

D4219

THE LITTLE MIAMI RIVER
A Wild and Scenic River Study

FOR



Bureau of Outdoor Recreation
U.S. DEPARTMENT OF THE INTERIOR

AS THE NATION'S PRINCIPAL
CONSERVATION AGENCY, THE
DEPARTMENT OF THE INTERIOR
HAS BASIC RESPONSIBILITIES
FOR WATER, FISH, WILDLIFE,
MINERAL, LAND, PARK AND
RECREATIONAL RESOURCES.

INDIAN AND TERRITORIAL
AFFAIRS ARE OTHER MAJOR
CONCERNS OF AMERICA'S
"DEPARTMENT OF NATURAL
RESOURCES."

THE DEPARTMENT WORKS TO
ASSURE THE WISEST CHOICE
IN MANAGING ALL OUR
RESOURCES SO EACH WILL
MAKE ITS FULL CONTRIBUTION
TO A BETTER UNITED STATES
NOW AND IN THE FUTURE.



DEPARTMENT OF THE INTERIOR

Rogers C. B. Morton, Secretary

Bureau of Outdoor Recreation

James G. Watt, Director

THIS REPORT WAS PREPARED PURSUANT TO PUBLIC LAW 90-542, THE WILD AND SCENIC RIVERS ACT. IT SETS FORTH CONCEPTUAL GUIDELINES FOR THE CLASSIFICATION, DEVELOPMENT, AND MANAGEMENT OF THE RIVER AREA AS A COMPONENT OF THE NATIONAL SYSTEM AND IS INTENDED FOR USE BY CONCERNED FEDERAL AND STATE AGENCIES INVOLVED IN MASTER PLANNING AND EVENTUAL ADMINISTRATION OF THE AREA.

SEP 1973

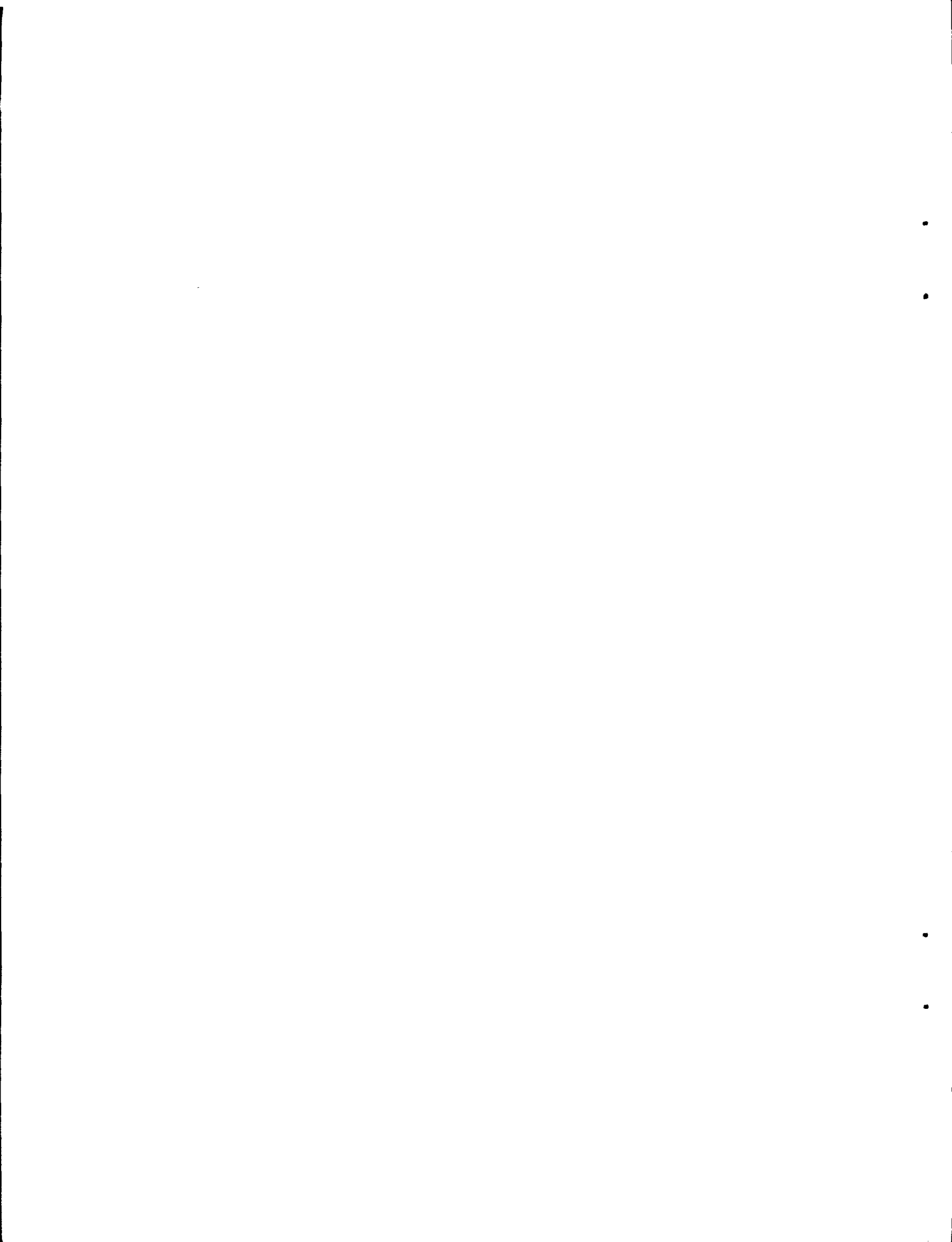
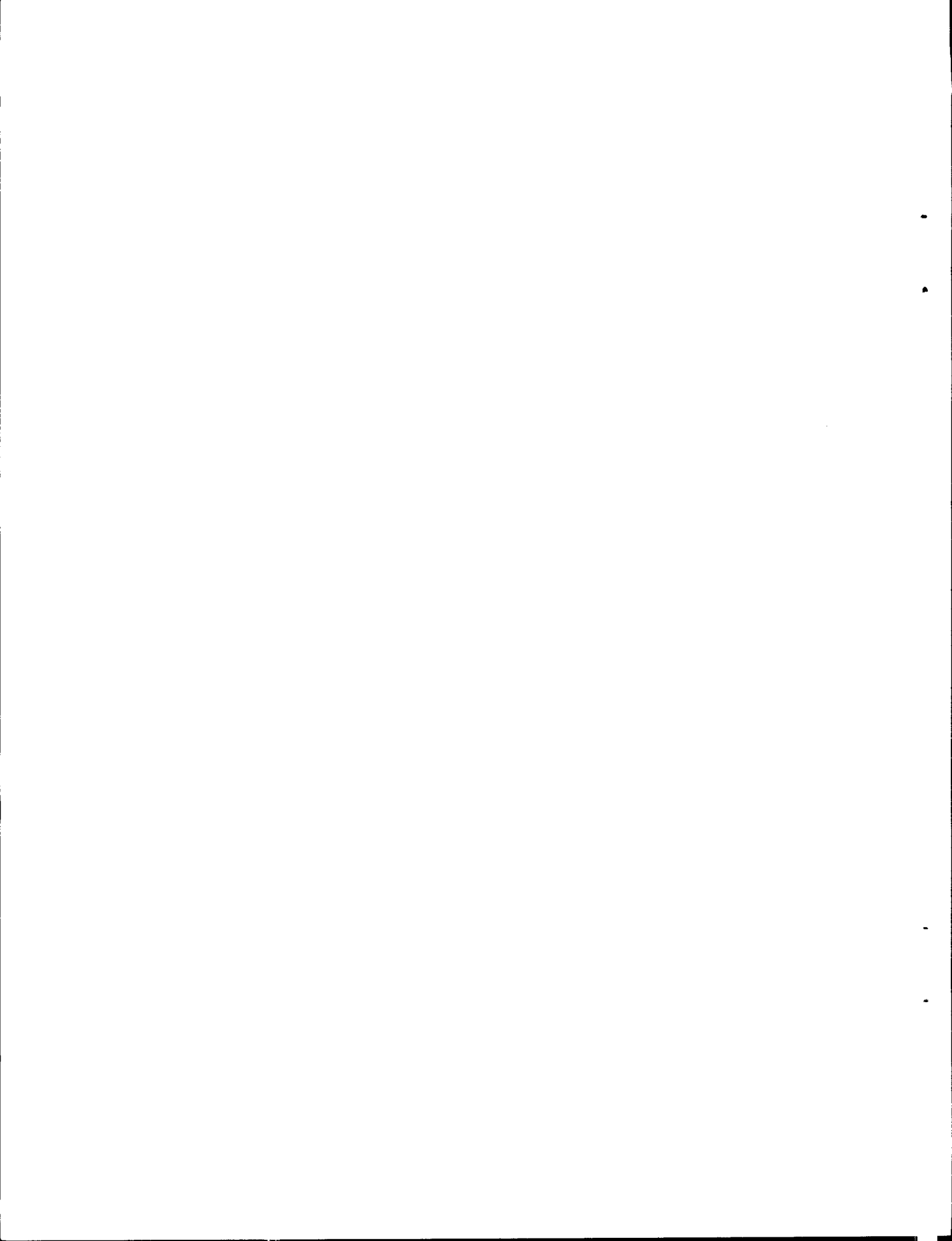


TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	SUMMARY OF FINDINGS AND RECOMMENDATIONS	7
III.	REGIONAL SETTING	13
	Landscape.....	15
	Economy and Population.....	17
	Transportation Network.....	21
	Recreation Resources	23
IV.	DESCRIPTION AND ANALYSIS	29
	A Photo Trip Down the Little Miami River	31
	Riverscape	37
	Flow Characteristics	39
	Water Quality	45
	Climate	48
	Geology and Soils	48
	Flora	56
	Fauna	57
	History and Archaeology	61
	Access	69
	Land Use	70
	Land Ownership	73
	Water Rights	74
	Nonrecreational Use of the Little Miami	76
	Recreation	79
V.	CONCLUSIONS	91
VI.	RECOMMENDED RIVER PLAN	101
	Area	103
	Costs	103
	Appropriate Boundaries	103
	Acquisition Policy and Land Use Controls	105
	Development	106
	Management	111



MAPS

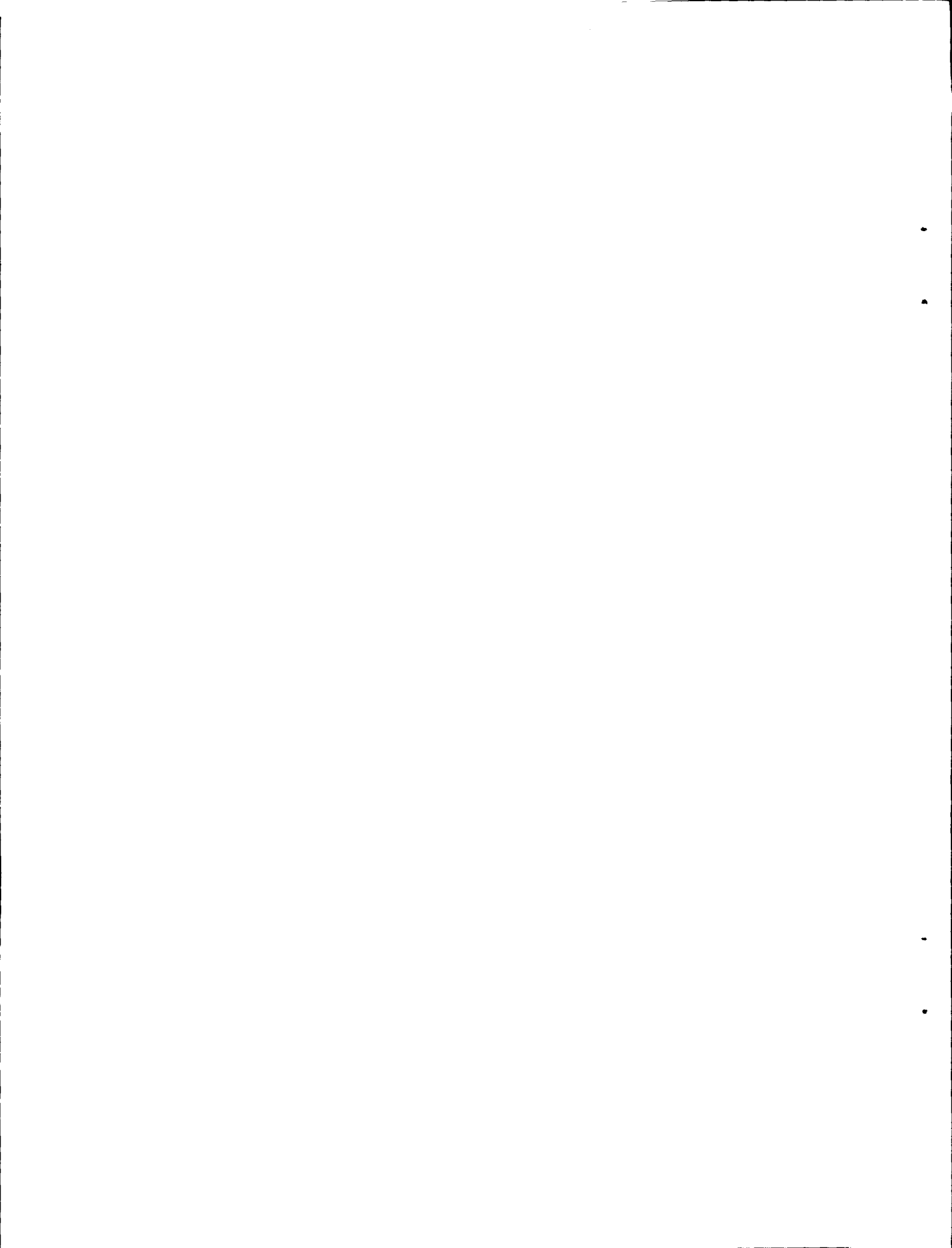
1.	Little Miami River Basin	
2.	Physiographic Sections of Ohio	16
3.	Regional Population Density	19
4.	Cincinnati to Springfield Urban Development	20
5.	Regional Highway Network	22
6.	Soil Associations - Little Miami River Basin	51
7.	Soil Limitations Relative to Land Use	52
8.	Major Archaeological Sites	62
9.	Major Historic Sites	68
10.	Existing Recreation Facilities	83
11.	Conceptual Plan	113

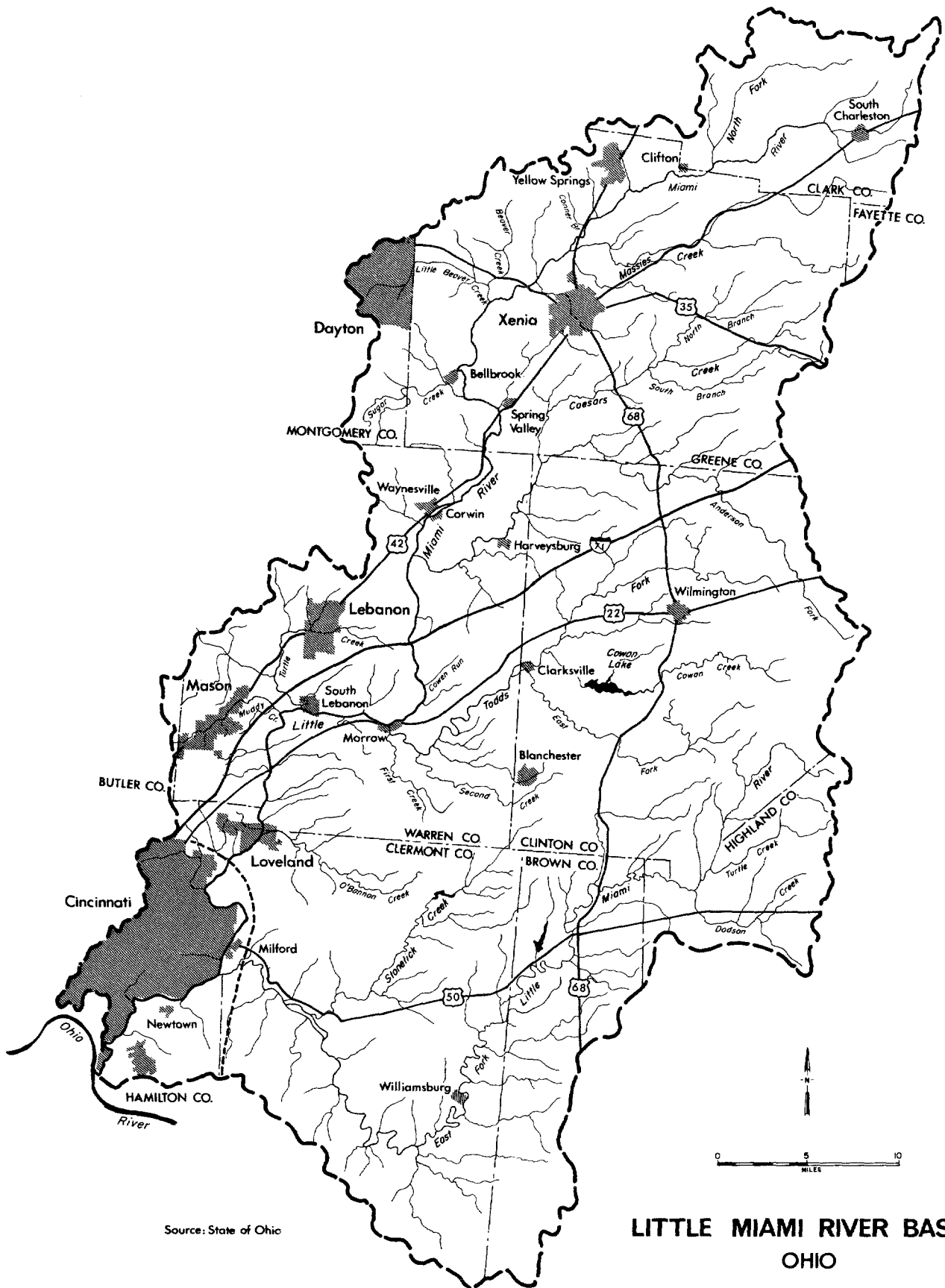
TABLES

1.	Population Projections by County for Selected Years	18
2.	Population Projections by SMSA for Selected Years	18
3.	Distance and Driving Time from Major Urban Centers to Xenia, Ohio	23
4.	Supply of Public and Private Recreation Areas for Eight Regions of Ohio: 1970	26
5.	Soil Characteristics	53-54
6.	Land Use - Little Miami Basin	70
7.	Land Use Within Visual Corridor Above Loveland	71
8.	Land Use Zoning in the Visual Corridor Above Loveland	72
9.	Land Ownership Within the Visual Corridor Above Loveland	73
10.	Ownership of River Front Lands Above Loveland	74
11.	Water Use in Little Miami Basin	77

FIGURES

1.	Little Miami River Profile	40
2.	Little Miami River at Milford (Average Discharge)	41
3.	Little Miami River at Oldtown (Average Discharge)	42
4.	Water Levels for Canoeing	43
5.	Geologic Structure - Little Miami Valley	50
6.	River Classification	96
7.	Critical Sight Lines for Typical Valley Cross Sections	104





Source: State of Ohio

LITTLE MIAMI RIVER BASIN
OHIO



I

INTRODUCTION

I. INTRODUCTION

On October 2, 1968, Public Law 90-542, the Wild and Scenic Rivers Act, was approved. In this Act the Congress declared it:

. . . 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, cultural, or other similar values, shall be preserved in their 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, the Wild and Scenic Rivers Act established a wild and scenic rivers system composed of eight initial rivers and identified 27 other rivers, including the Little Miami River, to be studied for possible inclusion in the national system. The Act calls for a determination of the suitability of the Little Miami for inclusion in the system and, if it is to be included, recommendations pertaining to the administration and management of the river environment.

Background

Ever since the advent of the first bills in Congress dealing with the establishment of a national system of free-flowing rivers in 1965, there has been strong state and local interest in preserving the Little Miami River and including it as part of such a system.

To determine the possibilities and potentials of fitting the Little Miami into a national system of rivers, the Ohio Department of Natural Resources, with the encouragement of many local groups, asked the Ohio University Planning Institute in March 1966 to study both the Little Miami and the intent of proposed legislation and to make appropriate recommendations. This study, completed in April 1967, concluded that the Little Miami River possesses the physical character, environment, historic associations, and locational attributes which make its preservation as a free-flowing river and its inclusion into a national system highly desirable.

A good example of local interest in preserving the Little Miami River was the formation of Little Miami, Inc., in September 1967. Little Miami, Inc., a nonprofit organization, was formed to promote and encourage protective state and federal legislation. It has since grown to an organization of over 2,000 individuals, with the backing and support of around 200 organizations and institutions.

On February 28, 1968, the Ohio legislature passed substitute Amended Senate Bill 345, creating a state system of scenic rivers. The Little Miami was the first stream in Ohio to receive official designation as a scenic river under the provisions of this Act. The section of the Little Miami mainstem from Loveland upstream to its sources, including the North Fork, was officially designated as a state scenic river area on April 23, 1969. That section from Loveland southward to the confluence of the East Fork was officially designated on September 19, 1969, and the remaining 12 miles of the river from East Fork to the Ohio River were officially designated on October 27, 1971.

The outgrowth of this high degree of state and local interest was the inclusion of the Little Miami River in Section 5(a) of the federal Wild and Scenic Rivers Act. The reach of the Little Miami designated for study in the Act includes the river from Loveland upstream to its sources, including the North Fork. Because of the interest of the State of Ohio and local citizens in the protection of the entire Little Miami River, the study was extended beyond that segment identified by the Act to include the remaining portions from Loveland south to the Ohio River.

A study team composed of representatives from the Bureau of Outdoor Recreation, the U. S. Fish and Wildlife Service, the U. S. Forest Service, the U. S. Army Corps of Engineers, the National Park Service, and the Ohio Department of Natural Resources was formed to study the Little Miami in January 1969.

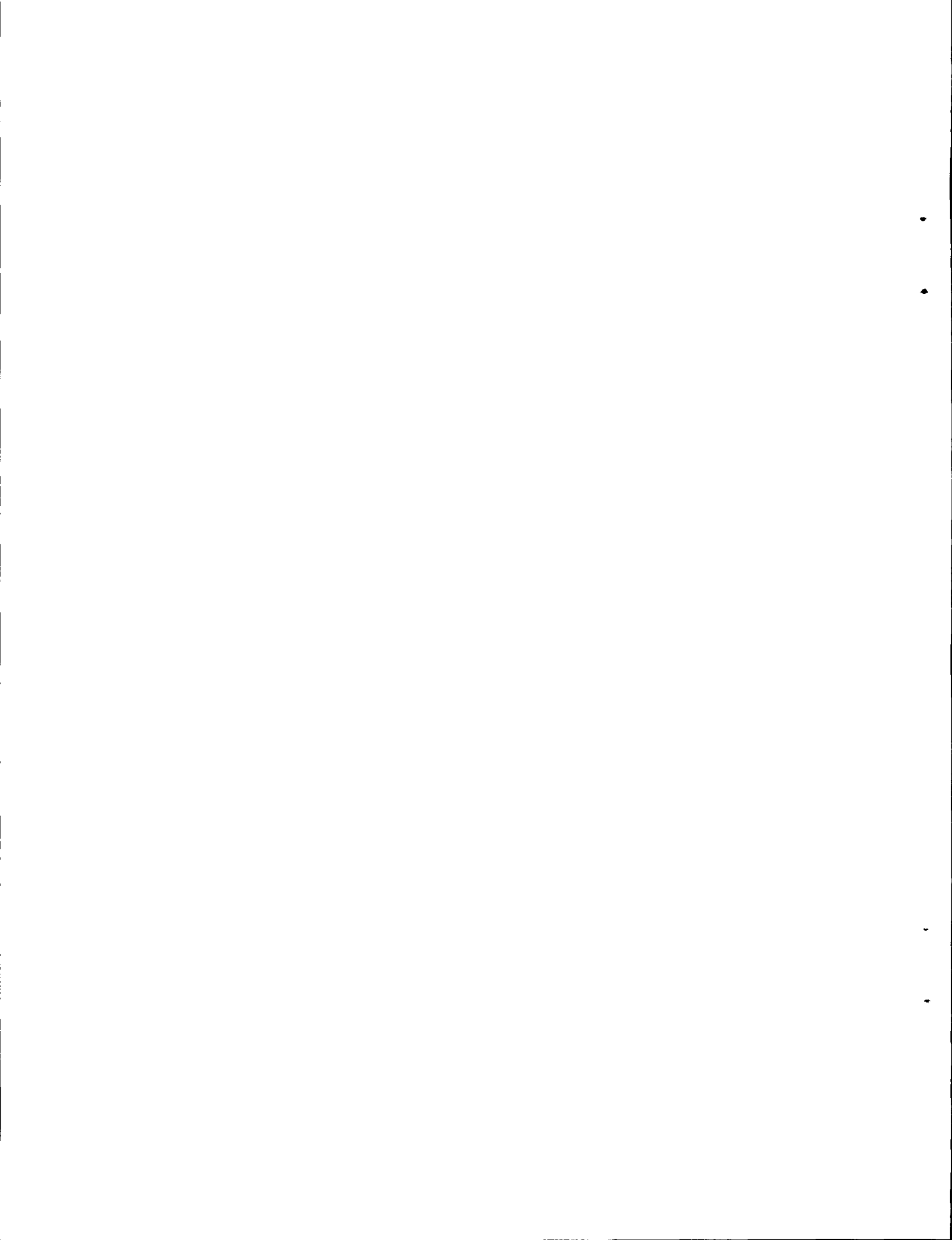
Public information meetings were held by the study team on April 20-21, 1971, in Yellow Springs and Lebanon, Ohio, respectively. Public opinion was very strongly in favor of inclusion of, at a minimum, that portion of the river recommended in this report. Public sentiment was overwhelmingly in favor of immediate additional federal funding and inclusion of the entire river in the national system.

Acknowledgements--During the course of the study, the study team worked closely with many individuals and organizations in the Little Miami area. The compilation of information and statistical data would not have been possible without the full cooperation of government agencies, universities, quasi-public organizations, and private groups and individuals. Appreciation is expressed to all who helped in their efforts with special thanks to the following organizations and individuals:

U. S. Geological Survey
U. S. Soil Conservation Service
Ohio Department of Highways
Federal Highway Administration
Little Miami, Inc.
Hamilton County Regional Planning Commission
Ohio-Kentucky-Indiana Regional Planning Commission
Ohio Historical Society
Dr. Kenneth Hunt, Antioch College
Mr. Bob Morgan, Canoe Livery Owner

ii

SUMMARY OF FINDINGS AND RECOMMENDATIONS



II. SUMMARY OF FINDINGS AND RECOMMENDATIONS

Portions of the Little Miami River and its immediate environment possess significant natural values and public outdoor recreation potential and are worthy of preservation in a free-flowing condition. Scenic, recreational, fish and wildlife, geologic, and historic values associated with the Little Miami River from Glen Island, just below Foster, Ohio, upstream 64 miles to the State Highway 72 crossing at Clifton, Ohio, and the two miles of the Caesars Creek tributary below Caesars Creek Dam, are such that these free-flowing river areas meet the criteria for inclusion in the national wild and scenic rivers system.

The fundamental assets of the Little Miami River are:

Scenic--The Little Miami River corridor contains some of the most scenic, interesting, and diverse natural features in the State of Ohio. For much of its length it is a pleasant stream, flowing alternately through a deep gorge, steep wooded slopes, pleasant farmlands, and occasional small river-side communities. Even though man's activities are evident along many parts of the river's edge, the river is relatively undeveloped when compared to other Ohio streams. The Little Miami and its immediate surroundings are of major importance for open space and natural beauty in southwestern Ohio, where urban growth is rapidly destroying the few remaining natural areas.

Recreation--With appropriate development and management, the Little Miami River could provide substantial recreational opportunities for people living in and near Cincinnati, Dayton, Hamilton, Middletown, Springfield, and Columbus, Ohio, areas where there are few river-oriented recreation developments and only small segments of river areas under protection. These recreation opportunities are distinctive, of relatively high quality, in a natural environment, and not readily available elsewhere.

Flora--Although man's activities have changed the original climax vegetation, there is still relatively good vegetative cover adjacent to a majority of the river. In the Clifton Gorge and Glen Helen areas, both designated as National Natural Landmarks, the vegetation and ecology are particularly noteworthy. Remnants of vegetation usually found in more northerly climates have managed to survive since glacial times and can be found in the cool, moist environs of Clifton Gorge. On the south-facing side of the gorge, there are elements within the plant communities which have counterparts in the Gulf Coast and southwestern states. Unusual microclimates are found in the limestone and dolomite outcroppings. Some 322 different species of wildflowers and 104 species of woody plants have been identified and listed for the Clifton Gorge-Glen Helen areas. This is an exceptionally wide variety of plants to be found within such areas.

Fauna--The river and its immediate environs support a variety of fish and wildlife. A significant sport fishery exists for smallmouth bass, spotted bass, channel catfish, flathead catfish, rock bass, and bluegill. Of the 170 species of finfish and 70 species of shellfish known in Ohio waters, 94 species and 35 species, respectively, are found in the Little Miami River. Several of the species of shellfish present are very rare and considered endangered. Reptiles and amphibians are well represented in the Little Miami Valley as are the mammals, with 44 species present. Perhaps the most outstanding category of fauna of the Little Miami is the bird life. A total of 199 species use the area on an annual basis. Of the 42 primary species of warblers east of the Rockies, 36 are found in the Little Miami Valley.

Geology--The Little Miami Valley is an area of considerable geological interest. The basin is crossed by what was the southern boundary of the Wisconsin Age glacier, and by the boundaries of rock formations from two major geological periods--the Ordovician and the Silurian. The most impressive evidence of the effects of the varied geological history is found at Clifton Gorge. Collecting sites for invertebrate fossils are numerous near the Little Miami River. Layers containing extinct trilobites lure collectors to Xenia, Lebanon, and other localities along the Little Miami River. Many other fossils, not so valuable, but still interesting and worth collecting, can be found in abundance at almost any outcropping of Ordovician strata. Although harder to find, fossils in the Silurian dolomites are also sought as these beds contain rich layers of coral heads as well as occasional trilobites and crinoids.

Historical--There are numerous sites of historical interest, of national as well as local scope. The Little Miami River provided an easy pathway through the thick forest of pioneer times and at least three military expeditions used this pathway. In addition, there are numerous mills that provided service for early settlers and taverns which provided rest for travelers. Perhaps the most important historical features of the Little Miami region lie in the many Indian camps and earthworks. The best known of these is Fort Ancient, the home at different times of two distinct prehistoric Indian tribes. Fort Ancient, a National Historical Landmark, has long been recognized as one of the outstanding prehistoric sites in the United States.

The remaining sections of the Little Miami do not meet the criteria established for inclusion in the national wild and scenic rivers system. The river above Clifton is small, shallow, and lacks significant scenic or recreational attributes. Below Foster, although there are sections still in relatively good condition, extensive man-made impacts on the river and its immediate environment have lowered natural values below the quality required by the Wild and Scenic Rivers Act. The use and abuse of the

lower river in past years have given rise to a number of problems and conflicts which have and will have important repercussions on existing and future uses of the area. Among some of the more serious problems associated with the lower river at the present time are urban blight, incompatibility of land uses, and inaccessibility of much of the river's shoreline for public recreational use. The problem of urban blight is especially acute in the reach from Milford downstream to Shademoore where the riverbanks, in certain sections, are badly covered with litter, bankside dumps, run-down properties, dilapidated cottages, and other such evidences of man's careless use of the water course. The major incompatible uses are the sand and gravel operations, especially those operating in the river channel itself. Rehabilitating the lower river area is a challenge to our urban society. Here the clash between our careless misuse of nature and our need for breathing space and wholesome recreation is clearly perceived. The resource potential of the lower river is such that, with a major rehabilitation effort by local public bodies, the river could eventually be upgraded to meet the minimum criteria for inclusion in the national system.

Recommendations

To Preserve the Little Miami River in its free-flowing state and to protect and enhance its natural values, it is recommended:

1. That the Little Miami River, from Glen Island just below Foster, Ohio, upstream 64 miles to the State Highway 72 crossing at Clifton, Ohio, and the two miles of the Caesars Creek tributary below the proposed Caesars Creek dam, be included in the national wild and scenic rivers system as a state designated and administered area as defined under Section 2(a)(ii) of Public Law 90-542, the Wild and Scenic Rivers Act.
2. That the proposed river section be divided into four segments, two classified as "scenic" and two as "recreational" under the criteria described in the Wild and Scenic Rivers Act. The recommended divisions are: eight miles of scenic river from the State Highway 72 crossing at Clifton to Conner Branch tributary, 32 miles of recreational river from Conner Branch to Caesars Creek, 10 miles of scenic river from Caesars Creek to the Cowen Run tributary (including the lower two miles of Caesars Creek), and 16 miles of recreational river from Cowen Run to Foster.
3. That the Little Miami riverway boundary contain approximately 9,900 acres of adjacent land for the protection of the river environment and the provision of recreation-use areas. Of the 9,900 acres included within the proposed boundary, 2,250 acres are presently in public ownership, 920 owned and managed by Antioch College as part of the Glen Helen Nature Preserve, and 6,460 acres in private ownership. Approximately 2,000 of the 6,460 acres of privately owned land are recommended for purchase in full fee title. Easements are recommended for the remaining 4,460 acres. In lieu of acquiring easements, good zoning ordinances could be an effective

means of protecting the river. Floodplain and other protective zoning by local entities and the state should be encouraged to provide additional control and protection throughout the river area and to extend the buffer zone beyond the official river boundaries. Although state zoning actions are not common, where a resource such as a river extends through a number of local jurisdictions, such action may be appropriate. This may be possible by amending the Ohio Scenic Rivers Act to give the Director of Natural Resources the authority to enact and enforce adequate zoning regulations within a state scenic river area if local units fail to do so.

4. That the development and management of the Little Miami riverway give primary emphasis to maintaining and enhancing its aesthetic, scenic, historic, archaeological, and scientific features. All recreation facility development should be consistent with protection and enhancement of the river environment.

5. That a Little Miami Advisory Board be established to advise and assist the state and local governmental units on the planning, development, management, and administration of the river as a component of the national system. It would serve as the primary means of coordinating state, local government, and citizen effort in achieving a unified, comprehensive program to protect and make available the special values of the river.

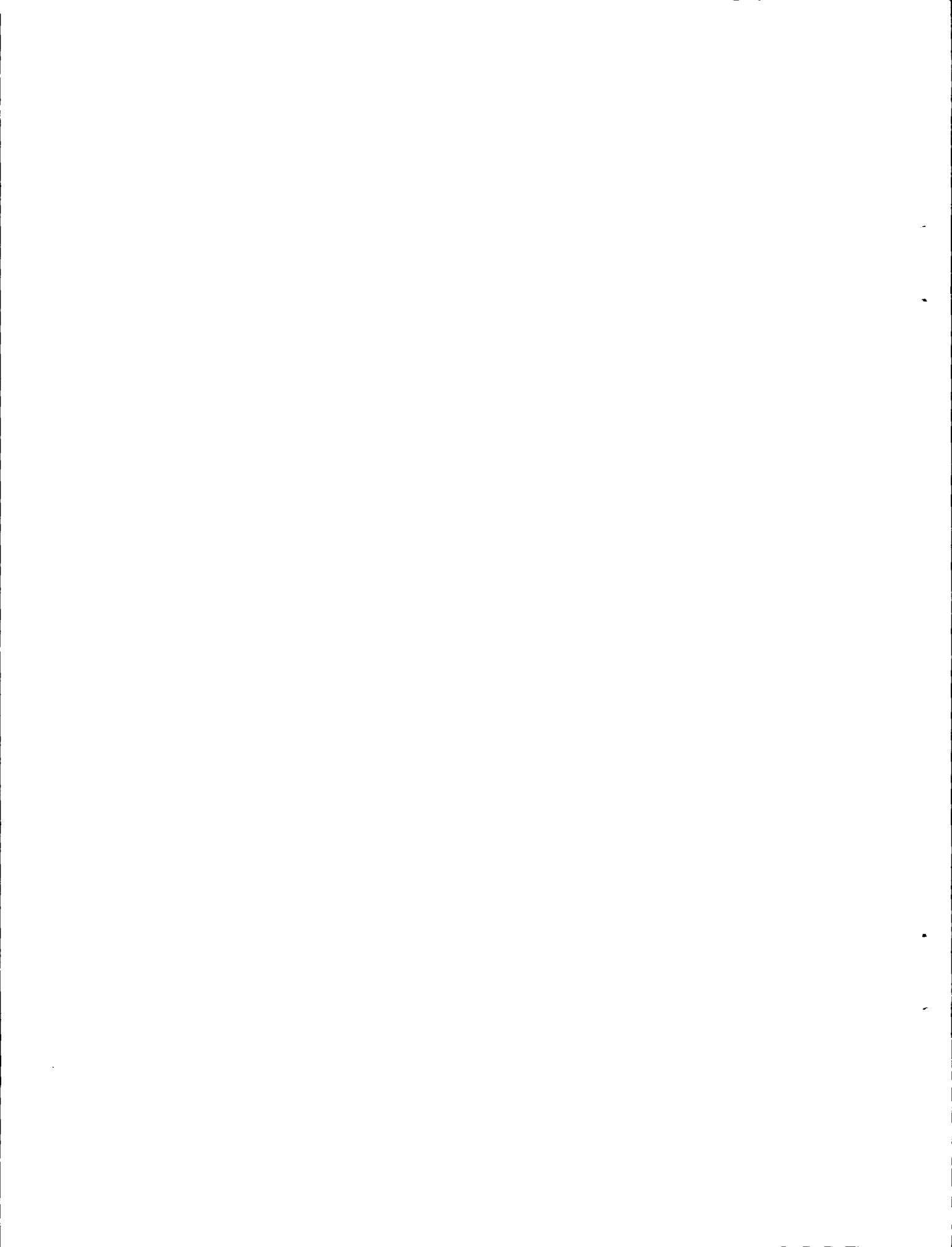
6. That Section 1501.17 of the State Scenic Rivers Act be amended to require any state department, agency, or political subdivision to submit plans to the Director of Natural Resources for approval prior to building or enlarging any highway, road, or structure and prior to dredging or gravel operations within a scenic river area. This would give the Director the authority to deny permission for construction, if he felt the construction would have an adverse effect on the river.

7. That state and local units of government take appropriate actions to protect and enhance the natural attributes presently existing in the portions of the Little Miami River not recommended for inclusion in the national system. County, township, and municipal governments should continue to back state actions along the river by supplementing state acquisition with complementary zoning and land use controls.

8. That the state and appropriate federal agencies take steps to insure high water quality on the Little Miami watershed through enforcement of water quality standards and the encouragement of compatible soil and water conservation practices.

III

REGIONAL SETTING



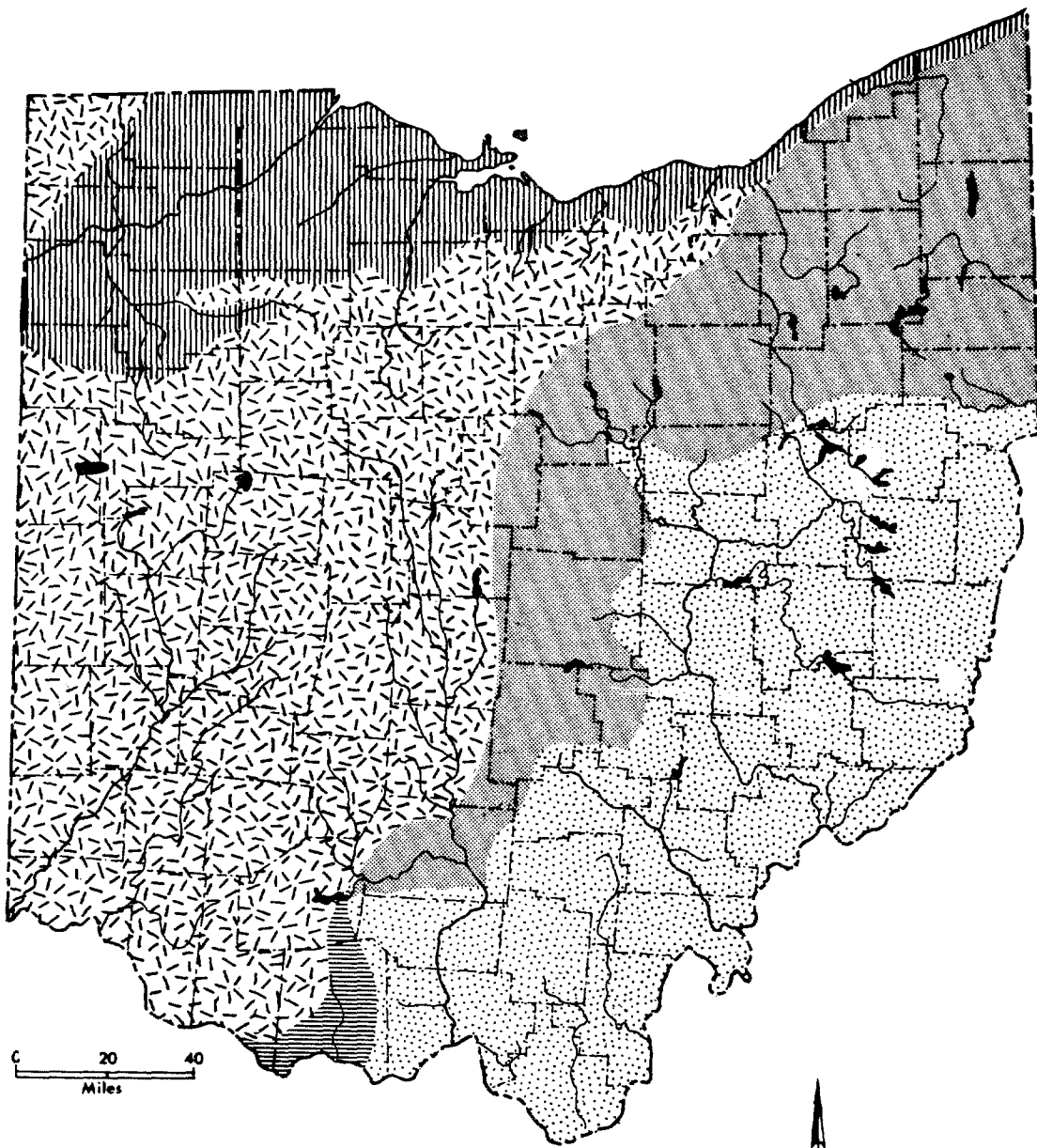
III. REGIONAL SETTING

Landscape

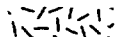




The Little Miami drainage area is located entirely in the southwest portion of the State of Ohio. Rising in the flat farmlands of Clark County near South Charleston, the Little Miami winds in a general southwesterly direction for approximately 105 river miles to its confluence with the Ohio River in the eastern suburbs of the City of Cincinnati. The river gradually descends 689 feet from its source elevation of 1,137 feet to the 448-foot level of the Ohio River. The Little Miami and its three primary tributaries--East Fork, Todds Fork, and Caesars Creek--drain an area of 1,755 square miles on the eastern boundary of one of the nation's most intensely industrialized and urbanized areas. East Fork, its principal tributary, originates near Hillsboro and joins the main stem about 11.5 miles above the mouth. East Fork drains 501 square miles or approximately one-third of the total area comprising the Little Miami basin. Todds Fork, with a watershed area of 261 square miles, drains portions of Clinton, Warren, and Clermont Counties, joining the main stem about 40 miles above the mouth. Caesars Creek, the smallest of the three watersheds, drains an area of 239 square miles in portions of Greene, Clinton, and Warren Counties. Caesars Creek joins the Little Miami main stem approximately 52 miles above the mouth.

There are in reality two Miami Valleys in southwestern Ohio--the Great Miami and the Little Miami Rivers. They follow roughly parallel courses southwestward to the Ohio, lying west and east, respectively, of Cincinnati. Although the Great Miami Valley is the dominant feature of southwestern Ohio, the pioneer term "Miami Country" embraced both valleys. Physiographically, southwestern Ohio lies in the Glaciated Till Plain division of the Central Lowlands physiographic province, known for its glacial till deposits resulting from the penetration of the region by continental ice sheets. This area represents the only place where the undulating plains of the Central Lowlands province reach the Ohio River. This drift plain corridor lies between the hill country of the Appalachian Plateau on the east and the hills of southern Indiana on the west. In the southern portion where only the earlier ice advance masked the terrain, subsequent erosion has carried away most of the deposited materials, and the present landscape is hilly, in some places resembling parts of the plateau country farther east.

In general, one of the most significant factors in the physical geography of the area has been the effects of glaciation. Glaciation by at least two major ice sheets has affected the watershed--the Wisconsin sheet going down to about the northern boundary of Hamilton County and the Illinois sheet covering the entire area. Upon receding, the outwash carried by



LEGEND

-  Till Plains
-  Lake Plains
-  Lexington Plains
-  Glaciated Plateau
-  Unglaciaded Plateau

Source: State of Ohio

PHYSIOGRAPHIC SECTIONS OF OHIO

meltwaters filled the major drainageways. The glacial outwash material consisted primarily of coarse sand and gravel. Most of the upland areas were covered with till composed of clay, sand, and stones. The entire area is underlain by consolidated rocks of sedimentary origin, including shale, limestone, and dolomite, ranging in age from late Ordovician to Silurian.

There are no large natural lakes in the area. Principal man-made bodies of water are Cowen Lake on Cowen Creek south of Wilmington, Ohio; Stonelick Lake on Stonelick Creek near Edenton, Ohio; Spring Valley Lake near Spring Valley, Ohio; Acton Lake at Hueston Woods State Park; West Fork Reservoir in Hamilton County, and Lake Loramie on Loramie Creek in Shelby County.

Economy and Population

From its earliest settlement, agriculture has been the dominant feature of the economy of the

Little Miami drainage basin. Land

use patterns, however, are rapidly changing. Although farming still provides an important part of the income of the region, its importance is decreasing each year. Land is being converted to urban uses at an ever increasing rate. This is due to the overflow of urban development from the Cincinnati-Dayton metropolitan areas. By 1970 the overflow of urban development around Cincinnati and Dayton had pushed into Clermont, Warren, and Greene Counties. Continued urban growth in these counties and around Xenia, Centerville, Lebanon, Mason, Loveland, and others is being greatly intensified by the nearly completed freeway system in the region. Interstates 75, 275, 71, U. S. 35, and U. S. 50 are having a major impact on these areas, even though several sections of these highways are not yet completed. Greene County's population expanded from 59,000 in 1950 to 124,000 in 1970 and Warren County's from 38,000 to 85,000 during the same period. There are presently more than 160 subdivisions in Warren County. The population expansion for the same period in Clermont and Hamilton Counties has also been very high. For the period from 1950 to 1970, Clermont County jumped from 42,000 to 95,000. The Hamilton County increase was from 724,000 to 915,000. Between 1950 and 1960, Clermont, Warren, and Greene Counties ranked second, fourth, and sixth in the state for net percentage population increase due to migration.

Table 1
Population Projections by County for Selected Years
in Thousands

	1970	1980	1990	2000	2020
Butler	205	235	267	294	373
Clark	150	222	279	336	494
Clermont	87	111	133	150	202
Clinton	32	51	65	78	116
Greene	110	165	215	261	382
Hamilton	887	982	1,124	1,262	1,703
Montgomery	554	654	747	818	1,021
Warren	81	138	188	235	357

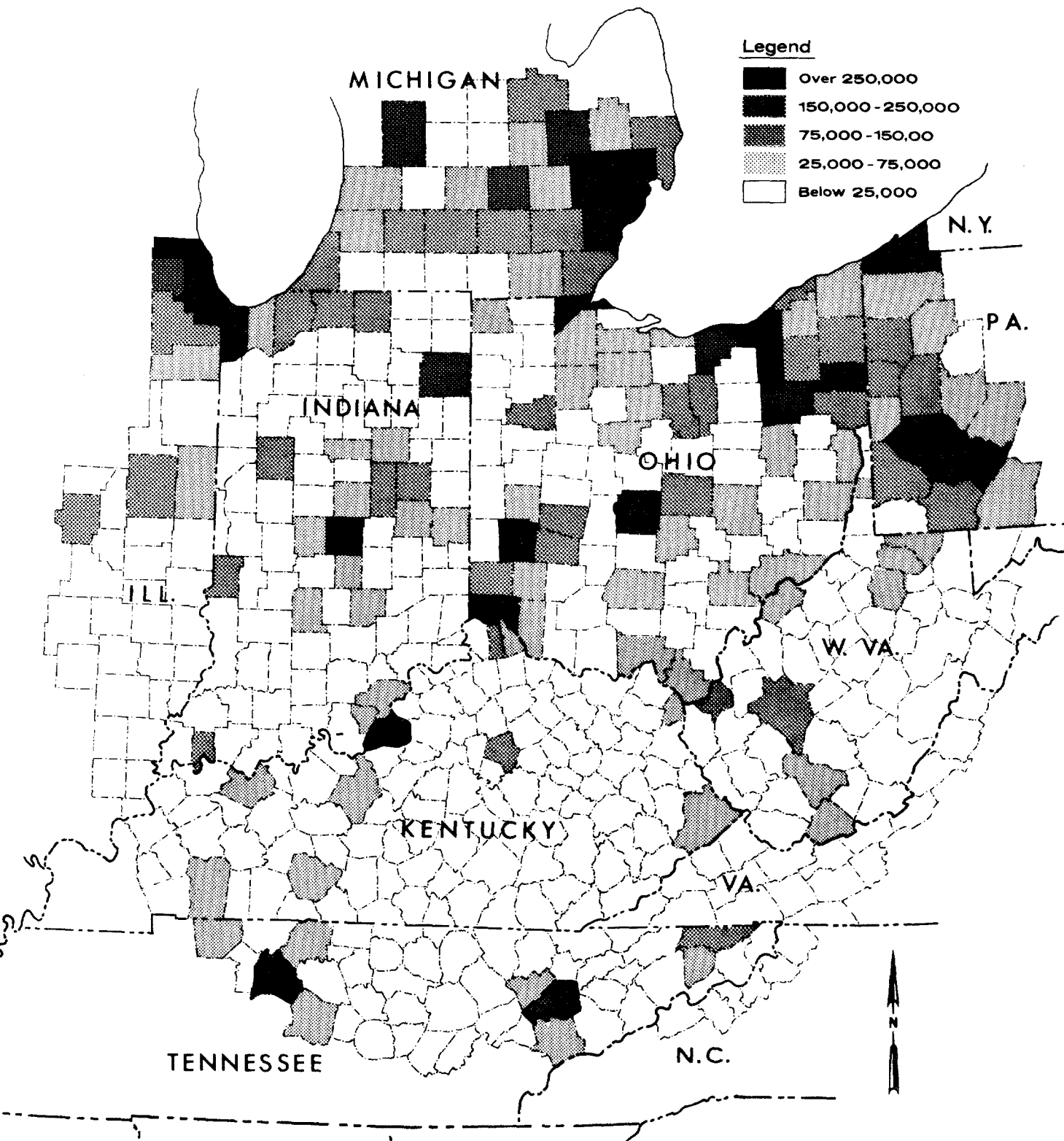
Table 2
Population Projections by Standard Metropolitan
Statistical Areas (SMSA) for Selected Years
in Thousands

	1965	1980	1990	2000	2020
Cincinnati	1,319	1,530	1,793	2,046	2,836
Dayton	781	973	1,150	1,297	1,706
Hamilton-Middle- town	205	235	267	294	373
Springfield	150	222	279	336	494

Source: Battelle Memorial Institute, Preliminary Population Projections for Socio-Economic Study of Southwestern Ohio, Appendix B

The area between Dayton and Xenia is building up rapidly, and within a few years there will be little, if any, open space between the two cities. In fact, by 2020 the entire area from Cincinnati to Dayton may be one urban area, as indicated in the urban development map.

The area has a considerable variation in density of development. The estimate for the number of persons per square mile for 1970 in Hamilton and Montgomery Counties was 2,257 and 1,258, respectively. Greene, Warren, and Clermont Counties were estimated at 297, 221, and 216 persons per square mile.



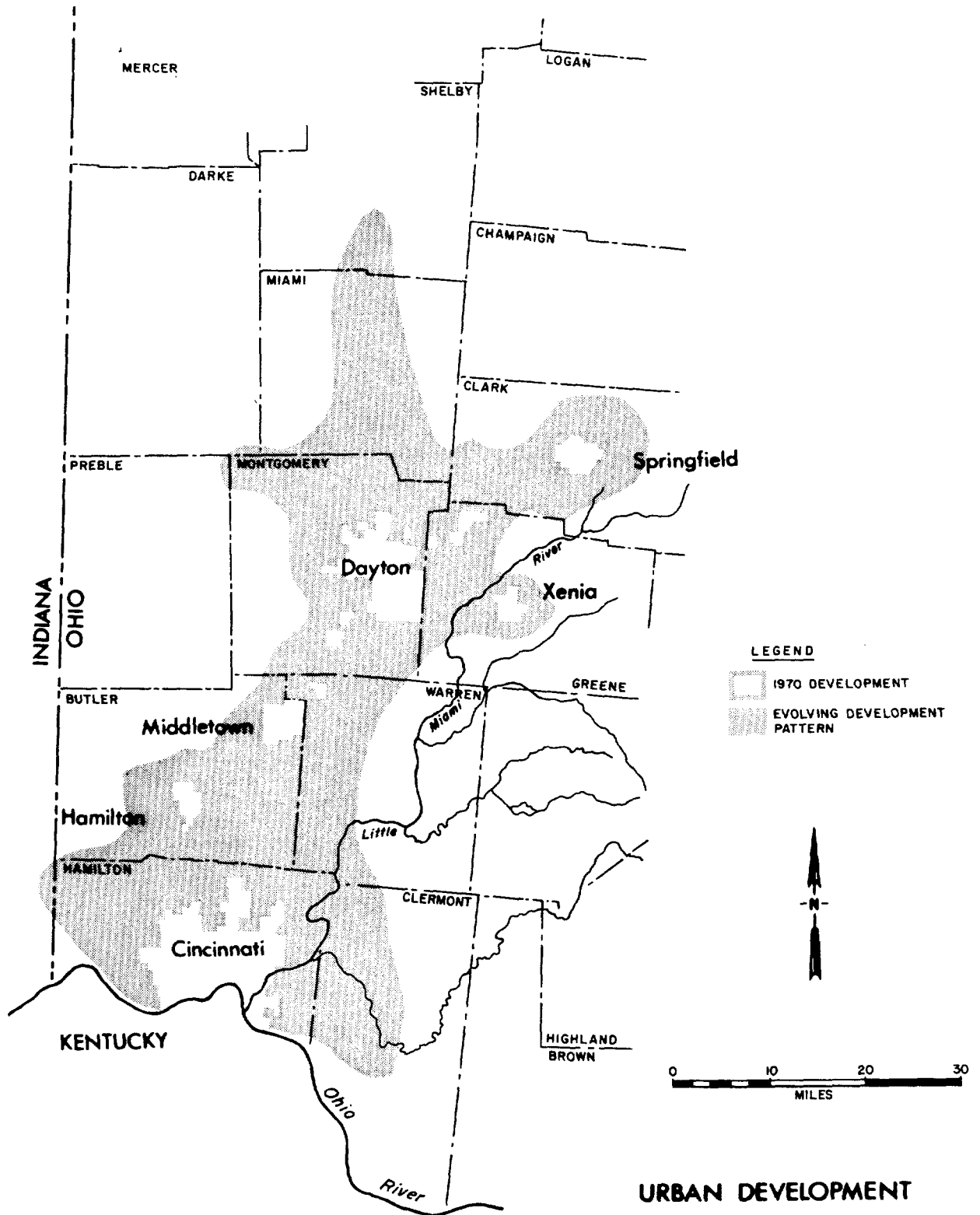
Legend

- Over 250,000
- 150,000 - 250,000
- 75,000 - 150,000
- 25,000 - 75,000
- Below 25,000

Source: Bureau of Census, 1970

0 50 100
MILES

LITTLE MIAMI RIVER, OHIO
REGIONAL POPULATION DISTRIBUTION
BY COUNTY



SOURCE:
SOUTHWEST OHIO WATER DEVELOPMENT PLAN

URBAN DEVELOPMENT
Cincinnati to Springfield, Ohio

Manufacturing, especially the machine tool and electrical equipment industries, is important to the region. However, service industries, led by wholesale and retail trade and government administration, account for the major share of employment in the Cincinnati-Dayton metropolitan areas. Generally, the rural Little Miami basin is characterized by general grain and livestock farming. Cash grains are the principal crops on the fertile southwestern Ohio soils, although hogs and cattle are the highest ranking source of farm income.

Transportation Network

Because of its proximity to Cincinnati and Dayton, regional access to the Little Miami basin is excellent. Interstate High-

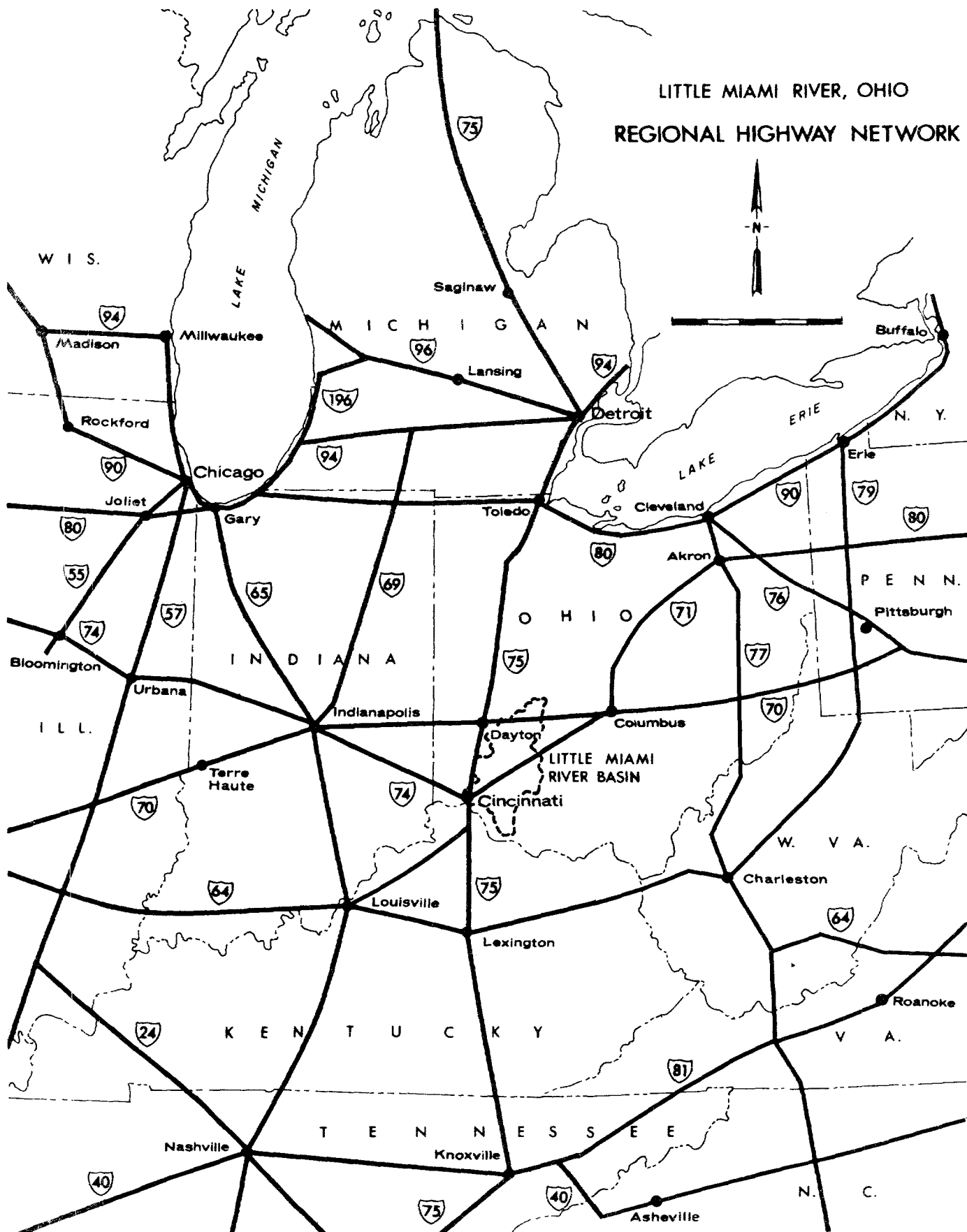
ways 75, 70, 71, 74, and 275 provide routes from major urban centers in all directions from the basin. Interstate 75 connects the area with Dayton, Toledo, and Detroit to the north; with Lexington, Knoxville, Atlanta, and Tampa to the south. Interstate 71 crosses the middle section of the Little Miami River, connecting the area with Cleveland and Columbus to the north with Louisville to the south. Interstate 70, the major east-west route linking Indianapolis and Columbus, passes through the headwaters of the Little Miami. Interstate Route 74 connects Cincinnati with Peoria and Indianapolis to the west. Interstate Route 275, now partially completed, will encircle the more densely developed areas of Cincinnati and connect with Interstate Routes 74, 75, and 71.

Nine U. S. highways extend into the area and include U. S. Routes 22, 25, 27, 35, 50, 52, 68, and 127. These facilities connect the area with other cities in the region, and provide major internal thoroughfares. In addition to the Interstate and U. S. highways, a well-developed system of secondary roads provide access between the river area and the nearby urban centers.

Railway passenger service is provided by Amtrak to Cincinnati and Dayton. This passenger service is provided in all directions at frequent intervals. Both Dayton and Cincinnati are served by numerous railroad lines. Railroads cross the Little Miami in several places and occasionally run parallel to the Little Miami for short distances.

Two major airports in the area provide regularly scheduled passenger service: the Greater Cincinnati Airport in Covington, Kentucky, and the Dayton Municipal Airport at Vandalia, Ohio. The Cincinnati Municipal Airport (Lunken Field), situated in the eastern portion of the city limits adjacent to the Little Miami River, rates as a major airport for private and corporate aircraft. General aviation facilities are available at Lebanon, Oxford, Springfield, and Xenia.

LITTLE MIAMI RIVER, OHIO REGIONAL HIGHWAY NETWORK



Source: U. S. Department of Transportation.

As shown in the following table, numerous large urban areas lie within easy driving distance of the Little Miami River.

Table 3
Distance and Driving Time
from Selected Urban Centers to Xenia, Ohio

Urbanized Area Population 1970 (M)		Distance Miles	Approximate Driving Time
<u>Day Use Zone</u>			
850	Dayton	16	1/4 hour
157	Springfield	20	1/2 hour
226	Hamilton-Middletown	45	3/4 hour
1,385	Cincinnati	53	1 hour
916	Columbus	54	1 hour
<u>Weekend Use Zone</u>			
171	Lima	89	1-1/2 hours
174	Lexington, Kentucky	100	2 hours
1,109	Indianapolis, Indiana	120	2-1/2 hours
827	Louisville, Kentucky	120	2-1/2 hours
692	Toledo	145	3 hours
372	Canton	172	3 hours
679	Akron	175	3 hours
2,064	Cleveland	191	3-1/2 hours
280	Ft. Wayne, Indiana	145	4 hours
3,289	Detroit, Michigan	215	4 hours
6,980	Chicago, Illinois	290	7 hours

Recreation Resources

Rivers--The nearest existing components of the national wild and scenic rivers system are the Wolf River in Wisconsin, the St. Croix

on the boundary between Minnesota and Wisconsin, and the Eleven Point in Missouri which are all located over 400 miles from the Little Miami River.

In addition to the Little Miami River, two other rivers in Ohio were designated in Section 5(a) of the Wild and Scenic Rivers Act for study as potential additions to the national wild and scenic rivers system. They are Little Beaver Creek and the Maumee River. The study of the Little Beaver was initiated in the fall of 1971. The study of the Maumee River began in September of 1972.

The Little Miami and Sandusky Rivers have been dedicated as components of the Ohio Scenic Rivers System, authorized by the 107th Ohio General Assembly in amended Substitute Scenic Bill No. 345. The sections given formal designation include: (1) The entire 105 miles of the Little Miami River from its confluence with the Ohio River upstream to its sources, including the North Fork and (2) the 70-mile stretch of the Sandusky River main stem from U.S. Highway 30 in Wyandot County downstream to the northernmost edge of Roger Young Memorial Park. The Ohio Department of Natural Resources is presently studying other rivers in the state for possible inclusion in the state system.

Other rivers or portions of rivers which have recreation potential and are somewhat comparable to the Little Miami River include the Chagrin, Kokosing, Stillwater, Mohican-Walhonding, Grand, and upper Cuyahoga Rivers. Mention should be made to the stream preservation programs in Kentucky and Indiana, the two states adjoining the southwestern part of Ohio and the area to which many people of this area travel to recreate. In 1967, Indiana established a Natural Streams Preservation Program to preserve, in their natural state, those streams which still retain a large portion of their natural scenic beauty. This program was reinforced in April 1973 with the passage of Senate Enrolled Act #134 creating the Indiana system of natural, scenic, and recreational rivers. To date, no rivers have been set aside. There are sections of four rivers, however, which have been given priority for preservation: (1) Big Blue River from Fredericksburg to Rathrock Dam; (2) Sugar Creek from Crawfordsville to Shades State Park; (3) Elkhart from Albion to Highway 6; and (4) Tippecanoe River in Pulaski County. The Big Blue and Sugar Creek, both somewhat comparable to the Little Miami River, are located approximately 150 road miles from the Cincinnati-Dayton urban complex.

In October 1968, the Governor of Kentucky established a Wild Rivers Advisory Commission and empowered it to conduct studies, investigations, and research concerning the designation of wild rivers and to develop a wild rivers program. The Advisory Commission, on January 19, 1970, presented an interim report to the Governor outlining those streams it felt were deserving of the highest priority, those which would qualify as wild streams in a Natural Streams System. The report also presented proposed legislation for the establishment of a Natural Streams System. Those rivers recommended for wild river status included: (1) the Cumberland River from the Kentucky 204 bridge to the backwater of Lake Cumberland; (2) the Green River from the eastern boundary of Mammoth Cave National Park to Lock and Dam No. 6 and that portion impounded by the lock and dam within the park; (3) Red River from the Kentucky 746 bridge to the mouth of Swift Camp Creek; and (4) the Rockcastle River from the Kentucky 80 bridge to the backwater of Lake Cumberland. Legislation patterned after that recommended by the Commission has been introduced in the state legislature but as yet has not been passed into law. The Red River is approximately 150 miles from the Cincinnati-Dayton urban complex and the Rockcastle, Green, Cumberland, 180, 200, 210 miles respectively.

Other rivers in Kentucky with particularly high potential include the Big South Fork of the Cumberland River in McCreary County, Big Clifty Creek in Pulaski County, Martins Fork in Harland and Bell Counties, the Little South Fork of the Cumberland River in Wayne and McCreary Counties, and Big Caney Fork in Todd and Logan Counties. Of these streams, Big Clifty Creek is the closest area to the people of southwestern Ohio, being approximately 175 miles by road.

The water body in the area with the greatest overall recreation potential is the Ohio River. Many boaters, particularly owners of larger craft, are users of the entire Ohio-Mississippi system. The Ohio River was developed long ago into small navigation pools by a series of small locks and dams. These small dams are now being replaced by 19 new high level lock and dam complexes that will make this old meandering group of shallow pools a system of 19 deep lakes and, therefore, vastly increase the river's recreational opportunities.

Other Resources--In order to determine the number, acreage, and make-up of recreation areas, the State of Ohio has conducted a detailed survey as part of their new Statewide Plan for Outdoor Recreation (1971-1977). Southwest Ohio was used as the regional setting for presenting a picture of the recreational facilities and needs in the Little Miami River area. Recreation in southwest Ohio is provided by a multitude of organizations and jurisdictions.

Overall, the region has 123,381 acres of recreational open space, accounting for approximately 3.6 percent of its total land and water area. However, about 37 percent of these recreational lands are provided by private and institutional organizations. Of the 39,206 acres of private and institutional recreation lands available, private golf courses constitute 8,739 acres; group camps 7,519 acres; private hunting and shooting areas 5,088 acres; and commercial fishing, picnicking, and camping areas and recreation clubs the remaining 17,860 acres.

About 25 percent (30,533 acres) of the total recreation acreage within the region is being managed by the federal government at 22 areas. At Meldahl Locks and Dam on the Ohio River, there are 150 acres of recreation lands on the Ohio side, including launching ramps, parking, and picnicking facilities. At the West Fork project, there are 545 acres leased to Hamilton County Park District by the Corps of Engineers for recreation purposes. Wright Patterson Air Force Base holds 3,287 acres of recreation land at 14 areas which are not open to the general public. The remaining federal acreage, totaling 27,203 acres is associated with Clarence J. Brown Reservoir, Caesars Creek Reservoir, and East Fork Reservoir.

Clarence J. Brown Reservoir is not presently open to the public due to lack of facilities. The projected date for opening is spring of 1974. The East Fork and Caesars Creek Reservoirs are now open to the public for hunting and a limited amount of passive recreation; however, there are very few

facilities at the present time. Construction is presently under way at these sites so they will not be operating at optimum levels until 1976.

A substantial role is played by state-owned lands which constitute approximately 20 percent of the total recreation lands. The Ohio Division of Parks and Recreation presently manages 9,544 acres at five areas: Stonelick Lake State Park; Lake Loramie State Park; Hueston Woods State Park, listed in the National Registry of Natural Landmarks; John Bryan State Park; and Caesars Creek State Park. The acreage at Caesars Creek State Park is undeveloped at the present time but will be operational upon completion of the Caesars Creek Reservoir. The Ohio Division of Wildlife manages a total of 5,247 acres at 51 areas, including the 842-acre Spring Valley Wildlife area; 1,755-acre Cowen State Park; 1,174-acre Clark Lake Wildlife Area; and the 316-acre Darke County Lake Wildlife Area. County and city recreation acreage account for 20 percent of the total acreage.

Designated water (lakes and ponds) in southwest Ohio available for recreational use totaling 12,670 acres constitutes only 10 percent of the total available recreation space. This figure includes the 7,000 acres of water to be impounded by Clarence J. Brown, Caesars Creek, and East Fork Reservoirs located on tributaries outside the proposed area. An additional 20,758 acres of undesignated water (streams and rivers which are not maintained or administered as specific recreation areas but are still available and provide boating and fishing opportunities) are available for recreation in the major water courses in the southwest Ohio region. The Ohio River accounts for 6,180 acres of this additional undesignated water.

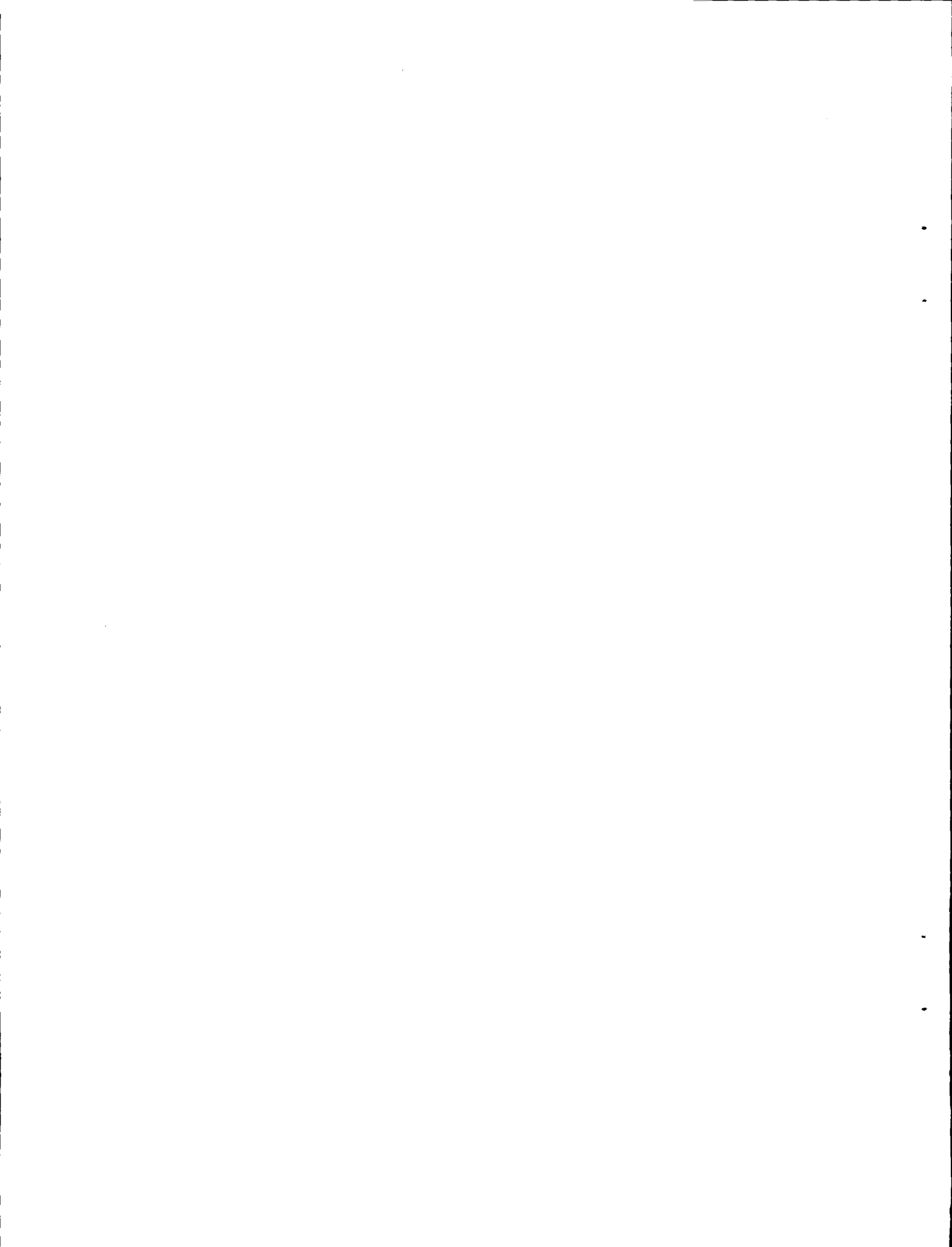
In terms of acres of recreation land for each 1,000 people, southwest Ohio (Miami Valley Region) ranks lowest among the eight planning regions of the state. There is presently a significant shortage of boating water and facilities for camping, picnicking, hiking, and swimming. Present available supply of public recreation acreage is sufficient to satisfy only 37 percent of the total boating demand; 42 percent of the camping, picnicking, and hiking demand; and 60 percent of the swimming demand.

Table 4
Supply of Public and Private Recreation Areas
for Eight Regions of Ohio: 1970

Region	Population	Recreational Land Acreage	Number of Acres Per 1,000 Population
Miami Valley Region	2,449,800	123,381	50
Lake Plains Region	859,700	53,648	62
Lakeshore Uplands	4,505,300	290,216	64
Sandusky Valley	267,400	32,408	122
Tuscarawas Valley	402,700	145,738	361
Ohio Valley	615,000	536,682	872
Scioto Valley	1,281,300	104,337	81
Maumee Valley	400,600	45,178	113

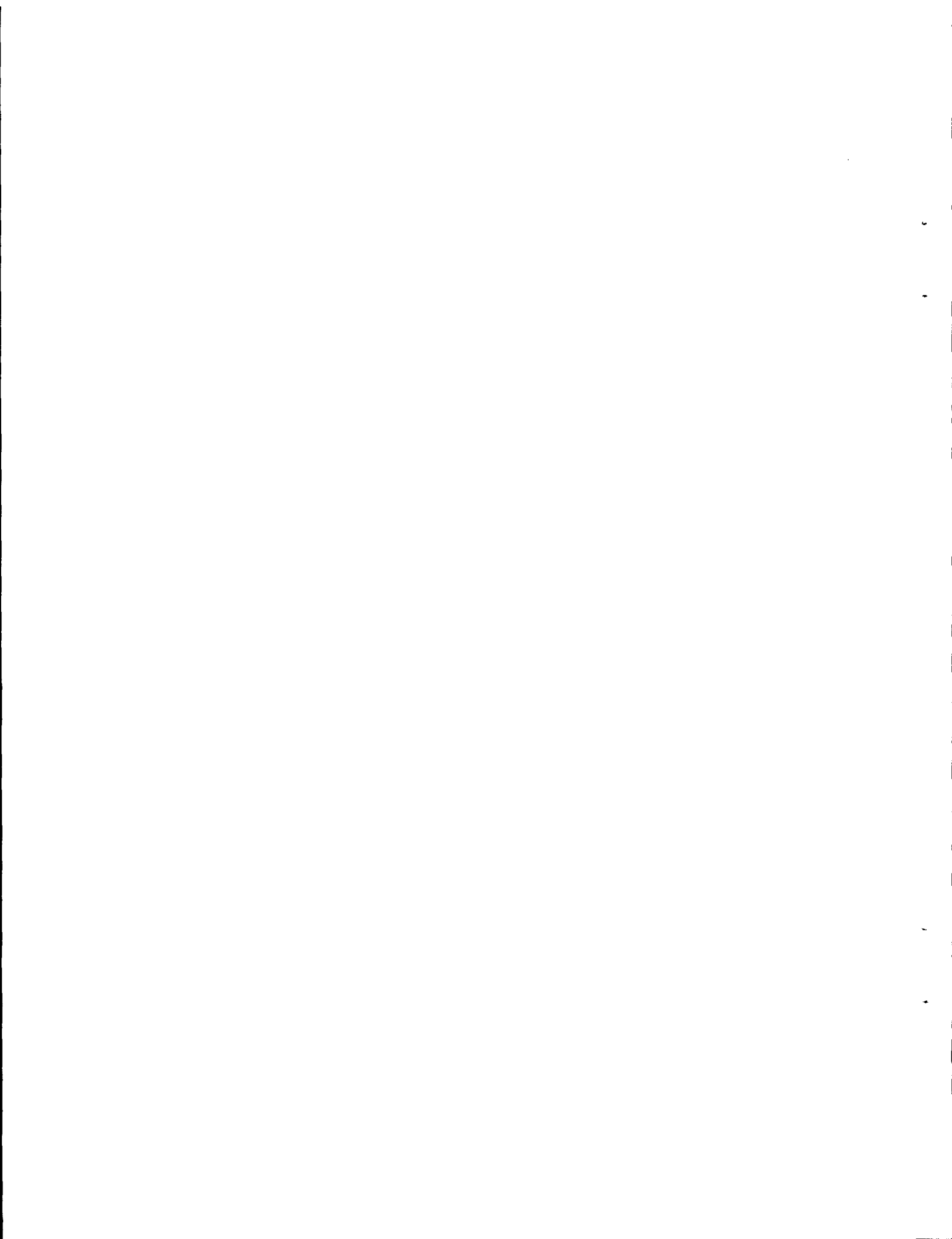
The demand for outdoor recreation and open space in the southwestern region can be further illustrated by looking at the increase in annual visitation at the five state park areas. Over the past 10 years there has been an increase of over 150 percent and the past three years an increase of over 33 percent.

One of the best available quantitative estimates of overall recreation needs in southwest Ohio is contained in the Ohio River Comprehensive Basin Study, Appendix H. In the Ohio-Cincinnati and the Little Miami-Miami subareas (southwest Ohio), the estimated demand for water-oriented outdoor recreation opportunities totaled 17.8 million recreation days in 1960. The comparison of estimated recreation demand with existing use at inventoried facilities in 1960 indicated that only about 48 percent of the total estimated demand was being met. The resulting needs (9.3 million recreation days) for year 1960 can be, in part, attributed to the relative scarcity of both land and water areas within the region for recreation pursuits. In addition, developments presently programmed will be inadequate to meet projected future needs. The need for outdoor recreation water-oriented opportunities is expected to increase more than three times by 1980 and seven times by 2000. In addition, the region will be unable, to any great extent, to look to adjoining subareas to meet projected needs, for these areas will also experience high recreational needs. The total unmet needs at the present time for the four subareas surrounding southwest Ohio, for example, is nearly 30 million recreation days. This need is expected to nearly double by the year 1980 and increase four times by 2000.



IV

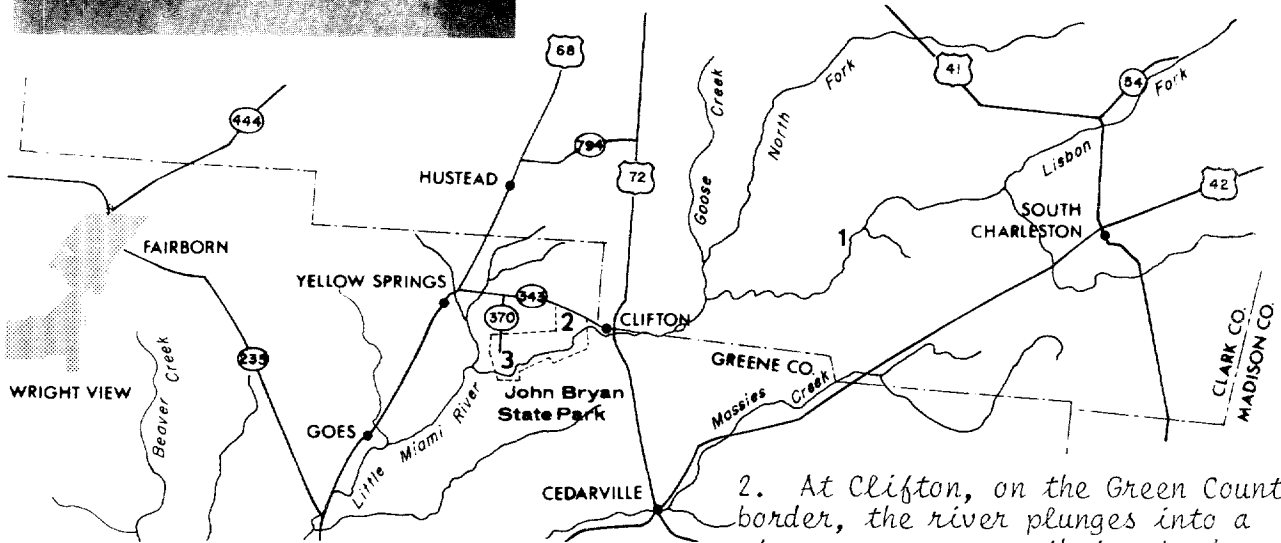
DESCRIPTION AND ANALYSIS



A PHOTO TRIP DOWN THE LITTLE MIAMI RIVER



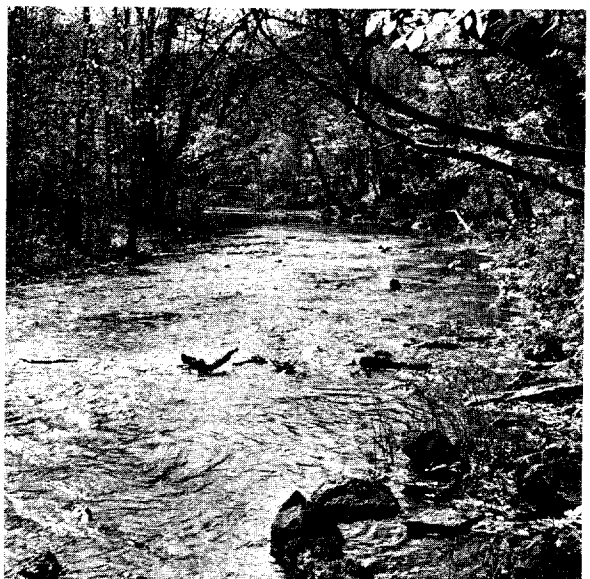
1. Above Clifton, in the headwater area, the Little Miami is a small meandering stream, crossing the flat farmlands of Clark County.



2. At Clifton, on the Green County border, the river plunges into a steep narrow gorge that extends for four miles.

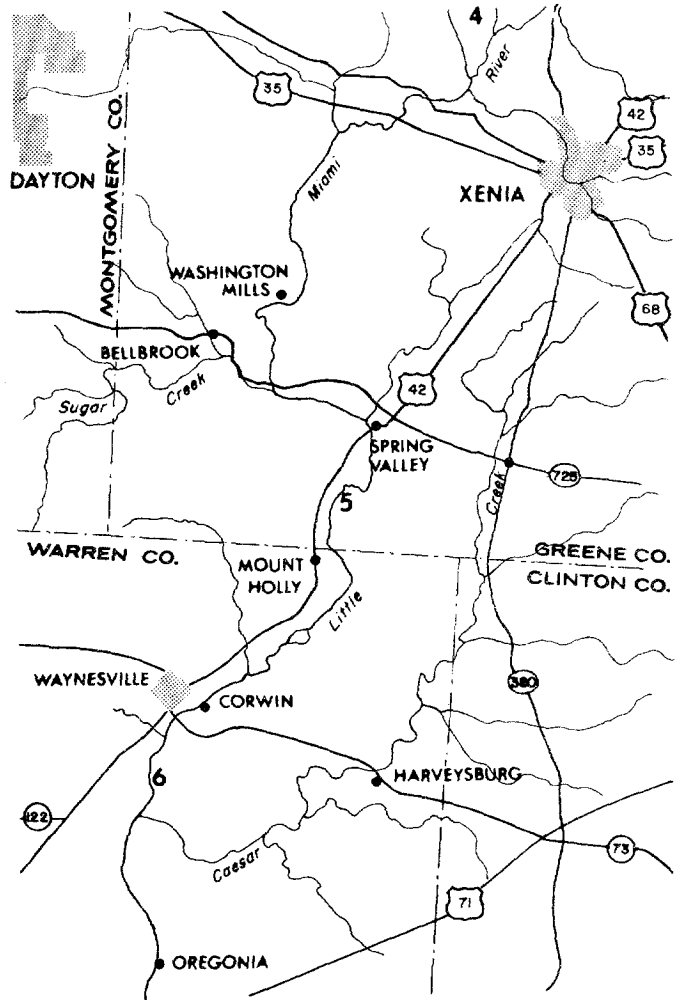


3. The river resembles a small mountain stream in the southern reaches of John Bryan State Park.





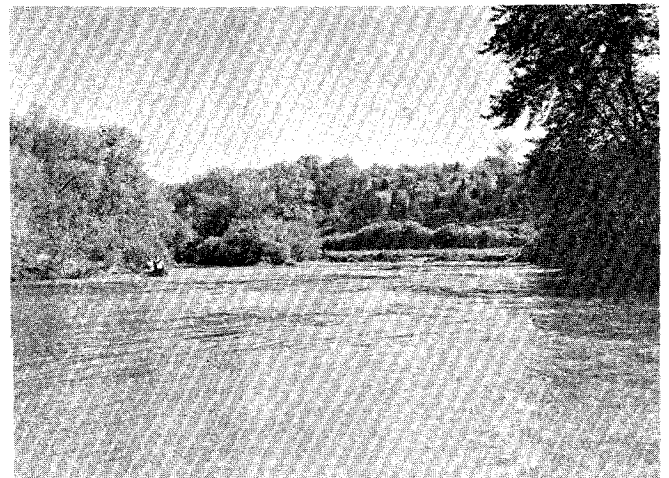
4. In most sections, a barrier of trees dominates the immediate visual corridor.

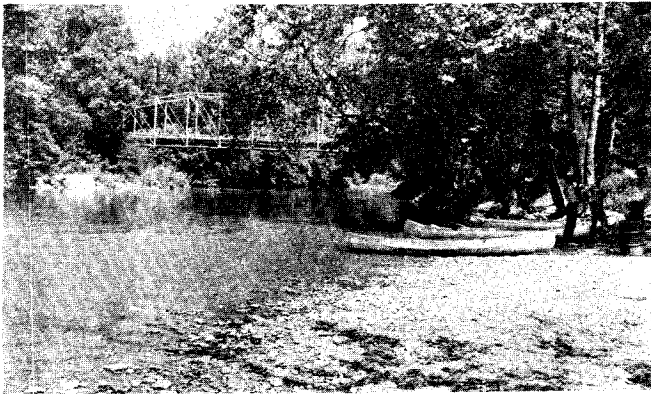


5. The river valley is almost a mile wide from Spring Valley to Waynesville.



6. The valley begins to constrict once again near the mouth of Caesar Creek.

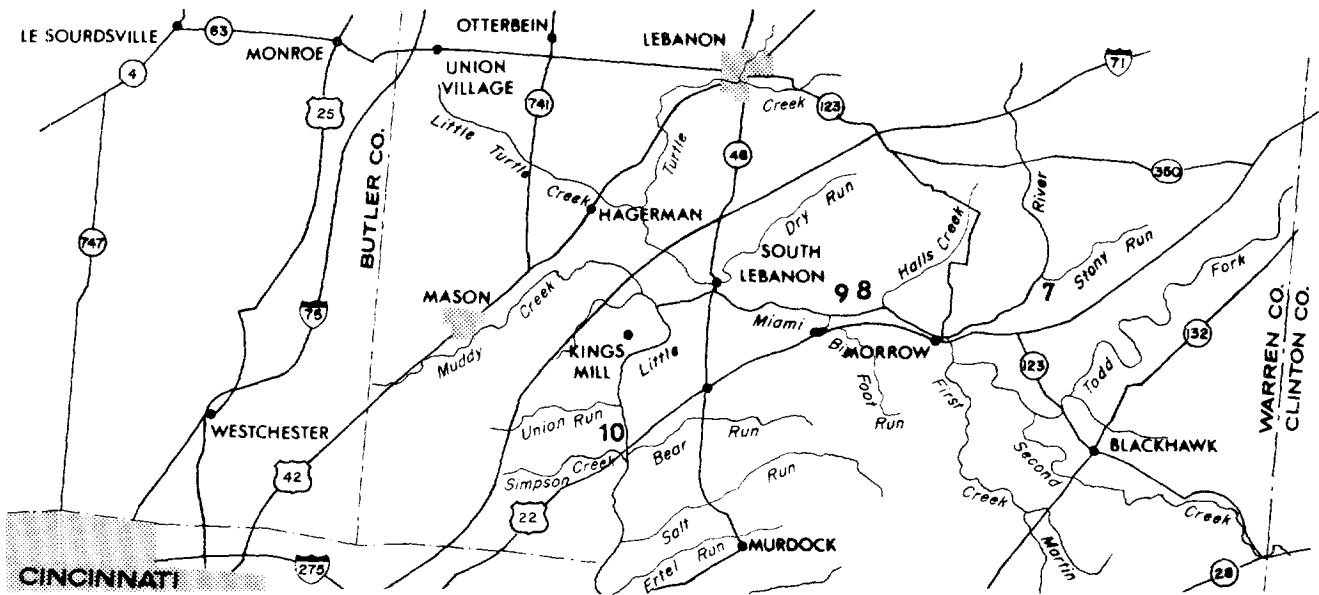




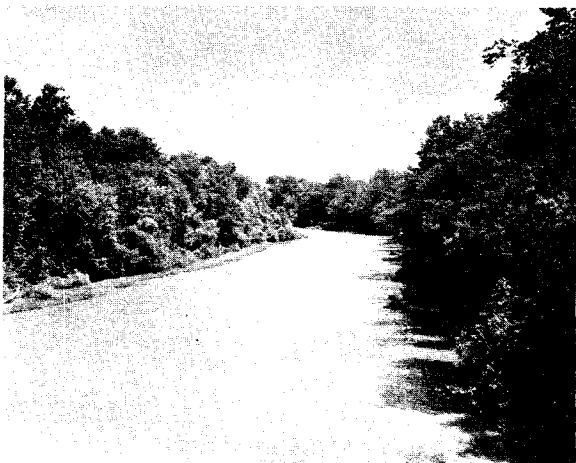
7. A canoe livery is located at Fort Ancient.



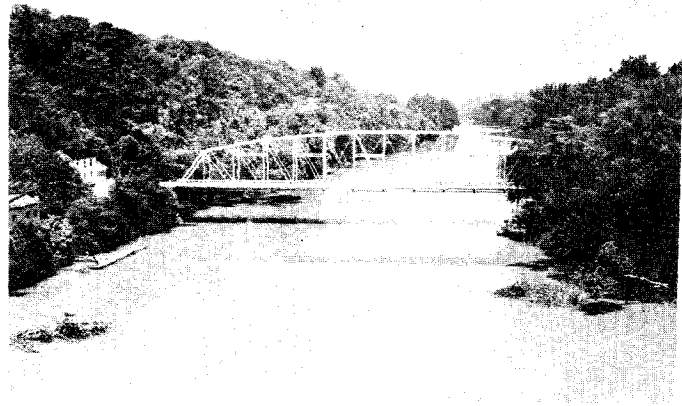
8. Scenic Halls Creek forms a series of small waterfalls as it passes over the Ordovician limestone bedrock.

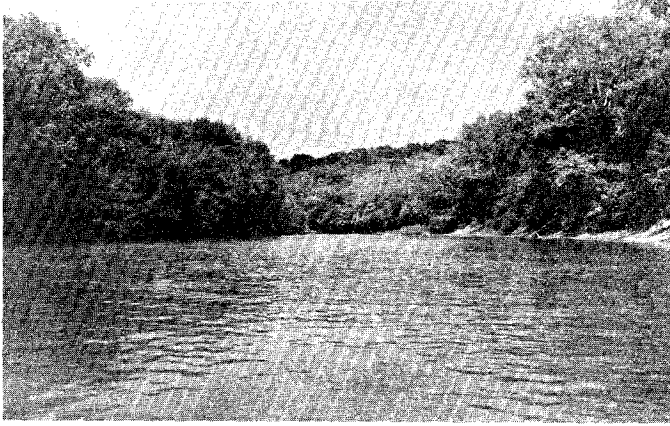


9. The river near Stubbs Mill Road.

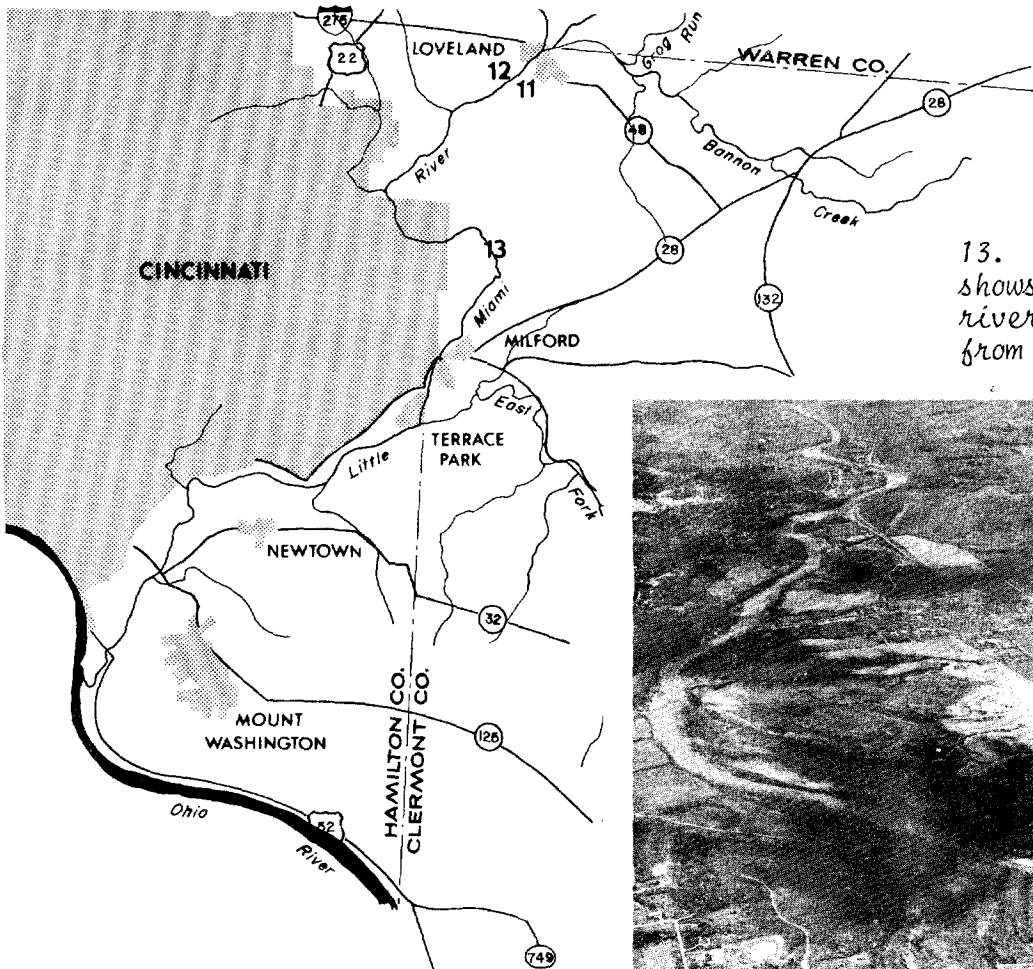


10. This is one of 59 bridges which cross the Little Miami main stem.



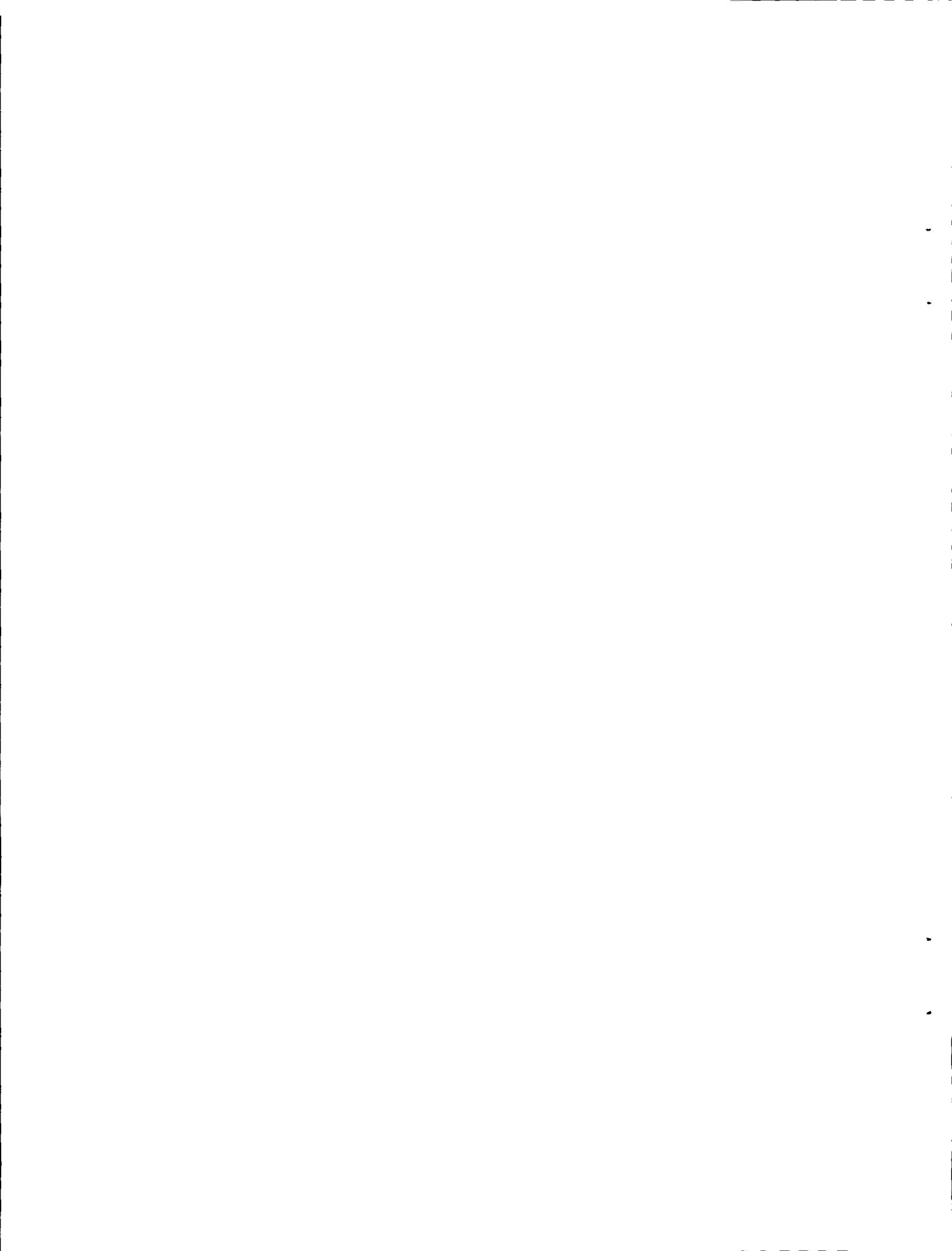


11,12. The river from Loveland to the Ohio River is characterized by long, quiet pools separated by short stretches of faster water.



13. This photograph shows what the lower river area look like from the air.





IV. DESCRIPTION AND ANALYSIS

Riverscape

The Little Miami is one of the few Ohio rivers still in a relatively natural condition. For much of its length it is a picturesque stream, flowing alternately through a deep gorge, steep wooded slopes, pleasant farmlands, and small towns. Even though man's activities are evident along a large part of the river, it should be realized that the river and its valley are relatively undeveloped. Away from the broader floodplain areas, there are some reaches that can still be classed as natural areas. In the floodplain areas, where the terrain is amenable to development, the presence of man is evident. Numerous roads, railroad lines, and electric powerlines crisscross the valley and intrude upon the river corridor. Cottages line the banks in some areas and occasionally farmlands extend to the river's edge. The debris that seems to accompany human occupancy is often present. This river corridor is of major importance to the aesthetic and recreational environment of southwestern Ohio where areas of any degree of naturalness are rapidly disappearing.

The floodplain of the Little Miami varies in width from a few hundred feet to one and one-half miles. Local relief ranges from a few feet to as much as 275 feet. The Little Miami flows in a varying bed of sand, gravel, silt, and rock to its terminus at the Ohio River. The river varies in width but generally is in the 50-to 100-foot range.

The scenery along much of the river is pleasing and provides a variety of scenic enjoyment. Along the banks, a barrier of trees dominates the immediate visual corridor. Swift water is found only in short stretches between the pools and generally only in the bends of the river. With recurring floods, natural to any river, bank erosion occurs which undermines the root network of the bank-side trees. For this reason, the trees have a tendency to lean out over the channel. Much of the bottomlands are in agricultural use. Where the river flows through cultivated lands, there is often a fringe of trees separating these lands from the river, thus providing a screen. However, there are some places, particularly along the lower reaches of the river, where the vegetation has been removed from the river banks, resulting in severe bank erosion.

Numerous urban areas border the Little Miami; including Clifton, Waynesville, Morrow, South Lebanon, Loveland, Milford, Terrace Park, Mariemont, and Cincinnati. Together, they border slightly over 16 river miles. There is, however, very little industrial development along the river.

Four lowhead impoundments exist at this time on the Little Miami main stem. Dams at Clifton, Waynesville, and Foster are each about five to six feet high and impound short segments of the river. A small rock dam near State Route 68 at Oldtown provides a riffle and some 300-500 feet of pool area. The total length of impounded stream is less than one mile.

Above Clifton, in the headwater area, the Little Miami River is a small, meandering stream, crossing the flat farmlands of Clark County and devoid of appreciable scenic value. This area is high-quality agricultural land, with no urban pressures evident as yet. At Clifton, on the Greene County border, the river plunges into a steep, narrow, scenic gorge that extends for four miles. The change in the character of the river can be correlated to the change in the underlying bedrock. On approaching the site, the stream meanders over glacial drift in its broad upland valley. Upon reaching bedrock it abruptly drops into the narrow slot of Clifton Gorge, plunging over a series of rapids. By cutting away the relatively soft Springfield dolomite, the overlying thicker and harder Cedarville dolomite was undermined and broken down along vertical fracture plans forming the gorge's sheer walls. During this erosion, numerous potholes were scoured in the streambed. Impressive concave remnants of these are visible in the sidewalls.

Below Clifton Gorge, the river flows across a broad floodplain for an eight-mile distance. The floodplain in this section is about a mile wide and is mainly farmland. It also contains several transportation corridors (U. S. 68, State Route 235, old and new U. S. 35, Pennsylvania Railroad, a Baltimore and Ohio Railroad) and is just on the fringe of development pressures from the Dayton metropolitan area to the west. Recent commercial development on U. S. 35 less than a mile west of the river indicates what soon could be in store for this area if present development continues unchecked.

South of U. S. 35, the valley constricts again. "The Narrows," as this section is referred to, is dominated by steep wooded slopes. Some of the slopes are nearly 200 feet above the valley floor. The area of steep slopes east of Bellbrook is covered with some of the finest stands of trees in southwestern Ohio. The distance from U. S. 35 to Sugar Creek is approximately eight and one-half miles.

Below Sugar Creek the valley once more widens. The floodplain is almost one mile wide from Spring Valley to Waynesville, a distance of approximately 10 miles. Much of the land here is in crops, mainly corn, although man-made Spring Valley Lake forms the nucleus for a state wildlife management area in the floodplain. Even though much of the land is under cultivation, heavy vegetation effectively screens much of this cultivated land from the river. The rolling upland plateau, which lies beyond the valley proper, presents a landscape common to Ohio--farmlands interspersed with woodlots. The Pennsylvania Railroad enters the floodplain at Spring Valley and follows the river in its southern course over floodplain and terrace to the Ohio.

Moving southward, the appearance of the Little Miami changes once more near the mouth of the Caesars Creek in the northeast corner of Warren County. Pastured hillsides give way to steep wooded slopes around Mather's Mill. The valley narrows from an approximate width of 1,800 feet, with valley wall slopes of 15 to 25 percent at Caesars Creek, to a narrow gorge less than 300 feet in width with almost precipitous walls just below Fort Ancient. The bluffs in this eight-mile section rise as high as 275 feet above the valley.

From Fort Ancient and for a distance of about eight miles to just below South Lebanon, an appreciable widening occurs. The width of the valley in this stretch averages about three-fourths of a mile. The river bank is dotted by summer cottages and small private developments, and several sand and gravel operations are located in the floodplain. Below South Lebanon the valley is again restricted to narrow widths as it approaches Kings Mills. This section is particularly scenic, with steep wooded banks and little development.

As the Little Miami approaches the Hamilton County line, it is increasingly influenced by Cincinnati. Deleterious effects are evident as the Little Miami passes through Foster where the encroachment of housing developments upon the cottages of summer residents becomes conspicuous for the first time. The urban development, which detracts from the scenic and recreational potential of the lower river, is a clue to the future character of the Little Miami in the face of urban settlement encroaching from the west, unless steps are taken to protect and preserve its natural condition. Just south of Foster, the river narrows to a sharp gorge, gradually widening out to more than a half mile at Loveland. The bluffs in this stretch are more even and less gullied than those south of Milford. From Loveland south to the Ohio River, urban development predominates and, in sections, only a narrow strip along the river remains undeveloped. Long rows of cottages exist on the river bank in some sections. Many of these appear to be permanent residences, and a sizable percentage of them are in poor condition. Problems of flooding together with the rugged topography in sections, however, have kept large blocks of land in this stretch relatively undeveloped. Through the efforts of organizations such as Little Miami, Inc., and other citizen groups, progress is being made toward improvement of the quality of the riverscape along this lower stretch of the Little Miami.

Between Milford and the mouth of the Little Miami the valley floor ranges from 1.25 to 1.75 miles wide. As a result of periodic flooding, an extensive alluvial floodplain has been built, and the river has become entrenched with banks of silt and gravel.

Flow Characteristics

A necessary consideration in evaluating recreation potential of the Little Miami River is the water volume throughout the year. The rate of flow is particularly important during summer months when recreation is at a yearly peak and water volume is at a minimum.

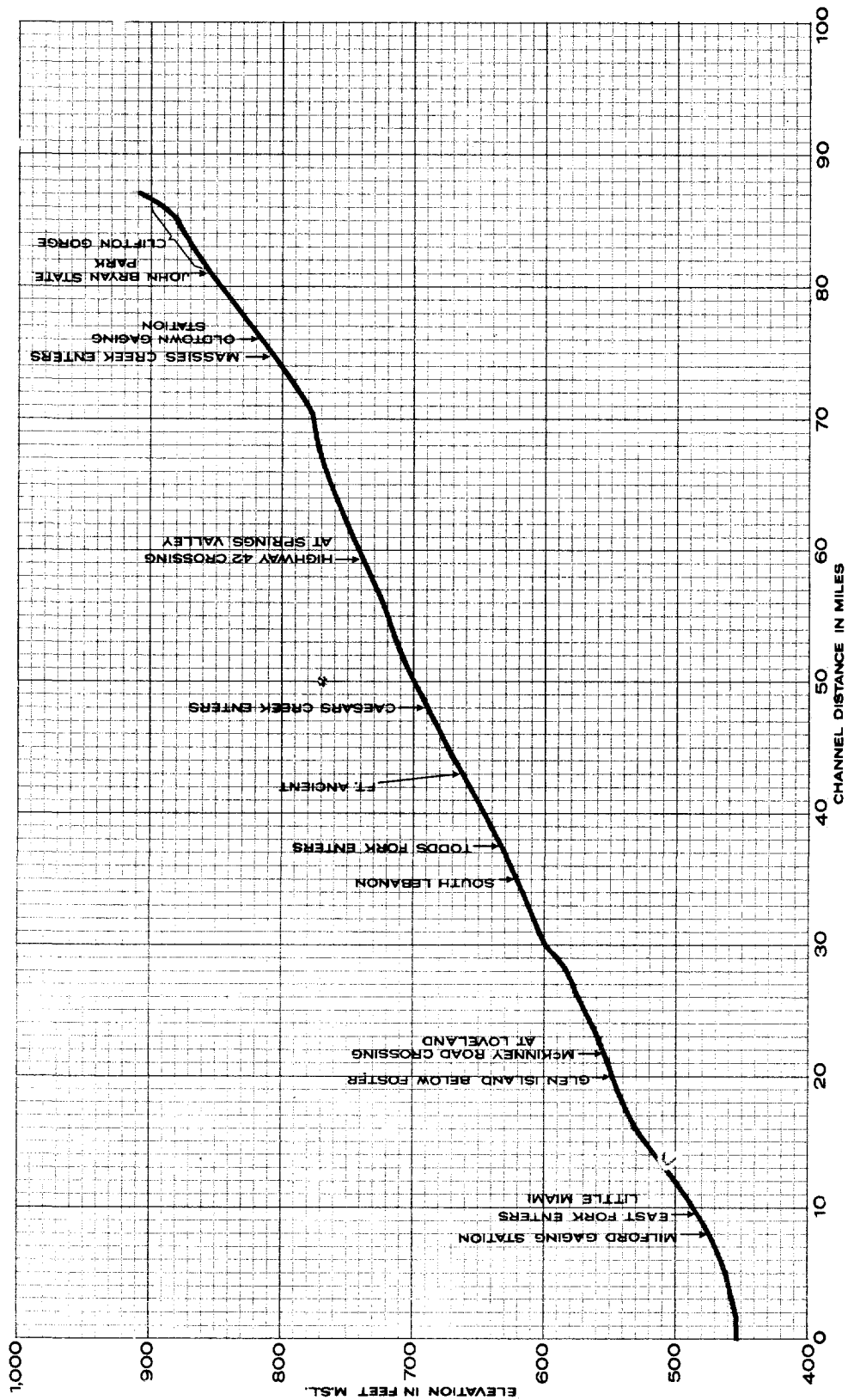


Figure 1
LITTLE MIAMI RIVER
RIVER PROFILE

NOTE:
Mile 0 is the point where
the Little Miami River
enters the Ohio River.

Source: U. S. Army Corps of Engineers

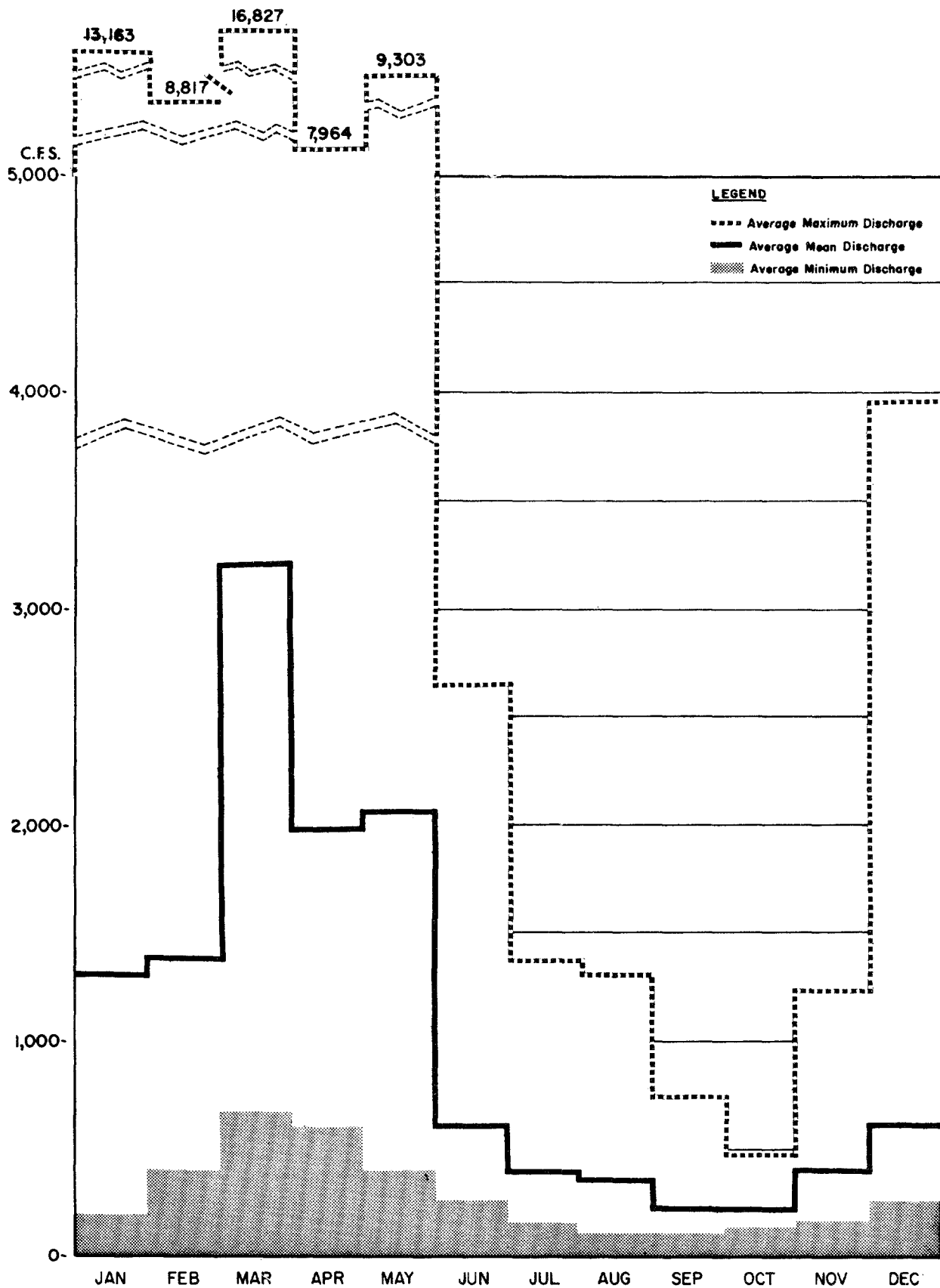


Figure 2

LITTLE MIAMI RIVER
AT MILFORD

Source: U. S. Geological Survey

1959-1968 AVERAGE DISCHARGE

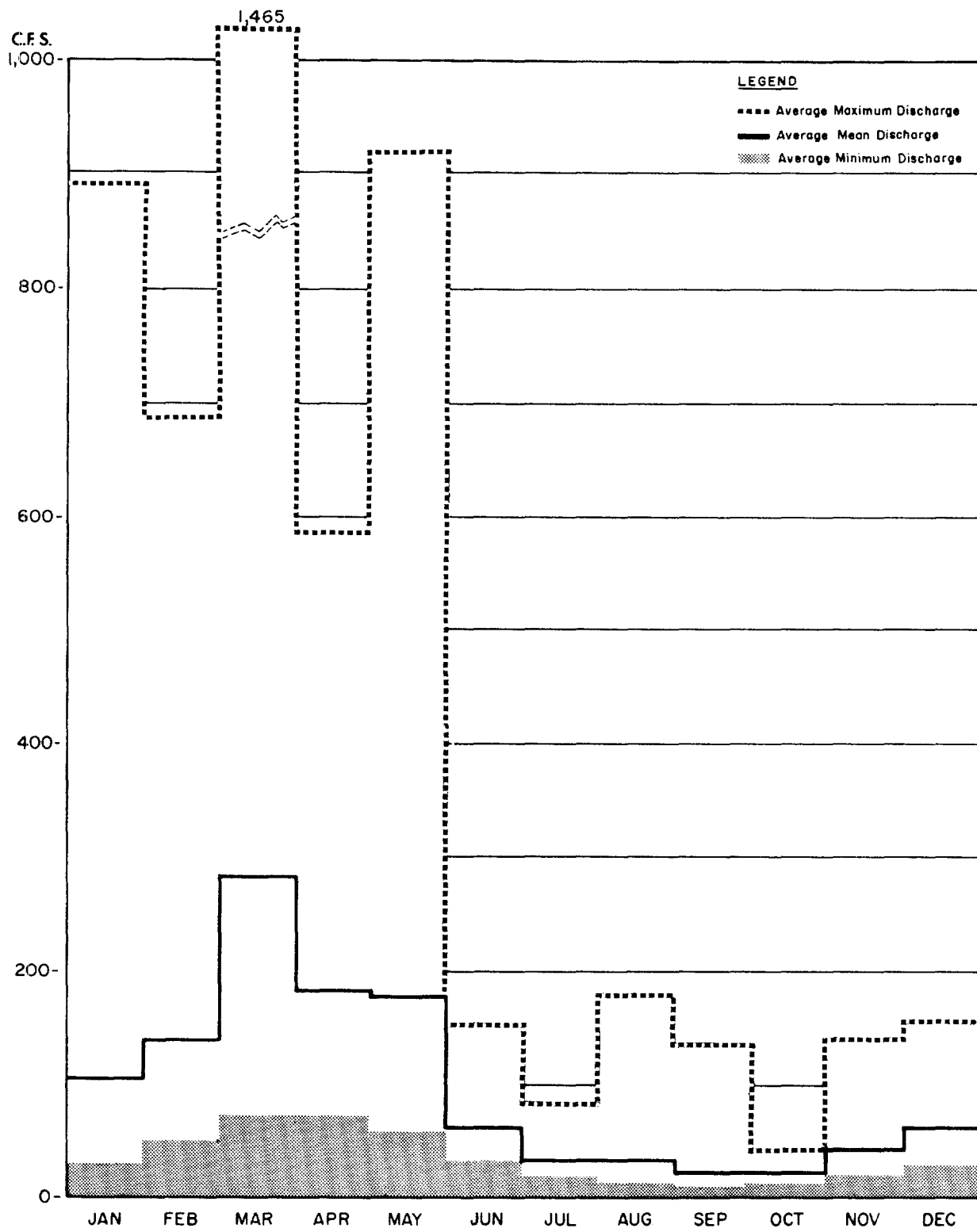
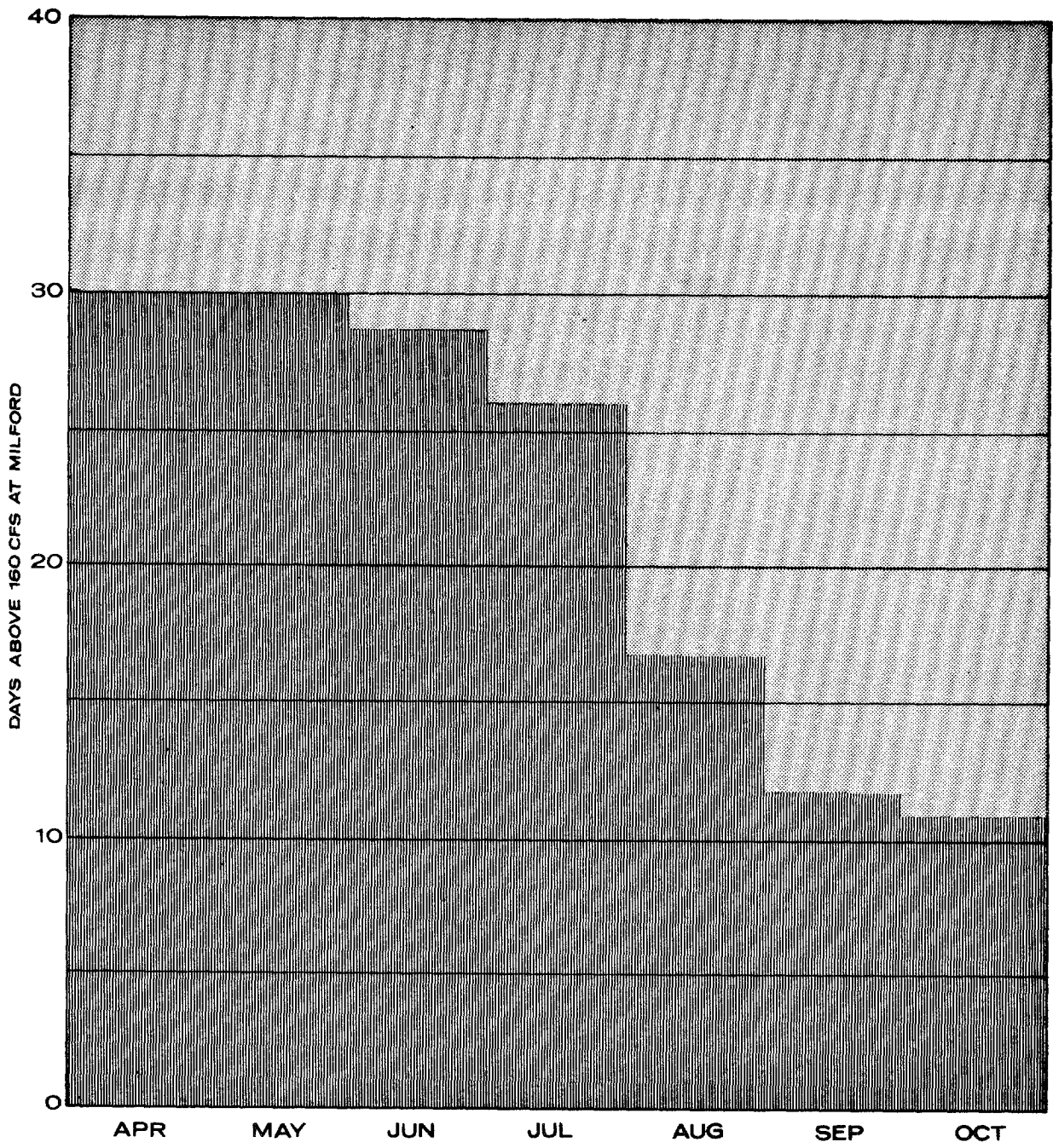


Figure 3



LITTLE MIAMI RIVER
NEAR OLDTOWN

1959-1968 AVERAGE DISCHARGE

Source: U. S. Geological Survey



LEGEND

-  Days of Good Canoeing
-  Days of Poor Canoeing

Source: Bureau of Outdoor Recreation

Figure 4

LITTLE MIAMI RIVER
 WATER LEVELS FOR CANOEING
 1955-1969 AVERAGES

Flow data are available at three locations on the Little Miami. Starting upstream, the sites are at or near Oldtown, Fort Ancient, and Milford. The most complete data are the Milford records. For this reason the Milford data are used to relate stream flow to canoeability of the stream. Although the Milford records will not always represent the flow characteristics of the entire stream, the data will sufficiently correlate stream flow throughout the wet and dry seasons to canoeability.

The Little Miami exhibits fairly good low-flow characteristics. The relatively high sustained flow is a result of the widespread gravel deposits which lie above Caesars Creek in the headwater area of the basin. These deposits, which are highly permeable, absorb large quantities of rainfall and release it rather uniformly throughout the year. In addition to the ground water contribution from the glacial deposits, a minor amount is contributed by the limestone and dolomite formations. The record of flow at the Milford gaging station shows a high dry-weather flow index. This is still a reflection of the influence of conditions in the headwater area, although some additional flow is contributed by terrace deposits in the valley north of Milford.

During periods of intense rainfall, many of the creeks and streams in the basin become raging torrents endangering life and property and interrupting the normal commerce of the valley. Flooding is not frequent enough, however, to significantly impair recreation use of the river. Floods have influenced land use in much of the valley near the main channel, and summer cottages and homes are often constructed on "stilts" to escape the raging waters. Portions of the Towns of Bellbrook, Spring Valley, Waynesville, Morrow, South Lebanon, Loveland, Milford, and Newtown are subject to periodic flooding. The flooding problem will be partially alleviated with the completion of Caesars Creek and East Fork Reservoirs.

Shallow draft boats such as canoes, kayaks, and johnboats are the most suitable for use on the Little Miami River and are the basis for our evaluation of the river. Factors such as a canoe's draft under various loads; the stream velocity; the nature of the streambed materials; and the tolerance of canoeists for dragging, towing, or portaging complicates the analysis. The field study investigation indicated that a flow of 160 cubic feet per second (cfs) recorded at the Milford gauge is a reasonable minimum for satisfactory canoeing on the Little Miami from Clifton to the Ohio River. A flow of 160 cfs at Milford yields the same quality as 20 cfs flowing at the Oldtown gauge. The change in the stream bed topography, as the Little Miami meanders to the Ohio, accounts for similar canoeing quality at different flow rate throughout the span of the river. Considerable dragging and portaging will be necessary in the upper half of the Little Miami when the Oldtown gauge reads less than 20 cfs.

The suitability of the stream for canoeing is graphically shown in Figure 4. The chart is based on 160 cfs at Milford as the minimum flowage required to support good canoeing. Data extends for a 15-year period from 1955 to

1969 for the months of April through October, the recreation season. During June, July, and August, the most intensively used months, the canoeing can be considered good for 74 percent of the recreation season over the 15-year period. The high flows in April and May (refer to Figures 2 and 3) present the most ideal canoeing. The figures reflect only the 15-year average. The actual monthly conditions will vary each year. Extremely wet or dry years will result in additional or decreased canoeability. During the driest year of the 15-year period, 1963, the river flow was above 160 cfs 54 percent of the recreation season.

When completed, Caesars Creek and East Fork Reservoirs will augment flow and, therefore, substantially improve the canoeing and other summer recreation potential of the river. Caesars Creek Reservoir will enhance canoe recreation for more than one-half of the frequently canoed portion of the Little Miami. Release from Caesars Creek is dependent on water quality. Water quality releases will be dependent on dilution requirements which will be determined by stream surveillance during operation. The Caesars Creek Reservoir guidelines established by the Federal Water Quality Administration for water quality will be to provide a minimum outflow of 45 cfs and 125 cfs at 90 percent dependability for years 2010 and 2060, respectively. The flows will be seasonally adjusted with only 50 percent needed in the winter. The project as designed has a capacity of providing 86 cfs seasonally adjusted with 90 percent reliability. With the reservoir operating under normal conditions, the initial minimum outflows are expected to be about 20 cfs seasonally adjusted for present water quality needs.

Water Quality

Generally speaking, present water quality in the Little Miami from its headwaters to Hamilton County is good to excellent. As indicated in the

following paragraph, there are locations along this portion of the Little Miami River at which impairments of water quality are occurring. Downstream from the Hamilton County line the quality of waters gradually deteriorates.

The principal pollution problems are oxygen-consuming materials, nutrients, and bacteria. The upper reaches of a number of the tributary streams receive rather large volumes of treated wastes in proportion to their dry weather flows. Low dissolved oxygen levels and high coliform counts occur downstream from the municipal wastewater treatment facilities of Xenia, Loveland, and the Beaver Creek Sewer District in Montgomery County. Dissolved oxygen concentrations of less than five ppm are evident between Yellow Springs and Waynesville and again between South Lebanon and Mason and are in violation of the State of Ohio water quality standards for maintenance of warm water fisheries.

Dissolved solids of the streams of the basin reflect the characteristics of the underlying geological formations. High dissolved solids and sulfates occur in the upper reaches where there is less clay overlying the limestone bedrock. The low chloride concentrations indicated that the streams are

free of brine discharges and, in most cases, carry only relatively small amounts of sanitary sewage. The narrow range of the pH(7.2-8.4) reflects the ample buffering capacity of the stream's system.

Summer water temperatures reach a maximum of 79°F. on the tributaries and upper reaches of the main stem of the Little Miami. A somewhat warmer temperature (85°F.) was recorded on the main stem at Milford.

During the spring of the year all streams of the basin have been found to contain significant concentrations of nitrates; whereas, the highest concentrations of phosphates usually occur during the low flow period of autumn. The occurrence, during the period of high flow, would indicate land runoff as a significant source.

Although the water quality is now good, the murky color it assumes following each period of heavy rainfall and run-off is an indication of heavy siltation. This is undoubtedly due to the intensive farming practices in the upper half of the watershed, plus land-clearing and other construction activities in the river valley.

Inadequate and over-taxed municipal sewage systems; poor livestock range practices, especially in the raising of hogs on confined areas; and the contribution of the overflow of domestic and industrial cesspools and septic tanks, all potentially threaten to cause over-fertilization and eutrophication of the waters of the Little Miami.

A large cattle feedlot is now operating near South Charleston in the headwaters region. This operation is using the most modern computerized feed techniques and is giving special attention to disposal of animal waste materials. In addition, the owners are conducting, at their expense, bi-monthly water quality surveys of the watershed just downstream of the lot.

Nevertheless, public health agencies should constantly monitor this operation since an accident or slackening of pollution control by the management could cause massive over-fertilization in the headwaters of the Little Miami with the possibility of a serious fish kill occurring during periods of hot weather and low stream flows.

Silt and sediment are problems which are visible and can be controlled through a remedial program. The pollution from nutrients in the water cannot be seen but can be controlled through land-use regulations. The two nutrients of importance are nitrates and phosphates. The Little Miami valley is unique in the aspect of phosphate pollution. The underlying strata being dolomite, which is a magnesium carbonate, combine with the phosphate to form magnesium phosphate, which is tied up in the soil. The build up of nitrates in the water will remain a problem. Cooperative programs available through the Soil and Water Conservation Districts could help remedy this problem.

Fifteen of the 20 municipalities in the basin under Ohio Water Pollution Control Board permit have secondary treatment facilities. Twelve of the 13 county sewer district treatment facilities include secondary treatment facilities. Many have plans for enlargements and improvements and others are in the planning process. There are presently eight industries under permit and only one of these industries has a system with inadequate treatment facilities. This system is currently being improved.

Despite the fact that secondary treatment has been provided for a large portion of the population and many industries, the residual loads are such that, in several locations, the very low stream flows are unable to assimilate the treated wastes without serious degradation.

The Ohio Water Pollution Control Board adopted Water Quality Standards on April 9, 1968, for the waters of the Little Miami River basin. Through this adoption, the Board will implement and enforce a planned program for prevention, control, and abatement of new and existing pollution of the waters within the basin. All waters in the basin shall also meet the minimum conditions and criteria for all applicable uses as adopted by the Board on October 10, 1967, and amended on April 14, 1970. The amended criteria for stream water quality has set the minimum conditions applicable to all waters at all places and at all times as follows:

1. Free from substances attributable to municipal, industrial, or other discharges, or agricultural practices that will settle to form putrescent or otherwise objectionable sludge deposits.
2. Free from floating debris, oil, scum, and other floating materials in amounts sufficient to be unsightly or deleterious.
3. Free from materials producing color, odor, or other conditions in such a degree as to create a nuisance.
4. Free from substances in concentrations or combinations which are toxic or harmful to human, animal, plant, or aquatic life.

For recreational purposes including swimming, the stream water quality must also meet the following criterion which is used for evaluating the conditions at any point in waters designated for such use:

Bacteria: The fecal coliform content (either MPN or MF count) is not to exceed 200 per 100 ML as a monthly geometric mean based on not less than five samples per month; nor exceed 400 per 100 ML in more than 10 percent of all samples taken during a month.

Even if all sources of pollution are eventually eliminated, one particular form of eyesore must be removed from the river basin. The presence of litter and trash dumps along the stream banks contribute floating debris to the river, especially during high flow. A vigorous state-local-private cooperative program to eliminate such dumps along the river is necessary if the scenic qualities and water quality are to be preserved.

The Ohio Water Pollution Control Board is continuing study of the basin, and, with the planned upgrading of standards for existing sewage treatment plants, the water quality of the Little Miami River should improve.

Climate

The climate of the Little Miami valley is classified as continental. Such a climate is marked by large annual and daily variations in temperature and precipitation. Weather conditions change every few days from the passing of cold or warm fronts and their associated centers of high and low pressure. Summers in the Little Miami valley are moderately hot and humid with an average of 33 days with temperatures of 90°F. or higher. During summer afternoons, the humidity is often in the 80-90 percent range, causing rather uncomfortable conditions. Winters are reasonably mild and cloudy with an average temperature about 34°F. During an average winter, the temperature reaches zero on only two days. The fall season of the year is very pleasant with the least rainfall, an abundance of sunshine, and comfortable temperatures. Spring is the wettest season.

Precipitation in the Little Miami valley varies widely from year to year; however, it is normally abundant and well distributed throughout the year with fall being the driest season. The mean annual precipitation is 39 inches; of this amount, about 9.15 inches falls during the winter, 12.01 inches during spring, 9.79 inches during summer, and 7.05 inches during fall. Excessive rainfalls in the late winter and early spring cause flooding in many areas of the valley, while during the summer the rainfall decreases to the extent that many of the streams and creeks in the area exhibit intermittent flows. Showers and thundershowers account for most of the rainfall during the primary recreation season--May through October. Thunderstorms occur on about 40 days each year. The average annual snowfall is around 19 inches. Snowfall, however, fluctuates widely from this annual mean. About one of five winters will have at least 30 inches of snow.

Cloudiness is greatest in winter and least in summer. This seasonal variation in cloudiness is most clearly illustrated by the percentage of possible sunshine which is about 75 percent in July but less than 40 percent in December. During the primary recreation season, it is sunny over 68 percent of the time. The prevailing wind direction for the year is in the southwest quadrant. Damaging winds of 35 to 85 miles per hour occur most often during spring and summer. Such storms are usually associated with migrating thunderstorms.

Geology and Soils

Geology. The geology of southwestern Ohio is primarily of sedimentary and glacial origin. Ancient seas covered the area during the Paleozoic era and resulted in deposits of lime and clay muds. The weight of subsequent overlying deposits compacted the lower levels into limestone and shale that form today's bedrock.

About the middle of the Paleozoic era, a low dome known as the Cincinnati Arch pushed up from the ocean floor. By the end of the Paleozoic era the rock strata of the ocean floor were somewhat fractured and warped. The area was evenly uplifted far above sea level. As the sea retreated, new rivers and streams were formed, starting their work eroding the newly raised lands.

During the Pleistocene Epoch, known as the Ice Age, the area experienced a series of continental glacier advances and retreats. These glaciers scoured the upper surface of the bedrock and deepened and widened the valley. Rock and gravel carried along with the advancing glaciers were left as deposits, filling earlier scoured valleys and forming low hills when the glaciers melted.

The first glacier to enter western Ohio is called the Kansas, but it did not reach the Little Miami valley. It did, however, block the ancient Teays River and changed the drainage system of western Ohio.

The second glacier to enter Ohio is called the Illinoian, and it covered all of the area now known as the Little Miami valley and left deposits of glacial till that formed the soils of much of the lower watershed as it melted.

The last glacier to enter the area is called the Wisconsin, which came as far south as Kings Mills in Warren County. The present-day drainage system was formed as this glacier melted.

When glaciers entered Ohio, plants native to the more northern climes of Michigan and Canada migrated in advance of the ice fronts into the state. As the glaciers retreated, some of these plants managed to remain in selected areas through the state. One such refuge is in the gorge below Clifton, where some of these glacial relics have survived forming a botanically unique area in southwestern Ohio.

In some places there are 200 feet of these glacial deposits on the older sedimentary bedrock strata. At Clifton the thickness of these glacial deposits lessens, and the underlying consolidated stratum is the Cedarville dolomite. About four miles below Clifton this stratum ends. Underlying the Cedarville dolomite is the Osgood shale which is easily eroded by rushing water. The Cedarville dolomite is resistant to erosion, and where it ended the soft shale has eroded away, forming waterfalls and steep-sided gorges.

This geologic process of undercutting the resistant dolomite by weathering the underlying shale has resulted in a gorge ranging to 150 feet deep. The narrow gorge is very scenic, with bluffs of massive dolomite, fern-covered talus slopes, tall trees, and a small rapid-flowing stream.

Huge blocks of dolomite cap, breaking off in the process of gorge formation, are scattered about the floor of the narrow valley.

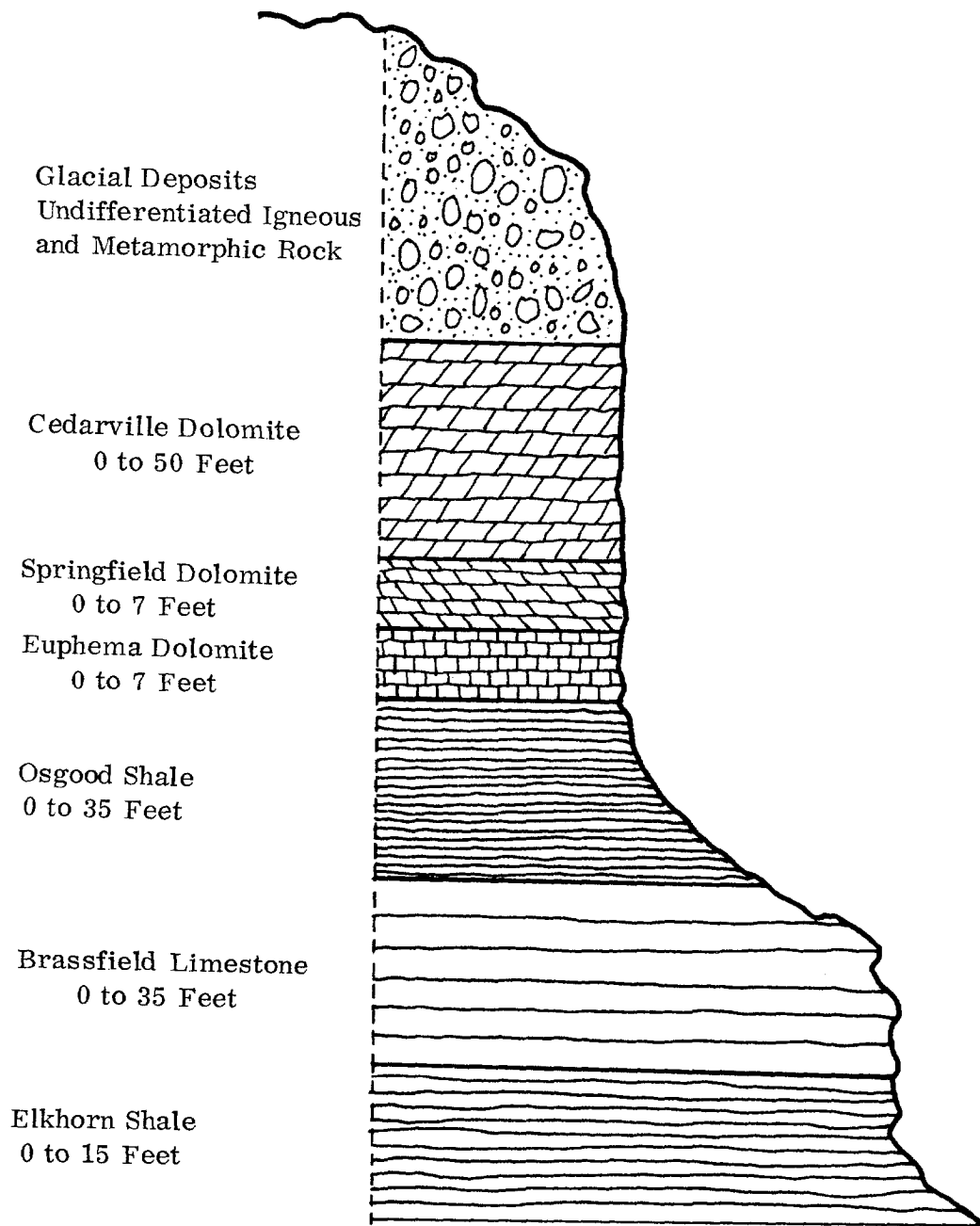


Figure 5

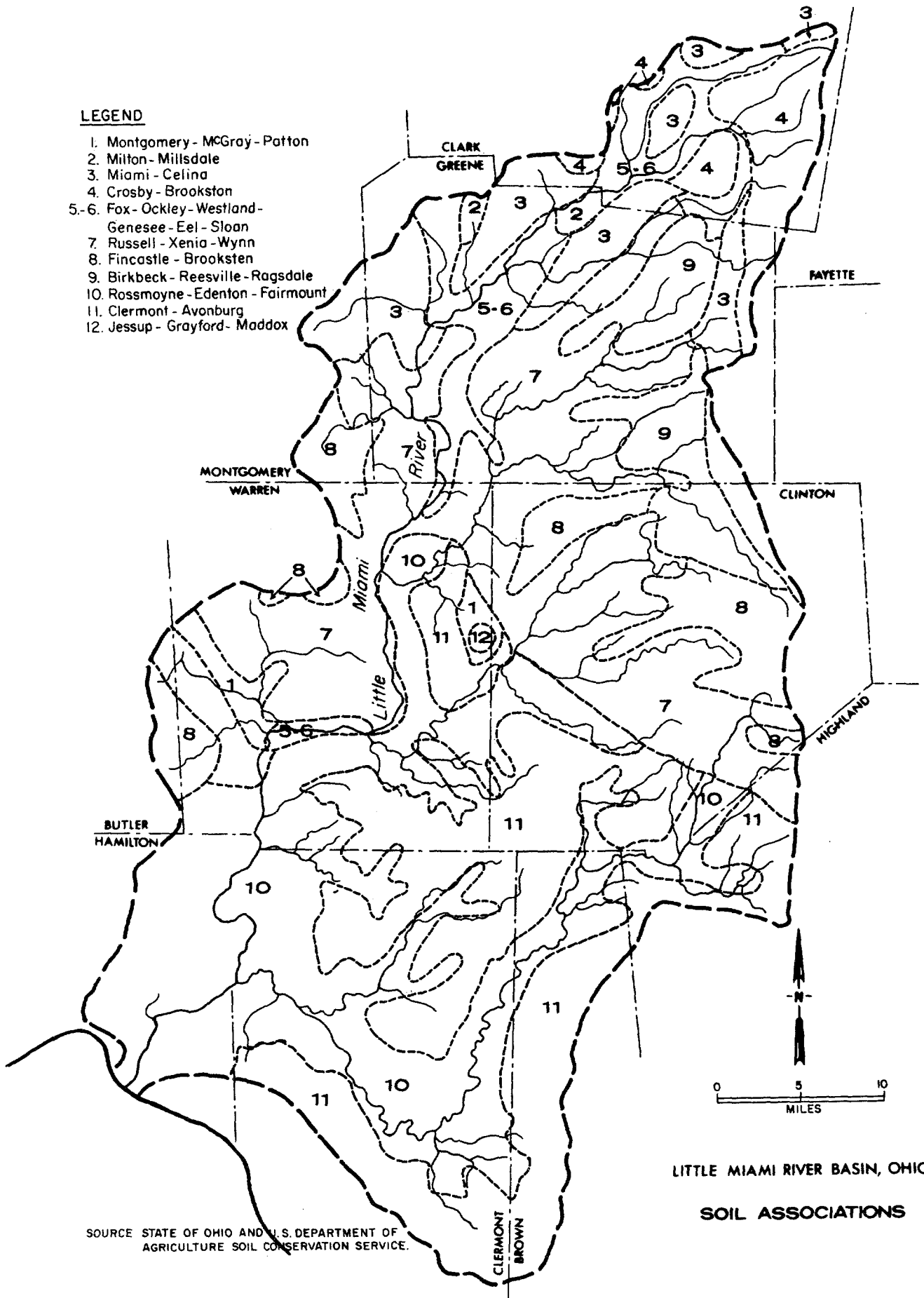
LITTLE MIAMI RIVER, OHIO

GEOLOGIC STRUCTURE

Source: State of Ohio

LEGEND

- 1. Montgomery - McGray - Patton
- 2. Milton - Millsdale
- 3. Miami - Celina
- 4. Crosby - Brookston
- 5-6. Fox - Ockley - Westland -
Genesee - Eel - Sloan
- 7. Russell - Xenia - Wynn
- 8. Fincastle - Brookston
- 9. Birkbeck - Reesville - Ragsdale
- 10. Rossmoyne - Edenton - Fairmount
- 11. Clermont - Avonburg
- 12. Jessup - Grayford - Maddox



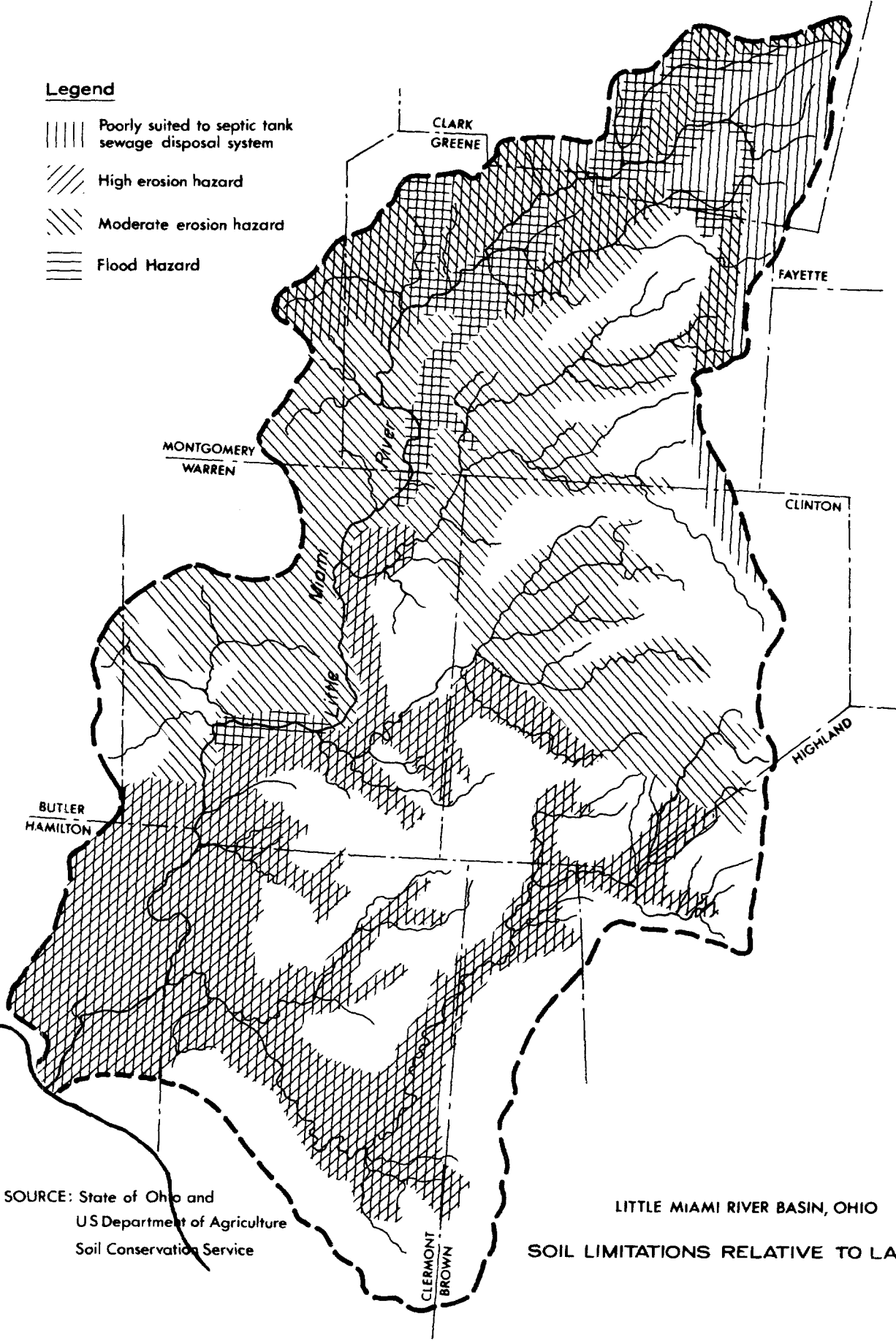
SOURCE STATE OF OHIO AND U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE.

LITTLE MIAMI RIVER BASIN, OHIO

SOIL ASSOCIATIONS

Legend

- ||||| Poorly suited to septic tank sewage disposal system
- //// High erosion hazard
- \\\\ Moderate erosion hazard
- ==== Flood Hazard



SOURCE: State of Ohio and
US Department of Agriculture
Soil Conservation Service

LITTLE MIAMI RIVER BASIN, OHIO
SOIL LIMITATIONS RELATIVE TO LAND USE

Table 5

Soil Characteristics

Association	Map No. 1/	Series	Productivity	Erosion Hazard ^{2/}	Flood Risk	Degree and Kind of Limitations for: ^{2/}	
						Homesite	Septic Tank
MONTGOMERY-McGARY-PATTON Laucustine terraces	1	Montgomery McGary Patton	Very High High Very High	No No No	No No No	Sev. :d, f, w Mod. :d Sev. :d, f, w	Severe:d, f, p, w Severe:p, w Severe:d, f, p, w
MILTON-MILLSDALE Wisconsin till over limestone	2	Milton Millsdale	Mod. High Very High	Mod. No	No No	Sev. :b, s Sev. :d, b, w	Severe:b, p Severe:d, p, w
MIAMIAN-CELINA Wisconsin till	3	Miamian Celina	Mod. High Mod. High	Mod. Mod.	No No	Slight to Sev. :s Slight to Sev. :s	Severe:p Severe:p
CROSBY-BROOKSTON Wisconsin till	4	Crosby Brookston	Mod. High Very High	No No	No No	Mod. :d, w Sev. :d, w, f	Severe:p, w Severe:d, w
FOX-OCKLEY-WESTLAND Wisconsin outwash	5	Fox Ockley Westland	High High Very High	Mod. Mod. No	No No No	Slight Slight Sev. :d, w, f	Slight- ^{3/} Slight- ^{3/} Severe:d, w
GENESEE-EEL-SLOAN Alluvium	6	Genesee Eel Sloan	Very High Very High High	No No No	Yes Yes Yes	Sev. :f Sev. :f Sev. :d, f	Severe:f Severe:f Severe:d, f, p
RUSSELL-XENIA-WYNN Loess capped Wisconsin till	7	Russell Xenia Wynn	Mod. High Mod. High Mod. High	Mod. Mod. Mod. to Sev.	No No No	Slight to Mod. :s Slight to Mod. :s Sev. :d	Severe:p Severe:p Severe:b, p

Table 5 (continued)

Soil Characteristics

Association	Map No. ^{1/}	Series	Productivity	Erosion Hazard ^{2/}	Flood Risk	Home site	Degree and Kind of Limitations for: ^{2/}	Septic Tank
FINCASTLE-BROOKSTON Loess capped Wisconsin till	8	Fincastle Brookston	Mod. High Very High	No No	No No	Mod. :d, w Sev. :d, w, f	Severe:p, w Severe:d, w	
BIRKBECK-REESVILLE- RAGSDALE Loess	9	Birkbeck Reesville Ragsdale	High High Very High	Mod. No No	No No No	Slight Mod. :d, w Sev. :d, w	Severe:p Severe:p, w Severe:p, w	
ROSSMOYNE-EDENTON- FAIRMOUNT Illinoian till and residual material	10	Rossmoyne Edenton Fairmount	Mod. Mod. Low	Mod. Mod. High	No No No	Slight Mod. to Sev. :s Sev. :s	Severe:p Severe:p, s Severe:p, s, b	
CLERMONT-AVONBURG Illinoian till	11	Clermont Avonburg	Mod. Mod.	No No	No No	Sev. :d, w Mod. :d, w	Severe:d, w, p, f Severe:p, w	
JESSUP-GRAYFORD ^{4/} Loess, Illinoian till and limestone	12	Jessup Grayford	Mod. Mod.	Mod. Mod.	No No	Slight to Mod. :s Mod. to Sev. :b	Severe:p Severe:p, b	

^{1/} Number refers to a soil association on the Soil Association map.

^{2/} Based on dominant slope, erosion hazard increases with slope

Slight--No limiting soil limitations

Moderate--Limitations that need to be recognized but that can be easily overcome

Severe--Limitations that are difficult and costly to overcome, maintenance is a continuing problem

b = depth to bedrock d = natural drainage f = flooding and ponding p = permeability s = slope w = water table

^{3/} Hazard of pollution to underground water supplies

^{4/} Best suited to forest and range use

Source: State of Ohio and Soil Conservation Service, USDA.

Beyond the gorge, features of geologic interest are restricted to the effect of glaciation on the course of the river. As at Clifton Gorge, the characteristics of the valley indicate when the river is flowing in pre- or post-glacial channels.

Broad, wide, open parts of the stream valley lie on deposits which fill the ancient Teays tributaries. The narrow, gorge-like valleys are those sections of the river formed during post-glacial times when volumes of melt-water poured through the channel, creating a spillway for ice-blocked waters. Those stretches of river on former channelways are found near Oldtown, Spring Valley to Waynesville, Morrow to South Lebanon, and Loveland to the Ohio River. The stretches of river with narrow valley walls, formed during post-glacial times, are the gorges at Clifton, Alpha-Bellbrook, Fort Ancient, and Kings Mill.

The sediments laid down in the ancient shallow sea which covered the area in the Paleozoic era contained fossil remnants of the early life on this planet and supply some very rich graveyards for fossil hunters. Layers containing extinct trilobites lure collectors to Xenia, Lebanon, and other localities along the Little Miami and its tributaries. Many other fossils, not so valuable but still interesting and worth collecting, can be found in abundance at almost any outcrop of Ordovician strata. Although harder to find, fossils in the Silurian dolomites are also sought, for these beds contain rich layers of coral heads, as well as occasional trilobites and crinoids.

Soils. Material deposited by the glaciers has helped determine the types of soil found in southwestern Ohio. The Little Miami valley is within two major soil regions. The upper Little Miami, above Waynesville, is in the High-Lime Wisconsin Till Soil Region, which is a gentle undulating to rolling till plain. The lower portion is in the Illinois High-Lime Till Soil Region, which is nearly level to gently sloping, but strongly dissected old, deep weathered soils. Generally, the productivity of the soils in the valley is high. Table 5 shows the soil associations of the Little Miami drainages and their limitations relative to land use and development. Table 5 lists selected soil characteristics of the major series within an association. These soil limitations and properties are of particular interest to scenic river evaluation in analyzing the effects of land use on water quality and quantity.

As indicated in Table 5, most of the soils have severe limitation for septic tank sewage systems. This is primarily due to seasonally high water tables, poor natural drainage, and slow permeability of these soils. Present and future development in these areas should be provided with other than septic tank sewage systems.

The erosion hazard is generally low. Only a few soils display moderate erosion hazard characteristics. A severe erosion hazard exists for all soils having slopes in excess of six percent. Soil stabilization practices for

present and future development should be tailored to prevent deterioration of the developed site and of water qualities and fisheries habitat.

Flood risk is common only to a small section of the valley. Recreational development would be limited to this area.

Flora

The river and the geologic history of the area have had an influence on the vegetation of the Little Miami valley.

However, these have not been major factors in determining present vegetative cover. Although glaciation, rock outcroppings, slope, exposure, moisture, soil conditions, and other miscellaneous factors greatly influence vegetative cover, it is, to a major extent, man's activities which had the greatest effect on the existence of present vegetation.

There are a few areas which, because of inaccessibility, have escaped the human influence and can be said to be presently in somewhat "original vegetation." Almost all of this river valley has been changed through farming, timber cutting, construction, and other forms of man's use or misuse.

Botanically, the most outstanding area of the Little Miami valley occurs in the upper reaches where the river flows through Clifton Gorge. Here the narrow, rocky gorges with sheer cliffs shelter the valley floor and produce an abundance of flora.

There have been 322 different species of wildflowers and 104 species of woody plants identified and listed for the Clifton Gorge-John Bryan State Park area. This is an exceptionally wide variety of plants to be found within an area of its size. Because of its unique geology, natural history, and flora, Clifton Gorge has been designated and dedicated by the National Park Service as a National Natural Landmark, as has nearby Glen Helen.

Remnants of northern vegetation which have managed to survive since glacial times can be found in the cool, moist environs of the upper gorge near the Village of Clifton. Here, northern relic plants of Canadian yew, eastern hemlock, mountain maple, red elderberry, yellow birch, and arborvitae can be found growing along the rock ledges and cliffs of Clifton Gorge.

In John Bryan State Park as well as nearby Glen Helen, unique microclimates that produce an abundance of flora occur in areas where limestone and dolomite outcroppings are found.

Ferns of note which occur in the area are bulblet, walking, Christmas, smooth cliffbreak, and the purple cliffbreak. The latter two species are of special significance for their occurrence in this area.

A few other gorge-like areas with steep walls occur downstream which tend to be the largest remaining refuges of extensive forests in this area. The two best preserved areas of mixed hardwood forests are found in the vicinity of Fort Ancient and Kings Mill sections of the river.

In the understory of these forests, one can find the lush flora abounding during the spring. Such wildflowers as jack-in-the-pulpit, large flowered trillium, hepatica, bloodroot, Dutchman's breeches, and spring larkspur array the hillsides of these areas. One flower commonly known as "Miami Mist" is named for its occurrence in great abundance in this valley.

In Greene County, below John Bryan State Park, the valley tends to widen out into a rather broad floodplain and is typical of many such areas which occur in various sections of the river downstream. The wide bottomlands have rich, deep soil which make them excellent for farming and as such are devoid of natural vegetation. Much of the river valley in these sections has been cut over, and in many stretches of the river only a thin line of trees and shrubs divide the river from those lands used for crops and pasture.

Typical of many Ohio streams, forested areas in the bottomlands of the Little Miami tend to be composed of sycamore, box elder, black willow, cottonwood, and elm. Occasionally, groves of Ohio buckeye, pawpaw, black walnut, and osage orange are found among the dominants of the floodplain.

Herbaceous plants such as monkey flower, blue lobelia, cup plant, sneeze-weed, lizard tail, water willow, and many species of the composite family occur along the river banks and terraces. Poison ivy and stinging nettle are the only two plants of significance which may present a problem as plants of the poisonous or pest category.

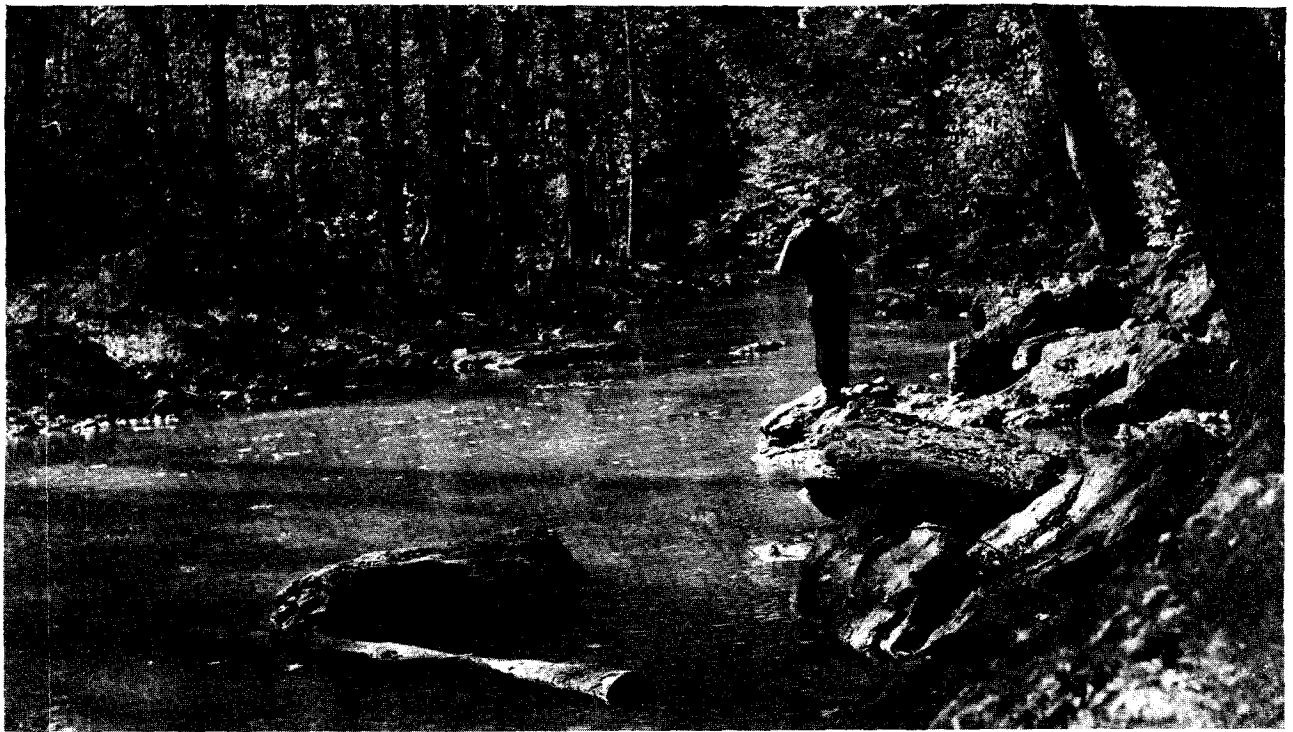
Fauna

A substantial sport fishery exists in the Little Miami for smallmouth and largemouth bass, spotted bass, channel catfish, flathead catfish, rock bass, bluegill, and the common sucker. The Little Miami River is a significant nursery ground for the sport fishery in the lower portion of the Ohio River. The Little Miami River is also valuable as a spawning stream for commercial finfish of the Ohio River such as channel catfish, fresh water drum, and buffalo fish. The Little Miami supports 94 of over 170 finfish species found in Ohio. Fifty-six species were identified in the 229 square-mile headwaters of the watershed above Xenia in a study made by the Ohio Division of Wildlife during the period 1952-1958 (Brown 1960).

Less known, but of equal importance, are the shellfish. This region has developed a great abundance and variety of stream dwelling shellfish, especially the freshwater, bivalve mollusks (clams or mussels, known also as naiads). Of the 70 species found in Ohio, at least half are found in the Little Miami River. Riffles make this river especially attractive to these organisms.



Fishing the Little Miami River.



According to Dr. David H. Stansbery, Professor of Zoology at Ohio State University: "Naiad populations have decreased rapidly in recent years. Of 102 species found in the Ohio River system, 41 species are rare and considered endangered and eight species are already extinct." Water pollution and dam construction are major factors contributing to the demise of these stream dwelling organisms.

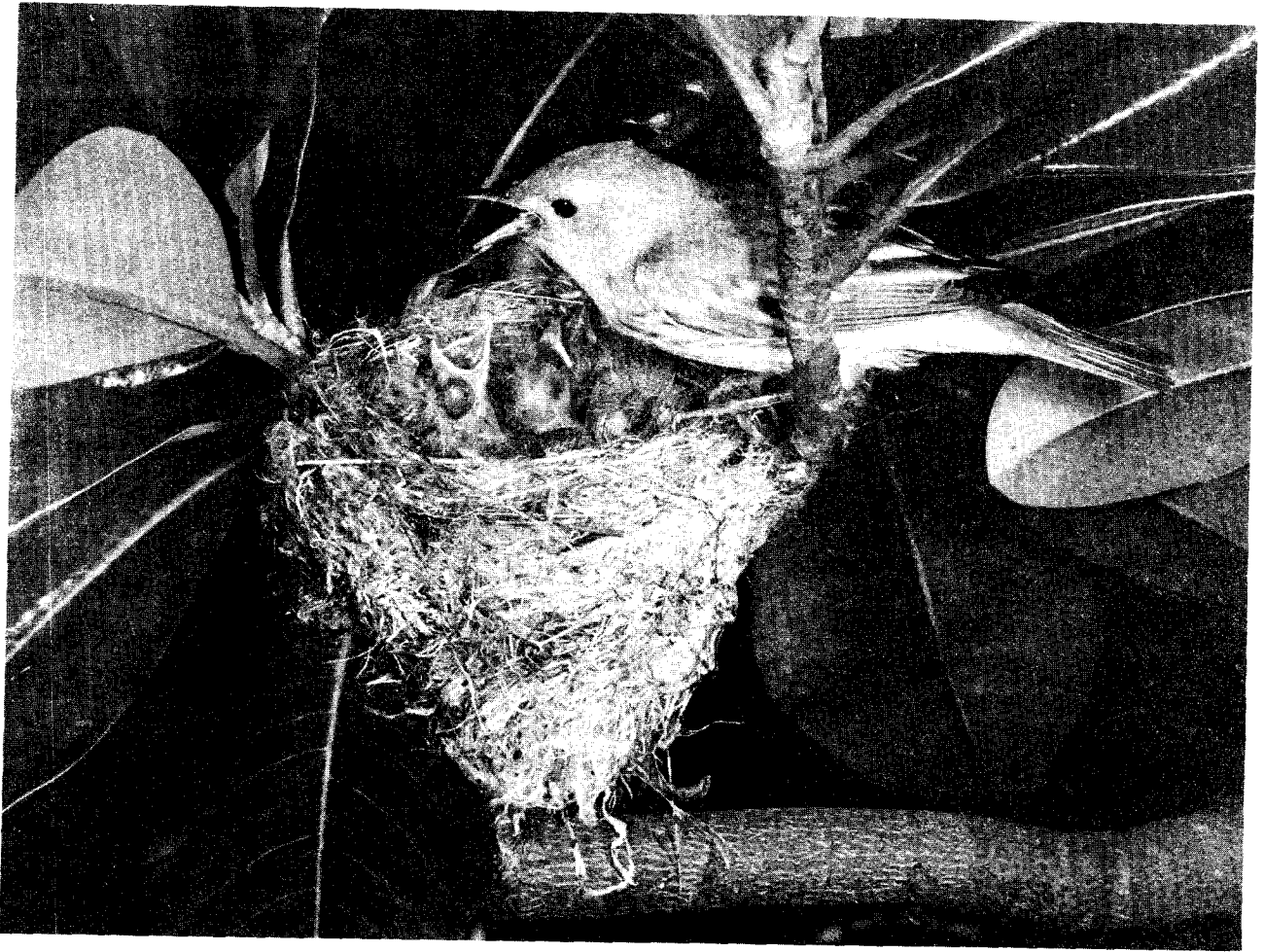
The life span of the naiad varies from five to 60 years depending on the species. Dr. Stansbery has pointed out that longer-lived species are considered an important research tool since their longevity enables them to reflect certain stream conditions over a long period of time.

Another aquatic animal found in significant numbers in the watershed is the crayfish. Five species are represented. The most abundant species, Orconectes rusticus, is an important item in the diet of the raccoon and many fishes. The Queen snake, one of the most abundant snakes in southwest Ohio, feeds almost entirely upon softshelled crayfish.

Reptiles and amphibians are well represented in the Little Miami valley. Six turtle species, 18 snake species, 14 salamander species, and 11 frog and toad species are found in the basin. Venomous snakes are found in only two locales. The swamp rattlesnake, commonly called the massassauga, is found in the Spring Valley area, and the northern copperhead is known to occur in Clermont County.

Forty-four species of mammals occur in the watershed. Cottontail rabbits and grey and fox squirrels are popular game animals. Trapping for mink, weasel, and muskrat is moderate throughout the watershed. Night raccoon hunting is a popular pastime in some areas. White-tailed deer are found in the southern portion of the watershed and are believed to be spreading into the northern portion. Recent recorded sightings of badgers to the west of and within the basin indicate that this animal is extending its range into the Little Miami region. Another species which appears to be returning to the Little Miami area is the coyote. A specimen was recently collected at Stonelick Lake in the East Fork area.

Bird life is one of the Little Miami's outstanding categories of fauna. A total of 199 species of birds use the area on an annual basis. There are 27 permanent bird residents, nine winter residents and visitors, 59 summer residents, and 104 spring and fall migrants. Approximately half, or 109 species, regularly nest in the Little Miami basin. Some of the better bob-white quail hunting in Ohio is found in the upper half of the watershed. Ring-necked pheasants, although rare in the southern half of the watershed, are common popular game birds in the northern portion. Mourning doves are abundant throughout the watershed but protected against hunting by state law. The state's 842-acre Spring Valley Wildlife Area furnishes a variety of public hunting, primarily for small-game species. It contains one of the few extensive marsh areas found in the watershed and provides hunting for several waterfowl species--primarily coots, wood ducks, mallards, and blue-winged teal.



Of the 42 species of warblers regularly found east of the Rockies, approximately 85 percent are found in the Little Miami valley, and one-third of these nest there.

The pileated woodpecker is regularly recorded, and several other species of woodpeckers can be found in winter in the mature and old growth hardwoods at Fort Ancient, Glen Helen, John Bryan State Park, and other locations along the Little Miami.

With the exception of wood ducks, which commonly nest along tree-lined streams, and the few waterfowl that nest in the Spring Valley marshes, the river is not an important waterfowl production area. It lacks extensive marshes and other types of wetlands preferred by waterfowl.

In summary, the environment of the Little Miami is not only scenic but also of high biological quality. It is an important natural laboratory, located within easy reach of several million people.

History and Archaeology

The prehistory and history of the area drained by the Little Miami River is a story which has evolved largely as a result of geography. Prehistoric

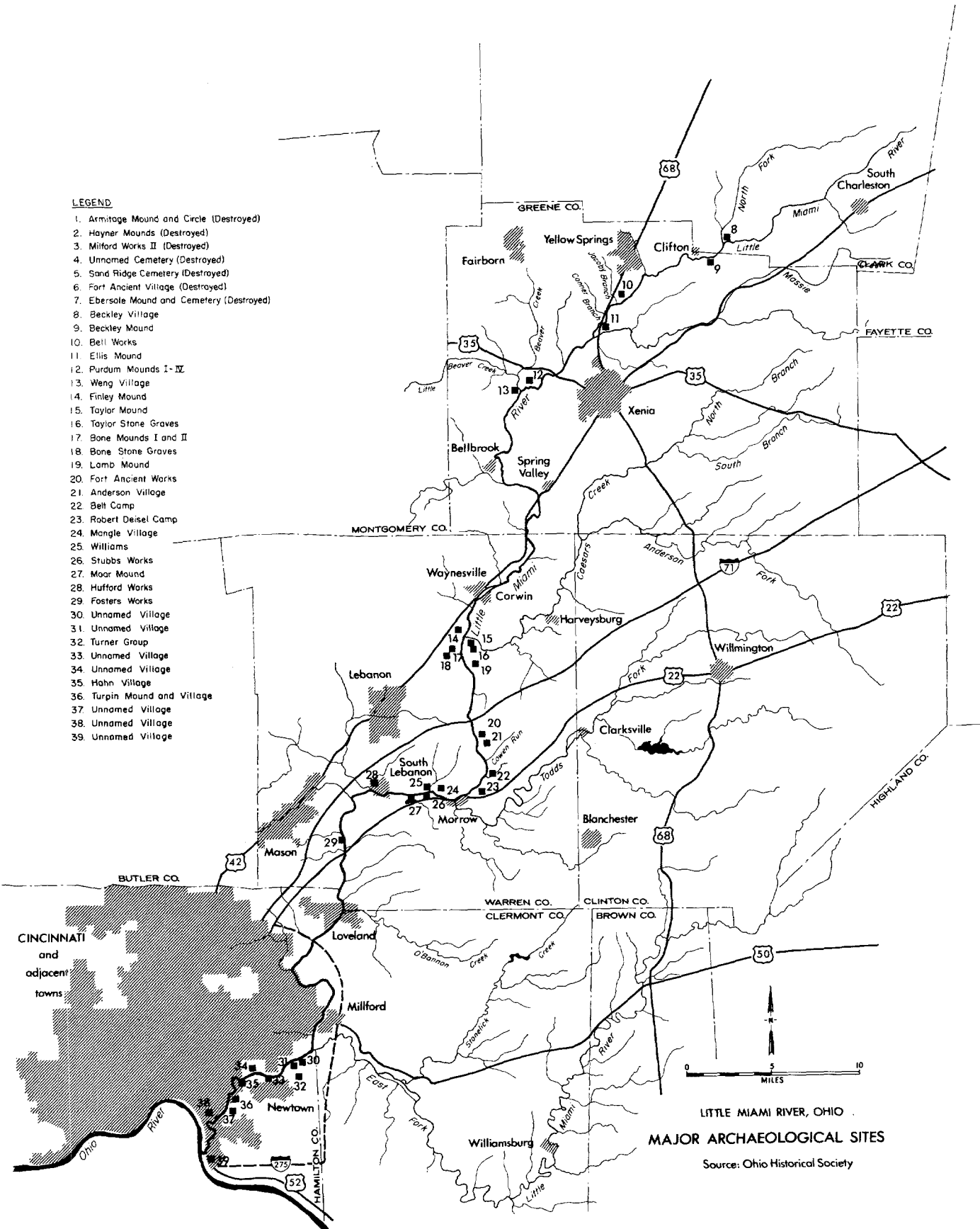
man and later the Indian generally migrated to well-watered valleys, such as the Little Miami, which provided the natural resources necessary for maintaining their cultures. The importance of geography to the area was not lessened by the coming of the European to the Ohio country in the latter part of the 17th century. The Little Miami River basin proved to be both a fertile land for the farming settler and, because the valley formed a part of the State of Ohio, it was an entry point in the eastern border of the Midwest. Ohio served as a clearinghouse between the developing areas of the West and Midwest and the markets and production centers of the Eastern seaboard and the Mississippi River regions. Ohio's geography made the area a natural for transportation routes through the interior of America in the great westward expansion period of the 19th century. Throughout the prehistoric and historic eras of the Little Miami River basin, the natural geographical resources of relatively flat, well-watered, and richly soiled lands proved to be a dominant element in the region's developing culture and civilization.

The first human life in the Little Miami River area came many thousands of years ago. The origin, culture, or fate of these early inhabitants is only partially known. Not until the coming of cultures which we refer to as the Mound Builders do we have much evidence by which to describe prehistoric life in the Little Miami River basin. This culture was in existence approximately two or three thousand years ago, and its remnants were preserved in mounds which served as burial grounds and effigy mounuments.

The mound-building Indians of the Little Miami were of two distinct cultures--the Adena and the Hopewell--each with its own characteristics of physical types, dwellings, pottery, weapons, etc. A third group of occupants was the Fort Ancient culture.

LEGEND

1. Armitage Mound and Circle (Destroyed)
2. Hayner Mounds (Destroyed)
3. Milford Works II (Destroyed)
4. Unnamed Cemetery (Destroyed)
5. Sand Ridge Cemetery (Destroyed)
6. Fort Ancient Village (Destroyed)
7. Ebersole Mound and Cemetery (Destroyed)
8. Beckley Village
9. Beckley Mound
10. Bell Works
11. Ellis Mound
12. Purdum Mounds I-IV
13. Weng Village
14. Finley Mound
15. Taylor Mound
16. Taylor Stone Graves
17. Bone Mounds I and II
18. Bone Stone Graves
19. Lamb Mound
20. Fort Ancient Works
21. Anderson Village
22. Bell Camp
23. Robert Deisel Camp
24. Mangle Village
25. Williams
26. Shubbs Works
27. Moor Mound
28. Hufford Works
29. Fosters Works
30. Unnamed Village
31. Unnamed Village
32. Turner Group
33. Unnamed Village
34. Unnamed Village
35. Hahn Village
36. Turpin Mound and Village
37. Unnamed Village
38. Unnamed Village
39. Unnamed Village



LITTLE MIAMI RIVER, OHIO
MAJOR ARCHAEOLOGICAL SITES

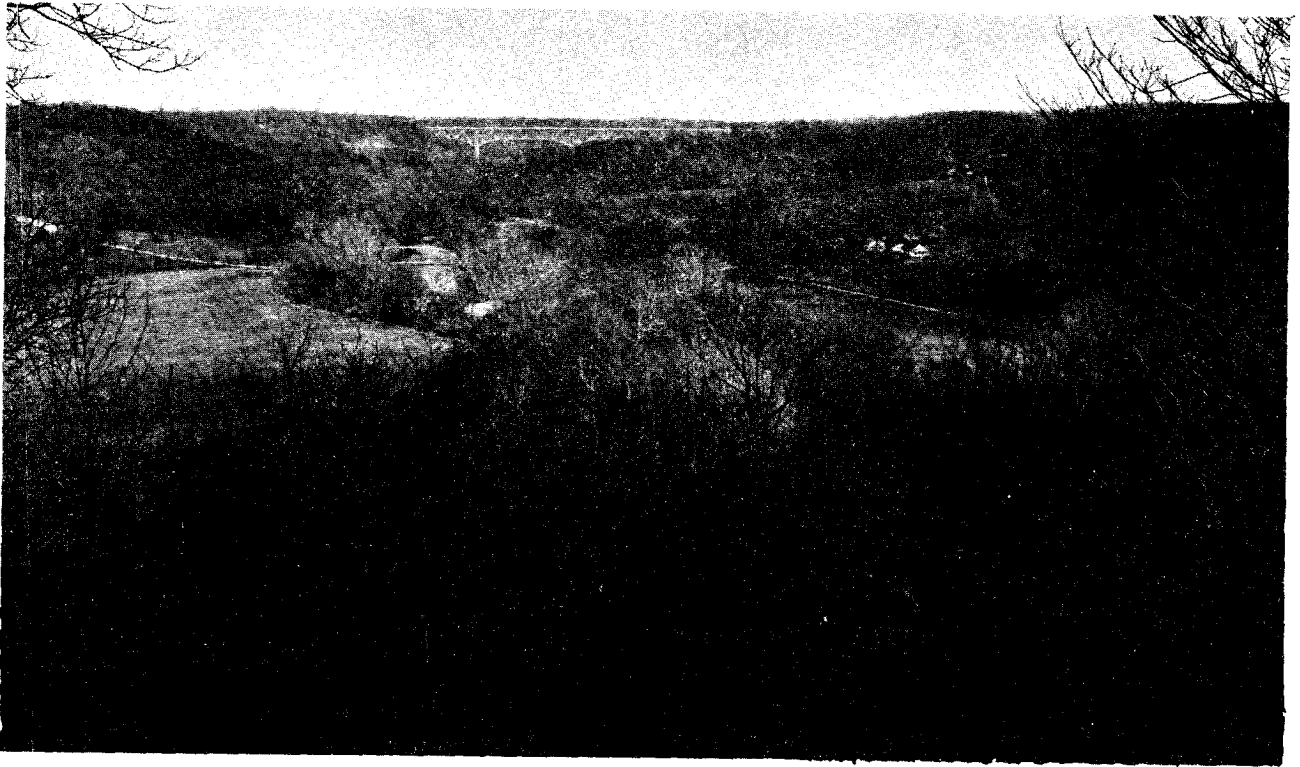
Source: Ohio Historical Society

Of particular interest in relation to the Little Miami River valley were the effigy mounds which were of two general types. First, there were those built on hilltops which seem to have served a defensive purpose. Second, there were those mounds which had a more or less geometric character. Judging from their location, this second class of mounds could not have been used for fortification. Rather, it is more likely that they had some ceremonial or social significance. The Little Miami River basin houses the most significant example of the former group of effigy mounds in the country. At Fort Ancient, on a bluff rising 275 feet above the Little Miami River, the Hopewell prehistoric Indians constructed approximately 3.5 miles of walls varying from four to 23 feet in height by using hoes made of animal shoulder blades and by carrying earth and limestone slabs. This "fort" was not built solely for defensive purposes; it was also used for social and religious ceremonies. Much of Hopewell life (300 B.C. - 600 A.D.) centered around elaborate death ceremonies connected with cremation which were presided over by a medicine man. Within the enclosure are located ditches, stone pavements, and burial mounds. Fort Ancient has been designated as a National Historical Landmark.

The Little Miami valley had, at one time, numerous burial mounds. Unfortunately, many have been partially or completely destroyed by the farmer's plows. However, there are a few mounds remaining in near-original condition. Archaeological evidence does not exist only in the form of mounds. Whole prehistoric villages have been discovered. The area from Milford to the Ohio River contains the largest concentrated number of prehistoric works in the Little Miami valley. There are at least 19 sites, either on the floodplain, terraces, or ridges overlooking the valley, and all three cultural groups are represented. The Anderson Township Historical Society has documented 30 sites still existing below Milford and 100 other sites no longer existing below Milford.

The next native population after the Mound Builders, of which we have any archaeological evidence, was the Eries or Cat Nation. Although the Eries were fierce fighters, their lack of European armaments, an item their eternal enemies, the Iroquois, had been able to obtain from the early settlers and explorers, put them at a fatal disadvantage. The Iroquois Confederacy besieged the chief fighting force of the Eries in one of their strongholds in 1655 and nearly obliterated them. For many years the present area of Ohio was uninhabited except, perhaps, for scattered groups.

By the beginning of the 18th century, the Miami Indians began moving into western Ohio. The pressure of white settlement on the seaboard and intertribal warfare in the east had produced a general displacement of various Indian nations from their traditional homes. The resulting general westward movement of Indians meant that as the Iroquois moved toward Ohio, the Miami tribes moved southward to the valleys to which they gave their name. In this process of migration westward there were four important tribes which came to occupy the area of Ohio--the Miamis, the Shawnees, the Wyandots, and the Delawares. The Shawnees established their main village site of Old Chillicothe, adjacent to the Little Miami River at the present-day village



The high bluffs at Fort Ancient provide an excellent view of the Little Miami Valley.

A small section of earthwork at Fort Ancient



of Oldtown in Greene County. Many military campaigns were waged against and from Old Chillicothe by white and red men alike. It is also reported to be the birthplace of the famous Shawnee chieftan, Tecumseh, who was leader of Indian resistance in the Northwest Territory until his death in 1813.

The first European in the area of whom we have record came in the latter part of the 17th century. This French explorer was Rene Robert Cavellier, Sieur de La Salle. His exploration took him south from Lake Erie to the Ohio River and through part of the Ohio Valley. Next were the explorers for the Albany fur traders who came to the area in 1692. They penetrated into the Ohio Valley but soon departed. The great distance to the Great Lakes, which served as easy transportation routes, combined with the menace of fierce Iroquois tribes discouraged the establishing of trade connections in the region. By the first half of the 17th century, British traders operating out of Albany, Philadelphia, and Charleston came to trade for furs and skins in defiance of French priority. This trade developed quite thoroughly and by the 1740's began to cause French officials alarm, for it was tapping the lake area and diverting from Montreal part of the northwestern Indian trade.

French officials viewed the rise of British influence among the western Indians with considerable apprehension, for it was becoming evident that control of the Ohio Valley was the key to the interior of America. The struggle between the French and British to control Ohio naturally came to involve the Indians of the region. In the years immediately preceding the Seven Years War (French and Indian War) the struggle between the British and French in the Ohio Valley took the form of attempts to gain the good will of the native population. To gain such an amicable situation, each side attempted to impress the Indians with great numbers of presents and the awe of military power. The animosity thus created between the two European nations soon flared, by 1754, into open conflict, though there was never an actual battle within Ohio.

After several years of strife in the west, the French had been deserted by the Indian allies and were short of supplies because of the British control of the seas. Wisely they abandoned their control of the Ohio Valley without a significant engagement.

From the French, the British inherited not only the lands but also the problems of Indian hostilities and unscrupulous colonists which plagued Ohio. With lack of government restraints to the contrary, frontiersmen were quick to exploit the Indian and his lands. This helped bring out more completely the underlying animosities between the Indian and the newcomers to the Ohio region. The motivations for an Indian uprising were present; all that was needed was a leader. Pontiac, the Ottawa chieftain, supplied this need in 1763. The uprising, after initial successes, was bloodily put down. The hatreds which had created it, though, continued to make the concluded truce an uneasy one, and throughout the following decades open warfare flared several times between the new settlers and the Indians.

During the American Revolution, the struggle for Ohio was essentially a renewal of the conflict between Indian and frontiersman that had begun with the Seven Years War and had been reopened for a time by Pontiac in 1763. The British were able to enlist the aid of many Indians by playing on their fears of losing their lands to the encroaching civilization. Such efforts, however, proved to be of no avail and Ohio saw little action during the Revolutionary War other than minor skirmishes. One such encounter took place close to the confines of the study area. In 1780 the famous George Rogers Clark took a band of approximately 1,000 backwoodsmen from all parts of Kentucky on a retaliatory expedition into Ohio. They traveled up the Little Miami River in late summer to the Indian Center of Old Chillicothe. Here they found the village site aflame, for the Indians had abandoned their towns and fled some 12 miles to the north to their capital, which was located near the present site of Springfield. Here Clark and his men fought a successful engagement with those Indians who had not fled. This fight, called the Battle of Piqua, was the only major engagement which occurred in the Little Miami River valley.

The ending of the war did little to alter the situation. The only real change was that the problems of controlling Indian people had been met, and the State of Ohio was created on March 1, 1803. At least three mills were in operation on the Little Miami River at the turn of the 19th century. The first mill, known as Waldsmith's Mill, was located at the present site of Milford. The second and third mills, built in 1793 and 1799, respectively, were located near Xenia and Kings Mills.

Landmarks listed by the Ohio Historical Society which were deemed eligible for inclusion on the National Register of Historic Places comprise 10 historic and architectural landmarks and nearly 50 prehistoric earthworks, mounds, sites, and other features which have been identified in the valley of the project area.

During the period from 1800 to 1850, villages, mills, and farms appeared in increasing numbers along the entire length of the Little Miami River. The many mills along the river were a necessity to the early settlers who depended upon them for grinding their grain. Clifton Mill and Grinnels Mill in Greene County and the Waynesville Mill and Fosters Mill in Warren County are among those mills constructed during this period that are still existing. Clifton Mill, built in 1835, has been renovated and is still grinding grain for commercial sale. There are numerous fine, old homes along or near the proposed area of the Little Miami River corridor, many of which are well over 100 years old.

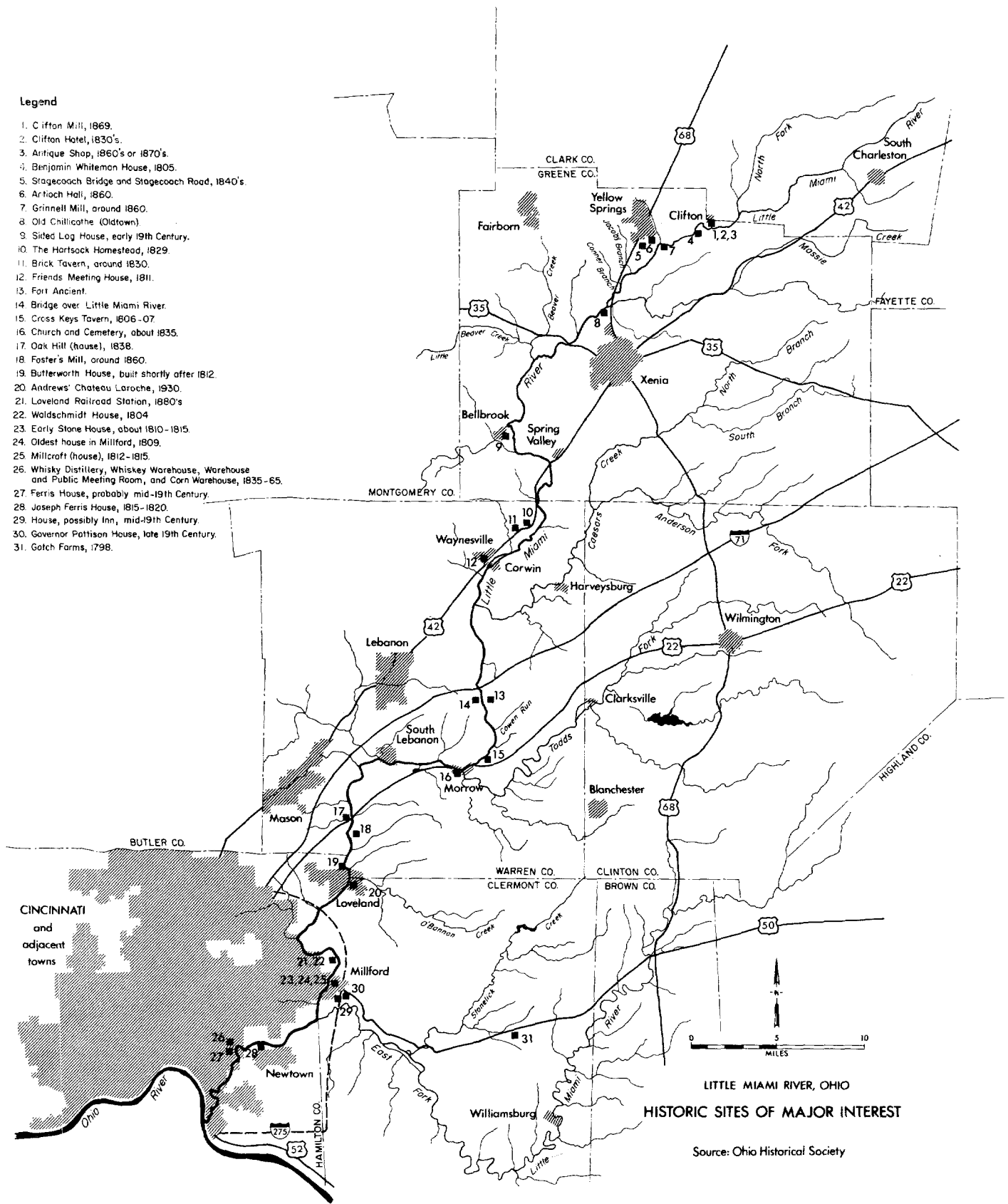
The development of transportation routes in the Little Miami valley progressed slowly. The first stagecoach line was not opened until 1827 and ran from Cincinnati to Sandusky. Another stage line, the Cincinnati-Pittsburgh Road, traversed what is now John Bryan State Park. Associated with the early transportation routes were the many taverns where the traveler stopped to rest and eat. Two of these taverns are still standing in Warren County. One is the Cross Keys Tavern, located near Fort Ancient



Clifton Mills, built in 1835, has been renovated and is still grinding grain for commercial sale.

Legend

1. Clifton Mill, 1869.
2. Clifton Hotel, 1830's.
3. Antique Shop, 1860's or 1870's.
4. Benjamin Whiteinan House, 1805.
5. Stagecoach Bridge and Stagecoach Road, 1840's.
6. Artich Hall, 1860.
7. Grinnell Mill, around 1860.
8. Old Chhlicathe (Oldtown).
9. Sided Log House, early 19th Century.
10. The Hartsack Homeslead, 1829.
11. Brick Tavern, around 1830.
12. Friends Meeting House, 1811.
13. Fort Ancient.
14. Bridge over Little Miami River.
15. Cross Keys Tavern, 1806-07.
16. Church and Cemetery, about 1835.
17. Oak Hill (house), 1838.
18. Foster's Mill, around 1860.
19. Butterworth House, built shortly after 1812.
20. Andrews' Chateau Laroche, 1930.
21. Loveland Railroad Station, 1880's
22. Waldschmidt House, 1804
23. Early Stone House, about 1810-1815.
24. Oldest house in Millford, 1809.
25. Millicraft (house), 1812-1815
26. Whisky Distillery, Whiskey Warehouse, Warehouse and Public Meeting Room, and Corn Warehouse, 1835-65.
27. Ferris House, probably mid-19th Century.
28. Joseph Ferris House, 1815-1820.
29. House, possibly Inn, mid-19th Century.
30. Governor Pottison House, late 19th Century.
31. Gotch Farms, 1798.



LITTLE MIAMI RIVER, OHIO
HISTORIC SITES OF MAJOR INTEREST

Source: Ohio Historical Society

but no longer in use, and the other is the Golden Lamb in Lebanon, which is still open. The Warren County Canal, connecting the Great and Little Miami Rivers, was opened for service in 1840. This canal was short-lived, however, for during this same period the Little Miami Railroad was completed.

The decades of the 1850's saw political developments which were to affect the course of America. Though the actual hostilities of the Civil War did not begin until the first part of the following decade, the underlying causes were visible throughout the country by 1855. The counties of the southern valley--Clermont, Hamilton, and Brown--all saw their economic interests connected with the south through Cincinnati, the major city in Ohio doing considerable trade with the southern states of the Mississippi River. They wanted, therefore, to keep the relations between north and south tranquil, and once hostilities had begun, to find a quick and amicable settlement. The other counties of the study area more easily identified their economic interests with the north and were influenced by the abolitionists of the counties in northern Ohio. During the Civil War, Ohio felt little of the direct brunt of the fighting. The only strife occurred in 1863 when a raid through the upper Ohio River valley was conducted by Brigadier General John H. Morgan.

The physical location of the Little Miami River, as a stepping stone to the west and its geography which perpetuated a farming economy greatly influenced the part of the area, was to play in American history.

Access

General access to and circulation along the Little Miami River are excellent. The Little Miami main stem and its North Fork tributary are

crossed by 59 highway bridges. Two serve interstate highways; seven U. S. highways; 11 state highways; and the remaining, county, primary, secondary, and feeder roads. In addition, approximately 19 miles of road parallel the river within 300 feet.

At present, public access to the Little Miami for recreation purposes is inadequate. Most of the land along the river is in private ownership, restricting access by the general public. Many of the bridge crossing areas provide potential access, but again it is necessary to cross private land. There are only five sites along the river where it is possible to launch a boat from public land. These sites are at Fort Ancient State Memorial; Spring Valley Wildlife Area; Spring Valley, along state Route 725; Washington Mill Road; and along the 2.4-mile reach from Oregonia to Fort Ancient. There is a small launching site near the Town of Camp Ross, but this is not available to the general public.

The State Division of Wildlife has acquired limited access for fishermen to 47 miles of tributary streams and is continuing in its efforts to acquire more land adjacent to the river for access purposes.

Land Use

Land use patterns in the Little Miami River valley are rapidly changing. Large areas, once dominated by an agricultural economy, are being replaced by subdivisions. Between 1950 and 1960, Clermont, Hamilton, and Warren Counties lost an average of about 3,400 acres of farmland per year to other uses. With the development of better transportation facilities in the future, i.e., limited access freeways and suburban rapid transit systems, this trend of land development is expected to continue.

The major land use categories shown in Table 6 are for the entire Little Miami River basin. The acreage in roads was not separated out.

Table 6

Land Use - Little Miami River Basin

Use	Drainage Above Loveland		Drainage East Fork Little Miami		Total Drainage Little Miami	
	Acres	Percent	Acres	Percent	Acres	Percent
Cropland	480,864	60.0	176,525	55.6	657,389	58.7
Range and Pasture	83,876	10.5	22,546	7.2	106,389	9.6
Forest	81,705	10.3	79,148	24.9	160,853	14.4
Developed ^{1/}	116,033	14.5	25,412	8.0	141,445	12.7
Other Land ^{2/}	34,992	4.3	12,699	3.9	47,661	4.3
Water	3,287	0.4	1,155	0.4	4,442	0.3
TOTALS	800,757	100.0	317,455	100.0	1,118,212	100.0

^{1/} Includes residential, commercial, and industrial.

^{2/} Acreage of nonfederal rural land which is not classified cropland, pasture, range, or forest land. Includes strip mines, borrow, and gravel pits.

In order to focus more closely on the river, land use data are also presented for the area considered to be within the "visual corridor." This is the area that can be seen from the riverbank, if there were no vegetative buffer. There are about 24,200 acres within the "visual corridor" along the Little Miami River above Loveland. Present land use within this corridor was taken from recent aerial photographs and is presented in Table 7.

Table 7

Land Use Within Visual Corridor Above Loveland

	Acres	Percent
Urban and Industrial	1,786	7.5
(Mineral Extraction ^{1/})	(160)	(.6)
Cropland	12,445	51.5
Forest Land	6,215	25.5
Range	1,810	7.5
Designated Recreation	553	2.3
Water		
Impoundments	117	.5
River	1,114	4.6
TOTALS	24,200	100.0

^{1/} Included in Urban and Industrial Category.

Zoning--The present land use zonings along the "visual corridor" are listed in Table 8. The present zoning does not provide for recreation or aesthetics. Floodplain and other protective zoning by local entities and the state should be strongly encouraged to provide additional control and protection throughout the river area, especially in areas now zoned commercial or industrial. Approximately 9.2 percent of the total acreage within the visual corridor is now zoned for commercial and industrial uses.

Agriculture--Farming is the dominant land use in the Little Miami River basin. Corn, grain, hay, livestock, and dairy operations are the most common types of farming. About 337,000 acres are used for corn, grain, and hay. Approximately 56 percent of this is used for corn. One hundred six thousand (106,000) acres of range and pasture support about 146,500 cattle and sheep. The average farm size is 155 acres, with a current trend toward fewer farms of larger size. Land values, due to urbanization, have soared to a point where the return per acre must be high. Good farmland in the valley will frequently sell for \$700 to \$1,000 per acre. Adjacent land suitable for housing development will often bring twice that price. With urbanization there has been a tendency toward the increased, absentee ownership of farms.

The agricultural land blends well with the scenic setting along the Little Miami River. The present agricultural land use is compatible with the scenic qualities of the river. No significant change in agricultural land use is anticipated.

Table 8

Land Use Zoning in the Visual Corridor Above Loveland

Area Visual Corridor		24,200 Acres	
<u>Zoned Use</u>	<u>Acres</u>	<u>Percent</u>	
Floodplain	4,601	19.0	
Agriculture ^{1/}	7,948	32.8	
Residential ^{1/}			
Category "A"	1,248	5.2	
Category "B"	240	1.0	
Category "C"	55	.2	
Total Residential	1,543	6.4	
Commercial-Industrial			
Retail Business	315	1.4	
Trailer Park	0	0	
Light Industrial	92	.4	
Heavy Industrial	1,817	7.4	
Total Commercial-Industrial	2,224	9.2	
Not Zoned	7,884	32.6	

^{1/} Category "A" - Minimum lot size approximately 20,000 square feet.
 Category "B" - Minimum lot size approximately 10,500 square feet.
 Category "C" - Minimum lot size approximately 6,000 square feet
 plus multiple dwellings, hospitals, rest homes,
 educational and religious institutions permitted.

Forestry--About 161,000 acres are forested in the basin. The average annual harvest from this land is 131,000 boardfeet of saw logs; 1,940 cords of wood, of which most is fuel wood; and about 2,500 Christmas trees. The Christmas tree industry is expanding, and land use for this product is expected to increase in the future.

Within the "visual corridor" 25.5 percent is classed as forest. Little or no harvest has taken place in the "visual corridor," and no extensive harvest is anticipated in the future. The forest cover along the Little Miami provides good screening and enhances the scenic qualities of the river. It also provides areas for recreational development.

The impact on forested land, from the designation of the Little Miami as a component of the national wild and scenic rivers system, could be substantial. Heavy use of sites for camping, picnicking, and hiking could lead to problems in excessive surface runoff, soil erosion, and sedimentation due to a reduction or loss of natural ground cover. Incidence of fire occurrence would probably increase. All these factors would add to site

deterioration which would detract from the scenic qualities of the river. Proper guidelines for development and maintenance are needed to protect the area from site deterioration.

Urban-Industrial--Approximately 12 percent of the Little Miami basin is developed for urban and industrial use. Most of this development is along the river; therefore, the percent of land development for urban-industrial uses within the "visual corridor" is much higher than that of the entire basin.

Xenia, with a population exceeding 25,000, is the largest residential and commercial area within the basin. Several small towns and villages dot the river shoreline, especially as the river passes near the Cincinnati metropolitan area.

Of particular interest to a scenic river evaluation are the effects of land use on water quality and quantity. The Little Miami River is located between two large population centers. The desirability and demand for open space and suburban living has had a large impact on the land in the valley and will continue to have a major impact in the future. This development, if allowed to continue without restriction, will be detrimental to the water quality of the Little Miami. A stream monitoring system should be installed for water quality surveillance to check on the effect of urban growth as it continues to expand throughout the watershed.

Land Ownership

The following tabulation shows the land ownership pattern occurring along the Little Miami River above Loveland, based on the area within

the visual corridor. No attempt was made to determine the area in township, county, and state-owned highways and roads.

Table 9
Land Ownership Within the Visual Corridor Above Loveland

<u>Ownership</u>	<u>Acres</u>	<u>Percent</u>
Federal	21	.1
State	1,070	4.5
Department of Highways	45	.2
Division of Wildlife	480	2.0
Division of Parks and Recreation	330	1.4
Historical Society	215	.9
County	37	.1
Municipal	1,300	5.4
Quasi-Public	850	3.5
Private	20,922	86.4
TOTALS	24,200	100.0

Table 10 gives the ownership breakdown for lands directly fronting on the river.

Table 10
Ownership of River Front Lands Above Loveland

Ownership	<u>River Frontage</u> (Miles)	<u>Percent</u>
State	11.8	5.6
County	.7	.3
Municipal	5.4	2.6
Quasi-public	7.4	3.5
Private	184.7	88.0
TOTAL	210.0	100.0

Water Rights

In Ohio the rules determining ownership of the beds of streams or other bodies of water are determined by the laws of riparian rights or boundaries.

Where a person owns on both sides of a nonnavigable stream, he owns the soil under the stream. Where different persons own on opposite sides of such a stream, in the absence of boundary lines, it is the general rule that each riparian owner owns the soil to the thread of the stream, and he may exercise any proprietary right over it which will not interfere with the rights of other riparian owners.

A stream is considered navigable in Ohio if it is available for general use of pleasure boats, although not utilized for commercial purposes. The entire Little Miami River, except for portions of the headwaters, is, therefore, considered by the state to be navigable.

The riparian owner has interest in the stream bed, banks, and water of the rivers of the state; thus, all private uses to which the land is susceptible belong to him. Since the owner of land situated on the bank of a navigable stream owns the bed to the thread of the stream, it is considered trespassing for another individual to take sand or other material from the bed of the stream. However, ownership of the banks or even the bed of navigable waters gives the owner no right to prohibit the public from fishing on such waters. The owner would have this right on nonnavigable waters because the law affords no adequate remedy.

Riparian land must be in actual contact with the water, proximity without contact being insufficient; and most of the courts which have passed upon the question hold that the riparian right to the use of the waters cannot be exercised on nonriparian lands.



The presence of private roadways across the river, such as this one near Shademoore, is a hindrance and potential hazard to river users. This road was built to transport sand and gravel mined in the flood plain on the opposite shore. Legal questions concerning their presence on a public waterway must be resolved.

The interest of a riparian proprietor, where his rights are not limited by usage or convention, consists of an absolute right to any use he can make of the water while passing over his land, conditioned only that he use the water so as not to damage other riparian proprietors. He is bound to transmit it by its natural channel to the next occupant, and he is permitted to exact the same "servitude" from the proprietor above him. This right to use the water in its natural flow is not a mere easement or appurtenance; it is inseparably annexed to the soil itself. It does not depend upon appropriation or a presumed grant from long acquiescence on the part of other riparian proprietors above and below but exists as a natural right to land.

It is a well-settled rule of law that a riparian proprietor is not the owner of, and has not property in, the actual flowing water in the stream adjacent to which his property lies. On the other hand, it is equally well settled that riparian rights are founded on the common law; that they are property rights and, therefore, property, in the legal significance of the term, and within the meaning of the constitutional requirement that compensation be made for private property taken for a public use. Recreational use of a watercourse by the general public under such common law could be interpreted as use of private property and thus require compensation to the riparian owner.

However, at the present, recreational uses of some waterways and the Little Miami in particular seem to be limited to and definitely hampered by the presence of fencing across the river, existence and ownership of dams, and the construction of private roadways across the stream. All of these are potential hindrances or hazards to river users and legal questions concerning their presence on a public waterway must be resolved.

Jurisdiction on the Little Miami River differs from area to area, but, in general, the sheriff has authority within this county and the city police within the municipality through which the river passes. Game protectors of the Ohio Division of Wildlife have authority to enforce all watercraft laws and all laws and Wildlife Council orders pertaining to hunting, fishing, and stream littering. Park officers may enforce refuse and pollution laws upstream from any state park boundary.

Nonrecreational Uses of the Little Miami River

The following estimates were made for water use in the Little Miami River basin.

The Ohio Department of Natural Resources, Division of Water, published a report Water Inventory of the Little Miami and Mill Creek Basins, in Jan-

Table 11

Water Use in Little Miami Basin

<u>Use</u>	<u>Thousands of Gallons Per Day (mgd)</u>
Power Plants (municipally owned, public utilities, and industrial)	169.0
Manufacturing Plants (self-supplied)	1.0
Municipal Use	11.5
Irrigation and Greenhouse	1.3
Rural and Suburban Homes, Livestock, and Golf Courses	10.4
Other Miscellaneous Industrial Use (self-supplied)	3.9
TOTAL	<u>197.6</u>

Even though electric generating stations are the largest users of water in the Little Miami River basin, they have an insignificant effect on the Little Miami River.

Municipal water supply is the second greatest use of water in the Little Miami basin. The basin has 32 public water supply systems. However, most of the communities obtain their supplies from wells. None of the seven communities using surface water take their supply directly from the Little Miami. Rather, they take water from tributaries or surface impoundments of the Little Miami tributaries. The total average daily demand of the seven communities is only 1.2 mgd. The expansion of ground wells is expected to adequately supply the smaller rural communities away from Cincinnati and Dayton. Communities near Cincinnati and Dayton will turn to those metropolitan municipal water systems when their supplies fall short. The greatest problem of municipal water use in the Little Miami River basin is the quality of the water returned by communities to the river. This problem is covered under the water quality section of this report.

In the Little Miami basin in 1955, 1.2 mgd was applied over a 90-day season for irrigation. Supplemental irrigation is likely to increase. Because irrigation is a consumptive water use and irrigation takes place at the time of lowest stream flow, it could conflict with other water uses during the recreation season. However, irrigation is not presently a water use problem.

The growth of the metropolitan areas in the Little Miami basin will correspondingly increase the water demand. However, most of the demand will be met from the Ohio River, additional ground water sources, or impoundments. The problem of water use from the Little Miami River by municipalities, industry, and farming is not one of consumption but water misuse.

Several existing and proposed water resource projects will affect the Little Miami River. The Caesars Creek and East Fork Reservoir projects are currently under construction by the U. S. Army Corps of Engineers. Five small watershed projects are at varying stages of planning by the Soil Conservation Service.

The Caesars Creek and East Fork Reservoir projects could affect the downstream environment in several ways. The reservoirs could improve water quality downstream by low flow augmentation and by acting as a catch basin for silts and sediments. On the other hand, they will impede the movement of fishes, and, if normal tailwater flows are not sustained, serious degradation would take place downstream, especially during periods of low water and hot weather, resulting in eutrophication. If the low flow releases are sustained as planned, water-based recreation activities such as canoeing will be improved. The Caesars Creek project will enhance canoeing for more than one-half of the most frequently canoed portion of the Little Miami River.

The Soil Conservation Service has received five applications for assistance from sponsoring local organizations under authority of Public Law 83-566. The present status of these projects is as follows:

- a. Dick's Creek - Little Muddy Creek--This project, as supplemented, includes four impoundments and 14.1 miles of channel alteration. It was authorized for installation in 1962. However, construction has not been started and the project is presently in an inactive status pending a decision by the sponsors to proceed with local responsibilities.
- b. Beaver Creek--- Applications have been received and preliminary investigations have been started.
- c. Massie Creek-- organizations have not yet made decisions necessary before the preliminary investigations can be completed. Thus, projects are presently inactive.
- d. Upper Little Miami River--
- e. Anderson Fork--An application was received in 1959 but no investigations have been made.

The Beaver Creek small watershed project would include a portion of the Little Miami River in the vicinity of U. S. 35 above Bellbrook. If activated, the portion of the project involving the Little Miami would have an adverse impact on the Little Miami Wild and Scenic River proposal. Such a project, whether it be a reservoir construction project or channelization of the stream, would be incompatible with the intent of maintaining a free-flowing stream.

If local interest is revived in these five projects, the Soil Conservation Service will consider the local objectives. It is imperative that the Soil Conservation Service cooperate with the state and appropriate federal agencies to avoid or minimize adverse effects on the natural and scenic

values of the Little Miami River. It is also essential that where channel modification is necessary, care be exercised to preserve the quality of the stream and to mitigate any losses which may accrue to fish and wildlife habitat.

Recreation

Existing and Proposed Recreation Facilities. The primary public use areas along the Little Miami River are the Country Common in Green County;

Spring Valley Wildlife Area in Greene and Warren Counties, Fort Ancient State Memorial and the I-71 scenic park area in Warren County.

The Country Common, a 1,800-acre area lying just east of Yellow Springs in a scenic section of the valleys of the Little Miami River and Yellow Springs Creek, represents one of the most interesting developments in cooperative outdoor recreation in the nation. In addition to Glen Helen Nature Preserve and John Bryan State Park, the Country Common includes the Boy Scouts' Camp Greene, the Ohio Soldiers and Sailors Orphans Home Camp Cooper, the 4-H Camp Clifton, and open space properties of the Village of Yellow Springs. The committee for a Country Common is a group of representatives of all of the above properties, plus neighboring property owners who have granted or sold conservation easements on their lands. The goal of the Committee is to reserve, either by easement or by purchase, enough additional land to double the present acreage and make possible a future combined open space of some 3,600 acres. The effect of this will be a region between Yellow Springs and Clifton that will remain open as farm and forest in spite of the eventual transformation of adjacent lands to suburbs or other development.

Glen Helen Natural Area is a 920-acre nature preserve owned by Antioch College. The preserve contains the wooded ravine of Yellow Springs Creek, the mineral-rich yellow spring which gave the town its name; many unique geological and ecological features; and stands of mature trees.

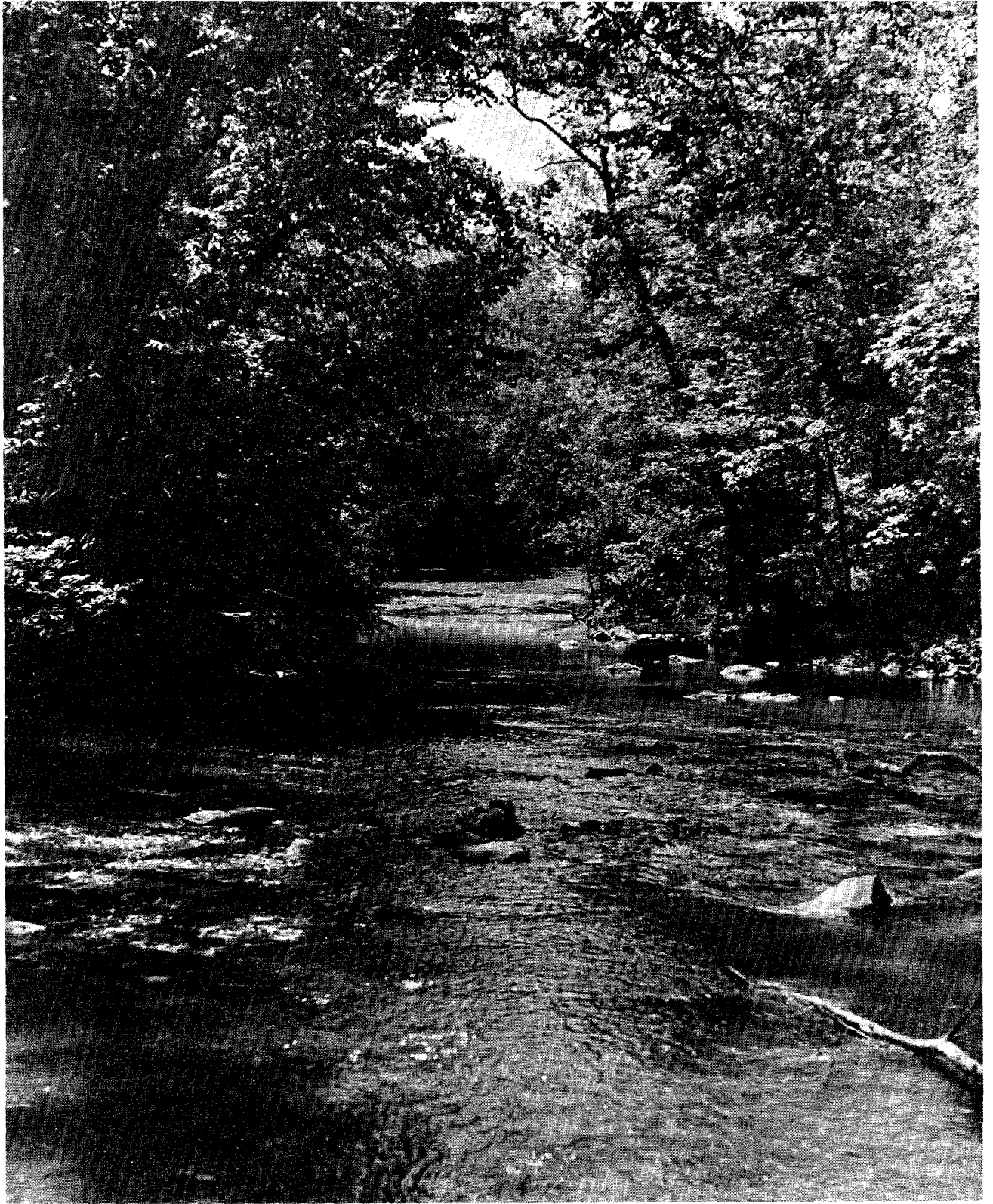
The Glen Helen Natural Area is open to the general public and provides trails for hiking, a trailside museum, guided tours throughout the year, and trailside sessions in interpreting the natural scene. There is an Outdoor Education Center where year-round school camping is available and where conference and workshops in conservation and related programs are held. This area also includes the 100-acre Yellow Springs School Forest, a resource management project, and a 200-acre experimental farm that emphasizes recreation in a modern farm management program including a riding center. Glen Helen Natural Area possesses outstanding quality in its illustrations of geology and ecology, but its greatest importance results from recognition of the value of its resources and their use for education and enjoyment. In 1965, the Glen Helen Natural Area was added to the National Registry of Natural Landmarks. Glen Helen had approximately 70,000 visitors in 1971.

Immediately adjacent to Glen Helen and also a part of the Country Common is John Bryan State Park where camping, picnicking, and swimming in a public pool are possible. The park is 795 acres in size and includes considerable acreage above Clifton Gorge as well as a large section of the gorge itself. A small day-use lodge is available for rental. In fiscal 1971, total attendance in the park exceeded 612,000 visitors, of which over 51,000 visitors were campers.

The 841-acre multipurpose Spring Valley Wildlife Area, located on the Little Miami River near Bellbrook, is administered by the Ohio Division of Wildlife for public hunting, trapping, and fishing. Camping, picnicking, archery, and shooting ranges are also provided. Within Spring Valley, fishing is provided on a 75-acre lake and along two miles of the Little Miami River. A "put and take" pheasant release program is carried out and other wildlife species are managed. The area annually receives heavy hunting pressure. An extensive marsh area adjacent to the lake has made the area popular among naturalists.

The 685-acre Fort Ancient State Memorial, administered by the Ohio Historical Society, is situated on the east bank of the Little Miami River approximately seven miles southeast of Lebanon on State Route 350. The preserve was created by a joint resolution of the legislature in 1891, making it Ohio's first state park. The memorial actually consists of two sections: Fort Ancient, the prehistoric Hopewell Indian earthwork on the 275-foot bluff overlooking the Little Miami River; and the Anderson Village Site, also prehistoric, located on the river below Fort Ancient. The 100-acre hilltop enclosure which the Hopewell Indians built (somewhere between 300 B.C. - 600 A. D.) was divided into three sections: A North Fort, a Middle Fort, and a South Fort. Within these areas are located ditches, stone pavements, and burial mounds. Archaeological explorations have removed pottery, tools, and ornaments identified with the Hopewell Indians. Long after the Hopewell culture had left the scene, the Fort Ancient Indians, from 1000 A.D. to 1600 A.D., built small villages in the South Fort and at the Anderson Village Site in the valley. Archaeologists have uncovered over 150 burials at the Anderson Village Site along the riverbank. A new museum at the park presents modern exhibits, models, and life study groups of the two Indian cultures which inhabited the site. Picnicking, hiking, and scenic overlooks are the principal outdoor features of the memorial. This area has been designated a National Historic Landmark. This area had approximately 217,000 visitors in the 1971 fiscal year.

A 180-acre scenic overlook park area has just recently been built on both sides of I-71 at the west end of the Jeremiah Morrow Bridge, the state's highest bridge. The bridge stands 235 feet above the Little Miami River valley and is 2,230 feet long. Divided into three sections, the park offers roadside rest facilities, picnic tables, grills, nature trails, shelter houses and overlooks--all connected by scenic driveways. The scenic roadside park was developed by the Ohio Department of Highways to comply with the 1965 Highway Beautification Act.



The Little Miami River in John Bryan State Park.

The Greene County Park District operates three recreation areas along the Little Miami River, one adjacent to Spring Valley along State Route 725, another one mile northeast of Bellbrook on Washington Mill Road, and the third about one mile southwest of Cedarville on Massies Creek. The parks at Spring Valley and Bellbrook, totaling 21 acres, are basically boat launching and fishing sites with parking and picnic facilities provided. Land for the 120-acre Cedar Cliffs Park on Massies Creek has recently been acquired. Developments will include nature trails, picnic areas, hiking trails, and the reconstruction of an old 14-acre pond for fishing and boating. This park is one of the most outstanding natural areas in southwestern Ohio, containing numerous caves, interesting springs, a scenic limestone gorge, and a 30-foot waterfall. Also located in the park is an old Indian mound, approximately 1/4 acre in size and presently owned by the Ohio Historical Society.

The 565-acre Sugarcreek Reserve, administered by the Dayton-Montgomery County Park District, is located on the Big Sugar Creek tributary, several miles above the confluence with the Little Miami River. The area is presently relatively undeveloped and for the most part will remain that way. Some 365 acres will be left in a natural condition as an ecological study area with facilities for hiking. The remaining 200 acres will be used for a riding center, archery range, picnicking, and primitive group camping.

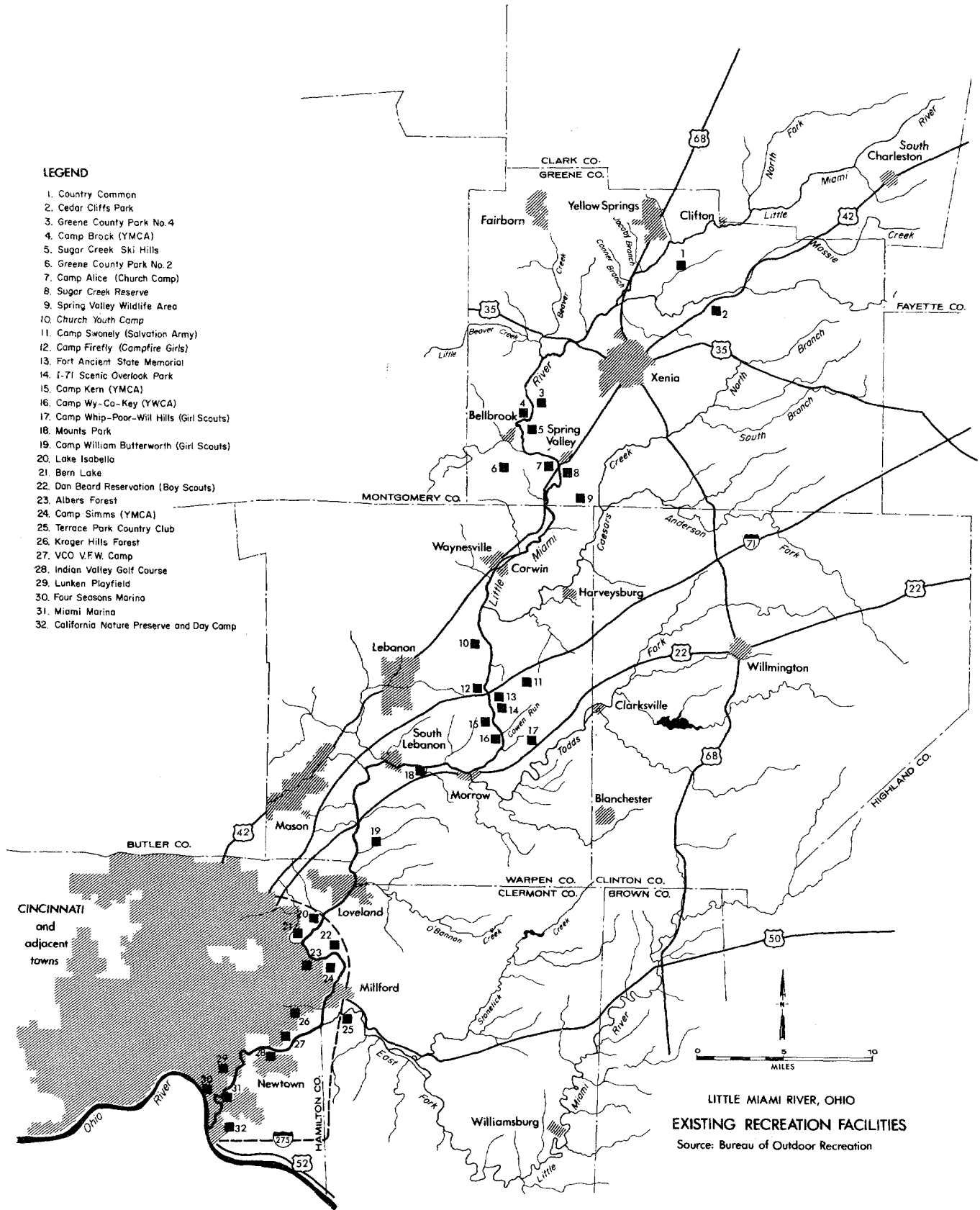
Thirteen group camps are located on or close to the Little Miami River. These include four Boy Scout camps, three Girl Scout camps, three YMCA camps, one Campfire Girls camp, one 4-H Club camp, and one camp run by the Ohio Soldiers and Sailors Orphans Home. Together, these camps total 2,219 acres. Although only semi-public in nature, these areas afford recreational opportunities to thousands of individuals, most of whom are children.

The most substantial contribution will come from Caesars Creek and East Fork reservoirs now under construction on two tributaries of the Little Miami River. These will add a total of 4,990 acres of water surface and 20,000 land acres available for recreation. Facilities will be provided for camping, picnicking, swimming, boating, hiking, and nature study. The development of these facilities at the two reservoirs will provide for an estimated use of 1,550,000 recreation days initially with an ultimate visitation expected to reach 4,900,000 recreation days.

The privately owned Kings Island Amusement Park, situated in the vicinity of Kings Mills comprising approximately 1,600 acres of land adjacent to the Little Miami River is being developed and is now available to the public. The park includes a 70-acre theme park, two golf courses, a 200-unit motor inn, a 330-foot replica of the Eiffel Tower, an entire street of various shops, and a 300-unit campground. It also includes a number of carnival-type rides, six manmade lakes, displays of wild animals, and a circus area. The park includes ownership of about 2.4 miles of river on the west bank and 1.4 miles on the east bank of the Little Miami River.

LEGEND

1. Country Common
2. Cedar Cliffs Park
3. Greene County Park No. 4
4. Camp Brock (YMCA)
5. Sugar Creek Ski Hills
6. Greene County Park No. 2
7. Camp Alice (Church Camp)
8. Sugar Creek Reserve
9. Spring Valley Wildlife Area
10. Church Youth Camp
11. Camp Swanley (Salvation Army)
12. Camp Firefly (Campfire Girls)
13. Fort Ancient State Memorial
14. I-71 Scenic Overlook Park
15. Camp Kern (YMCA)
16. Camp Wy-Co-Key (YWCA)
17. Camp Whip-Poor-Will Hills (Girl Scouts)
18. Mounts Park
19. Camp William Butterworth (Girl Scouts)
20. Lake Isabella
21. Bern Lake
22. Dan Beard Reservation (Boy Scouts)
23. Albers Forest
24. Camp Simms (YMCA)
25. Terrace Park Country Club
26. Kroger Hills Forest
27. VCO V.F.W. Camp
28. Indian Valley Golf Course
29. Lunken Playfield
30. Four Seasons Marina
31. Miami Marina
32. California Nature Preserve and Day Camp



LITTLE MIAMI RIVER, OHIO
EXISTING RECREATION FACILITIES
 Source: Bureau of Outdoor Recreation

The Kings Island Park is the type of recreation development which, if not properly managed, would be considered incompatible with the natural character of the river even under a "recreational" category. Visual intrusions and associated noises of a carnival-type nature could be undesirable to users who are boating, hiking, or fishing along the river. It is possible that the Kings Island Amusement Park would provide a novelty-type activity for some river users, particularly if tastefully done.

Recreation Use and Opportunities--The Little Miami River provides a fine base for a number of recreational activities. As discussed previously, the Little Miami valley possesses a rich fish and wildlife resource. The river is one of the state's better smallmouth bass streams, and fishing is presently one of the major recreational uses of the river. Although the upper reaches of the Little Miami are well known to local fishermen, fishing pressure in the area is surprisingly modest in view of the high quality fishing that the area affords. The Ohio Division of Wildlife has acquired acreage along the 2.4 mile reach from Oregonia to Fort Ancient. They have also acquired fishing easements along sections of the Turtle Creek, West Turtle Creek, Caesars Creek, Beaver Creek, and Anderson Fork, all of which are tributaries of the Little Miami River. This amounts to 47 river miles and 123 acres.

In 1970 approximately 68,000 fishing licenses were issued in the counties through which the Little Miami flows. The Ohio Department of Natural Resources estimates 90,000 - 100,000 angler trips were made along the Little Miami in 1970.

Hunting is a popular sport in the valley. Ringneck pheasants are found north from the Fort Ancient "Narrows," and cottontail rabbits are distributed over the valley. An estimated 12,000 hunting trips were made within the Little Miami basin in 1970. The majority of these hunting trips were in the Spring Valley area. The Spring Valley Wildlife Management Area received general recreational use by 68,200 persons in 1970.

Much of the Little Miami is usable for canoeing, for there is sufficient water during most of the year. The low degree of difficulty and the leisurely pace of the river, enhanced by a meandering channel marked by occasional riffles, make a trip on the Little Miami an enjoyable experience for the average canoeist. Excellent canoeing is possible during periods of good flow in the spring and fall from the southern edge of Glen Helen at Jacoby Bridge to the Ohio River. Most portages on this route are relatively short and infrequent, except during periods of low flow. Few designated canoe access sites exist on the river, and opportunities for increasing the number of canoe launching areas are numerous.

Various civic organizations presently sponsor canoe races during the spring and summer along several stretches of the river. The Beaver Creek Jaycees sponsor an annual canoe race on the upper part of the Little Miami River from Fairgrounds Road north of Xenia to the Spring Valley Wildlife Area, a distance of 18 miles. This race is held in late April or early May.

Little Miami, Inc., sponsors the Annual Little Miami Canoe Race held on the first weekend in June and covering the 30-mile stretch from South Lebanon to Milford. The Milford Chamber of Commerce sponsors sprint races from Miamiville to Milford, a distance of four miles, in conjunction with the above event. The Warren County Canoe Association, Inc., in conjunction with Little Miami, Inc., sponsors the annual Fort Ancient-Little Miami River Canoe Races held along a 15-mile stretch from Corwin Dam to the Ohio 350 bridge at Fort Ancient. This race is usually held in early August. These races draw large crowds, attracting participants from several states, and are all sanctioned by the United States Canoe Association.

A canoe livery is located on the river at Fort Ancient. This livery offers various float trips on the river, ranging up to five days in length. In 1970 approximately 14,000 people used a total of 6,000 canoes from this livery on the Little Miami River. It is estimated that an additional 9,000 canoes, carrying approximately 21,000 people, were launched by groups and individuals at access sites along the Little Miami.

Camping in a developed campground is presently limited to John Bryan State Park and Spring Valley Wildlife Area. There is presently a rather serious deficiency of camping areas in the Little Miami valley and in southwestern Ohio. The Little Miami valley offers abundant opportunities for developing additional camping areas to meet these needs.

Picnicking is enjoyed primarily at the public recreation areas along the river, although there is limited activity at bridge pull-offs and other access points and in association with floating activity.

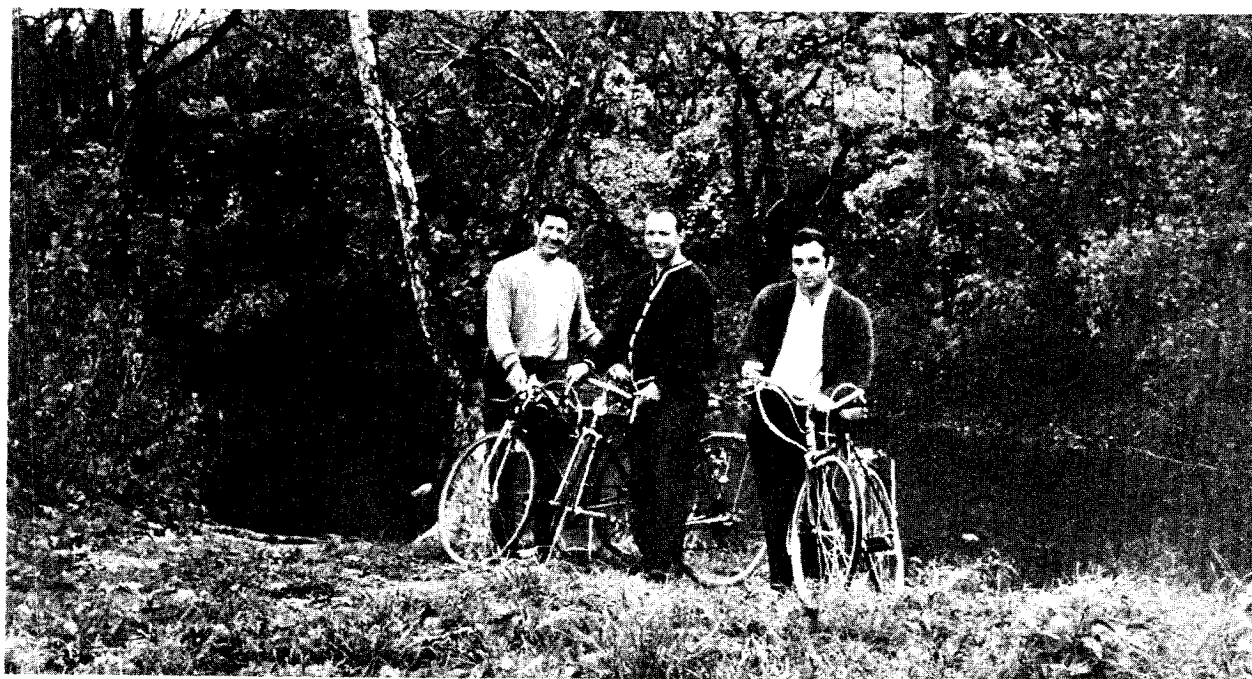
Although swimming is not a major activity on the river at the present time, there is some swimming activity which does take place, mostly by the local residents and in conjunction with floating and fishing activity. The Little Miami is generally too shallow to provide extensive opportunities for swimming.

Hiking and nature-oriented pursuits are popular at John Bryan State Park, Glen Helen, Spring Valley, Fort Ancient, Sugarcreek Reserve, and at several of the other public areas along the river. The lack of developed trails and the limited amount of public lands restrict the scope of these activities. There are, however, excellent opportunities for developing a trail system for the Little Miami valley. A hiking trail is planned along the southern reaches of the Little Miami River that will spur from the Buckeye Trail, Ohio's longest footpath. The Little Miami hiking and riding trail will branch off the Buckeye Trail at Miamiville in Hamilton, Clermont, and Warren Counties to Waynesville and, eventually, continue on up the valley to connect with existing trails at Spring Valley, John Bryan State Park, and Clifton Gorge. The Buckeye Trail extension is being developed jointly by the Buckeye Trail Association and Little Miami, Inc.

Several civic organizations presently sponsor canoe races along the Little Miami River.



Bicycling along the Little Miami Scenic Bikeway.



The 90-mile Little Miami Scenic Bikeway, developed jointly by the City of Cincinnati Recreation Commission; Little Miami, Inc.; and the Bicycle Institute of America was officially opened in October 1970. The route parallels the Little Miami River, starting at Lunken Playfield in Cincinnati and extending northward to the Greene-Clark County line. The Bikeway follows existing county and township roads, public property, and connects the existing Old Mill Bikeway at Clifton-Yellow Springs with the Lunken Airport Bikeway in Cincinnati, Ohio. Most of the route is within a quarter of a mile of the river. There are some 48 historic sites and points of interest along the 90-mile route.

In addition to the Little Miami Scenic Bikeway, the Fairborn Bike Route, developed by the Fairborn Park and Recreation Department, the Dayton Cycling Club, and the Bicycle Institute of America, was opened in August 1970. This route, totalling some 20 miles, begins in Fairborn at the Air Force Museum and runs eastward to John Bryan State Park, connecting up with the Old Mill Bikeway and the Little Miami Scenic Bikeway.

The Buckeye Trail extension and the Little Miami River and Fairborn Scenic Bikeways, following separate routes, will give families who want to bike, horseback ride, and bicycle through the countryside marked routes which they can follow past places of natural and historical interest.

Due to its natural attractiveness and relationship to several large metropolitan areas, driving for pleasure and sightseeing within the Little Miami valley are popular recreation activities. Marked scenic routes utilizing existing country and local roads would increase the popularity of this activity.

Limiting Factors--There are a number of physical and cultural factors which present limited recreational use of the Little Miami River. Several of these, such as water quality, water flow, access, conflicting water and land uses, and riverbed ownership, have been discussed previously. This section will summarize some of the factors previously discussed and expand on those not completely evaluated from a recreation use point of view.

Water quality is not a significant limiting factor in the case of the Little Miami River. Although small sections of the Little Miami River do not presently meet minimum standards for recreation adopted by the Ohio Water Pollution Control Board, the remainder of the river is generally in good condition and suitable for most recreational pursuits. To meet overall water quality, criteria will require improved treatment of waste discharges at several locations as well as flow augmentation or stream treatment. An enforcement plan has been published by the Ohio Water Pollution Control Board and found acceptable by the Office of Water Programs, Environmental Protection Agency (formerly the Federal Water Quality Administration), and local residents.

Turbidity caused by soil erosion can be significantly reduced by streambank stabilization and land conservation methods in the watershed. Steps to correct this problem are underway through cooperative action under Public Law 566 between local watershed groups, the U. S. Soil Conservation Service, and the State of Ohio.

Generally, there is good sustained flow during most of the year. During extended dry periods, however, most water-related activities, including canoeing, are somewhat limited in parts of the river. Canoeing and other water-related activities will be greatly enhanced by flow augmentation releases from Caesars Creek and East Fork Reservoirs, due to be completed in 1976.

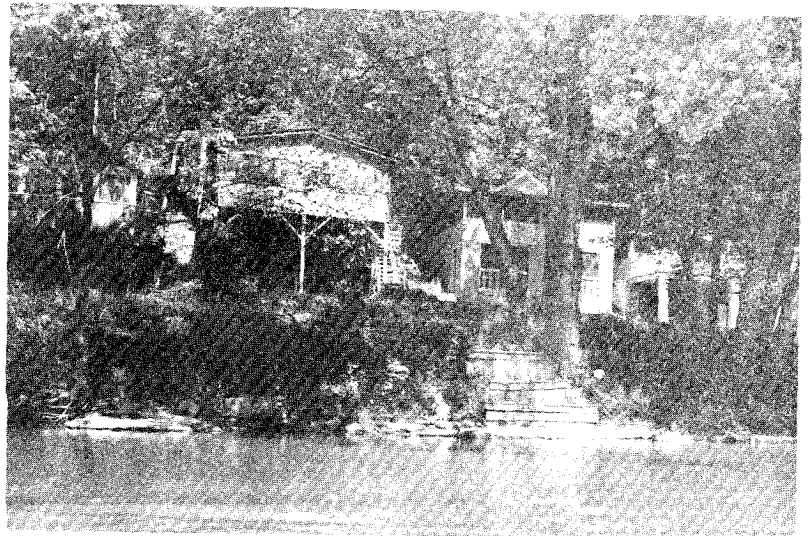
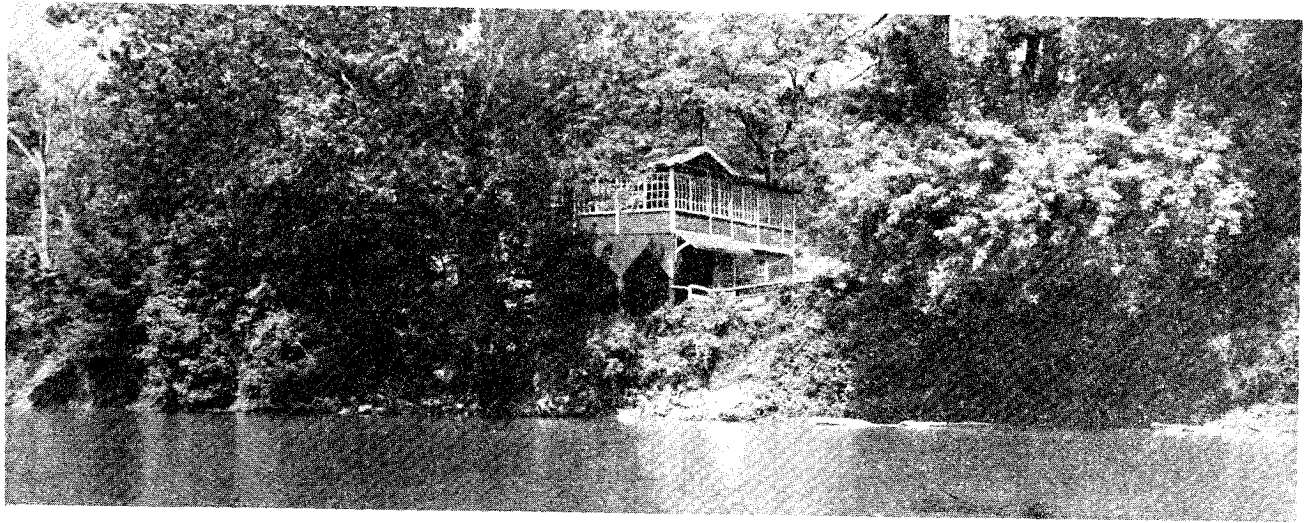
The scarcity of designated and developed public access sites presently limits use of the river. Although one can usually obtain permission to cross private lands at bridge areas to launch boats, knowledge of the most suitable sites is limited to local people and to frequent river users. Some of the road crossing access points receive very heavy use on summer weekends. Littering has become a problem at most of these sites since there are no waste containers provided. Some serious erosion problems have also resulted. Additional access sites under public control are needed to assure access to the river. In addition to access sites, there is a general lack of picnic and sanitary facilities.

Existing uses of riparian lands along the Little Miami are for the most part compatible with recreation use. Obsolescence, deterioration, and improper use of land, however, have resulted in blight along sections of the river. The river banks in sections are badly covered with litter, bankside dumps, debris, run-down properties, dilapidated cottages, and other such evidences of man's carless use of the water course. These conditions substantially detract from one's enjoyment of the river.

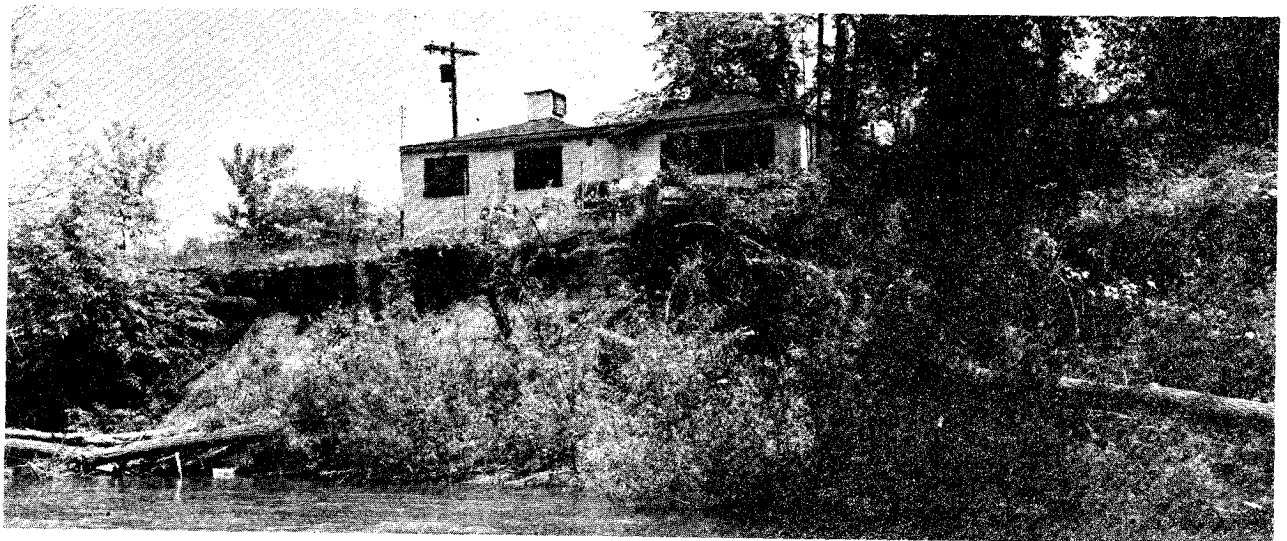
The problem is especially acute in the section from Milford downstream to Shademoore. Major redevelopment measures are needed if such areas are to satisfy effectively outdoor recreation and other needs.

Considerable improvement has been made in clearing litter and debris from the river channel and banks since passage of the state anti-littering law last year. In addition, numerous citizen groups have conducted cleanup campaigns along the river. These have helped alleviate some of the problem areas.

Another problem confronting those interested in the conservation and enhancement of the scenic and recreation values of the Little Miami River is the encroachment on the open space along the river by other land uses, such as housing developments and transmission lines.



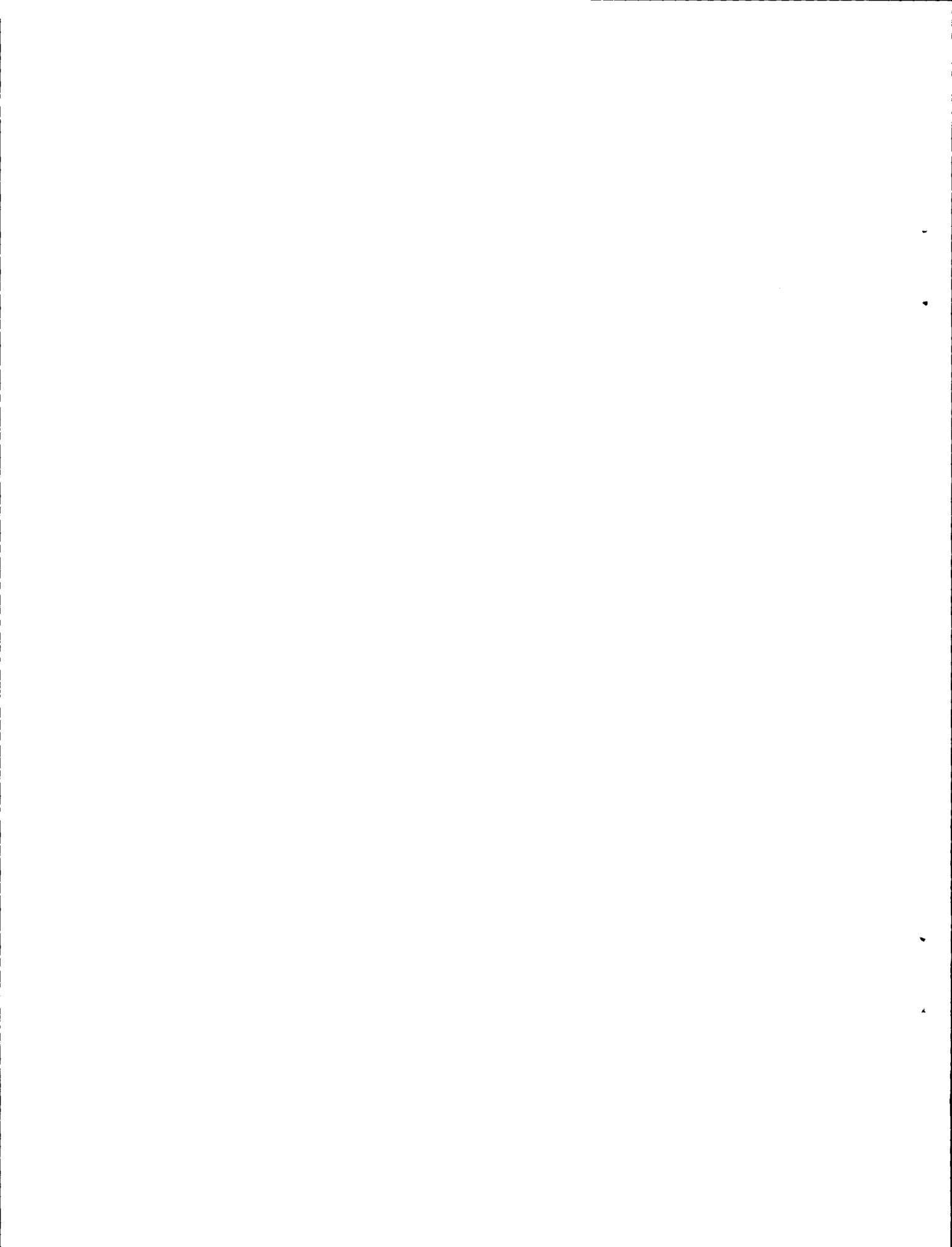
Cabins and year-around homes of varying degrees of compatibility with the riverscape are located within the visual corridor and are in the view of the river user.



As noted previously, the Little Miami is subject to occasional flooding. Most of the problem is concentrated in the lower reaches of the river at Morrow and below. The present level of flooding does not seriously impair the recreational potential of the valley. The two tributary reservoirs now under construction will alleviate many of the flood problems.

V

CONCLUSIONS



V. CONCLUSIONS

The Little Miami River from Glen Island, just below Foster, Ohio, upstream 64 miles to the State Highway 72 crossing at Clifton, Ohio, and the two miles of the Caesars Creek tributary below Caesars Creek Dam, along with their immediate environments, possess natural values and provide potential recreation opportunities which warrant inclusion under the national wild and scenic rivers system. These free-flowing segments offer scenic, recreational, fish and wildlife, and historic values of a distinctive nature for the large populations in and near Cincinnati, Dayton, Hamilton, Middletown, Springfield, and Columbus, Ohio, areas where there are few river-oriented recreation developments and only minimal river areas under protection. The Little Miami River contains water of relatively good quality and meets the "Aesthetics-General Criteria" as defined by the National Technical Advisory Committee on Water Quality Criteria, April 1, 1968.

The remaining sections of the Little Miami River do not meet the criteria established for inclusion in the national wild and scenic rivers system. Above the Town of Clifton the river is small, shallow, and lacks significant scenic or recreational attributes. Below Foster, although there are some sections still in good condition, extensive man-made impacts on the river and its immediate environment have lowered natural values below the quality required by the Wild and Scenic Rivers Act. The major problems in the lower river are the sand and gravel operations in the river bed, cluttered housing, and dumping. The resource potential is such, however, that with a major rehabilitation effort by the local public bodies, the river could eventually be upgraded to meet the minimum criteria.

The Soil Conservation Service has received five applications for assistance from local sponsoring organizations under authority of Public Law 566. The water resource development proposals approved for construction on Dick's Creek-Little Muddy Creek, as supplemented, are four impoundments, 14.1 miles of channelization, and 42,000 acres of accelerated land treatment. Water resource development considerations on the Beaver Creek, Upper Little Miami River, and Massies Creek areas consist of 12 impoundments and 50 miles of channel modifications to meet the stated project objectives. If public interest is renewed on these projects, the Soil Conservation Service will reconsider the local objectives and cooperate with the state and appropriate federal agencies to avoid or minimize adverse effects on the natural and scenic values of the Little Miami River. Where channel modification is necessary, care will be exercised to preserve the quality of the stream and to mitigate any losses which may accrue to fish and wildlife habitat.

There are two authorized U. S. Army Corps of Engineers reservoir projects in the watershed, one on Caesars Creek and the other on East Fork. The East Fork project will not have a direct effect since it is downstream from the segment recommended for inclusion in the national system. The effect of the Caesars Creek project on the downstream river environment can be

both good and bad, depending on the construction practices and the method of reservoir operation. Every effort should be made by the Corps to avoid any adverse effects downstream during the construction phase. Once completed, the project should be operated to avoid adverse effects downstream. Emphasis should be given to enhancing the recreational potential of the downstream segment.

A land development proposal which poses a possible threat to the river environment is the multimillion dollar amusement park area developed by the Taft Broadcasting Company and Coney Island, Inc., on a 1,200-acre tract along I-71 near Kings Mills and adjacent to the Little Miami River. A written agreement between the state and park developers would be desirable to assure that the area immediately adjacent to the river remains compatible with the concept of a scenic river.

Classification. The Wild and Scenic Rivers Act requires that the rivers in the national wild and scenic rivers system be classified as "wild," "scenic," or "recreational." Because of its varied character, the Little Miami River does not conform to a single classification. It is, in essence, a combination of several rivers, each with its own contrasting features. The rugged gorge and rapids below Clifton bear little resemblance to the broad valley and quiet waters near Xenia. The steep wooded hillsides near Fort Ancient differ sharply from the cultivated bottomland near Corwin and the highly urbanized lower portion of the valley. The proposed Little Miami riverway contains two of the three classes defined in the Act, recreational and scenic. These two river classifications are defined as follows:

Section 2(b)(2) Scenic River Areas - Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Section 2(b)(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 in the past.

The approximately 66 miles of river under consideration have been divided into four segments. Two of these segments are classified as "scenic" and two as "recreational." These segments are:

<u>Segment</u>	<u>Classification</u>
State Highway 72 crossing at Clifton to Conner Branch tributary (eight miles)	Scenic
Conner Branch to Caesars Creek (32 miles)	Recreational

Caesars Creek to Cowen Run tributary
including lower Caesars Creek (10 miles)

Scenic

Cowen Run to Foster (16 miles)

Recreational

1. Scenic - Clifton to Conner Branch - This section, approximately eight miles in length, begins at the State Highway 72 crossing at Clifton and ends at the Conner Branch tributary below Goes. Included are the rugged Clifton Gorge, John Bryan State Park, Glen Helen Natural Area, and the surrounding lands making up the Country Common. The shorelines of this section of the river are largely in a natural condition. There are no roads which closely parallel the riverbank and only two roads which bridge the river. These two crossings are by township roads receiving only moderate traffic.
2. Recreational - Conner Branch to Caesars Creek - From Conner Branch to the mouth of Caesars Creek is a distance of 32 miles. Wide, farmed valleys, "The Narrows," and bluffs in Greene County and Spring Valley Wildlife Area are the dominant features. There is more urban development in this segment, farming use is more visible from the river, and there is one small impoundment. In this section, roads occasionally parallel and often cross the river. There are 15 bridge crossings in this stretch.
3. Scenic - Caesars Creek to Cowen Run - This section, approximately 10 miles in length, begins at the mouth of Caesars Creek and extends downstream to Cowen Run. It also includes the scenic Caesars Creek Gorge below the Caesars Creek Dam, now under construction. This segment is dominated by the high bluffs of the Fort Ancient area, and the river environment retains an overall natural character, qualifying under the "largely primitive" criteria. Farmsteads are occasionally seen and crop and pasture land in several places extends to the river's edge. There are five bridge crossings in this section. There are several short stretches of roads and railroads paralleling the river, but they are inconspicuous and well screened.
4. Recreational - Cowen Run to Foster - From the mouth of Cowen Run to Glen Island, just below Foster, Ohio, it is 16 miles. Urban development is more visible in this segment than in any of the others. The river flows through the communities of Morrow, South Lebanon, and Foster, but most of the riverbank still retains much of its natural character. The gorge in the Kings Mills area and the Halls Creek Woods area west of Morrow are the dominant features. There is one small impoundment, eight bridge crossings, and numerous short stretches of well-traveled roads closely paralleling the riverbank. Most of the paralleling roads, however, are inconspicuous and well screened.

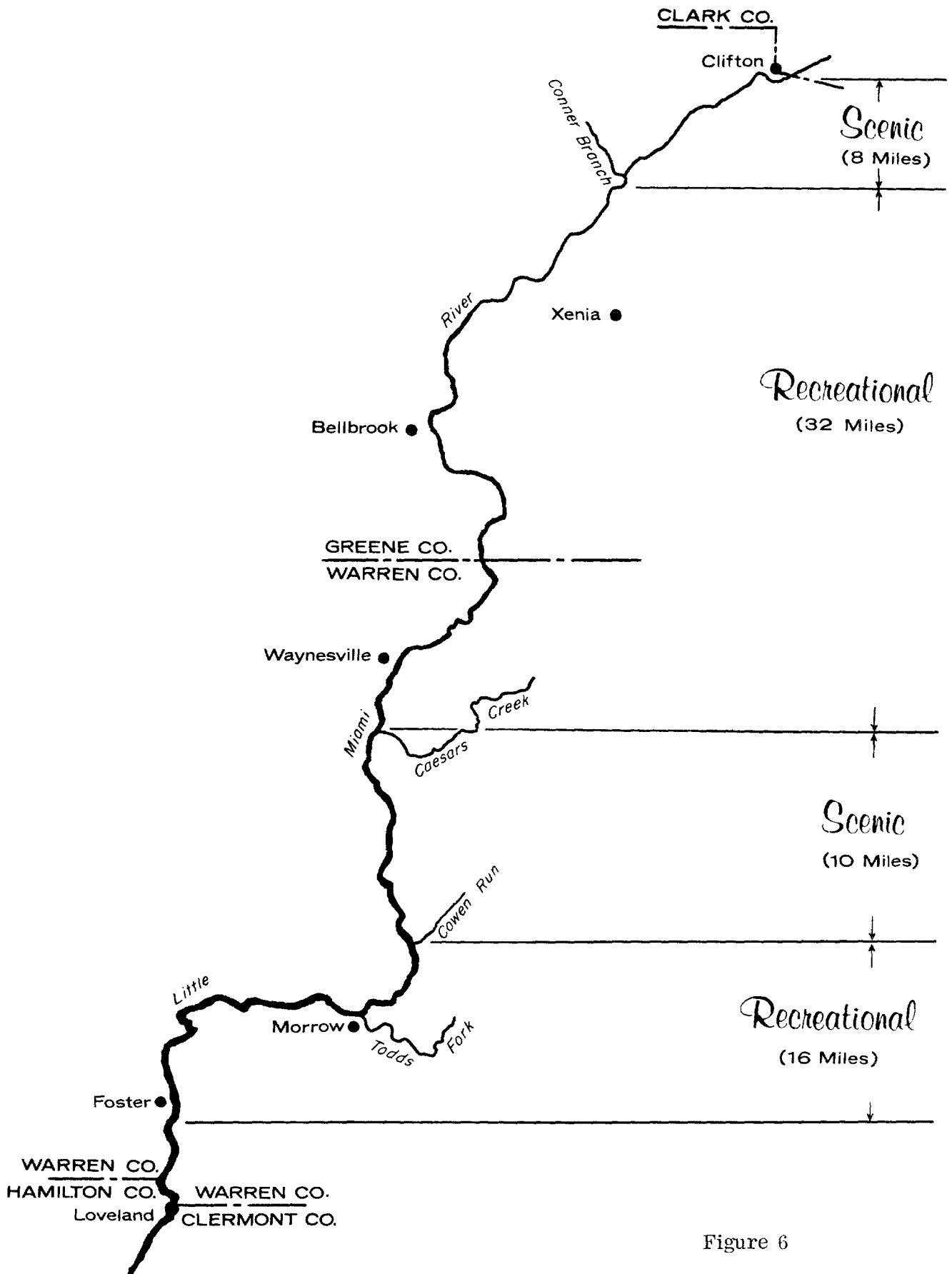


Figure 6

LITTLE MIAMI RIVER, OHIO
RIVER CLASSIFICATION

Source: Bureau of Outdoor Recreation

Administration. The protection and development of the Little Miami River can be effectively achieved by the State of Ohio in cooperation with local units of government. The state is presently administering the Little Miami River as a state scenic river area and is planning to initiate a land acquisition program in the 1971-73 biennium.

The state conservation officers are now active in policing and protecting the river. They enforce a number of state laws concerning hunting, fishing, trapping, boating, stream litter, and conservation that are important to a river preservation project. Pollution laws are presently being enforced by the Water Pollution Control Board of the Ohio Board of Health. Through these and other programs, the state has established good working relationships with local government officials, groups, and individuals.

Most of the local public bodies along the river have expressed their support for the protection and recreation development of the Little Miami River. In addition, a local citizens conservation group, Little Miami, Inc., has been actively promoting the protection of the Little Miami. The established lines of communications and the high level of favorable local interest should be invaluable to the state in encouraging local participation in a scenic river program and in negotiating and enforcing scenic easements and other land-use controls along the river.

A major portion of the length of the component would remain in private ownership under various types of land-use control obtained through easement or state and local zoning action. There are also a large number of jurisdictions having planning, management, or development responsibilities over the type and extent of uses made of the land and water resources both within the component and on adjacent areas. The overall values of the Little Miami River would receive greater protection and enhancement if state and local jurisdictions and residents along the river had a common focal point to coordinate their activities relating to the land and water resources within the designated segment. A Little Miami Advisory Board should be established to accomplish this purpose. Its primary purpose would be to advise and to assist the state and local governmental units in the planning, development, management, and administration of the river and would provide all interests a voice in the policies and actions with respect to the Little Miami River.

The added protection a state river receives as a result of including it in the national system is from projects coming under federal license or involving federal funds. The Federal Power Commission cannot issue a license for any dam or other project, nor can any federal agency provide grants, loans, licenses, or other assistance for projects that would have a direct and adverse effect on the river and its immediate environment, or, if outside the river area, would invade or unreasonably diminish the values present in the river area. There are no restrictions in the Wild and Scenic Rivers Act involving state or local projects on rivers in the national system which do not involve a federal license or federal financing. Protection from these projects, therefore, rests with the state agency administering the river.

Under the Ohio Scenic Rivers Act, the state has no legal control over construction by local public bodies with a scenic river area. Section 1501.17 of the Ohio Scenic Rivers Act states only that "no state department, agency, or political subdivision may build or enlarge any highway, road, or structure within a scenic river area outside the limits of a municipal corporation without consulting with the Director of Natural Resources." Therefore, public bodies located within a designated scenic river area are required only to consult with the Director before initiating construction. This may involve simply forwarding construction plans to the Director. As worded, the Director has no legal authority to refuse permission for construction or to stop construction, unless the section involved is in state ownership. The state act should be amended to require any state department, agency, or political subdivision to submit plans to the Director of Natural Resources for approval prior to building or enlarging any highway, road, or structure within a state scenic river area. This would give the Director the authority to deny permission for construction if he felt the construction would have an adverse effect on the river. If this authority were not granted, a local project may be constructed in the future which would have an adverse effect on the values of the river and its immediate environment. This could result in a reclassification of the river area; i.e., scenic to recreational; or if severe, withdrawal of the river from the national wild and scenic rivers system by the Secretary of the Interior.

Federal Participation. Ohio presently has federal funds available for financing land purchases, improvement, and development programs for scenic and recreational river-type programs through the Land and Water Conservation Fund, the Dingell-Johnson and Pittman-Robertson programs, and the Open Space Land Program. The demand for these funds is intense.

Under the Land and Water Conservation Fund program, the Bureau of Outdoor Recreation makes grants to states and through them to their political subdivisions for planning, acquiring, and developing public outdoor recreation areas and facilities. Funds apportioned to the states under this program finance 50 percent of total allowable project costs. The state or local governmental unit must provide the remaining 50 percent. A total of \$9,750,000 was apportioned from the Fund to Ohio for fiscal 1972. In Ohio, approximately 40 percent of the Land and Water Conservation Fund monies annually go to state agencies and 40 percent to local units of government, with 20 percent held as a contingency reserve. Under the present schedule of acquisition and development for fiscal years 1971-1975, \$3,233,000 has been earmarked for use by state agencies in the Miami Valley Planning Region for the five-year period. Approximately 94 percent of this will be used for recreation development and six percent for land acquisition.

Under the Dingell-Johnson Program (Federal Aid in Fish Restoration Act-1950), the U. S. Fish and Wildlife Service makes cost-sharing grants up to 75 percent to the state game and fish departments for, among other things, the

acquisition, development, restoration, rehabilitation, and improvement of water areas adaptable as hatching, feeding, or breeding places for fish. Under the Pittman-Robertson Program (Federal Aid in Wildlife Restoration Act-1937), the U. S. Fish and Wildlife Service makes cost-sharing grants up to 75 percent to the state game and fish departments for the acquisition, development, restoration, rehabilitation, and improvement of land and water areas adaptable as feeding, resting, or breeding places for wildlife. It is not expected that much assistance would come from these two programs, due to the small amount of money available and the high demands on these monies across the state. In fiscal 1970 only \$287,000 was available to Ohio from the Dingell-Johnson program and \$693,000 from the Pittman-Robertson program.

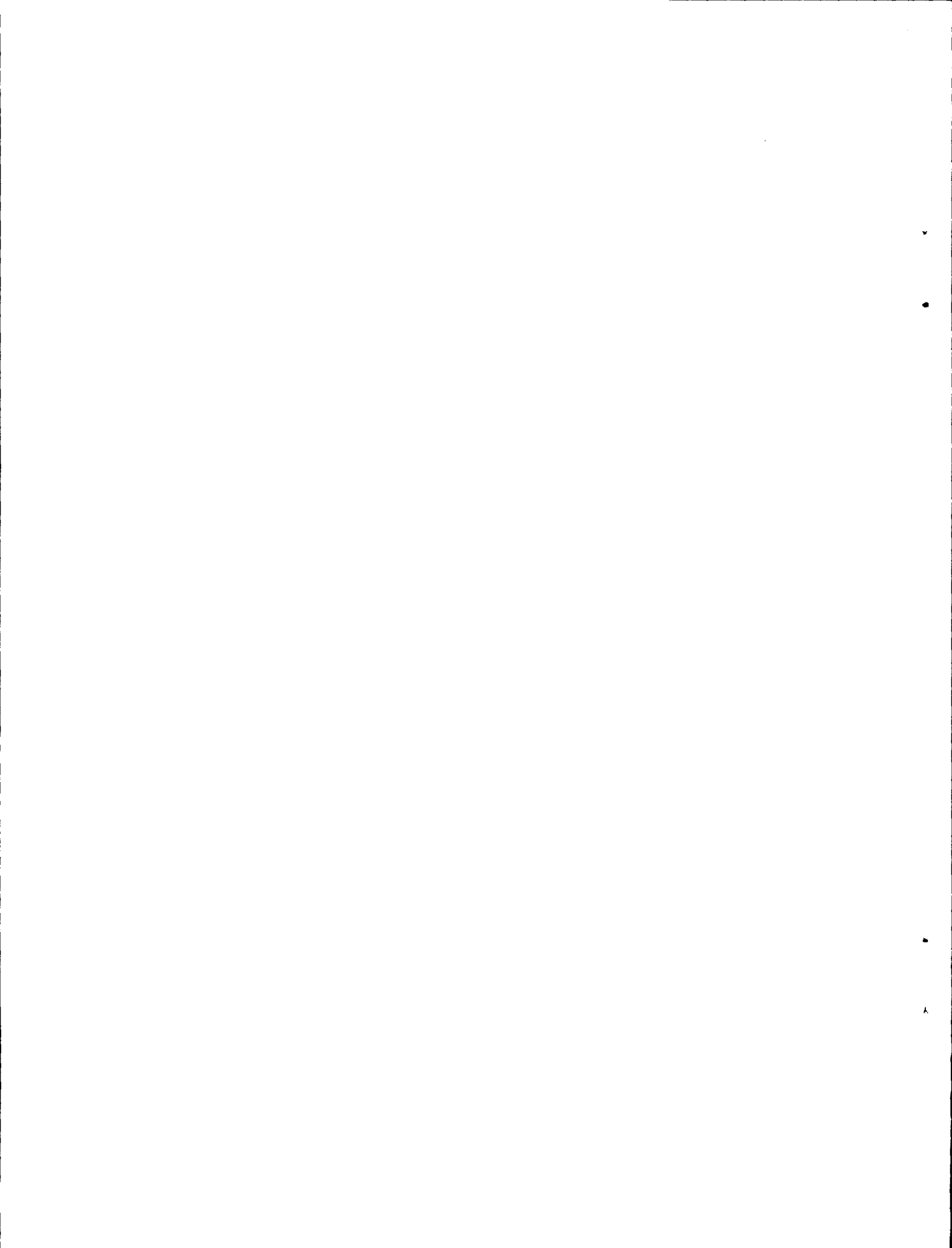
The Open-Space Land Program, administered by the Community Resources Development Administration, provides matching grants to states and local public bodies up to 50 percent of the cost of acquiring and developing land in urban areas for permanent open space use. Use of land for park, recreation, conservation, scenic, or historic purposes is included. Since inception of this program in 1962, through fiscal year 1969, only \$7,600,000 had gone into open space projects in Ohio. Most of this has been going into small projects such as "vest pocket parks" in the larger urban areas.

Economic Impact of the Proposed Action

Although a detailed assessment of the economic impact of the proposal was not developed, the effect of the proposal's implementation can be evaluated in a general manner.

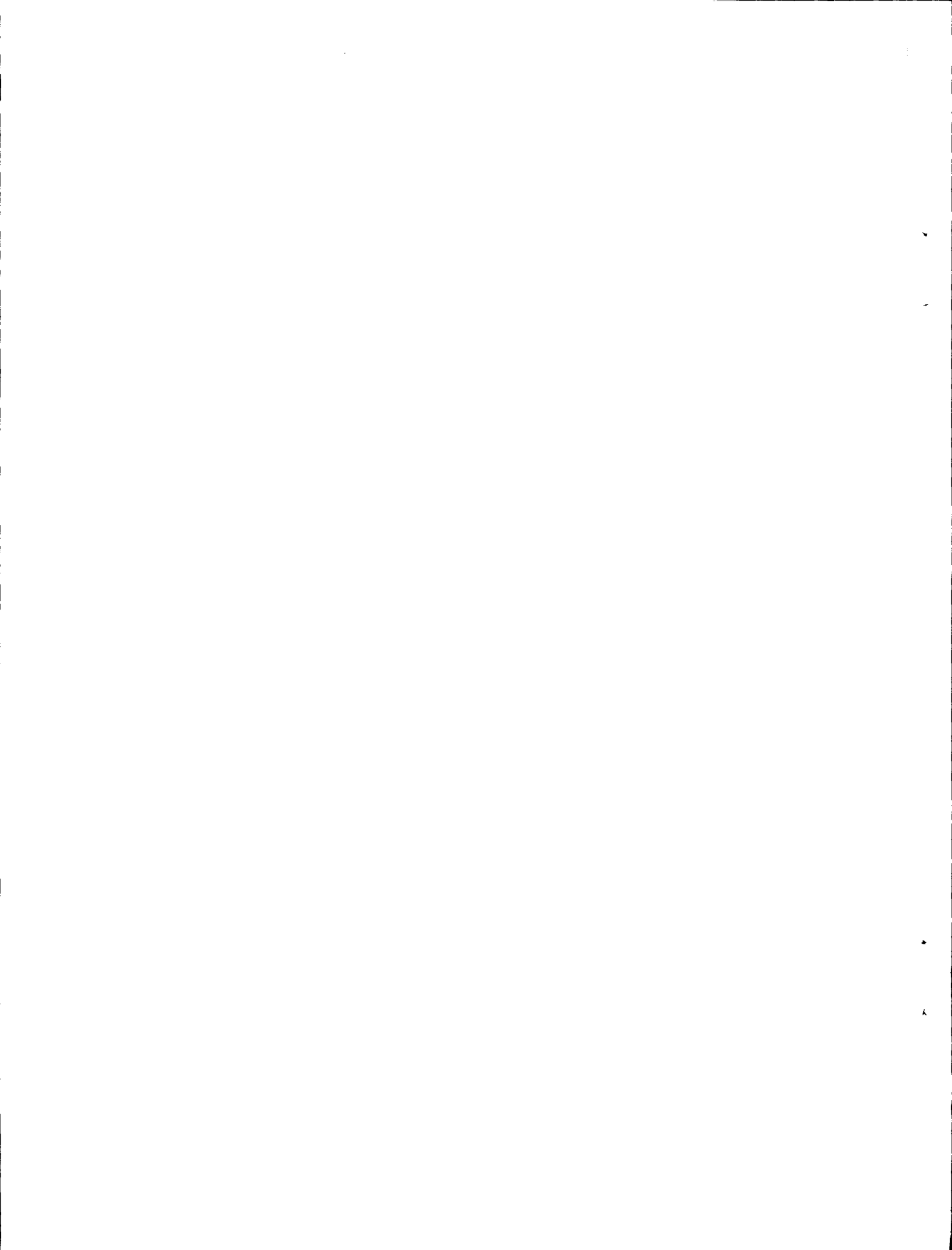
Establishment of the Little Miami as a scenic and recreational riverway as envisioned by this proposal would preclude residential and commercial development of riverside lands; however, the presence of a national scenic river would tend to enhance the value of private property in the vicinity of the riverway boundaries. No significant amount of agricultural land would be taken out of production; however, some tax loss to local units of government would result from land acquisition by the State of Ohio. No planned major water resource development would be prevented by implementation of the proposal.

A number of beneficial effects would occur as a result of the riverway program. A natural river environment would be protected for the use and enjoyment of present and future generations, and vital open space would be provided for the expanding Cincinnati-Dayton urban complex. Recreational values inherent in the riverway and its environment would be utilized and not lost due to urban encroachment. Other beneficial results from program implementation might include increased sales by local business establishments due to an expanded number of recreationists and an increase in business for, and expansion of, service industries.



VI

RECOMMENDED RIVER PLAN



VI RECOMMENDED RIVER PLAN

This river plan is designed to provide the State of Ohio with recommended management policies and developments for the administration of the Little Miami River as a component of the national wild and scenic rivers system. The boundaries and developments shown are presented as general recommendations and should not be construed as being the complete or final plan for the river.

Area

The proposed boundary incorporates a total of 66 river miles and encompasses approximately 9,900 acres.

The riverway would extend from the State Highway 72 crossing at Clifton, Ohio, to Glen Island, just below Foster, Ohio. Of the 9,900 acres included within the boundary, 2,520 acres are presently in public ownership; 920 acres are owned and managed by Antioch College as part of the Glen Helen Nature Preserve; and 6,460 acres are in private ownership. It is estimated that 2,000 of the 6,460 acres in private ownership would be purchased in fee. Scenic easements should be obtained on the remaining 4,460 acres. These figures are estimates and it is expected that the state will refine them as planning for the river proceeds.

Costs

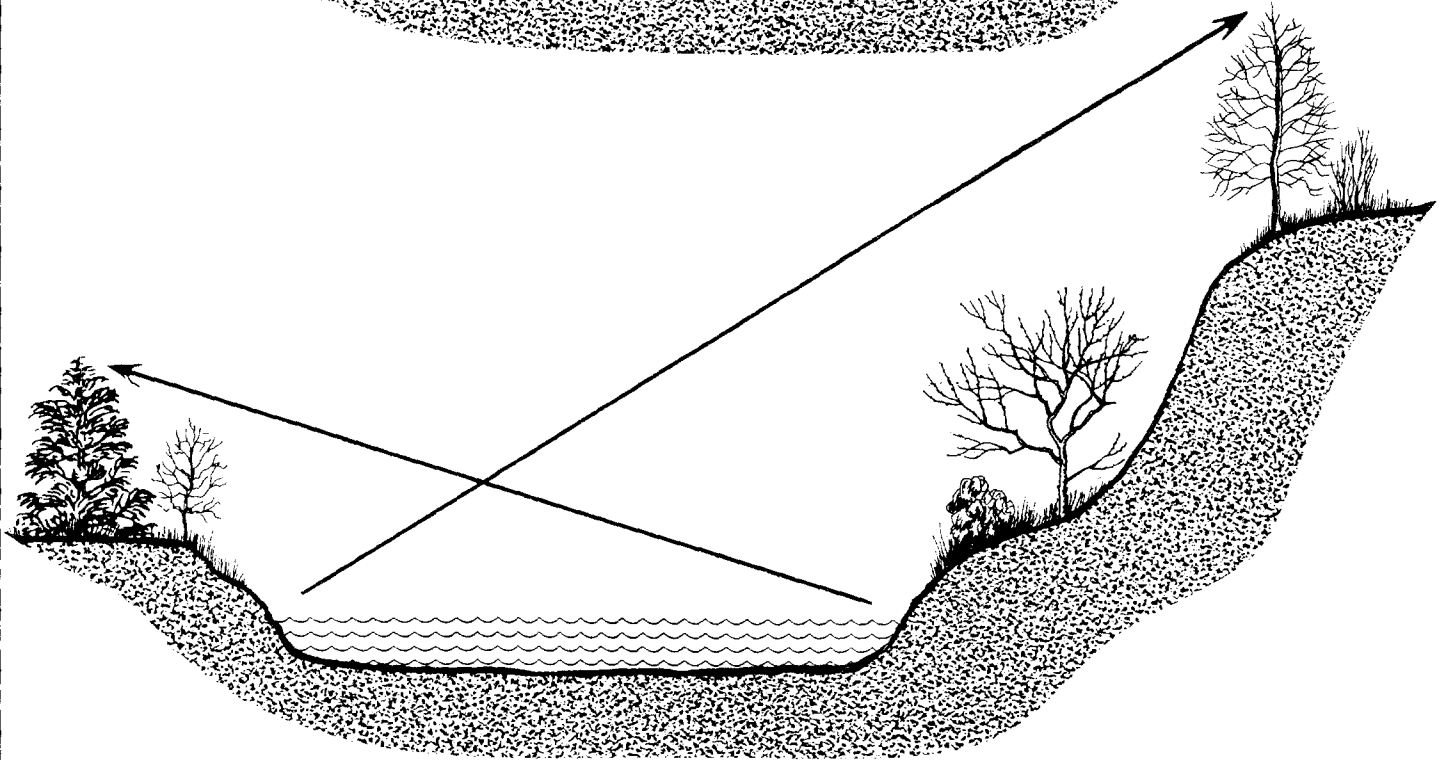
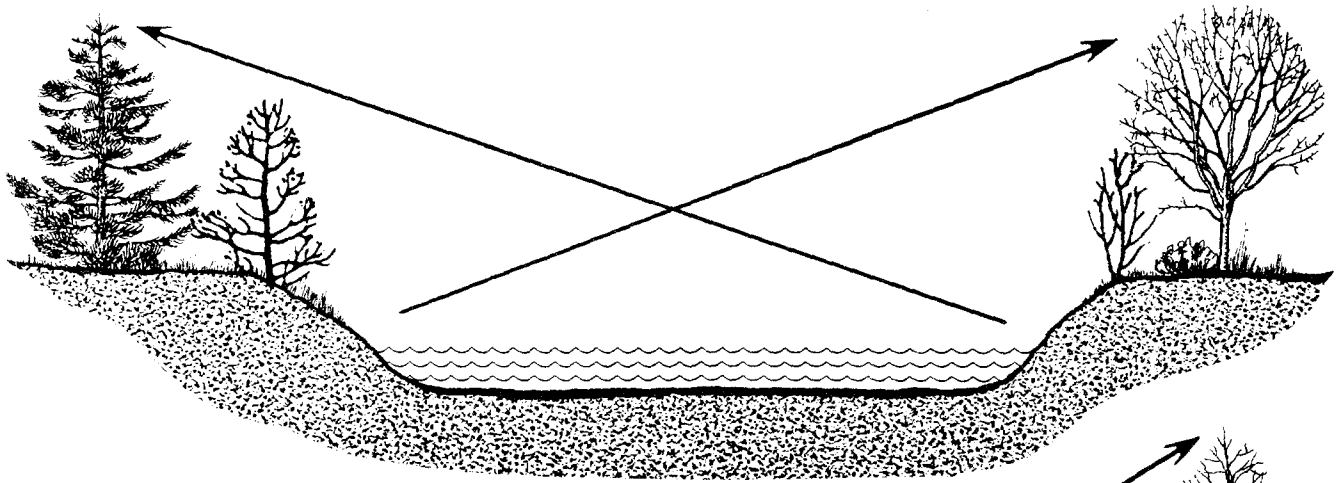
Acquisition costs for the 2,000 acres of land in fee title and the 4,460 acres in scenic easements would be approximately \$2,200,000 and \$2,650,000, respectively, for a total of \$4,850,000. Provision of the recreation developments recommended in the river plan would cost an estimated \$725,000. The estimated cost for operation and maintenance of the recommended facilities, based on 1971 figures, would be approximately \$200,000 annually.

Appropriate Boundaries

The Conceptual Plan map shows a recommended boundary for the Little Miami River. The rationale used for determining the appropriate boundaries was

drawn from concepts developed in a number of recent studies containing riverway recreation proposals. The basic element is the idea of a "visual corridor" or "critical sight line." The sketches in Figure 7 illustrate the concept as it applies to typical Little Miami River valley cross sections. Essentially, it is the zone of adjacent land which has a visual impact on the river user and, therefore, must be protected from adverse use if the natural and scenic appeal of the riverway is to be retained.

Within this "visual corridor" framework, lands were selected using several basic guidelines. Where the river banks are low, a strip of land 50-400 feet deep on each side of the river was considered adequate to protect the



Typical Valley Cross Sections

Figure 7

LITTLE MIAMI RIVER, OHIO

CRITICAL SIGHT LINES

Source: Bureau of Outdoor Recreation

view from the river. This strip of land would support a screen of trees and brush and could also accommodate a hiking trail. It would be narrow enough, however, to leave practically all of the rich agricultural land in the floodplain under private ownership. Where bluffs or hillsides closely front the river on one or both sides, the boundaries were drawn to the ridge line of the hill or bluff to insure protection of slopes within view of the river. There were also cases where expansion was necessary to provide adequate room to place recreation facilities back from the river. Unique biological areas or important archaeological sites, which do not necessarily fit under the "visual corridor" guidelines but are still closely associated with the river, were given consideration for acquisition and protection under the scenic and recreational river program. It was also desirable to expand the boundaries in several areas to gain some control on adjoining lands where adverse development could damage the environment, such as industrial development in the floodplain.

Acquisition Policy and Land Use Controls

Property rights acquired within the recommended boundary would be designed to protect the natural scene and accommodate recreational use.

Fee acquisition would be confined to the acreage needed to provide access and services to the public and to protect the river and resource values which might be jeopardized by less-than-fee control. The remaining acreage would be protected by the use of scenic and recreation easements. Generally speaking, procurement of scenic easements on lands is more readily acceptable to the majority of landowners and local units of government than are fee purchases. These controls would provide for certain recreational uses, permit continuation of the existing agricultural pattern, protect the land from incompatible utilization, and retain the land on the local tax rolls. The specific nature of the restrictions included in an easement would be determined on a case-by-case basis.

The control and protection of lands through easements and other agreements would require detailed investigation and entail extensive negotiation with the landowners before agreement on the advisability and extent of such control for each tract can be reached.

The rights most likely to be negotiated with landowners along the Little Miami River in easements are:

1. Restrictions on the land to specific uses and developments, such as single-family residential, agricultural, timber stand improvement, etc.
2. Limitations on the heights of future structures, on the exterior appearance of buildings, and on the intensity of development.
3. Prohibitions of billboards and advertising signs.
4. Prohibitions of dumping sites for piles of trash or other unsightly materials.

5. Restrictions on the allowable extent of the cutting of trees and vegetation.

Cities and villages with portions of their corporate limits abutting the Little Miami River would be encouraged to adopt zoning ordinances which contribute to the protection and preservation of the riverway and are consistent with the purposes of the Wild and Scenic Rivers Act.

Floodplain and other protective zoning by local entities and the state would be needed to provide additional control and protection throughout the river area and to extend the buffer zone beyond the official river boundaries.

It would be highly desirable if the Ohio Scenic Rivers Act could be amended to give the state, through the Department of Natural Resources, the authority to review the zoning regulations adopted by local units of government or the need for such regulations concerning lands within the designated boundaries of a state scenic river area. If the Director of Natural Resources believes that further regulation of lands within a scenic river area is needed, he should notify the appropriate local unit of government and recommend guidelines and standards for a zoning ordinance which would carry out the purposes of the state act. If local units of government fail to enact and enforce adequate zoning regulations, the Director should be given the authority to enact ordinances for the local units of government and cause them to be enforced. Regulation of the lands within a scenic river area is essential to insuring preservation of the river. Changes in the State Scenic Rivers Act, giving the Director of Natural Resources the aforementioned authority with respect to zoning, would insure adequate zoning regulations for these lands.

Development

The purpose of providing public use facilities would be to enhance the visitor's enjoyment of the area and to insure that the visitor does not

destroy the very environment he seeks to enjoy. The recommended development plan for the Little Miami River is based on the concept of maintaining the river environment in as natural a state as possible while providing sufficient recreational facilities for appropriate visitor use and enjoyment of the river. Considering the closeness of the Little Miami to the Cincinnati-Dayton urban complex, demand will undoubtedly be greatest for day-use type facilities. With the exception of small primitive campgrounds for river users, no additional campgrounds are proposed. It was felt that these could be provided at adjoining public areas such as Caesars Creek State Park and by private enterprise outside the scenic river boundary.

In addition to the existing developments at John Bryan State Park, Glen Helen Nature Preserve, Spring Valley Wildlife Area, and Fort Ancient State Memorial, small multiple-use parks are recommended for seven areas. These include the Fairgrounds Road, "Narrows," and Sugar Creek areas in Greene

County and the Caesars Creek Gorge, Waynesville Bluffs, Halls Creek Woods, and Deerfield Gorge areas in Warren County.

1. Fairgrounds Road - Approximately 100 acres are proposed for acquisition on the west bank where Fairgrounds Road passes over the Little Miami River. This wooded tract offers excellent opportunities for picnicking and associated day-use facilities. Comfort facilities, drinking water, a parking area, and boat ramp would be provided along with several short loop trails for hiking. A river-user camp area would be developed just south of Ford Road.

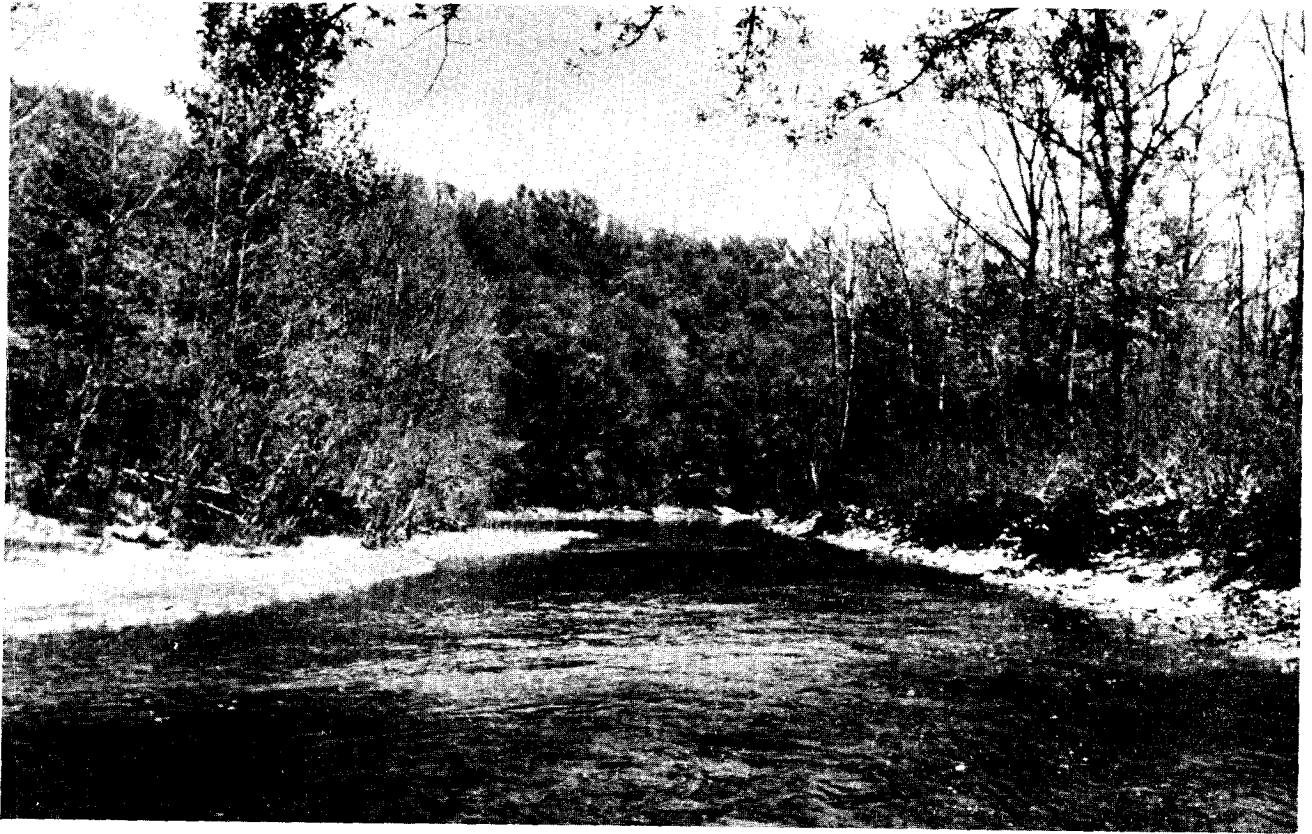
2. Narrows - Approximately 350 acres are recommended for acquisition in the "Narrows" near Bellbrook. This section of the Little Miami River is very scenic and has high recreation potential. The valley is heavily wooded and steep with little or no development at the present time. Eastward expansion from Dayton, however, is fast approaching this area. The recent trend is toward the development of rural residential homesites, and the cost of land in the area is rising rapidly. This section should receive high priority for acquisition. Recreation development, centered around day-use facilities, would provide for picnicking, fishing, canoeing, horseback riding, hiking, and nature-oriented activities. A trail and river-user camp area will also be provided within this area.

3. Sugar Creek - Approximately 175 acres are proposed for acquisition along the Little Miami River near the confluence of Sugar Creek. A majority of this acreage involves the forested bluff area on the south bank. This area will provide good fishing access to both Sugar Creek and the Little Miami River. Proposed developments include a river-user camp, picnic facilities, rest room facilities, boat ramp, overlook area, and hiking trails along the river and in the well-forested sections of the proposed area.

4. Caesars Creek - The Caesars Creek Gorge should be purchased from the Caesars Creek Dam to the Little Miami River, a total of 440 acres. This scenic natural area would provide a corridor between the planned state park development on Caesars Creek Reservoir and the Little Miami River.

The steeply wooded gorge is rich in flora. The mixed hardwood forest is made up of good varieties of mature timber and will lend itself well to being a nature preserve. There is presently no development within this area. The gorge should be developed as a nature preserve with activities limited to hiking, canoeing, and tailwater fishing.

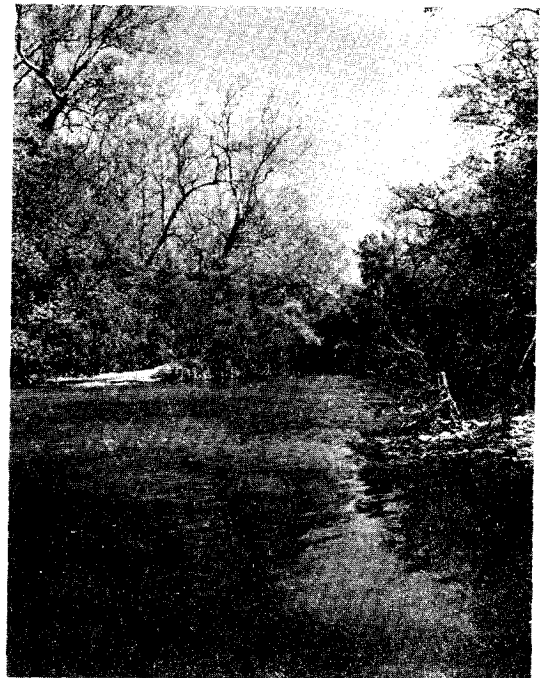
5. Waynesville Scenic Overlook - Approximately 30 acres are proposed for acquisition along the bluff tops bordering the west side of the river about 1.5 miles below the mouth of Caesars Creek. This area would provide an excellent setting for a picnic area, overlook, and hiking trails.



Fairgrounds Road Area

Narrows Area

Sugarcreek Area



6. Halls Creek Woods - Approximately 260 acres are proposed for acquisition in the rugged Halls Creek Woods area, about one mile downstream from Morrow. The forest is composed of mixed hardwoods of maple, beech, oak, and hickory with a large variety of wildflowers and ferns present. The scenic attraction of the area is Halls Creek which passes through the area and forms a series of small, but beautiful waterfalls as it passes over the Ordovician limestone bedrock. The area is proposed for use as a natural area with activities limited to hiking and nature study.

7. Deerfield Gorge - An area of approximately 280 acres is proposed in the Deerfield Gorge near Kings Mills. This steep, wooded gorge area is very scenic and would be developed primarily for day-use activities such as picnicking, hiking, and horseback riding. An overlook area and the river user camp area would also be developed.

Boat launching areas should be developed at about 12 other areas where public roads cross or come near the river. These sites would average about 15 acres and would be provided with boat ramps, parking areas, drinking water, picnic tables, and comfort facilities.

1. Grinnel Road
2. Jacoby Road
3. Massies Creek (off U. S. 68)
4. U. S. Highway 35
5. Indian Ripple Road
6. Corwin Mill Dam
7. Corwin Road at confluence of Caesars Creek
8. Oregonia Road
9. Woodville Road at confluence of Todd Fork
10. State Route 58
11. Maineville Road
12. Glen Island Park area near Foster

Existing boat launching areas are located at Greene County Parks No. 2 and 4 (Washington Mill Road near Bellbrook and adjacent to Spring Valley along State Route 725), Roxanna Road within Spring Valley Wildlife Area, Mathers Mill, and at Fort Ancient.

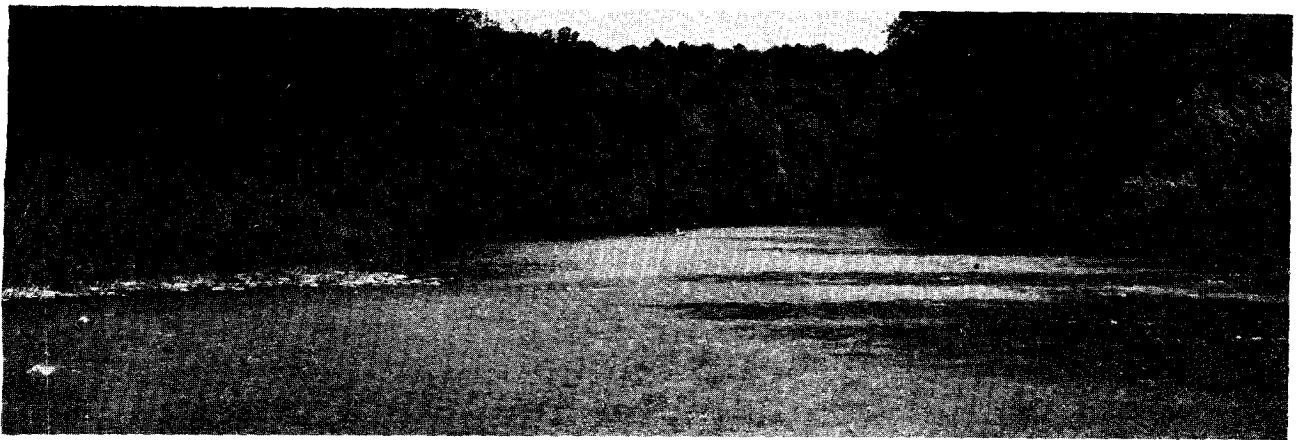
Eight primitive campgrounds are recommended for initial development. These camps would provide overnight stopping places for river travelers or hikers and would be spaced at appropriate intervals which permit visitors to participate in journeys varying from a few hours to several days. All facilities at the float camps should be rustic in design and include a well with hand pump, vault-type privies, tent pads, fireplaces, perhaps a table or two, and trash containers. The campgrounds should be located back from the river and designed to minimize their visual effect from the river. A log-type loading area and asphalt walkway leading to the camp should be developed at access points in order to avoid bank erosion. Several of the camps should be specifically designed to handle large groups such as Boys Scouts, since



Halls Creek Woods Area

Caesar Creek Gorge

Deerfield Gorge Area



there will be a demand for this type of facility. Consideration should also be given to providing permanent shelters at several of the camps proposed below.

1. North of Grinnel Road.
2. Wooded area south of Ford Road.
3. Area south of Sperling Lane Road below the "Narrows."
4. Sugar Creek area.
5. Spring Valley Wildlife Area adjacent to Collett Road.
6. Adjacent to Waynesville Road approximately one mile downstream from Caesars Creek.
7. South of Fort Ancient near Gilmour Road.
8. Confluence of Muddy Creek about one mile downstream from South Lebanon.

Management

The management objectives for the Little Miami River should be to protect and enhance the values which caused it to be recommended for inclusion in the national wild and scenic rivers system, without limiting other uses that do not substantially interfere with public use and enjoyment of these values. The river should be managed to:

- Maintain its natural free-flowing condition.
- Protect and enhance the scenic, recreational, geologic, fish and wildlife, historic, cultural, archaeological, scientific, and other similar resources.
- Maintain and enhance water quality.
- Provide for public access, use, and interpretation of the important scenic, recreational, geologic, fish and wildlife, historic, cultural, archaeological, scientific, and other similar resources, consistent with protection of the quality of the river and its environment.

Some specific management suggestions are:

Recreation

- Emphasis should be placed on the development of water-oriented recreation facilities that would provide a wide range of compatible recreation activities.
- Efforts should be made to establish visitor-use levels which do not endanger the values for which the river was designated a component of the national system. Access sites and other facilities should be developed and distributed with close attention

paid to the impact from use that would result. Because the long term and continuing impact of human use on the river and its environment is not fully understood, a system of periodic evaluation and monitoring should be established to develop criteria for the protection and management necessary to insure a meaningful scenic river experience.

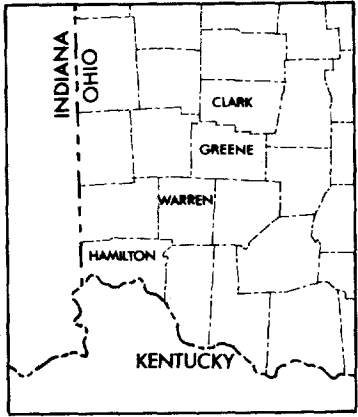
- Facility development should not detract from the quality of the river scene. Development should be back from the river's bank and in most cases screened from the view of the river user.
- Interpretation of the historical and natural features of the river for the educational and recreational benefit of its users is an important management objective. The interpretive devices and signs should be kept to a minimum on the more natural stretches of the river and be relatively unobtrusive or complementary to the natural and historical scene.
- The use of motorized vehicles and watercraft for recreation purposes should be strictly controlled.

Fish and Wildlife

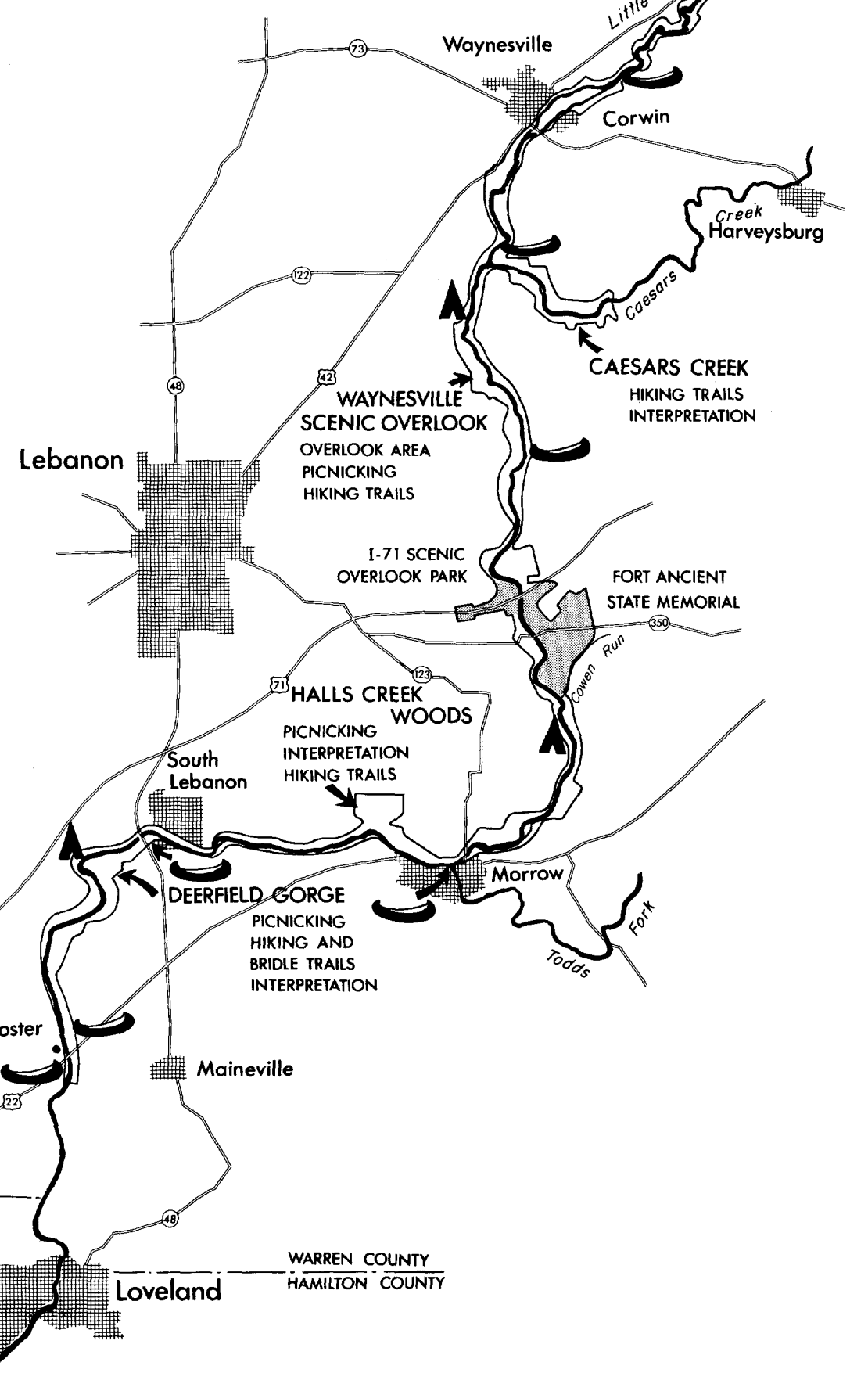
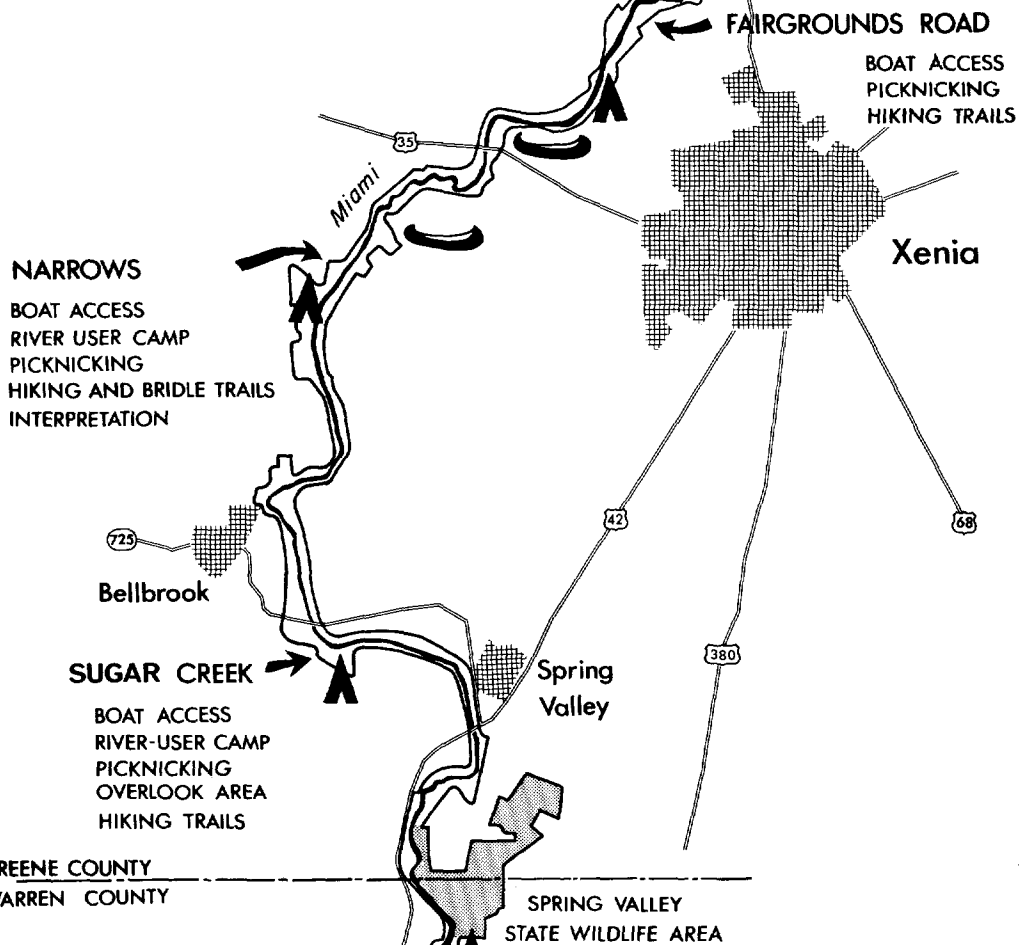
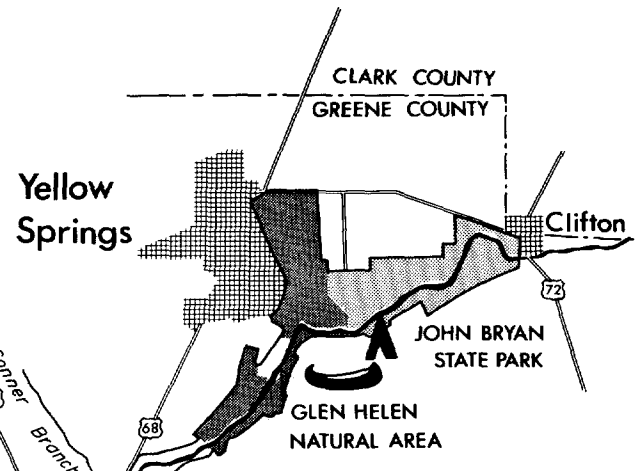
- Habitat management for fish and wildlife should reflect equal consideration of game and nongame species, and all practices employed should be in conformance with the maintenance of the natural qualities of the riverway.

Land Resource Use

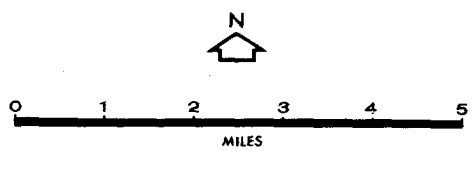
- Management objectives should be to maintain or restore a natural appearing, healthy timber stand wherever possible. Some selective harvesting of timber stands within the boundaries could be permitted provided the effects are not apparent to users of the river and it does not conflict with recreational values, including aesthetic qualities.
- Native species should be used in all areas where seeding or planting is required. Special management protection measures would be needed for areas of unique biological value.
- Protection of the timber resources within and near the river boundaries from fire, insect, and disease damage should receive added emphasis. Control or salvage measures necessary for diseased or damaged trees or other vegetation should be carefully weighed against the adverse impact on the scenic values to determine if the control is warranted.



Vicinity Map



- LEGEND**
- RIVER USER CAMP
 - BOAT LAUNCH AREA
 - PROPOSED BOUNDARY



**LITTLE MIAMI RIVER
CONCEPTUAL PLAN**

- Maintenance of stable soils and protection of the watershed adjacent to the river is essential. Because much of the recreation activity and development would take place near the river's edge, special emphasis should be placed on preventing and controlling soil erosion. This is true for both natural and man-caused deterioration. Soil stabilization measures and revegetation should be undertaken where feasible on all exposed soil areas.
- Removal of bankside vegetation should be prevented and cropping restricted where it endangers natural or scenic values.
- Efforts should be made to encourage local units of government to apply zoning controls of lands adjacent to the river, particularly in the floodplains and nearby developed areas to insure that the quality environment is protected by a buffer zone.

Water Resources

- Since river and stream communities are especially susceptible to pollution, careful attention must be given to the planning and construction of developments along the river and its tributaries. A program for monitoring chemical, biological, and physical water quality characteristics should be established.
- Efforts to reduce siltation through land conservation measures throughout the watershed should be intensified. Further investigation should be made of the feasibility and desirability of additional watershed projects in the Little Miami River basin.
- No alteration of the natural channels in the basin that significantly affect the free flow of water should be permitted unless it is clearly demonstrated that such alterations would have no adverse effect on the scenic and recreational river reaches.
- The taking of gravel from the river bed should be prohibited within the riverway. Gravel operations in the floodplain adjacent to the river area should be closely monitored so that they do not adversely affect river values.
- The vigorous state-local cooperative program to control littering and dumping along the river should be continued.

Utilities

- New utilities should be located out of sight or otherwise be screened from view of the river.
- Generally, no new utility or transmission lines should cross the river. Where it is essential that they do so, existing rights-of-way should be used if possible.

PHOTO CREDITS

<u>Page</u>	<u>Photos</u>	<u>Source</u>
Cover	Clifton Gorge	Dr. Kenneth Hunt
58	Fishing the Little Miami	Ohio D.N.R.
60	Pileated Woodpecker & Warbler	Karl Maslowski, Cincinnati, Ohio
64	Fort Ancient	Ohio Historical Society
67	Clifton Mill	B.O.R.
75	Roadway Across Little Miami	B.O.R.
81	John Bryan State Park	Ohio D.N.R.
86	Canoe Race and Bicycling	Little Miami, Inc.
89	Cabin Development	B.O.R.
108	Suggested Development Areas	B.O.R.
110	Suggested Development Areas	B.O.R.

River Trip

<u>Photo Number</u>	<u>Source</u>
1	B.O.R.
2	B.O.R.
3	Ohio D.N.R.
4	Ohio D.N.R.
5	B.O.R.
6	B.O.R.
7	B.O.R.
8	Ohio D.N.R.
9	B.O.R.
10	B.O.R.
11	B.O.R.
12	B.O.R.
13	B.O.R. Camair Corporation

