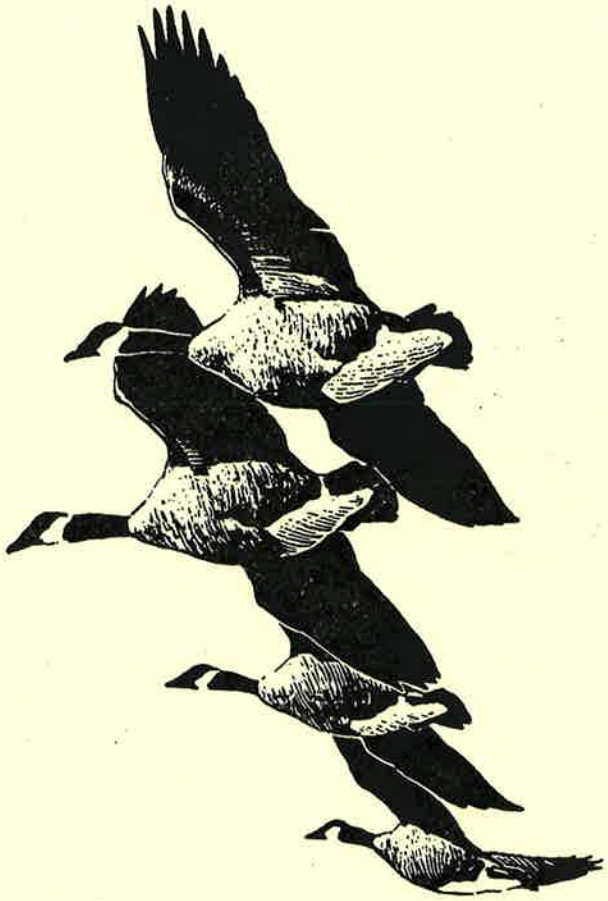
Lac qui Parle Area Management Plan



Minnesota Department of Natural Resources

January 15, 1997

Minnesota Department of Natural Resources

OFFICE OF THE COMMISSIONER
500 Lafayette Road
St. Paul, Minnesota 55155-4037

RE: Department of Natural Resources (DNR) Approval of Management Plan for the Lac qui Parle Area

Minnesota Statutes 86OA.09 requires that a master plan be prepared for units of Minnesota's outdoor recreation system. Laws of Minnesota for 1941 established Lac qui Parle State Park and the Legislature established Lac qui Parle Wildlife Refuge and Management Area in 1957.

Over the past year and a half, the DNR has worked in partnership with local citizens to develop a management plan for this area. The management plan was approved through the DNR's CTECH/Senior Managers' review process during December, 1996.

Rodney W. Sando

1-23-97

Rodney W. Sando, Commissioner
Minnesota Department of Natural Resources

Date

Lac qui Parle Area Management Plan

This plan is dedicated in memory of Kenneth W. Bonnema, Lac qui Parle Wildlife Manager, who died April 10,1996.

State of Minnesota, Department of Natural Resources, 1996

This Management Plan is a cooperative project. For more information please contact any of the following project participants.

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Ortonville Area Office
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INTRODUCTION

Executive Summary

The Lac qui Parle area provides a wide range of recreational opportunities and nationally significant wildlife habitat. Lac qui Parle Wildlife Management Area (WMA) and Lac qui Parle State Park are situated along the upper Minnesota River on the shores of Lac qui Parle and Marsh Lakes. Lac qui Parle is located in a region of western Minnesota currently experiencing a tremendous increase in destination tourism. This growth can be attributed to several factors: outstanding outdoor recreation, including hunting and fishing; increased business traffic; a renewed awareness of the river through the work of private citizens and organizations such as Coalition for a Clean Minnesota River (CCMR) and Clean Up our River Environment (CURE); and increased interest in the numerous historic sites.

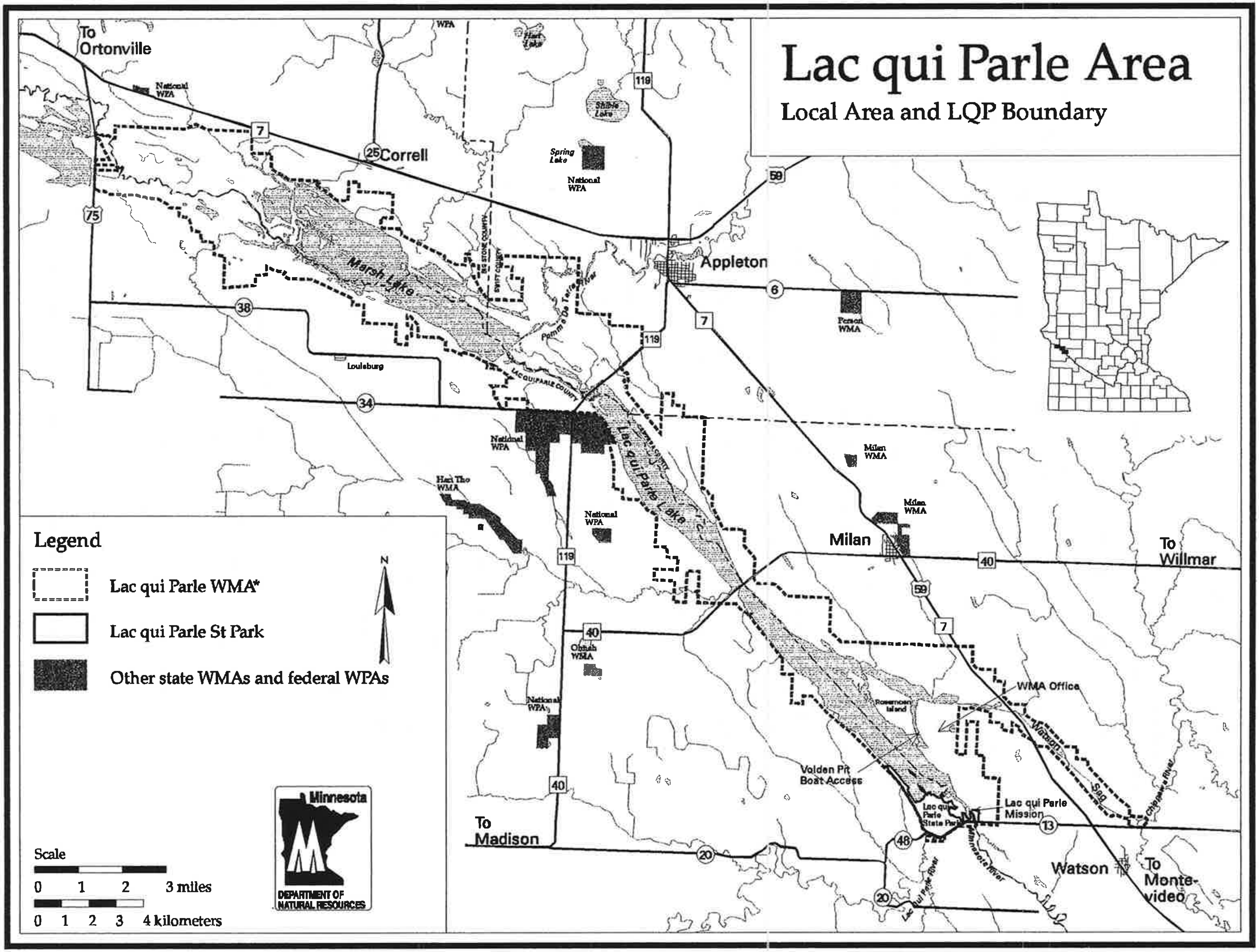
In 1996, The Minnesota Department of Natural Resources (DNR) constructed an education center to meet the growing customer needs and to attract more customers. The new facility will enable Lac qui Parle WMA and Lac qui Parle State Park to utilize one central location on the southeast side of the lake to serve the public seven days a week. The facility will also provide opportunities for environmental education and hunter education.

The Minnesota Legislature expanded the state park boundaries in 1996 to the east side of the lake in order to develop a new campground out of the flood plain. Through effective design, the new campground will allow campers easy access to the lake, the new center and to historic Fort Renville and Lac qui Parle Mission sites.

The Lac qui Parle area has an experienced, knowledgeable and dedicated management team and work force that are committed to efficiently managing the resources, working with the neighbors and neighboring communities, and serving recreational users. This planning process is a three phase program to improve the overall management of the area: Phase 1) Site and construct the new facility; Phase 2) Develop a cooperative integrated resource management plan utilizing extensive public involvement; and the next step to be completed is, Phase 3) Initiate a watershed stewardship plan and program.

The following comprehensive management plan presents the mission, vision, goals, and key issues. There are detailed resource and recreation background sections that provide data for use in making management decisions. The final sections outline the objectives and recommended future actions.

The DNR is seeking funding to complete facility improvements and expansion and to commence the next phase of planning. As was evident in many local public roundtable meetings, the timing is right to begin addressing the water quality and flooding issues of the upper Minnesota River.


Lac qui Parle Area
Local Area and LQP Boundary
To Ortonville
Correll
Appleton
Milan
To Willmar
To Madison
Watson
To Montevideo
Marsh Lake
Lac qui Parle Lake
Louisburg
National WPA
Spring Lake
Person WMA
Milan WMA
Hart Tho WMA
Chauh WMA
Rosemoen Island
WMA Office
Volden Pit Boat Access
Lac qui Parle State Park
Lac qui Parle Mission
Watson Sag
Chippewa River
Minnesota River
Lac qui Parle River
Pomme de Terre River
Legend
Lac qui Parle WMA*
Lac qui Parle St Park
Other state WMAs and federal WPAs
N
Scale
0 1 2 3 miles
0 1 2 3 4 kilometers
Minnesota
DEPARTMENT OF NATURAL RESOURCES

Lac qui Parle Area Mission/Vision/Goals

Mission Statement for the Lac qui Parle Area Planning Effort:

We will develop a sustainable management plan for the public lands and waters within the Lac qui Parle Wildlife Management Area and Lac qui Parle State Park boundaries that recognizes watershed issues and utilizes stakeholder involvement.

Lac qui Parle Area Vision:

To wisely manage the Lac qui Parle area by preserving, protecting, restoring and enhancing the resources for the benefit of present and future generations.

Lac qui Parle Area Goals:

(See pages 89 and 90 for objectives specific to resource and recreation management)

- To improve the water quality in the Lac qui Parle Area in cooperation with Comprehensive Local Water Plans.
- Maintain hunting at Lac qui Parle WMA and seek methods to increase the quality of the hunting experience in the Lac qui Parle area.
- To continue to improve the quality of fishing in the Lac qui Parle area.
- To determine the best options to address the problem of flooding in the state park.
- To increase trust between the Department of Natural Resources and the public in the Lac qui Parle Area.
- To manage remaining native prairie and wetland landscapes as functioning ecological communities.
- To provide a balance between resource preservation and use.
- To concentrate development in order to preserve the remaining portions of the natural areas.
- To cooperate with the public, user groups and environmental entities at local, state and federal levels when making management decisions.

Area Description

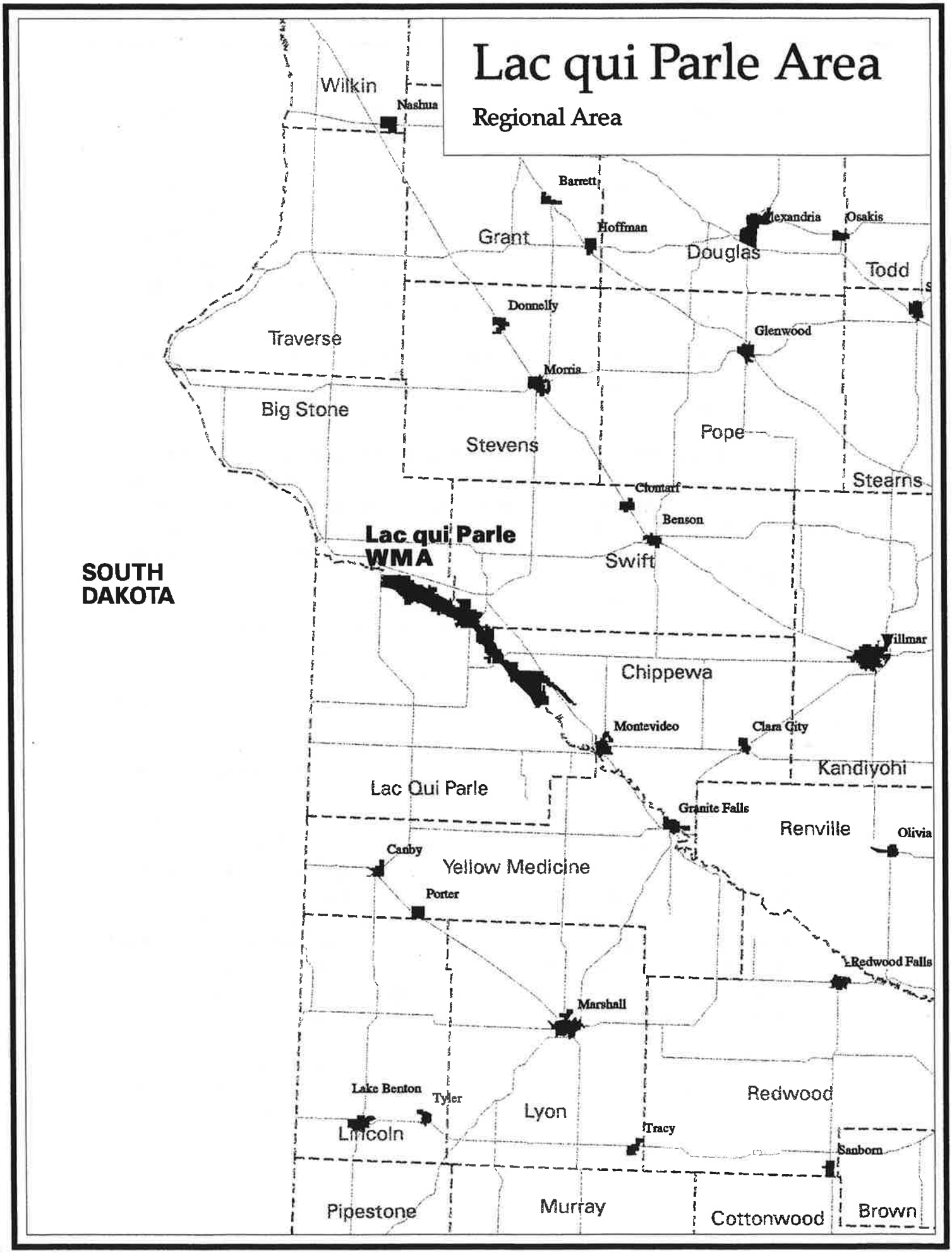
Throughout this plan the "Lac qui Parle area" includes Lac qui Parle Wildlife Management Area (WMA) and Lac qui Parle State Park, and Lac qui Parle and Marsh Lakes. The lakes are actually contained within the WMA. The Lac qui Parle Wildlife Management Area is located in four counties: Lac qui Parle, Chippewa, Swift, and Big Stone counties. The park is located in Lac qui Parle County in western Minnesota, 12 miles northwest of Montevideo on the Minnesota River. (See Regional Map).

Lac qui Parle WMA is one of the largest and most complex WMAs in Minnesota. The Lac qui Parle Wildlife Management Area is about 25 miles long, 1 to 3 miles wide, and includes over 31,000 acres. Lake, lowland marsh, flood plain forest, and brush and upland grassland and cropland characterize the unit. Public fishing, hunting, trapping, and the observation and study of wildlife and their habitats are the preeminent uses of the Lac qui Parle WMA.

Lac qui Parle State Park's present statutory boundary includes 513 acres. Approximately 498 acres are state-owned, 14 acres are county owned and approximately 1 acre is privately owned. Native prairie, floodplain forests and wetlands are the highlights of the park, as well as a modern campground and a developed trail system providing recreation activities in both the summer and winter months. The Minnesota Historical Society administers the 16.8 acre Lac qui Parle Mission state historic site adjacent to Lac qui Parle State Park.

The natural and cultural resources in the Lac qui Parle area offer visitors a diversity of outdoor recreation opportunities. The area includes:

- Nationally significant goose management area. The wildlife management area has become one of the biggest and most popular goose concentration areas in the United States. As many as 150,000 geese can be in the area at one time.
- Access to Lac qui Parle and Marsh Lakes. The area provides access to Lac qui Parle and Marsh Lakes, created by the flood control projects on the Minnesota River.
- Biological funnel. The Minnesota River is a major flyway. The southern part of the lake is the last to freeze in the fall and first to thaw in the spring. Consequently, waterfowl and wildlife are concentrated in this area.
- Historic District classification on the National Register. The entire park is part of the Lac qui Parle Mission and village historic district.
- Some of the best fishing in western Minnesota, especially for walleye. Other species include northern pike, crappie, yellow perch, and white bass.
- A diversity of prairie, wetland and forest ecosystems. Native prairie, floodplain forests and wetlands provide habitat for eagles, pelicans, and Neotropical migratory songbirds, as well as conserving native plants and functioning ecosystems.
- Largest pelican nesting colony in Minnesota and possibly in the USA. Current production is approximately 10,000 young each year.
- Excellent views of the Minnesota River Valley. The area has three scenic overlooks offering panoramic views of the beautiful Minnesota River Valley.


Lac qui Parle Area
Regional Area
Wilkin
Nashua
Barrett
Hoffman
Grant
Alexandria
Douglas
Osakis
Todd
Donnelly
Traverse
Glenwood
Morris
Big Stone
Pope
Stevens
Stearns
Clontarf
Benson
Lac qui Parle WMA
Swift
SOUTH DAKOTA
Willmar
Chippewa
Montevideo
Clara City
Kandiyohi
Lac Qui Parle
Granite Falls
Renville
Olivia
Canby
Yellow Medicine
Porter
Redwood Falls
Marshall
Lake Benton
Tyler
Redwood
Lyon
Lincoln
Tracy
Sanborn
Pipestone
Murray
Cottonwood
Brown

Planning Process

The Department of Natural Resources formed an Integrated Resource Management (IRM) team to assist in developing this plan. Initially, it was to be a park management plan to deal with the flooding issues. However, early on it was decided that wildlife's plan also needed updating and that it should be a community based management plan. The first IRM meeting was held January 5, 1995. This technical team included: Park Manager, Area Wildlife Manager and Regional Nongame Wildlife Specialist, Area Fisheries Supervisor, Conservation Officer, District Forester, Area Trails and Waterways Supervisor, Area Hydrologist, Regional Realty Specialist, Regional Administrator and Parks and Wildlife Regional Managers.

The IRM team met two additional times and thereafter met with the citizens at the public roundtable meetings. There were also several informal meetings with individuals on the team throughout the process.

A public news release announced the beginning of the planning process. The first public roundtable meeting was held April 22, 1995 to identify and prioritize issues that should be addressed in the new area management plan. Following the initial meeting, additional roundtable meetings were held in Montevideo to discuss major planning issues on the following dates (all meetings were advertised and open to the public).

May 31, 1995	Fish Management
June 14, 1995	Recreation Resources Management
August 2, 1995	Wildlife Management
September 6, 1995	Land and Water Management
November 21, 1995	Environmental Educ. & Community Linkages
February 7, 1996	Review Public Written Comments and assorted unfinished issues.
Oct. 22, 1996	Final Public Review of Draft Management Plan

In addition to the public news release to 30 newspapers, radio and television stations, a mailing list of over 125 people and/or organizations received agendas prior to the meetings and approximately one week after the meetings notes summarizing the meetings were mailed. Some of the groups that regularly sent representatives included: Milan Beach Resort, Chippewa County Historical Society, CURE, Lac qui Parle Hunting Camp, U.S. Army Corps of Engineers, State Historical Society, Lac qui Parle Lake Association, Chippewa County Commissioners, and several sportsmen's clubs. Each meeting was attended by an average of 20-30 citizens. The Montevideo American News and KDMA radio sent reporters to every meeting.

The issues and recommendations in this plan were developed as a result of the public process. This plan provides the basic management direction for the area and is not intended to provide specific management or development details.

It should be noted that the various divisions have had individual management plans in the past, however, this is the first cooperative management plan for the Lac qui Parle area.

A completed area plan and "planning process file" documenting the 1995-1996 planning process and pertinent background information will be distributed to the following locations: Lac qui Parle WMA, Lac qui Parle State Park, Ortonville Fisheries Office, New Ulm Regional Office, state park planning section (St. Paul) and DNR Engineering (St. Paul). A completed area plan will also be located at the DNR Library and the Montevideo, Willmar, Madison, Milan, Dawson, Appleton, and Ortonville Libraries.

Lac qui Parle Area Issues

The following list was generated by participants of the April 5, 1995 meeting: (Note: these have been broken into categories for ease of reading. Some issues could have gone in several categories, but are only listed once. They are not in any particular order.)

WATER AND LAKESHORE ISSUES

- Better water quality (mentioned 4 times).
- Improve water quality in the watershed. Stewardship - flooding, water quality.
- Water level management. Higher and higher level for a longer time. Therefore park can't be used.
- Do more on shoreline development! Stop erosion. Replant trees. (4 times).
- Develop a water level management plan! To best fit all areas of economic and social needs.
- Watershed management- influx of drainage, sediment in ditches, education
- Marsh Lake water level management Fish vs. Wildlife.

HUNTING ISSUES

- Better blind locations (poor appearance of roadside blinds) and more decoying, less pass shooting (so that geese can be attracted closer to the blinds).
- Expand deer hunting opportunities to bow hunting in State Park.
- WCGZ (West Central Goose Zone) permit. What is its future?
- Goose hunting season-timing of season opener and goose limits.
- Hunting pressure to be spread. How to get an accurate census on harvest? Reduce cost to kids.
- Quality of hunting within WMA (Wildlife Management Area).
- Six shell limit.
- Improve quality of shooting. a) Have fewer blinds (private owners). b) Too much sky busting cripples.
- Split season of duck and goose seasons: 2 weeks on, 2 weeks off, 2-3 weeks on...to get a chance to hunt late ducks.
- Goose quota and length of season (2 times).
- Watson Sag area should be reopened as WMA open to public hunting.

FISHING ISSUES

- Extend/open fall fishing on south end of LQP lake (6 times).
- Slot limits on walleyes (minimum and/or maximum length limits). Slot limits on gamefish on LQP Lake (special regulations).
- Fall fishing effects on waterfowl and deer hunting.
- Minimum size limit on walleyes (2 times).
- Reduce fishing regulations, more simple.
- Fishery management - water level not only flood control - fish studies -watershed issues.
- More fishing enforcement year-round.
- Additional fishing pier on LQP Lake (2 times).

OTHER RECREATION

- Need for observation points.
- Use north end as a campground.
- Larger access at Volden's Pit and another ramp on North side of road. (2 times).
- Protective barrier for boat launching at Boyd's.
- Better access to south end (Engebretson's, Clay banks) for early ice, foot traffic.
- MN River access below the Dam.
- Snowmobile trails from Ortonville to Montevideo.
- Maximize area recreation use with non-motorized trails (hiking, cross-country skiing, biking, etc.).

PARK ISSUES

- Park improvement i.e. Security-unsafe when staying at park; No one lives at the park.
- How to address specific concerns of park visitors and land owners. A forum with the DNR. a) Balance consideration of local land owners concerns vs. DNR/State law. b) Too much government control.
- Campground flooding. Relocate campground (mentioned 4 times). What about a dike in the park to prevent flooding? Is this feasible?
- State park needs manager and assistant year-round.
- Utilize existing buildings at state park - placement of staff offices.
- Free boat launch in state park.

WILDLIFE, HABITAT & GENERAL ENVIRONMENT

- Better pheasant habitat management on west side of lake.
- Habitat base and improvement.
- Address depredation concerns.
- Confined goose populations - concerns with disease.
- Pelican management - too many pelicans.
- General cleanup - (2 times) make upland areas more pleasing to look at - beautification.
- Improve soil erosion problems on state lands.

MONEY AND ECONOMICS

- Concerned with the high cost of hunting. What is the future? Less user fees statewide. Eliminate $3.00 permit (goose hunt).
- What effect will ecosystem based management have on labor intensive projects in the refuge.
- Adequate funding to keep enforcement/labor force working.
- Declining economic benefits to small towns (specifically from goose hunting).
- Where are gambling funds being spent?
- DNR buying higher lands (uplands) farmland. Why? Where does the money and justification come from? What's the purpose?
- Delay in repairs.

DNR IMAGE

- DNR be more sincere about public input. Trust level is low!
- Building trust among DNR and public. Promote and create DNR - Public Partnerships (all divisions of DNR).
- Property owners, overregulated. Compliance can be a nightmare of paperwork.
- Public involvement plan development and implementation.
- Better management and controls of LQP region.
- DNR - all talk no action!
- Lack of return input on recommendations. (What happens to our suggestions?)

TOURISM AND PROMOTION

- Promotion of area - there's more to the area than goose hunting. Promote all the values of the area e.g. cross-country skiing, fishing, hiking, etc. Remember it's year round usage - not just one month!
- More promotion for state park..
- Include state parks in "Prairie Sportsman" TV show on PBS from Appleton.

EDUCATION AND YOUTH

- Educate hunting public on goose biology and populations.
- Involve/encourage youth in hunting and fishing (2 times).
- Education all users, not just hunters. Focal point (visitor center) location.
- Would like visitor center at the mission site.

Benefits of the Lac qui Parle Area

Outdoor recreation and public lands are essential to our individual lives, community, economy and environment. Some of the benefits that the Lac qui Parle area provides are:

Personal Benefits

- The physically fit person is able to enjoy life more fully, is less prone to injury and is more productive (both at work and in the community).
- Fit senior citizens live longer, remain in their homes longer and participate more fully in community life.
- Recreation/adventure activities help build confidence and self-esteem in youth. When they feel good about themselves, they operate more effectively and productively in our communities, families and schools.
- Stress is a serious issue in modern society - all of the popular "prescriptions" or solutions highlight the role of leisure and relaxation.

Social Benefits

- Couchman (1988), in his extensive work with families, states that leisure is the single most important force developing cohesive, healthy relationships between husbands and wives, between parents and their children. Families who recreate together tend to be closer, more cohesive and improve their chances of staying together.
- Recreation is the strongest contributing factor to creating strong and supportive families which in turn nurture productive and involved children and youth. The dysfunctional family, on the other hand, presents unfair challenges to the child - generating many demands for costly, alternative support services.
- Communities come together and learn to work together through sports, arts, cultural and environmental activities.

Economic Benefits

- Economic development literature repeatedly stresses the attraction of local quality of life in the decision to relocate a firm to a new state or city. Parks recreational opportunities and leisure services are primary considerations and measures in such a move.
- Many studies have shown that financial investment in recreation projects pay dividends throughout the community - the return is always greater than the original outlay.
- Habitat protection and recreation is often the highest and best use of lands that are too fragile for development (slope, floodways).

Environmental Benefits

- Participation in appreciative outdoor recreation activities like hiking and camping is a valuable predictor of environmental concern - outdoor recreation participation is positively associated with environmental concern
- Research on the public's willingness to pay taxes for various types of services repeatedly places environmental protection at or near the top of the list.
- The provision of prairies, wetlands, parks, and protected natural environments contribute to the environmental health of our communities. This is an essential, life-sustaining role.
- The provision of prairies, wetlands, parks, and protected natural environments provide for essential habitat for the native species of Minnesota.

BEYOND LAC QUI PARLE BOUNDARIES

Regional/Landscape and Watershed Description

Ecological Classification System

Minnesota's Ecological Classification System (ECS) stresses the interrelationships among components of the ecosystem. These components include climate, geology, geomorphology, soil, vegetation, hydrology, animals and land history. The ECS approach handles each component in relation to the others, rather than each one separately (Hargrave, 1992).

Minnesota River Prairie Subsection

The ECS divides Minnesota into 23 subsections (see ECS map page). The Lac qui Parle area is located in the Minnesota River Prairie subsection. This subsection consists of gently rolling ground moraine about 60 miles wide (Hobbs and Goebel. 1982). The Minnesota River occupies a broad valley that splits the unit in half. It was created by Glacial River Warren, which drained Glacial Lake Agassiz (Match and Wright, 1967). The Minnesota River Prairie subsection encompasses 7,745,786 acres and has an elevation ranging from 750 to 1300 feet above sea level (Hargrave, 1994).

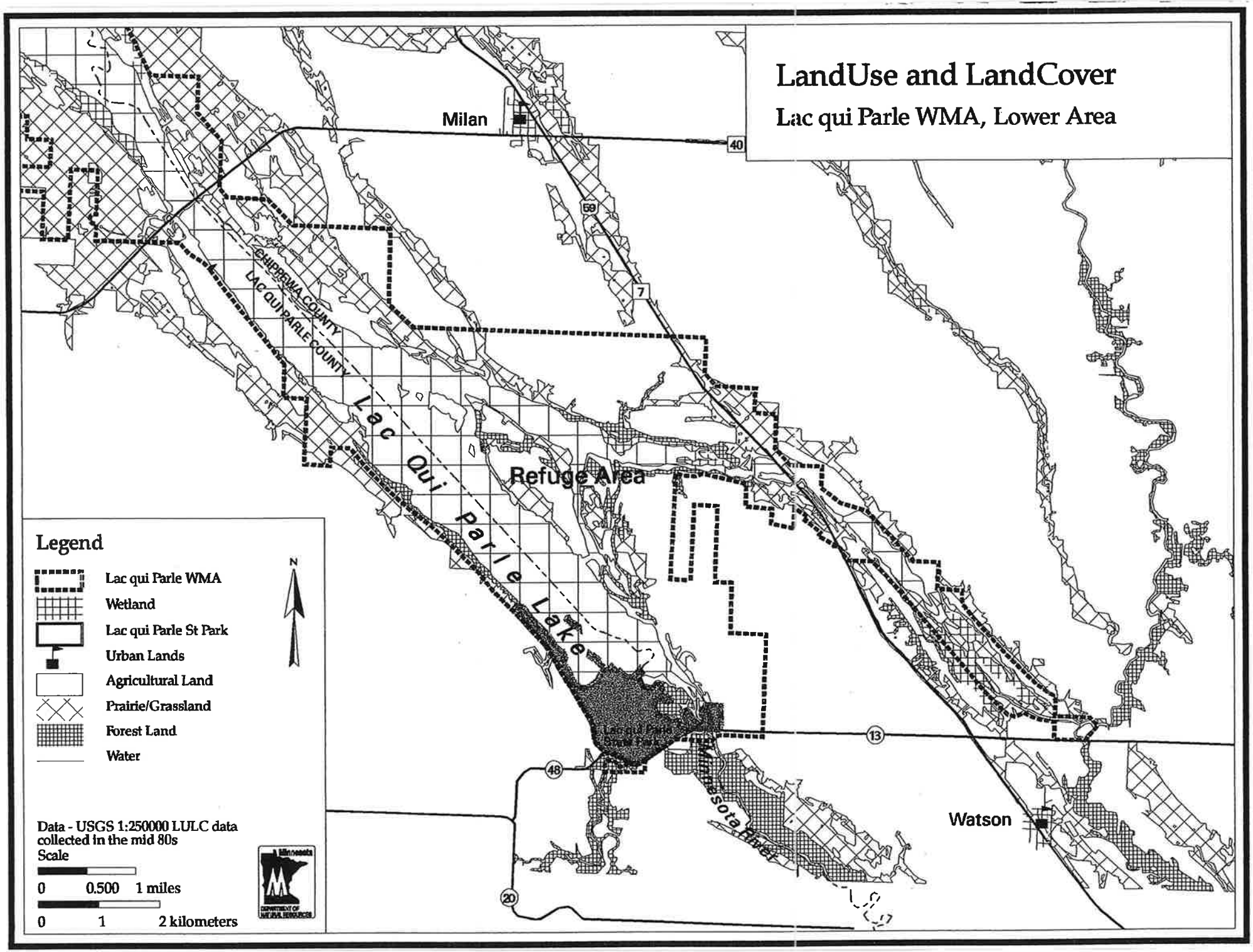
Landforms are predominately loamy ground moraines (till plain); however, end moraines, and lake plains also occupy a significant area (Hobbs and Goebel 1982). Ground moraine topography is level to gently rolling. The steepest topography of the subsection is along the Minnesota River and on the Big Stone Moraine, which has both steep kames and broad slopes.

Original pre-European settlement vegetation was primarily tallgrass prairie, with many islands of wet prairie (Marschner, 1974). Forests of silver maple, elm, cottonwood, and willow grew on floodplains along the Minnesota River and other streams. Fire was the most common natural disturbance before European settlement. Fire suppression has allowed woodlands to develop from what was originally oak openings or brush prairies (Wheeler et. al. 1992). Other causes of disturbance are floods and tornadoes.

Present vegetation and land use is dominated by agriculture. This area is the heart of the Minnesota cornbelt. Upland prairie species used to be common throughout most of the subregion. Remnant stands of tallgrass prairie are rare.

Watershed Description

The Minnesota River Prairie subsection is drained by the Minnesota River. Lac qui Parle and Marsh Lakes and the Minnesota River are the most prominent watershed features in the region. Most small rivers and streams eventually empty into the Minnesota or the Upper Iowa Rivers. There is a poorly developed natural drainage network due to landscape characteristics. This region has 150 lakes greater than 160


LandUse and LandCover
Lac qui Parle WMA, Lower Area
Milan
40
59
7
CHIPPEWA COUNTY
LAC QUI PARLE COUNTY
Lac Qui Parle Lake
Refuge Area
Lac qui Parle State Park
13
48
20
Minnesota River
Watson
Legend
Lac qui Parle WMA
Wetland
Lac qui Parle St Park
Urban Lands
Agricultural Land
Prairie/Grassland
Forest Land
Water
N
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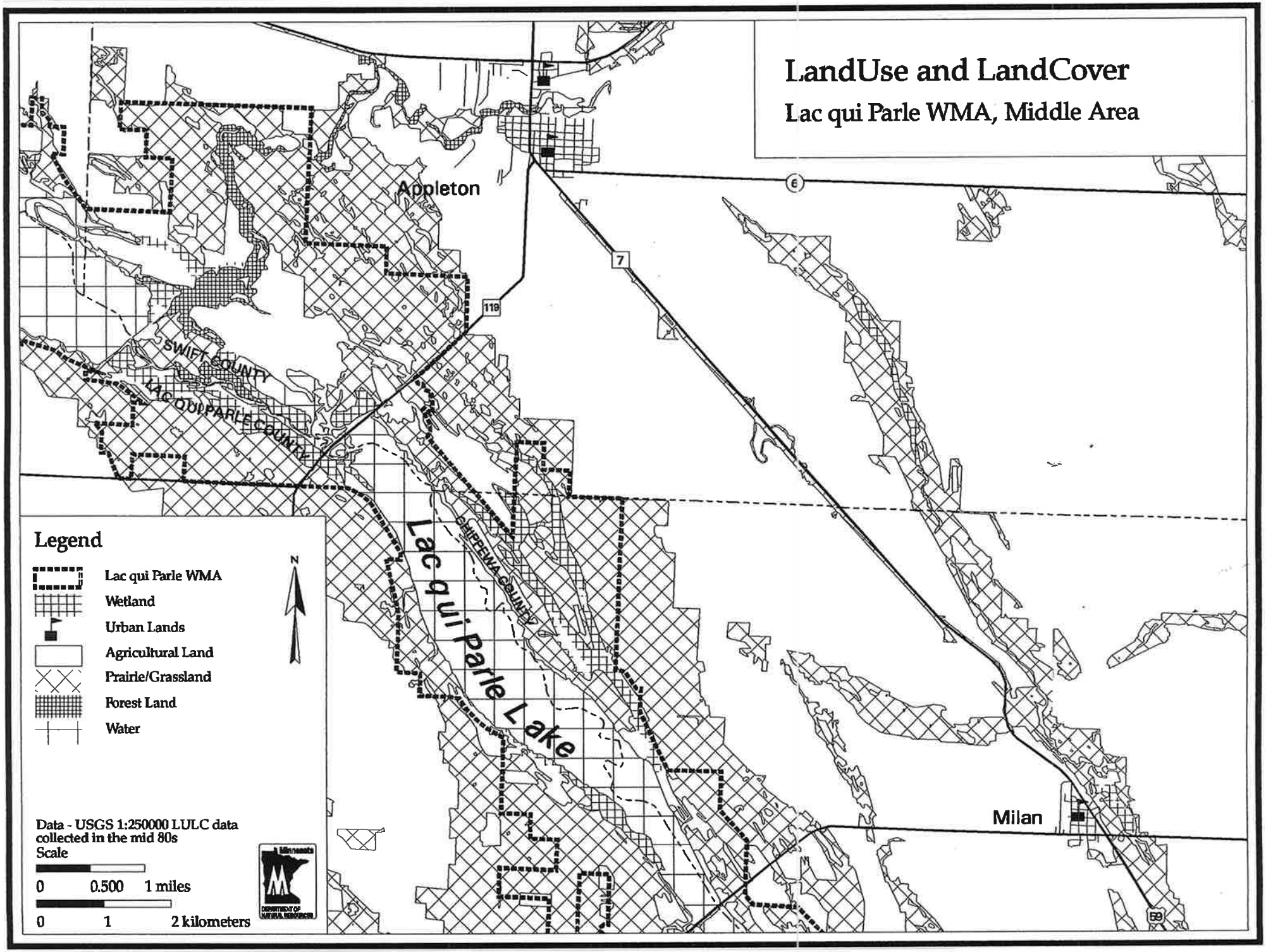
Minnesota
DEPARTMENT OF NATURAL RESOURCES


LandUse and LandCover
Lac qui Parle WMA, Middle Area
Appleton
Milan
6
7
119
59
SWIFT COUNTY
LAC QUI PARLE COUNTY
CHIPPEWA COUNTY
Lac qui Parle Lake
Legend
Lac qui Parle WMA
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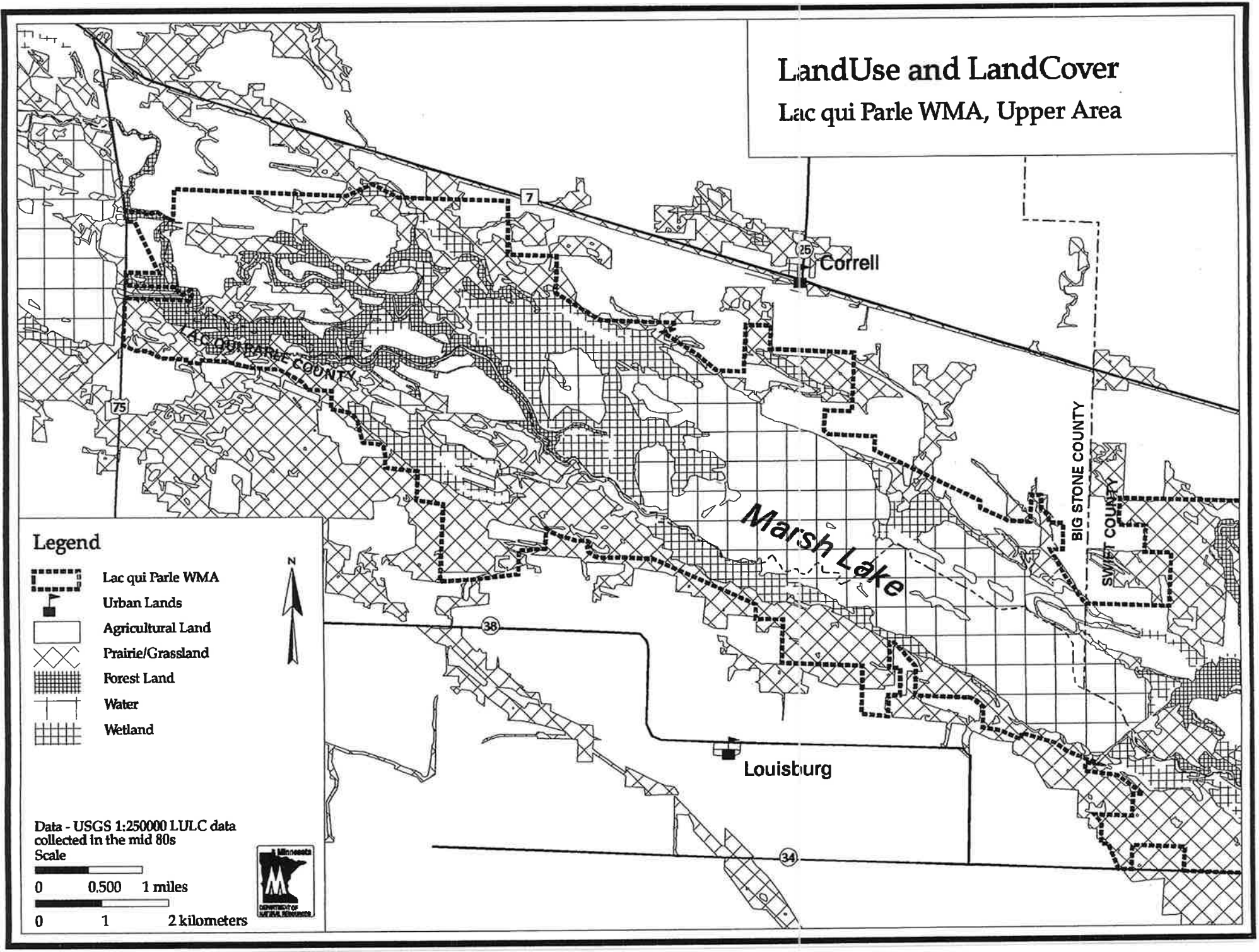
LandUse and LandCover
Lac qui Parle WMA, Upper Area
Correll
LAC QUI PARLE COUNTY
BIG STONE COUNTY
SWIFT COUNTY
Marsh Lake
Louisburg
7
75
25
38
34
Legend
Lac qui Parle WMA
Urban Lands
Agricultural Land
Prairie/Grassland
Forest Land
Water
Wetland
N
Data - USGS 1:250000 LULC data collected in the mid 80s
Scale
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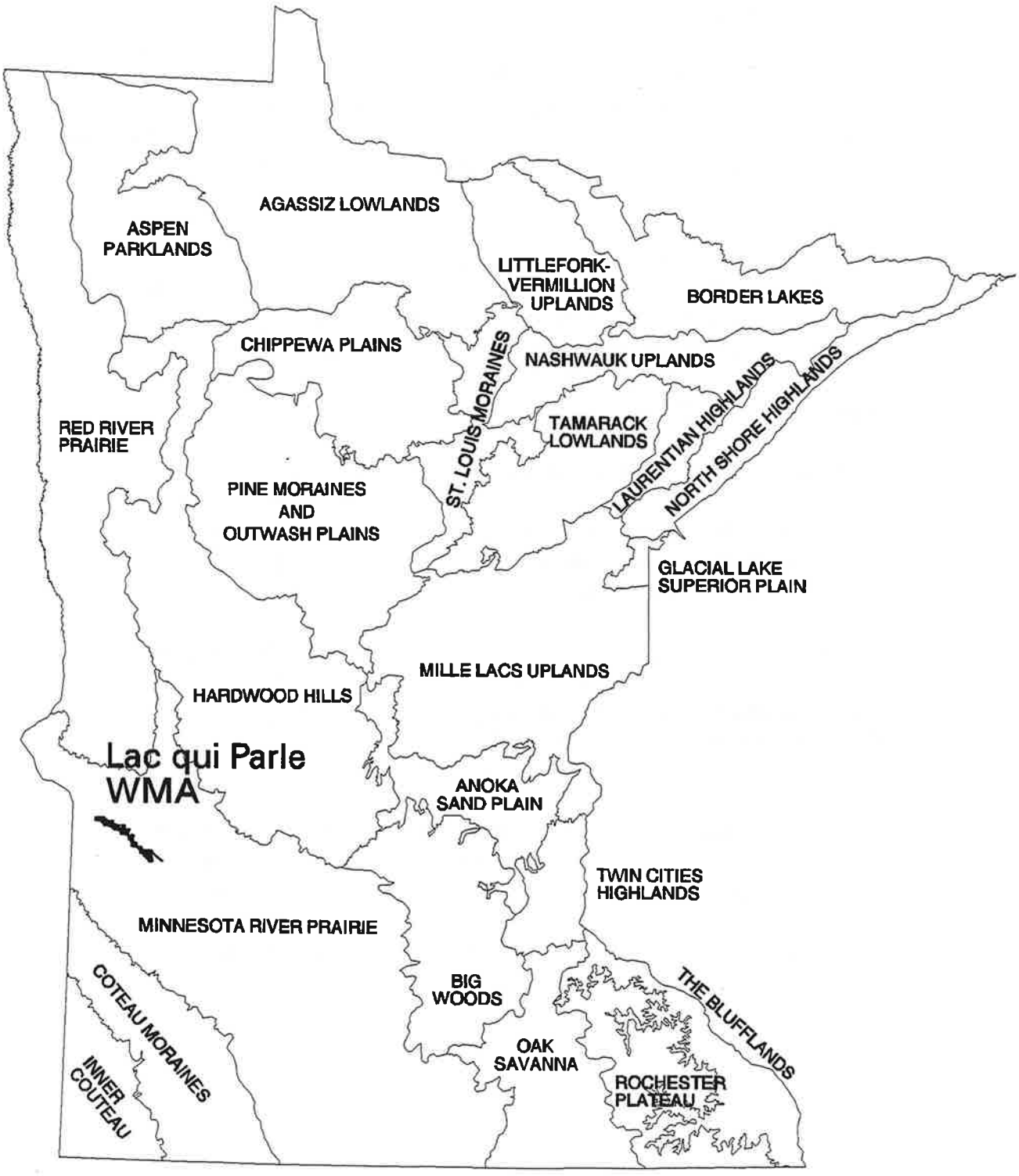
Ecological Classification System (ECS)

Subsection Map of Minnesota



acres in size (Dept. of Soil Science, University of Minnesota 1981). Many are shallow, perched lakes. Wetlands, very common before settlement, are now mostly drained.

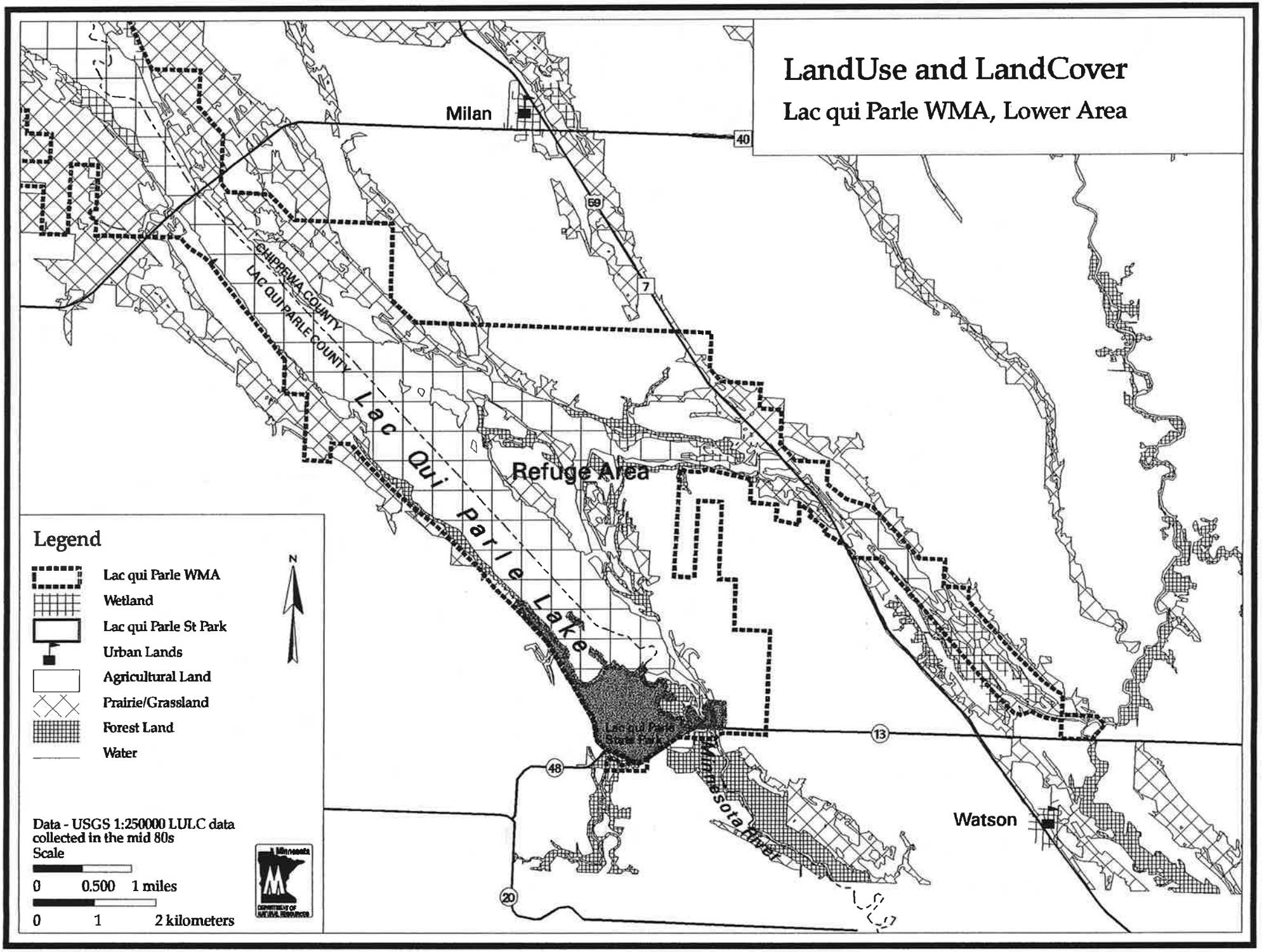
The Minnesota River watershed above Lac qui Parle Dam covers 4,050 square miles. A portion of the flow from the 2,050 square mile watershed of the Chippewa River is periodically diverted into Lac qui Parle Lake for flood control. The Big Stone Lake, Yellow Bank River, Pomme de Terre River, Lac qui Parle River, and Chippewa River watersheds all contribute to the Lac qui Parle area. The Little Minnesota and Whetstone rivers drain portions of eastern South Dakota and contribute to the watershed. In addition, there are several smaller watersheds that drain directly into the Minnesota River, Marsh Lake, or Lac qui Parle Lake.

The Pomme de Terre River enters Marsh Lake from the north just upstream of the Marsh Lake Dam, and the Lac qui Parle River enters Lac qui Parle Reservoir from the south just upstream of the Lac qui Parle Dam. Combined, the flow from these two tributaries contributes an average of about 30 percent of Minnesota River flow at the Lac qui Parle Dam. Three other streams enter the lakes, but contribute less than 10 percent of the average flow.

The Minnesota River watershed above Lac qui Parle Dam is an intensively farmed agricultural area, with growing of annual row crops the dominant land use. (See 3 Area Land Use Maps) The natural drainage network and hydrologic regime in the watershed has been greatly modified through wetland drainage, field drainage, ditching, and stream channelization.

The Lac qui Parle Flood Control Project was authorized as a Federal project by the Flood Control Act of 1936. The primary purpose is to provide flood protection to the agricultural areas downstream from Lac qui Parle Dam. This project has significantly affected the watershed, the WMA and the park. More details on the Flood control project can be found in the Surface Water section of this plan.

Three of the largest Minnesota River floods on record have occurred in the last decade. The trend for precipitation in the Minnesota River basin has been increasing, with an increase of over 2 inches in the average annual precipitation since 1935. (U.S. Army Corps of Engineers, Dec. 1994). The trend toward higher Minnesota River flows has been caused by changes in land use in the watershed, by extension of the artificial drainage network, and by climatic change.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Milan
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40
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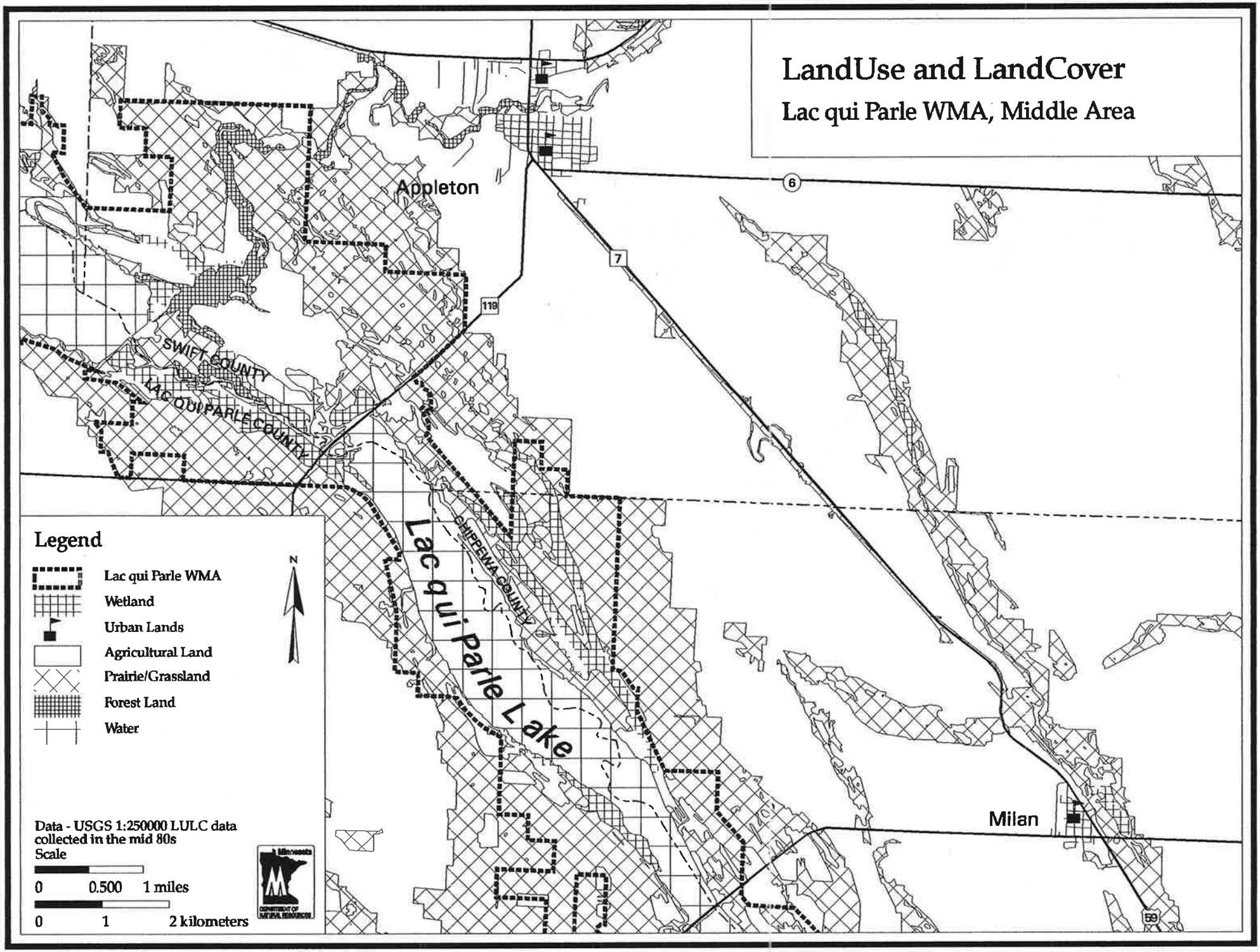
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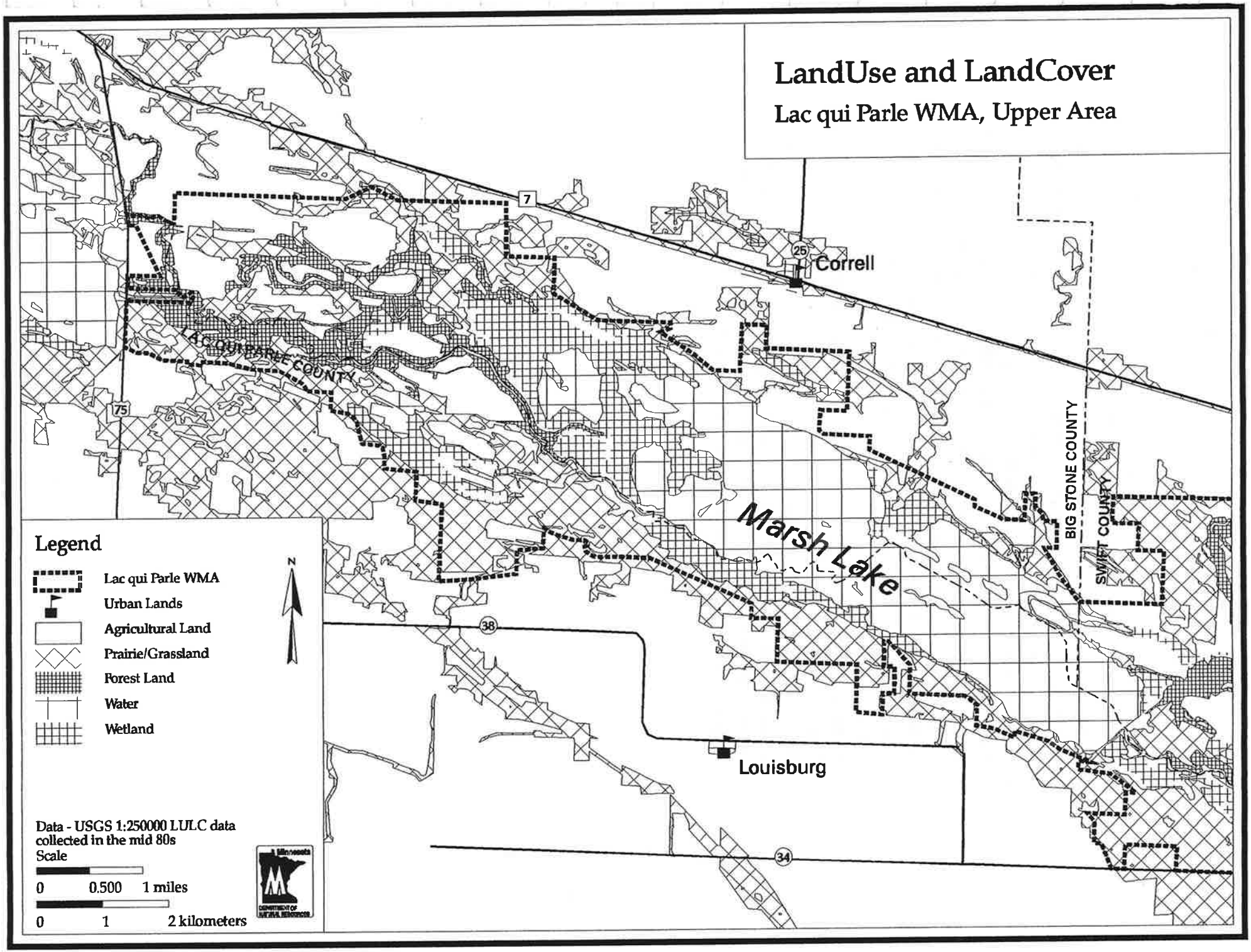
Lac qui Parle WMA, Middle Area
Appleton
Milan
6
7
119
59
SWIFT COUNTY
LAC QUI PARLE COUNTY
CHIPPEWA COUNTY
Lac qui Parle Lake
Legend
Lac qui Parle WMA
Wetland
Urban Lands
Agricultural Land
Prairie/Grassland
Forest Land
Water
N
Data - USGS 1:250000 LULC data collected in the mid 80s
Scale
0 0.500 1 miles
0 1 2 kilometers


LandUse and LandCover
Lac qui Parle WMA, Upper Area
Correll
7
25
75
LAC QUI PARLE COUNTY
BIG STONE COUNTY
SWIFT COUNTY
Marsh Lake
38
Louisburg
34
Legend
Lac qui Parle WMA
Urban Lands
Agricultural Land
Prairie/Grassland
Forest Land
Water
Wetland
N
Data - USGS 1:250000 LULC data collected in the mid 80s
Scale
0 0.500 1 miles
0 1 2 kilometers

Regional Issues

- The major conservation concern in this region is water quality in the Minnesota River drainage area. There is a significant pollution problem throughout the area. Urban pollution and intensive agricultural activities are often cited as primary causes of pollution, erosion and nutrient loading. Groundwater is extremely hard and many wells need extensive treatment to be fit for human consumption.
- Flooding also remains a major concern in this region. As more and more wetlands have been drained in recent years, and the drain tile system expanded, flooding now occurs at a more rapid rate and with greater volume than in the past.
- Another concern is preservation of existing prairies and wetlands and restoration of former wetlands that are presently drained and restoration of degraded prairies.
- The entire region has been losing population since 1940. This trend is expected to continue.
- Young adults often leave rural farm areas for more opportunities, resulting in a higher median age than the state average.
- Agriculture is the economic base of the region. Median incomes in this area are lower than the state and national average; unemployment is slightly higher than the state average but lower than the national average; and the poverty rate is higher than the state average and about the same as the national average.

Regional Population

Lac qui Parle State Park and Wildlife Management Area are located in four western Minnesota counties; the state park is situated in eastern Lac qui Parle County and the WMA is situated in Big Stone, Chippewa, Lac qui Parle and Swift Counties. The population for these counties as well as major cities within them is shown below. Data is from 1990 Census information.

County	1990 Population	Major City	1990 Population
Big Stone	6285	Ortonville	2203
Chippewa	13228	Montevideo	5499
Lac qui Parle	8904	Madison	1951
Swift	10724	Appleton	1552
TOTAL	**39141**	**TOTAL**	**11205**

The Lac qui Parle area is located in Legislative District 13B in western Minnesota. This district, according to the 1990 Census, has the largest proportion of people over 65 than anywhere in the state; 22.5 percent of its total population is over 65 compared with the statewide average of 12.5 percent.

District 13B also has a very small minority population. Less than 2 percent of the population in the district is non-white, compared with 6.3 percent at the state level and 24.4 percent at the national level.

The combined population of Big Stone, Chippewa, Lac qui Parle, and Swift counties in 1975 was 47,000 (Minnesota State Planning Agency 1975a). The 16 percent decline from 1975 to 1990 is significantly more than the 2 percent decline predicted in 1975. (Minnesota State Planning Agency 1975b). Future population losses at this level will have significant impacts on all aspects of the area's economy.

Tourism and Marketing

The Lac qui Parle area is accessible from several principle highways, however, there are no major interstate highways nearby. It is located 140 miles west of the Twin Cities in the Minnesota River Valley, northwest of Montevideo. The Visitor Analysis section of this plan gives further data on the number of visitors and revenue.

The Recrcation Market in the Lac qui Parle Region

Public hunting is the primary recreational use of the WMA, although thousands of bird watchers and nature observers visit the area each year. In the fall as many as 150,000 Canada geese may land at Lac qui Parle at one time. Geese are the most commonly hunted species, followed by duck, deer, and pheasants. Immediately upstream from the Lac qui Parle WMA is the Big Stone National Wildlife Refuge administered by the U.S. Fish and Wildlife Service.

Lac qui Parle State Park has approximately 50,000 visitors each year. The state park attracts a diversity of visitor groups including anglers, hikers, horseback riders, birders, skiers and campers. Visitation to the Corps of Engineers day use areas at Lac qui Parle Dam and Marsh Lake Dam has averaged about 200,000 visitor hours per year. One resort, five hunting camps and one sporting goods store are located on Lac qui Parle Reservoir. The Lac qui Parle area provides year-round fishing with excellent walleye, northern pike, crappie, yellow perch, catfish, and white bass fishing.

History and historic sites provide additional visitor attractions in the area. The Lac qui Parle Mission Chapel is listed on the National Register of Historic Places and played a prominent role before and after the U.S.-Dakota Conflict of 1862. The Camp Release Monument, on the edge of Montevideo, commemorates the release of 269 captives and the surrender of about 1200 Dakota people at the end of the conflict. The Fort Renville site is located about a mile from the Mission site. In Montevideo there is a 20 acre Chippewa City Pioneer Village and a restored railroad depot and turntable. Between Montevideo and Granite Falls is the Olof Swensson Farm Museum where an annual Threshing Show is held. In Milan is the Arv Hus Museum with Scandinavian art and historic photos. The Swift County Historical Museum is located in Benson and the Lac qui Parle County Historical Museum is in Madison.

Tourism is Growing in the Region

In the words of lifelong Montevideo resident and local business owner, Cheryl Gibbson tourism is "Finally coming alive out here."

The Tax Research Division of the Minnesota Department of Revenue keeps records of Annual Gross Sales by County of Eating and Drinking Businesses; Amusement and Recreation Industry; and Hotels, Motels, Resorts and Other Lodging Places. Of the four counties that Lac qui Parle is situated in, all four have shown an increase in gross sales from 1990 to 1993 (except for a slight drop in Eating and Drinking and Recreation sales in Big Stone County). Chippewa and Swift Counties showed the most increase in all three categories, in many cases, these two counties increased more than double the statewide average. The report also gives statewide totals for

these three market categories. When totalled together statewide, Eating and Drinking Businesses make up 69% of the gross sales; Amusement and Recreation is 13%; and Lodging accounts for 18% of sales. Of the four counties in the Lac qui Parle area, only Lac qui Parle County comes close to matching this ratio of sales. The other three counties have very low percentages of sales for Lodging, almost half the state average: Chippewa (9%), Big Stone (8%) and Swift (9%). This might indicate a shortage of lodging facilities in the region. A new hotel was opened in 1995 in Montevideo after three extensive feasibility studies showed indicators of growth and traffic flow. A similar hotel will be opening in Benson in 1996. Local citizens involved in tourism report even greater increases from 1993 to 1995.

The Chippewa County Historical Society reports a 65% increase in visitors to the Pioneer Village in Montevideo from 1994 to 1995. The Swensson Farm also reported a 60% increase in visitors for that same period. June Lynne, with the Historical Society notes that the county is becoming more of a travel destination rather than just a pass-through route. She also reports a significant increase in Genealogy Tourism, where people from all over the United States are searching for family records and are especially drawn to rural areas.

Economic Benefits

The Minnesota Department of Revenue and the Minnesota Department of Jobs and Training produce a report on the Economic Impact of Domestic Travel and Tourism. The following chart shows the data for the Lac qui Parle region.

County	Employees (No. Jobs)	Wages (Million dollars)	Output (Million dollars)
Big Stone	29	0.5	1.4
Chippewa	121	2.3	6.1
Lac qui Parle	No Data Available because of data confidentiality		
Swift	63	1.2	3.2

In a 1994 Minnesota Office of Tourism Survey, the average total trip expenditure per party was $738 for Minnesotans and $784 for non-Minnesotans. Non-Minnesotan "first-time visitors" had the highest daily expenditure per person ($53). The average was $35 per person per day.

There is local debate as to whether the one goose bag limit has caused the hunter traffic to decline. It is most likely due to increased hunting opportunities in other areas of the state. However, everyone agrees that hunters do have a major impact on the local economy. Two simple examples illustrate this effect. Local nonprofit groups hold Steak Fries in the Milan Legion Hall once a month throughout the year, except during the hunting season when they are held every Saturday night. In March 1995 they sold 100 steaks, but on an average Saturday during the goose season they will sell 500 steaks. The Appleton Luther League has a similar event with the Hunter's Breakfast fund raisers. Details of hunter usage can be found in the Visitor Analysis section of this plan.

A 1991 Economic Benefit Study of Minnesota State Parks indicated that Lac qui Parle State Park generates $62,276 in income annually, from out-of-state visitors who make up about 20 percent of the park's average 42,000 annual visitors. That is the amount of money out-of-state visitors spend in the area while visiting Lac qui Parle State Park. In addition, the area benefits from spending by visitors from the Twin Cities who vacation or visit the park throughout the year. Study results show that day visitors spend about $18 per day in local communities and that overnight visitors spend about $22 a day. Using 1994 data, total monies generated from visitors is estimated at $922,800 to the state and surrounding communities. The economic value of the sport fishery was estimated at $1,328,781 in 1994-1995.

Recreation Trends and Tourism Potential

In 1994, a survey conducted by the Minnesota Office of Tourism asked resident and nonresident tourists to list their principal reasons for vacationing in Minnesota. People surveyed were asked to list their top five interests from a list of 24 offerings. Here are the results of the top 10 interests.

Vacationers in Minnesota

	Minnesota Tourists			**Non-Minnesota Tourists**	
1.	Natural Scenery	75%	1.	Natural Scenery	70%
2.	State/National Parks	49	2.	State/National Parks	48
3.	Camping	43	3.	Historic Sites	43
4.	Historic Sites	41	4.	Shopping	43
5.	Fairs & Festivals	37	5.	Fishing	32
6.	Fishing	35	6.	Camping	30
7.	Visit Friends	28	7.	Fairs & Festivals	29
8.	Hiking	23	8.	Visit Friends	26
9.	Shopping	22	9.	City Sights	23
10.	Museums	20	10.	Museums	23

It is interesting to note that the top five interests are readily available in the Lac qui Parle area. Compared with a 1993 survey, camping moved up in the ranking, while fishing moved down slightly but still remains very high and visiting friends and relatives moved down.

Tourism is one of the fastest growing economic activities. Nationally, one in fifteen people work in travel related industry. Particularly in rural areas this will intensify. The challenge is to have tourism on the terms that are acceptable to the local communities. Authenticity, heritage and preserving the resources are important elements to keep in rural tourism. These are what people are looking for. Word of mouth continues to be the most important way to transmit information.

The following is a list of trends associated with outdoor recreation and tourism.

- Travelers want "life enriching" vacations. Over half want nature/outdoor experiences during their vacation.
- People are cutting their vacations short, but are taking more trips during the year. The average distance traveled is 75-100 miles. Trips of three days or less will increase in popularity.
- Technology is changing the way travelers get information. The Internet and other computer-based systems are increasingly being used to plan trips.
- Places that can offer "stress relief", peace, and quiet will be sought by travelers.
- Families are changing. The 1990 census shows that the number of married couples without children living at home surpassed the number of couples with kids. More single parent families are visiting recreation sites.
- Seniors are the fastest growing population, and they are leading healthier, more active lives. People now live 20-25 years beyond the age of retirement.
- User groups are changing. More women are recreating and recreating in activities traditionally dominated by men. More minorities and disabled persons are recreating.
- Recreation interests are changing. More expensive, high-tech recreation equipment/toys are being utilized. A high demand for fishing opportunities will continue, however a decline in demand for some hunting activities is anticipated. Nature tourism is growing, including viewing wildlife. There is an increased demand by travelers for educational vacations, including increased interest in rural history and culture.
- There is increased interest by the public to volunteer at parks and other loca tions .

The key to increased tourism in this region of the state will be for communities to band together in combining the various attractions of several areas into a single tourism destination. There are two attractions of national significance to appeal to tourists who are traveling on longer trips. Pipestone National Monument is 83 miles from Montevideo. As a national monument it attracts 100,000 to 120,000 visitors each year. The 11,000 acre Big Stone National Wildlife Refuge is one of seven National Wildlife Refuges in Minnesota. Tours could be designed with different orientations and emphasis around these and other attractions. For example an Indian history tour could trace the historic Indian sites and U.S.-Dakota Conflict; a wildlife viewing tour could connect many of the wildlife areas; a Scandinavian-American tour could also include various shops and museums; a historic tour could incorporate many of the historic sites; a farm tour might include visits to various types of farms or farm bed and breakfast facilities. These tours could also be packaged with various lodging accommodations.

Emphasis could also be placed on expanding the types of festivals that are appealing to most visitors -- arts and crafts, ethnic themes, and less to agriculture-oriented ones. Marketing efforts should also consider South Dakota in promotional efforts. The development of strong area tourism associations is key.

Supply and Demand of Recreational Facilities

Supply

The Minnesota DNR has maintained a database of recreational facilities since the early 1970s. While the listings of public facilities are generally up to date, some of the private facility listings can be somewhat dated.

The following table shows an estimate of the public and private recreational facilities within a 50 mile radius of the Lac qui Parle Area. 50 miles was chosen as a search area for its convenience within one hour's drive of the area. The majority of recreational facilities are located in the Minnesota River Valley. South Dakota data is not included in the chart below.

Recreation facilities within a 50 mile radius of the Lac Qui Parle Area

	Number of Facilities				Miles			
	Boat Accesses	Picnic Grounds	Campgrounds	Beach	Hiking Trails	Horse Trails	Ski Trails	Snowmobile Trails
US Fish & Wildlife	7	1	0	0	2	0	0	0
U.S. Corps of Engineers	4	2	0	0	0	0	0	0
DNR Trails & Waterways	83	6	0	1	0	0	0	21
DNR Fish & Wildlife	15	0	0	0	0	0	0	0
DNR Parks & Recreation	7	12	8	5	58.5	40.9	39.4	38.1
MNDOT	0	16	0	0	0	0	0	0
County	14	13	13	9	14	0	8	150
City	19	48	16	7	12.2	0	13.7	0
Public Subtotal	150	104	37	25	86.7	40.9	53.1	211.1
Private	20	28	26	32	3	0	2	0
Total	170	132	63	57	89.7	40.9	55.1	211.1

Boat Accesses

There are approximately 150 publicly administered boat accesses within 50 miles of the Lac qui Parle Area; the majority are administered by the Minnesota Department of Natural Resources. Of these, approximately 27 are carry-in accesses. There are also 20 private boat accesses within 50 miles of the area, bringing the total to approximately 170. Most of these are along the Minnesota River.

Picnic Grounds/Beaches

There are 104 public and 28 privately administered picnic grounds and 25 public and 32 private beaches within 50 miles of the Lac qui Parle area. The majority of these are located on or near the Minnesota River.

Campgrounds

There are 37 public campgrounds (or individually administered canoe campsites) within 50 miles of the area. There are also 26 private campgrounds within 50 miles of the Area. The following table shows the breakdown of Minnesota State Parks that provide camping within the 50 mile search area.

Minnesota State Parks that provide camping
within 50 miles of the Lac qui Parle Area.

Park	Drive-In Campsites	Horse-Campsites
Big Stone Lake	42	--
Camden	93	12
Glacial Lakes	39	3
Lac qui Parle	50	5
Monson Lake	20	--
Sibley	138	5
Upper Sioux Agency	45	45

Horse Trails

There are approximately 41 miles of horse trails within 50 miles of the Lac qui Parle Area. All of these trails are administered by the DNR Division of Parks and Recreation. However, there may be some private horse trails that are not included in the DNR's facilities database.

Bike Trails

There are two major segments of bike trails in this area. 4.8 miles of paved bike trail connects Montevideo to Wegdahl. In 1997 another 1.7 miles will be added in Montevideo and there are plans to add more to the urban bike system connecting city parks, schools, etc. Biking is allowed on the Auto Tour route in Big Stone Wildlife Refuge. There is some interest in having a bike trail that connects Mankato to Ortonville someday.

Snowmobile Trails

There are currently 211 miles of snowmobile trails within 50 miles of the Lac qui Parle area. 150 of these miles are County Grant-In-Aid (GIA) trails. GIA trails are funded by snowmobile registrations and unrefunded gas taxes through the Minnesota DNR to local units of government who in turn distribute the funds to local snowmobile clubs for trail development and maintenance. The remaining mileage in the 50 mile area is administered by the DNR Trails and Waterways Unit and the Division of Parks and Recreation.

Big Stone National Wildlife Refuge

This 10,790 acre refuge is adjacent to the Lac qui Parle area and was opened in 1974. A dam on the Minnesota River at U.S. Highway 75 impounds 4,000 acres of marshes and open water. The refuge includes nearly 6,000 acres of grasslands with small areas of bottomland hardwoods, granite outcrop, farm groves, and food plots.
Public facilities include a 2.5 mile auto tour road, nature trails, a picnic shelter-interpretative center, and 2 canoe accesses. No camping or off-road motorized vehicles are allowed. Public hunting of deer and upland game is allowed on 3,000 acres. Waterfowl hunting is prohibited. The refuge is managed to produce waterfowl.

Corps of Engineers Public Use Areas

The U.S. Army Corps of Engineers maintains public use areas on federal land below the Marsh Lake and Lac qui Parle dams. The 15 acre Marsh Lake area on the east bank of the Minnesota River contains a 50 space parking area. The 10 acre Lac qui Parle Dam use area has 36 paved parking spaces on the west bank and 50 on the east bank of the Minnesota River. Both areas have picnic tables, trash containers, vault toilets, and drinking water. Playground equipment is provided on the west bank of the Lac qui Parle Dam site.

Estimated visitation at the public use areas for the years 1991 through 1993 are shown below. Fishing accounted for most of the use, while hunters account for some use during the fall deer hunting season.

Year	Visitation
1991	95,394
1992	102,107
1993	115,800

Note: Visitation is calculated as "Activity Occasions", which is one person entering the area one time.

Nature Conservancy Land

The Nature Conservancy is a private organization whose primary objective is the preservation of natural areas. The Nature Conservancy owns two areas adjacent to the wildlife management area in Chippewa, Swift, and Lac qui Parle Counties. The 1,064 acre Chippewa Prairie is in Chippewa and Swift Counties about three miles west-north-west of Milan, and the 654 acre Plover Prairie is in Lac qui Parle County 4 miles north of Bellingham. These areas may be used for nature appreciation, observation, and photography. These areas are owned and managed by The Nature Conservancy with occasional assistance from the Lac qui Parle WMA staff during the prescribed burn season.

Private Hunting Camps

There are currently five private hunting camps in the area, offering hunting opportunities on private land.

Demand

State parks and wildlife management areas provide unique natural resource and recreational opportunities. These opportunities differ from most city, county and private recreational facilities due to the significant resources and atmosphere associated with them.

Even though other state parks and wildlife management areas located in the Lac qui Parle area offer different combinations of recreational opportunities and experiences, they can be used to provide an estimate of existing demand for state park and wildlife management services. The following table illustrate demand for state parks in the Lac qui Parle area.

1994 State Park Attendance in the Lac qui Parle Area

Park	Overnight Visitors	Total Visitors	% of Visitors that are camper
Big Stone	2,025	13,679	15
Camden	10,523	102,336	10
Glacial Lakes	7,382	23,141	32
Lac qui Parle	5,624	49,228	11
Monson Lake	1,053	8,590	12
Sibley	35,654	368,650	10
Upper Sioux Agency	1,578	41,727	4
50 Mile Region Total	**63,839**	**607,351**	**ave. 13**

NATURAL AND CULTURAL RESOURCES

Introduction

The Natural and Cultural Resources chapter provides detailed sections which inventory and describe the resources of the area. The Plan Recommendations section, at the end of this document, will serve as the resource management plan for the area; this section can be revised periodically as described in the last chapter of this plan.

Climate and Seasons

Temperatures in the Lac qui Parle Area average about 43°F, with highs in July and lows in January. Summer highs of more than 90°F are common, but they rarely exceed 100°F. Winter lows below 0°F occur frequently, and lows of -20°F usually occur yearly. The frost free period is 130 to 140 days.

Precipitation averages about 26 inches yearly. Total precipitation may vary 3 inches within the area, being less in the west than in the east. Approximately 65 percent of the annual precipitation falls during May and September. Annual snowfall averages about 34 inches. In Swift County, an average of 98 days per year have snow cover of 1 inch or more, with an average depth of 11 inches in March and about 8 inches from December through March.

The trend for annual precipitation in the Lac qui Parle Area has been increasing. Since 1935, average annual precipitation has increased over 2 inches in the area, resulting in higher Minnesota River flows. Flooding in the Minnesota River Basin has become an annual problem; three of the largest Minnesota River floods on record have occurred in the last decade (Corps of Engineers Operations Plan, 1994).

Waters

Water Resources

Groundwater

Groundwater in the region is recharged in the uplands and flows toward the river valley where it is discharged through runoff and evapotranspiration. Precipitation infiltrates the soil and moves through the relatively impermeable glacial till. Water flowing toward the valley concentrates in sand and gravel aquifers which occur as surficial deposits or as "lenses" buried up to 150 feet deep in the glacial till.

Wells in the Lac qui Parle WMA vicinity usually tap these sand and gravel aquifers and yield about 15 gallons per minute. These flows are adequate for rural domestic and livestock use. Larger wells yield an average 255 gallons per minute, a low to moderate supply for municipal, industrial, and irrigational uses.

Water quality is acceptable for domestic, industrial, and agricultural uses. The water from these aquifers is extremely hard, and levels of total dissolved solids, iron, manganese, and sulfate may exceed Minnesota Pollution Control Agency limits for Class 1-A domestic water supplies. Well water must be treated extensively to be fit for human consumption, and even after treatment, the water retains a harsh mineral taste. Surface sand and gravel aquifers occur irregularly and have high recharge capacity, but are easily contaminated.

Streams

The Minnesota River is the most prominent watershed feature of the Lac qui Parle area. The river enters the west end of the area and meanders through a wide floodplain with stream channels, potholes, and marshes before reaching Marsh Lake. Similar conditions exist between the Marsh Lake Dam and upper Lac qui Parle Lake. The gradient of the Minnesota River through the area is 0.4 – 0.5 feet per mile, descending less than 10 feet in 26 miles. Lac qui Parle and Marsh lakes are impoundments of the river that cover about 40 percent of the Wildlife Management Area.

Lac qui Parle County Ditch No. 13 enters the Minnesota River from the southwest, shortly before the river enters Marsh Lake. Five Mile Creek enters Marsh Lake from the north, near the center of the lake. The Pomme de Terre River enters Marsh Lake from the north, immediately above the Marsh Lake dam. A small tributary, Emily Creek, enters Lac qui Parle Lake from the west, above the State Highway 40 causeway. The Lac qui Parle River enters Lac qui Parle Lake from the southwest, just above the Churchill dam. Water from the Chippewa River flows through a U.S. Army Corps of Engineers diversion dam and a channel through the Watson Sag, entering Lac qui Parle Lake from the east.

Although peak flows can be substantial, these tributaries are generally slow flowing and often enter the lakes through marshy deltas. Discharges are variable, being highest in spring and after summer rains, and usually declining to little or no flow in late summer and winter. There is considerable variation from year to year in dis-

charge from the major tributaries. Substantial portions of the larger tributaries can be navigated with canoes or small boats. However, navigation can be hindered by low flows, downed trees or log jams.

All of the area's tributaries support an extensive artificial drainage system. Development of these drainage systems has had a profound effect on water quantity and quality in the Minnesota River and Lac qui Parle and Marsh lakes by decreasing infiltration and increasing runoff. For example, the mean annual runoff for the Lac qui Parle River watershed from 1931 to 1965 was 85,640 acre feet (USGS, 1991). The mean annual runoff has increased to 95,220 acre feet for the water years of 1931 to 1990. Consequently, the mean annual discharge of the Lac qui Parle River increased from 118 cfs for the water years of 1931 to 1965 to 131 cfs during 1931 to 1990. This means there has been a 27% increase in flow from the 1931-1961 flows to the 1966-1990 flows. Similar increases have been observed in the Pomme de Terre River.

However, not all of the increase in mean annual runoff and discharge can be attributed to drainage. Runoff and discharge can also be affected by yearly precipitation, and records at the University of Minnesota's West Central Experiment Station at Morris show above average precipitation for a ten year period starting in 1977 (Evans, 1991).

Higher discharges may lead to more frequent and more extensive flooding. A flood crest 4 feet above full bank may be expected once in 19 years on the Pomme de Terre River, and a 9 foot flood may be expected on the Lac qui Parle River once in 40 years.

The Chippewa River control works, diversion channel, and weir are part of the Lac qui Parle flood control system. A rolled earth fill dam is located on the Chippewa River, east of the Watson Sag. A 3,500 foot diversion channel runs from above the dam to the Watson Sag where diverted water flows over a concrete weir with a fixed crest at 938.8 feet. During the spring, inflow usually exceeds 1,500 cfs on the Minnesota River and 1,000 cfs on the Chippewa River. At this time, water flows from the Chippewa River through the diversion channel into Lac qui Parle Lake. When the Chippewa River flow drops to 1,000 cfs, water diversion to Lac qui Parle Lake through the Watson Sag is reduced but maintained at 3 to 6 cfs to prevent stagnation.

Marsh Lake

Marsh Lake has a surface area of 4,500 acres as planimetered from a 1953 lake map (MDNR, 1991), a surface area of 5,100 acres at a conservation pool level of 938 feet above sea level (U.S. Army Corps of Engineers, 1966) and a surface area of 6,100 acres according to DNR Division of Waters' Inventory of Minnesota Lakes (1968).

The maximum depth of Marsh Lake is about 5 feet. The shoreline length is 26.2 miles, and the maximum fetch is 6.1 miles. One farm and one hunting shack are located on the north shore of the lake. The immediate watershed use is 80% State Wildlife Management Area, 15% agricultural, and 5% forested or woodland. Shore-

line cover types are mixed hardwood fringe, cattails and grassland. Shoal water soils are 48% muck, 25% silt, 15% sand, 5% gravel, 5% clay, and 2% rubble/boulder.

Marsh Lake is impounded by an earth fill dam, approximately 11,800 feet long with a fixed crest concrete spillway and a 90 foot grouted riprap auxiliary overflow section . The elevation of the main spillway is 937.6 feet and the auxiliary spillway is 940 feet. A 2 foot square lift gate is located in the dam at 934.5 feet and allows drawdown of the lake through a concrete conduit. Since the elevation of the Marsh Lake dam cannot be regulated, discharges and the level of Marsh Lake are determined mainly by inflows, and the Marsh Lake dam provides very little flood control benefit. The level of Marsh Lake is typically about 938 feet, but has ranged from 927.75 feet to 944.55 feet.

Lac qui Parle Lake

Lac qui Parle Lake has a surface area of 5,589 acres as planimetered from a 1968 lake map (MDNR, 1989), a surface area of 6,400 acres at a conservation pool level of 931 feet above sea level, and a surface area of 8,400 acres according to DNR Division of Waters' Inventory of Minnesota Lakes.

The maximum depth of Lac qui Parle Lake is about 15 feet. The shoreline length is 37.7 miles, and the maximum fetch is 12.6 miles. One resort is located along the northeast shoreline just north of the MN Hwy #40 bridge. Three cottages are located on the southwest side of the lake. The immediate watershed use is 40% State Wildlife Management Area and State Park, 45% agricultural, and 15% forested or woodland. Shoreline cover types are hardwood fringe on gently rolling hills mixed with pasture, grassland, tilled cropland, and scattered marsh areas. Shoal water soils are 34% muck–silt, 38% sand, 20% gravel, 6% rubble, and 2% clay.

The Lac qui Parle (Churchill) Dam is 4,100 feet long and comprised of 2 rolled earth fill dikes and a 237 foot long concrete control structure. A paved County State Aid Highway has been constructed to cross the river via the dam. The west section of the dam is an emergency spillway with an elevation of 941.1 feet. The control structure contains 12, 17 foot long bays with varying discharge capabilities. Eight bays have spillways at 934.2 feet, and 5 of these bays can be closed with steel bulkheads. Three bays have vertical lift gates at 922.7 feet, and one bay has 3 vertical lift gates with a sill elevation of 915.2 feet.

The U.S. Army Corps of Engineers is responsible for operating the Lac qui Parle dam, primarily for flood control benefits but secondarily for recreation benefits. Operation of the dam was revised in 1995. During spring flood rises prior to May 15, inflows or dam capacity are discharged without exceeding the downstream urban flood damage targets of 13,000 cubic feet per second (cfs) or a stage of 17 feet. After May 15, releases will not exceed the downstream channel capacity of 2,500 cfs until the Lac qui Parle pool level reaches elevation 938.0. If the pool continues to rise and is forecast to exceed elevation 941.0 within the next 14 days, the discharge from the dam will be set at a constant value (which may exceed 2,500 cfs) so as to just reach the 941.0 pool elevation at the end of the 14 day period. The 14 day forecast is

updated each day with dam outflow adjustments made daily until the pool elevation peaks. During flood recession, inflow will be discharged until the inflow recedes to less than 2,500 cfs. Then, 2,500 cfs is released until the pool level recedes to elevation 933.0. Thereafter, releases are adjusted to maintain the summer conservation pool elevation of 933.0. Starting September 1, the Lac qui Parle pool level is increased to attain an elevation of 934.0 by September 30. That level is maintained until the end of February when the pool level is reduced to attain an elevation of 933.0 by March 15.

Discharge at Lac qui Parle dam has ranged from 0 to 29,000 cfs. The U.S. Army Corps of Engineers tries to maintain a minimum flow of 14 cfs through the dam. Flood control practices cause widely and often rapidly fluctuating water levels. The level of Lac qui Parle Lake has varied from 928 feet in 1976 to 941.95 feet. Rapid and wide fluctuation of water levels may be detrimental to both the water quality and the natural biota. Rapid water level fluctuations inhibit the development of typical aquatic communities and prevent the development of beneficial rooted aquatic plants (macrophytes). Rapidly declining water levels during spring spawning periods can be detrimental to fish production, and declining water levels in the late summer or fall can be detrimental to aquatic furbearers.

During periods of high discharge and high lake levels, the Lac qui Parle (Churchill) dam controls water levels on both Lac qui Parle and Marsh Lake reservoirs. A floodplain of 8,900 acres is inundated by normal spring flood levels of 940 and 941 feet above sea level in Lac qui Parle and Marsh lakes. The lakes have a combined capacity of 157,800 acre–feet of water at "full pool" level of 941.1 feet above sea level. The pools were designed to hold water up to the 945 foot contour. A flood crest of 3 feet over full bank level may be expected to occur every 22 years. Extended periods of high water levels at Lac qui Parle Lake have resulted in inundation and loss of mature hardwoods and severe shoreline erosion. High water levels have also curtailed use of Lac qui Parle State Park.

Lac qui Parle Dam Statistics

Drainage area	6,100 square miles
Maximum discharge of record and year	29,400 cfs, 1969
Conservation pool elevation	933.0 summer; 934.0 winter
Capacity at conservation pool	LQP=7,750 acres; Marsh=4,500acres
Full pool elevation	941.1
Embankment crest elevation	946.0

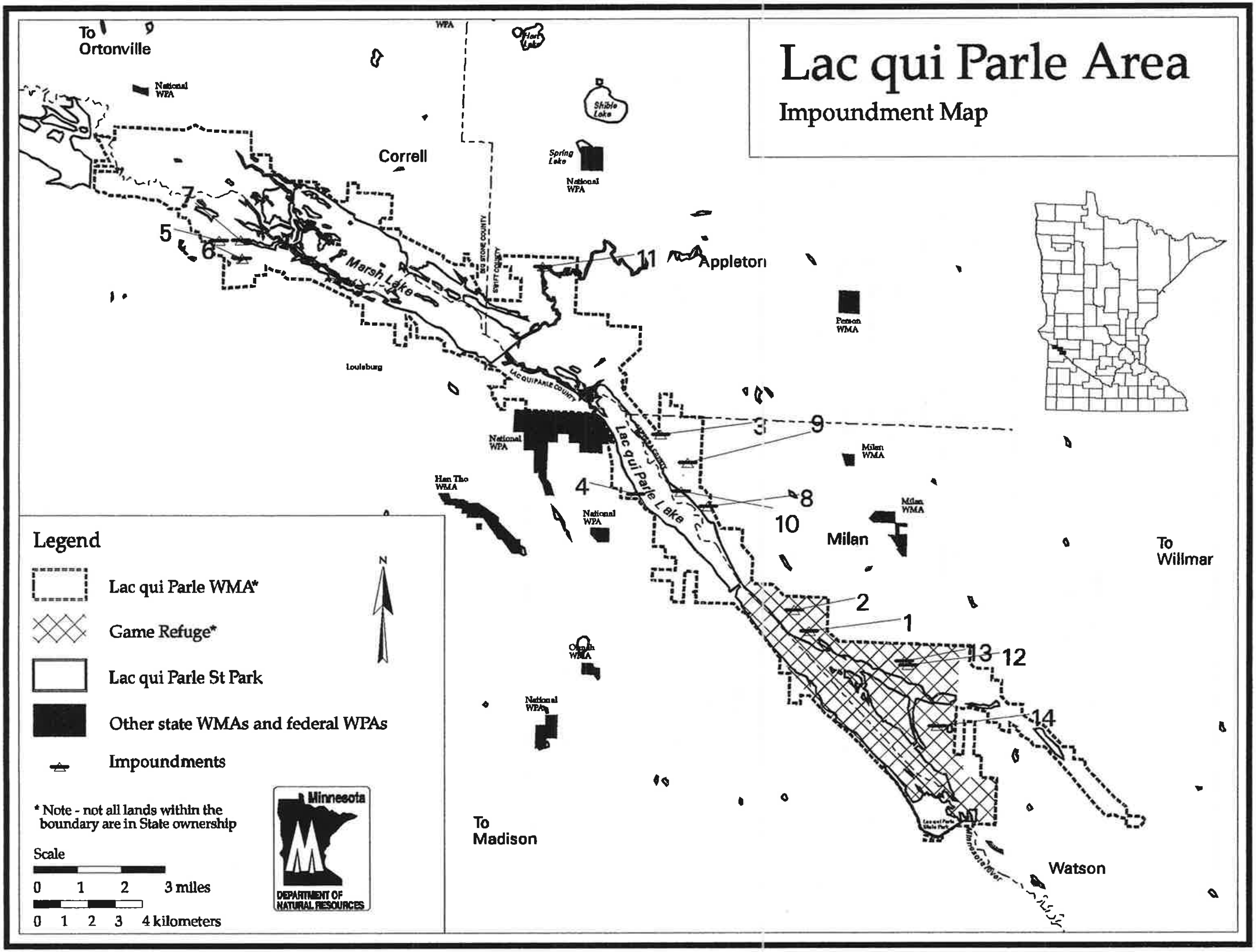
Wetlands

Most wetlands in the Lac qui Parle area adjoin Marsh or Lac qui Parle Lakes, but some upland areas contain potholes and impounded watercourses. There are 2,480 acres of Type II wetlands, 1,795 acres of Type III seasonal wetlands, and 5,500 acres of Type IV deep marsh, including Marsh Lake. Eight impoundments cover 425 acres with 170 acres of open water. Several dikes impound 572 acres in 14 wetlands (See Impoundment Table and accompanying Impoundment Map on the following pages).

Impoundments on the Lac Qui Parle Wildlife Management Area

No. *	Name	Date Built	Length of dikes (ft.)	Type of control structure	Acres of wetland
1	Engebretson-1	1960	900	Vegetated spillway	40
2	Engebretson-2	1960	190	Tube overflow	5
3	Lillijord	1965	500	Vegetated spillway	30
4	Avelsgard	1968	850	Vegetated spillway	10
5	Sotoberg-1	1973	1,000	Half riser	100
6	Sotoberg-2	1973	640	Half riser	80
7	Sotoberg-3	1976	950	Half riser	80
8	Big culvert	1978	1,000	Center riser	80
9	Mettlerkamp	1979	700	Center riser	40
10	Beaver	1982	600	Center riser	80
11	Williamson	1982	1,250	Center riser	20
12	Anderson-1	1988	150	Vegetated spillway	2
13	Anderson-2	1988	150	Vegetated spillway	2
14	Headquarters	1991	100	Vegetated spillway	3

*** Numbers denote location of individual impoundments on map**


Lac qui Parle Area
Impoundment Map
To Ortonville
National WPA
WPA
Correll
Spring Lake
Shible Lake
National WPA
Marsh Lake
Appleton
Person WMA
Louisburg
Lac qui Parle Lake
National WPA
Han Tho WMA
National WPA
Milan WMA
Milan WMA
Milan
To Willmar
To Madison
National WPA
Watson
Minnesota River
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Legend
Lac qui Parle WMA*
Game Refuge*
Lac qui Parle St Park
Other state WMAs and federal WPAs
Impoundments
* Note - not all lands within the boundary are in State ownership
Scale
0 1 2 3 miles
0 1 2 3 4 kilometers
N
Minnesota
DEPARTMENT OF NATURAL RESOURCES

The dikes are compacted earth with clay cores and are equipped with half risers, center risers, tube overflows, or vegetated spillway water level controls.

Water quality

Historical Perspective

Very little water quality data exists on the Upper Minnesota River prior to the early 1960s. Featherstonhaugh provided perhaps the first observation of the Minnesota River water quality in the fall of 1830. Featherstonhaugh found the water near Mankato to be very clear. He also noted that the Blue Earth River seemed to be more turbid. A 1909 map describes the sediments of Lac qui Parle Lake as sand and gravel. The average depth of the lake was about three to four feet in 1909. Some mud was recorded near the outlet of Lac qui Parle Lake. Mud was also noted upstream from historical Lac qui Parle Lake in a widening of the river channel.

In 1930, Arnold E. Sevareid published a journal of a canoe trip from Minneapolis to Hudson Bay. In his book "Canoeing with the Cree," Sevareid described the Pomme de Terre River as being crystal clear as it enters the muddy Minnesota River.

The historic Marsh Lake and Lac qui Parle Lake were formed from sediment transported by the Pomme de Terre and the Lac qui Parle River watersheds and deposited as deltas in the Minnesota River Valley forming natural dams. A dam was constructed by the Minnesota Game and Fish Commission in 1922 or 1923 on the Minnesota River, about 1.3 miles upstream from the present dam, which was constructed in 1939. The earlier dam was removed prior to the construction of the present dam.

Lac qui Parle Lake was clean and clear in the 1930s with an abundance of freshwater clams according to reports of local residents. During the 1940s, a decline in water quality was noted, and the water began to appear muddy. The first algae blooms were noticed in the 1960s and have become progressively worse since that time.

Construction of the Marsh Lake and Lac qui Parle dams caused profound changes in the hydrologic conditions of the Lac qui Parle system. The depth and retention time of the lakes increased and flows decreased. This decreased the carrying capacity of the river, resulting in an increase in sediment deposition within the basin.

Environmental conditions within the watershed also changed rapidly during the twentieth century. Prairie was replaced with cropland. Horse drawn agricultural equipment was replaced by steam and gas powered equipment. Continued improvements in technology provided more effective weed control and more fall plowed land. These conditions resulted in more erosion and runoff from the watershed. The advent of modern herbicides in the late 1950s and 1960s allowed farmers to eliminate all weeds from the fields, further increasing the potential for erosion and runoff. In addition, extensive drainage of wetlands occurred during this time. Wetlands serve as a sediment and nutrient sink and slow runoff. Currently all major tributaries support an extensive network of drainage ditches. These ditches changed the hydrology of the tributaries. Drainage ditches deliver water more rapidly to the tributaries and cause an increase in the effective drainage area in the watershed. This causes an

increase in the discharge of the rivers and greater potential for flooding. An increase in the peak flows will cause a greater amount of stream bank erosion, a major source of sediment. The Conservation Reserve Program (CRP) began in 1985 and has removed large amounts of highly erodible land from production. In addition to the changing agricultural industry in the watershed, towns and municipalities allow untreated storm water to discharge into the tributaries.

Streams

Lac qui Parle area tributaries have similar land use characteristics (predominately agricultural) and therefor similar water quality problems. However, some problems are more pronounced in some of the tributaries than in others. The major tributaries do differ in respect to basin morphology and geology. Because of these differences, problems such as stream bank erosion are more significant in some tributaries than others.

Surface waters of the Lac qui Parle area are relatively high in dissolved ions, but they are useful for nearly all purposes, including irrigation. Minnesota River water, if properly treated, is suitable for domestic use.

Fecal coliform counts are an indicator of human and/or animal waste contamination. Counts from the Pomme de Terre River in 1973 were far above the Minnesota Pollution Control standards for safe swimming. Those high coliform counts were attributed to inadequate sewage treatment two miles north of the area at Appleton, Minnesota. Coliform counts in the Lac qui Parle River are also high at times. Other than municipal or private sewage, most pollution comes from agricultural chemicals and animal wastes.

The Minnesota Pollution Control Agency lists all impaired water bodies as required by Section 304 of the Clean Water Act (Lac qui Parle CLWP). There are three lists based on the degree of impairment. Waters on the long list are impaired by point or non-point source discharge of toxic, conventional, and non–conventional pollutants. The medium list of waterbodies are impacted by toxic pollutants of any source. The short list of waterbodies are impacted by priority toxic pollutants that can be traced to a known point source (WCEC, 1992).

The Lac qui Parle River is included on the long list due to metal contamination in some segments. Parts of the Lac qui Parle River are on the medium list due to fish contamination (Lac qui Parle County Comprehensive Water Plan, 1991). The Minnesota Department of Health (MDH) (1994) has issued consumption advisories for certain sized carp from the West Fork Lac qui Parle River below Dawson, due to PCB contamination. The MDH has also issued consumption advisories for certain sizes of carp in the West Fork above Dawson, for certain sizes of northern pike and walleye in the West Fork below Dawson, and for certain sized northern pike in the Lac qui Parle River south of Dawson, due to mercury contamination.

The Lac qui Parle Watershed Project Association collected data on agricultural chemicals in water samples from the Minnesota River, Lac qui Parle River and the

Chippewa River diversion. All concentrations of parameters tested were below detection levels or below recommended allowable limits for drinking water. There appears to be considerable variation of total phosphorus, nitrate & nitrite, and suspended solids levels within data collected from the area's tributaries. Generally, highest concentrations were associated with spring melt or storm events. Major storm events can transport large quantities of phosphorus, nitrogen and sediment. These events can cause more nutrient and sediment loading in two or three days than in many months of normal flow. Phosphorus, nitrogen and sediment levels also varied among the tributaries, depending on land use, with highest levels associated with watersheds that drain predominately agricultural land.

Lakes

A 1975 environmental assessment of Lac qui Parle reservoir included water sampling of both Lac qui Parle and Marsh Lakes, testing for chemical, physical, and biological water quality parameters, and surveying planktonic and benthic organisms. The Minnesota Pollution Control Agency conducted a Lake Assessment on Lac qui Parle in 1988 with results published in 1991. The U.S. Army Corps of Engineers conducted a water quality monitoring program of Marsh Lake from June through November of 1991 (James & Barko, 1995). That study focused on wind–induced resuspension of bottom sediments, and subsequent nutrient release. West Central Environmental Consultants prepared a Lac qui Parle Lake Environmental Evaluation for 1991 to 1992, for the Lac qui Parle Lake Watershed Project Association (WCEC, 1992).

Lac qui Parle and Marsh lakes are productive, warm water lakes. Water temperatures can exceed 27° (80°F) in midsummer months. Dissolved oxygen is adequate for fish through most of the summer but may decrease to levels stressful to some fish in certain locations if winds are calm for long periods. Winter kills of fish may occur under ice and heavy snow cover.

Prevailing winds usually create enough wave action during open water periods to keep oxygen, temperature, and nutrient levels constant at all depths. The same wind and wave conditions, and/or the actions of nongame fish, can increase water turbidity by resuspending bottom sediments. This effect may be aggravated by a lack of rooted, submergent vegetation, and is more pronounced in Marsh Lake and the northwest basin of Lac qui Parle Lake because they are more shallow.

Human activities in the watershed undoubtedly contribute chemicals to the lakes. Pollutants from cropland and livestock operations as well as from municipal wastes are indicated by coliform counts. These substances are either assimilated by the lake biota or flow out of the lakes.

The Minnesota Department of Health has issued consumption advisories for certain sized walleye and white bass from Lac qui Parle Lake, and for certain sizes of walleye from Marsh Lake, due to mercury contamination. The MDH has also issued consumption advisories for certain sized carp in Marsh Lake due to PCB contamination (MDH 1996).

The Lac qui Parle Watershed Project Association and Minnesota Pollution Control Agency have collected data on agricultural chemicals in water samples from Lac qui Parle Lake. All concentrations of parameters tested were below detection levels or below recommended allowable limits for drinking water.

High total phosphate levels, high alkalinity, and moderate nitrate concentrations support midsummer "blooms" of blue–green algae on both lakes. The mean total phosphorus level in Lac qui Parle Lake for a 20 year period from 1970 to 1990 was .256 mg/L. At this concentration the lake is considered hypereutrophic.

Like the streams, there appears to be considerable variation of total phosphorus, nitrate & nitrite, and suspended solids levels within data collected from the area's lakes. Generally, highest concentrations were associated with spring melt or storm events, or high wind. High winds may resuspend bottom sediments and associated nutrients. The WCEC study evaluated the impacts of wastes from the large concentration of migratory waterfowl and concluded that the goose population does not have a large effect on the summer trophic status of Lac qui Parle Lake (WCEC, 1992).

Wetlands

The water quality of wetlands in the area has not been examined. Bottoms of the wetlands are soft muck, high in organic matter, and are easily disturbed by bottom feeding fish, cattle, or high winds. Disturbance of sediments and high planktonic populations create turbidity. Nutrients and sediments undoubtedly enter the wetlands from surrounding land uses.

Geology

The most important events that shaped the current landscape features of the management area were processes and materials associated with the continental glaciers. The Lac qui Parle area lies within the Minnesota River Valley, which was formed by erosion caused by the Glacial River Warren that drained Glacial Lake Agassiz. The geologic landscape exposed within the valley could be described as a systematic patchwork of different types of geologic materials. Beneath the soils of the area, there are four major units of geologic materials. The units are distinguished by age and general composition.

The youngest materials are alluvial deposits created from periodic flooding within the Minnesota River Valley floodplain. This unit contains silt, sand, and gravel that has been deposited in different combinations and locations over the past 9,000 years.

Next in age are the various deposits left from glaciers, especially the meltwaters from the last retreating glaciers during the timespan 12,000 to 9,200 years ago. The Glacial River Warren cut a deep valley down into the older layers of geologic materials, and deposited alluvial sediments at "high water" levels or terraces along the valley walls to create much of what we see today. The Watson Sag, a marshy arm of Lac qui Parle Reservoir, is a former channel of the River Warren. Lac qui Parle Lake was

formed behind the natural dam created by an alluvial fan deposited in the channel of the River Warren by the Lac qui Parle and Chippewa Rivers. Glacial drift deposits are from 0 to 200 feet thick in the management area.

The third unit includes saprolith, shale, marl, and mudstone from the last great age of dinosaurs, the Cretaceous period (65 to 135 million years ago). During this period, an inland sea episodically covered this area. Shales, mudstones, and marl were deposited. At times the sea receded westward, and dominantly nonmarine deposits of mudstone and sandstone accumulated. The sediments that are still preserved from those events occur in the areas between Appleton and Louisburg and also between Watson and Lac qui Parle. The Cretaceous sediments are between 0 and 100 feet thick in the management area. Commonly occurring beneath these sediments is a zone called saprolith, which is highly weathered, decomposed crystalline bedrock. This zone is up to 100 feet thick and in places contains a significant amount of kaolin clay.

The fourth, and oldest, unit includes the ancient, solid, crystalline bedrock that has been the core of a continent for 3,600 million years. This part of the state is within the tectonic element called the Gneiss terrane, and is composed of two different blocks - the Benson block and the Montevideo block. The Benson block is composed mostly of 2,700 million year old granite. The Montevideo block is composed mostly of 3,600 to 3,000 million year old gneiss and amphibolite. These rocks are some of the oldest in North America. The boundary between the two blocks is a major break in the crust called a thrust fault. This thrust fault stretches from Appleton to near Belgrade in Stearns County.

Mining has historically been a part of the industrial base of the region, with significant past production of dimensional granite, crushed granite, crushed limestone, kaolin, and sand and gravel. Currently, mining continues within the region for all those commodities except limestone. Although significant mining does not occur in the management area, the geologic setting is similar to the areas where mining is occurring.

The mineral potential for this region of the state, is moderate to high for crushed stone, dimensional granite, kaolin, and sand and gravel. More specifically, the mineral potential of each geologic unit can be described. Within the glacial drift, there is high potential for sand and gravel. Within the Cretaceous sediments in the region, there is high potential for kaolin and low to moderate potential for manganese. Within the Cretaceous saprolith, there is high potential for kaolin and low to moderate potential for gold, silver, platinum group elements, copper, and nickel. Within the Gneiss terrane, there is low to moderate potential for such elements as gold, silver, platinum group elements, copper, nickel, cobalt, and zinc, as well as diamonds. In this region we are aware of exploration only for kaolin at the present time.

While we have learned much about the *regional* geology in the last two decades, we still have much more to learn about the geologic setting on a *local* scale. That is because most of the geologic materials lie buried beneath other layers. Thus, we get

small glimpses of the geologic units in roadcuts or natural erosion exposures along the walls of the Minnesota River Valley or in six-inch diameter drill holes or water wells. However, we cannot see the other +99% of each geologic unit. Therefore, this lack of information about the geologic setting at the *local* scale limits our ability to describe the mineral potential for the management area in *local* scale terms.

Soils

Lac qui Parle is in the semiarid to subhumid plains region, characterized by the Chernozem great soil group. The US Natural Resources Conservation Service has mapped more than 41 soil series with more than 44 soil types in the area. Most soils were formed from calcareous glacial till, modified glacial outwash, or lacustrine or alluvial deposits under prairie vegetation. Chernozem soils have a dark, thick, humus-rich topsoil and contain an accumulation of calcium salts in the subsoil. Humic-gley soils, poorly developed highly organic mineral soils, were formed in marsh and river flat areas, and Solanchak or saline soils are found where a high water table or evaporation of shallow water concentrated mineral salts as the soil formed. Chernozem, Humic-gley, and Solanchak great soil groups are now classified in the Soil Order Mollisols, or "soft soils". The Chernozems and Humic-gleys are well supplied with nutrients and are highly productive agricultural soils when not limited by low precipitation or poor drainage.

The area's soils range from productive soils conducive to intensive agriculture, through stony soils and rock outcrops, to poorly drained or frequently flooded soils. The characteristic soil associations in the area are generally delineated by topography. In the Minnesota River bottoms, the alluvial soils are frequently flooded. Rising from the floodplain is the terrace escarpment, having easily eroded and droughty soils. Above the escarpment, soils occur on a flat, gently rolling terrace. These soils are variable and may be stony, poorly drained, or suited to agriculture. These soils are generally fertile and have been cultivated where limitations are absent or where drainage and stone removal are economically feasible.

Vegetation

Pre-European settlement Vegetation

The Lac qui Parle area lies within the grassland biome. The area is characterized by prairies, wet meadows, marshes, and scattered trees. The mid-grass prairies which dominated this region were a mosaic of tall and short grasses whose distribution was dictated by soil moisture. Low, chronically wet areas nearer the river were marshes, wet meadows, or clumps of trees and brush. Early records indicate that the area was generally rolling prairie and river bottom with a "small proportion being timber". Timber usually consisted of green ash, basswood, elm and cottonwood. Records and diaries from Fort Renville and the Lac qui Parle Mission indicate that there were trees along the Minnesota River in that area and south of the Mission, but from the Mission to Ortonville, there was no tree cover along the river banks. Near Ortonville the immediate Minnesota River banks had willow. On tributaries further south, elm, willow and box elder grew quite heavily along the Pomme de Terre River, and maples, elm, box elder and birch grew along the Chippewa River near Montevideo (Woolman).

Fire profoundly influenced pre-European settlement vegetation. Recurrent wildfires helped maintain the prairie and prevented the encroachment of bottomland hardwoods into the wet meadows. The bottomland hardwood stands developed on sites protected from fire, such as stream valleys and lakeshores, and once established, were quite resistant to ground fires.

Existing Vegetation

Only 2% of the original prairie remains in Big Stone and Lac qui Parle Counties. In 1987-1988 the MCBS identified 18,493 acres remaining in these two counties, out of the estimated original 807,104 acres of prairie. Since European settlement, the prairie soils were farmed where possible. Wet prairies and wet meadows were usually hayed, and stony prairies were often pastured. Woody vegetation has invaded the wet meadows with the practice of fire suppression. Forests were utilized by farmers for fuel and lumber. Because of fire suppression and tree planting, tree cover may be more extensive than pre-European settlement. The following section is a list and general description of plant communities which can be found in the Lac qui Parle area.

Bottomland Hardwoods The species composition of this community varies with soil moisture and disturbance. Along shorelines and stream channels, bottomland hardwoods are subjected to frequent flooding and have chronically water-saturated soils. Dominant tree species are cottonwood, peachleaf willow, and black willow. Common understory species are reed canary grass, rice cutgrass, slough sedge, blue verbena, and wild cucumber.

Bottomland hardwoods occurring in the interior of the river floodplain and on gentle valley slopes are dominated by American elm and green ash. Slippery elm, box elder, basswood, and bur oak may be locally common, especially on drier slopes. Tree canopies are high and closed, allowing little understory development. Characteristic

herbs include wood nettle, stinging nettle, lopseed, broad-leaved goldenrod, white snakeroot, pink wood violet, and waterleaf. Shrub species occurring are wild black currant, Missouri gooseberry, prickly ash, and common buckthorn and are most common in openings and edges. Woodbine, wild grape, and poison ivy are also common. Bottomland hardwoods near the tops of steep slopes and adjoining the grasslands occur on soils that are dry much of the year. Dominant trees include green ash, box elder, bur oak, and basswood. Bur oak characteristically occupies the very top of the slope at the edge of the forest. Shrub species are most prevalent near the grassland edges and include wild black currant, choke cherry, snowberry, and smooth sumac. Herbs include pink wood violet, bedstraw, longbeaked sedge, catnip, white avens, lopseed, and columbine.

Plant species composition on any bottomland hardwood site will be stable unless a change in soil conditions or a disturbance occurs. Along shorelines and stream channels, reduced flooding will favor vegetation similar to the interior of the floodplain. Should floodplain soils become drier, basswood, green ash, box elder, and bur oak will increase. American elms throughout the bottomland hardwood community are dying of Dutch elm disease and are being replaced by silver maple and green ash.

Mixed Woodlots This community includes woodlots dominated by box elder with occasional American elm and hackberry. Ground layer species are variable and burdock is usually common.

Vegetational changes are influenced by site characteristics. Sites located near the lakes will succeed to bottomland hardwoods. On dry sites, dominant trees will remain the same, with green ash or bur oak invading the edges. With frequent fires, these areas will revert to grasslands.

Lowland Brush This community is intermediate between a wet meadow and bottomland hardwoods. Shrubs and small trees such as peachleaf, sandbar, and heart leaved, willows dominate. The understory may contain cottonwood, box elder, and green ash seedlings. Herbs in the ground layer include several sedge species, reed canary grass, rice cutgrass, and squirrel tail grass, as well as wild cucumber, beggarticks, smartweeds, licorice root, wild mint, bugleweed, and giant ragweed.

Without disturbance, a willow-green ash-elm community will succeed this community. Frequent fires will convert the lowland brush type to wet meadows or temporary wetlands. Cottonwoods usually require bare soil for germination.

Prairies Prairies exist along a moisture gradient ranging from moist to very dry but are not mapped separately because of their small areas and intergradations.

Wet prairies are limited in extent and occur near the edges of wet meadows or on sites receiving runoff. Wet prairies are prairies on deep, poorly drained, silty clay loam to sandy loam soils. Typically they occur within the abandoned glacial-river channels in the Minnesota River Valley and in broad northwest-southeast drainageways in the western part of Lac qui Parle county. Cover grasses are mainly

prairie cordgrass, northern reedgrass, and sedges. Common forbs are great blazing star, yellow stargrass, New England aster, golden alexanders, bottle gentian, and giant goldenrod. Smooth wild rose is a commonly occurring shrub.

High ground in the Lac qui Parle area was originally prairie. Today, this area is now classified as mesic prairie. Mesic prairies are prairies on deep, moderately drained to well-drained loamy soils formed in calcareous glacial till or alluvium. They occur mainly on level terraces in the Minnesota River Valley and in abandoned glacial-river channels. These areas depend solely on precipitation for moisture. Mesic prairies are typically dominated by big bluestem and Indian grass. In areas with more moisture, switchgrass increases; and in dryer sites little bluestem, sideoats gramma and porcupine grass increase. Characteristic herbs include prairie coneflower, stiff goldenrod, heartleaf golden alexanders, purple prairie-clover, white prairie-clover, smooth blue aster, Missouri goldenrod, northern bedstraw, rattlesnake-root, violet wood sorrel, Maximilian's sunflower, rough blazing star, black sampson, silverleaf scurfpea, Indian breadroot, white prairie aster, and prairie birdsfoot violet. The shrub-like lead plant is also common.

The driest prairies occupy steep slopes and ridge tops and are uncommon in the area. Characteristic grasses are little bluestem, stony hills muhly, sideoats grama, blue grama, prairie sandreed, plains reedgrass, and prairie junegrass. Other common and characteristic species include sun sedge, spreading pasque flower, alum root, early goldenrod, hairy gold aster, white prairie aster, narrow-leaved blazing star, and white wild onion. Western snowberry, a shrub, is also present in small, dispersed clumps. Prickly pear and ball cacti often occur where thin soils and bedrock exposures provide some protection from fire.

Internal replacement, or micro-gap succession, is common in prairies. Succession occurs as plants invade areas typically disturbed by burrowing mammals and mound building ants. Prior to their extirpation, bison also created large disturbed areas. Disturbed areas are invaded by biennials and short-lived perennials such as the native common ragweed, fleabane, daisy, prairie thistle, evening primrose, Canada wildrye, wooly vervain, and introduced species such as quack grass, sweet clover, yarrow, and dandelion.

Prairie composition may change with changes in soil moisture. When the soil moisture increases or decreases, species adapted to the new conditions begin to dominate a site. Fire also influences the vegetational composition. Prolonged fire exclusion may allow woody vegetation or exotic species to invade prairies.

Old Fields. Old fields are abandoned agricultural lands, primarily haylands or pastures. The species composition depends on the length of abandonment, site characteristics, former use, and other factors. Old fields often have introduced grasses and are vegetated by both exotic and native prairie herbs. Dominate species include smooth brome grass, Kentucky and Canada bluegrass, quackgrass, redtop and in wetter areas, reed canary grass. Secondary prairie succession can occur in old fields if there is a nearby source of prairie plants for colonization to occur. Woody invasion into old

fields is common and may be controlled by frequent burning which may also help prairie plants to colonize.

Cropland Most of the cropland on the WMA unit is farmed by cooperating farmers to provide fall and winter food for concentrations of waterfowl, deer, and upland game. During the 1990 through 1994 crop years, an average of 2,171 acres were leased under cooperative farming agreements which provide the state with one-fourth of the crop, or in certain agreements, one-third of the corp. An average of 360 acres of corn were left standing during these years with an average of $7,564 received from salvage corn payments. Haying and grazing permits are issued for additional acres.

The Lac qui Parle WMA work crews plant an additional 325 to 350 acres of food plots each year for resident and migratory wildlife species. Specifically, 210 acres are planted for Canada goose management, 175 acres of this is planted on Rosemoen Island. The remaining 110 acres are scattered throughout the unit and provide an important food source for resident wildlife species throughout the winter months. Other benefits include keeping the wildlife next to good winter cover, reduced depredation on nearby private land, and provides hunting recreation.

Seasonally Flooded and Wet Meadow Wetlands (Type I and II). These wetlands occur in low areas adjacent to the lakes and streams and contain water for several weeks during the spring and following summer floods. Soils are water-saturated to within a few inches of the surface throughout all but the driest growing seasons. These communities usually intergrade with lowland brush, bottomland hardwoods, moist prairies, or aquatic communities.

The species composition is influenced by soil moisture. In the wettest areas, broadleaf and narrowleaf cattail are mixed with common cane. Species occurring near open water are American waterplantain, needle spikerush, prairie cordgrass, beggar-ticks, and swamp milkweed. In drier areas, rice cutgrass, reed canary grass, and slough and wooly sedge dominate. Forbs occur most often in openings or disturbed places and include smartweeds, docks, water horehound, wild mint, hedge nettle, Canada thistle, and field horsetail. Cottonwood or willow shrubs occur along the community margins.

Vegetational changes depend on water depths and fire frequency. Permanently high water levels will encourage cattail, common rush, bulrush, and spikerush, With lower water levels, grasses and sedges will dominate, and moist prairie species will invade. Fire exclusion would result in the establishment of bottomland hardwoods. Encroachment by willow and cottonwood is evident in many temporary wetlands.

Shallow Marsh Wetlands (Type III). These communities have spring water depths up to 3 feet but are usually dry by mid to late summer. Cattail is often interspersed with common reed. Along open water, bulrushes, American water plantain, duck potato arrowhead, and giant burreed occur. Submerged species including the pondweeds, water milfoil, and common bladderwort, appear irregularly. Duckweeds, docks, spikerushes, and several annual forbs also occur.

Vegetational changes are variable. As basins fill with sediments and decaying plant material, these wetlands will become wet meadows, lowland brush, and bottomland hardwood communities. Increasing water depth and permanence will eliminate cattail stands and favor emergent and submergent aquatic species. Fire will invigorate growth and reproduction of many plant species and will maintain the stand composition.

Deep Marsh Wetlands (Type IV). Wetlands with deep open water (up to 5.5 feet), usually surrounded by cattail and common reed, are semipermanent wetlands. Common species include the cattails, smart weeds, docks, and spikerushes. Emergent vegetation, such as bulrushes, arrowhead, and giant burreed, are lesser components. The pondweeds, water milfoil, and common bladderwort may also occur but are limited by the water turbidity. Succession will lead to seasonal wetlands, temporary wetlands, and wet meadows if siltation caused by the impoundment of water exceeds that removed by annual floods. In most cases, these marshes are flushed directly by the river, and basin filling is retarded.

Open Water. Open water (often over 5.5 feet deep) occurs in deep wetlands and lakes, with emergent and submergent vegetation near the shore and in shallows. A 1991 fisheries survey of Marsh Lake indicated about 20% of the lake surface was covered by standing emergent vegetation (MDNR, 1992). Narrowleaf cattail and cane were considered abundant, cord grass was considered common, and softstem bulrush, hardstem bulrush and smartweed were present. Submerged plants were observed growing to a depth of 5.5 feet. Sago pondweed was considered abundant, with beds present throughout the lake and heaviest concentrations from the islands in mid lake to the northwest shore. Coontail was observed occasionally, and flatstem pondweed was present. Lesser duckweed was observed occasionally and greater duckweed was present. Vegetation abundance has been extremely dynamic and has changed since the 1991 survey.

A 1989 fisheries resurvey of Lac qui Parle Lake indicated about 5% of the lake surface was covered by standing emergent vegetation (MDNR, 1990). River bulrush was considered abundant, common cattail and hardstem bulrush were considered common, and narrowleaf cattail, chufa, cord grass, and arrowhead were present. Submerged plants were limited to sago pondweed, observed growing to a depth of 4.0 feet and considered common. Greater and lesser duckweed were present.

Water depths and turbidity generally prevent plant growth over much of open water areas. In the case of Marsh and Lac qui Parle Lakes, rapid and extreme water level fluctuations inhibit the development of typical aquatic plant communities and prevent the development of beneficial rooted aquatic plants. This leads to unstable substrates, prone to sediment resuspension by wind or bottom feeding fish, which increases turbidity and compounds water quality problems. However, extreme drought periods, such as 1976-77, can expose lake bottoms at the upper ends of the lakes. This creates conditions which allow cattails and other submergent vegetation to become established. Extensive stands of cattails were established in the upper end of Marsh Lake during this period.

Wildlife

Introduction

The Lac qui Parle area offers excellent opportunities for wildlife watching. Wildlife diversity is supported by the variety of habitat types and abundant water resources. Spring and fall migration brings thousands of geese and waterfowl as well as other migratory birds.

Mammals

Since European settlement, the number and species of mammals found in the vicinity has changed. Bison, pronghorn antelope, elk, mule deer, and eastern timber wolves were a part of pre-settlement prairie fauna. An occasional grizzly bear also occurred. Cultivation, fencing, and uncontrolled hunting were responsible for the reduction in number and elimination of some mammals from the Lac qui Parle vicinity.

Fifty-two mammal species are known to probably occur on the area. Moose, mule deer, and pronghorn antelope are casual visitors. Mammals from the grassland, deciduous forest, and northern coniferous forest biomes contribute to the diversity of the area.

Because small mammals are inconspicuous, their distribution and abundance is difficult to assess. The most common small mammals include: white-footed mouse, deer mouse, shorttailed shrew, meadow jumping mouse, meadow vole, prairie vole, masked shrew, and redbacked vole.

Eastern cottontail, white-tailed jackrabbit, gray squirrel, fox squirrel, raccoon, white-tailed deer, and (rarely) mule deer are hunted with firearms during Minnesota DNR authorized seasons. Beaver, muskrat, mink, and raccoon are trapped for fur by permit only. Coyote, red fox, and gray fox are also hunted and trapped during the late fall and winter. During the same period, badgers, weasels, and skunks, all unprotected, are trapped under permits. All mammals are protected on the management area from March 1 to September 1. The white-tailed deer is common, especially in the fall and winter. The table on the following page summarizes the Fur Harvest.

Fur Harvest Report from 1976-94 on the Lac Qui Parle Wildlife Management Area

Year	No. of Trappers	Muskrat	Mink	Weasel	Raccoon	Fox	Coyote	Beaver	Total Harvest	Est. Fur Value ($)
1994	10	238	27	5	247	5	0	92	614	4,345
1993	11	286	21	5	82	3	0	45	442	1,512
1992	9	274	62	2	73	29	0	18	458	2,529
1991	10	85	26	6	70	33	3	13	236	1,224
1990	11	62	34	1	86	37	1	35	256	1,693
1989	15	57	17	0	63	21	0	49	207	1,505
1988	28	47	37	0	80	62	1	48	275	3,141
1987	28	1,601	90	1	100	68	2	135	1,997	12,877
1986	22	1,636	48	0	195	32	1	118	2,030	13,407
1985	26	970	63	2	73	36	0	18	1,162	5,048
1984	29	1,146	40	0	31	26	0	50	1,293	6,068
1983	32	997	53	1	98	37	0	63	1,249	6,633
1982	35	799	63	2	93	36	0	6	999	5,714
1981	31	1,799	80	2	92	74	0	31	2,078	15,482
1980	36	2,815	92	4	129	66	1	110	3,217	27,031
1979	27	759	71	7	98	42	0	40	1,017	13,346
1978	12	206	47	5	27	29	4	0	318	5,713
1977	25	Closed	14	2	20	44	2	3	85	3,117
1976	31	27	51	14	47	90	6	43	278	7,567
Total Harvest		**13,804**	**936**	**59**	**1,704**	**770**	**21**	**917**	**18,211**	
Total Fur Value		**47,702**	**22,163**	**62**	**28,453**	**25,585**	**694**	**13,293**		**137,952**

Birds

A total of 253 species of birds is likely to occur in the vicinity. Migrants and winter visitors account for 148 species, and 6 species have been observed only casually. Breeding species include representatives of the wetland, grassland and deciduous forest ecosystems, and migrants include species breeding in the grassland, coniferous forest, and tundra. Ring-necked pheasant and gray partridge (Hungarian) nest on the area, and neither is native to the United States.

Waterfowl Management

Blue-winged teal, mallard, and wood duck are the most abundant breeding ducks. The ruddy duck is the most commonly nesting diving duck, but secure nest sites are limited due to fluctuating water levels which flood over-water nests.

The Lac qui Parle area lies within one of the most heavily traveled duck migration corridors in the United States. Most migrants originate from Alberta, Manitoba, North Dakota, and Minnesota, but others come from subarctic and arctic nesting grounds in western Canada and Alaska.

The mallard is the most abundant migrant species. Duck species most commonly taken by hunters are: mallard, green-winged teal, blue-winged teal, lesser scaup, wood duck, American wigeon, pintail, northern shoveler, and gadwall.

Resident Canada Geese - Present Programs

Giant Canada geese were transplanted to the Lac qui Parle WMA to establish a resident flock and to attract migrating geese. The first transplant, from the Tamarack National Wildlife Refuge in 1958, consisted of 42 pinioned giant Canada geese. From 1961 to 1963, a total of 130 goslings raised at the Carlos Avery game farm were wing-clipped and released in pens on Rosemoen Island. In 1965 and 1966, an additional 130, 3-year old geese from the Carlos Avery game farm were added to the flock. The first nests were found in 1961.

A self-sustaining resident Canada goose flock has been established. Secure nesting and brood rearing habitats are provided throughout the unit and the use of artificial nesting sites (goose tubs) are monitored each spring.

No population surveys have been conducted in recent years, but observations indicate resident goose numbers are stable or slightly expanding on the unit. Until 1988, local geese were drive-trapped and fitted with USFWS legbands each July when young and adults were flightless. Band returns were used to determine the migratory patterns of geese.

Normally only 1 or 2 crop depredation complaints are received each summer. The complaints usually center around the north side of Marsh Lake, an area where private cropland abuts the lake. The lack of complaints does not indicate a low resident goose population, but illustrates the fact that Lac qui Parle WMA owns

most land surrounding both Lac qui Parle and Marsh lakes. Complaints are responded to within 1 working day and abatement techniques follow proven methods and section guidelines.

Migrant Canada Geese - Present programs

The numbers of migrating Canada geese have steadily increased since the reestablishment of the resident flock. Peak fall Canada goose numbers rose from 150 in 1958 to 70,000 in 1975 and in 1995 to 150,000.

The migratory Canada geese are mostly from the Eastern Prairie Population (EPP) which nests near the southwestern shore of Hudson Bay and winters in Missouri. An estimated 70 to 80 percent of the EPP, numbering about 225,000 in midwinter, use the management area during migration. The EPP consists mainly of medium-sized Interior Canada geese. In addition, minor numbers of giant Canada geese and "small" Lesser and Richardson's Canada geese also use the area. Hunter bag checks on the area indicate that 75 percent of the harvested birds are medium-sized EPP Canadas and the remainder are giants and "small" geese.

Major goose management areas in Minnesota include: Roseau River WMA, Thief Lake WMA, Agassiz National Wildlife Refuge, Big Stone National Wildlife Refuge, and Elm Lake WMA in the northwest; Lac qui Parle WMA, and Talcot Lake WMA in the southwest; and the Rochester Goose Refuge in the southeast. Minnesota's goose regulations take into account the status of several different populations of Canada geese. These can be grouped into 3 categories: large (over 10 pounds), medium (6-10 pounds), and small (less than 6 pounds). Large geese include those that migrate from the Interlake region of Manitoba and winter near Rochester, and giant Canada Geese that nest in Minnesota. Medium-sized geese that migrate through Minnesota include those from the EPP and Mississippi Valley Population. Small Canada geese (Tall Grass Prairie Population) are most prevalent in northwestern Minnesota during migration.

Geese begin arriving at Lac qui Parle in mid-September and exceed 40,000 by the first week in October. After October, numbers vary yearly. Most of the Canada geese leave before the first week in December, with 2,000 to 3,000 geese overwintering on the area.

Refuge for migrant geese is provided by an 8,500 acre refuge, a 5,200 acre limited no trespass zone, and a year round no trespass zone consisting of Rosemoen Island and 4 nearby islands. Corn, winter wheat, soybean, and pasture are available as goose food in the refuge.

The Canada goose harvest in the vicinity is monitored daily, and the goose hunting in the Lac qui Parle Zone is ended by Minnesota Statues 48 hours before the harvest quota is reached. All geese shot in the controlled hunting zone are checked and counted at refuge headquarters. The Canada goose kill in the remainder of the Lac qui Parle Zone is estimated by WMA personnel from two 25-mile surveys completed each day. Hunter numbers and success are recorded and extrapolated to estimate the

daily kill.

Refuge personnel estimate the numbers of geese using the refuge each week from mid-September through January. Goose numbers are estimated during midday roosting periods on the entire management area from vantage points on land. The manager and assistant manager make independent estimates. These estimates are compared with weekly or biweekly DNR Wildlife Research aerial estimates.

Wildlife personnel provide propane operated "exploders" and technical assistance to landowners experiencing crop damage by geese. The provision of adequate crops in the refuge, efforts to keep the hunting season open as long as possible, and favorable fall weather have prevented large-scale crop damage.

Wildlife personnel check shoreline areas regularly for signs of disease whenever more than 1,000 geese are on the refuge. If unusual mortality is observed the Lac qui Parle Disease Contingency Plan is implemented immediately. Samples are collected and sent to MNDNR Pathology Laboratory and the USFWS Madison Laboratory for disease confirmation. The Lac qui Parle Disease Contingency plan guides wildlife personnel on appropriate steps to follow during disease outbreaks. The plan is updated annually.

Other Geese

Snow geese and white-fronted geese also use the area during migrations. Peak snow geese numbers have historically ranged from 500 to 6,000. However, in recent years with the development of large impoundments in the Dakotas, the snow geese populations at Lac qui Parle has dropped to less than 100 at a time. There are seldom more than 100 white-fronted geese on the area. Canada goose numbers peak at about 25,000 in the spring, while few snow geese or white-fronted geese are seen.

Regulatory Authority At Lac qui Parle for Migratory Birds

The U.S. Fish and Wildlife Service has the overall authority for migratory birds because of the Migratory Bird Treaty Act and the fact that birds cross state and national borders. Nationwide, all state migratory bird seasons must fit within the framework of regulations set by the federal government. The states may be more restrictive but they may not be more lenient.

The three major areas of the framework are:

1) Dates when the hunting seasons may begin and end
2) Maximum number of days that hunting is allowed
3) Maximum bag limit allowed

Throughout Minnesota, state regulations set the maximum limits allowed by the Federal government for both number of hunting days and bag limit. The U.S. Fish and Wildlife Service recognizes the key role that Lac qui Parle plays as a migratory stopover site. Therefore, they have established specific restrictions for the Lac qui Parle zone that are even more restrictive than for the whole West-Central Goose Zone.

At Lac qui Parle the 1995 federal Canada goose season allows:

1) Hunting season may be between the Saturday nearest October 1 - January 20
2) Maximum of 30 hunting days
3) Not more than 1 goose a day bag limit at Lac qui Parle
4) Maximum quota of 16,000
5) In addition, the season may be split into two parts.

The state regulations do take the maximum allowable season and quota that is allowed by federal law for Lac qui Parle.

There is a possibility that the season may be expanded to include an early hunt that would target resident geese. In order to do this the state must prove that an early hunt would not impact the migratory population. It has been fairly well documented in other areas that a season before September 15th would not significantly affect the migratory goose population. This has not been documented specifically at Lac qui Parle.

Nongame Birds

Several unique and conspicuous nongame birds inhabit the area. The upland sandpiper and marbled godwit nest in relatively undisturbed prairie. About 10,000 white pelicans and 500 double-crested cormorants are produced on an island rookery in Marsh Lake each year. Great blue heron rookeries have declined in the WMA in recent years. They occur along the north shore of Marsh Lake in a small willow grove. The Marsh Lake rookery used to have about 100 nests and now has only about 10 nests. There used to be 24 nests in a stand of cottonwoods on Rosemoen Island, however, these are no longer utilized. Bald eagles are common on the area during the fall and spring, peaking at around 50 birds during November. Golden eagles are uncommon, with 1 or 2 present through the fall and winter.

The Lac qui Parle area provides nesting habitat for numerous Neotropical migratory songbirds and is also a major flyway. In Minnesota, 43% of the forest bird species are Neotropical migrants (birds such as flycatchers, vireos and warblers that migrate south to central Mexico, Cuba and into northern South America). The floodplain forests provide especially important habitat for these birds. However, the large extent of grassland in the area is very important to ground-nesting Neotropical migrant birds which are dependent on grasslands for safe nesting. Populations of grassland-dependent birds, as a group, are declining at a greater rate over a more extensive area than any other group of birds, including those who utilized the tropical rain forests in the winter.

Ring-billed gull populations have been steadily increasing in the area and now nest in association with the pelicans and cormorants on Marsh Lake.

Reptiles and Amphibians

Rocky outcropping and other dry areas provide habitat for reptiles while in the abundant wetlands a variety of amphibians can be found in the Lac qui Parle area. The following is a list of reptiles and amphibians that may be seen in the Lac qui Parle area spring through fall:

Smooth soft-shell turtle	Fox snake
Western spiny soft-shell turtle	Hog nose snake
Snapping turtle	Mudpuppy
Western painted turtle	Eastern tiger salamander
Northern Prairie Skink	American toad
Red-bellied snake	Dakota toad
Red-sided garter snake	Western chorus frog
Plains garter snake	Swampy tree frog
Bull snake	Northern leopard frog

Butterflies and Insects

The Natural Heritage and Nongame Research Program has very little information about the insects and other arthropods (spiders, mites, centipedes, etc.) of the Lac qui Parle area. Extensive disturbance by European settlement has produced a fauna that is strongly dominated by generalist species of widespread distribution, including many introduced from the Old World. There are some native prairie remnants within the area and a distinctive fauna of restricted species is associated with these.

The Natural Heritage and Nongame Research Program maintains locational data for a small number of butterfly species that are on the state list of endangered, threatened, and special concern species (hereafter, the state endangered species list). Several of these are inhabitants of native prairie and may occur within the Lac qui Parle area, although there are no records. They have been recorded from nearby areas, such as Big Stone NWR, Plover Prairie (TNC), and Chippewa Prairie (TNC). These are: the Dakota skipper (*Hesperia dacotae*), the ottoe skipper (*Hesperia ottoe*), and the poweshiek skipperling (*Oarisma powesheik*). Other prairie-restricted butterflies that may occur here are the regal fritillary (*Speyeria idalia*), one of the state's showiest butterflies, the arogos skipper (*Atrytone arogos*), the pawnee skipper (*Hesperia leonardus pawnee*), and the dusted skipper (*Atrytonopsis hianna*). All but the last are included on the state endangered species list as special concern species.

Butterflies belong to the order Lepidoptera, a large order that is dominated by moths. There is much less information about moths than about butterflies, but there are also prairie-restricted moths, perhaps a large number. Examples are the underwing moths *Catocala abbreviatella* and *C. whitneyi*, and the small *noctuid Schinia lucens*. All of these feed on leadplant (*Amorpha canescens*) as larvae. Other important orders that are known to contribute elsewhere to a distinctive prairie fauna are the beetles (*Coleoptera*) and the leafhoppers (*Homoptera*). The grasshoppers and crickets (*Orthoptera*) may also have a few highly restricted representatives in prairie remnants.

Open sedge meadow wetlands that have not suffered much disturbance also support some restricted butterflies (and probably members of other orders), such as the mulberry wing (*Poanes massasoit*), the broad-winged skipper (*Poanes viator*), and the dion skipper (*Euphyes dion*). However, there are no records from the vicinity.

Aquatic habitats are prominent features of the Lac qui Parle area. Major aquatic insect orders should be well-represented, including stoneflies (*Plecotpera*), mayflies (*Ephemeroptera*), caddisflies (*Trichoptera*), and dragonflies (*Odonata*). Other orders that contribute significantly to the aquatic and shoreline fauna are beetles, flies (*Diptera*), and true bugs (*Hemiptera*). The highly disturbed character of aquatic habitats probably means that there are no rare or narrow habitat specialists present. There are several small calcareous seepage fens present in the WMA that might harbor some rare specialists.

Agricultural Pests

Approximately 350 acres of corn, spring and winter wheat are planted in the Lac qui Parle WMA by the DNR staff. Over 2,000 acres are planted to corn, soybeans, small grains and grass/legumes through cooperative farm agreements. These crops are planted to minimize crop depredation to neighboring farms and to provide wildlife with food and cover. Like all cropland, they are subject to agricultural insect pests.

Approximately one-half to two-thirds of the agricultural pest insects have been imported from other countries and are not adapted the native plants in the area. It is also unlikely that they are breeding in the natural areas either. Most agricultural pests are highly adapted to the specific crops that they were introduced on, such as European corn borer or the Colorado potato beetle. Native insects in the native vegetation areas have natural enemies that control their populations vs. a field with non-native insect populations.

In Minnesota there are 75 species of grasshoppers, however, the vast majority of them are not economically important. Only five species of grasshoppers cause agricultural problems in Minnesota. The most damaging species during drought years are: red-legged, two-stripped, migratory, and clear-winged grasshoppers. These species are adapted to cropland and do not dominate native prairies. Like grasshoppers, cut worms and army worms are very specialized. Species that are adapted to wetlands will not lay eggs on crops and visa-versa.

The Minnesota Department of Agriculture reports that it is unknown at this time how CRP lands may be impacting insect population. It is possible that insects with longer life cycles, such as wire worms and white grubs, may benefit from set aside programs. However, these are not the principle insect pests in cropland. It is possible that seed corn beetles and maggots, and some cut worms could exist in CRP lands. According to John Luhman, from the Minnesota Department of Agriculture, it is nearly impossible to make broad generalizations to predict which insects might attack crops from CRP lands, but on a case-by-case basis, they could reasonably judge if a given "pest" simply moved in from other fields (i.e. croplands), or could have come from a population on CRP lands.

Historically, one of the reasons that wetlands were drained was to reduce the populations of blood sucking insects. In the past, diseases were carried by midges, flies and mosquitoes which transmitted the diseases to farm animals. Other insects such as gnats, and no-see-ums often bothered livestock so much that it cut down on production. There is concern among some entomologists, that increased protection and restoration of wetlands may cause a rise in blood sucking insects and associated problems.

Fisheries

Streams

Physical, chemical and biological data from the uppermost portion of the Minnesota River was collected in a biological survey conducted between 1978 and 1982 (Kirsch et. al., 1985). A fisheries population assessment was conducted in 1992 which sought to repeat sampling efforts used on the Minnesota River in 1980 (Stauffer et. al., 1995). Qualitative data on invertebrates is also available in a 1990 Investigation of the Benthic Invertebrates of the Minnesota River (Montz, 1990) and qualitative data on mussels is available in a 1989 Survey of the Mussels of the Minnesota River (Bright et. al., 1990).

Fisheries surveys, describing physical, chemical and biological characteristics have also been conducted on Emily Creek in 1989, Pomme de Terre River in 1980 and 1991, Lac qui Parle and West Branch Lac qui Parle Rivers in 1984 and 1994, and Yellow Bank and North Fork Yellow Bank Rivers in 1974 and 1994.

Generally, streams in the area are characterized by warm or coolwater fisheries. Species assemblages collected in stream surveys suggest that tributaries are influenced by the Marsh and Lac qui Parle Lake impoundments, with many species of fish undoubtedly migrating between the reservoirs and streams.

Habitat quality varies considerably between streams, or even between different reaches of the same stream. As a result, species diversity and abundance also vary. Flow fluctuations, nutrient loading, siltation and turbidity problems affect most streams to different degrees. Physical size of the streams probably limits sport fish populations to the largest streams, or the lower ends of tributaries. Most streams probably function as a route for migratory fish species like northern pike and suckers travelling to suitable spawning habitat. Most streams probably also provide nursery habitat for young fish or habitat for nongame or forage fish species.

Marsh Lake

Marsh Lake was initially mapped in 1953 and remapped in 1962. Game lake surveys were conducted in 1938, 1940, 1941, 1943, 1953, 1962, and 1968. Fisheries population assessments were conducted in 1981, 1986, 1994, and an initial lake survey was conducted in 1991. Fish samples were collected for contaminant sampling in 1988 and 1994. Dissolved oxygen monitoring was conducted intermittently from 1943 to 1980, and most winters since 1980. The U.S. Army Corps of Engineers conducted a water quality monitoring program from June through November of 1991.

The fishery of Marsh Lake was historically managed for walleye, with secondary emphasis on northern pike. In 1992 the lake management plan was rewritten and primary fish management emphasis was switched to naturally reproducing northern pike. Management activities have consisted of generic fishing regulations, stockings, commercial fishing, winter rescue operations, liberalized fishing, and standard fisheries investigations.

Liberalized fishing was allowed on Marsh Lake during the winters of 1966–67, 1981–82, and 1990–91. Winterkills occurred during 1940–41, 1974–75, 1981–82, and 1988–89. Winter rescue of northern pike and walleye was conducted in 1974–75. Marsh lake was stocked with walleye fry in 1977, '78, '80, '84, '86, and '88. Fry stocking rates ranged from 43 to 208 per littoral acre. One hundred and seventy–six adult northern pike were stocked in 1981.

Abundance of northern pike in Marsh Lake, as measured by mean gill net catch rates, has fluctuated, but has been within or higher than the normal range for lakes with similar physical and chemical characteristics. Northern pike gill net catch rates have also been one to six times higher than lake management plan goals or objectives. Size structure of northern pike was higher than the desirable range in 1991 and within the desirable range in 1995.

Northern pike production, year class strength, and ultimately abundance and size structure all appear to be influenced by water levels not only in Marsh Lake, but also in streams and wetlands in the watershed. Pike production appeared to be poor during the droughty period of the late 1980s and early 1990s, with corresponding weak year classes and decreased abundance. With increased precipitation and higher water levels since 1992, northerns have again been able to find the seasonally flooded vegetation they need for successful reproduction. As the larger year classes are recruited into the population they result in higher abundance and changing size structure.

Yellow perch abundance in Marsh Lake has fluctuated from within the normal range for similar lakes, to seven times higher than the third quartile. Although walleye stockings were discontinued in 1988, they have maintained a good, naturally reproducing population. Since 1986, walleye abundance has been within or higher than the normal range for similar lakes. Abundance of black crappie has been within the normal range for similar lakes since 1986. It appears that crappies are reproducing satisfactorily, but young fish are not surviving and recruiting into the population.

Fish management in Marsh Lake may be limited by:

- Agricultural, domestic and municipal pollution, mainly in the form of sediment and nutrient loading, which has degraded fisheries habitat, reduced recreational opportunities, reduced the aesthetic quality of the lake and increased the likelihood of direct effects to the fisheries in the form of fish kills.
- Moderate blue–green algae blooms which usually occur annually, and severe blooms which occur occasionally.
- Turbidity and water level fluctuations which can inhibit the development of rooted aquatic plants, resulting in wind induced resuspension of bottom sediments and associated nutrients.
- Underutilized, nongame fish species which can compete with more desirable species for available food and space.
- The shallowness of Marsh Lake (normal maximum depth < 5 feet) which makes it prone to winterkill, and at times during the summer results in high water tem-

peratures which may be stressful to some species of game fish.

- Poor spawning habitat for largemouth bass, bluegill, and walleye.
- Abundant aquatic vegetation at times, which may limit fishing, boating or other aquatic recreation.

Lac qui Parle Lake

A report was prepared on the necessity of carp removal from Lac qui Parle Lake in 1938 and an age and growth study was conducted from 1936–1940 by the University of Minnesota and WPA. A report on fish and fishing conditions in Lac qui Parle and contiguous waters was prepared in 1945. A fish kill investigation was conducted in 1949. Lac qui Parle Lake was initially mapped in 1957. Lake surveys were conducted in 1956, 1975 and 1989. Fisheries population assessments were conducted in 1981, 1986, and 1990 through 1996. Natural reproduction checks were conducted in 1987 and 1989. Fish samples were collected for contaminant sampling in 1988 and 1994. The U.S. Army Corps of Engineers prepared a summary report on winter 1988–89 water quality monitoring. West Central Environmental Consultants prepared a Lac qui Parle Lake Environmental Evaluation for 1991 to 1992, for the Lac qui Parle Lake Watershed Project Association. Winter dissolved oxygen monitoring was conducted from 1946 to present. Winter fish kills were recorded on Lac qui Parle Lake in 1964–65, 1976–77, and 1978–79.

The fishery of Lac qui Parle Lake has historically been managed for walleye, with a secondary emphasis on northern pike, black crappie, and channel catfish. Management for bluegill, smallmouth bass, and flathead catfish has been attempted at times. Management activities have consisted of generic Minnesota fishing regulations, stockings, commercial fishing, efforts to improve water quality, water level management, and standard fisheries investigations.

Lac qui Parle has been stocked by DNR with various combinations of walleye fry, fingerlings and adults each year between 1945 and 1978, and with 1 to 3.5 million fry semiannually, during odd numbered years, between 1979 and 1989. In the mid to late 1980s, the Lac qui Parle Lake Association (LQPLA) requested more stockings, and in particular more or larger walleyes. In 1990, DNR Section of Fisheries agreed to an experimental walleye stocking arrangement where walleye fry were to be stocked in 1992, '95 and '98 at the rate of approximately 500 per acre, or about three million fry. The Lac qui Parle Lake Association would be allowed to stock purchased walleye fingerlings at the rate of 0.5–1.0 lb. per acre (4,200–8,400 lbs.) in 1990, '93, '96 and '99. Northern pike were stocked in Lac qui Parle sporadically and in low numbers from 1945 through 1979. From 1983 through 1988 northern pike fingerlings, yearlings and/or adults were stocked annually. Channel catfish were stocked as fingerlings in 1969–71, '74, '76 and '83. Yellow perch, bluegill, crappies, smallmouth bass, and flathead catfish have been stocked sporadically in various years in attempts to establish or bolster populations.

Walleye abundance, as measured by mean gill net catch rates, has generally increased since 1956, and has fluctuated at levels within or above the normal range for lakes with similar physical and chemical characteristics, since 1975. Walleye gill net catch

rates have been one to six times higher than lake management plan goals or objectives since 1991. Size structure of walleye has also fluctuated around a desirable mid–range.

Fluctuations in walleye abundance generally appear to be related to stocking. Strong year classes of walleye have developed in most years that fry were stocked, but a weak year class from 1987 also corresponded to a year when fry were stocked. Strong year classes have also corresponded to a year when both fry and fingerlings were stocked, and a year when only fingerlings were stocked. However, substantial numbers of fingerlings were already present in the lake, from the fry stocking and/or natural reproduction, before additional fingerlings were stocked in each of those years. Generally, weak to moderate year classes have resulted in nonstocked years. However, a mark and recapture experiment indicated that 88% of a strong 1993 year class was due to natural reproduction.

Except for a period in the late 1980s, abundance of northern pike in Lac qui Parle Lake appears to have generally increased since 1975. Northern pike abundance was within the normal range for lakes with similar physical and chemical characteristics from 1981 through 1992, and above the normal range since then. In addition, northern pike gill net catch rates have been one to four times higher than lake management plan goals or objectives since 1991. Size structure of northern pike has been within or higher than the desirable range since 1986.

Like Marsh Lake, northern pike production, year class strength, and ultimately abundance and size structure in Lac qui Parle Lake appear to be influenced by water levels in streams and wetlands in the watershed. Pike production appeared to be poor during the droughty period of the late 1980s and early 1990s. With increased precipitation and higher water levels, northerns were able to find the seasonally flooded vegetation they need for successful reproduction. As the larger year classes were recruited into the population they resulted in higher abundance and changing size structure.

Yellow perch abundance in Lac qui Parle Lake has fluctuated, but generally been within or just above the normal range for similar lakes since 1971. Abundance of black crappie has been near the low end of the normal range for similar lakes. Although large numbers of crappies were collected in a couple samples, they were mostly young of the year, age 0+, fish. It appears that crappies reproduced well those years, but young fish did not survive or recruit into the population. Channel catfish abundance has historically been low. Although natural reproduction of channel catfish occurs, it appears to be low because of a lack of suitable spawning habitat. More abundant catfish could provide an additional fishing opportunity. Like the crappies, abundance of white bass has generally been near the low end of the normal range for similar lakes, with peaks in abundance a couple years that were due to high numbers of young of the year, age 0+, fish. Reproduction of white bass appears to be erratic.

Fish management in Lac qui Parle Lake may be limited by:

- Agricultural, domestic and municipal pollution, mainly in the form of sediment and nutrient loading, which has degraded fisheries habitat, reduced recreational opportunities, reduced the aesthetic quality of the lake and increased the likelihood of direct effects to the fisheries in the form of fish kills.
- Moderate blue–green algae blooms which usually occur annually, and severe blooms which occur occasionally.
- Turbidity and water level fluctuations which can inhibit the development of rooted aquatic plants, resulting in wind induced resuspension of bottom sediments and associated nutrients. Water level fluctuations may also reduce the success of natural reproduction of fish. High water levels have lead to extensive shoreline erosion which increases turbidity and sedimentation further reducing vegetation and spawning success.
- Underutilized, nongame fish species which can compete with more desirable species for available food and space.
- The shallowness of Lac qui Parle Lake (maximum depth at normal pool 15 feet) which makes it prone to winterkill, and at times during the summer results in high water temperatures which may be stressful to some species of game fish.
- Fair spawning habitat for northern pike, largemouth bass, panfish, or walleye.

Endangered, Threatened, and Special Concern Species

The Minnesota Natural Heritage and Nongame Research Program (MNHNRP), in collaboration with the Minnesota County Biological Survey (MCBS) collects and maintains information about species listed as endangered, threatened, or special concern under the state endangered species act (MN Statutes 84.0985) as well as significant native habitats and sensitive areas such as animal aggregation sites. These rare features are called "elements" and location information is maintained by MNHNRP in both map and computerized formats. Each location record is termed an "occurrence". In the lists that follow, the "status" is the state status. For the small number of species that are also federally listed, the federal designation is also shown. Species designated as endangered or threatened under state law are protected from taking, importing, transporting, or sale, except as provided for in statute and rule.

In Lac qui Parle WMA, Lac qui Parle State Park, Lac qui Parle Lake, and Marsh Lake, 26 elements have been documented by the MNHP with over 67 total occurrences reported. In 1987 and 1988, Lac qui Parle and Big Stone Counties were surveyed by the MCBS. The goal of MCBS is to systematically identify significant natural areas and to collect and interpret data on the distribution and ecology of rare plants, rare animals and natural communities. Chippewa or Swift Counties have not yet been surveyed by MCBS, and are not scheduled for survey within the next two years. A few occurrences have been collected in these two counties over the years, especially along the Minnesota River.

Known Elements Within Area Boundary

Plants:

Hair-like Beak Rush (*Rhynchospora capillacea*) - Current status: Threatened. A small population is located in Chippewa County on a perched, hillside fen within the Lac qui Parle WMA.

Hall's Sedge (*Carex hallii*) - Current status: Special concern. Located in Lac qui Parle County.

Small White Lady's Slipper (*Cypripedium candidum*) - Current status: Special Concern. Two locations in Chippewa County and one in Lac qui Parle County. One of the locations in Chippewa county has over 1000 clumps of small white lady's slipper and the second site in the county has over 50 clumps. The Lac qui Parle County site has approximately 50 clumps.

Louisiana Broomrape (*Orobanche ludoviciana*) - Current status: Special Concern. One location in Chippewa County and one in Lac qui Parle County. Both of the locations are found on hillsides with many surface boulders.

Slender Milk-Vetch (*Astragalus flexuosus*) - Current status: Special Concern. One location in Chippewa County, one in Lac qui Parle County, and one in Swift County.

Marsh Arrow Grass (*Triglochin palustris*) - Current status: rare, but no legal status. Two locations in Chippewa County. One in the calcareous seepage fen near Watson Sag and a second, small population locate on a large, perched, hillside fen.

Low Milk-Vetch (*Astragalus lotiflorus*) - Current status: rare but no legal status. One location in Chippewa County and two in Lac qui Parle County. The location in Chippewa county is found on a gravelly west-facing slope along an abandoned glacial river channel near Watson Sag. One of the locations in Lac qui Parle County is found on the upper slope of SW facing side of Emily Creek near its confluence with Lac qui Parle.

Bunch Speargrass (*Poa arida*) - Current status: rare, but no legal status. Two locations in Lac qui Parle County. One location is found in a broad shallow saline wetland within a prairie-cattail wetland complex of the Minnesota River bottoms.

Animals:

Bald Eagle (*Haliaeetus leucocephalus*) - Current status: Special Concern. Federal Status: Threatened in MN. At least three nests are located in the WMA, two are located in Chippewa County and one in Swift County. The bald eagle is an endangered species success story. In 1993 this species reached 568 well-distributed breeding pairs in Minnesota. Up to 50 bald eagles can be seen on Lac qui Parle Lake during the fall and early winter.

Prairie Chicken (*Tympanuchus cupido*) Booming Ground - Current status: Special Concern. Located in Lac qui Parle County. Restoration of this species using hand-reared birds was attempted in the 1970s. This restoration failed for a number of reasons. However, there are still occasional sightings of prairie chickens which are probably birds that have migrated into the area from existing populations in northwest Minnesota.

Western Hognose Snake (*Heterodon nasicus*) - Current status: Special Concern. Located in Lac qui Parle County.

Mucket Mussel (*Actinonaias ligamentina*)- Current status: Threatened. One location in Lac qui Parle County and one in Swift County (both dead specimens).

Black Sandshell Mussel (*Ligumia recta*) - Current status: Special Concern. One location in Lac qui Parle County and one in Swift County (both dead specimens).

Colonial Waterbird Nesting Site - White Pelican, also, Double-crested Cormorant, Black-crowned Night Heron, Ring-billed Gull, Great Blue Heron and Great Egret. The above species nest on Marsh Lake Island in Big Stone County and in Lac qui Parle County. Marsh Lake Island is Minnesota's largest nesting colony of white pelicans; over 4,000 young are produced each year.

Colonial Waterbird Nesting Site - Western Grebe and Forster's Tern. Located on Marsh Lake in the Lac qui Parle WMA in Big Stone County.

Colonial Waterbird Nesting Site - Great Blue Heron and Great Egret.. Located on Marsh Lake in the Lac qui Parle WMA in Big Stone County.

Colonial Waterbird Nesting Site - Cattle Egret.

Other Significant Natural Features:

A number of these features are significant natural communities. Natural communities are groups of native plants and animals that interact with each other and their abiotic environment in ways not greatly altered by modern human activity or by introduced (non-native) organisms. The Natural Heritage Program developed a classification system for native vegetation in Minnesota, which is currently being revised through a collaborative effort of the MNHNRP, MCBS, and the DNR's Ecological Classification Systems project. The names listed below are based on this classification. Additional information about natural communities, including descriptions and lists of characteristic species can be found in Minnesota's native vegetation: a key to natural communities, version 1.5, 1993, MNDNR Biol. Report No. 20.

Mesic Prairie (Southwest)- 14 Different Sites in Lac qui Parle WMA (no legal status) - Big Stone County (3 sites), Lac qui Parle County (10), and Swift County (1). These vary from dry-mesic to mesic prairie, most have good diversity, some have been grazed in the past.

Dry Prairie (Southwest) Hill Subtype- 4 Different Sites in Lac qui Parle WMA (no legal status) - Big Stone County (1) and Lac qui Parle County (3).

Wet Prairie (Southwest and Northwest Seepage Subtype) - 4 Different Sites in Lac qui Parle WMA (no legal status) - All four sites are located in Lac qui Parle County.

Rock Outcrop (Southwest) - in Lac qui Parle WMA (no legal status) - Big Stone County. This area features low, rounded granite exposures in the Minnesota River Valley.

Calcareous Seepage Fen (Southwest) Prairie Subtype - 2 Different Sites - Prairie subtype (no legal status) both are located in the Lac qui Parle WMA in Chippewa County. One is a complex of moderate quality fens near the base of the N-NE facing prairie hillside bordering Watson Sag. A free flowing spring exists at the base and flows down to the sag. The second site is a relatively large composite of calcareous fen and hummocky rich fen areas. There is one high quality discharge area.

Rich Fen (Transition) Sedge subtype (no legal status). Located in Chippewa County. This fen is within a relatively larger complex of mesic to wet prairie. The rich fen area is dominated by sedges.

Known Elements In The Vicinity

The following species occur in the Lac qui Parle area (within 4 - 5 miles). Some are not yet known to occur in the park or WMA. The existence of these species in the nearby vicinity suggests that these species may also occur in similar habitats in the WMA or Park. The occurrence of 42 elements with over 250 different records is also an indicator of the rich diversity of natural communities within the watershed.

Plants:

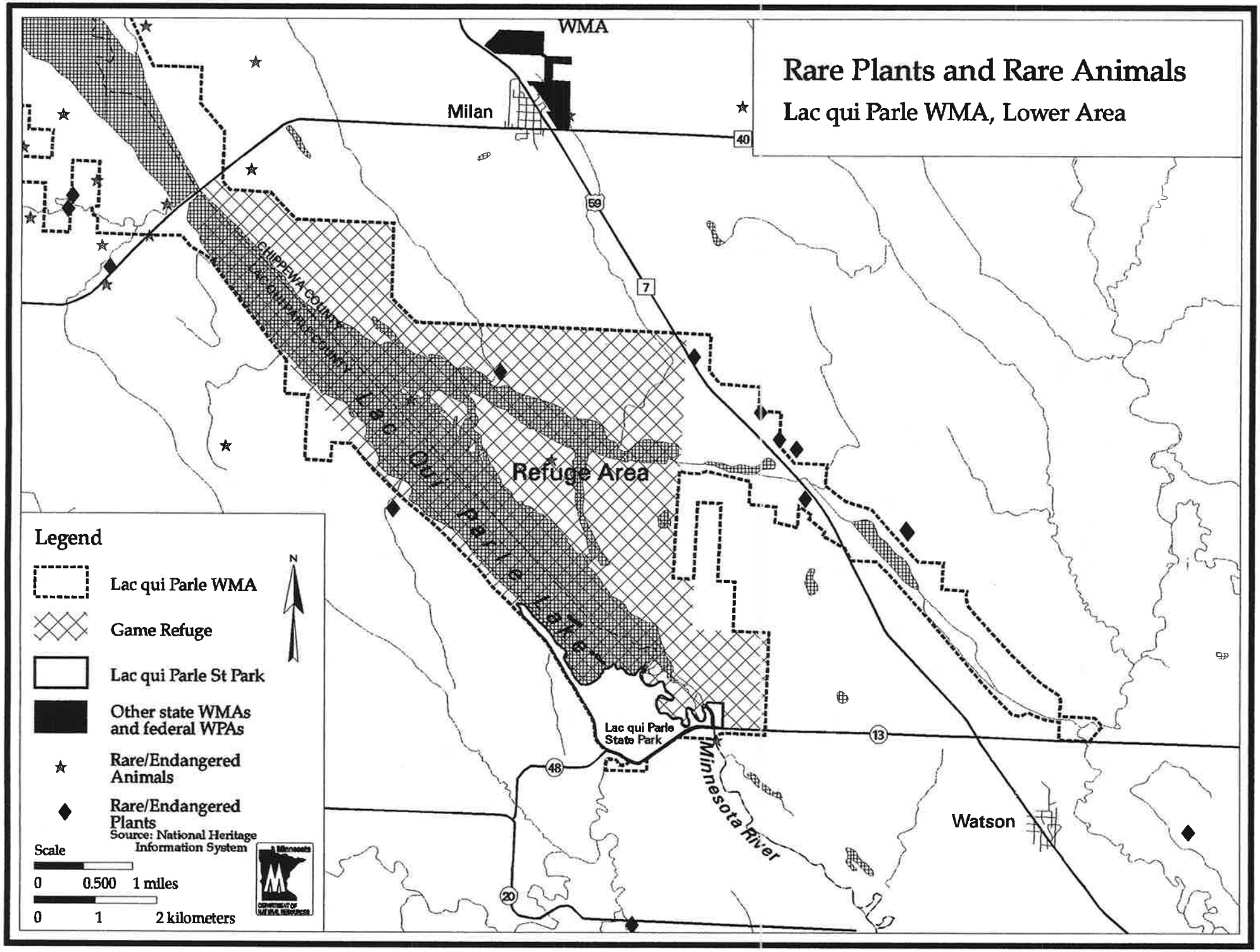
Tooth-Cup (*Rotala ramosior*)
Slender Milk-Vetch (*Astragalus flexuosus*)
Missouri Milk Vetch (*Astragalus missouriensis*)
Water-Hyssop (*Bacopa rotundifolia*)
Prairie Moonwort (*Botrychium campestre*)
Buffalo Grass (*Buchloe dactyloides*)
Hall's Sedge (*Carex hallii*)
Small White Lady's Slipper (*Cypripedium candidum*)
Mudwort (*Limosella aquatica*)
Soft Goldenrod (*Solidago mollis*)

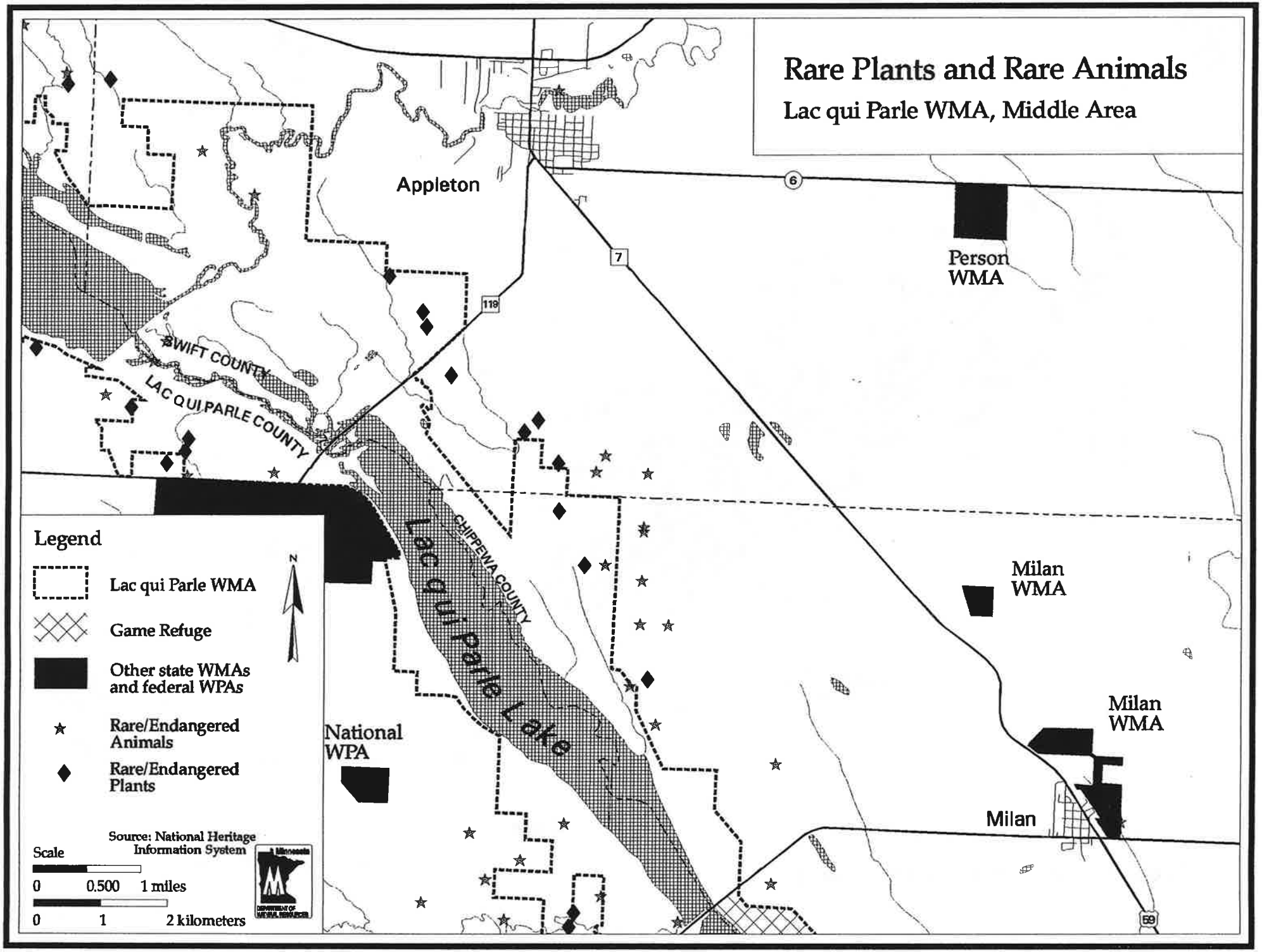
Animals:

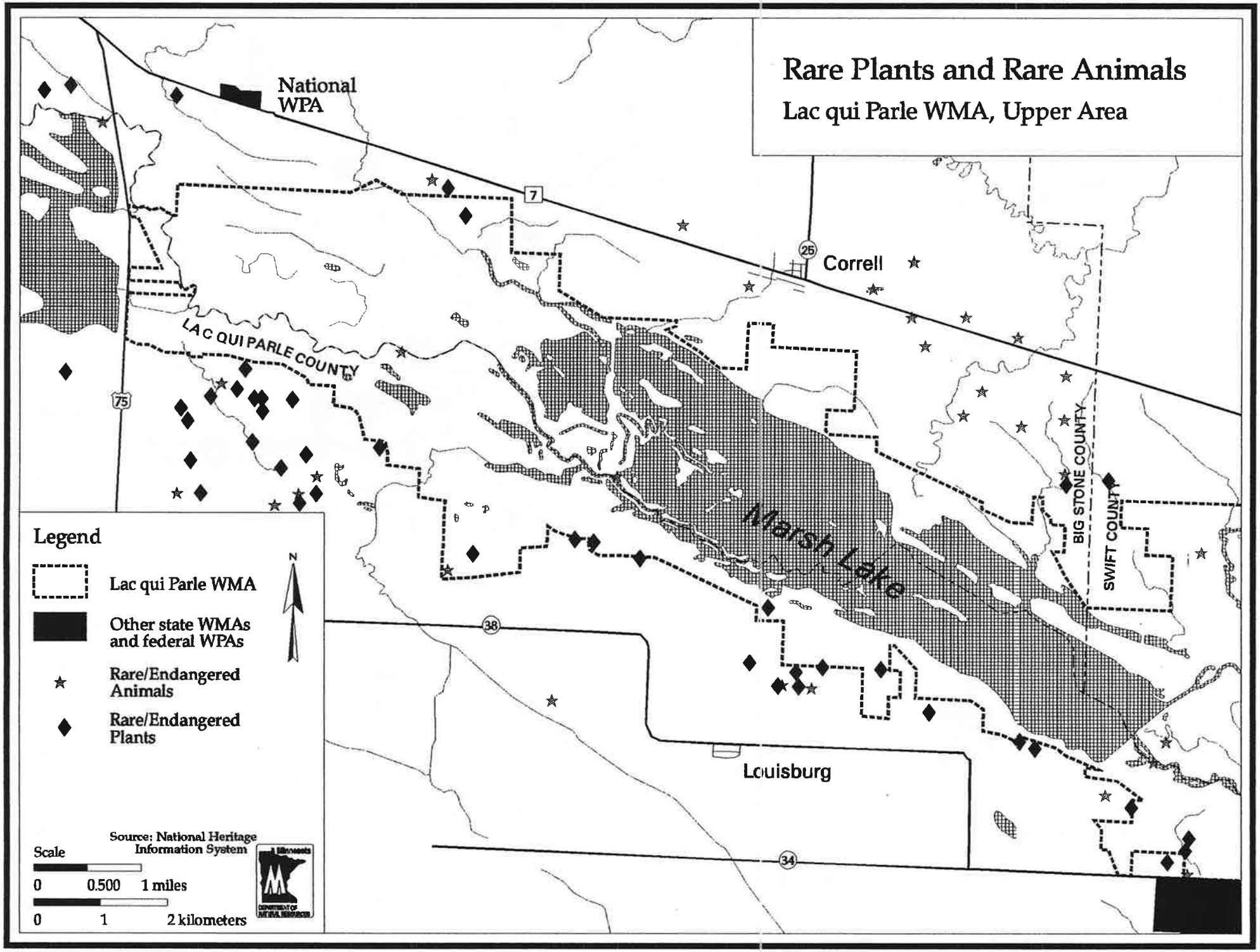
Henslow's Sparrow (*Ammodramus henslowii*)
Wilson's Phalarope (*Phalaropus tricolor*)
Burrowing Owl (*Speotyto cunicularia*)
Short-Eared Owl (*Asio Flammeus*)
Chestnut-Collared Longspur (*Calarius ornatus*)
Loggerhead Shrike (*Lanius ludovicianus*)
Marbled Godwit (*Limos fedoa*)
Western Hognose Snake (*Heterodon nasicus*)
Dakota Skipper Butterfly (*Hesperia dacotae*)
Poweshiek Skipper Butterfly (*Oarisma poweshiek*)
Mucket Mussel (*Actinonaias ligamentina*)
Fluted-Shell Mussel (*Lasmigona costata*)
Black Sandshell Mussel (*Ligumia recta*)
Colonial Waterbird Nesting Site
Prairie Chicken (Tympanuchus cupido) Booming Ground

Other Unique Features:

Proglacial River Erosion (Quaternary)
Sedimentary Unit or Sequence (Quaternary)
Calcareous Seepage Fen (Southwest) - Prairie Subtype
Dry Prairie (Southwest) - Hill Subtype
Mesic Prairie (Southwest)
Rock Outcrop
Wet Prairie (Southwest)
Wet Prairie (Southwest) - Saline Subtype


Rare Plants and Rare Animals
Lac qui Parle WMA, Lower Area
WMA
Milan
40
59
7
CHIPPEWA COUNTY
LAC QUI PARLE COUNTY
Lac Qui Parle Lake
Refuge Area
Lac qui Parle State Park
13
48
20
Minnesota River
Watson
Legend
Lac qui Parle WMA
Game Refuge
Lac qui Parle St Park
Other state WMAs and federal WPAs
Rare/Endangered Animals
Rare/Endangered Plants
Source: National Heritage Information System
Scale
0 0.500 1 miles
0 1 2 kilometers
N


Rare Plants and Rare Animals
Lac qui Parle WMA, Middle Area
Appleton
6
7
119
Person WMA
SWIFT COUNTY
LAC QUI PARLE COUNTY
CHIPPEWA COUNTY
Lac qui Parle Lake
National WPA
Milan WMA
Milan WMA
Milan
59
Legend
Lac qui Parle WMA
Game Refuge
Other state WMAs and federal WPAs
Rare/Endangered Animals
Rare/Endangered Plants
N
Source: National Heritage Information System
Scale
0 0.500 1 miles
0 1 2 kilometers


Rare Plants and Rare Animals
Lac qui Parle WMA, Upper Area
National WPA
7
25
Correll
LAC QUI PARLE COUNTY
75
Marsh Lake
BIG STONE COUNTY
SWIFT COUNTY
38
Louisburg
34
Legend
Lac qui Parle WMA
Other state WMAs and federal WPAs
Rare/Endangered Animals
Rare/Endangered Plants
N
Source: National Heritage Information System
Scale
0 0.500 1 miles
0 1 2 kilometers

History/Archaeology

The Minnesota River has been identified as a major travel route and hunting area for prehistoric cultures. It is not uncommon to find American Indian artifacts along its bluffs. Archaeological sites in the Minnesota River Valley span a range of time from 8,000 B.C. to historic times.

The Lac qui Parle Area has a rich prehistory. A number of prehistoric cultures are known to have existed in the area. The Paleo-Indian or Big Game cultures were the first known inhabitants of Minnesota. A partial skeleton dating back to 8,000 B.C. was discovered in the Lac qui Parle area in 1933. The Paleo-Indian cultures were followed by the Archaic tradition. This tradition was succeeded in the Minnesota River Valley by the Woodland tradition which existed here from about 1,000 B.C. to 1,000 A.D. Woodland peoples built permanent villages and burial mounds, made pottery and began harvesting wild rice.

Eventually these cultures began planting and cultivating other foods as well, and gradually became part of the Mississippian Cultural tradition. By 1,000 A.D. a Mississippian manifestation was established in the central and upper Minnesota River Valley. This culture was based on intensive agricultural practices. Hunting and fishing remained very important, although the Mississippian sites in Minnesota show a dependence upon bison as a staple food.

The Mississippian peoples lived in extensive villages of about 600 to 800 people. The villages were often located on flat river terraces above the bottomlands.

The Minnesota River is a large placid river that slowly winds through the rich, fertile farmland of southwestern Minnesota. This river was once an essential highway for Indians, explorers, traders, and settlers.

There are four bands of Dakota (Sioux); the Wahpeton and Sisseton tribes are two of the bands and together they were historically referred to as the Upper Sioux Indians. Their villages were located on the Minnesota River between Carver and the foot of Lake Traverse. The upper Wahpeton people dwelt in the Lac qui Parle Area. (Folwell, 1956).

One of the first European explorers of the Minnesota River was Pierre Charles LeSeur in 1700. The French and English explorers who followed named this river St. Pierre (St. Peter) after Pierre Charles LeSeur. The name continued until 1849 when a request was made to the U.S. president that the name of this river be changed to Minnesota; this was accomplished by an act of Congress in 1852.

A series of trading posts were established in the early 1800s. The regions' first trading post was built northwest of Lac qui Parle on the east shores of Lake Traverse. Another was established northwest of Ortonville along the west shore of Big Stone Lake in 1819 and was operated by the American Fur Company by 1823.

Joseph Renville established the Columbia Fur Company in 1822 in partnership with several other trappers. Renville also established and operated the Lac qui Parle Trading Post (later known as Fort Renville) on the north side of the Minnesota River across from the Wahpeton Indian Village. The log post had a storehouse for trade goods, two dwellings, and a stockade enclosure for protection.

Before being absorbed by the American Fur Company in 1827, the Columbia Fur company left a great mark on the history of the region by developing well marked trails between the Mississippi River and Lake Traverse. This company had opened four posts in the Minnesota Valley: Fort Snelling, Little Rapids near Carver, Traverse des Sioux, and Lac qui Parle. This company also introduced two-wheeled wooden carts drawn by horses or oxen to the Minnesota Valley.

Under Renville's protection, a Protestant mission was established at Fort Renville in 1835 by Dr. Thomas S. Williamson and Alexander Huggins. The mission consisted of small log buildings located beneath the bluff about a mile from Fort Renville. Following the fur traders, the mission was one of the first contact points between white settlers and Indians in Western Minnesota. After Renville's death in 1846, the mission was largely unsuccessful and was abandoned and moved from the foot of Lac qui Parle to the Upper Sioux Agency (Gilman, 1979).

White settlement of the area began in the 1850s. and was temporarily halted by the U.S.- Dakota Conflict of 1862. Settlement began again in earnest in the late 1860s. Immigrants, mostly Norwegians and New Englanders, first settled near the rivers, near transportation routes, and the timber of floodplain forests.

In the 1870s, wheat farming began on the region's fertile soils. Buffalo were gone and the drainage of marshes and sloughs began. Cash crops were grown and cattle grazing was common, especially in the western parts of the region, and in the river bottoms and on untillable, rocky soil.

State Park History

For many years, Lac qui Parle State Park was composed of three units acquired at different times. The first unit, 17 acres in Chippewa County, was acquired in 1931 as a place to restore the Chippewa-Lac qui Parle Protestant Mission, first established in 1835. The Minnesota state legislature authorized the area as the "Chippewa-Lac qui Parle Indian Mission Park". In 1937 the park was renamed to the "Chippewa Mission Memorial State Wayside".

As early as 1936 there was talk of recreational facilities in conjunction with the purchase of flowage lands at the southwest end of the lake. Development began in 1937-1938 within the Lac qui Parle Conservation Reserve. This second part of the park was located on the south side of the Minnesota River in Lac qui Parle County. The proposed Lac qui Parle State Park was to have been 558 acres. However, by 1940 only 250 acres had been acquired by the state Executive Council.

Lac qui Parle State Park was established in 1941 with 457.49 acres in Chippewa and Lac qui Parle Counties. The third unit was added to the park, comprising 2.2 acres on the east bank of the Lac qui Parle Lake. This is the historic site of the Renville Stockade. The area was donated to the state by Chippewa County at the request of the Chippewa County Historical Society. The restoration of the Mission at Lac qui Parle State Park was dedicated in July, 1942.

In 1959 the legislature established the Lac qui Parle Recreation Reserve for the perpetual use of the people of the State of Minnesota. In 1967 the boundary was expanded to include the piece of land between the old road and the new alignment of C.S.A.H. 33 as relocated in 1966. In 1969 the Chippewa Mission memorial state wayside was renamed the Chippewa Mission state wayside and in the same legislative session Lac qui Parle state recreation reserve was renamed to Lac qui Parle state recreation area.

The entire park, the mission and the village site were designated as an historic district in 1976. In 1982 the Chippewa Mission state wayside was renamed to the Lac qui Parle mission state historic site. At the same time, administrative authority and control of the mission site and Fort Renville were transferred to the Minnesota Historical Society. In 1991, the Lac qui Parle State Park Historic District was created to recognize the significance of the WPA Rustic Style historic resources of the park.

Legislation in 1992 changed the name and designation from a recreation area to Lac qui Parle State Park, which is its current legal status.

Wildlife Management Area History

The area that is now Lac qui Parle WMA was first established in 1936 as a state-sponsored flood control project under the federal Works Progress Administration (WPA), and the unit was authorized as a federal flood control project later in 1936. By 1939, the state completed the water control structures and the U.S. Army Corps of Engineers improved and completed the project between 1941 and 1951. Operational authority was transferred from the Minnesota Commissioner of Drainage and Waters to the Corps of Engineers in 1950. In 1957, the Minnesota Legislature placed project lands, except for a small acreage near the water control structures, under the management of the Minnesota Conservation Department for use as a wildlife refuge and public hunting grounds. The unit has been expanded since 1957 to increase the area's potential for wildlife production. In 1975, the WMA acreage was 27,803 acres and in 1996 acreage is 31,724 acres. Area developments include waterfowl impoundments, food plots, cover plantings, and the reestablishment of a resident and migrant Canada goose flocks.

What is often forgotten now, is that in the 1950s there were no resident Canada geese in this area and stopovers by migrating geese were rare. The Canada goose program first started at Lac qui Parle in 1958 and was called the Lac qui Parle Goose Management Project. The project consisted of providing an adequate area of water and land where migratory waterfowl, especially Canada geese, could rest and feed undisturbed.

Because geese are nervous birds, fishing, hunting and other disturbances were restricted in critical areas. Game refuge boundaries were established under Game Refuge Order #274 in July 1958. Under Minnesota Statutes, the DNR Commissioner may designate a contiguous area as a game refuge if more than 50 percent of the area is in public ownership (97A.085 subd 2.)

In the fall of 1958, 50 Canada geese from Tamarac refuge, near Detroit Lakes, Minnesota, were placed on Rosemoen Island as a decoy flock. These birds had their wings clipped and were unable to fly. However, their honking and the goose calls from a record player placed in a nearby barn, persuaded 150 migrating geese and 600 snow geese to stop at the refuge that first year. The following two years Canada geese increased to about 1,500, but there were fewer snow and blue geese. In 1961 the Canada geese numbered approximately 2,500 while there was over 5,000 snow, blue, and white-fronted geese stopping at the refuge.

At the time, the rapid buildup of populations was seen as quite remarkable. Other refuges in Wisconsin and Missouri did not achieve the same results for 7 - 14 years. Also in 1961, three pair of geese nested in the refuge, with one pair being successful in hatching three young.

Then in 1962 and 1963, 70 and 60 birds respectively, were received from the Carlos Avery Game Farm near Anoka, Minnesota. The wings were clipped on these birds each year until three years of age. Canada geese do not mate until they are three years of age, all young geese were wing clipped so they were unable to fly until they were three and had mated. From 1962 to 1966 the number of nests and young hatched increased rapidly and by 1966 most of the resident flocks were free flying. In addition to natural nesting sites existing in the area, nesting tubs were installed on some of the ponds and bays for several years.

In 1966 there were 25,000 acres in the Lac qui Parle WMA and 9,000 of those acres of land were refuge. The remaining two-thirds of the land was open to public hunting beginning in 1963. In the first two years, only 130 and 65 geese were killed. While the focus was on the goose population, even in the early years it was already a popular area for duck, pheasant and deer hunting. Lac qui Parle Lake was also very popular for fishing.

In 1974, 102 stations or shooting spots were set up around the perimeter of the refuge at approximately 500 feet apart. Hunting near the refuge was only allowed at the stations, and they were on a first come-first serve basis. Although overnight camping was not allowed, it was a common practice, which frustrated many hunters who came to the blinds at 4:00 a.m. At that time there were few shell restrictions and newspaper writers reported hearing "the cannonading along the firing line." Hunter complaints and associated problems, eventually resulted in the implementation of a drawing system for blinds and various shell restrictions. These programs still continue today.

Archaeological Aspects

The Minnesota State Archaeologist assessed the archaeological aspects of the area. A group of 3 prehistoric burial mounds is located in Chippewa County, just outside the WMA boundary. Nine other burial mounds are located within Lac qui Parle State Park. None of the sites has been excavated or tested. Many other burial mounds are known in the management area's vicinity.

Elden Johnson assessed the archaeological potential as follows: "This is an area of extremely high potential as reflected in the large number of archaeological sites recorded in the area. The area has not been surveyed to locate habitation or village sites, and these must exist in numbers and most probably in the lowlands within the management area."

Historical Sites

Four sites of interest are located on the management area in Lac qui Parle County. The sites include wagon road remnants, a habitation site, a river crossing, and a partially completed railroad line; all of which date to the early settlement period.

RECREATION RESOURCES

Existing Lac qui Parle area Development

Day-Use

- New visitor center (scheduled for completion in 1996)
- WPA Historic Model Project Building
- Swimming beach
- 8 Picnic Sites
- Present development of water recreation facilities on the LQP management area: earth and concrete plank launch ramps; unrestricted parking areas; roll in docks
- 1 (CORE) fishing pier, which was fabricated for fluctuating water levels.
- 29 Parking areas in the WMA of varying capacities
- 6 handicap accessible hunting blinds

Trails

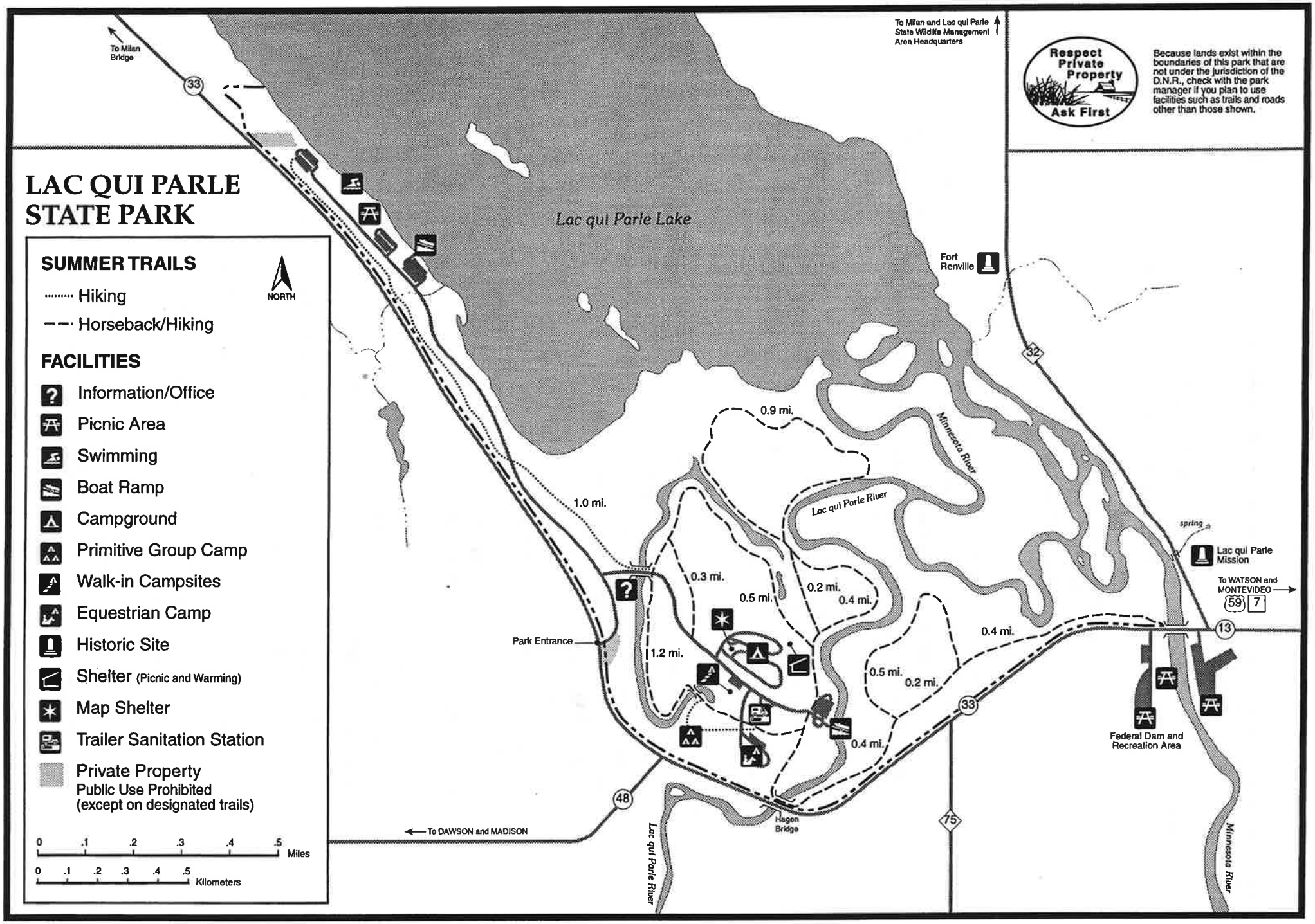
- Hiking: 6 miles
- Horseback Riding: 5 miles
- Cross-country skiing: 6 miles

Camping

- 50 semi-modern sites, 21 with electric
- Primitive Group Camp: 50 person capacity
- Horse riders campground and picnic shelter
- 6 walk-in sites
- Trailer dump station in park

Administration

- Park Office
- Wildlife Area Manager's residence and Assistant Manager's residence
- Maintenance garages and shop areas at park and WMA
- 12 Barns, granaries, corn cribs and other storage buildings
- Septic tanks: 4 in park with one lift station and 4 in WMA with 2 mound systems
- Active wells: 2 in park and 4 in WMA
- Roads: 1.5 miles in park and 35 miles in WMA (not including boundary roads)
- 3 Buildings in the park are on the National Register of Historic Places
- Approximately 1.7 miles of dike impound 574 acres in 14 wetlands; 2 of the impoundments also have waterfowl nesting islands.


LAC QUI PARLE STATE PARK
SUMMER TRAILS
Hiking
Horseback/Hiking
NORTH
FACILITIES
Information/Office
Picnic Area
Swimming
Boat Ramp
Campground
Primitive Group Camp
Walk-in Campsites
Equestrian Camp
Historic Site
Shelter (Picnic and Warming)
Map Shelter
Trailer Sanitation Station
Private Property
Public Use Prohibited
(except on designated trails)
0 .1 .2 .3 .4 .5 Miles
0 .1 .2 .3 .4 .5 Kilometers
To Milan Bridge
To Milan and Lac qui Parle State Wildlife Management Area Headquarters
Respect Private Property
Ask First
Because lands exist within the boundaries of this park that are not under the jurisdiction of the D.N.R., check with the park manager if you plan to use facilities such as trails and roads other than those shown.
Lac qui Parle Lake
Fort Renville
Minnesota River
Lac qui Parle River
spring
Lac qui Parle Mission
To WATSON and MONTEVIDEO
59
7
0.9 mi.
1.0 mi.
0.3 mi.
0.5 mi.
0.2 mi.
0.4 mi.
0.4 mi.
1.2 mi.
0.5 mi.
0.2 mi.
0.4 mi.
Park Entrance
Federal Dam and Recreation Area
Hagen Bridge
To DAWSON and MADISON
Lac qui Parle River
Minnesota River
33
32
13
48
75

Visitor Analysis

Lac qui Parle Wildlife Management Area

Minnesota wildlife management areas are used for public hunting, trapping, fishing, and other activities compatible with wildlife and fish management. Hunting has always accounted for the largest share of public use on the Lac qui Parle Wildlife Management Area, but the area is also used for fishing, cooperative farming, rough fish harvest and environmental education.

Hunting

A variety of factors influence hunter activity. Season lengths, wildlife populations, habitat types, public accessibility, and numbers of other hunters all play a role in the individual decision to use a particular area. The Lac qui Parle Wildlife Management Area provides hunters with a large block of public land containing high wildlife densities and a variety of habitat types.

Hunters pursue various wildlife species at Lac qui Parle. Foremost are Canada geese, followed by other waterfowl, deer, and pheasants. The pursuit of rabbits, squirrels, and furbearers (raccoon, fox and coyote) also provides important recreational opportunity to a dedicated minority.

Canada Goose Hunting

The Lac qui Parle Wildlife Management Area is an important migration stop for Eastern Prairie Population Canada geese that nest on the west coast of Hudson Bay in Manitoba, and traditionally winter in Missouri, Arkansas, and other mid latitude states. An increasing number of Canada geese have wintered at the Lac qui Parle Wildlife Management Area since the early 1980s.

The Lac qui Parle Wildlife Management Area lies within Minnesota's West Central goose zone. Land management, hunting pressure, and Canada goose populations at Lac qui Parle are the major factors influencing Canada goose populations and hunter activity throughout the West Central Goose Zone.

For a five year period (1990–1994) all goose hunters in the West Central Goose Zone were required to purchase a permit before hunting. A post season survey of randomly selected permit holders was then conducted to determine Canada goose harvest, hunter activity, and success. These post season surveys provided an excellent source of information for estimating goose hunter numbers and activity at and near the Lac qui Parle Wildlife Management Area.

In addition, hunters using state blinds at the Lac qui Parle Refuge are required to register in person to use a blind, and report their success at the completion of their hunt. Based on the West Central Goose Zone survey, in 1994, 11,121 persons spent a total of 60,581 hunter–use days pursuing Canada geese. The state blinds accounted for 4,271 hunters–use days — an average of 142 hunters/day. Of the state blind hunters, 603 were under 18 years of age. Most hunters (39.1%) were from the southern portion of Minnesota, with 22.5% from the Twin Cities and 10.7% from the

West Central Goose Zone. The total economic value of the goose hunt was estimated at 2.2 million in 1985 with over half the goose hunter expenditures (1.2 million) being made in the local area (Hiller and Kelly 1987). Private land hunters paid nearly $410,000 to property owners for hunting privileges that same year. It is important to note that the above figures are based on an estimate of 5,446 hunters or 30,546 goose-hunting days in the Lac qui Parle Zone. From the 1990-94 West Central Goose Zone permit, it was determined that 7,500-10,600 hunters spend 30,500-43,200 goose-hunting days in the Lac qui Parle Goose Zone. Based on permit data, it appears the 1987 report, although the numbers are substantial, underestimated the economic impact of the goose hunt.

Waterfowl Hunting

The Lac qui Parle refuge (south of Highway 40) is closed to waterfowl hunting except from the 114 state blinds. The majority of all waterfowl hunting takes place on Upper Lac qui Lake (north of MN Hwy 40), Marsh Lake, and several small impoundments. Marsh Lake (5,100 acres) in particular provides good to excellent waterfowl production and hunting opportunity.

Formal contact with waterfowl hunters on Lac qui Parle Wildlife Management Area is limited to opening day bag checks. An estimated 500 duck hunters were present on opening day in 1995.

Marsh Lake, especially the west end, is the focal point for most of this activity. One hundred forty–six vehicles were counted around Marsh Lake on opening day with 90 of those vehicles parked along the Louisburg grade road. There were an average of 2.2 hunters per vehicle — 321 hunters or 1 hunter/16 acres of Marsh Lake.

Forty–five cars (100 hunters) were counted around the man–made impoundments and backwater areas west of the Louisburg grade road (Bahl, Von Holtum, Simonson/ Sorteberg tracts). Approximately 50 hunters utilized the backwater and flooded timber areas between Hwy. 119 and the Marsh Lake Dam. Another 20 hunters were scattered throughout the unit keying in on small prairie potholes and man-made impoundments.

Hunting pressure remains heavy on the weekends throughout the waterfowl season, but is light to moderate during the week. Eighty percent of the opening day duck hunters were from the 5 County metropolitan area.

Pheasant Hunting

Large blocks of prairie, interspersed wetlands, and food plots combine to provide ideal habitat for pheasants at Lac qui Parle Wildlife Management Area. Pheasant counts are normally well above the statewide average. The Lac qui Parle Refuge area south of Highway 40 is closed to upland game hunting during the controlled goose hunt. This results in essentially two opening days for pheasant hunters at Lac qui Parle - the general opener on the majority of the unit, and the opening of the controlled hunting zone (CHZ) following goose season closure.

Hunter bag checks are conducted only on the opening day of the regular pheasant season. On that portion of Lac qui Parle north of Hwy 40, an estimated 230 hunters harvested 133 pheasants on opening day in 1995. Sixty percent of these hunters were from the 5 county Metropolitan area.

Hunting pressure and harvest are highly changeable from year to year. In 1985, 973 hunters harvested 403 pheasants while only 79 birds were harvested by 295 hunters in 1986. Pheasant populations, amount of crop harvested, and weather are variables that determine hunter numbers and harvest on opening day.

The opening of the CHZ to pheasant hunting is eagerly anticipated. Hunter density is high and remains so until season closure. Harvest has not been estimated but is substantial. Above average pheasant numbers, coupled with a large number of hunters observing these birds while goose hunting, are contributing factors to heavy hunting pressure.

Deer Hunting

All of the Lac qui Parle Wildlife Management Area, including the refuge, is open to deer hunting during the established seasons. Historically, the only area closed to deer hunters is the Rosemoen Island sanctuary. However, beginning in 1994, a special deer hunt was initiated on Rosemoen Island for handicapped individuals.

The Lac qui Parle WMA lies within deer registration block 433. Registration block 433 is 402 square miles. The Lac qui Parle WMA is approximately 52 square miles (13% of block 433).

The Lac qui Parle Wildlife Management Area lies in Zone 4 of the Minnesota Firearms deer season. Zone 4 is further subdivided by date into Zone 4A (2 days) and Zone 4B (4 days).

Firearms deer hunters are limited in the duration of their hunt based on the season chosen, and type of license purchased. The Multi–Zone Buck License allows persons to hunt bucks only during the regular firearms seasons established for both Zone 4a and 4b, a total of 6 days. The majority of deer hunters choose to purchase either a 4A or 4B license option, and apply for an antlerless deer permit.

The final option for the firearm deer hunter is the muzzleloader deer season. The muzzleloader season in 1994 was a 16 day period from Nov. 26 through December 11. Muzzleloader hunters are allowed to harvest one deer of either sex. Firearms deer hunters may hunt during the regular firearms deer season or the muzzleloader season, not both.

The 1994 archery deer season at Lac qui Parle Wildlife Management Area extended for 79 days from September 17 through December 4. Lac qui Parle WMA personnel maintain limited contact with deer hunters. As a result, hunter numbers and activity are not well documented. Although deer harvest numbers and hunter activity are

available by registration block, interpretation of these harvest statistics in an attempt to assign values for the Lac qui Parle area is speculative. The following represents estimates derived from deer registration data for the 1994 hunting season.

Archery Deer Hunting

An estimated 618 hunters used the Lac qui Parle area in 1994. The 1991 National Survey of Fishing, Hunting, and Wildlife–Associated Recreation (U.S. Department of Interior) estimated the average hunter spends 10 days pursuing their sport. Based on that estimate, 6,180 man days were spent archery deer hunting in 1994. Archery deer harvest on Lac qui Parle was estimated at 104 animals, or 59 percent of the total archery harvest for Permit Area 433.

Firearm Deer Hunting

Firearms deer hunting pressure is moderate to heavy throughout the unit with the refuge experiencing the highest hunter density. In 1994, an estimated 456 firearm deer hunters harvested 227 deer on the Lac qui Parle WMA during the 4A and 4B seasons, or 22% of the total deer harvest for Permit Area 433.

In 1994, an estimated 100 muzzleloader hunters harvested 52 deer on the Lac qui Parle WMA, or 3% of the statewide muzzleloader deer harvest.

Wheelchair Deer Hunt

In 1994, eight hunters confined to wheelchairs were successful in harvesting 4 deer from the Rosemoen Island sanctuary in the first of a planned annual hunting opportunity for physically challenged individuals. Participants in this hunt were allowed to use either legal firearms or archery equipment.

Trapping

Trappers are required to receive a trapping permit from the resident manager, and provide an annual harvest report. The number of trappers has declined since 1976. Fur prices are the driving force behind trapping numbers. From 1976 through 1994, an estimated total of $138,000 of fur has harvested from the unit. Muskrat, raccoon, and mink comprised most of the harvest. Muskrat and mink abundance vary in relation to yearly changes in water levels.

Other Activities

Other activities include wildlife observation, picnicking, hiking, photography, snowmobiling on the lake ice, pleasure boating, water-skiing, use of personal watercraft, canoeing and swimming. No estimate has been made of general sight-seeing from vehicles. These activities are year-round, dispersed, and very difficult to monitor. The area is probably used as much for these activities as for goose and duck hunting combined.

Fishing

A total of 35,913 angler trips, accounting for 148,903 angler hours, was estimated during an angler creel survey on Lac qui Parle Lake in 1994–95 (Domeier, 1995). This total includes 13,305 trips, or 73,618 hours, of ice fishing pressure. During a 1989–90 creel survey anglers made 34,577 trips which accounted for 139,713 hours, including 8,300 trips or 38,979 hours of ice fishing and spearing (Polomis, 1990). The economic value of the sport fishery was estimated at $1,328,781 in 1994–95 and $1,119,431 in 1989–90. About 52% of the anglers lived within 15 miles of Lac qui Parle Lake. Another 33% lived between 15 and 50 miles from the lake. Over 13% lived between 50 and 200 miles, 1% lived between 200 and 500 miles, and 1% lived over 500 miles from the lake.

Walleye was the primary species sought in 1994–95, accounting for 70% of anglers' preference. This was followed by northern pike (20%), yellow perch (8%), and crappie (3%). White bass, channel catfish, bullheads and carp each accounted for less than 1% of anglers' preference. Twenty two percent of anglers indicated no particular species preference.

Only 20% of open water anglers were female and 80% were male. During the ice fishing season only 7% of anglers were females and 93% were males. Only 16% of open water anglers, and only 7% of ice anglers were under the age of 16.

Commercial Fish Harvest

Commercial fish harvest in Marsh and Lac qui Parle Lakes has ranged from 0 to 1,830,242 pounds per year, and averaged 255,063 pounds over the past ten years (1985–86 to 1994–95) (Ortonville Area Fisheries, unpublished data). This was considerably higher than the average for the previous ten year period (34,152), but lower than the historic average of 378,500 for 1941–42 to present.

Over the last ten years, about 23% of the commercial fish harvest has come from Marsh Lake, and about 77% from Lac qui Parle. Carp has comprised 95% of the commercial harvest from Marsh Lake, but only 42% from Lac qui Parle. Buffalo comprised 43% of the fish harvest from Lac qui Parle Lake, but only 4% from Marsh. Freshwater drum and bullheads comprised 10% and 5% of the Lac qui Parle harvest, respectively, but were not harvested from Marsh Lake in the last ten years. Suckers comprised less than 1% of the harvest from both lakes.

Lac qui Parle State Park

Lac qui Parle State Park currently attracts approximately 50,000 visitors per year. Day users comprised over 92% of the visitor activity (4 year average). Primary activities that attract day users are swimming, picnicking and water based recreation such as shore or boat fishing. Current park attendance records 1992-1995, reflect unusual years of flooding. As a result, figures ranged from reduced use in some areas to total park closure for the majority of the main peak seasons. For this reason, the revenue and visitor information numbers may not truly represent the park's potential.

Camper Profile

Camper registration cards are completed for each campsite which is used. This card records camper name, address, number in party, length of stay, and dates the campsite was used. Approximately six and 11 percent of all users camped in Lac qui Parle State Park in 1993 and 1994 respectively. Group camping accounted for about one percent of camping in both years.

Attendance	1992	1993	1994	1995
Day Use	41,923	31,727	43,786	36,206
Camping	3,864	2,097	5,715	2,898

ENFORCEMENT AND INTERPRETIVE SERVICES

Summary of Existing Enforcement Services

• There are three conservations officers who are Licensed Peace Officers that serve an average of 1,000 square miles each. One officer patrols the eastern part of Lac qui Parle Lake, one the western part and one patrols the northern part of Lac qui Parle and all of Marsh Lake. Additional conservation officers are brought in during high use periods.

• The state park manager and assistant park manager are Level II Peace Officers. Lac qui Parle also has one Level I officer that serves as night security. Their enforcement authority is limited by the department to within the park boundaries. Park officers use a low key approach to enforcement with an emphasis on education and compliance. Level II officers may issue citations for violations. Most of park enforcement is focused on enforcing park rules and visitor concerns. They also respond to emergencies and customer services.

• The wildlife manager and assistant wildlife manager are Level II Law Enforcement Officers. Five additional staff have Level I training which means they have been trained how to document and report violations. Only the Level II officers can write citations. Departmental limitations for Level II wildlife enforcement authority at Lac qui Parle extends to 5 miles outside the exterior WMA boundaries and throughout the Lac Qui Parle Goose Zone.

Interpretive Services

The following interpretive services chapter is organized into two main sections: a summary of existing interpretive services and interpretive themes. Interpretive clientele was discussed under visitor analysis and interpretive services recommendations are located in the next chapter. This section follows a format that was developed by the Division of Parks and Recreation Interpretive Services in 1993.

Summary of Existing Interpretive Services

Presentations and Activities

About 41,000 visits were recorded the last several years at the park. The park has not had any full–time, seasonal or volunteer naturalists in the last ten years. Naturalist–led programs have not been a regular part of the park's operation during the last 15 years. However, the park has sponsored several special events and programs. The park managers speak to several scout groups, school groups and senior citizen tours each year. Staff also cooperate with the County Extension Service for "Conservation Day" and work at various county fairs, travel shows and game fairs each year. Park staff also participate in "Take a Kid Fishing" day.

The wildlife management area has not conducted any formally organized educational programs on a regular basis. The WMA staff gives tours to some school groups on request. However this is limited by the WMA's staff time.

The Fisheries Section has a formal aquatic education program called MinnAqua. Local Fisheries staff have used this program to conduct activities with groups of kids from schools, other organizations or the general public. These programs have been facilitated in three different ways: 1) Area Fisheries staff; 2) through an intern hired each of the last three years and stationed at the Regional office in New Ulm; 3) specially trained facilitators such as the Extension Specialists for Yellow Medicine County. There are typically one or two program activities per year in the Lac qui Parle Area. Staff from the Ortonville Fisheries Office also give presentations regularly on a variety of topics concerning fish management. Talks are usually arranged on an as requested basis, but in the Lac qui Parle area they average three or four per year. Fisheries staff are also beginning to work with teachers at some of the local schools to involve students in environmental monitoring.

Trails, Exhibits, and Publications

The WPA era Map Building and concrete model of the Lac qui Parle Flood Control Project is the oldest non–personal interpretive service in the park. Always Changing is the title of a sign located on a prairie hillside. This sign tells the story of the seasonal changes on the prairie. A printed bird checklist of the park and area is available, and several pairs of binoculars are also available for park visitors to borrow during their visit in the park.

The Ortonville Area Fisheries office has set up a display annually at the Lac qui Parle County Fair, and occasionally at the Chippewa County Fair. Display topics are center around fish management in the Lac qui Parle area. The Ortonville Area Fisheries office provides fish annually for an aquarium display at the Lac qui Parle County Fair, and the Spicer Area Fisheries office provides fish each year for a display at the Chippewa County Fair. Signs will be installed in 1996 at Lac qui Parle lake access to explain the experimental fishing regulation for walleye. Adhesive rulers and brochures will also be distributed.

Facilities

Currently, there are no facilities dedicated to environmental education or interpretation in the State Park or WMA. In the summer of 1996, the Minnesota Department of Natural Resources (DNR) is constructing a visitor center. The new facility will enable Lac qui Parle WMA and Lac qui Parle State Park to utilize one central location to serve the public seven days a week. The facility will also provide opportunities for environmental education and hunter education.

Area Interpretive Opportunities

The following area private and public facilities and organizations provide cultural and or environmental education opportunities.

- The Bonanza Environmental Center located in Big Stone lake State Park provides environmental education to seven school districts in the Ortonville area, plus some community education efforts.
- The Lac Qui Parle Mission, operated by the Minnesota Historical Society, provides interpretation on the mission site and the people who lived and worked there.
- The Big Stone Wildlife Refuge, operated by the U. S. Fish and wildlife Service, has available to the visitor a self–guided auto tour of its property and a bird checklist.
- C.U.R.E., a private environmental organization, sponsors seminars, speakers, field trips and programs on clean water and land for the public.
- The Land Stewardship program, a private agricultural/environmental organization, sponsors seminars, speakers, field trips and programs on holistic land management for the public and farming community.
- Many local schools conduct their own environmental education activities in conjunction with their school curriculum.
- County Extension offices, local Historical Societies and County Local Water Plan Coordinators also offer a variety of programs and educational information.

Interpretive Themes

Connecting Themes

Connecting themes are the common elements that tie the area together. Two connecting themes for the Lac Qui Parle area are:

1) The Minnesota River is a major influence on the natural and cultural resources of the Lac Qui Parle area.

2) Lac Qui Parle WMA and Lac Qui Parle State Park exist today because of past efforts to conserve the area's natural resources.

Primary themes

Primary themes are the main stories of the Park and WMA. The primary themes are listed below.

Cultural

- Who were the earliest people to live in the Minnesota river valley?
- How did the Dakota people use the Minnesota river?
- European settlers changed the Minnesota river valley.
- WPA employment programs built the dam and park as part of a flood control project.
- Why was Lac Qui Parle WMA started?
- What is the mission of the Lac Qui Parle WMA?
- How has hunting changed in the Lac qui Parle area?
- How has fishing changed in the Lac qui Parle area?
- Hunting and fishing affects many nearby communities.
- How have our views of hunting and fishing changed?
- Hunting – an American tradition.

Geologic

- How did glaciers shape the Lac Qui Parle area?
- How was the Minnesota river valley formed?
- How was Lac Qui Parle lake formed?
- How does geology affect stream and lake characteristics and water quality?

Biologic

- What is a Wetland?
- What is prairie?
- What is biodiversity and why is it important to protect rare species and significant natural communities in the area?
- Prairie fire: natural necessity or natural disaster?
- Clean water is essential for all life along the Minnesota River. (Emphasize the watershed and what can be done positively and specifically to improve water quality and reduce flooding and erosion)
- Why do Canada Geese stop at the LQP area?
- What do we know about Canada Goose migration?
- Bald Eagles are frequent visitors to the Lac qui Parle area.
- Alien plants degrade native ecosystems.

Recreation

– Young people can enjoy the out-of doors at Lac qui Parle
– The best methods for observing wildlife in the Lac qui Parle area.
– Lac qui Parle's best wildlife viewing spots.
– You can take great photos of Lac qui Parle's wildlife.
– How to have a safe hunt.
– Are you a courteous and responsible hunter?
– Are you a courteous and responsible angler?
– Tips for fishing on Lac qui Parle Lake
– Tips for hunting on Lac qui Parle WMA.
– Hunting on private land: It's a privilege.

Management

– Fire is an important part of habitat management at Lac qui Parle.
– How are Canada Geese managed at Lac qui Parle WMA?
– How far does your shot go?
– When should I shoot at the geese?
– How to release a fish.
– How catch and release affects fishing on Lac qui Parle Lake.
– Stocking fish in Lac qui Parle Lake is only part of the management picture.
– How are fish managed in Lac qui Parle Lake?
– Which fish are safe to eat?
– How are water levels on Lac qui Parle Lake set?
– How do recreation needs mix with the environment?

PLAN RECOMMENDATIONS

Natural & Cultural Resource Objectives

These objectives will guide the area plan and decisions toward the sustainable management of natural and economic resources and the protection of cultural resources.

Community

- Raise the level of understanding of cultural and environmental issues. Communities come together and learn to work together through cultural and environmental activities.
- Maintain natural communities that offer opportunities for solitude. Stress is a serious issue in modern society. All of the popular solutions highlight the role of leisure and relaxation.
- Manage natural resources on a landscape and ecosystem basis. The provision of parks, open spaces and protected natural environments contribute to the environmental health of our communities.
- Identify, monitor and manage historical and cultural resources in cooperation with the Minnesota Historical Society and county historical societies.

Economic

- Development should be completed in a manner compatible to resource management and protection. Many studies have shown that financial investment in recreation projects pay dividends throughout the community--the return is always greater than the original outlay.
- Use natural resources and public funds efficiently. Direct growth towards areas with existing capacity in infrastructure and services. Use land efficiently and appropriately. Habitat protection and recreation is often the highest and best use of lands that are too fragile for development (slope, floodways, etc.)

Environmental

- Protect existing wetlands and prairie ecosystems and identify former wetlands and prairies for restoration where feasible under our jurisdiction.
- Protect known cultural resource sites.
- Protect and enhance habitats for plant and animal species that are listed as endangered, threatened or special concern. Research on public's willingness to pay taxes for various types of services repeatedly places environmental protection near the top of the list.
- Identify, monitor and control invasive exotic species including plants, insects, diseases and animals.
- Manage and maintain examples of each natural plant community. This also provides essential habitat for the native species of Minnesota.
- Sustain functioning ecosystems and maintain the integrity of biological diversity at all levels including: ecosystem, community, species, and genetic.
- Identify degraded natural communities and ecosystems and work toward restoration through management.

Recreation Management Objectives

This set of objectives will guide the area plan and decisions toward the sustainable use of natural and economic resources.

Community

- Provide the highest level of access feasible for persons with disabilities.

- Offer and market a package of opportunities which include:
  - Nationally significant wildlife area
  - Camping
  - Native prairie complex
  - Excellent fishing opportunities
  - A variety of trail opportunities including biking, hiking, horseback riding, and skiing
  - Unique watershed and geological features
  - Hunting
  - Historical/Cultural education
  - A diversity of wildlife and birds

- Promote the safety and security of users.

- Complement the character and economic vitality of the neighboring communities.

- To promote increased understanding, appreciation and enjoyment of natural and cultural resources in the area by providing interpretive services.

Economic

- Consider the long-term social, economic and environmental costs of growth and development. Base decisions on whether or not they are sustainable over the long term.

- Use natural resources and public funds efficiently. Direct growth toward areas with existing capacity in infrastructure and services. Use land efficiently and appropriately.

Environmental

- Respect the limitation of the natural environment to support growth and development.

- Preserve the area's natural scenic beauty, noncommercial atmosphere, and historic character.

- Minimize and concentrate developments in order to preserve the remaining natural areas.

Boundary Recommendations

Introduction

The existing statutory boundary of Lac qui Parle State Park includes approximately 530 acres. Included within the boundary are 10 acres of county-owned land and one acre of privately owned land. The rest is state-owned property administered by the DNR, Division of Parks and Recreation. As of the end of the 1996 Legislative session, 146.88 acres in Kragero Township was added to the Lac qui Parle State Park statutory boundary. This new acreage is privately owned. Private lands are acquired by state parks only from willing sellers. Acquisition projects are placed in priority order with other with other state park acquisition projects. The Lac qui Parle Mission Site and Fort Renville are state-owned property administered by the Minnesota Historical Society and managed by the Chippewa County Historical Society.

The existing Wildlife Management Area boundary as of August, 1996 was approximately 31,724 acres in four counties. In 1957, the Minnesota Executive Council transferred 22,877 acres of the Lac qui Parle Flood Control Project to the Minnesota DNR for a wildlife refuge and public hunting ground. An additional 347 acres is licensed to the Minnesota DNR by the federal government (Corps of Engineers).

Boundary modifications are considered in all DNR management plans. Although modifications may be proposed, changes in state park boundaries require approval by the legislature and acquisition of WMA lands requires County Board approval. Both situations require a willing seller and a fair market value price.

Payment In Lieu of Taxes (PILT)

The impact of public land ownership on the local tax base has long been a concern to local governments. Since 1979, the state of Minnesota has been reimbursing counties for lost tax revenue through the Payment In Lieu of Taxes (PILT) program. Determination of payments in lieu of taxes is currently governed by statutes that prescribe general rates to be paid for different land classes. For the Lac qui Parle area the following rates currently apply (1996):

In-Lieu Land Class	Payment to County
1. Purchased Land, Condemned Land, and Gift Land.	$3.00/ac or 0.75% appraised value (whichever is greater for that county)
2. County administered tax-forfeit land	$.75/acre
3. Trust Land, Con Con Land, and Exempt acquired land.	$.375/acre

Big Stone, Chippewa, and Lac qui Parle counties have chosen to have their In Lieu taxes based on $0.75 of the appraised value of the land. In 1996, Swift County has their In Lieu taxes based on the $3/acre rate.

The following table shows how many acres of DNR land is in each county and shows how many acres are acquired or other acres (tax-forfeit or exempt land). In fiscal year 1995 (payable 1996),the DNR paid the following counties In Lieu of Taxes as follows (note: acreage is for all DNR land in each county, not just Lac qui

Parle Park or WMA):

	Acres Acquired	Other Acres	Gross Payment
Big Stone	4,556	3,829 (exempt & forfeit)	$24,689
Chippewa	5,773	3,902 (exempt & forfeit)	$27,328
Lac qui Parle	10,822	6,763 (exempt)	$61,350
Swift	6,880	2,250 (exempt)	$21,484

State Park Boundary Recommendations

Discussion

As part of the citizen's roundtable meetings, it was recommended to not think too small in terms of the state park boundary. If the state park boundaries are expanded to the east side of the lake it would be possible to develop a new campground out of the flood plain. Through effective design, the new campground will allow campers easy access to the lake, the new visitor center and to the historic Fort Renville and Lac qui Parle Mission sites.

ACTION

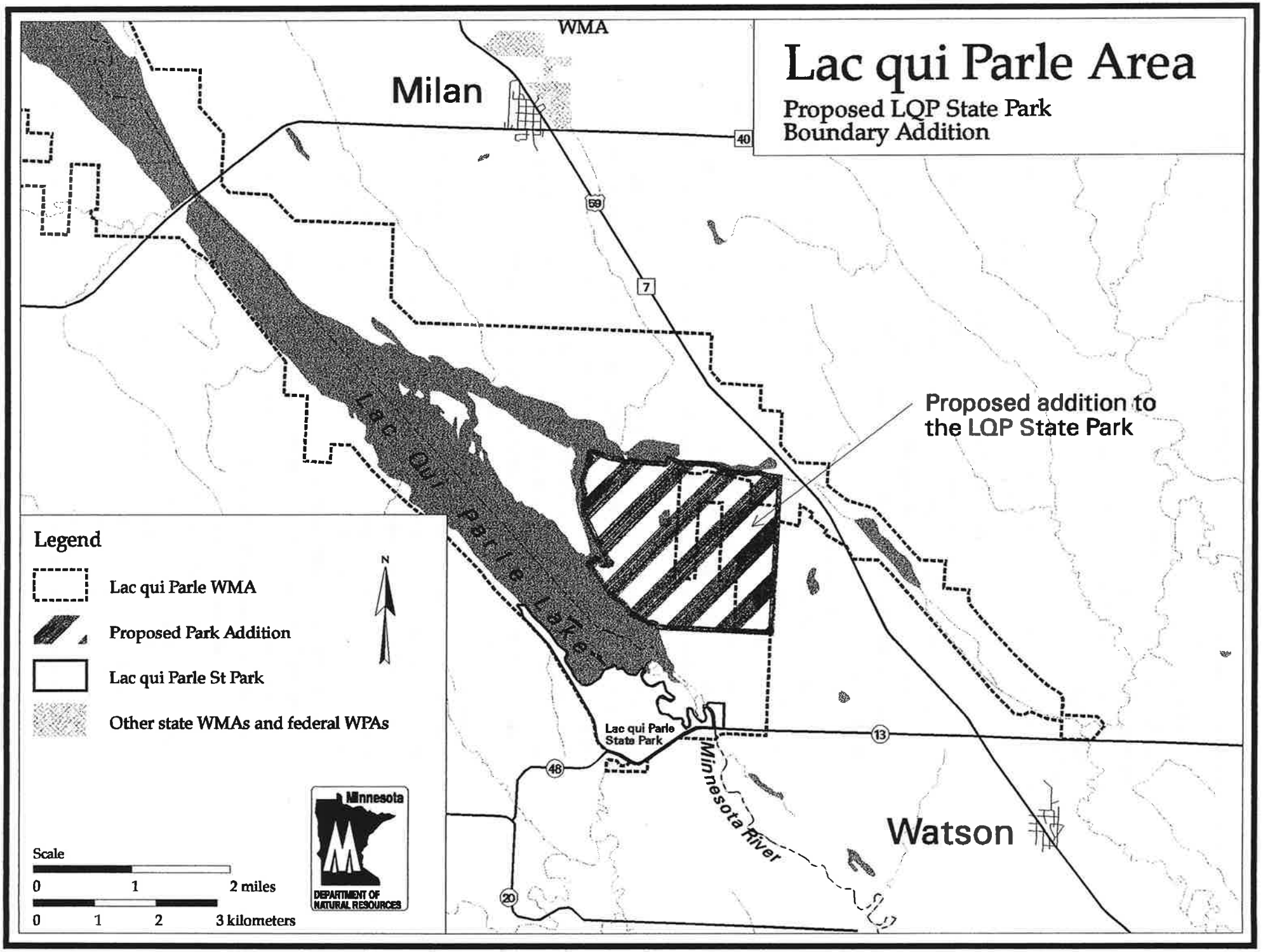
- Move the park campgrounds to the east side of Lac qui Parle Lake. An estate of approximately 150 acres is the most probable location for an initial acquisition and for the site of the new campgrounds. It is located along the lakeshore between the Mission Site and the WMA headquarters. (See Map).
- In the future, the state park boundaries should be expanded to an area of about four sections (Sections 1,11,12, and 13) (See Map). Much of this area would still be managed for wildlife but it would allow for greater flexibility in terms of recreational opportunities. There may be some federal funding issues to be resolved.
- The existing state park would remain as a state park but its uses might be changed.

WMA Boundary Recommendations

Discussion

The focus of the Lac qui Parle WMA is to: 1) provide wildlife habitat; 2) conserve and enhance natural communities, and: 3) provide public hunting and trapping. Initially the WMA was set aside to restore giant Canada geese to their former range and to attract migrant geese to the refuge. Canada goose management is still a primary focus, however, there is now an increased emphasis on management and conservation of natural communities. In the Lac qui Parle area, critical habitats are remnant native prairies and wetlands. Funds to acquire Lac qui Parle WMA lands have come from the $4 surcharge on small game hunting licenses, Reinvest in Minnesota (RIM) Matching Program, North American Wetland Conservation Act, state bonding, Environmental Trust Fund, Future Resources Funds, and Pittman Robert federal aid.

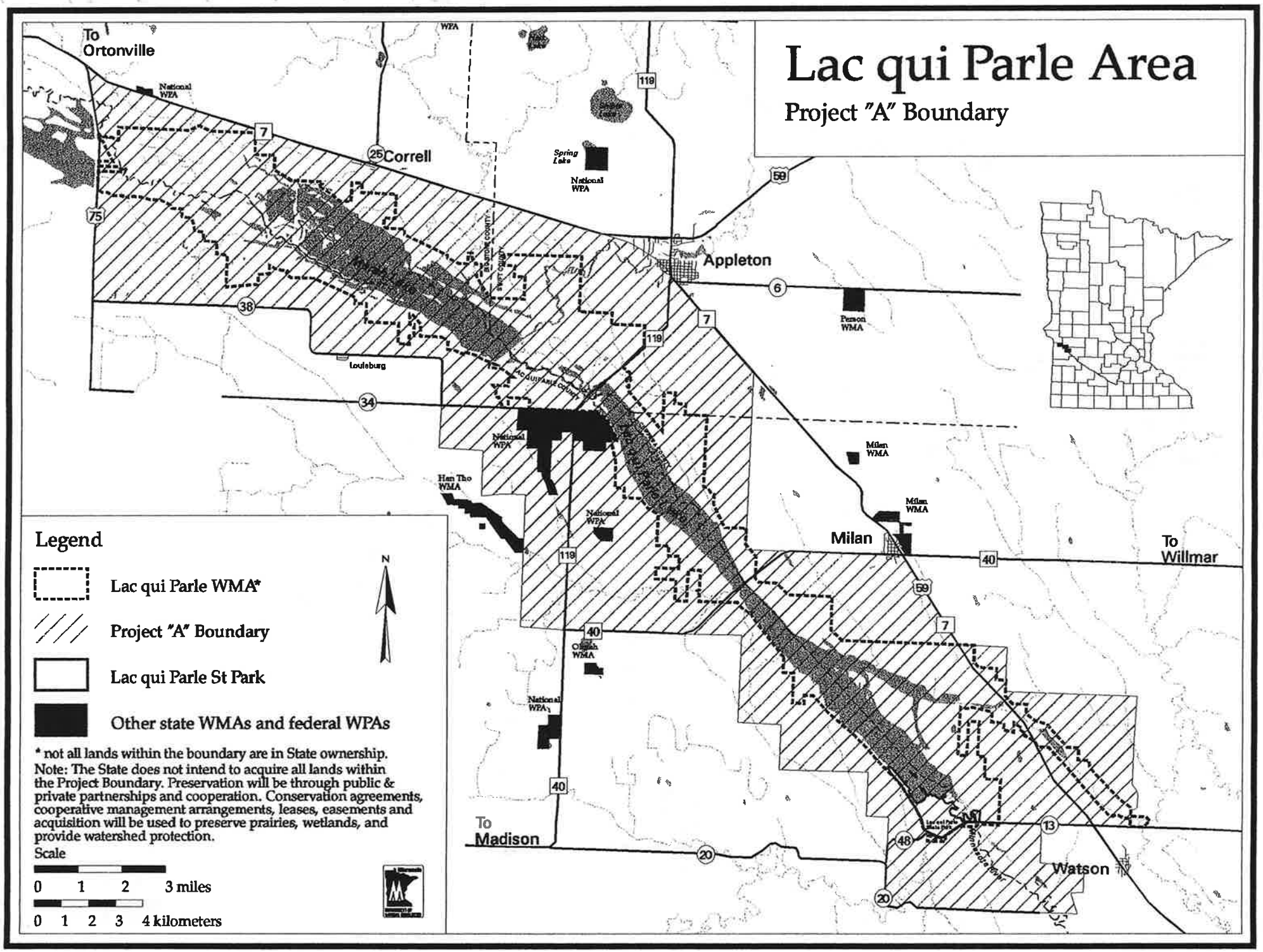
At public meetings there were mixed opinions on whether the WMA should expand its boundaries all the way to Highway 7. However, the majority seem to favor expansion of the WMA especially if it means protecting endangered species, prairies or wetlands or to fulfill management objectives. Conversion of agricultural lands to another use such as prairie restoration was seen as a concern. However, since prairies consist of grasslands, grazing and livestock interests may be compatible. Sustainable

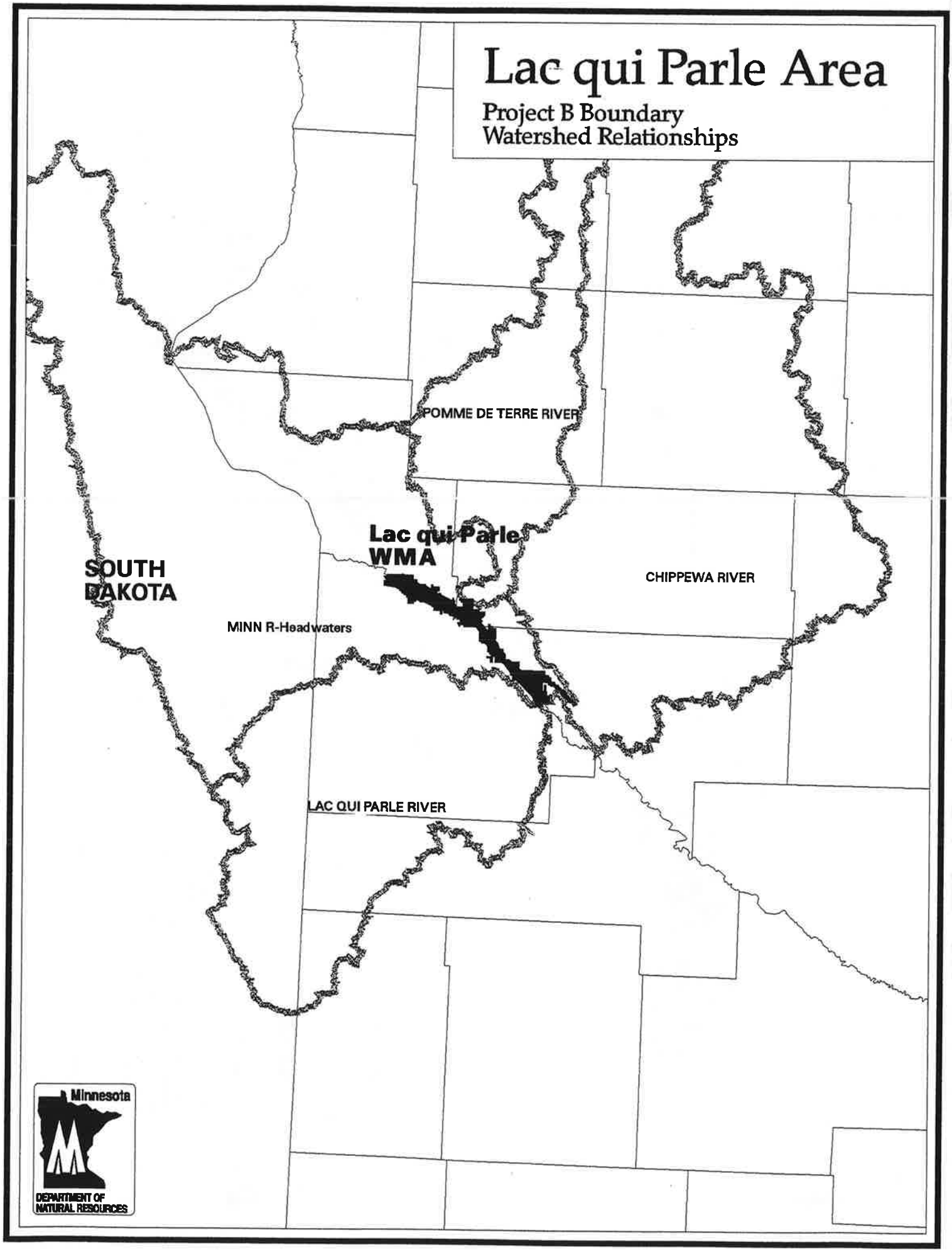

Lac qui Parle Area
Proposed LQP State Park
Boundary Addition
WMA
Milan
40
59
7
Lac Qui Parle Lake
Proposed addition to
the LQP State Park
Legend
Lac qui Parle WMA
Proposed Park Addition
Lac qui Parle St Park
Other state WMAs and federal WPAs
N
Lac qui Parle
State Park
48
13
Minnesota River
Watson
20
Minnesota
DEPARTMENT OF
NATURAL RESOURCES
Scale
0 1 2 miles
0 1 2 3 kilometers

agriculture studies are showing that rotational grazing can be economically viable and grassland studies are showing that grazing is an important ecological process that can be used as a prairie management tool. There is real potential for setting up rotational grazing agreements with neighboring farmers and setting up sustainable agriculture programs. Restoration of large native mammals such as bison was also discussed as a land management option.

ACTIONS

- Seek WMA priority boundary expansion based on management objectives. See Lac qui Parle Area Map - Project A). The WMA does not propose to buy all the land within the new boundary. (See next recommended Action item below). Acquisition will be focused on quality prairie and wetland habitat. However, within this new boundary the goal will be to work with landowners so that the land is managed to protect water quality, prairie and wetland habitat. The new boundary will follow easily identifiable roads and landmarks. It incorporates the headwaters of small watersheds, streams and wetlands. The new boundary also encompasses most of the known key prairies remnants in the area and many rare species that are presently outside the boundary. Acquisition is not prioritized in this plan, because so much is based on availability. Ideally, key parcels will be connected if possible. Some enhancement of degraded prairies or wetlands which still contain native plant species will be considered as a buffer to remnant prairies and wetlands. Conversion of cropland to grassland using native plants (restoration) for buffering or interconnecting remnant prairie or wetland areas will be limited.
- Utilize and encourage partnerships. Conservation agreements, cooperative management arrangements, leases, easements, and acquisition could be used for cooperative prairie or wetland preservation or enhancement. Appropriate compensation will be made for any rights transferred by willing sellers of those rights. With this sort of cooperative protection program, the Lac qui Parle area could become the largest block of prairie and wetland in Minnesota. Citizens have influenced this concept of a nontraditional wildlife management area that will result in a diverse and flexible land protection effort.
- Use full range of management options in acquiring lands or property rights. Willing seller acquisition on selected tracts will only be one part of the management strategy. State, Federal, nonprofit, and landowner cooperation will be a vital part of the protection strategy. The Conservation Reserve Program, Wetland Reserve Program, RIM, and other conservation efforts will be integrated into this prairie and wetland preservation effort.
- Address the loss of taxes resulting from government ownership. Tax base loss could be reduced by protected lands remaining in private ownership. In-lieu-of-taxes will continue to be paid to the counties. These lands could best be cooperatively managed through conservation agreements and lease arrangements.
- Work cooperatively with various agencies and landowners to protect and enhance land and water quality within the watershed. (See Watershed Boundary Map - Project Area B). Many of the same ecosystem protection actions will be taken as in Project Area A, however there will be a greater emphasis on the watershed planning and water quality, and the approach will not include much acquisition. Project B will target greenway corridors and working with landowners.


Lac qui Parle Area
Project "A" Boundary
To Ortonville
Correll
Appleton
Louisburg
Milan
To Willmar
To Madison
Watson
Legend
Lac qui Parle WMA*
Project "A" Boundary
Lac qui Parle St Park
Other state WMAs and federal WPAs
* not all lands within the boundary are in State ownership.
Note: The State does not intend to acquire all lands within the Project Boundary. Preservation will be through public & private partnerships and cooperation. Conservation agreements, cooperative management arrangements, leases, easements and acquisition will be used to preserve prairies, wetlands, and provide watershed protection.
Scale
0 1 2 3 miles
0 1 2 3 4 kilometers


Lac qui Parle Area
Project B Boundary
Watershed Relationships
POMME DE TERRE RIVER
Lac qui Parle
WMA
SOUTH
DAKOTA
CHIPPEWA RIVER
MINN R-Headwaters
LAC QUI PARLE RIVER
Minnesota
DEPARTMENT OF
NATURAL RESOURCES

NATURAL AND CULTURAL RESOURCES

Resource Management Recommendations

Introduction

Natural and cultural resource management is a dynamic process. The following section contains recommendations that are a result of the public input planning process and current resource management practices. They are intended to provide direction for management for the next 20 years. However, it is important to keep in mind that some of these recommendations will need to be updated over time as public needs change and improved management techniques are established. Implementation of some recommendations may be dependent on adequate funding.

Land and Water Management

Ecosystem Based Management

Discussion

Management actions for the Lac qui Parle area revolve around the concepts of maintaining biological integrity, Ecosystem based management and using current and future technology (GIS, ECS and others). Many of the resource management actions will also involve interpretation. See the Interpretive Services Recommendations for details.

ACTION

- Development and management activities must consider and integrate community, economic and environmental goals to reflect their interdependence.

Biological Integrity and Vegetation management

Discussion

The Lac qui Parle area is a major piece of largely-contiguous river valley habitat, by itself, and in combination with the Big Stone National Wildlife Refuge. All effort should be made to avoid habitat fragmentation and protect biodiversity.

ACTION

- Use all appropriate practices to enhance native prairie (burning, mowing, haying etc.) On wildlife lands, evaluate and consider grazing as native prairie management tool. As new data becomes available, reconsider the management directions and amend plan accordingly.
- Provide conservation tillage buffer strip and other Best Management Practices demonstration areas.
- In the state park, implement resource management activities that will encourage native vegetation patterns.
- Protect elements identified by the Minnesota Natural Heritage Program.
- Identify and evaluate candidate old growth stands in the area.
- Unless dead trees present a safety hazard, they should be allowed to remain standing to provide habitat for cavity nesting wildlife.

Water quality

Discussion

Most of Lac qui Parle Lake's shoreline and approximately 80% of Marsh Lake's shoreline is bordered by the State Wildlife Management Area or State Park. Siltation originating from those adjacent lands is minimal because most have either been converted from intensively tilled to wildlife lands, or are maintained with permanent cover. Water quality improvement will often involve watershed management.

ACTION

- Support and assist efforts of local, state or federal agencies and groups to improve water quality, and maintain or improve fisheries habitat in area streams, Lac qui Parle and Marsh Lakes.
- Review permit applications to work in a protected water, to appropriate water, or for aquatic nuisance control within Lac qui Parle and Marsh Lakes, their tributaries or the watershed, and make recommendations to minimize impacts to aquatic resources.
- Keep soil loss as low as possible, try for "T". "T" is one of the factors used in the universal soil loss equation which is a formula used to design water erosion control systems. "T" is the soil loss tolerance value that is assigned to each soil type and is expressed in tons per acre per year. For example, the "T" value is approximately "5" for many agricultural soils, which means the soil type could lose 5 tons per acre per year and not negatively impact the long term productivity of that soil. This does not take into account the resulting sedimentation in adjacent waterways. Work cooperatively with state and federal farm programs to seek needed program changes such as better incentive programs.
- Cooperate with counties on inventory of abandoned wells.
- Locally implement shoreline improvement projects as funding allows and work with groups in the watershed to improve water quality . Utilize bio-technical methods of shoreline stabilization where practical, otherwise riprap may be needed. This might include willow posts, bundles or other methods.
- Conduct an independent study of effects of goose population on water quality.

Water Level Management

Discussion

The Army Corps of Engineers has approximately two million dollars available for partial funding of an improved dam that could better regulate the water level on Marsh Lake for wildlife habitat management. (Currently there is a fixed crest dam that is in satisfactory condition). At both the fishing and hunting meetings there was little support for a dam modification at Marsh Lake. Most preferred to keep it as it was. It was felt that the project was too expensive. During the public written comment period it was suggested that improved water quality should also be factored into the decision. Vegetation benefits and water level stability are other reasons to modify the structure. The issue of fluctuating water levels and the associated problems on Lac qui Parle Lake was discussed at almost every meeting.

ACTION

- Conduct a feasibility study that evaluates whether water quality in Marsh Lake and Lac qui Parle Lake would be improved by the proposed dam modification. As part of the study conduct a cost-benefits analysis. Also interview managers

that work with large systems similar to Marsh Lake.

- Work with the Corps of Engineers and other appropriate agencies to stabilize the water level.

Watershed management

ACTION

- Create a watershed coordinator/environmental education coordinator position for the watershed. This position would serve as a resource interpreter at Lac qui Parle to tie together the watershed programs, ecosystem based management and the communities.
- Consider acquiring easements, property, or using cost–share programs to protect marginal land or critically eroding areas in the watershed in order to minimize erosion, siltation, sedimentation, and impacts on fisheries habitat. Property should be inventoried and prioritized.
- Prepare a management plan for the watershed.

Wetland restoration

ACTION

- Inventory and prioritize restorable wetlands.
- Develop temporary water holding areas. Include fish access concerns in any water control structures.

Aggressive exotic species

Discussion

Aggressive exotic species should be eliminated and replaced with native species wherever possible. At this time, known aggressive exotic species in the Lac qui Parle area include: Canada thistle, purple loosestrife and buckthorn .

ACTION

- Control undesirable exotic species and be more aggressive on weed control. Continue to explore new chemicals as they become tested and approved for specific uses. Develop control and monitoring strategies for buckthorn (*Rhamnus cathartica*), Russian olive (*Eleagnus angustifolia*), wild parsnip (*Pastinaca sativa*), Ginnala maple (*Acer ginnala*), and caragana (*Caragana arborescens*).
- Use innovative techniques for exotic species, such as those methods that have been tried at Slayton WMA and Blue Mounds State Park, including mowing, fall burning, biological controls, etc.
- Experiment with rotational grazing, partly to control thistle, but also as a vegetation management technique in general.
- Expand educational efforts, especially with purple loosestrife.
- Prohibit or provide incentive to NOT plant Hybrid poplar and reed canary grass (*Phalaris arundicacea*) within the vicinity of the area. Prohibit DNR distribution of non-native shrubs for wildlife plantings and other uses in the region.
- Monitor leafy spruge control.

Fish Management

Lac qui Parle Lake

ACTION

- Conduct fisheries population assessments or special sampling annually through 2002, and as needed to evaluate management efforts thereafter. Conduct lake resurveys about every ten years to monitor long term trends in habitat and fish community.
- Conduct angler creel surveys in 2001-02 and 2002-03. Monitor winter fishing pressure by conducting fish house counts in conjunction with dissolved oxygen monitoring.
- Maintain naturally occurring forage or other nongame fish communities.
- Allow commercial fishermen to harvest under-utilized, nongame fish.
- Monitor winter dissolved oxygen levels at least once each year, and more closely if the initial check reveals depletion problems.

Marsh Lake

ACTION

- Conduct fisheries population assessments or special sampling as needed to evaluate management efforts. Conduct lake resurveys about every ten years to monitor long term trends in habitat and fish community.
- Conduct angler creel surveys in conjunction with Lac qui Parle or other area lakes, if fishing pressure warrants. Monitor winter fishing pressure by conducting fish house counts in conjunction with dissolved oxygen monitoring.
- Allow commercial fishermen to harvest underutilized, nongame fish.
- Monitor winter dissolved oxygen levels at least once each year, and more closely if the initial check reveals depletion problems.

Streams

Discussion

Fisheries management goals are to maintain or improve fisheries habitat, mussel resources and water quality of area streams.

ACTION

- Work with various groups, agencies and individuals to: promote the use of best management practices; develop a pilot project area(s) to demonstrate desirable agricultural, erosion control, and stream bank stabilization practices; protect existing wetlands or restore drained wetlands; inventory highly erodible land; enforce road easements to prevent farming of ditch bottoms; consider implementation of soil loss ordinances; establish or update laws and regulations that protect water resources, and enforce compliance; upgrade septic systems and wastewater treatment facilities; inventory feedlots and enforce regulation relating to location and maintenance; improve disposal of solid and hazardous wastes; promote conservation practices in water use; review drainage projects to avoid contributions to downstream flooding and negative changes in stream flow fluctuations.
- Work with those conducting snag removal operations to minimize damages to aquatic resources.
- Encourage and assist efforts to establish protected stream flows.

- Work to remove barriers to fish migration. Specifically , consider removing dams on the Pomme de Terre at River Mile 8.5 (Appleton Mill Pond), and at River Mile 18.3 (US Highway 12), and on the West Branch Lac qui Parle at River Mile 1.5 (Dawson)
- Investigate fish kill or other pollution reports and refer them to the appropriate authorities.
- Monitor physical, chemical and biological characteristics of streams on a regular basis.
- Develop a database of biological and chemical characteristics of streams, in conjunction with other agencies
- Encourage and assist efforts to establish policy or guidelines for permitting mussel harvest.
- Conduct angler creel or recreational use survey(s) if fishing pressure or recreational use warrants.

Subimpoundments

Discussion

Additional subimpoundments received mixed public support. A lot would depend on the availability of 900 acres of land. Existing subimpoundments may impede migration of spawning fish.

ACTION

- If appropriate lands are acquired, an assessment will be made to determine if additional subimpoundments would be beneficial. Any new subimpoundments should be designed and operated so as not to impede fish reproduction and additional environmental review may be necessary.
- Operation of existing subimpoundments should be reviewed to determine the feasibility of modifying operations to facilitate fish reproduction.
- Investigate the feasibility of breaching the dike at the Marsh Lake Rearing Pond and allowing it to function as a "natural" northern pike spawning area.

Habitat structures for Fish

Discussion

There is currently no interest in creating habitat structures for fish. It was felt there was enough habitat diversity on Lac qui Parle.

Fish Stocking programs

Discussion

Specific stocking programs were not discussed in detail, although most participants seemed pleased with existing program.

ACTION

Lac qui Parle Lake

- Continue to stock walleye fry and fingerlings through 2000, according to the schedule agreed upon with the Lac qui Parle Lake Association (LQPLA). Stock walleye fry at the rate of 500/littoral acre (3,000,000 total) in 1998, Allow LQPLA to stock purchased walleye fingerlings at the rate of 0.5–1.0 lb. per DOW acre (4,200–8,400 lbs. total) in 1996 and 1999.

- Attempt to estimate stocked walleye fingerlings survival and the contribution of stocked walleye fry and fingerlings by electrofishing and gillnetting. Provide recommendations by 2000 for future stocking rates, schedule, or size of fish to maintain desirable levels of abundance and size structures of walleye and forage fishes at minimum costs. Continue to adjust as necessary.
- Northern pike adults may be stocked to bolster brood stock if production is so poor that abundance declines below acceptable levels and if several consecutive year classes are not represented in sampling. Stock adult northern pike (if available from rescue operations) at the rate of 0.5 lb. per acre if gill net catch rates are less than 1.0 fish per net lift, and if several consecutive year classes are not represented
- Channel catfish may be stocked at a rate of up to 10 per littoral acre (55,890 total) if public demand warrants. The contribution of any stocking to channel catfish abundance (gill net CPE) or fishing success will be evaluated. The need for additional stockings of channel catfish will be determined. Stocking rates, schedule or size of fish will be established to maintain a desirable level of channel catfish abundance and size structure at acceptable costs.

Marsh Lake

- It may become necessary to reintroduce northern pike, yellow perch, black crappie, or walleye in the event of a winterkill. These species may repopulate Marsh Lake on their own by immigrating from the Minnesota River system, and stocking should not be considered without prior assessment netting to document a need.
- Adult northern pike may also be stocked to bolster brood stock if production is so poor that abundance declines below acceptable levels and if several consecutive year classes are not represented in sampling. Stock adult northern pike (if available from rescue operations) at the rate of 0.5 lb. per acre if gill net catch rates are less than 1.0 fish per net lift, and if several consecutive year classes are not represented.

Walleye regulations

Discussion

Public input groups generally supported a 14 inch minimum size on walleye, and some supported a 16 inch minimum. Some participants thought it would be best to wait five years to see the results of the current stocking program. In public input meetings, predicted effects of various regulations were explained and a majority of those in attendance favored a 15 inch minimum size limit.

ACTION

- An experimental 15 inch minimum size limit for walleye in Lac qui Parle Lake is being implemented in spring, 1996. The objectives of this regulation change are to increase the mean length of harvested walleye, and to increase the number of large (> 15 inches) walleye caught.

Catch and Release

Discussion

Generally it was felt that catch and release is more effective if promoted by some local organization (although none has stepped forward). Most felt that catch and

release was good, but in the long term, size limitations may be more effective.

ACTION

- Work with local groups to enhance catch and release education.

Fall Fishing (during goose season)

Discussion

There was support by fishing and hunting groups for a gradual liberalization of fall fishing on Lac qui Parle, starting with keeping fishing open until the goose season begins and then on a trial basis open fishing in the afternoon during the goose season. It was agreed that some areas may need to be off limits and the DNR would retain the right to say whether this is working.

ACTION

- Gradually liberalize fall fishing through the above methods. Starting in 1996, allow fishing in the south closure area until the beginning of the goose hunting season. Allow fishing between any split goose hunting seasons.

Wildlife Management

Canada Goose Management

Discussion

The objective for goose management at Lac qui Parle is to manage resident and migrant geese at socially acceptable levels that provide quality viewing and maximum hunting opportunities within the framework of North American, National, and Mississippi Flyway plans.

Resident Canada Geese

Discussion

The successful reestablishment of resident, giant Canada geese at Lac qui Parle has fulfilled two purposes - the birds have been restored to part of their pre-settlement breeding range (Hanson 1965) and have helped attract migrant geese to the area.

ACTION

- Lac qui Parle WMA is part of the West Central Goose Management Block and the Section of Wildlife policy (1994-1999) dictates that resident geese in these areas will be managed for limited growth and expansion through reproduction and immigration; no gosling releases will be considered (Section of Wildlife Policy on Management of Resident Canada Geese, February 1995).
- The 15 remaining goose tubs will be maintained until the structures are no longer serviceable. Then they will be removed and the artificial nesting program will be discontinued.
- Depredation complaints will continue to be responded to within one working day and wildlife personnel will work with landowners to prevent future crop depredations.
- Technical advice on goose abatement techniques will be distributed to area landowners through informal contacts, county fairs, farm shows, and public input meetings.

Discussion

The Lac qui Parle WMA is one of the most important state-operated goose management areas in the nation. During migration, the unit provides food, rest, and refuge for a large portion of the Eastern Prairie Population Canada Goose Population (EPP). Thus, the State of Minnesota shares substantial responsibility for the welfare of a resource utilized in nine states and two Canadian provinces.

The Minnesota DNR, in cooperation with other Mississippi Flyway States and the USFWS must limit the goose harvest at Lac qui Parle WMA and in Minnesota so equitable shares of the EPP harvest are provided to other states in the Mississippi Flyway. Hunting regulations are set to conform with specific harvest strategies outlined in the EPP Management Plan. Minnesota takes the largest share (35%) of the total EPP Canada goose harvest The remainder are taken in Manitoba (27%), Missouri (13%), Illinois (8%), South Dakota (5%), and other areas (12%). Of Minnesota's harvest, 85% is concentrated in the West Central, Lac qui Parle, West, and Northwest goose zones. That is why seasons frequently have to be more restrictive in those areas.

Minnesota has always selected the maximum hunting season framework for Canada geese under the EPP management plan. Long goose hunting seasons allow maximum hunter participation, discourage crop depredations on private lands, and encourage southward migrations.

Fall Canada goose numbers have increased on the unit since 1962. The EPP Canada geese number nearly 400,000 in the fall. Peak populations on the unit remained below 100,000 until 1988 when numbers reached 130,000. Since 1988, peak numbers have ranged between 85,000 and 200,000. Numbers normally peak in mid-October although the recent trend is toward peak numbers in late-October or early November. Migration patterns of Canada geese are dynamic, and continued changes of goose numbers should be expected. The challenge for managers is to document and/or predict these changes and modify harvest and habitat management to provide for the broadest distribution of hunting opportunity without jeopardizing population status.

Crop depredation complaints on migrant geese are sporadic and correlated with fall weather conditions. Severe crop damage on private land is possible, especially when wet weather delays the crop harvest. Fortunately, the fall season is normally dry in this region. Hunting on private land discourages depredations, but when the quota is reached early, crop damage is more likely later.

Waterfowl concentrations are vulnerable to disease outbreaks. Large concentrations of waterfowl do not cause disease, but large numbers facilitate disease transmission and increase the likelihood of a large die-off. Avian cholera was first documented on the refuge in 1989 although evidence suggests cholera outbreaks occurred before that date. Since then, avian cholera has occurred every 2 years. Losses are as follows: 1989 (7,600), 1991 (6,000), 1993 (600), and 1995 (53). The last 2 outbreaks origi-

nated in Canada and would have gone undetected at Lac qui Parle had it not been for Lac qui Parle's disease monitoring program.

ACTION

- The present management of migratory Canada geese will continue. This includes providing refuge for migrant geese on the 8,500 acre refuge; daily monitoring of goose harvest; estimating goose numbers; providing assistance to landowners experiencing crop damage; checking for signs of disease and taking appropriate action if necessary.
- Cropland management and the management of Canada goose hunting on the refuge and on private land will be coordinated with changes in goose numbers and status on the area.
- Wildlife personnel will work with landowners to ensure cropping and hunting practices are responsive to goose management needs.

Goose Hunt

Discussion

Public input meetings only addressed issues and actions that can be changed at the state level. See the Resource Management chapter for a discussion about what limits are determined at the federal level.

ACTION

- It was recommended that the DNR keep the six shell limit.
- It was also recommended that the DNR evaluate the feasibility of maintaining a controlled hunt on Watson Sag.
- Blinds will be moved further into the refuge where possible, with the goal of providing more areas for the use of decoys.
- Blinds will be renumbered in numerical order.
- Daily blind fees will not be increased in the short term.
- Develop and expand on educational programs and materials regarding hunter ethics.
- The number of handicap sites is currently sufficient, however, additional blinds for wheelchair hunters should be developed away from roadways.
- Recommend an early 10 day goose hunt in the first part of September for resident Canada geese in the West Central Goose Zone (including Lac qui Parle).
- A shooting range for shotgun patterning is recommended. In order to provide education on how to pattern shot guns and determine effective ranges, safe and convenient facilities should be provided on public land.

Food Plots

Discussion

Food plots provide nutrition, keep wildlife in or near good winter cover, reduce depredation and provide places for hunting recreation.

ACTION

- Maintain DNR food plot base of 325 to 350 acres each year.
- Continue to evaluate DNR and cooperative farm food plot locations throughout the Lac qui Parle WMA, to determine needs for additional plots.

Deer hunting

Discussion

In general, deer, raccoon, and other wildlife populations will be managed to meet balanced ecosystem goals. The Lac qui Parle area provides one of the largest and most important tracts of habitat in this region. As such, the natural resources within the area should be managed to promote a healthy, natural condition.

ACTION

- Continue current deer management programs in the WMA and State Park. (State parks are refuges except when there is a biological reason to have a special hunt).

Nongame wildlife

Discussion

The goal of ecosystem-based management is a viable population of all native species, varying within sustainable limits. Although game species receive the most attention at Lac qui Parle, there are also significant populations of nongame species. CRP land in the area provides valuable additional habitat for all wildlife. Some people in the public meetings noted that they would like to see a season on cormorants. Since they are a federally protected bird, it would require a change in federal regulations.

ACTION

- Research the feasibility of reintroducing prairie chickens.
- Provide additional research on cormorant/pelican food habit studies at Lac qui Parle and Marsh Lakes that will document effects on fish populations.

Wildlife damage

Discussion

It is the goal of the DNR to continue to promote and maintain positive relationships with neighbors. Lac qui Parle staff will try to anticipate and address neighbor concerns regarding crop depredation. Good neighbor relations depend on effective communication and looking for ways to work together.

ACTION

- Emphasize utilizing goose pastures and aid landowners with depredation problems. Establish permanent goose pastures and develop other vegetation management practices to keep resident goose depredation to a minimum.

Trapping

Discussion

The wildlife manager issues trapping permits for the WMA. The number of trapping permits has gradually declined over the past 20 years, but remains a viable wildlife management program. The WMA was divided into 36 trapping permit areas. Prior to 1995, trappers selected their own permit areas, on a first come-first serve basis. Only two trappers were allowed per permit area. However, in 1995 due to decline in the number of trappers, restricted permit areas were dropped. Fur price often dictates the amount of trapping activity. Trappers are required to report their harvest.

ACTION

- Annually evaluate the trapping pressure in the unit, if trapping pressure increases and conflicts occur, reinstate the restricted permit areas.

Recreation Recommendations

The proposed recreational development in this plan is generally conceptual. Site-specific, detailed development plans will be completed based on the concepts outlined in this plan.

All recommended development proposals (e.g. buildings, trails) will be contingent on a detailed site analysis prior to implementation. Development will only take place after a detailed physical analysis (e.g. soils) and resource assessment (e.g. rare plants or archaeological sites) have been conducted and considered. Any future development will not adversely impact the significant natural resources of the area.

Many of the issues and problems involving recreational development stemmed from lake level instability. This was a recurring theme in every meeting.

State Park Campgrounds

Discussion

The main Semi-modern Campground has 50 sites, 21 with electricity. Six years of flooding, closures and revenue loss due to flooding indicate the need to relocate the campgrounds. Long term, there is a need to work toward stabilizing and reducing the reservoir level. Considering limited development space inside the park boundary, but out of the floodplain, a whole new campground is recommended, possibly outside the current park boundary. The existing state park should be kept as a state park, but its uses may be changed.

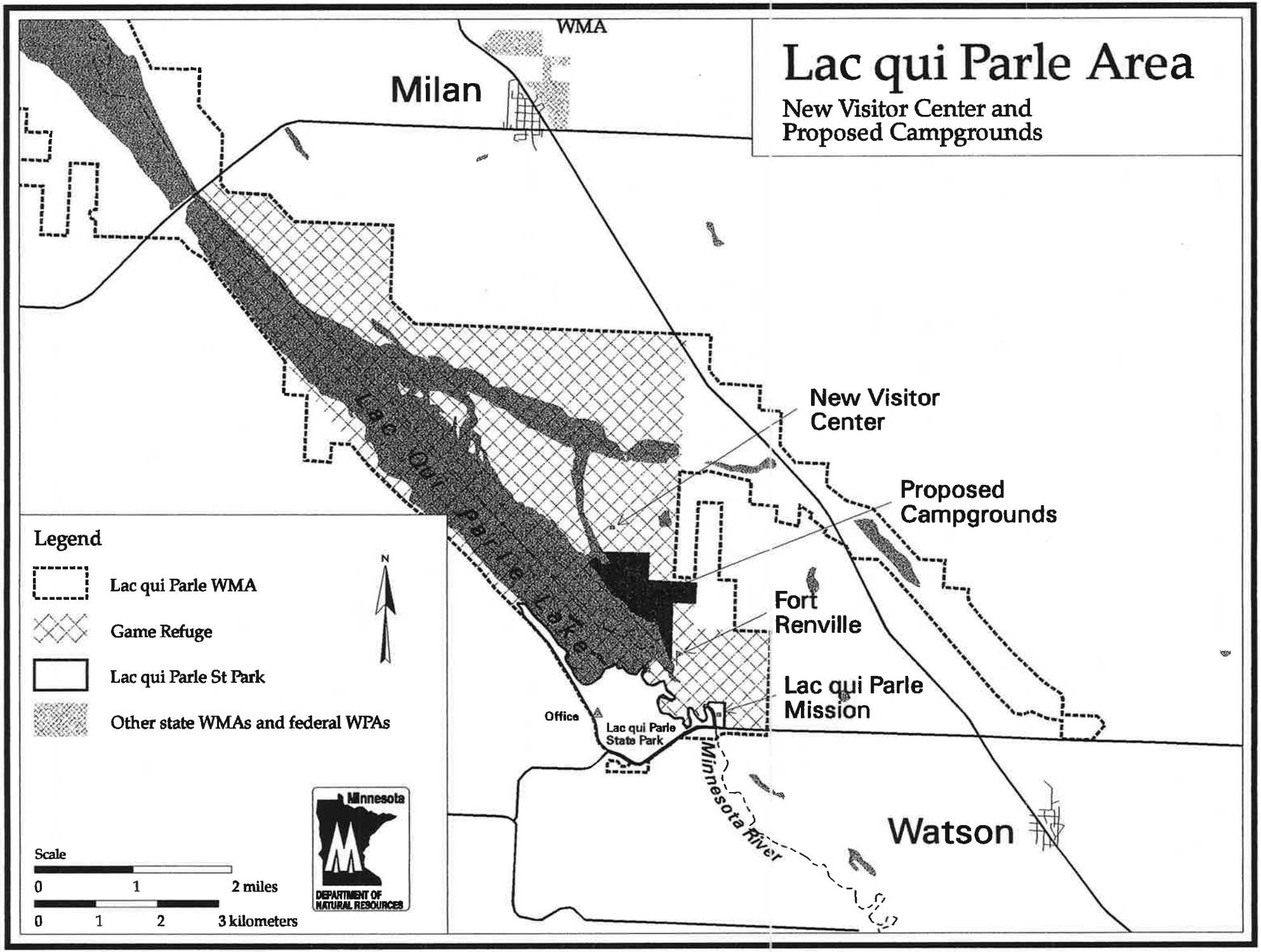
The Horse Campground can accommodate five camping parties with a maximum of 50 people. Other groups may also use the horse camp. The horse campground does not have the regular flooding problems that the main campgrounds has, however, the horse trails are often flooded. It was decided not to relocate the horse campgrounds because there was no strong reason to change the situation. There is a need for a well with a hand pump in the horse camp because there is currently no water available there now.

The Group Campground will handle about 50 people in six individual sites. There is a need for a well with a hand pump. Currently water is supplied by an electric pump from the main campgrounds which may be disconnected when the main campground is relocated.

The Backpack / Walk-in Campground has five sites that are adequate to meet the demands of the area at this time. Water is not provided here, there is a carry-in water policy that is satisfactory.

ACTION

- Move the main campgrounds to the east side of Lac qui Parle Lake. An estate of about 150 acres was pointed out as the most probable location for initial acquisi-


WMA
Milan
Lac qui Parle Area
New Visitor Center and
Proposed Campgrounds
New Visitor Center
Proposed Campgrounds
Fort Renville
Lac qui Parle Mission
Office
Lac qui Parle State Park
Minnesota River
Watson
Lac Qui Parle Lake
Legend
Lac qui Parle WMA
Game Refuge
Lac qui Parle St Park
Other state WMAs and federal WPAs
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Scale
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Minnesota
DEPARTMENT OF NATURAL RESOURCES

tion and the site of the new campgrounds. It is located along the lake shore between the Mission Site and the WMA Headquarters. If this is not available, possibly on some existing WMA land, county land or other private land.

- The old campgrounds should be utilized for "rustic camping". It might also be used as an Environmental Education group camp/location in cooperation with the Minnesota River School project.
- The new campgrounds should be a modern campgrounds, offering, but not limited to: modern shower building and sites, playground, beach, lake access for canoes, boat dock may be needed, fishing pier and possibly a small sliding hill for the winter. It was recommended that there should be approximately the same number of campsites (approximately 50 sites).

Trails

Discussion

There was strong public support for expanding the ski trail system in the woods and valleys so that skiers could be out of the wind and snow would not be blown off the trails. There was also interest in bike trails. Ideally there should be a bike trail all around Lac qui Parle approximately 13 miles. The City of Montevideo is expanding their bike trail system and perhaps someday, that could connect with the Lac qui Parle area. When the park is expanded onto the east side of the lake, many of the existing trails could remain and new trails would also be developed. Some of the old trails may need to be abandoned due to continuing flooding and maintenance problems. There was discussion of the issue that snowmobile trails are not compatible with the WMA.

ACTION

- Extend hiking/ski trails to new campgrounds. A trail should be made that would connect the new campgrounds with the hard-surfaced bike trail to the Lac qui Parle Mission Site. Horses and bicycles are generally not compatible on the same tread-way. Another trail should connect the new campgrounds with the new office and education center facility.
- Snowmobiles and ATV's will be allowed in Lac qui Parle Lake ice for fishing purposes.
- Hikers and skiers may go anywhere on the WMA, however, trails will not be developed.
- In the park, if expansion is accomplished, trails would also be expanded.
- Investigate the feasibility of a bike trail along roadways in and around the Lac qui Parle area.

Levels of Service Provided by the DNR

Discussion

It was recommended that the DNR seek mechanical ways for people to get information about the WMA on weekends.

ACTION

- Improve and diversify access to information. Some sort of outdoor phone or message machine or even just a kiosk/message board or a sign that refers people to an information center.

Access - Land and Water Units

Discussion

Frequent flooding and constant fluctuation of water levels have created problems for water access site users. Launch ramps, roll in docks, and in some cases, complete parking areas have become totally submerged in a matter of hours and/or a few days. Other results of flooding are erosion, vegetation loss, and in some cases, slippery launch ramps due to silt deposit. Solutions to these problems will vary from site to site and will be addressed case by case in future development. There are five unimproved public accesses located around Marsh Lake, and smaller boats can be launched from four of the accesses.

ACTION

- Seek funding to raise the Volden's Pit road by 18".
- Enlarge Volden's Pit parking area and add lighting.
- The WMA will be responsible for maintaining the dock at Volden's pit on a daily basis. Other priority docks will be the one in the park (maintained by park staff) and the one at Randall's. Some interest in an improved canoe access above and below the dam.
- The schedule for future development and/or upgrades in the Lac qui Parle management area is 1–2 access sites/year for the next 5–10 years.
- Change the existing launch ramp slope from 7% to 12%. This will greatly improve launching ease especially during flooding.
- Regrade the existing parking area to 2% and constructing typical access parking areas. This will control traffic flow, designate parking, and prevent erosion.
- Construct storm water management settling ponds. This will catch storm water runoff from the parking area and allow sediment and nutrient loads to settle out before entering the lake. Use native grasses and forbs in landscaping.
- Stabilize shorelines at access sites where necessary.
- Install a 75 ft. long handicapped accessible floating boat dock. These docks will replace the roll–in dock and will be done on an experimental basis. This dock will be placed in the spring and removed in late fall. If launch ramp grades are at 12% or greater the dock should not have to be adjusted with the fluctuating water levels as a portion of it will always be floating and a portion will always be on shore.
- Construction of a concrete boat ramp at one or two of the Marsh Lake access sites will be considered. This would allow access for medium sized fishing boats.

Observation points

Discussion

No recommendations at this time, but there is interest in maintaining/clearing some of the existing overlooks.

ACTION

- Maintain vistas by selective pruning at existing overlooks without causing increased erosion problems.
- Construct a wooden overlook in the park, near the prairie area, overlooking the lake.

Fishing piers

Discussion

A second fishing pier is seen as a lower priority than the docks. However, if funding became available at some time in the future, the public would like to see a second pier. Future maintenance liabilities and funding must also be considered when deciding whether a second fishing pier is feasible.

ACTION

- As funding becomes available install a second fishing pier on Lac qui Parle.

Security

Discussion

There was some concern among the public that there was no longer a manager living in the park. There was also concern that during the transition time, when the park staff is located in the new office, that there would be no park staff in the old campgrounds area. No further recommendations were made at this time, although it was noted that this would probably be a growing concern. (See Enforcement Recommendations).

ACTION

- Monitor enforcement trends and address issues as needed.

Tourism and Community Recommendations

Good Neighbor guidelines

Discussion

It is the goal of the DNR to continue to promote and maintain positive relationships with neighbors. Good communication builds trust and good relations with neighbors and can contribute significantly to the DNR's effectiveness in accomplishing the mission. The following recommendations were developed specifically for the Lac qui Parle area.

ACTION

- Evaluate the value of developing a program similar to the South Dakota Walk-In Program. Landowners could be paid to allow walk-in hunting on their land. Maps would show where participating sites are located.
- Increase involvement and communication with neighboring land owners; including informal visits and personal contact. Follow through on commitments. Put important agreements in writing.
- Continue local pre-goose hunt input meeting.
- Continue to involve public in decision making process.
- Inform landowners of violations on their property.
- Increase involvement with local school system.
- Acknowledge ideas from the public.
- Develop strategic alliances with organizations such as the Army Corps of Engineers, Prairie Sportsman, etc.

Promotion of the area as a year round, multiple recreation opportunity

Discussion

There is a great deal of local enthusiasm to tie in promotion of the Lac qui Parle area with surrounding communities and attractions.

ACTION

- Work with chambers, Historical Societies, and other area tourism groups to develop one day tours and other activities.
- Increase media communication. This could include television, radio, newspapers and potentially the Internet or other computer access programs.
- Provide overlooks and kiosks. Kiosks, some located at overlooks, could be developed to interpret the Minnesota River Prairie ecosystem, historical sites, or birds and wildlife of the area.
- Work with group tours to make Lac qui Parle a destination point. This would include bus tours that might promote bird watching and wildlife watching or history of the area.
- Host at least one special event. This might include a canoe trip, eagle watch, or other activities. Tours or programs might be held in conjunction with special events in the neighboring communities.
- Work with existing organizations to develop more promotional and interpretive materials. These should be available in local communities.

- Work with highway departments to provide additional road signs directing people to various locations. (Signs are especially needed coming from South Dakota).

Funding and Efficiency

Discussion

Many of the recommendations developed throughout the planning process were limited by the lack of funding. Therefore, several suggestions were presented to increase funding sources or improve efficiency of existing resources.

ACTION

- Develop a Lac qui Parle merchandise line.
- Provide rental equipment such as: binoculars, spotting scopes, decoys, etc.
- Develop partnerships and/or Organize a Friends Group
- Investigate the availability of pull-tab money.
- Make all facilities energy efficient, improve fuel consumption of vehicles, improve communications equipment.
- Utilize volunteers and donations,
- Support efforts to get the Environmental Trust Fund to the $1 billion level by 2005 by putting more of the lottery profits into the fund.
- Support efforts to earmark 1/8th of 1% of the sales tax to DNR projects. It was noted that Missouri has a similar program and that it is very popular. It was supported by the citizens group if it did not mean an increase in taxes.

Interpretive Services Recommendations

With the addition of the new co-located park and wildlife office and the education center, there will many new opportunities for interpretive programs, displays and other educational opportunities including fishing and hunter education. There will also be many opportunities for the Minnesota Historical Society, the Chippewa County Historical Society and the DNR to develop cooperative interpretive programs, displays or brochures about the Lac qui Parle area.

Education Center

Discussion

The new facility at Lac qui Parle will have over 1,000 square feet designated for public use as an education center, display area and hunter contact station. There are several built in glass display cases, windows facing the lake and storage space for AV equipment and extra tables and chairs. The ceiling height is 11'6" allowing for some hanging displays. There will be additional space in the lobby area for merchandise displays and exhibits. There will also be a small conference room connected to the main information room. All facilities will meet American with Disability Act (ADA) requirements.

ACTION

- Things to be interpreted include mission statement "why are we here", native biodiversity, wildlife, plants, rare species, significant natural communities, river, history and recreation. Displays should also interpret user ethics and hunter performance.
- Provide teacher and youth leader training workshops on natural resource topics.
- Develop interactive exhibits.
- Provide an area for changeable exhibits.
- Provide information/orientation exhibits in the lobby/reception area.
- Develop video tapes detailing: Management of the EPP Goose flock; flood control and drainage and the effect on water levels at Lac qui Parle; pelican nesting colony and feeding habits.
- Promote prairie and wetland protection on private lands by having resources available about Prairie Tax exemption, prairie banks etc. and have staff trained to explain these programs.

Education of all users

Discussion

Themes might include water resources, travel, major flyway for birds. Priority audiences are: landowners, youth, government officials and boards, outdoor recreation users, general citizenry.

ACTION

- Develop a core curriculum that focuses on all the resources in the Lac qui Parle watershed.
- Coordinate education programs and involvement with all schools along the river. This could include monitoring the quality of the ecosystem, water quality sam-

pling, monitoring invertebrates, and/or identification of fish spawning areas.

- Develop Environmental Education council for the area. This group can coordinate environmental education efforts of the region.
- Co-sponsor prairie walks.
- Produce a video program that portrays the broad scope of the watershed.
- Develop programs that tie Lac qui Parle resources with the rest of the state.
- Collaborate with various DNR divisions to deliver educational programs.
- Collaborate with other agencies to provide diverse interpretive opportunities.

Other Interpretive Services

Discussion

There are many opportunities for MN DNR State Parks, Wildlife, Fisheries, and Trails and Waterways, Minnesota Historical Society, private environmental organizations and interested individuals to combine money and time to develop cooperative interpretation and informational programs and activities for the Lac qui Parle area. Listed below are some recommendations.

ACTION

- Fund an environmental education and interpretive specialist. This position should serve all of the DNR's customers in the area with presentations, activities, signs, trails, and printed materials based on the Lac qui Parle area's themes. Other duties should include developing volunteer programs, customer focus groups, publicity and public relations (it may be possible that the position could be combined with the watershed coordinator position).
- Develop exhibits, signs, trails, printed materials, and special events.
- All of these items should be based on the themes identified in this document.

Enforcement Services Recommendations

Resource Enforcement and Public Safety

Discussion

The goal is to continue emphasis on resource enforcement and public safety.

ACTIONS

- Identify high use areas and peak fishing hours in the Lac qui Parle area.
- Three local enforcement officers share the Lac qui Parle area and area assistance is available (approximately two work parties with three additional officers).
- Approximately 1,200 hours will be available for fishing enforcement, depending on fishing pressure. Fishing enforcement efforts will concentrate on: experimental regulations, over-limits, too many lines, litter, etc.
- Maintain our current level of migratory waterfowl enforcement.
- In addition to the three local enforcement officers, four to five additional work parties are available for Waterfowl Enforcement, depending on hunting pressure (regional and other region's officers, and the U.S. Fish and Wildlife Service).
- Approximately 700 hours will be available for waterfowl enforcement, depending on hunting pressure. Waterfowl enforcement efforts will concentrate on: overbagging, toxic shot, early/late shooting, baiting, commercial guides and camps, and Hunting Under the Influence of Alcohol or unlawful chemical substances (HUI).
- Continue emphasis on big game and small game activity, concentrating on: trespass, shooting from vehicles, radio use, chasing, fur trapping, and hunting under the influence.
- Hours for big game and small game enforcement within Lac qui Parle area will be approximately 250 hours depending on hunting pressure.

Emerging Enforcement Needs

Discussion

The goal is to meet the current and emerging environmental and recreational needs of Minnesota.

ACTIONS

- Continue recreational enforcement in the areas of watercraft, snowmobile, and ATV.
- Conduct high visibility patrols in high use areas (Lac qui Parle) and during peak periods.
- Utilize approximately 175 hours for recreation (watercraft, snowmobile and ATV) enforcement through local and area conservation officers.
- Continue to assist Lac qui Parle State Park. Use approximately 70 hours for enforcement in the state park.
- Local and area conservation officers will respond as needed and also concentrate on: off trail use, disorderly problems, cross-country skiing, special seasons (muzzleloading, etc.), park permit problems.
- Other areas with possible need for enforcement at Lac qui Parle will be: nongame enforcement (approximately 60 hours), arson investigation within the WMA or park and as needed for fire problems, and illegal dumping with in the park or WMA (litter, solid waste, etc.).

Education and Public Relations

Discussion

The goal is to educate people about Enforcement's role and the laws to improve understanding, acceptance, and compliance.

ACTIONS

- Increase public relations hours to approximately 115 hours in the Lac qui Parle area.
- Local officers will continue to meet with the stakeholders in the Lac qui Parle area.
- Local conservation officers will continue to meet stakeholders needs by attending: lake improvement meetings, sportsmen's club meetings, season input meetings, conservation school days for students (Floats for Tots, Take a Kid Fishing, etc.)
- Assist other DNR staff with: search and rescues, medical emergencies, picking up diseased waterfowl, surveys.

Research Needs and Priorities

Effective management and educational programs require adequate and accurate information and knowledge. Natural systems are dynamic, being changed by natural succession, climate fluctuations, pest cycles, and human disturbance to name only a few factors. To effectively manage this unique area with its complex resources will require effective research, and inventory and monitoring programs to document existing resources, develop and evaluate management strategies, monitor impacts of human activity, particularly recreational use, and other factors impacting the area's resources. Listed below are some of the specific needs as recommended by a variety of Department of Natural Resources personnel.

Natural and Cultural Resources

- Monitor the impacts of fluctuating water levels, particularly sustained high levels, on all aspects of the Lac qui Parle Wildlife Management Area's (WMA) and LQP Park's natural and cultural resources. Recommend change in water level manipulation, as needed.

- Complete the Minnesota County Biological Surveys in Chippewa and Swift Counties.

- Test and develop options to more optimally meet management needs to maintain the biodiversity and stability of the native prairie resources. A monitoring plot (point, route, etc.) system could be established to record changes. Management effects could also be researched and documented for ecosystem based management values (prescribed burning, grazing, weed control etc.).

- Conduct a floral and faunal inventory with voucher collection to fill in existing information gaps and verify, where possible, some of the older field observations. Lac qui Parle is large enough to consider applying more diverse ecosystem based management scenarios.

- Review existing information on water quality, identify problem areas, and prioritize problem areas for management.

- Study the effects of fragmentation of grassland from tree plantings and natural invasion by trees.

- The Lac qui Parle area would be an appropriate site to document eolian (wind borne) deposition of nutrients and chemicals.

Fisheries

- Evaluate costs and benefits of stocking fry vs fingerling vs natural reproduction, and impacts on walleye populations.

- Identify critical habitat areas (e.g., spawning) of walleye and northern pike, and prioritize the management needs of these areas (e.g., endangered due to degradation.

- Monitor abundance and size structure of aquatic invertebrates, and relate to the success of walleye stocking.

Wildlife

Non Game

- Establish a monitoring program of colonial nesters including numbers, reproductive success, species composition, and impacts on nesting habitat.

- Study the food habits of double crested cormorants and white pelicans.

- Evaluate the impacts of loss of large trees, due to high water levels, on eagle nesting sites and eagle viewing potential.

- Monitor diversity and abundance of nesting prairie birds.

- Inventory of aquatic invertebrates and non game fishes.

Upland Game Species

- Study deer population dynamics:
  1) impacts of hunting pressure and timing of harvest on population composition and recruitment.
  2) impact of the LQP WMA and Park on surrounding area's deer population and on hunting opportunities.

- Study the opportunity for restoration of a self–sustaining wild prairie chicken population.

- Study the feasibility of reintroducing bison for prairie management and eventually possible bison shoots.

Waterfowl

- Manipulations to redistributing goose flocks to reduce disease problems and rapid harvest, and provide for more stable food supplies.

- Document ecology of wintering geese—survival, movements, problems, composition (Eastern Prairie Population vs resident giants – potential of increased harvest to control local populations).

Operations and Staffing

Lac qui Parle area operations are minimally implemented with present staff levels. Resource degradation, from minimal maintenance, is occurring in some areas; for example building maintenance, access, road, and trail maintenance.

Other Operations Conducted by Lac qui Parle Staff

The Lac qui Parle wildlife staff is responsible for completing habitat management projects on 185 units in nine counties for a total 34,000 additional acres. These smaller WMA's are located in: Chippewa, Kandiyohi, Meeker, Renville, Lac qui Parle, Yellow Medicine, Big Stone, Swift, and Lincoln counties. The habitat management projects are developed by area wildlife managers and implemented by Lac qui Parle staff.

Several actions in the plan would require additional staffing.

The 1994 Division of Parks and Recreation Statewide Interpretive Plan recommended the placement of an Upper Minnesota area naturalist position. The planning process fully justified that position. This position could be an environmental education and interpretive specialist for the park, WMA and other Lac qui Parle area programs. It was also recommended in the planning process that a watershed coordinator for the upper Minnesota River should be funded. In addition, there are a number of recommendations which will result in the need for additional staff, mainly maintenance hours.

Many of the development proposals would have one time start-up expenses with additional maintenance expenses. Some of the proposals can be developed with minimal expenses using alternative labor, for example:

- Sentences to Services (STS)
- Minnesota Conservation Corps
- Other Volunteers

For example, the STS could complete construction on the proposed trail changes. This would result in minimal impact on the operating budget.

Additional staff may be needed as a result of the new office/contact station. The DNR will experience increased pressure for service and increased work loads as a result of increased use which will result from projected trends and plan implementation. For example, the Division of Enforcement can experience increased workloads as a result of increased recreational participation.

Costs

Operational Costs

If all the actions and recommendations in this plan were implemented, the various division's annual operational costs would increase. The level or amount of this increase is difficult to estimate because many of the recommendations are too general to base estimates on at this time. However, the increase in staffing outlined in the previous sections combined with a review of the development projects outlined below, suggests the area's annual operating budget would be increased by 15 to 25%.

Development Costs

The following list represents those actions which have development cost implications. The total cost to implement these actions is estimated at $ 2.5 million, (in 1996 dollars). This estimate was generated as part of the planning process and has a significant margin of error because a variety of assumptions were made related to unknown variables (site specific soil conditions, decisions related to site design, distance to electrical service).

1. Implement shoreline stabilization projects using bio-technical methods.
2. Conduct a feasibility study on Marsh Lake to evaluate if water quality would be improved by dam modification.
3. Fund an independent study on geese to evaluate their impact on water quality.
4. Develop temporary water holding areas to reduce flooding problems and improve water quality.
5. Implement an aggressive weed control program.
6. Develop and expand educational programs and materials on hunting and fishing ethics.
7. Research the feasibility of reintroducing prairie chickens.
8. Research cormorant/pelican feeding habits and document effects on fish populations.
8. Aid landowners with depredation problems.
9. Develop a new semi-modern campground (approx. 50 sites), with modern shower building, playground, beach, boat dock, fishing pier, canoe access.
10. Develop new hiking trails connecting new campground with office and Lac qui Parle Mission trail. Also trails to lake and prairie areas.
11. Determine the feasibility of constructing bike trails along roadways in the area.
12. Develop additional information sources, such as kiosks, outdoor phone or message machine.
13. Raise Volden's Pit road by 18".
14. Enlarge and improve Volden's Pit parking lot (including storm water settling ponds) and add lighting.
15. Install a 75 ft. long handicapped accessible floating boat dock
16. Construct concrete boat ramps at one or two of the Marsh Lake access sites.
17. Construct a wooden scenic overlook deck in the state park.
18. Install a second fishing pier on Lac qui Parle lake.
19. Provide additional informational and educational kiosks.

20. Develop additional interpretive and promotional brochures and materials.
21. Work with the Highway Department to install additional road signs.
22. Develop various exhibits and displays in the new office/contact station.
23. Develop a core curriculum with area schools on the Lac qui Parle watershed.
24. Monitor, inventory and research 6-12 additional resource concerns including flora and fauna, water issues, and fisheries.
25. Conduct angler creel surveys on Lac qui Parle and Marsh Lakes.
26. Remove barriers to fish migration on Pomme de Terre and Lac qui Parle Rivers.

Acquisition

All acquisition projects will be placed in priority order with other state park and WMA acquisition projects.

1. Purchase approximately 150 acres for new campground location. The new campground land is estimated at $200,000 (1996 dollars).

2. If state park boundary expansion is approved by the legislature, purchase private, county, state or federal land within the new boundary (approximately Sections 1,11,12, and 13). Much of this land is already owned by the WMA and some sort of land trade may be possible.

3. If WMA boundary expansion is approved by the county, purchase priority land to complete WMA boundary (approximately to Highway 7). The total cost to complete this acquisition cannot be estimated because it is unknown how much land will be purchased vs. conservation easements and other cooperative land agreements. In general, tillable land in the area costs $1,000 to $1,500 and occasionally over $2,000/acre. Wetlands and woodlands tend to have a market value of less than $500/acre (1996 dollars). The Project "A" boundary for the WMA would include an estimated 45,000 additional acres. Only priority land and major corridors would be acquired from willing sellers. The rest would involve working with landowners to enhance water quality, prevent erosion, and protect existing prairies and wetlands.

4. Seek acquisition of critical areas in the watershed to improve water quality. And/or consider acquiring easements, or cost-share programs to protect marginal lands or critically eroding areas. The watershed improvement project has not begun yet, so there is not even an estimate of acreage for this project.

Plan Modification Process

The Lac qui Parle Management Plan documents a partnership-based planning process and the recommended actions resulting from that process. This comprehensive plan recognizes that all aspects of natural resource management are interrelated, and that management recommendations should also be interrelated.

Over time, however, conditions change that affect some of the plan recommendations (or, in extreme cases, an entire plan). Plans need to recognize changing conditions and be flexible enough to allow for modifications as needed.

For the purpose of this plan we will differentiate between less controversial plan revisions and major plan amendments. Minor plan revisions can generally be made within the various Divisions. If a proposed change to a management plan meets any of the criteria below, it must follow the Plan Amendment Process. To maintain consistency among the plans and processes, all revisions and amendments should be coordinated through the Division of Parks and Recreation planning section. Requests for modifications should be directed to the Division of Parks and Recreation Planning Manager at the central office.

Major Plan Amendments

Proposed Plan Change Amendment Process Criteria

If a proposed change meets any of the following criteria, it must be approved through the amendment process below.

The proposed change:

1. Alters the mission, vision, goals, or specific management objectives outlined in the plan; or
2. Is controversial among elected officials and boards, user groups, the public, other DNR divisions or state agencies.

Management Plan Amendment Process

1. Division Initial Step: Review plan amendment at the area and regional level. Determine which stakeholders potentially have a major concern and how those concerns should be addressed. If the major concerns are within a single division , the issue should be resolved within the division. Review proposed approach with central office managers.

2. If the proposed change issue is between DNR Divisions, the issue should be resolved by staff and approved by the Division Directors. This may require one or two area/regional integrated resources management team meetings. The Division Directors will determine whether the proposed changes should go through the departmental (CTECH/Senior Manager) review process.

3. If the proposed change issue is between state or federal agencies, the issue should be resolved by staff from both agencies and approved by the Division Directors.

4. If the proposed change is potentially controversial among elected boards, user groups, or the public, a public roundtable meeting should be held to discuss the proposed change or an open house forumcould be held. The public meetings should be advertised in the local and regional area. Following the open house, the appropriate Division Directors will determine whether the proposed change should be reviewed by the department.

5. All plan amendments should be coordinated, documented, and distributed by the Division of Parks planning staff.

Plan Revisions

If a plan change is recommended that does not meet the amendment criteria above and generally follows the intent of the management plan (through mission, vision, goals, and objectives, the various divisions have the discretion to modify the plan without a major planning process.

Revisions related to Physical Development Constraints and Resource Protection

Detailed engineering and design work may not allow the development exactly as it is outlined in the plan. A relatively minor modification, such as moving a proposed building site to accommodate various physical concerns, is not uncommon. Plans should outline a general direction and document general "area" for development rather than specific locations. For the most part, plans are conceptual, not detail-oriented. Prior to development, proposed development sites are examined for the presence of protected Minnesota Natural Heritage Program elements and historical/ archaeological artifacts. If any are found, the planned project may have to be revised to accommodate the protection of these resources.

Program Chapter Revisions

The resource management section and Interpretive Services chapter should be updated periodically as needed. Resource Management and Interpretive staff will determine when an update is needed and coordinate the revision with the park planning section. Program chapters should be rewritten in a format consistent with the plan as originally approved by the DNR. To retain consistency, park planning staff should be involved in chapter revision review, editing and distribution.

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