WOLSFELD WOODS
SCIENTIFIC AND NATURAL AREA

MANAGEMENT PLAN
AND
RESOURCE INVENTORY

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

WOLSFELD WOODS
SCIENTIFIC AND NATURAL AREA

MANAGEMENT PLAN
AND
RESOURCE INVENTORY

A Public Use Unit

Permitted Uses Include:

.Research - Programs conducted by qualified scientists and college graduate and post-graduate students (permit required)

.Education - Primary, secondary and college programs

.Public Use - Interpretive programs and nature observation

Division of Fish and Wildlife
Minnesota Department of Natural Resources

WOLSFELD WOODS

SCIENTIFIC AND NATURAL AREA

MANAGEMENT PLAN

JULY 1981

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I. INTRODUCTION

A. Description of Wolsfeld Woods Scientific and Natural Area

1. Regional Setting

Wolsfeld Woods Scientific and Natural Area (SNA) is located in the middle of Hennepin County, two miles north of the town of Long Lake, in Section 26, 27; T118N, R23W. Approximately 80% of the unit lies within the city boundaries of Medina, about 20% within Orono (figure 1). Wolsfeld Woods is located on the east-central edge of the Big Woods Landscape Region (figure 2).

2. The Unit

Wolsfeld Woods SNA consists of 185 acres of woodlands and a 34 acre lake, totaling 219 acres.

The unit has a rolling topography. Relief is not great, but almost the entire area is sloped. Drainage is immature, as evidenced by a rapidly eroding stream valley, numerous small undrained depressions and a large, poorly drained wetland. The lake is fed by a major stream at the northwest end, a small stream on the eastern side, and by a temporary stream which drains the western half of the unit. The unit contains another stream at the southeast end of the lake. Soils are generally deep and loamy.

The vegetation consists of mature northern hardwoods (sugar maple, basswood, elm, red oak, ironwood, bitternut hickory, and others) in various combinations. The depressions are dominated by graminoids and ringed by a narrow band of swamp forest. The wetlands contain swamp forest of American elm, green ash, sugar and red maple.

3. Significant Resources

a. significant illustrations of the geological formations and features of the St. Croix moraine;

b. a significant occurrence of a Big Woods forest community;

c. several ecological communities significantly illustrating the process of succession and restoration to natural condition following disruptive change;

d. habitat supporting ginseng species;

e. a lake and wetland considered to be of important research value to Minnesota limnologists.

f. one state record tree (bitternut hickory) and near record sugar maple trees;

g. excellent diversity of woodland flowering plants, often in unusually large colonies;

h. an area large enough to permit effective research or educational functions and to preserve the inherent natural values of the area;

i. a location which is very convenient to several major research institutions and a very large number of schools and colleges.

4. Other Features

a. a dirt road enters the tract from County Road 6 on the south side, crosses the area, goes past the lake, the old Wolsfeld farm, and continues on to the Holmberg property;

b. a number of old farm buildings and a house comprise the remains of the old farm. The house is the original Wolsfeld log house, sided over;

c. an extensive network of trails cross the tract. The remains of the sugar shack are still standing.

B. Unit Goal

The goal of the Wolsfeld Woods SNA unit is to preserve the "Big Woods" plant community and the plant ginseng. Both are elements, as defined by the Natural Heritage Program.

C. History of Protection Efforts

1. Identification of the Unit

Wolsfeld Woods SNA was nominated by Geof Barnard in April, 1978.

2. History of efforts to preserve the unit

The resources of Wolsfeld Woods have been appreciated for many decades by the Wolsfelds, by picnickers and horse riders, and by a wide variety of neighbors. In 1960 the land was acquired by the Wolsfeld Lake Company from the Wolsfelds for its development potential. Soon after acquisition the company was contacted by the Hennepin County Park Reserve. Ultimately the park reserve decided not to bid for the land. Gradually the company, in particular two of its principal partners, Con and Marney Brooks, began to see the values of preservation. Marney Brooks contacted Dr. Don Lawrence of the University of Minnesota Botany Department. It was Dr. Lawrence who first brought the tract to the attention of the University and The Nature Conservancy (TNC). The Nature Conservancy began to work with the Brooks to help determine the best despensation of the land. In June of 1978, the land was transfered to TNC and then to the state, with the prior agreement that it be designated a Scientific and Natural Area.

3. Designation as an SNA

Wolsfeld Woods SNA was designated by the Commissioner of Natural Resources on November 6, 1978 and filed with the secretary of state November 20 of that year. It is designated as a public use unit.

D. The Scientific and Natural Areas Program - Overview

1. Background

The Minnesota legislature first authorized the designation of scientific and natural areas by the Department of Natural Resources (DNR) in MN Stat 1969, Section 84.033. The Outdoor Recreation Act, MN Stat 1975, Section 86A.01 to 86A.11 detailed the role of SNAs as a component of Minnesota's outdoor recreation system.

2. Goal

In keeping with the legislative mandate of the Outdoor Recreation Act of 1975, the DNR has established a goal for the SNA system. This goal is:

> TO PRESERVE AND PERPETUATE THE ECOLOGICAL DIVERSITY OF MINNESOTA'S NATURAL HERITAGE, INCLUDING LANDFORMS, FOSSIL REMAINS, PLANT AND ANIMAL COMMUNITIES, RARE AND ENDANGERED SPECIES OR OTHER BIOTIC FEATURES, AND GEOLOGICAL FORMATIONS, FOR SCIENTIFIC STUDY AND PUBLIC EDIFICATION AS COMPONENTS OF A HEALTHY ENVIRONMENT.

E. The Outdoor Recreation Act Planning Directive

1. The ORA mandated that each unit in the Outdoor Recreation System must have a master plan and that this plan must be completed and approved before development funding is permitted. The SNAs come under this jurisdiction and must have plans.

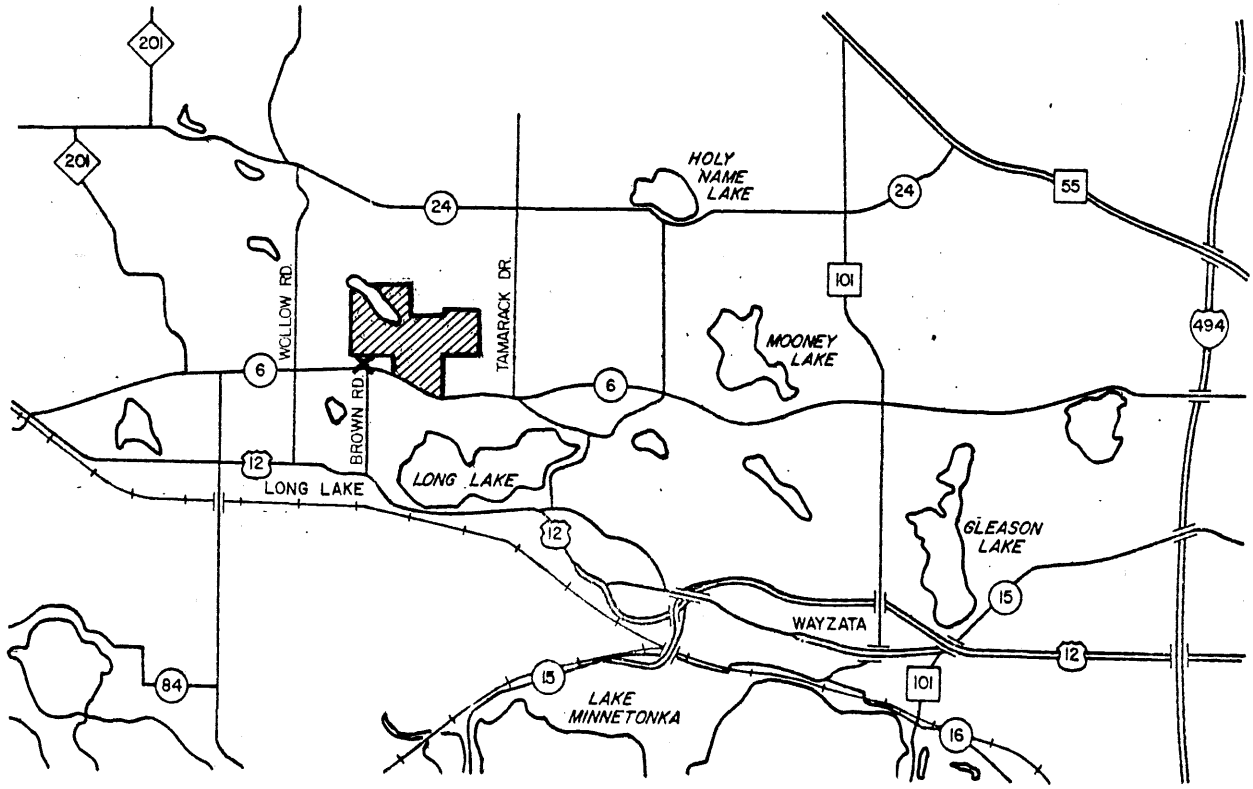
2. The plan functions to:

1) assemble site specific information from diverse sources
2) translate legislative and SNA policy directives into site specific actions
3) present the rationale for these actions
4) outline the authority and responsibility for the actions
5) summarize the costs of these actions.

F. Review of the Plan

The first draft of the management plan was issued in May, 1979. Copies were circulated to the commissioner's advisory committee on SNA; the DNR planning and environmental review team; DNR planning; the State Planning Agency; The Nature Conservancy; and concerned neighbors, users, researchers, educators, and SNA staff. There was general consensus on most, but not all items. It was felt that continued discussion of the plan would be beneficial enough to warrant postponing the final draft. On the basis of the comments of the reviewing groups and their individual roles in the plan approval process, the pressing management needs, and the avail-

able labor, many of the recommended actions were initiated. A second draft of the plan was sent out in June 1980 and a third draft in December 1980. This fourth and final draft differs from the first primarily in an abbreviation of the introduction, an expansion of the inventory, a restatement of some objectives pertaining to trail use, and an update on implementation.



Wolsfeld Woods Scientific and Natural Area, Hennepin County, Minnesota
parking and entrance (Trinity Lutheran Church parking lot)

fig 1

II. INVENTORY

The function of the inventory is to:

a) identify and describe management opportunities, needs, or problems
b) provide a resource catalog for users and for preparation of any interpretive materials
c) assemble information on the history or management and land use
d) provide baseline data for future ecological or management comparisons
e) provide information on the frequency and distribution of rare or unusual species, communities or other natural features to the Natural Heritage Program
f) provide data for a state-of-the-art assessment of the significance of the area
g) identify nearby potential users
h) identify adjacent compatible and incompatible land uses

The following inventory is not comprehensive. What is presented here is a compilation from secondary sources, field work voluntarily contributed by a variety of individuals, field mapping conducted by the Soil Conservation Service, and limited DNR field work. As the inventory is completed, it will be incorporated into the plan.

A. Climate

1. Methods

Information about the specific climate or microclimate of Wolsfeld Woods is not available because a weather station is not on the site. It is unlikely that one will be established. Regional climate data were used to describe local conditions. Regional climate data are gathered by the National Weather Service (U.S. Department of Commerce) at the Minneapolis/St. Paul International Airport following standardized recording techniques. These data are summarized in the Soil Survey for Hennepin County, Soil Conservation Service, April 1974, from which this information was taken. Additional information is available from the Freshwater Biological Institute on the shore of Lake Minnetonka but was not incorporated into this inventory.

2. Climate

The climate is predominantly continental. There are wide variations in temperature. It is very warm with a moderately high humidity in the summer, and very cold in the winter. The mean temperature for the months of December, January, and February is about 15 degrees Fahrenheit, and for the months of June, July, and August about 70 degrees Fahrenheit.

Most vegetation is dormant for seven months, with the growing season including the months of May through September. During this period the normal rainfall is 16.07 inches. Snowfall can be heavy, averaging more than 40 inches a season. Snow has occurred in all months except June, July, and August. The average last date of frost is April 29. The average first frost is October 13. The average growing season

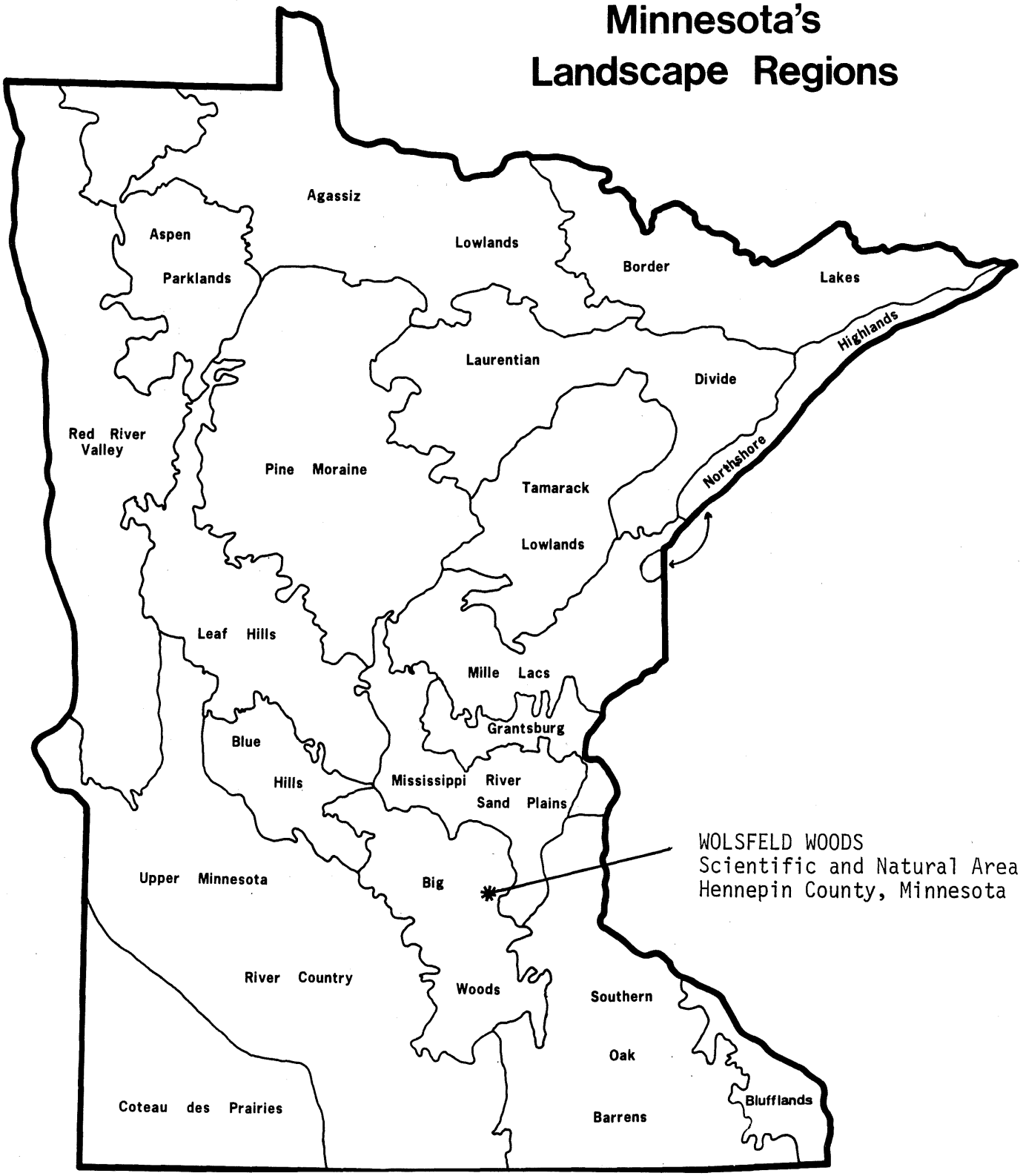


Figure 2. Wolsfeld Woods Scientific and Natural Area in relation to Minnesota's landscape regions. Adapted from T. Kratz and G. L. Jensen, An Ecological Geographic Division of Minnesota (unpublished, 1977).

is 166 days. Wind speed ranges from an average of 9.1 miles/hour in August 59 12.6 miles/hour in April. The prevailing direction is from the south and southeast from May through October and from the northwest during the other months. There is an average of 102 clear days, 102 partly cloudy days, and 161 cloudy days in a year.

B. Geology

1. Methods

The following geologic information was compiled from an unpublished description of the geology of Wolsfeld Woods by Eric Grimm, a graduate student at the University of Minnesota, Department of Ecology and Behavioral Biology. (Mr. Grimm did his post-graduate work on the ecology and palynology of Wolsfeld Woods and Wolsfeld Lake). Mr. Grimm obtained his information by analysis of the topography and comparison of the till. Till is an unconsolidated mixture of clay, silt, sand, and stones left by a glacier. Further information was provided by Dr. Ed Cushing and Dr. Herb Wright, and from Landscapes of Hennepin County by Patrick Kennedy and Robert Lueth published by the Soil Conservation Service in 1976.

2. Regional Historical Geology

Wolsfeld Woods lies on the St. Croix moraine. The moraine was formed by a glacial lobe that extended from Canada to near Minneapolis, Minnesota. It is called the Minneapolis lobe and dated from approximately 12,000 years before present. Wolsfeld Woods lies on the 200-300' thick moraine materials deposited along, on, and around the edge of the Minneapolis lobe.

A great many geologic forces are typically at work along the edge of a glacier. How these forces interact can vary greatly from section to section. In the specific area of Wolsfeld Woods, the landscape is believed to have formed from a downwasting, stagnant icefield. It is believed that a thick bed of supra-glacial till lay on the ice surface in the late stages of the glacial advances. As the ice melted, the highly saturated drift slumped and slid into lows, filling holes on the wasted ice. After the ice melted, the landscape was a random assemblage of hummocks, ridges, basins and small plateaus. Ice blocks trapped in the till later melted and formed low basins, marshes and lakes. In the region of Wolsfeld Woods, the glacial till is generally of a loamy texture. It is covered by a clayey, shale-rich mantle 5 to 25 feet thick. Soils formed in this upper mantle have a distinct firmness to the touch when moist, a slight increase in clay and silt, a slightly more yellow color, and more strongly developed soil layers and structures.

3. Relief and Landforms

The topography of Wolsfeld Woods is irregularly rolling. Total relief is 90 feet. The depressions are mostly wet and undrained, although streams have broken out of the larger areas. The large lowland on the western side was probably a lake and/or marsh originally and

only began draining relatively recently, perhaps within the last 200 years. Evidence for this is the very unstable, rapidly eroding stream channel that is its only outlet. The outlet from Wolsfeld Lake is also downcutting, although more slowly, and may ultimately drain the lake completely. Wolsfeld Lake covers 34 acres and is up to 26 feet deep. Limnic sediments are up to 50 feet thick.

C. Soils

1. Methods

The inventory was conducted by the Soil Conservation Service in the fall of 1978. The result of their work is a highly detailed soils map (1"=100') which has been simplified for reproduction here. The original map may be seen in the SNA office. Information on individual soil characteristics was obtained from Soil Conservation Service publications.

2. Soil Types

The soils of Wolsfeld Woods (figure 3) consist of the following:

Map Symbol Map Units

Gc

Glencoe silty clay loam - a deep, very poorly-drained loamy soil, formed in loamy colluvium over calcareous, loamy till. This soil lies in shallow depressions and in places in drainageways. It has high available moisture capacity, very slow internal drainage, and moderate to moderately slow permeability. The water table is near the surface during the wet seasons. Glencoe soil is high in organic matter content and natural fertility.

Ha

Hamel loam - a deep, poorly-drained soil that formed in loamy colluvium over loany till occupying the deeper drainageways between hills. During wet periods there is a perched water table within one foot of the surface and ponding may occur.

Hb

Hayden loam - a deep, well-drained, loamy soil that formed in loamy glacial till. These gently sloping to very steep soils are in convex areas on knolls and hillsides. There are stones and boulders near the surface. Hayden soils have high available moisture capacity and moderate permeability. The water table is at a depth below five feet in all seasons. These soils have low organic matter content and medium natural fertility. The subsoil in most places is high in phosphorus. Roots penetrate the soil deeply and easily. The surface layer is easily eroded, especially on the steeper slopes.

Hc

Hayden clay loam - a more clayey phase of the Hayden loam described above.

Ld

Lake beach, loamy - a deep poorly-drained or very poorly-drained loamy or silty soil formed from materials of lakes and sloughs. The underlying material is calcareous, gray loam. The water table is usually within a three foot depth. The surface layer has high organic matter content, available moisture capacity, and natural fertility.

LMb

Lerdal loam - a deep, somewhat poorly-drained soil that formed in a calcareous, loamy mantle of till three to twenty feet thick. Lerdal soils typically occupy slight rises and knolls on broad hilltops. Slopes are complex, but less than four percent. Occasional stones and boulders occur near the surface. This soil has high available-moisture and organic matter content; fertility is medium. It has moderately slow permeability and medium to slow internal drainage. The water table is at three to five feet or more. The root zone is deep, but roots grow slowly in the dense subsoil.

Ma

Marsh - shallow lakes and ponds that are wet all year long. The soil material is too wet to be classified.

NeB

Nessel loam - a deep, moderately well-drained loamy soil formed in calcareous till on nearly level to gently sloping rises, low knolls, and broad hilltops. This soil has high available moisture capacity, medium fertility, and low organic matter content. The subsoil is medium to high in phosphorus. The water table is at three to five feet during wet seasons. Nessel loam is moderately permeable and the root zone is deep.

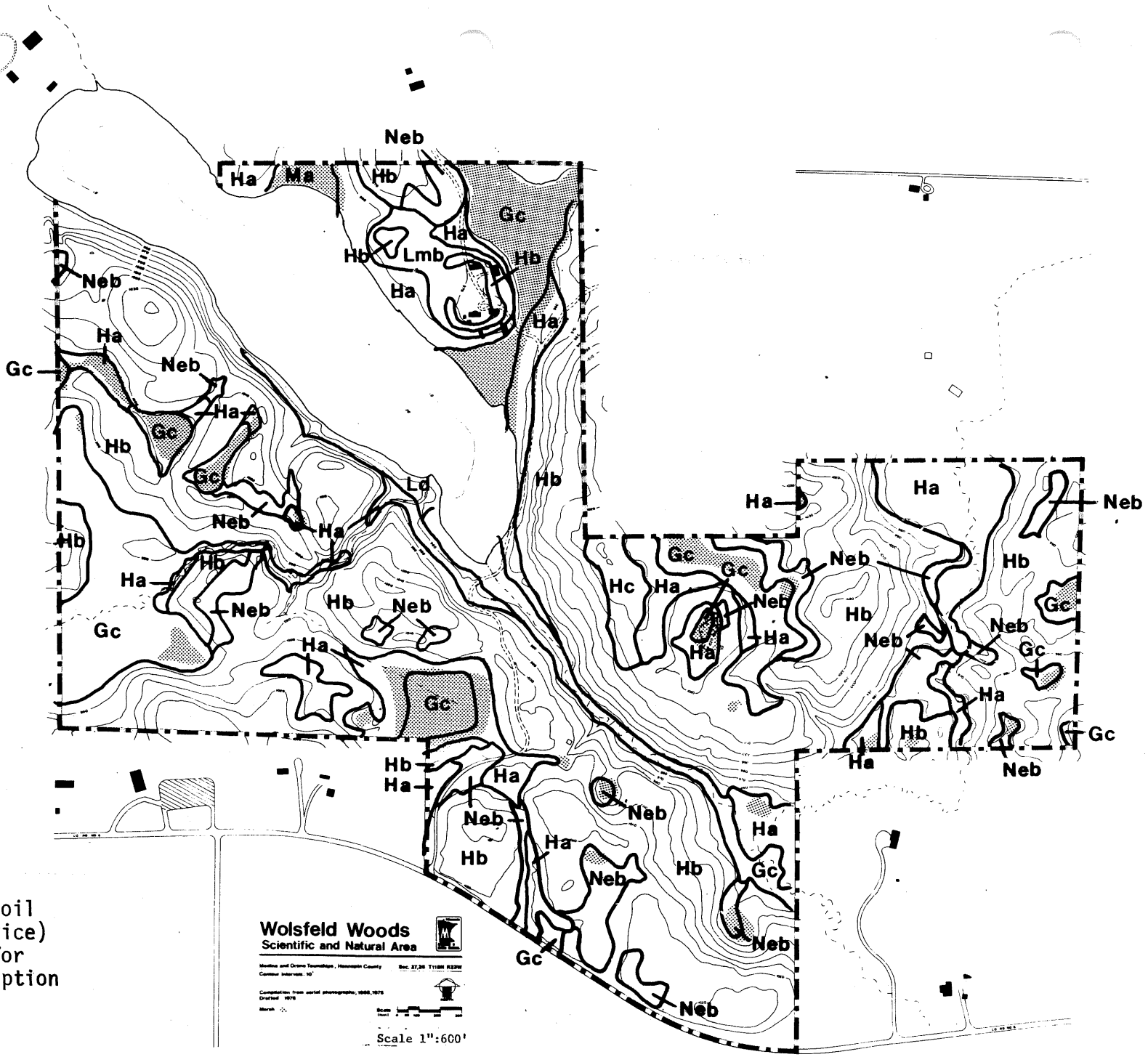
D. Water Resources

1. Methods

The water resources have not been adequately inventoried and the data used in this report are based on Landscape of Hennepin County (Kennedy P. and R. Lueth, Soil and Conservation Services 1976), a 1960 DNR lake survey (figure 4), a 1933 survey (figure 5), and personal communication from neighbors.

2. Hydrological Setting

Wolsfeld Lake lies in the Long Lake watershed which in turn lies in the Lake Minnetonka watershed. The drainage basin for Wolsfeld Lake include some smaller lakes and ponds.



SOILS MAP (From Soil Conservation Service) See text (p. 8) for legend and description

Figure 3

GF 165 Rev. 7-1-65 (58)

LAKE SURVEY SUMMARY

27-157

Name / At or Near	County(ies)	Watershed No.	Ident. No.
Walsfeld (Wolsfeld) / Maple Plain	Hennepin		5-124

Township(s)	Range(s)	Section(s)	Type of Lake
118N	23W	22,27	

Wetlands Classification	Ecological Classification	Management Classification
		Centrarchid (l.m. bass)

SOURCE OF INFORMATION: 1. Fish Lake Survey Report Jy 19-22, 1960 2. Game Lake Survey Report
3. Lake File 4. Gazetteer 5. D.O.W. Bulletin No. 25 6. 7.
Maps: 8. Res. & Plan. 1960 9. 10.

Item	Data	Source
Area-Acres	34.4	8
D.O.W. Area-Acres		
Max. Depth-Ft.	26	8
Median Depth-Ft.	10	8
Littoral Area-%	74	8
Shore Length-Mi.	1.3	8
Greatest Length-Mi.	0.53	8
Meandered-Yes or No		
Annual Fluctuation-Ft.	+ 1 , - 1	1
Long-term Fluctuation-Feet	+ 2 , - 2	
No. Islands		
No. Dwellings	1	1
No. Resorts, Units at Resorts	0	1
No. Boats - Resort, Private	2	1
No. Boat Liveries		

Dams: None

Major Drainage Basin: Mississippi

Sequence of Waterways to Major Drainage Basin:

Inlets - Trib. No.	Name	Location	Flow - C.F.S.	Source of Information
	Unnamed	S. 32	0.11	
	Unnamed	S. 27	dry	1
Outlet				
	Unnamed	S. 27	0.4	1

Watershed Description: Use is 50% forest, and 50% agricultural. Picnic grounds on SW side of lake.

Watershed Ownership: Private

Benchmark: water level 3.8 feet below top of steel stake at base of 3' elm at access on SW shore.

Shoal Water Soils - %	Ledge-rock	Boulder	Rubble	Gravel	Sand	Silt	Clay	Muck				Source

Lake Bottom - %: Shoals are sand around entire lake with detritus near outlet & small amount
Shore Cover: Rolling hills with woods and pasture plus some hay land (of muck on E.
Accessibility: No design, public access; possible thru private picnic grounds at 50¢/car.
Erosion & Pollution:

% Emergent Cover Dist.
% Occur. Submerged Veg. Dist.

Water Plants - Species	Abund.	Water Plants - Species	Abund.	Water Plants - Species	Abund.
Cattail	R	Yellow water lily	R		
Reed canary grass	R	Sage pondweed	R		
		Aquatic plants grew to a depth of 4 feet.			1
		Carp have destroyed most of the vegetation			1

Algae

Plants grew to depth of Ft.

Fish Species	ABUND. No.	ABUND. Wt.	Gear*	Growth Rate	Spawning Facilities	S.
Carp	2.80	2.52	T	-	-	1
Bl. Bullhead	1.30	0.48	T	-	-	1
Br. Bullhead	0.40	0.22	T	-	-	1
Y. Bullhead	0.20	0.18	T	-	-	1
Bluegill	23.20	5.12	T	-	Good	1
Hy. Sunfish	0.40	0.03	T	-	Good	1
Bl. Crappie	0.10	0.005	T	-	Good	1
L.m. Bass	P		S			1

* Gear - G - 250' gillnet set for 24 hours

Item	Surface	S.	Below Therm.	S.
Temp. - °F.	82	1	52	1
D.O. - p.p.m.	10.0		0.0	1
T.Alk. - p.p.m.	132.5	1		
SO_4 - p.p.m.				
Cl. - p.p.m.				
T.P. - p.p.m.				
T.N. - p.p.m.				
Color				

Secchi Disc Reading Ft.
Cause of Turbidity
Loc. of Therm. Ft. from Surf.

Winterkill Dates "periodically" 1959-60 G. T.
Special Problems Secchi - 3 1/2 feet

ABBREVIATIONS: A - abundant, C - common, O - occasional, R - rare, P - present, S - source of data, G - 250' gillnet set for 24 hours, T - trapnet set for 24 hours, E - Electrofishing (____hours).

Dept. of Conservation (DNR) 1960 Lake Survey.

Figure 4

Lake	Date	Approximate area square mi.	Maximum depth found, ft.	Depth of sample, ft.	Temperature	Dissolved oxygen cc. per liter	Reaction to phenolphthalein	Carbon dioxide deficiency or excess, cc. per liter	"Fixed" CO_2 (Carbonater) cc. per liter
Wolsfeld	8/24/27	0.1	27	0	73.5	6.2 6.2	alkali	-10	23.3
				15	63	0.7 1.0	acid	8.8	---
				25	56	0.0 0.0	acid	15.2	38.8

Comments: Unusually great change in CO_2 from top to bottom.

From Johnson, Maynard, 1933, Preliminary Report on some Minnesota Lakes and their Productiveness of Fish Food, University of Minn., St. Paul, Minn.

Figure 5

A series of water tables, or water-saturated zones exist in the area of Wolsfeld Woods. At the base of the till there exists a deep, little-varying regional water table. Much closer to the surface is another zone, one which intersects many of the lower lying areas, where it creates marshes and lakes. This water table is susceptible to yearly fluctuations of the climate. Running across the flat hill-tops and across flatter areas, regardless of elevation, is a so-called perched water table. A perched water table is one that moves to within a few feet of the ground surface during wet spells and drops many feet down, perhaps even vanishes during dry periods (Kennedy P. and R. Lueth 1976).

3. Limnology

Wolsfeld Lake occupies about 34 acres. It is fed by a major inlet on the northwest corner, by a small stream on the east, and an intermittent stream on the west. The only outlet is on the southeast corner. The water is very high in phosphorus with much sediment pollution. The biological condition is poor, based on local accounts fishing has gone from excellent to terrible, very little expected emergent vegetation is present, and introduced rough fish now dominate the lake.

However, the lake and one of the small depressions have been used in a palynological (pollen) study by Dr. Eric Grimm of the University of Minnesota. The former lake bed on the west side has also demonstrated research value and is currently the focal point of a National Science Foundation grant (to Eric Grimm). The history of research on the lakes and the data stored in these lake sediments make this lake a valuable site for future paleoecological research.

E. Vegetation Communities

1. Methods

In 1975 Mike Scanlon of the University of Minnesota Botany Department prepared a document "An analysis of the Wolsfeld Lake property" for the Wolsfeld Lake Company. The purpose was "to identify and record the unique areas within the company's property." "Unique" was defined as infrequent on the property or in the county. The study dealt primarily with the plants and plant communities of Wolsfeld Woods.

This report makes Scanlon's map and description of the map units available in condensed form. Scanlon's methods were not recorded. Recent field checking by DNR confirms most of Scanlon's research, descriptions and conclusions. His work must suffice for plant community mapping at this time. Scanlon's work, coupled with more recent inventory efforts, was used for use-management planning.

The description of the history and dynamics of the regional vegetation was voluntarily submitted to the DNR in July 1978 by Eric Grimm. The information on which his description is based was derived from secondary sources (e.g. land survey records) and from his ongoing ecological and palynological research on Wolsfeld Woods and Wolsfeld Lake.

2. Regional Vegetation: History and Dynamics

Wolsfeld Woods is a small remnant of the "Big Woods," the largest area of continuous deciduous forest in Minnesota before settlement (figure 2). Almost all of this original forest has been cleared and the land is now devoted to agricultural or urban purposes. "Big Woods" is the English translation of Boise franc or Bois fort, which were used by the French voyageurs to describe forest composed of large deciduous trees. In this part of Minnesota, "Big Woods" acquired a geographic connotation as well as botanical. The "Big Woods" was large in extent and consisted of large trees, including a high proportion of elm, basswood, and sugar maple. In contrast, the surrounding areas were either prairie or very scrubby oak and aspen. To the early explorers the "Big Woods" was a wilderness with a mystique of its own, covered with large trees and beautiful lakes. inhabited by mosquitoes, bears, and Indians.

The well-known geologist N. H. Winchell made these comments in 1875:

> The existence of this great spur of timber, shooting so far south from the boundary line separating the southern prairies from the northern forests and its successful resistance against the fires that formerly must have raged annually on both sides, is a phenomenon in the natural history of the state that challenges the scrutiny of all observers.

In general, two types of forest occurred in the "Big Woods." On poorly drained soils it consisted of primarily elm and ash. On well-drained soils, the important tree species were sugar maple, basswood, hickory, ironwood, butternut, and red and white oak. Wolsfeld Woods has both of these types. Most of the woods is on well-drained soils and sugar maple, red oak, and basswood dominate. Poorly drained soils occur around small depressions, and in the southwest part of the woods. American elm is the dominant tree here, but basswood, green ash, and silver maple are also frequent. In Wolsfeld Woods the less common trees found on well-drained soils are hickory (many of which died in the 1930's), bur oak, white oak, and slippery elm. On poorly-drained soils the less common trees are red maple, black ash, and hackberry. Aspen occurs in disturbed areas and tamarack occurs in one of the small marshes west of the road.

The original composition of the "Big Woods" also varied regionally. Hickory, black walnut, butternut, and black cherry were more common to the southeast. Maple and ironwood are more common in the north, elm less so, while white oak is mostly restricted to the north and eastern parts of the region.

The vegetation of Wolsfeld Woods has not always appeared as it does today. In fact, the present community of sugar maple, basswood, and elm is only a few centuries old. Vegetation history can be studied by analyzing plant remains that collect in lake or marsh basins. As the vegetation changes, the assemblage of plant remains and pollen falling into these basins changes. A core of sediment can be taken from a lake or marsh and the plant remains and pollen grains identified. The core represents a trip through time.

At the bottom of the sediments in the lake is a layer of spruce boughs, indicating that spruce dominated the region immediately after deglaciation about 12,000 years ago. As it became warmer, the spruce disappeared and deciduous trees became more abundant. As the warming trend continued, prairie began to appear. Prairie increased in the area and reached its maximum extent about 7,000 years ago. At this time, which was the warmest and dryest period since deglaciation, the prairie-forest border was about 75 miles northeast of the present border. Prairie lasted around Wolsfeld Lake until about 5,000 years ago when oaks invaded. Oak savannas and oak forest dominated the landscape from 5,000 to 500 years ago. The "Big Woods," as it was at settlement, began to develop only about 500 years ago, during a period of world-wide cooling. Although many factors affect the distribution of vegetation types, changing climates have no doubt been largely responsible for the changing vegetation patterns.

The populations of trees in Wolsfeld Woods are in no way stable. Some changes are obvious and others are more subtle. As in any population, there are various causes of mortality and various requirements for reproduction. The elms are rapidly succumbing to Dutch elm disease. Innumerable numbers of sugar maple seedlings occur and saplings of all ages are common. Hickory and slippery elm seedlings are frequent, but saplings are rare. Basswood seedlings are very rare and saplings occur only as sprouts around mature stumps. American elm and oak seedlings and saplings are rare. Ironwood seedlings are rare, although saplings are common. Ironwood is a small tree and these saplings may be quite old.

The required conditions for reproduction of some trees currently do not exist, but they must have occurred in the past. Red oak is a good example. It is very abundant in the large size classes, but almost completely absent as seedlings and saplings. It is known that red oak seedlings require a large amount of sunlight if they are to survive. Therefore, it must be concluded that the canopy of Wolsfeld Woods must have been much more open at times in the past. Several factors could open the canopy, including windstorms, logging, and fire.

Although definite proof is currently lacking, circumstantial evidence indicates that fires were very important. Studies in woods similar to Wolsfeld have shown that ground fires were responsible for abundant red oak reproduction. Ground fires burn the litter, kill the seedlings and saplings, and kill or damage some of the large trees, particularly sugar maple. As a result, a large amount of light penetrates to the forest floor and conditions favorable for red oak reproduction occur. Other trees, including basswood, ironwood, aspen, and white and bur oak are favored by the high light conditions. As the trees grow to maturity, the light levels become very low and sugar maple is the only species whose seedlings can tolerate these conditions. Many of the large red oaks are older than the earliest settlement in this region. It is likely that they became established after ground fires.

Other factors, including windthrow, frostkill, and selective cutting open small patches of the canopy and allow light penetration. Small numbers of red oak, ironwood, and slippery elm can take advantage of these conditions. An example is the area between the two highest marshes west of the road in which a number of trees have been cut.

Several red oak saplings occur here, as well as abundant ironwood and sugar maple saplings. Aspen is another species that requires an open habitat for reproduction. The areas of aspen in the northeast part of the woods must be the result of a severe disturbance, possibly grazing or cutting.

With experience one can visually detect the effect of disturbance. Upland wooded areas that have not had a major disturbance for a long time are usually very open in the understory and have primarily large trees forming a closed canopy, with a few saplings. Areas that have been more recently disturbed have few large trees, large numbers of saplings, and a dense understory.

If disturbances are minimal, an increase in the dominance of sugar maple is expected. Basswood will maintain itself by stump sprouting, but will not increase in dominance. The red oaks are mostly mature trees. These and other species can occasionally reproduce in small openings, however as the mature individuals die, the seed sources disappears. Of course, one severe windstorm could reverse the increasing dominance of sugar maple.

The poorly-drained areas present another situation. The elm is rapidly dying. The reproduction of several species, including basswood, ash and silver maple can be expected to replace them; however sugar maple is capable of colonizing these areas and may become abundant here also. The relative establishment and mortality factors are not as well understood in this habitat.

The herbs of Wolsfeld Woods show a great amount of diversity. In general they share the common characteristic of adaptation to the high shade. Some species, such as bloodroot, hepatica, wild leek, and Dutchman's breeches grow rapidly and flower in early spring before the trees leaf out. Some of these die back in early summer. Others, such as Virginia waterleaf, resume growth in the fall. These spring ephemerals and bloomers comprise some of the most colorful of the woodland flowers. Other species, such as wood nettle, lopseed, and ginseng are capable of surviving under low light. Almost all of the forest herbs are perennials and often reproduce vegetatively, forming clones. Occasionally conditions are favorable for seed production and germination. Some species probably invaded under an open canopy and have maintained themselves vegetatively ever since. Hog peanut may be such a plant. At present, relatively little is known concerning the reproductive requirements of woodland herbs. Wolsfeld Woods provides a valuable natural laboratory for such studies.

3. Vegetation Units of Wolsfeld Woods (figure 6)

Upland Forest Units

W1 Oak Forest

This area includes several knolls where white oak (Quercus alba) is the dominate tree species. On the west-facing slopes and lower rises, red oak (Quercus rubra) is more common than white oak. Ironwood (Ostrya virginiana) is also present. On the banks of the north-south tending stream and in depressions, basswood (Tilia americana), American elm (Ulmus americana), green ash (Fraxinus pennsylvania), and ironwood are present. One black

cherry (Prunus serotina) and a few bur oak (Quercus macrocarpa) trees were also found in this forest. The soils are Hayden loams and Glencoe silty clay loams. Slopes are from 6-12%.

In the past the oaks were removed in the northeastern corner of the area and 4-5" dbh ironwood trees are now the most common tree species in that area.

The eastern edge of this unit appears to have been grazed. The interior of the forest was not affected. Because the trees are almost entirely oaks, it is possible that sugar maple and basswood were once common canopy species but were selectively logged off. If logging did occur, it happened in the distant past because there are no stumps and neither the 1937 aerial photographs nor the understory show evidence of disturbance.

W3 Oak-Maple-Basswood Forest

This component is an excellent red oak forest on an east-facing slope. Sugar maple (Acer saccharium), basswood, and white oak are the codominant trees. Ironwood and white oak are common particularly at the north edge and American elms are scattered along the lower edge of the slope.

The soils are mainly Hayden loams and Hayden clay loams with 6-18% slopes.

The only disturbance has been light logging on the northern edge where ironwood is common.

W4 Maple Forest

This forest has a 30-50% canopy of large, old sugar maples and some basswood and red oak. The area was logged prior to 1937 and has possibly been grazed as well. The westward arm has been grazed continuously from before 1937 to about 1958. Small (average 9" dbh) sugar maples and ironwoods form a dense canopy under the older trees. In some areas sugar maple is not reproducing well, while bitternut hickory is doing well.

The soil of the area is Glencoe silty clay loam and Hayden clay loam.

W6 Maple-Oak-Basswood Forest

This is an excellent sugar maple, red oak, and basswood forest. The major soil is deep, well-drained Hayden loam. It occurs on both the rolling uplands and the very steep, 30-50 foot high slopes.

Located within this unit is a one hectare plot being inventoried by Prof. Ed Cushing of the Ecology and Behavioral Biology Department, University of Minnesota.

W7 Maple-Basswood-Elm Forest

This forest has a logging road leading into it from the service road to the east. Many of the downed trees that are so common in other areas have apparently been removed. The area was being logged in 1937 and has probably been logged intermittently since that time because approximately one-half of the trees are 10" dbh or less. The area that has been logged does not include the slope to the lake or the area near the intermittent stream on the southwest corner.

W8 Maple-Basswood-Oak Forest

This extensive unit occupies most of the upland and slopes along the southwestern edge of Wolsfeld Lake. The area abruptly terminates in the elm lowlands to the southwest. Near the steep-walled ravine and the intermittent stream at the southeastern boundary, the dominant trees are red oak and sugar maple. At the opposite end of the unit, basswood and sugar maple are the dominant trees. Ironwood is infrequent in the understory and American elm and green ash fringe several marshes and ephemeral pools.

The soils are a mixture of Hayden and Lester loams on the 24-35% slopes over the lake. In the remainder of the area, Lester loams are present on the 6-18% slopes and knolls, while Glencoe silty clay loam underlies the marshes and their connecting drainageways.

The only major disturbance has been some random logging in an area of about one acre in size. The logged area is dominated by 3-5" dbh sugar maples and a few ironwoods.

W10 Maple-Oak Forest

This forest is dominated by sugar maple and red oak. Basswood and ironwood are less common and a few elms and bitternut hickories (Carya cordiformis) are present. The soils are the deep, well-drained Lester loams. The area is steeply rolling. Disturbance is minimal except near the southern edge.

W11 Disturbed Forest

This area is a composite of lowland hardwoods on the lake plain and various oak communities on steep slopes. There is considerable evidence of several kinds of disturbance.

Lowland Forest Units

W9 Elm Lowland Forest

This area is located southwest of Wolsfeld Lake and includes approximately 23 acres of primarily natural lowland forest. The boundary between this community and the upland forests is approximately the 990 foot countour level. The dominant tree species is American elm. Green ash is also common, especially in the northern one-third of the area. The adjacent slopes and higher ground projecting into this area are occupied by sugar

maple, basswood, and some American elm. Red oak and white oak are occasionally present on these slopes, but they are never found on the lowland proper. Although much of the area is in excellent condition, the southwestern corner was moderately grazed before 1937. A few silver maple (Acer saccharinum) and box elder (Acer negundo) trees and the abundance of elderberry (Sambucus pubens) are indicators of this past disturbance.

W2 Elm-Ash Lowland Forest

This stand is dominated by large American elm and green ash trees. The northern edge may have been grazed in the past. This is suggested by the presence of box elder, trembling aspen (Populus tremuloides), and silver maple in that part of W2.

The area is nearly level and the soils are of two types: in the north the soil is the poorly-drained Hamel Loam, in the south the soil is the well-drained Hayden loam.

W5 Basswood Lowland Forest

Basswood is the tree that occupies most of this area which spans the outlet stream that flows southeast from Wolsfeld Lake. Green ash, American elm, and sugar maple are also present. Disturbance is not apparent except on the border of the forest which is adjacent to an abandoned pasture.

The soil is Glencoe silty clay loam.

Radically Disturbed Areas

F Secondary Growth

Vegetation in these areas is highly unstable, following clearing. Pioneering species include shrubs such as sumac and gooseberry and trees such as American elm and box elder.

Other

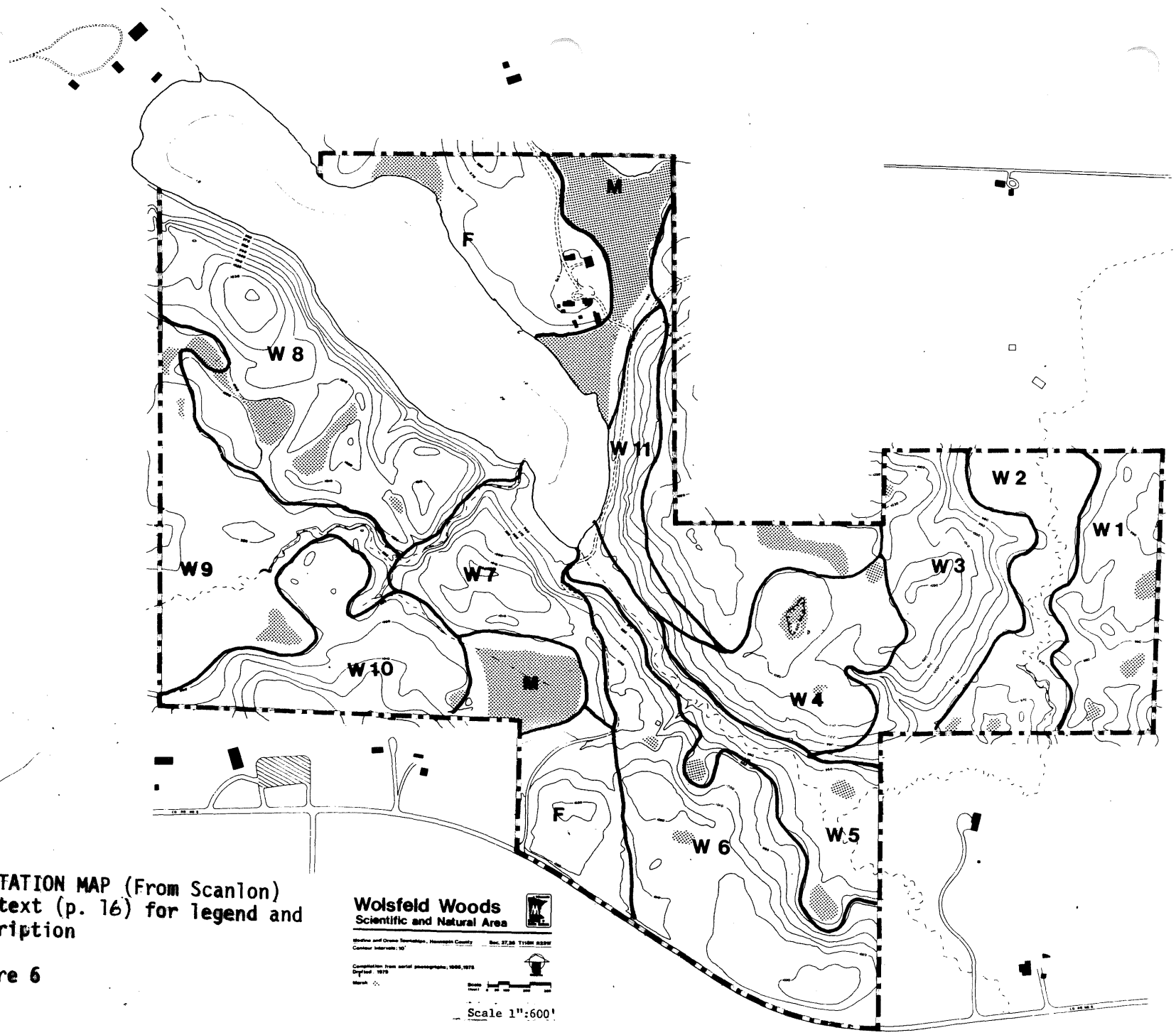
M Marshes

Marshes are usually dominated by graminoids and shrubs. Trees are generally sparse or absent. There are several marshes large enough to be mapped separately at this scale. Many other smaller marshes occur within other units.

4. Significant Communities

W6 and W8 are prime examples of "Big Woods." W6 contains two of the largest sugar maples in the state. W3, W10, and W1 are probably the next most well-preserved and thereby unusual, of the upland forests. W3 contains the state record bitternut hickory.

The wetland forests are unusual because most of each of them is virtually undisturbed. They are also significant because they are undergoing a time of radical natural change in their history. Turning points in the life of a community, such as the Dutch Elm catastrophe, are not common and



VEGETATION MAP (From Scanlon)
See text (p. 16) for legend and description

Figure 6

rarely observed, especially on a virgin tract.

5. Additional Research and Inventory Needs

For effective management more information is needed about "Big Woods" regeneration patterns, especially with respect to fire. There is a unique opportunity and need to monitor all results of the elm mortality, now underway, in the swamp forests.

F. Flora

1. Methods

The following list of plant species, arranged phenologically, was submitted voluntarily (November 1980) by Evelyn Moyle as a result of her weekly surveys during 1979 and 1980. She is an active Volunteer Naturalist with the Friends of Wolsfeld Woods. Identification was established by Evelyn Moyle; voucher specimens were not collected.

2. Results

Flora in bloom during April

Anemone quinquifolia (Wood Anemone)
Anemonella thalictroides (Rue Anemone)
Asarum canadense (Wild Ginger)
Claytonia Virginiana (Spring Beauty)
Dentaria laciniata (Toothwort)
Dicentra cucullaria (Dutchman's Breeches)
Hepatica acutiloba (Hepatica)
Sanguianaria virginiana (Bloodroot)

May:

Actaea rubra (Red Baneberry)
Arabis divaricata (Rock Cress)
Aralia naudicaulis (Wild Sarsaparilla)
Cardamine pennsylvanica (Marsh-Peppergrass)
Carex pennsylvanica (Sedge)
Caulophyllum Thalictroides (Blue Cohosh)
Fragaria virginiana (Wild Strawberry)
Gallium aparine (Rough Bedstraw)
G. boreale (Northern Bedstraw)
Geranium maculatum (Wild Geranium)
Hydrophyllum virginicum (Waterleaf)
Maianthemum canadense (Wild Lily-of-the-Valley
Osmorhiza claytonia (Sweet Cicely)
Ranunculus abortivus (Small Flowered Crowfoot)
Sambucus pubens (Red-berried Elder)
Sambucus stellata (Starry False Solomon Seal)
Smilacina racemosa (False Solomon Seal)
Tillium cernum (Nodding Trillium)
Thalictrum dioicum (Early Meadow Rue)
Uvularia grandiflora (Bellwort)
Viola compressa (Dog Violet)
Viola pubescens (Yellow Violet)
Viola sororia (Blue Violet)

June:

Amphicarpa bracteata (Hog Peanut)
Panax quinquefolius

Anemone canadensis (Canada Windflower)
Aplectrum hyemale (Puttyroot)
Aquilegia canadensis (Columbine)
Erigeron philadelphicus (Daisy fleabane)
Impatients biflora (Jewelweed)
Iris versicolor (Blue flag)
Laportea canadensis (Wood Nettle)
Menispermum canadense (Canada Moonseed)
(Ginseng)
Sanicula Marilandica
(Black Snakeroot)
Smilax echirrata
(Carrionflower)
Urtica dioica
(Common Nettle)

July:

Agrimonia spp. (Yellow Agrimony)
Alisma Plantago-aquatica (Water Plantain)
Allium tricoccum (Wild Garlic)
Asclepius incarnata (Swamp Milkweed)
A. syriaca (Common Milkweed)
A. verticulata (Whorled Milkweed)
Cicuta maculata (Water Hemlock)
Circaea quadrisculcata (Enchanters Nightshade)
Eupatorium perfoliatum (Boneset)
Geum canadense (White Wood Avens)
Hypericum pyrimadatum (Great St. Johnswort)
Melilotus alba (White Sweetclover)
M. officinalis (Yellow Sweetclover)
Monotropa uniflora (Indian Pipe)
Nuphar variegatum (Spatter-dock)
Phyrma lepotostachya (Lopseed)
Plantago major (Common Plantain)
Polygonum arifolium (?)
(Tearthumb)
Potentilla argenta
(Silvery cinquefoil)
Ratibida laciniata
(Coneflower)
Scutellaria laterifolia
(Mad-dog Scullcap)
Sonchus arvensis
(Sow Thistle)
Trifolium hybridum
(Alsike Clover)
Trifolium pratense
(Red Clover)
Trifolium repens
(White Clover)
Typha latifolia
(Cattail)
Verbena hastate
(Blue Vervain)

August and September:

Aster cordifolius (Frost Aster)
A. spp. (Aster)
Bidens spp. (Tickseed)
Cirsium canadense (Canada Thistle)
C. vulgare (Bull Thistle)
Eupatorium maculatum (Joe-pye Weed)
E. purpureum (Sweet Joe-pye Weed)
E. rugosum (White Snakeroot)
Goodyeara spp. (Rattlesnake Plantain)
Lysimachia ciliata (Yellow Loosestrife)
Mimulus ringens
(Monkey-flower)
Ratibida pinnata
(Gray-headed Coneflower)
Rudbeckia hirta
(Black-eyed Susan)
Solidago canadensis
(Common Goldenrod)
S. flexicaulis
(Zig-zag Goldenrod)
Veronia fasciculata (Ironweed)

Ferns:

Adiantum pedatum (Maidenhair Fern)
Athyrium Felix-femina (Lady Fern)
Botrychium virginiana (Grape Fern)
Dryopteris cristata (Crested Shield)
Matteuccia struthiopteris (Ostrich)
Onoclea sensibilis
(Sensitive Fern)
Osmunda cinnamonea
(Cinnamon Fern)
Woodsia ilvensis (Woodsia)

Fungi:

1. Methods

The following inventory is a compilation of efforts by the Minnesota Mycological Society (two visits, June 2, 1979 and June 24, 1979) and by two botany graduate students, Tom Trana and Karen Lustig on October 21, 1978.

2. Results

Clavaria cristata	Geaster spp	Pluteus cervinus
Clavulina spp.	Hericium spp.	Polyporus brumalis
Collybia velutipes	Hygrophorus flavescens	P. squamosus
Coprinus atramentarius	Morchella deliciosa	P. versicolor
C. ebulbosis	M. esculenta	Polystichus versicolor
C. micaceus	Mycena spp.	
Dacromyces deliquescens	M. spp.	Psathyrella multipedata
Daldinia concentrica	Panellus nidulans	
Entoloma lividum	Peziza spp.	Tremellodon spp.
		Xylaria polymorpha

G. Fauna

Insects

No reliable inventory has been conducted or is known to exist.

Amphibians and Reptiles

No reliable inventory has been conducted or is known to exist.

Birds

1. Methods

The following inventory is a combination of two summer surveys voluntarily conducted by Jerry Sivets, an active Volunteer Naturalist with the Friends of Wolsfeld Woods, a winter census by Jerry Sivets, and two spring surveys by ornithology classes led by Bob Askins. The summer census was taken by walking a transect which essentially covered all habitat types found in Wolsfeld Woods. Only those birds within 100 meters of either side of the transect were included in the census. All records are for 1979.

2. Birds of Wolsfeld Woods

As "S" indicates a singing male, a "V" a visual record only, a "C" a call other than a mating call; an "X" indicates presence.

	May 17	May 26	June 5	June 20	Dec 15
Great Blue Heron		X			
Green Heron			V	V(2)	
Mallard					
Wood Duck	X	X			
Broad-winged Hawk			V		

	May 17	May 26	June 5	June 20	Dec 15
Killdeer		X			
Black Tern			V		
Rock Dove					V(2)
Mourning Dove			V		
Black-billed Cuckoo			S	S	
Barred Owl		X			
Chimney Swift	X	X			
Belted Kingfisher		X	V		
Flicker	X	X			V
Pileated Woodpecker					V
Red-bellied Woodpecker	X		S		V
Hairy Woodpecker	X	X	V(3)	C(2)	V(2)
Downy Woodpecker	X	X	V		V(3)
Eastern Kingbird			V		
Great C'd Flycatcher	X	X	S(7)	S(2)	
Least Flycatcher	X	X			
Eastern Wood Pewee	X	X	S(6)	S(4)	
Olive-sided Flycatcher					
Barn Swallow			V		
Purple Martin			V		
Blue Jay	X	X	V	C(3)	V(3)
Common Crow		X	V(2)	C(2)	V(4)
Black-cppd Chickadee	X	X	S(5)	C(4)	V(6)
White-brstd Nuthatch		X	S(5)	C(2)	V(2)
Brown Creeper					V(2)
House Wren	X	X	S	S	
Catbird	X	X	S	S	
Brown Thrasher			S		
Robin	X	X	S,V	V(2)	
Wood Thrush	X	X	S		
Blue-gray Gnatcatcher	X		non-census reports		
Cedar Waxwing			C(2)V(3)		
Solitary Vireo	X				
Red-eyed Vireo		X	S(13)	S(5)	
Blue-winged Warbler			non-census reports		
Tennessee Warbler	X	X			
Nashville Warbler	X	X			
Black-thd Grn Warbler	X				
Cerulean Warbler			non-census reports		
Blackburnian Warbler		X			
Chestnut-sided Wrblr		X			
Bay-brstd Warbler		X			
Black-poll Warbler	X	X			
Ovenbird	X	X	S(3)	S	
Yellowthroat	X	X	S(5)	S(4)	
Wilson's Warbler		X			
Canada Warbler		X			
American Redstart	X	X	S(2)	S(2)	
Red-winged Blackbird		X	S(4)	S(4),C	
Baltimore Oriole	X	X	S(2)	S	
Common Grackle	X	X	V(3)	V(5),C	
Brown-hdd Cowbird	X	X	S		
Scarlet Tanager		X	S(2)	S(2)	
Cardinal		X	S	S	

	May 17	May 26	June 5	June 20	Dec 15
Rose-br Grosbeak	X	X	S	S	
Indigo bunting			S(3)	S(2)	
American Goldfinch	X	X			V
Chipping Sparrow		X			
Field Sparrow			S	S,C	
Song Sparrow		X			

Total number of bird species recorded: 65

Mammals

No reliable inventory has been conducted or is known to exist.

H. Land Use History

The recorded history of Wolsfeld Woods extended back to 1855. This fairly detailed and long (for Minnesota) record greatly increases our understanding of the present and consequently makes the natural and cultural resources all the more valuable.

1. Methods

Information was obtained through a series of conversations with individuals closely involved with the property and through efforts of the Western Hennepin County Pioneers Association, based in Long Lake.

2. Land Use History

The Minnetonka area around Wolsfeld Woods has much documented use by prehistoric people. Archaeological prospects at Wolsfeld are reported good but no exploration has taken place. There will be no disturbance of the area unless an archaeological study has first taken place. The Minnesota Archaeological Society or other qualified persons or groups may apply for research permits from SNA. These applications will be given the same consideration as other applications.

The Wolsfeld Woods area was first settled in 1855 by three Wolsfeld brothers and their families, recently emigrated from Trier, Germany. John settled on the west end of the lake. Charles took the northeast side and there raised corn, wheat, oats, rye, and barley. The more rolling sections on the east and south were left wooded for the forest products. The basswood, second growth hickory, and oak were sold to the huge barrel works in Long Lake, active until the 1880's. Ash and hickory were used by brother Nicholas for tool and wagon parts, the butternut for furniture. Dead trees were harvested for heating and cooking. This clearing of dead wood continued, at up to 150 cords per year, until about 1960. Some herbs were undoubtedly used, especially ginseng which was almost completely eliminated from the woods. By 1880 maple sugaring, which had been a small scale family operation, was proving to be a profitable business. Until World War II the Wolsfelds sold and delivered maple sugar all across the state and into neighboring western states. While sugaring itself probably did not have a great impact on the woods, many associated activities did. The fires for the evaporating pans required firewood. Access trails were

cleared and maintained throughout the woods. A small area around the sugar shack was heavily altered. Perhaps most important, but most subtle, was clearing and pruning of the middle-aged sugar maple to increase productivity. The woods have also been grazed. At first the marshes and small cleared areas near the cabin (still standing) were used for cattle and horses. Later grazing extended to the western half of the tract and apparently to selected other areas, as part of the old German multiuse management practices.

From about 1920 the Wolsfelds turned increasingly to revenues from picnicking on the grassy areas around the lake and on the eastern knoll (outside the unit). The remnants of this activity are a series of highly eroded trails, some litter, an outhouse and a general disturbance of the woods around the lake outlet and road. The area has, until recently, kept an association with partying.

I. Visitor Characteristics

Understanding the use patterns and needs of visitors to the unit is essential to the plan of a unit. In the long run this type of information may be important to the functioning of the entire SNA program.

1. Methods

The inventory has consisted of talking to every available user and neighbor, combined with on-site observations. An interesting problem arose in that a number of neighbors were convinced they knew the type and degree of usage (horse, foot, ski) thoroughly. Their perceptions, however, do not agree entirely and are sometimes very different.

2. Present Visitor Characteristics

a) Foot traffic

Most neighbors/users agree that walking has not been common here until recently, at least in comparison to riding. Our observations have confirmed this. Until 1978 most walkers were also riders. Since designation in 1978 however walking usage has increased visibly and is now at about 50/day on prime days. Walkers typically enter from the parking lot. Usage is concentrated on the ridge south of the lake, in the section in the southeast and on the road beside the lake, the old picnic ground and the trail leading southeast from the picnic ground. (The old picnic ground is located adjacent to the southeastern most corner of the lake). Most of the walking now is by individuals not well acquainted with the woods. This suggests that the steady stream of favorable publicity is finding its mark.

The woods is also used by adolescents as a play area. Some of their activity e.g. building forts or swings, cutting trees or concentrated off-trail use is destructive.

b) Equestrian traffic

The woods has been used for decades for leisure riding. The great majority of riders live within a few miles of Wolsfeld Woods, in

most directions except to the south. They have access to the woods, as part of a rather extensive area-wide trail system. There are no sound numbers on usage, but 5-15 riders per day seems reasonable, more in spring and fall, less in summer and none, yet, in winter. Riders typically come singly or in pairs, and remain for one half to one hour. Before the trails were marked according to type of use permitted, horses were using the entire six miles of trails. This plan restricts them to two miles of trails marked accordingly.

Prior to 1978 Wolsfeld Woods was used up to twice a week in the fall for a large-scale simulated fox hunt. The hunt rarely left the trails except to pursue errant dogs. The hunt has taken a responsible role in securing right of way and trail grooming, including the trails in Wolsfeld Woods. In recent years the hunt used Wolsfeld Woods less and less and is now permanently excluded from the unit.

c) Other

In recent years off-trail motorized vehicles and snowmobiles have been infrequent in Wolsfeld Woods. Skiing, on the other hand, has been increasing steadily. Skiers come from a fairly wide area to visit Wolsfeld Woods specifically. It is not hooked up to a larger trail system, as are the horse trails. Consequently, the parking lot is the typical entry point. Skiers usually stay on the trail right-of-way, making divergent paths when a brushed out trail is not obvious.

3. Demographic predictions

The area immediately around Wolsfeld Woods and the region generally is experiencing growth. It is an attractive semirural area containing many lakes. Wolsfeld Woods itself is located only a half-hour from downtown Minneapolis. Most of the area within one half mile of the woods is ripe for urbanization and the woods itself will undoubtedly serve as a magnet. The Metropolitan Council demographic estimates predict by 1990 the population of Medina will increase from 2622 (1980 census) to 3300, of Orono from 6835 (1980) to 9000, and of Long Lake from 1746 (1980) to 2000. Currently the farms surrounding Wolsfeld Woods are not subdivided. It is difficult to say if that will change under the pressures of urban expansion. If the surrounding land is subdivided for residential development it could have a negative impact on the woods.

III. MANAGEMENT

A. SNA Management

The function of the management section is to describe the implementation of resources and human use (SNA) policy, based on the description of the site by the inventory. This policy is supported by SNA Rules and Regulations, which have the force of law.

SNA Rules and Regulations as outlined in NR 300, 301, 302(1973) prohibit:

> Disturbing, picking, hunting, or collecting any of the plants, animals, or other natural resources.

Damaging or altering any research or educational equipment.

Camping or picnicking.

Using a motorized vehicle, snowmobile, or off-trail vehicle.

Bringing in horses or pets.

Drinking alcoholic beverages.

Smoking tobacco or marijuana.

Burning or dumping.

Swimming, fishing, or boating.

Engaging in violent, abusive, loud, or immoral behavior.

Possessing a gun (unless unloaded and cased) or any other weapon or explosive.

Doing or advertising business.

In addition, NR 301(a) enables the Commissioner of the DNR to set restrictions on use for the purpose of protecting and preserving the area. These restrictions may include (1) travel within the area, (2) hours of visitation, and (3) numbers of persons within the area at any given time.

Two amendments to the Rules and Regulations were established by the Commissioner for Wolsfeld Woods:

1. A person may ride or lead or have a horse on trails designated and posted for such use. The Commissioner may impose limitations on periods of use or number of riders.

2. It is unlawful for any person on foot to go anywhere except on trails or areas designated and posted for such use.

B. Related Statutory Authority

Laws such as Endangered Species (MS 98.488), Conservation of Certain Flowers (MS 17.23), Protected Wild Animals (MS 98.48), Control of Aquatic Vegetation (MS 98.48) are not considered in this section because they are less restrictive than and fully covered by SNA Rules and Regulations. Certain management actions require permits, such as those pertaining to public waters or burning.

1. Shade tree and disease control program

The Dutch elm disease control zone for Orono ends well to the south of the unit. The control zones for Medina are small and scattered and restricted to platted areas. The nearest such zone is across Willow Drive, 3/4 mile away. There is a potential conflict between the goals of the shade tree disease control program and SNA rules,

regulations, and policies. However, the control zones do not include, and are not near, the unit. It is likely that within two or three years all the elms will be dead and in a non-infectious state.

The oak wilt control zones are identical to the Dutch elm zones. The same potential conflict of purpose, noted above, exists with respect to oak wilt. According to a DNR Forest Pathologist report of July 1978, there is no oak wilt problem in the unit and generally the upland forest is in superb condition.

2. Control of noxious weeds

Under state law (MS 18.181) it is the duty of all land owners to eradicate or otherwise destroy all noxious weeds. Section 18.315 also states that towns and cities may take steps to control noxious weeds on state lands within the territorial limits of the towns or cities provided that the managing agency fails to take action within fourteen days of receiving notice to cut or control the weeds. There is a potential conflict between the goals of this program and SNA rules, regulations, and policies. The wooded sections do not support any sizable population of weeds.

3. Mosquito control

Mosquito control is an active program in most of the seven county area. It is funded directly by the Legislature and is independent of any other agency. The goals of this program are in potential conflict with SNA rules, regulations, and policies. However, the surveillance by the Metropolitan Mosquito Control Agency does not usually extend as far as Wolsfeld Woods. If surveillance of Wolsfeld Woods does appear necessary to identify disease vectors, the MMCA has agreed to contact the DNR-Scientific and Natural Areas Program first. They also have agreed to discuss any further actions with DNR-SNA in the event that control measures are deemed unavoidable. In terms of SNA policy "unavoidable" would require proof that disease-bearing mosquitoes are breeding on the tract.

C. Wolsfeld Woods Deed/Lease Considerations

1. Deed considerations

There are several conditions of the deed, contained in the Hennepin County title registration case #15602, dated May 28, 1965.

a. Morris Holmberg, heirs and assigns, retains recreational access to the lake, until his land is platted.

b. Morris Holmberg, heirs and assigns retains the right of use of the road leading to his property (on the north side).

c. DNR shall maintain the roadway or cartway in a reasonable manner. The donor, The Nature Conservancy, may institute proceedings in law or equity if the unit is not managed as an SNA and in substantial compliance with SNA rules and regulations.

2. Lease considerations

a. Mr. Jim Hillegass owns the Wolsfeld cabin. DNR leases him the land 175 feet around his chimney for $600/year. "Mr. Hillegass... will maintain the house and not be absent from the premises for more than three months... he shall inspect the Wolsfeld Woods on a regular basis and notify the state of the general conditions of the Wolsfeld Woods, any special management problems, and any violations of the rules and regulations... neither party has obligation to the other to maintain or plow the road."

These and the other terms of the lease formed part of the deed that was transformed to the state from The Nature Conservancy.

b. The DNR leases 280 feet of the service road for access to the adjacent property to the Wolsfeld Lake Company for $25.00 for the term of the lease. No modifications to the existing road or construction of a new road is permitted without prior written permission of the DNR. There are two major advantages to this lease. First it will prevent the landowner from building a new road on a bad grade near the present service road. Second, the amount of unauthorized use of the service road should decrease. If it is posted as a private drive people might be more likely to stay out. A gate, which can be locked, will be located immediately beyond the turnoff into the leasor's driveway.

D. Management Objectives and Considerations

The following management objectives were derived directly from SNA policy. The actions that will implement or effect the implementation of each objective are listed in abbreviated form on the right, along with a number referenced to the Management Actions section.

Resource management objectives	Actions: Key words and action numbers
1. Maintain natural regeneration	
This is the single overriding objective. All action must be considered for their impact on the undisturbed quality of the land. The long term impact is considerably more important than the short term. "Natural" is meant as essentially free from the present or historical effects of European settlement.	Burn (1) Plots (33) Buckthorn(5)
2. Erosion: Curtailment and restoration	
Although erosion is a normal and vital part of the environment there are also many naturally counteracting forces. However, accelerated, man-induced erosional problems have become significant on many current and former trail segments and along the road.	Erosion (3) Seasonal Horse (13) Trail Closing (6)

3. Restore lake

Wolsfeld Lake bears little resemblance to its pre-settlement condition. Phosphorus levels are radically higher than neighboring lakes and sediment pollution has increased greatly in the last few decades. Emergent vegetation, and the associated diversity of animals and birds, is nearly non-existent. Fishing, as a rough index of water quality, has gone from excellent to terrible.

Lake (4)
Dock (17)

Several degrees of restoration effort are possible. The simplest and most dramatic would probably be a rough fish control program. Any further restoration would be meaningless without a clear goal. An inventory of lake biota would be an important resource in helping set, as well as implement such goals. Aside from its value for management planning an inventory would have many other important uses, including making the lake considerably more valuable as a research resource. Because of its small size, proximity to the University of Minnesota and the Freshwater Biological Institute, public control of the shore, the basin and some of the watershed, and a good surveillance situation, the lake offers good opportunities for limnological work. As of 1980, however, funds for substantial baseline data collection or limnological research seem to be dwindling. Ultimately the lake would be of more benefit to more SNA clientele without rough fish than with, regardless of baseline data. Thus, implementation of either a rough fish control program or of an inventory should proceed according to which can be funded first.

4. Reestablish fire

Although the canopy in most areas contains much red oak, red oak seedlings and saplings are almost nonexistent here. Red oak regeneration depends in part upon disturbance. The usual disturbance was probably fire, occasionally wind, or normal death of an individual member of the canopy. Fire has many other effects on "Big Woods" including: 1) reducing the density and cover of brush and very young trees (old oak and maple are not particularly susceptible to ground fire), 2) changing some soil characteristics, including reducing the amount of

Prescribed burn (1)

litter and breaking down allogenic substances, 3) elimination of non fire-adapted species, especially aliens, 4) enhancing appearance, and 5) stimulating herb growth. As "Big Woods" ecology is examined it has become apparent that fire played an important role in the region. In Wolsfeld Woods itself, fire scars on the larger trees and charcoal layers in the lake sediments confirm the occurrence of fire here.
Fire should be reestablished, initially at least on a small and experimental scale, as part of the natural ecology of the area. Fire management should not actually have regeneration of red oak as a goal but as a desirable by-product.

TRAILS:

5. Provide and maintain controlled access, in the form of trails, to areas of interest

There is an existing trail system which covers most areas of the Woods in some fashion. If the trails did not exist and use pressures were low, managing the tract without trails might be best. However, the present and anticipated use pressures are high. Trails will confine these impacts. Short access spur trails may be developed for areas of interest that are not so provided.

New trails (9)
Trails, various (6-11)

6. Reduce total number of amount of trails

All trails need substantial justification for continuance under SNA stewardship. For reasons of redundancy, erosion, lack of use, enforcement, access control, general disturbance, or for other reasons, trails should be reduced as much as possible.

Trail discont. (6)

7. Reduce number of access points

The number of access points should be kept to a functional minimum. This would reduce the total number of trails, minimize the number of intersections requiring control, reduce developmental and operational costs, simplify the overall system and facilitate monitoring and enforcement. The more visitors the greater the need to limit access points.

Trail discont. (6)

8. Provide walking loops

Walkers frequently express a desire to go out and return by different paths.

See Figure 6

This is an appropriate consideration when many users come for a short educational or interpretive experience. The heaviest use walking areas should be designed with walking loops.

9. Accommodate skiing

Skiing is not prohibited in SNAs. Skiing could continue at Wolsfeld Woods as a primative ski experience on those trails designated for walking or riding. Any additional limited development or maintenance will be a subject of cooperation between skiers, represented through FWW, and the DNR. If skiing pressure increases or promises to increase significantly it will need to be controlled or curtailed. As far as just visiting or viewing the area is concerned, snowshoeing is usually sufficient and does not require any special trail maintenance.

See Figure 8

10. Accommodate horseback riding in the short term (trial basis)

Horses are prohibited by SNA Rules and Regulations. Riding 1) is inconsistent with the research and educational use of SNAs, 2) may create ecological problems, 3) introduces considerably more trail development, trail maintenance, and information and enforcement needs, and 4) presents safety problems for some walkers, the primary clientele. However, horseback riding is a long-standing practice in the Woods. Riding-trails here connect with a local trail system that winds through an area with the nation's highest density of stabled horses; consequently the Commissioner established an exception to the rules so that horses may be led or ridden on designated riding trails.

See Figure 8
Grooming (11)
Seasonal horse (13)
Monitor (32)

In the long run riding in Wolsfeld Woods should be phased out. This may happen of its own accord, as the surrounding area is developed, thereby closing down trail access. On the other hand increasing development may constrict a given level of riding to a smaller regional trail system. If the use levels of both walkers and riders remains at present levels and trail enforcement or other problems do not develop, the current arrangement is acceptable indefinitely. If, however, riding or walking increases, or promises to increase significantly, the arrangement must be reviewed.

11. Develop/maintain trail corridors

Trail corridors, including established trail surfaces, groomed vegetation, stream crossings, and bypasses around fallen trees or wet spots have existed for decades. At the time of designation this totalled about six miles of trail. What factors determined the particular routes of each trail are not always clear. At any rate, the existing trails have been used and, to a certain extent actively maintained, by horse riders. With almost no exception all old trails have been well established. These trails are typically very narrow (less than two feet wide) and fairly straight. At wet spots and stream crossings they widen out considerably and/or are very muddy. Occasionally near trail junctions there may be several short cuts. Bypasses, sometimes more than one, have developed where trees have fallen across the trail. At two locations trails go straight down steep slopes.

Chips (7)
Bypasses (8)
Crossings (10)
Grooming (11)

The level or type of maintenance of old or new trail corridors must vary depending on the type of usage. The major factor governing the kinds of trail improvements and maintenancd will be resource protection. The primary clientele are those on foot. All trails that are used by walkers should be maintained for their convenience and safety. Crossings of streams and wet spots should not greatly inconvenience a walker (with or without equipment). Riding trails should be maintained for the safety of riders. Trail improvements solely for convenience will not be provided. On riding trails, a crossing for walkers might be provided at streams and wet spots, separate from old muddy (but safe) horse crossings.

12. Monitor intensity and type of trail usage, trail surface problems and user conflicts

Because of changes in local demography, local and regional land use, community awareness, neighbor attitudes, recreational or educational fashions, etc., types and intensity of trail usage can be expected to change steadily. In order to identify or even anticipate problems it is necessary to monitor trail usage regularly.

Monitor (32)

CLEANUP:

13. Cleanup

For reasons of liability, aesthetics, and research and education interests, all

Sugar shack (14)

artifacts should be removed, except for reasons of historical interest, unit servicing, legal encumbrances, or research/education need.

Wolsfeld Bldgs (15)
Cleanup (16)

FACILITIES:

14. Provide lake facilities

Limnologists with the Freshwater Biological Institute, The Limnological Research Center, and the University of Minnesota have expressed an interest in monitoring, experimenting with, and restoring the lake. Much of this requires daily on-site work and inspection which would be greatly facilitated by a small boat dock.

Dock (17)

VISITOR SERVICES:

15. Provide an orientation system(s) for users

Some walkers are easily lost, confused and frightened in the maze of trails. Emergencies demand a locational system. Horse riders need explicit directions for trails. The inventory and natural history/interpretive work need a reference system.

Posts (18)
Map (22)
Figure 6

16. Promote appropriate use

The success of a public project such as Wolsfeld Woods SNA depends partly on public awareness and involvement.

Nature Trail (24)
Interpretive Brochure (25)
Research File (26)
Rules and Reg. (27)
Plots (33)

17. Develop and maintain a data file

An excellent way of promoting research is to develop solid baseline data and to publicize its presence and availability.

Research File (26)

18. Develop an interpretive program for visitors

Wolsfeld Woods is a public use unit and the public has used it considerably. Aside from the ORA mandate that interpretive programs be developed, DNR has an excellent opportunity in such a program to help the public understand and appreciate the values and uses of SNAs. A nature trail consisting of numbered posts keyed to a brochure would be simple and effective. Materials could be written for an adult audience. These same materials are then

Nature Trail (21)
Interp. Broch. (25)

available as solid information for primary and secondary school teachers.

ENFORCEMENT:

19. Provide information

Effective enforcement depends practically and legally on obvious placement of all rules and regulations, exceptions and trail designation.

Rules and Reg. (27)

20. Surveillance

While most users conform to the rules and regulations, a minority will not. In most cases personal contact will solve the problem. An active surveillance program, especially if assisted by the Friends of Wolsfeld Woods or other neighbors, will discourage nonconforming behavior in the future.

See Implementation Lease

OTHER:

21. Maintain road

The access road will be maintained as a limited access roadway, as specified in the Morris Holmberg easements. This level of maintenance is more than sufficient for the occasional road uses of DNR, enforcement officers or others with permits.

Road fill (30)
Gate (31)
Lease

E. Management Actions

The following management actions are designed to implement the management objectives. Individual actions are described with respect to materials, design, location, labor and their costs. In most cases there is a fair degree of latitude for the implementor; in cases of the management objectives and then the SNA policy or personnel. Some actions are described rather generally since it was not possible, logical or desirable to be specific with respect to materials, design, location and/or labor.

Some trail maintenance work has already been, or is being, implemented. This was deemed necessary since the trails, established long before acquisition of the unit, have been in continuous use. These critical trail restorations have the approval of the Department of Natural Resources and state agencies consulted and most have met general approval by Friends of Wolsfeld Woods.

I. Resource Management Actions

1. Prescribed burn

At this time the most appropriate area(s) have not been selected. It should be small, perhaps only 2-3 acres, bounded by good fire breaks and accessible to fire control equipment. Ecologists in the area should be contacted to assist in designing the burns. The district forester should be consulted about practical considerations. All actions should be well advertised and explained to the Friends of Wolsfeld Woods and other neighbors.

Material/labor	Funding source	Implementors
$0/$500 (first year)	Development	DNR (various) Long Lake Fire Dept.

2. Wildfire suppression

At present the Long Lake Fire Department is contracted by the Department of Natural Resources for wildfire suppression. All wildfires are suppressed as soon as possible following their detection.

Additional manpower and equipment may be dispatched to a wildfire upon the request of the fire department. Equipment and manpower available are outlined in the Metro Region Fire Dispatch Plan; copies of which are at Metro Forestry Headquarters and the Waconia District Office.

A "let burn" policy cannot be implemented due to the danger from a wildfire to the adjacent land holdings, even though this would be the most desirable management practice.

3. Erosion control structures

Erosion is a serious problem in two locations and indications are that they will continue to deteriorate, even if use is curtailed (figure 7). Water bars will be constructed out of timber to divert water from the problem areas and to slow the speed of any water that does flow over the problem areas.

Material/labor	Funding source	Implementors
$50/$80	Maintenance Operations	DNR (Region) SNA

4. Restore lake

A rough fish control program would be quick, expensive and dramatic. It would be least expensive and most effective if it were part of a Long Lake watershed control project or at least control of that part of the watershed containing Wolsfeld Lake. Reintroduction of native fish and vegetation if necessary, would be desirable. Sediment and chemical pollution control is probably not feasible as long as the watershed contains farms and dairy operations.

Material/labor	Funding source	Implementors
$2000/$18,000	Development	DNR Fisheries Freshwater Biological Institute

5. Control Buckthorn

Two species of buckthorn (Rhamnus cathartica and Rhamnus alnifolia) are invading southeastern Minnesota hardwood forests. Neither are native to the area. Reports from the south and east are that these species can become very serious pests. They occur in our area as small trees with lateral roots only and no tap root. Because the stumps of buckthorn produce sprouts, it is necessary to either topple the tree after severing the laterals (the roots probably do not sprout) or to kill the tree by application of a herbicide.

Buckthorn is not known to have reached Wolsfeld Woods yet. The problem, should it threaten, is best controlled by eliminating individual buckthorn as soon as they appear, before they produce a whole crop of seedlings. If it is acceptable to the owners, control measures should be extended to the woodlands adjoining the property on the west and south.

Material/labor	Funding source	Implementor
$50/$100	SNA	DNR (Region)

II. Use Management Actions

6. Trail discontinuation

These trails should have barriers of local brush or logs and a small "do not enter" sign. Both of these should be removed once revegetation is complete. Refer to figure 7 for locations.

Material/labor	Funding source	Implementors
$20/$180	Development & Rehabilitation	FWW DNR (Region)

7. Trail resurfacing: wood chips

Most of the large broad, badly damaged trail areas can be restored with wood chips. The chips should be placed along a relatively narrow corridor to encourage narrowing of the trail and provided, if necessary, with some kind of containing wall.

Material/labor	Funding source	Implementor
$50/$200	Development & Rehabilitation	DNR (Region)

8. Trail bypasses

Short bypass trails to avoid severe wet spots in trails are occasionally necessary. Such trails should be narrow, relatively level, unobtrusive and with minimal vegetation damage. Refer to figure 7 for locations of major bypasses.

Material/labor	Funding source	Implementors
$50/$100	Development & Rehabilitation	FWW DNR (Region)

9. New trails

The existing trails were not laid out necessarily according to SNA interests. New trails are necessary, although these must be minimized, especially given the extent of the existing system. Trails should be nearly level, narrow, unobtrusive and with minimal vegetation damage. Refer to figure 7 for locations.

Material/labor	Funding source	Implementors
$0/$200	Development & Rehabilitation	FWW DNR (Region)

10. Stream crossings

The following numbers are keyed to figure 8. #1 is a major crossing for both foot and horse traffic. Both can be accommodated by a gravel-based ford. #2 is a foot crossing only. Stepping stones, obtained from the rock pile near the access road should suffice. #3 is a short simple crossing requiring only a re-direction of the trail and a short culvert. #4 is a broad muddy stretch where the trail crosses the flood plain for which gravel footing is sufficient. #5 is a 10 foot crossing over a permanent stream. Gravel will make the horse crossing safe while two or three 12x12 planks bound together should provide a safe, convenient crossing for walkers.

Material/labor	Funding source	Implementor
$100/$250	Development	DNR (Region)

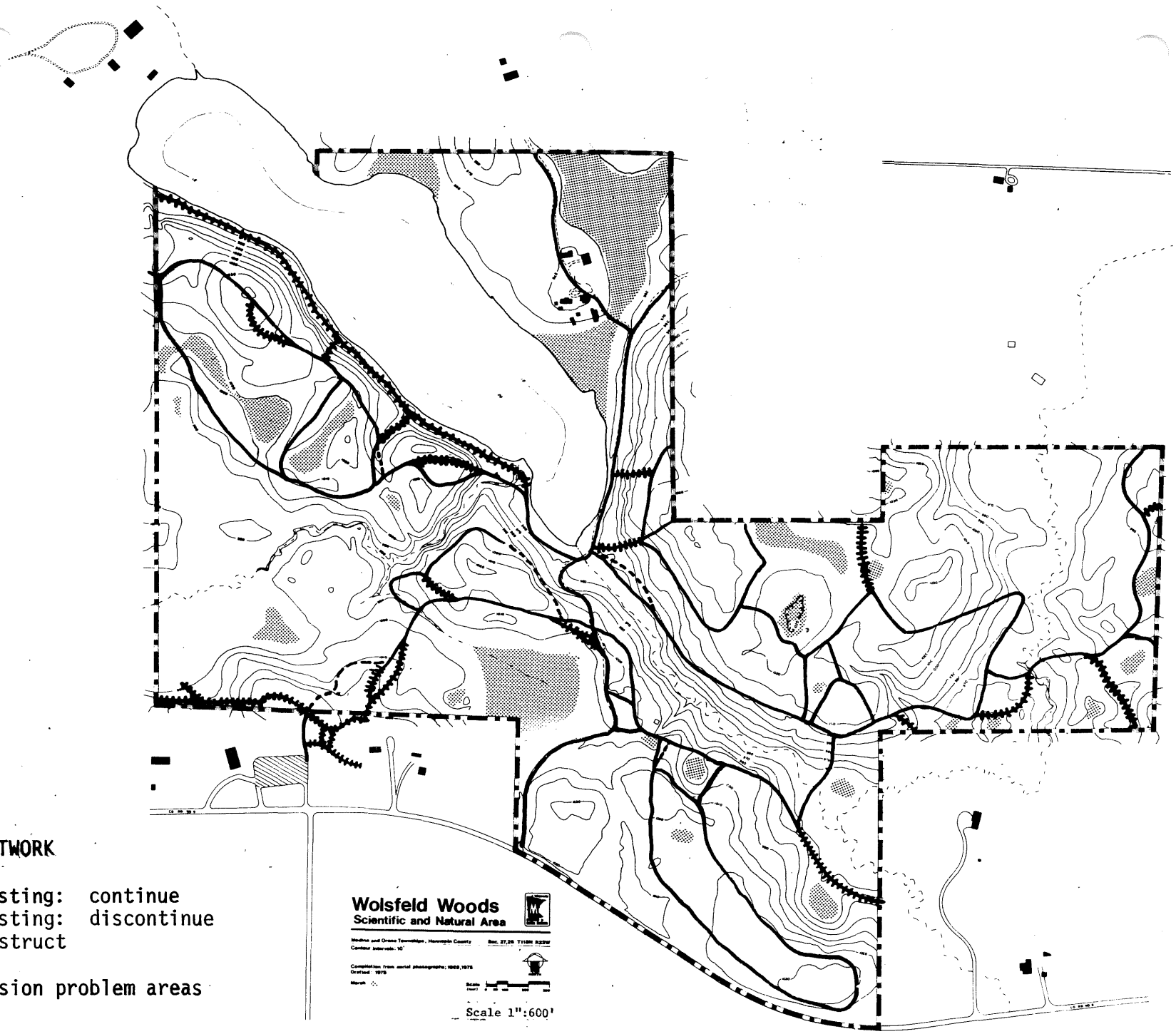
11. Trail grooming

Foot/ski trails need periodic grooming, particularly occasional removal of fallen logs and brush. Horse trails require more servicing, at the discretion and action of Friends of Wolsfeld Woods.

Material/labor	Funding source	Implementors
$0/$30 (per year)	Operations & Management Development & Rehabilitation	FWW DNR (Region) SNA

12. Parking

The Trinity Lutheran Church is agreeable to accommodate Wolsfeld Woods Scientific and Natural Area parking. It is anticipated that this parking will concentrate in the NE corner of their lot. This area is well away from the church entrance. Problems may arise on Sunday mornings, however, when both the church and the Woods are most heavily used. Refer to figure 8 for location. This relationship should be formalized through a letter of cooperation. This letter will be obtained after the management plan has been formally approved. If and when this arrangement becomes unacceptable to either party, a parking lot should be constructed along the access road in the old fields on the south side.



TRAIL NETWORK

Existing: continue
Existing: discontinue
Construct

A,B Erosion problem areas

Figure 7

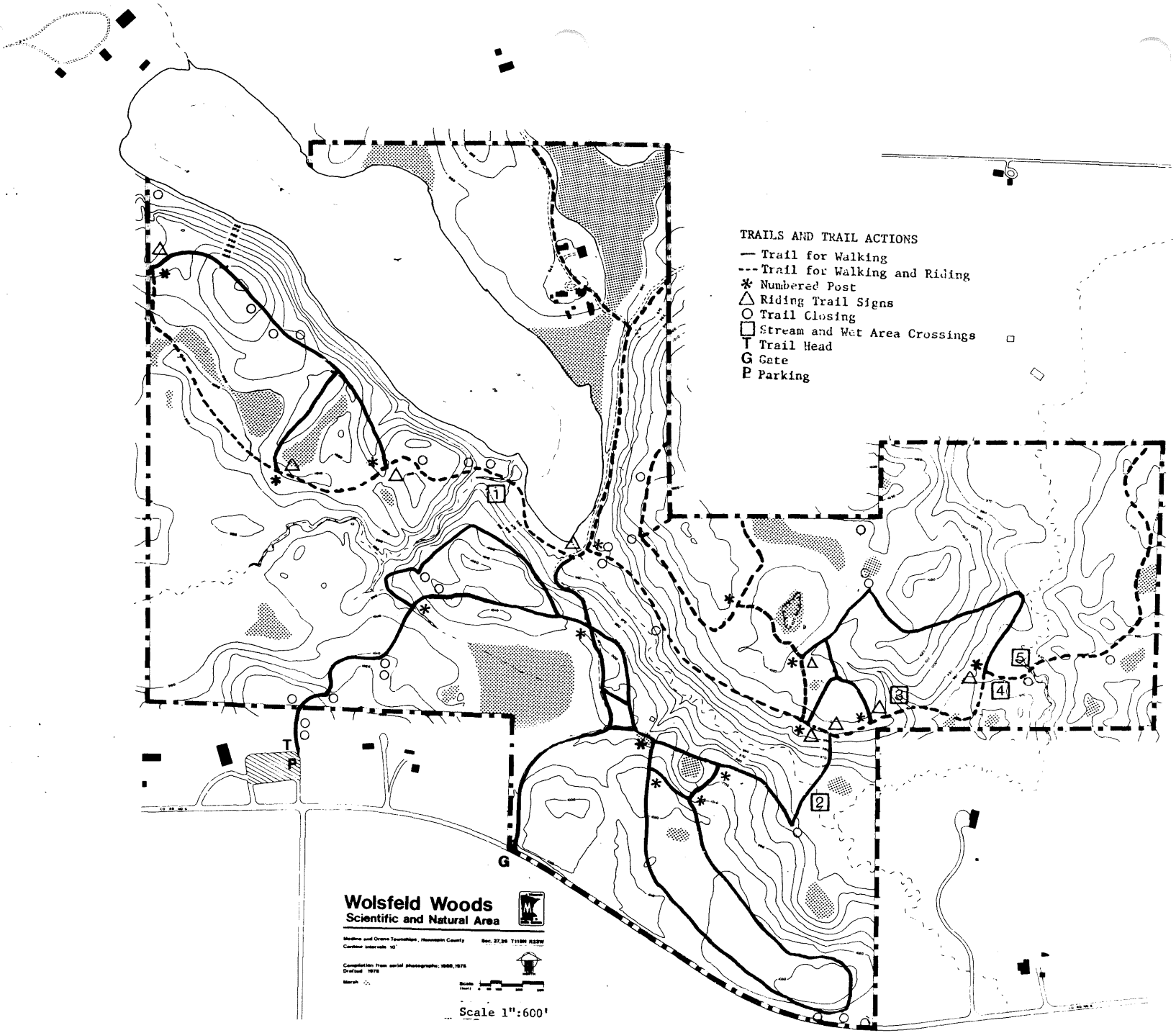

TRAILS AND TRAIL ACTIONS
— Trail for Walking
--- Trail for Walking and Riding
* Numbered Post
△ Riding Trail Signs
○ Trail Closing
□ Stream and Wet Area Crossings
T Trail Head
G Gate
P Parking
1
2
3
4
5
T
P
G
Wolsfeld Woods
Scientific and Natural Area
Scale 1":600'

Figure 8

13. Seasonal horse exclusion

Horses must be kept off all trails during wet periods of the year, especially early spring. The dates when no trails should be open for riding will vary from year to year. The Department of Natural Resources and the Friends of Wolsfeld Woods should jointly decide and publicize or post this information seasonally.

Material	Funding sources	Implementors
$25/$25	Operations & Maintenance	FWW DNR (Region)

14. Sugar shack cleanup

Loose planking, exposed nails and other hazardous materials should be removed.

Material/labor	Funding source	Implementors
$0/$150	Development & Rehabilitation	FWW DNR (Region)

15. Wolsfeld building cleanup

The old buildings not within the lease area should either be sold for salvage or removed at Department of Natural Resources' cost. Buildings within the lease area for which Hillegass will not assume responsibility and liability should also be removed.

Material/labor	Funding source	Implementor
		Field Services

16. Clean up

There is a wide variety of refuse scattered through the unit. Almost all can be removed with backpacks or wheelbarrows. The heavier materials are mostly close to the road and can be removed with several strong people and a pickup.

Material/labor	Funding source	Implementor
$0/$240	Development & Rehabilitation	FWW SNA

17. Small boat dock

If necessary, a dock should be located on the SE corner of the lake in a place that is convenient to the road but not conspicuous. Refer to the map for location. Construction should wait until Scientific and Natural Areas receives what it judges a legitimate request.

Material/labor	Funding source	Implementor
$50/$200	Development & Rehabilitation	SNA

18. Numbered posts

These posts should be four feet long, be sunk two feet, projecting two feet. They will be slash cut at the top with a routed number as per the 1980 Sign Manual. They should be placed at most trail intersections in a fashion that is unobtrusive but not hidden. Refer to figure 8 for location.

Material/labor	Funding source	Implementors
$0/$240	Development & Rehabilitation	FWW Trails

19. Trail use signs

Trail use signs, basically indicating whether or not horses are permitted should be placed wherever needed. This is primarily at the entrance to trails leading out from the intersection of riding and non-riding trails.

Material/labor	Funding source	Implementor
$200/$50	Development & Rehabilitation	DNR (Region

20. Trail head sign

A trail head sign, bulletin board type #1 of the 1980 Sign Manual, should be installed at the main entrance. The sign will be placed so that it is convenient but relatively inconspicuous. A handout distribution box (21) should be attached to it.

Material/labor	Funding source	Implementor
$200/$0	Development & Rehabilitation	FWW Trails (RN)

21. Registration box

This should be located near, or attached to, the trail head sign, and should roughly follow the TNC design for same.

Material/labor	Funding source	Implementors
$75/$100	Development & Rehabilitation	FWW SNA

22. Map

A small map should be made available to all users, distributed at the trail head. It should be referenced to all the orientation systems.

Material/labor	Funding source	Implementors
$300/$0	Development & Rehabilitation	Engineering Information & Education SNA

23. The Nature Conservancy sign

This should be a low sign, approximately 2.5 feet wide stating: "This tract was acquired with the assistance of The Nature Conservancy." It should have yellow routed letters on a dark background standing no more than three feet high. It should be placed at the trail head in a clearly visible but unobtrusive location.

Material/labor	Funding source	Implementors
$100/$50	Development & Rehabilitation	FWW DNR (Region)

24. Nature trail

This trail should use trails that are part of the proposed network. The most logical choice is the loop in the SE corner (figure 8), since it is accessible, forms a loop, crosses several habitats, visits one of the most mature and pristine forests of the unit and passes the old sugar shack. Numbered posts of a different type than the orienting posts at intersections, keyed to a brochure would be best. SNA has already begun the project but continuation might be best accomplished by volunteers working with the Regional Naturalist.

Material/labor	Funding source	Implementor
$50/$50	Operations & Maintenance	DNR (Region)

25. Nature trail interpretation

A small brochure is needed to accompany the nature trail. It should describe and analyze all the natural history features of significance along the trail. Since a large proportion of users are adults, it should be written to stimulate their interests.

Material/labor	Funding source	Implementors
$50/$200	Development & Rehabilitation	FWW DNR (Region) SNA

26. Research file

A file should be maintained containing all materials concerning the natural history of Wolsfeld Woods, including research, reports from visiting scientists and naturalists, volunteer naturalist projects, inventory, and reports from long-time users and neighbors.

Material/labor	Funding source	Implementor
		SNA

27. Rules and Regulations

A simplified form of the rules and regulations should be posted at

all access points and any other key locations. The full legal form should be posted at the main entrance.

Material	Funding source	Implementor
$75/$100	Development & Rehabilitation	SNA

28. Survey

Survey work was completed in Fall 1979.

Material/labor	Funding source	Implementor
		Engineering

29. Posting

The perimeter should be posted every 500 feet with SNA signs.

Material/labor	Funding source	Implementors
$0/$50	Development & Rehabilitation	FWW DNR (Region)

30. Road fill

Three truck loads of crushed limestone rocks (18 yards @ $5.00/yard) are needed on the long wet spot beyond the Hillegass compound.

Material/labor	Funding source	Implementor
$100/$100	SNA	SNA (contract)

31. Gate

A simple road-gate should be installed, secured with a lock if necessary, consisting of two posts, connecting chain and some kind of safety reflector(s) located approximately 300 feet from County Road 6. This distance allows access to the private driveway off of the service road (refer to Lease Considerations).

Material/labor	Funding source	Implementors
$50/$150	Development & Rehabilitation	FWW DNR (Region)

MONITORING ACTIONS:

32. Monitor trail use and condition

Trails will need to be monitored after the institution of the trail plan and after any trail work. It should be relatively easy to detect the degree and type of violations of discontinued trails or foot-traffic only trails. Monitoring type and degree of conforming use trails is more difficult. Friends of Wolsfeld Woods and especially Hillegass should be involved.

Material/labor	Funding source	Implementors
$0/$150 (per year)	Operations & Maintenance	Hillegass FWW DNR (Region) SNA

33. Permanent plots

Permanent plots in the swamp forest on the west side and in selected upland areas should be established. A 100x100 meter plot has been established in the SE area (W6 in figure 6) by Dr. Cushing of the University of Minnesota Ecology Department. The plan, already much completed, is to map all trees in the area, from sapling to rotting log, by species and size. In the swamp forest (W9 in figure 6) a photoplot should be established and records begun.

Material/labor	Funding source	Implementors
$25/$250	Planning	FWW Trail (RN) SNA

34. Complete inventory

Material/labor	Funding source	Implementors
$100/$750	Development & Rehabilitation	FWW SNA

F. Boundary Modifications: Summary and Additions

1. There are no boundary modifications needed for management purposes at this time.

2. Protection should be sought for the hillside near the NW corner that contains an impressive stand of putty-root and toothwort. Pending a systematic inventory, Department of Natural Resources should obtain a lease or conservation easement to about five acres of this property.

G. Implementation

I. Administration

The following is a list of organizations or individuals with particular roles in the Wolsfeld Woods management, along with a description of their current and projected role and a brief history of their involvement.

A. Department of Natural Resources

1. The Wildlife Section of the DNR assumes responsibility for all actions within the jurisdiction defined in the Outdoor Recreation Act of 1975 and Scientific and Natural Area policy.

2. Metropolitan Regional Office

a. The Conservation Officer (CO) has primary enforcement responsibilities with the power of arrest.

b. The Scientific and Natural Areas Coordinator is responsible for the management of all SNA units within the region.

c. The Trail Coordinator will work with the SNA staff in development and management of trails.

d. The District Forester will authorize burning or collecting permits, assist in preparation of suppression and prescribed burning plans.

e. The Regional Fisheries Supervisor may develop and implement a rough fish control program if and when a program is developed for the Long Lake watershed. The supervisor will review any other plans for the lake or streams.

B. The Friends of Wolsfeld Woods (FWW)

The friends began forming in August, 1978, had their first organizational meeting in November, 1978, and formally adopted Articles of Association on April 2, 1979. Throughout the fall and winter of 1978-1979 the Department of Natural Resources conducted public meetings concerning management considerations, especially horse and ski usage. The Friends formed a Steering Committee (chairman Larry Trottochau) to gather public opinion and to present advocate positions to the DNR. The understanding reached between the Steering Committee and the DNR was presented to the Friends on April 2, 1979 and passed on to the six member Board of Directors (president Doug Knudson) that formed at that time. The function of the Friends, as defined in the Articles of Association include:

1. To educate citizens of the State of Minnesota regarding the use and enjoyment of the Woods as an SNA.

2. Support the DNR in the development of Wolsfeld Woods.

3. To support the development of a sound financial framework for Wolsfeld Woods SNA.

4. To encourage citizen input to the DNR as a means of responsiveness to citizens needs.

5. To inform citizens and public officials of the need for regional SNA activities.

6. To aid the DNR as volunteer workers in appropriate programs such as leisure interest research, public information, physical improvements, interpretive programs and the like.

Two committees have already formed:

Research and Education

This group will solicit, organize and present to the Friends and to the DNR the concerns of researchers, educators, and others of similar concerns.

Volunteer Naturalists

The Volunteer Naturalists formed in the summer of 1978 and met several times in 1978. These early meetings were mostly experiments with interpretive techniques, and for general information and materials. On March 15, 1979 the DNR presented an outline of some Research and Education needs on Wolsfeld Woods. These consisted, initially at least, of an inventory and phenology. The group endorsed their involvement. Other functions might include:

a. a resource room in Trinity Lutheran Church
b. photographic documentation, display
c. tours
d. tour guide training
e. nature trail, materials
f. natural features map
g. lectures and media shows
h. support other SNA - Volunteer Naturalists organizations
i. publicity, including a weekly phenological column in the Sun Newspaper
j. logistic help for researchers

C. Medina City Council

The great bulk of the unit lies in Medina. The Council should be kept informed at all time of plans and developments.

D. Medina Police

Department of Natural Resources and the police force should meet and agree on an enforcement plan.

E. Long Lake Fire Department

The Department of Natural Resources has a contract with the Long Lake Fire Department for fire suppression.

F. Orono City Council

A small portion of the unit lies in Orono. The Council should be kept informed at all times of plans and developments.

G. Orono Police

At this time the DNR and the police of Orono should meet and agree on an enforcement plan.

H. The Nature Conservancy

The Nature Conservancy, as the immediate donor, reserves the right to retract the gift if it is not managed as an SNA.

I. Jim Hillegass

Mr. Hillegass owns the old Wolsfeld cabin. He leases a small amount of land beneath and around the cabin from the Department of Natural Resources. As a condition of this lease he "shall inspect the Wolsfeld Woods on a regular basis and notify the DNR of the general conditions of Wolsfeld Woods, any special management problems and any violations of the SNA Rules and Regulations." Mr. Hillegass has been active in this regard and was generally responsible for the decrease of snowmobile, motor bike, and off-trail vehicle use prior to Department of Natural Resources acquisition.

J. Morris Holmberg

Mr. Holmberg retains two easements against the property. One is recreational access to the lake. This does not take into account any zoning of the lake. The other is use of the road and the right to have it maintained as a cartway.

K. Other

In addition, the following organizations should be routinely notified, when appropriate, of any major developments or plans:

Audubon Society (Minneapolis)
James Ford Bell Museum of Natural History, Director Department of Energy, Planning, and Development (Physical Environment Section)
Environmental Conservation Library (ECOL)
Freshwater Biological Institute
Hennepin County Park Reserve
Local High School Field Biologists (about 15)
Isaac Walton League
Limnological Research Center
Metropolitan Council
Minnehaha Watershed District
Minnesota Association of Environmental Professionals
Minnesota Entomologist Association
Minnesota Environmental Education Board
Minnesota Horticultural Society
Minnesota Mycological Society
Minnesota Naturalists Association
Minnesota Ornithological Union
Minnesota Science Museum
Minnesota Wildlife Heritage Foundation
Natural History Society
Pollution Control Agency
Sierra Club (North Star)

Soil Conservation Service
The Nature Conservancy
The Wildlife Society (Minnesota Chapter)

II. Status of Recommended Actions, Spring 1981

For an overview of the development of the management plan and its implementation. As of the Spring 1981 the following actions have been completed: Trail discontinuation (6), Stream crossings (10), Sugar shack cleanup (14), Numbered posts (18), Trail use signs (19), Trail head sign (20), Survey (28), Posting (29), and Road fill (30).

The following actions have been partially implemented: Trail re-surfacing - chips (7), Trail bypasses (8), Erosion control structure (3), Stream crossings (10), Parking (12), Map (22), The Nature Conservancy sign (23), Nature trail (24, 25), and Permanent plots (33).

The following periodic or ongoing actions have been initiated: New trails (9), Trail grooming (11), Cleanup (16), Research file (26), and Trail monitoring (32).

Actions that have not been initiated at this point: 1, 2, 4, 5, 13, 15, 17, 21, 27, 31.

III. Cost Summary

The following are estimates of the remaining actions and their costs separated by type of funding.

Development	Material	Labor
Burn (1)	0	500 (first year)
Trail resurface (7)	0	125
Trail bypasses (8)	50	100
New trails (9)	0	50 (year)
Stream crossings (10)	100	25
Dock (17)	50	200
Registration box (21)	75	100
Map (22)	300	0
TNC sign (23)	100	50
Nature trail brochure (25)	50	200
Rules and Regulations (27)	75	100
Grade (31)	50	150
Management & Operations action		
Erosion (3)	50	80
Buckthorn (5)	50	100
Trail groom (11)	0	30
Seasonal horse (13)	25	25
Cleanup (16)	0	50/yr
Monitoring (32)	0	150

Development	Material	Labor
Research		
Lake (4)	2,000	18,000
Planning		
Permanent plots (33)	25	250
Complete inventory (34)	100	750
Total	$ 3,100	$ 21,035

The following is a priority list to be followed if funds are limited.

Action

Erosion (3)
Seasonal horse (13)
Rules and Regulations (27)
Registration box (21)
Cleanup (16)
Stream crossing (10)
New trails (9)
Trail groom (11)
Map (22)
TNC sign (23)
Trail bypasses (8)
Trail resurface (7)
Nature trail brochure (25)
Buckthorn (5)
Monitoring (32)
Grade (31)
Dock (17)
Lake (4)
Complete inventory (34)
Permanent plots (33)
Burn (1)