file

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

ESTABLISHMENT RECORD FOR NEWAYGO PRAIRIES
RESEARCH NATURAL AREA WITHIN HURON-MANISTEE
NATIONAL FORESTS, NEWAYGO COUNTY, MICHIGAN

U. S. GOVERNMENT PRINTING OFFICE : 1980 O - 309-842

6200-7 (10/73)

United States Department of Agriculture | Forest Service | WO

Reply to: 4060-3 (TMR)

Date: June 21, 1988

Subject: Newago Prairie Research Natural Area (RNA) Approved by Chief

To: Regional Forester, R-9, and Director, NC Station

Congratulations; the Newago Prairie RNA was approved by the Chief on June 10. Enclosed for your file is a copy of the Establishment Record containing a copy of the Designation Order signed by the Chief. Keep up the good work.

STANLEY L. KRUGMAN, Director
Timber Management Research

Enclosure

Newago Prairie

USDA-FOREST SERVICE

PHOTOGRAPHIC RECORD

PHOTOGRAPHER

HEADQUARTERS UNIT: Huron-Manistee N.F.'s

LOCATION: Cadillac R.D.

DATE SUBMITTED

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 ~~XXXX~~ TEMP. NO. (1)	PERMANENT NO. (To be filled in by the WO) (2)	SELECTED FOR W.O. PHOTO LIBRARY (3)	DATE OF EXPOSURE (4)	LOCATION (State and National Forest or County) (5)	DESCRIPTION OF VIEW (6)
				All locations on Manistee NF, Newaygo County T12N R12W	
	1		9/86	Sec. 35 S1/2, SW NW	Finger Prairie, looking NW, 1800' W of center 1/4 corner. View of Bluestem dominated prairie, showing original forest/prairie border and encroaching conifers. This picture is taken from privately owned land recommended for inclusion in the Newaygo Prairies Research Natural Areas (RNA).
	2		9/86	Sec. 35 N1/2, NW SW	Society of American Foresters cover type 14, Northern Pin Oak, is shown in this picture. Picture taken 500' S of photo 1 and looking W. Located on National Forest system land included in the Newaygo Prairies RNA.
	3		9/86	Sec. 2 E1/2, NW NE	E unit of West Tract Prairie, looking S from NW corner of area. View Bluestem dominated prairie, with encroaching hardwoods, includir Allegheny Plum (Prunus alleghaniensisa).
	4		9/86	Sec. 2 SW NW	West unit of West Tract Prairie, looking E from 700' and 100' N of W 1/4 corner of Section 2. View Bluestem dominated prairie, and original forest/prairie border.
	5		9/86	Section 3	West Unit of West Tract Prairie, looking NW. Picture taken 600' W of E 1/4 corner of Section 3. View Society of American Forester cover type 21, Eastern White Pine.

Photo 1 - Finger Prairie: View of Bluestem grass dominated prairie.

Photo 2 - Finger Prairie: SAF cover type 14, Northern Pin Oak.

Photo 3 - West Tract Prairie: East Unit - view of Bluestem dominated prairie.

Photo 4 - West Tract Prairie: West Unit - view of Bluestem dominated prairie.

Photo 5 - West Tract Prairie: West Unit - SAF cover type 21, Eastern White Pine.

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 Newaygo Prairies Research Natural Area the lands described in the following establishment record prepared by Matthew D. Sands, dated July 31, 1987. These land shall hereafter be administered as a research natural area subject to the above regulations and instructions issued thereunder.

for Chief

JUN 10 1988
Date

Original

SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Newaygo Prairies Research Natural Area

Huron-Manistee National Forests

Newaygo 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 July 31, 1987
Matthew D. Sands, Research
Natural Area Coordinator,
Huron-Manistee National Forests

Recommended by G W Joiner Date July 31, 1987
Gordon W. Joiner, District Ranger, White Cloud District

Recommended by Ronald E. Scott Date July 31, 1987
Ronald E. Scott, Acting Forest Supervisor,
Huron-Manistee National Forests

Recommended by for Larry Payne Date 2/23/88
Floyd J. Marita, Regional Forester, Eastern Region

Recommended by R. D. Lindmark Date 3/8/88
Ronald Lindmark, Station Director,
North Central Forest Experiment Station

TITLE PAGE

Establishment Record for the Newaygo Prairies
Research Natural Area within Huron-Manistee
National Forests, Newaygo County, Michigan

ESTABLISHMENT RECORD FOR THE NEWAYGO PRAIRIES RESEARCH NATURAL AREA WITHIN THE HURON-MANISTEE NATIONAL FORESTS, NEWAYGO COUNTY, MICHIGAN

INTRODUCTION

This Research Natural Area (RNA) is comprised of three locations, two areas are known as West Tract and one as Finger Prairie, totaling 180 acres (72.9 hectares), and is entirely within the Huron-Manistee National Forests on National Forest System lands. The three locations of this RNA represent undisturbed and recovering dry sand prairie and undisturbed oak (Quercus sp.) and eastern white pine (Pinus strobus) forests. Society of American Foresters (SAF) cover types are #14, Northern Pin Oak (Quercus palustris); #21, Eastern White Pine; and nonforested prairies. Appropriate Kuchler types are K-86(1966), Great Lakes Pine Forest; and K-73, a mosaic of K-66, Bluestem Prairie and K-91, Oak-Hickory Forest.

The Newaygo Prairies RNA is comprised of three individual areas which are remnants of historically recognized Marengo and Little Scherrar Prairies (Hauser, 1953). These were first proposed as natural area preserves by the Michigan Natural Areas Council in 1964 and again in 1983 by the Michigan Natural Features Inventory, based on the presence of State of Michigan Threatened and Special Concern species (Crispin and Chapman, 1984).

Upland forests are adjacent to these prairie remnants at West Tract and Finger Prairies. These forests are either dominated by virgin eastern white pine or second growth, undisturbed mixed oak species. Most of the area at the West Tract location has been included in the Newaygo unit of the Lower Michigan Experimental Forest since 1960.

Current uses of these areas include research at the college level (Kapp, unpublished, and Hauser, 1953), botanical education (Crispin and Chapman, 1984), and general forest recreation uses, primarily hunting of upland game and viewing of natural landscapes. Sixteen acres (6.5 hectares) of these three locations have been classified as commercial forest land; the remainder is nonforest for wildlife or research purposes.

LAND MANAGEMENT PLANNING

The Huron-Manistee National Forests' Land and Resource Management Plan and Environmental Impact Statement were issued in July 1986 under Record of Decision dated July 16, 1986. Management Prescription 8.1, Special Areas, provides for designation of unique areas for their scientific and biological significance. These three prairie remnants were identified as the Newaygo Prairies and recommended as a proposed RNA in the Final Forests' Plan for this Planning period.

The Newaygo unit of the Lower Michigan Experimental Forest has been managed since 1960 for research purposes. Both of these areas will be managed as Special Areas of the Forests for this Planning period.

OBJECTIVES

The objectives of the Newaygo Prairies RNA are:

1. To protect and monitor the special habitats, plants and ecological settings of the prairies and woodlands.

2. To provide a land base for the continuation of nonmanipulative research on prairie habitats and low to moderately productive oak and pine ecosystems.

3. To provide the Huron-Manistee National Forests with upland forests suitable for monitoring required under 36 CFR 219.12(K)(2), documentation of prescriptions and effects of management.

4. To acquire private land or obtain conservation agreements with private owners in order to coordinate management of an archipelago of National, State, and private dry sand prairie preserves.

JUSTIFICATION

Lands supporting natural prairie vegetation are now rare in Michigan. Soil surveys and historical records indicate that approximately 9,000 acres (3644 hectares) of Newaygo county once supported dry sand prairie vegetation (Crispin and Chapman, 1984). Today only 230 acres (93 hectares), or 3 percent, are set aside as preserves by the Michigan Nature Association, The Nature Conservancy, and the Forest Service (Crispin, 1980). Remaining prairie locations total approximately 120 acres (49 hectares). Perhaps another 650 acres (263 hectares) exist in a disturbed (i.e. plowed, conifer plantations, or grazed), but potentially recoverable condition on private or National Forest land. The remaining 8,000 acres (3239 hectares) are further removed from their original prairie conditions (Crispin and Chapman, 1984). The Newaygo Prairies RNA will directly protect 45 acres (18 hectares) of virgin and recovering prairie.

Included in this RNA are four areas of upland forests. These range in year of origin from 1883 to 1934, and are undisturbed examples of their cover types. These forests are important to the Huron-Manistee for two reasons: they represent the original forest-prairie border, and they are representative of 400,000 acres (161,943 hectares) of National Forest lands that currently or potentially support these forests. Land set aside for RNA's would be useful for long-term monitoring and documentation of prescriptions and effects on the Huron-Manistee National Forests [36 CFR 219.12(K)(2)], as similar ecosystems are not found elsewhere in the National Forest System. SAF cover type #14, Northern Pin Oak, is represented in only one other Eastern Region

RNA. The inclusion of another representative of SAF cover type #21, Eastern White Pine, will simply be a change in designation from one type of research natural area to another.

PRINCIPAL DISTINGUISHING FEATURES

Dry sand prairies in Newaygo county bear the closest resemblance to a western dry prairie of any Michigan grassland type (Michigan Natural Features Inventory, 1983). These areas are characterized by sparse woody vegetation, which is usually large diameter northern pin oak, black oak (Quercus velutina), or eastern white pine in contrast to the surrounding oak and pine woodlands. Nomenclature for tree species is Agriculture Handbook 541 (Little, 1979). Herbaceous vegetation, which dominates the prairies, is mostly Pennsylvania sedge (Carex pensylvanica) and little bluestem (Andropogon scoparius). Herbaceous and other woody vegetation nomenclature follows Gleason (1952).

State of Michigan Special Concern (SC) and Threatened (T) species are elements of the ground flora in the prairies. These include yellow flax (Linum sulcatum), prairie smoke (Geum triflorum), western silvery aster (Aster sericeus), false arrow-feather (Aristida necopina), and Allegheny plum (Prunus alleghaniensis) (State of Michigan Public Act 203, 1974).

The three prairie remnants are located exclusively on one soil type, Sparta loamy sand. The presence of a 10-12 inch (26-31 cm) thick "A" horizon is diagnostic of a soil which has developed under grassland vegetation. Adjacent forested land is growing on Plainfield sand, a soil with a typical forest developed profile (USDA-Soil Conservation Service, 1951).

LOCATION

Legal Description

The Newaygo Prairies RNA is located on the White Cloud Ranger District of the Huron-Manistee National Forests. All three areas are located within Newaygo county, Michigan. Individually, the areas may be described as follows:

NAME	LEGAL DESCRIPTION	LATITUDE-LONGITUDE	ACRES (HECTARES)	ELEVATION IN FEET (METERS)
Finger Prairie	T12N, R12W Section 35 N1/2, NWSW	43° 22' N 86° 43' W	20 (8)	804 (245)
West Tract Prairie	T12N, R12W Section 2 SWNW, E1/2NWNE, and S1/2NWNW	43° 27' N 86° 43' W	80 (32)	800 (244)
	SENE and NESE Section 3		80 (32)	800 (244)

Access

Access to these areas, by passenger vehicles is as follows:

Finger Prairie (Photographs #1 and 2)

From White Cloud, Michigan, go south 10 miles (16.1 km) on M 37, through Newaygo, Michigan, to M 82. Then east on M 82 three miles (4.8 km) to Spruce Avenue. Then south 1 mile (1.6 km) to 96th Street. Then east one mile (1.6 km) to Poplar Avenue. Then north 0.4 mile (0.6 km) to the south end of Finger Prairie. See Map 1.

West Tract Prairie (Photographs #3, 4 and 5)

From White Cloud, Michigan, go south 4.75 miles (7.7 km) to 40th Street. Then east 3.1 miles (5.0 km) to Laurel Drive. Then southwest 1 mile (1.6 km) to 48th Street where Forest Road 5901 begins. Proceed east .375 mile (0.6 km) to the west side of the East unit of West Tract Prairie, or proceed west 0.25 mile (0.4 km) to Poplar Avenue (also Forest Road 5900), then south 0.375 mile (0.6 km) to the West unit of West Tract Prairie. See Map 1.

AREA BY COVER TYPES

Society of American Foresters

The Newaygo Prairies RNA is about 60 percent forested. Of this 60 percent, 37 percent is in SAF Type 21, Eastern White Pine and 23 percent in SAF Type 14, Northern Pin Oak. The white pine type is on the western edge of the West Tract Prairie unit. The northern pin oak is also in the western part of the West Tract Prairie unit as well as in the Finger Prairie unit. See Map 3. The 40 percent of the RNA that is nonforested is mostly big and little blue stem grassland with less than 25 percent tree cover. See Map 3.

SAF Cover Type and Number	Acres	Hectares
Nonforest	73	30
Northern Pin Oak, #14	42	17
Eastern White Pine, #21	65	26

Kuchler Cover Type

Kuchler's cover type 73, a mosiac of Kuchler types 66, Bluestem Prairie, and Kuchler type 91, Oak-Hickory Forest, describes the prairie portions of this RNA. Little bluestem and big bluestem (*Andropogon gerardii*), major herbaceous species of this Kuchler type in other north-central U.S. locations, are common on these prairie remnants. The major associated tree species in Newaygo county are northern pin oak, black oak, and eastern white pine. Hickory (*Carya* sp.) is replaced by these species on the xeric Newaygo county plains. Forested areas are a part of Kuchlers' Type 86,

Great Lakes Pine Forest. SAF cover types #14, Northern Pin Oak, and #110, Black Oak, are seres of K-86 (Kuchler, 1966).

Kuchler Type and Number	Acres	Hectares
Bluestem Prairie and Oak-Hickory Forest, K-73	68	27
Great Lakes Pine Forest, K-86	112	45

PHYSICAL AND CLIMATIC DATA

Physical

Finger Prairie is an unplowed remnant of a once larger Little Scherrar Prairie (Hauser, 1953). Topography is level, except for a small seepage wetland. The original prairie-woodland border is largely intact, but encroachment of oaks, eastern white pine, and jack pine (Pinus banksiana) has occurred (Photograph #1). The majority of the prairie is located on privately-owned land. The National Forest land forms the southern edge of the original prairie, and also contains a small seepage wetland. The Northern Pin Oak SAF cover type originated in 1924 and has not been managed (Photograph #2).

The two locations of the West Tract Prairie are remnants of Marengo Prairie (Hauser, 1953). Past disturbances here are thought to have been grazing, but have not significantly altered the natural vegetation (Michigan Natural Features Inventory, 1984). Encroachment of woody vegetation has occurred (Photograph #3), but the original prairie edge is very much intact (Photograph #4). This site has a level topography throughout. Surrounding woodlands represent SAF cover types #14, Northern Pin Oak, and #21, Eastern White Pine (Photograph #5). Year of origin on these forests are 1883, 1915, and 1934, respectively.

There is a powerline transmission right-of-way on the edge of West Tract Prairie, and an underground right-of-way for a gas pipeline on the Finger Prairie location.

(Management of these right-of-ways will not impact RNA.)

Climate

Weather observations are available from Croton Dam and Hardy Dam dating from 1907. Croton Dam is located within 4 miles (6.4 km) of all three areas. West Tract Prairie is 3 miles (4.8 km) to the northwest, and Finger Prairie is 4 miles (6.4 km) to the southwest. The elevation of Croton Dam is 725 feet (221 m). Hardy Dam is 4 miles (6.4 km) upstream (north) of Croton Dam and became the observation site in 1961. The elevation of Hardy Dam is 830 feet (253 m).

The general climate of this region alternates between continental and semi-marine due to the presence of Lake Michigan 38 miles (61.3 km) to the west. Fifty-six percent of the 32 inches (800 mm) of mean annual precipitation falls in May through October and snowfall averages 57 inches (145 cm). Mean January temperature is 21.7° F (- 5.7° C)

with an annual mean temperature of 45.5° F (7.5° C) (Michigan Department of Agriculture, 1971).

DESCRIPTION OF VALUES

Flora

The dominant vegetation of these prairies has been intensively surveyed by Hauser (1953), Crispin and Chapman (1984), and the Michigan Natural Features Inventory (1986). Grasses (Gramineae sp.), sedges (Cyperaceae sp.), and various herbaceous species predominate. Hauser found that Pennsylvania sedge (Carex pensylvanica) and western ragweed (Ambrosia psilostachya var. coronapifolia) are usually represented on 50 percent or more of all Newaygo prairie sites. Poverty oatgrass (Danthonia spicata), big bluestem, and little bluestem are other common species on the RNA's.

The following summary of current associates and potential natural vegetation is drawn from Hauser (1953), The Michigan Natural Features Inventory (1984, 1986), Irvine (1986), and Irvine and Dunlap (1984).

Woody vegetation on the prairies is sparse and consists of large specimens of northern pin oak, black oak, and eastern white pine; although smaller specimens do occur. Other woody vegetation is prairie willow (Salix humulis), northern dewberry (Rubus flagellaris), pasture rose (Rosa carolina), black cherry (Prunus serotina), sand cherry (Prunus pumila), and bearberry (Arctostaphylos uva-ursi); and comprises the low and intermediate cover.

Herbaceous associates include Pennsylvania sedge, sky-blue aster (Aster azureus), Indian grass (Sorghastrum nutans), tumbleweed (Anemone cylindrica), Canada bluegrass (Poa compressa), needle grass (Stipa spartea), Kentucky bluegrass (Poa pratensis), wormwood (Artemisia caudata), horsemint (Blephilia ciliata), lance-leaved coreopsis (Coreopsis lanceolata), prairie alum-root (Heuchera richardsonii), prickly pear (Opuntia compressa), downy phlox (Phlox pilosa), and hairy beard-tongue (Penstemon hirsuta).

Potential natural vegetation is best characterized by predominance of grasses, especially big and little bluestems, over Pennsylvania sedge. Also present would be scattered woody perennials, such as oaks, cherry and conifers, and at a lesser frequency northern dewberry.

One State of Michigan Threatened (ST) plant species is known to be located on the National Forest portion of these prairies. This species is prairie smoke (Geum triflorum) and is located at Finger Prairie.

Fauna

Habitats are provided for three groups of wildlife species (Irvine, 1986). Locally extirpated species include greater prairie chicken (Tympanuchus cupido), dickcissel (Spiza americana), and logger-head shrike (Lanius ludovicianus). The eastern elk (Cervus elaphus), now extinct, was also

provided habitat from the prairies at one time. Nomenclature follows Hall (1981) for mammals and American Ornithological Union (1976) for avian species.

A second group includes species that have benefited from conversion of forests to agriculture and brush or grassland cover. This group is typified by thirteen-lined ground squirrel (Citellus tridecemlineatus), eastern fox squirrel (Sciurus carolinensis), prairie deer mouse (Peromyscus maniculatus bairdi), American kestrel (Falco sparverius), eastern bluebird (Sialia sialis), and many other species. These animals are grassland dependent species historically associated with prairies throughout lower Michigan.

The third association represents species that utilize a variety of habitats, including grassland types, but grasslands are not a key to their existence. Representatives such as white-tailed deer (Odocoileus virginianus), eastern cottontail (Sylvilagus floridanus), big brown bat (Eptesicus fuscus), red-tailed hawk (Buteo jamaicensis), and American crow (Corvus brachyrhynchos) are common; as are many other species.

Two State of Michigan rare butterfly species are associated with dry sand prairie vegetation. These are Ottoe's skipper (Hesperia ottoe) and regal fritillary (Speyeria idalia) (Michigan Natural Features Inventory, 1984).

Geology

The 1978 Oil and Gas overview of the Huron-Manistee National Forests' (USDA-FS, 1978), indicates that the oil and gas reserve potential of the bedrock underlying the RNA is generally low.

The stratigraphic column of lower Michigan resulted from the filling of the Michigan Basin over the course of 300 million years. Most formations are carbonate rock, and the depth to Precambrian formations is approximately 2 miles (3.2 km). A layer of glacial drift, several hundred feet thick, covers the bedrock on the prairie locations (Dorr and Eschman, 1970).

Minerals

The mineral estates are 77 percent U.S.A. and 23 percent State of Michigan ownership. The following table describes the status of these rights.

Legal Description (All T12N, R12W)	Status	Expiration Date
E1/2, NWNE of Section 2	Lease #ES 27811	4/1/93
SWNW of Section 2	Lease #N-20436 (State of Michigan)	8/9/92
SENE and NESE of Section 3	Lease #ES 21258	7/1/92
N1/2, NWSW of Section 35	Lease #N-20477 (State of Michigan)	8/9/92

Soils

The soils derived from the drift of northern lower Michigan are primarily sandy. Two soil series may be found on all Newaygo prairie sites. Sparta loamy sand; a sandy, mixed mesic Entic Hapludoll is exclusively associated with these prairies. This is a true prairie soil having a thick "A" horizon which developed with grass/herbaceous vegetation. The other soil, Plainwell sand; a siliceous, frigid Typic Udipsamment is a weakly developed spodosoll which shows the influence of forest vegetation (USDA-Soil Conservation Service, 1951). Both of these series are excessively drained sands located on outwash plains deposited 14,000 years ago following formation of the Lake Border moraine (Ibid).

Cleland (1986) is developing an Ecological Classification System for the Huron-Manistee National Forests. This system is based on a hierarchy of Land Type Associations (glacial age and mode of deposition) and Ecological Land Type Phases (potential vegetation). All forested RNA locations are on Land Type Association #1, nonstratified, outwash plains. The Ecological Land Type Phase is #1, northern pin oak-white oak (*Quercus ellipsoidalis* and *Quercus alba*) and hair-grass (*Deschampsia flexuosa*).

Lands

All National Forest land in the RNA has been acquired from various owners under Weeks Law authority. There are no land acquisitions needed to complete ownership of this RNA.

The following chart describes all acquisitions.

Legal Description (All T12N, R12W)	Acquired
E1/2, NWNE of Section 2	9/24/62
S1/2, NWNW of Section 2	4/29/63
SWNW of Section 2	4/12/45
SENE and NESE of Section 3	10/11/52
N1/2, NWSW of Section 35	4/19/50

Vegetation treatment and land use restrictions apply to the West Tract (west unit) Prairie under the 1960 designation of the Newaygo Experimental Forest. Rights-of-way exist for county roads, power transmission lines, or pipelines at all RNA locations. These physical improvements are located on the periphery of woodlands and prairies. In addition, one or more two-track roads traverse portions of West Tract Prairie.

Cultural

The historical record also indicates that Indian mounds, probably of the Havanna-Hopewell period (2,000 years before present), were located in the center of Brooks Township (T12N, R12W). None have been located on any RNA location (Davis, 1986). None of these areas have been surveyed for cultural resources by the Forest Service.

IMPACTS AND POSSIBLE CONFLICTS

The Huron-Manistee National Forests' Land and Resource Management Plan contain Standards and Guidelines for the management and protection of Special Areas. These Standards and Guidelines provide the basis for conflict resolution and are the framework for the following discussion and Management Plan outline:

Mineral Resources

Oil and gas reserves have been exploited in many locations within Newaygo county. However, most of these reserves are in intermediate depth rock layers (e.g., 5,000+ feet or 1,525+ m). Recent exploration has been twice as deep, generally. Hard rock minerals, coal, and gypsum have not been developed in the area due to the great depth of the overburden or lack of economically proven deposits (Lindwall, 1986).

Nonsurface disturbing exploration is permissible on these areas. Other types of exploration and development is permitted on a case-by-case basis following a site-specific environmental analysis. Subsurface rights may be subordinated or acquired if conflicts cannot be resolved, the

public benefits of surface values exceed the cost of acquiring subsurface rights, and the costs are consistent with budgets.

Surface occupancy is not permitted at Finger Prairie and in Section 2 locations of West Tract Prairie. Surface occupancy is not restricted in the remainder of the West Tract Prairie. Future mineral leases may be considered because of the small land areas involved, but surface occupancy must not be allowed in future leases.

Common variety minerals extraction will not be allowed if these areas are designated as an RNA. These minerals are administered by the USDA-Forest Service and the Michigan Department of Natural Resources, Forestry Division.

Grazing

These areas are not presently under a grazing allotment. The present vegetation cover, combined with small acreages, lack of fences, water, and needed returns on range investments precludes viable grazing opportunities. In addition, grazing may have undesirable effects on State Threatened and Special Concern species. For these reasons, these areas will be withdrawn from grazing use.

Timber

Withdrawals from the timber producing land base will be necessary to establish this RNA. Nonforested land and land designated as the Newaygo Experimental Forest are not considered as a part of this commercial forest land base. The total area to be withdrawn is 16 acres (6 hectares) and the volume of timber affected is estimated to be 160 Mbf (253 Ccf).

Watershed Values

The watershed of the Newaygo Prairies is a source of groundwater for recreational use in nearby lakes and rivers. Dwellings in adjacent subdivisions undoubtedly also draw upon shallow aquifiers for potable water.

Surface water on the RNA sites is limited to one small seepage wetland. The flat topography and permeable soils preclude any erosion problems.

Designation as an RNA is consistent with the intended groundwater uses of the surrounding townships. Prevention of woody vegetation succession will allow greater contributions to the groundwater flow.

Recreation Values

Dispersed recreation activities that occur on these sites are large and small game hunting, natural history study, and occasional camping. Overall use figures for these activities are not available per location, but may be inferred from the Forests' recreation data records to provide 200-300 Recreation Visitor Days of participation in these activities. Vehicle use on these areas is primarily via two-track trails that enter from county roads.

Recreation uses, such as hunting and nature study, do not threaten to modify ecological processes or to alter natural conditions. Closure of two-track trails will reduce any threats of vehicle operation and camping, and thereby enhance research and educational values of the prairies and woodlands. Similar ecosystems are managed within T12N, R12W by the Michigan Nature Association and The Nature Conservancy. Road closures on these prairies have controlled unauthorized uses that would degrade natural conditions and modify ecological processes.

Wildlife and Plant Values

The Threatened and Special Concern species of these areas are dependent on maintaining the remnant prairies in a natural condition. The biggest threats to the ecological setting of these areas is encroachment of woody vegetation and disturbances that encourage nondesirable herbaceous vegetation, especially Pennsylvania sedge.

Woodlands that represent SAF cover types will be protected from fuelwood gathering, trespass, refuse disposal, and other uses that degrade these areas for research use.

The presence of county roads and utility corridors on the edges of prairie remnants and woodlands does not threaten educational uses or modify ecological conditions and natural conditions. It is the presence of two-track trails that lead from these roads and corridors that has the greatest impact on potential RNA values.

New herbarium collections will not be necessary for plants known to be present on these areas. Grazing is not necessary to perpetuate Threatened or Special Concern species. Prescribed fire may be necessary to preserve prairie conditions, especially to conserve and maintain Threatened and Special Concern species. Other vegetation treatments may be necessary at West Tract and Finger Prairies to eliminate woody vegetation which is not a part of the prairie natural condition (Kapp, unpublished data file).

No vegetation treatments are anticipated in forested portions of this proposed RNA to preserve the cover type or RNA values. However, prescribed fire may be used to simulate naturally occurring surface fires known to be a part of the ecology of Northern Pin Oak and Eastern White Pine cover types.

Wilderness, Wild and Scenic River, National Recreation Area Values

Establishment of this RNA will not impact any Congressionally designated area. West Tract, Finger and the Newaygo Prairie Ecological Study Area, and the Newaygo Unit of the Lower Michigan Experimental Forest are not located in any proposed or existing Wilderness, Wild and Scenic River, or National Recreation Area.

Transportation Plans

There would be no impact to the Forests' transportation system if this RNA were established. All two-track roads have been previously identified for closure.

The Newaygo County Road Commission has authority over the roads that provide access to these RNA locations. County roads are adjacent to the west side of Finger Prairie and at two locations on West Tract Prairie. These roads all have recorded rights-of-way. Despite the proximity of these roads, they pose no threat to the integrity of these prairies and woodlands.

MANAGEMENT PLAN

The objectives of the Newaygo Prairies RNA are:

1. To protect and monitor the special habitats, plants and ecological settings of the prairies and woodlands.

2. To provide a land base for the continuation of research on prairie habitats and low to moderately productive oak and pine ecosystems.

3. To provide the Huron-Manistee National Forests with upland forests suitable for monitoring required under 36 CFR 219.12(K)(2), documentation of prescriptions and effects of management.

4. To acquire private land or obtain conservation agreements with private owners in order to coordinate management of an archipelago of National, State, and private dry sand prairie preserves.

Vegetation Management

The most important need for vegetation management is to reduce arborescent encroachment on prairie remnants. Management practices that will provide a close approximation of naturally-occurring processes and vegetation are prescribed fire, supported by mechanical girdling of vegetation too large to eliminate with fire. This vegetation treatment must be done to protect the prairies against indirect ecological modifications created by fire protection and elimination.

These practices will be performed as soon as practical following establishment of this RNA at the West Tract Prairie, (west unit). Prescribed fire in forested portions of this RNA will be used to simulate naturally-occurring surface fires. Scheduling of prescribed fire after initial application at West Tract Prairie will be dependent upon receiving formal research proposals. All other prairie locations of this RNA are not threatened by woody encroachment. Therefore, scheduling of prescribed fire at these sites will also be coordinated with formal research activities.

Wildfire will not be suppressed within the boundary of this area should it be designated RNA, except to preserve life, property, or special prairie values. If such control is necessary, no mechanically constructed control lines may be within the RNA boundary. Fire control activities should be coordinated with county road locations under these circumstances.

Threatened and Endangered Species

The Forests will continue to monitor Threatened and Special Concern species populations and any impacts of dispersed recreation to these species. The Forests should schedule rare plant surveys every five years if such surveys are not performed as a part of formal research.

Law Enforcement

These areas will be protected from noncommercial timber cutting and road intrusions. This is one of the most important needs of this RNA.

Grazing

Grazing would have an unknown effect on the rare plant species of the prairies and is therefore an uncompatible use.

Conservation Coordination

The acquisition of the following lands, by either the USDA-Forest Service or a conservation cooperator, will protect important prairie remnants. National Forest lands may become a part of this RNA or be incorporated in a Special Interest Area, depending on the protection afforded by ownership patterns, ecological values, and other land uses.

Two other prairie reserves, a Michigan Nature Association tract and the Ore-Ida Prairie, are located nearby. The establishment of the Newaygo Prairies RNA will complement these reserves.

Township	Section Description	Acres	Site Name
T12N, R12W	SENW of Section 4	40	Section 4
T12N, R12W	That part of SWNW lying south of M-82 in Section 26	30	High Rollway Prairie
T12N, R12W	W1/2,NWSE of Section 27	20	Bowl Prairie
T12N, R12W	SWNW and W1/2,W1/2, E1/2,NW of Section 35	60	Finger Prairie Addition

The above lands are known to provide habitat for several State of Michigan Threatened (ST) and Special Concern (SC) species. The following lists sites and species (Michigan Natural Features Inventory, 1986 and Kapp, unpublished):

Species	Locations
Prairie smoke (ST) (*Geum triflorum*)	Bowl Prairie, High Rollway Prairie, and Section 4 site
Western silvery aster (ST) (*Aster sericeus*)	Bowl Prairie, High Rollway Prairie, and Section 4 site
Allegheny plum (SC) (*Prunus alleghaniensisa*)	Bowl Prairie
Yellow flax (SC) (*Linum sulcatum*)	Bowl Prairie
Side-oats grama (ST) (*Bouteloua curtipendula*)	Section 4 site

ADMINISTRATIVE RECORDS AND PROTECTION

The administrator and protector of these areas is:

District Ranger
USDA-Forest Service
White Cloud, MI 49349

The research coordinator is:

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

The research data files are maintained by the North Central Forest Experiment Station with copies kept at the White Cloud Ranger District and Regional Office.

The herbarium collection and an additional data file is maintained by:

Dr. Ronald Kapp
Alma College
Alma, MI 48801

REFERENCES

American Ornithological Union. 1976. Handbook of North American Birds. Yale University Press. Ralph S. Palmer ed.

Cleland, David T. 1986. Soil Scientist, Huron-Manistee National Forests. Cadillac, MI.

Crispin, Susan R. 1980. Michigan Botanist, Vol. 19, #3. Michigan Botanical Club. Ann Arbor, MI.

Crispin, Susan R. and Kim A. Chapman. 1984. Michigan Botanist, Vol. 23:69-75. Michigan Botanical Club. Ann Arbor, MI.

Davis, John R. 1986. Archeologist, Huron-Manistee National Forests. Cadillac, MI.

Dorr, John A. Jr. and Donald F. Eschmann. 1977. Geology of Michigan. The University of Michigan Press. Ann Arbor, MI.

Gleason, H. A. 1952. The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada. New York Press. New York, NY.

Hall, E. R. 1981. Mammals of North America. John Wiley and Sons. New York, NY.

Hauser, R. S. 1953. An Ecological Analysis of the Isolated Prairies of Newaygo County, Michigan. PhD dissertation. Michigan State University. East Lansing, MI.

Irvine, George W. 1986. Wildlife Biologist, Huron-Manistee National Forests. Cadillac, MI.

Irvine, George W. and Ronald L. Dunlap. 1984. Review and Evaluation of Species Considered for Endangered, Threatened, and Sensitive Classification for the Huron-Manistee National Forests. Huron-Manistee National Forests. Cadillac, MI.

Kapp, Ronald O. 1986. Unpublished data file from the Newaygo Prairies. Alma College. Alma, MI.

Kuchler, A. W. 1964. Potential Natural Vegetation of the Conterminous United States and Canada. U.S. Geographical Society. Special Publication #36.

Kuchler, A. W. 1966. Map of Potential Natural Vegetation.

Lindwall, Lance. 1986. Shared-services Geologist, Huron-Manistee National Forests. Cadillac, MI.

Little, Elbert L. 1979. Checklist of United States Trees (Native and Naturalized). USDA-Forest Service, Agricultural Handbook 541.

Michigan Public Act 203. 1974. State of Michigan list of Threatened and Endangered species.

Michigan Department of Agriculture, Weather Service. 1971. Climate of Michigan by Stations. Climate of Croton and Hardy Dams.

Michigan Natural Features Inventory. 1983. Data file of the Newaygo county prairies. Lansing, MI.

Michigan Natural Features Inventory. 1984. An Overview of the Endangered and Threatened Species in Huron-Manistee National Forests, Michigan. Lansing, MI.

Society of American Foresters. 1980. Forest Cover Types of the United States and Canada. F.H. Eyre, ed. Society of American Foresters. Washington, DC.

USDA-Soil Conservation Service. 1951. Soil Survey of Newaygo County, Michigan.

USDA-Forest Service. 1978. Oil and Gas Overview of the Huron-Manistee National Forests. Huron-Manistee National Forests. Cadillac, MI.

USDA-Forest Service. 1979. Checklist of United States Trees (Native and Naturalized). Elbert L. Little Jr., ed. Agriculture Handbook #451.

USDA-Forest Service. 1986. Land and Resource Management Plan of the Huron-Manistee National Forests. Huron-Manistee National Forests. Cadillac, MI.

USDA-Forest Service. 1986. Unpublished data file of Potential Research Natural Areas on the Huron-Manistee National Forests. Huron-Manistee National Forests. Cadillac, MI.