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LOWER WISCONSIN RIVER, WISCONSIN WILD AND SCENIC RIVER STUDY

MESSAGE

FROM

THE PRESIDENT OF THE UNITED STATES

TRANSMITTING

A REPORT ON THE LOWER WISCONSIN RIVER IN WISCONSIN, PURSUANT TO SECTION 4(a) OF THE WILD AND SCENIC RIVERS ACT, AS AMENDED

OCTOBER 5, 1979.—Message and accompanying papers referred to the Committee on Interior and Insular Affairs and ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1979

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TO THE CONGRESS OF THE UNITED STATES:

In my Environmental Message of August 2, 1979, I proposed legislation to add a number of rivers and trails to the National Wild and Scenic Rivers and National Trails Systems.

Enclosed are reports and draft legislation that would add the following three river segments to the National Wild and Scenic Rivers System as federally administered components:

-- Gunnison River, Colorado

-- Encampment River, Colorado

-- Priest River, Idaho

I am reaffirming my support for designation of a segment of the Illinois River in Oregon for which legislation was submitted to the Congress last year. I am also reaffirming my support for the following four river segments proposed in my last Environmental Message for inclusion in the System:

-- Bruneau River, Idaho

-- Dolores River, Colorado

-- Upper Mississippi River, Minnesota

-- Salmon River, Idaho

In addition, I am transmitting to you new study reports on eight rivers which have been found to qualify for inclusion in the National Wild and Scenic Rivers System as State-administered components. Each of the States in which the rivers are located has expressed an interest in administering these rivers as components of the national system. The rivers are:

-- Pine Creek, Pennsylvania

-- Buffalo River, Tennessee

-- Youghiogheny River, Pennsylvania-Maryland

-- Shepaug River, Connecticut

-- Kettle River, Minnesota

-- Lower Wisconsin River, Wisconsin

-- Housatonic River, Connecticut

-- Illinois River, Oklahoma

In my 1977 Environmental Message, I proposed 20 additional river segments for study as potential additions to the National Wild and Scenic Rivers System. Several of those rivers have already been designated. Except for rivers where subsequent development has affected the river's qualification for designation, I continue to support legislation authorizing the study of these rivers. Moreover, I am submitting legislation to add the North Umpqua River in Oregon to the list of those rivers to be studied.

In order to assist full congressional deliberation on the proposed Upper Mississippi Wild and Scenic River, I have directed the Secretary of the Interior to complete, with full public participation, a conceptual master plan for the river which will set forth the specific requirements for lands or interests in lands to protect the river corridor and provide public access, campgrounds and other recreational facilities. This is to be completed by April 1980.

My recent Environmental Message also contained a number of proposals relating to the National Trails System. The system is still in its fledgling stage and should be expanded to meet widespread public interest. With this objective in mind, I have directed the Federal land managing agencies to enlarge the National Recreation Trails System. In addition, I am transmitting the study report and legislation to designate the 513-mile Natchez Trace National Scenic Trail through Tennessee, Alabama and Mississippi. I am also resubmitting proposed legislation to establish the Potomac Heritage Trail through Pennsylvania, Maryland, West Virginia, Virginia and the District of Columbia. Furthermore, I am reaffirming my support for the enactment of legislation to create the North Country Trail from the State of New York to North Dakota. Legislation to create this 3,200-mile trail has already passed the House of Representatives in the form of H.R. 3757.

Finally, I am transmitting a report from the Secretary of the Interior recommending that a 13.6-mile segment of the Big Thompson River in Colorado not be added to the National Wild and Scenic Rivers System. This river segment is located entirely within the Rocky Mountain National Park and is managed and protected by the National Park Service. Further, approximately 80% of this 13.6-mile river segment is in a wilderness proposal now before the Congress. Therefore, I believe that the protection afforded by the National Wild and Scenic Rivers Act is unnecessary.

I urge that the Congress promptly act on my recommendations in order to protect these rivers and trails for the recreational and aesthetic enjoyment of all Americans.

Jimmy Carter

THE WHITE HOUSE,
October 2, 1979

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

The President
The White House
Washington, D.C. 20500

SEP 14 1979

Dear Mr. President:

We take pleasure in transmitting our reports on the Housatonic and Shepaug Rivers in Connecticut, the Kettle River in Minnesota, and the Lower Wisconsin River in Wisconsin. The reports and our recommendations are in response to the provisions of the Wild and Scenic Rivers Act, Public Law 90-542, as amended, which designated these rivers for study as potential components of the National Wild and Scenic Rivers System.

The studies were conducted by field task forces composed of representatives of Federal, State and local agencies, or organizations having programs involving the rivers or special interest in their values.

The studies found that 41 miles of the 51 miles of the Housatonic River studied qualified for inclusion in the National System as do 26 miles of the Shepaug, 58 miles of the Kettle River, and 82.4 miles of the Lower Wisconsin River.

In accordance with the wishes of the local communities, the reports on the Housatonic and Shepaug propose that those rivers be protected by local and State actions. The Heritage Conservation and Recreation and National Park Services in this Department are working with local interests to develop management plans for the two rivers which will protect their national, cultural, and historic values.

The State of Minnesota has designated the portion of the Kettle River covered by our report as a unit of the State's Wild and Scenic Rivers System and has developed a management plan for the river. Accordingly, we propose State administration of the river.

Approximately 40 percent of the Lower Wisconsin River area is in public ownership including State parks, wildlife areas and public access sites or controlled by scenic easements. In addition, the natural characteristics of the area in the form of steep bluffs, marshes, sloughs and frequently inundated flood plains provide a high degree of protection to the area. These factors, together with the State Natural Resources Board's interest in developing the multiple recreation values of the area, support our proposal that the area be protected by State and local initiatives.

If any of these States finds it desirable at some future date to add its rivers to the National System, we would be pleased to consider applications for such designation under the provisions of Section 2(a)(ii) of the Wild and Scenic Rivers Act, as amended.

It is recommended that the reports be transmitted to the Congress in compliance with Section 5(a) of the Act.

Sincerely,

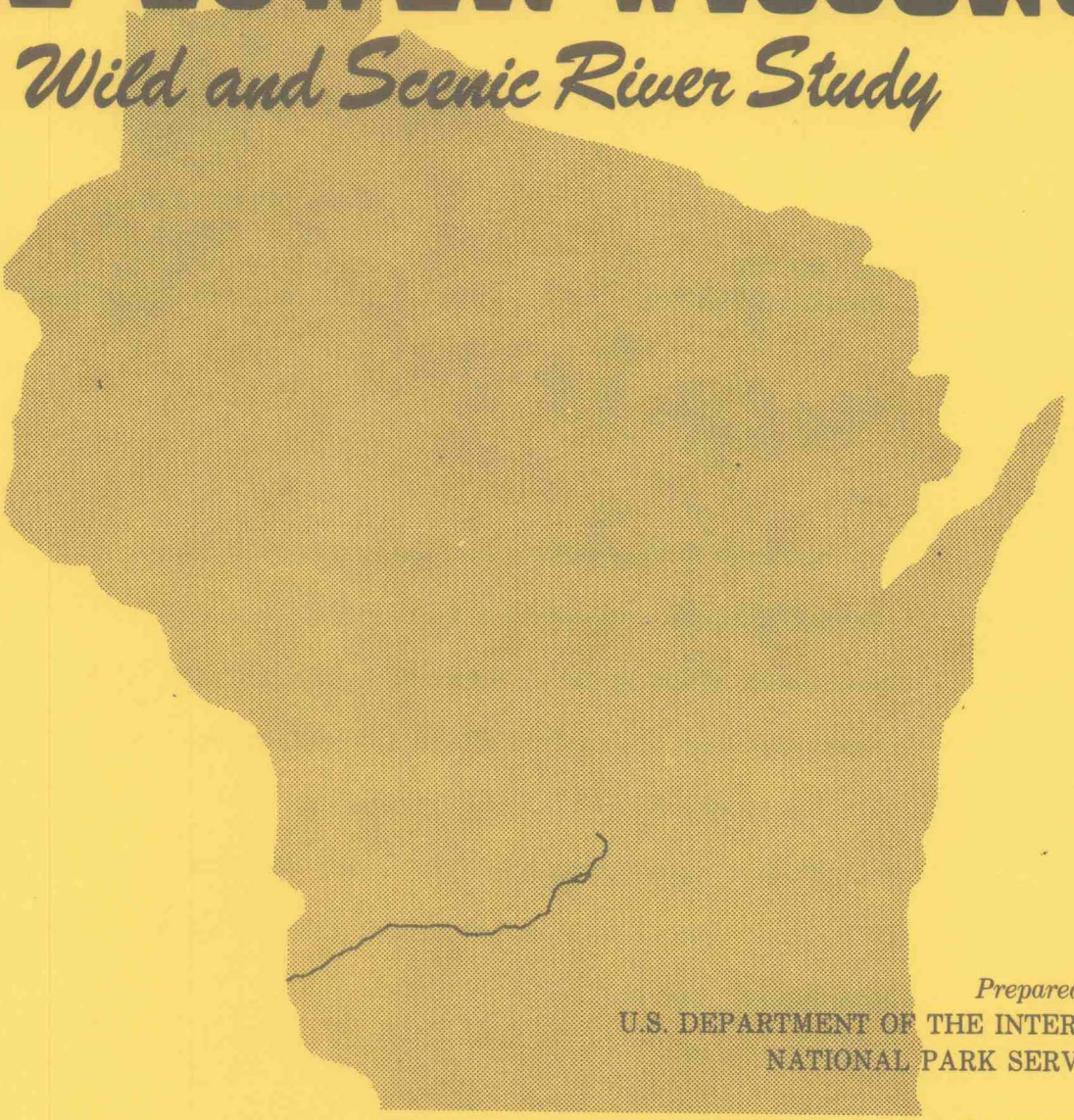
Cecil D. Andrus

SECRETARY

Enclosures

THE LOWER WISCONSIN

A Wild and Scenic River Study



Prepared by:
U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
and
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FOREST SERVICE

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U.S. DEPARTMENT
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NATIONAL PARK SERVICE
WILLIAM J. WHALEN, DIRECTOR

U.S. DEPARTMENT
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FOREST SERVICE
JOHN R. McGUIRE, CHIEF

The Heritage Conservation and Recreation Service (formerly Bureau of Outdoor Recreation) was the Department of Interior Co-chairman and with the USDA Forest Service, conducted field investigations for this study which drafted the initial report. Following a reassignment of the study in March of 1978, the report was completed and printed by the USDA Forest Service.

THE LOWER WISCONSIN RIVER

A WILD AND SCENIC RIVER STUDY

JANUARY 1979

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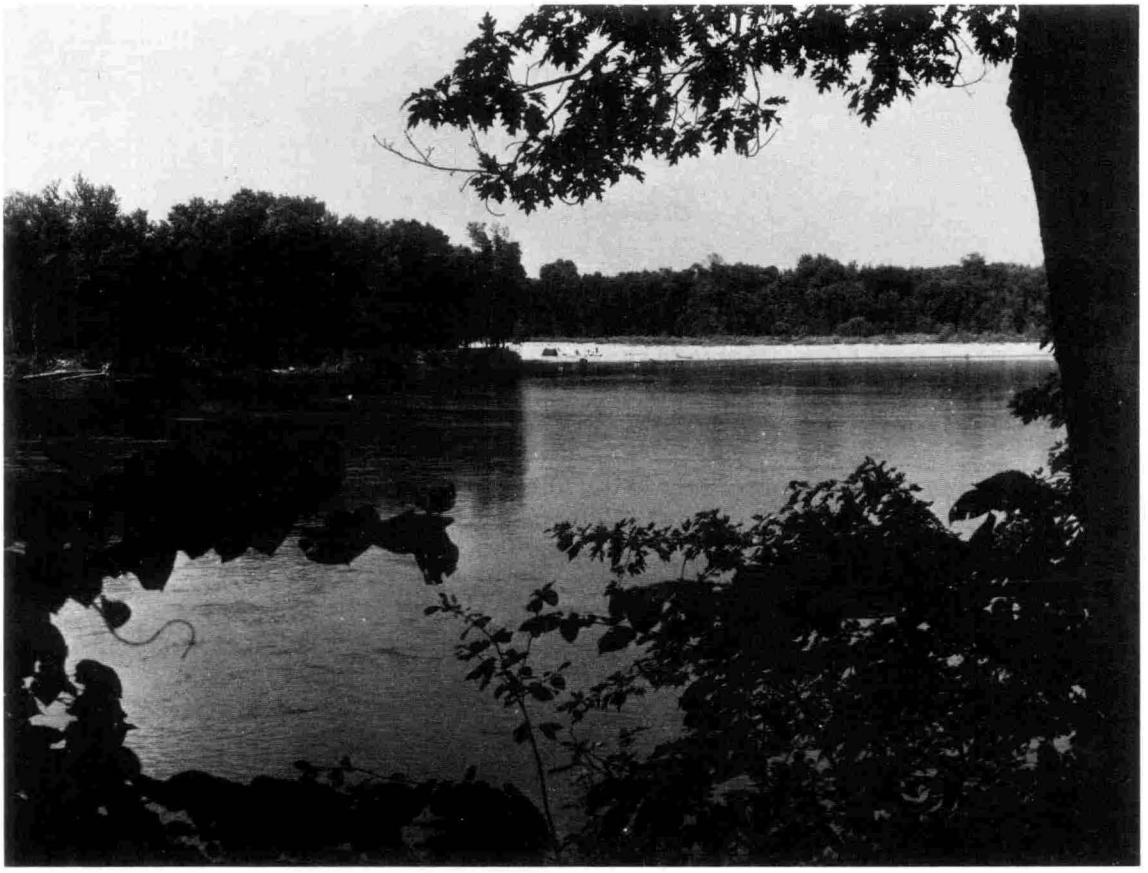


". . . Rich alluvial bottoms heavily timbered extended along the river in which are seen great grape vines interlacing their branches in the fangs of the prickly ash. . . Here and there stand the huge oak thickening the shade. The water contains a multitude of fish. Thousands of duck swim in the water in thoughtless security, while the wild geese, more intent on safety, sit furtherest in the stream. . . I'm listening now to the songs of thousands of birds in the branches. . ."

J. E. Forester letters from
Helena, Wisconsin, circa 1840.
Source: Manuscript Department,
State Historical Society.

I. INTRODUCTION

Purpose

To some, the Wisconsin River is the Nation's "hardest working river." To others, it is a favorite memory of a quiet place to fish, swim, or contemplate the varied wildlife attracted to its wide shores and scattered islands. It is a remarkable river--remarkable in that it pushes the turbines of 26 hydroelectric power dams in its upper reaches yet maintains a serene, natural appearance for most of its length below the Prairie du Sac dam.

Congress passed the National Wild and Scenic Rivers Act, P.L. 90-542, in 1968. 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, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes."

The Act established the National Wild and Scenic Rivers System, designated eight rivers as initial components of the system, and prescribed methods and standards by which additional rivers could be added to the system from time to time.

On January 3, 1975, P.L. 93-621 added 29 rivers, including the lower 90.5 miles of the Wisconsin from Prairie du Sac to its confluence with the Mississippi, to be studied as provided under the Act. The Act calls for a study to determine the suitability of the lower Wisconsin River for inclusion in the National System and, if it qualifies, recommendations and guidelines pertaining to the administration and management of the river environment.

STUDY LOCATION

"It is very wide . . . It has a sandy bottom which forms various shoals that render navigation difficult. It is full of islands, covered with vines."

Pere Marquette
1673

"We always had plenty; our children never cried from hunger . . . furnished with an abundance of excellent fish, and the land being very fertile never failed to produce good crops of corn, beans, pumpkins, and squashes . . . Here our village stood for more than a hundred years during all of which time we were the undisputed possessor of the Mississippi valley . . . If a prophet had come to our village in those days and told us that these things were to take place which have since come to pass, none of our people would have believed him."

Blackhawk (Ma-ka-tai-me-she-kai-tuck),
Chief of the Sauk and Fox
McLuhan, 1972.

Background

The lower reaches of the Wisconsin River have long been recognized for their outstanding wildlife production and opportunities for recreation. The State's first acquisition took place in 1948 when more than 1,100 acres were purchased for the Mazomanie unit of the Lower River Wildlife Areas. During the late 1940's and 1950's there were numerous proposals for purchase, easement, and expansion from resource managers, sportsmen,

and conservation clubs. Acquisition programs escalated during the mid-60's and 70's. Currently about 24,000 acres are controlled under the Lower Wisconsin River Wildlife Areas in either fee simple or easements with approximately 28 miles of riverfront under control. These areas provide for a variety of low density recreation uses. In addition to extensive hunting and fishing, the area is used for nature study; gathering of nuts, berries, and mushrooms; hiking; camping; and driving for pleasure.

The Wisconsin State Comprehensive Outdoor Recreation Plan (SCORP) includes as one of its priority actions and recommendations "recognition of the Wisconsin River's recreation potential and protection of its shoreline uplands." The Wisconsin Department of Natural Resources initiated a study of the lower Wisconsin as a possible recreation area; however, this study was deferred pending completion of the Federal river study.

Conduct of Study

The Federal study, launched in April 1975, was a joint effort of the U.S. Department of Agriculture and the U.S. Department of the Interior represented by the Forest Service and the Bureau of Outdoor Recreation, respectively. A group of study associates representing various private, State, and Federal agencies provided valuable input in collecting and interpreting data. Agencies represented included the National Park Service, Bureau of Land Management, Geological Survey, Soil Conservation Service, Fish and Wildlife Service, Environmental Protection Agency, Wisconsin Department of Natural Resources, University of Wisconsin, and Wisconsin Power and Light.

Public information meetings were held June 2 and 3, 1975, in Spring Green and Boscobel, respectively. The purpose of the meetings was to explain the nature and purpose of the study and to invite comments from interested parties anytime during the course of the study. Following the initial public information meetings, the study team conducted field trips along the river and surrounding area gathering the necessary background material for preparation of the evaluation report.

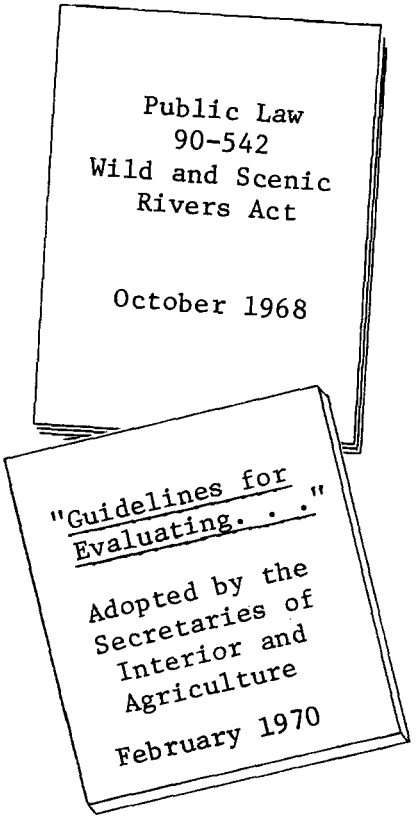
During late summer and early fall of 1975, the University of Wisconsin-Extension publicized the study via local radio stations and newspapers. This was complemented by a field survey to gain the reactions of people living in the counties bordering the river. The survey indicated that many people were either unaware of the study or uncertain as to its purpose. Of those with opinions concerning inclusion of the river in the National System, those persons residing in or adjacent to the study corridor were more likely to oppose inclusion than those living outside it.

A second set of public meetings was held April 20 and 21, 1976, to present the findings of the study and discuss possible management alternatives regarding the future of the Wisconsin. The meetings were well attended, with representatives of both supporting and opposing views

present. Most persons present expressed a concern that the river's natural qualities be preserved or upgraded. They expressed a desire for additional support facilities such as restrooms and for better maintenance through trash removal; however, many landowners did not see a need for controls beyond existing floodplain and shoreland management programs. Others felt that some control would be necessary to accommodate increasing use by assuring police protection, fish and wildlife management, and facility maintenance. The comments and suggestions offered at these meetings, or through correspondence, were carefully considered and served an important role in the subsequent development of a recommended course of action.

Eligibility Determination and Classification Procedure

The first basic task outlined for the Wisconsin River study in the Wild and Scenic Rivers Act was to determine whether or not the river reaches met the eligibility criteria for either wild, scenic, or recreational river areas as set forth in the Wild and Scenic Rivers Act and the Guidelines for Evaluating Wild, Scenic, and Recreational River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System as Adopted by the Secretaries of the Interior and Agriculture. In other words . . . .



COULD THEY QUALIFY FOR THE NATIONAL SYSTEM?

ELIGIBILITY CRITERIA

- FREE - FLOWING CONDITION
- ACCESSIBILITY
- SHORELINE DEVELOPMENT
- WATER QUALITY
- SCENIC QUALITY
- FISH AND WILDLIFE VALUES
- RECREATION POTENTIAL
- GEOLOGIC FEATURES
- CULTURAL AND HISTORICAL VALUES

In addition to these general requirements, every wild, scenic, or recreational river in its freeflowing condition or upon restoration to this condition shall be considered eligible for inclusion in the National Wild and Scenic Rivers System and, if included, shall be classified, designated, and administered as one of the following:

1. Wild river areas--Those areas or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

2. Scenic river areas--Those rivers or sections of rivers that are free of impoundments with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible.

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

In arriving at a finding of eligibility and stream classification, the study team had to exercise its judgment, not only for each of the eligibility criteria as they applied to a particular segment of a river but on the river system as a whole, and to evaluate the combined effect of all criteria. It should be understood that the criteria are not absolutes. There is no way the criteria can be written so as to automatically indicate which rivers are eligible and what class they must be. Accordingly, the entire river system and its immediate land area were considered as a unit, with primary emphasis upon the quality of the experience and overall impressions the public would receive while using the river.

II. SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Findings

Important findings of the study team include the following:

Portions of the lower Wisconsin River study area contain shoreline which appears primitive and remote from man's influence.

Stream segments which qualify for inclusion in the National System are in a free-flowing condition, are of sufficient length to provide a meaningful experience, and display a scenic character of exceptionally high quality.

Approximately 23.4 million people live within 250 miles of the lower Wisconsin River, but only about 429,000 live within the six counties bordering the study segment. Two-thirds of these live in Dane County alone.

Major highways provide good access to the river.

Present water quality of the lower 82.4 miles of the river is adequate for partial body contact activities which are primarily fishing, canoeing, and boating. Water quality generally is not acceptable for whole body contact but is expected to improve to meet established State standards. Water quality is adequate to support the propagation of the fish, other aquatic life, and wildlife which normally are adapted to the habitat of the stream.

There are no problems of air pollution in the study area.

The study area provides excellent habitat for an impressive array of fish and wildlife species. Eighty-four species of fish have been recorded in the lower Wisconsin. Forty-seven species of mammals have been recorded and a total of 230 species of birds use the area on an annual basis. The area near Ferry Bluff is a winter roosting area for the northern bald eagle. Reptiles and amphibians are plentiful with the two classes represented by 41 different species.

Vegetation along the river is diverse and, for much of the shoreline, provides ample screening against man's influence on the landscape. Approximately 148 species of trees, wildflowers, and other plants have been identified.

Sites of historical interest along the river include the old shot tower at Tower Hill State Park; Frank Lloyd Wright's home, Taliesin, a National Historic Landmark; and Wyalusing State Park, which includes a National Natural Landmark.

Nature provides a considerable amount of protection from man's intrusion in the form of steep bluffs, marshes, sloughs, and extensive lengths of floodplain which are inundated almost annually. These areas have changed little since presettlement time.

Water levels are subject to wide fluctuations, both seasonally and daily. Boating and canoeing are frequently hampered in late summer due to low water. The last hydroelectric dam on the river, at Prairie du Sac, may cause a two-foot variation in water levels within hours. Although moderating with distance from the dam, this effect still is felt far downstream.

Approximately 28 miles of shoreline are already in public ownership including State parks, wildlife areas, and various public access sites. Approximately nine miles, mostly on the north shore, are controlled by scenic easements associated with State Highway 60.

The lower Wisconsin River and related shoreland are used extensively for a wide variety of recreational uses, including hunting, fishing, nature study, boating, canoeing, swimming, camping, and pleasure driving, and use is increasing rapidly.

There are no water resources projects presently planned on those portions of the lower Wisconsin River recommended for inclusion in the National System. However portions of the area recommended for inclusion have been identified as suitable primary sources of water for future steam electric generating facilities.

Although portions of the lower Wisconsin River and its surrounding environment have remained essentially natural and scenic in character, the study team also found several factors which presently or potentially endanger those qualities. These include the following:

1. Water quality, while generally acceptable for partial body contact recreation activities, is being degraded by pollutants from Lake Wisconsin; effluent from several municipal treatment plants and dairy product processing plants, shoreline homes and cottages; and agricultural run-off.

2. Streambank erosion is a problem. The probable primary cause is through natural conditions, but the river level fluctuations caused by the Wisconsin Power and Light dam at Prairie du Sac contribute to the problem. Although the waters immediately below the dam are stained by tannic acid, they are generally clear because the river has dropped its sediment load in Lake Wisconsin; in its lower reaches the river has again become very turbid due to stream bank erosion and sediment laden discharges from tributaries.

3. In places, recreational cottages and mobile home parks continue to encroach on the shoreline and islands. Some of

this development is unattractive and detracts from the scenic qualities of the river. For three miles immediately downstream of the Prairie du Sac dam, the twin cities of Prairie du Sac and Sauk City have their back doors to the riverbank.

4. There are 14 powerline, seven highway, and three railroad bridge crossings of the river in the study stretch considered eligible for inclusion in the National System. In places the riverbank is closely paralleled by roads.

5. Recreational use of the river combined with a lack of adequate facilities and management accountability causes some problems of litter and trespass along the river.

6. Increases in the foregoing activities in the areas identified in this report and/or additional locations could occur. In addition, other types of development that would not be compatible with a scenic or recreational river might also occur.

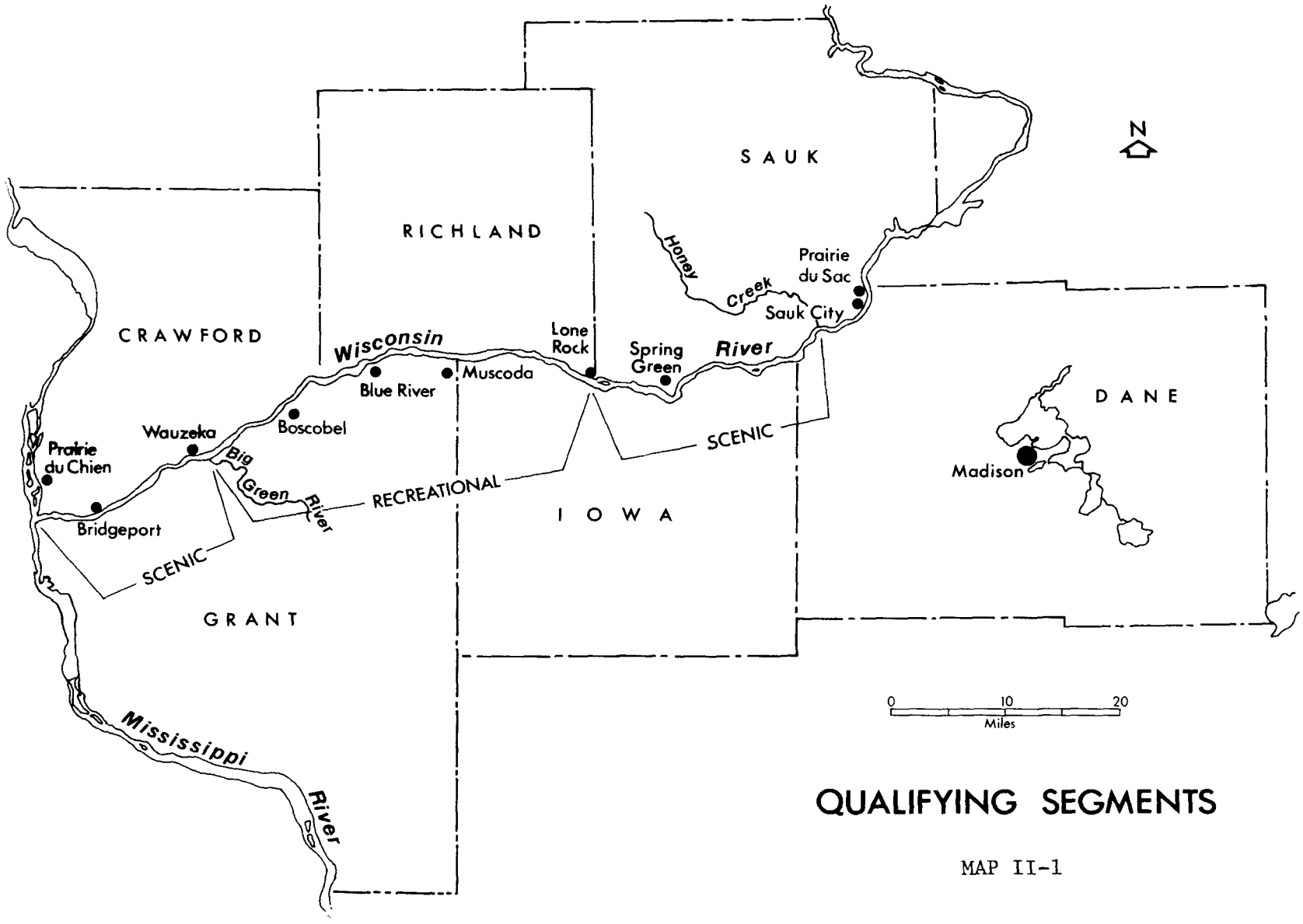
Conclusions

It is concluded that a total of 82.4 miles of the lower Wisconsin River possess outstandingly remarkable scenic, recreational, fish and wildlife, historic, cultural, or geologic values, and that the river and its immediate environment should be protected for the benefit and enjoyment of future generations. The following stream segments totaling 43.4 miles meet the criteria for "scenic" river classification as defined in the Wild and Scenic Rivers Act and in the supplementary criteria developed by the Secretaries of the Interior and Agriculture:

First Scenic Segment (24.7 Miles)	From Honey Creek (County Road Y on the southern bank) to the State Route 130 highway bridge crossing at Lone Rock.
Second Scenic Segment (18.7 Miles)	From Big Green River to the river's mouth at the Mississippi River.

The stream segment from Lone Rock to the confluence of the Green and Wisconsin Rivers meets the criteria for "recreational" river classification. This is a distance of approximately 39 miles.

The stream segment from the Wisconsin Power and Light Dam at Prairie du Sac to Honey Creek (8.1 miles) was found not to qualify for inclusion in the system due to questionable water quality and extensive development--the "back doors" of Prairie du Sac and Sauk City, two highway and one railroad bridge crossings, and shoreline development immediately above County Road Y.



QUALIFYING SEGMENTS

MAP II-1

Recommendations

In order to preserve the lower Wisconsin River in its free-flowing state, to protect and enhance the outstanding natural and scenic values of the river environment, and to assure these values are available for present and future generations, it is recommended that:

1. The approximately 82.4 miles of stream which meet the criteria be included in the National Wild and Scenic Rivers System as a State designated and administered component as provided for in Section 2(a)(ii) of the Wild and Scenic Rivers Act, and classified as "scenic" and "recreational" river areas as described.

2. The Wisconsin Department of Natural Resources be the administering agency.

3. The State of Wisconsin prepare a master plan for the riverway area (prior to designation) setting forth specific boundaries and plans for acquisition and development and for the timely implementation of the management of the lower Wisconsin as a component of the National System. Such a plan would require the approval of the Governor. In developing a master plan for the river, the State of Wisconsin should use the concepts, policies, and suggested facility development discussed in Chapter VI.

4. A Wisconsin River Advisory Board be established to advise and assist the State and local governmental units in the planning, development, management, and administration of the river as a component of the National System. The membership of the board should include representatives of local units of government to ensure local input into the planning process and to coordinate complementary local programs.

5. The development and management of the lower Wisconsin give primary emphasis to maintaining and enhancing the aesthetic, scenic, historic, fish and wildlife, and geological features. All recreational facility development should be considered with the protection of those values of the river environment which enable it to qualify for inclusion in the National System. However, development and management of the lower Wisconsin River should not preclude environmentally acceptable industrial use of this water resource, provided such use is not inconsistent with the goals of the Wild and Scenic Rivers Act.

6. Any construction of new bridge crossings, renovation of existing structures, transmission or pipeline crossings, and water resource projects be reviewed and approved in advance by the managing agency to ensure that construction is consistent with the purposes of the Wild and Scenic Rivers Act. The managing agency will ensure that, where possible, planned or proposed transmission line crossings

are rerouted around the segments proposed for inclusion in the National Wild and Scenic Rivers System. Existing powerline and pipeline crossings will be used whenever possible and be adequately screened.

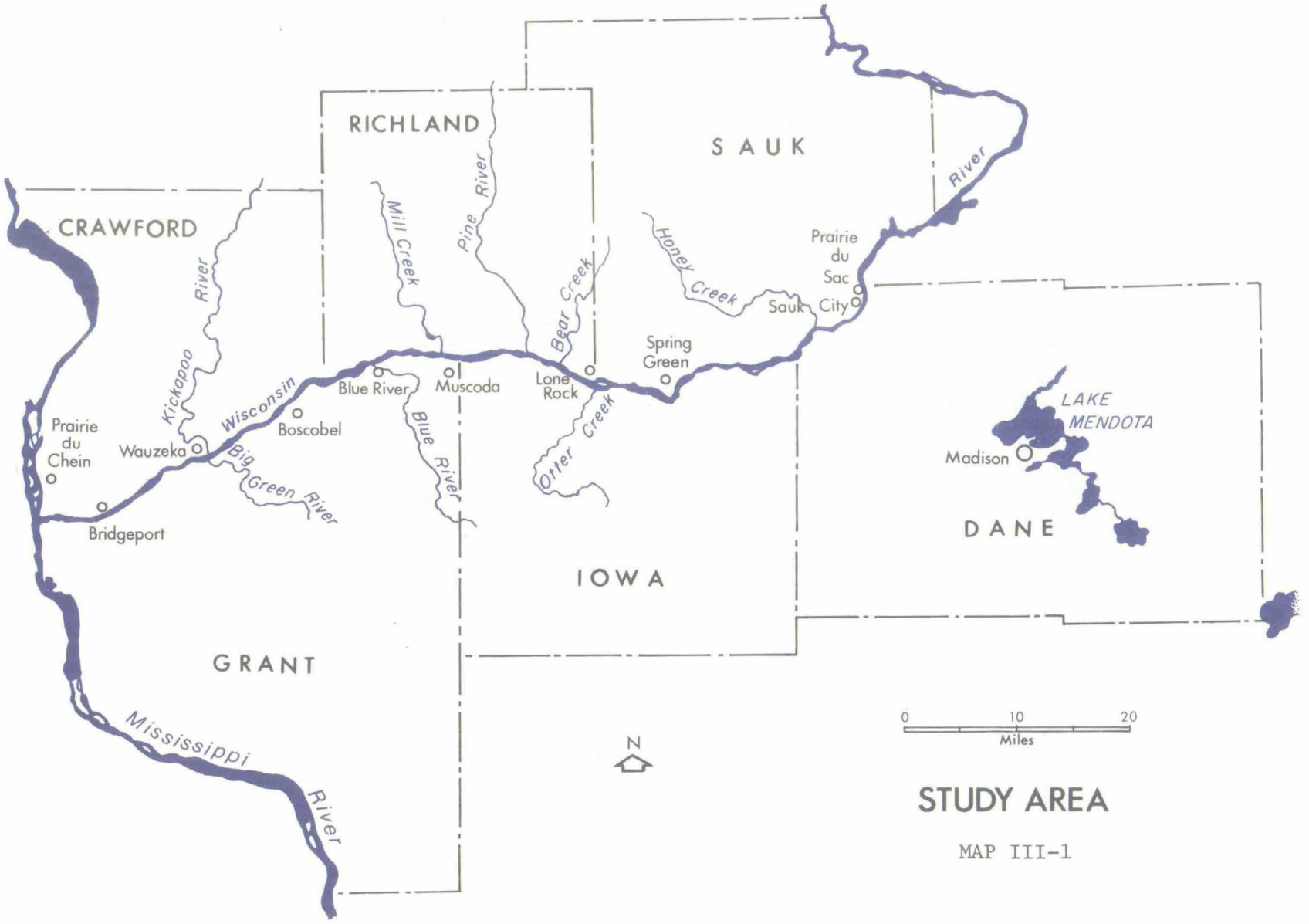
7. Every effort be made to restore and maintain historical and archaeological structures and sites. Communities on or near the riverway which still retain some of the historic flavor of the area would be encouraged to maintain their cultural and historical settings. A detailed inventory of historic, archaeologic, and natural areas will be made. A program will be developed for their protection and coordinated through the State Historic Preservation Officer.

8. Natural areas be established wherever future studies indicate an area is of State significance. Access and development of recreation facilities at these sites will be kept to a minimum or excluded entirely if the fragility of the resource indicates this is necessary for protection.

9. Appropriate State and Federal agencies take the necessary actions to improve water quality throughout the lower Wisconsin watershed through enforcement of water quality standards, upgrading of existing treatment facilities, and the encouragement of soil and water conservation systems. Until total body contact standards are met, the managing agency will take this into consideration in developing the master plan.

10. Existing local zoning ordinances be enforced to prohibit new commercial, industrial, or residential uses which are inconsistent with the purposes of the Act, and that the Wisconsin DNR be alert to possible violations of the Shoreland Management and Flood Plain Management Programs.

11. The State vigorously pursue its Wisconsin Trail System program in this area, and acquire the Chicago, Milwaukee, St. Paul & Pacific Railroad for development as a trail if it is ever abandoned.



STUDY AREA

MAP III-1

III. REGIONAL SETTING

Physical Environment

The lower Wisconsin River flows through the southwestern corner of the State. The portion of the river which Congress designated for study is that section from the Wisconsin Power and Light Company's dam at Prairie du Sac to its junction with the Mississippi near Prairie du Chien, a distance of 91 miles. Six counties[1/] border this stretch of river--Sauk, Dane, Richland, Iowa, Grant, and Crawford. Major tributaries to this portion of the Wisconsin are the Kickapoo and the Pine Rivers.

At the upper end of the study corridor the river valley is quite broad, as much as four or five miles wide, with little relief until the valley floor meets the steep bluffs which rise 300 feet or more above the level of the river. However, the valley gradually narrows downstream until at Bridgeport, near the mouth, the bluffs are scarcely more than a mile apart.

Almost the entire study area lies within the so-called "Driftless Area," the land which was not glaciated during the last Ice Age. Because of this, the topography is somewhat more rugged than is found further north in the river basin.

Soils of the valley floor are primarily sandy and loamy deposits from glacial outwash from neighboring glaciated areas to the north. In recent years irrigation has increased the productivity of these valley soils considerably and now large, center pivot, spray booms are common on the upper half of the study area. In some cases the coniferous shelter belts planted in the 30's and 40's as erosion control measures have been cleared in order to make room for the large irrigation equipment necessary to support large agricultural areas.

Almost 45 percent of the study corridor is forested. The forest cover is predominantly an oak-hickory type on the uplands and an elm-ash-cottonwood type on the bottomlands. The latter is found on the river margins and, consequently, provides the setting for most of the foreground scenery as viewed from the river. An important component of this timber type is the red or river birch which often occurs in small, pure stands along the riverbank. In addition, there are a number of softwood plantations, mostly red pine (Norway), of varying age and size which have been planted in the valley as shelter belts to control wind erosion.

1/ Columbia County borders about one mile of the study stretch immediately below the dam, but this portion was found not to qualify. It was judged logical to treat only those six counties directly affected by the study; therefore, Columbia County is not included in the discussion of the "region."

Trees framing the Wisconsin River represent a variety of species.

Some of these are now reaching merchantable age and are being thinned on a commercial basis. Besides their role in erosion control, they add variety to an already pleasant landscape.

There are no large cities in the study corridor. (Refer to topo maps IV-9 following page 98.) The largest concentration is the twin cities of Sauk City-Prairie du Sac with a combined population of 4,300. However, there are several small towns and villages, some of which have begun to feel the presence of nearby Madison as urban dwellers look for "a place in the country," either for year-round residences or, more often, recreation homes. The latter are often mobile homes or lightly built cabins, frequently at the river's edge in the floodplain.

Roads and/or railroads parallel the river throughout the study corridor and, over most of this distance, they occupy land on both banks. (See topo maps IV-9.) In very few places is the river as much as a quarter-of-a-mile from either a road or railroad. Although generally screened from the river, it is probable that the river user in a canoe would be aware of the sounds of road traffic through much of the study reach. Railroad traffic is very light and seldom encountered by the river user.

Although the effect of daily fluctuations in water level caused by the operation of the dam at Prairie du Sac has not been determined exactly, it affects the type and amount of vegetation on the stream banks and sand bars at least as far downstream as Spring Green (see map III-1).

According to the U. S. Geological Survey, the Wisconsin River at Muscoda has an average flow of 8,613 cubic feet per second (cfs), with maximum and minimum flows of 80,800 cfs and 2,000 cfs, respectively (see map II-1).

As with all rivers, the lower Wisconsin has a character all its own which, in this case, not only sets it apart from all other rivers but also puts it in sharp contrast to the busy, hardworking upper Wisconsin above Prairie du Sac. It is this quality that has caused it to be the subject for possible inclusion in the National Wild and Scenic Rivers System.

Population

The heaviest concentrations of population lie to the south and east of the study area and include Madison, Milwaukee, and Chicago. Lesser population centers are in Iowa and Minnesota. Table III-2 shows some of the major population centers and driving distance and time to the portion of the river nearest it.

Despite close proximity to centers of population,[1/] the counties through which the lower Wisconsin River flows are, with the exception of Dane County, rural in character as is shown in Table III-1 below.

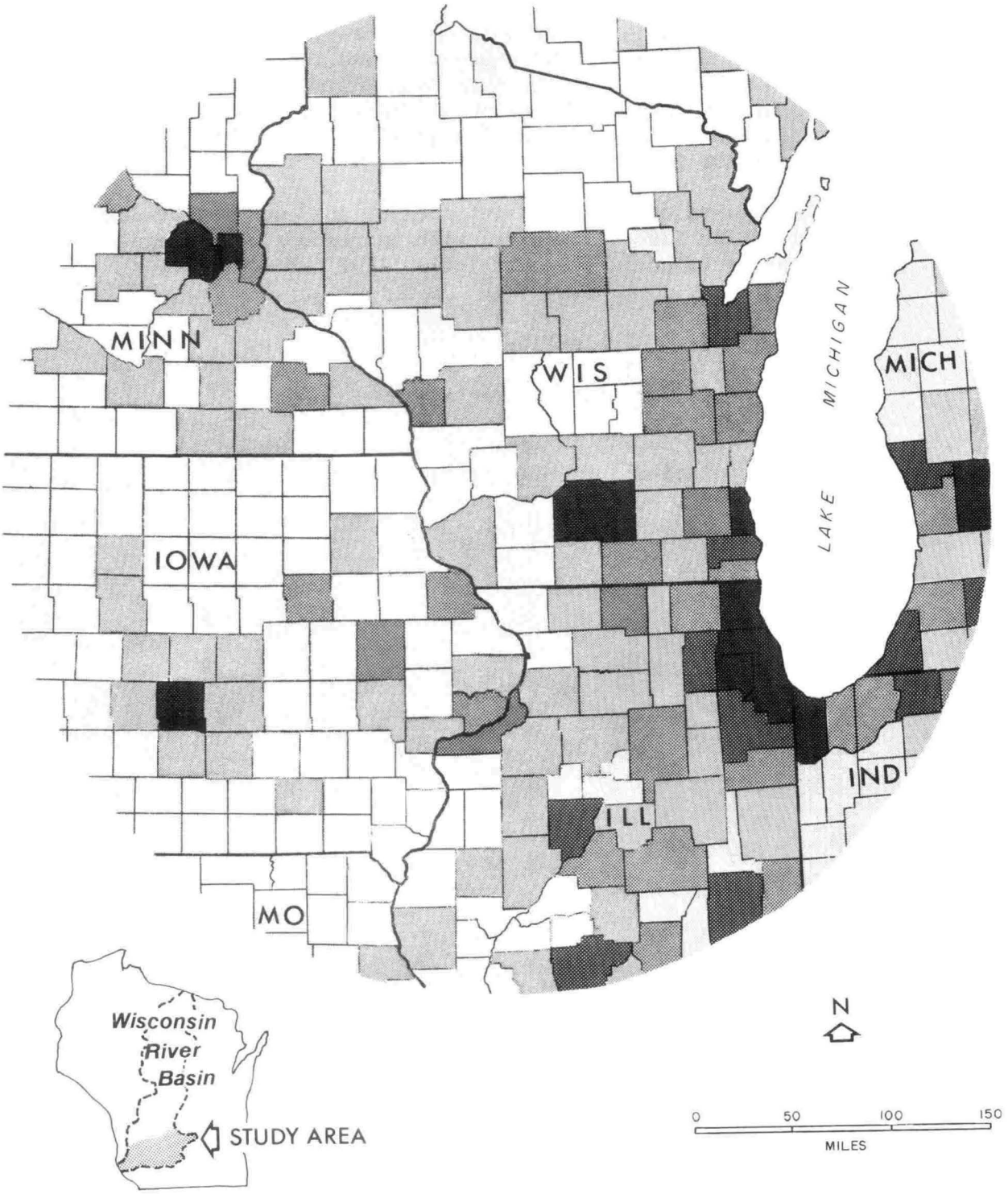
Table III-1

County Population Statistics

County	Population	Area (Miles^2)	Density Persons/Mi.^{2}
Crawford	15,252	363.3	42
Grant	48,398	734.1	66
Richland	17,079	373.2	46
Sauk	39,057	538.4	73
Iowa	19,306	487.9	40
Dane	290,272	766.9	378
Six-County Area	429,346	3,263.8	132

Although the Counties of Crawford, Richland, and Iowa experienced losses in population between 1960 and 1970, the six-county area as a whole had a net gain of 25.5 percent or just over 73,000 people. Table III-3 shows percentage population changes from the 1940 to 1970 census.

1/ According to the 1970 census, the population within a radius of 250 miles of the study corridor was 23.4 million persons (see map III-2). Of this number 15.4 million or 67 percent of the population within the area lived in 28 Standard Metropolitan Statistical Areas (SMSA's) in seven States. Within a radius of 125 miles the 1970 census showed a population of 7.4 million, of which 5.9 million or 80 percent lived in 14 SMSA's. Portions of four States fall within the 125-mile radius.



POPULATION DENSITY

250 MILE RADIUS

MAP III-2

Table III-2

DISTANCE AND DRIVING TIME FROM
MAJOR URBAN CENTERS TO WISCONSIN RIVER

Urban Center (*Indicates SMSA) 1970 Census	Distance (Miles)	Approximate Driving Time (Hours:Minutes)
Beloit, Wisc. (35,700)	71	1:30
Cedar Rapids, Iowa (163,213*)	90	2:00
Champaign-Urbana, Ill. (163,281)	275	7:15
Chicago, Ill. (6,978,947*)	160	3:00
Davenport-Rock Island, Iowa/Ill. (362,638*)	125	2:30
Dubuque, Iowa (90,609*)	45	1:00
Duluth-Superior, Minn. (265,350*)	304	6:45
Eau Claire, Wisc. (44,600)	136	2:45
Green Bay, Wisc. (158,244*)	145	3:00
Indianapolis, Ind. (1,109,882*)	300	6:00
Janesville, Wisc. (46,400)	52	1:00
LaCrosse, Minn-Wisc. (80,468*)	58	1:00
Madison, Wisc. (290,272*)	26	0:30
Milwaukee, Wisc. (1,403,688*)	100	2:00
Minneapolis-St. Paul, Minn (1,813,647*)	200	4:00
Peoria, Ill. (341,979)	219	4:15
Rockford, Ill. (272,063*)	85	1:45
Springfield, Ill. (161,335)	289	7:30
Waterloo, Iowa (132,916*)	98	2:00

NOTE: See Map III-3.

Table III-3

Percent Change in Population 1940 - 1970

County	1940-1950	1950-1960	1960-1970
Crawford	- 3.7%	- 7.4%	- 6.7%
Dane	+ 29.6%	+ 31.1%	+ 30.7%
Grant	+ 2.0%	+ 7.1%	+ 9.0%
Iowa	- 4.8%	+ 1.0%	- 1.7%
Richland	- 5.6%	- 8.0%	- 3.4%
Sauk	+ 13.1%	- 5.1%	+ 8.0%

The study corridor itself reflects the rural character suggested by the census report. It is predominantly an area of small villages and farms.

Economy

Although the economy in the study corridor proper is heavily oriented toward agriculture, manufacturing comprises the bulk of economic activity in the six-county area. Tables III-4, III-5, III-6, and III-7 give an indication of the respective activities in manufacturing, farming, and business in the six-county area.

Manufacturing in the Counties of Crawford, Grant, Iowa, Richland, and Sauk is typically in small firms. Seventy-six percent of the plants in these counties have fewer than 20 persons employed and 94 percent have fewer than 100 persons. Table III-4 shows the distribution of manufacturing plants according to number of employees and value of goods.

Sixty-six percent of the plants are engaged in three types of manufacturing--food and kindred products (primarily dairy)--41 percent, lumber and wood products--14 percent, and printing and publishing--11 percent.

Poultry, dairy, and livestock farming make up 89 percent of the agricultural sales in the six-county study area. If Dane County is excluded from the tabulation, these three types of farming account for 93 percent of farm sales in the other five counties.

Business patterns (Table III-6), even more than manufacturing, show a heavy concentration in small businesses. Excluding data for Dane County, 92 percent of the business establishments in the other five counties employ fewer than 20 persons and 99 percent employ fewer than 100.

TABLE III-4

Manufacturing - By Number of Employees, Payroll, Size Class and Total Establishments - 1972

County	Number of Employees	Payroll ($1,000)	Number of Establishments by Size Class 1-19 Employees	20-99 Employees	100-249 Employees	250 or more Employees	Total Establish-ments	Value of Shipments ($1,000)
Crawford	600	4,800	31	2		1	34	48,100
Dane	16,200	163,700	259	86	16	14	375	804,900
Grant	1,200	7,400	56	14	2		72	53,900
Iowa	400	2,600	25	3	2		30	17,500
Richland	700	4,100	22	8		1	31	47,800
Sauk	4,900	38,800	52	17	3	5	77	104,400
Six County Totals, less Dane	7,800	57,700	186	44	7	7	244	271,700
Six County Totals	24,000	221,400	445	130	23	21	619	1,076,600

SOURCE: 1972 Census of Manufacturers, U.S. Department of Commerce, Bureau of Census.

Table III-5

Value of Crops, Livestock, and All Farm Products-1969

County	Crops		Livestock		Total	Value of all
	Number of Farms	Value ($1,000)	Number of Farms	Value ($1,000)	Number of Farms in County	Agricultural Products Sold ($1,000)
Crawford	684	1,982	1,104	13,245.4	1,178	15,301
Dane	2,520	12,597	3,014	63,092.3	3,600	75,714
Grant	1,468	3,879	2,713	54,207.0	2,763	58,200
Iowa	731	2,038	1,421	31,252.7	1,507	33,313
Richland	681	1,385	1,351	17,965.1	1,465	19,412
Sauk	1,167	2,819	1,771	29,120.4	1,974	32,087
Six County Totals	7,251	24,700	11,374	208,882.9	12,487	234,027

SOURCE: 1969 Census of Agriculture, U.S. Department of Commerce, Bureau of the Census

Table III-6

1973 Business Patterns - By number of Employees,
Taxable Payroll, Size, and Total Establishments

County	Number of Employees	Taxable Payroll ($1,000)	Number of Establishments by Size Clsss				Total* Establish-ments
			1-19 Employees	20-99 Employees	100-249 Employees	250 or more Employees	
Crawford	2,509	3,476	304	15	1	1	321
Dane	85,722	155,116	4,495	710	83	42	5,330
Grant	7,204	9,372	843	59	6	1	909
Iowa	2,460	3,039	334	18	3		355
Richland	2,538	3,183	317	17	1	1	336
Sauk	10,917	17,232	760	74	6	6	846
Total Less Dane	25,628	36,302	2,558	183	17	9	2,767
Six County Totals	111,350	191,418	7,053	893	100	51	8,097

*Includes private nonfarm and nonprofit activities subject to FICA.

SOURCE: County Business Patterns, 1973 U.S. Department of Commerce, Bureau of the Census

Table III-7

Comparison of Manufacturing, Farming and Business Activity Adjusted to 1973 Dollars

County	Manufacturing Value of all Shipments ($1,000)	Farming Value of all Agricultural Products sold ($1,000)	Business Payrolls Subject to FICA
Crawford	54,353	19,353	3,476
Dane	909,537	95,763	155,116
Grant	60,907	73,612	3,972
Iowa	19,775	42,134	3,039
Richland	54,014	24,552	3,183
Sauk	117,972	40,584	17,232
County Total Less Dane	307.021	200,235	30,902
Six County Total	1,216,558	295,998	186,018

Table III-8

Eating, Drinking, and Lodging Establishments - 1973

	Eating & Drinking			Lodging Establishments		
County	Number of Employees	Payroll ($1,000)	Number of Establish-ments	Number of Employees	Payroll ($1,000)	Number of Establish-ments
Crawford	210	129	46	--	--	12*
Dane	6,427	3,965	388	1,395	778	37
Grant	608	277	109	88	35	10**
Iowa	225	117	36	--	--	7*
Richland	133	60	32	--	--	6*
Sauk	720	450	92	159	203	16

*Data for 1976 **Data for 1972

Table III-7 compares output of the three activities by dollar amounts with manufacturing and farming adjusted to 1973 dollars.

Table III-8 shows the number of establishments that can be expected to serve the tourist trade in the six-county area. Dane County, which includes the Madison area, is obviously nontypical of the study area. The uneven distribution of lodging establishments also reflects the influence of the Wisconsin Dells on the northern edge of the study area.

Transportation Network

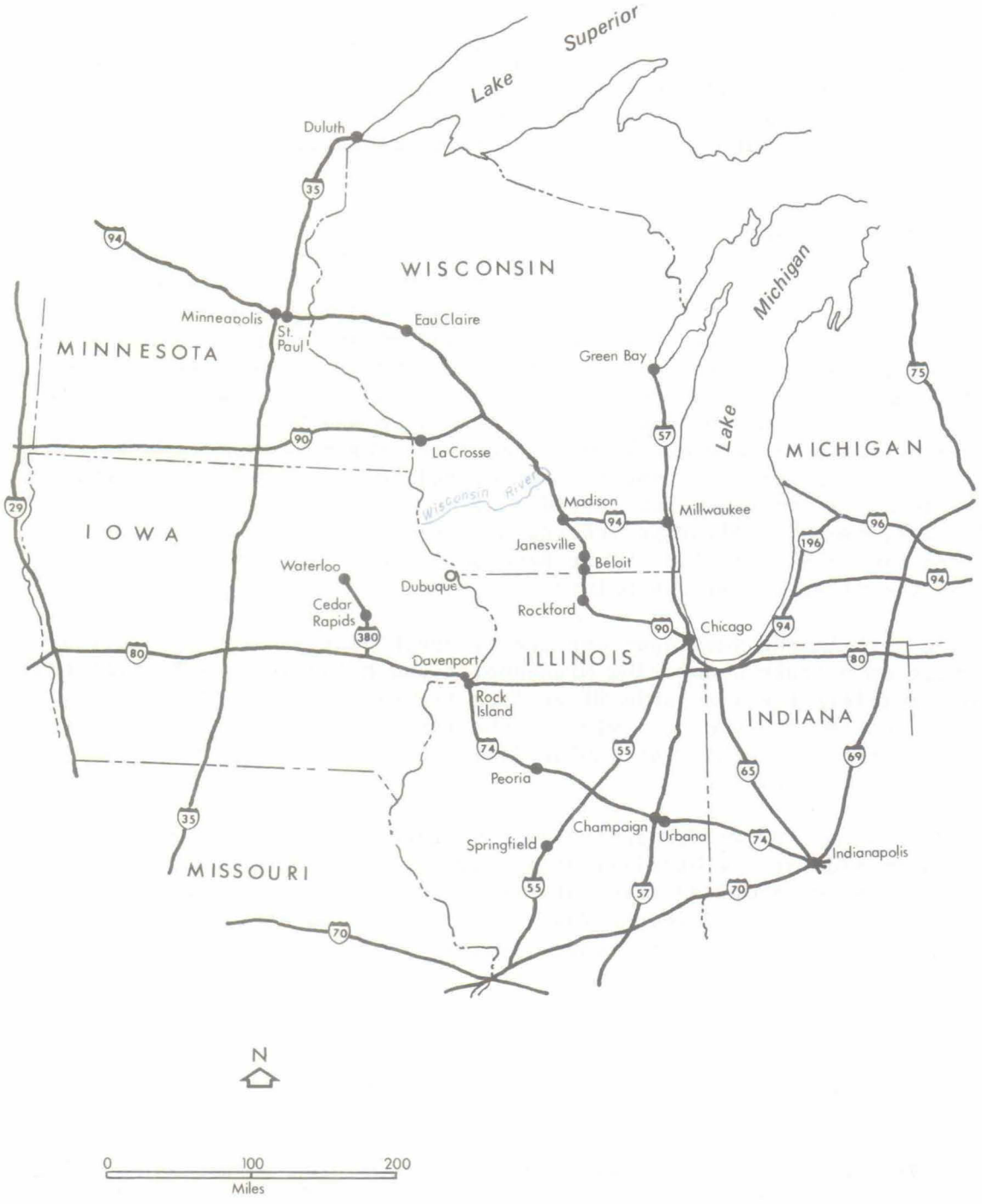
The study region is well served by a complex of interstate highways, U. S. routes, and primary and secondary State and county roads (see maps III-3 and III-4). Interstate Routes 90 and 94 are only 15 miles east of Prairie du Sac at their nearest point. The two major east-west routes paralleling the highway are U.S. Highways 14 and 18. U.S. 14 parallels the river for about 25 miles between Mazomanie and Gotham. U.S. 18 runs along Military Ridge about 15 miles south of the river and crosses the river at Bridgeport. It intersects several north-south highways which provide access to the river corridor at their bridge crossings. In addition, two U.S. highways provide access to the river area: U.S. 12 at Prairie du Sac and U.S. 61 at Boscobel. Four State highways also cross the river at various points.

The nearest Amtrak passenger service is north of the river corridor at Portage on a route connecting Minneapolis and Milwaukee. A freight rail line parallels the Wisconsin River from Prairie du Sac to Prarie du Chien, at times providing a view of the river and its associated wetlands. Traffic on this particular line is light with freight service provided twice weekly.

The Mississippi River is paralleled on either side by rail lines. The Wisconsin side of the Mississippi is serviced by a Burlington Northern rail line which provides frequent freight service to Prairie du Chien. Although passenger service on rail lines is limited at the present time, future energy conditions may cause restoration of passenger service on lines now used exclusively for freight.

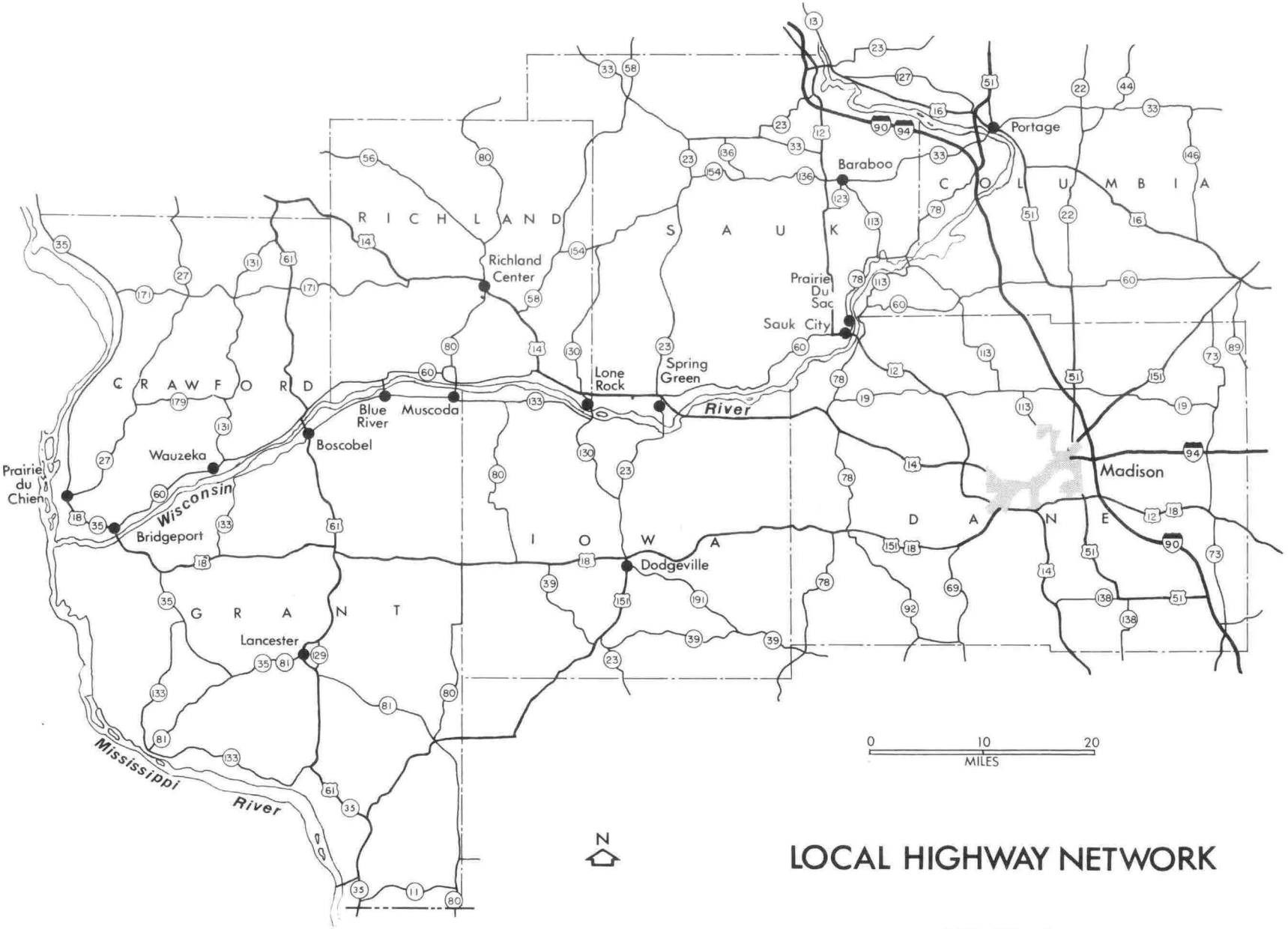
Several bus companies operate in the six-county region, connecting the small towns with larger urban areas. Greyhound, Badger, River Trails, and Iowa Coaches, Inc. have different routes through the region with service once or twice daily.

Airports serving the region with regularly scheduled commercial flights are located at Madison, La Crosse, and Dubuque. Several local airports supporting noncommercial traffic are scattered throughout the area. Those airports nearest the river are located at Lone Rock, Prairie du Sac, Boscobel, and Prairie du Chien.



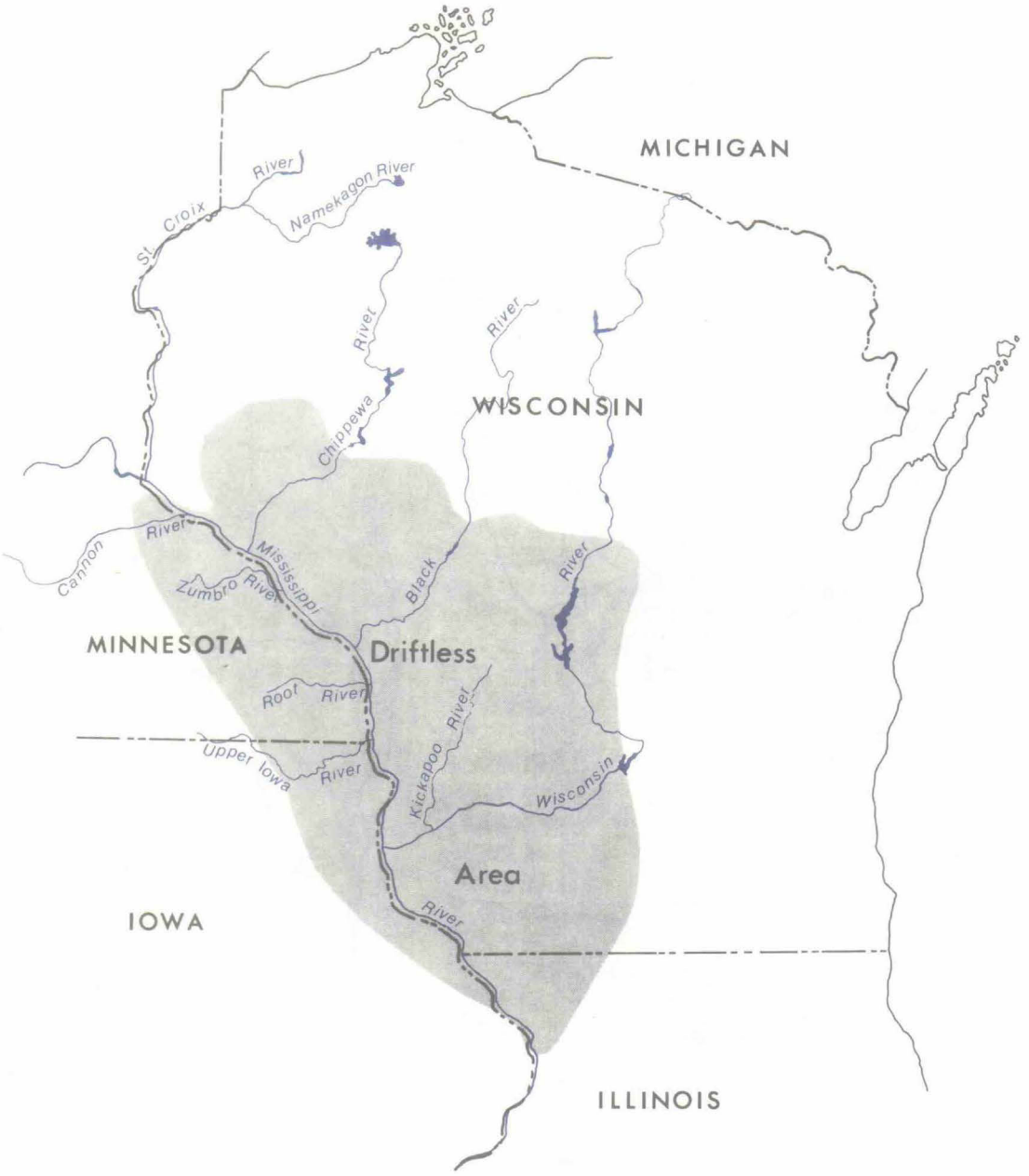
INTERSTATE HIGHWAY ACCESS

MAP III-3



LOCAL HIGHWAY NETWORK

MAP III-4



RECREATION RIVERS OF THE DRIFTLESS AREA

Map III-5

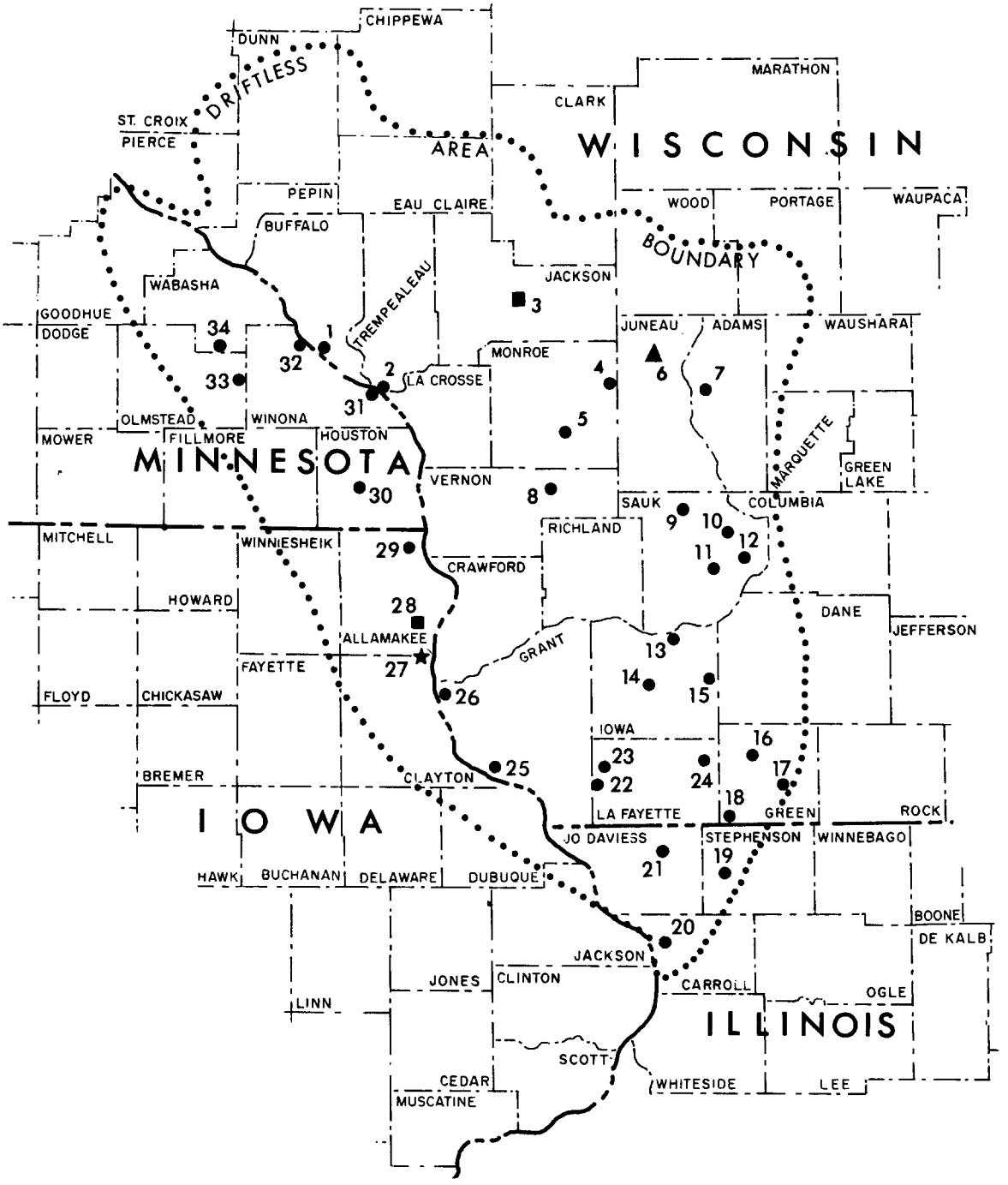
Regional Recreation Resources

The lower Wisconsin River flows through the Driftless Area (see Map III-5), an area which, with its interesting topography of hills, bluffs, and scenic valleys, is attractive to vacationers on their way to the "north woods" or visiting the region for its own features. While the bulk of the Driftless Area lies in Wisconsin, it also includes small portions of southeastern Minnesota, northeastern Iowa, and northwestern Illinois. In addition to 30 State parks (see Map III-6) the area has several popular commercial tourist attractions, such as the famous Wisconsin Dells.

Rivers--Recreation is an important activity on a number of rivers in the Driftless Area, particularly on the Mississippi. The primary recreational uses of the Mississippi are hunting and fishing, picnicking, swimming, and boating and water skiing. The myraid of side channels and sloughs provide what seem like unlimited opportunities for fishing and waterfowl hunting, while the river sustains very heavy usage from all sizes of watercraft. There are seven State parks along this stretch of the river.

Other important recreational rivers in the Driftless Area include the Cannon, Root, and Zumbro in Minnesota; the Black, Chippewa, and Kickapoo, in Wisconsin; and the Upper Iowa in Iowa. The St. Croix, located just outside of the Driftless Area, and its tributary, the Namekagon, are already components of the National Wild and Scenic Rivers System. The Upper Iowa River has been studied and the segment from the Iowa-Minnesota border to Lane's Bridge in Allamakee County has been found eligible. State administration was recommended for the Upper Iowa, but to date the Governor of Iowa has not requested designation under Section 2(a)(ii) of the Act.

Nonriver Resources--Of the 30 State parks in the Driftless Area, 10 are within the six counties through which the study segment flows. Two of these, Wyalusing and Tower Hill State Parks, are located on the Wisconsin River and feature river scenery. Devils Lake State Park in Sauk County is one of the State's most popular, providing for a variety of recreational interests from swimming and boating to nature study and rock climbing. Governor Dodge State Park in Iowa County attracts large numbers of visitors for water-based recreation because of its two lakes, Cox Hollow and Twin Valley. Nelson Dewey State Park is an historical site featuring the home of the first governor of Wisconsin. Blue Mound State Park in Iowa County is of geologic interest with the highest elevation in the southern half of the State. Lake Mendota State Park, in Dane County, is one of Wisconsin's newest State parks and is still in the initial acquisition and development stage. In Sauk County, Natural Bridge State Park has a natural rock bridge as its main attraction. Rocky Arbor State Park features ledges and wooded valleys, and Mirror Lake features water recreation and lake scenery.



LEGEND

- ★ NATIONAL MONUMENT OR HISTORIC SITE
- ▲ NATIONAL WILDLIFE REFUGE
- ■ STATE FOREST
- ● STATE PARK

STATE AND NATIONAL RESOURCE AREAS IN THE DRIFTLESS AREA

MAP III-6

Table III-9

Key to Map III-6

STATE AND NATIONAL RESOURCE AREAS IN THE DRIFTLESS AREA
WITH ANNUAL VISITOR DAY USE IN 1976

1.	Merick State Park	118,000
2.	Perot State Park	203,324
3.	Black River State Forest	269,900
4.	Mill Bluff State Park	80,800
5.	Elroy Sparta State Park Trail	33,244
6.	Necedah National Wildlife Refuge	80,000
7.	Roche a Cri State Park	34,868
8.	Wildcat Mountain State Park	132,150
9.	Rocky Arbor State Park	103,080
10.	Mirror Lake State Park	172,265
11.	Natural Bridge State Park	12,071
12.	Devils Lake State Park	1,333,955
13.	Tower Hill State Park	70,677
14.	Governor Dodge State Park	536,900
15.	Blue Mound State Park	169,800
16.	New Glarus Woods State Park	21,376
17.	Sugar River State Park Trail	43,069
18.	Cadiz Springs State Park	72,500
19.	Lake Le-Aqua-Na State Park	282,200
20.	Mississippi Palisades State Park	1,032,000
21.	Apple River Canyon State Park	126,700
22.	Platteville-Calomine State Park Trail*	
23.	First Capital State Park	17,386
24.	Yellowstone State Park	409,400
25.	Nelson Dewey State Park	91,554
26.	Wyalusing State Park	148,500
27.	Effigy Mounds National Monument	67,500
28.	Yellow River State Forest**	
29.	Fish Farm Mounds State Park**	
30.	Beaver Creek Valley	17,298
31.	O. L. Kipp State Park	3,840
32.	John A. Latsch State Park	2,580
33.	Whitewater State Park	260,000
34.	Carley State Park	12,700

* Park not yet open.
**No information available.

Two national wildlife refuges are located within the Driftless Area. The largest of these is the Upper Mississippi River National Wildlife and Fish Refuge which extends along the Mississippi River adjacent to the mouth of the Wisconsin River at Prairie du Chien. The Necedah National Wildlife Refuge provides about 40,000 acres of waterfowl habitat approximately 75 miles to the north of Spring Green. The refuges provide breeding and resting areas for migratory waterfowl and are part of a chain of such areas in the Mississippi Flyway. Although these lands are set aside primarily for the preservation of wildlife habitat, they are managed to accommodate low density recreation uses such as nature study, hiking, sightseeing, and hunting and trapping.

The Driftless Area is noted for its lack of glaciation which is partially responsible for the deficiency in surface water areas. Crawford, Richland, and Grant Counties have no substantial lakes attracting extended visit recreation. In addition to the two impoundments in Governor Dodge State Park, Iowa County has two P.L. 566 projects--Blackhawk Lake and Birch Lake. Sauk County has five major impoundments and one natural lake, Devils Lake, that provide significant recreational opportunity. Dane County has six major lakes attracting extended visit recreational use.

Three recreational impoundments that may be constructed in the foreseeable future include:

Pine River Watershed in Richland County - 50 and 484 water acres.

Tri-Creek Watershed in Monroe County - 88 water acres.

The region has a variety of commercial recreation attractions. The Wisconsin Dells region, with its duck boat rides and water shows, various museums, and other attractions, is a popular area for vacationers. Other locales have developed tourist attractions such as Baraboo's Circus World Museum, Spring Green's House on the Rock, and North Freedom's Railway Museum.

Two major highway routes in the region have been designated as scenic and historic routes. A segment of the Great River Road parallels the Mississippi River through the study area. In Iowa and Wisconsin a series of highways branching off the Great River Road have been designated the "Hiawatha Pioneer Route." These roads follow the historic paths of the region's early settlers. Interpretive signs along the route highlight areas of interest.

There are several county park systems in the region that provide for a variety of local recreation needs. With the exception of Plain Honey at White Mounds Park, a P.L. 566 project, and several boat landings and river access points maintained by the counties, these county parks generally do not draw users from outside the region (see chapter on River Access). The Dane County park system has several parks providing access to the county's major lakes. Some of them allow overnight camping.

IV. DESCRIPTION AND ANALYSIS OF THE RIVER

History and Archaeology

Meskousing, Wees-koos-errah, Quisconsin. To the early French explorers attempting to write the Indian name given this river, the Wisconsin was a main thoroughfare between Green Bay and the Mississippi River. To the Indians, this river was a source of food and shelter and a primary route of travel across what is today the State of Wisconsin.

Man began to occupy the lower Wisconsin River valley nine to 12,000 years ago. Largely nomadic, he migrated throughout the area hunting the larger animal species of the period. Between 8000 and 500 B.C., the Archaic people frequented the river valley hunting game and gathering edible wild foods. In 1945 the Osceola archaeological site near Potosi in Grant County began yielding information on the activities of these Copper Culture people.

Between 1000 B.C. and the arrival of the first Europeans in the 1600's, the area was inhabited primarily by the mound builders of the Woodland Cultures. Evidence of the Middle Woodland period, 100 to 400 A.D., and especially the Effigy Mound period of A.D. 300 to A.D. 1200 is prevalent. Near the Town of Boscobel is the Miller site, location of a village of the Middle and Late Woodland cultural period. Conical and linear mounds of the Effigy Mound period are located near the Villages of Bridgeport and Wauzeka. Known primarily for their mound building, peoples of the woodland Culture were dependent primarily on hunting, fishing, and food gathering; although evidence exists that they were beginning agricultural practices.

A total of 131 archaeological sites associated with the Archaic, Middle Woodland, Effigy Mound, and Historic Tribes cultural periods have been reported within the proposed corridor along the lower Wisconsin River. The number of sites (predominantly burial mounds and associated villages) increases as one travels downstream, climaxing at the confluence of the Wisconsin River with the Mississippi River near Wyalusing State Park. This total does not reflect the dozens of sites that lie immediately outside the proposed corridor or border the Wisconsin River Valley on upland ridgetops. Highly sensitive areas along the bottomlands include areas where major streams or tributaries enter the Wisconsin River, such as the Pine River, Bear Creek, and Mill Creek in Richland County; Otter Creek in Iowa County; and the Blue River in Grant County (see Map III-1). The uplands bordering the Wisconsin River at Bridgeport were the focus of highly significant mound building activities during prehistoric times. In general, extensive investigation and study of these sites have not yet begun.

In 1659 the French explorers Raddisson and Grossielliers probably became the first Europeans to view the Wisconsin River as they travelled from Green Bay to the Mississippi River in search of furs. The first recorded journey along the river is that of Pere Jacques Marquette and Louis Joliet who on June 17, 1673, entered the Mississippi River from the Wisconsin at a point near what is today Wyalusing State Park. The first English speaking person to travel and describe the river was Jonathan Carver in 1766. In the accounts of his travels, Carver made note of what is believed to have been the first European settlement in the river valley--Prairie du Chien. He also described the area's rich deposits of the mineral lead, the presence of which had been noted by Father Hennepin as early as 1679.

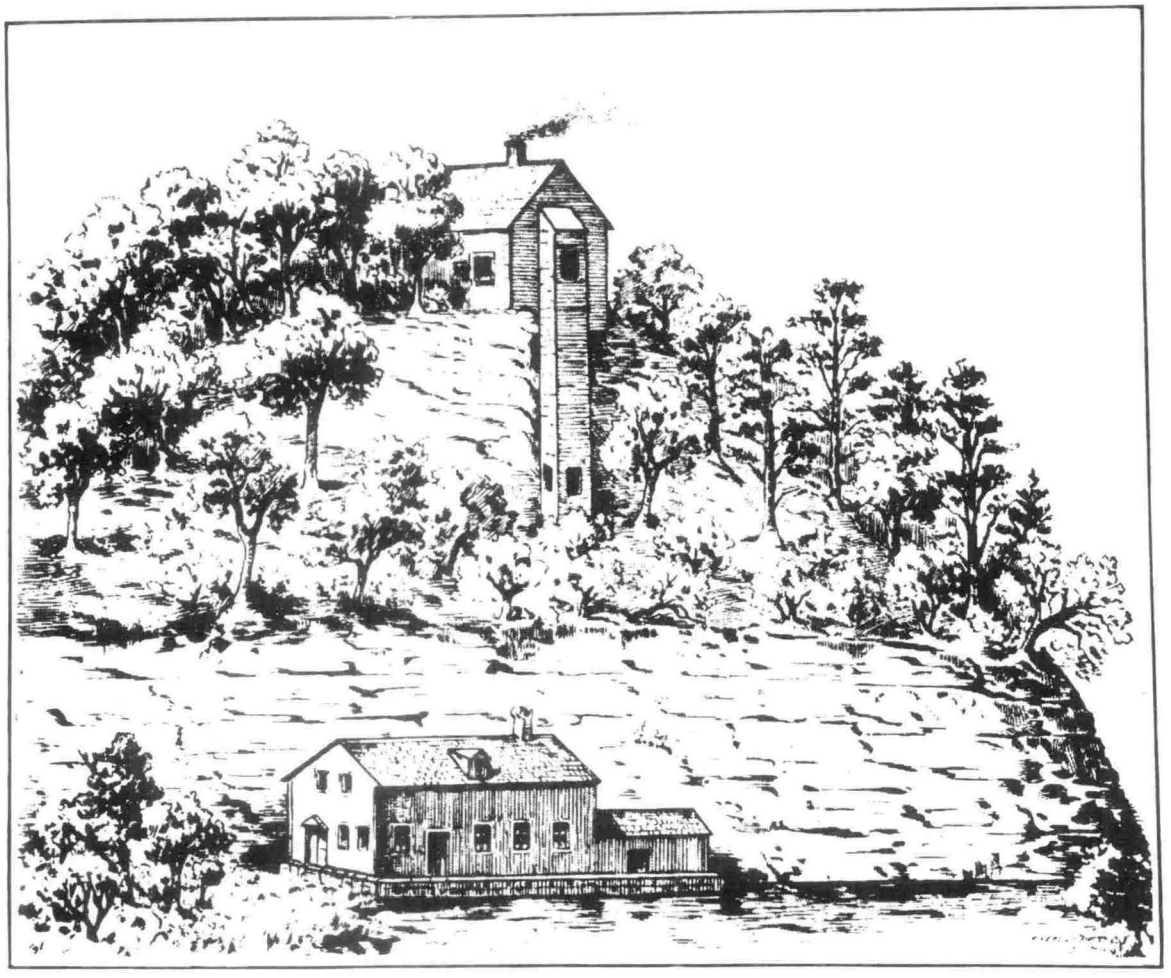
A thriving fur trade established by the French with Indians of the Sauk, Fox, Chippewa, Ottawa, Potawatomi, and other tribes soon attracted British and American traders to the area. Prairie du Chien became the focal point for this fur trading activity. Control of this trade and the region rested with the French until the 1760's when Britain gained control. With the exception of a brief period in 1814-15 when the British seized the American's Fort Shelby at Prairie du Chien during the War of 1812, the United States flag has flown over Wisconsin since 1783. Today, Prairie du Chien still retains reminders of this fur trading era. Five structures located there, four of which were utilized by the early traders, have been designated National Historic Landmarks.

With the end of the War of 1812, the American government gained firm control over the region. This marks the beginning of major settlement in the area. Fur trading would continue for some years, but interest had turned to the rich lead and zinc deposits south of the river.

These mineral rich lands were still Indian, but in 1825 the United States government began entering into a series of land treaties with Wisconsin Indians. During the following 12 years, the Winnebago, Chippewa, Ottawa, Potawatomi, and other tribes would cede their lands to the Government. The result of these negotiations was to open the door to mining and settlement along the lower Wisconsin.

Sauk City is the oldest incorporated village in Wisconsin and is named for the large settlement of Sauk Indians which once stood there. Jonathan Carver, who visited the village in 1766 and 1767, said that it was the largest and best constructed Indian town he had ever seen. He described it as containing about 90 houses with each house large enough for several families.

The Sauk City vicinity was the site of a major engagement of the Black Hawk War. In 1832, on heights to the north and east of the city overlooking the Wisconsin River, U. S. troops and militia under the command of Colonel J. D. Henry and Colonel Henry Dodge fought the Indian warrior Black Hawk. The Black Hawk War, which saw several skirmishes along the Wisconsin River, ended at the Battle of Bad Axe near the Mississippi River on August 2, 1832.



In July, 1836, John Wilson sketched the shot tower at Helena, Wisconsin.

During the period 1830-1850, southwestern Wisconsin dominated the State's history. A fabulous lead strike at the town of Mineral Point in Iowa County ushered in the lead mining boom in 1828. The village of Muscoda was settled in 1832 and Sauk City in 1838. Flatbottomed boats, and later for a brief period steamboats, plied the waters of the lower Wisconsin carrying goods and materials to and from these and other river towns. On July 4, 1836, the Wisconsin Territory was formally declared; and Henry Dodge became its first Governor.

Towns such as Gotham and Helena were well known during the height of the lead mining era. Producing lead ingots and shot from the mineral mined to the south, these communities lived and died with the boom. By 1848 lead mining had begun to decline and Gotham and Helena would soon disappear. At the site of Helena stands the reconstructed shot tower used between 1833 and 1861 to manufacture lead shot. During the 1830's, six men working here could produce 5,000 pounds of shot per day. Helena, once considered as a possible location for the territorial capitol, continued to thrive until 1857 when the panic of that year and bypassing by the railroad brought its decline. It had been abandoned by 1861.

With the decline of lead mining, the predominantly Cornish miners of the area turned to agricultural use of their lands. An era of change for the region began in 1856, fueled by the coming of the railroad and the end of reliance on the river as a route for commerce and industry.

The noted architect, Frank Lloyd Wright, was born on June 8, 1869, in the Spring Green valley. Taliesin, his home, workshop, laboratory, and retreat, is situated here within a mile of the Wisconsin River. Comprising structures built between 1896 and the mid-1940's, Taliesin is one of three Spring Green vicinity historic sites listed on the National Register of Historic Places. The only restaurant ever designed by Wright, the Spring Green, is located directly on the river. Other historic structures include the shot tower at the site of the old Town of Helena and the Unity Chapel a mile south of Taliesin. The Unity Chapel, designed by Wright's early employer, Joseph Silsbee, was constructed in 1885-86. Frank Lloyd Wright is buried in the cemetery beside the chapel.

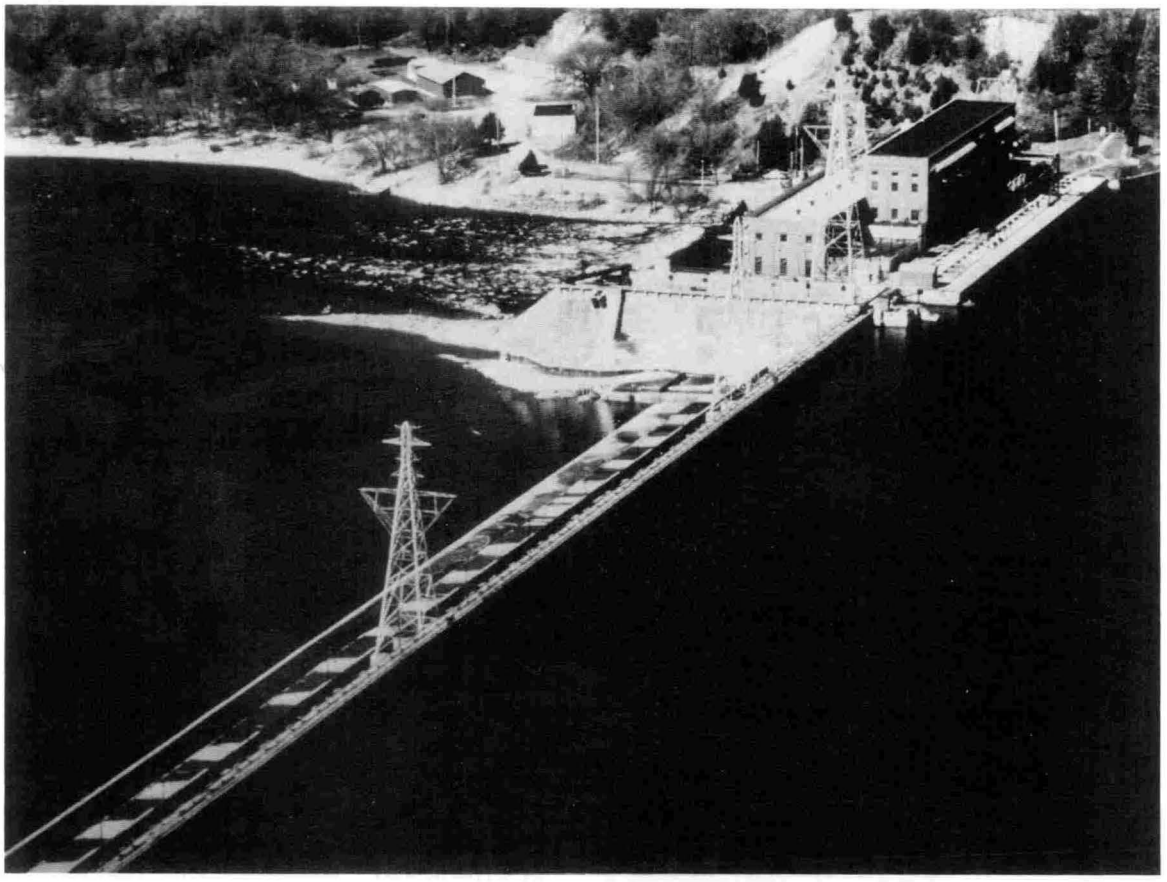
The lower Wisconsin River valley is the site of several other noteworthy historic sites and structures. Several buildings of the period 1840-1870 are located at Prairie du Sac and Sauk City including the Baltanz House, indicative of the Greek revival style of the 1840's, and the Kehl Winery, constructed of quarry stone in 1867. The noted Wisconsin publisher and historian, August Derleth, lived in Sauk City, building a house there in 1939-40.

Located north of Prairie du Sac is one of Wisconsin's best known historical landmarks, the Prairie du Sac hydroelectric plant. An impressive structure with its 1,000 foot long spillway, lock, and powerhouse, the plant produced its first marketable kilowatt of power on September 10, 1914.

Man has long been present in the Wisconsin River area but only a few of his early traces are now present. With more extensive investigation and study of known archaeological sites in the river valley, however, considerable knowledge about his early history in North America will undoubtedly be gained. Planned historic sites surveys along the river will also shed greater light on the early use and development patterns of European man in the region. It can be anticipated that as these investigations and surveys are completed the list of lower Wisconsin River sites and structures appearing on the National Register of Historic Places will grow.

Riverscape

Wees-Kon-San, the Chippewa Indian name for "the gathering of the waters," amply describes the Wisconsin River as it flows 430 miles through the State. It flows southerly from its headwaters on the Michigan-Wisconsin State line in Vilas County to near Portage and thence westerly to its confluence with the Mississippi River at Prairie du Chien. The upper portions of the river have been impounded many times by dams for power production or in connection with the industries located along its banks.



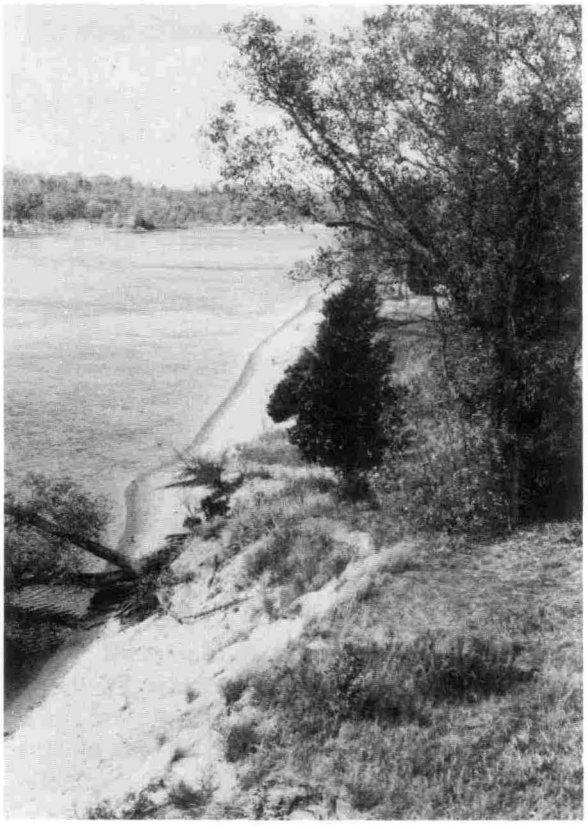
Wisconsin Power and Light Company's dam at Prairie du Sac, built in 1914, is the last of 27 hydroelectric dams on the Wisconsin River.

In the late 1800's the river was jammed with logs as they were floated downstream to various lumber mills and paper plants. Many major paper mills are in operation, and the prime industry of several towns is still based on paper products.

The segment of river studied for possible inclusion in the National Wild and Scenic Rivers System begins below the dam at Prairie du Sac, 90.5 miles above the river's confluence with the Mississippi (see Map IV-9). The dam, built in 1914, is owned and operated by the Wisconsin Power and Light Company and forms Lake Wisconsin. Fishing for walleye below the dam is popular and fishermen are frequently observed; in winter, eagles can sometimes be spotted feeding in the open water below the dam.

The communities of Prairie du Sac and Sauk City are viewed from the river.

Sand banks and wide expanses of water characterize the Lower Wisconsin River.

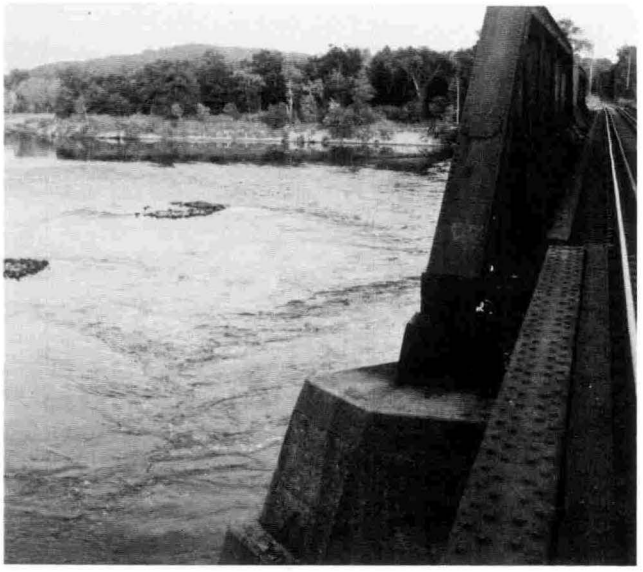


Prairie du Sac - Honey Creek
(8 miles)

The first three miles are strongly influenced by the development of the twin Towns of Prairie du Sac and Sauk City which are located adjacent to the river on its western bank. They have a combined population 4,287. Residential, commercial, and industrial facilities can be seen from the river. Some parklands have been provided along the river for the enjoyment of visitors.

The river is about 1,000 feet wide and is characterized by shifting sandbars. Flow fluctuates daily due to the changing discharge rates of the dam as the demand for power production varies. In addition, the 26 dams above the Prairie du Sac dam influence the flow of the river. The settling action in Lake Wisconsin and the impoundments above remove much of the sand and other materials held in suspension. The waters are clear but have a distinctive reddish-brown hue from the tannin of the wetlands at its headwaters.

Eddies around the pilings of the railroad bridge at Sauk City could be a threat to inexperienced canoeists.



Three bridges cross the river in a stretch of slightly more than three miles below the dam; however, the river is not spanned again until near Spring Green. (See Map IV-9, sheets 1 and 2.)

The river has a generally placid appearance as it flows south and west through farmlands adjacent to the river. The bottomland hardwoods along the banks screen most evidence of human development except in two places where County Highway "Y" is close to the river on the south bank. Here, homes and vacation cabins have been constructed within the floodplain on the south bank and are very visible to the river user.

Honey Creek - Lone Rock (24.7 miles)

The character of the river changes considerably where Honey Creek enters the Wisconsin River from the north. Here there are more islands and sandbars than upstream. Bluffs 250 feet high rise on the north, highlighted by Ferry Bluff--the first and most prominent. This distinctive feature served as a landmark for early river travelers and has been the subject of many legends and pioneer stories. At one time a ferry operated here, and now there are two public access points--one at the mouth of Honey Creek and another on the south side of the river in the 3,000-acre Mazomanie State Wildlife Area. Anheuser-Busch has donated

Outside Prairie du Sac and Sauk City, the river quickly regains its natural character. Ferry Bluff is in the background.

The scenic segment begins at Ferry Bluff, where Honey Creek enters the Wisconsin from the north. The river is very broad, approaching 1,500 feet in width and has frequent islands and sandbars.

$47,000 to the National Wildlife Federation for acquisition of a 150-acre eagle refuge on Ferry Bluff. The Ferry Bluff Eagle Refuge will be turned over to the Eagle Valley Environmentalists by the National Wildlife Federation for management on a contract basis.

Parts of the river are probably much as they were when Father Marquette first visited the river in 1673 He described it as being very wide with a sandy bottom and with many vine covered islands. The river approaches 1,500 feet in width in places as it flows westward. At low flows it is scarcely deep enough for canoes, but at flood stage it spreads over a floodplain up to several miles in width.

From Arena to Spring Green, State Highway 60 parallels the river on the north immediately adjacent to the floodplain, but in most places the river user is unaware of its presence because of the half-mile wide screen of vegetation and associated wetlands. There are occasional glimpses of farms, and a few trailers have been moved in along the bank where the vegetation has been cleared.

Dense bottomland vegetation predominates through much of the river corridor.

In places the river takes on a pastoral character, offering a break from the bottomland scene.

Arena Prairie, south of the river, is very sandy and highly productive for growing truck crops when irrigated from high pressure wells. Some of the islands in this reach are grazed by cattle. A major powerline and a railroad bridge cross the river near Helena. Here the river curves and flows south for three miles. Although the U. S. Highway 14 bridge above Spring Green is a major crossing and has associated development, both sides of the river corridor are masked by lowland hardwoods and adjacent wetlands.

The old shot tower at Tower Hill State Park can be seen during the approach to the Wisconsin Highway 23 bridge. Here, during the 1830's molten lead brought from the mills south of the Wisconsin River was poured through a sieve at the top of the tower into the cold water 200 feet below to form shot. A powerline crosses the river just above the bridge. Peck's landing on the north side of the bridge provides a developed access point, and the Spring Green Restaurant overlooks the river from the south bank. This restaurant was designed by Frank Lloyd Wright.

Livestock graze some of the bottomlands.

Turning northward at Spring Green, the river makes a large horseshoe bend before heading west. The slopes of Wintergreen Ski Area are visible on the southwest bank, while the northeast bank is covered with dense lowland forests, wetlands, and unusually prolific poison ivy. A marina, which includes a canoe livery and a campground has been developed at the end of Shiflett Road south of Spring Green. Some of the lands along the river have been subdivided, and two homes have been built. Additional building on these lots is restricted by the Wisconsin Floodplain and Shoreland Management Programs. The river is flanked on both sides by lowland hardwood and wetland types. The 1,840-acre Bakken's Pond State Wildlife Area occupies the north bank for over three miles between Spring Green and Lone Rock.

Lone Rock - Green River (39 miles)

Approaching Lone Rock, State Highway 130 closely follows the shoreline of the river for one-half mile before the Lone Rock bridge and for several miles downstream. Cars and trucks are easily seen and heard and detract from the feeling of a natural river corridor. The bluffs on the south shore are high, nearly vertical from the river's edge. The village of Lone Rock, shielded by a very large island and lowland hardwoods, is not visible from the main part of the river. Some subdivision has taken place in the conifer plantations, especially in the vicinity of Long Lake. These areas are out of the floodplain and are well screened from the river. They indicate a demand for suitable subdivision lands in the vicinity.

Although roads parallel portions of the Wisconsin River, usually there is vegetation screening view of the road.

The high sand banks in Richland County are prone to erosion.

As the river flows northwest, most of its shoreline is natural and undeveloped. The 867-acre Lone Rock Wildlife Area is located along the northern bank. Richland City, a once prosperous and historic river town, was located at the mouth of the Pine but now has only a few homes. Over half of the area originally platted in the city in the 1840's has been eroded into the river. The high sand banks indicate the extent and depth of the sandy soils of the area, and the erosion of these sandy banks emphasizes the power of the water of the river. The area near Gotham and Richland City is one of the most striking examples of erosion to be found along the Wisconsin.

The 3,580-acre Avoca Wildlife Area occupies five miles of the southern bank of the river and remains in an essentially natural condition interrupted only by a major powerline crossing. In addition to the usual varied lowland vegetative types, the area contains the largest remaining wetland prairie in the State. Many species of rather uncommon plants have been identified in this area.

Bluffs 400 feet high rise from the north shore of the river with State Highway 60 occupying a narrow bench between the bluffs and the river. Because of this, the highway traffic is highly visible and audible to the river user. Several dozen cottages or homes exist along the three-mile stretch of road which closely parallels the river; some are between the river and the highway; others are beyond the highway. The State Highway Department has obtained scenic easements to protect the bluffs from further development.

An occasional cabin is tucked into the flood plain.

Development occurs on both banks of the river at Orion and at Muscoda, and boating access points have been provided on both shores.

The railroad follows along the north shore for four miles above Bridgeport. Traffic on this line is very light.

At Muscoda the floodplain broadens and the bluff is screened from the river user by the lowland forest. The 4,181-acre Blue River Wildlife Area occupies five miles of the southern riverbank. The only access or development which is visible from the river is at County Road T which crosses from Blue River at Port Andrew. Highways 60 and 61 are visible at Boscobel. There are two major powerline crossings as the river approaches Boscobel.

Below Boscobel the river valley narrows and the bluffs on either side are visible again beyond the floodplain. Exposed sandbars are fewer and most islands are smaller than observed upstream. Much of the land has been posted "No Trespassing." Roads are close enough to the river to be visible for three-fourths of a mile at Boydtown and for a short distance at the access point at the mouth of the Green River. The Chicago, Milwaukee, St. Paul, and Pacific Railroad crosses the river at Woodman. In all, there are four highway bridges, two railroad bridges, and seven powerline crossings between Lone Rock and the Green River. Although communities such as Woodman and Boydtown are close to the river, they do not now impinge on the river. Some cabins, trailers, and year-round residences have been constructed along the river or on the islands; but they are few in number, particularly below Boscobel.

Green River - Mississippi River (18.7 miles)

Evidence of man's presence diminishes even more below Green River. However, there are two powerline crossings in this reach, one at Bridgeport and one two miles upstream from Bridgeport. In addition, the railroad reappears and follows the north shore for four miles above Bridgeport. Highway 18 crosses the river at Bridgeport.

The last five miles of the river are the most primitive with no access or development. The 500-foot high bluffs of Wyalusing State Park and the bottomland hardwoods in the floodplain below dominate the south bank. The combination of public ownership and difficult topography preclude development in this reach. Looking downstream the river user can also see the bluffs on the Iowa side of the Mississippi. Extending a short way into the mouth of the Wisconsin are units of the Upper Mississippi River Wildlife and Fish Refuge. The only major intrusion into this segment of the river is the Burlington Northern Railroad bridge about a mile above the confluence.

The bluffs of Wyalusing State Park mark the confluence of the Wisconsin and Mississippi Rivers.

Flow Characterisitics

The flow of water throughout the year and the stream gradient are necessary considerations in evaluating the recreational potential of the lower Wisconsin River. This flow is regulated in part by the dam at Prairie du Sac and influenced considerably by the 47 storage reservoirs and 26 power dams above Lake Wisconsin. The river's gradient and flow characteristics are illustrated by a river profile (Figure IV-1) and graphs of flow durations (Figure IV-2), seven-day low flows (Figure IV-3), and flood-flow recurrence (Figure IV-4). Sufficient streamflow data to develop meaningful graphs were available for the gauging site at Muscoda, the approximate midpoint of the river reach being studied.

The uniformly low gradient of the river below the Prairie du Sac dam (Figure IV-1) allows easy recreational boating and canoeing. In this reach, the river gradient is only about 1.6 ft./mi. and is at grade with the Mississippi River. Being at grade, the Wisconsin is neither eroding downward nor building up its valley. Sediments commonly removed from the outside of meander loops generally move slowly downstream as migrating sand bars and eventually are deposited along the insides of other meander loops. Boaters and canoeists have no difficulty with the slow-moving water but occasionally may become grounded on the slightly submerged sand bars.

These two photographs illustrate the fluctuation of water levels on the Wisconsin, as influenced by the dams upstream. Taken at the Arena boat landing over a 24-hour period, they suggest approximately a two-foot change in water level.

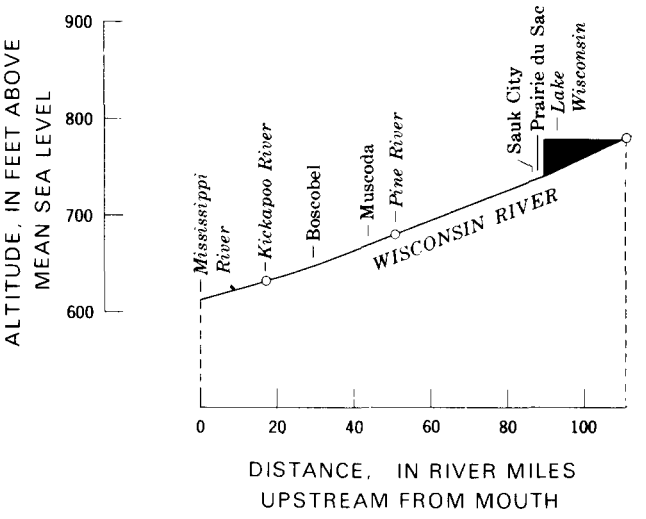
The flow-duration curve (Figure IV-2) shows the percentage of time that the discharge equaled or exceeded a given rate between 1939 and 1968. For about 98 percent of the time, the discharge of the Wisconsin River at Muscoda ranged between about 3,000 cfs and 30,000 cfs. The flow was more than 30,000 cfs only one percent of the time and less than 3,000 cfs only one percent of the time. Average flow of the river for the 1913-74 period (8,613 cfs) was equaled or exceeded about 35 percent of the time.

The seven-day low flow is the lowest average discharge during seven consecutive days of any year. Figure IV-3 shows the recurrence interval of these seven-day low flows based on a data period from 1939 to 1968. Based on the assumptions that 1939-68 is a representative sample of time and that regulation patterns of upstream reservoirs have not and will not change, an extreme low flow of only 2,000 cfs for seven consecutive days can be expected in the future on the average of just once in 50 years. More common are seven-day low flows of about 3,000 cfs, which may recur an average of about once in five years.

Flood-frequency curves show the average recurrence interval of a given discharge and the percentage chance of that discharge being exceeded in any year assuming the period of record is a representative time sample and there is no change in regulation patterns. The range of flood flows on the lower Wisconsin River are not great--the 50-year flood is only about twice as high as the average annual flood. Figure IV -4 shows that the 50-year flood will have a discharge of about 70,000 cfs compared to a two-year or average flood of about 35,000 cfs and a 1.05-year flood of about 14,000 cfs. This

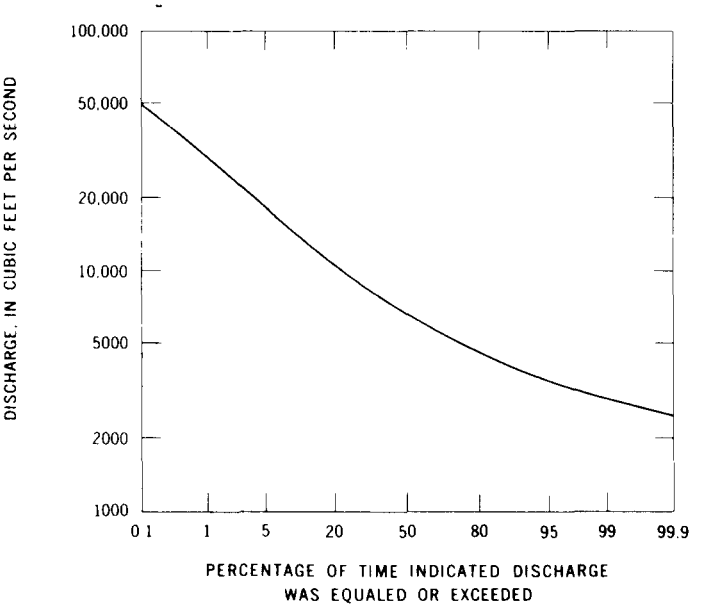
PROFILE OF THE WISCONSIN RIVER BETWEEN THE MISSISSIPPI RIVER AND LAKE WISCONSIN

FIGURE IV-1



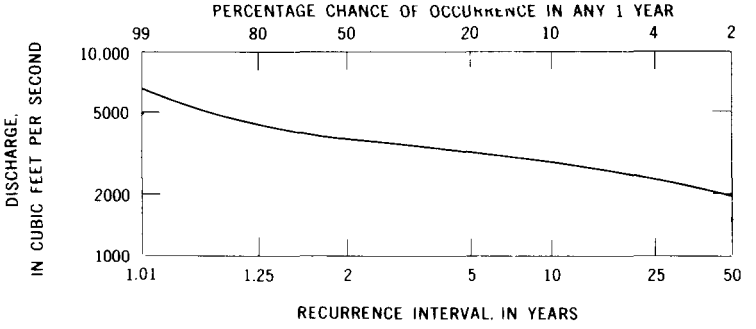
FLOW DURATION OF THE WISCONSIN RIVER AT MUSCODA

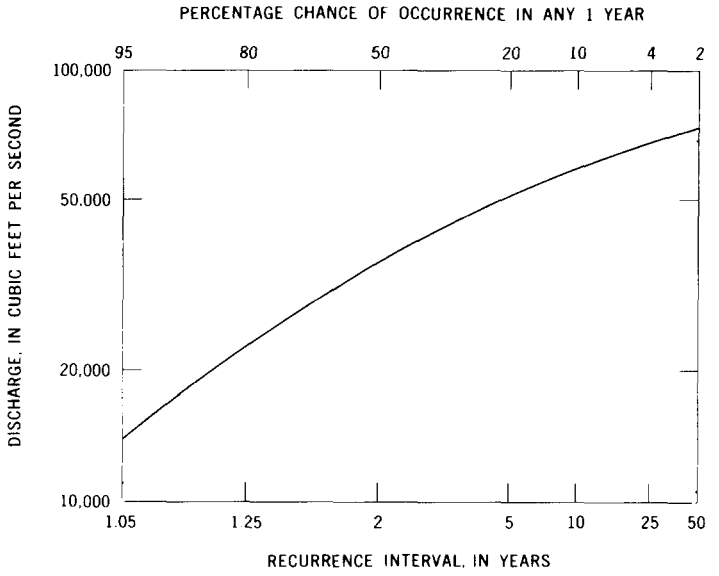
FIGURE IV-2



7-DAY LOW FLOW OF THE WISCONSIN RIVER AT MUSCODA

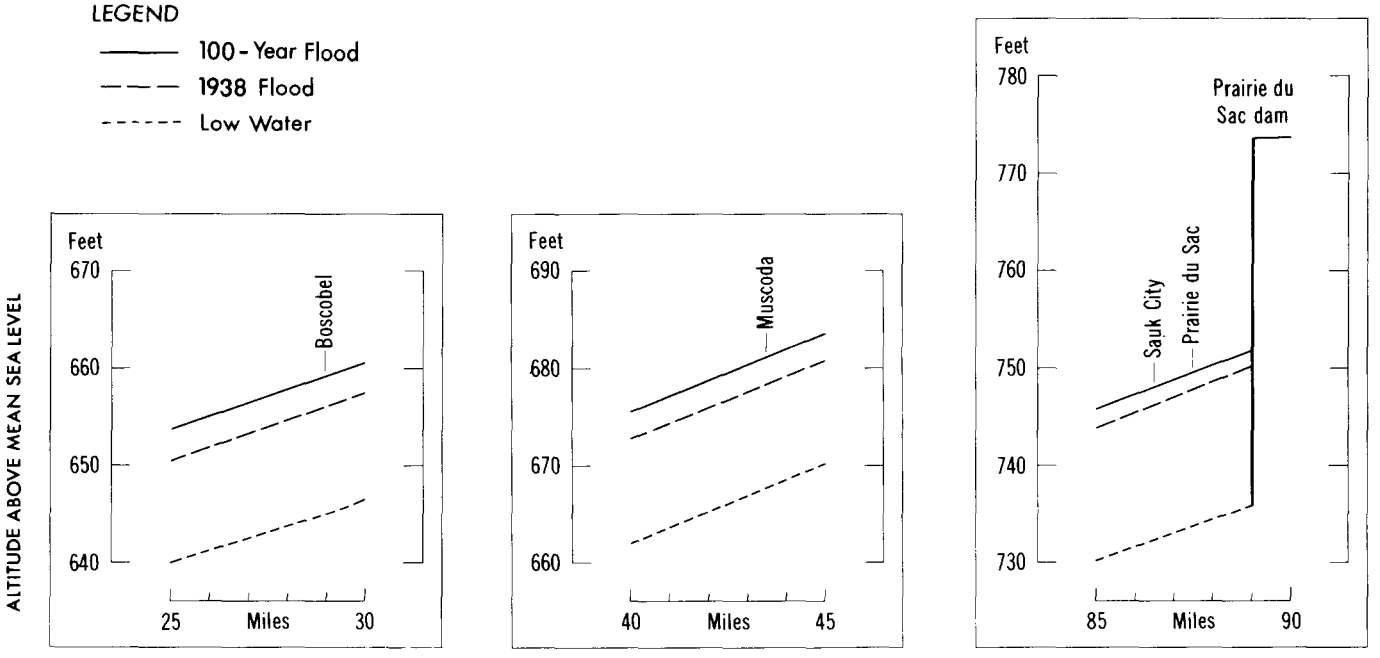
FIGURE IV-3





FLOOD-FLOW RECURRENCE OF THE WISCONSIN RIVER AT MUSCODA

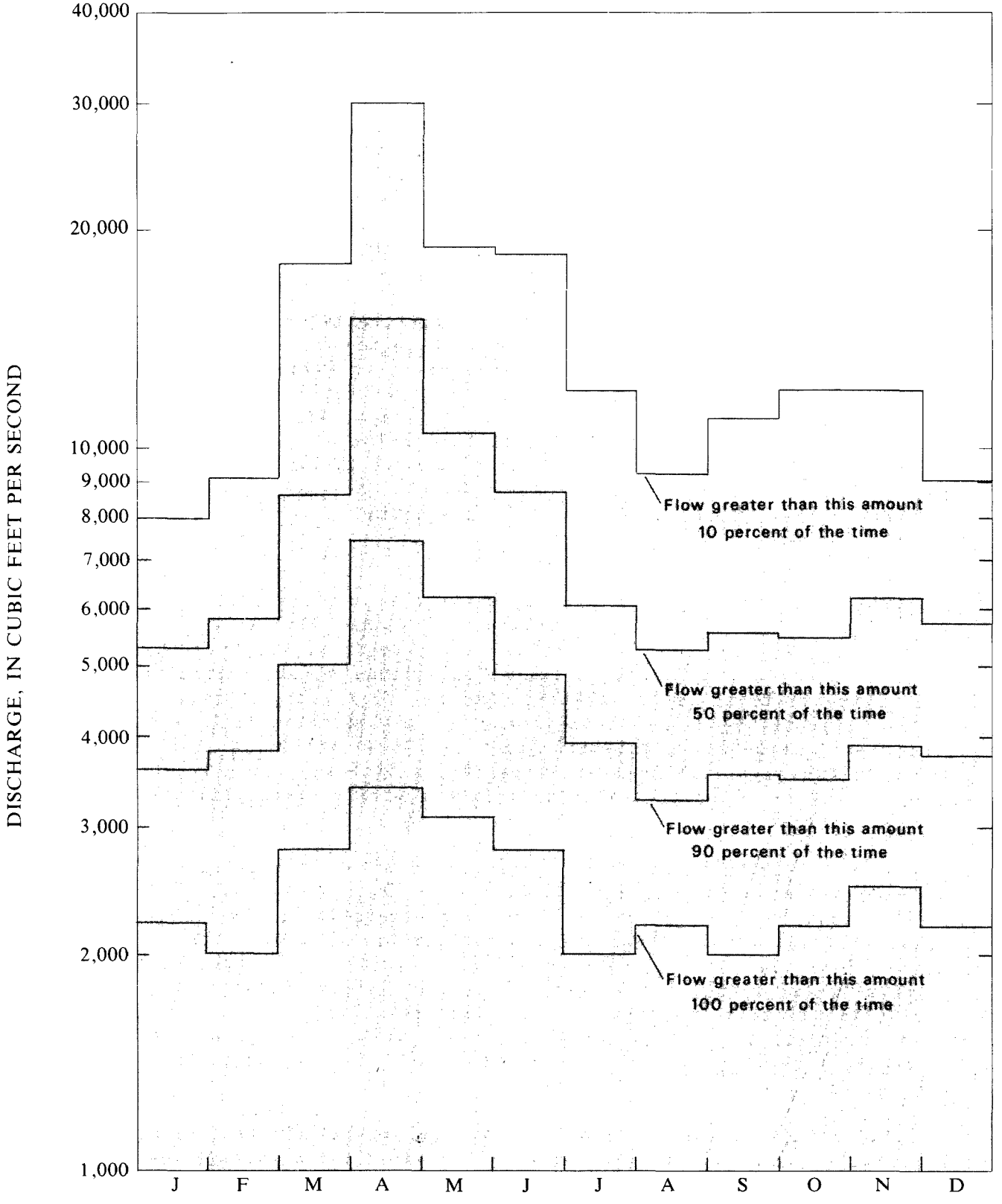
FIGURE IV-4



DISTANCE, IN RIVER MILES UPSTREAM FROM MOUTH

PROFILES OF THE 100-YEAR FLOOD, THE HIGHEST FLOOD OF RECORD (SEP 1938), AND LOW WATER

FIGURE IV-5



MONTHLY FLOW DURATIONS OF THE WISCONSIN RIVER AT MUSCODA

FIGURE IV-6

narrow range of flood discharge can be attributed to floodwater storage behind the many dams farther upstream and by the dam at Prairie du Sac.

Figure IV-5 compares water profiles for the predicted 100-year flood, the highest flood of record, and low water. All three profiles show 14-to-16 foot differences between low water and the predicted 100-year flood. At each location the 100-year flood is only two to three feet above the record flood of September 1938. The flood-profile segments are for places where major damage might result from a 100-year flood. This 100-year flood is estimated to be about 94,000 cfs at the Muscoda gauge.

The suitability of the Wisconsin River for canoeing may be judged from monthly flow durations. Figure IV-6 shows the percentage of days or time in each month that the riverflow equaled or exceeded a given amount (based on daily records of the Wisconsin River at Muscoda between 1913 and 1974). During the period of record, the average daily discharge for each of the 12 months always was greater than 2,000 cfs. At a flow of 2,000 cfs, the river could be traversed by a canoe if the canoeist could "read the river" and use the deep-water channel. As discharge increases, sand bars become less of a problem for the canoeist.

Air Quality

Air quality is monitored for compliance with Federal primary air quality standards at several representative points within or near the lower Wisconsin River basin. National Ambient Air Quality Standards are shown in Appendix I and the sampling stations are shown in Table IV-1. The primary standards are intended to protect human health, while the secondary standards will protect against the more subtle, long-term damaging effects of air pollution on such things as growing plants and painted surfaces.

Data from the monitoring stations listed in Table IV-1 indicated that only one parameter, photochemical oxidants (ozone), was being violated and this about one percent of the time. The occurrence of photochemical oxidants, which are a product of the decomposition of hydrocarbons by sunlight, is a nationwide problem found in rural as well as urban areas. The high oxidant levels in the lower Wisconsin River basin are believed to be from both stationary and mobile hydrocarbon sources. These sources may be difficult to locate and control, and constitute a regional problem as the following excerpt from the 1974 Clean Air Act report to Congress indicates.

> The oxidant (standard) attainment problem is further complicated by the fact that recent measurements of oxidant levels in rural areas have shown that national standards are exceeded regularly, in some cases more than 20 percent of the time. Though it is known that natural emissions from such sources as coniferous forests can cause the formation of photochemical oxidants, data from remote ambient

Table IV-1

(January 1974 - December 1974)
Photochemical Oxidant Standards Violations - Lower Wisconsin River

Station Location	Station Code	# Observations	# 160 mg/m^3	% Observations violating standard	Observed Max. Value mg/m^3
MacKenzie Environmental Center (Wisconsin DNR Station) Columbia Co.	001F03	7453	51	0.7	212
Wisconsin DNR Station on median strip of W. Wisconsin Ave., Madison, Wisc.	999F05	447	6	1.3	202
Wisconsin DNR station at Bluffview mobile courts on Highway 12 west of Badger Ordinance Plant, Sauk Co.	999F05	827	16	1.9	212

> air monitoring sites, when correlated with meteorological data, indicate that oxidants are transferred into these remote areas from large metropolitan areas that may be hundreds of miles distant. Additionally, east of the Mississippi River, where large cities are in close proximity, research data show that oxidants in remote areas may come from different source cities depending on wind direction.

State implementation plans are available to correct the primary air quality standards violations, and additional oxidant control strategies to meet the secondary air quality standards are expected to be developed by 1980. The present infrequent violations of Federal air quality standards are not expected to adversely affect recreational use of the lower Wisconsin River.

Water Quality

The present water quality in the lower Wisconsin River is suitable for partial body contact activities such as boating, canoeing, fishing, and wading, but not for total body contact activities such as swimming or water-skiing. The water is capable of supporting the propagation of aquatic life, including fish, which normally would be adapted to the habitat of the stream. With reference to water quality, the Guidelines for Evaluating Wild, Scenic, and Recreational River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System, which were established by the U. S. Departments of the Interior and Agriculture, state that for scenic and recreational components:

> Water quality should meet minimum criteria for desired types of recreation except where such criteria would be exceeded by natural background conditions and aesthetics and capable of supporting propagation of aquatic life normally adapted to habitat of the stream, or is capable of and is being restored to that quality.

While the river meets the criteria for inclusion in the National System, water quality problems of varying degrees are encountered throughout the entire study area. Serious problems of low oxygen content water frequently exist from the dam at Prairie du Sac to several miles west of Sauk City. This is related to the release of deoxygenated water and water containing significant concentrations of organic, oxygen-demanding material from Lake Wisconsin. This situation is aggravated by seepage from the Sauk City wastewater treatment lagoon. The U.S. Environmental Protection Agency believes the situation improves before the river reaches Honey Creek-County Road Y, where the river segment recommended for inclusion in the National System begins. Fecal coliform appears to be the only State standard violated within the qualifying reach. Fecal coliform counts fluctuate widely, but monthly average fecal coliform counts are in the range of 300-500/100 ml as opposed to a Wisconsin Water Quality Standard[1/] for recreational use (i.e., whole body contact recreation) of 200/100 ml. However, present levels are well within the 1968 recommendations of the National Technical Advisory Committee of the

1/ See Appendix for summary of Wisconsin Water Quality Standards.

Federal Water Pollution Control Administration (now part of the EPA) of 2000/100 ml as an average for general recreation use waters where there is no danger of significant water ingestion. The EPA does anticipate that the 200 fecal coliform/100 ml. standard will be met by 1983 with the implementation of the municipal and industrial treatment levels required by Public Law 92-500.

Other problems with water quality are related to heavy metals, nutrients, and sediment. Data concerning heavy metals are scarce. However, Wisconsin Department of Natural Resources sampling data indicate that mean concentrations of heavy metals, including mercury, do not exceed recommended limits for fresh water biota. In the late sixties maximum concentrations for mercury far exceeded the recommended water quality standards with the result that mercury accumulated in fish tissue at levels which exceeded the 0.5 ppm guidelines of the Federal Food and Drug Administration for fish sold commercially. Recent Wisconsin River fish samplings, however, have shown that 95 percent of the fish assayed contained less than the allowable limit for mercury attesting to the success of the point source control program. In view of the high residual mercury levels in some of the fish tests, the Department of Natural Resources has chosen not to lift the existing advisory against consuming more than one meal a week of fish taken from the Wisconsin River. No danger to human health is expected to result from recreational fishing use of the lower Wisconsin River.

In discussing nutrient levels, phosphorous is recognized as being the controlling factor in biological productivity. Recommended maximums for total phosphorous are generally in the range of .05 mg/l-.1 mg/l for the prevention of nuisance blooms in free-flowing streams. Mean values for total phosphorous at both Prairie du Sac and Bridgeport exceed this recommended level, reaching .12 and .17 mg/l, respectively. Although mean values of .07 mg/l were recorded in Lake Wisconsin and at Muscoda, these lower values for total phosphorous are probably the result of biomass uptake. Such growths are often in evidence in shallower waters. Agricultural over-fertilization rather than point sources or animal wastes is considered to be the chief source of nutrients. The Department of Natural Resources estimates that only one percent of the annual phosphorous and nitrogen loadings of 1,450 and 9,060 tons, respectively, is attributable to animal wastes reaching surface waters.

Sediment carried by the Wisconsin River ranges from light below the Prairie du Sac dam to heavy in the lower reaches. Below Sauk City the water may be characterized as dark in appearance because of the tannic acid; most of the sediment load has settled out in the lake. The load appears to rebuild slowly and does not appear heavy until near Muscoda. The suspended sediment load of the main stem measured at the U.S.G.S. station at Muscoda averaged 10,747.6 tons/day over the period from 1964-1975. Tributaries undoubtedly bring in a substantial portion, but the bare, sandy banks washed daily by fluctuating water levels must also be a very significant source. Prospects for reducing the sediment load cannot be considered promising.

Table IV-2

Water Quality Conditions in Streams Below Muscoda

Stream Reach	Stream Miles to Wisconsin River	Date of Survey	Fecal Coliform Count	Benthic Conditions
Sounders Creek below Boscobel STP	1.6	9/9/71	110,000/100 ml	Very polluted condition below Boscobel outfall, trace deposits noted.
Crooked Creek below Milk Specialities Inc. outfall	0.7	8/18/71	4,500	Presence of very tolerant organisms and slime growth indicating polluted condition.
Kickapoo River below Wauzeka	0.5	7/1/71	4,100	No information on benthic conditions at Wauzeka, but improvement is expected following construction of a new STP
Little Kickapoo Creek below Spring Brook Cheese Factory	2.5	7/1/71	22,000	No survey conducted on Little Kickapoo Creek
Hazelton Tributary below Hazelton Cheese Factory	4.0	8/17/71	379,000	No survey conducted on Hazelton Tributary

Pesticide levels do not appear to be a problem. Levels have been measured on both the Pine and Kickapoo Rivers with only the Kickapoo basin showing significant levels. Three of the pesticides found--DDT, Chlorodane, and Dieldrin--have been greatly restricted in use since August 1976 by the U. S. Environmental Protection Agency. Chlorodane and Dieldrin may be used only under special permit while DDT has been phased out entirely. The other three--2, 4-D, Silvex, and 2,45-T--were not present in levels considered toxic to fish.

In addition to the problems identified with the quality of water released from Lake Wisconsin, a number of point sources of pollution have been identified and are shown on Map IV-1. Thirteen of the 18 sources shown are municipal sewage treatment plants, and five are dairy processors. Information on the treatment of these point sources may be found in Appendices III and IV.

Most of the water quality problems in the lower Wisconsin River derive from municipal and industrial polluters, both on the main stem and tributaries in the basin. The tributaries above Muscoda apparently are not a major factor. Localized deterioration noted in water quality below industrial and municipal point sources is corrected before reaching the main stem. In general, the tributaries above Muscoda are swift streams which carry a sizable sediment and phosphorous load. Many of the smaller tributaries have been classified as smallmouth bass and trout waters by the Wisconsin Department of Natural Resources. Smallmouth bass can occasionally be found in all larger streams (over 20 feet wide) that enter the lower Wisconsin. Since these streams have mainly silt and sand bottoms as opposed to rocky, gravel bottoms preferred by smallmouth bass, the smallmouth population in the corridor is limited.

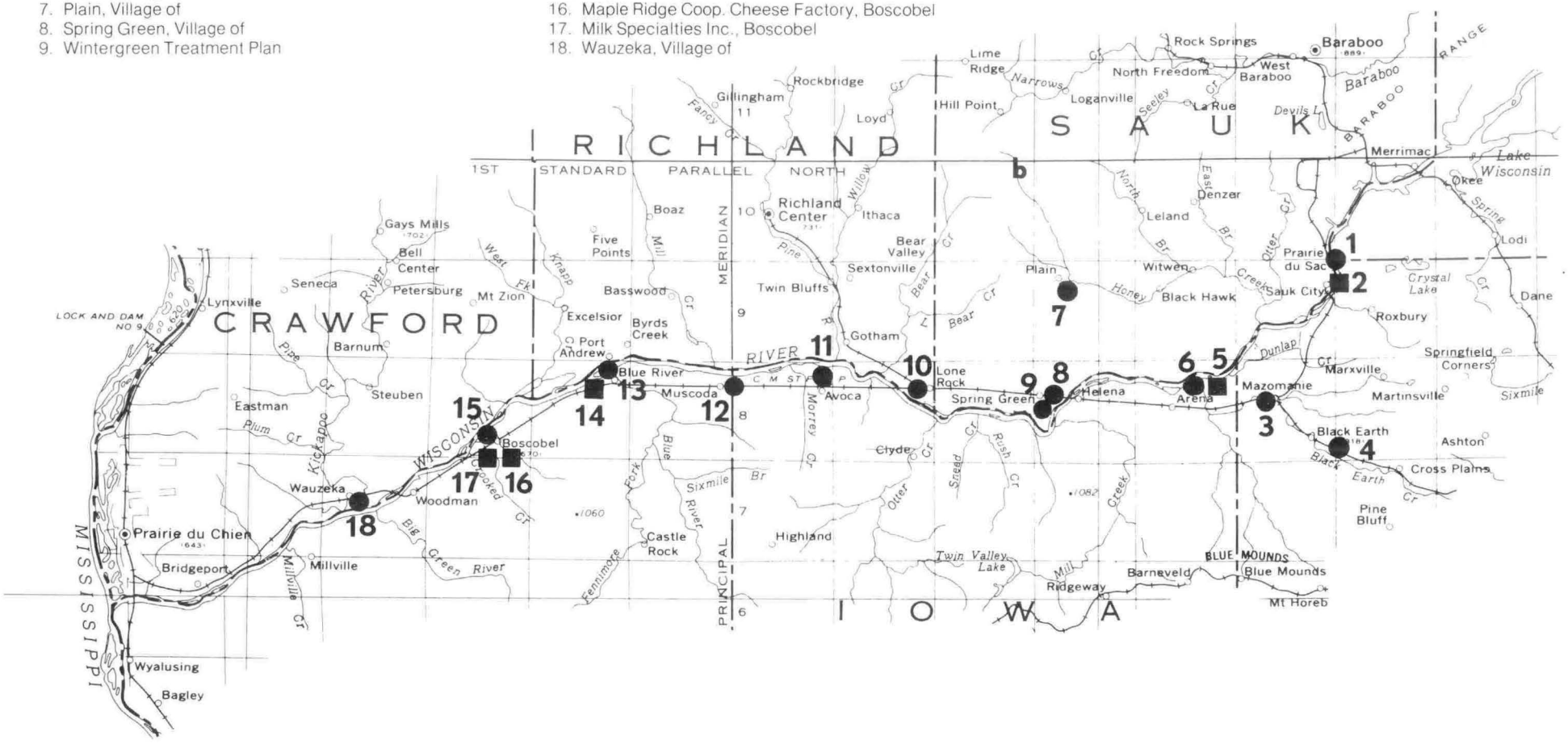
The tributaries below Muscoda show a definite potential for affecting the water quality of the study segment as shown in Table IV-2. Although both Boscobel and Wauzeka have adequate treatment facilities, sewer system problems may cause bypassing of raw sewage during periods of heavy runoff. There is no indication that the Hazelton Cheese Factory has adequate waste treatment facilities.

In order to achieve the standards shown in Appendix 2, effluent restrictions were adopted pursuant to Section 301 of P.L. 92-500. Under this legislation, municipal or publicly owned treatment facilities were required to have secondary treatment capability by July 1, 1977. Effective secondary treatment removes almost all floating and settleable solids and approximately 90 percent of both five-day biochemical oxygen demand and suspended solids through a settling and biological decomposition process similar to stream assimilation. By July 1, 1983, even more stringent effluent standards will be required of municipal and industrial dischargers.

Effluent standards represent a minimum level of treatment which must be achieved by point sources. If this minimum level of treatment is not adequate to meet water quality standards, higher levels of treatment

INDUSTRIAL AND MUNICIPAL POINT SOURCES

1. Sauk City-Prairie du Sac Sewerage Commission, Sauk City
2. Wisconsin Dairies Coop., Sauk City
3. Mazomie, Villiage of
4. Black Earth Sewage Plant
5. National Farmers Organization, Arena
6. Arena, Village of
7. Plain, Village of
8. Spring Green, Village of
9. Wintergreen Treatment Plan
10. Lone Rock, Village of
11. Avoca, Village of
12. Muscoda, Village of
13. Blue River, Village of
14. Excelsior Dairy Assoc., Blue River
15. Boscobel, City of
16. Maple Ridge Coop. Cheese Factory, Boscobel
17. Milk Specialties Inc., Boscobel
18. Wauzeka, Village of



● MUNICIPAL
■ INDUSTRIAL
▲ OTHER

N

0 10 20
Miles

WASTE SOURCES

MAP IV-1

may be required. However, the general effluent guidelines for municipal and industrial dischargers are frequently modified by their National Pollutant Discharge Elimination System (NPDES) permit to ensure the attainment of water quality standards within a reasonable period of time, given the limitations of present funding and manpower at the State level, the constantly changing technology of pollution control, and the lack of adequate baseline data on treatment plant operation and stream hydrology.

The lower Wisconsin River and its tributaries have been classified as an effluent limited segment meaning that the present water quality problems were supposed to be corrected by July 1, 1977, with the implementation of secondary/best practicable treatment by point sources. However, two factors prevented this goal from being attained. These are the present background levels of bacterial contamination on the mainstem presently being attributed to nonpoint sources by the State and the lack of adequate funding and manpower to implement fully the anticipated point source control program.

Between 1965 and 1975 six municipal treatment plants in the basin were upgraded to provide secondary treatment. No one in this basin has received Federal funds to construct a new primary treatment plant alone since 1965. In some cases communities have received funds for a primary plant, but the effluent must be disposed of on land.

Upgraded from Primary to Secondary Treatment	Provided with First Centralized Waste Treatment System
1. Black Earth	1. Soldiers Grove
2. Blue River	2. Yuba
3. Cross Plain	3. Avoca
4. Gays Mill	4. Arena
5. Mazomanie	
6. Wauzeka	

Five more municipalities presently employing primary treatment are receiving grants to upgrade their facilities. These are the Sauk Prairie Sewage Commission and the Villages of La Farge, Viola, Spring Green, and Ontario. Grants are awarded in three steps: Step 1-Planning, Step 2-Design, and Step 3-Construction. The following schedule illustrates the dates when each of these municipalities was awarded or is due to be awarded a grant for each step:

	Step 1	Step 2	Step 3
Sauk Prairie Sewage Commission	Awarded 10/75	Due 6/78	Due 7/79
La Farge	Awarded 10/75	Due 9/78	Due 9/79
Viola	Awarded 10/75	Due 3/78	Due 3/79
Spring Green	Awarded 2/76	Due 3/78	Due 1/79
Ontario	Awarded 9/75	Awarded 5/77	Due 12/77

A comparison of this list with Table IV-3, the municipal facility needs for the lower Wisconsin River basin through 1990, indicates the extent of unmet water pollution control needs in 1977. For example, although Spring Green is eligible to receive a Federal grant to upgrade its existing sewage treatment plant, its needs for additional interception sewers will probably not be met before 1979.

Excessive inflow and infiltration of clear water into municipal sanitary sewer systems appear to be a significant problem in the lower Wisconsin River basin. Although the majority of municipal sewer systems have separate conveyances for sanitary wastes and stormwaters, these systems are frequently cross-connected. The result is that sanitary sewage may overflow into the stormwater system under conditions of overloading and be discharged untreated. There have also been instances where individual residential sanitary sewers have been connected directly to storm sewers which allow untreated wastes to be discharged daily regardless of the loading conditions. Excessive overloading of a wastewater treatment plant with either organic material or clear water upsets the designed balance between waste reducing organisms and the concentration of organic material and results in inadequate treatment. The importance of preventing the inflow or infiltration of clear water to the system and raw sewage bypasses is borne out by the CEQ estimate that 40-80 percent of the organic loading from a community with secondary waste treatment may be attributed to such sources.

This problem may be corrected by either expanding the hydraulic capacity of the treatment plant, or rehabilitating or replacing all or part of the municipal sewer system. Therefore, an infiltration/inflow (I/I) analysis is required to determine the most cost effective solution before a construction grant may be made to a community for upgrading or expansion of its treatment system. Boscobel, Mazomanie, and Wauzeka will be required to complete an I/I analysis.

The requirement of an I/I analysis, like any other municipal pollution control requirement involving an expenditure of Federal assistance, is contingent upon the availability of grant funds to correct the problem.

Despite the progress made during the last decade to provide waste treatment facilities and upgrade the operation of existing facilities to provide adequate disinfection and secondary treatment, communities such as Muscoda, Spring Green, and were not able to implement all of the needed wastewater treatment facilities by 1977. Since the projected deadlines for correcting the water quality standards violations attributable to municipal and industrial point sources apparently will not be met, the actual time period needed to correct these problems cannot be ascertained. Any estimate will have to take into consideration the funding and manpower situation and congressional redirection for the water pollution control program after 1977. Correction of sewer system problems may be a long standing factor in the pollution problems of the basin, as will nutrient loadings from agricultural activities. The State of Wisconsin's Department of Natural Resources is now establishing an outfall monitoring program for sewers and a network of sampling stations to better define the nonpoint source problem.

Table IV-3

Municipal Facility Needs for the Lower Wisconsin River Basin
Through 1990

Entity	Needs Description	Estimated Total Project Cost
Gays Mills	I/I Analysis New Collector Sewers	370,000
Highland	I/I Analysis New Collector & Interceptor Sewers Advanced Waste Treatment Facility	417,000
La Farge	I/I Analysis, Secondary Treatment (BPWTT)	274,000
Muscoda	Secondary Treatment (BPWTT)	10,000
Plain	I/I Analysis, Secondary Treatment (BPWTT)	253,000
Spring Green	I/I Analysis, New Interceptors Secondary Treatment (BPWTT)	483,000
Wauzeka	I/I Analysis, New Collectors and Interceptors	71,000
Wilton	I/I Analysis, New Interceptors Secondary Treatment (BPWTT)	430,000

Study segment total needs $493,000

Lower Wisconsin River basin total needs $2,308,000

Wisconsin River basin total needs $117,726,000

Not all sources of pollution can be readily identified or controlled.

Riprap and debris clutter the bank near Prairie du Sac city park.

Climate

The location of the lower Wisconsin River near the center of the North American continent gives the region a typically continental climate. Such a climate is marked by large annual and daily ranges in temperature. These annual variations are accentuated by large seasonal changes in the solar zenith angle and in the day length which produce large seasonal temperature changes. The prevailing wind patterns further accentuate the large seasonal temperature differences by flowing relatively warm southern air into the region in summer and relatively colder northern air into the region in winter. The lack of mountain barriers toward the arctic or the tropics leaves the region wide open as an ideal battleground between tropical and arctic air masses, resulting in short term temperature variability associated with the passing of frontal zones. Temperatures are most variable in the summer months, with the average daily temperature range being 25°F in July, while only 18°F in January.

Winters are severe in the lower Wisconsin River region with temperatures averaging about 20°F. Temperatures fall below 0°F 20 to 25 days annually, and maximum daily temperatures do not exceed 32°F 50 days annually. A record low temperature of -43°F has been recorded at Lone Rock. Temperatures begin to rise rapidly in the spring, particularly in the western areas of the lower Wisconsin River. Monthly average temperature data, presented in Table IV-4, confirm this trend as Prairie du Chien and La Crosse exhibit higher average spring temperatures than do eastern reporting stations. Warming continues until temperatures peak

TABLE IV-4

Average Monthly Temperatures (°F)

Month	Prairie du Chien	La Crosse	Muscoda	Madison	Prairie du Sac	Wisconsin
January	17.4	16	13.6	17	17.0	19.1
February	20.8	19	17.7	20	21.0	21.9
March	33.8	32	32.1	31	33.2	31.8
April	48.5	47	47.2	46	47.3	46.9
May	59.9	59	58.2	58	58.7	58.6
June	68.8	68	67.5	67	68.2	68.3
July	73.7	73	73.4	72	73.8	73.1
August	70.9	70	70.2	70	71.2	71.1
September	63.6	62	61.3	62	63.2	62.5
October	51.8	50	48.6	50	50.9	51.4
November	36.6	35	35.6	35	36.7	34.4
December	23.3	22	22.4	23	22.6	23.4

From: United States Weather Bureau, "Climatic Summary of the United States, Wisconsin Section."

in the summer months of July and August. Humidity and temperatures are high during the summer, with humidity often exceeding 80 to 90 percent and temperatures averaging 70°F. Temperatures exceed 90°F 18 to 22 days annually. A record high temperature of 110°F has been recorded at Prairie du Chien. With the advent of autumn, temperatures begin to fall rapidly in September and October. Fall temperatures average 49°F. The fall of temperature continues until winter ensues in December.

Precipitation in the lower Wisconsin River region is abundant and rarely varies more than 20 percent from the historical annual average of 30 to 33 inches. Precipitation is maximum during the late spring and early summer, with June having the highest monthly average precipitation of 3.5 to 4.5 inches. Excessive rainfalls in the late spring and early summer and again in early fall often lead to flooding along the lower Wisconsin River. Winter is the driest season, with January and February having low monthly average precipitation of one to two inches. Table IV-5 gives monthly average precipitation data from several reporting stations in the lower Wisconsin River region. Droughts are unusual in the region and occur in late summer, if at all. These dry periods are usually not severe since a secondary precipitation maximum often occurs

TABLE IV-5

Average Monthly Precipitation (Inches)

Month	Prairie du Chien	La Crosse	Muscoda	Madison	Prairie du Sac	Wisconsin
January	1.08	1.20	0.95	1.50	0.97	1.15
February	1.09	1.10	1.20	1.50	0.98	1.04
March	1.81	1.60	1.36	2.10	1.34	1.92
April	2.63	2.40	2.44	2.60	2.76	2.75
May	3.74	3.70	4.48	3.70	3.64	3.72
June	4.17	4.30	3.78	3.90	3.68	4.69
July	3.52	3.80	3.32	3.80	3.01	3.77
August	3.83	3.50	3.47	3.20	3.21	3.94
September	3.86	4.00	3.93	3.60	4.37	3.63
October	2.20	2.30	2.51	2.40	2.02	2.23
November	1.70	1.60	1.80	1.80	1.59	2.09
December	1.34	1.30	1.14	1.60	0.93	1.21
Annual	30.94	30.80	30.38	31.70	28.50	32.14

From: United States Weather Bureau, "Climatic Summary of the United States, Wisconsin Section."

in the fall. On an average of 60 days annually, precipitation of 0.10 inches or more is recorded. Snowfall averages 40 inches in the lower Wisconsin River region. Snowfall, however, varies widely from year to year, ranging from 13 to 80 inches. From December through March, snow cover may be expected 65 percent of the time.

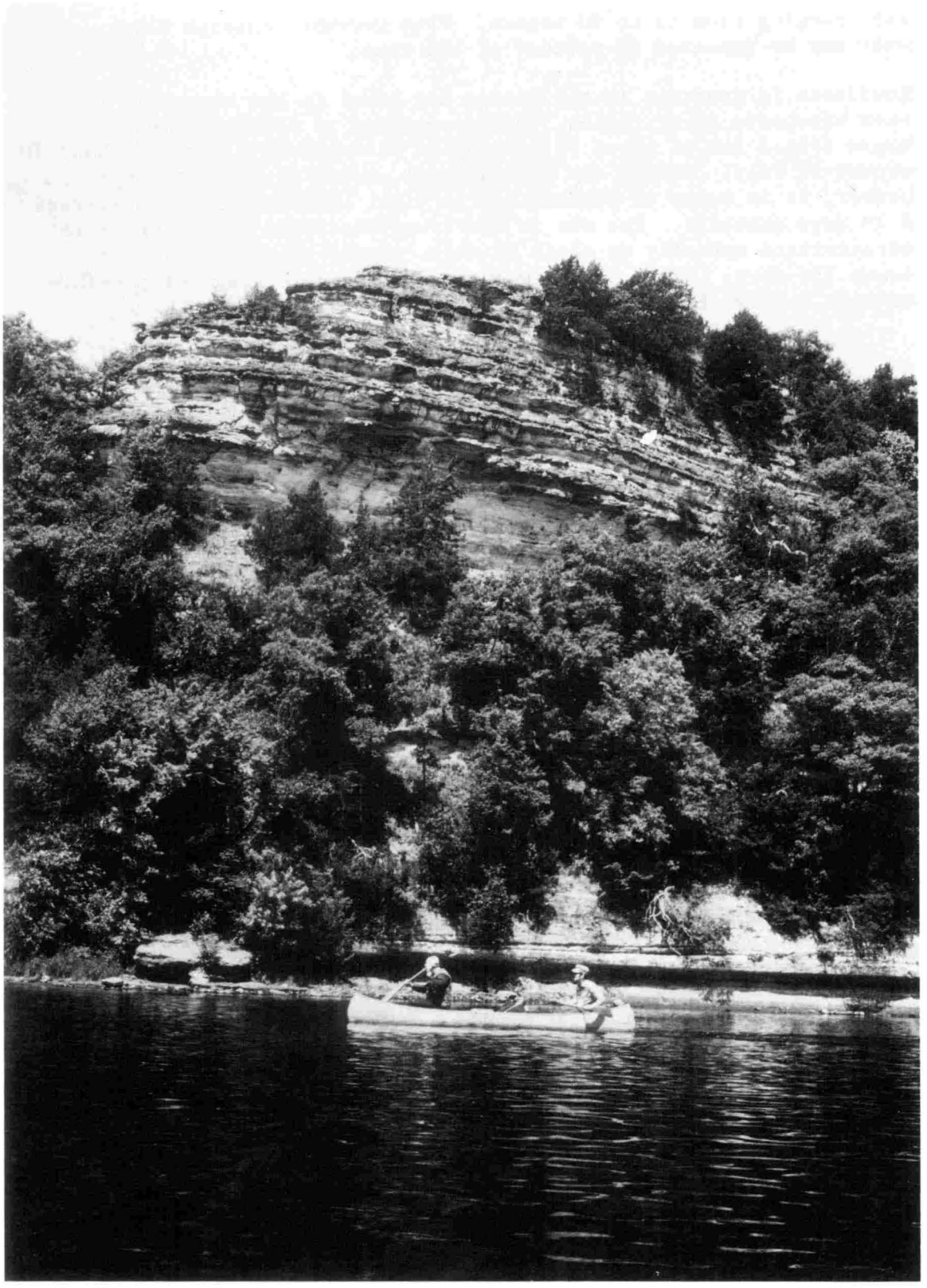
Cloudiness is greatest in the winter and least in the summer in the lower Wisconsin River region. The percentage of possible sunshine ranges from a low of about 40 percent in December to a high of about 70 percent in July. During the recreational period of April through October, it is sunny 60 percent of the time. Fog occurs on an average of 18 days annually. The sky in the lower Wisconsin River region is characterized annually as clear 95 days, partly cloudy 96 days, and cloudy 184 days. Table IV-6 gives the monthly percentage of possible sunshine for two locations in the lower Wisconsin region.

TABLE IV-6

Average Percent of Possible Sunshine

Month	Madison	La Crosse
January	44	49
February	48	54
March	51	56
April	53	57
May	57	60
June	63	63
July	68	71
August	64	66
September	58	58
October	51	53
November	40	42
December	37	41
Annual	53	56

From: United States Weather Bureau, "Climatic Summary of the United States, Wisconsin Section."



Canoeists pass Ferry Bluff.

Geology

The lower Wisconsin River is in the Driftless Area of the Western Upland, a region that was not glaciated during the Pleistocene epoch, or ice age. The rugged landscape has numerous rock outcrops, much clay-chert residuum, a few caves in Ordovician dolomites, a relief of several hundred feet, and a modified dendritic drainage pattern. Oxbow lakes constitute the only natural lake form. Essentially flat-lying Paleozoic marine shales, siltstones, sandstones, and dolomites and limestones outcrop in the area but are somewhat obscured by Pleistocene loess, terrace deposits and outwash, and Recent alluvium, colluvium, and soils. The most conspicuous topographic feature of the area is the great valley of the Wisconsin River. At Prairie du Sac the Wisconsin has a mean sea level elevation of 740 feet, and at its confluence with the Mississippi the elevation is 615 feet, a descent of about 1.6 feet per mile. The floodplain of the Wisconsin is more than four miles wide below Prairie du Sac, about two miles wide at Muscoda, and narrows to one-half mile at Bridgeport, some six miles from the Mississippi River. Near Bridgeport the river has cut through resistant bedrock and is much narrower.

Excellent rock exposures occur along roadcuts and quarries and occasionally outcrops are seen along stream cutbanks and channel bottoms. A resistant Cambrian sandstone forms low cliffs adjacent to the river west of Spring Green in Sauk County. Higher Ordovician calcitic-dolomite caps the bluffs along the river. The general geologic structure of the area is fairly simple with no large-scale faulting or folding. Except where slumped or current-bedded, the strata appear almost horizontal. Formations dip at less than one degree per mile to the southwest, which is similar to the general regional dip in the Driftless Area. There are minor folds, monoclines, and localized faults. The total exposed thickness of Paleozoic sediments is about 1,300 feet. Not exposed is a considerable thickness of Cambrian sandstones and shales that rest on an irregular Precambrian basement of granite. The nearest outcrop of the Precambrian is in the Baraboo range north of the Wisconsin River. Pleistocene deposits are about 150 feet thick and recent sediments are probably not more than 20 feet thick.

Soils

The study area is almost entirely within the unglaciated region of Wisconsin. Only a very small portion in the northeastern part of the area has been glaciated. For the purpose of this study, only the soils of the steep valley slopes and the soils of the stream valley are discussed. In both the unglaciated and glaciated parts of the area, the river has been deeply entrenched into limestone and sandstone rock strata similar to those from which the soils on the valley walls have developed. Soils on the terraces of the valley floor formed primarily in sandy and loamy deposits from glacial outwash to the north and from the local bedrock. The alluvial soils on the floodplains formed in more recent alluvium from stream deposition and are extremely variable in texture and drainage within short distances.

The following general discussion of soils is subdivided by the major physiographic features of the study area. Table IV-7 lists the major soils in the study corridor and their general suitability or limitation for agriculture and woodlands, building sites, on-site sewage disposal; camp sites, parks and playgrounds; and paths and trails. It combines the soils from several soil delineations because of similar management needs. The soil associations are shown on Map IV-2.

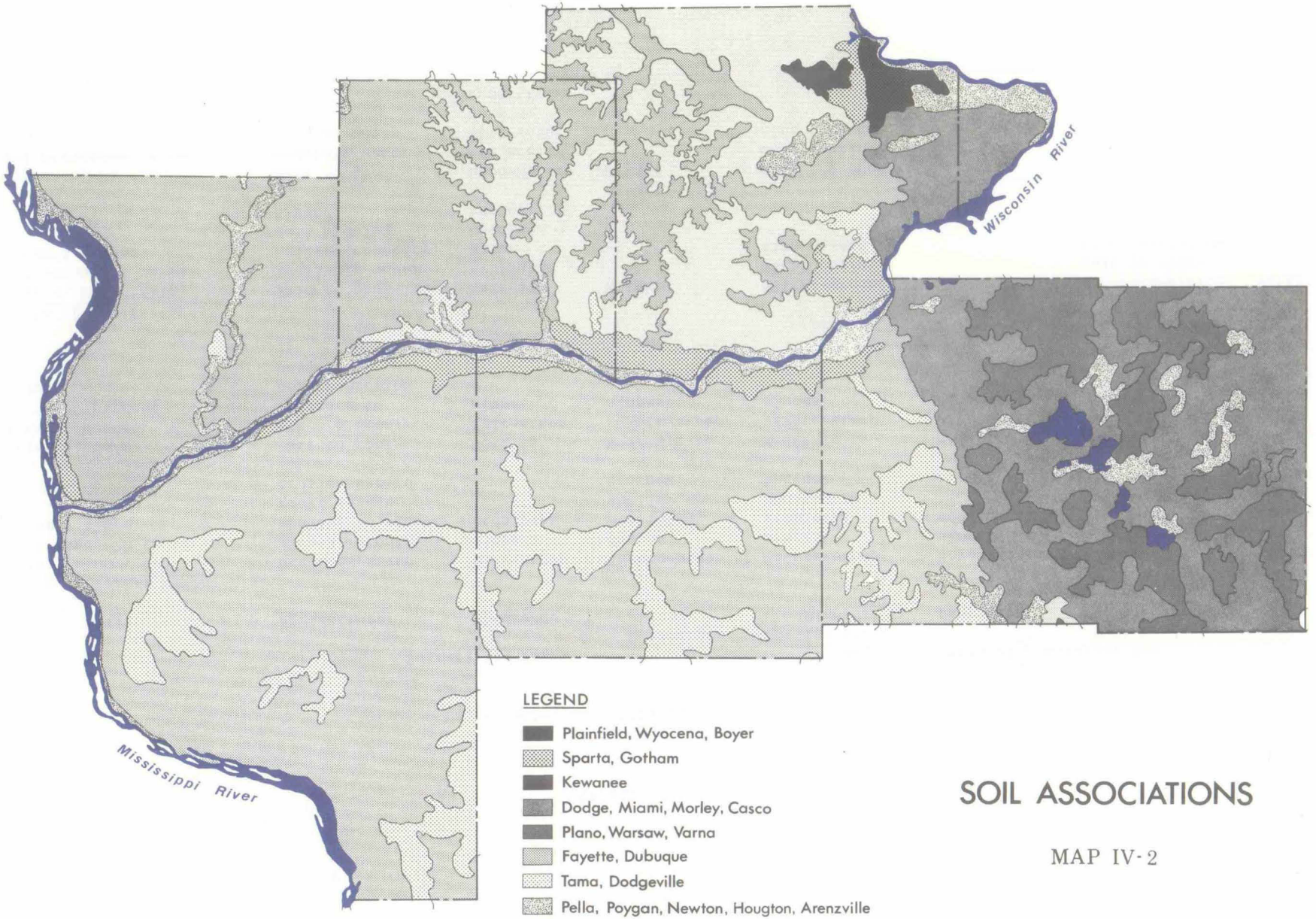
1. Soils of the Valley Walls --steep, stony, and rocky soils are dominant. They are underlain by limestone near the top of the hills and by sandstone at the lower elevations at depths ranging from one to four feet. Most areas have a thin wind-laid silt mantle up to three feet thick on the surface. Rock cliffs and rock outcrops are common. Most areas are very stony. Deeper soils occur at the base of many of the valley walls on lower slopes and in coves. Fayette, Gale, Hixton, and Norden soils are the principal soils and occur in long ribbon-like areas between the terraces and steeper valley walls. Steep slopes, stoniness, and shallow depth to bedrock are major limitations for many land uses on the steeper valley wall soils. These valley wall soils have severe limitations for recreation, wildlife, and building sites.

The soils on the lower valley slopes and in coves are productive woodland sites, provide good wildlife habitat, and are suited for limited recreational use.

2. Soils of the Stream Terraces -- Throughout the study area and extending along the whole stream valley are nearly level to sloping terraces. Sparta, Plainfield, Meridian, Dakota, Dickinson, and Gotham soils formed on these terraces in sandy and loamy outwash materials. Sparta, Plainfield, and Gotham soils are sandy to depths of five feet or more. Meridian, Dakota, and Dickinson soils developed in two to three feet of loamy outwash overlying sandy outwash. They usually occur on the terraces at slightly higher elevation than the sandier soils.

These soils are all well drained, deep, and have good permeability. They are well suited to a wide range of land uses such as wildlife habitat, woodland production, recreation, and for building sites.

3. Soils of the Floodplains -- Alluvial land; alluvial land-wet, Arenzville, Orion, and Ettrick are the major soils in the floodplains. The Arenzville, Orion, and Ettrick soils developed in silty water laid material. Arenzville soil is moderately well drained, Orion is somewhat poorly drained, and the Ettrick is poorly drained. Alluvial land and alluvial land-wet have developed in stratified sandy, loamy, and silty stream deposits with small pockets of organic material scattered throughout. Alluvial land is moderately well to somewhat poorly drained whereas alluvial land-wet is poorly drained.



SOIL ASSOCIATIONS

MAP IV-2

TABLE IV-7

Major Soils, Suitabilities, and Limitations

Soils	Suitability for		Degree and Kind of Limitation for				
	Agriculture	Woodlands	Building Sites	On-Site Sewage Disposal	Campsites	Parks and Playgrounds	Paths and Trails
1. Soils of Valley Walls							
Steep, stony, and rock land, 20 to 45 percent slope.	Unsuited-steep slopes, stoniness shallow to bedrock, severe erosion hazard	Fair-steep slopes, stoniness	Severe-steep slopes, stoniness, shallow to bedrock.	Severe-steep slopes, stoniness, shallow to bedrock	Severe-steep slopes, stoniness.	Severe-steep slopes, stoniness	Moderate to severe-steep slopes, stoniness, erosion hazard.
Fayette, Gale Hixton, Norden, 12 to 30 percent slopes	Fair to poor-steep slopes, moderate to severe erosion hazard.	Good to fair-steep slopes.	Moderate to severe-steep slopes.	Moderate to severe-steep slopes.	Moderate to severe-steep slopes.	Moderate to severe-steep slopes	Moderate to severe-steep slopes, erosion hazard.
2. Soils of the Terraces							
Sparta, Plainfield, and Gotham, 0 to 12 percent slopes.	Fair to poor-low available water holding capacity, soil blowing hazard.	Fair-low available water holding capacity.	Slight	Slight-ground water pollution hazard.	Slight	Moderate-difficult to maintain vegetation	Slight
Meridian, Dakota and Dickinson, 0 to 12 percent slopes.	Fair to good-moderate water holding capacity.	Good-Moderate available water holding capacity.	Slight	Slight-ground water pollution hazard.	Slight	Slight	Slight

TABLE IV-7 (continued)

Soils	Suitability for		Degree and Kind of Limitation for				
	Agriculture	Woodlands	Building Sites	On-Site Sewage Disposal	Campsites	Parks and Playgrounds	Paths and Trails
3. Soils of Floodplains							
Arenzville, 0 to 3 percent slopes. Orion, Ettrick	Good-when used during no flood season.	Good	Severe-subject to flooding.	Severe-subject to flooding.	Severe-subject to flooding.	Moderate if used during no flood season.	Moderate if used during no flood season.
Alluvial land, 0 to 3 percent slopes.	Fair to good if drained and protected from flooding during cropping season.	Fair to good wet soil.	Severe-subject to flooding, wet soil.	Severe-subject to flooding wet soil	Severe-subject to flooding, wet soil.	Severe-subject to flooding wet soil.	Severe-subject to flooding, wet soil.
Alluvial land, wet, 0 to 2 percent slopes.	Severe-flooding wet soil.	Fair-flooding, wet soil	Severe-Flooding, wet soil.	Severe-flooding wet soil.	Severe-flooding, wet soil.	Severe-flooding wet soil.	Severe-flooding, wet soil.

Arenzville, Orion, Ettrick, and alluvial land have potential for woodland, wildlife habitat, and recreation use if the use is limited to parts of the year when flooding is less likely to occur. Alluvial land-wet, has a more severe flood hazard which severely restricts its use for recreation. It has a high potential for wetland wildlife habitat and some potential for woodlands.

In general, the soils of the stream terraces provide the best sites for homes or recreational structures, on-site sewage disposal, campsites, playgrounds, and picnic areas within the study area. The steep valley wall soils and especially the cove and footslope areas could be used for scenic paths and trails if these are constructed on the contour with care taken to control erosion. The bottomland soils, especially the better drained ones, can also be utilized for nature trails during nonflood seasons.

The terrace soils all have porous sandy or gravelly substrata which might permit effluent from septic tank filter fields to contaminate nearby streams or groundwater. For this reason, vault type toilets rather than septic tanks may need to be used in some areas.

In summary, the soils in the study area have a wide range of properties which have a pronounced influence on their suitability for different land uses. By their nature, soils of the valley walls and the floodplains are definitely limited in their capacity to provide sites for recreation development and to support recreation use.

Flora

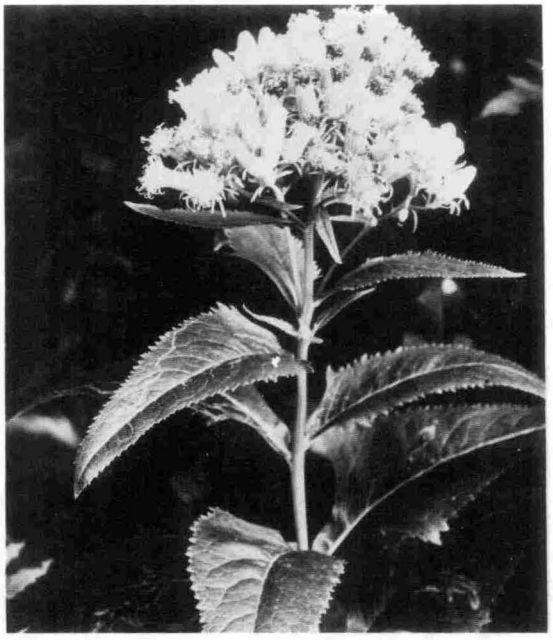
Probably the most noticeable feature to a recreational user of the lower Wisconsin River is the vegetation encountered. It is the vegetation which gives the river much of its wild character and beauty. In many places along the river the vegetation has not changed substantially since European settlement, and a person can still gain an impression of how it may have felt to canoe the Wisconsin over a century ago. Ecologically, the vegetation can be typed into more or less discrete communities, based on groups of plants which consistently grow together.

1. Southern Wet and Wet-Mesic Forest--Also known as southern lowland river forest, this is the dominant woodland type in the Wisconsin River corridor. Seasonally flooded and characterized by riverine-deposited, poorly drained soils, this forest type is dominated by silver maple, river birch, swamp white oak, American elm, green ash, cottonwood, and willows. While not especially a comfortable community to walk through due to the frequency of such irritating species as wood nettle, prickly ash, poison ivy, and mosquitoes, there are many photogenic species (e.g., cardinal flower, burning bush, false dragonhead, green dragon) as well as edible species (e.g. ground nut, riverbank grape, wild yam, elderberry, mushrooms)

A lowland river woodland along the Wisconsin in Crawford County contains ephemeral ponds.

which are common in this forest type and give it special recreational values. In addition, there are a number of species largely restricted in the State to the southern lowland forest and, while most are recognized only by the serious botanist, their presence constitutes an outstanding natural resource. Among such species are those of sedges and grasses and trees such as the honey locust and possibly sycamore.

2. Emergent and Submergent Aquatic Communities--A major portion of the wetlands in the "driftless area" in which the corridor is located

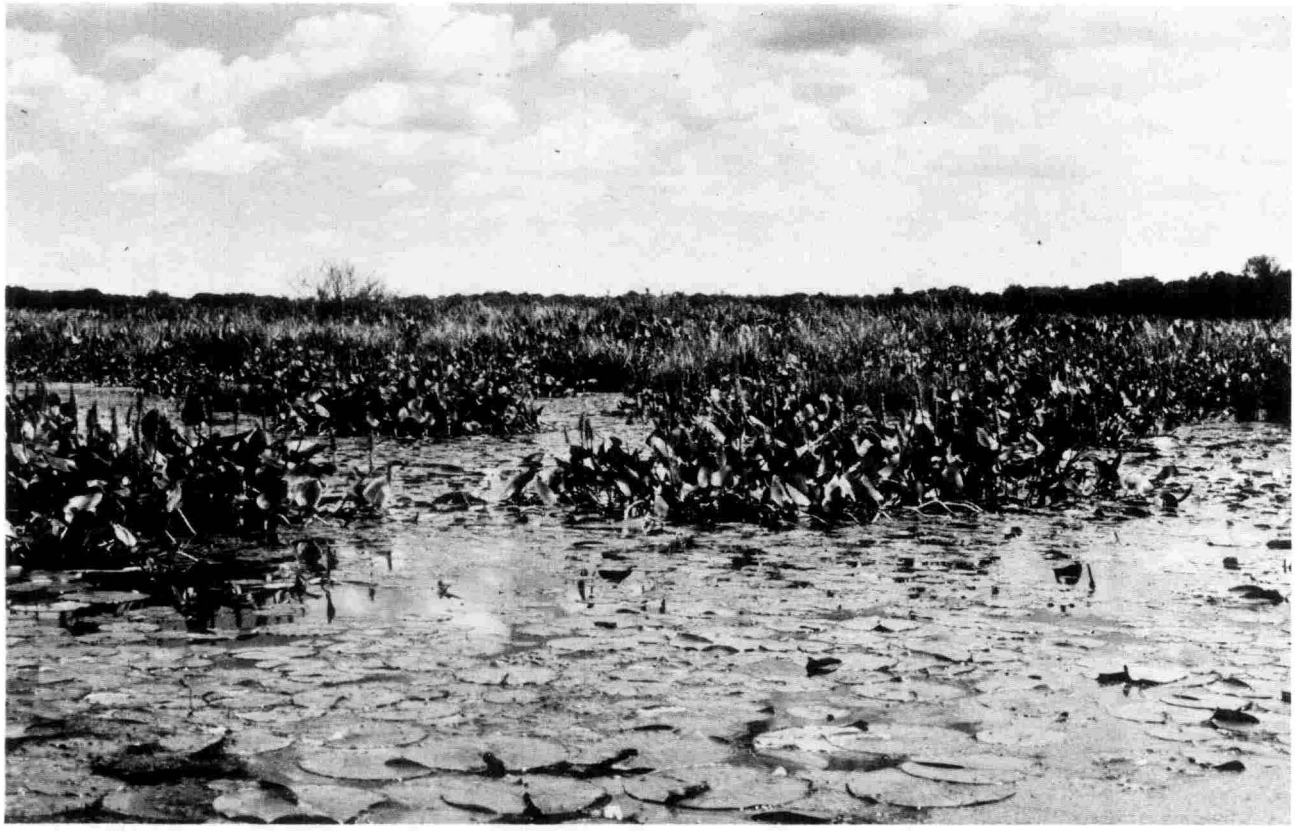


The sweet Indian plantain is not a true plantain but a member of the sunflower family found along the lowland woods edges.

The green dragon (Arisaema dracontium) is a common plant of lowland forests along the Wisconsin River.

are concentrated along the valleys of the major rivers. Most of these wetlands are river backwaters, sloughs, swales, oxbowlakes, and similar depressions which owe their existence to the river's actions. The vegetative composition of these wetlands is diverse, its nature depending on such factors as the degree of water fluctuation, water chemistry, water depth, and flow characteristics. In general, submerged aquatic types are composed of pondweeds, coontail, waterweed, water stargrass, water milfoil, white waterlily, spatterdock, and bladderwort. Most of the aquatic areas are shallow and have emergent vegetation interspersed. This vegetation may be composed of any number of species, the most common and striking being sweet flag, American lotus, common bur-reed, common arrowhead, halberd-leaved rose mallow, pickerel weed, cattail, and a number of bulrushes. In addition, where there is cold water seepage or especially good water quality, wild rice is sometimes a locally common emergent species.

Southern sedge meadows are wetlands where sedges and certain grasses (e.g., blue joint) are dominant. Such a community develops where water is at or near the surface year around. Periodic fire is believed to have been responsible for keeping woody vegetation out of sedge meadows. In the fire prevention attitude which has prevailed since settlement, many sedge meadows have grown up into thickets of dogwood and willow. Such a community is termed a Shrub carr.



This slough along the Wisconsin River in Sauk County is typical of the wetlands found in the river valley. The handsome pickeral week is the dominant emergent plant across the middle of the photo.

3. Prairies--Due to the arability of most prairie lands, this plant community type has become increasingly rare in North America. Fortunately, some excellent remnants still exist in southern Wisconsin, a few of which are located along the lower Wisconsin River. Basically there are two types of prairie in existence along the river valley, dry bluff prairies on steep south-facing exposures, and sand prairies -- either dry or wet-mesic in composition -- formed on deep, sandy glacial outwash terraces. Both prairie types owe their inadvertent preservation to inaccessibility, excessive wetness or dryness, or steep topography.

   An outstanding example of a prairie preserved because of its inaccessibility and excessive wetness is the Avoca Prairie located in Iowa County. Spring flooding cut off a large piece of land from the mainland during the critical plowing and planting time, so the tract could only be utilized as a mowing meadow. Even then hay mowing was sporadic due to the deep swell-swale topography which kept a large portion of the area wet during much of the year. The

The Avoca prairie scientific area, undergoing a prescribed burn, is a large tract of sandy wet-mesic prairie.

periodic mowing that did occur was minimally damaging to the prairie. Today Avoca Prairie stands out as perhaps the largest example of sandy wet-mesic prairie remaining in the Midwest.

Sandy dry prairies and xeric bluff prairie remnants are found scattered along the river valley. Most remnants are found along railroad rights-of-way and on the steepest of hillsides where grazing is unfeasible. Much of the flat sandy land of the valley floor which was prairie or barrens at the time of settlement has been converted to agricultural lands (pasture land, cropland, old field) or conifer plantations. With the recent introduction of large-scale irrigation, land which was marginally arable and often supported recovering sand prairie (reverted from old field) has been plowed and planted to crops. An intensified beef cattle industry in the area has also opened up, converting sandy prairies as well as woodlands to heavy grazing. The number of sand prairies is being drastically reduced.

Among plant communities, the prairie is nearly unsurpassed in aesthetic beauty and biological diversity. Besides the dominant grasses (big bluestem, little bluestem, northern dropseed, Indian, switch, side-oats grama, cordgrass, etc.), the prairie contains many attractive forbs. Interesting species which may be found in Wisconsin River valley prairies include prairie dandelion,[1/] wild indigo, blazing star, pasque flower, poppy mallow (restricted largely in Wisconsin to sandy prairies along the Wisconsin), sweet black-eyed susan, and many others.

4. Sand Barrens and Sand Bars--Open sand, either exposed by wind action or deposited by the river, supports a peculiar set of plants. In the dry sand blows and adjacent barrens (often formed as a result of farming marginal land) grow such plants as prickly pear cactus, hair sedge, sand croton, fame flower, and buttonweed (restricted in Wisconsin to sand blows north of Arena).

The Blue River Cactus and Dunes Scientific Area features moving sand dunes amidst recovering sand prairie and scattered oaks.

1/ The prairie dandelion (Agoseris Cuspidata), mentioned above, and Sullivantia renifolia, cited on page 75, are considered threatened species in the "Endangered and Threatened Vascular Plants in Wisconsin" published in 1976 as Technical Bulletin 92 by the Scientific Areas Preservation Council. Sullivantia renifolia is a candidate for threatened status on the Interior list under the authority of the Endangered Species Act of 1973, as indicated in the Federal Register (40 FR 17612, April 21, 1975). Another species proposed for Endangered status on the Federal list (41 FR 24561, June 16, 1976) is Aconitum noveboracense. It inhabits the "driftless area" discussed on page 74.

Sand bars and mud flats are alluvial deposited exposures of mud and sand in the river and are often utilized as recreation and camping areas by canoeists and other river users. Since the bars are somewhat ephemeral, they support only a very limited, but rather interesting, vegetation. Many of the species are minute graminoids and thus are of interest mainly to the serious botanist or patient amateur. Among the plants of the sand bars are false pimpernal and fog fruit.

5. Southern Dry and Dry-Mesic Forest--On the steep upland slopes of the river valley edge, dry to dry-mesic forest often occurs. Whether the forest is very xeric, containing red-white-bur oak, shagbark hickory, and wild black cherry as dominants, or is more mesic, containing in addition to the xeric species sugar maple, yellow-bud hickory, white ash, basswood, and slippery elm, is largely dependent on such factors as exposure, soil and bedrock type, moisture content and degree of slope. Wild fires kept many prairie-savannas open in presettlement times. With the cessation of fires since settlement, the acreage of dry forests may have increased because of the closing in of these savannas.

   High quality woodlots have become increasingly uncommon as have other presettlement vegetation types because of human utilization pressures. For woodlots, factors which have led to degradation and destruction of natural examples are intensive timber harvest, land clearing for cropland, and grazing. Still, a few good examples of upland woods exist within sight of a canoeist on the river.

   Probably the most interesting time to examine these deciduous woodlands is in the spring, from late April to mid-June, when many ephemeral species are at their flowering peak. Showy orchids, yellow lady's slipper, dutchman's breeches, and bloodroot are among the many showy and interesting species to be found at this time of year in rich woods.

6. Pine Barrens--Outlier communities of pine barrens exist in the sandy outwash plain of the Wisconsin River. These barrens are composed of scattered to rather dense (due to lack of maintenance fires) stands of jack pine and scrub oak (mainly red, black, and bur oaks) on sandy soil and support largely a sand prairie flora. The number of good barrens left in the river valley has decreased due either to clearing and conversion to agricultural land, or to succession to young pine-oak forest because of wild fire suppression needed to maintain a barrens community.

7. Cliffs--The "driftless area" through which the lower Wisconsin River passes contains numerous cliffs, both shaded and exposed. Plants existing on these cliffs are not only often rigidly restricted to the particular habitat requirements offered by the cliff environment, but are in cases restricted in state- or world-wide distribution to the driftless area cliffs.

A number of cliffs exist in view of the river, some of which contain these interesting species. One sandstone cliff base along the river contains the only Wisconsin station for the narrow-leaved day flower. Shaded cliffs at the mouth of the Wisconsin River contain large populations of a particular cliff-dwelling shooting star. Exposed cliffs along the length of the river contain a species of goldenrod endemic to the driftless area. Inhabiting several shaded cliffs along the river is a strange member of the saxifrage family, Sullivantia renifolia. Its closest relative grows on cliffs in southern Indiana, Ohio, and Kentucky, hundreds of miles disjunct from the Wisconsin stations.

With the many additional ferns and other seed plants to be found on particular cliffs, exploration of this habitat is always an exciting, if not somewhat treacherous, adventure.

Natural Sites in the Wisconsin River Area

Natural area inventories conducted by the Scientific Areas Preservation Council have been completed for Sauk, Grant, Iowa, and Richland Counties, and one has been partially completed for Dane County. Identification of natural sites in these counties is relatively complete. Very little is known of natural sites in Crawford County. The information on sites within the study corridor compiled is presented in Appendix IV.

Fauna

The lower Wisconsin River, with its connection to the Mississippi River, is a fascinating study in fish distribution. Through these two great rivers we see northward movement of southern species and eastern movement of western plains species. Thus, the rich number of fish species found in the lower Wisconsin River is not surprising. The most extensive recent collecting, done in the early 60's by Professor George C. Becker, University of Wisconsin-Stevens Point, revealed 82 species representing 20 families from the lower Wisconsin River. Two additional species have been included based on communications with personnel from the Wisconsin Department of Natural Resources.

Catfish are the most frequently sought species of the lower Wisconsin River. The channel catfish is most abundant, but flathead catfish, occasionally in excess of 50 pounds, is also taken. These large fish are most often taken on set lines and bank poles using small bullheads for bait. Smallmouth bass, walleyes, and sauger are also popular and frequent species in the angler's catch. Common panfish species include bluegills, white and yellow bass, and black and white crappie. Northern pike and largemouth bass are found in side channels and backwater areas.

Commercial fishing was permitted on the lower Wisconsin River in the past, with carp and buffalo comprising the bulk of the catch. The last year for which commercial catch records are available is 1952. At a public hearing in Boscobel in April 1974, a vast majority (130-140) of the participants expressed opinions against allowing commercial fishing on the lower Wisconsin River.

Twenty-one species of minnows were found including the crystal darter whose status is under review by the Department of the Interior to determine whether it should be proposed for listing as endangered or threatened.[1/] The Department of Natural Resources (Endangered Animals in Wisconsin, 1975) lists the greater redhorse as an endangered species and the paddlefish, pallid shiner, weed shiner, blue sucker, starhead topminnow, crystal darter, and mud darter as threatened species.

Recent collections of mussels, also known as clams or naiads, from the lower Wisconsin River indicate 26 different species are present. Water pollution and dam construction are major factors contributing to the demise of these stream dwelling organisms, and the shifting sands of the lower Wisconsin River limit suitable habitat for them. Since a portion of the life cycle of these mussels is spent as a parasite on a host fish, the extirpation of fish species may also eliminate clam species. Although the shellfish are not harvested by humans for commercial use in the lower Wisconsin River, numerous fishermen reported using them as catfish bait, and they are a food item in the diet of muskrats and raccoons.

Two crawfish species are found in the lower Wisconsin River. They may occasionally be used by anglers as bait and are an important food item for fish, muskrats, mink, otters, and raccoons.

The many habitat types of the lower Wisconsin River corridor, including timbered islands, extensive marshland, wet meadows, winding channels,

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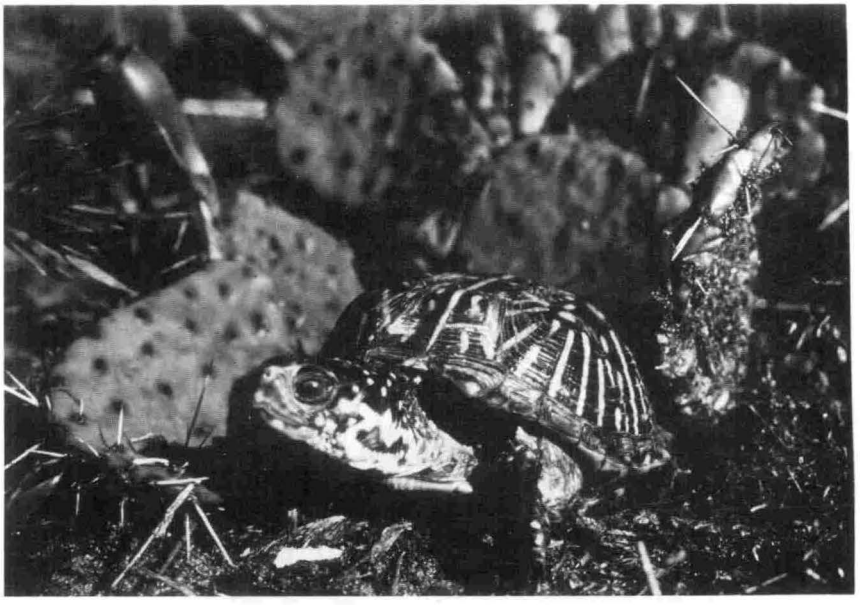
1/ Wisconsin defines "endangered species" as any species or subspecies that are in trouble. Their continued existence as a part of the State's wild fauna is in jeopardy and without help they may become extirpated. Officially protected by Chapter 29.415 of Wisconsin statutes.

"Threatened species" are any species or sub-species which appear likely within the forseeable future to become endangered. Threatened animals will be officially designated upon passage of pending legislation in the State and afforded varying degrees of protection as necessary.

"Watch status" is applied to any species or sub-species that may or may not be holding their own at the present time. They will be under special observation to identify conditions that could cause further decline or factors that could help to ensure their survival in the State.

land-locked oxbows, wooded bluffs, and remnant prairie, support a diverse assemblage of reptiles and amphibians. These two classes of animals are represented by 14 species of snakes, nine species of turtles, nine species of frogs and toads, five species of salamanders, and two species of lizards. Of these, the Department of Natural Resources lists the six-lined racerunner and bullfrog as animals with watch status. The timber rattlesnake is found in rocky outcroppings and upper bluff slopes, and also has watch status.



Ornate box turtle.

The snapping turtle is taken commercially by turtle fishermen on the lower Wisconsin River. Many of the turtles are marketed locally and Friday night turtle specials are not uncommon at area restaurants.

Forty-seven species of mammals have been recorded in the six counties along the lower Wisconsin River. Popular small game animals include cottontail rabbits, gray and fox squirrels, and raccoons. The sound of baying coon dogs is common on crisp November nights as hunters pursue this nocturnal animal. A prime pelt of an adult may bring as much as $20. The cottontail rabbit provides ample hunting opportunities near grass and weed patches and thickets on farms, along brushy fencerows, and in sparse woodlands with numerous thickets, brush piles, and fallen trees.

Although fox squirrels prefer open hardwood woodlands and groves in higher, rolling agricultural country, they are commonly found with the gray squirrel in areas with brushy undergrowth and in river bottoms in addition to wooded bluffs and slopes along such waters.

A mammal which has received special consideration by State game officials is the fisher. This animal probably roamed over most of the State in favorable wooded habitats until about 1850. They were depleted by logging of heavy timber and fur trapping, and the last recorded specimen was taken in 1932. Between 1956 and 1967, 146 animals were stocked in national forests in northern Wisconsin. A confirmed fisher sighting was recorded approximately two miles northwest of Arena in Iowa County on April 26, 1975. This location was approximately 150 miles from the nearest release point and 120 miles from the nearest other sighting. The fisher is also listed by the Department of Natural Resources as having watch status, but its outlook is encouraging.

Mink and muskrats are abundant in the floodplain and trapping of these furbearers furnishes significant amounts of recreation for local residents as well as a supplement to their income. Beaver and otter trapping is permitted within the lower Wisconsin River corridor except on some State lands where beaver dams in the bottomlands have a positive impact on waterfowl and muskrats.

Beaver trapping is permitted many places along the river.

White-tailed deer are abundant throughout the corridor. The six counties bordering the lower Wisconsin River are popular hunting areas and in 1973 contributed 9.4 percent of the total deer harvested in the State.

Wood ducks.

Twenty-three species of waterfowl may be seen migrating through the area, and seven species nest within the lower Wisconsin River corridor. The many protected backwaters provide important brood areas as well as resting and staging areas during migration flights. The timbered bottomlands with associated marshes provide ideal habitat for wood ducks and production is excellent. Ground nesting species, such as mallards and blue-winged teal, nest in the area, but periodic flooding limits their success.

Upland game birds which are found in the six counties bordering the river are ruffed grouse, bobwhite, ring-necked pheasant, gray partridge, and wild turkey. Two upland game birds which were found in the area in the past are the prairie chicken and sharptail grouse. The prairie chicken is now listed as a threatened species while the status of the sharptail grouse is being watched by the Wisconsin Department of Natural Resources.

The bobwhite, formerly an abundant resident in southern and central parts of Wisconsin, has declined in numbers. The decline has been directly correlated with the destruction of shrubby hedgerow cover along fields, woodlands, streams, and roadsides. At present, there are scattered populations in five counties bordering the lower Wisconsin River. A research project is being conducted on bobwhites on 38,400 acres in Richland County.

Two hundred and thirty species of birds may be seen along the lower Wisconsin River on an annual basis. Of these, 42 species are present year-round, 18 species are winter visitors, 94 species are seen during all seasons except winter, 13 species are usually present only during spring and summer, and 63 species are found primarily during spring and fall migrations. One hundred and twenty-four species have been known to nest within the lower Wisconsin River watershed.

The redshouldered hawk, a threatened species, is locally common in the river bottom woods.

Fourteen species of birds-of-prey may be seen along the lower Wisconsin River, including the osprey, which is a migratory visitor, and the bald eagle which may be seen year-round but is more common during late fall, winter, and early spring. Bald eagles have nested within the adjacent Upper Mississippi Fish and Wildlife Refuge near Winona, Minnesota, but no confirmed nesting sites have been reported for the lower Wisconsin River. A private organization has purchased a 170-acre site in a natural area known as Ferry Bluff for a winter roosting area. Fifteen to 20 eagles have used the preserve as a protective roost against harsh winter weather and as natural protection against man. The bald eagle has been proposed for Federal threatened status. Turkey vultures are commonly observed soaring high above the river, especially at Wyalusing. Threatened species include Cooper's hawk and the red-shouldered hawk, which are locally common in the river bottom woods.

Wild turkeys once occurred south of a line from Prairie du Chien to Green Bay which includes the lower Wisconsin River. By 1900 they were probably extirpated from the State by advancing agriculture, overshooting, and occasional killing winters. Efforts to restock turkeys have been carried out since 1929, and those stocked in the southwest are gradually expanding their range and numbers. This wary bird is rarely seen, however, except by the most skilled observers. Both the wild turkey and bobwhite are classified by Wisconsin as having a changing status.

Ring-necked pheasants are regularly stocked on State hunting grounds throughout the State because of the high demand for this showy game bird. Suitable winter cover is found along the lower Wisconsin River, and some natural reproduction of pheasants does occur.

The forested bottomlands of the lower Wisconsin River provide excellent habitat for woodpeckers and seven species nest in the area. The most spectacular is the pileated woodpecker which is a year-round resident, but more often heard than seen because of its wary habits.

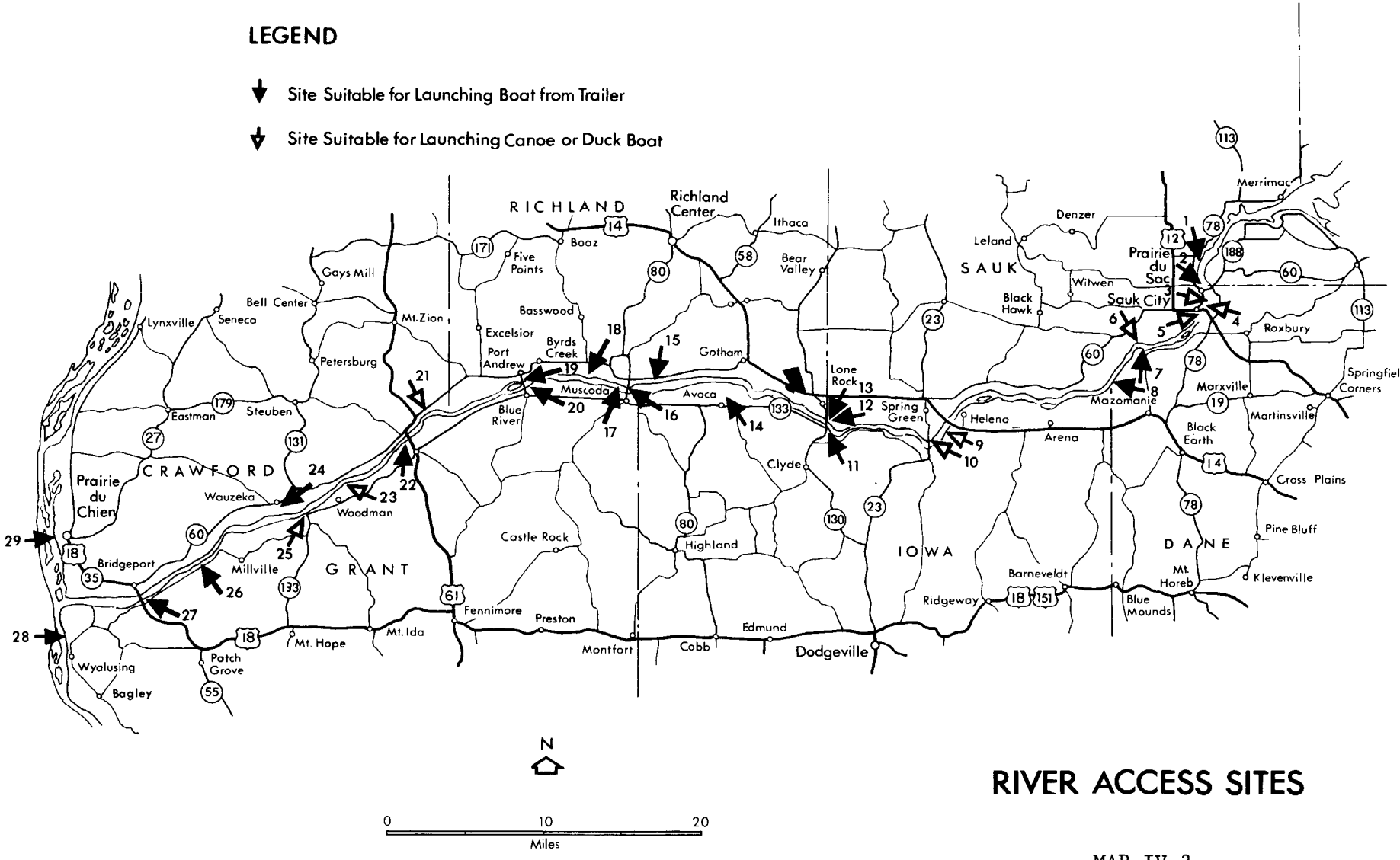
Nine species of warblers nest in the corridor, and 18 additional species may be seen during spring and fall migrations.

The Wisconsin Department of Natural Resources has recognized that the diversity of topography and vegetation of the lower Wisconsin River provides habitat for a wide range of wildlife species and has taken steps to preserve many of these wildlife areas. A total of 10 units comprising about 17,000 acres wholly or partially within the lower Wisconsin River corridor are owned by the State for use as wildlife areas. Another 7,000-plus acres are controlled by the State through various easements.

The diverse habitats of the lower Wisconsin River and the fauna which they support provide a high quality recreational experience for the most casual and the most demanding participant. The recreational potential and the educational opportunities of the area depend to a great extent on its rich fauna. Through wise use and management of these wildlife resources, the lower Wisconsin River will remain a dynamic and challenging natural environment for future recreational and educational opportunity.

Access

Access to the Wisconsin River is provided in a number of ways: on private lands, at road rights-of-way, at bridge crossings, at city or State parks, and at designated access points. Access is generally good; however, most sites need to be upgraded and additional facilities provided. Many of the 30 public access sites are paired with a similar site on the opposite bank of the river (see Map IV-3). This arrangement provides additional convenience in the transportation of persons, canoes, or boats between put in and take out points. The established access sites range from a simple gravel boat ramp with no support facilities to



RIVER ACCESS SITES

MAP IV-3

TABLE IV-8

WISCONSIN RIVER ACCESS SITES

SITE #	NAME	PARKING	RAMP	CAMPING	PICNICKING	WATER	TOILETS
1	Prairie du Sac Dam	X	X		X		X
2	Prairie du Sac Village Park	X	X	X	X	X	X
3	Sauk City	X					
4	Sauk City	X					
5	Sauk City	X					
6	Honey Creek	X					
7	Highway Y	X	X				
8	Mazomonie Wildlife Area	X	X				
9	Tower Hill State Park	X		X	X	X	X
10	Highway 23 Peck's Landing	X	X		X		X
11	Otter Creek	X	X		X		X
12	Long Lake	X	X	X	X		X
13	Long Lake	X	X	X	X		
14	Avoca Lake	X	X		X	X	X
15	Orion	X	X		X		
16	Muscoda Village Park	X	X	X	X	X	X
17	Muscoda	X	X		X		
18	Eagle Corners	X	X		X		
19	Jones Lake	X	X		X		
20	Blue River		X	X	X	X	X
21	Highway 61 Roadside						
22	Boscobel	X	X	X	X	X	X
23	Woodman Lake						
24	Wauzeka Public Landing	X	X			X	
25	Green River	X	X		X		X
26	Milville	X	X	X	X	X	X
27	Bedford Slough		X		X		
28	Wyalusing State Park (Mississippi River)		X				
29	Prairie du Chien (Mississippi River)	X					

The Milville Recreation Area reflects the careful maintenance given all of Grant County's access areas.

more complete installations with campgrounds, picnicking, and sanitary facilities. Maintenance of these sites varies from little or none to adequate (see Table IV-8).

Grant County is an excellent example of the types of access facilities that can be provided. The areas have been acquired and are operated under its County Parks and Access Department. Developments are not large or elaborate but usually provide a parking area, developed launching ramp, trash containers, restrooms, and often limited provisions for picnicking and camping. Regular cleanup and maintenance of the areas are apparent.

Access to the river in several locations involves private lands. Most landowners have been cooperative, but continued permission for access is not assured, particularly if recreational use expands in the future.

This Wisconsin River access site is busy.

Land Use and Ownership Patterns

For the purposes of the study, only land use and ownership within a delineated corridor were inventoried. The study corridor chosen was arbitrarily selected as that area along the river between the nearest paralleling public roads or railroads on either side. This area was selected for resource inventory purposes only and may not have any relationship to the final management area.

Land cover types for the corridor were inventoried from satellite (LANDSAT) imagery under contract with Bendix Aerospace System Division, Ann Arbor, Michigan. Ground truth, necessary to enable the computer to identify cover types from the imagery, was largely obtained by the Soil Conservation Service, USDA, with assistance from several other State and Federal agencies.

Fourteen cover types or categories were identified in this process. In addition, 1,229.68 acres were not recognized by the computer as fitting into any of the 14 categories and so are shown as uncategorized in Table IV-9. All classifications are displayed in the table.

TABLE IV-9

Study Corridor Cover Types

Cover Type		Acreage	Percent of Corridor
Sand		1,712.61	1.8
Lowland Hardwood		18,482.91	20.0
Wetland		12,124.68	13.0
Water		7,442.93	8.0
Coniferous Forest		4,623.61	5.0
Bare Field		514.24	0.6
Truck Crops		2,411.31	2.6
Row Crops		12,654.57	13.6
Small Grains		5,207.16	5.6
Improved Grassland		882.02	1.0
Urban Industrial		249.29	0.3
Hay/Grass		5,320.07	5.7
Upland Hardwood		16,839.60	18.2
Grass/Dry Wetland		3,075.33	3.4
	Subtotal	91,540.33	98.8
Uncategorized		1,229.68	1.2
	TOTAL	92,770.01	100.0

Forty-three percent of the river corridor is forested. Most of this is in lowland or upland hardwood. The rest is in coniferous forests, some of which are shelterbelt plantings dating from the CCC days. Agricultural uses, which account for roughly 32 percent of the corridor, include truck crops, row crops, small grains, hay, and pastureland. The primary agricultural practices taking place adjacent to the river are pastureland and grazing and production of marsh hay. Much of the bottomland is marshy and not suited for agricultural practices. Wetlands account for 13 percent of the corridor (see Table IV-10).

The accompanying maps illustrate the extent of the land cover types and their relationship to the river itself. Although the maps are prepared from the LANDSAT data, cover types have been grouped to show significant uses as follows: agricultural, lowland hardwood forest, upland hardwood and coniferous forest, wetlands, and sand and bare fields. Agricultural uses include row and truck crops, small grains, and hay and pastureland.

TABLE IV-10

Study Corridor Cover Types Shown on Maps

Cover Type	Acreage	Percent of Corridor
Agricultural Use	29,532.46	32
Lowland Hardwood Forest	18,482.91	20
Upland Hardwood and Coniferous Forest	21,463.21	23
Wetlands	12,124.68	13
Sand and Bare Fields	2,226.85	2

Landownership within the study corridor consists mainly of private individual holdings and land controlled by the State of Wisconsin (see Table IV-11 for summary of landownership and Map IV-9 for State and Federal holdings).

Private ownership is fairly well distributed along the corridor. The number of owners per township is consistent throughout the corridor's length with a total of 586 private owners.

Public land is well distributed throughout the corridor's length with over 80 percent managed primarily as wildlife habitat. State holdings total just under 20 percent of the river study corridor. Most of this is in six wildlife management areas.

The State Department of Transportation owns only 66 acres within the corridor, but maintains scenic easements along Highway 60 on almost 2,200 acres, or 2.7 percent of the corridor. Between Gotham and Bridgeport, there are 23 miles of easements along State Highway 60 and nine

Pages 87 through 96 originally consisted of maps depicting vegetative cover and land use in study area. Unfortunately, the display of vegetative cover and land use, limited to black and white processing, did not meet quality requirements and had to be deleted.

miles of river frontage with some type of easement. The nature and extent of these easements are outlined in Table IV-13.

Quasi-public ownership in the corridor is very minor and includes only the Prairie du Sac Country Club and a Boy Scout camp for a total of 223 acres or just 0.2 percent of the corridor.

Federal ownership is limited to 2.3 percent of the corridor. Slightly over 1,000 acres are managed by the U.S. Fish and Wildlife Service where a portion of the Upper Mississippi River National WIldlife and Fish Refuge extends into the mouth of the Wisconsin River. The Bureau of Land Management controls almost 900 acres in 92 unsurveyed islands.

One hundred and forty-one islands which range in size from one acre to 233 acres have been inventoried in the lower Wisconsin. The Bureau of Land Management is responsible for 92 islands[1/] and the Wisconsin Department of Natural Resources controls 20 islands (Table IV-12). The balance are in private ownership. The largest publicly owned island is Cedar Island, consisting of 200 acres.

The majority of the corporate ownership is in the Arena-Spring Green area which consists of farm and recreation development. Wisconsin Power and Light Company owns small parcels near Prairie du Sac and Mazomanie and one larger parcel of river frontage between Avoca and Muscoda. The Wauzeka Box Company and Evergreen River Plantations have significant holdings near Wauzeka and Blue River which are used for forest production.

TABLE IV-11

Landownership within the Wisconsin River Corridor

Ownership	Acres	Percent of Corridor
Federal	1,890.3	2.3
State	14,871.1	18.2
Department of Transportation	66.3	0.1
Department of Natural Resources	14,804.8	18.1
County	61.2	0.1
Municipal	2,017.0	2.5
Quasi-Public	223.2	0.2
Private	62,832.8	76.7
TOTAL	81,895.6	100.0

1/ Title conflicts exist on 14 of the islands.

TABLE IV-12

Island Ownership Summary

Ownership	Acres	Percent in Corridor
Private	1,255.9	35.0
Federal (unsurveyed)*	883.2	25.0
State	1,399.3	40.0
TOTAL	3,538.4	100.0

*Fourteen possible title conflicts on Federal unsurveyed islands

TABLE IV-13

State Department of Transportation
Scenic Easements and Fee Simple Land Along Highway 60

Type of Easement	Acreage	Percent	Length of River Frontage Involved
Commercial, residential, and agricultural use only	64.15	3.0	0.5 miles
Residential and agricultural use only	1,148.33	52.3	1.3
Agricultural	536.1	24.4	1.8
General Crop or livestock farming only	168.2	7.6	-0-
Timber or Woodland only	177.64	8.0	2.2
Controlled advertising, no trash dumps or unsightly use	37.33	1.7	0.3
Fee Simple	66.3	3.0	2.9
TOTAL	2,198.05	100.0	9.0

LEGEND

- Federally Owned Island
- Authorized DNR Project Area
- Existing State Park
- Existing DNR Wildlife Area
- Flood-prone Area Boundary

APPROXIMATE AREA
OCCASIONALLY FLOODED

EXISTING AND AUTHORIZED PUBLIC AREAS

MAP IV-9

5 4 3 2 1

SHEET 1 OF 5 SHEETS

LEGEND

- Federally Owned Island
- Authorized DNR Project Area
- Existing State Park
- Existing DNR Wildlife Area
- Flood Prone Area Boundary

APPROXIMATE AREA OCCASIONALLY FLOODED

EXISTING AND AUTHORIZED PUBLIC AREAS

5 4 3 **2** 1

SHEET 2 OF 5 SHEETS

LEGEND

- Federally Owned Islands
- Authorized DNR Project Area
- Existing State Park
- Existing DNR Wildlife Area
- Flood Prone Area Boundary

ESTIMATED AREA OCCASIONALLY FLOODED

APPROXIMATE AREA OCCASIONALLY FLOODED

EXISTING AND AUTHORIZED PUBLIC AREAS

5 | 4 | 3 | 2 | 1

SHEET 3 OF 5 SHEETS

LEGEND

- Federally Owned Islands
- Authorized DNR Project Area
- Existing State Park
- Existing DNR Wildlife Area
- Flood Prone Area Boundary

FLOOD PRONE AREA

EXISTING AND AUTHORIZED PUBLIC AREAS

5 | 4 | 3 | 2 | 1

SHEET 4 OF 5 SHEETS

LEGEND

- Federally Owned Island
- Authorized DNR Project Area
- Existing State Park
- Existing DNR Wildlife Area
- Flood Prone Area Boundary

EXISTING AND AUTHORIZED PUBLIC AREAS

5 | 4 | 3 | 2 | 1

SHEET 5 OF 5 SHEETS

Other than development in Prairie du Sac, the housing subdivisions on the riverfront are small. Minor concentrations are located near Mazomanie, Arena, Spring Green, Gotham, Orion, Port Andrew, Boscobel, and Bridgeport. Within the corridor studied, 2.7 percent is in municipal boundaries, most of which is not on river front land.

Water Rights

The policies of the State of Wisconsin as to water rights on the lower Wisconsin River and similarly situated waters have evolved from the concepts of the Northwest Ordinance of 1787, which stated:

> The navigable waters leading into the Mississippi and St. Lawrence and carrying places between the same, shall be common highways, and forever free. . . .

The ordinance does not have the force of law because it preceded the Constitution of the United States and Wisconsin Statehood, but the above concept was incorporated into Art. IX, Section 1, of the Wisconsin Constitution. These documents, together with the principles of the common law, as modified from time to time by Statute, form the basis for the State's exercise of control over bodies of water, including the lower Wisconsin River.

Ownership and use rights are based upon the riparian doctrine. The basis of the riparian doctrine, accepted by all States east of the Mississippi River, is the English Common Law, which was adopted in this country as it seemed applicable. In Wisconsin the riparian doctrine has had grafted onto it the "reasonable use" theory. This means the owner of a tract of land (whether a private party or a semi-public or public body) abutting on a stream has a right to the reasonable use of the water. The right to reasonable use in no way denotes ownership of the water itself. What constitutes reasonable use is open to question and frequently must be settled by legislation, the courts, or administrative decision by a governmental agency. Water law is complex, continually evolving, and varies from State to State and from time to time.

The general rights of a riparian owner include exclusive rights of access from his lands to the navigable channel of the river; the right to build and maintain suitable landings, wharves, and piers for his use, subject to permit and regulations to protect public rights; and to water his livestock or withdraw water for "domestic purposes." Utility companies and public bodies have the same rights as private parties except they also have the right of eminent domain to acquire necessary lands (for power generation only, in the case of utilities).

The law has evolved to grant the public broad rights on both navigable and nonnavigable waters. The question of what constitutes a navigable stream has everywhere been a thorny issue. Generally stated, the Federal test has been that a river must be capable of carrying commercial traffic. The State of Wisconsin has broadened this test to "floatability."

Any stream capable of floating the shallowest draft recreational craft is open to public usage, including fishing, bathing, and wading. The right of the public is probably limited to "nonwithdrawal uses" and not for something like irrigation or public drinking water.

Under the "trust doctrine" all navigable waters are held by the State in custody for the benefit of its citizens. Wisconsin case law, interpreting the trust doctrine, has developed that while the State has true ownership only of the beds of navigable lakes, it controls the water which flows over the beds of navigable streams, and thereby controls anything which affects the natural character of the water. By Wisconsin case law, beds of navigable streams are owned by the stream riparian owner whose property abuts the stream, but such ownership is qualified by the role of the State as custodian of the water that flows over the bed. The State's custodial role as "guardian" is so strong that title to the beds of nonmeandered navigable streams was given to the riparian owner in a manner making his use subservient to the overriding public interest. Title to the beds of remaining navigable water lies in the State with the adjacent riparian owner having clear title only to the ordinary high-water mark and exclusive right to use the exposed lands below that mark, but only in such use as will not preclude public use when the water returns. The whole approach of the statutes and case law is one of reasonable use by both the riparian proprietor (owner) and the public. In addition, navigation under the statutes has come to include various "incidents" of navigation, such as fishing, swimming, hunting, but not trapping.

Control of river waters is further restricted by the United States Constitution which gives jurisdictional control to the Federal Government in matters concerning commerce and navigation, e.g., navigability, flood protection, watershed development, and recovery of cost of improvements through utilization of power.

The State controls and supervises, so far as practical, any activity which changes or will change the course, current, or cross section of public waters, including but not limited to the construction, reconstruction, repair, removal, abandonment, the making of any other changes, or the transfer of ownership of dams, reservoirs, control structures, and waterway obstructions, in any of the public waters of the State.

In Wisconsin, any land which accretes on land belonging to a riparian owner (including the streambed) would become his private property. Thus, islands formed by natural, gradual accretion would be private unless a public agency owns the shoreline. If the island existed at the time of Statehood and no patent has been issued, it is the property of the Federal Government.

The fact that the public has a right to use a certain body of water or watercourse in no way grants the public the right to cross private lands to obtain access. Consequently, the public may not always be able to exercise its rights on public waters. In Wisconsin, public agencies

have a right to acquire or improve lands for the purpose of providing public access to any navigable lake or stream wholly or partly in that agency's jurisdiction, and may even request financial assistance from the State for this purpose. The Department of Natural Resources may acquire easements providing access and use of lands and waters for hunting, fishing, and the enjoyment of scenic beauty.

A court interpretation of Chapter 30 of Wisconsin Statutes Annotated held:

> The right of citizens of the State to enjoy navigable streams for recreational purposes, including the enjoyment of scenic beauty, is a right that is entitled to all the protection which is given financial rights.

A later ruling held that the legislature could delegate to local government units the authority to protect and preserve waters for fishing, recreation, and scenic beauty (e.g. through zoning).

Under Chapter 88, drainage districts and owners are prohibited from taking such drainage actions as will materially impair navigation or other public rights or uses in waters. Chapter 92 charges the State Board of Soil and Water Conservation Districts with preventing erosion and floodwater and sediment damage.

Chapters 144 and 147 authorize the Department of Natural Resources to protect all waters of the State, both navigable and nonnavigable, surface and ground, from pollutants and "environmental pollution" (as defined in 144.30). "Environmental pollution: means to contaminate or render unclean or impure the air, land, or waters of the State, or to make the same injurious to public health; harmful for commercial or recreational use; or deleterious to fish, bird, animal, or plant life."

Wisconsin has a somewhat limited authority to restrict watercraft use; the Department of Natural Resources is responsible for "maintaining water safety." Controls may be very general (speeds are restricted to those which are "reasonable and prudent") or very specific (no waterskiing between sunset and sunrise). Authority to regulate speeds, types of watercraft on certain waters, hours of usage, and the like are a local responsibility.

Zoning

The State of Wisconsin requires each county to have four codes: (1) floodplain management program, (2) shoreland management zoning, (3) subdivision regulations, and (4) a sanitary code. Minimum standards for these regulations have been outlined and the counties given a period to adopt these or similar measures. If the county does not adopt a satisfactory program in accordance with the State guidelines, the State has the authority to impose State minimum standards. The counties are charged with the administration of the ordinance.

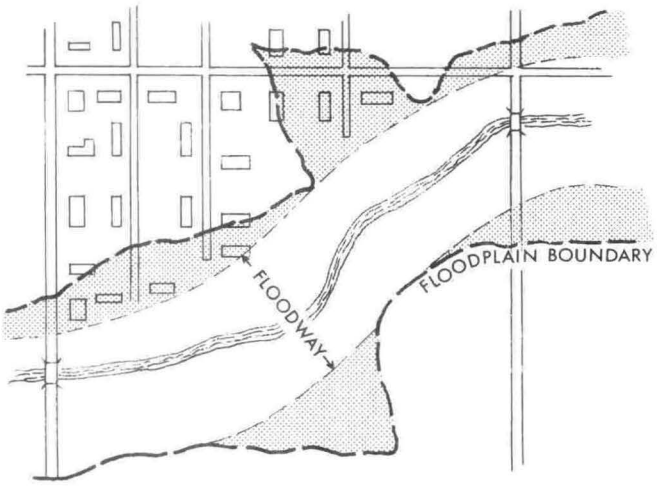
The two codes most affecting the Wisconsin River are the shoreland and floodplain management programs. The floodplain ordinance limits development within the floodway and floodplain. The floodplain is defined as the land adjacent to a body of water which has been or may be thereafter covered by floodwater, including but not limited to the regional flood. The floodway is the channel of a stream and those portions of the floodplain adjoining the channel that are required to carry and discharge the floodwater or flood flows of any river or stream, including but not limited to flood flows associated with the regional flood. (Definitions taken from chapter NR 116 of the Wisconsin Administrative Code. Refer to figure IV-7.) Suggested uses for floodway lands are open areas, such as park land and agriculture, that have a relatively low flood damage potential. Floodproofed structures for other than human habitation are also permitted.

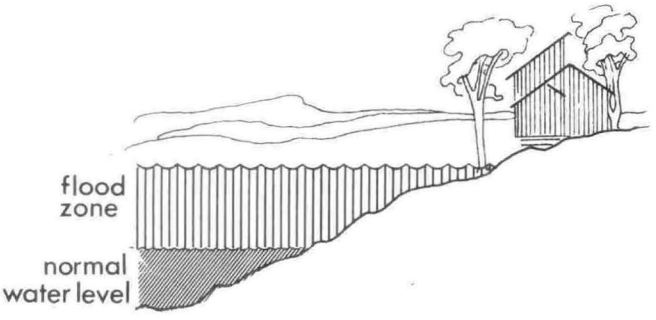
Residential units are prohibited in the floodplain on the landward side of the floodway unless constructed above the flood protection elevation and in accord with strict floodproofing measures. The shoreland management program limits development on the shoreline of navigable lakes and rivers. The shoreland for a river includes that area 300 feet back from the river or its floodplain. Development within the shoreline zone is closely regulated for structure setback, the placement of septic tank and drain fields, and the cutting of shore cover (refer to Figure IV-8). The goal of the shoreland management program is not to prohibit all development but to control the development of substandard lots.

Zoning is not especially popular in rural areas. Although all six counties bordering the study area have adopted the Department of Natural Resources (DNR) floodplain and shoreland management programs, the ordinances are not uniformly enforced. Some counties have taken a firmer approach to enforcing the zoning whereas others are more influenced by outside pressure. In particular, the DNR recognizes Crawford County as having difficulty enforcing the shoreland and floodplain management programs. Part of the problem is that Crawford County has not had a full-time zoning administrator to supervise county development.

Most of the counties along the study segment do not consider development along the river corridor to be a major concern. Presently, there are some subdivisions located adjacent to the river between Lone Rock and Orion and again near Bridgeport, but these reached their development peak when all of the riverfront lots were sold and are no longer expanding. Over 12,000 acres of wetlands along the river corridor make most areas unsuitable for development. The counties do not anticipate future subdivision development next to the river based on present zoning regulations in each county.

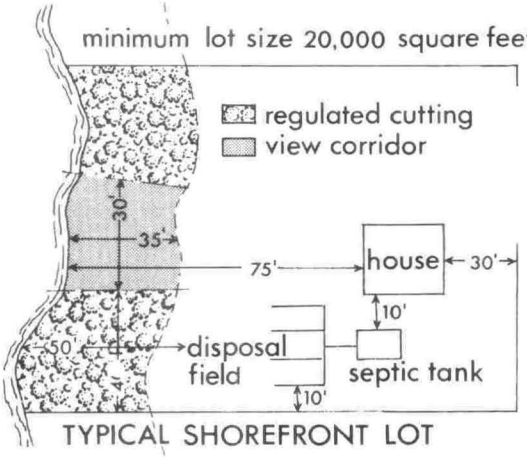
The communities along the river in Sauk County--Sauk City, Prairie du Sac, and Spring Green--may experience nominal growth in the near future, but no major zoning problems are expected. Long Rock in Richland County is in a similar situation. In Iowa County a zoning issue exists concerning the Wisconsin River Development Corporation's (WDRC) proposal





FLOODPLAIN MANAGEMENT ZONING

FIGURE IV-7



SHORELAND MANAGEMENT ZONING

FIGURE IV-8

for a 1,200+ unit housing, condominium, and apartment development in conjunction with the Winter Green ski resort. The development will be set back on the other side of the hills, away from the river so as not to be visible from the river; however, such a development would have significant impacts on the river. Iowa County's approval of the plats is contingent upon WRDC's ability to provide sewage treatment and other services for the subdivision. Because of mounting financial concerns, it is not known whether or not WRDC will proceed with the project.

Grant County has identified sewage disposal problems along the Mississippi and Wisconsin Rivers related to zoning where resort cottages on small lots, campgrounds, or mobile home areas have been poorly designed or located. The Grant County plan has identified some areas along the Wisconsin River as resource and environmental protection areas to be preserved for their scenery and natural habitat and prevent erosion in threatened areas. Some future industrial development is expected at Muscoda and Boscobel, two Grant County communities along the river.

In Crawford County some substandard dwellings and mobile homes exist along the Wisconsin River. As the shoreland and floodplain management programs are enforced, future substandard development will be prevented.

Nonrecreational Uses of the River

The lower Wisconsin is relatively free of commercial and nonrecreational uses below the twin cities of Prairie du Sac and Sauk City. Such nonrecreational uses as do exist generally are not highly noticeable. Exceptions to this are the powerline and bridge crossings that occur throughout the study reach.

Although there was commercial fishing on the river many years ago, there is none now. Some small scale commercial trapping for turtles and for fur bearers such as beaver, raccoons, muskrat, mink, otter, and red and gray fox does occur. In addition, some stock watering takes place, and in a few instances the river still serves as the ultimate depository for municipal waste.

The lower Wisconsin River has been identified as one of the remaining primary sources of water in the State of Wisconsin suitable for the location of future electric generating facilities. For example, during the site selection process for a recently approved 527 megawatt coal-fired generating station, the Wisconsin Power and Light Company identified a site at Muscoda as an alternative site. Any such facility constructed near the lower Wisconsin River would utilize its water solely as a source of cooling water and service water for the facility. The facility itself could have considerable visual impact on the river corridor. The Wisconsin Power and Light Company has indicated a willingness to locate any future power plant developments away from the river to preserve the integrity of the natural river corridor. Cooling water needed could be piped to the plant, with any intake structures screened to reduce impact.

In summary, the commercial and nonrecreational uses of the lower Wisconsin River are minor and do not seriously impinge on the study corridor except where bridges and powerlines cross.

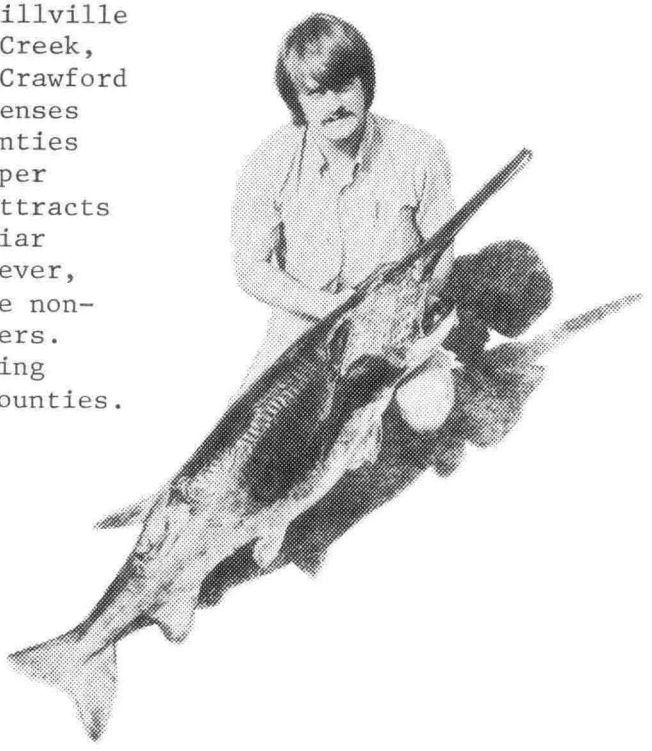
Recreational Uses of the River

Regional recreation resources are depicted in Map III-6.

The lower Wisconsin wildlife areas comprise the principal public use land available along the Wisconsin River. Approximately 26,000 acres or 28 percent are controlled by the DNR for State parks and for wildlife habitat and compatible recreation. Of this, about 19,000 acres are held in fee simple and about 7,000 in perpetual easement.

The major recreation uses of the area are hunting, trapping, and fishing. Because of its location along the Mississippi flyway, the area attracts extensive waterfowl populations. Wook ducks, mallards, and Canada geese are the most common. The adjacent upland areas provide a wide variety of game species including deer, squirrels, muskrats, beaver, ruffed grouse, bobwhite quail, woodcock, and rabbits. Because the resident pheasant populations are small, additional birds are stocked annually in the fall for the hunting season.

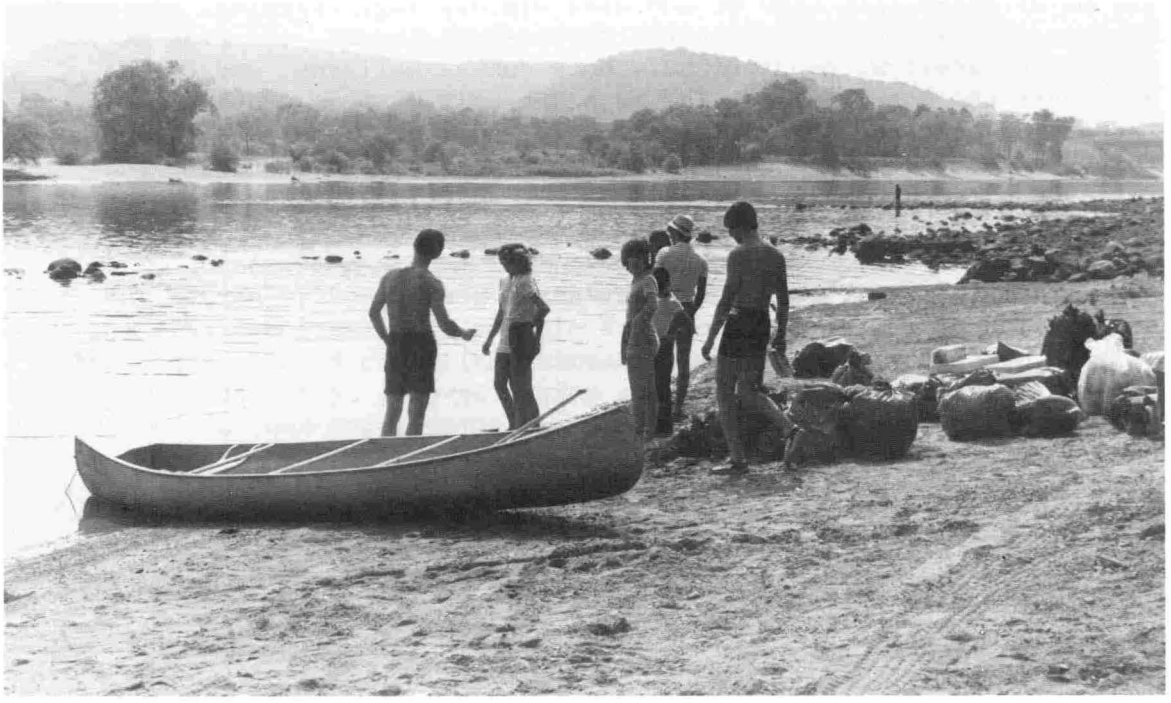
The variety of water resources provides a year-round fishery. The combination of the river, backwater sloughs and lakes, and tributary streams make available to the fisherman smallmouth bass, northern pike, bluegills, bullheads, catfish, and carp. Several of the tributaries to the Wisconsin have been designated trout streams and kept active through stocking programs. These include Byrds Creek in Richland County; Lane Creek and Millville Creek in Grant County; and Boydtown Creek, Clear Creek, and Gran Grae Creek in Crawford County. In 1974, 47,563 fishing licenses were sold to citizens of the six counties bordering the river, a ratio of one per nine persons. The Wisconsin River attracts mainly local fishermen who are familiar with its backwaters and sloughs; however, the tourist season finds considerable nonresident interest in fishing its waters. During 1974, 13,078 nonresident fishing licenses were purchased in the six counties.



This paddlefish was taken from the Wisconsin River just below the Prairie du Sac dam in 1974. The paddlefish is listed as a "threatened species" by the Wisconsin Department of Natural Resources.

Family and group canoeing on the Wisconsin are very popular because of the relative ease and safety in canoeing there. The shallowness and lack of whitewater combine to make the river safe for even the most inexperienced canoeist, although some spots can be troublesome where the water swirls around bridge pilings. The frequent sandbars and islands are popular spots for picnicking and camping, giving the recreationist a sense of getting away from it all. Most canoe trips incorporate a variety of recreational activities, including swimming, camping, wading, fishing, photography, and nature study.

Although interest is increasing, there are still rather few canoes among local residents. Most canoe groups are from outside the river corridor, representing areas such as Milwaukee, Madison, Chicago, southern Wisconsin, and northern Illinois.



A group prepares for an overnight canoe trip.

There are seven canoe rentals on the Wisconsin with a total of 150 canoes for rent. Most of the rentals take place on the upper end of the study reach, at Sauk City and Spring Green, with canoe trips of one or more days downstream. One canoe livery operator estimated 70 percent of the canoe use on the river to be rental canoes. The period of heaviest use occurs on weekends from mid-April to mid-October. Generally, nearly every livery canoe is reserved in advance for the weekends. Weekday use is very light except during July and August.

Other recreational uses of the lower Wisconsin wildlife areas include hiking, cross country skiing, snowmobiling, nature study, camping, boating, berry picking, and nut and mushroom gathering. Local residents occasionally drive for pleasure along the sand roads within the wildlife areas. In the past, dog trials have been held in several of the units. In 1974 just one trial provided 100 person days of recreation. Camping is available at a few of the units, but it may be curtailed in the future.

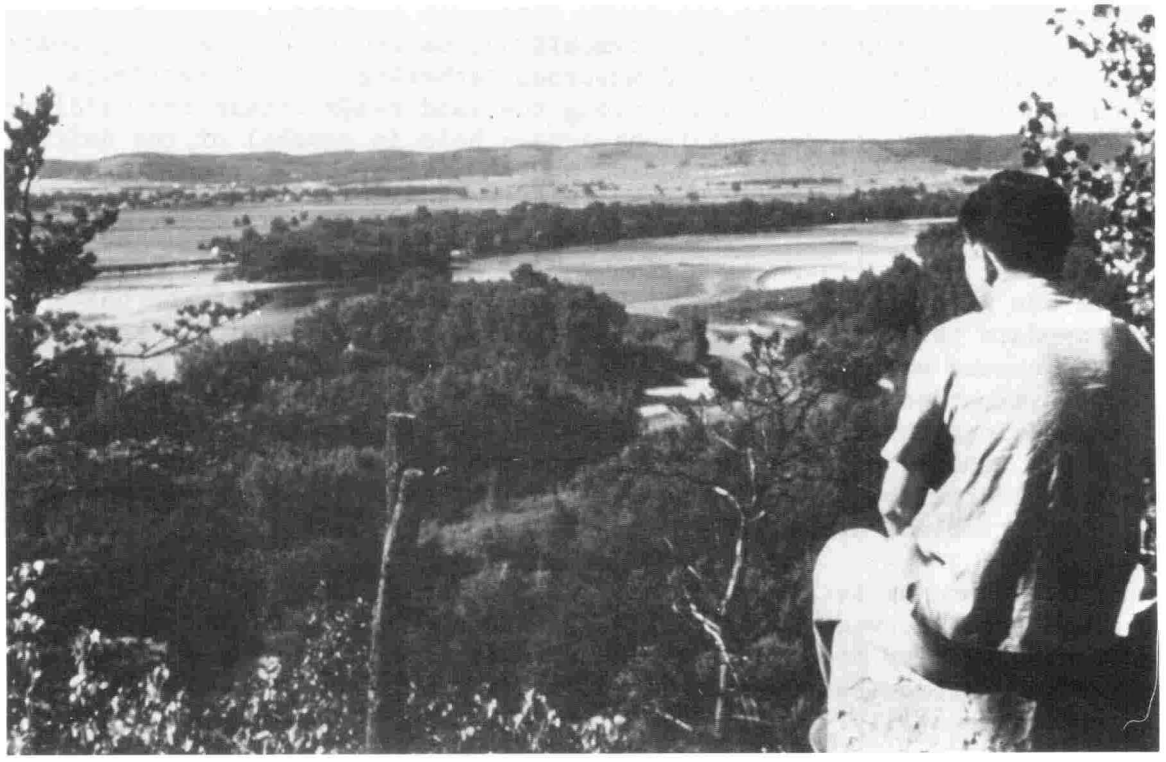
There are plans to develop snowmobile trails within some of the units to accommodate this winter activity. In the past, indiscriminate snowmobiling caused problems so that some areas have been closed to this use. The construction of marked snowmobile trails, as in the Blue River unit, located along the southern bank of the Wisconsin between Muscoda and Boscobel, should minimize conflict with the area's intended use. Other outdoor recreation vehicles such as trail bikes and jeeps have been seen in the bottomland areas.

At the Woodman-Millville unit, also located along the southern bank of the Wisconsin between Boscobel and Wyalusing State Park, Woodman Lake provides swimming opportunities. Because it lacks the current of the river and motorboats are prohibited, it is a popular spot with use increasing annually.

Nature study is an important recreational and educational activity in the lower Wisconsin wildlife areas. In the Pine River unit, located along the Pine River between Gotham and State Highway 58, the Sextonville Tamarack Bog was designated a Richland County Scientific Area. In the Blue River Unit, a 130-acre area of sand dunes and blow-outs was designated the Cactus and Dunes Scientific Area in 1968. Every year these areas are visited by university and school groups to study the unique biota of these ecosystems.

There are two State parks adjacent to the Wisconsin River, Tower Hill and Wyalusing. Tower Hill State Park, near Spring Green, is a 108-acre park with the historic shot tower its main attraction. The park's primary use is for short-term camping and day use picnicking and hiking. There are 22 campsites with no water or electrical hookups. Tower Hill has a canoe landing on Mill Creek giving access to the Wisconsin River. One factor affecting recreational use of Tower Hill is the resident mosquito population; Tower Hill is reputed to have more mosquitos than any other park in the State. In spite of this, 57,000 people visited the park in 1974.

Wyalusing State Park encompasses nearly 2,600 acres of wooded bluffs and river frontage at the junction of the Wisconsin and Mississippi Rivers. Outstanding vistas of the rock bluffs and islands in the river combine to make this one of Wisconsin's most scenic parks. In addition to the scenic resources, the park has notable historic, geological, biological, and recreational attractions. The park offers group and family camping opportunities, with 94 family campsites and a lodge with four dormitories available for groups. Wyalusing has a boat landing on the



At Tower Hill State Park the Wisconsin River may be viewed from a pinecovered blufftop.

Mississippi River, and a self-guiding canoe route is marked through the sloughs, islands, and backwaters. Canoeists wishing to take out at Wyalusing after floating the Wisconsin must float about three miles down the Mississippi to reach the boat ramp. Visitor use in 1974 totaled 129,000, with 40,500 campers. Even so, it is not considered a heavily used park.

Recently the DNR has proposed inclusion of approximately 1,250 acres of river bottomlands from the Highway 35 bridge at Bridgeport to the Burlington Northern Railroad Bridge at Prairie du Chien as an addition to the Wauzeka Unit-Lower Wisconsin River Wildlife Area.

The DNR is in the process of preparing a Wisconsin Trail System plan that proposes a program for trail development over the next 25 years. One of the proposed long-distance hiking trails parallels the lower Wisconsin. The goal is to have 50 percent of the trail, about 82 miles, ready for use by 1984 with the remaining 100 miles completed by 1989.

Several factors limit the recreational potential of the river. The greatest single factor limiting the types of recreational use of the Wisconsin is its depth. Because of its overall shallowness and the shifting sandbars, the river is best suited for watercraft with shallow

draft such as canoes, boats with small motors, or airboats. Even experts at "reading the water" occasionally find themselves stranded on a submerged sandbar with no alternative but to get out and pull their canoe or boat to deeper channels. Because the river is so shallow, it is generally not suitable for sports associated with larger motorboats, such as waterskiing. Small motor boats are very popular with local residents and are primarily used for fishing. Airboats have had some popularity among local residents in recent years, but their number is not significant.

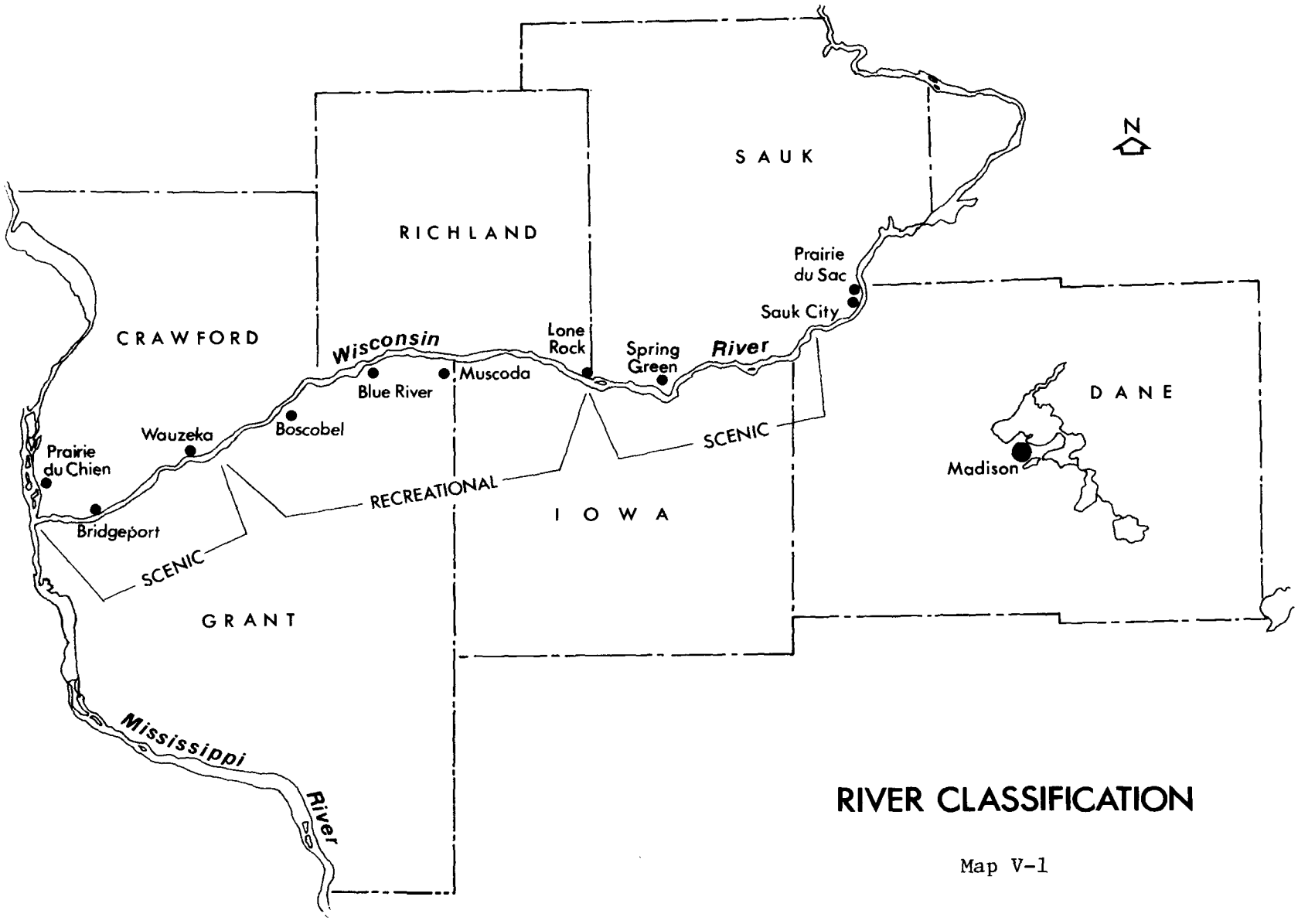
Recreational use of the Wisconsin is also limited by water quality. Full body contact activities are not recommended even though they occur. In the early 1970's, fishermen were advised to limit their consumption of fish taken from the Wisconsin River because of high mercury levels. Fish from the Wisconsin commonly exceeded the 0.5 ppm mercury level tolerance established by the Food and Drug Administration. However, withdrawal of the mercury warning for Lake Wisconsin indicates progress. There are some fishermen who claim to detect a sulphur-like smell in the fish, and keep their live catch in a private pond for a month or two to filter out the offensive taste and smell.

The diurnal fluctuation of the Wisconsin River created by operation of the Wisconsin Power and Light Company dam may inconvenience some recreationists. At one period of the day there may be enough water to run a motorboat, but there may not be enough several hours later. The river can rise several feet in the night and has been known to wash canoes off sand bars and flood campers. Canoe liveries caution recreationists to make their camps on high ground.

In the summer months, the prevailing southwesterly winds come up the river valley. Occasionally, the winds are strong enough to offset the river current and make downstream progress difficult for the canoeist.

In addition to being a nuisance, the ever present mosquito may be a health hazard. Fifty cases of California encephalitis were reported in Wisconsin during 1975 compared to 25-30 cases during past years. The most common vector is a mosquito which breeds in tree cavities on hillsides of hardwood deciduous forests. Because of concern for student health, at least two school group field trips to the area were cancelled in 1975. An increase in the number of encephalitis cases in the State or even the Midwest could deter others from visiting the lower Wisconsin River during summer months.

The relative lack of sanitary facilities may also be considered a limiting factor in recreational use. While many recreationists prefer the primitive aspects of no facilities, feeling "away from it all," there is a limit to how much the river area can absorb. Well-meaning campers often bury their refuse only to have it washed up and carried downstream as the river level rises. Without proper sanitary facilities, human waste is likely to pollute the water and degrade the resource recreationists come to admire.



RIVER CLASSIFICATION

Map V-1

V. EVALUATION AND CLASSIFICATION

Evaluation

The lower Wisconsin River from Honey Creek to the confluence with the Mississippi River and its immediate environment possesses sufficient natural and scenic values and provides recreation opportunities to qualify for inclusion in the National Wild and Scenic Rivers System. The river is free-flowing (though levels fluctuate through controls imposed at the Wisconsin Power and Light Company facility at Prairie du Sac) and exhibits scenic, recreational, geologic, fish and wildlife, and historic values of an outstanding nature. The qualifying segment is of sufficient length (82.4 miles) to provide a meaningful recreation experience and has adequate water flows to permit a wide range of water-related outdoor recreation activities. Water quality meets the "Aesthetics--General Criteria" as defined by the National Technical Advisory Committee on Water Quality Criteria, April 1, 1968. There are no water resource projects presently planned on the segment found eligible for inclusion in the National Wild and Scenic Rivers System.

Classification

The stretches of river from Honey Creek to the Highway 130 bridge at Lone Rock and from the confluence with the Green River to the confluence with the Mississippi River exhibit characteristics which enable them to qualify for scenic classification which is defined in the Criteria and Guidelines as ". . . those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads."

Scenic classification was determined on the basis of the following conditions:

1. Both recommended river segments are free of impoundments.

2. Both recommended river segments have shorelines and immediate environs which present an overall natural character and therefore meet the criteria for "largely primitive."

3. Both recommended river segments are "accessible in places by road" which only occasionally cross the river area. Five bridges and seven powerlines span the 39 miles of riverway in the scenic classification; two bridges serve railways and three serve primary roads.

4. Both river segments meet the established criteria for "largely undeveloped." Concentrations of dwellings on or near the shore are limited to only very short portions of the total recommended area.

The "largely undeveloped" character was evident during the various field evaluations and is further indicated by the following breakdown of land use within the "study corridor:" 43 percent forest, 13 percent wetlands, 32 percent agriculture, and 0.3 percent urban.

The segment of the lower Wisconsin from the Highway 130 bridge at Lone Rock to the confluence of the Green and Wisconsin Rivers exhibits characteristics which enable it to qualify for recreational classification which is defined as ". . . those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past."

Recreational classification was determined on the basis of the following conditions:

1. The recommended segment is readily accessible by road. In this 39-mile stretch there are four highway crossings and one railroad crossing.

2. Road segments are adjacent to the river for a total of 11.5 miles of the 78 miles of paralleling shoreline.

3. There are several small villages or towns near the shoreline, but most are shielded from direct view of the river by vegetation or topography. Seven powerlines also span the river.

VI. RECOMMENDED RIVER PLAN

This conceptual plan is intended to be a guide for the State of Wisconsin and should not be construed as being a detailed master plan for a scenic and recreational river program for the lower Wisconsin River. The riverway acreages and suggested facility developments included in this plan are subject to modification, and the State should continue to refine the guidelines presented, tailoring them to meet the needs of the people of Wisconsin and adjacent States. It is recommended that the State of Wisconsin prepare a detailed master plan for the protection and recreational development of the river.

Boundaries

It is recommended that all 82.4 miles of the lower Wisconsin which meet the criteria set forth in the Act (P.L. 90-542) and the 1970 Guidelines for Evaluating Rivers adopted by the Secretaries of the Interior and Agriculture be included in the National System. A description of the segments and their recommended classification are shown in Chapter V of this report.

Delineation of specific riverway boundaries for segments in the National System is the responsibility of the administering agencies and should be determined in terms of a zone of influence on the natural scene as perceived from the river itself. The senses of sight, smell, and sound all directly relate to the zone of influence. The line-of-sight is a primary factor which is determined by topography and land use or vegetative cover. A narrow strip of dense vegetation, for instance, can provide a more effective vegetative screen than a sparse tree stand of much greater depth. Expansive views of bluff lines and marsh fringes are also key focal points which influence the experience. Sounds emitting from engines and machinery such as trucks, automobiles, and irrigation pumps are important influences. Offensive odors from land fill, agricultural activity, or poor water quality are important as well. All of these factors should be considered when defining the project boundaries.

The boundary should include outstanding natural, historical, or archaeological areas and necessary public use and access areas. Existing property ownership should be utilized where feasible to delineate the boundary in order to reduce new survey and severance costs. All privately held islands should be acquired so that recreational use on them can be controlled and to give the administering agency authority for trash collection. It is expected that existing authorized boundaries of State parks and wildlife areas would be utilized.

Bluffs are extremely effective in screening the river corridor if they are near the riverbank. However, along the lower Wisconsin, bluffs in close proximity to the river are generally on only one side of the river; the opposite bank is often floodplain. Where bluffs are a considerable distance from the river, perhaps in excess of one mile, pro-

tection to the bluff line may not be necessary and would be impractical. Where protection is needed, scenic easements rather than fee purchase are recommended.

Means of Protection

Land protection methods should be sufficiently comprehensive to ensure that the natural integrity of the river be preserved for future generations in accordance with its classification criteria. Acquisition of lands provides a maximum protection of that land. Property rights acquired within the boundary should be adequate to provide reasonable protection of the natural scene and to accommodate the desired level of recreational use. However, it is the intent of the Wild and Scenic Rivers Act that national wild and scenic rivers be administered in such a way as to protect and enhance the scenic, recreational, geologic, fish and wildlife, historic, and cultural values without limiting other uses that are compatible and do not substantially interfere with public use and enjoyment of these values.

Fee Title Acquisition--Lands needed to provide access and services to the public and to protect the river and its environment, including unique natural areas which may be jeopardized by less than fee control, should be acquired in fee title. Fee title acquisition should be limited in order to minimize impacts on the local people and economy. The Department of Natural Resources has the power of condemnation, but the Natural Resources Board must review and approve each tract proposed for condemnation. This authority is rarely exercised.

Scenic Easements--Necessary protection and control of land use for a major portion of the proposed segments should be accomplished through a combination of the purchase of scenic easements and land use zoning. Essentially, a scenic easement involves acquisition of the right to control certain uses of the land for the purpose of protecting the natural qualities of the river. Easement acquisition may be accomplished through an agreement or series of agreements (for appropriate compensation) whereby a landowner binds himself, his heirs, successors, or assigns to refrain from using or developing the land in ways which would detract from the scenic and natural character of the land. In no instance would scenic easement acquisition restrict, without the landowner's consent, any regular use exercised prior to the acquisition. The use of an easement in lieu of fee purchase would permit land to remain in private ownership and, therefore, remain on the tax rolls. Easement rights which would be negotiated with landowners could include:

1. Limitations on the heights of future structures, on the exterior appearance of buildings, and on the intensity of development.

2. Restrictions on the allowable extent of the cutting of trees and native vegetation.

3. Prohibitions of commercial sand and gravel extraction operations.

4. Prohibitions of billboards and advertising signs.

5. Prohibitions of piles of trash.

6. Restriction of the land to specific uses and developments, such as single family residential, agricultural, timber growing, particular recreation uses, etc.

7. Restrictions of livestock grazing and watering in the river but only after such grazing and/or watering have been determined to be environmentally detrimental or inconsistent with the public use of the river by the administering agency.

All scenic easements would be established on the basis of mutual agreement between concerned landowners and the administering agency.

Zoning--The Shoreland Management and Floodplain Management Programs were enacted by the State legislature to go into effect in September 1970. The provisions of these programs were discussed in the section on "Zoning" in Chapter IV. Maximum advantage should be made of these programs to afford protection of scenic values without expense being accrued to the public and with minimum disruption to the lives of riparian owners. Maximum protection using this method will involve primarily the enforcement of existing zoning codes.

Development

The purpose of providing public use facilities should be to enhance the visitor's enjoyment of the river area and to ensure that the visitor does not destroy the very environment he seeks to enjoy. For this reason, the conceptual development plan suggested is intended to retain the river environment in as natural a state as possible while providing suitable recreation facilities needed for appropriate use and enjoyment. Developments should be oriented primarily for activities which require river access such as canoeing, boating, and fishing. Facility development for recreation activities not directly associated with the river should be kept to a minimum.

Access Sites--There are 30 public and one private (but available to the public) access points along the river below the dam at Prairie du Sac. Additional sites will not be needed, but approximately seven should be upgraded. Most access sites should require little more than sanitary and trash facilities, drinking water, and small parking areas which can be used for fishing and floating access. A limited number of areas should also provide boat launching and picnicking facilities.

Campgrounds--Small campgrounds accessible only by water (or service roads for administrative use only) should be provided for river users

participating in overnight float trips. All facilities should include sanitary facilities, tent pads, and fireplaces. Only 75 sites, in units ranging in size from 5-20 campsites, are recommended for establishment until the DNR has had a chance to gauge needs. Numbers and locations should be used as a management tool to control overnight use and prevent overuse of the resource. All facilities should be well screened from the river.

Scientific and Natural Areas--The Scientific Areas Preservation Council has identified 51 natural areas on or near the study area (see Appendix V). Seven of these areas are designated "scientific areas." A scientific area is a tract of land in its natural state permanently protected or managed to preserve native plant and animal communities. Because the scientific areas represent unique communities of rare plant and animal species, they should be protected for scientific study; and unrestricted public use of these areas should not be encouraged. The use of management tools, such as prescribed burnings to maintain the integrity of prairie plant and animal diversity, should be carefully controlled to prevent conflict with river users.

Some of the areas recognized as natural areas of general natural history interest could be made accessible to the public with interpretive facilities as appropriate. This would relieve pressure from the small and delicate scientific areas. All proposed activities concerning scientific and natural areas should be coordinated with the Scientific Areas Preservation Council.

Management

The management objectives for the lower Wisconsin River should be to protect and enhance the values which allow it to be recommended for inclusion in the National Wild and Scenic Rivers System. Management objectives should be to:

- Maintain the river's natural, free-flowing condition.
- Protect and enhance scenic, recreational, geologic, fish and wildlife, historic, archaeologic, and other similar resources.
- Maintain or enhance water quality.
- Provide opportunities for river-oriented recreation which are consistent with protection of the quality of the river and its environment.

Some specific management suggestions to achieve the above objectives are:

Recreation

-- Access sites and float camps should be developed and distributed in accordance with the type and amount of use each area can support without causing an unacceptable change in

either the physical environment or the recreational experience. Once begun, contruction should be completed as quickly as possible to shorten the time of adverse impact on soil and vegetation. Because the long-term and continuing impact of human use on the river and its environment is not fully understood, a system of periodic evaluation and monitoring should be established to develop criteria for the protection and management necessary to ensure a meaningful scenic river experience for the river user.

-- Facility development should not detract from the quality of the river scene. Development should generally be back from the river's bank and screened from view of the river user.

-- A detailed inventory of historic, archaeologic, and other special interest areas should be made, and a program developed for their protection and, where appropriate, their interpretation. Interpretive devices and signs should be relatively unobtrusive or complementary to the natural and historic scene. To protect these resources, portions of the inventories may need to be confidential. If any previously unrecorded sites should be encountered during development or operation, the State Historic Preservation Officer should be notified and any development suspended until a professional determination is made of the site's significance.

Fish and Wildlife

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

-- The managing agency should give consideration to the privately owned eagle roost at Ferry Bluff. The National Wildlife Federation and the local Eagle Valley Environmentalists are responsible for managment of the 170-acre area; the managing agency should cooperate with these groups in determining user levels on the adjacent river segment that would not disturb the eagles. (For example, a campground near the roosting site would not be compatible.)

-- Bird and animal species will be managed by the administering agency with special attention and care in accordance with State and Federal laws and regulations governing endangered/threatened species, if the species are presently so designated, or if they are later so designated.

Land Resource Use

-- Native species should be used primarily in areas where seeding or planting is required. Special managment protection measures would be needed for areas of unique biological value.

-- Protection of the forest resources within and near the river boundaries from fire, insect, and disease damage should receive added consideration. Control or salvage measures necessary for diseased or damaged trees or other vegetation should be carefully weighed against possible adverse impacts on the ecological and scenic values of the river corridor.

-- Maintenance of soils and protection of the watershed adjacent to the river are essential. Because much of the recreation activity and development would take place near the river's edge, special emphasis should be placed on preventing and controlling soil erosion. This is true for both measures, and revegetation should be carefully weighed against possible adverse impacts on the ecological and scenic values of the river corridor.

-- The present amount of livestock grazing and watering along the river is not considered degrading to the environment and should be treated as a continuing compatible land use. It is recognized, however, that cattle in the river can be detrimental from the standpoint of aesthetic and public health considerations. Therefore, any incompatible increase or change in the nature of grazing or watering activities may require restriction of grazing and water rights through easements or fee acquisition if necessary.

-- Removal of bankside vegetation should be prevented where it endangers natural or scenic values. However, selective timber harvesting should be allowed where it is consistent with the overall management objectives and subject to regulation by the administering agency.

-- Species of flora will be managed by the administering agency with special attention and care in accordance with State and Federal laws and regulations governing endangered/threatened species, if the species are presently so designated, or if they are later so designated.

-- Local units of government should be encouraged in their enforcement of zoning controls of lands adjacent to the riverway and in nearby developed areas to ensure that the immediate environment of the lower Wisconsin River is protected.

-- An archaeological survey should be conducted as part of the master planning process and the results evaluated prior to site development. Areas identified as the most vulnerable to vandalism or destruction due to development of the riverway must be protected.

Water Resources

-- Since aquatic organisms are especially susceptible to water quality degradation, careful attention must be given to the planning and construction of developments along the river and its tributaries. A program for monitoring chemical, biological, and physical water quality characteristics should be established throughout the watershed.

-- An intensive State-local cooperative program should be initiated to control littering and dumping along the river.

-- Regulations requiring float campers to carry out their garbage and litter should be established, widely advertised, and vigorously enforced.

-- Alteration or diversion of the natural channels in the river which would significantly affect the free flow of water should not be permitted unless it is clearly demonstrated that such alterations or diversions would have no adverse effect on the scenic and recreational qualities of the river corridor.

-- Efforts to reduce siltation through land conservation measures throughout the watershed should be intensified.

-- Commercial sand and gravel operations within the immediate river corridor are detrimental to maintaining a natural river environment and any new operation should be prohibited.

Utilities

-- Any construction of highways and new bridge crossings, renovation of existing structures, or power or pipeline crossings should be reviewed and approved in advance by the managing agency. Where possible, new construction of powerline and pipeline crossings of the river should be avoided. If crossings cannot be avoided, the managing agency and the public utility company should jointly select the location which will result in the least damage to the river environment. This may be on or adjacent to existing corridors. Existing power and pipeline crossings should be adequately screened where possible.

Recommended Administration

It is recommended that the State of Wisconsin administer the lower Wisconsin River as a component of the National Wild and Scenic Rivers System. Administration by the State is appropriate for a number of reasons: the Wisconsin DNR administers six wildlife areas and two State parks with 19,415 acres in present State ownership and an additional 17,335 acres authorized for ownership along the river. In addition, over 7,000 acres are controlled by easement, and upwards of 5,500 acres are covered by annual hunting and fishing leases. The State also administers four access points along the river. State conservation officers are now active in policing and protecting the river, and they enforce State laws concerning hunting, fishing, trapping, boating, littering, and conservation which are important aspects in a river protection plan. Through these and other programs, the State has established good working relationships with local government officials, groups, and individuals.

There are a large number of jurisdictions having planning, management, or development responsibilities over the type and extent of uses made of the land and water resources both within the river corridor and on adjacent areas. The overall values of the lower Wisconsin would receive greater protection and enhancement if State and local jurisdictions and residents along the river had a common focal point to coordinate their activities relating to the land and water resources within the designated segment. A lower Wisconsin Advisory Board should be established for this purpose. Its primary objective would be to advise and assist State and local governmental units in the planning, development, management, and administration of the river and provide all interests a voice in the policies and actions with respect to the river.

Local units of government should be encouraged to provide zoning regulations that would complement State land acquisition programs and to cooperate fully with the State in implementing the scenic river program.

The Wisconsin DNR should prepare a detailed master plan for the lower Wisconsin and take the necessary steps to assure implementation of that plan. This master plan would require the approval of the Governor. The Governor of Wisconsin would then forward to the Secretary of the Interior an application requesting that qualifying portions of the lower Wisconsin River be included in the National System, as set forth in Section 2(a)(ii) of the Wild and Scenic Rivers Act.

At one time the State expressed interest in seeing the lower Wisconsin included in the National Wild and Scenic Rivers system, but more recently has asked for consideration of the area as a National Recreation Area.

On April 15, 1976, the Wisconsin Natural Resources Board passed a resolution stating that it ". . . reiterates its strong support for the inclusion of the lower Wisconsin River in the National Wild and Scenic Rivers System as the most suitable and lasting method of protection and preser-

vation for this unique river valley." The board changed its position on March 30, 1977, when it passed a new resolution recommending ". . . that the planning associated with the designation of the lower Wisconsin River as a scenic and recreational river be broadened to include recreation area concepts," and that the Wisconsin DNR and U. S. Department of the Interior initiate study of the area for its potential as a National Recreation Area (see Appendix VI for copies of the resolutions). However, until directed otherwise by the Congress, the Heritage Conservation and Recreation Service and U. S. Forest Service will continue to carry out the Congressionally directed charge to do a wild and scenic river study. Additional direction will be needed before the study can be widened as requested by the Wisconsin Natural Resources Board.

Possible Administrative Alternatives

Three other possible administrative arrangements for managing the lower Wisconsin River as a component of the National Wild and Scenic Rivers System which were considered involved the Federal Government, joint State-Federal administration, and the establishment of regional or local government authorities.

Federal Administration--Through an Act of Congress, the Department of the Interior (more specifically the National Park Service) would probably be designated for overall administration of the lower Wisconsin. Under this arrangement, the Federal Government would be responsible for the acquisition, development, and management of the river corridor. The portions of the nonfederal public lands would either be donated to the Federal Government or proper administrative arrangements would be determined between the designated Federal agency and the Wisconsin DNR. Under Federal administration, an advisory council could be established. Membership of the council would consist of representatives from appropriate Federal, State, local, and private organizations.

Joint State-Federal Administration--Under this administrative alternative, responsibilities for acquisition, development, operation, and maintenance of the riverway would be divided between the two levels of government by mutual agreement. This would be accomplished by cooperative agreements which would clearly define the river management areas and the specific responsibilities to be assumed by each party.

Regional or Local Government Authorities--Under this alternative, all counties bordering the river would have the primary responsibility for administering the river areas and would acquire, plan, and develop the lands necessary to assure appropriate protection and development of the rivers. A formalized structure, such as a conservancy district, would be required to coordinate responsibilities and activities. Cooperation with the State in the administration of the river would also be required in areas of present State ownership. Necessary funds would be provided by the counties, but additional financial assistance may be available from the State, or possibly through the use of Land and Water Conservation Fund monies for acquisition or development projects.

VII. ANALYSIS AND EVALUATION OF ALTERNATIVE CONCEPTUAL PLAN

This analysis offers a brief summary of the consequences of including or not including the lower Wisconsin River in the National Wild and Scenic Rivers System under State administration. The tables on pages 176 to 185 are provided in accordance with the Bureau's guidelines for implementing the Principles and Standards for Planning Water and Related Land Use Studies of Wild, Scenic, and Recreational Rivers and National Recreation Areas. The qualitative and quantitative expressions of plan impacts are arrayed in the following four accounts: National Economic Development, Environmental Quality, Social Well Being, and Regional Development.

National Economic Development Enhancement Plan

Proposals for water resources utilization which would significantly or irreversibly alter the potential uses of water and related land resources of an area must consider alternatives which range from developing those resources for optimum national economic return to enhancing the natural environmental conditions. The Principles and Standards planning procedures are to be applied to wild, scenic, and recreational river studies where identified water resource development opportunities emphasizing national economic development will be foregone.

Proposals to establish wild, scenic, and recreational rivers have the objective of enhancing the quality of the environment and may not involve an irreversible commitment of resources over the long term or a significant conflict in the preferences of society for the utilization of water and related land resources of an area. When there are no conflicts which would provide the basis for a viable national economic development alternative which meets the tests of acceptability, effectiveness, efficiency, and completeness, the range of alternative plans relate to the environmental quality objective.

No active water resource development projects of the lower Wisconsin River were identified during the course of the study.

At the initiation of the study, the Corps of Engineers was invited to participate in the study. The Corps acknowledged the request but declined participation as its only current involvement with the study reach of the Wisconsin is with the regulatory permits program. Although in the past the Corps has been requested to study certain problems, such as hindrances to small navigation, corrective measures have not proven feasible.

The Federal Power Commission was also contacted during the course of the study. Although two potential hydroelectric sites have been identified

in the study segment, they do not appear economically feasible for development at the present time.

The Soil Conservation Service (SCS) participated as a study associate. Presently no channelization or diversion works are planned for the Wisconsin. The Soil Conservation Service concurs with the recommendation for designation as a scenic and recreational river, ". . . if the designation and management plans allow prime and unique agricultural land to remain in its present agricultural capacity."

The SCS is currently in the planning stages of a cooperative river basin study of the Wisconsin River. Although problems of erosion and sedimentation have been identified, no recommendations for remedial action have been made. Conflicts with the designation of the lower Wisconsin are not anticipated.

The Dane County Regional Planning Commission considered a proposal to construct a canal connecting the Madison lakes with the lower Wisconsin River. The proposal called for the canal to be filled with effluent from the Madison metropolitan sewerage district, and would serve as a transportation system for agricultural and other commodities. In October 1975, the Regional Planning Commission reported that a sanitary barge canal was not feasible, economically or environmentally.

As explained in the preceding paragraphs, areas of potential conflict with designation were explored. No active proposals for water resource development were identified, so an alternative with a National Economic Development Objective was not prepared. The study focused on a range of alternative plans which relate only to the environmental quality objective, i.e., preservation of natural values and enhancement of potential development of economic activities such as agriculture or timber harvest, the economic values of these activities are identified as benefits foregone under the alternatives.

The objectives of the wild and scenic river study were grouped into three planning components: (1) preserving the remaining free-flowing segments of the lower Wisconsin River, (2) controlling land use within the river corridor, and (3) providing for continued high quality recreation opportunities. The impacts of the alternative plans on these planning components were analyzed by arraying the impacts into the four accounts required by the Principles and Standards. These accounts are: National Economic Development (NED), Regional Development (RD), Environmental Quality (EQ), and Social Well-Being (SWB).

Environmental Quality Enhancement Plan

In the absence of a viable national economic development alternative, two planning alternatives for the Wisconsin River were prepared: the recommended plan emphasizing enhancement of the environmental quality and a no-plan alternative. The recommended plan would designate 43.4 miles as scenic and 39 miles as recreational segments

in the National Wild and Scenic Rivers System. The Wisconsin Department of Natural Resources would manage the river and develop a comprehensive management plan prior to designation by the Secretary of the Interior. The no-action plan would allow present trends to continue.

The Principles and Standards analysis calls for comparisons of impacts of the planning alternatives. Existing data on current recreational use is sketchy at best, and this makes trend analysis and future projections difficult. During the course of the study an effort was made to gather information regarding levels of use during peak use days. The data gathered are only samplings, but they served as the basis for the projections made.

The question of how much of any increased use should be attributed to designation in the National System when use already is increasing is a knotty one, and one that is difficult to answer with any degree of confidence. It is likely that no two situations are identical; therefore, each situation should be examined in its own particulars. For example, a common assumption is that publicity (not necessarily resulting from a concerted advertising campaign) and increased access and facilities prompt a large jump in use, at least initially. However, in the case of the Upper St. Croix River in Wisconsin (designated in 1968), the National Park Service has found that "the designation has appeared on road maps and in travel publications for some time, yet there has been no significant influx of long distance visitors, particularly in the categories of active participation, i.e., canoeing, swimming, boating, and fishing." This holds true for the Ozark National Scenic Riverway where only six percent of the users come from outside Missouri. Both, however, demonstrate an important regional appeal. The St. Croix National Scenic Riverway experiences very heavy use (90 percent of day use) from the Twin Cities metropolitan area which is only 60 miles southwest. Nearly 50 percent of the users of the Ozark National Scenic Riverway are from St. Louis. It appears the Wisconsin similarly will exhibit a regional appeal.

In the case of the lower Wisconsin, the river will probably continue to attract heavy use from the Chicago and Milwaukee metropolitan areas, and large cities such as Madison, Rockford, and Dubuque.[1/] Regardless of whether the river is added to the National System, use of the lower Wisconsin is projected to increase significantly in the next 25 years. The bulk of this use should be attributed to a natural growth due to the interest in canoeing and other water-oriented recreational activities and not to designation if it occurs.

For the tables that follow, rates of increase were extrapolated from the Wisconsin State Comprehensive Outdoor Recreation Plan (SCORP, 1972). The assumption was made that with designation the rate of use for activi-

1/ BOR visitor survey on Lower Wisconsin River, summer 1975.

ties such as canoeing and canoe camping would increase faster initially then ease back to predicted increase levels. The with-plan rate of increase is assumed to be twice the without-plan (SCORP) rate for the first five years after designation; the next 20 years are expected to follow increases projected in the SCORP. As a result, the with-plan alternative will result in an additional 19,000 canoe and canoe camping occasions over the 25-year planning horizon.

Fishing and pleasure boating uses of the river are almost exclusively local. Designation of the river as part of the National System is not expected to alter this pattern or to prompt any increase in fishing or boating pressure. The amount of accessibility to the river will not increase significantly. Local fishermen could be expected to be drawn by better fishing but not by mere designation. Accordingly, rates of increase for these activities are the same in the with or without a plan alternatives in the table.

Two examples to demonstrate interpretation of the tables follow:

1. As indicated in the NED account of Table 1, expenditures for fee and easement acquisition with the recommended plan totals $1,587,903.

2. As indicated in the RD account of Table 1, recreation expenditures with the plan over a 25-year period will be $90,464 greater than without the plan.

TABLE VII-1

ENVIRONMENTAL QUALITY PLAN
DISPLAY OF NET EFFECTS*

COMPONENTS	NED ACCOUNT[1] WITH DESIGNATION	NED ACCOUNT[1] WITHOUT DESIGNATION	NED ACCOUNT[1] NET	RD ACCOUNT[1] WITH DESIGNATION	RD ACCOUNT[1] WITHOUT DESIGNATION	RD ACCOUNT[1] NET
1. Preserve free-flowing characteristics of a river.	No Conflicts Identified				No conflicts identified	
2. Manage land use within river corridor.	Land acquisition Fee: $ 396,976 Easement: $1,190,927 Total: $1,587,903[2]	0 0 0	-$ 1,587,903	Negligible Impact on tax base resulting from fee acquisition and no loss from easements.[3]	0	Exact amount of tax revenue lost is indeterminable, but a small reduction is anticipated.
	Values Foregone Timber: $ 221,130[4]	0	-$ 221,130			
	Location of fossil fuel generating plant outside protected corridor: $161,740,800-$209,504,880	Location of fossil fuel generating plant near riverbank: $157,697,280-$205,461,360	-$ 4,043,520[5]			
3. Provide a quality outdoor recreation experience	Recreation benefits[6] $ 3,496,227	Recreation benefits $ 3,435,918	+$ 60,309	Recreation expenditures[11] $ 5,244,341	Recreation expenditures $5,153,877	+$ 90,464
	Facility costs Initial development: $ 293,867[7]		-$ 293,867			
	Operation & Maintenance: $ 789,750[8]		-$ 789,750			
	Replacement $ 176,904[9]		-$ 176,904			
	Total $1,260,521	Unknown[10]	-$ 1,260,521			

*Net effects based upon a 25-year project period. This relates only to the initial development period and life expectancy of initial facilities. Unless otherwise stated, costs are amortized over this period. The project life, however, should be viewed as indefinite since the intent is to protect the river for all posterity.

TABLE VII-1 (continued)

COMPONENTS	EQ ACCOUNT			SWB ACCOUNT		
	WITH DESIGNATION	WITHOUT DESIGNATION	NET	WITH DESIGNATION	WITHOUT DESIGNATION	NET
1. Preserve the free-flowing characteristics of a river.	Protect scenic values of 82.4 miles of free-flowing river.	Potential exists for impoundments or other works affecting free flow	Protection of scenic values of 82.4 miles of river.	Maintain diversity of recreational experience by preserving free-flowing values.	Potential degradation and/or loss of the scenic and natural values which make this an outstanding recreational resource.	Recreational diversity maintained.
2. Manage land use within the river corridor.	Protection of scenic values in the river corridor. Fee: 2,269 acres (inc. 1,744 acres of isls) Easement: 5,050 acres (bluffs) Zoning:[12/] 9,657 acres (all but 987 acres are in floodplain)	Existing floodplain and shoreland zoning restrictions, together with ongoing State wildlife programs, offer a moderate degree of protection to lands in river corridor. Probable additional development of bluffs and floodplain for cottages or homesites.	Additional protection of scenic and natural values in river corridor.	Protection of scenic and natural values in: Islands: 1,744 acres Bluffs: 5,050 acres Other: 9,657 acres No probable reduction to landowner in tax assessment for conveying less than fee rights. Such landowners will be limited in their opportunity to develop lands for economic return.	Potential deterioration and/or loss of scenic and natural values. 0	Enhancement of corridor for public enjoyment and study. Undetermined financial loss to landowner.
	Timber management objectives along riverway reflect preservation of scenic values through modified harvesting procedures.	No restrictions on timber cutting.				
	FPC may not license (where its approval is necessary)* transmission line crossing without prior concurrence by the Secretary of the Interior.	No review and concurrence on FPC licensed lines by Secretary of the Interior.				

* An FPC license is required for hydroelectric power projects and primary transmission lines from these plants.

TABLE VII-1 (continued)

COMPONENTS	EQ ACCOUNT			SWB ACCOUNT		
	WITH DESIGNATION	WITHOUT DESIGNATION	NET	WITH DESIGNATION	WITHOUT DESIGNATION	NET
3. Provide a quality outdoor recreation experience	Likelihood that lower Wisconsin River will become a higher priority river for water quality improvement.	Likelihood that lower Wisconsin River will remain a low priority river for water quality improvement.	Accelerated improvement in water quality in lower Wisconsin River.	Increased facilities and improved maintenance and operation of facilities and riverway. Upgraded access sites: 7 Primitive camp sites: 75 resulting in 19,003 additional recreation occasions over first 25-year period.	Fewer public facilities and poorer maintenance of existing facilities.	More enjoyable recreational experience and 19,003 additional recreation occasions over first 25-year period.
	Control will be exercised through location and density of facilities	Recreational use will be regulated only by existing State and local laws with lesser enforcement.	Increased protection of the resource.			
				Increased employment: Facility development: 20.3 man years (one-time basis) O&M: 5 man years annually	No employment opportunities above those resulting from natural increase in use.	+ 20.3 man years (annually) + 5 man years (annually)
				Increased enforcement of existing State and local laws.	Lesser degree of enforcement of State and local laws.	Increased user safety and less litter, both resulting in greater public enjoyment.

TABLE VII-2

BENEFICIAL AND ADVERSE EFFECTS OF THE ENVIRONMENTAL QUALITY PLAN
(Quantified Monetary Effects are Annualized over Period of Analysis)

COMPONENT	NED ACCOUNT EFFECT		RD ACCOUNT EFFECT		EQ ACCOUNT EFFECT	SWB ACCOUNT EFFECT
	Beneficial	Adverse	Beneficial	Adverse		
1. Preserve the free-flowing characteristics of a river.					Protection of the free-flowing characteristics of the river by designating 43.4 miles as a scenic river and 39 miles as a recreational river will allow future generations to appreciate the rare environmental aspects of the river.	Protect the river and related environmental values to provide diverse recreational experiences.
2. Manage the land use within the river corridor.		Timber harvest foregone: $221,130 Land acquisition costs: Fee: $396,976 Easement: $1,190,927 Costs of locating fossil fuel plant away from river: $4,043,520		Negligible tax revenue foregone	Additional protection of scenic values in river corridor: 2,269 acres protected through fee acq. 5,050 acres protected through easement 9,657 acres protected through increased zoning control. Restrictions on timber cutting. No FPC licenses granted for projects under its control without review by Secretary of the Interior.	Enhancement of corridor for public enjoyment & study through acquisition in fee and scenic easement. Undetermined financial loss to landowner resulting from sale of scenic easements: No reduction in taxes & limitations on development of land for economic return.

TABLE VII-2 (continued)

COMPONENT	NED ACCOUNT EFFECT		RD ACCOUNT EFFECT		EQ ACCOUNT EFFECT	SWB ACCOUNT EFFECT
	Beneficial	Adverse	Beneficial	Adverse		
3. Provide a quality recreation experience.	Recreation benefits +$ 60,309	Initial cost of facilities: $293,867 O&M: $ 789,750 Replacement: $ 176,904 Total: $1,260,521	Increased income to local economy resulting from multiplier effect of recreation expenditures: $ 90,464		Prevent degradation of the environment by controlling access to areas of special environmental concern and by managing recreational use within the resource capability. Accelerated improvement in water quality in lower Wisconsin River	Improvement of social welfare through assurance of a balanced mix of recreation opportunities and preservation of option to enjoy river-oriented recreation activities in the future. Increased number of jobs available: 5 man years annually for O&M 20.3 man years total for facility development After 25 years of designation, net use is expected to be 19,003 recreation days over what would otherwise occur by: Providing 75 primitive campsites, Upgrading 7 access sites, and better operation & maintenance. Increased enforcement of State & local law, both resulting in greater public enjoyment & safety.

TABLE VII-3

SUMMARY COMPARISON OF RECOMMENDED PLAN AND NO DESIGNATION

COMPONENT	DESIGNATION (Recommended Plan)	NO DESIGNATION	DIFFERENCE
	NED ACCOUNT		
2. Manage land use within the river corridor	Values foregone:		
	Timber: $ 221,130	0	- $ 221,130
	Land Acquisition Costs: $ 1,587,903	0	- $ 1,587,903
	Cost of locating fossil fuel plant away from river corridor: $161,740,800-$209,504,880	$157,697,280-$205,461,360	- $ 4,043,520
3. Provide a quality outdoor recreational experience	Recreation benefits: $ 3,496,227	$ 3,435,918	+ $ 60,309
	Facility costs:		
	Initial Development- $ 293,867	0	- $ 293,867
	O&M $ 789,750	0	- $ 789,750
	Replacement $ 176,904	0	- $ 176,904
	Total $ 1,260,521	Unknown	- $ 1,260,521
	RD ACCOUNT		
2. Control land use in river corridor.	Negligible tax revenue foregone	0	Exact amount of tax revenue lost is indeterminable but a small reduction is anticipated.
3. Provide a quality outdoor recreation experience.	Recreation Expenditures: $ 5,244,341	$ 5,153,877	+ $ 90,464

TABLE VII-3 (continued)

COMPONENT	DESIGNATION (Recommended Plan)	NO DESIGNATION	DIFFERENCE
	SWB ACCOUNT		
1. Preserve the free-flowing river.	Maintain recreational diversity.	Potential degradation and/or loss of the scenic and natural values that make this an outstanding recreational resource.	Recreational diversity maintained.
2. Control land use within the corridor	Protection of scenic and natural values of river corridor. Islands : 1,744 acres Bluffs : 5,050 acres Zoning : 9,657 acres	Potential degradation and/or loss of the scenic and natural values that make this an outstanding recreational resource.	Enhancement of corridor for public enjoyment and study.
	No probable reduction to landowner in tax assessment for selling less than fee interest Landowners conveying those rights will be limited in their opportunity to develop lands for economic return.	-0-	Undetermined financial loss to landowner (but they are paid for scenic easement initially).
3. Provide a quality outdoor recreation experience.	Provide 75 primitive campsites and upgrade 7 access sites. Better facility management of existing areas		Provide more and better recreational opportunities.
	1,761,930 visitor occasions	1,742,927 visitor occasions	Increase of 19,003 visitor occasions.
	More law enforcement personnel assigned to river to enforce safety laws.	No additional law enforcement personnel.	Increased user safety and less litter, both resulting in greater public enjoyment.
	Increased employment opportunities Facility development 20.3 man years O&M 5 man years annually	No employment opportunities above those resulting from natural increase in use.	+ 20.3 man years total + 5 man years annually

TABLE VII-3 (continued)

COMPONENT	DESIGNATION (Recommended Plan)	NO DESIGNATION	DIFFERENCE
	EQ ACCOUNT		
1. Preserve the free-flowing river	Protect 82.4 miles of free-flowing river.	Potential exists for impoundment or other works affecting free flow.	Protection of scenic values of 82.4 miles of river.
2. Manage land use in the river corridor	Protection of scenic values in the river corridor by buying 2,269 acres in fee (including 1,744 acres in islands); taking scenic easements on 5,050 acres (mostly bluffs); providing additional zoning protection to 8,670 acres and new zoning protection to 987 acres.	Existing floodplain and shoreland zoning restrictions, together with ongoing State wildlife programs, offer a moderate degree of protection to lands in river corridor. Probable additional development of bluffs and floodplain for cottages or home sites.	↑ Additional protection of scenic and natural values in river corridor. ↓
	Timber management objectives along riverway reflect protection of scenic values through modified harvesting procedures.	No restrictions on timber cutting.	
	FPC may not license transmission line crossings without prior concurrence of the Secretary of the Interior.	No review and concurrence on FPC licensed lines by Secretary of the Interior.	
3. Provide a quality outdoor recreation experience.	Likelihood that lower Wisconsin River will become a higher priority river for water quality improvement	Likelihood that lower Wisconsin River will remain a low priority river for water quality improvement.	Accelerated improvement in water quality in lower Wisconsin River.
	Greater degree of user control gained by location and density of facilities. 75 primitive campsites 7 upgraded access sites with sanitary facilities	No additional recreational or sanitary facilities. Recreational use regulated only be existing State and local laws.	Increased protection of the resources.
	More law enforcement personnel assigned to river to guard against littering and other despoliation of land and water.	No additional law enforcement personnel	Increased protection of resources.

Footnotes for Preceding Tables

1. All values are stated in terms of 1976 dollars.

2. Acquisition costs are amortized over a seven-year period, the length of time the acquisition program is expected to last.

3. Purchase of land in fee is expected to have only a slight effect on tax revenues due to State in-lieu payments, the small amount of land proposed for purchase, its relatively low value, and the spread of fee purchase lands over multiple political jurisdictions. No reduction in taxes is expected at this time on scenic easements. See impact section for more complete discussion on this subject.

4. Timber production foregone is calculated at a constant $17,500 per annum. This is based on production of 400,000-500,000 bd. ft./year, mostly soft maples and swamp white oak. Stumpage values are approximately $35 per 1,000 bd. ft.

5. Based on projection that Wisconsin Power and Light, without designation of the lower Wisconsin River, will develop at least one coal-fired generating station along the lower Wisconsin River in the next 20 years. The site would be planned to ultimately consist of three to four 300-megawatt units. These 300-megawatt units would be installed sequentially at two- to four-year intervals. Capital costs are estimated at $123 million for the first 300-megawatt unit and $94.5 million for each subsequent unit. With inclusion of the river in the Wild and Scenic Rivers System, the plant would be located some distance from the river. This would result in incremental costs associated with constructing and operating the facilities for bringing makeup water to the station. This is estimated at an additional $8 million. Costs are amortized over a 20-year period.

6. Five categories of recreational use are considered, with the value of a recreational occasion valued as follows: canoeing $7, primitive canoe camping $5, pleasure boating $5, bank fishing $1.50, and boat/fishing $2.25. These figures are considered conservative and do not include a factor reflecting a greater "willingness to pay," a situation which could reasonably be anticipated since the future number of areas which meet criteria to qualify for special designation will decrease while there is an increase in population stimulating demand for these areas.

7. Based upon an average cost of $35,000 for upgrading an access site, $30,000 for a 20-unit primitive campground, $25,000 for a 10-unit primitive campground, and $20,000 for a 5-unit primitive campground. Total costs, unamortized, are figured at $350,000. Costs are amortized over five years, the time expected for completion of facilities.

8. O&M costs are calculated at $62,500 per annum. In terms of 1976 dollars, they are expected to remain fairly constant over 25-year period.

9. Replacement costs are calculated at four percent per annum. Actually, replacement costs will be minimal for first six to eight years after installation, but increasing significantly thereafter, being particularly high in years when major cost items such as vault toilets need replacement. Annual costs, unamortized, are calculated at $14,000 per annum.

10. No designation assumes no change in level of development, protection of resources, etc. In reality, the next 25 years will see such changes without designation also, but it is impossible to project these.

11. Based upon a modest multiplier effect of 1.5. (Source: Economic Impact of the Crow Wing Canoe Trail, Wadena County, Minnesota, ERS-467, page 22.)

12. There are 987 acres outside the floodplain but within the corridor which will have to be zoned. Otherwise, zoning restrictions will not necessarily be increased but adherence to them would be expected to be very close as a result of State review authorities.

VIII. ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACT OF THE PROPOSED ACTION

Impacts on the Social and Economic Environment

Recreation

The proposed lower Wisconsin Scenic River has potential for providing quality outdoor recreation for a larger number of people than are presently utilizing the area. Existing recreational use can be characterized as light to moderate, with the heaviest use occurring above Spring Green and on holidays and weekends during the normal recreation season from May through September. Canoeing, canoe camping on islands and sandbars, fishing, and swimming (as a secondary activity associated with canoeing) are the most popular activities. Shallow water limits use for boating. According to the Wisconsin State Comprehensive Outdoor Recreation Plan, demand for the activities mentioned is expected to increase by about 15-20 percent between 1976 and 1990.

Many canoeists come from the Chicago and Milwaukee metropolitan areas and large cities such as Dubuque, Rockford, and Madison. Awareness that the river has been included in the National System is expected to cause a slightly greater increase in canoeing and canoe camping use initially, but after the first few years the rate of increase is expected to return to what it would be without designation. The development of primitive-type canoe campgrounds and the upgrading of seven access sites will benefit recreationists. Protection of the scenic values, litter control, and enforcement of safety laws will also contribute to a more enjoyable experience for the user. In the first 25 years after designation, 19,000 recreation occasions are expected over what would occur without designation.

Whether or not increased use will eventually impair the present high quality recreation experience will depend on efforts to direct use and maintain facilities. With proper management, there is every reason to believe the resource can provide many more recreation occasions than presently occur.

Local Economy

1. Business--Regardless of whether the river is designated as part of the National System, additional businesses catering to recreationists--canoe liveries, motels, restaurants, gas stations, souvenir and antique shops, private campgrounds, and the like--will open in the lower Wisconsin valley because of presently expanding recreational use of the area. The projected increase of 19,000 recreation days over a 25-year period attributed to designation is not enough to stimulate new business. However, this additional use should stimulate business for existing establishments. Over a 25-

year period these recreationists will spend $121,717. Annual payroll increases for operation, maintenance, and replacement will be approximately $70,200 following a one-time payroll of $203,000 for initial facility development.1/

2. Employment--The local job market would be only minimally affected. Initial facility development would employ from 18-20 workers for one year. Subsequently, operation, maintenance, and law enforcement would require about five man years annually. No new employment is anticipated in the private sector as a result of designation, but existing operators will be busier.

3. Timber Production--Modification of timber harvest procedures to protect scenic values of shoreline will result in roughly 400,000 to 500,000 board feet of production foregone annually. Species affected will be primarily lowland species such as swamp white oak and soft maple. Annual stumpage value lost is estimated at $17,500. This does not represent a significant figure for the counties bordering the river.

4. Agricultural Production--No impact on the agricultural economy of the area is expected. The present minimal amount of livestock grazing and watering along the river is not considered degrading to the environment and would be treated as a compatible use. No land currently used or considered usable for crop production is recommended for acquisition.

Tax Revenues

The purchase of approximately 2,269 acres in fee and approximately 5,050 acres in scenic easements will have a minor and insignificant effect on local unit tax revenues. To date, county tax assessors have not recognized the legitimacy of decreasing property values and taxes for land carrying development restrictions. Consequently, there will not be an immediate reduction of tax revenues from the 5,050 acres. It should be anticipated that eventually local tax assessors will take development restrictions into account, but the resultant impact cannot be evaluated with any precision at this point. However, the scattering of the taking of easements across dozens of taxing jurisdictions and the realization that there would be only a partial reduction in taxes indicate strongly that no single political unit will have its ability to provide necessary services impaired.

The removal from the tax rolls of the land acquired in fee will have an insignificant impact. The very modest amount of land to be acquired in fee, again spread over multiple jurisdictions, makes it evident that no local unit will be significantly affected. The total tax revenue derived from the 2,269 acres is approximately $4,000/year. However, the

1/ Using 1976 dollars--unamortized and without including any multiplier effect.

State makes in lieu of tax payments when it acquires land. The "ORAP-200" law enacted in January 1970 provides local units with an annual formula payment in lieu of real estate taxes for all land acquired after July 1, 1969. The annual formula payment is based on the May 1 assessment of the year following acquisition, multiplied by the county, local, and school tax rate levied that year. The first year payment is 100 percent and each succeeding year is reduced by 10 percent of the first payment until the 10th year. After that, all subsequent years will be equal to the tenth payment, but never less than $0.50 per acre. This formula mitigates to a considerable degree the State's taking of land, and in cases where low valued land is taken may even increase revenue to the local unit. Another important factor in mitigating any loss is that the tax rate for the school district, which accounts for 70 percent of the total tax rate (on a statewide basis) is essentially unchanged because the State offsets the lost tax revenue nearly dollar for dollar in the form of increased school aids. Finally, changes in State-shared taxes and tax credits cushion the overall impact upon taxes.

Transportation and Utility Systems

Designation of the river will not generate sufficient additional traffic to cause crowding of roadways or necessitate highway improvements. However it may affect State highway programs. Construction of additional roads and bridge crossings will not be precluded, but construction, relocation, and upgrading of Federal Aid Highways may require coordination under Section 4(f) of the Department of Transportation Act of 1966, as amended. Alternative locations outside the corridor would be sought whenever possible, but if this should prove infeasible, measures which would mitigate adverse impacts on the corridor would be taken. All this would result in increased costs and some inconvenience for the Highway Department. Presently, there are no plans for new highway or bridge construction which would affect the river corridor.

Designation would preclude construction of any new hydroelectric generating facility below Prairie du Sac. Steam generating facilities would not be legally precluded from the riverway, but construction of such a facility clearly would not be in keeping with the purposes of designation. The Wisconsin Power and Light Company has identified an area along the river near Muscoda (recreational segment) as a potential site for construction of a series of three or four 300 megawatt units of a coal-fired generating plant. It is likely that development would begin on at least one of these units in the next 20 years. The company has indicated a willingness to place the facility a considerable distance off the river to avoid an adverse effect on aesthetics if the river is designated as part of the National System. This would result in incremental costs associated with construction and operation of facilities for bringing make-up water to the station. An intake structure could be designed and screened to preserve the aesthetic nature of this reach. The amount of water needed for a coal-fired plant (27-36 cfs) is insignificant compared to the average volume of the river at Muscoda (8,613 cfs) and would not impair recreational use. The facility would cost an additional

$8 million, a cost which would be passed along to the consumer. It is presumed that similar arrangements would be made for any such additional plants which may be constructed in the next century.

The construction of any new power and natural gas transmission facilities will not in most instances be precluded by Section 7(a) of the National Wild and Scenic Rivers Act. In the event such facilities are prohibited by Section 7(a), or if the company agrees to reroute a line, rerouting would result in increased costs and inconvenience to the company involved. It is more likely, however, that either an existing highway or transmission corridor would be used. In any case, an effort should be made to have the line as unobtrusive as possible where it crosses the land portion of the corridor.

Designation as a scenic and recreational river will affect the construction and location of municipal wastewater treatment plants on the lower Wisconsin River. Although the Act does not specifically prohibit such structures, they are not considered to be compatible with scenic river status.[1/] New plants must be located away from the visual corridor which may involve increased costs to the Federal Government and the affected local units of government.

Water Resources Development

Existing uses of the river are primarily limited to recreation and livestock watering. Eighteen dairy processors and small communities use the river for discharge of sewage effluent. Eighteen dairy processors and small communities use the river for discharge of sewage effluent. (These are discussed in more detail in Section IV, Water Quality.) Dischargers to the Wisconsin River are or will be ordered to clean effluent to EPA levels of acceptability. Failure to comply could result in closure of those operations.

A proposed Wisconsin Power and Light Company facility was discussed with "Transportation and Utility Systems." Presently, there are no other active proposals for water resource development. The Federal Power Commission has identified two sites for potential development of hydroelectric power facilities, both of which are viewed as currently infeasible.

The Army Corps of Engineers has indicated that its only involvement with the stretch of the Wisconsin under study is through the regulatory permits program. Although in the past the Corps has been requested to study certain problems such as hindrances to small craft navigation, corrective measures have not proven feasible.

1/ Section 7(a) states, in part, that "No department or agency of the United States shall recommend authorization of any water resources project that would have a direct and adverse effect on the values for which such river was established. . ." Wastewater treatment plants are considered water resources projects.

The Soil Conservation Service has indicated that there are presently no plans for wing dams, channelization, or other diversionary works on the Wisconsin River.

The Dane County Regional Planning Commission recently considered a proposal to construct a canal linking the Madison lakes with the lower Wisconsin River. The canal would be filled with effluent from the Madison Metropolitan Sewerage District and would be used to transport agricultural and other commodities by barge. In its October 1975 report, the regional planning commission indicated the canal would not be feasible, economically or environmentally. The proposal would not significantly affect existing uses of the river except, perhaps, to encourage more timely realization of effluent standards.

The present minimal amount of livestock watering is not considered a detriment to the river. A substantial increase in the amount of livestock, however, could cause pollution problems and would have to be restricted.

Designation would not affect the existing State water quality standards. Designation would require setback of the proposed power generation facilities at Muscoda and screening of any intake structure to preserve the scenic values of this reach. It would also preclude development of projects significantly affecting or modifying the river channel.

Summary of Impacts Expected to Result from Inclusion of the Lower Wisconsin in the National Wild and Scenic Rivers System

Item Affected	Impact
Soil and vegetation	Major beneficial
Fish and wildlife	Minor beneficial
Air and water quality	Air (none), water (minor beneficial)
Aesthetics	Major beneficial
Cultural resources	Minor beneficial
Recreation	Major beneficial
Business	Minor beneficial
Employement	Minor beneficial
Timber production	Minor adverse
Mineral production	Minor adverse
Agricultural production	None
Tax revenue	Minor (either beneficial or adverse)
Transportation and utility systems	Minor adverse
Water resource development	Moderate adverse

Impacts on the Natural Environment

Soil and Vegetation

Streambank erosion presently is viewed as a serious problem by residents along the Wisconsin River. Much of this is natural, caused by the sandy nature of the banks and frequent flooding in the spring. The daily fluctuations of the river caused by the release of water for peaking power at the Wisconsin Power and Light Dam at Prairie du Sac undoubtedly adds to the problem.

Designation should have only a minor impact on soil and vegetation in the river corridor. The managing agency will have to give special attention to the needs of threatened and endangered species. Impacts will be related to facility development, added use, timber management, and other resource protective measures.

In the process of improving boating and canoeing accesses, some shaping of streambanks will occur, and it is inevitable that soil erosion and stream turbidity will be temporary results. Since these facilities will be improvements of existing accesses, streambank grades are not as severe, and the adverse effects will be minimal. Over the long term, stabilization of these undeveloped sites with formal launching facilities should reduce erosion. Similarly, there will be a minor amount of vegetation removed in construction at river access sites for parking, picnicking, and sanitary facilities.

Erosion will occur also at takeout spots for the canoe campsites. In addition, undergrowth and sapling size trees will be removed for canoe campsites. This will be followed by soil compaction in future years as a result of recreational use. Some 25-35 acres, an insignificant amount of land, will be affected in this way.

Dense undergrowth, thick poison ivy, mosquitoes, and marsh and swamp line much of the shoreline. Therefore, most off-river recreational use stemming from the modest increase in use projected for the river if it is designated is expected to occur on the islands. Since this will occur on the sandy, largely unvegetated portions of the islands, little impact will be felt. Erosion will not be a problem and compaction is impossible. Campers will use wood for fires, but this will be primarily down wood and no significant loss is anticipated.

The vast majority (99+ percent) of soil and vegetation within the riverway boundary will be unaffected by construction processes and recreational uses associated with the riverway. However, natural conditions within this area will be beneficially affected by implementation of the proposal. Timber harvest will be terminated on land held in fee or covered by scenic easement if it is within sight of the river user. Annual production lost will be approximately 400,000-500,000 board feet per year, composed largely of swamp white oak and soft maple. Presently, islands are a major source of timber in the riverway. Cleared land will be

reforested or permitted to regenerate. In addition to visual enhancement, this will contribute to soil stability. These are considered to be the main impacts which the proposal would have on soil and vegetation.

Fish and Wildlife

Initially, designation as part of the National System can be expected to generate a modest increase in recreational use of the river and river corridor. This should have a minimal impact on fish and wildlife resources. However the managing agency will have to give special attention to the needs of threatened and endangered species. Fishing pressure will increase slightly faster since some of the additional canoeists who will use the river will fish as a secondary activity, but this is not expected to have a significant impact on the fishery resource. Designation is not expected to bring additional recreationists whose primary intent is to fish. If, as it is expected to do, designation leads to a more rapid improvement in water quality, all aquatic life will be affected beneficially.

The primary impact on wildlife will be the maintenance of habitat, particularly the wooded riverbank. This involves all but a few miles of riverbank on the 82.4-mile stretch. Wooded areas provide food, cover, and travel lanes. The existing agricultural uses (crops, cattle) in association with woods will continue to provide edge effect, contributing to wildlife diversity. Only the removal of the minimal amount of vegetation needed to improve access sites and construct primitive canoe campgrounds will reduce the amount of existing habitat.

With increased use, there exists the potential of an increased number of recreationists disrupting wildlife areas. Although most recreationists will stay in the corridor of the main river channel, human intrusion into the backwaters and sloughs during critical periods (breeding, nesting season) could have an adverse effect, especially on waterfowl. However, most recreational activity will occur during the mid-summer months and not during critical periods in the spring. In addition, the dense vines, ivy, undergrowth, and marsh areas will discourage entry into prime breeding habitat.

The eagle sanctuary at Ferry Bluff provides a winter roosting area for 15 to 20 bald eagles. The eagles roost in the sheltered timber on the back side of Ferry Bluff and feed along the river. Summer recreation in this stretch of the river is not expected to disturb the winter habitat. However, excessive intrusion into the 147-acre sanctuary could disrupt the area enough to discourage eagle roosting.

Regardless of the designated administering agency, there will be no effect on the jurisdiction or responsibility of the State of Wisconsin over fish and wildlife resources. The Wisconsin Department of Natural Resources will continue to enforce State game and fish laws.

Air and Water Quality

No impact on air quality is expected to result from implementation of the proposal. Assuming an increase of only 19,000 additional recreation

occasions over a 25-year period, the maximum additional traffic on any given day will be counted in dozens of vehicles only over the 80+ mile stretch of river valley.

Overall, water quality is expected to improve more rapidly with designation since the river should become a higher priority target for improvement. Water quality will be monitored more closely, offending sources identified and ordered to clean up, and municipalities should have a better opportunity for government grants for treatment facilities. However, any increase in sandbar or island camping will inevitably result in more human waste entering the river. This source of pollution is not considered serious at present and is not expected to become so. The managing agency will have to remain aware of this potential problem source and take necessary measures if it becomes serious.

Aesthetics

The lower Wisconsin River is not an "intimate little stream." Rather, it offers many vistas of a wide river guarded by dense vegetation on its shores and watched over by bluffs, either set close by the shore or standing some distance back. The bluffs also exhibit a dense cover of greenery during the summer months. The river is liberally sprinkled with heavily wooded islands with very dense undergrowth. Because of the dense cover and the considerable distance the river user normally is from the shore, there is relatively little opportunity for observing wildlife; however, a blue heron may be aroused and take flight before a canoe. All this adds up to an overall impression of great scenic beauty and tranquility.

One of the primary purposes of the Wild and Scenic Rivers Act is to protect the scenic values of certain selected rivers. Methods commonly used to accomplish this goal are acquisition in fee and easement of key lands, zoning, and management of land in the public domain. Protection of the scenic values of the river is considered the major impact of the project.

Proposed plans for development will provide a means for attaining greater utilization of existing and proposed facilities while at the same time ensuring protection of natural and scenic values in the river corridor. In limiting facilities and recreational activities to those deemed compatible with a lower Wisconsin National Scenic and Recreational Riverway concept, the State parks and wildlife areas will help buffer the river and complement the regional recreation plan. Incompatible activities such as logging near shorelines will be terminated, thus enhancing aesthetics.

Impacts on the Cultural Environment

To date, 131 archaeological sites associated with the Archaic, Middle Woodland, Effigy Mound, and Historic Tribes cultural periods have been identified along the lower Wisconsin River within the proposed riverway boundary. Little investigation of these sites has been undertaken.

Identification of sites during the master planning process will increase the possibilities for protecting important cultural values. The overall impact of designation should be to enhance protection of cultural resources and the public's knowledge of them.

The only site within the proposed riverway boundary presently listed on the National Register of Historic Places is the old shot tower in Tower Hill State Park. This structure will not be affected by including the lower Wisconsin River in the National System. It is anticipated that historic site surveys along the river will shed greater light on European man's occupation of the valley and that additional structures will be placed in the National Register. Even though visitation to these historic sites is expected to increase, there is no reason to believe any item of historical interest will be adversely affected by inclusion of the lower Wisconsin in the system.

APPENDICES

APPENDIX I

National Ambient Air Quality Standards

	Primary	Secondary
Total Suspended Particulates (ug/m^3)*		
Annual Geo. mean	75	60
Max. 24-hr. conc.**	260	150
Sulfur Dioxide (ug/m^3)		
Annual arith. aver.	80 (.03 ppm)	-
Max. 24-hr. conc.**	365 (.14 ppm)	-
Max. 3-hr. conc.**	-	1,300 (0.5 ppm)
Carbon Monoxide (mg/m^3)		
Max. 8-hr. conc.**	10 (9 ppm)	10
Max. 1-hr. conc.**	40 (35 ppm)	40
Ozone (ug/m^3)		
Max. 1-hr. conc.	160 (.08 ppm)	160
Hydrocarbons (ug/m^3)	160 (.24 ppm)	160
Max. 3-hr. conc.**		
Oxides of Nitrogen (ug/m^3)		
ANNUAL ARITH. AVER.	100 (.05 ppm)	100

* Micrograms per cubic meter

** Not to be exceeded more than once a year.

Source of data: 36 F.R. 8187, April 30, 1971;
38 F.R. 25678, Sept. 14. 1973.

APPENDIX II

Wisconsin Water Quality Standards Summary

Minimal Acceptable Standards NR 102.02 (1) (not allowed)

Substances causing objectionable deposits on shore or bed or body of water
Floating or submerged oil or scum or other materials
Materials producing color, odor, taste, or unsightliness
Materials harmful to humans, animals, plants, or aquatic life

Fish and Aquatic Life NR 102.02 (3) (required)

Dissolved Oxygen:	> 5 mg/l at all times
Temperature:	No change adversely affecting aquatic life natural daily and seasonal fluctuations maintained rise at edge of mixing zones not > 5°F for streams of > 3°F for lakes not > 89°F for warm water fish.
pH	Allowable range from 6.0 to 9.0 no change > 0.5 units outside the natural seasonal minimum and maximum

No substances or combination of substances toxic to fish and aquatic life Environments or trout streams cannot be adversely affected.

No artificial temperature increases
Dissolved oxygen: Not artificially lower than 6.0 mg/l or 7.0 mg/l in the spawning season.

Great Lakes tributary streams used by stock salmonoids for spawn runs not lowered below natural background for period of habitation.

Recreational Use NR 102.02 (4)

Membrane Filter Fecal Coliform County (MFFCC) not to exceed:

200/100 ml as geometric mean of > 5 samples per month:

400/100 ml in > 10% of monthly samples.

Antidegradation: No waters of the State shall be lowered in quality unless it has been affirmatively demonstrated to the Department that such a change is just as a result of necessary economic and social development, provided that no new or increased effluent interfere with or becomes injurious to any assigned uses made of or presently possible in such waters.

APPENDIX III

Treatment of Municipal Dischargers

Entity	County	Receiving Stream	Type of Treatment	Flows MGD Avg. Flow Design Flow	BOD mg/l	SS mg/l	Adequacy of Disinfection
Blue River	Grant	Trib. of Fennimore Creek	A	0.020 0.040	15	15	UK
Boscobel	Grant	Saunders Creek to Wisconsin River	AC	0.160 0.190	25		A
Lone Rock	Richland	Wisconsin River		0.050			NR
Mazomanie	Dane	Black Earth	AC	0.070 0.160	16	10	A
Muscoda	Grant	Wisconsin River	LC	0.125			NR
Sauk Prairie Sewerage Com.	Sauk	Wisconsin River	PG				NR
Spring Green	Sauk	No Surface discharge	PG_1	0.150			NR
Wauzeka	Crawford	Kickapoo River	Excess Organics clear water AC	0.044 0.080	20	20	A
Wintergreen Treatment Plant	Iowa	No Surface Discharge	AL_hC	0.030			UK
Avoca	Iowa	No Surface Discharge	P_{G1}	.022 .045			NR
Black Earth	Dane	Black Earth Creek	A	.072 .162	22	3	UK
Plain	Sauk	Honey Creek	T	0.100 0.090	41	26	UK
Arena	Iowa	No Surface Discharge	PG_1	0.034 0.050			NR

TYPE OF TREATMENT CODES
(KEY TO APPENDIX III)

P - Primary Treatment Units

T - Trickling Filter (Secondary Treatment)

A - Activated Sludge (Secondary Treatment)

L - Lagoon (For Secondary Treatment)

- a - Annually discharged Waste Stabilization Lagoon
- s - Semi-Annually Discharged Waste Stabilization Lagoon
- c - Continuously Discharged Waste Stabilization Lagoon
- o - Other Waste Stabilization Lagoon

C - Chlorination or Other Disinfection

G - Land Application

- s - Spray Irrigation
- f - Flood Irrigation
- r - Ridge and Furrow Irrigation
- l - Seepage Lagoon
- t - Sub-Surface Application (Tile Field)
- u - Land Underdrained
- o - Other Facilities for Land Application

DISINFECTION CODES

A = Adequate Disinfection Facilities Provided
I = Inadequate Disinfection Facilities Provided
UK = Adequacy of Disinfection Facilities Unknown
ND = No Disinfection Facilities
NR = Disinfection Not Required.

ABBREVIATIONS

BOD_5 - Biochemical Oxygen Demand After Five Days
SS - Suspended Solids

APPENDIX IV

Treatment of Industrial Dischargers

Entity	City	Permit Status	Expiration Date	Compliance Date
Excelsior Dairy Association	Blue River	(Land disposal--permit issued)		
Maple Ridge Coop. Cheese Factory	Boscobel	Application filed	(Land disposal permit--public noticed)	
Milk Specialties, Inc.	Boscobel	Issued	9/30/78	
National Farmers Organization	Arena	(Land disposal--no permit)		
Wisconsin Dairies Coop.	Sauk City	Issued	9/30/78	

APPENDIX V

Natural Sites in the Wisconsin River Area

Area Name	Features
Dane County	
1. Roxbury Bluffs	Sandstone, limestone cliffs, red cedars on steep slopes and summit.
2. Mazomanie Oak Barrens	Black oak barrens, sand prairie, box turtle habitat.
3. Mazomanie Bottoms	Floodplain forest, heron rookery, open marsh around Fishers Lake.
Sauk County	
4. Ferry Bluff-Cactus Bluff-Steamboat Bluff	Moist sandstone cliffs, exposed limestone cliffs, dry prairie remnants, scenic overlooks, extensive oak woodlands, eagle roosting (winter sites.
5. Loddes Mill Bluff*	Sandstone bluff capped with limestone; several woodland types, dry prairie, rare cliff plants.
6. Wisconsin River Lowlands	The 26-mile expanse of the Wisconsin River in Sauk County contains an estimated 6,250 acres of lowlands. Approximately 77 percent is lowland forest, the remainder being marsh aquatic types. This lowland zone extends from the Honey Creek drainage (T9N R6E Section 22) south and west to Lone Rock at the county border and averages 1/2 mile in width. A great number of sloughs, oxbows, springs, and islands occur in the zone along with sedge meadows and shrub swamps.

*Officially designated State natural sites.

	Area Name	Features
7.	Robinson group of eight conical mounds	Indian mounds overlooking river.
8.	Pierce Mounds	A group of four Indian mounds of the linear, conical, and effigy types.
9.	Spring Green Reserve*	River bluffs, limey prairie, sand blows and prairie habitat for threatened and endangered animals.
10.	Spring Green-Lone Rock-Gotham-RR Prairie, Sand Blows and Jack Pine	A 10-mile expanse of outstanding sand prairie on both sides of the railroad. Closer to the river on the droughty sand terrace are numerous examples of sand barrens and blow outs. A common tree in this area is native jack pine.
11.	Dry Prairie and Blows.	Limey bluff prairie and sand prairie on lower flats; extensive sand blows and barrens.
12.	Bakkens Pond	Wisconsin River slough, aquatic types, marsh, and floodplain forest.
	Richland County	
13.	Button Bluff-Peck Bluff-Point Jude	River bluff prairie, vertical cliffs, red cedars.
14.	Bogus Bluff	River bluff prairie.
15.	Cruson Slough	Open marsh, quiet water, floodplain forest.
16.	Murray Prairie	Sand prairie.
17.	Lone Rock Oak Opening	Old, open grown oaks with sandy prairie beneath.
18.	Orion Marsh	Open marsh at the confluence of Mill Creek and the Wisconsin River.

	Area Name	Features
19.	Lower Lake Area	1,500 acres of lowland forest plus open marsh and Lower Lake, with nearby dry, vertical cliffs. South portion 7 and north part of Section 18 has large timber.
20.	Gotham Jack Pines	Native jack pine and barrens species on droughty river terrace sand.
21.	Eagle Corners Forest	Wet, lowland forest.
22.	Bock Brothers Gravel Quarry	Outwash gravel of geological interest.
23.	No. 1 School Quarry	Outwash gravel of geological interest.
	Iowa County	
24.	Avoca Prairie and Marsh*	Nearly 800 acres of tall grass prairie interspread with a braided pattern of marsh occupying old channels. An oak savanna occurs in part of the prairie, while sedge marsh and shrub thickets are found in wetter sites.
25.	Long Island Cliffs	Sandstone cliffs with Sullivantia, a driftless area endemic plant.
26.	Blue Mounds Creek-Cedar Island Bottoms	Nearly 1,200 acres of lowland forest, river channels, and sloughs. A tract of about 200 acres in this block is under the protective ownership of The Nature Conservancy.
27.	Helena RR Prairie	About four miles of sand prairie between Helena and Arena along the RR.
28.	Tower Hill Bottoms*	Floodplain forest.
29.	Goodwiler Lake-Kendal Lake Sloughs	Series of numerous sloughs and ephemeral ponds and surrounding marsh.

	Area Name	Features
30.	Pine Road Sand Blows	80 acres exhibiting excellent diversity of types including jack pine barrens, dry sand prairie, open sand blows, and constantly moist sand. Several of Wisconsin's rare and endangered species occur here.
31.	Helen Lake Marsh and Floodplain Forest	600-acre wetland flooded annually by the Wisconsin River. It contains several habitat types including small ephemeral ponds and a seepage lake as well as lowland forest, cattail marsh, sedge meadow, and tall shrub communities.
32.	Frank Lloyd Wright Bluff Prairie	A small, steep prairie remnant containing many species characteristic of dry lime prairies as well as numerous small junipers and invading shrubs.
33.	Sweet Island Oak Woods	An excellent example of a southern dry-mesic forest notable for its topographic diversity.
34.	Highway 137 Sedges	An area including sedge-meadow and tall shrub communities supporting excellent wildlife populations.
	Grant County	
35.	Muscoda Area Barrens	Jack pine and oak barrens, sand prairie and rare lichens occur in numerous areas on the droughty river terrace. Area extends eastward into Iowa County one-half mile.
36.	Blue River Cactus & Dunes*	Blowouts and dunes, oak barrens, succulent plants, reptile habitat, incommon insects.
37.	River lowlands (Note: not marked on map)	Between Cross Slough at Blue River, and Big Cat Slough at Muscoda, some six miles apart, there are approximately 2,000 acres of open and forested wetland along the Wisconsin River.

	Area Name	Features
38.	Flynn Bluff Prairie	Southwest--facing bluff prairie--one of the largest along the Wisconsin River bluffs.
39.	Bullhead Slough	A large tract of open water, shrub marsh, and floodplain forest.
40.	Woodman RR Woods Island	Floodplain forest on island.
41.	Woodman Prairie	Dry sand prairie.
42.	Hill's Prairie	Dry bluff prairie.
43.	Millville Bottoms	Extensive lowland forest zone.
44.	Adiantum Woods	Mesic forest on north facing bluff.
45.	Campbell Ridge	Linear river bluff rising to nearly 400 feet above river level, and wooded with mesic to dry-mesic forests.
46.	Weniger Island	Wooded Island.
47.	Wyalusing Wilderness Area	Wooded river bluff with a sequence of forest types from wet at the base to zeric near the summit.
48.	Walnut Eddy Island	Wooded island.
49.	Wyalusing Walnut Forest	Floodplain forest to vertical cliffs at the summit with intermediate forest types.
	Crawford County	
50.	Wauzeka Box Company Woods	Extensive area of mature floodplain forest, oxbow lakes, and marsh east of the mouth of the Kickapoo River.
51.	Boydtown Creek	Two and one-half miles of brown trout habitat. Class 3 trout stream (stocked).

APPENDIX VI

RESOLUTION
WISCONSIN NATURAL RESOURCES BOARD
MADISON, WISCONSIN
April 15, 1976

WHEREAS, the Wisconsin River is one of the State's most important and treasured resources; and

WHEREAS, the Department of Natural Resources has been entrusted by the people of Wisconsin with the stewardship of our State's natural resources; and

WHEREAS, the Congress of the United States has enacted Public Law 90-542 establishing the National Wild and Scenic Rivers System; and

WHEREAS, Public Hearings are to be held April 20 and 21, 1976, to discuss initial river survey findings, river preservation alternatives and concepts;

NOW, THEREFORE, BE IT RESOLVED:

That the Wisconsin Natural Resources Board, assembled in Madison on April 15, 1976, does go on record and reiterates its strong support for the inclusion of the Lower Wisconsin River in the National Wild and Scenic Rivers System as the most suitable and lasting method of protection and preservation for this unique river valley.

WHEREAS, there is currently a preliminary report of the lower Wisconsin River Study before the Federal Interdepartmental Study Group of the U. S. Departments of Agriculture and Interior, and,

WHEREAS, that report recommends that the lower Wisconsin River be added to the national wild and scenic rivers system as a state-designated and administered component, and,

WHEREAS, it is the belief of the Natural Resources Board that the existing and expected recreation uses of the lower Wisconsin River corridor are far broader than those normally accommodated by actions provided for by inclusion in the Wild and Scenic Rivers Act, and,

WHEREAS, the lower Wisconsin River, by reason of its location close to major population centers and its outstanding recreation values, is clearly a resource of regional or national significance worthy of Federal recognition, and,

WHEREAS, the multiple recreation values of the lower Wisconsin River corridor might better be protected and utilized through its inclusion in the National Recreation Area system, now therefore,

BE IT RESOLVED, that the Natural Resources Board recommends that the planning associated with the designation of the lower Wisconsin River as a scenic and recreational river be broadened to include recreation area concepts, and,

BE IT FURTHER RESOLVED, that the Department of Natural Resources, in consort with the U. S. Department of the Interior be instructed to

initiate planning associated with a concept plan meeting the criteria of a National Recreation Area for the lower Wisconsin River, including the preliminary development of principles which might be included in national legislation, and,

BE IT FURTHER RESOLVED, that the Department staff, the Land and Business Committee of the Board and other Board members meet simultaneously with the appropriate members of Wisconsin's Congressional delegation and officials of the U. S. Department of the Interior to inform them of this resolution and to seek their advice and council as guidance for the study, and,

BE IT FURTHER RESOLVED, that copies of this resolution be forwarded to the Secretaries of the U. S. Departments of the Interior and Agriculture, and,

BE IT FURTHER RESOLVED, that in the development of plans to achieve establishment of such an area, the Department of Natural Resources shall make every effort to receive and utilize the thinking of local residents and the great variety of user groups who have an interest in the lower Wisconsin river.

Adopted by the Wisconsin Natural Resources Board this 18 day of March, 1977.