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The 1979 Resource Inventory
for
Hastings Scientific and Natural Area
Dakota County, Minnesota

Section 34, 35, 23
Township 115 North, Range 17 West
Hastings Quadrangle

Prepared by
The Scientific and Natural Areas Section
Division of Parks and Recreation
Minnesota Department of Natural Resources

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INTRODUCTION

Scope and Organization

This report documents the information collected during a 1979 inventory of Hastings natural area. The inventory recorded information on climate, geology, soils hydrology, plant communities, flora, birds, mammals, amphibians, reptiles, and land use history. Data supplied by this document will be used by the Minnesota Natural Heritage Program and other evaluators to assess the site as a potential Scientific and Natural Area (SNA). The document can also be used by scientists, educators, and others interested in the area. Should the site be designated an SNA, management plans can be written using this document as a reference.

This report is divided into five sections including: introduction, abiotic, vegetational, and zoological components, and land use history of the site. Methodologies and results are presented for each section.

The inventory of Hastings was part of a larger 1979 effort in which eighteen natural areas in east central, northwest, and southeast Minnesota were surveyed. Inventory team members were: John Borowske, SNA Planning Coordinator; Cherry Keller, Karen Lustig, Deb Schowalter, and Jeff Weigel, Researcher/Writers; Kathy Bolin, Community Specialist; and Nancy Berlin, Tony Busche, Barbara Eikum, Peter Farrell, Joanne Herman, Laura Hill, Susan Ottoson, Deanna Schmidt, Marianne Severson, Angela Tornes, and James Ziegler, Researchers. Gerald Jensen, Coordinator, Scientific and Natural Areas

Program, and Mark Heitlinger, Coordinator of Preserve Management, The Nature Conservancy, Minnesota Chapter served as inventory advisors. Michael Rees, Project Editor, The Nature Conservancy, provided editorial assistance. Other individuals who assisted in the preparation of the inventory are mentioned in the appropriate sections. Their help is gratefully acknowledged.

Description of Study Area

Hastings natural area is a 69 acre unit in eastern Dakota County, within the city limits of Hastings, Minnesota. The area's climate is mid-continental, relatively cool and moist, with warm summers and cold winters. Floodplain, pond, swamp, rocky bluff, talus slope, and upland areas are found on the site, which the Vermillion River traverses. Erosion, sedimentation, and flooding by Mississippi and Vermillion waters have formed the natural area's landscape. A flowing spring originates in a rocky outcrop on the preserve. Sandy and loamy soils have formed on Hastings natural area under a variety of vegetation types. Present vegetation includes various upland and river bottom forest and emergent vegetation communities.

The flora and fauna of Hastings are mostly typical of natural communities found in Minnesota. Species observed on the tract include: 169 vascular plants, 65 birds, 7 mammals, 4 amphibians, and 2 reptiles. The site lies adjacent to an urbanized area, and is crossed by improved roadways. It has been subjected to a variety of human impacts, including ditching, and use as a parking lot.

Preliminary Assessment of Significance

This section lists features identified by the Minnesota Natural Heritage Program (MNHP) as potential elements¹, and identifies other aspects of the preserve believed by the authors to be important components of Minnesota's natural diversity, or which otherwise might qualify the site for SNA designation. Criteria for SNA evaluation are enumerated in "Minnesota Department of Natural Resources Policy Plan for Scientific and Natural Areas", dated July 6, 1979.

Hastings natural area supports a diverse assortment of flora in several noteworthy plant communities. Water-Dock (Rumex verticillatus), listed as a potential plant element of state significance by the Minnesota Natural Heritage Program, occurs on the site.

Fairly steep escarpments and talus slopes at Hastings are covered with an undisturbed hardwood forest community dominated by Red Oak (Quercus borealis), Sugar Maple (Acer saccharum), and Basswood (Tilia americana) in the overstory. This forest type is representative of the "big woods", as described by Marschner (1930) and interpreted by Heinselman (1974). Forests of this type are relatively rare because of agricultural practices and increased urbanization in southeastern Minnesota (Moyle, 1973). Typical herb layer species in this community include Wild Ginger (Asarum canadense) and Dutchman's Breeches (Dicentra cucullaria), typical of "shaded cliff" communities (Curtis, 1959), and Jack-in-the-pulpit (Arisaema triphyllum).

¹ An element is a natural feature of particular interest because it is exemplary, unique, threatened, or endangered on a national or statewide basis.

Also present in this community is Snow Trillium (Trillium nivale), near the northern edge of its range at Hastings (University of Minnesota herbarium records). Exposed rocky areas in this community are covered with numerous mosses, lichens, liverworts, and ferns. Several species more typical of northern forests occur here, intermixed with typical southern plants (Moyle, 1973). For example, Choke-Cherry (Prunus virginiana) and Bush Honeysuckle (Diervilla lonicera), more common northward, occur along with Bitternut (Carya cordiformis), a more southern species.

A second community type found on the natural area occupies low floodplain areas. This community is representative of Marschner's "river-bottom forest". Virtually all species listed by Marschner as dominants in this type are present, including American Elm (Ulmus americanus), Green Ash (Fraxinus pennsylvanicus), Cottonwood (Populus deltoides), Box Elder (Acer negundo), Silver Maple (A. saccharinum), Hackberry (Celtis occidentalis), and various Willows (Salix amygdaloides, S. interior, S. rigida).

Hastings natural area is significant geologically as a topographically undisturbed feature supporting native vegetation. Outcroppings of Ordovician age Oneota Dolomite are present in the hardwood forest community. The outcroppings provide a variety of niches for specialized plant species and are of interest geologically. A large portion of the tract is in the Vermillion/Mississippi Rivers floodplain. This floodplain is continually affected by geologic processes of erosion and sedimentation. The relatively open structure of the river-bottom forest is maintained by periodic flooding, which may submerge portions of the tract for long periods of time (Curtis, 1959).

ABIOTIC FACTORS

The abiotic resources of an area provide a framework necessary to the existence of all life. The role of physical factors, involving processes of climate, geology, soils and water is important in ecology. Biotic characters such as range, distribution, and diversity of plant and animal life are ultimately determined by potential limiting factors of the physical environment. These factors must be considered in any analysis of the biota of a natural area.

The natural diversity of an area must be assessed in terms of abiotic as well as biotic elements. Unique physical characteristics, such as influential hydrologic conditions or landforms illustrating geologic processes contribute to overall diversity. The preservation value of a particular area may rest wholly on its abiotic features. The following sections describing climate, geology, soils and hydrology are an effort to describe the abiotic setting of Hastings natural area.

CLIMATE

Methods

Climatological data were gathered by researching reports from the National Oceanic and Atmospheric Administration (NOAA), Minnesota Agricultural Experiment Station, and Soil Conservation Service (SCS). Most numerical data were obtained from the NOAA station at Farmington approximately 18 miles southwest of Hastings natural area.

Regional Climate

The climate of east central Minnesota is typical of areas in the central part of the North American continent. Sharp seasonal contrasts in temperature and precipitation result from a lack of moderating factors, such as location near a large body of water. During summer months, southerly winds carry warm, moist air masses northward from the Gulf of Mexico, making summer the season of greatest precipitation. During winter, cold air masses invade from the north making the winter months cold and dry.

Discussion

The mean temperature for June, July, and August in the Hastings area is 70^o F; the December, January, and February mean is 16^o F. On the average, there are about 13 days above 90^o in the summer and 37 days below 0^o F. in the winter. The average duration of the freeze-free season is 150 days. The length of the total crop season, which includes the growing period for both cool and warm species, averages 220 days (Baker & Strub, 1963b).

About two-thirds, or slightly more than 20 inches, of the area's annual precipitation (water equivalent) falls during the period of

April through September. June is the wettest month, with numerous thunderstorms accounting for an average of 4.6 total inches of rain. Rainfall intensities of 2.4 inches per day every year, 4.2 inches per day every ten years, and 5.3 inches per day every 50 years are expected to occur. The precipitation during the winter months usually falls as snow, with an average seasonal total of 42 inches. About 95 days a year have a ground snow cover of one inch or more. Precipitation of 0.01 inch or more can be expected about 110 days a year in the area. Total annual precipitation about equals total annual evaporation in the area. Prevailing winds blow from the west and northwest during the winter, and from the south and southeast during the summer.

Damaging storms such as severe blizzards, tornadoes, and ice storms occur infrequently in the area. The occurrence of ice storms averages less than once per year. However, heavy rains, winds, and hail associated with thunderstorm squall lines occur each year. Table 1 is a summary of selected climatic data for the Farmington area.

Table 1. Selected Weather Data for Farmington.

TEMPERATURE	°F	°C
Mean annual temperature	44.7	7.1
Highest temperature recorded (30 June 1963)	99	37.2
Lowest temperature recorded (15 January 1972)	-36	-37.8
Mean temperature warmest month		
Month: July	71.6	22.0
Mean daily maximum	82.5	28.1
Mean daily minimum	60.6	15.9
Mean temperature coldest month		
Month: January	11.5	-11.4
Mean daily maximum	20.9	-6.7
Mean daily minimum	2.1	-16.6
Average date last freeze (Spring) ^a	c. 2 May	
Average date first freeze (Fall) ^b	c. 6 Oct.	
Average days freeze freeze season ^c	150	
Average days total crop season ^d	220	
PRECIPITATION	in.	cm.
Mean annual precipitation	29.37	74.6
Mean precipitation wettest month		
Month: June	4.61	11.7
Mean precipitation driest month		
Month: January	0.78	1.98
Mean annual snowfall	41.9	106.4
Mean snowfall heaviest month		
Month: March	10.7	27.2

^aBased on Figure 3. Baker, D. G., and J. H. Strub, Jr. 1963a. Climate of Minnesota: Part I. Probability of Occurrence in Spring and Fall of Selected Low Temperatures. Minnesota Agr. Exp. Sta. Tech. Bull. 243.

^bBased on Figure 4. Baker and Strub, 1963a.

^cBased on Figure 16. Baker, D. G., and J. H. Strub, Jr. 1963b. Climate of Minnesota: Part II. The Agricultural and Minimum-Temperature-Free Seasons. Minnesota Agr. Exp. Tech. Bull. 245.

^dBased on Figure 14. Baker, D. G., and J. H. Strub, Jr. 1963b. Climate of Minnesota: Part II. The Agricultural and Minimum-Temperature-Free Season Minnesota Agr. Exp. Sta. Tech. Bull. 245.

Sources of Information

- Baker, D.G., and J.H. Strub, Jr. 1963a. Climate of Minnesota: Part I. Probability of Occurrence in Spring and Fall of Selected Low Temperatures. Minnesota Agricultural Experiment Station Tech. Bulletin 243.
- _____. 1963b. Climate of Minnesota: Part II. The Agricultural and Minimum Temperature Free Seasons. Minnesota Agricultural Experiment Station Tech. Bulletin 245.
- Baker, D.G., D.A. Haines, and J.H. Strub, Jr. 1967. Climate of Minnesota: Part V. Precipitation Facts, Normals, and Extremes. Minnesota Agricultural Experiment Station Tech. Bulletin 254.
- U.S. Department of Agriculture, Soil Conservation Service, and Minnesota Agricultural Experiment Station. 1960. Soil Survey of Dakota County, Minnesota. U. S. Government Printing Office, Washington, D.C.
- U. S. Department of Agriculture, Soil Conservation Service. 1975. Hydrology Guide for Minnesota, St. Paul.
- U. S. Department of Commerce, National Oceanic and Atmospheric Administration. 1977. Climate of Minnesota. Climatology of the U.S. #60. Asheville, North Carolina.
- _____. 1973. Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1941-70. Climatology of the U.S. #81. Asheville, North Carolina.

GEOLOGY

Methods

Geologic information was primarily obtained through a literature search. Field observations using topographic maps and aerial photos aided in interpretation.

Historical Geology

The topography of the Hastings natural area formed primarily as a result of geologically recent events of the Wisconsin Stage of the Pleistocene Epoch, covering the past 100,000 years. However, much older events of the Cambrian and Ordovician periods (approximately 570 to 425 million years ago) are evident at the site.

Beginning in Cambrian times, southeastern Minnesota was inundated successively by several large seas, which also flooded various other areas of North America. The seas advanced and receded a number of times over the next 500 million years, leaving characteristic deposits represented today by sedimentary rock formations. The formations were laid down over older, pre-existing igneous, sedimentary, and metamorphic rocks. During these times, what is now the Hastings natural area was located relatively close to the shoreline of the ancient seas, in a bay called the Hollendale Embayment. This feature, now overlain by thick glacial drift, covered all of southeastern Minnesota, and was flooded repeatedly by marine waters. The thick deposits of sedimentary rocks cropping out on and underlying the preserve are the only evidence left by these vast seas. The steep rock face at Hastings natural area is a sedimentary formation called Oneota Dolomite (Thiel, 1944); it was

deposited in a sea covering the area during Early Ordovician times, about 475 million years ago.

The most recent ice advances of the Wisconsin Stage of glaciation were the next significant event in the geologic history of the tract. Glacial processes affected the flow regime of rivers like the Mississippi, which were typically much larger than today because of the abundant supply of meltwater provided by the glaciers.

During late Wisconsin times, a tongue of ice called the Des Moines lobe advanced southward out of Manitoba and into Minnesota. This lobe eventually covered much of western Minnesota and parts of Iowa, about as far south as Des Moines. The Des Moines lobe began to retreat northward after 16,000 B.P (years before present) (Wright, 1972). As it retreated, it paused briefly near Brown's Valley, Minnesota, where it formed a recessional moraine. This landform, called the Big Stone moraine, served the purpose of damming southward drainage of meltwater from the ice front into the Red River lowland, thus forming Glacial Lake Agassiz about 12,400 B.P. (Elson, 1967).

Glacial Lake Agassiz established a southward drainage outlet, which subsequently enlarged, creating the Glacial River Warren. The River Warren flowed through and formed the present-day Minnesota and lower Mississippi River valleys, entering the Mississippi valley at St. Paul. Discharge through this river was torrential, as evidenced by the wide valley it eroded, presently occupied by its feeble predecessors, the Minnesota and Mississippi rivers. The River Warren carved and exposed the sedimentary rock bluff faces bounding the present Mississippi valley,

including the Oneota Dolomite outcrop on the natural area. Eventually lower northern drainage outlets for Lake Agassiz were established, and the River Warren source was cut off. As meltwater sources disappeared with the glaciers, the discharge of glacial rivers in the state was substantially reduced. Thus, rivers like the Minnesota and Mississippi are "underfit" for the large valleys they flow in today.

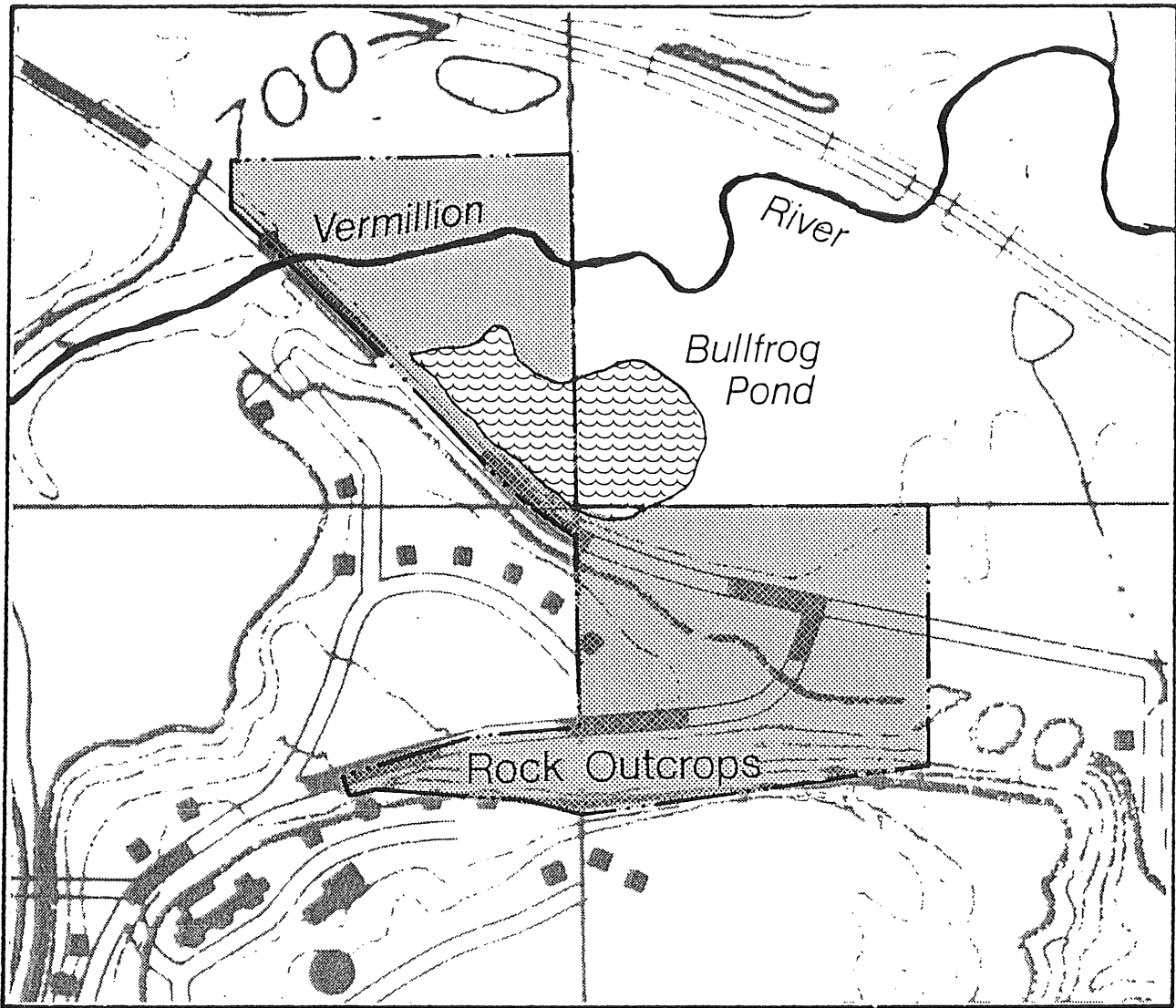
The lower elevations of the Hastings natural area are within the floodplain of the Vermillion and Mississippi rivers. Fluvial processes of erosion and sedimentation involving these streams constitute the bulk of geologic activity on the site today.

Topography and Bedrock

The tract has a maximum relief of about 160 feet between the highest bluff top and the floodplain. A steep, north facing bluff rising to an elevation of about 840 feet forms the southern boundary. The lowest land of the floodplain is at approximately 680 feet. The bluff is the most prominent relief feature, consisting of nearly perpendicular rock faces standing above steep, vegetated talus slopes. The slopes grade quickly into the level floodplain, which covers about half of the tract.

Southeastern Minnesota is underlain by thick deposits of Paleozoic sedimentary rocks deposited in the Hollendale Embayment. These rocks form deposits approximately 800 feet thick beneath Hastings natural area (Sims and Morey, 1972). Older Precambrian rocks, mostly sandstones, shales, basalts, and rhyolites, underlie the sedimentary strata in this part of the state. Glacial drift and wind-blown loess deposits cover the bedrock in some areas; at Hastings and other sites closely bordering the Mississippi the bedrock is either outcropping or covered by outwash deposits of the River Warren.

Fig. 1. Topography of Hastings Natural Area. Adapted from U.S. Geological survey Hastings Quadrangle (1:24000) 1974.



----- Preserve Boundary

 River

 Pond



Scale: 8 Inches=1 Mile

Sources of Information

- Bray, Edmund C. 1977. Billions of Years in Minnesota. Science Museum of Minnesota, St. Paul.
- Dott, R.H., and R.L. Batten. 1976. Evolution of the Earth. McGraw-Hill, Inc.
- Elson, John A. 1967. Geology of Glacial Lake Agassiz, in W.J. Mayer-Oakes, editor, Life, Land and Water. University of Manitoba, Winnipeg.
- Morey, G.B. 1976. Geologic Map of Minnesota. 1:3,168,000. Minnesota Geological Survey. University of Minnesota, Minneapolis.
- Sims, P.K. and G.B. Morey, editors. 1972. Geology of Minnesota:A Centennial Volume. Minnesota Geological Survey. University of Minnesota, Minneapolis.
- Thiel, G.A. 1944. The Geology and Underground Waters of Southern Minnesota:Minnesota Geological Survey, Bulletin 31.
- U.S. Department of the Interior, Geological Survey (USGS) 1974. Hastings Quadrangle. MN:7.5 Minute Series (Topographic). 1:24,000. Denver, Colorado.
- Wright, H.E., Jr. 1972. The Quaternary History of Minnesota, in Sims, P.K. and G.B. Morey, editors - The Geology of Minnesota:A Centennial Volume. Minnesota Geological Survey. University of Minnesota, Minneapolis.

SOILS

Methods

Soil information was obtained from literature sources and from the Dakota County Soil Survey manual. Soil series descriptions are based on single sheet soil interpretations provided by the Soil Conservation Service (SCS).¹

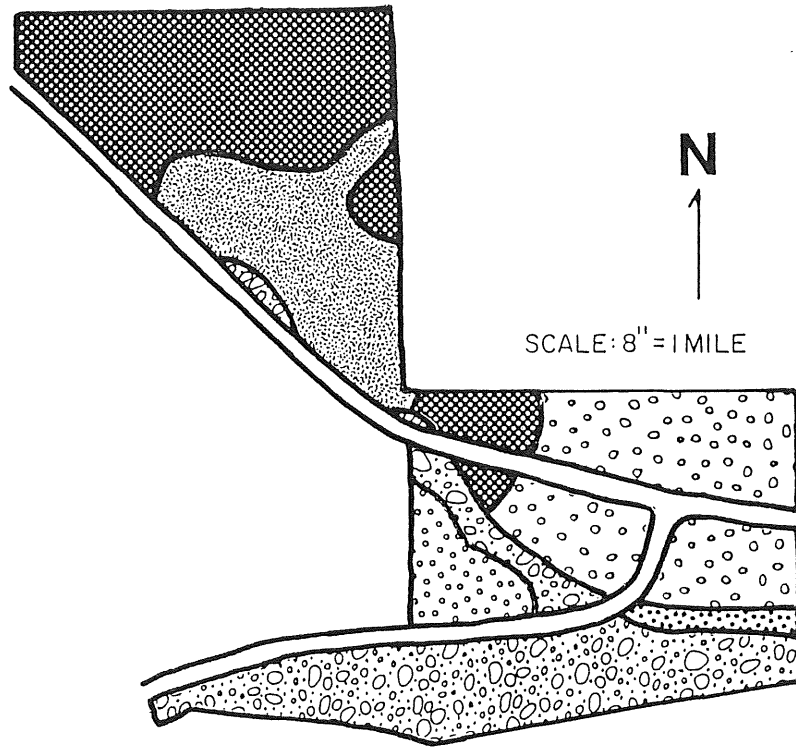
Soils of Hastings Natural Area

Hastings Scientific and Natural Area lies in an area of coarse to medium textured prairie soils formed from glacial outwash (Arneman, 1963). The site's soils formed primarily in sandy outwash, loess and aluvium. Six soil series and two land types are present on the tract.

All of the soils on the natural area are mollisols, characterized by nearly black, friable surface horizons rich in organic matter. The Estherville, Wadena, and Waukegan series soils (typic hapludolls) are humid climate soils displaying minimum horizon development. All are underlain by sand and gravel at relatively shallow depths and have somewhat acidic surface layers. They are found on the steepest areas of the preserve. Estherville soils are intermixed with rough broken land, a land type found in rock outcrop areas. Wadena and Waukegan soils are mapped together in a soil complex. Kennebec soils (cumulic hapudolls) are similar to the typic hapludolls, but have a thick surface accumulation of organic matter and are not underlain by sand and gravel. Poorly drained Colo series soils (cumulic haplaquolls) are mapped in the

¹ Ray Diedrich, Soil Specialist, SCS, St. Paul, provided valuable help for this section.

Fig. 2. Soil and drainage classes for Hastings SNA.



KEY

<u>DRAINAGE</u> <u>SYMBOL</u>	<u>DRAINAGE</u> <u>CLASS</u>	<u>SOIL</u> <u>SERIES</u>	<u>MAP</u> <u>SYMBOL</u>
	Excessively Drained	Hubbard	HfA
	Somewhat Excessively Drained	Estherville	EbE
	Well Drained	Wadena/Waukegan	DbA
	Moderately Well Drained	Kennebec	JaC
	Poorly Drained	Colo	Sa
	Somewhat Poorly - Very Poorly Drained	Mixed alluvial land	Mb

general area presently occupied by Bullfrog Pond, which is not shown on the available soil map. The pond apparently was not present at the time of soil mapping, which took place prior to 1960. Colo soils are characterized as wet soils with a relatively thick accumulation of surface organic matter, but thin subsurface horizons.

Soils of the Hubbard series (udorthentic haploborolls) are mollisols typical of cool and cold regions. They are characterized by the lack of a horizon of clay accumulation and minimum horizon development. These soils are sandy and excessively drained, and occupy upland areas adjacent to floodplains on the Hastings natural area. Mixed alluvial land is a land type found on flat floodplains. It is highly variable in composition due to annual flooding.

Key to Table 2

TEXTURE: Relative proportions of various soil separates (silt, sand, clay) in a soil.

Topsoil: "surface soil" in uncultivated soils, a depth of 3 or 4 to 8 or 10 inches; in agriculture, refers to the layer of soil moved in cultivation.

Subsoil: soil below the top soil, from 8 to 10 to 60 inches.

DRAINAGE CLASS: Soil drainage refers to natural frequency and duration of saturation which exists during soil development. Soil drainage classes are those used in making detailed soil maps (Arneman and Rust, 1975; USDA-SCS, and Minnesota Agricultural Experiment Station, 1977).

ED - Excessively Drained - water is removed very rapidly. Soils are without mottles.

SED - Somewhat Excessively Drained - water is removed rapidly and soils are without mottles.

WD - Well Drained - water is removed from soil readily but not rapidly. Soils are nearly free of mottling.

MWD - Moderately Well Drained - water table usually below 5 feet. Soils are wet for small but significant part of the time. Mottling is lower B horizon.

SPD - Somewhat Poorly Drained - water table at depths of 36 to 60 inches. Soil is wet for significant periods, commonly with mottles below 6 to 16 inches.

PD - Poorly Drained - water table seasonally near surface for prolonged intervals. Water table from 18 to 36 inches. Soils wet for long periods, generally with mottles.

VPD - Very Poorly Drained - water table remains at or near surface (above 18 inches) greater part of time. Soils wet nearly all the time, with or without mottling.

COMPONENT IN STATE: Extent of acreage in state.¹

M - Major: 100,000 acres or more

I - Intermediate: 10,000 to 100,000 acres

m - Minor: 10,000 acres or less

LOCATION IN STATE:¹

WC - West-central Minnesota

SC - South central Minnesota

SE - South-east Minnesota

¹ Determined by Ray Diedrich, Soil Specialist, SCS, St. Paul

Table 2. Soil Characteristics of Hastings Natural Area.

	SOIL SERIES # ACRES PERCENT	DRAINAGE CLASS	DEPTH TO WATER TABLE	PARENT MATERIAL	LANDSCAPE POSITION	TEXTURE		VEGETATION		COMPONENT IN STATE	LOCATION IN STATE
						TOPSOIL	SUBSOIL	ORIGINAL	PRESENT		
typic hapludolls	Estherville 19.7 acres 28.5%	SED	>6.0	sandy loam outwash underlain by sands & gravels	outwash plains and stream terraces 0-25% slopes	sandy loam	loamy sand and gravelly coarse sand	tall grass prairie	upland forest	M	WC & SC
	Wadena ¹	WD	>6.0	loamy out- wash under- lain by sands and gravels	outwash plains and stream terraces 0-12% slopes	loam	loam, sandy loam & sand & grav- el	prairie	upland forest	M	WC & SC
	Waukegan	WD	>6.0	loess or silty alluv- ium under- lain by sand and gravel	outwash plains and stream terraces 0-12% slopes	silt loam	silt loam & coarse sand & gravel	prairie grasses	upland forest	M	SE
cumelic hapudolls	Kennebec 3.9 acres 5.6%	MWD	2.0'- 5.0'	alluvium	floodplains and gentle slopes 0-5% slopes	silt loam	silt loam	prairie grasses	upland forest	I	SC & SE

¹ Mapped as a soil complex with Waukegan soils, covering 2.0 acres, 2.9% of preserve.

Table 2 (Continued). Soil characteristics of Hastings Natural Area.

	SOIL SERIES # ACRES PERCENT	DRAINAGE CLASS	DEPTH TO WATER TABLE	PARENT MATERIAL	LANDSCAPE POSITION	TEXTURE		VEGETATION		COMPONENT IN STATE	LOCATION IN STATE
						TOPSOIL	SUBSOIL	ORIGINAL	PRESENT		
udorthenic haploborolls	Hubbard 15.8 acres 22.9%	ED	>6.0'	sandy materials	uplands 0-35% slopes	loamy coarse sand	coarse sand	prairie grasses	bottomland forest	M	WC
udifluvents	Mixed Alluvial land 19.7 acres 28.5%	SP- VPD	-	mixed alluvial material	occasional and frequently flooded areas 0-3% slopes	variable	vari- able	aquatic grasses and water toler- ant trees	emergent vegetation, bottomland forest	M	state- wide
land type	Rough Broken Land ¹	vari- able	vari- able	variable	steep slopes with rock outcrops	variable	vari- able	--	--	I	state- wide
cumelic haplaquolls	Colo 7.9 acres 11.4%	PD	1.0'- 3.0'	alluvium	bottomlands 0-5% slopes	silty clay loam	silty clay loam	aquatic grasses	lake, emergent vegetation		

1. Mapped with Estherville Series.

Sources of Information

- Arneman, H.R. 1963. Soils of Minnesota. University of Minnesota Extension Bulletin 278. Minneapolis, Minnesota.
- Arneman, H.R. and R.H. Rust. 1975. Field Manual for Field Course Soil Survey. University of Minnesota. Department of Soil Science. St. Paul, Minnesota.
- Buol, S.W., F.O. Hole, R.J. McCracken. 1973. Soil Genesis and Classification. Iowa State University, Ames.
- U.S. Department of Agriculture, Soil Survey Staff. 1960. Soil Classification, a Comprehensive System - 7th approximation U.S. Government Printing Office, Washington D.C.
- U.S. Department of Agriculture, Soil Conservation Service and Minnesota Agricultural Experiment Station. 1960. Soil Survey of Dakota County, Minnesota. U.S. Government Printing Office, Washington, D.C.
- _____. 1977. Soil Survey of Morrison County, Minnesota. Preliminary data, unpublished.
- U.S. Department of Agriculture, Soil Conservation Service. Various dates. Soil Series descriptions, loose leaf. Lincoln, Nebraska.

HYDROLOGY

Hydrology of Hastings Natural Area

Hastings natural area is located on the floodplain of the Vermillion and Mississippi rivers. The tract is affected annually by spring floodwaters, which inundate the lowest elevations. Major floods occur less frequently; according to Army Corps of Engineer records (1971), which list 12 between 1879 and 1971 (measured at a gaging station approximately 1 mile northwest of the site). Flooding is an important process at Hastings natural area. Floodwaters alter the substrate by eroding and depositing alluvial materials and maintaining the open forest structure characteristic of floodplains (Curtis, 1959).

Several man-made structures affect the flow of surface water on the tract (see Land Use History section). Two city streets, 10th Street (CSAH 54) and 18th Street (CSAH 291), cross the site. These roads affect runoff by interrupting drainage patterns and causing water to collect in ditches adjacent to them. Indian Springs, a natural springs emerging from the base of the cliffs near the tract's eastern boundary, is drained by a man-made ditch and culvert. Water flows from the springs into Bullfrog Pond, a small body of surface water, part of which is off the preserve.

Because of their elevation, higher upland parts of the tract are unaffected by floodwaters. Oneota Dolomite, outcropping on the uplands, holds little groundwater; it is not an important aquifer. It carries some water in joints and bedding planes, but is more important as a cap confining groundwater in the subjacent Jordon Sandstone, a porous

formation holding abundant supplies of water. The Jordon Sandstone does not outcrop at the natural area (Thiel, 1944).

Sources of Information

Curtis, John T. 1959. Vegetation of Wisconsin. University of Wisconsin Press, Madison.

Thiel, G.A. 1944. The Geology and Underground Waters of Southern Minnesota:Minnesota Geological Survey Bulletin 31.

U.S. Army Corps of Engineers. 1971 Flood records for Mississippi River at Hastings, Minnesota. St. Paul.

U.S. Department of Agriculture, Soil Conservation Service (SCS). 1975. Hydrology Guide for Minnesota. St. Paul.

U.S. Department of the Interior, Geological Survey (USGS). 1974. Hastings Quadrangle. MN:7.5 Minute Series (Topographic). 1:24,000. Denver, Colorado.

VEGETATIONAL COMPONENTS

Plants and plant communities are a major part of the ecosystems present on a natural area. Vegetation reflects the combined influences of all physical factors, and provides the primary energy source for all other living organisms. A description of the flora provides information on the natural area's diversity, as well as an understanding of the origin and recent history of the vegetation. An inventory of vegetational components was conducted to: 1) document the area's species diversity and communities, 2) obtain baseline data so changes can be discerned, and 3) identify rare, sensitive, or representative species and communities.

VEGETATIVE COMMUNITIES

Methods

Vegetative communities were mapped and described according to their cover type. Vegetation maps were produced by delineating major communities visible on aerial photographs. Recent color infrared and/or black and white photographs were used. Communities were described by walking through the area and recording dominant (i.e., most abundant) species present based on visual estimation. It should be noted that all variations in vegetation were not distinguished on the map. Rather, major types are separated and variations within each type are discussed in the text.

Releves were also conducted to provide further information on species composition. Numerous plots were set up at Hastings during the summer of 1977 by Craig Cox (1977). With the exception of one community, all releve information presented in this report was gathered from Cox's study. Releve plots were determined according to the methods described by Cox.

Overview of Regional Plant Communities

Hastings is located in the Southern Oak Barrens landscape region (Figure 3). Prior to European settlement, the Southern Oak Barrens consisted mainly of prairie and oak openings and barrens (Marschner, 1930; Figure 4). In addition, Marschner's map indicates the presence of big woods and river-bottom forests. European settlers converted most of the upland areas to farm land, however, examples of the original vegetation can still be found on the area today.

Minnesota's Landscape Regions

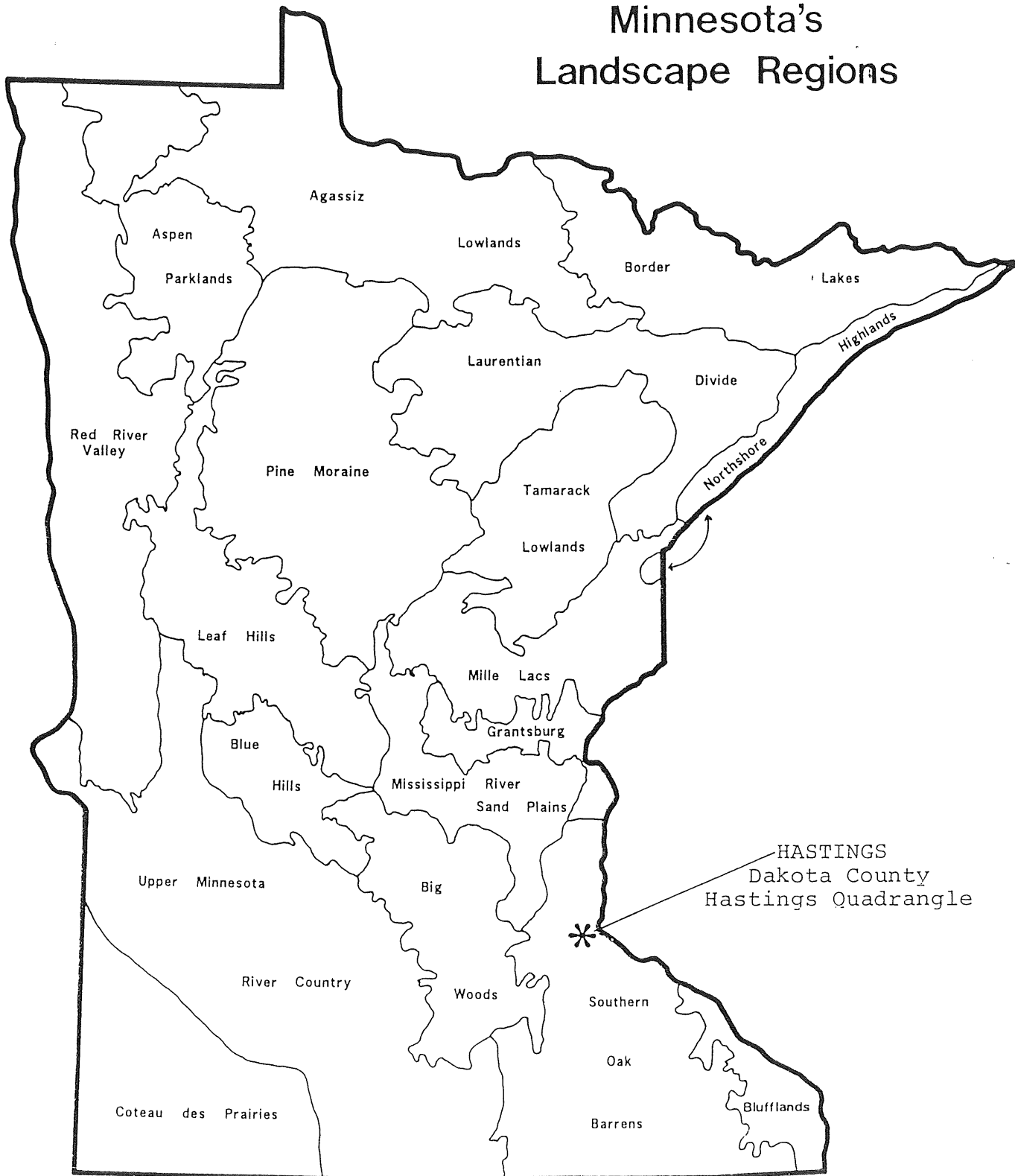
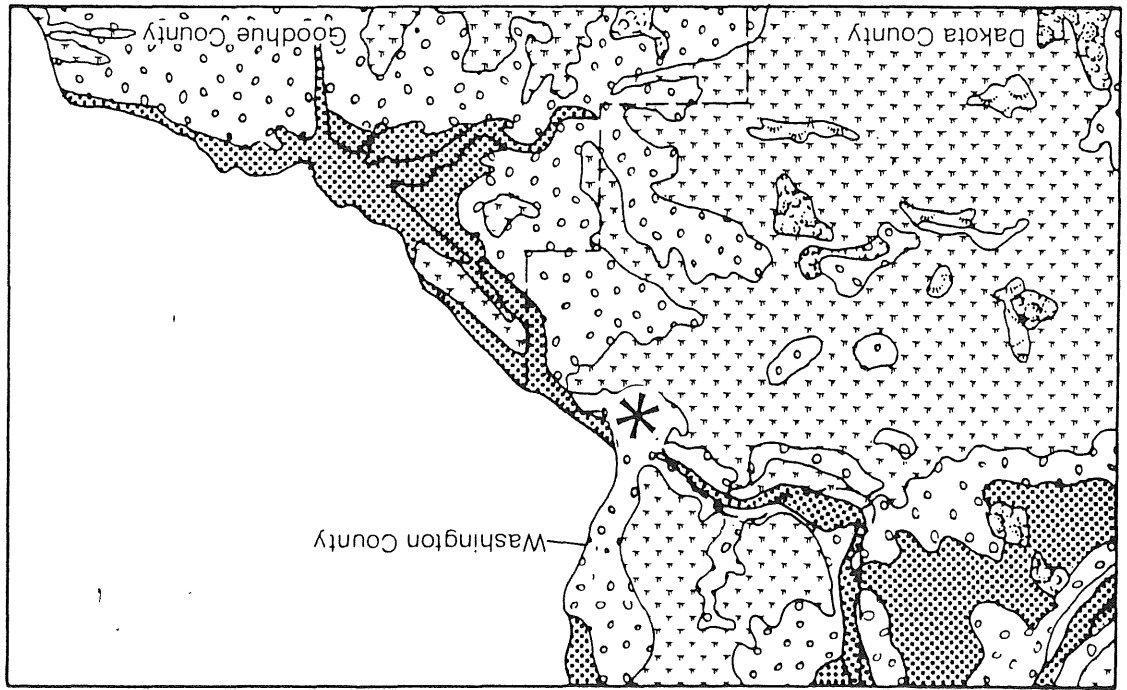







Figure 3. Hastings Natural Area in relation to Minnesota's landscape regions. Adapted from T. Kratz and G.L. Jensen, an ecological geographic division of Minnesota (Unpublished, 1977).

Figure 4. The original vegetation of the Southern Oak Barrens. Adapted from F.J. Marschner, *The Original Vegetation of Minnesota*.



Scale: 1:500,000

-  Hardwood Forest
-  Wet Prairie
-  Dry Prairie
-  Potential SNA
-  Aspen-Oak Land

Results

Hastings plant communities are illustrated in Figure 5. The area contains a combination of upland hardwood forest and river bottom forest communities. These communities can be further subdivided by their dominant canopy species. In addition, community overlap and disturbance produces small stands with a mixture of species. A description of each community is given below.

OAK-BASSWOOD UPLAND FOREST: 18 acres, 26% of preserve.

The dominant canopy species are Red Oak (Quercus borealis) and Basswood (Tilia americana). Common understory species include Ironwood (Ostrya virginiana) and Sugar Maple (Acer saccharum).

This forest community occurs on wooded, north facing slopes above and below the Sugar Maple-Basswood forest. Sources of information: field inspection and releve data (Cox, 1977).

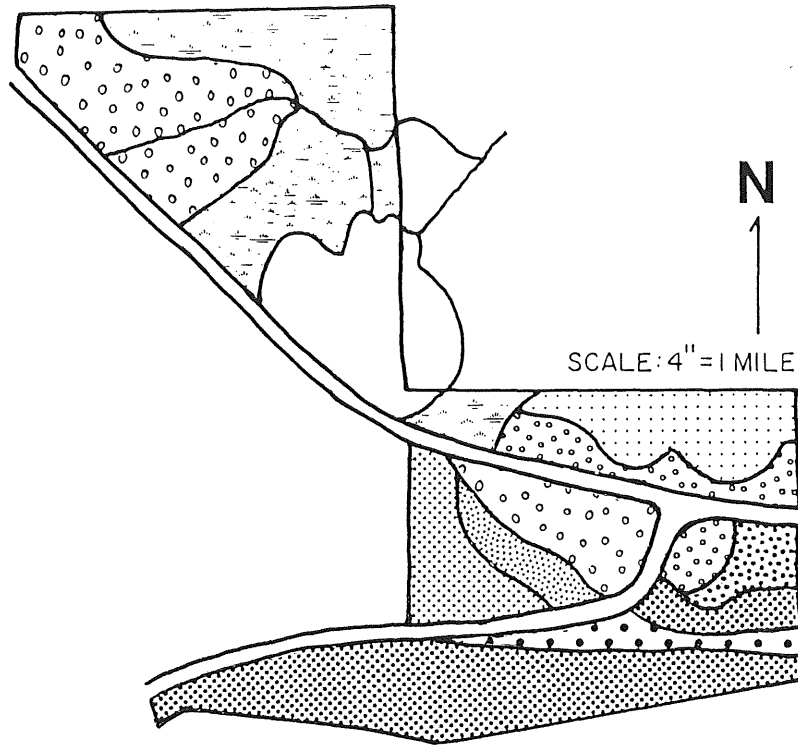
SUGAR MAPLE-BASSWOOD UPLAND FOREST: 3 acres, 5% of preserve.

Sugar Maple (Acer saccharum) and Basswood (Tilia americana) are the dominant trees. Common understory species are Sugar Maple and Bladder-nut (Staphylea trifolia). Sources of information: field inspection and releve data (Cox, 1977).

OAK-PINE UPLAND FOREST: 2 acres, 3% of preserve.

This community is similar to the oak-basswood forest, with the addition of Red Pine (Pinus resinosa) and White Pine (Pinus strobus) in the canopy. These trees are planted in this area. Sources of information: field inspection and releve.

Figure 5. Vegetation communities identified in the Hastings SNA.



KEY



Oak-Basswood Upland Forest



Silver Maple Bottomland Forest



Oak-Pine Upland Forest



Box Elder Bottomland Forest



Elm-Aspen-Sugar Maple Upland Forest



Elm Riverbottom Forest



Sugar Maple-Basswood Upland Forest



Emergent Vegetation



Silver Maple-Cottonwood Bottomland Forest

ELM-ASPEN-SUGAR MAPLE UPLAND FOREST: 2 acres, 3% preserve.

Dominant trees are American Elm (Ulmus americana), Large-toothed Aspen (Populus grandidentata), and Sugar Maple (Acer saccharum). Several woody species occur in the shrub layer, including Ironwood (Ostrya virginiana) and Paper Birch (Betula papyrifera). Source of information: field inspection and releve data (Cox, 1977).

SILVER MAPLE-COTTONWOOD BOTTOMLAND FOREST: 4 acres, 5% of preserve.

Dominant overstory species are Silver Maple (Acer saccharinum) and Cottonwood (Populus deltoides). Silver Maple seedlings are also the dominant understory species, with Green Ash (Fraxinus pennsylvanica) also common. Source of information: field inspection and releve data. (Cox, 1977).

SILVER MAPLE BOTTOMLAND FOREST: 13 acres, 19% of preserve.

Silver Maple (Acer saccharinum) dominates the overstory layer. Wood Nettle (Laportea canadensis) is a common ground cover species.

This community has wide spaced trees, but few or no shrubs in the understory layer. Source of information: field inspection and releve data (Cox, 1977).

BOX ELDER BOTTOMLAND FOREST: 20 acres, 31% of preserve.

In one small area Box Elder (Acer negundo) is the dominant tree species. Butternut (Juglans cinerea) also occurs in the canopy. Otherwise, the Box Elder community is very similar to the Silver Maple bottomland forest. Source of information: field inspection and releve data (Cox, 1977).

ELM RIVERBOTTOM FOREST: 7 acres, 8% of preserve.

The 1977 report of Hastings SNA indicated a small bottom land community dominated by American Elm (Ulmus americana). Since that time dead and diseased elms have been removed. Releve studies conducted in the summer of 1979 revealed elm stumps amid a dominant ground cover of Wood Nettle (Laportea canadensis), with occasional Green Ash (Fraxinus pennsylvanica) and Silver Maple (Acer saccharinum) seedlings. Source of information: field inspection and releve data (Cox, 1977, releve plot-HSI, 1979).

EMERGENT VEGETATION: 19 acres, 27% of preserve.

No survey conducted in this area due to flooding.

Sources of Information:

Curtis, John T. 1959. Vegetation of Wisconsin. University of Wisconsin Press.

Heinselman, M.H. 1974. Interpretation of F.J. Marschner's Map of the Original Vegetation of Minnesota. USDA. North Central Forest Exp. Sta. St. Paul.

Heitlinger, M. 1979. Vegetation Analysis for 1979. SNA - MDNR Inventory. Unpublished report. Scientific and Natural Area Office. St. Paul, Minnesota.

Marschner, F.J. 1930. The Original Vegetation of Minnesota. (Map). USDA. North Central Forest Exp. Sta. St. Paul, Minnesota.

FLORA

Methods

Hastings natural area was visited on a weekly basis, when weather conditions permitted, from 16 April to 27 August, 1979. Flowering or fruiting plants were collected and pressed. Habitat, associated species, and collection date was recorded for all specimens. Locations of specimens were indicated on an aerial photograph of the area, or grid field map.¹ Specimens were deposited at the University of Minnesota Herbarium, Botany Department, St. Paul.

A phenological record of the flowering plants was also kept. The recording began on the first visit to the area and ended on the last visit.

Plants were identified using several references (cited at the end of this section). John W. Moore, retired Associate Scientist, University of Minnesota, identified 12 specimens. Gerald Wheeler, identified all species of the genus *Carex*. Dr. Gerald Ownbey, Curator of the Herbarium, University of Minnesota, verified the remaining specimens. Any specimens identified in the field, but not collected, are indicated as such in the list.

Plants were designated alien if described as "introduced" in northeastern United States by both Fernald (1950) and Gleason and Cronquist (1963). Plants were designated possibly alien if described as "introduced" by one of these authorities and native by the other.

¹ On file, Scientific and Natural Areas section, St. Paul.

Results

Table 3 is an annotated list of the plants identified on the tract.¹ A total of 169 vascular plant species, representing 58 families, were recorded on the unit in 1979. Fifteen of these species are alien. The families with the largest number of species were: Poaceae with 14 species (8.28% of total), Asteraceae with 12 species (7.10% of total), and Ranunculaceae with 11 species (6.50% of total).

Figure 6 illustrates the number of species in flower on each visit to the preserve. A total of 116 species were included. The peak of blooming occurred in June.

¹ Nomenclature is according to Gleason and Cronquist (1963).

Figure 6. Blooming phenology of Hastings SNA.

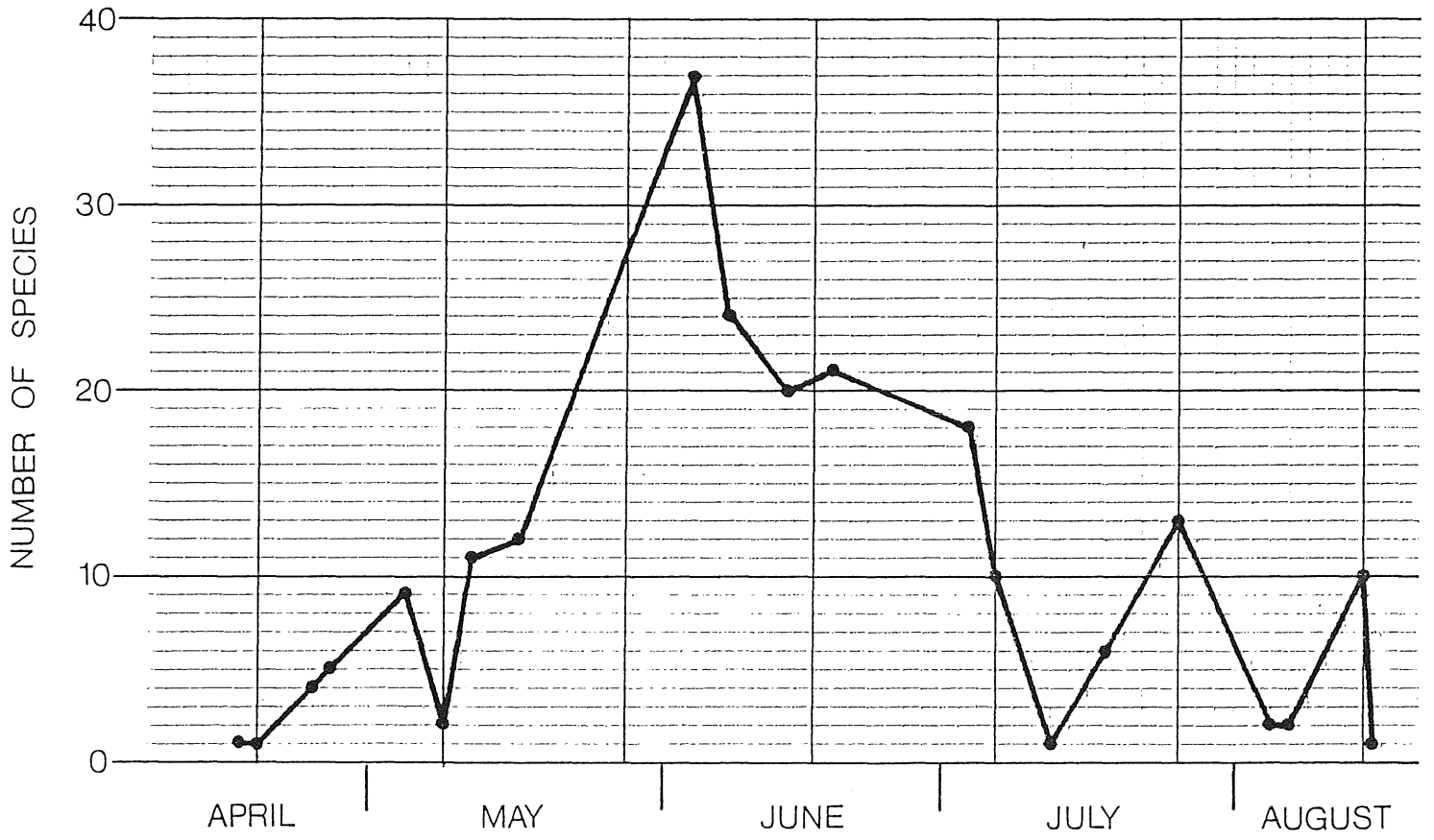


Table 3. Annotated List of Plants for Hastings Natural Area.

Format: Scientific name. Common name. Collection number of voucher specimen. Community in Hastings. Designated "alien" or "possible alien" if not native to Minnesota. Special significance of collection, if known. Shrubs and trees marked with a (⊕) were identified by Craig Cox. A (+) indicates a species was noted but not collected. Asterisk (*) if specimen was identified by John Moore. Species of the genus Carex were identified by Gerald Wheeler, all other specimens were verified by Dr. Gerald Ownbey.

PTERIDOPHYTA - Spore-Bearing Plants

Equisetaceae - Horsetail Family

Equisetum arvense L. - Common Horsetail. #96. Floodplain.

OPHIOGLOSSACEAE - Adder's-Tongue Family

Botrychium virginianum (L.) Sw. - Rattlesnake Fern. #119. Maple Basswood Woods.

POLYPODIACEAE - Polypody Family

Adiantum pedatum L. - Maidenhair Fern. #125. Maple-Basswood Slope.

Cystopteris bulbifera (L.) Bernh. - Bulblet Fern. #126. Rocky Ridge.

SPERMATOPHYTA - Seed Plants

GYMNOSPERMAE - Gymnosperms

PINACEAE - Pine Family

Pinus resinosa Ait. - Red Pine. ⊕

Pinus strobus L. - White Pine. ⊕

ANGIOSPERMAE - Angiosperms

MONOCOTYLEDONEAE - Monocots

ALISMATACEAE - Water Plantain Family

Alisma plantago-aquatica L. - Water Plantain. #178. Wet Area of Floodplain.

Sagittaria latifolia Willd. - Broad-Leaved Arrow-Head. #165. Edge of Pond and Floodplain.

ARACEAE - Arum Family

Arisaema triphyllum (L.) Schott. var. triphyllum - Jack in the Pulpit. #39. Maple Basswood Woods.

CYPERACEAE - Sedge Family

Carex laxiflora Lam. var. blanda (Dewey) Boott. (C. blanda Dew. in Fernald, 1950).

Carex rosea Schk. (C. convoluta MacKenz. in Fernald, 1950). #138.
Oak Basswood Woods.
Carex cristatella Britt. - Crested Sedge. #180. Floodplain.
Carex stricta Lam. var. elongata (Bock.) Gl. (C. emoryi Dew. in Fernald,
1950) - Emory's Sedge. #110. Floodplain.
Carex laeviconica Dewey. - Polished-Fruited Sedge. #75. Floodplain.
Carex nigromarginata Schw. var. elliptica (Boott) Gl. (C. peckii in
Fernald, 1950). #47.
Carex sparganioides Muhl. #128. Oak Basswood Woods.
Carex spengelii Dewey. - Long-Beaked Sedge. #34. Ridgetop.
Carex tenera Dewey. - Slender Sedge. #74. Floodplain.

DIOSCOREACEAE - Yam Family

Dioscorea villosa L. - Wild Yam. #136. Maple Basswood Woods.

IRIDACEAE - Iris Family

Iris versicolor L. - Blue Flag. #94. Floodplain.

LILIACEAE - Lily Family

Allium tricoccum Ait. - Wild Leek. #118. Maple Basswood Woods.
Hemerocallis fulva L. - Day-Lily. #139. Disturbed Area.
Maianthemum canadense Desf. - Wild Lily of the Valley. #135A. Maple
Basswood Woods.
Polygonatum biflorum (Walt.) Ell. Solomon's Seal. #102. Maple Basswood
Woods.
Smilacina racemosa (L.) Desf. - False Solomon's Seal. #59. Maple
Basswood, Oak Basswood, and Pine Woods.
Smilax herbacea L. var. lasioneuron (Small) Rydb. - Carrion Flower. #66.
Oak Basswood Woods.
Trillium cernuum L. - Nodding Trillium. #36. Maple Basswood Woods.
Trillium gleasoni Fern. (T. flexipes Raf. in Fernald, 1950) - Drooping
Trillium. #36A. Maple Basswood Woods.
Trillium nivale Riddell. - Snow Trillium. #1. Maple Basswood Woods.
Uvularia grandiflora Sm. - Large Flowered Bellwort. #22. Oak Basswood
Woods.

ORCHIDACEAE - Orchid Family

Orchis spectabilis L. - Showy Orchid. #73. Maple Basswood Woods.

POACEAE - Grass Family

Bromus inermis Leyss. - Smooth Brome. #175. Floodplain. Alien. *
Cenchrus longispinus (Hack.) Fern. - Sandbur. #188. Possible Alien. *
Digitaria ischaemum (Schreb.) Muhl. - Small Crab Grass. #187. Alien. *
Digitaria sanguinalis (L.) Scop. - Crab Grass. #160. Floodplain. Alien. *
Echinochloa muricata (Beauv.) Fern. (E. pungens Poir. in Fernald, 1950)
- Barnyard Grass. Floodplain. *
Elymus virginicus L. - Virginia Wild Rye. #174. Floodplain. *
Hystrix patula Moench. - Bottle-Brush Grass. #131. Oak Basswood Woods. *
Leersia virginica Willd. - #180. Floodplain.

Lolium perenne L. - English Rye Grass. #115. Floodplain. *
Oryzopsis racemosa (Smith) Ricker. - Black-Fruited Mountain-Rice. #133 *
Panicum capillare L. - Witch Grass. #159. Floodplain. *
Panicum virgatum L. - Switch Grass. #173. Floodplain. *
Phalaris arundinacea L. - Reed Canary Grass. #92. Floodplain. Possible
Alien.
Setaria glauca (L.) Beauv (S. lutescens (Weigel) F.T. Hubb. nom. illeg.)
- Foxtail Grass. #161. Floodplain. Alien. *

DICOTYLEDONEAE - Dicots

ACERACEAE - Maple Family

Acer negundo L. - Boxelder. ⊕
Acer saccharinum L. - Silver Maple. ⊕

AIZOACEAE - Carpet-Weed Family

Mollugo verticillata L. - Carpet-Weed. #117. Floodplain.

AMARANTHACEAE - Amaranth Family

Amaranthus tuberculatus (Moq.) Sauer. - Amaranth. #171. Silver Maple
Floodplain.

APIACEAE - Parsley Family

Cryptotaenia canadensis (L.) DC. - Honewort. #120.
Osmorhiza claytoni (Michx.) Clarke. - Sweet Cicely. #67. Oak Basswood
Woods.
Sanicula gregaria Bickn. - Black Snakeroot. #81. Oak Basswood Woods.
Sanicula marilandica L. - Black Snakeroot. #122. Oak Basswood Woods.
Zizia aurea (L.) Koch. - Golden Alexander. #76. Floodplain and Disturbed
Area.

APOCYNACEAE - Dogbane Family

Apocynum cannabinum L. - Indian Hemp. #140. Oak Basswood Woods.

ARALIACEAE - Ginseng Family

Aralia nudicaulis L. - Wild Sarsaparilla. #42. Oak Basswood Woods.
Aralia racemosa L. - Spikenard. #127.

ARISTOLOCHIACEAE - Birthwort Family

Asarum canadense L. - Wild Ginger #23. Maple Basswood and Oak Basswood
Woods.

ASCLEPIADACEAE - Milkweed Family

Asclepias incarnata L. - Swamp-Milkweed. #185. Disturbed Area.

ASTERACEAE - Composite Family

Achillea millefolium L. - Yarrow. #113.
Arctium minus Schk. - Common Burdock. #123. Oak Basswoods Woods. Alien.
Crepis tectorum L. - Hawk's Beard. #108. Floodplain.
Eupatorium purpureum L. - Joe-Pye Weed. #167. Floodplain.

Eupatorium rugosum Hoult. - White Snakeroot. #137. Oak Basswood Woods.
Helianthus strumosus L. - Pale-Leaved Wood Sunflower. #151. Roadsides.
Matricaria matricarioides (Less.) Porter. - Pineapple-Weed. #129
Roadsides. Alien.
Rudbeckia hirta L. - Black-Eyed Susan. #182. Disturbed, Edge of Pines.
Alien.
Solidago gigantea Ait. - Late Goldenrod. #154. Disturbed Area.
Sonchus arvensis L. - Field Sow Thistle. #145. Oak Basswood Woods.
Alien.
Taraxacum officinale Weber. - Common Dandelion. #43. Moist Area, Oak
Basswood Woods. Alien.
Vernonia fasciculata Michx. - Ironweed. #166. Silver Maple Floodplain.

BALSAMINACEAE - Touch-Me-Not Family

Impatiens biflora Walt. - Touch-Me-Not. #152. Roadside.
Impatiens pallida Nutt. - Touch-Me-Not. #144. Road Ditches.

BERBERIDACEAE - Barberry Family

Caulophyllum thalictroides (L.) Michx. - Blue Cohosh. #35. Oak Basswood
Woods.

BETULACEAE - Birch Family

Betula papyrifera Marsh. - Paper-Birch. ♂
Ostrya virginiana (Mill.) K. Koch. Ironwood. ♂

BRASSICACEAE - Mustard Family

Barbarea vulgaris R. Br. - Winter-Cress. #49. Disturbed Area.
Capsella bursa-pastoris (L.) Medic. - Shepherd's Purse. #86. Roadside,
Sandy Soil. Alien.
Cardamine pennsylvanica Muhl. - Bitter Cress. #78. Floodplain.
Hesperis matronalis L. - Dame's Rocket. #64. Oak Basswood Woods.
Lepidium densiflorum Schrader. - Pepper-Grass. Roadside, Sandy Soil.
Nasturtium officinale R. Br. - Water-Cress. #27. Stream in Oak Basswood
Forest.
Sisymbrium altissimum L. - Tumbling Mustard. #186. Floodplain.

CAMPANULACEAE - Harebell Family

Campanula americana L. - Tall Bellflower, #153. Silver Maple Floodplain.
Campanula rapunculoides L. - Creeping Bellflower. #148. Rocky Area,
Oak Basswood Woods. Alien.
Campanula rotundifolia L. - Harebell. #114. Oak Basswood Woods.

CAPRIFOLIACEAE - Honeysuckle Family

Diervilla lonicera Mill. - Bush Honeysuckle. #87. Disturbed Area.
Lonicera dioica L. - Wild Honeysuckle. #56. Roadside.
Lonicera tatarica L. - Tartarian Honeysuckle. #55. Roadside.
Sambucus canadensis L. - Common Elder. #95. Floodplain.

CARYOPHYLLACEAE - Pink Family

Arenaria lateriflora L. - Grove Sandwort. #51. Disturbed Area.
Lychnis alba Mill. - White Campion. #50. Disturbed Area. Alien.

Saponaria officinalis L. - Soapwort. #152. Shoreline.
Silene stellata (L.) Ait. f. - Starry Campion. #146. Maple Basswood
Woods.
Stellaria longifolia Muhl. - Long-Leaved Chickweed. #184. Silver Maple
Floodplain.

CORNACEAE - Dogwood Family

Cornus alternifolia L. f. - Alternate Leaved Dogwood. #71.
Cornus stolonifera Michx. - Red Osier Dogwood. #105. Near Pond.

CUCURBITACEAE - Gourd Family

Echinocystis lobata (Michx.) T. & G. - Balsam-Apple. #163. Floodplain.

FABACEAE - Bean Family

Desmodium glutinosum (Muhl.) Wood. - Pointed-Leaved Tick-Trefoil. #130.
Pine Woods.
Lathyrus ochroleucus Hook. - Vetchling. #53. Disturbed Area.
Medicago lupulina L. - Black Medick. #85. Roadside. Alien.
Melilotus alba Desr. - White Sweet Clover. #101. Silver Maple Floodplain.
Alien.
Vicia americana Muh. - Purple Vetch. #61. Disturbed Area.

FAGACEAE - Beech Family

Quercus alba L. - White Oak. ♂
Quercus borealis Michx. f. - Northern Red Oak. ♂
Quercus macrocarpa Michx. - Bur-Oak. ♂

FUMARIACEAE

Dicentra cucullaria (L.) Bernh. - Dutchman's Breeches. #3. Moist Soil,
Maple Woods.

GERANIACEAE - Geranium Family

Geranium maculatum L. - Wild Geranium. #62. Disturbed Area.

HYDROPHYLLACEAE - Waterleaf Family

Hydrophyllum virginianum L. - Virginia Water-Leaf. #28. Maple Basswood
Woods.

JUGLANDACEAE - Walnut Family

Carya cordiformis (Wang.) K. Koch. - Bitternut. ♂
Carya ovata (Mill.) K. Koch. - Shellbark. ♂
Juglans cinerea L. - Butternut. ♂
Juglans nigra L. - Black Walnut. ♂

LAMIACEAE - Mint Family

Glechoma hederacea L. - Creeping Charlie. #48. Disturbed.
Physostegia virginiana (L.) Benth. - False Dragonhead. #156. Oak Basswood
Woods.
Prunella vulgaris L. - Self-Heal. #150.

LYTHRACEAE - Loosestrife Family

Lythrum salicaria L. - Purple Loosestrife. #141. Near Pond, Oak Basswood Woods.

NYCTAGINACEAE - Four-O'clock Family

Oxybaphus nyctagineus (Michx.) Sweet. (Mirabilis nyctaginea (Michx.) MacM. in Fernald, 1950) - Four-O'clock. #90B. Roadside, Sandy Soil.

OLEACEAE - Olive Family

Fraxinus pennsylvanica Marsh. - Green Ash. 0.

ONAGRACEAE - Evening-Primrose Family

Circaea quadrisulcata (Maxim.) Franch. and Sav. - Enchanter's Nightshade. #134. Pine Woods.

Oenothera biennis L. - Evening-Primrose. #142. Silver Maple Floodplains.

PAPAVERACEAE - Poppy Family

Sanguinaria canadensis L. - Bloodroot. #4. Maple Basswood and Oak Basswood Woods.

POLEMONIACEAE - Phlox Family

Phlox divaricata var. laphamii Wood. - Wild Blue Phlox. #57. Rock, Oak Basswood Woods.

POLYGONACEAE - Smartweed Family

Polygonum lapathifolium L. - Pale Smartweed. #158. Edge of Pond.

Polygonum pensylvanicum L. - Pennsylvania Smartweed. #158A. Edge of Pond.

Rumex verticillatus L. - Water-Dock. #79. Floodplain. Potential Heritage Element.

PRIMULACEAE - Primrose Family

Lysimachia ciliata L. - Fringed Loosestrife. #155. Near Pond.

RANUNCULACEAE - Crowfoot Family

Actaea rubra (Ait.) Willd. - Baneberry. #77. Oak Basswood Woods.

Anemone canadensis L. - Canada Anemone. #60. Disturbed Area.

Anemone quinquefolia var. interior Fern. - Wood Anemone. #21. Oak Basswood Woods.

Anemone virginiana L. - Thimble Weed. #135. Oak Basswood Woods.

Aquilegia canadensis L. - Columbine. #72. Rocky Edge of Ridge; Oak Basswood Woods.

Hepatica acutiloba DC. - Sharp-Lobed Hepatica. #2. Maple, Oak and Basswood Woods.

Isopyrum biternatum (Raf.) T. & G. - False Rue Anemone. #65A. Oak Basswood Woods.

Ranunculus abortivus L. - Small-Flowered Crowfoot. #25. Moist Soil, Oak Basswood Forest.

Ranunculus septentrionalis Poir. - Swamp Buttercup. #31. Edge of Stream, Oak Basswood Woods.

Thalictrum dasycarpum Fisch. & Ave-Lall. - Tall Meadow Rue. #98.
Near Pond.

Thalictrum dioicum L. - Early Meadow Rue. #33. Oak, Basswood Woods.

RHAMNACEAE - Buckthorn Family

Rhamnus catharticus L. - Buckthorn. #69. Oak Basswood Woods.

ROSACEAE - Rose Family

Fragaria virginiana Duchesne. - Common Strawberry. #149. Oak Pine Woods.

Geum canadense Jacq. - White Avens. #115. Silver Maple Floodplain.

Potentilla norvegica L. - Rough Cinquefoil. #112. Silver Maple Floodplain.

Prunus americana Marsh. - Wild Plum. #37. Disturbed Area.

Prunus virginiana L. - Choke-Cherry. #54. Disturbed Area.

Rhubus flagellaris L. - Northern Dewberry. Ⓟ

Rosa blanda Ait. - Smooth Wild Rose. #93. Near Pond.

RUBIACEAE - Madder Family

Galium aparine L. - Cleavers. #45. Ridge, Oak Basswood Woods.

Galium concinnum T. & G. - Bedstraw. #121. Disturbed Area.

RUTACEAE - Rue Family

Zanthoxylum americanum Mill. - Prickly Ash. Ⓟ

SALICACEAE - Willow Family

Populus deltoides Marsh. - Cottonwood. Ⓟ

Populus grandidentata Michx. - Large-Toothed Aspen. Ⓟ

Populus tremuloides Michx. - Quaking Aspen. Ⓟ

Salix amygdaloides Anderss. - Peach-Leaf-Willow. #89. Silver Maple
Floodplain.

Salix interior Rowlee. - Sand Bar-Willow. #88. Silver Maple Floodplain.

Salix rigida Muhl. - Heart-Leaved Willow. #106. Near Pond.

SAXIFRAGACEAE - Saxifrage Family

Mitella diphylla L. - Bishop's Cap. #38. Maple Basswood Woods.

Philadelphus coronarius L. - Mock Orange. #183. Edge of Pine Woods.

Ribes missouriense Nutt. - Missouri Gooseberry. #44. Disturbed Area.

Ribes oxycanthoides L. - Northern Gooseberry. #52.

SCROPHULARIACEAE - Figwort Family

Mimulus ringens L. - Monkey-Flower. #164A. Floodplain.

Veronicastrum virginicum (L.) Farw. - Culver's Root. #143. Roadside.

STAPHYLEACEAE - Bladder-Nut Family

Staphylea trifolia L. - Bladder-Nut. Ⓟ

TILIACEAE - Linden Family

Tilia americana L. - Basswood. Ⓟ

ULMACEAE - Elm Family

Celtis occidentalis L. - Hackberry. Ⓟ

Ulmus americana L. - American Elm. Ⓟ

Ulmus rubra Muhl. - Red Elm. Ⓟ

VIOLACEAE - Violet Family

Viola pubescens Ait. - Downy Yellow Violet. #20. Oak Basswood Woods.

Viola sororia Willd. - Woolly Blue Violet. #29. Near Stream, Oak
Basswood Woods.

VITACEAE - Grape Family

Parthenocissus vitacea (Knerr) Hitchc. (P. inserta (Kerner) K. Fritsch,
in Fernald, 1950) - Virginia Creeper. ♂

The following additional plant species were identified in releve plots.
Voucher specimens were not collected.

ACERACEAE

Acer saccharum

APIACEAE

Osmorhiza cf. longistylis

ASTERACEAE

Aster macrophyllus

Aster simplex

Solidago flexicaulis

CORNACEAE

Cornus racemosa

CUCURBITACEAE

Sicyos angulatus

CYPERACEAE

Carex cf. pennsylvanica

FABACEAE

Amphicarpa bracteata

LAMIACEAE

Leonurus candiaca

Lycopus uniflorus

Mentha cf. piperita

MENISPERMACEAE

Menispermum canadense

PHRYMACEAE

Phryma leptostachya

POACEAE

Agrostis stolonifera var. major

Leersia oryzoides

POLYPODIACEAE

Athyrium filix-femina

URTICACEAE

Laportea canadensis

Pilea pumila

Urtica dioica

VITACEAE

Vitis cf. riparia

Sources of Information

- Ayensu, E.S. and R.A. DeFilipps. 1978. Endangered and Threatened Plants of the United States. Smithsonian Institution and the World Wildlife Fund, Inc. Washington, D.C.
- Britton, N.L. and H.A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, Inc. New York. 3 vols.
- Fernald, M.L. 1950. Gray's Manual of Botany. D. Van Nostrand Co., New York, New York.
- Gleason, H.A. and A. Cronquist. 1963. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. D. Van Nostrand Co., New York.
- McGregor, R.L., coordinator and T.M. Barkley, editor. 1977. Atlas of the Flora of the Great Plains. Iowa State University Press, Ames.
- Morley, Thomas. 1966. Spring Flora of Minnesota. University of Minnesota Press, Minneapolis.
- Moyle, John B. 1973. Notes on the vegetation of Mississippi River escarpments and slopes on the grounds of the Hastings State Hospital and the value of preserving these as natural areas. Unpublished memorandum.
- Petrides, G.A. 1958. A Field Guide to Trees and Shrubs, Peterson Field Guide Series #11. Houghton Mifflin Co., Boston.
- Rosendahl, Carl O. 1975. Trees and Shrubs of the Upper Midwest. University of Minnesota Press, Minneapolis.
- Stevens, O.A. 1963. Handbook of North Dakota Plants. North Dakota Institute for Regional Studies, Fargo, North Dakota.
- U.S. Department of Agriculture Soil Conservation Service. 1968. Key to the Native Perennial Grasses - Midwest Region East of the Great Plains. Abstracted from Hitchcock's Manual of the Grasses.

ZOOLOGICAL COMPONENTS

Animals are an important part of virtually all of Minnesota's natural areas. Their diversity is determined by both abiotic and vegetational components of the environment. Reciprocally, the zoological components may have a limited effect on the vegetational and abiotic resources of an area; seed dispersal, soil aeration, and water levels, for example are often influenced by animals. In addition, certain animal species, by their presence or absence, are considered ecological indicators that provide information on changes occurring in the area. An inventory of birds, mammals, amphibians, and reptiles was conducted to: 1) document the area's species diversity, 2) obtain baseline data so changes can be discerned, and 3) identify rare, sensitive, or representative species and communities.

BIRDS

Methods

The 1979 bird inventory used a variation of the IPA (Indices Ponctuels d'Abondance) or Point Count Method (Robbins, 1978) to inventory breeding birds. This method infers a breeding territory based on repetition of a singing male in the same area during the breeding season (May-June). Nine circular stations¹ (50 m radius) were established to include each of the major habitat types. A researcher visited the tract once a week, remaining 10 minutes at each station. The time of day and order in which the stations were visited varied. All birds seen or heard from each station were recorded. A minimum of three non contemporaneous occurrences of a particular species on a given station was used as a guideline for inferred breeding of that species. Additional species observed outside of the established stations were also recorded.

Species identification was based on visual observations, songs, and/or nest characteristics. Locating nests was done on an incidental basis throughout the field season.

Results

The results of the 1979 bird inventory are presented in the form of an annotated list, Table 4.² Sixty-five species of birds, representing 25 families, were observed on, above, or adjacent to Hastings Scientific and Natural Area. Nine species were found nesting on the area with 21

1 Maps showing the location of these stations are on file, Scientific and Natural Areas Section, St. Paul.

2 Additional information, in the form of field data sheets and secondary sources, is on file, Scientific and Natural Areas Section, St. Paul.

others recorded as inferred breeders. Great Blue Herons were seen regularly on the pond, possibly using the area for feeding. Chimney Swifts, Starlings, House Sparrows, and Chipping Sparrows were nesting on the hospital grounds and buildings and were seen regularly on the area.

Sources of Information

- Harrison, Hal H. 1975. A Field Guide to Birds' Nests, Peterson Field Guide Series #21. Houghton Mifflin Company, Boston.
- Pettingill, Olin Sewall, Jr. 1970. Ornithology in Laboratory and Field. Burgess Publishing Company, Minneapolis.
- Robbins, Chandler S., B. Bruun, H.S. Zim. 1966. Birds of North America. Golden Press, New York.
- Robbins, Chandler S. 1978. Census Techniques For Forest Birds. Proceedings of the Workshop Management of Southern Forests for Non-game Birds. U.S. Department Agricultural Forest Service General Technical Report SE-14:142-163.

Additional Sources of Information

- Peterson Field Guide. A Field Guide to Bird Songs. Eastern and Central. 1971. Houghton Mifflin Company, Boston.
- Sounds of Nature Series. Vol. IV Warblers, Vol. VI Finches, Federation of Ontario Naturalists.

Key to Table 4

FAMILY/SCIENTIFIC NAME: Names are in phylogenetic order, according to Green and Janssen, 1975.

DATE: Date of first observation

HABITAT: All habitats where a given species was observed are listed.

Flpl - Floodplain
L - Lake
OBa - Oak-Basswood Forest
P - Pine Forest
SMA - Silver Maple Forest
MaBa - Maple-Basswood Forest
Dis - Disturbed
E - Elm
TP - Throughout Preserve

RESIDENCY: Represents a basic breakdown based on breeding populations in Minnesota (Green and Janssen, 1975).

M - Migrant
P - Permanent Resident
S - Summer Resident
WV - Winter Visitant

BREEDING STATUS:

- - Positive Nesting - nest with eggs, adult sitting on nest constantly, or eggshells near nest; young in nest; downy young or young still unable to fly seen away from nest (Green and Janssen, 1975).
- - Inferred Nesting - adults seen building nest, in distraction display, carrying fecal sac, or carrying food; fledglings seen in area (Green and Janssen, 1975).
- ⊖ - Inferred Breeding - based on the Point Count Method (Robbins, 1978), a minimum of two noncontemporaneous occurrences of a species at a given observation station.

TABLE 4. ANNOTATED LIST OF BIRDS OBSERVED AT HASTINGS SCIENTIFIC AND NATURAL AREA

FAMILY/SCIENTIFIC NAME	COMMON NAME	DATE	HABITAT	RESI-DENCY	BREEDING STATUS	REMARKS
ARDEIDAE						
<u>Butorides virescens</u>	Green Heron	16 May	Flpl	S		
ANATIDAE						
<u>Branta canadensis</u>	Canada Goose	26 April	L	S	●	Family seen on lake 6/26
<u>Anas americana</u>	American Widgeon	30 April	L	S		
<u>Aix sponsa</u>	Wood Duck	24 April	L OBa	S	⊕	
ACCIPITRIDAE						
<u>Accipiter cooperii</u>	Cooper's Hawk	11 May	P	S	●	Nest in pines 5/11
<u>Buteo jamaicensis</u>	Red-Tailed Hawk	4 May	Flpl SMA	S		
LARIDAE						
<u>Sterna hirundo</u>	Common Tern	16 May	L	S		
COLUMBIDAE						
<u>Zenaida macroura</u>	Mourning Dove	26 April	P	S	⊕	
CAPRIMULGIDAE						
<u>Chordeiles minor</u>	Common Nighthawk	16 May	MaBa	S		
APODIDAE						
<u>Chaetura pelagica</u>	Chimney Swift	7 July		S		Observed flying. Nesting in neighboring buildings.
TROCHILIDAE						
<u>Archilochus colubris</u>	Ruby-Throated Hummingbird	18 May	MaBa	S		
ALCEDINIDAE						
<u>Megaceryle alcyon</u>	Belted Kingfisher	24 July	L	S		
PICIDAE						
<u>Colaptes auratus</u>	Common Flicker	24 April	P OBa MaBa	S	⊕	
<u>Dendrocopas villosus</u>	Hairy Woodpecker	26 April	OBa MaBa	P	⊕	
<u>Dendrocopos pubescens</u>	Downy Woodpecker	24 April	OBa MaBa	P	●	Nest 6/3

TABLE 4. (Continued)

ANNOTATED LIST OF BIRDS OBSERVED AT HASTINGS

FAMILY/SCIENTIFIC NAME	COMMON NAME	DATE	HABITAT	RESI-DENCY	BREEDING STATUS	REMARKS
TYRANNIDAE						
<u>Myiarchus crinitus</u>	Great Crested Flycatcher	16 June	OBa	S		
<u>Sayornis phoebe</u>	Eastern Phoebe	11 May	MaBa OBa	S		
<u>Empidonax minimus</u>	Least Flycatcher	18 May	Flpl Sma	S	⊕	
<u>Contopus vineris</u>	Eastern Wood Pewee	11 May	OBa P	S	⊕	
HIRUNDINIDAE						
<u>Iridoprocne bicolor</u>	Tree Swallow	4 May	L	S	●	Nest 6/7
<u>Stetgidopteryx rufficollis</u>	Rough-Winged Swallow	4 May	L	S	●	Young seen 6/16/
CORVIDAE						
<u>Cyanocitta cristata</u>	Blue Jay	16 May	OBa P	P	⊕	
<u>Corvus brachyrhynchos</u>	Common Crow	24 May	P	S	●	Fledglings 6/7/
PARIDAE						
<u>Parus atricapillus</u>	Black-Capped Chickadee	24 April	MaBa OBa	P	⊕	
SITTIDAE						
<u>Sitta carolinensis</u>	White-Breasted Nuthatch	26 April	OBa	P	●	Nest 5/21
TROGLODYTIDAE						
<u>Troglodytes aedon</u>	House Wren	11 May	Dis MaBa	S	⊕	
MIMIDAE						
<u>Dumetella carolinensis</u>	Gray Catbird	5 May	Dis	S	0	
TURDIDAE						
<u>Turdus migratorius</u>	American Robin	24 April	Flpl	S	●	Fledglings 6/3/
<u>Hylocichla mustelina</u>	Wood Thrush	24 May	OBa	S	⊕	
SYLVIIDAE						
<u>Polioptila caerulea</u>	Blue-Gray Gnatcatcher	16 May	E	S		

TABLE 4. (Continued)

ANNOTATED LIST OF BIRDS OBSERVED AT HASTINGS

FAMILY/SCIENTIFIC NAME	COMMON NAME	DATE	HABITAT	RESI- DENCY	BREEDING STATUS	REMARKS
STURNIDAE						
<u>Sturnus vulgaris</u>	Starling	26 April	Dis	P		
VIREONIDAE						
<u>Vireo flavifrons</u>	Yellow-Throated Vireo	11 May	Dis OBa	S	⊕	
<u>Vireo solitarius</u>	Solitary Vireo	11 May	MaBa	S		
<u>Vireo olivaceus</u>	Red-Eyed Vireo	3 June	OBa	S	⊕ 0	
PARULIDAE						
<u>Mniotilta varia</u>	Black-And-White Warbler	24 April	P	S		
<u>Vermivora peregrina</u>	Tennessee Warbler	11 May	P	S		
<u>Vermivora ruficapilla</u>	Nashville Warbler	16 May	P	S		
<u>Parula americana</u>	Parula Warbler	11 May	P			
<u>Dendroica petechia</u>	Yellow Warbler	11 May	S Ma Flpl	S		
<u>Dendroica magnolia</u>	Magnolia Warbler	24 May	Dis	S		
<u>Dendroica coronata</u>	Yellow-Rumped Warbler	26 April	Dis TP	S		
<u>Dendroica virens</u>	Black-Throated Green Warbler	11 May	P MaBa	S		
<u>Dendroica fusca</u>	Blackburnian Warbler	18 May	OBa	S		
<u>Dendroica pensylvanica</u>	Chestnut-Sided Warbler	18 May	P L	S		
<u>Dendroica stovata</u>	Blackpoll	11 May	P			
<u>Dendroica palmarum</u>	Palm Warbler	11 May	P	S		
<u>Seiurus aurocapillus</u>	Ovenbird	24 April	MaBa OBa	S		
<u>Seiurus noveboracensis</u>	Northern Waterthrush	4 May	Flpl OBa	S		
<u>Geothlypis trichas</u>	Common Yellowthroat	11 May	Flpl L	S	⊕	
<u>Wilsonia pusilla</u>	Wilson's Warbler	11 May	P	M		
<u>Wilsonia canadensis</u>	Canada Warbler	11 May	P	S		
<u>Setophaga ruticilla</u>	American Redstart	18 May	OBa	S		
PLOCEIDAE						
<u>Passer domesticus</u>	House Sparrow	24 April	Dis	P		

TABLE 4. (Continued) ANNOTATED LIST OF BIRDS OBSERVED AT HASTINGS

FAMILY/SCIENTIFIC NAME	COMMON NAME	DATE	HABITAT	RESI- DENCY	BREEDING STATUS	REMARKS
ICTERIDAE						
<u>Agelaius phoeniceus</u>	Red-Winged Blackbird					
		24 April	L	S	⊕	
<u>Quiscalus quiscula</u>	Common Grackle	11 May	P OBa	S		
<u>Molothrus ater</u>	Brown-Headed Cowbird	26 April	TP	S	⊕	
<u>Icterus galbula</u>	Northern Oriole	18 May	OBa	S	⊕	
THRAUPIDAE						
<u>Piranga olivacea</u>	Scarlet Tanager	18 May	OBa	S		
FRINGILLIDAE						
<u>Cardinalis cardinalis</u>	Cardinal	26 April	OBA	P	⊕	
<u>Pheucticus ludovicianus</u>	Rose-Breasted Grosbeak					
		3 June	MaBa	S	⊕	
<u>Passerina cyanea</u>	Indigo Bunting	16 May	Dis	S	●	Nest 6/3/
<u>Spinus tristis</u>	American Goldfinch	7 June	Dis	S	⊕	
<u>Spizella passerina</u>	Chipping Sparrow	24 April	Dis	S	⊕	
<u>Zonotrichia albicollis</u>	White-Throated Sparrow					
		3 June	Dis	S		
<u>Melospiza guorgiana</u>	Swamp Sparrow	24 June	Flpl	S		

MAMMALS

Methods

Mammals were identified by sight, track, sound, and collections. Collection tools used were drift fences, live and snap traps. The 1979 mammal inventory was conducted late in the summer; incidental observations were made throughout the summer.

The mammal inventory was conducted over a three day period during which traps were set and scent stations were made. A trapline was set in each of the major habitat types. Each line consisted of 16 Museum Special snap traps; two Shermans, one Havahart and one wooden live trap set approximately 8 m apart. Traps were baited with peanut butter and oatmeal mixture. Victor Pocket Gopher traps were set in gopher mounds. The drift fences used during the amphibian and reptile inventory were re-opened. Scent stations, 1 m diameter, were established on mounds of soil excavated by pocket gophers. Artificial scent was placed in the center of these stations.

Traps and scent stations were checked once daily over a three day trapping period. The specimens were collected for measurements and identification, live duplicates were released. A male and female of each species collected were deposited in the Bell Museum of Natural History, University of Minnesota, Department of Ecology and Behavioral Biology, as voucher specimens.

Results

The results of the 1979 mammal inventory are presented in the form of an annotated list, Table 5.¹ Seven species, representing four families were observed or captured on Hastings.

¹ Additional information, in the form of field data sheets and secondary sources, is on file, Scientific and Natural Areas Section, St. Paul.

Table 5. Mammals Identified on Hastings Natural Area.

Family Name/ Scientific Name	Common Name	Habitat
SORICIDAE		
<u>Blarina brevicauda</u>	Short-tailed Shrew	Disturbed Area
SCIURIDAE		
<u>Marmota monax</u>	Wood Chuck	By Stream, Oak Basswood
<u>Sciurus carolinensis</u>	Eastern Gray Squirrel	Woods
<u>Tamias sciurus</u>	Eastern Chipmunk	Woods
CRICETIDAE		
<u>Peromyscus leucopus</u>	White-footed Mouse	Maple Basswood, Oak Basswood, Silver Maple, Floodplain, Dis- turbed
<u>Ondatra zibethica</u>	Muskrat	In Pond
CERVIDAE		
<u>Odocoileus virginianus</u>	White-tailed Deer	Disturbed

Sources of Information

Banfield, S.W.F. 1974. The Mammals of Canada. University of Toronto Press, Toronto.

Burt, William H., Richard Grossenheider. 1964. A Field Guide to the Mammals. Houghton Mifflin Company, Boston.

Gunderson, Harvey L. and James R. Beer. 1953. The Mammals of Minnesota. University of Minnesota Press, Minneapolis.

AMPHIBIANS AND REPTILES

Methods

Amphibians and reptiles were identified by vocalizations, sight, and collection of specimens.¹ Collection tools used were drift fences, fyke nets, and hand collection. Incidental observations were made throughout the summer.

Collection of amphibians was accomplished by hand capture and with drift fences. In the spring frogs, toads and salamanders congregate for breeding, often in the same areas. Frogs and toads can be identified using their breeding vocalizations, located and hand captured. Salamanders were collected by searching the breeding area. Collecting was done at night with head lamps and waders. Later in the spring and throughout the summer drift fences, ranging from 50 to 100 feet long, were constructed of 18 inch high galvanized flashing sunk 3 to 4 inches into the ground. One bucket was placed at each end of the fence with a pair of buckets along the fence at 15 foot intervals. These served as drop receptacles for amphibians moving along the fence. The fences were placed in low areas and along the shores of water areas. Any animal moving toward or away from the water was diverted by the obstructing fence into one of the drop buckets.

Reptiles were collected by hand with exception of turtles which were collected by fyke nets. The fyke nets were anchored in the water and tied to shore. These nets are composed of a net trap with 50 foot

¹ Field work in the spring and early summer was conducted by Scientific and Natural Areas volunteers Bruce Brecke and Mike Pappus.

net leads which funnelled the animals into the trap. Turtles were also sighted when surfacing to breathe and collected by wading after them.

Voucher specimens were deposited in the Bell Museum of Natural History, University of Minnesota, Department of Ecology and Behavioral Biology.

Results

The results of the 1979 amphibian and reptile inventory are presented in the form of an annotated list, Table 6. Four amphibians and two reptiles were identified on Hastings Natural Area.

Sources of Information

Breckenridge, W.J. 1944. Reptiles and Amphibians of Minnesota.
The University of Minnesota Press, Minneapolis.

Conant, Roger. 1958. A Field Guide to Reptiles and Amphibians.
Houghton Mifflin Company, Boston.

Table 6. Amphibians and Reptiles Identified on Hastings Natural Area.

AMPHIBIA

BUFONIDAE

Bufo americanus (American Toad)

HYLIDAE

Hyla versicolor (Gray Tree Frog)

Pseudacris triseriata triseriata (Western Chorus Frog)

RANIDAE

Rana clamitans melanota (Green Frog)

REPTILIA

TRIONYCHIDAE

Triomyx spiniferus spiniferus (Eastern Spiny Softshell)

COLUBRIDAE

Thamnophis sirtlaxis sirtlaxis (Eastern Garter Snake)

Elaphe vulpina vulpina (Fox Snake)

CWELYDRIDAE

Chelydra serpentina serpentina (Snapping Turtle)

EMYDIDAE

Chrysemys picta belli (Western Painted Turtle)

LAND USE HISTORY

Virtually all "natural areas" have been affected to some degree by the activities of people. Farming, grazing, logging, drainage of wetlands and the suppression of fire are some of the ways people have affected the land. Knowledge of historical land use practices helps explain the present condition of the land and its resources. Surrounding land use practices also affect the viability of all natural areas.

Methods

The land use information presented here is based on historical records, inspections of the site, and interviews with nearby residents and other individuals who are knowledgeable about the site.

Recent Land Use History

In the 1820's Europeans began settling in the Hastings area. By 1850 a permanent settlement had been established. As the settlement's population increased, more land was cleared and developed for commercial, industrial, residential, public, and other uses. In a relatively short time the settlement became the city of Hastings. Today the Hastings SNA is on the western fringe of the urban area: two roads, a railroad, a hospital, a sewage disposal road, a city park, and two farmed areas are in the vicinity of the natural area. However, intensive urban development has been limited due to periodic river flooding in the area.

Hastings SNA has been owned by the State since 1898 when the tract was purchased as part of the grounds for the Hastings State Hospital. The hospital, which has since become a V.A. Hospital, has for the most part left the tract undisturbed. Rusty buckets strewn on the hill near

the hospital indicates that the hospital may have tapped the tract's sugar maples at one time. A few years ago a trench was dug by some hospital patients near Indian Springs. According to a knowledgeable resident, over the past thirty years several fires were started by patients along the tract's south ridge. The northeast corner of the site, now known as the "parking lot", was paved at one time. In the past one hospital employee used the area as a dog pound and as an area on which to raise ducks. The "parking lot" is presently used as a dump and for unauthorized beer drinking parties.

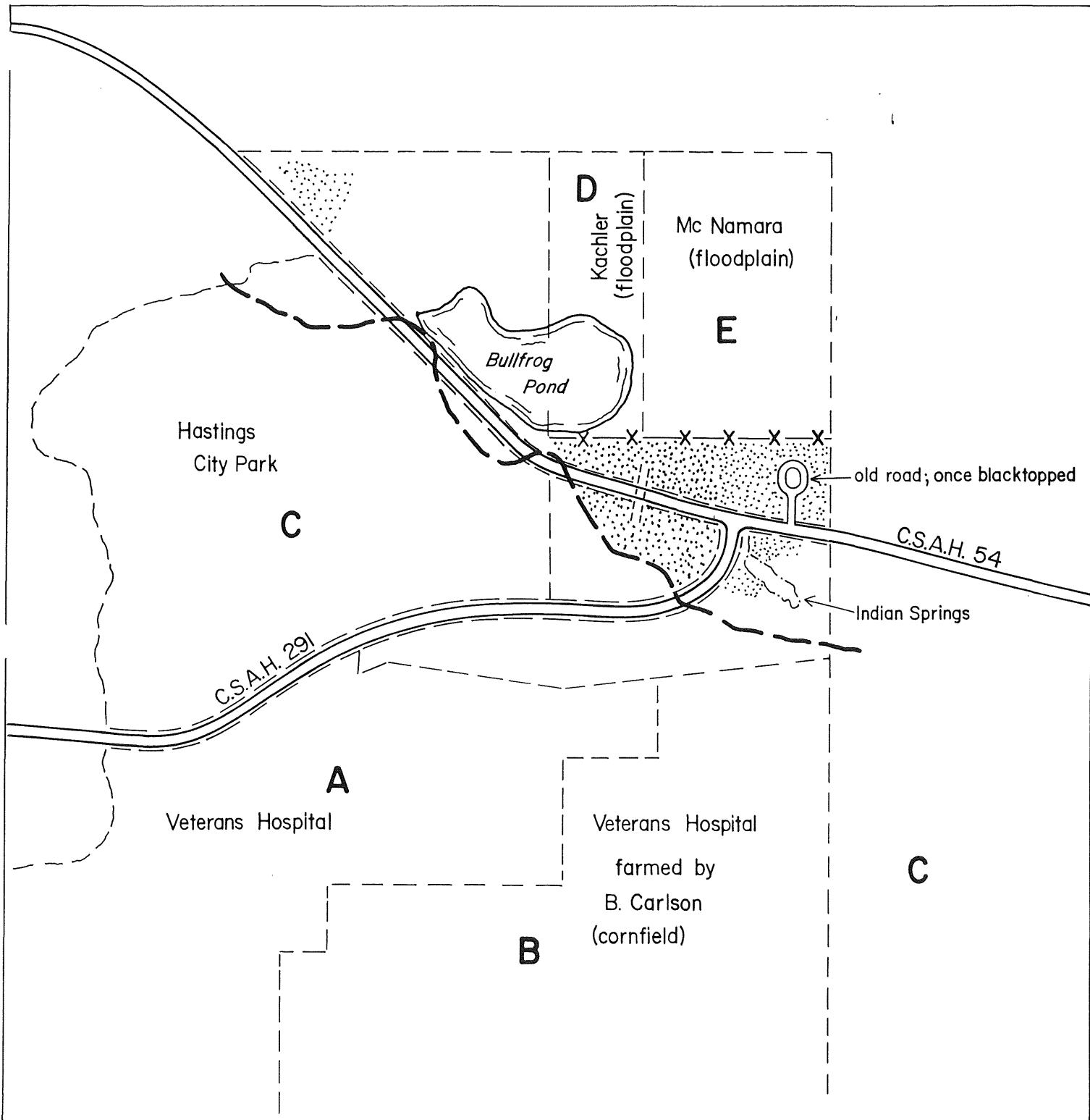
Several other activities have affected the natural area's landscape. Indian Springs, natural springs which emerge from the base of the cliffs on the SNA's east side and form a small stream, was used as a water hole by early pioneers. In 1888 Indian Springs was dug out and enlarged when a severe drought occurred in the area. The WPA built a wall near the springs in 1940. A culvert and ditch is now used to drain the spring into Bullfrog Pond.

Two roads, 10th Street (CSAH 54) and 18th Street (CSAH 291, a trunk highway) pass through the area. Tenth Street was originally an old stage coach road which meandered through the tract following the cliffs and dodging the water. In 1950 the road was straightened, a new bridge was built across the Vermillion River, and much of the road was moved north to its present location. Presumably the ditches and culverts adjacent to the road, including those affecting Indian Springs, were built at the same time. In 1979 the city street department deepened and widened the ditches along Tenth Street, and drained additional water, from an unknown source, onto the tract.

Two other structures are present on the SNA. An old deer blind is located in one of the tract's pine trees, which indicates the area has been hunted in the past. There is also an old dilapidated barbed wire fence on the tract's northeast boundary.

Finally, trees have been both removed and planted on the SNA. In the winter of 1977 diseased elm trees were removed; tall stumps are all that are left of these trees. Planted Red and White Pines are growing on a hill in the tract. Other trees probably had to be removed from the hill to plant the pines, but when this occurred is unknown. It may be that the hill was logged before 1900, and if so there is the possibility that other areas in the SNA were also logged.

Figure 7. Past and present land use practices in the vicinity of the Hastings SNA.



LEGEND

- x—x— Old Fence Line
- — — Old Wagon Road
- - - - - Culvert
- Area of Elm Removal