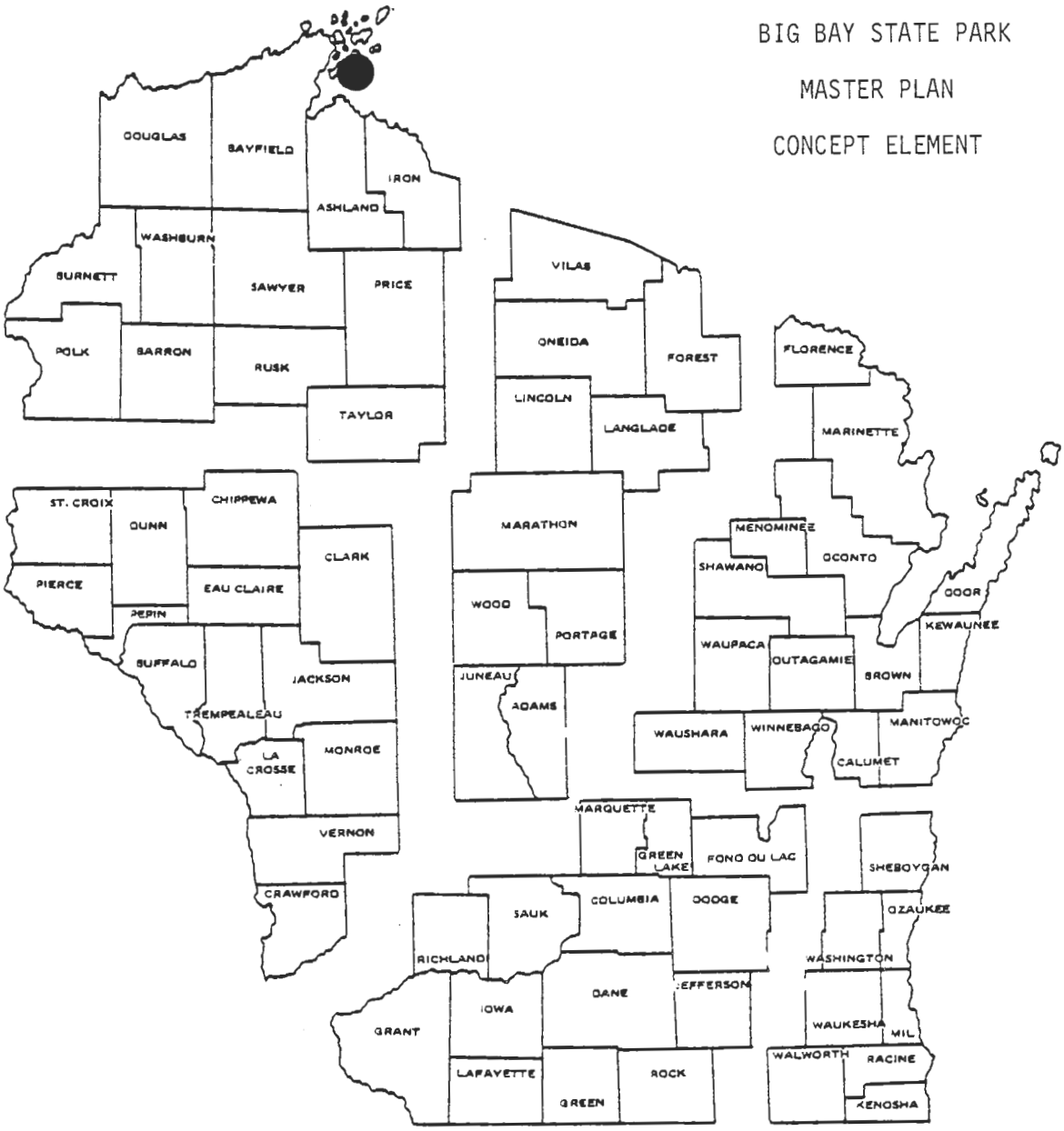
BIG BAY STATE PARK

MASTER PLAN

CONCEPT ELEMENT



Property Task Force

Leader - Lyle Hannahs-Staff Specialist (Rec.)
Jack Pickert-Park Supt.
William Volavka-Forester
Fred Strand-Wildlife Manager
George King-Fish Mgt. Coordinator

Approved by Natural Resources Board

November 1979

Date

Submitted: February 1979

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
MADISON, WISCONSIN

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SECTION I - ACTIONS

A. GOAL AND OBJECTIVES

1. Goal

To make available a public recreation area that provides intensive and extensive recreational development in such a manner as to protect and enhance the natural assets of the area.

2. Objectives

a. To provide intensive recreational development areas to accommodate an ultimate of 80,000 annual visitors in activities such as camping, picnicking, and swimming.

b. To provide extensive recreational development areas for activities such as trails for hiking, nature study, and cross-country skiing.

c. Provide for scientific area in Big Bay Lagoon as designated by the Scientific Areas Preservation Council.

d. Manage the forested areas outside of the scientific area for salvage, safety and aesthetics in accordance with the Forest Aesthetics Management Handbook.

B. RECOMMENDED MANAGEMENT AND DEVELOPMENT PROGRAM

1. Acquisition

Reduce the present park acreage goal by 397.04 acres to 2,692.96 acres. The present goal is 3,090 acres. Presently 2,204.45 acres are under state ownership. Land remaining to be purchased consists of 488.51 acres.

A 75-foot easement on the west side of CTH "H" known as "Black Shanty" Road, a 75-foot easement along the north side of CTH "H" up to the Gripp-Whitchurch property and 60-foot easement adjacent to the town road on the south boundary of the park are proposed. These easement widths coincide with widths in the local zoning ordinance. Total acquisition cost as of June 30, 1979 is $321,019.20.

2. Trails

A 4,800 foot hiking trail will be located in the proposed scientific area on the barrier reef. The actual location, method of construction, and surfacing material will be subject to review by the Scientific Areas Preservation Council. Boardwalks or bridges may be required dependent upon trail location, vegetation, soil, etc., a portion of the trail would double as a self-guided nature trail. The existing 1.4 mile long hiking trail south of the Eagle's Nest picnic area will be redeveloped as a self-guided nature trail.

The existing snowmobile trail will be removed from the scientific area. Development of a new trail would be the responsibility of the Department on state-owned lands. Some privately-owned land will have to be crossed adjacent to CTH "H". The agency sponsoring the trail will be responsible for obtaining the necessary use agreements and trail construction on these segments. The sponsoring local agency will maintain the entire trail.

3. Day-Use

A new day-use picnic area will be developed on the present campground site. New facilities will consist of 20 car parking spaces, a set of four unit pit toilets with change stalls, 20 picnic tables and 10 grills. A new set of four unit pit toilets will be located at the Eagle's Nest picnic area.

4. Family Camping

The proposed rustic campground would consist of up to 60 sites in three groups of 20 sites each. A four unit combination pit toilet and well would serve each group of sites. This facility would replace the existing 17 site campground. The new campground would be located approximately 1,000 feet west of the existing one. Benefits to the park user would be improved sanitary facilities and greater pedestrian safety in the campground, plus better separation between the campground and day-use area. The potential and demand for campground expansion exists. Implementation of this proposal will be dependent upon future funding priorities, the statewide park development program, and whether or not private enterprise can meet the camping demand for this area. A short hiking trail will provide access to the beach and day-use areas.

5. Group Camp

An outdoor group camp will be developed near the south shore of the park. The camp will be designed to accommodate two groups of up to 25 persons each. Reservations would be accepted with preference given to organized juvenile groups such as church groups, scouts, school groups, etc. Each group site will have a set of four unit pit toilets. A total of 12 picnic tables and 12 fire rings will be provided. Two 10 car parking lots will be provided. Trash receptacles will be available. A well with a hand pump will be provided. A short trail will connect the group camp to the hiking/nature trail.

6. Roads

The main park road shows signs of weakening and failure over 10-15% of the total lineal distance of roadway. In the opinion of the Department of Natural Resources, Bureau of Engineering, the basic trouble is inadequate drainage of the roadbed. A resurfacing and roadside ditching project will be scheduled.

7. Support Facilities

A new entrance road at the existing contact station is proposed as a part of this master plan. Approximately 120 feet of road will need the approval of the Town of La Pointe before being abandoned. Discussions with the Town of La Pointe will begin when the Department learns more of future funding potential for both road funds and ORAP funds.

A travel trailer sanitary station is not required with the existing 17 unit campground. A private trailer sanitary station in La Pointe will adequately serve the proposed campground. A user fee is charged for this privately-owned facility.

Development Items and Cost (Based on 1978 Economics)		
Relocate snowmobile trail	$ 2,500	Develop
Nature trail at Eagle's Nest picnic area	2,000	
Repair existing park roads	50,000	(estimated)
New entrance road past contact station	25,000	
Develop hiking/nature trail on barrier reef	4,500	
Develop new 40 unit family campground	125,000	
Develop new day-use area on old campground site	14,000	
Provide new toilets at Eagles Nest picnic area	11,000	
Develop outdoor group camp	32,300	
Develop additional 20 family camping units	65,000	

Total development cost including 15 percent for engineering and contingency is $380,995.

8. Operations

Big Bay State Park is part of a combined work unit of Parks and Fire Control. Big Bay will continue to be administered from the Fire Control Ranger Station in Washburn.

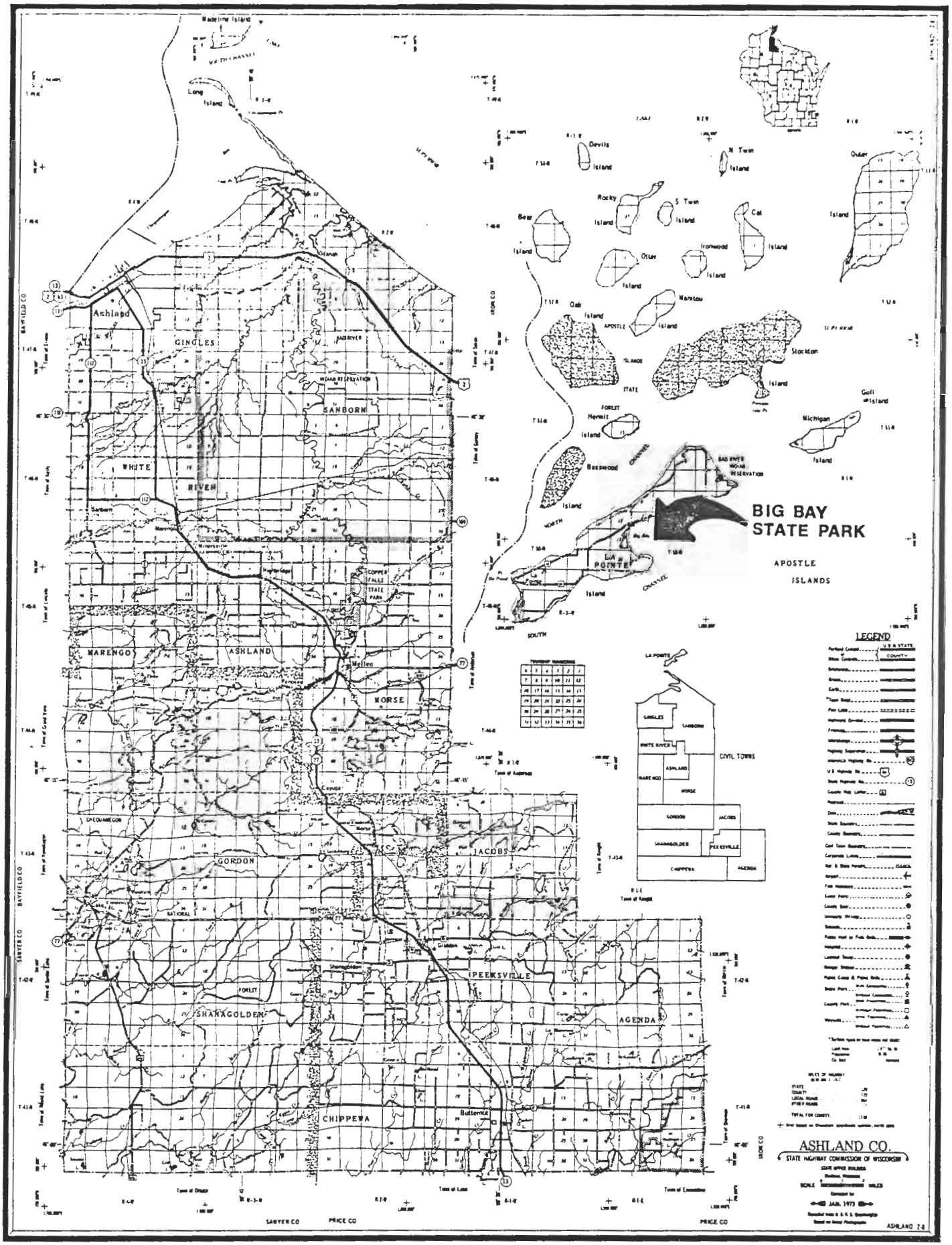
MAINTENANCE AND OPERATIONS COSTS 1977-79

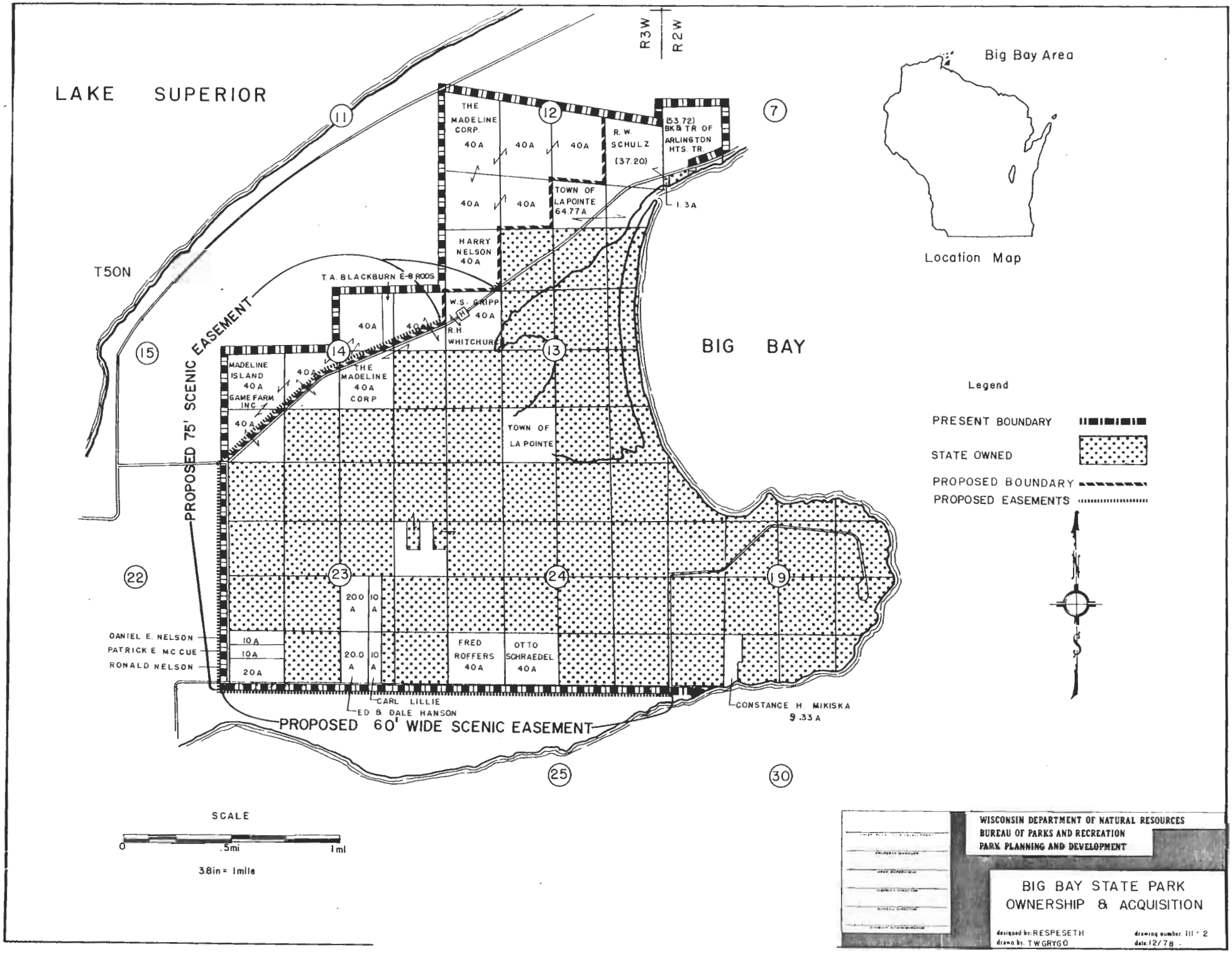
Annually	
Limited Term	$8,000
Supplies and Services	6,000
Purchase Capital Items	300
	$14,300

Maintenance and operations costs would continue at the 1977-79 level with adjustments to offset inflation. Some adjustments must also be made at such time as the new family campground and outdoor group camp are developed.

C. PLANNING MAPS

1. Location Map
2. Acquisition and Land Ownership
3. Development Map

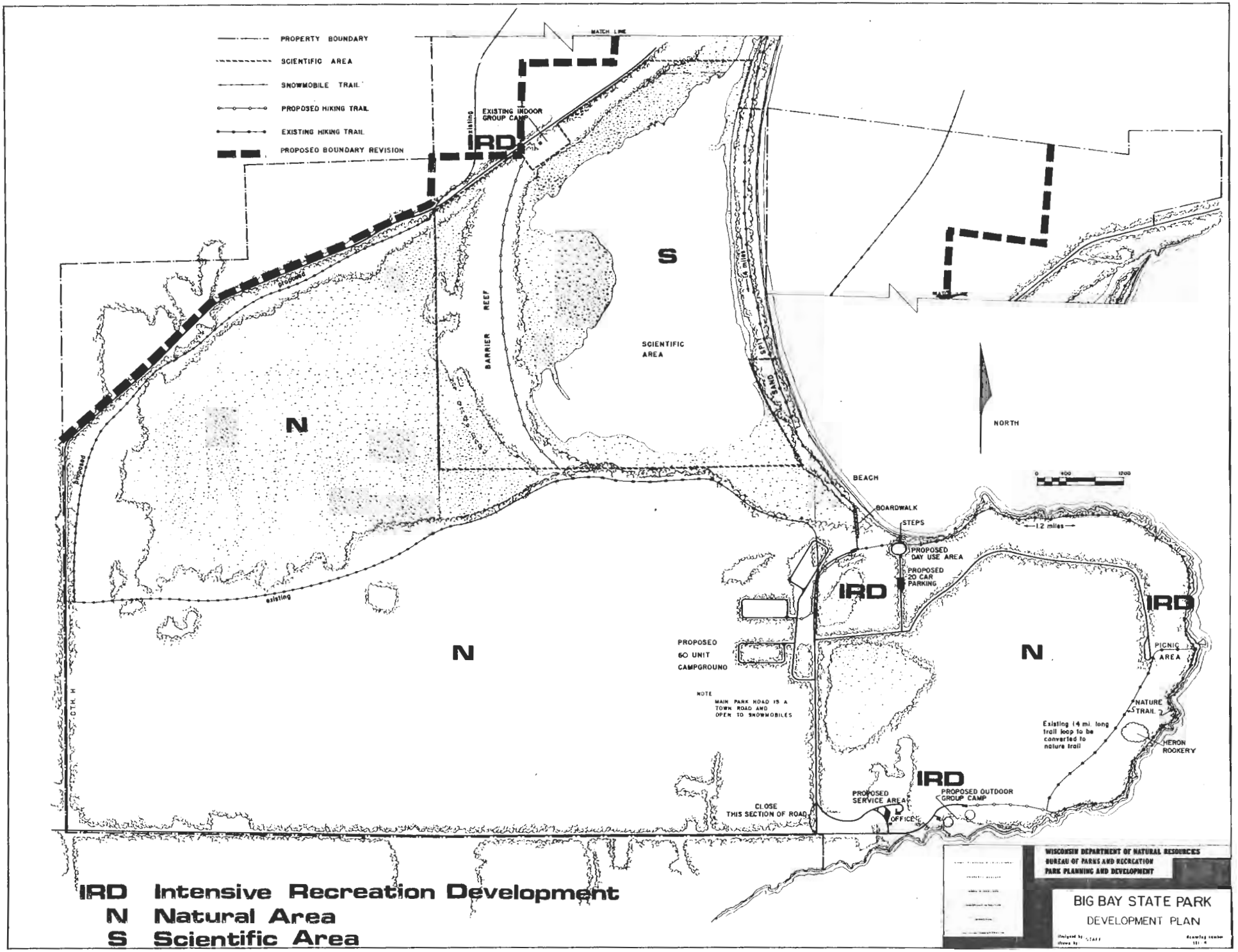

Madeline Island
Long Island
Devils Island
N Twin Island
Outer Island
Rocky Island
S Twin Island
Bear Island
Cat Island
Ironwood Island
Otter Island
Oak Island
Manitou Island
APOSTLE ISLANDS STATE FOREST
Stockton Island
Gull Island
Hermit Island
Michigan Island
Basswood Island
BAD RIVER INDIAN RESERVATION
LA POINTE
Ashland
GINGLES
SANBORN
WHITE RIVER
Sanborn
COPPER FALLS STATE PARK
MARENGO
ASHLAND
Mellen
MORSE
CHEQUAMEGON NATIONAL FOREST
GORDON
JACOBS
PEEKSVILLE
SHANAGOLDEN
AGENDA
CHIPPEWA
Butternut
BIG BAY STATE PARK
APOSTLE ISLANDS
LEGEND
CIVIL TOWNS
ASHLAND CO.
STATE HIGHWAY COMMISSION OF WISCONSIN
SAWYER CO
PRICE CO
PRICE CO



WISCONSIN DEPARTMENT OF NATURAL RESOURCES
BUREAU OF PARKS AND RECREATION
PARK PLANNING AND DEVELOPMENT

BIG BAY STATE PARK OWNERSHIP & ACQUISITION

designed by: R.E.SPESETH
drawn by: T.W.GRYGO
drawing number: III - 2
date: 12/78


PROPERTY BOUNDARY
SCIENTIFIC AREA
SNOWMOBILE TRAIL
PROPOSED HIKING TRAIL
EXISTING HIKING TRAIL
PROPOSED BOUNDARY REVISION
MATCH LINE
EXISTING INDOOR GROUP CAMP
IRD
existing
proposed
BARRIER REEF
SPIT
SAND
½ miles
S
SCIENTIFIC AREA
N
NORTH
BEACH
BOARDWALK
STEPS
1.2 miles
PROPOSED DAY USE AREA
PROPOSED 20 CAR PARKING
IRD
IRD
N
N
PROPOSED 60 UNIT CAMPGROUND
PICNIC AREA
NATURE TRAIL
Existing 1.4 mi. long trail loop to be converted to nature trail
HERON ROOKERY
NOTE
MAIN PARK ROAD IS A TOWN ROAD AND OPEN TO SNOWMOBILES
IRD
PROPOSED SERVICE AREA
PROPOSED OUTDOOR GROUP CAMP
OFFICES
CLOSE THIS SECTION OF ROAD
STH H
IRD Intensive Recreation Development
N Natural Area
S Scientific Area
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PARK PLANNING AND DEVELOPMENT
BIG BAY STATE PARK
DEVELOPMENT PLAN

SECTION II - SUPPORT DATA

A. BACKGROUND INFORMATION

1. Location

Big Bay Park is located on Madeline Island, the largest of the Apostle Island archipelago. By political subdivision, the park is located in the Town of La Pointe, Ashland County.

2. Regional Context

The park is approximately 31 miles from Ashland, Wisconsin, 94 miles from Superior, Wisconsin, and 68 miles from Ironwood, Michigan. Madeline Island is accessible by car ferry from spring through fall and by air, sled or driving over the ice during the winter months. A small airport is located on the Island.

The nearest large town is Ashland, approximately 31 miles south of the park. The 1974 estimated population of Ashland was 9,255. The nearest metropolitan area, Duluth-Superior, had a 1974 estimated population of 262,975. The Village of Washburn had a 1974 estimated population of 2,009 while the other nearby Villages of Bayfield, La Pointe, and Red Cliff each have less than a thousand inhabitants.

Within a 250-mile radius of Big Bay Park are seven metropolitan areas with a population of some five million people.

The United States Department of Interior/National Park Service estimate this population will double by the year 2,000 and the demand for recreation should triple.

3. Record of Property Creation

The Wisconsin State Planning Board, Conservation Department (DNR), and the National Park Service in 1939 all recommended a state park on Madeline Island.

In 1954 both the Ashland County Board and the Legislative Interim Committee passed resolutions in favor of establishing a state park on Madeline Island. The question was brought up again on February 20, 1959 when Mr. Elmer Nelson of La Pointe asked the Conservation Commission at a public hearing in Ashland if the Commission was interested in parts of Madeline Island for a park.

On September 13, 1963, Big Bay Park was established to provide an area for outdoor recreation and public education in conservation and nature study which would be accessible by car or boat with facilities to include picnic areas, beach, campgrounds, hiking trails, and a nature program.

The reasons for the park are perhaps best summarized in a 1963 letter from Roman H. Koenings, Director of the Division of Forests and Parks to L. P. Voigt, Secretary of the Wisconsin

Conservation Department, in which Mr. Koenings requested establishment of the Apostle Island-Big Bay State Park Recreation Area. Mr. Koenings stated:

> "We are recommending that a 2,731.05 acre state park recreation area be established on Big Bay on Madeline Island to provide an area on the Island for outdoor recreation and public education in conservation and nature study that cannot be provided on the other islands due to transportation difficulties..." He also mentioned that the Island is "rich in Indian, French, English, and American history . . . and . . . offers one of the most interesting places for a park naturalist or interpretive program in the state."

Big Bay State Park is an area of outstanding scenic beauty and geological interest in Wisconsin. The area, with its broad expanse of forest, rocky shoreline, sand beach, and excellent recreation water resource, is a place of much beauty and natural interest.

Big Bay also supports one of the unique natural beaches in the state and is a geological feature of outstanding quality.

4. History of the Park

Prior to the establishment of the park in 1963 most of the property was in private ownership and undeveloped. Several parcels had permanent residences, one of these being the Hagen property. The Hagen house has since been converted to the park contact station.

Park development began in 1967 with construction of the 17 unit campground and the Eagle's Nest picnic area. A temporary park office was set up in a trailer moved from Devil's Lake State Park.

In 1968 the hiking trails were completed. Development since then has consisted of construction of pit toilets in the campground and beach area parking lot (1971), and remodeling of the former Hagen residence (1971) to provide an office-contact station.

5. Present Use and Management

Existing recreational developments and attractions at Big Bay Park consist of a 17-unit campground, five acre picnic area with 20 tables and five grills, 7,500 feet of beach (natural sand beach), four miles of hiking trails, and an indoor group camp, a former residence that was remodeled, with a 20-person capacity. The group camp has drinking water, electricity and outdoor pit toilets. Additional support facilities consist of an entrance station, storage garage, two miles of interior park roads, a 19 car parking lot at the Eagles Nest picnic area and a 10 car gravel parking lot near the beach area. A

set of single unit pit toilets is also provided at the beach parking lot, the Eagles Nest picnic area and the family campground. A well with hand pump is located in the campground and at Eagles Nest picnic area.

Camping demand at Big Bay State Park has been on the increase for the past nine years, (1968-1976). Camping has increased by an average of 37% per year, while general park attendance during this same period increased at an average of 25% per year. From 1974 to 1977 campground attendance has been at or near capacity from May 30 to September 3.

The proposed Big Bay Scientific Area consists of approximately 400 acres and includes Big Bay Lagoon bordered by a sand spit, ridges and bog. No park development has taken place in the proposed scientific area other than a 1.4 mile long hiking trail on the sand spit. A snowmobile trail does exist adjacent to a portion of the scientific area and is discussed later in this plan. Deer hunting, hiking, fishing and other compatible uses are permitted in the scientific area.

Management of the park is the responsibility of the Forest Ranger-Superintendent stationed at the Washburn Ranger Station.

B. RESOURCE CAPABILITIES AND INVENTORY

1. Geology and Topography

The upland area of Big Bay State Park is almost flat. Only intermittent drainage patterns may be found in this part of the park. The shoreline, however, is a sharp contrast to the uplands; it is composed of 1-1/2 miles of sand beach and approximately 1-3/4 miles of sandstone cliffs.

The beach is a sand spit which was formed by currents in Lake Superior. The body of water known as Big Bay Lagoon, which is behind the beach, was a shallow open bay less than 10,000 years ago. Lake currents built a barrier beach across the middle of the bay and later built the present beach 1-1/2 miles long across the mouth of the bay.

2. Soils

The Apostle Island soils consist of stratified lake and stream deposits of glacial origin, the majority of which are clay and silt.

Soils in the development areas of the park have been classified by the USDA, Soil Conservation Service as having slight to moderate limitations for recreation. This means these soils have several limitations. Some limitations can be overcome by management and manipulation.

3. Vegetation

Most of Madeline Island is forested in second growth stands of northern hardwoods, along with hemlock, pine, balsam fir and aspen. Each of these timber types may be found in the park. Big Bay Lagoon and the surrounding area is a unique and natural area, consisting of extensive floating bog mats, aquatic vegetation and sandy beach plants.

4. Wildlife

Several species of mammals are found on Madeline Island. The species listed in Appendix H have either been trapped and identified by researchers or observed by them while working on Madeline Island. The list was not compiled in the immediate Big Bay Park area, but it may be assumed the animals are present where their habitat niches occur in the park.

Surprisingly very little written information is available concerning authenticated observations of bird-life on Madeline Island or any of the Apostle Islands. Observations by DNR Game Managment personnel indicate that most species of birds common to the nearby mainland may be found in season in similar habitats on Madeline Island.

Of interest in the park is an active Great Blue Heron rookery.

5. Water Resources and Fish

The most significant water resource for Ashland County is Lake Superior, the largest fresh water lake in the world (20,352,000 acres). Likewise it is the only dominant body of water affecting Big Bay Park.

Intermittent drainage patterns are found in the park. However, these are insignificant for swimming, boating, or fishing. Swimming in the park, is restricted to the shore of Lake Superior as the entire shoreline at Big Bay Lagoon is a bog.

Commercial fishing activities in the past played an important role in the local economy. Commercial fishing declined as sea lampreys invaded the Great Lakes and the lake trout industry declined. Other factors also affected the production of fish.

Lamprey control efforts are showing promise for the future of fishing. The Great Lakes Fishery Commission in its 1964 report notes that the lake trout populations in Lake Superior have responded sharply. Sport fishing for lake trout is allowed. The introduction of coho salmon and the steelhead in tributaries leading into Lake Superior offer other fishing opportunities. Other fish species caught around the Apostle Islands include lake whitefish, lake herring, chub, smelt, sucker, burbot and round whitefish.

6. Soils Potential

Most of the soil types have some limitations for recreation development. Extra measures must be taken to allow adequate drainage of surface water. Surface water runoff and a high ground water table are the major factors to consider when developing any facilities at Big Bay.

7. Vegetation Potential

The combination of northern hardwoods hemlock, pine, and balsam fir create a pleasant setting for campgrounds, picnic areas, and hiking trails. The different species from upland to aquatic vegetation offers a unique area for nature study. Most of the potential development areas and the existing use areas contain a variety of tree species. Any dead, dying or high-risk trees should be removed in these areas. Cutting operations in the park should be restricted to that necessary for safety and aesthetics or cutting for disease or insect control. The overall management program for the park will be directed toward preserving its natural appearance without sacrificing the safety of the public.

8. Wildlife Potential

Casual observation by the park manager and park personnel have indicated that the Great Blue Heron rookery in the park has increased in size over the years. Other species of wildlife common to the Island have also been observed on a regular basis. Migratory waterfowl frequent Big Bay Lagoon each fall and use this site for rest and food. Prior to acquisition as a state park, duck hunting was popular in the lagoon. Section 29.57(4) of the Wisconsin Statutes, prohibits small game hunting on state park lands. Section 10.27 of the Wisconsin Administrative Code allows gun and bow and arrow hunting for deer, within the park.

9. Recreation Potential

Recreational use and development at Big Bay Park may be categorized as both intensive consisting of the campground, and day-use areas and facilities, and extensive consisting of the remaining undeveloped portions of the park.

Essential to the operation of the park entrance visitor station. The former Hagen residence which was converted for this use will remain at its present location with a new park entrance road constructed to circulate vehicular traffic past the entrance station. In addition to the visitor contact function, a portion of the building has been set aside for exhibits of island history, wildlife displays, etc.

The opportunities for rustic trailer camping and closeness to a natural environment are available at Big Bay Park. The park offers the camper an opportunity for outdoor education,

solitude, and an awareness of unspoiled beauty. The more popular recreation opportunities in the park consist of swimming and wading, hiking, fishing, and deer hunting.

Major recreation opportunities outside the park consist of boat launch facilities at La Pointe, bicycling over town and county roads on Madeline Island and sightseeing.

Campground development and associated travel trailer sanitary facilities are restricted in several areas of the park due to soil limitations. All new campground developments must comply with State Health Codes (H-78). Soil characteristics will be the single most limiting factor for any development at Big Bay Park.

Day-use activities may include picnicking, swimming, hiking, sightseeing, etc. Facilities for the most of these activities are provided. While actual records are not available, observations by park personnel place sightseeing as the largest day-use activity. Excellent opportunities for hiking, sightseeing, photography, berry picking, and nature study exist.

Outdoor juvenile group camp facilities could be considered should the demand for this activity increase. Several locations separated from the existing campsites could be developed for this type activity.

The major scenic values of the park are obtained at its fringe, namely the Lake Superior shoreline. During clear weather a person on the shore near Eagle's Nest picnic area may see the Wisconsin mainland approximately 10 miles away or the Porcupine Mountains in Michigan approximately 40 miles distant. On a smaller scale of scenic beauty are the many rock formations along the Lake Superior shoreline of Madeline Island.

The proposed Big Bay Lagoon Scientific Area is a very unique area for nature interpretation and edcation. The area is comprised of ancient barrier beaches, and supports numerous species of aquatic and bog vegetation. The remainder of the park offers excellent opportunities to study wetlands, forest areas, and lakeshore environments.

10. Water Resources and Fish Potential

Lake Superior provides an excellent opportunity for boating, fishing and other water sports. Sport fishing is diversified in the area, offering opportunities not commonly found. Deep sea trolling for lake trout or coho salmon and casting for lake run brook trout along the rocky coastline are popular activities. A fleet of trolling boats is available for hire in the area. Marinas can be found at Cornucopia, Ashland and Bayfield on the mainland and at La Pointe on Madeline Island. Tour boat rides through the Apostle Islands are also available. Steep banks and/or shallow underwater topography make the park itself unsuitable for a marina type of development.

Storms make the open lake and large bays extremely hazardous for small craft, although the islands tend to deflect the full force of the wind and provide some protection.

Big Bay Lagoon is a soft water, seepage lake of about 105 acres with a shallow intermittent outlet to Lake Superior. The fish population consists of northern pike, yellow perch, and minnows. Big Bay Lagoon provides the spawning grounds and juvenile nursery area for the excellent northern pike population found in adjacent Lake Superior. The lagoon is shallow, 10 feet maximum depth, has medium brown stained water and provides only very limited fishing opportunity.

A swimming beach is available in the park. The relatively cold temperatures of the water in Lake Superior (high of 64°F in July) limits the number of days swimmers can enjoy the water. However, sunning and beach combing for rocks and driftwood is popular.

11. Land Use Potential

Lands within the park are classified as; Natural (N), Intensive Recreational Development (IRD) and Scientific (S). The location of these areas is illustrated on the development map included in the appendix.

Intensive Recreational Development (IRD) accounts for approximately 92 acres. Fifty-two acres are presently developed for picnic area, campground, group camp, beach and hiking trails. The remaining 40 acres will be devoted to the construction of a new 60-unit rustic family campground and outdoor group camp.

The Big Bay Scientific Area consisting of approximately 400 acres has been identified as a potential scientific area by the Scientific Areas Preservation Council. The proposed area included Big Bay Lagoon bordered by a sand spit, ridges and bog.

Natural Area (N) encompasses approximately 2,201 acres of the total 2,629.96 acres within the proposed park boundary. It will be managed in accordance with the guidelines set forth in the policy on wild resources adopted by the Natural Resources Board on 12/10/73, Manual Code 1031.1.

C. MANAGEMENT PROBLEMS

1. Soils Limitations

Most of the soil in the vicinity of Big Bay Park has been classified by the Soil Conservation Service as having moderate to severe limitation for road location. Those areas having only moderate limitations can accommodate low volume traffic, adequate provisions for removing water from the roadway are provided.

Soil limitations affecting recreational development are similar to those for road locations. Adequate provisions must be taken to allow sunlight into campsites or otherwise sites will remain wet and soft for long periods.

2. Unauthorized Activities

As previously mentioned, the campground is at or near capacity during the entire use season. (17 campsites exist at the park.) Campers arriving after the attendant has left the park will very often set up for the night between existing campsites if the campground is full, or in other parts of the park.

Foot and bicycle traffic while usually not considered as unauthorized, has led to some problems along the sand spit Access to the spit may be gained through the state park and also through the town park to the north. A 1.4 mile long developed trail exists on the sand spit, there are other undeveloped paths created by deer and people. The constant tramping by people could lead to destruction of vegetation through compaction, erosion of the sand base, and physical damage. The trail should be well designated and carefully maintained to correct any erosion problems that may start. Bicycles should be prohibited from the trail across the sand spit.

The existing, indoor group camp does not have walking access to the main use areas of the park. Some trails are starting to develop by bikers from the group camp to the main park use areas. To correct this situation a single, designated hiking trail should be developed, marked and maintained for hiking use. Such a trail is proposed across the old barrier reef, within the scientific area. A single, well marked trail will have less impact on the environment than several undesignated trails.

3. Socio-political

Snowmobile trails through the park have been developed by Ashland County. A trail enters the proposed scientific area and forks into a North-South trail following the barrier beach and an East-West trail following an old logging road on the upland ridge. The East-West trail connects into the main park road which is a town road and open to snowmobiles. The snowmobile trail will be rerouted around the proposed scientific area.

The park office does not lie on the main entrance into the park. The road system is proposed to be altered to accomplish this. This will entail discussion with the town prior to action. The possibility for private development along the south side of the town road that serves as the main entrance to the park is likely.

D. RECREATIONAL NEEDS AND JUSTIFICATIONS

1. State Recreation Plan and Ashland County Plan

The 1977 Wisconsin Outdoor Recreation Plan indicates a deficit of campsites in planning region 15 which is a combination of Ashland, Bayfield, Douglas, and Iron Counties. The need for

additional developed campsites is 1,200 in 1975, 1,300 in 1980, 1,400 in 1985, and 1,600 in 1995. While an actual figure is not available specifically for Ashland County, the report shows the increasing need for campground facilities in this part of Wisconsin.

The Madeline Island Master Plan (prepared by Max Anderson Associates) outlines the local recreational needs as well as indicating existing facilities. It refers to the State Recreational Plan and the Ashland County Plan.

Technical Memorandum #2, which refers to zoning regulations for the Town of La Pointe (also prepared by Max Anderson Associates) recommends both wetlands preservation and "wilderness preservation" for the area encompassing Big Bay State Park. By definition, the zoning regulation proposal is almost identical to the proposed program outlined for Big Bay State Park in this master plan.

2. Other Facilities

It is anticipated that use generated by the Apostle Islands National Lakeshore will make this deficit even greater, especially for campgrounds accessible by motor vehicle.

Campground development in the Apostle Island National Lakeshore will consist of 150 group campsites and 100 family campsites on Stockton Island. Access to these sites will be by boat only; no vehicles are allowed on the islands. Primitive campsites will number 40 and are planned for five of the islands. Visitor estimates by the National Park Service are 750,000 to 825,000 persons in 1985 when the Apostle Islands National Lakeshore is fully developed.

Forty-eight family campsites have been developed at the Town of La Pointe park located north of the Big Bay Lagoon.

Dalrymple City Park in Bayfield provides 20 camping spaces. Little Sand Bay Town Park, located 5 miles north of Bayfield has 11 camping spaces.

Several privately-owned campgrounds provide family camping facilities on the mainland, near Bayfield.

E. ANALYSIS OF ALTERNATIVES

1. Status Quo

To operate as is would be to continue the present uses of camping, picnicking, swimming and hiking in the present quantities and locations of facilities. All problems associated with the present uses would remain. Day-use visitors account for 30%

of the park visitors, with a daily turnover rate of approximately three times. Administrative costs and staffing would increase.

2. Remove Facilites and Manage for Exclusive Preservation

To implement this proposal would require removal or at least partial removal of the campground, picnic area, entrance facility, and park roads. Development would be limited to parking areas and trails for nature study and education. Under the National Park Service plan several of the other Apostle Islands will be managed for preservation.

3. Improve Present Intensive Recreational Facilities and Manage Balance for Preservation Purposes

The Eagle's Nest day-use facility would continue to operate as is with five acres of picnic area, 20 picnic tables and parking for 19 cars. At such time as the new campground is developed, the existing campground could be converted into a day-use site with facilites for picnicking and twenty car parking.

A hiking trail would be expanded into the scientific area. It would be feasible to use a portion of this trail as a self-guided nature trail. This trail would provide the only non-vehicular access from the group camp to the main park use areas.

The existing 1.4 mile long loop hiking trail at the Eagle's Nest Picnic Area would be redeveloped as a self-guided nature trail.

The park has the potential for expanding camping facilities. Use patterns at the existing 17-unit campground over the past several years have indicated a growing demand for additional facilities. (Future campground expansion should not take place at the existing location as soil characteristics will limit expansion.) Family camping would not be expanded if the demand is met by other public and private facilities.

This alternative would require the construction of additional roads and support facilities such as a road past the park entrance visitor station and some type of service building. The existing beach parking lot would have to be removed and replaced at the old campground site.

Swimming would continue as is. New pit type toilets with change stalls would be constructed in the day-use area.

Snowmobile activity in the park would be limited to a pass-through trail. The existing snowmobile route would be removed from the scientific area.

The indoor group camp would continue to operate as is. Future development of outdoor juvenile group camp facilities would be considered.

4. Alter Boundary

Much of the area north of CTH "H" which is privately-owned is not necessary for either buffer zone or park development. Acquisition costs could be reduced considerably if the boundary was reduced by approximately 420 acres to exclude this land.

A 60 foot scenic easement, adjacent to the town road on the south boundary of the park would maintain the aesthetic quality of this entrance road. If a scenic easement were not acquired, future development could detract from the aesthetics of the entrance drive.

However, the present zoning code, if enforced with no variances granted, could safeguard the Hagen Road boundary and the CTH "H" boundary from undesirable development. A 75 foot easement on the west side of CTH "H" known as "Black Shanty" road and a 75 foot easement along the north side of CTH "H" up to the Gripp-Whitchurch property could be proposed. The 75 foot easement includes a small parcel of land immediately north of the Gripp-Whitchurch property. These easement widths coincide with widths in the local zoning ordinances.

APPENDIX

A. BOARD ACTION

B. SUPPORT FOR PARK

C. ATTENDANCE

D. SCIENTIFIC AREA

E. SOILS

F. VEGETATION

G. WILDLIFE

H. ADVISORY COUNCIL COMMENTS

A P P E N D I X A

BOARD ACTION

Appendix A

BOARD ACTION

September 13, 1963

(c) Establishment of Apostle Islands - Big Bay State Park Recreation Area.
(Item S-B-10, Minutes of July 26, 1963.)
2,731.05 acres - Big Bay, Madeline Island

Commissioner Smith stated that a number of Commissioners had inspected this area and were very favorably impressed with it. It is close to the mainland and will be good public access to the other islands. It has about two and one-half miles of beautiful beach. He stated that this is part of the overall Apostle Islands and Bayfield Peninsula development and is in line with previous Commission action and ORAP.

Commissioner Smith stated the Land Committee recommends establishment of the Apostle Islands - Big Bay State Park Recreation Area, and he so moved.

The motion was seconded by Commissioner Olson.

When put to a vote, motion was carried unanimously.

A P P E N D I X B

SUPPORT FOR PARK

Appendix B

Wisconsin Conservation Department

INTRA-DEPARTMENT

MEMORANDUM

Madison
Station

Date July 17, 1963

TO: L. P. Voigt

FROM: Roman H. Koenings

SUBJECT: Establishment of the Apostle Islands-Big Bay State Park Recreation Area

In 1959 the Conservation Commission established the Apostle Islands State Forest, and Basswood, Oak and Stockton Islands were designated for purchase. The Commission also adopted a policy to preserve Stockton Island as a wilderness area. Chapter 427 of the Laws of 1961 named additional areas on the Bayfield Peninsula to be acquired for recreation as well as the Apostle Islands.

We are recommending that a 2,731.05 acre state park recreation area be established on Big Bay on Madeline Island to provide an area on the islands for outdoor recreation and public education in conservation and nature study that cannot be provided on the other islands due to transportation difficulties. The following are some of the features of the area:

1. The island is scenic with a large number of sand beaches, cliffs and forests.

2. The island is rich in Indian, French, English and American history. The Indian legends date back to 1490, and the first fort was built on Madeline Island in 1693. The island offers one of the most interesting places for a park naturalist or interpretive program in the state.

3. The area to be purchased includes about one and one-half miles of sand beach, forests, swamps and a lagoon.

4. The island is accessible by ferry at nominal fees and also by chartered boats.

5. The facilities and services to be provided will be picnic areas, beach, campgrounds, hiking trails and a naturalist program.

6. This area combined with the Apostle Islands State Forest and areas on the Bayfield Peninsula will provide such varied outdoor recreation

as wilderness treks, boating, hunting and fishing, as well as the usual features and activities found in parks.

The Town Board of LaPointe favors the proposal.

Roman H. Koenings

RECOMMENDED:

_____ _____
John A. Beale Date

APPROVED:

_____ _____
L. P. Voigt Date

Wisconsin Conservation Department
Madison, Wisconsin

BIG BAY STATE PARK

History of Establishment

The 1939 State Planning Board, Wisconsin Conservation Department and National Park Service recommendation was to establish a State Park in the Apostle Islands.

The resolutions of Bayfield County Board (1954) Legislative Interim Committee were to establish a park.

At the February 20, 1959, public hearing at Ashland, Mr. Elmer Nelson of LaPointe asked the Commission if it was interested in parts of Madeline Island for a park.

May 11, 1961 - Mr. Elmer Nelson wrote to Roman Koenings concerning establishing a park on Madeline Island.

Sept. 13, 1963 - Commission established Big Bay State Park on Madeline Island to provide an area for outdoor recreation and public education in conservation and nature study which would be accessible by car or boat, with facilities to include picnic areas, beach, campgrounds, hiking trails and a nature program.

Land Acquisition and Development Proposals

Land Acquisition

	Acres	Cost (Estimates)
Acreage goal	2,707	$284,220.00
Purchased to date	1,051.36	176,903.20
Left to purchase	1,655.64	107,316.80

Land Acquisition and Development Proposals (Cont.)

Development Potential

4,200 feet of beach

Camp area - 60 acres 240 units

Picnic area - 40 acres

Trails - nature program

Boat launching

Estimated cost - $300,000

Development Proposal - 1967-1969

50-unit camp area

Entrance road

Boat landing - 25 car

Picnic area - 4 acres - 60 tables

Beach development - 500'

Trails - 4 miles

Estimated cost - $120,000

BIG BAY STATE PARK

Apostle Islands State Forest

A SUMMARY

There have been numerous proposals over the past 25 years recommending that the Conservation Commission establish a state park in the Apostle Islands.

In 1939 the Wisconsin State Planning Board and the Conservation Commission, in cooperation with the National Park Service, recommended the establishment of a state park in the Apostle Island group.

In 1950 the Milwaukee County Conservation Alliance recommended that the Commission determine the feasibility for the purchase of the Apostle Islands for recreational purposes.

In 1954 Bayfield County Board passed a resolution favoring the establishment of a state park or forest in the Islands. The Ashland Chamber of Commerce notified the Department that it had gone on record favoring the establishment of an Apostle Islands State Park.

On July 12, 1954, the Conservation Commission made a tour of the Islands. The feeling of the Commission was that the matter should be presented to the Legislature.

On August 23, 1954, the Legislative Interim Committee on Conservation made a tour of the Apostle Islands. The Committee went on record favoring the purchase of Basswood, Hermit, Manitou, Oak and Stockton Islands.

In 1955 the resolution of the Legislative Council was discussed by the Conservation Commission. The Vilas Estate had contacted the Conservation Department regarding the sale of land on Stockton Island.

The Commission did not feel that there were sufficient funds in the Conservation budget for this purchase and that the Legislature should

provide funds.

At the April 1, 1955, meeting of the Conservation Commission, Assemblyman Victor Wallin of Grandview appeared before the Land Committee of the Commission and spoke in favor of the purchase of property in the Apostle Islands. He cited support of the Bayfield County Board and Ashland Chamber of Commerce.

During 1955 the Apostle Islands were discussed by the Conservation Commission, the University of Wisconsin submitted a report, the lands on Stockton Island were appraised and further contacts were made with the trustees of the Vilas Estate.

At the August 12, 1955, Commission meeting at Bayfield the Commission adopted the "Policy on Acquisition of an Apostle Islands Wilderness Area".

On March 9, 1956, the Conservation Commission voted to lease lands on Stockton Island owned by the Vilas Estate. The lease agreement was signed on April 10, 1956.

On January 9, 1959, the Commission approved a project to create a state forest in the Apostle Islands and authorized the Department to hold hearings for the determination of boundaries and as a basis for a formal order creating the forest.

Public hearings were held in Madison on February 18, 1959, and at Ashland on February 20, 1959. The overwhelming sentiment of those present was favorable and in support of the project.

A digest of the hearing is as follows:

1. The Conservation Commission held a public meeting in the Courthouse in Ashland on February 20, 1959.

   In studying the minutes of this meeting, the following facts stand out in rather bold relief:

   A. In August of 1955, the Commission went on record as approving acquisition of lands to be known as the Apostle Islands Wilderness Area.

B. Stockton Island was the first objective as most of it was owned by the Vilas Estate.

C. On February 7, 1959, the National Park Service announced that it was not interested in the establishment of a National Park Area in the Apostle Islands.

D. The following citizens expressed themselves on the subject. The Commission also made certain statements herein listed:

The following spoke for the establishment: Victor Wallin, Duane Ruth and Frank Dexter of Bayfield; Basil Kennedy, Ralph Borst and Elmer Nelson.

The Vilas Estate paid taxes in 1958 of $623.35 on 1957 taxes.

Hugo Pieper wanted to know who would furnish facilities to get to the Islands. Mr. Elmer Nelson asked the Commission if it was interested in parts of Madeline Island which has scenic values.

On March 12, 1959, Order No. SF-912 was approved establishing the Apostle Islands State Forest consisting of Stockton, Oak and Basswood Islands, effective May 1, 1959.

On April 28, 1959, 9,801 acres of land owned by the Vilas Estate on Stockton Island were purchased.

Following the establishment of the Apostle Islands State Forest, interest from residents and by the Town of La Pointe was expressed regarding the establishment of a park on Madeline Island in letters and contacts with members of the Conservation Department. Sites mentioned include lands owned by the Red River Indian Tribe on the northeast shore of the island and at Big Bay. Letters were written to Governor Gaylord Nelson.

On September 13, 1963, the Conservation Commission approved the establishment of the Big Bay State Park Recreation Area and established boundaries to include 2,731 acres. The park would provide outdoor recreation and public education in conservation and nature study.

The Big Bay State Park, along with the Apostle Islands State Forest, would offer a variety of outdoor recreation including wilderness, boating, nature study, fishing, swimming, boat camping, primitive campgrounds and modern campgrounds that may be reached by car. Hunting would be permitted on state forest lands.

Developments to date include the construction of a dock on Stockton Island in 1964, development of primitive campsites and picnic areas in 1965.

The land acquisition summary is as follows:

Apostle Island State Forest

Acreage goal - 17, 112.66

Purchases -

1959	9,801.33
1965	671.63
Total	10,472.96

Left to purchase - 6,639.70

Big Bay State Park

Acreage goal - 2,707 (corrected figure)

Purchases

1964	549.42
1965	80.00
1966	240.00
Total	869.42

Left to purchase - 1,837.58

A P P E N D I X C

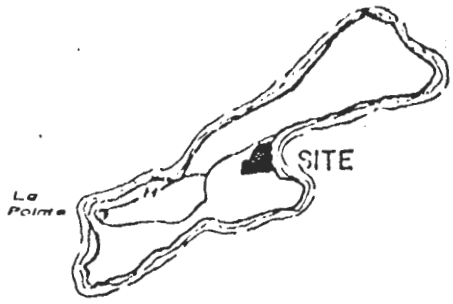
ATTENDANCE

APPENDIX D
BIG BAY STATE PARK ATTENDANCE

YEAR	DAY-USE	CAMPING
1968	15,117	2,178
1969	22,270	2,531
1970	4,366	1,542
1971	36,830	3,672
1972	29,428	7,304
1973	32,302	8,215
1974	36,599	7,850
1975	38,909	8,599
1976	41,557	9,651
1977	48,574	9,401
1978	64,117	9,591

A P P E N D I X D

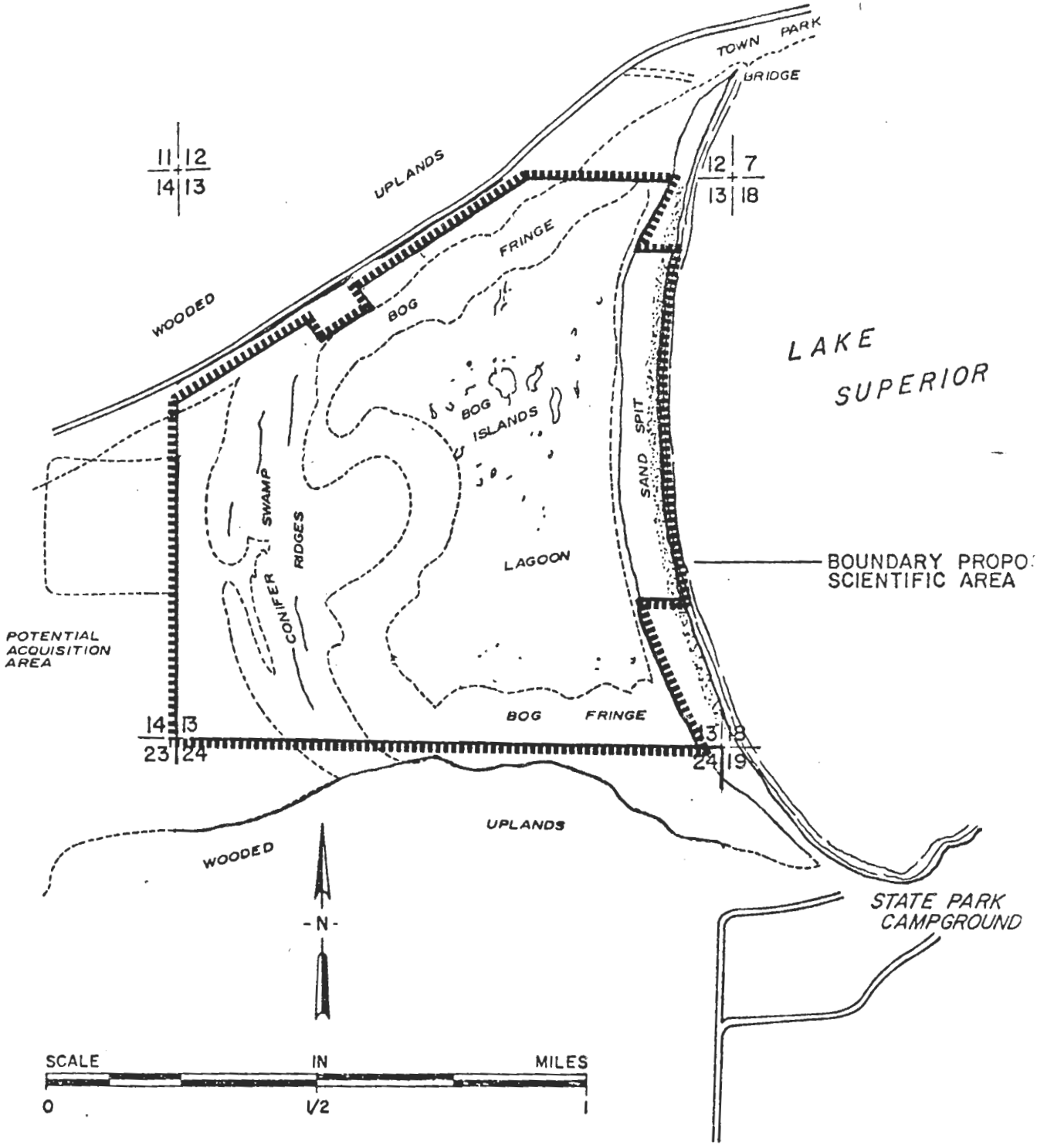
SCIENTIFIC AREA



LOCATION MAP, *MADELINE IS.*

BIG BAY SAND SPIT, RIDGES and BOG

MADELINE ISLAND—ASHLAND COUNTY



D9/1/71 RGB

Wisconsin Scientific Areas Preservation Council
Scientific or Natural Area Report

Name of Area Big Bay Sand Spit, Ridges and Bog Inspection Date August 4, 1971

Quarter NE County Ashland Twsp. 50N Range 3W Sections 13

Boundaries and acreage of proposed or established area and buffer All of section 13 except SE SW 13, SW NW 13 and that portion north of a line 200' south of County H. Also excluded from Section 13 is the sandspit in N 1/2 NE NE and in SE SE. Approximately 400 acres. See attached map.

Access to area 1) From the north through the Town Park off County H, about 6 miles north of La Pointe, or 2) from the south via footpath from the Big Bay State Park Camping Area.

Description of area: Outstanding features, primary and secondary biotic communities, dominants, understory and rare species, topography, soils, geology and archeology.

Big Bay State Park features a sand spit or bay mouth bar which creates a large lagoon behind it. The old ridges behind the lagoon, the extensive floating bog mats, aquatic vegetation and sandy beach plants all add up to a very unique natural area. Its fantastic richness and undisturbed nature qualify it immediately as a scientific area. The beach zone on the sand spit is narrow, 20-30 feet, and stabilized mainly with Ammophila, but the gradual sloping rear dune is up to 200' wide. Almost everywhere it is covered with low ericaceous shrubs and hardy herbs and its entire length is scatteringly wooded, almost savanna-like, with red pine, white pine of similar size and a few jack pine. Along the entire west edge of the spit is a tall shrub zone adjacent to the carex bog which borders the lagoon. There are extensive bog areas ringing the lagoon containing such plants as Eriocaulon septangulare, Xyris, Scheuchzeria, Pogonia, Calopogon and many more. Thes west end of the lagoon borders ancient ridges, as yet unexplored, but which must contain varied and undisturbed marsh, bog and boreal forest elements.

History of land use and limiting factors: Area undisturbed! Boardwalk to sand spit from Town Park and footpath from State Park allow access by foot. Toilets and picnic tables at north end, otherwise no development. Camping not allowed on beach.

Administrative information: Land owner and administrator, existing and proposed management, degree of scientific, educational and recreational use of area, adjacent lands and compatibility. Area within Big Bay State Park, Bureau of Parks and Recreation. Park manager is Ben Waskow.

Planned development within lowlands includes trail development. Any other type of development must be prohibited in order to preserve the area's natural features. More investigation, especially in the ridges, is needed to document plant associations there.

Reference information: person recommending area, references, quadrangle and other publications and date of action taken toward designation of area.

Recommended by Scientific Area staff. See Madeline Island Quadrangle, Park maps and ownership boundary map. See the attached species lists for more detailed information from the August 4 field trip.

Rev. 3/71 Report by: Bill Tans Date: August 1971

Big Bay State Park Tans-Read-Samuelsen - August 4, 1971

A. Flora of the Sand Spit, divided into three zones

1. Beach zone, wet and dry sands, the boundary of which is marked by copious amounts of weathered driftwood under which can be found Storeria occipitomaculata, Northern Red-bellied Snake, and Thamnophis sirtalis, Common Garter Snake. This zone is rather abrupt and narrow, about 20-30 feet wide, and more than one mile long.

Achillea millefolium
Agropyron trachycaulum
Ammophia breviligulata - abundant
Deschampsia flexuosa! - abundant on upper edge of beach zone and rear dune zone; rare in Wisconsin, previously collected at only three sites.
Elymus canadensis
Festuca saximontana - upper edge of beach zone
Gaylussacia baccata - common also on next zone
Lathyrus maritimus - occasional
Oenothera biennis
Polygonella articulata
Potentilla tridentata - on next zone also, widespread

2. Rear Dune or Heath zone, which slopes gently back from the Beach Zone for about 200 feet. It is sparingly wooded with Pinus resinosa, Red Pine, 10-20" DBH and lesser amounts of Pinus strobus, White Pine, same size, and an occasional Pinus banksiana, Jack Pine, commonly 4-9" DBH. An occasional Acer rubrum can be found. Low shrubs predominate, lending a heath-like appearance to the area.

Apocynum androsaemifolium
Arctostaphylos uva-ursi - abundant
Artemisia candata
Asclepias syriaca
Commandra richardsiana
Danthonia spicata - widespread
Gaultheria procumbens
Geaster - Earthstar
Hudsonia tomentosa - occasional
Juniperus communis var. depressa - rare
Lactuca canadensis - rare
Melampyrum lineare - abundant
Mianthemam canadense
Pteridium aquilinum
Rumex acetosella
Solidago speciosa
Spiranthes gracilis
Equisetum hyemale var. affine
Aster ciliolatus
Hieracium kalmii
H. scabrum

3. The High Shrub community is located along the bay edge of the sand spit and adjacent to a narrow zone of sedge-bog.

Alnus rugosa	Myrica gale
Betula papyrifera	Salix sp.
Chamaedaphne calyculata	Spirea alba
Larix laricina	

B. Aquatic Vegetation, Fish, Amphibians and Reptiles

1. Aquatics

Nuphar advena, Brasenia schreberi Nymphaea tuberosa
Sparganium (angustifolium)?
Potamogeton zoosteriformis, Pinatans, P. Foliosis, P. amplifolius
Vallisneria americana, Chara, Najas flexilis, Anacaris canadensis
Myriophyllum verticillata, Megaladonta beckii

Heracleum lanatum
Sparganium eurycarpum, Rosa (palustris)?, Glyceria canadensis
Sium suave, Campanula aparinoides, Phalaris arundinaceae
Scirpus cyperinus

2. Fish - seined in SE $\frac{1}{4}$ section 13, August 4, 1971 - Don Samuelsen

Notropis heterolepis - Blacknose Shiner
N. atherinoides - Emerald Shiner
Esox lucius - Northern Pike
Ictalurus melas - Black Bullhead
Perca flavescens - Yellow Perch
Notemigonus crysoleucas - Golden Shiner

3. Amphibians and Reptiles

Rana clamitans - Green Frog
R. catesbeiana - Bull Frog

4. Reptiles

Chrysemys picta - intergrade between c. p. belli and c. p. Marginata - Painted Turtle
Storeria occipitomaculata - Red-Bellied Snake
Thamnophis sirtalis - Common Garter

D. Notes on the vegetation of the ridges - Bob Read, walking from about the center of section 13 west toward ridges.

The vegetation changes from a submergent aquatic community in the lagoon (Brasenia shreberi, Nyphar, etc.) to one of many small islands, usually with one Larix laricina or Picea glauca, and Myrica gale, Chamaedaphne shrub complex. Closer to the ridges there is a complete floating mat with Carex lasiocarpa, Eriocaulon septangulore and Scheuchzeria polustris. Closer to high land the woody vegetation shrub as Larix (stunted), Chamaedaphne, Myrica predominate and gradually give way to an open forest of Thuja occidentalis and Alnus, Osmunda regalis and Ledum thickets with Alous throughout. More investigation of ridges is needed. Water away from lagoon is colder.

Walking westward along the south line of section 13 from the southeast corner of the section, one finds a vast expanse of quaking bog which grades into the lagoon to the north. It is a Carex-dominated bog; almost every bog plant was found. Several were collected for later identification.

Ridges

The ridges evident on the aerial photograph are less pronounced topographically, although varying vegetation types are quite distinct. They are not as obvious as the ridges in Bailey's Harbor. The following sequence shows the progression following a compass line westward along the south line of section 13 beginning at the west edge of the floating bog mat.

1. Conifer swamp of Thuja occidentalis, Picea mariana, P. glauca, Larix laricina with scattered individuals of Betula papyrifera, B. lutea and Acer rubrum. Occasional Pinus strobus of considerable size can be observed. Also Sorbus americana to 6" DBH, Width of this zone varies between 200-600 feet.

Arceuthobium pusillum - Dwarf mistletoe, parasitic on Picea mariana
Calamagrostis canadensis
Carex
Carex
Clintonia borealis
Coptis groenlandicum
Cornus canadensis
Drosera rotundifolia
Dryopteris spinulosa
Equisetum fluviatile
Gaultheria hispidula
G. procumbens
Gaylussacia baccata
Glyceria grandis
Habenaria obtusata
Juncus
Ledum groenlandicum
Lycopodium lucidulum
L. obscurum
Mianthemun caradense
Monotropa uniflora
Osmunda cinnamomea
O. regalis
Rubus strigosus
Sphagnum

Trientalis borealis
Vaccinium angustifolium

2. Low rise, wooded and in parts fairly open, perhaps due to past logging. Betulea papyrifera and Acer rubrum more common here. Width 200-330 feet.

Betula lutea
Danthonia spicata
Gaultheria procurbens
Lycopodium clavatum
Pteridium aquilinum
Vaccinium angustifolium

3. Low area of Shrub-carr, mainly of Alnus rugosa with Myrica gale, Typha latifolia. An intermittent zone, not continuous.

4. Narrow, low rise of scattered conifers - 200 feet.

5. Carex bog, approximately 300 feet wide.

6. Very thin zone of conifer forest - 50' wide, beyond which lies Carex bog and small wooded portions of ancient ridges.

jsm
9/13/71

Big Bay Sand Spit, Ridge and Bog State Scientific Area — No. — Ashland County

Part I of this plan contains the Scientific Areas Preservation Council's recommended general procedures for the management of scientific areas. Some items may not apply to this scientific area. Part II contains modifications to the general procedures and specific recommendations for this area as jointly agreed to by the Council and the owners or administrators of this area. The plan will be reviewed periodically and amended as needed.

The objective of these procedures is to preserve the scientific area in a natural condition with as little disturbance as possible. Management decisions should be guided by the preceding statement when not otherwise covered in this plan.

PART I - GENERAL MANAGEMENT PROCEDURES

A. Management of the Biotic Communities

1. Removal of plants, plant parts, minerals, animals and artifacts is generally not permitted. However, hunting, fishing, trapping, berry picking and nut gathering is permitted if not expressly restricted in Part II or otherwise prohibited by law. Collecting for scientific purposes may be allowed by permission of the Scientific Areas Preservation Council.

2. Cutting of dead, down, living trees or other vegetation is to be limited to that essential to meet safety requirements along roads, trails and firebreaks. Where cutting is essential, material should be left within the scientific area.

3. Control of abnormal animal populations or control of plant succession with the use of fire, mowing or water level manipulation, may be employed to maintain a particular scientific area type, if provided for in Part II. However, no alteration of the biotic community will be initiated without the approval of both the property manager and the Council.

4. Introductions of plant and animal species, whether native or exotic is generally prohibited.

5. Herbicides, insecticides, fungicides, or other chemicals should not be used for plant or animal control. The Council shall be notified of any emergency need for exceptions to this rule.

B. Public Use

1. Intensive public use should generally not be encouraged. Any public use whether recreational or educational which damages vegetation or otherwise impairs natural conditions should be discouraged and if necessary controlled. Recreational use such as hiking and observation, and educational use which does not degrade the natural features is encouraged.

2. There should be a minimum of attention-drawing signs. A sign regarding the areas purpose and use limitations is desirable where roads or trails pass through or adjacent to frequently used scientific areas. Boundaries may be marked with suitable stakes for the convenience of the property manager and visitors.

3. Vehicle traffic of all types is discouraged. Existing trails and access roads may be maintained. They should be identified and located on the attached management plan map. New walking trails may be constructed where use is heavy or where needed to protect sensitive vegetation, following joint approval of the Council and the property manager.

4. No buildings, and other improvements such as fireplaces, picnic grounds, athletic facilities or beaches, dams or other waterway modification devices will be constructed. Any public use facility, maintenance facility or habitat modifying device essential to the scientific area should be located in a surrounding buffer zone.

PART II - SPECIFIC RECOMMENDATIONS, ADDITIONS OR EXCEPTIONS TO GENERAL PROCEDURES

1. The water level of the lagoon shall be maintained without manipulation, and dredging in the lagoon is prohibited. Current use such as canoeing or fishing is compatible.

2. The sand spit should be maintained in its natural condition by prohibiting development, dredging, construction of bulkheads or boat access.

3. Trail development on the ridges and the existing trails on the sand spit are compatible with scientific area designation. It is recommended there be no trail improvement or development to the existing trails on the sand spit.

4. The operation of snowmobiles or the creation of snowmobile trails is prohibited on the scientific area.

This management plan and attached management map is approved as a part of the agreement between the Scientific Areas Preservation Council and Bureau of Parks & Recreatic owners or administrators of Big Bay Sand Spit, Ridges & Bog scientific area.

For the Council: _____ Chairman

_____ Secretary

Date: _____

For owner or administering agency: _____

_____

Date: _____

12/13/68
nd

APPENDIX E

SOILS

Soil Series Organic Soils — LRA 92 — Date 4/13/70

Map Symbols 02, 02C, 02S, 032, 032S, 034, 034C, 180 — Name Lake Superior Plain

SOIL INTERPRETATIONS

BRIEF SOIL DESCRIPTION: Nearly level, very poorly drained organic soils. Soil symbols containing either the letter C or S are underlain with clay or sand respectively, within 16 to 50 inches of the soil surface. Those organic soils without letters are more than 50 inches thick.

INTERPRETATIONS FOR CROPLAND, PASTURE, AND WOODLAND AND OTHER LAND USES

Cropland - general and specialty farm crops	SEVERE - Very high available water capacity; very erosive when drained; severe climatic limitations.
Pasture	SEVERE - High water table; sod easily damaged when wet.
Woodland	SEVERE - Few species suited; windthrow hazard.
Other	

Land capability unit and yield predictions (crops, hay, pasture)

Slope Class	Eros.	Capability Unit	Corn-Grain (bu.) A	Corn-Grain (bu.) B	Corn-Silage (tons) A	Corn-Silage (tons) B	Oats (bu) A	Oats (bu) B	Alfalfa-Brome Hay (tons) A	Alfalfa-Brome Hay (tons) B	Bluegrass Pasture (AUD) A	Bluegrass Pasture (AUD) B
0-2%	-	---	--	--	--	--	--	--	--	--	--	--

LIMITATIONS FOR WILDLIFE HABITAT ELEMENTS

Grain and Seed Crops		SEVERE - Wet soil
Grass and Legumes		SEVERE - Wet soil; few species suited.
Wild Herbaceous Upland Plants		SEVERE - Wet soil; few species suited.
Woody Plants	Hardwood	SEVERE - Wet soil; few species suited.
	Conifers	MODERATE - Wet soil; some species not suited.
Wetland Food and Cover Plants		SLIGHT - Wet soil.
Shallow and Deep Water Developments		SLIGHT - Wet soil; moderately rapid permeability.

LIMITATIONS AND SOIL FEATURES AFFECTING RECREATION

Tent and Camp Trailer Sites	SEVERE - Sites remain wet and soft; poor trafficability.
Picnic Areas, Parks, & Extensive Play Areas	SEVERE - Poor trafficability.
Playground, Athletic Field, and Intensive Play Areas	SEVERE - Poor trafficability; high water table.
Bridle Paths, Nature and Hiking Trails	SEVERE - Wet; poor trafficability; difficult to maintain.
Golf Course Fairways	SEVERE - Sites remain wet and soft.

Organic Soils

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

Depth Inches	Classification			Percent of Material Passing Sieve			Permeability in/hr	Available water capacity in/in	Soil reaction pH	Shrink-swell potential
	USDA	Unified	AASHO	No. 4 5.0 mm.	No. 10 2.0 mm	No. 200 0.074 mm				
Surface layer 0-54	Muck & peat	Pt	--	---	---	---	2.0-6.3	.25-.35	5.0-7.5	--
Substratum 54-60	Sand	SP	A-3	95-100	95-100	5-10	6.3-20	.03-.05	6.0-7.0	Low
	or Clay	CH	A-7	95-100	95-100	90-100	.06-.20	.10-.14	7.0-8.0	High

INTERPRETATIONS OF ENGINEERING PROPERTIES — Hydrologic Group D

Suitability as a source of:	
Topsoil	POOR - Oxidizes rapidly.
Sand and gravel	Organic soil - UNSUITABLE; Sand - FAIR; Clay - UNSUITABLE; high water table hinders excavation.
Road subgrade and highway fills	Organic soil - UNSUITABLE; Sand - FAIR; Clay - POOR; high water table.

Limitations and Soil Features Affecting:		
Highway Location		SEVERE - Poor stability and high water table.
Foundations for low buildings		SEVERE - High water table; low bearing value.
Corrosion hazard	Metal	Organic material - HIGH; Clay - MODERATE ; Sand - LOW.
	Concrete	Organic material - LOW; Clay - LOW; Sand - LOW.
Pond reservoir areas		Moderate to rapid permeability; high water table; dugout ponds feasible.
Dams, dikes and embankments		Organic soil - NOT SUITABLE; Sand - POOR; Clay - FAIR.
Waterways		SEVERE - Erosive; difficult to vegetate.
Drainage		MODERATE - High water table; subsurface drainage feasible.
Terraces and diversions		Not applicable.
Irrigation		High available water capacity; poorly drained; rapid water intake rate.

LIMITATIONS FOR SOME URBAN USES

Sanitary land fill	SEVERE - High water table.
Disposal fields	SEVERE - High water table.
Sewage lagoons	Organic soil and sand - SEVERE; Clay - MODERATE; high water table.

The soil is evaluated only to a depth of 5 feet or less. Soils are rated on the basis of 4 soil suitability and limitation classes. In the following definitions the suitability rating is listed first and limitation rating listed second:
Good, Slight - The soils have no limitations or limitations for a given use that are easy to overcome; Fair, Moderate - The soils have limitations for a given use that can be overcome by average management and manipulation; Poor, Severe - The soils have limitations for a given use that are difficult to overcome; Unsuitable, Very Severe - The soils have limitations that generally preclude their use for a given purpose.

S,N—27111

Soil Series Beach sand LRA 90-92 Date April 1970

Map Symbols 4, 7 Name Lake Superior Plain and Central Wisconsin & Minnesota thin loess and till

SOIL INTERPRETATIONS

BRIEF SOIL DESCRIPTION Nearly level to gently sloping, well to poorly drained sandy beach deposits. They have rapid permeability and very low available water capacity.

INTERPRETATIONS FOR CROPLAND, PASTURE, AND WOODLAND AND OTHER LAND USES

Cropland - general and specialty farm crops	SEVERE - Not suited
Pasture	SEVERE - Not suited
Woodland	MODERATE where water table is shallow; SEVERE where water table is deep; few species suited; difficult to vegetate.
Other	Well drained areas are good for swimming beaches.

Land capability unit and yield predictions (crops, hay, pasture)

Slope Class	Eros.	Capability Unit	Corn-Grain (bu.) A	Corn-Grain (bu.) B	Corn-Silage (tons) A	Corn-Silage (tons) B	Oats (bu) A	Oats (bu) B	Alfalfa-Brome Hay (tons) A	Alfalfa-Brome Hay (tons) B	Bluegrass Pasture (AUD) A	Bluegrass Pasture (AUD) B
0-5%	1	VIIIs10	--	--	--	--	--	--	--	--	--	--

LIMITATIONS FOR WILDLIFE HABITAT ELEMENTS

Grain and Seed Crops		SEVERE - Drouthy to wet; few species suited.
Grass and Legumes		SEVERE - Drouthy to wet; few species suited.
Wild Herbaceous Upland Plants		SEVERE - Drouthy to wet; few species suited.
Woody Plants	Hardwood	SEVERE - Drouthy to wet; few species suited.
	Conifers	MODERATE - Drouthy to wet; some species not suited.
Wetland Food and Cover Plants		MODERATE where shallow to water table; SEVERE on dry sites.
Shallow and Deep Water Developments		SLIGHT where shallow to water table; MODERATE on dryer sites.

LIMITATIONS AND SOIL FEATURES AFFECTING RECREATION

Tent and Camp Trailer Sites	SEVERE - May be wet; subject to wave action; difficult to vegetate.
Picnic Areas, Parks, & Extensive Play Areas	SEVERE - Difficult to vegetate; poor trafficability
Playground, Athletic Field, and Intensive Play Areas	SEVERE - Difficult to vegetate; poor trafficability
Bridle Paths, Nature and Hiking Trails	SEVERE - Poor trafficability; difficult to maintain; may be wet.
Golf Course Fairways	SEVERE - not suited.

Beach sand

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

Depth Inches	Classification			Percent of Material Passing Sieve			Permeability in/hr	Available water capacity in/in	Soil reaction pH	Shrink-swell potential
	USDA	Unified	AASHO	No. 4 5.0 mm.	No. 10 2.0 mm	No. 200 0.074 mm				
0-60	sand	SP	A-3	95-100	85-95	0-2	6.3-20	.03-.05	4.5-5.5	Low

INTERPRETATIONS OF ENGINEERING PROPERTIES — Hydrologic Group A

	Suitability as a source of:
Topsoil	POOR - Sandy; drouthy, erosive
Sand and gravel	FAIR - Poorly graded sand; water table hinders excavation.
Road subgrade and highway fills	FAIR - Low stability unless confined.

		Limitations and Soil Features Affecting:
Highway Location		SEVERE - 1 to 5 feet to permanent water table; hauling and excavation are difficult.
Foundations for low buildings		SEVERE - High water table restricts installation; basements are wet.
Corrosion hazard	Metal	LOW
	Concrete	HIGH
Pond reservoir areas		SEVERE - Dugout ponds feasible; difficult to vegetate.
Dams, dikes and embankments		SEVERE - Poor stability and compaction characteristics; very pervious; difficult to vegetate.
Waterways		SEVERE - Erosive; difficult to vegetate
Drainage		Not feasible.
Terraces and diversions		Not applicable.
Irrigation		Not applicable.

LIMITATIONS FOR SOME URBAN USES

Sanitary land fill	SEVERE - High water table; danger of ground water contamination.
Disposal fields	SEVERE - High water table; danger of ground water contamination.
Sewage lagoons	SEVERE - Very pervious; danger of ground water contamination.

The soil is evaluated only to a depth of 5 feet or less. Soils are rated on the basis of 4 soil suitability and limitation classes. In the following definitions the suitability rating is listed first and limitation rating listed second:
Good, Slight - The soils have no limitations or limitations for a given use that are easy to overcome; Fair, Moderate - The soils have limitations for a given use that can be overcome by average management and manipulation; Poor, Severe - The soils have limitations for a given use that are difficult to overcome; Unsuitable, Very Severe - The soils have limitations that generally preclude their use for a given purpose.

USDA-SCS-LINCOLN, NEBR. 1980 — S,N-27111

Soil Series Pickford silty clay loam LRA 92 Date 3/26/70

Map Symbols 267 268 Name Lake Superior Plain

SOIL INTERPRETATIONS

BRIEF SOIL DESCRIPTION

Clayey, nearly level soils, 15 to 30 inches thick over calcareous clay on lake plains, poorly drained.

INTERPRETATIONS FOR CROPLAND, PASTURE, AND WOODLAND AND OTHER LAND USES

Cropland - general and specialty farm crops	MODERATE - Medium available water capacity; depressions pond surface water.
Pasture	MODERATE - Sod easily damaged when wet.
Woodland	MODERATE - Ponded surface water hinders mechanical tree planting and harvesting; severe plant competion and drowning hazard for seedling establishment.
Other	

Land capability unit and yield predictions (crops, hay, pasture)

Slope Pct.	Eros.	Capability Unit	Corn-Grain (bu.) A	Corn-Grain (bu.) B	Corn-Silage (tons) A	Corn-Silage (tons) B	Oats (bu) A	Oats (bu) B	Alfalfa-Brome Hay (tons) A	Alfalfa-Brome Hay (tons) B	Bluegrass Pasture (AUD) A	Bluegrass Pasture (AUD) B
0-2	1	IIIw1b	—*	—*	—*	9	35	55	—	3.5	—*	—*

*Crop seldom grown.

LIMITATIONS FOR WILDLIFE HABITAT ELEMENTS

Grain and Seed Crops		MODERATE when drained; VERY SEVERE when undrained; seasonally wet; flooding hazard.
Grass and Legumes		MODERATELY for drained; SEVERE for undrained; seasonally wet; some species not suited.
Wild Herbaceous Upland Plants		SEVERE - Wet soil; few species suited.
Woody Plants	Hardwood	SEVERE - Wet soil, suited to lowland hardwoods.
	Conifers	MODERATE - Wet soil, some species not suited.
Wetland Food and Cover Plants		SLIGHT on 0-2%; wet soil
Shallow and Deep Water Developments		SLIGHT on 0-2%; wet soil; moderately slow to slow permeability.

LIMITATIONS AND SOIL FEATURES AFFECTING RECREATION

Tent and Camp Trailer Sites	SEVERE - Sites remain wet and soft; poor trafficability when wet.
Picnic Areas, Parks, & Extensive Play Areas	SEVERE - High water table; poor trafficability; sod damaged easily when wet. Water may pond for short periods.
Playground, Athletic Field, and Intensive Play Areas	SEVERE - High water table; poor trafficability; sod damaged easily and is muddy and slippery when wet.
Bridle Paths, Nature and Hiking Trails	SEVERE - High water table; poor trafficability; muddy and slippery when wet.
Golf Course Fairways	SEVERE - High water table; sites remain wet and soft; poor trafficability; and turf easily damaged when wet.

Pickford silty clay loam

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

Depth Inches	Classification USDA	Unified	AASHO	Percent of Material Passing Sieve No. 4 5.0 mm.	No. 10 2.0 mm	No. 200 0.074 mm	Permeability in/hr	Available water capacity in/in	Soil reaction pH	Shrink-swell potential
Surface layer 0-8	silty clay loam	CL	A-7	--	95-100	90-100	.63-2.0	.18-.22		--
Subsoil 8-20	clay	CH	A-7	--	95-100	90-100	.20-.63	.10-.14		High
Substratum 20-60	clay	CH	A-7	--	95-100	90-100	.06-.20	.10-.14		High

INTERPRETATIONS OF ENGINEERING PROPERTIES — Hydrologic Group D

		Suitability as a source of:
Topsoil		Surface - FAIR; clayey Subsoil - POOR; clayey, high water table.
Sand and gravel		Unsuitable - clayey
Road subgrade and highway fills		Subsoil and substratum - POOR. High shrink-swell potential; low bearing value; unstable when wet; high water table.
		Limitations and Soil Features Affecting:
Highway Location		SEVERE - Less than 1 foot to water table. Cuts and fills have low stability; highly plastic.
Foundations for low buildings		SEVERE - High shrink-swell potential; low bearing value; high water table; hazard of wet basements.
Corrosion hazard	Metal	HIGH
	Concrete	LOW
Pond reservoir areas		Subsoil - Moderately slow permeability. Substratum - slow permeability. High water table; dugout ponds feasible.
Dams, dikes and embankments		Subsoil and substratum - Fair to poor stability and compaction; semi-pervious; high compressibility; moderate shrink-swell potential.
Waterways		MODERATE - Difficult to establish sod in clayey subsoil; wetness oftens hinders construction.
Drainage		Slow permeability, high water table; land smoothing and surface drainage feasible.
Terraces and diversions		Not applicable.
Irrigation		Medium available water capacity; deep soil; slow water intake rate; poorly drained.

LIMITATIONS FOR SOME URBAN USES

Sanitary land fill	SEVERE - High water table
Disposal fields	SEVERE - High water table
Sewage lagoons	MODERATE - High water table

The soil is evaluated only to a depth of 5 feet or less. Soils are rated on the basis of 4 soil suitability and limitation classes. In the following definitions the suitability rating is listed first and limitation rating listed second:
Good, Slight - The soils have no limitations or limitations for a given use that are easy to overcome; Fair, Moderate - The soils have limitations for a given use that can be overcome by average management and manipulation; Poor, Severe - The soils have limitations for a given use that are difficult to overcome; Unsuitable, Very Severe - The soils have limitations that generally preclude their use for a given purpose.

S,N-27111

Soil Series Rudyard silty clay loam LRA 92 Date 4/1/70

Map Symbols 275, 348 Name Lake Superior Plain

SOIL INTERPRETATIONS

BRIEF SOIL DESCRIPTION Nearly level to gently sloping, moderately deep, somewhat poorly drained clayey soils with moderately slow permeability and medium available water capacity.

INTERPRETATIONS FOR CROPLAND, PASTURE, AND WOODLAND AND OTHER LAND USES

Cropland - general and specialty farm crops	MODERATE - Medium available water capacity; some ponding of surface water; moderate natural fertility; surface drainage is beneficial.
Pasture	MODERATE - Some ponding of surface water; sod easily damaged when wet.
Woodland	MODERATE - Severe plant competition hazard; severe equipment limitations; ponding of surface water.
Other	

Land capability unit and yield predictions (crops, hay, pasture)

Slope Pct.	Eros.	Capability Unit	Corn-Grain (bu.) A	Corn-Grain (bu.) B	Corn-Silage (tons) A	Corn-Silage (tons) B	Oats (bu) A	Oats (bu) B	Alfalfa-Brome Hay (tons) A	Alfalfa-Brome Hay (tons) B	Bluegrass Pasture (AUD) A	Bluegrass Pasture (AUD) B
0-2	1	IIIw1b	—	—	9	12	60	80	2.5	3.5	80	130
2-6	1	IIIw1b	—	—	9	12	60	80	2.5	3.5	80	130

LIMITATIONS FOR WILDLIFE HABITAT ELEMENTS

Grain and Seed Crops		MODERATE when drained; SEVERE for undrained. Seasonally wet; tight subsoil.
Grass and Legumes		SLIGHT when drained; MODERATE for undrained. Seasonally wet; some species not suited.
Wild Herbaceous Upland Plants		MODERATE - Seasonally wet; some species not suited.
Woody Plants	Hardwood	MODERATE - Seasonally wet; some species not suited.
	Conifers	MODERATE - Seasonally wet; some species not suited.
Wetland Food and Cover Plants		MODERATE on 0-2%; SEVERE on steeper soils; some species not suited.
Shallow and Deep Water Developments		SLIGHT on 0-2%; MODERATE on steeper soils. Seasonally wet; slow permeability.

LIMITATIONS AND SOIL FEATURES AFFECTING RECREATION

Tent and Camp Trailer Sites	MODERATE - Sites remain wet and soft.
Picnic Areas, Parks, & Extensive Play Areas	MODERATE - Seasonal high water table; slow permeability; water ponds in low areas.
Playground, Athletic Field, and Intensive Play Areas	SEVERE - Seasonal high water table; slow permeability; poor trafficability and sod easily damaged when wet; leveling may expose clayey subsoil.
Bridle Paths, Nature and Hiking Trails	MODERATE - Wet for moderate periods; muddy and slippery when wet.
Golf Course Fairways	MODERATE - Seasonal high water table; slow permeability; sites remain wet and soft; turf easily damaged when wet.

Rudyard silty clay loam

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

Depth Inches	Classification			Percent of Material Passing Sieve			Permeability in/hr	Available water capacity in/in	Soil reaction pH	Shrink-swell potential
	USDA	Unified	AASHO	No. 4 5.0 mm.	No. 10 2.0 mm	No. 200 0.074 mm				
Surface layer 0-8	silty clay loam	CL	A-7	--	95-100	90-100	.63-2.0	.20-.24	6.5-7.0	--
Subsoil 8-20	clay	CH	A-7	--	95-100	90-100	.20-.63	.10-.14	7.0-8.0	High
Substratum 20-60	clay	CH	A-7	--	95-100	90-100	.06-.20	.10-.14	7.5-8.5	High

INTERPRETATIONS OF ENGINEERING PROPERTIES — Hydrologic Group C

	Suitability as a source of:
Topsoil	Surface - FAIR; thin. Subsoil - POOR; clayey.
Sand and gravel	Unsuitable - clayey
Road subgrade and highway fills	Subsoil and substratum - POOR; high shrink-swell potential; low bearing value; unstable when wet; high water table.

		Limitations and Soil Features Affecting:
Highway Location		MODERATE - Seasonal water table at 1 to 3 feet; highly plastic; moderate frost heave potential.
Foundations for low buildings		MODERATE - High shrink-swell potential; low bearing value; basements subject to seasonal wetness.
Corrosion hazard	Metal	HIGH
	Concrete	LOW
Pond reservoir areas		Moderately slow permeability in subsoil; slow permeability in clayey substratum; seasonal high water table; dugout ponds feasible.
Dams, dikes and embankments		Subsoil and substratum - FAIR to POOR stability and compaction; semipervious; moderate shrink-swell potential.
Waterways		SLIGHT - Wetness hinders construction.
Drainage		Slow permeability; seasonal high water table; land smoothing and surface drainage feasible.
Terraces and diversions		MODERATE - Dense clayey subsoil and wetness hinders construction.
Irrigation		Medium available water capacity; deep soil; slow water intake rate; somewhat poorly drained.

LIMITATIONS FOR SOME URBAN USES

Sanitary land fill	SEVERE - Leachate ponds in pit over clayey substratum.
Disposal fields	SEVERE - Slow permeability; seasonal high water table.
Sewage lagoons	SLIGHT on 0-2%; MODERATE on 2-6%; slow permeability.

The soil is evaluated only to a depth of 5 feet or less. Soils are rated on the basis of 4 soil suitability and limitation classes. In the following definitions the suitability rating is listed first and limitation rating listed second:
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9004-ECS-LINCOLN, NEBR. 1998 S,N-27111

Soil Series Superior Sandy Loam LRA 92 Date Dec. 1969

Map Symbols 280 Name Lake Superior Plain

SOIL INTERPRETATIONS

BRIEF SOIL DESCRIPTION Moderately deep, well drained, nearly level to steep, loamy soil with a medium available moisture capacity, overlying slowly permeable clayey till at depths of 10 to 20 inches.

INTERPRETATIONS FOR CROPLAND, PASTURE, AND WOODLAND AND OTHER LAND USES

Cropland - general and specialty farm crops	FAIR - medium available water and fertility-holding capacity; contains many seep spots; sloping areas have a water erosion hazard.
Pasture	FAIR - periodic pasture renovation very beneficial; erosive on slopes; many small wet seepage spots.
Woodland	MODERATE - plant competition and frost hazard limits seedling survival; erosive on steep slopes.
Other	Fair yields of small fruit are produced on these soils.

Land capability unit and yield predictions (crops, hay, pasture)

Slope Pct.	Eros.	Capability Unit	Corn-Grain (bu.) A	Corn-Grain (bu.) B	Corn-Silage (tons) A	Corn-Silage (tons) B	Oats (bu) A	Oats (bu) B	Alfalfa-Brome Hay (tons) A	Alfalfa-Brome Hay (tons) B	Bluegrass Pasture (AUD) A	Bluegrass Pasture (AUD) B
0-2	1	IIs7a	-	-	5	9	40	65	2.0	3.5	50	100
2-6	1,2	IIe6	-	-	5	9	40	65	1.75	3.5	50	100
6-12	1,2	IIIe6	-	-	4	7	20	55	1.5	3.0	40	75
12-20	1,2	IVe6	-	-	4	7	15	45	1.0	3.0	30	50
20-30	1,2	VIe6	-	-	-	-	-	-	.5	2.5	25	25

LIMITATIONS FOR WILDLIFE HABITAT ELEMENTS

Grain and Seed Crops		MODERATE on 0-6% and SEVERE on steeper soils; water erosion hazard; clayey subsoil and substratum.
Grass and Legumes		SLIGHT on 0-12%; MODERATE on 12-20%; and SEVERE on steeper soils.
Wild Herbaceous Upland Plants		SLIGHT on 0-20% and MODERATE on steeper soils.
Woody Plants	Hardwood	SLIGHT on 0-20% and MODERATE on steeper soils.
	Conifers	SLIGHT on 0-20% and MODERATE on steeper soils.
Wetland Food and Cover Plants		SEVERE on 0-2% and VERY SEVERE on steeper soils; few species suited.
Shallow and Deep Water Developments		MODERATE on 0-2% and SEVERE on steeper soils; subsoil and substratum have moderately slow to slow permeability.

LIMITATIONS AND SOIL FEATURES AFFECTING RECREATION

Tent and Camp Trailer Sites	MODERATE on 0-12% and SEVERE on steeper soils; erosive; adequate vegetative cover hard to maintain.
Picnic Areas, Parks, & Extensive Play Areas	MODERATE on 0-12% and SEVERE on steeper soils; slow permeability; erosive.
Playground, Athletic Field, and Intensive Play Areas	MODERATE on 0-2% and SEVERE on steeper soils; slow permeability; extensive leveling will expose clayey subsoil; erosive.
Bridle Paths, Nature and Hiking Trails	MODERATE on 0-12% slopes and SEVERE on steeper soils; poor stability on slopes; difficult to maintain; erosive.
Golf Course Fairways	MODERATE on 0-12% and SEVERE on steeper soils; erosive; slow permeability; turf easily damaged when wet.

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

Depth Inches	Classification			Percent of Material Passing Sieve			Permeability in/hr	Available water capacity in/in	Soil reaction pH	Shrink-swell potential
	USDA	Unified	AASHO	No. 4 5.0 mm.	No. 10 2.0 mm	No. 200 0.074 mm				
Surface layer 0-15	sandy loam	SM	A-2	90-100	90-100	25-35	2.0-6.3	.12-.16	6.0-7.0	-
Subsoil 15-24	clay	CH	A-7	-	95-100	90-100	.06-.20	.10-.14	7.0-8.0	HIGH
Substratum 24-60	clay	CH	A-7	-	95-100	90-100	.06-.20	.10-.14	7.5-8.0	HIGH

INTERPRETATIONS OF ENGINEERING PROPERTIES — Hydrologic Group C

Suitability as a source of:	
Topsoil	Surface - FAIR; thin. Subsurface - POOR; clayey.
Sand and gravel	UNSUITABLE - clayey
Road subgrade and highway fills	Subsoil and substratum - POOR; low bearing value; high shrink-swell potential; unstable when wet.
Limitations and Soil Features Affecting:	
Highway Location	MODERATE - highly plastic; cuts and fills have low stability.
Foundations for low buildings	MODERATE - high shrink-swell potential; low bearing value; moderate shear strength.
Corrosion hazard — Metal	MODERATE
Corrosion hazard — Concrete	LOW
Pond reservoir areas	Slowly permeable.
Dams, dikes and embankments	Subsoil and substratum - fair to poor stability and compaction; semipervious; high compressibility; high shrink-swell potential.
Waterways	SLIGHT - no limiting factors.
Drainage	Slow permeability; land smoothing and surface drainage feasible.
Terraces and diversions	MODERATE - dense clayey subsoil; construction difficult.
Irrigation	Medium available water capacity; deep soil; slow water intake rate.
LIMITATIONS FOR SOME URBAN USES	
Sanitary land fill	SEVERE - leachate ponds in pit over clayey substratum.
Disposal fields	SEVERE - slow permeability.
Sewage lagoons	SLIGHT on 0-2%; MODERATE on 2-6%; and SEVERE on steeper soils.

The soil is evaluated only to a depth of 5 feet or less. Soils are rated on the basis of 4 soil suitability and limitation classes. In the following definitions the suitability rating is listed first and limitation rating listed second:
Good, Slight - The soils have no limitations or limitations for a given use that are easy to overcome; Fair, Moderate - The soils have limitations for a given use that can be overcome by average management and manipulation; Poor, Severe - The soils have limitations for a given use that are difficult to overcome; Unsuitable, Very Severe - The soils have limitations that generally preclude their use for a given purpose.

9984-SCS-LINCOLN, NEBR. 1968 — 5,N—27111

Soil Series: Hibbing silt loam LRA 92 Date Dec. 1969

Map Symbols 281 Name Lake Superior Plain

SOIL INTERPRETATIONS

BRIEF SOIL DESCRIPTION Well drained, nearly level to steep, permeable clayey soils overlying clayey till. These soils are calcareous at depths of 20 to 40 inches and have high available water capacity.

INTERPRETATIONS FOR CROPLAND, PASTURE, AND WOODLAND AND OTHER LAND USES

Cropland - general and specialty farm crops	GOOD - erosive on slopes; high available water and fertility-holding capacity; small depressions pond water; slowly permeable substratum.
Pasture	GOOD - grows wide range of species; sod easily damaged when wet.
Woodland	SEVERE - equipment limitations; erosion hazard on steep slopes.
Other	GOOD - small fruit and apple crops are grown on these soils.

Land capability unit and yield predictions (crops, hay, pasture)

Slope Pct.	Eros.	Capability Unit	Corn-Grain (bu.) A	Corn-Grain (bu.) B	Corn-Silage (tons) A	Corn-Silage (tons) B	Oats (bu) A	Oats (bu) B	Alfalfa-Brome Hay (tons) A	Alfalfa-Brome Hay (tons) B	Bluegrass Pasture (AUD) A	Bluegrass Pasture (AUD) B
0-2	1	IIs7a	-	-	5	9	35	65	2.0	3.5	60	120
2-6	1,2	IIe6	-	-	5	9	35	65	1.75	3.5	60	120
6-12	1,2	IIIe6	-	-	3	7	30	60	1.5	3.0	50	100
12-20	1,2	IVe6	-	-	2	7	25	55	1.0	2.75	40	90
20-30	1,2	VIe6	-	-	-	-	-	-	1.0	2.5	30	80

LIMITATIONS FOR WILDLIFE HABITAT ELEMENTS

Grain and Seed Crops		SLIGHT on 0-6%; MODERATE on 6-12%; and SEVERE on steeper soils; water erosion hazard.
Grass and Legumes		SLIGHT on 0-12%; MODERATE on 12-20%; and SEVERE on steeper soils.
Wild Herbaceous Upland Plants		SLIGHT on 0-20% and MODERATE on steeper soils.
Woody Plants	Hardwood	SLIGHT on 0-20% and MODERATE on steeper soils.
	Conifers	SLIGHT on 0-20% and MODERATE on steeper soils.
Wetland Food and Cover Plants		SEVERE on 0-2% and VERY SEVERE on steeper soils; few species suited.
Shallow and Deep Water Developments		MODERATE on 0-2% and SEVERE on steeper soils; slow permeability in substratum.

LIMITATIONS AND SOIL FEATURES AFFECTING RECREATION

Tent and Camp Trailer Sites	MODERATE on 0-12% and SEVERE on steeper soils; sites remain wet and soft for short periods; surface compacts easily.
Picnic Areas, Parks, & Extensive Play Areas	SLIGHT on 0-6%; MODERATE on 6-12%; and SEVERE on steeper soils; erosive on slopes.
Playground, Athletic Field, and Intensive Play Areas	MODERATE on 0-2% and SEVERE on steeper soils; slow permeability; compacts easily; muddy and slippery when wet; leveling will expose clayey subsoil.
Bridle Paths, Nature and Hiking Trails	MODERATE on 0-12% and SEVERE on steeper soils; erosive on slopes; muddy and slippery when wet.
Golf Course Fairways	SLIGHT on 0-6%; MODERATE on 6-12%; and SEVERE on steeper soils; slow permeability; sites remain wet for short periods.

Hibbing silt loam

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

Depth Inches	Classification			Percent of Material Passing Sieve			Permeability in/hr	Available water capacity in/in	Soil reaction pH	Shrink-swell potential
	USDA	Unified	AASHO	No. 4 5.0 mm.	No. 10 2.0 mm	No. 200 0.074 mm				
Surface layer 0-10	silt loam	CL or ML	A-4	95-100	90-100	85-95	.63-2.0	.18-.22	6.0-7.0	-
Subsoil 10-30	clay	CH	A-7	-	90-100	85-95	.20-.63	.14-.18	7.0-8.0	HIGH
Substratum 30-60	silty clay	CL	A-6	-	90-100	85-95	.06-.20	.10-.14	7.5-8.0	HIGH

INTERPRETATIONS OF ENGINEERING PROPERTIES — Hydrologic Group C

	Suitability as a source of:
Topsoil	Surface - GOOD; thin. Subsoil - POOR; clayey.
Sand and gravel	UNSUITABLE - clayey.
Road subgrade and highway fills	Subsoil and substratum - POOR; high shrink-swell potential; low bearing value; unstable when wet.

		Limitations and Soil Features Affecting:
Highway Location		MODERATE on nearly level soils; SEVERE on steeper soils; highly plastic; cuts and fills have low stability.
Foundations for low buildings		MODERATE - high shrink-swell potential; moderate bearing value and shear strength.
Corrosion hazard	Metal	LOW
	Concrete	LOW
Pond reservoir areas		Moderately slow permeabillty in subsoil; slow permeability in clayey substratum.
Dams, dikes and embankments		Subsoil and substratum - fair to poor stability and compaction; semi-pervious; moderate shrink-swell potential.
Waterways		MODERATE - difficult to establish and maintain vegetative cover. SEVERE on slopes over 12 percent.
Drainage		Slow permeability; land smoothing and surface drainage feasible.
Terraces and diversions		MODERATE - dense clayey subsoil; construction difficult.
Irrigation		High available water capacity; deep soil; slow water intake rate.

LIMITATIONS FOR SOME URBAN USES

Sanitary land fill	SEVERE - leachate ponds in pit over clayey substratum.
Disposal fields	SEVERE - slowly permeable in substratum.
Sewage lagoons	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on steeper soils; slowly permeable.

The soil is evaluated only to a depth of 5 feet or less. Soils are rated on the basis of 4 soil suitability and limitation classes. In the following definitions the suitability rating is listed first and limitation rating listed second:
Good, Slight - The soils have no limitations or limitations for a given use that are easy to overcome; Fair, Moderate - The soils have limitations for a given use that can be overcome by average management and manipulation; Poor, Severe - The soils have limitations for a given use that are difficult to overcome; Unsuitable, Very Severe - The soils have limitations that generally preclude their use for a given purpose.

S,N-27111

Department of Natural Resources

INTRA-DEPARTMENT

MEMORANDUM

Madison

Station

Date September 3, 1971 IN REPLY REFER TO: 8680

TO: Milton Reinke - 8

FROM: Laurence F. Motl

SUBJECT: Big Bay State Park Road

Pursuant to a memorandum from Lowell Hansen, District Director, of the Northwest District (copy attached) in relation to observations made by himself, Natural Resources Board members and by Secretary, L. P. Voigt, upon their inspection of the roads in Big Bay Park; Mr. Corbin of this office made a detailed inspection of the "completed" road project on Friday, August 27, 1971.

Mr. Corbin's inspection consisted of traversing the entire project on foot observing and probing the areas of failure for depth of bituminous matt, type of subgrade, drainage in the near vicinity of each failure, general drainage of the right-of-way, width of bituminous matt, intersections, curves and general impressions. Photographic record was made of many of the above mentioned items as basis for future planning discussion.

The depth of the bituminous matt varied between two inches and three and one-half inches except where the subgrade had failed and the matt had been broken. The average width of the bituminous matt was 19 feet. The widest spot observed was 21 feet and the narrowest spot observed was 18 feet, the latter being at the junction of the roadway and the Eagle Point turnaround. This narrowest width was a single point, as the roadway measured 19 feet in the width fifty feet from the intersection.

The subgrade and base materials were examined and found to be in accordance with the planned construction. The subgrade having originated locally from a pit on Department of Natural Resources property adjacent to Big Bay Park and the base course being a granular material hauled from the mainland. This selection of materials was made to effect a saving of material costs amounting to more than $5.00 per yard between the two materials.

The roadway was constructed in two segments. The easternmost segment was constructed during the fall of 1970 and has a soil cement base. The westernmost portion was laid during the spring of 1971 and has a lime stabilized base.

Work schedules largely controlled by the weather precluded construction of the soil cement base over the entire roadway during the fall of 1970. The necessary curing time for the soil cement base could not be afforded in the construction schedule this spring, thus the use of the more expedient lime stabilization method. The difference between the two methods being that the soil cement renders support to the bituminous surface matt, while the lime applied to absorb the moisture in the subgrade lends no inherent strength to support the surface matt. Nor does the initial drying caused by addition of lime recur after saturation has been reached in the total mass of subgrade material.

Generally it was observed that wherever failure had occurred or was evidenced as occurring, the roadside drainage had been interrupted or was nonexistent. Where ditchlines and water surfaces were greater than two feet below the roadway surface the roadbed was intact. Where it was evidenced that water had stood adjacent to the road in the woods or in a ditch at an elevation nearer than two feet below the road surface, the subgrade had softened and the bituminous surface had failed due to the softening. Weakening and failure was apparent over 10-15% of the total lineal distance of roadway built.

Engineering recalls having had discussions with your Planning Section to consider clearing, ditching and draining, alignment and roadbed widths and elevations. A preliminary plan supplied by highway was marked and returned to them enumerating Department of Natural Resources wishes. Engineering does not have a copy of the final plan for the construction and doubts if a formal plan was developed by the district. We have on record several accounts of field inspections and visits to the Highway District office in Superior by park personnel Considerable time and effort could be expended on determining what actions precipitated the "as built" design of the Big Bay road. Whatever those findings might be, the fact remains that additional work will be necessary to bring the roadway up to standards of serviceability and that costs for such work will be from Department of Natural Resources sources.

In the opinion of the Engineering Bureau the basic trouble is inadequate drainage of the roadbed. Proper drainage can best be achieved at this stage of additional clearing of the roadsides so ditchlines can be established that will concentrate and lead the water away from the right-of-way. Materials from these ditchlines are needed to grade generous shoulders to support the bituminous matt which presently has been laid from one shoulder of the roadbed to the other and having no lateral edge support in most instances.

Engineering sees no value in reviewing the present situation with the Division of Highways. Given the opportunity to exercise their best engineering judgment we are confident that an acceptable roadbed can be designed and built by them.

No further action will be taken by Engineering until requested to do so by your Bureau.

Laurence F. Mutl

Attach.

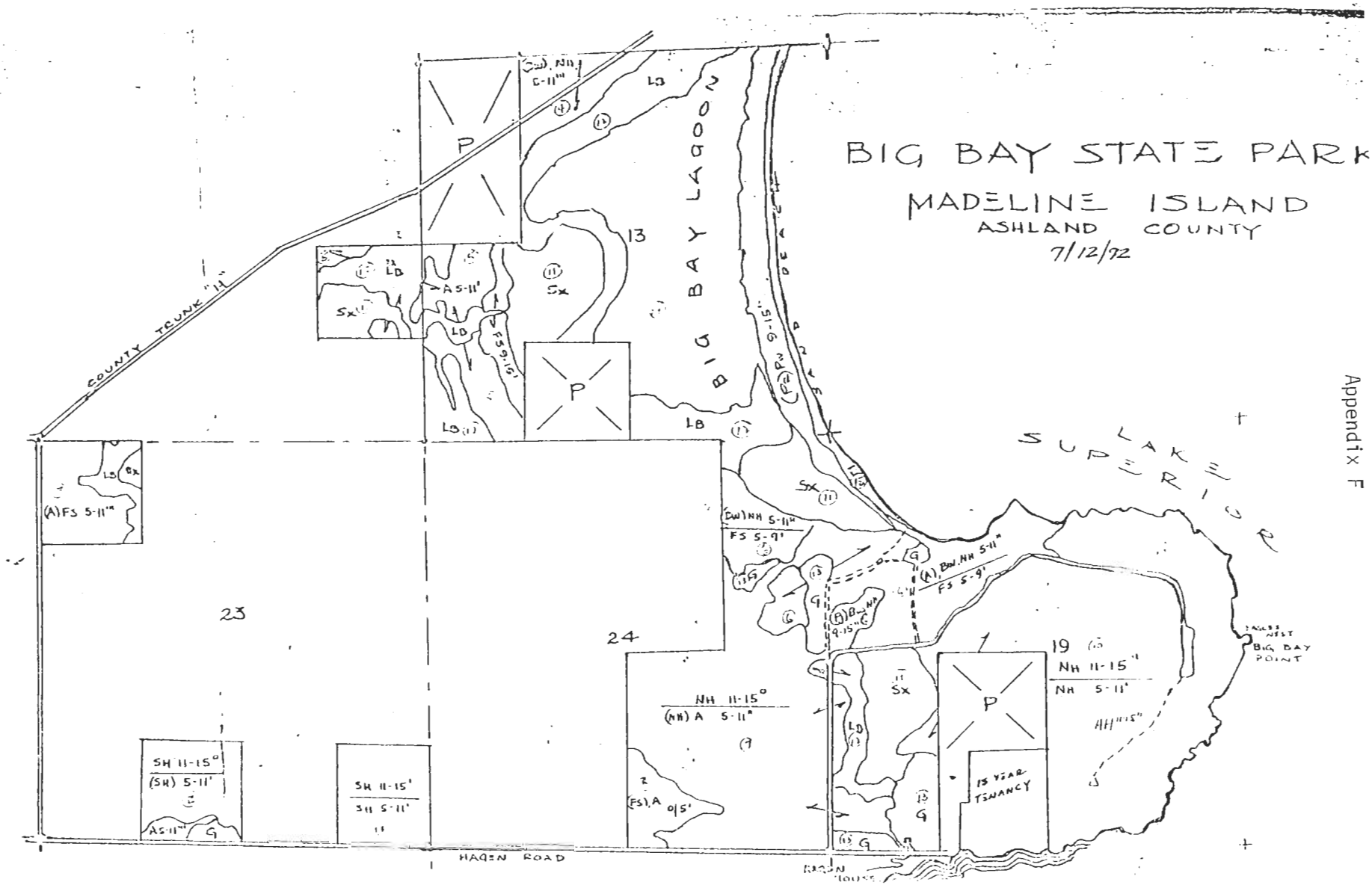
cc: S. W. Welsh
J. R. Smith
W. A. Matson

NOTED:

_____ _____
Date

A P P E N D I X F

VEGETATION


BIG BAY STATE PARK
MADELINE ISLAND
ASHLAND COUNTY
7/12/92
BIG BAY LAGOON
LAKE SUPERIOR
COUNTY TRUNK "H"
HAGEN ROAD
13
23
24
19
P
LD
Sx
LB
(A)FS 5-11"
SH 11-15°
(SH) 5-11'
NH 11-15°
(NH) A 5-11"
NH 11-15"
NH 5-11"
13 YEAR TENANCY
BIG BAY POINT

Appendix F

A P P E N D I X G

WILDLIFE

Department of Natural Resources
INTRA-DEPARTMENT
MEMORANDUM

Brule
Station

Date August 29, 1973 IN REPLY REFER TO: 1600

TO: R. L. Mortier

FROM: D. G. Bublitz

SUBJECT: Comments on Birds for E.I.S. (Madeline Island)

There is surprisingly little to be found in the literature concerning authenticated observations of bird-life on Madeline Island (or for that matter, all the Apostles). For lack of lists of birds for Madeline Island, I believe it is reasonable to assume that most species of birds common to the nearby mainland can be found in season in similar habitats on the island. This would apply to all the so-called songbirds and the larger, more prominent species. My own casual observations over the years would tend to support this opinion.

The most noteworthy observation in the immediate Big Bay Park area is an active Great Blue Heron rookery. The rookery is located in the park approximately 400 yards south of the Eagle Nest ~~Campground~~. PICNIC AREA

The bald eagle nest referred to by its namesake -- Eagle Nest ~~Campground~~ PICNIC AREA -- ceased to be continuously active shortly after intensive development began in the park some five or six years ago. The nest was considered dead the past several years and now the tree which supported it has toppled.

There is some scattered nesting of herring gulls along rocky shorelines. I'm not aware of nesting by the other numerous gull, the ring-billed gull or Lake Erie gull as it is known locally.

Interestingly, one bird does seem to be especially numerous on the island. That bird is the yellow-shafted flicker.

In common with most northwoods areas, the number of species present in the winter months on Madeline Island is small. Populations of winter birds are also relatively low.

Donald G. Bublitz

DGB:da
Attach

NOTED:

_____ _____
Date

E.I.S.

Brule

June 5, 1973 1300

TO: Duane E. Dupor

FROM: Don Bublitz

SUBJECT: List of Mammals for E.I.S. (Madeline Island)

Sometime ago you inquired about mammals that should be mentioned in an Environmental Impact Statement for Big Bay Park. The species listed below have either been trapped and identified by competent researchers or visually observed by them while in the field. These records weren't all recorded in the immediate Big Bay area, of course, but we can assume they are found where their habitat niches do occur in the park area.

Rodents

Microtus pennsylvanicus (meadow vole)
Clethrionomys gapperi (red-backed vole)
Peromyscus maniculatus gracillus (white-footed mouse)
Blarina brevicauda (short-tailed shrew)
Sorex cinereus (masked shrew)
Tamiasciurus hudsonicus (red squirrel)
Lepus americanus (snowshoe hare)
Castor canadensis (beaver)

Mustelids

Mustela cicognanii (short-tailed weasel)
Mustela vison (mink)
Lutra canadensis (otter)

Canids

Vulpes fulva (red fox)
Canis latrans (coyote) - transient

Miscel.

Lynx rufus (bobcat) - transient
Odocoileus virginianus (white-tailed deer)

Donald G Bublitz

Donald G. Bublitz

DGB:da

NOTED: Duane E Dupor 6/11/73

Note: Mammals common to area but not found on Madeline Island are:
Eastern chipmunk - Tamia striatus
Porcupine - Erethizon dorsatum
Muskrat - Ondatra zibethica
Woodchuck - Marmota monax
Raccoon - Procyon lotor
Striped skunk - Mephitis mephitis

Department of Natural Resources
INTRA-DEPARTMENT
MEMORANDUM

Bayfield
Station

Date August 31, 1973 IN REPLY REFER TO: 1600

TO: J. Rieckhoff

FROM: George King

SUBJECT: E.I.S. - Big Bay Park

RECEIVED
SEP 4 1973
[illegible] DISTRICT

As per request on attached memo:

C. Fish

1. All species found in and around Big Bay Park:

Lake trout	Walleye
Brook trout	Yellow perch
Brown trout	Northern pike
Rainbow trout	Black bullhead
Coho salmon	Johnny darters
Lake whitefish	Spottail shiners
Round whitefish	Brook stickleback
Pigmy whitefish	Sculpin
Lake herring	Burbot
Chubs	Rock bass
Smelt	Lake sturgeon
White sucker	Sea lamprey
Longnose sucker	

2. Any rare and endangered species - NONE

3. Fish populations possible in streams in the park - None except for minnows.

George King
George R. King

GRK:mth

JR
Noted

9/4/73
Dated

A P P E N D I X H

ADVISORY COUNCIL COMMENTS

MAY 21 1979

UWEC UNIVERSITY OF WISCONSIN-EAU CLAIRE/EAU CLAIRE, WISCONSIN 54701

DEPARTMENT OF GEOGRAPHY

May 17, 1979

D. J. Mackie
Bureau of Parks
Box 7921 DNR
Madison, WI 53707

Dear Don:

Of all of the master plans reviewed by the Wild Resources Advisory Council the Big Bay State Park is one of the best and at this point conceivably the best--it is legal (fulfilling the guidelines of Manual Code 1031.1), it is concise, quite legitimately ambitious, well balanced professionally and beautifully written. WRAC compliments to the master plan committee.

Sincerely,

Henry W. Kolka, Chairman
Wild Resources Advisory Council

yp

Comments and recommendations on the Big Bay State Park Master Plan
May 18, 1979

The master plan lists and addresses all existing unit problems expediently adroitly and projects a plan for overcoming major environmental limitation. The Big Bay State Park is well conceived. The Wild Resources Advisory Council wishes to underline following proposals:

1. WRAC agrees with the master plan's projection of rerouting the snowmobile trail away from the proposed scientific area. In fact we encourage immediate map relocation of trail and trail sign posting of the new ruling.

2. The WRAC encourages the establishment of a more complete and exhaustive island inventory of year around and seasonal bird life--when such opportunity presents itself.

3. We recommend continued tight surveillance of the Blue Heron rookery. Human intrusion must be made difficult and even peripherial molestation forbidden.

4. WRAC recommends that major effort be exerted to prevent trail proliferation enforcement of single trail confinement and the establishment of bicycle off limits on trails in fragile environments.

5. WRAC supports the projected scientific areas block. It is unique in many respects and it possesses some environmentally very sensitive sites.

We recommend that human use be carefully monitored for signs of degradation. Future uses may of necessity require modification of present use rules.

Henry W. Kolka, Chairman
Wild Resources Advisory Council

JUN 14 1979

The State of Wisconsin

SCIENTIFIC AREAS PRESERVATION COUNCIL
P. O. Box 7921
Madison, Wisconsin 53707

June 13, 1979

Mr. Don Mackie
Bureau of Parks and Recreation
Dept. of Natural Resources
P. O. Box 7921
Madison, WI 53707

Dear Mr. Mackie:

The Scientific Areas Preservation Council has reviewed the Concept Master Plan for Big Bay State Park, Ashland County. We are in general agreement with the management proposed for this property.

The proposed scientific area will protect and recognize a very significant Lake Superior shoreline feature of botanical and geological significance.

The public hiking trail on the sand spit through the scientific area is of concern since it leads to many "casual" cross trails from the spit to the beach and to the slough. Since the ground layer vegetation on the sand spit is sensitive, we recommend that specific beach and slough access trails be constructed and marked to limit the cross traffic.

Sincerely,

Forest Stearns
Chairman