

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

ESTABLISHMENT RECORD FOR NORDHOUSE DUNES
RESEARCH NATURAL AREA WITHIN HURON-MANISTEE
NATIONAL FORESTS, MASON COUNTY, MICHIGAN



United States
Department of
Agriculture

Forest
Service

WO

~~D. Nelson~~
D. Nelson
J.J.
RRWK

Caring for the Land and Serving People

Reply to: 4100

Date: DEC 14 1987

(M)

Subject: Nordhouse Dunes Proposal

To: Regional Forester, Region 9

The proposed Nordhouse Dunes Research Natural Area was signed into being by the Chief on December 8. There were a few items in need of correction or alteration before the proposal could be forwarded to the Chief. These were made by pen and ink and the proposal forwarded with little delay thanks to the excellent cooperation of R-9 folks and especially Devon Nelson.

We look forward to seeing additional proposals in the near future now that we have had this "trial run" with Nordhouse Dunes.

Sincerely,



RUSSELL M. BURNS, Coordinator
Forest Service Research Natural Areas Program

Nordhouse Dunes

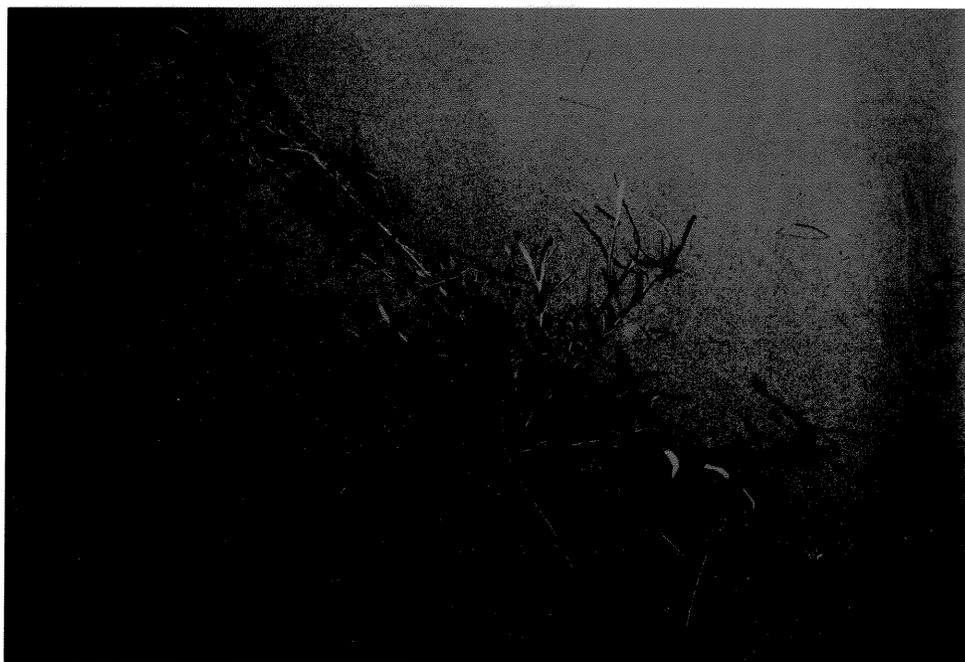
PHOTOGRAPHIC RECORD

INSTRUCTIONS: Submit to Washington Office in quadruplicate. Permanent numbers will be assigned and the forms will be distributed as follows: (1) Washington Office, (2) RO or Station, (3) Forest or Center and (4) Photographer.

Item NO.	PERMANENT NO. (To be filled in by the FO)	SELECT- ED FOR W.O. PHOTO LIBRARY	DATE OF EXPOSURE	LOCATION (State and National Forest or County)	DESCRIPTION OF VIEW
(1)	(2)	(3)	(4)	(5)	(6)
1			10/86	T20N R18W Sec. 33 H-M N.F.'s Mason Co., MI	Lake Michigan shoreline, looking north
2			10/86	T20N R18W Sec. 33	Vegetative growth, Pitcher's thistle (Cirsium pitcheri), typical habitat
3			10/86	T20N R18W Sec. 33	Mature interdunal wetland, Jack Pine, SAF cover type 1
4			10/86	T20N R18W Sec. 33	Isolated stabilized dune, Red Maple, SAF cover type 108
5			10/86	T20N R18W Sec. 33	Complex dune field, Nordhouse Dunes
6			10/86	T20N R18W Sec. 33	Immature interdunal wetland, dominated by emergent aquatic vegetation



Photograph #1, Lake Michigan Shoreline



Photograph #2, Pitcher's Thistle (*Cirsium pitcheri*)



Photograph #3, SAF cover type 1, Jack Pine,
associated with interdunal wetlands



Photograph #4, SAF cover type 108, Red Maple,
associated with stabilized dunes



Photograph # 5, Complex dune field, Section 33



Photograph #6, Interdunal wetlands dominated by emergent aquatic vegetation

DESIGNATION ORDER

By virtue of the authority vested in me by the Secretary of Agriculture under regulations 7 CFR 2.60(a) and 36 CFR 251.23, I hereby designate as the Nordhouse Dunes Research Natural Area the lands described in the following establishment record prepared by Matthew D. Sands, dated June 19, 1987. These lands shall hereafter be administered as a research natural area subject to the above regulations and instructions issued thereunder.

F Dale Robertson
Chief

12/8/87
Date

SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Nordhouse Dunes Research Natural Area

Huron-Manistee National Forests

Mason County, Michigan

The undersigned certify that all applicable land and resource management planning and environmental analysis requirements have been met in arriving at this recommendation.

Prepared by Matthew D. Sands Date 6/19/87
Matthew D. Sands, Research
Natural Area Coordinator,
Huron-Manistee National Forests

Recommended by Rm Garrigus Date 7/1/87
Russell Garrigus, District Ranger, Manistee District

Recommended by Wayne K. Mann Date 6/19/87
Wayne K. Mann, Forest Supervisor, Huron-Manistee National Forests

Recommended by Floyd J. Marita Date 7/17/87
Floyd J. Marita, Regional Forester, Eastern Region

Recommended by Ronald Lindmark Date 8/4/87
for Ronald Lindmark, Station Director, North Central Forest Experiment Station

TITLE PAGE

Establishment Record for the Nordhouse Dunes
Research Natural Area within Huron-Manistee
National Forests, Mason County, Michigan

**ESTABLISHMENT RECORD FOR THE
NORDHOUSE DUNES RESEARCH NATURAL AREA (RNA)
WITHIN THE HURON-MANISTEE NATIONAL FORESTS
MASON COUNTY, MICHIGAN**

INTRODUCTION

The Nordhouse Dunes Research Natural Area (RNA) is located entirely on National Forest land within the Huron-Manistee National Forests (HMNF). The area is centrally located within a 12 mile (19 km) stretch of public ownership on the Lake Michigan coast of lower Michigan. *See Map 1.*

The Nordhouse Dunes RNA is 795 acres (321 ha) of National Forest system land that is a part of the 3,395 acre (1,374 ha) proposed Nordhouse Dunes Wilderness Study area. The location is approximately 11 miles (17 km) south of Manistee, Michigan, in Manistee County. *(Map 1)* *Run 3*

The presettlement flora of the vicinity is still very much represented within the RNA, despite some early logging and fire which occurred before 1900. Black oak (SAF Type 110), jack pine (SAF Type 1), and red maple (SAF Type 108), cover types generally originated between 1900-1919. Non-forested dunes and their typical vegetation are recovering from prior unregulated recreation and off-road vehicle (ORV) use. These activities have decreased dramatically since The Nature Conservancy's acquisition and subsequent purchase of the Sensibar Tract by the USA in 1979.

Prior to inclusion in the National Forest system, the Sensibar tract of the Nordhouse Dunes received heavy recreational pressures from off-road vehicles. These same uses and pressures occurred throughout the entire Nordhouse area. In 1973, the Forest established the Nordhouse Dunes Vehicle Management Area. This area includes the Nordhouse Dunes RNA. Damage to fragile dune formations, foot-trails, and vegetation resulting from unrestricted and increasing off-road vehicle use, especially dune climbing vehicles, prompted this management policy. Management of the area prohibits vehicle use and camping on open sand areas.

There have been six legislative attempts since 1980 to include the Nordhouse Dunes in a State of Michigan wilderness proposal. None has been implemented. The Nordhouse Dunes area has generated controversy because of the potential for oil and gas development.

The Niagaran Trend, a proven reserve of oil and gas, is known to underly this part of Michigan. Twenty-five percent of the mineral rights within the Nordhouse Dunes RNA are privately-owned. Michigan Department of Natural Resources (MDNR) director, Gordon Guyer, has denied a permit for exploration and development in the Nordhouse Dunes area which includes the RNA.

Currently, there are two dozen other Lake Michigan dune areas set aside as preserves (Michigan Botanist, 1980).

**LAND AND RESOURCE
MANAGEMENT
PLANNING**

The Huron-Manistee National Forests Land and Resource Management Plan's Record of Decision dated July 16, 1986, recommends the Nordhouse Dunes/Sensibar Tract as a candidate wilderness study area with the included Sensibar Tract proposed as a RNA.

The area is currently in Management Prescription 9.2, Lands in Holding pending the future decisions on RNA and wilderness study area. If designated a RNA, the area would be managed under Management Prescription 8.1, Special Areas. If Nordhouse Dunes is designated a wilderness, the area would be managed under Management Prescription 5.1. The RNA would then be subject to legislation and regulations governing management of the Congressionally-designated area.

OBJECTIVES

The objectives for establishing the Nordhouse Dunes RNA are:

1. To protect and monitor the special habitat, plants, and ecological settings of the open and wooded sand dunes.
2. To provide a land base for continuing research of unique sand dune ecological areas along the Great Lakes.

JUSTIFICATION

The open sand dunes and associated interdunal wetlands along the fresh water of Lake Michigan are better represented here than anywhere in the world. The RNA portion of the Nordhouse Dunes is part of the largest expanse of wind-blown duneland and interdunal wetland adjacent to fresh water in the world (Chapman et. al., 1985). (See photograph #1)

Designation of 795 acres (321 ha) of the Nordhouse Dunes as a RNA is desirable to protect the fragile sand dune ecology from damage associated with recreational uses. Designation of a RNA prior to any finalization of Wilderness legislation will provide for better coordination for protection and conservation of sand dune ecosystems than if this area were designated after the Nordhouse Area becomes a part of the National Wilderness Preservation system.

One of the world's two largest populations of the Great Lakes' endemic pitcher's thistle (Cirsium pitcheri) is here, and the dune complex is large enough to be a macropreserve where this plant may be indefinitely assured of survival (Ibid). (See photograph #2) This plant is State Threatened and is a Federal candidate for the Threatened and Endangered list. Gleason (1952) is the authority for nomenclature of herbaceous and small woody vegetation throughout this record.

Other special interest plants associated with the open dunes, interdunal wetlands, and oak woods are State threatened sand cancer-root (Orobanche fasciculata) (Ibid), and State Special Concern plants ram's head lady slipper (Cypripedium arietinum), spotted wintergreen (Chimaphila maculata), and trailing Christmas-green (Lycopodium complantatum) (Hazlett).

In addition, three other species may find suitable habitats in the Nordhouse RNA. These are a State Threatened sand grass species (Tripalsis purpurea), State and Federal Endangered piping plover (Charadrius melodus Ord.), and Federal and State Threatened bald eagle (Haliaeetus leucocephalus) (Michigan Natural Features Inventory, 1984). The avian nomenclature follows the American Ornithological Union (1976).

**PRINCIPAL
DISTINGUISHING
FEATURES**

These are Michigan's best example of wind-blown dunes and the most extensive interdunal wetlands adjacent to fresh water in the world.

The association of open and active dunes, wooded, stabilized dunes, interdunal wetlands, and bogs found in the area form a continuum not found at most of the other natural areas along the Lake Michigan shoreline. Geomorphic features of Nipissing through Algoma Lake stages are within the boundary of the Nordhouse Dunes RNA.

The large size of the RNA, all of which is in public ownership, in combination with the present and continued management policy restricting motorized access and use is unique, and will allow the presettlement ecosystems to continue to be undisturbed.

Two State of Michigan Threatened plant species are known to be present in this area. These are pitcher's thistle and sand cancer-root. Three State of Michigan Special Concern plants also exist here. They are: ram's head lady-slipper, spotted wintergreen, and trailing Christmas-green (Hazlett, 1981).

Ecological types represented on the Nordhouse Dunes differ significantly from other dune systems in lower Michigan. Sleeping Bear Dunes located in Leelanau County are representative of Northern Hardwoods (Kuchler Type 97), and the Grand Mere Dune system located in Berrien County is dominated by Oak-Hickory Forests (Kuchler Type 91). In contrast, the Nordhouse dune system is located within the tension zone, where a Great Lakes Pine Forest (Kuchler Type 86) may be expected. Numerous Society of American Foresters cover types are included in these Kuchler types.

LOCATION

The Nordhouse Dunes RNA is located on the Manistee Ranger District of the Huron-Manistee National Forests located in northern lower Michigan. The area can be described as follows:

<u>Legal Description</u> (All T20N, R18W)	<u>Latitude-Longitude</u>	<u>Acres</u> (Hectares)	<u>Elevation in</u> <u>Feet (Meters)</u>
All of Sections 28, 32, and 33 above the ordinary high water line of Lake Michigan and SW 1/4 and S 1/2 NW 1/4 Sec. 34	44° 5'N 86° 25'W	795 (321)	580'-740' (177-226)

RWB

Access Access to the Nordhouse Dunes is as follows:

From the city of Manistee, Michigan, take US 31 south 8 3/4 miles (14 km) to Forest Trail Road (FR 5629). Go west 2 1/2 miles (4 km) to Quarterline Road (FR 5209). Turn south 1 1/2 miles (2.4 km) to Nurnberg Road (FR 5211). Then west 6 1/4 miles (10 km) to the trailhead access road. Proceed northwest 1/2 mile (.8 km) to the Nurnberg Road trailhead parking lot.

RWB

Once in the parking lot, take the foot-trail marked Nordhouse Dunes 1/4 mile (.4 km) to the western edge of the RNA. Another 1 mile (1.6 km) will bring you to the end of the trail. The RNA northern boundary is 1/4 mile (.4 km) to the northwest, and the southern boundary is approximately 2 miles (3.2 km) southwest. (See MAP 1)

RWB

AREA BY COVER TYPES (See MAP 3)

Society of American Foresters (SAF) Type

This is a sand dune community. The active dunes are not described by any SAF cover type (nonforest). SAF cover types most adequately describe forested, stabilized dunes and interdunal wetlands. In addition, the wetlands in the SW 1/4 of section 34 may also be characterized by a SAF cover type (Society of American Foresters, 1980).

SAF cover type 1, Jack Pine, is very descriptive of the forested, interdunal wetlands. (See photograph #3)

Based on Hazlett's (1981) findings, SAF cover type 108, Red Maple, is applicable to a portion of the stabilized dune in section 34, and the islands of hardwood forest in sections 27, 33, and 34. Hazlett termed these as moist deciduous woods. (See photograph #4)

His datum also show that SAF cover type 110, Black Oak, is most appropriate for the remainder of the forest on the dune in section 34. Here Hazlett assigned this vegetation an oak (Quercus sp.) woods classification.

The wetland in the SW 1/4 of section 34 is associated with the Hamlin Lake riparian zone. SAF cover type 12, Black Spruce, subtype E, Black Spruce-Speckled Alder, is representative of this area.

<u>SAF Cover Type</u>	<u>Acres</u>	<u>Hectares</u>
1 - Jack Pine	80	32.4
12-E - Black Spruce-Speckled Alder	12	4.8
108 - Red Maple	120	48.6
110 - Black Oak	127	50 51.4
Nonforest	456	182 184.5

Rms

Kuchler Type Kuchler's cover type 86, Great Lakes Pine Forest, describes the potential natural vegetation of the Nordhouse environs well (Kuchler, 1964, 1966). The SAF cover types of Jack Pine (1), Red Maple (108), and Black Oak (110), are all components of Kuchler type 86. This cover type is also assigned to the non-stabilized dunes.

Kuchler's cover type 85, Conifer Bog, is descriptive of the wetland in the SW 1/4 of section 34. SAF cover type 12-E is one of many types included in this Kuchler type.

<u>Kuchler Cover Type</u>	<u>Acres</u>	<u>Hectares</u>
K-85 Conifer Bog	12	4.8
K-86 Great Lakes Pine Forest	783	313 316.9

Rms

PHYSICAL AND CLIMATIC DATA

Physical

The most prominent features of the RNA are the sand dunes. The MDNR Dune Morphology Classification for the Nordhouse area categorizes four main feature types (Buckler, 1979). These are:

- Parabolic dunes, of moderate to high relief (23-85+ ft or 7-26+ m), with an irregular orientation. This typifies the main forested dune in section 34.
- Linear dune ridges, of moderate relief (23-85 ft or 7-26 m), with an irregular orientation. Examples of this feature trend north-south in section 33. The remainder of this section is a complex of parabolic and linear dune ridges.

- Complex dune field, generally of low relief (< 23 ft or < 7 m). This is found in section 32 and the W 1/2 SW 1/4 of section 33. (See photograph #5)
- Interdunal lowlands. These are wetlands occurring in depressions of open dune areas that experience fluctuating water levels (0-5 in, 0-12 cm). They may support aquatic vegetation, such as rush species (Juncus balticus), or pioneer types such as Carex flava. Mature interdunal lowlands have a jack pine (Pinus banksiana) fringe, and are successional towards the jack pine cover type. The source of tree names is Agriculture Handbook 451 (USDA-FS, 1979). (See photograph #6)

Dune features within the general Nordhouse area are associated with Wisconsin-age ice sheets; specifically, since the time of post Lake Algonquin water levels (12,000 years before present). The prominent parabolic forested ridge in section 34 is thought to be a Nipissing lake stage feature (5,000-3,500 years before present), and the linear dunes in section 33 are associated with Algoma lake stages (3,500-2,500 years before present) (Dorr and Eschman, 1977).

The dunes rise to 140 feet (43 m) above the surface of Lake Michigan. There is no permanent surface water within the RNA, other than that which lies in interdunal wetlands and the spruce bog in section 34. Ten thousand feet (3,000 m) of Lake Michigan shoreline is a notable feature; there has never been any shoreline development or sand mining within the RNA (USDA-FS, 1976).

The Nordhouse Dunes foot-trail traverses the RNA for .5 mile (.8 km) along the west boundary of the RNA in section 34. It is a part of the Forest Service trail network within the larger Nordhouse Dunes Vehicle Management Area. Ludington State Park adjoins the RNA on its southeast boundary.

Climate

Weather observations are available from the Michigan Department of Agriculture (1971) at Ludington, Michigan dating from 1898. The weather station is located 4 miles (6 km) southeast of Ludington, and 12 miles (19 km) southeast of the Nordhouse Dunes RNA.

The general climate of this region alternates between continental and semi-marine, due to the presence of Lake Michigan. Fifty-five percent of the 29.93 inches (76 cm) of mean annual precipitation falls in May-October, and snowfall averages 65.6 inches (166 cm). Mean January temperature is 23.9° F (-4.5° C), with a mean annual temperature of 45.9° F (7.7° C).

Weather observations are also available from Manistee, Michigan, 10 miles (16 km) to the northeast of the RNA. A shorter observation period indicates that this station

receives approximately 13 percent more snowfall, while having 1 percent less total precipitation. Available data also show that the mean January temperature is 23.7° F (-4.6° C), while the mean annual temperature is 43.8° F (6.6° C).

**DESCRIPTION
OF VALUES**

Flora

Hazlett (1981, 1986), has published the most recent listing of vascular plants of the Nordhouse Dunes area. The Michigan Natural Features Inventory also investigated Threatened and Endangered species within this area (Michigan Natural Features Inventory, 1984). The special interest plants within the RNA boundary are known to be the following:

<u>Plant Name</u>	<u>Status</u>
Pitcher's thistle (<u>Cirsium pitcheri</u>)	State Threatened
Sand cancer-root (<u>Orobanche fasciculata</u>)	State Threatened
Ran's head lady-slipper (<u>Cypripedium arietinum</u>)	State Special Concern
Spotted wintergreen (<u>Chimaphila maculata</u>)	State Special Concern
Trailing Christmas-green (<u>Lycopodium complantatum</u>)	State Special Concern

Dunes, both stabilized and shifting, and the interdunal wetlands are unique ecosystems. They are classified as the sand dune group, Land Type Association 18, in the top tier of the Huron-Manistee Ecological Classification System (Cleland, 1986). As mentioned above in the report, the wetlands support hydrophyllic species, such as Juncus sp. and others, and are fringed and successional towards jack pine.

Non-forested and open dunes are characterized by beach grass (Ammophial breviligulata) near the shoreline. This is also where Orabanche fasciculata grows as an obligate parasite on wormwood (Artemesia caudata). Sand reed grass (Calamovilfa longifolia), another grass species is an associate here. This species is very vulnerable to loss of its host from disturbance.

A State Threatened sand grass species, Triplasis purpurea, apparently occupies blow-outs of forested dunes and other exposed places. No plants of this species are recorded in

the RNA, but suitable habitat may be found here. The species requires disturbance to successfully compete. Three of this species' known associates (Michigan Natural Features Inventory, 1984) are reported by Hazlett (1981) on the beach, foredune, blow-outs, and open dunes.

Pitcher's thistle grows on open sand dunes, beaches, and gravel surfaces only on Great Lakes shores, and has a large population within the RNA (Ibid). Although tolerant of limited disturbance, the integrity of large colonies must be maintained (Michigan Natural Features Inventory, 1984). This species is found in a community represented by common dune species, such as beach grass (Ammophila breviligulata), sand reed grass, and grows with common milkweed (Asclepias syriaca) on disturbed areas (Ibid).

The three State Special Concern plants are associated with two community types within the RNA. Ram's head lady-slipper is found in the jack pine cover type, as is spotted wintergreen. Trailing Christmas-green is known from the red maple cover type (Hazlett, 1981).

Fauna

The Huron-Manistee National Forests (USDA-FS, 1976) has compiled a list of vertebrate species' habitats in the Nordhouse Dunes area. Over 100 bird species, 40 mammals, and 24 reptiles and amphibian species utilize this environment for breeding and/or other purposes. As a part of a major migratory route, and because of its tension zone location and Lake Michigan proximity, the area is especially attractive for avian species.

Two Endangered species once found nesting habitats in the RNA vicinity. The piping plover (Charadrius melodus Ord.), which is a State of Michigan and a Federal Endangered species, is a beach nester which requires solitude. The bald eagle (Haliaeetus leucociphalus), a Federal and State of Michigan Threatened species also is sensitive to human disturbance when nesting. Chemical pollution of Lake Michigan (e.g. polychlorinated biphenols, PCB's) is also a factor in these species' decline along the shoreline (Irvine, 1986).

Geology

Various layers of limestones, shales, and sandstones comprise the stratigraphic rock column of the Michigan Basin. Depth to Precambrian level is approximately 3.5 miles (6 km). In the Big Sable Point vicinity, the bedrock is close to sea level, with 600-700 feet (180-210 m) of drift and dune sand covering it (Dorr and Eschman, 1977).

Of particular interest is the Niagaran-Salina rock group (Silurian age), which is typified by numerous reefs, a complex structure, and a successful hydrocarbon exploitation history. Vital Resources (1986) prepared an environmental study and report of this dune region for the MDNR. Data in

that report indicate an excellent potential of the area for oil-gas reserves. The report recommended a preferred alternative to the MDNR that hydrocarbon exploration and development be permitted "only outside the Designated Sand Dune Area, (and) within the Dune System Buffer Zone, allow development with slant and lateral drilling to target beneath the Designated Sand Dune Area." (Ibid). The RNA lies entirely within the Grant-Hamlin-Pere Marquette Sand Dune Area (State of Michigan Public Act 222, 1976).

Minerals

Although all of the surface estate is in federal ownership, there are existing oil and gas leases and privately reserved mineral rights within the RNA boundary. The following table describes the status of these rights.

<u>Legal Description</u> (All T20N, R18W)	<u>Status</u>	<u>Expiration Date</u>
Section 28	Lease #ES 28380	5/1/1994
Section 32, partial	Lease #ES 33484	10/1/1994
Section 33	Lease #ES 28380	5/1/1994
Section 34, SW 1/4	Grand Rapids Trust	12/20/2034
Section 34, SW ¹ / ₄ NW ¹ / ₄	Porter-Mulder Land	12/31/2062 <i>Rms</i>

The remaining mineral rights are vested in the United States and are not under lease.

Soils

Wonser (1939) is the latest published third order soil survey of Mason county; the county is currently being resurveyed.

Dune sand, a well-drained soil, occupies most of the area. This soil is non-forested and subject to wind deformation. The black oak and red maple SAF cover types are growing on Bridgeman sand, another well-drained soil series. The conifer bog in SW 1/4 of section 34 is comprised of Greenwood peat and Rifle peat. These are poorly drained organic soils differing in age, acidity, and peat composition.

Watson (1976) points out that soil ages progress from younger to older as distance from Lake Michigan increases.

Lands

All 795 acres (318 ha) of the RNA have acquired land status under Week's Law authority. There are no land acquisitions needed to complete ownership of this RNA. The following table describes the land acquisitions.

<u>Legal Description</u> (All T20N, R18W)	<u>Acquired</u>
Section 28	7/13/79
Section 32 & 33	7/30/80
Section 34, SW 1/4 NW 1/4	7/30/80
Section 34 SW 1/4	8/27/37
Section 34, SE 1/4 NW 1/4	9/13/62

Ursum

Cultural

The USDA-Forest Service has not surveyed this area for cultural resources. However, Ursum (1985), an experienced amateur archeologist, has documented where aeolian disturbances revealed ceramic and lithic debris he attributes to the late Woodland period (400-1200 years before present). Brashler (Vital Resources, 1986) states that until sites are excavated, subsistence and settlement practices can only be assumed.

**IMPACTS AND
POSSIBLE
CONFLICTS**

The Huron-Manistee National Forests' Final Land and Resource Management Plan contains Standards and Guidelines for the management and protection of Special Areas and/or designated Wilderness. These Standards and Guidelines provide the basis for conflict resolution, and are the framework for the following discussion and Management Plan outline.

**Mineral
Resources**

Despite recent market fluctuations, oil and gas exploration and development of the Niagaran reef structure remains active. The decision by the MDNR to prohibit hydrocarbon exploration and production in the area including Nordhouse Dunes RNA has been challenged in court by one of the holders of private mineral rights.

Current Forest Service policy is to continue to offer leases within RNA's using stipulations for no surface occupancy. If legislation were to pass designating Nordhouse Dunes as a wilderness area, it would then be withdrawn from further mineral entry and leasing, subject to valid existing rights.

Grazing

This area has no grazing potential. There are no conflicts that would result when the RNA is withdrawn from grazing use.

Timber

Two hundred forty-seven acres (199 ha) of commercial forest land will be withdrawn from the timber producing land base. The total volume of timber products on this area is 3,705 Mbf (21 cubic meters). The remaining lands to be withdrawn are either non-forest (456 acres, 185 ha) or of lesser commercial value. This includes 92 acres (37 ha) of black spruce type wetlands and jack pine type disjuncts of the open dunes.

Ursum
Ursum

All lands within the RNA are identified as minimum level lands in the Forests' Land and Resource Management Plan (USDA-FS, 1986).

Watershed
Values

There is no open water within the RNA. Besides Lake Michigan, the nearest open water is Hamlin Lake to the south, Nordhouse Lake to the east, and to the north Porter Creek.

As part of the Environmental Study of Hamlin Lake/Nordhouse Dunes Area-Mason County, Michigan (Vital Resources, 1986), a geohydrolic investigation was carried out (Ibid, Appendix IV). This appendix reveals that the surface water drains either into Lake Michigan, Hamlin Lake, or infiltrates the soil and becomes groundwater. Groundwater moves both east and west, with the divide trending northeast-southwest within the RNA. Discharge then is into one of the large lakes.

No specific water quality data was taken in this study, but it was concluded that the shallow, sandy, aquifers are low in mineral content and the water quality of the area is excellent. Potable water used by recreationists must be obtained from outside sources, or purified from one of the adjacent sources.

Recreation
Values

The 1985 total of recreational visits to the Nordhouse Dunes area was estimated at 17,000 recreation visitor days (RVDs). Most of this was associated with camping and hiking use initiating at the Lake Michigan Recreation Area. This is a large (98 unit) developed camp-picnic-beach facility located 1 mile (1.6 km) north of the RNA boundary. The balance of visits originated at the south trailhead parking lot, 1/4 mile (.4 km) east of the RNA (USDA-FS, 1986).

Conflicts between motorized and nonmotorized uses are now eliminated by terms of the Nordhouse Dunes Vehicle Management Area.

Recreation uses within the RNA boundary are confined to beach and foot-trail use. Occasionally, dispersed overnight camping use occurs. These activities do not conflict with RNA values. There is scant evidence of human occupancy or use in the RNA away from the trails or beach.

Wildlife and
Plant Values

Maintenance of suitable habitats for State Threatened pitcher's thistle and sand cancer-root is dependent on minimizing human disturbance. Most human activities in this area occurs along foot-trails, or near beaches and dispersed campsites. Visitors and managers need to be aware that disturbance to wormwood, the obligate host of sand cancer-root, is likely on the leeward (deposit zone) slope of the first or second ridge inland from Lake Michigan.

Pitcher's thistle conservation is dependent on some natural disturbance. In the past recreational uses have avoided large colonies that exist on the open sand dunes (Michigan Natural Features Inventory, 1984).

Wilderness,
Wild and
Scenic River,
National
Recreation
Values

Establishment of this RNA ^{not be in conflict and would} be in keeping with Wilderness designation of the Nordhouse Dunes/Sensibar Tract. RNA values in this area, such as nature study and preservation of Threatened and Endangered species habitats, are in harmony with nonmotorized activities that emphasize solitude in an area dominated by natural ecological processes.

Research activities that might occur here would not conflict with wilderness values. Prescribed fire or other vegetation treatments are not needed for Threatened and Endangered species conservation. RNA designation will also help to stabilize and preserve cultural resources thought to be in the area.

None of the area has been proposed for Wild and Scenic River or National Recreation Area designation.

Transportation
Plans

The Nordhouse Dunes Vehicle Management Area regulations eliminated all motor vehicle access to the RNA. Therefore, there are no restrictions to be imposed on the Forests' transportation system as a result of RNA establishment. The only possible impact resulting from this RNA on the transportation system would be if the owners of the mineral estate in the SW 1/4 section 34 were able to secure a drilling permit from the State of Michigan. If this were to occur, site specific environmental analysis would determine the best road location outside of the RNA boundary.

MANAGEMENT PLAN

The objectives of the Nordhouse Dunes RNA are:

1. To protect and monitor the special habitat, plants and ecological settings of the open and wooded sand dunes.
2. To provide a land base for continuing research of unique sand dune ecological areas along the Great Lakes.

Vegetation
Management

No direct management is needed to maintain ecologic conditions. There is no anticipated need for prescribed fire as a management tool.

Threatened and Endangered Species The Forests will continue to monitor Threatened, Endangered, and sensitive species populations, and any impacts of dispersed recreation to these species.

The Forest Service is a cooperator with the State of Michigan and the United States Fish and Wildlife Service on bald eagle and piping plover surveys. The Forests' will make periodic rare plant surveys if such surveys are not performed as a part of formal research proposals.

In addition, managers and visitors should be aware that the jack pine dominated interdunal wetlands are the habitat for ram's head lady-slipper and spotted wintergreen, while trailing Christmas-green is an oak (Quercus sp.) woodland species. Management monitoring should occur in these habitats to help conserve these species (Ibid).

The State Threatened species; bald eagle and Triplasis purpurea, the sand grass species, and the piping plover, a State Endangered species require monitoring to determine if they become established in the area. Generally, these species are also favored by natural disturbance; however, the piping plover will require seasonal beach restrictions if a breeding population moves in (Irvine, 1986).

None of the above species requires grazing, vegetation treatments, or prescribed fire for their management (Irvine and Dunlap, 1984).

Law Enforcement

The Forests will continue to enforce the Nordhouse Dunes Vehicle Management Area regulations.

Grazing

Grazing would be a non-compatible use of the RNA. The area will be withdrawn from grazing use.

**ADMINISTRATION
RECORDS AND
PROTECTION**

The Administrator and Protector of this area is:

District Ranger
USDA-FS
Manistee, MI 49660

The Research Coordinator is:

Director
North Central Forest Experiment Station
1992 Folwell Ave.
St. Paul, MN 55108

Administrative records and copies of research data and publications are deposited at the North Central Forest Experiment Station, Ranger District, and Regional Office.

The herbarium collection and copies of research data file are also maintained by:

Brian T. Hazlett
Division of Biological Sciences
University of Michigan
Ann Arbor, MI 48109

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APPENDIX G

RESEARCH NATURAL AREAS

OVERVIEW

The Huron-Manistee National Forests have identified 18 candidate areas to be evaluated for potential establishment as Research Natural Areas (RNAs) as shown on figure G-1. After further field review and evaluation by a special evaluation group coordinated by the Huron-Manistee National Forests' Research Natural Area Coordinator, final decisions regarding establishment of these candidate areas will be made through the National Environmental Policy Act (NEPA) process. The evaluation and establishment process will be occurring simultaneous with the completion of the Final EIS and Plan. Therefore, these documents will not reflect final decisions concerning each candidate area. Forests' Plan Standards and Guidelines will protect the Research Natural Area attributes of each candidate area until such final decisions are made. Forest Service Research, North Central Station, the Nature Conservancy, Michigan Natural Features Inventory, Michigan Natural Areas Council, and other key groups and individuals will be involved in the evaluation process. District Rangers, the Michigan Department of Natural Resources, the Nature Conservancy, and other conservation groups nominated possible RNA areas.

The candidate areas must meet the objectives of the RNA program. These require that the candidate areas meet one or more of the following criteria:

- (1) Contributes to the protection of diversity of vegetation communities and wildlife habitat.
- (2) Typifies important forest shrubland, grassland, alpine, aquatic, and/or geologic types.
- (3) Represents special or unique characteristics of scientific interest and importance.
- (4) Helps carry out provisions of laws, such as by providing habitat for endangered species.
- (5) Protects or maintains special aquatic, geologic, or potential natural vegetation and faunal communities or protects cultural resources.

Candidate areas not meeting these criteria may become special areas under USDA Regulations, Title 36, Section 194.1, National Natural Landmarks (a U.S. Department of Interior program) or be assigned to a management area not emphasizing natural area protection.

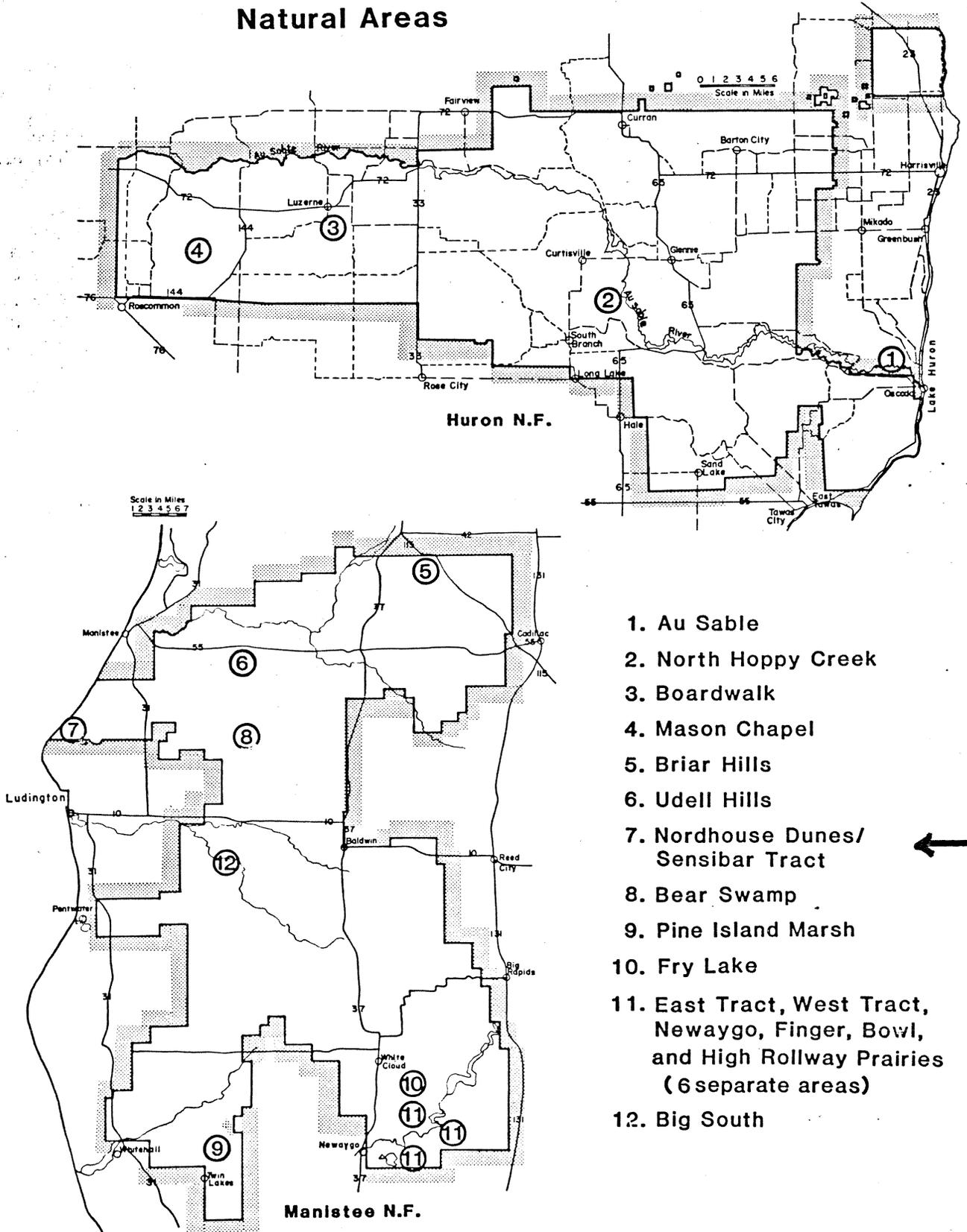
Use of and activities in these areas are limited to research, study, observation, monitoring, and kinds of educational activities that are nondestructive. Management activities will be limited to those that maintain or enhance the characteristics for which the RNA was established. On the Huron-Manistee National Forests, particular attention has been given to identifying candidate areas that, taken together, will represent as completely as possible the spectrum of forest types indigenous to Michigan. Areas with rare plant communities (for example, prairies and Atlantic coastal plain marshes) have also been identified. Descriptions (table G-1) and location maps (figure G-1) of the candidate areas follow.

Table G-1. Candidate Research Natural Areas (RNAs)

Candidate RNA	Acreage	Ranger District	County	Township, Range
<u>Huron National Forest</u>				
Au Sable	1,309	Tawas	Iosco	T24N, R8 & 9E
North Hoppy Creek	67	Harrisville	Alcona	T25N, R5E
Big Cedar	6	Mio	Oscoda	T26N, R3E
Boardwalk	64	Mio	Oscoda	T26N, R1E
Mason Chapel	43	Mio	Crawford	T25N, R1W
<u>Manistee National Forest</u>				
Briar Hills	93	Cadillac	Wexford	T23N, R11W
Udell Hills	320	Manistee	Manistee	T21N, R15W
Nordhouse Dunes/ Sensibar Tract	3,395 ^{1/}	Manistee	Mason	T20N, R18W
Bear Swamp	3,485 ^{1/}	Manistee/Baldwin	Mason/Lake	T19&20N, R14&15W
Pine Island Marsh	14	White Cloud	Muskegon	T12N, R16W
Fry Lake ^{2/}	60	White Cloud	Newaygo	T13N, R12W
West Tract Prairie	80	White Cloud	Newaygo	T12N, R12W
Newaygo Prairie	80	White Cloud	Newaygo	T12N, R12W
Finger Prairie	20	White Cloud	Newaygo	T12N, R12W
Bowl Prairie	34	White Cloud	Newaygo	T12N, R12W
High Rollway Prairie	8	White Cloud	Newaygo	T12N, R12W
East Tract Prairie	80	White Cloud	Newaygo	T12N, R11W
Big South	82	Baldwin	Mason	T17N, R15W

^{1/} Only portions of these acreages may be designated RNAs.
^{2/} Also known as Horseshoe Lake.

Figure G-1. Location of Candidate Research Natural Areas



1. Au Sable
2. North Hoppy Creek
3. Boardwalk
4. Mason Chapel
5. Briar Hills
6. Udell Hills
7. Nordhouse Dunes/
Sensibar Tract
8. Bear Swamp
9. Pine Island Marsh
10. Fry Lake
11. East Tract, West Tract,
Newaygo, Finger, Bowl,
and High Rollway Prairies
(6 separate areas)
12. Big South



Michigan Natural Features Inventory

Stevens T. Mason Building
Post Office Box 30028
Lansing, Michigan 48909
517 / 373-1552

22 November 1985

F. Glenn Goff
Vital Resources, Inc.
1518 River Terrace Dr.
East Lansing, MI 48823

Dear Glenn:

Here's our proposed RNA which the Huron-Manistee National Forest RNA Selection Committee is considering. The situation is that an RNA will be harder to establish before than after Wilderness is designated, so the Committee will probably wait until the Wilderness Area is established. Also, the boundaries of the RNA we proposed, and additional other RNA's within the Wilderness Area, are open to discussion. In fact, MNFI has informed HMNF that you will be in the best position, after your work is completed, to judge where the boundaries should go.

Hope this is timely enough.

Yours,

A handwritten signature in cursive script, appearing to read "Kim".

Kim Alan Chapman,
Ecologist

MINI SITE PACKAGE
Michigan Natural Features Inventory

Site Name: Nordhouse Dunes Research Natural Area

Location: Mason County, T20N, R18W, Secs. 28,32,33,34.

Purpose of Package: To delineate an area within Huron-Manistee National Forests and partially within the Nordhouse Dunes proposed Wilderness Area, that merits strong protection through designation as a research natural area.

Ownership Comment: The entire tract lies within Huron-Manistee National Forest. It is comprised largely of the Sensibar Tract purchased by the Nature Conservancy for inclusion in the Forest.

Summary of Significance: As described in Kim Chapman's full site package of 3 January 1984 on Big Sable Point Dunes & Swales, this tract is part of the world's largest freshwater dune system. It also contains the most extensive interdunal wetlands known on the Great Lakes. It supports one of the two largest populations of the Federal candidate Pitcher's thistle (Cirsium pitcheri) in existence, as well as the state threatened sand cancer-root (Orobanche fasciculata).

This tract merits strong protection because it is not only a fine and relatively undisturbed example of open dune and interdunal wetland community types, but because it is also the largest and highest quality example in existence. It is composed primarily of open dunes and interdunal wetlands, but also includes a full series of forested dunes (sec. 34) which will provide a full successional spectrum of dune ecosystems in the RNA. Sand dune ecosystems are extremely sensitive to degradation through overuse from humans (including frequent foot traffic), and a Research Natural Area designation is necessary to safeguard the integrity and value of this area from misuse or overuse.

Preparer: Sue Crispin

Date: May 27, 1985