William O'Brien
State Park Management Plan

Draft

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STATE OF MINNESOTA

DEPARTMENT NATURAL RESOURCES
Park Planning

Office Memorandum

TO : All Individuals Interested In The Management Plan For William O'Brien State Park

DATE: June 5, 1981

FROM : Jim Weseloh, Park Planner
Peter Buesseler, Park Planner

PHONE: 296-6078

SUBJECT: William O'Brien State Park Open House

A draft management plan for William O'Brien State Park has been completed. You can review a copy at any Washington County library, the Minneapolis central library, the St. Paul central library, and at the William O'Brien State Park office. An open house is scheduled for Tuesday, June 23rd to discuss the plan with you. It will be held in the Village Hall at Marine from 7:00 p.m. to 9:30 p.m. Please feel free to drop in any time during these hours.

This open house is the third, and last, in a series of three planning workshops the Department of Natural Resources has hosted on William O'Brien State Park. The first two were held September 10th and December 17th, 1980. Many of you may have attended these. This third workshop is being held in the middle of a 30-day review period on the draft plan (June 8-July 7). You are guaranteed this opportunity to review the draft by the Outdoor Recreation Act of 1975. The product of our cooperative efforts will be a plan that identifies present park needs, and guides future park development and management.

We hope you can be there. If you wish to send us written comments on the draft management plan, address them to:

Jim Weseloh or Peter Buesseler
Department of Natural Resources
Park Planning Section
Box 10E - Centennial Building
St. Paul, Minnesota 55155

or call 296-6078.

JW:PB:la

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PREFACE

The primary concern in the development of the park management plan format was the identification of the "audience." For whom are these plans to be written? Eight different audiences were identified.

1. DNR reviewers of the whole planning process
2. DNR reviewers whose main concern is one specific part of the plan
3. DNR regional administrators, supervisors, and park managers
4. SPA reviewers
5. The general public
6. Special interest groups
7. Reviewers of the environmental impacts of proposed actions
8. Legislators

The requirements of each of the audiences are different. All audiences require a document which includes some technical data, but the degree of detail as well as the manner of presentation varies. Some audiences require that specific topics be discussed in detail in all phases from inventory through recommended management. Other groups require a short, non-technical, yet comprehensive and logical management plan. A plan, obviously, cannot be both technical and non-technical nor can it be both long and short. It seemed logical then to produce two documents: 1) a short, comprehensive, non-technical document for the general public ("General Park Management Plan" GPMP), and 2) a detailed, technical document for specialists ("Management Plan Detail" MPD).

This document is the General Park Management Plan. All recommendations, both resource management and physical development, are included in this document. Detailed inventory data and specific instructions necessary for implementation of the plan are not included. This information has been compiled into technical appendices which are on file at:

Park Planning
Department of Natural Resources
444 Lafayette
St. Paul, Minnesota 55101

THE PLANNING PROCESS

The variety of outstanding natural, cultural, and historical resources of Minnesota provide abundant opportunities for outdoor recreation and education. In order to ensure that present and future generations will have the opportunity to enjoy these resources, we must plan now to protect, perpetuate, and provide access to these resources. For this reason, the Minnesota State Legislature passed the Outdoor Recreation Act of 1975 (ORA '75).

This act mandated that a comprehensive management plan be completed for each of the major units in the state recreation system. In the course of this planning process, each park will be classified in recognition of its resources and its role in the statewide system.

This plan sets the long range goals and objectives for resource management and recreational development which are appropriate for the park's classification. The actions that should be taken to move toward fulfilling these goals and objectives are then stated and scheduled.

The planning process consists of five steps:

1. Compilation of an inventory of natural resources and existing facilities. Task forces of specialists from other DNR divisions and sections are mobilized to assist in collecting pertinent data. At this point the first public workshop is held.

2. Identification of alternatives for park management and development. A second public workshop is held to review these alternatives and invite further public comment. These alternatives are then reviewed by the DNR, Division of Parks and Recreation.

3. Classification of park, development of park goal, and writing draft plan. This step culminates in the first interdepartmental review, followed by a 30 day public review. Within this 30 day period, the third public workshop is held.

4. Revision of the draft plan according to information received from public and interdepartmental reviews. Plan is then sent to the State Planning Agency for a 60 day reviewal period.

5. Implementation of development plan by the DNR, Division of Parks and Recreation.

INTRODUCTION

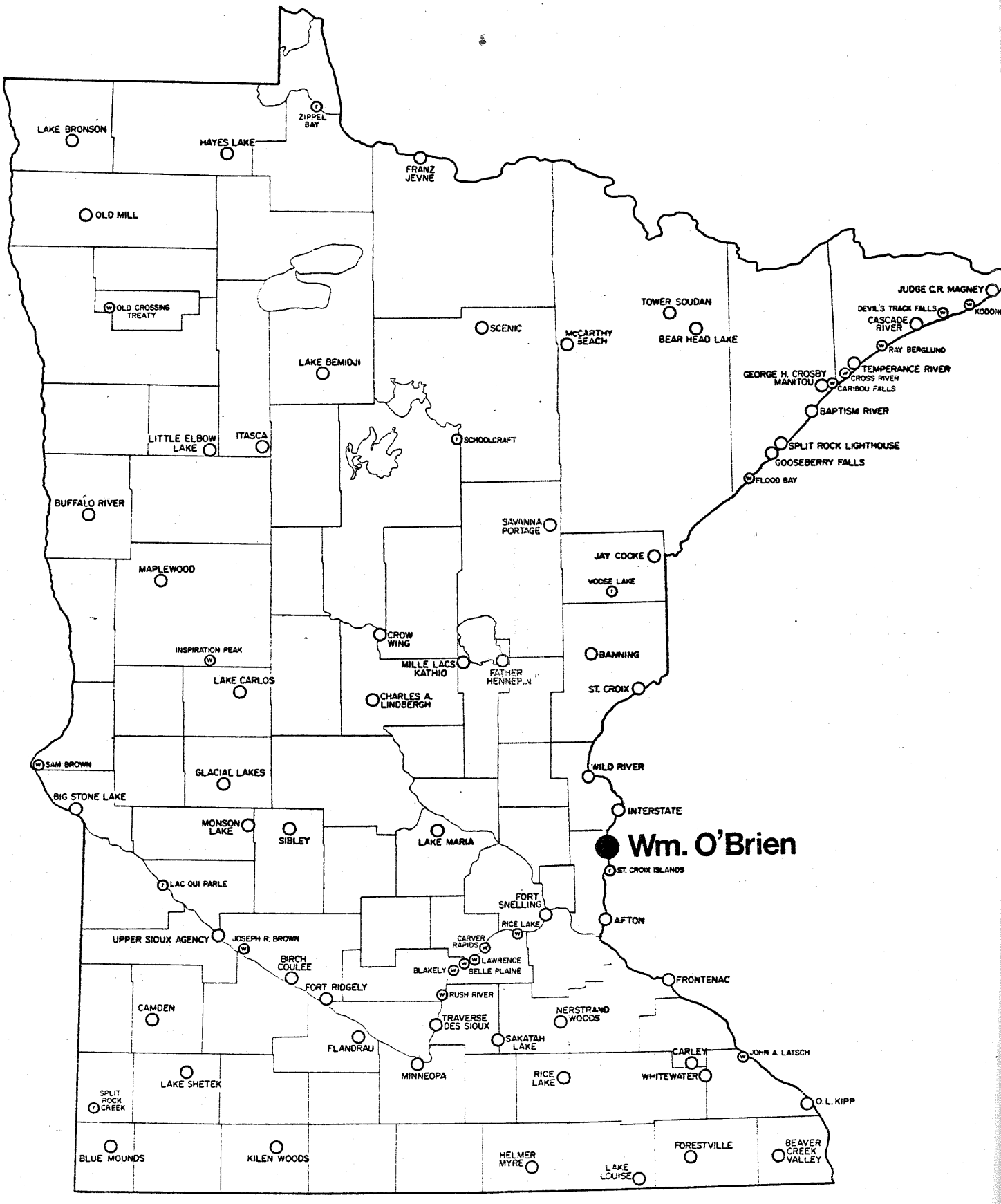
AN OVERVIEW OF WILLIAM O'BRIEN STATE PARK

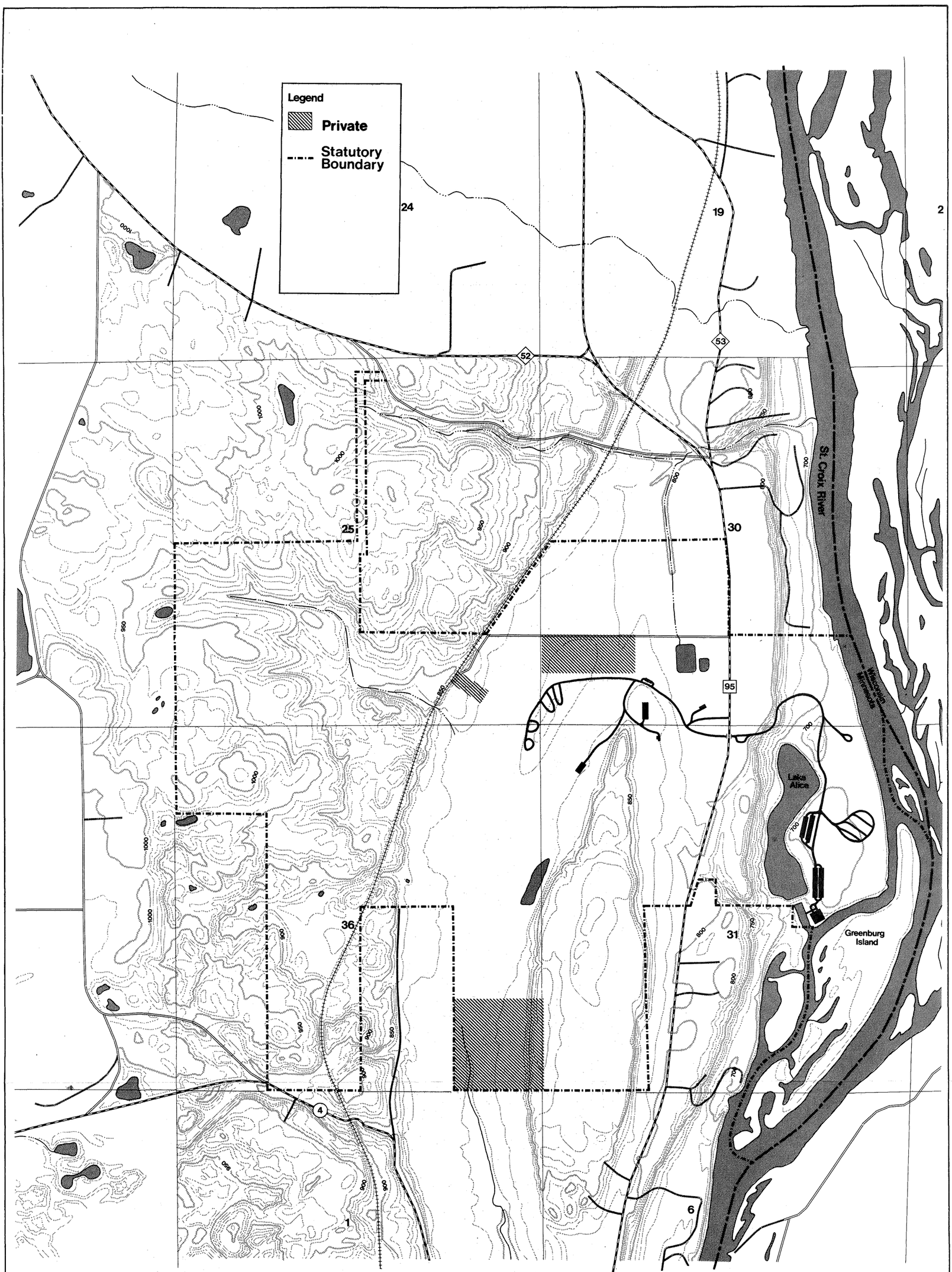
William O'Brien State Park is located in Washington County at Marine on St. Croix, approximately 30 mi (48 km) northeast of Minneapolis and St. Paul between the cities of Stillwater and Taylors Falls. The park's eastern most boundary is the Wisconsin state line and the St. Croix River which is a component of the national Wild and Scenic Rivers system.

As important as William O'Brien's natural amenities, are its recreational amenities. Lying within 30 mi (48 km) of the Twin Cities metropolitan area, the park offers a variety of recreational opportunities to the outdoor enthusiast. The type of activities offered are not often duplicated so near the Twin Cities area. Recreational opportunities span the seasons from cross country skiing to canoeing, camping, hiking, and swimming.

William O'Brien State Park became a reality when Alice O'Brien donated land in memory of her father to be used as a state park. William O'Brien was a pioneer lumberman who settled in the area. The park was expanded with the addition of Greenberg Island which was donated in memory of Phillip and Ellen Greenberg by the family of their son, S. David Greenberg. Other park lands have since been acquired from willing sellers.

There are 1343 acres (544 ha) within the statutory boundary of William O'Brien State Park. The state owns 1270 acres (514 ha). Of the 73 privately owned acres (30 ha), 18.7 acres (8 ha) are Soo Line Railroad right-of-way and the remaining are owned by private individuals. See Ownership Map p .


LAKE BRONSON
HAYES LAKE
ZIPPEL BAY
FRANZ JEVNE
OLD MILL
OLD CROSSING TREATY
SCENIC
McCARTHY BEACH
TOWER SOUDAN
BEAR HEAD LAKE
JUDGE C.R. MAGNEY
DEVIL'S TRACK FALLS
KODONI
CASCADE RIVER
RAY BERGLUND
TEMPERANCE RIVER
CROSS RIVER
CARIBOU FALLS
GEORGE H. CROSBY MANITOU
BAPTISM RIVER
SPLIT ROCK LIGHTHOUSE
GOOSEBERRY FALLS
FLOOD BAY
LAKE BEMIDJI
LITTLE ELBOW LAKE
ITASCA
SCHOOLCRAFT
BUFFALO RIVER
SAVANNA PORTAGE
JAY COOKE
MOOSE LAKE
MAPLEWOOD
CROW WING
INSPIRATION PEAK
MILLE LACS KATHIO
FATHER HENNEPIN
BANNING
LAKE CARLOS
CHARLES A. LINDBERGH
ST. CROIX
SAM BROWN
GLACIAL LAKES
WILD RIVER
BIG STONE LAKE
INTERSTATE
MONSON LAKE
SIBLEY
LAKE MARIA
Wm. O'Brien
ST. CROIX ISLANDS
LAC QUI PARLE
FORT SNELLING
AFTON
RICE LAKE
UPPER SIOUX AGENCY
JOSEPH R. BROWN
CARVER RAPIDS
BIRCH COULEE
LAWRENCE
BLAKELY
BELLE PLAINE
FRONTENAC
FORT RIDGELY
RUSH RIVER
CAMDEN
NERSTRAND WOODS
TRAVERSE DES SIOUX
SAKATAH LAKE
FLANDRAU
CARLEY
JOHN A. LATSCH
MINNEOPA
RICE LAKE
WHITEWATER
LAKE SHETEK
SPLIT ROCK CREEK
O.L. KIPP
BLUE MOUNDS
KILEN WOODS
HELMER MYRE
LAKE LOUISE
FORESTVILLE
BEAVER CREEK VALLEY



6 **William O'Brien State Park** | **Ownership**

SUMMARY

The metropolitan area of Minneapolis and St. Paul has a great influence on William O'Brien State Park. Land adjacent to the park is beginning to be influenced by suburban sprawl. The park is used largely by metropolitan area residents. Often park facilities are used to capacity. Inspite of heavy use, large portions still retain a natural character.

Because of its location so near a large metropolitan center and the need for additional recreational facilities in the area, a recreational state park classification is recommended for the park. The goal of this plan is to blend the park's natural and recreational resources while still retaining the integrity of both.

The recommended resource management and recreational development actions are:

Develop a planting plan for the park (p)

Control oak wilt (p)

Convert old fields to native grasslands (p)

Develop a fire management (p)

Restore natural drainage (p)

Continue stocking Lake Alice (p)

Survey the park for prehistoric and historic artifacts (p)

Build a multi-purpose, energy efficient trail center (p)

Expand ski touring and trail system (p)

Develop a bicycle trail link to the county system (p)

Develop a snowmobile trail link to surrounding grant-in-aid trails (p)

Rehabilitate the lower campground (p)

Develop a tenting only, hike-in campground (p)

Expand the upper campground (p)

Reserve the canoe campground for river users only (p)

Remodel the interpretive building for use as a picnic shelter (p)

Build two new picnic shelters (p)

Add changing rooms onto the beach toilet building (p)

Construct a playground for children from natural materials (p)

Remodel the maintenance area (p)

Build a new assistant manager's residence (p)

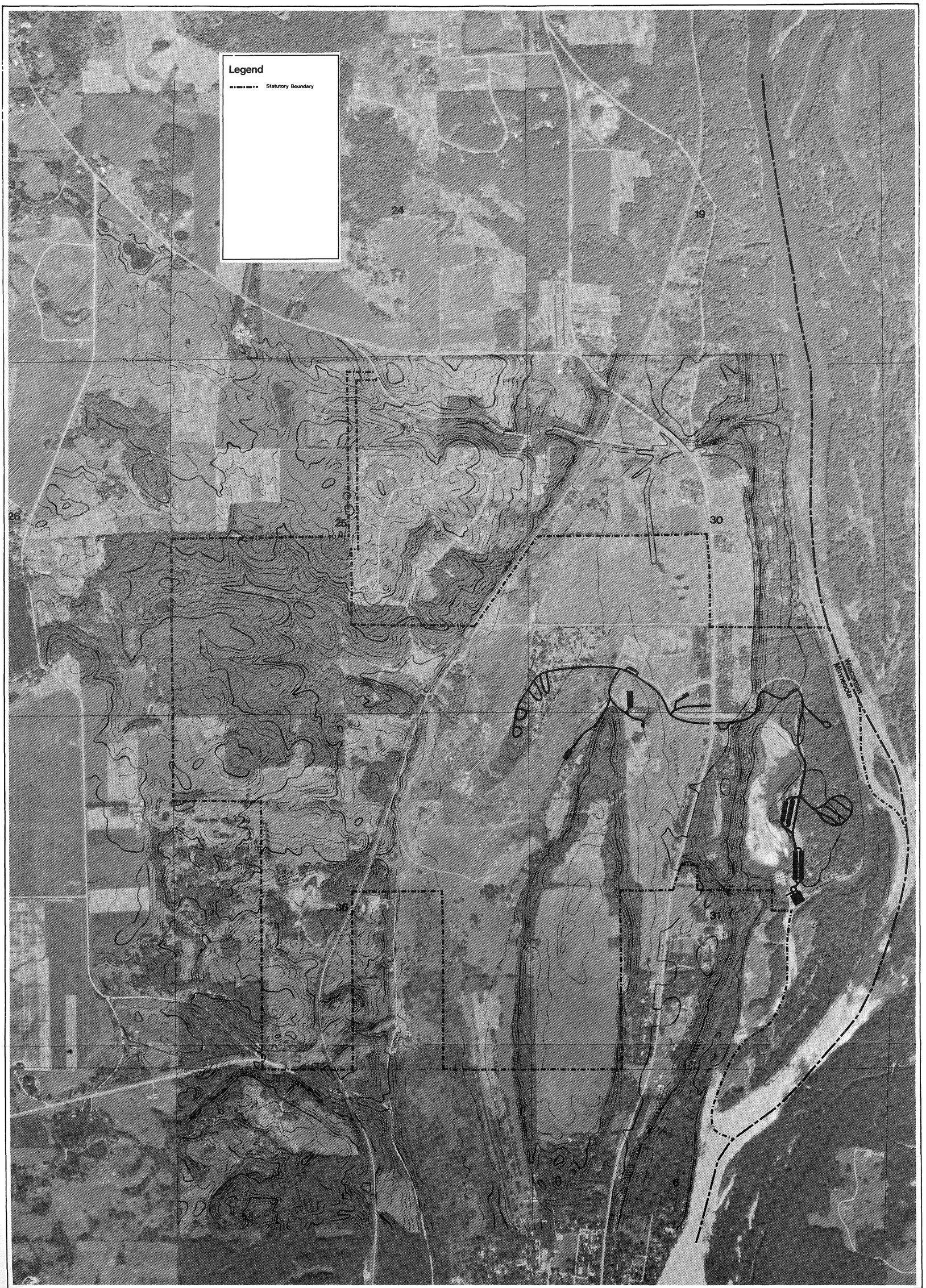
Provide for wood storage and ice coolers at the contact station (p)

Bury all power lines (p)

Pave all park roads and parking lots except the canoe campground lot (p)

Provide orientation and interpretive information for park visitors (p)

NOTE: The following map is experimental. Overlay information was drafted from U.S.G.S. base before air photo was obtained. As a result it does not correspond exactly to the photo. Data on future maps will be drafted to match air photo.



William O'Brien State Park

REGIONAL ANALYSIS

INTRODUCTION

In order to determine a park's potential role in perpetuating natural resources and fulfilling recreational needs, a regional analysis process has been initiated. The analysis is designed to look at a given park's interrelationship with factors such as: accessibility, population, distribution, economy, transportation, and other recreational facilities nearby.

Recognition of a state park's interrelationship with these components will help to ensure that park development will be planned to protect natural and historic resources, meet appropriate recreational demands, and avoid competition with other recreation providers.

THE SURROUNDING AREA

Accessibility

The accessibility of William O'Brien in terms of time and distance from the population it serves must be evaluated when recreational programs and developments are considered. Alternative methods of transportation need to be considered in light of the energy situation.

Most of the population of the seven county metropolitan area lives within 50 mi (80 km) or an hours drive of the park. Trunk Highway 95 (TH 95) splits the park and provides the primary park access. The St. Croix River provides access to the park for boaters. The city of Marine on St. Croix has developed an off-road bicycle path into the park from the south. Washington County is currently developing on-the-shoulder bike paths throughout the county. With the current concerns about energy and high gasoline prices, alternative modes of travel to the park may be the way of the future. Bicycle access to the park can be improved if Washington County and Marine on St. Croix expand and connect their bicycle trail systems. Mass transit can also be a transportation alternative. While no buses presently stop at William O'Brien, they do stop at larger towns in the area. Expansion of bus service with proper advertising has potential to be a viable alternative transportation method.

Population

The population of Washington County is growing rapidly. The 1980 census shows 113,720 persons residing in the county. This is an increase of 30,772 persons or 37 percent since 1970.

The park is within the highly populated seven county metropolitan area which has a population of over 2,000,000. This area is dominated the twin cities of Minneapolis and St. Paul.

Surrounding Land Use

Attendent to population growth is the development of housing for increasing numbers of people. Much of the land adjacent to William O'Brien is presently being used for agriculture or woodlots, however several areas are beginning to be used for subdivisions. This is evident on both the north and south sides of the park. Statistics show Washington county and its municipalities are becoming "bedroom communities" for the metropolitan area. The majority of residents are dependent on the Twin Cities for employment. The predominate type of dwelling being built for these people is the single family residence. Many dwellings are being constructed on large lots as dictated by Washington County zoning. This type of development is consuming available natural lands and destroying potential open space for outdoor recreation. If this trend continues, open space for recreation will no longer be available. As an existing state park, William O'Brien is presently providing open space recreation. With accelerated population growth and housing development, this role can only become more important in the future.

REGIONAL RECREATIONAL FACILITY SUPPLY AND DEMAND

To properly plan for the future development of a park, it is important to determine the type of services necessary to satisfy the recreational needs of the area. Analysis of this type helps ensure that services are not provided at a level which exceeds their need. There are numerous providers of outdoor recreational facilities in the William O'Brien area. Governmental agencies include the National Park Service, the Minnesota Department of Transporation, county governments, and municipal governments. The private sector also provides recreational facilities in the area. Care must be taken when evaluating privately owned and operated recreational facilities, as many are

not open to use by the general public. It is the policy of the DNR not to develop facilities if the private sector is adequately serving the same need. The St. Croix National Wild and Scenic Riverway and the proposed Minnesota Wisconsin Boundary Trail are recreational features of special note in the area.

The Minnesota State Comprehensive Outdoor Recreation Plan (SCORP) makes recommendations concerning the need for recreational services on a regional basis. Recommendations for the metropolitan area show an increasing need for the following types of service which William O'Brien is presently providing:

Ski touring facilities
Hiking trails
Camping facilities
Swimming facilities

A computer report by the DNR, Office of Planning Research and Policy Section using (SCORP) data on recreational facilities shows that services like those provided at William O'Brien are not abundant within a 10 mi (16 km) radius of the park in Minnesota. The 10 mi (16 km) radius was chosen to show facilities in the immediate vicinity (See Regional Analysis Map, p). Also shown are facilities within a 30 mi (48 km) radius of the park.

Number of Facilities Within 10 mile Radius

	In Park	Private	Other Public	Total
Ski Touring (miles of trails)	9.5	0	5	14.5
Hiking Trails (miles of trails)	9.5	12	5	26.5
Camping Sites (number of sites)	125	215	0	340
Group Camps (number of facilities)	1	6	0	7

The Metropolitan Council, in looking at the level of recreational service for the metropolitan area, has determined that Washington County is not served as well as some other counties in the metropolitan areas by recreational facilities. Because of this, the council is proposing two large regional open space recreational facilities for the area and additions to some parks that already exist. In addition, St. Paul and Ramsey County are presently highly urbanized and unable to provide adequate open space for recreation. The Metropolitan Council projects that recreational needs will therefore have to be met by the less developed surrounding areas such as Washington County.

PARK USE

William O'Brien State Park is heavily used. In 1980 over 220,000 people visited the park. Much of the use occurs on weekends. Because of the parks

close proximity to the metropolitan area and because of the rapidly growing local population, use figures at William O'Brien can be expected to grow substantially.

Day Use

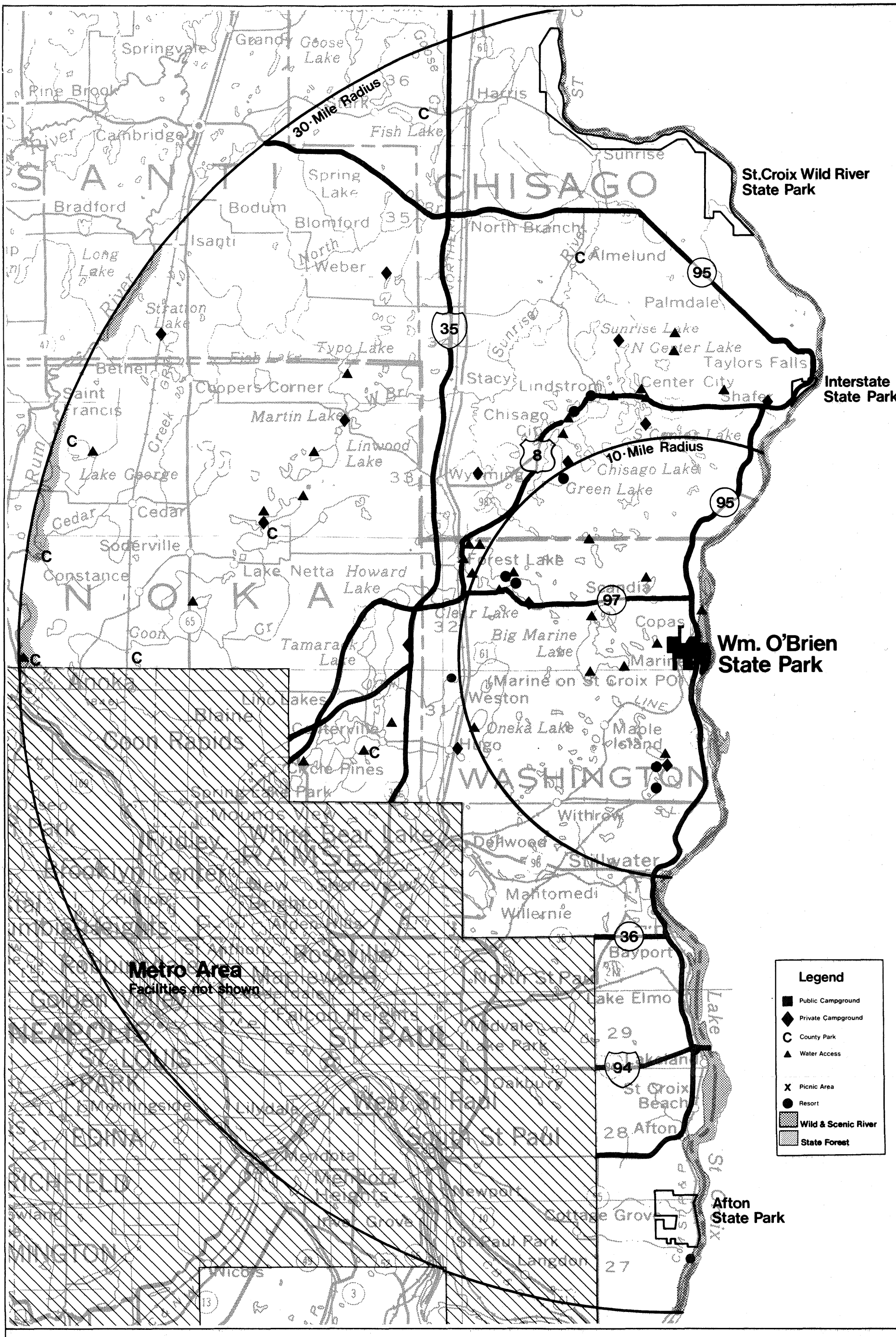
Park records show the vast majority of park users (over 185,500 in 1980) were day users. A Metropolitan Council survey of William O'Brien in 1976 revealed that over 85 percent of the day users come from the seven county metropolitan area surrounding Minneapolis and St. Paul. Statistics show that over 70 percent of those using the park travel less than 45 minutes to get there. On weekdays a greater percentage of park visitors come from areas in very close proximity to the park. For example, on weekdays 22 percent of all visitors were from Marine and Scandia, while on weekends they made up only 7 percent of the visitation. Statistics show that weekend users spent longer time periods in the park than their weekday counter parts.

Winter Use

Cross country skiing is the major winter use of the park. On winter weekends when snow cover is adequate, trails are heavily used. Winter use from December 15th to March 15th is approximately 10 percent of total park use.

Overnight Use

Over 90 percent of the camping at William O'Brien occurs from May 15 to Labor Day. In 1980 the campgrounds were 100 percent full on weekends and approximately 50 percent full on weekdays during the this period. Approximately 36,600 people camped at William O'Brien in 1980 (32,500 in the vehicular campground and 4,100 in the group campground). A DNR computer survey of 302 campers taken during 1978 and 1979 provides an idea of camping use in the park. Eighty seven percent of all camping parties at William O'Brien were from Minnesota. Of these 79 percent were from the seven county metropolitan area. The remaining Minnesota campers were distributed evenly from throughout the rest of the state. Three and a half percent of all camping parties were from Wisconsin, while 3.1 percent were from Iowa. The data did not establish a trend for other states. Over 80 percent of the camping parties camped either one or two nights in the park. Party size varied, but over 75 percent of the parties consisted of two to four persons (2 persons/40 percent, 3 persons/13.2 percent, and 4 persons/22.5 percent.)



William O'Brien State Park

Regional Analysis

CLASSIFICATION

THE STATE RECREATION SYSTEM

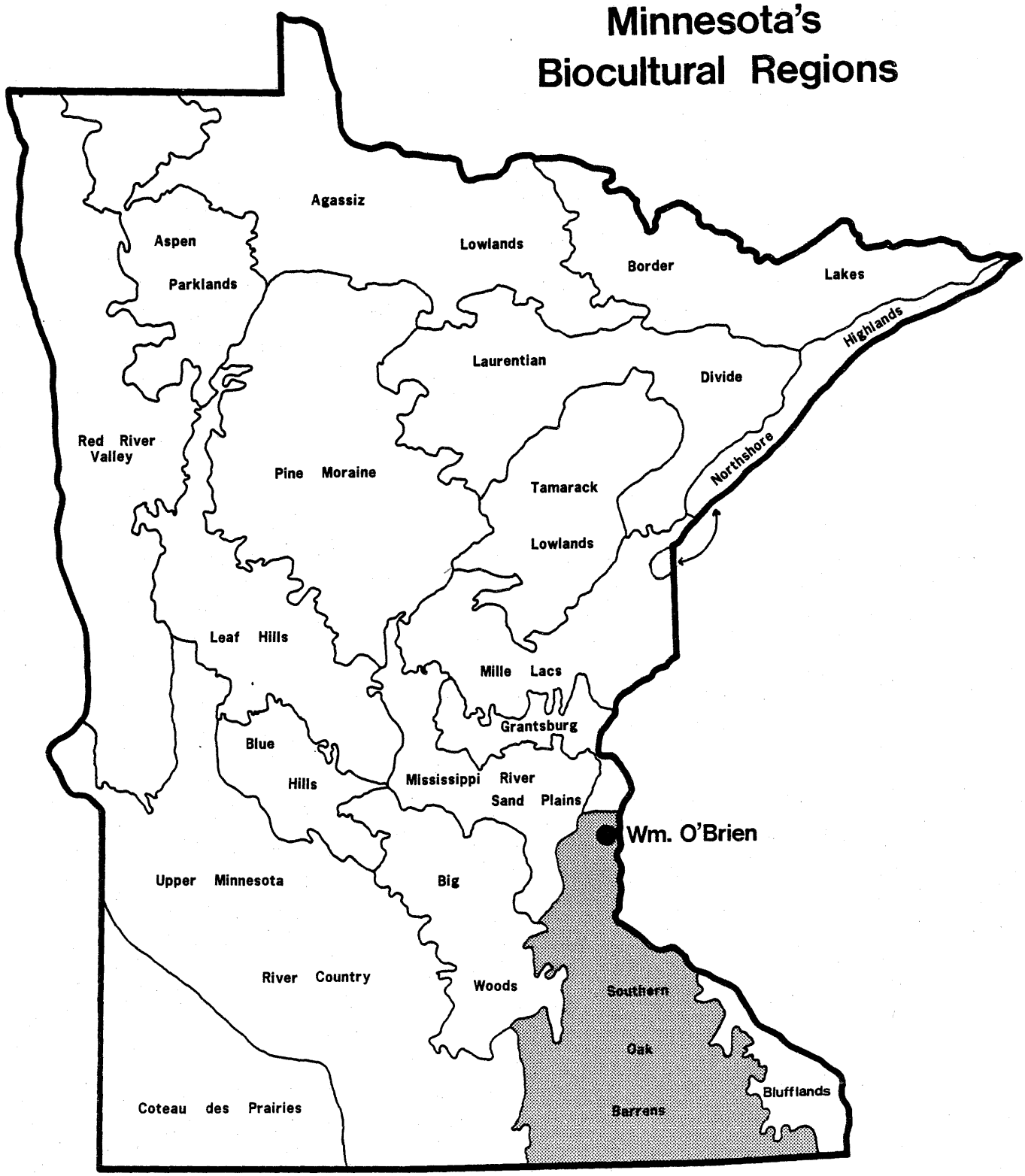
Minnesotans are fortunate to live in a state with such a wide variety of natural, scenic, and historic resources. To ensure public access and to prevent inappropriate development, the state has set aside lands which exemplify these outstanding resources. It is the management goal for all state recreational lands, including state parks, to protect and perpetuate these resources for use by the citizens of Minnesota.

There is a delicate balance which must be maintained when recreational facilities are provided for large numbers of people in areas of outstanding and often sensitive resources. Inappropriate development can result in irreparable damage to the resource. To help ensure this recreation/resource balance, the Minnesota State Legislature established, through the Outdoor Recreation Act of 1975 (ORA '75) a classification process whereby each unit in the state recreation system can be identified as one (or more) component in the system. These components are: natural state park; recreational state park; state trail; state scientific and natural area; state wilderness area; state forest and state forest sub-area; state wildlife management area; state water access site; state wild, scenic, and recreational rivers; state historic site; and state rest area. Included in this legislation are general criteria for classifying, planning, and managing each of these components.

Through this classification system the role for each recreational unit in the system is identified. The two primary classifications for state parks are natural and recreational. These two, along with other classifications, are considered during the planning process. The most appropriate is recommended for the park. If a state park does not meet the established classification criteria, the DNR will consider the possibility of eliminating the park from the state recreation system.

BIOCULTURAL REGION SYSTEM

The biocultural region system divides the state into 18 regions. These regions are differentiated according to the characteristic plant and animal life, landforms, and cultural patterns which existed before, during, and after European settlement. The biocultural region system is a framework which provides valuable information useful in the planning of Minnesota's state parks. William O'Brien State Park is located in the Southern Oak Barrens Biocultural Region (see map, p 11).


Minnesota's
Biocultural Regions
Agassiz
Aspen
Parklands
Lowlands
Border
Lakes
Highlands
Laurentian
Divide
Red River
Valley
Pine Moraine
Tamarack
Lowlands
Northshore
Leaf Hills
Mille Lacs
Grantsburg
Blue
Hills
Mississippi River
Sand Plains
Wm. O'Brien
Upper Minnesota
Big
River Country
Woods
Southern
Oak
Barrens
Blufflands
Coteau des Prairies

Biologically, this area is a broad transition zone between the prairie to the west and deciduous forest to the north and east. Originally the dominant vegetation was prairie with occasional groves and scattered individual oak trees, known as savanna.

CLASSIFICATION PROCESS

The purpose of the classification process as stated in the Outdoor Recreation Act of 1975 (ORA '75) is to establish "an outdoor recreation system which will (1) preserve an accurate representation of Minnesota's natural and historical heritage for public understanding and enjoyment and (2) provide an adequate supply of scenic, accessible and usable lands and waters to accommodate the outdoor recreational needs of Minnesota's citizens."

In accordance with the ORA '75, the park planning staff reviews possible classifications for each park in the state recreation system. After the park resource inventory is completed for each unit, the planning staff determnines:

A. Which of the 11 classifications from ORA '75 is most appropriate for the unit.

B. Whether sub-units should be considered to deal with special areas within the unit (scientific and natural areas or other sub-units authorized in ORA '75).

C. Whether administration of the unit should be reassigned to other loal governmental bodies (other state agencies, county, or local governments).

Existing Park

The extent to which William O'Brien, at its present size, meets the ORA '75 cirteria for a natural or recreational state park is summarized below.

Natural State Park Alternative

ORA Criterion #1

> "Exemplifies the natural characteristics of the major landscape regions of the state, as shown by accepted classifications, in an essentially unspoiled or restored condition or in a condition that will permit restoration in the foreseeable future; or contains essentially unspoiled natural resources of sufficient extent and importance to meaningfully contribute to the broad illustration of the state's natural phenomena."

William O'Brien State Park is located in the northernmost tip of the Southern Oak Barrens Biocultural Region. The character of the vegetation is in many ways also similar to the Grantsburg Biocultural Region to the north. The Grantsburg region is described as having primarily a big woods type vegetation with conifer bogs sometimes occuring in depressions. The park represents a transition between these two biocultural regions and does not exemplify the characteristic features of either one clearly.

ORA Criterion #2

> "Contains natural resources sufficiently diverse to attract people from throughout the state."

William O'Brien State Park contains a pleasing diversity of natural resources. Similar resources can however be found in numerous other locations in the state. For this reason, it is unlikely the park's natural resources will attract people from throughout the state.

ORA Criterion #3

> "Is sufficiently large to permit protection of the plant and animal life and other natural resources which give the park its qualities and provide for a broad range of opportunities for human enjoyment of these qualities."

William O'Brien State Park contains 1343 acres (544 hectares) within its statutory boundary. This area is large enough to permit the protection of plant and animal life and other natural resources.

Recreational State Park Alternative

ORA Criterion #1

> "Contains natural or artificial resources which provide outstanding outdoor recreational opportunities that will attract visitors from beyond the local area."

The park does provide outstanding recreational opportunities that attract visitors from beyond the local area. The camping, picnicking, swimming, and trail facilities all draw large numbers of people to the park.

ORA Criterion #2

> "Contains natural resources which permit intensive recreational use by large numbers of people."

The park will permit intensive recreational use by large numbers of people while still retaining its natural character.

ORA Criterion #3

> "May be located in areas which have serious deficiencies in public outdoor recreational facilities, provided that recreational state parks should not be provided in lieu of municipal, county, or regional facilities."

There are deficiencies in picnicking, camping, and trail facilities in the area according to the Statewide Comprehensive Recreation Plan (SCORP). The park can help to fill these needs.

SCORP shows a need for camping facilities and ski touring, hiking, bicycling, and snowmobiling trails in the metropolitan area. In addition, outdoor recreational opportunities in the eastern portion of the metro region, particularly in Washington County, are not equal to those provided elsewhere in the metropolitan region. Much of this need can be fulfilled by local units of government, but William O'Brien State Park will remain a dominant recreation provider in the region.

RECOMMENDED CLASSIFICATION

William O'Brien is recommended for classification as a recreational state park because it best meets the ORA '75 criteria. this classification however is recommended with the qualification that large portions of the park be managed to maintain their natural character.

GOAL FOR THE PARK

The goal for William O'Brien State Park can be found in the purpose for all recreational state parks as stated in the ORA '75:

> "A recreational state park shall be established to provide a broad selection of outdoor recreation opportunities in a natural setting which may be used by large numbers of people."

PARK RESOURCES

CLIMATE

Very cold winters and short, fairly warm summers characterize the climate of William O'Brien State Park. Temperature extremes normally range between -30 ^{o}F (-34^{o}C) to 100^{o}F (38^{o}C). Probability is that 50 percent of the time the last day of frost in spring will be May 10th and that the first frost of the fall will be on October 1st. The following table lists average monthly temperatures.

Month	Average Temperature (degrees Fahrenheit)
January	12.8
February	17.9
March	30.6
April	46.1
May	58.2
June	67.5
July	72.2
August	70.4
September	60.9
October	51.2
November	34.4
December	20.3

Precipitation reaches its peak in early summer. The following table lists average monthly precipation and the average monthly snowfall.

Month	Average Rainfall Precipitation (inches)	Average Snowfall Precipitation (inches)
January	.77	10.1
February	.75	9.0
March	1.48	9.3
April	2.32	3.1
May	3.74	.0
June	4.25	.0
July	3.44	.0
August	3.62	.0
September	3.05	.0
October	2.63	.3
November	1.35	3.7
December	1.01	10.0

GEOLOGY

The present day appearance of William O'Brien State Park owes much to the St. Croix River. It was the St. Croix River of the relatively recent geological past (approximately 12,000 years ago) which carved the large valley where the park is located. The St. Croix River which eroded the massive valley was not the placid river bordering the park today. It was a raging torrent of water fed by a glacial lake formed by the meltwaters of the last great ice sheet to cover the area. This glacial lake, Lake Duluth, makes the great lakes of today look small by comparison. Lake Superior is but a remnant of this huge lake. This is evidenced by beaches which have been found at elevations twice as high above sea level as that of present day Lake Superior.

Glacial Lake Duluth formed as the ice sheet melted to the northeast along the present Great Lakes, ponding water on its retreating edge as it receded. When the water level became high enough, it poured out of the lake through the valley of the Brule River in Wisconsin and then into the St. Croix. This drainage pattern continued until the ice melted back far enough to open the present day drainage of the Great Lakes by way of the St. Lawerence River.

In the vicinity of William O'Brien the glacial river St. Croix cut through layers of sedimentary rock to form the 300 foot deep, mile wide valley which exists today. The sedimentary rocks (mostly sandstones), through which this tremendous erosional force cut, were laid down during a period which began nearly 600 million years ago when great seas covered much of the continent. It was in these seas that primitive life had its beginnings. Evidence of this life can be found as fossils in the sedimentary rocks exposed along the river.

At Marine on St. Croix just south of the parks exposed bedrock and well drilling shows evidence of three distinct layers of sandstone cut by the river in forming its valley. This sandstone bedrock is topped by material called glacial drift which was deposited by glaciers which covered the area. The drift is capped by a shallow layer of topsoil, the product of years of accumulation of dead and decayed plant material mixed with the drift and subjected to the process of weathering.

Source

G.M. Schwartz and G.A. Thiel. 1973. Minnesota's Rocks and Waters (Minneapolis, Minnesota: University of Minnesota Press), pp 329-340.

SOILS

Soils are an important consideration in planning park development. Topography, drainage, slope, composition of parent material, climate, and vegetation all have a part in producing an individual soil type. Each of these soil types has certain characteristics which make it suitable or unsuitable for different uses.

The soils of William O'Brien were formed on outwash plains or stream terraces of the St. Croix River. This outwash or parent material is a fine to gravelly coarse sand. The top soil which lies over this parent material was formed under deciduous hardwood or prairie grass vegetation. In some places in the park bedrock is exposed. These outcrops are most often found on bluffs or near the river. Most of the soils which have developed in William O'Brien are loamy in character.

As the parent material in the park was basically homogenous, soil development was based, for the most part, on topography, slope, drainage, and vegetation. Because of these factors there is a range of variation in the soils and the suitability of soils for varying uses. The following map and table show the soils, their distribution within the park, and their suitability for park uses.

Legend (Soils Suitability/Characteristics Table)

Slight - Limitations for a stated use are minor and can be overcome easily.

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

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

Clay - As a soil separate, the mineral soil particles are less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Gravel - Rounded or angular fragments of rock up to 3 in. (7.5 cm) in diameter. An individual piece is a pebble.

Loam - Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength - The soil is not strong enough to suport loads.

Muck - Dark colored, finely divided, well-decomposed organic soil material.

Perc - (percolation) - The downward movement of water through the soil.

Sand - As a soil separate, individual rock or mineral fargments from 0.05 mm to 2.0 mm in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Slope - The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then mutiplied by 100. Thus, a slope of 20 percent is a drop of 20 ft (6.1 m) in 100 ft (30.5 m) of horizontal distance.

Small stones - Rock frangments less than 3 in. (7.5 cm) in diameter. Small stones adversely affect the specified use of the soil.

Soil - A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Variant soil - A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

SOILS SUITABILITY CHARACTERISTICS TABLE

SOIL TYPE	MAP CODE (p)	SLOPE (percent)	CAMP AREAS (see p for legend)	PICNIC AREAS	PATHS AND TRAILS	BUILDINGS WITH BASEMENTS
Emmert loamy coarse sand	12C	3 to 15	Moderate: slope, small stones	Moderate: slope, small stones	Moderate: small stones	Moderate: slope
Emmert gravelly loamy coarse sand	12D	15 to 25	Severe: slope	Severe: slope,	Moderate: slope, small stones	Severe: slope
Antigo silt loam	49B	2 to 6	Slight	Slight	Slight	Moderate: shrink-swell, low strength
Antigo silt loam	49D	12 to 18	Severe slope	Severe: slope	Moderate: slope	Severe: slope
Copaston loam	100B	0 to 6	Slight	Slight	Slight	Severe: depth to rock
Brill silt loam	120		Slight	Slight	Slight	Moderate: wetness, shrink-swell, low strength
Burkhardt sandy loam	151B	3 to 9	Slight	Slight	Slight	Slight
Santigo silt loam	153B	2 to 6	Moderate: percs slowly	Slight	Slight	Moderate: low strength
Santigo silt loam	153C	6 to 15	Moderate: slope, percs slowly	Moderate: slope	Slight	Moderate: slope, low strength

SOIL TYPE	MAP CODE (p)	SLOPE (percent)	CAMP AREAS (see p for legend)	PICNIC AREAS	PATHS AND TRAILS	BUILDINGS WITH BASEMENTS
Chetek sandy loam	155B	0 to 6	Slight	Slight	Slight	Slight
Gotham loamy sandy	177B	1 to 6	Moderate: too sandy	Moderate: too sandy	Moderate: too sandy	Slight
Freer silt loam	266	Level	Severe: wetness	Moderate: wetness	Moderate: wetness	Severe: wetness
Rosholt sandy loam	302B	1 to 6	Slight	Slight	Slight	Slight
Chaska silt loam	329	Level	Severe: wetness, floods	Moderate: wetness	Moderate: wetness	Severe: wetness floods
Kingsley sandy loam	342B	2 to 6	Moderate: percs slowly	Slight	Slight	Slight
Kingsley sandy loam	342C	6 to 12	Moderate: slope, percs slowly	Moderate: slope	Slight	Moderate: slope
Faxon silt loam	408		Severe: wetness, floods	Severe: wetness	Severe: wetness	Severe: wetness, floods, depth to rock
Crystal Lake silt loam	449	1 to 3	Slight	Slight	Slight	Moderate: wetness, low strength
Comstock silt loam	452	Level	Severe: floods, wetness	Moderate: wetness	Moderate: wetness	Severe: floods, wetness
Mahtomedi loamy sand	454B	0 to 6	Moderate: too sandy	Moderate: too sandy	Moderate: too sandy	Slight

SOIL TYPE	MAP CODE (p)	SLOPE (percent)	CAMP AREAS (see p for legend)	PICNIC AREAS	PATHS AND TRAILS	BUILDINGS WITH BASEMENTS
Mahtomedi loamy sand	454C	6 to 12	Moderate: slope, too sandy	Moderate: slope, too sandy	Moderate: too sandy	Moderate: slope
Mahtomedi loamy sand	454D	12 to 25	Severe: slope	Severe: slope	Moderate: too sandy, slope	Severe: slope
Rifle Muck	541	Level	Severe: floods, wetness, excess humus	Severe: wetness, excess humus	Severe: wetness, excess humus	Severe: wetness, floods low strength
Gravel Pits	1029		No data	No data	No data	No data
Mahtomedi variant rock slope outcrop complex	1820F	25 to 60	Severe: slope	Severe: slope	Severe: slope	Severe:

N

0 500' 1/4mi. 1/2mi. 1mi.
Miles

0 500m 1km
Kilometers

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Soils

VEGETATION AND WILDLIFE

Presettlement Vegetation

Vegetation is continuously changing as the result of short-term disturbances such as fires or storms, and long-term events, such as climatic changes or soil development. Even without disturbance, plant communities change in response to changes on a site, with one species dying out and being replaced by another. The orderly change in plant communities is called succession.

Descriptions of the presettlement vegetation in the park are available from a variety of sources. Marshner's map (1930) shows the uplands of the upper park forested by aspen oak land and oak openings and barrens. Part of the wet lowland in the upper park seems to have been conifer bog and swamp. The lower part of the park was mapped as river bottom forest. In the vicinity, Marshner delineated areas of big woods.

Trygg's abstracts of land survey field notes (1963) for T32N, R20W described the southeast quarter of the township as nearly barren of timber. Other parts were described as "well timbered with oak and aspen, the aspen being generally small and very thick." Lakes, ponds, swamps, and marshes were numerous.

Soils in the upper part of the park have developed under paririe-forest transition zone conditions (Soil Conservation Service/SCS 1977 and Heitlinger 1979).

Existing Vegetation Inventory

Plant communities were delinated from 1980 color slides taken by the Agricultural Stablization and Conservation Service (ASCS). The vegetative composition of these communities was field checked by DNR, Park Planning in January 1981. Snow cover was negligible at the time of the survey.

The abundance of a species in a strata of a given vegetative community was recorded as follows:

a = abundant
c = common
o = occassional
r = rare

The diameter at breast height (dbh) size class indicates that more than one half the stems were in that size class.

Stem Size Class	dbh (in.)
1	0 to 1
2	1+ to 3
3	3+ to 5
4	5+ to 9
5	9+ to 15
6	15+

Oak Forest (OA)

This type occurs on rolling to steep, hilly, upland sites, which have well to moderately well-drained loamy sand to loam soils. Red oak, white oak, aspen, and paper birch are the dominant canopy species. Most of the aspen and birch is mature or overmature. Red maple saplings occur in areas with a closed canopy. Some have reached canopy and subcanopy height. Adjacent old fields and pastures show some evidence of woodland encroachment. Pioneering tree species include aspen, oak, blackcherry, paper birch, and box elder.

The original U.S. government surveyor's notes (1857) described this area as more sparsely wooded than at present. White oak, bur oak, and aspen were the predominant tree species. Timber was scattered or in thickets of aspen and prickley ash. Some timber may have been harveted prior to the government survey as a saw mill was established at Marine on St. Croix in 1839. Marshner (1930) described the area as aspen-oak land and oak openings and barrens.

The aspen-oak forest community is established either by 1) complete destruction of an existing forest canopy by fire or other disturbance (Curtis 1959), or 2) the forest invading grassland areas which have not been disturbed by fire for long periods of time. Pin oak forms vigorous thickets and establishes itself as the dominant species after destruction of a former woodland community (Gibbs and French 1980). Pin and red oaks are much more susceptible to fire than white or bur oaks. Oaks in general do not reproduce under a closed canopy. Curtis (1959) describes red maple replacing red oak in several stands in Wisconsin. This type of replacement seems to be occurring in the park. It appears that in the park and surrounding vicinity, the composition of the forest on the more loamy soils was dependent on the type and frequency of disturbance. At any point in time the vegetation of a site would be somewhere between grassland, aspen, scattered oak, or big woods.

Examination of aerial photographs (SCS 1938, 1953, 1957, 1964, 1977) shows instances of cutting and grazing in various parts of the oak forest. The present variety in successional stages can be explained partly by these disturbances. The total canopy coverage has been increasing since 1938.

A few pockets of oak wilt have been identified in the park. They were controlled by cutting and/or injection of cacodylic acid.

Oak Forest Community Composition

	Common Name	Abundance	Stem Size Class
Overstory:	White oak	c	5
	*Northern red oak/ *Northern pin oak	c	5
	Bur oak	o	6
	Paper birch	c	4
	Quaking aspen	c	4
	Bigtooth aspen	c	4
	Black cherry	o	5
	Red maple	o	3
Understory:	Hazel	c	
	Honeysuckle	o	
	Prickly ash	c	
	Elderberry	o	
	Ironwood	c	
	Trembling aspen	c	
	Paper birch	o	
	Blue beech	r	

* Northern red oak and northern pin oak were not seperated in the field survey. Hybridization between these two species is apparently common on the Anoka sand plain.

Deciduous Wetland Forest (DW)

Dutch elm disease has drastically altered this forest type in recent years. Before the outbreak of the disease, American elm dominated the canopy. Presently almost all the elm have died and some have been removed. Box elder saplings (up to 20' tall) are now the dominant tree species. Other assoicated species include raspberry and prickly ash.

The type occurs on a poorly-drained silt loam flooded periodically by surface runoff. A small creek meanders along its length. Some cutbanks in the adjacent sand/gravel hillside slopes are present.

Decidious Wetland Forest Community Composition

	Common Name	Abundance	Stem Size Class
Overstory:	American elm	c	6 (dead)
Understory:	Box elder	a	
	Prickly ash	c	
	Bramble	c	
	Stinging nettle	c	
	Wild cucumber	c	

Mixed Northern Wetland Forest (MNW)

This type is situated on a level glacial river terrace. Bedrock is at a depth of 20 - 40 in (51 - 102 cm). The soil is a poorly to very poorly drained silt loam. Drainage is both to the north and south. It is commonly flooded by surface runoff from adjacent upland areas. A few natural springs are present.

Black ash is the primary tree species. Also included are box elder, paper birch, American elm, green ash, and tamarack. Until recently, American elm was a major component of the canopy. Dutch elm disease has killed most all the large elms. There is a large number of young ash and box elder now occupying areas opened by dead elms. Tamarack occurs occasionally in this type, but earlier it was much more dominant. Original government survey records (1857) map and describe the area as a tamarack swamp extending north and south through the park. The decline of tamarack may be due to a number of factors. These include attacks of the larch sawfly (Pristiphora erichsonii), changes in water level, fire, competition from more shade tolerant species, and clearing by early settlers.

One of tamarack's main growth requirements is a constant moisture supply. Standing water, however, is usually fatal to its seedlings. Tamarack is very intolerant of shade. It regenerates by seed or root sprout only when there is full sunlight overhead. Increased canopy of other tree species such as elm and ash shades out tamarack. Tamarack is also very susceptible to fire. A moderately severe ground fire will kill a stand. (Curtis 1959). Farmers

often convert this vegetation type to pastures and fields. Aerial photographs of the park suggest that much of the mixed northern forest was cleared, ditched, and then hayed or cropped. The area was ditched both to the north and south sometime prior to 1938. In the absence of disturbance, the general successional trend here is wet meadow to lowland shrubs to mixed northern wetland forest.

In 1975 two trails were developed through the lowland area. They were constructed with gravel and dirt from the construction of an underpass under TH 95 for the park road. It is not known how this has affected drainage. There are a few areas where trees are standing in open water. Mature paper birch in the cover type are dying with no apparent regeneration.

Mixed Northern Wetland Forest Community Composition

	Common Name	Abundance	Stem Size Class
Overstory:	Box elder	c	4
	Green ash	c	5
	Black ash		
	American elm (dead)	c	6
	Black willow cf.	o	5
	Paper birch	c	5
	Tamarack	o	5
Understory:	Willow	a	
	Viburnum	c	
	Box elder	c	
	Speckled alder	a	
Ground Layer:	Reed canary grass	c	
	Blue joint	a	
	Sedge	c	
	Golden rod	o	
	Aster	o	
	Green coneflower	o	
	Stinging nettle	o	
	Moss	o	
	Willow herb	c	

Lowland Shrub (LS)

The dominant shrubs in this type are willow and speckled alder. Density varies from continuous to interrupted. The ground layer is predominantly bluejoint and sedge. Cattails grow in the wettest sites. There are a few areas of open water. The lowland shrub type is progressively encroaching on the surrounding wet meadow.

Lowland Shrub Community Composition

	Common Name	Abundance
Shrub Layer:	Willow	a
	Speckled alder	a
	Red osier dogwood	c
	Box elder	o
	Paper birch	r
	Prickly ash	r
	Meadow sweet	r
Ground Layer:	Sedge	a
	Blue joint	a
	Reed canary grass	c
	Golden rod	o
	Common cattail	o
	Blue vervain	o

Wet Meadow (WM)

This type occurs on a level, poorly-drained silt loam. Reed canary grass is the dominant species. In the past, these areas have been cultivated or hayed. Aerial photographs show they were drained sometime before 1938.

In the E1/2 of Sec 31 and the W1/2 of Sec 36, this type may have been established by clearing a tamarack swamp. In the absence of disturbance, willow, speckled alder, and red osier dogwood are encroaching. Included in the wet meadow cover type are a few Type II and III wetlands*. The Type II wetlands are small depressions surrounded by wet meadow vegetation. The Type III wetlands support some wetter plant species like cattail and bull rush.

Wet Meadow Community Composition

Common Name	Abundance
Reed canary grass	a
Blue joint	c
Blue vervain	o
Golden rod	o
Willow	o
Red osier dogwood	o
Speckled alder	o
Bullrush	r

* Type II wetland: Inland fresh meadow. The soil usually is without standing water during most of the growing season, but is waterlogged within at least a few inches of its surface.

Type III wetland: Inland, shallow, fresh marsh. The soil is usually waterlogged during the growing season; often it is covered with as much as 6 in. (15 cm) of water. (From U.S.D.I. Fish & Wildlife Service Cir. 39)

Grassland (GR)

Virtually all areas now occupied by this type were once actively cultivated. The dominant grass is brome. In some areas timothy, foxtail, and bluegrass are dominant.

There are a few very small areas of native prairie vegetation left in the park. The best is a dry prairie on a steep, south facing slope in the S1/2, SE1/4, SW1/4 of Sec 36. Much of this slope is now covered by sumac. The sumac will eventually shade out the understory prairie species.

Some prairie species also occur along the railroad right-of-way.

Grassland edges are being invaded by box elder, oak, aspen, birch, pin cherry, and red cedar.

Grassland Community Composition

Common Name	Abundance
Brome grass	a
Timothy	c
Foxtail	c
Yarrow	o
Goldenrod	o
Common mullen	o
Prairie Species	
Little bluestem	a
Side oats grama	c
Needle grass	c
Big bluestem	o
Indian grass	o
Lead plant	o
Coneflower	r
Culvers root	r
False gromwell	r

Cedar Glade

This type was only recently established in the park. Red cedar is the characteristic tree species. In most cases, it develops a savanna-type character. Historically, cedar glades are found on gravelly moraines on sites which have an effective fire barrier. Red cedar is extremely fire sensitive. The ground layer is very similar to dry praire in composition (Curtis 1959).

The present cedar glade is similar in structure to the historical type, but the understory differs greatly in composition. It commonly invades open fallow hillsides. The seeds of red cedar are known to be transported by birds (Curtis 1959).

Cedar Glade Community Composition

	Common Name	Abundance	Stem Size Class
Overstory:	Red cedar	a	3
Ground Layer:	Same as grassland, no prairie species		

River Bottom Forest (RB)

This type is found on the level, loamy, well-drained soils along the river bottom. The composition is a mixture of what are commonly thought of as big woods species (sugar maple, basswood, and red oak) and floodplain forest species (silver maple, green ash, and cottonwood). White pine also occurs in this cover type. There are a number of large white pine along the riverbank and in the two campgrounds. Regeneration of white pine is occurring around these parent trees in areas where there is little or no trampling by park users. Prickly ash and other shrubby growth seems to offer some protection for the seedlings. Browsing of these seedlings and saplings does not appear to be a problem.

Aerial photographs (1938) and an old land sale advertisement (circa 1930) show some areas of the present canopy were formerly open. This covertype includes some poorly-drained depressions dominated by young green and black ash, and occasionally tamarack.

River Bottom Forest Community Composition

	Common Name	Abundance	Stem Size Class
Overstory:	White pine	c	5
	Northern red oak	c	5
	Cottonwood	c	5
	Silver maple	c	6
	Sugar maple	o	5
	Green ash	o	4
	Butternut	r	5
	White pine	o	6
	Trembling aspen	o	3

Understory:	Blue beech	a
	Ironwood	c
	Box elder	c
	Sugar maple	o
	Prickly ash	c
	Yellow bud hickory	o
	Basswood	o
	Green ash	o
	White pine	o

Northern Hardwoods (NH)

Northern hardwoods occur at the base of the steep valley walls. Large mature yellow birch are characteristic of this type. A number of seeps are present at the base of these slopes. The wet soils directly below them are commonly carpeted with scouring rush. Originally these seeps formed little creeks that join into a short stream paralleling the slope, draining into the St. Croix River. This stream was dammed in 1964 creating Alice Lake. Some northern hardwoods were inundated as a result.

Dutch elm disease has also caused disturbance in this stand. In 1979 most of the dead and dying elm were felled and left lying. It is difficult to estimate how this will affect species composition. The relative dominance may shift towards more shade intolerant species as yellow birch, ash, and yellowbud hickory. Yellow birch is somewhat shade intolerant. It requires an opening in the canopy for successful establishment. Seeds can germinate on mineral soil or logs and stumps with a moderate blanket of mosses. (Curtis 1959).

Northern Hardwood Forest Community Composition

	Common Name	Abundance	Stem Size Class
Overstory:	Basswood	c	5
	Yellow birch	c	6
	Sugar maple	u	5
	Black ash	c	5
	Yellowbud hickory	u	3
Understory:	Basswood	c	
	Black ash	c	
	Sugar maple	u	
	Yellowbud hickory	u	
	Red osier dogwood	c	
	Blue beech	c	
Ground Layer:	Scouring rush	c	
	Ostrich fern	u	
	Ferns, misc.	c	
	Mosses	c	
	Liverworts	c	

Floodplain Forest (FF)

Large silver maples and green ash are the dominant overstory trees. This type occurs on floodplain islands in the St. Croix River. The soil is a poorly-drained silt loam. Large trees are characteristic of a floodplain forest and the type is relatively stable (Curtis 1959). Dutch elm disease has killed some elms, however elm does not appear to have been a major component of the overstory. Understory coverage is sparse. Included in this type are some shallow linear wetlands occupying natural flood channels.

Floodplain Forest Community Composition

	Common Name	Abundance	Stem Size Class
Overstory:	Silver maple	a	6
	Green ash	c	5
	Hackberry	o	5
	American elm		6 (dead)
Understory:	Silver maple	c	
	Hackberry	c	
	Green ash	c	
	Elderberry	o	
	Prickly ash	o	
Ground Layer:	Aster	o	
	Green coneflower	o	
	Unidentified grass	c	
Wetland Areas:	Beggar ticks	c	
	Dock	c	
	Unidentified grass	c	

Conifer Plantings (CP)

Norway pine is the most commonly planted conifer in the park. This species is not indigerous to the area. They have been planted in dense rows resulting in a plantation-like appearence. The heaviest planting has been done along TH 95. The soil here is a well-drained, level loam formed in a 12-20 in. (30-51 cm) mantle of loamy glacial drift over bedrock. Available water capacity is very low due to the shallow depth of the soil.

Conifer Planting Community Composition

Common Name	Abundance	Stem Size Class
Norway pine	a	3
White pine	r	1
Colorado blue spruce	r	2
Colorado blue spruce	r	4
White spruce	r	2

Box Elder (BE)

Box elder is a very adaptable species. It successfully pioneers in abandoned agricultural fields and other disturbed sites. It has a life expectancy of about 100-120 years and may establish relatively pure stands. The canopy is dense and little undergrowth is present. The stability of a stand is somewhat uncertain. Box elder is intolerant of shade and does not reproduce under itself unless there is some opening in the canopy. Elm can successfully invade a box elder stand and cottonwood can compete with box elder at the time of establishment. Box elder is also commonly associated with basswood and oak or upland sites.

In the park, box elder has established some stands on previously disturbed sites. These include lowland areas, field depressions, and field edges.

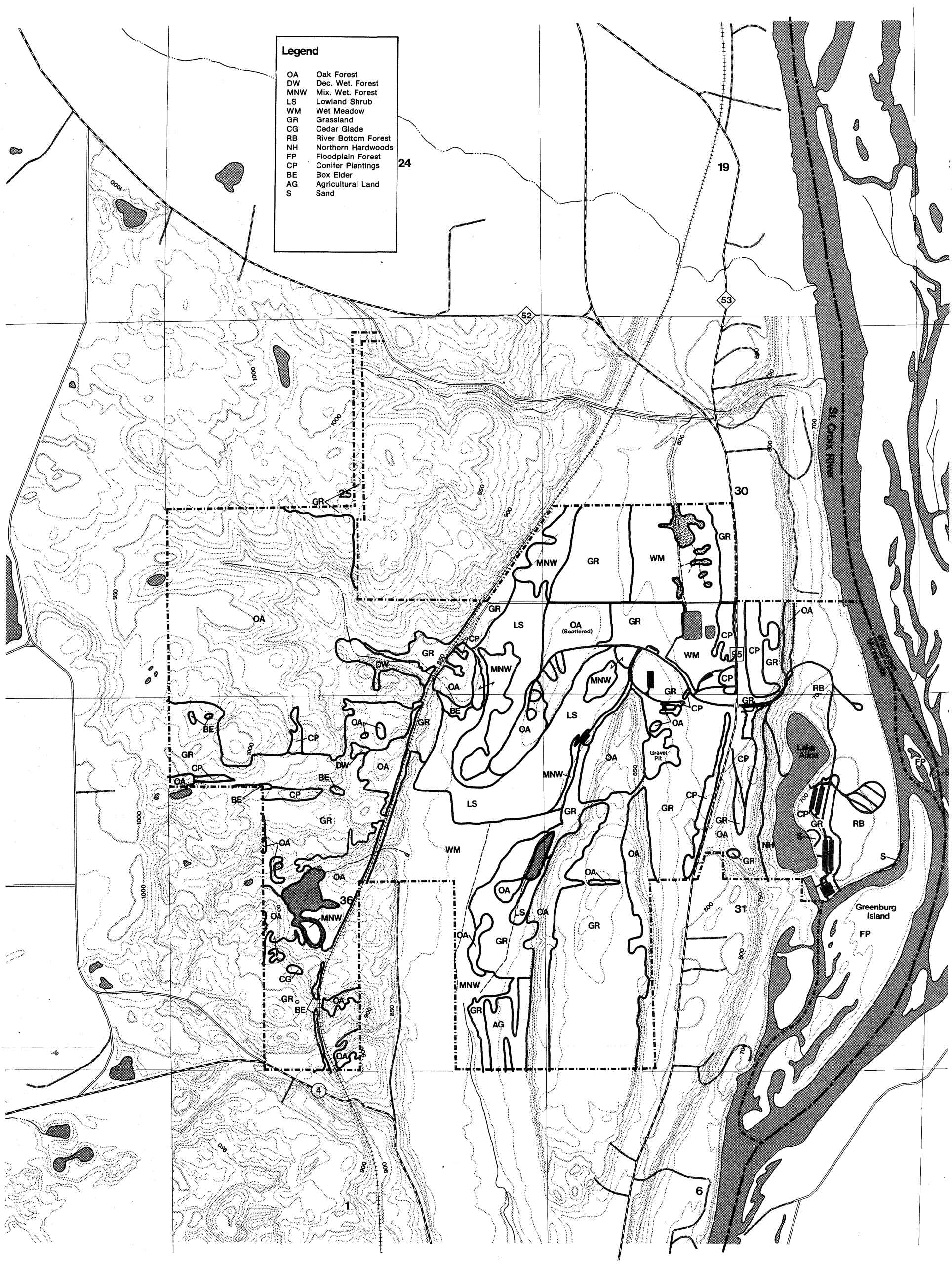
Box Elder Community Composition

	Common Name	Abundance	Stem Size Class
Overstory:	Box elder	a	4

Common and Scientific Names of Plant Species Cited in the Text

American elm	*Ulmus americana*
Basswood	*Tilia americana*
Beggars ticks	*Bidens* sp.
Bigtooth aspen	*Populus grandidenta*
Black ash	*Fraxinus nigra*
Black cherry	*Prunus serotina*
Black willow	*Salix nigra*
Blue beech	*Carpinus caroliniana*
Blue joint	cf. *Calamagrostis canadensis*
Blue vervain	*Verbena* cf. *hastata*
Box elder	*Acer negundo*
Bramble	*Rubus* sp.
Bur oak	*Quercus macrocarpa*
Butternut	*Judglans cinerea*
Choke cherry	*Prunus virginiana*
Colorado blue spruce	*Picea pungens*
Common cattail	*Typha latifolia*
Common mullein	*Verbascum thapsus*
Coneflower	cf. *Ratibida* sp.
Cottonwood	*Populus deltoides*
Culvers root	cf. *Veronicastrum virginicum*
Dock	*Rumex* sp.
False gromwel	*Onosmodium molle*
Foxtail	*Setaria* sp.
Goldenrod	*Solidago* sp.
Green ash	*Fraxinus pennsylvanica* var. *subintegerrima*
Green coneflower	cf. *Rudbeckia laciniata*
Hackberry	*Celtis occidentalis*
Hazel	*Corylus* cf. *americana*
Honeysuckle	*Lonicera* sp.
Ironwood	*Ostrya virginiana*
Lead plant	*Amorpha canescens*
Little bluestem	*Andropogon scroparis*
Meadow sweet	*Spiraea alba*
Needle grass	*Stipa* sp.
Northern pin oak	*Quercus ellipsoidalis*
Northern red oak	*Quercus borealis*
Ostrich fern	*Matteuccia struthiopteris*
Paper birch	*Betual papyrifera*
Pin cherry	*Prunus pensylvanica*
Prickly ash	*Zanthoxylum americanum*
Quaking aspen	*Populus tremuloides*
Red berried elder	*Sambucus* cf. *pubens*
Red cedar	*Juniperus virginiana*
Red maple	*Acer rubrum*
Red osier dogwood	*Cornus stolonifera*
Red pine	*Pinus resinosa*
Reed canary grass	*Phalaris arundinauaceae*
Sedge	*Carex* sp.
Side oats grama	*Bouteloua curtipendula*
Silver maple	*Acer saccharinum*
Speckled alder	*Alnus rugosa*
Stinging nettle	*Urtica dioica*
Sugar maple	*Acer saccharum*

Tamarack	*Larix laricina*
Timothy	*Phleum pratense*
Viburnum	*Viburnum* cf. *lentago*
White oak	*Quercus alba*
White pine	*Pinus strobus*
White spruce	*Picea glauca*
Wild cucumber	*Echinocystis* cf. *lobata*
Wild plum	*Prunus americana*
Willow herb	*Epilobium* sp.
Yarrow	*Achillea millefolium*
Yellow birch	*Betula lutea*
Yellow bud hickory	*Carya cordiformis*



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Wildlife Inventory

No formal records of wildlife abundance or occurrence have been kept for the park. This information must be extrapolated from county, regional, or other local surveys. Some areas in the vicinity where such data are available include: Carlos Avery Wildlife Management Area, DNR; Cedar Creek Natural History Area, University of Minnesota; Afton State Park, DNR; and Camp Wilder, Wilder Foundation. The largest concentration of wintering deer in the county occurs about 4 mi (6.4 km) south of the park in the Square Lake area. The St. Croix River valley seems to serve as a spring and fall migration corridor for many bird species.

Included is a species list compiled in 1980 by Richard Oehlenshlager, the naturalist at Camp Wilder. Camp Wilder is located 3-4 mi (4.8-6.4 km) south of the park. The vegetation there is similar to the upper part of the park, mainly oak woods and old fields. One major difference however, is the Camp Wilder area includes a number of lakes. Their wildlife inventory will have more waterfowl and other aquatic oriented species than would occur in William O'Brien State Park. Camp Wilder also does not include any river valley land.

The Natural Heritage Program identifies outstanding natural features and species that have priority for protection. These Elements are of particular concern on a national or statewide basis because they are: (1) rare or threatened plant or animal species or (2) uncommon, threatened, or particularly noteworthy examples of plant communities, geological features, or other special features. For example: the Minnesota trout lily, the piping plover, oak savanna plant communities, eskers, or patterned peatlands.

Elements lists were developed through intensive review of pertinent literature, museums, and private collections and discussions with knowledgeable individuals in cooperation and consultation with all divisions of DNR.

Table 1. The Birds of Camp Wilder

Species		Season Present:				Habitats Used:				
Common Name	Scientific Name	S	S	F	W	Forest	Forest Edge	Non-Forest	Aquatic	Aerial
American coot	Fulica americana	*		*					*	
American goldfinch	Spinus tristis	*	*	*	*	*	*	*		
American kestrel	Falco sparverius	*	*	*	*		*	*		*
American redstart	Setophaga ruticilla	*	*	*		*	*			
American robin	Turdus migratorius	*	*	*	*	*	*	*		
American wigeon	Anas americana	*		*					*	*
American woodcock	Philohela minor	*	*	*			*	*		
Bald eagle	Haliacetus leucocephalus	*		*	?				*	*
Bank swallow	Riparia riparia	*		*				*	*	*
Barn swallow	Hirundo rustica	*	*	*				*	*	*
Barred owl	Strix varia	*	*	*	*	*	*	*		
Bay-breasted warbler	Dendroica castanea	*		*		*	*	*		
Belted kingfisher	Megaceryle alcyon	*	*	*					*	
Black tern	Chilcenias nigor	*	*						*	*
Black-and-white warbler	Mniotilta varia	*		*		*	*	*		
Black-billed cuckoo	Coccyzua orythropthalmus	*	*	*		*	*			
Black-capped chickadee	Parus atricapillus	*	*	*	*	*	*	*		
Black-crowned night heron	Nycticorax nycticorax	*	*						*	
Black-throated blue warbler	Dendroica caerulescens			*		*				
Black-throated green warbler	Dendroica virens	*		*		*	*			
Blackburnian warbler	Dendroica fusca	*		*		*	*			
Blackpoll warbler	Dendroica striata	*				*	*			
Blue jay	Cyanocitta cristata	*	*	*	*	*	*	*		
Blue-gray gnatcatcher	Polioptila caerulca	*					*			
Blue-winged teal	Anas discors	*	*	*					*	*
Blue-winged warbler	Vermivora pinus		*			*	*			
Bonaparte's gull	Larus philadelphia	*							*	*
Broad-winged hawk	Buteo platypterus	*	*	*		*	*	*		*
Brown creeper	Certhia familiaris	*		*	*	*	*	*		
Brown thrasher	Toxostoma rufum	*	*	*			*	*		
Bufflehead	Bucephala albcola	*		*					*	*

Table 1. The Birds of Camp Wilder

Species		Season Present:				Habitats Used:				
Common Name	Scientific Name	S	S	F	W	Forest	Forest Edge	Non-Forest	Aquatic	Aerial
Canada goose	Branta canadensi	*	*	*					*	*
Canada warbler	Wilsomia canadensis	*		*		*	*			
Canvasback	Aythya valisineria	*		*					*	
Cape May warbler	Dendroica tigrina	*		*		*	*			
Cardinal	Cardinalis cardinalis	*	*	*	*	*	*	*		
Cedar waxwing	Bobycikka cedrorum	*	*	*	*	*	*	*		
Cerulean warbler	Dendorica carulea					*	*			
Chestnut-sided warbler	Dendroica pensylvanica	*		*		*	*	*		
Chimney swift	Chaetura pelagica	*	*	*						*
Chipping sparrow	Spizella passerina	*	*	*			*	*		
Clay-colored sparrow	spizella pallida	*	*	*			*	*		
Cliff swallow	Petrochelidon pyrrhonota									
Common crow	Corvus brachyrhynchos	*	*	*	*	*	*	*		*
Common flicker	Colaptes auratus	*	*	*	*	*	*	*		*
Common goldeneye	Bucephala clangula	*		*					*	*
Common grackle	Quiscalus quiscula	*	*	*		*	*	*	*	
Common loon	Gavia immer	*	*	*					*	
Common merganser	Mergus merganser	*		*					*	*
Common nighthawk	Chordeilos minor	*	*	*				*		*
Common redpoll	Acanthis flammea				*	*	*	*		
Common snipe	Capella gallinago	*	*	*					*	
Common yellowthroat	Geothlypis trichas	*	*	*			*	*	*	
Connecticut warbler	Oporornis agilis									
Cooper's hawk	Accipiter cooperii	*	*	*		*	*			*
Dark-eyed junco	junco hymalis	*		*	*		*	*		
Double-crested cormorant	Phalacrocorax auritus	*							*	*
Downy woodpecker	Dendrocopos pubescens	*	*	*	*	*	*	*		
Eastern bluebird	Sialia sialis	*	*	*			*	*		
Eastern kingbird	Tyrannus tyrannus	*	*	*			*	*		
Eastern meadowlark	Sturnella magna	*	*	*				*		
Eastern phoebe	Sayornis phoebe	*	*	*			*	*		
Eastern wood pewee	Contopus virens	*	*	*		*	*			
Evening grosbeak	Hesperiphona vesportina				*	*	*	*		

Table 1. The Birds of Camp Wilder

Species		Season Present:				Habitats Used:				
Common Name	Scientific Name	S	S	F	W	Forest	Forest Edge	Non-Forest	Aquatic	Aerial
Field sparrow	Spizella pusilla	*	*	*			*	*		
Forster's tern	Sterna forsteri	*							*	
Fox sparrow	Passerella iliaca	*		*		*	*	*		
Golden-crowned kinglet	Regulus satrapa	*		*	*	*	*	*		
Golden-winged warbler	Vermivora chrysoptera	*	*	*		*	*			
Goshawk	Accipiter gentilis	*		*	*	*	*			
Gray catbird	Dumetella carolinensis	*	*	*			*	*		
Gray jay	Perisorcus canadensis				*	*				
Gray-cheeked thrush	Catharus minimus	*		*		*	*	*		
Great Blue heron	Ardea herodias	*								
Great Horned owl	Bubo virginianus	*	*	*	*	*	*	*		
Great crested flycatcher	Myiarchus crinitis	*	*	*		*	*			
Great egret	Casmerodius albus	*								
Greater yellowlegs	Tringa melanoleucus	*		*					*	*
Green heron	Butorides striatus	*								
Hairy woodpecker	Dendrocopos villosus	*	*	*	*	*	*	*		
Harris's sparrow	Zonotrichia querula	*		*			*	*		
Hermit thrush	Cathrus guttatus	*		*		*	*			
Herring gull	Larus argentatus	*		*					*	*
Hooded merganser	Lophydytes cucullatus	*	?	*					*	*
Hooded warbler	Wilsonia citrina									
Horned grebe	Podiceps auritus	*							*	
Horned lark	Eomophila alpestris	*	*	*	*			*		
House sparrow	Passer domesticus	*	*	*	*			*		
House wren	Troglodytes aedon	*	*	*			*	*		
Indigo bunting	Passerina cyanea	*	*	*			*	*		
Killdeer	Charadrius vociferus	*	*	*				*	*	*
Least bittern	Isobrychus exilis	*	*	*					*	*
Least flycatcher	Empidonax minimus	*	*	*		*	*			
Lesser scaup	Aythya affinis	*		*					*	*
Lesser yellowlegs	Tringa flavipes	*		*					*	*
Lincoln's sparrow	melospiza lincolnii	*		*			*		*	
Long-eared owl	Asio otus			*	*	*	*			

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Table 1. The Birds of Camp Wilder

Species		Season Present:				Habitats Used:				
Common Name	Scientific Name	S	S	F	W	Forest	Forest Edge	Non-Forest	Aquatic	Aerial
Magnolia warbler	Dendroica magnolia	*		*		*	*	*		
Mallard	Anas platyrhynchos	*	*	*					*	*
Marsh hawk	Circus cyaneus	*	*	*	*			*		*
Merlin	Falco columbarius	*		?			*			?
Mourning dove	Zenaida macroura	*	*	*	*	*	*	*		*
Mourning warbler	Oporornis philadelphia	*	*	*		*	*			
Nashville warbler	vermivora ruficapilla	*		*		*	*	*		
Northern oriole	Icterus galbula	*	*	*			*	*		
Northern shrike	Lanius excubitor	*		*	*		*	*		
Northern waterthrush	Seiurus noveboracensis	*		*		*	*	*		
Olive-sided flycatcher	Nuttallornis borealis	*		*			*			
Orange-crowned warbler	Vermivora celata	*		*		*	*	*		
Osprey	Pandion haliactus	*		*					*	*
Ovenbird	Seiurus aurocapillus	*		*		*	*			
Palm warbler	Dendroica palmarum	*		*			*	*	*	
Philadelphia vireo	Vireo philadelphicus			*		*	*			
Pied-billed greve	Podilymbus podiceps	*							*	
Pileated woodpecker	Dryocopus pileatus	*		*	*	*	*			
Pine grosbeak	Pinicola enucleator				*	*	*	*		
Pine siskin	Spinus pinus	*	*		*	*	*	*		
Pine warbler	Dendroica pinus	*		*		*	*			
Purple finch	Carpodacus purpureus	*	*	*	*	*	*	*		
Purple martin	Progne subis	*	*	*				*	*	*
Red-bellied woodpecker	Centurus carolinus	*	*	*		*	*			
Red-breasted merganser	Mergus serrator	*		?					*	*
Red-breasted nuthatch	Sitta canadensis			*		*	*			
Red-eyed vireo	Vireo alivacens	*	*	*		*	*			
Red-headed woodpecker	Melanerpes erythrocephalus	*	*	*			*	*		
Red-shouldered hawk	Buteo lineatus	*	*	*	?	*	*			*
Red-tailed hawk	Buteo jamaicensis	*	*	*	*		*	*		*
Red-winged blackbird	Agelaius phoeniceus	*	*	*				*	*	
Redhead	Aythya americana	*		*					*	*
Ring-billed gull	Larus delawarensis	*		*					*	*

Table 1. The Birds of Camp Wilder

Species		Season Present:				Habitats Used:				
Common Name	Scientific Name	S	S	F	W	Forest	Forest Edge	Non-Forest	Aquatic	Aerial
Ring-necked duck	Aythya collaris	*		*					*	
Ring-necked pheasant	Phasianus colchicus	*	*	*	*		*	*		
Rock dove	Columba livia	*	*	*	*			*		
Rose-breasted grosbeak	Pheucticus ludovicianus	*	*	*		*	*	*		
Rough-legged hawk	Beteo lagopus	*		*	*		*	*		*
Rough-winged swallow	Stelgidopteryxx ruficollis	*		*				*	*	*
Ruby-crowned kinglet	Regulus calendula	*		*		*	*	*		
Ruby-throated hummingbird	Archilochus colubris	*	*	*			*	*		*
Ruffed grouse	Bonasa umbellus	*	*	*	*	*	*			
Rufous-sided towhee	Pipilo crythrophthalmus	*	*	*			*	*		
Rusty blackbird	Euphagus carolinus	*		*			*	*	*	
Savannah sparrow	Passerculus sandwichensis	*	*	*				*		
Saw-whet owl	Aegolius acadicus			*		*				
Scarlet tanager	Piranga olivacea	*		*		*	*			
Screech owl	Otus asio				*		*			
Sharp-shinned hawk	Accipiter striatus	*		*	*	*	*	*		
Snow bunting	Plectrophenax nivalis			*	*			*		
Solitary sandpiper	Tringa solitaria	*		*					*	
Solitary vireo	Vireo olivaceous	*		*		*	*			
Song sparrow	Molospiza melodia	*	*	*		*	*	*	*	
Sora	Prozana carolina	*	*	*					*	
Spotted sandpiper	Actitis macularia	*	*	*					*	
Starling	Sturnus vulgaris	*	*	*			*	*		
Swainsons thrush	Catharus ustulatus	*		*		*	*	*		
Swamp sparrow	Melospiza georgiana	*		*			*	*	*	
Tennessee warbler	Vermivora peregrina	*		*		*	*	*		
Traill's flycatcher	Empidonax traillii	*	*				*			
Tree sparrow	Spizella arborea	*		*	*		*	*		
Tree swallow	Iridoproene bicolor	*	*	*			*	*	*	*
Tufted titmouse	Parus bicolor					*	*			
Turkey vulture	Cathartes aura	*		*						*
Veery	Catharus fuscescens	*	*	*		*	*			
Vesper sparrow	Pooecetes gramineus	*	*	*				*		

Table 1. The Birds of Camp Wilder

Species		Season Present:				Habitats Used:				
Common Name	Scientific Name	S	S	F	W	Forest	Forest Edge	Non-Forest	Aquatic	Aerial
Virginia rail	Rallus limicola				*				*	
Warbling vireo	Vireo gilvus	*	*	*			*	*		
Western meadowlark	Sturnella neglecta	*	*	*				*		
Whistling swan	Olor columbianus	*		*						
White-breasted nuthatch	Sitta carolonensis	*	*	*	*	*	*	*		
White-crowned sparrow	Zonotrichia leucophrys	*		*			*	*		
White-throated sparrow	Zonotrichia albicollis	*		*		*	*	*	*	
Wilson's warbler	Wilsonia pusilla	*		*			*	*		
Winter wren	Troglodytes troglodytes	*		*		*				
Wood duck	Aix sponsa	*	*	*		*	*		*	*
Wood thrush	Rylocichla mustelina	*	*	*		*	*			
Yellow warbler	Dendroica petechia	*	*	*			*	*	*	
Yellow-bellied flycatcher	Empidonax flaviventris	*		*		*	*			
Yellow-bellied sapsucker	Sphyrapicus varius	*	*	*		*	*	*		
Yellow-billed cuckoo	Coccyzus americanus	*		*		*	*			
Yellow-runped warbler	Dendroica coronata	*		*		*	*	*		
Yellow-throated vireo	Vireo flavifrons	*	*	*		*	*			
Addenda:										
Bobolink	Dolichonyx oryzinvorus	*	*	*				*		
Caspian tern	Sterna caspia	*							*	*
Gadwall	Anas strepera	*							*	
Grasshopper sparrow	Ammodramus savannarum	*	*	?				*		*
Oldsquaw	Clangula hyemalis			*					*	
Red crossbil	Loxia curvirostra		*							*
Short-eared owl	Asio flammeus	*							*	*
Whip-poor-will	Caprimulgus vociferus		*			*	*			

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Table 2. The Reptiles and Amphibians of Camp Wilder

Species		Habitats Used:			
Common Name	Scientific Name	Forest	Forest Edge	Non-Forest	Aquatic
American toad	Bufo americanus	*	*	*	*
Blandings turtle	Emydoidea blandingii			roads	*
Bullsnake	Pituophis melanoleucus sayi			*	
Common garter snake	Thamnophis sirtalis	*	*	*	*
Common tree frog	Hyla versicolor	*	*	*	*
Eastern hog-nosed snake	Heterodon platyrhinos			*	
Green frog	Rana clamitans			roads	*
Jeffersons salamander	ambystoma jeffersonianum	?	?	*	*
Leopard frog	Rana pipiens		*	*	*
Northern prairie skink	Eumeces septentionalis		*	*	
Northern water snake	Natrix sipedon				*
Plains garter snake	Thamnophis radix		*	*	*
Red-bellied snake	Storeria occipitomaculata	?	*	*	
Smooth green snake	Opheodrys vernalis			*	
Snapping turtle	Chelydra serpentina		*	roads	*
Spiny softshelled turtle	Trionyx spiniferus			roads	*
Spring peeper	Hyla crucifer	*	*		*
Swamp tree frog	Pseudacris triseriata	*	*	*	*
Tiger salamander	Ambystoma tigrinum	?	*	*	*
Western painted turtle	Chrysemys picta belli	?	*	*	*
Wood frog	Rana sylvatica	*	*		*

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*Imported Bull Frogs (Rana catesbeiana) were released in the past in Camp Wilder by Don Beimborn (pers. comm.) formerly of the Warner Nature Center. However, none appear to have survived in the wild. Mr. Beimborn also reported having captured and tagged four Wood Turtles (Clemmys insculpta) and 200 Painted Turtles in the camp.

Table 3. The Mammals of Camp Wilder

Species		Habitats Used:				
Common Name	Scientific Name	Forest	Forest Edge	Non-Forest	Aquatic	Aerial
Badger	Taxidea taxus			*		
Beaver	Castor canadensis		*		*	
Big brown bat	Eptesicus fuscus		*	*		*
Black bear	Ursus americanus	*	*			
Cottontail rabbit	Sylvilagus floridanus	*	*	*		
Eastern (common) mole	Scalopus aquaticus	*	*	*	*	
Eastern (gray) chipmunk	Tamias striatus	*	*			
Eastern fox squirrel	Sciurus niger		*	*		
Gray squirrel	Sciurus carolinonsis	*	*	*		
Hoary bat	Lasiurus cinereus	?	?			*
Least weasel	Mustela nivalis		*?	*?	?	
Little brown bat	Myotis lucifugus		*	*		*
Long-tailed weasel	Mustela frenata		*	*	*	
Masked shrew	Sorex cinereus	*	*	*		
Meadow jumping mouse	Zopus hudsonius	*	*	*	*	
Meadow vole (mouse)	Microtus pensylvanicus		*	*	*	
Mink	Mustela vison		*	*	*	
Muskrat	Ondatra zibethica				*	
Northern white-footed	Peromyscus leucopus	*	*	*		
Norway rat	Rattus norvegicus					
Pocket gopher	Goomys bursarius	*	*	*		
Raccoon	Procyon lotor	*	*	*	*	
Red fox	Vulpes fulva	*	*	*		
Red squirrel	Tamiasciurus hudsonicus	*	*			
Red-backed vole	Clethrionomys gapperi					
River otter	Lutra canadensis				*	
Short-tailed shrew	Blarina brevicauda	*	*	*		
Short-tailed weasel	Mustela erminea	*	*	*	*	
Striped ground squirrel	Spermophilus tridecemlineatus		*			
Striped skunk	Mephitis mephitis	*	*	*		
Water shrew	Sorex palustris				*	
White-tailed deer	Odocoileus virginianus	*	*	*	*	
Woodchuck (groundhog)	Marmota monax		*	*		

* Additional confirmation of the species in Camp Wilder is desired.
** The records of theses species for Camp Wilder are for casual (stray) individuals; the species are not otherwise regular in occurrence here.

Definition of Natural Heritage Program Status Categories

ENDANGERED

Species that face extirpation in Minnesota in the forseeable future if efforts are not make to prserve thier remaining populations. This category includes species that have been listed as federally endangered.

THREATENED

Species that may become endangered if their populations re significantly reduced. Species assigned to this category might be characterized by:

1. Populations that have always been small and any decline in their numbers would be significant, and/or

2. Populations that have already undergone an apparent decline and for whom any further decline would be detrimental.

This category includes species that have been listed as federally threatened.

RARE

Species that are not currently endangered or threatened but by virtue of their limited occurrence warrant close scrutiny. This category includes species for which there is currently no evidence of a decline in species populations or for which the decline is not yet considered significant.

STATUS UNDETERMINED

Species that may belong in one of the preceeding categories but for which there is too little current information to make a judgement.

SPECIAL CONCERN

Species that do not belong in one of the preceeding categories but do require special attention. Included are:

1. Species subjected to species-specific exploitation, and

2. Species whose habits and habitats lend them to being particularly vulnerable to disturbance.

RECENTLY EXTIRPATED

Species that have disappeared from Minnesota since 1800. Some of the species could perhaps reestablish populations in the state should environmental conditions become more favorable.

Table 1.

Heritage Animal Elements That Could Occur in William O'Brien State Park

Species	NHP Status
Blandings turtle (Emydoidea blandingii)	Special concern
Tufted titmouse (Parus bicolor)	Rare
Loggerhead shrike (Lanius ludovicianus)	Threatened
Bell's vireo (Vireo bellii)	Rare
Wood turtle (Clemmys insculpta)	Rare

Vegetation and Wildlife Management

General Objectives:

To enhance the natural qualities of recreational areas

To maximize opportunities for wildland and wildlife oriented recreation

To reestablish the presettlement character of biotic communities

To recommend management programs which take into consideration land use in the vicinity

To ensure the survival, in a natural state, of any Element identified by the Minnesota Natural Heritage Program

Forest Areas

Objectives:

To return parts of the park to their presettlement vegetative character

To minimize the cost of vegetation management

To screen use areas in the park

To control disease

Action #1. Develop and implement a planting plan for the park.

The plan should be developed by the park manager, the regional resource coordinator, and the area forester. It should include: white pine and tamarack regeneration and revitalization of the vegetation in high use areas.

1a. White pine regeneration.

Historical records show oak and pine were associated together in the area in presettlement times (Rand 1953, U.S. Government Surveyors notes 1857). White pine occured either singly or in small groves scattered throughout the oak forest. White, red, and pin oak were the dominant oak species on loamy soils. White pine grows best on deep loams, but it can survive on most any soil. The presence of a mature overstory of aspen, birch, or other pioneer species promotes the best regeneration (Curtis 1959). Suitable sites for planting are present in the oak forest areas of the S1/2 of Sec. 25 and around existing white pine in the lower park. The success of planting white pine seedlings under a mature overstory should be demonstrated on a small scale before it is applied to larger areas. White pine require sunlight to become established. Natural breakup of the canopy should be sufficient to provide this sunlight. No active removal should be implemented unless seedlings will not grow. Planting should be restricted to small scattered groves, simulating presettlement character. The resulting increase in complexity of the vegetation will promote avian diversity (Temple et al 1979). Large, scattered white pine also add to the aesthetic quality of the forest, especially to the winter landscape. The park is situated in the transition area between low and minor hazard zone for white pine blister rust (Anderson 1973). Any occurrences of the infection should be controlled.

1b. Tamarack regeneration.

Areas that offer the best potential for tamarack regeneration are wet meadow and lowland shrub communities. It is likely that these communities were originally tamarack swamp. Site preparation would probably require disruption of the sod. Two options are scalping the sod directly around individual seedlings or discing a larger tract and planting. Another alternative for creating a stand is to establish scattered plots of tamarack and let natural reseeding

establish the rest of the area. Tamarack are profuse seeders. The effectiveness of this method is not known. Restoring natural drainage (See Vegetation and Wildlife Management, Wetland Areas, pp -) may reduce some of the competition from other lowland hardwoods. An effort should be made to reestablish characteristic ground species if natural recolonization does not appear to be likely. The avian community of a tamarack swamp includes bird species common in shrubby areas, as well as species generally associated with hardwood forests (Dawson 1979.) Conversion to tamarack would decrease upland nesting cover for waterfowl, however there is little available open water for brood raising.

The golden color of tamarack in the fall will provide additional visual pleasure for the park user.

1c. Planting in high use areas.
Shrubs and trees are needed to provide additional screening. Areas proposed for future development also require planting. In the campground and other developed areas the vegetation recieves considerable user abuse. This abuse and soil compaction inhabits natural regeneration.

Revegetation with plant material of a suitable size and the desired species is presently limited by both high costs and availability. Native shrubs are particularly scarce from state or commerical nurserys. These limitations are common to most revegetation projects in state parks. One possible solution is to obtain a cooperative agreement between the DNR divisions of Parks and Recreation and Forestry to grow the necessary plant materials at state nurseryes.

Prairie plant materials are presently being grown at the Carlos Avery State Nursery for state parks. If such an agreement for trees and shrubs is not possible, another alternative must be found to provide state parks with the necessary plant materials at an affordable cost.

The recommended tree species for William O'Brien State Park include white oak, bur oak, red maple, and green ash.

	Phases				
Cost.	1	2	3	4	5
1a.	$2,000	$1,000	$1,000	$1,000	$1,000
1b.		4,000	3,000	3,000	3,000
1c.		Covered in cost of other actions			

Action #2. Control the spread oak wilt.

Red and pin oak in the park are very likely to be a highly susceptible oak wilt host population. Red oak establishes itself as a dominant tree through thicket forming. During this process root grafts occur. Transmission of the disease through root grafts is the primary cause of mortality (Gibbs and French 1980).

Control requires cutting diseased trees, chemical treatment, and trenching. Periodic monitoring for the disease is necessary to check its spread. An inventory and control program should be developed cooperatively with the area forester, park manager, and regional resource coordinator.

	Phases				
	1	2	3	4	5
Cost. On Going	$1,000	$1,000	$1,000	$1,000	$1,000

Action #3. Reduce the visual dominance of conifer plantings.

The conifer planting near the contact station is the dominant visual feature when approaching the park on TH 95 and from the site of the proposed trail center. This is especially evident in the winter. These trees are not characteristic of the park or the surrounding area and have obviously been artificially established. The visual dominance of these plantings should be reduced by creating irregular openings; interspersing the area with clumps of white oak, bur oak, birch, aspen, maple, and shrub species; and interplanting with white pine. Replacement should be gradual, retaining the vegetative cover and screening.

	Phases				
	1	2	3	4	5
Cost.	$3,000	$2,000	$2,000	$2,000	$2,000

Action #4. Maintain large, undisturbed forested areas.

Large areas of continuous forest are becoming rare in Washington County. Large, mature forest tracts are excellent habitat for certain bird species. Noon and others (1979) showed that undisturbed, mature forest plots have both a higher overall population and a higher proportion of rare species than disturbed or successional plots. this includes birds of prey (e.g. hawks, owls), bark driller (e.g. woodpeckers), hover gleaners (some warblers like parula warbler, blackburnian warbler) and salliers (e.g. flycatchers). These and many insect eating songbirds which inhabit only the deep interior of forests are disapppearing from localities where forests are becoming fragmented (Robbins 1979). The value of mature forests for cavity nesters has often been documented (Evans & Conner 1979). Forest edge species are more adaptable to a variety of habitats and have a higher reproductive rate (Robbins 1979).

About 14 percent of Washington County is forested. Of that, 86 percent is privately owned and 14 percent publicly owned. Private forest lands in Washington County are either grazed or not managed. Average forest tract size is less than 40 acres (16 ha). Other forest lands in the county which are administered by governmental agencies or non-profit organizations receive moderate to high recreational use, but are otherwise not actively managed. The largest, contiguous forested areas include the St. Croix River valley, the Wilder Camp area, and William O'Brien State Park. The largest areas of contiguous forest in park include: 250 acres(101 ha) of oak forest in the NW 1/4 of Sec adjacent to an additional 80 acres (32 ha) outside park boundary, and approximately 100 acres (40 ha) in the St. Croix River valley which is part of the river bottom and floodplain forest extending north and south the length of the river.

	Phases				
	1	2	3	4	5
Cost.		No cost			

Action #5. Maintain the maximum abundance of dead standing and downed wood.

Avian species richness and density are influenced by the quality and quantity of available snags (Evans and Conner 1979). Snags serve a variety of purposes for birds. These include: cavity nesting, drumming, roosting, hunting perches, loafing, forage production (insects), and food caches (Miller and Miller 1980, Scott et al 1980). Other groups of animals also require dead or downed wood. Niemi (1979) identified either obligatory or preferred use by amphibians, reptiles, and mammals in addition to birds.

Snags differ in their suitability for cavity nesters. Sound sapwood and decayed heartwood is most desired by cavity excavators. Girdled trees rot from the outside in and hence are less suitable for cavity nesters, unless heart rot was already present. Dutch elm disease and oak wilt in effect girdle the tree making them less desirable for cavity nesters, however they still serve other uses.

No dead standing or downed wood should be removed from the park unless it poses a safety hazard, is removed for the purpose of development, or is required to control the spread of disease. In the latter case, infected or susceptible trees should be removed only if it will effectively control the spread of the disease. Where possible, snags in high use areas should be trimmed for safety and left standing. This will increase the abundance and diversity of wildlife close to the park users.

	Phases				
	1	2	3	4	5
Cost.		No cost			

Grassland Areas

Objectives:

To convert grasslands from exotic species to native species

To control grassland wildfires

Action #1. Convert old fields dominated by brome grass to native grassland species.

Park grasslands are largely old fields which have been planted to brome grass. Grasslands dominated by brome are relatively impervious to encroachment or invasion by other grasses, forbs, or woody species. They are dense and provide little structural diversity. In the winter, snow flattens brome making it unsuitabale for cover. Wildlife use of brome grasslands is low.

Vegetative structure and diversity appear to be two major factors determining wildlife communities (Temple et al 1979; Zeedyle and Evans 1975; and MacArthur and MacArthur 1961). The avian community in grasslands is organized by grass height (Cody 1968). Other factors such as amount of litter, forb density, height, structure and presence or absence of trees also play a role (Balda 1975). In general, the number of bird species increases as the complexity of the vegetation increases (Balda 1975). Prairie habitat which provides a variety of grasses and forbs is more suitable for nongame birds than homogeneous areas. Monocultures should be avoided (Verner 1975).

In Iowa, replanting brome and bluegrass pastures to switchgrass increased both species and numbers of birds. Switchgrass grows tall, stout, and clumped. It provides above ground nesting for songbirds, bare openings at base of clumps for ground nesters, and remains upright in winter providing cover. (Ron George, Wildlife Research Biologist, Iowa Conservation Department, personal communication, 1981).

Common techniques for converting one type of grassland to another include: burning, chemical treatment, and cultivation. Most management programs include a combination of these. A combination of these techniques should be implemented on a small scale to determine which is most practical and effective in the park. The overall grassland conversion program should be determined by the regional resource coordinator and the park manager.

	Phases				
	1	2	3	4	5
Cost.	$6,000	$6,000	$6,000	$6,000	$6,000

Action #2. Interplant old field grasslands with clumps of trees and shrubs.

The character of present grasslands is largely the result of past agricultural practices. The unbroken expanses and straight edges strongly reflect human dominance of the landscape.

Visual aspects are extremely important to visitor experiences (Fuhriman and Crozier 1974). A more natural, visual character could be created by irregularly planting individual trees and shrubs along field edges and establishing scattered groves of trees and shrubs in the grassland interiors. The plantings should be designed to provide park trail users with a variety of open spaces, views, and vistas. Plantings can also screen views of development adjacent to the park. These actions would also increase the foliage height diversity of the grasslands. Research has shown a positive correlation between foliage height diversity and the abundance and diversity of wildlife species (MacArthur and MacArthur 1961; MacArthur 1962; Shugart and James 1973). The areas of contiguous grassland in the park are probably not of sufficient size to attract a characteristic assemblege of open rangeland bird species which require large blocks of grassland habitat. There are no large areas of undisturbed grasslands in the vicinity that might serve as source areas for these species. Fragmentation of grasslands in the park is not expected to eliminate any species.

Recommended species:

Tree:	Bur oak	Shrub:	Pin cherry dogwoods
	White oak		Wild plum willows
	Paper birch		Hawthorne
	Aspen		Honeysuckle
			Raspberry
			Elderberry

	Phases				
	1	2	3	4	5
Cost.			$3,000		$3,000

Action #3. Maintain converted grasslands by fire management.

Prescribed burning will be used to maintain converted grasslands. See Action #4 below concerning fire management program for grasslands.

	Phases				
	1	2	3	4	5
Cost. On Going		$2,000	$2,000	$2,000	$2,000

Action #4. Develop a fire management plan.

A fire management plan should be developed by the regional resource coordinator, area forester, and park manager. This plan should determine the safest, most effective method for accidental or precribed burns. A system of fire breaks, using vegetation, water, and trails should be included in the fire management plan.

	Phases				
	1	2	3	4	5
Cost.		No cost			

Wetland Areas

Action #1. Restore natural drainage in the park.

1a. Wetlands in the NE1/4, SW1/4, Sec 30.
The main ditch draining this area should be plugged. Small ditches connecting the small depressions should also be plugged. The road ditch on the south side of the dirt road directs drainage from the lowland shrub area to the south, around the east side of the sewage lagoon. This should be redirected to drain north, down the natural drainage basin. The desired result is the creation of better wildlife habitat by increasing the water levels and length of water retention in the depressions.

1b. Wetlands in the E1/2, E1/2, Sec 36.
Two ditches here should be plugged. One drains the lowland shrub, wet meadow, and mixed northern wetland cover types. The other drains the basin at the base of the west side of the old island. If necessary, culverts should be installed to allow for drainage under the trail beds. The desired result is to reestablish presettlement saturated conditions in conjunction with the reestablishment of a tamarack swamp (See Vegetation and Wildlife Management, Forest Areas, Action #1b, p). Before any of these actions are implemented, a hydrologist should determine if such actions will in anyway impact downstream water supplies.

	Phases				
	1	2	3	4	5
Cost.		$1,500			

Minnesota Natural Heritage Elements

Action #1. Limit unnecessary disturbance and habitat alteration in the vicinity of known populations of the following Natural Heritage Plant Elements: dissected grape-fern (Botrychium dissectum), brome-like sedge (Carex bromoides Schleuhr), cattail sedge (Carex typhina, michx), American water-pennywort (Hydrocotyle americana L.), and Virginia water-horehound (Lycopus viginianus).

The park is the only known management area in the state where the existence of these species has been verified. All except the American water-pennywort occur in the vicinity of the lower campground. Every resonable effort should be made to protect the sites from disturbance or alteration.

	Phases				
	1	2	3	4	5
Cost.		No cost			

Action #2. Restrict any disturbance in the northern hardwoods community type.

Although the stand does not have MNH status, the type is a MNH element and should be protected. The only major disturbance in the present stand has been the cutting of diseased elm.

	Phases				
	1	2	3	4	5
Cost.		No cost			

Action #3. Monitor the park for the following Natural Heritage Animal Elements; where found, protect the habitat:

Species	Habitat
Blanding's turtle	Interior marshes or wetlands and sandy beaches (for egg laying)
Wood turtle	Same as Blanding's turtle
Bell's vireo	Shrubby lowlands
Tufted titmouse	Decidiuous woodlands
Loggerhead shrike	Open savanna type areas

Legend

Map Code	See Text*	Vegetation and Wildlife Management Actions
		Forest Areas
		Action #1. Develop and implement a planting plan for the park
F1a		1a. White pine regeneration
F1b		1b. Tamarack regeneration
F1c		1c. Vegetation in high use areas
	X	Action #2. Control the spread of oak wilt
F3		Action #3. Reduce visual dominance of conifer plantings
	X	Action #4. Maintain large, undisturbed forested areas
	X	Action #5. Maintain the maximum abundance of dead, standing and downed trees
		Grassland Areas
G1		Action #1. Convert brome grass dominated old fields to other native grasses
G2		Action #2. Interplant old field grasslands with clumps of trees and shrubs
G3		Action #3. Maintain converted grasslands by fire management
	X	Action #4. Develop fire management plan
		Wetland Areas
W1		Action #1. Restore natural drainage in the park
		Natural Heritage Elements
H1		Action #1. Protect plant elements
H2		Action #2. Protect northern hardwoods
	X	Action #3. Protect animal elements if found
	X	Action #4. Inventory priority areas

* Some actions are not strictly related to a particular cover-type and are not easily identified on the map. How and where these actions will be applied is discussed in the text.

William O'Brien State Park

Vegetation Management

	Phases				
	1	2	3	4	5
Cost.		No cost			

SURFACE WATER

Inventory

William O'Brien State Park owes much of its character to the St. Croix River which forms its eastern boundary. Adjacent to the park, the river is nearly a quarter mile in width. Its course is often dissected by low lying islands. One such island, Greenburg, lies within the the park's boundaries. Braided channels and partial former channels are characteristic of the valley floor in the vicinity of the park. The section of river adjacent to William O'Brien is jointly administered by the National Park Service and the states of Minnesota and Wisconsin. Recreational use of the river is heavy. Canoing, boating, fishing, and swimming are the most popular activities. Proximity to the Twin Cities area makes this particular stretch of the St. Croix River a prime recreational resource. Water quality of the river is good enough to permit full body contact water sports.

Projections set the extent of the 100 year flood of the St. Croix River within the park at 698 ft (213 m) above sea level. Much of the lower part of the park lies near this level.

Lake Alice was created by impounding a small creek that ran parallel to the valley side slopes and emptied into the St. Croix. This creek was fed by seeps and springs at the base of the slopes. These seeps are now the primary water source for Lake Alice. Several small ponds are found within the park boundaries. These water holes provide valuable wildlife habitat. Presently ditches drain these wetlands. (See Vegetation and Wildlife Management, Wetland Areas, Action #1, pp - for further discussion and recommendations.)

Objectives:

To prevent flood damage to park facilities

Action #1. New developments or extensive repairs to existing development should be floodproofed so the structure is raised to a level of 1.5 ft (46 cm) above the 100 year flood level.

	Phases				
	1	2	3	4	5
Cost.	Cost included in the cost of each project				

GROUND WATER

Inventory

Movement of ground water in the vicinity of William O'Brien is generally east toward the St. Croix River. Numerous layers of sandstone bedrock underlie the park. Most of the area's water supply is from these bedrock aquifers. Drilling through several bedrock layers generally produces a large supply of water.

Five wells have been drilled in the park. All have an adequate water supply. The picnic ground and swimming beach are served by a 75 ft (23 m) well located 100 ft (30 m) north of the picnic area. A 115 ft (35 m) well is located next to the central toilet building in the lower campground. A 65 ft (20 m) well is located at the manager's residence. A 65 ft (20 m) well located next to the maintainence area serves Pioneer Camp, the shop office, and assistant manager's residence. The upper campground has a 215 ft (66 m) well located next to the toilet building.

Management

The quality and quanity of the park's water supply is such that no management actions are necessary.

FISHERIES

Inventory

The St. Croix River and Lake Alice offer good fishing opportunities. Catch rates as established by creel census show good fishing in the river. It is fished for walleye, sauger, northern pike, smallmouth bass, largemouth bass, white bass, black crappie, white crappie, yellow perch, rock bass, catfish, bluegill, and other sunfish species. Carp, buffalo fish, catfish, drum

suckers, quillback, redhorse, and occasionally eels are commercially harvested. Major predator forage fish include the dog fish, mooneye, gizzard shad, gar, log perch, and burbot. Two species present but considered uncommon are the shovelnose sturgeon and the paddlefish. The rare lake sturgeon is also present. The most abundant species are crappie, white bass, sunfish, carp, sauger, walleye, smallmouth bass, redhorse, and suckers.

The river also contains a freshwater mussel (Lampsilis higginsi) which is rare and in danger of extinction. At one time this freshwater mussel was widely distributed and commercially important in the upper Mississippi River system. Presently it is known to survive only sporadically in the Mississippi River because of pollution. It is also found in the Mermac River in Missouri, where a dam threatens its survival.

The DNR, Section of Fisheries stocks Lake Alice with mature sunfish and crappies. Test netting shows gizzard shad, carp, black bullhead, yellow bullhead, largemouth bass, green sunfish, blue gill, white crappie, and black crappie to be present in the lake. It is not likely that Lake Alice freezes out in the winter.

Management

Objective:

To keep a viable pan fish population in Lake Alice.

Action #1. Continue stocking Lake Alice.

	Phases				
	1	2	3	4	5
Cost.	DNR, Section of Fisheries				

Sources: U.S. Department of the Interior, Master Plan Lower St. Croix National Scenic Riverway Minnesota - Wisconsin, Final Environmental Statement, prepared by the National Park Service, Midwest Regional Office in cooperation with the Departments of Natural Resources of Minnesota and Wisconsin, August 18, 1975.

Minnesota Department of Natural Resources, Division of Fish and Wildlife, Fisheries Lake Survey, Lake Alice, August 6 and 7, 1979.

Progress report on the Lake St. Croix creel census. Krosh, H.F., Minnesota Department of Conservation, Division of Game and Fish, Section of Technical Services, 1969.

ARCHAEOLOGY AND HISTORY

Archaeology

The Minnesota Historical Society (MHS) maintains an archaeological file in its state historic preservation office. The file describes two known sites within or near the boundaries of William O'Brien State Park. A third site that was located in the early 1900's cannot be relocated and may have been destroyed during the construction of TH 95.

One site is located halfway between the northern park boundary and the city of Copas (approximately a half mile north of the park). The site originally consisted of 27 Indian mounds, although only a few remain today. The largest mound in the group, one which measures 7.8 by 10 ft (2.4 by 3 m), produced a skinning knife that the MHS maintains in its collection. The second site is located in the main use area of the park, stretching in a narrow strip along the river between the canoe campground and the picnic ground. The site was located during a 1978 random survey of Greenburg Island and adjacent park shoreland. Several artifacts were recovered from this early habitation site. Archaeologists consider these articles to be associated with the middle to late Woodland and Mississippian cultures. Woodland populations existed between 1000 B.C. and 1700 A.D. Finds that characterize this culture include tooth-stamped pottery and earthen burial mounds. Precursors of the Mississippian cultures came from the southern United States and brought Mexican influences to the north via the Mississippi River. The Mississippian period overlaps the Woodland era and is characterized by a more agrarian-based lifestyle. Mississippian sites near Marine on the St. Croix have been carbon dated at about 1300 A.D.

History

In the 1650's an expedition led by Pierre Radisson and Sieur de Grosseilliers canoed down the St. Croix River. They were the first European visitors to pass through the O'Brien area. This voyage marked the beginning of the French and English exploration of the St. Croix valley via fur trade activities which dominated commerce over the next 180 years. By 1830 fur-bearing mammal populations had declined drastically. The beaver, which was the mainstay of the trapping industry, was overtrapped to extremely low population levels.

During the 17th and 18th centuries, the St. Croix valley was divided between rival Indian tribes and fur traders. French traders from the Mississippi and lower St. Croix supplied the Sioux, while those from Lake Superior supplied the Chippewa. An 1825 treaty between the Sioux and Chippewa set a boundary for the tribes just north of the park, near the Chisago-Washington county line.

Although the main tribe was Sioux in the O'Brien area, the Chippewa also played an important role in the history of the area because of the proximity of their territory. Many Sioux-Chippewa conflicts occurred in the boundary region between present day Wild River State Park to the north and Stillwater to the south. In an 1837 treaty, both tribes ceded all lands east of the Mississippi and south of Mille Lacs to the United States. This triangular section of east central Minnesota was the first portion of the future state to become legally available to European settlers.

Recognizing the logging potential of the St. Croix valley, a group of Marine, Illinois residents started the first civilian settlement in Minnesota in the spring of 1839. This settlement became the village of Marine on St. Croix, just 1/2 mi (.8 km) south of the park. It was the beginning of one of the biggest industries in Minnesota history. This small timber company, which was formed in 1839, to produced 9,000,000 ft (2,743,200 m) of lumber during the 1873 season. Just as the river was a highway for the voyagers of the previous fur trade, it now provided a means of floating timber downstream from the heavily forested areas to the north. The lumber industry dominated commerce in the valley until the turn of the century, providing a strong economic basis for expansion of supporting trades as well.

Marine on St. Croix became an entry point for thousands of immigrants arriving in Minnesota by steamboat. The first wave consisted mostly of lumber developers from the New England states. The newly established Minnesota territory was often called the "New England of the West." Following the major Indian land cessessions of the early 1850's, European immigration dominated. Immigrants to the St. Croix area were primarily Scandinavians. The Swedish settlement of Scandia (northwest of the park) was established by 1850. Wooden shoes and Swedish newspapers were common in early Marine on St. Croix.

Steamboats played an integral part in the development of the St. Croix valley as well as the entire Minnesota territory. In 1838, the 101-ton "Palmyra", a side-wheel steamer, arrived at the dalles in Taylors Falls. The 30 year period between 1860 and 1890 was the peak of steamboat activity on Minnesota

riverways. During 1869 a total of 230 steamers reached Taylors Falls. By the 1880's railroads began taking over the steamboat's importance. The last commercial steamboat docked at Taylors Falls in 1916.

Many communities along the St. Croix did not fulfill the promise of their early years. They declined or disappeared as the pine forests of the valley were exhausted. Such was the case with the town of Old Copas, which consisted of several businesses and dwellings along the railroad tracks just north of the park. Old Copas changed names many times, but its original name was Vasa, after the 16th century king of Sweden. Old Copas existed between 1849 and the early 1900's. The town dwindled during the 1857 financial panic. It was rebuilt along the new Duluth-Twin Cities railroad line in 1886, but declined again as the trucking industry took over the railroad business. The old harness shop was torn down in 1963, leaving nothing but building foundations scattered just outside the northern park boundary. The present day town of Copas was built on a new site just off TH 95, about 1/2 mi (.8 km) north of the park.

The city of Marine on St. Croix never reached the grandiose expectations of its founders. Today it exists as a small and quiet community of 544 residents (1980 census). It still has many of the original New England style buildings built during the logging era in its historic district. The first frame building in Marine, built in 1848, still stands as a private home. The present day Stone House Museum, built in 1872, is cited in the National Historic American Building Survey as an outstanding example of Swedish stonework. These are only two examples of several historic buildings that preserve the character and integrity of the community. Many of the residents are descendents of the original settlers who traveled from New England and Scandinavia to the new land of Minnesota.

William O'Brien was a leading figure in the early St. Croix valley logging days. He originally settled in Marine on St. Croix, but later carried on extensive lumber operations to the south while maintaining his home in St. Paul. William O'Brien purchased 180 acres (73 ha) adjacent to the river in 1919. In 1945 his daughter Alice donated the property to the state in her father's memory. Through subsequent donations and land acquisitions, the park has grown to encompass 1,370 acres (554 ha). The rich history of the area provides outstanding interpretive potential, especially for native Minnesotans interested in the beginnings of their state. Park naturalists are already making use of the Marine on St. Croix State Historic District as a part of the park interpretive program.

Management

Objectives:

To preserve and protect all important prehistoric and historic sites in the park.

To intepret prehistoric and historic use of the park and surrounding area for park visitors

To encourage archaeological research that will increase the existing knowledge of prehistoric human activity in Minnesota.

Action #1. Field check all proposed development sites for the presence of prehistoric and historic remains before any work is begun.

Where remains are found, an assessment will be made of the size and importance of the site. When necessary, the site will be excavated before construction is begun. All excavation work must have the approval of the state historic preservation officer. Artifacts removed will become the property of the DNR. Information obtained on the site during excavation will be made available to the park interpretive program. Construction of the development in another location will be considered, if the site proves to be significant.

	Phases				
	1	2	3	4	5
Cost.	$1,000				

PHYSICAL DEVELOPMENT AND RECREATION MANAGEMENT

EXISTING DEVELOPMENT

Recreational activities in William O'Brien State Park range from camping, picnicking, hiking, swimming, fishing, boating,and canoeing to nature observation, photography, interpretive programs, orienteering, ski touring, and snowshoeing. The park has two vehicular campgrounds: the lower near the St. Croix River has 60 sites and the upper or west campground has 65 sites. There is a group campground near the St. Croix River which can accommodate up to 50 people and often serves as a canoe campground. There is a larger, 75 person capacity group campground in the western portion of the park to serve organized groups such as the Boy Scouts. There is a picnic area with approximately 200 tables and an enclosed picnic shelter which doubles as an interpretive center. A swimming beach has been developed on Lake Alice. A concrete ramp provides access to the St. Croix River for boaters, canoists, and fishermen. During the summer months a private concessionaire rents canoes at the access area. A private concessionaire also operates a snack stand in the picnic ground in the summer. A system of 11.5 mi (18.4 km) of trails has been developed to serve ski touring and hiking enthusiasts. The city of Marine on St. Croix has developed a bicycle path to the park paralleling TH 95. Administrative development in the park includes a contact station, the shop maintanence area, and residence for the park's manager and assistant manager. The manager's residence has been fitted for solar heating in a cooperative venture with Honeywell and National Aeronautics and Space Administration. (See Existing Development Map, pp 65).

PROPOSED DEVELOPMENT

Physical development in William O'Brien State Park will be limited to that necessary for appropriate park use and enjoyment and efficient management. Necessary facilities should be provided only under carefully controlled safeguards against unregulated and indiscriminate use, ensuring the protection of park resources. To the highest practical degree, location, design, and materials for facilities should be consistent with the objectives of preserving and conserving the grandeur of the natural environment.

Administrative facilities, including roads and trails, are necessary for proper management. Public accommodations, such as campgrounds, are called for so that the public may have an opportunity to enjoy and use the unique environments set aside for them. Such facilities should be located, designed,

Legend

24

19

52

53

25

30

31

36

1

6

4

95

St. Croix River

Restrooms

Sewage Lagoon

Winter Parking

Trailer Sanitary Station

Sanitation Building

Restrooms

Upper Campground

Restrooms

Service Area

Asst. Manager's Residence

Administration Area & Contact Station

Restrooms

Canoe Camp

Manager's Residence

Primitive Camp

Restrooms

Lake Alice

Lower Campground

Sanitation Building

Restrooms

Picnic Area

Pop Stand

Picnic Shelter

Water Access & Canoe Rental

Greenburg Island

Trail Shelter

Restrooms

1000 950 900 850 800 750 700

N

0 500' 1/4mi. 1/2mi. 1mi.

Miles

Kilometers 0 500m 1km

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Existing Development

and constructed, to serve and protect park values by focusing and directing the uses of the park. For example, a road, a trail, or a formal campground can serve to channel use within specifically designated locations, preventing indiscriminate use of a larger area which could damage or destroy some of the very resources for which the park has been set aside to protect.

Facilities should be designed to be compatible with the natural environment. Existing facilities which are not consistent with the objectives of this plan should be modified.

It is state law to provide access to recreational facilities for all people. However, extreme topographic relief at times precludes extensive use by people with physical disabilities. (For instance, to provide trials which are accessible to everyone may in some areas require such an extensive system of "switchbacks" and hard surfacing that the natural atmosphere for which the park was established is destroyed.) Therefore, the DNR will concentrate efforts on providing accessibility in those areas that have the most potential for use by people with physical disabilities. Keeping in mind the importance of providing recreational opportunities for all individuals, a systematic approach will be followed to remove barriers and to provide for use and enjoyment by everyone.

The costs of implementing physical development projects in the park have been scheduled into five phases to facilitate budgeting and funding requests.

Trail Center

William O'Brien currently has no trail center facilities. Heavy winter use indicates a need for indoor facilities to provide protection from the elements. Use in other parks similar to William O'Brien, such as Wild River State Park and Hennepin County Park Reserve parks, indicate that ski touring facilities and a snack concession would be well-used. A trail center could also be used for meetings and naturalist programs.

Objective:

To provide a multi-use facility which will accommodate a broad range of trail and interpretive activities

Action #1. Build an energy efficient trail center south of the present shop maintenance area near the old gravel pit.

The center should be oriented to fully use the sun for solar heating and designed with a low horizontal profile to blend into the low rolling hills of the surrounding landscape. An enclosed observation deck should overlook the open area to the south and west. The building should have a fireplace and facilities for ski rental and snack concessions. Sanitation facilities should include toilets, sinks, and hot and cold running water. The interior space should be flexible enough to allow it to be divided into small areas to accommodate smaller groups or left open to for large groups. There should also be facilities for naturalist programs. A parking lot should be developed behind the building, out of sight from the observation deck and major use areas. Parking bays should be paved with asphalt and have no physical barriers to facilitate snow plowing. The bay nearest the trail center should be lighted. All facilities should be accessible to special populations.

	Phases				
	1	2	3	4	5
Cost.	$300,000				

Action #2. When trail center facilities have completed, remove existing winter parking lot. Scrape gravel and revegetate to grassland (See Vegetation Management, Grassland Areas, Actions #1 & 2).

	Phases				
	1	2	3	4	5
Cost.			$700		

Trails

The trail system of William O'Brien is well-developed and includes 9.5 mi (15.2 km) of trail. In winter, trails are used for ski touring and in summer for hiking. Other trail uses on a large scale would present irreconcilable conflicts (e.g. motorized trail use). Heavy winter trail use indicates a need for expansion of the trail system. Only limited expansion (approximately 1.5 miles) is possible because of land area constraints. Small adjustments to the existing trail system are necessary to maximize use of the park's natural

environment. Location of the new trail center will require the deletion of some small existing trail segments and the development of others. Development of a self-guiding interpretive program for the entire trail system should promote trail use and enjoyment. Present and proposed trails entering the park include the existing Marine on St. Croix bicycle trail, the proposed Washington County on-shoulder bicycle trail, and the proposed legislatively designated Minnesota-Wisconsin Boundary Trail.

Objectives:

To provide a year round trail system for park users

To ensure that trails are compatible with the park's environment

To separate conflicting trail uses

To align trails to make the best use of topography and park resources

To provide ski trails for all levels of expertise

To connect the trail system to other area recreational facilities

To promote trail use

To provide links to local, regional, and statewide trail systems

Action #1. Expand ski touring and hiking trails as shown on the Proposed Trails Map, pp). The additions will provide added trail length and diversity.

Location of the proposed trail center will require the deletion of small portions of existing trail and the addition of others. Small portions of the existing trail should be redesigned to maximize the use of scenic views, vegetation, and topography.

	Phases				
	1	2	3	4	5
Cost.		$3,000			

Action #2. Expand the paved bicycle trail through the park to the North to connect with the Washington County bike trail system and the park's trail center.

	Phases				
	1	2	3	4	5
Cost.				$15,000	

Action #3. Develop an interpretive pamphlet for the ski touring and hiking trail systems and inconspicuously mark interpreted locations along trail.

	Phases				
	1	2	3	4	5
Cost.		$5,000			

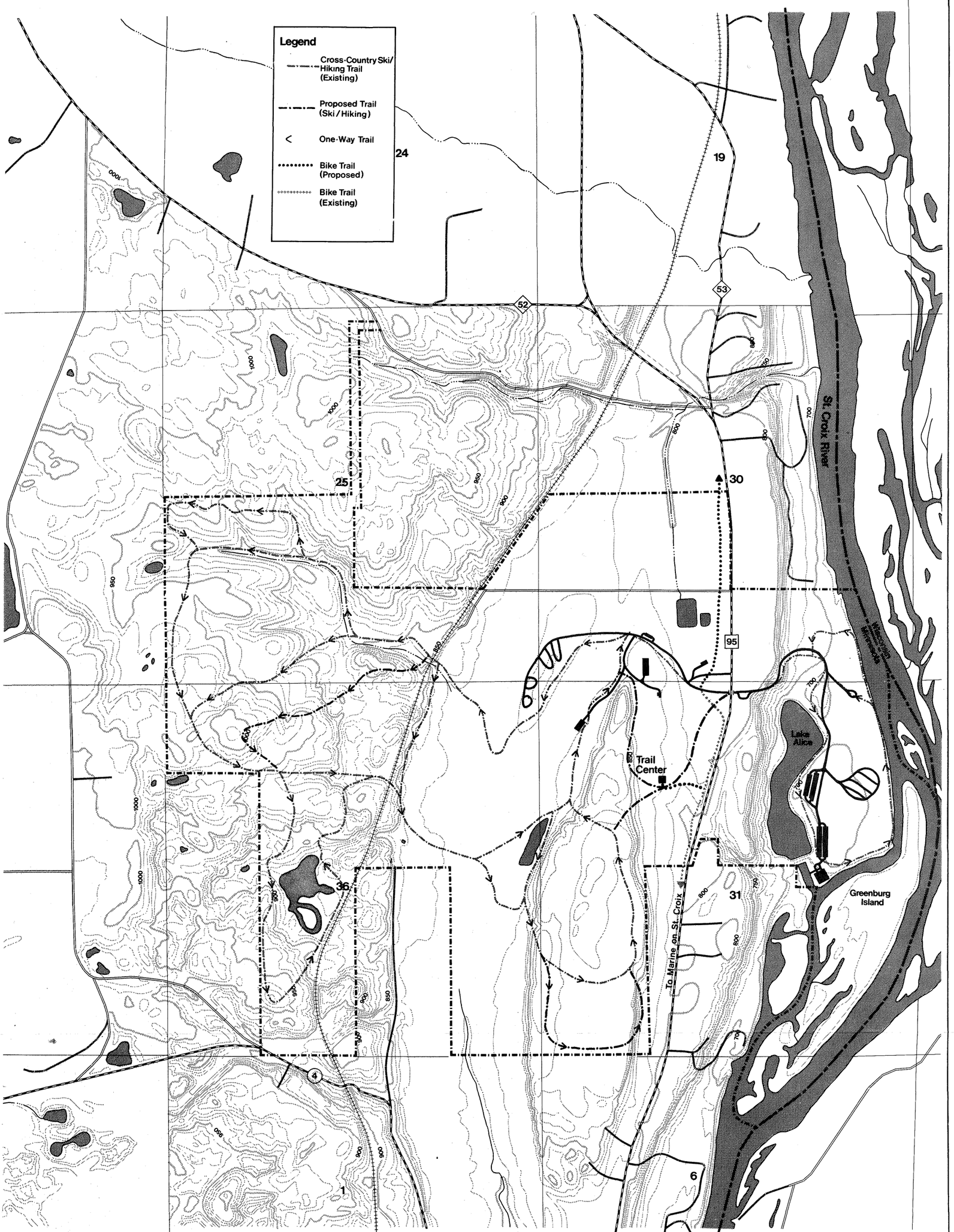
Action #4. Develop a snowmobile trail on park periphery, if grant-in-aid trails in the area need a connection through the park and access to the trail center.

	Phases				
	1	2	3	4	5
Cost.		Grant-in-aid Program			

Action #5. Provide a horseback trail right of way through park if a grant-in-aid trail connector is developed from Soo Line railroad grade.

It seems likely horseback riding trails will be provided by the DNR on the recently purchased Soo Line railroad grade which terminates six mi (9.6 km) south of William O'Brien. If use of the Soo Line indicates a need for more miles of horseback riding trails in the area, riders should develop a grant-in-aid trail for more trail mileage. If the grant-in-aid connector reaches the park a trail through the park will be developed as a portion of the system.

	Phases				
	1	2	3	4	5
Cost.		Grant-in-aid Program			



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Miles 0 500' 1/4mi. 1/2mi. 1mi.

Kilometers 0 500m 1km

81 **William O'Brien** State Park | **Trails**

Camping

Camping facilities at William O'Brien are heavily used. Close proximity to the Twin Cities metropolitan area ensures that this heavy use will continue. The lower campground is in need of general rehabilitation. Sites are crowded, overused, and lacking in vegetative cover. Parking spaces are poorly defined, compounding the loss of vegetative cover and in the worse cases causing camper disputes. There is standing water in portions of the campground. Rare plant species on the campground periphery require protection to ensure their survival. (See Vegetation Mangement, Minnesota Natural Heritage Elemts, Action #1, p).

The area north of the upper campground is the best location for expansion of vehicular camping facilities. This area is presently privately owned and can only be purchased from a willing seller before expansion can be carried out. Old field areas to the north of the present campground should be planted in anticipation of future expansion.

Some people prefer tent camping and solitude that is not possible in a vehicular campground. Providing tent only campground would satisfy this need. Canoe camping along the St. Croix is very popular. The National Park Service is planning to provide sites for river users in the future. Until these sites are developed, the park canoe campground should be used to serve camping needs of canoists.

Objective:

To provide a wide variety of camping opportunities in a natural setting.

Action #1. Rehabilitate the lower campground.

Remove some sites for better spacing and screen the remaining sites with natural vegetation. Establish grass on the sites and define parking areas. Drainage work will be necessary to correct the standing water problem in some portions of campgrounds. Circut breakers should replace the fuse system for electrical sites.

	Phases				
	1	2	3	4	5
Cost.		$100,000	$1,000	$1,000	$1,000

Action #2. Develop a tent only hike-in campground with 10 to 15 sites on the plateau above the proposed trail center.

The trail center parking lot can be used for parking by campers in this campground. Hiking trails should be developed from the lot to the campground. Design of these trails must take into account the erosion potential of side slope soils. The individual campsites should be widely spaced and heavily screened for privacy. Vault toilets and water should be provided. A hiking/ski touring trail south of this site near the plateau will be developed. (see proposed Trails Map, p). This trail should provide access to the campground for maintenance vehicles. The area immediately south of the wooded area on the plateau should be planted for possible future campground expansion. (See Proposed Development Map, p).

	Phases				
	1	2	3	4	5
Cost.		$6,000	$2,500		

Action #3. Expand upper campground by 100 sites when land to the north is acquired.

Fifty sites should be provided as an extension of the vehicular camping loops to the south. Another 50 tent-only sites with short Trail Links should be developed to the north. The sites should be widely spaced and heavily screened. A modern sanitation building should be provided with flush toilets, sinks, and showers. (See Proposed Development Map, pp 70).

	Phases				
	1	2	3	4	5
Cost.	$10,000	$1,000		$1,000	

Action #4. Reserve camping in canoe campgrounds for river users only until the National Park Service (NPS) completes construction of an adequate number of sites for river users.

When the NPS has provided these sites, convert the area to a group camping facility. A canoe camping information sign should be located on the river near the north park boundary. An honor system should be implemented to collect fees for camping at the area.

	Phases				
	1	2	3	4	5
Cost.	$500				

Picnic Ground

The picnic ground is heavily used on most summer weekends including many large gatherings such as family reunions. Inclement weather can destroy long planned picnic events. Only one building which also serves as an interpretive center is available for protection in the event of bad weather.

Objective:

To provide adequate shelter in picnic ground from inclement weather.

Action #1. Remodel existing interpretive building for use as a picnic shelter.

The sides of the building should be opened and the opposite fireplace refurbished. A second fireplace should be developed on the end of the building both fire places should be designed for cooking.

	Phases				
	1	2	3	4	5
Cost.		$60,000			

Action #2. Develop two new picnic shelters.

These structures should have open, circular fireplaces in the center designed for cooking. The second shelter should be developed only if use indicates the need.

	Phases				
	1	2	3	4	5
Cost.		$60,000			$60,000

Swimming Beach

Swimming facilities at William O'Brien are heavily used on weekends during the summer. Facilities for changing clothes are needed as many beach users also use other park facilities after swimming.

Objective:

To provide adequate changing facilities at the swimming beach.

Action #1. Build an addition with changing rooms for swimmers onto existing beach toilet building.

	Phases				
	1	2	3	4	5
Cost.				$30,000	

Natural Playground

The only playground equipment in William O'Brien is a swing set. This type of equipment is out of character with a natural area.

Objective:

To provide natural play area for small children

Action #1. Construct a playground with natural materials

This play area should be developed with natural materials such as debarked tree limbs, stumps, and rocks. It should be designed designed to blend into the landscape and located near the lower campground. Berms and vegetation should be used to screen the area.

	Phases				
	1	2	3	4	5
Cost.		$5,000			

Shop Maintenance Area

The existing maintenance area has very limited storage space and is inadequate for current needs. Proximity of the maintenance area to high use areas requires security fencing.

Objective:

To provide adequate storage and maintenance facilities for park equipment out of the view of the public.

Action #1. Remodel the maintenance area.

Construct additional unheated storage northwest of the existing garage. The small storage buildings that are located here will be removed. The addition will be approximately 30 x 60 ft (9 m x 18 m). The maintenance building should be connected to the existing natural gas main and the fuel tank removed. The area should protected with a fence and gate. The area should be heavily screened to keep it out of public view.

	Phases				
	1	2	3	4	5
Cost.		$100,000			

Assistant Manager's Residence

The cost of renovating the existing assistant manager's residence is prohibitive because of the age and poor condition of the building.

Objective:

To provide the assistant manager with adequate housing

Action #1. Build a new assistant manager's residence.

The house should be located just north of the existing house. This will help to ensure security of the nearby maintenance area. The structure should be energy efficient and designed for solar heating.

	Phases				
	1	2	3	4	5
Cost.		$115,000			

Contact Station

The present contact station design and location serves the park well. Wood which is available for sale to campers is stored in a visually unattractive trailer parked adjacent to the station. Existing ice coolers are also a visual intrusion.

Objective:

To provide contact station facilities which meet park and user needs.

Action #1. Construct a facility for wood storage and ice coolers onto the contact station.

This addition should blend with the style of the existing building.

	Phases				
	1	2	3	4	5
Cost.		$10,000			

Action #2. Connect the facility to natural gas service, remove propane tanks.

	Phases				
	1	2	3	4	5
Cost.	$1,000				

Action #3. Landscape the area

	Phases				
	1	2	3	4	5
Cost.	$5,000				

Power Lines

Power lines in the park detract from the natural character of the area.

Objective:

To remove obtrusive objects from view of park users

Action #1. Bury all power lines

	Phases 1	2	3	4	5
Cost.	$5,000				

Pavement

Roads in the upper part of the park, campground loops, the shop maintenance area and the group camp parking lot are presently unpaved. Paving with asphalt would control dust and reduce maintanence. The canoe area parking lot is also unpaved, but paving this area is impractical because of settling problems.

Objectives:

To control dust and reduce maintenance problems.

Action #1. Pave all park roads, campground loops the service court, and parking lots except canoe area lot.

	Phases 1	2	3	4	5
Cost.		$100,000			

ARCHITECTURAL THEME

New buildings and major renovation of existing buildings should be in keeping with an architectural theme for the park. All proposed new structures will be integrated into the landscape. All heated buildings will be designed for energy efficiency and apply all or some of the following energy conservation features: proper sun/wind orientation, maximum insulation, earth sheltering, and passive and active solar space and water heating applications.

New structures should be designed to blend into the landscape by locating them in side hills or by earth berming. Exposed surfaces should be covered with naturally textured materials; wood, textured concrete, or block. The remainder should be left natural or stained or painted with earth tone colors.

VISITOR SERVICES

Visitor Orientation

The visitor's first contact with the park and park personnel is at the contact station, located just inside the park entrance. Information received at the contact station, includes graphic displays, maps, and handout literature, designed to prepare the visitor for the change in environment and experience the park will provide. Also, at the contact station the visitor pays entrance and camping fees in addition to asking specific questions.

Objective:

To provide information to orient and inform the park visitor about the park and its natural features.

Action #1. Continue and improve information dissemination at the park.

Many visitors are not familiar with the park and need to be given a quick resume of what the park has to offer.

Displays, maps, and handout literature should be available both inside and outside the contact station. This information should help to orient the visitor to the park itself, as well as the local area, and the state park system.

		Phases				
		1	2	3	4	5
Cost.	On Going	$500		$500		$500

Interpretive Programs

Interpretive programs are valuable educational tools. Increased resource sensitivity is necessary if our parks or other natural portions of our environment are to retain their character. Presently the William O'Brien interpretive program is run only during the prime summer camping months of June, July, and August.

Numerous possibilities exist in regard to expanding the interpretive program. They range from a full time program with a large staff to a limited program with a part-time employee. Determination of the type of program to be used

should be based on the audience the DNR wishes to reach. For example, a program can be aimed at present park users only, or it can be expanded to reach schools and other organized groups. It can even be geared to serve the public at large if properly organized and advertised. This management plan while it can be a source of materials for the interpretive program is not intended to show either the magnitude or the range of interpretive possibilities. Because naturalist porgrams change with the seasons, and the naturalist's preferences and expertise, it is recommended that the naturalist program for the park be developed by the regional naturalist in consultation with staff.

Recommendation

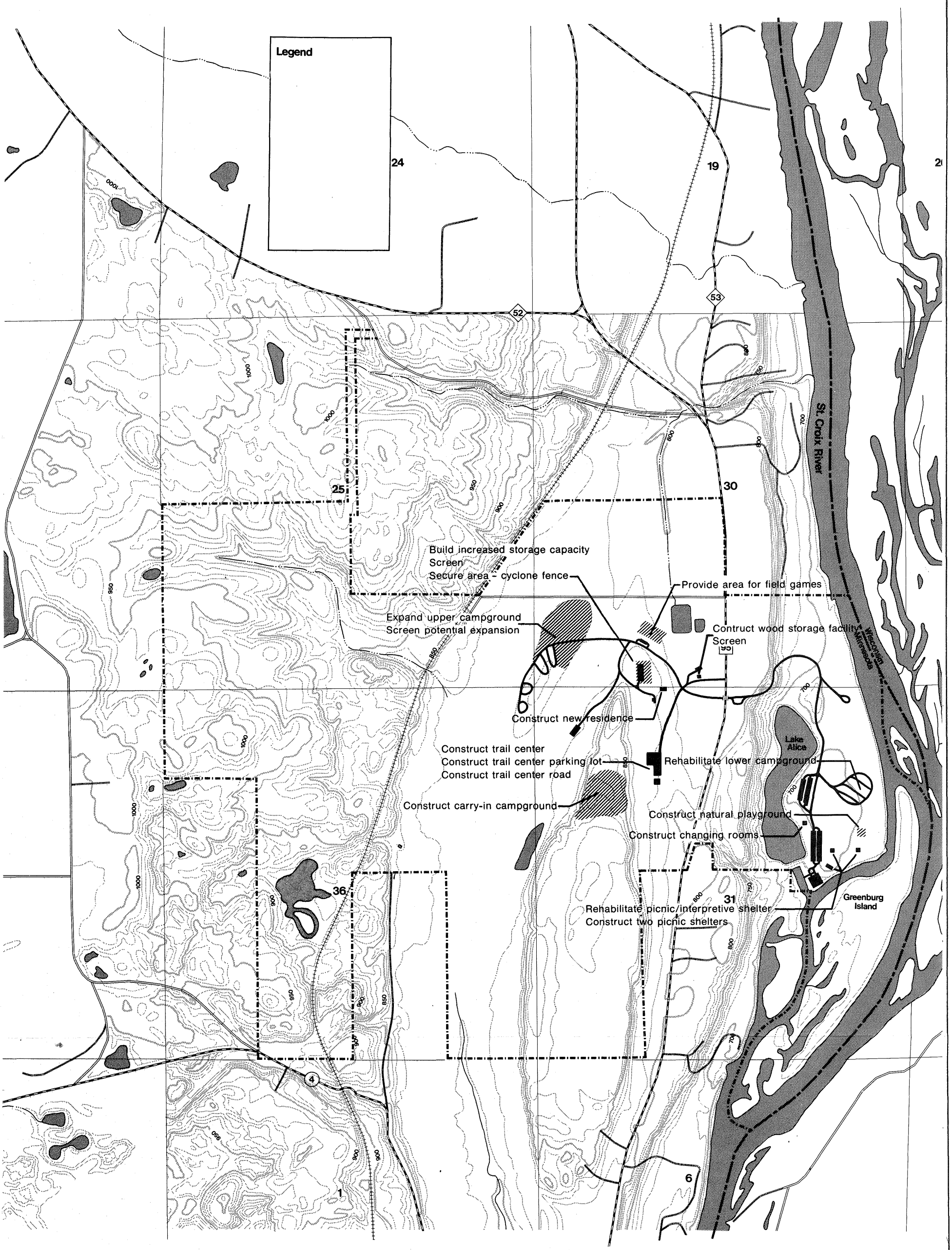
Based on present use patterns, it is recommended that the interpretive program be carried on not only during the prime summer camping months but expanded to weekends during the rest of the year as well.

Concession Services

Concession services for the enjoyment and convenience of the park user are ofered at the park. Fire wood and ice are provided at the contact station. A private concessionaire operates a snack stand in the picnic ground and another concessionaire rents canoes near the river. See Proposed Development, Trail Center, Action #1, p for proposed concession services).

Recommendation

Two additional concessions operations are proposed for the new trail center: ski rental and a food concession. It is recommended that these be contracted to a private concessionaire.



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Proposed Development

PARK BOUNDARY

PARK BOUNDARY

Two types of land have been identified adjacent to the present park boundary:

1. Park quality land--This is land which has the qualities necessary to become part of the park. These lands would be used to provide more area for park facilities (specifically for an expanded trail system). The inclusion of these lands in the park would also protect and perpetuate natural plant communities and wildlife habitat. Two hundred eighty-two acres (86 ha) on the west side of the park have been identified as park quality lands. These lands are presently wooded pasture or woods. The rolling topography and wooded character of the lands make them a natural for expansion of the park's trail system. Numerous small ponds and marsh areas would provide excellent wildlife habitat.

   The four private landowners who presently hold title to the land have been personally contacted by DNR staff representatives about this issue. (See ~~Surrounding Land~~ PARK BOUNDARIES Map, p 80).

2. Scenic land--This is land adjacent to the park which, if developed improperly, could have an adverse impact on the park. Two ways of protecting these lands are:

   a. Zoning--Lands could be zoned by Washington County and the city of Marine on St. Croix to prevent undesirable development. This could be done by large lot residential zoning with requirements for screening with vegetation
   b. Scenic easements--Lands could be protected by purchasing certain landowner rights. Some examples of these include: restrictions on building additional structures or clearcutting wooded tracts. The purchase of these rights, called "scenic easements" would be negotiated with each landowner individually. The landowner would be paid fair market value for the easements and the land would remain in private ownership. Lands would remain on the tax rolls with scenic easements, but future tax assessments should reflect the rights which have been sold.

Actions necessary to purchase park quality lands and/or scenic easements:

1. The legislature must authorize the purchase.
2. The legislature must appropriate money for acquisition.
3. Landowners must be willing to sell before the state can purchase fee titles or easements.

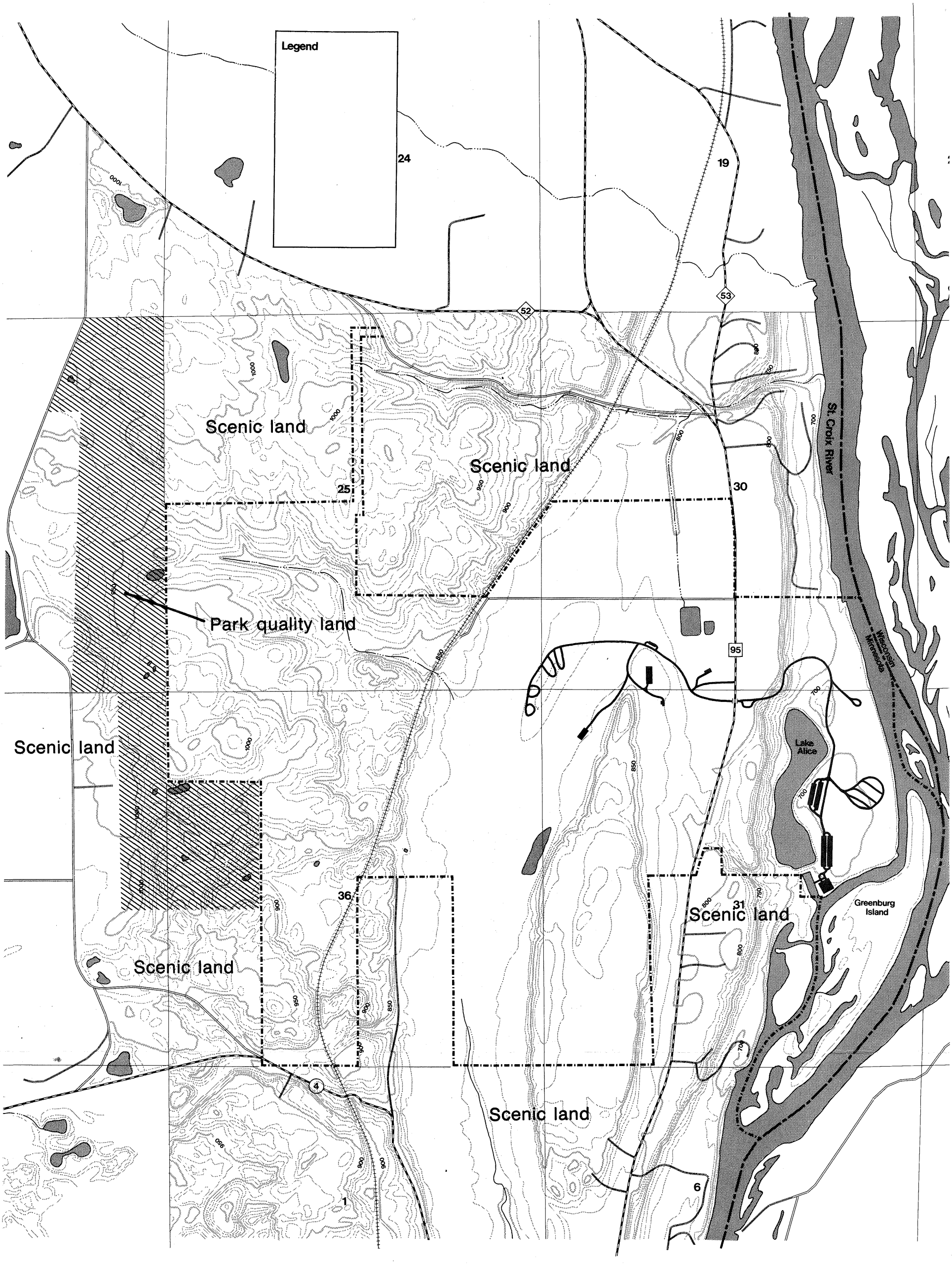
Recommendation

Park quality lands should be included in the park's statutory boundary and should be purchased when they become available. Scenic easements should be purchased on lands adjacent to the park from willing sellers. Lands purchased as scenic easements must meet the following criteria.

1. Be visible from the park
2. Contain natural resources worth maintaining
3. Have potential to adversely affect the park if developed

Legislation to include park quality lands should be tailored to alleviate problems for the private land owner. The park quality lands identified are portions of farms. If the landowner wishes to sell the whole property and the DNR can only purchase those portions which are of park quality, the landowner would have to negotiate with two buyers: the DNR which wants only park quality lands and another buyer who might want the remaining lands. Legislation should be sought which would allow the DNR to purchase whole properties, including non-park quality lands. Then the DNR could sell back those portions which are non-park quality to interested buyers.

In addition, some of the park quality lands are owned by people who wish to continue farming. This use does not necessarily destroy park quality lands. In recognition of this fact, scenic easments might be used as a way to protect these lands until they become available for purchase. In this way landowners can continue the present use of their land while it is protected for future park use.



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Miles 0 500' 1/4mi. 1/2mi. 1mi.

Kilometers 0 500m 1km

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Park Boundaries

OPERATIONS STAFFING AND EQUIPMENT

OPERATIONS

Maintenance is an essential responsibility of the DNR, Division of Parks and Recreation. It is responsibility that often goes unnoticed by the park visitor in comparison with new development. Yet, the park and the DNR are continually judged by the appearance of the park and its facilities.

The task of providing services to the public and security for park facilities and resources 24 hours a day, 12 months of the year is essential. During the busy season, full-time operation is necessary from 8:00 to 10:00 p.m. The remaining hours are covered by the resident manager. During other seasons, there is only part-time operation 56 hours per week, however, maintenance, repair, and park security account for many extra work-hours. If these responsibilities are to be met, competent trained personnel is essential.

There are four basic aspects to maintenance and operations:

1. Maintaining resources
2. Maintaining facilities
3. Providing services to the park visitors
4. Enforcing rules and regulations which protect park visitors, resources and facilities

One of the major maintenance problems of parks is the impact of people concentrated in specific locations. These areas include: campsites, trails, river banks, areas around buildings, and scenic points of interest. This overuse affects the groundcover and frequently exposes tree roots to damage from foot traffic. The eventual result may be erosion slides, disfigured sites, and even danger to park visitors. A regular maintenance program with adequate personnel, supplies, and equipment controls damage, thereby, avoiding future reconstruction expenditures.

STAFFING

One of the staffing problems in all state parks is the heavy reliance on federally funded work programs, such as the Comprehensive Employment and Training Act (CETA), the Neighborhood Youth Corps (NYC), and Green View. The low cost personnel provided by these programs makes it possible for parks to

offer programs and services which would otherwise be impossible. However, these employees are hired on a short-term basis, usually 8 to 10 weeks and often do not have the training and experience necessary to provide needed services without constant supervision in already understaffed parks. To avoid these problems, funding should be made available to hire trained personnel for major public service and maintenance programs. Temporary employees should only be hired for minor maintenance and special projects.

The following chart summarizes the existing staff in William O'Brien Park.

Existing Park Staff

Management Staff
- 1 Park manager (12 months)
- 1 Assistant park manager (12 months)
- 1 Clerk typist (9 months)

Maintenance Staff
- 2 Park workers (9 months and 8 months)
- 2 Laborers (9 months and 5 months)
- 1 Night watchman (4 months)

Recreation Staff
- 1 Naturalist (3 1/2 months)
- 2 Lifeguards (3 months)

In addition to park staff, work in the park has been done by individuals under the Comprehensive Employment Training Act (CETA), Green View and a program for inmates of Stillwater State Prison.

Proposed Staff

Additional staff is necessary at the park to carryout ongoing operations and maintainence. The most cost effective method of carrying out much of the development proposed in this plan is with park staff. A full staff complement at William O'Brien should include:

	Staff Months
Park manager (full time)	12
Assistant park manager (full time)	12
Technician (full time)	12
Clerk typist (full time)	12
Park worker (9 mo.)	9
2 Park workers (6 mo.)	12
2 Park workers (4 mo.)	4
Laborer (10 mo.)	10
Laborer (9 mo.)	9
Laborer (6 mo.)	6
Naturalist (4 mo.)	4
2 Lifeguards (3 mo.)	6
Total Staff Months	112

Equipment

Many types of equipment are necessary for the day to day operations of a park. This equipment requires maintainence and replacement when it is worn out. Equipment of proper size and specifications must be selected on a park by park basis to match the conditions and the job being accomplished. New or specified equipment may be necessary when park activities change over time. Proper up-to-date equipment will reduce personnel needs, costs of repairs to old equipment, and the cost of maintainence and development projects.

The following list includes the major existing and needed equipment of the park as of Spring 1981. Other small equipment is to numerous to note.

Equipment	Status	Miles
Staff automobile	Existing	56,500
4 x 4 truck	Existing	30,700
1 ton truck	Existing	67,200
Tractor	Existing	1965 model
Bombi (trail groomer)	Existing	150 hrs.
Rider mower 42"	Existing	800 hrs.
1/2 ton pickup	Needed	
Rider mower 42"	Needed	

Replacement Criteria

Light maintainence and administrative vehicles 5 years or 70,000 miles.

Heavy equipment replacement time varies according to type of equipment and use.

Small equipment such as mowers, chainsaws, and other small equipment should be replaced as needed.

Interpretive furniture and fixtures should be purchased as necessary.

COST AND PHASING SUMMARY

The following cost estimates were generated in April, 1981. These cost estimates are based on current prices and available information. As new information is made available and as new or modified programs are initiated, revised cost estimates will be prepared to more realistically represent costs at that time. This plan is intended to be implemented in ten years. The phases noted suggest the level of funding to be requested each biennium. but there is no guarantee that this amount of funding would be received from the Legislature. Therefore, some change to these phases can be expected.

RESOURCE MANAGEMENT	Phases 1	2	3	4	5
VEGETATION AND WILDLIFE					
Forest Areas					
Action #1. Develop and implement a planting plan for the park					
1.a. White pine regeneration	$2,000	$1,000	$1,000	$1,000	$1,000
1.b. Tamarack regeneration		3,500	2,500	2,500	2,500
1.c. Vegetation in high use areas		Covered in cost of other actions			
Action #2. Control the spread of oak wilt	1,000	1,000	1,000	1,000	1,000
Action #3. Reduce visual dominance of conifer plantings	3,000	2,000	2,000	2,000	2,000
Action #4. Maintain large, undisturbed forested areas		No cost			
Action #5. Maintain the maximum abundance of dead, standing and downed trees		No cost			
Grassland Areas					
Action #1. Convert brome grass dominated old fields to other native grasses	6,000	6,000	6,000	6,000	6,000

	Phases 1	2	3	4	5
Action #2. Interplant old field grasslands with clumps of trees and shrubs			$3,000		$3,000
Action #3. Maintain converted grasslands by fire management		$2,000	2,000	$2,000	2,000
Action #4. Develop fire management plan		No cost			
Wetland Areas					
Action #1. Restore natural drainage in the park		1,500			
Natural Heritage Elements					
Action #1. Protect plant Elements					
Action #2. Protect northern hardwoods		No cost			
Action #3. Protect animal elements if found					
Action #4. Inventory priority areas					
SURFACE WATER					
Action #1. Floodproof development		Cost included in physical development and recreation management			
FISHERIES					
Action #1. Continue stocking Lake Alice		DNR, Section of Fisheries			
ARCHAEOLOGY AND HISTORY					
Action #1. Field check all proposed development sites for the presence of prehistoric and historic remains before any work is begun	$1,000				

	Phases 1	2	3	4	5
PHYSICAL DEVELOPMENT AND RECREATION MANAGEMENT					
Trail Center					
Action #1. Build trail center	$300,000				
Action #2. Remove existing winter parking lot			$700		
Trails					
Action #1. Expand ski and hiking trails		$3,000			
Action #2. Expand bicycle trail				$15,000	
Action #3. Develop trail interpretive program		5,000			
Action #4. Connect snowmobile trail to grant-in-aid trail		Grant-in-aid Program			
Action #5. Connect horseback trail to grant-in-aid trail		Grant-in-aid Program			
Camping					
Action #1. Rehabilitate lower campground		100,000	1,000	1,000	$1,000
Action #2. Develop hike in campground		6,000	2,500		
Action #3. Expand upper campground	10,000	1,000		1,000	
Action #4. Canoe campground	500				
Picnic Grounds					
Action #1. Remodel existing interpretive building for use as picnic shelter			60,000		
Action #2. Deveop two new picnic shelters		60,000		60,000	

	Phases 1	2	3	4	5
Swimming Beach					
Action #1. Build changing facilities				$30,000	
Natural Playground					
Action #1. Build natural play area		$5,000			
Shop Maintainence Area					
Action #1. Remodel maintainence area		100,000			
Assistant Manager's Residence					
Action #1. Build new assistant managers residence		115,000			
Contact Station					
Action #1. Build addition to contact station		10,000			
Action #2. Remove fuel tanks and convert to natural gas	$1,000				
Action #3. Landscape area	5,000				
Power Lines					
Action #1. Bury all power lines	5,000				
Pavement					
Action #1. Pave park roads, service court, campground loops, and parking lots		100,000			
Visitor Services					
Action #1. Continue to improve information disemination	500		$500		$500

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