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Savanna Portage State Park Management Plan



**Minnesota Department of Natural Resources
Division of Parks and Recreation**

September 16 , 1996

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Minnesota Department of Natural Resources

OFFICE OF THE COMMISSIONER

500 Lafayette Road

St. Paul, Minnesota 55155-4037

RE: Department of Natural Resources Approval of Management Plan for Savanna Portage State Park

Minnesota Statutes 86A.09 requires that a master plan be prepared for units of Minnesota's outdoor recreation system, including state parks and state recreation areas. Laws of Minnesota for 1961, established Savanna Portage State Park.

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

A handwritten signature in cursive script, reading 'Rodney W. Sando', is written over a horizontal line.

Rodney W. Sando, Commissioner
Minnesota Department of Natural Resources

A handwritten date '9-18-96' is written in cursive script over a horizontal line.

Date



Savanna Portage State Park Management Plan

State of Minnesota, Department of Natural Resources, 1996

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Table of Contents

I. Introduction

Executive Summary	1
Park Description and Law	2
Park Advisory Committee and Planning Process	5
State Park's Mission/Vision/Goals	7
Management Zoning Recommendations	8

II. Beyond Park Boundaries

Regional Landscape and Watershed Description	12
Regional Context and Issues	15
Regional Population	16
Tourism and Marketing	17
Supply and Demand of Recreation Facilities	19
Park Visitor Analysis	22
Marketing the Park's Benefits	24
Marketing and Tourism Actions	25

III. Natural and Cultural Resources

Cultural Resource/History	26
Climate and Seasons	34
Geology	34
Soils	41
Vegetation	43
Wildlife	48
Endangered, Threatened, and Special Concern Species	51
Waters/Fisheries	55
Resource Objectives	61
Integrated Management Actions	62

IV. Recreation Resources

Recreation Management Objectives	69
Existing Development	70
Proposed Development Actions	71

V. Park Boundary84

Recommended Land Management Actions	87
---	----

VI. Interpretive Services

Interpretive Clientele	88
Interpretive Themes	90
Summary of Existing Interpretive Services	92
Interpretive Service Actions	93

VII. Operations, Staffing, and Costs96

VIII. Plan Modification Process	99
---------------------------------------	----

Bibliography	101
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List of Maps

Regional Context	4
Zoning	10
Ecological Classification System	13
Origin of Visitors	23
Archaeological Sites	33
Surficial Geology	37
General Land Office Survey	44
Old Growth Candidates	46
Wetlands Inventory	58
Existing Winter Trails	73
Proposed Winter Trails	74
Existing Summer Trails	76
Proposed Summer Trails	77
Proposed Development	81
Ownership	85

INTRODUCTION

Executive Summary

Savanna Portage State Park provides a wide range of recreational opportunities, a nationally significant historic trail, and a large area of remote undeveloped land. The park is situated in northeastern Aitkin county and contains numerous lakes, streams and wetlands as well as northern hardwood forests and tamarack lowlands. Savanna Portage State Park is surrounded by the Savanna State Forest which provides additional resources and recreational opportunities. The park and the state forest are situated in a region of northern Minnesota that is currently experiencing an increase in destination tourism. This growth can be attributed to several factors: outstanding outdoor recreation, including snowmobiling, hunting and fishing; increased business traffic; and a renewed awareness of Sandy Lake, due to the work of private citizens and organizations such as the Big Sandy Area Lakes Watershed Project.

The Minnesota Department of Natural Resources (DNR), has remodeled the park contact station in 1996, to meet the growing customer needs and to make the facility handicap accessible. The newly remodeled facility will enable Savanna Portage State Park to provide additional opportunities for environmental education and historical education.

As a result of this planning project, Savanna Portage State Park will be revising the park's 76 mile trail system beginning in 1997. In general, trails will be utilized year round with skiing and mountain bike trails located in the southwestern part of the park, connecting with the Remote Lake Forestry trails. Snowmobile and hiking trails will be in the northern and eastern areas of the park. The Division of Parks and Recreation is also seeking funding to build a new trail center/visitor center to meet the increasing needs of trail users and organized groups. Through effective design, the trail center will allow all users easy access to trails and provide in-depth interpretation of area natural and cultural resources. Other recommendations include development of a rustic swimming beach near the main campgrounds, a primitive group camp near Wolf Lake, and a diversity of natural and cultural resource management activities.

Savanna Portage State Park has an experienced, knowledgeable and dedicated management team and work force that are committed to efficiently and innovatively managing the resources, working with the neighbors and neighboring communities, and serving recreational users. The planning process has resulted in the development of an integrated resource management plan utilizing extensive public involvement.

The following comprehensive management plan presents the mission, vision, goals and key issues. There is a detailed assessment of resources and recreational opportunities that provide data for use in making management decisions. At the end of each chapter are the recommended future actions. This plan provides the basic management direction for the park and is not intended to provide specific management or development details. The DNR seeks funding to complete trail and facility improvements and to commence the next phases of natural and cultural resource management.

Park Description and Law

Savanna Portage State Park is located in northeastern Aitkin County and western St. Louis County. The park is 17 miles northeast of McGregor. It is located 140 miles north of Minneapolis and St. Paul and 60 miles west of Duluth. (See Local Area Map on page 4). Currently it is the third largest Minnesota State Park, with a statutory boundary encompassing over 15,000 acres.

The park's rolling hills, large bogs and numerous lakes were created by glaciers. An esker separates the two watersheds in the park. The drainage to the west flows south to Mississippi River, and the drainage to the east flows northeast to Lake Superior. The Savanna Portage was an important link between these two watersheds for early canoe travelers going between the St. Louis River and the Mississippi River. The word Savanna refers to the expanse of marsh grass on the eastern portion of the portage trail. This six mile portage was used for centuries by American Indians before fur traders discovered the route in the mid 1760s. It was considered by voyageurs to be the "worst carrying place in the northwest" because of the marshes, bogs and tamarack swamps.

Although extensive logging took place in the park and some areas were drained by large ditches, much of the park remains in a wild and undeveloped condition. Most of the recreation facilities are concentrated in the center of the park between Loon Lake and Lake Shumway. The park includes:

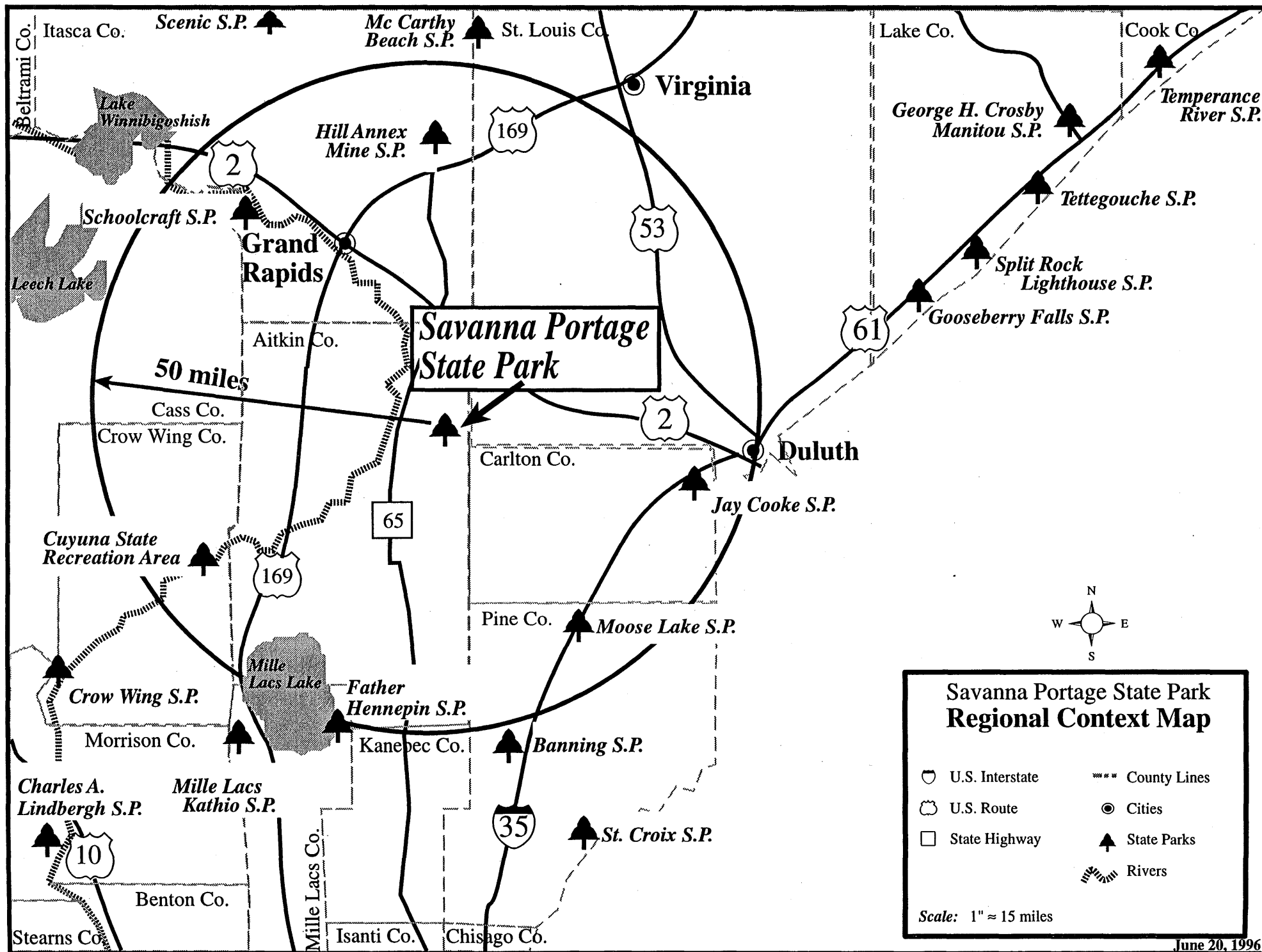
- The historic Savanna Portage Trail and the scenic Continental Divide trail. There are 61 miles of groomed snowmobile trails, 16 miles of cross-country ski trails, 22 miles of summer hiking trails, and 10 miles of mountain bike trails.
- Six lakes provide fishing opportunities: East and West Savanna Rivers, the Prairie River and the Prairie Flowage are also within the park boundary.
- There is a wide variety of camping opportunities, including the popular group camp, and the campground with 64 semi-modern sites, 16 electric hookups, one camper cabin, and seven backpack sites.
- The Loon Lake beach and picnic area is very popular and has a shelter building and playgrounds.
- Savanna Portage is the only state park located in the Tamarack Lowlands Subsection. The northeast and eastern portions of the park typify the Tamarack Lowlands.
- The Guest Cottage is now available for rent on Savanna Lake.

Savanna Portage was established as a state park April 10, 1961 when the bill was signed by Governor Elmer L. Anderson. (See Park History section). The sponsoring Senator was Norman W. Hanson of the 54th District and Representative Birger Nurminen was the house author. Under Chapter 226, Laws of 1961, \$3,300 were appropriated from the general fund to the commissioner of conservation for Savanna Portage State Park only under the condition that there were matching gifts of cash or

land. Within days, Lawrence Hanson, President of the Savanna Portage State Park Association, Incorporated, donated on behalf of the Association the matching funds needed for land acquisition. Under the law establishing Savanna Portage State Park, "the commissioner of conservation is authorized to acquire by gift, purchase or condemnation as funds are available, the described lands in Aitkin and St. Louis Counties. All lands described when acquired, shall be perpetually dedicated for state park purposes and administered in the manner provided for other state parks and shall be known as Savanna Portage State Park".

When private land is included in a state park statutory boundary, Division of Parks and Recreation can negotiate for purchase of that land from a willing seller. Land-owners inside of a statutory boundary can sell to whomever they choose.

The park was officially opened and dedicated in 1967. In December 1971 the Department of Natural Resources and the Minnesota Historical Society signed an agreement to protect the Savanna Portage, to include restrictions of archaeological research and analysis. In March 1973, the Savanna Portage and adjacent land was officially designated as a National Historic District and is listed in the National Historic Register. The site continues to be administered by the Minnesota Department of Natural Resources.



June 20, 1996

Park Advisory Committee and Planning Process

Although the Savanna Portage State Park Association, Inc. was active in the establishment of the park, it was dissolved long before this planning process was initiated in late 1994.

In December 1994 a public news release announced the beginning of the planning process. It noted that there would be several public "open houses" and a Park Planning Citizen Advisory Committee. The committee structure included representation from the following:

1. Aitkin County Board
2. Local logger
3. Public school teacher
4. Local historian
5. Mayor of McGregor/Librarian
6. Several area business people
7. Retired school principal
8. Farmer and sawmill owner
9. Real estate agent
10. Local environmentalist
11. Big Sandy Lake Association
12. Snowmobile clubs/interests

The Sandy Lake Band of Ojibwe was asked to provide a representative, but was unable to do so because of other commitments. The Citizen Advisory Committee decided to postpone any public meetings until after May due to the large number of people who leave the area for the winter. After their first meeting, the Citizen Advisory Committee decided to meet jointly with the DNR Integrated Resource Management Team. Meetings were held to discuss major planning issues on the following dates (advertised and open to the public):

January 26, 1995	Develop list of park issues & concerns
February 24, 1995	Park overview & develop preferred future
April 4, 1995	Land management and boundaries issues
May 10, 1995	Natural resource management issues
June 8, 1995	Cultural resource management issues
July 20, 1995	Recreation resources and community links
September 13, 1995	Interpretive services issues
October 5, 1995	Finish boundary, wildlife & development issues
November 30, 1995	Finish zoning and development issues

In addition, public "Open Houses" were held on June 4, 1995 , January 25, 1996 and June 28, 1996.

The Department of Natural Resources formed an Integrated Resource Management (IRM) team to assist in developing this park plan. This professional team included:

personnel from the Division of Forestry, the Area Wildlife Supervisor, the Regional Nongame Wildlife Specialist, the Area Fisheries Supervisor, the Area Conservation Officer, the Rice Lake National Wildlife Refuge Manager, the Region 3 Planner, Division of Minerals personnel, the Area Trails and Waterways Supervisor, the Area Hydrologist, the Big Sandy Lake Watershed representative, Regional Parks and Recreation personnel, and Savanna Portage State Park personnel.

The IRM team met formally on December 13, 1994 and thereafter met with the Citizen Advisory Team. There were also several informal meetings with individual team members throughout the process.

The recommendations in this plan are the result of this partnership-based planning process. This plan provides the basic management direction for the park and is not intended to provide specific management or development details.

It should be noted that this is the first comprehensive management plan for Savanna Portage State Park. In 1982 a park plan was initiated, however, it was never completed or approved.

A comprehensive park plan and "planning process file", documenting the 1994-1995 planning process and pertinent background information, will be distributed to the following locations: Savanna Portage State Park, Region 3 Parks and Recreation Manager, State Park Planning Section (St. Paul), and DNR Engineering (St. Paul). Park plans will also be located in the DNR Library and in the McGregor Library.

State Park's Mission/Vision/Goals

The following statements were generated by participants of the planning process and state park personnel.

Savanna Portage State Park Mission:

To preserve and manage the diverse natural, scenic, and cultural resources of Savanna Portage State Park for present and future generations while providing appropriate recreational and educational opportunities.

Savanna Portage State Park 20 Year Vision:

- Restore, manage and interpret natural landscape patterns and associated wildlife while providing for appropriate recreational opportunities.
- Maintain natural character by clustering recreational development.
- Develop historical and cultural awareness, knowledge and preservation through a diversity of interpretive services and facilities. There should be special emphasis on the significance of the portage route.
- Encourage tourism in the locality by being an active participant and asset to tourism for the communities of Aitkin County.
- On a regional level, develop and utilize programs and tours to integrate the history and resources with other resources such as Jay Cooke State Park and Crow Wing State Park.

Savanna Portage State Park Goals:

(See pages 61 and 69 for objectives specific to resource and recreation management)

- Continue to provide a balance between resource preservation and use.
- Concentrate park development in order to preserve the character of undeveloped portions of the park.
- Produce and implement a comprehensive and active vegetation and wildlife management plan.
- Increase emphasis and funding for interpretive improvements and resource management.
- Increase day use of the park, especially by promoting the park's wildlife/bird watching, diversity of ecosystems and historical significance.

Management Zoning

Introduction

Before the specific management of Savanna Portage State Park can be considered, a zoning concept must be established to evaluate the various management alternatives. This section establishes a zoning system which formally recognizes the various features of the park and identifies those areas suitable for specific uses. (See Park Management Zoning Map page 10). Management zoning is a planning technique that evaluates and classifies lands and prescribes what can and cannot occur regarding resource management, visitor use, access, and facilities in different areas of the park. It provides guidance for short-term operations and long-term decision-making. Zoning does not provide regulatory or legal designations.

The attached zoning map does not describe existing conditions, facilities and management. It instead, it shows the desired future conditions and considers the capability of lands to support different uses and identifies the location of the park's exceptional resources and values. Some zones may be changed if information gathered justifies the change. However, it is assumed that if there are endangered species or archaeological sites, they will be protected under law, regardless of the zone.

Management Zoning for Achieving Desired Future Conditions

A land classification system utilizing six major management zones was adopted which will permit effective, economical management of the park's resources, centralize park development and protect delicate resources within the park. Each of the six zones has been defined with a description of their prime management objectives. The following text provides the rationale for why the zones were established. The zoning map is a composite of all potential zones. In some areas two or three zones may have been appropriate. However, only one was mapped as the preferred management zone. These decisions were based on an analysis of resources and visitor experiences. This zoning map will guide the recreation and resources management decision-making process and establish a foundation for long-term management continuity.

Ecological Protection Zone - The ecological protection zone includes areas having ecological communities which are either sensitive to certain uses, require special management or protection and/or have significant value for research. Areas having unique or endangered wildlife habitat or vegetative communities are included in this zone. Management will be directed toward perpetuating these ecological values. Development will be restricted to interpretive facilities or trails which do not disturb these values. All forms of access may be prohibited when necessary. In certain instances, small structures may be necessary to orient use and protect habitat.

- Three different basic area types qualify for protection in this category. The recommended Old Growth Forest candidate stands, the West Savanna River which provides the water quality baseline data for the Big Sandy Lake Watershed Project and provides habitat for fresh water sponges and the Heron Rookery on Shumway. It should be noted that although Loon Lake is probably the most sensitive lake in the park, it was decided to have some multiple zoning in this area.

Outstanding Natural Feature Zone - The outstanding natural feature zone includes areas which are geologically or biologically of statewide significance. These features often are the park's principal resource attractions and will be managed to provide for visitor enjoyment without impairing their quality. Development of restricted forms of recreation facilities may be necessary to allow for enjoyment and interpretation. All development must be compatible to the features of the site to protect its natural character. Resource management will be restricted to restoring the resources and perpetuating their natural characteristics.

- The northeast portion of the park represents the only example of the Tamarack Lowlands Subsection in Minnesota State Parks. At one time this area was also considered as a possible Scientific and Natural Area. The second outstanding natural feature in the park is a set of crosscutting eskers just north of Glacier Lake. These are explained in the Geology section of this plan. The outstanding features zone may be modified based on the Minnesota County Biological Survey evaluations.

Primitive Zone - The primitive zone includes extensive areas of land and water remote from high-density use areas and major development within the park and removed from the external influences of civilization. Development will be restricted to trails, primitive walk-in campsites and appropriate interpretive facilities. Resource management will be directed toward restoring and perpetuating the natural environment and the aesthetic character of that environment.

- Primitive zones were used as additional buffers for the Old Growth Forests and around some lakes. It was also used along the Continental Divide viewing area. It was also decided to have the east side of the flowage be Primitive Zone and the west side (along the road) be General Environment.

General Environment Zone - This zone includes areas which, while they may be very scenic, contain no identified outstanding natural, historical or cultural features. In addition, the resources in this zone must be able to tolerate moderate use. Properly managed, this zone will serve to unite the other zones into a cohesive unit.

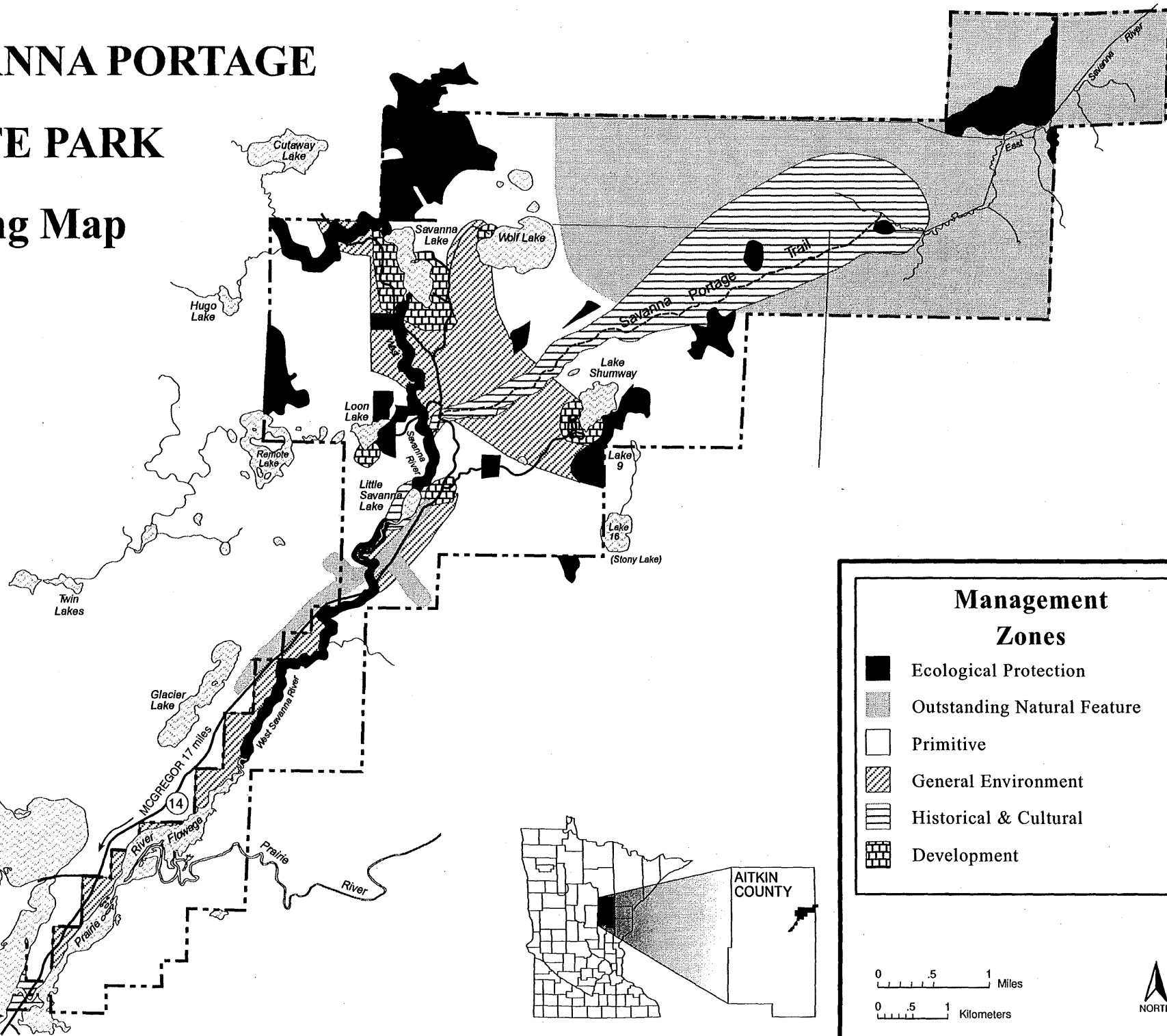
- General Environment Zone in Savanna is used to connect major development zones and for most roadways.

Historical and Cultural Zone - The historical and cultural zone includes those sites which help to illustrate the historical and archaeological heritage of the area. Activities should emphasize the interpretive values of the site. Recreation development will be restricted to activities such as trails, small picnic areas, interpretive facilities and parking. Activities and improvements should be limited to those which will not detrimentally affect the preservation and restoration of these sites and should be reviewed with the Minnesota Historical Society. All historical or cultural sites should be surrounded by sufficient natural buffers to minimize encroachment from other activities. Natural resource management activities should maintain and perpetuate historical and cultural values while insuring regeneration of native or historically

SAVANNA PORTAGE

STATE PARK

Zoning Map



compatible plant and animal species.

- Four sites of archaeological significance have been identified. The entire Savanna Portage Trail was included in a broad zone designated as Historical and Cultural. This zone is wider than the actual National Historic District due to the probability that the current route is not the only or the most accurate path that was historically used, and also to accommodate the aforementioned buffer. Also designated as Historic, are the shore of Big Sandy Lake which has documented archaeological artifacts and around Little Savanna, which is associated with the portage route. The fourth area, which is not shown on the map, is the Battle Island archaeological cemetery site. This site has been recommended as eligible for inclusion on the National Register. Two other areas were discussed for designation but they require further research: A logging camp found in the early 1920s on the western edge of Wolf Lake; and an area along the Prairie River which was a historic a travel route.

Development Zone - The development zone includes lands and waters where major park development and intensive use, both existing and proposed, has or will substantially alter the environment. This zone will be managed to provide and maintain the level of development necessary to provide compatible access to the resource identity of the park, and to serve the needs of relatively large numbers of visitors and of park administration. Park roads extending beyond this zone may be included in appropriate natural or historic zones through which they pass. Resource management will be directed toward improving the recreation capabilities and characteristics of the environment. However, native vegetation should be used when plantings are necessary.

- Development zones in Savanna Portage State Park are limited by the soil suitability, large wetland areas in the park, topography, old growth forest stands and numerous cultural sites. Selection of the final development zone also took into consideration such factors as functional location, user circulation, and flow patterns to existing facilities. The development zone includes all current and proposed major physical development except for remote campsites, trails and carry-in boat launches. All development will be located and designed to have a minimal negative effect on the parks natural and cultural resources. Even within this zone, only a small percentage of the area will be developed. (Most of the development on Savanna Lake consists of private homes).

Summary

The largest areas of the park are zoned for Outstanding Natural Features and Primitive Zones. The Outstanding Natural Features zones include the scenic eskers area of the park and the Tamarack Lowlands, representative of the whole landscape region. Three areas of archaeological/cultural significance have been zoned for protection and research. The old growth forest stands, the West Savanna River and the heron rookery are zoned for ecological protection. A General Environment zone has been designated in the central part of the park which allows pedestrian and non-pedestrian trails to connect the developed areas in the park and this zone contains the heaviest concentration of trails. The Development zones are centrally located within the park, in areas where the soils are suitable for development.

BEYOND PARK BOUNDARIES

Regional/Landscape and Watershed Description

Ecological Classification System

Minnesota's Ecological Classification System (ECS) is a means of separating and describing units of a landscape. This approach stresses the interrelationships and the results of interactions among components of the ecosystem. These components include climate, geology, geomorphology, parent material, soil, vegetation, hydrology, and land history. The ECS approach handles each component in relation to the others, rather than treating each one separately (Hargrave, 1992).

The ECS approach divides Minnesota into 23 distinct units called subsections (see ECS map, page 13). Savanna Portage State Park is located at the intersection of two landscape subsections: the Tamarack Lowlands and the Mille Lacs Uplands.

The Tamarack Lowlands Subsection

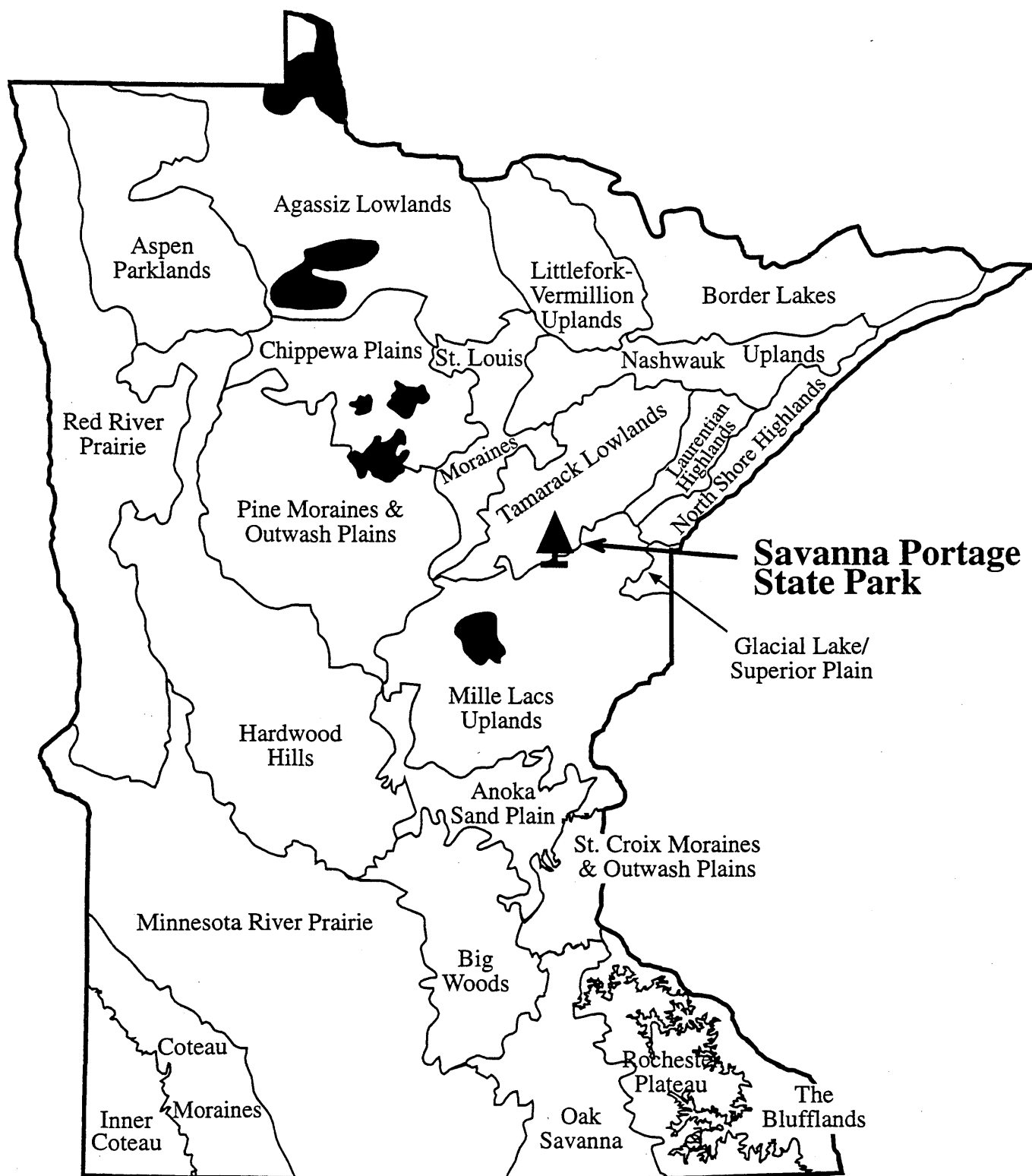
The Tamarack Lowlands area is characterized by lowland hardwoods and conifers which were the most common forest communities. Northern hardwoods and aspen-birch were common on the other portions of this subsection. Pre-European contact vegetation in the lowlands was dominated by lowland conifers (black spruce, tamarack, white cedar) and lowland hardwoods (black ash). Sedge meadows were also extensive. Uplands supported aspen-birch and upland conifer forest. White pine-red pine forests were located on the ground moraine at the edges of the lake plain, but were not extensive.

Mille Lacs Uplands Subsection

Gently rolling till plains and drumlin fields are the dominant landforms in this region. Glacial drift ranges from 100 to 300 feet in depth over bedrock. Bedrock is locally exposed throughout the northern portion of the subsection, where depths are typically 100 feet or less. The pre-European settlement vegetation consisted of a mosaic of forest types. This subsection was a vast mix of conifer, hardwoods and mixed conifer-hardwood forests. Peatland areas were inhabited by sedge-fen, black spruce sphagnum, or white cedar-black ash communities. Both fire and wind-throw were important in determining the vegetation of the subsection.

ECOLOGICAL CLASSIFICATION SYSTEM (ECS)

Subsection Map of Minnesota



Watershed Description

Most of Savanna Portage State Park lies in the Big Sandy Area Lakes Watershed. This watershed is the easternmost of the six Mississippi Headwaters basins, and extends approximately 26 miles eastward from the Mississippi River and is about 18 miles wide north-south. Water in Big Sandy Lake originates from four main rivers: the West Savanna from the north, the Prairie and Tamarack from the east and the Sandy River from the south. The Prairie River is the longest, about 30 miles from its origin at an elevation of 1315 feet to its mouth at Big Sandy Lake at an elevation of 1217 feet.

The Big Sandy Area Lakes Watershed is about 37% wetlands (wooded and non-wooded), 32% wooded upland, 19% agriculture/open uplands, 9% lakes, and 3% industrial, residential and roads (Big Sandy Area Lakes Watershed Management Plan 1993).

The northeastern portion of Savanna Portage State Park lies in the St. Louis River watershed. The St. Louis River watershed encompasses 3,600 square miles and it is the largest watershed on the Lake Superior Basin within the United States. The major rivers in the watershed include: the St. Louis, Cloquet, and Whiteface Rivers. The East Savanna River flows into the St. Louis River.

The water quality of the upper reaches of the St. Louis River and its tributaries is generally good for most general water quality parameters (St. Louis River Management Plan, 1994). The predominant portion of the St. Louis River watershed is forested, with some agricultural and urban areas. The upper reaches of the St. Louis River affect water quality by the potential for increased erosion and concurrent sedimentation and nutrient loading of the rivers. Most of the St. Louis River water quality concerns are in the lower stretches of the river, near Duluth.

Regional Context and Issues

Savanna Portage State Park is situated in the center of the 218,450 acre Savanna State Forest of which 150,000 acres are administered by DNR Forestry. The park is located 60 miles west of Duluth and 14 miles north of McGregor. It is 140 miles north of the Twin Cities.

The following section describes the regional population, tourism and resort industry, the regional supply and demand of recreational services, and the region's natural resources and landscape. Throughout this chapter, the plan will reference a 50-mile radius. This distance was chosen as the area roughly within a one hour drive of the park.

This region's economy is based heavily on travel and tourism. According to the 1993 Big Sandy Lakes Watershed Management Plan, in Aitkin County alone, travel and tourism generated more income (\$71 million) than agriculture and livestock production (\$45 million). Nearly 80% of the real estate taxes collected in Aitkin County are derived from shore land property. These recreational economic impacts are dependent upon maintaining water quality, fisheries and wildlife resources, and esthetic qualities of the region's waterways and shores.

Regional Issues:

- Maximizing biological diversity and minimizing fragmentation of natural habitats.
- Protecting both groundwater and surface water resources, including protection of shore topography, vegetation and bluff impact zones. (Phosphorus loading is a major issue on many of the region's tributaries and lakes).
- Protecting the region's wetlands and minimizing activities which change drainage patterns.
- Realizing "desired future conditions" where there is a balance between natural resource management and strong local/regional economy.
- Identifying and managing unique natural and cultural resources.
- Providing a high quality sustainable fisheries in the region's lakes and rivers.
- Controlling the spread of exotic species.

Regional Population

Savanna Portage State Park is located in northeastern Aitkin County, with a small section in western St. Louis County. In 1990, Aitkin County had a population of 12,425. St. Louis County had a population of 198,213 and Carlton County had a population of 29,259. Nearby cities in Minnesota with a population over 2, 500 are shown below. (Wisconsin statistics are not shown).

<u>Cities Over 2,000</u>	<u>1990 Population</u>
Duluth	85,493
Hibbing	18,046
Cloquet	10,885
Grand Rapids	7,976
Hermantown	6,761
Chisholm	5,290

Although the 50 mile radius surrounding the park is fairly heavily populated, the towns in the immediate area of the park are quite small. The countryside is sparsely populated with large areas of bogs and marshes. McGregor, the nearest town by road, had a population of 376 in 1990. Other nearby towns and villages include: Tamarack, 53; Floodwood, 574; Cromwell, 221; and Palisade, 144. The town of Aitkin, which is the Aitkin County Seat, had a population of 1,698.

The Minnesota Population Projections 1980-2010 report shows minimal growth for Aitkin County over the next 20 years. The largest growth is expected to be in the 45-65 age group category. Aitkin County Projected Populations are in the year: 2000: 14,578; 2005: 14,660; 2010: 14,690.

In this region it should be noted that a very high percentage of the residences are seasonal. In Aitkin County 52.4% of the net tax base of housing were classified as seasonal residences in 1995. Therefore, the seasonal population is much higher than the permanent population.

In Minnesota, the median age rose from 29.2 years in 1980 to 32.5 in 1990. This follows a nationwide trend of aging of the "baby boom" generation. Statewide, Aitkin County had the highest median age of 42.8 years.

Unemployment rates in Minnesota are highest in northcentral and northwest Minnesota and the central cities of the Twin Cities. Legislative district 3B in northern Aitkin County, ranked fifth highest, statewide, with 11% unemployed in the 1990 census. (District Data Book, Minnesota Legislative Districts, March 1993).

Tourism and Marketing

Sample tourism-related statistics for 1993 (Several other counties, with state parks, are given for comparison):

- Total tourism receipts (including direct, indirect and induced spending).

Aitkin Co.	\$13.4 million
Crow Wing Co.	\$200 million
Otter Tail Co.	\$57 million
Statewide total	\$6.3 billion.
- Estimated number of jobs in the travel and tourism industry; and some show the percent of the county's population employed in the tourism industry.

Aitkin Co.	266 jobs, or approximately 2% of the population
Crow Wing Co.	4,138 jobs, or 9% of the population
Fillmore Co.	147 jobs
Otter Tail Co.	1,122 jobs
Statewide total	123,540 jobs.
- Wages earned in tourism and travel

Aitkin Co.	\$5 million
Crow Wing Co.	\$78.65 million
Fillmore Co.	\$2.57 million
Otter Tail Co.	\$19.2 million
Statewide total	\$2.5 billion
- It is quite likely that the Aitkin County figures are underestimated, since the Office of Tourism bases its calculations on overnight lodging statistics. The area between Duluth and Mille Lacs tends to experience a lot of day trip usage.

It is interesting to note that the total tourism receipts of \$13.4 million is more than triple what it was prior to 1992. From 1989 to 1991 Aitkin county tourism dollars averaged \$4.2 million per year. In 1992 that figure jumped to \$14.1 million. Much of this increase may be related to the new casinos near Mille Lacs and Duluth.

The Department of Revenue, Tax Research Division, shows that Aitkin county had approximately 25 resorts in 1991. These resorts reported sales of approximately \$950,00. There is an average of 40 lodging places in Aitkin County including camping, hotels and resorts. Sales at all lodging places in Aitkin county were:

1987	\$935,000
1988	\$1,067,000
1989	\$1,088,000
1990	\$1,203,000
1991	\$1,364,000

In 1986, a Comprehensive Marketing Plan was developed for Savanna Portage State Park by area and regional staff. Thirty actions and projects were recommended to improve service and customer satisfaction. Some of these actions have since been completed, such as the installation of playground equipment, while others may no longer be desirable. Those that do still apply are incorporated into this management plan.

The 1986 marketing plan targeted three markets for Savanna Portage State Park:

1. Young-family campers
2. Senior-citizen campers, especially midweek use
3. Day use, especially by area residents and cabin owners.

Supply and Demand of Recreational Facilities

Supply

As part of the Statewide Comprehensive Outdoor Recreation Planning (SCORP) process, the DNR has maintained a data base of recreational facilities since the early 1970s. While the data for most of the public facilities have been updated in recent years, some of the private facility data are out of date. Private facility information in this plan is supplemented by information from the Office of Tourism and from local publications (1994).

The following table shows an estimate of selected recreational facilities within a 50 mile radius of Savanna Portage State Park. Fifty miles is a one-hour drive from the park.

Administrator	Number of Facilities					
	Campgrounds	Picnic Grounds	Boat Accesses	Beaches		
County	5	6	39	5		
City	8	47	55	21		
DNR Fish & Wildlife	1	0	12	0		
DNR Fisheries	0	0	6	0		
DNR Forestry	9	15	15	6		
DNR Parks & Rec	9	8	8	4		
DNR Trails & Waterways	27*	3	157	0		
MN DOT	1	44	16	2		
U.S. Army Corp	6	6	9	3		
U.S. Fish & Wildlife	0	1	3	0		
U.S. Forest Service	1	2	10	2		
Total Public	40	132	330	43		
Church/Other Non-profit	14	9	5	22		
Private	134	106	144	256		
Total Private	148	115	149	278		
Grand Total	188	247	479	321		
* Individual canoe campsites						
Administrator	Miles of Trails					
	ATV	Hiking	Horse	Skiing	Snowmobile	Mountain Bike
County Total	153	48	10	103	1971	0
City Provided	0	33	0	65	153	0
DNR Fish & Wildlife	0	11	0	0	0	0
DNR Fisheries	0	0	0	0	0	0
DNR Forestry	46*	35	15	42	112	66*
DNR Parks & Rec	0	90	5	55	83	10
DNR Trails & Waterways	0	50	33	0	81	7
MN DOT	0	0	0	0	0	0
U.S. Army Corp	0	0	0	0	0	0
U.S. Forest Service	0	34	36	49	0	66
Total Public	199	301	99	314	2400	83
Church/Other Non-profit	0	35	16	20	0	0
Private	0	94	21	24	3	0
Total Private	0	129	37	44	3	0
Grand Totals	199*	430	136	358	2403	83
Approximate miles of trails *						

Boat Accesses - There are approximately 330 public and 150 private boat accesses within 50 miles of Savanna Portage State. Approximately 71 are carry-in portage type accesses. Over 150 of these accesses are administered by the DNR-Trails and Waterways Unit.

Picnic Grounds/Beaches - There are over 240 picnic grounds and 320 beaches within 50 miles of Savanna Portage. Approximately 90 percent of the beaches and about one half of the picnic grounds are privately owned and operated.

Campgrounds - There are at least 40 public campgrounds within 50 miles of Savanna Portage. The DNR-Trails and Waterways Unit also administers 27 individual boat-in campsites. The public campgrounds are evenly distributed among the counties, the cities, the Minnesota DNR, the US Forest Service and the US Army Corps of Engineers. State Park campgrounds within 50 miles of Savanna Portage State Park are listed in the table below.

Campsites administered by DNR Parks and Recreation within 50 miles of Savanna Portage State Park

<u>Park</u>	<u>Drive-In Sites</u>	<u>Electric Sites</u>	<u>Horse Sites</u>
Banning	31	11	0
Hill Annex Mine	0	0	0
Jay Cooke	80	21	0
Moose Lake	18	0	0
Savanna Portage	64	18	0
<u>Schoolcraft</u>	<u>30</u>	<u>0</u>	<u>0</u>
50 Mile Region Total	159	32	0

Hiking Trails - There are over 430 miles of hiking and 360 miles of cross country ski trails within 50 miles of Savanna Portage. Approximately one third of the hiking trails are administered by entities other than county, state and federal governments; churches and other nonprofit groups as well as the private sector offer over 120 miles of hiking trails in the area.

Mountain Bike Trails - One state park and all state forests within 50 miles of Savanna Portage offer mountain bike trails. Jay Cooke State Park offers 8 miles of mountain bike trail. Mountain biking is permitted on most state forest roads and trails, unless posted closed.

Cross Country Ski Trails - Most cross country ski trail mileage in the area is administered by county governments. Cities in the area as well as DNR divisions also offer a significant amount of cross country ski trail miles.

Horse Trails - There are approximately 100 miles of designated horse trails in the 50 mile area. Over one third of these miles are offered by the DNR-Trails and Waterways Unit and the US Forest Service. DNR Parks and Recreation and DNR Forestry also administer horse trails in the area, however, there are no horse trails in Savanna

Portage State Park.

Snowmobile Trails - There are approximately 2000 miles of county-maintained Grant-In-Aid (GIA) snowmobile trails accessible within 50 miles of the park. 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. Most of the snowmobile trails are owned and operated by the individual counties.

Cuyuna Country State Recreation Area - This new addition to the State Park System will add significantly to the supply of recreation within 50 miles of Savanna Portage. Land acquisition is currently underway. Eventually, Cuyuna Country State Recreation Area will offer camping, hiking, biking, horse back riding, cross country skiing and snowmobiling. It will be an important component of the state recreation system upon completion.

Demand

From 1980-1990 Minnesota has experienced an increase in fishing, and nonconsumptive wildlife activities including the number of people who feed birds. The number of residents hunting in Minnesota during the same period decreased only slightly, by -4 percent. Fishing increased by 10 percent over these ten years. This can be compared to the national trend of the number of Americans 6 years or older who hunted and/or fished, which saw an increase of 17 percent. The number of anglers increased 20 percent and the number of hunters remained steady. Nationally, nonconsumptive recreational activity, i.e. feeding, observing or photographing wildlife while on trips at least one mile from home, increased 63 percent. Feeding wildlife around the home is the largest single nonconsumptive wildlife activity in the United States. This increase has been faster than the rate of overall population growth (1980-1990 Fishing, Hunting and Wildlife-Associated Recreation Trends).

There are five state parks within 50 miles of Savanna Portage State Park. Although these state parks offer contrasting recreation experiences, attendance at these parks is still a good indicator of existing, expressed demand for natural resource based outdoor recreation experiences in the Savanna Portage area. Jay Cooke is near Duluth.

Attendance at state parks within 50 miles of Savanna Portage State Park.

<u>Park</u>	1994	1994	92-94 Ave.	1994
	<u>Day Use</u>	<u>Camping</u>	<u>Occupancy</u>	<u>Total Visitors</u>
Jay Cooke	208,000	27,189	85%	235,189
Savanna Portage	56,611	11,068	64%	67,679
Banning	60,811	6,505	85%	67,316
Moose Lake	36,524	3,802	80%	40,326
Hill Annex Mine	13,159	-----	-----	13,159
<u>Schoolcraft</u>	<u>7,000</u>	<u>1,675</u>	<u>15%</u>	<u>8,675</u>
50 Mile Region Total	382,105	50,239		432,344

Park Visitor Analysis

Day Use

In a three year average of total visitor attendance, Savanna Portage ranked 38th out of the 64 Minnesota State Parks. However, it should be noted that attendance has been steadily increasing from 1993 to 1995.

Savanna Portage State Park Attendance

1993 Total Visitors	58,767
1994 Total Visitors	67,679
1995 Total Visitors	75,077

For both campers and day visitors, the most popular recreational activities are fishing, hiking, biking and swimming. Wildlife observation, berry picking, picnicking and canoeing are other frequent uses. During the summer months visitation is heaviest on weekends.

Winter use accounts for over 20% of the total use at Savanna Portage. Only four other state parks have a higher percent of their use during winter months: Lake Maria, George Crosby Manitou, Afton and Bear Head Lake. Winter use of the park, primarily includes snowmobiling and cross-country skiing, especially when weather conditions are suitable. Thursday through Sunday are the heaviest use days. During the peak of the winter season, snowmobile traffic on the trails approaches maximum use. Most snowmobilers using the park enter on the trails. Similarly, many of the skiers using the park will use the ski trails in the Remote Lakes area of Savanna State Forest.

Unmeasured day use of the park includes wild rice harvesters, boaters, canoeists, anglers, and campers on the Savanna River and Prairie River Flowage. These areas are also extensively utilized for hunting waterfowl, deer and grouse.

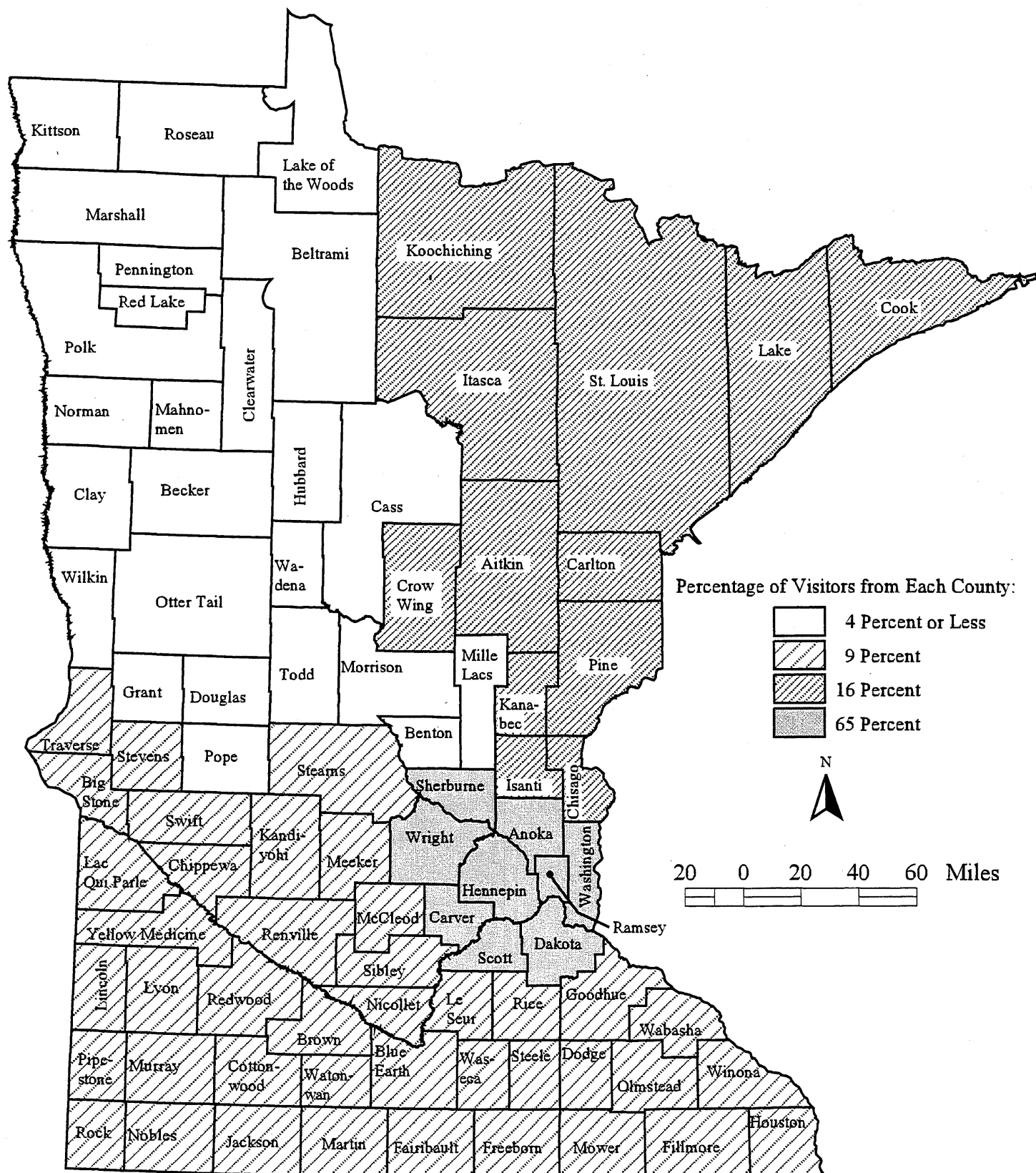
Overnight Use

Camping is a primary activity at Savanna Portage. Among campers, 63% are from the Twin Cities metropolitan area and 29% live within 150 miles of the park. (See Origin of Visitors map on page 23). Average group size per camper unit is 3.65 people (Camping registration statistics).

The semi-modern campground is usually filled to capacity on holiday weekends and to near capacity during July and August weekends. The three year average of May - August weekend campground occupancy is 64.66%; while the weekday campground occupancy is 17.29%

The primitive group camp on Savanna Lake is heavily used on weekends. For the period of May 13-September 30, 1994 for Friday and Saturday nights, the Savanna Portage Group camp was occupied 38 nights out of a possible 41 or 92.7% of the time. This is very high occupancy for a state park primitive group camp.

ORIGIN OF VISITORS TO SAVANNA PORTAGE STATE PARK



Marketing the Park's Benefits

In marketing Savanna Portage State Park, it is important to sell benefits rather than products to customers. This is done by identifying the benefits customers will receive from the park's products and services. The best benefits are those that favorably affect either people's feelings, their pocket books or convenience. Outdoor recreation and public lands are essential to our individual lives, community, economy and environment. Some of the benefits that Savanna Portage State Park provides are:

Personal Benefits

- The physically fit person is able to enjoy life more fully, is less prone to injury and is more productive. Savanna's trails provide opportunities for various exercises.
- Fit senior citizens live longer, remain in their homes longer and participate more fully in community life. Park trails range from easy to difficult.
- Recreation/adventure activities help build confidence and self-esteem in youth. When they feel good about themselves, they are more productive in our communities, families and schools. Backpack and group camps provide overnight experiences.
- Stress is a serious issue in modern society - all of the popular "prescriptions" or solutions highlight the role of leisure and relaxation. Long trails through the back country may help people feel that they are escaping civilization and reduce stress.

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. Swimming, boating, hiking and playgrounds provide many leisure activities.
- Communities come together and learn to work together through sports, arts, cultural and environmental activities. The Big Sandy Area Lakes projects is an example.

Economic Benefits

- Economic development literature repeatedly stresses the attraction of local quality of life in the decision to move a firm to a new city. i.e. new hotel in McGregor.
- Many studies have shown that financial investment in recreation projects pay dividends throughout the community - the return is 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). Savanna's vast wetlands for example.

Environmental Benefits

- Participation in appreciative outdoor recreation activities is a valuable predictor of environmental concern - outdoor recreation participation is positively associated with environmental concern. Interpretive signs help people learn more about nature.
- 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 parks, open spaces and protected natural environments contribute to the environmental health of our communities. i.e. Savanna's old growth forests.
- The provision of parks, open spaces and protected natural environments provide for essential habitat for the native species of Minnesota. i.e. Endangered species.

Marketing and Tourism Actions

Community Linkages

Savanna Portage State Park plays an important role in the natural environment. It also has a strong role in the local economy and the community's quality of life. The park is not an island, but an integral part of a larger ecosystem and neighboring communities. Recommended management actions for tourism and marketing are listed below. Other actions related to tourism can be found in the natural and cultural resource recommendations, the proposed recreation development section, and the interpretive services recommendations.

- **Action 1: Work with area tourist groups to develop activities that could attract more families to the park/area.** This might involve organizing family oriented environmental or cultural activities or it might include bus tours. Promote bird watching and wildlife watching in the park. This might be done through videos and maps of local species and habitat. Cooperative programs could be held in conjunction with other agencies or parks. Tours of the area and park could be held in conjunction with area special events. (See Interpretive section for more actions).
- **Action 2: Work with existing organizations to develop promotional maps and materials.** Develop a portable photo display for use at promotional activities, events, the McGregor tourist information booth or for general off-site use. Distribute maps, signs and informational materials to additional locations. Assist existing organizations in developing new and better marketing tools to promote the area as well as the park.
- **Action 3: Work with Senior Citizen groups to make the park more appealing as a destination.** To accommodate the growing senior citizen market, video presentations should be made available in an accessible building.
- **Action 4: Encourage local clubs, groups and schools to utilize the park for school trips and field projects.** Work with the Long Lake Environmental Center to determine how the two can develop some cooperative programs/trips. Outreach programs for area schools, parks and events could tell the story of the park and showcase its resources.
- **Action 5: State park staff should communicate regularly with federal agencies and work together to complement services.**
- **Action 6: Work together with the staff at the American Indian center.** This will be an excellent opportunity to complement each other for the benefit of the communities. There could be dual promotions of the history and the portage.
- **Action 7: Participate in the Elderhostel Program.** It was noted that there is an active Elderhostel Program in the Mille Lacs area that utilizes Mille Lacs Kathio State Park extensively. A church group or some other organization could potentially be the sponsoring agency when appropriate.

NATURAL AND CULTURAL RESOURCES

Introduction

The Natural and Cultural Resources chapter begins with sections which list and describe the resources of the park. At the end of the chapter is a section which lists integrated resource management recommended actions. The Natural and Cultural Resource Objectives and the Recommended Resource Management sections will serve as the general resource management plan for the park; this section will be revised periodically as new data becomes available.

Cultural Resources/History

A Natural Continental Crossroads

Savanna Portage is recognized on the National Register of Historic Places for its importance in the fur trade, primarily for beaver, which first established Europeans in central North America. Yet from time immemorial, such water routes have been natural transportation corridors.

Savanna Portage State Park, notwithstanding the fact that much of its landscape is tamarack bog, lies at a height-of-land of continental significance. In Savanna Portage, the waters of the Mississippi and St. Lawrence drainage approach each other more closely than at any other place in Minnesota. Similarly, Grand Portage, the nine-mile carrying place, connects the Gulf of St. Lawrence with the Hudson Bay drainage. In each instance, an overland haul of less than ten miles, however arduous, opened the door to continental travel and trade.

Just how many millennia humans have known this area's geophysical significance will probably never be known for certain. However, recent scholarship is quick to note that Europeans did not "establish" North American continental trade. Contrarily, European economic inroads into this area were enabled by a centuries-old aboriginal network of cultural routes, native relations and protocols. And it is certain that Savanna Portage remained the primary transportation route in the area until the mid-Nineteenth Century, when military roads (St. Paul to Duluth - 1858) and railroads (Northern Pacific - 1870) made overland travel possible.

With the depth of historical importance of Savanna Portage, there is a surprising lack of popular interpretive literature available on the subject. Most references consist of obscure journals, early maps, out-of-print historical accounts, and unpublished scientific journals. The one popular book on the subject of Savanna Portage, Twelve Poses West, (Greer, et. al. 1967) is long out of print. The interpretive section of this plan also addresses the subject of interpretive literature and publications. Copies of most of the manuscripts referred to in this section are on file in the office of Savanna Portage State Park.

Savanna Portage State Park, in northeastern Aitkin County, was established to protect for posterity this ancient passage. It is not surprising, then, that most historical and archaeological research in this vicinity has concentrated on the portage, itself, and its role in Euro-American fur trade. In the course of such research, important evidence has arisen for a long and varied human relationship with a changing local landscape. These tantalizing prehistoric clues, far more obscure, are no less rich and those of the relatively brief European Fur Trade.

Prehistoric Evidence

There are many reasons for the patchwork nature of our knowledge of local prehistory. Of major importance is that the archaeological focus, to date, has been on the portage trails. Another is the characteristic nature of earlier cultures, and the relative simplicity and perishable nature of their artifacts. But nothing has been more detrimental to our learning than the illegal and nonsystematic destruction of archaeological sites. It is likely that, with time, considerable evidence will surface for these earlier human activities here. Nonetheless, in 1969 Nancy and Alan Woolworth, Minnesota Historical Society, produced for Minnesota State Parks a comprehensive history of the use of Savanna Portage, Savanna Portage Southwest (unpublished). In doing so, they surveyed artifactual evidence spanning many millennia.

For instance, in 1969, Charles Watrall recovered projectile points characteristic of the Paleo-Indian, or Big Game Hunting, period near the portage's eastern end. This nomadic life-style, which occurred in the area prior to 5,000 year B.C., shows the very early importance of this water route for migrating large mammals, many now extinct. Watrall also reports the finding of "Old Copper" points on Sandy Lake, characteristic of an Archaic aboriginal industry widespread in the Great Lakes area from 3,000 to 1,000 year B.C. In 1894, Jacob V. Brower found mounds in the Sandy Lake and Sandy River areas, on either side of Davis Bay. Brower's 1894 descriptions indicate an Early Woodland people who had decorative pottery and copper earrings, suggestive of cultural connections as far away as Ohio, as early as 500 years B.C.

The archaeological record confirms a local aboriginal affiliation with Mille Lacs Lake Eastern Dakota for several centuries prior to the arrival of Europeans. The Woolworths refer to this life-style as Mississippian. Farther south, true Mississippian villages are characteristically semi-permanent or permanent riverine agricultural settlements. Elden Johnson, former state archaeologist, notes that, while it is true that many Mississippian cultural traits are found in area sites, it was probably the staple wild rice (*Zizania aquatica*) which let some elements of this southeastern tradition be adopted here. This area of Minnesota is beyond the climatic range for native maize, and which accounts for at least some seasonal settlements.

Historical Records

The first historical reference to Savanna Portage (*Portage de la Savanne*) comes from the Jesuit Relations (1670-1671), describing it as a "*Hauteur des Terres*", or height-of-land. The first Frenchman known to have crossed the portage was Daniel

Greysolon, Sieur du Lhut (Duluth), on July 2, 1679. Here, he encountered Eastern Dakota peoples, who guided his party to their cultural heartland around Mille Lacs Lake. Duluth phonetically recorded *Isanti* as their name for themselves.

It is logical that Savanna Portage would become a major area of conflict, often referred to as a "war road", in the ubiquitous contention for Minnesota's lake country between the Dakota and the eastern Ojibwe, who were pushing westward with the burgeoning fur trade. So rife was this warfare that the French closed the portage between 1680 and 1731. The conflict continued sporadically until around 1775, when the Quebec Act established the Mississippi River as the boundary, in European eyes, between the Dakota and the Ojibwe.

According to the Woolworths, the heyday of historical use of Savanna Portage was between 1780 and 1870. The primary users, in succession, were North West Fur Company, American Fur Company, missionaries, Indian Agents and tourists. The Ojibwe referred to Savanna Portage as *Mushkigonigumi*, or Marsh Portage. The first Ojibwe inhabitants figured as signatories to several important treaties. In 1867, White settlers tried to get the local Ojibwe to relocate to White Earth. There were several instances of the new settlers simply chasing them off the land, so that only a few individuals continued to live in the local area as late as 1920.

In the mid-1800s, a new chapter in the history of northern Minnesota was begun. The rich forests lured lumbermen and associated businesses into the area. A good portion of the upland forests of the Sandy Lake vicinity, consisted of white pine. In 1856, local logging operations began when Joseph Libby and William and Joseph Wakefield opened the first lumbering companies near Sandy Lake.

Timber was harvested mainly in the winter months when the ground was frozen and more easily accessible. Horse and oxen teams would then transport (or skid) lumber to the banks of the Prairie and West Savanna rivers. During the summer months, this lumber would be floated as log rafts to and across Sandy Lake, and eventually down the Mississippi River to waiting sawmills.

Several early logging camps were maintained in the Savanna Portage area. These camps thrived for over a half century, until the great pine forests had largely been harvested. The last camp in the McGregor Lakes region closed in 1917. Timber harvesting around the turn of the century had a profound effect on the upland landscape that exists in the park today.

In the early 1900s, the lowland areas of the Savanna Portage region were profoundly changed when bonds were sold by the Aitkin County ditching commission to finance 400 miles of ditches. The ditches were constructed in hopes of draining the vast lowland tamarack wetlands to produce, hopefully, productive agricultural land. Operators used large floating steam dredges between 1905 and 1931 to dig forty-foot-wide ditches that stretched for miles. The ditching commission eventually went bankrupt, however, because of the cost of the project, changing agricultural markets, and repercussions of the 1929 stock market crash.

The dredging caused local water tables and nearby lake levels (such as Wolf Lake) to drop. Wetland habitat changes, including fish die-off, were products of these lowered water levels. Only recently have beaver dams across the ditches caused lake levels and wetlands to return closer to natural conditions.

Park History

Although the Savanna Portage fell into a period of disuse, it was not forgotten. Residents of the area were aware of its historical value and it was the subject of weekend outings and casual discussion up to and after its "rediscovery".

The first published account of the portage's use in modern times came from Irving Hart, a member of the faculty at State Teachers College at Cedar Falls, IA and William Ingersoll, an Architect. Using Government Land Survey notes and information from local citizens they retraced the route of the portage and published various accounts. The work of Hart and his associates renewed interest in the area through the 1920s and 1930s. As a result, the area was protected by the establishment of Savanna State Forest, to be administered by the Minnesota Department of Conservation. In the 1940s the Division of Forestry worked with the Minnesota Historical Society and the Boy Scouts of America to brush out the portage, mark and define its location.

There was a trend in the 1950s to set aside recreational lands in Minnesota for future generations. This effort appealed to local citizens, who held the cultural and natural resources of the area in high esteem. A number of public meetings were held in the area and the Savanna State Park Association was formed in 1957. The drive was to establish a state park around the portage route, to protect its history and provide recreational opportunities. As Mrs. Hazel Sorenson, an officer of the Association stated, "We want to preserve this wilderness region, not only because of its historical value but also because it offers an ideal site for recreation in a natural setting."

On April 10, 1961 the bill passed the State Legislature and Savanna Portage State Park was established. The funds available for development totaled \$3300 in the original bill. The area defined in the bill included 11,480 acres in state or county ownership and 3,480 acres in private ownership. The park was dedicated September 23, 1967. It became the third largest park in the state park system.

Savanna Portage Historic District

Savanna Portage was placed on the National Register of Historic Places on April 23, 1973. Savanna Portage State Park is built around the historic six mile Savanna Portage. The historic district includes all of the portage and that part of the Prairie River which lies between the western terminus of the portage and Big Sandy Lake. This important portage linked the Mississippi River and Lake Superior and formed an indispensable part of one of the three chief water highways into Minnesota (the St. Louis River, the Mississippi River and the Red River). Remains of this trail are still visible and are being protected and preserved by the state system.

In 1926, Irving Hart and William Ingersol used historical data supplemented by interviews with residents to determine the location of the portage trail. Hart had noticed that on the original township surveys, the eastern part of the trail was recorded. He also reported that "either by lack of interest or because its route was already more or less obliterated, the western part of the portage was left unmarked".

Although they had difficulty discovering the trail during their first day of investigation, they did eventually find old blazes on trees and in the swamp they found tamarack poles running lengthwise on the trail. After the swamp, they encountered drainage ditches, which were already being abandoned as unsuccessful, and beavers had begun reclaiming the area. Hart and Ingersol were able to discover the eastern end of the trail by the East Savanna River. They were able to locate a presumed fur company camp on a knoll above the bend of the West Savanna. They also found the western part of the trail, part of which ran on an existing road for a mile or so. They reported that the first four miles from the western end of the trail are comparatively high and dry. Their recommendation, after locating the trail, was that some means should be found to permanently mark this historic trail.

In 1941, staff from the Division of Forestry located a possible second portage trail. A cooperative effort was begun between the Division of Forestry, the Minnesota Historical Society and Region 10 Boy Scouts of America. A total of 65 Eagle Scouts worked that summer and the next, brushing and clearing approximately four miles of the portage trail from the West Savanna River to the channel at the eastern end.

University professor Guy Gibbon and Eugene Willms have made the most thorough and systematic attempts to locate the exact route of the Savanna Portage to date. During the 1980s, they searched both sides of the current trail and found many artifacts from the early portage days. Through their investigations, Gibbon and Willms reached two major conclusions. First, the portage trail as it exists in the state park today is not the exact route. Second, the portage route probably changed from time to time because of changes in water levels caused by the weather. Beaver dams that altered water levels and fires that burned peat in the swamp also forced rerouting.

The Savanna Portage Trail is designated a Historic District because it encompasses more than 10 acres. The designation allows for a 300 foot corridor centered on the portage trail. It is possible that the original trail does not stay within this corridor.

Cultural Resource Management

By far, the most important cultural resource management responsibility of Savanna Portage State Park is to protect the archaeological record. Since funding for archaeological research is usually linked to the imminent destruction of sites, it is rare and difficult to secure the means to conduct such investigation strictly for education and interpretation. And though this pattern is a long-standing axiom of archaeological science, it shall remain the park's objective to actively seek funding to reach these important ends, in the interest of all Minnesotans and park visitors.

Aboriginal and Fur Trade era artifacts are common in local collections, and important

contexts have been lost forever in their removal from original sites. Historical records have been combed extensively, if not exhaustively, for references to local travel and commerce. Systematic archaeological studies have sought to establish evidence for the enigmatic portage route(s).

Savanna Portage Historic District, to the degree it may yet be better established, will provide more precise limits for the National Register unit and critical park zoning for cultural resource management.

In monitoring potential negative impacts to the historic property, SHPO may take into consideration historic landscape issues which affect park management options. Key review agents for monitoring National Register sites are identified in state law (Minnesota Historical Society, Office of State Archaeologist, Minnesota Indian Affairs Council)

Research Conducted and Recommended

Locating the precise route or routes of Savanna Portage has long intrigued adventurer and scientist, alike. Even with previous efforts, the main route of the portage remains unclear. Most accounts refer to portage's length to have been six miles, with thirteen pauses (from the French *pose*, or resting place), at approximately one-half-mile intervals.

Many factors have complicated such searches. Crossing this morass under burden does not exactly inspire the loftiest of prose, then or now, and the often emotionally charged historical descriptions do not facilitate consensual interpretation. Misreading of early references have at times confused "Savanna" Portage with "Prairie" Portage, three miles to the south on the St. Louis River. It is quite likely that sections of the route changed, at times, to accommodate seasonally-dynamic water levels.

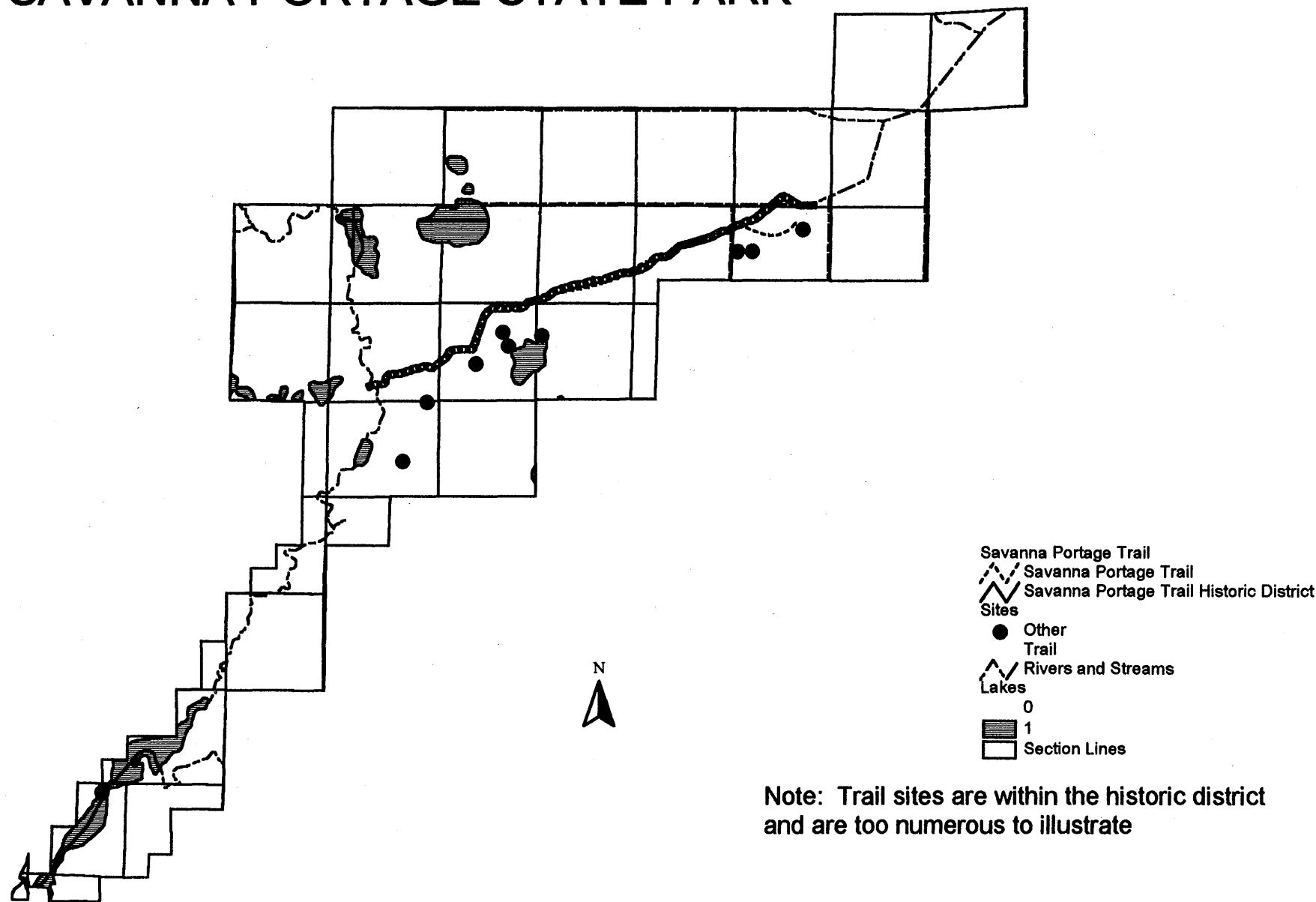
To date, the most accurate portage designation is based on the Gibbon-Willms work. This study established a system of spacial reference, using some 53 metal posts precisely located by transit. This datum system reference the Gibbon-Willms work and will prove invaluable to future research. Once this work is compiled on accurate base maps, this corridor should be submitted to SHPO for possible amendment of the National Register description. The Gibbon-Willms studies have also provided some logical priorities for additional cultural research and archaeology, as well as considerable interpretive information. Cultural history themes and subthemes are recommended, based on field and literature findings. This study, in particular, has provided salient ideas for interpretive priorities. These are treated in more detail in the interpretive section of this plan.

As mentioned above, securing funding for the much-needed additional research is a persistent problem. This underscores the vital need to protect cultural resources *in situ*, or in their original locations. Additional archaeological field work along the trail, particularly to further test and define the portage *poses* is a cultural resource management priority. Testing of logging era, settler sites, and pre-European contact sites is a

slightly lower priority.

When possible, oral histories could be pursued which may shed more light on the recent land use history in the park, for resource management and interpretive purposes. A professional seasonal interpreter, a priority of the Divisional Interpretive Plan, could coordinate such initiatives and efforts in a much more timely and focal manner (see also Interpretive section).

KNOWN ARCHAEOLOGICAL SITES SAVANNA PORTAGE STATE PARK



Note: Trail sites are within the historic district and are too numerous to illustrate

Climate and Seasons

Savanna Portage State Park is subject to the same continental weather patterns that influence all of Minnesota. The climate is influenced by cold arctic air during winter months and is frequently dominated by hot air masses from the Gulf of Mexico during summer months. The mean temperature in June, July, and August is 62°F. Daily highs are in the low 80s while daily lows are in the mid 50s. The mean temperature in December, January, and February is 11.6° F. Winter averages 50 days with a temperature of 0°F or lower. Average annual snowfall is 61.3 inches. There has been a recorded high of 107" and low of 25" of snowfall. There are an average of 130 days with 1" or more of snowcover, and 99 days with 6" or more of snowcover. Climatically, this area has a short growing season, because the low-lying area forms a frost pocket with late spring frosts and early fall frosts.

Geology

Glacial History

Minnesota's "recent" geologic history has been marked by periodic advances of glacial ice from the north. Most of the surficial features that we observe in the park today resulted from the last stage of glaciation, which is believed to have lasted from 35,000 to 10,000 years ago. This period is called the Late Wisconsin Stage of the Pleistocene (Ice Age) Epoch. During this stage, individual ice lobes advanced over the mid-continent from the northeast and northwest.

As the ice lobes advanced, they picked up rock and debris along their paths and deposited these materials as they melted. Their flow paths crossed different soil and rock types, allowing the glaciers to pick up distinctive sediment loads. The glacial drift deposited by each lobe is distinct in color, texture and stone content. The sediments and landforms left behind by the glaciers offer clues for understanding the past glacial history.

Unraveling the glacial history of Savanna Portage State Park involves deciphering the past activities of three glacial lobes. This is complex, because the glacial drift from one glacier was buried by the drift of the next advancing glacier. Evidence within the park suggests that the last sequence of glaciation went as follows: Superior lobe advanced through the area, followed by the Rainy lobe, and then the St. Louis sublobe. These three glacial lobes deposited the majority of the near-surface and surface sediments within the park. The overlapping advances of the glacial lobes resulted in a partial mixing of the glacial drifts. When an advancing glacier moves over deposits of a previous glacier it often incorporates a portion of the older drift into its sediment load, thus diluting its drift with materials from previous advances. Most of the gravel pits in the area contain a mixture of "indicator" rock types used to distinguish the Rainy and Superior lobes. The sediments of older glaciations have not been preserved at the surface, as they have either been eroded or buried by the more recent glacial advances.

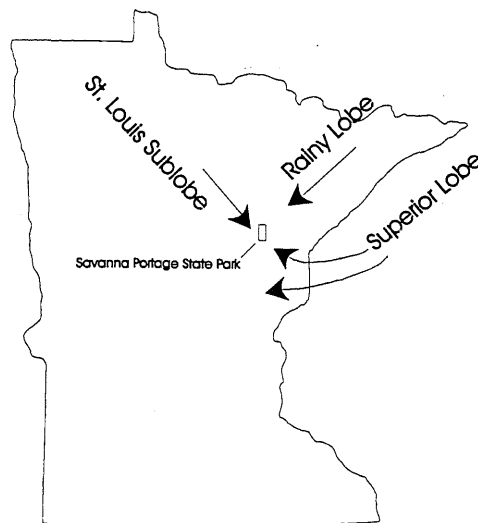


Figure 1. Glacial lobes.

The glacial lobes entered Minnesota by following different flow paths. The Superior lobe advanced from the northeast through the Lake Superior Basin. The Rainy lobe advanced from the northeast, following a southwest course parallel to the Lake Superior coastline. The St. Louis sublobe, which is an eastern offshoot of the Des Moines lobe, advanced from the northwest. (See figure 1).

Glaciers and the Landscape

The majority of hills and ridges in the park appear to be related to the moraine of the Rainy lobe and possibly a moraine of the Superior lobe. These deposits have been overlain by a thin, patchy blanket of glacial sediments from the later advances of the St. Louis sublobe. Even though these younger sediments overlie the Superior and Rainy lobe deposits, the hilly landscape predominantly reflects the preexisting moraine.

The development of the hilly Rainy lobe moraine indicates that the ice margin stabilized in this area long enough to deposit the sediments necessary to build such prominent topography. The glacial landforms in the area suggest that when the glacier began to melt back from this position, the ice did not simply retreat but stagnated and melted in place. This created the opportunity for well-defined ice stagnation features to develop in the park and surrounding area. As the ice melted, large volumes of melt water cut tunnels and channels through the stagnated ice, resulting in the formation of sand and gravel-filled ridges called eskers (see Fig. 2). Conical-shaped hills of sand and gravel (kames) formed where meltwaters plunged into holes in the ice (see Fig. 3). Ice-walled lake deposits formed where depressions or crevasses in the ice filled with meltwater to form lakes and then filled with materials slumping and washing in from the ice surface. The shape of these deposits can vary greatly, from conical-shaped hills to irregular-shaped, flat-topped hills. Areas within the hilly moraine also consist of nonsorted sediment (till) which slumped into depressions as the ice melted. These till-filled depressions became hills when the ice melted away, lowering the sediments to the surface below. Lakes formed in depressions where buried ice melted

and the meltwaters could not escape.

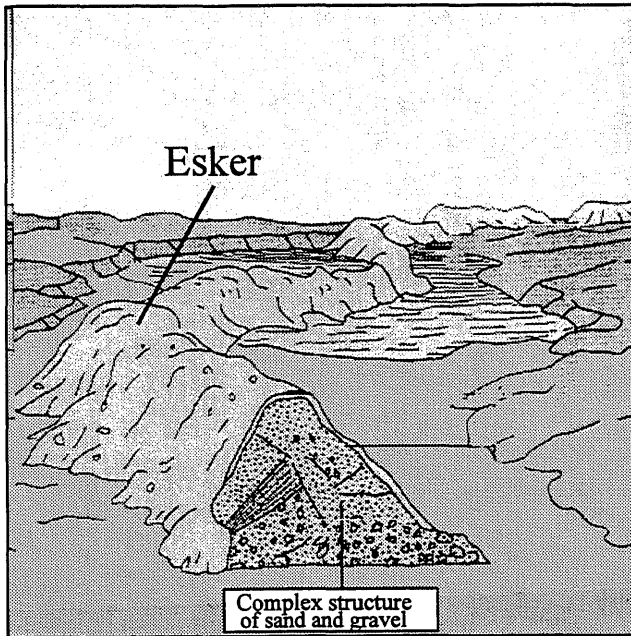


Figure 2. Schematic view of an esker deposit.

The St. Louis sublobe was the last glacial advance to cover this area. It did not leave distinct ice marginal (moraine) features in the park area as the previous advances of the Rainy lobe had. This indicates that the ice margin did not stabilize long enough in this area to deposit large amounts of sediment. Also, the thin, patchy distribution of St. Louis sublobe sediment suggests that the ice was not carrying large amounts of debris.

Glacial Lakes Aitkin and Upham

As the St. Louis sublobe ice melted away from this area, two large glacial lakes formed. Glacial Lake Aitkin to the west of the park and Glacial Lake Upham to the northeast have long since drained. Meltwaters entering these lakes carried sands, silts and clays that settled to the lake bottoms. Over time, enough sediment accumulated to blanket the preexisting topography, resulting in a flat to gently-sloping surface when the lakes drained. The large, low-lying area in the northern portion of the park is located within lake plain of Glacial Lake Upham. These lake plains now contain large peat deposits.

Crosscutting Eskers

The two large eskers which intersect each other at 90 degrees (see Fig. 4). raise many interesting questions about the glacial history of the area. It appears that the NE-SW-trending esker (A) is cutting through the NW-SE-trending esker (B), if this relationship is correct, esker A would be younger than esker B. This crosscutting "age" relationship and the stone content of esker B, which contains a high percentage of stones derived from bedrock surrounding Lake Superior, suggests that it is associated with the Superior lobe. This interpretation differs from the previous mapping which identified this esker with the St. Louis sublobe. A study to determine the water flow direction when the esker formed would help resolve this difference in interpretation.

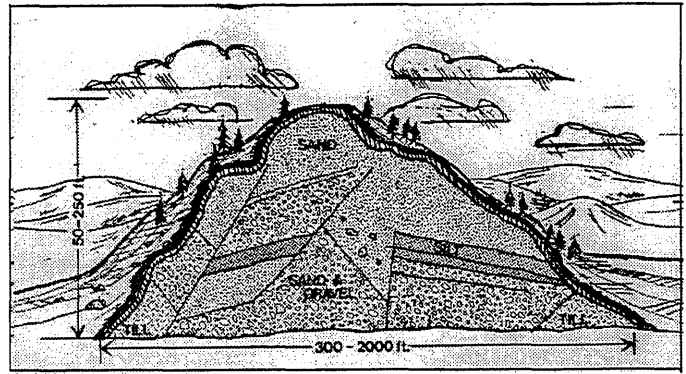
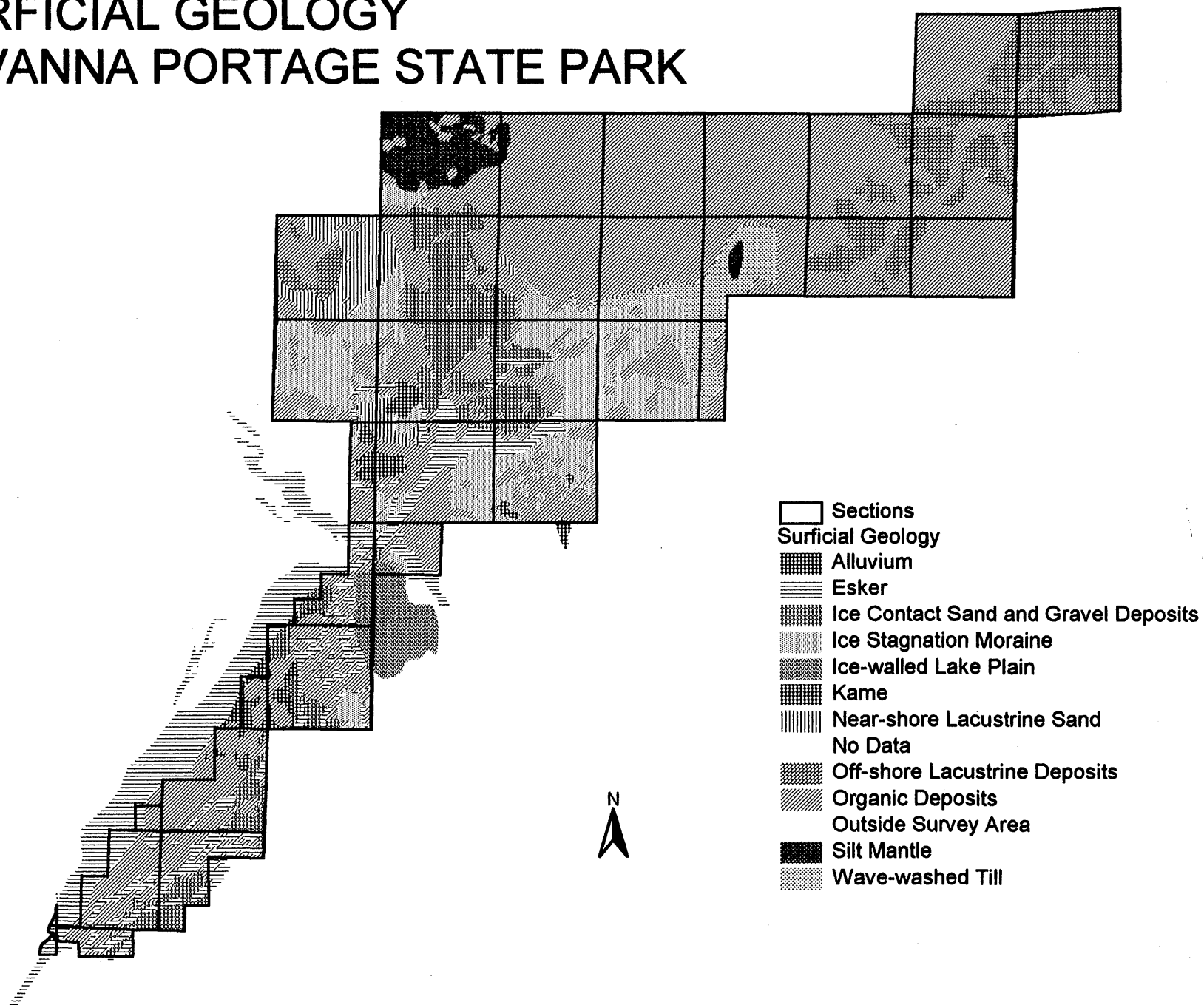


Figure 3. Schematic view of a kame deposit showing the complex distribution of sediments. Figures 2 and 3 are from *Industrial Minerals in Minnesota: A status report on sand, gravel, and crushed rock*; Eng and Costello, 1979.

SURFICIAL GEOLOGY SAVANNA PORTAGE STATE PARK



The NE-SW trending esker A appears to have formed when the Rainy lobe stagnated and melted, or it possibly may have formed when an early stage of Glacial Lake Upham drained.

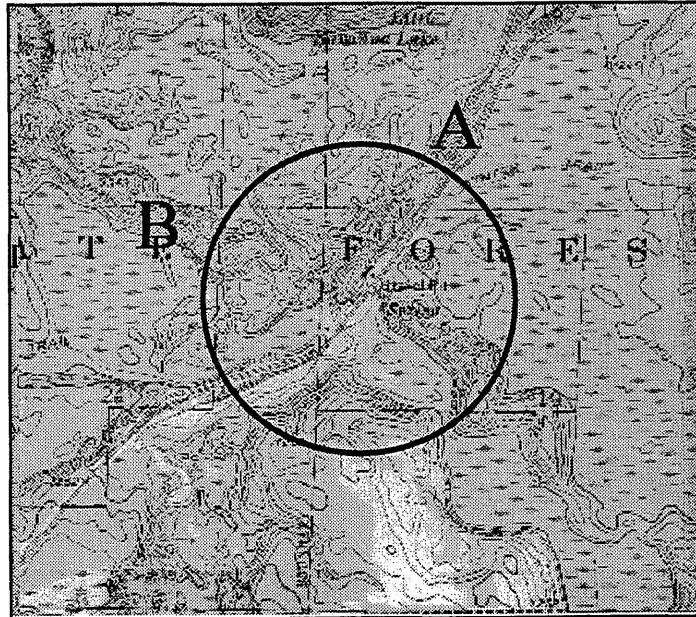


Figure 4. Crosscutting eskers located in T50N R23W Sec. 24 and T50N R22W Sec. 19.

Many details of the reconstruction of the glacial events that led to the surface features in the Savanna Portage State Park area are imperfectly known. Different interpretations are possible within the framework of existing data. Further study is needed to fully understand the complex glacial history of this area.

Peat Development

Peat is an organic soil consisting of dead and partly decomposed plant material. It accumulates where conditions inhibit the decomposition of plant material. The past glacial activity in the park has created large areas that are well suited for peat accumulation. Peat formation generally occurs by two processes--lakefill and paludification "swamping". Both of these processes have been active in the development of peatlands in the park.

Paludification (swamping) is a process of peatland expansion caused by the gradual extension of wet, peat-favoring conditions (see Fig. 6). The process begins with the growth of herbaceous plants in areas of low-relief and poor drainage; the plant materials accumulate as peat. The build up of peat in these low-lying areas hinder drainage and cause the water table to rise, thus encouraging the growth of more plants. As more peat accumulates, the process continues, gradually allowing the peatland to expand up slope and to eventually cover large areas. The extensive peatland in the northern part of the park can primarily be attributed to paludification. This peatland covers much of the lake plain formerly occupied by Glacial Lake Upham. The lake plain's low relief and impermeable, clay-rich soils inhibit drainage, thus providing a good base for peat accumulation. Peat depths taken within the park portion of the

lake plain range in depth from one foot to ten feet (see the Surficial Geology map for site locations with depth information - *not available for this draft*).

Lakefill is defined as the filling in of lakes or ponds by vegetation (See Figure 5). It occurs when plant communities begin growing around the edges of water-filled basins and progressively grow inward. The invading vegetation often occurs in the form of a floating mat. As plant communities expand to the center of the basin, dead plant material eventually collects as peat. As the lakefill process proceeds, peat continues to be deposited, filling the basin inward, ultimately converting it into a peatland.

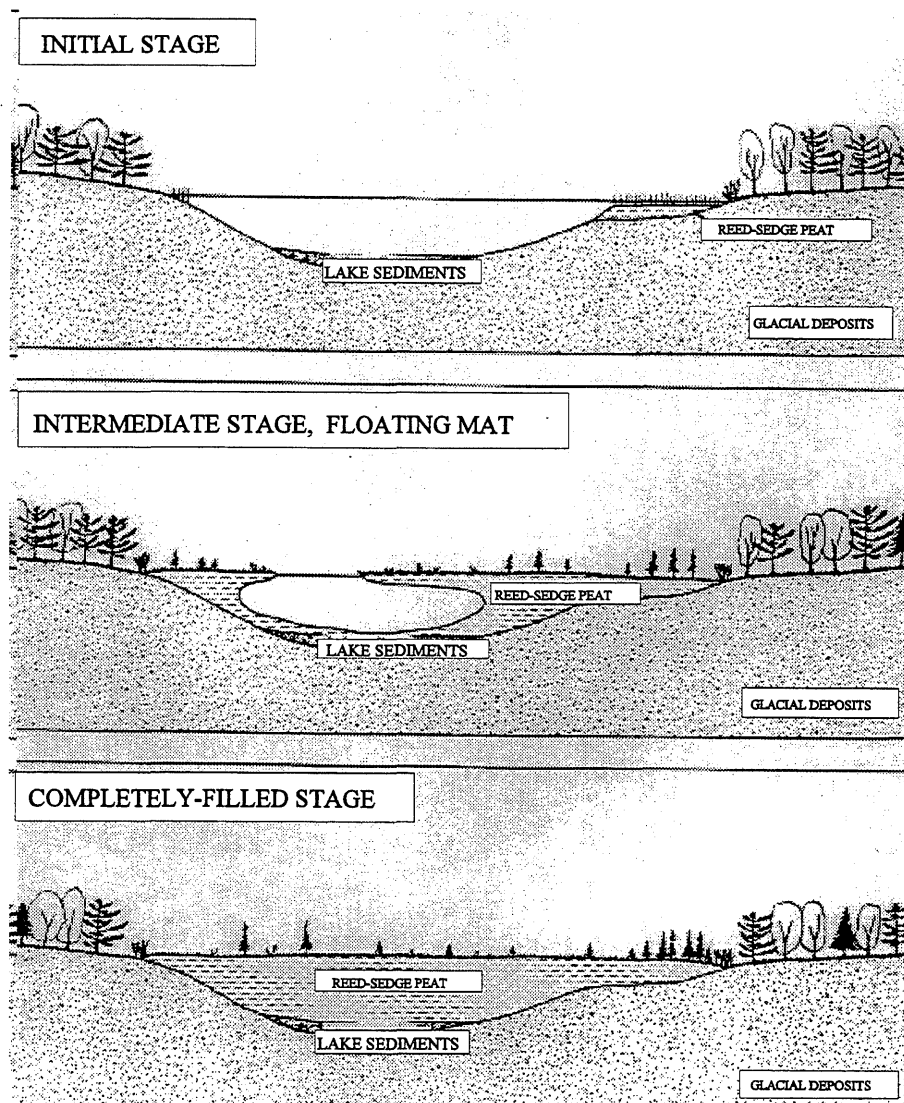
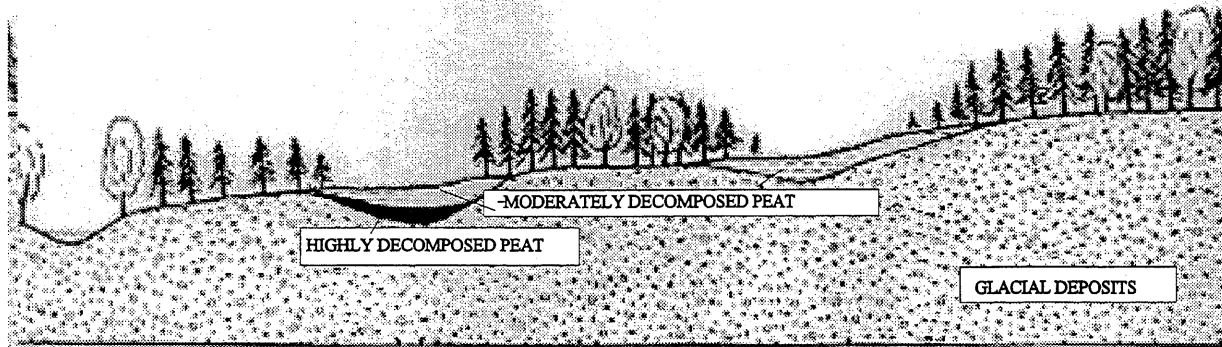
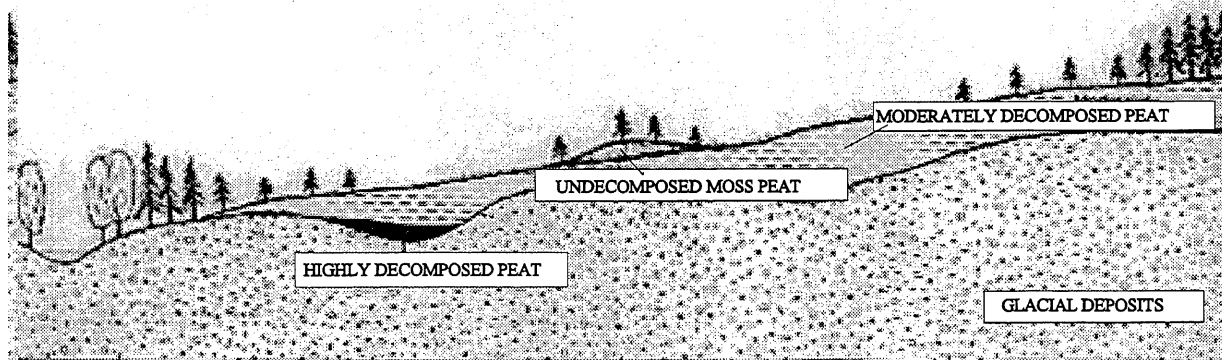


Figure 5. Lakefill process of peatland formation. Figure modified from Inventory of Peat Resources: Aitkin County, Minnesota; DNR Division of Minerals, 1982.

INITIAL PALUDIFICATION



EXPANSION STAGE



RAISED BOG FORMATION

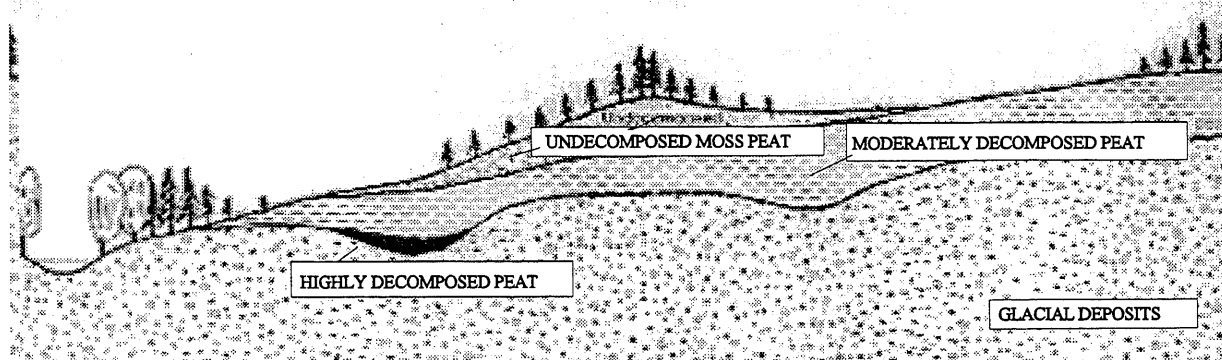


Figure 6. Paludification process of peatland formation. Figure modified from Inventory of Peat Resources: Aitkin County, Minnesota; DNR Division of Minerals, 1982.

Soils

Two major glacial events are responsible for creation of the soil associations in this area. The northeast area of the park is primarily a large peat bog. This is a remnant of Glacial Lake Upham, which formed as the Superior lobe melted and retreated to the northeast. Other areas within the park are hilly, loamy and sandy areas formed as a sublobe of the St. Louis sublobe downwasted and retreated leaving a ground moraine and end moraine.

There are northern hardwood forests in some areas of the park on top of kames and eskers. These kames and eskers are composed mostly of infertile sand. The sand would not support such a forest. But these sandy kames and eskers were covered over by just a few feet of till deposited by the St. Louis sublobe glacier, the last glacial advance. This till material developed more fertile soil that retains moisture better, and that supports the forest. Thus, the park's ecosystem could have been very different without this relatively minor, last glacial event. Along some road cuts, a visitor can see this profile of infertile sand overlain by a couple feet of till and forest. Additional soils data is currently being collected (1996) in conjunction with the Minnesota County Biological Survey vegetation work as part of developing an ECS map and a current vegetation map of the park.

The soil associations found within the park are:

Alstad-Talmoon Cushing Association - nearly level to rolling, soils formed in loamy glacial till, under mixed hardwoods, on moraines.

Cushing-Mahtomedi Association - nearly level to steep, well to excessively drained soils formed in loamy glacial till and sandy outwash sediments on moraines, eskers and kames, under mixed hardwoods.

Greenwood-Lupton-Cathro Association - level, very poorly drained soils formed in organic deposits on lake plains. The organic soil materials are derived from the original reed and sedge vegetation. This original vegetation has since evolved to an overstory dominated by black spruce and an understory dominated by Labrador tea, leatherleaf, cottongrass, bog rosemary, and sphagnum on the Greenwood soils. The vegetation on the Lupton and Cathro soils is now made up of a mix of overstory species, including black spruce, tamarack, white cedar, and black ash, with an understory made up of willow, alder, bog birch, dogwood, and to a lesser degree sphagnum, Labrador tea, leatherleaf, cottongrass, cranberry and bog rosemary. This vegetative variety reflects the different trophic status that exists between the Greenwood soils and the Lupton and Cathro soils.

The next page summarizes the soil limitations in Savanna Portage State Park. It should be noted that almost half of the soil types shown in the chart have severe limitations for all types of recreational use. These are primarily the peat and muck soils.

Savanna Portage State Park Soil Limitations Table

Map Unit	Description	Slope	Permeability*	Water Table	Septic Tank	Absorption Fields	Sewage Lagoon Areas	Buildings**	Local Roads & Streets	Intensive Camp Areas	Picnic Areas	Playgrounds	Paths & Trails	Lawns & Landscaping	Overall Suitability
147	Spooner silt loam	0-2%	0.6-6"	1-3 feet	S	S	S	S	S	S	M	S	M	M	S
202	Meehan loamy sand	0-2%	6-20"	1-3 feet	S	S	S	M	S	M	S	M	M	M	S
204B	Cushing loam	2-6%	0.6-2"	2.5-4.5 feet	S	S	M	M	L	L	M	L	M	M	M
204C	Cushing loam	6-12%	0.6-2"	2.5-4.5 feet	S	S	M	M	M	M	S	L	M	M	M
240B	Warba very fine sandy loam	1-6%	0.6-6"	>6.0 feet	S	M	M	S	L	L	L	L	L	L	L
243	Stuntz very fine sandy loam	0-3%	0.6-6"	1.5-3.0 feet	S	S	S	S	M	M	M	M	M	M	M
268E	Cromwell fine sandy loam	12-25%	0.6-2/6.0-20"	>6.0 feet	S	S	S	S	S	S	S	S	M	S	S
268F	Cromwell fine sandy loam	25-40%	0.6-2/6.0-20"	>6.0 feet	S	S	S	S	S	S	S	S	S	S	S
292	Alstad loam	0-3%	0.2-2"	1-3 feet	S	S	S	S	S	M	S	M	M	S	S
346	Talmoon fine sandy loam	0-2%	0.2-6"	1-3 feet	S	S	S	S	S	S	S	S	S	S	S
454B	Mahtomedi loamy course sand	2-6%	6.0-20"	>6.0"	S	S	L	L	M	M	M	M	M	M	M
454E	Mahtomedi loamy course sand	12-25%	6.0-20"	>6.0"	S	S	S	S	S	S	S	M	S	S	S
502	Dusler silt loam	0-2%	.06-2"	1.5-3.0 feet	S	M	S	S	M	M	M	M	M	M	M
504B	Duluth fine sandy loam	1-6%	.06-2"	3.5-6.0 feet	S	M	M	S	L	L	M	L	L	L	L
504C	Duluth fine sandy loam	6-12%	.06-2"	3.5-6.0 feet	S	M	M	S	L	L	M	L	M	L	L
504E	Duluth fine sandy loam	if < 100 12-25%	.06-2"	3.5-6.0 feet	S	S	S	S	S	S	S	S	S	S	S
533	Loxley peat	0-2%	0.2-6/>6.0"	(+) 1-1.0 feet	S	S	S	S	S	S	S	S	S	S	S
540	Seelyeville muck	0-2%	0.2-6.0"	(+) 2-2.0 feet	S	S	S	S	S	S	S	S	S	S	S
541	Rifle peat	0-2%	0.2-6.0/>6.0"	(+) 1-1.0 feet	S	S	S	S	S	S	S	S	S	S	S
544	Cathro muck	0-2%	0.2-6.0"	(+) 1-1.0 feet	S	S	S	S	S	S	S	S	S	S	S
546	Lupton muck	0-2%	0.2-6.0"	0-1.0 feet	S	S	S	S	S	S	S	S	S	S	S
549	Greenwood peat	0-2%	>6.0/0.6-6.0	0-1.0 feet	S	S	S	S	S	S	S	S	S	S	S
620B	Cataway loamy sand	1-6%	.06-0.6/6.0-20"	>6.0 feet	S	S	L	L	M	M	M	M	M	M	M
625	Sandwick loamy sand	0-2%	0.2-20"	1.0-2.0 feet	S	S	S	S	S	M	S	M	M	S	S
628	Talmoon muck depression	0-2%	0.2-6.0"	(+) 1-1.0 feet	S	S	S	S	S	S	S	S	S	S	M
870B	Itasca Goodland complex	2-6%	0.6-6.0"	>6.0 feet	M	M	L	M	L	L	M	S	L	M	
870C	Itasca Goodland complex	6-12%													
870E	Itasca Goodland complex	if < 15	0.6-6.0"	>6.0 feet	M	S	M	M	M	M	S	S	M	M	
928C	Cushing-Mahtomedi complex	12-25%	0.6-6.0"	>6.0 feet	S	S	S	S	S	S	S	S	S	S	S
928D	Cushing-Mahtomedi complex	2-10%	0.2-2.0"	2.5-4.5 feet	S	M	L	M	L	L	S	L	M	M	
928E	Cushing-Mahtomedi complex	10-25%	0.2-2.0"	2.5-4.5 feet	S	S	S	S	S	S	S	S	M	S	
928F	Cushing-Mahtomedi complex	25-40%	0.2-2.0"	2.5-4.5 feet	S	S	S	S	S	S	S	S	S	S	
980	Blackhoof & Mahtomedi Soils	0-2%	0.2-2.0"	0-1.0 feet	S	S	S	S	S	S	S	S	S	S	
995	Borosapristis depressional	0-1%	0.2-6.0"	0-3 feet	S	S	S	S	S	S	S	S	S	S	
1002	Cathro & Fluvaquents	0-2%	0.2-6.0"	0-3 feet	S	S	S	S	S	S	S	S	S	S	
1031	Histosols ponded			a pond	S	S	S	S	S	S	S	S	S	S	
1154/665	Sax muck	0-1%	0.2-6.0"	(+) 1-1.0 feet	S	S	S	S	S	S	S	S	S	S	
1878	Hamre muck	0-1%	0.2-2.0"	(+) 1-1.0 feet	S	S	S	S	S	S	S	S	S	S	

Chart Legend-Soils Suitability/Characteristics

L - (Low) Limitations for a stated use are minor and can be overcome easily.

M - (Moderate) Limitations for a stated use can be overcome by special planning, design, or intensive maintenance.

S - (Severe) Limitations for a stated use generally require a major soil reclamation, special design, or intensive maintenance.

*Permeability measure in inches per hour.

**Based on buildings with a basement or foundation.

Information from the Soil Limitation chart was derived from a report by the U.S.D.A. Soil Conservation Service and SCS Soil Interpretation Records in St. Paul as interpreted by the Aitkin County Natural Resources Conservation Service, 1995.

Vegetation

Savanna Portage State Park is located in two landscape region subsections as defined by the DNR Ecological Classification System Committee: Mille Lacs Uplands and Tamarack Lowlands. It is the only state park representing the Tamarack Lowlands Subsection. (See the Regional Landscape section for more details)

Native Vegetation

Newton Winchell, State Geologist who traveled the portage in 1878, described the vegetation as follows, "...in order of named frequency: aspen, white pine, white birch, balsam, tamarack, white spruce, Norway pine, soft maple, white cedar, iron wood, elm, ash (black and white), blue beech, black and bur oak, small red cherry (sometimes six or eight inches in diameter), bass, gray birch (small trees)".

The General Land Office (GLO) took place from 1873 to 1874 in the Savanna Portage State Park area (see General Land Office Survey map page 43). The eastern portion of the park was described as being dominated by conifer swamp, mostly tamarack, while the upland areas in the western half of the park were described as being predominately covered by hardwoods (white oak and aspen), and pine communities.

The survey also showed two large areas of disturbance, windfall and burned areas in the central upland region of the park. Surveyor S. E. Stebbins stated that "nearly all of the upland and a large part of the swamps had been burnt over and now covered with small aspen brush and tamarack". Human and naturally occurring fires were known to have occurred on a frequent basis. Fire was an active influence on the vegetative communities, with active succession towards climax pine and hardwoods. Meadow and marsh grass components were recorded, mostly along what appears to be the East and West Savanna River flowages.

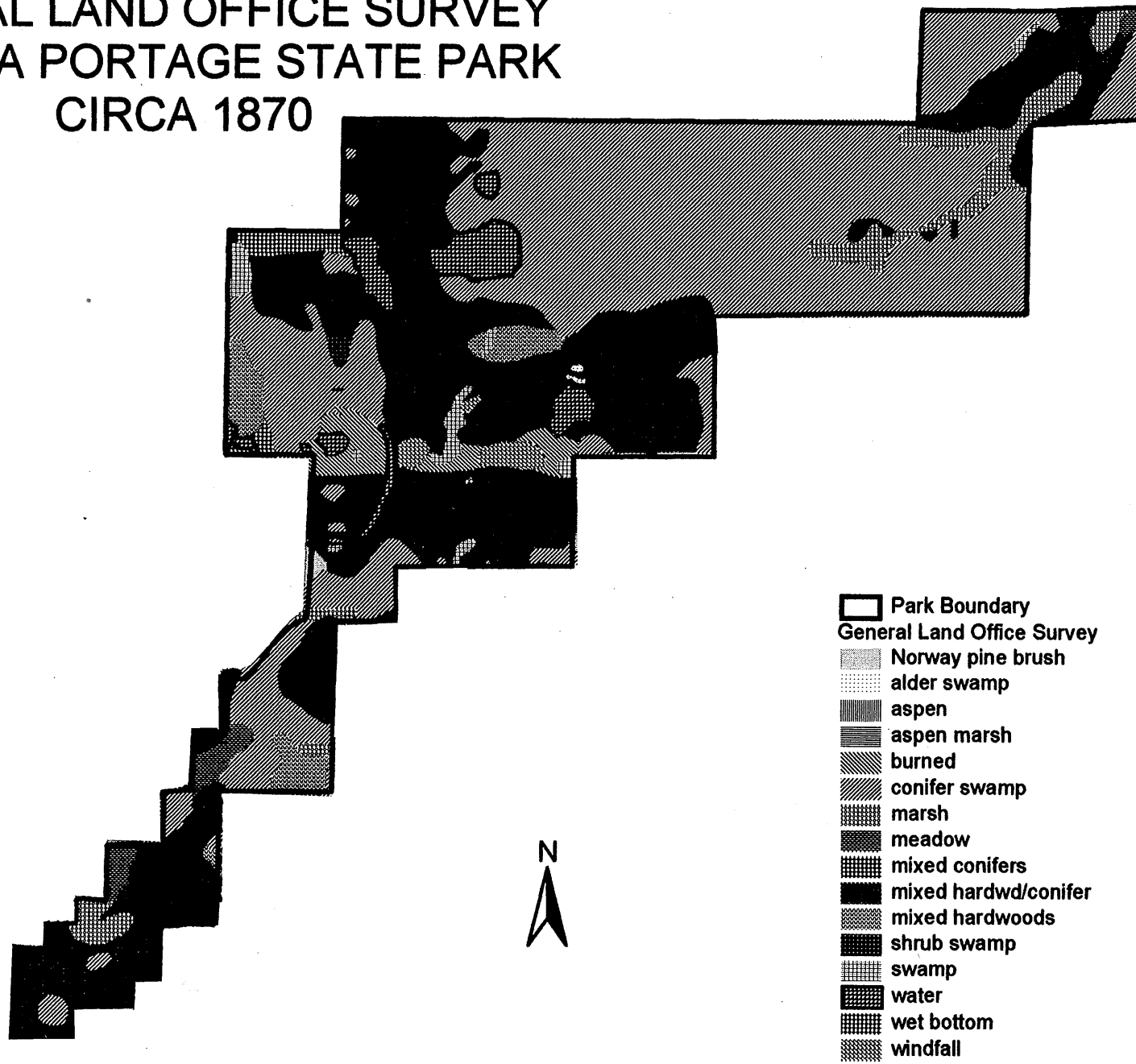
Cultural references include maple stands used for sugaring and rice beds for rice harvesting. The eastern half of the portage appears to have been quite well defined, as it appears on maps and in notes.

Existing Vegetation

Savanna Portage State Park is located in the transition zone between the coniferous forests of northern Minnesota and the hardwood forests of the southern part of the state. Habitat varies from open water to heavily forested uplands. Scattered grasslands, small lakes, tamarack lowlands and conifer forests result in a variety of bird and wildlife species. Existing native vegetation data is being collected by the Minnesota County Biological Survey using the natural community classification (*Minnesota's native vegetation: a key to natural communities version 1.5*).

The existing vegetation has been influenced by many human activities, including

GENERAL LAND OFFICE SURVEY SAVANNA PORTAGE STATE PARK CIRCA 1870



logging, fire suppression and agriculture. It is dominated by the following elements: lowland conifers (spruce and tamarack), northern hardwoods, aspen-birch, Balm of Gilead, balsam fir, lowland hardwoods (ash) and scattered pine stands.

Fire

Fire has been one of the most important influences in the molding of the present park vegetation patterns. The pre-European period has little documentation. However, as was stated, the known historical accounts and notes from the General Land Office (GLO) survey are filled with references to fire effects. The interval between fires was fairly short in this area, crown or severe surface fires had cycles of 50-100 years. American Indians inhabited and used the area for thousands of years. They used fire extensively as a part of their cultural regime (Heinselman 1973, Frissell 1973). European settlers, by historical account, also used fire in the area. Fire was an agricultural tool, and spring meadow burning was a tradition.

Following the logging period, the region entered a time when fire suppression was the predominant management practice. This was a response to the catastrophic fires of the early 1900s. Fire suppression was very successful in Savanna Portage, with fire only occurring in times of extreme drought.

Inventories

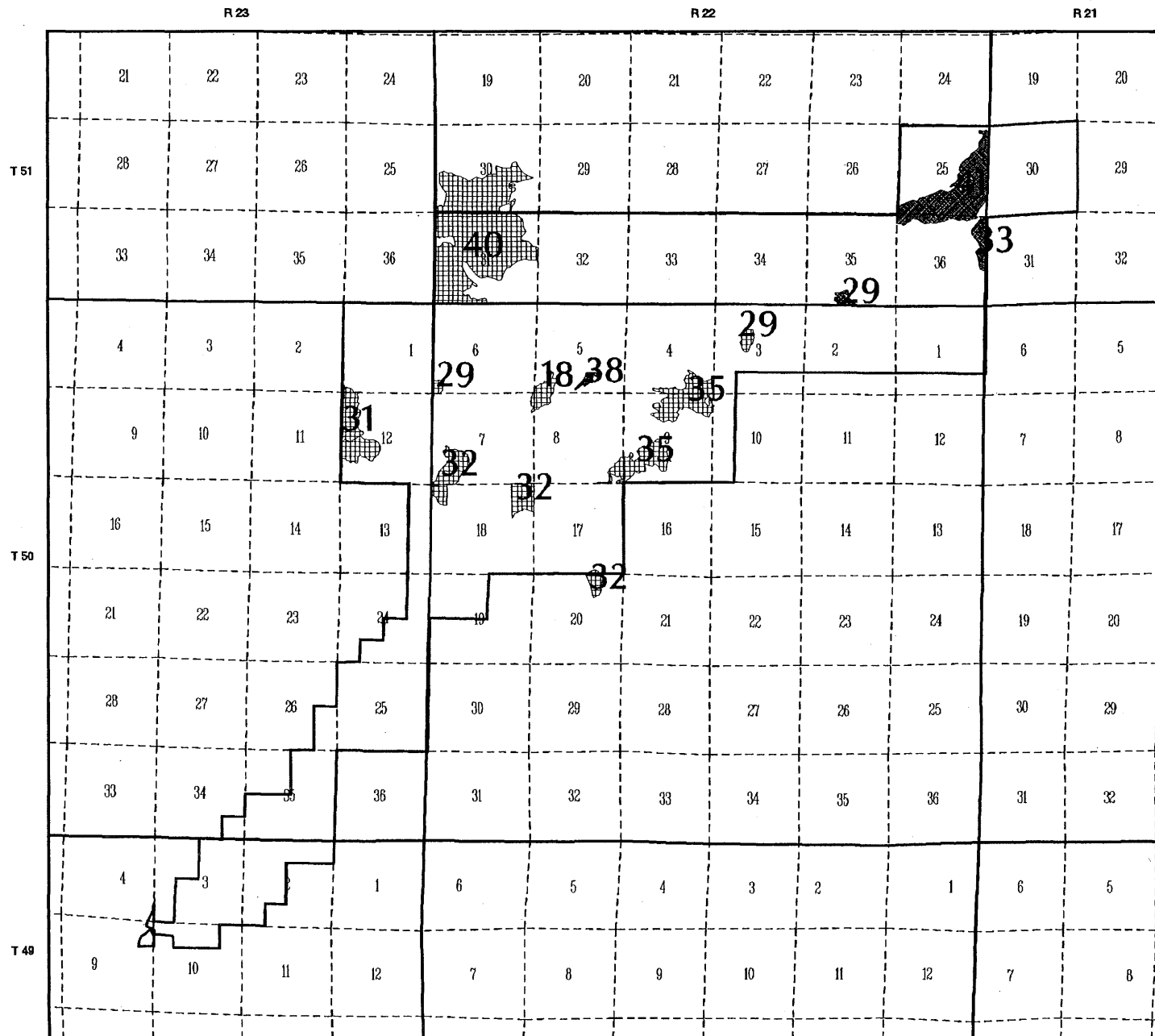
Cooperative Stand Assessment (CSA) of plants was completed in 1982 by the Division of Forestry . This survey was conducted to assess the amount and extent of tree species on DNR administered lands, and mostly depicts forest crown cover from aerial photos and field checks. While useful, this inventory does not always meet the needs to make ecologically-based management decisions. Today, CSA shows the park being dominated by aspen, tamarack, ash, and northern hardwoods.

Old Growth Forest Candidate stands have recently been identified for Savanna Portage State Park. (See Map of scored Old Growth Stands page 45). Old-growth quality ranking is based on a combination of the following criteria: 1) stand age, 2) stand size and context, 3) degree of human disturbance, and 4) ecological feature. A score of 50 is the highest possible ranking. Old growth stands in Savanna Portage are primarily maple-basswood forests or black ash swamp. There are two ash stands with scores of 29 and 38. Three lowland hardwood stands with scores ranging from 33 to 41. Sixteen northern hardwood stands with scores ranging from 18 to 35. There is also one white pine stand and four oak stands. The management of old growth forests will be in accordance with the landscape plans for the Tamarack Lowlands and the Mille Lacs Uplands as established by the DNR Old Growth Guidelines.

The Minnesota County Biological Survey is now in progress in the park. Results are likely to influence the boundaries of the outstanding features zones, management of vegetation and rare species in the park.

The University of Minnesota Herbarium maintains a vascular plant checklist. From May through September 1995, Dr. Anita Cholewa, from the Herbarium, was con-

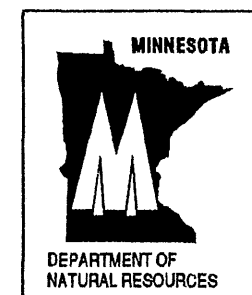
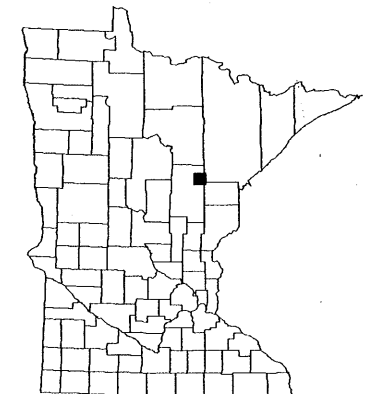
Savanna Portage - State Park



Old Growth Candidates

-  Maple Basswood Forest
-  Black Ash Swamp

Data source: DNR C&A Inventory and the Old Growth Candidate Stand Summary and Scorecard (1994). The number indicates the total score out of a possible 50 points. Higher scores indicate higher quality.



tracted to continue to update this list. Her efforts were focused primarily in the Savanna and Wolf Lakes areas.

Dr. Cholewa found a number of interesting range extension species in the park. These are plants that are common in other areas of the state, but they reach their northern, southern, eastern or western limits in the park. These individual species that are on the edge of their ranges are important because they reflect the changes in climate since the ice age.

Edge of Range Species found in Savanna Portage State Park:

Bishop's cap, *Mitella diphylla*--N edge of range in Minnesota
Honewort, *Cryptotaenia canadensis*--approaching N edge of range in MN
Lopseed, *Phryma leptostachya*--N edge of range in Minnesota
Mountain Maple, *Acer spicatum*--approaching SW edge of range in MN
Heart-leaved twayblade, *Listera cordata*--S edge of range in MN; orchid
Red pondweed, *Potamogeton alpinus*--S edge of range in MN
Rue-anemone, *Anemonella thalictroides*--range extension northward; nearest locality in Chisago and Stearns counties
Rattlesnake Orchid, *Goodyera pubescens*--N edge of range in MN; orchid
Staghorn sumac, *Rhus typhina*--N edge of range in Minnesota

Dr. Cholewa also recorded 11 species that are not common or not often noticed and seven species of orchids, in addition to the two species mentioned above. The vascular plant list, begun by Dr. Cholewa, is being augmented by the Minnesota County Biological Survey floristic work.

Wildlife

Mammals

Forty-eight of Minnesota's 81 species of mammals have been sighted in or near the park. White-tailed deer, black bear and beaver are visitor favorites for wildlife watching in Savanna Portage State Park.

Mammals in the park include:

long-tailed shrew	arctic shrew
pygmy shrew	short-tailed shrew
star-nosed mole	little brown bat
silver-haired bat	red bat
eastern cottontail rabbit	snowshoe hare
eastern chipmunk	woodchuck
Franklin's ground squirrel	thirteen-lined ground squirrel
gray squirrel	fox squirrel
red squirrel	southern flying squirrel
northern flying squirrel	beaver
woodland deer mouse	white-footed mouse
southern red-backed vole	meadow vole
woodland vole	muskrat
meadow jumping mouse	woodland jumping mouse
porcupine	coyote
eastern timber wolf	red fox
gray fox	black bear
raccoon	fisher
marten	short-tailed weasel
long-tailed weasel	mink
badger	striped skunk
river otter	cougar
lynx	bobcat
white-tailed deer	moose

These sightings have been recorded independently by Burton Anderson, McGregor, MN, Warren Nelson, Aitkin, MN and/or local DNR staff.

It is estimated that there are one or two packs of wolves in Savanna Portage State Park and the surrounding forest area. Their population, as in the rest of the state, has been steadily increasing. (See the section on Endangered, Threatened, and Special Concern Species for additional information.)

Nine additional species are likely to be found in the park according to Evan B. Hazard's book, The Mammals of Minnesota. They are, masked shrew, water shrew, big brown bat, eastern pipistrelle, northern myotis, hoary bat, least weasel, southern bog lemming and the white-tailed jackrabbit.

Birds

The current park bird list shows 161 species identified in the park. This includes sightings of 25 species of warblers and 4 species of vireos. The local Audubon Society has reported sightings of American bittern and osprey (formerly special concern species) in the spring, summer and fall in Savanna Portage State Park. The primary source of bird records are from Warren Nelson and the Aitkin County Audubon Society.

Savanna Portage State Park, and other northern parks, lie in a narrow forest belt that supports the highest diversity of songbirds in North America (over 120 species). 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 park, and Aitkin County in general, also provides important habitat for many owl species. In the winter, owls tend to concentrate in the area because of the habitat and small mammal population, especially red-backed voles. Seven owl species have been documented in the park: great horned owl, snowy owl, northern hawk owl, barred owl, great gray owl, long-eared owl and the northern saw-whet owl.

At nearby Rice Lake National Wildlife Refuge, 219 species have been observed and recorded on their bird checklist. Upland sandpiper have been recorded by Lee Pfannmuller on the Floodwood Breeding Bird Survey Route 1980-1994. This species has also been recorded in the Rice Lake National Wildlife Refuge in spring and fall. The Minnesota Ornithological Union reports that sandhill cranes nest in the Rice Lake National Wildlife Refuge. An additional 17 species have been seen at Rice Lake that are not normally found in this area. Nearly two dozen species of hawks and owls frequent the area. Bald eagles are often seen during spring and fall migration and there are several active nests in the county.

Reptiles and Amphibians

Reptiles and amphibians include several frog species, common toads, painted and snapping turtles (a special concern species), garter and green snakes and salamanders. A comprehensive survey has not been completed in the park. A listing of species that are likely to occur in the park is found in the appendix.

Butterflies and Moths

Surveys have not been completed in Savanna Portage State Park for butterflies or moths. Bog copper butterfly (*Epidemia epixanthe michiganensis*), dorcas copper butterfly (*Epidemia dorcas dorcas*), and frigga fritillary butterfly (*Clossiana frigga saga*) have all been recorded in Aitkin County. A listing of additional species that are likely to occur in the park is found in the appendix.

Mosquitoes

Mosquitoes have historically played an important role in the fauna of Savanna Portage State Park. Voyageur David Bates Douglass wrote, "The mosquitoes which had been very troublesome on the rivers St. Louis and Savannah became almost intolerable here. Joined to the sandflies and gnats, each vying with the other in the vigour of their attacks, they almost drove me crazy during the short time requisite for taking a bearing."

Diann Marie Crane wrote a thesis on the mosquitoes of Savanna Portage State Park in 1994. The focus of her study was on the mosquitoes that might affect park visitors, with most of her sampling at the swimming beach and picnic area at Loon Lake, hiking trails throughout the park and the campground on Lake Shumway. She collected and identified 124,908 mosquitoes during the two year study.

A total of 32 species of mosquitoes were obtained, including 13 new records for Aitkin County. Only one other survey in the northern coniferous forest region has yielded a higher diversity of mosquitoes - Isle Royale National Park identified 34 mosquito species in 1953.

Freshwater Sponges

Freshwater sponges have been recorded in the West Savanna River by Konrad Schmidt. Little is known of their distribution or diversity in the park. Compared with most groups of freshwater invertebrates, sponges are quite sensitive to variations in environmental conditions. A few species of freshwater sponges will tolerate a minor amount of pollution. Freshwater sponges can be quite abundant in clean ponds, lakes, streams, and rivers. Because of their inconspicuous green, brown, gray, or yellowish coloration, however, they are frequently unnoticed. It is estimated that there are a total of 27-30 species of freshwater sponges that occur in North America. It is unknown as to how many species exist in Minnesota.

Although they are very simple organisms, in some habitats they comprise a major component of the benthic fauna and may play important roles in ecosystem processes. Several species of insect larvae feed on sponge tissues and crayfish feed on sponges. The availability of substrate plays a crucial role in the population dynamics of freshwater sponges. A suitable substrate for the mat-like sponge growth might range from boulders or exposed bedrock to the branches of fallen trees or leaves. Sponges may be found on the upper surfaces, sides, or lower surfaces and they are commonly found in waters less than two meters deep.

Endangered, Threatened, and Special Concern Species

The Minnesota Natural Heritage Nongame Research, Nongame Wildlife Program, and Minnesota County Biological Survey document locations of rare features, including rare plants and animals, natural communities, and selected animal aggregations and geologic features. Each entity is termed an "element" and is included on an official register maintained by the NHNGR program. Statewide locations of these elements are stored in a geographic computerized database, known as the Rare Features Database.

Four elements have documented locations within the park, and it is likely that the 1996-97 surveys by MCBS will identify other locations. Additional elements have been identified in Savanna State Forest. A survey by the Minnesota County Biological Survey of vegetation and rare plants in Savanna Portage State Park is underway (1996). The status reported in the text is the official current state status as listed by the State of Minnesota, effective July 1, 1996 (there may also be a federal status for each species).

Known Elements Within Park Boundary

Plants:

Slender Naiad (*Najas gracillima*) or Bushy Pondweed - Current Status: Special Concern. This species appears to be uncommon and dependent on a sensitive habitat type in Minnesota, but a decline in distribution has not yet been documented. The U of M Herbarium has two records on file for Savanna Portage State Park and/or Savanna State Forest. This species has been recorded at Camp Lakes south of the park, and at Long Lake and Jenkins Lake near Palisade. This small aquatic species is reported to be sensitive to increased turbidity, warming and eutrophication of lakes and streams. It grows submerged in lakes and ponds with mud or silt bottoms.

Animals:

Gray Wolf (*Canis lupus*) - Current Status: Special Concern. Federally Endangered in all the lower 48 states except Minnesota where it is Federally listed as Threatened. The recent dramatic expansion in this species' range and numbers reflects its recovery from a threatened state. Continued evidence of recovery will likely lead to delisting. Savanna Portage State Park and the surrounding forest land probably support one or possibly two wolf packs. A typical pack is six wolves in late fall or early winter, although packs can have up to 14-16 members. Wolf numbers in northern Minnesota are probably much higher today than in pre-settlement times due to current forest management practices and abundant deer. The Federal Endangered Species Act of 1973 completely protected wolves in 1974, and this protection enabled wolves to increase. Unless the eastern timber wolf is delisted, it will continue to be managed by the U.S. Fish and Wildlife Service. Minnesota currently has authority to take depredating wolves. According to Bill Berg, wildlife biologist with the Minnesota DNR, it

is unlikely that park development would impact wolf populations. With their expanding range they are now crossing roads, and living near people.

Bald Eagle (*Haliaeetus leucocephalus*) - Federal Status: Endangered in most of the lower 48, however, Threatened in Minnesota. Current MN status: Special Concern. The bald eagle is an endangered species success story. In 1993 this species reached 568 well-distributed breeding pairs in Minnesota. This species has not been recorded in the Natural Heritage Rare Features Database for Savanna Portage, however park staff and the local Audubon Society have been seeing them in the park for several years. Bald eagles select lakes and rivers in forested areas where large trees are available for nesting. In Minnesota, red or white pines in the supercanopy are often selected. If nests are found in the park, areas around nesting trees should be protected from disturbances, especially during nesting season.

Colonial Waterbird Nesting Site - Great Blue Heron. An active heron rookery exists in the park at T50N R22W NENE17.

Snapping Turtle (*Chelydra serpentina*) - Current Status: Special Concern.

Other Unique Features:

Esker (Quaternary) The north end of the Big Sandy Lake Esker is located in Savanna Portage State Park. It begins in Section 7 and goes southwest through Section 18 and 19 (T50N, R22W) and 24, 25 and 26 (T50N, R23W). According to the Natural Heritage Database, the esker continues southwest to Big Sandy Lake. It is capped by part of the St. Louis sublobe. There is a good cutaway at the gravel pit in Section 19, where another esker crossed. These are explained in greater detail in the Geology section of this plan.

Northern Hardwoods Forest. Approximately 10 acres of mature northern hardwood forest dominated by sugar maple is found in the park T51N R22W SWSW31. There is good size class distribution of maple and diverse ground flora. Large pine stumps can be seen. The forest is patchy with small patches of old growth and young stands.

Northern Hardwoods Forest. Approximately 10 acres of mature northern hardwoods is also located in the park at T51N R22W SENW31. This forest is dominated by sugar maple (up to 66 cm DBH) with lesser amounts of basswood. The area is fairly undisturbed but few old-growth trees exist and all pines have been removed in the past. The surrounding area is mostly mature aspen with northern hardwoods understory.

Known Elements In The Vicinity Of The Park

Plants:

Ram's-Head Lady's-Slipper (*Cypripedium arietinum*) - Current Status: Threatened. The U of M Herbarium and the MN Natural Heritag Rare Features Database has one record several hundred feet outside the park on the southwest boundary near Sandy Lake (T49 R23 NENE of Sect 9). It is located on private property. In Minnesota, several additional populations have recently been discovered, indicating that this species is not as rare or as limited in distribution as previously thought. It inhabits a range of habitats including northern white cedar, tamarack, or black spruce forests, typically on hummocks of Sphagnum moss, and it also occurs in upland conifer forests dominated by red, white or jack pine.

Clubbed-spur Rein Orchid (*Habenaria clavellata*=*Platanthera clavellata*) - Current Status: Special Concern. The nearest known location of this plant is a swamp north of Lake Minnewawa. Its preferred habitat is shrubby tamarack swamps. Aitkin County is on the western edge of its known range.

Lapland Buttercup (*Ranunculus lapponicus*) - Current Status: Special Concern. The nearest known site is Dam Lake Bog, Rice Lake Refuge. Its preferred habitat is conifer swamps on sphagnum hummocks.

Dragon's Mouth (*Arethusa bulbosa*) - Current Status: No Status (however, there is local interest in this former special concern species). The University of Minnesota Herbarium has two current records of this species within a mile or so of Savanna Portage State Park that are in Savanna State Forest. To date, none has been found in the park. One location is on the north end of Lake Minnewawa (Shamrock twp. T49 R23) and the second site is located on the southwest side of Little Prairie Lake (Balsam twp. T50 R22 Sect 15). A third site on record with MNHP is located on the northeast edge of Camp Lake Tamarack twp. (T49 R23 NWNW of Sect. 13). Although this species is not considered rare in Minnesota, it is known to be rare and declining over a significant portion of its range. In Minnesota this orchid is found in large peatlands and wilderness areas of the northern part of the state. It finds suitable habitat in conifer swamps, floating mats, fens, and sedge-dominated water tracks. It is usually associated with Sphagnum moss.

Animals:

Peregrine Falcon (*Falco peregrinus*) - Current Status: Threatened; Federal Status: Endangered. This species has been recorded at the Rice Lake National Wildlife Refuge.

Wilson's Phalarope (*Phalaropus tricolor*) - Current Status: Threatened. Wilson's phalarope is an uncommon spring and fall visitor to the Rice Lake National Wildlife Refuge. This once abundant resident is now only occasionally seen in Minnesota. A few individuals were observed in a recent survey.

Horned Grebe (*Podiceps auritus*) - Current Status: Threatened. This species is an uncommon spring and fall migrant at the Rice Lake National Wildlife Refuge. While summer sightings are still periodically reported for the state, this species' last known nest attempt in Minnesota was in 1985. An intensive 1991 survey yielded only one sighting.

Common Tern (*Sterna hirundo*) - Current Status: Threatened. The common tern is occasionally sighted in the spring and fall at the Rice Lake National Wildlife Refuge. This species has declined in Minnesota in recent years, reflecting a regional population crash over the past decade. Intensive ongoing management may not reverse this trend.

Other Unique Features:

The Appendix has additional listings from the Natural Heritage Database of rare features found in Aitkin and St. Louis counties.

Waters/Fisheries

Water Resources

Groundwater

According to the Aitkin County Comprehensive Local Water Plan groundwater issues in relation to use and quality have been relatively minor concerns in Aitkin County. Groundwater quality is very good at the present time. Most municipal sources of water come from surficial, or buried glacial aquifers, or Precambrian metasedimentary bedrock aquifers. These aquifers are highly susceptible to contamination from a wide range of possible contaminants. Sources may include above and below ground storage tanks, hazardous waste generators, landfills, abandoned dumps and other sources. There are currently no landfills in Aitkin County, all solid waste is shipped out, most of it to Elk River. According to the Watershed Management Plan, there are reports of several sites in the watershed where solid waste is being dumped in unapproved locations on private property. There is a demolition landfill that is currently being proposed just south of the city of Aitkin.

Tests conducted by the Aitkin County Planning and Zoning Department indicated that less than 2% of all wells tested had nitrate concentration in excess of 10 mg./L. However, nearly 13% of all wells tested had coliform bacteria. Local County representatives and residents have indicated that the areas between Big Sandy and Minnewawa Lakes may have groundwater-related problems resulting from nonconforming septic systems. As stated in the Aitkin County Comprehensive Water Management Plan, "Little is currently known regarding the extent of groundwater quality degradation." In the park, all wells consistently test good to excellent. However, all wells and sewage disposal facilities should be carefully designed to accommodate the high water table and the abundance of streams and lakes. Compliance with the Minnesota Health Department's water well construction code and the Minnesota Pollution Control agency's on-site sewer system standards will assure protection.

Surface Water

Surface water quality in Savanna Portage State Park is excellent. The Sandy Area Lakes Watershed Project samples water in the West Savanna River for their baseline water quality standard. The park also includes parts of the East Savanna River, the Prairie River and the Prairie River flowages. The West Savanna, Prairie Rivers and Big Sandy Lake lie on glacial till (moraines). Throughout the West Savanna there are numerous beaver dams which create marsh areas. The West Savanna River joins the Prairie River in the southwest end of the park and they empty into an Army Corps of Engineers reservoir comprised primarily of Big Sandy Lake. The acreage for the lakes within the reservoir system are listed below. The numbers in () refer to the Public Waters Inventory.

Big Sandy Lake (1-62P)	9,380
Prairie Flowage	720
Sandy River Flowage(1-60P)	<u>368</u>
TOTAL	10,468 acres

Six lakes in the park are large enough to support fish populations:

Loon Lake-AKA Townline (1-24P)	32 acres
Wolf Lake (1-19P)	168 acres
Savanna Lake (1-14P)	90 acres
Little Savanna Lake (1-18P)	23 acres
Lake Shumway-AKA Green (1-15P)	71 acres
Lake Nine (not a protected waters).	

There are also several smaller lakes in the park, and the western edge of the park includes a section of shoreline along Remote Lake and a short section of shoreline along Big Sandy Lake.

Remote Lake and Wolf Lake are shallow lakes, with occasional to frequent winterkill. They are exceptionally soft water lakes. Loon (Townline) Lake, Savanna, and Shumway (Green) Lake are small lakes, with occasional to partial winterkills during severe winters. They are also soft water lakes.

In addition to the Big Sandy Area Lakes Watershed water quality data, surface water quality data for Savanna Portage State Park can also be found in a 1995 report on Qualitative Bivalve Survey of the Sandy River Drainage. Freshwater mussels (unionids) are used to assess human impact on streams throughout the United States. Mussels can be utilized as long-term, stationary indicators of water quality. By observing mussel diversity and frequency between tributaries, it is possible to obtain evidence on where water and/or habitat quality problems occur. In this study, the West Savanna River appears to have the most diverse and densely-populated unionid community of the drainage. Diversity was somewhat greater in upstream sites surveyed compared to downstream sites in the West Savanna River.

Water quality samples were collected in the West Savanna River 0.5 miles east of the north end of Glacier Lake. This collection showed:

Total Phosphorus = 0.041mg/L
Ortho-phosphorus = 0.009mg/L
Ammonium nitrate = 0.06mg/L
Nitrite and nitrate = 0.04mg/L
Total Kjeldahl nitrogen = 0.88mg/L
pH² = 7.4 (pH of 7 is neutral)

The nutrients nitrogen and phosphorus are essential to the life functions of aquatic organisms such as algae. However, too much of these nutrients in lakes will cause excess algal growth, phosphorus-producing algal "blooms" and green, scummy water. This enrichment process is called eutrophication and is the greatest threat to the degradation of lakes in the area. Of the sample stations along the rivers in the unionid study, only the upper section of the Prairie River, just downstream from Prairie Lake, had slightly better water quality.

Although surface water quality within the park boundary is excellent, there are many concerns in the greater watershed area. Big Sandy and Minnewawa Lakes make up

70% of the surface water acreage in the Big Sandy Lake Watershed. Water in Big Sandy Lake originates from four main rivers: the West Savanna, the Prairie, the Tamarack and the Sandy rivers. The watershed is about 37% wetlands (wooded and non-wooded), 32% wooded upland, 19% agriculture/open upland, 9% lakes, and 3% industrial, residential and roads. In the 1993 Watershed Management Plan, it was reported that even a slight (10%) increase in phosphorus loading would cause increased frequencies of algal blooms, increased growth of nuisance aquatic plants, impairment of fisheries resources and a decline in economic value of water and shoreland resources. An estimated 95% of the phosphorus loading to Big Sandy Lake is derived from the major tributaries. Therefore, it is critical, in protecting against further degradation of water quality in the watershed, that activities which change drainage patterns and result in major alteration in land use should be discouraged unless adequate controls are used to prevent erosion, sedimentation and increased nutrient runoff. Forested land and wetlands comprise nearly 80% of the watershed acreage. Therefore, activities in these areas, such as the park, may have a major adverse impact, if proper controls are not utilized.

Wetlands

There are four other Protected Waters/Wetlands in, or adjacent to, the park:

Unnamed (1-20P)	19 acres
Stony-AKA Lake 16 (1-17P)	52 acres
Remote (1-38P)	135 acres
Unnamed (1-370P)	unknown acres

The Protected Waters/Wetlands map for the area will show locations for the above lakes.

County ditches within and near the park were dug in the early 1900s when an effort was made to establish increased farmland. Recent studies by the Big Sandy Watershed Diagnostic Study, have shown that ditching of wetlands may cause them to lose their nutrient holding ability. The release of large amounts of phosphorus to downstream lakes can result. The public drainage ditch system is also of major concern in Aitkin and St. Louis Counties. Maintenance problems are extensive while the necessary capital and public interest to correct them is limited.

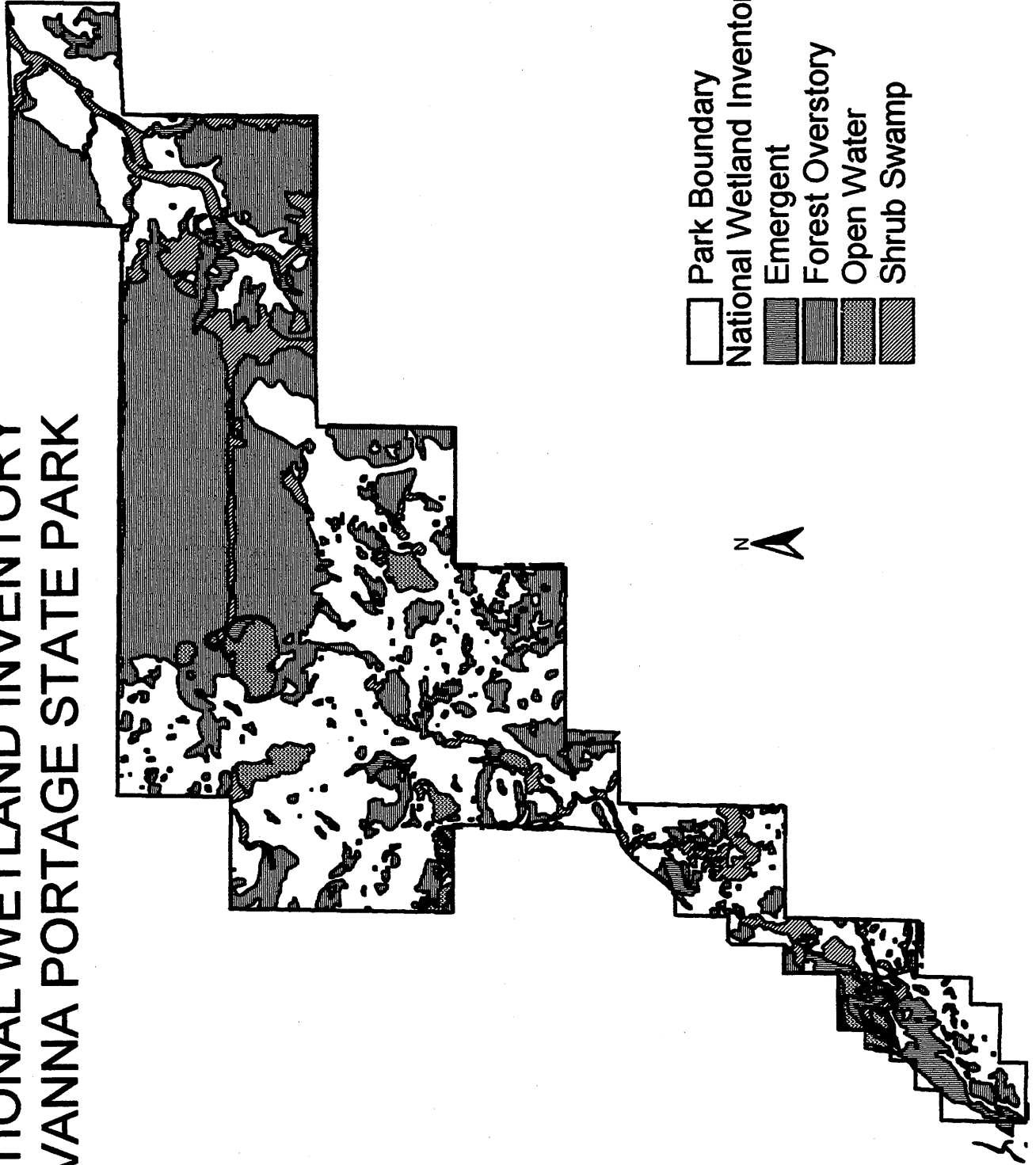
In Savanna Portage State Park there are two major east-west ditches, three north-south ditches and one NE-SW ditch that channels part of the East Savanna River. All of these ditches are located in the northeast section of the park and they are interconnected to each other and to additional ditch systems outside the park.

Atmospheric Issues of Concern

Acid Rain

Acid rain has caused damage in northern Minnesota, but it is not as severe as was predicted in the 1980s. Wisconsin, Michigan and the Adirondack Mountains have acidified lakes caused by acid rain. Minnesota is currently far enough west that acid rain has not been a major problem. In a report on northeastern lakes, Loon Lake in

NATIONAL WETLAND INVENTORY SAVANNA PORTAGE STATE PARK



- ☐ Park Boundary
- ☐ National Wetland Inventory
- ☐ Emergent
- ☐ Forest Overstory
- ☐ Open Water
- ☐ Shrub Swamp

Savanna Portage State Park was cited as being highly sensitive to acid rain and is the most sensitive in Aitkin County. According the Minnesota Pollution Control Agency, current rainfall in Minnesota is only slightly acidic and even the most sensitive lakes can naturally buffer and neutralize incoming acid rain.

Mercury

Mercury found in the Savanna Portage State Park area comes predominantly from airborne sources. Increased airborne sources come mainly from coal burning, ore smelting, waste incineration and fungicides in paint. Global dispersion of mercury affects many area lakes. Mercury pollution is most often a problem in walleye lakes. Efforts are underway to reduce these sources on a national and global level.

Fisheries

Savanna Portage State Park has six lakes which support game fish populations and part of the West Savanna River, Prairie River and the Prairie River Flowage. Shumway, Savanna, and Remote Lakes have walleye, crappies, sunfish, northern pike, and largemouth bass as do the rivers. Wolf Lake has perch and bullheads; and Lake Nine has northern pike. Loon Lake has rainbow and stocked brook trout and is open to fishing only during a limited season.

Historical surveys of Savanna Portage State Park have identified 38 species of fish in the park (including Big Sandy Lake). All of the following fish species are native to the area, except for white crappie. DNR Fisheries personnel, Konrad Schmidt, in his surveys from 1989 to 1990, verified 26 of these species (note *).

Amiidae

Bowfin*	<i>Amia calva</i>
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Umbridae

Central mudminnow*	<i>Umbra limi</i>
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Cyprinidae

Brassy minnow*	<i>Hybognathus hankinsoni</i>
Golden shiner*	<i>Notemigonus crysoleucas</i>
Blacknose shiner*	<i>Notropis heterolepis</i>
Northern redbelly dace*	<i>Phoxinus eos</i>
Blacknose dace*	<i>Rhinichthys atratulus</i>
Creek chub	<i>Semotilus atromaculatus</i> (Reported in 1995 Bivalve survey appendix)
Hornyhead Chub*	<i>Nocomis biguttatus</i>
Common shiner*	<i>Notropis cornutus</i>
Spottail shiner*	<i>Notropis hudsonius</i>
Fathead minnow*	<i>Pimephales promelas</i>
Finescale dace*	<i>Phoxinus neogaeus</i>

Catostomidae

White sucker*	<i>Catostomus commersoni</i>
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Silver redhorse	<i>Moxostoma anisurum</i>
Bigmouth buffalo	<i>Ictiobus cyprinellus</i>
Shorthead redhorse	<i>Moxostoma macrolepidotum</i>
Ictaluridae	
Black bullhead*	<i>Ictalurus melas</i>
Brown bullhead*	<i>Ictalurus nebulosus</i>
Yellow bullhead*	<i>Ictalurus natalis</i>
Tadpole madtom*	<i>Noturus gyrinus</i>
Percopsidae	
Trout-perch	<i>Percopsis omiscomaycus</i>
Centrarchidae	
Rock bass*	<i>Ambloplites rupestris</i>
Pumpkinseed*	<i>Lepomis gibbosus</i>
White crappie	<i>Pomoxis annularis</i>
Black crappie*	<i>Pomoxis nigromaculatus</i>
Bluegill*	<i>Lepomis macrochirus</i>
Largemouth bass	<i>Micropterus salmoides</i>
Percidae	
Iowa darter*	<i>Etheostoma exile</i>
Yellow perch*	<i>Perca flavescens</i>
Walleye	<i>Stizostedion vitreum</i>
Western sand darter	<i>Ammocrypta clara</i> (1927 record)
Johnny darter*	<i>Etheostoma nigrum</i>
Logperch	<i>Percina caprodes</i>
Salmonidae	
Cisco Trout	<i>Coregonus artedii</i>
Esocidae	
Northern pike*	<i>Esox lucius</i>
Gadidae	
Burbot	<i>Lota lota</i>
Gasterosteidae	
Brook stickleback*	<i>Culaea inconstans</i>
Cottidae	
Mottled sculpin	<i>Cottus bairdi</i>

Lake Management Plans have been completed by Fisheries staff for Loon Lake, Wolf Lake, Savanna Lake and Remote Lake. These and fish surveys are located in the appendix.

Natural & Cultural Resource Objectives

These objectives will guide the park management decisions toward sustainable 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.

Economic

- Park 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. (Benefits of Parks Catalogue)
- Use natural resources and public funds efficiently. Direct growth towards areas in the park 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 identify former wetlands under our jurisdiction for restoration where feasible.
- 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. The provision of parks provide for essential habitat for the native species of Minnesota.
- Sustain functioning ecosystems and maintain the integrity of biological diversity at all levels: ecosystem, community, species, and genetic.
- Identify degraded natural communities and ecosystems and work toward their restoration through management.

Integrated Resource Management Actions

This plan provides the basic management direction for the park and is not intended to provide specific management or development details. The Minnesota Department of Natural Resources (DNR) has a goal of managing resources in a way that is sustainable for future generations. Ecosystem-based management (EBM) is the approach DNR is using to achieve this goal. The way this goal is approached is by taking a broader perspective and addressing ecosystem management rather than focusing only on individual plant or animal species. The goal of this planning process is to decide how to manage Savanna Portage to sustain healthy ecosystems into the future. This EBM perspective forces us to look at Savanna Portage State Park not as an island, but as an integral part of a larger ecosystem.

Management actions for Savanna Portage State Park revolve around the concepts of working towards restoring native vegetative systems focusing on restoring natural processes (not just communities), Ecosystem Based Management and using current and future technology (GIS, ECS and others). This plan does not attempt to locate specific forest regeneration areas. This cannot be done until after the plant inventory work is completed in 1998. Soil surveys and subsequent interpretations of soils through ECS will be important in determining management strategies for sites. Interpretation is an important component of effective resource management. See the Interpretive Services section for details.

The major concerns at this time are: 1) Maintaining biodiversity; 2) Avoiding fragmentation of habitat; 3) Developing the Ecological Classification System; 4) Reestablishing ecological processes; 5) Protection of listed species, while maintaining old growth and old seral representatives; 6) Avoiding introduction of exotic species, monitoring for new introductions, and eliminating exotic species when feasible. It should be noted that although the actions are numbered, they are NOT in priority order.

Maintaining Biological Integrity & Developing ECS

Discussion:

Savanna Portage State Park contains a contiguous forest habitat enhanced by combination with Savanna State Forest. All efforts should be made to avoid habitat fragmentation and protect biodiversity. Biodiversity considerations include composition, structure, and function relating to species. Composition includes the species and genetic diversity that constitute the communities and ecosystems. Structural diversity pertains to how the ingredients of diversity are arranged relative to each other in time and space. Functional diversity applies to ecological processes and many interactions that occur in an ecosystem (Crow, Haney, Waller, '94). Effort should be made to maintain minimum levels of each successional stage. Reserves should be large enough to offset catastrophic events (Vora '94).

- **Action 1: Implement management towards native vegetation patterns.**

Completing the Ecological Classification System (ECS) will help obtain accurate and useful information with which to determine the most appropriate ecological commu-

nities. The Ecological Classification System will examine the interrelationships between climate, geology, geomorphology, parent material, soil, topography, vegetation, hydrology, animals, and land use history, rather than handling each component as if it were distinct. It will incorporate the General Land Office Surveys, Cooperative Stand Assessment (CSA), and any other available information to determine desired management goals. Restoration is the goal in degraded natural communities, such as old fields and gravel pits.

- **Action 2: Incorporate concepts of biodiversity, ecosystem management and watershed/landscape management into park interpretive programs and displays.**
- **Action 3: Participate in local and regional planning efforts to sustain healthy ecosystems.**
- **Action 4: Protect Federal and State listed species and manage their habitats for optimum sustainability conditions.** In 1996, the MCBS began evaluation of natural communities and the survey of rare plants.
- **Action 5: Monitor species and natural communities** for indications that reflect changes in populations and biological health. Indicator species should be identified.
- **Action 6: Minimize forest fragmentation to protect interior forest species habitat.** Forest fragmentation can be permanent (roads, utilities, buildings and parking lots) or temporal (temporary changes in vegetation characteristics from natural occurrences or management practices).
- **Action 7: ECS and GIS computer technology will be used in site selection, prioritizing and planning future resource management activities.** MCBS floristic work will provide additional data.

Reestablishing Ecological Processes

Discussion:

Reintroducing disturbances is often vital to restoring ecosystems in state parks. Historically, fire was a major force in the shaping of the park's vegetation. Since it has been effectively removed from the system, those communities dependent on it have decreased. Fire disturbance should mimic natural events as closely as possible. ECS will provide important management data.

- **Action 1: Reintroduce fire as an active part of the system.**
Maintain uplands and lowland meadows, using fire as a tool.
- **Action 2: Use paleoecology to study fire frequency and community health.**
- **Action: Public input will be sought prior to major forest regeneration projects.**
Proposed projects will be presented to the Big Sandy Watershed groups. Neighbors will be notified, especially when burning is planned.
- **Action 3: Understory burning may be desirable in some hardwood forest areas, but will probably not be a high priority for resource management.** Fire may be a useful tool in some aspen/birch or balsam stands to reduce fuel loads and as site preparation for white pine regeneration projects. Fuel reduction through the use of prescribed cuts prior to prescribed burns or as an alternative to burning may sometimes be necessary.
- **Action 4: Integrated Pest Management will be incorporated into vegetation management decisions.**

This will involve mimicking the historical patterns of disturbance. In some areas

disturbance may have been frequent, in others it may not have occurred for decades. Mimicking successional pathways and natural disturbances will lead to a diversified forest that will minimize outbreaks of forest pests. Trying to exclude pests may actually create a greater susceptibility to a catastrophic outbreak. Monitor for yellow-headed spruce sawflies and spruce budworm. Planting too many white spruce will invite spruce sawflies. Prevent pine bark beetle and bronze birch borer problems by following the DNR Forest Development Manual guidelines (1994). Provide interpretive materials on forest tent caterpillars and tortrix as necessary.

Special Considerations and Old Growth

Discussion:

Although ecosystem based management will focus on natural community types and ECS data will be used to manage natural communities, there are several tree species which may require special consideration. These trees include: white pine, red pine, northern white cedar, and yellow birch. Savanna Portage also has a number of Old Growth Forest candidate stands.

- **Action 1: White pine should be protected and actively managed for regeneration.**

Savanna Portage is in the severe hazard zone for white pine blister rust. Past fire suppression and logging activities has reduced white pine to minimal levels resulting in minimal success in reproduction (Frissell '73, Heinselman '73). Today white pine blister rust, deer, and white pine weevil are limiting factors in the success of white pine regeneration. Existing pines will be carefully protected and various techniques will be used to encourage regeneration based on the DNR Forest Development Manual. Use of fire and shrub removal will slow the intrusion of species such as hazel brush and enhance pine regeneration (Lorimer '94). The park should take advantage of natural seeding sites within remnant stands.

- **Action 2: Northern white cedar and yellow birch should be protected where ever possible.**

Regeneration should be achieved by mimicking natural disturbances and protecting the seedlings from deer depredation. Most of the yellow birch is found in old growth stands. The key regeneration conditions are open areas with bare soil that is well drained. If reproduction areas are established, electrified fencing or other management strategies may be used to limit deer damage. This may make a good research project.

- **Action 3: Aspen, birch, and balsam communities may be managed to regenerate and diversify age classes in selected areas.**

Many areas in the park have such excessive die-off occurring that fuel buildup is becoming critical. Disturbance can be achieved through burning and vegetation removal. Management of these species will include looking at landscapes within and outside of the park. Decisions will also need to consider what would naturally have been in an area and what species the seral stages of succession would include. Some aspen sites may be appropriate locations for white pine regeneration projects. Aesthetics will be factored into any vegetation removals so as to minimize visual impact and erosion.

-
- **Action 4: Old Growth Forest Policy, Guidelines, and the regional plan will be followed in managing old growth stands in the park.** Continue to delineate and protect old growth forest areas. Work with adjacent landowners in managing stands which cross boundaries.

Hazard Trees and Plantations

Discussion:

Other forest concerns include hazardous trees and pine plantations.

- **Action 1: In the campgrounds, picnic areas and along the roads, the Department's Hazardous Tree Policy will be followed.** In areas where extensive cutting is needed, hard maples, basswood and green ash would be appropriate for replanting. White pine may work adjacent to sites, however, they will not tolerate compactions.
- **Action 2: Pine plantations in the park should be thinned periodically to achieve a more natural appearance.**

It would be advantageous to open the canopy for more vertical diversity. Wherever possible, the monoculture effect should be reduced. Thinning on five-year intervals will achieve a natural appearance. If underplanting is needed, it will be determined on a stand by stand basis.

Exotic Species

Discussion:

In managing exotic species, exotics should be eliminated and replaced with native species wherever possible.

- **Action 1: When caragana is removed from the campgrounds it should be replaced with native species such as dogwoods, wild plum or native cherry trees.** Caragana was planted heavily in the campground and in other areas of the park. While this shrub is not native, it is also not an aggressive invader and it does attract birds, butterflies and wildlife. Long-term, the goal should be to remove this non-native species, but it should be done in such a way that it does not cause problems with aesthetics (it is currently the main buffer species between campsites).
- **Action 2: Manage Canada thistle in the park.** Remove undesirable aggressive, non-native species, such as Canada thistle.
- **Action 3: Monitor for Eurasian water milfoil.** Eurasian water milfoil has been found to be transported from the Twin Cities area on boats. Lakes should be monitored for its presence and boaters given information on preventing its spread.
- **Action 4: Monitor for purple loosestrife.** Wetlands, which are extensive in the park, should be periodically monitored for the presence of purple loosestrife.
- **Action 5: Monitor for gypsy moths.** The park should continue to participate in the gypsy moth trapping program.
- **Action 6: Monitor for zebra mussels, ruffe, lamprey, spiny water flea.** The spread of zebra mussels, ruffe, lamprey and the spiny water flea should be monitored in Lake Superior and the St. Louis watershed. The proximity of the St. Louis watershed to the Mississippi River watershed through the portage raises the level of

consciousness for exotic species presence in Lake Superior and potential impacts.

- **Action 7: Provide interpretive materials on exotic species as appropriate.**

Future Research

Discussion:

Research is needed to further the management of vegetation in the park, and to better understand ecological conditions and processes before significant Euro-American impact (Kilgore '85). Future studies can help the park's success in ecological restoration efforts.

- **Action 1: Incorporate new management techniques as recommended by re-search and evaluation.**
- **Action 2: The park manager and regional resource specialist should work with others in the DNR and other research entities to determine special research needs for the park.**
- **Action 3: Maintain a database and geographic information system of natural and cultural resource information to guide planning and monitor activities.**

Watershed and Wetlands Management

Discussion:

The major goal is to protect surface and ground water against further degradation of water quality. The West Savanna River provides the baseline data for water quality on the Big Sandy Area Lakes Watershed Project. This group should be consulted on any proposed activities that could impact the watershed.

- **Action 1: Discourage activities which change drainage patterns, cause wetland filling or result in major alterations in land use.**

At a minimum, prevent erosion, sedimentation and increased nutrient runoff during all construction activities.

- **Action 2: Forest management procedures should be consistent with the Big Sandy Lake Watershed Management Plan.**
- **Action 3: Record old logging dams in order to differentiate them from beaver dams.**

Interpretive materials can be created using this information, along with materials on early 1900s settlement, agriculture and the use of ditches.

- **Action 4: Work with appropriate governing agencies to assess whether the ditches might be suitable for wetland mitigation.**

If so, appropriate procedures will be followed to add them to the DNR Wetland Mitigation Site list.

- **Action 5: In naturally occurring wetland areas (and beaver dams), determine water level control practices on a case-by-case basis. In most cases, let nature do the restoration.**

Wildlife

Discussion:

A holistic approach is the foundation of ecosystem-based management. The goal is a

viable population of all native species, varying within sustainable limits. This should be accomplished at Savanna Portage with the ECS document.

- **Action 1: Manage deer, raccoon, bear, beaver and other wildlife populations to meet balanced ecosystem goals.**

Beaver may be a problem in some areas in the park, where they should be managed through appropriate procedures. These may include using Clemson levelers or trappers to control nuisance beaver. Vegetation controls on ditch banks and culverts can be used to eliminate damming material. Some trails may be abandoned due to beaver activity. Interpretive activities should include beavers and the historical fur trade. The impact of deer on vegetation should be monitored. State parks are wildlife refuges, however, in managing populations, there may be biological reasons for having a special hunt (this may occur when the deer population exceeds the carrying capacity, when there is damage to agricultural crops or forests etc.). Boundaries need to be surveyed, posted and maintained in order to clarify hunting restrictions.

- **Action 2: To the extent possible, "bear-proof" the campgrounds and provide information to park visitors regarding bears.**
- **Action 3: Place an emphasis on educating the public about forest songbirds and diversity.** Aitkin County is known as one of the best birding areas in the state of Minnesota. People come from all over the country to the McGregor Marsh SNA and Rice Lake Wildlife Refuge. The park is also an excellent area for bird watching. It was also noted by local resident, Burton Anderson, that bird watchers contribute a great deal to the area economy.
- **Action 4: Monitor populations of fisher and pine marten.**
- **Action 5: Conduct a survey of reptiles and amphibians.**
- **Action 6: Develop interpretive materials on wildlife in the park.**

A recent interpretive survey showed that wildlife is the topic that is most likely to interest the public. Informational handouts and brochures, naturalist programs and displays at visitor centers were the best ways to provide information. Suggestions for Savanna Portage include: Provide pictures or permitted mounts of mammals found in the park, so that visitors can identify wildlife (especially fisher and pine marten). Provide educational materials on reptiles and amphibians. Provide a map/brochure showing areas in the park that are good for viewing birds, beaver or deer.

- **Action 7: Consider reintroducing native spruce grouse to appropriate habitat areas.** Sharp-tail grouse may also be in the park or may return to the park if meadows are burned. An ecosystem approach needs to be followed vs. vegetative management for a single species.

Fisheries

Discussion:

In general, natural drainage patterns should be maintained and preserved whenever possible. Beaver dams, water control structures, and road culverts often prevent access to spawning and rearing habitats.

- **Action 1: Protect natural spawning habitat in lakes and streams.**
- **Action 2: Implement a creel census on Savanna and Loon Lakes.**
- **Action 3: Work with Fisheries to survey rivers within the park.**
- **Action: The West Savanna River is a priority area for beaver control to maxi-**

mize spawning habitat.

There are numerous areas in the park where beaver dams block fish habitat. Realistically, only a few key locations can be monitored and improved.

- **Action 4: Stabilize erosion on islands in Remote Lake and at the access.**

Work with Forestry, Fisheries, and Trails and Waterways to accomplish this.

Cultural Resource Management

Discussion

Cultural and regional history are topics which are of special interest to park visitors.

- **Action 1: Park staff will work with local volunteers to conduct oral history interviews of key people.**

The Minnesota Historical Society and key state parks naturalist staff may be available to train volunteers on interview techniques.

- **Action 2: Continue to research, survey, and document additional archaeological and historic sites.**

Site data should be entered into the GIS system. Battle Island may be a priority preservation site due to erosion problems. A systematic investigation and mapping program of the park is preferable to development-driven, individual surveys.

- **Action 3: Survey proposed development areas for the presence of cultural resources.**

As is the Division of Parks policy, if significant cultural resources are discovered during surveys, facility siting, design, use, and possible archaeological mitigation may need to be reviewed to avoid or minimize impacts. The Minnesota State Historic Preservation Office should review all major proposed developments within the Savanna Portage Historic District, in order to maintain historical integrity in the Register area.

- **Action 4: Inventory, catalog and maintain the collection of historical records and documents kept in the park.**

- **Action 5: Work with state park archaeologists and State Archaeologist to develop management plans for known cultural sites which identify current impacts, determine whether they are detrimental, and prescribe how to mitigate impacts.**

RECREATION RESOURCES

Recreation Management Objectives

This set of objectives will guide the park plan and its recommendations 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:
 - Only State Park in Tamarack Lowlands
 - Camping, swimming, and picnicking
 - Historic Savanna Portage
 - Old Growth Forest complex
 - Trout fishing lake and other fishing opportunities
 - A variety of trail opportunities including hiking, mountain biking, skiing and snowmobiling.
 - Scenic Continental Divide and other unique geological features
 - A diversity of wildlife and birds, including wolves and eagles.
- Promote the safety and security of park users.
- Complement the character and economic vitality of the neighboring communities.
- Promote increased understanding, appreciation and enjoyment of natural and cultural resources in the park by providing interpretive services.

Economy

- 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 and interpret the park's natural scenic beauty, old growth hardwood communities, noncommercial atmosphere, and historic character.
- Minimize and concentrate park development in order to preserve the remaining portions of the park.

Existing Development

Camping

- Semi-modern campground: 64 drive-in sites, 18 with electricity, 4 pull-through sites.
- 2 sanitation buildings with showers
- 1 primitive group camp: 30 person capacity
- 1 camper cabin
- 1 rental guest house with equipped kitchen: 6 person capacity
- 7 backpack camp sites

Trails

- Hiking: 22 miles
- Self-guided: 3 miles
- Mountain Biking: 10 miles
- Cross-country Skiing: 16 miles groomed, Remote Lake 13 miles
- Snowmobiling: 61 miles groomed trails
- Total trail alignment: 76 miles

Day-Use

- Picnic Shelter and beach house
- Children's playground equipment
- National and State Historic District - Savanna Portage
- 1 Fishing pier on Shumway
- 1 Swimming beach
- 3 Drive-in water accesses
- 1 Carry-in water access
- 1 Boat dock: mooring capacity of 6
- 2 Volleyball courts and 1 horseshoe pit
- 6 fishable lakes, Prairie River and Flowage, West Savanna River

Park Administration

- Contact Station
- Manager's residence
- Park service garage and shop area
- Trailer dump station
- Septic tanks: 11
- Active wells: 7, Abandoned wells: 6
- Roads: 9.5 miles gravel

Proposed Development Actions

This plan provides the basic management direction for the park and is not intended to provide specific management or development details. The proposed development in this plan is generally conceptual. Site-specific, detailed development plans will be completed based on the concepts outlined in this plan. The proposed development map on page 80 shows the location of major proposed developments. Also, refer to the proposed summer and winter trail maps on pages 73 and 76 and the Interpretive Service chapter.

Proposed developments outlined in this plan were generated after reviewing available information on park resources. Development recommendations are made after careful consideration of the natural and cultural resources, resource management zoning map and the recreation management objectives outlined in this plan. Plans often need to be altered as more data become available.

Each recommended development proposal (e.g. buildings, trails) is 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. impact on soils, wetlands, geological features, rare plants, and/or animals or archeological sites) have been conducted, considered and mitigated.

Trails

Trail locations and conditions are seen as major issues in the planning process. With 76 miles of trails in a wetland area with diverse topography, maintenance concerns are inevitable. Existing park trails often utilized old logging roads, and topographic maps were not available when many of the trails were originally laid out.

With shrinking maintenance budgets and greater emphasis on efficiency, every existing trail was evaluated for its ability to provide multiple use and ease of maintenance. Consideration was also given to a potential trail that would highlight the Tamarack Lowlands ecosystem. Signing needs ongoing evaluation.

Winter Trails (Snowmobiling and Cross Country Skiing)

Discussion

Several factors were considered in redesigning the winter park trails. 1) One objective was to minimize the interaction between snowmobile trails and ski trails. 2) The park ski trail system does not currently connect with the Division of Forestry Remote Lake ski trail system, and this is seen as a missed opportunity. 3) Snowmobile use has changed over the past 20 years and fewer people utilize short snowmobile loops. They tend to prefer longer corridor trails that take them from town to town. 4) Minimize maintenance. Overall, the snowmobile trails will cover the same mileage while there will be fewer miles of ski trails in the park. These ski trails will now connect with the Remote Lake ski trails for an additional 13 miles of ski trails.

- **Action 1: Focus snowmobile trail maintenance efforts on the main**

corridor trails. The main corridor snowmobile routes through the park will be maintained at higher quality standards, and there will be less maintenance emphasis on the smaller loop trails. The snowmobile trail system will be simplified, and some of the short loop trails may be eliminated. Corridor trails will be consolidated where possible to utilize the best terrain and still keep the four connections to Jacobson, Floodwood, Big Sandy/McGregor and Cromwell. The floodwood trail needs to be assessed and possibly relocated. Also eliminate #1 - #3 Beaver Pond snowmobile trail. Trail #16 will be moved north because of marsh and beaver problems (no new construction will be needed in the proposed route since it redesignates existing trails).

- **Action 2: Consolidate ski system in the west side of the park and create several shorter ski loops.**

This will separate the ski trails from the snowmobile trails and will provide access to the Remote Lake ski trails that are on State Forest land. The new classical ski trails will provide shorter loops and a greater diversity of trails for various skill levels. This will involve dropping the ski trail to Wolf Lake. However, this route would be maintained as a hiking trail. All ski trails in the park will continue to be for classical skiing.

- **Action 3: Eliminate Loon Lake area snowmobile trails.**

This area will now be utilized to tie in park ski trails with the Remote Lake Ski trails. The snowmobile trail north of Loon Lake presently gets little use, and traffic from CR-36 could be rerouted further north. The Loon-Remote Lake- Highway 36 is partly on a road. It is also badly damaged by beaver and it is dangerous for snowmobiling. One trail south of Loon Lake is a dead end and the other has a poor river crossing, making it impassable most of the time. All of these snowmobile trails will be eliminated.

- **Action 4: Seek funding for Ski Trail Grooming.**

Currently Savanna Portage does not receive funding from the State Park Ski Pass account. With expanded trails and connections to Remote Lake, new use patterns might attract more ski clubs and ski events to the park, and with that, there will be increased maintenance needs. Increasing numbers of skiers also support this action.

- **Action 5: Construct a Trail Center in the vicinity of the Portage Parking Lot.**

A trail head warming shelter is needed for the heavy winter trail use that the park receives. The Portage Parking area may be appropriate because ski trails would lead one direction and snowmobile trails would lead the other direction. There would be minimal overlap of their use areas. This facility, if it proves feasible in design and location, would also provide year round interpretation of the Savanna Portage Trail. See Trail Map for details.

- **Action 6: Construct new bridges.**

Three new bridges are needed on the eastern (Floodwood) snowmobile trail. If bridges cannot be built, the eastern swamp trail will need to be rerouted or have extensive beaver control work implemented. Another bridge is needed near the eastern end of the Portage Trail. A bridge is needed on the Lake Shumway trail.

SAVANNA PORTAGE STATE PARK

Existing Winter Trail System

Savanna State Forest

WINTER TRAILS

- *** Savanna Portage Trail
- — Snowmobile Trail
- Cross-Country Skiing
-  Easy
-  More Difficult
-  Most Difficult

-  Boat Ramp
-  Carry-in Access
-  Pit Toilet
-  Numbered Trail Intersections
-  Water
-  Private Property
-  Public Use Prohibited
(except on designated trails)

FACILITIES

-  Information/Office
-  Telephone
-  Historic Site
-  Picnic Area
-  Shelter
-  Swimming
-  Fishing Pier
-  Overlook
-  Parking
-  Campground
-  Primitive Group Camp
-  Trailer Sanitation Station

0 .5 1 Miles

0 .5 1 Kilometers

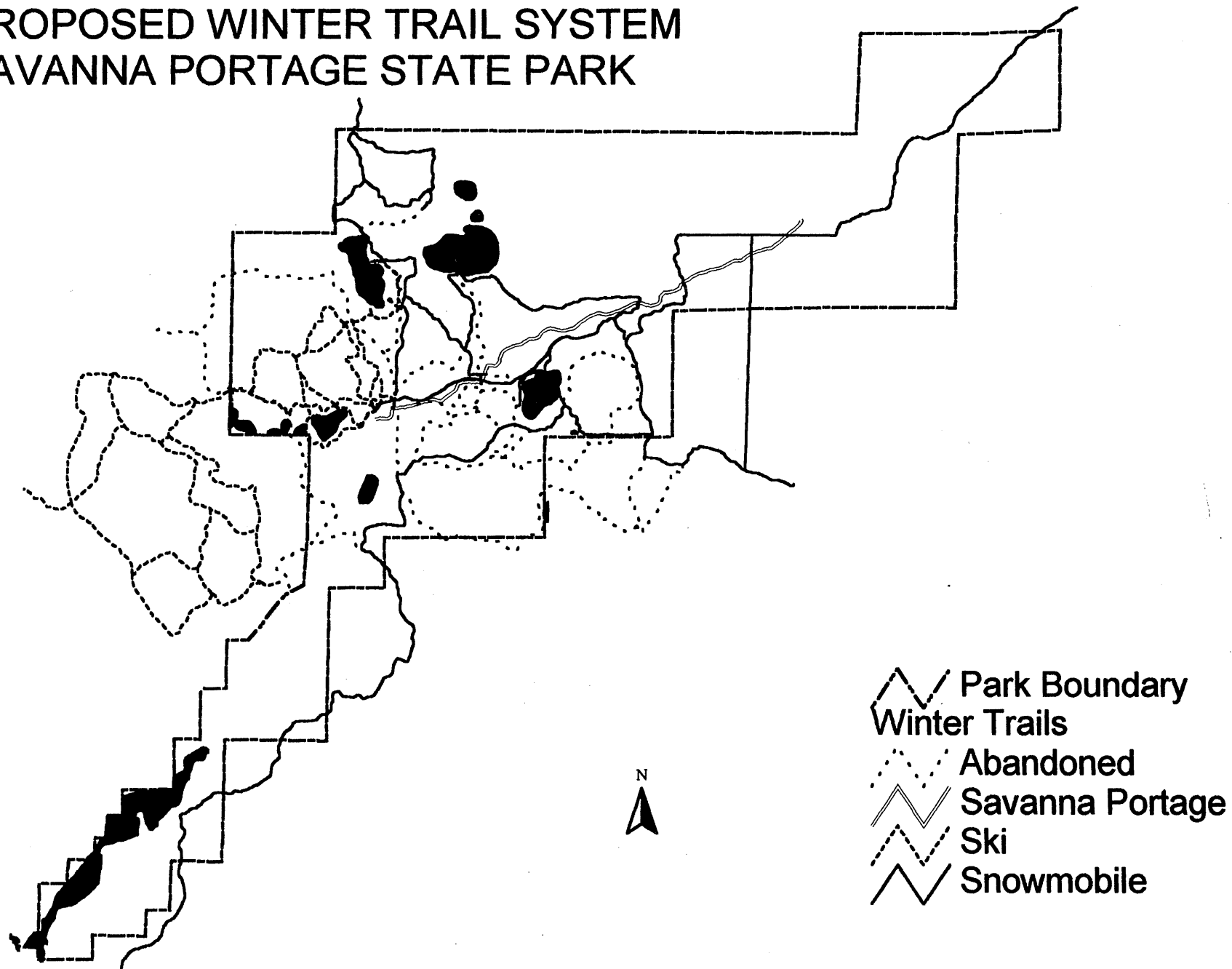


NORTH

Loon Lake and Lake Shumway are open to trolling motors only.

The inset map is double the scale of the main map.

PROPOSED WINTER TRAIL SYSTEM SAVANNA PORTAGE STATE PARK



-  Park Boundary
-  Winter Trails
-  Abandoned
-  Savanna Portage
-  Ski
-  Snowmobile

-
- **Action 7: Develop a connecting trail between the Continental Divide Trail and the Portage Trail.**

Year round, the Continental Divide Trail is one of the most popular trails in the park. The planning process identified it as the highest priority for trail maintenance. The Savanna Portage Trail is also very significant in the park. Currently, people have to snowmobile or walk along the narrow gravel road in order to connect these two important trails along the west end. This trail could also be used by group campers to access the Continental Divide Trail.

- **Action 8: Add shelters for cross country skiers and backpackers.** Once the ski trails are relocated in the western part of the park it will probably be necessary to locate at least one or two new shelters between the parking lot and the Remote Lake area.

Summer Trails (Bike and Hike)

Discussion

The summer trails allow access to major park attractions and facilities and connect many of the areas together in a network of trails. Although erosion is a concern in several areas, the major maintenance problem arises with the mucky soil, often the result of beaver activity. In many cases it was concluded that it will be easier to move the trail rather than combat the ongoing problem of beavers. As much as possible, summer trails utilize existing ski and snowmobile trails. There will be a net gain in both hiking and mountain bike trails.

The possibility of ATV trails in Savanna Portage State Park was discussed at several group meetings. It was decided that the problems of erosion and noise would outweigh the advantages of providing this new day use activity in the park. There are already abundant ATV opportunities in the area. The January, 1995 "Minnesota ATV Trails Guidebook" shows that there are approximately 550 miles of forest road available in the Grand Rapids region for riding motorcycles and ATV's. Adjacent to the park, the Savanna State Forest roads are open to ATV and motorcycle use, unless posted otherwise.

- **Action 9: To highlight the Tamarack Lowlands landscape type, create a bog walk from the northern end of Wolf Lake to Lakes #3 and #4.** This will take visitors through a black spruce forest, then tamarack and then through large cedars. There are old glacial beach ridges part of the way, so floating boardwalks may be needed in several locations. This trail would be accessible from the existing parking area on the west end of Wolf Lake.
- **Action 10: Develop a new loop adjacent to or through the old growth northern hardwoods to showcase this area.** There was discussion as to whether this could also be a winter snowmobile trail. A decision awaits completion of the Old Growth Plan for the area. The DNR Old Growth Forest Guidelines note that "new road and trail development should not occur" in candidate or future old growth stands during the evaluation period. Once old growth designation is complete, a site specific old

SUMMER TRAILS

- *** Savanna Portage Trail
 Hiking
 Mountain Bike/Hiking

FACILITIES

- Information/Office
 Telephone
 Historic Site
 Picnic Area
 Shelter
 Swimming
 Fishing Pier
 Overlook
 Parking
 Campground
 Primitive Group Camp
 Backpack Camping
 Trailer Sanitation Station



Boat Ramp



Carry-in Access



Pit Toilet

N
Numbered Trail Intersections

Private Property
 Public Use Prohibited
 (except on designated trails)

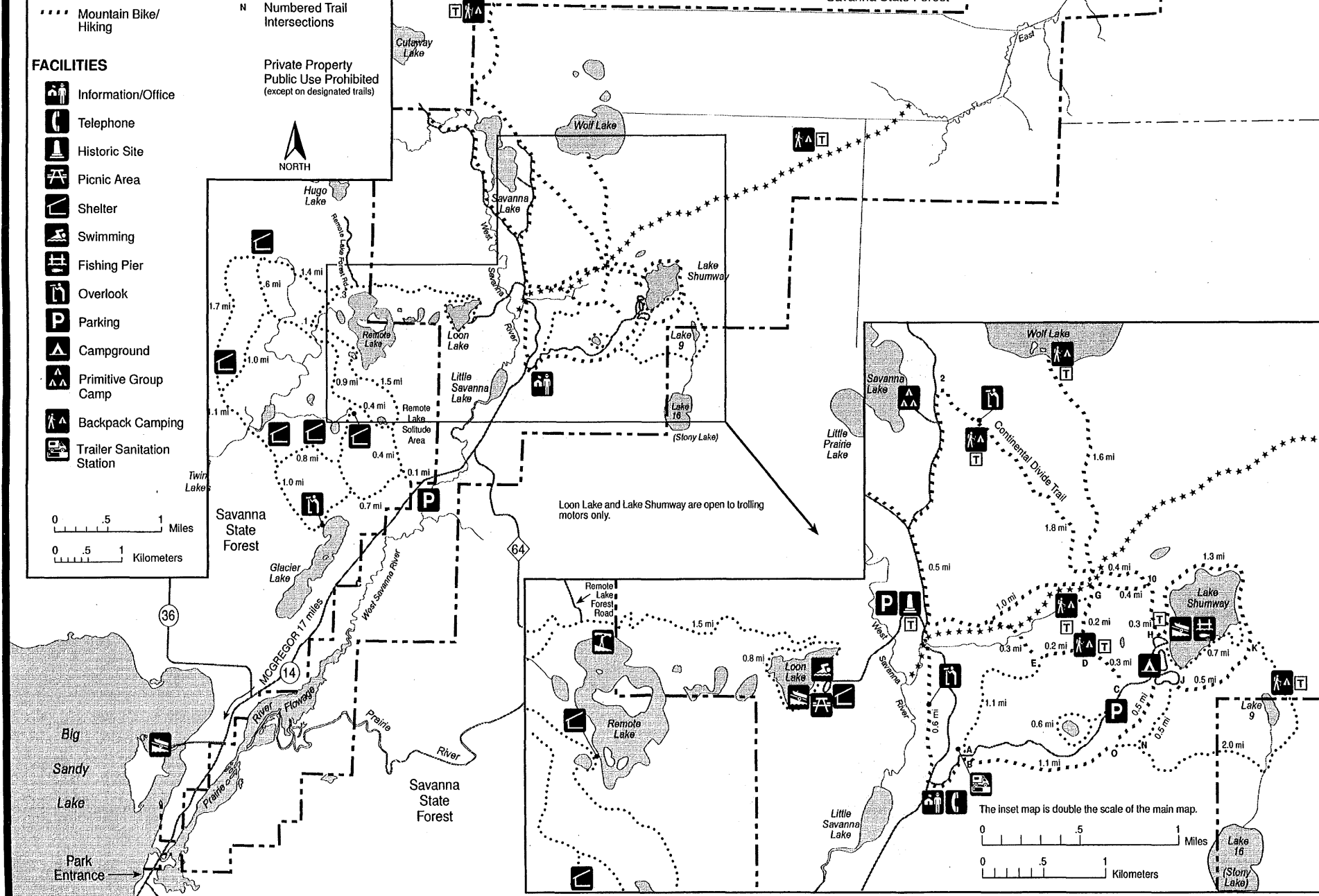


NORTH

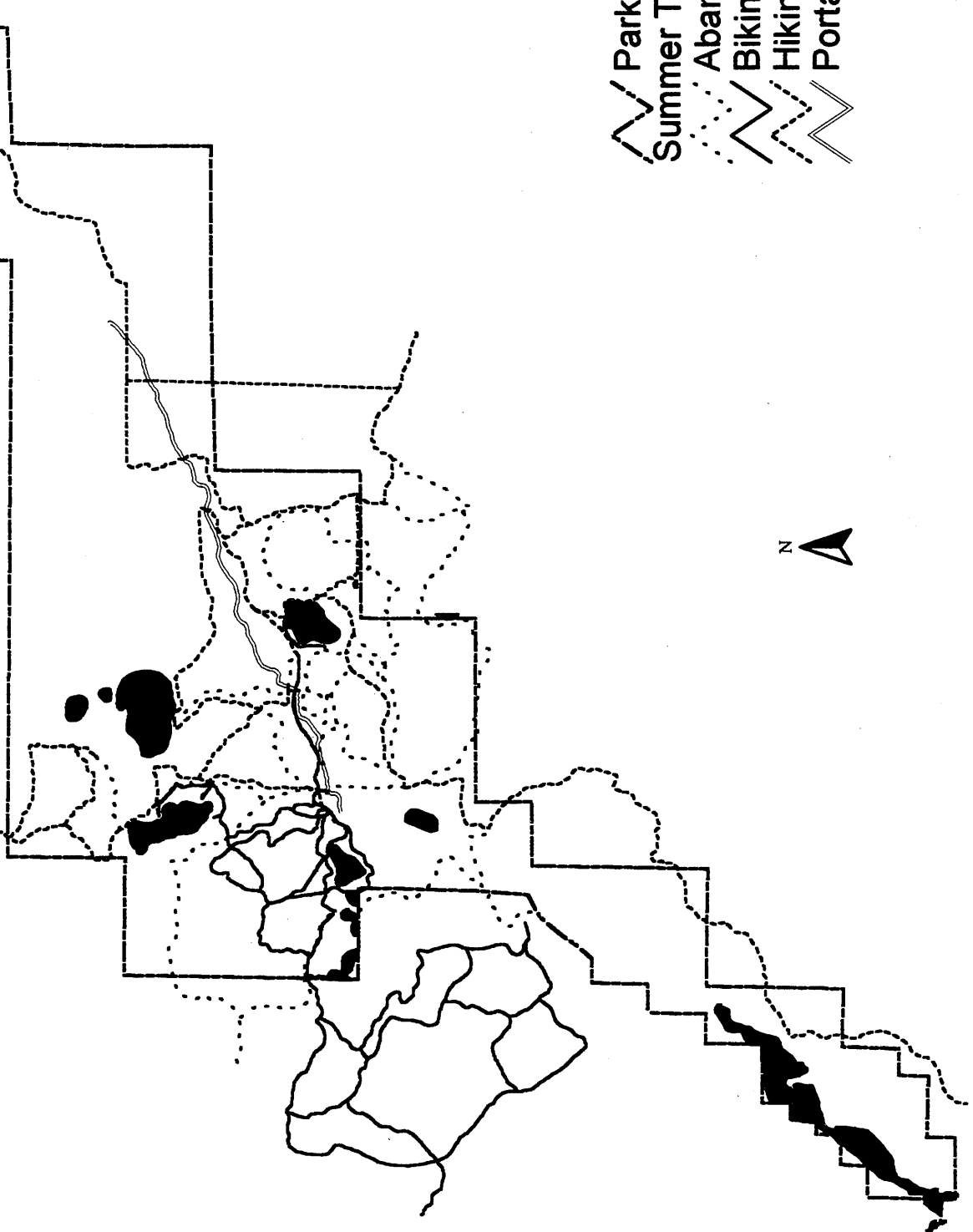
SAVANNA PORTAGE STATE PARK


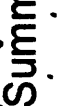



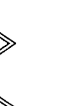
Existing Summer Trail System

Savanna State Forest



PROPOSED SUMMER TRAIL SYSTEM SAVANNA PORTAGE STATE PARK



-  Park Boundary
-  Summer Trails
-  Abandoned
-  Biking
-  Hiking
-  Portage Hike

growth management plan will need to be developed. That plan could address the trail issue. The trail need not go through the most ecologically significant portion of the old growth. Any trail should be primarily for allowing people to understand and experience old growth, not just to add more miles of recreation trails.

- **Action 11: Mountain bike trails will be relocated in the west end of the park, and will connect to the Remote Lake trails.** The hiking trails would be concentrated on the north and east side of the park. There will need to be a trail connecting the campgrounds to the mountain bike trails. The plan is to keep the mountain bikes separate from the hiking trails. The park currently has 10 miles of designated mountain bike trails, the proposed mileage will remain about the same. In addition, by connecting to the Remote Lake Forestry trails, there will be approximately 10 more miles of mountain bike trails. The mountain bike trails currently receive moderate use. The State Parks Mountain Bike Task Force researched the impact of mountain bikes. Their findings suggest that if a park has a lot of mountain bike use on multiple use trails, there will be conflicts. There are also maintenance costs to consider. The trend in state parks is to not increase the number of mountain bike trails. However, Savanna has several unique situations that may make it a practical exception. Mountain bikes might allow more visitors an opportunity to see the park and get to some of the more remote areas, where distance often discourages summer hikers. (See Proposed Summer Trail Map)
- **Action 12: Savanna Portage Trail interpretation is a higher priority than relocating the trail.** A bridge is needed at the ditchbank crossing. Archaeologists and planners recommend not relocating the Savanna Portage Trail on the actual route. It would be better to run parallel to it, with interpretation along the way. Currently the park trail is sometimes on the historic route, sometimes off, and in some places the historic route has been destroyed by early logging and road activity. Mapping efforts continue to establish the actual route. Specific plans are premature at present. It was noted that, when repair is needed on the long boardwalks along the east end, archeological approval is required, and further study may be needed. Interpreting the historic corduroy walkway would be appropriate. Improving the observation deck along the boardwalk or upgrading the Maple Ridge shelter were not seen as priorities at this time. Repairs and upgrades are contingent on budgets.

Camping and Overnight Accommodations

Main Campground

Discussion

The main campground at Savanna Portage State Park offers scenic, private sites, and two shower buildings. It is nearly full on summer and fall weekends with some midweek use. The main campground is closed in the winter, and winter campers are allowed to use the Portage Parking lot, although there is no electricity or water available there.

- **Action 1: Convert A-Loop campground vault toilet building to flush toilets.** This project is on the state park capital needs list and is awaiting funding.

-
- **Action 2: Develop a cart-in camping area across from A-Loop in old field near shore of Lake Shumway.** It is recommended to not add additional semi-modern campsites. Semi-modern camping is already available at the Corps of Engineers site nearby and at a new private campground along the river. Cart-in campsites are relatively inexpensive to develop. This site was selected because of existing facilities and good privacy, although it will need some revegetation work.
 - **Action 3: Develop a "Rustic Swimming Beach" on Lake Shumway.** Camper comment cards and verbal comments indicate the need for an additional beach in the park, preferably in the campgrounds. The Loon Lake beach is very busy, especially when bus loads of swimming classes come in to utilize the facility. There are very few public beaches in the area. A beach in the campgrounds would likely reduce the crowds on Loon Lake and would be a convenience for campers. There is a naturally-occurring sand beach on the south end of Lake Shumway. It is recommended that a minimum impact beach would be most appropriate. Campers could hike to the beach from the main campgrounds along a footpath. Only a small amount of clearing should be done along the shore and a terrace may be needed to protect the trees. This type of "Rustic Beach" would minimize the visual impact of the shoreline from the campgrounds and would also minimize loss of shoreline habitat. The project will need to comply with shoreline ordinances.
 - **Action 4: Construct a screened shelter building in the campgrounds.** There are frequent requests from campers to have some shelter/protection from the insects. Two potential locations are above the fishing pier or in the play area/field. This facility could also be used in inclement weather and would be a good location for future interpretive programs.
 - **Action 5: Construct a fish cleaning house in the campgrounds near the boat access area.** This would help control the disposal of fish garbage, would discourage bear problems and help control associated insect problems.
 - **Action 6: Install 6-8 electrical hook-ups in the Portage parking lot to allow for winter camping hookups.** Plowing the main campgrounds in the winter is not practical at Savanna Portage for the current winter use. However, there are limited winter overnight accommodations in the area, and there are a number of snowmobile users and skiers who would like to hook up their RV's. If a trail center/visitor center is developed in this area, it would likely increase the demand for this type of service.

Group Campground

- **Action 7: Develop a group camp near Wolf Lake.** Savanna does have a very high demand for a second group camp. Near Wolf Lake seems to be the best area that has been found in the park. The new camp should be off the lake, back in the pine plantation, to minimize impacts to the lake. The problem of mosquitoes in this area was discussed and initially it was suggested that a cluster of camper cabins would offer some protection. It is possible that a screened shelter and sanitation facilities might

be all the development that is needed. It was also recommended that the boat access remain a public access, not exclusively for the group camp. The primitive group camp on Savanna Lake is extremely popular and is booked a year in advance. With the recent acquisition of land on Wolf Lake, there was discussion at several meetings as to what should be done in this area. The pro's and con's of development were analyzed and it was noted that, although there is currently no development on the lake, it has historically been homesteaded, and the abandonment of the Teen Camp has left electrical lines and other infrastructure. Only a primitive group camp is recommended, as a Class I or II Group Camp would not be practical given budget constraints.

Backpack and Canoe Camping

- **Action 8: Experiment with screened lean-to shelters similar to the ones at St. Croix and Isle Royale National Park.**
- **Action 9: Relocate several of the backpack sites to better locations.**
- **Action 10: Develop a primitive canoe campsite(s) along the West Savanna River or the Prairie River Flowage.** Site selection will require additional study and evaluation.

Other Day Use Recreation

- **Action 1: Monitor and minimize damage to the Loon Lake picnic area.** Evaluate the area to determine if there is a need for improvements or if actions can be taken to minimize erosion etc.
- **Action 2: Remodel Loon Lake shelter to better utilize space and meet customer needs.** Currently few people use the changing rooms, more people use the restrooms for changing. Also there is poor visibility of the lake and playgrounds in the current design, and people need to be able to watch their kids.
- **Action 3: The accesses at Wolf Lake and the Prairie River Flowage should be improved and Wolf Lake should be classified as a non-motorized, electric trolling lake only.** It was further recommended that plank ramps be added at Wolf Lake only down to the water's edge. This access has a hard sand bottom, and a full ramp is probably not needed. It might create maintenance problems with spring ice heaves. At Prairie River Flowage (often called the Johnson Landing) it was recommended that the boundaries be established and posted with park signs. The existing parking lot should be upgraded, however, the access should remain a carry-in site.
- **Action 4: Enhance the visitors' opportunity to canoe the river in the park.** In accord with policies and guidelines, clear the West Savanna River, and from the Balsam Bridge to the Prairie River Flowage.

Roads, Parking Lots, Accessibility and Energy Efficiency

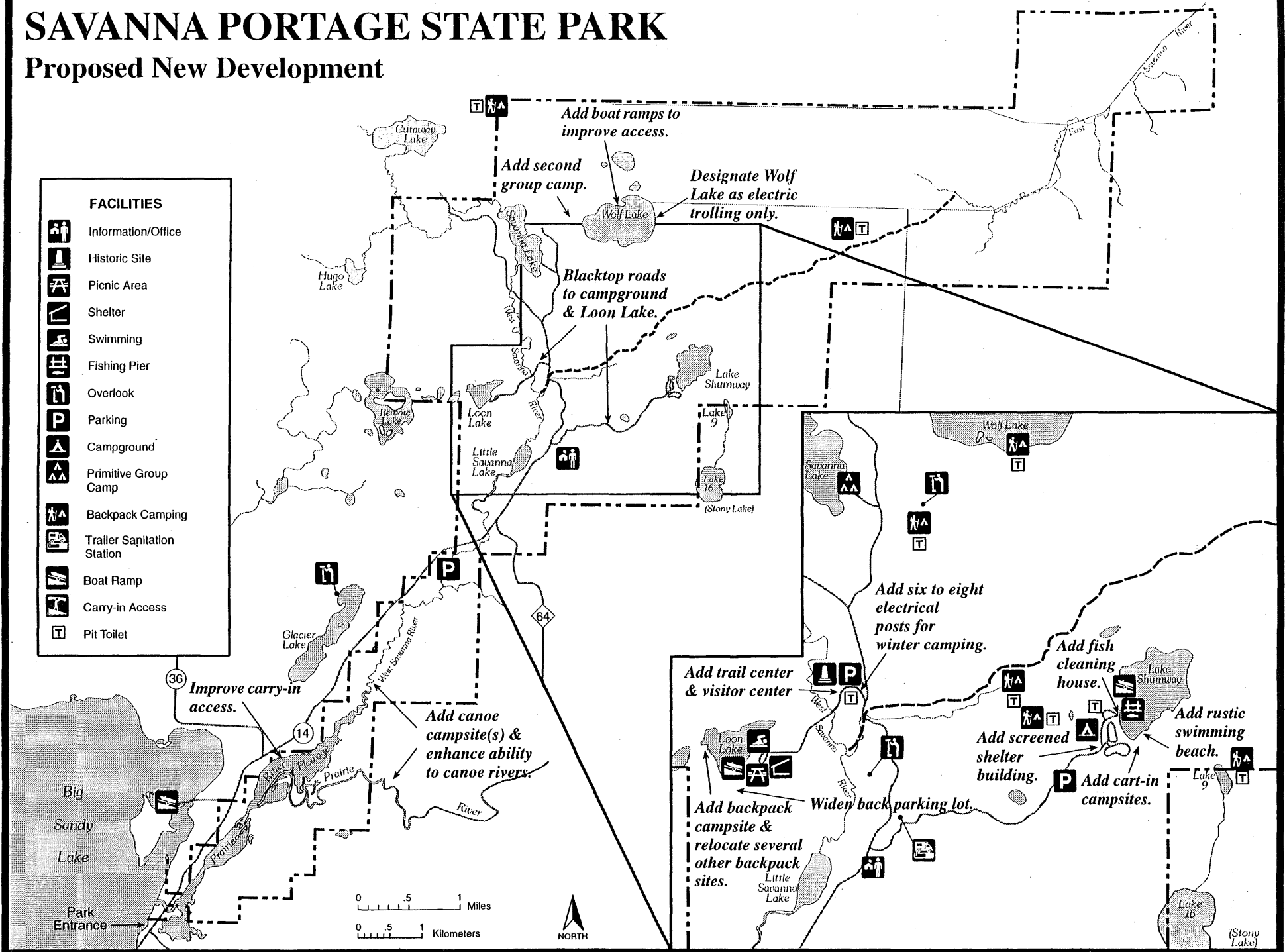
- **Action 5: Blacktop the main roads going to and through the campgrounds and**

SAVANNA PORTAGE STATE PARK

Proposed New Development

FACILITIES

- Information/Office
- Historic Site
- Picnic Area
- Shelter
- Swimming
- Fishing Pier
- Overlook
- Parking
- Campground
- Primitive Group Camp
- Backpack Camping
- Trailer Sanitation Station
- Boat Ramp
- Carry-in Access
- Pit Toilet



to Loon Lake. First priority would be the campground road, but Loon Lake should be done eventually. Further blacktop is not needed at this time. Once the campground and Loon Lake roads are blacktopped, it is probable that the road will be used by bicyclists and roller bladers, and these roads should be designed with that in mind.

- **Action 6: Widen the back part of the Loon Lake Picnic Area parking lot.** This could be widened in the back to allow for additional parking for school busses, RV's and other large vehicles with minimal environmental impact. It was recommended that no additional parking is needed in the park except at Loon Lake. A parking lot does not appear necessary or feasible at the east end of the portage trail. The winter parking, visitor parking in the campgrounds and at Continental Divide trail parking lot are all adequate.
- **Action 7: Convert the contact station and campground sanitary facilities to accessible buildings.** Making the park more accessible was seen as a major issue in the planning process. The office work is nearly completed (1996).
- **Action 8: Construct paved ramps from parking areas to buildings in accordance with the Americans with Disabilities Act (ADA).**
- **Action 9: Make an accessible trail from the Campgrounds/Boat Access around the north side of Lake Shumway.** Although the west end of the Portage Trail was originally considered for an accessible trail, resource impact and needed mitigation would make it impractical. Loon Lake was also considered, however there is already too much user impact on that area of the park.
- **Action 10: Evaluate the feasibility of constructing an accessible fishing platform/pad on Loon Lake.** Bank fishing is popular on Loon Lake and a fishing platform/pad(s) would make it more accessible for everyone, minimizing shoreline erosion.
- **Action 11: Utilize energy efficient lighting and heating in the park buildings.** Heating and lighting should also be evaluated and replaced when appropriate to improve efficiency. Interpretation could highlight these improvements.

Search and Rescue and Enforcement

- **Action 12: Work cooperatively with appropriate agencies (Enforcement, Forestry, Aitkin Sheriff's Office, McGregor Ambulance and Fire Department, Rice Lake Wildlife Refuge and Corps of Engineers) to develop a search and rescue plan for the park.** Include a listing and locations of various rescue equipment, determine if there are any special needs for the park (i.e. pre-packed rescue trail sled).
- **Action 13: Insure park staff are appropriately trained.** Coordinate rescue plans with the Sheriff's Department. Due to the size and remoteness of the park, search and rescue efficiency and effectiveness was identified as a major issue in the planning process.

-
- **Action 14: Evaluate emergency radio channel status.** Determine feasibility of accessing MINCEF and forestry stations to improve enforcement capabilities. (The park is already on the Aitkin County Sheriff's radio frequency). To attempt to deter future crime in the park, DNR Enforcement personnel and the Sheriff's Department should be encouraged to regularly patrol the park.
 - **Action 15: Boundaries should be cleared and identified to delineate the state park.** Savanna Portage State Park has never been surveyed. Therefore hunting continues to be an issue, especially since the park is surrounded by forestry land and the northern part of the park has been a traditional area for hunting.

PARK BOUNDARY

The existing statutory boundary of Savanna Portage State Park includes approximately 15,818 acres. Included within the boundary are approximately 1,681 acres of state-owned property administered by the DNR, Division of Parks and Recreation, approximately 600 acres of privately owned land, approximately 3,050 acres of school trust fund land and approximately 10,146 acres of Consolidated Conservation (Con Con) lands. Battle Island in Big Sandy Lake has recently been transferred from the Bureau of Land Management to the park and is now in the statutory boundary. Boundary modifications are considered during all state park management planning processes. Boundary modifications were discussed at several planning meetings and no major alterations of the park boundary are recommended. The unusual shape of the park is attributed to the goal of protecting the historic portage and the waterways connecting the two watersheds. There are several small islands in Big Sandy Lake, (in addition to Battle Island) that could be added to the park's statutory boundary.

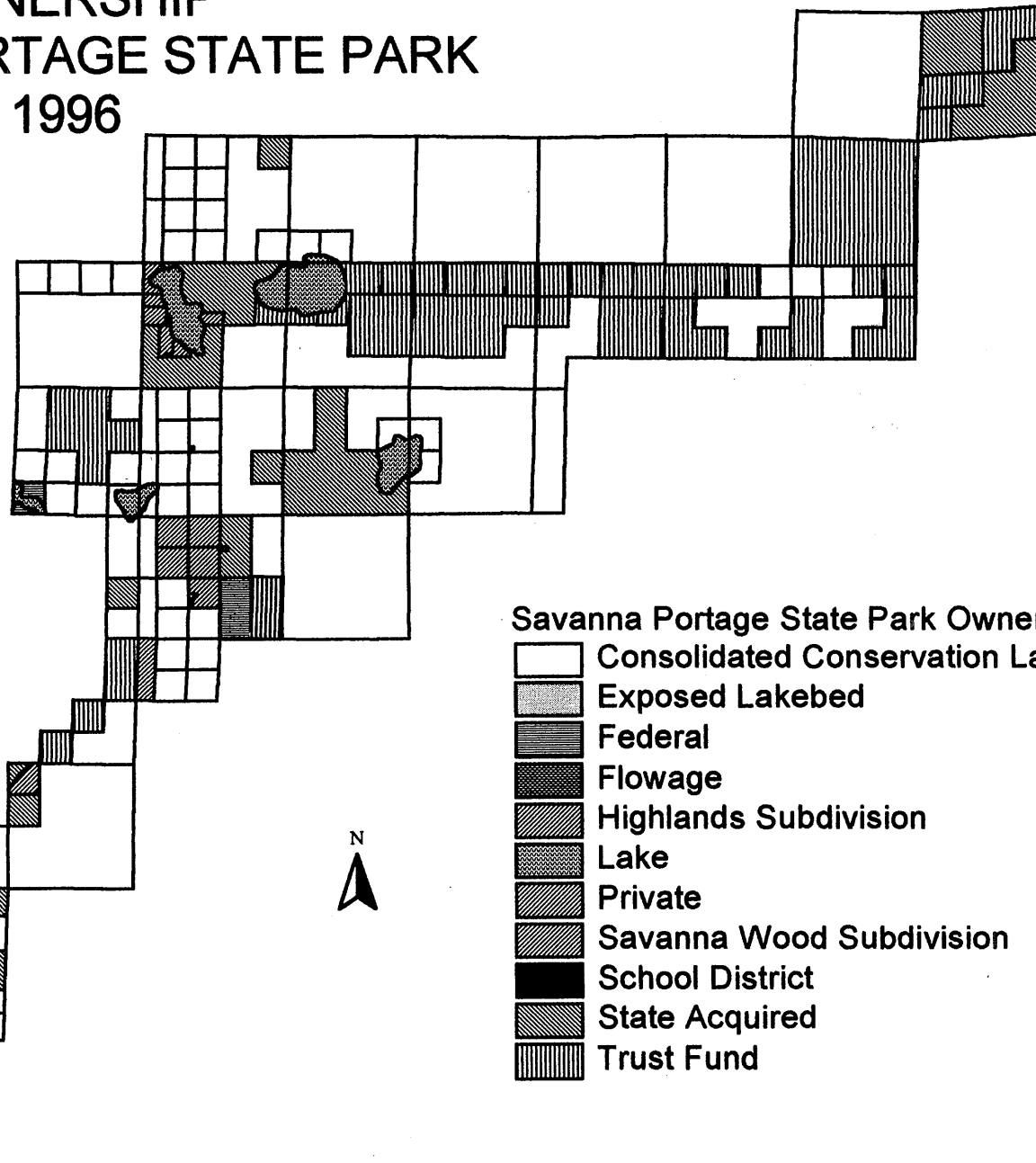
Land History

School Trust Fund Land. In 1849, when Minnesota was established as a territory, sections 16 and 36 of every township were granted in trust to the state to support education. Proceeds from the sale and management of these lands were placed in a trust fund called the Permanent School Trust Fund. The trust fund supports the public schools (K-12). The federal government granted 2,900,000 acres to Minnesota through these acts. In many townships, sections 16 and 36 did not exist, were under water or already homesteaded. Under such circumstances, the state was allowed to select land from the federal domain in lieu of lands that were not available. Indemnity school trust lands are often referred to as "in-lieu" lands. (DNR Administered Lands, 1989). In the past, the state also administered over 4.7 million acres of Swamp Trust. Today there is still over 1.5 million acres of the Swamp Trust Land and it has been combined with the School Trust Fund Land and is treated in the same manner. As of 1996, there is a combined total of approximately 2.5 million acres of Trust Fund Land. The DNR administers these lands and the proceeds are apportioned to the schools. (See the following sections on Payment-In-Lieu-of-taxes-PILT)

At one time state parks had many acres of trust fund land. Through the State Park School Trust exchange project 6,750 acres of this land was removed from parks. Four state parks still have trust fund land: Savanna Portage, Nerstrand Big Woods, Hill Annex and Itasca. Of these, Savanna has the most acreage in trust fund lands. Most of the 3,049.5 trust fund acres are located in the northern part of Savanna Portage State Park; 2,806.98 in Aitkin County and 242.52 in St. Louis County. (See Ownership map).

The Issue: Ideally, there should not be trust fund land in state parks, because it does not generate revenue for the fund (State parks are precluded from paying). Typically, revenues are generated from trust fund land through timber harvest, gravel mining or mineral leases. However, there are other areas in the state where trust fund land is not currently generating revenue due to poor access or low forest productivity (i.e. swamps).

OWNERSHIP SAVANNA PORTAGE STATE PARK 1996



Savanna Portage State Park Ownership

- Consolidated Conservation Land
- Exposed Lakebed
- Federal
- Flowage
- Highlands Subdivision
- Lake
- Private
- Savanna Wood Subdivision
- School District
- State Acquired
- Trust Fund

Consolidated Conservation Land.

(Also referred to as Conservation Lands, or Con Con lands).

During the 1920s and 1930s many drainage projects failed to meet their financial obligations due to nonpayment of tax assessments. Counties experienced difficulty in making payments on the debt and eventually defaulted. The state assumed responsibility for these defaulted debts in return for title free of trust for the taxing districts within the counties. The state acquired title to more than 1.6 million acres in this way. In 1949, the state legislature placed these lands into "conservation areas".

Consolidated Conservation land is generally administered by the Division of Forestry, however, the Division of Fish and Wildlife also administers some Con Con land.

Savanna Portage State Park has Consolidated Conservation land scattered throughout the park that is administered by the Division of Parks and Recreation.

The Issue: Although the DNR has title to the Con Con lands, the counties are entitled to receive 50% of the proceeds from revenue generated on these lands. However, logging and mining operations do not take place in state parks, therefore, state parks have been exempt from these payments. The issue is the perceived loss of revenue to the county. (Note: approximately half of the Con Con land in Savanna Portage is wetlands).

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 Savanna Portage State Park the following rates currently apply (1996):

<u>In-Lieu Land Class</u>	<u>Payment to County</u>
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

For Savanna Portage State Park, most of the DNR administered land base is currently in category #3 at the \$.375/acre rate since over 10,000 acres is Con Con land and 3,049 is Trust Land. In Aitkin County, Savanna Portage State Park accounts for only 2% of the state in lieu land, and in St. Louis County only a fraction of a percentage. In fiscal year 1995 (payable 1996), St. Louis County received the highest in lieu tax payment of any county in the state (\$957,789). Aitkin County ranked fifth highest in the state, receiving a payment of \$430,256 from the state.

Recommended Land Management Actions

- **Action 1: Seek funding to purchase the Trust Fund Land (3,050 acres) within the park.** This project will be placed in priority order with other state park acquisition projects and can be acquired as funds become available. The Division of Parks and Recreation will be developing an acquisition strategy for trust fund lands in Savanna Portage and the other three parks with trust fund lands. This strategy may include requesting special legislation to fund the acquisition, or the division may allocate a percentage of the regular acquisition budget on an annual basis until all the trust fund land has been acquired. Other options such as exchanges and transfers were discussed and explored; however, acquisition would seem to be the most practical in the case of Savanna Portage.
- **Action 2: Work with the County Board and county government to reach an agreement on Con Con land. If a County Board resolution is passed, then seek appropriate legislation to implement the plan.** The county will have the choice to determine what will be the best revenue generating situation for them; however, the legislature will need to authorize the action. The reason Savanna Portage was designated as a state park, was to preserve the historic portage trail. Previous logging operations have already destroyed sections of the trail. The desire to preserve the portage was a local initiative. Once an archaeological site is destroyed, it is gone forever and cannot be replaced. Therefore, it is highly unlikely that future logging or mining operations will take place on the Con Con lands in Savanna Portage State Park. One option, however, would be for the county to give up their 50% interest in revenue from the land and have it removed from the Con Con listing, the land could be reclassified as acquired land and the county could receive significantly higher payment in lieu of taxes. (At 1996 rates it would mean the difference of Con Con payments of \$3,804 or potential acquired lands payments of \$30,436). Legislation would need to stipulate that for purposes of calculating the PILT, this land would be treated as "acquired lands" (otherwise it would be exempt acquired lands and would still be at the \$.375/ac rate). Appropriate local units of government will also be contacted for their support; without the support of the community, the Division of Parks and Recreation will not request the designation changes from the Legislature.
- **Action 3: Seek funding to purchase private and other publicly owned land within the park.** This project will be placed in priority order with other state park acquisition projects. Private lands are acquired only from willing sellers.
- **Action 4: The parts of the park that have been posted are refuges , however, in managing wildlife populations, there may be biological reasons for having a special hunt.** The southern park of the park has not been surveyed or posted yet. Education of hunters regarding policy will need to continue.
- **Action 5: The purpose of any tree removal would be for resource management reasons, and not to generate revenue.** However, if revenue is generated on a management project, then it will be necessary to investigate reimbursement procedures if the cutting takes place on trust fund land or Con Con land.

INTERPRETIVE SERVICES

The Minnesota State Park and Recreation's interpretive mission is

"to provide accessible interpretive services which create a sense of stewardship for Minnesota's natural and cultural heritage by illuminating the changing relationships between people and landscapes over time."

As a division of the Minnesota Department of Natural Resources, the Minnesota State Park system seeks to promote increased understanding, appreciation, and enjoyment of natural and cultural resources in Minnesota; assist in protecting each state park's resources; promote public understanding of, involvement in, and support for the Minnesota Department of Natural Resources and its Division of Parks and Recreation; and to increase public awareness of critical environmental problems on a local, state, national and worldwide scope, as a major provider of environmental educational experiences.

The park Interpretive Services chapter of this plan identifies and describes interpretive themes (or stories) that should be told about Savanna Portage State Park based on its natural, cultural and recreational resources. The chapter recommends ways for the park manager and staff, regional naturalist, park interest groups and volunteers to interpret and tell those stories to the park's stakeholders. The resources and themes listed in this chapter reflect the importance of those stories as they fit in with the Minnesota State Park System's Interpretive Services Plan (1994).

Savanna Portage received the highest ranking possible in representing the resource characteristics of the Tamarack Lowlands Landscape Region. This means that the park comes close to depicting what the original native vegetation of this area looked like, although the upland areas had already been logged extensively for pine and spruce prior to surveys.

Savanna Portage State Park is the only park located **in the Tamarack Lowland landscape** region, although there are other parks in the Mille Lacs Uplands. This region has level to gently rolling topography with little relief. It covers most of Aitkin County, southwestern St. Louis County, western Carlton County and southeastern Itasca County. This area was once covered by Glacial Lakes Aitkin and Upham. This landscape region is characterized by extensive peat lands intermittently interrupted by stretches of sandy mineral soils. An original vegetation map compiled in 1930 by F. J. Marschner indicated that conifer bogs and swamps were the predominant vegetational types in the area. Black spruce, tamarack and white cedar are common trees in the peatlands, but there is also a vast acreage of patterned peatland not covered by trees. Aspen-birch (conifer) and Jack Pine Barrens were major upland vegetation types in this region. Culturally, this area is important for its large stands of wild rice, and the area was inhabited by the Dakota and Ojibwe who used this food source.

Landscape Regions provide one reference point in time to interpret what resources

where here when Europeans arrived, how interactions between people and the land affect each other, and why the landscapes look the way they do today. The natural resources in Savanna Portage State Park are significant on a statewide level. The resource is of interest to the public, and with interpretation it has the potential for attracting an interpretive audience from around the state.

Cultural resources in Savanna Portage State Park are ranked as having Upper Midwest Regional Significance. Regional significance and high quality of the cultural resources is noted by both cultural resource professionals and the general public. With interpretation, the cultural resources have the potential for attracting an interpretive audience from the upper Midwest region, defined as the state and provinces bordering Minnesota.

Interpretive Clientele

An analysis of park use has been used to measure the present and potential audiences for interpretation in all Minnesota State Parks in the Interpretive Services Plan. This was based on the number of day use visitors, the number of campers and the population within a 25-mile radius. The criterion to document additional potential users of the park's interpretive services includes environmental education opportunities for local schools. Savanna Portage ranked mid-range for number of campers, low for number of day users and very low for population base within 25 miles, when compared to other state parks.

There are several organizations in the area that could account for potential increased interpretive interest. The Long Lake Conservation Center is located approximately 30 miles west of the park and serves 6,000 students in a residential setting each year. In addition, each summer the Conservation Leadership School combines traditional camp experiences like canoeing, hiking, archery, and camping with a thorough grounding in conservation principles and resource management. The summer camp program would be the most likely to be interested in field trips to the park. They are particularly interested in canoeing opportunities.

Other groups that frequently use the park, and may be interested in interpretive services, are the Aitkin Senior Citizens and Camp New Hope. At this time, the local schools under-utilize the park for field trips.

Interpretive Themes

Connecting Themes

Connecting themes are the common elements that tie the area together. Two broad themes have been identified for Savanna Portage State Park. They highlight the most obvious aspects of the park's resource identity.

1) The Mille Lacs Uplands and Tamarack Lowlands landscape regions that the park represents have had a profound affect on the past and present relationships between people and the land.

Area lakes, soils and vegetation have provided habitat for humans to live and thrive since prehistoric times. The changing geography, vegetation and geology of the Mille Lacs Uplands and Tamarack Lowlands subsections are an ongoing process. These changes occur naturally through geologic processes and forest succession as well as human imposed changes, such as logging and drainage ditching.

2) The Savanna Portage Trail has had a major influence on the natural and cultural resources of Savanna Portage State Park.

This six mile portage has been used by humans for centuries as a major trade and travel route connecting the Lake Superior watershed with the Mississippi River watershed. The region was highly valued by the Dakota and Ojibwe Indians who lived in the area at various times and who used the portage trail. In the 1700s Europeans and Americans began utilizing the portage as a significant connection in the water route between the eastern United States and the interior of the country.

Primary Themes

Primary themes are the main stories of the park. Examples of primary themes are outlined below.

Cultural

- Lakes, rivers and portages were the primary highways for past travel and trade.
- The Savanna Portage was used as a travel and trade route by both Ojibwe and Dakota Indians for several hundred years.
- The Savanna Portage was a significant route for European and American fur traders, explorers and missionaries as they traveled into the interior of Minnesota.
- The fur trade of the 1700s was built on long established trade routes, and had an important effect on how the Savanna Portage area was explored and settled.
- The six-mile portage posed some of the most difficult carrying in North America.
- There were several rest stops or "pauses" on the Savanna Portage. Many of these have been identified by historical and archaeological research.
- An overland route was used in dry years that extended the Savanna Portage several miles to the Prairie River flowage or perhaps to Big Sandy Lake.
- Logging became the major industry in the area in the late 1800s and early 1900s
- Logging camps operated in what are now park boundaries, playing a critical role in shaping the vegetation we see today.

-
- Efforts to drain the tamarack swamps through ditching in the early 1900s had an effect on the drainage, hydrology and fisheries in the Wolf Lake area.

Geologic

- Most of the major land forms found in the park, such as eskers (the Continental Divide Trail), rolling hills, tamarack bogs and lakes were formed during glacial advancing and retreating.
- Global issues such as pollution and acid rain have an effect on local water quality in the park.
- Geology involves ongoing processes; landscapes are continually changing from natural and human caused processes.
- Water falling on the east side of the continental divide will flow to Lake Superior and the Atlantic Ocean via the East Savanna and St. Louis Rivers. Water falling on the west side of the divide will flow to the Mississippi River and the Gulf of Mexico via the West Savanna River and Big Sandy Lake.

Biologic

- Biological diversity is an important component of a healthy ecosystem.
- Wetlands such as tamarack bogs play many important roles in a healthy ecosystem.
- The park's old-growth hardwood forests provide valuable habitat for many species of birds, mammals and other animals.
- Logging altered the character and species composition of the park's woodlands.
- The park is a unique place to view and learn about wildlife such as deer, beaver, otter, wolves, eagles and many other animal species.
- Exotic species interfere with the management of native communities.
- Careful management can restore wildlife which has been lost from an area due to disturbances.
- Fire plays an important role in forest regeneration and succession.

Management

- The Big Sandy Area Lakes Watershed Project has played an important role in mobilizing local landowners to play an active role in protecting the environment.
- State parks provide many benefits to individuals and the community.
- Ecosystem-based management promotes an integrated healthy, sustainable environment, community and economy.
- How do activities outside of the park affect the park (and vice-versa)?

Summary of Existing Interpretive Services

Personal

There is presently no interpretive staff assigned to Savanna Portage State Park. According to the Minnesota State Park System Interpretive Services Plan, Savanna Portage is in the group of parks that ranks medium to high in resource significance and visitor use is high but with seasonal peaks. Parks in this group merit programming 4 to 7 days a week during peak season by a seasonal naturalist. They also merit a seasonal interpretive center; indoor displays and exhibits; audiovisual programming; self-guided trails and wayside exhibits. Until such can be funded, park management staff will provide some interpretive programs for Community Education programs, special events and classroom presentations, as time allows. The regional naturalist will assist in these efforts.

Non-Personal

Current interpretive efforts at Savanna Portage State Park include a self-guided trail and signs along the Savanna Portage Trail, with an accompanying brochure. There is also a larger exhibit/sign near the parking area. An interpretive display area in the park office highlights the two broad primary themes.

Trail

The one interpretive trail in Savanna Portage State Park is located on a three-mile section of the portage trail. It interprets the history and natural resources along the trail using signposts located along the side of the trail.

Facilities

The contact station serves as the only interpretive facility at this time. The office has been recently remodeled to meet ADA regulations and there is now additional space for exhibits and a small visitors library. Planning efforts are underway to develop this new area interpretively, with expanded displays and resources.

Volunteers

Volunteers at Savanna Portage are utilized primarily for special programs.

Interpretive Services Recommended Actions

This plan provides the basic management direction for the park and is not intended to provide specific management or development details. Note: The primary and secondary themes will guide where and what types of interpretive services we will provide. (For example, forest management kiosks would be located near an active forest management site.)

Non-Personal Programming Recommendations

Facilities

- **Action 1: In the short-term, the exhibit area of the park office should be improved.** Dominant park themes should be interpreted with references made to primary themes which will be interpreted in other park locations. In addition, a small reading area will be included for reference materials regarding park and portage history.
- **Action 2: Pursue the original recommendation (1966) to build an interpretive center in the vicinity the Portage parking lot.** The ideal building would be a multipurpose facility--a combination Trail Center and Visitor Center if a practical site and design is developed. This would serve summer and winter visitors. Such a building would also serve as an educational focal point in the park. This location is highly desirable from an interpretive perspective. It is also good in that the ski trails and snowmobile trails will meet in this area. Having it in this location is not a new idea. It was recommended as early as 30 years ago and in subsequent archaeological survey reports. Many site considerations need to be factored into such a decision, and a feasibility study will need to be completed.
- **Action 3: Develop facilities for outdoor interpretive events.** At present Savanna Portage has very little equipment or facilities for conducting programs, hikes or lectures. Currently a rustic amphitheater is located in the campgrounds.

Self-guided trails

- **Action 4: Bog Walk Trail--this would probably be best developed near the northern end of Wolf Lake to Lakes #3 and #4.** This will take visitors through a black spruce forest, then tamarack, and then through large cedars. This is seen as the highest priority for self-guided trail development.
- **Action 5: Develop a self-guided trail around Lake Shumway.** This could focus on forest cover-type, history of Indian and European settlement.
- **Action 6: Savanna Portage State Park (Sandy Lake/McGregor area) could be developed as a major stop on a thematic "circle" tour of Minnesota** (e.g. Mille Lacs Indian Museum, Forest History Center etc.).

Brochures, Guides and AV materials

- **Action 7** Show interpretive films at the park office, and eventually at the visitor center.
- **Action 8: Develop a Beaver Pond Loop Trail.** Use this trail to showcase pines and beaver habitat.
- **Action 9: Have for sale publications regarding the park or area history/culture** such as books, pamphlets or video programs that would help to tell the story of major interpretive themes.

Exhibits and Kiosks

- **Action 10: Develop an exhibit on the Tamarack Lowland ecosystem that would be located at the scenic overlook on the Continental Divide Trail.**
- **Action 11: Interpret other historic resources in the park** - the logging camp, the historic Ojibwe settlement, early settler houses, the drainage ditches.
- **Action 12: Displays are an important feature at any historic site. More emphasis should be placed on exhibits** of either artifacts or reproductions, maps, dioramas, photos, kiosks, programs, or independent electronic audio and/or visual displays.
- **Action 13: Work with existing organizations to coordinate promotional activities.** Develop a photo display for the McGregor tourist information booth.

Naturalist Program Recommendations

Staff

- **Action 1: As recommended in the Interpretive Services Plan, a seasonal naturalist should be assigned to Savanna Portage State Park as soon as funding can be secured.** The position will require strong knowledge, skills and abilities in both natural and cultural interpretation.
- **Action 2: Develop alternative interpretive presentation activities.** Interpretive programs have consistently been cited by state park visitors as one of the most desirable features of a state park camping experience. Because of the significant historical features of the park and the desire of many park visitors to understand this aspect of Minnesota's past, finding alternative means of interpretation is desirable. Fortunately, a variety of options exist which might take advantage of the park's features and use patterns at relatively low cost. This may include increasing the number of special interpretive programs presented in the park.

Programs

- **Action 3: Outreach programs for area schools, colleges, parks (e.g. Jay Cooke, Itasca, Crow Wing) and public events could tell the story of Savanna Portage**

State Park and showcase the resources here.

- **Action 4:** Cooperative programs with other agencies or parks might be useful in showing the connection between regions.
- **Action 5:** Tours of the area for park visitors, or as a means of attracting persons to the park, could be held during the summer in conjunction with special events.
- **Action 6:** The park can host specific events or programs, such as: canoe trips with school classes or other groups down the West Savanna River (day trip); sponsor endurance races from the St. Louis River to the Mississippi; have voyageur "baptisms" at the height of land; commemorate portage hiker's achievements with unique medallions in the form of trade tokens; offer unique crafts by Ojibwe people.

OPERATIONS, STAFFING, AND COSTS

Operations and Staffing

Savanna Portage State Park operations are minimally implemented with present staff levels. Resource degradation, from minimal maintenance, is occurring in some areas; for example building maintenance and trail maintenance. Several actions in the plan would require additional staffing.

The 1994, Division of Parks and Recreation Statewide Interpretive Plan recommended the placement of a Seasonal Naturalist at Savanna Portage. The planning process fully justified that position. In addition, there are a number of recommendations which will result in the need for additional staff, mainly maintenance hours. Examples of this would be: the trail center, a group camp, a cart-in campground. Currently, enforcement problems are minimal in the park. Future enforcement efforts should be focused on heavy use weekends and interpretive efforts (personal and non--personal) and should emphasize ways to protect the park's natural and cultural resources and reduce impacts on the resources. This could become increasingly important if future bike trail use increases significantly.

Many of the development proposals would have initial start-up expenses with additional long term maintenance expenses. Some of the proposals could be developed with minimal expenses using alternative labor, for example:

- North Star Ski Club
- Sentences to Services (STS)
- Minnesota Conservation Corps
- Other Volunteers

For example, use the North Star Ski Club and/or STS to complete construction on the proposed trail changes. This would result in minimal impact on the park operating budget for construction, however, there would still be ongoing maintenance costs.

The Division of Parks and Recreation will experience increased staffing needs and work loads as a result of plan implementation. Other DNR disciplines may also experience some increased work load in the implementation of certain recommended actions. For example the Division of Enforcement, the Division of Forestry, the Division of Trails and Waterways, the Division of Fish and Wildlife, the Bureau of Engineering, and the Bureau of Real Estate Management, may experience increased work loads as a result of increased recreational opportunities and resolution of land issues. Local representatives of these disciplines participated in the planning process and are familiar with what their role may be in the future.

Costs

Operational Costs

If all the actions and recommendations in this park plan were implemented, the park's annual operational costs would need to be significantly increased. 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 (approximately \$16,000) combined with a review of the development projects outlined below, suggests the park'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 (as noted) 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, septic system selection, distance to electrical service).

1. Develop a portable photo/promotional display.
2. Conduct biological surveys.
3. Restore degraded communities and remove undesirable exotic species.
4. Complete park database and GIS of natural and cultural resources.
5. Assist in assessing ditches in the park for wetland mitigation.
6. Provide "bear-proof" boxes in backpack sites
7. Conduct oral history interviews and document information
8. Conduct cultural resource surveys, especially in proposed development areas.
9. Inventory and catalog historical records, documents and artifacts.
10. Work with archaeologists to determine if mitigation is needed for known cultural sites.
11. Implement recommended trail changes - approximately 10 miles of new trail.
12. Construct a new Trail Center/ Visitor Center.
13. Construct three new bridges on snowmobile trails.
14. Add two new ski/backpack shelters
15. Construct an interpretive Bog Walk Trail
16. Remodel A-Loop campground toilet building with flush toilets.
17. Develop a cart-in campground.
18. Develop a "rustic swimming beach" on Lake Shumway.
19. Construct a screened shelter building in the campgrounds.
20. Construct a fish cleaning house in the campgrounds.
21. Install 6-8 electrical posts in the Portage parking lot for winter camping.
22. Develop a primitive group camp near Wolf Lake, with a screened shelter.
23. Construct 2-4 screened lean-to trail shelters.
24. Relocate 2-3 backpack sites.
25. Develop primitive canoe campsite(s).
26. Remodel Loon Lake shelter.

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27. Improve accesses at Wolf Lake and Prairie River Flowage.
 28. Blacktop the main roads going to the Campgrounds and Loon Lake.
 29. Widen the Loon Lake parking lot.
 30. Convert campground sanitary facilities to accessible buildings.
 31. Construct paved ramps from parking areas to buildings.
 32. Construct an accessible trail from campgrounds/boat access around the north side of Lake Shumway.
 33. Evaluate/construct accessible fishing platform/pads on Loon Lake.
 34. Install facilities for outdoor interpretive events.
 35. Develop a self-guided trail around Lake Shumway.
 36. Develop a trail kiosk on the Tamarack Lowlands.
 37. Exhibits - early travelers, historic resources in the park, ditches.
 38. Brochures - bears, bird/wildlife watching, history.

A breakdown of development cost estimates is available in the Planning Process File.

Acquisition

All acquisition projects will be placed in priority order with other state park acquisition projects. The total cost to complete this acquisition is estimated at \$ 1.5 million (1996 dollars).

1. Purchase Trust Fund Land (approximately 3,050 acres).
2. Purchase Con-Con Land (approximately 10,00 acres).
3. Purchase other private, county and federal land (approximately 600 acres).

Plan Modification Process

State Park Management Plans document a partnership-based planning process and the recommended actions resulting from that process. These comprehensive plans recognize that all aspects of park management are interrelated, and that management recommendations should also be interrelated.

Planning is an ongoing process and the written plan must be regularly revised if it is going to have continuing value. 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 Division of Parks and Recreation. 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 park mission, vision, goals, or specific management objectives outlined in the plan; or
2. Is controversial among elected officials and boards, park user groups, the public, other DNR divisions or state agencies.

Management Plan Amendment Process

1. Division of Parks and Recreation Initial Step: Review plan amendment at park and regional level. Determine which stakeholders potentially have a major concern and how those concerns should be addressed. If the major concerns are within the Division of Parks and Recreation, 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 agencies, the issue should be resolved by staff from both agencies and approved by the Division of Parks Director.

4. If the proposed change is potentially controversial among elected boards, park user groups, or the public, the park advisory committee should discuss the proposed change and attend an open house forum which is advertised in the local and regional area. Following the open house, the Division of Parks Director 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 park management plan (through mission, vision, goals, and objectives, the Division of Parks has 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 detailed-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 (Natural and Cultural Resource Objectives and Integrated Management page 61) and Interpretive Services chapter should be updated periodically as needed. Division of Parks and Recreation 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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