before it can be removed from the list of potential rarities.

*Phaseolus polystachios* **Wild Bean** (12/ca. 15). This south-central species is known from widely scattered areas of Kentucky, but populations may generally be small and distributed at low density. There is only one record from the Stearns District, a 1980 collection from lower slopes along the Cumberland River upstream of the Falls.

*Phlox amoena* **Charming Phlox** (7/ca. 10). In Kentucky, this southeastern interior species is known from a limited south-central area, but it is locally frequent. In the Stearns District, it has been found at more than 20 sites, almost all along roads and adjacent forest edges on sandstone ridges. At only one site, in the rather open, grassy, stunted *Pinus virginiana* woods on the sandstone outcrops of

Dobbs Hills (see Significant Areas), were plants found frequently in more natural vegetation. This population and some of the roadside populations contained at least 100-300 plants.

*Physostegia virginiana* ssp. *virginiana* **False Dragonhead** (5-7/30?). In Kentucky, this southeastern subspecies is known only from large streams in the southern Cliff Section, plus a old record from the Falls of the Ohio, and perhaps further west (R. Athey collections). In the Stearns District, it has been found to be locally frequent on the limestone banks of Little South Fork, and on the sandstone banks of Big South Fork; also, it was found at one site along Rock Creek. However, it is virtually unknown along the Cumberland River above the Falls, except on the cobble bar at the mouth of Bunches Creek (where some abnormally stunted plants were tentatively referred to *P. intermedia* in Palmer-Ball et al. 1988). The plants are restricted to broader open areas on rocky banks in the transition from the zone dominated by *Andropogon gerardii*, to the streamside itself with shrubs, Cyperaceae and *Justicia*.

*Platanthera lacera* **Ragged Orchid** (10/ca. 15). In Kentucky, this widespread eastern species is known from much of the Cliff Section or nearby, but with a low density. It typically occurs in full sun or partial shade on seasonally wet, acid soil. It was not found during 1989 in the Stearns District, but in 1987 M. Evans (pers. comm.) observed this species in the brushy, abandoned channel of Marsh Creek with *Solidago patula* (see below), and M. Medley (pers. comm.) observed it during the early 1980s in an open field above Salt Branch of Big South Fork.

*Porteranthus trifolius* (*Gillenia t.*) **Indian Physic** (5/>30). In Kentucky, this Appalachian species is known mostly from rugged areas in the southeast. Although not found in the Somerset District, it was found to be widely scattered on non-calcareous soils at over 20 sites in the Stearns District, from the Cliff Section to the Rugged Eastern Area. It was found infrequently within dry to moist forest, generally not flowering, and at forest edges, with groups of up to 10-20 flowering plants.

*Potamogeton illinoensis* **Illinois Pondweed** (4/4). In Kentucky, this northwestern (to Pacific) and Gulf Coastal species was previously known from only two sites along the Ohio River (Beal & Thieret 1986). During 1989, it was discovered at several sites in the Little South Fork, from the Parmleysville area downstream to the impoundment. It was concentrated in moderately shallow water (about 25-75 cm deep) near riffles, but not in the most rapid sections. It was generally found near beds of *Vallisneria*, but it was most abundant in somewhat shallower, faster moving water on rockier bottoms. Unlike *Vallisneria*, it was found downstream of the polluted Lick Creek, though at notably reduced density. A few plants of *Potamogeton pectinatus* was also found at one site in the Little South Fork during 1989. This species has a similar distribution--global and local--to *P. illinoensis*, but it is known from more Kentucky counties (at least 8).

*Rhododendron catawbiense* **Mountain Rose-bay** (7/ca. 10). In Kentucky, this Appalachian species is widely scattered on rocky sites in the Cumberland Mountains. It has also been found at more than 10 sites in the southernmost Cliff Section on sandstone cliffs near the South Fork and its tributaries, especially Rock Creek. All these sites except two are in the Stearns District. All sites are on N-NE facing ledges, in somewhat open forest or in partial sun. Most plants were found in groups with only 1-5 mature bushes, but near Skullbones Knob (above Little South Fork) at least 20 were seen, some leaning up to 5 m down the steep slopes.

*Robinia hispida* var. *rosea* [= *R. boyntonii*] **Rose-acacia** (4/10). This Appalachian taxon should not be confused with var. *fertilis*, which is frequently cultivated and naturalized in Kentucky. The only localities known in the state are in the Cumberland Mountains and the southern Cliff Section (mostly in the Natural Arch/The Gulf/Dumpling Rocks area of the Somerset District). All records are from relatively narrow sandstone ridges or knobs, in dry pine or oaks woods, especially young stands, thickets and edges. In the Stearns District, it was found at two sites, each with only 1-5 plants seen, on the ridge above the mouth of Roaring Paunch Creek and on Grassy Knob (both on the Barthell Quadrangle). It has also been reported from thickets adjacent to garbage dumps south of Route 90 in McCreary County (J. MacGregor, pers. comm.).

\**Sanicula marilandica* **Sanicle** (1/2). This north-central (to Rocky Mountain) species was not definitely recorded from Kentucky before its discovery during 1989 in the Stearns District. The plants are referable to var. *petiolulata*, which largely occurs in "dry sandy pineland" of the southern Atlantic Coastal Plain (Fernald 1950). They were found at two sites in open woods and thickets near roads on rather broad ridges about mid-way between the Cumberland River and the Big South Fork. Only 2-5 plants were seen at each site. Both areas had native grasses and forbs typical of frequently burnt or otherwise disturbed woodland.

[*Scutellaria serrata* **Skullcap** (7/ca. 10). In Kentucky, this Appalachian species is known mostly from the Cliff Section. A 1987 record of M. Medley (pers. comm.) from lower slopes below the Cumberland Falls in McCreary County (near the *Veratrum parviflorum* site) was omitted from the Somerset District report. It should be looked for on higher terraces of larger streams in the Stearns District and elsewhere.]

[*Senecio pauperculus* **Ragwort** (2/3). This northern and western species has been recently found at two sites along the Cumberland River, above and below the Falls (Soil Systems Inc. 1980). There is also an 1830s record from the Blue Licks area of Robertson County (Braun 1943). The Bunches Creek bar sites at the northeast corner of the Stearns District was noted in Palmer-Ball et al. (1988).]

*Solidago patula* var. *patula* **Swamp Goldenrod** (7/ca. 10). In Kentucky, this northern species is known from a few sites on wet, acid soils in the southwest and southeast. There is only one known site in the DBNF, discovered in 1989; this is in an old channel of Marsh Creek in the transition from Cliff Section to Low Hills Belt. This is an area of swampy forest and thickets with much *Acer rubrum*, *Liriodendron*, *Carpinus*, *Lindera*, *Thelypteris noveboracensis*, *Lygodium*, *Carex debilis*, *Viola primulifolia*, *Solidago rugosa* and *S. patula*. *S. patula* is locally dominant on the ground.

*Stenanthium gramineum* var. *micranthum* **Featherbells** (2/ca. 5). In Kentucky, this south-central species is known from at least seven counties as var. *robustum*, but only two as var. *micranthum*. In the Stearns District, the latter is known from only two localities, in the Big Creek-Barren Fork streamhead area (see Significant Areas), and on the bottomland of Marsh Creek near the head of the ravine section. In the former locality, three patches of 5-20 plants have been found. Along Marsh Creek, a small patch and a large patch, with over 50 plants in young *Liquidambar* forest, were found. A few plants have also been found on the Cumberland River banks near the Falls, just beyond the northeast corner of the Stearns District.

*Talinum teretifolium* **Fame-flower** (2/8). This Appalachian species was unknown in Kentucky until found during 1987-89 at five localities in the Somerset District and five in the Stearns District. All these sites are flatter sandstone outcrops (with relatively slow runoff) on rather narrow ridges, especially on points or saddles, with little or no tree cover. Most of the sites are within 10-20 ft of roads or utility rights-of-way. These openings may have a natural origin, perhaps enhanced by fire. Some roadside disturbance may now play a role in maintaining some populations. However, one site discovered in 1987 had apparently been eliminated by a log staging area in 1989. Population sizes in the Stearns District ranged from about 50 to 500 plants.

*Trachelospermum difforme* **Climbing Dogbane** (8/ca. 30). In Kentucky, this southern species is known mostly from riverbanks and floodplain woods in the west. In the east, it is known only from rocky sandstone banks of the Big South Fork, within the Stearns District, and the main stem of Cumberland River near the Falls, just outside the Stearns District (Palmer-Ball et al. 1987). During 1989, few plants were seen, perhaps due to frequent flooding. Based on previous records (especially M. Medley, pers. comm.), this species is scattered at low density along the rockiest sections of these rivers, mostly in the transition from the grassy zone (with *Andropogon gerardii*) to the streamside shrub zone.

*Triphora trianthophora* **Three Birds Orchid** (17/30). This widespread eastern species is rarely seen because of its short period of above ground growth. Records are scattered in most regions of Kentucky, but there is only one from the southern half of the Cliff Section or adjacent eastern DBNF areas. This

record is a 1950 Braun collection from "meso[phytic] woods below "Narrows" in Yahoo road" (i.e. KY 700 west of Whitley City). The species usually occurs in the usual forest types on moist to slightly dry soils.

*Tripsacum dactyloides* **Gamma-grass** (15/ca. 30). In Kentucky, this south-central (and tropical) species is known mostly from old western records. The only locality known east of the former "Big Barrens" region is along the Cumberland River near the Falls. It has been found at two sites below the Falls (Palmer-Ball et al. 1988) and one site above the Falls (near road, on McCreary side, W.H. Martin, pers. comm.). It is notable that several other graminoid species with a generally western, or Ohio Valley, distribution in Kentucky do occur rarely on or near the Cumberland River bars: *Cyperus refractus*, *Panicum virgatum*, *Paspalum fluitans* and *Spartina pectinata*.

*Uvularia sessilifolia* **Sessile Bellflower** (ca. 10/50). In Kentucky, this north-central species is restricted to several small eastern and western areas, mostly in the Cliff Section or the Low Hills Belt. It was not found in the Somerset District, though it is known further east, from "Charlie Cheek's Swamp", near London. In the Stearns District, it was found frequently on the sandy banks of Rock Creek, Roaring Paunch Creek and Marsh Creek, and, less frequently, along the Big South Fork and Clear Fork (terrace at its mouth). It was generally in transitional forest from streambanks with *Betula nigra* to terraces with *Tsuga*, *Fagus* and associates. Whether it is also locally frequent at the other localities in Kentucky deserves further study.

*Viburnum dentatum* var. *lucidulum* **Arrow-wood** (3/ca. 10). In Kentucky, this species is known mostly from the Cliff Section, especially on sandstone banks of larger streams. Most records are of the hairy, south-central var. *dentatum*, and there are only three known localities with smooth, northern var. *lucidulum* (= *V. recognitum*). The only locality in southern Cliff Section is along the Big South Fork, where it is locally frequent in thickets at the back edges of the boulder-cobble bars. The var. *dentatum* is known from the Big South Fork, main stem of Cumberland River and Rockcastle River, but at a relatively low density. In addition, the latter variety has occasionally been found in dry forest on ridges above the river valleys, including the ridge above the mouth of Roaring Paunch Creek.

*Viburnum molle* **Broad-leaved Arrow-wood** (15/30?). This species of the Interior Low Plateaus has been reported from several limestone areas of Kentucky west of the Appalachian region. Most confirmed records are from cliffs along the Kentucky River and tributaries in the Bluegrass Region. There are a few records from the western edge of the Appalachian region, including a 1935 Braun collection (No. 999) from "riverbank, South Fork, Cumberland River, McCreary Co.". Other collection numbers indicate that the location was probably near Alum Creek, where the river is now impounded. The plant was presumably

growing among calcareous rocks. There is also a 1939 Braun collection from "limestone cliffs (shaded), Cumberland River, Pulaski Co.", probably near the edge of the Somerset District. These two records, both confirmed by E.J. Palmer, are the only ones from the southern half of Daniel Boone National Forest.

\**Viola fimbriatula* (sensu stricto) **Fringed Violet (2/2?)**. There was no verified record of this north-central species in Kentucky before it was found during 1989 at one site in the Stearns District (but see McFarland 1942). This site is the banks of an old eroded dirt road near the head of Turkey Branch of Bear Creek. At least 30 plants were found, mostly growing in exposed sandy soil in full sun. Further north it is a common species within disturbed forests, especially on exposed mineral soils.

[*Vitis rupestris* **Sand-grape (3/ca. 10)**. In Kentucky, this southwestern species was previously known only from the boulder-cobble bars of the Rockcastle River (Palmer-Ball et al. 1987); a record from Calloway County is erroneous (Woods 1983). At the western edge of the Stearns District, it was found at one site along the Little South Fork in 1989. This site was a grass-shrub covered river-bar of cobbles of limestone and perhaps other rocks, together with much sandy fill. The bar also had the only population of *Ceanothus herbaceus* found in or near the Stearns District (see Significant Areas).]

*Waldsteinia fragarioides* **Barren strawberry (17/ca. 20)**. This north-central species is known from 17 Kentucky counties, but it appears to have a low density. The var. *parviflora*, which is distinguished only by flowers, is known from only four counties, all in the southeast, and probably including all records from the Stearns District. Within this District, the species is known from a few sites along the Big South Fork and the Little South Fork. These sites are all mostly in moist forest (with *Fagus*, *Acer saccharum* or *Tsuga*) on lower slopes, often with sandy soil overlying shale or limestone.

*Wisteria frutescens* (sensu lato) **Wisteria (11/ca. 50)**. In Kentucky, native *Wisteria* occurs mostly in the west, and the only known eastern sites are in the southern Cliff Section, along rocky banks of the Cumberland River (Palmer-Ball et al. 1987) and the South Fork (M. Medley, pers. comm.), and occasionally on upland roadsides nearby. However, it does not appear to be generally present in upstream sections of these rivers within the Stearns District. There are a few records from the northwestern and northeastern edges of the District (including a roadside site along KY 700). The frequent flooding during 1989 may have made plants less visible.

*Xyris torta* **Yellow-eyed Grass (ca. 7/10?)**. This south-central species is known from scattered sites in the southern half of Kentucky. It generally occurs in native grassy or boggy ground on acid, seasonally wet soil. It is inconspicuous, except

when in flower, and may often have been overlooked, but its habitat is unusual. The only Appalachian Plateaus records in Kentucky are from the Stearns District. These records include three sites on flatter uplands east of Big South Fork: one near a flat sandstone outcrop along the road to Bear Creek (NE of the *Talinum* site); and the others in streamheads where *Platanthera integrilabia* has been found (including 1940s records from the Big Creek-Barren Fork area). An additional site was discovered on the Wolf Creek bottom in the Jellico Mountain Region, growing in young forest with *Liquidambar*, *Acer rubrum* and *Quercus phellos*. This site also had *Lobelia nuttallii* (see Significant Areas). Only 1-5 plants were found at each of the recently discovered locations.

## TERRESTRIAL VERTEBRATE FAUNA

The following accounts summarize data for all listed rare terrestrial vertebrate animal species that have been reported from the Stearns District or nearby. The inclusion of one of these species, the Mountain Lion, is based on sight records of unsubstantiated validity. For this reason, its account is enclosed in parentheses ( ). Another two species have been recorded from just outside the District, and their accounts are placed in square brackets [ ]. Following each species' name, its official listed status is shown as follows (1/2/3):

- (1) Status in Kentucky according to the Kentucky Academy of Science and the Kentucky State Nature Preserves Commission (KAS-KSNPC; Warren et al. 1986): E = Endangered, T = Threatened, S = Special Concern, or "-" = not listed.
- (2) Status in Daniel Boone National Forest as listed by the USFS (B. Knowles, pers. comm.): S = species listed as Sensitive, E = species listed as Endangered, "-" species not listed by the USFS in Daniel Boone National Forest, or "+" KAS-KSNPC or federally listed species that recently have been documented for the first time on Forest Service property or along its boundaries.
- (3) Federal Status as designated by the United States Fish and Wildlife Service (1985a, 1987); E = Endangered; C2 = candidate for listing, Category 2; 3C = recently dropped from consideration for listing, Category 3; or "-" = not listed.

### Amphibians

*Aneides aeneus* Green Salamander: (-/S/3C). The Green Salamander is an Appalachian species ranging from southwest Pennsylvania south to northern Alabama and Mississippi with a disjunct population in the Blue Ridge Mountains of North and South Carolina. This species' distribution largely corresponds to the presence of damp sandstone outcrops where it inhabits narrow crevices in the rock faces. Records for this species in Kentucky exist from no less than 25 counties. Although this salamander has recently been removed from consideration for listing as Federally Endangered or Threatened, it continues to be retained as Sensitive on the DBNF. Prior to this inventory, the Green Salamander was known from at least seven sites within the Stearns Ranger District. Although no new sites were discovered for this species during the inventory effort, it is likely the Green Salamander occurs throughout the District wherever appropriate sandstone outcrop habitat occurs. In order to maintain Green Salamander populations, their habitat requirements must be managed for. This involves maintaining canopy cover adjacent to cliffs and rock outcrops to ensure proper (low) temperature and (high) humidity levels, in addition to

protection from human intrusion into the rockhouses and cliffines where they may reside.

[*Plethodon wehrlei* Wehrle's Salamander: (E/-/-). Very little information on this salamander is available. It is known from Kentucky only on the basis of one well-documented population in Letcher County. It is included in this report because of the proximity of the collection of several individuals at the base of massive sandstone cliffs along a tributary of Jellico Creek, just inside Tennessee. The single Wehrle's Salamander populations in Kentucky and Tennessee, and several populations located in western Virginia, are unique in that they exhibit a double row of yellow dorsal spots. The Angel Mountain and Jellico Mountain areas would be likely regions to search for this elusive species.]

## Reptiles

*Eumeces a. anthracinus* Northern Coal Skink: (S/-/-). The northern coal skink is among Kentucky's rarest lizards, having been found in only 10 counties, primarily in the southeastern portion of the state. The species ranges from western New York and central Pennsylvania, southwest to northwestern Alabama, although its distribution within that range is not continuous. There is one previous record of this species in the Stearns Ranger District. That individual was caught along a powerline right-of-way near the junction of KY 90 and KY 700 west of Cumberland Falls. The northern coal skink should inhabit open, rocky hillsides or stream borders within the District. They are more easily found, as are most lizards, on cool or rainy days underneath some type of cover.

*Lampropeltis triangulum elapsoides* Scarlet Kingsnake: (S/-/-). This elusive snake has been reported from at least nine counties in Kentucky. The species is known from the Stearns Ranger District on the basis of a historical record from McCreary County. There is also a record of a scarlet kingsnake just outside the District boundary along KY 90 just west of Cumberland Falls State Resort Park. The species is largely fossorial, spending a great deal of time searching for prey in underground burrows. This aspect of its behavior makes finding this very colorful reptile particularly difficult, and it is also believed that population densities of the species are usually low. However, it may be found on the ground surface following warm, heavy rains and on warm, humid nights.

*Ophisaurus attenuatus longicaudus* Eastern Slender Glass Lizard: (S/-/-). This rare reptile is a legless lizard that is found in localized populations throughout the southeastern United States. It has been found in at least eight counties in central and south-central Kentucky. Most of the state's records are from McCreary County. There are 10 previous records of this species within the Stearns Ranger District. Two new records were obtained as a result of this inventory. One individual was caught alive along KY 478 in McCreary County, approximately 0.5 miles west of Laurel Cemetery, travelling east along Wright

Branch. Another individual was found dead in the road along KY 478 in front of Laurel Cemetery. Both locations were situated in close proximity to tall, weedy areas that were not very densely vegetated close to the ground. This species may be sensitive to habitat degradation associated with human activities that replace sandy topsoils with rock and clay. These activities are antagonistic to the species' fossorial nature.

*Pituophis melanoleucus* Pine Snake: (S/S/C2). This species is known from eight counties in Kentucky, but many of these records are old and obscure in precise location. One such record of the species is from within the Stearns Ranger District on US 27 south of Pine Knot. Open stands of oak or oak-pine forest, sandy soils, and high rodent populations are needed to support this rare snake. It is a species difficult to find due to low population numbers and its tendency to be fossorial during much of the year.

#### Birds

*Accipiter striatus* Sharp-shinned Hawk: (S/-/-). This small raptor is known as a breeding bird from at least three counties in Kentucky, although summer sightings have been reported from more than 20 counties. Prior to this inventory, the Sharp-shinned Hawk had not been reported in the Stearns Ranger District in summer, but during the inventory two new records were obtained. One individual was observed in the Wolf Knob area preying on a northern fence lizard along FS 213 in late June, and another was observed circling over rural farmland near Hollyhill in early July. The timing of these observations probably indicates breeding in the vicinity of both. The Sharp-shinned Hawk normally places its nest in conifers and requires extensive mixed or coniferous forests for foraging.

*Picoides borealis* Red-cockaded Woodpecker: (E/E/E). The Red-cockaded Woodpecker is a Federally Endangered bird whose range in Kentucky, and the rest of the southeastern United States, has been severely limited by the loss of old-growth pine and mixed pine-hardwood stands. There are currently five inactive Red-cockaded Woodpecker colonies within the Stearns Ranger District that are recognized. They are the "Big Creek", "Flat Rock Cemetery", "Peters' Mountain", "Pigskin", and "Stepping Rock" colonies. Although recent activity has not been detected at these formerly active colonies, the species must certainly still be present in the District. Although the large area to be surveyed and the low population density make location of new colonies difficult, a comprehensive search of suitable Red-cockaded Woodpecker habitat should be conducted on the Stearns Ranger District in the very near future. Large tracts of nesting and foraging habitat including recruitment stands must be maintained in order for the species to survive. The USFS is implementing a recovery plan for the Red-cockaded Woodpecker on the Daniel Boone National Forest involving protection of nesting sites and understory removal.

## Mammals

(*Felis concolor cougar* **Eastern Cougar: (E/E/E)**. This species once could be found across much of the eastern United States, but its current range is not well documented. If not entirely extirpated, this form is certainly restricted to only a few disjunct localities in the east. The Mountain Lion is included in this inventory report strictly on the basis of a few unconfirmed sightings within the Stearns Ranger District. The District could potentially harbor this species considering the low human population in combination with the ruggedness of the terrain with isolated portions, such as the Big South Fork Cumberland River corridor, that could serve as sanctuaries.)

*Myotis [=subulatus] leibii* **Eastern Small-footed Myotis: (E/S/C2)**. This poorly-known species has been documented from only a few scattered localities in Kentucky. It has been found in the Stearns Ranger District only once; one was captured in a mistnet in the entrance of an old mine portal near Blue Heron along the Big South Fork Cumberland River. This species appears to favor rocky cliffs and can sometimes be found wedged into crevices in caves and rockhouses along cliffines. Concentrations are not found, rather single individuals are usually discovered in scattered localities. The extensive amount of cliffline within the District should indicate high potential for the presence of the Small-footed Myotis. Protection of cliffines that are probably utilized by this species would appear to be a major factor in its conservation.

*Myotis [=keenii] septentrionalis* **Northern Long-eared Bat: (S/-/-)**. This bat is primarily a northern species that is has been reported from at least 21 Kentucky counties. The species is a permanent resident in the state, inhabiting caves and old mines during the winter and forest trees in summer. Prior to this inventory, the northern long-eared bat was known from five sites within the Stearns Ranger District. One new site was identified during the inventory effort; that being along Marsh Creek at FS 691, where a single individual was mist-netted in early July. As with the Small-footed Myotis, this species is not found in colonies, but is usually found singly or in small numbers along cliffines and in caves. For this reason, entire systems of cliffines with caves and rockhouses must be protected in order to ensure their survival. This management would include leaving an intact buffer strip of mature timber along cliffines and surrounding cave entrances.

*Myotis sodalis* **Indiana Myotis: (E/E/E)**. This species is known to occur throughout the cave region of Kentucky during the winter months. Documentation of summer range and maternity sites within the state is limited. It is likely that the Indiana Myotis is not typically found in large numbers within the District during winter due to the general lack of suitable hibernacula. However, rockhouses, mines, and small caves along cliffines are probably utilized in spring and fall, and bottomland and riparian forests may be utilized during the breeding season.

Presently, only one site within the District has been identified for this species, that being an abandoned mine portal along the Big South Fork near Blue Heron. It is becoming apparent that in order for the Indiana Myotis to be fully protected, more investigation of breeding, foraging and roosting habitats is necessary, especially concerning requirements during the breeding season.

*Neotoma floridana magister* Eastern Wood Rat: (-/S/C2). The Eastern Wood Rat is known from at least 23 counties in eastern Kentucky and from four counties in the karst region of west-central Kentucky. This species occupies many rockhouses, caves, ledges, and rock outcrops within the Stearns Ranger District. At least two sites for the species were known prior to this inventory effort. Fifteen new sites were identified during the present inventory. Wood Rat sign was evident in most of the larger rockhouses and caves that were surveyed during the field effort. Evidence of Wood Rats observed included large caches of nuts, leaves, acorns, magnolia fruits and bones, and mounds of droppings. Measures to protect this species must focus on protection of the clifflines and caves the species inhabits. Protection of these habitats will also assist in conservation of other species utilizing these habitats including the Green Salamander and various bats.

[*Nycticeius humeralis* Evening Bat: (T/-/-). The Evening Bat is a fairly widespread species of the eastern United States. In Kentucky, the species has been reported from about a dozen scattered counties in central and western Kentucky. This bat is most often found in abandoned or little-used habitations, and occasionally in caves, especially during spring and fall. Although the Evening Bat has not been reported from the Stearns Ranger District, there is a record from just west of the DBNF near Coopersville, Wayne County. It is probable that the species is an occasional visitant to the District during its migrations between summer breeding sites and overwintering areas.]

*Plecotus rafinesquii* Rafinesque's Big-eared Bat: (T/S/C2). This southeastern species is fairly widespread throughout eastern Kentucky and found sporadically in the central and western parts of the state. It has been reported from at least 23 counties in the state. Prior to this inventory effort, the species was known from 10 sites within the Stearns Ranger District, mostly from abandoned mine portals along the Big South Fork Cumberland River. Two new sites were added as a result of this inventory. One individual was observed in a small sandstone cave below the cliffline at the head of Franklin Hollow north of Whitley City. The other site was a large, multilevel rockhouse along Railroad Fork that contained a maternity colony of over 40 individuals. As more and more biological inventory has been undertaken on DBNF, the importance of the extensive cliff-lines of the western edge of the Cumberland Plateau have become much clearer. This unique situation serves as crucial habitat for a great diversity of plant and animal species including several rare bats. Perhaps no bat better exemplifies this utilization than the Rafinesque's Big-eared Bat. Now that maternity sites have

been identified in such habitat, it is clear that cliffline habitat is crucial to this species throughout the year, being utilized for both reproduction and overwintering, as well as seasonal roosts during the spring and fall.

*Sorex [=Microsorex] hoyi winnemana* **Pygmy Shrew:** (-/S/C2). This species is known from a wide variety of habitats throughout its range from Pennsylvania south through the Appalachian Mountains to Georgia. It is known from no less than 20 counties in central and eastern Kentucky. In former inventory work (Palmer-Ball et al. 1988, Campbell et al. 1989), the pygmy shrew was collected only in xeric, upland oak-pine sites. During this inventory, three individuals were caught in pitfall traps at two sites; two of the individuals were trapped in a regenerating hardwood slope just above a bog area near Whitley City, while the second site was located near the head of a small branch on Jellico Mountain in Whitley County. Based on these data, it appears that the pygmy shrew probably occurs in a variety of habitats in the state. Further trapping efforts should help clarify this species' status and habitat preferences within the District.

*Spilogale putorius* **Spotted Skunk:** (S/-/-). The spotted skunk is a relatively obscure mammal that occupies an extensive range east of the Mississippi River. It has been reported from at least 10 counties in eastern Kentucky, mostly on the basis of road kill and road crossing observations. The species is known from the Stearns Ranger District on the basis of four records in McCreary County at the Rock Creek Campground, along KY 700 near Jones Branch, along FS 669 at Pleasant Knob Church, and inside Whitley City. From these data, it appears that the species is probably distributed throughout the District, although little remains known about its population density and habitat requirements.

*Ursus americanus* **Black Bear:** (E/-/-). This large omnivorous mammal once occurred all across North America, but now can be found only in remote, heavily forested areas with little human disturbance. The Black Bear population is apparently beginning to reestablish itself in southeastern Kentucky as rebounding Appalachian populations spread westward. This species has been recorded from no less than 25 counties in eastern Kentucky in recent years, but the reliability of some reports has been questioned. Such is the case for many reports of Black Bear from the Stearns Ranger District, but a few reports appear to be valid and constitute sufficient documentation to regard the bear as an extant species on the District. Much of the Stearns District would appear to offer excellent bear habitat with large tracts of forested land and little human disturbance being major features of McCreary and Whitley counties. The Black Bear is a very adaptable species and will probably eventually occupy other areas with suitable habitat within the Stearns Ranger District provided their presence is accepted and tolerated by the local human inhabitants.

## AQUATIC FAUNA

A total of eight sites on the Big South Fork Cumberland River (1), Cumberland River (1), Indian Creek (1), Little South Fork Cumberland River (1), Marsh Creek (3), and Rock Creek (1) were sampled for USFWS and KAS-KSNPC listed mollusks and fishes. No crustaceans, gastropods or fishes listed by these organizations were collected during this effort. The following accounts summarize the status of the four listed unionids collected and one aquatic salamander known in the District. Information regarding many additional rare aquatic organisms that occur or occurred within the Stearns District but were not collected during this study is available through the Kentucky State Nature Preserves Commission Natural Heritage Database. Following each species' name, its official listed status is shown as follows (1/2/3):

- (1) Status in Kentucky according to the Kentucky Academy of Science and the Kentucky State Nature Preserves Commission (KAS-KSNPC) (Warren et al. 1986): E = Endangered or T = Threatened.
- (2) Status in Daniel Boone National Forest as listed by the USFS (B. Knowles, pers. comm.): E = Endangered, S = species listed as Sensitive, or "-" species not listed by the USFS in Daniel Boone National Forest.
- (3) Federal Status as designated by the United States Fish and Wildlife Service (1989, 1989); E = Endangered; C2 = candidate for listing, Category 2; or "-" = not listed.

### Mollusks

*Alasmidonta atropurpurea* Cumberland elktoe: (E/S/C2). In Kentucky, this Cumberland River endemic is known only from Marsh Creek, Big South Fork Cumberland River (S. Bakaletz, pers. comm.), and Rock Creek. In addition to historic records from the Cumberland River above the falls and Lynn Camp Creek, Ahlstedt (1986) reported one specimen from Horse Lick Creek. This record may, however, be a misidentification of *Alasmidonta marginata*. This species is also rare in the remainder of its range (Tennessee) and will probably be added to the Federal endangered species list. During this study, specimens were collected from four sites on Marsh Creek, and one on Rock Creek.

*Epioblasma brevidens* Cumberland combshell: (E/S/C2). This is another Cumberlandian endemic that will probably soon be listed as endangered by the United States Fish and Wildlife Service. It was formerly common in the mainstem Cumberland River below the falls and in the Big South Fork upstream to Parkers Lake Station, and also occurred in the Rockcastle River and Beaver Creek, but has been extirpated from all of these areas. It currently exists as

remnant populations in Buck Creek and the upper Big South Fork mainstem in Kentucky, two streams critically important to the conservation of this rare unionid. One live specimen was observed and returned to the river at the latter site.

*Pegias fabula* Little-winged pearlymussel: (E/E/E). *Pegias fabula* is known from several upper Cumberland River streams (i.e., Rockcastle River, Big and Little South forks of Cumberland River, Kennedy Creek, and one record for Buck Creek) and the Red River in western Kentucky, where it is known to persist only in Whippoorwill Creek. This rare unionid was, however, once much more widely distributed, which was the impetus for it's listing as a Federal endangered species. A single live specimen was observed at one site on the Big South Fork Cumberland River.

*Ptychobranchus subtentum* Fluted kidneyshell: (T/-/-). Four live specimens of the Fluted kidneyshell were collected from the Big South Fork Cumberland River during this effort. Although once more widespread, this unionid is additionally extant in Rock Creek, Little South Fork Cumberland River, Kennedy Creek, Buck Creek and Rockcastle River.

### **Salamanders**

*Cryptobranchus [a.] alleganiensis* Eastern Hellbender: (-/S/C2). This large, aquatic salamander is known from at least 29 counties in Kentucky. The species is known from two sites within the Stearns Ranger District. One individual was obtained in the Cumberland River upstream from Cumberland Falls; the other was seen in Laurel Creek upstream from the SR 478 bridge east of Whitley City. Undoubtedly, this species occurs in the Stearns Ranger District to a greater extent than currently documented. The species is largely nocturnal and requires fast-running, unpolluted streams with large rocks, snags, or other debris for shelter during the daylight hours and the District would seem to have ample habitat for the species.

## SIGNIFICANT AREAS

Each area described in this section were deemed biologically significant for one or more of the following reasons: (1) it has a cluster of rare species; (2) it has a particularly good population of a rare species; or (3) it has a special ecological feature. These sites, therefore, contribute greatly to the overall biodiversity within the Stearns District. Together, these areas contain a majority of the rare species occurrences; about 60% of the occurrences are from the larger stream corridors alone. The general location of these areas is shown on Fig. 4, and their individual boundaries are shown on Figs. 5-26. Wherever justifiable, the boundaries include broad corridors along major streams, or whole watershed units, in order to provide a minimum of ecological integrity and diversity in any conservation area.

The important features of these areas are described below as a basis for discussion of management and acquisition plans that would focus on protection of the rare species and their habitats. The essential data on rare species are given for each area. The species listed for each area include a few that are probably extirpated or that have been recorded only nearby but which are likely to occur within the area. Some rare species at the state level are widespread in the District, and are not included under each Site Summary. Among listed species these include *Gaylussacia brachycera*, *Dichantheium sabulorum*, *D. acuminatum* var. *villosum*, *Panax quinquefolius* and *Thalictrum mirabile*; among "other species of interest", these include *Anemone quinquefolius*, *Porteranthus trifoliata* and *Uvularia sessilifolia*.

The boundaries of some areas have already been determined by federal or state government designation. Most of the others are somewhat tentative, and further research is needed before deciding on the best limits for conservation of the biologically significant entities. Two special problems related to the federally protected animal species require more intensive surveying to estimate population levels and the extent of suitable habitat. These species are as follows.

### (1) Red-cockaded Woodpecker habitat.

No extant colonies of this federally Endangered Species are currently known on the Stearns District, but there are many suitable sites and several recent records. Suitable habitat, i.e., older pine stands, occurs mostly in the north-central section of the District, especially on the uplands between the KY 700 area (NE of Whitley City) and the Cumberland River (and lower Marsh Creek). An intensive search for this species should be undertaken in this general area. Two sites of botanical interest are noted below on the periphery of this area ("KY 700 Roadsides" and "USFS-690 Ridge"), and these have some features that may be associated with good Red-cockaded Woodpecker habitat.

### (2) Blackside dace habitat.

Further sampling is needed to determine where the best populations of this federally Threatened Species are in the Stearns District. Two of these appear to

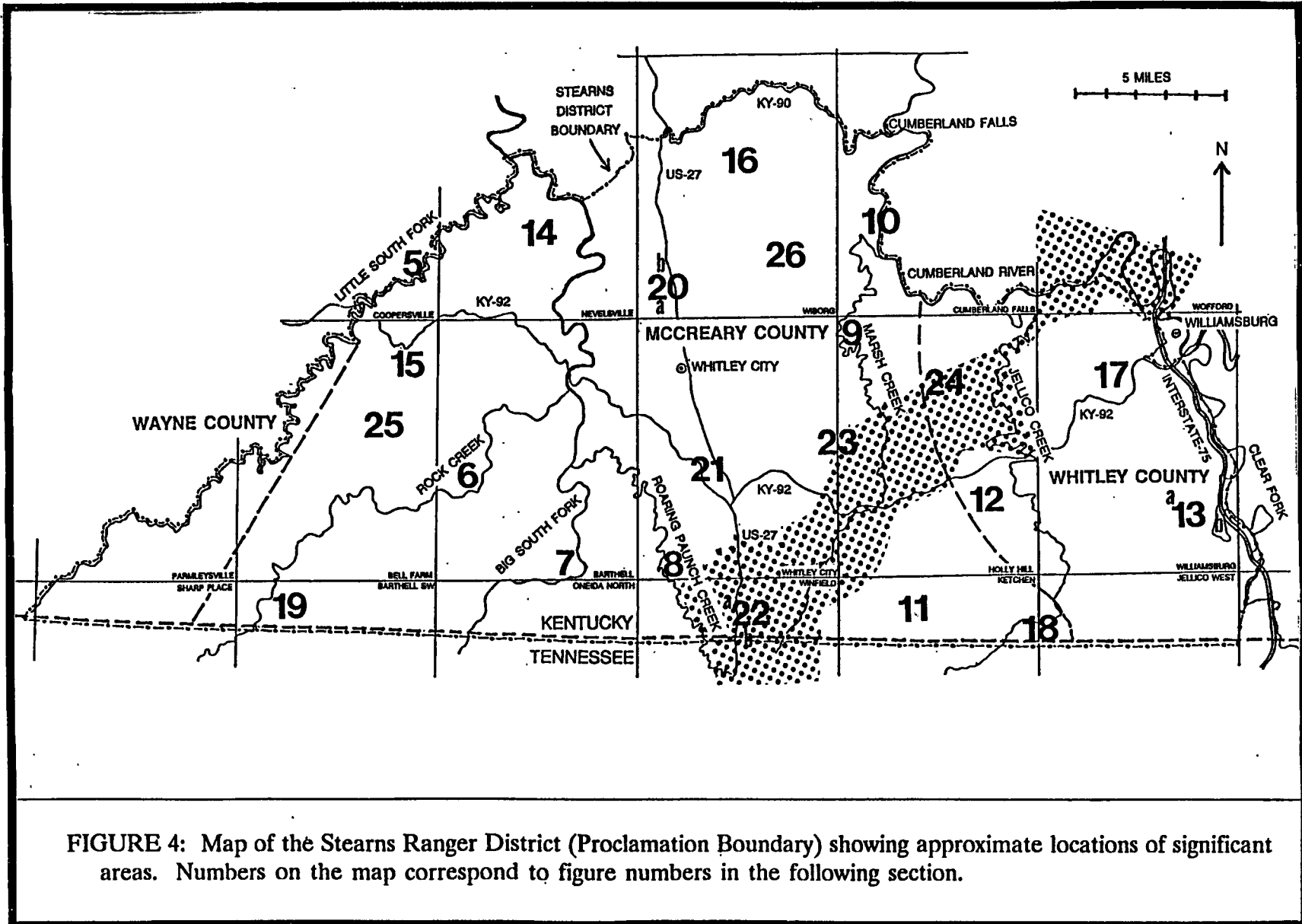


FIGURE 4: Map of the Stearns Ranger District (Proclamation Boundary) showing approximate locations of significant areas. Numbers on the map correspond to figure numbers in the following section.

be in Rock Creek (SE McCreary Co.) and Bucks Branch (SW Whitley Co.), and these watersheds--both tributaries of Jellico Creek--are described as Significant Sites below. Another may be Trammel Fork of Marsh Creek (S McCreary Co.), and there are several recent records from Indian Creek and Laurel Creek (NE of Whitley City). With the latter records in mind, it is likely that a relatively large area of suitable habitat for both these animal species, and some associated rare plants (e.g., see under "Freeman Fork Tributary" and "KY 700 Roadsides"), exists in the region between Whitley City and Cumberland Falls.

Some other areas not included in the full descriptions below may still deserve consideration after further botanical study. In brief, these are as follows.

- (a) Two openings on eroded shale (Pennington Formation) saddles near the Little South Fork, 0.6 miles SSE of old Parmley School site (Parmleysville Quadrangle), and 1 mile east of Slavans (Coopersville Quadrangle). These small (< 2 acre) openings, within forest of *Pinus virginiana* and *Juniperus virginiana*, appear to be at least partly natural as opposed to man-made. They are highly unusual features within the District. Several species typical of cedar glades are present. The Parmleysville site has the only *Scutellaria leonardii* found in the District (see notes on listed species). Further research in these and other similar areas is needed to indicate what factors caused the openings, and to establish more precisely what ecological significance they have.
- (b) Wolf Ridge Roadsides (Nevelsville Quadrangle). This area lies along about 2 miles of KY 92 on Wolf Ridge, mid-way between the Big South Fork and Little South Fork. The western end is at the head of Alum Creek and the gravel road to the north. The eastern end is at the inhabited area near the old Wolf Ridge School site. The grassy, mowed roadside is relatively wide in places (up to 100 ft on each side), including the utility line right-of-way that is parallel to the road. The adjacent forest (with much *Pinus echinata*) has been burnt several times in recent years, creating a relatively open understory. This area has some of the most extensive patches of native grassy vegetation typical of ridges in the Cliff Section of the Stearns District (with abundant andropogonoid grasses and several composites, including frequent *Helianthus atrorubens*). Two plant species--*Carex jorii* (in a shady seasonal pond) and *Lilium philadelphicum* (in the grassy edges)--are particularly rare in the District (with only 2-3 sites known). Although currently maintained largely by mowing, the small grassy patches may resemble original "barrens" or "savannah" vegetation, and they could be managed further to approach a presettlement condition. However, the KY 700 Roadsides (see below) may have more significant natural features, and deserve greater priority.
- (c) The Bald Knob-Grassy Knob-Stepping Rock-Piney Butte area (Barthell Quadrangle). The ridges and knobs in this area between Big South Fork and Rock Creek watersheds have a few scattered rare plants, including *Aster concolor*

and *Robinia hispida* var. *rosea*. However, the populations found so far are not outstanding. The drier pine woods should be searched further. This area lies on or near the boundary of the Big South Fork National River and Recreation Area (BSFNRRRA).

- (d) The Smithtown-Barthell-Natural Bridge area (Barthell Quadrangle). The more open ridges and roadsides (especially KY 791) in this area (bordering BSFNRRRA and the Roaring Paunch Corridor) have a few scattered rare plants, including *Carex physorhyncha*, *Gratiola pilosa*, *Sporobolus clandestinus* and *Tephrosia spicata*. Again, the populations are not particularly significant, but further searching is deserved.
- (e) The Alum Creek Road-Yahoo Ridge roadsides and open woods (Nevelsville Quadrangle). This area currently has only historical significance. It is based on E.L. Braun's records of some rare plant species during the 1930s (specimens at the Smithsonian Institution). The imprecisely stated locations were mostly along Alum Creek Road (KY 700), including "sandstone knobs", and Yahoo Ridge, which is presumably the ridge between the two forks of Yahoo Creek. These two localities are about 0.5-1 miles apart. Although most of this area must have been forested in the 1930s, Braun's collections indicate that some of the uplands included roadsides, "barrens" or dry woods with a naturally open, grassy aspect. Most or all of this area has now grown up into typical upland pine or oak forest, with no known rare species. However, it deserves more intensive exploration. The listed plants recorded here by Braun are *Agalinis decemloba* (Y), *Aster concolor* (Y), *Castanea pumila* (Y), *Oenothera perennis* (A), *Schwalbea americana* (A) and *Silene regia* ("sandy field" near mouth of Alum Creek). These are mostly extremely rare or extirpated species in the District (see notes on Listed Species). It is likely that some or all of these species were formerly favored by fire. It is still possible that a few plants persist, or perhaps dormant seeds in the soil. If experimental use of fire for reconstruction of a natural area is ever attempted in the Stearns District, these ridges might form another suitable site.
- (f) East Pine Knot area (from Pine Knot to the airport). Although most of this relatively flat area is cleared and the forests disturbed, there are scattered areas at the heads of streams that have rare plants, including *Calamagrostis cinnoides*, *Dulichium arundinaceum*, *Parnassia asarifolia*, *Platanthera cristata* and *Sanicula marilandica*. The area deserves further searching, especially for *Platanthera integrilabia*.
- (g) Jellico Creek corridor. In contrast to streams further west, there are few records of rare species (listed ones are only *Clematis glaucophylla*, *Orontium aquaticum* and *Solidago rupestris*). However, there are some interesting ecological features, including the frequent gravel bars with shrubs and water willow, the broader forested bottoms (most are cleared), and occasional rock

outcrops. A particularly unusual site is a shale outcrop just south of KY 92, which is dominated by red cedar; two ferns that are rare in the Appalachian Region were found here--*Polypodium polypodioides* and *Cheilanthes lanosa*.

- (h) The lower Clear Fork (Cumberland River) bottoms. At least two sites just outside the District's eastern boundaries are relatively good remnants of the swampy terrace forest type characterized by *Quercus phellos* (Fig. 13). On of these sites, near the mouth of Clear Fork is where *Aster radula* was discovered during 1989, new to Kentucky; also found here was *Hypericum hypericoides* var. *hypericoides*.

## Stream Corridors

Within the Stearns District, important aquatic habitats include essentially all streams that have retained some resemblance to their original natural physio-chemical and biotic characteristics. These streams deserve protection because they support remnant faunas and floras that were once much more widespread in Kentucky and other states. Streams in the southern section of DBNF have been seriously affected by two major impacts. The impoundment of the Cumberland River by the closure of Wolf Creek Dam in 1950 eliminated a large segment of the native fauna below Cumberland Falls, and in the lower ends of tributaries such as the Rockcastle River, Laurel River, Buck Creek and Big South Fork. The second major factor is coal mining, which degraded habitat and rendered miles of stream unsuitable as aquatic habitat (e.g., White Oak Creek and the lower segment of Big South Fork).

These impacts have effectively isolated populations of aquatic organisms in the upper Cumberland River from those downstream in Tennessee and also isolated those in adjacent streams (e.g., Rock Creek and Big South Fork Cumberland River). As a result, many of the remnant populations of aquatic organisms in the upper Cumberland River can be considered founding populations that are evolving with a greatly reduced level of genetic variability.

Significant streams in the District include Big and Little South Forks of Cumberland River, Rock Creek (SW McCreary Co.), Roaring Paunch Creek, Marsh Creek, Rock Creek (SE McCreary Co.) and others supporting USFWS or KAS-KSNPC listed organisms.

**Site Name:** LITTLE SOUTH FORK, CUMBERLAND RIVER (up to Parmleysville); Fig. 5, p. 116.

**Size:** approx. 10 square miles (6500 acres)

**Counties:** Wayne and McCreary

**USGS Quadrangles:** Nevelsville, Ky.; Coopersville, Ky.; Bell Farm, Ky.; Parmleysville, Ky.

**Location of Site.** The Little South Fork runs along or near the southern boundary between Wayne and McCreary Counties. This corridor extends from the mouth upstream to the Parmleysville area. Its width is about 0.25-0.75 miles and includes the slopes directly bordering the river. The corridor outlined here includes the State Wild and Scenic River Corridor, plus the remaining 3 miles section downstream to the mouth, and a long addition upstream from the KY 92 bridge. There are several unpaved roads leading to fords and a new bridge (near Mt Pisgah), but KY 92 is the only paved road with a bridge.

**Site Description.** This river flows in a SW-NE direction along the transition between the Highland Rim and the Cumberland Plateau. The watershed is moderately rugged and largely forested, though mostly in private ownership and cut-over. A large strip-mined area drains into Lick Creek. The river bottom is mostly underlain by limestone, which outcrops in several places directly on the banks. In addition, there is much sandy alluvium washed down from the uplands. There are a few cave systems, with underground streams, near the river.

#### Listed Animal Species

- Alasmidonta marginata*, Elktoe (mollusk)
- Aneides aeneus*, Green Salamander
- Etheostoma cinereum*, Ashy darter
- Fusconaia subrotunda subrotunda* (extirpated?), Long-solid (mollusk)
- Hybopsis insignis*, Blotched chub
- Neotoma floridana magister*, Eastern Wood Rat
- Notropis* sp., Palezone shiner
- Notropis* sp., Sawfin shiner
- Pegias fabula*, Little-winged pearlymussel (mollusk)
- Percina burtoni*, Blotchside darter (extirpated?)
- Percina macrocephala*, Longhead darter (extirpated?)
- Pleurobema oviforme*, Tennessee clubshell (mollusk)
- Ptychobranchnus subtentum*, Fluted kidneyshell (mollusk)
- Plecotus rafinesquii*, Rafinesque's Big-eared Bat
- Toxolasma lividus*, Purple lilliput (mollusk)
- Villosa trabalis*, Cumberland bean mussel (mollusk)

### Listed Plant Species

*Aconitum uncinatum*, Monkshood  
*Aureolaria patula* (nearby), False Foxglove  
*Carex stricta* (var. *elongata?*), Sedge  
*Ceanothus herbaceus*, Redroot  
*Cladrastis kentukea*, Yellow-wood  
*Erigeron pulchellus* var. *brauniae*, Braun's Robin Plantain  
*Pachistima canbyi*, Mountain Lover  
*Philadelphus hirsutus*, Mock Orange  
*Solidago rupestris*, Goldenrod  
*Spiranthes lucida*, Shining Ladies' Tresses  
*Vallisneria americana*, Tape Grass

### Other Plants of Interest

*Baptisia australis* var. *australis*, False Indigo  
*Crataegus uniflora*, One-flowered Hawthorn  
*Potamogeton illinoensis*, Illinois Pondweed  
*Vitis rupestris*, Sand-grape  
*Waldsteinia fragarioides* (var. *parviflora?*), Barren Strawberry

**Summary of Significance.** This river has good water-quality upstream of Lick Creek, and one of the best concentrations of rare mussels in the state, including federally listed species. It has some of the largest known populations of riverine aquatic plants (*Potamogeton*, *Vallisneria*) in the state. Some plants on the rocky banks are particularly rare in the state (the *Ceanothus*, *Vitis* and *Spiranthes*). The prairie-like vegetation on the limestone banks is a variant of a globally rare natural community (grassland on rocky Appalachian riverbanks). The frequent patches of *Astranthium integrifolium*, *Physostegia virginiana* and *Penstemon digitalis* make the banks particularly attractive for canoeists. Two grasses occur here which are rare in central and eastern Kentucky--*Panicum virgatum* and *Spartina pectinata*; other western species that are rare in Eastern Kentucky are *Dentaria multifida* and *Potamogeton pectinatus*.

**Explanation of Boundaries.** The short downstream addition to the State Wild River Corridor is an impounded section without rare aquatic species, but it includes relatively undisturbed potential habitat for rare plants of limestone slopes, one of which is a federal candidate (*Pachistima* on the ridge at the mouth). The long upstream addition includes several records of rare species, though at a gradually reduced density (at least for plants). Several species extend upstream to where the river becomes narrow enough that tree canopies cover most of it. The KY 92 bridge is an arbitrary limit adopted here that leaves almost no rare species records further upstream.

**Site Name:** ROCK CREEK (OF BIG SOUTH FORK, CUMBERLAND RIVER);

Fig. 6, p. 117.

**Size:** approx. 9 square miles (5500 acres)

**County:** McCreary (in SW section; note other Rock Creek in SE section)

**USGS Quadrangles:** Barthell, Ky.; Bell Farm, Ky.; Barthell SW, Tenn.-Ky.

**Location of Site.** The downstream limit is the mouth of White Oak Creek, a major tributary. The upstream limit is the Kentucky-Tennessee state line. The width of the corridor averages about 0.5 miles, and it includes slopes adjacent to the valley bottom. A gravel road runs along the whole valley bottom, but the only easy access to this road is from the downstream end or from linking roads at Bell Farm.

**Site Description.** This stream flows in a SW-NE direction along the western zone of the Cliff Section of the Cumberland Plateau. The watershed is rugged, though cliffs are not as extensive as along the Big South Fork. It is almost entirely forested in Kentucky, with most owned by USFS, and a few stands in ravine bottoms are 100 years old or more. There is little coal-mined land. The stream valley is mostly lined by sandstone and shale, with frequent bouldery sections and small, low cobble bars.

#### **Listed Animal Species**

*Alasmidonta atropurpurea*, Cumberland elktoe (mollusk)

*Aneides aeneus*, Green Salamander

*Neotoma floridana magister*, Eastern Wood Rat

*Notropis* sp., Sawfin shiner

*Spilogale putorius*, Spotted Skunk

#### **Listed Plant Species**

*Arenaria cumberlandensis* (not relocated), Cumberland Sandwort

*Carex picta*, Sedge

*Coreopsis pubescens*, Downy Coreopsis

*Cystopteris fragilis* var. *mackayi*, Mackay's Fragile Fern

*Deschampsia flexuosa*, Hair Grass

*Erigeron pulchellus* var. *brauniae*, Braun's Robin Plantain

*Eupatorium luciae-brauniae*, Lucy Braun's White Snakeroot

*Hexastylis contracta*, Heart-leaf

#### **Other Plants of Interest**

*Carex austro-caroliniana*, Sedge

*Carex pedunculata*, Sedge

*Rhododendron catawbiense*, Mountain Rose-bay

**Summary of Significance.** This stream has excellent water-quality, and supports at least one rare mussel. Cliffs and rock outcrops along the corridor harbor good populations of Green Salamanders and Eastern Wood Rats. There are several rare plants, though the rarest ones appear concentrated in the upstream section, including three federally listed species (the *Arenaria*, *Eupatorium* and *Hexastylis*).

**Explanation of Boundaries.** At the downstream limit, White Oak Creek has been a source of pollution from coal-mining, and the rare aquatic species largely disappear. The upstream limit is political, i.e., the Kentucky-Tennessee state line, but the Pickett State Park within Tennessee contains much of the upper watershed, and might allow additional management for conservation. The adjacent slopes, rather than the streambanks, include most of the rare plants in the corridor, and they greatly increase the conservation value.

**Site Name:** BIG SOUTH FORK NATIONAL RIVER AND RECREATION AREA (KY section, including the Wild River Corridor); Fig. 7, p. 118.)

**Size:** approx. 45 square miles (30,000 acres)

**County:** McCreary

**USGS Quadrangles:** Barthell, Ky.; Oneida North and Barthell SW, Tenn.-Ky.

**General Note.** The Big South Fork National River and Recreation Area (BSFNRRRA) includes the Big South Fork Wild River Corridor and some smaller sites of interest. Because of the recent acquisition of most land in this area by the National Park Service for management generally as an undisturbed natural area, it is useful to consider the whole area as a "Megasite". In addition to the Wild River Corridor, the area includes several tributary ravines that have considerable interest, e.g., along Huling Branch (Harker et al. 1979), Bear Creek and Alum Creek, and several sandstone outcrops (see notes below). However, relatively few rare species records are added by extension of the area from the Wild River Corridor to the whole BSFNRRRA. Species which have been found only outside the Wild River Corridor are shown by asterisks below (\*).

**Location of Site.** This large area lies either side of the Big South Fork of Cumberland River from near Big Creek (and the northern Stearns District boundary) upstream to the Kentucky-Tennessee state line. North of the Blue Heron area, the BSFNRRRA is only 1-2 miles wide, but to the south it widens to about 10 miles, including much of the watershed. The State Wild River Corridor itself has its downstream limit at the upper extent of impoundment near Blue Heron (below Devil's Jump), and its upstream limit at the State Line (above Difficulty Creek). The width averages about 0.5 mile wide, and includes slopes directly bordering the river. There is only one paved road access, via KY 742 to Blue Heron. There are a few gravel or dirt roads down to the banks, but the only good one is at the mouth of Bear Creek (to the gaging station).

**Site Description.** The river flows through the Cliff Section of the Cumberland Plateau. The watershed is rugged and largely forested; much is in federal ownership, either the Big South Fork National River and Recreation Area (National Park Service), which encloses the whole corridor and extends into Tennessee, or the USFS. A few forest stands along the river and in some tributary ravines exceed 100 years in age (as old as 1740-70 in 3 stands totalling 80 acres, according to USFS data). There are several abandoned deep-mine portals, but there are relatively few strip-mined areas. The river bottom is underlain by the Mississippian Pennington Formation, with various types of rock, including a little limestone. However, the banks are dominated in many places by sandstone boulders that have fallen from the ridges. There are several cobble bars.

### Listed Animal Species

- Aneides aeneus*, Green Salamander
- Epioblasma brevidens*, Cumberland combshell (mollusk)
- Epioblasma capsaeformis*, Oyster mussel (mollusk)
- Etheostoma cinereum*, Ashy darter
- Etheostoma tippecanoe*, Tippecanoe darter
- Myotis leibii*, Small-footed Myotis
- Myotis septentrionalis*, Northern Long-eared Bat
- Myotis sodalis*, Indiana Myotis
- Neotoma floridana magister*, Eastern Wood Rat
- Pegias fabula*, Little-winged pearlymussel (mollusk)
- Percina squamata*, Olive darter
- \* *Picoides borealis* (extirpated?), Red-cockaded Woodpecker
- Plecotus rafinesquii*, Rafinesque's Big-eared Bat
- Pleurobema oviforme*, Tennessee clubshell (mollusk)
- Ptychobranhus subtentum*, Fluted kidneyshell (mollusk)
- Spilogale putorius*, Spotted Skunk
- Villosa trabalis*, Cumberland bean mussel (mollusk)

### Other animals of interest

- Limnothlypis swainsoni*, Swainson's Warbler

### Listed Plant Species

- Aconitum uncinatum*, Monkshood
- Arenaria cumberlandensis*, Cumberland Sandwort
- Aster concolor* (marginal), Aster
- \* *Aureolaria patula*, False Foxglove
- Calycanthus floridus*, Sweet Shrub
- Chrysogonum virginianum*, Green and Gold
- Clematis glaucophylla*, Leatherflower
- Comptonia peregrina*, Sweet Shrub
- Conradina verticillata*, Cumberland Rosemary
- Coreopsis pubescens*, Downy Coreopsis
- \* *Cystopteris fragilis* var. *mackayi*, Mackay's Fragile Fern
- Erigeron pulchellus* var. *brauniae*, Braun's Robin Plantain
- Eupatorium luciae-brauniae*, Lucy Braun's White Snakeroot
- Euphorbia mercurialina*, Spurge
- \* *Gymnopogon ambiguus* (extirpated by impoundment?), Beardgrass
- \* *Hexastylis contracta* (not relocated), Heart-leaf
- Liatris microcephala*, Blazing-star
- Marshallia grandiflora*, Barbara's Buttons
- \* *Minuartia glabra*, Sandwort
- \* *Oenothera linifolia*, Thread-leaved Sundrops
- \* *Philadelphus inodorus* (not relocated), Mock Orange
- Podostemon ceratophyllum*, Riverweed

- Rhynchosia tomentosa* (nearby in Tenn.), Erect Rhynchosia  
 \* *Scleria ciliata* (impounded banks), Nut Rush  
*Solidago spathulata*, Goldenrod  
*Thuja occidentalis*, Northern White Cedar  
*Trichomanes boscianum*, Filmy Fern

**Other Plants of Interest**

- Acer pensylvanicum*, Striped Maple  
*Aster saxicastellii*, Rockcastle Aster  
*Baptisia australis* var. *australis*, False Indigo  
*Berberis canadensis*, American Barberry  
 \* *Crotonopsis elliptica*, Rushfoil  
 \* *Gentiana* cf. *cherokeensis* (extirpated by impoundment?), Cherokee Gentian  
 \* *Lysimachia hybrida* (extirpated by impoundment?), Swamp Loosestrife  
 \* *Oxalis montana*, Wood-sorrel  
 \* *Panax trifolius*, Dwarf Ginseng  
 \* *Platanthera lacera*, Ragged Orchid  
*Rhododendron catawbiense*, Mountain Rose-bay  
 \* *Talinum teretifolium*, Fameflower  
*Trachelospermum difforme*, Climbing Dogbane  
*Viburnum dentatum* var. *lucidulum*, Smooth Arrow-wood  
 \* *Viburnum molle* (not relocated), Broad-leaved Arrow-wood  
*Waldsteinia fragarioides* var. *parviflora*, Barren Strawberry  
 \* *Xyris torta*, Yellow-eyed Grass

**Summary of Significance.** This river section has relatively good water-quality, except below Bear Creek. Some of the best concentrations of rare mussels in Kentucky occur here; several populations of *Podostemon* also attest to the water-quality. The boulder-cobble bars are a variant of a globally rare natural community (grassland on rocky Appalachian riverbanks), with two plants that are federal candidates (*Conradina*, *Marshallia*) and several KAS/KSNPC-listed plants. Cliffs and rock outcrops in the corridor harbor good populations of Green Salamanders and Eastern Wood Rats. In addition, several rare bat species have been found utilizing man-made sites along the corridor as hibernacula, especially old mine-shafts, and they probably use many natural sites along cliffs.

**Explanation of Boundaries.** The BSFNRRRA boundaries have been determined by the federal government. The downstream limit of the Wild River Corridor is the upper limit of the Cumberland Lake impoundment. The upstream limit of the Corridor is a political boundary--the Tennessee State Line. However, the BSFNRRRA continues into Tennessee, presenting an opportunity for federal management of an extended river corridor. The slopes along the river have several rare plants, and are an important component of the corridor's total conservation value.

Notes on Special Sections. Some sections of the BSFNRRRA outside the Wild and Scenic River Corridor deserve recognition on their own merits, and any planned recreational development should take these features into account. These sections include, but are not limited to, the following areas.

- (a) Big South Fork, Impounded Section (Barthell and Nevelsville Quadrangles). The biological significance is largely historical. Many aquatic animals were devastated by the siltation and reduced flow associated with the impoundment in 1950. Before impoundment, the riverbanks were probably similar to the unimpounded section, but with increasing limestone exposure downstream. Largely due to Braun's collections, the following rare plants were recorded here: *Aureolaria patula*, *Calycanthus floridus*, *Conradina verticillata* (extirpated), *Coreopsis pubescens*, *Euphorbia mercurialina*, *Gymnopogon ambiguus* (extirpated), *Hexastylis contracta* (not relocated), *Marshallia grandiflora* (extirpated), *Philadelphus inodorus* (not relocated), *Scleria ciliata*, *Solidago spathulata* and *Trichomanes boscianum* [listed species]; and *Gentiana* cf. *cherokeensis* (probably extirpated, with no other Kentucky record), *Lysimachia hybrida* (extirpated or nearby?), *Panax trifolius* (not relocated) and *Viburnum molle* (not relocated) [other species of interest]. There is a need for more intensive survey of the remnants of pre-impoundment vegetation on the banks, and for assessment of any further impacts.
- (b) Alum Creek Ravine (lower section; Nevelsville Quadrangle). This area lies between the impounded section of Big South Fork (a) and some USFS- or privately owned uplands of at least historical interest (see introduction to "Significant Sites" section). The scenic waterfall (a popular hiking destination) has a large population of *Trichomanes*, and Braun collected *Philadelphus inodorus* nearby.
- (c) Bear Creek Ravine (lower section; Oneida North Quadrangle). Although the water-quality in this creek has been damaged by strip-mining, the narrow, scenic sandstone gorge probably harbors several rare plants, but it has not been thoroughly explored; *Trichomanes* is known from a tributary. A relatively old forest stand is known on the banks of the Big South Fork just upstream from the mouth of Bear Creek (W.S. Bryant, pers. comm.).
- (d) Huling Branch Ravine (Oneida North Quadrangle). This is another narrow ravine that was considered of special significance by Harker et al. (1979), due to its relatively undisturbed condition. Rare plants found here include *Panax trifolius* and *Oxalis montana*.
- (e) Oil Well Branch Clifftop (Barthell Quadrangle). This lies at the head of the west fork of Oil Well Branch of Big South Fork, about 1.5 miles south of the old Bald Knob School location. This is a relatively flat sandstone clifftop that is bare of woody vegetation for up to half an acre. The sparse vegetation is

dominated by lichens and annual vascular plants, together with grasses and composites (including *Liatris microcephala*). This is the smaller of the two known localities in the Stearns District with *Minuartia glabra* and *Crotonopsis elliptica*. The ravine below has a particularly well-developed cliffline and needs further exploration to determine if other important features exist nearby.

- (f) Bear Creek Road Glade (Barthell Quadrangle). This lies on the Bear Creek Road about half a mile southwest of where the road crosses Salt Branch, and half a mile northeast of the turn-off to the gaging station. It is adjacent to a small turn-around and parking area near a scenic natural arch, where an overlook and trail were constructed in 1989. This area is a small, disturbed sandstone glade complex with two rare plants: *Oenothera linifolia* (only known site in eastern Kentucky) and *Talinum teretifolium*. Nearby in seasonally wet fields and roadsides two others rare plants have been found in previous years - *Platanthera lacera* and *Xyris torta*. Careful relocation of the existing gravel road and parking lot in this area could lead to an improvement in the natural quality. If this site is to be conserved, a plan is needed soon, given the projected increase in recreational use.

**Site Name:** ROARING PAUNCH CREEK (from mouth upstream to the Tennessee State Line); Fig. 8, p. 119.

**Size:** approx. 5 square miles (3200 acres)

**County:** McCreary

**USGS Quadrangles:** Barthell, Ky.; Whitley City, Ky.; Winfield, Tenn.-Ky.

**Location of Site.** The downstream limit is the mouth of the stream at Big South Fork, Cumberland River. The upstream limit is the Tennessee State Line. The corridor width averages 0.25-0.5 miles, and includes the slopes adjacent to the stream. There are several paved and unpaved roads near the stream, and there are bridges on KY 742, KY 1470, and the Otter Creek Road.

**Site Description.** This stream generally flows in a SE-NW direction, though with much meandering. The headwaters are in the Low Hills Belt (relatively undissected Cumberland Plateau) and the mouth is in the Cliff Section. The watershed is gently rolling to rugged. It is largely forested, but mostly in private ownership, with no particularly old stands except for a few USFS-owned strips within a few hundred feet of the stream. Some headwaters drain from large strip-mined areas. The stream bottom is underlain by sandstone and shale, and there are bouldery sections in the Cliff Section; the lowest half-mile is not canoeable. There are few boulder-cobble bars similar to those on the Big South Fork.

#### Listed Animal Species

*Aneides aeneus*, Green Salamander

*Cambarus bouchardi*, Big South Fork crayfish

*Neotoma floridana magister*, Eastern Wood Rat

*Plecotus rafinesquii*, Rafinesque's Big-eared Bat

#### Listed Plant Species

*Carex stricta*, Sedge

*Cleistes divaricata*, Spreading Pogonia

*Coreopsis pubescens*, Downy Coreopsis

*Cypripedium kentuckiense*, Kentucky Lady's-Slipper

*Cystopteris fragilis* var. *mackayi*, Mackay's Fragile Fern

*Eupatorium luciae-brauniae*, Lucy Braun's White Snakeroot

*Erigeron pulchellus* var. *brauniae*, Braun's Robin Plantain

*Helianthus atrorubens*, Sunflower

*Hexastylis contracta*, Heart-leaf

*Liatris microcephala*, Blazing Star

*Malus angustifolia*, Crab Apple

*Orontium aquaticum*, Golden Club

*Podostemon ceratophyllum*, Riverweed

*Polygala polygama*, Purple Milkwort  
*Solidago spathulata*, Goldenrod  
*Viola tripartita*, Yellow Violet

**Other Plants of Interest**

*Humulus lupulus* var. *lupuloides*, American Hops  
*Panax trifolius*, Dwarf Ginseng  
*Robinia hispida* var. *rosea* (marginal), Rose-acacia

**Summary of Significance.** This stream has moderately poor water quality, though a few rare aquatic species do remain. The misnamed "Big South Fork" crayfish (formerly a federal candidate) is known only from Roaring Paunch Creek and tributaries. The riverbanks have many rare plant species. These mostly occur along the Big South Fork as well, but Roaring Paunch Creek has the only known population of *Cypripedium kentuckiense* (a federal candidate) in the Stearns District. Some rare species also occur on adjacent slopes and cliffines, including two federal candidates (the *Eupatorium* and *Hexastylis*). Cliffs and rock outcrops along the corridor support good populations of Green Salamanders and Eastern Wood Rats. In addition, the Rafinesque's Big-eared Bat has been documented to utilize man-made sites along the corridor, and the species probably uses natural sites as well.

**Explanation of Boundaries.** The rocky section downstream of KY 742 has more rare plant species than upstream, but some of the species do extend to near the state-line, including *Cypripedium kentuckiense*. A few were found only in this upstream section (the *Humulus*, *Malus* and *Polygala*). For this reason, the site was extended to the state-line.

**Site Name:** MARSH CREEK, LOWER SECTION (from mouth up to Clear Creek); Fig. 9, p. 120.

**Size:** approx. 5 miles (3200 acres)

**County:** McCreary

**USGS Quadrangles:** Cumberland Falls, Ky.; Hollyhill, Ky.

**Location of Site.** The corridor extends from the mouth of Marsh Creek up to, and including, the broad forested bottoms around the mouth of Clear Creek. The corridor averages about 0.5 miles wide. Access is easy from the bridges of KY 92 (just above upper limit), KY 1044, KY 478 and KY 679. The lower third is not directly accessible by road. (The upstream limits deserve further study.)

**Site Description.** In this section, the stream flows in a general S-N direction from the Low Hills Belt to the eastern part of the Cliff Section. The watershed is mostly forested, with much USFS ownership along this section. However, the broad bottoms upstream of this section are mostly agricultural, and there is some strip-mined land in the headwaters. The stream flows through sandstone and shale, and the banks and streambed are rocky in many places. There are several outcrops on the banks, and many small cobble-bars.

**Listed Animal Species**

*Alasmodonta atropurpurea*, Cumberland elktoe (mollusk)

*Aneides aeneus*, Green Salamander

*Etheostoma nigrum susanae*, Johnny darter

*Myotis septentrionalis*, Northern Long-eared Bat

*Neotoma floridana magister*, Eastern Wood Rat

**Other Animals of Interest**

*Nycteris cinerea*, Hoary Bat

**Listed Plant Species**

*Aster concolor*, Aster

*Calycanthus floridus*, Sweet Shrub

*Clematis glaucophylla*, Leather Flower

*Coreopsis pubescens*, Downy Coreopsis

*Erigeron pulchellus* var. *brauniae*, Braun's Robin Plantain

*Liatris microcephala*, Blazing Star

*Maianthemum canadense*, Canada Mayflower

*Orontium aquaticum*, Golden Club

*Solidago spathulata*, Goldenrod

*Vallisneria americana* (Clear Creek), Tape Grass

*Vernonia noveboracensis*, New York Ironweed

### Other Plants of Interest

*Aster puniceus* (along Clear Creek), Purple Aster  
*Catalpa bignonioides* (native?), Catalpa  
*Solidago patula*, Swamp Goldenrod  
*Stenanthium gramineum* var. *micranthum*, Featherbells

**Summary of Significance.** The water quality is moderately good, and there are several rare aquatic species present. Marsh Creek provides habitat for the most substantial population in the state of the Federally Endangered mussel, *Alasmidonta atropurpurea*. In the lower section, the population of *Orontium aquaticum* is locally dense, and, in upper section, there is an abundance of *Potamogeton diversifolius* (not found elsewhere in the Stearns District during 1989). The terraces have the only *Maianthemum canadense* known in the southern Cliff Section, and a locally dense population of *Stenanthium*. An unusual old meander of the creek has the only population of *Solidago patula* known in the Cliff Section of Kentucky (growing near *Platanthera flava*, *P. lacera*, *P. peramoena* and *Vernonia noveboracensis*). Several sedges of interest occur on the wetter bottoms, including *Carex crus-corvi* (at mouth of Clear Creek--only site in Appalachian Kentucky), and specimens tentatively identified as *C. howei* and *C. styloflexa*. Cliffs and rock outcrops along the corridor harbor good populations of Green Salamanders and Eastern Wood Rats, and probably rare bat species, as well.

**Explanation of Boundaries.** This lower section of Marsh Creek flows almost entirely through forested land, whereas the bottomland further upstream is mostly cleared. The broad forested bottom around the mouth of Clear Creek form the most extensive bottomland forest remaining in the Stearns District. Although this bottom is cutover and brushy in places, much of it appears to have never been farmed. The Clear Creek extension includes two rare plants not found along Marsh Creek itself (*Aster puniceus* and *Vallisneria*).

**Upstream Potential.** Other patches of bottomland forest with potential interest occur upstream of the corridor as defined here. Plants of interest in these patches include *Humulus lupulus* (Braun collection), *Quercus bicolor* and *Q. palustris* (see also Isham streamheads). In addition, Trammel Fork supports a relatively good population of Blackside dace (*Phoxinus cumberlandensis*). Although the upper Marsh Creek watershed is relatively disturbed, further research may suggest that some parts do deserve consideration for long-term conservation planning.

**Site Name:** CUMBERLAND RIVER, FROM THE FALLS TO REDBIRD; Fig. 10, p. 121.

**Size:** approx. 8 square miles (5000 acres)

**County:** McCreary and Whitley

**USGS Quadrangles:** Cumberland Falls, Ky.; Wofford, Ky.; Williamsburg, Ky.

**Location of Site.** The downstream limit is the KY 90 bridge just above Cumberland Falls. The upstream limit needs more study, but is tentatively located here near Redbird (above the State Wild River Corridor upper limit near Jellico Creek). The width of the corridor averages 0.5-0.75 miles, including adjacent bottoms and slopes. Several roads run near the river, but the only easy access points are the bridges at KY 90, Redbird and Williamsburg.

**Site Description.** This section of the river generally flows, with much meandering, in a SE-NW direction from the Rugged Eastern Area (Jellico Mountains) through the Low Hills Belt to the east side of the Cliff Section. The watershed is large and varied, with much urban land, agricultural land and strip-mined land in addition to forests. The bottoms are relatively broad in many areas, compared to other streams further west. The riverbanks are mostly alluvial, but there are several "shoals" in more rocky (sandstone) sections. Some of these shoals are fringed by sandstone outcrops or boulders, and there are a few low cobble bars.

#### **Listed Animal Species**

*Alasmidonta atropurpurea*, Cumberland elktoe (mollusk), (historical)  
*Aneides aeneus*, Green Salamander  
*Cryptobranchus alleganiensis*, Hellbender  
*Etheostoma nigrum susanae*, Johnny darter  
*Lampsilis ovata*, Pocketbook (mollusk), (historical)  
*Neotoma floridana magister*, Eastern Wood Rat  
*Phoxinus cumberlandensis*, Blackside dace (tributaries)

#### **Listed Plant Species**

*Carex stricta*, Sedge  
*Coreopsis pubescens* (not relocated), Downy Coreopsis  
*Gratiola pilosa* (not relocated), Hedge Hyssop  
*Liatris microcephala*, Blazing Star  
*Malus angustifolia*, Crab Apple  
*Orontium aquaticum* (not relocated), Golden Club  
*Platanthera integrilabia* (extirpated?), White Fringeless Orchid  
*Podostemon ceratophyllum* (extirpated?), Riverweed  
*Solidago spathulata*, Goldenrod  
*Tephrosia spicata*, Goat's Rue

### Other Plants of Interest

*Aster radula* (nearby), Scouring Aster  
*Catalpa bignonioides* (native?), Catalpa  
*Senecio pauperculus*, Ragwort  
*Trachelospermum difforme*, Climbing Dogbane  
*Tripsacum dactyloides* (nearby), Gama Grass  
*Wisteria frutescens*, Wisteria

**Summary of Significance.** The river has moderately poor water quality, and rare aquatic species are not as well represented as below Cumberland Falls. There are a few widely spaced rocky banks and cobble bars with rare plants. The occurrence of *Senecio pauperculus* (on the cobble bar at the mouth of Bunches Creek) is the only recent record of this species from Kentucky. The occurrence of *Aster radula* (on a terrace near the mouth of Clear Fork) is the only record of this species from Kentucky. Several other species on the grassy banks are rare in central and eastern Kentucky, though scattered along the Ohio Valley (*Cyperus refractus*, *Panicum virgatum*, *Paspalum fluitans* and *Spartina pectinata*). Bunches Creek (and perhaps other small tributaries within the immediate corridor) harbor Blackside dace. The cliffs and rock outcrops along the river are inhabited by good populations of Eastern Wood Rats and Green Salamanders, and probably rare bat species, as well.

**Explanation of Boundaries.** The lower boundary, at Cumberland Falls, is a natural topographic boundary, as well an administrative boundary. The appropriate upper limit needs further research, since the section between Williamsburg and Marsh Creek has not been thoroughly explored by botanists. Remnants of forest on the largely agricultural bottoms deserve surveying as far upstream as the Williamsburg area and beyond. Near the mouth of Clear Fork, above Williamsburg, *Aster radula* was discovered for the first time in Kentucky.

**Site Name:** ROCK CREEK (OF JELICO CREEK); Fig. 11, p. 122.

**Size:** approx. 6.5 square miles (4200 acres)

**County:** McCreary (SE section)

**USGS Quadrangles:** Ketchen, Tenn.-Ky.

**Location of Site.** It lies in southeastern McCreary County, adjacent to the Kentucky-Tennessee state line. It is reached by gravel roads, becoming dirt roads in places, from KY 1898 and KY 1470.

**Site Description.** This is a moderately large tributary watershed of Jellico Creek in the Rugged Eastern Area. It is over 90% forested, and mostly in USFS ownership. The N-facing southern side has several stands of above-average maturity. There has been relatively little strip-mining, and there are currently no residents.

**Listed Animal Species**

*Phoxinus Cumberlandensis*, Blackside dace

**Listed Plant Species**

none known (but *Cladrastis kentukea*, Yellow-wood, might be expected)

**Other Plants of Interest**

*Panax trifolius*, Dwarf Ginseng

**Summary of Significance.** Rock Creek contains the best known population of the Federally Threatened Blackside dace in the Stearns District. This population is probably dependent on the relatively good water quality and relatively extensive undisturbed forests in the watershed. This is the most remote, least disturbed watershed of moderate size in the Jellico Mountain Region of Kentucky, and it may provide the last chance to protect a sizeable section of this region before excessive resource extraction degrades water quality and associated features.

**Explanation of Boundaries.** These are the watershed boundaries.

**Site Name:** BUCKS BRANCH (Liza Mountain and eastern Ryan's Creek Mountain); Fig. 12, p. 123.

**Size:** approx. 1250 acres

**County:** McCreary and Whitley

**USGS Quadrangle:** Hollyhill, Ky.

**Location of Site.** It lies on the west side of Jellico Creek 2 miles southwest of the KY 92 bridge, straddling the McCreary-Whitley County line. On the north side is Liza Mountain, and on the south side is the eastern end of Ryan's Creek Mountain. A gravel road (to an active mine shaft) provides access from KY 1898.

**Site Description.** This is a small watershed in the Jellico Mountains region (in Rugged Eastern Area). Most (about 90%) is forested, except for a strip of farmland along the bottom, and some strip-mines on the southern side of the watershed. The upper slopes on the southern (N-facing) side are relatively steep. Also on this side, the forest is of above-average maturity for the region.

**Listed Animal Species**

*Phoxinus cumberlandensis*, Blackside dace.

**Listed Plant Species**

*Cladrastis kentukea*, Yellow-wood

**Summary of Significance.** One of the best three populations of Blackside dace known in the Stearns District was documented here by O'Bara (1985). Although there has been some mining, and some recent clear-cutting, the largely forested state of the watershed might enable this area to become one of the few stable refuges for this Federally Threatened Species in the District. Despite the severe drought of 1986, during which much of the stream dried up, the species persisted and individuals (at least 13 in total) were observed at most sampling stations in 1988 (USFS data). Relatively mature forest occurs on parts of the N-facing slope, with a scattering of *Cladrastis* (Dwarf Ginseng, *Panax trifolius*, may also be known from here; see Vascular Flora, Other Species of Interest.)

**Explanation of Boundaries.** These simply delimit the watershed, to enable plans for complete protection of water quality.

## Bottomland Forests

**Site Name:** WOLF CREEK BOTTOM (Owen's Bottom); Fig. 13 (a), p. 124.

**Size:** approx. 40 acres

**County:** Whitley

**USGS Quadrangle:** Williamsburg, Ky.

**Location of Site.** The site is 0.3 miles ESE of Wolf Creek Church, on KY 628, just downstream from the confluence of Wolf Creek and Little Wolf Creek.

**Site Description.** Wolf Creek is a tributary of Clear Fork of Cumberland River, within the Rugged Eastern Area (Jellico Mountains). The site includes some small remnants of young forest on terraces and streambanks. The forest is partly fragmented by some thickets and old fields, and these are also included.

### Listed Plant Species

*Coreopsis pubescens* (tentative id.), Downy Coreopsis

*Lobelia nuttallii*, Nuttall's Lobelia

### Other Plants of Interest

*Carex tenera* (nearby, tentative id.), Sedge

*Coreopsis verticillata*, Narrow-leaved Coreopsis

*Xyris torta*, Yellow-eyed Grass

**Summary of Significance.** In Whitley County, this is one of the best five remnants of seasonally wet terrace forest, characterized by the presence of *Quercus phellos*. It contains the only known populations in the county of the above rare plants, but with small populations. The forest is young and brushy, but these plants appear to grow in more open areas. In addition, there is some relatively undisturbed streamside forest. (The Johnny darter has been found in Wolf Creek near this site, but continuing strip-mining in the watershed may threaten the population.)

**Explanation of Boundaries.** Although the vegetation is somewhat fragmented by fields, the boundaries include a sequence from terrace to streamside soils. Appropriate management could enable a diversity of natural vegetation types to develop in this relatively small area.

**Site Name:** MOUNTAIN ASH BOTTOM (Beam's Bottom); Fig. 13 (b), p. 124.

**Size:** approx. 70 acres

**County:** Whitley

**USGS Quadrangle:** Williamsburg, Ky.

**Location of Site.** It lies 0.5 miles southwest of Mountain Ash, between Interstate 75 and an artificially cut off meander of Clear Fork. It can be reached directly at the end of KY 2995.

**Site Description.** This site is on the bottom of Clear Fork of Cumberland River, within the Rugged Eastern Area (Jellico Mountains). It contains small remnants of bottomland forest and a field.

**Note:** no listed species are known at this site.

**Summary of Significance.** Although no rare species are known here yet, the site contains the most mature example of seasonally wet terrace forest in Whitley Co. (or perhaps anywhere else in southeastern Kentucky). Characteristic trees are *Quercus phellos*, *Q. michauxii* and *Q. palustris*. In places the trees are up to 15-20 inches (40-50 cm) dbh.

**Explanation of Boundaries.** The best forest is only about 10 acres, but the younger forest and fields included within the boundaries could be allowed to grow up, eventually increasing the area of mature forest.

## Ravines and Dissected Upland Forests

**Site Name:** BRIDGE HOLLOW; Fig. 14, p. 125.

**Size:** approx. 130 acres

**County:** McCreary

**USGS Quadrangle:** Nevelsville, Ky.

**Location of Site.** Bridge Hollow is a tributary of Cowhorn Creek, which flows into the Big South Fork of Cumberland River NW of Whitley City. It can be reached from gravel roads north of KY 92.

**Site Description.** This is a small SE-facing watershed in the western part of the Cliff Section. It is ringed by narrow sandstone-capped ridges, and a well-developed cliffline with rockhouses. About 5-10 acres of forest at the head of the hollow is dominated by yellow poplar (*Liriodendron*) trees that are 30-40 inches (75-100 cm) d.b.h. The lower parts have young or recently clearcut forest.

### Listed Plant Species

*Eupatorium luciae-brauniae*, Lucy Braun's White Snakeroot

*Liatris microcephala*, Blazing-star

**Summary of Significance.** The small area at the head of the hollow appears to be essentially undisturbed by man, and is one of the most impressive old-growth stands found during the Stearns District Inventory. Within this area and nearby, there are two good populations of *Eupatorium luciae-brauniae* (a federal candidate) in rockhouses. The narrow ridge along the northeastern boundary has a good example of sandstone outcrop vegetation, with much *Liatris microcephala*, and it is a particularly scenic route to hike.

**Explanation of Boundaries.** The boundaries delimit the whole watershed of the hollow. In addition to the individual features noted above, the ecological interest from special protection of an entire watershed should be considered.

**Site Name:** SKULLBONES KNOB; Fig. 15, p. 126.

**Size:** approx. 60 acres

**County:** McCreary

**USGS Quadrangle:** Bell Farm, Ky.

**Location of Site.** It is part of Wolf Ridge about 2 miles SE of the KY 92 bridge over Little South Fork. It can be reached directly from the dirt road on Wolf Ridge, south from KY 92.

**Site Description.** It lies at the western edge of the Cliff Section. It contains a small sandstone-capped knob, a connecting saddle to the main ridge with a half-acre pond, and some surrounding cliffs and slopes. Except for small sandstone outcrops and the pond, it is covered in forest, which is not exceptionally mature.

**Listed Plant Species**

*Carex jorii*, Sedge

*Cystopteris fragilis* var. *mackayi*, Mackay's Fragile Fern

**Other Plants of Interest**

*Rhododendron catawbiense*, Mountain Rose-bay

**Summary of Significance.** This area contains a group of interesting features: the pond with *Carex jorii*, the cliffs with a relatively large population (at least 20 plants) of *Rhododendron catawbiense*, and the knob with exceptionally dry forest and thickets.

**Explanation of Boundaries.** In addition to enclosing the essential features noted above, the site includes a buffer-zone of forested slopes below the cliffs.

**Site Name:** FREEMAN FORK TRIBUTARY RAVINE; Fig. 16, p. 127.

**Size:** approx. 70 acres

**County:** McCreary

**USGS Quadrangle:** Wiborg, Ky.

**Location of Site.** This small tributary of Freeman Fork of Indian Creek is about 2 miles southeast of Parkers Lake. It is directly southwest of the most upstream fork in blue-line channels at the head of Freeman Fork. It is at least a mile from the nearest roads (unpaved branches of KY 90).

**Site Description.** This is a small NE-facing watershed in the eastern part of the Cliff Section. It is ringed by a shaley ridge and it contains a low narrow ravine with sandstone cliffs. This ravine, covering about 10 acres, contains relatively mature forest dominated by hemlock and beech trees about 20-35 inches (50-90 cm) dbh.

**Note:** no listed species are currently known from this site

**Other Plants of Interest**

*Oxalis montana*, Wood-sorrel

**Summary of Significance.** The site contains one of the most mature small ravine forests found in the Stearns District. It contains the largest known population of *Oxalis montana* in the southern Cliff Section, giving the ground vegetation an unusual character.

**Explanation of Boundaries.** The site consists of the entire watershed in order to plan complete protection and to include a diversity of forest types. Other rare species should be looked for here and in similar ravines nearby. Blackside dace have been found in some other tributaries of Indian Creek, and it is possible that further exploration would suggest a much larger watershed unit for special protection in the basin (see introduction to this section).

**Site Name:** STANIFORD HOLLOW; Fig. 17, p. 128.

**Size:** approx. 550 acres

**County:** Whitley

**USGS Quadrangle:** Williamsburg, Ky.

**Location of Site.** It lies 2 miles southwest of Williamsburg, and can be reached directly from the gravel road that turns west from KY 92 at Bon. Staniford Hollow is a tributary of Brier Creek, which flows into the Cumberland River.

**Site Description.** This watershed is in the Rugged Eastern Area (Jellico Mountains subsection). It is entirely forested. The N-facing slope is of above-average maturity in several places, with beech and sugar maple dominating, and canopy trees mostly 15-30 inches (40-70 cm) dbh. The S-facing slope has some small recent clearcuts. There are a few abandoned deep mine portals, and some old unpaved roads.

**Listed Plant Species**

*Cladrastis kentukea*, Yellow-wood

**Summary of Significance.** The N-facing slope has one of the most mature forest stands exceeding 50 acres in Whitley County or elsewhere in the Stearns District. It has the second-best known *Cladrastis* population known in the Appalachian Region of Kentucky, and some of the largest known trees in the state (up to ca. 50 cm dbh.). The whole watershed is included here because there are few (less than five?) of similar size in Whitley County (or elsewhere in the southern Rugged Eastern Area?) that are completely forested. (There are a few deep mine shafts that need to be checked for rare bats.)

**Explanation of Boundaries.** The boundaries outline the entire watershed above the cleared areas and the old strip-mine near the mouth of the hollow.

**Site Name:** JELICO CREEK OLD-GROWTH; Fig. 18, p. 129.

**Size:** approx. 270 acres

**County:** McCreary

**USGS Quadrangles:** Ketchen, Tenn.-Ky.; Jellico West, Tenn.-Ky.

**Location of Site.** It is on the south side of Jellico Creek, one mile southwest of the mouth of Capuchin Creek (in the southeastern corner of McCreary Co.). It is reached directly by the gravel road along the Jellico Creek bottom which joins KY 92 near the KY 92 bridge across Jellico Creek.

**Site Description.** This is a N-facing slope, extending from streamside to ridgeline, within the Rugged Eastern Area (Jellico Mountains). It is entirely forested, and in much of the area the canopy trees are relatively large, at about 15-35 inches (40-80 cm) dbh. The dominant species are beech, and locally hemlock or sugar maple.

**Note:** no listed species are currently known from this area.

**Summary of Significance.** This area has about the most mature forest seen within the Rugged Eastern Area of the Stearns District (the N-face of Staniford Hollow is similar). However, there are plans for a temporary logging road to traverse this area.

**Explanation of Boundaries.** Two more or less distinct old-growth sections are combined within the boundaries, together with some younger forest. The extension from streamside to ridgeline includes a diversity of forest types, and would allow conservation of the site's integrity.

## Less Dissected Uplands and Streamheads

**Site Name:** CHESTNUT RIDGE STREAMHEAD; Fig. 19, p. 130.

**Size:** approx. 190 acres

**County:** McCreary

**USGS Quadrangle:** Barthell SW, Tenn.-Ky.

**Location of Site.** It lies at the northwestern end of Chestnut Ridge, on the northwest side of the Peter's Mountain Road (or "Divide Road") between the Rock Creek and Big South Fork watersheds. The boundaries delimit a watershed unit with several streamheads, draining into Rock Creek.

**Site Description.** This is a small, relatively undissected watershed above the cliffline in the western part of the Cliff Section. It is entirely forested (and USFS-owned), though there is a recent clear-cut at the south end. The stream bottoms are locally swampy or boggy (with much *Sphagnum*).

### Listed Plant Species

*Calamagrostis cinnoides*, Cinna-like Reed Grass

*Parnassia asarifolia*, Ginger-leaved Grass-of-Parnassus

*Platanthera cristata*, Crested Fringed Orchid

### Other Plants of Interest

*Carex angustior* (tentative id.), Sedge

*Carex bromoides*, Sedge

**Summary of Significance.** This is one of the 5-10 most biologically interesting streamhead areas found in the Stearns District. Although partly clear-cut, this area is undisturbed by agricultural influence or roads. The populations of *Parnassia* and *Platanthera cristata* (though only 6 plants were seen) are relatively large compared to other sites.

**Explanation of Boundaries.** The whole watershed is delimited, allowing potential control of the drainage.

**Site Name:** BARREN FORK-BIG CREEK STREAMHEADS; Fig. 20 (a), p. 131.  
**Size:** approx. 230 acres  
**County:** McCreary  
**USGS Quadrangle:** Wiborg, Ky.

**Location of Site.** It lies either side of Old US 27 about 3 miles north of Whitley City and 2 miles south of Flat Rock. The eastern boundary lies along New US 27.

**Site Description.** The site is a relatively undissected area in the Cliff Section, on the divide between the Cumberland River watershed (specifically, Barren Fork of Indian Creek) and the Big South Fork watersheds (specifically, Big Creek). Several small streamheads occur here, including some small swampy, natural openings. The *Platanthera integrilabia* was described from a "sphagnum bog" in the 1940s, but this may have grown more brushy today. The area is forested, except for the roads, railroad, and some clearings and homesites near the southern boundary. The forest is mostly young (ca. 15-30 years), and there is a recent clearcut at the head of Big Creek.

#### Listed Animal Species

*Sorex [=Microsorex] hoyi winnemana*, Pygmy Shrew

#### Listed Plant Species

*Calamagrostis cinnoides*, Cinna-like Reed Grass

*Calopogon tuberosus* (extirpated?), Grass Pink

*Carex picta*, Sedge

*Carex stricta* (var. *stricta*), Sedge

*Gratiola pilosa* (extirpated?), Hedge Hyssop

*Helianthus atrorubens*, Sunflower

*Platanthera cristata*, Crested Fringed Orchid

*Platanthera integrilabia*, White Fringeless Orchid

*Sphenopholis pennsylvanica*, Swamp Oats

*Vernonia noveboracensis*, New York Ironweed

#### Other Plants of Interest

*Bartonia paniculata* (extirpated?), Screw-stem

*Carex bromoides*, Sedge

*Stenanthium gramineum* var. *micranthum*, Featherbells

*Xyris torta* (extirpated?), Yellow-eyed Grass

**Summary of Significance.** Part of the interest is historical, since this is where E.L. Braun and others collected *Platanthera integrilabia*, *Calopogon tuberosus* (both "abundant") and other rare plants in the 1940s. It is the type locality from which

*P. integrilabia* was first described as new to science. The *Calopogon* and *Gratiola* have not been refound, but this site still has the best known concentration of rare streamhead species in the Cliff Section. The *P. integrilabia* population is the largest currently known in Kentucky, and only three localities with this federal candidate are known in the state.

**Explanation of Boundaries.** The boundaries mostly lie along watershed divides to allow control of water quality for species that probably depend on relatively nutrient-poor water. The western and eastern boundaries cut off upstream sections of Big Creek and Barren Fork where rare species are known or likely to occur.

**Site Name:** PINE KNOT JOB CORPS STREAMHEADS; Fig. 21, p. 132.

**Size:** approx. 45 acres

**County:** McCreary

**USGS Quadrangle:** Whitley City, Ky.

**Location of Site.** It is about 1.5 miles north of Pine Knot between US 27 and KY 92, on the west side of the road from the Pine Knot Job Corps Center to Freedom Church.

**Site Description.** It consists of two small streamhead watersheds in a relatively undissected eastern part of the Cliff Section. The area is forested (and USFS-owned), though much of it was clear-cut in 1988-89. The stream bottoms are locally boggy, with *Sphagnum* patches.

**Listed Plant Species**

*Calamagrostis cinnoides*, Cinna-like Reed Grass

*Platanthera cristata*, Crested Fringed Orchid

*Platanthera integrilabia*, White Fringeless Orchid

**Other Plants of Interest**

*Xyris torta*, Yellow-eyed Grass

**Summary of Significance.** This is one of three known localities (each with 1-3 patches) in Kentucky with *Platanthera integrilabia* (a federal candidate), and there are a few other rare plants. Although one of the two *P. integrilabia* patches recently had its forest canopy clear-cut, it did flower vigorously in 1989, in marked contrast to the shaded patch. This site will be important for monitoring and studying the effects of cutting on this species.

**Explanation of Boundaries.** The two small watersheds with *Platanthera integrilabia* are outlined by the boundaries, so as to allow control of the drainage.

**Site Name:** WHERRY'S BOG STREAMHEAD (mostly of historical significance);  
Fig 22 (a), p. 133.

**Size:** approx. 40 acres

**County:** McCreary

**USGS Quadrangle:** Winfield, Ky.

**Location of Site.** It lies either side of New US 27, about 1 mile south of Strunk and 0.75 miles north of the Tennessee State Line at Isham. It is a small valley at the head of Fox Branch of Roaring Paunch Creek. The eastern boundary (and watershed divide) is Old US 27, just above a pond. The western boundary is just east of the railroad.

**Site Description.** This is a small streamhead in a relatively undissected ("Low Hills Belt") part of the Cumberland Plateau between the Cliff Section and the Rugged Eastern Area. The watershed is mostly forested, though all young and cut-over; it is disturbed by roads, but there has been little or no coal mining. The pond may have been partly created by the construction of New US 27. In the 1940s, this site was referred to as a "sphagnum bog" and the plants indicated rather open, seasonally wet conditions, not a swampy thicket and pond like today.

#### Listed Plant Species

*Aster concolor* (extirpated?), Aster  
*Calamagrostis cinnoides*, Cinna-like Reed Grass  
*Calopogon tuberosus* (recently extirpated?), Grass Pink  
*Helianthus atrorubens*, Sunflower  
*Lobelia nuttallii* (extirpated?), Nuttall's Lobelia  
*Parnassia asarifolia*, Ginger-leaved Grass-of-Parnassus  
*Polygala cruciata* (extirpated?), Cross Milkwort  
*Platanthera cristata* (recently ext.?), Crested Fringed Orchid  
*Platanthera integrilabia* (ext.?), White Fringeless Orchid  
*Vernonia noveboracensis*, New York Ironweed

**Summary of Significance.** The interest in this site is partly historical, especially the 1940s record of *Platanthera integrilabia* and the early 1980s record of *Calopogon tuberosus* (just one plant). Although about half the rare species with records from this site could not be found here in 1989, there are enough recent records to give it some significance for conservation. Appropriate management might enable some of the lost species to return. The most critical problems may be the apparent increase in water table of the pond due to New US 27, the possible pollution from roads, and the increasingly woody perimeter of this pond, which has apparently shaded out the *Calopogon* and *P. cristata* within the past 5 years (D. Stephens, pers. comm.).

**Explanation of Boundaries.** The upstream boundary is the watershed divide, to enable hydrological control. Below US 27, the boundaries just include the stream valley where *Parnassia* was found in 1989. There is a need for further exploration here and west of the railroad, and this might lead to extension of the boundaries.

**Site Name:** ISHAM STREAMHEADS; Fig. 22 (b), p. 133.

**Size:** approx. 130 acres

**County:** McCreary Co., Ky.; Scott Co., Tenn.

**USGS Quadrangle:** Winfield, Tenn.-Ky.

**Location of Site.** It lies near the Kentucky-Tennessee state line east of US 27 at Isham. It includes bottomland along Isham Creek in Tennessee (a tributary of Roaring Paunch Creek) and some small tributary watersheds in Kentucky. The optimal placement of boundaries needs further study.

**Site Description.** This area of small or medium-sized stream bottoms and low hills is on rather undissected land between the Cliff Section and the Rugged Eastern Area. On the Kentucky side, it is all forested and in places the canopy trees are relatively mature (about 12-24 inches, or 30-60 cm, dbh), but on the Tennessee side there are some clearings. The stream bottoms are swampy in places (with a few trees of *Quercus palustris* and *Q. bicolor*), but the channels are entrenched enough to prevent general development of mossy or boggy conditions.

#### Listed Plant Species

*Calamagrostis cinnoides* (Ky.), Cinna-like Reed-grass  
*Castanea pumila* (Ky.-tentative, one sapling), Chinquapin  
*Corallorhiza maculata* (Tenn.), Spotted Coral-root  
*Lobelia nuttallii* (Tenn.), Nuttall's Lobelia  
*Malus angustifolia* (Ky.), Crab Apple  
*Platanthera cristata* (Ky.), Crested Fringed Orchid  
*Vernonia noveboracensis* (Tenn.), New York Ironweed

#### Other Plants of Interest

*Juncus coriaceus* (Tenn.), Rush  
*Lespedeza cf. capitata* (Tenn.), Capitata Bush-clover

**Summary of Significance.** This site appears to contain the best remaining seasonally wet forest within the Low Hills Belts of the Stearns District. The forest is relatively mature in places, and there are some rare plant records (including the only recent DBNF record of *Castanea pumila*). However, *P. cristata* could not be found in 1989. The wet meadows and thickets south of the state-line are of further interest, due to their predominantly native composition and the occurrence of additional rare plants species (including *Corallorhiza maculata*, unknown in Kentucky west of the Cumberland Mts.).

**Explanation of Boundaries.** As drafted here, boundaries are tentative. They include some small watersheds and part of the bottomland along Isham Creek. Further exploration is needed, especially on the Tennessee side.

**Site Name:** USFS 690 (FLAT ROCK ROAD) RIDGE; Fig. 23, p. 134.

**Size:** approx. 480 acres

**County:** McCreary

**USGS Quadrangles:** Whitley City, Ky.; Hollyhill, Ky.

**Location of Site.** It is about 1-1.5 miles northeast of Gilreath, on either side of USFS-690, a gravel road north of KY 1044. It consists of the flatter land on the ridge between Taylor Branch and the west fork of Big Branch (both creeks draining into Marsh Creek).

**Site Description.** This area is at the east side of the relatively undissected uplands around Pine Knot, in the transition from Cliff Section to Low Hills Belt. It is mostly forested (and USFS-owned), and the canopy is dominated by rather widely spaced trees of shortleaf pine (mostly 20-50 cm dbh) mixed with, or often overtopping, a lower layer of oaks and hickories. There are several streamheads, with some small boggy places.

#### **Listed Plant Species**

*Calamagrostis cinnoides*, Cinna-like Reed Grass

*Cleistes divaricata*, Spreading Pogonia

*Helianthus atrorubens*, Sunflower

*Parnassia asarifolia*, Ginger-leaved Grass-of-Parnassus

*Vernonia noveboracensis* (marginal), New York Ironweed

#### **Other Plants of Interest**

*Liatris squarrosa* (only known site in McCreary Co.), Blazing Star

**Summary of Significance.** This is the largest area of relatively mature forest, and USFS-ownership, on the less dissected parts of the Cliff Section in the Stearns District. Within the modern landscape, it may be about the most similar land to the estimated condition of "pine-barrens" or "pine-savannah" that existed here before settlement and fire-suppression (Rogers 1941, Braun 1950, Palmer-Ball et al. 1988). Some rare plants typical of open pine-oak woods and seasonally wet streamheads have been found. (Within DBNF, Braun also collected the *Liatris squarrosa* in "dry open woods of Plateau", Whitley Co.) Some parts have not yet been explored. If managed appropriately for a few decades, this area could become suitable habitat for Red-cockaded Woodpeckers (*Picoides borealis*).

**Explanation of Boundaries.** These include the whole area of USFS ownership on the flatter ridgetop, plus, on the west side, some adjacent forested land and old field edges with rare streamhead species.

**Site Name:** DUCK RUN STREAMHEAD; Fig. 24, p. 135.

**Size:** approx. 50 acres

**County:** Whitley

**USGS Quadrangle:** Hollyhill, Ky.

**Location of Site.** It lies on the west side of KY 478, 0.2-0.4 miles south the junction between KY 478 and KY 679. It consists of the small forked watershed draining directly down from the road. This stream is the head of Duck Run, a tributary of Marsh Creek.

**Site Description.** This is a small streamhead in a relatively undissected part of the poorly defined "Low Hills Belt". It may be described as a disjunct eastern segment of the flatter lands around Pine Knot (within the Cliff Section). The area is mostly covered with young (about 10-20 year-old) forest (in USFS-ownership) that has a grassy, fire-maintained "barrens" appearance in places. There is also a wet opening of about one acre at the forks in the stream. This opening appears to be at least partly natural, and is dominated by tall herbs, sedges and grasses.

#### Listed Plant Species

*Calamagrostis cinnoides*, Cinna-like Reed Grass

*Helianthus atrorubens*, Sunflower

*Lilium philadelphicum*, Wood Lily

*Rhynchospora globularis*, Grass Beak Rush

*Vernonia noveboracensis*, New York Ironweed

#### Other Plant of Interest

*Juncus coriaceus*, Rush

**Summary of Significance.** This area has an unusual wet opening and one of the most interesting clusters of rare plants known on less dissected uplands in the Stearns District. It is the easternmost site with such species in the District (and the only one in Whitley Co.). The rare plants all grow in openings--mostly in the wet opening or along the road, which might be suitably managed with fire in a reconstruction of a "barrens" type of vegetation.

**Explanation of Boundaries.** The site consists of the entire watershed at the head of this stream, so that the drainage may be controlled. It also includes the adjacent roadsides with *Lilium philadelphicum*.

## Sandstone Glades and Barrens

**Site Name:** DOBBS HILL GLADES ("Mounce's Rock"); Fig. 25, p. 136.

**Size:** approx. 30 acres

**County:** McCreary

**USGS Quadrangle:** Bell Farm, Ky.

**Location of Site.** It lies at the junction of KY 1363 and the Rattlesnake Ridge Road, mostly on the north side of the road. The area extends no more than 200 ft from the road. (Small outcrops of interest also occur about 0.5-1 miles to the southwest along KY 1363.)

**Site Description.** This is a rocky part of a sandstone ridge in the western part of the Cliff Section. There are large, flat-topped sandstone outcrops along the road and next to houses. Some of these roadside areas have native grassy areas and open woods dominated by Virginia pine, but other areas are more disturbed and have exotic species.

### Listed Plant Species

*Liatris microcephala*, Blazing Star

*Sporobolus clandestinus*, Dropseed

### Other Plants of Interest

*Carex physorhyncha*, Sedge

*Phlox amoena*, Phlox

*Talinum teretifolium*, Fame Flower

**Summary of Significance.** The small rocky roadside areas have an unusual type of vegetation that is virtually unknown elsewhere in Kentucky, and there are some rare species. In addition to the typical species of dry sandstone outcrops like *Liatris microcephala*, *Talinum teretifolium*, *Andropogon scoparius*, *Stipa avenacea* and *Pinus virginiana*, there is a large admixture of species more typical of intermediate or high base-status in the soil, i.e., *Pellaea atropurpurea* and *Woodsia obtusa* (the only sandstone occurrence of these two ferns known to the authors), *Sporobolus clandestinus*, *Phlox amoena* and *Juniperus virginiana*.

**Explanation of Boundaries.** The whole roadside area, and up to about 200 ft into the woods, might have some long-term potential for conservation management. However, the rights-of-way and homesites would present immediate problems currently. Two other rare plant sites occur along this road about 0.5-1 mile southwest of Dobbs Hill (*Talinum teretifolium* and *Sphenopholis pennsylvanica*), and they could be included in any conservation plans for the roadsides of this area.

**Site Name:** FLAT ROCK CLIFFS (Franklin Hollow-head of Railroad Fork);

Fig. 20 (b), p. 131.

**Size:** approx. 840 acres

**County:** McCreary

**USGS Quadrangle:** Wiborg, Ky.

**Location of Site.** It lies either side of US 27 about 1 mile south of Flat Rock and 4 miles north of Whitley City. It includes the headwaters of Franklin Hollow (west of US 27) and Railroad Fork (east of US 27).

**Site Description.** This is a moderately dissected area in the Cliff Section, in the divide between the Cumberland River watershed (specifically Railroad Fork of Indian Creek) and the Big South Fork watershed (specifically Franklin Hollow, a tributary of Big Creek). The area is generally covered by forest of average to somewhat above-average maturity, except for the rights-of-way and a homesite. It includes some ravines lined by sandstone cliffs, with rockhouses and caves, and some open woods and glades above the cliffline.

#### **Listed Animal Species**

*Plecotus rafinesquii*, Rafinesque's Big-eared Bat

#### **Listed Plant Species**

*Calamagrostis cinnoides*, Cinna-like Reed Grass

*Carex picta*, Sedge

*Cleistes divaricata*, Spreading Pogonia

*Eupatorium luciae-brauniae*, Lucy Braun's White Snakeroot

*Malus angustifolia*, Crab Apple

*Minuartia glabra*, Sandwort

*Rhynchospora globularis*, Grass Beak Rush

#### **Other Plants of Interest**

*Cirsium carolinianum*, Carolina Thistle

*Crotonopsis elliptica*, Rushfoil

*Panicum albomarginatum* (or hybrid?), Panic Grass

*Talinum teretifolium*, Fame Flower

**Summary of Significance.** This site includes a combination of diverse ravine and ridge features that could be managed as a area with significant conservation, education and research values (and easy access from US 27). The sandstone cave used by Rafinesque's Big-eared Bats (a federal candidate) is one of the largest known to be used by rare bats in DBNF. There are two good populations of *Eupatorium luciae-brauniae* (a federal candidate) in rockhouses. There is an unusually well-developed area of grassy pine woods or "barrens"

(*Stipa-Pinus virginiana*) above the cliffs. The glades have among the largest known populations (or population-clusters) of *Minuartia glabra*, *Talinum teretifolium* and *Crotonopsis elliptica* known in the Cliff Section of Kentucky (or DBNF).

**Explanation of Boundaries.** These outline the entire watersheds at the heads of Franklin Hollow and Railroad Fork, in order to maximize research value and biodiversity, at the species and ecosystem levels. Since the area is bisected by US 27 and the railroad, it is useful to recognize two subsections.

**Site Name:** KY 700 ROADSIDES; Fig. 26, p. 137.

**Size:** approx. 90 acres

**County:** McCreary

**USGS Quadrangle:** Wiborg, Ky.

**Location of Site.** It lies along KY 700 between the inhabited area west of Pond Ridge and the Sand Hill Church area. It consists of the forest edges along the road and adjacent utility rights-of-way.

**Site Description.** This is a ridgetop in the western part of the Cliff Section, running along the divide between the Indian Creek and Marsh Creek watersheds (both tributaries of Cumberland River). The forest edges, thickets and grass-forb vegetation along the rights-of-way are largely composed of native species.

**Listed Animal Species**

*Ophisaurus attenuatus*, Slender Glass Lizard

**Listed Plant Species**

*Helianthus atrorubens*, Sunflower

*Lilium philadelphicum*, Wood Lily

*Polygala polygama*, Purple Milkwort

**Other Plants of Interest**

*Carex physorhyncha* (nearby), Sedge

*Sanicula marilandica*, Sanicle

*Phlox amoena*, Phlox

**Summary of Significance.** The vegetation of these rights-of-way appears to form one of the best remnants of the pine-oak "barrens" that is presumed to have existed before settlement and fire-suppression. It contains the largest known population of *Lilium philadelphicum* in the Stearns or Somerset Districts (though with no more than 20 plants seen). The slender glass lizard also remains as a relict of the former "barrens" habitat.

**Explanation of Boundaries.** Only the openings along the rights-of-way are included here, but further management plans could seek to extend the "barrens" type into the forest, e.g., by controlled burning. On the south side of this road, there are several square miles with relatively mature pine stands in several places, which should be searched further for the Red-cockaded Woodpecker (see introduction to this section).



FIGURE 5: Map of Little South Fork Cumberland River Corridor showing significant area. Corbin, Ky. USGS 30 x 60 Minute Quadrangle.

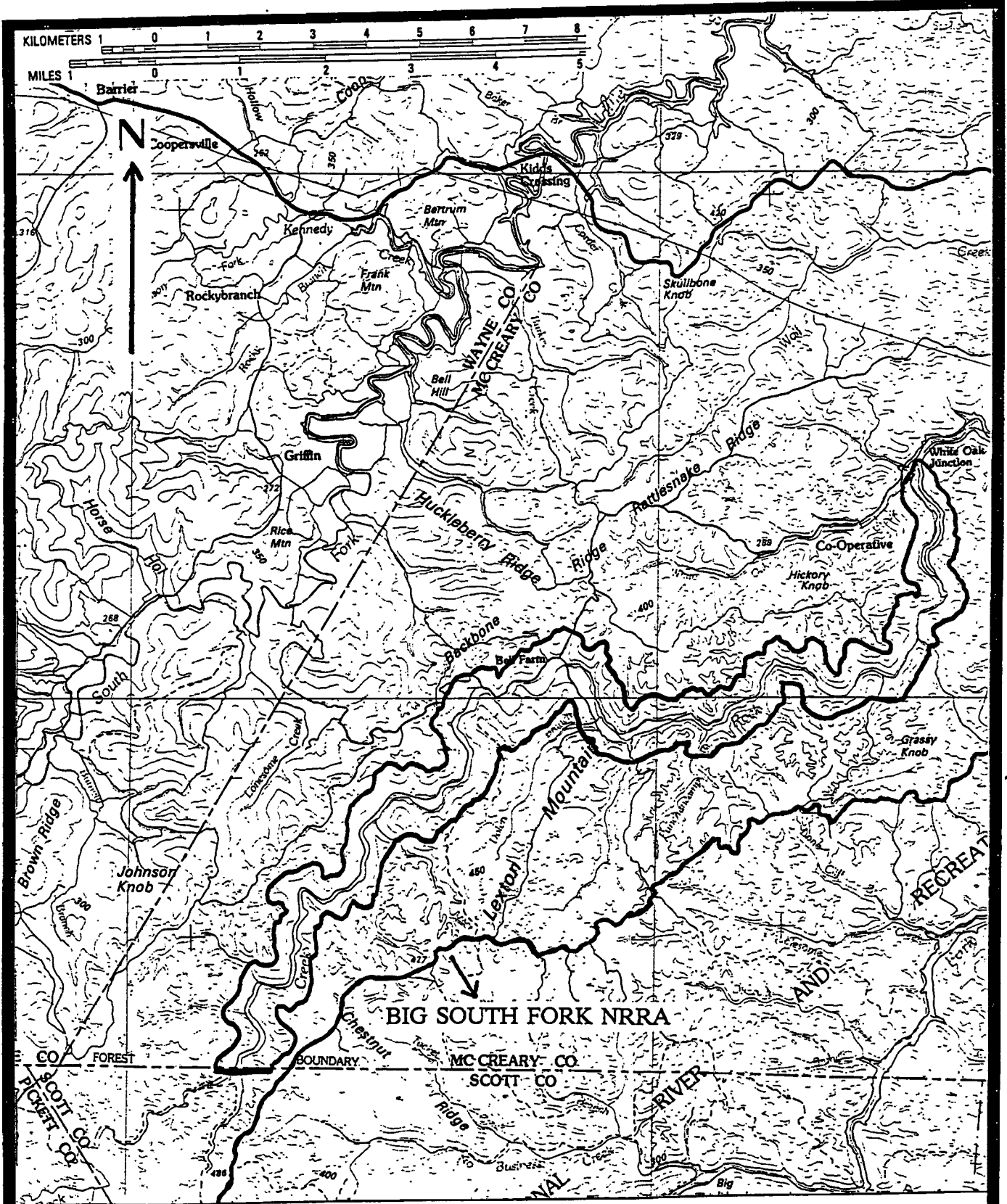


FIGURE 6: Map of the Rock Creek (sw McCreary County) Corridor showing significant area. Corbin, KY. USGS 30 x 60 Minute Quadrangle.

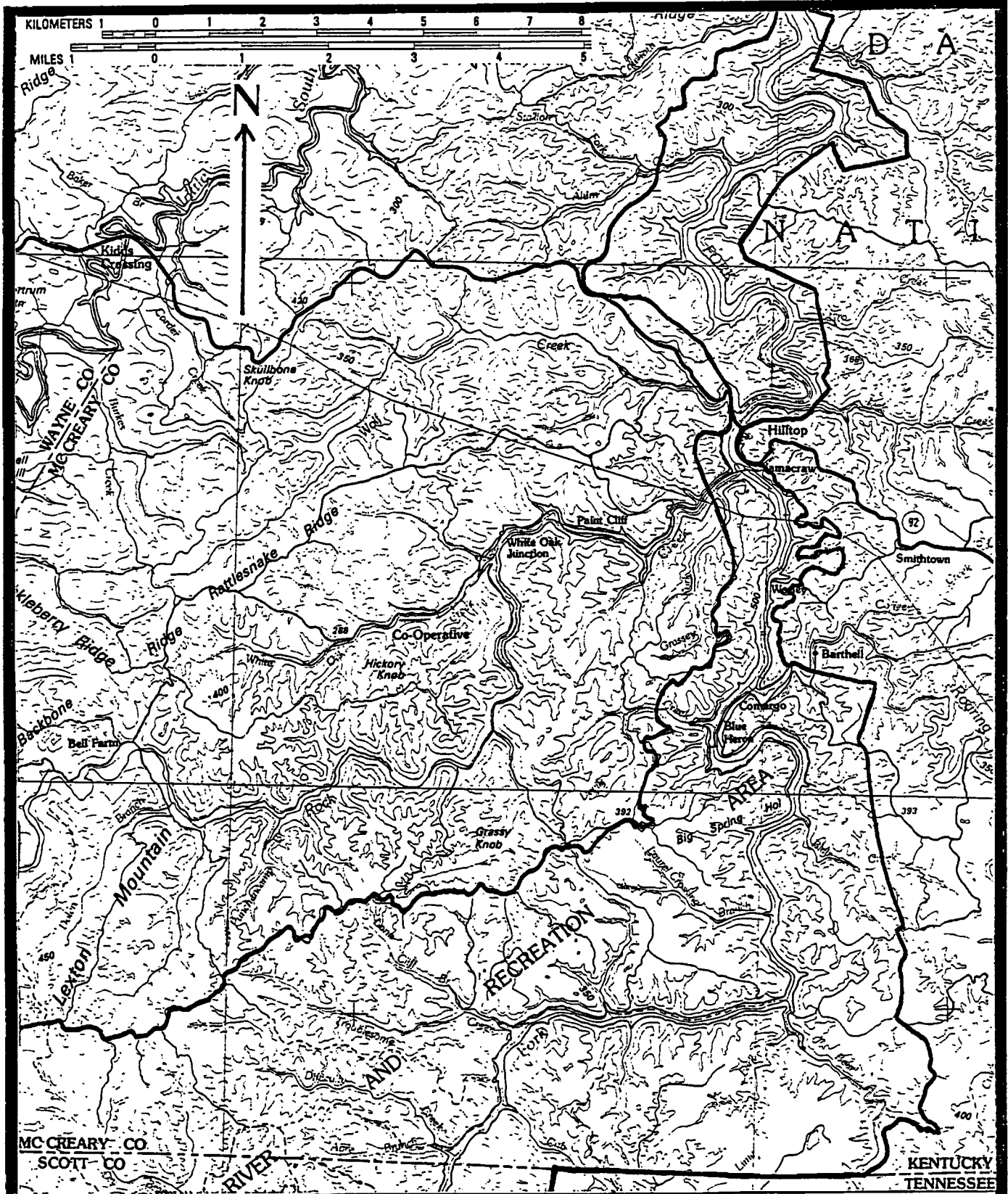


FIGURE 7: Map of Big South Fork National River and Recreation Area, a significant area. Corbin, Ky. USGS 30 x 60 Minute Quadrangle.

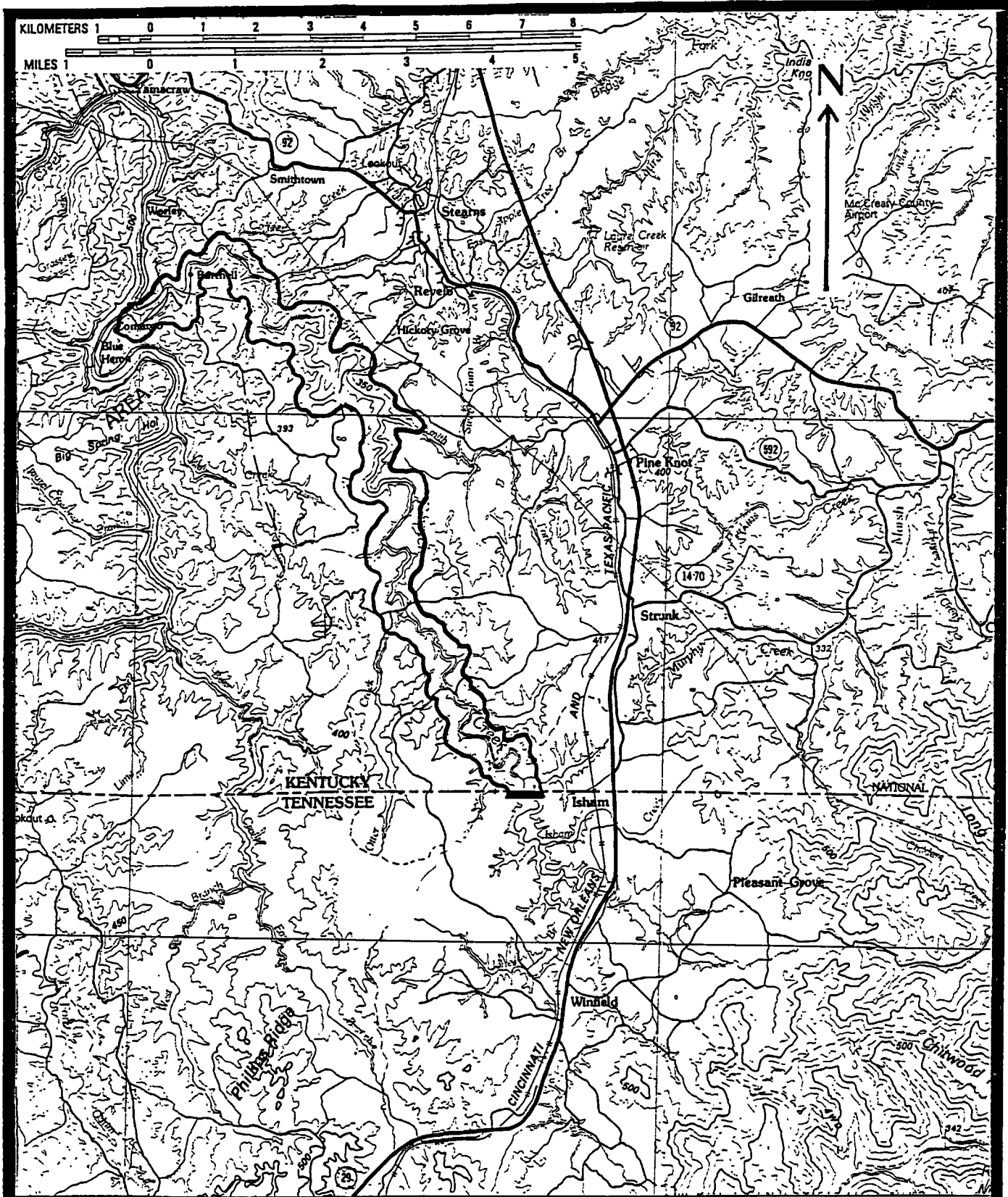


FIGURE 8: Map of the Roaring Paunch Creek Corridor showing significant area. Corbin, Ky. USGS 30 x 60 Minute Quadrangle.

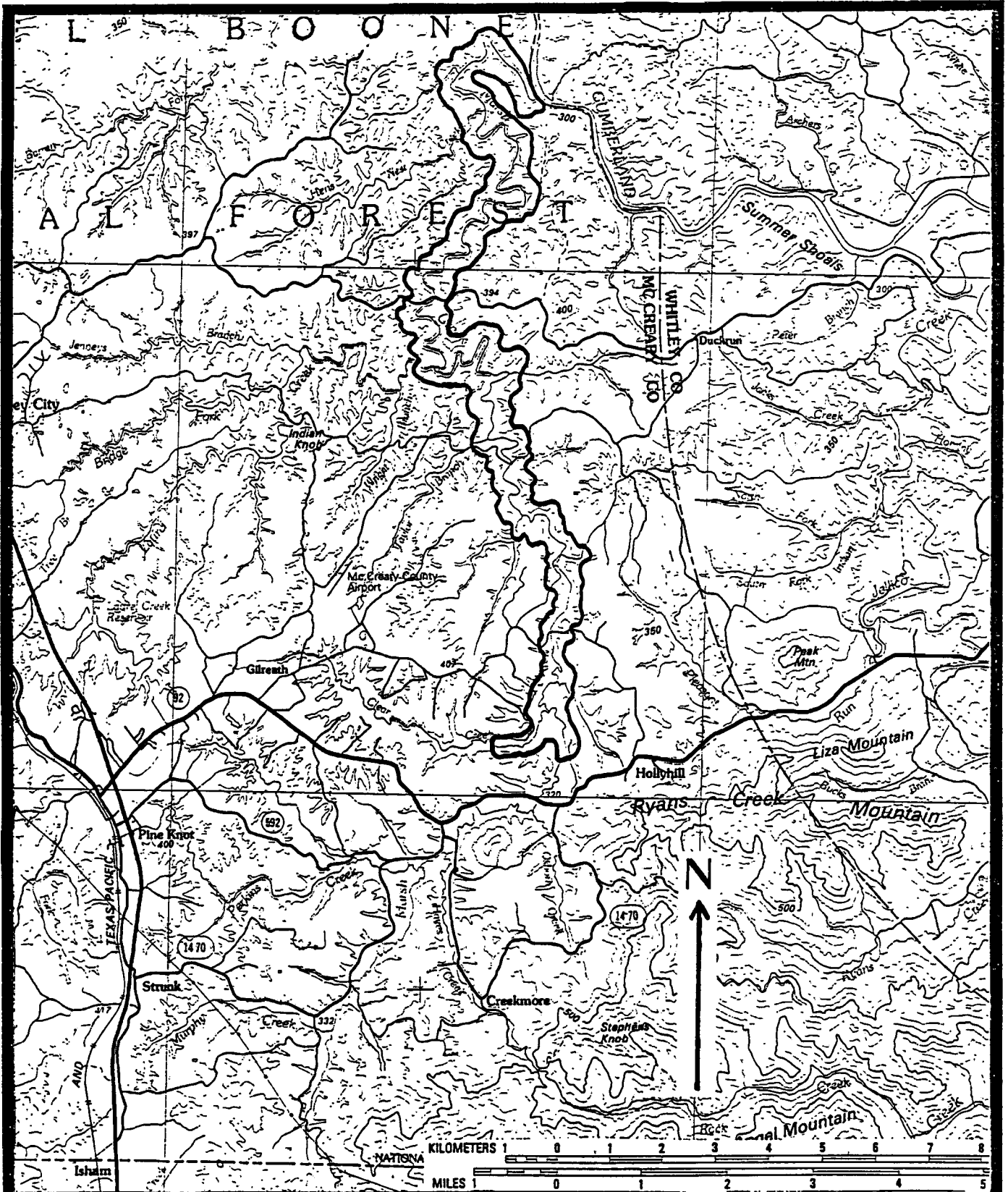


FIGURE 9: Map of the Marsh Creek Corridor showing significant area. Corbin, Ky. USGS 30 x 60 Minute Quadrangle

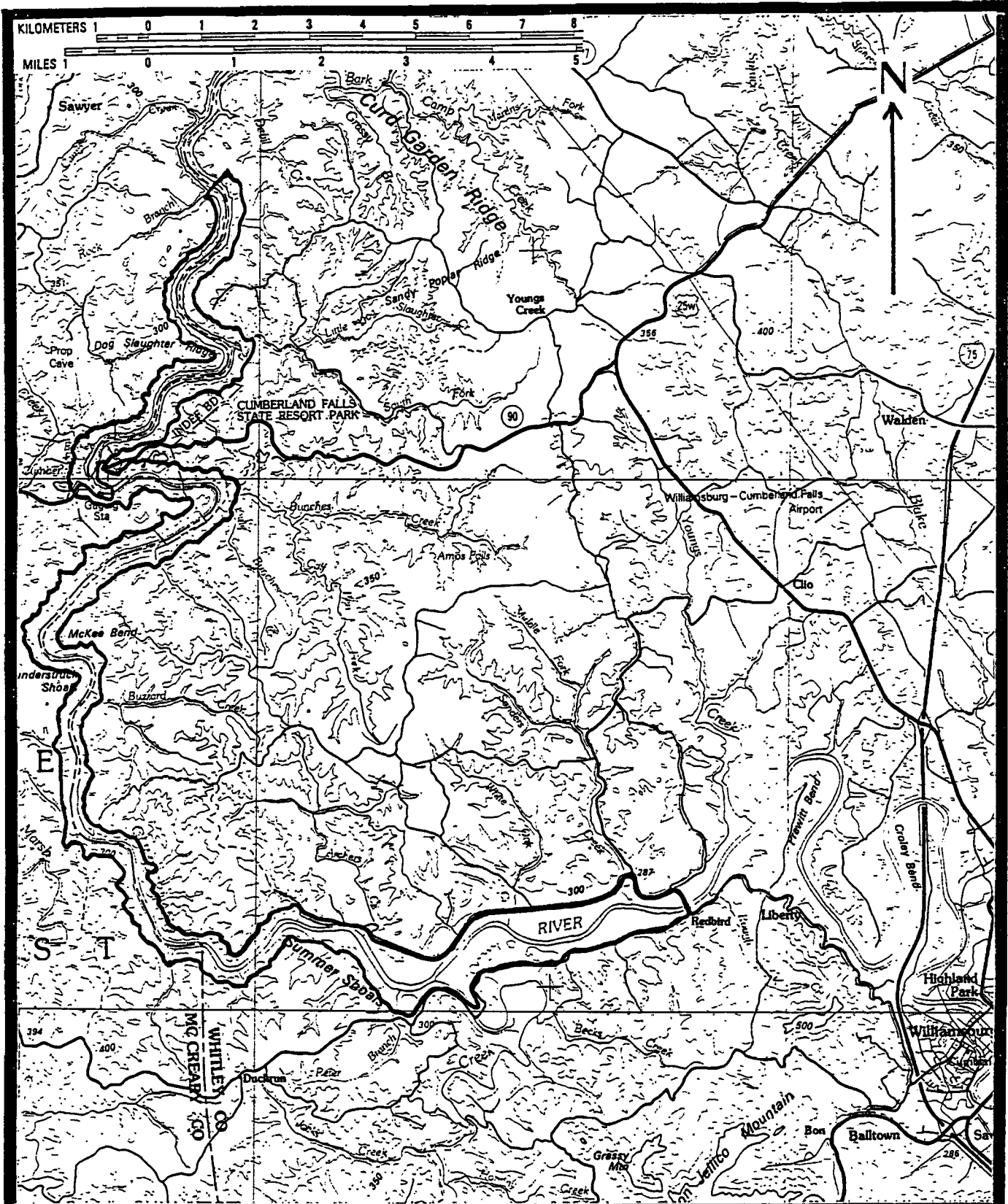


FIGURE 10: Map of Cumberland River Corridor showing significant area. Corbin, Ky. USGS 30 x 60 Minute Quadrangle

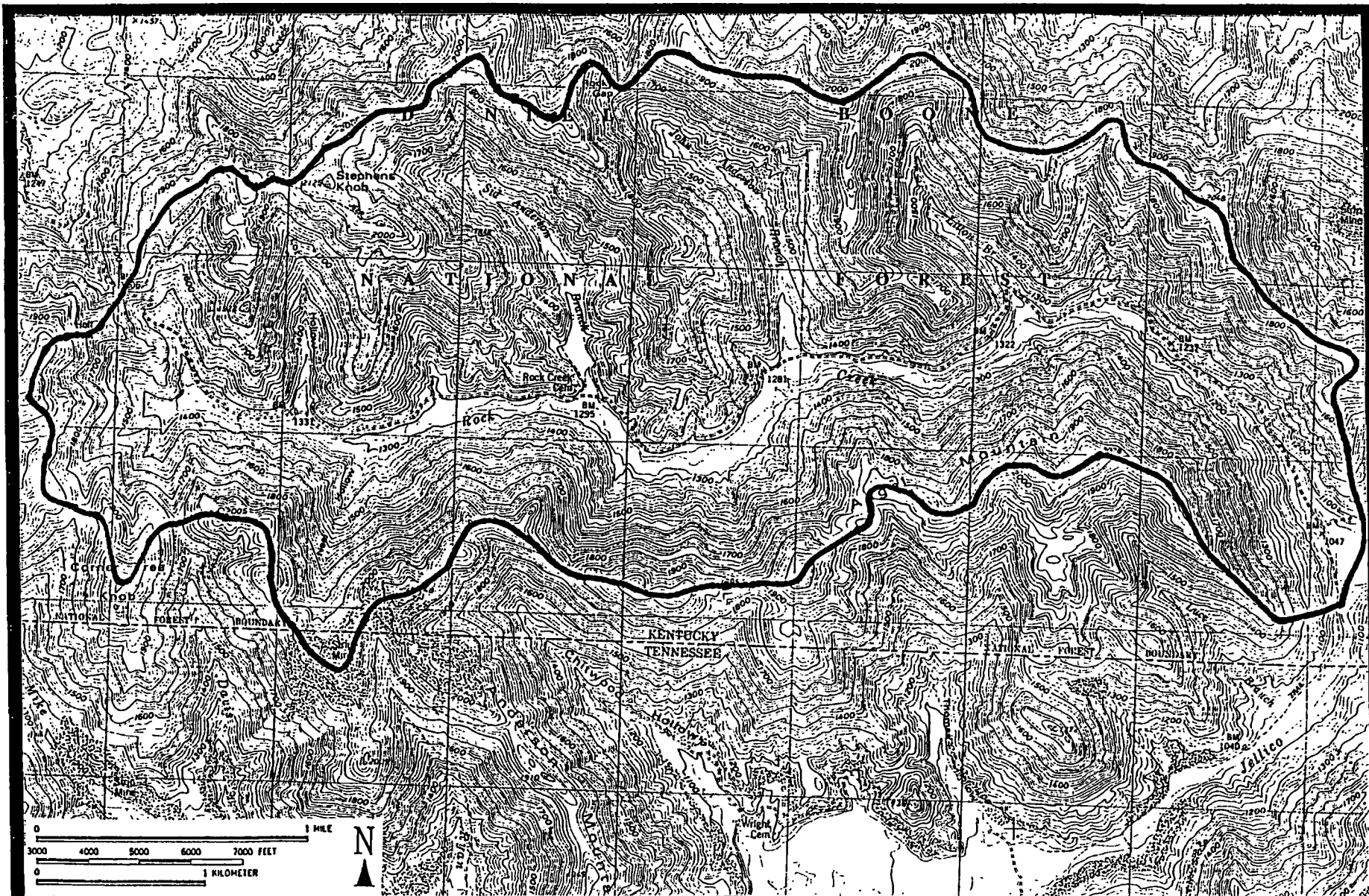


FIGURE 11: Map of Rock Creek (of Jellico Creek) and vicinity showing significant area. Ketchen, TN-KY. USGS 7.5 Minute Quadrangle.

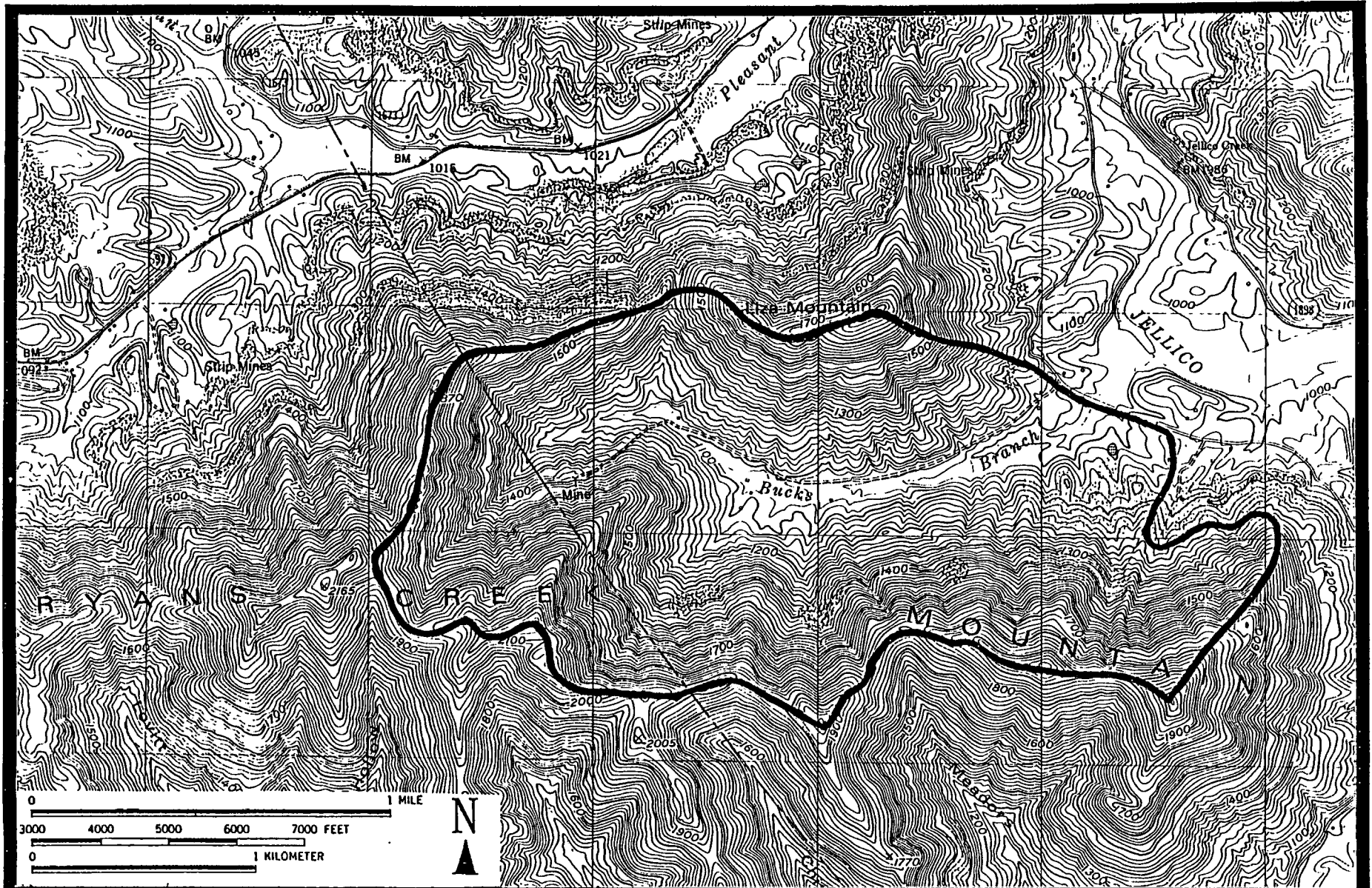


FIGURE 12: Map of Bucks Branch and vicinity showing significant area.  
Hollyhill, KY. USGS 7.5 Minute Quadrangle.

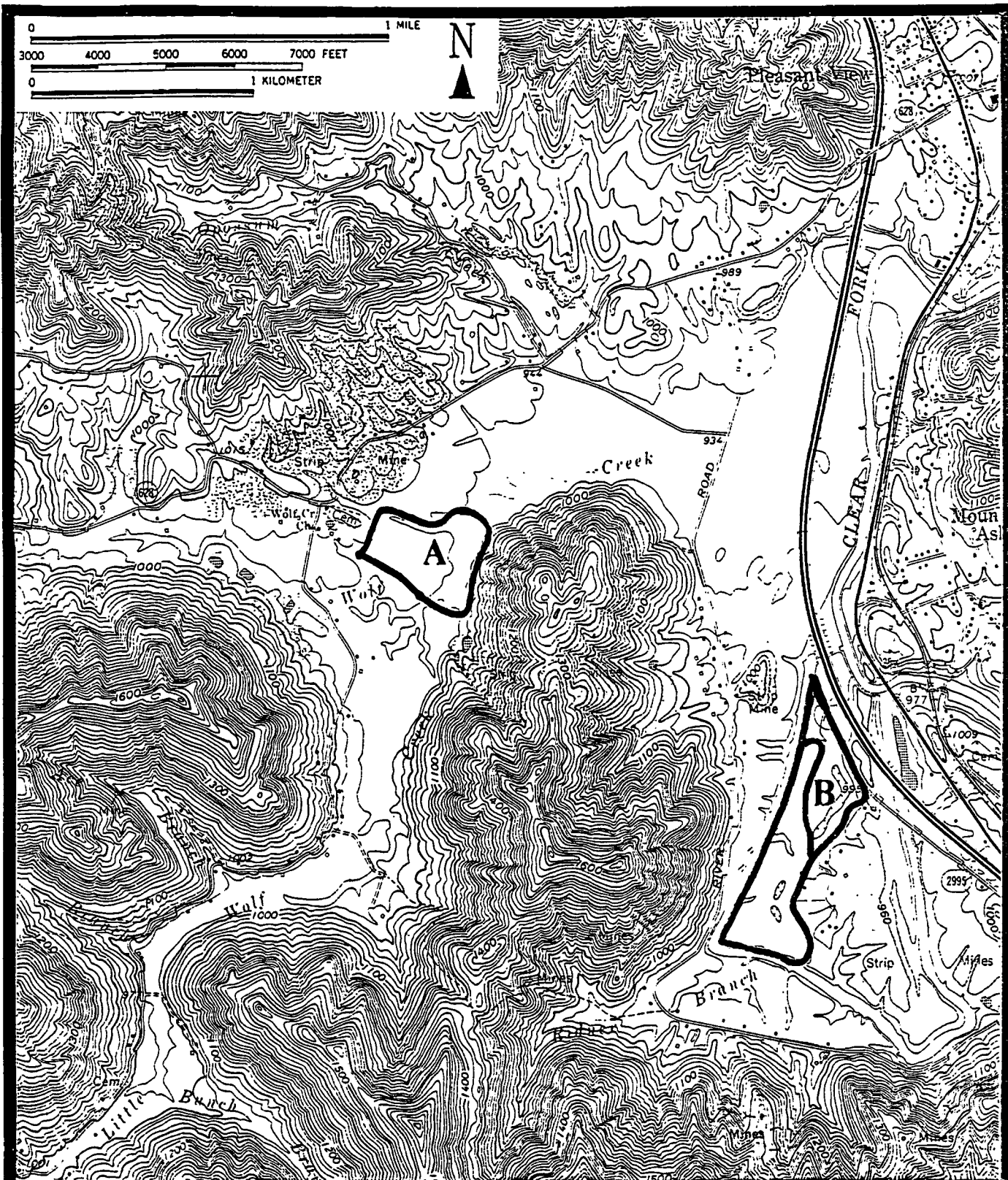


FIGURE 13: Map of Clear Fork area showing significant areas:  
 (a) Wolf Creek Bottom; (b) Mountain Ash Bottom (primary area is on N side).  
 Williamsburg, KY. USGS 7.5 Minute Quadrangle.

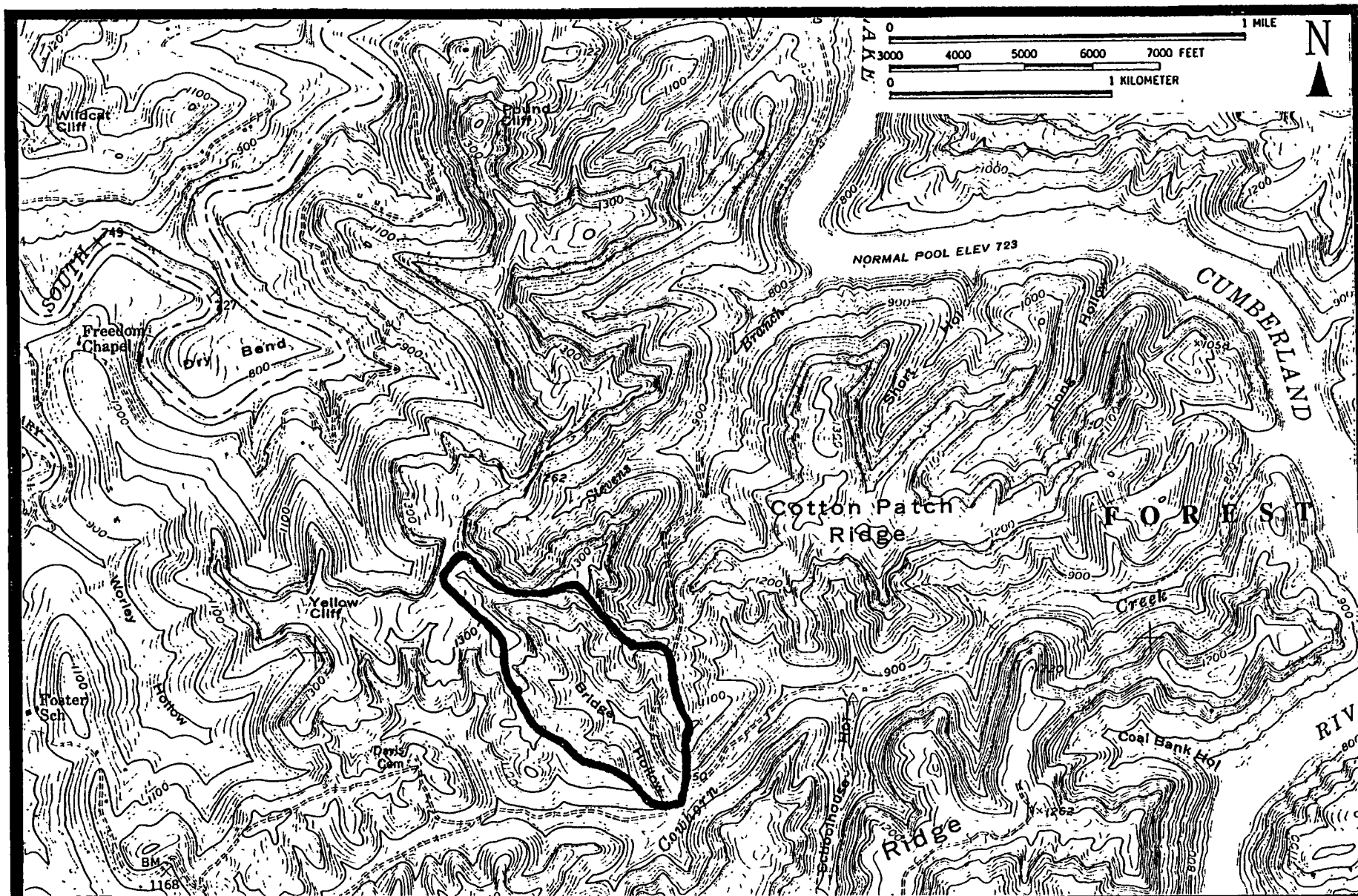


FIGURE 14: Map of Bridge Hollow and vicinity showing significant area. Nevelsville, KY. USGS 7.5 Minute Quadrangle.

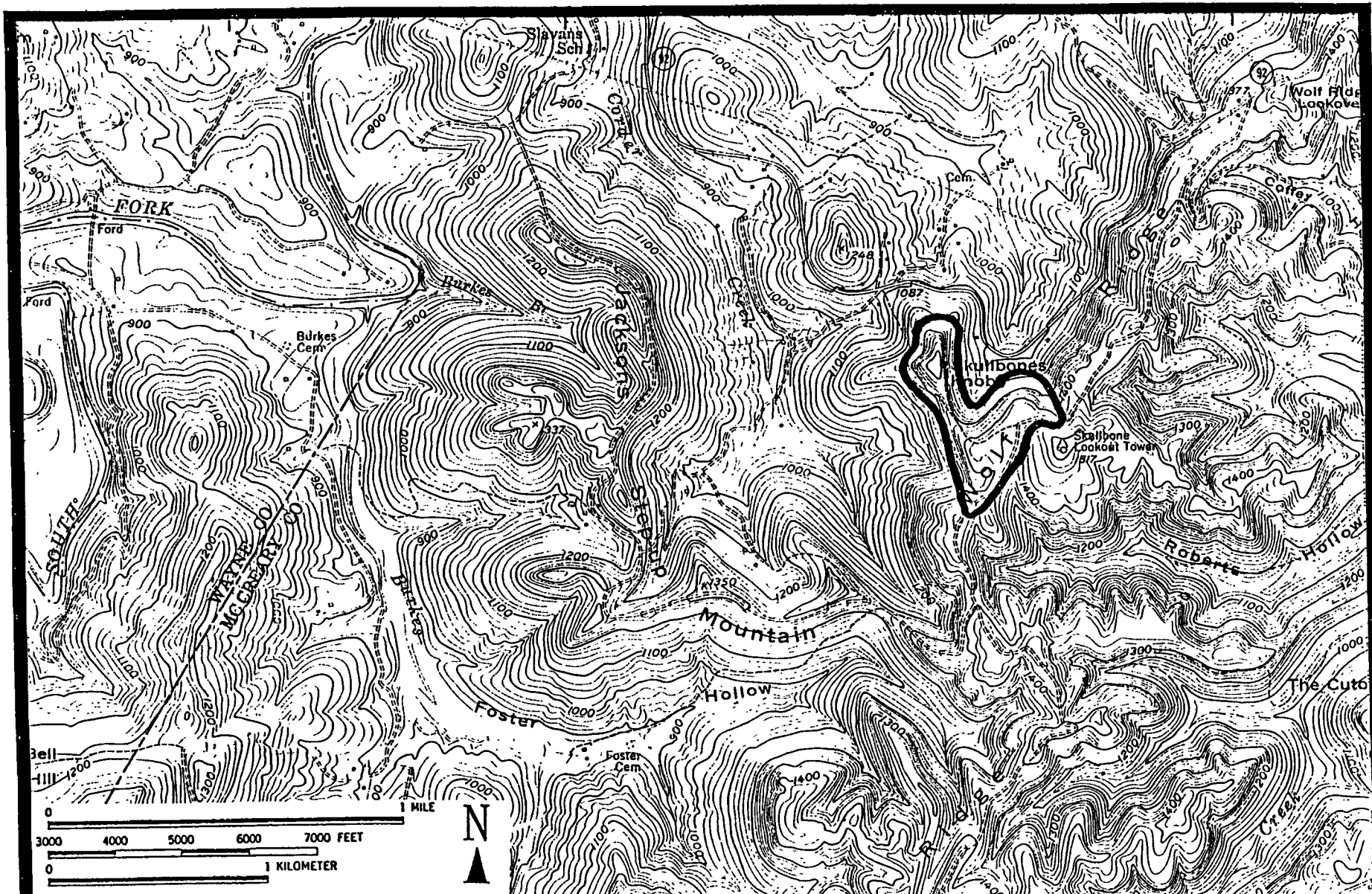


FIGURE 15: Map of Skullbones Fork and vicinity showing significant area.  
Bell Farm, KY. USGS 7.5 Minute Quadrangle.

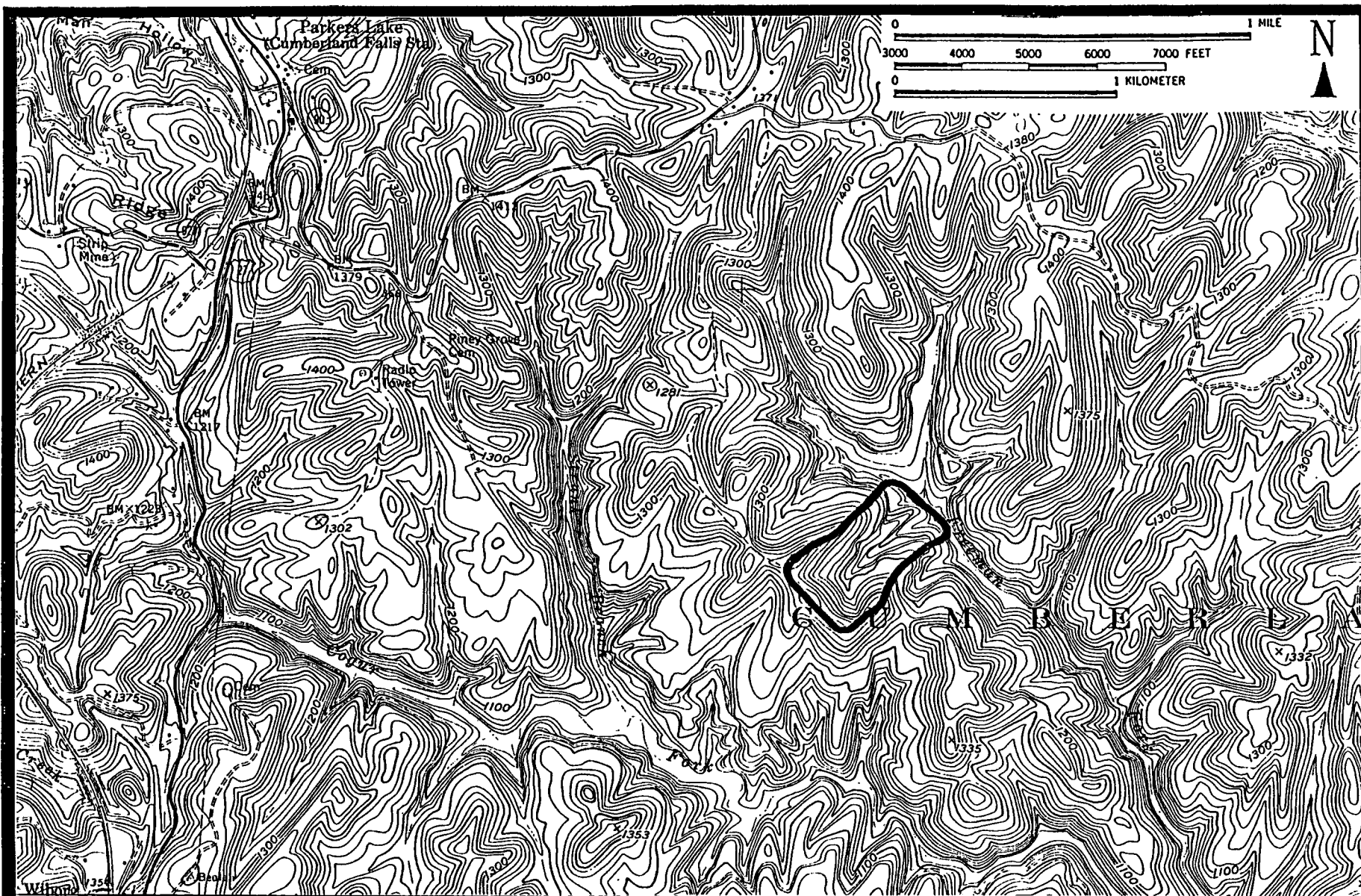


FIGURE 16: Map of Freeman Fork Tributary Ravine and vicinity showing significant area. Wiborg, KY. USGS 7.5 Minute Quadrangle.

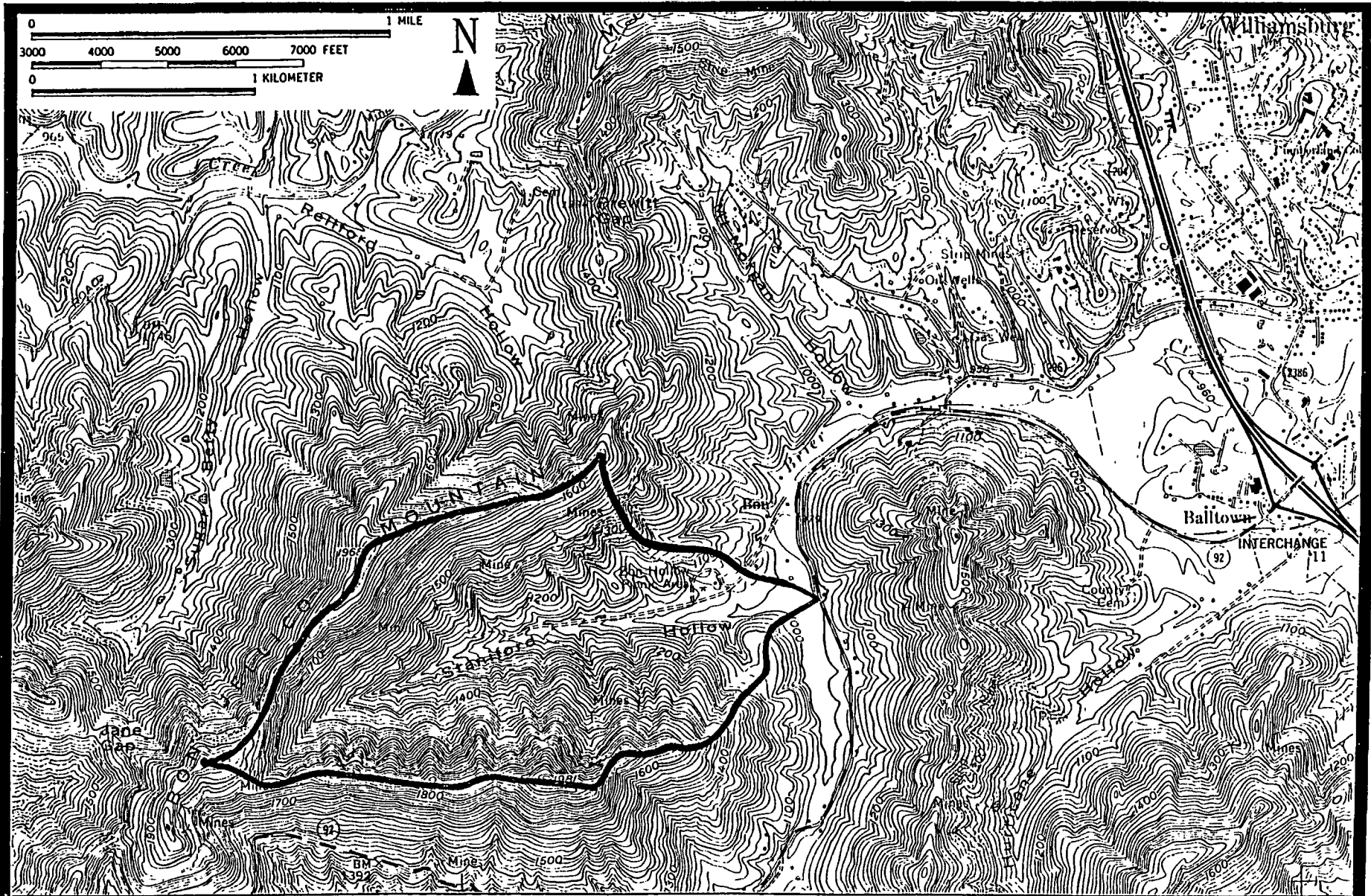


FIGURE 17: Map of Staniford Hollow and vicinity showing significant area.  
Williamsburg, KY. USGS 7.5 Minute Quadrangle.

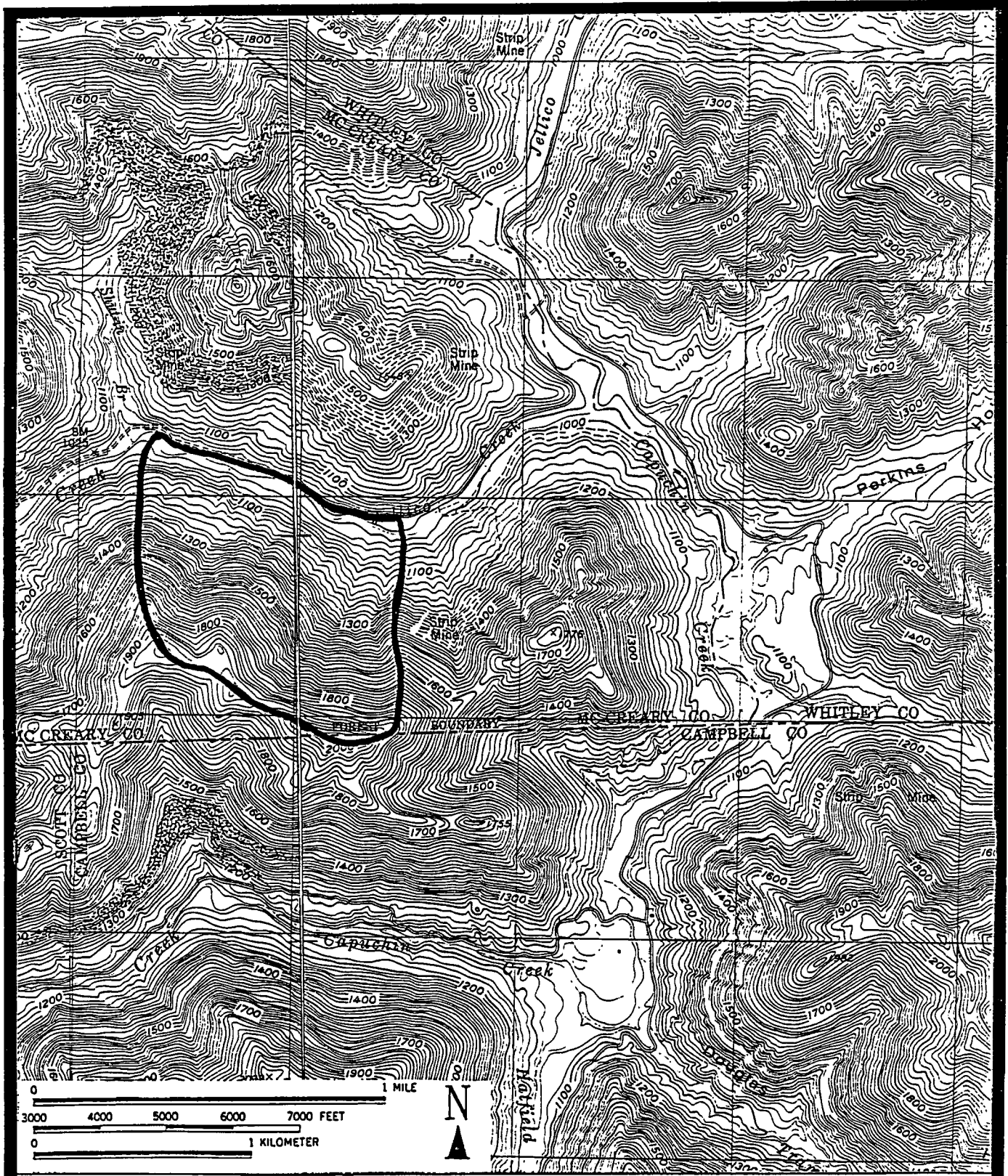


FIGURE 18: Map of Jellico Creek near Tennessee State-line showing significant Old-Growth area. Jellico East and Ketchen, KY-TN. USGS 7.5 Minute Quadrangles.

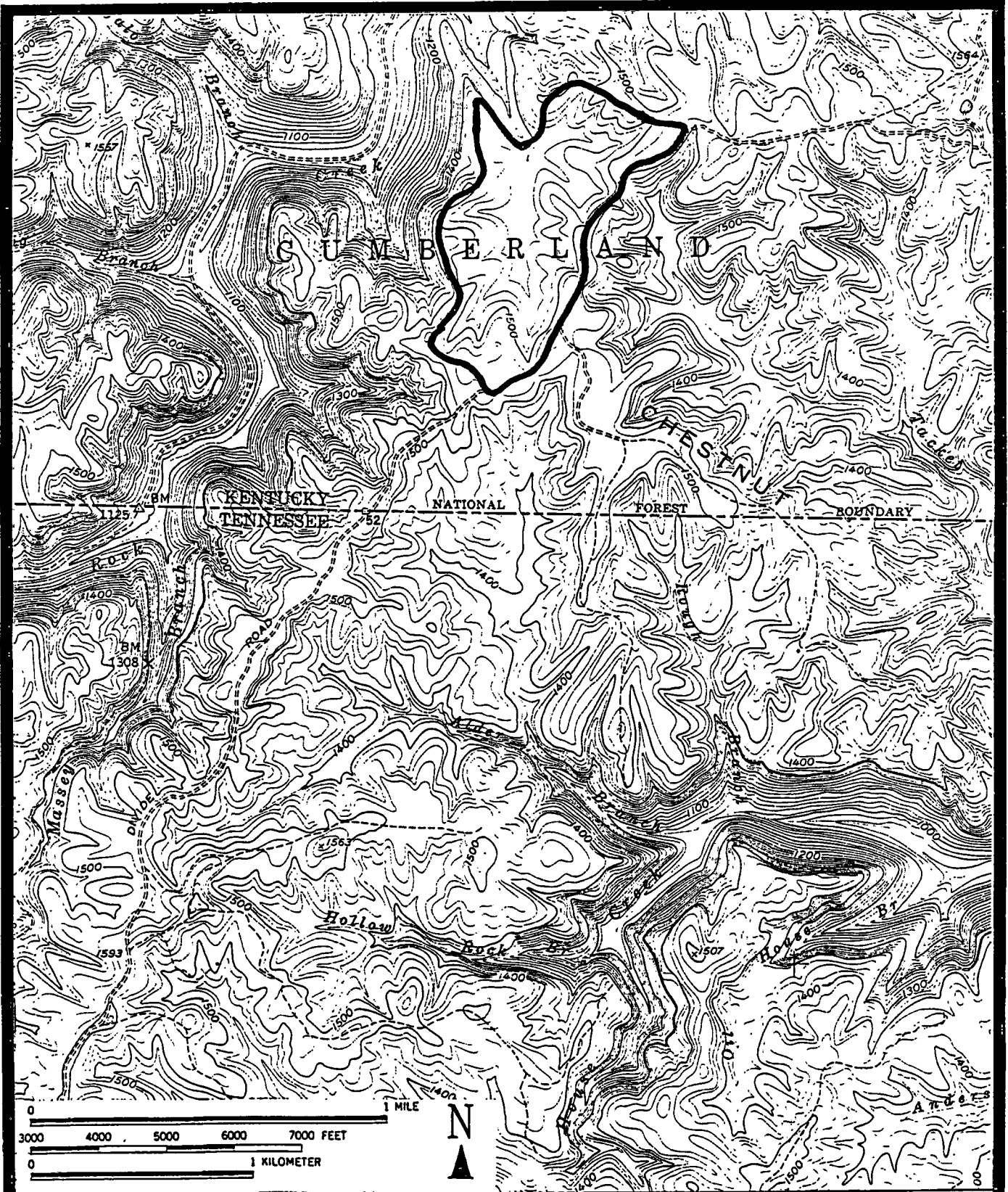


FIGURE 19: Map of Chestnut Ridge Streamhead and vicinity showing significant area. Barthell SW, TN-KY. USGS 7.5 Minute Quadrangle.

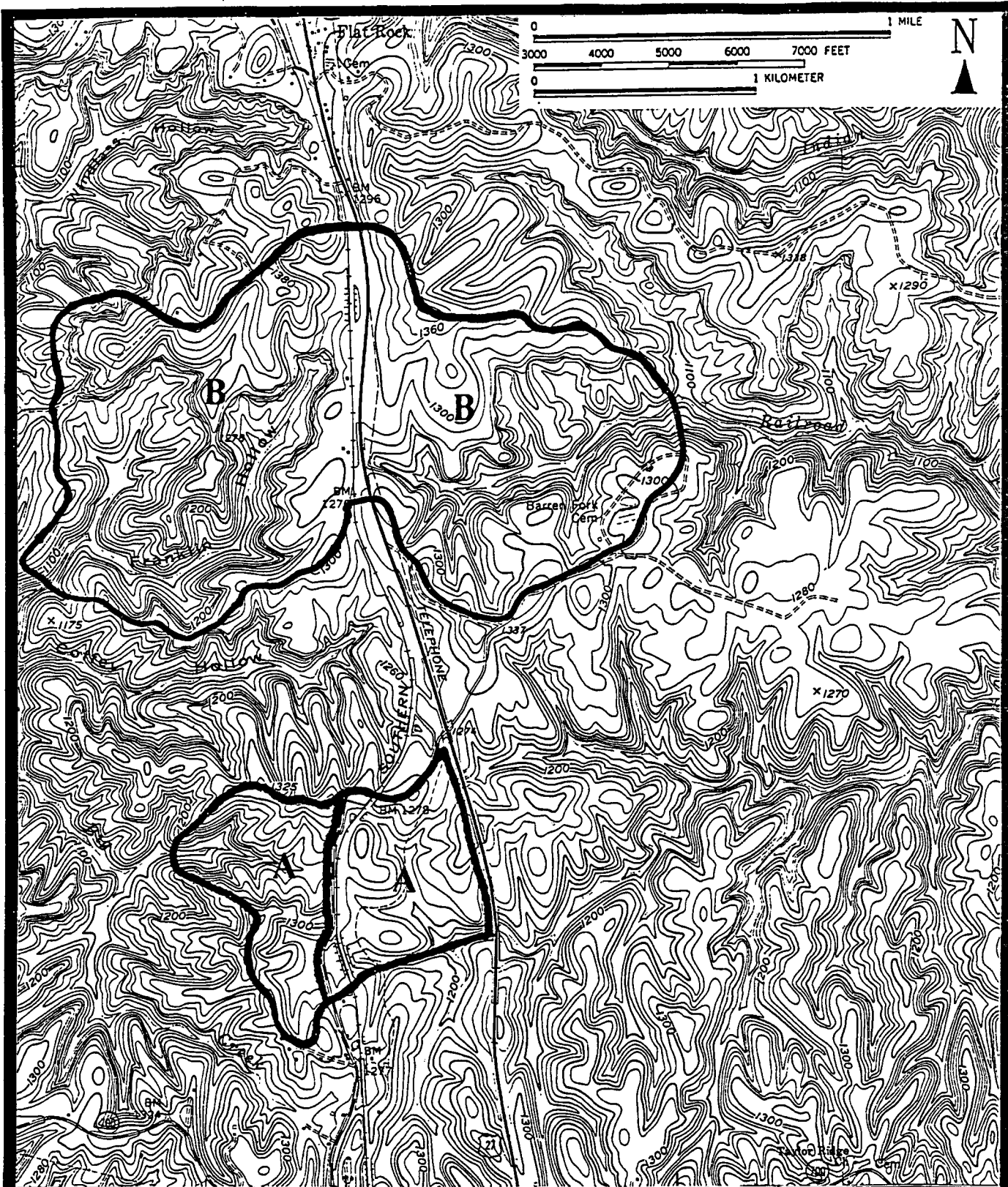


FIGURE 20: Map of (a) Barren Fork-Big Creek Streamheads (western part has primary importance) and (b) Flat Rock Cliffs vicinity showing significant areas. Wiborg, KY. USGS 7.5 Minute Quadrangle.

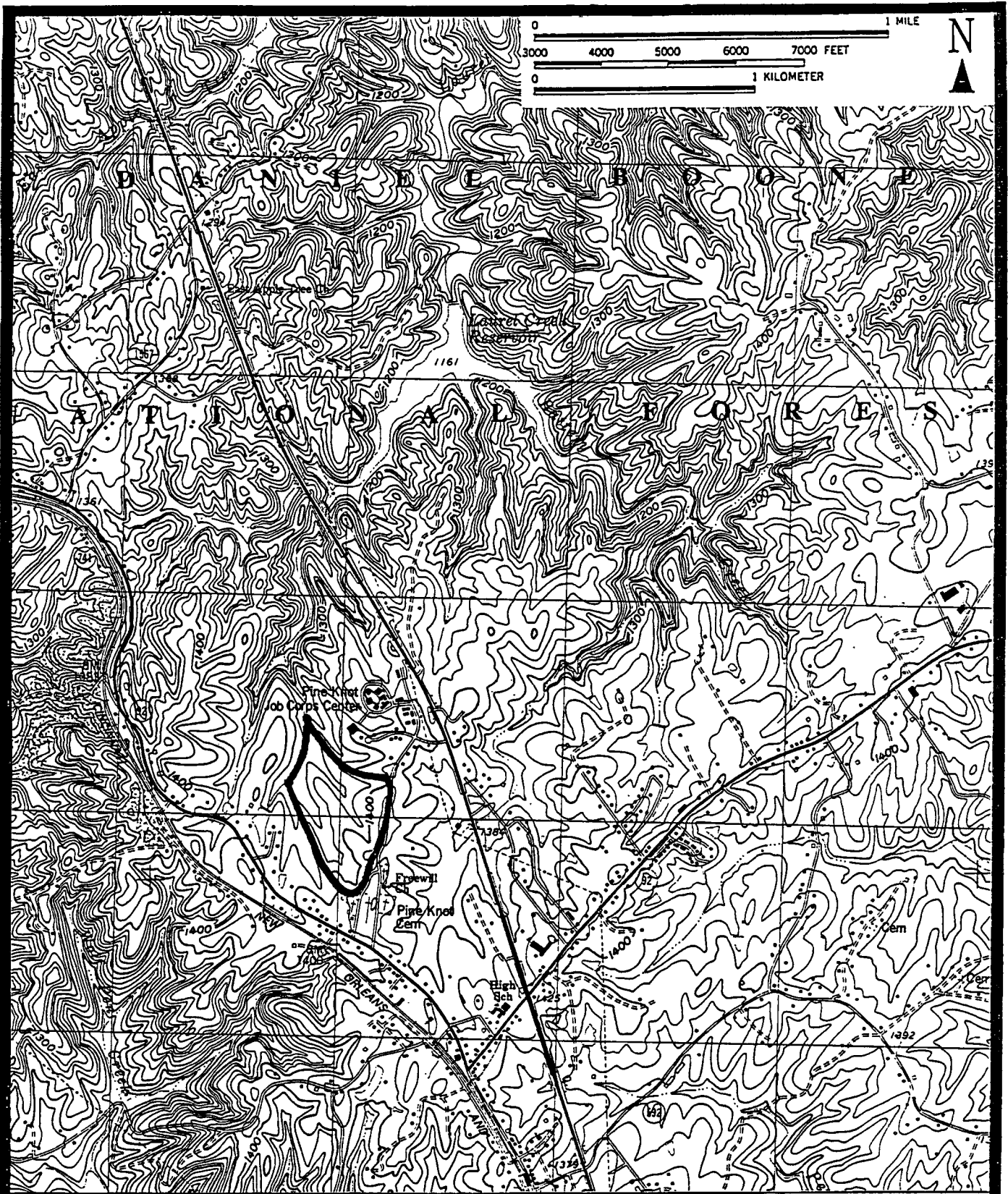


FIGURE 21: Map of Pine Knot Job Corps Streamheads and vicinity showing significant area. Whitley City, KY. USGS 7.5 Minute Quadrangle.

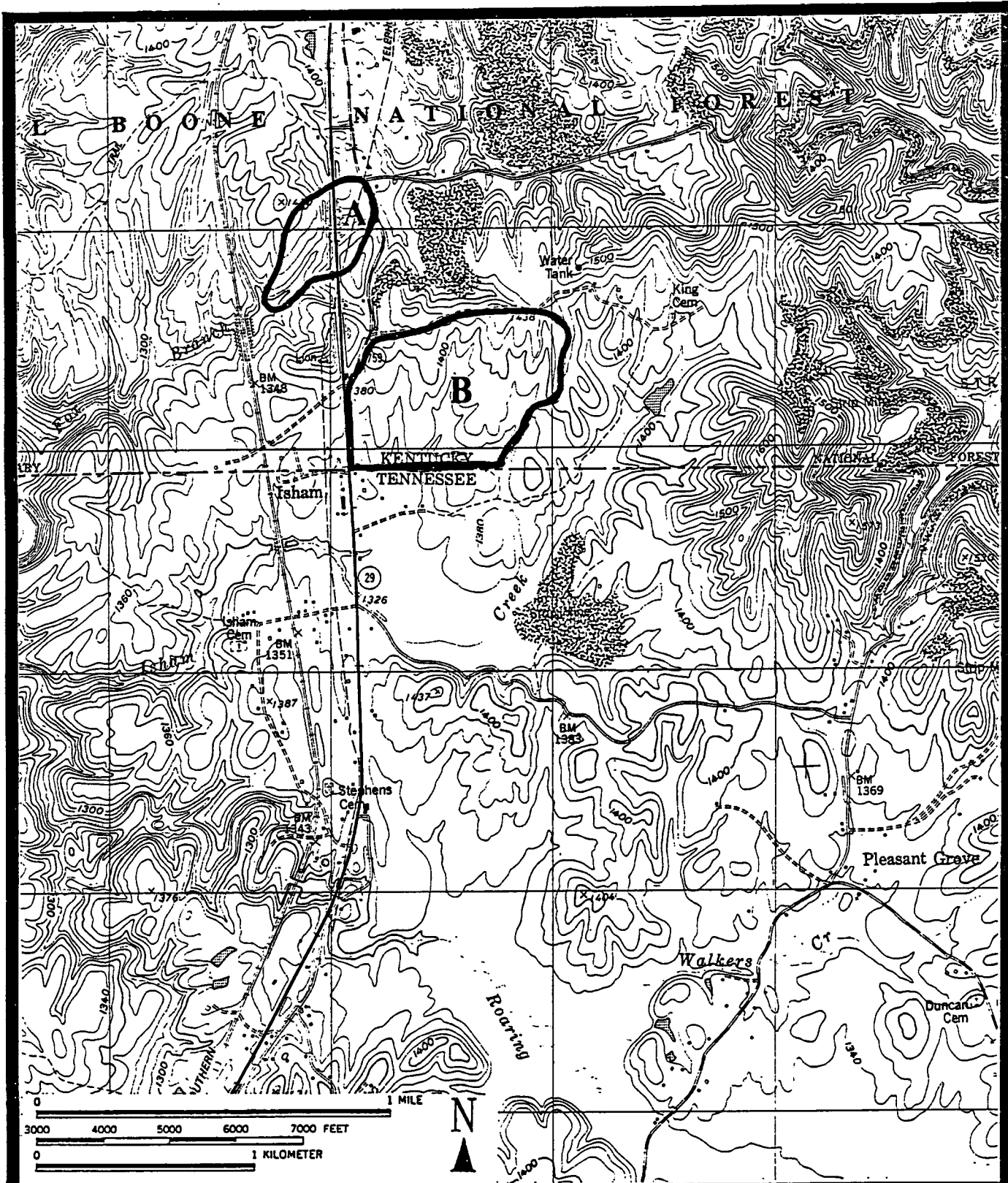


FIGURE 22: Map of Isham and vicinity showing significant areas:  
 (a) Wherry's Bog Streamhead; (b) Isham Streamheads. Winfield, KY  
 USGS 7.5 Minute Quadrangle.

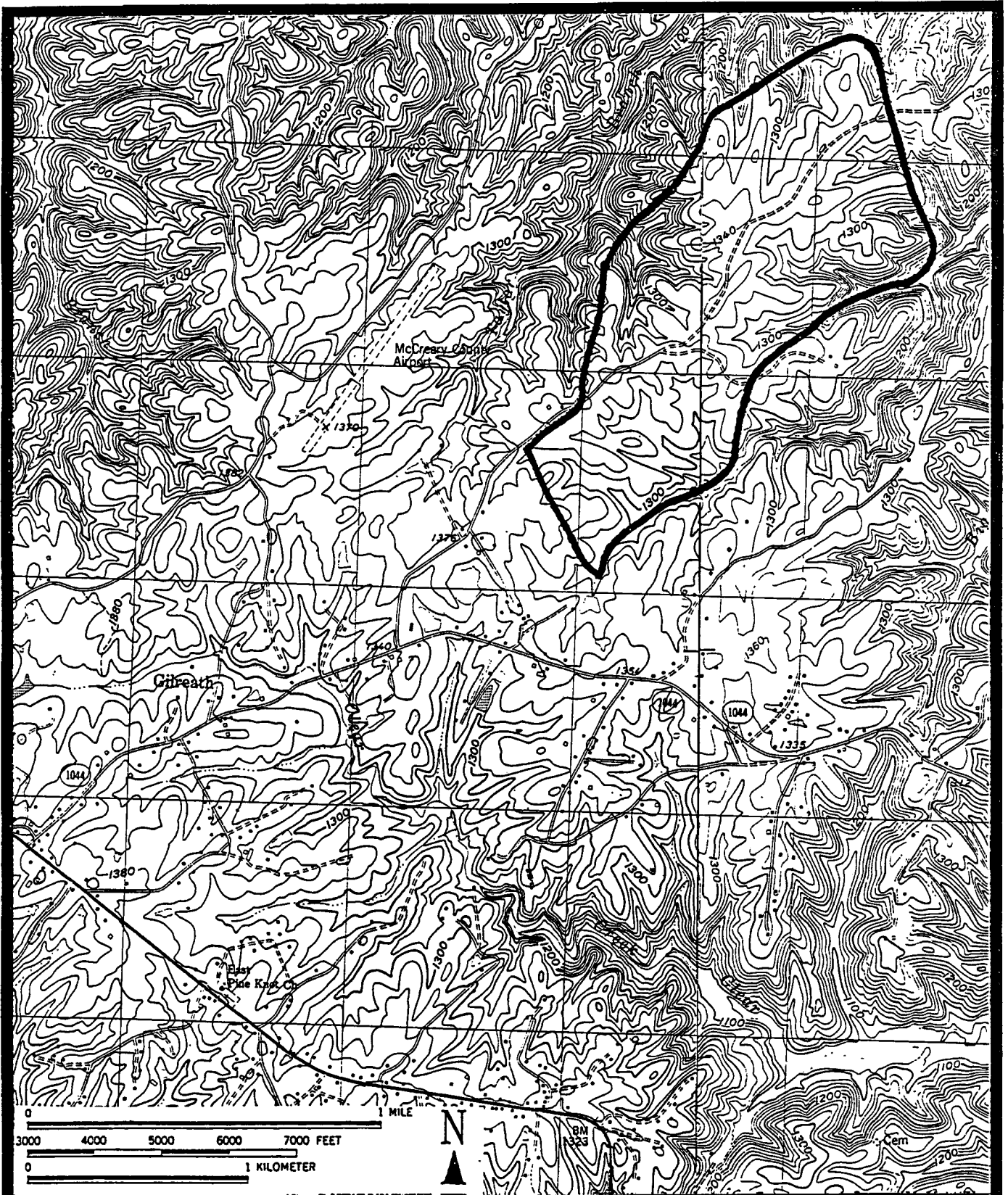


FIGURE 23: Map of USFS-690 (Flat Rock Road) Ridge and vicinity showing significant area. Whitley City, KY. USGS 7.5 Minute Quadrangle.

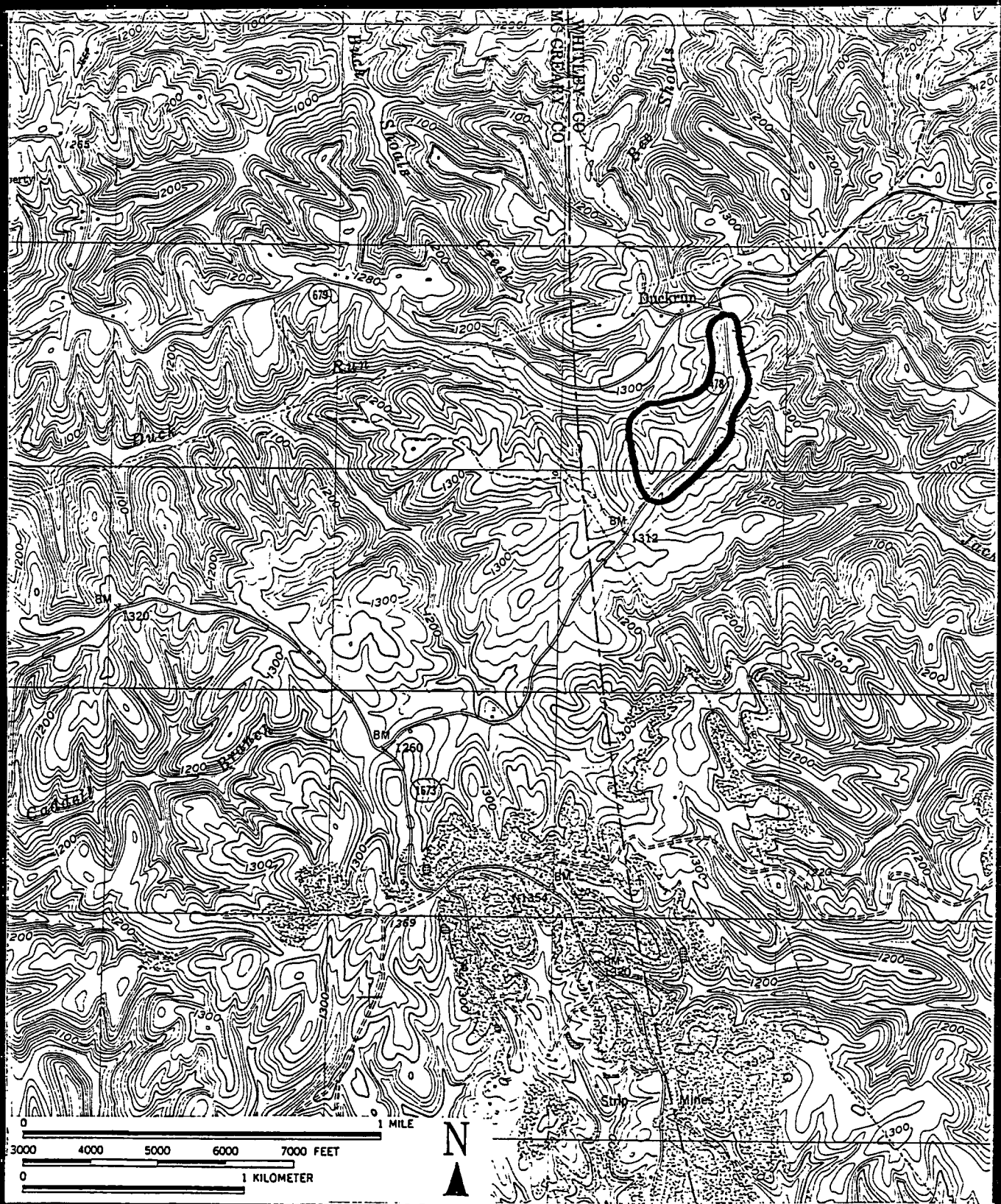


FIGURE 24: Map of Duck Run Streamhead and vicinity showing significant area. Hollyhill, KY. USGS 7.5 Minute Quadrangle.

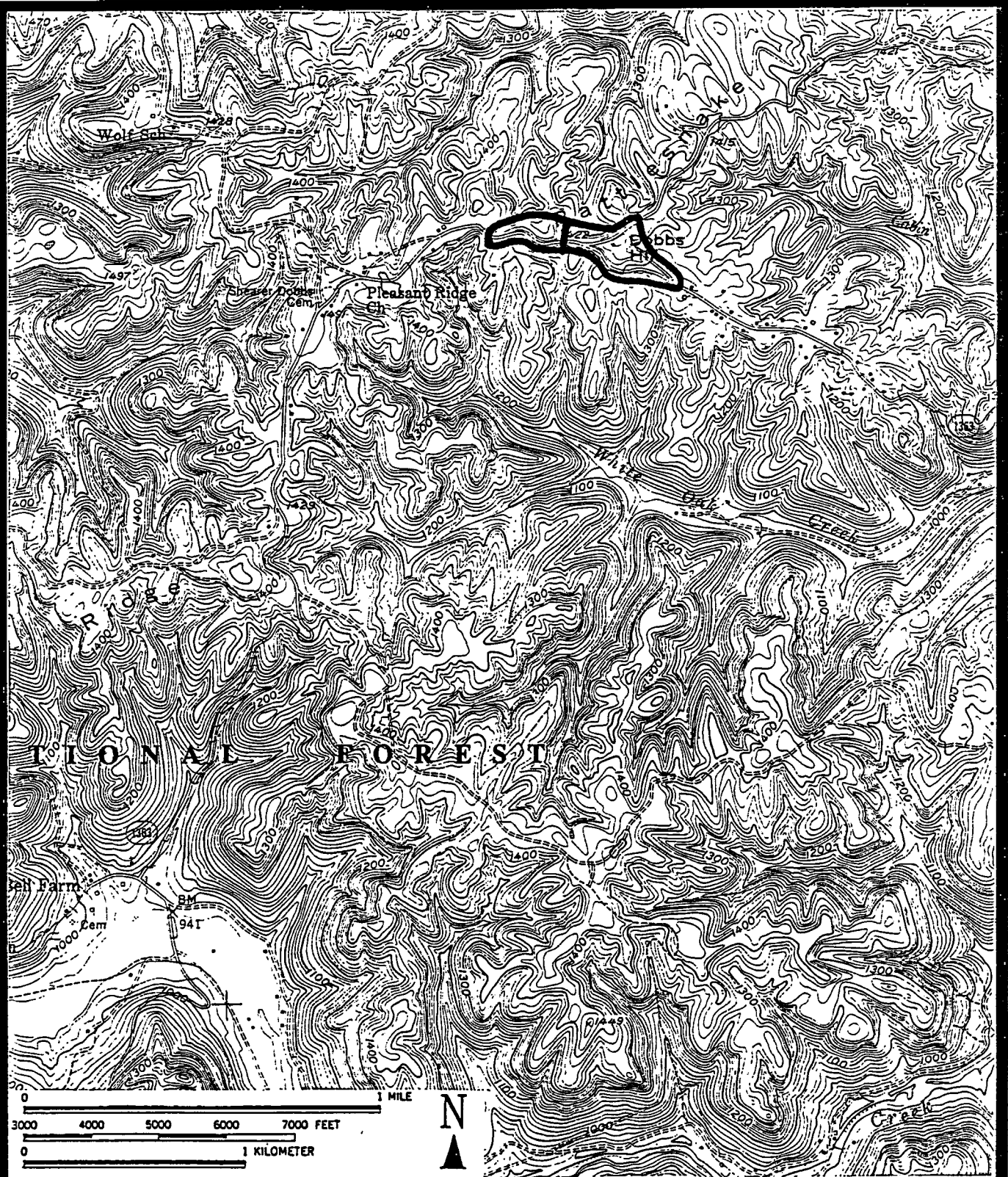


FIGURE 25: Map of Dobbs Hill Glades and vicinity showing significant area (primary area is on west side). Bell Farm, KY. USGS 7.5 Minute Quadrangle.

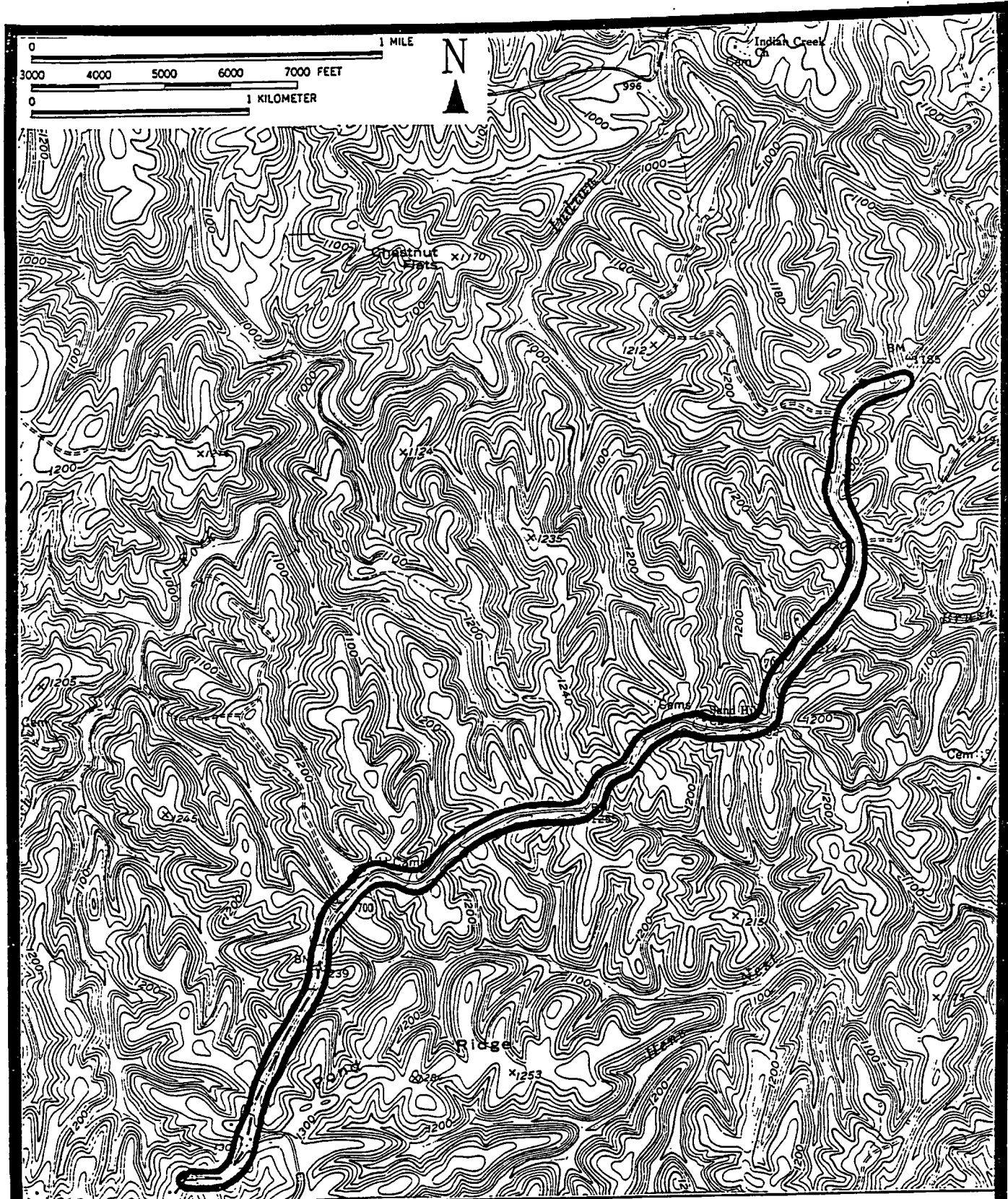


FIGURE 26: Map of KY-700 Roadside and vicinity showing significant area. Wiborg, KY. USGS 7.5 Minute Quadrangle.



## SUMMARY

The results of the Cooperative Inventory of Endangered, Threatened, Sensitive and Rare Species in the Stearns Ranger District have greatly enriched the knowledge of rare flora, fauna and natural communities in this southernmost portion of the Daniel Boone National Forest. Information provided by the report will assist Daniel Boone National Forest staff in making wise conservation and management decisions.

More than 300 occurrences of rare plants and animals were discovered, multiplying the known occurrences of these species in the Stearns District more than two-fold. While new animal records were few in number, two new rare species were added to the fauna known from the Stearns District. Several rare plant species were recorded on the District for the first time, including at least seven species with that were not previously well-documented from the state: *Aster radula* (Scraping Aster), *Berberis canadensis* (American Barberry), *Carex austro-caroliniana* and *C. physorhyncha* (Sedges), *Coreopsis verticillata* (Narrow-leaved Coreopsis), *Sanicula marilandica* (a Sanicle) and *Viola fimbriatula* (Fringed Violet). In addition, much information was obtained for a number of other species of interest, including those not presently listed, but which are in need of further study and consideration for listing by KAS-KSNPC.

The inventory has been an excellent opportunity to combine the expertise and resources of several conservation agencies, forming a partnership that made efficient use of the funds invested. It is estimated that less than one percent of the Commonwealth's land remains in a relatively undisturbed condition. Creative partnerships of public and private conservation agencies have a great opportunity, and responsibility, to safeguard Kentucky's remaining natural treasures through cooperative ventures such as this inventory.

It is hoped that this cooperative effort to inventory the Daniel Boone National Forest will be ongoing. Continued support, both in funds and in-kind services, will help clarify the status of the Forest's unique species and natural communities, and will contribute to Forest Service efforts to conserve and provide for unique natural resources.



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## APPENDICES

- 1: Herptiles of the Stearns Ranger District
- 2: Breeding Birds of the Stearns Ranger District
- 3: Mammals of the Stearns Ranger District



APPENDIX 1: HERPTILES OF THE STEARNS RANGER DISTRICT.

Species	Abundance	Habitat(s)
<b>Amphibians</b>		
<b>Salamanders</b>		
<i>Ambystoma maculatum</i> Spotted Salamander	fc*	Woodlands.
<i>Ambystoma opacum</i> Marbled Salamander	uc	Woodlands.
[ <i>Ambystoma texanum</i> ] Smallmouth Salamander	ra	Woodlands.
<i>Aneides aeneus</i> Green Salamander	uc*	Sandstone outcrops.
<i>Cryptobranchus a. alleganiensis</i> Eastern Hellbender	uc	Streams; rivers.
<i>Desmognathus f. fuscus</i> Northern Dusky Salamander	co*	Headwater streams; seepages.
<i>Desmognathus m. monticola</i> Appalachian Seal Salamander	co*	Headwater streams; seepages; wet rock outcrops.
<i>Desmognathus ochrophaeus</i> Mountain Dusky Salamander	ra	Seepages.
<i>Desmognathus welteri</i> Black Mountain Salamander	fc*	Headwater streams.
<i>Eurycea b. bislineata</i> Northern Two-lined Salamander	fc*	Streams.

APPENDIX 1 Cont'd.

Species	Abundance	Habitat(s)
<i>Eurycea l. longicauda</i> Longtail Salamander	fc*	Rock outcrops; caves; streams.
<i>Gyrinophilus porphyriticus duryi</i> Kentucky Spring Salamander	uc*	Springs; seepages.
<i>Hemidactylium scutatum</i> Four-toed Salamander	uc*	Woodlands.
<i>Necturus m. maculosus</i> Mudpuppy	ra	Rivers; streams.
<i>Notophthalmus v. viridescens</i> Red-spotted Newt	co*	Woodlands.
<i>Plethodon d. dorsalis</i> Eastern Zigzag Salamander	fc	Woodlands.
<i>Plethodon g. glutinosus</i> Slimy Salamander	co*	Woodlands.
<i>Plethodon kentucki</i> Cumberland Plateau Woodland Salamander	ra	Woodlands.
<i>Plethodon richmondi</i> Ravine Salamander	uc*	Woodlands.
[ <i>Plethodon wehrlei</i> ] Wehrle's Salamander	ra	Rock outcrops.
<i>Pseudotriton montanus diastictus</i> Midland Mud Salamander	ra	Springs; seepages; swamps.
<i>Pseudotriton r. ruber</i> Northern Red Salamander	fc	Woodlands; springs; headwater streams.

APPENDIX 1 Cont'd.

Species	Abundance	Habitat(s)
<b>Frogs and Toads</b>		
<i>Acris crepitans blanchardi</i> Blanchard's Cricket Frog	ra*	Marshes; ponds.
<i>Bufo a. americanus</i> Eastern American Toad	co*	Ubiquitous.
<i>Bufo woodhousii fowleri</i> Fowler's Toad	co*	Ubiquitous.
<i>Gastrophryne carolinensis</i> Eastern Narrowmouth Toad	fc*	Swampy meadows; pastures; reclaimed surface mines.
<i>Hyla chrysoscelis</i> Cope's Gray Treefrog	co*	Woodlands; edges.
<i>Hyla c. crucifer</i> Northern Spring Peeper	co*	Woodlands; edges.
<i>Pseudacris brachyphona</i> Mountain Chorus Frog	fc*	Woodlands.
<i>Pseudacris triseriata feriarum</i> Upland Chorus Frog	ra*	Marshes; meadows.
<i>Rana catesbeiana</i> Bullfrog	co*	Ponds; marshes; rivers.
<i>Rana clamitans melanota</i> Green Frog	co*	Ponds; streams.
<i>Rana palustris</i> Pickerel Frog	fc*	Ponds; caves; streams.

APPENDIX 1 Cont'd.

Species	Abundance	Habitat(s)
[ <i>Rana sphenoccephala</i> ] Southern Leopard Frog	ra	Marshes; meadows; ponds.
<i>Rana sylvatica</i> Wood Frog	co*	Woodlands.
<i>Scaphiopus h. holbrookii</i> Eastern Spadefoot	ra	Woodlands with sandy soils.
<b>Reptiles</b>		
<b>Turtles</b>		
<i>Chelydra s. serpentina</i> Common Snapping Turtle	fc	Ponds; streams; rivers.
[ <i>Chrysemys picta marginata</i> ] Midland Painted Turtle	ra	Ponds.
<i>Graptemys geographica</i> Map Turtle	uc	Rivers; ponds.
<i>Graptemys ouachitensis</i> Ouachita Map Turtle	ra*	Rivers.
<i>Pseudemys c. concinna</i> Eastern River Cooter	ra*	Rivers; reservoirs.
<i>Stemotherus odoratus</i> Stinkpot	ra*	Ponds.
<i>Trachemys [= Pseudemys] scripta elegans</i> Red-eared Slider	ra	Ponds; rivers; reservoirs.
<i>Terrapene c. carolina</i> Eastern Box Turtle	co*	Woodlands; brush- lands; edges.

APPENDIX 1 Cont'd.

Species	Abundance	Habitat(s)
<i>Trionyx s. spiniferus</i> Eastern Spiny Softshell	uc	Rivers; streams.
<b>Lizards</b>		
<i>Eumeces a. anthracinus</i> Northern Coal Skink	ra	Rocky slopes; stream margins.
<i>Eumeces fasciatus</i> Five-lined Skink	co*	Edges; woodlands; openings
<i>Eumeces inexpectatus</i> Southeastern Five-lined Skink	ra*	Edges; openings.
<i>Eumeces laticeps</i> Broadhead Skink	ra*	Edges; woodlands; openings.
<i>Ophisaurus attenuatus longicaudus</i> Eastern Slender Glass Lizard	uc*	Edges; openings.
<i>Sceloporus undulatus hyacinthinus</i> Northern Fence Lizard	co*	Edges; open woodlands; rock outcrops.
<i>Scincella lateralis</i> Ground Skink	fc*	Edges; open woods.
<b>Snakes</b>		
<i>Agkistrodon contortrix mokeson</i> Northern Copperhead	fc*	Woodlands; edges; fields.
<i>Carphophis amoenus</i> Worm Snake	fc*	Woodlands; edges.

APPENDIX 1 Cont'd.

Species	Abundance	Habitat(s)
<i>Cemophora coccinea copei</i> Northern Scarlet Snake	ra	Woodlands; edges.
<i>Coluber constrictor priapus</i> Southern Black Racer	co*	Edges; fields; forest openings.
<i>Crotalus horridus</i> Timber Rattlesnake	uc*	Woodlands.
<i>Diadophis punctatus edwardsii</i> Northern Ring-necked Snake	co*	Woodlands.
<i>Elaphe o. obsoleta</i> Black Rat Snake	co*	Edges; fields; woodlands.
<i>Heterodon platyrhinos</i> Eastern Hognose Snake	uc	Edges; fields.
<i>Lampropeltis getulus niger</i> Black Kingsnake	fc*	Edges; fields.
<i>Lampropeltis triangulum elapsoides</i> Scarlet Kingsnake	ra	Edges; fields; open woodlands.
<i>Lampropeltis t. triangulum</i> Eastern Milk Snake	uc*	Edges; fields; woodlands.
<i>Nerodia s. sipedon</i> Northern Water Snake	fc*	Ponds; streams; marshy areas.
<i>Opheodrys aestivus</i> Rough Green Snake	uc*	Woodlands; edges.
<i>Pituophis m. melanoleucas</i> Northern Pine Snake	ra	Openings; open oak or oak-pine woodlands.

APPENDIX 1 Cont'd.

Species	Abundance	Habitat(s)
<i>Regina septemvittata</i> Queen Snake	uc*	Streams.
<i>Storeria dekayi</i> Brown Snake	fc*	Edges; fields.
<i>Storeria o. occipitomaculata</i> Northern Redbelly Snake	uc*	Woodlands; edges.
<i>Thamnophis s. sirtalis</i> Eastern Garter Snake	co*	Ubiquitous.
<i>Virginia v. valeriae</i> Eastern Earth Snake	uc	Edges; fields; rocky woods.

Key to Appendix 1:

[ ] -- indicates species not documented from the Stearns District, but occurring nearby in adjacent counties.

\* -- indicates species was observed or collected during Stearns District Inventory.

Key to Abundances: co -- common; fc -- fairly common; uc -- uncommon; ra -- rare.



APPENDIX 2: BREEDING BIRDS OF THE STEARNS RANGER DISTRICT.

Species	Abundance	Habitat(s)
Green-backed Heron	fc	River/streambanks, ponds.
Wood Duck	uc	Rivers, streams and ponds.
Black Vulture	ra	Woodlands and bluffs.
Turkey Vulture	co	Farmland; woodlands; bluffs.
Sharp-shinned Hawk	ra	Pine/mixed woodlands.
[Cooper's Hawk]	ra	Open woodlands; farmland.
Red-shouldered Hawk	uc	Wooded ravines; borders.
Broad-winged Hawk	fc	Woodlands.
Red-tailed Hawk	fc	Farmland; woodlands.
American Kestrel	uc	Farmland; roadsides.
Ruffed Grouse	fc	Woodlands.
Wild Turkey	uc	Woodlands; wildlife openings.
Northern Bobwhite	uc	Farmland; wildlife openings.
Killdeer	uc	Farmland; settled areas.
[American Woodcock]	uc	Open woodlands; borders.
Mourning Dove	fc	Farmland; open woodlands.
Yellow-billed Cuckoo	fc	Woodlands.
Eastern Screech-Owl	fc	Woodlands.
[Great Horned Owl]	fc	Woodlands; farmland.

APPENDIX 2 Cont'd.

Species	Abundance	Habitat(s)
[Barred Owl]	uc	Mesic woodlands; bottomland.
Chuck-will's-widow	fc	Open woodlands; farmland.
Whip-poor-will	fc	Woodlands.
Chimney Swift	fc	Farmland; settled areas.
Ruby-throated Hummingbird	fc	Woodlands; borders.
Belted Kingfisher	uc	Rivers and ponds.
[Red-headed Woodpecker]	ra	Open areas; farmland
Red-bellied Woodpecker	uc	Open woodlands; farmland.
Downy Woodpecker	co	Woodlands; borders.
Hairy Woodpecker	fc	Woodlands.
[Red-cockaded Woodpecker]	ra	Pine/mixed woodlands.
Northern Flicker	uc	Open woodlands; farmland.
Pileated Woodpecker	fc	Woodlands.
Eastern Wood-Pewee	fc	Woodlands.
Acadian Flycatcher	fc	Woodlands, esp. along streams.
Eastern Phoebe	fc	Open woodlands; settled areas.
Great Crested Flycatcher	uc	Woodlands; borders.
Eastern Kingbird	fc	Farmland; settled areas.
Horned Lark	ra	Reclaimed surface mines.

APPENDIX 2 Cont'd.

Species	Abundance	Habitat(s)
Purple Martin	uc	Settled areas.
Northern Rough-winged Swallow	uc	Roadcuts; farmland.
Barn Swallow	fc	Farmland.
Blue Jay	co	Woodlands; borders.
Common Crow	co	Woodlands; farmland.
Carolina Chickadee	co	Woodlands.
Tufted Titmouse	fc	Woodlands.
White-breasted Nuthatch	fc	Woodlands.
Carolina Wren	co	Woodlands; farmland.
Blue-gray Gnatcatcher	fc	Woodlands.
Eastern Bluebird	uc	Farmland; settled areas.
Wood Thrush	co	Woodlands.
American Robin	fc	Farmland; settled areas.
Gray Catbird	uc	Farmland.
Northern Mockingbird	fc	Farmland; settled areas.
Brown Thrasher	uc	Farmland; brushy borders.
Cedar Waxwing	uc	Pine/mixed woodlands; settled areas.
European Starling	co	Farmland; settled areas.

APPENDIX 2 Cont'd.

Species	Abundance	Habitat(s)
White-eyed Vireo	fc	Successional habitats.
Solitary Vireo	ra	Woodlands.
Yellow-throated Vireo	fc	Woodlands.
Red-eyed Vireo	co	Woodlands.
[Blue-winged Warbler]	uc	Successional habitats.
Northern Parula	fc	Wooded ravines.
Yellow Warbler	uc	Successional riparian habitats.
Black-throated Green Warbler	fc	Wooded ravines with hemlocks.
Yellow-throated Warbler	fc	Pine/mixed woodlands.
Pine Warbler	fc	Pine/mixed woodlands.
Prairie Warbler	fc	Successional habitats.
Cerulean Warbler	ra	Mesic/bottomland woodlands.
Black-and-white Warbler	fc	Woodlands.
[American Redstart]	ra	Mesic woodlands.
Worm-eating Warbler	co	Woodlands; esp. slopes.
[Swainson's Warbler]	ra	Mesic woodlands.
Ovenbird	co	Woodlands.
Louisiana Waterthrush	fc	Woodlands; esp. along streams.
Kentucky Warbler	fc	Woodlands.

APPENDIX 2 Cont'd.

Species	Abundance	Habitat(s)
Common Yellowthroat	co	Farmland; clearcuts.
Hooded Warbler	co	Woodlands.
Yellow-breasted Chat	uc	Successional habitats.
Summer Tanager	fc	Woodlands; esp. zeric.
Scarlet Tanager	co	Woodlands; esp. mesic.
Northern Cardinal	co	Woodlands; farmland.
Blue Grosbeak	uc	Brushy, successional habitats.
Indigo Bunting	co	Woodland borders; farmland.
Rufous-sided Towhee	fc	Woodland borders; farmland.
Chipping Sparrow	fc	Settled areas.
Field Sparrow	uc	Brushy, successional habitats.
Grasshopper Sparrow	ra	Farmland; surface mines.
Song Sparrow	uc	Settled areas, esp. along streams.
Red-winged Blackbird	fc	Farmland; ponds.
Eastern Meadowlark	uc	Farmland.
Common Grackle	uc	Farmland.
Brown-headed Cowbird	uc	Farmland.
Orchard Oriole	uc	Farmland; successional habitats.

APPENDIX 2 Cont'd.

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Species	Abundance	Habitat(s)
[Northern Oriole]	uc	Farmland; open woodlands.
House Finch	uc	Settled areas.
American Goldfinch	fc	Successional habitats.
House Sparrow	fc	Farmland.

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Key to Appendix 2:

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Relative abundances: co -- common; fc -- fairly common; uc -- uncommon;  
ra -- rare.

[ ] -- indicates species not documented during inventory, but occurrence in the  
District is likely.

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APPENDIX 3: MAMMALS OF THE STEARNS RANGER DISTRICT.

Species	Abundance	Habitat(s)
<b>Marsupials</b>		
<i>Didelphis virginiana</i> Virginia Opossum	co*	Ubiquitous.
<b>Shrews and Moles</b>		
<i>Blarina brevicauda</i> Short-tailed Shrew	co*	Ubiquitous.
<i>Cryptotis parva</i> Least Shrew	uc*	Edges; fields.
<i>Parascalops breweri</i> Hairy-tailed Mole	uc*	Woodlands.
<i>Scalopus aquaticus</i> Eastern Mole	uc	Bottomlands.
<i>Sorex fumeus</i> Smoky Shrew	co*	Rich woodlands.
<i>Sorex [= Microsorex] hoyi winnemana</i> Pygmy Shrew	uc*	Woodlands.
<b>Bats</b>		
<i>Eptesicus fuscus</i> Big Brown Bat	co*	Caves; mines; cliffs; buildings.
<i>Lasionycteris noctivagans</i> Silver-haired Bat	ra	Caves; cliffs; wood- lands.
<i>Lasiurus [= Nycteris] borealis</i> Red Bat	co*	Woodlands.

APPENDIX 3 cont'd.

Species	Abundance	Habitat(s)
<i>Lasiurus</i> [= <i>Nycteris</i> ] <i>cinerea</i> Hoary Bat	ra*	Woodlands.
<i>Myotis grisescens</i> Gray Myotis (Bat)	ra	Caves.
<i>Myotis lucifugus</i> Little Brown Myotis (Bat)	co*	Caves; woodlands buildings (summer).
<i>Myotis septentrionalis</i> [= <i>M. keenii</i> ] Northern Long-eared Bat	uc*	Caves; rockhouses; woodlands; mines.
<i>Myotis sodalis</i> Indiana Myotis (Bat)	uc	Caves; woodlands; mines.
<i>Myotis leibii</i> [= <i>M. subulatus</i> L.] Small-footed Myotis (Bat)	ra	Caves; woodlands; cliffs.
[ <i>Nycticeius humeralis</i> ] Evening Bat	ra	Buildings?
<i>Pipistrellus subflavus</i> Eastern Pipistrelle	co*	Caves; woodlands.
<i>Plecotus rafinesquii</i> Rafinesque's Big-eared Bat	uc*	Caves; rockhouses; cliffs; mines; woodlands; build ings (summer).
<b>Rabbits</b>		
<i>Sylvilagus floridanus</i> Eastern Cottontail	co*	Edges; fields.

APPENDIX 3 cont'd.

Species	Abundance	Habitat(s)
<b>Rodents</b>		
<i>Glaucomys volans</i> Southern Flying Squirrel	fc*	Woodlands.
<i>Marmota monax</i> Woodchuck	fc*	Fields; edges.
<i>Microtus ochrogaster</i> Prairie Vole	ra	Fields; edges.
[ <i>Microtus pennsylvanicus</i> ] Meadow Vole	ra	Edges; fields.
<i>Microtus pinetorum</i> Pine Vole	fc	Edges; woodlands.
<i>Mus musculus</i> House Mouse	co	Habitations; fields.
<i>Castor canadensis</i> Beaver	uc	Streams; rivers.
<i>Napaeozapus insignis</i> Woodland Jumping Mouse	uc	Woodlands; edges.
<i>Neotoma floridana magister</i> Eastern Wood Rat	co*	Caves; cliffines; rockhouses; woodlands.
<i>Ochrotomys nuttalli</i> Golden Mouse	uc*	Thickets; old fields.
<i>Ondatra zibethicus</i> Muskrat	fc*	Streams; ponds.

APPENDIX 3 cont'd.

Species	Abundance	Habitat(s)
<i>Peromyscus leucopus</i> White-footed Mouse	co*	Ubiquitous.
<i>Rattus norvegicus</i> Norway Rat	uc	Habitations; dumps.
<i>Reithrodontomys humulis</i> Eastern Harvest Mouse	uc	Fields; edges.
<i>Sciurus carolinensis</i> Gray Squirrel	co*	Woodlands.
<i>Sciurus niger</i> Fox Squirrel	fc*	Open woodlands.
[ <i>Sigmodon hispidus</i> ] Hispid Cotton Rat	ra	Fields; edges.
<i>Synaptomys cooperi</i> Southern Bog Lemming	uc*	Fields; edges.
<i>Tamias striatus</i> Eastern Chipmunk	co*	Woodlands; edges.
<i>Zapus hudsonius</i> Meadow Jumping Mouse	ra	Edges; fields; wet meadows.
<b>Carnivores</b>		
<i>Canis latrans</i> Coyote	uc	Farmland; open woods.
[ <i>Felis concolor cougar</i> ] Eastern Cougar	ra	Woodlands.

APPENDIX 3 cont'd.

Species	Abundance	Habitat(s)
[ <i>Lutra canadensis</i> ] River Otter	ra	Rivers; large streams.
<i>Lynx rufus</i> Bobcat	fc*	Woodlands; rock outcrops.
<i>Mephitis mephitis</i> Striped Skunk	co*	Ubiquitous.
[ <i>Mustela frenata</i> ] Long-tailed Weasel	uc	Edges; fields.
[ <i>Mustela nivalis</i> ] Least Weasel	ra	Edges; fields.
<i>Mustela vison</i> Mink	uc	Edges; fields.
<i>Procyon lotor</i> Raccoon	co*	Ubiquitous.
<i>Spilogale putorius</i> Spotted Skunk	ra	Woodlands; edges.
<i>Urocyon cinereoargenteus</i> Gray Fox	co*	Woodlands; farmland.
<i>Ursus americanus</i> Black Bear	ra	Woodlands.
<i>Vulpes vulpes</i> Red Fox	uc*	Farmland; woodlands.
<b>Even-toed Ungulates</b>		
<i>Dama virginianus</i> White-tailed Deer	uc*	Woodlands; edges.

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**Key to Appendix 3:**

[ ] -- indicates species not documented from the Stearns District, but occurring nearby in adjacent counties.

\* -- indicates species was observed or collected during Stearns District Inventory.

Relative abundances: co -- common; fc -- fairly common; uc -- uncommon; ra -- rare.

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