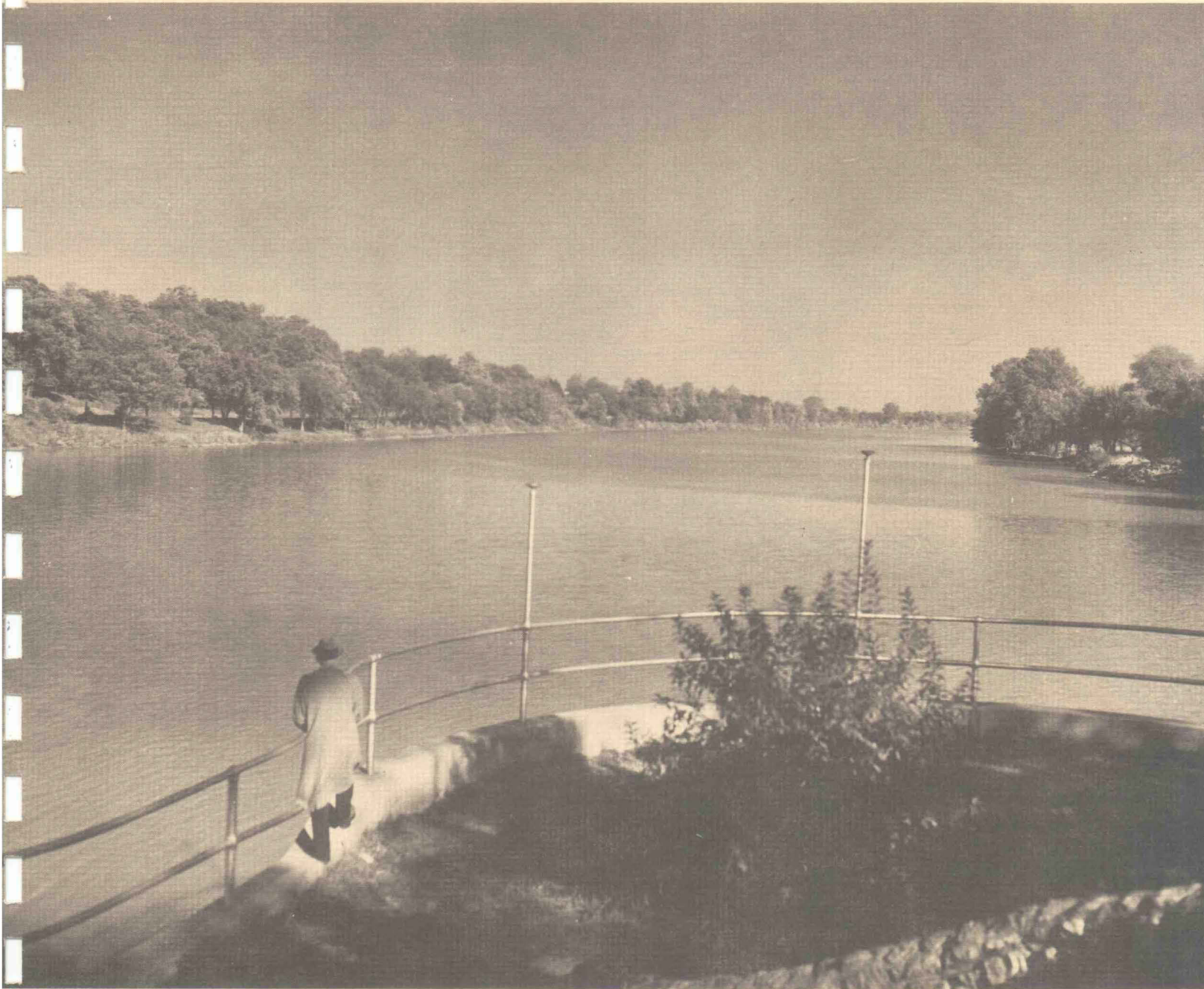


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THE MAUMEE RIVER

A Wild and Scenic River Study



Field Draft Report

Prepared by

Bureau of Outdoor Recreation
Lake Central Region

JUNE 1974

AS THE NATION'S PRINCIPAL CONSERVATION AGENCY, THE DEPARTMENT OF THE INTERIOR HAS RESPONSIBILITY FOR MOST OF OUR NATIONALLY OWNED PUBLIC LAND AND NATURAL RESOURCES.

THIS INCLUDES FOSTERING THE WISEST USE OF OUR LAND AND WATER RESOURCES, PROTECTING OUR FISH AND WILDLIFE, PRESERVING THE ENVIRONMENTAL AND CULTURAL VALUES OF OUR NATIONAL PARKS AND HISTORICAL PLACES, AND PROVIDING FOR THE ENJOYMENT OF LIFE THROUGH OUTDOOR RECREATION.

THE DEPARTMENT ASSESSES OUR ENERGY AND MINERAL RESOURCES AND WORKS TO ASSURE THAT THEIR DEVELOPMENT IS IN THE BEST INTERESTS OF ALL OUR PEOPLE.

THE DEPARTMENT ALSO HAS A MAJOR RESPONSIBILITY FOR AMERICAN INDIAN RESERVATION COMMUNITIES AND FOR PEOPLE WHO LIVE IN ISLAND TERRITORIES UNDER U. S. ADMINISTRATION.

DEPARTMENT OF THE INTERIOR

Rogers C. B. Morton, *Secretary*

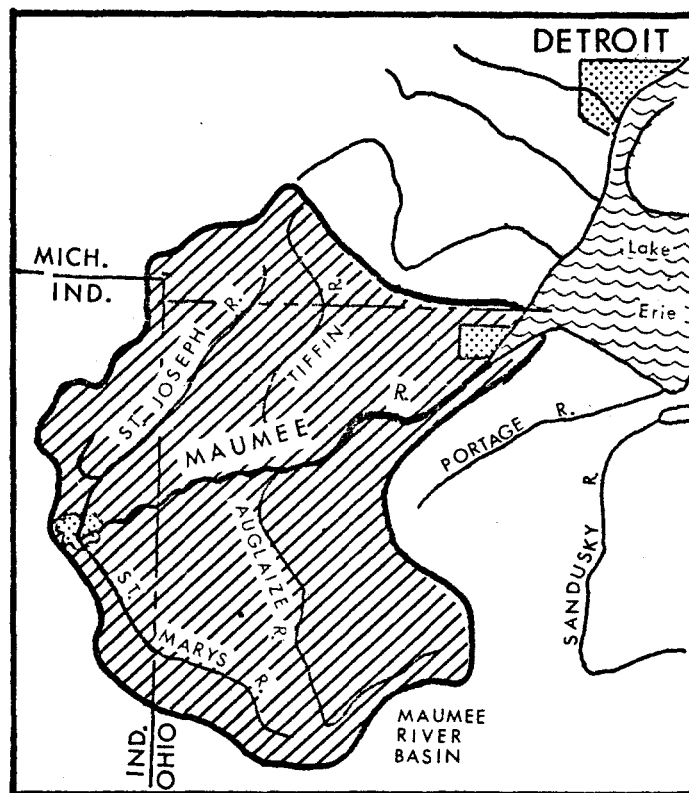
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Bureau of Outdoor Recreation

James G. Watt, *Director*

THIS REPORT WAS PREPARED PURSUANT TO PUBLIC LAW 90-542, THE WILD AND SCENIC RIVERS ACT. PUBLICATION OF THE FINDINGS AND RECOMMENDATIONS HEREIN SHOULD NOT BE CONSTRUED AS REPRESENTING EITHER THE APPROVAL OR DISAPPROVAL OF THE SECRETARY OF THE INTERIOR. THE PURPOSE OF THE REPORT IS TO PROVIDE INFORMATION AND ALTERNATIVES FOR FURTHER CONSIDERATION BY THE BUREAU OF OUTDOOR RECREATION, THE SECRETARY OF THE INTERIOR, AND OTHER FEDERAL AGENCIES.

SCENIC RIVER STUDY OF THE MAUMEE RIVER



June 1974

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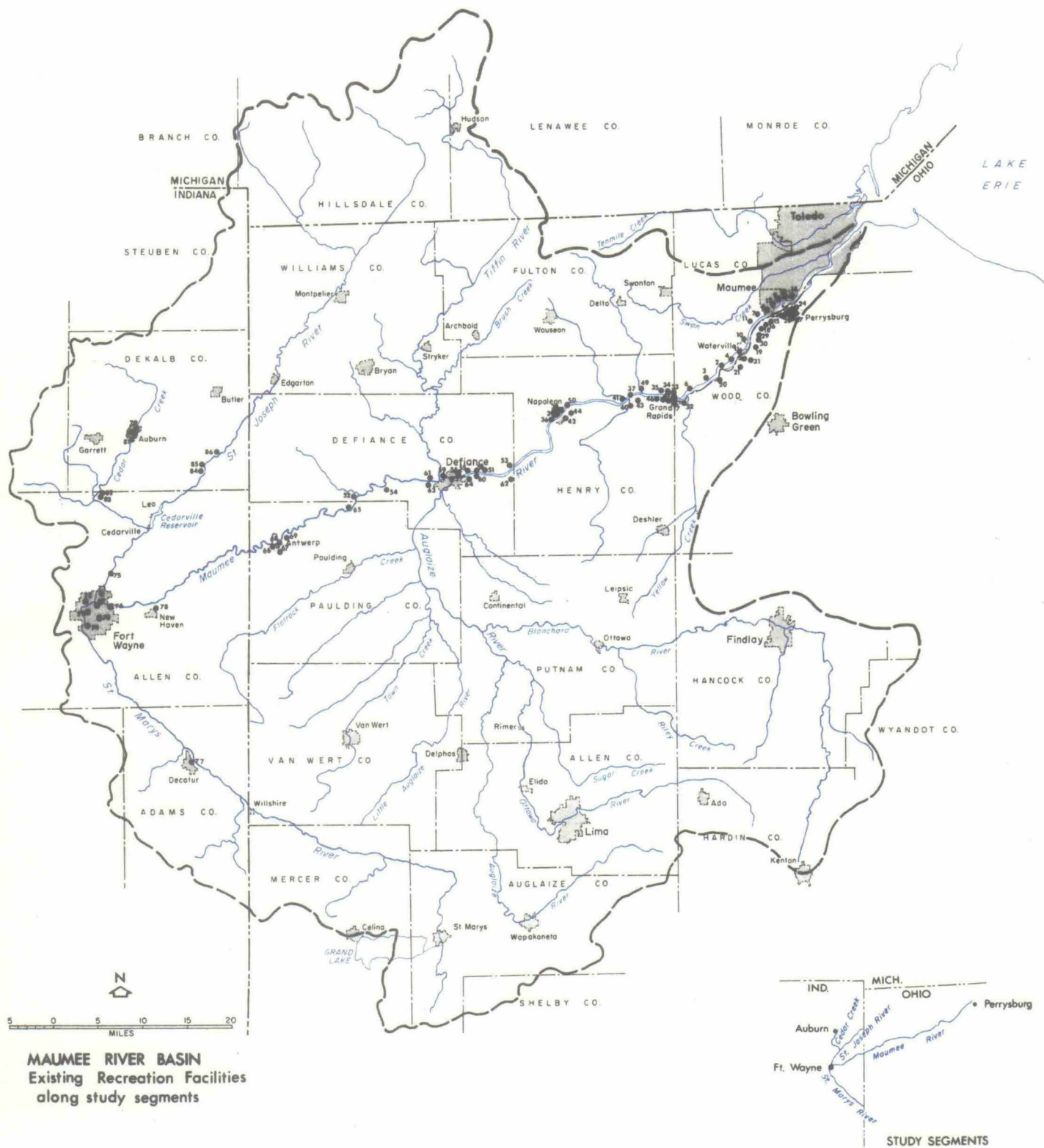
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I.
INTRODUCTION

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 National Wild and Scenic Rivers System composed of eight instant rivers and identified 27 other rivers, including the Maumee River, to be studied for possible inclusion in the National System. The Act calls for a determination of the suitability of the Maumee River from Fort Wayne, Indiana, to Perrysburg, Ohio, and its tributaries in Indiana for possible inclusion in the System and, if the river is to be included, recommendations pertaining to the administration and management of the river environment.

Background

Interest in the Maumee River and its attributes has dated back to the establishment of the Maumee River Scenic and Historic Highway Association in 1929. This group has been active in promoting the scenic and recreational aspects of the river. Other groups both old and new have expressed their interest and concern for the establishment of a river preservation program. There has been strong state and local interest in preserving the Maumee River and including it as part of a system of state or national natural rivers. In 1965, the Ohio Department of Natural Resources had a development plan prepared by Vogt-Ivers and Associates for a recreational area and scenic parkway. At the same time the Allen County Planning Commission prepared a Maumee River park and recreation study for that portion of the river in Indiana.

On February 28, 1968, the Ohio legislature passed legislation creating a state system of scenic rivers. The Act was amended by Senate Bill 108 in August 1972. Several streams have received official designation as a scenic river under the provisions of this Act. To determine the possibilities and potentials of incorporating the Maumee into a system of rivers, the Ohio Department of Natural Resources, with the encouragement of many local groups, instituted a study of the Maumee River in Ohio. This study was completed in January 1973 and concluded that the Maumee River possesses the physical character, environment, historic associations, and locational attributes which make its preservation as an essentially free-flowing river and its inclusion into the state system highly desirable. Studies focusing on the Maumee River by the Metropolitan Parks of the Toledo Area and the Toledo Metropolitan Area Council of Governments are also continuing. A good example of the present local interest in preserving the Maumee River was the formation of "Friends of the Maumee, Inc.," in December 1972. Friends of the Maumee, Inc., a nonprofit organization, was formed to promote the preservation of the Maumee River and its corridor and to encourage protective state and federal legislation.

In April 1973, the State of Indiana enacted legislation to establish a state natural, scenic, and recreational river system. The state is developing criteria for evaluation of potential rivers for inclusion in the Indiana state system. It is anticipated that portions of the streams considered in this report will be studied for possible inclusion in the state system.

An outgrowth of the high degree of past interest was the inclusion of the Maumee River in Section 5(a) of the Wild and Scenic Rivers Act in 1968 (P.L. 90-542). The reach of the Maumee designated for study in the Act includes the river from Perrysburg, Ohio, upstream to Fort Wayne, Indiana, excluding the tributaries in Ohio but including tributaries in Indiana. The study included the evaluation of the Indiana portions of the St. Marys River; the St. Joseph River; and Cedar Creek, a tributary of the St. Joseph River.

Conduct of the Study

The conduct of the river evaluations required by the Wild and Scenic Rivers Act is viewed as a cooperative venture by appropriate federal and state agencies. For the study of the Maumee River, the Bureau of Outdoor Recreation, Lake Central Region, Ann Arbor, Michigan, was assigned the responsibility of organizing and coordinating an inter-agency study team. In August 1972, a study team was formed composed of representatives of the Bureau of Outdoor Recreation, the National Park Service, the Bureau of Sport Fisheries and Wildlife, the U. S. Forest Service, the Environmental Protection Agency, the Great Lakes Basin Commission, the U. S. Army Corps of Engineers, and the Ohio and Indiana Departments of Natural Resources.

Public information meetings were held by the study team on September 18 and 19, 1972, in Defiance and Fort Wayne, Indiana, respectively. These meetings were held to acquaint local citizens with the principles of the Wild and Scenic Rivers Act and discuss the study framework. Public sentiment was in favor of preservation of the natural resources of the river corridor. During the remainder of 1972 and through 1973, the study team conducted field studies along the rivers and held meetings with local citizens to gather the necessary background material necessary for the preparation of an evaluation report. Additional public information meetings were held in November 1973 at which time the study team's findings were announced and public comments on the alternatives presented were solicited. Concern for the preservation of the resources of the river corridor was expressed by many with the indication that the river should be included in a system of wild and scenic rivers.

Acknowledgments

During the course of the study, the study team worked closely with many individuals and organizations in the Maumee River basin. The compilation of information and statistical data would not have been possible without the full cooperation of federal, state, and local governmental agencies; universities; quasi-public organizations; and private groups and individuals. Appreciation is expressed to all who assisted with special thanks to the following organizations:

U. S. Geological Survey
U. S. Soil Conservation Service
Fort Wayne Park and Recreation Board, Indiana
Allen County Park and Recreation Board, Indiana
Decatur/Adams County Parks and Recreation Board, Indiana
Butler Park and Recreation Board, Indiana
Metropolitan Park District of the Toledo Area, Ohio
Maumee River Scenic and Historic Highway Association
Acres, Inc., Indiana
Maumee Valley Resource Conservation and Development District, Ohio
Three Rivers Coordinating Council, Indiana
Toledo Metropolitan Area Council of Governments, Ohio
League of Women Voters
Cedar Creek Wildlife Project, Indiana
Purdue University - Fort Wayne, Indiana
Friends of the Maumee, Inc.
Izaak Walton League, Indiana
Maumee Watershed Conservancy District, Ohio
Toledo Naturalist's Association, Ohio
Maumee River Landmarks Commission, Ohio
Allen County Historical Society, Indiana
Ohio Historical Society
Clear Water, Inc., Ohio

II.

FINDINGS AND CONCLUSION

II.

FINDINGS AND CONCLUSION

MAUMEE RIVER

(129 miles)

Perrysburg, Ohio, to Defiance, Ohio
(52 miles) - In this lower stretch
of the Maumee River, the river is
broad and shows much evidence of

man's influence. In almost constant view are shoreline developments, roads, bridges, industry, and other associated uses. Streamside vegetation largely consists of intermittent narrow bands of trees along the river. Water quality in this part of the Maumee varies, depending on location and flow, but it is generally poor and does not meet the accepted criteria for aesthetics or partial body contact. Of particular note is its excessive turbidity.

Six historic sites listed in the National Register of Historic Places are located along the lower Maumee River. Segments of the Miami and Erie Canal are found along major portions of the Maumee River. These are important for historical interpretation and are regionally significant. In addition, there are five major parks and recreation sites which exist along this lower segment of the Maumee River. The amount of shoreline presently in public ownership (and available for recreation) is approximately 15 miles (14 percent) plus the 3-1/2 miles of shoreline of the 247-acre, state-owned Missionary Island.

Defiance, Ohio, to Fort Wayne, Indiana (77 miles) - In this upstream segment the river corridor is usually well screened by a narrow band of trees and is interspersed with woodlots and riparian strips of bottomland forest or open views of agricultural land. Except for an occasional group of homes along the adjacent roadways or in small towns like Antwerp, this river reach is mostly undeveloped. The river meanders, becomes narrower, and is distinctively different from the downstream segment. Because of its meandering nature, paralleling roads pass in close view along major bends of the river. Water quality is similar to the lower segment. In the eight-mile reach from New Haven to Fort Wayne, views of urban development along the river prevail, including homes, industry, junk piles, and waste treatment facilities. Five roads, one railroad, three major powerlines, and two pipelines cross the river in these eight miles; in addition, roads and railroads parallel the river for most of the distance.

ST. JOSEPH RIVER

(42 miles)

The shoreline area of the St. Joseph is more heavily forested than the Maumee, but in many places the higher vegetation consists of little more

than a narrow band of trees. A slow turbid stream, 23 miles of the St. Joseph above Cedarville Reservoir meet the criteria for partial body contact, but the river below the reservoir does not consistently meet this criteria. The muddy appearance of the river detracts from its aesthetic value.

Scenery along the St. Joseph River is not spectacular and no areas exist which would be considered of outstanding scenic quality. While the river offers potential for recreational opportunities such as camping, picnicking, and hiking, its primary attraction is its pastoral quality. However, this quality is also typical of many similar streams in the region.

CEDAR CREEK

(22 miles)

Cedar Creek is a tributary to the St. Joseph River. Its water quality is somewhat better than the other stream segments studied and

could be made suitable for put and take trout habitat if excessive turbidity were controlled. However, occasional low streamflows decrease the creek's suitability as a natural trout fishery. These low flows during the recreation season may also prohibit the full enjoyment of water-related recreation activities.

Above the Allen-DeKalb County line, Cedar Creek is a narrow tree-lined waterway traversing the agricultural lands of DeKalb County. Downstream, Cedar Creek flows southeast 14 miles through an area known as Cedar Canyons, which is a valley 60-70 feet deep in contrast to the surrounding flat topography. The stream gradient for Cedar Creek is four times greater than the other streams studied, averaging about four feet per mile.

Development along Cedar Creek consists of two quasi-public youth camps and seven suburban homes located close to the creek; others are set back from the stream, and most are screened from view by the heavily wooded banks. No public recreation facilities are currently available along Cedar Creek. The area supports a variety of flora and fauna but contains no historical or cultural features with more than local or regional significance.

ST. MARYS RIVER

(43 miles)

The St. Marys River possesses neither outstanding scenic qualities nor exceptional recreation potential. The river is very

turbid and the water quality is unsafe for body contact recreation. Canoeing and similar water-related activities are limited due to the flat gradient of the stream bed and insufficient streamflows during parts of the primary recreation season. Only a narrow and often intermittent band of trees separates the river from the adjacent agricultural areas. Considerable urban and industrial development occurs along the river at Fort Wayne and Decatur. Sparsely vegetated and heavily developed in places, the river corridor is similar to the Maumee.

CONCLUSION

When viewed in their entirety and in consideration of the development; pollution problems; occasional low flow conditions; and lack of outstandingly remarkable geological, fish and wildlife, historical, or cultural values; the Maumee River and its tributaries do not qualify for inclusion in the National System.

- The river corridors have been modified considerably and contain innumerable cultural features which reduce their scenic and aesthetic values, particularly near the urban areas. These intrusions not only include urban and industrial development but also summer homes, trailer camps, pipeline and powerline crossings, paralleling road and railroad rights-of-way, and mineral extraction scars. Land transportation networks are within sight or sound of most parts of the river segments. Cedar Creek has been modified by man less than other study segments and contains some significant natural attributes; however, the stream segment is limited to 14 miles. The guidelines indicate that a river unit should be long enough to provide a meaningful experience and should be at least 25 miles long. A shorter segment may be included only if the stream possesses outstanding qualifications.

In arriving at this finding, the study team had to exercise its judgment not only for each of the eligibility criteria as it applied to different stream segments but, more importantly, it was necessary to evaluate the combined effect of all criteria for each stream. It should be understood that the criteria cannot be written so as to mechanically decide which rivers are eligible. Accordingly, the streams and their immediate land areas were considered as a unit, with primary emphasis upon the quality of the experience and overall impression the public would receive while using the streams.

THE INTERAGENCY STUDY TEAM FINDS THAT THE MAUMEE RIVER, ST. JOSEPH RIVER, CEDAR CREEK, AND THE ST. MARY'S RIVER AND THEIR IMMEDIATE ENVIRONMENTS DO NOT MEET THE REQUIREMENTS FOR INCLUSION IN THE NATIONAL WILD AND SCENIC RIVERS SYSTEM AS DESCRIBED IN THE ACT AND THE GUIDELINES.

III.
REGIONAL SETTING

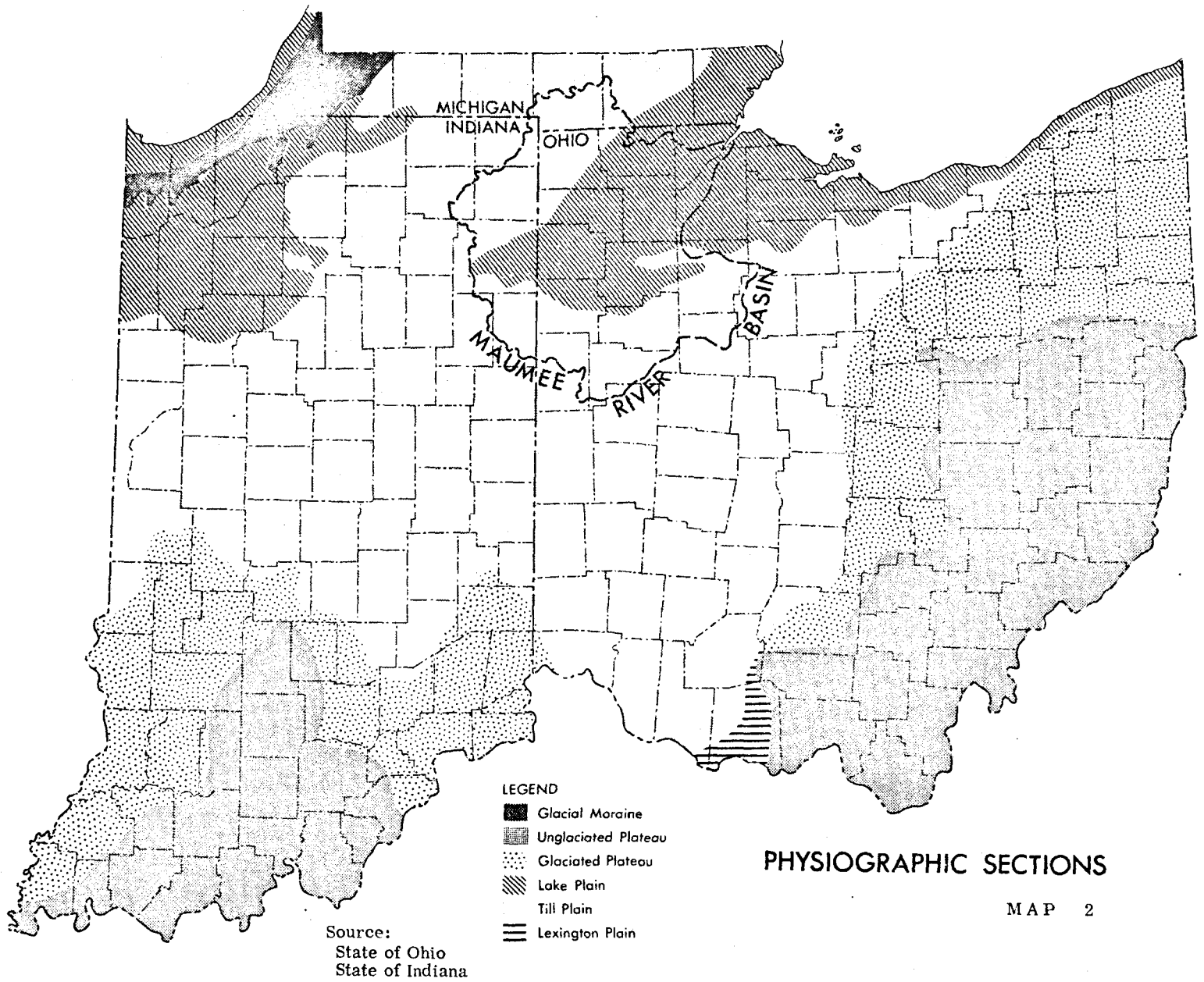
III. REGIONAL SETTING

Physical Environment

The Maumee drainage area is located in the northwestern part of Ohio, the northeastern portion of Indiana, and extends into the southernmost portion of Michigan. The Maumee River begins in the City of Fort Wayne, Indiana, at the confluence of the St. Joseph and St. Marys Rivers and winds in a general northeasterly direction for 138 river miles where it empties into Lake Erie at Toledo, Ohio. The river has low gradient and descends only 167 feet from an elevation of 750 feet at Fort Wayne to the level of Lake Erie. This averages 1.2 feet per mile. The Maumee and its four primary tributaries--the St. Marys, St. Joseph, Auglaize, and Tiffin Rivers--drain an area of 6,586 square miles, of which 19 percent is in Indiana, seven percent in Michigan, and the remaining 74 percent is located in Ohio. The basin is located in one of the nation's most highly industrialized and urbanized regions. Rich agricultural lands of the Corn Belt are located within the basin and border the river for a great part of its length.

The Auglaize River, the principal tributary to the Maumee, originates near Lima, Ohio, and flows northward to join the Maumee at Defiance. The Auglaize drains 2,448 square miles, or approximately 38 percent of the total area composing the Maumee basin. The Tiffin River, with a watershed area of 804 square miles (12 percent of the basin), heads in Michigan and flows south through Fulton, Williams, and Defiance Counties, joining the main stem of the Maumee about a mile above Defiance, Ohio. The St. Marys River is 100 miles long and drains an area of 817 square miles (12 percent of the basin). The St. Marys River heads at Grand Lake St. Marys, Ohio, and flows northwesterly through Auglaize, Mercer, and Van Wert Counties in Ohio and Adams and Allen Counties in Indiana. The St. Joseph River heads in Michigan and flows southwesterly through Williams County, Ohio, and into DeKalb and Allen Counties in Indiana. Length of the river is 93 miles, and it drains 1,060 square miles (16 percent of the basin).

The entire Maumee basin has been affected by glaciation, and the rivers of the basin are products of the glacial action. The St. Marys and St. Joseph Rivers were formed along the edge of the melting Wisconsin glacier as it retreated northward. The water drained to the west through the Wabash and Mississippi River systems. As the glacier retreated, it formed a large lake called Lake Maumee, a forerunner to our present Lake Erie. As the lake found lower outlets, the Maumee valley was uncovered, leaving a lake plain feature with only a few beach ridges and recessional moraines. Nowhere else in Ohio is there such an extensive area of flat landscape. The Maumee River developed and by headwater erosion eventually captured the flow of the St. Joseph and St. Marys Rivers and diverted their flow into the Great Lakes basin.



The soils of the lake plain are finely textured, poorly drained, and relatively impermeable. For many years the region was known as the Great Black Swamp and acted as a barrier to settlement.

There are no large natural lakes in the basin, but low dams have been constructed on the Maumee River at Independence and Grand Rapids and on the Auglaize River above Defiance. Generally, large reservoir impoundments are not feasible on the Maumee River because of the flatness of the land.

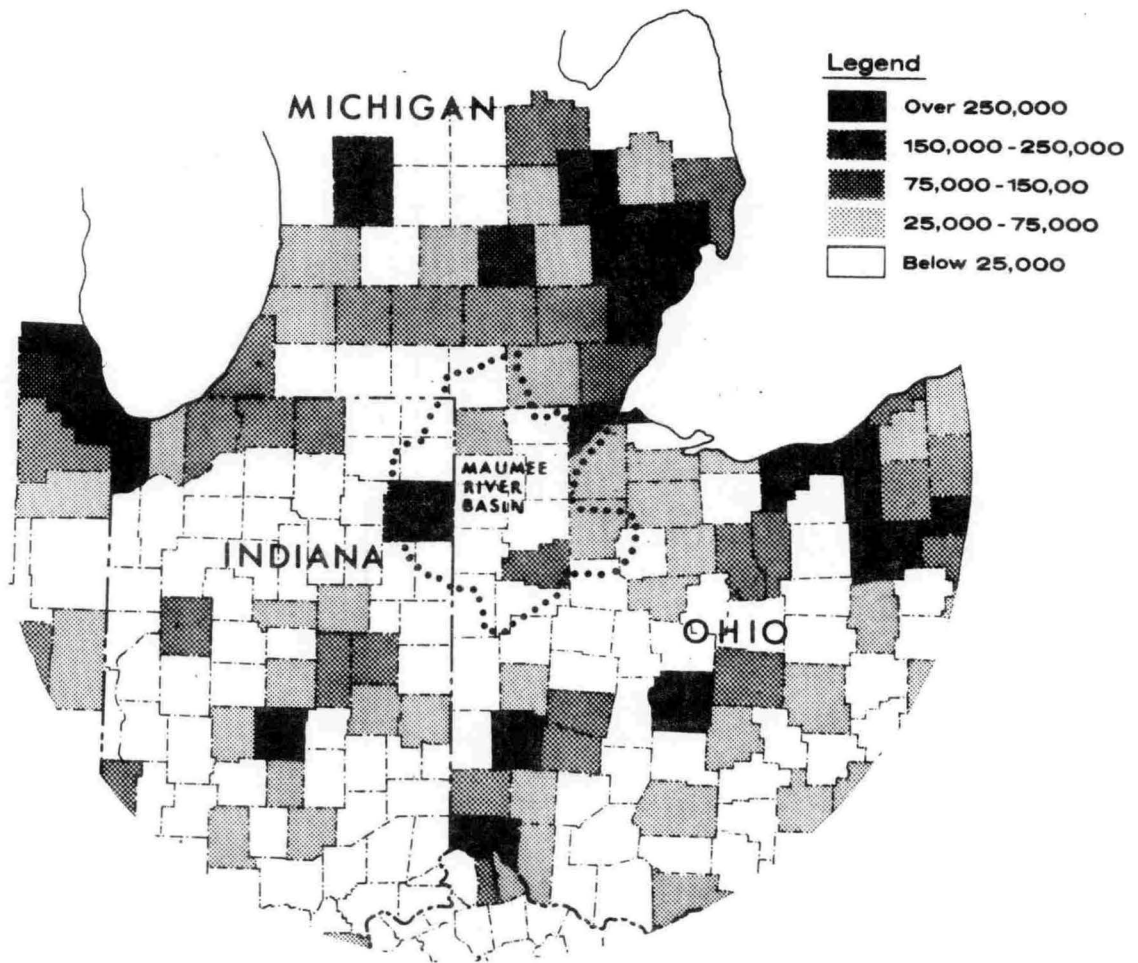
Population and Economy

The rich lake plain was ideally suited for agricultural use as the land could be cleared and drained. Only a few woodlots and fringes of trees along the water courses remain as evidence of the trees that once covered the basin. Agricultural lands compose 90 percent of the basin, with corn, alfalfa, and soybeans the principal crops. There is also a sizable production of cattle, hogs, and truck crops.

Major industrial centers are located along the river at Fort Wayne, Indiana, and Toledo, Ohio. Other industrial developments are located at Defiance, Napoleon, Decatur, and several smaller communities along the rivers. Toledo is the second largest port on the Great Lakes and is the nation's third largest railroad center. The principal industries in the basin are machinery, metal fabrication, clay and glass, petroleum, chemicals, and food.

Urbanization from both Fort Wayne and Toledo is evident along the river valleys. Growth is apparent and new subdivisions are started frequently. Population in 1970 for the basin was 1.7 million with 67 percent of those residents being classified as urban. The basin's population is expected to increase to 3.1 million by 2020.

Because of the proximity to large urban centers of the Midwest, the Maumee River valley is within a two-hour drive of over 10 million people.



Source: Bureau of Census, 1970



REGIONAL POPULATION DISTRIBUTION BY COUNTY

TABLE I

Population Projections for Counties in Study Area
for Selected Years in Thousands

	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>
<u>Indiana</u>						
Adams	26,871	30,200	33,700	37,100	41,100	45,900
Allen	280,455	338,200	407,300	480,500	569,200	675,900
DeKalb	<u>30,837</u>	<u>35,200</u>	<u>39,500</u>	<u>43,700</u>	<u>48,500</u>	<u>54,000</u>
Total Indiana	338,163	403,600	480,500	561,300	658,800	775,800
<u>Ohio</u>						
Defiance	36,949	40,557	43,420	49,726	54,915	60,848
Henry	27,058	29,638	33,000	34,426	38,018	42,126
Lucas	484,370	525,684	576,623	612,016	675,879	748,903
Paulding	19,329	18,719	20,842	22,951	25,345	28,084
Wood	<u>89,722</u>	<u>93,594</u>	<u>105,946</u>	<u>120,491</u>	<u>133,064</u>	<u>147,440</u>
Total Ohio	657,428	708,192	779,831	839,610	927,221	1,027,401
 TOTAL	 <u>995,591</u>	 <u>1,111,792</u>	 <u>1,260,331</u>	 <u>1,400,910</u>	 <u>1,586,021</u>	 <u>1,803,201</u>

SOURCE:

Regional population projections of the Great Lakes Basin Framework study were allocated to individual counties based on historical data and contacts with federal and state planning agencies.

U.S. Army Corps of Engineers.

Transportation Network

Because the Maumee River flows through the urban areas of Fort Wayne and Toledo, highway access to the river areas under study

is excellent. The Ohio Turnpike and Indiana Toll Road, a major east-west connecting link between New York, Pennsylvania, Chicago, and the rest of the western United States, is one of the more heavily traveled interstate routes in the nation. This route crosses the Maumee just below the lower end of the study area. Interstate 75 and Interstate 475 cross the Maumee at the lower end of the study area. Interstate 69 crosses Cedar Creek about 10 miles north of Fort Wayne and again south of Auburn.

Primary highways serving the area include U. S. Routes 6, 20, 23, 24, 25, 27, 30, 33, and 224. U. S. 24 parallels the main stem of the Maumee River for 108 miles between Toledo and Fort Wayne. U. S. 27 and 33 parallel the St. Marys River in Indiana. All of these highways cross one of the segments of the study rivers. These roads connect cities in the region and provide major thoroughfares. In addition to the interstate and primary highways, a well developed system of state and secondary roads provide access to the river and to nearby urban centers.

Railway passenger service is provided by AMTRAK to Fort Wayne, Indiana, and Lima, Ohio, as part of the New York to Chicago Broadway Limited service. The passenger service is provided once each day in each direction. Both Toledo and Fort Wayne are served by numerous rail lines. Railroads both parallel and cross the Maumee, St. Joseph, and St. Marys Rivers.

Scheduled air passenger service is available at the Toledo Express Airport and at Baer Field in Fort Wayne. General aviation facilities are available in the basin at Defiance, Napoleon, Wauseon, Bryan, and Montpelier in Ohio, and at Decatur, Woodburn, Auburn, Garrett, and Smith Field in Fort Wayne, Indiana. In addition, there are numerous smaller or private landing fields.

There are several large urban centers within easy driving distance of the Maumee River basin. Forty-two of the nation's Standard Metropolitan Statistical Areas (SMSA's) are within 200 miles of the basin. They range in population from a low of 104,000 at Bloomington, Illinois, to Chicago's over 7,000,000, the second largest SMSA in the nation. The following table shows distance from selected areas.

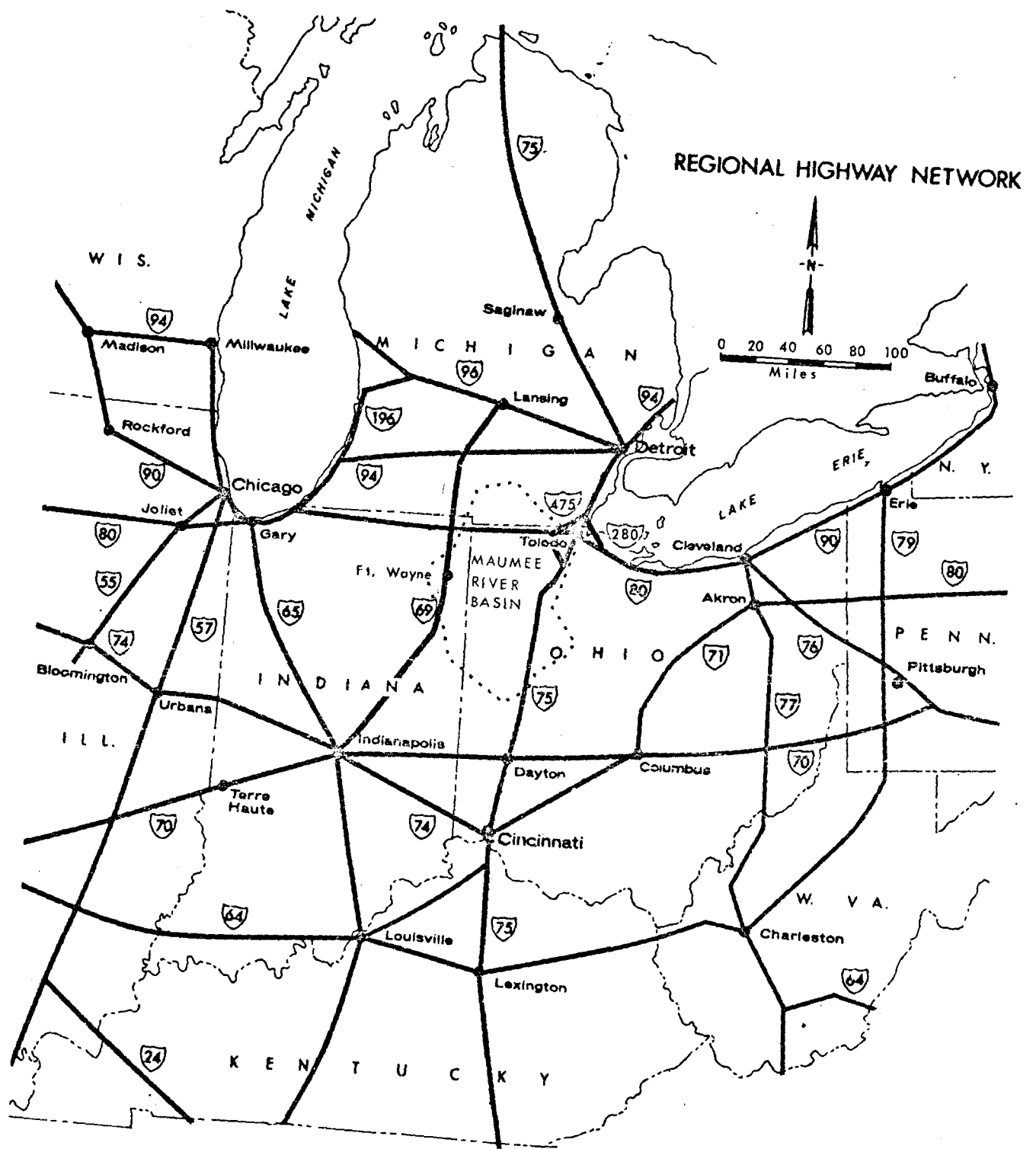
TABLE II

SELECTED SMSA'S NEAR THE MAUMEE BASIN
 DISTANCE FROM MAJOR URBAN CENTERS

SMSA Population 1970	From	Miles to Toledo	Miles to Fort Wayne
<u>Day Use Zone</u>			
280,455	Fort Wayne, Indiana	108	-
692,571	Toledo, Ohio	-	108
4,817,914	Detroit, Michigan	61	169
<u>Weekend Use Zone</u>			
• 2,064,194	Cleveland, Ohio	110	218
916,228	Columbus, Ohio	141	157
1,384,911	Cincinnati, Ohio	208	159
1,109,882	Indianapolis, Indiana	229	121
7,032,075	Chicago, Illinois	239	158
1,403,887	Milwaukee, Wisconsin	328	247
2,401,245	Pittsburgh, Pennsylvania	228	330
826,553	Louisville, Kentucky	321	233

Source: 1970 Census

Eastern United States
 Map and Transcontinental
 Mileage Chart -
 Standard Oil Company



Source: U. S. Department of Transportation.

Recreation Resources

Rivers - The nearest existing component of the National Wild and Scenic Rivers System is the Little Miami in southwestern

Ohio which is a state-administered river under the provisions of Section 2(a)(ii) of the Act. The Wolf River in Wisconsin, the St. Croix in Wisconsin and Minnesota, and the Eleven Point in Missouri are also components of the National System and all are over 300 miles from the Maumee Basin.

In addition to the study of the Maumee River in Ohio and Indiana, other nearby rivers designated for study under Section 5(a) of the Wild and Scenic Rivers Act as potential additions to the National System include Little Beaver Creek in eastern Ohio and the Pere Marquette in the western part of the Lower Peninsula of Michigan.

Ohio has an active scenic rivers program which began with the passage of the state's Scenic River Act in 1968 and was modified by amended Senate Bill 108 in 1972.

There are presently six rivers designated as part of the Ohio system. The rivers given formal designation include:

1. The Little Miami, approximately 105 miles from its confluence with the Ohio River upstream to its sources near Yellow Springs including the North Fork.
2. The 70-mile stretch of the Sandusky River main stem from U. S. Highway 30 downstream to the northernmost edge of Roger Young Memorial Park.
3. The Olentangy River from the Delaware Dam reservoir southward 20 miles to Wilson Bridge Road in Worthington.
4. Little Beaver Creek, including the North Fork beginning at the Ohio-Pennsylvania state line, the Middle Fork from Elkton, and the West Fork beginning from the vicinity of Y-Camp Road and running downstream to the Ohio-Pennsylvania state line, totaling approximately 32 miles.
5. The Grand River from Route 322 in Ashtabula County downstream approximately 56 miles to the Norfolk & Western Railroad trestle south of Painesville.
6. Cuyahoga River from the Burton-Troy township line at River Park in Geauga County downstream approximately 25 miles to the State Route 14 bridge crossing north of Lake Rockwell in Portage County.

Studies of several other rivers, including the Maumee, have been completed, and the Director of the Ohio Department of Natural Resources (ODNR) indicated they qualify for inclusion in the state system and the state intends to proceed with the designation process. The ODNR is presently studying other rivers in the state to determine their suitability for inclusion in the system. Other rivers or portions of

rivers which may have recreation potential and are somewhat comparable to the Maumee include the Tiffin, St. Joseph, Tuscarawas, and Walhonding which are to be studied for inclusion in the Ohio scenic rivers system.

As early as 1967, Indiana studied a number of streams for possible inclusion in a natural streams preservation program. The purpose of the program was to retain those streams in a natural state to preserve their natural character and scenic beauty. Priority streams identified for preservation included segments of the Big Blue River from Fredericksburg to Rothrock Dam, Sugar Creek from Crawfordsville to Shades State Park, Elkhart River from Albion to Highway 6, and the Tippecanoe River at Tippecanoe State Park.

As a result of this and other studies, the Indiana General Assembly passed legislation in 1973 establishing a natural, scenic, and recreational rivers system in the state. The legislation calls for the Department of Natural Resources to establish criteria for each different type of stream and establish a rivers system throughout the state. Indiana is presently implementing that legislation by establishing criteria for selection of streams. After the criteria have been established, various rivers will be designated for detailed study prior to including a stream or segment of stream in the system.

Lakes and Reservoirs - There are few lakes or reservoirs in the Maumee basin. The major impoundments are the low-head dams at Grand Rapids and Independence on the Maumee, the Power Dam on the Auglaize, and Grand Lake St. Marys.

Lake Erie near Toledo provides significant opportunity for water-oriented recreation, especially for the waterfowl hunters and owners of large boats. Water contact activities are limited by the poor water quality of the shallow western end of Lake Erie. Some swimming beaches have been closed because of pollution.

National Forest, Park, Recreation, and Wildlife Areas - Neither Indiana nor Ohio has any national parks; however, Indiana Dunes National Lakeshore, administered by the National Park Service, is located along Lake Michigan about 120 miles from Fort Wayne. One archeological national monument (Mound City Group) is located in central Ohio near Chillicothe 150 miles southeast of the study area, and one historical monument 45 miles to the northeast commemorates Perry's Victory in Lake Erie. Lincoln Boyhood National Memorial and George Rogers Clark National Historical Park are located in southwest Indiana about 225 miles from the Maumee valley. The nearest national forest areas (the Wayne-Hoosier National Forest in southern Ohio and Indiana and the Huron-Manistee National Forest in central Michigan) are over 150 miles away from the Maumee valley, provide large areas for low density recreation, and have several sites developed for camping and picnicking. Cedar Point and Ottawa National Wildlife

Refuges are located along Lake Erie east of Toledo within 25 miles of the Maumee. Muscatatuck National Wildlife Refuge is located 100 miles south of Indianapolis, and the Shiawassee Refuge is located near Flint, Michigan, one hundred miles to the north. The refuge areas provide only limited general recreation opportunities, being limited to access and interpretive facilities.

State Administered Areas - Major areas located near or within the basin include two state parks in Ohio located on the banks of the Maumee River (Independence Dam State Park and Mary Jane Thurston State Park). Other nearby state parks or recreation areas include: Grand Lake St. Marys, Crane Creek State Park, and East Harbor State Park in Ohio; Pokagon, Qubache, and Chain-O-Lakes State Parks in Indiana. Recreation facilities are also provided at other nearby state facilities, including the Pigeon River and Tri-County Wildlife Areas, and at recreation areas at Huntington Reservoir and Salamonie Reservoir in Indiana, Harrison Lake, Oxbow Lake, Indian Lake, Lake Loramie, and Maumee State Forest in Ohio.

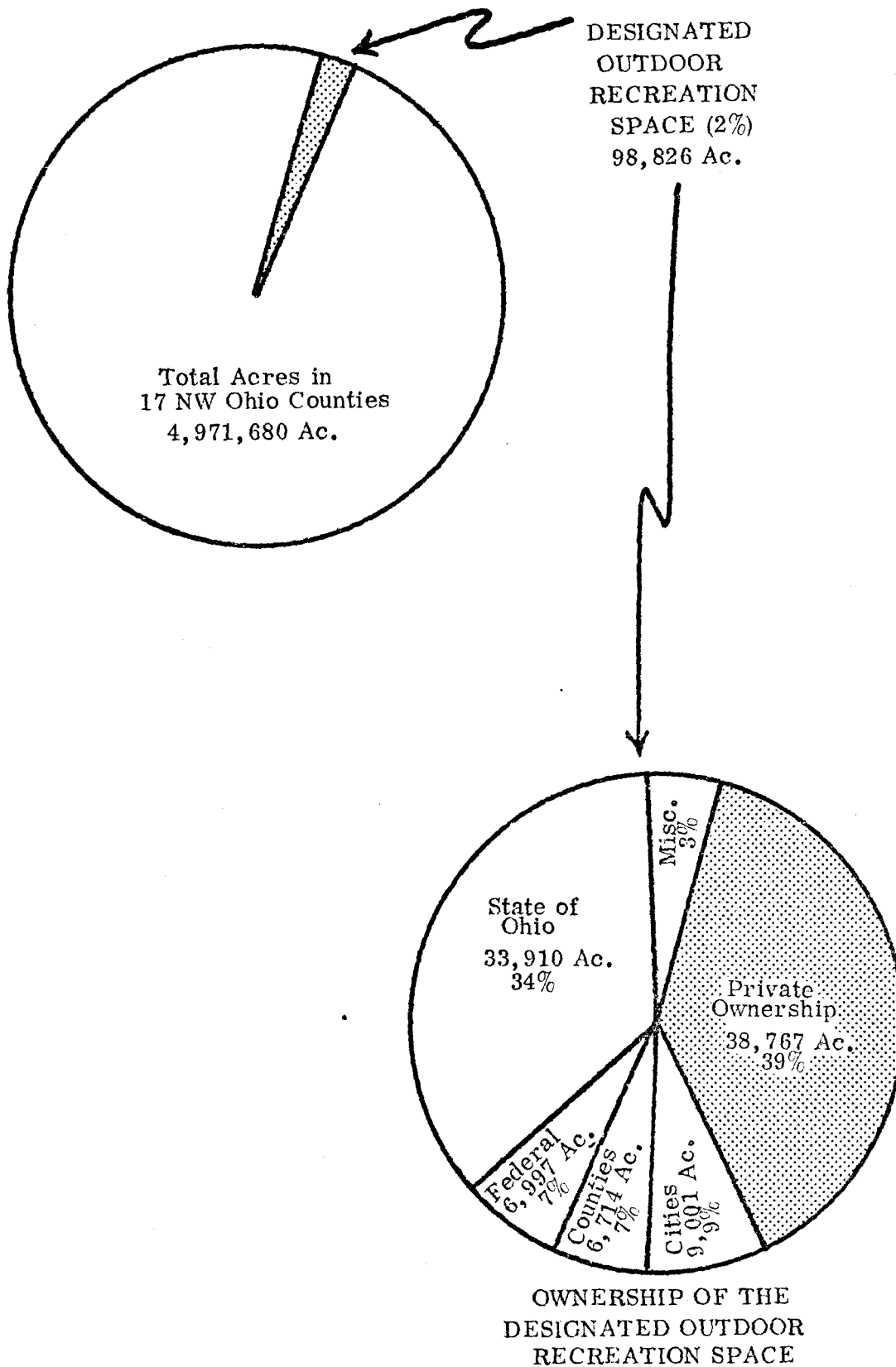
Outdoor Recreation Situation - The Maumee valley region and the lake plains region of northwest Ohio (socio-economic regions of Ohio described in the Statewide Plan for Outdoor Recreation) are used to illustrate the regional setting and for presenting the recreational needs for the Ohio portion of the Maumee River. Recreation in northwest Ohio is provided by a multitude of organizations and jurisdictions. In order to determine the number, acreage, and makeup of recreation areas, the State of Ohio has conducted a detailed survey as part of its new Statewide Plan for Outdoor Recreation (1971 - 1977).

According to this survey, the combined region of 17 northwestern Ohio counties contains 4,791,680 acres of which two percent (98,826 acres) are inventoried as designated outdoor recreation space.

Twenty-three percent (22,380 acres) of the designated areas are surface water, with Grand Lake being the largest and encompassing over 13,000 acres. The total acreage in the inventory also includes large areas managed primarily for wildlife such as the 6,900¹ acres in the Ottawa and Cedar Point National Wildlife Refuges along Lake Erie. Only limited recreational developments are available at the state and federal wildlife areas.

Thirty-nine percent (38,767 acres) of the designated recreation areas listed in the inventory are in private ownership. Some are open to the public on a commercial basis and others are restricted to "members only." These private facilities include golf courses, picnicking and camping areas, marinas, group camps, recreational clubs, and private hunting and fishing areas. One sportsman's club contains 8,500 acres;

¹Since the survey was completed by the State of Ohio, the Bureau of Sport Fisheries and Wildlife reports that the refuge acreages have increased to 7,873 acres.



PUBLIC / PRIVATE RECREATION SUPPLY

Source:
"A Statewide Plan For
Outdoor Recreation In Ohio
1971-1977"

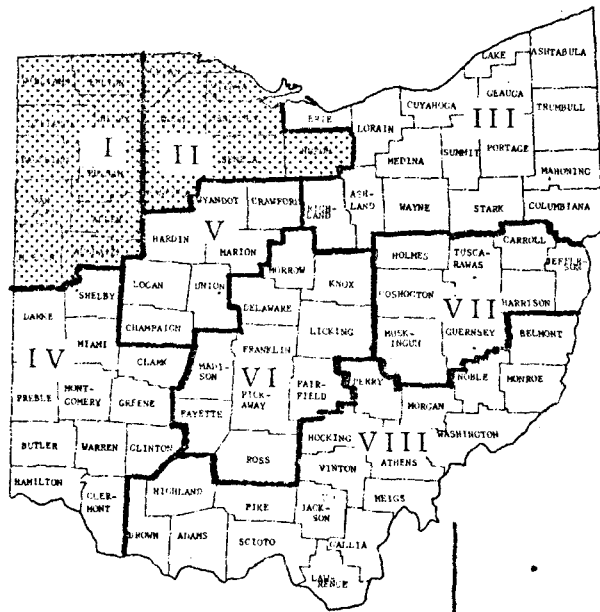


TABLE III

Supply of Public & Private Recreation Areas
for Eight Regions of Ohio

Socio-Economic Regions		Population	Total Recrea- tional Land Acreage	Number of Acres Per 1,000 Population	Public Recrea- tional Land Acreage	Percent of Recreational Land Acreage	Number of Acres Per M Population
I	Maumee Valley	400,600	45,178	113	27,104	60	68
II	Lake Plains	859,700	53,648	62	32,955	61	38
III	Lakeshore Uplands	4,505,300	290,216	64	174,673	60	39
IV	Miami Valley	2,449,800	123,381	50	84,073	68	34
V	Sandusky Valley	267,400	32,408	122	23,255	72	86
VI	Scioto Valley	1,281,300	104,337	81	77,099	74	60
VII	Tuscarawas Valley	402,700	145,738	361	93,092	64	231
VIII	Ohio Valley	<u>615,000</u>	<u>536,682</u>	<u>872</u>	<u>385,499</u>	<u>72</u>	<u>626</u>
STATE TOTAL		10,781,800	1,331,588	123	897,750	67	83
Subtotal Region I & II Northwest Ohio		1,260,300	98,826	78	60,059	61	48

another 3,100 acres; and another one contains 2,600 acres. In addition, there are numerous smaller areas of this type which have limited public access but have been included in the inventory because they do provide recreational activities for some of the region's residents.

Of the remaining 61 percent (60,059) not in private ownership, seven percent (6,997 acres) is administered by the federal government (principally wildlife refuges), 34 percent (33,910 acres) by the State of Ohio (This includes state parks, state forests, wildlife areas, scenic highways, and highway rest stops.), seven percent (6,714 acres) by the various counties (mainly as county or metropolitan parks and county fairgrounds), nine percent (9,001 acres) by the cities, and the remainder is administered as miscellaneous sites such as historical areas.

An additional 15,296 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 in the major watercourses of northwestern Ohio. The Maumee River accounts for 7,600 acres of this additional undesignated water.

In terms of acres of total designated recreation land, the northwest Ohio regions (lake plains region and Maumee valley region) average 78 acres per thousand people. Public recreation space available is 48 acres and private is 30 acres of land per thousand people. Northwest Ohio is considerably below the statewide average of 123 acres total recreation per thousand population. There are presently shortages of lands and facilities to supply existing needs. The statewide outdoor recreation plan lists the Toledo urban area as one of the four areas of the state having the greatest need for boating, swimming, and land-based activities.

The demand for outdoor recreation and open space in northwestern Ohio can be further illustrated by looking at the increase in annual visitation at the state parks areas of the region. Over the past ten years (1963-1972), visitor use has increased 199 percent at Independence State Park and 138 percent at St. Marys. During the five years of reporting at Thurston State Park (1966-1972), use has increased 341 percent. New marina facilities have recently been installed at Thurston and Independence Dam State Parks and may account for the extra large increase at those areas.

The most recent quantitative estimates of overall recreation needs in the Maumee basin are contained in Appendix 21 to the Great Lakes Basin Framework Study. In the Lake Erie southwest subarea the estimated need was over six million recreation days in 1970. Need is defined as the difference between the existing recreation

supply and the total recreation requirement. This is expected to increase to 14.1 million by 1980, 32.7 million in 2000, and exceed 58.2 million by 2020.

Need - Lake Erie Southwest Subarea

1970	6,022,000
1980	14,190,000
2000	32,733,000
2020	58,226,000

Source: Table 21-11, page 95, Appendix 21, Great Lakes Basin Framework Study.

Thus, only part of the existing demand is being met, and this emphasizes the scarcity of both land and water areas within the region for recreational pursuits. In addition, developments presently programmed will be inadequate to meet projected future needs. The region will be unable to look to adjoining areas to meet these projected needs, for these heavily populated adjoining areas are also experiencing high unsatisfied recreational needs.

Indiana Planning Region III encompasses nine counties in northwestern Indiana which have close ties with the Fort Wayne metropolitan area. The Indiana outdoor recreation plan, Shaping the Future, indicates that the region has no need of additional regional (state) recreational areas until the year 2000 but it does have a need of six district recreation areas (400-800 acres, 40-60 percent undeveloped within one-half hour driving time radius) by 1980 and ten additional such parks by the year 2000. These parks would normally be the responsibility of county park and recreation departments. A study by Allen County Park Board has indicated the possibility of acquisition and development of linear park areas along the Maumee River from Fort Wayne to the Ohio line. Only 1.7 percent of the region (39,071 acres) is designated recreation space. Privately owned lands equal 33 percent (12,805 acres) of the total, and the remaining 67 percent (26,266 acres) are publicly owned. About 10 percent of this acreage is in lake, stream, or wetland.

IV.
DESCRIPTION AND ANALYSIS

IV.

DESCRIPTION AND ANALYSIS

Riverscape

The Maumee River drainage area consists of some 6,586 square miles in northwestern Ohio, northeastern Indiana, and southeastern Michigan, with 1,260 square miles of this drainage area in Indiana, 470 square miles in Michigan, and the remainder in Ohio. The Maumee River begins at the confluence of the St. Marys and St. Joseph Rivers in Fort Wayne, Indiana, and flows northwest through New Haven, Indiana, and into Ohio, passing the Towns of Defiance, Napoleon, Grand Rapids, Waterville, Perrysburg, Maumee, and Toledo, where it enters Lake Erie. The total length of the Maumee River is approximately 138 miles, of which 105 miles are located in the State of Ohio. Two major tributaries--the Tiffin River from the north and the Auglaize River from the south--join the Maumee at Defiance, Ohio.

The Maumee falls 167 feet as it twists through Indiana and Ohio to Lake Erie, giving an average gradient of 1.2 ft./mi. Three impoundments are located on the river, in Fort Wayne, near Defiance, and near Grand Rapids. The first impoundment, Josey Dam, is about one mile from the headwaters. It is used to stabilize the water supply for Fort Wayne. The second impoundment located four miles below Defiance is the Independence Dam. This dam creates a 600-acre backwater, with the river width varying from 400-800 feet. The dam was a regulating structure for the old Miami and Erie Canal. Independence Dam State Park, starting just above the dam, contains seven miles of the old canal and restored locks. Grand Rapids Dam, located one mile below the Henry-Lucas County line near Grand Rapids, forms the third impoundment. This was also constructed to serve the Miami and Erie Canal. The dam, with about a 10-foot head, creates a 2,110-acre backwater over 25 miles in length with a width varying from 500 to 1,800 feet. Mary Jane Thurston State Park is located on the south shore of this impoundment.

The Maumee River is dotted with small islands created by deposits of drifting silt. The rich soil on these islands supports a heavy plant cover, with many bottomland trees and other vegetation. Seventeen islands averaging less than one-fourth of an acre may be found in the stretch from Fort Wayne to the Indiana-Ohio border. Larger islands are found in the lower portion of the river, including Missionary Island which contains over 200 acres. The banks of the Maumee vary from almost level with the surrounding land to a few steeply banked sections rising 30 feet above the water surface to the surrounding flat farmland.

Vegetation along the Maumee's banks is occasionally dense but for the most part consists of a narrow band of bottomland hardwood and understory vegetation. Some larger woodlots are to be found along the river's edge, particularly in the area from Defiance upstream to Fort Wayne; in many other sections the tree cover has been removed to the water's edge.

The river bottom is covered almost entirely with rocks, gravel, and drifted silt. At the lower end of the Maumee, exposed limestone outcroppings create rapids.

The high silt content in the river gives it a very muddy appearance, and the visibility depth usually extends no more than a few inches. Water quality varies, depending on location and flow, but it is generally poor and does not meet the accepted criteria for aesthetics or partial body contact.

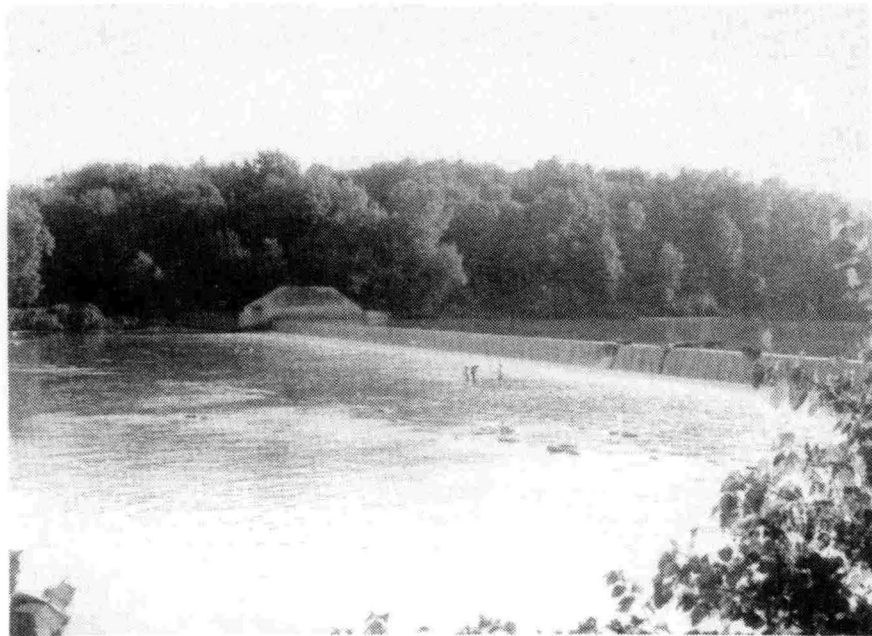
The influence of man is apparent in most locations on the Maumee River. There is substantial industrial development within sight of the river at Napoleon, Defiance, New Haven, and Fort Wayne. Homes, railroads, power lines, dumps, and traffic noise are prevalent along the entire length of the river. The flat, glacial plain of the Maumee basin holds rich agricultural land, and the level of agricultural development is high. Agricultural activity may be seen from the river wherever the woody vegetation has been removed from the banks; drain tiles and water outfalls are also noticeable along the riverbank. While the Maumee River banks and islands provide some interest and relief from the flat landform of the surrounding area, the high level of human development has appreciably altered the river's natural appearance.

The St. Mary's River in Indiana winds through 40 miles of very flat farmland. The river falls about 40 feet from the Indiana-Ohio border to its confluence with the St. Joseph River in Fort Wayne, giving an average gradient of 1.0 ft./mi. through Indiana. The river averages 80 feet in width, and the bank height varies from level with the surrounding land to 15 or 20 feet high, with low banks predominant. There are no islands in the river, and the water is slow with only occasional short riffles.

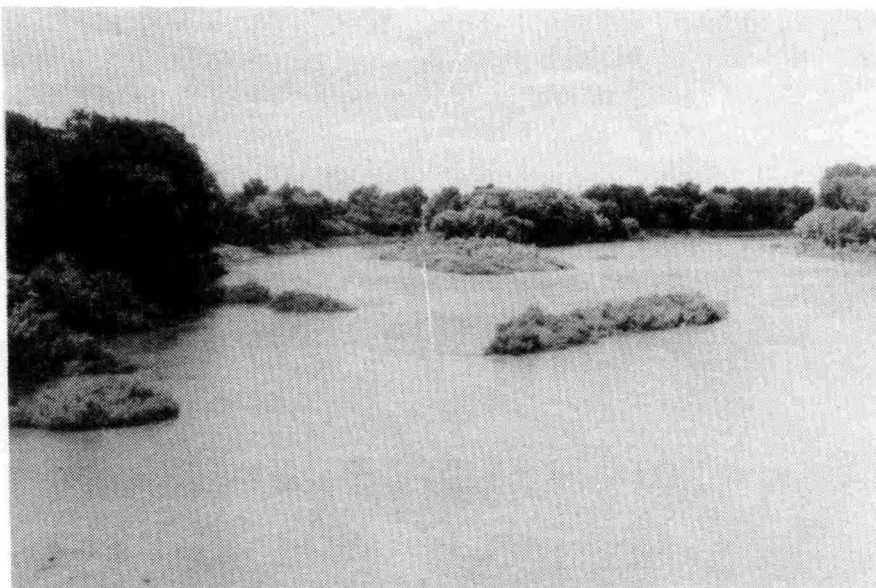
The St. Marys River has no impoundments; its clay-loam banks are vegetated with a variety of trees, shrubs, and grasses, but the existing vegetation changes little throughout the Indiana length. No large woodlots are found along the river, and in some locations the tree cover has been removed to the edge of the river. The river water is turbid from heavy siltation; the depth of visibility is often only a few inches.



Utilities Dam on the
St. Joseph River in
Fort Wayne, Indiana

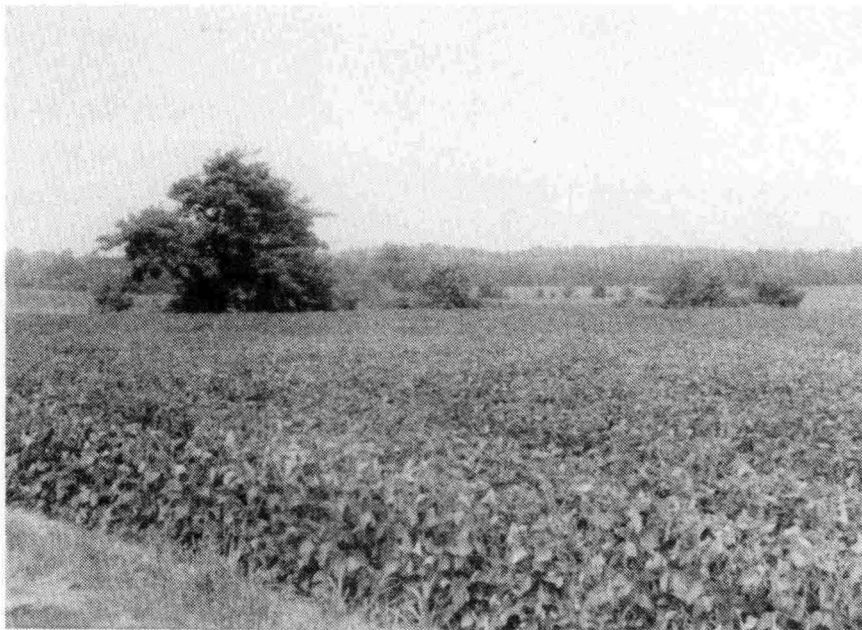
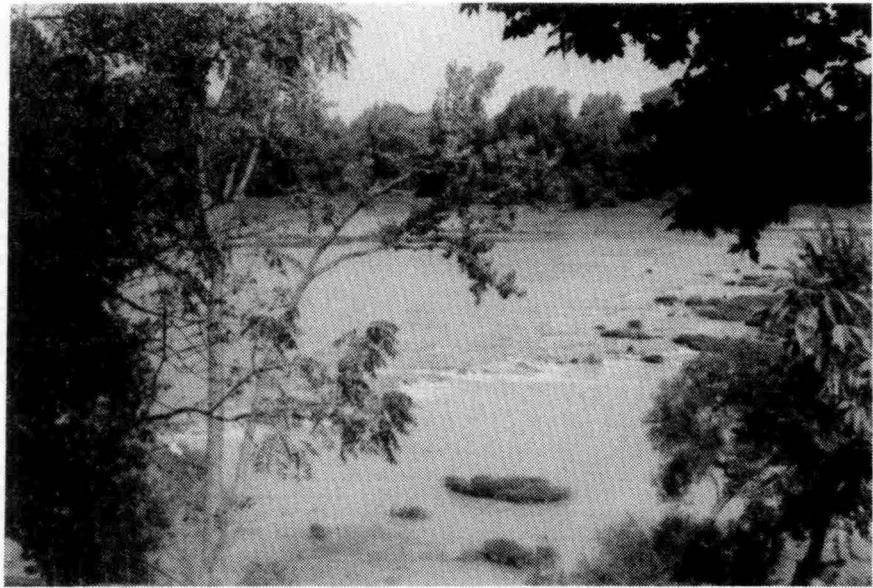


Independence Dam on
the Maumee River in
Ohio



Islands in the lower
Maumee River in
Ohio

Rapids of the lower
Maumee River in
Ohio



St. Marys River
Indiana

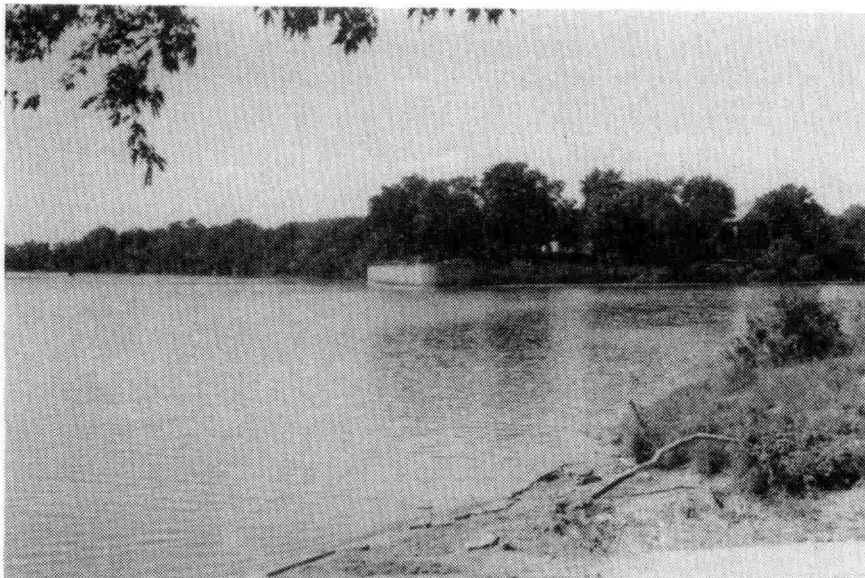
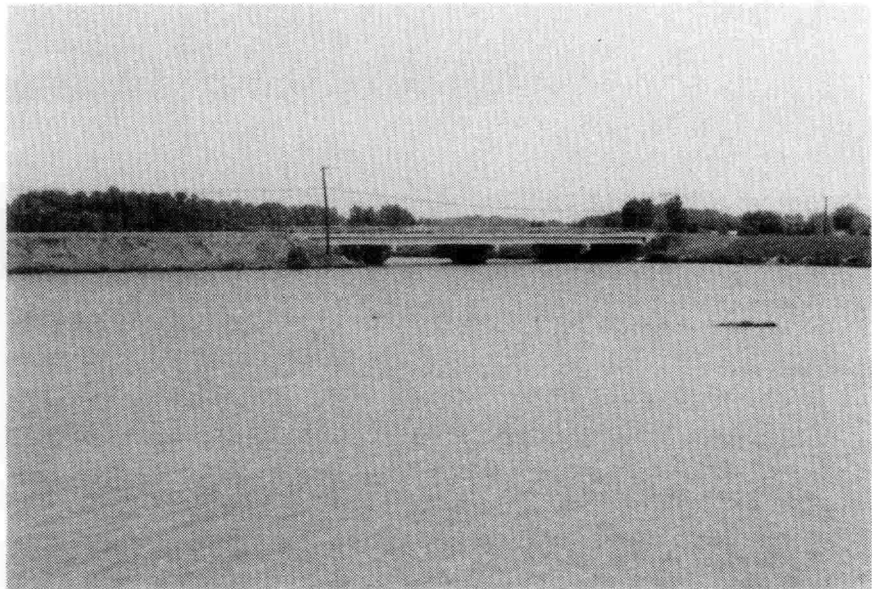
Rich agricultural
lands are adjacent
to the study rivers
in Ohio and Indiana



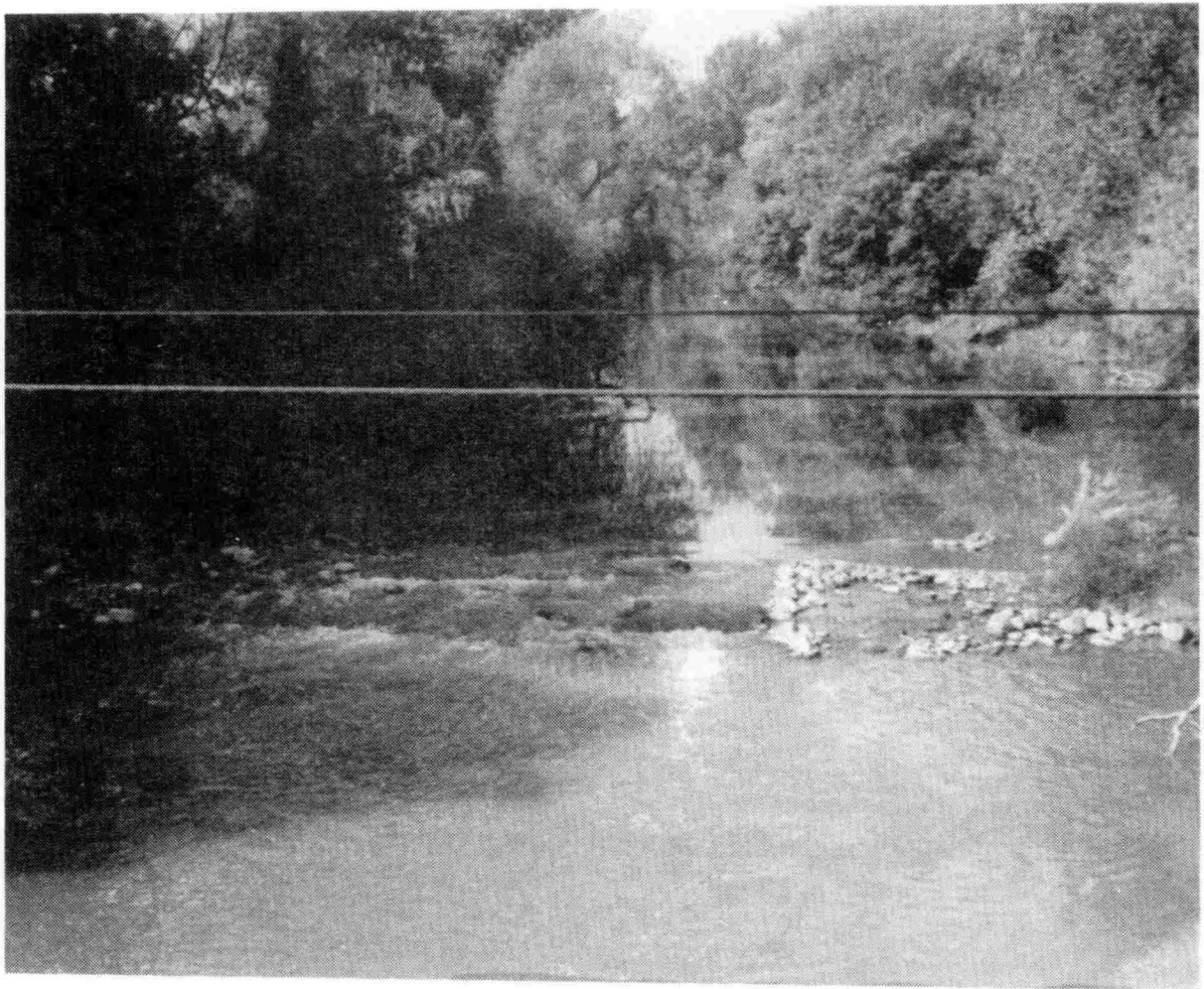


Streamside vegetation,
clay banks, and turbid
water on the upper Maumee
River near the Ohio-
Indiana state line

Highway bridge over
the upper portion of
Cedarville Reservoir
near Leo, Indiana



Site of Fort Defiance
at the junction of the
Maumee and Auglaize
Rivers at Defiance, Ohio



St. Joseph River
Indiana

The influence of man upon the river is apparent throughout its length. Numerous homes are visible, particularly in Decatur and Poe, Indiana. Many dumps and abandoned autos may be seen along the banks. Where tree cover has been removed, one can see well out into the flat agricultural areas. Twenty-seven bridges cross the study reach of the St. Marys. Except for the last eight miles in Fort Wayne, roads do not closely parallel the river.

The St. Joseph River, rising in Hillsdale County, Michigan, flows southwest through northwestern Ohio into Indiana. Its watershed area of 1,060 square miles includes 603 in Indiana, 219 in Michigan, and 238 in Ohio.

In Indiana the river meanders through 63 miles of flat to gently rolling northeastern Indiana countryside. In the study segment the river falls 55 feet, giving an average gradient of 1.3 ft./mi. This river, like the St. Marys, has an average width of about 80 feet, but it widens in two locations as a result of impoundments. The first impoundment, Cedarville Reservoir, is located about 11 miles above Fort Wayne and creates a backwater as much as 1,000 feet wide and 5-1/2 miles long. The second, the municipal reservoir in Fort Wayne, is located three miles above the confluence with the St. Marys River and creates a backwater 400 feet in width and a mile long. These impoundments help to stabilize the municipal water supply for Fort Wayne. Because of these impoundments and the flat gradient, the river is slow. Most of the river banks are low, but in several areas the river is incised more sharply, with bank heights rising to 30 feet. These areas occur near Spencerville, Indiana, and again below the Cedarville Reservoir dam. Below the municipal dam in Fort Wayne, the eastern bank again rises sharply to a height of 12 - 15 feet.

The banks along the St. Joseph River are mostly composed of clay-loam soil, with some areas showing sand and gravel mixed with the loam. Except for open areas around the impoundments, residential developments, and highway crossings, they are heavily vegetated. Large bottomland woods, high wooded banks, and narrow strips of trees alternate along the river. This river, like the St. Marys, carries a heavy siltation load. Siltation is heavier above the Cedarville Reservoir. Water clarity never exceeds more than a few inches. The stream above Cedarville Reservoir meets the criteria for partial body contact recreation.

Because of its rather small upstream watershed population and heavy shoreline vegetation, the St. Joseph River corridor above Cedarville Reservoir retains a near-natural appearance through much of its length. Occasional homes are seen along the river along with several dumps, but towns are small, with Spencerville the only noticeable town upstream. Spencerville is the site of an interesting covered bridge and old rock dam. As the river enters Cedarville Reservoir and proceeds south,

development becomes more noticeable, with signs of fill and erosion control measures along the bank and more bridge and power line crossings, factories, and commercial and residential structures. The lower part of the St. Joseph River is paralleled by roads. Farther upstream, however, town and country roads only occasionally run near the river. Seventeen bridges cross the river between the state line and Fort Wayne.

Cedar Creek in DeKalb and Allen Counties, Indiana, is an important and interesting tributary to the St. Joseph River. The 20-mile study section runs southwest from Auburn, Indiana, to the Allen County line then turns southeast to the St. Joseph River. Cedar Creek falls 80 feet as it flows through the gently rolling farmland of DeKalb County and a steeply banked canyon area in northern Allen County. The creek has an average gradient of about four feet per mile. Walls in "Cedar Canyon" rise 60 to 70 feet. This portion of Cedar Creek is 8 - 10 river miles long in Allen County.

Vegetation along Cedar Creek varies from bottomland woods to upland woods and field edges. The canyon area provides a particularly interesting and wide variety of vegetation and features large, overhanging trees and several rare plants. A trail along the creek provides a fine opportunity to observe wildlife and plant growth.

Most evidence of man's influence on the area is limited and blends well into the natural environment. No industries or towns are found on this section of Cedar Creek. A few homes are visible and six bridges cross the creek in Allen County, but most do not significantly interfere with the area's natural environment. The I-69 bridge crossings and a 345 KV power line are the only objectionable structures on the creek. These bridges and the highway noise temporarily disrupt the natural scene.

Along Cedar Creek a group of landowners have banded together in organizations called ACRES, Inc. and the Cedar Creek Wildlife Project, Inc. in an effort to preserve the stream valley.



The St. Joseph and St. Marys Rivers meet in downtown Ft. Wayne, Indiana, to form the Maumee River



Limestone outcroppings along the lower Maumee River at low flow



Woodland area in floodplain along Cedar Creek



The residents of the Cedar Creek area have worked together to establish the Cedar Creek Wildlife Area. One of the objectives of this group is to preserve the natural values of the area

Flow Characteristics

A necessary consideration in evaluating the recreational potential of the Maumee and its tributaries is the water volume

throughout the year. The rate of flow is particularly important during the summer months when recreation use is at its highest and water volume is often at minimum.

Glacial geology is believed to be the principal factor controlling the sustained flow of streams in this area. The Maumee basin is shaped like a saucer, flat in the center with elevations higher around the rim except toward Lake Erie to the northeast. The bed-rock geology has little direct influence on streamflow. The superficial deposits on the floor of ancient Lake Maumee are generally fine sand, silt, and clay, which are relatively impermeable but with occasional deposits of deep and relatively permeable sand. The principal soils are predominantly fine textured, poorly drained, and relatively impermeable. The low dry weather streamflow in the Maumee basin reflects the highly impermeable characteristics of the soils in the basin.

Flow data are available at eight stream gaging stations within the study area: (1) Cedar Creek at Highway 427; (2) St. Joseph River eight miles northeast of Fort Wayne; (3) St. Marys River at the U. S. 27 bridge at Decatur; (4) St. Marys River five miles south of Fort Wayne at Anthony Wayne Boulevard; (5) Maumee one mile north of New Haven; (6) Maumee one mile north of Antwerp on state highway 49; (7) Independence Dam; and (8) at the state highway 64 bridge at Waterville. Selected records are contained in Appendix IV.

Throughout the Maumee River basin there are no streams with exceptionally high sustained flow. Viewing the State of Ohio as a whole for comparison, the streamflow in the Maumee basin may be considered fair to poor. Not only are the low-flow indices low, but the medium and high flow indices are below average for the state. The highest dry weather flow indices are recorded on the St. Joseph River.

Due to the slow infiltration rates of the soils, much of the precipitation runs from the land surface into the drainage system. The drainage system is rather extensive with 271 named streams (total length 2,118 miles) and numerous small unnamed waterways (adding another 700 miles). The clay particles of the soil have a strong affinity for the water that does infiltrate the soil, releasing very little free water for gravitational movement. This water is held near the surface, often producing a relatively high water table and a somewhat limited underground storage capacity. The flat topography of the basin and the relatively high water table tend to make evapotranspiration losses greater than average. The combination of these factors induce low flows in the basin.

Floodwaters on the Maumee and its tributaries are often caused by the rapid runoff after periods of heavy precipitation or snow melt. These floodwaters affect primarily agricultural lands in the upper reaches of the tributaries and some urban properties where development has occurred near the river in Fort Wayne, Defiance, Napoleon, Florida, Perrysburg, Rossford, and Toledo.

The Maumee River is suitable for shallow draft boats such as canoes, kayaks, and johnboats, except at limited locations in the lower river during periods of low flow. Cedar Creek, the St. Marys River, and St. Joseph River are generally suitable for canoeing although there may be low water periods when short stretches of up to 200 yards would require portaging. Portions of the Maumee are deep enough to permit power boating. Waterskiing occurs in the slack water behind the Grand Rapids Providence Dam and the Independence Dam. Commercial dredges and barges operate on parts of the river for extraction of sand and gravel.

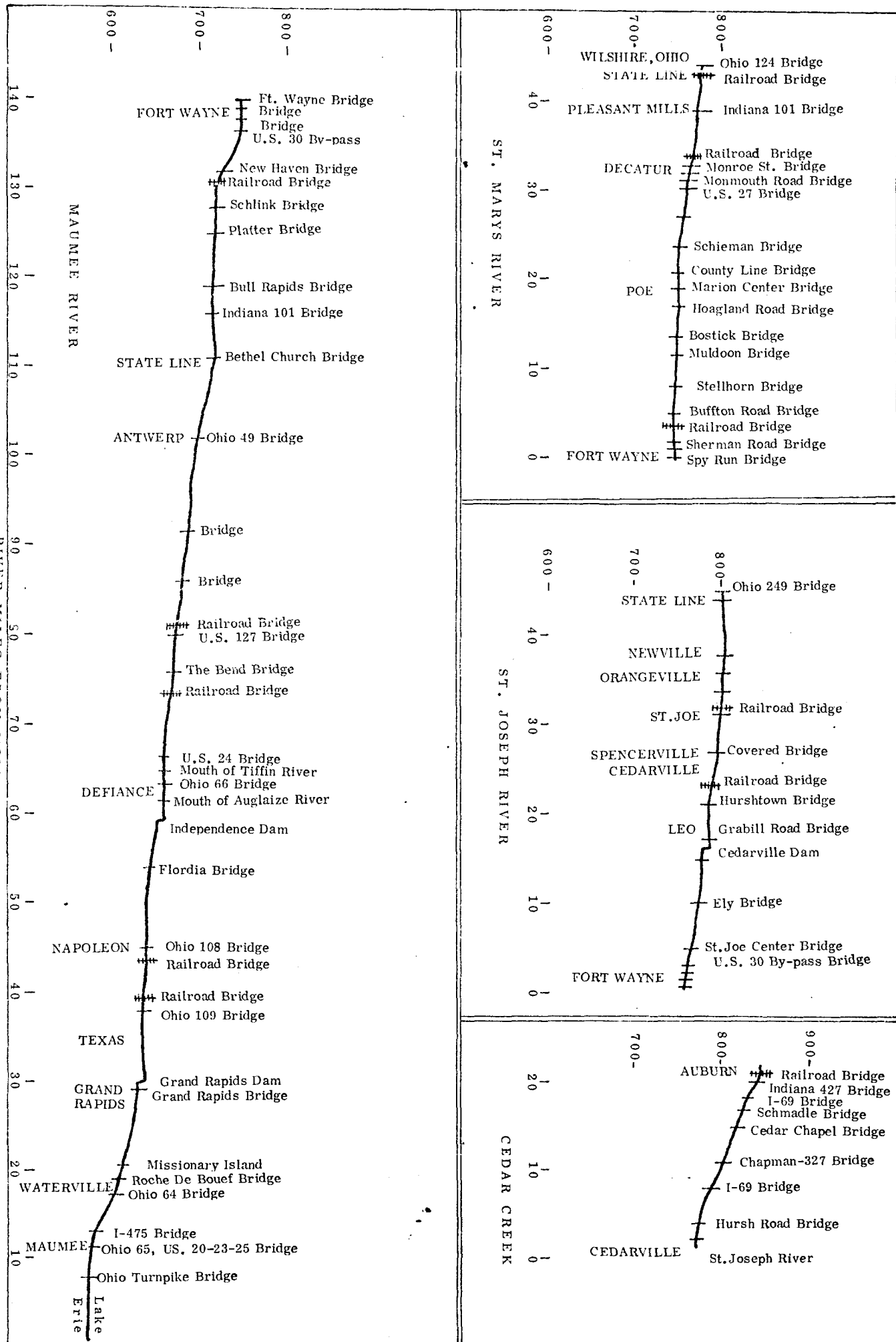
The current in many parts of the Maumee system is very sluggish and at times resembles backwater from a dam rather than a flowing stream. The water level of the Maumee River system fluctuates considerably. These fluctuations make the clay riverbanks extremely slippery and often unsuitable for launching canoes except at developed sites.

There are no feasible reservoir sites which provide low flow augmentation sufficient to materially change the flow characteristics of the river.

STREAM PROFILES

RIVER MILES FROM MOUTH

FIGURE 2



ENVIRONMENTAL QUALITY

Water Quality

The present water quality of the Maumee River main stem, the lower St. Joseph River and much of the St. Marys River is inadequate to meet the established criteria for inclusion in the National Wild and Scenic Rivers System. There are indications that low flows portions of Cedar Creek and extensive areas of the Maumee and its tributaries may not meet the criteria for a high quality recreational experience, due to the concentrated flow of industrial and municipal effluent and agricultural runoff.

Heavy rainfall, on the other hand, causes the many combined or partially combined sewer systems in the basin to overflow. High streamflows also scour materials from sludge banks along tributary streams that ultimately contributes to the year-round pollution problem.

The following discussion is based largely on water quality data from public and private sources available through the National Storage and Retrieval System (STORET). Current water quality data for the study area are available from state sampling stations at New Haven in Indiana; Antwerp, Defiance, Florida, Napoleon and Waterville in Ohio; and from samplings at public and private water intakes. To preserve the consistency of this discussion, it was necessary to supplement current data with data from periodic samplings of varying duration taken during the mid to late 1960's. The State of Indiana has recently added four additional long-term sampling stations to its monitoring system, two on the Maumee River and one each on the lower St. Marys and St. Joseph Rivers. Data recorded at these stations during 1971-1972 have been included in this report.

Although the value of using mid-1960's data may be debated, it should be realized that at this time the Great Lakes and, coincidentally, their Maumee River basin tributaries, were at low levels, the result of several years of below normal precipitation over the basin. The 1964 data are important since they offer the most recent opportunity for viewing the water quality situation on the Maumee and its tributaries under lowest flow conditions. Despite the many waste treatment facility improvements implemented in recent years, the possible length of these hydrologic cycles makes the inclusion of this data relevant to any discussion of the long-term recreation potential of the Maumee River.

St. Marys River

The overall water quality of the St. Marys River is fair. The main sources of pollution are agricultural and domestic flows. Phosphorus concentrations at all sampling points are sufficient to support algal growths throughout the year.

Severe dissolved oxygen depletion occurs below St. Marys, Ohio. The minimum dissolved oxygen level at Willshire, 30 miles downstream, is 3.8 mg/l (Appendices VI and VII). However, the recovery process is interrupted by pollution from the Willshire municipal dump. This dump contributes oil, grease, color, suspended solids, and floatables which affect the water quality of the study area.

As Table IV indicates, the City of Decatur presently provides secondary waste treatment but will require tertiary treatment and nutrient removal facilities to meet present water quality standards. In Decatur, the Central Soya Plant presently provides tertiary treatment. In order for this plant to meet future needs, nutrient removal facilities would have to be installed. The plant's discharge is described in Table V. Minimum dissolved oxygen concentrations above Fort Wayne presently meet Indiana's criteria for aquatic life of 4.0 mg/l of dissolved oxygen at all times. Dissolved oxygen concentrations within this reach appear to fluctuate widely due to the animal waste pollution and abundant algal growths. Total coliforms which average 570,000/100 ml below St. Marys, Ohio, drop to more moderate levels before entering the study area but rise again to 32,000/100 ml 10 miles above the confluence with the St. Joseph River (Appendices VIII and IX). The latter sample presumably reflects the concentration of runoff from hog feedlots in Adams and Mercer Counties. Coliform bacteria, turbidity, ammonia-nitrogen, color, and phenol levels in recent samples taken near Fort Wayne exceed Public Health Service (PHS) standards for drinking water supplies, and recreational use of the St. Marys River in this vicinity is not recommended.

St. Joseph River

Based on 1964-1969 sampling, the overall water quality of the St. Joseph River appears to be quite good, both chemically and bacteriologically. Phosphate concentrations recorded at sampling points above the Cedarville Reservoir were sufficient to permit algal blooms in both the reservoir and the river. Turbidity levels at this point were equivalent to water containing 77.1 mg/l of sand in one liter of water, marginal for the maintenance of a good freshwater fishery. The lower St. Joseph River is light brown in color with visibility limited to several inches. Temperatures and dissolved oxygen levels at all points below Edgerton are sufficient to support a well balanced fishery.

Fecal coliform measurements taken in 1964 at a station near the confluence of Cedar Creek indicate that the water at this location meets the criteria of 1000/100 ml for secondary contact recreation with a median count of 650/100 ml. Beyond this point the water does not consistently meet recreational standards. Total coliform concentrations at this point and at river mile 1.10 were 28,335/100 ml and 14,000/100 ml, respectively.

Cedar Creek

Cedar Creek, a major tributary of the St. Joseph River, enters the river just below the Cedarville Reservoir. Stream quality surveys and observations have indicated that Cedar Creek is at least periodically degraded. Causes include discharges of inadequately treated municipal and industrial waste, overflow of combined sewer systems, runoff from agricultural areas, and sedimentation caused by poor land management practices.

A comprehensive water quality survey was conducted on August 21, 1973, by a U. S. EPA sampling crew. The results of this study are presented in the Appendix. This study and others have found the creek to be turbid, high in dissolved solids, and odorous at times, with fecal coliform counts exceeding the standard for partial body contact recreation along the entire segment under study. Dissolved oxygen sags have been experienced within Allen County which could have adverse effects on aquatic organisms at low flow. Phosphorus levels, which reflect the excessive amounts of soil erosion and agricultural runoff as well as treated waste residuals, appear to be sufficient to promote algal blooms and the growth of aquatic weeds in slack water areas when turbidity decreases.

Although enforcement actions have been initiated against some basin discharges, the cause of all present pollution problems has not been identified. Because waste is classified as a water quality limited segment, as defined by the Indiana Water Strategy Paper and U. S. EPA guidelines, all municipalities will be required to provide the equivalent of advanced waste treatment for wastes discharged to Cedar Creek. The remaining pollution problems attributable to agricultural runoff, combined sewer overflows, and accelerated soil erosion will be addressed as a part of the state's continuing planning process for water quality management.

Maumee River

Agricultural activities contribute significant quantities of nutrients, herbicides, fungicides, pesticides, algicides and sediment to the main stem of the Maumee River and its principal tributaries. It has been estimated that on the average the Upper Maumee from Fort Wayne to the Tiffin River receives 160 tons of ammonia-nitrogen; 190 tons of organic

nitrogen; 670 tons of total nitrogen; 170 tons of phosphates; 23,640 tons of sulfates; and 36,600 tons of calcium from rural runoff, annually. Figures for the lower Maumee, including the Auglaize and Tiffin subbasins, were: 180; 310; 720; 120; 15,700; and 30,500 tons, respectively. In addition, 140 million tons of sediment enter Lake Erie annually from the Maumee River basin.

Phosphates and nitrates are contributed by agricultural runoff, inadequate sewage treatment and disposal, and the discharge of industrial process water. As Table IV indicates, a number of Maumee River basin communities require nutrient removal facilities or higher levels of waste treatment which would affect a reduction of phosphorus and nitrogen in the final effluent. Phosphate concentrations exceeded the critical concentrations of .03 mg/l for algal blooms on the Maumee River at all sampling points. The river is very muddy with turbidity readings of 50 to 130 Jackson Turbidity Unit. The latter turbidity measurement is roughly equivalent to the suspension of 295 mg of sand in one liter of water. Visibility is usually limited to less than one foot.

Nitrate-nitrogen concentrations on the Maumee main stem were generally well within the Public Health Service limits of 10 mg/l for untreated drinking water supplies, with the exception of the Defiance area where long-term average concentrations of 16.0 to 20.0 mg/l were experienced. The high average concentrations of total phosphates and total nitrates reflects the discharge of industries, the overflow of combined sewer systems, and the number of faulty septic tanks within the urbanized area of Defiance.

Investigations have shown that ammonia-nitrogen concentrations of 1.5 mg/l may be toxic to aquatic life when combined with low dissolved oxygen levels and a pH of 8.0 or greater. Concentrations of 2.5 mg/l are generally considered to be toxic. While average ammonia-nitrogen concentrations exceeded the Public Health Service limit of .05 mg/l for public drinking water supplies at all sampling points within the Maumee River basin, average concentrations as high as 1.68 and 2.10 mg/l were reported below Fort Wayne and Napoleon, respectively. With the exception of the lower Maumee River, pH levels are generally acceptable; however, localized problems may occur below some industrial outfalls.

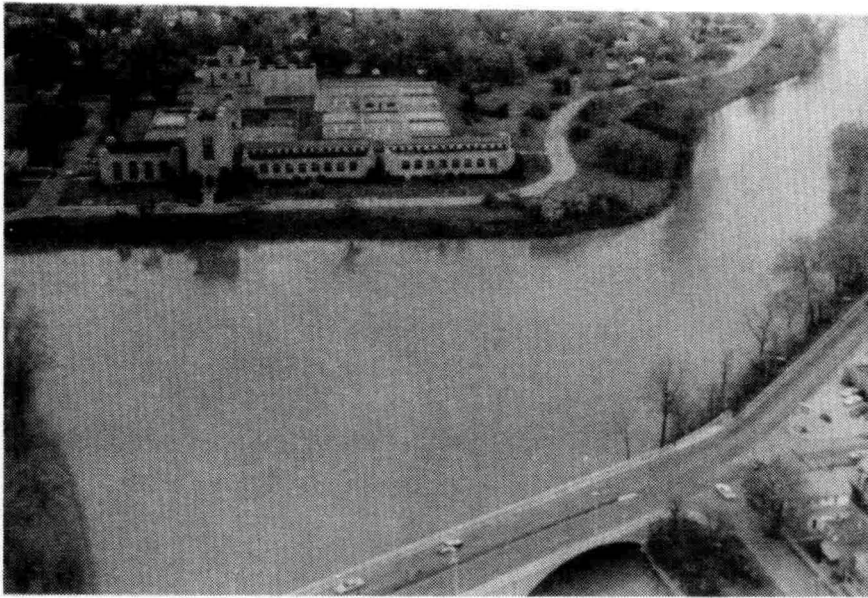
Phenols are another compound which impart tastes to water supplies and can taint fish flesh in quantities as small as 1 mg/l. This concentration, which is also the recommended limit for public water supplies, was equaled or exceeded at most reporting locations. The majority of sampling sites on the Maumee main stem reported average concentrations of 2.0 to 3.0 mg/l. However, an Ohio station at Napoleon indicated that average phenol concentrations were 11.9 mg/l in samples taken over the last two years with a maximum value of 51.0 mg/l. Phenol concentrations even at this maximum level should not be toxic to fish.

Taste problems associated with water withdrawals at Defiance during the winter months have been traced to industrial discharges of phenols at Fort Wayne. These phenolic wastes are quickly assimilated during warm weather, and taste problems are not experienced at that time. Phenols are also discharged into the Maumee River by the Johns Manville plants in Defiance and Waterville and by Republic Creosote in Lima, on the Ottawa River, a tributary to the Auglaize and Maumee Rivers.

The St. Marys River does not meet the state's minimum dissolved oxygen standard of aquatic life over much of its length. The biochemical oxygen demand for decaying algae, waste discharges and combined sewer overflows at Decatur and St. Marys, and feedlot wastes are the likely cause of this oxygen deficit.

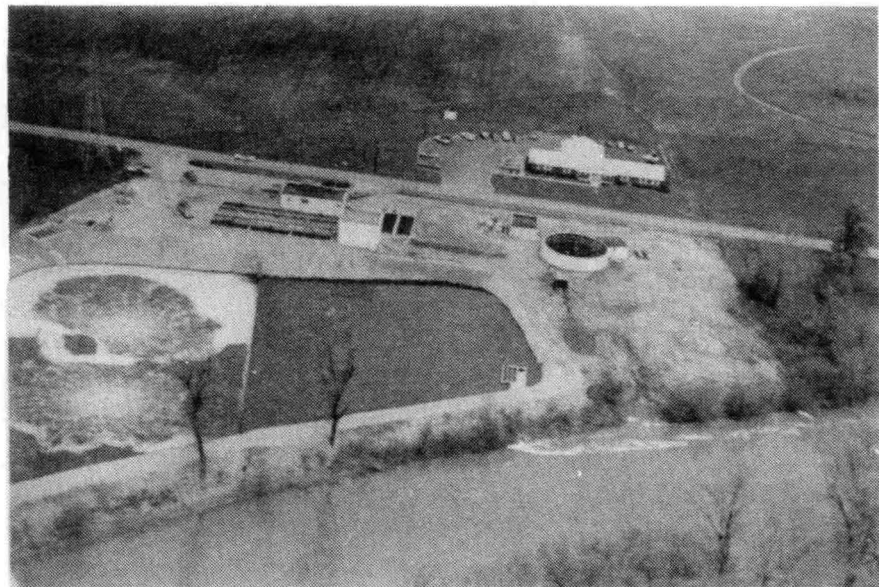
From Fort Wayne to Antwerp minimum dissolved oxygen levels are inadequate to support a well balanced fishery. Fourteen industries and the Fort Wayne sewage treatment plant have applied for permits to discharge into the St. Marys and Maumee Rivers at Fort Wayne. Despite the installation of storm water control and treatment facilities, the installation of tertiary treatment will be necessary to meet minimum dissolved oxygen and partial body contact recreation standards under all conditions. The New Haven sewage treatment plant is presently overloaded, contributing to the total coliform counts of 460,000 to 320,000 per 100 ml recorded during the low flow years of 1964 and 1965 and current median fecal coliform counts which exceed the Indiana standard for partial body contact recreation. This situation should be improved somewhat by the planned connection of New Haven with the Fort Wayne sewage treatment system. Indications are that the stretch of the Maumee from Woodburn, Indiana, to Grand Rapids, Ohio, may meet the median fecal coliform criteria for partial body contact recreation over most of its length; however, it does not consistently meet this criteria. The City of Antwerp presently has no treatment facilities other than septic tanks for its population of 1,700. Although their discharge has little effect on dissolved oxygen levels, 1972 fecal coliform measurement of 27,000/100 ml was recorded during low flow, and the installation of secondary treatment facilities with disinfection capabilities is necessary. The Weatherhead Corporation discharges excessive quantities of cyanide and 51 pounds of oils and grease per day, which adversely affect the recreational potential of the Maumee River below Antwerp.

At Defiance the Maumee River is significantly degraded by industrial and municipal wastes discharged directly to the river, and pollutional loads delivered by the Tiffin and Auglaize Rivers. Although the Defiance treatment plant has recently been upgraded to provide secondary treatment with nutrient removal, significant system by-passing occurs during heavy rainfall periods. The dissolved oxygen sag observed above Defiance may be attributed to the concentration of ineffective septic tanks at this point; such operational problems are common on the clayey floodplain soils.



Both usually quite turbid, the water of the St. Marys River (left) mixes with the St. Joseph River (right) to form the Maumee River in downtown Fort Wayne. The city water treatment plant is the large building in the center of the photograph. Fort Wayne uses the St. Joseph River as its municipal water supply

Many municipal treatment plants are located along the Maumee and its tributaries. Some release inadequately treated sewage into the streams



Due to excessive nutrients present, water quality is less than desirable with floating debris, scum, and other matter occasionally present



The Maumee and its tributaries are excessively turbid. This can be partially attributed to poor land development practices



During low flow, water often pools or stagnates behind obstructions producing an accumulation of foul water accompanied by objectional odors

Defiance Milk Products and the George Issac Company are presently discharging oxygen demanding materials without adequate treatment. The discharges of a number of other industries such as Defiance Fertilizer, the General Motors Central Foundry Division, and Johns-Manville Fiber Glass #7 plant, also contain oxygen-demanding substances.

Other less severe dissolved oxygen deficits occur below Napoleon and Grand Rapids. Within the City of Napoleon, Campbells Soup Company and the Gould Harris Division discharge oxygen-demanding material. Although the Campbell Soup Company has reduced its discharge of biochemical oxygen-demanding substances by about 88 percent over the last seven years, it still represents the largest single contributor of oxygen-demanding material.

As the river nears Toledo, minimum dissolved oxygen concentrations decline to 2.0 to 3.0 mg/l before leaving the study area at Perrysburg. Several communities in Lucas and Wood Counties presently have no treatment or inadequate waste treatment. Consolidation of the wastewater flows of Whitehouse, Waterville, Maumee and Holland for treatment at the proposed Lucas County - Maumee sewage treatment plant will provide a more reliable and cost-effective system for meeting water quality standards. Despite the aggregate effects of these discharges on dissolved oxygen levels, average fecal coliform counts were below the 1,000/100 ml limit for partial body contact recreation at all long-term sampling stations between Defiance and Perrysburg.

The water quality in the study area will be monitored regularly by 12 stations as a part of the Federal-State Discharge Permits Program. As a part of their obligations under the 1972 amendments to the Federal Water Pollution Control Act the states are required to designate stream segments where water quality standards will or will not be met by the implementation of the best practicable treatment methods. Segments where water quality standards should be met by 1977 are designated as a striped band in Appendix X. Water quality limited segments are represented by a dashed line and indicate those portions of the Maumee where standards will not be met or where there is insufficient water quality data for an effluent limited designation to be applied.

The implementation plans of the States of Ohio and Indiana are designed to maintain the water quality needed for all present and future uses. These uses include municipal water supply, industrial process water, recreation, irrigation, fish and aquatic life, wildlife and stock to supplement their implementation plans with load limits for industrial and municipal discharges within water quality limited segments. However, even if all industrial and municipal waste discharges were eliminated and controls were placed on the use of all agrichemicals, a significant pollution problem would still remain, due to natural and man-induced sedimentation. The present annual soil loss is three tons per acre.

Although the sedimentation of larger particles may limit bottom flora and fauna, suspended solids pose a more serious threat to shellfish, fish, and other gill-breathing organisms. The small size of these particles, which frequently approach colloidal diameter, may clog their respiratory systems. In addition, and important from a recreation viewpoint, turbid streams are not as aesthetic as clear streams. When canoeing, the opportunity to view fish, rocks, and bottom formations can provide exciting diversions from the passing shoreline. On the Maumee this would be desirable since a great deal of the shoreline is similar in appearance.

The projected increase of 25 percent for row crop production by the year 2020 indicates that pollution from runoff and erosion will continue to increase. The U. S. Environmental Protection Agency; USDA Soil Conservation Service and the Agricultural Research Service; Purdue University; and the Allen County Soil and Water Conservation District are presently engaged in a five-year pilot study of methods to reduce sedimentation in the Maumee basin, which may reverse this undesirable trend.

TABLE IV
Municipal Waste Treatment Facilities
in the Study Area

Municipal Discharger (Adams Co.)	Discharger		Present Treatment	Needed Improvements	Sewer System	Receiving Stream
	Des.	Act.				
Berne, Inc.	0.40	0.30	Stabilization lagoons	Nutrient removal upgrading to tertiary	Combined	Gates Ditch
Decatur, Ind.	1.80	1.70	High rate trickling filters	Nutrient removal, upgrading to tertiary, construction of interceptor sewers	Combined	St. Marys River
Monroe, Ind.			Septic tanks		Unknown system	Yellow Creek
(Allen Co.) Caribe Colony Subd.	.044	.040 (est)	Activated sludge with extended aeration		Separate	Maumee River
Edgewood Park Meadows	0.48	.45 (est)	Activated sludge with extended aeration	Adequate	Separate	Spy Run Creek - STMR
Nailand Hts. Subd.	.025	.020 (est)	Activated sludge with extended aeration	Adequate	Separate	St. Marys River
St. Joe Twp- Maumee		.50	Activated sludge with extended aeration	Adequate	Unknown system	Maumee River
	0.14	0.10	Activated sludge with- out extended aeration	Adequate	Separate sewers	St. Joseph River
Havenwood Forest Subd.			No treatment	Const. secondary, disinfection	No sewers	Maumee River

TABLE IV
Municipal Waste Treatment Facilities
(Continued)

Municipal Discharger	Discharger		Present Treatment	Needed Improvements	Sewer System	Receiving Stream
	Des.	Act.				
Valley Hills Mo Ho Pk.				Const. secondary, disinfection		Martin Ditch -
Ft. Wayne, Ind.	32.0	31.5	Activated sludge without extended aeration	Upgrade to tertiary, additional capacity and sewer separation, nutrient removal	Separate sewers	Maumee River
St. Joe STP	1.50	0.55	(Overload to Ft. Wayne via intercep- tor) stabilization lagoons	Needs nutrient removal	Separate sewers	Maumee River
Hanna-Creighton Urbanrene			Septic tanks	Sewer Collection system	Unknown system	
56 Grabill	.078	.030	Activated sludge without extended aeration	Nutrient removal	combined	Graybill Ditch - STJR
Huntertown	.144	.040	High rate trickling filters	Adequate	Unknown system	Willor Cr. to Cedar Cr.
Monroeville	.18	.08	High rate trickling filters	Upgrade to tertiary	Combined	E. Hatrock Cr. to MR
New Haven	.75	.90	Standard rate trickling filters	Connection to Ft. Wayne	Combined	Martin Ditch
Woodburn	.15	.06	Stabilization lagoons		Unknown system	Trib. of MR

TABLE IV
Municipal Waste Treatment Facilities
in the Study Area
(Continued)

Municipal Discharger (DeKalb Co.)	Discharger		Present Treatment	Needed Improvements	Sewer System	Receiving Stream
	Des.	Act.				
Ashley	.08	.05	Activated Sludge extended aeration	Disinfection	Separate	Turkey Cr.
Auburn	2.0	1.6	Activated sludge without extended aeration	Nutrient removal upgrading to tertiary	Combined	Cedar Cr.
Butler	.30	.25	High rate trickling	Disinfection nutrient removal	Sewer system	Big Run Cr. - STJ
Corunna			Septic tanks	Installation of secondary sewers and disinfection	Unknown sewer system	John Diehl Ditch Co.
57 Springs Camp Grounds			Septic tanks	Installation of tertiary disin- fection	Unknown sewer system	Cedar Cr.
Altona- Garrett	.80	.45	Activated sludge without extended aeration	Nutrient removal and upgrading to tertiary inceptor system	combined	Garrett Ditch CC
Saint Joe			Septic tanks	Installation of secondary	Unknown system	Trib. to St. Joseph R.
Waterloo	.18	.16	Activated sludge extended aeration	Adequate	Separate	Cedar Cr.
(Defiance Co.) Defiance	4.0	1.6	Secondary nutrient removal	Sludge disposal, sewer improvements	Combined & Separate	Maumee R.

TABLE IV
Municipal Waste Treatment Facilities
in the Study Area
(Continued)

Municipal Discharger	Discharger Des. Act.		Present Treatment	Needed Improvements	Sewer System	Receiving Stream
Sherwood			Septic tanks	Installation of secondary disinfection	Combined	Sulphur Cr. MR.
(Fulton Co.)						
Delta	.30	.05	Activated sludge- without extended aeration	Sewer improvements sludge dewatering	Separate	Bud Cr. to MR
Swanton	.32	.42	High rate trickling filters	Upgrade to tertiary plant expansion	Separate	AI Cr. to Swan Cr. MR.
Wauscon	1.07	.82	High rate trickling filters	Plant expansion	Combined & Separate	N. Turkeyfoot Cr. MR.
(Henry Co.)						
Deshler	.36	.28	Stabilization lagoons	Adequate	Separate	Yellow Cr. MR
Liberty Center			Septic Tanks	Sewer Const. installation of secondary	Combined	Dry Cr. MR
Napoleon	1.25	1.25	High rate trickling filters	Improved operation	Combined & Separate	Maumee R.
(Lucas Co.)						
Lucas Co. * Sewer Dist.			Small package			

* The Lucas Co. - Maumee sewage treatment plant is scheduled to serve the communities of Whitehouse, Waterville, Maumee, and Holland when it becomes operational

TABLE IV
Municipal Waste Treatment Facilities
in the Study Area
(Continued)

Municipal Discharger	Discharger Des. Act.		Present Treatment	Needed Treatments	Sewer System	Receiving Stream
Maumee			No treatment		Separate	Maumee R.
Waterville	.12	.38	High rate trickling filters	Sewer improvement connection to Lucas Co. S.D.	Combined	Maumee R.
<u>(Paulding Co.)</u>						
Antwerp			Septic tanks	Install secondary Sewer Improvement	Combined	Maumee R
Paulding	.59	.584	Stabilization lagoons		Combined	Flatrock Cr. to Auglaize R.
<u>(Wood Co.)</u>						
Grand Rapids			No treatment		No sewers	Maumee R
Haskins	0.21		Primary settling	Needs secondary improvements	Combined	Haskin Cr. to
Perrysburg	2.75	.97	Secondary, disinfection		Combined	Grassy Cr.
Wood Co. Sewer Dist.	.14		Activated sludge without extended aeration	Sludge disposal facilities	Combined	Tontogany Cr.

Source:

Environmental Protection Agency - STORET

TABLE V
INDUSTRIAL DISCHARGERS

Name/Location	Direct Surface Discharge	Municipal System Discharge	Nature of Discharge
<u>Indiana Dischargers</u>			
<u>Woodburn</u> B.F. Goodrich	0.33		Color, solids, ammonia, nitrates, phosphorus, oil, grease, BOD
<u>Fort Wayne</u> Phelps Dodge	0.38	.006	Color, solids, nitrates, phosphorus, chromium, iron, zinc, oil, grease, phenols, BOD
Gladieux Oil	0.30		Solids, COD, ammonia, nitrate, phosphorus, iron, phenols, heavy metals, cyanide
International Harvester	1.01	.28	Solids, oil, grease, iron
Dana Corp.	0.23	.02	Solids, BOD, alkalinity
M.A.Y. Stone Co.	1.8		Solids, BOD
N&W R.R.	.047		Solids, oil, grease, iron, phosphorus, nitrates, coli- form bacteria
Falstaff Brewing	.80	.58	Color, solids, waste heat, organics, iron
Kunkle Valve Co.	.001	.010	Solids, nitrates, phosphorus, iron, alkalinity
Coverall Rental Serv.	1.08		Color, solids, ammonia, nitrates, phosphates, BOD, COD, oil, grease, chlorinated hydrocarbons
Straub Bros.	.007		Solids, ammonia, nitrates, phosphorus
May Stone & Sand	1.8	0	Hardness, BOD
N. Indiana Public Serv.	.020	.008	Solids, alkalinity, ammonia, nitrates, phosphates, oil, grease, phenols, iron

TABLE V
(continued)

Name/Location	Direct Surface Discharge	Municipal System Discharge	Nature of Discharge
General Electric	.03	.14	Color, solids, ammonia, heavy metals, cyanides, iron, oil, grease
I.T.T. Federal Labs	.032	.11	Solids, color, heavy metals, iron
<u>Decatur</u> Central Soya	.028	.01	Color, solids, ammonia, nitrates, phosphorus, iron, algicides, oil, grease, BOD, COD, coliform, bacteria
<u>Hogland</u> Stone Street Gravel Inc.	.5	0	Suspended solids, ammonia, hardness
<u>Butler</u> Universal Tool		.55	Solids, Heavy metals, BOD, phosphorus, ammonia
<u>St. Joe</u> Sechler & Sons Inc.	.009		Solids, color, ammonia, BOD, coliform bacteria, phosphorus
<u>Waterloo</u> Kitchen-Quip Inc.	.02	.001	Solids, heavy metals, iron, oil, grease
Jackson Township	.07		Solids, ammonia, nitrates, phosphorus, coliform, bac- teria, iron
County Line Cheese Co.			
<u>Ohio Dischargers</u>			
<u>Antwerp</u> Weatherhead	.47		Solids, grease, oil, heavy metals, cyanides
<u>Defiance</u> GM Central Foundary	4.0		Solids, COD, iron
Defiance Fertilizer Co.	.0004	.0005	Solids, color, ammonia, nitrates, phosphates, BOD, oil, grease

TABLE V
(continued)

Name/Location	Direct Surface Discharge	Municipal System Discharge	Nature of Discharge
Defiance Milk Prod.	.88	.077	Solids, color, ammonia, nitrates, phosphorus, heavy metals, phenols, oil, grease, COD, BOD, coliform bacteria
Johns-Manville Plan #7			Phenols, COD, solids
George Issac	.02		Solids, grease, oil, COD
<u>Napoleon</u> Campbell Soup Co.	4.6		Solids, BOD
Gould Harris Div.	.06		Solids, COD, phosphates, BOD, zinc
<u>Waterville</u> Johns-Manville		.079	Solids, ammonia, nitrates, phosphorus, phenols, oils, grease, BOD, COD, coliform bacteria
Water Filtration Plant	.0085	.3	Color, turbidity, suspended solids, BOD, iron, magne- sium, zinc
<u>Perrysburg</u> Owens-Illinois Inc. Industrial Park	.002		Solids, ammonia, nitrates, phosphorus, oil, grease, phenols, coliform bacteria

Source:

Environmental Protection Agency - STORET

Noise

At most points along the Maumee River noise of various types and intensities is present. The noises which permeate the river corridor testify to man's nearby presence and detract from quiet recreational experiences. The songs of birds along the river are masked as large trucks roar along U. S. 24 and other roads which parallel the river. In addition to highway sounds, it is often possible to hear noise from railroads, farm machinery working in nearby fields, sand and gravel operations, or factories located in the corridor. Recreation use itself adds to noise levels when power boats are used on the river.

Air Quality

The Maumee River is situated in three air quality control regions outlined in Appendices IX and XII. The industrial profile is primarily foundries, glass manufacturing, grain handling, and oil refining.

Air quality along the Maumee River is classified according to the priorities in Table IV, which were established by the U. S. Environmental Protection Agency under the 1970 Clean Air Act. A priority I designation for a particular air pollutant indicates that the concentration of that parameter is above the primary ambient air quality standard. The primary standard is the maximum allowable concentration to prevent a health hazard, as opposed to the secondary standard which sets the maximum allowable limits for general welfare and aesthetics. The latter standard was established to prevent plant damage and undue particulate soiling.

Priority II indicates that the air quality, as reflected by a particular parameter, is essentially between the primary and secondary standard. Priority III indicates that air quality is better than the secondary standard set to protect the general welfare and aesthetic values.

Table VI
Regional Classification

Air Quality Control Reg.	Priority				
	Part	Sulfur Dioxide SO ₂	Carbon Monoxide CO	Nitrogen Dioxide NO ₂	Photo-Chemical Oxygen (SMOG) OX
Northeast Indiana	II	III	III	III	III
Northwest Ohio	II	I	III	III	III
Toledo	I	I	III	I	I

As Table VI indicates, with the exception of the Toledo metropolitan area, air quality in the Maumee River basin is generally good. The present air quality of the Toledo area reflects its industrialized character, displaying excessively high levels of suspended particulates, sulfur dioxide, nitrogen dioxide, and photochemical oxidants. The City of Toledo has recently adopted a numerical contaminant reporting system that provides a simplified method for daily reporting of these air pollutant concentrations.

Under the state implementation plan, all air quality control regions will be required to meet the secondary ambient air quality standards by 1975. Although they vary, the state implementation plans may achieve this goal through the limitation of certain fuels, zoning regulations, modifications in existing industrial processes and the addition of pollution control equipment.

Climate

Climate in the Maumee River basin is typical of the southern portion of the Great Lakes region. Summers are warm and humid while winters are cold and cloudy. Characteristic of this region are large fluctuations in annual, daily, and day-to-day temperatures.

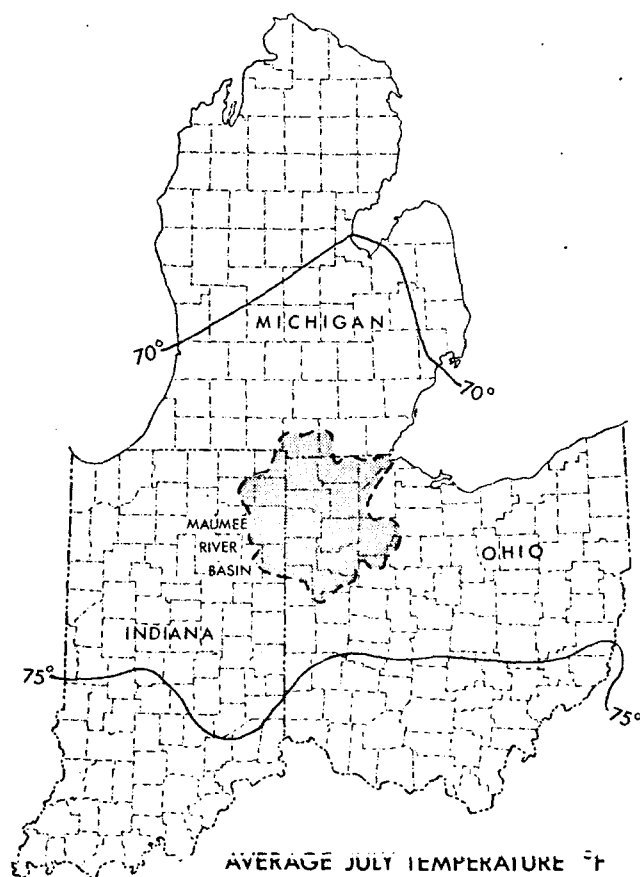
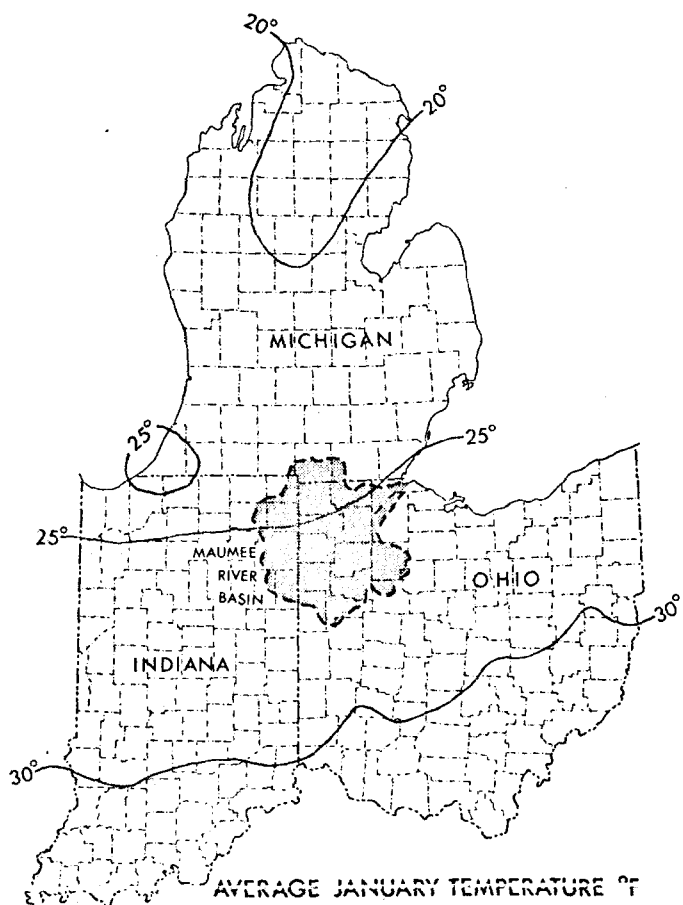
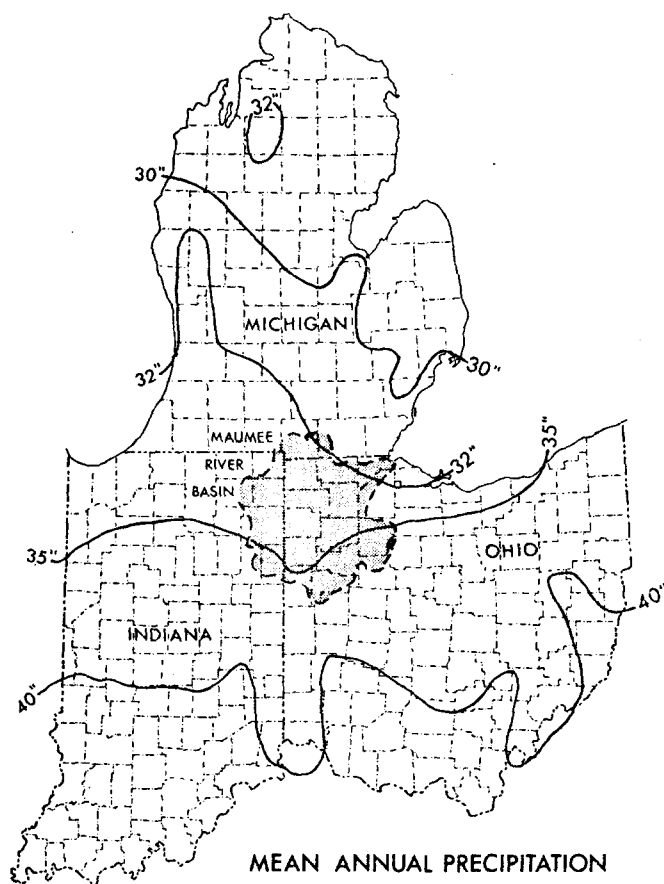
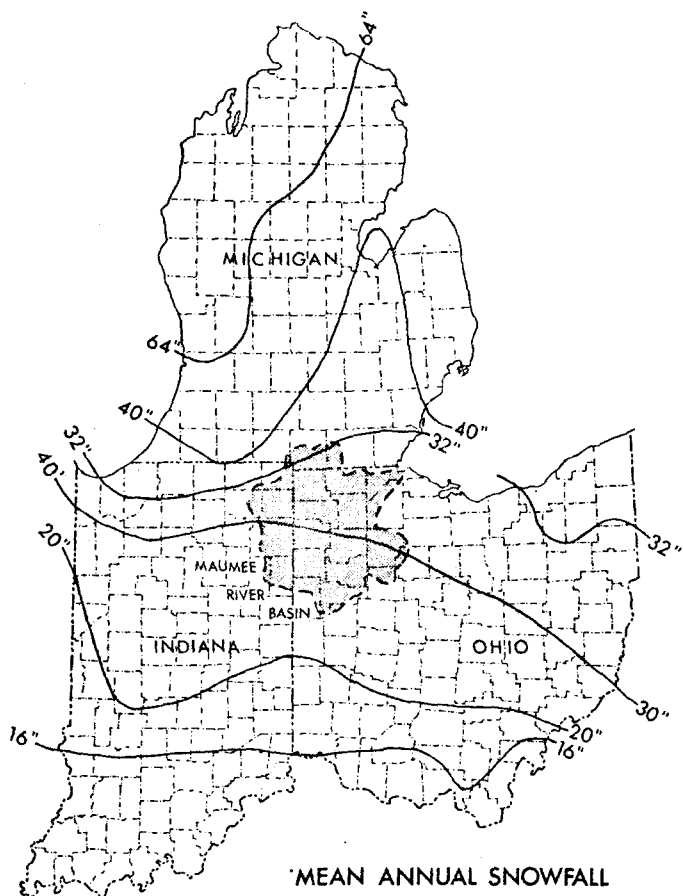
Average temperatures range from 26° Fahrenheit in January to 73° Fahrenheit in July. On the average, there are only 15 days a year when the temperature reaches 90 degrees or greater and only eight days when it drops to 0° or below. During summer afternoons the humidity often reaches 80 - 90 percent.

Mean annual precipitation in the basin is approximately 30-32 inches and is well distributed throughout the year. Average snowfall is around 30 inches distributed from November through March.

There is an excessive amount of cloudiness throughout the year but especially so during the winter. In winter months the sun shines during only 30 percent of the daylight hours. During the primary recreation months, it is sunny about 70 percent of the daylight hours.

High water in the spring is common in this area, although most years it is not severely damaging. This is often accentuated by ice jams occurring during the spring breakup. In recent years high water has been more prevalent due to sudden overflow of creeks and drainage ditches. This is a result of channelization and additional development in the watershed.

The prevailing wind direction is from the southwest quadrant. Strong winds approaching 90 miles an hour can occur in connection with summer thunderstorms. The area can experience severe weather, including tornados in the spring and summer and heavy snows and blizzards in the winter.



Geology

Geologic processes operating during the Pleistocene epoch produced most of the landscape in the Maumee River watershed. Glacial drift deposits by glacial ice cover most of the area.

As the glacial ice left the area about 13,000 to 15,000 years ago, a number of surface features were produced; terminal moraines are the most prominent feature. A number of other features are present in the form of kames, eskers, recessional moraines, and beach ridges deposited by glacial Lake Maumee.

Ground moraine consists of till that lies between terminal moraines. Ground moraine is generally thin and exhibits a low rolling topography. The till is rich in clay and relatively impervious.

Outwash material of sand and gravel carried by the melting ice filled in valleys and in places is covered with till deposits.

Superficial rocks are of metamorphic composition; the most common types are gniess, quartzite, granite, shale, diorite, syenite, and conglomerate.

The formations are Silurian (440 million years old) and Devonian (350 million years old). The bedrock consists primarily of dolomite and shales that dip slightly to the northwest.

Maumee River Geology--The Maumee River basin was formed by glacial action about 20,000 years ago. Advances and retreat of ice formed Lake Maumee, which was approximately 1-1/2 times the size of Lake Erie. Originally, water from the basin discharged through a channel known as the Wabash-Erie Channel. Water flowed westerly in this channel and discharged into what is presently the Wabash River. As the glacial melt waters receded, Lake Maumee dropped steadily. The lake drainage pattern then reverted to the northeast out the St. Lawrence River system and lowered the lake level. Drainage into the lake formed the channel of the present Maumee River. The broad, flat Maumee Lake plain was developed from silt and clay that settled out of Lake Maumee on top of the glacial till, filling irregularities on the land surface.

St. Marys River and St. Joseph River Geology--The two rivers follow the Fort Wayne moraine and join at its apex near the northeast corner of Wayne Township in Allen County, Indiana. Streamflows of the rivers are sluggish due to a low gradient. On the St. Marys River, bluffs and extensive floodplain deposits are absent. The St. Joseph River flows past numerous low bluffs and terraces, indicating it once was much wider and deeper. Much of the St. Joseph River bed is composed of sand and gravel deposits.

Cedar Creek Geology--Cedar Creek is a tributary of the St. Joseph River. Evidence points to the fact that at one time Cedar Creek carried a large volume of water. The creek flows through a gorge 60 to 70 feet deep and width reaching 800 to 1,000 feet. This gorge was formed from the ancient banks of a channel which carried floodwaters from the melting glacial ice.

Soils

The soils within the study area consist of nearly level soils on the upland areas; steep, moderately eroded soils on escarpments and slope breaks; nearly level to sloping soils on the stream terraces; and nearly level soils on the floodplains.

The general soil map included with this section shows the soil associations in the Maumee study area in Indiana and Ohio. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil and is named for the major soils. The soils in one association may occur in another but in a different pattern.

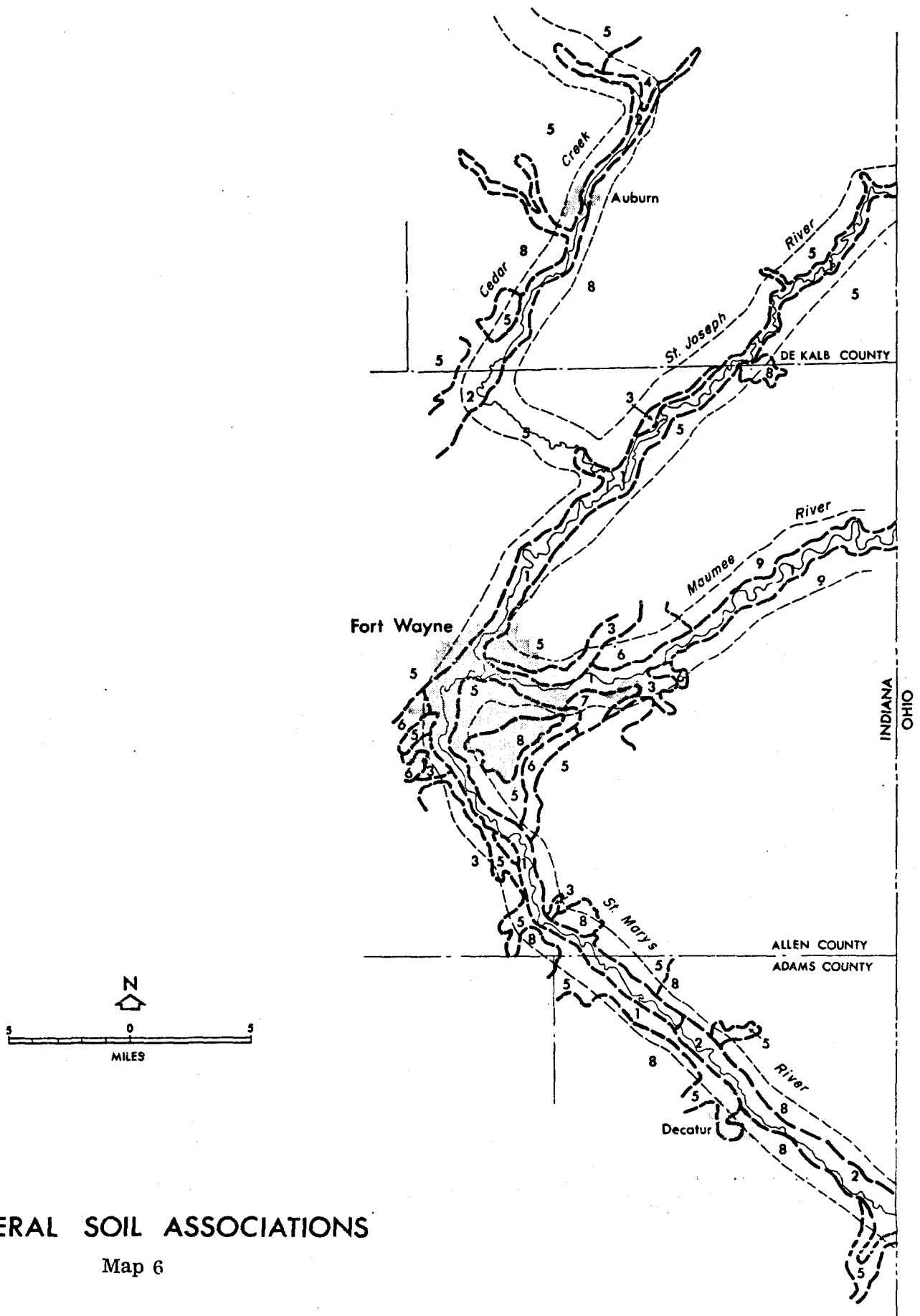
The general soil map shows the general pattern of the soils in the study area, a comparison of different parts of the study area, and the location of large tracts that are suitable for certain land uses. The map is a useful general guide in managing a watershed, a recreational area, a wooded tract, a wildlife area, or in planning sediment control practices. It is not a suitable map for planning the management of a particular tract of land or for selecting the exact location of improvements, because the soils in any one association differ in slope, depth, texture, drainage, and other characteristics that affect their management. Table VII, Estimated Soil Limitations or Suitability for Selected Uses, provides soil interpretations for each soil named in the soil associations on the general soil map. Interpretations are for uses that may be important in evaluating the soils of the Maumee River study area.

Soils rated as "SLIGHT" have few or no limitations for their use. Soils rated as "MODERATE" have limitations which reduce to some degree their desirability when used for the purpose being considered. They require some corrective measures. Soils rated as "SEVERE" have unfavorable soil characteristics that severely restrict their use and desirability for the stated purpose. A severe rating does not mean the soil cannot be used for a specific use. It does indicate problems during or after application of the use, unless special design, engineering, or other corrective measures are used to overcome the limitations. Costs of development are usually greater than on soils rated slight or moderate, and many times costs are prohibitive.

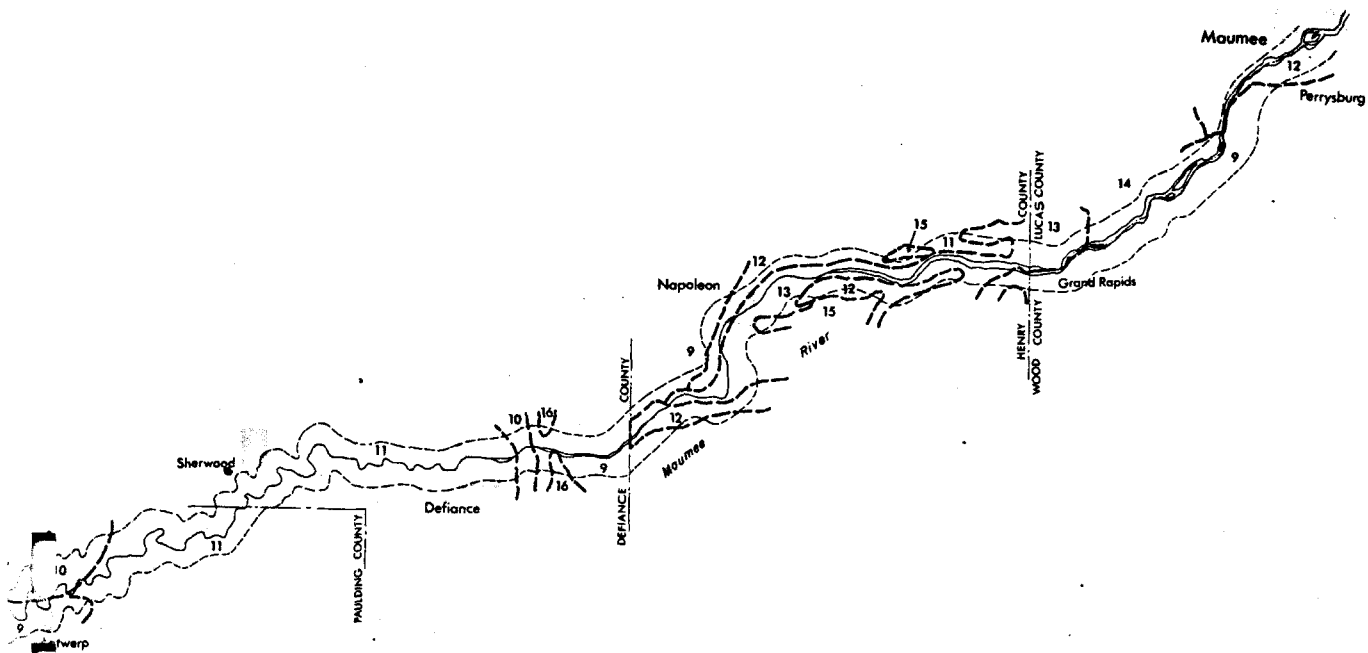
Soil suitability classes are rated as "Good," "Fair," "Poor," and "Very Poor." These are relative classes and indicate the feasibility and amount of management needed to perform the function indicated in the table. "Good" are the most feasible and require the least amount of management; "Very Poor" are unfeasible for the stated use.

In general, the soils of stream terraces and beach ridges provide the best sites for homes or recreation structures, on-site sewage disposal, campsites, and picnic areas. The steep valley walls have potential for scenic paths and trails if these can be located mostly on the contour with provisions for adequate erosion control.

The soils of outwash areas, stream terraces, and some floodplain areas have porous, sandy, or gravelly substrata which might permit effluent from septic tank filter fields to contaminate nearby streams or ground water. Otherwise, they are suited to on-site disposal of sewage effluent. In summary, the soils in the study area have a wide range in properties which have a pronounced influence on their suitability for the anticipated land uses.



GENERAL SOIL ASSOCIATIONS
Map 6



GENERAL SOIL ASSOCIATIONS

Map 7

TABLE VII
MAUMEE WILD AND SCENIC RIVER STUDY
ESTIMATED SOIL LIMITATIONS OR SUITABILITY FOR SELECTED USES

Soil Association	Soil Series & Percent of Association	Per*	Homesite	Septic Tank Absorption Fields	Paths & Trails	Campsite	Park & Picnic Areas	Erodability	Intensive Cropping	Woodland Productivity	Openland Wildlife	Woodland Wildlife	Wetland Wildlife
1	Eel Martinsville Benese	45 45 10	Severe:4 Slight Severe:4	Severe:4 Slight Severe:4	Severe:4 Moderate:5 Severe:4	Moderate:4 Slight Moderate:4	Severe:4 Slight Severe:4	Slight Slight Slight	Good Good Good	Good Good Good	Good Good Good	Good Good Good	V.Poor V.Poor V.Poor
2	Fox Martinsville Alluvial Soils	30 22 22	Slight Slight Severe:4	Slight Slight Severe:4	Slight Moderate:5 Severe:4	Slight Slight Moderate:4	Moderate:1 Slight Severe:4	Moderate Slight Slight	Fair Good Good	Good Good Good	Good Good Good	Good Good Good	V.Poor V.Poor V.Poor
3	Martinsville Belmore Fox	40 20 15	Slight Slight Slight	Slight Slight Slight	Moderate:4 Slight Slight	Slight Slight Slight	Slight Moderate:1 Moderate:1	Slight Moderate Moderate	Good Fair Fair	Good Good Good	Good Good Good	Good Good Good	V.Poor V.Poor V.Poor
4	Miami Riddles Crossier	23 20 17	Moderate:5 Moderate:5 Severe:3	Moderate:2 Moderate:2 Severe:2,3	Severe:5,6 Severe:5,6 Severe:5,6	Slight Slight Moderate:3	Moderate:1 Moderate:1 Moderate:3	Moderate Moderate Slight	Fair Good Good	Good Good Fair	Good Good Good	Good Good Fair	V.Poor V.Poor Fair
5	Moyley Blount	37 22	Moderate:5 Severe:3,5	Severe:2 Severe:2	Severe:5,6 Severe:5,6	Slight Moderate:3	Moderate:1,2 Moderate:2,3	Slight Slight	Fair Fair	Fair Fair	Good Good	Fair Fair	Fair Fair
6	Milford Montgomery Rensselaer	53 21 21	Severe:3 Severe:3,5 Severe:3	Severe:2,3 Severe:2,3 Severe:2,3	Severe:3,5 Severe:3,5 Severe:3	Severe:3 Severe:2,3,6 Severe:3	Severe:3 Severe:2,3,6 Severe:2,3	Slight Slight Slight	Good Good Good	Fair Fair Fair	Fair Poor Poor	Good Good Good	Good Good Good
7	Rensselaer Whitaker	50 35	Severe:3 Severe:3	Severe:2,3 Severe:3	Severe:3 Moderate:3	Severe:3 Moderate:3	Severe:2,3 Moderate:3	Slight Slight	Good Good	Fair Fair	Poor Good	Good Fair	Good Fair
8	Blount Pevamo	42 32	Severe:3 Severe:3,5	Severe:2,3 Severe:2,3	Severe:3,5,6 Severe:3,5,6	Moderate:3 Severe:3	Moderate:2,3 Severe:2,3	Slight Slight	Fair Good	Fair Fair	Good Poor	Fair Good	Fair Good
9	Hoytville Nappanee	67 15	Severe:3,5 Severe:3,5	Severe:2,3 Severe:2,3	Severe:3,5,6 Severe:5,6	Severe:3,6 Moderate:2,3	Severe:2,3,6 Moderate:2,3	Slight Slight	Good Fair	Fair Fair	Poor Fair	Good Fair	Good Fair
10	Mucks & Peats Latty Kappanee	90 70 10	Severe:3,5,6 Severe:3,5 Moderate:3,5	Severe:3 Severe:2,3 Severe:2,3	Severe:3,5,6 Severe:3 Severe:5,6	Severe:3,5,6 Severe:2,3,6 Severe:2,3	Severe:3,5,6 Severe:3 Moderate:3	Slight Slight Slight to Mod	Good Good Fair	Poor Fair Fair	V.Poor Poor Good	V.Poor Good Fair	Fair Good Poor
11	Pauldung Ror elms	80 5	Severe:3,5 Moderate:3,5	Severe:2,3 Severe:2,3	Severe:3,6 Moderate:3	Severe:2,3,6 Severe:2,3	Severe:3,6 Moderate:3	Slight Slight	Fair Fair to Poor	Fair Poor	Poor Fair	Poor Fair	Fair Poor
12	Toledo Lerawee Fulton	40 15 25	Severe:3,5 Severe:3,5 Moderate:3,5	Severe:2,3 Severe:2,3 Severe:2,3	Severe:3,6 Severe:3 Moderate:3	Severe:2,3 Severe:2,3,6 Severe:2,3	Severe:3,6 Severe:3 Moderate:3	Slight Slight Slight to Mod.	Good Good Fair	Fair Good Fair	Poor Poor Fair	Good Good Fair	Good Fair Poor
13	Merrill Harkins	55 15	Severe:3,5 Moderate:3,5	Severe:2,3 Severe:2,3	Severe:3 Moderate:3	Severe:2,3 Severe:3	Severe:3 Moderate:3	Slight Slight	V.Good Good	Good Fair	Poor Good	Good Fair	Good Poor
14	Colwood Kibble	45 25	Severe:3 Moderate:3	Severe:3 Moderate:3	Severe:3 Moderate:3	Severe:3 Moderate:3	Severe:3 Moderate:3	Slight Slight	V.Good Good	Good Good	Poor Good	Good Fair	Good Fair
15	Ottokee Cranby	35 40	Slight Severe:3	Slight Severe:3	Mod. to Sv:6 Severe:3	Mod. to Sv. Severe:3	Mod. to Sv:6 Severe:6	Slight to Mod. Slight	Poor to Fair Good	Fair Good	Fair Poor	Fair Good	Fair Poor
16	Harey Belmore Millgrove	5 80 5	Slight Slight Severe:3	Slight Slight Severe:3	Slight to Mod:1 Slight to Mod:1 Severe:3	Slight to Sv:1 Slight to Mod:1 Severe:3	Slight to Mod:1 Slight to Mod:1 Severe:3	Slight to Mod. Slight Slight	Good Fair V.Good	Good Good Good	Good Good Poor	Good Good Good	Poor Poor Good
17	Mucks & Peats	90	Severe:3,5,6	Severe:3	Severe:3,5,6	Severe:3,5,6	Severe:3,5,6	Slight	Good	Poor	V.Poor	V.Poor	Fair

*The total of the percentage estimates are less than 100 percent because the minor soils are not included in the table.

Key to Principal Soil Limitations

- | | | |
|----------------------|------------------------------|-------------------|
| 1. Excessive Slope | 3. Seasonal high water table | 5. Poor stability |
| 2. Slow permeability | 4. Flood Hazard | |

Flora

Topography, geological features, and associated land uses have been the primary factors influencing present vegetation patterns along the Maumee

River and its tributaries. The river is generally contained within glacial deposits, and there are presently few floodplain forests of any consequence. The topography of the surrounding land is flat with only occasional changes in relief. This characteristic has resulted in intensive use of the adjacent lands for agricultural purposes. As described at the time of the earliest land surveys, vegetation of the area was represented by three types of plant associations: elm-ash swamp forests, beech forests, and mixed oak forests. Occasionally prairie grasslands also occurred. Today, only remnants of these original forest types remain.

Vegetative cover generally consists of a narrow band of trees extending along the banks of the river. Within the floodplain and bordering the stream, common trees and shrubs are cottonwood, sycamore, silver maple, box elder, bladdernut, black haw, pale dogwood, redbud, witch hazel, smooth sumac, winterberry, red elm, and various species of willow. American elm was formerly abundant in the floodplain forests, but the Dutch elm disease has almost eliminated this species. Poison ivy is a common ground cover in association with heweled, stinging nettle, wild rye, and Equisetum.

Gently rolling hills and low steep-sided bluffs or ravines occur along portions of the rivers. Much of the vast swamp forest which once covered parts of the valley has disappeared as a result of clearing and draining the land for agricultural purposes. There are only limited woodlots, mostly small, located on the upper banks and bordering flat uplands. Common trees in the moist locations are sugar maple, beech, green ash, red oak, tuliptree, black cherry, buskeye, and hackberry. White oak, black oak, and shagbark hickory dominate on drier locations.

There are few natural understories which have not been altered by grazing and occasional fires. The least disturbed areas may contain ferns, including Christmas, fragile rattlesnake and the spinulose wood fern. Other wild plants such as trilliums, jack-in-the-pulpit, white baneberry, sweet cicely, bloodroot, spring beauty, hepatica, bellworth, Dutchman's breeches, wild ginger, jewelweed, sneezeweed, monkey flower, turtlehead ragweed, columbine, and skunk cabbage exist along the rivers. The least disturbed areas usually occur in those sites where topography and poor drainage do not lend themselves to agricultural purposes. As the disturbance on an area increases the plant succession includes millet, sedges, rushes, asters, goldenrods, and invading blackberry or similar shrubs.

In the areas with low banks and adjacent wetlands, you can find cattails, sedges, rushes, gray and red osier dogwoods, poison sumac, trembling aspen, cinnamon and royal ferns, marsh marigold, bulk buttercress, arrowhead, and cardinal flower.



The St. Joseph River and Cedar Creek usually have a substantial corridor of trees along the stream banks



In many places the screening along the river bank is only an intermittent narrow band of trees. In some places the tree cover has been removed to the very edge of the river

A unique natural area occurs along the Maumee about six miles east of Defiance on the south side of the river. The area is known as the "Tree Farm" and contains 80 acres. It is in private ownership and is best known for its many varieties of trees, wildflowers, and fauna of the mature beech-maple forest association.

Cedar Creek (Allen County, Indiana) is the most extensive natural area within the study area. It has a much wider floodplain between its picturesque tree covered high banks and uplands. The stream has meandered in places and created small oxbow channels. Orchids and the rare Indian paint brush are some of the unusual wildflowers found in isolated parts of the valley.

Fauna

In much of the Maumee basin, present-day clean farming practices, with more intensive row cropping and the elimination of fence rows

and woods, have reduced protective cover and food-producing areas for wildlife. In this area, the woody cover along the riverbanks and adjacent woodlands provides the best wildlife habitat. Within the Maumee River drainage, the St. Joseph River basin contains the best terrestrial and aquatic habitat because of less intensive farming, abandoned fields, large bottomland woods, and better water quality. The upper portion of the main stem of the Maumee River above Defiance, Ohio, is bordered by an occasional wooded area and provides better wildlife habitat than along the lower section of the river. The St. Marys River watershed is intensively farmed, with a narrow band of trees and scattered woods along the river. Better habitat is found along the river downstream from Decatur, Indiana, than upstream.

Forty-four species of mammals are found in the Maumee River watershed. The white-tailed deer is the only big game animal in the basin and is found in good numbers in the wooded and brushy lands along Cedar Creek, the St. Joseph River, and the Upper Maumee River. Deer numbers vary from one to ten per township along the intensively farmed St. Marys River and lower Maumee main stem to twenty-six to ninety-nine per township in the varied habitat along Cedar Creek, the St. Joseph, and the Upper Maumee. The deer population in the Ohio portion of the basin is large enough at the present time to support both a buck and a special permit antlerless deer hunting season. Although hunting is popular, the aesthetic value of deer is of major importance in the region.

Coyote and badger are occasionally reported in the watershed. These visitors add unique interest to the area. Fair to good populations of red fox, gray fox, mink, weasel, skunk, raccoon, muskrat, woodchuck, and opossum occur in the watershed wherever dens, food, cover, and water are available. Trapping of furbearers, especially muskrat, mink, fox, and raccoon, is popular in some parts of the basin.

Beaver were nearly eliminated from Ohio by 1830 but have become reestablished in some areas of the state. Williams County, in the St. Joseph River and Tiffin River drainages, is the only county in northwestern Ohio which contains beaver. Twenty-three beaver were trapped here between 1963 and 1970. The northern section of Allen County, Indiana, contains a few scattered colonies of beaver. Because of their ability to favorably alter the environment for themselves and other fish and wildlife, beaver are of great interest to the biologist and naturalist. These same habits can make them enemies of farmers, but their numbers are currently low and complaints are rare. If necessary, trapping permits for removal of nuisance animals are issued by Indiana and Ohio.

Cottontail rabbits have low to medium populations in the basin and are found almost everywhere from suburban lawns and gardens to abandoned farmland and woods. The cottontail does not do well in the cleanly farmed region of the basin, but thrives where small fields of grain and hay occur together with brushy fencerows, woodlots, and similar types of cover. The rabbit is the most popular farm game animal in the basin.

Four species of squirrels are found in the Maumee basin. Fox squirrels, which prefer wooded streambanks and woodlots, have the highest populations. Although normally a forest animal, the gray squirrel is common in cities and parks in the watershed. Red squirrels and southern flying squirrels also inhabit basin woodlands.

The Indiana bat, considered ENDANGERED by the U. S. Fish and Wildlife Service, ranges through the eastern and midwestern United States, including the Maumee River basin. This bat is associated with major cavernous limestone areas and areas just north of cave regions and is an accidental visitor to the Maumee watershed.

Numerous species of reptiles and amphibians are found in a variety of habitats in the Maumee basin. Among them are eight turtle species, 14 species of snakes, ten species of salamanders, two species of toads, nine species of frogs, and the five-line skink. Several of these species are rare or endangered within Ohio, although they may be plentiful elsewhere in their ranges. These include the spotted turtle, northern copperbelly snake, and Kirtland's water snake. The secretive eastern massasauga is the only poisonous snake in the watershed, but it is not common. Amphibians and reptiles are valuable components of the environment, both as predators and as prey.

A great variety of bird life is found in the Maumee River watershed. The streams provide good to excellent habitat for nesting and migrating wood ducks. As an area for waterfowl production, the Maumee should be considered good, but not outstanding. This river has been included for over twenty years in Indiana's annual survey of wood duck production. Based on these data for the period 1952-1971, this river has produced

0.5 wood duck broods per mile compared to 1.0 broods per mile, the statewide average for all included streams. Although comparable data are not available, other streams in this vicinity, notably the St. Joseph River, undoubtedly surpass the Maumee as producers of wood ducks. The principal wood duck habitat is found in the large bottomland woods along the St. Joseph River and Cedar Creek. Some of the highest waterfowl concentrations in Ohio occur on the Maumee River, particularly in the rapids areas during the winter. These concentrations are of great interest to many people and provide many hours of nonconsumptive wildlife use. Numerous ducks also winter on the Indiana portions of the rivers wherever there is open water. Mallards and black ducks make up the greatest part of these concentrations. Other waterfowl, such as Canada geese, use the Maumee system during migration. Moderate waterfowl hunting occurs along basin streams, with wood ducks comprising the greatest percent of the harvest.

Great blue herons have been reported nesting at a rookery along the Maumee River and at one on Cedar Creek. On Cedar Creek there are about 50-55 active nests. Both great blue herons and green herons are commonly seen on the rivers during the summer and during migrations. Many species of song birds are permanent residents of the watershed while others are only accidental visitors to the area. Song birds, along with squirrels and small mammals, provide much aesthetic enjoyment for both the rural and urban populous. Owls and hawks are also found in the basin and are an important part of the ecosystem, feeding mainly on rodents, plus reptiles, amphibians, and other animals. The watershed contains good nesting habitat for great horned owls, with the population ranging from medium to high. Bald eagles nest in the Lake Erie marshes and are rarely observed in the Maumee basin.

The Hungarian partridge, not abundant in Ohio or in the Maumee watershed of Indiana, is a grassland game bird introduced in the United States in the early 1900's. This partridge does not do well in intensively farmed areas and has declined as the acreage of meadowland has decreased. The Upper Maumee watershed is one of the few areas in Ohio supporting populations of the Hungarian partridge. In the Maumee basin, coveys of birds maintain themselves in scatterings of desirable habitat.

Ring-necked pheasants and bobwhite quail are both found in the Maumee basin. Medium quality pheasant habitat and low-to-medium quality quail habitat are present. Pheasants do better in intensively farmed areas than in brushy country but still require undisturbed nesting and wintering cover. Pheasant populations have declined due to decreased habitat as row crops have replaced hay crops. Many nesting hens are killed by mowers on the remaining grasslands. Quail require good interspersed food and cover over a wide area and are more often found in the brushy edge along the river than in cleanly farmed fields. Both birds are hunted, with pheasants receiving greater pressure than quail because of their greater number.

All but a very few acres of the original Maumee basin wetlands have been drained. The St. Joseph River has low banks and considerable adjacent wetlands in its upper watershed which are valuable for waterfowl and aquatic furbearers. A 1960 survey of wetlands in Indiana listed about 250 acres in the headwaters of Cedar Creek as significant for waterfowl and muskrats. In Ohio, Oxbow Lake Wildlife Area near Defiance contains uplands and marshlands and is used by nesting wood ducks, mallards, black ducks, and occasionally blue wing teal. Muskrats; mink; and numerous water birds, amphibians, and reptiles utilize the area.

Hunting and trapping pressures on the Maumee in recent years have remained stable or increased slightly although it is local opinion that most game populations have decreased. This estimate of populations is probably accurate since wildlife habitats along the river have been notably downgraded in the last ten years by agricultural clearing, urbanization, and pollution. The exception to the general decline in game populations has been waterfowl, which has significantly increased, particularly dabbling ducks using the Maumee as a resting area during their spring and fall migrations.

The once great fishery of the Maumee River has been degraded by municipal, industrial, and agricultural pollution. Clearing and drainage, primarily in the 1800's, have resulted in continued sedimentation and reduced streamflows with concomitant adverse effects on the aquatic resources of the river. Industrial and sewage pollution became common by the 1930's and continues to degrade the river. Agricultural runoff contributes to overenrichment of the river.

Although 87 fish species were recorded for the Maumee River system in 1893, samplings taken during the last 10 years reveal 56 species remaining for the Ohio portion of the basin and 50 species for the Maumee main stem. The number of species may have decreased further since the survey was conducted. Some species, such as the Great Lakes muskellunge, the greater redhorse, and the mooneye, survive only as scattered individuals. All three of these species are rare or endangered in Ohio and are being eliminated in the Maumee and elsewhere in their range because of low tolerance for excessive turbidity and chemical pollutants.

A sample of the fishery of the Maumee River taken near New Haven between the sewage outflows of Fort Wayne and New Haven indicates the river is dominated by generally undesirable species, primarily gizzard shad (60 percent). Due to the poor water quality, only a few desirable fish species are found in this stretch of the river.

In terms of abundance, shad were followed by carpsuckers, green sunfish, and carp. Largemouth bass were eighth in abundance and represented only two percent of the total sample. A total of 400 fish were sampled in 1972 and they represented 22 species. The total sample was categorized as follows:

	<u>ROUGH FISH</u>	<u>GAME FISH</u>
Total Weight	70.03 lbs.	11.69 lbs.
Percent Weight	85.7	14.3
Total Number	322	78
Percent	80.5	19.5

On the day of the fisheries inventory, the river was high and extremely turbid. Water clarity was less than one inch.

Studies conducted since 1970 on the Maumee River in Ohio indicate a general improvement in the quality of fish populations in the stream as compared with those of the early 1960's. This improvement is related to improved water quality due to increased and improved industrial and municipal waste treatment and better streamflows after low flow years. As a result, the percent of desirable fish species has increased in that stretch of the Maumee from Independence Dam downstream, although the less desirable species still dominate. The desirable species which are increasing include northern pike, white bass, walleye, crappie, channel catfish, and freshwater drum. Water quality improvement is also responsible for more extensive migrations of walleye and white bass from Lake Erie to spawn in the reach of river below the Grand Rapids Dam. Smallmouth bass have been stocked below the latter dam since 1969. Despite pollution problems, fishing is a popular activity on the Maumee and is expected to increase in popularity, especially if increases in desirable fish species continue.

No fish population surveys have been conducted on the St. Joseph River, St. Marys River, or Cedar Creek, but fishermen have reported catches of northern pike in the St. Joseph. The relatively good water quality of this river should provide a good fishery although there are seasonal low flow problems. Cedar Creek is a rock bottom stream with riffles and cool water of good quality and contains habitat suitable for smallmouth bass and rock bass. The creek was once a good trout stream but no longer has either a native or a stocked population because pollution problems have made it unsuitable for trout.

Other aquatic life, including mollusks and crustaceans, has been badly affected by pollution of the Maumee. The once greatly diverse molluscan population has been reduced, primarily due to toxic chemicals and sedimentation of the clam beds. Commercial clamming for the pearl button industry once existed on the Maumee. The long-lived mollusks, or naiads, are a valuable research tool because their longevity (5 to 60 years) enables them to reflect certain stream conditions, including presence of metals and pesticides, over a long period of time. As many as 39 species of mollusks may once have been found in the Maumee main stem, but it is not known how many remain. The St. Joseph River is

known to contain a fine molluscan fauna, including at least three endangered species determined as a result of the 1971 Symposium on Rare and Endangered Mollusks held in Columbus, Ohio. One species, Epioblasma perobliqua, is currently known only to the St. Joseph. The other two species may still survive in other streams in addition to the St. Joseph.

Continued improvement of stream water quality in the basin as a result of improved industrial and municipal waste treatment programs is expected to improve the habitat for all aquatic life. But agricultural pollutants will continue to degrade water quality, especially in regard to sedimentation, excessive fertility caused by fertilizer runoff, and intensification of seasonal streamflow fluctuation. Ditching of fields and channelization of tributaries have destroyed suitable habitat for fish and other aquatic species and aggravated the streamflow fluctuation and sedimentation problems on the Maumee River main stem.

History and Archaeology

Prehistoric man, dependent on gathering, hunting, fishing, and primitive agriculture, generally avoided the extensive marshes of

the Maumee River basin in preference of drier forested uplands. Thus, he left few traces of his presence in the Maumee River valley.

Available archaeological evidence indicates Algonquin occupancy followed by Iroquoian and later Erie habitation. Generally, these Indians lived in fortified villages located at the confluence of rivers and streams or on high bluffs near by. Fortifications usually consisted of wooden stockades or earthen walls with exterior ditches.

Tribal warfare and the pressures of European settlement brought a southward and westward movement of Indian people into the Maumee valley in the late 17th and early 18th centuries. Predominant among them were the Miami's who by 1700 had settled at the headwaters of the Maumee River. By the mid-1700's numerous Miami and Ottawa villages were established along the Maumee River. Other tribes represented by habitation sites included the Shawnee, Delaware, Potawatomi, and Wyandot.

Evidence of Indian habitation is widespread throughout the Maumee River valley with tools and arrowheads found at locations of former hunting camps. Indications of later settlement and an increased reliance on agricultural crops have been found in several locations, notably at the lower end of the valley and at the confluence of the river's major tributaries. Among them are the Gladieux and Biggers sites near Perrysburg, the site of Fort Meigs, and the Black Knolls and William's sites on the south side of the river near Waterville. Missionary and Indian islands south of Waterville have been sources of Indian artifacts and related finds for years.

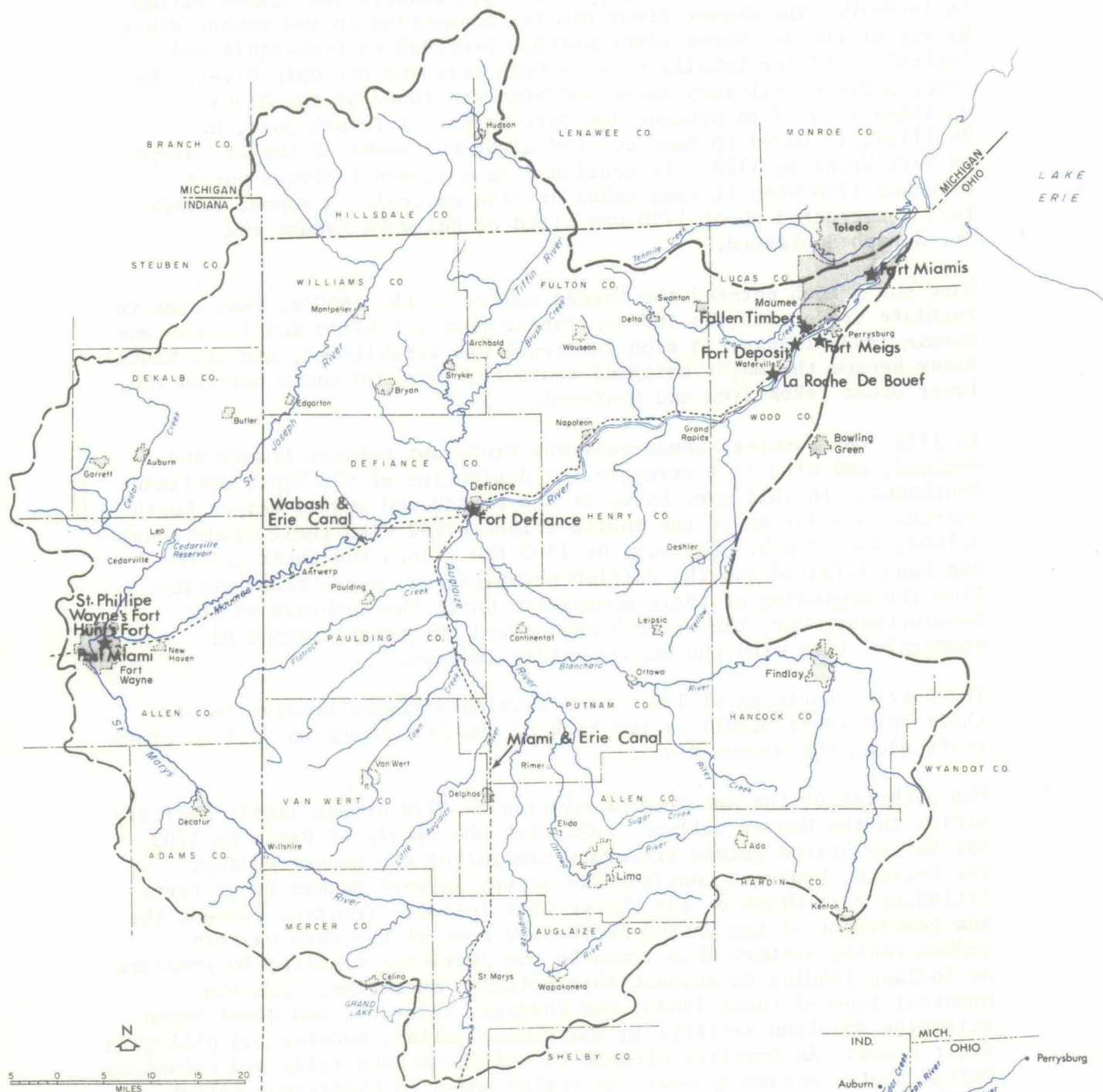
The French explorer, Rene Robert Cavelier, Sieur da LaSalle, is believed to be the first European to have entered the Maumee valley in 1669-70. The Maumee River and its connection to the Wabash River by way of the St. Marys River portage provided an accessible and logical route for LaSalle between Lake Erie and the Ohio River. By 1680, a French military force had been stationed at the Miami villages located in present day Fort Wayne. A French fort, St. Phillipe, is known to have existed along the banks of the St. Marys in Fort Wayne by 1720. It continued as a French fortress until December 1760 when it came under British control. A second French fort constructed about 1750 was sited at Delaware Avenue and St. Joseph Boulevard.

When the French entered the Maumee valley in the 1600's, they came to initiate trade with the Indians rather than establish settlements and obtain landholdings. A rich fur trade was established, and the Maumee River became the major shipping route for furs and goods between the lower Great Lakes area and Montreal.

In 1756, the European seven-year war broke out between France and England, and with it a struggle for domination of the North American Continent. In this war, known as the French and Indian War in North America, a majority of the Indian tribes sided with their traditional allies, the French. However, by 1760 the French and their allies had been defeated and the British occupied the Maumee River valley. From the beginning of their occupation until the outbreak of the Revolutionary War, the British emphasized the establishment of commercial ties with the Maumee valley Indians.

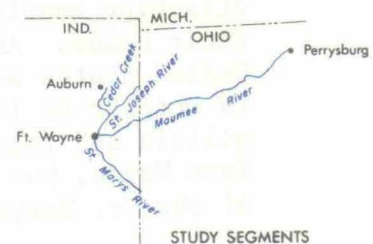
The Pontiac uprising of 1763 ended British military occupation of their Fort (Post Miami) on the bank of the St. Joseph as well as other posts along the Maumee River.

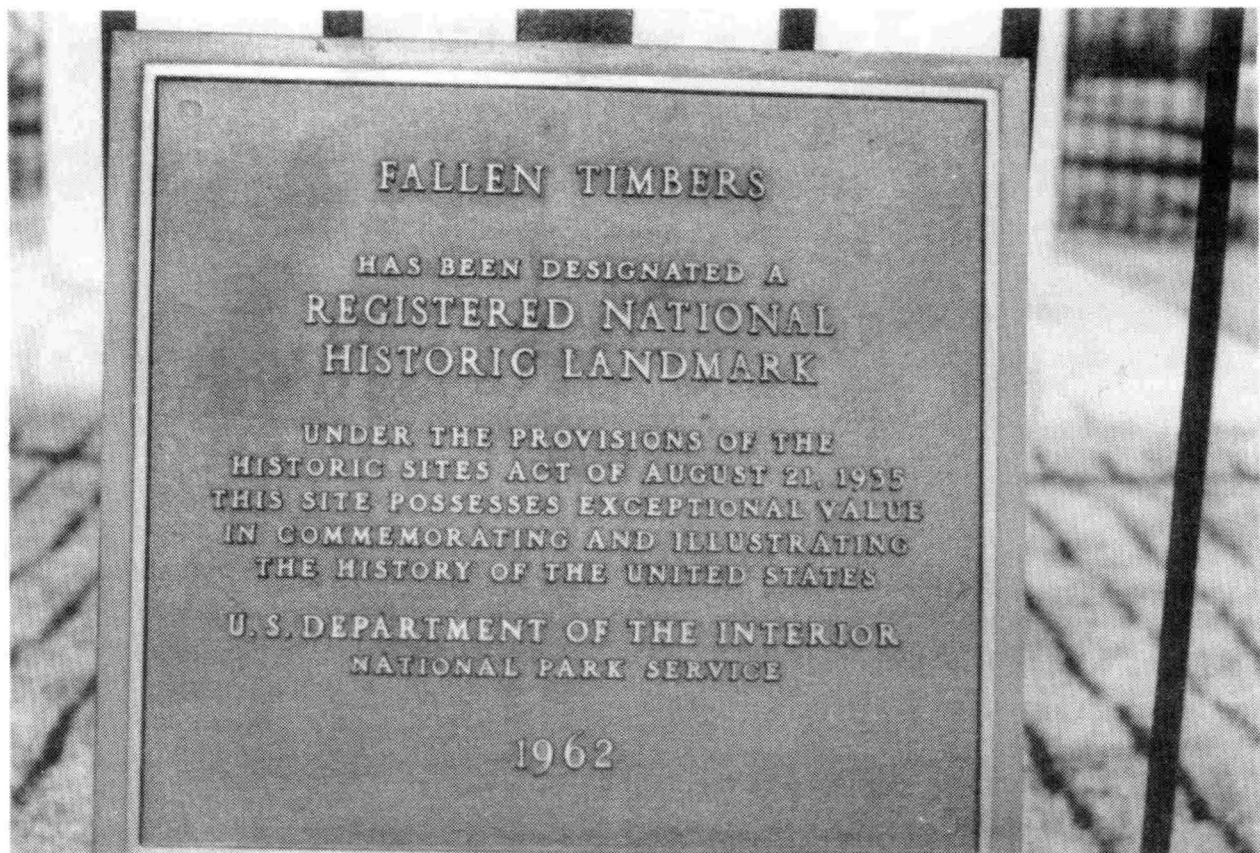
The outbreak of the American Revolution in 1776 brought little military action to the Maumee valley. Following the Treaty of Paris in 1783, the United States gained temporary control of the Maumee valley. The British, however, continued to occupy several Maumee River forts including Fort Miami on the Maumee near Toledo. Treaties between the new government of the United States and some of the more eastern tribes ceding eastern Ohio lands to the Americans resulted in pressure on Indians tending to support this British contention. Fearing eventual loss of their lands, the Shawnee, Delaware, and Miami began attacking American settlers in the Maumee valley, burning and pillaging their homes. An American attempt to end the Indian raids and establish United States authority over the valley ended in disastrous defeat. In October of 1790, General Josiah Harmar, with an army of 1,453 militia and regulars, lost 183 men and 31 were wounded at battles near Fort Wayne, but he failed to establish an American fort at the confluence of the St. Marys and St. Joseph Rivers. Known as Harmar's Defeat, this



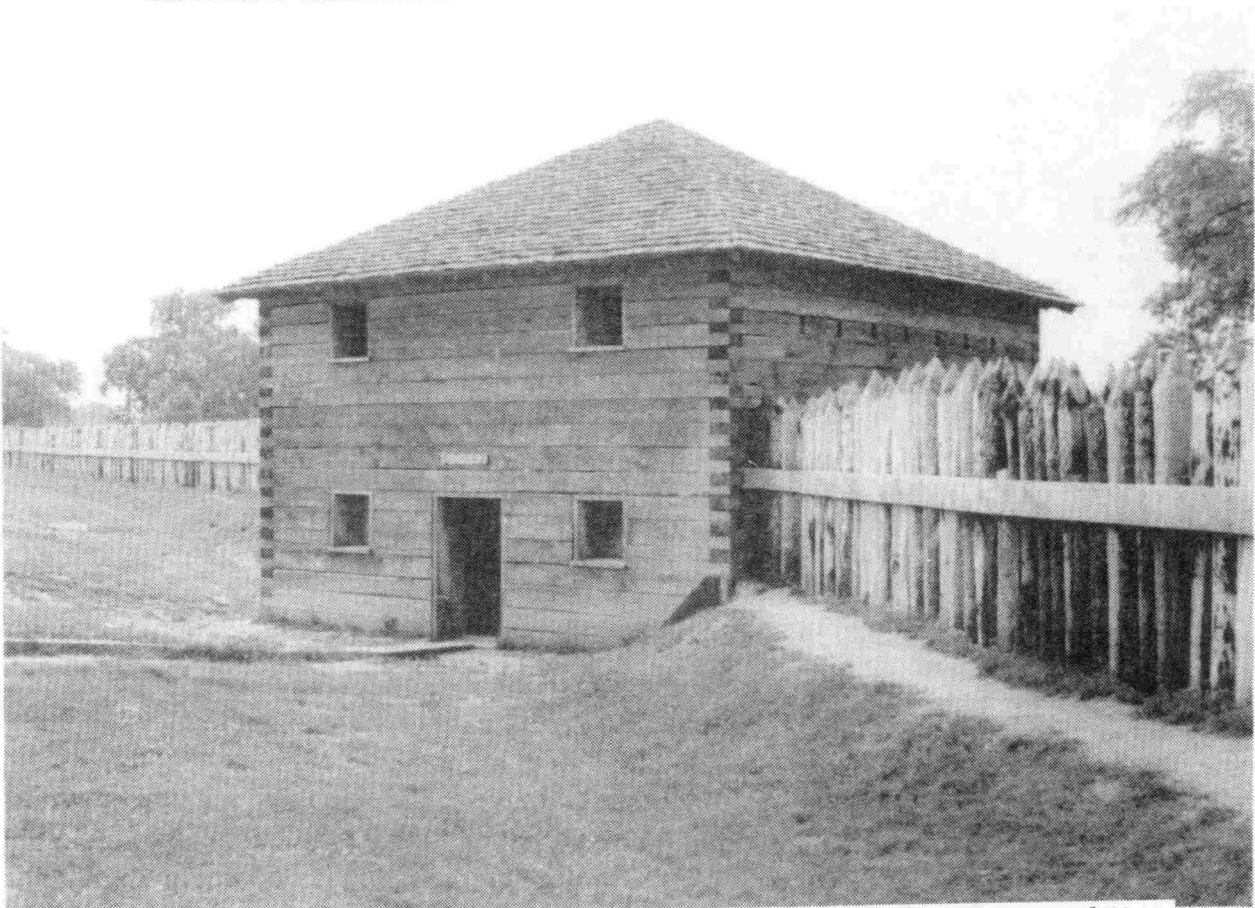
MAUMEE RIVER BASIN

Historic Sites of Major Interest
along study segments

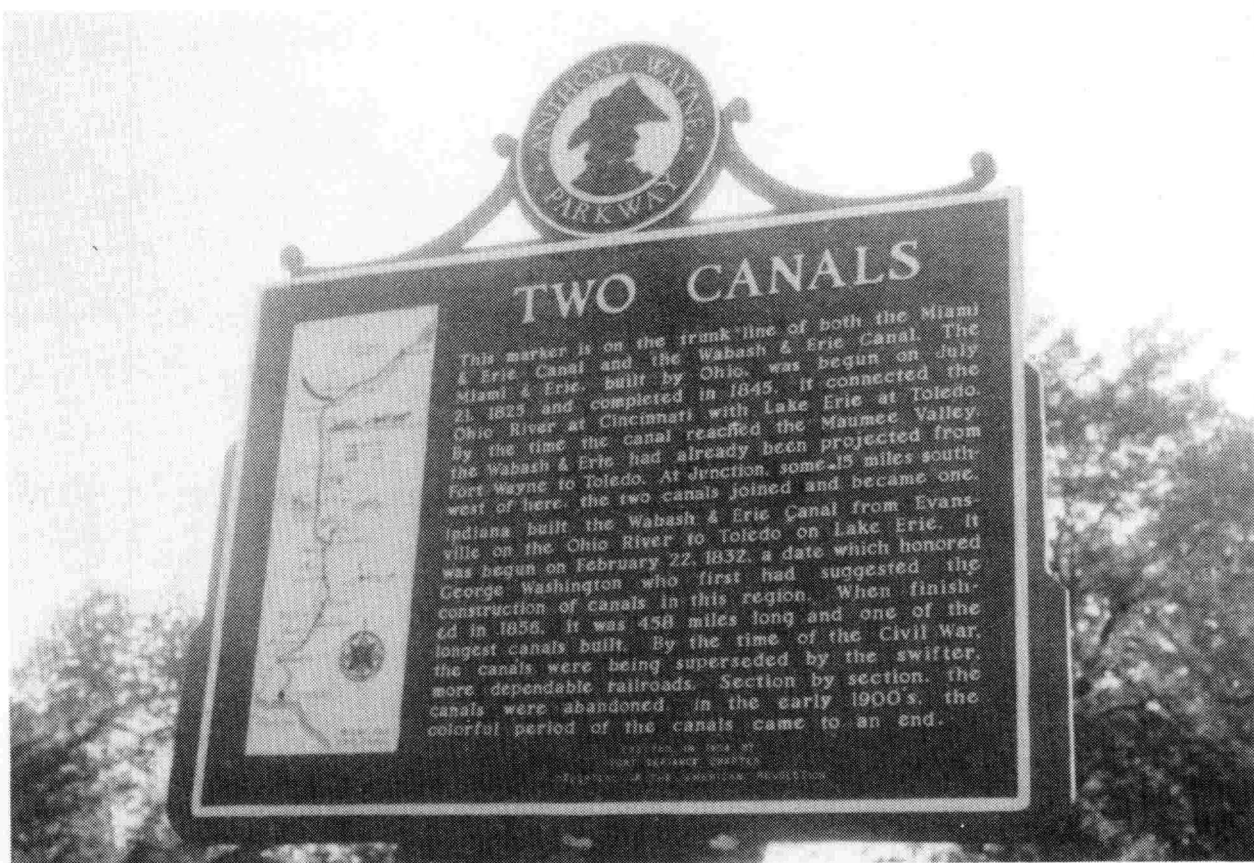




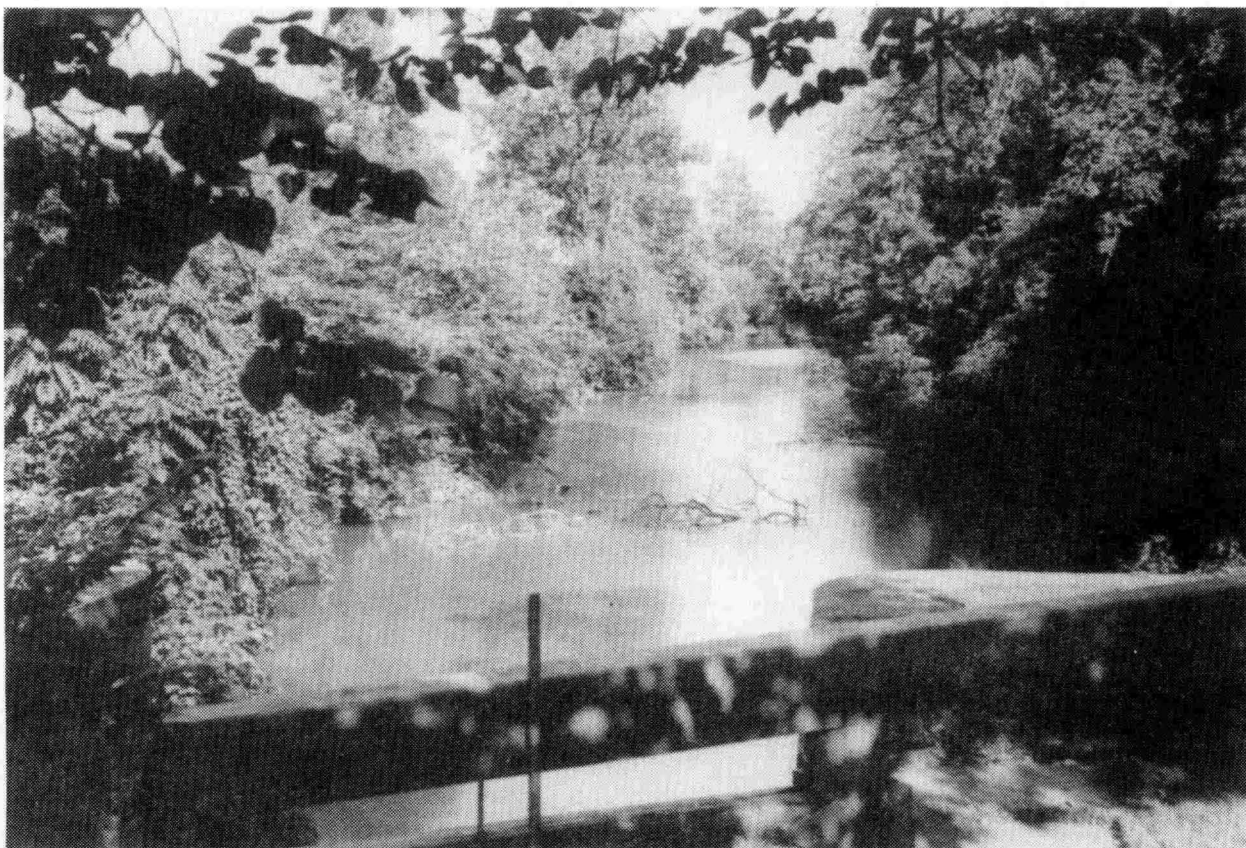
The site of the Battle of Fallen Timbers near Maumee, Ohio, together with other historical sites along the river have been designated National Historical Landmarks



Fort Meigs near Perrysville, Ohio, is being restored to its condition during the War of 1812 by the Ohio Historical Society



Important historical sites are generally well marked, and the information provided helps the visitor to appreciate the historical events which occurred in this valley



Parts of the Miami and Erie Canal, completed in 1845 but abandoned in the early 1900's, are preserved complete with locks at several places along the river

American failure was followed in November 1791 by the loss of over 600 American dead and 283 wounded in battles south of the Maumee valley. These clashes involved 1,400 troops under the command of General Arthur St. Clair and Indians under the leadership of Miami Chief Little Turtle, Shawnee Chief Blue Jacket and others. .

It was not until the expedition of General Anthony Wayne in 1794 that the Maumee valley was secured for the United States. At the Battle of Fallen Timbers fought on August 20, 1794, Wayne, with his legion some 3000 strong, defeated the confederated Indian tribes in less than one hour of vigorous combat. The Indians soon turned and ran for protection at the British Post (Fort Miamis). But the gates were closed and kept closed. The rout of the Indians at Fallen Timbers and subsequent actions led to the treaty of Green Ville in 1795 which established a boundary between the Indians and Americans and opened new lands for settlement. The site of the Battle of Fallen Timbers is located on the banks of the river near Maumee, Ohio, and is a Registered National Historic Landmark.

As a result of Wayne's expedition and in the years following, numerous American forts and trading posts were established throughout the valley. Fort Defiance (1794-1797) was located at present day Defiance, Ohio. Fort Deposit (1794) and Fort Meigs (1813) (presently being restored) were established near Perrysburg, Ohio. Fort Miamis (1789-1797) at Maumee, Ohio, was originally British before being relinquished to the Americans in 1796.

Fort Meigs, along with two other forts, has been identified in the State of Ohio's Historic Preservation Plan as possessing major historic significance. The Fort Defiance and the Fort Miamis sites are the only classic British forts built in Ohio. Two of significance in the Indiana portion of the Maumee valley were Hunt's Fort (1801) and Wayne's Fort (1794) both located in Fort Wayne. There are, however, no remnants of these forts.

Following the Battle of Fallen Timbers, the American military presence in the Maumee valley was limited to periodic occupation of the forts established during the Wayne expedition of 1794. Additional Indian lands were ceded to the United States, and settlers and traders continued to encroach on the lands of the Miami, Shawnee, Delaware, Potawatomi, and other tribes.

Pressed by an advancing European civilization, the Shawnee Chief Tecumseh and his brother, "The Prophet," formed a confederation with the British backing to meet this tide of settlement. Conflicts broke out culminating in the outbreak of the War of 1812. While there was little conflict within the Maumee valley proper, its waterways and trails served as routes for military forces of both combatants. In the fall of 1812, British and Indian forces lay seige to Fort Wayne and in 1813 Colonel William Dudley and his American troops suffered

a disastrous defeat by the Indian allies of the British forces near Fort Meigs. The victory of Commodore Oliver Perry over the British Navy on Lake Erie near Put-in-Bay off the mouth of the Maumee River essentially brought the War of 1812 to a close in the region by making it impossible for the British to dominate the Maumee valley for use as a line of communication with Canada.

The end of hostilities with the British and Indians brought a flood of settlers to the Maumee valley. Timber was cleared and the marshes were drained to lay bare the fertile soils of the river valley to the farmer's plow. Crops were planted and the bountiful harvests produced soon demanded a fast economical means of transport from the farm to the city. The age of the canal was born.

Two canals were constructed in the 1820's which together formed a system of water transportation between the Ohio River and Lake Erie. Work began on construction of the Miami and Erie Canal in 1825 to link Cincinnati with Lake Erie by way of the Auglaize and Maumee Rivers. Cincinnati and Dayton were joined by 1829 with the locks to the Ohio River being completed in 1834.

In 1829 a cooperative enterprise between the States of Indiana and Ohio initiated development of the Wabash-Erie Canal to stretch along the Maumee and Wabash Rivers linking Lake Erie with the Ohio River. The ground breaking occurred at Fort Wayne on February 22, 1832. By 1841 the canal was complete between Fort Wayne and Logansport to the west. Joining with the Miami and Erie Canal near Defiance, Ohio, in 1856 boats could travel the canal between Toledo and Evansville, Indiana, a distance of 452 miles.

Also by 1856 the Wabash Railroad was completed paralleling the canal. All passenger travel on the canals ceased in preference for the faster and better travel on the railroad. Linking Toledo with Lafayette, Indiana, via Fort Wayne, the railroad also rapidly absorbed a major portion of the canal freight business. In the face of the more reliable and swift railroad service, the canal was rapidly abandoned. The last section of the Wabash and Erie in operation between Fort Wayne and New Haven was used to haul firewood to Fort Wayne in 1878.

Abandonment of the Wabash and Erie was followed by that of the Miami and Erie some years later. The canal was not officially closed until July 8, 1929, as better methods of transportation became more fully developed. Remnants of the Wabash and Erie and Miami and Erie canal system are present throughout the Maumee valley. Much of the original canal right-of-way is today U. S. Highway 24 from New Haven to Antwerp, Ohio. Remains of the old canal banks and towpath can still be seen.



Locks of the Side Cut Canal are preserved and are a feature of Side Cut Metro Park at Maumee, Ohio



The only covered bridge in the study area is at Spencerville, Indiana. The bridge was constructed in 1873 and is still in daily use



The Inter-urban Electric Railway Bridge at Waterville is included on the National Register of Historic Places and is reported to be the largest and oldest bridge of this construction type in the U.S.

From the City of Defiance northeastward to Perrysburg, Ohio, excellent vestiges of the old canal system can again be seen along Highway 24. A restored canal gate and a five-mile section of canal towpath have been preserved at Independence Dam State Park, five miles northeast of Defiance on State Route 424. This site is readily accessible by vehicle and from the Maumee River. At Side Cut Metropolitan Park, three of the historic side cut locks abandoned in 1864 and portions of the Miami and Erie Canal towpath have also been preserved.

Providence Metropolitan Park, located along the river across from Grand Rapids, Ohio, includes a slack water pool, once used as a reservoir to control the water level in the canal system. The original towpath extending northeastward from the pool area now serves as a hiking trail for park visitors. Vestiges of the canal in good condition also exist within the Florida, Ohio, city limits and can be easily viewed from the Maumee River bridge crossing located there. Other equally good sections are present at other scattered locations along the river.

Throughout the Maumee River valley are scattered historical sites, structures, buildings, and objects of varying significance.

The home of the First Comptroller of the U. S. Currency and U. S. Secretary of the Treasury under three presidents, Hugh McCullough, is located in Fort Wayne.

At Parnall Avenue and the St. Joseph River is the grave site of John Chapman, known historically as Johnny Appleseed. Born in 1774, he died at Fort Wayne on March 18, 1845. Noted as an eccentric during his time, John Chapman worked as a nurseryman leasing and purchasing lands for the growth of his apple tree stock. Legend has it that he traveled about the country planting apple seeds, giving rise to natural orchards throughout the Indiana-Ohio region.

In addition to the Fallen Timbers Battlefield two miles west of Maumee, several other sites, buildings, and structures along the Maumee River in Ohio have been recognized as having national historic significance. In Lucas County, the Columbian House and the Interurban Electric Railway Bridge at Waterville are listed on the National Register of Historic Places. Of the period 1818-28, the Columbian House served as an Indian trading post, post office, and inn. Likewise, the James A. Wolcott House, built around 1827, home of an early pioneer developer and public official, and the Side Cut Locks of the Miami and Erie Canal, located in and near Maumee, are Registered National Historic Sites.

Down river at Perrysburg, Ohio, are two other National Register properties. The first is Fort Meigs presently being restored by the Ohio Historical Society to reflect its condition at the time of use during the War of 1812. Overlooking the Maumee River from its south shore, the fort is readily accessible to the river user. The second is the old Wood County jail (1846-47).

The Maumee valley contains numerous historical assets possessing state and local significance. Adams County, Indiana, through which flows the St. Marys River, is home for a settlement of Mennonites and some 2,000 Amish who continue to farm the area with horse-drawn implements such as they have for 100 years.

DeKalb County, Indiana, organized in 1837, was named for Baron DeKalb, a general in the American Revolutionary Army. The first settlement in the county was Spencerville, which boasts the only remaining covered bridge in the county, spanning the St. Joseph River at the eastern edge of town. At several other crossings, excellent examples of early steel bridges dated in the late 1870's can still be found. The Auburn and Cord automobiles were manufactured at Auburn, the county seat.

On Cedar Creek, there are no historical sites of more than local significance. Because of its relatively rapid descent, Cedar Creek was the site of several early gristmills which served the settlers of the valley.

A survey of buildings, structures, and objects is currently under way along the Maumee River in Ohio. Under the auspices of the Maumee River Valley Landmarks Commission, the study has resulted in a rapidly growing list of properties recommended for nomination to the National Register of Historic Places.

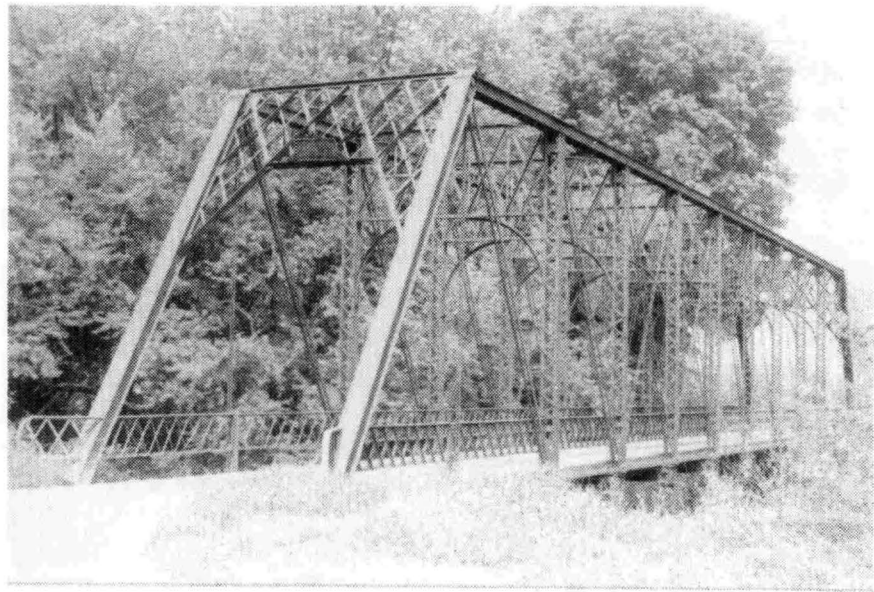
Over the years, individuals, groups, and some public agencies have displayed an interest in preserving and developing the Maumee valley's historical assets. Master plans have been proposed for the coordinated development and preservation of Fort Wayne and Allen County sites and structures, and groups in Ohio have long proposed and supported a plan for a scenic and historic highway along the Maumee River to expand the area's historic resources.

Access

General access and circulation roads along the Maumee and its tributaries are abundant. U. S. Highway 24 is adjacent to the main stem and in places is at the water's edge. Portions of U. S. 24 have been reconstructed and the old highway has been designated as Scenic Highway State Route 424. U. S. 24 crosses the Maumee west of Defiance, Ohio. Highway 24 is being considered by both Ohio and Indiana for



Bridges both old and new cross the Maumee or its tributaries in many places; some carry county or local roads while others carry state and federal highways





In Fort Wayne, the Maumee River flows through a substantial urban area

upgrading to a four-lane highway. The other side of the Maumee River is paralleled by various state and local highways. U. S. 27 and 33 parallel the St. Marys River to Decatur, and U. S. 23 parallels the river upstream into Ohio.

There are frequent bridge crossings over the river reaches studied involving both highways and railroads. Railroad bridges, however, are not legally available for public access.

	Total Road Bridges	Total Railroad Bridges	Miles of Road Within 300 feet* of the River
Maumee River	26	7	62
St. Joseph River	15	2	8
St. Marys River	16	6	6
	<u>11</u>	<u>1</u>	<u>0</u>
Cedar Creek			
TOTAL	68	16	76

*If this figure is increased to 1,000 feet the mileage of roadway would about triple. Roads within 300 feet may detract visually, noise of cars is noticeable, and odors can often be detected. Trucks can be heard distinctly for up to one-half mile away from the river.

Public access for recreation purposes is limited to a few developed sites with long stretches of the river having no public access. Many of the bridge crossings provide potential access points, but problems such as the lack of parking and the location of adjacent private land restrict access by the general public. The sites where boats can be launched from public land include several of the city parks in Fort Wayne, Independence Dam, and Mary Jane Thurston State Parks, Meyerholtz Wildlife Area, and Metropolitan parks in Toledo and Defiance. Boat ramps are provided by cities such as Napoleon and by private marinas along the river. Several fishermen access facilities have been provided by the Indiana and Ohio Departments of Natural Resources.

Private ownership is predominant along the rivers, and, thus, most of the adjacent lands are not available for public use.

Land Use

Present and future land use in the Maumee basin is one of the most critical variables in determining the suitability of the rivers for recreational use. Patterns and types of land use cause changes in water quality, flow, flora, fauna, and other elements of the natural system. Land use planning is nonexistent in most parts of the basin, although information does exist on some important resources such as soils and vegetation which serve as basic data in land use planning.

As a general overview, the study considered general land use in the counties through which the study rivers flow. These include Adams, Allen, and DeKalb Counties in Indiana and Defiance, Henry, Lucas, Paulding, and Wood Counties in Ohio. Other counties in the Maumee basin have similar land use characteristics.

Land use in the aforementioned counties is mainly agricultural with scattered urban build-up areas and forest lands. The area is approximately 77 percent agricultural, 12 percent urban, 8 percent forest land, and 3 percent in other uses such as borrow pits and farm roads. There is a small amount of water covered area.

The majority of agricultural land is in tillage rotation. This land produces mainly row crops such as corn and soybeans and lesser amounts of such crops as wheat, grasses, and legumes. Dairy farming is of moderate importance. Speciality crops such as tomatoes and sugar beets are also grown in the area. Forest land is scattered in the form of farm woodlots and riverside vegetation. The major forest cover types are oak-hickory, elm-ash-cottonwood, and maple-beech-birch. Urban build-up land is found throughout the study area with several large cities lying on the banks of the study rivers.

Table IX gives a summary of the land uses within the study area by counties. This treatment of data gives a good overall understanding of the land use in the study area.

Ohio Counties

Lucas County, with the Toledo metropolitan area, has the highest population of any of the counties in the study area. Agriculture is of lesser importance in this county, and forest land is rather scattered as it is throughout the basin. There is a significant amount of industrial development in Wood County; however, it is not as heavily populated as Lucas County and is quite heavily agriculturally oriented. The counties of Defiance, Henry, and Paulding are similar in that the major land use is agricultural with only scattered urban development, and forest land is only a small portion of the land use. From 1958 to 1967, there were no significant changes in land use. Land use trends indicate an increase in urban development in Wood County; land use in other counties will likely remain stable.

Indiana Counties

The Indiana section of the study is comprised of four different rivers; the Maumee, St. Joseph, St. Marys, and Cedar Creek.

The Maumee study rivers flow through the counties of Adams, Allen, and DeKalb. DeKalb County is mainly agricultural land. The land use breakdown is approximately 13 percent urban and build-up, 74 percent agricultural, 11 percent forested, and 2 percent in other land uses. From 1958 to 1967, urban land use has tripled in the county due to the conversion from agricultural land. This change is due to growth of the neighboring Fort Wayne area.

Fort Wayne, the second fastest growing city in Indiana, is located in Allen County. Land use statistics show that approximately 15 percent of Allen County is in urban and build-up, 74 percent agricultural land, 8 percent forest land, and 3 percent in other land uses. Ten-year land use changes have not been as large as in DeKalb County.

Adams County is the southernmost county in the Indiana study area. It has the least amount of urban build-up area with only about four percent. Agricultural land makes up about 86 percent of the land use in the county, and forest land about 7 percent. The remaining three percent is in other land use.

Row crops make up the majority of agricultural land uses, with moderate amounts of speciality crops and livestock. The major forest cover types are oak-hickory, maple-beech-birch, and elm-ash-cottonwood, with the latter predominating the river bottomlands.

The second level of study considered is a more concentrated land use survey within approximately one mile on either side of the river. This area is referred to as the study corridor.

Land use classes in the study corridor are divided into four categories. These are agricultural, forest, urban, and water. These data are tabulated in Table VII and visually displayed on Maps 10A and 10B.

Ohio

Eighty-three percent of the land along the river in Lucas and Wood Counties is still agricultural, with scattered forest land comprising 11 percent of the land use along the banks and the remaining 6 percent classified as urban.

Within the study corridor in Henry County, 86 percent of the land is in agricultural use, 10 percent in forest, and 4 percent in urban land use.

The study corridor within Defiance County is 75 percent agricultural use, 17 percent forested, and 8 percent urban land use. Agricultural land with scattered forest land lies along the banks between the urban build-up areas.

The study corridor in Paulding County is 87 percent agricultural land, 10 percent forested, and 3 percent urban land use. Antwerp is the only urban area in the county located directly on the banks of the Maumee.

Indiana

The Maumee River is heavily urbanized at its headwaters and has decreasing urbanization on its banks as it flows to the Ohio border. Land use is 77 percent agricultural, 17 percent urban, and 6 percent forest.

Land use in the area along the St. Marys River between Fort Wayne and Decatur is agricultural with scattered forest land intermixed. There is slight development along the river. Most of the river's edge is covered with elm-ash-cottonwood type forest. Statistically, land use within the St. Marys River study corridor is 58 percent agricultural, 34 percent urban, and 8 percent forest.

Along the St. Joseph River there is a reservoir at Cedarville, and the land uses are 76 percent agriculture; 12 percent forest, and 12 percent urban.

Cedar Creek is the most heavily forested of the study rivers. Its banks are almost completely forested with elm-ash-cottonwood and oak-hickory type forests and has only light development along its banks. The river flows through Cedar Canyon which is completely forested and has little or no development. The land use statistics for the Creek are 76 percent agricultural, 21 percent forested, and 3 percent urban.

The Maumee River is heavily urbanized at its headwaters and has decreasing urbanization on its banks as it flows to the Ohio border. Land use is 77 percent agricultural, 17 percent urban, and 6 percent forest.

TABLE VIII
LAND USE IN THE MAUMEE WILD AND SCENIC RIVER STUDY CORRIDOR

STATE OF INDIANA

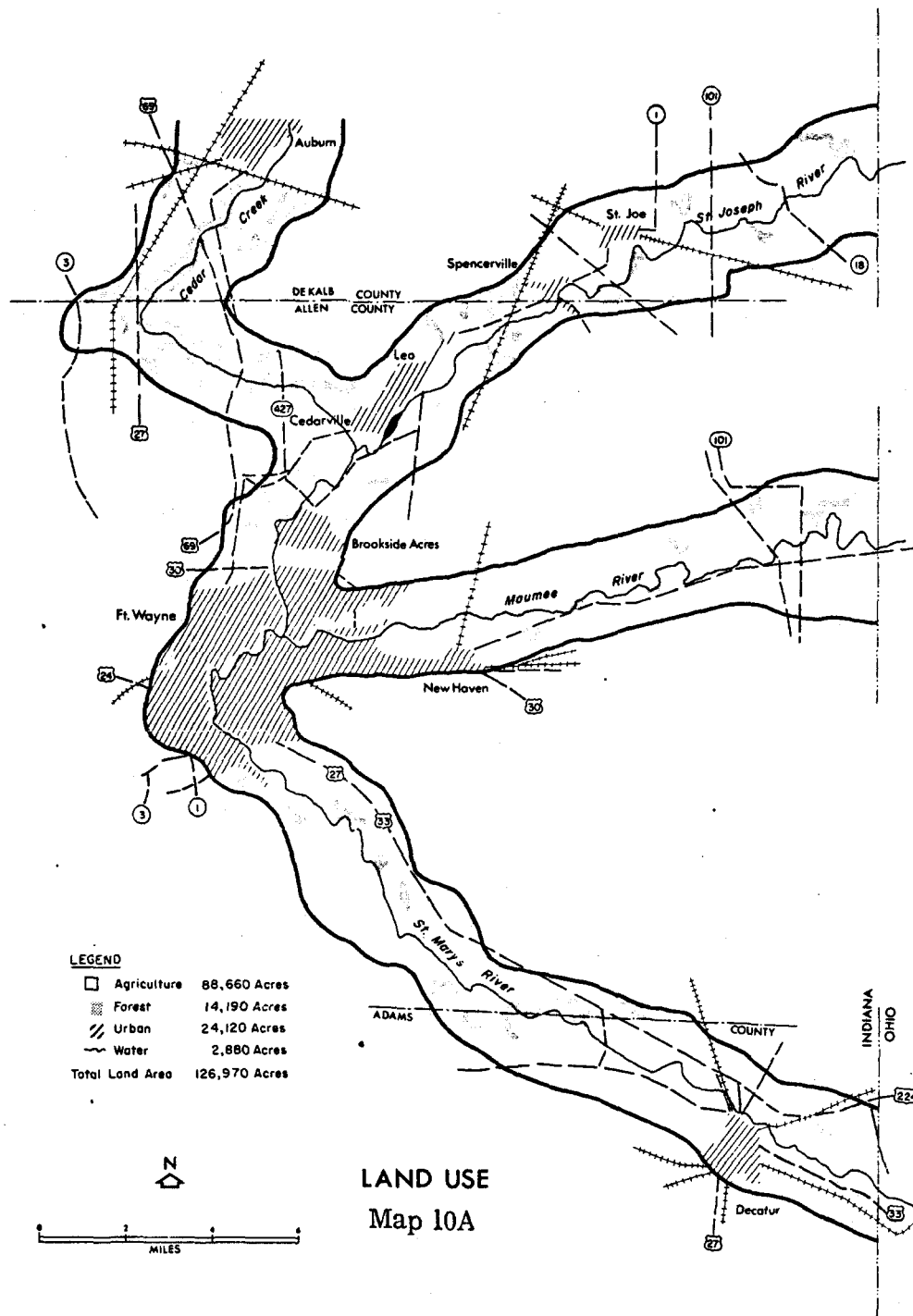
County & River	Total Land	Agriculture	%	Forest	%	Urban	%	Water	**
Adams County Total	23,160	19,960	86	1,970	9	1,230	5	430	2
St. Mary's River	23,160	19,960	86	1,970	9	1,230	5	430	2
Allen County Total	77,880	48,060	62	7,640	10	22,180	28	1,960	2
Maumee River	27,930	21,320	76	1,750	6	4,860	18	700	2
St. Joseph River	24,740	17,660	71	3,120	13	3,960	16	780	3
St. Mary's River	20,140	5,120	25	1,660	8	13,360	67	360	2
Cedar Creek	5,070	3,960	78	1,110	22	--		120	2
DeKalb County Total	25,930	20,640	79	4,580	18	710	3	490	2
Cedar Creek	16,080	12,130	76	3,400	21	550	3	210	1
St. Joseph River	9,850	8,510	86	1,180	12	160	2	280	3
State Totals	126,970	88,660	70	14,190	11	24,120	19	2,880	2
Cedar Creek	21,150	16,080	76	4,510	21	550	3	330	2
Maumee River	27,930	21,320	77	1,750	6	4,860	17	700	2
St. Joseph River	34,590	26,170	76	4,300	12	4,120	12	1,060	3
St. Mary's River	43,300	25,080	58	3,630	8	14,590	34	790	2

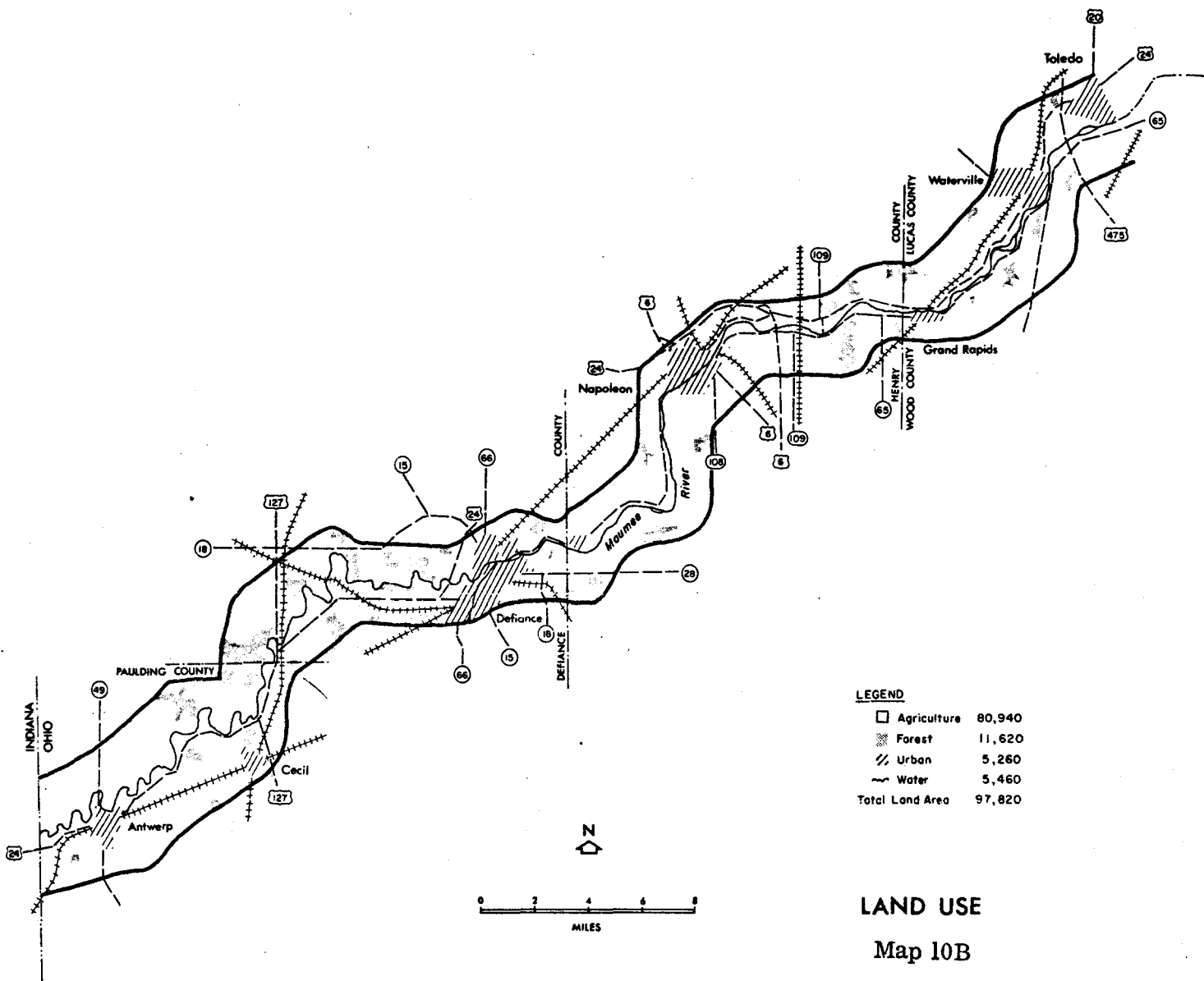
STATE OF OHIO
MAUMEE RIVER

State Totals	97,820	80,940	83	11,620	12	5,260	5	5,460	5
Defiance	24,730	18,650	75	4,100	17	1,980	8	930	4
Henry	27,990	23,970	86	2,760	10	1,260	4	2,030	7
Lucas and Wood	20,300	16,710	83	2,310	11	1,280	6	1,790	6
Paulding	24,800	21,610	87	2,450	10	740	3	710	3
Study Total All Rivers	224,790	169,600	76	25,810	11	29,380	13	8,340	4
Maumee River	125,750	102,260	81	13,370	11	10,120	8	5,790	4

*All areas are rounded to the nearest ten acres and percents to the nearest whole. Areas refer to that encompassed on approximately one mile on either side of river defined as the study corridor.

**Water percentages derived from land and water total.





Explanation of

Table IX

The land use information supplied by counties is broken down into eight different categories:

Federal Noncrop - Federal noncrop land is all federally owned except that used as cropland.

Urban and Build Up - These areas include cities, villages, and other build-up areas of 10 acres or more; areas devoted to roads and railroads; farm land inside city or village limits; industrial sites (except strip mines, borrow, and gravel pits); railroad yards; cemeteries; airports; golf courses; shooting ranges, etc.; industrial and public administrative sites; and similar types of areas.

Small Water Areas - Small water areas are areas of less than 40 acres and streams less than one-eighth of a mile wide. Such water areas were determined from soil surveys and other sources of information and then subtracted from the land area of the county.

Cropland - Cropland includes all cultivated land used for field crops of hay in pasture or rotation; cropland temporarily idle or diverted from production under government programs; permanent hayland; orchards, vineyards, and bush fruits; and open land formerly cropped and not converted to another use.

Pasture - This includes land producing forage plants, principally introduced species, primarily for grazing and not included in cropland rotation; includes native pasture and may contain shade or timber trees if canopy is less than 10 percent.

Forest - Forest or woodland includes land that is at least 10 percent stocked with forest trees and capable of producing forest products or influencing a water regime, land that formerly grew trees and is not currently developed for nonforest use, and land that has been planted to trees.

Other - Other land is nonfederal rural land which is not classified as cropland, pasture, or forest land. It includes strip mines, borrow and gravel pits, farmsteads, farm roads, ditches, rural nonfarm residences, and idle, open rural nonfarm land.

TABLE IX
MAUMEE WILD AND SCENIC RIVER STUDY

Land Use Acreages and Percentages for Counties*

<u>STATE OF INDIANA</u>								
<u>County</u>	<u>Total Land Area</u>	<u>Federal Non Crop</u>	<u>Urban +Build Up</u>	<u>Small Water Areas</u>	<u>Cropland</u>	<u>Pasture</u>	<u>Forest</u>	<u>Other</u>
Totals for State	883,100	700 0.1	102,178 11.6	3,602 0.4	638,910 72.3	40,647 4.6	74,679 8.5	22,384 2.5
Adams	220,700	0 0.0	8,978 4.1	600 0.3	117,715 80.4	12,952 5.9	15,000 6.8	5,455 2.5
Allen	428,800	700 0.2	64,000 14.9	1,300 0.3	308,176 71.9	9,216 2.1	35,237 8.2	10,171 2.4
DeKalb	233,600	0 0.0	29,200 12.5	1,702 0.7	153,019 65.5	18,479 7.9	24,442 10.5	6,758 2.9

<u>STATE OF OHIO</u>								
Totals for State	1,409,840	3,754 .3	166,849 11.8	3,224 .2	1,051,512 74.7	30,190 2.1	103,236 7.3	51,075 3.6
Defiance	262,400	0 0.0	15,382 5.9	1,033 0.4	195,990 74.7	9,307 3.5	30,187 11.5	10,501 4.0
Henry	266,240	0 0.0	13,450 5.1	125 .1	225,112 84.5	3,110 1.2	13,778 5.1	10,665 4.0
Lucas	219,520	3,754 1.7	92,867 42.3	531 0.2	91,572 41.7	1,458 0.7	23,873 10.9	5,465 2.5
Paulding	266,160	0 0.0	11,955 4.5	1,000 0.4	215,893 81.0	8,411 3.2	17,782 6.7	11,119 4.2
Wood	395,520	0	33,195 8.4	535 0.1	322,945 81.6	7,904 2.0	17,616 4.5	13,325 3.4

MAUMEE STUDY AREA TOTAL

<u>State</u>								
Indiana	833,100	700 0.1	102,178 11.6	3,602 0.4	638,910 72.3	40,647 4.6	74,679 8.5	22,384 2.5
Ohio	1,409,840	3,754 0.3	166,849 11.8	3,224 0.2	1,051,512 74.7	30,190 2.1	103,236 7.3	51,075 3.6
<u>Total</u>	2,292,940	4,454 0.2	269,027 11.7	6,826 0.3	1,690,422 73.7	70,837 3.1	177,915 7.8	73,459 3.2

*Data compiled from 1967 Indiana and Ohio Conservation Needs Inventory.

Land Ownership

The following table illustrates riverfront ownership along the segments of the study rivers. No attempt has been made to determine the area in township, county, state, or federal highways and roads. From these figures it is easy to determine that approximately 90 percent of the land is in private ownership.

Table X

OWNERSHIP OF RIVERFRONT LANDS

Maumee River -Ohio

<u>Ownership</u>	<u>Riverfront Miles</u>	<u>Percent</u>
Federal	0	0
State	16.5	9
County	4.1	2
Municipal	3.0	2
Quasi-public	2.8	1
Private	<u>165.6</u>	<u>86</u>
TOTAL MAUMEE RIVER-OHIO	192.0	100

Maumee River - Indiana

<u>Ownership</u>	<u>Riverfront Miles</u>	<u>Percent</u>
Federal	0	0
State	1	3
County	0	0
Municipal	1	5
Private	<u>58</u>	<u>92</u>
TOTAL MAUMEE RIVER-INDIANA	60	100

St. Marys River - Indiana

<u>Ownership</u>	<u>Riverfront Miles</u>	<u>Percent</u>
Federal	0	0
State	1	2
County	0	0
Municipal	5.5	5
Private	<u>79.5</u>	<u>93</u>
TOTAL ST. MARYS RIVER	86.0	100

St. Joseph River - Indiana

<u>Ownership</u>	<u>Riverfront Miles</u>	<u>Percent</u>
Federal	0	0
State	1.7	4
County	0	0
Municipal	6.5	6
Private	<u>79.8</u>	<u>90</u>
TOTAL ST. JOSEPH RIVER	88.0	100

Cedar Creek to Auburn, Indiana

<u>Ownership</u>	<u>Riverfront Miles</u>	<u>Percent</u>
Federal	0	0
State	.5	2
County	0	0
Municipal	1	3
Private	<u>50.5</u>	<u>95</u>
TOTAL CEDAR CREEK	52.0	100

Water Rights

Both Ohio and Indiana laws recognize the interest of the riparian owner and his rights to use the stream-bed, banks, and waters of the river for his private use.

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 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 middle of the stream and he may exercise any proprietary right over it which will not interfere with the rights of other riparian owners.

Differences in the application and interpretation of the law exist between the States of Ohio and Indiana.

Ohio

In Ohio, the owner of lands on both banks of the river owns the entire river, even though it is navigable. A stream is considered navigable in Ohio if it is available for the general use of pleasure boats, although not utilized for commercial purposes. The Maumee River in Ohio is considered by the State to be navigable.

Ownership of the banks or even the bed of navigable waters gives the owner no right to prohibit the public from fishing or canoeing on such waters, nor does the riparian owner have any property in the water itself but only the right to use it as it flows along.

The interest of a riparian owner where his rights are not limited by usage or agreement consists of a right to use the water as it passes over his land, so long as he does not use it in a manner which will result in damage to other riparian owners. He is required to transmit it by its natural channel to the next owner, and he is permitted to demand the same treatment 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 land itself. It is a well-settled rule of law that a riparian proprietor is not the owner and has no right in the actual flowing water in the stream adjacent to which his property lies.

Recreational use of the Maumee River has not been hindered by the presence of fencing across the stream or the existence and ownership of private dams. However, such potential hindrances or hazards to river users and legal questions concerning their presence on this or other public waterways must be resolved if the full recreation potential of the stream is to be attained.

Jurisdiction of the Maumee River differs from area to area, but, in general, the sheriff has authority within his county and the city police within the municipality through which the stream 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 offices may enforce refuse and pollution laws upstream from any state park boundary.

It is probable that portions of the Maumee River will be included in the Ohio scenic rivers system. Under the Ohio Scenic Rivers Act, the state has control over construction by state and local public bodies within a wild, scenic, or recreational river area. Section 1501.17 of the Ohio Scenic Rivers Act states that, "No state department, agency, or political subdivision may build or enlarge any highway, road, or structure, or modify or cause to modify the channel of any watercourse within a wild, scenic, or recreational river area outside the limits of a municipal corporation without having first obtained approval of the plans for such highway, road, or structure, or channel modifications

from the director of natural resources. . . ." Thus, the State of Ohio has authority to restrict adverse activities if the Maumee is designated a component of the Ohio scenic and recreation rivers system.

Indiana

In Indiana there are differences in the status of land in the riverbed depending on whether or not the watercourse is navigable. This determination is necessary to answer several other important questions as well, including if a particular watercourse is subject to federal regulation and if there are additional constraints on private rights.

Some pertinent features of Indiana's law of water rights with respect to water in watercourses may be summarized as follows:

- (1) Indiana has adopted the riparian doctrine of reasonable use.
- (2) The doctrine vests private rights in water in a relatively small segment of the populations of the state; that is, only those who own riparian lands or have acquired riparian rights. (Such rights may be, but not often are, severed from the land.)
- (3) Aside from purely domestic use, there can be no fixity of right to a particular type of use or to use a particular quantity of water since the riparian's right is limited by the rule of reasonable use; that is, reasonable in the light of uses of other riparians on the stream. It can, therefore, be seen that a use which is reasonable at one time may not be reasonable at a later time as to either or both the type or amount of use if other riparians have elected to exercise their rights of use in the interim.
- (4) The riparian doctrine is court-oriented; that is, the only basis for settlement of differences is in the court.
- (5) On nonnavigable waters, the public has no rights of use for any purpose, except in those public fresh-water lakes which meet the public use-riparian acquiescence test.
- (6) The test of navigability is a commercial test.
- (7) The public right of navigation does not explicitly cover recreational navigation, swimming, fishing, or other water activities.

- (8) The public right of navigation does not include the right to use of the bed of the stream or of the banks except in case of emergency.
- (9) The fact that a stream is navigable does not mean that the public has the right of access across riparian lands.

None of the streams in the Indiana portion of the Maumee basin have been declared to be navigable by either the general assembly or by the county commissioners of the respective counties involved.

The U. S. Army Corps of Engineers exercises jurisdiction in the administration of the laws of Congress concerning the navigable waters of the United States on the Maumee River from its mouth at Lake Erie to the head of navigation at Hosey Dam in Fort Wayne, Indiana. For the purposes of this study, we will accept the premise that from its mouth to Hosey Dam the Maumee River is navigable under federal standards. But jurisdiction of the United States on the Maumee River as a navigable stream can only be conclusively determined through judicial proceedings.

Zoning

Zoning along the Maumee River has had a major impact upon the development patterns of the watershed. Of the twelve townships along the river in Ohio, eleven have current zoning ordinances in effect, the exception being Antwerp Township in Paulding County.

There are ten different types of zoning classifications enforced by the various townships, ranging from agricultural to industrial development. Zoning restrictions for each classification that governs minimum lot size and maximum building size vary from township to township.

The zoning patterns are generally agricultural/residential in Paulding, Henry, and Defiance Counties, except near municipalities where high density residential, commercial, and industrial development is permitted.

Richland and Noble Townships in Defiance County have a special zoning classification called "Parkway Zoning." This classification restricts the type of development within two hundred feet of the river bank. Nearly 16 miles of river frontage in these townships are so zoned. Uses permitted under this classification include rural, playground, recreational, and for institutions of an educational or philanthropic nature.

Zoning for Lucas and Wood Counties is essentially similar to the zoning found in Paulding, Henry, and Defiance Counties, although residential, commercial, and industrial development becomes more intensified along the river due to increased urbanization.

Several townships and municipalities have indicated that present zoning ordinances are being or will be updated in the near future.

In Indiana, zoning along the Maumee, St. Joseph, and St. Marys Rivers and Cedar Creek has had significant effects on the development pattern of the watershed. Prior to the establishment of a zoning ordinance, a county must first develop a comprehensive plan. This comprehensive plan is incorporated into a master plan which delineates areas set aside for various purposes. The three counties in the study area are currently developing comprehensive plans and zoning ordinances.

Fort Wayne and Allen Counties have had zoning and subdivision control ordinances in effect for a number of years. These provide for the normal types of zoning classifications ranging from agriculture to industrial development. Zoning restrictions vary for each classification governing minimum lot sizes and maximum building sizes.

Adams County has developed a comprehensive plan and zoning ordinance adopted in October 1967. It also has adopted a subdivision ordinance. Its zoning ordinance includes 14 different classifications ranging from floodplain to planned heavy industry.

Wise land use planning is highly important in realizing orderly development at all levels of government, particularly at the county, township, and municipal levels. Without the necessary land use planning, development may occur in a haphazard fashion, allowing some land uses to develop at areas where they should not occur. The mere ability of a land area to support a particular land use should not be the only criteria considered when an area is zoned. Many other factors, including the provision of areas where little or no development would be desirable, should be considered.

Zoning objectives for the river corridor should be to reduce the effects of poorly planned shoreland development, prevent erosion, retain the natural characteristics of the area, and avoid the construction of permanent facilities in the floodplain. Subdivision regulations can affect the development of those specific areas by regulating initial layout and by stipulating what public improvements are to be provided. Existing zoning subdivision controls should be strictly enforced and revised as new conditions develop. Where necessary, such regulations should be established.

Nonrecreational Uses

The Maumee River study area is within a major industrial region. The principal industries are machinery and metal fabrication, food, and transportation equipment. The major industrial centers are the Toledo metropolitan area and Fort Wayne. The farm lands of the basin support a productive agricultural economy.

The Maumee River is navigable from Lake Erie to Fort Wayne, Indiana. Commercial shipping is confined to the Toledo harbor area, one of the principal harbors of the Great Lakes. Gravel barges operate on other limited parts of the river.

A summary of the installations affecting the main stem of the Maumee River from Fort Wayne, Indiana, to Perrysburg, Ohio, has been prepared. Table XI lists the installations crossing the Maumee. This includes both submarine and overhead pipes and cables in addition to the bridges.

Most of the underwater installations have little visual effect except where streamside vegetation has been cleared along the right-of-way during the construction period. Some bridges are not unpleasing; however, others seem to have little aesthetic appeal and serve only to detract from the river experience because of the noise and visual intrusion from the vehicles passing over them. Overhead power lines and high transmission towers visually detract from the natural setting of the river banks and can often be observed for long distances.

The total municipal water use by 171 communities in the Maumee basin amounts to approximately 128 million gallons per day (mgd), of which 113 mgd are obtained from surface supplies and the remaining 15 mgd from underground supplies.

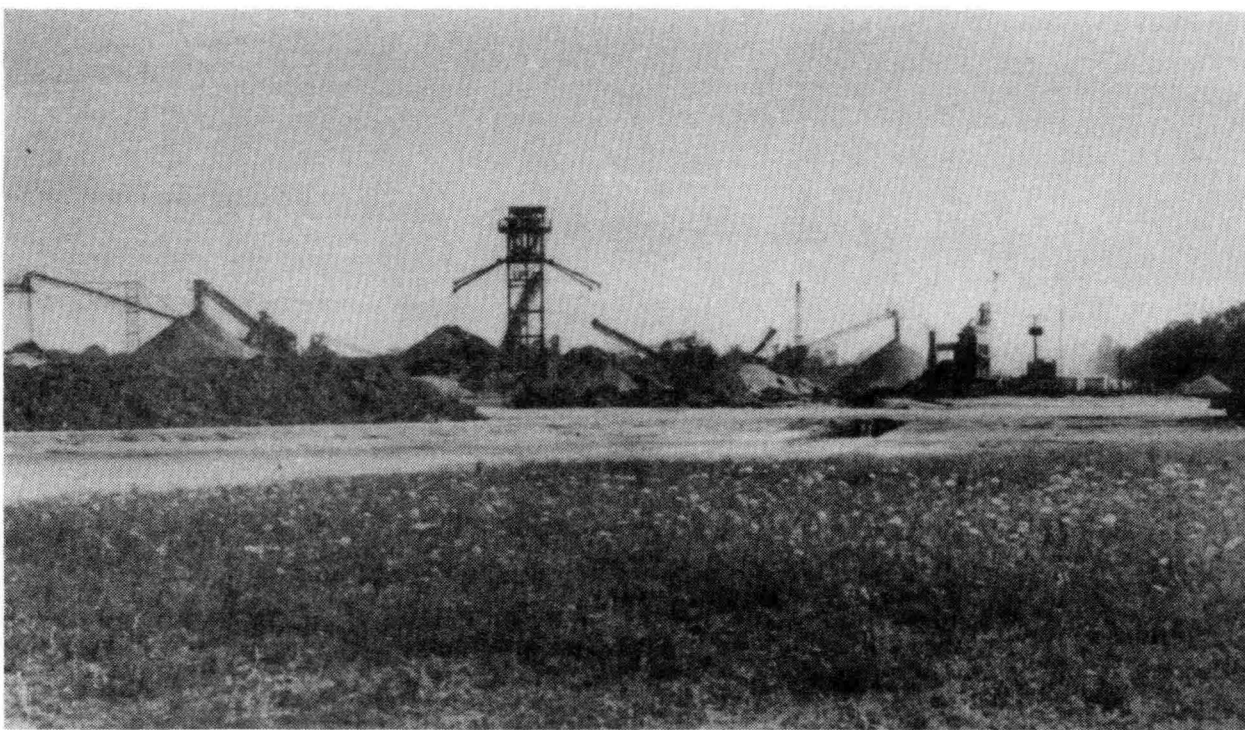
Five major municipalities obtain their water directly from the Maumee River (Waterville, Bowling Green, Grand Rapids, Napoleon, and Defiance). Fort Wayne uses the St. Joseph River as a source for its water supply. Other communities along various tributaries in the basin withdraw surface water for municipal use.

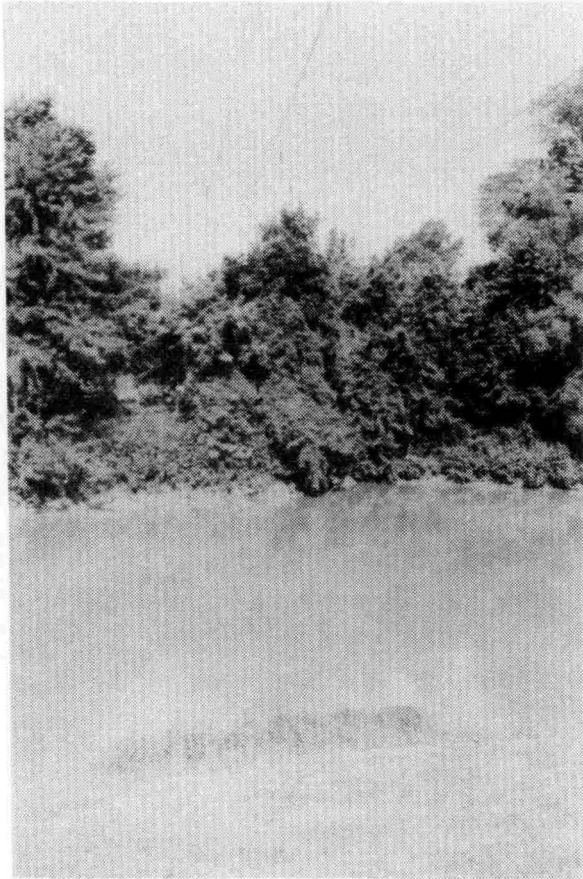
Community	Major Public Withdrawals		Projected Demand 2006 (mgd)
	Current Population Served	Current Average Demand (mgd)	
Waterville	3,300	.14	.47
Bowling Green	21,760	3.	6.37
Grand Rapids	976	.08	.29
Napoleon	7,791	1.3	3.5
Defiance	20,000	4.8	8.
Fort Wayne	190,000	30.	51.

In addition to the withdrawal for municipal use, several companies withdraw large amounts of water for industrial purposes.

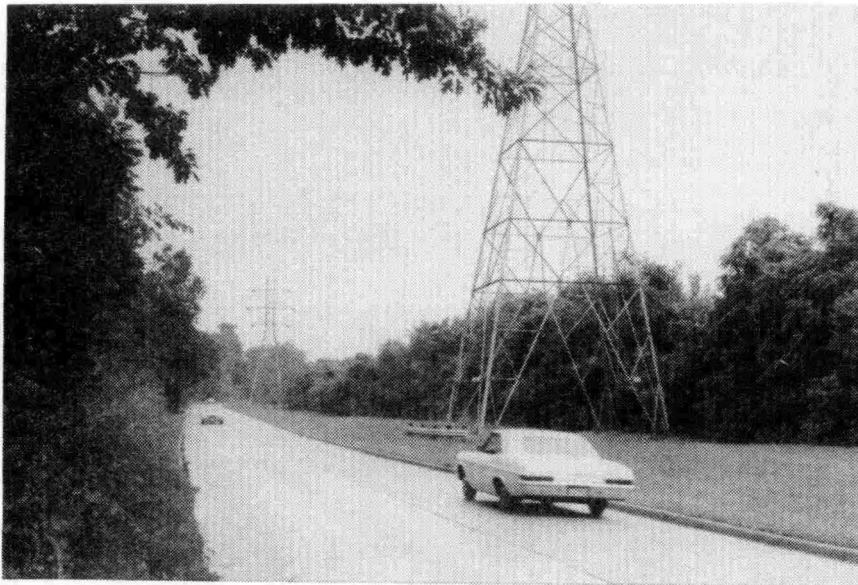


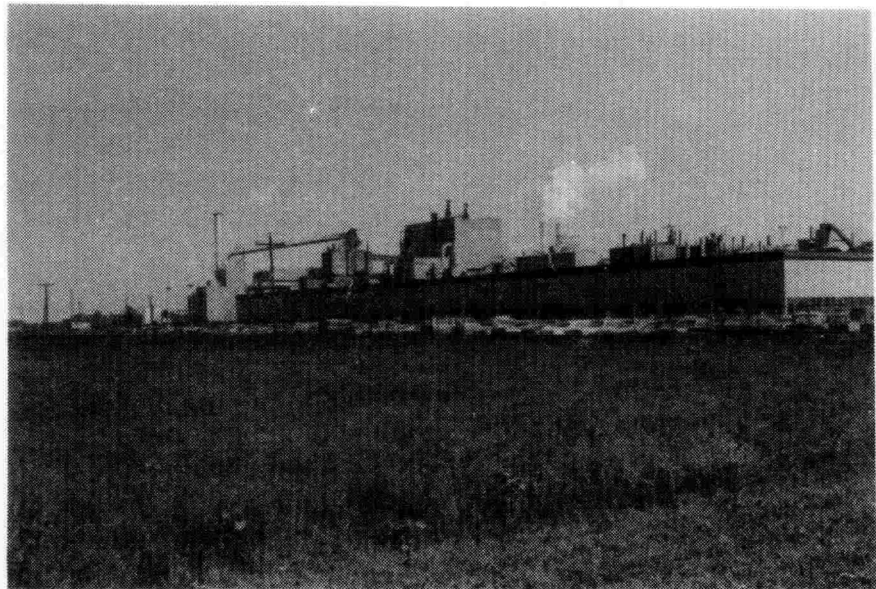
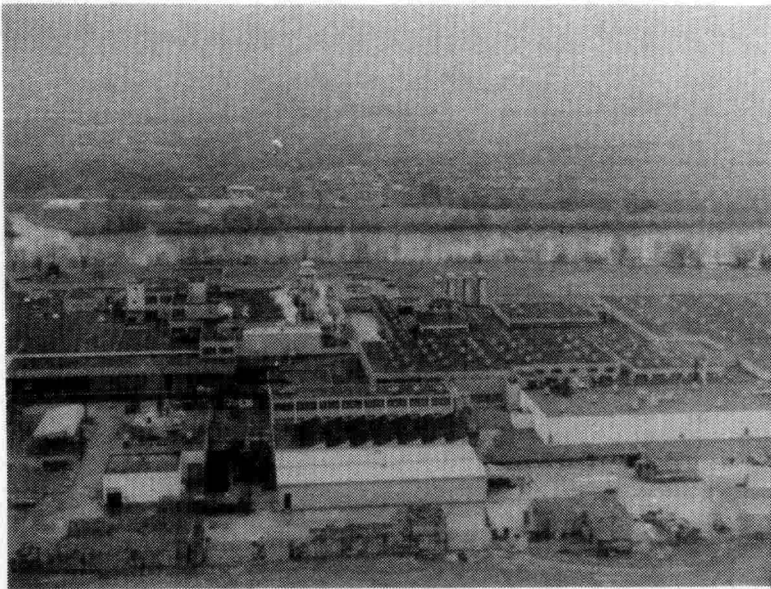
Non-recreational uses of the river include dredging the river and processing of aggregates on the adjacent lands



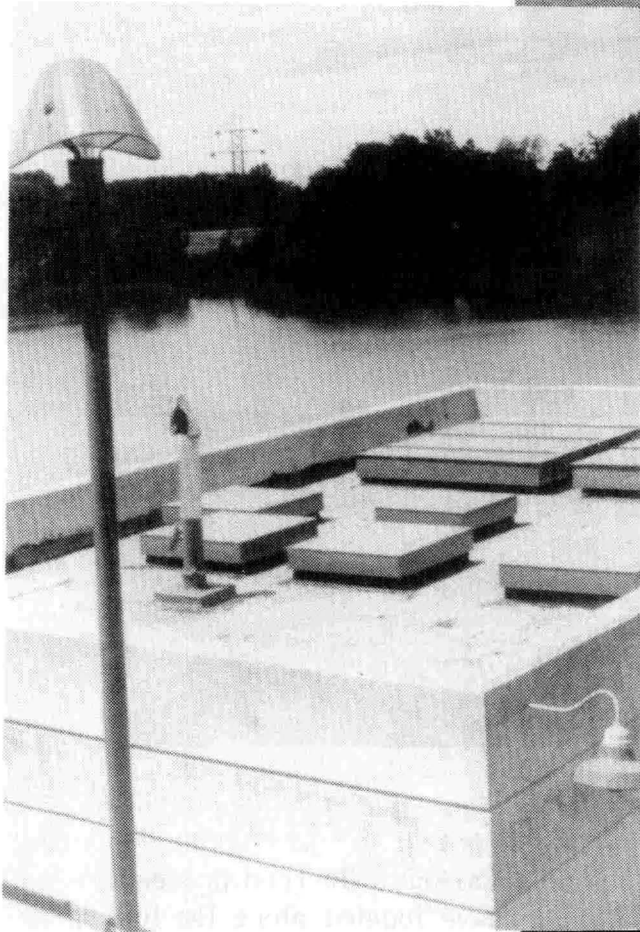
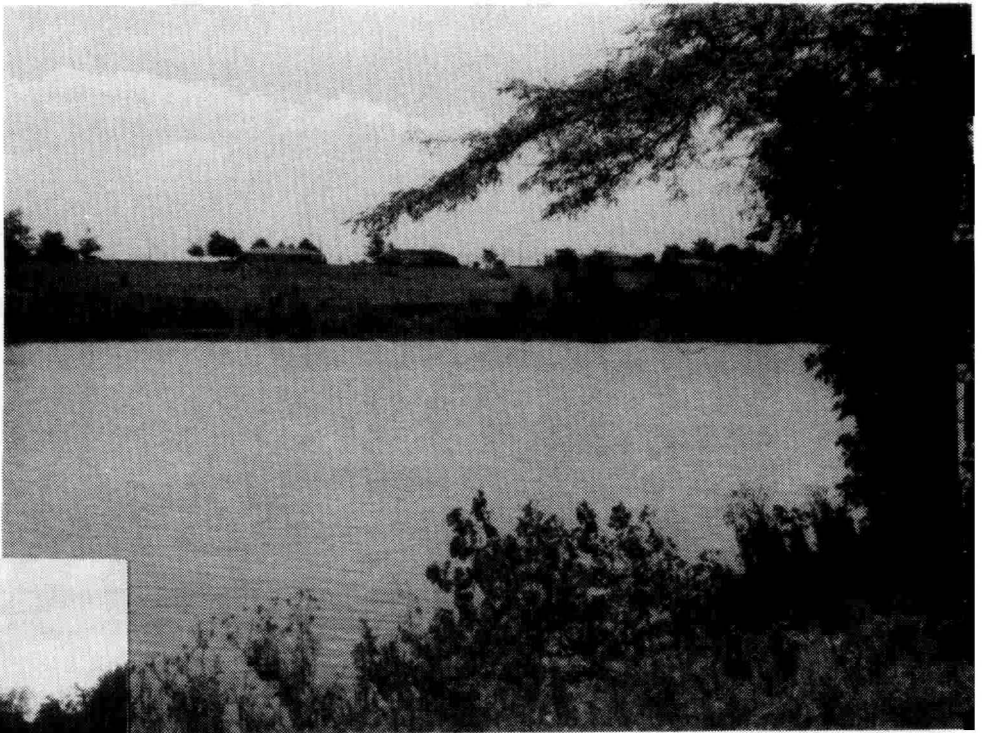


Utility corridors are frequent and cross or parallel the rivers in many locations





Various industrial processors have located along the lower Maumee from Toledo to Defiance, Ohio, and upstream from New Haven to Fort Wayne, Indiana



Suburban homes along the shoreline,
municipal water supply, and waste
disposal installations can be found in
various places along the rivers

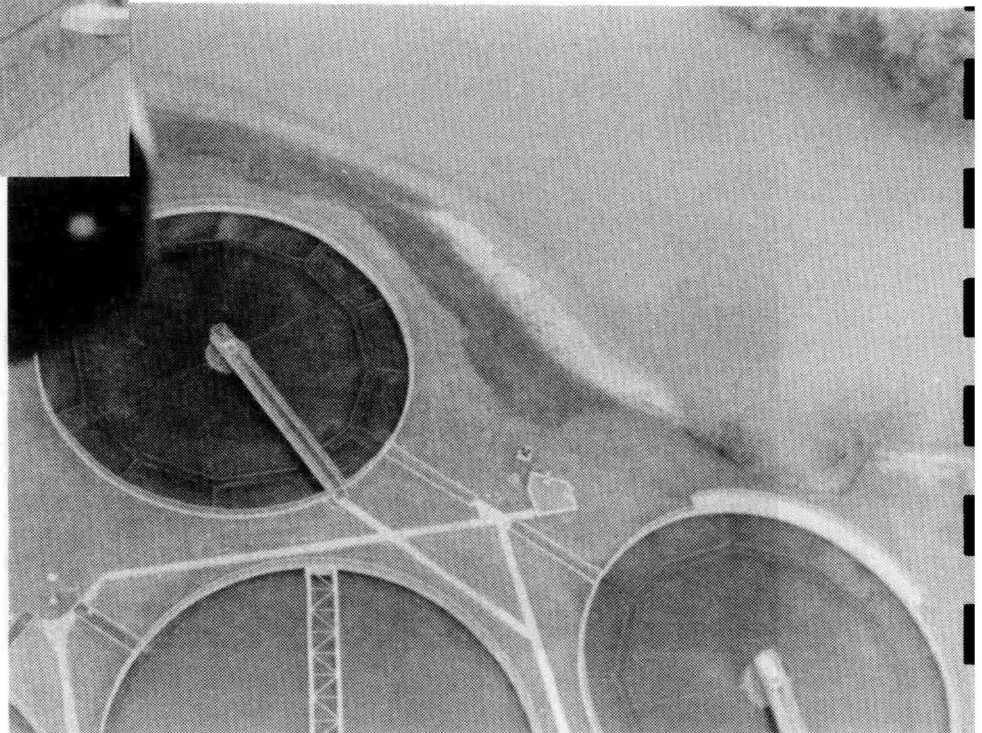


TABLE XI.
INSTALLATIONS CROSSING THE MAUMEE RIVER IN OHIO

INSTALLATION	LOCATION	OWNER
Two submarine natural gas lines 12" diam.	2,680 feet above Toledo Bowling Green, & Southern Electric R.R. Bridge at Maumee	Northwestern Ohio Natural Gas Company
One 8" pipeline for oil, submarine	2-1/4 miles above Maumee, Ohio	Buckeye Pipe Line Company
Four 12" gas lines, submarine	Under river, 4-1/2 miles upstream of junction with Tiffin River	Michigan Gas Transmission Company
One overhead power line	Near Defiance, Ohio, 1.3 miles downstream from Auglaize River mouth	Toledo Edison Company
Submarine 24" diam. steel pipeline for gas	Under river 4.5 miles upstream from junction of Tiffin River & Maumee River, 4 miles west of Defiance	Panhandle Eastern Pipeline Company
Overhead power line & cables	Over river, 6 miles upstream from Defiance, Ohio	Toledo Edison Company
Overhead power line	Over river, 8 miles upstream from Napoleon	Tri-County Rural Electric Co-operative
Overhead electric transmission line	Over river at Neowash Rd., 3.3 miles upstream of Bridge	Toledo Edison Company
Overhead transmission line	1/2 mile downstream of highway bridge at Grand Rapids, over river.	Toledo Edison Company
Overhead transmission line	100 feet upstream of Wabash R.R. Bridge at Defiance, Ohio	Toledo Edison
One 8" sewage pressure main, submarine	Under river 850 feet south of Detroit, Toledo & Iron-ton R.R. Bridge in Napoleon	City of Napoleon
One submarine pipeline for water	Perrysburg, 535 E. Front Street under river	Village of Perrysburg

TABLE XI
(continued)
INSTALLATIONS CROSSING THE MAUMEE RIVER IN OHIO

INSTALLATION	LOCATION	OWNER
One submarine pipeline	At Fort Wayne, Indiana, near foot of Artas Street under River	City of Fort Wayne
One submarine pipeline for gas, 20"	0.9 mile upstream from Maumee-Perrysburg Highway Bridge; under river	Ohio Fuel Gas Company
One submarine pipeline for water	Under river at Defiance between Ridge & Harrison Streets	City of Defiance
Water Intake	At Napoleon, on south bank of river, 2,500 feet downstream from U.S. Rte. 6 Bridge	Campbell Soup Company
One 4" submarine effluent line 80 feet into Maumee River from north side	300 feet upstream of Black Road at Waterville	Glass Fibers Inc.
Overhead electric crossing	At Napoleon 0.5 mile upstream of Perry St. Highway Bridge	Napoleon Municipal Utilities
Submarine, 26" pipeline for natural gas	4-1/2 miles upstream from confluence of Maumee & Tiffin Rivers, under river	Panhandle Eastern Pipeline Company
Overhead electric crossing	At Napoleon, 2.1 miles downstream from Perry St. Bridge	Toledo Edison
Storm water sewer outfall, offshore Maumee River east bank	At Napoleon, 1,900 feet downstream from DT&I R.R. Bridge	Campbell Soup Company
Pumphouse	At Waterville, 300 feet upstream of Black Road, extended, on north bank	Glass Fibers Inc.
One 48" concrete pipe drain outfall, on east bank of Maumee River	At Napoleon, 125 feet downstream from center of DT&I R.R. Bridge	Campbell Soup Company
One storm water sewer outfall, for 48" sewer	200 feet downstream from DT&I R.R. Bridge, on east bank of river, Napoleon, Ohio	Campbell Soup Company

TABLE XI
(continued)
INSTALLATIONS CROSSING THE MAUMEE RIVER IN OHIO

INSTALLATION	LOCATION	OWNER
Three submarine pipelines, sanitary sewers	At Defiance between Pearl St. and foot of Wayne Ave., under river	City of Defiance
Submarine pipeline, natural gas	At Fort Wayne, Indiana, under river, 2 miles upstream from Bull Rapids Bridge	Northern Indiana Fuel & Light Co.
Two submarine pipelines, gas	1.785 miles upstream from Maumee-Perrysburg Highway Bridge, under river	East Ohio Gas Company
One 30" submarine pipeline	At Defiance 1.8 miles upstream of corporate limits, under river	American Louisiana Pipeline Company
Overhead transmission line	At Napoleon, 0.5 mile upstream from Perry St. Highway Bridge	Napoleon Municipal Utilities
One 20" pipeline submarine	Under river, 3,000 feet upstream from Florida, Ohio	Tecumseh Pipeline Company
One 8" submarine pipeline	At Napoleon, 850 feet south of DT&I R.R. Bridge under river	City of Napoleon
One power line, overhead	At Napoleon, 1,100 feet upstream from the Detroit Toledo & Ironton RR Bridge	City of Napoleon
Overhead transmission line	East of Grand Rapids at junction of Ohio State Highway Nos. 110 & 65, east side of river, 1/2 mile downstream Grand Rapids Highway Bridge	Toledo Edison Company
Gas pipeline, 8", submarine	At Defiance, 2 miles downstream from Clinton St. Bridge, under river	Panhandle Eastern Pipeline Company
Overhead transmission line	At Defiance, Richland Twp.	Toledo Edison Company

TABLE XI
(continued)
INSTALLATIONS CROSSING THE MAUMEE RIVER IN OHIO

INSTALLATION	LOCATION	OWNER
Pipeline crossing, 30" natural gas, submarine	Near Defiance, 3.2 miles west of the U.S. Post Office under river	Michigan, Wisconsin Pipeline Company
Transmission line, electric, overhead	At Waterville, 1 mile downstream from the foot of Dutch Road (extended)	Toledo Edison Company
345KV Aerial Transmission line	At New Haven, Indiana, 2.7 miles downstream & east of New Haven, Allen Co., Indiana	Indiana and Michigan Electric Company
Submarine cable	Near Waterville, 0.2 mile upstream from 5 Points Road extended	American Telephone and Telegraph Co.
One Submarine pipeline, 30" diameter	At Defiance, 4.5 miles upstream of Tiffin River junction with river	Panhandle Eastern Pipeline Company

TABLE XII
MAUMEE RIVER BRIDGES IN STUDY AREA

<u>NAME OF BRIDGE</u>	<u>LOCATION</u>
U.S. 25 Highway	Southwest of Maumee
I-475	Maumee - Perrysburg
Ohio Rt. 64	East of Waterville
Forst Road-Interurban	South of Waterville
Ohio Route 578	North of Grand Rapids
Norfolk & Western R.R.	North of Grand Rapids
Ohio Route 109 Closed	West of Texas
Detroit, Toledo & Ironton R.R.	West of Texas
U.S. 6	East of Napoleon
Ohio Route 108	Napoleon
D.T. & I. R.R.	Napoleon
Florida Highway	Florida
Ohio Route 66	Defiance
Norfolk & Western R.R.	Defiance
Ohio Route 281	2 mi. East of Defiance
Baltimore & Ohio R.R.	East of the Bend
The Bend Road	South of the Bend
Penn Central R.R.	South of Sherwood
U. S. 127 Highway	South of Sherwood
Cecil Highway	North of Cecil
Forder Highway	Bethel Church
Ohio Route 49 (Antwerp)	North of Antwerp
Scipio River Road Closed	North of Sayer Cemetery
Indiana Route 101 (New Haven)	Four miles west of Indiana- Ohio line
Bull Rapids	South of Zion School
Platter	Southeast of Milan Center
Schlink	Three miles northeast of New Haven
Norfolk & Western R.R.	North of New Haven
Landin Road	North of New Haven
U.S. 30 Highway	Fort Wayne
Indiana Route 37 (Anthony Blvd.)	Fort Wayne
Dam - Fort Wayne - Head of Nav.	Fort Wayne
Crescent Avenue	Fort Wayne
Main Street	Fort Wayne

ST. MARYS RIVER BRIDGES
(INDIANA)

Spy Run Road	Fort Wayne
Harrison Street	Fort Wayne
Wells Street	Fort Wayne
Sherman Boulevard	Fort Wayne

TABLE XII
ST. MARYS RIVER BRIDGES (CONTINUED)
(INDIANA)

<u>NAME OF BRIDGE</u>	<u>LOCATION</u>
Norfolk and Western R.R.	Fort Wayne
Norfolk and Western R.R.	Fort Wayne
Main Street	Fort Wayne
Foot	Foster Park, Fort Wayne
U.S. 24 Highway	Foster Park, Fort Wayne
Penn Central R.R.	Foster Park, Fort Wayne
Taylor Street	Foster Park, Fort Wayne
St. Joseph Street	Foster Park, Fort Wayne
Norfolk and Western R.R.	Foster Park, Fort Wayne
Indiana Route 13	Foster Park, Fort Wayne
Stellhorn	Foster Park, Fort Wayne
Mulldoon	Southeast of Fort Wayne
Bostick Road	Southeast of Fort Wayne
Hoagland Road	East of Poe
Marion Center Road	Southeast of Poe
County Road	Allen-Adams County Line
Scheiman	5 mi. northwest of Decatur
U.S. 27-33	North of Decatur
Penn Central R.R.	North of Decatur
Monmouth Road	Decatur
U.S. 224	Decatur
Norfolk & Western R.R.	Decatur
Indiana 101 Highway	North Pleasant Mills

ST. JOSEPH RIVER BRIDGES
(INDIANA)

Tennessee Avenue	Fort Wayne
State Boulevard	Fort Wayne
Pernell Avenue	Fort Wayne
U.S. 30 Highway	Fort Wayne
St. Joseph Center	Fort Wayne
Ely	Northeast of Fort Wayne
Cedarville Road	South of Cedarville
Grabhill Road	East of Leo
Hurshtown	Northeast of Leo
Cuba Road	South of Spencerville
Wabash R.R.	South of Spencerville
Covered	East of Spencerville
Colburn Corners	Northeast of Spencerville
Baltimore & Ohio R.R.	East of St. Joe
Indiana Highway 8	Newville
Indiana Highway 101	Southwest of Orangeville
County Road	Northwest of Newville

TABLE XII
(continued)
CEDAR CREEK BRIDGES
(INDIANA)

<u>NAME OF BRIDGE</u>	<u>LOCATION</u>
Indiana Highway I Hursh Road	West of Cedarville Two miles north of Cedarville
Indiana 427	Four mi. northwest of Cedarville
I-69	Six mi. northwest of Cedarville
Cedar Canyons Road	Seven mi. northwest of Cedarville
Indiana 327 (2) Cedar Chapel	Six mi. south of Garrett Two mi. southeast of St. Johns
Indiana 427	Three mi. south of Auburn
One	Two mi. south of Auburn
Baltimore & Ohio R.R.	South of Auburn
I-69	South of Auburn

Recreational Uses

Existing and Proposed Facilities. The primary public use areas located along the Maumee include Independence Dam State Park, Mary Jane Thurston State

Park, the metropolitan parks of the Toledo area, and the municipal parks in Fort Wayne. In addition, there are other local parks, historical areas, roadside rest areas, and private or group areas.

Located at the Providence-Grand Rapids Dam, Mary Jane Thurston State Park abuts the river for 1-1/4 miles and contains 104 acres. The dam has a 10-foot head; it provides a slack water pool ranging in width from 500 feet to 1,800 feet and is about 25 miles long. It was built to provide water for the Miami-Erie Canal and another local canal which extends into Grand Rapids downstream from the park. The Gilead Side Cut Canal, built in 1836 to serve Purdy's Mill, is still in use for recreational boaters. Boating, picnicking, and sightseeing are the primary activities at this park. The state marina development has 112 mooring spaces. Attendance in 1972 was 266,168.

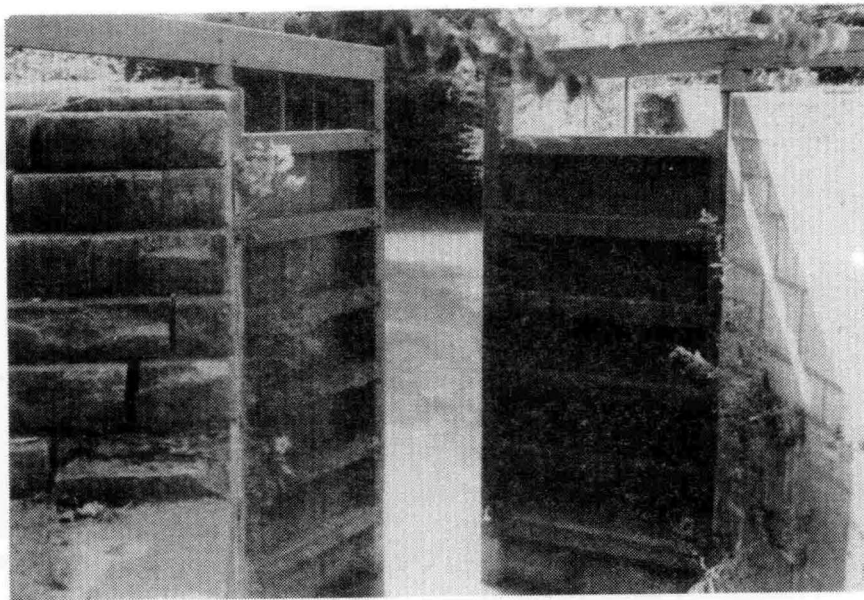
Independence Dam State Park is located about four miles downstream from Defiance, Ohio. The park consists of a narrow strip of land between the river and Highway 424. The park is seven miles long and includes restored canal locks and a portion of the old Miami-Erie Canal. The river below the dam ranges from 400-800 feet wide. The park has facilities for picnicking, camping, hiking, and boating, and 100 mooring spaces are provided at the marina. Attendance in 1972 was 503,370.

The Metropolitan Park District of the Toledo Area administers several regional parks along the Maumee River. Side Cut Park near the City of Maumee has 120 acres and provides facilities for day-use activities such as picnicking, hiking, fishing, field sports, ice skating, and organized day camping. The park contains three of the remaining locks which were used in the side cut from the old Miami-Erie Canal. Estimated capacity of this area exceeds 75,000 persons per year.

Farnsworth Metropolitan Park, across from Missionary Island, is located between River Road and the Maumee River southwest of Waterville. The park contains approximately 115 acres made up primarily of the abandoned lands of the Miami-Erie Canal bed and towpath. The canal lands vary in width from 150 to 250 feet and extend from Farnsworth Park southwest along the Maumee River to Providence Park, nine miles upstream. The park contains day-use facilities including a canoe rental concession. Other facilities at the park include reservable enclosed shelters, picnic areas, boat launching, play-fields and equipment, hiking trails, and a family camping area. Capacity of Farnsworth Park is estimated at 100,000 persons per year.



Independence Dam State Park along the Maumee gives the visitor a chance to camp, picnic, view the historic canal, or enjoy boating on the impoundment created by Independence Dam





Additional recreational facilities are provided by individual cities and towns along the rivers which provide opportunities for various types of recreation, including picnicking, boating, fishing, and other water-enhanced activities



Bend View Park, located two miles southwest of Waterville on a large bend of the Maumee River, contains 30 acres accessible only by trail along the old canal towpath. It affords a good view both upstream and downstream from a high vantage point at the bend of the river. A picnic shelter overlooks this scenic area.

Providence Metropolitan Park is located across the river from Mary Jane Thurston Park. It contains 60 acres plus 240 acres of the Slackwater Pool and occupies the narrow strip of land between U. S. Route 24 and the Maumee River. The most popular activities include fishing, picnicking, river viewing, and hiking on the old canal towpath. The estimated capacity is 25,000 persons per year.

The actual visitor use at all of the metropolitan park district riverfront parks has exceeded the parks' estimated capacity during the past few years.

Fort Meigs, overlooking the Maumee River just south of Perrysburg, contains 82 acres; it is administered by the Ohio Historical Society. The site is a historical restoration of the fort as it was in 1812. A picnic site is also provided.

Ostego Park, operated by the Wood County Park Board, is on the high bank overlooking the river rapids. It has facilities for picnicking, including an enclosed shelter house.

Fort Defiance Monument, at the confluence of the Maumee and Auglaize Rivers in Defiance, is operated by the Ohio Historical Society. It contains plaques and cannons but does not resemble the original fort that once stood at this location. Pontiac Park, operated by the Defiance Metropolitan Park District, is directly across the Maumee River, and Kingsberry Park, operated by the City of Defiance, is across the Auglaize River. The three parks together at the confluence of the rivers help to make this an attractive place.

In Indiana, there are a significant number of recreation areas on the banks of the Maumee, St. Joseph, and St. Marys Rivers. These parks contain approximately thirteen miles of river frontage and occupy over 88 acres of the riverfront visual corridor. These recreation areas include 847 acres of public parks and 332 acres of quasi-public recreation facilities.

The City of Fort Wayne's Park and Recreation Board administers most of these parks, the largest of which is Foster Park along the St. Marys. This 243-acre park features an 18-hole golf course, 3.5 miles of trails, a nature area, floral gardens and tree nursery, a log cabin historical site, and picnicking as well as organized field sports and surfaced court areas. Near the center of the city on the St. Marys is the 94-acre Swimney Park complex. It is intensively developed and has a

swimming pool, tennis center, field sports areas, museum, and picnic facilities. Just north of the central business district on the St. Marys is Lawton Park which contains 39 acres. It has a swimming pool, picnic facilities, greenhouses, and attractive gardens and floral displays.

There are several recreation areas located along the St. Joseph River which enters Fort Wayne from the north. The largest is Shoaff Park which has 169 acres and contains a golf course, camping area, picnic facilities, organized field and court game areas, a fishing lake, and a boat ramp. Another heavily used park near the heart of the city is the City Utilities Park. It features a municipal campground with over 40 sites, picnicking, two boat launching ramps, the Johnny Appleseed Grave Historical Site, sports fields, and court areas. The park contains 43 acres which include over a mile of river frontage. There are also some smaller parcels of park land and municipally owned buffer strips, a conservation club, and a reservoir along the St. Joseph River which make up a total of 8.2 miles of river frontage in public ownership.

Other recreation areas along the rivers include the Lakeside Golf Club on the Maumee in Allen County and the Fairview Golf Club on the St. Marys. Very little land along Cedar Creek is in public ownership; however, there are two quasi-public camps on its shores.

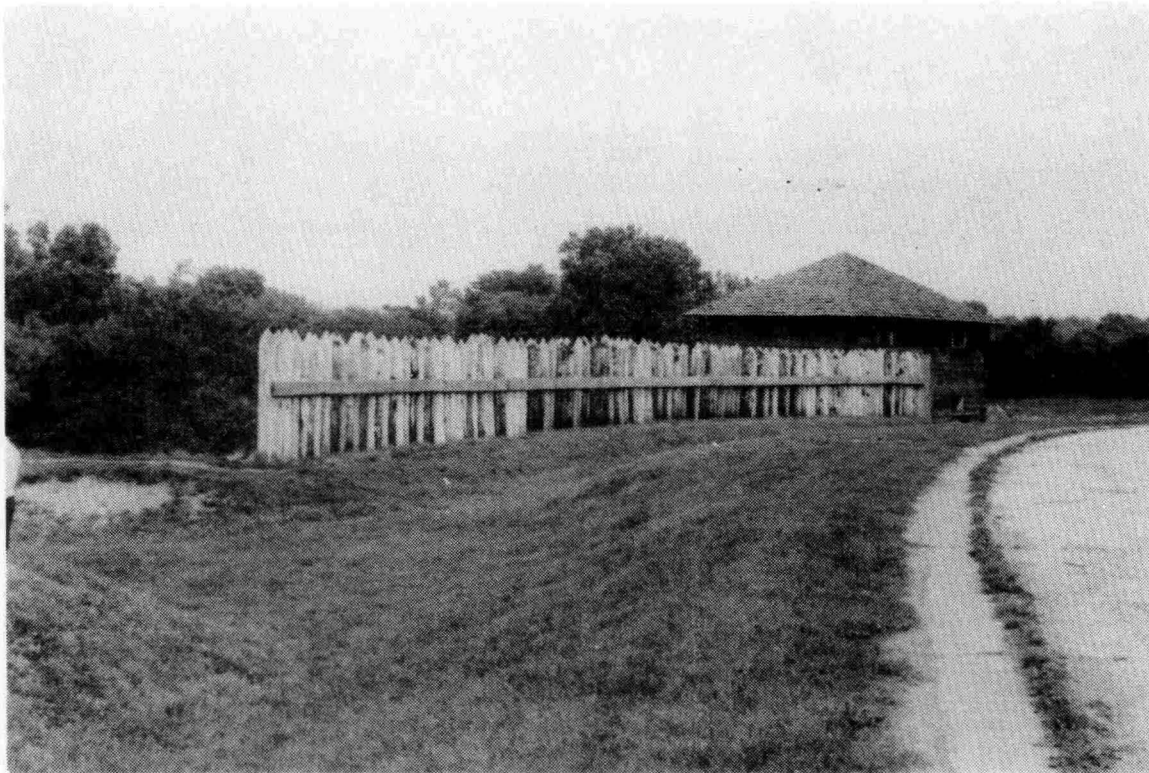
Several large recreation areas have been proposed along the Maumee; some have already been acquired and will be developed soon. The 296 acres at Missionary Island now owned by the State of Ohio may be leased to the Metropolitan Park District for development or operation as a recreational site during the summer. At North Turkeyfoot Creek, 478 acres have been acquired by the State of Ohio, and portions will be developed as a camping area. The Cities of Fort Wayne, Waterville, Maumee, Napoleon, as well as the metropolitan park districts, are acquiring and developing additional lands. Parks, parkways, trails, and wildlife areas have been proposed at other locations along the river.

The North Country Trail, presently under study by the Bureau, would cross the Maumee River near Defiance with the main axis of its route going north and south along the Tiffin and Auglaize Rivers. A portion of the Buckeye Trail, the official Ohio trail, is expected to parallel the Maumee from Defiance downstream to Toledo.

If developed, an inter-county hiking and bicycle trail is expected to cross the Maumee on the old interurban railway bridge west of Waterville.

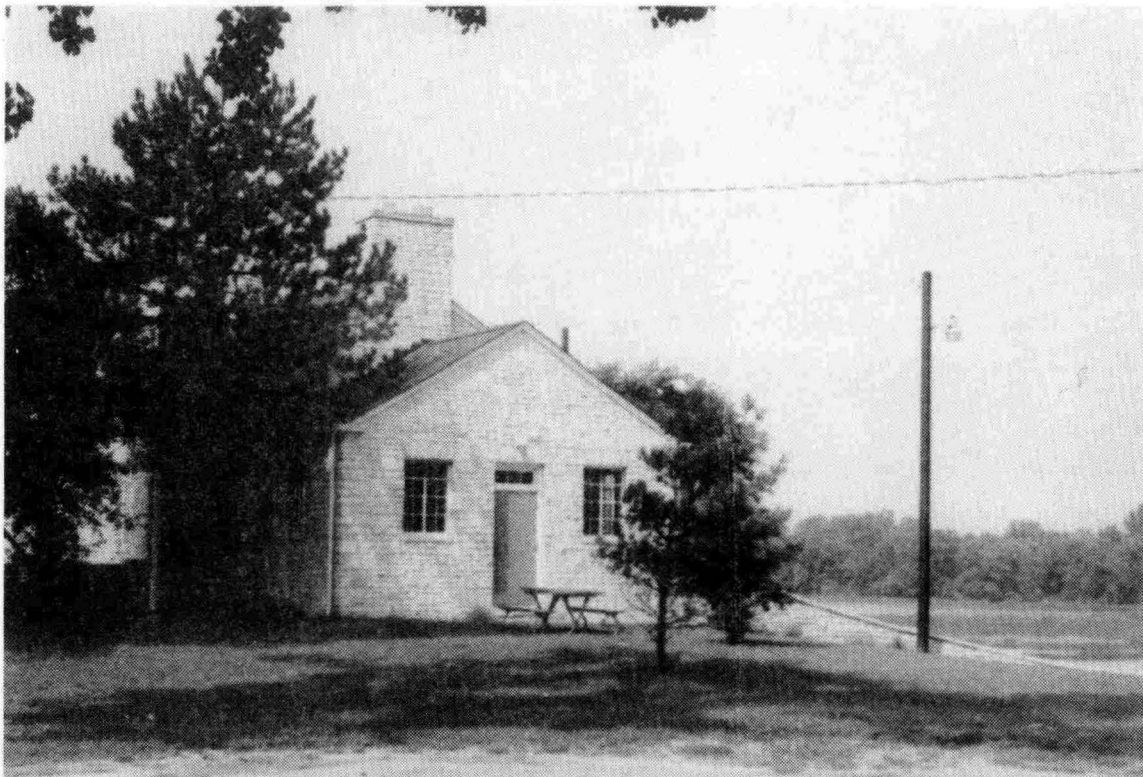
Recreation Use and Opportunities

Studies and programs outlining specific proposals for acquisition and development of recreation sites along the river have been completed by various planning groups, including state and local governments,



Historical sites provide opportunities for visitor use and enjoyment and with proper interpretive programs can add to the visitor's appreciation of the region

Otsego Park overlooking Otsego Rapids on the Maumee River provides an attractive shelterhouse and picnic facilities for local residents





The City of Fort Wayne has provided park facilities along the St. Joseph, St. Marys, and Maumee Rivers for the residents of the area. The existence of such areas provides a green environmental corridor along those portions of the rivers

Heavily traveled roads are often close to the rivers and riverside parks. They detract from the naturalness and peaceful qualities of the area



In Ohio where U. S. highway 24 is close to the Maumee River, the State Highway Dept. has provided highway rest stops for motorists. Portions of the old U.S. 24 have been re-designated Ohio 424, a State Scenic Highway



Rapids and rushing water are formed as the river crosses shallow rock ledges. This causes an attractive variety in the scenery. The rapids of the lower Maumee receive considerable use by fishermen

Quasi-public organizations such as the Girl Scouts have purchased camp sites at several locations along the Maumee or its tributaries to serve the members of their organization in the region





In most places the rivers are slow and placid, but many times the excessive turbidity and inferior water quality detract from their aesthetic value



metropolitan park districts, and historical associations. Action has already been taken to acquire and develop some parcels. Federal funds from the Land and Water Conservation Fund (P.L. 88-578) have been available through the Departments of Natural Resources and the Bureau of Outdoor Recreation for some of these projects. It is anticipated that the State of Ohio will provide funding for land acquisition within the proposed state designated scenic river corridor.

The rivers and the developments along them are significant elements of the local and regional recreation resources. The river valleys provide some of the better resource-oriented sites. They provide scenic and topographic relief from the surrounding flat agricultural lands, and the wooded areas along the streams (although limited) provide for wildlife habitat. The river has the potential for being a good fishery if the problems of pollution and sedimentation are resolved. Even now, the rivers provide fishing opportunities. Waterfowl hunting is popular along the Maumee together with the hunting of small upland game animals in the surrounding fields. Hunting for rabbits and pheasant is most popular.

Most of the river is suitable for canoeing and some sections are used for power boating and water skiing. Along with swimming, the latter is not recommended because of the high bacterial counts present in the river at various times. Canoeing of the river is not difficult and there are no dangerous rapids or other unusual hazards along most of the river. Portages are necessary in some locations but are usually short. The lower portion of the study area on the main stem of the Maumee has a higher proportion of rapids than the stretches in the headwaters.

Canoeing on Cedar Creek is more popular than at most other locations in the study area. It is a smaller, more intimate stream and its gradient is four times as great as the other streams. The faster water, combined with the more natural scenery, greater topographic relief and better water quality, provides a more meaningful recreational experience.

Picnicking is enjoyed at the various riverfront recreation areas and at the highway rest stops. Overnight camping sites have been provided in several locations by both the public and private sectors. Additional hiking, horseback riding, and bicycling facilities could be developed along the riverbanks.

Intensive agriculture in the region tends to restrict nature study; however, limited areas such as the "Tree Farm" and woodlots and ravines leading to the river provide areas for enjoyment of nature.

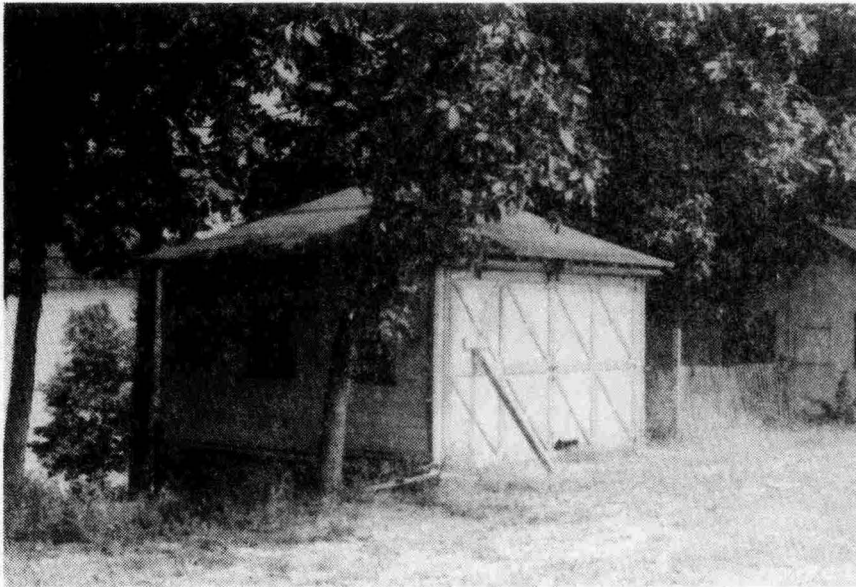
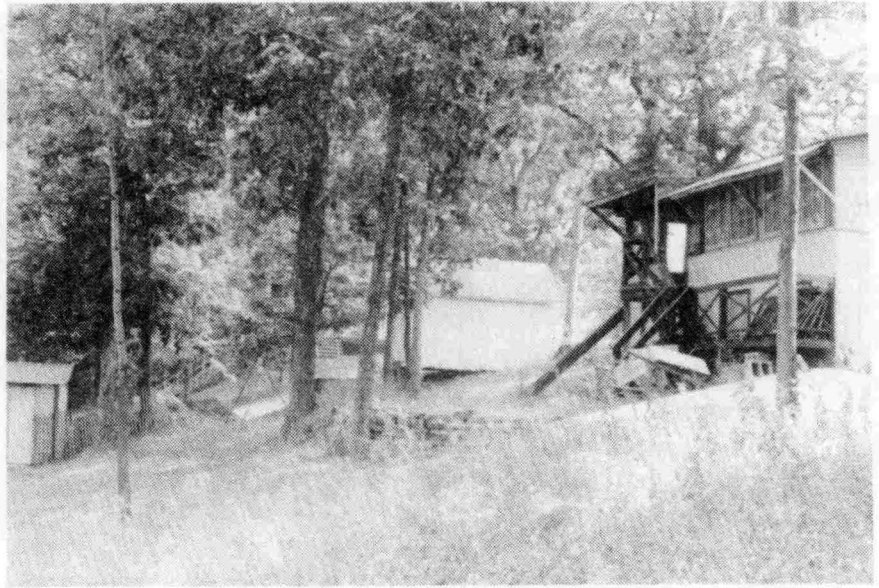
Limiting Factors--Several factors limit, to varying degrees, present and potential recreational use of the study segments. Many of these factors have been discussed in the various subsections of the report; however, some additional discussion is needed to relate these limiting factors directly to recreational use on the Maumee River and its tributaries. Water quality is a serious limiting factor affecting recreational use at the present time. An upgrading of the present water quality would provide a river environment of greater aesthetic appeal and enjoyment. Constant monitoring of water quality and strict enforcement of existing standards must be maintained to ensure that the water quality of the Maumee River improves and does not worsen.

The waters of the Maumee, St. Joseph, and St. Marys Rivers are sluggish and muddy which detract from their appearance. Heavy siltation is evident along the entire course of the river, which has been described in the slower or slack water areas as appearing somewhat viscous with a slick, glassy, veneer-thin surface, where objects only a couple of inches below the surface could not be seen at all.

The rivers pass through low, flat, very open farm land which is for the most part unrelieved and in its sameness except for occasional communities and urban areas extensively developed for residential, commercial, and industrial purposes. Along the rivers are sometimes found low bluffs and scattered islands and a few rapids to break the monotony. The total absence of land from other than the river (hills or high bluffs) sometimes instills a feeling of boredom to travelers as they travel along the river corridor. Cedar Creek in this respect provides a welcome change.

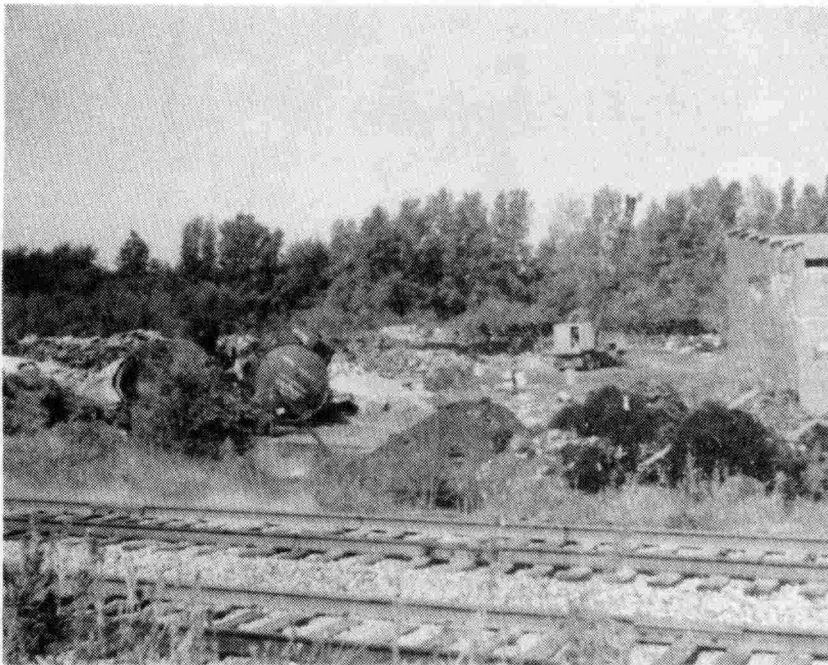
Roads which closely parallel the rivers detract from any feeling of naturalness, especially with the large volume of heavy truck traffic along U. S. 24. The sights, sounds, and smells of human activity in and around the river are always present and limit the recreational enjoyment. There would no doubt be short segments where (if one ignored the water quality) a mild sense of naturalness or remoteness could be felt.

Designated and developed public access sites are limited and often widely spaced, limiting the use of the river. Although permission can usually be obtained to cross private land, or road crossings can be used as access points, these are generally less than satisfactory. Parking and sanitation facilities are lacking, and littering has become a problem at some locations. At heavily used sites deterioration of the streamside vegetation has become a problem because of concentrated use.



Development of summer cottages and trailer camp areas have occurred at several locations especially near Grand Rapids. Some are not well maintained and many do not appear to have proper sanitary facilities and thus contribute to the pollution of the river.





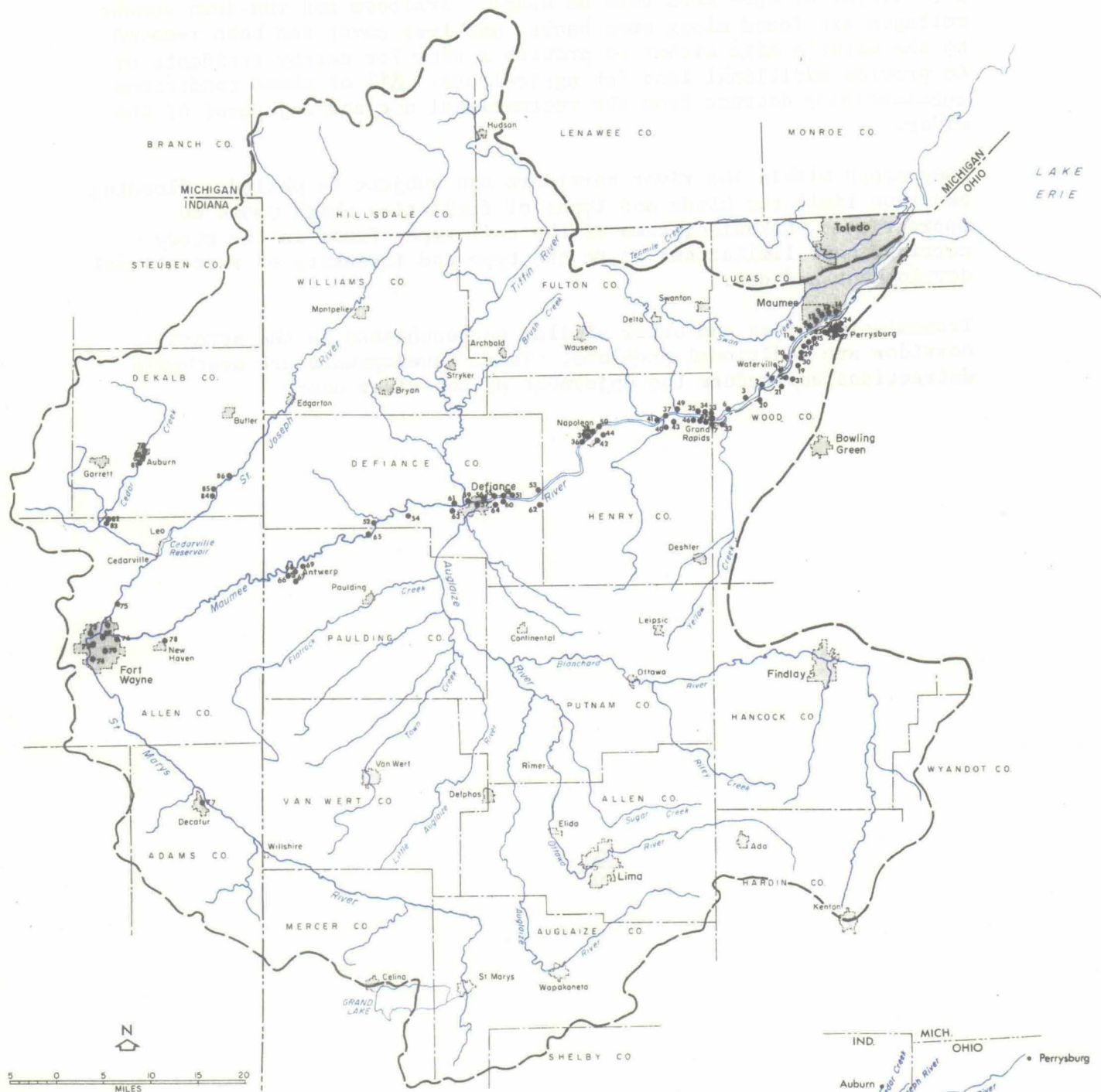
Often the river banks
are used as "back yards"
a place to store unneeded
items.



Some development and use along the river have less than desirable influence in any scenic qualities of the river and at times result in a blighted condition. In some places, the riverbanks are covered with litter or have been used as dumps. Trailers and run-down summer cottages are found along some banks, and tree cover has been removed to the water's edge either to provide a view for nearby residents or to provide additional land for agriculture. All of these conditions substantially detract from the recreational use and enjoyment of the river.

Many areas within the river corridors are subject to periodic flooding and thus limit the kinds and types of facilities which would be appropriate. Likewise, some of the soil types found in the study corridor have limitations as to the type and intensity of recreational development and use.

Transmission lines and other similar encroachments in the stream corridor are additional problems. These developments are aesthetic detractors and reduce the enjoyment of the river user.



MAUMEE RIVER BASIN
Existing Recreation Facilities
along study segments

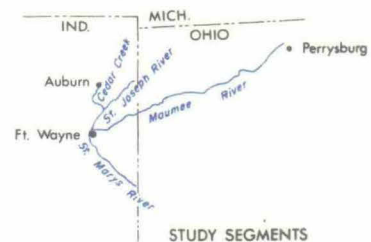


TABLE XIII

Facilities along the River Are Summarized in the Following Chart

Map No.	Name	County	Agency	Acres	Activities
1	Roadside Rest	Lucas	Department of Highways	2	F, H, P
2	Bend View Park	Lucas	Metro Parks	30	B, F, H, P
3	Canal Lands Park	Lucas	Metro Parks	120	Undeveloped
4.	Farnsworth Park	Lucas	Metro Parks	40	B, C, F, H, S, P, PE
5	Missionary Island	Lucas	Ohio DNR	247	F, Undeveloped
6	Providence Park	Lucas	Metro Parks	60	B, F, H, S, PE
7	Side Cut Park	Lucas	Metro Parks	120	G, F, H, HIS, S, P, PE, WS
8	Towpath Park	Lucas	Maumee City	20	H, His, S
9	Fort Miami	Lucas	Historical Society	5	F, His
10	Columbian House	Lucas	Private	1	His
11	Fallen Timbers State Memorial	Lucas	Historical Soc.	5	F, His
12	The Old Plantation	Lucas	Private	1	His.
13	Edison Club	Lucas	Members Only	5	B, P, PE
14	Indian Hill Boat Club	Lucas	Members Only	1	B, P
15	Ft. Meigs Mem. Park	Wood	Historical Society	57	His, P
16	Ft. Meigs Wildlife Area	Wood	Ohio DNR	10	H, B, F
17	Mary Jane Thurston State Park	Wood-Henry	Ohio DNR	104	H, P, PE
18	Maumee River Access	Wood	Ohio DNR		F

TABLE XIII
(continued)

Map No.	Name	County	Agency	Acres	Activities
19	Miltonville Access	Wood	Ohio DNR	2	F, B
20	Otsego Park	Wood	Wood County	6	B, F, P, PE
21	Weirs Rapids	Wood	Ohio DNR		F
22	Maple St. Boat Launch	Wood	Perrysburg	1	B, F
23	Hood Park	Wood	Perrysburg	2	G, F
24	Riverside Park	Wood	Perrysburg	4	His, F, S
25	The Flats	Wood	Perrysburg	31	P
26	Ft. Meigs	Wood	Historical Soc.	25	His.
27	Perrysburg Boat Club	Wood	Members Only	1	B, F
28	Ft. Meigs Gun Club	Wood	Members Only	5	Gun Club
29	Sunset View Park	Wood	Private	16	F, P
30	Shady Shore Park	Wood	Private	16	G, P, PE
31	Vollmars Park	Wood	Private	7	Amusement Park
32	Grand Rapids Marina	Wood	Private	1	P, B
33	Roadside Rest Area	Henry	Ohio St. Hwys	3	P
34	Fishing Access Area	Henry	Ohio DNR	1	F
35	Roadside Rest Area	Henry	Ohio St. Hwys.	5	P
36	Meyeholz Wildlife Area	Henry	Ohio DNR	14	B, P, F, Hunt.
37	Turkeyfoot Creek	Henry	Ohio DNR	2	Hunt.
38	Napoleon Boat Ramp	Henry	Napoleon	5	B, F
39	Ritter Park	Henry	Napoleon	14	F, P
40	Boat Ramp	Henry	Private	1	B, F

TABLE XIII
(continued)

Map No.	Name	County	Agency	Acres	Activities
41	Boy Scout Camping	Henry	Private	10	C
42	Fishing Access	Henry	Private	3	F
43	Fishing Access	Henry	Private	4	F, P
44	Fishing Access	Henry	Private	3	F
46	Lolly's Boat Ramp	Henry	Private	4	B, F
47	Lucy's 22	Henry	Private	24	B, Cab, C, F
48	Private Club	Henry	Private	5	B, F, P
49	Texas Marina	Henry	Private	1	B, F
50	Tullocks Marina	Henry	Private	5	B, F
51	Roadside Rest	Defiance	Ohio St. Hwys.	5	P
52	Roadside Rest	Defiance	Ohio State Hwys.	2	P
53	Independence Dam State Park	Defiance	Ohio DNR	291	B, C, F, H, His, P
54	Blue Island	Defiance	Metro Parks	3	Undeveloped
55	Kingsbury Park	Defiance	Defiance	3	B, G, F, P, PE, SM
56	Westwood Area	Defiance	Metro Parks	15	Undeveloped
57	Ft. Defiance Monument	Defiance	Historical Society	4	His.
58	Maumee Towpath	Defiance	Metro Parks	10	Undeveloped
59	Pontiac Path	Defiance	Metro Parks	5	B, P, His
60	Camp Libby	Defiance	Members Only	151	C
61	Edison Club	Defiance	Members Only	4	F, P, PE
62	General Motors Area	Defiance	Members Only	50	F, P, PE
63	Maulfair Park	Defiance	Members Only	8	G, F, P, Sm
64	N.W. Ohio Boat Club	Defiance	Members Only	2	B, F, P
65	Roadside Rese Area	Paulding	Ohio St. Hwys	3	P
66	O.E. Ehrhart Museum	Paulding	Paulding Co. Historical	1	His.

TABLE XIII
(continued)

Map No.	Name	County	Agency	Acres	Activities
67	Antwerp City Park	Paulding	Antwerp	3	G, P, PE
68	Veterans Mem. Park	Paulding	Antwerp	10	S, P
69	Antwerp Driving Range	Paulding	Private	5	Driving Range
70	Foster Park	Allen	Ft. Wayne	249	R, P, H, G, GF
71	Shoaff Park	Allen	Ft. Wayne	169	P, H, B, G, C, GF
72	Seyfert Farm	Allen	Ft. Wayne	110	Undeveloped
73	Tillman Park	Allen	Ft. Wayne	70	Undeveloped
74	Swinney Park	Allen	Ft. Wayne	94	P, R, S, G, WS, SM
75	Riverbank Parks	Allen	Ft. Wayne	30	P, H, B
76	Utilities Park	Allen	Ft. Wayne	43	P, C, PE, B
77	Community Center	Decatur	Decatur	40	Comm. Center
78	London Road	Allen	Private	1	P, F
79	Greenhurst Country Club	DeKalb	Private	110	GF
80	Thomas Park	DeKalb	Auburn	4	P
81	Eckhart Park	DeKalb	Auburn	10	P, PE, SM
82	Camp Red Cedar	Allen	Izaak Walton League	129	C, B, F, H, S
83	Camp McMillen	Allen	Girl Scouts	62	C, B, F, H
84	Covered Bridge	DeKalb	Lions Club	21	P, F, S
85	Kado Lato Farm	DeKalb	Private	85	Interpretive
86	Wild Cherry Park	DeKalb	St. Joe	7	P
87	Hanna Ford	Allen	Ft. Wayne	2	Nature

*Activities Code

B-Boating
C-Camping
Cab-Cabins
F-Fishing
G-Games

GF-Golf
H-Hiking
His-Historical
Hunt Hunting
P-Picnicking

PE-Play Equipment
R-Riding & Cycling
S-Scenery
Sm-Swimming
WS-Winter Sports

V.

OTHER POSSIBLE COURSES OF ACTION

V. OTHER POSSIBLE COURSES OF ACTION

The Maumee River and its Indiana tributaries should be recognized as valuable resources which can be enhanced from an environmental and recreational viewpoint. Several measures other than inclusion in the National Wild and Scenic Rivers System were identified during the study which could enhance and/or protect the remaining scenic and recreational values of these river reaches.

1. Pollution Abatement and Monitoring

Efforts have been made by local, state, and federal governments in controlling water pollution in the basin, and significant progress has been reported during the last 15 years; however, continued efforts to identify, minimize, and control pollution sources must receive the highest priority if the rivers' recreational and scenic attributes are to be maintained and improved. Significant water quality problems exist. An effective monitoring program for all types of pollutants should be established and coupled with a strong enforcement program.

Excessive turbidity from sediment in suspension is one element of the water quality which needs particular attention. The Maumee River contributes over 1.4 million tons of sediment per year to Lake Erie. The river has the highest sediment concentration in the State of Ohio. These high sediment concentrations detract from the aesthetic values of the stream corridor and limit the fish life in the stream. The difficulty with much of the sediment is its extremely small particle size which tends to remain in suspension for long periods of time. Sources of the sediment include accelerated erosion caused by poor agricultural practices, urban and cultural development, drainage ditches, and streambank erosion. Research is under way to determine methods of reducing sedimentation in the Maumee basin. As findings are available, programs should be developed to implement the recommendations. Controls will be necessary to prohibit indiscriminate ditching and stream channelization or other practices which permit large amounts of sediment to enter the streams.

2. Land Use Planning and Zoning

Although some localities have floodplain or open space conservation or recreational zoning along the rivers, others are unzoned or are zoned for residential, industrial, or other uses not compatible with maintaining the scenic and recreational values of the river.

Individual county plans or regulations need to be coordinated so that inconsistent protection and use control would not occur. Plans and zoning ordinances should be based on studies of land capability and suitability for various uses and should recognize the special environmental and recreational significance of the stream corridors. Plans should be coordinated at the county, regional, and state level. The national land use policy legislation before the Congress of the United States could provide an incentive for local units of government within the basin to enact coordinated land use controls which would preserve the values of the river areas. If enacted, this legislation should encourage state and local governments to plan and regulate land use in conformance with the capability of the land resource base.

3. Inclusion in State Systems of Wild and Scenic Rivers

Both Indiana and Ohio have passed enabling legislation to administer a natural or scenic rivers program. Ohio has completed a study of the river and has announced its intention to proceed with designation of the river as part of the state system. Indiana's legislation was passed in the last session of its legislature, and the Indiana Department of Natural Resources is developing criteria for inclusion of appropriate streams in its state system.

It is the general intent of both federal and state legislation that rivers included within scenic or natural rivers systems be administered in such a way as to protect and enhance scenic or recreational values without limiting compatible uses and which do not substantially interfere with public use and enjoyment of these values. Protection of the natural values of the stream corridors can be accomplished through various methods ranging from fee purchase to zoning. The type and amount of action would depend on the management plans prepared by the managing agency. Designation of streams that meet the criteria for inclusion in the state system should be encouraged.

4. Acquisition of Lands or Easements at Specific Sites by Local, Regional, or State Agencies

Local agencies could designate segments of the streams as environmental corridors to complement their open space or land use plans and obtain easements on adjacent lands to assist in preserving these areas.

Individual recreation sites along the rivers have been identified in various state or local plans as potential recreation areas. These sites usually represent the best possibilities for recreational development and when they are acquired will provide public access to the river corridor. As the fishery on these streams improves, consideration could be given to providing additional access.

The presence of numerous historic districts and structures in towns along the Maumee River, especially between Defiance and Perrysburg, has been recognized. These historical attributes provide focal points around which river and adjoining land use protection and preservation programs can be accomplished.

5. Establishment of Special Districts and Other Possible Actions

The study team noted several problems involved with preservation of the river corridor. The source of some of the problems may be in the headwaters and tributaries and not necessarily the river itself. A current level B water resources study under the chairmanship of the Great Lakes Basin Commission will cover the entire basin. Needed corrective actions will require cooperation of all individuals and levels of government.

Action by local and state agencies is necessary and the most logical for preservation of the Maumee River corridor. Park, recreation, and conservation activities must be recognized as an important social resource, and funds must be allocated accordingly. The Anthony-Wayne Parkway District, for example, was created by the legislature of the State of Ohio but has not been functional for the past years because no funds have been appropriated. Such an organization could prove valuable as a coordinator between local and other state agencies.

Another tool that might assist in the conservation of the streambanks in Indiana is to encourage forest plants along the streams to be placed under the Indiana State Classified Stream Act. This act provides special tax incentives for the retention and management of forest lands. Similar programs to retain stream corridor lands in their natural condition and promote conservation practices should be encouraged.

Many riverfront owners have expressed their desire to keep their property in its present condition and to restrict additional development in the stream corridor. In such cases the donation of a scenic easement to an appropriate organization or agency would accomplish that objective. Recreation and conservation agencies should be prepared to accept the donation of appropriate scenic or use easements and should encourage their conveyance. For the ease of administration, all easements in a particular area should be granted to one agency. The state departments of natural resources appears to be the most logical agency if it is involved in a state scenic rivers program on these rivers. Along Cedar Creek the landowners have banded together in organizations called ACRES, Inc. and the Cedar Creek Wildlife Project, Inc. in an effort to preserve the stream valley. The agreements among the landowners are only informal and do not have legal standing such as scenic easement, deed restriction, or zoning. While this is working satisfactorily today, some future owner may not care to subscribe to the principles of preservation of the valley.

There is a great lack of archaeological information, especially on the upper reaches of the rivers. Comprehensive archaeological studies should be undertaken throughout the valley expanding on the limited site surveys completed or currently under way. Such programs would provide for the identification of any significant sites that should be preserved.

Historic site surveys should be continual for identification of significant sites. Local and county park districts or historical societies should use the information for developing recreation and historic preservation and interpretation programs.

VI.
APPENDICES

SMSA's Within 200 Miles of Toledo or Fort Wayne

SMSA Name	Counties Included	SMSA, 1970 Population	SMSA, 1970 Ranking (Size)
Chicago, Ill.	Will, Cook, DuPage, Kane, McHenry, Lake	7,032,075	2
Detroit, Mich.	Oakland, McComb, Wayne, Westmorland	4,817,914	4
Pittsburg, Penn.	Beaver, Hancock, Allegheny, Brooke, Washington	2,401,245	9
Cleveland, Ohio	Cuyahoga, Medina, Lake, Geauga	2,064,194	12
Milwaukee, Wisc.	Milwaukee, Waukesha, Washington, Ozaukee Camp	1,403,887	19
Cincinnati, Ohio	Dearborn, Hamilton, Clermont, Boone, Kenton, Morgan, Hendricks	1,384,911	21
Indianapolis, Ind.	Marion, Boone, Hamilton, Hancock, Shelby, Johnson	1,109,882	29
Columbus, Ohio	Deleward, Franklin, Pickaway	916,228	35
Dayton, Ohio	Preble, Montgomery, Greene, Miami	850,266	39
Louisville, Ky.	Clark, Floyd, Jefferson	826,553	40
Toledo, Ohio-Mich.	Wood, Lucas, Monroe	692,571	46
Akron, Ohio	Summit, Portage	679,239	48
Gary-Hammond- E. Chicago	Lake, Porter	633,367	52
Grand Rapids, Mich.	Ottawa, Kent	539,225	61
Youngstown-Warren, Ohio	Trumbull, Mahoning	536,003	62
Flint, Michigan	Lapeer, Genesee	496,658	67
Lansing, Michigan	Eaton, Ingham, Clinton	378,423	77
Canton, Ohio	Stark	327,210	80
Fort Wayne, Ind.	Allen	280,455	112
South Bend, Ind.	St. Joseph, Marshall	280,031	113
Erie, Pa.	Erie	263,654	119
Lorain-Elyria, Ohio	Lorain	256,843	122
Ann Arbor, Mich.	Washtenaw	234,103	131
Hamilton-Middletown, Ohio	Butler	226,207	137
Saginaw, Michigan	Saginaw	219,743	138
Kalamazoo, Mich.	Kalamazoo	201,550	147
Wheeling, W. Va., Ohio	Belmont, Marshall	182,712	154
Terre Haute, Ind.	Sullivan, Clay, Vigo Vermillion	175,143	158
Lima, Ohio	Van Wert, Putnam, Allen	171,472	161
Racine, Wisconsin	Racine	170,838	162
Steubenville-Weirton O.-W. Va.	Jefferson	165,627	165
Champaign-Urbana, Ill.	Champaign	163,281	166
Muskegon, Muskegon Hts., Mich.	Muskegon	157,426	170
Springfield, Ohio	Clark	157,115	172
Jackson, Mich.	Jackson	143,274	182
Anderson, Ind.	Madison	138,451	185
Mansfield, Ohio	Richland	129,997	190
Muncie, Indiana	Deleware	129,219	191
Kenosha, Wisc.	Kenosha	117,917	202
Bay City, Mich.	Bay	117,339	203
Lafayette, West Lafayette, Ind.	Tippecanoe	109,378	210
Bloomington-Normal Illinois	McLean	104,389	215

APPENDIX II

Permanent Residents

Common Name	Remarks
1. Bobwhite Quail	R - C
2. Ring-necked Pheasant	R - C
3. Gray Partridge	Ac. - VR
4. Herring Gull	R - C
5. Ring-billed Gull	R - C
6. Rock Dove	C
7. Mourning Dove	C
8. Barn Owl	R
9. Screech Owl	R
10. Great Horned Owl	R - VC
11. Barred Owl	R - U
12. Long-eared Owl	Ac. - U
13. Short-eared Owl	Ac. - U
14. Belted Kingfisher	R - C
15. Yellow-shafted Flicker	R - C
16. Pileated Woodpecker	Rare or very local
17. Red-bellied Woodpecker	Local
18. Red-headed Woodpecker	VR - C
19. Hairy Woodpecker	R - U
20. Downy Woodpecker	U - C
21. Horned Lark	R - C
22. Blue Jay	U - C
23. Common Crow	U - C
24. Black-capped Chickadee	Ac. - C
25. Tufted Titmouse	C
26. White-breasted Nuthatch	U - C
27. Carolina Wren	VR - C
28. Mockingbird	Ac. - C
29. Robin	Ac. - Ab.
30. Eastern Bluebird	R - C
31. Cedar Waxwing	R - C
32. Starling	C - Ab.
33. House Sparrow	C - Ab.
34. Brown-headed Cowbird	U - VC
35. Cardinal	R - VC
36. Song Sparrow	C - Ab.

Key

Ab.	- Abundant
VC	- Very Common
C	- Common
U	- Uncommon
R	- Rare
VR	- Very Rare
Ac.	- Accidental

- Migrant Birds Which Sometimes Nest and/or Appear in Winter -

REMARKS			REMARKS		
Common Name	Nesting	Winter	Common Name	Nesting	Winter
1. Pied-billed Grebe	R (May - July)	Ac. - R	52. Red-breasted Nuthatch		Ac. - C
2. Great Blue Heron	U-VC (Apr.-Aug)	Ac. - R	53. Brown Creeper	Ac.	R - C
3. Green Heron	R-C (Apr.-July)	Ac.	54. Winter Wren		Ac. - U
4. Common Egret	R-C (Apr.-July)	Ac.	55. Long-billed Marsh Wren	Ac.-C (May-Sept.)	Ac. - R
5. Black-crowned Night Heron	VR-C (Apr.-Aug)	Ac. - VR	56. Short-billed Marsh Wren	Ac.-U (May-Sept.)	Ac.
6. Yellow-crowned Night Heron	Ac.-U (Apr.-July)		57. House Wren	Ac.-C (Apr.-July)	
7. Least Bittern	Ac.-U (May-July)		58. Catbird	U - C (May-July)	Ac. - R
8. American Bittern	Ac.-R (Apr.-July)	VR	59. Brown Thrasher	U - C (Apr.-July)	Ac.
9. Canada Goose	VR-U (Apr.-July)	R - C	60. Golden-crowned Kinglet		R - U
10. Mallard	R-U (Apr.-July)	U - C	61. Yellow-throated Vireo	Ac.-R (Apr.-Aug.)	
11. Black Duck	R-U (Apr.-July)	U - C	62. Red-eyed Vireo	C-VC (May-Aug.)	
12. Blue-winged Teal	VR-U (May-July)	VR	63. Warbling Vireo	R-C (May-Aug.)	
13. Wood Duck	U-VC (Apr.-Aug)	VR	64. Prothonotary Warbler	Ac.-U (May-July)	
14. Common Goldeneye		U - C	65. American Redstart	Ac.-C (May-July)	
15. Common Merganser		R - C	66. Yellow Warbler	U-VC (Apr.-July)	
16. Turkey Vulture	U-C (Apr.-July)	Ac. - VR	67. Blue-winged Warbler	Ac.-U (May-July)	
17. Sharp-shinned Hawk	Ac.-R (Mar.-July)	Ac. - VR	68. Myrtle Warbler		Ac.-C
18. Cooper's Hawk	U (Mar. - July)	U - C	69. Cerulean Warbler	Ac.-C (May-July)	
19. Red-Tailed Hawk	U (Mar. - June)	U - C	70. Chestnut-sided Warbler	Ac.VR (May-July)	
20. Red-shouldered Hawk	R-U (Mar.-July)	VR	71. Ovenbird	VR-C (May-Aug.)	
21. Broad-Winged Hawk	Ac.-R (Apr.-July)	Ac.	72. Yellow-breasted Chat	Ac.-C (May-Aug.)	
22. Rough-legged Hawk		R - C	73. Mourning Warbler	Definite nesting recrds from Lucas County	
23. Marsh Hawk	R (Mar.-July)	U - C	74. Yellowthroat	U-C (May-Aug.)	Ac.
24. Kestrel	U - C (Feb.-July)	U - C	75. Bobolink	Ac.-U (May-Aug.)	
25. Virginia Rail	Ac.-U (May-July)	Ac.	76. Eastern Meadowlark	U-Ab. (Apr.-Aug.)	Ac. - U
26. Sora Rail	Ac.-U (May-July)		77. Western Meadowlark	Ac. (Mar.-July)	
27. Common Gallinule	VR-U (June-Aug.)		78. Redwinged Blackbird	C-Ab. (Apr.-July)	Ac.
28. American Coot	R - U (May-Aug.)		79. Orchard Oriole	Ac.-C (May-July)	
29. Killdeer	R-VC (Apr.-July)	Ac. - R	80. Baltimore Oriole	R-C (Apr.-July)	Ac.
30. Woodcock	VR-R (Mar.-July)	Ac.	81. Rusty Blackbird		Ac. - C
31. Upland Plover	R-U (Apr.-June)		82. Common Grackle	U-Ab. (Apr.-July)	Ac. - C
32. Spotted Sandpiper	U-C (May-July)		83. Rose-breasted Grosbeak	Ac.-U (May-July)	
33. Common Tern	Ac.-C (May-Aug.)		84. Indigo Bunting	U-VC (May-Sept.)	
34. Yellow-billed Cuckoo	U-C (June-Sept.)		85. Dickcissel	Ac.-U (May-Aug.)	Ac.
35. Black-billed Cuckoo	Ac.-C (June-Sept.)		86. Purple Finch	Ac.-R (June-Sept.)	Ac. - U
36. Whip-poor-will	Very local		87. American Goldfinch	R-C (June-Sept.)	Ac.-U
37. Nighthawk	R-C (May-July)		88. Red Crossbill		Ac. - U
38. Chimney Swift	U-C (May-July)		89. White-winged Crossbill		Ac. - R
39. Ruby-throated Hummingbird	R-U (May-Aug.)		90. Rufous-sided Towhee	U (Apr.-July)	Ac.
40. Eastern Kingbird	U-C (May-July)		91. Savannah Sparrow	Ac.-C (May-July)	Ac.
41. Great Crested Flycatcher	U-C (May-July)		92. Grasshopper Sparrow	Ac.-C (May-Aug.)	Ac.
42. Eastern Phoebe	R-U (May-July)	Ac. - VR	93. Henslow's Sparrow	Ac.-U (May-Sept.)	
43. Acadian Flycatcher	R-U (May-Aug.)		94. Vesper Sparrow	U-Ab. (Apr.-Aug.)	Ac. - VR
44. Treill's Flycatcher	R-C (May-Aug.)		95. Slate-colored Junco		VR - C
45. Eastern Wood Pewee	R-C (May-Aug.)		96. Chipping Sparrow	U-VC (Apr.-July)	Ac.
46. Tree Swallow	Ac.-C (May-July)		97. Field Sparrow	U-VC (Apr.-Aug.)	Ac. - U
47. Bank Swallow	Ac.-VC (May-July)		98. Swamp Sparrow	Ac.-U (May-July)	Ac. - R
48. Rough-winged Swallow	R-C (May-July)		99. Lapland Longspur		Ac. - C
49. Barn Swallow	R-Ab. (Apr.-Aug)		100. Tree Sparrow		U - VC
50. Cliff Swallow	Ac. (May-July)		101. Snow Bunting		Ac. - C
51. Purple Martin	R-VC (Apr.-Aug.)				

APPENDIX II (continued)

APPENDIX II (Continued) MIGRATORY BIRDS

1. Common Loon	Ac - C	51. Knot	Ac - R	101. Orange-crowned Warbler	Ac - R
2. Red-throated Loon	Ac	52. Pectoral Sandpiper	C - VC	102. Nashville Warbler	U - C
3. Red-necked Grebe	Ac	53. White-rumped Sandpiper	Ac - R	103. Parula Warbler	Ac - U
4. Horned Grebe	R - C	54. Baird's Sandpiper	Ac - R	104. Magnolia Warbler	U - C
5. White Pelican	Ac	55. Least Sandpiper	R - C	105. Cape May Warbler	U - C
6. Gannet	Ac - VR	56. Dunlin	R - C	106. Black-throated Blue Warbler	R - U
7. Double-crested Cormorant	Ac - R	57. Short-billed Dowitcher	Ac - C	107. Black-throated Green Warbler	U - VC
8. Little Blue Heron	Ac - VR	58. Long-billed Dowitcher	Ac - C	108. Blackburnian Warbler	U - C
9. Snowy Egret	Ac - VR	59. Stilt Sandpiper	Ac	109. Yellow-throated Warbler	Ac - U
10. Whistling Swan	Ac - C	60. Semipalmated Sandpiper	R - C	110. Bay-breasted Warbler	U - VC
11. Brant	Ac - VR	61. Buff-breasted Sandpiper	Ac	111. Blackpoll Warbler	U - VC
12. Snow & Blue Goose	R - C	62. Marbled Godwit	Ac	112. Pine Warbler	Ac - U
13. Gadwall	U - C	63. Western Sandpiper	Ac	113. Prairie Warbler	Ac - R
14. Pintail	U - C	64. Hudsonian Godwit	Ac	114. Palm Warbler	R - VC
15. Green-winged Teal	U - C	65. Sanderling	Ac	115. Northern Waterthrush	R - C
16. Green-winged Teal	U - C	66. American Avocet	Ac	116. Louisiana Waterthrush	Ac - VR
17. Shoveler	U - C	67. Red Phalarope	Ac	117. Kentucky Warbler	Ac - R
18. Redhead	U - VC	68. Wilson's Phalarope	Ac - VR	118. Connecticut Warbler	Ac - U
19. Ring-necked Duck	VU - C	69. Northern Phalarope	Ac	119. Canada Warbler	R - U
20. Canvasback	VU - C	70. Parasitic Jaeger	Ac	120. Hooded Warbler	Ac - R
21. Greater Scaup	VR - R	71. Glaucous Gull	Ac	121. Wilson's Warbler	R - C
22. Lesser Scaup	C - VC	72. Great Black-backed Gull	Ac - U	122. Scarlet Tanager	Ac - C
23. Bufflehead	U	73. Franklin's Gull	Ac - R	123. Summer Tanager	Ac - C
24. Oldsquaw	R	74. Bonaparte's Gull	Ac - C	124. Evening Grosbeak	Ac - U
25. White-winged Scoter	Ac - U	75. Forster's Tern	Ac - R	125. Pine Grosbeak	Ac - VR
26. Ruddy Duck	U - VC	76. Least Tern	Ac	126. Common Redpoll	Ac
27. Hooded Merganser	U - C	77. Caspian Tern	Ac - C	127. Pine Siskin	Ac - C
28. Red-breasted Merganser	R - VC	78. Black Tern	R - C	128. Sharp-tailed Sparrow	Ac - R
29. Goshawk	Ac - VR	79. Yellow-bellied Sapsucker	U - C	129. Harris' Sparrow	Ac - VR
30. Bald Eagle	Ac - R	80. Least Flycatcher	R - C	130. White-crowned Sparrow	R - C
31. Golden Eagle	Ac - VR	81. Olive-sided Flycatcher	VR - R	131. White-throated Sparrow	U - Ab
32. Osprey	R	82. Carolina Chickadee	Ac	132. Fox Sparrow	R - C
33. Peregrine Falcon	VR	83. Bewick's Wren	Ac	133. Lincoln's Sparrow	VR - C
34. Pigeon Hawk	R - C	84. Wood Thrush	U - C	134. Smith's Longspur	Ac - C
35. Saw-whet Owl	Ac - VR	85. Hermit Thrush	U - C	135. Lark Sparrow	Ac - R
36. Sandhill Crane	Ac - VR	86. Swainson's Thrush	U - VC		
37. King Rail	VR	87. Gray-Cheeked Thrush	R - C		
38. Yellow Rail	Ac - R	88. Veery	R - C		
39. Purple Gallinule	Ac - VR	89. Blue-Gray Gnatcatcher	R		
40. Semipalmated Plover	R - C	90. Ruby-crowned Kinglet	R - C		
41. Piping Plover	Ac - VR	91. Water Pipit	Ac - C		
42. American Golden Plover	R - Ab	92. Northern Shrike	Ac - R		
43. Black-bellied Plover	VR - U	93. Loggerhead Shrike	Ac - VR		
44. Ruddy Turnstone	Ac - C	94. White-eyed Vireo	Ac		
45. Common snipe	U - C	95. Solitary Vireo	U - C		
46. Whimbrel	Ac - R	96. Philadelphia Vireo	VR - U		
47. Solitary Sandpiper	U - C	97. Black-and-White Warbler	R - C		
48. Willet	Ac - VR	98. Worm-eating Warbler	Ac		
49. Greater Yellowlegs	U - C	99. Golden-winged warbler	Ac - VR		
50. Lesser Yellowlegs	U - C	100. Tennessee Warbler	U - C		

KEY

Ab. - Abundant	R - Rare
Vc - Very Common	VR - Very Rare
C - Common	Ac. - Accidental
U - Uncommon	

Note: List compiled by the U. S. Bureau of Sport Fisheries and Wildlife.

APPENDIX III

MAMMALS OF THE MAUMEE RIVER WATERSHED

Common Name	Common Name
1. Masked Shrew	23. Silver-haired Bat
2. Short-tailed Shrew	24. Pygmy Bat (Pipistrelle)
3. Least Shrew	25. Indiana Bat
4. Eastern Mole	26. Big Brown Bat
5. Star-nosed Mole	27. Red Bat
6. Eastern Chipmunk	28. Evening Bat
7. Thirteen-lined Ground Squirrel	29. Hoary Bat
8. Southern Flying Squirrel	30. Opossum
9. Eastern Gray Squirrel	31. Woodchuck
10. Eastern Fox Squirrel	32. Cottontail Rabbit
11. Red Squirrel	33. Muskrat
12. Prairie Deer Mouse	34. Raccoon
13. Woodland Deer Mouse	35. Least Weasel
14. Southern Bog Lemming	36. Long-tailed Weasel
15. Meadow Vole	37. Mink
16. Pine Vole	38. Striped Skunk
17. Prairie Vole	39. Red Fox
18. Meadow Jumping Mouse	40. Gray Fox
19. House Mouse	41. Coyote
20. Norway Rat	42. Badger
21. Little Brown Bat	43. White-tailed Deer
22. Eastern Long-eared Bat	44. Beaver

MUSSELS OF THE MAUMEE RIVER BASIN

1. <i>Anodonta imbecilis</i>	24. <i>Actinonaias ligamentina</i>
2. <i>A. grandis grandis</i>	25. <i>Plagiola lineolata</i> ?
3. <i>Anodontoides ferussacianus</i>	26. <i>Obovaria olivaria</i> ?
4. <i>Strophitus undulatus undulatus</i>	27. <i>O. subrotunda</i>
5. <i>Alasmodonta marginata</i>	28. <i>O. retusa</i> ?
6. <i>A. viridis</i> *	29. <i>Truncilla truncata</i>
7. <i>Simpsoniconcha ambigua</i> *	30. <i>T. donaciformis</i>
8. <i>Lasmigona complanata</i>	31. <i>Lapodea fragilis</i>
9. <i>L. costata</i>	32. <i>Potamilus alatus</i>
10. <i>L. compressa</i>	33. <i>Toxolasma parva</i> *
11. <i>Megalonaia gigantea</i> ?	34. <i>T. glans glans</i>
12. <i>Quadrula quadrula</i>	35. <i>Ligumia recta</i>
13. <i>Q. cylindrica</i> X	36. <i>L. nasuta</i> ?
14. <i>Q. pustulosa</i>	37. <i>L. subrostrata</i> ?
15. <i>Amblema plicata</i>	38. <i>Villosa fabalis</i>
16. <i>Eusconaia flava</i>	39. <i>V. iris iris</i>
17. <i>Cyclonaias tuberculata</i>	40. <i>Lampsilis radiata luteola</i>
18. <i>Pleurobema clava</i> X	41. <i>L. ventricosa</i>
19. <i>P. coccineum</i>	42. <i>L. fasciola</i>
20. <i>Elliptio dilatatus</i>	43. <i>Dysnomia triquetra</i> *
21. <i>Unio merus tetralasmus</i> *	44. <i>D. torulosa rangiana</i> *
22. <i>Ptychobranchius fasciolaris</i>	45. <i>Epioblasma perobliqua</i> X
23. <i>Obliquaria reflexa</i>	

List from Clark and Wilson, the Mussel Fauna of the Maumee River (U.S. Bur. Fish. Doc., No. 757: 1-72) (1912)

Corrections by Dr. D. H. Stansbery, Ohio State University, Columbus:

* Should be or have been found in Maumee River - D.H.S.

? May be or may not have been found in Maumee River - D.H.S.

X Currently found in St. Joseph River. All three species are listed as endangered by the Symposium on rare and Endangered Mollusks of the U. S. held at Columbus, Ohio, 1971.

REPTILES AND AMPHIBIANS OF THE MAUMEE RIVER WATERSHED

Common Name	Common Name
1. Mudpuppy	23. Snapping Turtle
2. Jefferson Salamander	24. Stinkpot Turtle
3. Blue-spotted Salamander	25. Spotted Turtle
4. Small-mouthed Salamander	26. Eastern Box Turtle
5. Marbled Salamander	27. Map Turtle
6. Spotted Salamander	28. Midland Painted Turtle
7. Eastern Tiger Salamander	29. Blanding's Turtle
8. Red-spotted Newt	30. Northern Water Snake
9. Red-backed Salamander	31. Blue Racer Snake
10. Four-toed Salamander	32. Northern Water Snake
11. American Toad	33. Queen Snake
12. Fowler's Toad	34. Kirtland's Water Snake
13. Northern Spring Peeper	35. Northern Copperbelly
14. Eastern Gray Tree Frog	36. Eastern Milk Snake
15. Western Chorus Frog	37. Northern Brown Snake
16. Blanchard's Cricket Frog	38. Midland Brown Snake
17. Bullfrog	39. Butler's Garter Snake
18. Green Frog	40. Eastern Ribbon Snake
19. Northern Leopard Frog	41. Eastern Garter Snake
20. Pickerel Frog	42. Black Rat Snake
21. Wood Frog	43. Eastern Hognose Snake
22. Five-lined Skink	44. Eastern Massasauga

Note: List compiled by the U. S. Bureau of Sport Fisheries and Wildlife.

FISH OF THE MAUMEE RIVER BASIN

1. Largemouth Bass	29. Suckermouth Minnow
2. Rock Bass	30. Mooneye
3. Smallmouth Bass	31. Great Lakes Muschellunge
4. White Bass	32. Yellow Perch
5. Bluegill	33. Grass Pickerel
6. Bowfin	34. Northern Pike
7. Bignmouth Buffalo	35. Quillback
8. Black Bullhead	36. Gizzard Shad
9. Brown Bullhead	37. Common Shiner
10. Yellow Bullhead	38. Golden Shiner
11. Carp	39. Mimic Shiner
12. Channel Catfish	40. Redfin Shiner
13. Bigeye Chub	41. Spottail Shiner
14. Creek Chub	42. Steelcolor Shiner
15. White Crappie	43. Brook Silverside
16. Black Crappie	44. Yellow Stonecat
17. Blackside Darter	45. Stoneroller
18. Greenside Darter	46. Northern Hog Sucker
19. Johnny Darter	47. Northern Shorthead
20. Freshwater Drum	48. Redhorse Sucker
21. Longnose Gar	49. Greater Hognose Suck
22. Goldfish	50. Spotted Sucker
23. Logperch	51. White Sucker
24. Brindled Madtom	52. Green Sunfish
25. Tadpole Madtom	53. Longear Sunfish
26. Bluntnose Minnow	54. Orangespotted Sunfish
27. Fathead Minnow	55. Pumpkinseed Sunfish
28. Silverjaw Minnow	56. Blackstripe Topminnow

Note: List compiled by the U. S. Bureau of Sport Fisheries & Wildlife

APPENDIX IV

SUMMARY OF STREAM FLOW AND FLOW-DURATION ON MAIN STEM OF MAUMEE RIVER IN OHIO Based on Gaging Station Records

Map Sta. No.	Stream and Location	County	Drainage Area sq. mi.	Years of record and period included	*Average Discharge	
					cfs/ sq. mi.	inches
16	Maumee River at Antwerp	Paulding	2,049	30 - 1922-35 1940-55	.781	10.60
35	Maumee River near Defiance	Defiance	5,530	26 - 1926-35 1940-55	.718	9.75
37	Maumee River at Waterville	Lucas-Wood	6,314	30 - 1922-35 1940-55	.714	9.69

Map Sta. No.	Stream and Location	County	Minimum Discharge cfs/sq mi	Percent of time Discharge equalled or exceeded in cfs/sq/mi			*Percent of time mean annual discharge equalled or exceed
				10	50	90	
16	Maumee River at Antwerp	Paulding	.012	2.12	.300	.073	27.5
35	Maumee River near Defiance	Defiance	-	1.83	.203	.037	26
37	Maumee River at Waterville	Lucas-Wood	.005	2.09	.201	.039	26.5

*From records adjusted to normal period 1921-45 unless otherwise noted.

APPENDIX V
SELECTED SIGNIFICANT
HISTORICAL ASSETS
OF THE MAUMEE RIVER
STUDY AREA

<u>HISTORIC PROPERTY</u>	<u>LOCATION</u>	<u>SIGNIFICANCE</u>
<u>OHIO</u>		
Columbian House	Waterville	NRHP
Dix (William B.) Home	Maumee	OHP
Fallen Timbers Battlefield	2 miles west of Maumee	NRHP-NHL
Fort Defiance Site	Defiance	OHP
Fort Miami Site	Maumee	OHP
Fort Meigs	Southwest of Perrysburg	NRHP-NHL
House of Four Pillars (Where Theodore Dreiser wrote Sister Carrie)	Maumee	OHP
Hull Wolcott House	Maumee	NRHP
Interurban Electric Railway Bridge	Waterville	NRHP
Maumee Sidecut Locks	Maumee	NRHP
Old Wood County Jail	Perrysburg	NRHP
<u>INDIANA</u>		
Birthplace of Carol Lombard	Ft. Wayne	S-L
French Hanna & Co. Mill Building (last water powered mill building in area)	Ft. Wayne	L
Grave of John Chapman (Johnny Appleseed)	Ft. Wayne (Parnell Avenue & St. Joseph R.)	S-R
Hedekin House (1843) (early canal tavern)	613 Barr Street, Ft. Wayne	S-L
Maumee Wabash Portage	Ft. Wayne	S
Sites of American Forts Waynes Fort (1794) Hunts Fort (1801)	Ft. Wayne	S-L
Site of 1st French Fort (1720)	Ft. Wayne at St. Marys R.	S-L
Site of 2nd French Fort (1750)	Ft. Wayne	S-L
Spencerville Covered Bridge	Spencerville at St. Joseph River	L
Wabash & Erie Canal Right-of- Way (1832-1874)	Ft. Wayne	S-R

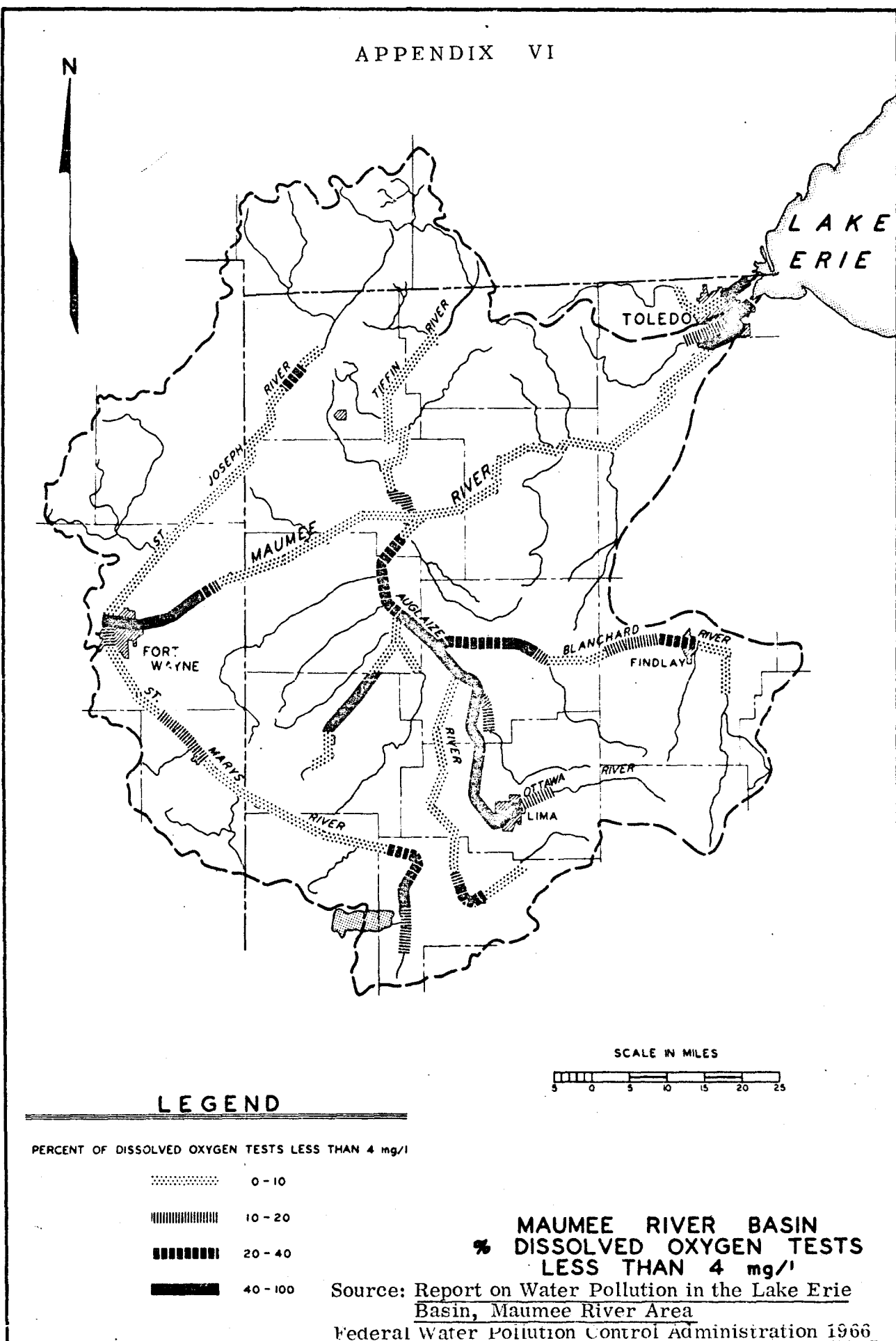
NRHP - Listed in National Register of Historic Places

NHL - National Historic Landmark

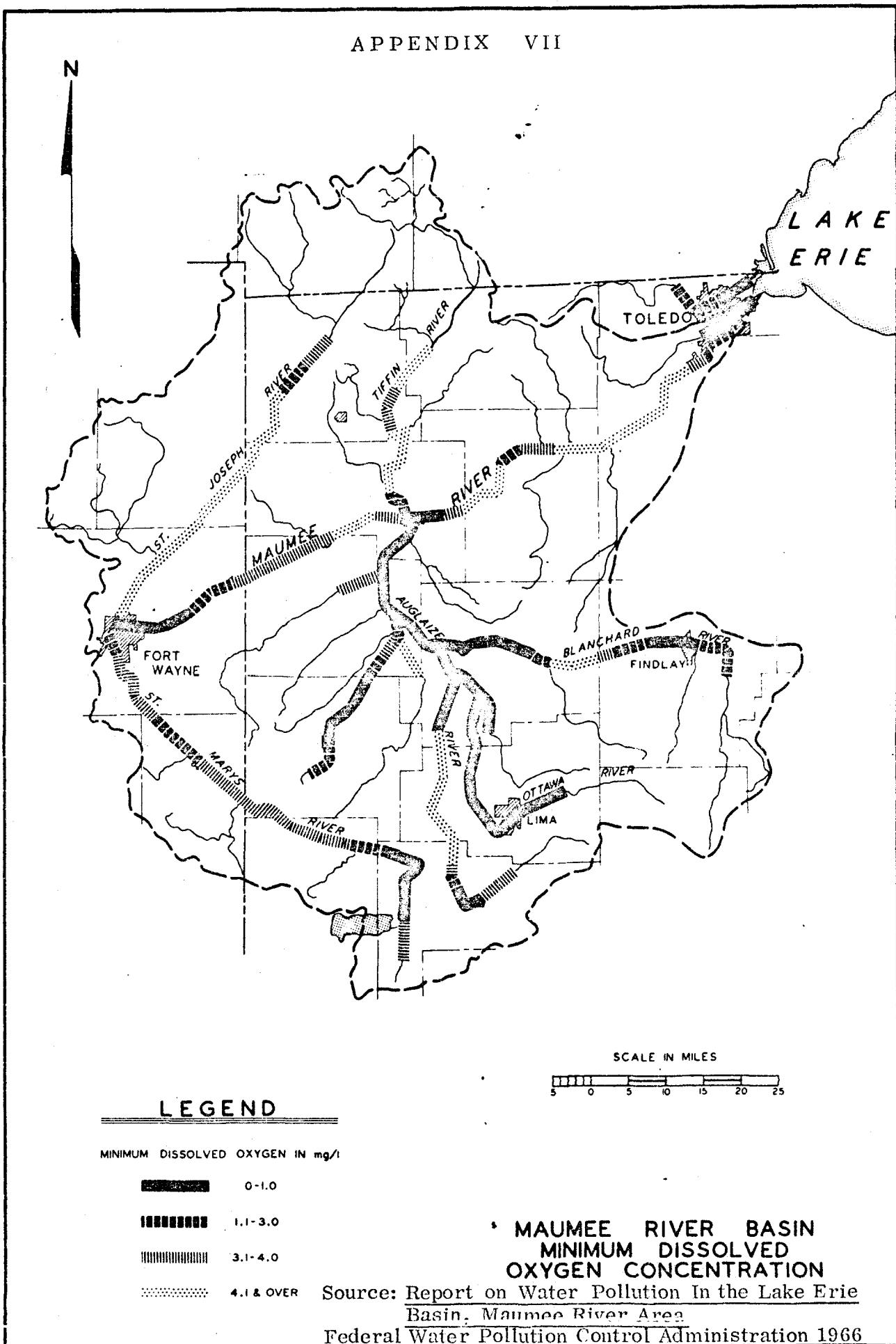
OHP - Listed in Ohio Historic Preservation Plan

S,L,R - State, local, or regional significance

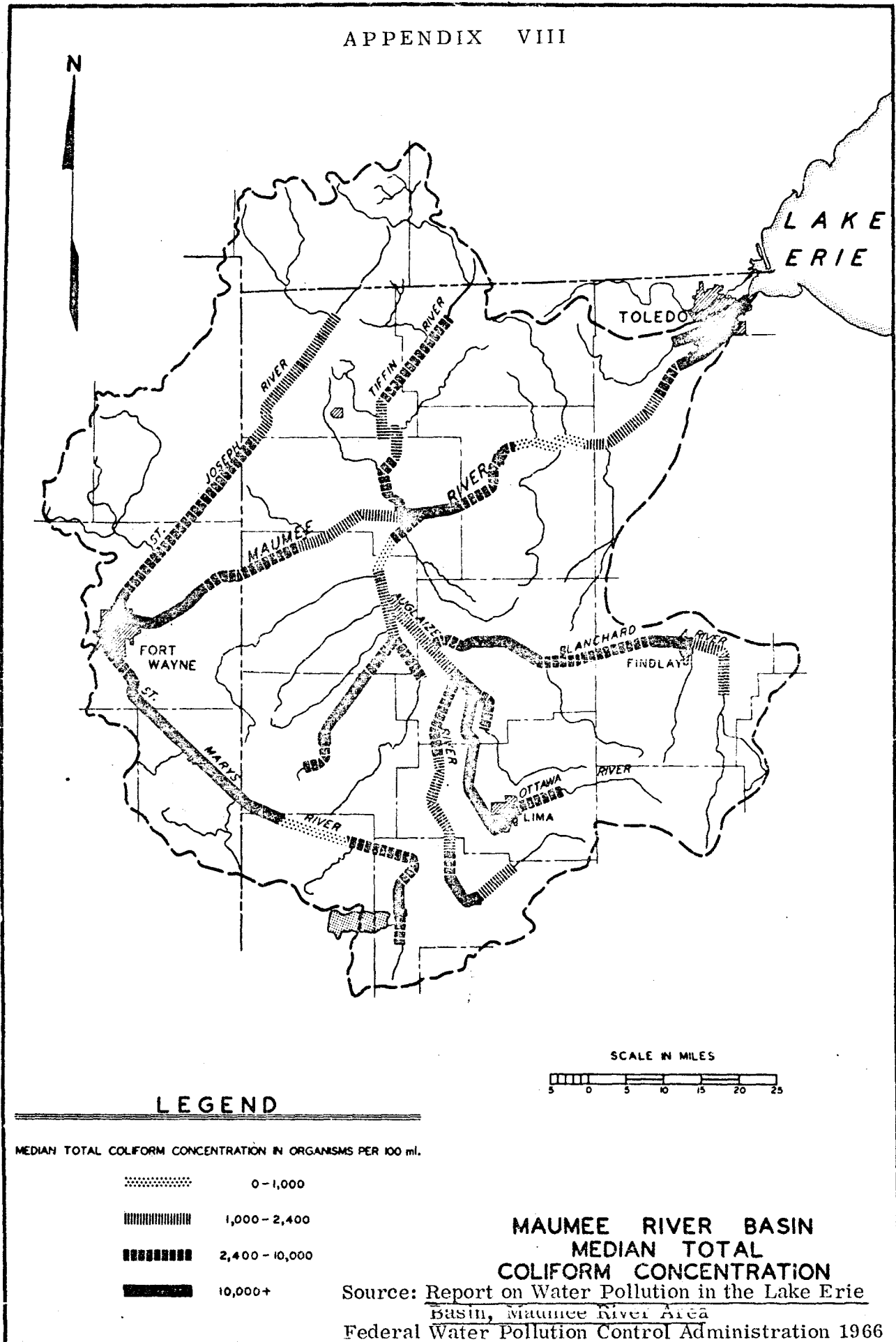
APPENDIX VI



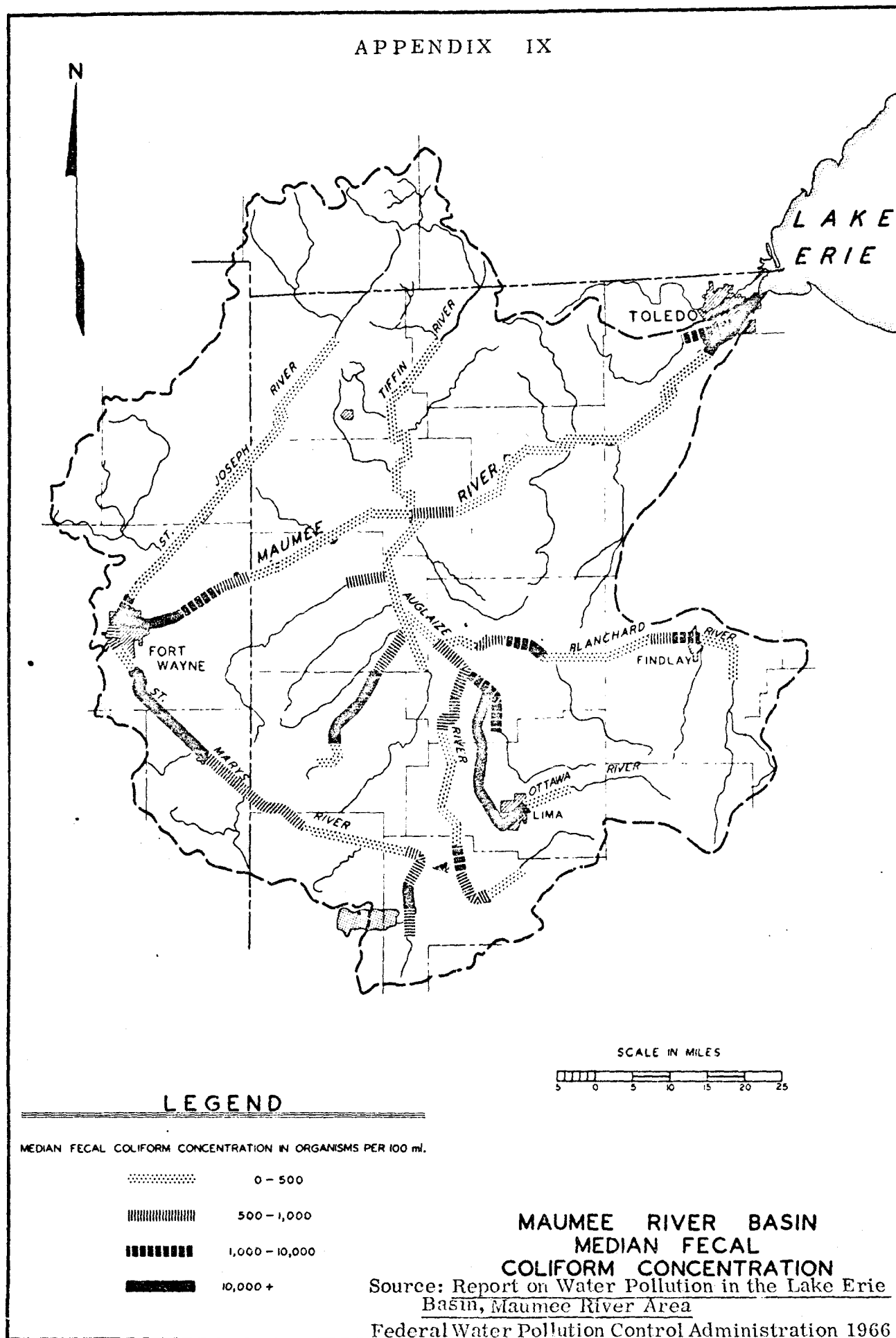
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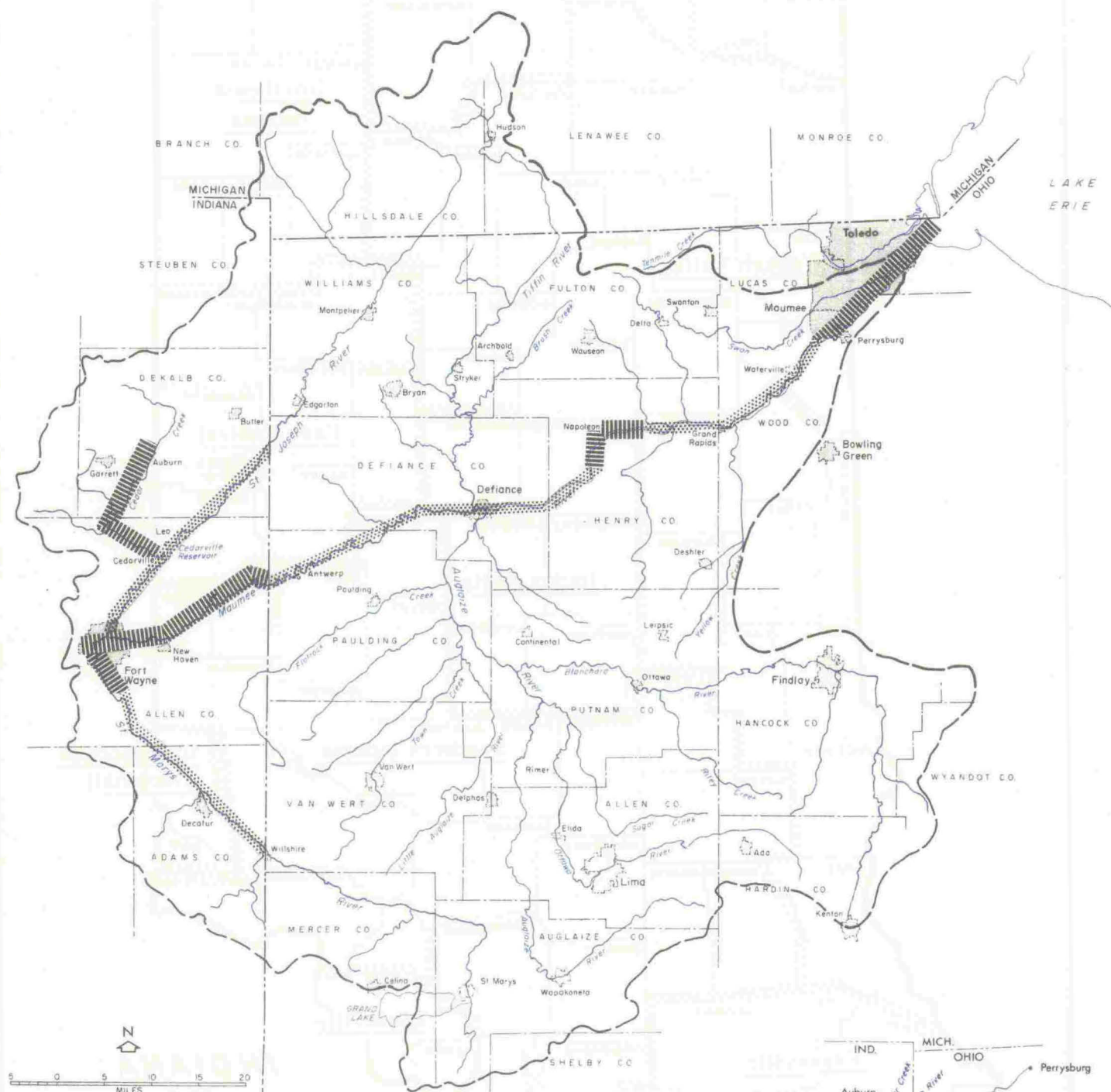


APPENDIX VIII



APPENDIX IX

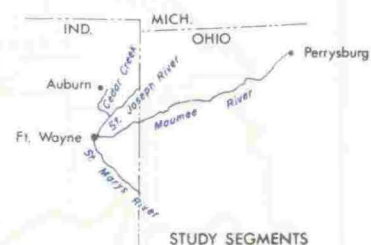


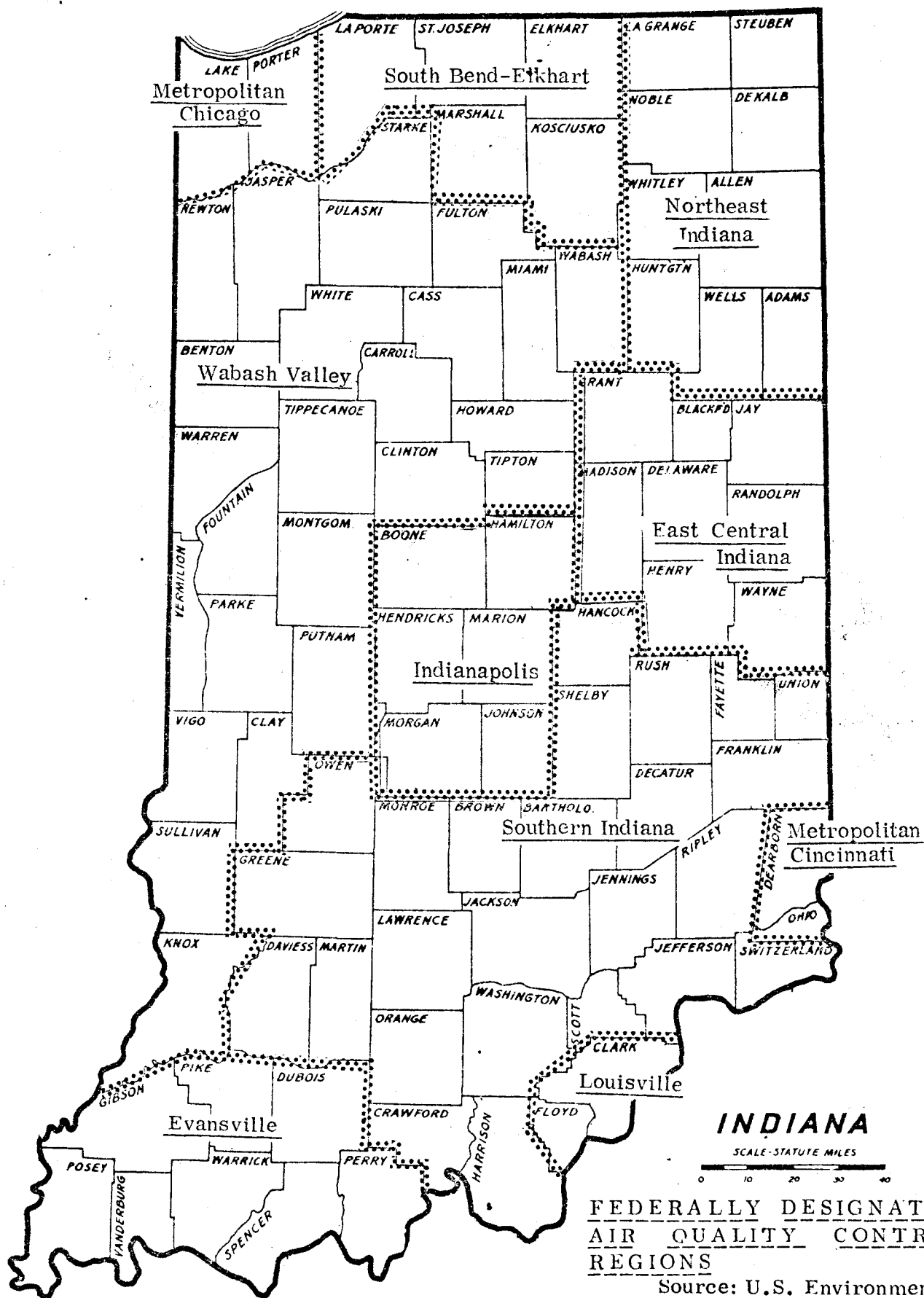


MAUMEE RIVER BASIN
Stream Classifications

-  Effluent Limited Segment
-  Water Quality Limited Segment

Source: Great Lakes & Illinois
River Basin Project
Federal Water Pollution
Control Administration







**FEDERALLY DESIGNATED
AIR QUALITY CONTROL
REGIONS**

Source: Ohio Department
of Health

APPENDIX XIII

CITY UTILITIES - FILTRATION PLANT
CITY-COUNTY BUILDING
ONE MAIN STREET
FORT WAYNE, INDIANA 46802

CEDAR CREEK TEST RESULTS

DATE COLLECTED	TOTAL ALKALINITY mg/l as CaCO ₃	NONCARBONATE HARDNESS mg/l as CaCO ₃	TOTAL HARDNESS mg/l as CaCO ₃	THRESHOLD ODOR NUMBER	SURFACTANTS (MBAS) mg/l	TOTAL COLIFORM MPN INDEX PER 100 M
1/3/72	170	210	380	-	0.28	10,900
2/7/72	284	148	432	17	0.17	1,300
3/6/72	224	166	390	12	0.21	--
4/3/72	208	154	362	8	0.12	490
5/1/72	208	134	342	17	--	14,100
6/5/72	276	122	398	24	0.12	2,300
7/3/72	302	100	402	17	0.08	2,780
8/1/72	286	108	394	17	0.12	3,300
9/1/72	298	84	382	12	0.11	940
10/2/72	226	109	335	12	0.11	7,900
11/1/72	248	110	358	24	--	1,300
12/4/72	238	102	340	17	0.08	3,300
1/3/73	176	80	256	17	--	5,420
2/5/73	190	89	279	12	0.07	10,900
3/1/73	260	103	363	17	0.12	2,300
4/2/73	190	74	264	17	0.15	24,000
5/1/73	229	75	304	17	0.13	10,900
6/5/73	114	46	160	50	0.17	240,000
7/2/73	--	--	--	24	0.14	--

Sampling Location: Indiana State Road (Leo Road) and Cedar Creek near Cedarville, Indiana

APPENDIX XIV
WATER QUALITY DATA FOR CEDAR CREEK TAKEN BY EPA SAMPLING CREWS

	<u>Station Location</u>		
	<u>*Cedarville Bridge</u>	<u>Cedar Canyon Road Bridge</u>	<u>DeKalb-Allen</u>
Date	8/21	8/21	8/21
Time	12:30 p.m.	11:40 a.m.	12:04 p.m.
Fecal Coliforms**	18,000/100ml	6,500/100ml	6,700/100ml
DO ppm	6.3	4.6	6.4
Lab PH	7.4	7.6	7.2
Conductivity	240	240	350
Sulfates mg/l	37	41	75
BOD ₅ mg/l	3.0	6.0	4.0
Nitrate-Nitrate nitrogen as nitrogen mg/l	2.43	2.38	1.98
(Ammonia) as nitrogen mg/l	0.10	0.11	0.11
mg/l total kjeldahl nitrogen	2.2	2.6	1.4
mg/l chlorides	13	14	32
mg/l cyanides	.01	.01	.01
total phosphorus mg/l	.401	.365	.306
ug/l cadmium	10	10	10
ug/l chromium	25	20	20
ug/l copper	20	20	20
ug/l lead	50	50	50
ug/l zinc	70	70	80
Phenols***	--	--	--

* At the time of this sampling the USGS gauge at the St. Rt. 427 bridge showed 3.07 or 456 cfs.

** Recorded 2-3 days after a heavy rain and believed to be due to the runoff of livestock wastes

*** Phenols were not measured.