



Lower Wisconsin State Riverway

Master Plan

Approved in 1988
(with boundary changes through 2009)

- Wisconsin Department of Natural Resources -

Wisconsin Department of Natural Resources
101 S. Webster St. P.O. Box 7921
Madison, Wisconsin 53707-7921



Publication LF-055 (2010)

The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and function under an Affirmative Action Plan. If you have any questions, please write to Equal Opportunity Office, Department of Interior, Washington, D.C. 20240. This publication is available in alternative format (large print, Braille, audio tape, etc.) upon request. Please contact the Department of Natural Resources, Bureau of Facilities and Lands at (608) 266-2135 for more information.

For your convenience this document is available on the Internet
at: www.dnr.state.wi.us/master_planning/

The Lower Wisconsin State Riverway Master Plan (2010)

A note to the reader about the background and content of this plan:

Until now, the Environmental Impact Statement (EIS) adopted by the Natural Resources Board in 1988 has served as the property master plan. This “new” master plan document is essentially the Description of the Proposed Action chapter of the EIS with the changes made by the NRB at the time of approval. Additionally, this master plan includes references to the Riverway law and related codes that apply to the project. In 1989 the Legislature created the larger Riverway project, which established the Riverway Board and performance standards for forest management and development on private and public lands within the Riverway boundary. Property acreages and State Natural Area designations or changes (all approved by the NRB after 1988) have been updated in this plan to reflect the current status. The project boundary has been modified twice by the NRB since the original boundary was established in 1988.

It is now standard practice to publish a final version of a property master plan after the NRB approval to address any changes that area required by the NRB action and to change language to reflect the approved status. We have not done this type of update to all of our older master plans. The primary reasons that this master plan has been developed at this time is to create a concise, current plan for the Department’s web page and as this plan is scheduled for revision in the next few years, it is hoped this more concise and current version of the plan will be a useful reference for the planning team and public in that effort.

*Kate Fitzgerald
Chief, Land Management Section
Bureau of Facilities and Lands*

Chapter One - Introduction and Overview	1
PROJECT SUMMARY	1
BACKGROUND	1
USE OVERVIEW	4
NEEDS AND JUSTIFICATION	4
Chapter Two - Management, Development, and Use	6
GOAL AND OBJECTIVES	6
STATE RIVERWAY MANAGEMENT FRAMEWORK	8
LAND MANAGEMENT AREAS	8
Resource Management Area	8
Habitat Preservation Area	8
Intensive Use Area	9
State Natural Area	9
Scenic Management Area	9
RIVER RECREATION MANAGEMENT AREAS	9
River Segments	10
Use-control Study	11
REAL ESTATE MANAGEMENT	11
Statutory Authority for acquisition	12
Real Estate Acquisition Policy	12
Aides in Lieu of Taxes	12
CULTURAL RESOURCE PROTECTION	12
SCENIC RESOURCE PROTECTION	13
SCENIC MANAGEMENT – DNR LANDS	14
Vegetation	14
Infrastructure	15
RESOURCE MANAGEMENT	15
FOREST AND OTHER VEGETATION	15
General Management Prescriptions by Vegetative Type	16
Timber Management Guidelines	17
Management Practices on Privately-Owned Forest Lands	18
Nursery Operations	18
Fire Protection	18
WILDLIFE	18
General Management Prescriptions	19
MANAGEMENT ON INDIVIDUAL RIVERWAY UNITS	21
Maintenance of Existing Facilities	21
Major Improvements or Changes	21
STATE NATURAL AREA AND ENDANGERED RESOURCES	22
State Natural Areas	23
Endangered Resource Management	27
FISHERIES	28
Life History Studies	29
Creel Census	29
Flow Stabilization	30

Bank Fishing in Readily Accessible Areas.....	30
Fish Carrying Capacity of Backwater Lakes, Sloughs, and Marsh Areas	30
Role of Islands in Providing Fish Habitat.....	31
RIVER FLOW	31
RECREATION MANAGEMENT	31
FACILITY DEVELOPMENT AND IMPROVEMENT	31
Upgrading River Boat Landings and Facilities.....	32
Camping.....	34
Trails	35
Non-intensive Use Area Facilities	37
Disabled Access	37
Facility Maintenance.....	38
Cooperation with Local Agencies.....	38
EDUCATION AND INTERPRETIVE PROGRAMS	38
RECREATIONAL MANAGEMENT REGULATIONS AND PROGRAMS	39
ADMINISTRATION AND OPERATIONS	41
LWSR STAFFING	41
FUNDING SOURCES.....	42
Chapter Three - BACKGROUND INFORMATION	43
LAND OWNERSHIP	43
TOPOGOGAPHY, GEOLOGY, AND SOILS.....	43
GLACIAL HISTORY.....	43
SOILS	44
THE RIVER AND OTHER WATER RESOURCES	45
THE WATERSHED	45
THE LOWER RIVER.....	46
VEGETATION AND NATURAL COMMUNITIES	47
Bottomland Hardwoods	47
Lowland Grass and Brush.....	48
Agricultural and Abandoned Fields	49
Sand Blows and Barrens	49
Upland Grass and Brush	50
Upland Hardwoods	51
Shaded and Exposed Cliff Habitats	51
WILDLIFE.....	52
Mammals.....	52
Birds.....	52
Upland Game Birds.....	52
Woodpeckers.....	52
Warblers.....	53
Birds-of-Prey.....	53
Waterfowl	53
Wading Birds	53
Reptiles and Amphibians	53
Fish.....	54

Mussels and other Aquatic Invertebrates	55
ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES	56
ARCHAEOLOGICAL AND HISTORICAL RESOURCES	56
RECREATIONAL USE AND FACILITIES	57
NON-RIVER RECREATION	57
HUNTING AND TRAPPING	57
RIVER RECREATION	58
Seasonal Use Patterns	58
Patterns of Use Throughout the Week	59
Patterns of Use by River Segment	59
Profile of River Users	60
Authority to Regulate River Use.....	61
BIBLIOGRAPHY	62
APPENDIX A: LWSR Recreational Facility Development (1988).....	64
APPENDIX B: Planned LWSR River Access Development (1988).....	65
Lower Wisconsin State Riverway Maps	66

CHAPTER ONE

INTRODUCTION AND OVERVIEW

PROJECT SUMMARY

The Riverway extends 92.3 miles along the Lower Wisconsin River, beginning at the Prairie du Sac dam and ending with the Wisconsin River's confluence with the Mississippi River (see Figure 1). Encompassing about 77,300 acres at its creation in 1988 and 94,780 acres in 2010, the State Riverway provides for the use and enjoyment of the river corridor's resources, for conservation of its scenic and environmental quality and improvements in public safety and access. In 2010 the Department owns about 52,500 acres of land and has 4,600 acres of scenic easements and about 8,000 acres of hunting and fishing access easements within the Riverway boundary.

While the Lower Wisconsin River qualified for designation as a Federal Wild and Scenic River, the State did not request Federal designation, electing instead to create its own project to manage and protect the river corridor's outstanding scenic and habitat values.

The acreage owned by the Department at the time the Riverway was established was within nine previously existing Department projects, mostly wildlife areas. The State Riverway consolidated and linked the nine existing projects to form a single comprehensive management unit for the entire lower river. Management of the Riverway emphasizes multiple use management with special emphasis on recreation and scenic quality. The Department will cooperate with local governments when ever possible to provide direct planning and funding assistance for related county, township and community owned recreational facilities.

BACKGROUND

Since early man first viewed the Lower Wisconsin in a time before recorded history, a variety of explorers, traders, writers, soldiers, settlers, raftsmen, naturalists, artists and recreators have traveled the river. The earliest written thoughts about the Wisconsin were by the explorers, Joliet and Marquette in 1673, and though over 300 years have passed, have a familiar ring: "It is very wide, it has a sandy bottom, which form various shoals that render its navigation very difficult. It is full of islands covered with vines. On the banks one sees fertile land, diversified with woods, prairies and hills..." Another traveler of the 1830's was impressed by the "beautifully skirted banks and prairie bluffs". Now in the late 20th century, the river still maintains much of this scenic beauty. Long stretches of shoreline still appear as they did to pioneer travelers with long vistas of prominent wooded bluffs, many sandbars and islands, extensive lowland forests and open wetlands. The 92 miles of the Wisconsin River downstream of the dam at Prairie du Sac is one of the longest remaining free-flowing stretches of river left in Wisconsin and the Midwest.

Lower Wisconsin State Riverway Master Plan, 1988
Chapter One – Introduction and Overview

There are many other special attributes that add additional value to the area. The hundreds of historical and archaeological sites along the banks and bluff tops are evidence of the river's heritage as the state's "first highway". Many diverse and unique plant communities and animal species are found here. The river's qualities are so unique that in 1979 the U.S. Forest Service and U.S. Park Service recommended the Lower Wisconsin join only a few other rivers in the country as a state administered component of the National Wild and Scenic Rivers system.

The 1988 EIS further described the pressures on the river at the time of the Riverway's establishment in this way;

It's rare in the Midwest for a large river lying within only 150 miles of fourteen million people to still be in such a generally undeveloped and natural condition. However, the Lower Wisconsin River area is not ignored by recreationists or overlooked by developers. About 400,000 people (visitor days) use this resource each year and the number has been growing steadily, particularly in water-based recreation. There is also a growing interest in subdividing farms and other properties to build homes and recreational cottages along the river banks and bluff tops.

At that time, the Department staff and other concerned people recognized that the recreation and development pressures being placed on the river corridor were beyond the management scope of the existing wildlife area projects and that a new management mechanism was needed, and that to be successful, management must be broad in scope and include the entire lower river. The plan for the Riverway was created by a multi-disciplinary Department task force and is based in part on comments collected through a wide range of early citizen involvement efforts over 10 years. This effort included dedicated participation and leadership by the 34 member Lower Wisconsin River Citizen Advisory Committee (CAC), elected officials at many levels, and many other concerned citizens.

This master plan was approved by the Natural Resources Board in December 1988. The following year, Governor Tommy Thompson signed Wisconsin Act 31 which created the Lower Wisconsin State Riverway. The Department of Natural Resources is responsible for administering a land acquisition program within the project boundaries, and for management of DNR controlled lands within the boundary. A new state agency, the Lower Wisconsin State Riverway Board, was created to administer the "performance standards" of the new law, which are designed to protect the aesthetic integrity of the Riverway. Permits are required for structures, timber harvesting, utility facilities and other activities. The Board is composed of nine members of which six must be local residents or local elected officials from the affected counties (Columbia, Crawford, Dane, Grant, Iowa, Richland and Sauk).

This master plan was amended in 1993 and 2003 to adjust the property boundary and acreage goal, and other minor boundary adjustments have also been made since 1988.

USE OVERVIEW

LAND USE

Farming and wood-using industries continue to be an important part of the local economy. Light industry and general tourism are also important in some localities. A dozen communities and several subdivisions front the river and add a sprinkle of urban flavor to the river valley. There are a number of areas along the river's shore where cottages and homes are located. Mostly they are found in groups or subdivisions, often near communities, but some are found in isolated locations on shore or bluff tops. These dwellings take many forms including expensive year-round homes, modest seasonal cottages, older mobile homes and hunting/fishing shacks.

RECREATIONAL USE

The river forms a backdrop for life in the valley and an outdoor playground for many visitors from across southern Wisconsin, northeast Iowa, and northern Illinois. While the high grounds away from the river receive some recreational use, particularly hunting, the bulk is on the Lower Wisconsin's waters or shoreline. They have found many ways to enjoy the river. Visitors come to canoe, boat, fish, swim, sunbathe, picnic or camp on sandbars; they may also come to hunt waterfowl or other game, water-ski, kayak the fast water at the Prairie du Sac dam or lazily float down river on innertubes and rafts.

The uneven pattern of recreational use along the river is striking. Recreational use is by far the heaviest on the upper third of the river between Prairie du Sac and Spring Green. Use decreases to a more moderate level from Spring Green to Boscobel and is much lighter from Boscobel to the Mississippi valley. This variation is valuable because it allows opportunities for different recreation experiences; like having a "beach party camp out" on a crowded sandbar or sharing time alone with family or friends in a natural setting or just solitary fishing in a secluded backwater.

NEEDS AND JUSTIFICATION

The justification for establishment of the Lower Wisconsin Riverway project in 1988 was based in part on findings and recommendations of the National Park Service and the U.S. Forest Service (Wild and Scenic River Study of the Lower Wisconsin, Ref. #13), the State Comprehensive Outdoor Recreation Plan (SCORP) (Ref. #16); and on a number of concerns identified by Department staff who were familiar with the river area, the Lower Wisconsin River Citizen Advisory Committee, other citizen groups and individuals.

The general concerns about the future recreational and the aesthetic quality of the river corridor were further validated by several University of Wisconsin Extension Surveys of recreation users, local landowners and local public officials (Ref. #1, 2, 3 and 4).

Lower Wisconsin State Riverway Master Plan, 1988
Chapter One – Introduction and Overview

The action on the Lower Wisconsin Riverway was prompted by five general factors:

- Long-term development pressures that, if ignored, will threaten the outstanding scenic and natural qualities of the river corridor;
- The deterioration of the quality of recreation in some locations along the river and the threat of the loss of additional high quality recreation opportunities in the future;
- The need to improve safety awareness among the large number of new recreational users to the river;
- The need for improved, more comprehensive management and protection of the river corridor's natural resources, including the area's valuable scientific and natural areas, archaeological and historic sites and endangered species;
- The need to provide high quality outdoor recreation and education opportunities closer to Wisconsin's population centers and to preserve existing opportunities for future generations.

Additional discussion of the above factors may be found in the 1988 EIS (Ref. # 18).

CHAPTER TWO

MANAGEMENT, DEVELOPMENT, AND USE

GOAL AND OBJECTIVES

The goal and objectives set the primary purposes for the establishment and management of the project. The goal serves as an umbrella statement for the objectives. Each objective focuses on a primary management activity.

The Department's overall intent with this Riverway Plan is to provide for the long-term protection and maintenance of the river corridor's natural and scenic areas while maintaining significant opportunities for compatible business and residential development within the broader river valley. The underlying management philosophy for the Riverway is that its general character, resource management and use should remain much as it is today. To this end, the Department's position is that facility development for river recreation should be minimal and that significant growth in water-based recreation should not be encouraged. River recreational facility development should focus on solving existing problems rather than new expansion. New recreation facilities should concentrate on non-river oriented activities. The approach toward resource management should be diverse, with techniques ranging from significant manipulations in some locations to little or no management in others.

GOAL

Provide a quality public use area for unique river corridor activities and compatible recreational pursuits; maintain the generally natural and scenic landscape of the Lower Wisconsin Riverway; and manage the corridor's natural resources for the long-term benefit of the citizens of the area and state.

OBJECTIVES

1. Protect, maintain and enhance the generally natural and undeveloped scenic beauty of 92.3 miles of river corridor, including islands, immediate shoreline, and important bluffs and hillsides visible from the river as defined by the project boundary.
2. Provide opportunities for 61,000 non-motorized and 12,000 motorized water craft users annually to include activities such as sandbar, island, and bank-side picnicking and camping, fishing and nature interpretation, and experiences ranging from social to solitary.
3. Maintain the fishery and fishing opportunities for 91,000 users annually throughout the flowing part of the river system; enhance fishing opportunities

Lower Wisconsin State Riverway Master Plan, 1988
Chapter Two - Management, Development, and Use

- associated with heavily used bank fishing areas along the river; enhance and increase the fishery and fishing opportunities of the backwater areas.
4. Maintain and enhance wildlife populations and associated habitats and annually provide 58,000 user days of hunting, 9,500 user days of trapping and 50,000 user days of wildlife appreciation and education activities.
 5. Manage forest and other vegetation types to enhance scenic values and wildlife, and as compatible with scenic beauty maintenance, provide forest products to include saw-timber, pulpwood, and fuel-wood, etc.
 6. Inventory, preserve, maintain, and enhance the best examples of naturally occurring biotic communities by establishing at least nine State Natural Areas and at least nine Public Use Natural Areas.
 7. Inventory and protect important archaeological, historical, and geological sites within the river corridor and interpret their significance.
 8. Inventory, protect, and selectively manage listed Wisconsin Endangered and Threatened Species found in the river corridor.
 9. Accommodate 45,000 picnickers and 113,000 sunbathers annually through limited development at some boat access points, the use of local and state parks and the designation of a few other carefully selected locations where such activities occur at present.
 10. Provide an educational/interpretive program for 40,000 users annually emphasizing self-guiding nature trails, auto tours, wayside markers and exhibits, and observation points.
 11. Provide, wherever practical, recreational access for the elderly and disabled.
 12. Provide recreational trails for 45,000 hikers, 5,000 cross-country skiers, 9,000 horse riders, 9,500 snowmobilers, and an auto trail on corridor highways for 35,000 motorists.
 13. Within the guidelines of the segmentation concept, provide annual opportunities for not more than 3,000 water accessible only bank-side campers, 2,000 backpack campers, and 25,000 sandbar and island campers.
 14. Provide 5,000 annual user days of dog trial and training activity on one Class I field trial ground and three dog training areas.
 15. Minimize short-term fluctuations of flow through the Prairie du Sac Dam and eliminate fluctuations resulting from power production. Maintain the current practice of augmenting low flows on the Wisconsin River system.

STATE RIVERWAY MANAGEMENT FRAMEWORK

LAND MANAGEMENT AREAS

The following land use classifications delineate the primary use of a particular part(s) of the State Riverway and help establish acquisition, management and development priorities. The classifications are shown on the maps in Appendix C. As noted below, adjustments in the acreage of most of the land management areas has occurred since 1988 due to changes in the Riverway and state natural area boundaries.

Resource Management Area

This management area contains Department managed lands where vegetative management, fish and wildlife production and low density recreation management occurs (36,745 acres, was 38,034 acres in 1988). The land use of specific tracts within this zone will depend upon the suitability of the site and on any binding restrictions such as the Pittman-Robertson Act (legislation that provides federal monies to be used for the specific purchase of lands for wildlife production and hunting). Some examples of permitted recreational uses in the resource management area include hunting, trapping, fishing, and hiking.

A wide variety of management activities will occur in this zone. They will vary from site to site depending on the management area objectives and each site's requirements or limitations. Examples are:

- Where forest and other vegetative management occurs, necessary logging and access trails may be constructed but will be done so that it blends into the natural landscape. Forestry practices may include the planting of trees, timber harvest, timber stand improvement (TSI), and firewood sales.
- Where fish or wildlife production is prominent, structures (dikes, etc.) and management access trails complementing the natural environment may be constructed. Wildlife practices may include prescribed burning, planting wildlife food and cover, share cropping, put and take pheasant stocking and constructing artificial nesting structures.
- Development for low density recreation activities in the resource management area will be limited to support facilities like parking lots, toilets, hand pump wells and trails. All facilities will be constructed to blend with the landscape.

Habitat Preservation Area

This area includes lands and waters containing excellent natural habitat and characteristics that are conducive to perpetuation and production of fish and wildlife (410 acres, was 642 acres in 1988). This includes game and fish habitat as well as areas to protect animals, plants or whole communities that are endangered or of changing status, as defined. The intent of this class is to preserve fish or wildlife and their habitat, with as little habitat development or modification as possible, for species perpetuation.

Designated state natural areas also function as habitat preservation areas.

Intensive Use Area

These areas are of concentrated, high levels of recreational use and existing or planned facilities or management. The Riverway has 80 acres with the intensive use area classification (was 165 acres in 1988). Examples of this type of use include boat landings, parking lots, picnic areas and campgrounds. These sites will be regularly patrolled and maintained.

State Natural Area

State Natural Areas (SNAs) are tracts of land or water specifically designated by the State Natural Areas Preservation Council as the best remaining examples of natural biotic communities or other natural features including significant geological or archaeological features. There are 6,745 acres of designated SNAs within the LWSR (was 5,592 acres in 1988). Some SNAs extend beyond the LWSR boundary, that acreage is not included in the total above.

Scenic Management Area

This management area contains lands where maintaining scenic quality is of the highest importance (50,800 acres as of 2010). The area is primarily comprised of lands that are visible from the river; bluffs, hillsides, islands and banks along the river's main channels and sloughs. Within this management area, forest and other vegetative management and development will be modified to maintain or enhance scenic values.

Note: The proposed plan (the EIS) called for about 23,000 acres in the scenic management area classification. The Natural Resources Board directed that all lands that were recommended for scenic zoning instead be added to acquired with an emphasis on the purchase of scenic easements. Therefore, the scenic management area expanded to include those lands. Since 1988, there have been additional plan amendments that have adjusted the scenic management area boundary and acreage as well.

RIVER RECREATION MANAGEMENT AREAS

For management purposes, the river is divided into three recreation management segments based on relative use levels and conditions. As described below, the recreational experience and management strategy varies depending upon the segment of river.

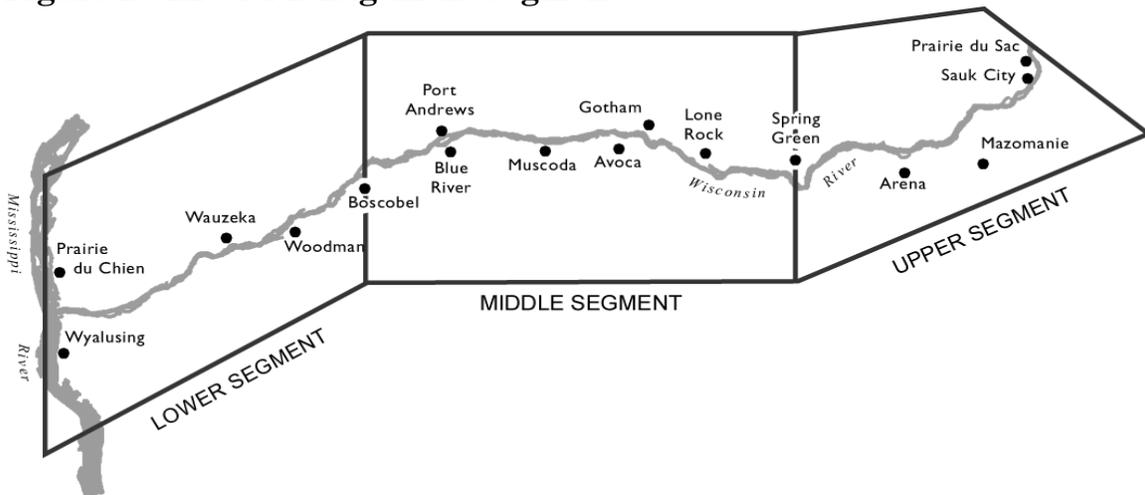
The Department's efforts to guide and manage recreation in the State Riverway, particularly near and on the river, are aimed primarily at maintaining the present wide array of opportunities for different experiences. For example, some people are drawn to the river for social afternoons of river floating, sand bar volleyball games, and picnics. Many come to camp on sandbars, often in large groups sharing space with many "new acquaintances". Others come to spend solitary hours gliding along quiet wooded shores and camp on untracked sandbars. Both extremes of experience, as well as those in

between, are valuable. The Department wishes to ensure there is a time and place for all in the Lower Wisconsin River's future.

River Segments

The Department will work cooperatively with local government in an effort to promote continuation of existing use patterns. Under this concept, the river management is divided into three management segments (shown on Figure 2), each managed for somewhat different recreational experiences. The segments are based on the present river use pattern where the upper river (the dam to Spring Green) has about 68% of the use, the middle river (Spring Green to Boscobel) about 20% and the lower river (Boscobel to the Mississippi River) about 12%. It should be noted that recreational use is light on the entire river on weekdays. As expected, substantially heavier use occurs on weekends and holidays. Refer to Chapter Three for more detail on recreational use levels.

Figure 2: River Management Segments



(Specific management actions relating to the segmentation concept are described in the Recreation Management Section of this Plan.)

The level of recreational facility development planned for each river segment is intended to support approximately the present level of river use and maintain existing water based experiences. For example:

- The lower river will remain a lightly used area with little facility development, where solitude is the preferred experience.
- The middle river segment will have more moderate facility development to support continued moderate use. Individual experiences in the middle segment will generally less social than on the upper segment but perhaps more social than on the lower segment.
- The highest level of use will continue to be accommodated (and promoted to a degree) on the upper river segment. Recreational sites, such as landings and on-

the-river day use areas, may be much larger in the upper segment and have more facilities and conveniences for users than on the lower two segments.

- The Department's scenic management plans are consistent throughout the Riverway and do not vary from segment to segment. Likewise, resource management actions are not governed by the "segmentation concept". They occur as prescribed by their individual needs and in agreement with the overall management guidelines for each land management area. However, recreation and scenic protection needs were strongly considered in setting the management guidelines for each area.

Use-control Study

The Department will study river-related recreational uses and their effect on user experiences and, in concert with the Riverway Board, make recommendations to the legislature on appropriate recreational use controls and control measures for the river. The Department shall report its findings and recommendations to the legislature within three years after the Riverway is established.

REAL ESTATE MANAGEMENT

The Lower Wisconsin State Riverway boundary (in 2010) encompasses 94,780 acres with an acquisition goal of 78,855 acres. As of 2010, approximately 52,500 acres are Department-owned in fee, with an additional 4,600 acres of scenic easements and approximately 8,000 acres of hunting and fishing access easements. See maps in Appendix C.

Major amendments to the acquisition boundary were made in 1993 and 2003. Other minor boundary changes, have also occurred from time to time that were associated with individual acquisition approvals by the Natural Resources Board.

The Department will primarily use fee and easement acquisition to meet management and protection needs in the river corridor. Fee acquisition is preferred as it allows full management capability and public use. However, easements will be used under certain circumstances, particularly where public access is not important, such as to protect the natural scenic qualities of highly visible lands (seen from the river) that are disjunct from the main project corridor.

The Department's real estate management program is flexible to meet the desires and needs of both the seller and the Department. The specific real estate management method to be used for any particular parcel is determined on a case-by-case basis. Both the wishes of the landowner and the management objectives of the Department are determining factors in the decision. However, due to the management and administrative complexity of the project and its long-term purpose, purchase in fee title and easements will be the most appropriate method for many tracts.

Statutory Authority for acquisition

The Department may acquire land in the Riverway under the provisions of the Conservation Act, s. 23.09(2)(d), including easements and rights in land under s. 23.09(10) Wisconsin Statutes.

Real Estate Acquisition Policy

All property purchases are on a willing seller basis. The Department is required by state and federal laws to pay “just compensation,” which is the estimated market value of a property based on an appraisal by a certified general licensed appraiser. At times, it is in the interest of the Department and the landowner for the Department to acquire partial rights to a property, in the form as an easement. The WDNR has a number of easement alternatives available to address these situations.

The Department will focus its real estate activities in the following areas:

- Scenic land with high potential for incompatible structural development,
- Land needed for public facility development,
- Land now used or suitable for intensive public use,
- Land needed for habitat management,
- Land needed for general public use.

Acquisition is a slow, ongoing process. The amount of acreage that might be purchased or leased each year will depend upon funding and staffing levels and, of course, landowner interest. Many parcels will never be acquired. In these cases, the Department will encourage compatible private land management through landowner participation in incentive programs, such as the Managed Forest Act or Farmland Preservation programs.

Aides in Lieu of Taxes

The Department makes an annual payment in lieu of real estate taxes to offset property taxes that would have been paid had the property remained in private ownership. The payment is made to the local taxing authority where the property is located. More detailed information on how the Department pays property taxes may be found in a publication titled *Public Land Property Taxes*, PUB-LF-001.

CULTURAL RESOURCE PROTECTION

The present compilation of cultural resources data represents a sizable, although not exhaustive, inventory of known prehistoric and historic sites located in the Lower Wisconsin River Valley. The archaeological and historic resources component of the Riverway plan centers on carrying out a broad program of field investigations, additional literature-searches and records reviews to reconstruct, understand and provide protection of the cultural history of this important historic waterway.

The cultural resources management plan includes the following:

- Continue the records research to complete the inventory of all known sites of cultural or archaeological significance within the corridor.
- Inspect all Riverway development sites (e.g., campgrounds, access roads, toilet buildings, and boat landings) prior to any construction to locate and evaluate any evidence of prehistoric and historic occupation. These cultural resources surveys will be conducted in compliance with federal laws and state guidelines on historic preservation. Appropriate steps will be taken to protect and preserve any significant archaeological sites found.
- Prepare thematic narratives of the history and prehistory of the Lower Wisconsin River Valley for use in guiding future planning and preservation efforts.
- Initiate a geomorphological study of the lowland floodplain. Such a program will provide the means for determining the relative age of topographic landforms where early prehistoric sites could be expected to occur. The results of such an investigation has important predictive and cost-benefit ramifications for identifying previously unrecorded prehistoric sites, many of which presently lie buried, undetected beneath shifting silt and sand deposits on islands and in the floodplain.
- Update the current inventory of Lower Wisconsin River archaeological and historic/architectural sites annually or as additional site information becomes available.
- Conduct field evaluations of all recorded sites (most have not been field checked since discovery) within the project boundary, record present site conditions, monitor site attrition, and determine their potential for nomination to the National Register of Historic Places. Conduct field checks of known sites located within or adjacent to planned development areas during pre-construction surveys.
- Nominate significant prehistoric and historic sites in the project area to the National Register of Historic Places.
- Foster public awareness and appreciation of the need to preserve and protect the archaeological and historical sites in the valley. Interpretive and education programs are planned (see the Nature Observation, Education, and Interpretive Program).

SCENIC RESOURCE PROTECTION

The river's outstanding natural beauty and the generally undeveloped character along its course are primary elements of the river's attraction and value to visitors and nearby residents alike. The ability to build on almost any site, together with the growing attractiveness of the area to people from regional population centers, underscores the need for a coordinated plan to manage alterations to the landscape in a manner consistent with the valley's natural beauty and rural character.

The LWSR is protected through scenic management prescriptions, performance standards and scenic regulations. Development and forest management within the LWSR is regulated by the 1989 Lower Wisconsin State Riverway Law and Wisconsin Administrative Code Chapters RB 1, RB 2, and NR 37. Ch. NR 37, Wis. Adm. Code provides unique aesthetic performance standards for all timber harvesting within the Riverway. Timber harvesting within the State Riverway (on both private and public land) requires a permit issued by the Lower Wisconsin State Riverway Board (LWSRB). This Board is an independent state agency that administers the performance standards. For more information see the LWSRB website: <http://lwr.state.wi.us/>.

In addition to the requirements of NR 37, the master plan provides additional scenic management provisions for Department managed lands. They are outlined below.

SCENIC MANAGEMENT – DNR LANDS

The Department will take the following actions toward protecting scenic beauty on Department managed lands.

Vegetation

- Manage state-owned shorelands to provide a 500 foot deep minimum scenic management strip along the river and major sloughs. Specific management includes a no-cut vegetation strip at least 75 feet deep along the waters-edge with the remainder managed according to the Department's Class A Scenic Management Guidelines (DNR Silviculture Handbook, 2431.5) where modified timber harvesting may occur. The Riverway manager shall prescribe more restrictive shoreland setback requirements as necessary to ensure the scenic management objectives are met.

The scenic shoreland management guidelines described above do not apply to established utility rights-of-way crossing Department lands. In these utility corridors the highest practicable vegetation shall be maintained within 500 feet of the river but the pruning or removal of trees that present a significant hazard to the maintenance of utility service is allowed.

- Manage the Department-owned bluff faces, bluff tops and hillsides visible from the river (the Scenic Management Area) to maintain and enhance their scenic quality. Some vegetation cutting is allowed. Management is governed by NR 37 and the Class A Scenic management guidelines of the Department's Forest Aesthetics and Silvicultural Handbook (Ref. #14)¹. Additional management prescriptions are discussed in the forest and wildlife management sections.
- Plant only trees, shrubs and plants that are native to the area on Department-owned shorelines and scenic management area bluff lands. Such plantings may be used to screen development from view.

*NR 37 is the primary governing document and should take precedence over the handbook where it is more specific or restrictive.*¹

Infrastructure

- Design and construct all developments (such as buildings, roads and parking lots) on Department-owned lands to blend into the natural landscape or not be visible from the river, and be at least 250 feet from the shoreline whenever possible. Overlooks, waysides and trails will be carefully sited to minimize their visual impact. Informational, entrance and interpretive signs will be designed using natural materials and unobtrusive colors. Boundary signs, as seen from the river, will be designed using colors compatible with the landscape.
- Close and restore to a natural condition all unnecessary roads and trails on state-owned lands.
- Use rip-rapping and other rock structures sparingly, generally only around boat access points and bridges or to enhance and protect some heavily used bank fishing areas.
- Any new utility construction will be done with scenic beauty as an important guideline. New power lines will be buried wherever possible. Old overhead lines will be buried upon replacement wherever possible.

RESOURCE MANAGEMENT

Funding-related Management Restrictions

Funding for much of the acquisition of land in the Lower Wisconsin Riverway came from a variety of federal funding programs. The three main programs are the Land and Water Conservation Fund (LAWCON), the Federal Aid in Wildlife Restoration Program (Pittman-Robertson), and the Federal Aid in Sport Fish Restoration Act (Dingell-Johnson). Each of these programs requires that the land purchased with federal funds be used for its original public purpose in perpetuity. Prior to engaging in any major land management activity it is important to review the acquisition funding history to determine whether the proposal conflicts with federal post-grant funding guidelines.

FOREST AND OTHER VEGETATION

Bottomland forests, upland forests, open marshy wetlands, tall grass prairies, and agricultural fields are all an integral part of the diverse plant communities of the Lower Wisconsin River Valley. Vegetative management is at the heart of the Riverway project—by improving habitat for different wildlife species, recreation, and natural areas, as well as protecting the watershed, perpetuating the forest and producing a sustained yield of timber products. The forest and other vegetative management actions for the state-owned lands in the Riverway are guided by the objectives for each land management area and are further modified by specific timber type, habitat, or other local management needs. The land management areas are shown on the maps in Appendix C. Specific vegetation management prescriptions are discussed below and also in the wildlife, endangered resources, and scenic management sections.

General Management Prescriptions by Vegetative Type

A brief description of the general vegetative communities and the management prescriptions for each is presented below, followed by a description of forest management guidelines that will commonly be followed in areas where forest management occurs.

Bottomland hardwoods: This is the most extensive timber type in the project area. The primary tree species include elm, silver maple, river birch, green ash, cottonwood, swamp white oak.

The most important action is to restore productivity and to upgrade the wildlife habitat and quality of timber produced. Shelterwood or group selection cutting is the primary method of regeneration. Planting of desirable species such as mast producing swamp white oak will encourage cavity-using wildlife.

Upland Hardwoods: The primary tree species include oaks, maple, ash, hickory, hackberry, black walnut, black cherry, and aspen. Oak will be favored on many sites to provide habitat and food resources for deer, turkey, ruffed grouse and squirrels. Oak, especially red oak, has a high commercial value and the oak timber type is very important to wildlife. Because oak (white, red, and black) is somewhat intolerant of shade, its reproduction is accomplished primarily by removing competition through clear-cutting or shelterwood cutting. The final overstory cut is not done until adequate advanced regeneration is established. A secondary tool is planting. Oak wilt control will be implemented where necessary. Hickory, hackberry, black walnut, and black cherry are managed similar to red oak because these species are also intolerant of shade. Black walnut has some wildlife value and high commercial value. Individual tree culture to enhance the commercial value will be practiced. On some sites within scenic areas, succession from oak to maple-ash (often called northern hardwoods) may be allowed to occur. The decision whether to allow this conversion to occur or to force maintenance of the oak type will be made on an individual basis, depending on the particular circumstances. Where the maple-ash timber type is encouraged, it will be managed on an all-aged basis and for successful regeneration.

Pine: This includes jack, white and red pine. Natural stands of jack pine will be maintained and perpetuated. Red pine plantations will be harvested at rotation age and the sites evaluated at that time for continued pine production or for conversion to sandy prairies. Some new red pine plantations will be considered in old field situations and used as accents to hardwood associations. Small plantings of pine also will be considered for winter wildlife cover.

Upland Grass and Brush: In desirable areas, native prairie and savanna will be reestablished through prescribed burning and the planting of prairie grasses, forbs (broad leaved plants), shrubs, and trees. Herbicide application in strict compliance with DNR guidelines may be used in special situations. Some open sites may be planted with trees where compatible with the surrounding landscape and use.

Lowland Grass and Brush (marsh): Prescribed burns, mowing, herbicide applications and timber harvest (probably firewood sales) will be used to eliminate undesirable woody vegetation to maintain these open areas. In some areas, special herbicide use could be the only means available to eliminate or control aggressive non-native invaders.

Agricultural and Abandoned Farm Fields: The majority of this type will be sharecropped, planted to prairie grasses, forbs, wildlife shrubs, and trees or kept open through burning, by mechanical means or by herbicide application.

Sand Barrens: These locations will be evaluated on a site-by-site basis. The general management concept will be to keep the sites in their natural condition. Mechanical means will be used to eliminate unwanted vegetation. On some sites, plantings will be used to control unwanted expansion of sand blows.

Timber Management Guidelines

These forest management guidelines will commonly be followed in areas where forest management occurs.

Site Preparation: Prescribed burning, mechanical means and herbicide application could be used to remove competing vegetation to prepare a site for regeneration. These methods could also be used to maintain wildlife openings and to restore prairie-type conditions. The use of herbicides will be minimal.

Reforestation: Natural regeneration will be encouraged. Where it's not possible or practical, tree planting may be done. Planting will serve one or more of the following purposes; to supplement natural regeneration where regeneration is inadequate, to improve the species composition of existing stands, to establish forest on desirable open areas, to improve or maintain the aesthetics of an area and to provide wildlife habitat. Native species that are best suited to the site will be planted. Limited herbicide use might be required in some cases.

Timber Stand Improvement (TSI): Timber stand improvement includes a variety of practices designed to improve the growth and/or species composition of immature forest stands. Aesthetics and/or wildlife habitat may also be improved concurrently, if desired. Management practices include thinning, release, salvage, and pruning.

Big Tree Silviculture: Big Tree Silviculture is a special management technique which is used to encourage large diameter trees (in long-lived species) which are desirable for both wildlife (mast production and den trees) and forest aesthetics (old growth look). Some timber harvest is allowed under this management technique.

Timber Harvest: All timber sales will be carried out in accord with the Riverway objectives and the management guidelines established for the zone in which the timber sale will take place. Timber harvesting will occur during the time period in which the affected area of the forest is least used by the public.

Timber sale procedures are established by law and detailed in the Department's Timber Sale Handbook (Ref. #15). Silvicultural guidelines used in determining the time, method, and details of harvest and intermediate cuts, and salvage cuts have been developed by the U.S. Forest Service and the Wisconsin Department of Natural Resources and tempered to meet local conditions.

Aesthetic Management: Aesthetic management techniques are defined by the Department's Silvicultural and Forest Aesthetics Handbook (Ref. #14). They are modifications of normal timber management techniques used to minimize the negative effects of management on aesthetics and recreational values. In addition, timber harvesting techniques such as reduction of slash visibility, winter logging, precautionary skidding, etc., are practices to further minimize logging impacts.

Management Practices on Privately-Owned Forest Lands

The Department will promote cooperative management consistent with the goal and objectives of the project on private forest lands within the Riverway boundary. Assistance to landowners may include the preparation of management plans, follow-up consultation to help use the plan, timber sale consultation, and tree planting. Enrollment in the Managed Forest Program will be promoted but not required for a landowner to receive technical assistance. Mandatory harvest under tax law contracts will be tempered by aesthetic considerations. Management recommendations for each individual parcel will be based on a number of factors; the management objectives for the land use zone where the parcel is located, the land owner's needs, and any site limitations. In general, timber management practices recommended will be similar to or complement those practices used on state lands within the Riverway.

Nursery Operations

The 100-acre Wilson State Nursery at Boscobel provides bare root planting stock for conservation purposes in southern Wisconsin. The nursery also maintains genetically superior seed orchards with 14 acres of red pine near Avoca, 3 acres of white pine at Richwood and 5 acres of black walnut at Wyalusing State Park.

Fire Protection

Because of sizeable pine plantations in the valley, particularly in the Muscoda-Lone Rock areas, high fire potential exists on portions of the Lower Wisconsin. The entire Riverway lies within the DNR Southern District extensive forest fire protection area. Forest fire protection is provided by the DNR and local fire departments under contract to the state. This system of fire protection will continue separate from the Riverway project.

WILDLIFE

Wildlife, whether deer, turtles, or eagles, are a very important part of recreation and everyday life along the Lower Wisconsin River. The wildlife management plan for the river corridor is designed to maintain and enhance traditional hunting and trapping activities and to provide new opportunities for wildlife observation, study, and participation in management programs.

Habitat protection and enhancement is the foundation of a successful long-term wildlife management program. The habitats and wildlife species of the Lower Wisconsin River corridor are quite diverse. In order to maintain this diversity and its quality, a wide spectrum of management options are called for. They range from intensive management to no management, depending on the type of habitat, its physical setting, and the needs of individual species.

The wildlife management plan for the Riverway is presented in two parts. Part one provides game species management prescriptions, by species or groups of species, that are to be applied to suitable sites across the property consistent with the Wisconsin Comprehensive Wildlife Management Plan. Part two outlines management and development proposals for individual management units (the original wildlife areas). Endangered, threatened, and other non-game wildlife management is discussed in the endangered resources section of the plan.

NOTE: Wildlife management activities are often integrated with forestry and other vegetative management. Consequently, some management proposals overlap, creating repetition in parts of this plan.

General Management Prescriptions

Waterfowl:

- Protect wood duck habitat, especially trees that have nesting cavities, and supplement natural cavities with wood duck houses.
- Maintain 5 existing waterfowl flowages and investigate other environmentally suitable sites for small flowage development.
- Manipulate flowage water levels to enhance waterfowl food production, maintain interspersions of desirable aquatic plants, and to control succession (natural vegetation changes).
- Establish and maintain additional dense nesting cover on suitable sites, stressing native prairie grasses and forbs.
- Maintain wet prairie-forb vegetation by prescribed burning, mowing, or selective herbicide application. Investigate the use of grazing to retard succession.
- Encourage beaver flowages where compatible with other objectives.
- Develop small, shallow open water areas where compatible with fishery objectives in backwater areas.
- Regenerate and enhance oak stands for mast production.
- Plant moist soil species such as wild rice.
- Conduct waterfowl production surveys and hunter use surveys.
- Determine resident Canada goose use and production in the Lower Wisconsin River Valley and investigate methods to enhance production (additional releases, nesting structures, and closed areas).

Lower Wisconsin State Riverway Master Plan, 1988
Chapter Two - Management, Development, and Use

- Investigate impact of water level fluctuations on duck production.
- Control purple loosestrife.
- Establish and maintain artificial waterfowl nesting structures.

Wild Turkey:

- Emphasize mast production in existing oak-hickory stands and plant mast producing trees and fruit-bearing shrubs on appropriate sites.
- Provide standing corn for winter food by cooperative sharecrop agreements with local farmers.
- Provide for summer range through sharecrop agreements.
- Maintain important openings by mowing, burning, selective cutting, and grazing.

Squirrel:

- Maintain at least five sound den trees per acre.
- Emphasize mast production and regeneration of oak-hickory stands.

Rabbit:

- Integrate cover maintenance for rabbits with timber harvest and fuel-wood sales, and with bobwhite quail habitat needs.
- Plant nesting cover in proximity of secure winter cover.
- Continue sharecrop program on agricultural land.

Bobwhite Quail:

- Utilize sharecrop program to provide winter food sources.
- Preserve and enhance existing hedgerows and where possible establish new hedgerow cover utilizing native species.
- Conduct prescribed burns to maintain prairie forbs.

Pheasant:

- Maintain suitable grass cover for put-and-take pheasant hunting.
- Annually stock pheasants for recreational hunting on Mazomanie, Avoca, and Blue River units.

Ruffed Grouse and Woodcock:

- Manage forested areas to provide hardwood age class and species diversity and tall shrub understory.
- Maintain forest openings and field shrub borders through selective cuttings, mowing, and herbicide application.
- Plant small (less than 2 acre) conifer plots for winter cover.

Deer:

- Management for other species will also benefit deer. No specific habitat management will be done for deer.
- Insure adequate harvest to prevent injury to forest regeneration and crops on

adjoining private lands.

Furbearers:

- Protect wetland and associated habitats.
- Manipulate flowage levels to maintain moderate muskrat numbers.
- Retain large den trees for raccoon.
- Control beaver activity to prevent damage to water control structures and private lands. Where possible allow beaver ponds to exist to enhance wetland habitats.

MANAGEMENT ON INDIVIDUAL RIVERWAY UNITS

Note: The units included are the original wildlife areas that existed prior to the creation of the Lower Wisconsin Riverway.

Maintenance of Existing Facilities

Unless specified otherwise, all existing facilities on the wildlife area lands will be maintained. Maintenance includes but is not limited to mowing trails and parking areas; blading and gravel surfacing of access roads; posting boundary, regulatory, and informational signs; repairing dikes and water control structures; erecting and maintaining fences; regulating off-road vehicle use by barriers, gating, and signing; litter removal, and annual sharecrop administration.

Major Improvements or Changes

Listed below by management unit (based on wildlife area lands existing prior to creation of the Riverway); refer to the maps in Appendix C for the general location of each.

Avoca Unit:

- Upgrade existing access road north of Haylane Road by filling holes and surfacing with gravel.

Bakken's Pond Unit:

- Restore upland prairie on 10 acres.

Blue River Unit:

- Replace water control structure and spillway outlet at Fish Trap Flowage.
- Remove five acres of floating sedge mat to create open water for waterfowl brood habitat and fishing.
- Harvest 30 acres of red and white pine plantation and convert to prairie.
- Develop and maintain 60 acres of upland sand prairie on sites not in pine plantation.

Knapp Creek Unit:

- Develop parking area and non-motorized access to Garner Lake.
- Harvest 35 acres of switchgrass for seed.

Lower Wisconsin State Riverway Master Plan, 1988
Chapter Two - Management, Development, and Use

Helena Marsh Unit:

- Establish two parking areas for a total capacity of 20 vehicles.
- Establish 12,500 feet of timber access trails.

Lone Rock Unit:

- Establish a parking area for 10 vehicles that will allow "carry in" boat access to Smith Slough.
- Eliminate access through the east end of the property where off-road vehicles have been entering.
- Eliminate 2,000 feet of unofficial trail.

Mazomanie Unit:

- Lease 2,000 additional acres of land (3,000 total) for public hunting.
- Establish and maintain artificial waterfowl nesting structures as needed.
- Harvest pine plantations in excess of 20 years old.
- Maintain existing flowage (approximately 60 acres in size).
- Develop four new parking lots and upgrade four existing lots.
- Improve existing trail network for pheasant releases.
- Encourage osprey nesting in flowage site.

Millville Unit:

- Establish eight 2-acre conifer plantings for winter cover and eight acres of wildlife shrub plantings on five sites.
- Create and maintain 18,000 feet of brushy field edge along woodland borders.
- Complete implementation of SCS soil conservation plan and construct additional diversions.

Wauzeka Unit:

- Develop parking for 10 vehicles.
- Implement cooperative wildlife habitat activities on easement tracts.
- Provide one designated wildlife observation site.

Woodman Unit:

- Remove 4,000 cu. yards of peat material for use at Wilson State Nursery. This action will increase the existing two-acre pond by approximately one acre.

STATE NATURAL AREA AND ENDANGERED RESOURCES

Endangered resources include a range of natural and cultural features that are in danger of being lost or degraded if not appropriately protected and managed. Included are natural communities (State Natural Areas) and rare plants and animals native to Wisconsin, archaeological sites, and significant geological features. Management for each category is discussed in the sections below.

State Natural Areas

State Natural Areas are defined and authorized in State Statute 23.27-23.29 and Administrative Code NR 1.32 as “an area of land or water which has educational or scientific value or is important as a reservoir of the state’s genetic or biological diversity and includes any buffer area necessary to protect the area’s natural value”. Section 23.27 (1) defines natural areas as “reserves for native biotic communities...habitat[s] for endangered, threatened, or critical species...or areas with highly significant geological or archaeological features”. Section 23.28(1) provides authority to designate areas as State Natural Areas and Section 23.29 provides authority to legally dedicate and protect State Natural Areas in perpetuity. While the intent of the Natural Areas program is to preserve the best examples of the state’s diverse natural communities, other recreational uses may be allowed, if those uses do not threaten those natural values. A brief description of each State Natural Area within the Riverway and its management is given below and they are shown on the maps in Appendix C. Some SNAs extend beyond the LWSR boundary.

Avoca Prairie and Savanna State Natural Area

This is the largest and highest quality dry-mesic to wet-mesic prairie east of the Mississippi River; 2,210 acres lie within the SNA project boundary, 2,195 acres are owned. The site is registered with the U.S. National Park Service as a National Natural Landmark. The area is intensively researched and is used by educators throughout the Midwest.

Management: Tree and shrub encroachment will be discouraged through brushing and prescribed burning. Construction of a mile long nature trail and wooden observation tower is planned as part of the Riverway nature education and interpretation program.

Tower Hill Bottoms State Natural Area

This is an excellent example of high quality southern wet and wet-mesic lowland forest. The area is used for research. It is 148 acres.

Management: No specific management action is required to maintain this natural community.

Mazomanie Bottoms State Natural Area

This 352 acre site is an example of old river channels and ridge and swale floodplain forest with nesting red-shouldered hawks and winter roosting bald eagles.

Management: No specific management action is required for this community.

Blue River Sand Barrens State Natural Area

This 130 acre natural area features a variety of xeric (dry) plant community types including sand blows, active dunes, sand barrens and stabilized dunes forested with black oak. The globally rare fame flower, *Talinum rugospermum*, is known from here. Prickly pear cactus is common here and the site provides nesting habitat for turtles and other reptiles, some of which are rare in Wisconsin. The site has been used for research on the

movement and stabilization of sand dunes and research on the physiology of certain reptiles.

Management: Management is directed toward restricting all vehicles from the natural area. Future measures, if necessary, may include signing, fencing and road closures near the site.

Richwood Bottoms State Natural Area

This 207 acre natural area is an excellent example of a typical southern-wet forest on the low lying areas and of the drier forest type of basswood and swamp white oak on the sandy ridges. It is good habitat for red-shouldered hawk and Kentucky warbler.

Management: No specific management is required to maintain this natural community type.

Gotham Jack Pine Barrens State Natural Area

This area is one of the best native jack pine barrens and associated sand blows in the Lower Wisconsin valley. The site has potential for rare lichens, invertebrates, and reptiles. Also this site has a small relic sycamore stand. The site is 353 acres.

Management: This site needs protection from off-road vehicles.

Bakken's Pond State Natural Area

This 153 acre site features many small streams and seepages feeding a flowage away from the main river channel and provides habitat for a diverse population of invertebrates, fish, and reptiles. The floodplain vegetation included in this area is sedge meadow and deep marsh interspersed with wet forest comprised of willow, silver maple, and alder. Extensive stands of purple flowered pickerel weed are a special feature of the site. Additionally, the area contains the starhead topminnow (state endangered) and pirate perch (special concern species).

Management: The Bakken's Pond site lies between two sub-impoundments and management to maintain the historic water levels is important. Buffer lands to the north of the town road are important to protect the water quality of the area.

Blue River Bluffs State Natural Area

Originally called Flynn Prairie SNA, this is a dry-lime prairie on an extremely steep southwest facing bluff and is the largest and best of numerous dry-lime prairies in the corridor. The site includes habitat for threatened plants and rare reptiles. Currently, 374 acres of this 659 project area have been purchased.

Management: Prescribed burning and brushing are the management tools required to eliminate encroaching woody vegetation and to control cool season grasses and herbaceous species.

Arena Pines and Sand Barrens State Natural Area

This 80 acre site contains an excellent example of sand barrens vegetated with native jack pine and pine-oak savanna.

Lower Wisconsin State Riverway Master Plan, 1988
Chapter Two - Management, Development, and Use

Management: Management consists of occasional brushing and prescribed fire to control woody species encroachment.

Ferry Bluff State Natural Area

This site features oak woods, open cliff, dry prairie rare species habitat. The area also is commonly used by bald eagles as a winter roost site. This area may be reoccupied by reintroduced peregrine falcons as a nest site. The SNA project boundary is 1,157 acres, 402 acres have been purchased.

Management: Due to heavy public use, some restrictions are necessary to protect the area's natural features and rare species values. Possible methods are a road closure, regulated trails, and seasonal use restrictions. Brushing and prescribed burning may be used to manage the prairie. Trees may have to be removed to open the cliff habitat.

Smith Slough and Sand Prairie State Natural Area

The SNA project boundary includes 443 acres, 397 acres have been purchased.

Smith Slough is a 15 acre lake formed in an old river channel now cut off from the main channel. The lake contains a good population of the starhead topminnow (a state-endangered fish) as well as a population of *Nelumbo pentapetala* (American lotus) and white-spangled skimmer, *Hibella cyania* (a rare dragonfly in Wisconsin). Surrounding the lake is an unusual mix of plant communities including an oak barrens, sand barrens, sedge meadow, and shrub-carr with ridges of sand supporting swamp white oak savanna grading into swamp white oak forest along the river. The sand barrens provide excellent nesting habitat for turtles. The diversity of habitat types makes this site especially suitable for nature study and appreciation. Motors are restricted on the lake [NR 45.11(4)(v)] except for disabled persons who may use electric motors.

Management: Post signs and enforce motor restriction on the lake. Savanna, barrens, and sedge meadows may require occasional brushing and burning to control woody plant encroachment.

Mazomanie Oak Barrens State Natural Area

This 160 acre site has an oak and pine barrens that furnishes protection to several threatened and endangered species. To date, 136 acres have been acquired.

Management: Management consists of controlling woody and cool season species encroachment by brushing and prescribed burning.

Wyalusing Island State Natural Area

A small 50 acre island with excellent floodplain forest adjoining Wyalusing Walnut Woods State Natural Area in Wyalusing State Park. This scenic island is easily accessible by canoe.

Management: No specific management is required to maintain this community.

Woodman Lake Sand Prairie and Dead Lake State Natural Area

This area is a good example of accessible sand prairie and active dunes. Steep sand banks are abruptly bordered by a shallow water slough with a good variety of emergent aquatic vegetation. Dwarf dandelion, false heather and rock spikemoss are plants of interest occurring here. The SNA is 286 acres.

Management: Prescribed burning, brushing and control of off-road vehicles are the major management considerations.

Newton Island State Natural Area

This 90 acre site is an excellent river bottom woods dominated by large silver maple and swamp white oak. A good variety of herbs, grasses, and sedges along with backwater sloughs make this area an excellent example of undisturbed floodplain forest.

Management: No specific management action is required.

Adiantum Woods State Natural Area

This southern mesic forest is dominated by sugar maple on a steep north facing slope. The understory is very rich with several species of orchids and ferns. By walking up the slope one can see a transition from mesic to dry-mesic to dry forest types. The SNA totals 50 acres.

Management: No specific management action is required to maintain this community. Timber theft must be watched for.

Bogus Bluff Prairie State Natural Area

A small, 25 acre high quality dry prairie. No acreage has been acquired

Management: Prescribed burning and brushing to restore and maintain is required.

Wauzeka Bottoms State Natural Area

This is the largest mature floodplain forest in the Lower Wisconsin River Valley with superior nesting habitat for lowland forest birds. Many lowland forest bird species require large tracts of mature lowland forest, a rare habitat type today. The full complement of Wisconsin's lowland hardwood bird species occurs here with the exception of nesting great egrets. The Wauzeka Bottoms forest diversity, associated open marsh, and large stands of mature timber are also significant features. This area has been frequented by adult bald eagles during the nesting season. This area may attract nesting herons and egrets in future years. About 880 acres of its 902 acres have been acquired.

Management: No special management other than preservation is needed.

Orion Mussel Bed

This SNA is a long linear stretch of river bottom and adjacent shoreline which hugs the north bank of the river. Seven rare mussels, 4 rare dragonflies and 2 very rare mayflies occur here. This site represents the best or only known occurrence of 8 of these species.

The site is 175 acres.

Management: Protect the area from disturbance.

Endangered Resource Management

All Riverway management/development activities are to be done with full consideration of the need to protect and minimize human disturbance of important habitats for special concern, threatened, and endangered plant and animal species. The following actions are the primary focus of management for endangered species on the Riverway:

General management actions:

- Identify habitats of rare plant and animal species through additional surveys.
- Protect endangered and threatened species habitats by inclusion of appropriate measures wherever necessary in Riverway management activities.
- Protect especially important habitats through protective land use classifications such as State Natural Area or Habitat Preservation Area.
- Provide additional management for a species as the need is determined.

Specific management actions to benefit rare and non-game species on the Riverway:

Birds

- Locate, monitor, and protect bald eagle roost and potential nest sites.
- Locate, monitor, and protect red-shouldered hawk nest sites.
- Locate, monitor, and protect cormorant and heron/egret rookeries.
- Erect osprey nest platforms in large open marshes with good water clarity.
- Maintain certain areas to prefer old field habitat with shrubby hedgerows for the endangered loggerhead shrike.
- Acquire, maintain, and protect 4-5 potential peregrine falcon nest cliffs.
- Erect barn owl nest boxes in silos at likely breeding sites.

Reptiles and Amphibians

- The endangered ornate box turtle is known only from the Lower Wisconsin River corridor and its tributaries in Wisconsin. Maintenance of sand prairie and other open habitats called for in a variety of places in this plan will directly benefit this species.
- Several other listed or rare reptiles in Wisconsin are also limited to open sandy habitat in the Lower Wisconsin River corridor and will also benefit from maintenance of sand prairie. These include the slender glass lizard, six-lined racerunner, prairie ring-necked snake, and the blue racer.
- The endangered massasauga rattlesnake has been recorded in the Mazomanie

bottomlands. Management for this species includes preservation of shoreline habitat and adjacent fields in the area.

Fish

The Lower Wisconsin River has populations of a number of listed or rare fish species, many inhabit areas of strong current and sand or gravel bottom. Specific management needs of this group of species include strict enforcement of shoreland zoning laws, life history research and distribution surveys.

The best populations of the endangered starhead topminnow in Wisconsin are in the numerous backwater sloughs of the Lower Wisconsin River corridor. Life history research and distribution surveys are needed.

Invertebrates

Recent research on mussels and aquatic insects point out the importance of the Lower Wisconsin River to the survival of several rare species. Many of these species have their best populations, and often their only populations, in the Lower Wisconsin River. At least two sites on the Lower Wisconsin River are remarkable for the co-occurrence of several globally rare species that have been identified, the Orion Gravel Bars site and a site near Woodman.

Orion gravel bars: A long linear stretch of river bottom and adjacent shoreline which hugs the north bank of the river. Seven rare mussels, 4 rare dragonflies and 2 very rare mayflies occur here. This site represents the best or only known occurrence of 8 of these species.

Woodman site: This site includes about 3.0 miles of river and adjacent shore from the Woodman railroad bridge downstream along the south channel through Newton Island. This area features 6 rare mussel species, 5 rare mayflies, and 3 rare dragonflies. This site represents the only known occurrence anywhere of the Pecatonica River Mayfly and of the few known occurrences of two additional mayfly species. See the Background Chapter for more information.

FISHERIES

The Lower Wisconsin River, along with the Mississippi River, is the most important fishery resource in southwest Wisconsin. Sport fishing pressure on them is quite high on a per surface acre basis when compared with other water bodies. It is expected that fishing pressure on the Lower Wisconsin River will increase significantly over the next several years although conflicts with other users often detract from the quality of the experience and, in the long run, may limit overall use by anglers.

Increased knowledge and appropriate management of the river's fishery is necessary to assure high-quality fishing opportunities into the future. Much remains to be learned about the fish and their management in large rivers like the Lower Wisconsin. Physical improvement of the habitat, as is common in our trout streams and small rivers, would be

costly and difficult because of the river's size and shifting sand bottom. Further, practical and proven artificial habitat improvement techniques have not been developed for large scale use on water bodies such as the Lower Wisconsin. Finally, many fish habitat improvement activities are often aimed at concentrating fish and increasing angler harvest of them as opposed to actually increasing the fish populations themselves. It is not a given that the fishery of the Lower Wisconsin River is currently under harvested and that a significant effort should be made to increase harvest. On the contrary, one of the major reasons for studying fish communities is the growing fear that over harvest of some of our more desirable fish species is, or may soon be occurring.

The flowing portion of the Lower Wisconsin is a naturally dynamic ever-changing water body. The existing fisheries have developed under the natural forces which have existed over the past 30 or so years and there will be no attempt on a large scale, to alter, control or change the river's character or general habitat types.

On the other hand, the backwater lakes, sloughs, and marshes do not represent dynamic ever-changing systems. As with all shallow water fertile lakes, these water bodies are undergoing a process of rapid eutrophication and degradation. These water bodies can, if improved, provide significant additional high quality lake type fishing opportunities in a part of the state where they are in high demand but minimally available.

This plan calls for setting the eutrophication process back several hundred years on a substantial number of backwater lakes, sloughs, and marshes. While the process of reclaiming these water areas cannot be viewed as natural, it would be hard to envision the end product as being anything but natural since the areas will be restored to a pre-existing condition.

It is obvious that the specific sites that may be restored will have to be examined in some detail for the environmental soundness, including impact on rare or unique flora or fauna. However, it should be recognized that the existing situation developed from conditions that we can only speculate may have been similar or identical to that to which we intend to restore these water bodies. The following fish management activities are planned:

Life History Studies

The Department will conduct additional studies of several fish species to determine the best management techniques necessary to maintain existing or superior population size and structure. The species studies could include sauger, smallmouth bass, flathead catfish, lake sturgeon, shovelnose sturgeon, and paddlefish. Studies now (1986) being done include an extensive study of channel catfish and walleye and lesser work on sauger, flathead catfish, and smallmouth bass.

Creel Census

Little is known about present harvest rates on the river as a previously conducted creel census yielded more information on how to census the river than on its fishery. The Department plans to conduct a creel census for the entire Lower Wisconsin River. In addition to harvest rates for the various fish species, the census will provide valuable data

on fishing pressure and angler attitudes. Special attention will be given to the spring and fall harvest of fish from the tail-waters of the Prairie du Sac dam to determine if fishing regulations should be modified to protect the fishery.

Flow Stabilization

In order to reduce adverse impacts on fish habitat and fish life-cycles, the Department will work within the limits of its authority to stabilize the flow of water in the Lower Wisconsin River (see River Flow Management).

Bank Fishing in Readily Accessible Areas

These areas are normally associated with public boat landings, bridge crossings, and high banks adjacent to established roadways. Development of these sites will involve the placement of underwater structures along the bank to attract desirable fish and to maintain good water depths there for shore fishing. Improved opportunities for disabled anglers will be included in site development.

Fish Carrying Capacity of Backwater Lakes, Sloughs, and Marsh Areas

Improvement of the year-round fish carrying capacity of backwater lakes, sloughs, and marshes would provide a significant, needed, and heavily used additional sport fishing opportunity. A number of existing backwaters contain excellent fish spawning areas and springtime fish habitat. During the summer and fall the fish habitat in these same areas often becomes marginal. Over-winter habitat and conditions are often insufficient to support fish life. Other backwater areas provide only spawning and springtime habitat and cannot support fish life during any other period of the year.

Two thousand acres of such backwater areas are to be identified and improved as necessary to support healthy viable fish populations on a year-round basis. It is obvious that sites will need to be specifically identified and evaluated from an environmental standpoint prior to the commencement of the necessary activities to accomplish the objective.

The major habitat modification to open water areas is the removal of flocculent peat-type material laying on the bottom along with deepening 10-15% of the bottom by removing sand bottom material to depths that will allow over-wintering of fish. Groundwater and spring water movement through these areas is adequate to support fish on a year-round basis. In the marsh areas which are mainly now covered by sedge mats, the habitat objective will be accomplished by the following sequence: 1) removal of the sedge mat layer to create an open water area, 2) removal of the flocculent peat-type material and, finally, 3) removal of sand bottom material to provide adequate depths to allow the over-wintering of fish.

The estimated cost of doing this work is approximately \$1,000 per acre/foot. This is really a relatively cheap price to pay for high quality fishing water. Maintenance costs associated with maintaining a desirable fishery in these areas over the next 100 years is expected to be zero.

A major physical problem associated with these projects will be the disposal of dredge spoil. Obviously as with all major activities, another significant problem is the appropriation of adequate funds to allow this work to be undertaken.

Role of Islands in Providing Fish Habitat

The role that islands play in providing fish habitat and the feasibility of protecting upstream portions of these islands from erosion will be evaluated. If specific protection proposals are developed, an environmental analysis (EA) will be done at that time.

RIVER FLOW

With the limits of the Department's authority in mind, and considering the broad physical limitations of the river's flow regulation system, the following will be sought:

- Attempt to minimize abrupt flow changes resulting from the operation of the Prairie du Sac dam and other dams upstream.
- Maintain the current management policy that augments low flows in the Lower Wisconsin River.
- Encourage the United States Geological Survey (USGS) to continue operation of their Muscoda stream flow monitoring station.
- Improve the ability to predict flow conditions for the Lower Wisconsin River by working with the Wisconsin Valley Improvement Corporation and the USGS to find ways to improve forecasts of flow conditions in the Lower Wisconsin River, and commission the USGS to improve the ability to predict flow changes resulting from runoff from the Lower Wisconsin's uncontrolled tributaries.
- Explore ways to improve the communication network to get reports on river conditions and forecasts to river users in a timely manner.

RECREATION MANAGEMENT

FACILITY DEVELOPMENT AND IMPROVEMENT

The following types of recreational facility development and improvement are planned:

- One new boat landing, relocation of some boat landings, and upgrading facilities at landings,
- Local park improvements,
- Camping,
- Trails,
- Educational and information programs,
- Hunting, trapping, fishing, and related activities,
- Non-intensive use area facilities, and

- Disabled access.

*Specific Riverway recreational facility developments are shown on **Appendix A** and **Appendix B**, and the details of each are discussed below.*

Upgrading River Boat Landings and Facilities

The boat landings and associated grounds are the cornerstone of recreation on the Lower Wisconsin River. They are used by canoeists, boaters, boat and bank anglers, hunters, sunbathers, picnickers, wildlife watchers and as waysides for travelers. Landings often serve as small local riverside parks - not just as a place to launch a boat or canoe.

The steady growth in popularity of Wisconsin River recreation has stressed many landings beyond their limit, particularly in the heavily used upper segment. Some access sites have severe parking deficiencies on heavy use days and most lack or have inadequate basic human services, like trash receptacles and toilets. In some cases crowding is causing serious conflicts between users.

Public river access sites should be upgraded wherever possible to improve health and safety, reduce environmental damage and to increase the enjoyment of all users. Planned River Access Development is listed by landing in Appendix B.

The minimum facilities for all river access areas are:

- Asphalt or gravel surface on all entrance roads and parking areas,
- Trash disposal,
- Signing and information boards, and
- Landscaping.

Additional facilities that may be appropriate for the more heavily used landings include:

- Toilets,
- Safety lighting (lighting shall be located and directed so as to be visually unobtrusive from the river),
- Telephone,
- Drinking water,
- Picnicking facilities - tables, grills, and in some cases a shelter,
- Boat tie ups and/or canoe racks,
- Separate access areas for motorized and non-motorized watercraft,
- Designed to be accessible at higher water levels,
- Designed to provide a quiet-water launch zone whenever possible, and
- Extra space to accommodate canoe livery vehicles.

Lower Wisconsin State Riverway Master Plan, 1988
Chapter Two - Management, Development, and Use

The Department does not endorse swimming at any location on the river. "Swim at your own risk, no lifeguards available" signs, and educational information describing the hazards of swimming in a river, will be posted at the major public use areas along the river.

New Landing: A new landing and public use area is planned for a location downstream of Sauk City, below the railroad trestle on the north bank and southwest of the sewage treatment plant. The launch will have a separate access for canoes and boats and parking capacity for 30-50 vehicles. The facility also will provide a picnic area with tables, grills, drinking water and shelter.

Landing Relocation or Major Redevelopment: Two landings, Buena Vista (Gotham) and the undeveloped landing at Arena will be redeveloped on more suitable sites.

Arena: The existing boat/canoe landing will be modified and a new canoe access area will be constructed immediately adjacent and to the west on state-owned land. The canoe/landing area will provide for launching into shallow, quiet water. Construction of an access road and parking is necessary. The new state-owned landing will also serve as a picnic area. Motorized craft will continue to use the existing access.

Buena Vista: The present eroding township-owned landing should be relocated to a new site on the east bank of Pine River within one-quarter mile of the existing site. An alternative is to keep the existing access where it is, raise the overall elevation of the site and relocate the entrance road 100 feet north away from the eroding riverbank. So that the existing road may be used, the feasibility of rip-rapping the bank should be evaluated.

Peck's Landing: Peck's Landing and Wayside, Highway 23 near Spring Green, is owned by the Wisconsin Department of Transportation and is maintained by Sauk County. This site gets very heavy use by sunbathers as well as by canoeists and picnickers and has a high level of congestion and frequent conflicts. This site will be redeveloped and expanded to properly accommodate its present use. In addition to the standard development, expanded parking, drinking water, full picnic facilities including a shelter, canoe racks and a canoe livery loading area are recommended for this site.

If sufficient land is not available to provide separate motor boat access at Peck's Landing, the facilities will be provided across the river at Tower Hill State Park. This action will probably require periodic dredging of Mill Creek as it tends to silt in. However, in the long run providing additional facilities at Tower Hill might prove beneficial as many of the user facilities called for at Peck's Landing are already provided at the park.

Mazomanie Wildlife Area: Because of the ever-changing river conditions, a large sandbar has formed in front of the boat landing effectively blocking boat access and making canoe access difficult at summer water levels. Until the river shifts and re-opens the landing, users will be directed to the nearest other public boat access points, such as the Town of Mazomanie landing upstream.

The large sandbar (often 40 acres or more) by the Mazomanie Wildlife Area has attracted large crowds of beach users in recent years. On heavy use days, 300 or more vehicles are parked in the area. The section of the town road (Conservation Drive) running adjacent to the sandbar will be widened to safely accommodate parking for up to 250 vehicles and surfaced with asphalt. The addition of drinking water and toilets should be considered for this site as well. Construction of a large parking lot is not planned because the long-term existence of the sandbar is uncertain.

Appendix B provides a summary of the planned development specifics for each public river access area, including those not discussed above.

Local Recreation Improvement: Several local recreation sites front the Lower Wisconsin or its backwaters and serve as important community riverside recreation areas. Two sites, at Lone Rock (village-owned) and at Woodman Lake (part of the state-owned Lower Wisconsin River Wildlife Area) are underdeveloped for their present use level. The Department recommends these two sites be upgraded and the Department will work with the local governments to provide funding and planning assistance for the redevelopment and maintenance. Specific recommendations include the following:

Lone Rock: Relocate the entrance road and parking, enlarge and improve the beach-picnic area and build a new picnic shelter.

Woodman Lake: Improve parking and construct a small unguarded beach-picnic area. A disabled fishing area should be located here as well.

Camping

A variety of new camping facilities are planned to better accommodate the types of camping discussed below:

Sandbar Camping: Many people enjoy sandbar camping because of its primitive, unstructured nature and the sense of freedom it affords them. With this experience in mind, no developments or services are planned for sandbar campers. However, some management actions are being considered to protect the quality of the sandbar camping experience. These actions will include a "no glass" and "carry out your own trash" policy.

Semi-primitive Riverbank Camping: (Gotham Sands Boat/Canoe Campground) The 15-20 campsite campground will offer only basic services such as pit or portable toilets, fire rings and cleared tent pads. Drinking water could be provided. Campers will be required to carry out their trash. Camper access will be only from the river. The development will occupy about 10-15 acres of land. Each campsite will be at least one-hundred feet from the next and linked by a pedestrian trail. Emergency and maintenance access will be available by a controlled access road from State Highway 60.

Development of this semi-primitive campground is for two purposes. First, the availability of a high ground campsite such as this will improve the opportunity for river camping in the off-season, as sandbar campsites are very limited or are non-existent in

spring and fall due to higher water. Secondly, during the high-use summer season, this site could be offered on a reservation only basis, which will provide an alternative to camping on a sandbar with no facilities. The site where this campground will be located is on the north bank about one and one-half miles east of Gotham.

Serious erosion has occurred on the site's sandy, high bank due to heavy ATV use. Reclamation of the eroded area and some bank stabilization will be necessary. This development is within the moderate use Spring Green to Boscobel river segment. Any development at this site must be adequately buffered to prevent encroachment on the Gotham Jack Pine and Barrens Natural Area.

Backpack Camping: A backpacking experience is associated with a lengthy hiking trail or system of trails, solitude and primitive camping. Presently there is no known backpacking occurring in the river corridor and backpacking opportunities are very limited in southern Wisconsin. A 15-mile trail system with backpack campsites is planned for the rugged Millville uplands. (The trail system is also described under "trails" below.) From 12 to 20 backpack campsites will be dispersed along the Millville hiking trail to provide a solitary camping experience. A number of sites could be located where river users could also pack in to camp for the night. Support items include fire rings and minimal toilet and drinking water facilities. Campers will be required to carry out their trash. The backpack sites will be available by reservation only. During the hunting season, campers will be informed of the fact that hunters were active in the area.

Trails

Opportunities for trail-related recreation are very limited in the river area and southwest Wisconsin. Construction of trails for a variety of recreational uses including hiking, cross-country skiing, horseback riding and snowmobiling are planned. In the areas where hunting is a priority use, the trails will normally be closed to non-hunting uses during hunting seasons. Trail design will follow these guidelines:

- Trails will be loop trails and will accommodate year-round use whenever possible to maximize recreation opportunities.
- The location and design considerations for each trail will include site limitations such as wetness and topography as well as its compatibility with shared and nearby uses.
- The trails will be designed to blend with the landscape and cause as little site disturbance and impact as possible. With this in mind, whenever possible new trails will follow existing pathways and abandoned roadways.
- Construction and maintenance will follow the guidelines set forth in the Department's Trail Specifications Handbook.
- In environmentally sensitive areas where there are concerns about potential compatibility of trails, such as for eagle roosts in and near the Mazomanie Wildlife Area, studies will be conducted to determine their compatibility before the trails are sited and constructed.

Lower Wisconsin State Riverway Master Plan, 1988
Chapter Two - Management, Development, and Use

Trails are planned for the following sites. Other trail locations have not been selected at this time.

Hiking/cross-country Ski Trails:

- Mazomanie Unit 10 mi.
- Blue River Unit (between Blue River and Muscoda) 6 mi.
- Millville Unit 15 mi
- Wyalusing State Park to Millville 8 mi.
- Sauk City (west of Sauk City and north of the river) 10 mi.

If the Madison to Prairie du Chien, or the Lone Rock to Richland Center, or the Mazomanie to Sauk City rail lines are ever abandoned, the Department recommends these grades become bicycle/hiking trails.

Snowmobile Trails (part of regional trail system):

- Bakken's Pond Unit 10 mi
- Blue River Wildlife Unit (between Muscoda and Boscobel) 9 mi.
- Mazomanie Unit Maintain the existing short crossing trail

Horseback Trails:

- About 25 miles of trail are recommended. Suitable locations are under study. If suitable, the horse trails should be considered for snowmobile use as well.

Auto Touring Trail: The river corridor has long been an attractive, popular area for pleasure driving. For many elderly and handicapped persons, auto touring is the primary way they can experience the river area.

A signed auto trail will be established. It will mainly follow the existing, lesser traveled roads along the river. A specific route has not yet been selected. The auto trail will be guided by maps and brochures, and punctuated by pull-offs or waysides and interpretive markers at points of interest. Limited, selective clearing may be done to open important vistas for viewing, if the scenic quality of the area will not be harmed. The auto route will be laid out to include facilities like waysides, scenic overlooks and nature trails. Because of the attractiveness of bicycling the scenic back roads of the river corridor, bikers are also expected to use the auto trail in fair numbers.

Highway Waysides: Four additional waysides are proposed to be constructed in cooperation with the state Department of Transportation to serve as rest stops and river viewing areas for the general traveling public, as well as for persons using auto trail system. At present (1988), there are only two highway waysides with good views of the river. Both are on Highway 60 in the central river segment. The new waysides are targeted for the upper and lower river segments. An additional wayside should also be considered for the larger, middle river segment.

Any new wayside site must have a safe access point to the highway and each site would be located and designed so as to not harm the scenic beauty of the area. Generally the user facilities planned for the new waysides include toilets, trash disposal, drinking water, picnic area, observation points and interpretive displays.

Potential wayside sites under study include:

- North of the river on Highway 60 two to three miles west of Gotham,
- North of the river on Highway 60 west of Wauzeka,
- In the Sauk City - Prairie du Sac Area,
- South of the River between Wyalusing and Millville on County Highway C, possibly the existing Millville boat access,
- North of the river on Highway 60 west of Boydtown,
- In the Bridgeport area, as part of the reconstruction of the Highway 18 bridge and shared with the boat access, and
- Highway 14, east of Spring Green, at the river.

ATV Trails: No ATV trails are planned. In spite of all of the public comment that came into the Department during the planning process in support of ATV use along the Lower Wisconsin River (about the same number were opposed), the Department is opposed to ATV use on state-owned lands within the project. In most or all of the project boundary, the length and type of ATV use requested (at least 20-25 miles of trail) would be incompatible with the goals of the plan. If an adjoining piece of land could be found where ATV use will not degrade or affect the function of the basic natural resources and is locally politically acceptable, the Department would consider providing its support to include this activity as a part of the plan.

Non-intensive Use Area Facilities

Non-intensive use area facilities include minor access roads, small parking areas, backwater and pond accesses, and hunter walking trails that are scattered throughout the resource management area. Usually these facilities serve hunters, backwater anglers, and people watching wildlife or picking berries, mushrooms and nuts. Maintenance and improvements or additions to these facilities are an important part of this plan. The non-intensive use facilities are discussed in the management/development section for each Riverway Management Unit.

Disabled Access

Disabled access will be provided wherever practical. Development emphasis will be placed in key areas such as at most boat access points, at day use areas (highway waysides, overlooks, bank fishing sites and picnic areas), and at the planned Riverway Headquarters so that the disabled user will also be able to enjoy many of the corridor's recreational activities. Access will be provided in backwater and backcountry areas as well as the more pronounced locations along the river. Each of the three river use segments will include opportunities for disabled camping, wildlife observation, and

hiking, and nature education (hard surfaced trails). In addition, brochures will be provided outlining where disabled facilities are available, as well as describing special disabled opportunities for canoeing, sandbar camping, etc.

Facility Maintenance

Routine facility maintenance, such as toilet and lawn care, trash collections and facility repair will continue to be the responsibility of the owner/operator of each site. The Department will provide appropriate maintenance, litter pick-up and related enforcement on all Department properties and Riverway waters. The Department may subcontract to private parties or other units of government for maintenance of some Department-owned facilities. Local governments will be responsible for access sites and local river related parks they own or operate.

Cooperation with Local Agencies

Whenever possible, the Department will cooperate to provide planning and funding assistance for county, township and community recreational facilities that are directly related to this plan. A number of local assistance grant programs such as the Land and Water Conservation Act (LAWCON), the County Fish and Wildlife Aid Program, and the Recreational Boating Facilities Program are available.

While the Department has no legal obligation to provide road maintenance or snowplowing on local roads adjacent to state-owned lands, some funding to assist a township in repair of those roads most affected by recreational use may be available. If issues related to solid waste disposal occur from increased recreational use, a similar spirit of cooperation would be applied.

In conformance with the statewide water access assistance program, the Department will provide cost sharing (at least 50% funding) and planning assistance to local governments that wish to develop or redevelop local governmentally owned river access sites to meet the recommendations of the Riverway Master Plan.

EDUCATION AND INTERPRETIVE PROGRAMS

The Department plans to develop and provide a comprehensive education and interpretation program for the Riverway. Only limited opportunities presently exist at Wyalusing and Tower Hill State Parks. In addition to being a popular form of recreation, the expanded education/interpretation programs will help foster visitors awareness of the valley's scenic, scientific, and wildlife values, its rich history and archaeological heritage and an awareness of human impacts on the resource. Much of this program will be integrated into other recreational facilities such as trails, landings, and waysides.

The program's general education and interpretation components include the following:

- A nature center at Tower Hill State Park (naturalist program, nature and historical /archaeological displays, film and slide shows, and a special school program),
- Interpretive displays, geological and historical markers, and informational and

- interpretive brochures. Place interpretive displays at major use sites, such as trail heads, landings, and auto trail pull-offs,
- A nature trail at the Mazomanie Unit and the Avoca Prairie, and self-guiding hiking, auto, and horse trails at locations to be determined,
 - Information promoting the Riverway user's appreciation of local history, traditions, culture, values and the extensive contributions to the Lower Wisconsin River Valley, and
 - As may be appropriate, the Department will bring to the attention of Riverway users, by placing signs at intensive use areas and other means, information related to emergency health care facilities, commercial services, recreation facilities and cultural activities available in the local area. Any signing will be in conformance with the Department's statewide standards.

Observation towers and lookouts are to be provided at key locations to help the visitor view and interpret the river valley and its forests, fields, wetlands, prairies, and wildlife. These observation points generally will be pedestrian access only, with parking located at a nearby convenient site. Each observation site will be designed to blend into the landscape and not detract from the area's scenic quality.

The management, environmental impact and safety awareness components of the education program include:

- Information concerning safety hazards (such as strong river currents and snags, sandbar drop-offs, thunderstorms, and poison ivy) with emphasis on the proper ways to deal with the hazards,
- Information concerning environmental impacts of activities like burying trash, littering, indiscriminate tree cutting, and improper human waste disposal, with emphasis on teaching/stressing "low impact recreation" techniques,
- Information to improve visitor's social awareness (focus on making each person aware of the needs and rights of other visitors and landowners), and
- Information explaining Riverway resource management activities, such as in the following:
 - Special resource management segment of the auto-tour trail
 - Designated resource study areas
 - Habitat demonstration areas
 - Guided group tours of resource management areas
 - Public participation in resource management programs
 - Special resource management maps, brochures and signing

RECREATIONAL MANAGEMENT REGULATIONS AND PROGRAMS

Achieving the State Riverway goals rests as much with successful management of river area's visitors as it does with providing ample facilities or managing the forest and wildlife. The Department will conduct regular recreational use studies and user counts to

guide future management decisions for the maintenance of the segmentation objectives.

The Department has authority to control use on state-owned lands (NR 45, Wis. Admin. Code) and to regulate the placement of structures on the bed of the river under the provisions of Chapter 30, Wis. Stats.. The Department will use these authorities to manage access to the river consistent with the recreational use levels recommended in this plan. However, the authority over the recreational use of navigable waters and their shores (including access from non state-owned landings or lands), has been delegated by the legislature to the counties, townships, cities, and villages, not the Department.

Successful management of recreation, particularly river use, will also depend upon a strong partnership between the Department and local governments. In managing recreational growth and activities on the river, the Department intends to work in partnership with local governments to accomplish the following:

- Limit the number and capacity of public and commercial river access points, and
- Monitor water skiing and restrict it if a severe hazard or conflict occurs.

In addition, the Department will seek legislation to:

- Establish litter control regulations for all river users, such as "carry-out" and "no glass" programs; [Enacted: NR 30.47]
- Restrict noise levels of airboats and hovercraft on the river; and
- Restrict piers and boat shelters. [Enacted: NR 30.445 and 30.45(10)]

The Department will also:

- Promote weekday use to relieve some of the heavier weekend use pressure.
- Enforce a "carry out" litter policy on all state-owned lands, except where trash collection facilities are provided such as at river access points and waysides. Liveries and other commercial enterprises will be encouraged to educate their clientele on the "carry out" program.
- Prohibit the use of all ATV's and motorized trail bikes on state-owned lands within the State Riverway.
- Recommend to the Town of Prairie du Sac (Sauk County) that they close the town road leading to Ferry Bluff about 1/2 mile back from the river. Reduced public access (i.e. use) would ease the severe erosion and vandalism problem on Ferry Bluff and will help reduce disturbance of the eagle roosting sites. An alternative for the erosion problem is to install site protective measures such as hardened walkways, barrier fencing and signing.
- Provide additional personnel and equipment to patrol the river and other heavily used recreation areas to provide assistance as well as enforce regulations.
- Heighten boating safety awareness and enforcement concerning the use of innertubes and other small, non-powered inflatable craft on the river.

ADMINISTRATION AND OPERATIONS

LWSR STAFFING

Administrative Staff: A Riverway superintendent will be responsible for overall management of the project. An assistant superintendent will be assigned to oversee day to day land and facility management activities.

Enforcement Personnel: Additional staff will be required as the potential increased enforcement workload is substantial. Aside from increased patrol for boating, hunting, fishing, and other law enforcement, enforcement staff must also perform an important rescue and information/education function. Under full operation two additional full time conservation warden stations will be assigned to the Riverway. In times of heavy workload additional limited term (LTE) special conservation wardens will be hired.

To meet current enforcement needs, two full-time conservation warden stations will initially be assigned to the Riverway to augment the present (.75 employee equivalent) conservation warden enforcement effort expended in the river corridor. Additional enforcement staff will be requested as necessary. Under full operation of the Riverway, two additional conservation warden stations are projected.

Resource Management Staff: Resource specialists will be assigned to the property staff as the need occurs. Under full operation of the project the resource management personnel assigned to the Riverway may include a fisheries manager and technician, a forestry technician, and wildlife technician. Some resource management functions will be done by the Dodgeville or Madison Area's technical staff and not be permanently assigned to the Riverway.

Recreation Management and Information Education Staff: Recreation management duties and the extensive information/education component of the project will be the primary responsibility of a full time park ranger, a seasonal park ranger and a full time naturalist. For additional assistance, limited term employees (LTE's) will be hired as necessary.

Maintenance Staff: The DNR will develop a regular maintenance program for the intensively used buildings and grounds that will include such things as day to day trash collection and toilet building cleanup. Roads, parking lots, day use areas, campgrounds and trails will all be included in a regular maintenance program. Some work will be handled by Department employees with other responsibilities contracted out. Department staff needs under full project operation are estimated to be two full time land/facility management technicians and several LTE assistants.

Real Estate Management Staff: Long-term real estate services will be the primary responsibility of the Department's Dodgeville Area. During the initial period of land

acquisition when real estate management activity is expected to be high, two additional real estate agents will be assigned to the Riverway on a temporary basis; a four-year project position and a one-year project position.

Administration and Service Facilities: A Riverway Headquarters building will be built in conjunction with the nature center at Tower Hill State Park. A primary maintenance facility will also be built there. Supporting maintenance and administrative facilities will be located at the Wilson Nursery (near Boscobel).

FUNDING SOURCES

Funding for the Lower Wisconsin State Riverway will come from a variety of sources, and some may require legislation:

- Federal Pittman-Robertson funds for wildlife lands and Dingell-Johnson funds for fishing and boating facilities may continue to be available,
- Forest Mill Tax monies may be available for general forest development and operation needs,
- Federal Land and Water Conservation Funds (LAWCON) for acquisition and development may also be available,
- General operation funds for fish, forestry, wildlife, and parks,
- Sharecrop control monies for maintenance, operation, and development,
- Parking lot fees, donation box, concessions, camping, and
- Timber sales.

User Fees: Initially fees will not be charged for access or use of Department-owned Riverway lands or facilities. Any future fee charges for the Riverway would be consistent with statewide fee policies that may be developed for these and similar classes of properties. Local governments will continue to have the authority to charge a reasonable access fee at their boat landings.

To further help finance the program, the Department will consider installing volunteer donation boxes at key locations. Also under consideration will be the establishment of a “friends group” which would operate any concessions with profits being returned to the Riverway project.

CHAPTER THREE

BACKGROUND INFORMATION

This material in this chapter was taken from the 1988 Environmental Impact Statement (ref. # 18). It has been edited to provide a general overview of the Riverway's resources and use. Some highly detailed data and out of data information was not included here. Please refer to the EIS to see the original background chapter in its entirety.

LAND OWNERSHIP

In 1944, the Department began purchasing wildlife area lands along the Lower Wisconsin River for public hunting, habitat management and general recreational use. Prior to establishment of the Lower Wisconsin State Riverway by the legislature in 1989, there were nine separate wildlife areas, totaling about 22,500 acres of ownership along the river corridor. These properties were re-designated as Riverway lands, forming the core of the new project. The current (2010) Riverway project boundary has been increased to 94,780 acres, of which about 52,500 acres of land have been purchased. An additional 4,600 acres of scenic easements and approximately 8,000 acres of hunting and fishing access easements have also been acquired.

TOPOGOGRAPHY, GEOLOGY, AND SOILS

GLACIAL HISTORY

Thick layers of sandstone, limestone, and dolomite, deposited 600 to 430 million years ago during Cambrian and Ordovician times, originally covered all of the Lower Wisconsin River region. Through time, forces of erosion cut a deep, V-shaped gorge down through the layers. This gorge was the start of the Lower Wisconsin River Valley. Four miles wide at Sauk City, the gorge narrows down to two miles at Muscoda and only about a mile near Wauzeka. The funnel shape of the gorge can be explained by the differences in the uppermost layers of rock found on the bluffs as one proceeds from east to west. Relatively soft Cambrian sandstones dominate the valley walls at the east end of the valley while harder Ordovician age dolomites dominate the bluffs toward the west end. The river was able to carve a wider gorge in the softer rock.

Beginning about one million years ago, glaciers in the northern and eastern parts of the state leveled hills and valleys, and covered the bedrock surface with a great amount of rock debris (called drift or glacial till) of varying composition and thickness. However, the south-western portion of Wisconsin, including the Lower Wisconsin River Valley,

was not covered by glaciers. This "driftless" landscape is unique in the state. The prominent hillsides of the river valley were not smoothed off by glacial ice, nor was the valley filled in with drift.

The Lower Wisconsin River Valley (gorge) was not totally unaffected by the glaciers. When the glaciers finally receded 10,000 years ago, melt water from glaciers to the north found its way into the Wisconsin River. This river of melt water carried glacial sand and gravel (glacial outwash) south and deposited it up to 150 feet deep in the river valley. The river later cut down through this deposit of glacial outwash to form a series of terraces that tend to run parallel to the river. Although the valley floor is fairly flat, the elevation rises slightly with each of the terraces. The ancient sides of the gorge not covered by glacial outwash deposits can still be seen. They are the steep hillsides (bluffs) with bedrock outcrops that rise abruptly 300 to 400 feet above the valley floor.

In contrast to glaciated areas of the state, naturally occurring lakes are few in number in the driftless region. Thousands of years of uninterrupted erosion formed a drainage pattern that allows water to rapidly run off the steep hillsides.

SOILS

Soils of the Lower Wisconsin River Valley can generally be grouped into categories that closely relate to their position in the landscape; ridge-tops; valley walls; terraces; and floodplains. Each are discussed in more detail below. Additional information about soils in the Lower Wisconsin Valley is available in the soils surveys for each county (Ref. #7 thru 12). They are available at the county Soil Conservation Service office and at local libraries.

As their name implies, soils of the floodplain are wet or subject to flooding. These bottomland soils have very gentle slopes that mainly range from 0 to 2%. Most areas are mucky or peaty on the surface, underlain by sand and silts deposited by the river at various depths. These characteristics severely limit their use for building sites, on-site sewage disposal systems, and agriculture. However, the better drained bottomland soils can be utilized for nature trails when they aren't flooded. Approximately 60% of the soils in the Riverway acquisition area are located in the floodplain.

Within the project area, the soils of the stream terraces generally have the most potential for providing sites for homes or recreational facilities, including on-site sewage disposal. They are also well suited for wildlife habitat and woodland production. Formed on sandy glacial outwash, their droughty nature makes them susceptible to wind erosion. While generally suitable for recreational use, care must be taken to control erosion if these soils are used for trails. With gentle to moderate slopes (generally from 2 to 15% although some areas are as steep as 30%) they can be used for agricultural purposes. However, in many areas intensive (and expensive) land management tools such as irrigation, herbicides, and fertilizer are needed to produce acceptable crop yields. Soils of the stream terraces comprise about 15% of the acquisition area.

By their nature, soils of the valley walls are definitely limited in their capacity to provide sites for agriculture, building sites, on-site sewage disposal systems, and recreational use and development; they are too thin and steep. Slopes mainly range between 20 and 30%, although some areas have slopes ranging up to 60%. Bedrock is often exposed. Despite these limitations for human use, these soils are important because they support habitat for rare or important plants and animals. The more gently sloping cove and foot-slope areas of the valley walls could be used for scenic paths and trails if these are constructed on the contour with care taken to control erosion. The steeper areas are unsuitable for most recreational trail uses unless they receive intensive erosion control and site modification (such as cutting into the hillside to widen the path area). Soils of the valley walls make up about 21% of the acquisition area.

Soils of the upland ridge-tops formed in windblown silt that covers the uppermost layers of bedrock on the bluffs overlooking the Wisconsin River Valley. Within the project boundary, most of these soils have slopes ranging from 10 to 20%, although there are a few areas with slopes less than 10% or greater than 20%. The more gently sloping ridge-top soils tend to have good moisture holding capacity, are relatively fertile, and under proper management, suffer no more than a moderate amount of erosion when crops are grown on them. Crops are sometimes grown on the more steeply sloping ridge-top soils, but they require careful management to protect them from erosion. Many of these steeper soils have already lost over half of their topsoil to erosion.

If they are protected from erosion, gently sloping (less than 10% slope) soils of the upland ridge-tops have generally good potential for recreational use such as camping, picnicking, and trails. Intensive erosion control is needed on the steeply sloping soils (10 to 20% slope) of the upland ridge-tops if they are to be used for recreational trails. However, they could withstand light recreational use such as occasional picnicking and hiking if care is taken to maintain the vegetative cover. Soils of the upland ridge-tops make up 4% of the acquisition area.

THE RIVER AND OTHER WATER RESOURCES

THE WATERSHED

Wees-Kon-San, the Chippewa Indian name for "the gathering of waters", amply describes the Wisconsin River as it flows 430 miles through the state. Flowing southerly from its headwaters on the Michigan-Wisconsin State line in Vilas County, the entire Wisconsin River drains a watershed covering 12,280 square miles, or 7,859,200 acres.

Much has changed since the time the Chippewa Indians were the main inhabitants of the region. Water levels of the Wisconsin River are now greatly influenced by the extensive system of 21 storage reservoirs (most are off the main stem of the river) and 26 hydro dams on the 338 miles of river that lay upstream of the dam at Prairie du Sac. These impoundments, particularly the reservoirs on the northern end of the river, serve to temper the river's flow by slowly releasing stored water in low-flow periods and holding

back water in high-water periods.

However, while the upper river system of impoundments has a tremendous ability to manage the river in the north, its effect decreases downstream. There are no storage reservoirs below the Big Eau Pleine Reservoir near Mosinee (about 164 miles upstream of Prairie du Sac). The long-term storage capacity of the downstream power dam reservoirs, such as at Prairie du Sac, the Kilbourn Dam at Wisconsin Dells and even on the large Petenwell and Castle Rock flowages, is quite limited, especially during the summer and fall.

The Prairie du Sac dam is operated as a "run of the river" facility (i.e. water is passed through the dam at approximately the same rate as the river flows into the reservoir above the dam). The Prairie du Sac Dam is owned and operated by Wisconsin Power and Light Co., primarily to produce hydroelectric power. The power company is required to maintain a fairly constant level in Lake Wisconsin (usually + or - 3 inches) to maintain the water level necessary for the Merrimac Ferry to operate.

The power dams are owned by private industry and public utilities, and the storage reservoirs are owned and operated by the Wisconsin Valley Improvement Corporation (WVIC). These dams and reservoirs (except for the Kilbourn and Prairie du Sac dams) are licensed by the Federal Energy Regulatory Commission (FERC). All of the dams and reservoirs are regulated by the Department. FERC authority over operations for the FERC licensed dams parallel the Department's authority in the areas of dam safety, fish and wildlife concerns, and setting minimum flows to be passed under low-flow conditions.

With virtually no water storage capacity at the Kilborn and the Prairie du Sac dams, there are essentially 4,100 square miles of uncontrolled drainage area in the Wisconsin River watershed below the Castle Rock Flowage. The capacity of the entire water management system is insufficient to control flooding when the storage reservoirs are full, usually late spring and late fall. This area is one third of the total Wisconsin River watershed area. This large, uncontrolled drainage area means that flows in the lower river can change dramatically in response to southern Wisconsin regional weather conditions.

The sometimes rapid fluctuation of water levels in the river (not including flooding or seasonal low flows) is perceived as the most critical flow-related problem affecting the fish spawning and recreational use. Recreationists camping and sunbathing on sandbars are sensitive to even minor changes in water levels. Just a few inches increase in water depth can often cover a sandbar.

THE LOWER RIVER

The lower reaches of the Wisconsin River are a broad, braided stream, approaching 1,500 feet in width in places, with many islands and sandbars. The river slowly descends at a rate of 1.5 feet per mile on its way toward the Mississippi River. The current is only one

to two miles per hour (measured at Muscoda), and there are no falls or rapids below the dam at Prairie du Sac. At seasonal low flows, the river is scarcely deep enough in some places for canoes, but at flood stage it spreads over a floodplain in places that are several miles in width.

The meandering characteristics of the river have allowed several shallow, "oxbow" lakes to form in backwater areas. Some are cut-off from the river with their water levels being primarily supported by the water table. Many of these backwater bodies are quite shallow and have a very limited flow through them during non-flood periods. In many, the original depth between the sand on the bottom and the water surface was 10 feet. However, now less than four feet of maximum water depth is typical, as most of their basins are filled with loose sediment. These shallower lakes closely resemble bog lakes with dense aquatic vegetation and sedge mats, and are often oxygen deficient.

VEGETATION AND NATURAL COMMUNITIES

The Lower Wisconsin River Valley is an important ecological corridor providing a wide diversity of vegetation and therefore habitat types, including timbered islands, extensive marshland, wet meadows, winding channels, land-locked oxbows, wooded bluffs, and remnant prairies. Consequently, a wide range of plants, mammals, birds, fish, reptiles, and amphibians can be found in the area.

Some habitat types found sporadically in other parts of the state are within the valley, including: wet prairie; jack pine and barren communities; large old growth lowland hardwood tracts; and marsh-shrub swamp communities. Without these limited habitat areas, a number of non-game wildlife species would no doubt be in danger of being substantially reduced in numbers in Wisconsin. Each habitat type (as existed in 1988) is described below.

Bottomland Hardwoods

Also known as floodplain forest or southern wet and wet-mesic forest, this is the dominant forest type (over 27,000 acres) in the Lower Wisconsin State Riverway boundary. Seasonally flooded and typically growing on river-deposited, poorly drained soils, this forest type contains more species of trees than any other type in Wisconsin. It is dominated by silver maple, river birch, swamp white oak, American elm, green and black ashes, cottonwood, and black willow. Of interest is the presence of sycamore. Although a common tree south of Wisconsin, sycamore is a rare species of special concern in the state. A small population exists near Arena in Iowa County and near Gotham in Richland County.

Unique to the floodplain forests are the diversity and abundance of lianas, or climbing vines, some of which can reach the top of the canopy and give the forest a subtropical atmosphere. Among these are moonseed, riverbank grape, woodbine, bittersweet and poison ivy.

While not an especially comfortable community to explore due to hordes of mosquitoes and often dense patches of wood nettle, stinging nettle and poison ivy, floodplain forests harbor many showy and photogenic plants such as cardinal flower, burning bush and green dragon. Edible plants, including wild yam, elderberry, morels and oyster mushroom, are also common in this forest type and give it special recreational values. In pre-settlement times, 1.2% (420,000 acres) of Wisconsin was covered by wet and wet-mesic forest (Ref. #5). Only a fraction remains today, much of it in the Lower Wisconsin River Valley.

Although lumbering and general forest management activities continue in sporadic areas of floodplain forest within the project boundary, several large and essentially undisturbed bottomland tracts remain in the corridor. Some of these areas (Tower Hill Bottoms at Tower Hill State Park and Wyalusing Walnut and Hardwood Forests in Wyalusing State Park) are preserved as State Natural Areas. Several other bottomland tracts within the Lower Wisconsin River boundary have been identified by the Bureau of Endangered Resources as having state-wide significance and worthy of preservation. These include Wauzeka Bottoms and Newton Island at the confluence of the Kickapoo and Wisconsin Rivers near Wauzeka, Mazomanie Bottoms near Mazomanie, Weniger Island just south of Bridgeport, and Richwood Bottoms northeast of Boscobel. These are among the last large tracts of mature floodplain forest left in the state and are important habitat for a diversity of native plants and animals, some of which require large, unfragmented forests to thrive. Among the rare animals that are dependent on the large floodplain forests along the Lower Wisconsin are cerulean and Kentucky warblers (both species of special concern in the state) and the state-threatened red-shouldered hawk. These bottomland tracts also offer potential rookery sites for the state-threatened great egret and the great blue heron, a species of special concern.

Lowland Grass and Brush

Several plant community types in the Lower Wisconsin River Valley are restricted to low-lying, usually wet, areas of the floodplain. The wettest sites along the river, including backwaters, sloughs and oxbow lakes which have standing water the year-round, contain familiar marsh plants such as cattail, bulrushes, arrowhead and sedges. There are about 15,000 acres of lowland grass and brush community types within the Riverway.

Some of these sites contain wet and wet-mesic prairies which are dominated by grasses (such as bluejoint, cordgrass and big bluestem) and put on a spectacular show of prairie flowers throughout the growing season. Although wet and wet-mesic prairies once covered about 525,000 acres (1.5%) of Wisconsin (Ref. #5), only a couple thousand acres remain today, most having been lost to conversion to agricultural lands. The Avoca Prairie State Natural Area, the largest low prairie remaining in the state, is located on a river terrace just east of Avoca in Iowa County and is an excellent area for prairie nature study and photography.

Wetter areas, dominated by grass-like sedges and where water is at or near the surface year-round, are classified as southern sedge meadows. They once covered approximately

1,000,000 acres of southern Wisconsin (Ref. #5), but most of the remaining acres have been ditched in an attempt to drain them for cultivation.

Because they are a combination of terrestrial and aquatic ecosystems, these meadows, like the wet and wet-mesic prairies, are important refuges for a great diversity of plants, mammals, birds and other animals. Among the many birds that rely on the open wetlands along the river are several that are of special concern in the state; upland sandpipers, bobolinks, Henslow's sparrows and, in the large marshes, yellow-headed blackbirds. The sandhill crane is also a regular visitor to the marshes and meadows along the river.

Historically, periodic wildfires kept woody vegetation out of the prairies and sedge meadows. With the fire prevention efforts which have prevailed since settlement, many open lowland areas along the river have been invaded by a dense growth of dogwoods, willows and other shrubs. Such a community is termed a shrub-carr.

Agricultural and Abandoned Fields

Within the project area, approximately 4,000 acres of the flat sandy land of the valley floor and stream terraces and about 5,700 acres of the upland ridge-tops and hillsides are or have recently been used for agriculture. Hay, corn, and oats are typical crops. Only about 1,200 acres are found on soils considered Class 1 or Class 2 farmland (that is, farmland needing little or no modification for agricultural use). Most of the fields found on soils of the valley walls and upland ridge-tops have slopes greater than 12%, and are subject to erosion. The fields found on soils of the terraces that are not Class 1 or Class 2 farmland are droughty and have low fertility. There are no irrigated lands within the project although a number of nearby farms do irrigate vegetable crops such as melons and beans growing on similar terrace soils.

Sand Blows and Barrens

Sand Blows: Whether exposed by wind action or deposited by the river, open sand supports a peculiar group of plant community types. Some of these areas are the result of past attempts at farming the marginal, sandy terrace lands. When the prairie sod which originally existed on the sandy terraces was broken by the plow, the underlying loose sands were free to blow with the wind. Wind-scoured areas where sand is continually being moved are known as "blow-outs" or "sand blows". Many of these areas have since been planted to pines, which effectively stabilize the soil.

Sand Barrens: The sand barrens along the Lower Wisconsin River are Wisconsin's closest approach to a desert, complete with lizards and prickly pear cacti. Although often dominated by sandy prairie species such as little bluestem and Junegrass, several other interesting plants are confined to these sandy soils. They include false heather, an evergreen shrub, sand croton, a succulent, and three special concern species; fameflower, buttonweed, and clustered poppy mallow.

Pine Barrens: Small areas of pine barrens, more typical of central and northwestern Wisconsin, exist along the sandy terraces primarily between Muscoda and Boscobel. These barrens are composed of scattered to rather dense (due to lack of fire) stands of

jack pine interspersed with openings of sand prairie.

Oak Barrens: Closely related to the pine barrens, but differing in having black or Hill's oaks as the dominant tree species, are the oak barrens. Oak barrens originally covered about 5% (1.8 million acres) of pre-settlement Wisconsin (Ref. #5). Only remnants remain today, many along the Lower Wisconsin River.

Two rare animal species inhabiting the barrens communities are the lark sparrow, a species of special concern which in Wisconsin occurs regularly only in sand barrens, and the state-endangered ornate box turtle. Several rare butterflies and a rare species of tiger beetle also inhabit the barrens. All of the above barren types are susceptible to wind erosion, and are easily damaged by ATV's and recreational uses such as camping. These incompatible uses threaten the barren's value as habitat for rare species. If these areas are used for nature study, it is desirable to control the visitor's movements through the barrens, so as to avoid trampling sensitive species.

The number of good barrens left in the Lower Wisconsin River Valley has decreased due to clearing and conversion to irrigated agricultural land and pine plantations. Ironically, wildfire prevention has also contributed to the decline of pine and oak barrens. Without the wildfires needed to maintain an open barrens community, many of these areas have changed to oak or jack pine forest through natural succession.

Upland Grass and Brush

About 6,000 acres of this vegetation type are found in the Riverway, mainly on soils of the upland ridge-tops and valley walls (hillsides). The vast majority of these acres are in pasture or are former prairies invaded by shrubs. Among the native plant communities included in this classification are the upland -- dry and dry-mesic (medium moisture) -- prairies which exist now as mere remnants of their former widespread acreages.

Dry-mesic Prairies: These prairies once covered 630,000 acres of southern Wisconsin (Ref. #5). Due to the desirability of these productive grasslands for agriculture, most have been cultivated or used as pasture. In the Lower Wisconsin River corridor, relict prairies exist as thin strips along level, sandy railroad rights-of-way and as small, isolated patches on moderate slopes of south and west-facing hillsides. They are dominated by native grasses such as big bluestem, little bluestem, prairie dropseed, and needlegrass.

Dry Prairies: Dry prairies along the Lower Wisconsin River are confined to the bluff tops and the steepest, driest, south and southwest facing hillsides overlooking the river. They are dominated by little bluestem and side-oats gramma grass and contain such typical dry prairie species as pasque flower, purple prairie clover and silky aster. Two rare species, the state-threatened round-stemmed false foxglove and pomme-de-prairie, a species of special concern, have been found in dry prairies along the river.

Although there were once an estimated 105,000 acres of dry prairie in Wisconsin (Ref. #5), only a few, isolated high quality remnants survive. Because these so-called "goat prairies" (named apparently because only sure-footed goats could walk on them) were too

steep for cultivation or pasture, they largely escaped direct human degradation. Ironically, their loss came largely as a result of post-settlement wildfire suppression which allowed woody species -- trees and shrubs -- to invade the grasslands and shade out the low-growing prairie vegetation.

Most dry prairies on the bluffs overlooking the Lower Wisconsin River appear as small openings surrounded by dry forests or shrub thickets. Without proper management such as brushing and prescribed burning, these remaining prairie openings will soon close in and the unique and rare species they contain will be lost.

Upland Hardwoods

Found primarily on hillsides and ridge-tops, upland hardwoods within the river corridor include the southern mesic (moist), dry-mesic (medium moist) and dry forest types. Mesic forests, found generally on moister, north and east-facing slopes, are dominated by sugar maple, basswood, red oak and white ash. On slightly drier sites and on south and west-facing slopes, dry-mesic forest of white and red oaks, with ironwood and basswood, predominates. The most xeric (dry) sites, like ridgetops, have dry forest of black and white oaks, shagbark hickory and black cherry. Several other tree species such as black walnut, hackberry, burr oak and red maple, are also found in the upland forests. Upland hardwoods cover about 18,000 acres of the project area.

Several rare plant species inhabit the upland forests along the river. They include the yellow giant hyssop, a state-threatened species of oak woods and wood edges; the great Indian plantain, a species of special concern found most often in rich mesic woods; and violet bush clover, another species of special concern inhabiting dry, open woods. Among rare animals that require large tracts of upland hardwoods is the acadian flycatcher, a species of special concern that has been seen in mesic woods along the river.

Shaded and Exposed Cliff Habitats

Shaded and exposed cliff habitats, each with a fairly distinct flora are also included in the broad vegetation type of upland brush and grass. In general, the bulk of the plants on any given cliff are closely related to the vegetation type surrounding the cliff (Ref. #5). However, several rare plant species are restricted to these cliffs of sandstone and limestone and are rarely found away from them. The shaded cliffs along the Lower Wisconsin River harbor three species of special concern in the state; kidney-leaved sullivantia (a member of the saxifrage family); cliff cudweed; and jewelled shooting star which, in early spring, colors the cliffs pink at Wyalusing State Park.

Some of the rare species restricted to the dry, sunny cliffs and ledges along the river are narrow-leaved dayflower and lance-leaved buckthorn, a shrub. Exposed sandstone cliffs also support populations of cliff goldenrod, a species endemic to the Driftless Area. All three of these are species of special concern in Wisconsin.

WILDLIFE

Mammals

Forty-seven species of mammals have been reported in the six counties along the Lower Wisconsin River. Important game species include cottontail rabbits, grey and fox squirrels, raccoons, and white-tail deer. Mink, muskrats, and beavers are abundant in the floodplain and trapping of these furbearers furnishes recreation for local residents as well as a supplement to their income. The river otter is also common in the Lower Wisconsin River Valley.

Of the forty-seven species of mammals known or thought to now inhabit the Lower Wisconsin River Valley, none are classified as endangered or threatened. One, the white-tailed jackrabbit, is classified as a species of special concern.

Birds

The Lower Wisconsin valley is an excellent area to observe birds. A checklist of 284 species (DNR files) has been compiled for the corridor. About 100 of these species are known to regularly breed in the area. The remainder, such as common loon, peregrine falcon and chestnut-sided warbler, are migrants, passing through or pausing briefly in the corridor on their biannual flights.

Upland Game Birds

This group includes ruffed grouse, bobwhite quail, ring-necked pheasant, gray partridge, woodcock, and wild turkey. The bobwhite, formerly an abundant resident in southern and central parts of Wisconsin, has declined in numbers. Decline has been directly correlated with the reduction of shrubby hedgerow cover along fields, woodlands, streams and roadsides. At the present, there are scattered populations in five counties bordering the Lower Wisconsin River.

Historically, wild turkeys were abundant in the region but declined soon after European settlement. Recent efforts to reestablish this big game bird have been very successful. Turkeys are rapidly expanding their range from stocked areas and they are now abundant in many parts of the river valley. Ring-necked pheasants are regularly stocked on selected state hunting grounds along the river because of the high demand for this game bird. Although suitable winter cover is found along the Lower Wisconsin River, natural reproduction of pheasants is very limited.

Woodpeckers

The forested bottomlands of the Lower Wisconsin River provide excellent habitat for woodpeckers and seven species nest in the area. The largest and most secretive is the crow-sized pileated woodpecker.

Warblers

More than 35 species of warblers have been observed in the river corridor. Nearly a dozen species, including prothonotary, yellow and cerulean warblers, remain in the valley to breed. The Kentucky warbler, a species of special concern, is present here at the northern edge of its breeding range.

Birds-of-Prey

Several species of birds-of-prey (raptors) may be seen along the river, including the state-endangered osprey, a fish-eating raptor which is a migrant through the area. Osprey have been sighted in the Lower Wisconsin River Valley during the breeding season, but no nests have been found. The federally-threatened, state-endangered bald eagle feeds and roosts along ice-free stretches of the river during the late fall, winter, and early spring. Often, several eagles can be observed fishing and roosting along the river below the Prairie du Sac dam. Adult bald eagles have been seen the past few summers and nesting could occur along the LWR. Peregrine falcons once nested in the Lower Wisconsin River Valley. Efforts were begun in May, 1987 to reintroduce this species.

Raptors which use the large tracts of mature floodplain forest include the barred owl and the state-threatened red-shouldered hawk. Habitat destruction, particularly logging of extensive, old-growth bottomland tracts is the main threat to these species. The threatened Cooper's hawk is also known to live in the area. It inhabits woodlands with frequent openings and wooded brushlands near farms. It has suffered a general decline across its range as a result of pesticide poisoning and habitat loss from intensive farming.

Waterfowl

Twenty-three species of waterfowl may be seen migrating through the area, and seven species nest within the 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 reproduction is excellent. Ground nesting species, such as mallards and blue-winged teal, nest in the area but predators and occasional flooding limits their success.

Wading Birds

Great blue herons are frequently sighted along the Lower Wisconsin River. Similarly, the state-threatened great egret is seen occasionally, but is not known to nest in the Lower Wisconsin River Valley.

Reptiles and Amphibians

The many habitat types of the Lower Wisconsin River corridor support a diverse population of reptiles and amphibians. These two classes of animals are represented by four species of salamanders, eleven frogs and toads, thirteen snakes, eleven turtles, and two lizards.

Among the rare anurans (frogs and toads) present in the corridor is the bullfrog, a species of special concern. The bullfrog, the largest frog in Wisconsin, is most often heard

singing from the wooded sloughs and backwaters along the river. The numbers of this slowly-maturing species has declined in recent years.

Several rare turtle species, including the state-endangered ornate box turtle, the threatened Blanding's turtle, and the threatened wood turtle are found in the Lower Wisconsin River corridor. Reasons for their decline are reported to be habitat destruction for agriculture and tree plantations and over collection for the pet trade (now prohibited).

Of the 13 species of snakes known to occur in the project area, three are of special concern in Wisconsin due to low or declining numbers. They are the black rat snake, the timber rattlesnake and the prairie ringneck snake. Prior to the 1880's, the Massasauga rattlesnake was fairly widespread across southern Wisconsin. However, drainage of its wetland habitat and a former bounty on rattlesnakes have caused this species to decline, and eventually become endangered in the state. This species was last recorded in the river area in 1959, but it is not certain whether it is still present.

Fish

The Lower Wisconsin River Fishery varies greatly in fish habitat and fishing activity along its 92.3 mile length. The river appears to support two distinct fisheries; one being the flowing channels, and the other the sloughs, bayous, and floodplain lakes. These two fisheries primarily interact during periods of high water; at other times the backwaters are cut off, or nearly cut off from the main river channel.

Because it is connected to the Mississippi River, southern and western species of fish are able to move through the Mississippi drainage basin to the Lower Wisconsin River. Thus, the large number of fish species found in the Lower Wisconsin River is not surprising. The most extensive recent collecting was done in the early 1960's by Professor George C. Becker of the University of Wisconsin-Stevens Point, and in the 1970's by the Department of Natural Resources. These studies revealed 84 species representing 20 families of fish from the Lower Wisconsin River.

The Lower Wisconsin River has a balanced warm water fish and aquatic life community. The main channel supports significant numbers of walleye, sauger, channel catfish, flathead catfish, smallmouth bass, rock bass, and bluegills, along with lesser but still important numbers of freshwater drum, lake sturgeon and shovelnose sturgeon. Also found here are significant numbers of carp, smallmouth buffalo fish, redhorse, various carpsuckers, white sucker, longnose gar, mooneye, and a variety of minnows.

The 3.5 mile stretch of the river immediately downstream of the dam at Prairie du Sac is heavily influenced by the dam, and is not typical of the rest of the river. The fish population in this stretch below the dam also includes significant numbers of white bass and chestnut lamprey.

There are a number of open water lakes in the Lower Wisconsin River bottoms whose water levels are supported by the water table. These lakes historically had good fisheries for largemouth bass, northern pike, bluegill and crappie. Many of these backwater bodies

are quite shallow and have a very limited flow through them during non-flood periods. In many, the original depth between the sand on the bottom and the water surface was 10 feet. However, less than four feet of maximum water depth now occurs in many of them as most of their basins are filled with loose sediment. These shallower lakes closely resemble bog lakes. Rooted aquatic vegetation and sedge mats have choked off some areas and are threatening other areas of open water available to fish. They become oxygen deficient during much of the year, particularly in the winter. The fishery of the larger backwater sloughs, bayous, and lakes of the Lower Wisconsin River Valley is comprised of a mixture of fish which one would expect to find in most any southern Wisconsin eutrophic (nutrient rich) lake, including significant numbers of bullhead, bluegill, largemouth bass, northern pike, and crappie. Also, the larger, deeper backwaters that are permanently connected to the river often contain channel catfish, walleye and sauger. Other fish found in these backwaters and ponds in significant numbers are bowfin, carp and various quillbacks and buffalo fish. The fishery in the oxygen deficient, shallow backwater lakes is limited to a population of stunted black bullheads or no fish at all.

The Lower Wisconsin River harbors no fewer than 13 species of fish identified by the Bureau of Endangered Resources as being endangered, threatened or of special concern in the state. Some species are rare because they are at the edge of their range. The exact cause of the decline of the other rare fish species in Wisconsin is unknown for the most part. A number of factors related to water quality and habitat are believed to play a role.

Mussels and other Aquatic Invertebrates

With 34 species having such exotic names as pink heel splitter and lilliput the Lower Wisconsin River has one of the most diverse mussel faunas in the state along with the St. Croix and Mississippi Rivers. Six of Wisconsin's rare mussel species have their stronghold in the Lower Wisconsin River and the federally and state threatened Higgins' eye pearly mussel has been found at several sites. Although commercial mussel harvesting is not allowed in the Lower Wisconsin River, fishermen do use the soft-parts for bait.

In general, the gravel bars formed below bluffs and cliffs directly adjacent to the river are the only areas on the Lower Wisconsin with any mussel diversity to speak of. In terms of relative area this amounts to around 13% of the river's shore line.

Among the myriad of other invertebrate species that inhabit the Lower Wisconsin River is the Pecatonica River Mayfly. The presence of this species in the river is noteworthy because it, until recently, has not been collected in the Midwest since 1927 and is listed as extinct by the U. S. Fish and Wildlife Service. Last year, DNR Bureau of Research personnel discovered two nymphs (the immature stage) of this mayfly in the river near Woodman in Grant County.

ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES

Definitions:

Endangered species: "Endangered species" means any species whose continued existence as a viable component of the state's wild animals or wild plants is determined by the Department to be in jeopardy on the basis of scientific evidence.

Threatened species: "Threatened species" means any species of wild animals or wild plants which appears likely, within the foreseeable future, on the basis of scientific evidence to become endangered.

Special concern species: "Special concern species" means species which appear to have undergone serious decline in Wisconsin, or are sufficiently uncommon such that any further reductions will cause them to become threatened in the foreseeable future. These species are not protected by the Wisconsin Endangered Species law.

As indicated in the previous sections and shown on the table below, the Riverway is rich in rare plant and animal species. The specific species present have been documented by the Bureau of Endangered Resources in an unpublished 1987 report (# 18). The table below gives a summary of the number of species recorded in each category.

Rare Species of the LWSR (1986)

	Endangered	Special Concern	Threatened
Plants	1	13	4
Birds	1	8	2
Fish	3	6	2
Mussels	1	9	0
Aquatic insects	0	1	0
Amphibians	1	1	1
Reptiles	2	3	3

ARCHAEOLOGICAL AND HISTORICAL RESOURCES

In 1984, the Department of Natural Resources commissioned Robert Fay, Archeology consultant, to compile an inventory of the known cultural resources of the Lower Wisconsin River area (Ref. #6). His literature search and review of records identified 385 historic sites and buildings of architectural significance and 383 archaeological sites. About one-third of the sites are located within the Riverway's boundary.

The study found that while many parts of the Lower Wisconsin River Valley have been investigated very intensively, others have scarcely been studied at all. For example, no systematic archaeological survey work has been conducted on Cassell Prairie, Arena

Prairie, the Green River Valley and other areas. As a result, many gaps and biases in the data base exists. Therefore, the present compilation of cultural resources data represents a sizable, although not exhaustive, inventory of prehistoric and historic sites located in the Lower Wisconsin River Valley.

The inventory shows the number of known archaeological sites for Native American inhabitants of the river corridor increases as one travels downstream. These sites (predominantly burial mounds and associated villages) tend to be found in the areas where major streams or tributaries enter the Wisconsin River. Highly sensitive areas along the bottomlands include the Pine River, Bear Creek, and Mill Creek in Richland County; Otter Creek in Iowa County; and the Blue River in Grant County.

The number of known sites peaks near Wyalusing State Park at the confluence of the Wisconsin River with the Mississippi River. The high density of reported sites, particularly mound groups in the Bridgeport - Wyalusing area, is probably due to the fact that amateur and professional archaeologists have been investigating the confluence area for over a century. In general, extensive investigation and study of these sites have not yet begun.

RECREATIONAL USE AND FACILITIES

NON-RIVER RECREATION

Non-river oriented recreation, other than hunting which is discussed separately, is relatively light and scattered throughout the public and private land in the river corridor. Some examples of the varied recreational activities in the river corridor include casual hiking, dog training, gathering berries or edible plants, watching wildlife, snowmobiling, and pleasure driving along the river area's many scenic roads.

HUNTING AND TRAPPING

Hunting for upland game, waterfowl, deer with gun and bow, and trapping are popular in the Lower Wisconsin area. An estimated 67,500 outings are devoted to these activities each year. Use is fairly uniform all along the river corridor. To some degree the upper river area receives more hunting pressure than the lower river as it is closer to larger population centers. Waterfowl hunting is an exception in the middle river section. With its greater amount of backwater ponds the middle section receives about double the hunting pressure of other segments.

A 1983 University of Wisconsin survey of hunters and trappers (Ref. #4) gives the following profile: The typical Lower Wisconsin River area hunter lives within an easy driving distance of the river, uses the area fairly intensively during the hunting season and returns year after year. Nearly 83% of the hunters reported using the area 5 years or longer and almost 50% said they hunted or trapped here on 21 or more days, almost 25% used the area 11 to 20 days and 20% from 5 to 10 days each year.

The strongest reasons hunters gave for hunting and trapping in the Lower Wisconsin River area are personal knowledge of the area and the potential to find game. Many hunters and trappers said access to private land was also a highly important reason why they come to the Lower Wisconsin River area. While ease of access to public hunting lands was not considered extremely important by many, only 10% of the survey respondents said it was unimportant.

In addition, the hunters and trappers surveyed reported they liked to come to the Lower Wisconsin River Valley because of the aesthetic quality of the area. Particularly noted was the natural appearance of the area (i.e. lack of litter and visible man made features), the absence of non-hunting noises like cars or radios, and the overall scenic beauty of the area. Safety from other hunters and the area's closeness to their home were additional factors in choosing the Lower Wisconsin River.

RIVER RECREATION

Seasonal Use Patterns

As the seasons change so do the primary recreational pursuits of the river's visitors. Even before the ice is off the backwaters, fishermen line the bank and crowd in boats below the Prairie Sac dam, fishing for walleye. Up to 150 fishing boats have been counted there on weekends in March and April. Beginning in late April or early May and extending throughout the summer and into the fall, fishing activity becomes more evenly scattered throughout the entire Lower Wisconsin River. DNR and UW surveys of people using the river indicate that fishing is second only to swimming and sunbathing in popularity.

Anglers make an estimated 75,000 trips to the river annually. In addition about 67% of the 50,000 canoeists who come to the river each year report fishing as a secondary activity. Fishing along the Lower Wisconsin River has steadily grown in popularity over the last dozen years. This is largely due to the marked improvement in water quality brought about by vigorous pollution abatement efforts along the upper Wisconsin River. These efforts began in the early 1970's.

Canoe and pleasure boat activity begins in April, particularly on weekends with favorable weather. This activity fluctuates with the ups and downs of spring weather. Camping activity is light in this season as there are generally few exposed sandbars and suitable bank camp sites are limited.

A major shift in river recreation usually occurs in late June, when water temperatures rise and diminishing river flows expose sandbars. In addition to swimming and wading, people use the newly exposed sandbars for sunbathing, picnicking, or camping. Dropping water levels makes boating increasingly difficult, with some river sections becoming nearly non-navigable by motorized craft. An exception is the last 20 miles of river from the Green River Landing to the Mississippi. This section of the river is deeper, and shallow-draft boats can generally navigate it all summer.

Lower Wisconsin State Riverway Master Plan, 1988
Chapter Three- Background Information

River recreation peaks in July and August, drops off when schools open, then increases again over the Labor Day weekend. Summer recreational use, particularly swimming and sunbathing, fluctuates widely with the weather. Canoeing and camping are less affected by the weather. However, the largest overall influencing factor on total summer use seems to be the amount of exposed sandbars.

In many ways autumn river use parallels spring use. After mid-September, camping tapers off to a low level. Recreational canoe use, also comparatively low, occurs mostly on pleasant weather weekends. Boat fishing increases with the cooler temperatures and better navigation from rising river levels. The hunting (primarily for ducks) season brings a new user group to the river system with the backwater ponds and sloughs being favored over the open river. Hunting and trapping use continues until freeze up and the backwaters become the domain of the ice-fishermen.

Seasonal use also affects other recreational activities in upland areas of the river corridor. The hunting season for wild turkeys is in April and May. Another popular spring "hunting" activity is gathering morel mushrooms. Hiking and camping in upland areas in the river corridor (primarily at Tower Hill and Wyalusing State Parks) peaks with the warm summer weather and decreases with the cooler fall weather. Hunting levels rise again in the fall during the deer hunting season.

Patterns of Use Throughout the Week

Midsummer river recreation activity, canoeing, sandbar camping and "beach" use such as picnicking on sandbars, is not as uniform in distribution throughout either the river's length or the days of the week as boat fishing or pleasure boating.

DNR use surveys (1981-82) show Saturday to be the high point every week for canoeing and sandbar camping activity. Sunday numbers run 20-30% lower. Beach use is variable, depending more on the weather. Fishing and motor boating are relatively stable over the weekend. Peak sandbar camping activity always occurs on Saturday night. On the average, 55-60% of the people canoeing on Saturday camp (usually on a sandbar) Saturday night. Friday nights are the second most popular for sandbar camping. While most sandbar campers are canoeists, camping from motorized boats is common where the river remains navigable for boats.

Summer river use during the weekdays runs much lower than weekend use. For example, weekday canoeing and camping is only about 10% of the Saturday levels. Weekday beach use averages 23% of Saturday levels. Motor boat use is 36% and boat fishing is approximately 50% of Saturday levels. The more uniform levels of weekday to weekend use by boat fishers, motor boaters and beach users is not surprising since a high percentage of these users live near the river corridor while approximately 63% of the canoeists and canoe campers live more than an hour's drive from the river.

Patterns of Use by River Segment

Summer river use is greatest on the upper river, progressively decreasing downstream.

Two years of Department use surveys (1981-82) indicate three relatively distinct river use zones.

Upper river segment: This river section, extending from the dam at Prairie du Sac to Spring Green, is the most heavily used. It receives about 70% of the weekend canoe use, 65% of the camping and 62% of the "beach" use. Typical peak Saturday use estimates for this 25 mile river segment are 350 to 400 canoes, 35 to 40 pleasure boats, 25 to 30 fishing craft, 200 to 300 beach users (who are not associated with a boat or canoe), and 200 to 250 tents. The use of inner tubes to float the river is variable but increasing. The upper segment is the most heavily used, 115 to 130 tubes have been counted on this section on several occasions.

Middle river segment: This segment stretches from Spring Green to Boscobel, and is the largest of the three segments at 39 miles. In general, weekend recreational use of this segment is about half of the upper segment.

Lower river segment: This segment comprises the last 28 miles from Boscobel to the Mississippi; it's farther from population centers and has far fewer sandbars. It receives only 3% to 6% of the Riverway's weekend canoeing, camping and "beach" use. About 20 to 25% of the river's boat use occurs here.

Profile of River Users

The University of Wisconsin surveyed river users at river access sites in the summers of 1981 and 1982. The questionnaire results (Ref. #3) show that people who visit the river and use the public boat landings during the peak summer season are primarily canoeists who do not live near the river and are relatively new visitors to the area. The profile doesn't necessarily represent visitors that walk in from other locations to swim and sunbathe. Additionally, local river users are under represented to a degree because a greater percentage of this group uses private landings that weren't surveyed. Surveys revealed the following characteristics:

- 77% were canoeists, 16% were power boaters, 1% had inflatables (rubber innertubes and rafts), and 5% no water craft. About half of the canoes were rented.
- Slightly over 33% of the visitors were on their first trip and almost another 25% had first visited the river for the first time within the previous 3 years. Only about 17% had been visiting the river longer than 12 years.
- About 3/4 of those surveyed were non-local area residents but almost all (97%) live within 1 day's travel of the river. However, only about 1/3 live less than 1 hour away and only 4% owned land
- Half of the visitors first heard of the Lower Wisconsin River by word of mouth. In comparison, 4% of the visitors said they learned about the river from the news media or magazines, and 3% from publicity about possible Federal Wild and Scenic River designation.

Aside from canoeing, boating, sandbar camping and other water related activities, the

Lower Wisconsin State Riverway Master Plan, 1988
Chapter Three- Background Information

survey shows summer visitors seek to "escape from society". They want to experience a closeness to nature, to enjoy the river's natural beauty and wildlife, to spend time with family or friends and also to find varying degrees of isolation. Most (78%) say they wish to spend time there only with their group or to be alone. Drinking and partying were listed as unimportant by over half of those responding.

From 30% to 40% of the people responding to the survey indicated they felt water pollution and litter were problems, while 20% to 30% indicated they were bothered by noise from other users, debris, crowding, airboats, and a lack of sanitary facilities.

Even though more than 3/4 of the river users said that crowding was not a problem, 55% of those that had been to the river before indicated they had taken some action at some time to avoid meeting other people using the river. The actions reported ranged from using a different river section, to changing the day or time of year they came to the river, or making other plans altogether.

More information and analysis on river use and users may be found in the *Final Environmental Impact Statement, Lower Wisconsin State Riverway* (Ref. #18).

Authority to Regulate River Use

While the statutes establish rules which are generally applicable to waters throughout the state, no state agency is empowered to adopt special regulations for a particular water body or portion of a water body to further restrict type of use, area of use, time of use, speed or use numbers. Counties are not authorized to adopt boating regulations, however, towns have been delegated this power in rural areas. The statutes prevent the adoption of varying regulations for a single water body by requiring all regulating units to adopt identical regulations. Reaching agreement is often difficult where multiple towns are involved. This severely limits establishment of effective water use regulations on large water bodies. Other than general statewide conservation regulations the state's authority to directly regulate recreational activities on and along the Lower Wisconsin River is limited solely to activities on state-owned lands and adjacent sandbars.

BIBLIOGRAPHY

1. Chenoweth, R.E. 1984. Visitor Employed Photography: A Potential Tool for Landscape Architecture. *Landscape Journal*. (3), 2, p. 136-143.
2. Chenoweth, R.E. and Niemann, B. 1984. Lower Wisconsin Landowner Survey: Results and Interpretations. Unpublished manuscript, University of Wisconsin-Madison: Department of Landscape Architecture.
3. Chenoweth, R.E. and Niemann, B. 1984. Lower Wisconsin River User Survey: Results and Interpretations. Unpublished manuscript, University of Wisconsin-Madison: Department of Landscape Architecture.
4. Chenoweth, R.E., Niemann, B. and Dickhut, K. 1984. Lower Wisconsin River Valley Hunter and Trapper Survey: Results and Interpretations. Unpublished manuscript, University of Wisconsin-Madison: Department of Landscape Architecture.
5. Curtis, John T. 1959. *Vegetation of Wisconsin*. University of Wisconsin Press, Madison, Wisconsin. 657 pp.
6. Fay, Robert P. Project Archaeologist. September, 1984. Cultural Resources Literature Search and Records Review of the Proposed Lower Wisconsin River State Forest. Unpublished report.
7. U.S. Department of Agriculture Soil Conservation Service. January, 1978. Soil Survey for Dane County, Wisconsin.
8. U.S. Department of Agriculture Soil Conservation Service. July, 1982. Soil Survey for Iowa County, Wisconsin.
9. U.S. Department of Agriculture Soil Conservation Service. March, 1980. Soil Survey for Sauk County, Wisconsin.
10. U.S. Department of Agriculture Soil Conservation Service. June, 1981. Soil Survey for Grant County, Wisconsin.
11. U.S. Department of Agriculture Soil Conservation Service. December, 1961. Soil Survey for Crawford County, Wisconsin.
12. U.S. Department of Agriculture Soil Conservation Service. March, 1959. Soil Survey for Richland County, Wisconsin.
13. U.S. Department of Interior, National Park Service and U.S. Department of Agriculture, Forest Service. 1979. *The Lower Wisconsin A Wild and Scenic River Study*. House Documents; Vol. 30, Wild and Scenic River Studies and National Trail Proposals. 96th Congress 1st Session. 170pp.

Lower Wisconsin State Riverway Master Plan, 1988

Bibliography

14. Wisconsin Department of Natural Resources. *Silviculture and Forest Aesthetics Handbook*. Unpublished.
15. Wisconsin Department of Natural Resources. *Timber Sales Handbook*. Unpublished.
16. Wisconsin Department of Natural Resources. December, 1985. *Statewide Comprehensive Outdoor Recreation Plan (SCORP IV). Wisconsin's Outdoor Recreation Needs Assessment By Area*.
17. Wisconsin Department of Natural Resources Bureau of Endangered Resources. May, 1987. *Endangered, Threatened, and Special Concern Species of the Lower Wisconsin River region - unpublished report*.
18. Wisconsin Department of Natural Resources. *Final Environmental Impact Statement, Proposed Lower Wisconsin State Riverway*. August 1988.

APPENDIX A: LWSR Recreational Facility Development (1988)

Development Type	Upper Segment		Middle Segment		Lower Segment	
	Existing	Planned New	Existing	Planned New	Existing	Planned New
Public Access						
River boat landings (number)	6	1	6	0	5	1
Pond boat landings (number)	1 (5 total veh.)	0	2 (20 total veh.)	0	0	0
Hunter parking lots (number /capacity)	12 (200 total veh.)	4 (20 total veh.)	22 (290 total veh.)	3 (40 total veh.)	0	7 (90 total veh.)
Other parking lots	0	1 (210 total veh.)	0	0	3 (20 total veh.)	1 (20 total veh.)
Trails (mileage may overlap due to dual-use designation)						
Auto trail miles	0	60	0	60	0	60
Hiking/cross country ski trail miles	1.5 (hike)	20	1.2 (hike)	6	0	23
Nature trail miles	.5	1	0	1	2 (Wyalusing SP)	0
Snowmobile trail miles	0	0	9	10	0	0
Horseback trail miles			None currently exist; a total of 25 miles are planned for the Riverway at locations to be determined.			
Camping						
Backpack (number campsites)	0	0	0	0	0	12 - 20
Bank-side campground	0	0	0	1 (15-20 sites)	0	0
Picnicking (number of sites with facilities)	3	7	5	4	3	4
Highway waysides	0	1	2	1	0	2
Observation towers/lookouts	1 (Tower Hill SP)	0	0	3	1 (Wyalusing SP)	4
Dog trial areas (number and acres)	1 (640 acres)	0	0	0	0	0

APPENDIX B: Planned LWSR River Access Development (1988)

	Standard Development				Optional Development									
	Surfaced Roads and Parking	Trash Disposal	Signing and Information	Landscaping	Safety Lighting	Toilets	Telephone	Drinking Water	Quiet-water Launch Area	Picnicking	Separate Motor - Non-motor Access	Generally Open in High Water	Extra Space for Livery Vehicles.	Canoe Racks
Upper River Segment														
Prairie du Sac	*	*	*	*	*	?	*	*	?	*	*	*	*	*
Sauk City	*	*	*	*	*	*	*	*	?	*	*	*	*	*
Town of Mazomanie	*	*	*	*	*	*	*	*	no	*	?	*	*	*
Mazomanie Unit	*	*	*	*	*	*	*	*	?	no	*	*	*	*
Arena	*	*	*	*	*	*	?	?	*	*	?	?	*	*
Highway 14 Bridge	*	*	*	*	*	*	*	?	*	*	?	?	*	*
Tower Hill	*	*	*	*	*	*	in park	in park	*	in park	?	*	*	*
Peck's Landing	*	*	*	*	*	*	*	*	?	*	*	?	*	*
Middle River Segment														
Otter Creek	*	*	*	*	*	*	*	?	*	*	*	no	*	*
Buena Vista	*	*	*	*	*	*	*	*	*	in park	*	*	?	?
Orion	*	*	*	*	*	*	*	no	?	?	no	?	no	no
Muscoda Park	*	*	*	*	*	*	*	*	*	*	*	?	*	*
Port Andrew	*	*	*	*	*	?	?	?	no	?	no	?	no	no
Blue River	*	*	*	*	*	*	*	*	?	*	no	no	no	no
Boscobel	*	*	*	*	*	*	*	*	*	*	*	no	?	*
Lower River Segment														
Woodman Lake	*	*	*	*	*	*	*	?	*	*	?	?	no	no
Green River	*	*	*	*	*	*	*	?	*	*	*	no	no	no
Wauzeka	*	*	*	*	*	*	*	*	*	?	?	?	no	no
Millville	*	*	*	*	*	*	*	?	*	*	?	?	no	no
Bridgeport	*	*	*	*	*	*	*	*	*	*	*	*	?	*

The above developments are conceptual and are subject to change due to unforeseen physical limitations that may be discovered during site design and engineering studies.

Lower Wisconsin State Riverway Maps