

TABLE OF CONTENTS

INTRODUCTION.....	3
Overview.....	5
The Planning Process.....	7
REGIONAL ANALYSIS.....	9
The Surrounding Area.....	11
Recreational Facility Supply and Demand.....	15
THE PARK USER.....	25
DEVELOPMENT AND RESOURCE INVENTORY.....	33
Climate.....	35
Geology.....	35
Soils.....	37
Vegetation.....	44
Wildlife.....	55
Surface Water.....	58
Ground Water.....	59
Fisheries.....	60
History and Archaeology.....	61
Existing Development.....	63
PARK BOUNDARY.....	67
CLASSIFICATION.....	71
The State Recreation System.....	73
The Landscape Region System.....	73
Classification Process - ORA '75.....	75
Natural, State Park Criteria.....	76
Recreational State Park Criteria.....	79
Scientific and Natural Area Criteria.....	80
State Wildlife Management Area Criteria.....	82
State Water Access Criteria.....	83
State Rest Area Criteria.....	83
Classification Justified by ORA '75.....	84
Additional Legislative Classification Options.....	87
DEVELOPMENT AND RESOURCE MANAGEMENT.....	93
OPERATIONS AND STAFFING.....	101
BIBLIOGRAPHY.....	106

LIST OF MAPS

Economic Development Regions.....	18
Camper Origin.....	32
Soils.....	42A & 43
Vegetation.....	51 & 53
Landscape Regions.....	74
Existing Development and Land Ownership.....	65 & 66A
Classification.....	89 & 91

This comprehensive management plan for Big Stone Lake State Park was completed by the Minnesota Department of Natural Resources, Office of Planning, Park Planning Section, 1983. Funding for the planning process was provided by the Legislative Commission on Minnesota Resources.

Park Planners: Dennis Thompson - Carol Reamer Braun
Peter Buesseler Document #0985F

INTRODUCTION

AN OVERVIEW OF BIG STONE LAKE STATE PARK

Big Stone Lake State Park was established in 1961. It is located in Big Stone County along the northern shore of Big Stone Lake. This park is comprised of three separate units having a combined total statutory area of 1,118 acres.

The three units are the Bonanza area, Overlook area and the Meadowbrook area.

The Meadowbrook area has a statutory boundary of 830 acres, of those 825 acres are in state ownership, 96 acres of which are held in life estate. Five acres are in private ownership. Of the state-owned land, the DNR, Division of Parks and Recreation operates 785 acres, 2.5 acres are a state water access and 37.5 acres are managed by the Division of Fish & Wildlife.

The 830 acre Meadowbrook area is the most developed recreational unit and is located 9 miles northwest of the city of Ortonville along Highway 7. This unit has a rustic campground with 42 campsites, a picnic ground, a boat launch, a trailer dump station, contact station/manager's office, small service court and a manager's residence. This unit contains a total of one mile of publicly owned shoreline.

The topography of the Meadowbrook area is relatively flat with a few low rolling hills and several drainage ways extending across the unit. The vegetation ranges from old field to wet prairie with a small area of woods in the picnic ground and campground.

The Overlook area has a statutory boundary of approximately 90 acres. The state owns 4 acres which are managed by the Minnesota Department of Transportation (Mn/DOT). The remaining 86 acres are in private ownership. This area has a small parking lot and pit toilets which are being maintained as a wayside rest area by Mn/DOT. It is located 18 miles northwest of Ortonville on Highway 7. This area has a spectacular panoramic view of Big Stone Lake.

The Bonanza area has a statutory boundary of 199 acres. The state owns 175 acres all of which are being managed by DNR, Division of Parks and Recreation. This area is located 19 miles northwest of Ortonville along Highway 7. A 4600 S.F. interpretive building was constructed in this unit in 1970. It was operated by a naturalist from 1913 to 1915 but has not been staffed since. This area also has a group camping area and picnic ground.

The Bonanza area contains a very high quality native glacial till hill prairie located on its steep bluffs. The level terrace created between the lake and the bluffs contains the several wooded areas and park development. Views from the top of the bluff offer an expansive view of Big Stone Lake and the glacial landforms surrounding it.

THE PLANNING PROCESS

The Outdoor Recreation Act of 1975 (ORA '75) was enacted by the Minnesota legislature to "preserve an accurate representation of Minnesota's natural and historical heritage" and to "provide an adequate supply of scenic, accessible, and usable lands and waters to accommodate the outdoor recreation needs of Minnesota's citizens." The intent of this legislation is to ensure, through long-range planning, the protection and perpetuation of Minnesota's outstanding resources.

ORA '75 also redefined certain recreation unit classifications. For example, the state park classification was divided into recreational state parks and natural state parks. As a part of the overall planning process, each unit will be reviewed to see that it is consistent with the classification for that unit. Upon completion, the unit plans will provide long-range management policies and recreation and resource development recommendations which will reflect the classification designated ^{of} that unit. The ORA '75 also states that after August 1, 1977, no development funding will be permitted for any unit until a management and development plan has been completed and reviewed for that unit. By authorizing this planning program, the legislature has taken a significant step toward building a state recreation system which reflects an accurate representation of "Minnesota's natural and historical heritage" ~~and~~ that ~~it~~ can be enjoyed both now and by future generations.

The Park Planning Section of the DNR, Office of Planning was established to formulate long-range resource management and recreation development plans for 82 state parks, recreation areas, and waysides.

The park planning process consists of six steps:

1. An inventory of natural resources, visitor use, and existing facilities is compiled. Specialists from other DNR divisions and sections assist in collecting pertinent data. At this point the first public workshop is held.
2. Alternatives for park management and development are developed. A second public workshop is held to review these alternatives and invite further public comment. These alternatives are then reviewed by the Park Planning staff and the DNR, Division of Parks and Recreation.

3. The recommendation for park classification is made, the park goal is developed, and the draft plan is written. This step culminates in the first interdepartmental review.
4. The draft plan is revised as the result of the interdepartmental review. The revised plan is made available to the public for a 30 day review period, during which the final public meeting is held.
5. The draft plan is revised according to information received from the public review. The plan is then sent to the State Planning Agency for a 60 day review period.
6. The plan is implemented by the DNR, Division of Parks and Recreation.

In planning the management and development of the various units, the Department of Natural Resources will consider probable future impacts which may affect each unit. In spite of this, unforeseen circumstances are bound to occur. Therefore, each plan should be reviewed periodically to see that it remains relevant in light of current conditions.

REGIONAL ANALYSIS

THE SURROUNDING AREA

Introduction

In order to determine a park's potential role in perpetuating natural resources and fulfilling recreational needs, a state park 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, surrounding land use, and other nearby recreational facilities.

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 undue competition with other recreation providers.

Big Stone Lake State Park is comprised of three separate units which are located 9, 18 and 19 miles northwest of Ortonville. All data given in this regional analysis section will be given for the Meadowbrook unit which is located 9 miles northwest of Ortonville. The Meadowbrook unit currently provides the major recreation facilities including camping, picnicking, and water access.

Recreation Attractiveness

Some areas of the state which are associated with high concentrations of lakes, streams, hills and forests have been identified as recreational zones in the Minnesota Department of Energy, Planning and Development report, MINNESOTA IN THE EIGHTIES. Big Stone Lake State Park is not located in a recreational zone. Big Stone Lake is a primary recreation resource for this area of the state, however, the poor water quality throughout much of the summer greatly reduces its recreation attractiveness. Water quality research and improvement programs are being implemented for Big Stone Lake. The area around Big Stone Lake has interesting geologic and archaeological features, some native vegetative communities and an abundance of wildlife which does enhance the recreational setting.

Accessibility

The park's accessibility in terms of time and distance from major population centers and the availability of alternative modes of transportation must be evaluated when recreation programs and developments are considered.

Big Stone Lake State Park is situated on the north shore of Big Stone Lake at the Minnesota - South Dakota border. The park is 184 miles west of Minneapolis and St. Paul; ⁹¹ miles northeast of Brookings, South Dakota; 75 miles west of Willmar; 33 miles south of Morris; and 9 miles northwest of Ortonville.

Population

Three cities with populations over 1,000 are located within 25 miles of the park's Meadowbrook unit (see Table 1). Census figures for 1980 indicate the entire Minnesota population within 25 miles of the park is 13,305. The South Dakota counties of Roberts (pop. 10,911) and Grant (pop. 9,013) are nearly entirely within twenty-five miles of the Meadowbrook or Bonanza areas. Therefore, their entire county populations were included. The combined Minnesota and South Dakota population within an estimated 25 mile radius of the park is 33,300. The 1980 census data indicated Big Stone County decreased in population between 1970 and 1980. The population projection by the Minnesota State Demography Unit projects a continued decrease in this population between 1980 and 1990.

TABLE 1.

Cities with populations over 1,000 located within 25 miles of the park's Meadowbrook unit.

<u>City</u>	<u>Population</u>
Browns Valley, Mn	1,231
Milbank, S.D.	4,108
Ortonville, Mn	2,548

Source: 1980 census

Within an approximate 35 mile radius of the park, four Minnesota and one South Dakota community contribute an additional 14,169 people to the regions population, they are: Wheaton (pop. 1,969), Morris (pop. 5,367), Appleton (pop. 1,842), Madison (pop. 2,212), and Sisseton, S.D. (2,779).

The South Dakota communities of Watertown (pop. 15,632) and Brookings (pop. 14,915) are located 65 and 91 highway miles from the park, respectively.

Economy

Agricultural land uses account for between 90 and 96 percent of the land uses in the six Minnesota counties surrounding the park (see Table 2).

TABLE 2.

PERCENT OF GENERAL LAND USE BY COUNTY

	<u>Big Stone</u>	<u>Chippewa</u>	<u>Lac Qui Parle</u>	<u>Stevens</u>	<u>Swift</u>	<u>Traverse</u>
cultivated	75	88	84	89	81	91
pasture/open	15	7	12	6	14	5
water/marsh	8	1.5	2	3.5	3	3
forest	.5	2	1	.5	1	.5
urban/industrial	1.5	1.5	1	1	1	.5

Source: Pocket Data Book, 1975. State Planning Agency.

Big Stone County is located in the small grain agricultural region. This region has flat rich prairie soils, but has variable moisture and ^afrost free growing season of approximately 115 days. Major crops include wheat, barley, sunflowers, potatoes, and sugar beets.

Ortonville's primary industries include agricultural and food processing services, metal fabrication, and hydro electric production. Two rail and two truck lines provide service to the community for shipping.

Graceville (pop. 780), located 19 miles north of Ortonville, has a variety of agricultural and building construction services. Major employers in Graceville are health and educational service facilities.

The community of Morris has industries which include education, health care and governmental services, hotels, restaurants and retail stores.

South Dakota cities located within a 25 mile radius of the park, include Big Stone City and Milbank. Big Stone City's major employers are a cheese products factory and granite mining companies. The city of Milbank has a variety of industries which include a major insurance company, granite mining, food processing and utility companies. Located within 35 miles of the park the community of Sisseton, S.D. has industries including food processing, manufacturing, retail, a hospital and agricultural services.

Transportation

With the current concern about energy and high gasoline prices, alternative modes of transportation to the park should be evaluated. Passenger bus service is available to the nearby town of Ortonville, 9 miles southeast of the park. Busses arrive daily enroute between Minneapolis, MN and Aberdeen, S.D. and between Sioux Falls, S.D. and Fargo, N.D. Public transportation is not available from Ortonville to the park and existing bus routes do not pass by the park.

Bicycle access to the park was also considered. The Department of Transportation has prepared statewide "Minnesota Bikeways" maps to aid bicyclists in selecting travel routes. Most paved state and county state aid roads have been rated for their suitability for bicycling. Bike access to the Meadowbrook area from Ortonville has been rated poor and Highway 7 between Meadowbrook area and the Bonanza area has been rated good. A variety of good to fair bike routes exist east of the park to Willmar and south of Ortonville to Madison. Direct routes from the park to Appleton are fair to unsatisfactory. Bike routes from Lac Qui Parle and Glacial Lakes state parks to Big Stone Lake State Park are good to fair.

The park is located 35 miles by road east of Interstate 29. East/west U.S. Highway 12, State Highway 7 and north/south State Highway 75 are secondary travel routes which pass through Ortonville.

Surrounding Land Use

Much of the shoreland adjacent to the park has been developed for year-round and summer residences. Several resorts are also located on the shores of Big Stone Lake. Most of the non-shoreland adjacent to the park is used for agricultural production and grazing. There are no industrial or commercial uses of land adjacent to the park.

RECREATIONAL FACILITIES SUPPLY AND DEMAND

Big Stone Lake State Park located along the Minnesota/South Dakota state border is in a region where the river lakes of Big Stone, Traverse, Marsh, and Lac Qui Parle provide the natural resources for most of the area's recreational activities. In the planning of Big Stone Lake State Park, it is important to analyze the interrelationship of the park with other area recreational facilities. This analysis is also intended to identify the recreational preferences and needs of Minnesota residents. The results of this analysis will help to determine the role which Big Stone Lake State Park plays in providing needed recreational facilities in this region. Because this park is on the state border it was not possible to base the analysis only on Minnesota information. Wherever possible population, user, and facility data was gathered from South Dakota and analysed with the available Minnesota data.

It is important to note that recreational facilities near a state park may duplicate services. However, some people will consistently choose to recreate at one area over another in the pursuit of a particular experience. For example, camping is a recreational activity which state parks accommodate. City and county parks in the vicinity may also have campsites. However, some people will consistently travel to a state park because of the type of experience it offers, namely, camping in a natural setting augmented by other recreational opportunities such as hiking, wildlife observation, and natural interpretation. While camping facilities may be duplicated elsewhere, the total activity experience is not.

Big Stone Lake State Park is comprised of two primary units - one known as the Meadowbrook area and the second, the Bonanza area. Since the Meadowbrook area is located closest to the city of Ortonville and it is the location of the campground and the center of park operations, all distances in this section will be given from the Meadowbrook area.

The distance Minnesotans are willing to travel to recreate varies for each activity. The following mileage figures on an individual's willingness to travel to make use of a recreational facility came from information collected by the DNR in preparation of the State Comprehensive Outdoor Recreation Plan (SCORP '79). SCORP '79 is a four year study which identified recreation patterns and activity preferences on state and region levels. The study is periodically updated.

Willingness to Travel

<u>Activity</u>	(Non-metro Minnesotans) <u>Distance willing to travel to participate</u>
Camping	76 miles
Picnicking	32 miles
Hiking	31 miles
Swimming	16 miles
Bicycling	14 miles
Horseback Riding	22 miles
Ski Touring	32 miles
Snowmobiling	43 miles
Golfing	13 miles
Visiting Historic Sites	20 miles

SCORP information was collected by economic development regions. (See Economic Development Regions Map, p. 18 .) There are 13 regions in the state. Region 6W, in which Big Stone Lake State Park is located, includes the counties of Chippewa, Swift, Big Stone, Lac Qui Parle and Yellow Medicine.

SCORP '79 has ranked a number of summer and winter recreational activities according to expressed desire by Minnesotans for more opportunities to do them. The activities ranked as follows:

Summer Activities

All Minnesotans

1. Bicycling
2. Camping
3. Fishing
4. Tennis
5. Swimming
6. Hiking
7. Picnicking
8. Boating
9. Golfing
10. Park facilities
11. Canoeing
12. Horseback riding

Region 6W Residents

1. Fishing
2. Camping
3. Swimming
4. Bicycling
5. Hiking
6. Tennis
7. Golfing
8. Baseball/softball
9. Horseback riding
10. Picnicking
11. Trail biking
12. Water skiing

Winter Activities

All Minnesotans

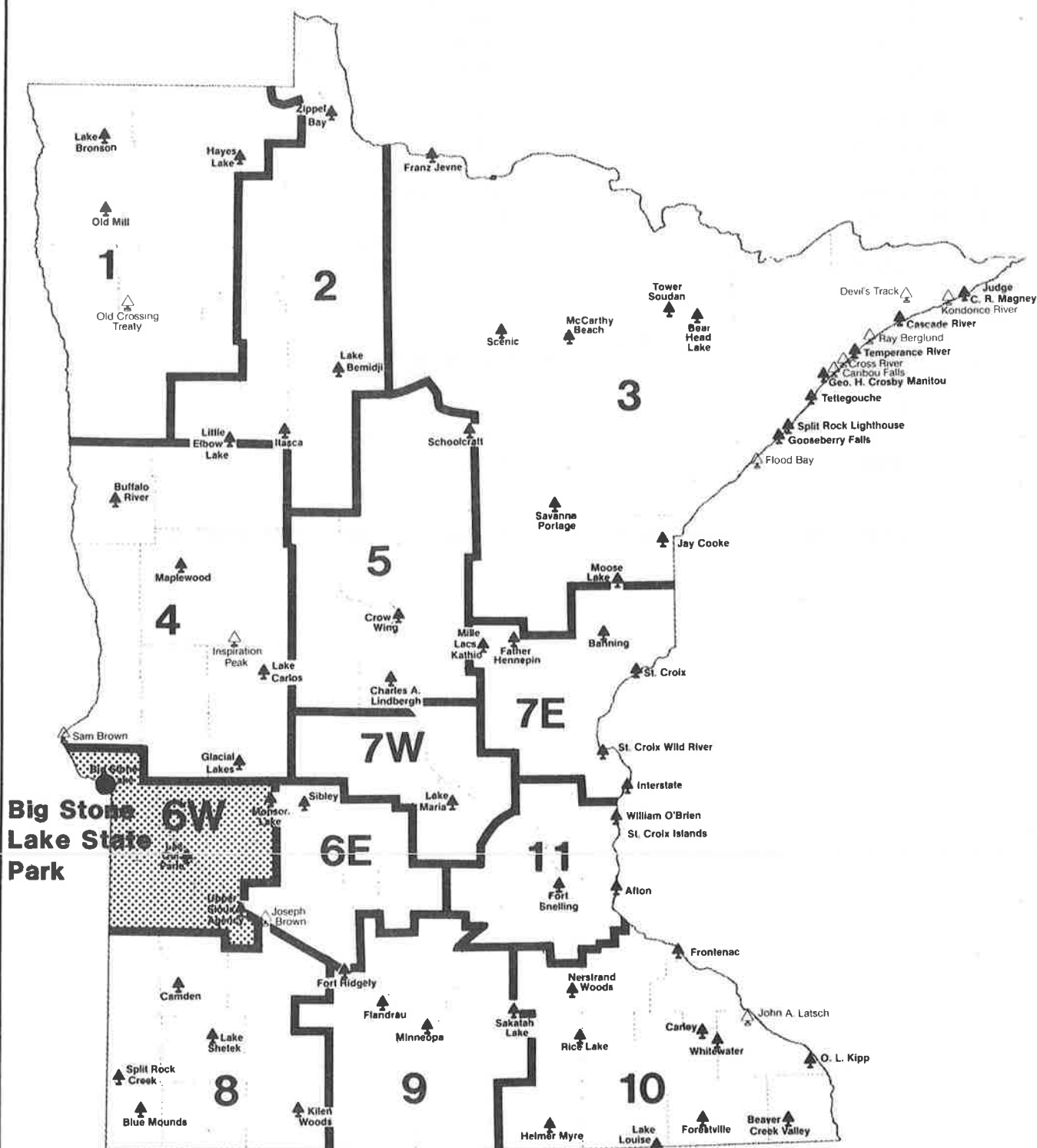
1. Hunting
2. Ski touring
3. Snowmobiling

Region 6W Residents

1. Hunting
2. Snowmobiling
3. Misc. skiing *

* Undetermined differentiation between downhill and cross-country.

Economic Development Regions



Big Stone Lake State Park

The population data discussed on page 12 is for an approximate 25 mile radius of Big Stone Lake State Park. Excluding snowmobiling and camping, 25 miles is an average distance non-metro residents are willing to travel to participate in a recreational day activity. The 33,300 Minnesotans residing within approximately a 25 mile radius of the park are the source of the park's primary day users. Use of the state park's facilities is highly dependent on the availability of comparable recreational facilities closer to the area's population centers. Comparable recreational facilities located beyond the 25 mile radius of the park can also attract potential users away from the state park.

The following is an inventory of the supply of each facility type in the study area ^(approx. 25 mile radius) and brief discussion of the demands for that opportunity on a regional and statewide basis.

Major Recreation Facilities Nearby

Big Stone National Wildlife Refuge

Big Stone National Wildlife Refuge contains 10,795 acres of land and offers fishing, hunting, cross-country skiing, canoeing, hiking, wildlife observation and a vehicular drive opportunity to visitors. Restrooms are provided on the refuge, but no drinking water is available. No designated picnic areas are provided. Camping and building of fires are prohibited. Swimming, horseback riding, traveling by off road vehicles or snowmobiles are not permitted, however, special use permits are usually provided upon request for organized horseman trail ride groups.

A four mile self-guided auto tour route is located in the refuge two miles southeast of Ortonville. It is open during the summer weekends and upon request. Along the tour route several numbered sign posts located at vehicle turnouts refer to a self-guided interpretive brochure available at the start of the tour. At the end of the auto tour route a major interpretive shelter with comprehensive interpretive displays, toilets, benches, and a foot trail with 15 points of interest has been developed. The auto tour provides a view of the major habitats protected in the refuge.

Hartford Beach State Park, South Dakota

Located on the south shore of Big Stone Lake 16 miles northwest from Ortonville this 331 acre South Dakota state park provides 43 semi-modern camping sites (21 campsites have electrical outlets), picnicking, swimming, boat launch, group camping and trail opportunities. Three of the parks hiking trails provide access to sites of ^{an}early fur trading post~~x~~, Indian village~~x~~, Indian burial mounds and scenic overlooks which are interpreted through a self-guiding trail brochure. The campground is filled only on holiday weekends. Average weekend occupancy for 1980 was 28 percent. Average overall occupancy for 1980 was 19 percent. This park includes a future campground expansion area already layed out and planted.

Big Stone Island Nature Area, South Dakota

This 100 acre "wilderness area" provides habitat for a variety of wildlife species. It is managed by the South Dakota; Department of Game, Fish and Parks, Division of Parks and Recreation and provides ^{primative}camping, hiking, and wildlife observation opportunities.

Toqua Lakes - Big Stone County Park

Toqua Lakes was established as a state park in 1919. In 1967, the state legislature transferred the park to Big Stone County. The park now provides swimming and picnicking in a natural setting and a sports field area for organized ball games. The park is located in the community of Graceville and is adjacent to a private golf course.

Picnicking

There are 33 places to picnic in Minnesota within a 25 mile radius of the park. These picnic areas are concentrated around lakes and the larger communities. There are five picnic shelters located in Ortonville's six municipal picnic areas. The following chart summarizes the type and number of facilities.

<u>Type of Facility</u>	<u>Number of Picnic Grounds</u>	<u>Number of Tables</u>
City Park	6	39
County Park	3	91
DNR - Trails & Waterways	4	7
DNR - State Park	1	36
Mn/DOT	5	6
Private	11	57
U.S. Corps of Engineers	2	10
U.S. FWS	<u>1</u>	<u>2</u>
Total	33	248

Picnicking is a desired activity statewide. It is not perceived to be in short supply by residents of Region 6W (SCORP '79).

Swimming

Big Stone Lake provides a majority of the swimming opportunities found within a 25 mile radius of the park. This lake ^{frequently} has very high algae bloom from mid to late June on until fall. This greatly reduces the desirability of using these swimming opportunities.

The following is a summary of Minnesota swimming facilities found within a 25 mile radius of the park.

<u>Type of Facility</u>	<u>Beach</u>	<u>Pool</u>
City	-	2
County	1	-
DNR - State Park	1	-
Private	<u>7</u>	<u>-</u>
Total	9	2

Two of these beaches are located at private resorts on Lake Traverse and the county facility is located at Toqua Lake County Park.

Beyond these a large number of good natural swimming facilities are not available within the study area. SCORP '79 identified swimming as the third most desired recreational activity for Region 6W, in addition residents of Region 6W expressed a very high level of need for more summer swimming opportunities. According to SCORP '79, 16 miles is the average distance

non-metro Minnesotans are willing to travel to participate in a swimming opportunity, but this can be adjusted when the activity is combined with other desired recreational opportunities.

Water Access

In Minnesota there are five designated public access sites on Big Stone Lake. In addition to these, SCORP '79 inventoried three private resorts having water access sites on Big Stone Lake. In Minnesota within the 25 miles surrounding the park, Big Stone Lake, Lake Traverse, Marsh Lake and the Minnesota River have numerous designated public water access sites on them. Ten additional water access sites are located on smaller area lakes and tributary rivers. The following is a summary of the Minnesota water access sites available within a 25 mile radius of the park.

<u>Managing Agency</u>	<u>Number of Sites</u>
DNR, State Parks	1
DNR, Trails and Waterways Unit	6
DNR, Division of Fish and Wildlife	10
U.S. Corps of Engineers	1
USFWS	4
County	6
Municipal	2
Private	5
Total	<u>35</u>

SCORP '79 identified fishing as the number one activity which people in Region 6W expressed a desire for more opportunity to do. Since water access sites are well dispersed throughout the study area and the number of sites is not small, then either the quality of the access sites or the quality of the fishing opportunities are limited.

Trails

Big Stone Lake State Park has approximately 4.5 miles of trails. Few designated trails are available in the study area. ^{SCORP '79, identified} The following trail facilities are available in Minnesota within 25 miles of the park.

TRAIL MILEAGE

Type of Facility	All Trails	Hiking	Ski Touring	Snowmobiling	Horseback Riding
County	3	3	3	3	3
DNR-State Park	4.5	1	-	3.5	-
USFWS	1	1	-	-	-
Total	8.5	5	3	6.5	3

[SCORP '79 identified a moderate to high desire for more hiking and horseback riding trails in Region 6W.

Camping

There are 10 campgrounds with a total of 148 camping sites in Minnesota within a 25 mile radius of the park.

In addition, a South Dakota state park provides a campground with 43 campsites. Additional private campgrounds are also provided in South Dakota. Big Stone Lake State Park provides less than 22 percent of the total number of campsites available in this area. The following is a summary of the number of facilities available.

	Type of Facility	Number of Campgrounds	Number of Campsites
<u>Minnesota</u>	Municipal	2	22
	County	2	27
	DNR - State Parks	1	42
	Private	5	57
	Total	10	148
<u>South Dakota</u>	State Parks	1	43
	Total	1	43

An additional 25 campgrounds with a total of 378 campsites are available in Minnesota in the zone between the 25 and 50 mile radius from the park. Two of these campgrounds are located in the state parks of Glacial Lakes and Lac Qui Parle.

Camping is an increasingly popular outdoor activity in Minnesota. According to SCORP '79, 10 year projections (1980-1990) indicate a 9.4 percent increase in camping occasions statewide. Fishing and camping were the most desired summer opportunities in Region 6W.

THE PARK USER

Park Users

Park visitation data is collected by park managers and their staff in each state park. Information is collected on two different groups of park users, the campers; and visitors who use the park during the day for hiking, fishing, picnicking, or swimming, but don't necessarily stay overnight. A registration card is filled out for each campsite that is used. This card notes the campsite number, the name and address of the person renting the campsite, how many nights they plan to stay, how many people in the party, and how many vehicles per campsite. This information is quite accurate. Data collected on day visitors is only an estimate and is never as accurate as camper data. Most state parks have a vehicle counter on the park entrance road, but Big Stone Lake State Park does not have a vehicle counter. The park manager counts the number of cars in the park between 2:00 and 3:00 p.m. each day. This number is then multiplied by 3 (an averages rate of turnover per day) to calculate the number of cars which probably entered the park that day. The number of cars is then multiplied by 4 (average number of people/car) to calculate the amount of visitors the park received that day.

The following chart shows the use Big Stone State Park has received since it was first opened in 1964.

BIG STONE LAKE STATE PARK ATTENDANCE

<u>Year</u>	<u>Camper Occasions</u>	<u>Day Visitors</u>	<u>Group Camp Users</u>	<u>Total Use</u>
1983	1,504	-	-	11,378
1982	1,706	7,380	121	9,086
1981	1,356	7,008	121	8,485
1980	1,847	8,363	113	10,323
1979	3,145	8,279	176	11,600
1978	3,975	8,592		12,567
1977	4,808	9,003		13,811
1976	5,253	8,875	214	14,342
1975	4,318	10,858	124	15,300
1974	5,881	9,545		15,426
1973	6,636	7,846	119	14,601
1972	8,499	10,075		18,574
1971	5,025	10,281		15,306
1970	5,337	5,105		10,442
1969	4,142	2,388		6,530
1968	3,903	4,370		8,273
1967	2,771	3,358		6,129
1966	4,075	8,070	246	12,391
1965	3,071	4,720	82	7,873
1964	294	4,600		4,894

The day use estimates are not kept separate for the Bonanza area and the Meadowbrook area. Discussions with local residents and the park manager and the grassy condition of the parking lots indicate that the Bonanza area receives very light use at present. Most of the use it does receive is informal swimming, shore fishing, and occasional group camp use.

The Meadowbrook area, receives more day use than the Bonanza area. However, it is still quite low compared to other state parks. In 1982, 90 percent of the state parks received more day use than the Meadowbrook area and Bonanza area combined.

The following attendance figures for Hartford Beach State Park, South Dakota are provided for comparison of park use over an extended period of time. Similarities do exist between peak use periods for each of these state parks.

<u>Year</u>	<u>Camper Occasions</u>	<u>Day Use</u>	<u>Total Use</u>
1982	3,859		
1981	4,725	57,416	62,141
1980	3,588	74,292	77,880
1979	3,321	78,249	81,570
1978	3,491	78,061	81,552
1977	4,199	58,260	62,011
1976	7,791		62,011
1975	6,001		88,570
1974	10,660		149,900
1973	10,284		92,980
1972	12,612		104,226
1971	13,804		126,555
1970	9,948		161,789
1969	7,372		126,312
1968	3,204		85,370

The peak year for use in Big Stone Lake State Park was 1972 and for Hartford Beach State Park, S.D. it was 1974 (with the largest camping use occurring in 1971). Both parks have shown a sizeable and steady decrease in camping since 1972 and a general decrease in day visitation. For Big Stone Lake State Park the total camper occasions in 1972 was more than 5.5 times greater than the camper occasions in 1983.

Hartford Beach State Park went through a period of major development in 1968 when new hard surfaced roads, a park residence, shop, picnic toilet building, and campground with 43 campsites were constructed. Twenty-one electrical outlets were installed in the campground and road renovations were completed in 1979. A new 30 ft. wide concrete boat ramp and a sewage dump station were constructed in 1980. Other facilities which are provided in this South Dakota park are a 300 ft. swimming beach with bathhouse, play equipment, three self-guided interpretive trails and a picnic shelter which doubles as a winter warming shelter.

Although the type of facilities offered in the South Dakota and Minnesota state parks differ, their use patterns over the past 15 years are very similar. The additional park facilities developed in the South Dakota state park don't appear to have been able to alter the major decline in use which both parks have experienced. Although no definite studies have been prepared, several outside factors may have affected the use patterns of these two parks.

- a. Interstate highways 29, 90, and 94 were significantly complete and open to traffic in 1975. Interstates 90 and 94 provided alternative east west routes to state highways 12, 212, and 55. The location of Interstate Highway 29 west of Big Stone Lake and totally within South Dakota provides a north south freeway between Sioux Falls and Fargo, S.D. These new highways may have been responsible for diverting travelers away from the Big Stone Lake area and providing greater mobility to other recreation areas of the state and beyond.
- b. Since the 1930's Big Stone Lake has been evaluated for its water levels and quality. The final phase of the \$12,000,000 U.S. Corps of Engineer's project to reduce flooding on Big Stone Lake and areas immediately downstream will be completed by spring of 1985. This project was authorized by the Federal Flood Control Act of 1965.

Negotiations began in January, 1979 between South Dakota and Minnesota to draft a joint EPA grant proposal to study the water quality problems of Big Stone Lake and its watershed. A 214 federal EPA grant was awarded to South Dakota in February, 1981.

The public discussions and identification for need of these projects and studies, for improved water quality in Big Stone Lake, may have played a negative role in the public's perception of the lake's water quality and promoted a negative impact on area tourism.

- c. During the mid-1960's the state of South Dakota and the U.S. Corps of Engineers cost shared the development and operations of several recreation camping areas on several newly constructed reservoirs. In the late 1960's, major upgrading of existing state park facilities occurred throughout South Dakota due to the availability of state and federal monies. Similar expansion and upgrading of the Minnesota state park occurred between the early 1960's and late 70's due to availability of state and federal development funds.

Improved alternatives to recreating in the Big Stone Lake area may have resulted in attracting park users west to the Missouri River^{S.D.}, or north to the Minnesota lake region.

- d. Other factors which may have affected the recreation attractiveness of this area of the state include a general decline in the local economy, and limited recreational diversity.

Camper's

Campground use in Big Stone State Park has declined steadily since 1972 (see Big Stone Lake State Park Attendance, p. 27). In 1972, 8,499 overnight stays were recorded compared to only 1,356 in 1981. This was the lowest overnight use since the park's first year of operation in 1964. Campground use increased slightly in 1982 to 1,706 overnight stays, but dropped again in 1983 to 1,504 overnight stays.

The median party size from 1977-1979 was 2.9 people per party. Several large groups were included in this analysis with a maximum group size of 49 people. Most of the camping parties (37%) had 2 people.

The median length of stay was 1.2 days. Most parties (61%) stayed only one night. An additional 26% stayed only two nights. This is consistent with the average length of stay for all ^{Minnesota} state parks.

Season of Use

Big Stone Lake State Park receives an unusually large percent of its use in the early spring. Approximately one-third of the camping occasions occur before the 1st of June. This is primarily because the fishing season on border lakes such as Big Stone Lake opens 2 weeks before the rest of the state, and because early spring fishing in this lake is quite good. The lake has a dense algae bloom starting in early summer which reduces park use for the rest of the season.

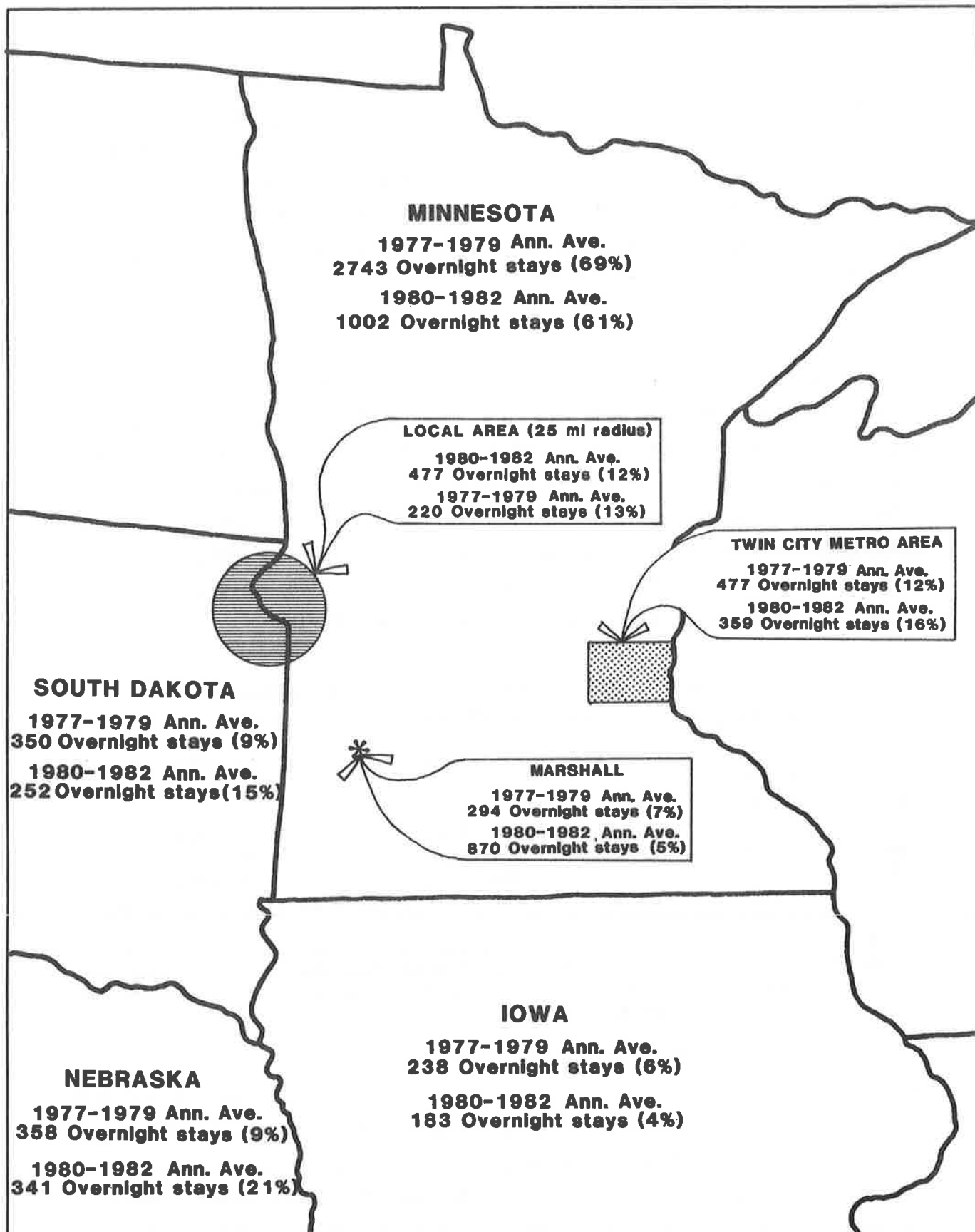
Origin of Campers

The following chart shows the origin of the people who camped at Big Stone Lake State Park. Out-of-state use has a reasonably high percent of the total amount of campers, which is expected due to its location on the very edge of the state. The percent of out-of-state camper occasion jumped to 58% in 1980. This is because although both out-of-state and Minnesota use dropped, the out-of-state use dropped at a slower rate. In 1981, the proportion was similar to the 1977-1979 average. In 1982 in-state use increased somewhat but out-of-state decreased even further.

<u>Year</u>	<u>Total Camper Occasions*</u>	<u>Out-of-State Camper Occasions</u>	<u>MN Camper Occasions</u>
1977	4,808	Ave. 1,232 (31%)	Ave. 2,743 (69%)
1978	3,975		
1979	3,145		
1980	1,847	1,071 (58%)	776 (42%)
1981	1,356	475 (35%)	881 (65%)
1982	1,706	358 (21%)	1,348 (71%)
1983	1,504	(Data for 1983 was not available at time of printing)	

*All of the camper use figures are calculated by multiplying the number of people per party times the number of nights they stayed. The amount of camper parties that visited the park could be estimated by dividing the overnight stay figures by 4.5.

The following Camper Origin Map shows the origin of campers who stayed at Big Stone State Park. The information is grouped into an average for two 3 year periods, from 1977-1979 and from 1980-1982. The average use has decreased considerably from the 1977-1979 average to the 1980-1982 average. The relative percent of use from any one area has stayed reasonably constant. The number of campers from Minnesota has decreased faster than the numbers of campers from South Dakota and Iowa.



Big Stone Lake State Park

Camper Origin

DEVELOPMENT AND RESOURCE INVENTORY

CLIMATE

Minnesota is considered to have a continental climate. It is subject to polar air movement throughout the year, occasional arctic air movement during the cold season and prolonged periods of heat resulting from southern air masses.

Information on annual temperature and precipitation comes from a weather station in Beardsley. The location of the park on the south facing slopes on the north shore of Big Stone Lake would be expected to cause some minor differences in the climate. The following is a summary of basic climate data:

Average Monthly Temperatures

Dec., Jan., Feb.	15.4° F
June, July, Aug.	70.4° F

Average Monthly Precipitation

Dec., Jan., Feb.	.61 inches
June, July, Aug.	3.24 inches

Annual precipitation for Beardsley averages 21.45 inches. About 85 percent of the annual precipitation (18.26 inches) falls from April through October. June is usually the highest rainfall month.

For this area of the state the mean maximum temperature for January ranges between 20° F and 22° F and the mean minimum temperature ranges between 0° F and -2° F. The mean maximum temperature for July ranges between 84° F and 86° F and the mean minimum temperature ranges between 58° F and 60° F. In winter this area averages between 100 and 105 days of 1 inch or greater snow cover and between 50 and 55 days of 6 inches or greater snow cover. (Kuehnast 1982).

GEOLOGY

Toward the end of the Ice Age, 12,000 to 13,000 years ago, the last advance of glacial ice had melted back to a location just north of where Ortonville is now situated. Here the edge held stationary for a time, depositing a broad ridge of till several miles wide, composed of small hills and depressions. This is now called Big Stone Moraine. The Glacial River Minnesota drained southeast from this glacier.

As glacial melting increased, meltwater accumulated behind the Big Stone Moraine, beginning the huge Glacial Lake Agassiz, one of the largest glacial lakes. As the lake level rose, it overflowed the moraine near Brown's Valley. Lake Agassiz drained southward for thousands of years, cutting the deep valley of Glacial River Warren, one of the largest glacial rivers in the midwest and predecessor of the Minnesota River. The volume of water that flowed in Glacial River Warren was tremendous. It quickly removed the loose surface glacial deposits and the underlying thin layers of sedimentary rock (shale, sandstone and conglomerates), exposing the more durable granitic rocks below. Numerous exposures of granitic rock still exist along the river valley between Brown's Valley and New Ulm.

As the glacier continued to retreat northward, lower outlets from Glacial Lake Agassiz opened to the northeast into Hudson Bay. With the large supply of water from Glacial Lake Agassiz eliminated, the river's size and velocity decreased and it no longer had the capacity to carry the large quantities of sediment supplied by its tributaries. Deposits of sand, gravel, and mud accumulated in the riverbed and the stream began to meander across the valley floor. Sometimes whole stretches of the river were abandoned. If they were deep enough to retain water they became lakes or ponds; otherwise, they became dried-up meander scars. Periodic flooding covered the valley floor with rich deposits of silt and clay, giving trees and shrubs a firm foothold. As the climate continued to become drier, the river diminished until it reached its present size.

The erosion of Glacial River Warren during the last Ice Age has provided an excellent view of the early geologic history of southwestern Minnesota. The age of dominant rocks in the upper part of the valley, granite and gneiss, has been determined by various radiometric dating methods. Some have been found to be more than three billion years old, the oldest rocks known on this continent. They are the eroded remnant or "roots" of the oldest mountains known in North America. These rocks in the Minnesota River valley are among the evidence of a sequence of geologic events that spans more than three billion years.

There are few valleys in the United States that have such a varied dramatic geological history as the Minnesota River.

Big Stone Lake is now the headwaters of the Minnesota River. The waters of Big Stone Lake are held in the valley by a delta deposited by the Whetstone River of South Dakota. The sediments of this delta have been built up to a level five to eight feet above the present water level in the lake and cover the entire area between Big Stone City, South Dakota and Ortonville, Minnesota.

SOILS

Both the Meadowbrook unit and the Bonanza unit lie within the sharp wide valley cut by the Glacial River Warren that drained Glacial Lake Agassiz. The Meadowbrook unit apparently occupies a relatively broad terrace, probably related to downcutting of the river as the elevation and positions of the lake's outlet changed. The Bonanza unit includes a small portion of the upland till plain, the valley wall, and a portion of the valley floor.

The soils in the Meadowbrook unit are relatively level and range from well drained to poorly drained. The poorly drained soils have severe restrictions for development because of wetness. Development restrictions on the well drained soils are varied, including seasonal high water table, shrink swell potential, and seepage. The soils of the Bonanza unit are well drained and the only major restriction for development is slope.

A current soils survey is not available for Big Stone County. The Soil Conservation Service (SCS) provided the information for the Soil Suitability Chart on p 40, based on information collected for both the Meadowbrook and Bonanza units in 1956.

A new survey of the counties' soils, to be conducted by the SCS is scheduled to begin in the summer of 1984. Data collection and documentation will require about two years at which time a new county soil survey will be published for Big Stone County.

The data collected in 1956 provides us with fair information to determine potential problems for each soil type. Since all soil types are based on a mixture of several soil characteristics, there may be some variations within each soil type classified in this park. In addition, the soils were probably only tested to a depth of 3 ft in 1956, therefore some information on sanitary

facilities and building site development may be limited. The Suitability Chart on p 40 lists the soils found in the park. The chart also lists soil suitabilities for various types of development and their limitations for development. These limitations are meant to be guidelines rather than absolute criteria for location of development.

Recreational Development

The soils have been rated according to limitations that affect their suitability for camp areas, picnic areas, and paths and trails. They are rated as having slight, moderate, or severe limitations.

It is important that a good cover of vegetation be established and maintained but this is not a part of the recreation rating. A limitation of "slight" means that soil properties are generally favorable and limitations are so minor that they can be easily overcome. A "moderate" limitation can be overcome or modified by planning, design, or special maintenance. A "severe" limitation means that costly soil reclamation, special design, intense maintenance, or a combination of these is required.

Camp areas are used intensively by campers with tents and small camp trailers. The principal soil features affecting the use of soils for camp areas are wetness; flood hazard; soil permeability; soil slop^e; surface texture; and the amount of gravel, stones, and rock outcrops on the soil surface. Ideally, a good camp area has good soil drainage; is nearly level or gently sloping; provides relatively good traction when wet; and has few pebbles, stones, or rock outcrops.

Picnic areas are attractive natural or landscaped tracts used primarily for preparing meals and eating outdoors. Soil features affecting the use of soils for picnic areas are wetness; flood hazard; slope; surface texture; and the amount of gravel, stones, and rock outcrops.

Paths and trails are used by hikers, cross country skiers, snowmobilers, and horseback riders. Design and layout should require little or no cutting and filling of soils. The best soils are at least moderately well drained, are firm when wet but not dusty when dry, are flooded not more than once during the season of use, have slopes of less than 15 percent, and have few or no rocks or stones on the surface.

Sanitary Facilities

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 18 inches to six feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects layout and construction, soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Building Site Development

Dwellings are defined as not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to bearing capacity and those that relate to ease of excavation. Soil properties considered are wetness, susceptibility to flooding, density, plasticity, texture, shrink swell potential, slope, depth to bedrock, and content of stones and rocks.

Local Roads and Streets

Local roads and streets are generally constructed with low cuts and fills from the material at hand. They are generally all-weather roads that are designed to carry low volume traffic. The principal soil features that affect the limitations of soils for this use are flood hazard, depth to the water table, depth to bedrock, slope, shrink-swell potential, susceptibility to frost heave, and stoniness.

Shallow Excavations

Shallow excavations are those that require digging to a depth of less than six feet. Examples are excavations for pipelines, sewer lines, phone and power transmission lines, basements, open ditches, and cemeteries. Soil properties considered are workability, resistance to sloughing, slopes, rock outcrops or large stones, drainage, and flooding or high water table.

The Soils Suitability Map on page 424⁴³ generalizes the soil limitations and illustrates those areas of the park which are generally suitable for development and those which are not.

Bonanza Unit

Soil Type	Map Code	Recreation Development		Sanitary Facilities		Building Site Development			Depth to Flooding Water Table		
		Picnic Area	Camp Area	Path & Trail	Septic Tank Lagoon	Filter Fld.	Roads	Shallow Excavations		Recreation Buildings	
Buse	31B2	Slight	Slight	Slight	Moderate -seepage -slope	Moderate -percs slowly	Moderate -low -frost strength action	Slight	Slight	Moderate None	Greater than 6.0 ft.
Barnes	33B2	Slight	Slight	Slight	Moderate -seepage -slope	Moderate -percs slowly	Moderate -low -frost strength action	Slight	Slight	Moderate None	Greater than 6.0 ft.
	33C1	Moderate -slope	Moderate -slope	Slight	Severe -slope	Moderate -percs slowly -slope	Moderate -low -frost strength -slope	Moderate -slope	Moderate -slope	Slight None	Greater than 6.0 ft.
Svea	70A1	Slight	Slight	Slight	Moderate -seepage -wetness	Severe -percs slowly	Severe -low -frost strength	Moderate -wetness	Moderate -shrink/swell	Slight None	4.0-6.0 ft.
Bues (stone)-Barnes Complex	RB	Severe -slope -large stones	Severe -slope -large stones	Severe -slope -large stones	Severe -slope -large stones	Severe -percs slowly	Severe -slope	Severe -slope	Severe -slope	High None	Greater than 6.0 ft.

Meadowbrook Unit

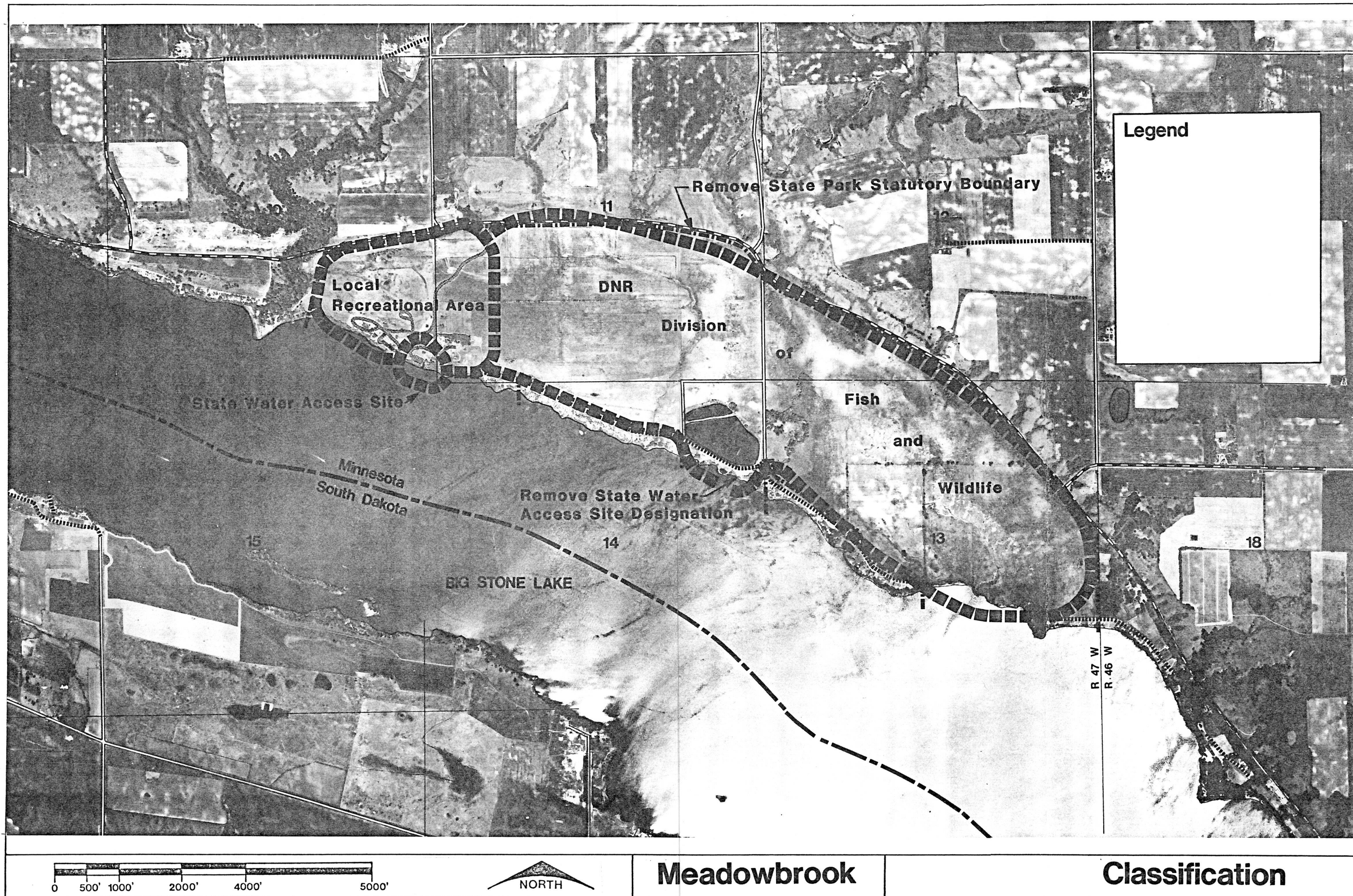
Soil Type	Map Code	Recreation Development			Sanitary Facilities		Building Site Development			Depth to Flooding Water Table	
		Picnic Area	Camp Area	Path & Trail	Sewage Lagoon	Septic Tank Filter Fld.	Roads	Shallow Excavations	Recreation Buildings		
Lamoure	18A	Severe -wetness	Severe -floods -wetness	Severe -wetness	Severe -floods -wetness	Severe -floods -wetness	Severe -low -floods -wetness	Severe -wetness	Severe -floods -wetness	Low Common -breif	1.0-2.0 ft.
Attiuvial undifferentiated	20C	Severe -wetness	Severe -wetness -floods	Moderate -wetness -floods	Severe -wetness -floods	Severe -wetness -floods	Severe -wetness	Severe -wetness	Severe -floods -wetness	Low Freq.	0.0-1.0 ft.
Stoney land, wet	22	Severe -wetness	Severe -wetness	Severe -wetness	Severe -wetness	Severe -wetness -percs slowly	Severe -low -wetness -frost action	Severe -wetness	Severe -wetness	Low None	0.0-1.0 ft.
Barnes	33B	Slight	Slight	Slight	Moderate -seepage -slope	Moderate -percs slowly	Moderate -low -frost strength action	Slight	Slight	Low None	Greater than 6.0 ft.
Parnell	34	Severe -ponding	Severe -ponding	Severe -ponding	Severe -ponding	Severe -ponding	Severe -low -frost strength action	Severe -ponding	Severe -ponding -shrink/swell	Low None	+2.0-2.0 ft.

Meadowbrook Unit

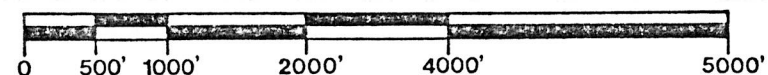
Soil Type	Map Code	Slope	Recreation Development			Sanitary Facilities			Building Site Development			Depth to Water Table
			Picnic Area	Camp Area	Path & Trail	Lagoon	Septic Tank Filter Fld.	Roads	Shallow Excavations	Recreation Buildings	Erosion	Flooding
01dham	34S	0-2%	Severe -ponding -too clayey	Severe -ponding -too clayey	Severe -ponding -too clayey	Slight	Severe -ponding -percs slowly	Severe -low strength -ponding -frost action	Severe -ponding	Severe -ponding -shrink swell	Low	None
F10m	36A1	0-2%	Moderate -wetness -percs slowly	Severe -wetness	Moderate -wetness	Severe -wetness	Severe -wetness -percs slowly	Severe -low strength -frost action	Severe -wetness	Severe -wetness	Low	None
Vallers	36AA1	0-2%	Moderate -wetness	Severe -wetness	Moderate -wetness	Severe -wetness	Severe -wetness -percs slowly	Severe -frost action	Severe -wetness	Severe -wetness	Low	None
Stoux	41D1	12-18%	Severe -slope	Severe -slope	Severe -slope	Severe -seepage -slope	Severe -poor filter -slope	Severe -slope	Severe -cutbanks cave -slope	Severe -slope	Low	None
Sverdrup	43	0-2%	Slight	Slight	Slight	Severe -seepage	Slight	Slight	Severe -cutbanks cave	Slight	Low	None
4382	2-6%	Slight	Slight	Slight	Slight	Severe -seepage	Slight	Slight	Severe -cutbanks cave	Slight	Moderate	None
Cotwin	47	0-2%	Severe -wetness	Severe -wetness	Severe -wetness	Severe -wetness	Severe -wetness -percs slowly	Severe -low strength -wetness -frost action	Severe -wetness	Severe -wetness	Low	None
Busse (stone)	49	0-2%	Moderate -large stones	Moderate -large stones	Severe -large stones	Severe -large stones	Severe -percs slowly	Moderate -low strength -frost action	Moderate -large stones	Moderate -shrink/swell -large stones	Low	None
4981	2-6%	Moderate -large stones	Moderate -large stones	Severe -large stones	Severe -large stones	Severe -percs slowly	Moderate -low strength -frost action	Moderate -large stones	Moderate -shrink/swell -large stones	Low	None	Greater than 6.0 ft.
49C1 33C2	6-12%	Moderate -slope -large stones	Moderate -slope -large stones	Severe -large stones	Severe -slope -large stones	Severe -percs slowly	Moderate -low strength -frost action	Moderate -large stones	Moderate -shrink/swell -large stones	Low to Moderate	None	Greater than 6.0 ft.

Meadowbrook Unit

Soil Type	Map Code	Recreation Development				Sanitary Facilities		Building Site Development				Depth to Water Table
		Picnic Area	Camp Area	Path & Trail	Sewage Lagoon	Septic Tank Filter Fld.	Roads	Shallow Excavations	Recreation Buildings	Erosion	Flooding	
49D1	12-18%	Severe -slope -large stones	Severe -slope -large stones	Severe -large stones	Severe -slope -large stones	Severe -percs slowly	Severe -slope	Severe -slope	Severe -slope	Low	None	Greater than 6.0 ft.
49E1	18-24%	Severe -slope -large stones	Severe -slope -large stones	Severe -large stones	Severe -slope -large stones	Severe -percs slowly	Severe -slope	Severe -slope	Severe -slope	Low	None	Greater than 6.0 ft.
Canis leo (Stoney)	49M	0-2% Moderate -wetness	Severe -wetness	Moderate -wetness	Severe -wetness	Severe -wetness	Severe -low strength -frost action	Severe -wetness	Severe -wetness	Low	None	1.0-3.0 ft.
Laprairie	51	0-3% Moderate -floods	Severe -floods	Moderate -floods	Severe -floods	Severe -floods -wetness	Severe -floods -low strength	Moderate -wetness -floods	Severe -floods	Low	Occas. -brief	3.5-6.0 ft.
Bearden	67	0-2% Mod-severe -wetness -percs slowly -too clayey	Mod-severe -wetness -percs slowly -too clayey	Mod-severe -wetness -too clayey	Severe -wetness -percs slowly	Severe -wetness -percs slowly	Severe -low strength -frost action	Severe -wetness	Moderate -wetness -shrink/swell	Low	None	1.5-2.5 ft.
Sea	70A1	0-2% Stight	Stight	Stight	Moderate -seepage -wetness	Severe -percs slowly	Severe -low strength	Moderate -wetness	Moderate -shrink/swell	Low	None	4.0-6.0 ft.
	70B1	2-6% Stight	Stight	Stight	Moderate -seepage -wetness -slope	Severe -percs slowly	Severe -low strength	Moderate -wetness	Moderate -shrink/swell	Low	None	4.0-6.0 ft.
Hammerly	70AA1	0-2% Stight	Stight	Stight	Severe -wetness	Severe -wetness	Severe -frost action	Moderate -wetness	Stight	Low	None	2.5-4.0 ft.
Arvilla-Barnes Complex	74D	12-18% Moderate -slope	Moderate -slope	Stight	Severe -seepage -slope	Severe -poor filter	Moderate -slope	Severe -cutbanks cave	Moderate -slope	Low	None	Greater than 6.0 ft.
Swerdrup	92A1	0-2% Stight	Stight	Stight	Severe -seepage	Severe -poor filter	Stight	Severe -cutbanks cave	Stight	Low	None	Greater than 6.0 ft.
Barnes	94B+	2-6% Stight	Stight	Stight	Moderate -seepage -slope	Moderate -percs slowly	Moderate -frost action	Stight	Moderate -shrink/swell	None	None	Greater than 6.0 ft.

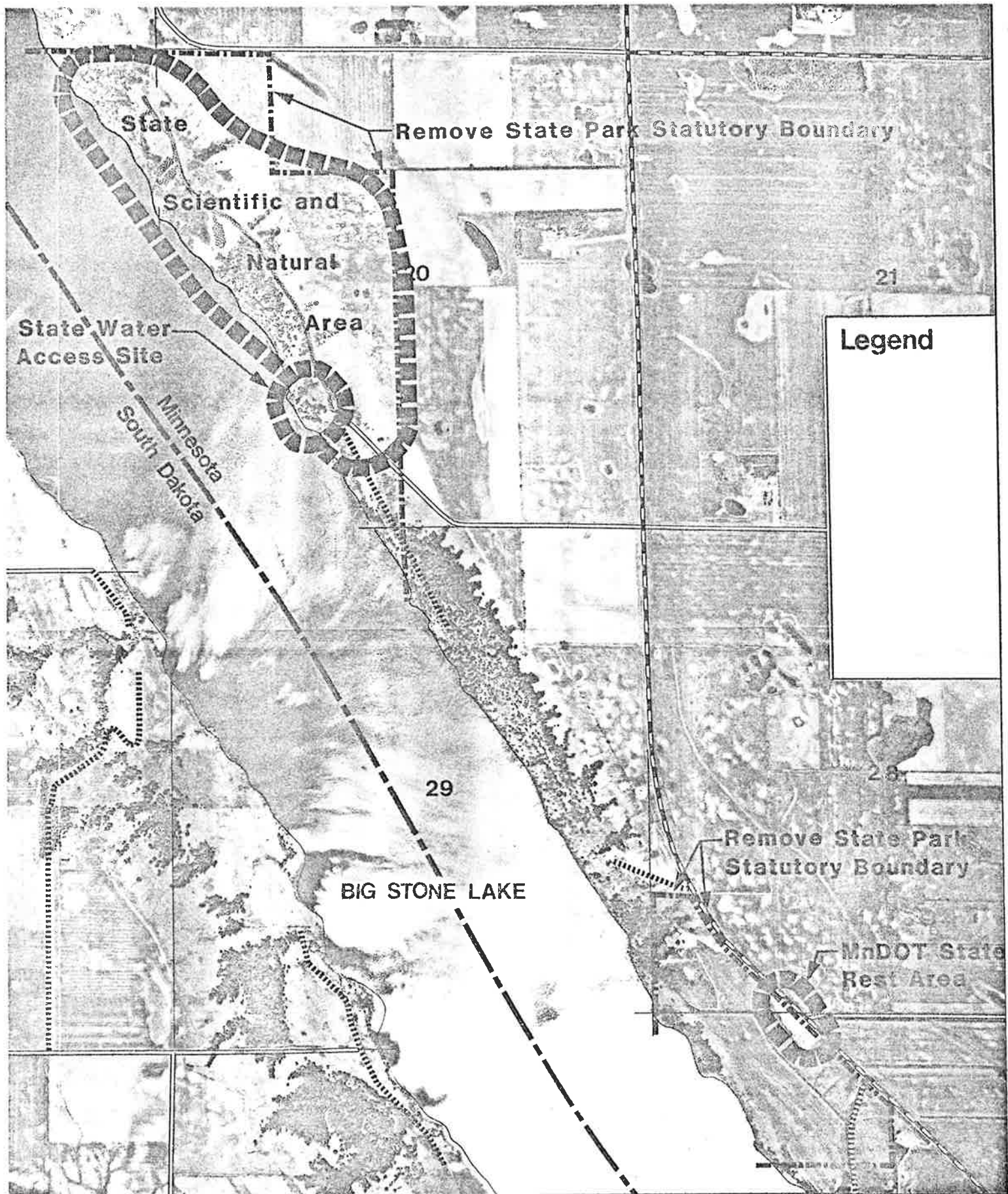


Legend



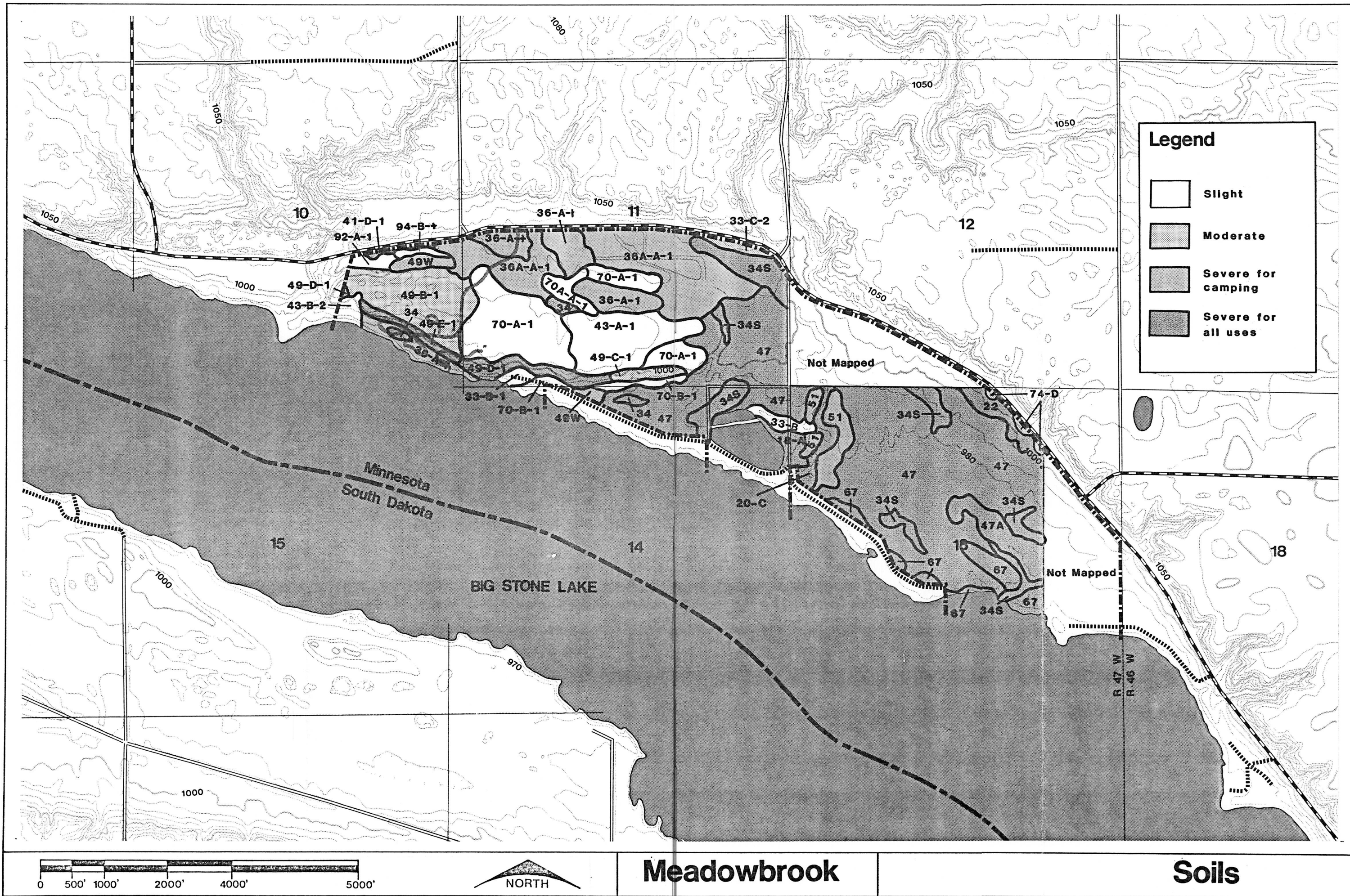
Meadowbrook

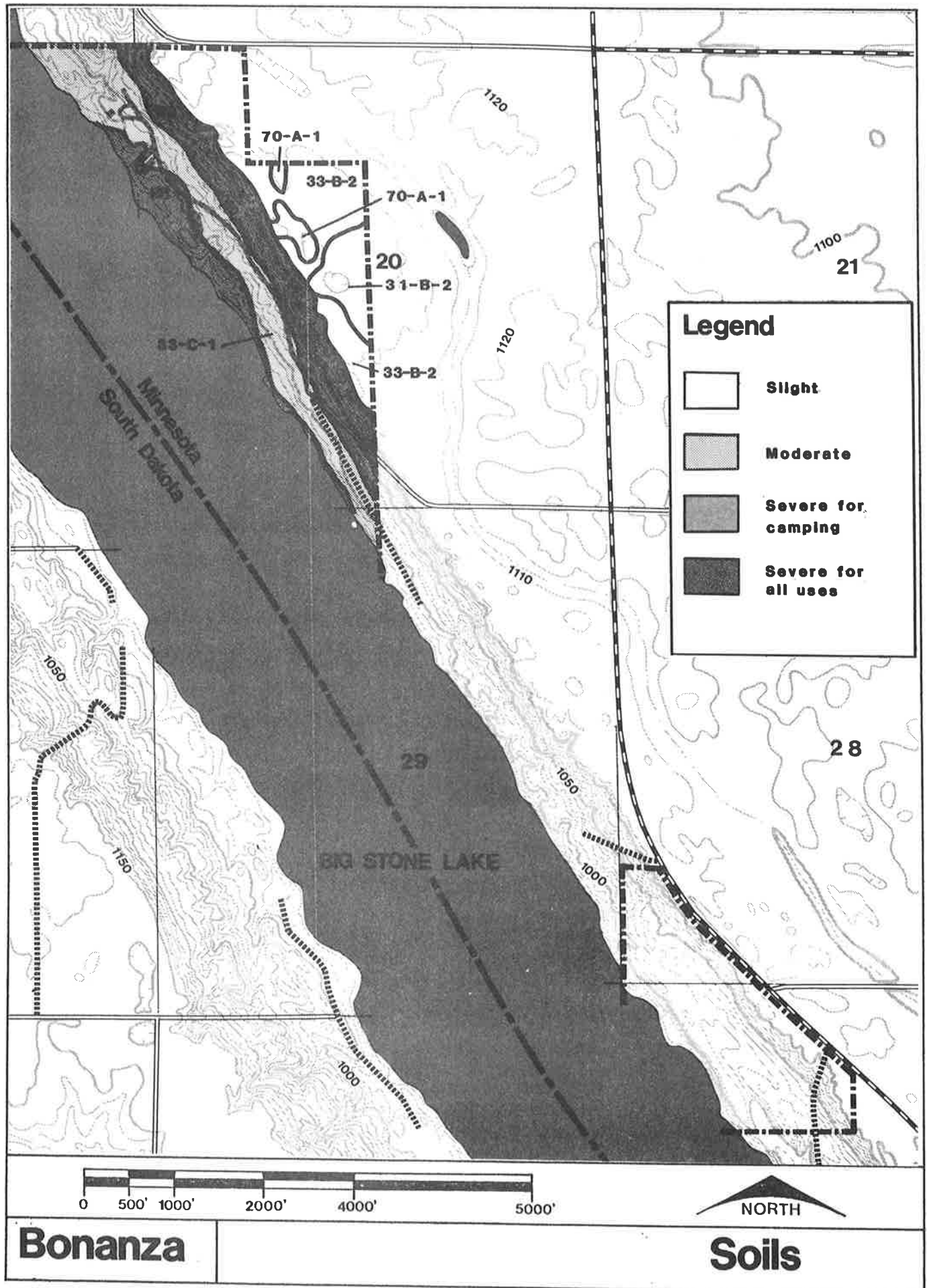
Classification



Bonanza

Classification





VEGETATION

Vegetation cover types were delineated from Soil Conservation Service (SCS) aerial photographs. The general composition of these cover types was field checked by DNR, Park Planning in March and April of 1983. There was little or no snow cover at the time of field work. Because of the dormant condition of the vegetation, only some of the herbaceous material was identified.

The scope of the inventory was to define cover types with characteristics important to vegetation and wildlife management, recreational uses and park development. The descriptions also include relationships of cover types to soils and landforms.

Map Code

WMP Wet-mesic to Mesic Prairie

Wet-mesic and mesic prairies in this part of the state are often referred to as tall grass prairies. In the park, the common native grasses in this coverytype are big bluestem, Indian grass, prairie dropseed, and switchgrass. Canada wild rye, western wheatgrass and muhly grass occur less abundantly. Some forbs occurring in the cover type are goldenrod, aster, licorice root, golden alexander, purple prairie clover, tall sunflower, cupleaved sunflower and blazing star. In wetter areas chord grass, bluejoint, sedges, tall sunflower and common reed grass dominate. On drier sites within the coverytype little bluestem, side oats grama and stiff goldenrod are more abundant.

This prairie type occurs on poorly drained, alkaline, silty to silty clay loams. The water table is at or near the surface, spring through mid-summer. This wetness apparently limited cultivation. The Soil Conservation Service classifies the vegetation associated with these soils as a "sub-irrigated" range site. Range sites are defined by; a) differences in the kinds of plants that compose a climax community, b) differences in the proportion of plants that compose a plant community and, c) differences in the total annual production of climax plant communities.

All areas within this cover type have apparently been either pastured, hayed or both. Despite these disturbances they are dominated by native plants and have few non-native species. The 1870, General Land Office survey records describe these areas as prairie bottomlands.

OF Old Fields

This cover type includes all park grasslands that were formerly cultivated and are now dominated by non-native species. These fields were seeded with various mixtures of grasses and legumes following park acquisition. No records of these mixes were kept. A large percentage of the covertime is dominated by smooth brome grass. In other areas bluegrass and quack grasses are dominant. Forbs are scattered, including goldenrod, aster, and occasionally licorice root, sunflower, and wild bergamot (several other species were present but not identified in their winter condition).

The old field cover type occurs on predominately well drained, loam to sandy loam soils. A smaller portion occurs on poorly drained, silty clay loam and silt loam soils. These areas were described as prairie in the 1870, General Land Office surveyor's notes.

HP Glacial Till Hill Prairie

Big Stone State Park contains fine examples of a distinctive prairie type--glacial till hill prairie. This prairie type is found on deep well drained soils formed in glacial till, typically occurring on steep side slopes along rivers, creeks, and deep drainageways. Glacial till hill prairies are commonly found from south central to western Minnesota; similar prairies are found on irregular moraine areas in northwestern Iowa and eastern South Dakota. Vegetation ranges from dry to dry-mesic prairie. Dry prairie, dominated by mid-grasses, is commonly associated with small gravelly pockets on steeper hills and ridges. Dry-mesic prairie, dominated by more mesic tall grasses, is commonly found on the deeper soils developed in loamy glacial till. Soils are typically unsuitable for cropping; grazing however is a common practice. Remnant hill prairies are typically severely degraded as a result of heavy grazing. Grazing alters the natural species composition (normally a shift from mesic to xeric,

extremely dry habitat, native species), reduces native species diversity, and increase the presence of exotic species. Examples of glacial till hill prairies which reflect native presettlement conditions are quite rare. The Minnesota Natural Heritage Program considers relatively undisturbed glacial till hill prairies to be - state threatened.

The hill prairies at Big Stone State Park occur in the Bonanza area on steep (25-30%) west facing slopes in the bluffs along the east side of Big Stone Lake. Elevation ranges from 970 to 1,120 ft above sea level. The vegetation is a mosaic of dry to dry-mesic prairie on the steep upper slopes with oak-ash-basswood forest on the lower slopes and in the draws. The prairie is dominated by little bluestem. Associated species include purple coneflower, floodmans thistle, prairie clover, silverleaf scurf pea, big bluestem, grama grasses, and dropseed. The Soil Conservation Service classifies this vegetation/soil association as a "thin-upland range" site. In addition, two rare plants occur on this site: Missouri milkvetch (state-threatened) and slender milkvetch (special concern). The level areas above the prairie slopes are old field vegetation.

Although the hill prairies have probably been grazed in the past, the tracts appear close to presettlement conditions. Pemble and Van Ambergs' (1975) Natural Area Survey of Big Stone County, selected this area as a very good example of what the hill prairies in Big Stone County were once like. The Natural Heritage Program considers the hill prairies at Big Stone State Park a high quality example of this prairie type. Remaining examples of relatively undisturbed glacial till hill prairies are rare in Minnesota, and presently threatened with degradation by heavy grazing practices.

W Wetland

The areas mapped as wetlands are small closed depressions. Included in this type are basins with water levels ranging from standing water through most the season to soils saturated near the surface. The dominant wetland species are cattail, three square and reed grass.

Several areas of wet prairie are (or include) wetlands, however, it was difficult to map them separately from the wet-mesic prairie type. Because of this, only areas with closed basinsⁿ were mapped as wetland.
^

OAB Oak, Ash, Basswood Forest

The description of this forested cover type is based on stands occurring in the Bonanza Unit of the park. This type occupies the area along the lakeshore and stretches up the bluffs in ravines. The soil is a well drained, neutral loam. The dominant canopy trees are bur oak, basswood, green ash, and to a lesser extent hackberry and elm. Cottonwood occurs along the edge of the lake. Tree dominance and composition of individual stands is variable. Saplings are occasional to abundant with green ash most common, followed by hackberry, elm and rarely basswood. Shrub coverage is also variable, ranging from continuous to sparse. Prickly ash and snowberry are the two most abundant shrub species. Other shrubs include sumac, currant, Siberian elm, mulberry, hazel; and along the lake, false indigo.

The ground layer is continuous with grasses and sedges. Sedges were generally more abundant than grasses. Grasses included bluegrass, Canada wild rye and occasionally switch grass, needle and thread grass, and smooth brome. There was very little evidence of forbs.

All the wooded areas have been grazed and some limited cutting has taken place. The present tree composition and size are similar to descriptions recorded in the General Land Office surveyor's notes (circa 1870).

DW Disturbed-Woody

This type groups a range of woody areas. It includes former windbreaks and early successional, woody shrub and tree growth. Boxelder, green ash and cottonwood are the most common large trees and occur primarily along former field edges. Boxelder is often multiple stemmed and at a stage where large limbs and trunks are falling over. Shrub species associated with this type include American plum, snowberry, Siberian elm, sumac, green ash, currant and some buckthorn. In one area, formerly a small field, Siberian elm forms a dense thicket along with plum. In another

stand where sumac is dominant scattered green ash saplings are overtopping the shrubs. In general the ground layer is a continuous bluegrass sod.

S Seeps

There is a band of groundwater seeps occurring along the highway at the base of the bluffs in sections 12 and 13 of the Meadowbrook area. The soils are apparently saturated throughout the growing season. Common reed grass dominates these seeps forming uniform stands, with small isolated areas dominated by sedges. These are often surrounded by a ring of boxelder which extends upslope to the road shoulder. On the downslope side this type grades into wet-mesic to mesic prairie.

BH Bottomland Hardwoods

These are woodlands occurring along stream courses on alluvial soils. The dominant tree species are elm, boxelder, hackberry and green ash. The areas may be flooded periodically. Dutch elm disease is eliminating the elms.

Scientific Names of Plants Cited in the Text

<u>Common Name</u>	<u>Scientific Name</u>
Big Bluestem	<u>Andropogon gerardii</u>
Indian grass	<u>Sorghastrum nutans</u>
Prairie dropseed	<u>Sporobolus heterloepis</u>
Switchgrass	<u>Panicum virgatum</u>
Canada wild rye	<u>Elmyus canadensis</u>
Western wheatgrass	<u>Agropron smithii</u>
Muhly grass	<u>Muhlenbergia spp.</u>
Goldenrod	<u>Solidago spp.</u>
Aster	<u>Aster sp.</u>
Licorice root	<u>Glycyrrhiza lepidota</u>
Golden alexander	<u>Zizia aptera</u>
Purple prairie clover	<u>Petalostemum purpureum</u>
Tall sunflower	<u>Helianthus giganteus</u>
Cupleaved sunflower	<u>Silphium perfolitum</u>
Blazing star	<u>Liatris spp.</u>
Chord grass	<u>Spartinia pectinata</u>
Bluejoint	<u>Calamagrostis canadensis</u>
Sedges	<u>Carex spp.</u>
Common reed grass	<u>Phragmites communis</u>
Little bluestem	<u>Andropogon scoparius</u>
Sideoats grama	<u>Bouteloua curtipendula</u>
Stiff goldenrod	<u>Solidago ridgida</u>
Smooth brome	<u>Bromus inermis</u>
Blue grass	<u>Poa sp.</u>
Quack grass	<u>Agropyron repens</u>
Wild bergamot	<u>Monarda fistulosa</u>
Purple coneflower	<u>Echinacea angustifolia</u>
Floodmans thistle	<u>Cirsium flodmani</u>
Prairie clover	<u>Petalostemum purpureum</u>
Silverleaf scurf pea	<u>Psoralea argophylla</u>
Grama grasses	<u>Bouleloua spp.</u>

*Missouri milkvetch

**Slender milkvetch

Cattail

Threesquare

Reed grasses

Bur oak

Green ash

Basswood

Hackberry

Elm

Cottonwood

Prickly ash

Snowberry

Sumac

Currant

Siberian elm

Mulberry

Hazel

False indigo

Needle and thread grass

Box elder

American plum

Buckthorn

Astragalus missouriensis

Astragalus flexuosus

Typha spp.

Scirpus americanus

Phalaris arundinaceae

Quercus macrocarpa

Fraxinus pennsylvanica

Tillia americana

Celtis occidentalis

Ulmus americana

Populus deltoides

Zanthoxylum americanum

Symphoricarpos albus laevigatus

Rhus spp.

Ribes spp.

Ulmus pumila

Morus spp.

Corylus cf. americana

Amorpha fruticosa

Stipa sp.

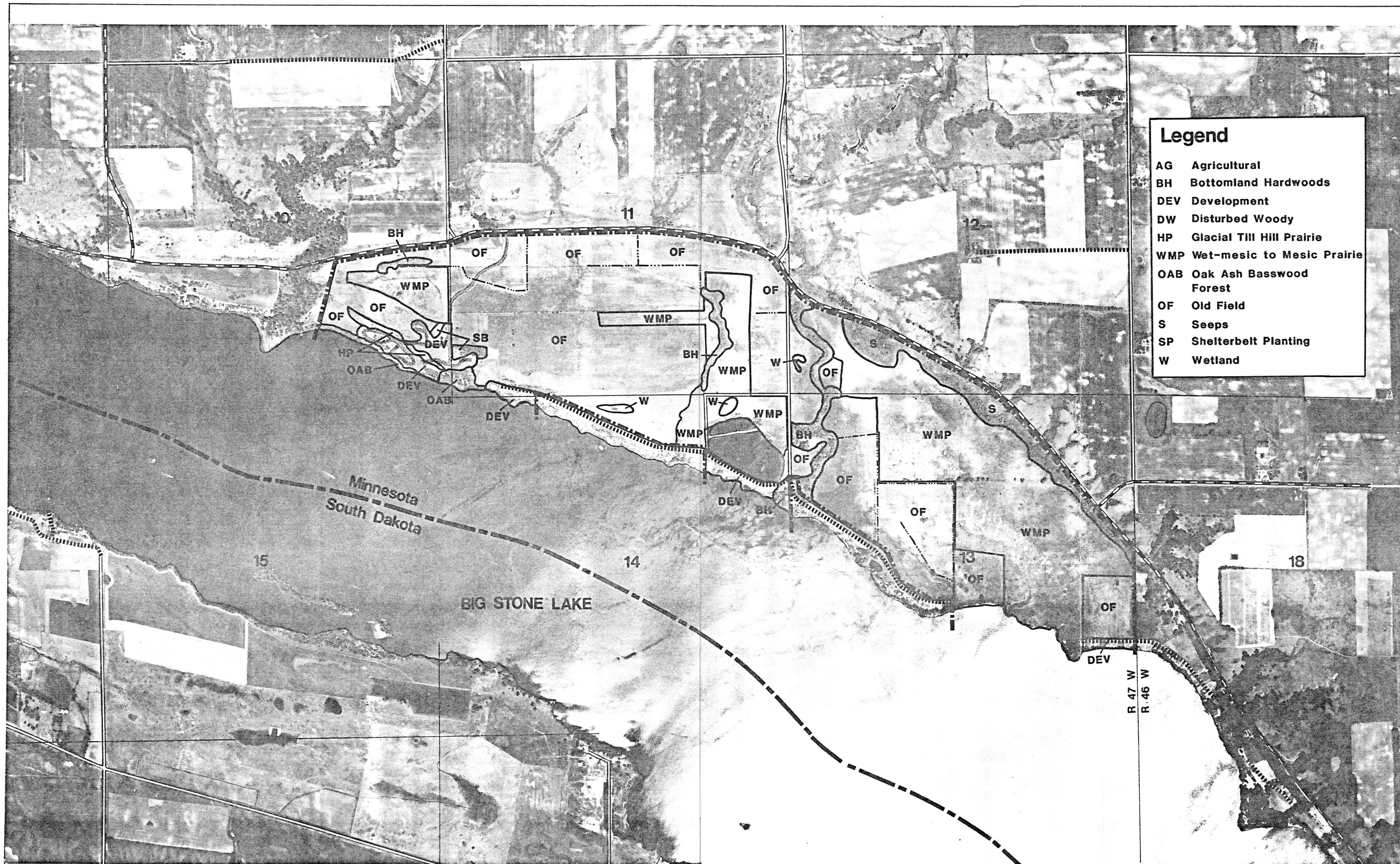
Acer negundo

Prunus americana

Rhamnus cathartica

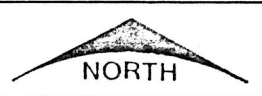
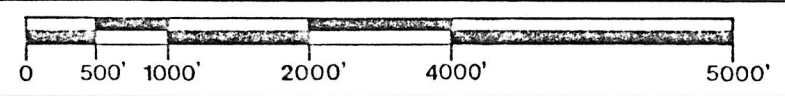
* State threatened plant

** State special concern plant



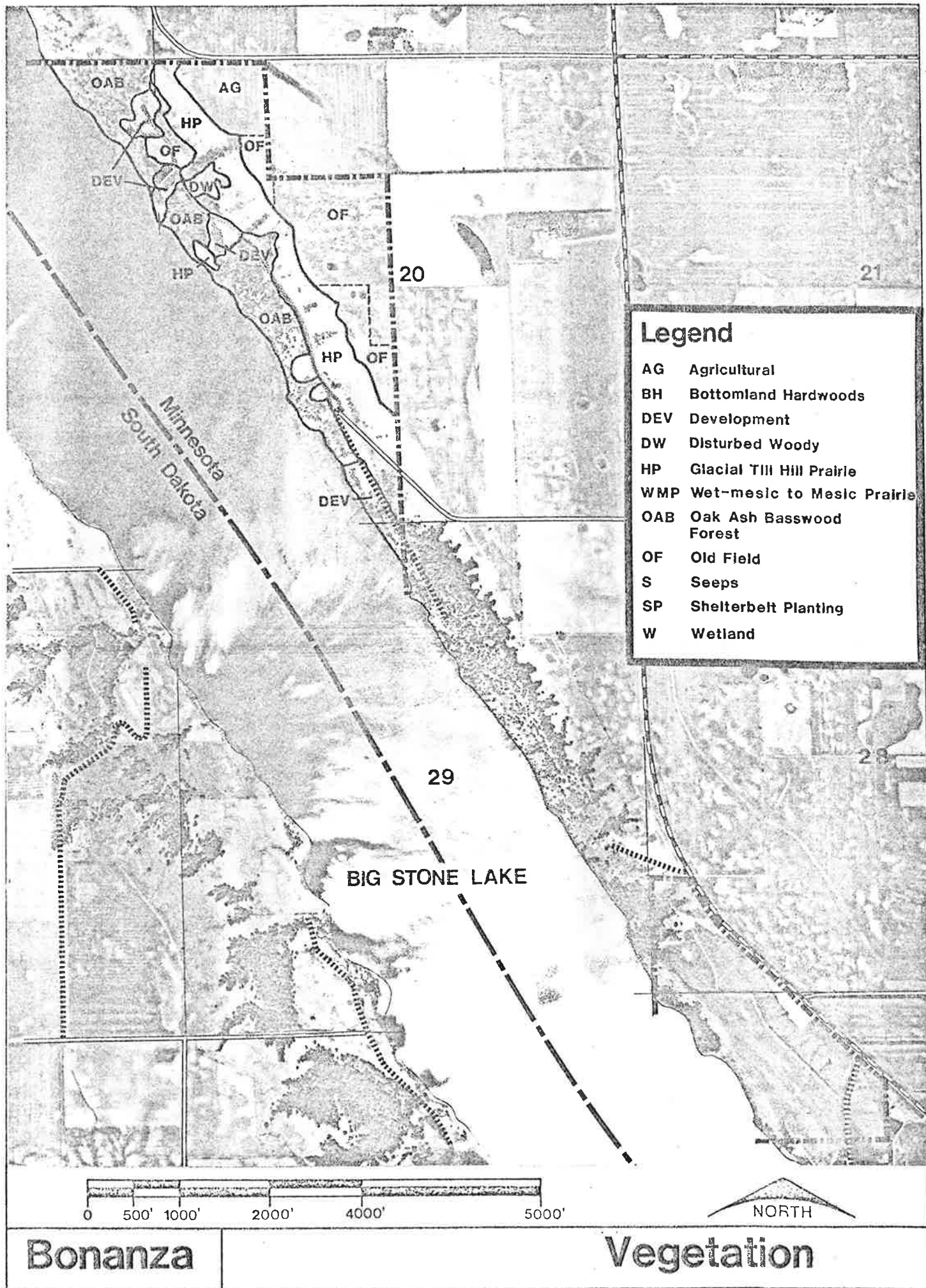
Legend

- AG Agricultural
- BH Bottomland Hardwoods
- DEV Development
- DW Disturbed Woody
- HP Glacial Till Hill Prairie
- WMP Wet-mesic to Mesic Prairie
- OAB Oak Ash Basswood Forest
- OF Old Field
- S Seeps
- SP Shelterbelt Planting
- W Wetland



Meadowbrook

Vegetation



WILDLIFE

Inventory

Big Stone Lake State Park is located in a highly agricultural zone of the state. Only 4 to 10 percent of the land in Big Stone, Lac qui Parle and Stevens counties is not in agricultural production or pasture land. Of the non-agricultural lands, over one percent is urban/industrial (SPA 1975).

It can be expected that continued pressure for more agricultural land will occur in the future. Agricultural trends which support this are continued drainage of wetlands and wet soils, and removal of fence rows and woodlots to increase field size. The wetlands, trees and shrubs being removed from the farm land are greatly reducing the needed habitat for numerous migrating birds and waterfowl and resident reptiles, amphibians and small mammals.

While continued habitat management on public lands has potential for enhancing both game and nongame wildlife resources, work on private lands may have the most widespread impacts. Only about 2 percent of the land in the entire agricultural region of the state is in public ownership.

Several significant wildlife resource areas exist in the vicinity of Big Stone Lake State Park. The large amount of marsh and uplands contained within the Big Stone National Wildlife Refuge provides excellent habitat for numerous species of both game and nongame wildlife. Colonial nesting birds which inhabit the refuge include western grebe, egret, great blue heron, black-crowned night heron, double-crested cormorant, yellow-crowned night heron, little blue heron, great egret, cattle egret, and snowy egret (Henderson 1978). Over 237 bird species have been observed in the area of the refuge since 1971 (USFWS, 1979). A refuge brochure indicates that 91 bird species are either abundant or common in the area during at least two seasons and 107 bird species nest locally (USFWS, 1979).

The Minnesota Natural Heritage program has identified the marbled godwit and upland sandpiper to be of state special concern. These two species have been observed nesting locally (USFWS, 1979). Further study is required to determine if these two species are currently nesting in the prairie areas of the Meadowbrook area. The Meadowbrook area does have suitable breeding habitat for these species.

There are also several good quality prairies near the park worth mentioning. Both Victory and Prairie wildlife management areas (WMA's) have been recognized on the Natural Heritage Register of highly significant natural features for their outstanding prairies.

Just 6 miles east of the Bonanza unit is the 160 acre Clinton Prairie. The Nature Conservancy has purchased this tract to protect a state threatened bird, the chestnut collared longspur.

These few high quality natural areas do enhance the quality of wildlife habitat for this area.

Game Wildlife

All state parks are designated by state law as game refuges. This prohibits hunting within state parks unless under special orders from the Commissioner of Natural Resources.

Big Stone Lake State Park is located within DNR designated quota area 430 for the harvesting of white-tailed deer. Quota area 430 extends about 20 miles both north and south of the Minnesota River between Granite Falls and Browns Valley. The 1983 spring breeding population for white-tailed deer in quota area 430 was estimated at 43,000 (2.75/sq. mile) and the fall population was estimated at 76,000 (4.8/sq. mile). (Personal communications with Al Berner, DNR Farmland Wildlife Research, Group Leader).

In 1983, the estimated white-tailed deer population for kill block 109, which includes nearly all of Big Stone County was approximately 2.1 deer per square mile for breeding population and approximately 3.6 deer per square mile fall population. This was within 10 percent of the management goals established for white-tailed deer in this area.

Due to poor snow coverⁱⁿ the area of the park^{it} was not flown for winter deer counts between 1980 and 1983.

The Bonanza area is not a traditional wintering area. However, in 1984 approximately sixty deer wintered in the surrounding area due to food plots provided on nearby private lands south of the park (personal communications, Dave Soren, Area Wildlife Manager).

The Meadowbrook area traditionally has a small winter deer population of 20-25 deer. These deer are fed shell corn from barrel feeders located in the park.

Farmland wildlife species are inventoried by the DNR, Section of Wildlife each fall and spring. Since the census is primarily concerned with pheasant populations, it is conducted in the pheasant habitat range. Incidental sightings and subsequent data relating to other species give a general population overview of several wildlife species. The farmland wildlife census has approximately a 20 percent error ratio per region.

Since 1979 the counties surrounding Big Stone Lake State Park have shown a significant increase in the pheasant population. Each of the four counties listed below, in Table 1, show consistent annual fluctuations in the pheasant population and an increase between 1982 and 1983 populations.

TABLE 1. County August ring-neck pheasant census results, 1979-1983¹

County	miles censused 1983	Pheasants observed per 100 miles					mean 1979-83	percent change
		1979	1980	1981	1982	1983		
Big Stone	75	104	384	352	187	304	266.2	+ 82%
Stevens	75	64	87	287	73	188	139.8	+158%
Swift	75	26	-	113	21	58	54.5	+176%
Lac qui Parle	75	65	144	224	204	212	169.8	+ 4%

¹Status of Wildlife Populations, fall 1983 and 1978-1982 Hunting and Trapping Statistics, 1983

The greatest increase in pheasant population between 1982 and 1983 occurred in the west central region (+27%) where Big Stone County is located and the southeast regions (+35%). The statewide average for pheasant populations was down seven percent between 1982 and 1983.

Nongame Wildlife

The study Minnesota Breeding Birds; Relative Abundance and Distribution 1978, by the DNR, lists a total of 81 species of breeding birds for Region 4 west. Region 4 west includes Redwood, Renville, Kandiyohi, Lac qui Parle, Yellow Medicine, Chippewa, Swift, Big Stone and Meeker counties. Of those species

listed three were non-native pest birds; two were non-native game birds; ten were native game birds and sixty-six were native non-game birds. This information is not park specific, but refers to the entire study area of Region 4 west.

A total of 37 nongame mammal species have been documented in Region 4 west. Fourteen of these species have been documented to occur in Big Stone County (Henderson, 1979).

A total of 23 species of reptiles and amphibians have been documented in the nine county region of 4 west. Ten of these were documented in Big Stone County (Minnesota DNR, Jan. 1979).

SURFACE WATER

The total drainage area for Big Stone Lake is 1,160 square miles. This includes the drainage basin of the Whetstone River. All major streams flowing into Big Stone Lake have very little natural surface water storage capacity. Many typically cease to flow during droughts, and they flood as a result of rapid snowmelt, ice jams, and high intensity rain storms. Many of the small lakes and minor streams go dry and are of little importance for water supply. Surface water, although hard, is generally of good quality for most uses.

Big Stone Lake is 12,610 acres in size which makes it the 13th largest lake in the state of Minnesota. It is part of the Mississippi Drainage Basin and headwaters for the Minnesota River. The maximum depth of the lake is 16 ft. The average depth is 8 feet. The lake is 26 miles long and has 61.85 miles of shoreline. A total of 1,034 dwellings and 14 resorts with 69 units were counted along the lakeshore in 1981. Most of the development is in the south three-fourths of the lake. The shoreline topography varies from flat to steeply rolling with mixed forest fringe to open farmland. Five public accesses are located on the Minnesota shoreline and six more are located on the South Dakota shoreline. In addition, several private resorts provide water accesses.

The water level of Big Stone Lake is controlled at the south end by a concrete, stop log dam with 10 bays and a fixed spillway. The annual water level fluctuations are +3 ft to -1 ft.

The principal causes of pollution are agricultural runoff and municipal waste, via the Little Minnesota River and the Whetstone River. Big Stone Lake is a fertile hardwater lake which is subject to extensive siltation, heavy summer algae bloom and sporadic small fish kills. The lake's water color is brownish green and turbid. The lake has a secchi disc reading of 2 ft to 2.5 ft.

GROUND WATER

The three principal aquifers from which ground water is obtained are cretaceous sandstone, buried sands and gravels, and near-surface sands and gravel deposits.

In the vicinity of the Bonanza area, the glacial till is between 50 ft and 200 ft thick. The probability of a well tapping several aquifers in the till is greatest where the till is thickest. Water yields for aquifers located in the till are low to moderate. Water from wells in the glacial till, although hard, and commonly high in iron, is generally suitable for most purposes. Ground water located within the glacial till moves toward the Minnesota River and its reservoirs. Most of the movement is through low-permeability till.

The Meadowbrook area is primarily underlain by cretaceous shale and sandstone. Yields from aquifers in these rocks are low. Most of the water from wells located in cretaceous aquifers is relatively soft and low in iron, but high in dissolved solids, chloride, sulfate, sodium, and boron. These waters are typically unsuitable for irrigation. Wells tapped in cretaceous sediments are concentrated in areas where these sediments are over 100 ft thick.

Four wells located in the park provide water for park users. The well located in the campground, drilled in June of 1964, is 105 ft deep and is a naturally flowing well operated by a hand pump. When tested in June of 1964 the well was pumped at a rate of 18 gallons per minute.

The well at the Meadowbrook Headquarters, drilled in 1967, is located in water bearing sand at a 75 ft. depth and is operated by a submersible pump. When tested in September of 1967 the well was pumped at a rate of 40 gallons per minute.

The 1975 and 1974 chemical analysis of the Bonanza area museum well showed that it is high in sulphates, but low in iron, manganese, chlorides and fluorides. The nitrate nitrogen content exceeded the maximum allowable level of 10 milligrams per liter and was recommended that it be posted "Water unsuitable for use in the preparation of infant formula" (Dept. of Health 1975, 1974). In 1974, the chemical analysis for this well indicated it was of unsatisfactory sanitary quality due to presence of coliform bacteria. Chlorination equipment was installed by the DNR in 1975 to correct the coliform bacteria problem.

The chemical analysis of the Bonanza area flowing well, located in the picnic ground, showed that this water is soft, very high in sulphates and fluorides, moderately high in iron, but low in manganese and chlorides (Dept. of Health, 1975).

FISHERIES

Fishing in Big Stone Lake is one of the main reasons for most park visits. The fishing season in Big Stone Lake begins two weeks before the rest of the state. This early opener attracts many fishermen to the South Dakota border lakes to fish 2 weeks before they can fish the in-state lakes. This early fishing use is reflected in the large amount of use the park receives in early May, when most state parks are receiving only a few visitors.

Fishing Big Stone Lake in spring is also more enjoyable than during the summer or fall. This is due to higher water quality in the spring. Large mats of blue green algae typically become established in the lake during the summer and fall. This algal bloom doesn't appear to have a major negative impact on the fish population. The walleye population appears to be most heavily influenced by the amount of fingerlings stocked. The shallowness of the lake and wave action seems to maintain sufficient oxygen levels for a healthy fish population. The algae mats do reduce light penetration and therefore reduce submerged plant growth, which is a major source of oxygen in many lakes.

The fish survey conducted in 1981 showed that Big Stone Lake is near the state average in the amount and size of game fish species (see chart). However, records compiled from rough fish seining show continued good fish numbers and size. The 1971 fish survey showed above the state average in both amount and size of game fish species.

<u>1981 Trapnet Catch Summary</u>						
<u>Fish Species</u>	<u>Total Number Caught</u>	<u>Number per Set</u>	<u>State Wide Median</u>	<u>Total Pounds of Fish</u>	<u>Pounds per Set</u>	<u>State Wide Median</u>
Black bullhead	17	1.5	2.6	23.7	2.2	2.2
Northern pike	3	.3	.5	6.8	.6	.9
White bass	21	1.9	.7	25.4	2.3	.5
Yellow perch	35	3.2	1.5	8.9	.8	.3
Walleye	8	.7	.5	14.7	1.3	1.0
Blue gill	16	1.4	11.7	5.1	.5	2.5
Black crappie	5	.4	2.7	4.4	.4	1.0

Minnesota DNR, Fisheries and South Dakota DNR share the management responsibilities for Big Stone Lake. Management actions are discussed and determined at an annual Minnesota - South Dakota border waters meeting. Each state has the responsibility to organize rough fish removal and fish stocking every other year.

HISTORY AND ARCHAEOLOGY

Archaeological sites in the Minnesota River valley span a range of time from 8000 B.C. to historic times. There are approximately 19 known historic and archaeologic sites, mostly near the river, between Brown's Valley and Marsh Lake. A partial skeleton dating back to 8,000 B.C. (during Paleo-Indian or Big Game cultures) was discovered near Brown's Valley in 1933 by William Jensen. This was a significant archaeologic find. Peoples of this culture were the first known inhabitants of Minnesota.

An unknown number of burial mounds and village sites, once common along ridgetops and high river terraces, have been lost due to cultivation and construction. But archaeologists excavating remaining sites have pieced together pictures of the earliest cultures in Minnesota.

The Paleo-Indian cultures were followed by the archaic tradition and succeeded in the Minnesota River valley by the Woodland tradition which existed here from about 1000 B.C. to 1000 A.D. Woodland tribes built permanent villages and burial mounds, made pottery, and began harvesting wild rice.

The addition of wild rice to the diet of Woodland peoples in about 800 A.D. resulted in a major population surge. Grains of superior strains of rice packed in mud balls were traded to tribes for planting in lakes that had no rice or inferior strains.

Eventually these tribes began planting and cultivating other foods as well and gradually became part of the Mississippian cultural tradition. By 1000 A.D. a major Mississippian center was established in the central and upper Minnesota River valley. Several Mississippian villages and burial sites have been found along the Minnesota River. The Mississippian culture was based on "intensive agriculture" practices. Its peoples cultivated primarily corn, beans, squash, sunflowers and tobacco. Hunting and fishing remained very important, although the Mississippian sites in Minnesota show a dependence upon buffalo as a staple food (Johnson 1969).

This Indian culture was probably the closest prehistoric Minnesota people came to an urban society. The Mississippian tribes lived in extensive villages housing from 600 to 800 people. The villages were often located on flat river terraces above the bottomlands. Storage pits dug throughout the village, were used for refuse after they were no longer fit for storing dried vegetables and other foods and are therefore of interest to archaeologists. Broken tools, pottery shards, animal bones, ashes, and other artifacts are found in these pits.

HISTORY

During settlement times the Dakota Indians occupied the lands around Big Stone and Traverse lakes. Robert Dickson established the area's first trading post on the east shores of Lake Traverse before 1800. This post later served as an anchor point for the Columbia Fur Company. Hartford Beach, located on the west shore of Big Stone Lake, was the site of another trading post which was established in 1819, but operated by the American Fur Company after 1823.

Settlement in the Red River Valley was good around 1800, but floods, crop failures, severe winters and Indian conflicts resulted in a major egress of settlers from this region during the 1820's. Settlement began to stabilize again in the 1830's and 40's.

The Columbia Fur Company had opened four additional trading posts in the Minnesota Valley between Big Stone Lake and St. Peter. To supplement the undependable water route up the Minnesota River and to speed up the movement of goods and furs, the company introduced two-wheeled wooden carts drawn by horses or oxen (Gilman 1979). Although the company was apparently the first to use such carts in the Minnesota Valley, they had long been used along the lower Red River and on the level grasslands of Manitoba and Dakotas (Gilman 1979). Oxcart routes were located in the open prairie northeast of Big Stone Lake and along the bluff on the west side of Big Stone Lake.

In 1838, a conflict between several Indians and the traders at the Lake Traverse Post resulted in the death of one post employee and wounding of another. This resulted in the closing of this post and shifting of all trading activity to the post at Lac Qui Parle. The oxcart routes were also shifted further east.

By the mid-1830's, settlement in the Red River Valley began to expand. The cattle and sheep which had been introduced in this area in the 1820's were now being brought down river to major trading centers and sold.

EXISTING DEVELOPMENT

Big Stone Lake State Park has recreational development in both the Meadowbrook and the Bonanza areas. They are:

Meadowbrook Area

Campground

- 42 rustic campsites
- 2 pit toilets

Picnic area

- 15 picnic tables
- 2 pit toilets

Boat launch

- concrete ramp
- 60 car parking lot (30 car and trailers)
- ft dock

Service court

- double garage
- Trailer dump station
- unheated storage building

Contact station/park office

Manager's residence

Hiking trail 1.5 miles

Snowmobile trail 3.5 miles

Bonanza Area

Interpretive center with naturalists office,
display area, and flush toilets

Picnic area

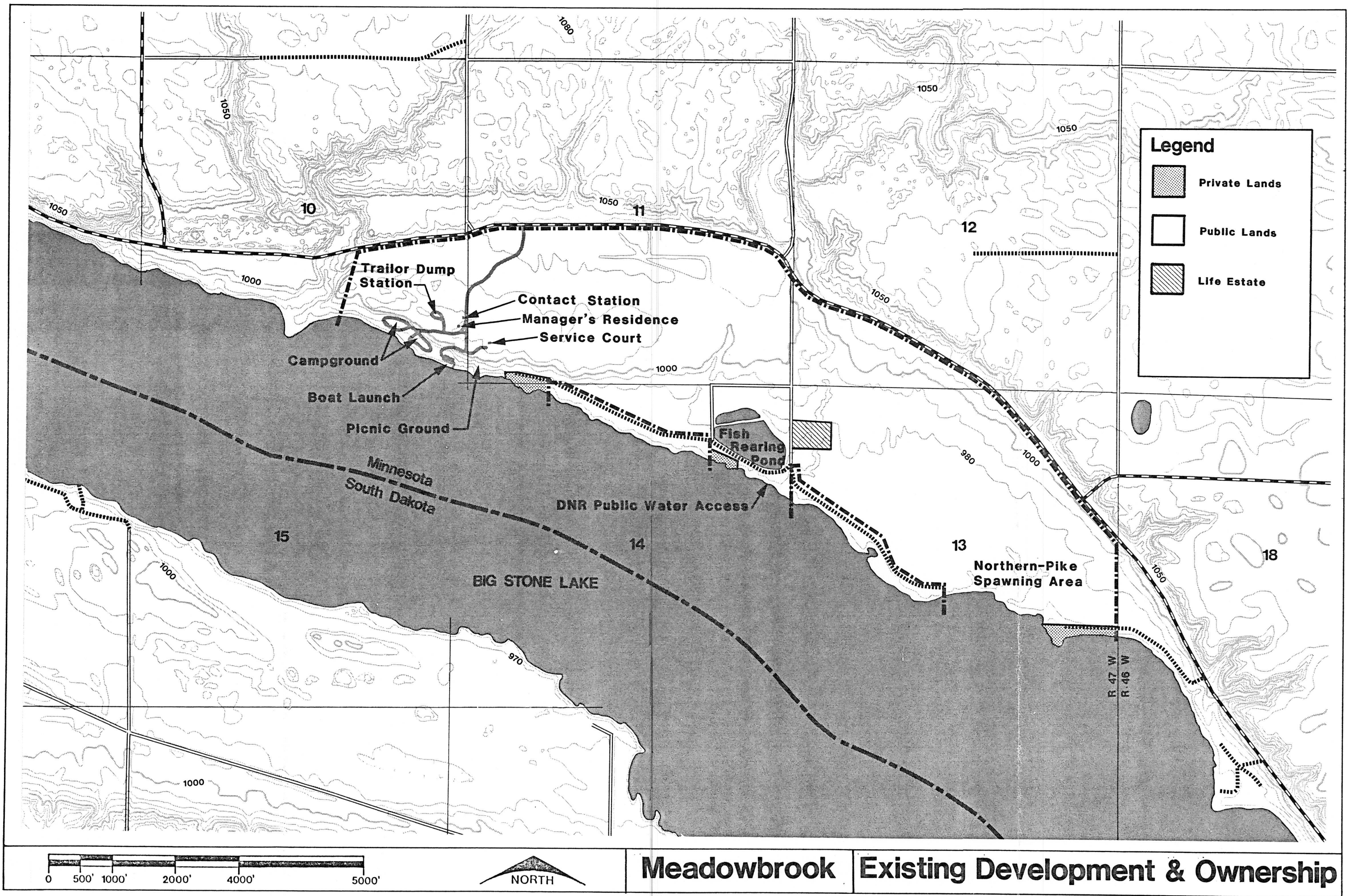
- 5 picnic tables
- 160 car parking lot
- 2 pit toilets

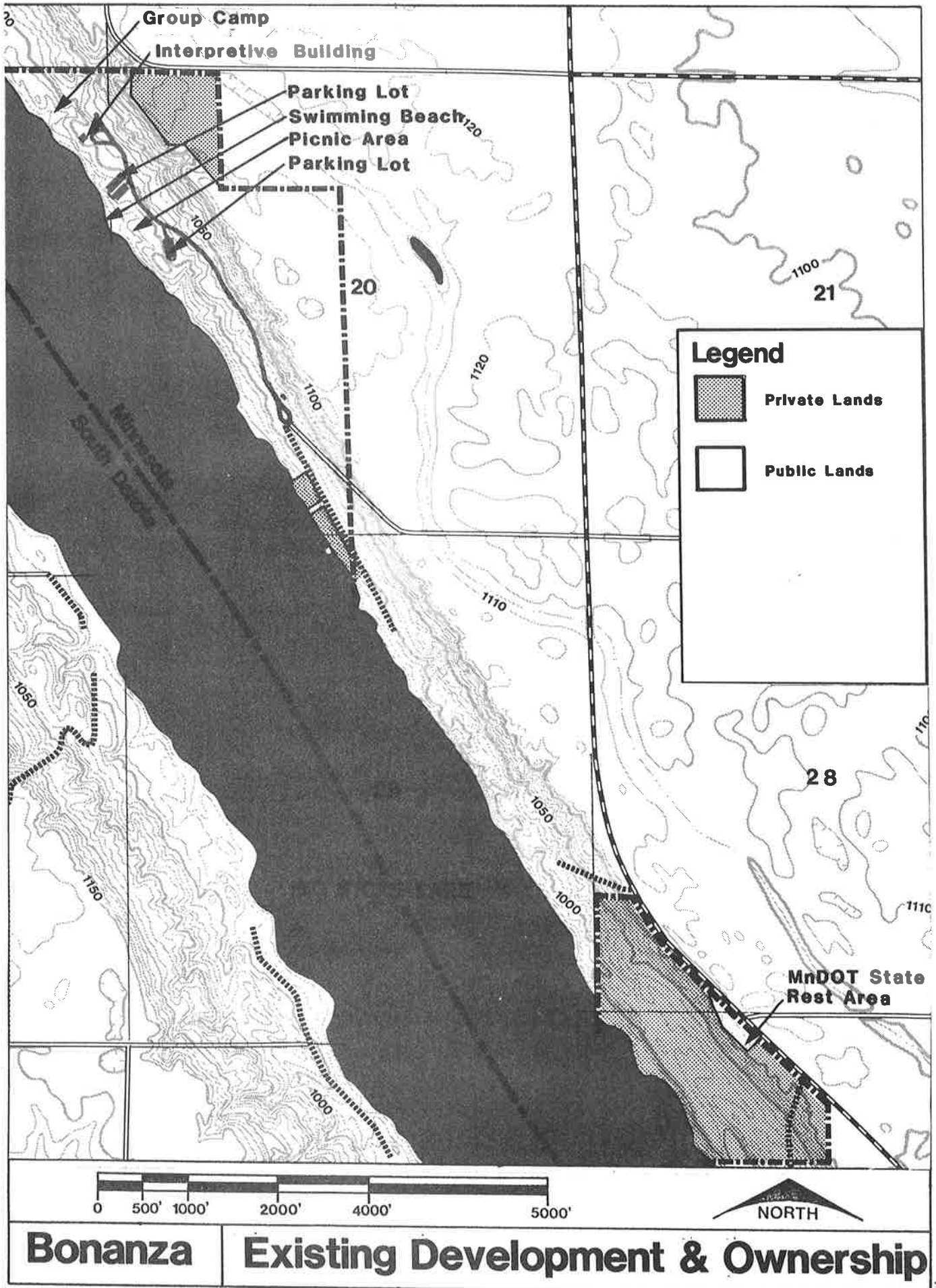
Swimming beach

- 60 car parking lot

Old log cabin

Double garage





PARK
BOUNDARY

Big Stone Lake State Park was authorized by the state legislature in 1961. This legislation authorized the state to acquire up to approximately 1,780 acres of land in three separate areas adjacent to Big Stone Lake. These three areas together would become Big Stone Lake State Park. The 1961 legislation also authorized \$60,000 for land acquisition, if Big Stone County would reimburse the state for one-half of this amount. Big Stone County was not required to match any of the later expenditures for land acquisition or capital improvements.

The southern most area was located 9 miles north of Ortonville and included 785 acres. This is the current Meadowbrook area. A second area having a statutory boundary of approximately 90 acres, currently includes the small 4 acre highway rest stop managed by the Minnesota Department of Transportation. A third area encompassing a 900 acre statutory boundary was located northwest of the present Bonanza area. In 1963, the legislature added the Bonanza area to Big Stone Lake State Park and authorized its acquisition. Then in 1965 the state legislature eliminated the 900 acre area north of Bonanza from the state park. Several other smaller changes to the statutory boundary of the park have been made as a result of land availability and citizen concerns.

At present, the park's statutory boundary includes approximately 1,119 acres. The Bonanza area includes 199 acres; the overlook approximately 90 acres; and the Meadowbrook area includes approximately 830 acres. The state owns and manages 175 acres in the Bonanza area. The state owns 825 acres in the Meadowbrook area, 96 acres of which are a life estate, 2.5 acres are a state water access, 37.5 acres are managed by the Division of Fish and Wildlife as a fish rearing pond and the remainder is managed by the Division of Parks and Recreation. The Department of Natural Resources does not manage any land in the overlook area, although the Department of Transportation maintains the small wayside adjacent to Highway 7.

The Meadowbrook area extends 2 1/2 miles along Big Stone Lake. Only slightly over 1 mile of this shoreline is under state ownership and that ownership is located in three separated areas. The largest contiguous shoreline area is by the campground and picnic area and it is only 1/2 mile long. Most of the private shoreline adjacent to the state park is developed with private homes and seasonal cabins. The majority of the Meadowbrook area is land separated from the lake by a narrow strip of private land.

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 outstanding resources. It is the management goal for all state recreational lands, including state parks, to protect and perpetuate resources for use by the citizens of Minnesota.

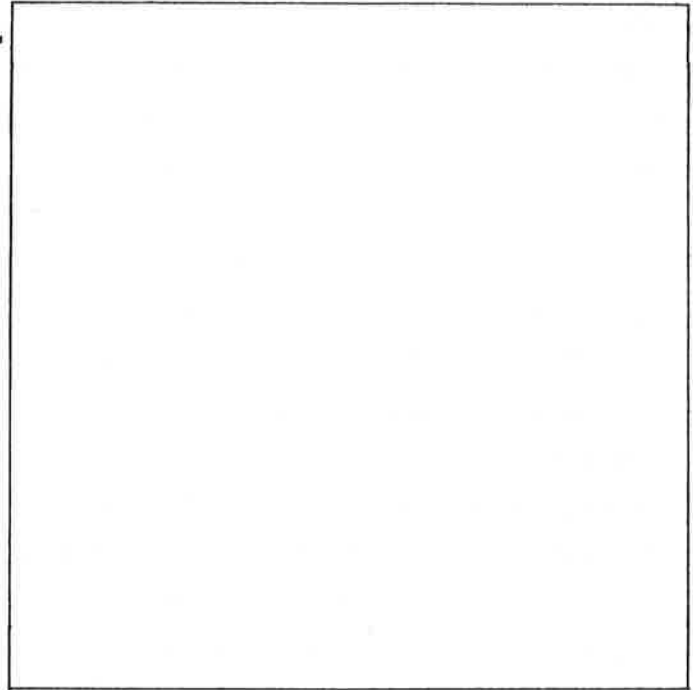
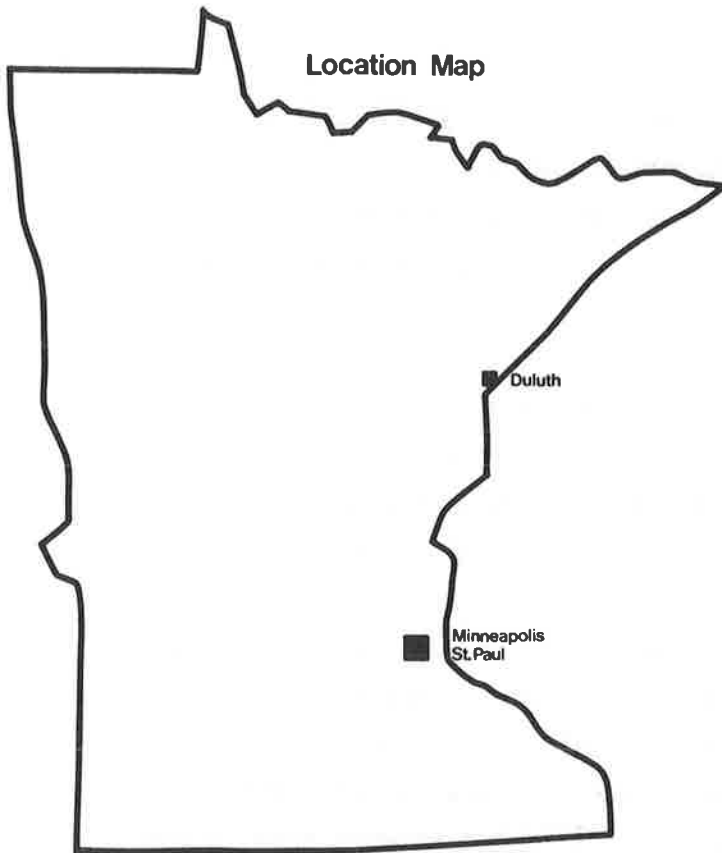
There is a delicate balance which must be maintained when recreational facilities are provided for large numbers of people in areas of outstanding and often sensitive resources. Inappropriate development can result in irreparable damage to the resource. To help ensure this recreation/resource balance, the Minnesota State Legislature established, through the Outdoor Recreation Act of 1975 (ORA '75), a classification process whereby the outdoor recreation system shall be comprised of classified units. Each unit shall be authorized, established, and administered to accomplish the purpose and objectives of its classification. These units 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.

Through this classification system, the role for each recreational unit in the state system is identified. The two primary classifications for state parks are natural and recreational. These two, along with other ORA '75 classifications, are considered during the planning process. The most appropriate is recommended for the park. If a state park does not meet any of the established classification criteria, the DNR will consider the possibility of recommending that park be eliminated from the state recreation system.

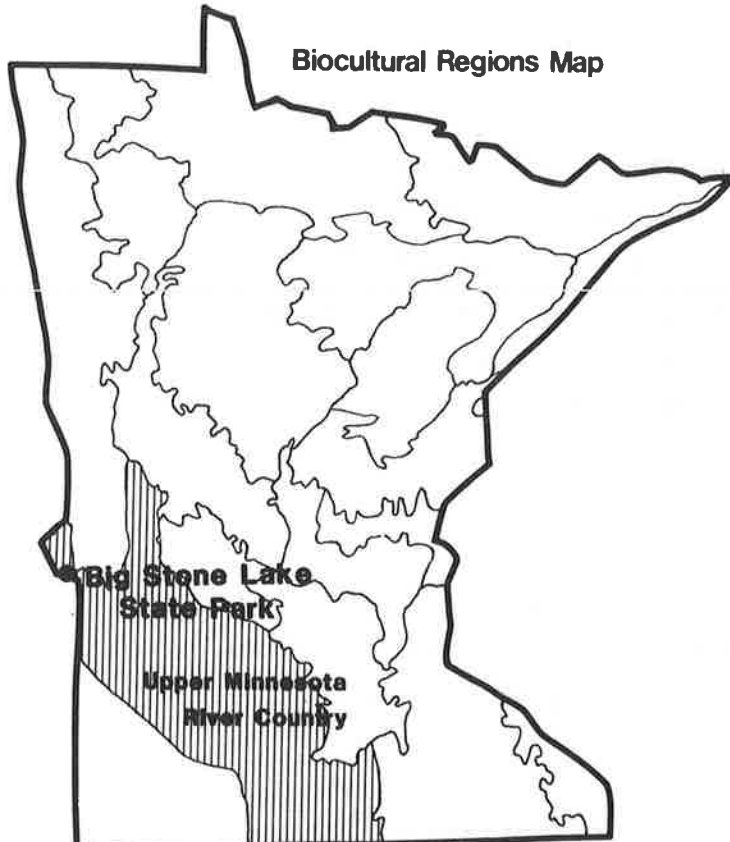
THE LANDSCAPE REGION SYSTEM

The landscape 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

Location Map



Biocultural Regions Map



The Upper Minnesota River Country Landscape Region is relatively flat. It is covered by glacial till deposited 10,000 to 12,000 years ago during the Wisconsin Glacial Period. The Minnesota River flows through a valley cut by Glacial River Warren. Presettlement Vegetation in this area was mostly prairie with river bottom forests along the river banks.

European settlement. The landscape region system is a framework which provides information valuable in the planning of Minnesota's state parks.

Big Stone Lake State Park is located in the Upper Minnesota River Country Landscape Region (see the Landscape Region Map, p⁷⁴). It is a large region, covering broad areas on either side of the Minnesota River from Mankato northwest to Traverse County on the Minnesota-South Dakota border. This region encompasses 7,828,000 acres or 14.6 percent of the state.

The area is relatively flat and covered by glacial till deposited 10,000 to 12,000 years ago during the Wisconsin glacial period. The most distinctive geological feature in the region is the Minnesota River. It flows through a valley cut by the earlier and much larger Glacial River Warren. Presettlement vegetation in the area consisted mostly of prairie with river bottom forests along the river banks. Big Stone contains a few features of the presettlement vegetation types. It is representative of the hillside prairies, river bluffs and floodplain wetlands and has little to no potential to represent the upland prairies of the Upper Minnesota River Country Landscape Region. Large areas of the park have been disturbed by agricultural practices.

CLASSIFICATION PROCESS AND JUSTIFICATION - ORA '75

The purpose of the classification process as stated in ORA '75 is to establish

"... an outdoor recreation system which will (1) preserve an accurate representation of Minnesota's natural and historic heritage for public understanding and enjoyment and (2) provide an adequate supply of scenic, accessible and usable lands and waters to accommodate the outdoor recreation needs of Minnesota's citizens."

In keeping with the legislative mandate of the Outdoor Recreation Act of 1975, policy has been formulated for all units in the state recreation system. Each unit is managed and developed according to the nature of its natural resources and their ability to tolerate visitor use. The classification alternatives considered for Big Stone Lake State Park were recreational state park, natural state park, wildlife management area, state water access site, scientific and natural area, *and state rest area.*

Big Stone Lake State Park was established in 1961 by the state legislature. The design concept for this park when it was established was to link three recreational areas together with a "Skyline Parkway" located along the top of the valley bluff. The three units identified were the Meadowbrook unit, a highway wayside/overlook and the Bonanza unit. This was the first and only linear parkway proposed for the Minnesota state park system. The concept has not proven to be successful for this park. In addition, the concept does not meet the current DNR policy for state parks. It is therefore recommended that each unit be considered independently for classification.

The Mn/DOT wayside rest was not considered for state park classification due to its size and current management.

Natural State Park Criteria

Following is a listing of the classification criteria for natural state parks and a discussion of how well Big Stone Lake State Park meets these criteria.

"...protect and perpetuate extensive areas of the state possessing resources which illustrate and exemplify Minnesota's natural phenomena, and provide for the use, enjoyment, and understanding of such resources without impairment for the enjoyment and recreation of future generations."

"No unit shall be authorized as a natural state park unless its proposed location substantially satisfies the following criteria:"

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;"

Bonanza Unit (statutory boundary 199 acres)

Big Stone Lake State Park is located in the Upper Minnesota River Country Landscape Region. This unit has very little land which currently represents or has the potential to represent the upland prairies which are the most dominant feature of the Upper Minnesota River Country Landscape Region. The high quality glacial till hill prairie is the primary resource feature of this park unit.

The glacial till hill prairie in the Bonanza unit has been studied and identified by the DNR, Natural Heritage Program as a very good example of this prairie type. This area of glacial till hill prairie is in an essentially unspoiled condition, its perpetuation would contribute to the broad illustration of the state's natural resources.

Meadowbrook Unit (statutory boundary 830 acres)

Over 60 percent of the Meadowbrook Unit's native vegetation has been removed to allow for agricultural crop production. These areas have since been reseeded into non-native field grasses.

Some areas in the eastern portion of this unit have native prairie vegetation which has been hayed or pastured in the past but, is reasonably undisturbed and should be preserved. These areas are not of sufficient quality or size for the entire unit to meet this criterion.

Criterion "(2) Contains natural resources, sufficiently diverse and interesting to attract people from throughout the state;"

Bonanza Unit

↓
This unit provides diverse topography, a mixture of vegetative types, and some natural shoreline which, when combined in sufficient quantity, could attract users from throughout the state. However, the total quantity of these characteristics within the Bonanza unit is insufficient to attract and hold visitors in this unit for any period of time. The land immediately surrounding the Bonanza unit does not contain sufficient natural features and desirable characteristics to support expansion of this unit to meet this criterion.

Several areas of the state have resource features outside of state parks which have broad appeal for recreational use. This area of the state does not have the type or quantity of natural features which have proven to attract a significant number of visitors from throughout the state.

Meadowbrook Unit

The land base of the Meadowbrook unit does not contain natural resources which are sufficiently diverse and interesting to attract people from throughout the state. The 830 acre land base is nearly flat with limited diversity in natural features and vegetative cover. The entire unit is open and contains few natural characteristics which are preferred for trail and camping opportunities. Meadowbrook does attract some campers from the southern one-third of the state, but the very low total number of campers currently attracted to the park indicates that the resources are not sufficiently diverse and interesting. Most park visitors are not attracted by resources of the land base, but are using the park for access to Big Stone Lake.

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."

Bonanza Unit

The Bonanza area is only 199 acres. This unit is too small to provide sufficient development to ensure a broad selection of outdoor recreation opportunities and perpetuate the natural resources. Approximately one-third of this area is native prairie located on steep slopes which are not suitable for recreational use. Less than 100 acres is available for use between the bluffs and the lake. Of this 100 acres, nearly one-half are too steep for development other than trails. The approximately 50 acres which are suitable for intensive development are located in isolated plateaus along the base of the prairie hillside.

DNR policy for natural state parks requires that no more than 10 percent of a park may be developed for intensive use. Ten percent of 200 is 20 acres. Twenty acres is an insufficient area to provide an adequate campground, picnic ground, boat launch, swimming beach, and necessary roads and parking.

The lands adjacent to the Bonanza unit are not well suited to provide a broad range of recreation opportunities for enjoyment of the units natural resources, therefore expansion of the statutory boundary would not ensure adequate land for recreational facilities and protect^{ion of} the natural resources.

Meadowbrook Unit

Meadowbrook is large enough to permit protection and use of its natural resources. There are a few areas of moderate slope, several wet areas and some areas of native grasslands which are sensitive to intensive use, however, through proper design and management any potential damage to the resource can be eliminated or significantly minimized. Most areas of the Meadowbrook unit can withstand recreational use while permitting protection of the natural resources.

Recreational State Park Criteria

Listed below are the classification criteria for recreational state parks and a discussion of how well Big Stone Lake State Park meets these criteria.

"(a) 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."

"(b) No unit shall be authorized as a recreational state park unless its proposed location substantially satisfies the following criteria:"

Criterion "(1) Contains natural or artificial resources which provide outstanding outdoor recreational opportunities that will attract visitors from beyond the local area;"

Bonanza Unit

The type and quantity of the unit's natural resources do not provide recreational opportunities of sufficient quantity or quality to attract a user group from beyond the local area (25 miles). The addition of significant recreation developments intended to attract users from beyond the local area would be constructed and used at the direct expense of the unit's natural resources.

Meadowbrook Unit

This unit does not contain sufficiently diverse or high quality resources which could provide outstanding outdoor recreational opportunities. The vast majority of park users use the park only for access to Big Stone Lake.

Criterion "(2) Contains resources which permit intensive recreational use by large numbers of people;"

Bonanza Unit

Most of this area cannot accommodate intensive recreational use, due to steep slopes, erodable soils, and native prairie vegetation. Even moderate recreational use of several portions of this unit could result in severe damage to the resources.

Meadowbrook Unit

The developed areas of this unit can withstand extensive amounts of use without suffering undue or irreparable damage.

"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."

This state park is not provided in lieu of local recreation facilities. This area of the state has limited high quality recreation opportunities, however, the local area (within 25 miles of the park) includes a broad selection of recreational opportunities. Municipal and county governments provide a variety of highly developed playgrounds, picnic areas, swimming opportunities, water accesses and a few camping opportunities. Federal agencies provide hunting, wildlife observation, picnicking, fishing, and water access opportunities. In addition, the state of South Dakota also operates a 331 acre state park with 43 camping sites on the southwest side of Big Stone Lake. Private resort owners also provide cabins and developed camping facilities on the shores of Big Stone Lake.

State Scientific and Natural Areas Criteria

"No unit shall be authorized as a scientific and natural area unless its proposed location substantially satisfies the following criteria:"

Criterion "(1) Embraces natural features of exceptional scientific and educational value, including but not limited to any of the following:"

"(iii) an undisturbed plant community maintaining itself under prevailing natural conditions typical of Minnesota;"

Bonanza Unit

This unit contains a good quality example of a distinctive prairie type classified as glacial till hill prairie. Due to land use practices, primarily agricultural, examples of glacial till hill prairies which reflect native presettlement conditions are quite rare. The Minnesota DNR Natural Heritage Program considers this type of prairie to be state threatened. The lower slopes and draws in the Bonanza unit are occupied by an oak, ash, basswood woodland. The woodland community is an integral part of the hill prairie landscape. Enough of the woodland's original character and species remain that with active management, these areas will return to more natural conditions.

The Scientific and Natural Area Program has have requested that the glacial till hill prairie and woodland be designated a state Scientific and Natural area.

Meadowbrook Unit

A large percentage of the Meadowbrook unit was formerly cultivated and is now dominated by non-native grasses or old field species. The remaining unplowed portions contain examples of two prairie types: mesic blacksoil prairie (southwest) and wet blacksoil prairie (southwest). The quality of these prairie tracts range from good to marginal. The Natural Heritage Program considers both these prairie types to be state threatened. The prairie and adjacent grasslands may also provide habitat for rare prairie bird species. The Scientific and Natural Area Program has requested that the prairie areas be further evaluated for appropriate protection strategies.

Criterion "(2) Embraces an area large enough to permit effective research or educational functions and to preserve the inherent natural values of the area."

Bonanza Unit

The Bonanza Unit contains a native glacial till hill prairie and woodland that is sufficiently large to preserve this landscape type, if it does not receive intensive use. To fully protect the hill prairie and woodland, protection of adjacent resources and control of adjacent land uses should be considered in the long range planning for this unit .

Meadowbrook Unit

The mesic blacksoil prairie and the wet blacksoil prairie types located in this unit are large enough to assure perpetuation and permit effective research or educational functions.

State Wildlife Management Area

"No unit shall be authorized as a state wildlife management area unless its proposed location substantially satisfies the following criteria:"

Criterion "(1) Includes appropriate wildlife lands and habitat, including but not limited to marsh or wetlands and the margins thereof, ponds, lakes, stream bottomlands, and uplands, which permit the propagation and management of a substantial population of the desired wildlife species;"

Bonanza Unit

The Bonanza unit contains upland wildlife habitat, but is not considered unique or highly needed wildlife lands for this part of the state.

Meadowbrook Unit

The existing condition of the Meadowbrook Area provides excellent wildlife habitat. This area has large areas of wet meadow, the potential for additional waterfowl impoundments, and excellent opportunities for enhancement of upland cover for nesting birds.

Criterion "(2) Includes an area large enough to ensure adequate wildlife management and regulation of the permitted recreational uses."

Bonanza Unit

This unit has limited utility for wildlife management of game species.

Meadowbrook Unit

The Meadowbrook area contains approximately 500 acres which can be managed to accommodate wildlife habitat programs. The unit is between 2,000 to 3,000 feet wide and is easily accessible and visible from Trunk Highway 7. This allows excellent supervision of the unit, however, the close proximity of several homes may require special review to determine appropriate management regulations.

State Water Access Site Criteria

"No unit shall be authorized as a state water access site unless its proposed location substantially satisfies the following criteria:"

Criterion "(1) The body of water to which access is being provided and surrounding lands can withstand additional recreational use without undue damage to the environment or undue risks to the health and safety of water users;"

Based on the DNR, state water access site policy dated 12/13/79, the carrying capacity for Big Stone Lake would be individually calculated. Preliminary estimates of 40 acres per boat, results in an estimated need of 315 parking spaces for the 12,610 acre lake. It is the determination of the DNR staff that improved access to the lake will not cause undue damage to the environment or undue risks to the health and safety of water users.

Criterion "(2) Public access to the body of water is either nonexistent or inadequate".

Bonanza Unit

Potential public access to Big Stone Lake is limited in the vicinity of the Bonanza unit, due to the extreme length of the lake and the distance which must be traveled to gain access to a particular area of it. In general, the DNR water access program considers this lake to have good public access.

Meadowbrook Unit

The existing designated state water access site located near the fish rearing pond in the Meadowbrook unit has minimal parking and the ramp is in shallow water. This ramp is unsatisfactory during periods of low water. The state park's water access located near the picnic grounds has good parking and deeper water. If there is a choice of retaining only one, the state park's water access should be retained.

State Rest Area Criteria

"No unit shall be authorized as a state rest area unless its proposed location substantially satisfies the following criteria:"

Criterion "(1) Is adjacent to or in near proximity to a trunk or interstate highway;"

The existing wayside rest is adjacent to Trunk Highway 7.

Criterion "(2) Is developed at appropriate intervals based on the type of road system, traffic and traffic projections and known or projected usage of the proposed development;"

The location of this site is appropriate. The development is sufficient for the amount of use it receives.

Criterion "(3) May be near or associated with a place or area of natural, scientific, cultural, or historic interest."

The site provides a spectacular view of Big Stone Lake and the geologic landforms which created it.

RECOMMENDED CLASSIFICATION JUSTIFIED BY ORA '75

The DNR is mandated by the state legislature to recommend a classification for each unit within the state recreation system. There are eleven classification options which the DNR can recommend within ORA '75. The preceding classification discussion analyzed how well the Bonanza, ^{overlook} and the Meadowbrook units fulfill the criteria for specific units established by ORA '75. Neither the Bonanza or Meadowbrook areas meet the classification criteria for either recreational or natural state park. The following recommendations are those which can clearly be justified by ORA '75 classification criteria:

Wayside Rest

Recommend classifying the wayside rest as a state Rest Area. This action will not affect the existing ownership or management of land in this unit. The Minnesota Department of Transportation (Mn/DOT) currently owns 4 acres in this unit, all other lands are in private ownership. The Mn/DOT will continue to operate the small existing state rest area/overlook.

Meadowbrook Unit

Transfer the water access site, located adjacent to the picnic grounds, to the DNR, Division of Trails and Waterways (see Classification Map, p 89) to be designated a state water access site and operated for free public use under their program. A small picnic ground could also be maintained adjacent to the water access through the State Water Access program. The existing small state water access, located near the fish rearing pond *should be removed*.

Transfer management of the eastern two-thirds of the park to the DNR, Division of Fish and Wildlife (see Classification Map, p 89) for appropriate management of resources by sections within that division. The section of Fisheries will continue to manage the wet meadow area near the eastern end of the park for northern pike spawning. The Scientific and Natural Area Program will develop preservation and management strategies for the unplowed native wet and mesic blacksoil prairie areas. The rarity of these native plant communities in the state warrants preservation and ongoing management of them in the Meadowbrook unit. The remaining land transferred to the Division of Fish and Wildlife will be managed as a Wildlife Management Area.

Transfer the developed recreation area of the park to a county, municipal or non-profit organization (see Classification Map, p 89) to be operated as a public recreation area. The land base which could be considered for transfer would include the campground, park managers residence and garage, dump station, contact station and service court. Additional lands which could be considered for supplemental recreational developments, such as ballfields and concessions could include the old fields west of the park entrance road. The unit of government or non-profit organization would assume total responsibility for new development, operations and maintenance of the facility. Supplemental state funding could be sought by a local unit of government through the LCMR grant program which is managed through the state Department of Energy and Economic Development.

If a managing organization was not located to take over the maintenance and operations of the recreational facilities in this park they could be operated in their present condition by the DNR, Division of Parks and Recreation, for a short period of time (not to exceed five years). After that time, all facilities not needed for the operation of the state water access or the state wildlife management area should be surplus and sold for removal or salvage. Following removal of all unneeded buildings and facilities the land should be graded and revegetated to enhance the wildlife habitat of the area. This land should then be transferred to the management of the DNR, Division of Fish and Wildlife for implementation of wildlife management programs.

This option is consistent with the criteria established in the ORA '75. The Meadowbrook unit meets the criteria for a wildlife management area (WMA), water access site and portions may meet the criteria for SNA. The area identified for a WMA has good upland wildlife habitat. However, adjacent landowners are opposed to hunting in this area. The close proximity of several homes may require special review to determine appropriate management regulations.

Bonanza Unit

Recommend that most of the Bonanza Area be designated a Scientific and Natural Area (SNA) and a portion designated a State Water Access Site.

This option is consistent with the criteria established in ORA '75. The Bonanza area fully meets the criteria for scientific and natural area and state water access site. The glacial till hill prairie and woodland in the Bonanza area has been recommended by the DNR, Scientific and Natural Areas Program as a high priority site for protection of these natural features. This area is in an essentially unspoiled condition, and would suitably portray this type of vegetative community for future generations.

Transfer a portion of the southern shore line of this unit to the DNR, Division of Trails and Waterways for development of a state water access site (see Classification Map, p. 91). Public access to Big Stone Lake is limited in the vicinity of the Bonanza unit. The land near the south end of the Bonanza unit is suitable for the construction of a water access site.

LEGISLATIVE CLASSIFICATION OPTIONS

There are special circumstances governing the future of Big Stone Lake State Park that are not addressed by ORA '75 criteria. These may be considered when the classification of the Meadowbrook unit of Big Stone State Park is determined:

- There is strong local support for retaining this area as a state park.
- The water quality of Big Stone Lake is currently poor. A federally funded EPA study has been conducted to determine how the water quality of Big Stone Lake may be improved. Improving the water quality of a lake is a very long process, but once achieved could enhance the attractiveness of the Ortonville area for recreators.
- The original design of this park was atypical. State parks are usually designed to be one contiguous land mass for visitor control and enjoyment and to minimize management costs. Big Stone was designed to be three different areas, separated by 10 miles and connected by a scenic parkway. This initial design has not proven successful. It has been inconvenient for visitors, inefficient for park management and has dispersed development investment.
- The tourism economy in the Ortonville area is in a depressed state. Several of the small resorts have gone out of business and others are not doing well. Removing the state park designation at this time could further reduce the area's economy.

Public involvement in the planning process for Big Stone Lake State Park strongly supported continued operation of the Meadowbrook unit as a state park. As a result of the public's concerns and circumstances not addressed in ORA '75, the planning staff has outlined two classification options which the legislature may consider when determining classification of the Meadowbrook unit.

Legislative Option #1 - Joint Local and State Operation

Classify the Meadowbrook area a recreational state park with a state water access sub-unit, but stipulate that the state park be operated cooperatively with both state and local dollars invested.

This unit does not meet ORA '75 criteria for recreational state parks. But there is strong local support to retain the Meadowbrook area as a state park. One of the reasons the state legislature passed ORA '75 was to place responsibility for the cost of providing recreation on the most appropriate unit of government. If a cooperative agreement can be developed between the DNR Division of Parks and Recreation and Big Stone County and/or the City of Ortonville to share development and operation costs, the state legislature may be more willing to retain the Meadowbrook area as a state park.

Minnesota Statute 471.59, Joint Exercise^e of Powers, authorizes that a "governmental unit" (as defined in the statute) may enter into an agreement with another "governmental unit" to provide services or functions which are within the legal authority for either unit to provide independent of each other. Based on this law the Department of Natural Resources currently has the legal authority to coordinate with a local "governmental unit" to share in the operations, management and development of any state recreation facility.

If the Minnesota state legislature chooses to adopt Legislative Option #1, the Minnesota DNR will be directed to negotiate with Big Stone County; and the city of Ortonville to develop a cooperative management program for Meadowbrook as a recreational state park.

Legislative Option #2 - Amend ORA '75

Establish a twelfth classification within ORA '75 which would include criteria designed to maintain Big Stone Lake State Park and other state parks having similar characteristics as part of the state recreation system.

Expanding the present ORA '75 from eleven to twelve units would allow more flexibility in establishing the criteria which a unit must meet, the types of recreation which may be provided within it, and expanded flexibility in the management of the unit.

DEVELOPMENT AND RESOURCE MANAGEMENT

The following recreation development and resource management objectives should be followed regardless of the final classification determination.

Objectives:

To provide a variety of recreation opportunities which reflect the best use of the land base

To locate developments where they have the least impact on sensitive natural or historic resources

To ensure physical accessibility and opportunity to participate in programs by special populations (i.e., persons with physical disabilities, the elderly, and the very young)

To provide safe public access to public waters

To minimize soil erosion

To enhance wildlife habitat for game and non game species

To protect and perpetuate state threatened or state concern elements identified by the Minnesota Natural Heritage Program

To manage vegetation with natural forces wherever feasible

To protect and perpetuate unplowed native vegetation

Introduction

The classification section of this plan established that Big Stone State Park does not meet the ORA '75 criteria for either a natural or recreational state park. All the major recreational facility developments and resource management recommendations made in this plan are consistent with the classifications justified by ORA '75. Some actions can be implemented for limited cost and will enhance the recreational experience for the interim before legislative action.

If the Minnesota State Legislature does not adopt the classifications justified by ORA '75, this plan should be revised to identify development and resource management actions consistent with legislative action.

Bonanza Unit

Action #1. Develop a state water access site near the south end of the Bonanza unit.

The shoreline in this portion of the park (see Classification Map, p 9/) has a gentle slope down to the water and sufficient level land to develop a parking lot. There is direct access from the existing park entrance road. Locating the water access at this location will minimize the amount of vehicular traffic which will go through the SNA. The parking lot will be used both by people launching boats and shore fishing.

Gravel and fill for constructing the boat launch, access road and parking lot can be salvaged from the picnic ground parking lot. The old lot should be graded to reestablish the natural landforms which would have existed before ~~its~~ construction.

	1	2	3	4	5	TOTAL
COST	To be provided by the DNR, Water Access Program					

Action #2. Determine a viable public use for the interpretive building.

The interpretive building does not currently serve a viable public function. It does not receive enough use to justify continued maintenance as an interpretive center. Currently the building is structurally sound and could be remodeled to serve another function. The Big Stone County Historical Society analyzed both the potential of using the building on site and moving it to Ortonville. Neither proved to be justifiable for their needs. The following options were also identified during the planning process. a) Work with the University of Minnesota, Morris to determine the feasibility of developing a natural resources field station for use by their students and staff; b) Work with the local school district to determine if the building could be utilized as a day camp facility focusing on environmental education programs; c) Transfer the building to the SNA Program to be used as a regional base of operations while maintaining and studying the Glacial till hill prairie; d) Declare the building surplus and advertise for bids to move portions of it or salvage the lumber and fixtures; e) Exclude the building

and a small area of land from the SNA and declare it surplus to be publicly sold for conversion to a private residence with pre-determined protective easements retained by the DNR.

The most desirable uses for the structure are those which would provide a public use compatible with the management of the proposed adjacent SNA. If transfer of the building to a public organization for a use compatible with the management of the adjacent SNA is not accomplished within the next five years (by 1990) alternative d or e above should be pursued.

Meadowbrook Unit

Action #1. Develop a small swimming beach in the picnic ground area.

A sand beach and bottom should be established. Some shore line grading and rock removal will be required. Suitable water depths and supervision concerns will determine the exact location.

	1	2	3	4	5	TOTAL
COST		\$5,000				\$5,000

Action #2. Eliminate campsites between campground road and the lake.

Because shoreline is so limited in this park, it should be equally accessible to all park users for shore fishing. Removal of these campsites will also allow for the establishment of a vegetative strip to break up the direct winds yet allow cooling breezes into the campground and provide shade for campers. In addition clustered plantings along the shore will screen the campground from the lake, thereby enhancing the natural character of the park's shoreline.

	1	2	3	4	5	TOTAL
COST		\$2,000				\$2,000

Action #3. Remove old building foundations and debris from the park.

Several old farm building foundations exist in the park primarily in the area of the service court. This should be done before trees in surrounding woods get large enough to hinder removal. Several areas near the service court have collections of abandoned farm debris. This should be removed from the park immediately.

	1	2	3	4	5	TOTAL
COST	Internal DNR operations (FORCE Acct.)					\$ 4,000
	\$4,000					

Action #4. Plant native trees in existing and potential development areas.

Much of the existing campground has small scattered ash and the picnic area has a larger, denser stand of trees again primarily green ash. The ash in both locations are showing signs of stress and disease, such as heart rot fungus (*fomes fraxinophilus*). The presence of conks, as are apparent on many of the trees in this park, usually indicates that tissue deterioration is quite advanced (Forest Service USDA 1979). To assure continued shade in the existing development area, clusters of young trees should be established. Tree varieties planted should be bottomland hardwoods native to the soils and site conditions, such as oak, ash, basswood, hackberry, or cottonwood. Planting in clusters is preferred because it establishes a microclimate condition which should reduce stress and wind damage and create some intersite screening.

Potential development areas of the park should be planted with trees to enhance trail quality and to provide future area for intensive development should it ever be needed. Areas of native prairie grasses should not be planted with or shaded by tree or shrub plantings.

	1	2	3	4	5	TOTAL
COST	\$3,000		\$3,000			\$6,000

Action #5. Coordinate with DNR, divisions of Fisheries and Wildlife, and Parks and Recreation to develop a type III-IV wetland for wildlife in the former fish rearing pond.

Development of a wildlife habitat type IV wetland would be highly attractive as a wildlife observation area for the park. It is currently not being operated as a fish rearing pond.

	1	2	3	4	5	TOTAL
COST	Cost to be provided by DNR Wildlife					

Action #6. Prepare a site fireplan for managing the prairie areas in the park.

The existing areas of native prairie in the park must be managed if they are to be perpetuated (see Vegetation Management Map, p. 51/53). Prescribed fire is the most important management technique that will be used. Fire management is also needed to further evaluate the quality of the prairie areas in the Meadowbrook unit. Management will be coordinated by the regional resource management coordinator.

	1	2	3	4	5	TOTAL
COST	no additional cost					

Action #7. Plant islands of trees to enhance the visual character of the park.

The majority of this park was prairie when it was first settled. Stands of hardwoods may have occurred along the lake, near wetlands, and along natural drainageways. Much of the native vegetation was destroyed for agricultural purposes before the park was established. The existing old field condition provides a very barren character to the park and minimizes the desire for park visitors to hike through it. Several islands of native hardwood trees should be planted in the vicinity of the park entrance road. They should be located where, as the trees mature, they will screen objectionable views and limit the occasional long distant views for persons entering the park. Tree planting locations will be coordinated with the burn plan to avoid future conflicts. Several other islands of bottomland hardwoods should be planted near the hiking trails connecting the campground and picnic ground areas to the eastern end of the park.

	1	2	3	4	5	TOTAL
COST		\$2,000		\$4,000		\$6,000

OPERATIONS AND STAFFING

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

The initial design of Big Stone Lake State Park as three separate recreation areas suggested a high level of maintenance and operations. This is specifically true in the areas of collecting park sticker fees, as per state law, and monitoring proper use of facilities. The current level of facility development, low public use, and Mn/DOT management of one of the three units has limited the maintenance and operations requirements of this park.

During 1982, Big Stone Lake State Park had the highest cost per visitor of all of Minnesota's state parks. This was calculated by dividing the park's operation budget by the total number of day visitors and campers who used the park.

The primary use period for this park is during the spring fishing period with slightly less use through the summer and early fall. The low amount of use which the park receives during the winter does not warrant the current year round staffing pattern.

The DNR, Division of Parks and Recreation is responsible for determining the appropriate level of maintenance and operations for each state park within the system and staffing it according to the level of work and season of operations.

Staffing

The staffing chart summarizes the existing staff and identifies the current needs for operations and maintenance based on existing conditions.

Staffing Chart

<u>Staff Position</u>	<u>Existing</u>	<u>Current Needs</u>
Park Manger	12 mo. fulltime	9 mo. seasonal fulltime
Building & Grounds Worker	7 mo. seasonal fulltime	6 mo. fulltime or part-time
Parks Worker	6 mo. seasonal fulltime	

The resource management recommendations in this plan will require staff time from the regional resource coordinator and the area wildlife manager. Their work should be coordinated with the park staff.

Housing will be provided for park staff in accordance with DNR policy.

If the state legislature adopts the recommended classification, Division of Parks and Recreation staff would no longer be required. The management of the landbase will be accomplished by appropriate staff from the Division of Fish and Wildlife, and the Trails and Waterways Unit.

BIBLIOGRAPHY

BIBLIOGRAPHY

- Forest Service, USDA. 1979. A Guide to Common Insect and Diseases of Forest Trees in the Northeastern United States. U.S. Government Printing Office, Washington, D.C.
- Gilman, Rhoda R., Carolyn Gilman and Deborah M. Stultz. 1979. The Red River Trails - Oxcart Routes Between St. Paul and the Selkirk Settlement 1820 - 1870. Minnesota Historical Society. St. Paul, Mn.
- Johnson, Eldon. 1969. The Prehistoric People of Minnesota. Minnesota Prehistoric Archaeology series. Published by Minnesota Historical Society.
- Kuehnast, Earl L., Donald G. Baker, James A. Zandlo. 1982. Climate of Minnesota Part XIII - Duration and Depth of Snow Cover. Technical Bulletin 333. Agricultural Experiment Station. University of Minnesota.
- Minnesota Department of Health, West Central District. May 29 and June 12, 1975. Report on Investigation of Sanitary Facilities, Big Stone State Park.
- Minnesota Department of Natural Resources. 1979. Minnesota State Comprehensive Outdoor Recreation Plan. Office of Planning, Research, and Policy Section.
- Minnesota State Planning Agency. 1975. Minnesota Pocket Data Book. Development Planning Division.
- Minnesota Department of Transportation. Minnesota Bikeways Map 27 and Map 31.
- University of Minnesota. May 1974. Archaeology Laboratory in the Department of Anthropology. Prehistoric Archaeological Sites in Minnesota State Parks. Minneapolis, Mn.
- U.S. Department of Commerce, Bureau of the Census. 1981. 1980 Census of Population and Housing, Advance Reports.

#0985F