wild and scenic river study

december 1980

# NOLICHUCKY RIVER

NORTH CAROLINA/TENNESSEE

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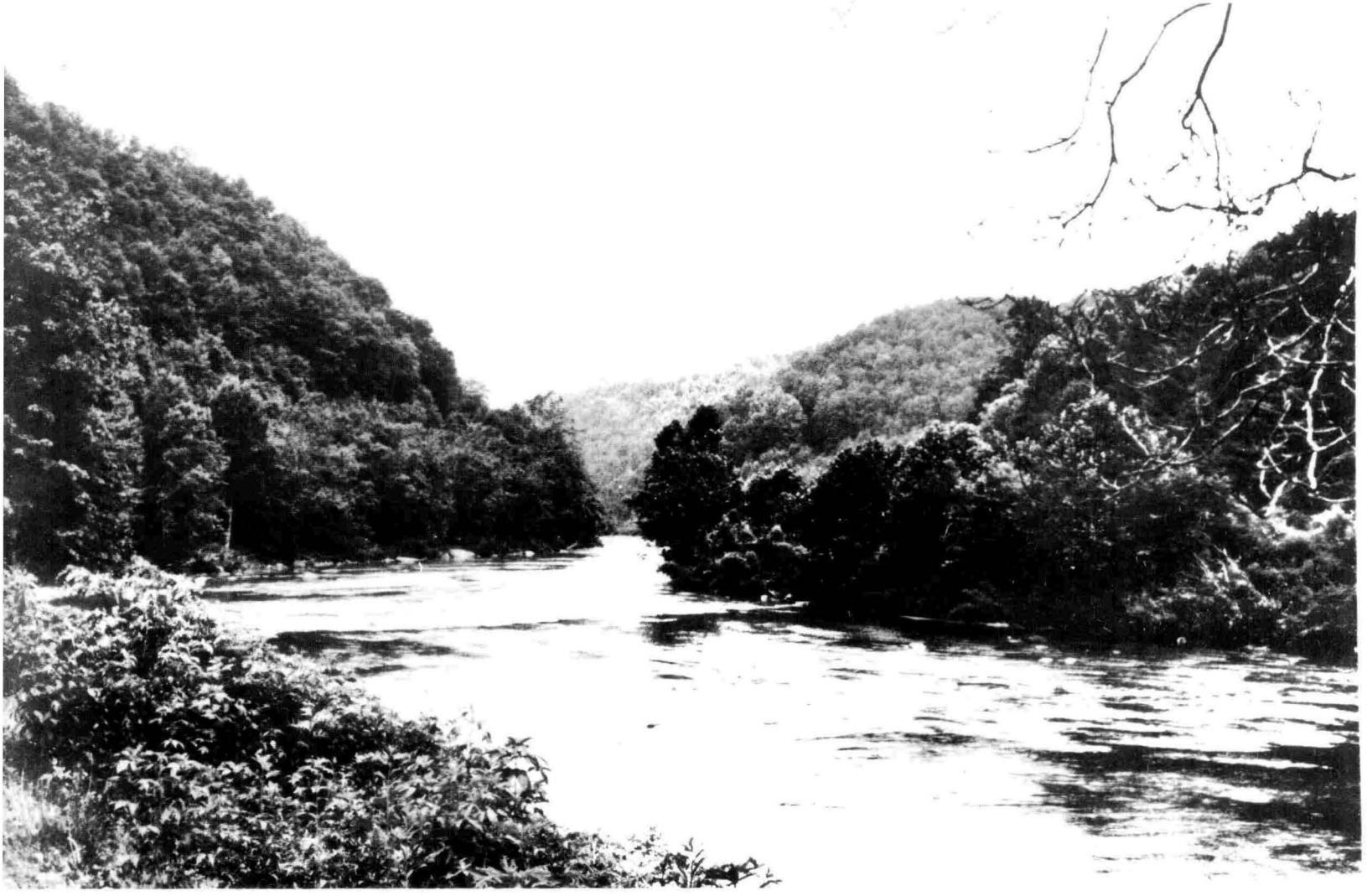
DEPARTMENT OF THE INTERIOR
Cecil D. Andrus, Secretary

# THE NOLICHUCKY RIVER

## A WILD AND SCENIC RIVER STUDY


Southeast Region
NATIONAL PARK SERVICE
December 1980



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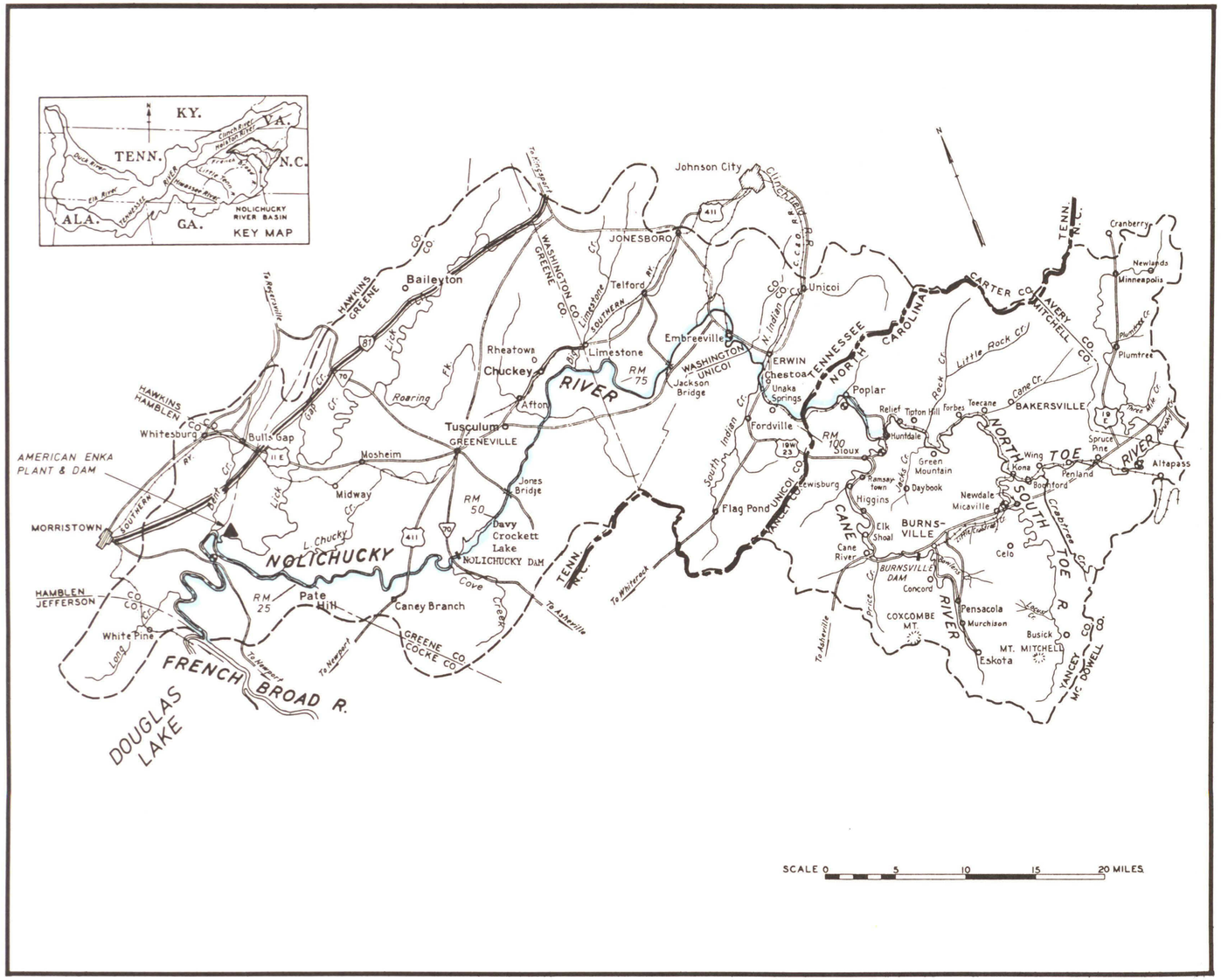
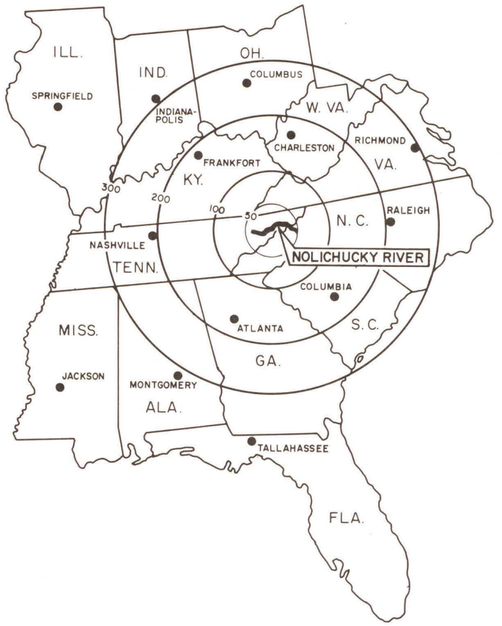
NATIONAL WILD AND SCENIC RIVERS SYSTEM
As Authorized by P.L. 90-542
As Amended
SKAGIT
PRIEST
METTE
FLATHEAD
ST. JOE
SNAKE
MISSOURI
JOHN DAY
SNAKE
CLEARWATER
SALMON
RAPID
ROGUE
SALMON
CLARKS FORK
OWYHEE
ILLINOIS
SNAKE
BRUNEAU
FEATHER
SWEETWATER
AMERICAN, N. FK.
GREEN
ENCAMPMENT
TUOLUMNE
TAMPA
ELK
CACHE LA POUDRE
COLORADO
BIG THOMPSON
GUNNISON
DOLORES
LOS PINOS
CONEJOS
PIEDRA
RIO GRANDE
RIO GRANDE
UPPER MISSISSIPPI
KETTLE
ST. CROIX
WOLF
MANISTEE
AU SABLE
LOWER ST. CROIX
PERE MARQUETTE
UPPER IOWA
WISCONSIN
ALLAGASH
PENOBSCOT
PINE CREEK
DELAWARE
ROUSATONIC
SHEPAUG
YOUGHIOGHENY
LITTLE BEAVER
LITTLE MIAMI
WISCONSIN
ELEVEN POINT
OBED
NEW
BUFFALO
KOLICHUCKEY
ILLINOIS
CHATTOOGA
SIPSEY FORK
CAHABA
SUWANNEE
Note: Found not qualified
ALLEGHENY
CLARION
MANISTEE
PA.
IND. OHIO
LEGEND
EXISTING COMPONENTS
STUDY COMPLETED
STUDY IN PROGRESS
MANAGEMENT OR STUDY RESPONSIBILITY
Dept. of Interior
Dept. of Agriculture
State/Local
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Outdoor Recreation
October 1977
MAP 1



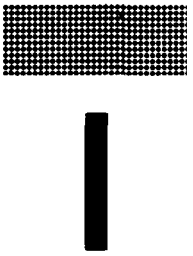




MAP TWO
LOCATION MAP

# THE NOLICHUCKY RIVER

WILD AND SCENIC RIVER STUDY

USDI NPS October 1978



# I. FINDINGS, RECOMMENDATIONS AND SUMMARY

## Findings

The study of the Nolichucky River and its environs resulted in the following findings:

1. The Nolichucky River does not possess the outstandingly remarkable values required by the Wild and Scenic Rivers Act for inclusion in the National Wild and Scenic Rivers System.

2. The Nolichucky Gorge between Poplar, North Carolina, and Unaka Springs, Tennessee, has noteworthy scenic and geologic values. However, the scenic values of this segment have been significantly diminished by a railroad line constructed by cut-and-fill along the entire length of the south bank of this segment. Railroad operations are ongoing and, with heavy use, this type of activity detracts from the scenic values of the gorge. In addition, water quality is at times below minimum acceptable standards for wild and scenic river designation.

3. The Nolichucky Gorge offers excellent recreational opportunities for whitewater rafting, kayaking, and canoeing in a relatively remote setting. However, the absence of suitable boat put-in and take-out facilities, the element of danger for even skilled boaters in running the gorge, the hazards of walking the well-used railroad line and trestles, and the absence of roads for emergency use, present certain problems for public recreational use and safety. Existing federal land ownership and programs make it possible for federal agencies to take appropriate action to improve conditions for public use and safety as well as for protection and preservation of the scenic, recreational, and other natural values of the Nolichucky Gorge.

4. The remainder of the Nolichucky River, exclusive of the gorge segment, also offers important recreational opportunities. Its recreational potential for boating, fishing and other purposes is sufficient to warrant the attention of State and Federal agencies having programs that can be used to improve conditions along the riverway.

## Conclusions and Recommendations

Conclusion:

Based on the finding that the Nolichucky River does not possess the outstanding qualities required of units of the Wild and Scenic Rivers System the following recommendations are made with respect to the river.

Recommendation:

It is recommended that no action be taken to include the Nolichucky River in the National Wild and Scenic Rivers System.

Conclusion:

Although the Nolichucky River is not recommended for inclusion in the Wild and Scenic Rivers System the river does possess important values that can be preserved for the benefit and enjoyment of people. These values can be preserved under existing laws and regulations.

Recommendations:

In order to preserve the natural and recreational values of the Nolichucky River described in this study report and to enhance public use and enjoyment of these values it is recommended that:

1. The U.S. Forest Service, as principal landowner in the gorge area, provide for protection and preservation of the scenic and other natural values of the gorge between the railroad bridge below Poplar, North Carolina, and the railroad bridge above Unaka Springs, Tennessee. Furthermore, the Forest Service, in cooperation with the respective States and the private organizations using the gorge, should take such appropriate action as will enhance public use of and safety in the gorge.

2. The Tennessee Valley Authority and the U.S. Forest Service, in cooperation with State, local, and private agencies, take such action as may be feasible and appropriate to provide public access points and facilities near the beginning and ending points of the gorge and at any other suitable points along the river to provide for public access and use of the river.

3. Federal, State and local agencies and private enterprise having responsibilities affecting water quality in the river act more energetically to restore the quality of water to meet or exceed a level suitable for public recreational use. Water quality restoration should be achieved as soon as possible in order to provide safe recreational use.

## A Summary Description of the Resource

The Nolichucky River starts as a fully developed stream at the confluence of the North Toe and Cane Rivers, less than a mile from the small community of Huntdale, North Carolina. It flows approximately 110 miles through two distinct physiographic provinces before entering Douglas Reservoir near Morristown, Tennessee. The source of the Nolichucky is in the Blue Ridge Province of the Appalachian chain in an area characterized by more subdued topography and moderate slopes than the steep gradients and dissected

ridges found on the eastern face of the province. It is in this region, however, that the river most resembles a mountain stream--dropping an average of 23.5 feet per mile for its first 20 miles. Thereafter the river enters the Valley and Ridge Province, a region of gently rolling topography and fertile soils which are heavily used for agricultural purposes. The remaining 90 miles of river drop an average of only 6 feet per mile as it becomes a slow-moving, gradually-widening pastoral river.

In the Blue Ridge Province part of the Nolichucky Basin, the climate is humid-temperate with short, cool summers. Winters are generally cold but not severe. However, short spells of very cold weather can be expected in winter.

In the Valley and Ridge Province, the climate is somewhat milder with fairly long, warm summers and fairly short, cool winters. Rainfall is plentiful and evenly distributed throughout the year in the mountains. At lower elevations rainfall is ample during the growing season but less frequent in July and August. As a result of ample rainfall, the topography, and other factors, streamflow in the Nolichucky River is continuous year round and, except for the gorge, adequate and safe for most recreational boating. Throughout much of the year, the flow in the gorge is fast, rapids are difficult, boulders are numerous, and float trips risky for all but experienced, well-equipped boaters and rafters.

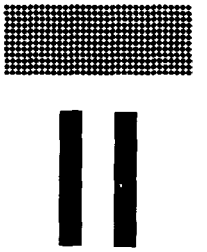
Adjacent land use from the Douglas Lake upstream to near the town of Erwin, Tennessee, is primarily agricultural. Above Erwin, much of the remaining adjacent land remains forested because of the rough terrain and extensive holdings of the Cherokee National Forest in Tennessee and the Pisgah National Forest in North Carolina.

The Nolichucky River has had serious water quality problems in the past due, in large part, to mica and feldspar mining operations on the North and South Toe Rivers in North Carolina. Great amounts of silt from these operations have seriously damaged the aquatic life and habitat above Nolichucky Dam and have caused the gradual filling of Davy Crockett Lake. Agricultural runoff, industrial wastes, private and municipal effluents have also contributed to the pollution problem. The situation has improved a little in recent years with the advent of stricter environmental standards, but much of the original silt load remains and is resuspended during storms and periods of heavy flow.

Vegetation in the mountainous areas of the upper Nolichucky originally consisted of an overstory of chestnut, oak, hemlock, balsam, yellow poplar, beech, birch, hickory, black walnut, sourwood and buckeye. Beneath the tree canopy was a growth of shrubs and other small plants consisting chiefly of dogwood, rhododendron, mountain laurel, huckleberry and buckberry. Gallax and trailing arbutus were common plants on the mountains.

However, a large part of the original tree growth has been cut for timber, and yellow poplar, oak, maple, black locust, pine, birch and hickory have come in as second and third growth. In the valley, predominant tree species are red oak, black oak, scarlet oak, white oak, post oak, yellow poplar, chestnut oak, Virginia pine, shortleaf pine, red cedar, and several species of hickory. Originally forests covered the entire Nolichucky Valley, but the harvesting of timber without replanting and the clearing of land for agriculture have reduced the total forest cover by 80 percent or more below Erwin.

There are two major impoundments on the Nolichucky River: one below river mile 0 and extending up to about river mile 9 (Douglas Reservoir) and one between river mile 46.0 and river mile 52.0 (Nolichucky Dam-Davy Crockett Reservoir). There are also two low water dams, one at Pate Hill and one at the American Enka plant (river miles 29.0 and 7.8, respectively). There are 25 existing road crossings, two railroad bridges, 15.6 miles of parallel railroad tracks, 15.9 miles of parallel roadway, 7 powerline crossings, 2 pipeline crossings, and over 400 buildings, exclusive of the town of Erwin, and other communities, within the river corridor.



# II. INTRODUCTION

The Nolichucky River study was conducted under the provisions of the Wild and Scenic Rivers Act, Public Law 90-542, as amended. In Section 1(b) of that Act Congress stated that:

> "It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes."

To carry out this policy, Congress instituted the Wild and Scenic Rivers System initially composed of eight rivers which were designated in Section 3(a) of the Act. Congress provided for additions to that System in Section 5(a) by designating 27 potential wild and scenic rivers which were to be studied. Subsequent amendments to the Act have increased the number of rivers, or segments of rivers, in the National System to 29 and the number of study rivers to 75. The Nolichucky River was added to the list of study rivers on January 3, 1975, by passage of Public Law 93-621.

The Act specifies that "the entire main stem" of the Nolichucky River, in North Carolina and Tennessee, shall be studied and a report submitted to Congress on the river's characteristics with recommendations and proposals regarding designating or not designating the river to the System.

Subsequent legislation relating to the protection of outstanding rivers and their environments include the National Environmental Policy Act of 1969, Public Law 91-190, approved January 1, 1970. On March 5, 1970, Executive Order 11514 furthered the purpose and policy of the National Environmental Policy Act of 1969 by defining the roles of Federal agencies and the Council on Environmental Quality established by the Act:

> The Federal Government shall provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies shall initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals. The Council on Environmental Quality through the chairman, shall advise and assist the President in leading this national effort.

In 1965, the Congress enacted the Water Resources Planning Act (Public Law 89-80), which included a provision (Section 103) that the Water Resources Council establish principles, standards, and procedures for Federal agencies involved in planning for water and related land resources. The Council's "Principles, and Standards for Planning Water and Related Land Resources" became effective October 25, 1973.

Principles and Standards is a procedure developed by the Water Resources Council to guide Federal water resources planning activities. The goal of this procedure is to improve the planning criteria used to achieve wise use to the Nation's water and related land resources by placing environmental concerns on a basis equal to economic development. This allows decision makers to identify and evaluate tradeoffs between the objective of national economic development and environmental quality.

Proposed and wild, scenic, and recreational rivers are considered to be water resources related only when establishment of such areas would significantly affect the availability and amount of water which could serve other uses, resulting in national economic development values foregone. Since this study recommends against the establishment of a wild, scenic, or recreational area the principles and standards analysis has not been prepared.

## Wild and Scenic River Studies

Section 4(a) of the Wild and Scenic Rivers Act specifies that a study report shall accompany each proposal submitted by the President to Congress for the addition of a river to the National Wild and Scenic Rivers System. Reports must set forth:

1. The area included within the report;

2. The characteristics which do or do not make the river a worthy addition to the system;

3. The current status of landownership and use in the area;

4. The reasonably foreseeable potential uses of land and water which would be enhanced, foreclosed, or curtailed if the area were included in the National Wild and Scenic Rivers System;

5. The federal agency by which it is proposed the area, should it be added to the system, be administered;

6. The extent to which it is proposed that such administration, including costs thereof, be shared by State and local agencies; and,

7. The estimated cost to the United States of acquiring necessary land and interests in land and of administering the area, should it be added to the system.

The Act directs the Secretary of the Interior, in close cooperation with the affected States and their political subdivisions, to complete a study to determine whether or not the Nolichucky River should be included in the National Wild and Scenic Rivers System. The Heritage Conservation and Recreation Service was initially designated as lead agency for the study by the Secretary of the Interior.

The Southeast Regional Office of the Heritage Conservation and Recreation Service, in keeping with the provisions of the Act, brought together a joint Federal/State study team late in 1975. The purpose of the study team was to prepare a field report and proposal for the Nolichucky River.

In March 1978 the study leadership role was transferred to the Southeast Regional Office of the National Park Service which completed the additional field studies, data collection and research, and prepared this study report.

Principal members of the study team were:

National Park Service
Heritage Conservation and Recreation Service
U.S. Forest Service
Tennessee Valley Authority
U.S. Fish and Wildlife Service
Environmental Protection Agency
Tennessee Department of Conservation
Tennessee Wildlife Resources Agency
North Carolina Department of Natural and Economic Resources

Public meetings were held at Greeneville, Tennessee, and at Burnsville, North Carolina, during the early stages of the study. Numerous interviews and conversations were held with citizens, representatives of commercial outfitters and user groups during the study process. These meetings and discussions were held to inform members of the public of the study process and the provisions of the Wild and Scenic Rivers Act, and to obtain public opinion and reaction to the proposal to include the river in the National Wild and Scenic Rivers System. Although there were opponents and proponents to designating any part of the river, the strongest opposition to the proposal concerned that part of the river between Erwin and Douglas Lake. Support for some kind of action to protect the river and enhance recreation use, above Erwin and especially in the gorge, was much stronger.

## Acknowledgements

Throughout the study, interested citizens, landowners, and private groups communicated varying levels of support or opposition, concerning designation of the Nolichucky as a national wild and scenic river. Their expressed interests, along with the cooperation and assistance provided by other Federal, State and local agencies, benefitted the team's evaluation and the preparation of an unbiased Nolichucky River study report.

Gratitude is extended to all those who assisted in this study effort, with particular appreciation to the following:

Federal Agencies

Heritage Conservation and Recreation Service, Department of the Interior

U.S. Geological Survey, Department of the Interior

U.S. Fish and Wildlife Service, Department of the Interior

Forest Service, Department of Agriculture

Soil Conservation Service, Department of Agriculture

Tennessee Valley Authority

Corps of Engineers, Department of the Army

Environmental Protection Agency

Federal Energy Regulatory Commission

State of North Carolina

Department of Natural and Economic Resources

Department of Water Resources

Historical Commission

Wildlife Resources Commission

Weather Bureau

Wildlife Federation

Conservation Council

Association of Soil and Water Conservation Districts

Forestry Association

State of Tennessee

Department of Conservation

Department of Public Health

Wildlife Resources Agency

Historical Commission

Weather Bureau

University of Tennessee

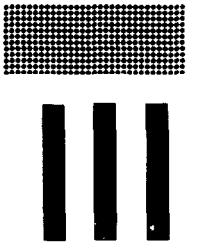
Association of Soil and Water Conservation Districts

Citizens for Wilderness Planning

Scenic River Association

Environmental Council

Forestry Association



# III. DESCRIPTION OF THE STUDY AREA

## Location

The Nolichucky River originates in western North Carolina about 35 miles north of Asheville and flows 110 miles in a westerly direction into Tennessee's Douglas Lake, about 40 miles northeast of Knoxville. The Nolichucky River is a tributary of the French Broad River, but the confluence of the two rivers has now been flooded by the Tennessee Valley Authority's Douglas Dam and reservoir, Douglas Lake.

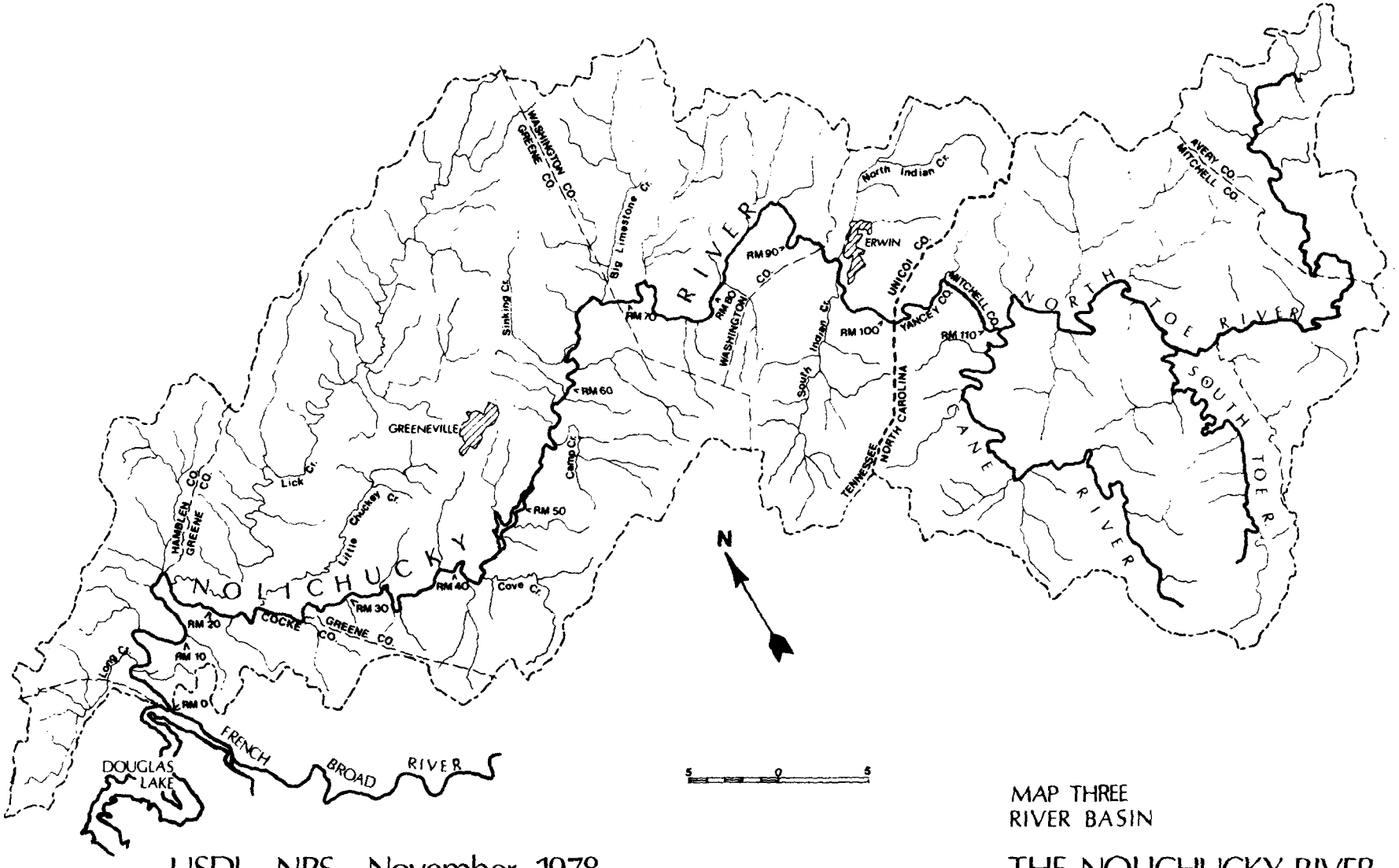
In North Carolina the Nolichucky starts less than a mile from the small community of Huntdale and flows northerly past the community of Poplar, then westerly through the 8-mile long gorge into Tennessee. The river marks the boundary line between the two North Carolina counties of Mitchell and Yancey. This segment of the river is also within the boundary of the Pisgah National Forest.

Crossing the state line halfway through the gorge, the river simultaneously enters Tennessee's Unicoi County and the Cherokee National Forest. After arching to the north a short distance past Erwin the river turns southwesterly and westerly through Washington and Greene Counties, passes just south of Greeneville. The lower part of the river forms the boundary line between Hamblen and Cocke Counties.

## Watershed

The Nolichucky River drainage area covers approximately 1,756 square miles of which 626 are in western North Carolina and 1,130 are in eastern Tennessee. The total length of the Nolichucky is 110.6 miles; only 10 miles of which flow through North Carolina. Major tributaries of the Nolichucky River are the North and South Toe Rivers, the Cane River, all above the point of origin of the Nolichucky River, the North and the South Indian Creeks near Erwin, Tennessee; Big Limestone Creek near Chuckey, Tennessee; Cove Creek (River mile 43.5); Little Chuckey Creek (River mile 23.5); and Lick Creek (River mile 16.0). Map 3, page 3-2).

The river falls from an altitude of 2,020 feet above sea level at the confluence of the Cane and North Toe Rivers to 1,009 at its mouth in Douglas Lake (French Broad River). This difference in elevation creates an average drop of 9.2 feet per mile for the 110.6 mile river. However, the gradient is much steeper in the upper reaches of the Nolichucky (Figure 1, Page 3-3). Section 2, the Nolichucky Gorge area, drops an average of 31 feet per mile and at some points drops as much as 40 feet per mile. From the river's head to the U.S. Geological




MAP THREE
RIVER BASIN

# THE NOLICHUCKY RIVER

WILD AND SCENIC RIVER STUDY

USDI NPS November 1978

(Information provided by TVA) RM=RIVER MILE

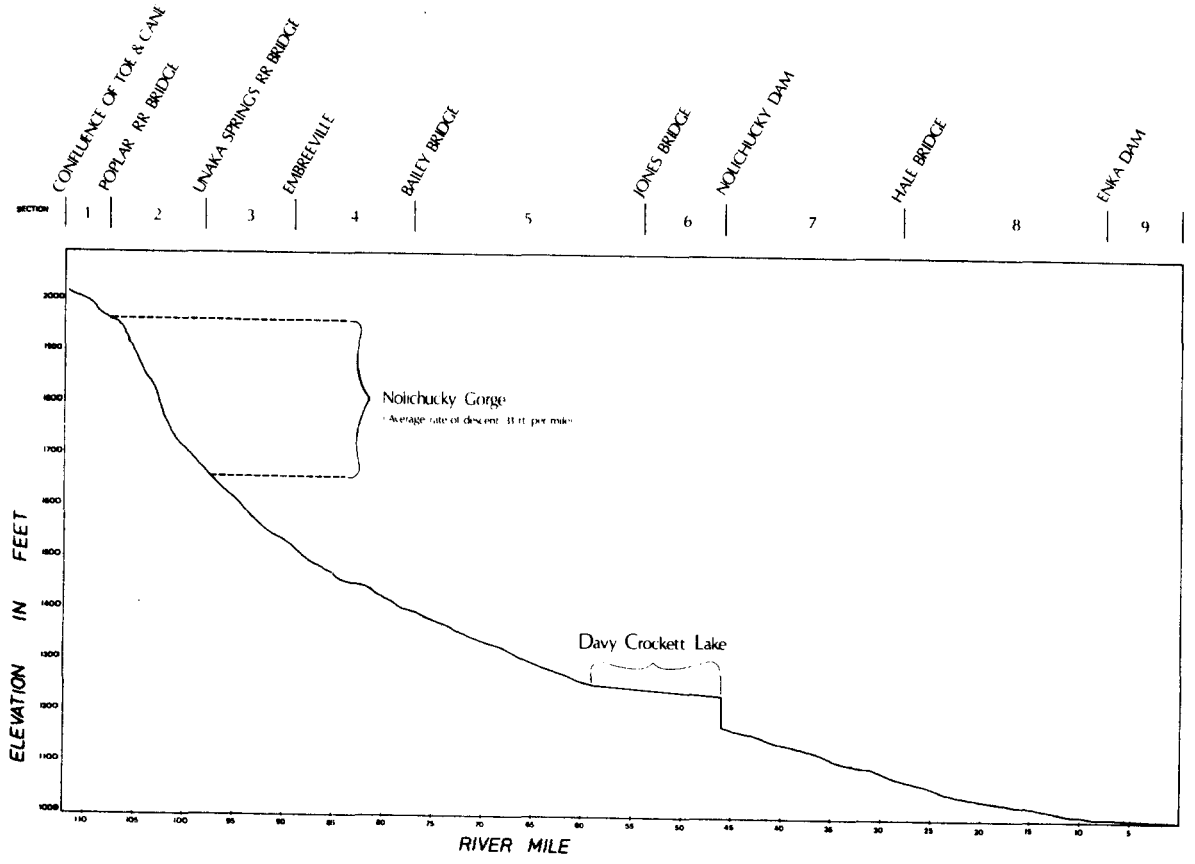



FIG. 1

USDI NPS November 1978

RIVER PROFILE
THE NOLICHUCKY RIVER
WILD AND SCENIC RIVER STUDY

Survey gauging station at Embreeville, a distance of 21.6 miles, the average drop is 23.5 feet per mile. Below Embreeville the river levels out somewhat, falling 8.4 feet per mile for the next 43 miles to Nolichucky Dam and then 3.7 feet per mile to the mouth.*

In North Carolina, the Nolichucky's course is heavily strewn with boulders and rocks. Although silt entering the river from mining operations has declined somewhat in recent years, the water is frequently turbid, particularly during periods of increased flow when the siltation from previous years is resuspended.

Man-made intrusions on the natural riverscape include 25 road crossings; 2 railroad crossings; 15.6 miles of paralleling railroad tracks; 15.9 miles of parallel roadway; 7 powerline crossings; 2 pipeline crossings. The Tennessee Valley Authority and the French Broad Electric Membership Corporation have under consideration other projects which would, if completed, further modify the natural qualities of the river. The

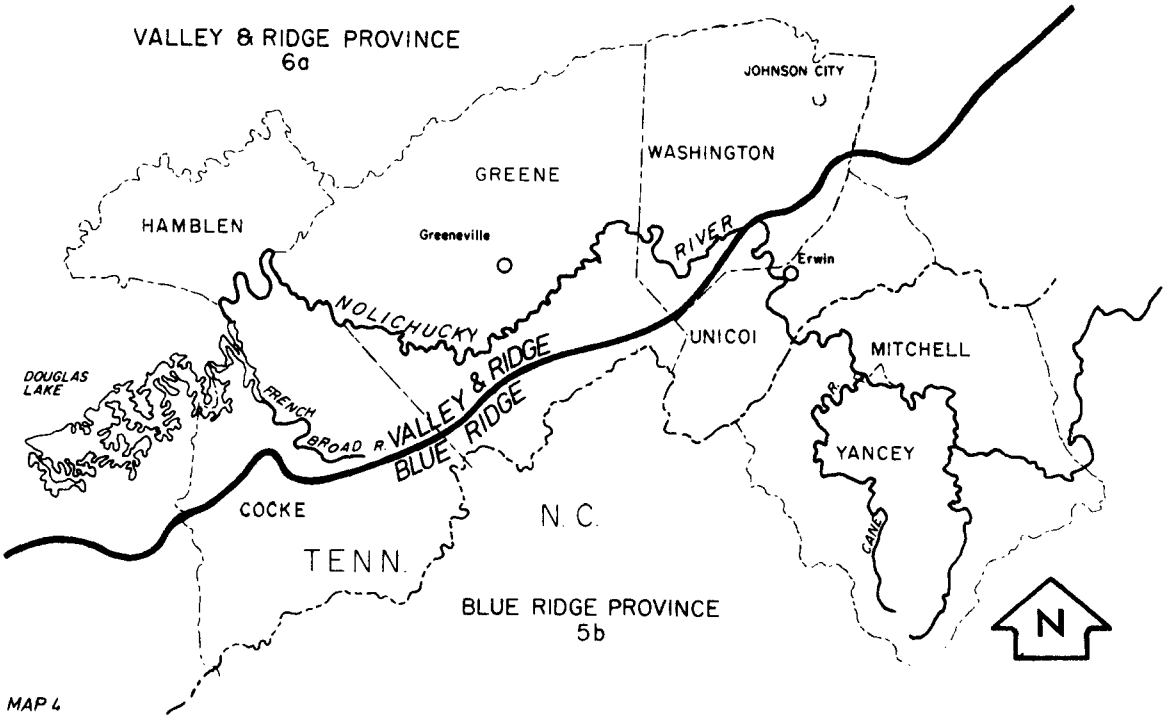
*Note: Table 11 provides data concerning the general characteristic of the river in each of the seven study counties and Table 12 provides data on flow extremes, see Chapter IV.

realignment of U.S. 23/SR-36 at Erwin, Tennessee, has resulted in extensive rechannelization and modification of the surrounding landscape. Additionally, the original free-flowing character of the Nolichucky River has been altered by two major impoundments, Douglas Lake and Davy Crockett Lake. The former produces backwater effects up to about river mile 9 and the latter floods about 6 miles of the river above river mile 45. Consequently, 15 miles, or 13.6 percent of the total river mileage is no longer free-flowing. Two low-water dams, located at the American Enka plant and at Pate Hill, river miles 7.8 and 29.0, respectively, have also influenced to a lesser degree the natural flow of the Nolichucky River by raising the water levels behind them. Enka Dam raises the water level approximately 2 or 3 feet above the stream below the dam.

## Physiography and Geology*

The Nolichucky River basin includes parts of two physiographic provinces: the Blue Ridge Province and the Valley and Ridge Province (Map 4, below).

The eastern face of the Blue Ridge Province, which is a mountainous belt extending from Georgia to Pennsylvania, is characterized by steep gradients and dissected ridges. East of the Blue Ridge front, Mitchell and Yancey Counties exhibit a topography of moderate to steep slopes. These counties are drained by generally northwesterly flowing streams, including the Nolichucky. Altitudes range from 1,700 feet above sea level where the Nolichucky enters Tennessee to 6,684 feet on the summit of Mt. Mitchell in Yancey County.




* For definitions of unfamiliar terms see Glossary in the Appendix

At the North Carolina-Tennessee State line, the Nolichucky flows into Unicoi County, past the Unaka Mountains on the north and the Bald Mountains on the south. These mountains, underlaid for the most part by quartzite and other clastic rocks of Cambrian and pre-Cambrian age, project 1,000 to 2,500 feet above the adjacent lowlands. This is a region of northeasterly trending formations known as Snowbird, Unicoi, Hampton, Erwin, Shady Dolomite, and Rome. These stratigraphic units are defined in the Appendix, page 8-2 and 8-6.

Once past Erwin, Tennessee, the river flows between steep mountain slopes which represent primarily the Unicoi and Erwin formations and the Ocoee series.

After passing Embreeville, at about river mile 85, the Nolichucky leaves the Blue Ridge Province and enters the Valley and Ridge Province. This province consisting of a long, narrow belt of faulted and folded dominantly calcareous Paleozoic rocks, extends for 1,200 miles from the St. Lawrence Valley to the Gulf Coastal Plain in Alabama. In Tennessee its average width is about 40 miles.

The average elevation of the Valley and Ridge Province in East Tennessee is about 1,000 feet. Lying between the Blue Ridge Province on the east and the Appalachian Plateau Province on the west, this province is characterized by a succession of northeast trending ridges of various widths. The rocks that underlie the Valley and Ridge Province are more susceptible to weathering than those of the Blue Ridge Province and, therefore, the topography is less rugged. Exposed rocks range in age from Cambrian to Ordovician. The oldest rocks, the Erwin, Hampton, and Unicoi formations and the Shady Dolomite, all of Early Cambrian age, are exposed in the southeast corner of Washington County where they crop out on Buffalo and Cherokee Mountains.

Less than a mile downstream from Embreeville, the river crosses the Buffalo Mountain fault and traverses a region of low rolling hills dominated by the Knox Dolomite. At its confluence with Big Limestone Creek, the river again enters a region of northeast trending ridges consisting of the Sevier Shale and Jonesboro Limestone formations. As the Nolichucky passes south of Chuckey, Tennessee, it turns to the southwest and flows in and out of a two to three mile wide formation consisting of the Upper Cambrian part of the Conasauga group and Honaker Dolomite. Two faults, known as Dunham Ridge and Pulaski, parallel the river and Davy Crockett Lake through this region.

Approximately 3 miles below the U.S. Highway 411 bridge, the Nolichucky enters a sizeable region consisting almost entirely of the Sevier Shale formation with occasional concentrations of the Knox Dolomite.

Observed through this lower segment of the river are the remnants of old floodplains formed before the streams cut their channels down to the present levels.

Two features of regional significance give special geologic importance to the bedrock outcroppings in and around the Nolichucky gorge. The first is that the extensive sequence of exposures along the left bank and southeastward from the Unaka Springs area is designated as the type section* of the Unicoi and Erwin formations. The second regionally important feature is the geologic structure revealed by the strata in and around the gorge area. In this area faulting, folding, and subsequent erosion have formed the complex Mountain City window, a major tectonic feature of the southern Appalachians. The revealing of this great structure, based in considerable part on exposures in the local area, gives us much insight into the history of deformation and geo-mechanics of the Appalachians.

In addition to the two regionally important features, many natural geologic processes and their resulting effects may be readily observed in and along the course of the Nolichucky. These are some of the more prominent processes and effects:

-Deep, rocky gorge cut by river action into resistant Cambrian and Precambrian siliceous sediments and granitic rocks.

-Abundant rock cliffs, walls, and ledges along the course of the river.

-Extensive bouldery talus slopes below outcropping ledges of massive quartzite beds.

-Evidence of landslides involving very rapid to slow downslope movement of colluvial masses.

-Small falls and numerous rapids; generally most common and pronounced where the strong, resistant beds of quartzite cross the river.

-Areas of stream-sorted deposits in and along the river channel. White sandy deposits are found in the small sheltered areas along the banks, and coarser gravels to cobbles are present in elongate bars, often located on the lee side of individual protective boulders.

-Layers of ancient vesicular basalt intercalated in some of the rocks.

-Cataclastic rocks or "shear zones" in the vicinity of faults.

*A type section is a reference standard used to formally establish and define a rock-stratigraphic unit and is of continuing importance because it provides a clearly defined base for future reference and restudy.

## Soils

Map 5, page 3-8 shows the distribution of the most common soil associations in the Nolichucky River basin. In the mountainous sections of Mitchell and Yancey Counties, where the river originates, the soils are primarily of the Ashe and Stoney steep Associations. These soils occur on steep to very steep slopes in the gorge; valley walls are greater than 30 percent and many slopes greater than 60 percent.

The Ashe Association borders both sides of the Nolichucky northerly from Huntdale for a distance of about 5 miles. This association is characterized by long steep to very steep side slopes. Ashe is the major soil with Porters and Tusquitee as the minor soils in the Association. Other series found on this part of the river are Tate, Watauga, and Comus, but these soils occur only in very small confined areas.

Steep phases in the Association vary in depth to the bedrock and range from 18 to 40 inches. Rocks outcrop in places and soil surfaces have scattered stones.

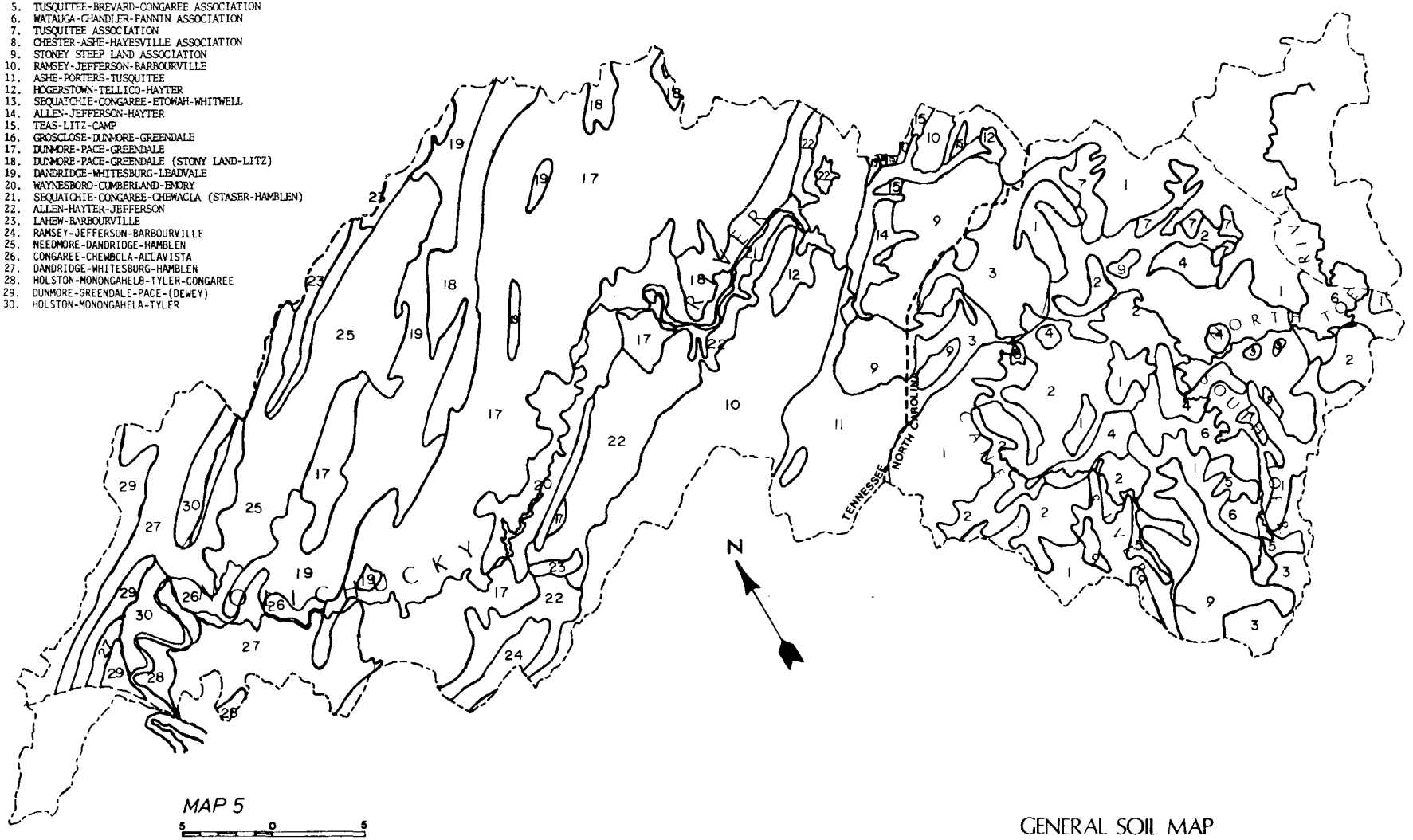
Loamy steep phases are medium to low in fertility. External drainage is rapid with internal drainage moderate.

The stony, steep phases have rock varying in size from small stones to large boulders, occurring on the surface, throughout the soil profile and in outcrops of rock in some places. External drainage is moderate to very rapid with internal drainage moderate. The steep slopes are very susceptible to erosion.

The Stony Steep Land Association occurs on both sides of the Nolichucky from Poplar downstream to the end of the gorge at Unaka Springs, Tennessee, river mile 98. Practically all of this land is in some type of forest, principally hardwoods. The land is generally unsuited for agriculture or other uses except forestland, and scenic beauty. The soils present moderate to severe limitations for the installation of sewerage systems and septic tanks with nitrification fields. As foundations for light industries, or roads they have moderate limitations because of their rocky inclusions and steep slopes.

In the transitional zone lying between the Blue Ridge Province and the Valley and Ridge Province, the soils are grouped into the Allen-Jefferson-Hayter, Ashe-Porters-Tusquittee, Ramsey Jefferson-Barbourville, and Hagerstown-Tellico-Hayter Associations. Both the Allen and Ramsey

1. PORTERS ASSOCIATION
2. CLIFTON-PORTERS ASSOCIATION
3. ASHE ASSOCIATION
4. CLIFTON ASSOCIATION
5. TUSQUITTEE-BREVARD-CONGAREE ASSOCIATION
6. WATAUGA-CHANDLER-FANNIN ASSOCIATION
7. TUSQUITEE ASSOCIATION
8. CHESTER-ASHE-HAYESVILLE ASSOCIATION
9. STONEY STEEP LAND ASSOCIATION
10. RAMSEY-JEFFERSON-BARBOURVILLE
11. ASHE-PORTERS-TUSQUITTEE
12. HOGERSTOWN-TELLICO-HAYTER
13. SEQUATCHIE-CONGAREE-ETOWAH-WHITWELL
14. ALLEN-JEFFERSON-HAYTER
15. TEAS-LITZ-CAMP
16. GROSCLOSE-DUNMORE-GREENDALE
17. DUNMORE-PACE-GREENDALE
18. DUNMORE-PACE-GREENDALE (STONY LAND-LITZ)
19. DANDRIDGE-WHITESBURG-LEADVALE
20. WAYNESBORO-CUMBERLAND-EMORY
21. SEQUATCHIE-CONGAREE-CHEWACLA (STASER-HAMBLEN)
22. ALLEN-HAYTER-JEFFERSON
23. LAHEW-BARBOURVILLE
24. RAMSEY-JEFFERSON-BARBOURVILLE
25. NEEDMORE-DANDRIDGE-HAMBLEN
26. CONGAREE-CHEWACLA-ALTAVISTA
27. DANDRIDGE-WHITESBURG-HAMBLEN
28. HOLSTON-MONONGAHELA-TYLER-CONGAREE
29. DUNMORE-GREENDALE-PACE-(DEWEY)
30. HOLSTON-MONONGAHELA-TYLER




MAP 5

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(Information provided by SCS)

GENERAL SOIL MAP

THE NOLICHUCKY RIVER

WILD AND SCENIC RIVER STUDY

soils occur more frequently on the steep slopes or at the mountain bases and are generally unsuited for row crops or pasture. Depending on slope, the Allen soils have limitations ranging from slight to severe for residential, industrial, and recreational uses. These soils, formed on colluvial deposits overlying limestone, provide for a relief that is hilly with moderately broad rolling ridge crests. The dominant soils are Allen and Jefferson, and these are usually stony, making the land unsuitable for cultivation or use as pastureland. The Ramsey soils have severe limitations for all uses: the terrain is mountainous and rugged and the soils are stony and shallow with common slopes of 20 to 60 percent.

Though the soils in Washington County are similar to those found in Unicoi County, the floodplain in the former becomes more pronounced and the mountainous slopes that dominate the uplands give way to more gently-sloped hills. Pastures dominate the use of lands on the uplands and the floodplain is often cultivated. The bottomlands soils are of the Sequatchie-Congaree-Chewacla (Staser-Hamblen) Association and are nearly level with the natural levees and intervening swales or sloughs that parallel the river. The soils of this association are basically well-suited to intensive cultivation; however, some restrictions do occur due to flooding, imperfect drainage, drought, or stoniness. Practically all soils of this association have been cleared and are intensively utilized for crop production.

The upland soils above the Sequatchie-Congaree-Chewacla Association on the north side of the Nolichucky River belong to the Dunmore-Stony-Greendale (Land-Litz) and the Waynesboro-Cumberland-Emory Associations; those on the south side belong to the Allen-Hayter-Jefferson Association. The Dunmore relief is rolling to hilly or steep with irregularly dendritic drainage patterns modified by sinks and subterranean streams. Dunmore soils are the most extensive soils of the association and, though considered only moderately productive, are well-suited to pasture and hay crops. Several escarpments and exposed bedrock occur where this association abuts the river.

Downstream, about river mile 84, soils of the Waynesboro-Cumberland-Emory Association begin to dominate the floodplains and nearby uplands on the north side of the river; the more remote soils on the river's north side belong to the Dunmore-Greendale-Pace Association. The soils of Waynesboro-Cumberland, probably the most productive in Washington County, consist of firm, well-drained, alluvium on gentle slopes. The Dunmore soils are somewhat less fertile, more highly leached, and generally shallower; and the relief is hillier, requiring a fairly high degree of management for their successful use.

From river mile 70 where the Nolichucky enters Greene County to river mile 46, near Nolichucky Dam, the soils have been identified as belonging to the Waynesboro-Cumberland-Emory Association. The relief in this association is undulating to rolling, and the soils are fair to moderately high in fertility and generally permeable; erosion is not difficult to control. Most of the soils in this association are used for plantings or pasture. On the northwest side of the river and to a lesser extent on the southeast side, soils of the Dunmore-Greendale-Pace Association dominate the slopes and hillsides. The relief of this association consists of broad rolling to hilly uplands. Narrow strips of nearly level to gently sloping local alluvium occur along the drainageways, and sinkholes are common. About 80 percent of this area has been cleared and is managed as pastureland. The Allen-Hayter-Jefferson Association with its numerous cobblestones occurs chiefly in a broad strip along the base of the mountains; and soils of the Ramsey-Jefferson-Barbourville Association, commonly associated with the mountainous areas, are usually forested. This association is represented in a portion of the Cherokee National Forest.

From Nolichucky Dam to the Allen Bridge (river mile 42), most of the soils are representative of the Waynesboro-Cumberland-Emory Association. A considerable amount of acreage of these soils has been cleared for pastureland.

Between Allen Bridge and river mile 30, the river penetrates an area of upland soils dominated by the previously described Dunmore-Greendale-Pace Association. From river mile 30 to river mile 28 in Green County a stretch of soils belonging to the Dandridge-Whitesburg-Leadvale Association appears.

These upland soils with their restricted drainage are usually low in fertility and moderately deep; most have been cleared for use as pastureland, small subsistence-type farms for which tobacco is the chief cash crop. The bottomland soils between river mile 28 and river mile 15 belong to the Congaree-Chewacla-Altavista Association, while the upland soils are dominated by the Dandridge-Whitesburg-Leadvale Association. Soils of the former association are moderately high in fertility but subject to flooding.

On the Cocke County side of this stretch of river, river mile 26 to river mile 17, the soils are identified as the Dandridge-Whiteburg-Hamblen Association and from river mile 17 to river mile 9 the soils are the Holston-Monogahela-Tyler-Congaree Association. The former type is not well suited to row crops; so much of it is used for pastureland and woodland. The Holston-Monogahela-Tyler-Congaree soils lie close to the river and are developed from old mixed alluvial materials. Most of this area is cleared and produces excellent crop yields.

Hamblen County, river mile 15 to river mile 0, has three primary soil associations close to the river; the Holston-Monongahela-Tyler Association is nearest the river, with the Dandridge-Whitesburg-Hamblen and Dunmore-Greendale-Pace (Dewey) Associations interspersed in parallel strips further back. Although the Dandridge-Whitesburg-Hamblen Association is better suited to woodland and pasture than row crops; the other two soil associations produce good crop yields.

Mineral Resources

Most of the mining activities affecting the Nolichucky River are centered around Spruce Pine and Micaville on the North Toe and South Toe Rivers in North Carolina (Map 6, page 3-12). There are presently 28 mineral producers operating in Mitchell and Yancey Counties.1/ Mineral extraction, by commodity, exhibited the following trends in this area:

Asbestos--Amphibole asbestos was mined principally in Yancey County. However, since 1972, output has been reported to have decreased substantially in terms of quantity and value.

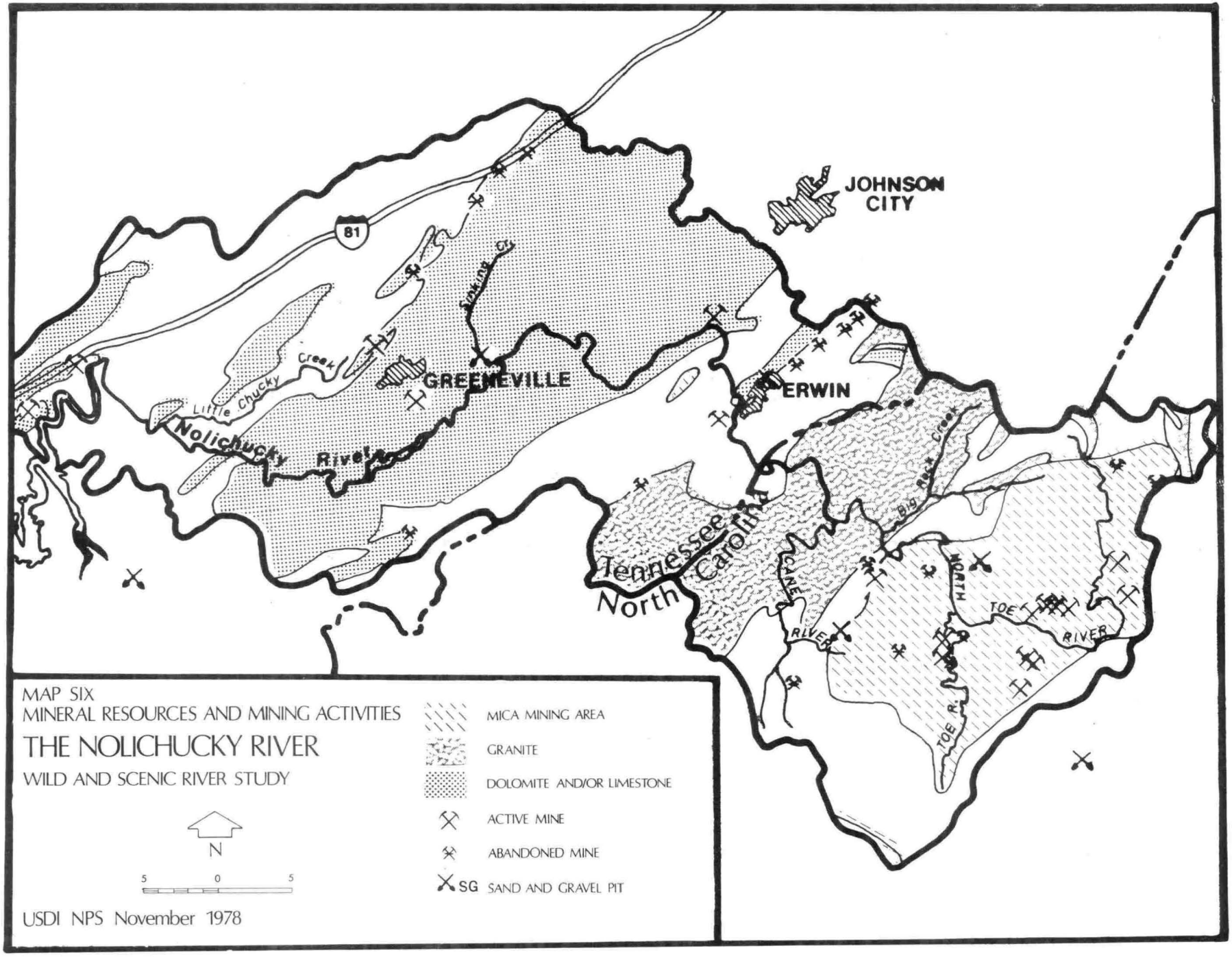
Feldspar--Nationwide, North Carolina ranks first in the production of this commodity. In 1973, the six companies operating nine mines in Mitchell, Yancey, and Cleveland Counties produced 66 percent of the nation's feldspar. The major demands for feldspar were in the glass-making and pottery industries.

Mica--For several years North Carolina has led in the production of scrap mica, and in 1973 accounted for 60 percent of the nation's domestic output by quantity and 73 percent by value. Mitchell, Yancey, Avery, and Cleveland Counties accounted for 75 percent of the State's production. Ground mica, utilized for joint cement, paint, roofing, rubber, and well drilling, is also produced in Mitchell and Yancey Counties.

Olivine--In 1973, the State, and more specifically Yancey County, led in the Nation's production of olivine, a greenish mineral used primarily by the foundry industry.

The following figures represent the total dollar value of all commodities extracted in Mitchell, Yancey, and Avery Counties from 1968 through 1973:

1/ Source: North Carolina Department of Natural and Economic Resources. Directory of North Carolina Mineral Producers. Raleigh, 1976.


JOHNSON CITY
81
GREENEVILLE
ERWIN
Little Chucky Creek
Nolichucky River
Tennessee
North Carolina
Big Rock Creek
CANE RIVER
NORTH TOE RIVER
TOE R.
MAP SIX
MINERAL RESOURCES AND MINING ACTIVITIES
THE NOLICHUCKY RIVER
WILD AND SCENIC RIVER STUDY
N
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MICA MINING AREA
GRANITE
DOLOMITE AND/OR LIMESTONE
ACTIVE MINE
ABANDONED MINE
SG SAND AND GRAVEL PIT

TABLE 1

VALUE OF MINERALS EXTRACTED IN MITCHELL, YANCEY, AND AVERY COUNTIES, 1968-1973

| YEAR | MITCHELL | YANCEY | AVERY |
|---|---|---|---|
| 1968 | $4,403,000 | W | W |
| 1969 | $4,161,000 | W | $1,178,000 |
| 1970 | $4,549,000 | W | $757,000 |
| 1971 | $4,374,000 | $1,031,000 | $958,000 |
| 1972 | $5,860,000 | $1,427,000 | $996,000 |
| 1973 | W | $1,976,000 | W |

1/ W - Withheld to avoid disclosure of individual company confidential data.

There is presently no mining activity or quarrying taking place along the Nolichucky River between Huntdale, North Carolina, and Unaka Springs, Tennessee. Remnant shallow depressions, indicating abandoned sand and gravel pits, are found above the gorge area between river mile 108 and 109, and other deposits undoubtedly exists. However, the absence of nearby markets makes their exploitation uneconomical. It is unlikely that commercially significant mineral deposits, with the possible exception of barite, occur along the river between Huntdale and Chestoa.

Mining operations in the Tennessee segment of the Nolichucky River Basin are far less extensive in comparison to North Carolina. However, there are several stone quarries and sand and gravel operations on the river in the Erwin-Embreeville area. Except for these operations there are at present no active mining operations in Tennessee which are likely to have an adverse impact on the Nolichucky River.

## Climate

The climate of the study area is strongly related to its varied topography. The section of the study area located in the Blue Ridge Province, where the climate is influenced by high altitudes, generally has short and cool summers, with a mean temperature of 66.8 degrees at Banner Elk, during July, the warmest month (Banner Elk, North Carolina, is located approximately 25 miles northeast of Poplar, in neighboring Avery County). Because of the differences in elevation there are wide variations in both mean annual temperature and precipitation within the Blue Ridge Province. On the higher mountain ranges precipitation is greater and temperatures are considerably lower than in the valley

areas, and snow remains on some of the more elevated slopes during much of midwinter. The winter months, though generally cold, are not severe and the summers bring cool evenings and days that are seldom sultry or very hot.

The Valley and Ridge Province experiences warm and relatively short summers. Here, the dryer weather that occurs in October and November--though favorable for the harvesting of crops that mature in late summer--can be harmful to those crops seeded in the fall. Rainfall is adequate, if not ample, during the growing season and a considerable amount of excess moisture is present during the winter months.

TABLE 2

U.S. WEATHER BUREAU MEAN TEMPERATURE AND PRECIPITATION DATA[1/]

| MONTH | Banner Elk Avery County, NC Temperature (°F) | Banner Elk Avery County, NC Precipitation (Inches) | Embreeville Washington County, TN Temperature (°F) | Embreeville Washington County, TN Precipitation (Inches) |
|---|---|---|---|---|
| January | 35.0 | 4.04 | 40.9 | 3.65 |
| February | 35.0 | 3.88 | 42.0 | 3.72 |
| March | 40.9 | 4.73 | 48.7 | 4.62 |
| April | 49.0 | 4.07 | 57.9 | 3.46 |
| May | 56.9 | 4.18 | 66.5 | 4.04 |
| June | 64.1 | 4.68 | 74.5 | 3.55 |
| July | 66.8 | 6.21 | 77.2 | 6.36 |
| August | 65.8 | 5.53 | 76.2 | 4.00 |
| September | 60.8 | 3.55 | 70.7 | 3.04 |
| October | 51.6 | 3.29 | 59.6 | 2.48 |
| November | 40.6 | 3.52 | 47.3 | 2.70 |
| December | 34.7 | 3.82 | 40.4 | 3.25 |
| Total Annual Precipitation: | | 51.50 | | 44.87 |
| Mean Annual Temperature: | 50.1 | | 58.5 | |

1/ Weather Bureau, U.S. Department of Commerce, Climates of North Carolina and Tennessee, February 1960.

2/ Eastern Division, Tennessee, average mean temperature.

Table 2 illustrates the temperature and precipitation data for Banner Elk, North Carolina, representative of the Blue Ridge Province and for Embreeville, Tennessee, which is representative of the Valley and Ridge Province. Mean monthly temperatures range from 5.7 to 10.4 degrees warmer in the Valley and Ridge Province. Average monthly precipitation in the Blue Ridge Province ranges from 0.39 inches to 1.53 inches more than it is in the Ridge and Valley Province.

## Air Quality

Within the Nolichucky River basin air quality is rated generally acceptable with no major pollution sources in the counties through which the river flows. The Region IV Office of the Environmental Protection Agency (EPA) has not identified any air pollution problem with emission sources in Mitchell or Yancey Counties, North Carolina, and according to the Tennessee Department of Public Health, Division of Air Pollution Control, no major sources of air pollution have been identified which might seriously affect the study area. Point sources within Unicoi, Greene, Washington, Hamblen, and Cocke Counties in Tennessee are either in compliance with emission standards or are scheduled to comply. Although Tennessee State law does exempt some air pollution sources, the operators of the sources have been advised to adhere to the Federal emission standards set by EPA.

## Population

The population of the seven county study area was 226,863 at the time of the 1970 census. (See Table 3) This represents a 16 percent increase over the population of 195,321 in 1950. However, this population increase was due primarily to growth in Greene, Hamblen and Washington Counties. Mitchell, Yancey, and Unicoi Counties actually lost population during this period. Population estimates for 1976 show continued growth for the study area as a whole and a reversal of the downward trend in Mitchell, Yancey and Unicoi Counties. The reversal of the downward trend in these counties is attributed to the return of former residents to this rural area as economic opportunities have improved.

In the 20-year period between 1950 and 1970, the overall population density of the seven counties of the Nolichucky River study area increased from 88.7 to 100 persons per square mile. The established and projected increases will more than likely result in greater demands in the future on the use of natural resources of the river basin and on the river. Population projections (See Table 4) indicate that the population of the study area will continue to increase. The Environmental Protection Agency has projected that the population will double by 2020. This growth is projected to occur primarily in the counties which have exhibited higher rates of growth in the past; Greene, Hamblen and Washington.

TABLE 3

POPULATIONS FOR NORTH CAROLINA, TENNESSEE, AND THE NOLICHUCKY RIVER STUDY AREA
1950 TO 1970[1/]

| STATE/COUNTY | AREA (Sq. Miles) | TOTAL POPULATION and (Persons per Square Mile) | | | |
|---|---|---|---|---|---|
| | | 1950 | 1960 | 1970 | 1976[2/] |
| North Carolina: | 52,712 | 4,061,929 (77.1) | 4,556,155 (86.4) | 5,082,059 (96.4) | 5,469,000 (103.7) |
| Mitchell | 215 | 15,143 (70.4) | 13,906 (64.7) | 13,447 (62.5) | 13,900 (64.6) |
| Yancey | 312 | 16,306 (52.3) | 14,008 (44.9) | 12,629 (40.5) | 14,500 (46.5) |
| Tennessee: | 42,244 | 3,291,718 (77.9) | 3,567,089 (84.4) | 3,923,687 (92.9) | 4,214,000 (99.7) |
| Cocke | 435.0 | 22,991 (52.8) | 23,390 (53.8) | 25,283 (58.1) | 27,600 (63.4) |
| Greene | 613.1 | 41,048 (67.0) | 42,163 (68.8) | 47,630 (77.7) | 50,000 (81.6) |
| Hamblen | 174.0 | 23,976 (137.8) | 33,092 (190.2) | 38,696 (222.4) | 43,000 (247.1) |
| Unicoi | 185.0 | 15,886 (85.9) | 15,082 (81.5) | 15,254 (82.5) | 16,000 (86.5) |
| Washington | 323.5 | 59,971 (185.0) | 64,832 (200.4) | 73,924 (228.5) | 81,300 (251.3) |
| TOTAL Seven-County Study Area | 2,257.6 | 195,321 (86.5) | 206,473 (91.5) | 226,863 (100.5) | 246,300 (109.1) |

1/ U.S. Census of Population; table 5 for 1950; table 6 for 1960; and table 9 for 1970.
2/ U.S. Bureau of Census estimate, July 1, 1976.

Though no major urban centers exist within the study area, there are within a convenient half day's drive of the Nolichucky River seven Standard Metropolitan Statistical Areas (SMSA's): Asheville, Greensboro-Winston-Salem-High Point, and Charlotte-Gastonia, North Carolina; Knoxville, Chattanooga, and Kingsport-Bristol, Tennessee; and Greenville-Spartanburg, South Carolina.

Table 4

PROJECTED POPULATION OF NOLICHUCKY RIVER
SEVEN-COUNTY STUDY AREA[1/]

| STATE/COUNTY | YEAR | | | | |
|---|---|---|---|---|---|
| | 1970 | 1980 | 1990 | 2000 | 2020 |
| North Carolina: | | | | | |
| Mitchell | 13,447 | 14,300 | 15,700 | 17,000 | 20,900 |
| Yancey | 12,629 | 12,800 | 13,600 | 14,400 | 17,000 |
| Tennessee: | | | | | |
| Cocke | 25,283 | 27,700 | 30,400 | 33,000 | 38,800 |
| Greene | 47,630 | 58,800 | 73,500 | 91,000 | 133,000 |
| Hamblen | 38,696 | 50,300 | 60,700 | 69,000 | 83,800 |
| Unicoi | 15,254 | 17,400 | 20,000 | 22,500 | 27,000 |
| Washington | 73,924 | 95,800 | 124,000 | 154,000 | 250,000 |
| TOTAL: | 226,863 | 277,100 | 337,900 | 400,900 | 570,500 |

1/ Population by Counties Historic (1940-1970) and Projected (1980-2020) Region IV, Environmental Protection Agency, Atlanta, Georgia.

Economy

Economic data was generally available at the county level but observations by the study team provided additional information concerning the local economy within the Nolichucky River Corridor.

Employment - Of the study area's total population, 36 percent were employed at the time of the 1970 census--only 2 percent less than the combined employment averages for the States of North Carolina and

Tennessee. The largest employer in the study area is the manufacturing industry (38.9%) followed by the service industry (22.9%) and retail trade (13.1%) (See Table 5). Agriculture, the dominant land use and industry along much of the Nolichucky River, actually engages a small part (6.6%) of the workforce of the study area as a whole.

Transportation and public utility sectors of the economy are strongly represented in the Nolichucky River corridor as components of the economy of Erwin, Tennessee. The Clinchfield Railroad, a part of the Family Lines System, is headquartered in Erwin. Clinchfield employs approximately 500 people in that town and has a payroll of over $10 million. Clinchfield's facilities in Erwin include a major terminal, a service facility, and the general offices for the railroad.

Income - As in other areas within the Appalachian Highlands, average income levels in the Nolichucky study area are considerably lower than the national average. According to 1970 census statistics incomes at less than the poverty level prevailed for 23 percent of the families in the seven-county area; rural farming per capita income was approximately 12 percent less than that for rural nonfarming occupations. Social and economic projections developed by the U.S. Water Resources Council for the upper Tennessee Water Resources Subarea (which includes the Nolichucky River basin), indicate steady increases to the year 2020 for three key economic parameters: population, employment, and income. (Table 6)

Agriculture - An analysis of 1969 land use data reveals that 38 percent of the study area's total acreage is utilized for either pasture or cropland; 45 percent is forested; 5 percent is urbanized; and less than 12 percent has been put to other use. Though 45 percent of the area remains forested, the 38 percent which is tillable cropland represents the area's major source of income. The use of the cropland was as follows: roughly 32 percent harvested, 58 percent pasture and grazing; and 10 percent other. In 1969, about 80 percent of the farm operators were in full ownership of their lands (See Table 7) which averaged 65 acres per farm. A steady market value increase in both cropland commodities and poultry and livestock has been projected for the seven-county study area through 2020. (Table 8)

The study area as a whole will more than likely continue to improve economically relative to the rest of the nation. As industrial development continues throughout the south, the Nolichucky River study area can be expected to share in this new growth. Erwin, Tennessee, is particularly well suited for new industry as a result of good rail and highway access and the availability of prime industrial sites along the Nolichucky River.

TABLE 5

EMPLOYMENT OF PERSONS OVER 16 BY INDUSTRY FOR COUNTIES IN STUDY AREA*

| INDUSTRY | COCKE | GREENE | HAMBLEN | UNICOI | WASHINGTON | MITCHELL | YANCEY | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Agriculture | 593 (7.2%) | 2044 (11.9%) | 604 (4.0%) | 326 (6.4%) | 1084 (4.1%) | 236 (5.0%) | 461 (10.5%) | 5348 (6.6%) |
| Mining | 15 (0.2%) | 43 (0.3%) | 37 (0.2%) | 27 (0.5%) | 51 (0.2%) | 148 (3.1%) | 99 (2.2%) | 420 (0.5%) |
| Construction | 524 (6.4%) | 1258 (7.4%) | 893 (5.9%) | 256 (5.0%) | 2269 (8.5%) | 402 (8.5%) | 517 (11.7%) | 6119 (7.5%) |
| Manufacturing | 4132 (50.1%) | 6486 (37.9%) | 6895 (45.5%) | 2139 (42.0%) | 8159 (30.6%) | 1944 (41.2%) | 1903 (43.2%) | 31658 (38.9%) |
| Transportation and Public Utilities | 278 (3.4%) | 695 (4.1%) | 704 (4.7%) | 706 (13.9%) | 1202 (4.5%) | 249 (5.3%) | 152 (3.5%) | 3986 (4.9%) |
| Wholesale Trade | 157 (1.9%) | 570 (3.3%) | 458 (3.0%) | 78 (1.5%) | 1042 (3.9%) | 109 (2.3%) | 75 (1.7%) | 2489 (3.1%) |
| Retail Trade | 1043 (12.6%) | 2039 (11.9%) | 2487 (16.4%) | 547 (10.7%) | 3660 (13.7%) | 557 (11.8%) | 400 (9.1%) | 10733 (13.2%) |
| Finance, Insurance and Real Estate | 83 (1.0%) | 378 (2.2%) | 492 (3.2%) | 69 (1.4%) | 881 (3.3%) | 84 (1.8%) | 42 (1.0%) | 2029 (2.5%) |
| Service | 1421 (17.2%) | 3602 (21.0%) | 2579 (17.0%) | 944 (18.5%) | 8310 (31.2%) | 992 (21.0%) | 754 (17.1%) | 18602 (22.9%) |
| TOTAL | 8246 | 17,115 | 15,149 | 5092 | 26,658 | 4721 | 4403 | 81,384 |

* Source: U.S. Department of Commerce, Bureau of the Census; Census of Population; Government Printing Office: Washington, D.C. 1970

TABLE 6

POPULATION; EMPLOYMENT; PERSONAL INCOME; AND AGRICULTURE, FORESTRY AND FISHERIES TOTAL EARNINGS, NOLICHUCKY RIVER STUDY AREA, SELECTED YEARS, 1969 TO 2020[1/]

| PARAMETER | 1969 | 1985 | 2000 | 2020 |
|---|---|---|---|---|
| Population | | | | |
| United States | 201,298,000 | 234,517,300 | 263,830,000 | 297,146,000 |
| Upper Tennessee Subarea | 1,655,912 | 2,032,600 | 2,261,900 | 2,430,700 |
| Seven-county Study Area | 226,863 | 278,470 | 309,884 | 333,011 |
| Total Employment | | | | |
| United States | 79,306,527 | 101,121,100 | 117,891,000 | 130,534,000 |
| Upper Tennessee Subarea | 595,788 | 790,600 | 929,000 | 1,017,900 |
| Seven-county Study Area | 81,671 | 108,603 | 127,052 | 139,865 |
| | (in percent) | | | |
| Employment-Population Ratio | | | | |
| United States | 39 | 43 | 45 | 44 |
| Upper Tennessee Subarea | 36 | 39 | 41 | 42 |
| Seven-county Study Area | 36 | 39 | 41 | 42 |
| | (1967 U.S. dollars) | | | |
| Per Capita Income | | | | |
| United States | 3,435 | 5,400 | 8,100 | 13,200 |
| Upper Tennessee Subarea | 2,429 | 3,900 | 6,200 | 10,900 |
| Seven-county Study Area | 1,820 | 2,922 | 4,645 | 8,166 |
| | (in percent) | | | |
| Per Capita Income (relative to U.S.) | | | | |
| United States | 100 | 100 | 100 | 100 |
| Upper Tennessee Subarea | 71 | 72 | 77 | 83 |
| Seven-county Study Area | 53 | 54 | 57 | 62 |
| | (in thousands of 1967 U.S. dollars) | | | |
| Total Personal Income | | | | |
| United States | 691,450,638 | 1,273,226,200 | 2,154,266,000 | 3,931,928,000 |
| Upper Tennessee Subarea | 4,021,461 | 8,083,200 | 14,237,700 | 26,629,100 |
| Seven-county Study Area | 412,891 | 813,689 | 1,439,411 | 2,719,360 |
| | (in thousands of 1967 U.S. dollars) | | | |
| Total Earnings: Agriculture Forestry and Fisheries | | | | |
| United States | 20,086,322 | 22,122,800 | 25,856,000 | 32,975,000 |
| Upper Tennessee Subarea | 102,607 | 99,900 | 111,700 | 138,100 |
| Seven-county Study Area | 47,075 | 45,832 | 51,246 | 63,358 |

1/ Projections from OBERS E, Vol. 3 (1967 dollars)

TABLE 7

FARM OPERATORS, TENURE AND CHARACTERISTICS, ALL FARMS,
NOLICHUCKY RIVER STUDY AREA, 1969[1/]

| STATE-COUNTY | Full-owner Operated Farms | Part-owner Operated Farms | Tenant Operated Farms | Total Farms | Farm Workers Working Off-Farm 100 days or more | Average Age | 65 Years of Age And Older (percentage) |
|---|---|---|---|---|---|---|---|
| North Carolina | 75,625 | 25,889 | 17,872 | 119,386 | 46,233 | 52.4 | 18.0 |
| Mitchell | 667 | 103 | 13 | 783 | 300 | 54.4 | 25.9 |
| Yancey | 944 | 155 | 16 | 1,115 | 507 | 54.9 | 23.9 |
| Tennessee | 93,222 | 19,039 | 9,145 | 121,406 | 58,474 | 53.0 | 21.0 |
| Cocke | 1,295 | 214 | 83 | 1,592 | 733 | 52.1 | 21.4 |
| Greene | 3,681 | 671 | 479 | 4,831 | 2,290 | 51.5 | 17.7 |
| Hamblen | 954 | 152 | 103 | 1,209 | 649 | 52.9 | 22.7 |
| Unicoi | 529 | 55 | 28 | 612 | 328 | 53.3 | 22.7 |
| Washington | 2,214 | 376 | 199 | 2,789 | 1,394 | 53.4 | 23.5 |
| Seven-county Study Area | 10,284<br>80% | 1,726<br>13% | 921<br>7% | 12,931<br>100% | 6,201 | 52.7 | 21.1 |

1/ U.S. Census of Agriculture, 1969.

TABLE 8

PROJECTED MARKET VALUE OF MAJOR COMMODITY SALES
NOLICHUCKY RIVER STUDY AREA, SELECTED YEARS1/
(in 1969 Dollars)

| Seven-county Study Area | 1985 | 2000 | 2020 |
|---|---|---|---|
| Crops | $18,233,439 | $21,598,785 | $24,657,173 |
| Livestock, Poultry and By-products | $38,432,880 | $44,710,891 | $49,781,195 |
| Total | $56,666,319 | $66,309,676 | $74,438,368 |

1/ Projections based on projections for the Upper Tennessee Subarea from 1972 OBERS Projections, Regional Economic Activity in the U.S., Series E Population Supplement Agricultural Projections. Water Resources Council, Washington, D.C., 1975.

Land Use

Existing land use in the Nolichucky River study area is primarily forest and agriculture (Table 9 and Map 7). Mitchell and Yancey Counties in North Carolina are mountainous and land use is primarily forestry and wildlife management. The portion of the study area located in Tennessee is primarily agricultural. Erwin, Tennessee, is the only urban area immediately adjacent to the river. The Land Use Map indicates the general pattern of land use in the Nolichucky River Basin.

Existing land use patterns in the study area are not expected to change in the foreseeable future. Mitchell and Yancey Counties, after having lost population between 1950 and 1970 (See Population), have been experiencing a very slow growth rate since 1970. This growth, as has been stated, is primarily the result of former residents returning to the area. The growth in recreational communities and second home development in neighboring Avery and Watauga Counties has not occurred in Mitchell and Yancey Counties. It is projected that the rate of growth in Mitchell and Yancey Counties will remain low. As a result there will be minimal development pressures and land use changes in the North Carolina portion of the study area.

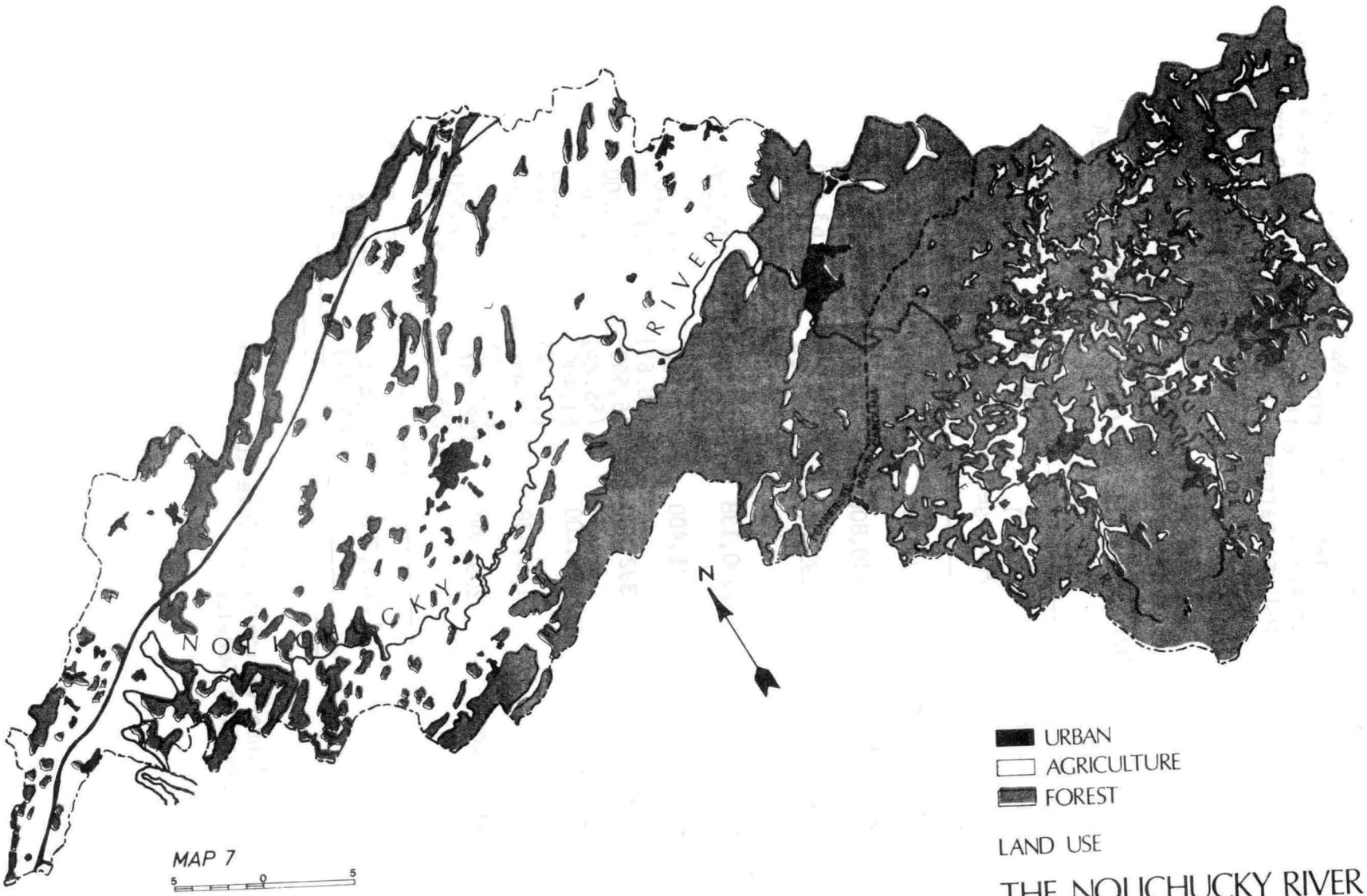
The Tennessee portion of the study area is primarily agricultural land. The area has not experienced a period of decline. However, growth rates are low and most of the increase is occurring in urban areas. As a result, general land use patterns in the region are expected to remain stable.

TABLE 9

LAND USE IN THE NOLICHUCKY RIVER STUDY AREA[1/]

| STATE-COUNTY | Total Acreage | Pasture and Croplands | Forest | Urban | Other |
|---|---|---|---|---|---|
| North Carolina | 339,840 | 66,064 | 210,245 | 7,076 | 56,455 |
| Mitchell | 140,800 | 29,071 (20.6%) | 89,540 (63.6%) | 2,646 (1.9%) | 19,543 (13.9%) |
| Yancey | 199,040 | 36,993 (18.6%) | 120,705 (60.6%) | 4,430 (2.2%) | 36,912 (18.5%) |
| Tennessee | 1,090,138 | 481,400 | 440,200 | 64,938 | 103,600 |
| Cocke | 271,400 | 77,600 (28.6%) | 120,700 (44.5%) | 6,700 (2.5%) | 66,400 (24.5%) |
| Greene | 392,200 | 216,500 (55.2%) | 150,200 (38.3%) | 15,500 (3.9%) | 10,000 (2.5%) |
| Hamblen | 99,200 | 51,400 (51.8%) | 29,000 (29.2%) | 12,800 (12.9%) | 6,000 (6.0%) |
| Unicoi | 118,338 | 13,900 (11.7%) | 88,500 (74.8%) | 5,038 (4.3%) | 10,900 (9.2%) |
| Washington | 209,000 | 122,000 (58.4%) | 51,800 (24.8%) | 24,900 (11.9%) | 10,300 (4.9%) |
| TOTALS | 1,429,978 | 547,464 (38.3%) | 650,445 (45.5%) | 72,014 (5.0%) | 160,055 (11.2%) |

1/ 1971 Conservation Needs Inventory for North Carolina and Tennessee, Soil Conservation Service




MAP 7

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USDI NPS November 1978

LAND USE

THE NOLICHUCKY RIVER

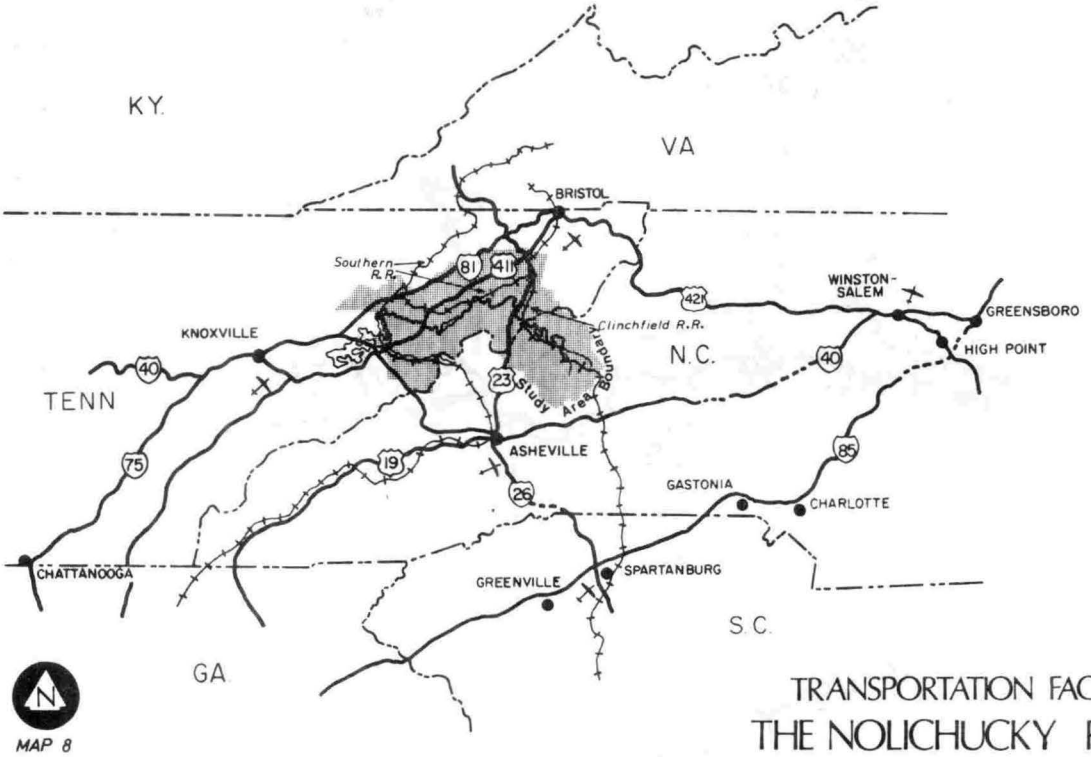
WILD AND SCENIC RIVER STUDY

## Transportation Systems

Access to the Nolichucky study area is adequately provided by a combination of ground, air, and waterway transportation systems. Of foremost importance within the seven-county study area, are the 2,000 miles of all-weather roadways; approximately 400 miles of which may be described as major tourist routes (see Transportation Facilities map). Interstate Highways 40, 75, and 81 converge in Knoxville, Tennessee, linking Nashville, Tennessee; Lexington, Kentucky; and Asheville, North Carolina, to the study area by way of I-81. To a certain degree, I-81 parallels the Nolichucky River through northeastern Tennessee. Other routes that serve the area are U.S. Highways 11-E and 411, in the central and western portions of the study area and U.S. 23 and 19-W in the eastern part of the region. U.S. Highway 411 is a principal non-interstate route to Atlanta, Georgia, and other urban areas in the southeast. Highways 23 and 19-W connect Asheville and Atlanta to the Tri-Cities area (Bristol, Kingsport. and Johnson City).

Scheduled commercial air service is available at terminals located in Knoxville, Asheville, and at the Tri-Cities Airport. Limited aviation facilities are also available at Johnson City and Greeneville Tennessee.

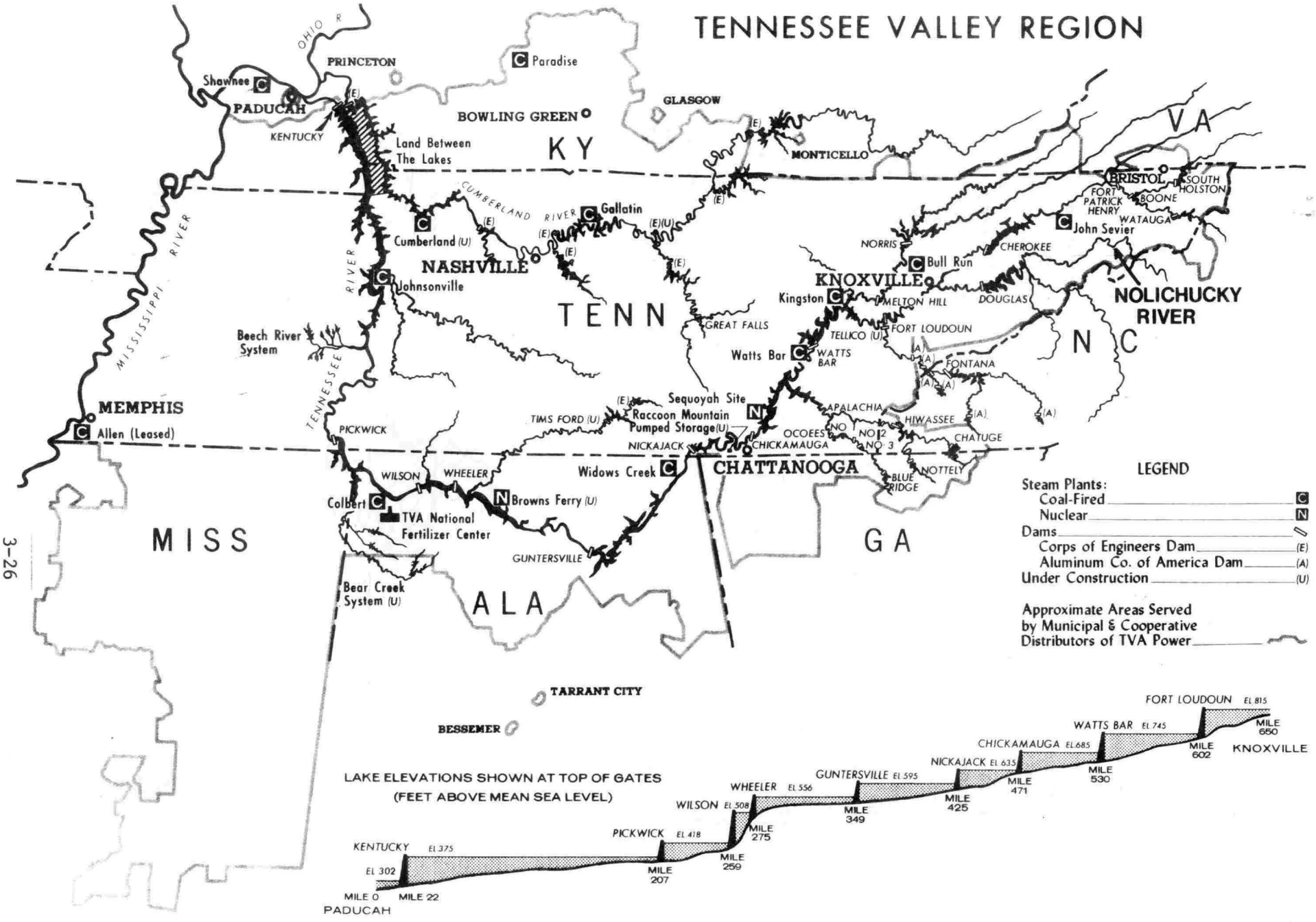
As a tributary of the French Broad River, the Nolichucky River is also a part of the Tennessee River waterway system (see Tennessee Valley Region Map). The system constitutes a major water transportation corridor that links the study area with other parts of the southeast.




MAP 8

USDI NPS November 1978

TRANSPORTATION FACILITIES
THE NOLICHUCKY RIVER
Wild and Scenic River Study




PROFILE OF THE TENNESSEE RIVER (ALL MAINSTREAM DAMS HAVE NAVIGATION LOCKS)

*MAP 9 - TENNESSEE VALLEY REGION*

Scheduled passenger rail service is not available in the study area. However, the Clinchfield Railroad that parallels the Nolichucky River from its headwaters in North Carolina to Erwin, Tennessee, does operate a freightline from Spartanburg, South Carolina, to Elkhorn City, Kentucky, and provides 10 to 12 short distance excursion trips at various times during the year.

## Fish and Wildlife Resources

Fish: The presence of heavy silt loads in the Nolichucky River, originating primarily from mica and feldspar mining operations on the North and South Toe Rivers in North Carolina, has severely limited game fish production in the river for many years. The situation is especially serious in the portion of the Nolichucky from its source to Nolichucky Dam. In this stretch, which encompasses about 58 percent of the river's total length, pollutants have essentially eliminated many species of fishes and mollusks from the river. For example, the entire subgenus Nothonotus, which includes the small minnows and darters, has been eliminated from the upper portion of the river. Mussels have also disappeared from the upper Nolichucky as a result of poor water quality. However, below the dam, which has trapped most of the silt, the diversity of the fish is somewhat greater. A rare river snail (Io fluvialis), which is included on the U.S. listing of Endangered and Threatened Species, and a declining bivalve (Cumberlandia monodonta) have both been observed on the lower river. Other fish species which inhabit the lower river are the blue sucker (Cycleptus elongatus), an undescribed minow (Notropis) related to N. Volucellus, and two minnows, the Phenacobius uranops and P. crassilibrum. Four darters (Etheostoma acuticeps, E. rufilineatum, E. camurum, and E. maculatum) are still found in good numbers.

Data with regard to sport fishing pressure in North Carolina are nearly nonexistent. The poor quality of fishing was indicated, however, by the fact that Statewide creel censuses in North Carolina in 1964-65 and 1970-71 did not result in a single fisherman contact on the Nolichucky River. The mineral industry has in recent years taken steps to regulate its operations, and water quality has improved somewhat. It is projected that continued employment of sedimentation control measures would, with time, have a favorable effect on the river's quality and could ultimately result in its restoration as one of the better smallmouth bass streams in North Carolina. Although an occasional smallmouth bass, trout, or catfish is taken from the stream in the gorge area, fishing pressure is mininal due both to the rugged terrain with its limited access and the rapid streamflow that makes fishing from a boat almost impossible.

Between the gorge and Nolichucky Dam sport fishing remains poor for the reasons stated above. However, as the river's silt load declines and the habitat becomes more conducive to fish life , the quality of sport fishing should improve dramatically.

In the lower portions of the Nolichucky, below Nolichucky Dam, the fishing for smallmouth bass and catfish is rated good to excellent.

Other fish species found in the lower reaches of the river include the following:

Game fish: Largemouth bass - Micropterus salmoides
White crappie - Pomoxis annularis
Bluegill - Lepomis macrochirus

Rough fish: Smallmouth buffalo - Ictiobus bubalus
River redhorse - Moxostoma carinatum
Carp - Cyprinus carpio
Channel catfish - Ictalurus punctatus
Flathead catfish - Pylodictis olivaris
Sturgeon - Acipenser fulvescens

Forage fish: Gizzard shad - Dorosoma cepedianum

Wildlife: The Nolichucky River flows through Pisgah and Cherokee National Forest lands. The U.S. Forest Service, with the cooperation of the State Wildlife Commissions of North Carolina and Tennessee, manages these lands for wildlife in addition to forestry management. Hunting and fishing on these lands are authorized subject to state fish and game regulations.

Both habitat and population levels for small and big game are generally good with the principal species encountered being deer, turkey, grouse, and small game such as squirrels and rabbits. In spite of good hunting conditions it appears that little actual hunting takes place due to the rugged terrain in the gorge. As the river enters Tennessee it leaves the wildlife management area but the habitat and populations levels remain good up to the Erwin area where heavy development has eliminated the conditions which once made this an outstanding area for big game.

As the river nears Erwin, Tennessee, a decrease in wildlife habitat becomes evident--the result of increased land use and dense development. Beyond Erwin and into Washington County small game habitat is

rated fair and big game habitat is rated poor. Waterfowl habitat is also rated poor. Correspondingly, wildlife populations for small game are rated fair, and for big game and waterfowl, poor.

For the remainder of its length the Nolichucky flows through lands used extensively for livestock production and cultivation. As a result, wildlife habitat is essentially nonexistent; and, therefore, wildlife populations are quite low. The one exception is an area around Davy Crockett Lake known as the Nolichucky Waterfowl Sanctuary. This sanctuary is an environmental project of TVA which was designed to improve the habitat for ducks and geese and by doing so improve waterfowl hunting outside the sanctuary itself. Tennessee Wildlife Rangers have observed improved wood duck hunting below Nolichucky Dam. Overall, hunting is very light due to the limited resources outside the gorge and the difficult terrain within the gorge.

Vegetation

Vegetation in the mountainous areas of the upper Nolichucky originally consisted of an overstory of chestnut, oak, hemlock, balsam, yellow poplar, beech, birch, hickory, black walnut, sourwood, buckeye, and dogwood. Beneath the tree canopy was a growth of shrubs and other small plants consisting chiefly of rhododendron, mountain laurel, huckleberry, and buckberry. Galax and trailing arbutus were common plants on the mountains. However, a large part of the original tree growth has been cut for timber, and yellow poplar, oak, maple, black locust, pine, birch and hickory have come in as second and third growth.

In the valley, predominant tree species are red oak, black oak, scarlet oak, white oak, post oak, yellow poplar, chestnut oak, Virginia pine, shortleaf pine, red cedar, and several species of hickory. Originally forests covered the entire Nolichucky Valley but the harvesting of timber without proper reforestation and clearing for agriculture have reduced the total forest cover by 80 percent or more in the area between Erwin and Douglas Lake.

Noteworthy plants found in the Nolichucky corridor include the following:

Sapsucker (Buckleya distichophylla) - Threatened plant
Fraser Sedge (Cymophyhlus Fraseri) - Threatened plant
Saxifrage - (Saxifraga careyana)
Allegheny Cliff-fern (Woodsia scopulina)

The State of North Carolina lists the following endangered plants by county or by range in the state. These may or may not occur in the immediate vicinity of the river:

Trisetum spicatum var. molle - Roan Mountain to Mitchell County (also Tennessee) - Rare

Carex aenea - Roan Mountain, Mitchell County - Rare

Carex misera - Ashe, Buncombe, Macon, Mitchell and Swain Counties (also Georgia and Tennessee) - Rare

Allnus crispa - Roan Mountain, Mitchell County (also Tennessee and West Virginia) - Rare and Endangered

Betula pap-rifera var. cordifolia - Black Mountain Yancey County (also West Virginia) - Rare and Endangered

Diervilla rivularis - Yancey County (also Alabama and Tennessee) - Rare

Solidago spithamaea - Mitchell and Avery Counties - Rare

Archeology and History

The earliest known inhabitants of the Nolichucky River valley were the Indians of the Woodland Culture--about 1000 B.C. to A.D. 300. As evidenced by artifacts such as stone axes, celts, spear points, arrowheads, ceremonial items, pottery remnants, and crude stone mortars for crushing corn, these Woodland hunters, fishermen, and farmers concentrated themselves along the banks of the Nolichucky near the present site of Erwin, Tennessee. During the mid-1950's, amateur archeologists, prompted by the University of Tennessee, unearthed at nearby Camp Creek several findings indicative of this culture. Their work was described in The Tennessee Archeologist, Volume 13, No. 1, pp. 1-48. Though a few minor excavations have been undertaken in the study area since that time, no comprehensive professional archeological survey of the Nolichucky valley has been initiated. There is one active archeological exploration underway at this time under the aegis of the University of Tennessee. These diggings are on the south side of the river in the vicinity of Jackson Creek.

The influence of Cherokee Indians in the Nolichucky area is indicated by the many place names of Cherokee origin. The name "Nolichucky" has been translated as "spruce tree place" from the Cherokee words Nana Tlugun Yi1/ or as "swift water" or "rapid river" from the Cherokee words Nona Chuna.2/

1/ James A. Mooney, Myths of the Cherokee; p. 527, 19th Annual Report of the Bureau of American Ethnology, 1900; U.S. Government Printing Office, Washington, D.C.

2/ Colonel Stephen H. Long, Corps of Engineers, after a survey of the Nolichucky River in 1832, wrote the following: "The Nolichucky, or, as it was originally called, Nonachuna, importing swift water, or rapid river,..." U.S. Congress, House. Holston and Tennessee Rivers. House-Executive Document No. 167, 43rd Congress, 2nd Session, 1975.

White men first ventured into the Nolichucky Valley in pursuit of buffalo herds, and the reports of returning hunters encouraged the more hardy pioneers to cross the mountains in search of new homesteads. In about 1770, Jacob Brown leased a sizable tract of land along the river from the Cherokee Indians and constructed a pole cabin and combination store and blacksmith shop which became a favorite trading and repair post for the Indians. Here, Brown sharpened the Indians' knives and tomahawks and repaired their guns. Brown is the first known permanent settler to establish a homesite in the vicinity of the Nolichucky River. Records indicate that in 1775, Brown along with other members of a land buying group arranged a 20 million acre land purchase from the Cherokees; this purchase included what is presently known as Unicoi County and parts of Greene and Washington Counties.

Pioneers from Virginia and the Carolinas were gradually attracted to the area and by 1778 the Webbs, Martins, Actons, Deakens, Hamptons, Loves, and Lewises had settled in what was known as Greasy Cove. Many of these family names--though generations removed--are still found on the tax list of Unicoi County.

On August 17, 1786, the famous frontiersman, politician, and hero of the Alamo, Davy Crockett, was born in a log cabin at the point where Big Limestone Creek enters the Nolichucky River. Crockett's birthplace, not far from Greeneville, has been designated as a State Historic Site. Two years before Crockett's birth, the State of Franklin was formed from land which was originally a part of North Carolina.

John Sevier, the first and only Governor of Franklin and the first Governor of Tennessee is believed to have acquired a tract of land on the south side of the Nolichucky River and named it the Plum Grove plantation.

Andrew Jackson, destined to become the Governor of Tennessee and the seventh President of the United States, entered the Nolichucky area as a young man, in 1788. According to local folklore Jackson lost a horserace at Erwin, on the banks of the Nolichucky, to Colonel Robert Love, a prominent resident of Greasy Cove. After the race, the two quick tempered participants had to be forcibly restrained by mutual friends in order to prevent bloodshed.

In addition to the purchase of the Sevier's Plum Grove estate by the U.S. Forest Service and Crockett birthplace by the State, the U.S. Department of the Interior has entered on the National Register of Historic Places the Clarksville Iron Furnace that went into blast in 1833 and operated through 1844. The furnace is about one mile upstream from the junctions of Clarks Creek and the Nolichucky River. A complete listing of sites listed on the National Register that are located in the seven-county study area is provided in the appendix of this report.

## Recreational Resources

The region surrounding the Nolichucky River basin has an abundance of recreational resources that include both natural areas and man-made facilities operated by Federal, State, and local governments and the private sector. (See Regional Recreation Resources - Map 10) The following areas are administered by the U.S. Department of the Interior's National Park Service and are within 100 miles of Greenville Dam, river mile 46.0:

Blue Ridge Parkway: A 469-mile scenic parkway extending from the Great Smoky Mountains, North Carolina, to Shenandoah National Park in Virginia. The parkway averages 3,000 feet above sea level, follows the Blue Ridge Mountains, and embraces several large recreation areas.

Great Smoky Mountains National Park: An 800 square mile park located on the boundary between North Carolina and Tennessee; contains unspoiled forests with over 1,400 varieties of flowering plants.

Cumberland Gap National Historical Park, Kentucky, Virginia, and Tennessee: A 20,000-acre park that includes the Wilderness Trail and mountain pass explored by Daniel Boone.

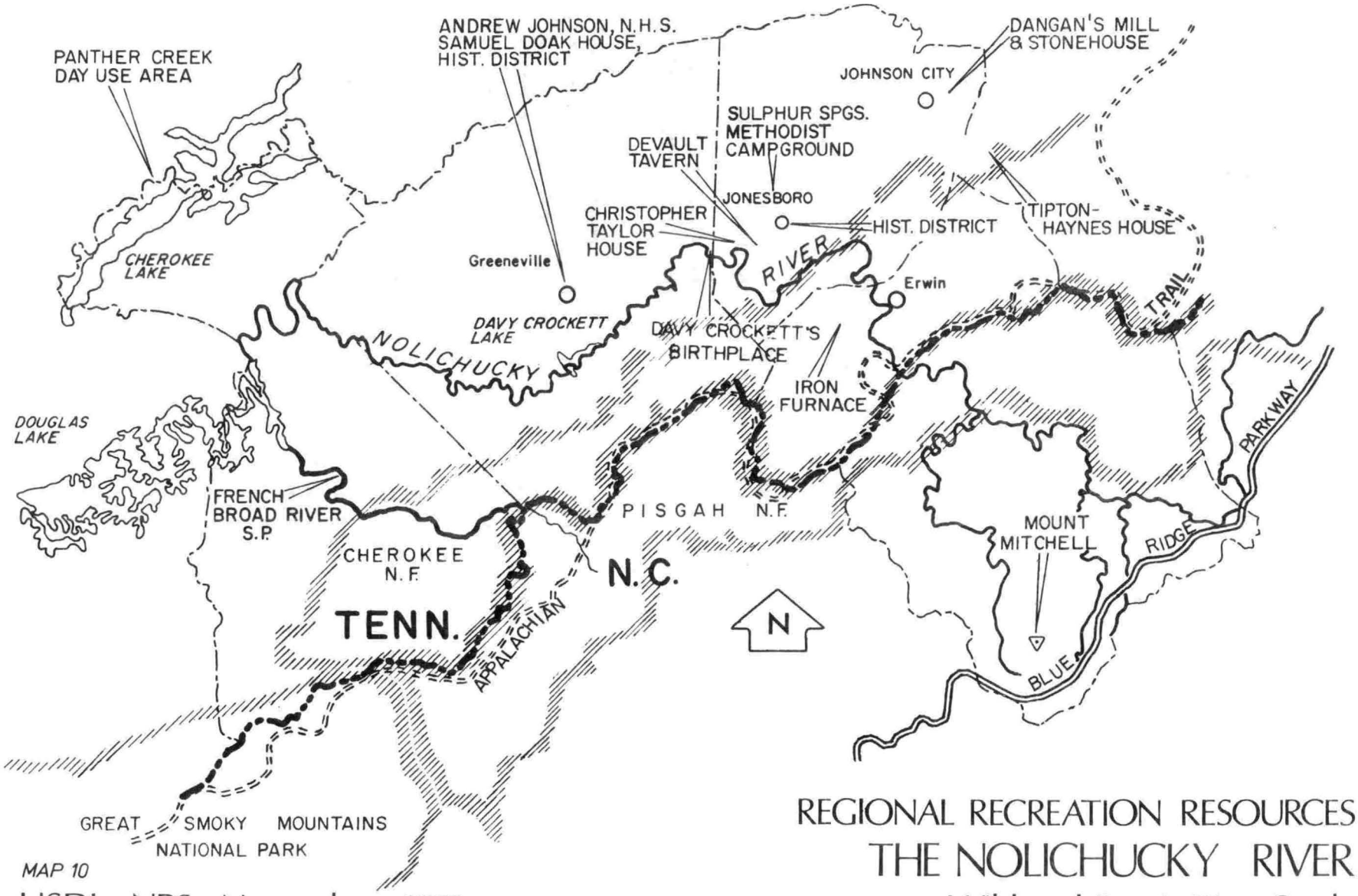
Andrew Johnson National Historic Site, Greeneville, Tennessee: Homestead, tailor shop and grave site of the Nation's 17th President.

Kings Mountain National Military Park, South Carolina: A significant American frontier and the site of an important Revolutionary battle.

Cowpens National Battlefield Site, South Carolina: Site of Brigadier General Daniel Morgan's Revolutionary War victory over the British.

Carl Sandburg Home National Historic Site, North Carolina: For 22 years the home of the noted poet-author.

Appalachian National Scenic Trail, Tennessee and North Carolina: Over 2,000 miles of trail extending from Katahdin, Maine, to Springer Mountain in north Georgia; transverses 14 states.




MAP 10

USDI NPS November 1978

# REGIONAL RECREATION RESOURCES
# THE NOLICHUCKY RIVER
## Wild and Scenic River Study

Annual recreation visits to the Great Smoky Mountains National Park and the North Carolina segment of the Blue Ridge Parkway have increased dramatically in recent years. Visits to the Great Smoky Mountains National Park increased from 5,954,900 in 1965 to 11,555,297 in 1978. On the Blue Ridge Parkway visits increased from 4,619,069 in 1965 to 15,351,632 in 1978.

The following landmarks have received Federal designation and have been placed on the National Register of Historic Places:

Greene County, Tennessee
- Andrew Johnson National Historic Site, Greeneville
- Greeneville Historic District
- Samuel Doak House, 1.5 miles east of Greeneville

Unicoi County, Tennessee
- Clarksville Iron Furnace, southwest of Erwin

Washington County, Tennessee
- Dangan's Mill and Stone House, northeast of Johnson City
- Tipton-Haynes House, southeast of Johnson City
- Jonesboro Historic District
- Devault Tavern, west of Jonesboro
- Taylor, Christopher House, southwest of Jonesboro
- Sulphur Springs Methodist Campground, north of Jonesboro

Mt. Mitchell, the highest point east of the Mississippi River, is located in Yancey County, North Carolina, and is registered as a National Natural Landmark.

For its initial 20 miles, the Nolichucky flows through two national forests: The Pisgah and the Cherokee in North Carolina and Tennessee, respectively. The Forest Service, Department of Agriculture, provides for and maintains in each of these national forests numerous conveniently located recreation facilities and visitor and interpretation centers.

The Appalachian National Scenic Trail crosses the Nolichucky River near Erwin, Tennessee. Here hikers on the trail can find food and lodging close by and good access to and from the trail. Northbound, the trail reaches the river above Unaka Springs, and follows the river downstream to Chestoa. A single lane concrete bridge at Chestoa provides access to the north side of the river. From this point a short hike to the left will lead to Erwin, or, a turn to the right and 1.5 miles upstream

the trail leads up the mountain slopes and continues northward. Scenic vistas of the river and gorge are experienced on this part of the trail. Access to the Appalachian Trail at Chestoa is particularly popular among the hikers of this area because of its convenience and availability for short weekend hikes.

Within 100 miles of Greeneville, Tennessee, the Tennessee Valley Authority maintains and operates 10 reservoirs with many boat docks and launching ramps, camp areas, and picnic sites:

Fontana Lake: Located on the Little Tennessee River at the southern edge of the Great Smoky Mountains National Park, North Carolina.

Fort Loudon Lake: South of Knoxville on French Broad River.

Melton Hill Lake: West of Knoxville on Clinch River.

Norris Lake: North of Knoxville on Powell River.

Cherokee Lake: Northeast of Knoxville on Holston River.

Douglas Lake: East of Knoxville on French Broad River.

Davy Crockett Lake: South of Greeneville on Nolichucky River.

Boone Lake: Between Johnson City and Kingsport on South Fork Holston River.

South Holston Lake: Southeast of Bristol on South Fork Holston River.

Watauga Lake: East of Johnson City on Watauga River.

In North Carolina the following State Parks provide for a variety of recreational opportunities in the vicinity of the study area:

Mount Mitchell: A 1,469-acre park located near the Blue Ridge Parkway in Yancey County with picnicking facilities, a museum, hiking trails, campsites, and other amenities.

Mount Jefferson: A relatively undeveloped 539-acre park in Ashe County affording scenic drives, picnicking, hiking and nature study.

Stone Mountain: Located in Wilkes and Alleghany Counties, this undeveloped State park features a 600 foot high granite pluton, 3 miles in circumference at its base, fishing, hiking, and nature study.

Components of the State of Tennessee's Outdoor Recreation Area System that are located within the Nolichucky River study area include:

Panther Creek Day Use Park, Hamblen County: 1,289 acres fronting on Cherokee Lake.

Davy Crockett Birthplace Historic Area, Greene County: 13 acres on the Nolichucky River.

French Broad State Scenic River: A Class III, partially developed 29 mile river in Cocke County.

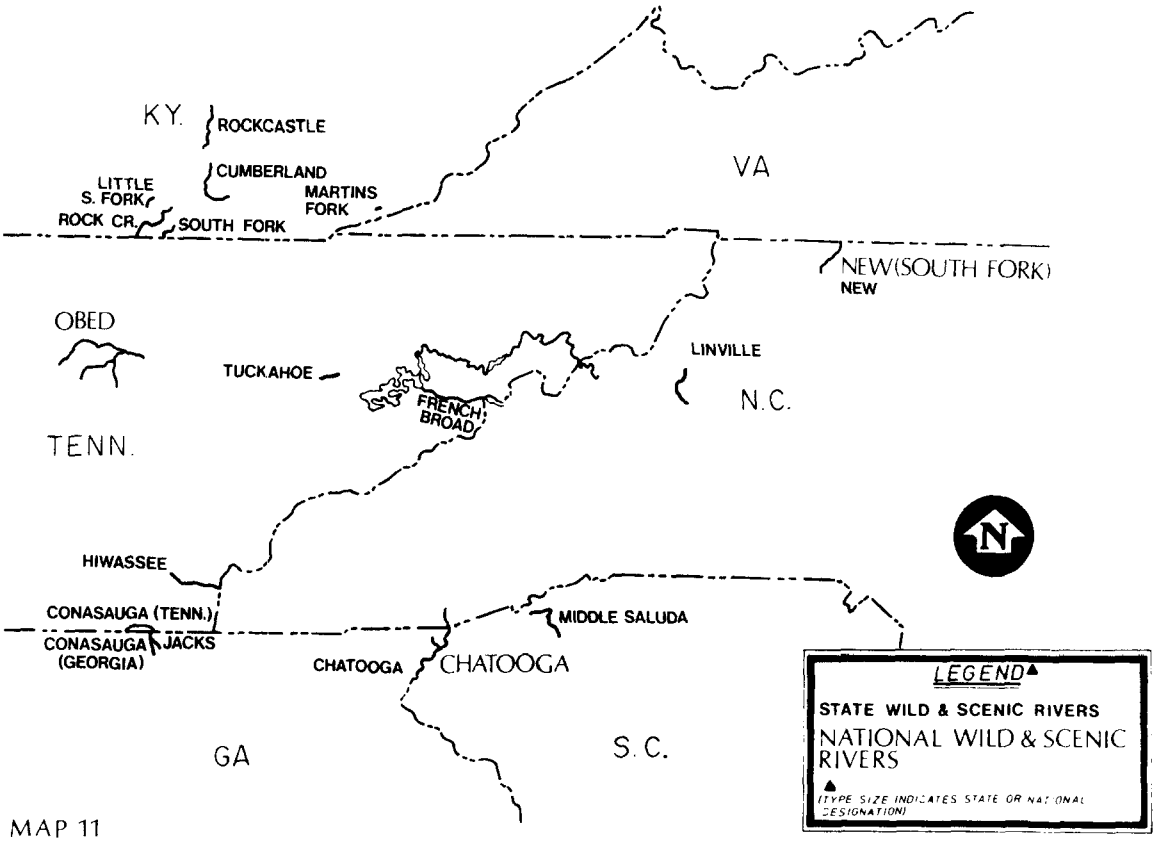
Within a half-day drive of the Nolichucky River there exist three components of the National Wild and Scenic Rivers System. (Map 11, p. 3-37) The Chattooga River in North Carolina, South Carolina, and Georgia was designated a unit of the System on May 10, 1974. Fifty miles of the Chattooga and 7.3 miles of the West Fork Chattooga River, a major tributary, are now managed by the Forest Service. On April 13, 1976, the Secretary of the Interior designated as a component of the System a 26.5-mile segment of the South Fork of the New River in Ashe and Alleghany Counties, North Carolina. More recently, on October 12, 1976, Congress designated segments of the Obed River, Clear Creek and Daddy's Creek and the Emory River, totaling 45 miles of stream as a component of the National System in Tennessee.

The Big South Fork of the Cumerland River was included in a larger area named the Big South Fork National River and Recreation Area on March 7, 1974. This national recreation area, limited by Congress to 125,000 acres, straddles the Tennessee-Kentucky line north of the Obed River.

The Obed River and the Buffalo River, also in the State of Tennessee, have been studied as potential components of the National System. The Obed River study recommended that the 100 miles of the river and tributaries, including the portion which has already received designation, be preserved in the National Wild and Scenic Rivers System. The Buffalo River study recommends that that river receive protection through State and local actions.

In addition, there are other rivers within 100 miles which are in state scenic river programs and protected by the State governments. The Hiwassee River in Tennessee, for example, is managed by the Tennessee Department of Conservation and attracted 85,000 floaters in 1978. Five

rivers in the area are to be studied as potential additions to the National Wild and Scenic Rivers System, pursuant to P.L. 95-625, November 10, 1978; they are the Red River in Kentucky, and the Cacapon, Bluestone, Gauley, and Greenbrier in West Virginia.




MAP 11

USDI NPS Jan 1979

STATE/NATIONAL WILD AND SCENIC RIVERS

# IV

# IV. DESCRIPTION OF THE RIVER CORRIDOR

The confluence of the North Toe River and the Cane River occurs less than a mile below Huntdale, North Carolina, on the Mitchell and Yancey county lines forming the larger stream named the Nolichucky River. Some local residents think of the Cane River and North Toe River as tributaries of the Toe River and of the latter as continuing on to the Tennessee State line where it's name then changes to the Nolichucky River. The U.S. Geological Survey and most other official sources, however, recognize the Nolichucky River as beginning at the point where the North Toe and Cane Rivers meet. The Wild and Scenic Rivers Act, Section 5(a)(45) designates the "Nolichuckey (sic), Tennessee and North Carolina: The entire main stem" for study and thereby requires that the longer stream be recognized for this study. Table 11 presents some general statistics by county on the river's characteristics.

From its source, the Nolichucky River flows westward for eight tenths of a mile and then turns northward. At this point the river is quite shallow, 1 to 3 feet deep in most places with numerous shoals, rocks, and gravel bars interspersed with pools of relatively quiet water. The river is a reasonably well behaved mountain stream down to the small community of Poplar, approximately 3.8 miles farther to the north, presenting few problems for the river recreationist.

Beyond Poplar, at the upper railway bridge, the river abruptly enters the gorge, turns westerly, and becomes boisterous white water, with rapids, boulders, rock gardens, ledges, chutes and other challenges for the experienced boater or rafter.

Poplar has a good, privately owned, unpaved ramp but the space available is presently very small and there is no room for parking. It provides a suitable terminus for those who have floated down the river from Huntdale and a good starting point to launch boats and rafts for the trip through the gorge.

In the gorge the river is not always at its optimum level--there are times when the water is so high that no one should attempt a passage; and there are other times when low flow changes the difficulties of the river to a laborious, rocky course. There is no time, however, when the gorge is safe for those who are unprepared in skills and equipment to undertake 8 miles of remote mountain stream. The only exit in the event of mishap, is along the railroad tracks which parallel the stream. Any situation in which an injury, for example, makes walking impractical could present a serious problem.

TABLE 10

PHYSICAL CHARACTERISTICS OF THE NOLICHUCKY RIVER

| PARAMETER | NORTH CAROLINA | TENNESSEE | | | | |
|---|---|---|---|---|---|---|
| | Mitchell - Yancey | Cocke | Greene | Hamblen | Unicoi | Washington |
| River Miles | | | | | | |
| North Bank | 10 - 0 | 0 | 54.4 | 15.2 | 7.9 | 23.1 |
| South Bank | 0 - 10 | 26.5 | 43.1 | 0 | 7.9 | 23.1 |
| Average width | 60 ft. | 75 ft. | 70 ft. | 130 ft. | 60 ft. | 65 ft. |
| Width range | 30-130 ft. | 40-180 ft. | 30-135 ft. | 90-180 ft. | 25-120 ft. | 30-130 ft. |
| Average riffle depth | 10 in. | 9 in. | 7 in. | 8 in. | 10 in. | 10 in. |
| Average pool depth | 3 ft. | 4 ft. | 3 ft. | 4 ft. | 3 ft. | 3 ft. |
| Normal color | slightly turbid | slightly turbid | slightly turbid | slightly turbid | slightly turbid | slightly turbid |
| Fish food abundance | low | numerous | average | numerous | average | numerous |
| Littoral aquatic plant abundance | average | average | average | average | average | scarce |

Source: USDA-SCS/DOI-HCRS & NPS.

The scenery throughout the gorge area provides the most natural and scenic vistas along the entire river. The stream is bounded on the north by the Unaka Mountains and on the south by the Bald Mountains. The entire area is characterized by steep mountains with narrow passes and dense foliage that includes a variety of poplar, oak, sugar maple, birch, chestnut, blackgum, and hickory. Unfortunately, the Nolichucky Gorge area is not a pristine wilderness--The Clinchfield Railroad tracks parallel the river from its source to the town of Erwin, Tennessee. The steepness of the mountain slopes on either side of the gorge resulted in the railroad being built just above the flood level of the river. Cuts in the mountain sides, rock fills, and concrete retaining walls characterize the south bank of the river. Bridges, telephone wires, signals, and discarded tires, rails and miscellaneous pieces of equipment further intrude upon the otherwise natural landscape. Even though many people who float the river are too absorbed in the task of navigating the waters in safety to notice the degree to which the natural scene has been destroyed by the presence of the railroad, its impact is inescapable for all those who care to look about them.

From the gorge entrance to the first major river bend at Cane Bottom, 3.7 miles, the Nolichucky drops in elevation approximately 34 feet per mile and continues in a southerly direction for one mile to Lost Cove. Through this latter stretch the river elevation drops another 40 feet and bends tightly to the west, bringing into view Flat Top Mountain.

Throughout the remainder of the gorge area as the river flows toward Erwin, Tennessee, the rapids become less severe. Approximately 2.6 miles downstream from the North Carolina/Tennessee border near the community of Unaka Springs, more signs of development are encountered: a railroad bridge; homes situated along the streambanks; and a paralleling dirt road. Probably the least aesthetically pleasing segment of the Nolichucky River is that section from Unaka Springs through Erwin. In this stretch of river there are five bridges, a railroad yard, many commercial and residential developments, riprapping, and a severe road cut and quarry excavation in the side of Looking Glass Mountain.

Beyond the town of Erwin the environment is more forested. This situation lasts, however, for about 2 miles before the number of buildings, clearings and parallel roads increase and the river emerges at the community of Embreeville in the shadow of Embreeville Mountain. From State Road 81 bridge at Embreeville and for the remainder of its length, the river flows more slowly and quietly with only an occasional riffle or minor rapid. The scenery is pastoral in character with gently rolling crop and pasture lands. Downstream, where the river is again crossed by State Road 81, is a stone quarry whose operations have laid bare the side of a mountain. This scar is but another of man's many trade-offs with nature for needed resources.

Between river miles 81 and 83, where the river passes around Jackson Islands, is the mouth of Jackson Creek which flows off Jackson Mountain. Here the Jackson bridge connects with State Road 107 which passes by the homesite believed to have belonged to Tennessee's first Governor, John Sevier. The site is located some 1,500 feet from the river, overlooking the valley, and is now owned by the Federal Government as a part of Cherokee National Forest. It is also in this area that significant archeological diggings of early Indian settlements are underway (see History and Archeology).

Throughout the next 12 miles of the river course, the banks are lined in part by a narrow band of trees, the foliage of which creates the impression of a forested environment during the summer months and obscures for short distances some of the adjoining farm lands. However, in this stretch there are four bridge crossings, over six and one half miles of parallel roadways, and more than 30 buildings near the river banks.

Near the confluence of the Nolichucky River and Big Limestone Creek in Greene County is the site of Davy Crockett's birthplace. This site has been preserved as a Tennessee State Park with a reconstructed log cabin, monument, and former KOA campground now under State management. From Big Limestone Creek, the river flows northward and thence southwesterly through agricultural lands for approximately 15 miles before reaching the backwaters of Davy Crockett Reservoir. This impoundment, created by the construction of Nolichucky Dam, is about 500 feet east and upstream of State Road 70 bridge. Siltation has now filled the lake and rendered the dam uneconomical for power generation. Since the dam is no longer utilized as a power source, the existing lake provides a few quiet, shady coves for the patient fisherman. Through a cooperative arrangement between TVA and the State, the lake has been adapted for use as a migratory water fowl sanctuary. Other than a 76-acre park adjacent to the dam structure and power generating plant, there are no major developments on Davy Crockett Lake.

For the remainder of its course downstream from the Nolichucky Dam to the backwaters of Douglas Reservoir, the Nolichucky is a winding, slow moving pastoral river with a few bluffs, islands, and small patches of forest. Though the adjacent lands throughout this river segment are not heavily developed, the scenic values of the river have been lessened by the numerous small structures, cleared banks, highway and powerline crossings, and two low water dams.

The series of illustrated maps at the end of this chapter provide a graphic guide to the river.

## Streamflow

The Nolichucky River generally has sufficient volume to be "floatable" throughout the year. However, there are fluctuations in the streamflow which can affect the quality of the experience, particularly in the Nolichucky Gorge.

Streamflow data for the Nolichucky River is measured at gaging stations located at Poplar, North Carolina (river mile 106.8); Embreeville, Tennessee (river mile 84.0); and 0.3 mile downstream from the Nolichucky Dam (river mile 45.7). Streamflow monitoring dates from the years 1901 and from 1921 to present at Embreeville and below Nolichucky Dam and to 1955 at Poplar, North Carolina. In addition to these gauge records, a number of discharge measurements have been taken at other locations on the Nolichucky River and its tributaries. Table 11 presents streamflow data for U.S. Geological Survey gaging stations at Poplar, Embreeville, and below Nolichucky Dam. Mean monthly streamflow at Poplar, North Carolina, ranges from 218 c.f.s. in October to 1,927 c.f.s. in March. Daily extremes range from 164 c.f.s. to 9,030 c.f.s. during a typical year. The maximum flow recorded at Embreeville since 1921 was 82,500 c.f.s. (August 13, 1940); the record low flow was 20 c.f.s. (October 4, 1971).

Numerous floods have occurred in the Nolichucky River Basin. The storm of May 18-21, 1901, caused unusually destructive flooding in the Watauga and Nolichucky River basins, and the maximum flood of record on the Nolichucky River of 120,000 c.f.s. was recorded at Embreeville. The most recent major flood occurred on November 6-7, 1977, and caused extensive damage along tributary streams and along the Nolichucky River in Unicoi County, Tennessee.

Whitewater enthusiasts who use the Nolichucky Gorge consider 500 c.f.s. (measured at Poplar U.S.G.S. gaging station) to be the lowest water level for a safe and enjoyable experience. Water levels above 2,300 c.f.s. create dangerous conditions for even the most experienced floaters. As is indicated by the figures in Table 12, the best times for whitewater use generally occur in the spring and late summer. The period of low flow in early summer does not preclude use of the river by floaters below Erwin, Tennessee, as the river has sufficient flow below Erwin for year round usage.

## Water Quality

Analysis of water quality was based primarily on information from the following data sources: EPA's STORET data base; TVA; U.S.G.S.; water quality management plans prepared by the States of North Carolina and Tennessee; and various agencies of State Government.

TABLE 11

FLOW EXTREMES (c.f.s.) OF THE NOLICHUCKY RIVER
RECORDED AT U.S. GEOLOGICAL SURVEY GAGING STATIONS

| MONTH | Poplar Mitchell Co., NC[1] | | | Embreeville Washington Co., TN[2] | | | Below Nolichucky Dam Greene Co., TN[2] | | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Mean | Max. | Min. | Mean | Max. | Min. | Mean | Max. |
| October | 164 | 218 | 356 | 260 | 1065 | 14200 | 20 | 1314 | 8860 |
| November | 215 | 372 | 1000 | 296 | 1087 | 6030 | 44 | 1296 | 7860 |
| December | 305 | 630 | 3730 | 351 | 1266 | 10400 | 319 | 1636 | 8240 |
| January | 280 | 477 | 1020 | 297 | 1485 | 7380 | 370 | 1933 | 7520 |
| February | 310 | 1280 | 4990 | 484 | 1939 | 18600 | 350 | 2637 | 8720 |
| March | 736 | 1927 | 5120 | 692 | 2271 | 23900 | 1030 | 2949 | 34500 |
| April | 840 | 1669 | 9030 | 600 | 1931 | 8890 | 766 | 2603 | 14000 |
| May | 592 | 934 | 2020 | 611 | 1542 | 10400 | 616 | 2061 | 11900 |
| June | 370 | 537 | 1220 | 334 | 1202 | 22000 | 412 | 1540 | 19100 |
| July | 322 | 649 | 1580 | 298 | 843 | 4120 | 302 | 1111 | 4250 |
| August | 405 | 973 | 3590 | 318 | 875 | 7140 | 401 | 1143 | 7610 |
| September | 220 | 338 | 628 | 260 | 622 | 6680 | 155 | 810 | 4140 |

1/ Water Year October 1954 to September 1955. (Streamflow monitoring discontinued in 1955)

2/ Water Year October 1964 to September 1973. (EPA STORET data base over 10 year period)

Table 12, illustrates the criteria for fecal coliform, temperature, dissolved oxygen, and pH which have been established by State and Federal agencies for water quality consistent with wild and scenic river designation objectives. Table 12 also provides values for these water quality elements at several key points along the Nolichucky River.

Fecal coliform levels in the Nolichucky River are consistently above the maximum levels recommended by the water quality criteria. Excess levels of fecal coliform were found to originate in the Cane River where levels as high as 55,000/100 ml have been recorded. Wastewater treatment plants in the area are performing adequately and do not contribute significantly to water quality problems. Much of the fecal coliform pollution of the Cane River is non-point source pollution from feed lots and ground water polluted by primitive toilets. This is true to a lesser extent for the Toe River as well as some sections of the Nolichucky. Due to the nature of the problem it would be difficult to ameliorate the polluted condition of the river.

Figure 2 indicates point sources which discharge effluents into the Nolichucky and its tributaries in North Carolina. Figure 3 provides the information for Tennessee. One point source which has caused particular concern is Nuclear Fuel Services in Erwin, Tennessee. Allegations that radioactive contamination of the river has occurred in the past and that higher cancer rates downstream of the Nuclear Fuel Services plant are related to this contamination are being investigated by the Tennessee Department of Public Health. Radiation levels in the river and in the plant and animal communities in the surrounding area also are being monitored by the State and by city water supply departments of Greeneville and Jonesboro. These communities draw their water supplies from the Nolichucky River. However, at the time of this study no conclusive information was available concerning radioactive contamination of the river.

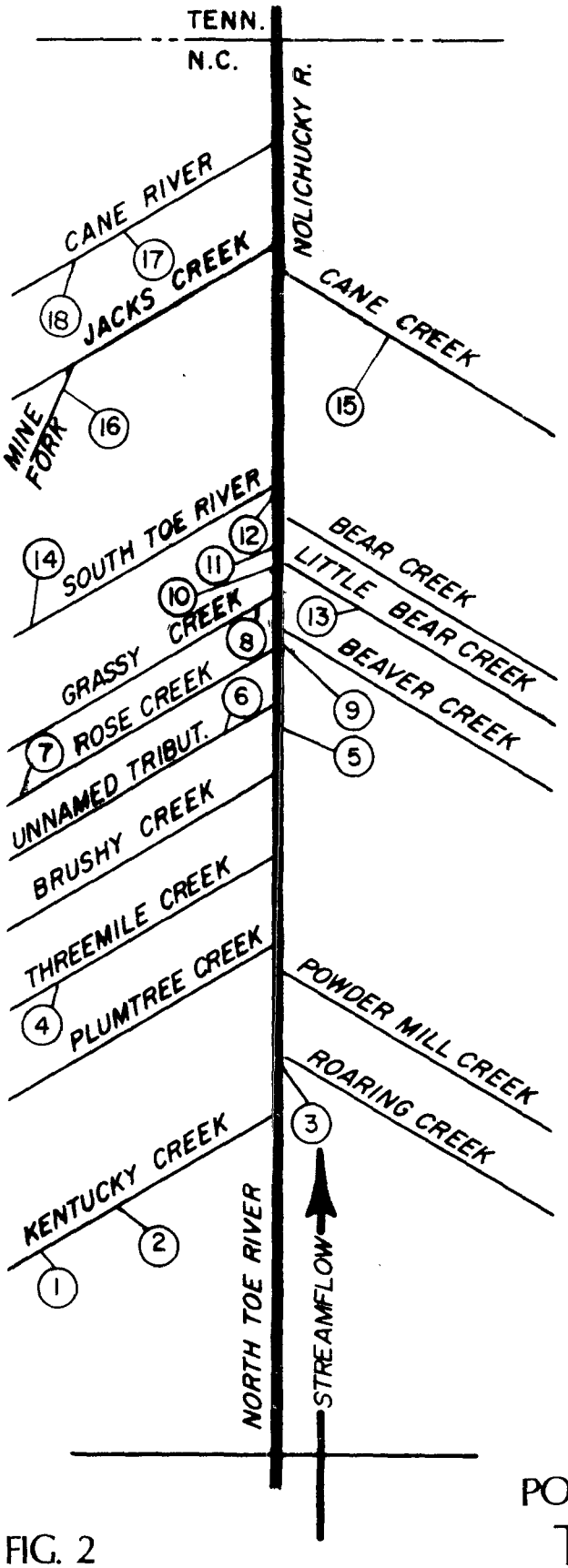
Prior to the passage in 1972 of the Federal Water Pollution Control Act, Admendments (P.L. 92-560) and the subsequent application of stricter environmental standards by the States, sedimentation from feldspar and mica mining operations seriously degraded the water quality of the Nolichucky River. Mining interests have, in recent years, somewhat refined their processes, but runoff from previously stripmined areas and sedimentation resuspended during periods of heavy flow continue to cause a high degree of turbidity. The heavy silt load has resulted in the elimination of many species of fish and mollusks from the upper portion of the river. By filling in the spawning spaces between pebbles, raising

TABLE 12

WATER QUALITY CRITERIA AND FIELD SAMPLING DATA

| Federal/State Criteria | | Cane River | North Toe River | Nolichucky River | | |
|---|---|---|---|---|---|---|
| | | SR 1417 | Huntdale | RM 107 | RM 55 | RM 43 |
| Fecal Coliforms 1000/100 ml max. | Mean | 1918.2 | 640.6 | 1023.0 | No Data | 174.3 |
| | Max. | 55,000 | 6500.0 | 13000.0 | Available | 800.0 |
| | Min. | 10.0 | 10.0 | 10.0 | | 10.0 |
| Temperature Centigrade $29.6^{o}$ C max. | Mean | 12.5 | 12.5 | 13.0 | 15.2 | 14.5 |
| | Max. | 25.0 | 27.0 | 27.0 | 28.0 | 29.0 |
| | Min. | 0 | 0 | 0 | 1.9 | 1.0 |
| Dissolved Oxygen Min. 5.0 mg/l | Mean | 10.1 | 10.3 | 10.0 | 8.9 | 10.7 |
| | Max. | 13.8 | 24.0 | 13.9 | 13.5 | 14.7 |
| | Min. | 4.2 | 2.9 | 6.2 | 4.0 | 7.6 |
| pH 6.5 - 8.5 pH units | Mean | 7.0 | 7.2 | 7.1 | 7.3 | 7.4 |
| | Max. | 8.2 | 8.3 | 8.4 | 8.6 | 8.2 |
| | Min. | 4.9 | 6.2 | 6.3 | 5.9 | 6.0 |

Source: EPA STORET Data File, October 1978.



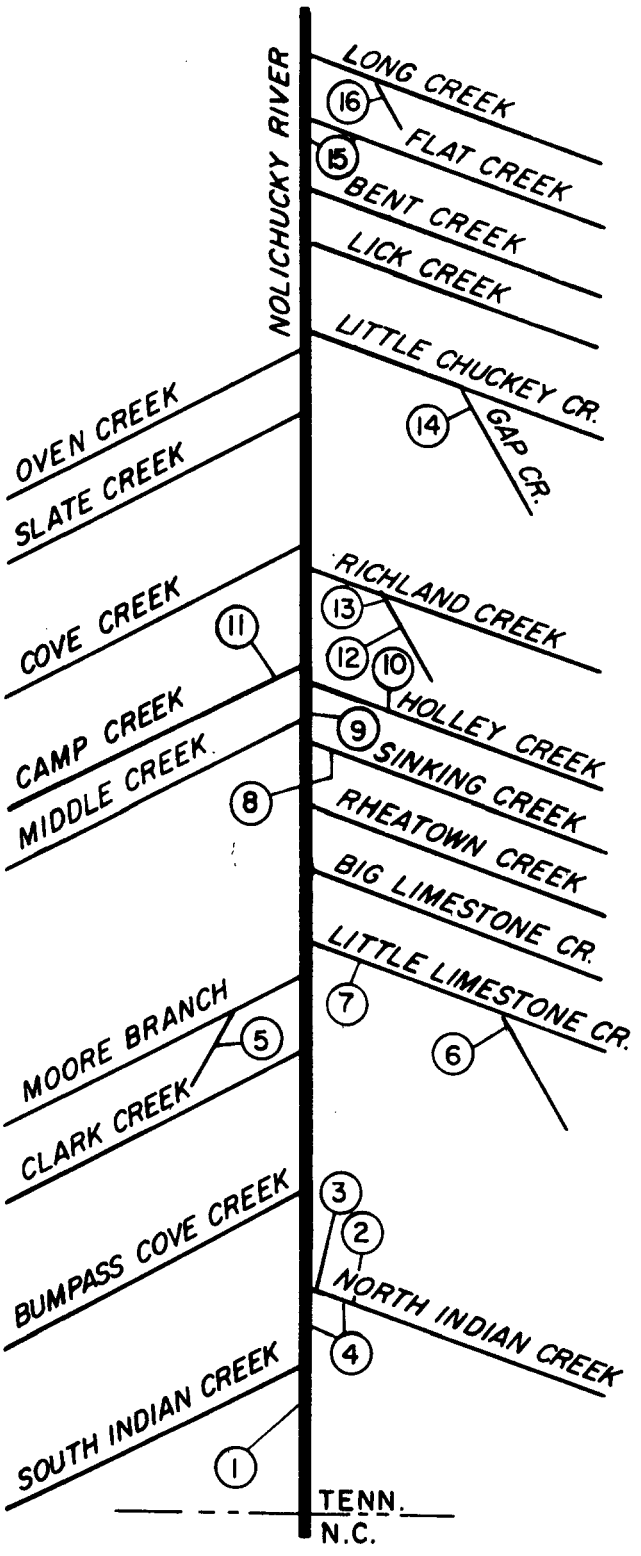

## STREAM SYSTEM SCHEMATIC

| | | |
|---|---|---|
| 1 | CAROLINA NORTHWEST KOA | 0.005 |
| 2 | I R C DIVISION OF TRW | 0.008 |
| 3 | TOWN OF NEWLAND | 0.16 |
| 4 | HARRIS MINING (GUSHER KNOB) | 1.44 |
| 5 | HARRIS MINING (KAOLIN PLANT) | 2.16 |
| 6 | HENREDON FURNITURE | 0.01 |
| 7 | HENREDON FURNITURE | 0.018 |
| 8 | APPOMATTOX GARMENT CO. | 0.004 |
| 9 | FELDSPAR CORP. | 5.05 |
| 10 | SABIN CHEMICALS NO. 1 | 3.16 |
| 11 | TOWN OF SPRUCE PINE | 0.45 |
| 12 | LAWSON UNITED FELDSPAR AND MINERAL | 2.5 |
| 13 | SABIN CHEMICALS NO. 2 | 2.16 |
| 14 | DENEEN MICA CO. | 1.0 |
| 15 | TOWN OF BAKERSVILLE | 0.05 |
| 16 | NORTHWEST INTERNATIONAL DIVISION | 0.228 |
| 17 | N.C. DEPT. OF CORRECTIONS | 0.01 |
| 18 | TOWN OF BURNSVILLE | 0.180 |

MILLION GALLONS PER DAY WASTEWATER GENERATED

FIG. 2
USDI NPS November 1978

POINT SOURCES - NORTH CAROLINA
# THE NOLICHUCKY RIVER
Wild and Scenic River Study




STREAM SYSTEM SCHEMATIC

| | | MILLION GALLONS PER DAY WASTEWATER GENERATED |
|---|---|---|
| 1 | NUCLEAR FUEL SERVICES | 0.037 |
| 2 | HOOVER BALL DIV. | 0.033 |
| 3 | VULCAN MATERIALS | 0.76 |
| 4 | CLINCHFIELD RAILROAD | 0.15 |
| 5 | MOODY DUNBAR INC. | 0.13 |
| 6 | FRANKLIN MILK CO. | |
| 7 | TENNESSEE NUCLEAR SPECIALTIES, INC. | 0.004 |
| 8 | BALL METAL & CHEMICAL DIV., BALL CORP. | 1.84 |
| 9 | PARVIN SAND CO. | |
| 10 | MAGNAVOX CO. | 0.02 |
| 11 | NOLICHUCKY SAND CO. | 0.80 |
| 12 | HURD LOCK CO. | 0.02 |
| 13 | METALS ENGINEERING | |
| 14 | PET, INC. | .015 |
| 15 | AMERICAN ENKA | 50 |
| 16 | UNION CAMP | 0.11 |

POINT SOURCES - TENNESSEE

# THE NOLICHUCKY RIVER

Wild and Scenic River Study

FIG. 3
USDI NPS November 1978

average temperatures, and reducing transmitted light the turbid conditions in the Nolichucky have severely restricted the propagation of those forms of life which would normally be adapted to the stream. Sedimentation and resultant turbidity are impounded to some extent by the Nolichucky Dam, and aquatic life below the reservoir is more prevalent. An additional impact of the heavy sediment load has been the silting in of the reservoir (Davy Crockett Lake). The Tennessee Valley Authority estimates that the original volume at elevation 1,245.9 feet was 21,750 acre-feet; volume at this elevation in 1970 was 5,050 acre-feet. This represents an accumulation of 16,700 acre-feet of sedimentation and a loss of 77 percent of the storage capacity at this elevation.

Navigability and Riparian Rights

This section has two purposes: to shed light on the rights of the public to the use of the waters of the Nolichucky River and to define the rights of riparian owners to lands out to the center of the stream. For the most part, the rights of the public to the use of the waters of a stream depend upon whether the stream, or segments of the stream, are considered navigable waters by the unit of government having jurisdiction--a determination as to the navigability of a stream is dependent upon State or Federal judicial decision.

Both North Carolina and Tennessee exercise a degree of jurisdiction over their navigable waters, but the Federal Government, primarily through the Corps of Engineers and by virtue of the Commerce clause of the Constitution and an Act of Congress dated September 19, 1890 (26 Stat. 454), exercises paramount jurisdiction over those waters it has determined navigable. Federal jurisdiction is limited, however, to issues such as the construction of dams for power, navigation, and water quality, and it does not modify the State's police power or the rights of riparian owners.

On October 15, 1974, the District Engineer, Nashville Corps of Engineers District, issued a Public Notice stating that ". . . the Nolichucky River, from its mouth to the confluence of the Cane and North Toe Rivers at river mile 110.6 has been determined navigable waters of the United States." Because the entire length of the Nolichucky River is treated as a navigable stream by the Federal Government, it follows that the public's right to the use of the waters of the stream is much the same as its right to the use of any public road. Jurisdiction over navigable streams is exercised by the States until or unless Congress interferes or supercedes. Though States have authorized dams, bridges, and levees to be built on, over, or into navigable streams of the United States, any action having an impact on a navigable stream now requires both State and Federal permits.

Since the question of navigability is one for the courts to decide, a person is prone to ask whether the Nashville District Engineer's determination regarding the navigability of the Nolichucky River would be upheld by the courts. A Relevant decision, the Daniel Ball, 10 Wall. 557, 19 L. Ed 999 (1870), follows:

> Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used, or are susceptible of being used in their ordinary condition, as highways of commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water. And they constitute navigable waters of the United States within the meaning of the Acts of Congress, in contradistinction from the navigable waters of the States, when they form in their ordinary condition by themselves, or by uniting with other waters, a continued highway over which commerce is or may be carried on with other States or foreign countries in the customary modes in which such commerce is conducted by water.

While navigable waters of the United States are subject to a Federal navigation servitude that gives the public the right to use the river and shore below the ordinary highwater mark for navigation and navigation related purposes, fishing rights and property rights are determined by State law.

The Tennessee Supreme Court has established three classifications of waterways with respect to navigability:

1. A stream is "legally navigable" if it is "capable, in the ordinary state of the water, of navigation ascending and descending, by sea vessels; that is, such vessels as are employed in the ordinary purposes of commerce, whether foreign or inland, and whether steam or sail vessels" (Stuart v. Clark's Lessee, 32 Tenn. 9, 15-16 (1852)).

2. Rivers are "navigable in the ordinary sense" when "though not navigable in the sense of the law, they are yet of sufficient depth naturally, for valuable floatage, as for rafts, flat-boats, and perhaps small vessels of lighter draft than ordinary" (Id. at 16). Along streams which are "navigable in the ordinary sense," the adjacent landowners should hold title to the thread of the stream, and the public would have an easement right for travel on the water (State ex rel. Cates v. West Tenn. Land Co. (Reelfoot Lake Case), 127 Tenn. 575, 158 S.W. 746 (1913).

3. If however, there are any parts of a river upon which light craft cannot go, then the river must be deemed "nonnavigable." A river useful only for floating logs is not navigable (Irwin v. Brown, 3 Tenn. Cas 309 (1898).

Because the physical characteristics of the Nolichucky below Erwin, Tennessee, permit use of flat bottom, motorized boats, that portion of the river would definitely be considered "navigable in the ordinary sense." Above Erwin, because the river flows through a narrow gorge and the mountain slope is quite steep, the Nolichucky is more treacherous, such that it is only suitable for rubber rafts, kayaks, and canoes. Still, so long as light craft can travel on the river at its usual level, then the river would be considered "Navigable in the ordinary sense." Therefore, according to information and data provided by the Corps of Engineers, "Past and Present Interstate Commerce for the Nolichucky River," the Nolichucky River would be "navigable in the ordinary sense" under Tennessee law.

Unlike the State of Tennessee, North Carolina law does not contain the distinction between "navigability in the legal sense" and "navigability in the ordinary sense." As stated in 1901, in the leading case:

> The rule now most generally adopted, and that which seems best fitted to our own domestic conditions, is that all water courses are regarded as navigable in law that are navigable in fact. (State v. Baum, 128 N.C. 600, 38 S.E. 900, 901 (1901).

Moreover, North Carolina criteria for navigability appear less restrictive:

> The capability of being used for purposes of trade and travel in the usual and ordinary modes is the test, and not the extent and manner of such use (State v. Twiford, 136 N.C. 603, 48 S.E. 586, 587 (1904). (Underscoring added.)
>
> Further,
>
> If water is navigable for pleasure boating, it must be regarded as navigable water, though no craft has ever been put upon it for the purpose of trade or agriculture. the purpose of navigation is not the subject of inquiry, but the fact of the capacity of the water for use in navigation (Id. at 588, quoting Attorney General v. Woods, 108 Mass. 436).

In the case regarding another waterway in North Carolina, it was determined that if logs had been rafted down the creek, the stream could be considered navigable (Taylor v. West Virginia Pulp and Paper Co., 262 N.C. 452, 137 S.E. 2d 833 (1964)). Based upon assembled information it has been determined that the Nolichucky would "pass" the navigability-in-fact test applied in North Carolina.

4. Most of the land in the Nolichucky Gorge between the railroad bridge at Poplar and Chestoa is owned by the U.S. Forest Service. The Pisgah National Forest owns 10.0 miles of streambank on the North Carolina side of the Gorge area, and the Cherokee National Forest owns 4.8 miles of streambank on the Tennessee side of the gorge.

5. Presently the only publicly owned land which is developed as an access site to the Nolichucky River is at TVA's Nolichucky Dam, below Davy Crockett Lake.

Access to The River

Access to the Nolichucky River is one of the major problems connected with its limited use as a recreational resource. The river area is well served by the existing highway system but there are at present no public access areas to the river except below Nolichucky Dam. Generally, access to the river on privately held lands and at informal locations on bridge rights-of-way is poor, damaging to the river banks, and, in some cases, hazardous. Not only does the shortage of suitable access inhibit boating, rafting and tubing on the river, other activities like fishing, picnicking, walking or just passive enjoyment of the environment are also inhibited.

The maps of Sections 1 and 2 show the "put-in" and "take-out" points generally used by paddlers floating the Nolichucky Gorge at the time this study was prepared. The "put-in" at Poplar is particularly unsatisfactory. Floaters gain access to the river at this point by crossing the Clinchfield Railroad's tracks. Parking is not available so vehicles line the highway. On some occasions river users have even taken their equipment (rafts, kayaks, etc.) between the railway cars of temporarily stopped trains to gain access to the river. The land used as an access site in Poplar is presently in private ownership. There are several informal "take-out" points used by those who float the gorge--such as under the railroad bridge at Unaka Springs. None of these informal "take-out" sites are satisfactory, however. There is one "take-out" point which is owned by a private river outfitter above the railway bridge but this is not available for general public use. Moreover, the present poor road access above the railway bridge would in itself limit the use of this area to the outfitter's regular customers. There are other locations available that would provide suitable river access areas if acquired and developed for public use. The Forest Service, Cherokee National Forest, has recently acquired two pieces of riverside land which they intend to develop as river access areas. These acquisitions are

located at river mile 97.8, between Chestoa and Unaka Springs, and at river mile 93.7, below Erwin. These properties, when developed, would not only serve the gorge users, but also those people favoring the less difficult stretches between the gorge and Embreeville. Land acquisitions in North Carolina for access sites are also under consideration by the Forest Service.

Recreation Use of the River

Two commercial outfitters have located permanent quarters on the Nolichucky River. Nolichucky Expeditions, Inc., has acquired property and is developing facilities at river mile 98.6, the lower end of the gorge. Nolichucky Whitewater Center, a part of New River Outfitters, has located in Poplar, North Carolina, at the upper end of the gorge. In addition to these two resident concerns some half a dozen other commercial outfitters guide groups through the gorge when there is sufficient demand. In addition to this kind of organized rafting in the gorge, there are individuals and groups who prefer to make the trip on their own.

Although no surveys have been made of the recreation use of the Nolichucky in general, and the gorge in particular, knowledgeable people in the area who were questioned by the study team generally agreed that recreation activity in the gorge has increased dramatically in the 3 or 4 years prior to 1979. Representatives of the two resident outfitters reported seasonal use to total 70 to 100 individuals per weekend day in the spring and early summer of 1979. Holiday weekend use levels approaching 150 individuals are considered a possibility. One resident outfitter considers that the present rate of use of the gorge is approaching the optimum level and that much more than 150 persons a day might be excessive for the remote conditions in the gorge--both in terms of safety and the quality of the experience. Recreationists travelling to the gorge for the float trip include a large proportion from the urban areas and university centers throughout the southeast.

Recreation use in other parts of the river is not well documented. No specific information was obtainable regarding activity and participation levels beyond the fact that tubing and rafting on the river from Huntdale to Poplar and from Unaka Springs to Embreeville appears to have increased significantly in the past 4 or 5 years. These two segments are less remote and less difficult to navigate than the gorge and tend, therefore, to be favored by less experienced recreationists. Some canoeing occurs on the river between Embreeville and the mouth but it is minimal by comparison.

## Potential Nonrecreational Use of the Nolichucky's Water Resources

The French Broad River Basin Water Quality Management Plan recommends the construction of six sewage treatment and discharge facilities, for those communities currently without such facilities, to be located on or near the Nolichucky. These communities include the town of Baileyton, the Chuckey-Rheatown community, the town of Tusculum, the town of Mosheim, the community of Embreeville, and the town of Limestone. It is likely therefore that within the next decade or two the Nolichucky will be receiving wastewater discharges from plants which do not now exist.

The Tennessee Valley Authority has identified a number of sites on the Nolichucky where dams might be built should national needs dictate. Four of the sites identified are considered superior to the others and have been included in the 1975 National Assessment of Water and Related Lands. The four potential projects are as follows:

1. Lower Nolichucky - River mile 16.0

   This dam would be for flood control and power generation. It would be constructed of earth and impound 33,200 acres at the 1,135 foot elevation. Flood storage capacity (January 1) would be 65,000 acre-feet. Power generation would be 50,000 KW and the average annual storage capacity for power would be 120 million KWH.

2. Buckingham Ferry - River mile 58.5

   This would be a single purpose power project; it would impound 2.500 acres at the 1,360 foot elevation and provide 45,000 acre-feet of flood storage capacity (January 1). Power production would provide 100 million KWH average annual power storage capacity. The dam would be constructed of earth and rock fill.

3. Erwin - River mile 82.3

   The purpose of this dam would be flood control and power generation. The area of the impoundment at elevation 1,628 feet would be about 7,000 acres and it would provide 400,000 acre-feet of flood storage capacity (January 1). Power production average annual storage capacity of this project would be 135 million KWH. The structure would be an earth dam.

4. Poplar - River mile 105.6

This single purpose power project would be a concrete gravity dam and diversion (i.e., through a flume, or pipe, to a remote power generator). This impoundment would have a flood storage capacity of 70,000 acre-feet at the 1970 foot elevation and an average annual power storage capacity of 168 million KWH.

There are other potential sites for impoundments on the Nolichucky River that have been identified by TVA but they are not so attractive. TVA does not have any plans to develop any of the above sites but instead, has noted their feasibility for construction should future national needs for energy make their construction desirable. A less attractive alternative economically but nevertheless feasible, would be the rehabilitation of the existing Davy Crockett Lake and Nolichucky Dam. This project would involve the dredging and removal of silt that has filled the lake since it was created. Removal of the silt would also require the location of an area where the silt can be deposited; a place that would be suitably located and not environmentally sensitive. Rehabilitation would only be economically justifiable, however, if energy needs became critical.

Land Values and other Costs

Land: A wide variation in the estimated value of land along the Nolichucky River was obtained in a survey made during the summer of 1979. This variation was due in large part to the expectation that certain trends toward population increases and the arrival of new industries in the study area, particularly near Greeneville and Erwin, will continue and, possibly, accelerate. Real estate agents operating in the study area expressed the opinion that few landowners would be willing to sell much of their riverfront land since to do so would deprive them of access to and use of the river. Local people value the integrity of the land which has been farmed and passed down from generation to generation and would be reluctant to let go any part of the "homeplace." A combination of these influences therefore would tend to drive up the cost per acre of any land that might be needed in fee simple. Scenic easements on the other hand might be more palatable to local landowners though the experience of the State Governments has shown that even these can be difficult and expensive to obtain. Rough estimates of the cost for scenic easements run from 40 percent to 100 percent of the fee simple cost with an average of about 75 percent. The following figures illustrate the range of costs obtained in the survey.

Tennessee

1. Below Nolichucky Dam

| | |
|---|---|
| Flood prone land | $700 to $1,000/acre |
| Farmland | $1,000 to $2,500/acre |
| Rock bluffs, low productivity | $800 to $1,500/acre |

2. Davy Crockett Lake to Jones Bridge

| | |
|---|---|
| Farmland | $1,000 to $3,000/acre |
| Developable sites | $2,000 up/acre |

3. Jones Bridge to Embreeville

| | |
|---|---|
| Flood prone land | $800 to $1,500/acre |
| Farmland | $1,000 to $4,000/acre |
| Developable sites | $3,500 up/acre |
| Choice building sites | up to $13,000/acre |

4. Erwin Urbanized Area

| | |
|---|---|
| Flood prone land | $1,000 to $1,500/acre |
| Developable land | $1,500 up/acre |
| Choice building sites | $10,000 to $13,000/acre |

5. Mountains above Erwin

| | |
|---|---|
| Flood prone land and islands | $500 to $700/acre |
| Riverfront (Developable) | $1,000 to $2,500/acre |
| Steep forest land | $600 to $1,000/acre |

North Carolina

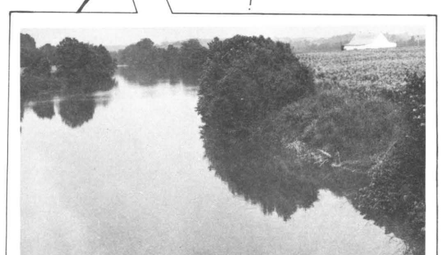
| | |
|---|---|
| Mountain land | $500 to $1,200/acre |
| Farmland | $800 to $1,500/acre |
| Developable land | $1,000 to $2,500/acre |

Choice vacation and second home sites in parts of North Carolina near to but not actually within the Nolichucky River corridor are advertised at $3,000 or more per acre. The 3 or 4 miles of river in North Carolina that are still in private ownership vary little in land form. There is a short stretch of land in the vicinity of Poplar that might be valued at the higher farmable or developable level but for the most part, land is steep and forested.

The Cherokee National Forest has recently purchased two tracts of land near Erwin, at river mile 94 and river mile 97, for development as river access points for recreationists. The Forest Service estimates average land costs in this area at from $1,000 per acre for more remote riverfront lands to $2,000 per acre for river frontage closer to, but not in, the urbanized area of Erwin.

Development: The two access sites purchased by the Forest Service will be developed to provide for parking, toilet facilities and a place to launch and take out rafts and canoes. Development of the site at river mile 94 will cost about $1,000 and at river mile 97 about $1,500.

Annual Operation and Maintenance: The Forest Service estimates that the cost of operating and maintaining the two sites mentioned above will total approximately $500.



River Mile 14 - Farm along the Nolichucky River

POWER TRANSMISSION LINE

SOUTHERN RAILROAD

Susong Bridge

Long Creek

Bent Creek

RM 15

HAMBLEN CO.
GREENE CO.

American Enka Plant

ENKA DAM

Hale Bridge

HAMBLEN CO.
COCKE CO.

RM 5

NOLICHUCKY RIVER

Kneelas Creek

160

Cooper Bridge

Lick Creek

HAMBLEN CO.
COCKE CO.

RM 10

Jones Bridge

DOUGLAS LAKE

transient land

RIVER MILE 0

Major Roads

Secondary Roads

Creeks

County Lines

Transmission Lines

State Lines

Railroad

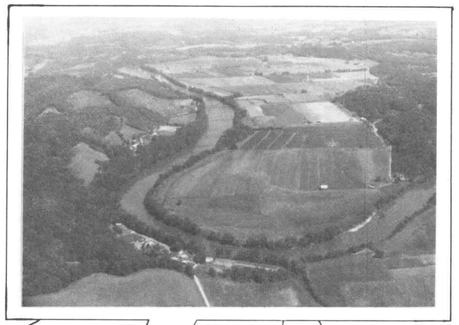
USDI NPS November 1978

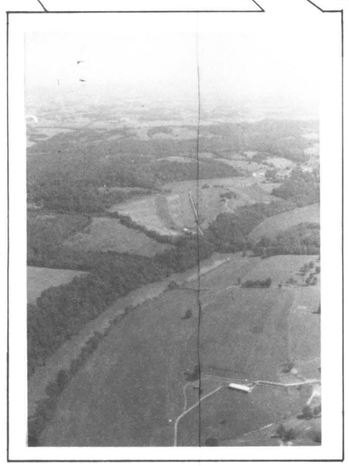
MAP 12a

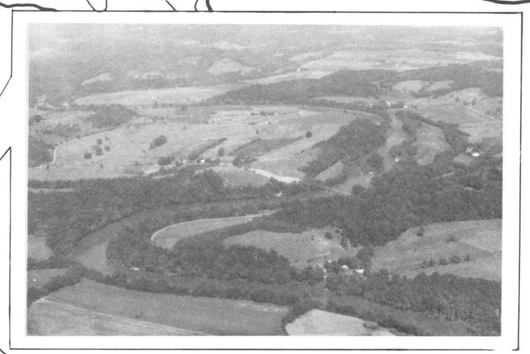
# THE NOLICHUCKY RIVER

## WILD AND SCENIC RIVER STUDY

1 3/4 1/2 0 1 mile







Steele Island

RM 20

Conway Bridge

Knob Creek

Little Chucky Creek

Bear Creek

GREENE CO.

COCKE CO.

NOLICHUCKY

RM 25

Bewley Island

Hale Bridge

RM 30

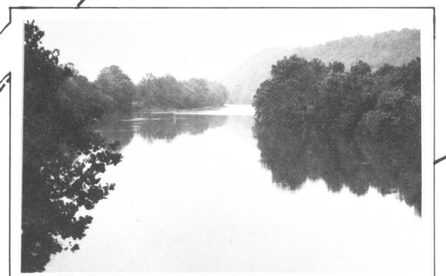
RIVER

Oven Creek

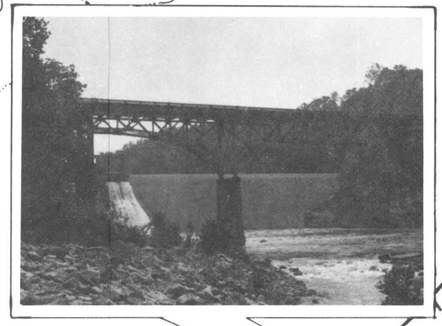
Slate Creek

1 3/4 1/2 0 1 mile

MAP 12b



River Mile 32 - The topography along the Tennessee segment is generally level. However, there are a few hills along the river.



Easterly Bridge

TRANSMISSION LINE

POWER

35

Highway

Love Bridge

Sevier

411

RM 35

John

Gregg Creek

Pigeon Creek

Buffalo Creek

NOLICHUCKY

RM 40

Allen Bridge

RM 45

RIVER

Trail of the Lonesome Pine

NOLICHUCKY DAM

DAVY CROCKETT LAKE

TRANSMISSION LINE

POWER

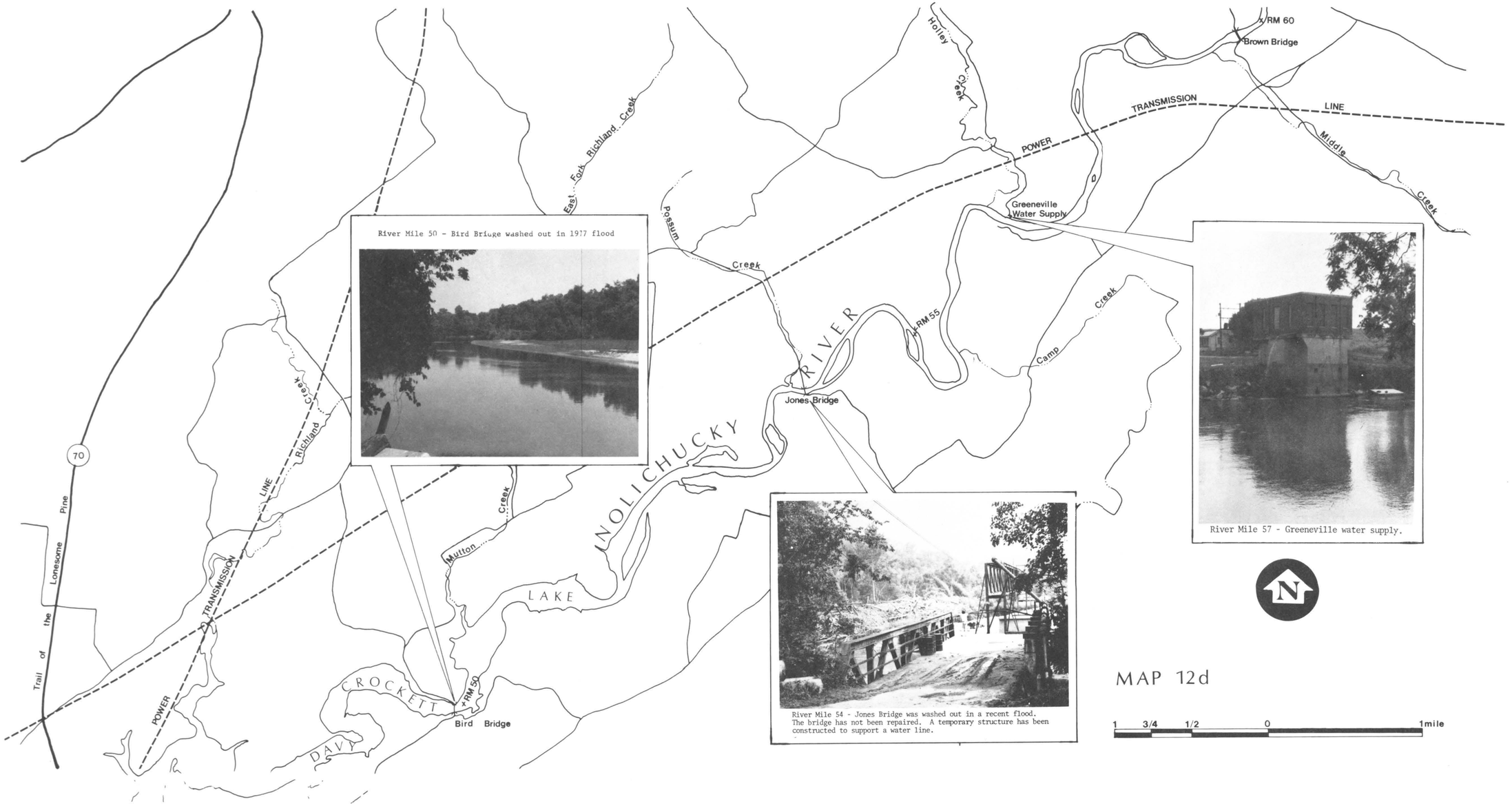
Cove Cr.

70

N

1 3/4 1/2 0 1mile

MAP 12c




River Mile 50 - Bird Bridge washed out in 1977 flood



River Mile 54 - Jones Bridge was washed out in a recent flood. The bridge has not been repaired. A temporary structure has been constructed to support a water line.

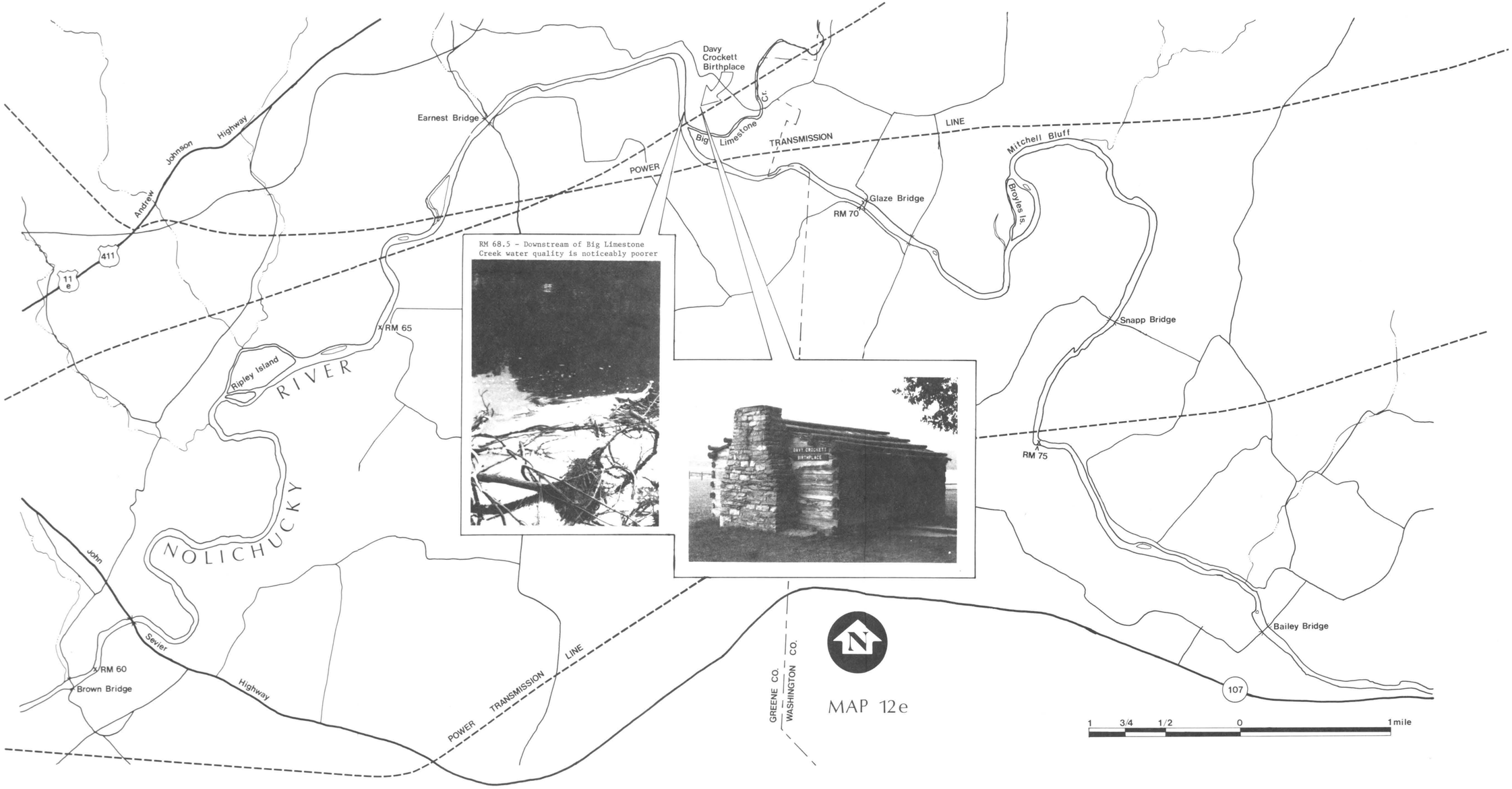


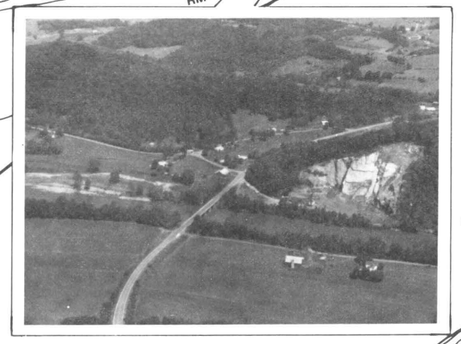


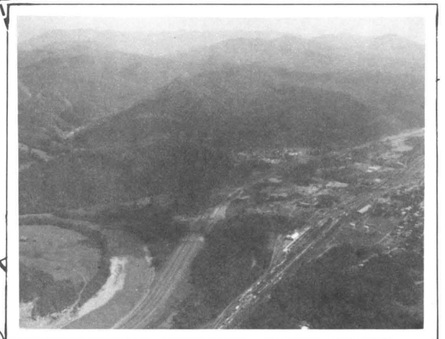
River Mile 57 - Greeneville water supply.

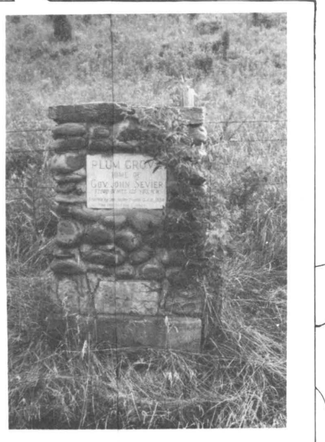
MAP 12d

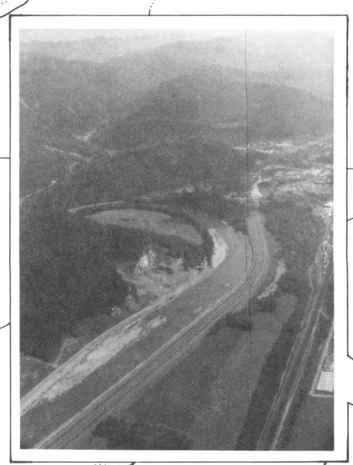
1 3/4 1/2 0 1mile


Davy Crockett Birthplace
Earnest Bridge
Big Limestone Cr.
TRANSMISSION LINE
POWER
Mitchell Bluff
Broyles Is.
Glaze Bridge
RM 70
Johnson Highway
Andrew
411
11 e
RM 68.5 - Downstream of Big Limestone Creek water quality is noticeably poorer
RM 65
Ripley Island
RIVER
NOLICHUCKY
Snapp Bridge
RM 75
John Sevier Highway
RM 60
Brown Bridge
POWER TRANSMISSION LINE
GREENE CO.
WASHINGTON CO.
Bailey Bridge
107
N
MAP 12e
1 3/4 1/2 0 1 mile







Dry Cr.

Dedrick Island

RM 85

107

RIVER

Jackson Islands

Archeological Site

Jackson Bridge

PLUM GROVE
Home of
John Sevier

Jackson Cr.

Embreeville

81

The Horseshoe

RM 90

FOREST

RM 80

NOLICHUCKY

John Sevier Highway

Clark

NATIONAL

Bumpus Cove Cr.

WASHINGTON CO

UNICOI CO

Roaring Cr.

CHEROKEE

MAP 12f

Clarksville
Iron Furnace

1 3/4 1/2 0 1mile

John Sevier Highway

RM 95

19W
23

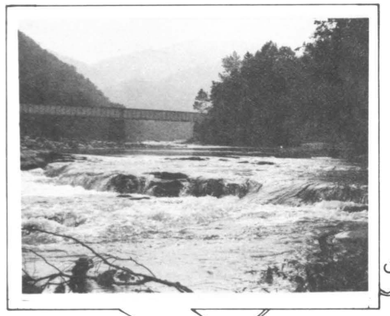
Bend

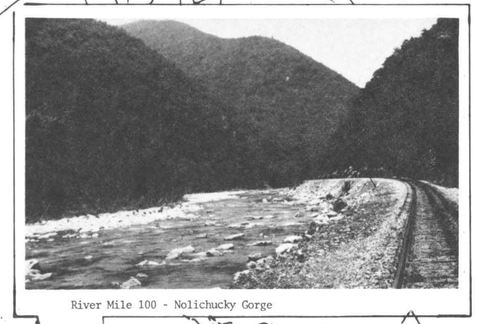
Glass

Looking Glass Mtn

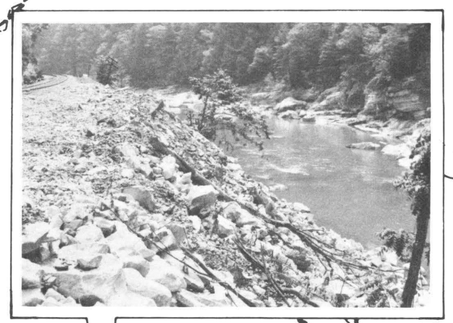
ERWIN

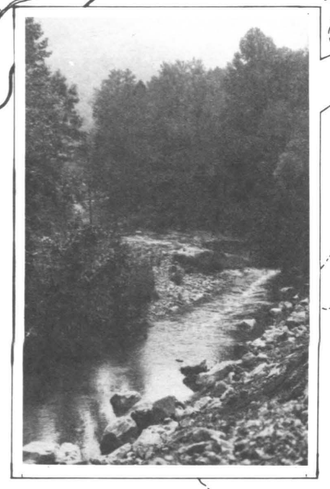
MAP 12g





River Mile 100 - Nolichucky Gorge





ERWIN

Indian Creek

South

19W 23

Chestoa

RM 97.5

"Take out"

Unaka Springs

Appalachian Trail

UNICOI CO.
MITCHELL CO.

NATIONAL FOREST

UNAKA MOUNTAINS

Hollow

Poplar Creek

RM 106.5

CHEROKEE

No Business Trail

No Business Knob (el. 4160)

CLINCHFIELD RAILROAD

TENNESSEE
NORTH CAROLINA

RM 100.6

Cane Bottom

NOLICHUCKY RIVER

NATIONAL FOREST

Lost Cove Creek

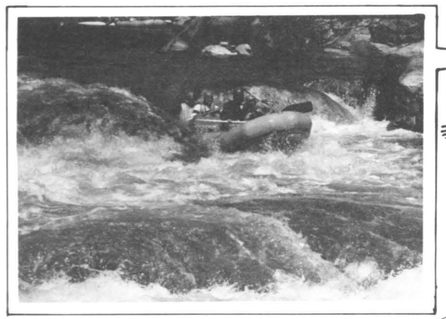
Devils

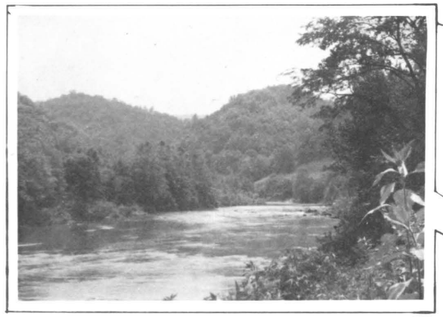
Poplar

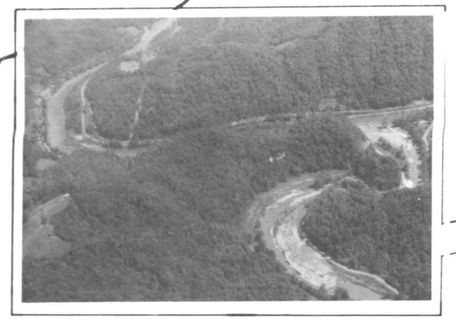
"Put in"

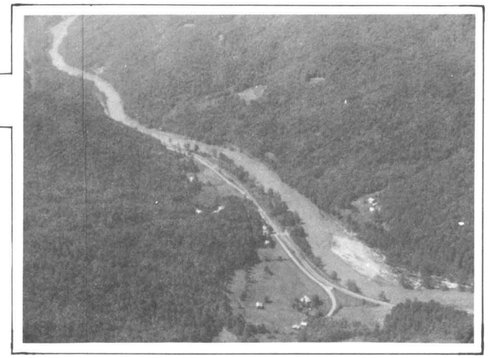
1 3/4 1/2 0 1mile

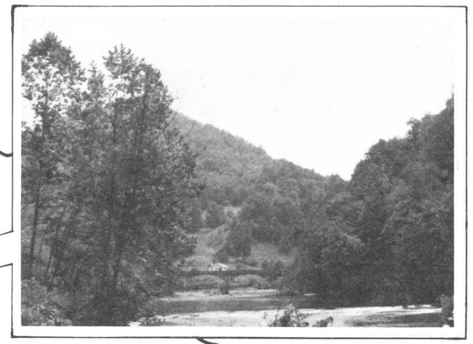
BALD MOUNTAINS











MITCHELL CO.
YANCEY CO.
FLATTOP MOUNTAIN
NOLICHUCKY RIVER
RM 106.5
Poplar
"Put in" & "Take Out"
PISGAH NATIONAL FOREST
RICH MOUNTAINS
Pigeonroost Cr.
TOE RIVER
19w 23
Peterson
RM 110.6 Origin of Nolichucky River
NORTH
Huntdale
"Put in"
CANE RIVER
26
N
1 3/4 1/2 0 1 mie

MAP 12h

TABLE 11

FLOW EXTREMES (c.f.s.) OF THE NOLICHUCKY RIVER
RECORDED AT U.S. GEOLOGICAL SURVEY GAGING STATIONS

| MONTH | Poplar Mitchell Co., NC[1] | | | Embreeville Washington Co., TN[2] | | | Below Nolichucky Dam Greene Co., TN[2] | | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Mean | Max. | Min. | Mean | Max. | Min. | Mean | Max. |
| October | 164 | 218 | 356 | 260 | 1065 | 14200 | 20 | 1314 | 8860 |
| November | 215 | 372 | 1000 | 296 | 1087 | 6030 | 44 | 1296 | 7860 |
| December | 305 | 630 | 3730 | 351 | 1266 | 10400 | 319 | 1636 | 8240 |
| January | 280 | 477 | 1020 | 297 | 1485 | 7380 | 370 | 1933 | 7520 |
| February | 310 | 1280 | 4990 | 484 | 1939 | 18600 | 350 | 2637 | 8720 |
| March | 736 | 1927 | 5120 | 692 | 2271 | 23900 | 1030 | 2949 | 34500 |
| April | 840 | 1669 | 9030 | 600 | 1931 | 8890 | 766 | 2603 | 14000 |
| May | 592 | 934 | 2020 | 611 | 1542 | 10400 | 616 | 2061 | 11900 |
| June | 370 | 537 | 1220 | 334 | 1202 | 22000 | 412 | 1540 | 19100 |
| July | 322 | 649 | 1580 | 298 | 843 | 4120 | 302 | 1111 | 4250 |
| August | 405 | 973 | 3590 | 318 | 875 | 7140 | 401 | 1143 | 7610 |
| September | 220 | 338 | 628 | 260 | 622 | 6680 | 155 | 810 | 4140 |

1/ Water Year October 1954 to September 1955. (Streamflow monitoring discontinued in 1955)

2/ Water Year October 1964 to September 1973. (EPA STORET data base over 10 year period)

## Streamflow

Sufficient volumes of water are considered essential if the recreation potential generally associated with free-flowing rivers is to be realized. The Nolichucky River generally has sufficient volumes to be "floatable" throughout the year. However, there are fluctuations in the streamflow which can affect the quality of the experience, particularly in the Nolichucky Gorge.

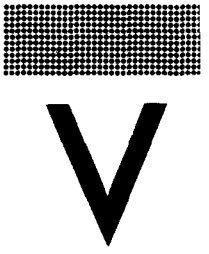
Streamflow data for the Nolichucky River is measured at gaging stations located at Poplar, North Carolina (river mile 106.8); Embreeville, Tennessee (river mile 84.0); and 0.3 mile downstream from the Nolichucky Dam (river mile 45.7). Streamflow monitoring dates from the years 1901 and from 1921 to present at Embreeville and below Nolichucky Dam and to 1955 at Poplar, North Carolina. In addition to these gauge records, a number of discharge measurements have been taken at other locations on the Nolichucky River and its tributaries. Table 11 presents streamflow data for U.S. Geological Survey gaging stations at Poplar, Embreeville, and below Nolichucky Dam. Mean monthly streamflow at Poplar, North Carolina, ranges from 218 c.f.s. in October to 1,927 c.f.s. in March. Daily extremes range from 164 c.f.s. to 9,030 c.f.s. during a typical year. The maximum flow recorded at Embreeville since 1921 was 82,500 c.f.s. (August 13, 1940); the record low flow was 20 c.f.s. (October 4, 1971).

Numerous floods have occurred in the Nolichucky River Basin. The storm of May 18-21, 1901, caused unusually destructive flooding in the Watauga and Nolichucky River basins, and the maximum flood of record on the Nolichucky River of 120,000 c.f.s. was recorded at Embreeville. The most recent major flood occurred on November 6-7, 1977, and caused extensive damage along tributary streams and along the Nolichucky River in Unicoi County, Tennessee.

Whitewater enthusiasts who use the Nolichucky Gorge consider 500 c.f.s. (measured at Poplar U.S.G.S. gaging station) to be the lowest water level for a safe and enjoyable experience. Water levels above 2.300 c.f.s. create dangerous conditions for even the most experienced floaters. As is indicated by the figures in Table 12, the best times for whitewater use generally occur in the spring and late summer. The period of low flow in early summer does not preclude use of the river by floaters below Erwin, Tennessee, as the river has sufficient flow below Erwin for year round usage.

## Water Quality

Analysis of water quality was based primarily on information from the following data sources: EPA's STORET data base; TVA; U.S.G.S.; water



# V. CRITERIA AND STUDY FINDINGS

## Wild and Scenic Rivers Act

The Nolichucky River was designated for study of its potential for the Wild and Scenic River System through an amendment of the Wild and Scenic Rivers Act, Public Law 90-542. The Act sets forth certain criteria by which each candidate for the system is to be evaluated. Section 1(b) of the Act, in a statement of policy, specifies the basic requirements of rivers to be selected for inclusion in the System and the objectives of the System:

> "(b) It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes."

Section 2(b) of the Act provides that the following classifications shall be taken into consideration:

> "Every wild, scenic or recreational river in its free-flowing condition, or upon restoration to this condition, shall be considered eligible for inclusion in the national wild and scenic rivers system and, if included, shall be classified, designated, and administered as one of the following:
>
> 1. Wild river areas--Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
>
> 2. Scenic river areas--Those rivers or section of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

3. Recreational river areas--Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past."

Guidelines

Based on the Wild and Scenic Rivers Act, the Department of the Interior and the Department of Agriculture jointly adopted in 1970 the Guidelines for Evaluating Wild, Scenic and Recreational River Areas for Inclusion in the National Wild and Scenic Rivers System Under Section 2, Public Law 90-542. The Guidelines provide that "In evaluating a river for possible inclusion in the system or for determining its classification, the river and its immediate land area should be considered as a unit, with primary emphasis upon the quality of the experience and overall impressions of the recreationist using the river or the adjacent riverbank. Although a free-flowing river or river unit frequently will have more than one classified area, each wild, scenic, or recreational area must be long enough to provide a meaningful experience." The Guidelines set forth five basic criteria that must be met by rivers being considered for the System. Such rivers must:

1. Possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values.

2. Be long enough to provide a meaningful experience. Generally, any unit should be at least 25 miles long. However, a shorter river or segment that possesses outstanding qualifications may be included in the System.

3. Be substantially free-flowing.

4. Normally have sufficient volume of water during the recreation season to provide full enjoyment of water-related outdoor recreation.

5. Contain high water quality or be restorable to that condition.

Evaluation of the River's Qualifications by Segments

The conclusion of the study team initially led by Heritage Conservation and Recreation Service and subsequently by the National Park Service is that the Nolichucky River does not possess the outstandingly remarkable values which would warrant its inclusion in the National Wild and Scenic Rivers System.

1. Section from the confluence of the Toe and Cane Rivers in North Carolina to the railway bridge at Poplar, North Carolina, river mile 110.6 to 106.5 (4.1 miles).

This section includes 4.1 miles of parallel railroad and 4.5 miles of parallel road, 1 mile of which is paved, 3 miles are unpaved, and 0.5 miles is low grade jeep trail. Approximately 37 houses and cabins are scattered along both sides of the stream. The river is free-flowing with several shoals. The terrain is steep, mountainous and forested. Water quality in this section is low, at times greatly below acceptable limits for fish and wildlife.

Conclusion:

This stretch of river is too short to be considered by itself. No outstandingly remarkable values were identified and the two strongest assets, its scenic and recreational values are marred by development. Since most of the pollution is caused by mining, feedlots, and inadequate private sewage systems upstream on the Cane, North and South Toe Rivers, correction is not likely to be accomplished in the foreseeable future. This segment does not qualify for inclusion in the System and even if combined with the gorge section would only total 12.6 miles in length

2. Section from the railway bridge at Poplar, North Carolina, to the railway bridge at Unaka Springs, just above Erwin, Tennessee, river mile 106.5 to 98.0 (8.5 miles).

This gorge segment is accessible by hiking old disused mountain trails, by walking along the railroad tracks, or by floating down the river. The entire length is paralleled on the south side by the Clinchfield Railroad which runs 10 or 12 long freight trains through the gorge per day under normal conditions. Except for the railroad right-of-way, the gorge area is almost entirely under Federal ownership and Forest Service management. However, there are some private tracts of land at the lower end of the gorge. The general terrain is rugged, forested, and steep, with numerous rocks and rapids in the river. The gorge is regarded as an outstanding whitewater experience by advanced boaters and floaters. Water quality is sometimes low due to the same upstream sources of pollution indicated above. Variation in water quality is such that at times quality is too low to meet permissible standards for fish and wildlife and, at other times, well within the standards for body contact.

Conclusion:

The Nolichucky River gorge does possess noteworthy scenic and recreational qualities but these qualities, especially the scenic values, are severely diminished by the presence of the railroad and the intrusiveness of its construction and equipment. Water

quality is generally acceptable but, as in the first section, it drops to unacceptable levels during periods of high runoff; this situation will persist so long as the upstream sources of pollution remain uncorrected.

The gorge segment does not possess the outstandingly remarkable values to warrant its inclusion in the National Wild and Scenic Rivers System.

3. Section from the railway bridge at Unaka Springs to Embreeville, Tennessee, river mile 98.0 to 89.0 (9.0 miles).

In this section the river completes its passage through the remaining mountains. However, the terrain is somewhat less rugged. The river has frequent shoals and small rapids but they are less threatening and offer little difficulty for the river recreationist who knows how to handle his boat.

Water quality in this segment is improved considerably but at times pollution and turbidity exceed acceptable levels. Turbid conditions are often caused by runoff from rock quarries and sand and gravel operations. Radioactive effluents from the nuclear fuel plant at Erwin (Chapter IV - Water Quality) have been carefully monitored at the Greeneville water plant and at intermediate points but no data was available to show that it has ever attained unacceptable levels for public health.

This section passes through the urbanized area of Erwin and the small suburban communities of Unaka Springs, Chestoa, Love Station, and Riverview. The stretch from river mile 98 down to 94 is paralleled on both sides by roads and the railroad. One of the parallel roads, U.S. 23/19E, is a 4-lane divided highway with twin bridges that cross the river. In addition to this and the railway bridge at Unaka Springs there are two other automobile bridges. The river through much of this stretch has been extensively channelized and riprapped. Vegetation on the stream bank is sparse or completely gone exposing to view from the river the buildings and other structures of the town. Below river mile 94 the vegetative cover is more natural but the entire stretch is paralleled by a paved highway on the north side, and more than a mile of secondary and gravel roads on the south side. Many houses dot this part of the river corridor especially at Embreeville. A quarry and borrow area in the side of Looking Glass Mountain, river mile 94, is an ugly intrusion visible for great distances.

Conclusion:

Due to the large number of developments, parallel roads, bridges, quarry, rip-rapping and other alterations by man, and due to periods of questionable water quality, this segment does not qualify for inclusion in the System.

4. Section from Embreeville to Davy Crockett Lake, just below Jones Bridge, river mile 89.0 to 53.0 (36 miles).

This stretch of river flows through rolling countryside devoted almost entirely to agriculture. Row crops and pasture land crowd the riverbanks where only a narrow fringe of trees and brush screen the view of the river. Here and there the banks are cleared so that the farms and other evidence of man's presence are readily seen.

In this 36 mile stretch there are 9 bridge crossings, a large stone quarry, 170 dwellings and numerous other structures and parallel roads.

No outstandingly remarkable values were identified in this stretch of the river. Questionable water quality is mostly due to the heavy suspended silt load carried by the river during and following periods of rain. This silt load is still of such proportions that fish and other aquatic life is adversely affected.

Conclusions:

Due to the extent to which the river corridor has been changed by the presence of dwellings and other buildings, clearing of vegetation, agricultural activity, roads and bridges, the poor water quality, and the general lack of outstanding features, this stretch is not qualified for inclusion in the Wild and Scenic Rivers System.

5. Section from the headwaters of Davy Crockett Lake to below Nolichucky Dam at the State Road 70 crossing, river mile 53.0 to 45.5 (7.2 miles).

This section consists entirely of Davy Crockett Lake and its dam and power station structure.

Conclusion:

This section is an impoundment and is therefore not qualified for designation to the Wild and Scenic Rivers System.

6. Section from State Road 70 crossing to the headwaters of Douglas Lake, river mile 45.5 to 1 (45.5 miles).

This section is similar in most respects to the segment between Embreeville and Jones Bridge. The quality of water is good but considerable turbidity remains during periods of high flow. Like section 4 above this stretch of river also flows through rolling countryside devoted almost entirely to agriculture. Row crops and pasture land crowd the riverbanks where only a narrow fringe of trees and brush screen the view of the river. Here and there the banks are cleared so that the farms and other evidence of man's presence are readily seen. Some small patches of woodlands occur in the lower portions of the river. Two low dams, one at Pate Hill and one at the American Enka Plant, are run-of-the-river dams that do not significantly impair the free flow of the river. Recreation use for boating and fishing is locally regarded as of good quality.

There are more than 130 dwellings, 16 miles of parallel roads, 4 miles of parallel railroad, 6 bridge crossings, 3 powerline crossings and other structures in this stretch.

No outstandingly remarkable qualities were identified in this 45.5-mile stretch of river.

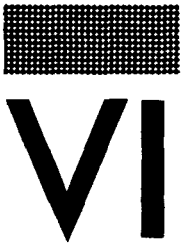
Conclusion:

Due to the lack of outstanding qualities, the large number of developments, and extensive use of the streamside land for agriculture and pastureland, this section of stream fails to qualify for inclusion in the Wild and Scenic Rivers System..

General Assessment of the River's Qualifications:

As previously stated in this chapter the Wild and Scenic Rivers Act states that rivers included in the National Wild and Scenic Rivers System shall be free-flowing streams which possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural and other similar values. No such values of outstandingly remarkable quality were found to exist in the Nolichucky River or its immediate environments.

On the basis of this study and the analysis of the river's qualities, the designation of the Nolichucky River as a unit of the National Wild and Scenic Rivers System is not recommended. The gorge area deserves protection for its scenic and recreation values and, since it is almost entirely in U.S. Forest Service ownership, it should be managed and designated for that purpose.



# VI. SUGGESTED ACTION PLAN

The study of the Nolichucky River revealed certain qualities that deserve recognition and suitable action to provide for public use and enjoyment of the river.

1. The river provides many opportunities for rafting and boating and a range of difficulty varying from 8.5 miles of advanced white-water to long intermediate and beginner class stretches above and below the gorge.

2. Resident populations of smallmouth bass and catfish attract many fishermen to the lower parts of the river.

3. Scenic values in the gorge are impressive and in the remainder of the river, despite extensive clearing for agricultural activity, there are many pleasant pastoral settings. Rock outcroppings and bluffs here and there add variety to the river.

4. Few facilities have been built along the river to provide for such recreation activities as fishing, picnicking, camping and boating. The few recreation access points to the river for boating, fishing and swimming are informal or poorly developed.

5. Historically interesting features in the river corridor include the birthplace of Davy Crockett and Plum Grove, the remains of the home and plantation believed to have belonged to Tennessee's first Governor, John Sevier. The history of early settlement of this part of the country by pioneers, and the sites of earlier Indian settlements add cultural, historical and archeological values to the river.

To improve opportunities for public use and enjoyment while providing protection for those values that might be threatened by future changes in land use or land management, the following steps might be taken by public agencies (or by interested citizens) operating within existing legislative authorities and programs.

The gorge is almost entirely owned by the Federal Government and is under Forest Service management. As such, the protection of the scenic qualities of the gorge and the provision of recreation opportunities for public enjoyment of the area is essentially a matter of Forest Service management and the cooperation of existing private landowners.

It is suggested that the Forest Service designate the gorge by an appropriate classification, such as "scenic area" or "natural area," and establish a management practice that will preserve the scenic qualities of the gorge. Some land between Poplar and Unaka Springs presently in private ownership might require acquisition as scenic eastments, use easements, or in fee title, as appropriate.

It is suggested that the Forest Service acquire and develop on a suitable piece of land at or near Poplar, above the gorge, an appropriate facility for use by the public to gain access to and from the river and that such action address the presently serious problems of inadequate parking, lack of sanitary facilities, and questionable safety involving the use of the Clinchfield Railroad tracks and right-of-way as a crossing.

The Forest Service has already acquired land at the lower end of the gorge and is preparing plans for its development. This land, and a second tract just below Erwin, will be developed for public use and will facilitate recreation in the gorge as well as the section of river below the gorge to river mile 93.7.

Good access points should be developed at the source of the river, below Huntdale, and in the vicinity of Embreeville, to provide facilities for the public to launch and retrieve their craft on public land. The Forest Service, Tennessee Valley Authority and/or the States could cooperate in the provision of these facilities.

Public access to the river between Embreeville and the mouth of the river is very poor. In many places access to the river is not practical or even hazardous. Many of the road crossings are at points where the riverbanks are too high to launch a canoe. Poor access or the lack of access tends to encourage trespass on private land and create problems between landowners and recreationists. Improved access would be particularly useful in the river between Nolichucky Dam and the mouth of the river.

Private industry, private landowners, and concerned public agencies of the State and Federal Governments should renew their efforts to clean up the sources of pollution of the river. A great deal in this regard has already been done and improvements are evident. However, much pollution remains and only the cooperation of all concerned can achieve satisfactory results.

# VII

# VII. APPENDIX

The following agencies of government were consulted and asked to comment on the Nolichucky River Study report:

*Department of Energy
*Department of Agriculture
*Department of the Army
Environmental Protection Agency
*Department of Transportation
*Governor of North Carolina
*Governor of Tennessee
*Tennessee Valley Authority

Agencies within the Department of the Interior were also consulted and offered review comments as were numerous private individuals and organizations. Letters from private individuals and organizations generally expressed disagreement with the study findings and recommendations. Private organizations which disagreed with the study findings and support designation of the Nolichucky River include the Tennessee Scenic Rivers Association, Inc., Tennessee Citizens for Wilderness Planning, The Conservation Council of North Carolina, the American Rivers Conservation Council and the Blue Hole Canoe Company.

*Letters of review printed in this Appendix (official comments from other agencies not received as of the date of this printing)

Department of Energy
Washington, D.C. 20585

JUN 30 1980

Mr. Robert L. Herbst
Assistant Secretary for Fish
Wildlife and Parks
U.S. Department of the Interior
Washington, D.C. 20240

Dear Mr. Herbst:

This is in response to your April 16, 1980, request for comments on the Wild and Scenic River Study for the Nolichucky River.

We have reviewed the draft study prepared pursuant to the Wild and Scenic Rivers Act (82 Stat. 906). The report recommends that the river not be designated as a unit of the National Wild and Scenic Rivers System. This recommendation would not have implications on possible energy resources in the vicinity of the river, and accordingly, the Department of Energy offers no comment.

Sincerely,

Ruth C. Clusen

Ruth C. Clusen
Assistant Secretary
for Environment

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

Honorable Cecil D. Andrus
Secretary of the Interior
Washington, D.C. 20240

Dear Mr. Secretary:

We have reviewed your Department's draft report on the Nolichucky River. We agree with the study conclusions that the study segment does not meet the criteria for inclusion in the National Wild and Scenic Rivers System. As noted in the study report, the Forest Service of this Department is taking steps to improve the opportunities for public use of the portion of the river within the National Forest and to protect existing natural values.

Although we agree with the report's conclusions, we have identified several areas of the report, particularly those related to the gorge segment, which can be improved. Rather than discuss these detailed matters here, we have asked the Forest Service to discuss these points directly with the National Park Service staff.

We appreciate the opportunity to review your proposed report.

Sincerely,

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D.C. 20310

1 JUN 1980

Honorable Robert L. Herbst
Assistant Secretary for Fish and
Wildlife and Parks
Department of the Interior
Washington, D.C. 20240

Dear Mr. Herbst:

This is in response to Mr. David Hales' recent request for comments of the Department of the Army on your proposed report on the Nolichucky River, Tennessee Wild and Scenic River study.

The Nolichucky River lies within the drainage basin of the Tennessee River; responsibility for and interest in water resources planning and development of the Tennessee River Basin is vested in the Tennessee Valley Authority. In view of this and recognizing your recommendation that the stream not be added to the National Wild and Scenic River System, the Department of the Army has no comments to offer on your proposed report.

I appreciate the opportunity to comment.

Sincerely,

for Michael Blumenfeld
Assistant Secretary of the Army
(Civil Works)

OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

8 [illegible] 1980

Mr. David F. Hales
Assistant Secretary for Fish
and Wildlife and Parks
Department of the Interior
Washington, D. C. 20240

Dear Mr. Hales:

This is in response to your request for the view of the Department of Transportation on the Department of the Interior's draft report on the Nolichucky River, in North Carolina and Tennessee.

We have reviewed the report and have no comment to offer. Thank you for the opportunity to consider this proposal.

Sincerely,

Martin Convisser
Director, Office of Environment
and Safety

STATE OF NORTH CAROLINA

OFFICE OF STATE BUDGET AND MANAGEMENT

JAMES B. HUNT, JR., GOVERNOR
AND DIRECTOR OF THE BUDGET

JOHN A. WILLIAMS, JR.
EXECUTIVE ASSISTANT TO THE GOVERNOR
AND STATE BUDGET OFFICER

June 16, 1980

Mr. Robert Eastman
National Park Service
Office of the Secretary
for Fish & Wildlife & Parks
Department of Interior
Washington, D. C. 20240

Dear Mr. Eastman:

RE: SCH File #076-80; Nolichucky River - N. C./Tennessee
Draft Wild & Scenic River Study

The State Clearinghouse has received and reviewed the above referenced project. As a result of this review, the State Clearinghouse has received the attached comments from the North Carolina Department of Natural Resources and Community Development.

Thank you for the opportunity to review the above referenced document.

Sincerely,

Chrys Baggett

Chrys Baggett (Mrs.)
Clearinghouse Director

CB/njh

Attachment(s)

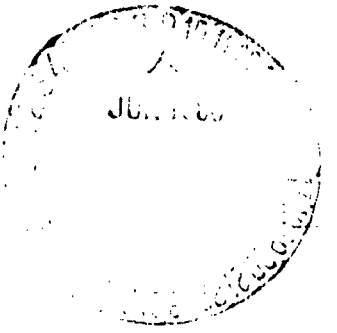


116 WEST JONES STREET—RALEIGH 27611 (919) 733-7061

North Carolina Department of Natural Resources & Community Development
James B. Hunt, Jr., Governor
Howard N. Lee, Secretary

OFFICE OF REGULATORY RELATIONS
Anne Taylor
Director
Box 27687, Raleigh 27611
Telephone 919 733-6376

MEMORANDUM



TO: Chrys Baggett
State Clearinghouse

FROM: Melba Strickland
Environmental Assessment

SUBJECT: 076-80

DATE: June 9, 1980

This report was reviewed by staff of the State Natural and Scenic Rivers Program and the North Carolina Trails System. In general, they concur with the study conclusions and recommendations regarding National Wild, Scenic and Recreation River designation.

The State Natural and Scenic Rivers Program staff will be providing additional detailed comments directly to the Park Service concerning the relationship to plans for canoe trails and scenic rivers proposals of the Tennessee Valley Authority.

The Natural Heritage Program staff has no objection to the study recommendations and does not anticipate adverse impacts on the environment resulting from proposed actions.

The pollution problems addressed in this report should be called to the attention of the responsible state and federal agencies, and application procedures and controls to correct these problems should be effected.

# State of Tennessee

LAMAR ALEXANDER GOVERNOR

June 2, 1980

JUN 11 1 50 PM '80

The Honorable Cecil D. Andrus
Secretary
Department of the Interior
Interior Building
Room 6151
18th and 19th Sts., NW
Washington, D. C. 20240

Dear Secretary Andrus:

The Executive Office has reviewed the draft report on the Nolichucky Wild and Scenic River Study as prepared by the National Park Service. This office is in concurrence with the study findings that the Nolichucky River does not qualify for inclusion in the National Wild and Scenic River system.

The 1979 State Comprehensive Outdoor Recreation Plan identifies a need for warm water and cold water fishing and various types of boating and canoeing in that region of Tennessee. Although present water quality in and lack of access to the Nolichucky River reduces its value for such activities, this office recognizes the potential and is, through various federal, state and local agencies, making progress toward the improvement of water quality and the provision of river access.

This office appreciates the opportunity to examine the study report on the Nolichucky River and looks forward to working with various federal and local agencies in the realization of the full potential of the Nolichucky River resources.

Sincerely,

Lamar Alexander

Lamar Alexander

LA/dlm

TENNESSEE VALLEY AUTHORITY
NORRIS, TENNESSEE 37828

July 7, 1980

Mr. Neal G. Guse, Regional Director
U.S. Department of the Interior
National Park Service
Southeast Regional Office
75 Spring Street, SW
Atlanta, Georgia 30303

Dear Mr. Guse:

We appreciate the opportunity to review the final draft report of the Nolichucky Wild and Scenic River Study. We believe that the Park Service has done a thorough job of evaluating and presenting the current situation on the Nolichucky River.

In reference to the Suggested Action Plan of the study, specifically page 6-2, we are currently cooperating with the Forest Service in an effort to develop access sites at Poplar and the lower end of the gorge above Erwin. In addition, we are trying to acquire a tract of land in the vicinity of Embreeville.

If we may be of further assistance, please let us know.

Sincerely,

Richard S. Austin, Projects Manager
Streams, Trails, and Natural Areas
Recreation Resources Program
Division of Land and Forest Resources

## GLOSSARY OF GEOLOGIC TERMS

Alluvium--Material transported by streams and deposited in stream valleys. Soils thus formed are called alluvial soils.

Amphibolite--A class of metamorphic rock containing mostly the silicate minerals plagioclase feldspar and hornblende.

Amphibolite Gneiss--A medium to coarse grained metamorphic rock characterized by compositional layering that produces a banded appearance.

Cambrian--The earliest of the geologic time periods within the Paleozoic era beginning about 600 million years ago and lasting approximately 50 - 100 million years. Cambrian rocks (including conglomerates, sandstones, shales, and limestones) indicate conditions of shallow sea water, a far from uniform climate, and a period of great duration.

Cherty Limestone--Chert is a dense, hard, silicate rock with the same hardness, fracture properties, and luster as quartz. The most common occurences of chert are nodules in layers of limestone.

Clastic Rocks--Clastic rocks are sedimentary rocks composed of fragmental materials such as sand and gravel that were produced by the mechanical disintegration of all types of preexisting rocks. A clastic sediment may consist of fragments of any type of rock.

Diabase Dikes--A dike is an igneous rock mass entirely enclosed by the invaded formation. Dikes are formed when molten rock is injected by pressure through a fissure or crack into the surrounding rock. Diabase is a fine grained igneous rock consisting mainly of the minerals feldspar and pyroxene.

Dissected Ridges--Ridges which have been cut in several places by streams or other natural forces.

Dolomite--A chemically deposited sedimentary rock which is dense and sugary textured and which is a calcium magnesium carbonate.

Displacement of Faults--The straight line distance between two points that were originally adjacent on opposite sides of the fault after the movement.

Dip--An angular measure used in describing fractures, faults, and cleavages. It is the angle between the plane and the horizon, measured in a vertical plane at right angles to the strike (see definition of strike).

Erwin Formation--The Erwin Formation and its equivalents, the Hesse sandstone, Murray shale, and Nebo sandstone, consist of about 1000 to 1500 feet of thick beds of white quartz cemented sandstone interbedded with bodies of dark green silty, sandy, or clayey shale mixed with very fine sandstone and siltstone. The quartztic beds of this formation are resistant to weathering and form no soil. The tight siliceous cement that binds the sand grains in these rocks does not allow ground water to move between them. Ground water is, therefore, restricted to fractures in the rocks.

Faults--A fault is a crack in the earth's crust along which displacement has occurred.

Folding--Bending or distorting of rock masses.

Gabbro--A generally dark igneous rock composed of coarse to medium grained pyroxene, hornblende, and biotite.

Hampton Formation--The Hampton formation consists of 500 to 2500 feet of dark silty and sandy shales and beds of thick sandstone. The shale of this formation weathers deeply and produces a soil full of shale chips. Groundwater occurs only in fractures in the sandstone and shale.

Honaker Dolomite--A formation consisting of about 1300 feet of light and dark, fine and coarse grained shaly and massive dolomite and interbedded limestone. The lowest portion of the formation is very shaly and grades into the red shale and siltstone of the underlying Rome formation. Groundwater occurs in fractures. In many places the formation has been severely crumpled by movement along faults.

Igneous Rocks--Igneous is a term meaning "born from fire," applied to both volcanic rocks and rocks that crystallize slowly within the earth's crust.

Joints--Cracks which are formed when erosion removes the weight of overlying rocks and causes the expansion of the rock below. The outermost layer of the rock may expand enough so that it breaks from the main mass, forming cracks or joints parallel to the surface.

Jonesboro Limestone--This formation is about 2000 feet thick and is a pure, massive dark blue weathering limestone containing thin layers of silty dolomite. Groundwater occurs in fractures in this formation.

Mantle--The zone in the earth's interior below the crust and above the core.

Metamorphic Rocks--Rocks which have undergone changes by high temperature and pressure within the earth's crust.

Ocoee Series--A body of sedimentary rock several miles thick. These rocks occur in the Great Smoky Mountains and other ranges along the North Carolina/Tennessee boundary.

Paleozoic--Relating to a grand division of geological history from the beginning of the Cambrian to the close of the Permian marked by the culmination of nearly all classes of invertebrates except the insects and in whose later epochs seed bearing plants, amphibians, and reptiles first appeared.

Pre-Cambrian--The period of geologic history from the creation of the earth to the period when fossils first became abundant, about 600 million years ago.

Quartzite--A metamorphic rock consisting of 80 percent quartz with tightly cemented sandstones in the matrix.

Rome Formation--The Rome Formation consists of more than 200 feet of sandstone, siltstone, shale, dolomite, and limestone. The sandstone and siltstone beds weather to a shallow residual soil full of shale chips. Groundwater occurs in fractures in the shale and sandstone and in solution channels in the dolomite.

Saprolite--Rock which has disintegrated somewhat and which lies in its original place.

Sevier Shale--The Sevier shale and its equivalents range in thickness from 2500 to 4000 feet and consist largely of blue, yellow-weathering silty to sandy calcareous shale. It usually forms rough, knobby, intricately dissected topography known locally as "slate knobs." Groundwater in the Sevier shale is restricted to fractures. The formation has been shattered by past earth movements, making the shale rather permeable and, therefore, one of the better acquifers in east Tennessee.

Sills--Layers of igneous rock occurring below the surface and which are more or less parallel to the beds of sedimentary rock which surround them.

Shady Dolomite--A formation consisting of about 1000 feet of white pure dolomite and blue-gray silty dolomite. Limestone occurs in the lower part and a few sandy beds are found close to the base of the formation. Groundwater occurs in fractures in the dolomite and limestone.

Shale--Consolidated mud and clay, often containing sand or lime in large amounts and having an earthy odor.

Shear Zones--Shear is a directed pressure which is applied in such a way that two adjacent parts of the material slip past one another. When rocks are broken and moved by directed pressure, as in faults, the resulting areas are known as shear zones.

Snowbird Formation--This is a part of the Ocoee series which consists of sandstone, shale, siltstone, and arkose.

Strike--The compass direction of any horizontal line (or rock formation) on a plane.

Thrusting--Thrust faults are faults caused by compression and which result in a shortening of the earth's crust. These faults are nearly flat and have mainly horizontal movement. Thus thrusting is the action which produces thrust faults.

Unicoi Formation--The Unicoi formation consists of 1000 to 5000 feet of coarse feldspathic sandstone and fine conglomerate cemented by vitreous quartz. The sandstones are resistant to weathering and form ridges. Groundwater occurs only in fractures.

GEOLOGY OF THE NOLICHUCKY RIVER STUDY AREA

STRATIGRAPHIC UNITS

| AGE (millions of years) | FORMATION | THICKNESS (feet) | DESCRIPTION |
|---|---|---|---|
| | Rome Formation | 1,500 | Mainly thin-bedded maroon siltstone and shale. Contains a few beds of massive, light-gray dolomite. |
| | Shady Dolomite | 1,000 | Dark- to light-gray, massive to thinly laminated dolomite; yellow-brown plastic residuum containing jasperoid masses is distinctive. |
| Early Cambrian (540-570) | Erwin Formation | 1,000 | Interbedded layers of thick-bedded, white vitreous quartzite, siltstone and shale. |
| | Hampton Formation | 1,500 | Dark greenish-gray silty and argillaceous shale; abundant layers of thin-bedded feldspathic sandstone throughout. |
| | Unicoi Formation | upper part 2,500; lower part 1,800 | White feldspathic quartzite with minor siltstone in upper part; feldspathic conglomerate and coarse-grained quartzite in lower part. Contains several layers of amygdaloidal greenstone in lower part. |
| | | ----Disconformity---- | |
| Late Precambrian (570-650) | Sandsuck Formation | 1,000 | Dark silty slate, calcareous at places, with discontinuous layers of silty sandstone, quartzite, and conglomerate. |
| | Snowbird Formation | 3,500 | Mostly well-sorted, white feldspathic quartzite. Beds of siltstone and slate common in upper portion; pebbly layers prevalent in lower portion. |
| | | ----Nonconformity---- | |
| Precambrian (possibly as old as one billion years) | Basement complex | | |

## Structural Developments in the Nolichucky River Corridor
## HCRS Rivers Inventory Evaluation

### Structural Developments in the Corridor

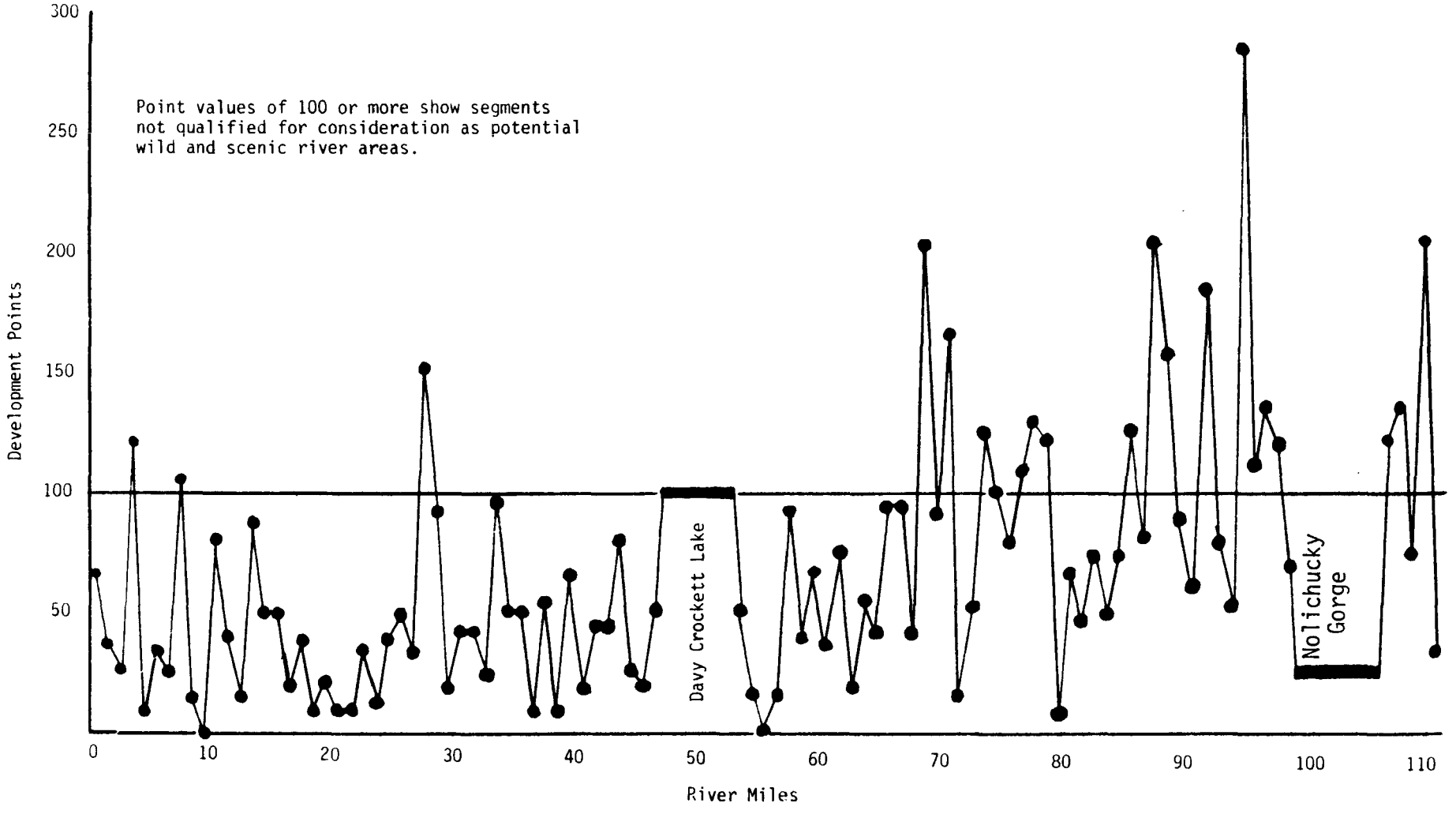
In 1975-1978 the Heritage Conservation and Recreation Service (HCRS) conducted an inventory of all streams in the southeast to determine which streams possessed the qualities that would make them desirable candidates for the Wild and Scenic Rivers System. The first criterion and test used in the selection process was taken from the Guidelines for Evaluating Wild and Scenic Recreational River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System Under Section 2, Public Law 90-542 which states "Generally, any unit included in the system should be at least 25 miles long. However, a shorter river or segment that possesses outstanding qualifications may be included in the system."

HCRS devised a number of tests based on the Wild and Scenic Rivers Act and the above mentioned Guidelines by which the qualities of a river can be readily evaluated and its potential for further study can be determined. The second test therefore was the degree to which a river area has been altered by man through the construction of buildings, roads, bridges, powerlines, pipelines, dams, quarries, towns and villages, railroads, etc. In all 116 specific types of structures were listed and given point values based on the degree of obtrusiveness inherent in each type of structure. For example, a dwelling was assigned a value of 8 points, a parallel railroad 25 points, and a paved road bridge crossing 20 points. The river corridor in which such structures were considered was 1/4 mile back from each river bank and the source of data used was the latest available county highway maps. Any one-mile segment of river in which the point values equalled to or exceeded 100 points was considered to be excessively developed and therefore not qualified for inclusion in the Wild and Scenic Rivers System.

Using this evaluation system HCRS examined the Nolichucky River and found that as of the dates of publication of the maps used (8-10 years old) the structural developments along the river disqualified 27 one-mile segments of the river from consideration as potential wild and scenic river areas. In addition many other segments approached the point of disqualification. The distribution of disqualified segments resulted in the longest acceptable segments, two in number being only 20 miles each in length. The next longest segment, above Davy Crockett Lake, was only about 13 miles long. Above river mile 68 the only significant segment that passed the structural development test was the 8 miles of gorge which was marred by its paralleled railroad. The accompanying chart shows graphically the results of the HCRS structural developments evaluation. It should be noted that land cleared for agriculture, widespread in the river area below river mile 88, and structures built since the publication of the county road maps available in 1977 are not reflected in this evaluation.

NOLICHUCKY RIVER
GRAPH OF STRUCTURAL DEVELOPMENT POINTS

Based on HCRS Potential Wild and Scenic Rivers Inventory, 1977.



Johnson City vicinity - HAMMER, ISAAC, HOUSE, N of Johnson City off U.S. 11 (3/19/76)
Johnson City vicinity - TIPTON-HAYNES HOUSE, SE of Johnson City on U.S. 19W (2/26/70) PH0045519
Jonesboro - JONESBORO HISTORIC DISTRICT (12/23/69) PH0045497
Jonesboro - TAYLOR, CHRISTOPHER, HOUSE, Main Street (12/9/71) PH0045501
Jonesboro vicinity - DEVAULT TAVERN, W of Jonesboro on Leesburg Road (6/4/73) PH0045471
Jonesboro vicinity - SULPHUR SPRINGS METHODIST CAMPGROUND, N of Jonesboro off TN 81 in Sulphur Spring Community (5/12/75) PH0140147 HABS
Limestone - GILLESPIE, COL. GEORGE, HOUSE, off U.S. 411 (8/22/77)
Telford vicinity - EMBREE HOUSE, SW of Telford on Walker's Mill Road (2/14/78)

UNICOI COUNTY

Erwin vicinity - CLARKSVILLE IRON FURNACE, SW of Erwin off TN 107 in in Cherokee National Forest (6/4/73) PH0045454

*Source: Federal Register, Vol. 44, No. 26, Tuesday, February 6, 1979.