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The 1979 Resource Inventory  
for  
Helen Allison Savanna  
Anoka County, Minnesota

N $\frac{1}{2}$  of NE $\frac{1}{4}$  of Section 2,  
Township 33 North, Range 23 West  
Isanti 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 Allison Savanna. The inventory recorded information on climate, geology, soils, hydrology, plant communities, flora, birds, mammals, amphibians, reptiles, and land use history of the natural area. 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 Allison Savanna 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

Helen Allison Savanna is an 86 acre unit in northeastern Anoka County, approximately 14 miles southeast of Cambridge, Minnesota. The area's climate is mid-continental, relatively cool and moist, with warm summers and cold winters. The tract is part of a larger glacial outwash area called the Anoka Sand Plain. Wind formed sand dunes and wet, poorly drained depressions are found on Allison Savanna. Generally poor drainage in low areas and a high water table contribute to wet conditions on the site, although higher dune areas are well drained. Sandy textured, easily erodable soils formed under a variety of vegetation types on the natural area. Present vegetation is primarily oak savanna with scattered sand dune blowouts and wet meadow. About 20 acres were formerly cultivated and now support old field vegetation.

The flora and fauna of Allison Savanna are mostly typical of native Minnesota grassland and savanna communities. Species observed on the tract include: 212 vascular plants, 45 birds, 11 mammals, 4 amphibians, and 1 reptile.

Allison Savanna lies within a corn, soybean, oats, hay, and pasture

farming area, although wetness prevents extensive cultivation. Many residential developments are also in the area. The natural area has been lightly grazed; other impacts include field roads, and homesteading on the site.

#### Preliminary Assessment of Significance

This section lists features identified by the Minnesota Natural Heritage Program (MNHP) as potential elements<sup>1</sup>, 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.

Helen Allison Savanna is notable as a tract of native vegetation on the Anoka Sandplain glacial outwash deposit. Three plant species of state significance were identified on the site during the 1979 inventory. The Minnesota Natural Heritage Program lists Sea-Beach Triple-Awned Grass (Aristida tuberculosa), Rhombic Evening Primrose (Oenothera rhombipetala), and Long-Bearded Hawkweed (Hieracium longipilum) as potential elements of state significance.

The natural area is part of a small sand dune area within the Anoka Sandplain. Although this sandplain covers much of east central Minnesota, only portions of it have sand dune formations<sup>s</sup>(Cooper, 1938), and many of these have been disturbed by man. Many sand dunes of varying size are

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

found on Allison Savanna. Even though most dunes have been stabilized by vegetation, some active blowouts exist. A noteworthy successional plant community with characteristic sandbinding pioneer species is found in blowout areas. Allison Savanna supports several representative vegetation types, including oak savanna, dominated by Bur Oak and Northern Pin Oak (Quercus macrocarpa and Q. ellipsoidalis) in the overstory, sand blowouts with Sea-Beach Triple-Awned Grass and Hairy Panic Grass (Panicum lanuginosum, var. fasciculatum), and wet areas dominated by Hayden's Sedge (Carex haydenii).

## 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 Helen Allison Savanna.

## 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 Cambridge, approximately 14 miles north of Helen Allison Savanna.

### 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 Helen Allison Savanna area is 68° F; the December, January and February mean is 13° F. On the average, there are 14 days above 90° F. in the summer and about 45 days below 0° F. in the winter. The average duration of the freeze-free season is 140 days. The length of the total crop season, which includes the growing period for both cool and warm season species, averages 210 days (Baker and Strub, 1963b).

About 80%, or more than 21 inches, of the area's annual precipitation (water equivalent) falls during the period of April through September.



Table 1. Selected Weather Data for Cambridge.

| TEMPERATURE                                    | °F        | °C    |
|--|-----------|-------|
| Mean annual temperature                        | 42.0      | 5.6   |
| Highest temperature recorded (14 July 1936)    | 109       | 42.8  |
| Lowest temperature recorded (1 January 1935)   | -42       | -41.1 |
| Mean temperature warmest month                 |           |       |
| Month: July                                    |           |       |
| Mean daily maximum                             | 81.1      | 27.3  |
| Mean daily minimum                             | 59.0      | 15.0  |
| Mean temperature coldest month                 |           |       |
| Month: January                                 | 8.5       | -13.1 |
| Mean daily maximum                             | 18.4      | -7.6  |
| Mean daily minimum                             | -1.4      | -18.6 |
| Average date last freeze (Spring) <sup>a</sup> | c. 7 May  |       |
| Average date first freeze (Fall) <sup>b</sup>  | c. 1 Oct. |       |
| Average days freeze freeze season <sup>c</sup> | 140       |       |
| Average days total crop season <sup>d</sup>    | 210       |       |
| PRECIPITATION                                  | in.       | cm.   |
| Mean annual precipitation                      | 28.47     | 72.3  |
| Mean precipitation wettest Month               |           |       |
| Month: June                                    | 4.77      | 12.1  |
| Mean precipitation driest month                |           |       |
| Month: January                                 | 0.69      | 1.7   |
| Mean annual snowfall                           | 42.4      | 107.7 |
| Mean snowfall heaviest month                   |           |       |
| Month: December                                | 9.3       | 23.6  |

<sup>a</sup>Based 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.

<sup>b</sup>Based on Figure 4. Baker and Strub, 1963a.

<sup>c</sup>Based 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.

<sup>d</sup>Based 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.

June is the wettest month, with numerous thunderstorms accounting for an average of 4.8 total inches of rain. There are about 36 thunderstorms per year. Rainfall intensities of 2.3 inches per day every year, 4.1 inches per day every ten years, and 5.2 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 100 days a year have a ground cover of 1 inch or more. Precipitation of 0.01 inch or more can be expected about 110 days a year. 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 Cambridge area.

#### 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.

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Asheville, N.C.

## GEOLOGY

### Methods

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

### Historical Geology

Glaciation during the past two million years (the Pleistocene Epoch) has dominated development of the landscape of Minnesota. The most recent ice advances of the Wisconsin Stage of glaciation are responsible for the majority of the state's landforms. Two separate ice lobes, the Superior lobe, and the Grantsburg sublobe of the Des Moines lobe, covered the Allison Savanna area at different times during the late Wisconsin Stage.

About 20,000 B.P. (years before present; Wright, 1972) the Superior lobe advanced southwestward out of a lowland now occupied by Lake Superior; it extended about as far south as the Twin Cities area. This lobe left characteristic deposits of sandy, reddish, noncalcareous glacial drift. A large drift deposit called the St. Croix end moraine was formed at the Superior lobe ice front to the southwest and southeast of Allison Savanna.

Following recession of the Superior lobe, a tongue of ice called the Grantsburg sublobe of the Des Moines lobe pushed northeastward over the St. Croix moraine and into the Allison Savanna area. This sublobe eventually advanced across east central Minnesota to a terminus near Grantsburg, Wisconsin about 16,000 B.P. (Wright, 1972). The Grantsburg sublobe diverted Glacial Mississippi River drainage northeastward

around the ice front and into the St. Croix River valley. Mississippi and St. Croix waters combined with Grantsburg sublobe meltwaters to form a large proglacial lake, Glacial Lake Grantsburg, to the north of Allison Savanna. Subsequent wastage of stagnant Grantsburg ice opened channels which drained the lake; however, meltwaters and Mississippi waters continued to flow on and around the ice front. These waters deposited a series of coalescing sandy outwash fans over east central Minnesota until the Grantsburg sublobe disintegrated completely. Eventually the Mississippi broke through the St. Croix moraine near Minneapolis and established its modern course. The large glaciofluvial deposit left behind by the Mississippi and Grantsburg waters is called the Anoka Sandplain.

Calcareous grey drift was deposited by the Grantsburg ice, in contrast to the older, red, sandy Superior material also found in the area. In the Anoka Sandplain, most of this drift was deposited as well sorted, sandy outwash. When the Mississippi established its present course, the sandplain was left as a broad, undulating, landform of minimal relief. A combination of dry climate, prevailing southeasterly winds, and an abundant source of sand worked to produce sand dunes in scattered clusters throughout the area. Some dune formations are found on and around Allison Savanna; they are for the most part stabilized by vegetation today. Most sand dune blowouts today are inactive because wind speeds are rarely sufficient to cause much erosion even in bare sand (Wright, 1972). However, some minor blowout activity does occur and active blowouts have been mapped on the natural area.

### Topography and Bedrock

Allison Savanna lies within the relatively flat, but smoothly undulating Anoka Sandplain. Poorly drained depressions are mixed with higher, better drained sites throughout the natural area. Wetland vegetation is found in the deepest depressions. Fairly steep sand dunes and level to gently rolling sand deposits are distributed on the remainder of the tract. Maximum relief on the site is approximately 20 feet. The highest sand dunes reach elevations of 930 feet and higher, while the lowest depressions are at about 920 feet.

East central Minnesota is underlain by various Paleozoic sedimentary rocks deposited from marine seas that covered southeastern Minnesota during Cambrian and Early and Middle Ordovician times (approximately 570 to 450 million years ago; Bray, 1977). These rocks, predominantly sandstones and shales about 700 feet thick, were laid down during a series of transgressions and regressions in a shallow branch of the Cambrian and Ordovician seas called the Hollendale Embayment (Sims and Morey, 1972). They are overlain by deposits of glacial drift approximately 200 feet thick in the vicinity of Allison Savanna (USGS, 1974). Precambrian basalts, rhyolites, sandstones, and shales underlie the sedimentary rocks in east central Minnesota.

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- Bray, Edmund C. 1977. Billions of Years in Minnesota. Science Museum of Minnesota, St. Paul.
- Cooper, William S. 1938. Ancient Dunes in the Upper Mississippi Valley as Possible Climatic Indicators, in Bull. Am. Meteorological Soc., Vol. 19, May, 1938.
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— · — · — Preserve Boundary



Scale: 8 Inches = 1 Mile

Figure 1. Topography of Allison Savanna. Adapted from U.S. Geological Survey - Isanti Quadrangle (1:24000) 1974.

- Eng, Morris T. 1978. An Evaluation of Surficial Geology and Peat Bogs in Anoka, Isanti, and Chisago Counties. Minnesota Department of Natural Resources. Map: (1:125,000). St. Paul.
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- U.S. Department of the Interior, Geological Survey (USGS). 1974. Isanti Quadrangle. MN: 7.5 Minute Series (Topographic). 1:24,000. Denver, Colorado.
- \_\_\_\_\_. 1974. Water Resources of the Rum River Watershed, East Central Minnesota Hydrologic Investigations Atlas HA-509. Washington, D.C.



## SOILS

### Methods

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

### Soils of Helen Allison Savanna

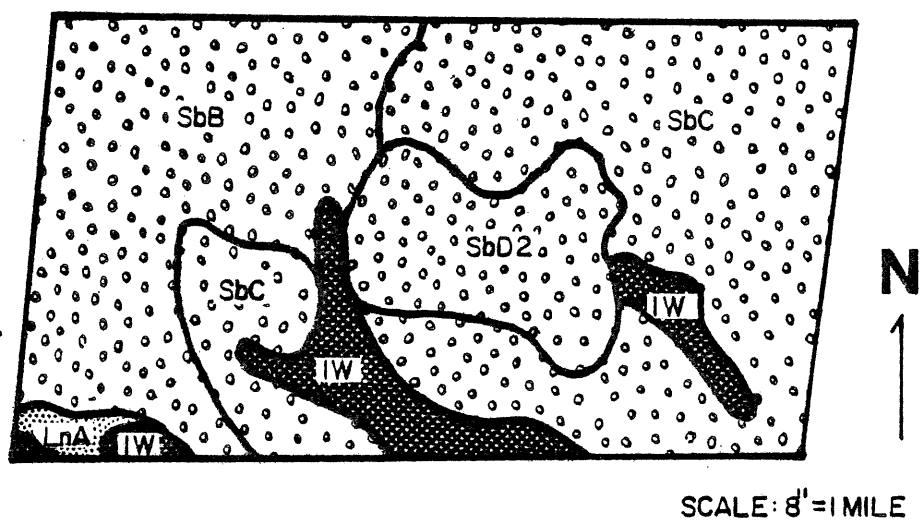
Allison Savanna lies in an area of coarse to medium textured forest soils formed from glacial outwash (Arneman, 1963). The site's soils formed in outwash sands associated with the Grantsburg glacial sublobe. One soil association and three soil series are present on the tract.

The Zimmerman-Isanti-Lino soil association (SCS, 1977) occupies about half of Anoka County. It is in a broad, undulating, sandy outwash plain. Drainage patterns range from excessive in elevated sand dune areas to very poor in wet depressional areas. Soil development is poor on easily eroded sandy sites. Mineral soils occupy moderate to well drained sites, with mucky and peaty organic soils found in poorly drained areas. The water table is at or near the surface in most depressions.

Isanti series soils (typic haplaquolls) are very poorly drained seasonally wet soils occupying depressional areas of Allison Savanna. They are mollisols, characterized by nearly black, friable surface

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






| <u>DRAINAGE<br/>SYMBOL</u>  | <u>DRAINAGE<br/>CLASS</u> | <u>KEY</u> | <u>SOIL<br/>SERIES</u> | <u>MAP<br/>SYMBOL</u> |
|---|---------------------------|------------|------------------------|-----------------------|
|  | Excessively Drained       |            | Sartell                | SbB<br>SbC<br>SbD2    |
|  | Somewhat Poorly Drained   |            | Lino                   | LnA                   |
|  | Very Poorly Drained       |            | Isanti                 | IW                    |

Figure 2. Soil and drainage classes for Allison Savanna.

horizons rich in organic matter. Typically they have horizons in which materials have been altered or removed but no clay or calcium carbonate has accumulated. In areas of Isanti soils the water table is commonly at the surface or within a depth of two feet. Surface layers are strongly acidic.

The Lino (aquic udipsamments) and Sartell (typic udipsamments) series are entisols, or recently formed soils displaying little horizon development. Both are characterized as sandy textured, easily weathered mineral soils. Lino soils are wetter and more poorly drained because they occupy topographically lower positions than Sartell soils. Surface layers are moderately acidic for the Lino series and strongly acidic for the Sartell series. Allison Savanna's Sartell soils vary greatly in slope, ranging from 2-24%. Steep, easily eroded sand dune areas with Sartell soils are the location of sand dune blowouts on the natural area.

#### Sources of Information

- Arneman, H.R. 1963. Soils of Minnesota. University of Minnesota Extension Bulletin 278. Minneapolis.
- 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, F.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. 1977. Soil Survey of Anoka County, Minnesota. U.S. Government Printing Office, Washington, D.C.
- \_\_\_\_\_. 1977. Soil Survey of Morrison County, Minnesota. Preliminary data, unpublished.

## 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 or 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 Agr. Expt. Sta., 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 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.<sup>1</sup>

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:<sup>1</sup>

C - Central Minnesota

<sup>1</sup> Determined by Ray Diedrich, Soil Specialist, SCS, St. Paul.

Table 2. Soil Characteristics of Helen Allison Savanna.

|                       | SOIL SERIES<br># ACRES<br>PERCENT | DRAINAGE<br>CLASS | DEPTH TO<br>WATER TABLE | PARENT<br>MATERIAL | LANDSCAPE<br>POSITION  | TEXTURE               |              | VEGETATION                                       |  | COMPONENT<br>IN STATE | LOCATION<br>IN STATE |
|-----------------------|-----------------------------------|-------------------|-------------------------|--------------------|--|-----------------------|--------------|--|--|-----------------------|----------------------|
|                       |                                   |                   |                         |                    |  | TOPSOIL               | SUBSOIL      | ORIGINAL   | PRESENT  |                       |                      |
| typic<br>haplaquolls  | ISANTI<br>9.4 Acres<br>10.9%      | VPD               | 0-2.0'                  | outwash<br>sands   | depressions,<br>drainageways,<br>and low flats on<br>outwash plains<br><br>0 - 2% slopes | fine<br>sandy<br>loam | fine<br>sand | grasses,<br>sedges and<br>willows                | marsh,<br>willow<br>thicket  | M                     | C                    |
| aquic<br>udipsamments | LINO<br>1.2 Acres<br>1.4%         | SPD               | 2.0 -<br>4.0'           | outwash<br>sands   | small drainage-<br>ways and low<br>broad flats on<br>outwash plains<br><br>0 - 4% slopes | loamy<br>fine<br>sand | fine<br>sand | deciduous<br>forest                              | willow<br>thicket  | M                     | C                    |
| typic<br>udipsamments | SARTELL<br>75.4 Acres<br>87.7%    | ED                | >8.0'                   | outwash<br>sands   | undulating to<br>hilly dune land-<br>scapes on out-<br>wash plains<br><br>2 - 24% slopes | fine<br>sand          | fine<br>sand | mixed tall<br>grass prairie<br>and oak<br>forest | oak savanna,<br>old field,<br>aspen<br>thicket,<br>blowout,<br>willow<br>thicket | I                     | C                    |
|                       |                                   |                   |                         |                    |  |                       |              |  |  |                       |                      |

## HYDROLOGY

### Methods

Hydrologic conditions of the site were investigated using soil and topographic maps, aerial photographs, and literature sources. Field observations were also used in determining relief and drainage patterns.

### Hydrology of Allison Savanna

Past geologic events associated with the most recent ice advances of the Wisconsin Stage of glaciation are primarily responsible for the hydrologic conditions present at Allison Savanna today. As part of a large glaciofluvial deposit called the Anoka Sandplain, the tract is in a region with a relatively high water table (SCS, 1977). The sandy nature of the Anoka Sandplain deposits and the soils formed in them dictate the flow patterns of both surface and subsurface waters at the site. No permanent bodies of water exist at Allison Savanna, although several intermittently wet depressions are present.

The Anoka Sandplain's sandy soils are underlain by fine outwash sand deposits. The soils and underlying sands are very porous, so they easily absorb surface water, and are capable of storing large amounts of ground water. Potentially, drainage into the soils is rapid, with little runoff or surface ponding (SCS, 1975). However, conditions are wet over large areas of the sandplain because of the high water table, which is commonly at or near the surface in the numerous depressions. Higher positive relief sites, such as sand dunes, are very dry because the water table is relatively deeper beneath them. Conditions at Allison Savanna are representative of such a contrasting wet/dry situation on

similar substrates; it has both dry, excessively drained sand dunes, and wet, very poorly drained depressions. Commonly, peat deposits are found in wet sites on the Anoka Sandplain. Eng (1978) maps a small area of peat at Allison Savanna.

The natural area is located directly on the mapped boundary of the lower St. Croix and Rum rivers watersheds. Ground water in this area flows in two general directions; east towards the deeply entrenched St. Croix River valley, or west towards Cedar Creek (USGS, 1974, HA-509, HA-490).

#### Sources of Information

- Eng, Morris T. 1978. An Evaluation of Surficial Geology and Peat Bogs in Anoka, Isanti, and Chisago Counties, Minnesota. Map: (1:125,000) Minnesota Department of Natural Resources, St. Paul.
- U.S. Department of Agriculture, Soil Conservation Service and Minnesota Agricultural Experiment Station. 1977. Soil Survey of Anoka County, Minnesota. U.S. Government Printing Office, Washington, D.C.
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## 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 vegetation-al 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 the dominant (i.e., most abundant) species present based on visual estimation. It should be noted that all variations of vegetation were not distinguished on the map. Rather, major types are separated and variations within each type are discussed in the text.

Relevés were conducted on selected communities to supplement field inspection and provide further information on species composition. Visual estimates were made of the abundance (% cover) of each species found in a prescribed plot. Plot locations were chosen to represent homogeneous stands of vegetation within a community type. Relevés were conducted in mid-July and late August according to the methods described by Heitlinger, (1979). All releve data is given in Appendix 1.

Photo points were established to give a visual description of vegetation, and to allow documentation of any future changes. All photo point slides are on file, Scientific and Natural Areas Section, St. Paul and The Nature Conservancy, Minneapolis Field Office.

### Overview of Regional Plant Communities

Helen Allison Savanna is located near the eastern edge of the Mississippi River Sand Plains landscape region, (Figure 3). Prior to European settlement, this area consisted of oak openings and barrens with sandy soils which was maintained by fire (Marschner, 1930; Figure 4).

# Minnesota's Landscape Regions

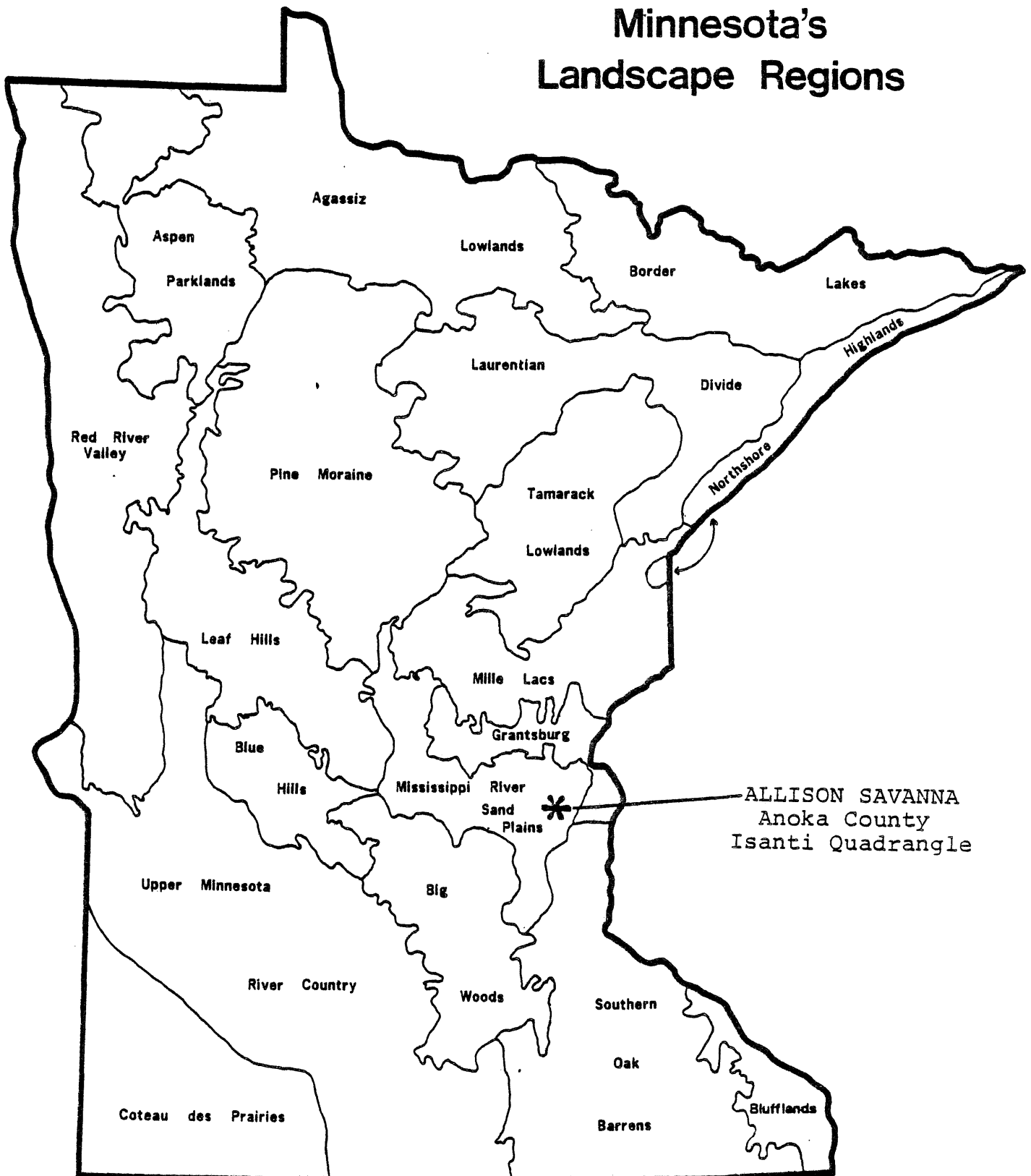
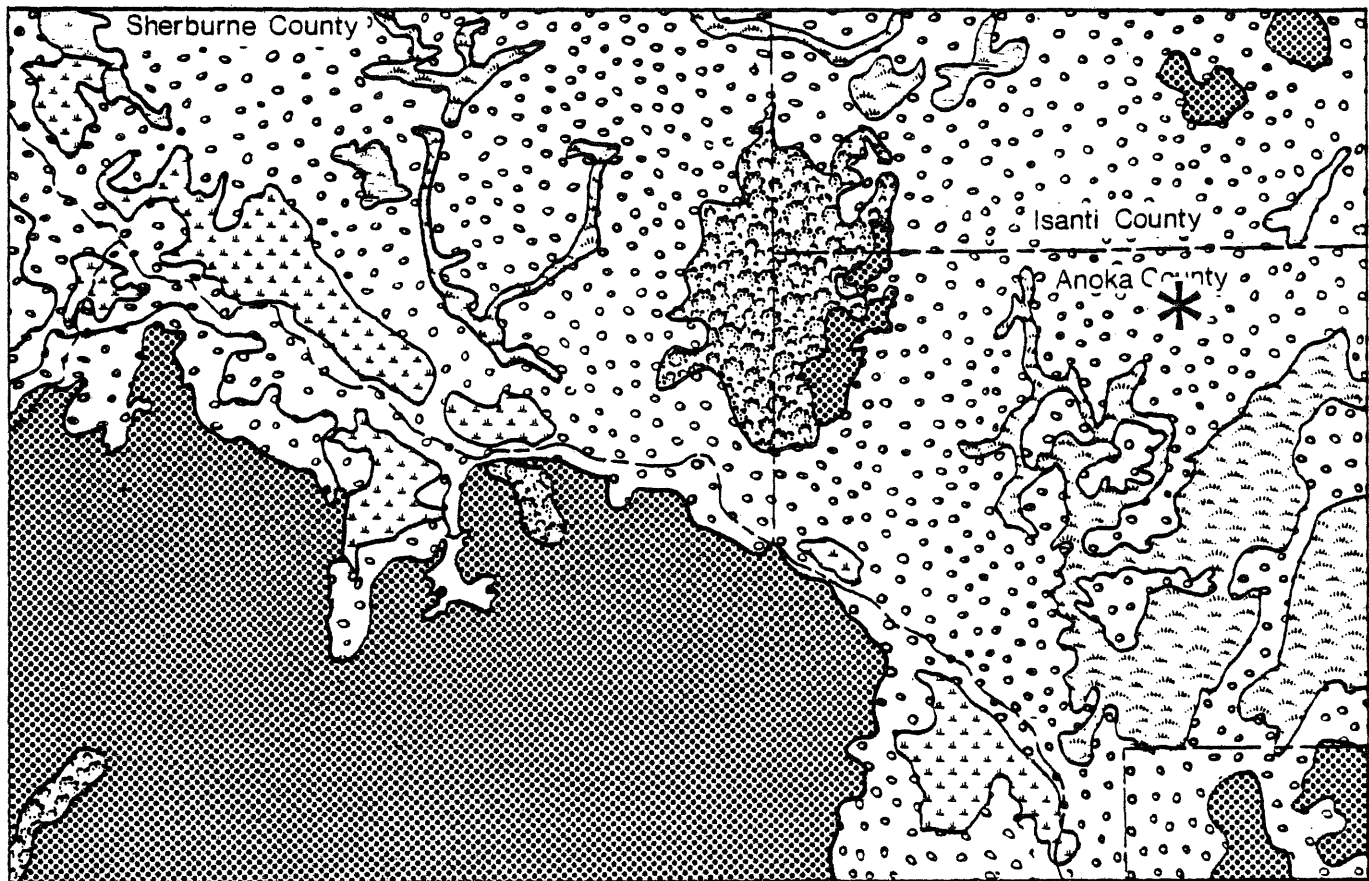


Figure 3. Helen Allison Savanna in relation to Minnesota's landscape regions. Adapted from T. Kratz and G.L. Jensen, an ecological geographic division of Minnesota (Unpublished, 1977).



Scale : 1:500,000

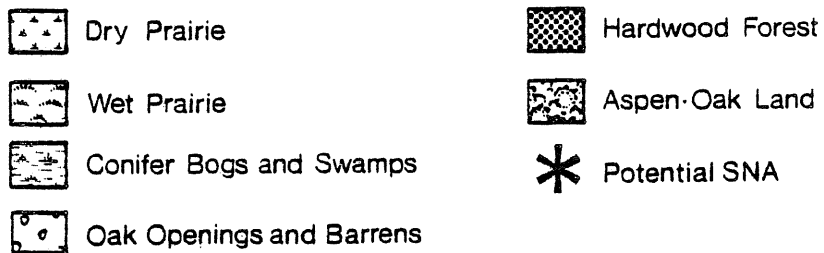


Figure 4. The original vegetation of east-central Minnesota, including Allison Savanna. Adapted from F.J. Marschner, The Original Vegetation of Minnesota, 1:500,000.

European settlers have converted most of the oak savanna to farm land, however, examples of the original vegetation can still be found on the area today.

### Results

Helen Allison Savanna's vegetative communities are illustrated in Figure 5. The area supports a combination of oak savanna, dune blowouts, willow and aspen thickets, and a variety of wetland communities. Tall-grass prairie and oak woodlands intergrade with oak savanna. Present vegetation types have been affected by the prescribed burn program. For further reference see Land Use History. A description of each community is given below.

OAK SAVANNA: 54 acres, 62% of preserve.

Bur Oak (Quercus marocarpa) and Northern Pin Oak (Quercus ellipsoidalis) are the dominant overstory species. Lead Plant (Amorpha canescens) and Smooth Sumac (Rhus glabra) are common woody species in the ground layer. Common herbs include Porcupine Grass (Stipa spartea), Kentucky Bluegrass (Poa pratensis), Western Ragweed (Ambrosia psilostachya), and Bastard Toad-flax (Comandra umbellata).

Patches of tallgrass prairie are located on the southwestern slopes of the dunes. In addition to the previously mentioned species, Little Bluestem (Andropogon scoparius), Big Bluestem (Andropogon gerardi), and Indian Grass (Sorghastrum nutans) are dominant grasses. Common forbs include Hairy Puccoon (Lithospermum carolinense) and Large Flowered Beard's-tongue (Penstemon grandiflorus).

Dense stands of mostly Northern Pin Oak occur on northeastern facing slopes and near wetlands. American Hazelnut (Corylus americana) and Choke Cherry (Prunus virginiana) dominate the understory layer. Source of information: field inspection and releves AS-1, 2, and 3.

OLD FIELD: 20 acres, 23% of preserve.

Running Dewberry (Rubus flagellaris) is the dominant woody species. Dominant herbs include Rough Bent Grass (Agrostis hyemalis), Kentucky Bluegrass (Poa pratensis), Western Ragweed (Ambrosia psilostachya), and Horseweed (Conyza canadensis). Scattered tree stumps and a few recent blowouts are also found in the old field. Source of information: field inspection and releve AS-6.

WETLANDS/WET MEADOW: 7 acres, 8% of preserve.

This area is dominated by Hayden's Sedge (Carex haydenii), which usually grows in clumps or tussocks. Marsh Fern (Thelypteris palustris), Blue-Joint Grass (Calamagrostis canadensis), and Wool Grass (Scirpus cyperinus) are commonly found between the sedge tussocks.

Along the edge of the wet meadows Running Dewberry (Rubus flagellaris), Meadow Sweet (Spiraea alba), and Hair Cap Moss (Polytricum sp.) occur. Source of information: field inspection.

WILLOW THICKET: 3 acres, 4% of preserve.

Dominant woody species are Slender Willow (Salix petiolaris), Running Dewberry (Rubus flagellaris), and Steeple-Bush (Spiraea tomentosa). White Aster (Aster hesperius) and Goldenrod (Solidago sp.) are part of the herb layer. Source of information: field inspection.

BLOWOUTS: 2 acres, 2% of preserve.

Dominant grasses are Sea-Beach Triple-Awned Grass (Aristida tuberculosa) and Hairy Panic Grass (Panicum languinosum, var. fasciculatum). Common forbs are Western Ragweed (Ambrosia psilostachya) and Horseweed (Conyza canadensis), especially in the older blowouts.

The dune blowouts are in various stages of stabilization. Recent blowouts have openings which are partially covered by a low mat of False

Heather (Hudsonia tomentosa). Source of information: field inspection and releves AS-4 and 5.

ASPEN THICKET: 1 acre, 1% of preserve.

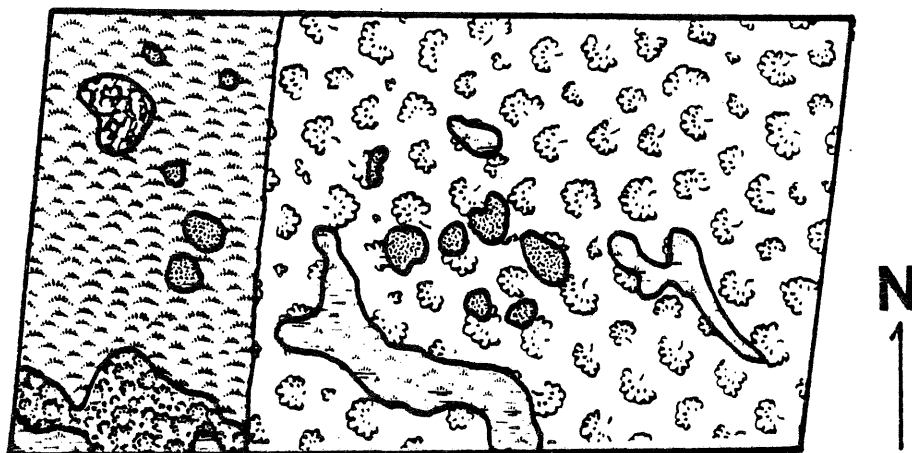
This community is similar to the willow thicket, except for the presence of Quaking Aspen (Populus tremuloides) as the dominant woody species. A few dead trees are present. Source of information: field inspection.

#### Sources of information

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

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

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



SCALE: 8" = 1 MILE

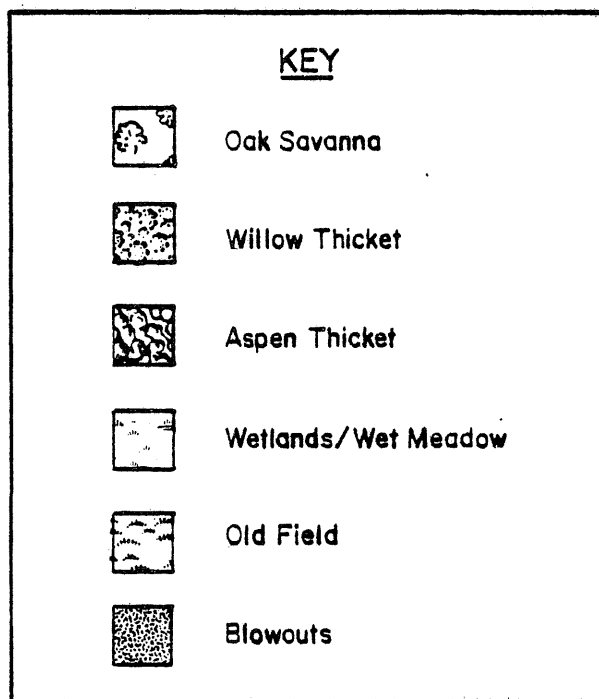


Figure 5. Vegetation communities indentified on Allison Savanna.

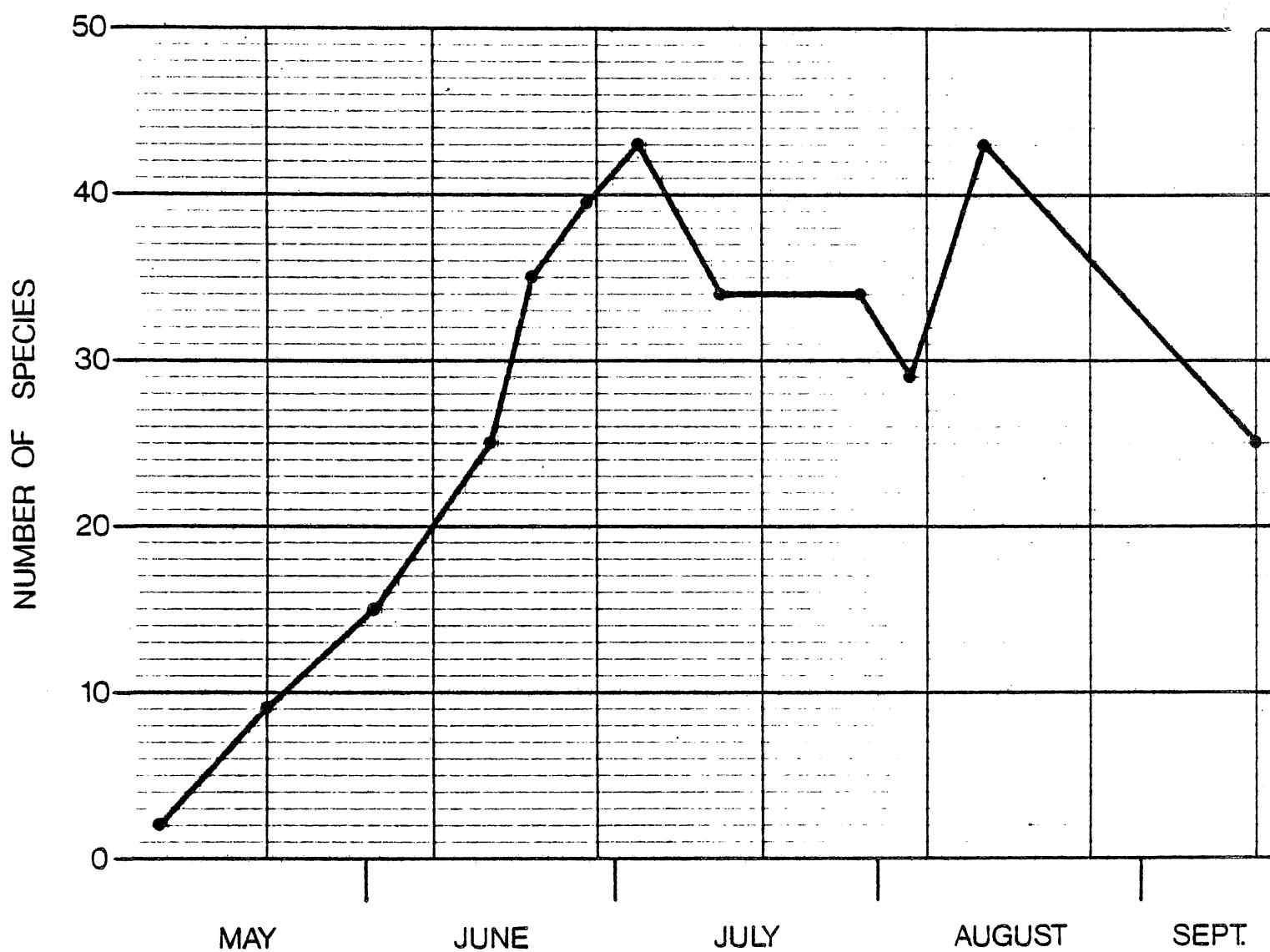


Figure 6. The 1979 blooming phenology on Allison Savanna. Graph illustrates the number of floral species in bloom on each visit to the preserve.



## FLORA

Methods

Helen Allison Savanna was visited on a weekly basis, when weather conditions permitted, during summer 1975, and from 27 April to 14 September, 1979. Flowering or fruiting plants (not previously collected by Heitlinger)<sup>1</sup> were collected and pressed, in 1979. 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.<sup>2</sup> 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 13 specimens. Gerald Wheeler, Graduate Student, Department of Botany, University of Minnesota, 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 north-eastern 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.

<sup>1</sup> See The Nature Conservancy file; "Checklist of Plants of Allison Savanna 1975", M. Heitlinger.

<sup>2</sup> On file, Scientific and Natural Areas Section, St. Paul.

## Results

Table 3 is an annotated list of the plants identified on the tract.<sup>1</sup>  
A total of 207 vascular plant species,<sup>2</sup> representing 52 families, were recorded on the unit in 1979. Sixteen of these species are alien. The families with the largest number of species were; Arteraceae with 31 species (15% of total), Poaceae with 27 species (13% of total), and Cyeraceae with 15 species (7% of total).

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

2 This total does not include additional plant species identified in releve plots.

Table 3. Annotated List of Plants for Helen Allison Savanna

Format: Scientific name. Common name. Collection number of voucher specimen. Community in Allison Savanna. Designated "alien" or "possible alien" if not native to Minnesota. Special significance of collection, if any. 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

##### LYCOPODIACEAE - Clubmoss Family

Lycopodium clavatum L. - Running Clubmoss. #1174. Oak Woodland.

Lycopodium complanatum L. - Ground Pine. #1176. Edge of Wet Forest.

##### EQUISETACEAE - Horsetail Family

Equisetum laevigatum A. Br. - Smooth Scouring-Rush. #746. Oak Savanna.

##### OPHIOGLOSSACEAE - Adder's-Tongue Family

Botrychium multifidum (Gmel.) Rupr. - Leathery Grape-Fern. #1173. Oak Woodland.

##### OSMUNDACEAE - Royal Fern Family

Osmunda claytoniana L. - Interrupted Fern. #799. Aspen Clone.

Osmunda regalis L. - Royal Fern. #798. Aspen Clone.

##### POLYPODIACEAE - Polypody Family

Onoclea sensibilis L. - Sensitive Fern. #827. Sedge Slough.

Thelypteris palustris Schott. - Marsh Fern. #1143. Edge of Wet Meadow.

#### SPERMATOPHYTA - Seed Plants

##### GYMNOSPERMAE - Gymnosperms

##### CUPRESSACEAE - Cypress Family

Juniperus communis L. var. depressa Pursh. - Bush Juniper. #895. Oak Savanna.

Juniperus virginiana L. - Red Cedar. #1155. Near Dune Blowout.

##### PINACEAE - Pine Family

Picea glauca (Moench) Voss. - White Spruce. #791. Edge of Low Marshy Areas.

Pinus banksiana Lamb. - Jack Pine. #764. Oak Savanna.

Pinus resinosa Ait. - Norway Pine. #792. Outside East Edge of Tract.

Pinus strobus L. - White Pine. Near Wet Meadow. +

Pinus sylvestris L. - Scotch Pine. Outwash Plain. +

##### ANGIOSPERMAE - Angiosperms

##### MONOCOTYLEDONAE - Monocots

##### AMARYLLIDACEAE - Amaryllis Family

Hypoxis hirsuta (L.) Cov. - Yellow Star Grass. #506. Wet Meadow

## COMMELINACEAE - Spiderwort Family

Tradescantia occidentalis (Britt.) Smyth. - Western Spiderwort. #702.  
Oak Savanna.

## CYPERACEAE - Sedge Family

Carex bicknelli Britt. - Bicknell's Sedge. #739. Low Meadow. \*  
Cyperus filiculmis Vahl. (C. filiculmis Vahl. var. macilentus Vahl. in  
Fernald, 1950) - Few-Flowered Slender Cyperus. #1142. Dune Blowout. \*  
Carex haydenii Dewey - Hayden's Sedge. #736. Sedge Slough. \*  
Carex heliophila MacKenzie (C. pennsylvanica var. digyna Bock. in Fernald,  
1950) - Pennsylvania Sedge. #680. Oak Savanna. \*  
Carex lasiocarpa Ehrh. var. latifolia (Bock.) Gilly (C. lanuginosa Michx.  
in Fernald, 1950) - Woolly Sedge. #730. Oak Savanna. \*  
Carex muhlenbergi Schk. - Muhlenberg's Sedge. #675. Oak Savanna. \*  
Carex scoparia Schk. - Pointed Broom Sedge. #752. Old Field. \*  
Carex siccata Dewey. (C. foenea Willd. in Fernald, 1950) - Dry-Spiked  
Sedge. #743. Oak Savanna. \*  
Carex umbellata Schk. - #231. Dune Blowout. \*  
Carex vesicaria L. - Inflated Sedge. #822. Low Marshy Areas. \*  
Cyperus lupulinus (Spreng.) Marcks (in McGregor and Barkley, 1977) ssp.  
lupulus - Slender Cyperus. #761. Oak Savanna.  
Cyperus lupulinus (Spreng.) Marcks (in McGregor and Barkley, 1977)  
X Cyperus schweinitzii Torr. - (Hybrid). #712b. Oak Savanna.  
Cyperus schweinitzii Torr. #712. Oak Savanna.  
Scirpus cyperinus (L.) Kunth. - Wool Grass. #754. Low Marshy Area.  
Scleria triglomerata Michx. - Tall Nut-Rush. #740. Low Meadow.

## IRIDACEAE - Iris Family

Iris versicolor L. - Blue Flag. #728. Shallow Depression.  
Sisyrinchium campestre Bickn. - Prairie Blue-Eyed Grass. #669. Oak  
Savanna.

## JUNCACEAE - Rush Family

Juncus balticus Willd. var. littoralis Engelm. - Baltic Rush. #729. Low  
Meadow.  
Juncus effusus L. - #749. Old Field.  
Juncus greenei Oakes and Tuckerm. - Greene's Rush. #1146. Low Area in  
Old Field. \*

## LILIACEAE - Lily Family

Asparagus officinalis L. - Asparagus. #780. Oak Savanna.  
Maianthemum canadense Desf. - Wild Lily-of-the-Valley. #561. North  
Face of Dune.  
Polygonatum biflorum (Walt.) Ell. - Solomon's Seal. #714. Oak Savanna.  
Smilacina stellata (L.) Desf. - False Solomon's Seal. #670. Oak Savanna.  
Smilax herbacea L. var. lasioneuron (Small) Rydb. - Carrion-Flower. #775.  
Oak Savanna.

## ORCHIDACEAE - Orchid Family

Habenaria lacera (Michx.) Lodd. - Ragged Fringed Orchid. #623. Wet Meadow.

## POACEAE - Grass Family

Agrostis hyemalis (Walt.) BSP. var. tenuis (Tuckerm.) Gl. (A. scabra Willd.  
in Fernald, 1950) - Rough Bent Grass. #1148. Dune Blowout.  
Agropyron repens (L.) Beauv. - Quack Grass. #806. Old Field. Alien.

Andropogon gerardi Vitm. - Big Bluestem. Oak Savanna. +  
Andropogon scoparius Michx. - Little Bluestem. #1163. Edge of Wet Meadow.  
Aristida tuberculosa Nutt. - Sea-Beach Triple-Awned Grass. #835.

Sand Blowout.

Bouteloua hirsuta Lag. - Hairy Grama. #776. Oak Savanna.  
Bromus inermis Leyss. - Smooth Brome Grass. #755. Roadside. Alien.  
Calamagrostis canadensis (Michx.) Beauv. - Blue-Joint Grass. #821.

Marshy Area.

Calamovilfa longifolia (Hook.) Scribn. - Long-Leaved Reed Grass. #884.  
 Oak Savanna.

Cenchrus longispinus (Hack.) Fern. - Sandbur. #771. Roadside. Possible Alien.

Digitaria sanguinalis (L.) Scop. - Crab Grass. #858. Roadside. Alien.  
Elymus canadensis L. - Nodding Wild Rye. #810. Old Field.  
Eragrostis spectabilis (Pursh) Steud. - Purple Love Grass. #812.  
 Old Field.

Koeleria cristata (L.) Pers. - June Grass. #677. Oak Savanna.  
Panicum capillare L. var capillare. - Witch Grass. #832. Oak Savanna.  
Panicum lanuginosum Ell. var fasciculatum (Torr.) Fern. - Hairy Panic Grass. #828. Edge of Sedge Slough.

Panicum oligosanthos Schult. (P. oligosanthos var. scribnerianum in Fernald, 1950) - Panic Grass. #813. Old Field.

Panicum villosissimum Nash. var. pseudopubescens (Nash) Fern. - White-Haired Panic Grass. #698. Oak Savanna.

Panicum virgatum L. - Switch Grass. #1138. Oak Savanna.

Phleum pratense L. - Timothy Grass. #859. Roadside. Alien.

Poa palustris L. - Fowl Meadow Grass. #565. Wet Meadow.

Poa pratensis L. - Kentucky Bluegrass. #804. Old Field. Possible Alien.

Setaria glauca (L.) Beauv. - Smooth Foxtail Grass. #803. Old Field. Alien.

Sorghastrum nutans (L.) Nash. - Indian Grass. #880. Wet Meadow.

Spartina pectinata Link. - Cord Grass. #882. Wet Meadow.

Sporobolus cryptandrus (Torr.) Gray. - Sand Drop-Seed. #716. Oak Savanna.

Stipa spartea Trin. - Porcupine Grass. #703. Oak Savanna.

#### DICOTYLEDONEAE - Dicots

##### AIZOACEAE - Carpet-Weed Family

Mollugo verticillata L. - Carpet-Weed. #837. Old Sand Blowout.

##### ANACARDIACEAE - Cashew Family

Rhus glabra L. - Smooth Sumac. #816. Oak Savanna.

Rhus radicans L. var rydbergii (Small) Redher - Poison-Ivy. #763.  
 Oak Savanna.

##### APOCYNACEAE - Dogbane Family

Apocynum androsaemifolium L. - Dogbane. #719. Oak Savanna.

Apocynum sibiricum Jacq. - Indian Hemp. #757. Roadside.

##### ASCLEPIADACEAE - Milkweed Family

Asclepias incarnata L. - Swamp Milkweed. #818. Low Marshy Area.

Asclepias syriaca L. - Common Milkweed. #748. Old Field.

Asclepias tuberosa L. - Butterfly-Weed. #684. Oak Savanna.

Asclepias viridiflora Raf. - Green Milkweed. #734. Old Sand Blowout.

## ASTERACEAE - Composite Family

Achillea millefolium L. ssp. lanulosa (Nutt.) Piper. - Yarrow. #793.  
Old Field.

Ambrosia psilostachya DC. - Western Ragweed. #879. Oak Savanna.

Antennaria neglecta Greene. var. attenuata (Fern.) Cronq. - Pussy-Toes  
#666. Oak Savanna.

Antennaria plantaginifolia (L.) Richards. - Pussy-Toes. #901. Old Field.

Artemisia campestris L. (A. caudata Michx. in Fernald, 1950) - Tall  
Wormwood. #1154. Near Dune Blowout.

Artemisia ludoviciana Nutt. - Western Mugwort. #1150. Oak Savanna.

Aster azureus Lindl. - Sky-Blue Aster. #845. Low Swale.

Aster ericoides L. - Heath's Aster. #1162. Edge of Wet Meadow.

Aster hesperius Gray. - White Aster. #1159. Wet Meadow. \*

Aster umbellatus Mill. - Flat-Topped White Aster. #881. Wet Meadow.

Chrysopsis villosa (Pursh) Nutt. - Hairy Golden Aster. #753. Oak Savanna.

Conyza canadensis (L.) Cronq. - Horse-Weed. #861. Old Field.

Coreopsis palmata Nutt. - Stiff Tickseed. #711. Oak Savanna.

Crepis tectorum L. - Narrow-Leaved Hawk's Beard. #505. Old Dune Blowout.

Erigeron strigosus Muhl. - Slender Daisy Fleabane. #690. Roadside.

Eupatorium perfoliatum L. - Common Boneset. #817. Low Marshy Area.

Gnaphalium obtusifolium L. - Sweet Everlasting. #1156. Oak Savanna.

Helianthus laetiflorus Pers. - Stiff Sunflower. #838. Oak Savanna.

Helianthus petiolaris Nutt. - Prairie Sunflower. #770. Roadside. Possible  
Alien.

Hieracium longipilum Torr. - Long-Bearded Hawkweed. #789. Old Field.

Krigia biflora (Walt.) Blake. - Dwarf Dandelion. #507. Wet Meadow.

Lactuca canadensis L. - Canada Wild Lettuce. #841. Low Swale.

Liatris aspera Michx. - Rough Blazing Star. #840. Oak Savanna.

Rudbeckia hirta L. - Black-Eyed Susan. #704. Oak Savanna. Alien.

Senecio pauperculus Michx. - Balsam Groundsel. #742. Low Meadow.

Solidago graminifolia (L.) Salisb. - Lance-Leaved Goldenrod. #1157.  
Old Field.

Solidago missouriensis Nutt. var. fasciculata Holz. - Bunch-Leaved Missouri  
Goldenrod. #773. Oak Savanna.

Solidago nemoralis Ait. - Gray Goldenrod. #800. Old Field.

Solidago rigida L. - Stiff Goldenrod. #1152. Oak Savanna.

Solidago speciosa Nutt. var. rigidiuscula T. & G. - Showy Goldenrod. #790.  
Old Field.

Tragopogon dubius Scop. - Goat's Beard. #720. Oak Savanna. Alien.

## BETULACEAE - Birch Family

Betula papyrifera Marsh. - Paper Birch. #785. Edge of Marshy Area.

Corylus americana Walt. - American Hazelnut. #805. Oak Savanna.

## BORAGINACEAE - Borage Family

Lithospermum canescens (Michx.) Lehm. - Hoary Puccoon. #667. Oak Savanna.

Lithospermum carolinense (Walt.) MacMill. - Hairy Puccoon. #663. Oak  
Savanna.

## BRASSICACEAE - Mustard Family

Arabis divaricarpa A. Nels. - Pink Rock Cress. #363. Old Field.

Berteroa incana (L.) DC. - Hoary Alyssum. #759. Roadside. Alien.

Lepidium densiflorum Schrader - Common Pepper-Grass. #733. Edge of Sand  
Blowout.

## CAMPANULACEAE - Harebell Family

Campanula aparinoides Pursh. - Marsh Bellflower. #820. Marshy Areas in Standing Water.

Campanula rotundifolia L. - Harebell. #701. Oak Savanna.

## CARYOPHYLLACEAE - Pink Family

Arenaria lateriflora L. - Sandwort. #562. North Face of Dune.

Lychnis alba Mill. - White Campion. #686. Roadside. Alien.

## CHENOPODIACEAE - Goosefoot Family

Chenopodium album L. - Lamb's Quarter's. #801. Old Field.

Chenopodium leptophyllum Nutt. - Narrow-Leaved Goosefoot. #737. Oak Savanna.

Cyclocoma atriplicifolium (Spreng.) Coult. - Winged Pigweed. #1164. Border of Preserve.

## CISTACEAE - Rockrose Family

Helianthemum bicknellii Fern. - Hoary Frostweed. #722. Oak Savanna.

Hudsonia tomentosa Nutt. - False Heather. #687. Sand Blowout.

Lechea stricta Leggett. - Prairie Pinweed. #830. Oak Savanna.

## CORNACEAE - Dogwood Family

Cornus purpusi Koehne. - #819.

Cornus racemosa Lam. - Panicle Dogwood.

## ERICACEAE - Heath Family

Arctostaphylos Uva-ursi (L.) Spreng. - Bearberry. +

Vaccinium angustifolium Ait. - Narrow-Leaved Blueberry. #766. Edge of Low Marshy Area.

## EUPHORBIACEAE - Spurge Family

Euphorbia corollata L. - Flowering Spurge. #621. North Side of Dune.

Euphorbia glyptosperma Engelm. - Ridge-Seeded Spurge. #852. Unvegetated Sandy Soil.

## FABACEAE - Bean Family

Amorpha canescens Pursh. - Lead Plant. #723. Oak Savanna.

Amphicarpa bracteata (L.) Fern. - Hog Peanut. #1149. North Side of Dune.

Astragalus canadensis L. - Canadian Milk Vetch. #777. Oak Savanna.

Desmodium canadense (L.) DC. - Canada Tick-Trefoil. #881. Wet Meadow.

Lathyrus venosus Muhl. var. intonsus Butters and St. John. - Veiny Pea. #772. Oak Savanna.

Lespedeza capitata Michx. - Bush Clover. #1160. Oak Savanna.

Melilotus alba Desr. - White Sweet Clover. #760. Roadside. Alien.

Petalostemum candidum (Willd.) Michx. - White Prairie-Clover. #774. Oak Savanna.

Petalostemum purpureum (Vent.) Rydb. - Purple Prairie-Clover. #831. Oak Savanna.

Petalostemum villosum Nutt. - Silky Prairie Clover. #809. Old Field.

Trifolium hybridum L. - Alsike Clover. #796. Aspen Clone. Alien.

Vicia villosa Roth. - Hairy Vetch. #685. Roadside.

## FAGACEAE - Beech Family

Quercus borealis Michx. f. - Northern Red Oak.Quercus ellipsoidalis E.J. Hill. - Jack Oak. #369. Oak Savanna.Quercus macrocarpa Michx. - Bur Oak. #1158. Oak Savanna.

## GENTIANACEAE - Gentian Family

Gentiana rubricaulis Schw. - Narrow-Leaved Gentian. #868. Low Swale Meadow.

## HYPERICACEAE - St. John's-Wort Family

Hypericum majus (Gray) Britt. - Small-Flowered St. John's-Wort. #829. Edge of Sedge Slough.

## LAMTACEAE - Mint Family

Hedeoma hispida Pursh. - Mock Pennyroyal. #765. Roadside.Lycopus americanus Muhl. - Water Horehound. #1145. Old Field.Lycopus uniflorus Michx. - Northern Bugle Weed. #867. Low Swale Meadow.Monarda fistulosa L. - Wild Bergamot. #782. Oak Savanna.Pycnanthemum virginianum (L.) Durand and Jackson. - Virginia Mountain Mint. #807. Old Field.Scutellaria parvula Michx. - Skullcap. #508. Dune Blowout.Stachys palustris L. - Hedge Nettle. #725. Old Field.

## LENTIBULARIACEAE - Bladderwort Family

Utricularia vulgaris L. - Bladderwort. #825. Marshy Area.

## LOBELIACEAE - Lobelia Family

Lobelia spicata Lam. - Rough-Spiked Lobelia. #787. Wet Meadow.

## NYCTAGINACEAE - Four-O'clock Family

Oxybaphus hirsutus (Pursh) Sweet. - Hairy Umbrella-Wort. #779. Oak Savanna.

## OLEACEAE - Olive Family

Fraxinus pennsylvanica Marsh. - Green Ash. #781. Oak Savanna.

## ONAGRACEAE - Evening-Primrose Family

Oenothera parviflora L. - Northern Evening-Primrose. #1147. Oak Savanna.Oenothera rhombipetala Nutt. - Rhombic Evening-Primrose. #885. Oak Savanna.

## POLEMONIACEAE - Phlox Family

Phlox pilosa L. var fulgida Wherry. - Prairie Phlox. #717. Oak Savanna.

## POLYGALACEAE - Milkwort Family

Polygala polygama Walt. var obtusata Chod. - Racemed Milkwort. #696. Oak Savanna.Polygala sanguinea L. - Purple Milkwort. #738. Low Meadow.

## POLYGONACEAE - Smartweed Family

Polygonella articulata (L.) Meissn. - Coast Jointweed. #897-B. Old Field.Polygonum convolvulus L. - Black Bindweed. #741. Old Field. Alien.Polygonum natans Eat. - Water Smartweed. #833. Marshy Area.Polygonum pensylvanicum L. - Pennsylvania Smartweed. #860. Old Field.Polygonum sagittatum L. - Arrow-Leaved Tear-Thumb. #905. Standing Water in Slough.



Polygonum tenue Michx. - Slender Knotweed. #799. Dune Blowout. \*  
Rumex acetosella L. - Field Sorrel. #697. Oak Savanna.

PRIMULACEAE - Primrose Family

Lysimachia ciliata L. - Fringed Loosestrife. #857. Sedge Slough.

RANUNCULACEAE - Crowfoot Family

Anemone cylindrica Gray. - Thimbleweed. #699. Oak Savanna.  
Anemone patens L. - Pasque-Flower. #661. Oak Savanna.  
Aquilegia canadensis L. - Wild Columbine. #665. Oak Savanna.  
Delphinium virescens Nutt. - Prairie Larkspur. #700. Oak Savanna.  
Ranunculus pensylvanicus L.f. - Bristly Buttercup. #824. Marshy Area.  
Ranunculus rhomboideus Goldie. - Prairie Crowfoot. #230. Oak Savanna.

ROSACEAE - Rose Family

Amelanchier laevis Wieg. - Smooth Juneberry. #275. Oak Savanna.  
Fragaria virginiana Duchesne. - Virginia Strawberry. #671. Oak Savanna.  
Geum triflorum Pursh. - Prairie Smoke. #688. Oak Savanna.  
Potentilla arguta Pursh. - Tall Cinquefoil. #713. Oak Savanna.  
Potentilla norvegica - Routh Cinquefoil. #622. Wet Meadow.  
Potentilla simplex Michx. - Old Field Cinquefoil. #693. Low Meadow.  
Prunus pumila L. - Sand Cherry. #1137. Oak Savanna.  
Prunus serotina Ehrh. - Black Cherry. #1161. Edge of Wet Meadow.  
Prunus virginiana L. - Choke-Cherry. #735. Oak Savanna.  
Rosa blanda Ait. - Smooth Wild Rose. #808. Sand Blowout.  
Rosa suffulta Greene. - Prairie Wild Rose. #563. Oak Savanna.  
Rubus flagellaris Willd. - Running Dewberry. #826. Sedge Slough.  
Spiraea alba DuRoi. - Narrow-Leaved Meadow-Sweet. #843. Low Swale.  
Spiraea tomentosa L. - Steeple-Bush. #786. Edge of Marshy Area.

RUBIACEAE - Madder Family

Galium boreale L. - Northern Bedstraw. #718. Oak Savanna.

SALICACEAE - Willow Family

Populus tremuloides Michx. - Quaking Aspen. #741. Edge of Low Meadow.  
Salix discolor Muhl. - Pussy-Willow. #662. Low Slough.  
Salix humilis Marsh. - Prairie Willow. #232. Near Wet Meadow.  
Salix petiolaris Sm. (S. gracilis Anderss. in Fernald, 1950) - Slender Willow. #795. Old Field.  
Salix tristis Ait. - Dwarf Upland Willow. #659. Low Slough.

SANTALACEAE - Sandal-Wood Family

Comandra umbellata (L.) Nutt. - Bastard Toad-Flax. #668. Oak Savanna.

SAXIFRAGACEAE - Saxifrage Family

Heuchera richardsonii R. Br. var hispidioides - Prairie Heuchera. #703.  
 Oak Savanna.

SCROPHULARIACEAE - Figwort Family

Gerardia purpurea var. parviflora Benth. - Gerardia. #870. Low Swale.  
Penstemon gracilis Nutt. - Slender Beard's-Tongue. #768. Old Field.  
Penstemon grandiflorus Nutt. - Large-Flowered Beard's-Tongue. #676.  
 Oak Savanna.

### Sources of Information

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Verbascum thapsus L. - Great Mullein. #747. Old Field. Alien.  
Veronicastrum virginicum (L.) Farw. - Culver's Root. #842. Low Swale.

SOLANACEAE - Nightshade Family

Physalis virginiana Mill. - Virginia Ground Cherry. #689. Oak Savanna.

VIOLACEAE - Violet Family

Viola lanceolata L. - Lance-Leaved Violet. #362. Edge of Wet Meadow.  
Viola pedatifida G. Don. - Prairie Violet. #673. Oak Savanna.  
Viola sagittata Ait. - Arrow-Leaved Violet. #672. Low Slough.

VITACEAE - Grape Family

Parthenocissus vitacea (Knerr) Hitchc. (P. inserta (Kerner) K. Fritsch.  
 in Fernald, 1950) - Thicket Creeper. #756. Oak Savanna.

The following additional plant species were identified on releve plots.

Voucher specimens were not collected.

ASTERACEAE

Lactuca cf. serriola

VITACEAE

Parthenocissus quinquefolia

## 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 of 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). Six circular stations<sup>1</sup> (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 was varied. All birds seen or heard from each station were recorded. A minimum of three noncontemporaneous 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. Forty-five species of birds, representing 23 families, were observed on or above Allison Savanna. One species was found nesting in the area with 12 species recorded as inferred breeders.<sup>2</sup>

<sup>1</sup> Maps showing location of these stations on file, Scientific and Natural Areas Section, St. Paul.

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

## 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.

AsTh - Aspen Thicket  
 WiTh - Willow Thicket  
 EgWM - Edge of Wet Meadow  
 OWo - Oak Woods  
 OS - Oak Savanna  
 TP - Throughout the Preserve  
 AlTh - Alder Thicket

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 ALLISON SAVANNA

| FAMILY/SCIENTIFIC<br>NAME         | COMMON<br>NAME           | DATE     | HABITAT           | RESI-<br>DENCY | BREEDING<br>STATUS | REMARKS         |
|-----------------------------------|--------------------------|----------|-------------------|----------------|--------------------|-----------------|
| ARDEIDAE                          |                          |          |                   |                |                    |                 |
| <u>Ardea herodias</u>             | Great Blue Heron         | 7 May    |                   | S              |                    | Observed Flying |
| ANATIDAE                          |                          |          |                   |                |                    |                 |
| <u>Aix sponsa</u>                 | Wood Duck                | 1 June   |                   | S              |                    | Observed Flying |
| ACCIPITRIDAE                      |                          |          |                   |                |                    |                 |
| <u>Buteo jamaicensis</u>          | Red-Tailed Hawk          | 20 June  |                   | S              |                    | Observed Flying |
| <u>Buteo platypterus</u>          | Broad-Winged Hawk        | 21 May   |                   | S              |                    | Observed Flying |
| FALCONIDAE                        |                          |          |                   |                |                    |                 |
| <u>Falco sparverius</u>           | American Kestrel         | 7 May    |                   | S              |                    | Observed Flying |
| PHASIANIDAE                       |                          |          |                   |                |                    |                 |
| <u>Phasianus colchicus</u>        | Ring-Necked Pheasant     | 27 April | AsTh With OS EgWM | P              | 0                  |                 |
| CHARADRIIDAE                      |                          |          |                   |                |                    |                 |
| <u>Charadrius vociferus</u>       | Killdeer                 | 21 May   | With              | S              |                    |                 |
| COLUMBIDAE                        |                          |          |                   |                |                    |                 |
| <u>Zenaida macroura</u>           | Mourning Dove            | 1 June   | OS                | S              |                    |                 |
| STRIGIDAE                         |                          |          |                   |                |                    |                 |
| <u>Strix varia</u>                | Barred Owl               | 7 May    | EgWM              | P              |                    |                 |
| PICIDAE                           |                          |          |                   |                |                    |                 |
| <u>Colaptes auratus</u>           | Common Flicker           | 3 May    | OS                | S              |                    |                 |
| <u>Melanerpes erythrocephalus</u> | Red-Headed Woodpecker    | 7 May    | OS                | S              |                    |                 |
| <u>Dendrocopos villosus</u>       | Hairy Woodpecker         | 15 June  | OS                | P              |                    |                 |
| TYRANNIDAE                        |                          |          |                   |                |                    |                 |
| <u>Tyrannus tyrannus</u>          | Eastern Kingbird         | 21 May   | OS AsTh EgWM OWo  | S              | 0                  |                 |
| <u>Myiarchus crinitus</u>         | Great Crested Flycatcher | 21 May   | OS                | S              |                    |                 |
| <u>Sayornis phoebe</u>            | Eastern Phoebe           | 1 June   | OS Eg WM          | S              |                    |                 |

TABLE 4 (Continued) ANNOTATED LIST OF BIRDS OBSERVED AT ALLISON SAVANNA

| FAMILY/SCIENTIFIC             | COMMON                  | DATE     | HABITAT            | RESI-<br>DENCY | BREEDING<br>STATUS | REMARKS         |
|-------------------------------|-------------------------|----------|--------------------|----------------|--------------------|-----------------|
| NAME                          | NAME                    |          |                    |                |                    |                 |
| HIRUNDINIDAE                  |                         |          |                    |                |                    |                 |
| <u>Iridoprocne bicolor</u>    | Tree Swallow            | 1 June   |                    | S              |                    | Observed Flying |
| <u>Progne subis</u>           | Purple Martin           | 27 April | OS                 | S              |                    |                 |
| CORVIDAE                      |                         |          |                    |                |                    |                 |
| <u>Cyanocitta cristata</u>    | Blue Jay                | 27 April | With OS EgWM       | P              | ⊕                  |                 |
| <u>Corvus brachyrhynchos</u>  | Common Crow             | 3 May    |                    | S              |                    | Observed Flying |
| PARIDAE                       |                         |          |                    |                |                    |                 |
| <u>Parus atricapillus</u>     | Black-Capped Chickadee  | 3 May    | AsTh OWo           | P              |                    |                 |
| SITTIDAE                      |                         |          |                    |                |                    |                 |
| <u>Sitta carolinensis</u>     | White-Breasted Nuthatch | 7 May    | OS                 | P              |                    |                 |
| MIMIDAE                       |                         |          |                    |                |                    |                 |
| <u>Dumetella carolinensis</u> | Gray Catbird            | 21 May   | OS EgWM            | S              | ⊕                  |                 |
| <u>Toxostoma rufum</u>        | Brown Thrasher          | 3 May    | EgWM OS OWo        | S              | ⊕                  |                 |
| TURDIDAE                      |                         |          |                    |                |                    |                 |
| <u>Turdus migratorius</u>     | American Robin          | 3 May    | AsTh OS EgWM       | S              |                    |                 |
| <u>Sialia sialis</u>          | Eastern Bluebird        | 21 May   | AsTh EgWM          | S              |                    |                 |
| BOMBYCILLIDAE                 |                         |          |                    |                |                    |                 |
| <u>Bombycilla adrovum</u>     | Cedar Waxwing           | 22 July  | OS                 | S              |                    |                 |
| STURNIDAE                     |                         |          |                    |                |                    |                 |
| <u>Sturnus vulgaris</u>       | Starling                | 3 May    | OWo                | P              |                    |                 |
| VIREONIDAE                    |                         |          |                    |                |                    |                 |
| <u>Vireo olivaceus</u>        | Red-Eyed Virco          | 1 June   | OS                 | S              |                    |                 |
| PARULIDAE                     |                         |          |                    |                |                    |                 |
| <u>Dendroica petechia</u>     | Yellow Warbler          | 7 May    | EgWM               | S              |                    |                 |
| <u>Dendroica coronata</u>     | Yellow-Rumped Warbler   | 7 May    | OS                 | S              |                    |                 |
| <u>Geothlypis trichas</u>     | Common Yellowthroat     | 21 May   | AsTh With EgWM OWo | S              |                    |                 |



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

| FAMILY/SCIENTIFIC<br>NAME      | COMMON<br>NAME                        | DATE     | HABITAT               | RESI-<br>DENCY | BREEDING<br>STATUS | REMARKS               |
|--------------------------------|---------------------------------------|----------|-----------------------|----------------|--------------------|-----------------------|
| ICTERIDAE                      |                                       |          |                       |                |                    |                       |
| <u>Agelaius phoeniceus</u>     | Red-Winged Blackbird                  | 27 April | AsTh With OWo OS EgWM | S              | ⊕                  |                       |
| <u>Icterus galbula</u>         | Northern Oriole                       | 21 May   | OS                    | S              |                    |                       |
| <u>Euphagus cyamocephalus</u>  | Brewer's Blackbird                    | 3 May    | OS                    | S              |                    |                       |
| ICTERIDAE                      |                                       |          |                       |                |                    |                       |
| <u>Molothrus ater</u>          | Brown-Headed Cowbird                  | 27 April | TP                    | S              | ⊕                  |                       |
| THRAUPIDAE                     |                                       |          |                       |                |                    |                       |
| <u>Piranga olivaceae</u>       | Scarlet Tanager                       | 21 May   | OS                    | S              |                    |                       |
| FRINGILLIDAE                   |                                       |          |                       |                |                    |                       |
| <u>Cardinalis cardinalis</u>   | Cardinal                              | 1 June   | EgWM                  | P              |                    |                       |
| <u>Passerina cyanea</u>        | Indigo Bunting                        | 3 July   | OS With               | S              |                    |                       |
| <u>Pipilo erythrophthalmus</u> | Rufous-Sided Towhee                   | 21 May   | OS                    | S              | ⊕                  |                       |
| <u>Ammodramus</u>              | <u>savannarum</u> Grasshopper Sparrow | 1 June   | AsTh With             | S              | ⊕                  |                       |
| <u>Pooecetes gramineus</u>     | Vesper Sparrow                        | 21 May   | AsTh With             | S              | ●                  | 1 nest 6 eggs 6/15/79 |
| <u>Chondestes grammacus</u>    | Lark Sparrow                          | 3 May    | OS With               | S              | 0                  |                       |
| <u>Spizella passerina</u>      | Chipping Sparrow                      | 7 May    | With OS EgWM          | S              | ⊕                  |                       |
| <u>Spizella pusilla</u>        | Field Sparrow                         | 27 April | OWo OS EgWM           | S              | ⊕                  |                       |
| <u>Melospiza melodia</u>       | Song Sparrow                          | 27 April | With AtTh OS EgWM     | S              | ⊕                  |                       |

Sources of Information

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Additional Sources of Information

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- Sounds of Nature Series. Vol. IV Warblers, Vol. VI Finches, Federation of Ontario Naturalists.

## 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 a 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 reopened. 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, 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. Eleven species, representing seven families were observed or captured on Helen Allison Savanna.<sup>1</sup>

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<sup>1</sup> 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 Helen Allison Savanna Natural Area.

| Family Name/<br>Scientific Name | Common Name           | Habitat                                 |
|---------------------------------|-----------------------|---|
| SORICIDAE                       |                       |   |
| <u>Blarina brevicauda</u>       | Short-tailed Shrew    | Marsh, Oak<br>Savanna                   |
| SCIURIDAE                       |                       |   |
| <u>Marmota monax</u>            | Woodchuck             |   |
| <u>Tamiasciurus hudsonicus</u>  | American Red Squirrel |   |
| <u>Tamias striatus</u>          | Eastern Chipmunk      |   |
| <u>Sciurus carolinensis</u>     | Eastern Gray Squirrel |   |
| GEOMYIDAE                       |                       |   |
| <u>Geomys bursarius</u>         | Plains Pocket Gopher  | Old Field                               |
| CRICETIDAE                      |                       |   |
| <u>Peromyscus leucopus</u>      | White-footed Mouse    | Oak Savanna,<br>Dunes Blowout,<br>Marsh |
| <u>Microtus pennsylvanica</u>   | Meadow Vole           | Marsh                                   |
| ZAPODIDAE                       |                       |   |
| <u>Zapus hudsonius</u>          | Meadow Jumping Mouse  | Marsh                                   |
| CARNIVORA                       |                       |   |
| <u>Vulpes fulva</u>             | Red Fox               |   |
| CERVIDAE                        |                       |   |
| <u>Odocoileus virginianus</u>   | White-tailed Deer     |   |

## AMPHIBIANS AND REPTILES

### Methods

Amphibians and reptiles were recorded both by sound identification and by hand collecting.<sup>1</sup> Collection of frogs and toads was mainly done in the spring. At this time of year they congregate and can be identified, using their breeding vocalizations, located and hand captured. Salamanders, frogs and toads were captured at night, using head lamps. Snakes, lizards and turtles were collected by hand during the day in the summer. Incidental sightings were recorded throughout the field season.

Voucher specimens were deposited in the Bell Museum of Natural History, 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. Five amphibians and one reptile were identified on Helen Allison Savanna.

### 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.

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

Table 6. Amphibians and Reptiles Identified on Helen Allison Savanna.

## AMPHIBIA

## AMBYSTOMIDAE

Ambystoma tigrinum tigrinum (Eastern Tiger Salamander)

## HYLIDAE

Hyla crucifer (Spring Peeper)

Hyla versicolor (Gray tree frog) heard in chorus

Pseudacris triseriata triseriata (Western Chorus Frog)

## Ranidae

Rana sylvatica (Wood Frog)

## REPTILIA

## COLUBRIDAE

Pituophis melanoleucus sayi (Bullsnake)

Sources of Information

Banfield, A.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.

## LAND USE HISTORY

Virtually all "natural areas" have been affected to some degree by the activities of people. Farming, grazing, logging, drainage of wetland, 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, aerial photographs, inspections of the site, and interviews with individuals who are knowledgeable about the area.

### Recent Land Use History

The area around Helen Allison Savanna was first settled by Europeans in the 1850's. Most of the land around the prairie was cleared and utilized for grazing, crop production, logging, and more recently for residential housing. Today, cultivated and formerly cultivated fields, residential lots, scattered trees, and the University of Minnesota Cedar Creek Natural History Area surround Allison Savanna. Residential areas to the northeast and south have been steadily increasing in the past few years. Figure 7 shows some of the owners and land uses in the vicinity of the tract in 1979.

Allison Savanna has also been affected by the activities of people. Since the tract was homesteaded in 1878 the land's title has changed hands seven times.<sup>1</sup> One of the owners may have built a structure on

<sup>1</sup> Clinton Olmstead homesteaded the tract from 1878 to 1902. From 1902 to 1938 Edward F. Lee and Emil W. Eckfelt owned the land. Then for the next eight years J. Thomas, Marier Schmitz, J.E. and Elizabeth O'Rourke were the owners. In 1946 the land passed into the state of Eunice Mabel Mayer. Phillip Engel became the owner that same year and held onto the property until 1958. Robert B. and Audrie Winger were the next owners of the tract. Donald B. Lawrence acquired the property in 1961, and the title to the land was transferred to The Nature Conservancy in 1972.



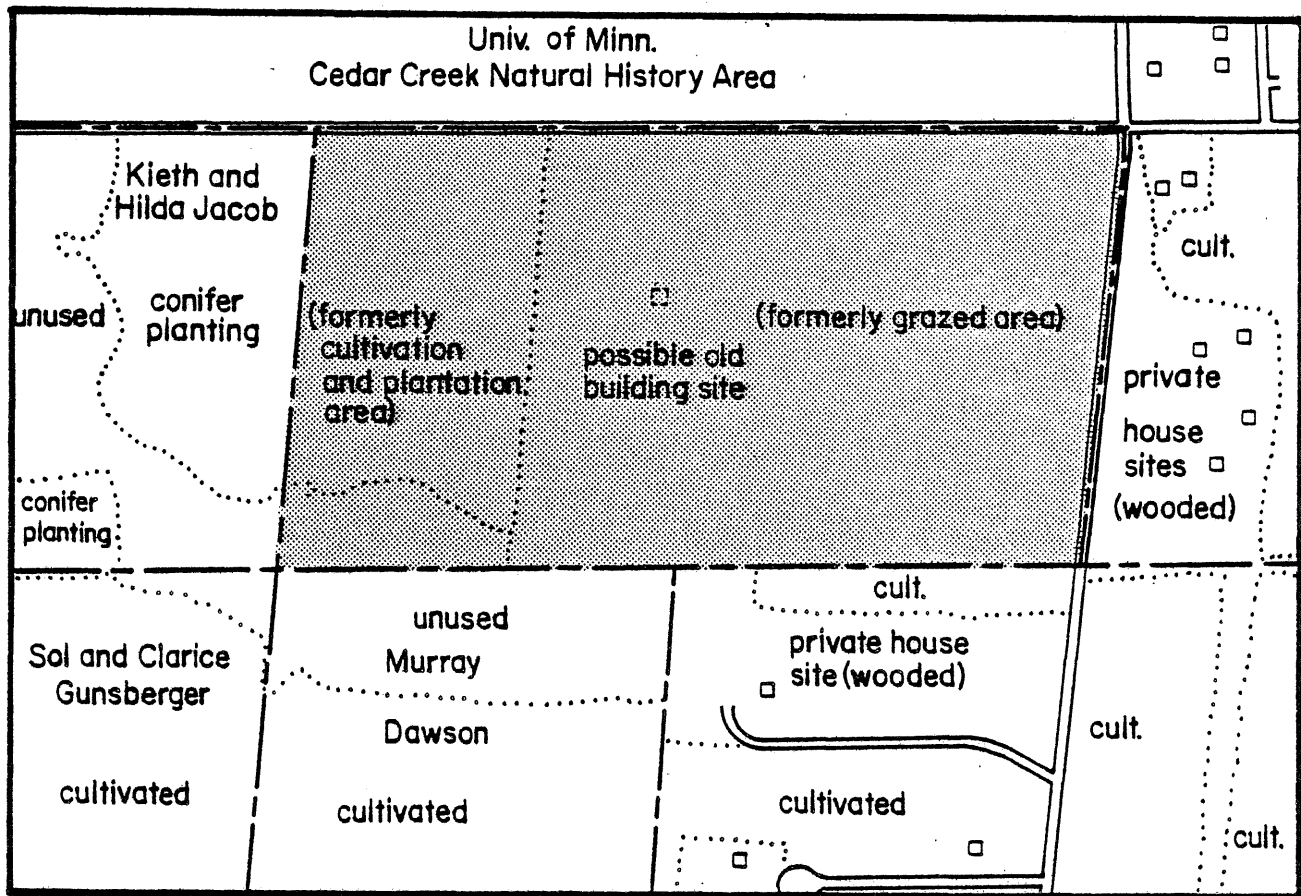
the tract, date unknown. This hypothesis is based on planted green ash and a large blowout present on the site (See Figure 7). However, there are no signs of a foundation or other evidence to support the existence of a structure here.

The eastern 60 acres was primarily used as a pasture. A two strand barbed wire fence was erected around the area sometime before 1900 to 1960. Two horses also grazed the area during the summer for a few years.

Two major activities have affected the western 20 acres. First, in the early 1900's the area was used to grow corn. Then in 1961 about 10,000 Jack, Scotch and Red Pine were mistakenly planted on the area. The trees were all removed by 1972.

Several other actions have modified the landscape and biota of Helen Allison Savanna. A tractor path is still evident in the southeast corner of the site. It was first used around 1900 to haul hay from fields west of the area. The location of another path is unclear, but apparently ran from the southeast to the northwest corners. This path was used by both horses and cars around 1920 as a short cut. Various chemicals have been applied on the tract at different times for control purposes: poisons were used on the west 20 acres between the crop rows and along the roadsides to control pocket gophers; the Metropolitan Mosquito Control Commission sprayed DDT and scattered pellets in marshes until they were requested to stop in 1962; and for a short time in the 1960's chemicals were used to control Smooth Brome Grass. The suppression of fire has affected the vegetation on Helen Allison Savanna. Prior to European settlement fire is thought to have been a regular occurrence on areas like this savanna. Without fire, one of the forces responsible

# ALLISON SAVANNA



- — — — — Property line
- ..... Present or former field line
- ===== Improved roads



Scale: 8 inches = 1 mile

Figure 7. Past and current land use practices in the vicinity of Allison Savanna.

for the creation and maintenance of the savanna community was eliminated.

After The Nature Conservancy acquired the land in 1961 fire was reintroduced on the savanna. Detailed records on the prescription burns which have occurred on the tract from 1962 to the present are on file at The Nature Conservancy, Minnesota Chapter, office.

#### History of Preservation Efforts

Dr. J. Roger Bray first stimulated interest in this tract when he discovered the area in 1957. Dr. Bray's high praise of the area and his belief that such a "beautiful savanna" should be preserved eventually led other scientists to examine the site. In June, 1960 Dr. Donald B. Lawrence visited the tract and was so impressed that he began exploring the possibility of acquiring the land. The owners, Mr. and Mrs. Robert B. Winger, were not eager to sell because they intended to use part of the tract for growing Christmas trees. However, Dr. Lawrence persisted in his effort to acquire the land. On October 13, 1960 the site was shown to a committee of the Minnesota Chapter of The Nature Conservancy. The committee immediately recommended acquisition of the tract. Finally early in 1961 the land was bought by Dr. Lawrence. In 1972 the title to the land was transferred to The Nature Conservancy.

During the period of acquisition and for the following three years the tract was known as "Winger Savanna". But on June 14, 1964 the tract was renamed in honor of Mrs. Helen Allison Irvine, who with her husband had contributed toward the acquisition. The tract is now officially designated as the Helen Allison Savanna.

## APPENDIX I.

The following is a summary of the species identified in each releve plot during 1979.<sup>1</sup> Relve plots were surveyed twice during the season; the dates and people conducting each survey are given in the heading. If the abundance of a species was recorded differently in the two surveys, the summary includes the greatest abundance noted. Species are grouped into grasses and forbes, or, woody and herb categories. Species are then listed by abundance within each category. A list of the symbols used in recording releve data are given below. Data is recorded in the following format:

|              |  |
|--------------|--|
| Species name | <u>height class</u><br>cover-abundance/sociability |
|--------------|--|

## SYMBOLS USED FOR RELEVE DESCRIPTIONS

Height Class (Stratification)

|   |           |
|---|-----------|
| 8 | 35 m      |
| 7 | 20 - 35 m |
| 6 | 10 - 20 m |
| 5 | 5 - 10 m  |
| 4 | 2 - 5 m   |
| 3 | 1 - 2 m   |
| 2 | .5 - 2 m  |
| 1 | 0 - .5 m  |

Coverage for Height Classes

|          |                            |
|----------|----------------------------|
| 75%      | continuous                 |
| 50 - 75% | interrupted                |
| 25 - 50% | parklike, patchy           |
| 5 - 25%  | sparse                     |
| 5%       | sporadic to<br>very scarce |

Cover-abundance, for species

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

Sociability (dispersion)

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

Certainty of Identification

|               |            |
|---------------|------------|
| (no notation) | positive   |
| ?             | some doubt |

<sup>1</sup> The scientific names in the releve data are from field notes and do not necessarily follow the nomenclature of Gleason and Cronquist (1963).

DATE: 15 June; 30 July; 14 Sept 1979

SURVEYOR: Lustig

PLOT #: 1 Allison Savanna

LOCATION: NE corner of preserve: From NE corner of plot +  
200 Feet east to East boundary (fence)  
190 feet north to Northern boundary (fence)

COVER TYPE: oak savanna

SOIL SERIES:

PLOT SIZE: 20 x 20 meters

## Height Classes

|                             | 8 | 7 | 6 | 5 | 4  | 3 | 2   | 1   |
|-----------------------------|---|---|---|---|----|---|-----|-----|
| Coverage for Height Class - |   |   |   |   | 5% |   | <5% | 75% |

Species

Remarks

[illegible]

SURVEYOR: Lustig

PLOT #: 1 Allison continued

LOCATION: NE corner of preserve

COVER TYPE: oak savanna

SOIL SERIES:

PLOT SIZE: 20 x 20 meters

### Height Classes

8      7      6      5      4      3      2      1

Coverage for Height Class -

Species

Remarks

Lithospermum carolinense

+

Asclepias tuberosa

+

Phytolites virginiana

+/-

Penstemon grandiflorus

 $+/1$ 

Delphinium virescens

41

Potentilla arquta

+/-

Sisyrinchium campestre

41

Galium boreale

 $\frac{1}{2} +$ 

Mirabilis hirsuta

4

Bouteloua hirsuta

+/

Polygonatum biflorum

T/

DATE: June 20  
July 30  
Sept 14. 1979

SURVEYOR: Lustig

PLOT #: 2 allison

LOCATION: 284 feet east of SW corner releve' plot 1, just east of  
COVER TYPE: oak savanna "west fire line #2, May 1963"

COVER TYPE: oak savanna

SOIL SERIES:

PLOT SIZE: 20x20 meters

### Height Classes

|                             | 8 | 7 | 6 | 5 | 4  | 3 | 2   | 1   |
|-----------------------------|---|---|---|---|----|---|-----|-----|
| Coverage for Height Class - |   |   |   |   | 5% |   | 25% | 75% |

Species

Remarks

|                                    |  |  |  |     |  | Remarks |
|------------------------------------|--|--|--|-----|--|---------|
| <i>Quercus ellipsoidalis</i>       |  |  |  | 1/1 |  | 2/1 +/1 |
| <i>Quercus macrocarpa</i>          |  |  |  | 1/1 |  | 1/1 +/1 |
| <i>Prunus virginiana</i>           |  |  |  |     |  | 1/1 +/1 |
| <i>Sorghastrum nutans</i>          |  |  |  |     |  | 1/2     |
| <i>Amelanchier laevis</i>          |  |  |  |     |  | + / 1   |
| <i>Ambrosia psilostachya</i>       |  |  |  |     |  | 2/1     |
| <i>Amorpha canescens</i>           |  |  |  |     |  | 2/1     |
| <i>Comandra umbellata</i>          |  |  |  |     |  | 2/1     |
| <i>Rhus glabra</i>                 |  |  |  |     |  | 2/1     |
| <i>Carex mühlenbergii</i>          |  |  |  |     |  | 1/2     |
| <i>Solidago nemoralis</i>          |  |  |  |     |  | 1/1     |
| <i>Stipa spartea</i>               |  |  |  |     |  | 1/2     |
| <i>Liatris aspera</i>              |  |  |  |     |  | 1/1     |
| <i>Rosa suffulta</i>               |  |  |  |     |  | 1/1     |
| <i>Lithospermum carolinense</i>    |  |  |  |     |  | 1/1     |
| <i>Poa pratensis</i>               |  |  |  |     |  | 1/1     |
| <i>Smilacina stellata</i>          |  |  |  |     |  | 1/1     |
| <i>Polygala polygamma</i>          |  |  |  |     |  | + / 1   |
| <i>Ambrosia tuberosa</i>           |  |  |  |     |  | + / 1   |
| <i>Panicum cf. villosissimum</i>   |  |  |  |     |  | + / 1   |
| <i>Nelanthemum bicknellii</i>      |  |  |  |     |  | + / 1   |
| <i>Conyza canadensis</i>           |  |  |  |     |  | + / 1   |
| <i>Delphinium virescens</i>        |  |  |  |     |  | + / 1   |
| <i>Penstemon grandiflorus</i>      |  |  |  |     |  | + / 1   |
| <i>Lespedeza capitata</i>          |  |  |  |     |  | + / 1   |
| <i>Fragaria virginiana</i>         |  |  |  |     |  | + / 1   |
| <i>Asclepias syriaca</i>           |  |  |  |     |  | + / 1   |
| <i>Panthenocissus quinquefolia</i> |  |  |  |     |  | + / 1   |
| <i>Solidago speciosa</i>           |  |  |  |     |  | + / 1   |
| <i>Prunus pumila</i>               |  |  |  |     |  | + / 1   |
| <i>Mirabilis hirsuta</i>           |  |  |  |     |  | + / 1   |
| fresh gopher hole                  |  |  |  |     |  | + / 1   |
| <i>Koeleria cristata</i>           |  |  |  |     |  | + / 1   |
| <i>Solidago rigida</i>             |  |  |  |     |  | + / 1   |
| <i>Physalis virginiana</i>         |  |  |  |     |  | + / 1   |
| <i>Potentilla arguta</i>           |  |  |  |     |  | + / 1   |

PLOT SIZE: \_\_\_\_\_

[illegible]



DATE: June 20  
July 30  
Sept 14 1979

PLOT #: 3 Allison Savanna

LOCATION: From SW corner relevé plot 2 go: 50 feet South, then 40 feet west

COVER TYPE: oak savanna

SOIL SERIES: \_\_\_\_\_

PLOT SIZE: 20x20 meters

[illegible]

DATE: \_\_\_\_\_ SURVEYOR: Lustig

PLOT #: 3 Allexon continued

LOCATION: \_\_\_\_\_

COVER TYPE: \_\_\_\_\_

SOIL SERIES: \_\_\_\_\_

PLOT SIZE: \_\_\_\_\_

### Height Classes

8 7 6 5 4 3 2 1

Coverage for Height Class -

|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|

Species

Remarks

[illegible]

DATE:

PLOT 非:

LOCATION:

COVER TYPE:

SOIL SERIES:

PLOT SIZE:

### Height Classes

### Coverage for Height Class -

Species

Remarks

| Plant Name  | 1/1 | +1 | +1  |
|---|-----|----|-----|
| <i>Fraxinus pennsylvanica</i>                           | 1/1 |    |     |
| <i>Calamovilfa longifolia</i>                           |     | +1 | +1  |
| <i>Aristida tuberculosa</i>                             |     |    | 1/1 |
| <i>Panicum virgatum</i>                                 |     |    | 1/1 |
| <i>Hudsonia tomentosa</i>                               |     |    | 1/4 |
| pocket gopher   |     |    | 1/1 |
| <i>Panicum cf. languinosum</i> var. <i>fasciculatum</i> |     |    | 1/1 |
| <i>Stipa spartea</i>                                    |     |    | 1/2 |
| <i>Amelanchier laevis</i>                               |     |    | 1/1 |
| <i>Polygonum tenue</i>                                  |     |    | +1  |
| <i>Petalostemum villosum</i>                            |     |    | +1  |
| <i>Liatris aspera</i>                                   |     |    | +1  |
| <i>Solidago graminifolia</i>                            |     |    | +1  |
| <i>Ambrosia psilostachya</i>                            |     |    | +1  |
| <i>Quercus ellipsoidalis</i>                            |     |    | +1  |
| <i>Chrysopsis villosa</i>                               |     |    | +1  |
| <i>Carex umbellata</i>                                  |     |    | +2  |
| <i>Koeleria cristata</i>                                |     |    | +2  |
| <i>Euphorbia glyptosperma</i>                           |     |    | +1  |
| <i>Lithospermum carolinense</i>                         |     |    | +1  |
| <i>Anemone cylindrica</i>                               |     |    | +1  |
| <i>Patentilla arguta</i>                                |     |    | +1  |
| <i>Andropogon scoparius</i>                             |     |    | +2  |
| <i>Smilacina stellata</i>                               |     |    | +1  |
| <i>Panus virginiana</i>                                 |     |    | +1  |
| <i>Amelanchier laevis</i>                               |     |    | +1  |
| <i>Penstemon graniflorus</i>                            |     |    | +1  |
| <i>Chenopodium album</i>                                |     |    | +1  |
| <i>Carex muhlenbergii</i>                               |     |    | +2  |
| <i>Tradescantia occidentalis</i>                        |     |    | +1  |
| <i>Polygala polygame</i>                                |     |    | +1  |
| <i>Cyperus filiculmis</i>                               |     |    | +1  |
| <i>Cyperus schweinitzii</i>                             |     |    | +1  |
| <i>Chenopodium leptophyllum</i>                         |     |    | +1  |
| <i>Poa pratensis</i>                                    |     |    | +1  |

DATE: June 20  
July 30  
Sept 14, 1979 SURVEYOR: Lustig

PLOT #: 5 Allison Savanna

LOCATION: center of preserve

COVER TYPE: 1<sup>st</sup> dune blowout

SOIL SERIES: \_\_\_\_\_

PLOT SIZE: 20 x 20 meters

### Height Classes

Coverage for Height Class -

| 8 | 7 | 6  | 5 | 4   | 3 | 2 | 1      |
|---|---|----|---|-----|---|---|--------|
|   |   | .. |   | 45% |   |   | 25-30% |

Species

Remarks

[illegible]

DATE: June 20  
July 30  
Sept. 14, 1979

SURVEYOR: Lustig

PLOT # : 6 Allison Savanna

LOCATION: 435 feet south of Northern boundary fence (Hwy 26) to NE corne.  
132 feet west of fire brake (edge of outwash plain) } of plot

COVER TYPE: old field (outwash plain)

SOIL SERIES:

PLOT SIZE: 20 x 20 meters

## Height Classes

8      7      6      5      4      3      2      1

Coverage for Height Class -

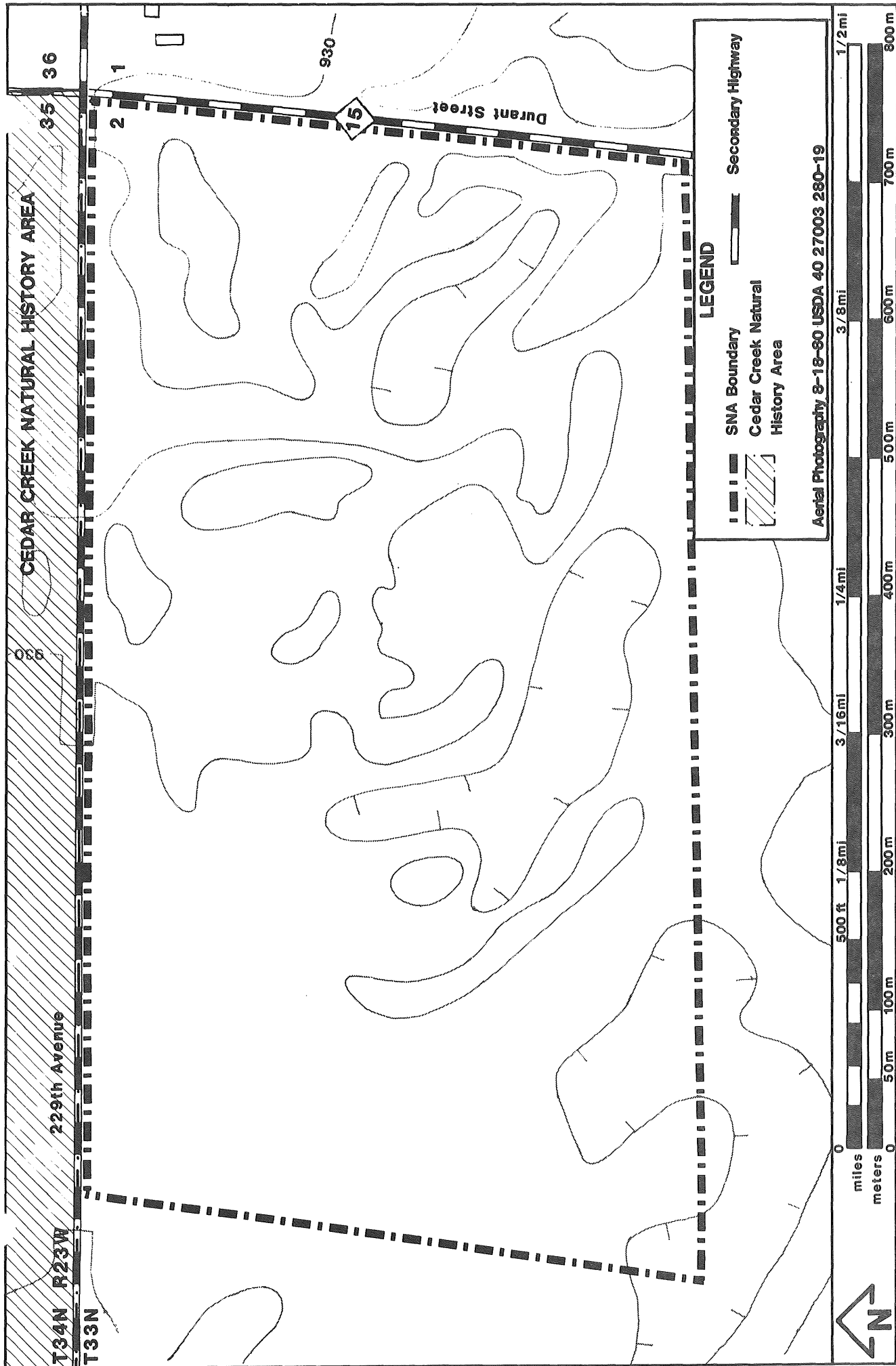
75%

Species

Remarks

| Species   | Count | Remarks                         |
|---|-------|---------------------------------|
| <i>Ambrosia psilostachya</i>                            | 2/1   |                                 |
| <i>Coryza canadensis</i>                                | 2/1   |                                 |
| <i>Agrostis scabra</i>                                  | 2/2   |                                 |
| <i>Poa pratensis</i>                                    | 2/1   |                                 |
| <i>Solidago nemoralis</i>                               | 1/1   |                                 |
| <i>Koeleria cristata</i>                                | 1/2   |                                 |
| <i>Eragrostis strigosus</i>                             | 1/1   |                                 |
| <i>Helianthemum bucknellii</i>                          | 1/1   |                                 |
| <i>Panicum cf. oliganthos</i> var <i>serotinerianum</i> | 1/1   |                                 |
| <i>Stachys palustris</i>                                | 1/1   |                                 |
| <i>Verbascum thapsus</i>                                | 1/1   | f plants removed from plot June |
| <i>Rosa suffulta</i>                                    | 1/1   |                                 |
| <i>Agropyron repens</i>                                 | +1    |                                 |
| <i>Polygonum tenue</i>                                  | +1    |                                 |
| <i>Lespedeza capitata</i>                               | +1    |                                 |
| <i>Gnaphilium obtusifolium</i>                          | +1    |                                 |
| <i>Quercus ellipsoides</i>                              | +1    |                                 |
| <i>Carex muhlenbergii</i>                               | +2    |                                 |
| <i>Artemisia caudata</i>                                | +1    |                                 |
| <i>Solidago speciosa</i>                                | +1    |                                 |
| remnant burnt pine tree                                 | +1    |                                 |
| <i>Koeleria cristata</i>                                | +2    |                                 |
| <i>Lactuca cf. canadensis</i>                           | +1    |                                 |
| <i>Lepidium densiflorum</i>                             | +1    |                                 |
| <i>Anemone cylindrica</i>                               | +1    |                                 |
| <i>Rumex acetosella</i>                                 | +1    |                                 |
| <i>Polygonum convolvulus</i>                            | +1    |                                 |
| <i>Tridax axillaris</i>                                 | +1    |                                 |
| <i>Tredscantia occidentalis</i>                         | +1    |                                 |
| <i>Petalostemum purpureum</i>                           | +1    |                                 |
| <i>Physalis virginiana</i>                              | +1    |                                 |
| <i>Lithospermum bucknellii</i>                          | +1    |                                 |
| <i>Sudellaria parvula</i>                               | +1    |                                 |
| <i>Penstemon gracilis</i>                               | +1    |                                 |
| <i>Crepis tectorum</i>                                  | +1    |                                 |

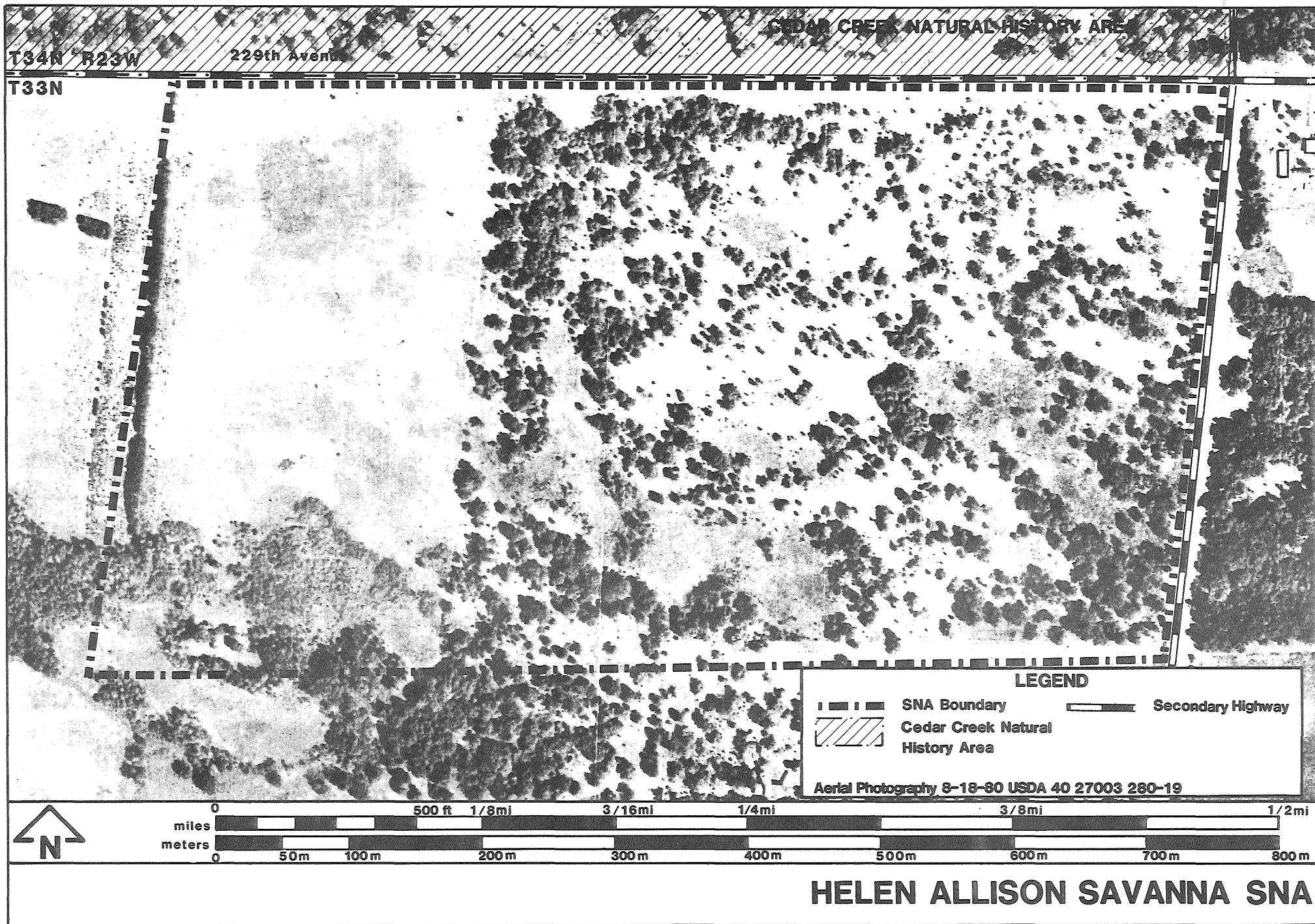




HELEN ALLISON SAVANNA SNA





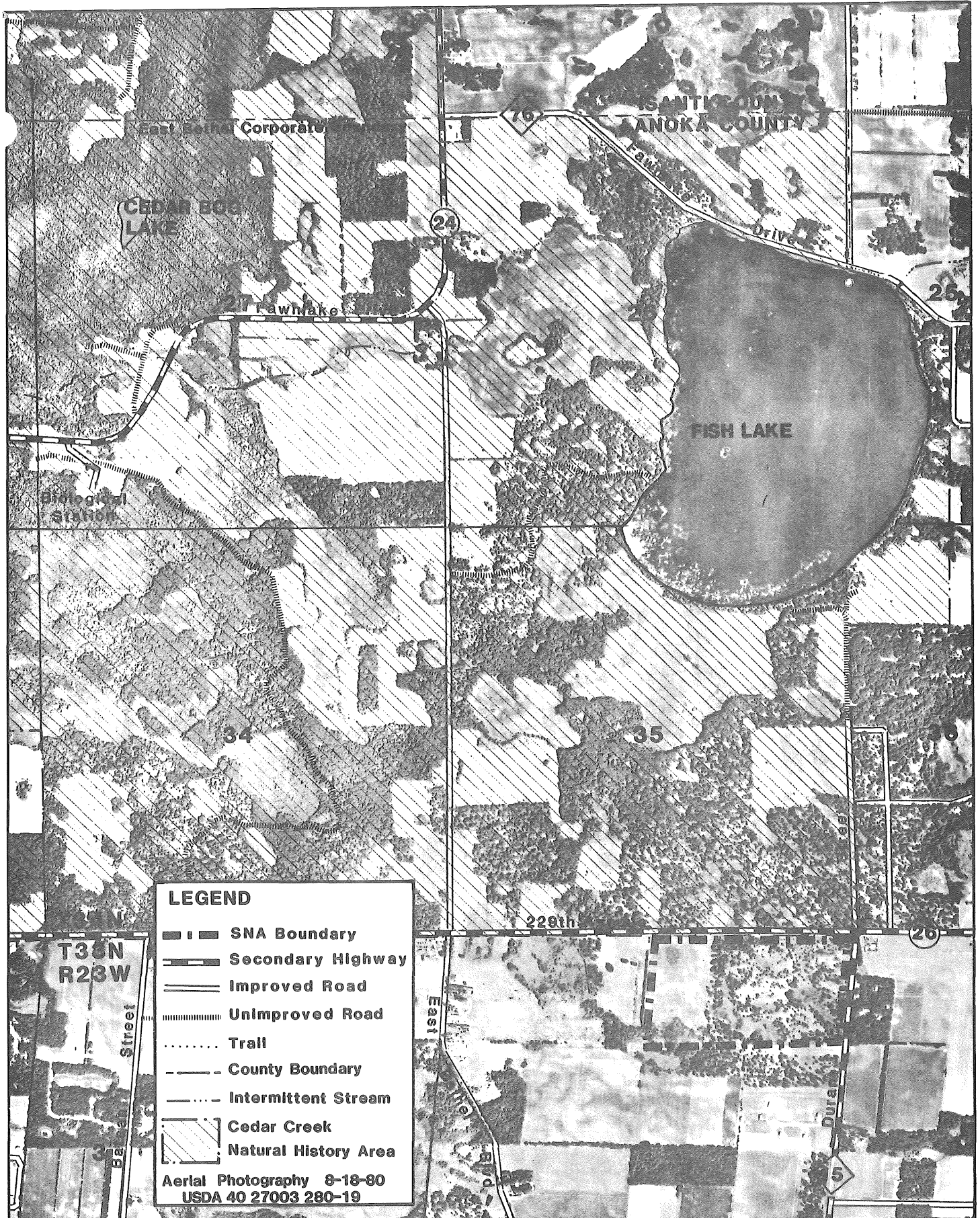








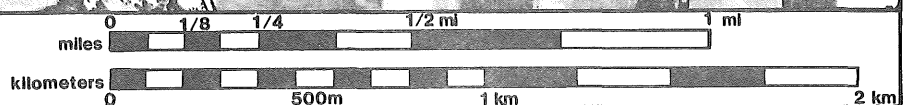




### LEGEND

- SNA Boundary
- Secondary Highway
- Improved Road
- Unimproved Road
- Trail
- County Boundary
- Intermittent Stream
- Cedar Creek
- Natural History Area

Aerial Photography 8-18-80  
USDA 40 27003 280-19



VICINITY MAP

HELEN ALLISON SAVANNA SNA