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TOWNSEND WOODS
SCIENTIFIC AND NATURAL AREA

MANAGEMENT PLAN
AND
RESOURCE INVENTORY

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***The Scientific and Natural Areas Program...
Protecting and Managing
the Best of Minnesota's
Natural World***

TOWNSEND WOODS
SCIENTIFIC AND NATURAL AREA

MANAGEMENT PLAN
AND
RESOURCE INVENTORY

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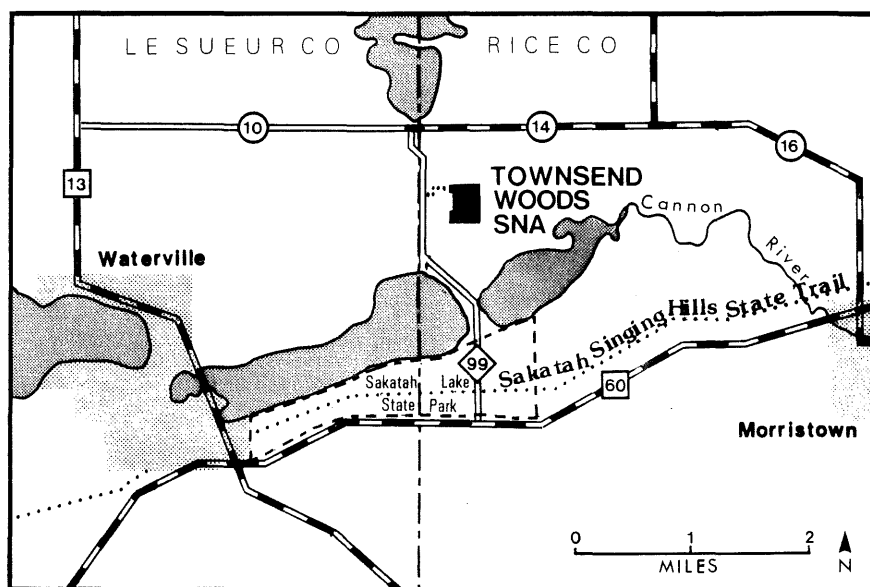
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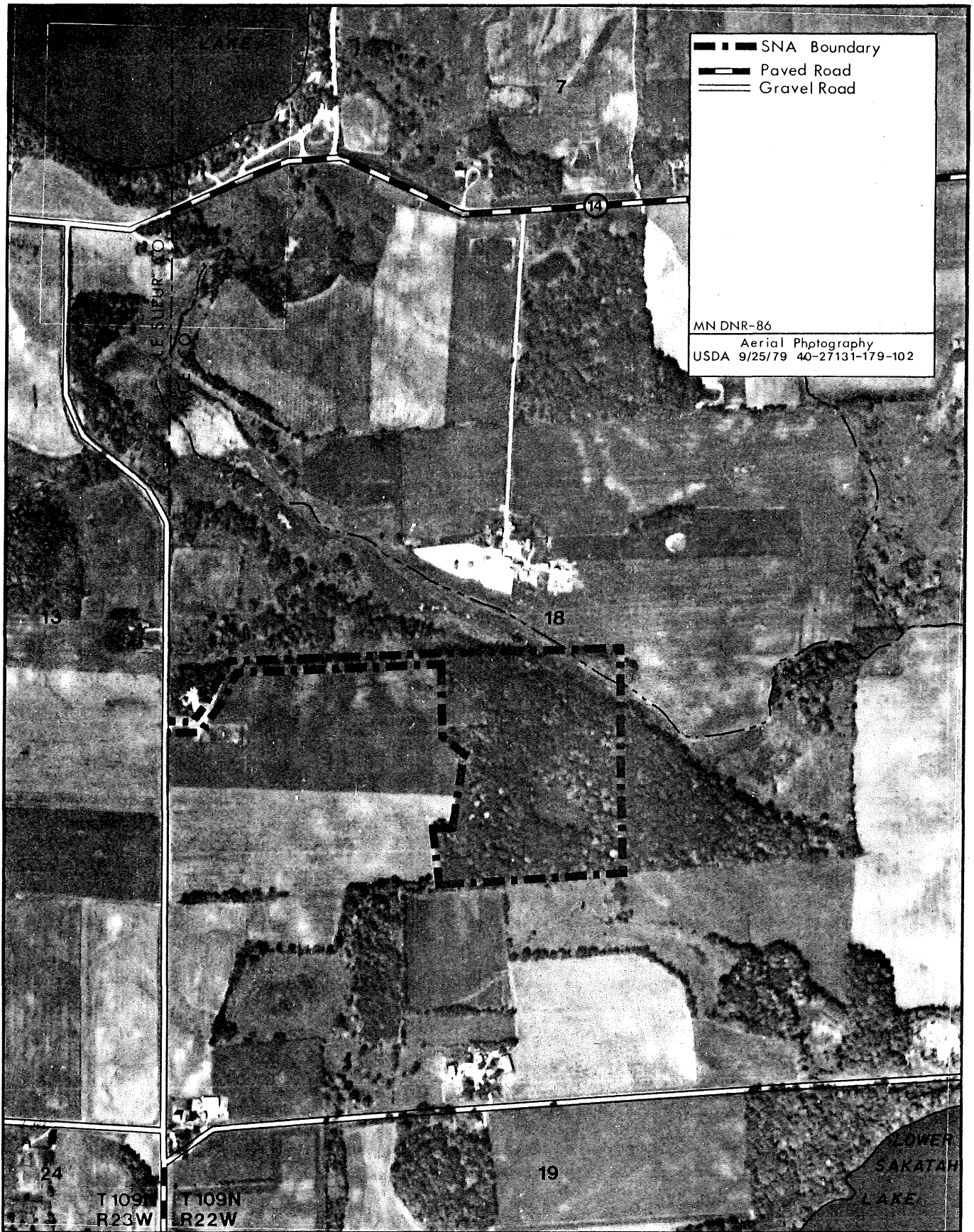
Division of Fish and Wildlife
Minnesota Department of Natural Resources

A MANAGEMENT PLAN
FOR
TOWNSEND WOODS SCIENTIFIC AND NATURAL AREA

A Portion of
NE 1/4 SW 1/4 Section 18
Township 109 North, Range 22 West
Waterville Quadrangle - V 15 A
Morristown Township
Rice County
Minnesota

Prepared by
The Scientific and Natural Areas Program
Section of Fish and Wildlife
Minnesota Department of Natural Resources
February 1987





--- SNA Boundary
— Paved Road
--- Gravel Road

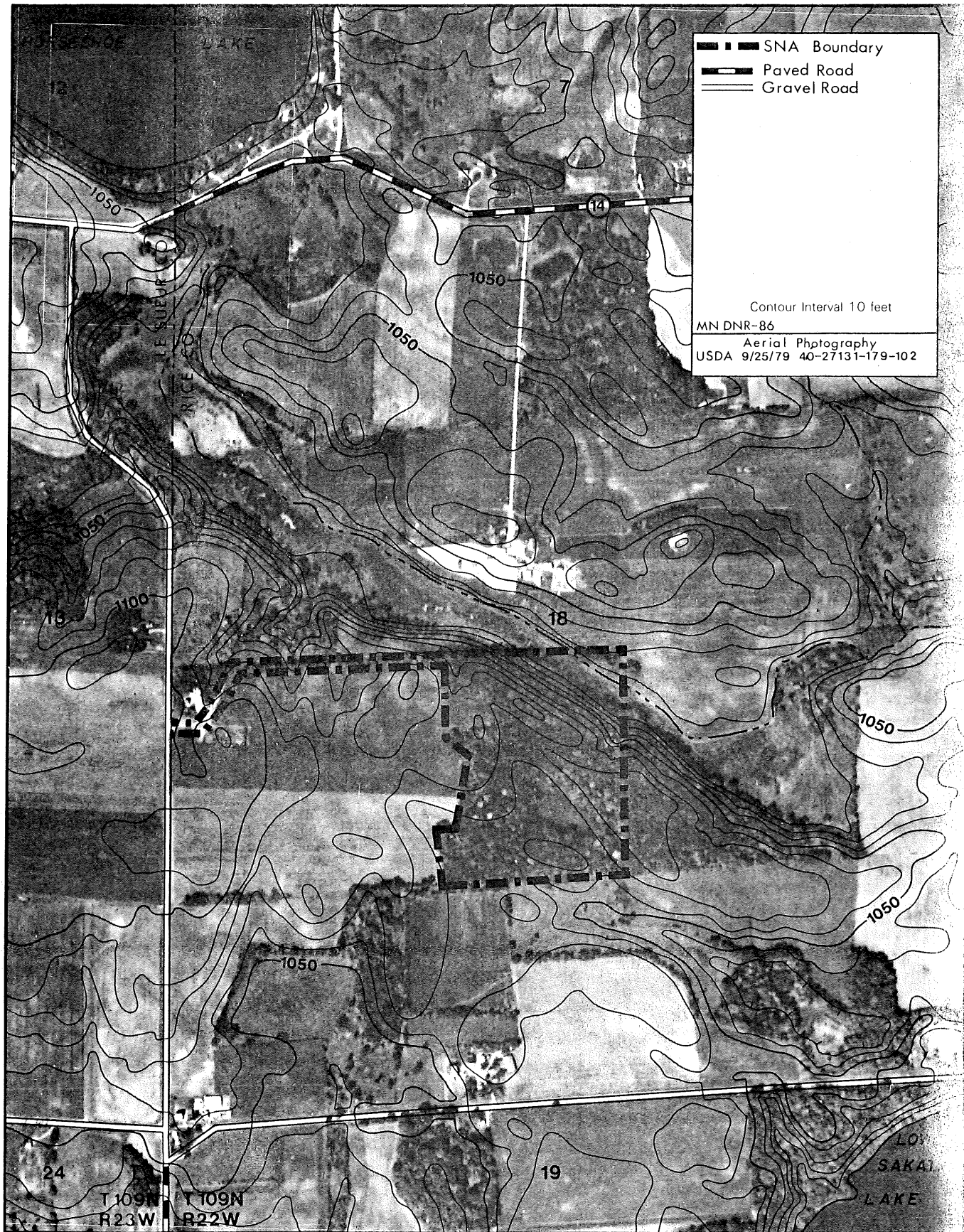
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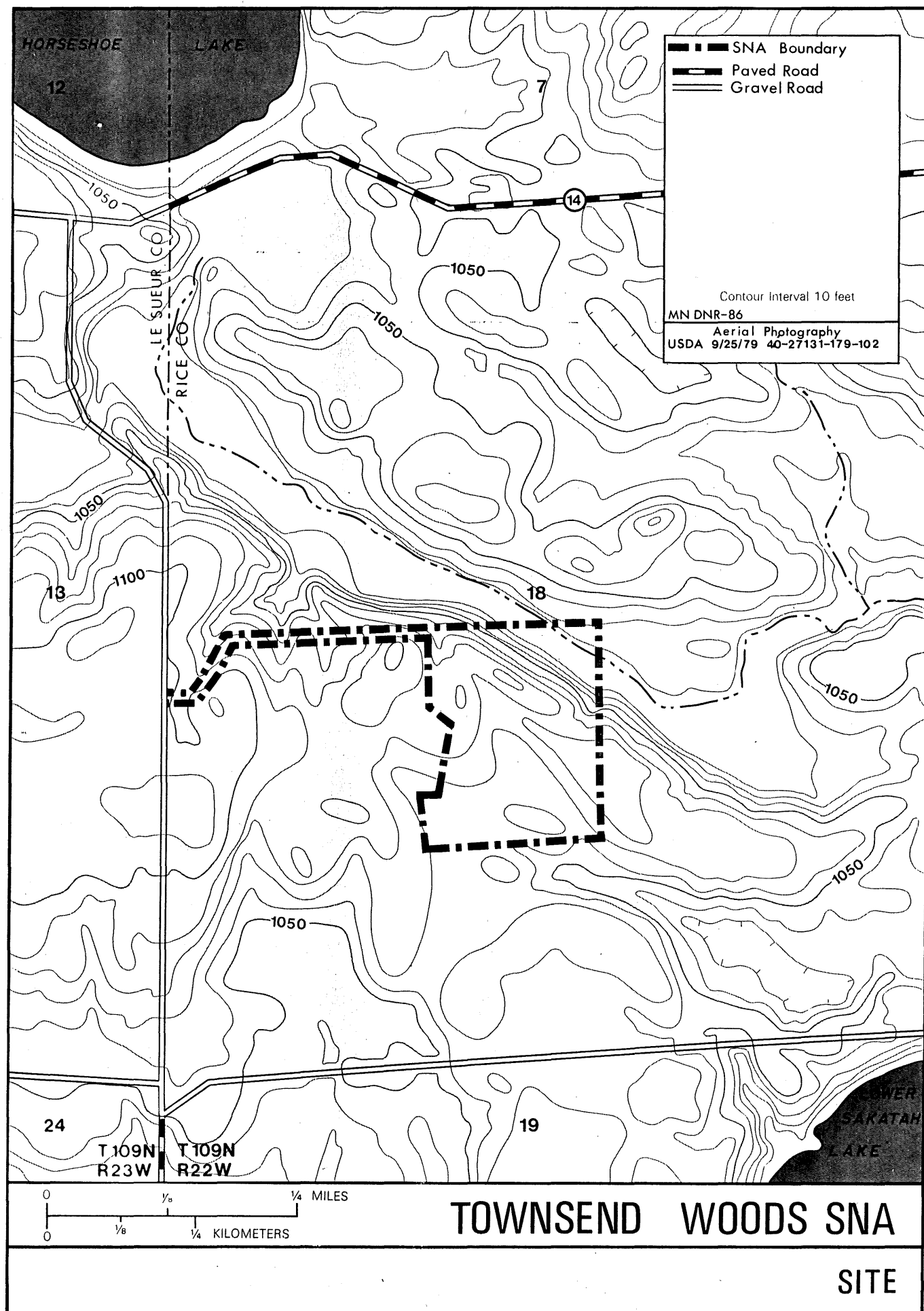
TOWNSEND WOODS SNA

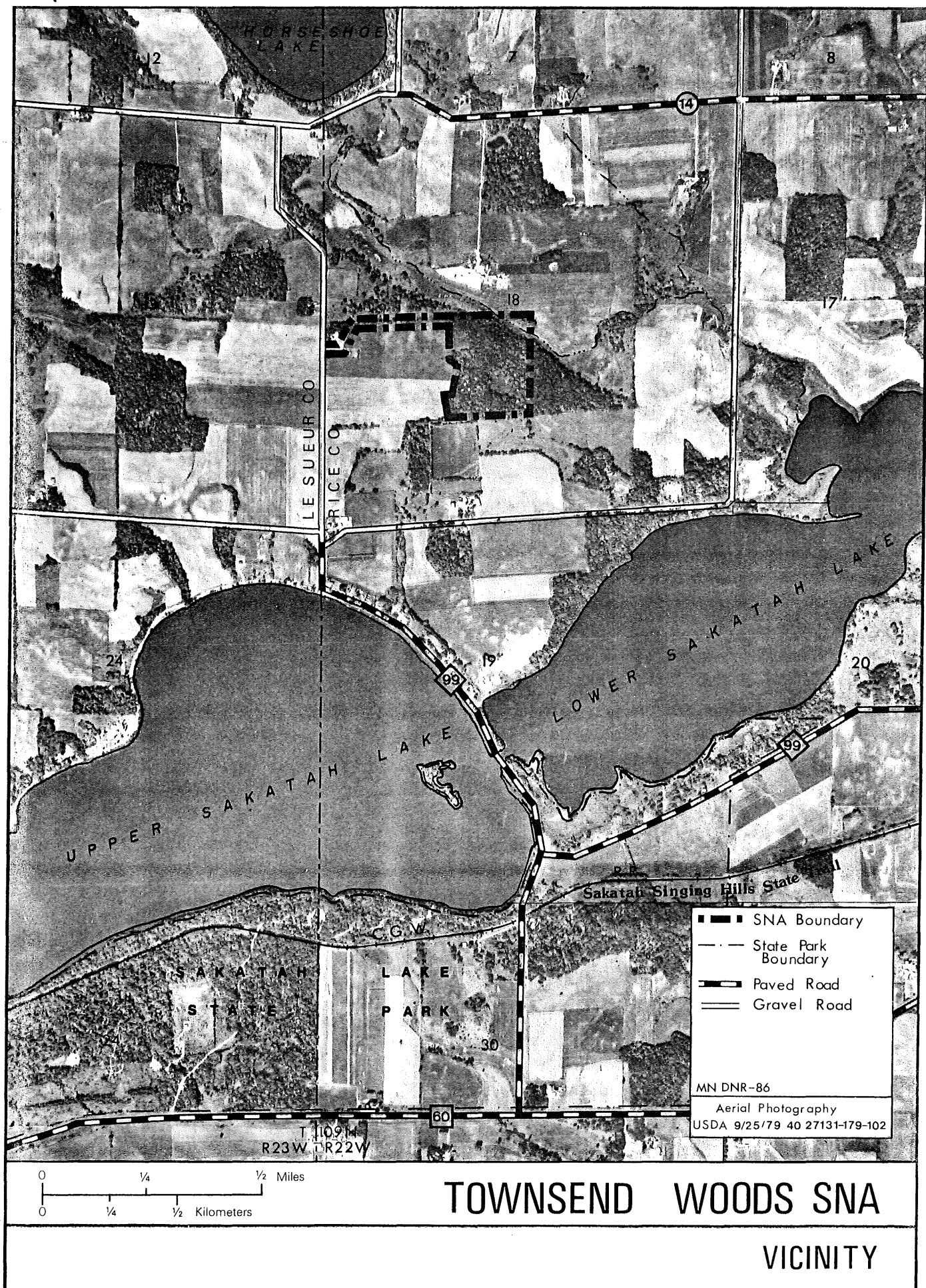
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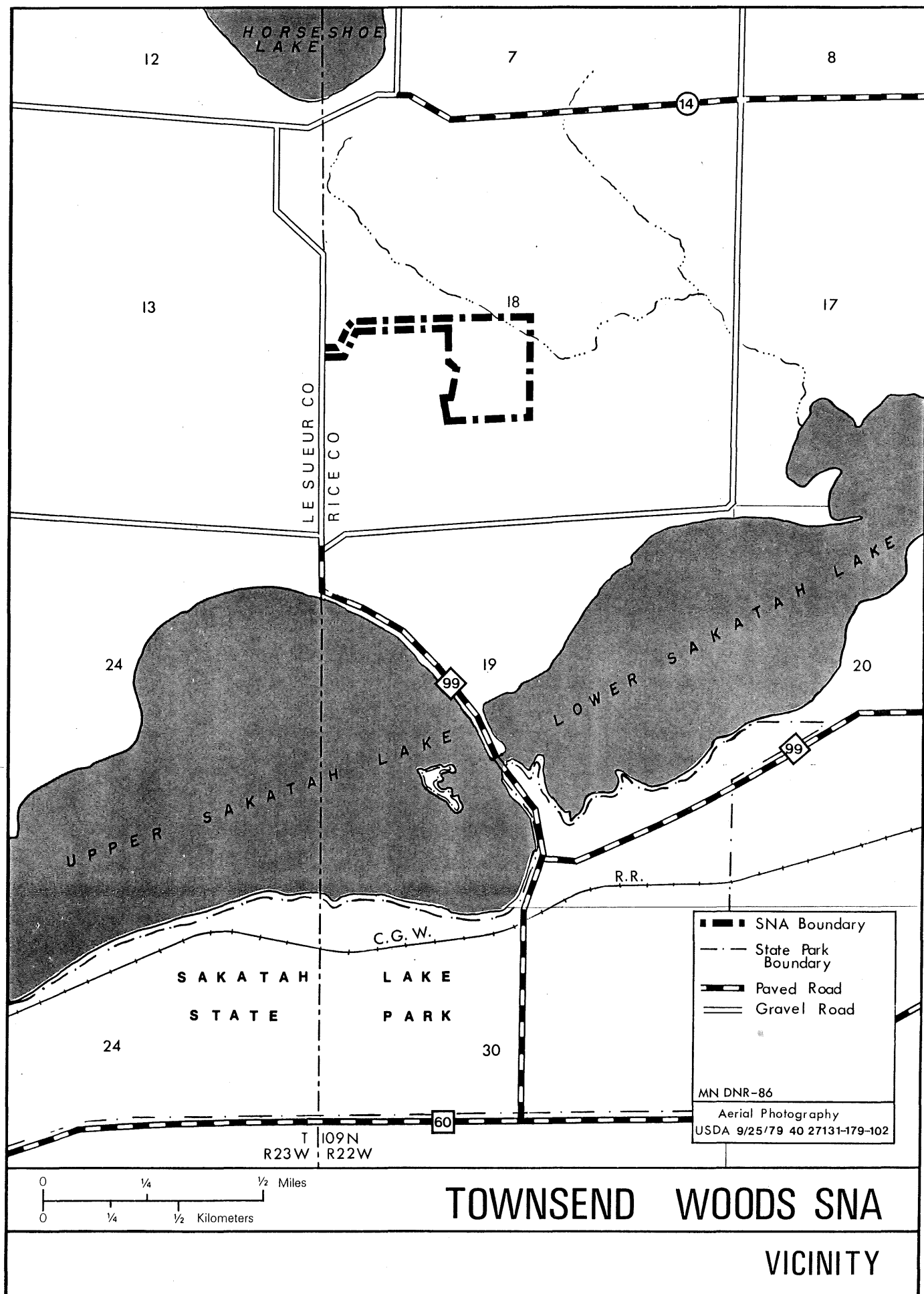


TOWNSEND WOODS SNA

SITE







PREFACE

Scientific and Natural Areas are established to protect and perpetuate natural features which possess exceptional scientific or educational value. Nominated areas must satisfy a set of rigorously drawn criteria to qualify for designation. Scientific and Natural Areas serve many purposes. They are places for the quiet appreciation and study of nature and serve as outdoor classrooms for teaching and research in the natural sciences. They are areas against which the effectiveness of resource management techniques employed elsewhere can be evaluated. Scientific and Natural Areas often protect the last remaining occurrences of a rare species or plant community.

However, land control alone does not assure long term preservation of natural areas and their endangered species. Many natural areas will decline in quality if they are not properly managed. Management of vegetation, control of foreign species, and management of visitors are important concerns.

Comprehensive planning is a prerequisite to effective and successful management. In 1975, the Minnesota legislature passed the Outdoor Recreation Act (86A), establishing the Outdoor Recreation System. This act directed managing agencies to prepare master plans for units of the system. This document is part of a planning effort to satisfy the mandates of that act. It establishes a strategy for stewardship that addresses biological management, obligations of ownership, and visitor management.

This plan was prepared by the Department of Natural Resources, Scientific and Natural Areas Program with the assistance of the Commissioner's Advisory Committee on Scientific and Natural Areas. It was based on a resource inventory, included as an appendix to this report, prepared by the Scientific and Natural Areas Program and the Natural Heritage Program. Funding was provided through the Legislative Commission on Minnesota Resources.

This SCIENTIFIC and NATURAL AREA was established to protect and perpetuate Minnesota's rare and unique natural resources for nature observation, education, and research.

Principal activities which are UNLAWFUL in the use of this area are listed below. Further information is available at Department of Natural Resources Offices.

- . Collecting plants, animals, rocks, or fossils.
- . Camping, picnicking, and swimming.
- . Horses, dogs, and other pets.
- . Snowmobiles and other motorized vehicles.
- . Hunting, trapping, fishing, and boating.

SUMMARY OF MANAGEMENT PROGRAMS

General Management Considerations

Sakatah Lake State Park is the closest DNR facility to the Townsend Woods SNA. Parks personnel have expressed willingness to assist with management of the site, and are interested in conducting interpretive activities there. The periodic mowing of the right-of-way will be carried out by Park personnel, and Park naturalists will conduct guided tours of the site when there is sufficient interest. The Sakatah Singing Hills State Trail is also in close proximity to the SNA, and will likely provide visitors to the site.

Management activities in the forested portion of the SNA will be minimal. A local volunteer steward will be identified to keep SNA staff informed of problems or infractions in the SNA. Enforcement is the responsibility of DNR staff.

Structures and Facilities

A 33-foot-wide right-of-way will be maintained for access to the site. The area will be seeded with white clover and mowed regularly. A gate will be placed at the end of the right-of-way close to the woods. The boundaries of the SNA will be surveyed and posted. An entrance sign will be placed at the beginning of the right-of-way (near LeSueur Road) and a rules and regulations sign placed at the end of the right-of-way, at the entrance to the woods. The fencing on the north, east, and south boundaries will be replaced.

Management of Natural Features

There will be no active management activities in the Maple-Basswood Forest community. Protection from grazing intrusion will be afforded by repairing and maintaining the boundary fences. In the unlikely event of a fire in the SNA, DNR Forestry personnel should make every effort to halt the fire. Areas previously cultivated will be planted with seeds and/or seedlings to restore Big Woods vegetation.

A set of permanent reference plots or transects will be established to document baseline structural and floristic information and track changes occurring in the forest. Surveys will be conducted to compile species lists of herbaceous plants in the SNA and invertebrate animals in vernal ponds in the site. The area will be monitored for evidence of damage to vegetation due to herbicide drift.

Adjacent Lands

The 40-acre parcel of land adjacent to the east boundary of the SNA is owned by the Nature Conservancy and is in the process of being gifted to the DNR for designation as part of the SNA. Following designation, a cultivated portion of the parcel will be restored to native vegetation and the tract will be signed.

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OVERVIEW

A. Description

The Townsend Woods Scientific and Natural Area (SNA) is a 33 acre unit in the southwestern portion of Rice County. The site is approximately three miles northwest of Morristown, and just over one mile north of Sakatah Lake State Park. It is bordered on the east by a Big Woods tract, which was recently purchased by the Nature Conservancy, and on the three remaining sides by agricultural land. With the exception of a small cultivated area, a mowed right-of-way and a small ponded area, the SNA is completely occupied by old-growth Maple-Basswood Forest, also known as the "Big Woods" community. The tract is one of the few remaining undisturbed remnants of the original 3000 square miles of Big Woods Forest which once occupied south central Minnesota. The topography consists of a ridge running northwest to southeast in the northern portion of the SNA, with a steep northeast facing slope and a more gradual southwest-facing slope.

The primary land use surrounding the SNA has been agricultural, including corn and hay crops and grazing. The only human activities impacting the woods were a small amount of selective cutting, maple sugaring, and in the adjacent wooded parcel to the east, cattle grazing.

B. Preservation Value

Townsend Woods SNA is located within the Big Woods landscape region. The Maple-Basswood Forest (Big Woods) community was identified as a highly significant natural feature by the DNR's Natural Heritage Program. The Natural Heritage Program maintains the most comprehensive data base on Minnesota's rare plant and animal species and biotic communities. These biological entities (species and communities) are known as elements and are ranked according to their rarity and endangerment in the state.

Plant Community

Southern Maple-Basswood Forest - Big Woods Section - State endangered

Maple-Basswood Forests once covered a large portion of Minnesota south of the tension zone, occurring within a broad belt running from the southeast corner to the northwest part of the state. The Big Woods section is the southwestern-most of three natural communities which occur as parts of this forest type. This section once occupied nearly 3000 square miles of the presettlement landscape (see Appendix, Figures 1 and 2) and now occurs only as remnant patches separated by agricultural lands.

Townsend Woods is an outstanding example of the Big Woods community. The site is dominated by northern red oak (Quercus borealis) with lesser amounts of sugar maple (Acer saccharum). The mature trees are old-growth (≥ 120 years old). The understory is rich in spring ephemerals and spring blooming herbs, and the tract shows very little sign of disturbance.

C. ORA Classification

The Townsend Woods SNA fully meets the designation criteria for a Scientific and Natural Area as outlined in the Outdoor Recreation Act of 1975 (86A.05 subd. 5). The preserve (1) supports an undisturbed plant community maintaining itself under prevailing natural conditions typical of Minnesota, and (2) embraces an area large enough to permit effective research or educational functions and to preserve the inherent natural values of the area.

D. Management Philosophy

The objective for the Townsend Woods SNA is the preservation of the Maple-Basswood Forest community, accomplished both through legal protection and through ecological research which will yield information useful to the management of the resource.

The community is old-growth forest, representing the cumulative successional processes of ≥ 120 years of growth. It is envisioned that no active manipulation of the habitat will be necessary to preserve the forest community.

Section 1

GENERAL MANAGEMENT CONSIDERATIONS

A. Sakatah Lake State Park and Sakatah Singing Hills State Trail

The proximity of the SNA to Sakatah Lake State Park provides an excellent opportunity for assistance with management and interpretive activities. Park naturalists will guide tours to the SNA when there is sufficient interest from park visitors and users of the nearby Sakatah Singing Hills State Trail (shown on the vicinity map at the beginning of this report). Park personnel will also maintain the right-of-way to the SNA (see Action 2.2).

Action 1.1 Provide Sakatah Lake State Park and State Trail access points with SNA informational materials.

Considerations:

Purpose - to enhance appreciation of the natural features in the SNA by interested park visitors and trail users.

Materials - will include program brochures, site maps, rules and regulations, research and collecting guidelines, and other relevant materials.

B. Management Resources

The amount of management that takes place on an SNA is dependent not only on the need, but also on the availability of management resources. Some of these resources are described below:

1. DNR offices or facilities

Townsend Woods SNA is approximately 55 miles from the St. Paul based SNA staff and Regional Nongame Specialist. The area Wildlife Manager is located in Owatonna, 18 miles southeast of the SNA. The District Forestry office is 17 miles east of the SNA in Faribault. The closest DNR office is Sakatah Lake State Park, located about one mile south of the site.

2. Proximity to University and College campuses

The University of Minnesota Twin Cities campuses are approximately 55 miles from the SNA, and Carlton College and St. Olaf College in Northfield are about 24 miles away, as is Mankato State University in Mankato. Researchers in these and other institutions may be interested in conducting research in Townsend Woods.

C. Surveillance and Enforcement

Inappropriate uses or overuse can damage natural conditions and the aesthetic appearance of natural areas. Because of the fragility of nature preserves, continued protection and maintenance requires systematic surveillance

and enforcement.

Enforcement is the responsibility of DNR enforcement officers and other department staff. Additional protection can be provided by local residents and visitors who support and recognize the values and permitted uses of the SNA. People wishing to report problems or who have questions relating to the SNA should contact the DNR Area Wildlife Manager or Conservation Officer in Owatonna, the Nongame Specialist in St. Paul, SNA staff in St. Paul, or other DNR official.

Action 1.2 Identify a local person to be a volunteer SNA steward. Maintain annual contact.

Considerations:

Purpose - To keep SNA staff informed of problems or violations occurring in the SNA.

Anticipated problems - The low visibility of the SNA makes it unlikely that many infractions will occur. A watch should be kept for potential digging of ornamental or rare plants, and hunting during appropriate seasons.

Section 2

STRUCTURES AND FACILITIES

A. Access

Access to the SNA is from LeSueur Road (Figure 1), which runs north-south and is located approximately 1/3 mile west of the western edge of the SNA.

B. Parking and Walkway

A 33-foot-wide right-of-way will be maintained for parking and walk-in access to the site (Figure 1). Parking space will be provided on the right-of-way close to LeSueur Road (Figure 1) for up to four cars or one bus. The parking area and central portion of the walkway will be seeded with timothy (*Phleum pratense*) to stabilize the soil, provide wildlife cover, and prevent thistles from colonizing. The edges of the walkway will be planted with native tree seedlings to provide shade and an aesthetic entrance to the site. The grass seeding will be done by contracting a local resident, and the right-of-way will be mowed regularly by Sakatah Lake State Park management personnel.

Action 2.1 Hire a local resident to seed the right-of-way

Action 2.2 Plant native tree seedlings along the edges of the right-of-way

Considerations:

Source of seedlings - Young trees can be thinned from the crowded edges of the SNA and transplanted onto the right-of-way.

Action 2.3 Maintain the right-of-way by mowing regularly

C. Fencing and Gate

The barbed wire fencing on the north, east and south boundaries is in dis-repair in a number of locations. It should be replaced in order to prevent cattle on adjacent lands from entering the SNA.

Action 2.4 Replace fencing on north, east and south boundaries with 3-strand barb wire fencing.

There is need for a gate at the end of the parking area to prevent vehicles from entering the SNA. The gate should allow pedestrians to easily enter the site.

Action 2.5 Place a gate between the parking area and the remainder of the right-of-way.



Figure 1

D. Signing

The objectives of signing are to identify the boundaries of the SNA and provide basic visitor information. Boundary signs, rules and regulations signs, and informational signs should be placed in appropriate places.

Action 2.6 Post boundaries on all four sides of SNA.

Action 2.7 Post entrance sign

Considerations:

Location - At the west end of the right-of-way, close to LeSueur Road.

Action 2.8 Post interpretive sign

Considerations:

Location - same as 2.6

Contents - Sign will include an accurate map of the SNA and the right-of-way and should show the location of the marsh. Text should include a brief description of the Big Woods community and make mention of historic maple sugaring activities.

Action 2.9 Post 2 rules and regulations signs.

Considerations:

Location - At both ends of the right-of-way.

Action 2.10 Annually check boundaries, replace damaged signs.

Section 3

MANAGEMENT OF NATURAL FEATURES

A. Natural Community Management

The mature Maple-Basswood Forest community is stable under present climatic conditions. The dominant canopy species will regenerate under natural conditions, with two exceptions: red oak and American elm. Red oak is gradually being replaced by more shade-tolerant species as a result of climatic changes and the exclusion of fire. American elms are susceptible to Dutch elm disease, and thus are gradually being eliminated. It is expected that sugar maple, and possibly basswood and ironwood, will increase as red oak and elm disappear from the canopy.

The southern edge of the tract, together with portions of the eastern and western edges, reflect past disturbance in the form of cutting or grazing. These areas are occupied by densely packed young trees under widely spaced canopy trees.

The general management policy in the SNA will be to allow natural succession to proceed in the area and to protect the site from fire and human-related disturbance. The results of natural disturbance, such as blowdowns from wind storms, will not be interfered with unless they pose threats to human lives.

Action 3.1 Prevent wildfire.

Considerations:

Flammability - The Forest contains very little flammable material, thus fires are unlikely. In the event that a fire should get started, area DNR Forestry personnel should halt it as soon as possible.

Approximately 2 acres in the western portion of the tract are presently under cultivation (Figure 1). These should be restored to Big Woods vegetation. To hasten this process, oak and sugar maple seeds from the tract and seedlings from the edges of the tract will be collected and planted following the removal of crops.

Action 3.2 Restore cultivated areas.

B. Natural Features Surveying and Monitoring

A thorough documentation of the structure and composition of the forest provides baseline data for measurement of changes in the community, whether they result from natural succession or human-induced disturbance. Ecological data

can also provide practical information for resource managers. Some practical research questions include: How do components of the community in this isolated tract of forest differ from those of more expansive forests? What are the effects of the forest edge on plant and animal distribution? How do components of this forest differ from those of Big Woods Forests which have experienced greater amounts of disturbance? What long-term changes are taking place in this forest community? How do numbers and species of vertebrate fauna relate to the small size of this forested tract? Do herbivory levels in the preserve differ from levels in other Big Woods preserves?

Action 3.3 Establish and maintain a set of permanent reference plots or transects

Considerations:

Objectives - to generate ecological data directed toward answering the previously stated research questions. Structure and composition of the vegetation, including the overstory, understory, shrub layer, and ground layer should be studied.

Standardization - Sampling design and data collection should, whenever possible, be standardized for other forest types in SNA's. Information should also be compatible with Natural Heritage Program methodologies, therefore should include the use of releves.

Inventories of herbaceous plant species and vertebrate fauna in the SNA should be completed. This will provide information about rare species which may be present and may require special management. Species lists will also aid park naturalists in their interpretive activities.

Action 3.4 Complete a floristic inventory of the SNA.

Action 3.5 Complete an inventory of vertebrate fauna in the SNA.

It has been suggested that the vernal ponds occurring in the SNA may harbor rare invertebrate species. A survey of these ponds in the spring should be done, and a list of species compiled.

Action 3.6 Survey vernal ponds for invertebrate fauna.

The presence of cultivated fields to the west of the SNA makes herbicide or pesticide drift into the western portion of the site a possibility. Regular surveys of the area for evidence of chemical influences should be made and records kept of any plants exhibiting damage likely due to chemicals.

Action 3.7 Annually monitor for evidence of herbicide drift, and record observations.

Considerations:

Documentation - Note date, area of impact, affected species and their conditions. Observations should be made in late spring, when the greatest diversity of herbaceous plants are evident. Any other disturbances to the site should also be noted, including excessive herbivory levels by deer and other vertebrate fauna.

Section 4

ADJACENT LANDS

Parcel A - S1/2 NW1/4 SE1/4 Sect. 18

The forested land immediately east of the SNA supports the same community type, Maple-Basswood Forest. The Nature Conservancy recently purchased this land as part of a 40-acre tract (Figure 2). The forest exhibits more evidence of heavy grazing and cutting disturbance with numerous multiple-stemmed trees and many sapling to pole sized individuals. The protection of this tract will prevent land use activities which could have a detrimental impact on the SNA. With the removal of disturbance, the forest will regenerate to a state more closely approximating pre-settlement conditions. The Nature Conservancy plans to donate the tract to the DNR for SNA designation.

Action 4.1 Designate Parcel A as an addition to the SNA upon DNR acquisition and manage as an SNA.

Considerations:

Restoration - The portion of Parcel A north of the creek (Figure 2) is presently under cultivation. Upon acquisition, the vegetation on this area should be restored as closely as possible to presettlement conditions, using seeds collected on the SNA.

Signing - The boundaries of the parcel will be posted with SNA signs.



Figure 2

Section 5

EFFECTS OF MANAGEMENT ON SIGNIFICANT RESOURCES

A. Maple-Basswood Forest

No active manipulation is proposed in this old-growth community type. Survey and monitoring activities (Actions 3.2, 3.3, 3.4, 3.5) will provide additional resource information useful in making future management decisions. Restoration of portions of the tract which were cultivated will increase the areal extent of the Big Woods community. SNA designation of the adjoining parcel of forested land (Action 4.1) will help insure the protection of the Maple-Basswood Forest community.

Section 6

MANAGEMENT COSTS AND IMPLEMENTATION

Actions recommended in this plan have been separated into two categories: (1) administrative and (2) operational. The costs of administrative actions are difficult to itemize because they are included in an SNA staff member's salary.

Operational actions are on-site activities. These often have both capital and labor costs. Capital costs have been listed. Estimates of labor needs are provided where possible.

Administrative and operational actions are often funded out of different budget sources. This makes it difficult to present an implementation schedule that equates both types of actions. To accommodate budget planning, separate implementation schedules are outlined for each category.

It is important, however, to have a mechanism that does allow comparison between all actions in this plan and between actions from different plans. The system outlined below distinguishes between (a) actions needed to improve or maintain the integrity of a site's most important features, called elements, (b) legal or moral obligations of ownership or land management by the Department, and (c) all other actions important for reasons other than above.

Group I Actions: Actions that prevent or reduce the vulnerability of the element to destruction or serious degradation. That is, in the absence of these actions the preservation of the element is threatened on this site. Research, ecological survey and monitoring may be included here if, without such information, it is not known what actions are necessary to maintain the element.

Group II Actions: Actions necessary because they constitute an obligation of land management/ownership by the Department. These may be legal obligations, departmental, or SNA program standard requirements.

Group III Actions: Actions taken for all other reasons. For example, actions taken to provide for public use, acquire supplementary resource information, administrative coordination, etc.

The following chart illustrates the scheduling of actions described in the text, and the immediate and on going-capital costs of implementation. The scope of this plan covers a ten year period. The plan should be reviewed every five years to evaluate progress, reassess priorities, and refine management techniques. Actions listed under the category "Begin Immediately" need immediate attention or are a continuation of an existing program. "Phase I" is the first five year period. "Phase II" is the second five year period. Implementation of many actions depends on availability of materials, equipment and labor. An action may be initiated sooner than scheduled if circumstances so dictate and if earlier scheduled actions will not suffer as a result.

ADMINISTRATIVE ACTIONS		STEWARDSHIP GROUP	BEGIN IMMEDIATELY	PHASE I	PHASE II	*RESPONSIBILITY, COSTS
Action 4.1	Designate and manage Parcel A as SNA upon acquisition	I		X		SNA
Action 1.1	Provide Sakatah Lake State Park and State Trail access points with SNA Informational materials	II		X		SNA
Action 1.2	Identify Volunteer Steward	III	X			SNA
OPERATIONAL ACTIONS						
Action 2.4	Replace Fencing on N.S.E. edges	I		X		W, \$3750
Action 3.1	Prevent Wildfire	I	X			FOR
Action 3.2	Restore cultivated areas	I	X			SNA
Action 3.3	Establish permanent plots	I		X		SNA
Action 2.1	Hire local resident to seed right-of-way	II	X			SNA
Action 2.3	Maintain right-of-way by mowing	II	X	X	X	P, ongoing
Action 2.5	Place gate at edge of parking area	II		X	X	SNA, \$500
Action 2.6	Post boundaries	II		X		W, 8 signs at \$5.50 ea.
Action 2.7	Post entrance sign	II		X		W, Wood-routed sign
Action 2.8	Post interpretive sign	II		X		W, aluminum sign \$305
Action 2.9	Post rules and regulations signs	II		X		W, \$5.50
Action 2.10	Annually check boundaries, replace damaged signs	II		X	X	P
Action 2.2	Plant native trees along right-of-way	III	X			SNA
Action 3.4	Complete Floristic inventory	III		X		NHP
Action 3.5	Complete vertebrate fauna inventory	III		X		SNA
Action 3.6	Survey vernal ponds for invertebrates	III		X		SNA
Action 3.7	Monitor for herbicide drift	III		X	X	SNA, ongoing

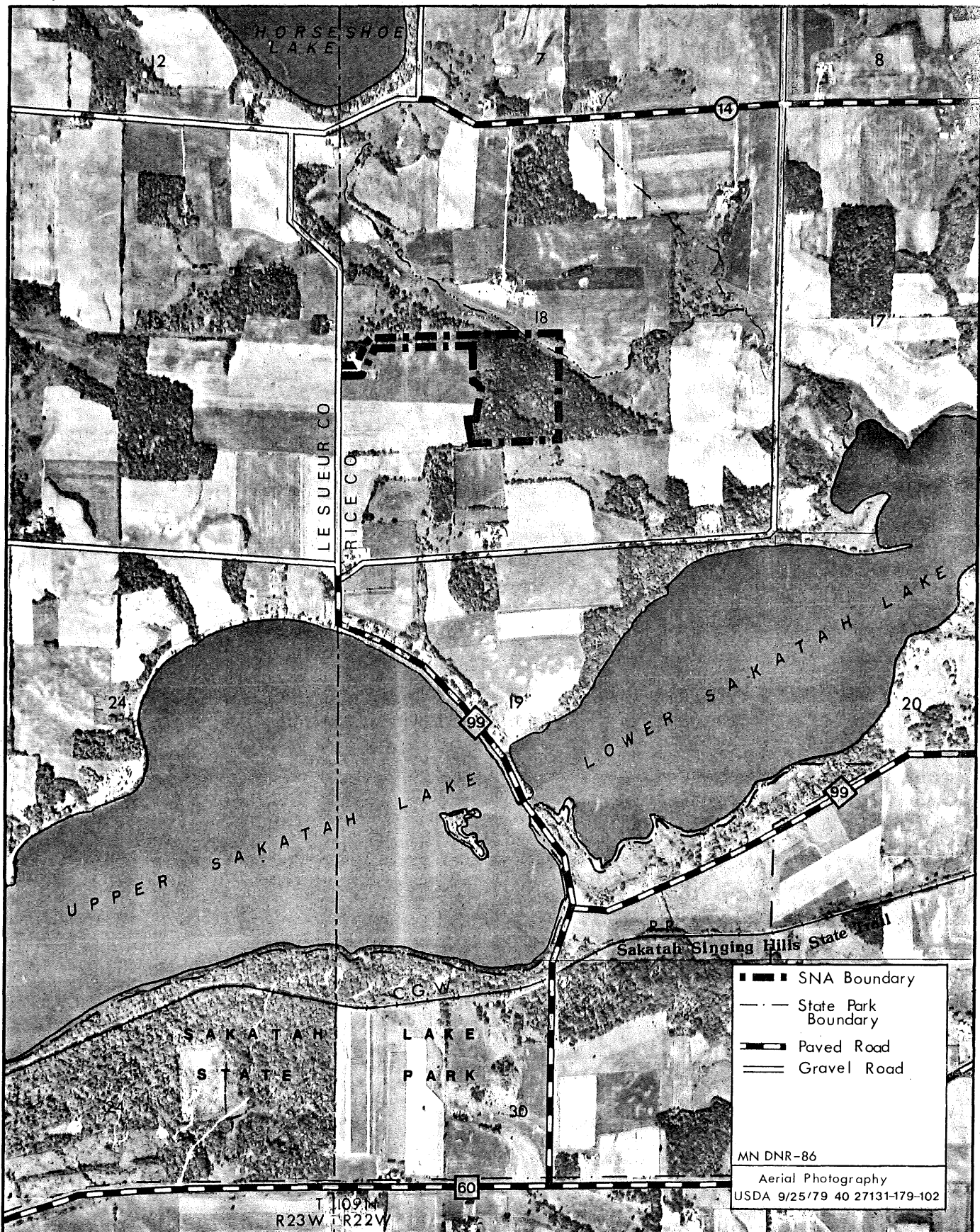
* SNA = Scientific and Natural Areas
W = Area Wildlife Manager
FOR = Forestry
P = Sakatah Lake State Park
right-of-way

APPENDIX

TOWNSEND WOODS
SCIENTIFIC AND NATURAL AREA
RESOURCE INVENTORY

February 1987

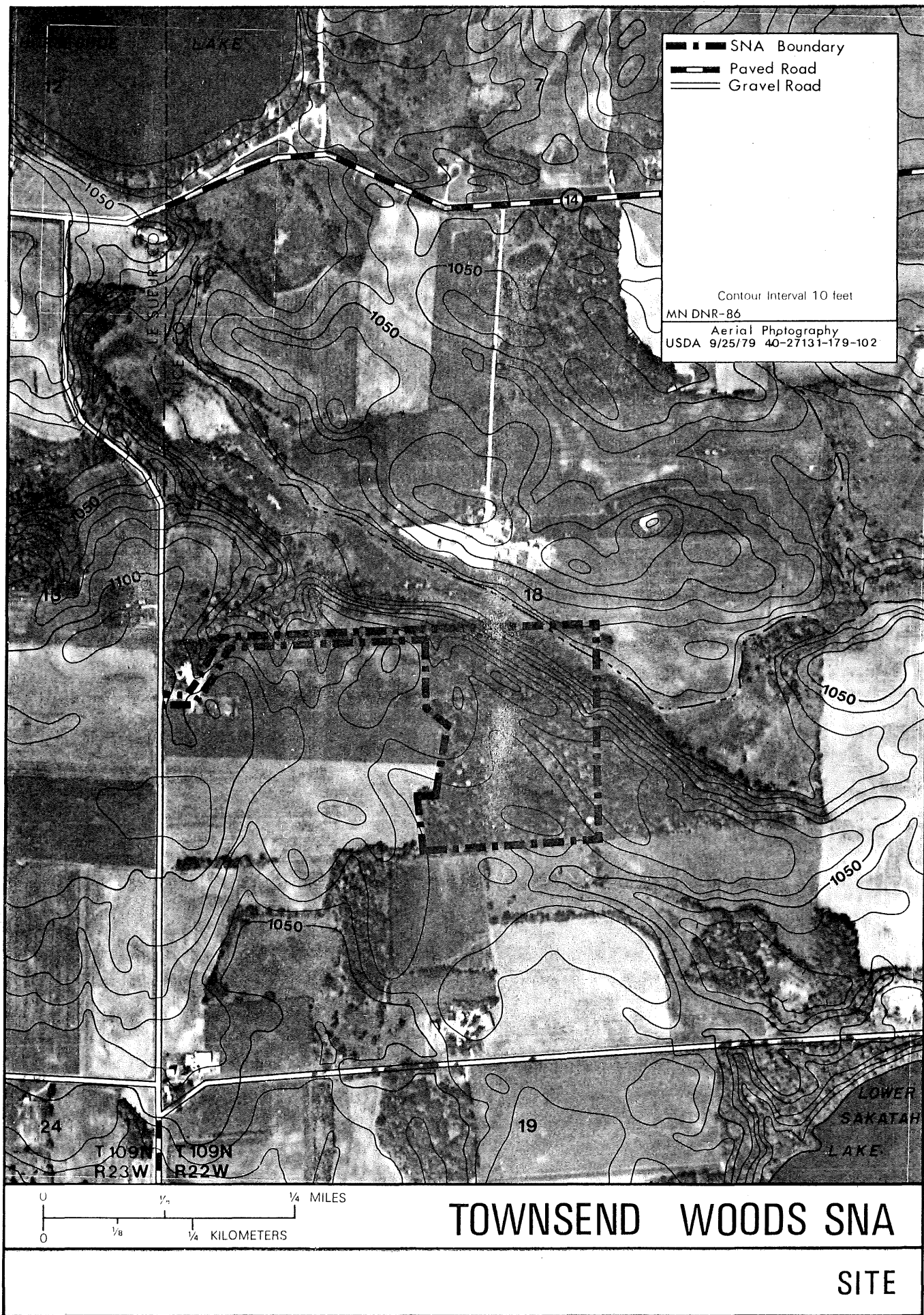
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Present Vegetation
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Southern Maple-Basswood Forest
(Big Woods Section) - Element Abstract

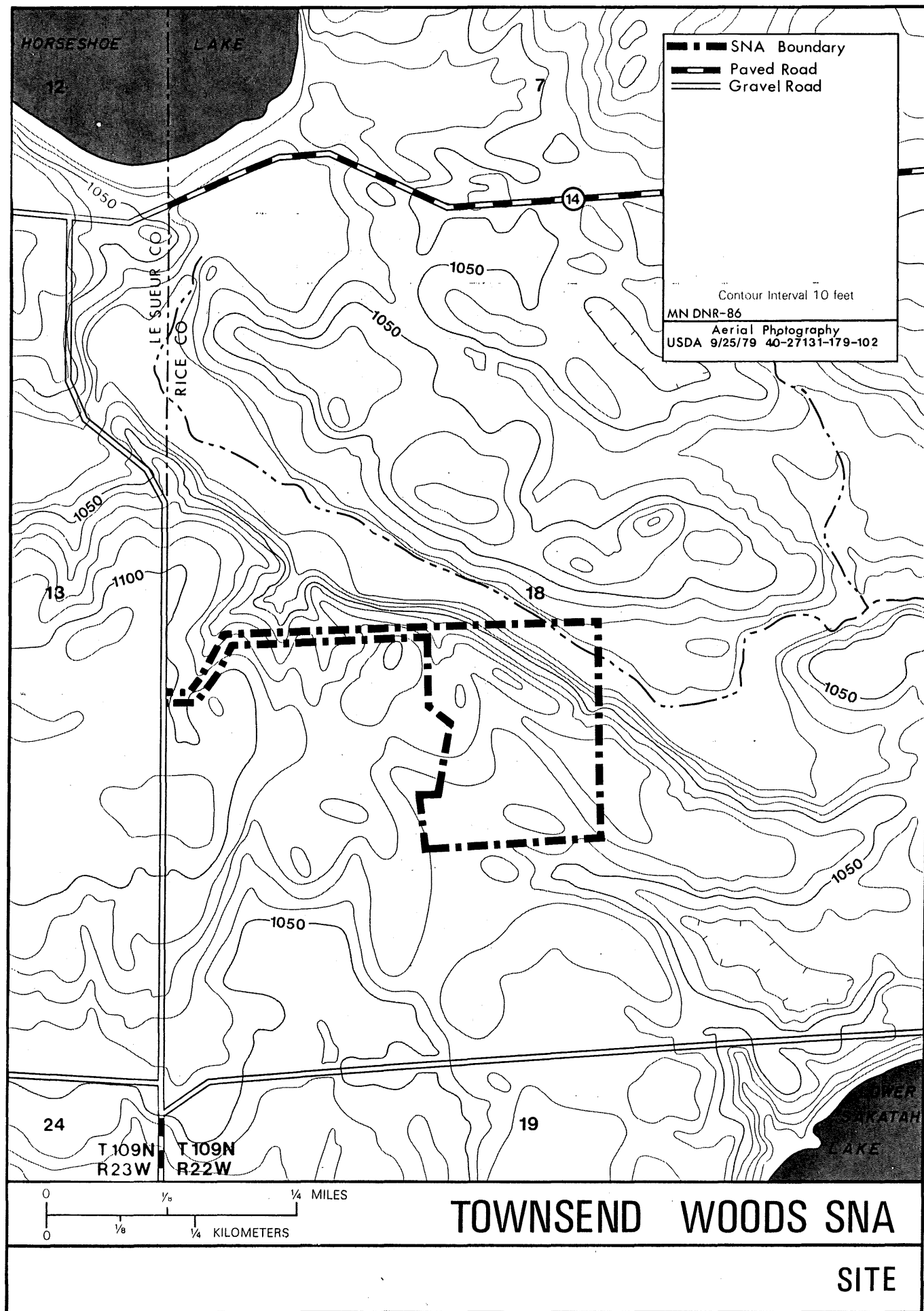


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TOWNSEND WOODS SNA

VICINITY





TOWNSEND WOODS SNA -- LAND USE AND VEGETATION HISTORY

Introduction

Townsend Woods was acquired as a Scientific and Natural Area in October 1985. Interest in preserving the "Big Woods" site extends back to 1962 when a local insurance agent, Owen R. Dickie, first called the site to attention. The land was originally owned by the University of Minnesota (1864-1869) and then by several private parties (1869-1985). Census information lists the occupations of these various resident private owners as farmers, thus the major activity impacting this area appears to have been agricultural.

The reconstruction of the Townsend Woods land use and vegetation histories utilized numerous sources. Earliest history was obtained from historical records and texts, title abstracts and the original (1854) "surveyor's notes" of Rice County. Land use history was also documented on the 40-acre parcel of land immediately east of the SNA (hereafter referred to as Parcel A), as the protection of this tract is a goal of the SNA Program.

Recent history information was acquired through aerial photos, plat maps, conversations with past and present landowners of the SNA and adjacent lands, and Sakatah Lake State Park files.

General History

Until the mid 1800's the only inhabitants of the area around and including Townsend Woods were native Americans. Pre-historic burial mounds of as yet unknown origin have been discovered on Horseshoe Lake approximately 1.5 miles north of this site and on the Sakatah Lakes approximately 1 mile south.

At the advent of recorded history, the Wahpekuta (translated 'leaf shooters', 'silent shooters' or 'those who shoot from among trees') Tribe of Dakota Indians occupied the area. The Dakota Indians were hunters, gatherers, and trappers. Most of their activity centered around the Cannon River which is a major part of a direct water route from points upstream of Mankato on the Minnesota River east to the Mississippi. This was the prime 'transportation corridor' of the area because the "Big Woods" made land travel difficult.

The first recorded visit of Europeans to the area was in the late 1690's when LeSueur explored west "from Fort Prairie Island to a bend in the Minnesota River" (now the site of Mankato). About 150 years passed before the first permanent European settlements began in the area. In the late 1820's, Alexander Faribault began establishing trading posts along the Cannon River. Two of these posts were within 5 miles of the Townsend's Woods site.

In 1851, Dakota Indians, including the Wahpekuta Tribe, signed the "Treaty of Mendota" opening the area to European settlement. The establishment of Mankato and Faribault was begun within a year of this treaty. 1853 marked the exit of the Indians, as the Wahpekuta left for a reservation on the Upper Minnesota River.

Settlement began in Morristown in 1855. Most settlers coming to this area did so with intentions of clearing the land and farming. According to Soil Survey records (1975) most of the county was eventually cleared and put into cultivation (approximately 70%). Townsend Woods was part of a parcel bought from the University in 1869 by an adjoining landowner in LeSueur County whose occupation was listed as 'farmer'. Farming was also the primary occupation of all owners of this area during the major portion of each ownership.

In 1882, the Cannon Valley Railroad Company completed construction of a railway from Faribault to Waterville along the route of the Cannon River. This passed the Townsend Woods site approximately 1.5 miles south and aided the settlement of the general area.

Land Use - Prehistoric and Native American

The archeological and early historical records of the area around Townsend Woods suggests extensive use by native Americans. The Dakota Indians who inhabited the area were primarily hunters and gatherers. The proximity of several villages to the Townsend Woods Site makes it likely that the area was used for hunting and possibly maple sugaring.

Land Use - Agricultural

The settlement of Rice County was primarily based on the availability of new farmlands. Much of the land in Morristown Township was described by the original surveyor as "a fair common average" and the land near Townsend Woods was described as "rolling and second rate" but did contain "a very good growth" of timber.

Clearing in the area around Townsend Woods probably began in the early 1870's when the land went into private ownership. By 1937 when the first aerial photos of the area were taken, virtually all of the area currently in agricultural production was cleared and in crops. In the 1970's, 2-3 acres on the west edge of the woods was cleared and the shallow spots and gullies along this edge filled with rocks, tree debris and soil (Fig. 1).

Much of the surrounding area was heavily grazed or in hay crops through the 1950's. Currently, most of this area is in corn production interspersed with occasional pastures. The areas immediately north and east of the SNA have been used primarily for grazing cattle. There is no evidence that Townsend Woods was grazed. The SNA is fenced off from surrounding grazing on the north, south and east sides by barbed wire fencing (Fig. 1). These fences, however, are in poor condition so some grazing encroachment may have occurred recently.

Portions of Parcel A have been used for haying, growing crops, grazing, and hunting. A 7-8 acre tract in the north portion has been cultivated since at least 1937 (Fig. 1); sunflowers, corn, and soybeans are crops known to have been planted there. Though fertilizers and chemicals have been used on this cropland, records of types and amounts are incomplete. The herbicide Lasso was applied in the spring to control foxtail in 1984 and 1985, and possibly in other years.

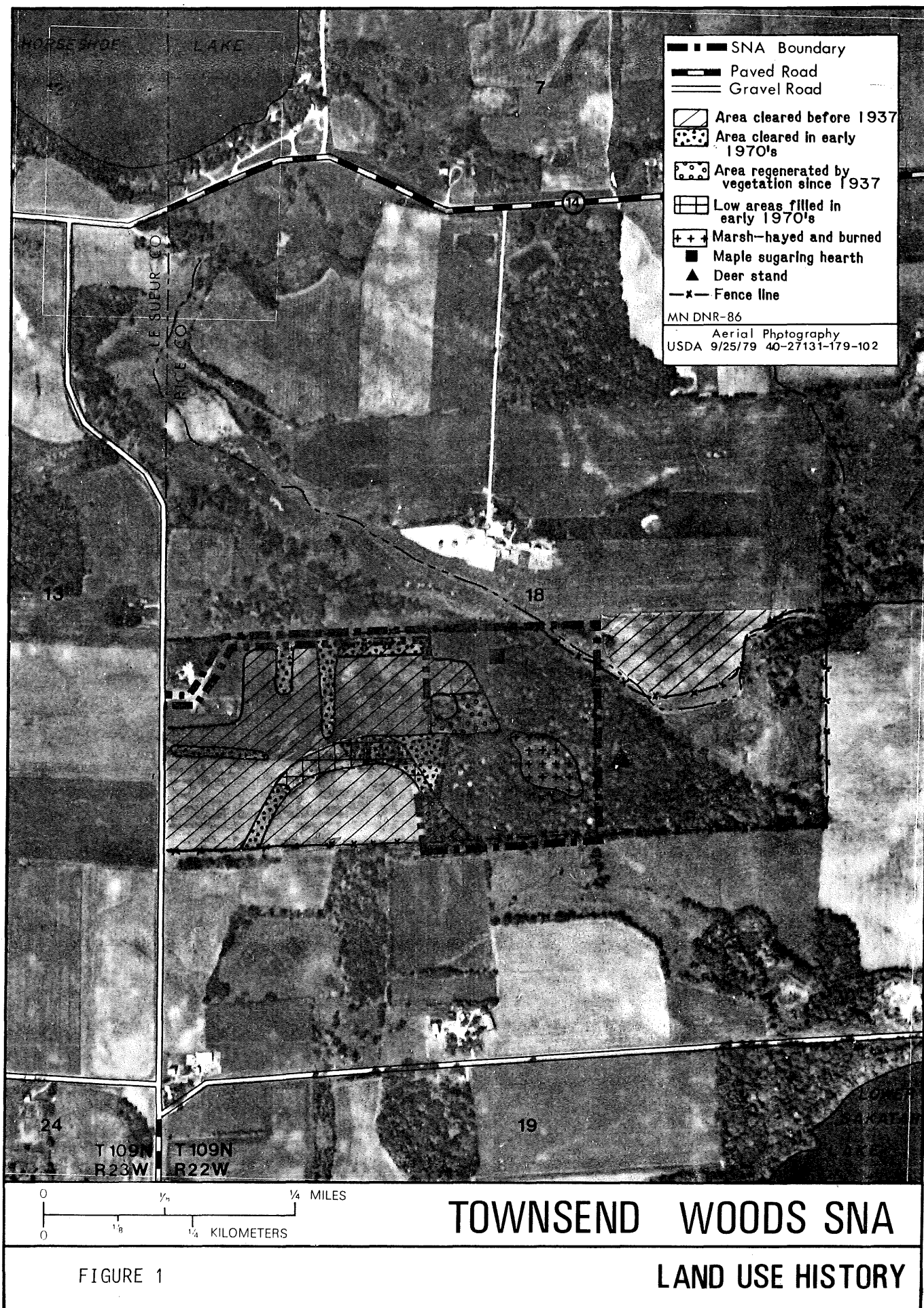


FIGURE 1

The slough area near the creek in Parcel A was mowed once a year in drier years for hay; the most recent landowner reported mowing 2-3 times in the last 10 years to obtain livestock bedding materials. The forest in Parcel A was grazed in the summer months for many years until about 1975.

It has been reported that haying occurred on the marsh within the SNA sometime in the 1930's-40's (Fig. 1). This activity apparently ceased by 1950.

Land Use - Logging

The earliest aerial photos of Townsend Woods, taken in 1937, show the south and southeast portions of the tract supported sparser woody vegetation than is present today. Early selective cutting, possibly coupled with grazing or fire, opened up these areas. Later aerial photos show the trees that were left in these areas gradually growing broad crowns, with spaces between the trees occupied by younger trees that were filling in gaps. Field checks in 1986 verified the presence of widely spaced, large, low-branching trees with densely-packed smaller trees between them. There was no apparent disturbance in the remainder of the tract. Parcel A supported denser, smaller-crowned trees than Townsend Woods in all aerial photos, indicating early heavy cutting before 1937.

Some large red elms were removed from both Townsend Woods and Parcel A in 1980-81 to be used for veneer wood. Eight to ten trees in Townsend Woods and 10-15 in Parcel A were cut and removed. Some of these trees were reportedly dying prior to being cut.

Land Uses - Other

Townsend Woods was used for maple sugaring sometime prior to and including the 1940's, with a trail running along the west edge to facilitate this operation. The stone foundation of a hearth (Fig. 1) and tap holes in some maples still remain as evidence of the operation.

Local residents have used the SNA and vicinity for a limited amount of snowmobiling.

Evidence of hunting exists in the form of a deer stand in Parcel A (Fig. 1) and numerous spent shotgun shells within site boundaries. The former landowner reported pursuit of deer, squirrels, rabbits, fox and raccoon in the site. In Parcel A, the owner reported hunting deer and squirrels and trapping for raccoon and muskrats.

Natural Factors Affecting Vegetation

A few small canopy openings occur due to deadfall of trees in the older age classes, a number of large snags and a few patches of dead oak. Some of this mortality has been attributed to diseases such as Dutch elm disease and possibly oak wilt.

One report noted that a fire burned the marsh area sometime prior to 1962, destroying the wild cranberry population associated with the marsh. That fire, or other early fires may have moved into the forest east of the marsh, contributing to the openness of the canopy there.

Presettlement Vegetation

The primary tool for reconstructing the state's vegetation history prior to settlement is the original general land office survey records. These records constitute the field notes of the surveyors who originally worked in Minnesota in the 1800's.

In each township, surveyors walked along the section lines, marking the mile and half mile intervals by recording tree species, diameter at breast height (dbh) and distance from the survey corner to the nearest trees. Theoretically, the only criterion for selecting these bearing trees was a minimum dbh of five inches. As surveyors travelled through the townships, they also recorded the location of uplands, swamps, prairies, marshes, groves, and windfalls, as well as all streams, rivers, lakes, and roads. Houses, cabins, fields and other "improvements" were noted with less regularity, depending on the surveyor and the year the survey was done. Although there are several problems in the use of survey notes for determining past vegetation, including fraud, bias, and species name duplication, the records remain a valuable source of information regarding the nature of the vegetation prior to settlement by European descendants.

The area surrounding Townsend Woods SNA was surveyed in 1854. As reconstructed from those records the area contained "a very good growth of sugar maple, lynn (basswood), elm, and some walnut timber", and "rolling timber" or "level timber" interspersed with "uncultivable marsh", "brooks", and "creeks". Elm, sugar maple, ash, butternut, "lynn" (basswood), oak, walnut and "box alder" were all recorded as components of the forest in this area.

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1940 WG-2A-98,99

1951 WG-1H-70,71

1958 WG-1V-65,66

1964 WG-1EE-99,100

1970 WG-1LL-6,7

TOWNSEND WOODS SNA PRESENT VEGETATION

Introduction

The Townsend Woods SNA is located on the Emmons-Fairbault Moraine. It occurs on Hayden loam soils on an irregular knoll with a moderately steep north-facing slope which borders an intermittent stream. This 33 acre Scientific and Natural Area contains a small, but significant example of the "Big Woods" forest type. The "Big Woods", a forest dominated by sugar maple, basswood and elm, once covered over 3000 square miles of south central Minnesota. It was the largest contiguous expanse of this forest type on the presettlement landscape. Today, remnant "Big Woods" forests occur only as small isolated tracts ranging in size from 5 acres to 200 acres, being separated by cultivated farm land and urban development. Many of these woodland "islands", scattered throughout the Big Woods region, have been severely degraded by grazing and logging. An abstract which details the ecology, distribution, and conservation status of the "Big Woods" is included in this report.

Methods

The vegetation communities of the Townsend Woods SNA are described in the following section. The southern maple-basswood forest ("Big Woods" section) is the only major vegetation type on the preserve. This forest type encompasses the entire preserve with exception of a small ponded area dominated by sedges and alder. The "Big Woods" forest type is considered to be a state endangered element* by the Minnesota Natural Heritage Program. Occurrences of the "Big Woods" forest are ranked according to their quality (i.e., how closely they resemble presettlement conditions). Four element occurrence ranks are given: Grade A = excellent, Grade B = good, Grade C = marginal, Grade D = poor. Definitions of the above ranks are provided in the element abstract for southern maple-basswood forest (Big Woods section) which is included in this report.

In order to provide a visual description of the vegetation structure and composition at Townsend Woods, releve plots were sampled in several areas. Releve data are found in a later section of this report.

* An element is a natural feature of particular importance because it is exemplary, unique, threatened, or endangered on a national or statewide basis.

Community Description

Southern Maple-Basswood Forest (Big Woods Section): Element Occurrence Rank B

This vegetation type covers the entire Scientific and Natural Area. The condition of the community is excellent; it displays nearly all the major characteristics of an undisturbed virgin "Big Woods" forest. The dominant canopy trees - red oak (Quercus borealis) and sugar maple (Acer saccharum) - are old growth (> 120 year old) and form a closed overstory canopy. All tree size classes, from seedling to mature trees, are represented in the forest with no evidence of past grazing or logging. The forest understory is notably rich and abundant in spring ephemerals (including Dicentra cucullaria, Dentaria laciniata, and Erythronium albidum) and in spring blooming herbs (Sanguinaria canadensis, Caulophyllum thalictroides, Asarum canadense, Hepatica acutiloba and Trillium cernuum). The only human caused disturbance has been minimal: the selective removal of a few red elm trees in 1980. The Townsend Woods SNA is a fine example of the "Big Woods" forest type and it is representative of presettlement conditions. Because of its small size, however, the woods has been ranked B instead of A.

REF. NO:
DATE: 2 May 1985
SURVEYOR: K. Wendt, C. Converse
LOCATION: Townsends Woods SNA, T109N R22W NENESW Sec 18, within the Emmons-Faribault Moraine, on an irregular knoll with a moderately steep north-facing slope bordering an intermittent stream.

RELEVE HABITAT: Old-growth Forest on well-drained soils of nearly level ridge top

SIZE: 400 sq. meters

TREE LAYER 07

Acer saccharum 3.1
Quercus borealis 3.1
Ulmus rubra 2.1
Tilia americana 1.1

TREE LAYER 06

Acer saccharum 2.1

TREE LAYER 05

Acer saccharum 1.1

SHRUB LAYER 04

Acer saccharum 3.1
Tilia americana +.1
Celtis occidentalis +.1

SHRUB LAYER 03

Celtis occidentalis +.1
Tilia americana +.1
Acer saccharum 1.1

HERB LAYER 02

Celastrus scandens +.1
Tilia americana +.1
Partneuocissus quinquefolius +.1
Ulmus rubra +.1
Acer saccharum 2.1
Celtis occidentalis +.1
Prunus americana +.1
Quercus borealis +.1

HERB LAYER H2

Sanguinaria canadensis +.1
Dicentra cucularia 2.4
Caulophyllum thalictroides +.1
Hydrophyllum virginiana +.1
Dentaria laciniata +.4
Laportea canadensis 1.1
Asarum canadense +.1
Hepatica acutiloba +.2
Osmorhiza claytonii +.1
Galium aparine 1.1
Viola pubescens +.1
Erythronium albidum +.2
Phlox divaricata +.1
Smilax larionera +.1

Anemone quinquefolia +.1
Uvularia grandiflorum +.1
Grass sp. +.1
Carex sp. +.1
Trillium cernuum +.1
Thalictrum dioicum +.1
Smilcina racemosa +.1
Botrychium virginianum r.1
Hystrix patula +.1
Solidago flexicaulis +.1
Aplectrum hymale +.1
Monotropa uniflora r.1

SYMBOLS USED ON RELEVE DESCRIPTIONS

Height Class (Stratification)

- 8 >35 m
- 7 20-35 m
- 6 10-20 m
- 5 5-10 m
- 4 2-5 m
- Graminoid & Forb layer <2 m

For each species within the height class two symbols are used (e.g., Zizia aptera + .1):
the first is an estimate of cover-abundance,
the second is an index of sociability
(dispersion of population)

Cover-abundance

- r single occurrence
- + occasional, cover <5%
- 1 plentiful, cover <5%
- 2 very numerous, cover 5-25%
- 3 any number of individuals, cover 25-50%
- 4 any number of individuals, cover 50-75%
- 5 any number of individuals, cover 75-100%

Sociability

- 1 growing singly
- 2 grouped, few individuals
- 3 large group, many individuals
- 4 small colonies, extensive patches,
broken mat
- 5 extensive mat

Additional symbols

- r rare or endangered species
- cf precise identification not possible
although close resemblance exists to
indicated taxon
- i introduced species

SOUTHERN MAPLE-BASSWOOD FOREST
(BIG WOODS SECTION)
ELEMENT ABSTRACT

NATURAL COMMUNITY

ELEMENT NAME: Southern Maple-Basswood Forest (Big Woods Section)

PLANT COMMUNITY

COVER TYPES: Acer saccharum - Quercus borealis - Tilia americana -
Ulmus americana (A3.A00)
Acer saccharum - Tilia americana - Quercus alba (A3.B00)

BASIS FOR CONCERN: Due to land clearing for agricultural cropland, selective logging, and grazing, old growth undisturbed stands of maple-basswood forest in the Big Woods section are quite rare.

DESCRIPTION

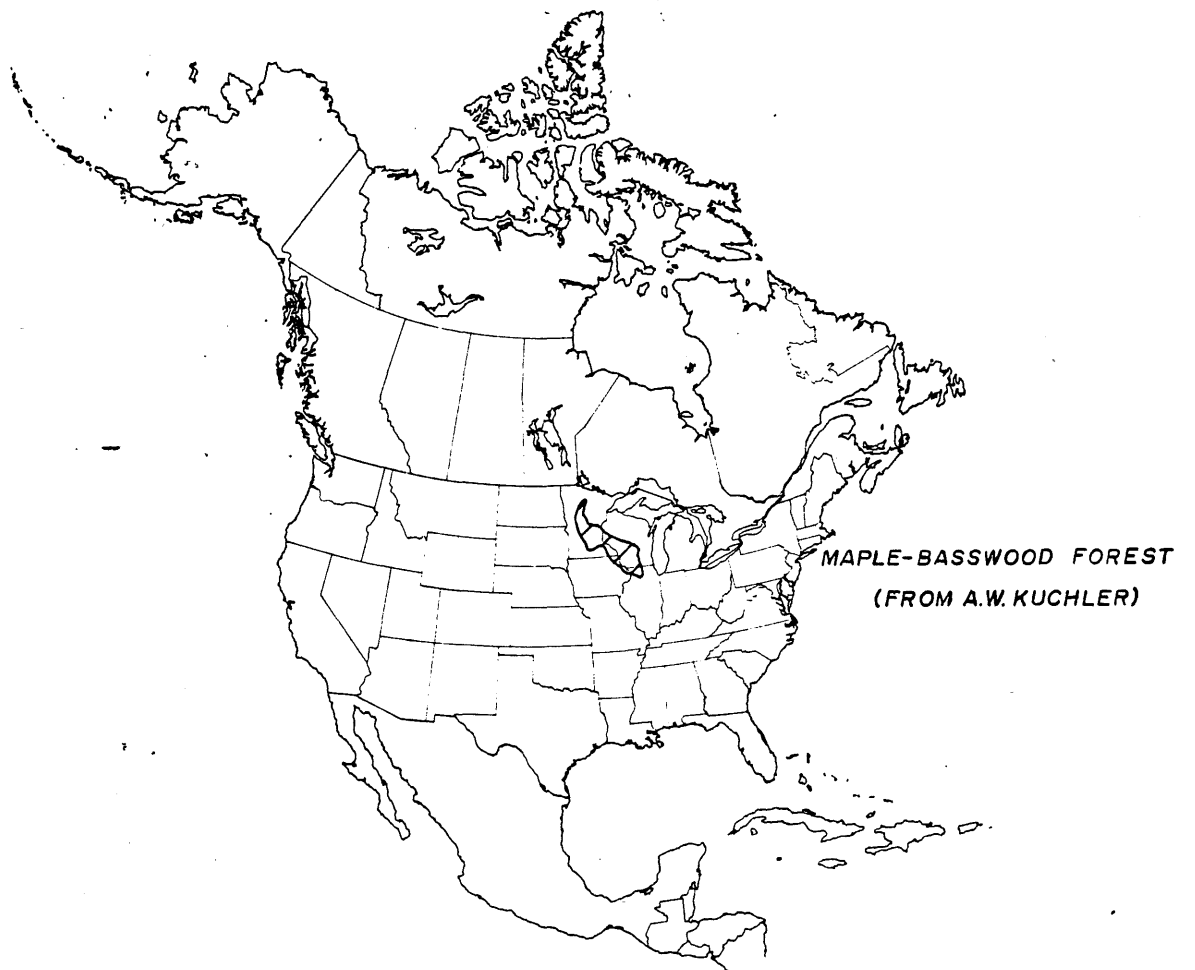
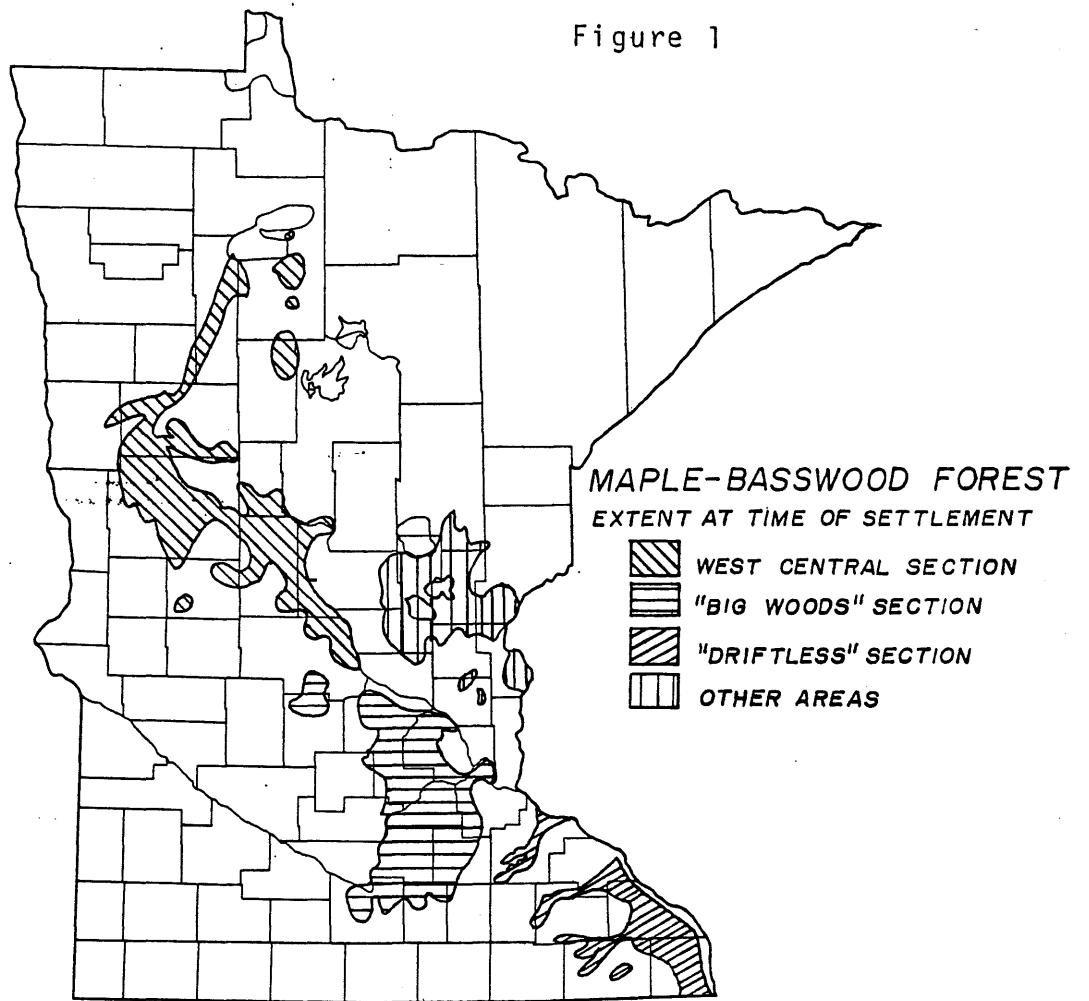
AND DISTRIBUTION:

The southern maple-basswood forests of Minnesota are the westernmost expression of Braun's (1950) Maple-Basswood Forest region which extends from westcentral Minnesota into southern Wisconsin, and through small areas of northeast Iowa and northwest Illinois in the "Driftless Area". Strongly mesophytic species, sugar maple (Acer saccharum) and basswood (Tilia americana) are the dominant trees; red oak (Quercus borealis) is the most common associate. The understory is characterized by species of southern affinity: bellwort (Uvularia grandiflora), bloodroot (Sanguinaria canadensis), blue cohosh (Caulophyllum thalictroides), ginseng (Panax quinquefolium), and white snakeroot (Eupatorium rugosum).

The Maple-Basswood Forest is similar to the northern part of Braun's (1950) Beech-Maple Forest which occurs in eastern Wisconsin and south Michigan. Here, west of the "beech border", American beech (Fagus grandiflora) replaces basswood as the principal co-dominant in the mesophytic forest. Rogers (1981) believes the differences in community characteristics (particularly understory composition) between the Beech-Maple and Maple-Basswood forests are not great enough to warrant subdivision into two distinct types. Curtis (1959) studied stands of beech-maple and maple-basswood forest in different regions of Wisconsin and found the stands floristically uniform enough to consider them as one forest type which he called the southern mesic forest.

The southern maple-basswood forest in Minnesota is found in three major geographic sections of the state (Figure 1). The Big Woods Section was the largest contiguous expanse of maple-basswood forest on the presettlement landscape. Smaller areas of maple-basswood forest occurred in the Driftless Section found in southeastern Minnesota and in the West-central Section, an area

Figure 1



extending north and west of the Big Woods in a narrow tongue between the prairie region and mixed conifer-hardwood region of Minnesota. These smaller areas of maple-basswood forest did not occur as contiguous forest, but rather as scattered islands in a matrix of other vegetation types.

THE BIG WOODS SECTION

The "Big Woods", as originally described by Daubermire (1936), was once the dominant vegetation type of south-central Minnesota and the largest continuous area of maple-basswood forest on the presettlement landscape. The forest covered approximately 3,420 mi² of Minnesota, extending roughly from St. Cloud south to Mankato (Figure 2). The "Big Woods" forest was found on mesic loamy soils formed in Des Moines Lobe till. The Hayden soil characterized the well drained sites while the Dundas and Glencoe soil series typified the poorly drained sites.

The boundaries of the original forest were in large part controlled by the frequency of fire. The "Big Woods" flora was restricted to areas where natural firebreaks such as rivers, lakes, and rough topography prevented the spread of fire. The characteristic trees of the "Big Woods" were elms (Ulmus americana, Ulmus rubra), red oak (Quercus borealis), basswood (Tilia americana), ironwood (Ostrya virginiana) and sugar maple (Acer saccharum) with lesser amounts of ash (Fraxinus nigra, Fraxinus pensylvanica) and butternut (Carya cordiformis). Prior to white settlement, elm was the most abundant tree throughout the Big Woods section, most frequently found on poorly drained soils. Sugar maple had the most restricted distribution of all the "Big Woods" tree dominants, preferring the well drained sites in areas well protected from fires. Based on Paleoecological studies, the "Big Woods" flora is relatively young; it succeeded oak forest in the region only around 300 years ago (Grimm, 1981).

CURRENT STATUS: The original "Big Woods" forest has been virtually eliminated through land clearing for agricultural cropland. Today, remnant maple-basswood forest occurs in the Big Woods section only as small isolated tracts ranging in size from 5 acres to 300 acres. These tracts are separated by cultivated farmland and residential land. Many of these scattered woodland "islands" have been utilized in ways which have significantly altered the structure and composition of the original forest.

Many of the remaining stands of "Big Woods" forest are being used as pasture. Under heavy grazing pressure, an almost complete destruction of the understory occurs. The result is an even-aged woodland containing large mature trees in the canopy but an almost total absence of trees in younger age classes. Forests which are subjected to light grazing pressure exhibit a shift in the composition of the original understory with certain native species increasing and others decreasing or eliminated. Light-moderate grazing generally increases the density of shrubs, especially prickly ash (Xanthoxylum americanum, blackberry (Rubus spp.) and current (Ribes spp.). Herbaceous plants such as sedges (Carex spp.), certain grasses, and forbs including hog peanut (Amphicarpa bracteata), Agrimonia (Agrimonia gryposepala), (Aster shortii), fleabane (Erigeron pulchellus), geranium (Geranium maculatum) and avens (Geum canadense) generally increase with grazing.

Other uses of the remaining "Big Woods" forest have been less destructive and have actually tended to maintain and often increase the dominance of the characteristic shade tolerant species - sugar maple, basswood, and ironwood. High-grading of the "Big Woods" by selective removal of less shade tolerant species such as red and white oak, yellowbud hickory and walnut to be used for barrels, fence posts, and building materials has been a common practice since settlement of the area. This steady cutting practice, over a long period, has resulted in a change in forest composition toward greater dominance of sugar maple and basswood in the remaining forests. Since the less shade-tolerant oaks and hickories do not normally reproduce under their own shade, sugar maple can be expected to increase naturally in the Big Woods section, at least in the absence of natural catastrophes such as fire and large windstorms.

The production of maple syrup, another use of the "Big Woods" forest since white settlement, has resulted in the maintainance of relatively intact pieces of maple-basswood forest. Some of the finest examples of "Big Woods" that remain today are those which have had a long history of maple sugar production.

Considerable change is occurring in the remaining "Big Woods" as a result of a more recent phenomenon - dutch elm disease. This disease is eliminating elm as a major component of the "Big Woods".

REPRESENTATIVE

SITES: Wolsfeld Woods SNA (Hennepin Co.)
Townsend Woods (Rice Co.)
Richter Woods (LeSueur Co.)

NUMBER OF
OCCURRENCES: Ten sites of natural area quality (Rank A or B), as of
October 1983.

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PREPARED BY: Keith Wendt, Plant Ecologist, Natural Heritage Program
10/83

Appendix A

ELEMENT OCCURRENCE RANKING - MAPLE-BASSWOOD FOREST

GRADE A

Old growth (120 yr.+) forest tracts relatively undisturbed by man or recovered to an extent where community structure and composition is intact and reflects native presettlement conditions. Grade A forests display the following ecological features (1) closed overstory canopy of old growth mesophytic species, (2) presence of standing dead trees and numerous down trees, (3) heterogenous understory, patchy distribution of herbaceous layer (4) uneven age stand, shade-tolerant mesophytic trees regularly distributed in all size classes, (5) abundance and richness of spring ephemerals and spring blooming herbs. Grade A forests may have been subjected to some light to moderate disturbance. Examples are tracts used in the past for sugar maple production or selective removal for oaks. These types of former land uses in a Grade A tract have done little damage; the major change has been an increase in the relative importance of the mesophytic species - sugar maple, basswood, ironwood.

GRADE B

Forest tracts due to slight to moderate man-induced disturbances or their small size are not considered of Grade A quality. These tracts have been recently lightly disturbed or moderately disturbed in the past, but have recovered much of their original composition and structure. Examples of Grade B forests are (1) old growth forests being selectively logged, (2) old growth forests with recent light grazing or moderate past grazing where the understory has recovered and is relatively intact, (3) old second-growth (90-120 yr.) forests with an intact ground layer, and good tree size class distribution, (4) virgin old growth forest of small size (<40 acres). Grade B forests have the propensity to return to Grade A condition with protection and removal of disturbance.

GRADE C

Mature second growth (50-90 yr.) forests or moderately disturbed communities where the original composition and structure has been altered and no longer reflects natural conditions. Grade C forests include old growth areas subjected to moderate or heavy grazing resulting in an increase in the density of armed shrubs especially Zanthoxylum americanum, Rubus spp. and Ribes spp., a shift in dominance of the ground layer species to those increasing with disturbance, and a decrease in tree reproduction. Ungrazed forests graded C are typically mid successional forests recovering after heavy logging. These tracts are characterized by an absence of larger tree size classes, presence of low branching and multiple-trunked trees, absence of dead falls, and relatively uniform understories, often characterized by a continuous cover of a few dominant species.

GRADE D

Degraded forest communities, where severe disturbances have profoundly altered the original structure and composition of the site. Grade D forests include young second growth stands (20-50 yr) following recent clear cutting, and heavily grazed forest tracts of any age where an almost complete destruction of the understory and herb layer has occurred. Such heavily grazed areas become open woodlots as the mature canopy trees die and there is a near total absence of trees in younger age classes to replace them. Characteristic herb species of severely grazed woods include Arctium minus, Ambrosia artemisiifolia, Nepeta cataria, Solanum dulcamora, Taraxacum officinale.

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