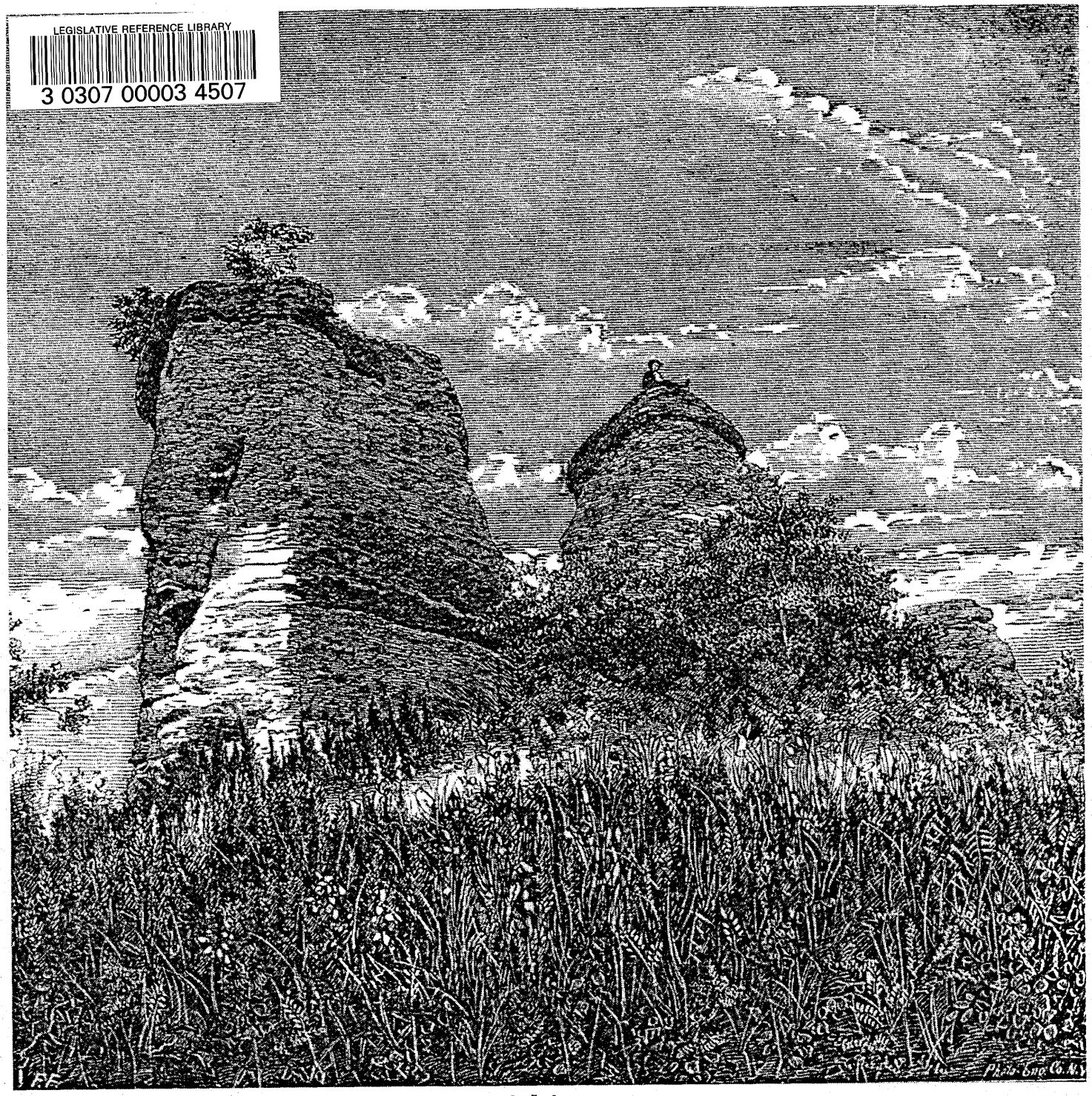

Survey of Biological Features within

Forestville/Mystery Cave State Park and Ecological Area

‘e County, Minnesota

Minnesota County Biological Survey
Division of Ecological Services
Minnesota Department of Natural Resources
500 Lafayette Road, Box 25 St. Paul, MN 55155

December, 2001

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Cover illustration "Figure 22. Eagle Rocks, situated in the valley of the South Branch of the Root River, on Section 27, Forestville Township" from Winchell, N.H., and W. Upham. 1884. The Geology of Fillmore County. Geology of Minnesota Vol. 1: 268-324.

Biological Report No. 70

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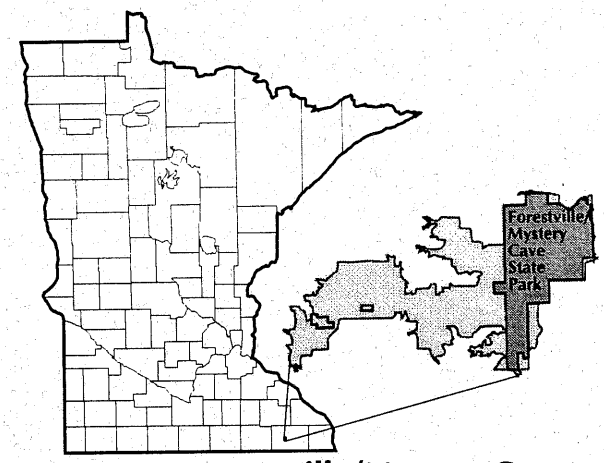

Forestville/Mystery Cave State Park and Ecological Area

SURVEY OF BIOLOGICAL FEATURES WITHIN FORESTVILLE/MYSTERY CAVE STATE PARK AND ECOLOGICAL AREA, FILLMORE COUNTY, MINNESOTA

Minnesota County Biological Survey
Division of Ecological Services
Department of Natural Resources
500 Lafayette Road, Box 25
St. Paul, Minnesota 55155

Biological Report No. 70
2001

A word of caution concerning sensitive material presented in this report.

This report provides detailed information and recommendations concerning the rare features present in the Forestville/Mystery Cave Ecological Area. Locations of sensitive species have been included on the maps and the database printouts to assist park managers, planners, resource specialists, and naturalists with future management and educational decisions. Native species are increasingly in demand for personal collections, commercial restorations, and for consumption or trade. The destruction of snake dens and collection of snakes for the pet trade reduces the viability of resident populations. Ginseng is also threatened by potential over-harvesting. For these reasons, we ask that caution be exercised when distributing copies of this report or that detailed location information be removed from copies made available to the general public.

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Important Points on Rare Plants and Native Plant Communities in the Forestville/Mystery Cave Ecological Area

The Ecological Area (8,130 acres) is a highly dissected watershed with a major river and three large tributary streams fed by springs emerging from subterranean channels. In addition, there are several intermittent streams that are also fed by groundwater.

The main park, which includes the historic town of Forestville, is a core natural area of nearly 2000 acres of high-quality, contiguous native plant communities. In addition, the Ecological Area has 1000 acres of fragmented communities outside of the park's statutory boundaries. This is highly significant for a natural area within a heavily developed region.

The Ecological Area includes 88 Element Occurrence Records (EORs) of 24 species of rare plants: 17 species are state-listed plants with a total of 73 EORs; 7 species are currently non-listed[1] with 15 EORs. Of the total number of EORs for listed species within the Ecological Area: state endangered species have 4 EORs, state threatened species have 34 EORs, special concern species have 35 EORs.

The park's statutory boundaries contains a majority of the plant EORs found within the Ecological Area (62% or 55 of 88 plant occurrences).

Seventeen native plant community types are within the Ecological Area: dry bluff prairie, oak woodland-brushland, dry oak forest, dry-mesic oak forest, mesic oak forest, maple-basswood forest, white pine-hardwood forest, lowland hardwood forest, black ash swamp - seepage subtype, seepage meadow, northern hardwood-conifer forest, dry cliff, moist cliff, maderate cliff, talus slope, algific talus slope and river beach.

MCBS established 24 permanent relevé vegetation plots for ecological monitoring. In addition, data were collected on 8 plots in communities too fragile for repeated monitoring.

The Ecological Area is a mixture of species groups whose centers of distribution (species range) are outside of Southeast Minnesota. Populations of these species are either disjunct or isolated from their primary range of distribution or they are peripheral populations near the edge of their range. Their existence is attributed to the rugged terrain which provides refuges for species that would not otherwise survive under today's climate or in the absence of fire.

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[1] Non-listed species have no legal status. They are tracked by MN DNR because their abundance and distribution is uncertain or unknown.

Cold-producing karst habitats have maintained relict populations of land snails and plants, more characteristic of the spruce-boreal forest of periglacial climates that have not been experienced within the Ecological Area for thousands of years. For example, balsam fir (*Abies balsamea*) was probably widespread in the postglacial spruce-boreal forest, now it is only found in association with algific talus slopes and maderate cliffs.

The Ecological Area has 38 acres of algific talus slopes and 17 acres of maderate cliffs, nearly 30% of the State's total and more than any other area in Minnesota. However, there are only 8.8 acres of algific talus slopes and 3 acres of maderate cliffs within the park's statutory boundary. These are among the best and coldest habitats in Minnesota.

The Ecological Area supports 4 of the 7 known Minnesota populations of the State-endangered, Iowa golden saxifrage (*Chrysosplenium iowense*) - an ice-age relict on algific talus slopes more characteristic of the boreal regions in western Canada. There are no occurrences of Iowa golden saxifrage on public land within the Ecological Area; however, private land within the Ecological Area supports the largest known population of Iowa golden saxifrage in the Paleozoic Plateau.

The following species have disjunct or peripheral populations on cold karst habitats within the Ecological Area:

alder-leaved buckthorn (*Rhamnus alnifolia*)
balsam fir (*Abies balsamea*)
bunchberry (*Cornus canadensis*)
high-bush cranberry (*Viburnum trilobum*)
mountain ash (*Sorbus americana*)
naked miterwort (*Mitella nuda*)
northern black current (*Ribes hudsonianum*)
northern oak fern (*Gymnocarpium robertianum*)
pink-flowered pyrola (*Pyrola asarifolia*)
small enchanter's nightshade (*Circaea alpina*)
yellow birch (*Betula alleghaniensis*)

The main park has three of the best and largest old growth forests in southeastern Minnesota including maple-basswood forest, mesic and dry-mesic oak forests and lowland hardwood forest. Analysis of Public Land Survey data and tree core data indicate that the oldest trees in these forests predate Euroamerican settlement of the area.

Naturally occurring stands of white pine originated following Euroamerican settlement with oldest trees estimated to be approximately 120 years old. White pine stands are represented by all age classes suggesting a healthy and sustainable demographic profile.

The main park at Forestville has nearly 300 acres of lowland hardwood forests which is a key a habitat for many rare species in the region. This area represents 8.5% of all lowland hardwood forests mapped by MCBS in the Paleozoic Plateau.

Groundwater seeps within the main park support over 20% of all the acreage of black ash swamps and mixed hardwood swamps mapped by MCBS in the Paleozoic Plateau.

Summary of Important Findings for Animals in Forestville/Mystery Cave State Park

MCBS surveys added 25 new or updated records of rare animals and animal aggregations for Northern myotis, Eastern pipistrelle, bat hibernacula, Acadian Flycatcher, Louisiana Waterthrush, and Cerulean Warbler.

Mystery Cave supports the largest number of hibernating bats of any natural cave in the state and should be considered one of the most important hibernacula in the Upper Midwest.

Southern red-backed voles, documented in the park, constitute a new county record, as well as the southernmost occurrence of this species in the state. This may represent a relict population that became isolated due to the expansion of the prairie during xeric post-glacial periods.

The extensive areas of mature forest in Forestville/Mystery Cave State Park provide important habitat for many birds, including several special concern and regionally rare species. The park is one of the few sites in southeastern Minnesota that supports this diversity of rare and uncommon forest birds.

Although records of pre-settlement vegetation suggest that forested areas in the park were more open than the current condition, these closed canopy forests have increased available habitat to rare forest bird species that are in decline elsewhere throughout the Paleozoic Plateau due to forest fragmentation

The park's significant forest communities represent one of western-most forested sites within the Blufflands Ecological Subsection. Accordingly, the park contains some of the western-most records for rare snakes within the subsection and the Root River drainage basin.

An active Timber rattlesnake den was located directly west of the park boundary and was the only known active den in the vicinity of the park. Acquisition of this private tract and enhancement of the habitat around the historic den along the Sandbank Trail are strongly recommended.

ACKNOWLEDGMENTS

Many individuals contributed invaluable assistance to this project. Special thanks are due to Kathy Bolin, Region V parks resource specialist at the time, who not only provided expertise and secured monetary assistance, but actively participated in field inventories. Mark White, park manager, and Arol McCaslin, assistant park manager, also provided advice, maps and other helpful information about historic management in the park. Warren Netherton, cave specialist, provided aid and comfort with warm enthusiasm, coffee and office space. We gratefully acknowledge Charles Juhnke, park naturalist and botanist, for his help in the field. Mr. Juhnke also tabulated occurrences of state-listed species from his own records, as well as previous collection records from Mike Tenney (currently with the MN DNR, Division of Wildlife). Other plants were collected by Welby Smith, MN DNR Heritage and Nongame Research Program. Wayne Ostlie of The Nature Conservancy assisted with the identification and evaluation of algific talus slopes and maderate cliffs. Appreciation is extended to the Minnesota Speleological Survey for allowing use of the Mystery Cave map in this report; the map was based on their extensive survey of the cave. Members also provided valuable information on other area caves that had bats and assisted with winter bat surveys. We would also like to thank Grant Scholen, DNR Parks, for allowing MCBS staff to participate in the early development of a new park plan.

We also wish to thank Dr. Scott Lanyon, Director of the James Ford Bell Museum of Natural History, and museum curators, especially Dr. Anita Cholewa, Herbarium Curator, for allowing access to the research collections and for providing permanent storage of specimens collected by the Minnesota County Biological Survey. Dr. Cholewa also verified collections by Mr. Juhnke.

PREFACE

The Minnesota County Biological Survey (MCBS) was initiated in 1987 in recognition of the need to assess the status of the state's biological diversity and its rare natural resources. It is a systematic, county-by-county survey of Minnesota's rare biological features. MCBS identifies significant natural areas and collects and interprets data on the distribution and ecology of native plant communities, rare plants, and rare animals. The information gathered by MCBS serves as a foundation for the conservation of critical components of Minnesota's biological diversity.

Biological surveys were conducted in Fillmore County between 1994 and 1999. These coincided with the development of a new management plan for Forestville/Mystery Cave State Park. The new plan was the first since the Minnesota State Parks' interpretive services directive focused park planning efforts on issues of Ecosystem-Based Management (EBM) and environmental education (MNDNR - Parks 1995). Through a cooperative agreement between MCBS and the Division of

Parks and Recreation, surveys of native plant communities and rare species were intensified in Forestville/Mystery Cave State Park and adjacent lands outlined by the park management plan and referred to as the Forestville/Mystery Cave Ecological Area – henceforth known as the Ecological Area. MCBS inventories of native plant communities and rare plants were enhanced throughout the Ecological Area, not just within the park statutory boundaries as was done in past park inventories. The vegetation of the Ecological Area, including native plant communities and disturbed areas, was mapped and additional vegetation plot samples were established. Animal surveys were increased within the park, but the Ecological Area outside present park boundaries was sampled at an intensity comparable to other parts of the county. Preliminary findings from these surveys were incorporated into the park management plan.

During the interval between field surveys and completion of this report, the state list of species that are considered endangered, threatened, or of special concern was reviewed and modified. The new list took effect on July 1, 1996. This report includes information on rare species that were listed previously, as well as those species added to the new list. All references to state status in this report give the current status, unless otherwise noted.

Additional information about many of the rare features described in this report can be found in *Minnesota's endangered flora and fauna* (Coffin and Pfannmuller 1988) and on a map showing the results of the completed inventory of Fillmore County (MNDNR - MCBS 1997b). Additional information about natural resources in Forestville/Mystery Cave State Park and Ecological Area, not included in the MCBS inventory, is stored in the Parks Resource Management database at the DNR Regional Office in Rochester.

The maps included within this report illustrate the dramatic results of the fragmentation and destruction of natural areas. These maps also point to the crucial role that parks play in protecting these diminishing habitats. The ecological importance of the Forestville/Mystery Cave Ecological Area cannot be overstated: it is one of the most significant natural areas in the state of Minnesota if not in the Midwestern United States. It is hoped that the findings of the MCBS survey will assist Parks in meeting their legislative mandate:

> State parks shall be administered by the commissioner of natural resources in a manner which is consistent with the purposes of this subdivision to preserve, perpetuate, and interpret natural features that existed in the area of the park prior to settlement and other significant natural, scenic, scientific, or historic features that are present. Management shall seek to maintain a balance among the plant and animal life of the park and to reestablish desirable plants and animals that were formerly indigenous to the park area but are now missing. Programs to interpret the natural features of the park shall be provided. Outdoor recreation activities to utilize the natural features of the park that can be accommodated

without material disturbance of the natural features of the park or the introduction of undue artificiality into the natural scene may be permitted. Park use shall be primarily for aesthetic, cultural, and educational purposes, and shall not be designed to accommodate all forms or unlimited volumes of recreational use. Physical development shall be limited to those facilities necessary to complement the natural features and the values being preserved (Minnesota Legislation Code 86A.05 Subd. 2c).

INTRODUCTION

Scott C. Zager, MCBS Plant Ecologist

Project Area

Forestville/Mystery Cave State Park (FSP) is administered by the Minnesota Department of Natural Resources, Division of Parks and Recreation (MNDNR Parks). The park is located in Fillmore County in southeastern Minnesota – approximately 45 miles south of the city of Rochester and about halfway between the towns of Spring Valley and Preston. The park includes two separate entities: the main park with the historic town of Forestville and Mystery Cave which has two entrances on separate parcels - Mystery Cave I and II. The main park is located on the South Branch of the Root River. Mystery Cave I and II are smaller parcels located approximately four miles upstream (west) of the main park. During the park planning process, an "ecological boundary" was delineated between the main park and Mystery Cave (MNDNR - Parks 1995). For purposes of field survey and data management, the Minnesota County Biological Survey (MCBS) has treated the "ecological boundary" as a macrosite and named it the Forestville/Mystery Cave Ecological Area – henceforth known as the **Ecological Area**. It includes the main park, Mystery Cave I & II and other public and private lands along a ten-mile segment of the river valley.

The Ecological Area is approximately 8,100 acres. The statutory boundary of the park and caves includes approximately 3,000 acres. Included within the statutory boundary are about 286 acres of privately owned land. Outside the park there are approximately 80 acres of state lands managed by the MNDNR Division of Forestry. The remaining 5,100 acres are all in private ownership including a small preserve owned and managed by The Nature Conservancy.

The Ecological Area is near the western edge of the Paleozoic Plateau –- a section of the Ecological Classification System (ECS) defined mainly by its geology[1]. It is a rugged landscape dominated by bedrock exposures of dolomitic limestone, sandstone and shale (Lively and Balaban 1995, Mossler 1995a, 1995b). These sedimentary rocks were deposited 600-430 million years ago by ancient seas during the Cambrian and Ordovician ages of the Paleozoic Era, hence the name. Portions of the Paleozoic Plateau in Minnesota and Iowa have been called the "driftless area" because they were once thought to be unglaciated during the Pleistocene or ice age; however, recent evidence suggests that the ECS section was repeatedly glaciated (Hallberg et al. 1984). After the glaciers receded, a dendritic network of waterways eroded steep valleys into the bedrock (Palmer and Palmer 1993a, 1993b); thus creating bluffs whose mesa-like crests rise up to 600 feet above the floodplain of the

[1] ECS is the science of delineating and describing meaningful units of the landscape for resource management and planning. It is a hierarchal system by which smaller units are nested within units of a larger scale. ECS units are defined by climate, geology, terrain, soils, vegetation, etc (Hargrave 1996, Albert 1994, Almendinger and Hanson 1998).

Mississippi River.

The Ecological Area is a well-developed watershed with deeply, entrenched valleys and ravines that expose sedimentary bedrock on the valley slopes. The surrounding plateau is a loess covered, karst plain with subterranean streams (Hobbs 1995a, 1995b, Alexander and Lively 1995). The tributaries of the Root River begin as prairie creeks on the level to rolling plains. As these creeks coalesce they form branches of the Root River whose valleys enter into bedrock just west of the park's Ecological Area. The South Branch flows past Mystery Cave and continues through a narrow, meandering gorge bounded by limestone cliffs. In between, a segment of the river sinks into a series of karst holes and flows underground to re-emerge within its valley about a mile away. The main park is at the confluence of the South Branch and two trout streams. Both trout streams emerge from their underground channels at the base of cliffs. These are Forestville Creek, which flows near the park office, and Canfield Creek, which emerges near the park's southern border. In addition, the main park includes portions of two intermittent-stream valleys that join the South Branch where its valley widens in the northeast portion of the main park.

Vegetation Prior to Euroamerican Settlement

During the last 12,000 years, the climate affecting the Ecological Area has fluctuated widely from cold periglacial conditions dominated by spruce boreal forest to warmer periods characterized by summer drought and reoccurring fires that promoted prairie (Table 1). The park has been unglaciated for over 500,000 years before present (YBP). At the time of glacial maximum, approximately 30,000 to 12,000 YBP, the Wisconsin glacier was about 45 miles west of the park. During this time until the glacier receded, the Ecological Area was tundra or spruce dominated taiga. As the climate gradually warmed, the region became dominated by open forests of mesic deciduous trees. Eventually summer rainfall and temperature changed drastically and the Ecological Area became entirely dominated by prairie for a couple of thousand years during the hypsithermal. This hot and dry period waned and increasingly, oaks returned to the area so that at the time of Euroamerican settlement the region was a mixture of prairie, oak savanna and woodlands with mesic forests in small isolated areas. At present, the park is at or near the ecological boundary between the eastern deciduous forest and the tall-grass prairie.

Data derived from the Public Land Survey (PLS) in the year 1853 indicates that tree densities within the main park were probably much less than what was observed by MCBS plant ecologists in 1994-95 (Tables 2 and 3). This is interpreted to mean that park forests had open canopies prior to widespread settlement by Euroamericans (see Cottam 1949, Ladd 1991). At that time, maple-basswood forests dominated lower slopes in the valley and there was a compositional change in species and tree density at higher elevations up the bluffs where oak forests, woodlands and oak savanna became increasingly less dense and more open. Prairie was also found within the Ecological

Area, on the broad alluvial valley of the Root River around the town of Forestville and on the surrounding upland plateau. It is also concluded, based on PLS line notes and later reports, that upper slopes and narrow ridge crests within the main the park were covered with oak woodlands and broader ridges were covered with scattered groves of oak with many prairie openings. According to the line notes recorded by the surveyors, settlement was already occurring within the main park and prairie openings were being cultivated, pastured or invaded by brush.

The vegetation recorded by the PLS represents a snapshot of a brief transitional period in the natural history of the Ecological Area. Already, several centuries or even millennia had transpired under a climate which was becoming increasingly more favorable to woody vegetation (Tables 1 and 4). These were mainly oaks while species of mesic forests were restricted within the narrow valleys. However, prairies and open woodlands were more desirable to indigenous people, and they would use fire to arrest forest succession (Higgins 1986, Grimm 1984, 1985, Ladd 1991, Abrams 1992, Axelrod 1985). This promoted shade-intolerant oaks while hindering the establishment of shade-loving, fire-sensitive mesic species of elm, basswood and sugar maple (Buell et al. 1954, Wilhelm 1987). With the arrival of Euroamericans, the stabilizing effects of fire were eliminated from the area. Around the town of Forestville, human disturbances such as logging and livestock grazing may have maintained open forests for a while (MNDNR - Parks 1995). However, following the demise of the town, many of these disturbances no longer occurred and between the years 1865 and 1885, prairie lands became shrubby woodlands and woodlands became dense forests (Table 4). According to tree core data collected by MCBS, most of the mature forest within the main park became established after the demise of the town of Forestville (Table 5 and 6). However, trees in old growth forests were found to have germinated prior to Euroamerican settlement. These old growth forests represent some of the best maple basswood, lowland hardwood and mesic oak forests found in the Root River watershed (MNDNR - MCBS 1997c, MNDNR 1994, MNDNR - NHP 1989).

RARE PLANT SURVEY

Scott C. Zager, MCBS Plant Ecologist

Methods of Rare Plant Survey

Rare plant surveys focused on species officially listed under the Federal Endangered Species Act of 1973, Public Law 93-205 or Minnesota Statute 84.0895. A revised state list was in effect July 1, 1996. Listed species include federal and state endangered and threatened species, as well as state special concern species (Coffin and Pfannmuller 1988). Endangered and threatened species are provided the highest level of legal protection under federal and state laws. In addition, the MNDNR tracks non-listed species that have no legal status. These are tracked because their abundance and distribution is uncertain or unknown. Another set of species were collected – but not tracked –

because their presence within the Ecological Area is considered biologically significant even though they may be common in other regions of Minnesota. Occurrences of these species within the Ecological Area represent either disjunct populations isolated from their primary range or peripheral populations near the edge of their range. Most have specific habitats with limited occurrences such as algific talus slopes or rich maple-basswood forests.

Field Survey

Site visits were made by MCBS plant ecologists throughout the growing seasons of 1994 and 1995 with a few follow-up visits in 1996. All rare plants encountered during the native plant community survey were documented by the plant ecologist. Previous floristic studies were conducted by park staff and other DNR botanists (see Acknowledgments). In addition, several areas with high potential for rare species occurrences were searched more intensively with the help of the park resource specialist, park naturalists and occasionally other MCBS plant ecologists and botanists.

Data Management

All rare plant occurrences of listed and non-listed species were recorded in the Natural Heritage Information System (NHIS) - Rare Features Database as Element Occurrence Records (EORs)[2]. EORs summarize the abundance and distribution of each rare plant population. Lists of associate species are also included. EORs also provide specific details about the local habitat such as soils, slope position, percent canopy cover and dominants. Rare plant occurrences were located on USGS 7.5 minute topographical maps and then digitally mapped using ARC/INFO GIS and ARCVIEW 3.2. When populations were of adequate size, plant specimens were collected, labeled and deposited into the herbarium of the James Ford Bell Natural History Museum, University of Minnesota, St. Paul.

Results of Rare Plant Survey

The locations of plant EORs are summarized by the type of native plant community where they were found and whether they occur on public or private lands (Tables 7 and 8). Twenty-four species of rare plants are documented within the Ecological Area with a combined number of eighty-eight EORs (Figures 4a-c, Appendix 1b, c). MCBS documented fifty-four EORs during the survey. Thirty-four EORs were collected prior to MCBS. Of the total number of rare plant EORs within the Ecological Area: seventeen species are state-listed plants with a total of seventy-three EORs; seven species are non-listed with fifteen EORs. There were forty-one EORs of state endangered or state threatened species within the Ecological Area. Most of these were nodding wild onion (*Allium cernuum*) and glade mallow (*Napaea dioica*).

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[2] EOR and digital map data are available upon request by contacting: Endangered Species Environmental Review Coordinator, Division of Ecological Services, Department of Natural Resources, 500 Lafayette Road, Box 25, St. Paul, Minnesota 55155.

Of all the rare plant locations within the Ecological Area: sixty-two percent (62%) were found on public land within the park's statutory boundaries (i.e., 55 of 88 plant occurrences). However, despite the relatively higher-quality of public lands, there are no records of four plant species on public land suggesting that privately owned habitats are a significant component of the overall biodiversity of the Ecological Area. Two of these species – Iowa golden saxifrage (*Chrysosplenium iowense*), state endangered, and moschatel (*Adoxa moschatelliana*), state special concern, are protected on property owned by The Nature Conservancy.

Native Plant Communities as Habitat Types

Each native plant community is considered to be a habitat for a particular set or association of plant species. Throughout the Ecological Area, native plant communities contain a substantial percentage of the total number of rare plant EORs (Table 8). While most plant EORs are within quality communities mapped by MCBS, a few EORs are within degraded communities such as grazed, lowland hardwood forests (Figures 1a-c, 2a-c). Sometimes a rare plant occurs within a small, unmapped community inside a larger type such as a wet meadow opening of a black ash swamp. Only a small percentage of EORs were found in non-native vegetation such as old fields dominated by Eurasian pasture grasses.

Rare plant EORs were mapped at the point of observation or collection. However, each EOR represents a sample of a rare plant population that may extend throughout the native plant community where they are located on the map. Refer to the specific EOR for documentation on the exact location and abundance of each rare plant occurrence. In addition, it is important to note that while species diversity and the total number of rare plants within a community type are indicators of the biological significance for that particular community; community types with fewer EORs may still contribute significantly to the park's overall biodiversity. For example, algific talus slopes are inhabited by species not found in any other community type. Preservation of the park's overall biodiversity depends upon maintaining or restoring the natural range of variation for all the community types within the Ecological Area.

Disjunct and Peripheral Plant Populations

The Ecological Area is one of most floristically diverse macrosites in southeastern Minnesota. This diversity is attributed to changes in distributions of plant species that followed climatic changes since the last glaciation (Table 1) and due to the rugged terrain which provides refuges for species that would not otherwise survive under today's climate or in the absence of fire (Wells 1965, 1970; Grimm 1983, 1984; Braun 1951; Gleason 1913). At present, the Paleozoic Plateau is at or near the interface of three major biomes whose distributions are primarily controlled by climate: northern coniferous forest, eastern deciduous forest and tallgrass prairie (Wendt and Coffin 1988). At one time, each of these biomes were more prevalent in the Paleozoic Plateau during past climatic regimes

(Baker et al. 1996, Baker et al. 1992, Chumbley et al. 1990). As climate changed, the ambient environment favored species of one biome while becoming hostile to others. Today, within the Ecological Area, remnants of these biomes are represented by species with unusual modern distributions. Some plant occurrences within the Ecological Area are disjunct populations isolated from their primary range, others are peripheral populations near the edge of their range (Smith 1988, Hartley 1966, Pusateri et al. 1993, Axelrod 1985). For example, within the Ecological area, the northern coniferous forest is represented by disjunct populations of balsam fir (*Abies balsamea*), bunchberry (*Cornus canadensis*), northern black current (*Ribes hudsonianum*) and Iowa golden saxifrage (*Chrysosplenium iowense*); the eastern deciduous forest is represented by peripheral populations of squirrel corn (*Dicentra canadensis*), silvery spleenwort (*Athyrium thelypteroides*), Goldie's fern (*Dryopteris goldiana*) and twinleaf (*Jeffersonia diphylla*); and prairie is represented by a small, peripheral population of rattlesnake-master (*Eryngium yuccifolium*).

It is likely that species with northern and eastern distributions were widespread in the Midwest during past climatic regimes. As the climate changed and these species diminished, a few populations survived as relicts in refugia whose microclimate is maintained by the rugged terrain or unique ecological processes (Braun 1951; Nekola 1993,1999; Frest 1986a, 1987, 1991; Pusateri et al. 1993). Northern species are sustained on cold karst habitats whose microclimate is attributed to subterranean ice. Eastern deciduous forest species are sustained in cool, humid environments within rich maple-basswood forests near groundwater seeps, along spring-fed streams, within secluded ravines or along lower slopes of north-facing bluffs. And while the diminishment of prairie is primarily attributed to habitat loss since Euroamerican settlement, extant prairies within the Ecological Area have only survived in the absence of periodic fire on drought-prone habitats that restrict the invasion of trees and shrubs. Perhaps prairie remnants on valley bluffs may be considered refugia for populations that have existed for millennia in an increasingly hostile environment – one that is more favorable to woody vegetation.

Throughout the past, such refuges have always served as seed sources for expansion during periods of favorable climate. Grimm (1983, 1984, 1985) stated that the "big woods" – a large area of mesic deciduous forest in south-central Minnesota – probably had its origins from several small mesic populations that coalesced into one contiguous canopy. Gleason (1913) stated that, "under attack of prairie fires, the forests have been driven back or destroyed, except in those areas where the ... topography has enabled them to resist the encroachments of the prairie." Frest (1991) stated that "...some of the land snail species have persisted [on cold-producing habitats] through several glaciations, it is likely that similar refugia existed in other interglacials... All the relict elements likely had much more extensive ranges in the past, most recently peaking in the Late Wisconsonian, perhaps 18,000-12,000 YBP" (Frest 1991, p7).

Within the park, and throughout the Paleozoic Plateau, refuge habitats of cold karst communities, rich maple basswood forest and bluff prairie are "centers of diversity" where species populations may have endured several millennia of climatic changes and human disturbances. In order to accomplish the park's stated goal to "... preserve, perpetuate, and interpret natural features that existed in the area of the park prior to [Euroamerican] settlement..." then these centers of diversity should be valued, protected and managed for their continual existence.

NATIVE PLANT COMMUNITY SURVEY

Scott C. Zager, MCBS Plant Ecologist

Methods of Native Plant Community Surveys

Native plant communities have no legal protection in Minnesota. However, the identification, protection, and management of native plant communities and ecosystems is considered a high priority within the MNDNR. Native plant communities are groups of native plants that interact with each other and the surrounding environment in ways not greatly altered by humans or by introduced plant or animal species. These groups of native plants form recognizable units, such as an oak forest, a prairie, or a marsh, that tend to repeat across the landscape and over time. A survey of community types of a particular area provides a more meaningful description of the natural landscape where rare plants and animals occur. A map of community types provides a general estimate of the habitat potentially available to species, especially plants. Vegetation within the Ecological Area was (MNDNR - NHP 1993). Forest communities in this classification are currently under revision. Preliminary data from analysis for this revision have been used to describe community types within the Ecological Area (Appendix 3).

Remote Sensing, Field Survey and Mapping

Native plant community types within the Ecological Area were initially delineated onto USGS 7.5 minute topographical maps using leaf-off, aerial photography[3]. Additional leaf-on aerial photography was used to adjust community boundaries, add cover types of disturbed areas and identify new roads and housing in adjacent private lands[4]. Other sources of information used to map and describe native plant communities include: Cooperative Stand Assessment (CSA) data from MNDNR, Division of Forestry; park management plan (MNDNR - Parks 1978, 1995); the Fillmore County soil survey (Farnharm 1954); the Minnesota soil atlas (University of Minnesota 1973); and the Geologic Atlas of Fillmore County (Mossler 1995a, Lively and Balaban 1995).

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[3] National Aerial Photography Program, 17 April, 1991, scale 1:40,000 color infra-red (CIR).

[4] MNDNR Forest Resource Inventory, October 1992, scale 1:15,840, CIR).

In order to verify air-photo interpretation, site visits were made by MCBS plant ecologists throughout the growing seasons of 1994 and 1995 with a few follow-up visits in 1996. During field visits, native plant community boundaries were modified in order to accurately map their observed relationships to slope position, elevation and gradient. By doing this, the location and distribution of community types can be compared to soil types and specific layers of bedrock.

Relevé Vegetation Plots

Native plant communities were sampled by MCBS plant ecologists using the relevé method of vegetation sampling. The relevé method is a semi-quantitative method of recording data used in the classification and description of vegetation in a consistent manner (Almendinger 1987). The method is used statewide, therefore, individual plot data can be compared to data from other areas and the combined results used to gain further understanding of the vegetation of Minnesota. The goals of relevé sampling within the park's Ecological Area were to assist with mapping and describing native plant communities while establishing a baseline for monitoring long-term vegetation changes in selected areas.

Relevé plots were 400 square meters for forested communities and 100 square meters for prairies and meadows. Within each plot, the vegetation was described by estimating the percent cover of each species in each of the different height strata. In addition, tree tallies were made in many forested plots. In these tallies, the plant ecologists recorded the diameter at breast height (DBH) of each tree over 7.5 centimeters DBH and counted saplings with a range of DBH from 2.5 to 7.5 centimeters. Within relevé plots, a representative sample of trees from the oldest and typical size classes were selected and aged with an increment bore (MNDNR - Forest Resource Assessment Program 1983).

Plot locations were selected to represent each community type. Multiple plots were established in some native plant community types in an attempt to document variation within important native plant community types. Permanent relevé plots were established within areas of public ownership within the Park. Permanent plots were marked with an orange-painted post made from steel conduit driven into the ground in the upper right-hand corner of each plot (facing upslope). Each post was identified with a numbered tag. Compass bearings of the relevé boundaries are included on photocopies of the original data sheets. Temporary plots were sampled in community types that are too fragile to withstand repeated sampling even over long intervals (i.e., algific talus slopes). Temporary plots were also used on private land within the Ecological Area in order to provide additional data leading to a more complete understanding of native plant communities in the region.

Data Management

Following site visits by the ecologist, community boundaries were corrected on the topographic maps. Initially, the final boundaries were digitally recorded using ARC/INFO Geographic Information System (GIS) and later converted to ARCVIEW 3.2. Locations and descriptions of each native plant community, were entered as Element Occurrence Records (EORs) into the Rare Features Database of the Natural Heritage Information System (NHIS). Appendix 1 contains EOR printouts that include information on native plant community type, percent canopy cover, major dominants, slope position or elevation, soil type, species associates, etc.

Results of Native Plant Community Surveys

While the park's Ecological Area was predominantly open forest or woodland prior to Euroamerican settlement, it is presently one of the largest areas of contiguous forest canopy in Southeast Minnesota and includes forests of the highest quality especially within the main park. The narrow valleys and adjacent bluffs of the Ecological Area are covered by deciduous forests of all age classes. Significant areas in the main park are dominated by old growth stands of maple-basswood, lowland hardwood, mesic red oak and dry-mesic oak forests. In addition, scattered stands of white pine, with some individual trees approaching 120 years old, are on shallow soils over several bench terraces cut into the bedrock cliffs at different elevations. Many remnants of wetland communities are present including spring-fed oxbow sloughs dominated by wild rice *(Zizania palustris var. interior)*, seepage meadows and black ash swamps containing 200 year old trees. Lowland forest dominates large areas within valleys of small tributaries to the South Branch Root River such as Canfield Creek and Forestville Creek. Within the Ecological Area, bluff prairies are only found in small remnants on upper slopes and narrow ridge crests. These are significant because bedrock bluff prairies are uncommon west of the town of Lanesboro. The Ecological Area supports more cold-producing habitats of maderate cliffs and algific talus slopes than is found at any other site or macrosite in Minnesota. These cold-producing slopes and cliffs support disjunct populations of northern plants such as balsam fir (*Abies balsamea*) that are thought to be Pleistocene relicts that have survived since the last glaciation.

The main park is the best portion of the Ecological Area forming a core natural area with nearly 2,000 acres of native plant communities. Slightly over half of these communities are considered to be of exceptional ecological quality. As illustrated on the enclosed map (Figures 1a-c), there are less than 900 acres of native plant communities outside of the park. These are generally – but not always – low quality fragments separated by disturbed forests and developed land (Figures 2a-c). For example, Mystery Cave I and II are small parcels located about four miles upstream from the Park headquarters. These small tracts include only portions of mediocre forests that show signs of human disturbances such as poor floristic diversity associated with rills and gullies from past erosion. Yet,

from a landscape perspective, even the highly disturbed forests, managed forests and old fields contribute to the area's biological diversity by providing potential habitat for plants, migrating birds and other species of wildlife. However, despite the overall higher quality of the main park, many of the best algific talus slopes and maderate cliffs are not on public land – some are just outside the borders of the park. These are the best cold-producing habitats in Minnesota. One is protected by The Nature Conservancy, others are being grazed.

Native Plant Community Types

Descriptions of native plant community types observed within the Ecological Area are given in Appendix 3. Maps of these native plant comminutes are given in Figures 1a-c. There are a total of seventeen native plant community types recorded within the Ecological Area. These include dry prairie bedrock bluff subtype, oak woodland-brushland, dry oak forest, dry-mesic oak forest, mesic oak forest, maple-basswood forest, white pine-hardwood forest, lowland hardwood forest, black ash swamp - seepage subtype, seepage meadow and northern hardwood-conifer forest. Six important primary communities found in the area include moist cliff, moist cliff maderate subtype, dry cliff, talus slope, talus slope algific subtype and river beach.

Native plant communities within the Ecological Area are generally arranged by the elevation or slope position where these communities occur on the terrain (Tables 9 and 10). Similar patterns of species composition, species distributions and native plant communities along a topographic gradient have been described in the driftless area and surrounding regions (Braun 1950, Curtis 1959, Hartley 1966, Eilers 1971, 1974, Cahayla-Wynne and Glenn-Lewin 1978, Christiansen et al. 1980, Blewitt et al. 1983, Lammers 1983, Johnson-Groh 1985, Johnson-Groh et al.1987, MNDNR - MCBS 1994, 1996). This vertical arrangement corresponds to the different layers of bedrock and soil types which appear to be the primary factors determining the distribution of vegetation within the park's Ecological Area. Each topographic position has a prevailing set of environmental conditions or ecological processes that most influences the vegetation best adapted to live there. For example, south-facing slopes have had a tendency in the past to burn more frequently especially on the upper slopes because they are hotter and drier. And even though these areas may not have burned for some time, the plants growing there are nonetheless adapted to fire prone habitats. Therefore, fire is part of a set of ecological processes that govern the type of vegetation and its structure found in these habitats. Another example of an ecological system is in mesic forests where competition for space, nutrients and light is the primary factor determining species presence. Within this system, various types of disturbances occur that create openings in forest canopies thereby allowing higher amounts of light to reach the forest floor. This helps to maintain sun-loving species within the community. Certain topographic positions and soil types have a higher tendency for disturbances such as wind damage, disease, lightning and even fire. Habitats where these events frequently occur are more likely to have

species requiring full light to reach maturity such as bur oaks and northern pin oaks.

Relevé Vegetation Plots

MCBS recorded data from thirty-three relevés within the Ecological Area (Figure 3, Tables 9 and 10). Of these, twenty-three relevé plots were permanently marked for future monitoring within the main park. Ten other relevés were sampled in unmarked plots because they were too fragile for repeated sampling or were on private land.

Permanent relevé plots were sampled in dry prairie - bedrock bluff subtype (relevés sampled: n = 1), oak forest - dry subtype (n = 1), dry-mesic oak forest (n = 6), mesic oak forest (n = 3), maple basswood forest (n = 3), lowland hardwood forest (n = 4), black ash swamps seepage subtype (n = 2), white pine - hardwood forest (n = 2) and seepage meadow (n = 1).

Non-permanent relevé plots were sampled in dry prairie - bedrock bluff subtype (n = 1), dry-mesic oak forest (n = 1), seepage meadow (n = 1), algific talus slopes (n = 5) and northern hardwood - conifer forest (n = 2).

Old Growth Forests

A total of thirty-three trees were aged within the main park (Table 5). Based on tree core data, it can be concluded that most of the mature trees in the park were among the first generation of trees (cohort) since the arrival of Euroamericans. The average age of all species recorded was 130 years (trees with DBH = 14-28 inches; n = 33:). The average age of 16 trees of large red oaks cored in the park was about 120 years with one red oak being older than 174 years. This places the date of origin for most of these trees somewhere between 1860-1885 (Table 6). This coincides with the collapse of the town's major industries (MNDNR - Parks 1995). At that time, the Forestville store was barely making a profit, although it was still operated part-time until 1910. The grist mill closed down in 1880. The brick kiln closed in 1885. However, many large trees predate Euroamerican settlement of the area. In a demographic distribution of the largest oak trees – greater than 16" DBH – one tree out of six is older than 145 years of age.

MCBS did not conduct old growth evaluations as part of the survey within the park; however, MCBS plant ecologists did record data which indicated that three forested tracts met old growth criteria. At present, forests in three large areas of the park support a high density of large old trees ($SW^1/_4$ section 18, $SW^1/_4$ section 13 and $NW^1/_4$ sect. 25) where the average age of the largest trees is about 133 years and several trees, especially the white oaks, are much older with some greater than 280 years (Tables 5 and 6). These are considered to be old growth oak, maple basswood and lowland hardwood forests (MNDNR - NHP 1989, MNDNR 1994, MNDNR - MCBS 1997c).

Map of Native Plant Communities

Included with this report is a cover map of native plant communities (Figures 1a-c). Native plant community types are described in Appendix 3. Colored polygons are classified according to the community type observed there. Each polygon is also labeled with an ecological rank that further describes the quality within the designated area (Figures 2a-c). Communities with high ecological quality show little if any evidence of human disturbance. High quality areas are often floristically diverse with few exotic weeds. Within these high-quality communities, plants exhibit their natural patterns of distribution over the landscape. High quality forests typically have trees of all age classes including an abundance of old trees, snags, downed trees and few stumps.

Communities were evaluated and given ecological quality ranks using a scale from "A to D", with "A" being the highest quality, or nearly pristine, and "D" the lowest, or most highly disturbed (MNDNR - NHP 1993). Areas ranked "A", "B", or the half-step "BC" are native plant communities of exceptional quality exhibiting characteristics of vegetation and soils that are above average. Areas ranked C are more disturbed, but are still considered to be intact native plant communities. Lower ranks of "CD" or "D", indicate highly disturbed areas, such as a prairie with few species and much woody invasion, or a forest that has been heavily grazed, eroded or logged. Gray depicts heavily disturbed plant communities that fall below standards. White depicts developed areas such as old fields, tree plantations and campgrounds. Printouts of element occurrence records for each native plant community is available upon request. EORs include quality ranks and descriptive information for each occurrence.

Native Plant Community Significance Tables

A major objective of this report is to describe the biological significance of the park's natural resources in relationship to other natural areas. Within the Paleozoic Plateau, all MCBS sites have been described and the number and the acreage of native plant communities has been determined. In Appendix 3, tables list the estimated total acreage of each native plant community found within the statutory boundaries of the park. These acreages are then compared to the total area of native plant communities within other larger geographic categories: the park's Ecological Area, Fillmore County and all counties inventoried by MCBS within the Paleozoic Plateau. Ecological quality is also addressed. Polygons of native plant communities were mapped within the park's Ecological Area according to the relative quality of the area. Area tables also show the acreage of native plant communities with exceptional ecological quality. For example, species occurring on cold-producing habitats can only be found in valleys with a specific type of bedrock and landform type. These landscape features can be recognized from topographic maps showing features of the slopes within valleys found entirely within Galena limestone. Not all such valleys have all the necessary conditions for producing ice-cooled habitats but it is believed that most areas have been located by

MCBS and previous surveys. There are 38 acres of algific talus slopes mapped within the park's Ecological Area. Most of these are of exceptional quality: 71% of the area's total. For comparison, there are 128 acres total for all algific talus slopes mapped by MCBS regardless of quality. The park's Ecological Area contains nearly 30% of the total area of algific talus slopes found in the state. However, only 8.8 acres are on public land within the park itself.

MANAGEMENT CONSIDERATIONS FOR ECOLOGICAL SYSTEMS

Scott C. Zager, MCBS Plant Ecologist

An ecological system is a broad unit of vegetation characterized by a unique set of environmental processes and conditions such as fire regimes, riparian flood regimes or by abiotic factors such as available nutrients. Within any particular ecological system there are groups - or associations - of plant species that share similar habitats and environmental gradients. These species associations are defined as native plant communities. Classifying native plant communities according to the ecological systems that most influence their habitats is a good way to begin discussion about the management of natural areas. Therefore, native plant communities within the park's Ecological Area have been organized according to six different systems given in Table 11.

The following considerations for native plant communities within the various systems should be viewed as ideal goals and not strict specifications. It is recognized that land managers must balance and prioritize multiple and often conflicting goals. Final action is often a pragmatic result of available time and resources. These guidelines should be considered attempts to mimic natural processes that historically occurred as part of the ecological systems (White 1979). Please see other sections of this report about management recommendations for animals. Managing park lands as part of a landscape team with other DNR divisions along with cooperating landowners may be the best approach to accomplishing the park's overall goals.

Protection of native plant communities within the Ecological Area depends upon local support. A combination of public ownership and private conservation action is necessary to maintain the natural quality of such a large macrosite. Specifically, it is recommended that state park statutory boundaries be expanded. It is also recommended that other portions of the Ecological Area be designated as Scientific and Natural Areas. It is hoped that private landowners and organizations will recognize the area's special qualities and voluntarily preserve the natural quality of their land. Private and public partnerships can be developed to protect natural areas and buffers where SNA status and park ownership is not an option (Allman 1996, 1997).

Buffers are needed above park lands with steep bluffs and cliffs. Agreements could be developed with surrounding landowners to ensure surface run-off and groundwater entering native plant communities are as non-erosive and unpolluted as possible. Conservation easements could be obtained to protect natural resources while maintaining private ownership of the land. Encouraging adjacent landowners to enroll into the Conservation Reserve Program (CRP) on surrounding cropland would help minimize potential erosion and pollution by trapping sediments and slowing surface runoff. Such agreements should include the preservation of sinkholes that feed air and water to cold-producing habitats.

Management Considerations for the Fire Dependent System

Prior to modern wildfire suppression, fire was an important ecological factor influencing many of the native plant communities within the Paleozoic Plateau. Today, remnants of fire-dependent communities within the park's Ecological Area are only found on dry, drought-prone substrates where succession has been delayed. Native plant communities within the fire dependent system occur as a series of successional stages arranged along a gradient of decreasing light available to the herbaceous layer. In the absence of fire, woody plants become more abundant while sun-loving herbs of prairies and woodlands become scarce.

In general, the management of fire-dependent communities should favor plants adversely affected by shade or woody competition. Top priority should be given to the rarest and most vulnerable communities and species, which in the fire-dependent system would be prairie. Woody vegetation should be controlled by a combination of prescribed burns and mechanical removal. Periodic fire has additional benefits not achieved by cutting alone. Frequent, repeated treatments are necessary to control woody vegetation (Tester 1989, 1996; Agee 1996). Care should be taken to avoid excessive burning of the site, particularly spring burning, which is likely to promote smooth sumac and aspens. Annual burning lowers species richness and results in chronic soil nitrogen deficiency (Collins 1992). Treatments in late summer or early fall provide the best control of woody plants. Historically in the Midwest, woodland fires occurred most often in October (Higgins 1986, Ladd 1991). Hot intense fires resulting from large fuel loads of duff or brush could damage native grasses and forbs (Agee 1996). Minimize potential damage by scattering cut brush, removing large limbs and logs and conducting cool burns when there are large accumulations of duff. Monitoring should be conducted to assess burn management and should consider animal species such as ants, butterflies, small mammals and reptiles, as well as plants.

It is recommended that prairies be cleared of woody species characteristic of woodlands and forests such as gray dogwood, aspens and prickly ash. To maintain prairie vegetation on cliff edges or along bluff crests, conversion of woodlands into savannas might be accomplished by removing all the

understory trees and leaving only the largest and oldest oaks and a few replacements. Plant diversity of the prairie within the park could be augmented with the addition of seed and cultivated seedlings collected from other prairies within the Ecological Area. Care should taken to collect seed in an appropriate manner so that the viability of existing native populations is maintained.

It is recognized that burning woodlands throughout the park will be difficult to achieve. Division of the park's natural areas into subunits is encouraged so that each subunit can be given a priority for burn management that is compatible with the park's overall goals. Selecting BC-ranked forest and woodland communities for burn management could have best potential for ecological improvement. Ideally, dry-mesic and dry oak forests would best be maintained as woodlands with open canopies. If possible, dry oak forests on upper slopes of south-facing, rocky bluffs could be converted to open-canopied woodlands by removing all understory trees and most shrubs. The upper slopes of dry-mesic forests could be converted to woodlands leaving the largest and oldest trees and a few replacements. Lower slopes of dry-mesic forests could be allowed to succeed to mesic old growth forest so that the viability of other native populations is maintained.

Prairies on private land in the western portion of the park's Ecological Area are biologically significant. These lands could be protected either through a program of cooperative agreements with landowners, prairie tax credit, modification of park boundaries or acquisition by the Scientific and Natural Areas Program.

Trails

Vegetation on shallow soils over bedrock is vulnerable to concentrated activity such as foot traffic, bike and horse riding. Recreational areas such as trails or scenic overlooks need to be designed to focus activity in selected, well-defined areas to minimize the impact along scenic cliffs and bluffs where the narrow band of prairie is all that remains in the immediate vicinity. An alternative route for horse trails would be preferred to the one that cuts across the park's only prairie.

Erosion

Throughout southeastern Minnesota, bluff crests and upper slopes have been converted to agriculture or other human uses that affect drainage. Native plant communities on steep bluffs are greatly impacted where rainwater infiltration is reduced and surficial runoff is maximized. Communities are especially vulnerable on slopes below cultivated land not ameliorated by soil conservation practices or on grazed forests with compacted soils. Sheet erosion on middle to upper slopes may not be readily observed because it has a gradual and accumulative effect of removing decaying vegetation, top soil and dormant seeds. Erosive conditions favor opportunistic weeds that establish quickly while safe sites where native seeds geminate and take root are reduced. Erosion is first evident on

footslopes and lower slopes where rills and gullies initially develop and begin to work upwards. If land-use patterns change upslope, then monitoring for erosion should occur. In order to protect the natural quality of public lands, adequate buffers are needed on and around steep valley bluffs. Within these buffers, soil conservation practices could be implemented or preferably these lands could be restored to native vegetation.

Management References:

Anderson 2000, Faber-Langendoen and Davis 1995, Jacobs and Wray 1992, Kilde 2000, MNDNR - Forestry 1993, Minnesota Forest Resources Council 1999.

Management Considerations for the Mesic Forest System

Mesic forest communities are subclimax and climax successional types where the subcanopy vegetation becomes increasingly shaded over time. Gradually as shade tolerant species become more abundant, there is a transformation of canopy dominants with corresponding changes in the subcanopy, shrub and herbaceous layers. As canopy trees age, forest structure becomes more varied as younger trees fill gaps created by snags, tip-ups and broken limbs. Changes in soil composition also occurs because nutrients and organic material tend to accumulate under maples, creating a richer soil with a higher capacity to hold moisture. Long-established mesic forests have a high number of obligate species specifically adapted to low light/high soil-moisture conditions. Consequently, the flora in rich maple-basswood forests is unique and represents a significant component of the region's biodiversity.

One management option is to allow mesic forests to succeed to old growth, climax forests. Since management to sustain red oak dominated stands in these habitats is not recommended, an assessment of the desired native plant communities in the park should be made to determine whether the maintenance of some other areas as oak-dominated communities is desirable. It is expected that the dominance of red oak in the canopy will diminish on mesic soils due to succession, but never entirely disappear because of gap phase replacement. Sustaining oak dominated forests, generation after generation, at any one location within the state park, may not be accomplished without very intensive management. Other lands outside the park within the Ecological Area, especially state forest lands, may offer better locations for regenerating oak while simultaneously protecting natural areas.

Other considerations for protecting rich maple-basswood forests would be to avoid trails and other developments along footslopes, within ravines and around margins of black ash seepage swamps. Loose colluvial soils accumulating at the base of super-steep bluffs are especially vulnerable to erosion and compaction resulting from hikers, climbers and horses. High deer populations could

have a deleterious effect on the mesic flora as many spring ephemerals such as trilliums and wild leeks are preferred food (Augustine and Frelich 1998). Monitoring should occur to check selected plant populations and browse of herbs, shrubs, seedlings and saplings should be noted.

Goals for dry-mesic forests are determined by their position on the slope. At present, dry-mesic forests on upper slopes are succeeding to mesic canopy species such as elms and hickories. These and other shade tolerant trees are becoming more prevalent. However, it is unlikely that the dry-mesic soils on upper slopes and crests will support plants of rich mesic forests found on footslopes and ravines where consistent moisture levels are assured. Therefore, when feasible, it is recommended that dry-mesic forests on upperslopes and bluff crests be managed as open woodlands. It is predicted that red oak would be sustained in woodlands where the total canopy cover is maintained between 50 and 75% and shrub cover is rare to interrupted (Cottam 1949, Jacobs and Wray 1992, Lorimer 1989, Crow 1988, Scholz 1948).

White pine populations are small and probably genetically isolated within the park's Ecological Area. White pine stands were included within the mesic system because the rugged terrain of the Ecological Area has enabled white pine to naturally regenerate above bedrock exposures. Steep slopes and shallow soils over bedrock have contributed to conditions similar to shelterwood silvicultural practices where the open canopy allows young pines to reach maturity. In addition, the rugged terrain probably protects seedlings and saplings by hindering access of browsers. White pine stands should be monitored to ensure that replacement is occurring and that all-age classes are present. Periodically, groups of small seedlings could be hand-planted to ensure canopy replacement in stands where only older trees remain. A local genetic source should be obtained. It may be prudent to introduce seedlings from other stands in the Paleozoic Plateau in order to increase genetic diversity. It is debatable whether or not white pine should be planted in bluff habitats other than on bedrock terraces.

Erosion

See comments on erosion in the management of fire-dependent communities.

Exotic Species

Exotic species were not observed to be a problem at the time of the survey. However, invasive species have over taken many woodlands in Fillmore county. In general, forest fragmentation and soil disturbance increase the potential for exotic species to colonize. The most problematic species to watch for are European alder-buckthorn (*Rhamnus frangula*), common buckthorn (*Rhamnus cathartica*) and garlic mustard (*Alliaria petiolata*).

Management References:

Anderson 2000, Faber-Langendoen and Davis 1995, Jacobs and Wray 1992, Kilde 2000, MNDNR - Forestry 1993, Pearson 1998, Green 1995, Minnesota Forest Resources Council 1996, 1999.

Management Considerations for the Floodplain System

Floodplain communities within the Ecological Area vary in species composition, dominants and overall structure. These characteristics increase the ecological quality of the floodplain and greatly enhance the biodiversity of the region. The overall appearance of the vegetation is determined primarily by hydrology. Other disturbances such as wind, fire and human activity have affected floodplains as well. Floods within the park are usually brief because flood waters are quickly drained away. Yet perched water tables provide stable habitats for black ash swamps and wet meadows. Many of these are maintained by springs. Other ephemeral wetlands are important. The lowland forest near the park office is a high quality stand with several old trees and snags characteristic of old growth forest. Another outstanding lowland forest occurs along Forestville Creek on private land. It is suggested that management should emphasize the mixed age structure and species composition of the forest while simultaneously increase the abundance of large trees and snags, especially along the streambanks. Herbaceous meadows and grasslands have a significant role as well.

Forested, narrow-valley streams with natural meanders and rocky streambeds are rare in southern Minnesota. As the popularity of the park increases, demand for new trails, roads and facilities within the floodplain will potentially impact these stream corridors. Stream segments outlined in Figure 5 are among the best natural waterways in the blufflands. Whenever possible, development should be avoided within these focal areas of biodiversity.

Management References

Pearson 1998, Green 1995, Minnesota Forest Resources Council 1999.

Management Considerations for the Wet Forest / Wet Meadow Systems

Groundwater seeps and springs within the Ecological Area are fed by large aquifers. Water emerges at specific bedrock layers at various slope positions depending upon their position within the valley. Stable wetlands form where groundwater emerges from bluffs at the same elevation as bench terraces or alluvial plains. Succession probably proceeded from open meadow to forested swamps according to the increasing dominance of black ash – some of which are nearly 200 years old. Surrounding these spring-fed wetlands are rich maple-basswood forests and wet-mesic lowland hardwood forests inhabited by rare plants. The seepage meadows are the last refuge for herbaceous species that were formerly common in wet prairies, wet meadows and emergent marshes. In one location, spring water

fills old channels creating pools of standing water providing habitat for wild rice and other emergent plants.

Changes in hydrology since Euroamerican settlement have undoubtedly reduced the number of wetlands. Decreased infiltration rates of rain water on the uplands have lead to episodes of rapid intense flooding, deepened stream channels and lowered local water tables. As a result, the local hydrology changed and wetlands on the floodplain became dry. Such conversion facilitated grazing, cultivation and other human uses leading to nearly total elimination of all presettlement wetlands in the Paleozoic Plateau. Natural wetlands have been maintained on perched water tables that are very local and specific to certain segments in the watershed. The main park transects one of these landscapes and contains a significant proportion of the total area of these community types documented within the Paleozoic Plateau.

Management should protect and enhance the defining characteristics of these native plant communities. Brush in wet meadows should not be eliminated but managed to maintain dominance of sun-loving, herbaceous species. Black ash swamps and surrounding mesic forests should be allowed to mature to old growth forests. Trails should avoid seepage areas and surrounding mesic forests. The quality and flow of groundwater should be monitored periodically. Seeps and springs emerging in valleys within the park are connected to larger aquifers underlying the upland plateau. Because these wetlands are potentially impacted by activities outside the park boundaries, continued participation by park staff in regional groundwater management is encouraged.

Management Considerations for the Cliff System

Please see discussion in management of Cold Karst Communities and sections on trails and erosion in management of fire dependent communities.

Management Considerations for the Cold Karst System

Algific talus slopes and maderate cliffs are unique to the Midwest and Minnesota has some of the best examples. The Ecological Area – with its algific talus slopes and maderate cliffs – is one of four, very large cold-producing watersheds in Minnesota (Table 12). These ice-chilled habitats support an exceptional number of rare species which makes these communities a high priority for preservation. Because the loose talus is easily dislodged, traffic by livestock or people can be disastrous. Changes in surface runoff caused by roads, trails, houses and other developments – such as increased runoff due to logging or cultivation upslope – can quickly erode shallow organic soils. Fracture lines and fissures in the underlying bedrock can go back as far as 3/4 of mile to sink holes on the upland plateau (Ostlie 1989). These geologic features make the groundwater feeding the ice cavities, and ultimately the cliffs and talus, vulnerable to contamination. Sealing of the sink holes

(e.g., agriculture, roads, houses) can obstruct ventilation necessary for the production of subterranean ice. In addition, a reduction in deciduous tree canopy may result in a loss of potential food for land snails that feed upon tree leaf litter, especially paper birch (*Betula papyrifera*), yellow birch (*Betula alleghaniensis*), mountain maple (*Acer spicatum*), sugar maple (*Acer saccharum*) and possibly basswood (*Tilia americana*) (Perkins 1988). Simultaneously, a decrease in shade may also adversely affect snail mortality due to increase ultraviolet radiation (Ostlie 1987 cited by Perkins 1988). Therefore, the adjacent uplands must be properly managed to protect the integrity of the cold habitats.

Generally, it is believed that many of the land snails are restricted to cold-producing karst habitats. Isolated populations possess little or no genetic variability because inbreeding is likely (Ostlie 1991). Because small, isolated populations are genetically uniform, all the genetic variability of a species is found between populations. It is therefore necessary that several cold-producing habitats are protected. Within valleys containing cold-producing bedrock, there is a gradient from cold to warm; and a second gradient from wet to dry. Species require some specific combination of the two factors: Cold-Wet or Cold-Dry. Many of the common snail species (succineids) are abundant around seepage areas (Frest 1991). Conservation action within the park and its Ecological area should attempt to protect the entire set of gradations present within the system.

The abundance of rare species within cold karst communities of the Ecological Area is reason alone for conservation action, however, the occurrence of these species in a natural landscape makes this one of the most important areas of biodiversity and a top priority for preservation. The Ecological Area is an excellent example of a catena of native plant communities as they would naturally occur on the southeast Minnesota landscape.

ANIMAL SURVEYS IN FORESTVILLE/MYSTERY CAVE STATE PARK

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Overview

The Minnesota County Biological Survey (MCBS) conducted surveys for small mammals, breeding-season birds, reptiles, and amphibians in Forestville/Mystery Cave State Park from 1995 through 1996, with follow-up work in 1999. Although the discussion of native plant communities and rare plants in this report encompass the Forestville/Mystery Cave Ecological Area, animal surveys were concentrated within the statutory boundaries of the park and little work was conducted outside the park in the ecological area. Rare animal species were the focus of survey efforts, with targeted species being determined by historical records and the presence of appropriate habitat within the park (Table 13). These included species that were federally-listed as endangered or threatened, species that were state-listed as endangered, threatened, or of special concern, rare but unlisted species that were tracked as elements by the Natural Heritage Information System (NHIS), and aggregations of animals, such as colonial waterbird nesting sites or bat hibernacula, that also were tracked by the NHIS Rare Features database.

During the same year that surveys were being conducted at Forestville/Mystery Cave State Park, the state's list of rare species was undergoing revision. From this revision, several species changed their level of endangerment, some were added to the list, and others were delisted (see Table 13). Thus, species added to the state list as a result of the revision were not specifically targeted for surveys in the park. Nevertheless, two bird species that were added, Acadian Flycatcher and Cerulean Warbler, were recorded while conducting bird surveys.

Prior to the MCBS surveys, the NHIS Rare Features database contained 14 records for eight rare animals and one animal aggregation within the statutory boundaries of Forestville/Mystery Cave State Park. These included two bats -- Northern myotis and Eastern pipistrelle, one bat hibernaculum -- Mystery Cave, no birds, two snakes -- Timber rattlesnake and Milksnake, one turtle -- Blanding's turtle, one fish -- American brook lamprey, and two landsnails -- Minnesota Pleistocene ambersnail and Hubricht's vertigo. Following completion of MCBS animal surveys, 25 new or updated records were added for Northern myotis, Eastern pipistrelle, bat hibernacula, Acadian Flycatcher, Louisiana Waterthrush, and Cerulean Warbler (Figure 7, Appendix 1; note that rare animal records in the appendix also include those for the Forestville/Mystery Cave Ecological Area to complement the list of the native plant communities and rare plants).

This section on animals in Forestville/Mystery Cave State Park is limited to those animal groups surveyed by MCBS – mammals, birds, and herpetofauna. However, information exists elsewhere for other animal groups found in the park. Surveys of fish were conducted in the park and portions the Root River in Mystery Cave (Schmidt 1990a, 1990b, 1992, 1993, 1994). Aquatic invertebrates were sampled from the Root River within Mystery Cave (Montz 1993). Surveys of rare landsnails were conducted in algific talus slopes within the park (Frest 1986b, 1991; refer to the description of algific talus slopes in the native plant community section for additional discussion of these snails).

Mammals

Six rare small mammals have been documented from the Paleozoic Plateau Ecological Section and another, the Eastern spotted skunk, has been reported, but not verified, from this region (Table 13). These rare species were the focus of MCBS mammal surveys at Forestville/Mystery Cave State Park. In addition, surveys sampled a variety of habitats to document the small mammal fauna present in the park.

Most of the existing records of rare small mammals from the Paleozoic Plateau were grassland-associated species. Thus, this habitat was of particular interest for surveys at Forestville/Mystery Cave State Park. In 1948, several Western harvest mice, a non-listed but rare species, were collected along a fencerow in tall grass in "Forestville" (James Ford Bell Museum of Natural History, University of Minnesota, St. Paul). The specimen information, however, did not indicate whether it was the town or the township of Forestville where this species was taken. The Least shrew also has been taken from this type of habitat, however, this species is known from the Paleozoic Plateau by only a single 1914 record from Winona County. Another grassland species, the Prairie vole, has been recorded from several locations within the Paleozoic Plateau. Most were taken from large, open tracts of dry, native prairie. The grasslands at Forestville/Mystery Cave State Park are not ideal for Prairie voles; the bluff prairies are relatively small and heavily over-grown and the larger grasslands tend to be mesic, highly disturbed, or have been restored to native plant species in the relatively recent past. Nevertheless, these areas were surveyed for rare small mammals (Figure 6, Table 14).

The only rare, terrestrial small mammal associated with forests in the Paleozoic Plateau is the Woodland vole. The two old records for this species were from apple orchards in Houston County, however, in Iowa, this species has been found in mature mesic forests similar to those present at the park. MCBS surveys at Beaver Creek Valley State Park and Whitewater Wildlife Management Area collected Woodland voles in lowland hardwood forests. Similar habitat along Canfield Creek in Forestville/Mystery Cave State Park was surveyed for this species (Figure 6, Table 14).

Forestville/Mystery Cave State Park, as well as the greater ecological area, is known for the

numerous caves and other karst features which provide important over-wintering habitat for bats. The two rare bat species, Northern myotis and Eastern pipistrelle, have been previously recorded hibernating in Mystery Cave and nearby outliers, and Mystery Cave has been identified as an important regional bat hibernaculum (Nordquist 2000, Nordquist and Birney 1985, Appendix 1). However, little was known about the presence of bats in the park during the summer months. Thus, MCBS survey efforts focused on documenting these species in the park at this time.

The Eastern spotted skunk was not a focus of MCBS surveys at Forestville/Mystery Cave State Park because, while the species has been reported in the county, no verified records were known. Documentation of this species requires a different technique than is typically used for small mammal surveys and MCBS surveys for Eastern spotted skunks elsewhere in the state suggest that the most productive strategy for documenting this species is to follow-up on sightings soon after they are reported. During the 1996 surveys, when MCBS animal surveys were being conducted in Fillmore County, no observations of this species were reported in the area.

Two other rare mammals, not included in Table 13 but reported from the area, are Mountain lion and Mule deer. Mule deer have been taken in this region during the hunting season, however, these individuals were thought to have been wanderers from the Dakotas and not part of a resident population. For that reason, this species was removed from the state list of endangered, threatened, and special concern species (Minnesota Department of Natural Resources 1995). Reports of Mountain lions continue to occur throughout the state, however, none have been undisputedly documented from the Paleozoic Plateau. Surveying for this large, special concern species was beyond the scope of MCBS animal surveys.

Survey methods

Survey methods employed at Forestville/Mystery Cave State Park included small mammal trap grids, drift fences, foraging bat surveys, cave surveys, and incidental observations.

Small mammal trap grids: Small mammal trap grids were the main survey technique used by MCBS mammal surveys. Each trap grid consisted of a 4-by-10 or 2-by-20 station array with one trap per station. Traps included 16 Sherman live traps, 16 Museum Special snap traps, 4 cone pitfall traps, and 4 Victor rat traps. All traps, except the pitfall traps, were baited with a mixture of peanut butter and oatmeal. The grids were run for 4 days and checked twice a day for a total of 120 trapnights. During each check, live animals were processed in the field, marked with a permanent marker, and released. Data obtained from each capture included species identification, sex, reproductive condition, age, weight, and molt. Others captures were further processed to collect standard measurements, internal reproductive information, and prepared as voucher specimens. Voucher specimens were permanently stored at the James Ford Bell Museum of Natural History at the

University of Minnesota in St. Paul.

Seven small mammal trap grids were set at Forestville/Mystery Cave State Park and run from 9 to 12 July 1996. Locations of the grids were first approved by the DNR archaeologist to ensure that no cultural features would be disturbed. Two grids were set in old field habitats (south of the Amphitheater and north of Historic Forestville), one in the restored prairie at the Old Townsite, two in maple-basswood forests (the old-growth stand behind the Park Office and west of the Brickyard), one in oak-hickory forest near the Horse Camp, and one in lowland hardwood forest along Canfield Creek (refer to Figure 6 and Table 14 for locations).

Drift fences: Small mammals also were taken from the drift fences as part of the amphibian and reptile surveys. Refer to the amphibian and reptile methods section for a description of the habitats sampled and the drift fence technique. These captures were identified to species, sex, and age.

Foraging bats -- mist nets: Prior to the development of inexpensive ultrasonic bat detectors, documenting the presence of bats during the summer was accomplished largely by the use of mist nets that were stretched across areas where bats were expected to fly. The nets were set on nights when weather conditions were most optimal for foraging activity (i.e., little-to-no wind or rain, warm temperatures, and when flying insects were abundant). Nets were opened after sunset to avoid capturing birds and monitored continuously through the period of early foraging activity (sunset until approximately 24:00 hours). Bats captured in the nets were identified to species, sex, and age and released. Due to the generally low return per effort of this survey technique, only one mist net was set at Forestville/Mystery Cave State Park , on 31 July 1996, across the South Branch Root River near the mouth of Canfield Creek.

Foraging bats -- bat detectors: Bat detectors transform the ultrasonic calls emitted by flying bats into a sound that is audible to humans. Bats are then identified by their call frequencies and call characteristics (Kunz 1988). During the 1996 MCBS animal surveys in Forestville/Mystery Cave State Park, a Skye ultrasonic bat detector was used. This model of bat detector allowed the operator to select the particular frequency that was picked up by the detector at any given moment. By tuning the detector so that incoming calls had the least amount of distortion, the frequency of that call was determined and the bat emitting the call identified. Most bats in the region were identifiable to species, with the exception of the Eastern pipistrelle, Northern myotis, and Little brown myotis, that were difficult to distinguish using this type of detector. The more recently-developed ANABAT bat detector system differs from the Skye recorder by producing a visual image of the bat call directly on a computer screen and by saving the image as a retrievable file (Corben and O'Farrell 1999). Under this system, the Eastern pipistrelle and the two myotis species could be reliably identified. Foraging bat surveys using bat detectors were conducted over the same time period and under the same

conditions as described under mist net methods. When using the Skye detector, information was manually recorded and included time of call stop, species (when possible), the clearest frequency of the call, characteristics of the call, and an estimate of the number of individuals present. Using the ANABAT system, time of call, call frequency, and characteristics were recorded automatically by the software. Call files were reviewed later and species identified. Estimates of number of individuals or notes on bat behavior were taken at the time the calls were recorded.

Foraging bat surveys using the Skye bat detector were conducted at 12 locations on the nights of 15 May, 10 June, and 31 July 1996. Surveys on 15 May and 10 June were conducted in conjunction with anuran call surveys, while 31 July bat surveys were conducted at other locations throughout the park (see Figure 6 and Table 14 for locations). Foraging bat surveys using the ANABAT bat detector were conducted on the nights of 20 and 21 August 1999 at five locations where previous surveys had indicated high bat activity. These included the bridge south of the Fisherman's Parking Lot, along the river in the Picnic Area, on the bridge and nearby open areas around Historic Forestville, at the mist net location near the mouth of Canfield Creek, and at the Group Camp.

Cave surveys: Previous surveys for hibernating bats have been made at Mystery Cave and other caves in the vicinity (Nordquist 2000, Nordquist and Birney 1985) and on-going winter bat counts have been conducted every three years in Mystery Cave since 1989 by DNR staff and members of the Minnesota Speleological Survey. Thus, no MCBS surveys were made of the caves in the park during winter. Portions of Mystery Cave were searched for bats during late summer/early fall, 1996 to document the timing of return by bats and changes in their distribution within the cave. Between 17 August and 19 October 1996, passages in Mystery Cave were checked periodically for roosting bats. Passages searched included the commercial passages of Mystery I and Mystery II, the wild section of 5th Avenue, and portions of Mystery III from Dragon's Jaw Lake to the Fingers Area (refer to Figure 10 for delineation of count routes). Six trips were made during this interval, although passages in Mystery III were only searched twice, 17 August and 19 September, due to time constraints. In addition, passages in the Blue Lake area were searched on 19 October. All bats observed during searches were visually identified to species. During August and September, when it was likely that the bats would continue to forage outside, any banded bats within reach were identified to species and sex and band number recorded. During October, no bats were removed from their roost locations.

Incidental observations: Observations of medium-to-large mammals or mammal sign were recorded when encountered.

Survey results

Twenty-six mammal species were documented in Forestville/Mystery Cave State Park during MCBS

surveys, including two special concern bat species, Northern myotis and Eastern pipistrelle (Table 15). None of the rare terrestrial small mammals were documented in the park. Another 15 species may occur in the park, but missed detection during MCBS surveys. Some of the species that almost certainly occur here include Hoary bat, Red fox, Ermine, Eastern fox squirrel, and Southern flying squirrel.

Small mammal trap grids and drift fences: Nine small mammal species were taken from the trap grids and drift fences (Table16). Although drift fences can be effective in capturing small mammals, those set at Forestville/Mystery Cave State Park had very low capture rates. Previous MCBS records for the Woodland vole were obtained from drift fences, however, those set in similar habitat in the park did not capture this species. One possible factor for the low capture rate may be attributed to raccoons that were plentiful in the park. They disrupted several trap grids and could also have removed mammals and herpetofauna from the drift fence buckets.

Comparison of captures among trap grids showed that open habitats were dominated by Meadow voles, while White-footed mice occurred in every forested site and were the most numerous species in these habitats (Table 16). Species richness was not particularly great in any of the grids, however, this may be partly due to the fact that three of the seven grids were raided by raccoons, which opened live traps and drug off snap traps. One grid was vandalized by park visitors who sprung the traps and moved them around. The grid with the highest species richness was the maple-basswood/lowland hardwood forest near the Brickyard; four species were found here. The lowest species richness was from the oak-hickory forest near the Horse Camp, where only White-footed mice were captured. Southern red-backed voles were taken from the lowland hardwood forest along Canfield Creek. This is not only a county record but constitutes a southern extension of its range in Minnesota (Hazard 1982).

Foraging bat surveys: From the 12 foraging bat surveys conducted in 1996, three bat species were identified in the park, Little brown myotis, Big brown bat, and Red bat, and one call was tentatively identified as an Eastern pipistrelle. No Hoary bats were recorded in Forestville/Mystery Cave State Park, however, bat surveys conducted elsewhere in Fillmore County did identify this species and it mostly likely is present in the park, as well. Due to the limitations of the Skye bat detector, no Northern myotis could be identified. The mist net set near the mouth of Canfield Creek failed to capture any bats over the period it was open, although bats were observed flying up to the net. Four areas with high bat activity in 1996 were revisited in 1999, using the ANABAT detector (Table 17; note that the Group Camp site was not a location with previously high bat activity). Five species were documented. In addition to the four species identified in 1996, Northern myotis were found at every location, although never in high abundance (Table 17, see Figure 8 for sonographs of calls). Little brown myotis were typically the most numerous species at each location, however, Eastern

pipistrelles were the species encountered most frequently at the bridge site near the Fisherman's Parking Lot. Sites with the greatest bat activity were at Canfield Creek and the Picnic Area along South Branch Root River, with 3.7 and 2.5 calls/minute, respectively (Table 17). Many bats were observed at the sites with high bat activity, however, it should be noted that the number of calls per minute is only an index to the level of foraging activity. It is often difficult to determine if the recorded calls are from many bats flying within range of the detector or a couple bats making repeated passes.

Cave surveys: Surveys of the caves in the vicinity of Forestville/Mystery Cave State Park have shown that bats utilize several of these as winter hibernacula (Nordquist 2000, Nordquist and Birney 1985, Appendix 1). All four species known to hibernate in the state, Little brown myotis, Northern myotis, Big brown bat, and Eastern pipistrelle, have been recorded from one or more of these caves. Although bats may be found roosting in Mystery Cave throughout the year, numbers increase as winter approaches. Return of bats to a cave in western Wisconsin showed that bat numbers increased slowly in August and the over-wintering population was present at the cave by mid-November (Nordquist unpublished data). During counts at Mystery Cave in late August 1996, the number of bats was quite low, but made a five-fold increase by the first week in September along the Mystery I and II count routes (Figure 9). Over the subsequent three counts, spaced approximately two weeks apart, the numbers increased by 70%, 100%, and 40% up to a maximum number of 442 over the two count routes. The mid-winter count conducted in 1998 along these count routes totaled 965 bats (20 in Mystery I and 945 in Mystery II). Thus, by mid-October, 46% of the over-wintering bats had returned to Mystery Cave (85% and 45% of the mid-winter numbers found in Mystery I and II, respectively). The overwhelming majority of the bats counted in October were Little brown myotis, with a few Northern myotis and Eastern pipistrelles. No Big brown bats were found.

Bats were banded in Mystery Cave from 1979 through 1988. No banded bats were observed during August counts, but some appeared beginning in September. Seven banded bats were examined and their band numbers checked against previous survey data (Table 18). The banded bats represented individuals banded from the range of years that banding took place in Mystery Cave. The most recently-banded bat was at least 8 years old and two bats, banded in 1979, were at least 16 years old. It is interesting to note that one of the oldest bats (band # 090) was found in Mystery III, very close to the original banding station. She was subsequently found roosting in the same area during the 1998 winter bat count, suggesting strong site and within-site fidelity in the choice of hibernating location.

Despite the apparent fidelity to a particular part of the cave, the distribution of bats along the passages of Mystery Cave during the fall counts revealed considerable shifting of positions (refer to Figures 10a - f). During the August counts (Figures 10a, b) bats were widely spaced along the count routes, however, during the September 5 and subsequent counts, relatively large numbers of bats

were seen along passages close to the entrance to Mystery II, particularly in the Carousel Area and Garden of the Gods. By mid-winter there are relatively few bats in these areas, suggesting that these passages serve as a staging area for bats before they distribute throughout the cave. Perhaps these bats are still leaving the cave to forage at night. During the September 19 count (Figure 10d), bats were clearly accumulating in the Fingers Area of Mystery III, an area that traditionally has high numbers of hibernating bats in mid-winter. Bats in Mystery I also showed evidence of shifting between counts. Eastern pipistrelles were not observed in this portion of the cave until mid-September, but by the last count had become the most numerous bat species here. Mid-winter counts support the fact that most Eastern pipistrelles are found in Mystery I.

Discussion of rare mammals and significant areas in Forestville/Mystery Cave State Park

Rare terrestrial mammals: Although no rare terrestrial small mammals were documented from Forestville/Mystery Cave State Park, the occurrence of Southern red-backed voles was a very unusual find. This species is a common component of northern forests, but is extremely rare south of the Minneapolis-St. Paul metropolitan area. The presence of this species along Canfield Creek is not only a county record for Fillmore County, but is the southernmost record for this species in the state. According to Hazard (1982), the nearest records for this species are from Goodhue County to the north and Steele County to the west. A few records of this species have been taken from a restricted area in the extreme north-central part of Iowa. It is hypothesized that this population and others in south-central Minnesota constitute relict populations that became isolated when their once widespread post-glacial distribution was separated by expansion of the prairie during xeric periods from 8,000 to 3,000 B.P. (Bowles 1975). Apparently, the cool, moist conditions of Canfield Creek provide suitable habitat for this species. Although the post-glacial history of the Woodland vole is quite different from the Southern red-backed vole, the forest type along Canfield Creek is similar to areas where MCBS has collected Woodland voles elsewhere in the Paleozoic Plateau. Additional surveys along Canfield Creek are merited to better understand the local distribution of Southern red-backed voles and, possibly, to document the presence of Woodland voles.

Bats -- summer: Forestville/Mystery Cave State Park is an extremely important area to state bat species. All four resident bat species, including the state-listed Northern myotis and Eastern pipistrelle, are found here year-round and migratory species, such as the Eastern red bat, also forage along the forested river and streams. Mystery Cave has long been known as an important bat hibernaculum, however, the value of the park as a summer foraging and rearing area for bats has been underappreciated. Although, no maternity colonies were located in the park during MCBS mammal surveys, summer bat surveys conducted in 1983, located maternity colonies in the attic of the park manager's house and in the barn of an adjacent landowner (Nordquist and Birney 1985). Buildings in Historic Forestville and adjacent farms should be examined for maternity colonies.

Placement of bat boxes at select locations in the park, particularly the larger designs preferred by pregnant females, would likely be occupied quickly by bats. Much like a bat box, the sign board outside the Ticket Office has provided summer roosting habitat for bats, as well as an opportunity for visitors to learn more about bats at the park. In addition to man-made roosting structures, the mature forests found in Forestville/Mystery Cave State Park provide natural roosting sites. Large, hollow trees and dead snags with loose bark provide ideal roosting conditions for larger maternity colonies, as well as solitary roosting bats. The high foraging bat activity along Canfield Creek suggests that this may be an important roosting area during the day. The large trees and snags along the creek should be examined for the presence of roosting bats and maternity colonies.

Mystery Cave, an important over-wintering site for bats, also serves as a summer day roost site and as a refuge from excessive heat. Park staff reported that during a particularly hot period during summer, 1994, approximately 30 Big brown bats appeared briefly in Devil's Kitchen in Mystery I. A few bats, mostly males and a few non-pregnant females, are present in the cave during summer, where they enter torpor for one or more days as a means of conserving energy between foraging bouts.

Bats – winter: Forestville/Mystery Cave State Park is rich in subterranean cavities. Over 40 caves and karst features have been identified within the park and many more are present in the ecological area (from files of the Minnesota Speleological Survey). A number of these caves provide suitable conditions for hibernating bats, including Old Mystery and Old Still caves. However, the most important cave for hibernating bats is undisputedly Mystery Cave, that supports all four bat species that hibernate in Minnesota. The 1998 cave-wide bat count recorded 2,123 bats in Mystery Cave in mid-winter. When this count is compared with estimated hibernating populations at two sand mines in western Wisconsin and at Soudan Underground Mine State Park in northern Minnesota, the number of bats overwintering in Mystery Cave comprises only 0.01% of the total (Nordquist 2000). Nevertheless, Mystery Cave supports the largest number of hibernating bats of any natural cave in the state and should be considered one of the most important hibernacula in the Upper Midwest.

Mystery Cave is subdivided into three sections, Mystery I, II, and III, based on areas of passage that are largely separated from others in the cave. Although all three sections are connected and bats may travel freely between them, they exhibit notable differences in the number of hibernating bats and the relative abundance of bat species (see Appendix 1). Based on 1998 winter counts, the majority of hibernating bats were found in Mystery II (74%), with Mystery III and Mystery I having 16% and 10%, respectively. However, just the reverse trend is observed in the distribution of Eastern pipistrelles within the cave. Mystery I had the largest number of this species (59%), followed by Mystery II (31%) and Mystery III (9%). Northern myotis were found in all sections of the cave in low numbers. Big brown bats have only been recorded from Mystery II during the winter and are

usually restricted to the colder areas of the stairway entrance to the cave. Internal cave conditions are generally thought to be quite stable, yet the bats are clearly selecting particular areas and passages within the cave.

Two banding projects (David Tallman and members of the Minnesota Speleological Survey, 1979-1983; and Elmer Birney and Gerda Nordquist, 1984-1989) banded a total of 1,179 bats in Mystery Cave and an additional 34 bats in and near the park during summer. Band recoveries have shown that bats have returned to hibernate in Mystery Cave year after year and that a number of individuals select the same areas within the cave. The recovery, in 1996, of two bats banded from the first year of banding (1979), underscores the importance of Mystery Cave to hibernating bats. Current management practices that limit winter recreational activity in portions of the cave with high numbers of bats further ensures the long-term protection of this valuable resource.

Breeding-season Birds

Five rare bird species were targeted for surveys in Forestville/Mystery Cave State Park (Table 13). Two additional species, the Acadian Flycatcher and Cerulean Warbler, were added to the state list after the 1996 revision. Although not specifically targeted for surveys, both species were documented during MCBS surveys in the park. Surveys of breeding-season birds were conducted from late May through mid-July, 1996. For early breeding species, such as Red-shouldered Hawk and Louisiana Waterthrush, surveys began in early April.

Survey methods

Point counts: Point counts were the primary method used by the MCBS to survey breeding birds. At each point within a given habitat, all birds heard or seen during a five-minute interval were identified, and evidence of breeding behavior or nesting was recorded. The number of individual birds within a 50-meter radius was counted. Birds detected outside the 50-meter radius, but within the habitat being surveyed, were recorded but not enumerated. Birds flying over a point were counted if they were potentially using the habitat (e.g., aerial foragers). Species detected outside the habitat being surveyed were also recorded in generating species lists for a site or area. Point counts were spaced a minimum of 300 meters apart and at least 150 meters from the edge of the habitat. Point counts were conducted from approximately 15 minutes before sunrise to about 4 hours after sunrise, during suitable weather conditions (i.e., wind less than 10 mph, precipitation no greater than a light rain). Locations of points were recorded on USGS 7.5-minute quadrangle maps. Supplemental record forms, detailing notes on habitat and behavior, were filled out for all state-listed species or other species of interest, when encountered. A total of 36 point counts were conducted in the park between 26 May and 6 June, 1996. Thirty-four point counts were located in deciduous forest and two points were in forest-edge habitat (refer to Figure 6 for a map and Table14 for a list of

survey locations and habitats). Additional surveys were conducted for Louisiana Waterthrushes by walking along the Root River and Canfield Creek, listening for this species' loud, distinctive song.

Playback: Playbacks of taped calls were used to elicit responses from Red-shouldered Hawks, which are known to react strongly to this technique. Taped Red-shouldered Hawk calls were played using a cassette tape player connected to an amplifier speaker. Birds reacting to the call were recorded and their behavior noted. Playback surveys for Red-shouldered Hawks were conducted at eight locations in the park (Figure 6).

Survey results

MCBS bird surveys resulted in the detection of 74 species in the Forestville/Mystery Cave State Park during the breeding season (Table 19). Three special concern species, Acadian Flycatcher, Louisiana Waterthrush, and Cerulean Warbler, were found in the park. An additional 22 species were not detected during MCBS surveys, but are likely to occur in the park based on the presence of suitable habitat in the park and the species' summer ranges in Minnesota (Janssen 1987, Table 19). An additional eighteen bird species were observed in the park during spring migration in May (Table 20). Two of these species, Blue-winged Teal and Broad-winged Hawk, may nest in the park.

Most birds found at Forestville/Mystery Cave State Park were forest species, occurring in deciduous forest, fragmented forest, and forest-edge habitats. The park's avifauna was similar to that of other good-quality forested sites surveyed in the Paleozoic Plateau Ecological Section. The frequency of occurrence of forest birds among state parks in the Paleozoic Plateau are summarized in Table 21. Bird species that occurred commonly in Forestville/Mystery Cave State Park included many neotropical migrants, such as Eastern Wood-pewee, Red-eyed Vireo, Yellow-throated Vireo, Wood Thrush, Ovenbird, and Scarlet Tanager. Unfortunately, Brown-headed Cowbirds also were relatively common in the park. This nest parasite, which is more common in open or fragmented habitats than in extensive, closed-canopy forests, is a factor in the decline of many forest songbird species. No Red-shouldered Hawks were found in the park. Habitat for this species in the park was marginal due to the lack of necessary wetland openings within the forest.

Two singing male Louisiana Waterthrushes were found in Forestville/Mystery Cave State Park during MCBS surveys, both along Canfield Creek. An additional singing male was documented along Canfield Creek as part of graduate research (Stucker 2000). Although the locations of defended territories change from year to year, the park probably supports up to three pairs of Louisiana Waterthrushes along the creek in a typical year.

Grasslands and developed areas in the park, such as those in the old Forestville townsite, provide habitat for several open country and edge species not typically found in extensive deciduous forests.

Species detected included Willow Flycatcher, Barn Swallow, Blue-winged Warbler, Yellow Warbler, Field Sparrow, and Bobolink (observed just outside the park boundaries). Many of these species are better able to adapt to human disturbances (e.g., urbanization, farming, and forest fragmentation) than forest species and are common and widespread throughout much of the state.

Discussion of rare birds and significant areas in Forestville/Mystery Cave State Park

Rare birds: Historically, a limited amount of grassland and oak savanna habitat occurred within the statutory boundary of Forestville/Mystery State Park. Many bird species typical of grasslands require relatively large tracts of open habitat. Grasslands of sufficient size to support breeding populations of species, such as Sedge Wren, Grasshopper Sparrow, and Eastern Meadowlark, may have never been present in the park. Several common grassland bird species nest near, but not in, the park in cultivated fields and pastures (Table 19).

Ideal habitat for the Louisiana Waterthrush consists of clear, swiftly-flowing streams with a closed canopy of mature forest. In Forestville/Mystery Cave State Park such habitat is largely restricted to Canfield Creek. This species nests in root masses and crevices of cut-banks along streams and forages at the water's edge. The surrounding forest canopy is critical to the nesting habitat of this species -- a narrow corridor of trees along a stream is not sufficient. Many valleys in southeastern Minnesota with permanently flowing water have been grazed and are converted to pasture or have insufficient canopy cover to support Louisiana Waterthrushes.

Cerulean Warblers were found at five locations in the park, despite the fact that the species was not a state-listed species at the time of MCBS surveys. Cerulean Warblers have been associated with mature deciduous forests, including upland forest communities, such as oak and maple-basswood forests, as well as lowland hardwood or floodplain forests. This species spends most of its time in the upper portions of the canopy in forests comprised of tall, mature trees.

Three records for Acadian Flycatchers were documented in Forestville/Mystery State Park. Similar to the habitat characteristics of the Louisiana Waterthrush, Acadian Flycatchers are found in mature, closed-canopy deciduous forests, usually near streams.

Four regionally rare species, Least Flycatcher, Winter Wren, Veery, and Mourning Warbler, were documented in Forestville/Mystery Cave State Park. These species are common in the forested portions of northern and central Minnesota, but are rare south of the Minneapolis-St. Paul metropolitan area. In southeastern Minnesota, they are usually associated with lowland hardwood or floodplain forests. Winter Wrens are primarily a coniferous forest species in northern Minnesota. Perhaps the presence of white pine, and rarely balsam fir, is a factor in the presence of this species in the park and elsewhere in southeastern Minnesota. In the center of its breeding range, Winter Wrens

are associated with lowland conifer swamps and do not typically use white pine forests. Elsewhere in southeastern Minnesota, this wren is not closely associated with conifers.

Significant areas for birds: Three areas in Forestville/Mystery Cave State Park are of particular importance to forest birds, including three special concern species and several regionally rare birds (Figure 11). These are discussed individually, below. The extensive forest communities adjoining forested stream valleys in Forestville/Mystery Cave State Park provide a relatively unbroken tract of mature forest that serves as important habitat for many forest bird species, including several species particularly sensitive to disturbance and fragmentation. Forest fragmentation is of great concern for many bird species that are negatively impacted by the loss of forest canopy cover. Besides the obvious effect of habitat degradation, forest fragmentation results in lower reproductive success due to increased brood parasitism by Brown-headed Cowbirds and increased predation by both mammalian and avian species (Rosenberg et al. 1999). In addition, some species may simply not be present in forest tracts below a certain size or at sites too isolated from the nearest suitable forest.

From the standpoint of forest bird species, any fragmentation of mature forest habitats is detrimental to birds requiring large tracts of unfragmented forest. Records of pre-settlement vegetation in the park suggest that forested areas were more open than the current condition. Nevertheless, allowing the pre-settlement oak woodlands and other deciduous forest communities to mature into closed canopy forests has increased available habitat to rare forest bird species that are in decline elsewhere throughout the Paleozoic Plateau due to forest fragmentation. In areas which historically were not forested, management or restoration of the open character of these habitats would negatively impact forest interior birds.

Canfield Creek: The extensive, mature, closed-canopy forest along Canfield Creek provides critical habitat for many rare birds documented in the park (Figure 11). The stream and adjoining forest provide the only suitable breeding habitat in the park for the Louisiana Waterthrush. Cerulean Warblers, Acadian Flycatchers, and several regionally rare species, such as Winter Wren and Mourning Warbler, also were found here, further emphasizing the importance of this area to rare birds. Degradation of stream valleys elsewhere in the Paleozoic Plateau has greatly reduced the amount of suitable habitat in this region. The forested slopes adjacent to the stream are an essential habitat component to the bird species that utilize the valley floors. Alteration or removal of these microhabitat components may have detrimental effects on habitat suitability for Louisiana Waterthrushes in the park (Stucker 2000). Any reduction in water quality due to pollution or siltation from adjacent lands could also negatively impact Louisiana Waterthrushes.

Forested areas north and west of the old Forestville town site: The most important area of this forest tract is centered on the west-east trending intermittent stream and associated slopes (Figure 11). One Cerulean Warbler and an Acadian Flycatcher were found immediately adjacent to the stream. Two

more Cerulean Warblers were present along the south-facing slope just north and west of the Picnic Area. Several singing males of the regionally rare Veery were also found in this tract. Horse trails in this area are negatively impacting seepage areas on slopes adjoining the intermittent stream, as well as the stream itself at the crossing point in the upper reaches of the stream.

Forested areas north and east of the Horse Camp: Key portions of this area include the forested west-facing slopes above the Root River, the forest along and adjoining the small stream near the eastern boundary of the park, and the intervening oak forest on the slopes and ridge tops between these areas. One Acadian Flycatcher and a Cerulean Warbler were found on the northwest facing slope above the Root River, and another Acadian Flycatcher was present in an area of mature sugar maple and red oak along the stream near the eastern edge of the park. This stream has potential habitat for Louisiana Waterthrushes, although it may be too small or intermittent to be optimal. Two regionally rare species, Least Flycatcher and Veery, were found at several locations in this tract.

Conclusions

Forestville/Mystery Cave State Park has extensive areas of mature forest which provide important habitat for many birds, including several special concern and regionally rare species. The presence of these extensive blocks of mature upland forest adjoining forested stream valleys make the park of particular importance to birds in the Paleozoic Plateau Ecological Section. Forestville/Mystery Cave State Park is one of the few sites in southeastern Minnesota that supports this diversity of rare and uncommon forest birds.

Amphibians and Reptiles

Prior to the animal surveys conducted in 1995 and 1996 by the MCBS, the NHIS Rare Features database had a total of five locations for three rare herpetofauna documented within Forestville/Mystery Cave State Park. These species consisted of Blanding's turtle, Milk snake, and Timber rattlesnake. Within the Forestville/Mystery Cave Ecological Area two additional Timber rattlesnake records have been added to the database since 1995 (Appendix 1).

Thirteen species of herpetofauna were targeted at Forestville/Mystery Cave State Park – three frogs, two turtles, one lizard, and seven snakes (Table 13). Site selection for herpetofaunal surveys was based on the species of interest and their preferred habitats (see Figure 6 for a map and Table 14 for a list showing locations and habitats of survey sites). Prior surveys targeting herpetofauna of Forestville/Mystery Cave State Park consisted of an inventory of the park's herpetofauna by the Minnesota Herpetological Society (Moriarty, 1985) and a survey targeting Timber rattlesnakes (Keyler and Oldfield, 1992).

Survey methods

Anuran surveys: Anuran surveys documented breeding frogs and toads and were conducted at night after dusk during chorusing periods from April through July, 1996. Wetland locations were surveyed for three minutes, where all species calling were identified and the intensity of calls (an index of the number of calling individuals) was recorded. Survey sites typically consisted of backwaters of the Root River or its tributaries. Anuran surveys were conducted during the breeding season on 30 April, 15, 30 May, 10 June, and 17 July 1996.

Artificial cover or *cover-boards*: Cover-boards were used as a means of sampling secretive herp species. Pieces of plywood, corrugated sheet metal, or roofer's felt, approximately two-by-four feet in size, were placed on the ground within selected habitats. The use of both wood and metal materials created a wide range of temperature and moisture conditions attracting both amphibians and reptiles. This technique was not constrained by time limitations and was more effective the longer the cover-boards were in place. Cover-boards were placed at 11 locations in the park, with 1-4 boards at each location. The boards were set in place during the summer of 1995 and checked periodically throughout the summer and early fall, between August 1995 and September 1996. Boards were checked for herpetofauna basking on top of the boards or sheltering beneath.

Drift fences: Three drift fences were installed to capture more secretive herpetofauna, such as salamanders. Drift fences consisted of 50-foot rolls of aluminum flashing with eight 5-gallon buckets buried flush with the ground on either side of the flashing. The DNR archaeologist reviewed the planned locations of drift fences to ensure that no cultural features were disturbed. All drift fences were placed in deciduous forest habitat near or in lowland hardwoods. The buckets were checked two to three times per week and all herpetofauna and small mammals were removed and identified. Drift fences were open from late April through early June, for a total of 1,128 trap nights.

Terrestrial searches: Terrestrial herp searches involved actively searching an area, lifting rocks and woody debris, and hand-capturing herpetofauna. Basking surfaces and rock crevices were also examined. This technique, effective for documenting snakes and lizards, was used to target Timber rattlesnakes at historic and potential den sites. Searches were conducted on 21 June 1995 and 22, 28 May, and 28 August 1996, targeting bluff prairie and rock outcrop habitats within mixed deciduous forest. Time spent searching consisted of a total of 17 hours, 7.75 of these hours were spent searching sites outside of the statutory boundaries of the park, but within the Forestville/Mystery Cave Ecological Area.

Turtle trapping: Baited hoop traps were used to survey Blanding's turtles. Two traps were set in an emergent marsh/seepage meadow along an oxbow of the South Branch Root River. The traps were set on 16 July 1996 and pulled on 18 July, for a total of 4 trap-nights.

Incidental records of herpetofauna were also recorded when encountered. Voucher specimens were collected and preserved for permanent storage at the James Ford Bell Museum of Natural History at the University of Minnesota in St. Paul.

Survey results

Five species of amphibians and four species of reptiles were documented in Forestville/Mystery Cave State Park during MCBS herp surveys. Within the ecological area, two additional species of amphibians and three species of reptiles were documented by MCBS. Previous herpetofaunal surveys conducted in the park contributed to the cumulative list of herpetofauna (Moriarty 1985; Keyler and Oldfield 1992). Additionally, park staff and visitors reported sightings of herpetofauna, creating a combined total of eight species of amphibians and nine species of reptiles potentially occurring within Forestville/Mystery Cave State Park (Table 22).

Anuran surveys: Six species of frogs and toads were documented in Forestville/Mystery Cave State Park during anuran surveys and one additional species was recorded directly east of the park. Different species were observed based on calling periods and water levels. The Spring peeper was the only species heard during early spring surveys, although the Northern leopard frog was observed with egg masses. Spring peepers and American toads were present at four of the five sites visited during late spring surveys, and were the most frequently documented species. Green frogs were present at two sites surveyed in the park during mid-summer surveys when sites with intermittent streams and vernal pools were dry. Breeding Green frogs require permanent water bodies such as river backwaters and oxbows. The backwaters of the South Branch Root River, in the vicinity of historic Forestville, had the most anuran diversity with four species recorded. However, the presence of fish in this system may reduce anuran recruitment. This site consisted of a stagnant body of water associated with a flowing, permanent water source. The Cope's gray treefrog was unexpectedly heard at the sinkhole site on the eastern boundary of the park. This species is associated with grassland habitats and is near the edge of its range in Fillmore County. It may occupy grassland habitat east of the park where breeding ponds are scarce. A Cope's gray treefrog specimen was collected by MCBS, 6 miles southwest of the park within the Canfield Creek drainage. Chorus frogs were present in the Forestville/Mystery Cave Ecological Area, but were not recorded within the park boundaries. Gray treefrogs were heard east of the park and outside the ecological area. Both of these latter species should be present within the park boundaries.

Cover-boards: The Eastern garter snake and Redbelly snake were documented using cover-boards. Redbelly snakes were most frequently observed and were present at 5 of the 11 sites. Preferred habitat for this species consisted of open grassland or forest edge. Nearly half of the total observations of this species (23 of 49 records) consisted of young of the year. Eastern garter snakes were found at three sites. Juveniles represented approximately 1/3 of the total observations (4 of 11).

Few individuals of either species were observed using coverboards in forested habitat.

Drift fences: Two species of herpetofauna were captured in the drift fence buckets, the American toad and Redbelly snake. The low diversity of herps captured in the drift fences was comparable to results at other forested drift fence sites in southeastern Minnesota. Species with toepads, such as Spring peepers and Gray treefrogs, have the ability to adhere to the walls of drift fence buckets and therefore may be under-represented with this type of sampling technique. Drift fences also captured small mammals; these results are discussed in the mammal section.

Terrestrial searches: During searches within Forestville/Mystery Cave State Park, Redbelly snakes were located under rocks and woody debris along forest edge habitat. Three Timber rattlesnakes were located during a terrestrial search on private land on 28 August 1996. The tract is within the ecological area, directly west of a forested tract of the park. The rattlesnakes were located among rock outcrops within openings of a forested south-facing ridge. This site appears to be the closest active den to the park. The lower portion of this privately owned tract is used as a hay field. Adjacent landowners to the north of the site were familiar with the presence of the rattlesnakes on the tract. Additional searches on bluff prairie habitat within the Forestville/Mystery Cave Ecological Area were not successful in recording any herpetofauna.

Turtle trapping: Four Painted turtles and one Snapping turtle were captured in baited hoop traps. Although wetland habitat was suitable for Blanding's turtles, it appeared to be too limited for a significant population.

Incidental record: A Northern water snake was collected on 17 July 1996. It was found dead on County Road 5 near the South Branch Root River within the ecological area.

Discussion of rare herpetofauna and significant areas in Forestville/Mystery Cave State Park

Rare herpetofauna: The rare reptiles found in Forestville/Mystery Cave State Park are primarily representatives of forest communities. Timber rattlesnakes, Fox snakes, and Milk snakes emerge from dens in the spring and may disperse up to four miles into surrounding forest and forest-edge habitat. The park contains some of the most significant forest communities in the county and represents one of western-most forested sites within the Blufflands Ecological Subsection. Accordingly, the park contains some of the western-most records for these species within the subsection and the Root River drainage basin.

Timber rattlesnakes: Timber rattlesnake populations were severely reduced during the 1900's due to bounty hunting, persecution, and habitat loss. Sightings of rattlesnakes during the early to mid-1900's were not uncommon near historic Forestville. Clyde Larson, previously employed by the

park, stated that 50 or more snakes were destroyed in a quarry blast at Rifle Hill Spring quarry during summer in the early 1960's. This was most likely a rookery (or birthing) site comprised of female Timber rattlesnakes and their offspring. Landowners who lived in the vicinity of the Forestville/Mystery Cave State Park prior to its establishment have stated that dens had previously existed along the Sandbank Trail and east of the South Branch Root River near Mystery Cave. These sites, along with a potential den near the Group Camp, have become overgrown with brush and would require habitat management efforts to enhance the sites as dens or rookeries. Habitat restoration, consisting of prescribed burning or brush removal, is recommended and should be done during periods of snake dormancy (late-October through mid-April). Single isolated shrubs, such as red cedar, are often used by snakes for shade and concealment and should be left near selected rock crevices.

Park staff and volunteers have initiated restoration along the Sandbank Trail near the historic den site and overlook. Mark White (personal communication) described patterns found in the age structure of the trees that suggest that the vegetation was formerly oak savanna. Numerous red oaks, 80 - 120 years of age, are being removed from the area to open the site for the much older, scattered bur oaks that are 250 years old. Restoration of this site may provide suitable rookery habitat adjacent to the historic den. Consideration should be given to rerouting trails in the vicinity of this historic den to discourage snake-human interactions. This historic den lies within ½ mile of the site where three Timber rattlesnakes were found in 1996, increasing the likelihood that the restored den could become active and possibly serve as an alternate den site. Acquisition of the private tract is strongly recommended for the protection of the park's Timber rattlesnake population. Due to continued interest in collecting, active dens should be patrolled during spring emergence and during the birthing period later in the summer.

Although no active dens are currently known to exist Forestville/Mystery Cave State Park, an active den was located directly west of the park where three rattlesnakes were observed in August, 1996 (see fig.10). Within the park, Timber rattlesnakes are occasionally observed by park staff, visitors, and adjacent landowners. Sightings have occurred near the Visitor's Center, Campground, Group Camp, and along the South Branch Root River near Canfield Creek. Confirmation of sightings would be helpful to ensure that Fox snakes, which also occur in the area, are not misidentified as Timber rattlesnakes. The installation of signs along trails or in campgrounds where rattlesnakes have been sighted may be beneficial if designed to be educational and not alarming to visitors. Additional surveys should be conducted on south-facing bluff prairies, particularly in the Big Spring area, to locate additional den sites.

During summer months, male and non-gravid female rattlesnakes may move an average of 2.5 miles from an overwintering den, utilizing forested habitat where they feed on small mammals and bask in

forest openings (Brown 1993). Forest habitat utilized by male and nongravid females in New Jersey consisted of canopy closure greater than 50%, thick surface vegetation and few fallen logs (Reinert and Zappalorti 1988). In New York, Brown and Greenberg (1992) found snakes in mixed deciduous or coniferous forests with canopy closure averaging 67%. Over half of the locations had greater than 75% canopy closure. In addition there was little surface vegetation and few rocks or fallen logs. Sites used by gravid females are sparsely forested with approximately 25% canopy closure, frequent fallen logs, and warmer climatic conditions (Reinert and Zappalorti 1988).

Taking steps to protect Timber rattlesnake habitat through acquisition or conservation easements is an important conservation strategy for Timber rattlesnakes protection. Brown (1993) recommends that a distance of 1.5 miles from a den is critical for the protection of Timber rattlesnakes in most denning populations (see Figure 12). Additionally, he states that each specific area should be studied in detail to determine movement patterns of migrating rattlesnakes. While rattlesnake movement patterns are not known at the Forestville/Mystery Cave State Park, any development planned for the park, including additional campsites and trails, should be minimized in the vicinity of potential den sites. Brown (1993) recommends that timber harvest be prohibited or minimized within 2.5 miles of an active den. Any thinning should be done during winter months to reduce impacts on snakes. Keyler (personal communication) has expressed concern about the impacts of multiple management efforts taking place in the vicinity of a den (i.e., burning at den site and thinning of forest) and recommends spacing out such activities over time. Within the Forestville/Mystery Cave Ecological Area, reforestation of selected agricultural tracts along the ridge could link the park to other large forested tracts creating travel corridors for rattlesnake dispersal.

Blanding's turtle: The Blanding's turtle is not typically associated with forested communities, however, it is an adaptable species that utilizes a variety of aquatic habitats and is known to use streams and rivers to travel between wetlands or backwaters. This species is known to travel greater than ½ mile overland to reach nesting sites in well-drained, sparsely vegetated soils. The single individual located in Forestville/Mystery Cave State Park was a male found in early September 1991, approximately 1/4 mile from the South Branch Root River. Approximately 7 miles west of the park, in the Goethite WMA, a Blanding's turtle, observed in June 1995, was most likely a gravid female in search of a nest site. The WMA consists of numerous wetlands associated with an abandoned strip mine and is just north of the South Branch Root River. Two other Blanding's turtle records exist in Fillmore County; both are associated with the Root River drainage basin. Blanding's turtles within the park are possibly transient individuals moving between or dispersing from emergent marsh habitats along the South Branch Root River.

Northern cricket frog: The Northern cricket frog is a state endangered species which utilizes river and stream habitats where it feeds on lightly vegetated mudflats and gravel bars and breeds in

adjacent wetlands. During the past two decades, this species has drastically declined throughout the northern portion of its range. The cause of its decline is unknown, but may be related to low recruitment and a short life span (Burkett 1984). Historically, Northern cricket frogs were present in the vicinity of Forestville/Mystery Cave State Park. They were reported south of Spring Valley by W. Breckenridge in 1939, and R. Berthel and G. Rysgaard in 1941. Although extensive surveys have been conducted throughout southeastern Minnesota during the 1990's (including park and its vicinity), no populations have been documented.

Herpetofaunal management issues in Forestville/Mystery Cave State Park

Trail management: Maintaining large forested tracts is critical in the protection of Timber rattlesnakes. The park represents one of largest, western-most forested sites within the Blufflands Ecological Subsection and provides important habitat for this species on the far edge of its range. Forest trails should be designed to reduce snake-human encounters and may need to be closed during dispersal periods in the spring. Wide trails and paved surfaces may attract snakes for basking and should be minimized, especially in areas where snakes are known to frequent or where habitat enhancement has been undertaken. See the discussion of rare herpetofauna for details on Timber rattlesnake conservation.

Rattlesnake habitat enhancement: Bluff prairies and associated rock outcrops provide critical overwintering sites for a variety of snakes and lizards. While male and non-gravid female Timber rattlesnakes disperse from den sites in the spring, gravid females remain on exposed bluff prairies or "rookeries" throughout the summer. The historic den along the Sandbank Trail is the most likely site to be revisited by Timber rattlesnakes due to its close proximity to the potential den identified outside the park in 1996. Reforestation of agricultural lands within the 1.5 mile buffer should be considered. See the discussion of rare herpetofauna for details on Timber rattlesnake conservation.

Wetland protection: Aquatic features identified in Figure 12 are considered important amphibian breeding areas. In the steep, forested terrain of southeastern Minnesota prime breeding habitat for anurans (i.e., fishless, shallow wetlands) is very limited and often occurs in riparian corridors. Plugged sinkholes, such as the one along the park's eastern border, provide important breeding sites for species that utilize ephemeral wetlands and should be protected from becoming filled or having the surrounding forest habitat logged. River oxbows and backwaters provide additional sources of breeding habitat for frogs and toads and should be protected from siltation. Drought refuges such as backwaters and oxbows may be important sources of amphibian recruitment during dry periods.

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Figures

Legend for Figures 1a, 1b, and 1c.
Locations of native plant communities and rare features

Native Plant Community Types:

Deciduous Forest

- Oak Forest - dry - mesic
- Oak Forest - dry subtype
- Oak Forest - mesic subtype
- Maple-Basswood Forest
- Lowland Hardwood Forest

Mixed Coniferous-Deciduous Forest

- White Pine-Hardwood Forest
- Northern Hardwood-Conifer Forest

Deciduous Woodland

- Oak Woodland-Brushland

Primary Community

- Moist Cliff
- Moist Cliff - maderate subtype
- Dry Cliff
- Talus Slope
- Talus Slope - algific subtype
- River Beach

Wet Meadow/Fen

- Seepage Meadow

Upland Prairie

- Dry Prairie - bedrock bluff subtype (DB)

Hardwood Swamp Forest

- Black Ash Swamp - Seepage subtype (BE)

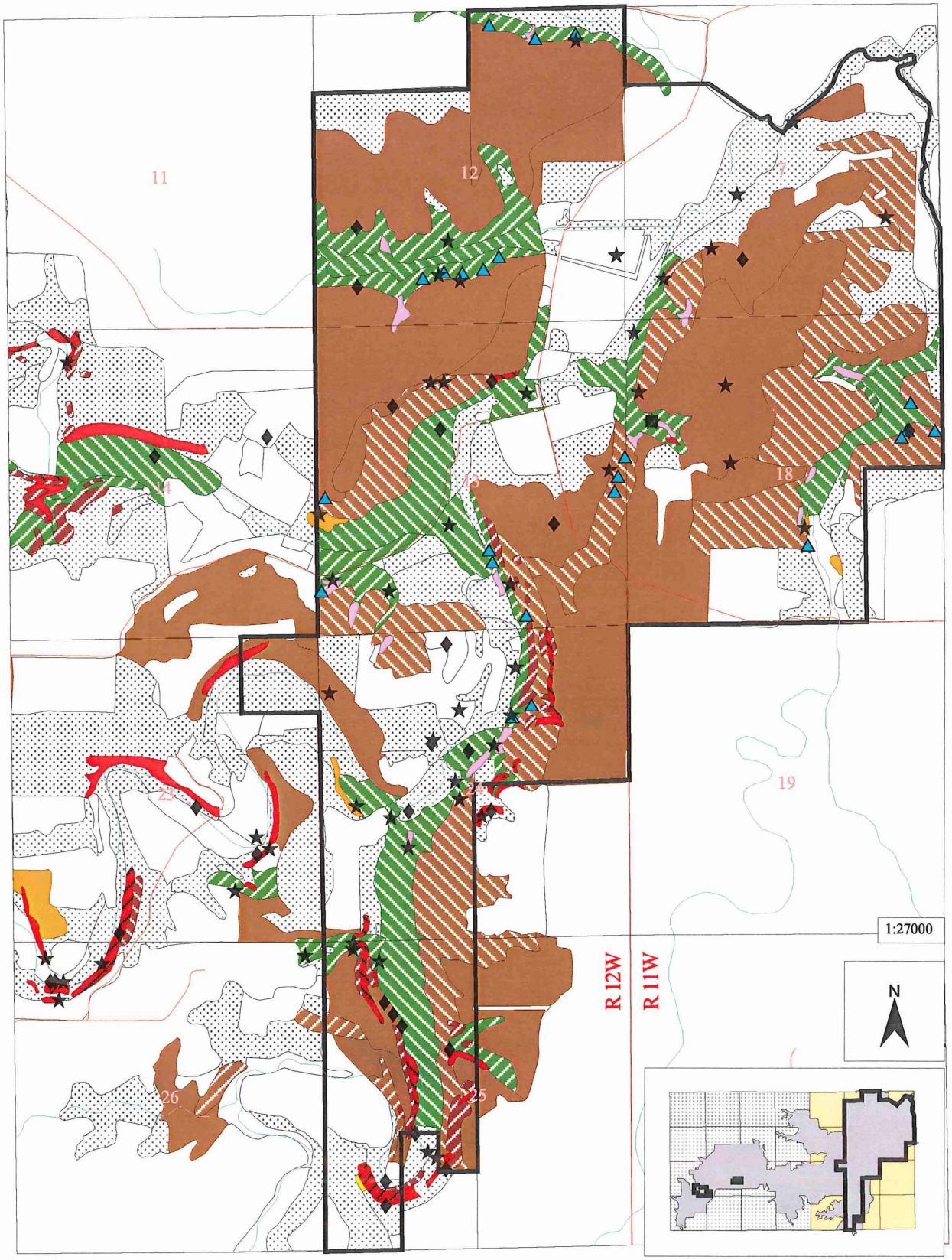
- Disturbed or low-ranked natural communities (including Pine Plantation (PP))
- CU - Agriculture (mostly cultivated land)
- DEV - Developed: residential, picnic areas, park facilities, etc.
- DL - Disturbed land: strip mines, quarries, etc.
- AG (GR) - Pasture
- OF - Old Field
- FENCE - Fence Row

Other Mapped Features

- Forestville/Mystery Cave State Park Statutory Boundary
- Plants
- Animals
- Animal Aggregations
- Groundwater Seeps (upland springs)
- Highways and Local Roads
- Rivers, Streams, Ditches

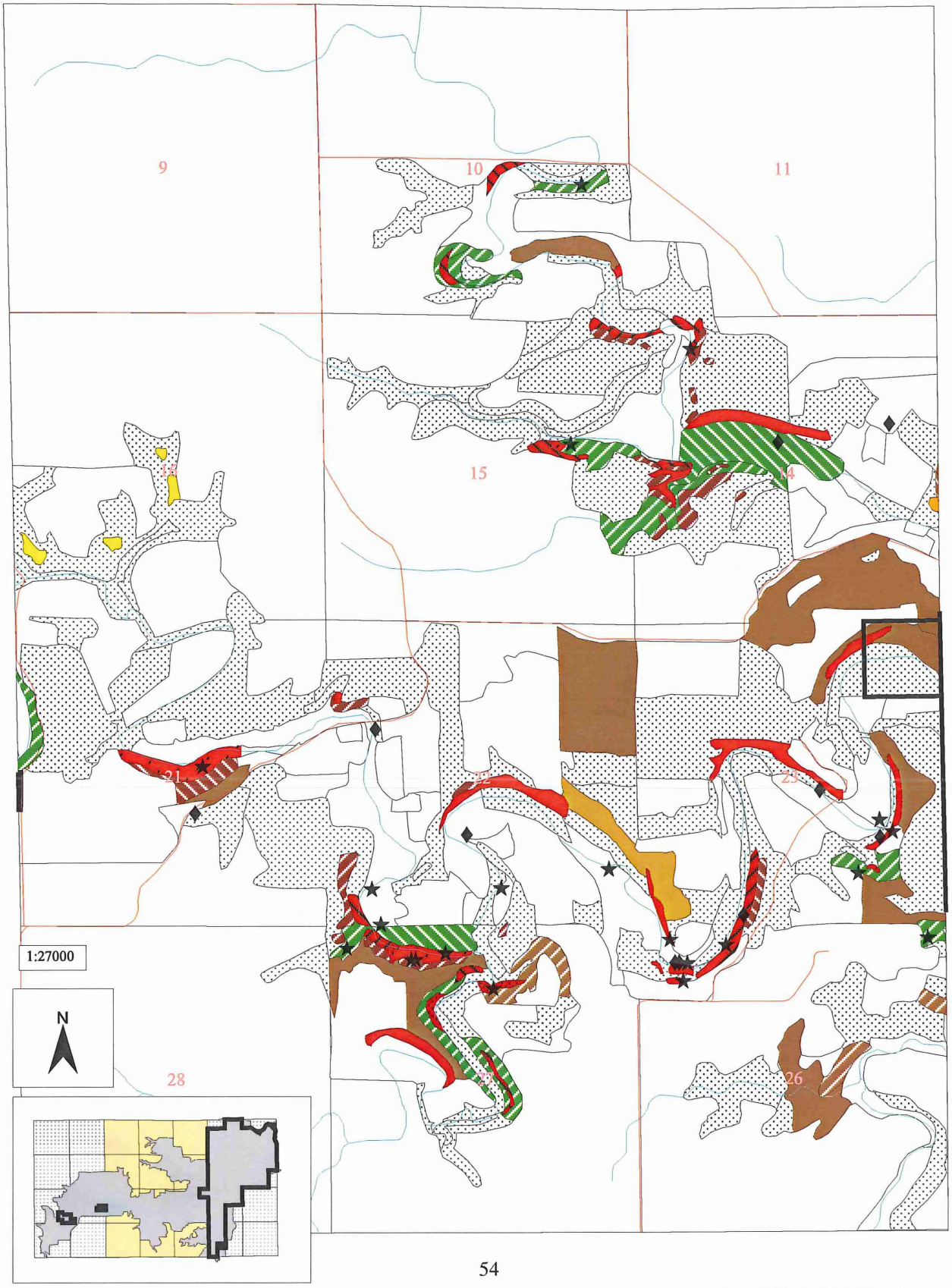
Source: MN County Biological Survey, 2001

Figure 1a. Locations of native plant communities and rare features in Forestville/Mystery Cave Ecological Area, eastern section.



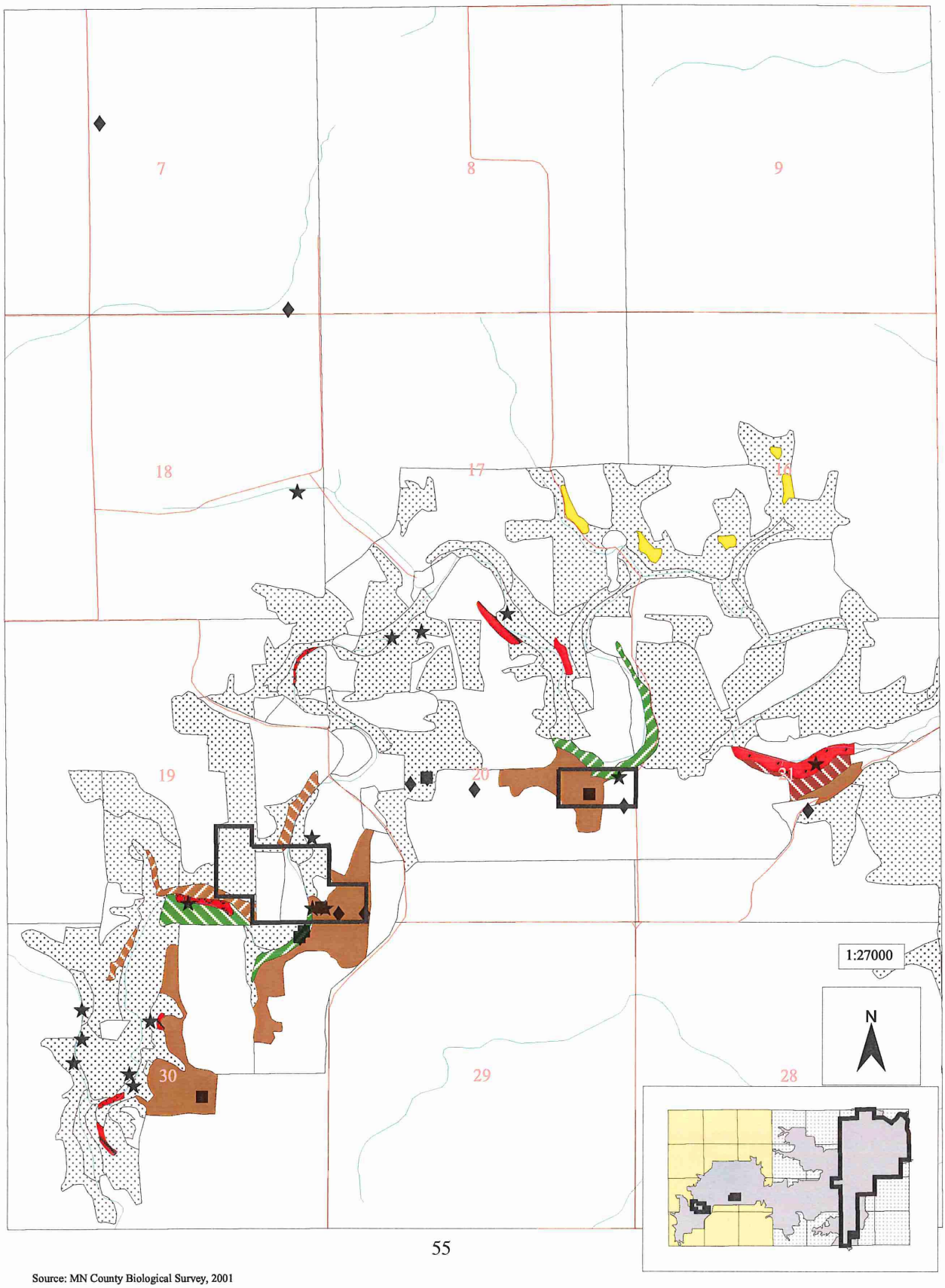
Source: MN County Biological Survey, 2001

Figure 1b. Locations of native plant communities and rare features in Forestville/Mystery Cave Ecological Area, central section.



Source: MN County Biological Survey, 2001

Figure 1c. Locations of native plant communities and rare features in Forestville/Mystery Cave Ecological Area, western section.



Source: MN County Biological Survey, 2001

Legend for Figures 2a, 2b, and 2c.
Quality ranks of native plant communities

Native Plant Communities:

Native Plant Communities with Quality Ranks

Disturbed Land, Developed Areas, or
Native Plant Communities Below Minimum Standards

Other Mapped Features:

Old Growth Forest

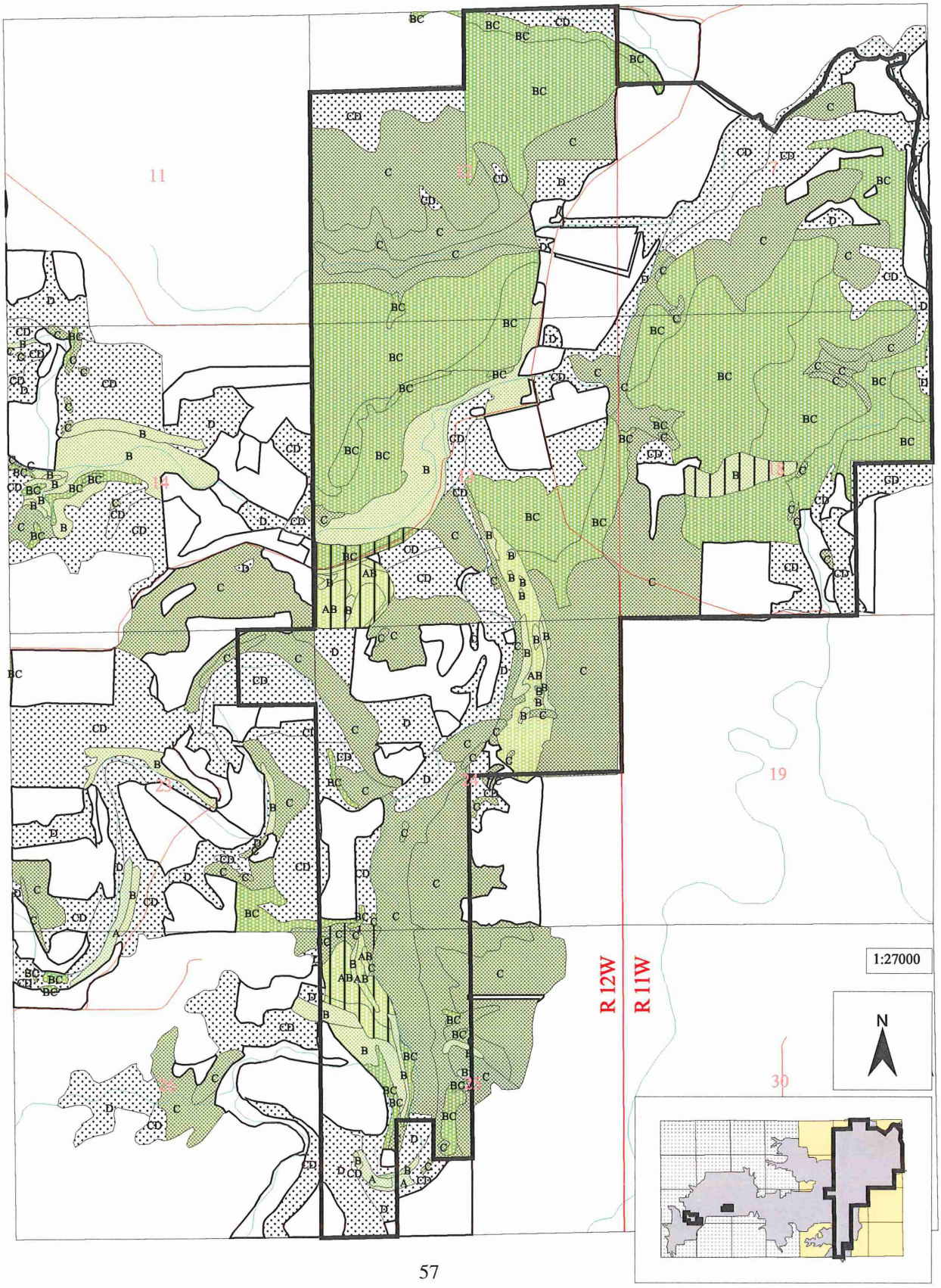
Forestville/Mystery Cave State Park -
Statutory Boundary

Highways and Local Roads

Rivers, Streams, Ditches

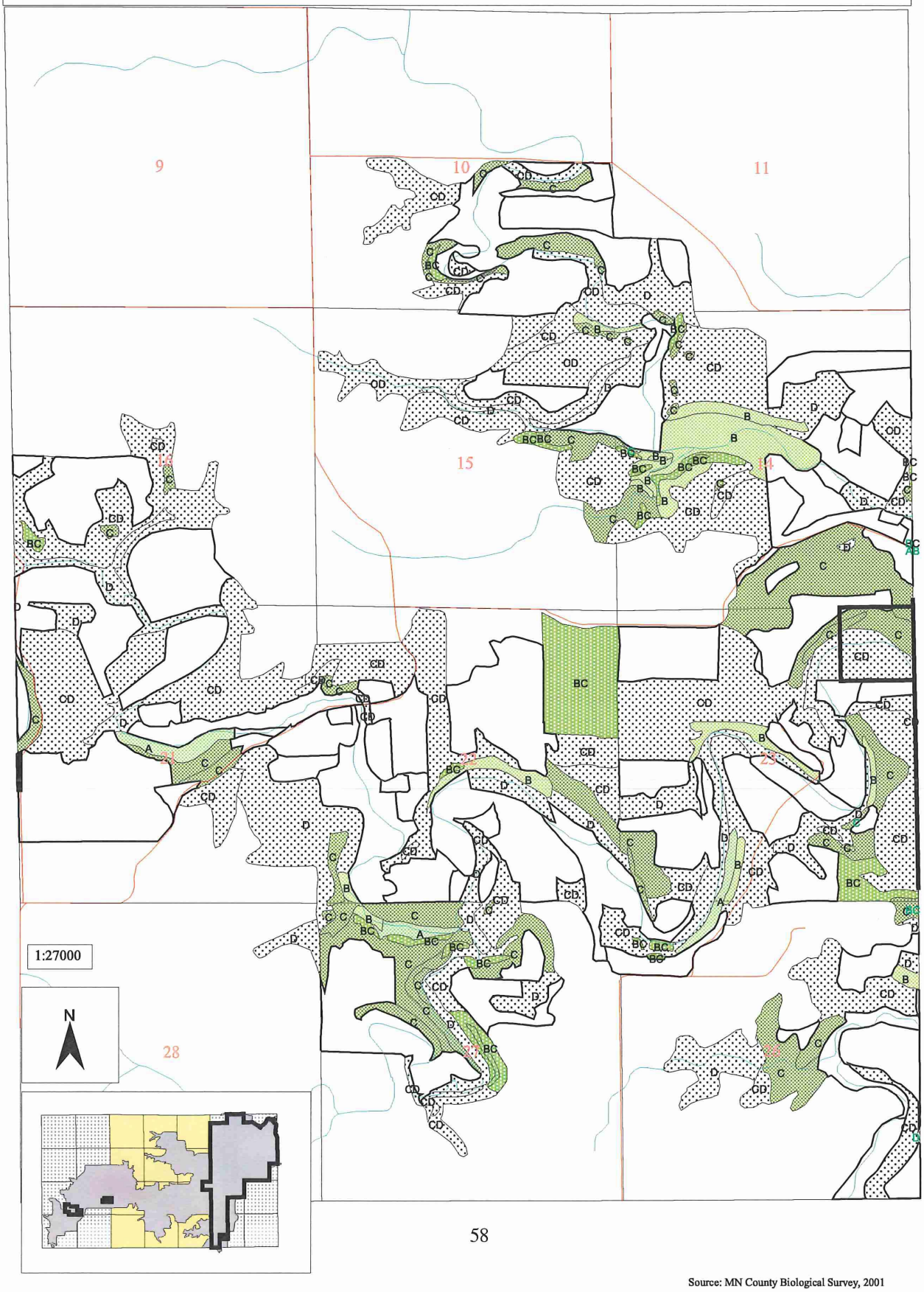
Source: MN County Biological Survey, 2001

Figure 2a. Quality Ranks of native plant communities in Forestville/Mystery Cave Ecological Area, eastern section.



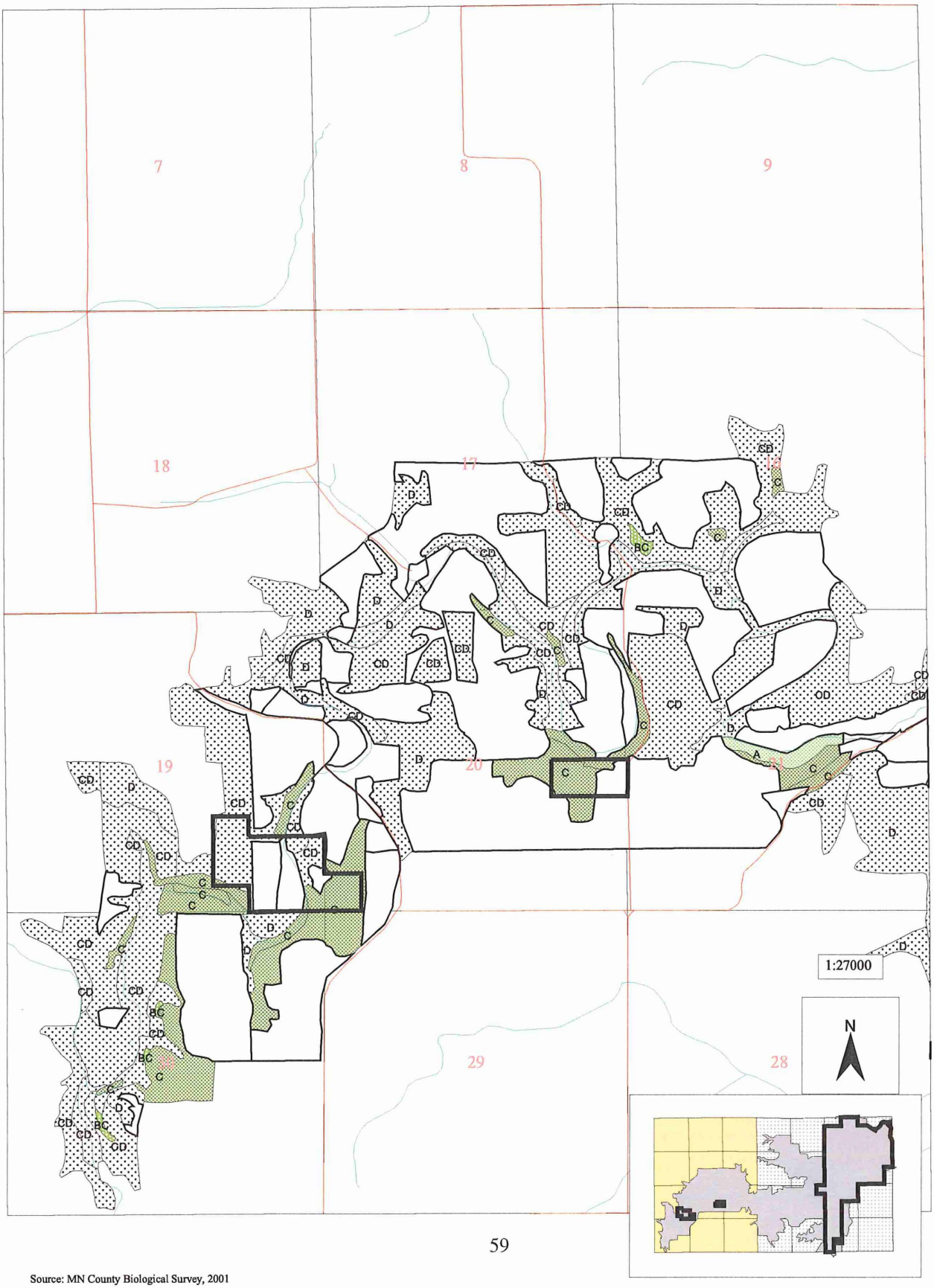
Source: MN County Biological Survey, 2001

Figure 2b. Quality Ranks of native plant communities in Forestville/Mystery Cave Ecological Area, central section.



Source: MN County Biological Survey, 2001

Figure 2c. Quality Ranks of native plant communities in Forestville/Mystery Cave Ecological Area, western section.



Source: MN County Biological Survey, 2001

Legend for Figure 3.
Releve' site locations

Forestville/Mystery Cave State Park - Statutory Boundary

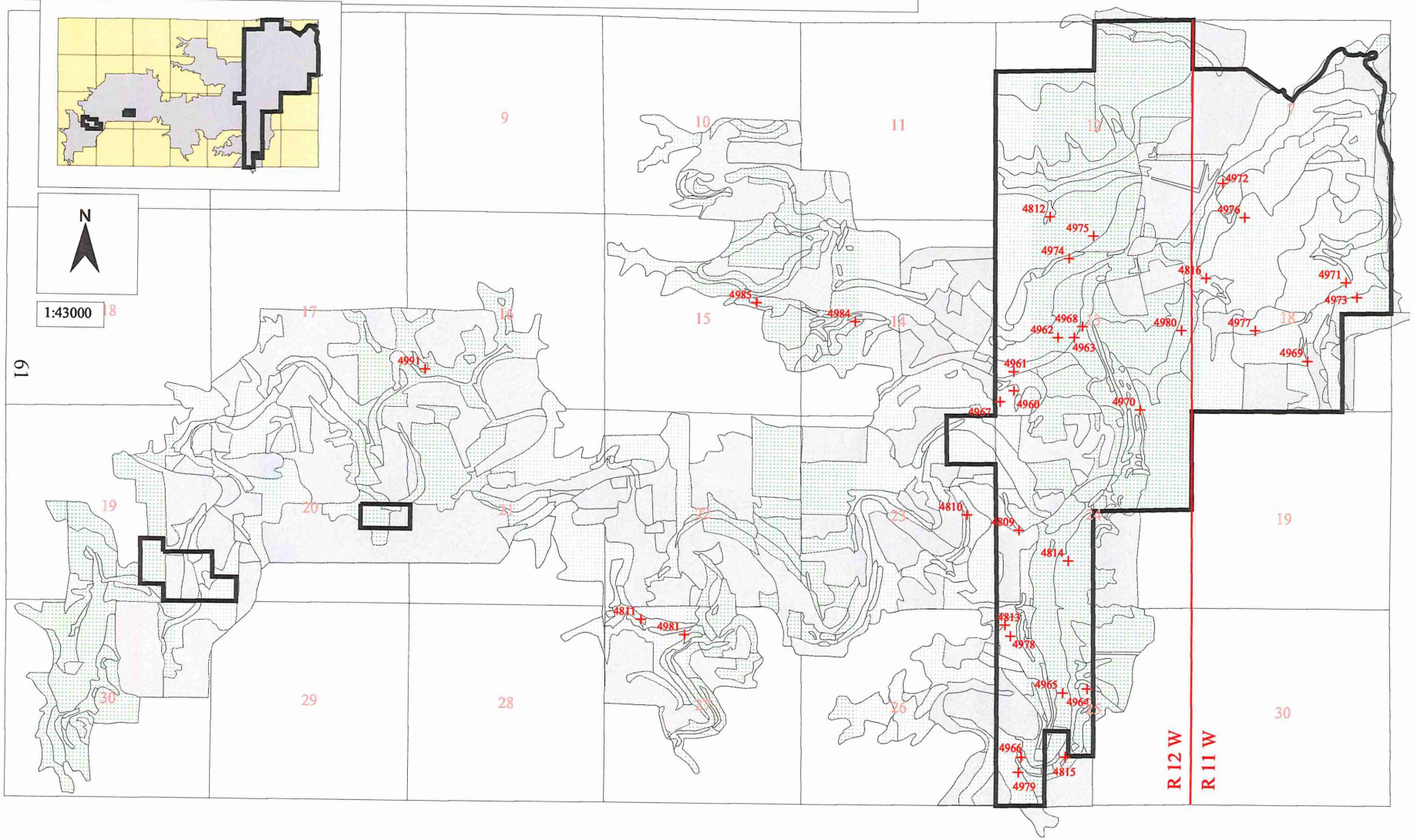
0123 Releve' Site Locations

Native Plant Communities with Quality Ranks

Disturbed Land, Developed Areas, or
Native Plant Communities Below Minimum Standards

Source: MN County Biological Survey, 2001

Figure 3. Releve' site locations Forestville/Mystery Cave Ecological Area



Source: MN County Biological Survey, 2001

Legend for Figures 4a, 4b, and 4c.
Rare plant species occurrences

Rare Plant Species Occurrences:*

★ Rare Plant Location (1970 - present) and map number

☆ Rare Plant Locations (pre-1970) and map number

Other Mapped Features:

Forestville/Mystery Cave State Park – Statutory Boundar

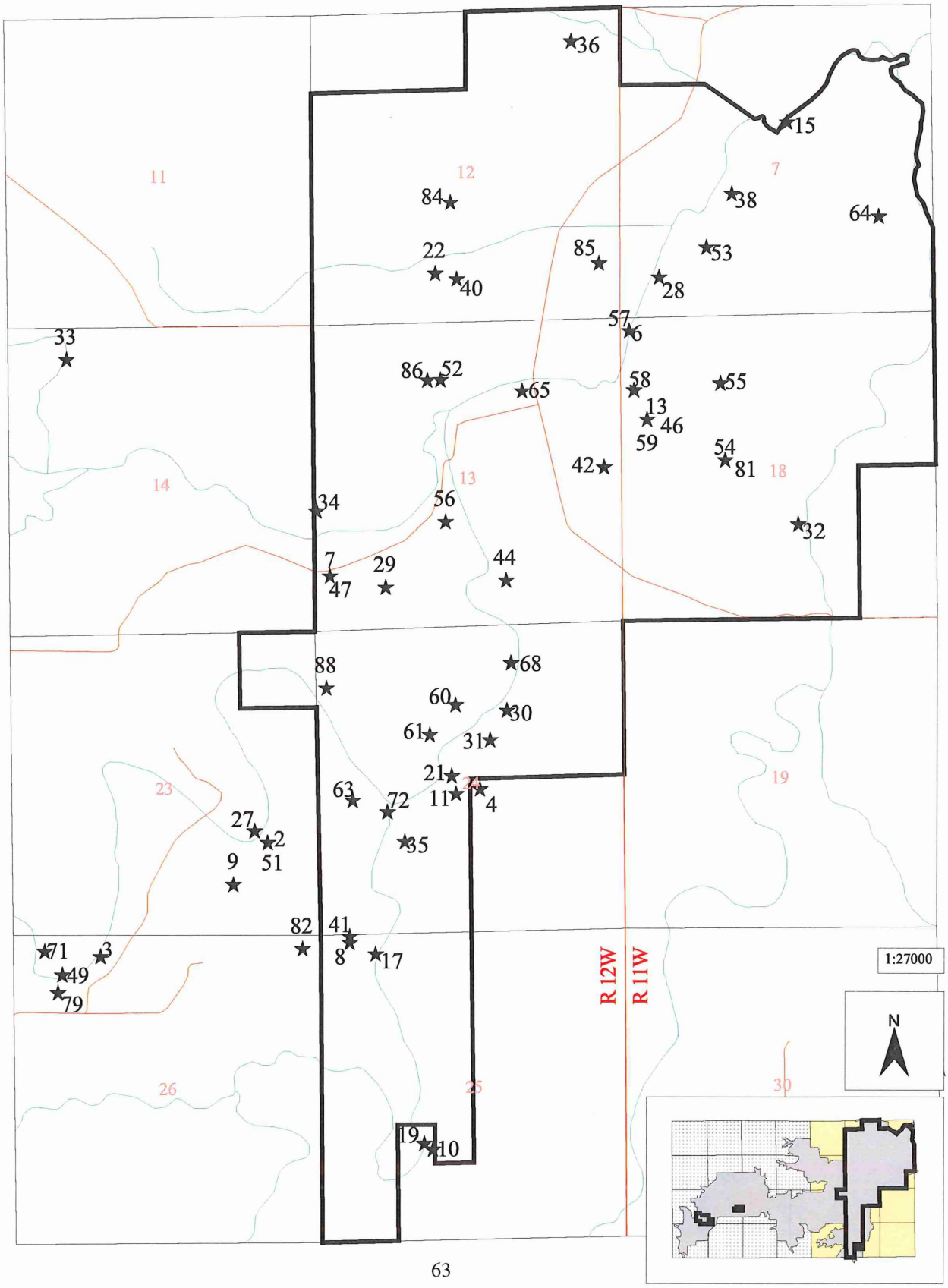
Highways and Local Roads

Rivers, Streams, Ditches

* Refer to list following maps for species associated with the map numbers.

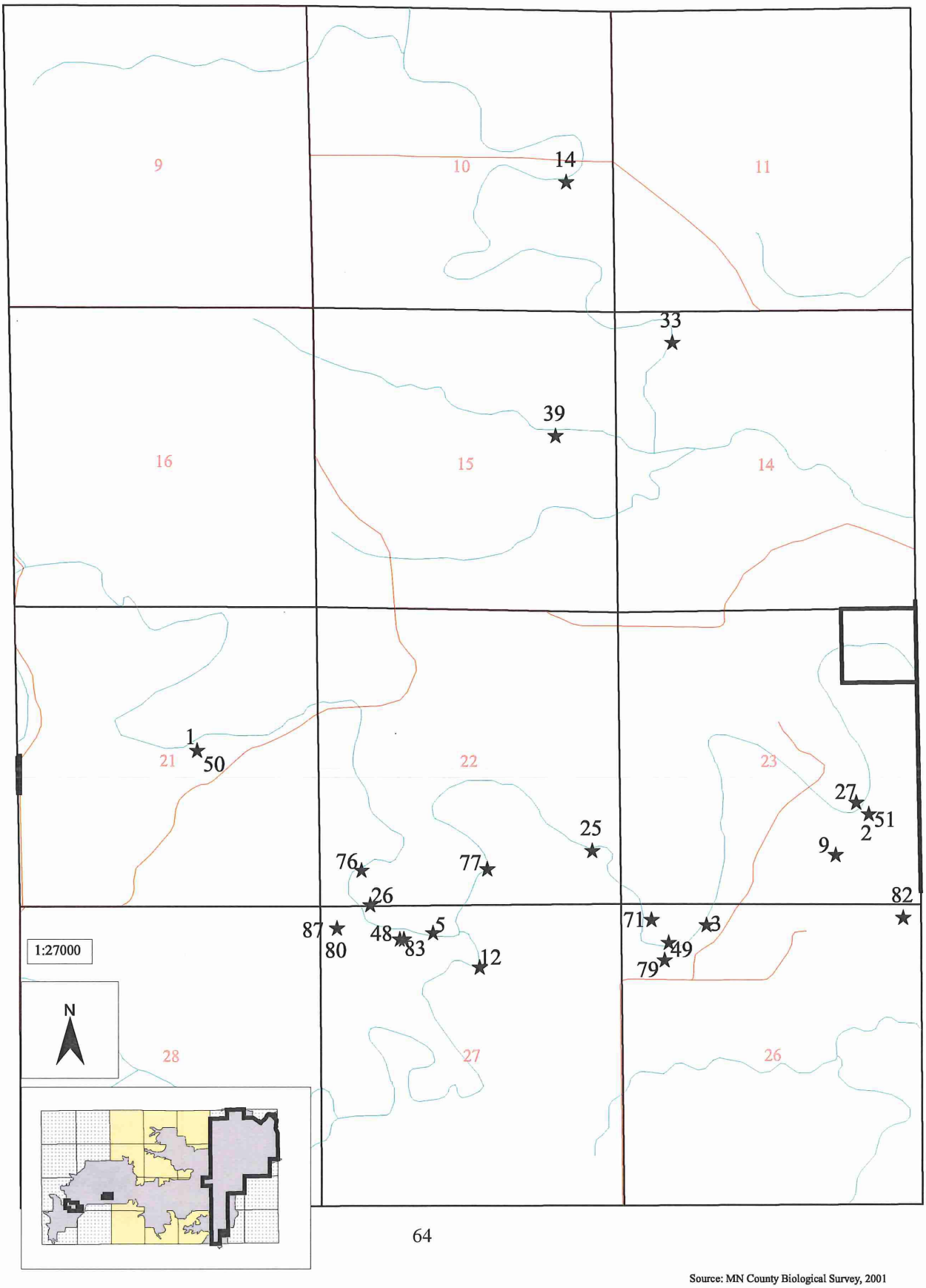
Source: MN County Biological Survey, 2001

Figure 4a. Rare plant species occurrences in Forestville/Mystery Cave Ecological Area, eastern section.



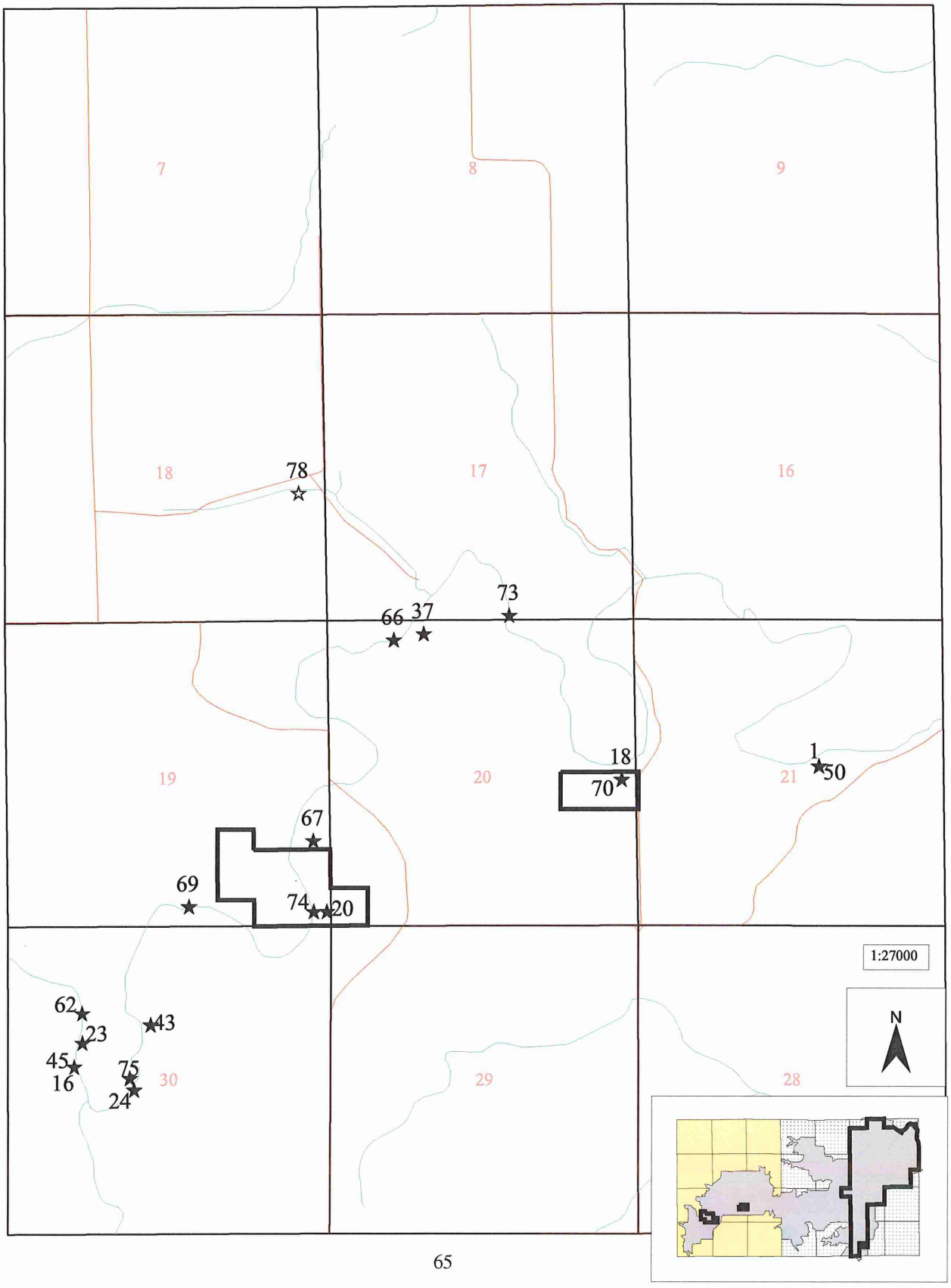
Source: MN County Biological Survey, 2001

Figure 4b. Rare plant species occurrences in Forestville/Mystery Cave Ecological Area, central section.



Source: MN County Biological Survey, 2001

Figure 4c. Rare plant species occurrences in Forestville/Mystery Cave Ecological Area, western section.



Source: MN County Biological Survey, 2001

Species list for Figures 4a, 4b, and 4c. Rare plant species occurrences in Forestville/Mystery Cave Ecological Area.

Map ID and No.	MN Status	Occur[1] #	Scientific Name	Common Name
1 - 4b 4c	SPC	19	*ADOXA MOSCHATELLINA*	MOSCHATEL
2 - 4a 4b	SPC	40	*ADOXA MOSCHATELLINA*	MOSCHATEL
3 - 4a 4b	SPC	41	*ADOXA MOSCHATELLINA*	MOSCHATEL
4 - 4a	SPC	49	*ADOXA MOSCHATELLINA*	MOSCHATEL
5 - 4b	SPC	99	*ADOXA MOSCHATELLINA*	MOSCHATEL
6 - 4a	THR	27	*ALLIUM CERNUUM*	NODDING WILD ONION
7 - 4a	THR	49	*ALLIUM CERNUUM*	NODDING WILD ONION
8 - 4a	THR	51	*ALLIUM CERNUUM*	NODDING WILD ONION
9 - 4a 4b	THR	28	*ALLIUM CERNUUM*	NODDING WILD ONION
10 - 4a	THR	52	*ALLIUM CERNUUM*	NODDING WILD ONION
11 - 4a	THR	50	*ALLIUM CERNUUM*	NODDING WILD ONION
12 - 4b	THR	48	*ALLIUM CERNUUM*	NODDING WILD ONION
13 - 4a	THR	47	*ALLIUM CERNUUM*	NODDING WILD ONION
14 - 4b	THR	61	*ALLIUM CERNUUM*	NODDING WILD ONION
15 - 4a	THR	26	*ALLIUM CERNUUM*	NODDING WILD ONION
16 - 4c	THR	29	*ALLIUM CERNUUM*	NODDING WILD ONION
17 - 4a	THR	62	*ALLIUM CERNUUM*	NODDING WILD ONION
18 - 4c	NON	3	*ARABIS LAEVIGATA*	SMOOTH ROCK-CRESS
19 - 4a	NON	23	*ARABIS LAEVIGATA*	SMOOTH ROCK-CRESS
20 - 4c	NON	30	*ARISAEMA DRACONTIUM*	GREEN DRAGON
21 - 4a	NON	4	*ASTER PILOSUS*	WHITE HEATH ASTER
22 - 4a	NON	34	*ATHYRIUM THELYPTERIOIDES*	SILVERY SPLEENWORT
23 - 4c	NON	6	*CACALIA MUEHLENBERGII*	GREAT INDIAN-PLANTAIN
24 - 4c	NON	7	*CACALIA MUEHLENBERGII*	GREAT INDIAN-PLANTAIN
25 - 4b	NON	8	*CACALIA MUEHLENBERGII*	GREAT INDIAN-PLANTAIN
26 - 4b	NON	9	*CACALIA MUEHLENBERGII*	GREAT INDIAN-PLANTAIN
27 - 4a 4b	NON	5	*CACALIA MUEHLENBERGII*	GREAT INDIAN-PLANTAIN
28 - 4a	THR	8	*CAREX JAMESII*	JAMES' SEDGE
29 - 4a	THR	2	*CAREX JAMESII*	JAMES' SEDGE
30 - 4a	THR	10	*CAREX JAMESII*	JAMES' SEDGE
31 - 4a	THR	23	*CAREX LAEVIVAGINATA*	SMOOTH-SHEATHED SEDGE

Species list for Figures 4a, 4b, and 4c. Rare plant species occurrences in Forestville/Mystery Cave Ecological Area.

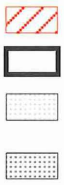
Map ID and No.	MN Status	Occur[1] #	Scientific Name	Common Name
32 - 4a	THR	16	*CAREX LAEVIVAGINATA*	SMOOTH-SHEATHED SEDGE
33 - 4a 4b	THR	17	*CAREX LAEVIVAGINATA*	SMOOTH-SHEATHED SEDGE
34 - 4a	THR	10	*CAREX LAEVIVAGINATA*	SMOOTH-SHEATHED SEDGE
35 - 4a	THR	12	*CAREX LAEVIVAGINATA*	SMOOTH-SHEATHED SEDGE
36 - 4a	SPC	55	*CAREX WOODII*	WOOD'S SEDGE
37 - 4c	SPC	20	*CAREX WOODII*	WOOD'S SEDGE
38 - 4a	SPC	34	*CAREX WOODII*	WOOD'S SEDGE
39 - 4b	SPC	54	*CAREX WOODII*	WOOD'S SEDGE
40 - 4a	SPC	36	*CAREX WOODII*	WOOD'S SEDGE
41 - 4a	SPC	37	*CAREX WOODII*	WOOD'S SEDGE
42 - 4a	SPC	31	*CAREX WOODII*	WOOD'S SEDGE
43 - 4c	SPC	15	*CAREX WOODII*	WOOD'S SEDGE
44 - 4a	SPC	32	*CAREX WOODII*	WOOD'S SEDGE
45 - 4c	SPC	30	*CAREX WOODII*	WOOD'S SEDGE
46 - 4a	SPC	33	*CAREX WOODII*	WOOD'S SEDGE
47 - 4a	SPC	35	*CAREX WOODII*	WOOD'S SEDGE
48 - 4b	END	7	*CHRYSOSPLENIUM IOWENSE*	IOWA GOLDEN SAXIFRAGE
49 - 4a 4b	END	5	*CHRYSOSPLENIUM IOWENSE*	IOWA GOLDEN SAXIFRAGE
50 - 4b 4c	END	3	*CHRYSOSPLENIUM IOWENSE*	IOWA GOLDEN SAXIFRAGE
51 - 4a 4b	END	4	*CHRYSOSPLENIUM IOWENSE*	IOWA GOLDEN SAXIFRAGE
52 - 4a	SPC	15	*DESMODIUM CUSPIDATUM VAR. LONGIFOLIUM*	BIG TICK-TREFOIL
53 - 4a	SPC	14	*DESMODIUM CUSPIDATUM VAR. LONGIFOLIUM*	BIG TICK-TREFOIL
54 - 4a	SPC	16	*DESMODIUM CUSPIDATUM VAR. LONGIFOLIUM*	BIG TICK-TREFOIL
55 - 4a	SPC	13	*DESMODIUM CUSPIDATUM VAR. LONGIFOLIUM*	BIG TICK-TREFOIL
56 - 4a	SPC	41	*DICENTRA CANADENSIS*	SQUIRREL-CORN
57 - 4a	SPC	47	*DRYOPTERIS GOLDIANA*	GOLDIE'S FERN
58 - 4a	SPC	46	*DRYOPTERIS GOLDIANA*	GOLDIE'S FERN
59 - 4a	SPC	37	*DRYOPTERIS GOLDIANA*	GOLDIE'S FERN
60 - 4a	SPC	65	*ERYNGIUM YUCCIFOLIUM*	RATTLESNAKE-MASTER
61 - 4a	SPC	49	*ERYNGIUM YUCCIFOLIUM*	RATTLESNAKE-MASTER
62 - 4c	NON	5	*GEUM LACINIATUM VAR. TRICHOCARPUM*	ROUGH AVENS
63 - 4a	NON	8	*GEUM LACINIATUM VAR. TRICHOCARPUM*	ROUGH AVENS
64 - 4a	SPC	33	*JEFFERSONIA DIPHYLLA*	TWINLEAF

Species list for Figures 4a, 4b, and 4c. Rare plant species occurrences in Forestville/Mystery Cave Ecological Area.

Map ID and No.	MN Status	Occur # [1]	Scientific Name	Common Name
65 - 4a	THR	13	*NAPAEA DIOICA*	GLADE MALLOW
66 - 4c	THR	10	*NAPAEA DIOICA*	GLADE MALLOW
67 - 4c	THR	11	*NAPAEA DIOICA*	GLADE MALLOW
68 - 4a	THR	12	*NAPAEA DIOICA*	GLADE MALLOW
69 - 4c	THR	39	*NAPAEA DIOICA*	GLADE MALLOW
70 - 4c	THR	5	*NAPAEA DIOICA*	GLADE MALLOW
71 - 4a 4b	THR	36	*NAPAEA DIOICA*	GLADE MALLOW
72 - 4a	THR	74	*NAPAEA DIOICA*	GLADE MALLOW
73 - 4c	THR	48	*NAPAEA DIOICA*	GLADE MALLOW
74 - 4c	THR	88	*NAPAEA DIOICA*	GLADE MALLOW
75 - 4c	THR	40	*NAPAEA DIOICA*	GLADE MALLOW
76 - 4b	THR	38	*NAPAEA DIOICA*	GLADE MALLOW
77 - 4b	THR	37	*NAPAEA DIOICA*	GLADE MALLOW
78 - 4c	SPC	8	*OROBANCHE UNIFLORA*	ONE-FLOWERED BROOMRAPE
79 - 4a 4b	SPC	35	*PANAX QUINQUEFOLIUS*	AMERICAN GINSENG
80 - 4b	SPC	160	*PANAX QUINQUEFOLIUS*	AMERICAN GINSENG
81 - 4a	SPC	238	*PANAX QUINQUEFOLIUS*	AMERICAN GINSENG
82 - 4a 4b	SPC	177	*PANAX QUINQUEFOLIUS*	AMERICAN GINSENG
83 - 4b	SPC	12	*POA WOLFII*	WOLF'S BLUEGRASS
84 - 4a	SPC	40	*SANICULA TRIFOLIATA*	BEAKED SNAKEROOT
85 - 4a	THR	12	*SILENE NIVEA*	SNOWY CAMPION
86 - 4a	NON	29	*TAENIDIA INTEGERRIMA*	YELLOW PIMPERNEL
87 - 4b	NON	24	*TAENIDIA INTEGERRIMA*	YELLOW PIMPERNEL
88 - 4a	NON	25	*TAENIDIA INTEGERRIMA*	YELLOW PIMPERNEL

[1] Occurrence number identifies the element record in the Natural Heritage Information System (see Appendix 1 for additional information on particular rare plant occurrences).

Legend for Figure 5.
Focal areas for ecological management of native plant community complexes



Focal area for ecological management of native plant community complexes

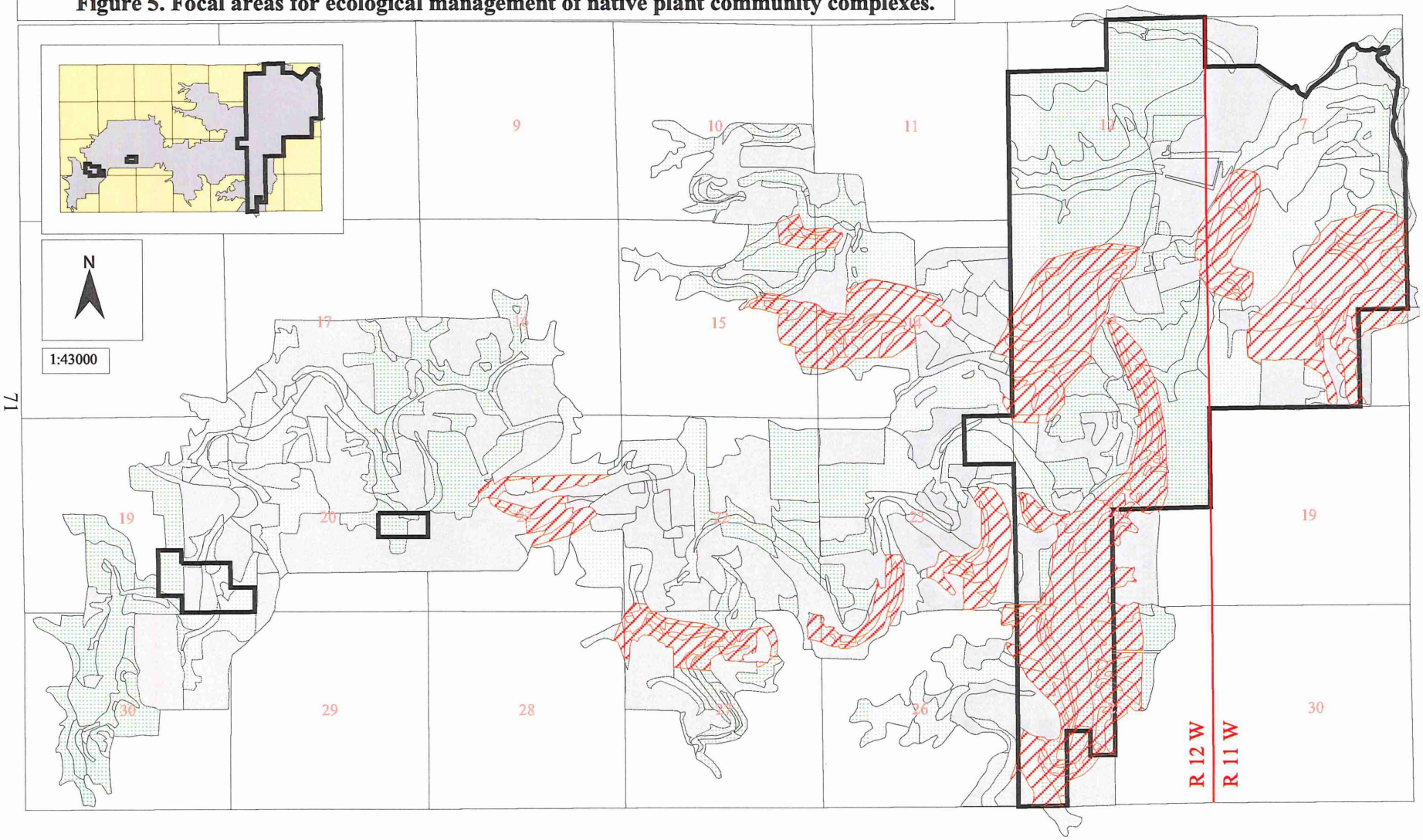
Forestville/Mystery Cave State Park - Statutory Boundary

Native Plant Communities with Quality Ranks

Disturbed Land, Developed Areas, or
Native Plant Communities Below Minimum Standards

Source: MN County Biological Survey, 2001

Figure 5. Focal areas for ecological management of native plant community complexes.



Source: MN County Biological Survey, 2001

Legend for Figure 6.
Locations of animal survey sites

Animal Survey Sites

Herp Survey Data

- Turtle Traps
- Herp Searches
- Drift Fence
- Cover Board
- Anuran Survey

Bird Survey Data

- Bird Point Count
- Bird Playback Location

Mammal Survey Data

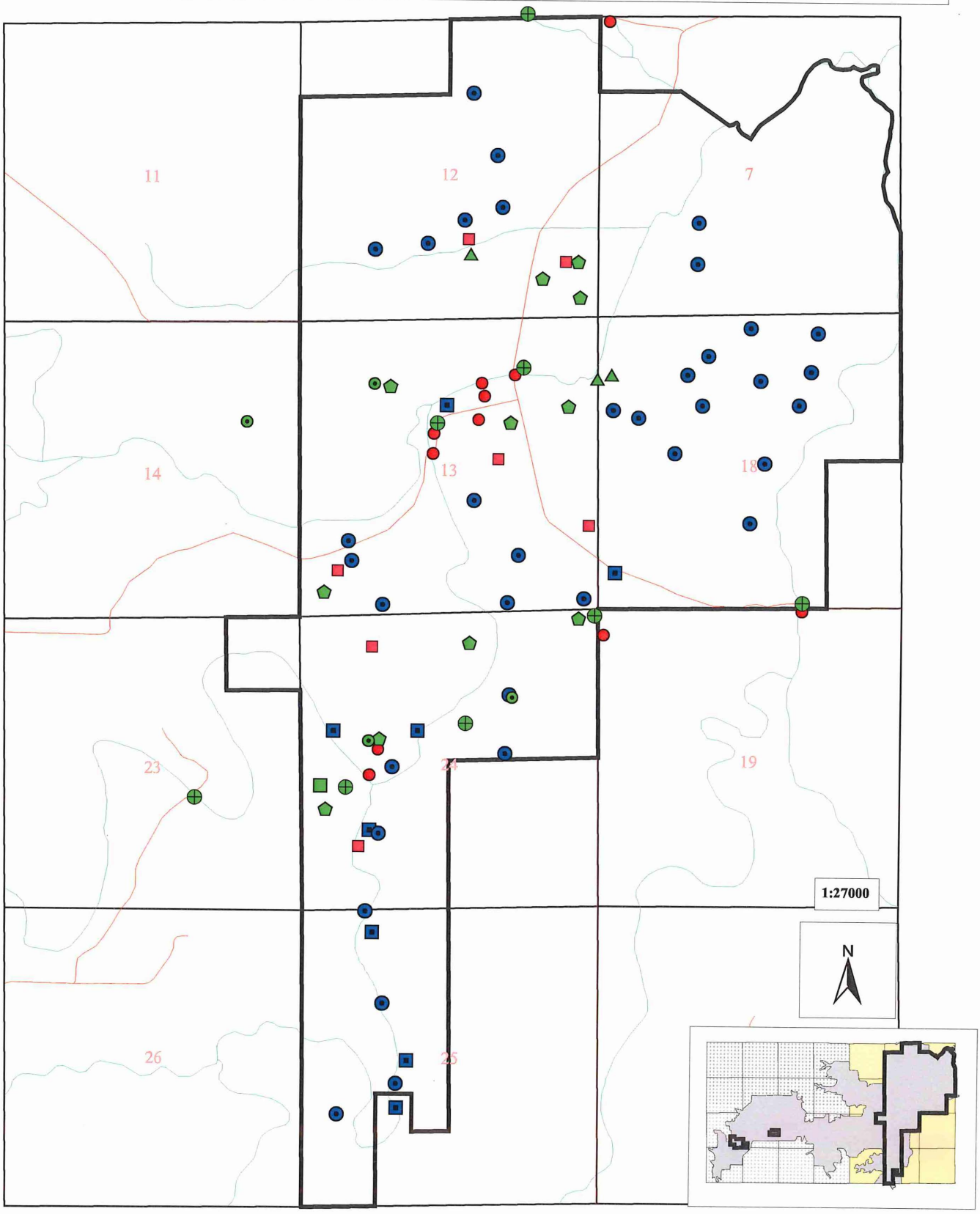
- Mammal Trap Grids
- Bat Survey

Other Mapped Features:

- Forestville/Mystery Cave State Park - Statutory Boundar
- Highways and Local Roads
- Rivers, Streams, Ditches

Source: MN County Biological Survey, 2001

Figure 6. Locations of animal survey sites in/near Forestville/Mystery Cave State Park.



Source: MN County Biological Survey, 2001

Legend for Figures 7a, 7b, and 7c.
Locations of rare animal species and animal aggregations

Rare Animals and Animal Aggregation Occurrences:*

- ♦ Rare Animal Location (1970 - present) and map number
- ◇ Rare Animal Location (pre-1970) and map number
- ■ Animal Aggregation (1970 - present) and map number

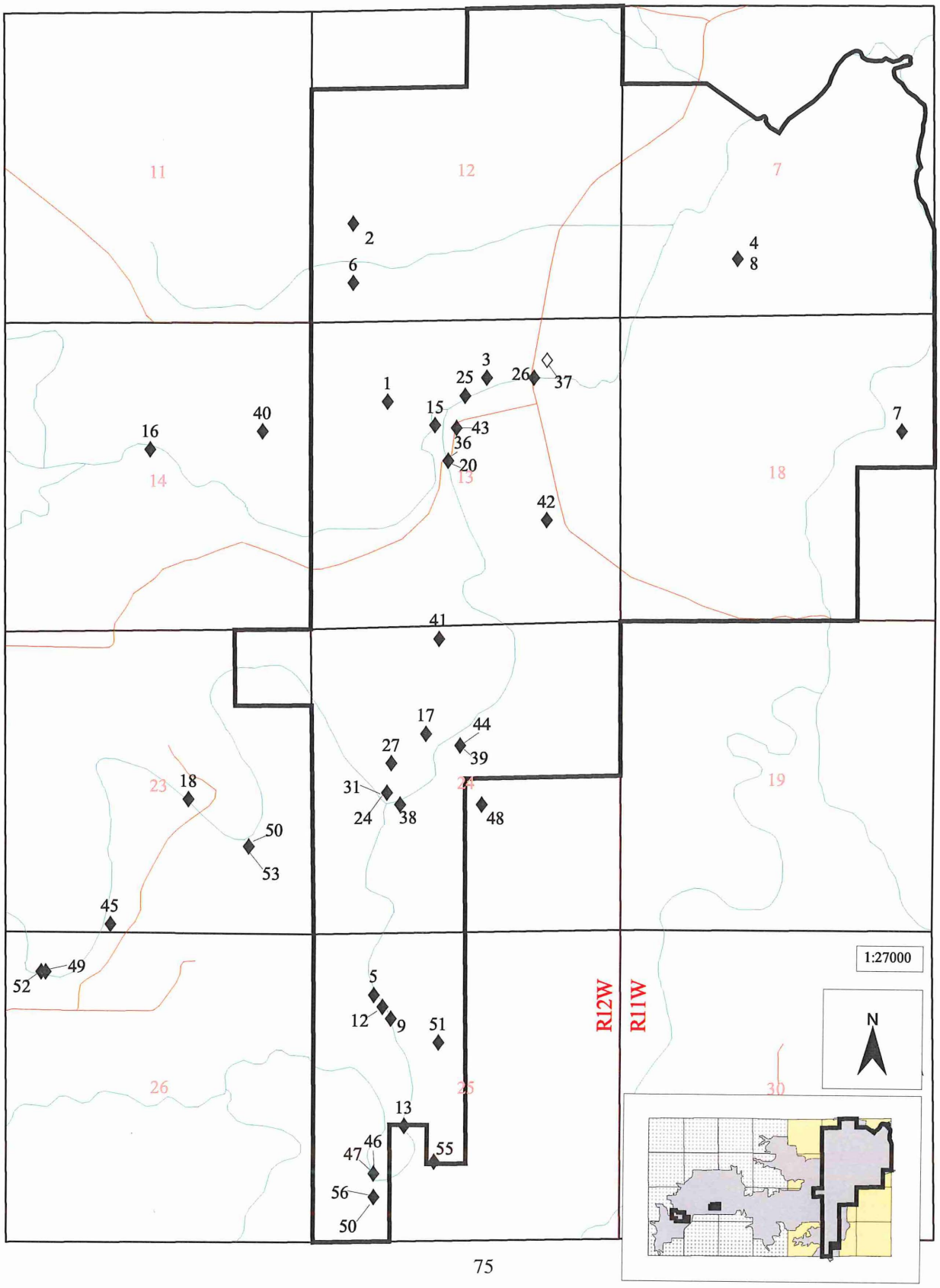
Other Mapped Features:

- Forestville/Mystery Cave State Park - Statutory Boundar
- Highways and Local Roads
- Rivers, Streams, Ditches

* Refer to list following maps for species associated with the map numbers.

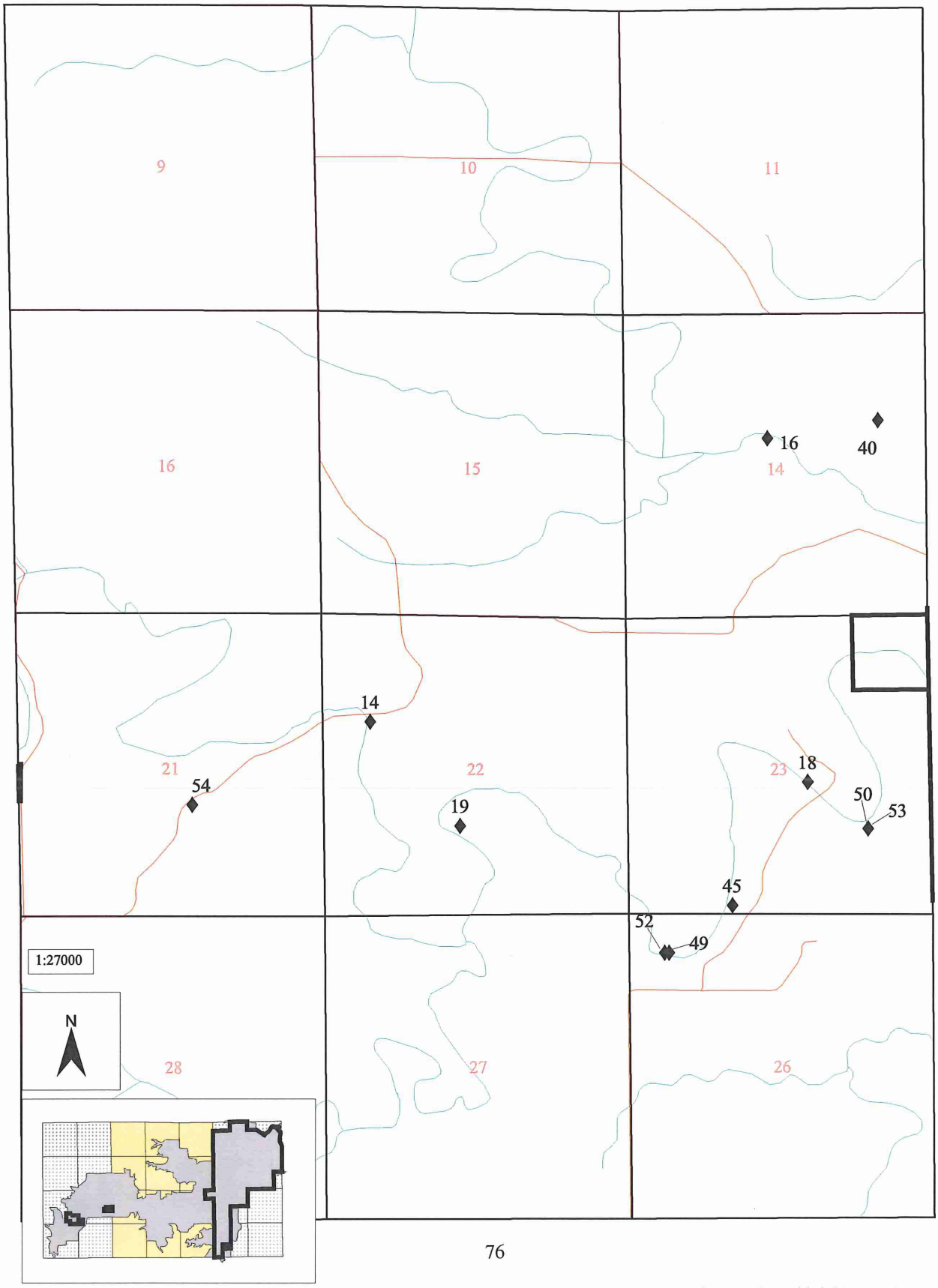
Source: MN County Biological Survey, 2001

Figure 7a. Rare animal species and animal aggregations in Forestville/Mystery Cave Ecological Area, eastern section.



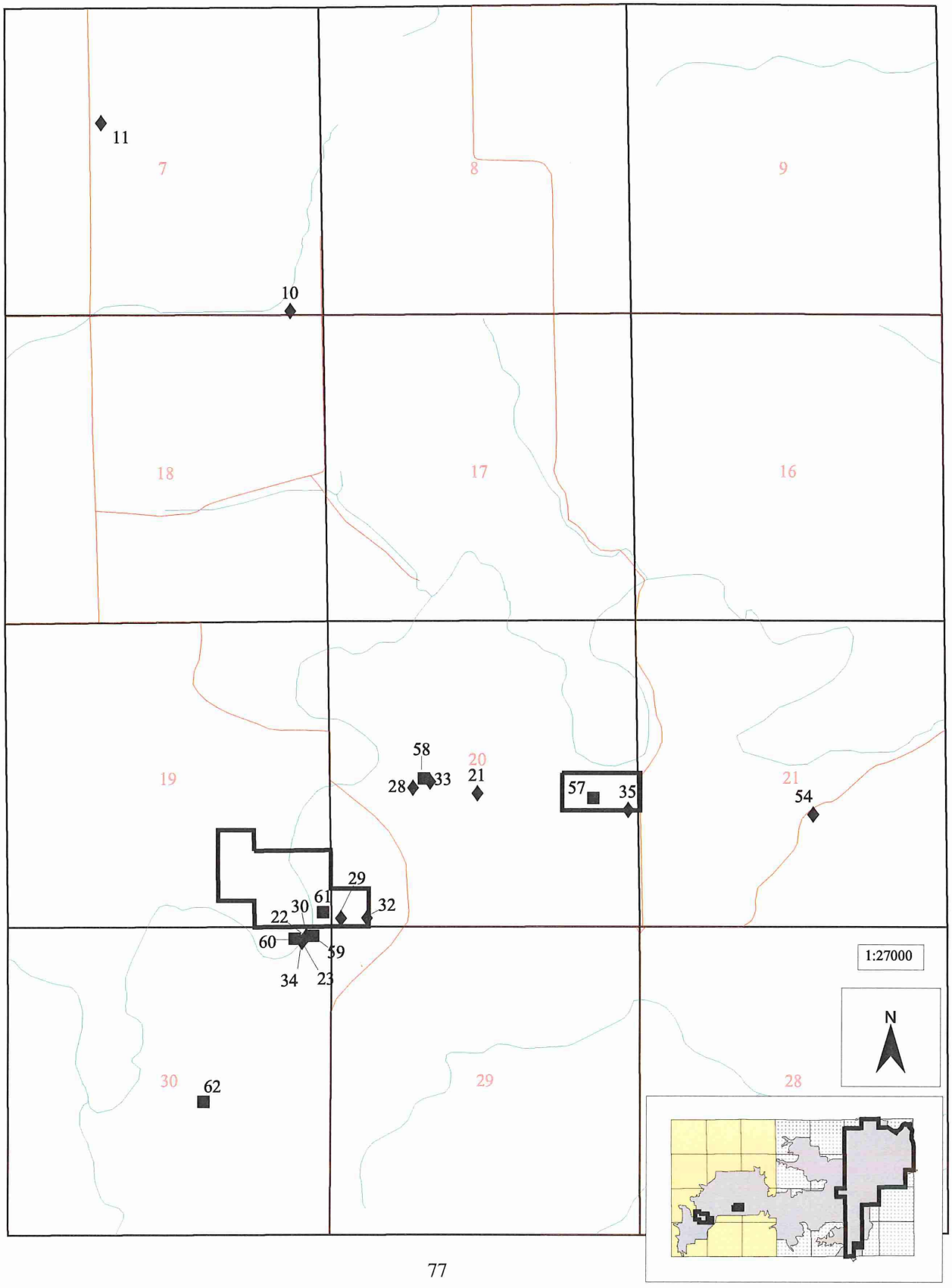
Source: MN County Biological Survey, 2001

Figure 7b. Rare animal species and animal aggregations in Forestville/Mystery Cave Ecological Area, central section.



Source: MN County Biological Survey, 2001

Figure 7c. Rare amimal species and animal aggregations in Forestville/Mystery Cave Ecological Area, western section.



Source: MN County Biological Survey, 2001

Species list for Figures 7a, 7b, and 7c. Rare animal species and animal aggregations in Forestville/Mystery Cave Ecological Area.

Map ID and No.	MN Status	Occur[1] #	Scientific Name	Common Name
BIRDS				
1 - 7a	SPC	17	*DENDROICA CERULEA*	CERULEAN WARBLER
2 - 7a	SPC	18	*DENDROICA CERULEA*	CERULEAN WARBLER
3 - 7a	SPC	16	*DENDROICA CERULEA*	CERULEAN WARBLER
4 - 7a	SPC	15	*DENDROICA CERULEA*	CERULEAN WARBLER
5 - 7a	SPC	12	*DENDROICA CERULEA*	CERULEAN WARBLER
6 - 7a	SPC	15	*EMPIDONAX VIRESCENS*	ACADIAN FLYCATCHER
7 - 7a	SPC	14	*EMPIDONAX VIRESCENS*	ACADIAN FLYCATCHER
8 - 7a	SPC	16	*EMPIDONAX VIRESCENS*	ACADIAN FLYCATCHER
9 - 7a	SPC	*60*	*EMPIDONAX VIRESCENS*	ACADIAN FLYCATCHER
10 - 7c	THR	146	*LANIUS LUDOVICIANUS*	LOGGERHEAD SHRIKE
11 - 7c	THR	154	*LANIUS LUDOVICIANUS*	LOGGERHEAD SHRIKE
12 - 7a	SPC	62	*SEIURUS MOTACILLA*	LOUISIANA WATERTHRUSH
13 - 7a	SPC	63	*SEIURUS MOTACILLA*	LOUISIANA WATERTHRUSH
FISH				
14 - 7b	NON	69	*LAMPETRA APPENDIX*	AMERICAN BROOK LAMPREY
15 - 7a	NON	37	*LAMPETRA APPENDIX*	AMERICAN BROOK LAMPREY
16 - 7a 7b	NON	38	*LAMPETRA APPENDIX*	AMERICAN BROOK LAMPREY
17 - 7a	NON	52	*LAMPETRA APPENDIX*	AMERICAN BROOK LAMPREY
18 - 7a 7b	NON	54	*LAMPETRA APPENDIX*	AMERICAN BROOK LAMPREY
19 - 7b	NON	63	*LAMPETRA APPENDIX*	AMERICAN BROOK LAMPREY
MAMMALS				
20 - 7a	SPC	19	*MYOTIS SEPTENTRIONALIS*	NORTHERN MYOTIS
21 - 7c	SPC	16	*MYOTIS SEPTENTRIONALIS*	NORTHERN MYOTIS
22 - 7c	SPC	15	*MYOTIS SEPTENTRIONALIS*	NORTHERN MYOTIS
23 - 7c	SPC	18	*MYOTIS SEPTENTRIONALIS*	NORTHERN MYOTIS

Species list for Figures 7a, 7b, and 7c. Rare animal species and animal aggregations in Forestville/Mystery Cave Ecological Area.

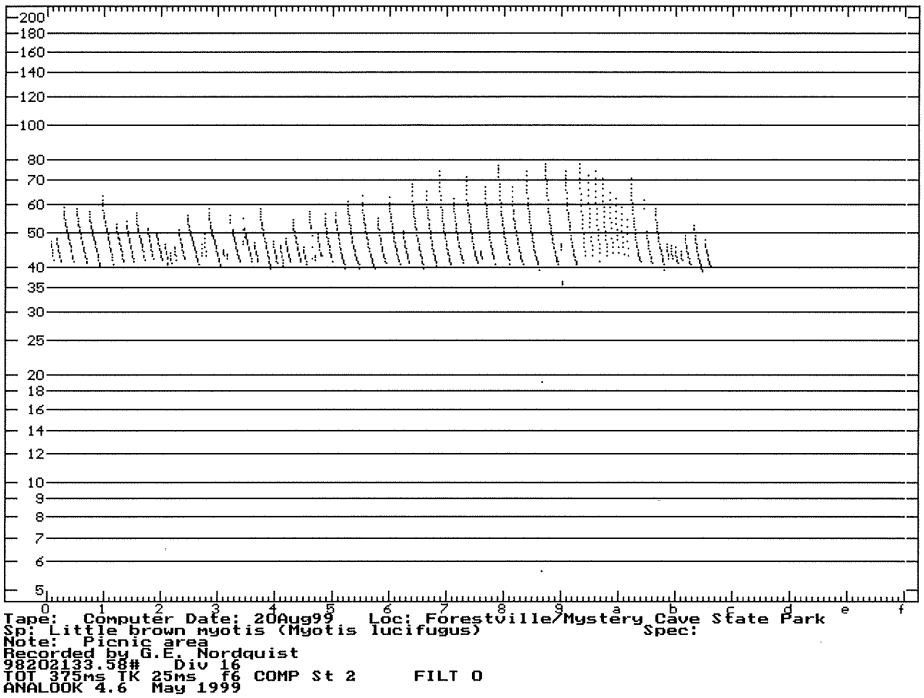
Map ID and No.	MN Status	Occur[1] #	Scientific Name	Common Name
24 - 7a	SPC	22	*MYOTIS SEPTENTRIONALIS*	NORTHERN MYOTIS
25 - 7a	SPC	21	*MYOTIS SEPTENTRIONALIS*	NORTHERN MYOTIS
26 - 7a	SPC	20	*MYOTIS SEPTENTRIONALIS*	NORTHERN MYOTIS
27 - 7a	SPC	23	*MYOTIS SEPTENTRIONALIS*	NORTHERN MYOTIS
28 - 7c	SPC	17	*MYOTIS SEPTENTRIONALIS*	NORTHERN MYOTIS
29 - 7c	SPC	6	*MYOTIS SEPTENTRIONALIS*	NORTHERN MYOTIS
30 - 7c	SPC	29	*PIPISTRELLUS SUBFLAVUS*	EASTERN PIPISTRELLE
31 - 7a	SPC	33	*PIPISTRELLUS SUBFLAVUS*	EASTERN PIPISTRELLE
32 - 7c	SPC	17	*PIPISTRELLUS SUBFLAVUS*	EASTERN PIPISTRELLE
33 - 7c	SPC	31	*PIPISTRELLUS SUBFLAVUS*	EASTERN PIPISTRELLE
34 - 7c	SPC	15	*PIPISTRELLUS SUBFLAVUS*	EASTERN PIPISTRELLE
35 - 7c	SPC	30	*PIPISTRELLUS SUBFLAVUS*	EASTERN PIPISTRELLE
36 - 7a	SPC	32	*PIPISTRELLUS SUBFLAVUS*	EASTERN PIPISTRELLE
37 - 7a	NON	15	*REITHRODONTOMYS MEGALOTIS*	WESTERN HARVEST MOUSE
REPTILES				
38 - 7a	THR	133	*CROTALUS HORRIDUS*	TIMBER RATTLESNAKE
39 - 7a	THR	22	*CROTALUS HORRIDUS*	TIMBER RATTLESNAKE
40 - 7a 7b	THR	114	*CROTALUS HORRIDUS*	TIMBER RATTLESNAKE
41 - 7a	THR	101	*CROTALUS HORRIDUS*	TIMBER RATTLESNAKE
42 - 7a	THR	604	*EMYDOIDEA BLANDINGII*	BLANDING'S TURTLE
43 - 7a	NON	9	*LAMPROPELTIS TRIANGULUM*	MILK SNAKE
44 - 7a	NON	1	*LAMPROPELTIS TRIANGULUM*	MILK SNAKE
MOLLUSKS				
45 - 7a 7b	THR	5	*NOVASUCCINEA N. SP. MINNESOTA A*	MINNESOTA PLEISTOCENE AMBERSNAII
46 - 7a	THR	6	*NOVASUCCINEA N. SP. MINNESOTA A*	MINNESOTA PLEISTOCENE AMBERSNAII
47 - 7a	END	3	*NOVASUCCINEA N. SP. MINNESOTA B*	IOWA PLEISTOCENE AMBERSNAIL
48 - 7a	NON	5	*VERTIGO HUBRICHTI*	HUBRICHT'S VERTIGO
49 - 7a 7b	END	2	*VERTIGO HUBRICHTI HUBRICHTI*	MIDWEST PLEISTOCENE VERTIGO

Species list for Figures 7a, 7b, and 7c. Rare animal species and animal aggregations in Forestville/Mystery Cave Ecological Area.

Map ID and No.	MN Status	Occur # [1]	Scientific Name	Common Name
50 - 7a 7b	END	1	*VERTIGO HUBRICHTI HUBRICHTI*	MIDWEST PLEISTOCENE VERTIGO
51 - 7a	THR	6	*VERTIGO HUBRICHTI VARIABILIS N. SUBSP.*	VARIABLE PLEISTOCENE VERTIGO
52 - 7a 7b	THR	2	*VERTIGO HUBRICHTI VARIABILIS N. SUBSP.*	VARIABLE PLEISTOCENE VERTIGO
53 - 7a 7b	THR	1	*VERTIGO HUBRICHTI VARIABILIS N. SUBSP.*	VARIABLE PLEISTOCENE VERTIGO
54 - 7b 7c	THR	5	*VERTIGO HUBRICHTI VARIABILIS N. SUBSP.*	VARIABLE PLEISTOCENE VERTIGO
55 - 7a	THR	3	*VERTIGO HUBRICHTI VARIABILIS N. SUBSP.*	VARIABLE PLEISTOCENE VERTIGO
56 - 7a	THR	4	*VERTIGO HUBRICHTI VARIABILIS N. SUBSP.*	VARIABLE PLEISTOCENE VERTIGO
ANIMAL AGGREGATIONS				
57 - 7c		19	*BAT CONCENTRATION*	BAT CONCENTRATION
58 - 7c		27	*BAT CONCENTRATION*	BAT CONCENTRATION
59 - 7c		23	*BAT CONCENTRATION*	BAT CONCENTRATION
60 - 7c		5	*BAT CONCENTRATION*	BAT CONCENTRATION
61 - 7c		2	*BAT CONCENTRATION*	BAT CONCENTRATION
62 - 7c		202	*COLONIAL WATERBIRD NESTING SITE*	COLONIAL WATERBIRD NESTING SITE

[1] Occurrence number identifies the element record in the Natural Heritage Information System (see Appendix 1 for additional information on particular rare animal occurrences).

Figure 8. Representative call sequences of foraging bats at Forestville/Mystery Cave State Park (Little brown myotis, Northern myotis, Eastern pipistrelle, and Eastern red bat).



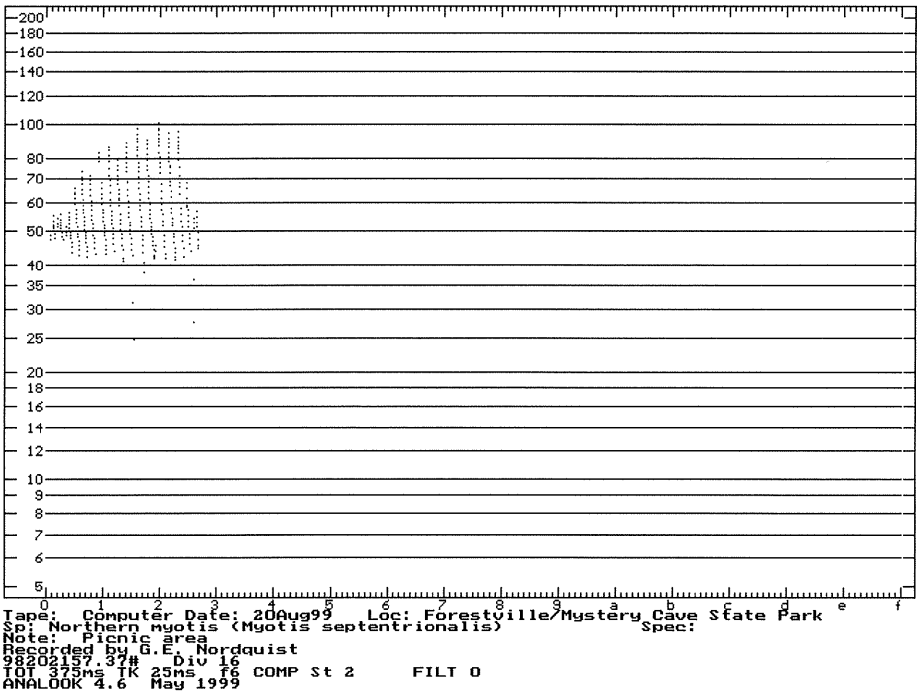
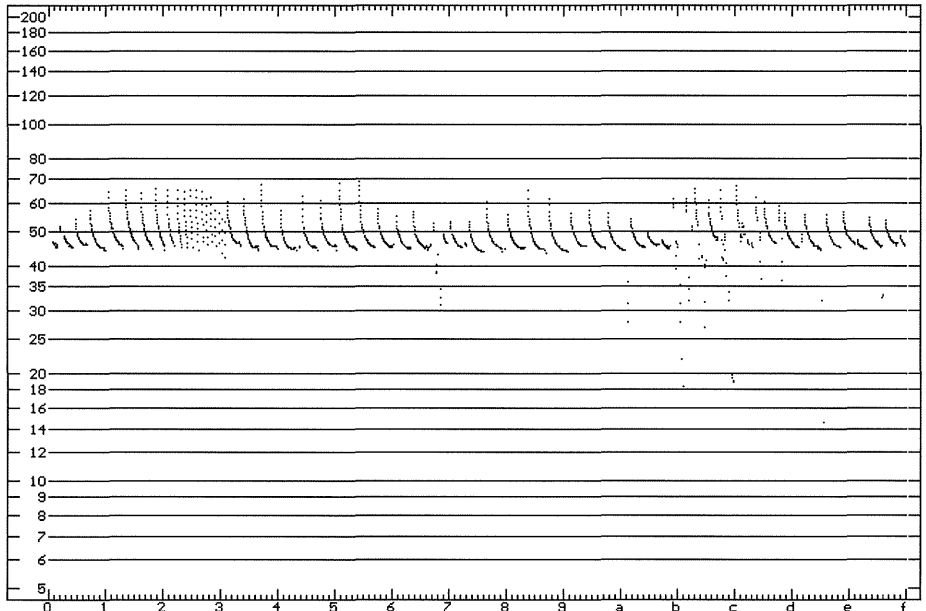


Fig. 8. Continued.



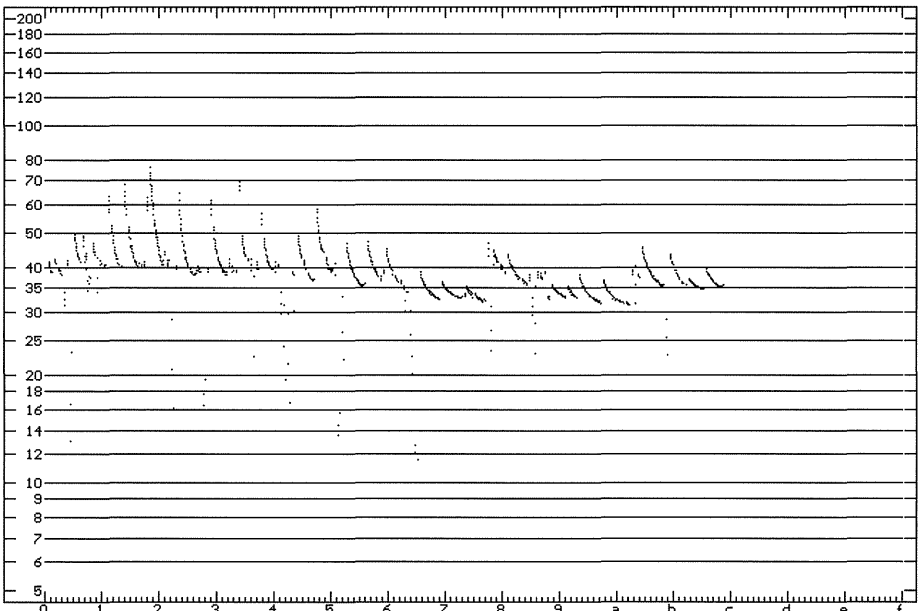
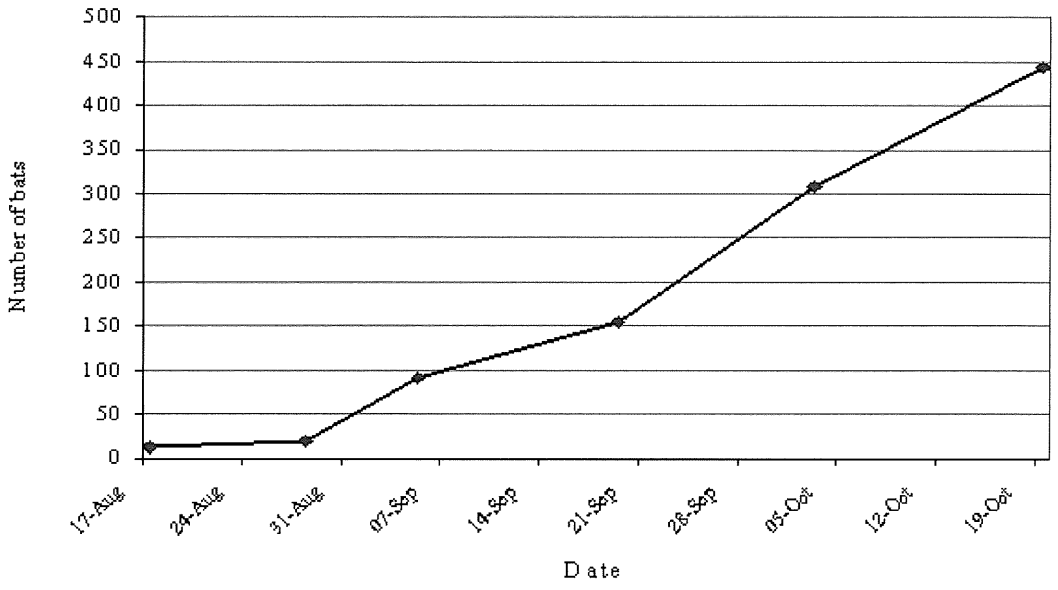
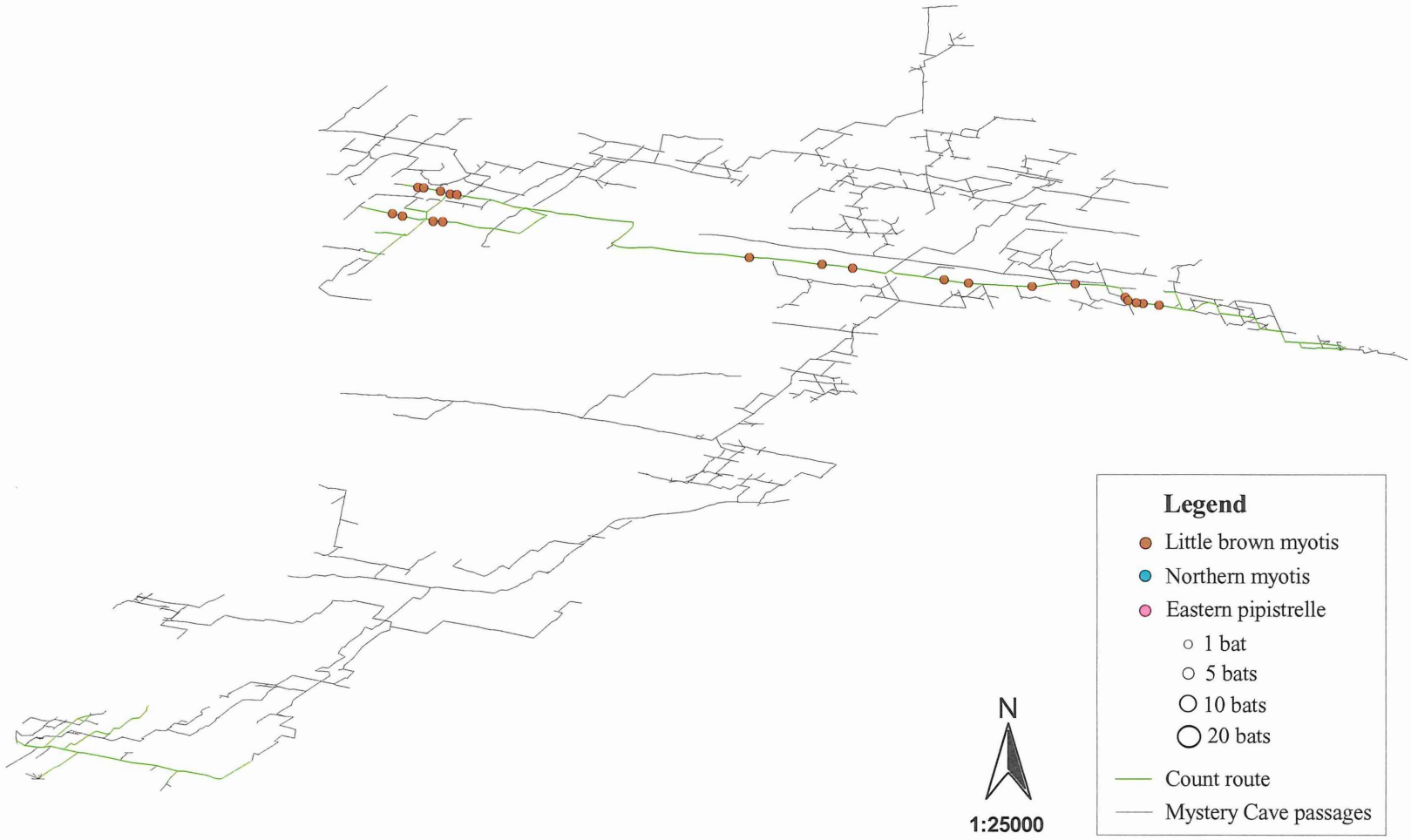


Figure 9. Arrival of bats to Mystery Cave during fall, 1996.
(Numbers taken from count routes in Mystery I and II.)



Date	Little brown myotis	Northern myotis	Eastern pipistrelle	Total
17-Aug-1996	12	0	0	12
28-Aug-1998	18	0	0	18
5-Sep-1996	89	2	0	91
19-Sep-1996	145	5	4	154
3-Oct-1996	303	0	6	309
19-Oct-1996	431	4	7	442

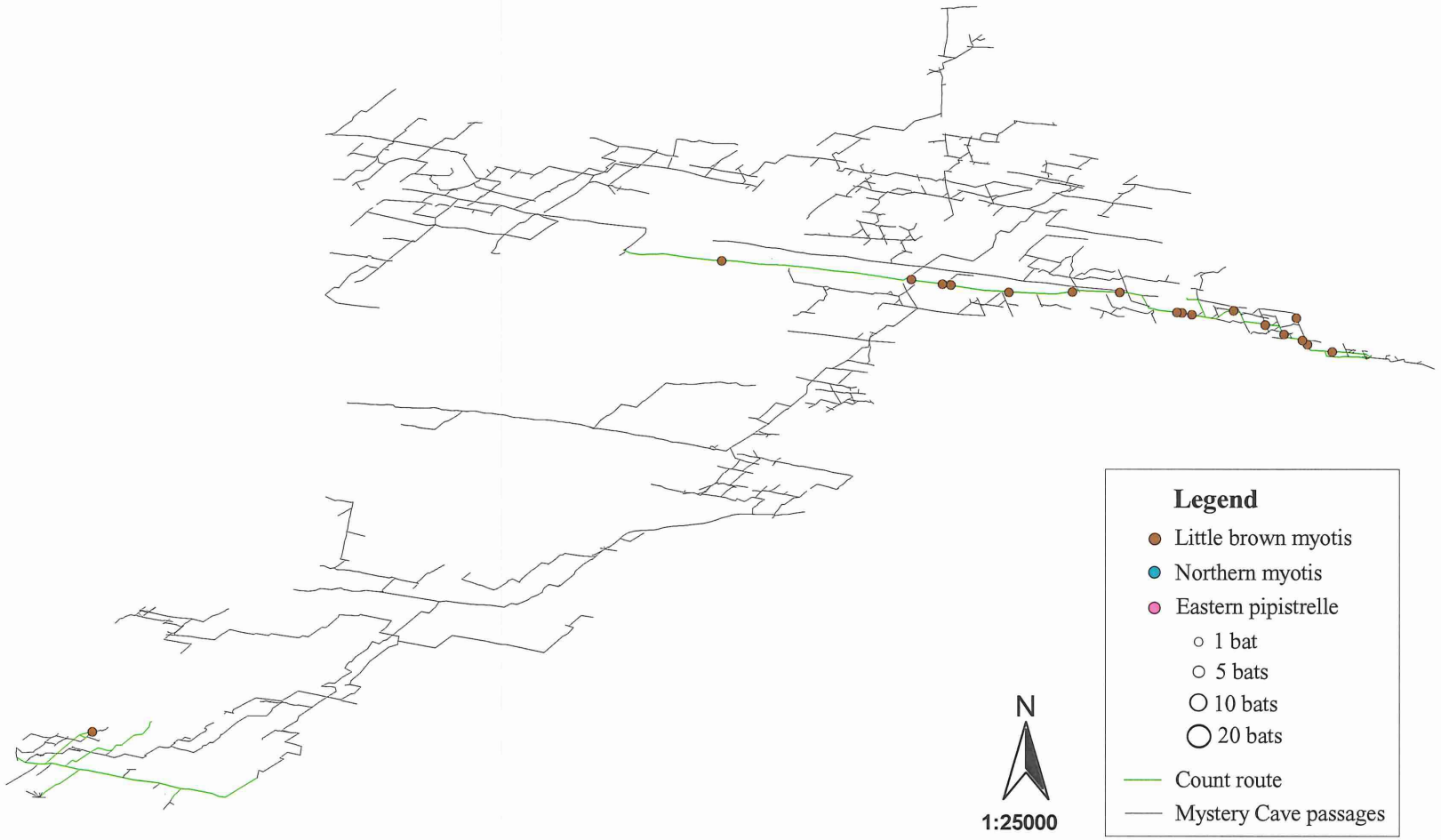
Figure 10a. Locations of roosting bats in Mystery Cave, 17 August 1996.



Map of Mystery Cave based on surveys by the Minnesota Speleological Survey.

Source: MN County Biological Survey, 2001

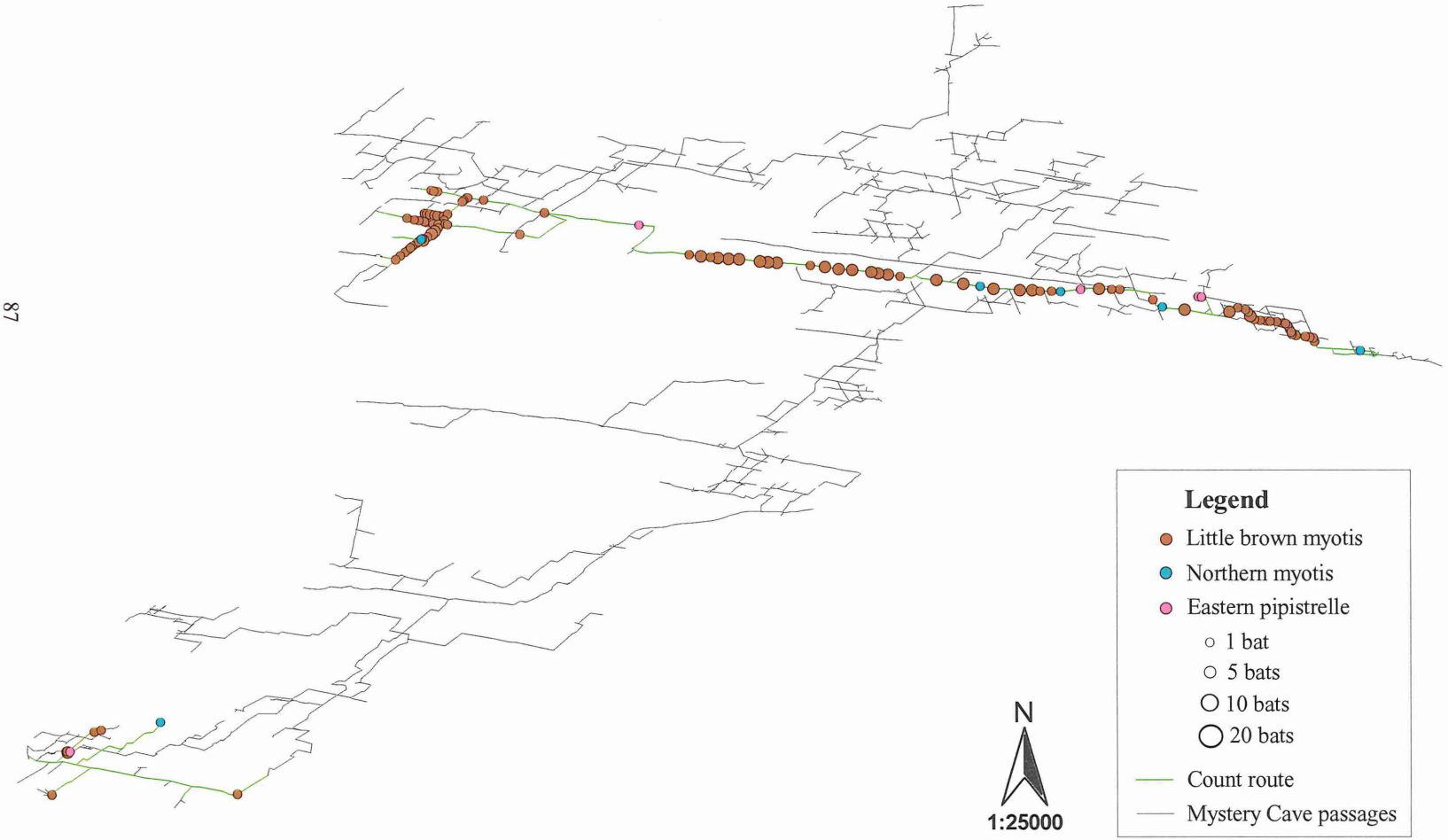
Figure 10b. Locations of roosting bats in Mystery Cave, 28 August 1996.



Map of Mystery Cave based on surveys by the Minnesota Speleological Survey.

Source: MN County Biological Survey, 2001

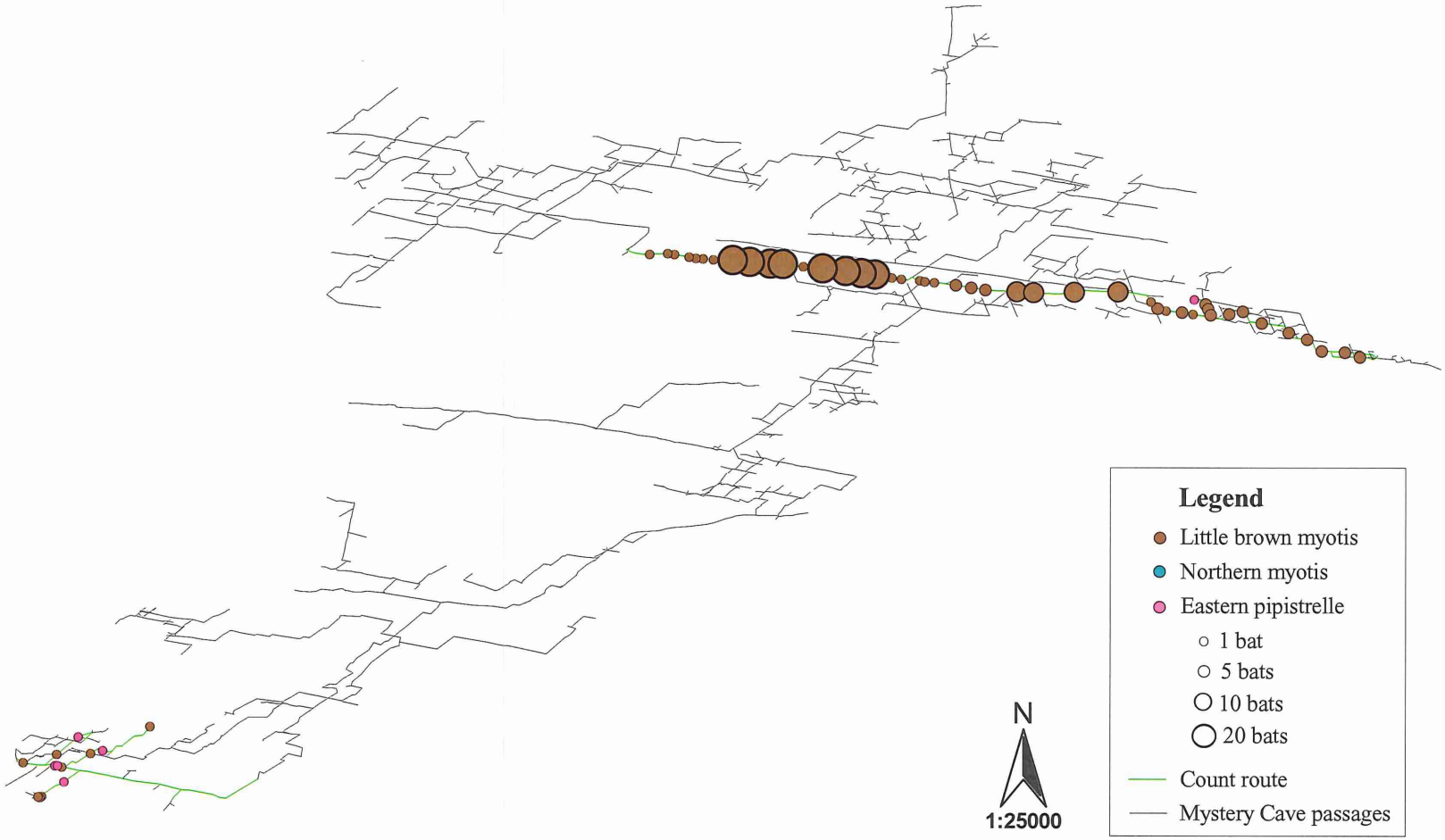
Figure 10d. Locations of roosting bats in Mystery Cave, 19 September 1996.



Map of Mystery Cave based on surveys by the Minnesota Speleological Survey.

Source: MN County Biological Survey, 2001

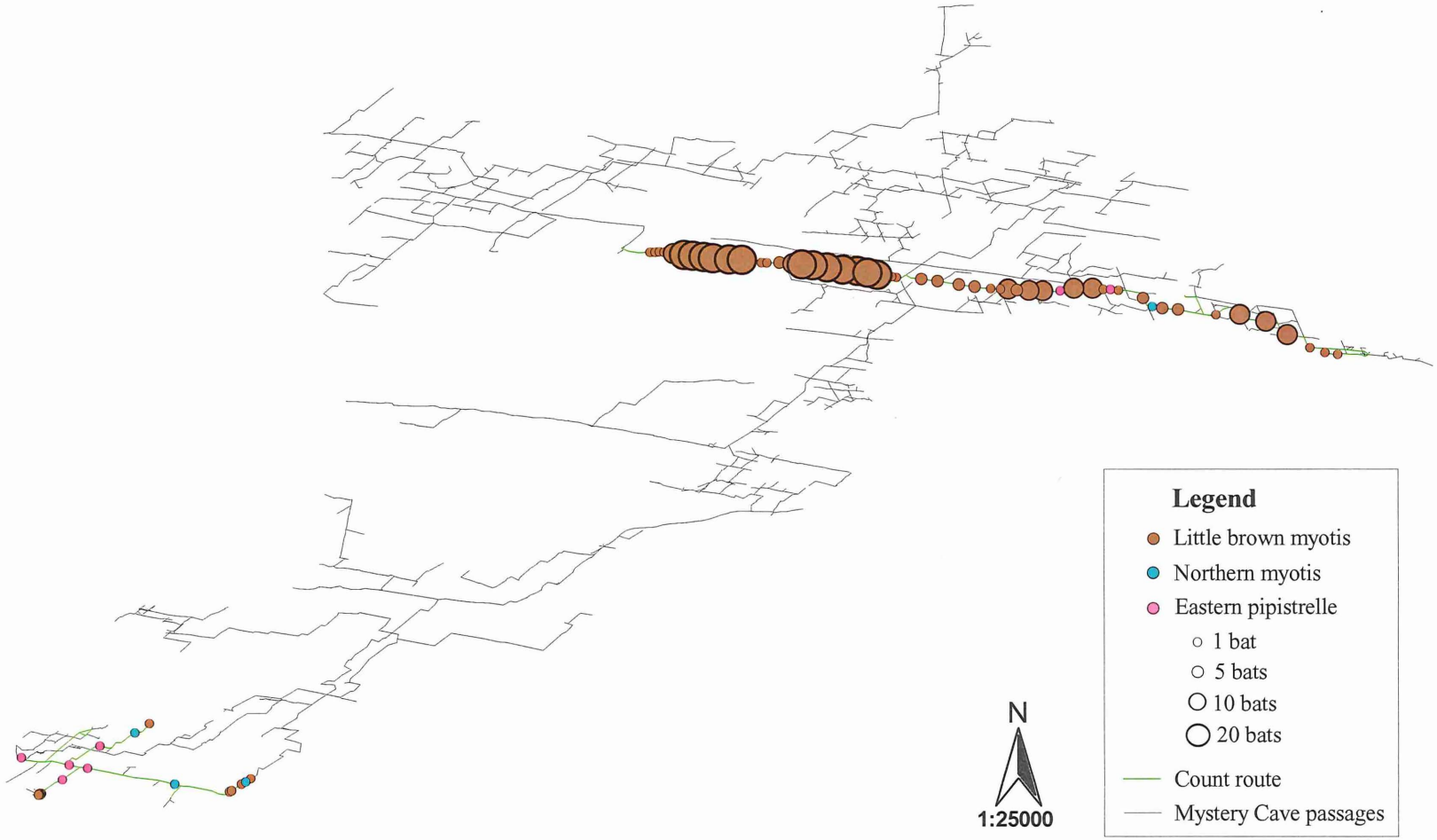
Figure 10e. Locations of roosting bats in Mystery Cave, 3 October 1996.



Map of Mystery Cave based on surveys by the Minnesota Speleological Survey.

Source: MN County Biological Survey, 2001

Figure 10f. Locations of roosting bats in Mystery Cave, 19 October 1996.



Map of Mystery Cave based on surveys by the Minnesota Speleological Survey.

Source: MN County Biological Survey, 2001

Legend for Figure 11.
Areas of importance to forest birds


Areas of importance to forest birds

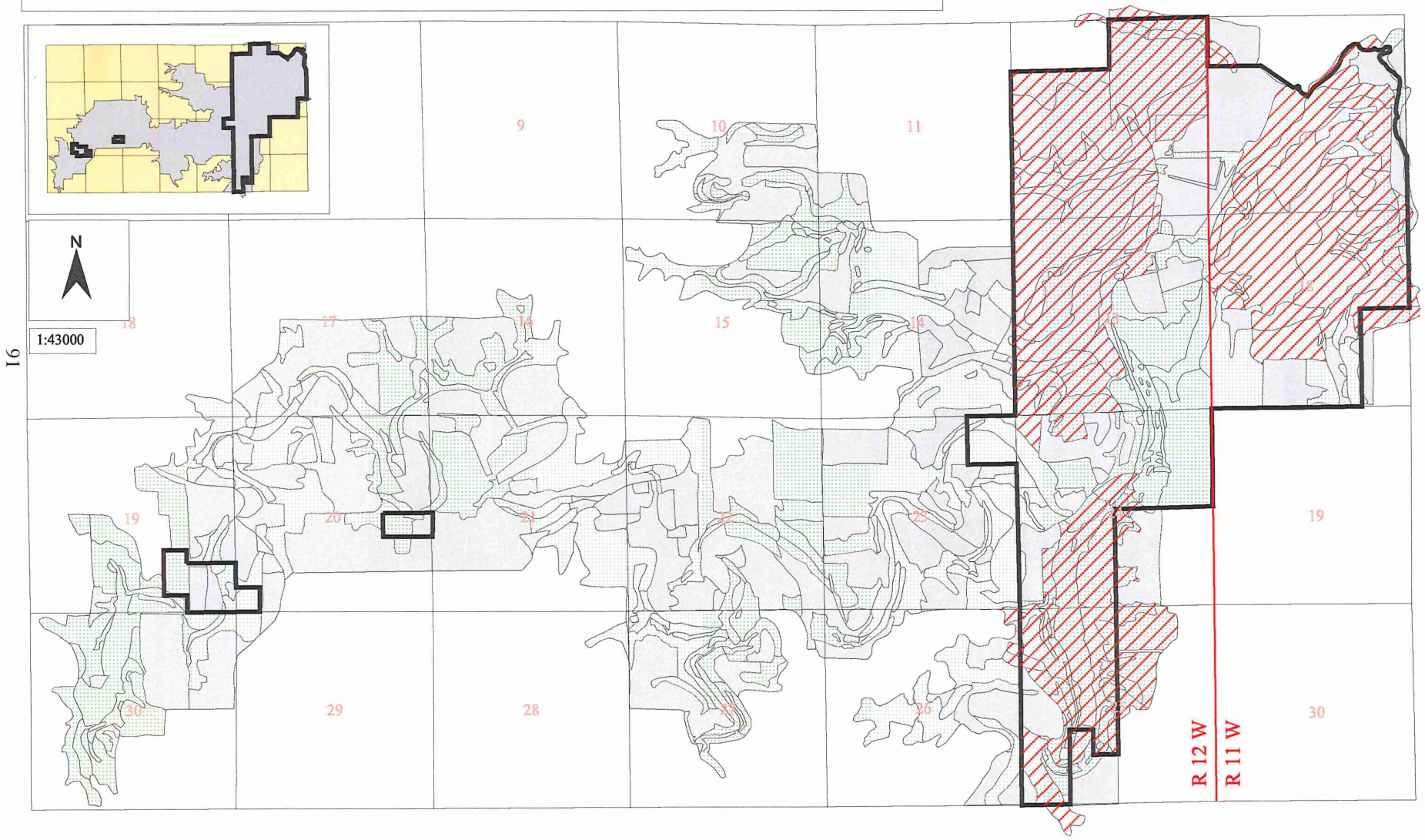

Forestville/Mystery Cave State Park - Statutory Boundary


Native Plant Communities with Quality Ranks


Disturbed Land, Developed Areas, or
Native Plant Communities Below Minimum Standards

Source: MN County Biological Survey, 2001

Figure 11. Areas of importance to forest birds in Forestville/Mystery Cave State Park.



Source: MN County Biological Survey, 2001

Legend for Figure 12.
Important habitat features for herpetofauna

Important habitat features for herpetofauna

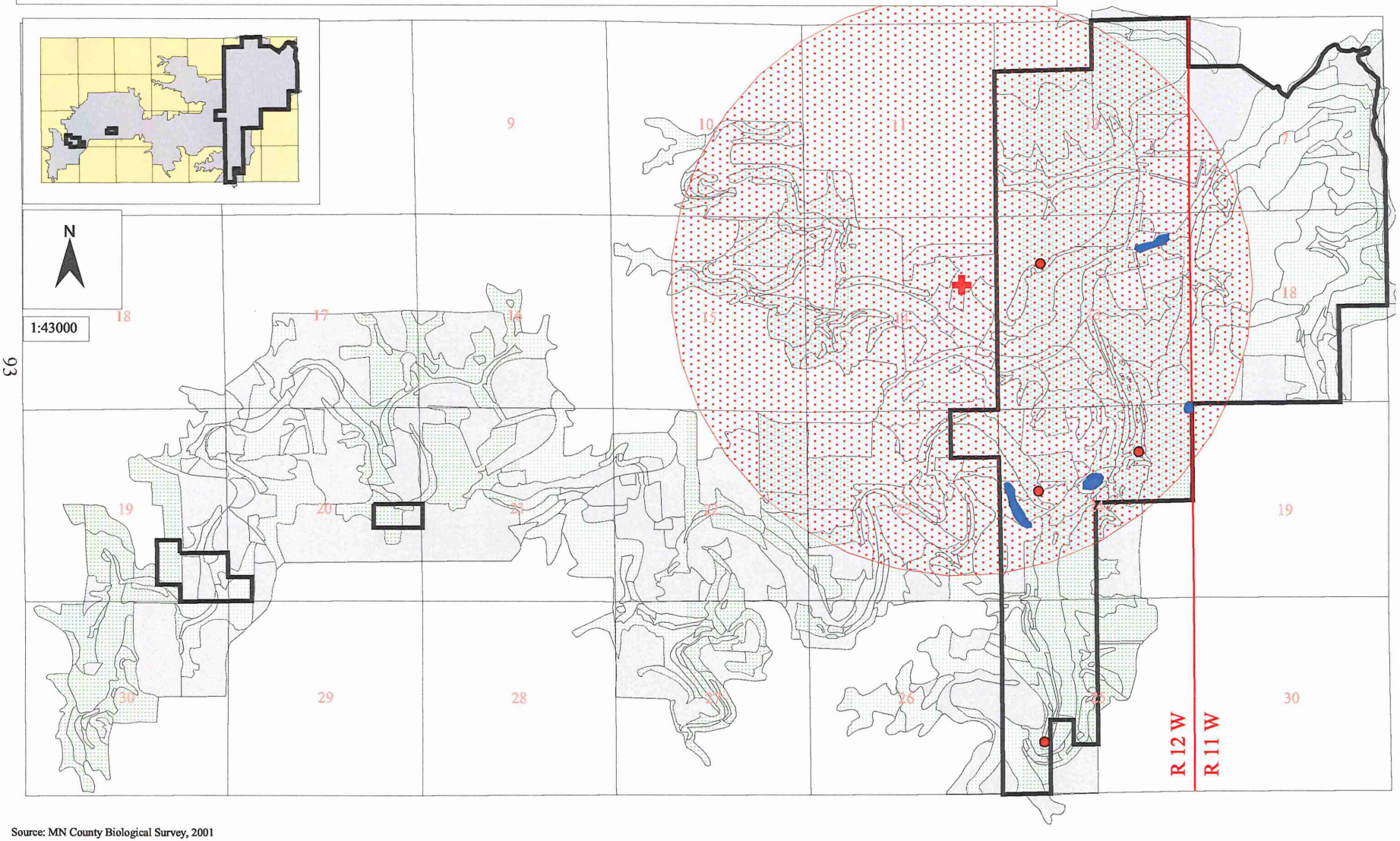
- Active Timber rattlesnake den
- Recommended buffer around rattlesnake den (1.5 miles)
- Historic or potential Timber rattlesnake den site
- Aquatic habitat: important amphibian breeding sites

Other mapped features

- Forestville/Mystery Cave State Park - Statutory Boundary
- Native Plant Communities with Quality Ranks
- Disturbed Land, Developed Areas, or Native Plant Communities Below Minimum Standards

Source: MN County Biological Survey, 2001

Figure 12. Important habitat features for herpetofauna in Forestville/Mystery Cave Ecological Area.



Source: MN County Biological Survey, 2001

Tables

Table 1. Chronological sequence of natural and human events affecting vegetation in the Forestville/Mystery Cave Ecological Area prior to Euroamerican settlement (Delcourt & Delcourt 1993, Baker et al. 1996, Baker et al. 1992, Chumbley et al. 1990, Grimm 1983, Winkler et al. 1986, McAndrews 1966, Brouillet and Whetstone 1993, Pewe 1983, Watts 1983, Webb et al.1983, Wright 1972, 1976, Cushing 1965, Gleason 19-).

Years Before Present	Major Event	Vegetation
30,000 -12,000	Maximum extent of Wisconsin Glacier followed by its rapid retreat away from southeast Minnesota. Periglacial climate with intense freeze-thaw upheavals promotes mechanical weathering of bedrock. Expanding ice in bedrock creates karst structures which store subterranean ice through summer. Super-steep slopes develop in river valleys following stream entrenchment from glacial meltwater.	Glacial margin with non-continuous permafrost covered by tundra or taiga. Cold-producing habitats develop creating refuge habitats for species of plants and land snails which are widespread in the Paleozoic Plateau at the time.
12,000 - 9,000	Very cool climate.	Vegetation dominated by spruce - tamarack - black ash.
9,000 - 5,500	Cool and moist climate	Mesic deciduous forest similar to maple-basswood forest except more open and less dense (Chumbley et al 1990). Prairie develops in the Midwest with prairie-forest border west of Paleozoic Plateau.
5,500 - 3,000	Warm and dry climate with doughty spring and summers.	Prairie expanding to maximum range. Mesic forests retreat from region, however remnants survive around groundwater seeps in deep, narrow limestone valleys. Glacial relicts persist on cold-producing habitats. Along sand terraces of Root River Valley, jack pine and dry ericaceous species, such as blueberries, expand outward from true "driftless area" in Wisconsin.
3,000 - 150	Slightly cooler climate with increasing summer precipitation.	Prairie retreats from maximum range to form the "prairie peninsula" as defined by Transeau (1935). Oak savanna develops as oaks become increasingly more abundant within the Paleozoic Plateau. Mesic woody and herbaceous plants expand along floodplains from fire-protected refuges in deep valleys with ground water seeps.
Circa 1853 A.D.	Public Land Survey of western Fillmore County. Euroamericans settle the area replacing Native Americans: periodic prairie fires cease; elk populations were extirpated by 1830; deer populations begin to decline eventually to local extirpation by 1900.	Government Land Surveyors record mesic deciduous forest on lower and mid-slopes; dry-mesic oak forest/woodland on upper slopes and narrow ridges; oak woodland-brushland with prairie openings on broad ridges within park; oak savanna and oak groves on surrounding upland plateau; mesic prairie or lowland savanna on broad floodplain of Root River Valley; glacial relicts persist on cold-producing habitats.

Table 2. Summaries of PLS bearing tree data for section and quarter-section corners surveyed at various topographic positions within Forestville/Mystery Cave State Park (main park) (United States Surveyor General 1853-1855).

Topographic position of survey corner. **Vegetation type at time of PLS.**	**Characteristic Line Notes**	**Tree Species recorded at section corners**	**Mean Azimuthal Distance to Bearing tree.** **Range**	**Minimum - Maximum Range of Bearing Tree Diameters with Mean.**	**Number of survey corners; Total number of bearing trees recorded**
Lower and middle slopes Maple-basswood, mesic oak	No specifics mentioned. Perhaps "timber 1st rate" would apply here.	White oak red oak sugar maple basswood butternut	27.7 ft (42 links) 4.6 - 70.6 ft	6 - (11.4) - 18 inches	6 corners 11 bearing trees
Upper slopes and narrow ridge crests Dry oak forest or woodland	"timber [was] bur oak, black oak, and white oak; very scattering & only fit for fuel"	white oak bur oak red oak	57.3 ft (87 links) 7.9 - 184 ft	6 - (10.5) - 18 inches	8 corners 19 bearing trees
Upland plateau and broad ridge crests Oak woodland-brushland or overgrown prairie/savanna	"soil 1st rate prairie"; "upland grass - stool grubs, scrub oak & hazel brush"; "heavy oak brush"; oak, hazel & ... very thick"	white oak bur oak red oak	170.3 ft (258 links) 54.1 - 331.3 ft	5 - (12.7) - 20 inches	5 corners 12 bearing trees
Wide bottomlands Savanna or mesic prairie	"upland grass and weeds"; "scattering bur oak"	red oak bur oak	172.5 ft (261 links) 45.5 - 300.9 ft	5 - (7.3) - 8 inches	5 corners 8 bearing trees
Narrow bottomlands Lowland forest	"No bottom worth noting ... current swift & bed rocky"; " bur oak, black oak, w. oak, r. oak, walnut, ash, sugar, elm"				

* mostly taken from the South Branch of the Root River or near the mouth of its tributaries.

Table 3. Modern native plant communities observed by MCBS at various topographic positions within Forestville/Mystery Cave State Park (main park).

Topographic position of survey corner. **Modern Vegetation**	Average Tree Tally (n) Per Relevé Percent Total Tally by Species	Calculated Estimate of Modern Bearing Tree distance[1] Mean Range	Minimum - Maximum Range of Bearing Tree Diameters. Mean Range	Total Number of Relevés Sampled and Relevé Number.
Lower and middle slopes **Maple-basswood, mesic oak**	**n = 30** -- sugar maple 34%, white oak 13%, basswood 13%, ironwood 9%, american elm 8%, bitternut 6%, red oak 6%, red elm 4%, butternut 2%, white ash 2%, blue beech 1%, bur oak 0.5 %.	6.8 feet 6.3 - 8.3 ft	10.3 inches 3.9 - 34.4 in.	**6 relevés:** 4971, 4976, 4967, 4960, 4961, 4973
Upper slopes **Mesic and dry-mesic oak forest** Upland plateau and broad ridge crests **Dry-mesic oak forest**	**24** -- red elm 21%, red oak 16%, basswood 11%, american elm 9%, white oak 8%, ironwood 7%, Juneberry 6%, bur oak 6%, white ash 4%, hackberry 4%, black ash 3%, sugar maple 2%, black maple 1%, bitternut 1%.	7.6 ft. 6.6 - 9.0 ft.	10.2 in 3.9 - 33.2 in.	**4 relevés:** 4974, 4975, 4977, 4978
Wide bottomlands **Developed or heavily disturbed**	No modern plant comminutes observed.			
Narrow bottomlands **Lowland forest**	**31**– box elder 20%, hackberry 12%, black ash 12%, american elm 10%, bur oak 10%, re elm 7%, tilia 7%, sugar maple 6%, rock elm 6%, black maple 4%, black walnut 4%, black cherry 1%.	6.6 ft. 6.0 - 7.1 ft.	9.3 in 3.9 - 35.5 in.	**4 relevés:** 4962, 4963, 4968, 4965

[1] This estimate of the distance to potential bearing trees if they were recorded in modern times using the same standards as the original public land survey (PLS) was determined by dividing the area of the relevé plot by the total number of trees tallied within. The estimated bearing tree distance equals the radius of the total area per tree assuming that the trees tallied within the relevé were evenly spaced. These distances include trees not favored by PLS surveyors (Almendinger 1996); however when small trees and species not favored by PLS surveyors were removed total distances were between 11-16 feet on average.

Table 4. Chronological sequence of natural and human events affecting vegetation in the Forestville/Mystery Cave Ecological Area since Euroamerican settlement.

Time Years Before Present	Major Event	Vegetation
years 1850-1885	The town of Forestville booms and busts. Local industries depend heavily upon nearby forests for fuel and construction materials.	Sugar or hard maple highly preferred for industrial fuel and completely removed in Spring Valley. Winchell and Upham (1884) note that white pines were all cut for lumber (oldest extant pines originated during this period). Logging of many oak forests and woodlands of surrounding area. Maughan family protects some forests as preserves.
year 1882	Geologic Survey of Fillmore County	Winchell and Upham (1884) note that native timber is steadily increasing. Much of the area is succeeding to brushland after prairie fires are suppressed.
year 1924	Fish habitat survey of Root River Watershed.	Surber (1924) reports heavy forest and dense undergrowth along river bottoms where large trees overhang "placid waters" and "forest canopy covers valley from crest to crest ... forming almost absolute wilderness".
year 1954	Fillmore County Soil Survey.	Farnharm (1954) reports that no mesic tall-grass prairie was observed in the county.
year 1995	Minnesota County Biological Survey	MCBS plant ecologists observe that the narrow valleys and adjacent bluffs of the Ecological Area are covered by a nearly contiguous canopy of deciduous forests of all age classes with significant areas in the main park dominated by old growth stands of maple-basswood, lowland hardwood, mesic red oak and dry-mesic oak forests. Scattered stands of white pine, with some individual trees approaching 120 years old, are on thin soils over several bench terraces cut into the bedrock cliffs at different elevations. Many remnants of wetland communities are present including spring-fed oxbow sloughs dominated by wild rice *(Zizania palustris var. interior)*, seepage meadows and black ash swamps containing 200 year old trees. Lowland forest dominates large areas within small tributaries to the Root River such as the valley of Canfield Creek. Bedrock bluff prairies are nearly absent west of the town of Lanesburo; within the Ecological Area bluff prairies are only found in small remnants on upper slopes and narrow ridge crests. The Ecological Area supports more cold-producing habitats of maderate cliffs and algific talus slopes than is found at any other site or macrosite in Minnesota. Cold-producing slopes and cliffs support disjunct populations of northern plants such as balsam fir (*Abies balsamea*). These are thought to be Pleistocene relicts which have survived since the last glaciation.

Table 5. Ages of large trees within the main park of Forestville/Mystery Cave State Park.

Species	DBH cm (in)	Age in Years[1]	Relevé #	Location	Date
Fraxinus nigra	46 (17.9)	116		T102N-R12W os12	5/16/94
Fraxinus nigra	56 (21.8)	193		T102N-R11W swswnw18	5/26/94
Fraxinus nigra	56 (21.8)	201			5/26/94
Pinus strobus	62 (24.2)	122			6/15/94
Quercus alba	44 (17.2)	111		T102N-R11W ne18	6/2/94
Quercus alba	53 (20.7)	130	4813	T102N-R12W nwnw25	9/08/94
Quercus alba	54 (21.1)	>147	4978	T102N-R12W nwnw25	8/16/95
Quercus alba	55 (21.4)	232			6/15/94
Quercus alba	67 (26.1)	>280			6/14/94
Quercus macrocarpa	36 (14.0)	104			5/27/94
Quercus macrocarpa	44 (17.2)	120	4962	T102N-R12W nesw13	5/16/95
Quercus macrocarpa	44 (17.2)	126	4962	T102N-R12W nesw13	5/16/95
Quercus rubra	42 (16.4)	103	4975	T102N-R12W nwnwne13	7/06/95
Quercus rubra	45 (17.6)	106	4976	T102N-R11W swsesw07	8/15/95
Quercus rubra	47 (18.3)	111			6/2/94
Quercus rubra	54 (21.1)	121	4813	T102N-R12W nwnw25	9/08/94
Quercus rubra	55 (21.4)	>137	4978	T102N-R12W nwnw25	8/16/95
Quercus rubra	56 (21.8)	118	4814	T102N-R12W nesw24	9/15/94
Quercus rubra	56 (21.8)	94		T102N-R12W nene12	
Quercus rubra	57 (22.2)	118	4967	T102N-R12W swswsw13	5/18/95
Quercus rubra	59 (23.0)	100		T102N-R12W se13, ne24	5/17/94
Quercus rubra	59 (23.0)	128		T102N-R12W se13, ne24	5/17/94
Quercus rubra	59 (23.0)	>175		T102N-R12W swsw13	5/27/94

Table 5. Ages of large trees within the main park of Forestville/Mystery Cave State Park.

Species	DBH cm (in)	Age inYears[1]	Relevé #	Location	Date
Quercus rubra	61 (23.8)	127	4961	T102N-R12W swsw13	5/15/95
Quercus rubra	63 (24.6)	>123		T102N-R11W nw18	5/26/94
Quercus rubra	63 (24.6)	125			5/26/94
Quercus rubra	67 (26.1)	141		T102N-R12W os12	5/16/94
Quercus rubra	71 (27.7)	92			6/22/94
Tilia americana	28 (10.9)	54		T102N-R11W ne18	6/2/94
Tilia americana	45 (17.6)	89	4961	T102N-R12W swsw13	5/15/95
Tilia americana	46 (17.9)	104		T102N-R11W nw18	5/26/94
Tilia americana	46 (17.9)	121			5/26/94
Ulmus americana	21 (8.2)	26	4968	T102N-R12W neneswl3	5/18/95

[1] tree age determined by adding the average number of years for species to reach breast height by site index (MN DNR - Forest Inventory Unit 1983 p. 15).

Table 6. Average age of large sized trees within the main park of Forestville\Mystery Cave State Park[1].

Category	Mean Age	Approximate Year of Origin
Quercus rubra (only)	120	1875
All Species	130	1865
All Species in Old Growth Stands:		
T102N-R12W nw25	133	1862
T102N-R12W sw13	133	

[1] CSA Type Size Class 6 & 7: DBH @ 15-24.9" (MN DNR Forest Inventory Unit 1983).

Table 7. State listed species of plants occurring within the Forestville/Mystery Cave Ecological Area (see Appendix 1 for complete records).

SPECIES (common name) EOR Ratio (Park Land - Privately Owned Land)		State Listing	Native Plant Community Code [1] (Number of EORs)
Adoxa moschatelliana (moschatel)	(0-5)	SPC - 5	TL (5)
Allium cernuum (nodding wild onion)	(10-2)	THR - 12	MB (6); LH (3); TL (1); NH (1); BA (1)
Arabis laevigata (smooth rock-cress)	(1-1)	NON - 2	MC (1); TA (1)
Arisaema dracontium (green dragon)	(1-0)	NON - 1	LH/MB[2] (1)
Aster pilosus (white heath aster)	(1-0)	NON - 1	OF (1)
Athyrium thelypterioides (silvery spleenwort)	(1-0)	NON - 1	MB (1)
Cacalia muhlenbergii (great indian-plantain)	(0-5)	NON -5	LH (5)
Carex jamesii (James' sedge)	(3-0)	THR - 3	MB (3)
Carex laevivaginata (smooth-sheathed sedge)	(4-1)	THR - 5	SM (5)
Carex woodii (wood's sedge)	(8-4)	SPC - 12	MB (9); LH (2); BA (1)
Chrysosplenium iowense (Iowa golden saxifrage)	(0-4)	END - 4	TL (4)
Desmodium cuspidatum var. *longifolium* (big tick-trefoil)	(4-0)	SPC - 4	OA (4)
Dicentra canadensis (squirrel-corn)	(1-0)	SPC - 1	LH (1)
Dryopteris goldiana (Goldie's fern)	(3-0)	SPC -3	TL (1); MB (2)
Eryngium yuccifolium (rattlesnake-master)	(2-0)	SPC - 2	OF [3] (2)
Geum laciniatum var. *trichocarpum* (rough avens)	(1-1)	NON - 2	LH [4] (1); SM (1)
Jeffersonia diphylla (twinleaf)	(1-0)	SPC - 1	MB (1)
Napaea dioica (glade mallow)	(6-7)	THR - 13	LH (13)
Orobanche uniflora (one-flowered broomrape)	(0-1)	SPC - 1	OA (1)
Panax quinquefolius (American ginseng)	(3-1)	SPC - 4	NH (1); OA (1); MB (1); TA (1)
Poa wolfii (Wolf's bluegrass)	(0-1)	SPC - 1	MC (1)
Sanicula trifoliata (beaked snakeroot)	(1-0)	SPC - 1	MB (1)
Silene nivea (snowy campion)	(1-0)	THR - 1	OF (1)
Taenidia integerrima (yellow pimpernel)	(2-1)	NON - 3	OD (3)
24 SPECIES **(55 Park Occurrences - 33 Private Occurrences)**		END 4 THR 34 SPC 35 NON 15 88	**LH (26); MB (24); TL (11); SM (6); OA (6); OF [3] (4); OD (3); TA (2); MC (2); BA (2); NH (2).**

[1] See Table 8 for the names of native plant communities. [2] Occurs at the ecotone of maple basswood forest with lowland hardwood forest. [3] May contain small remnants of various natural communities. [4] Occurs within an unmapped wet meadow inside lowland hardwood forest.

Table 8. Rare plant occurrences within native plant communities in the Forestville/Mystery Cave Ecological Area

Natural Community Type (code) [1] n = Total EORs : % Total	Rare Plant Occurrences within Native Plant Community Types (n = EORs)
Lowland hardwood forest (LH) **n = 26 : 30%.**	*Napaea dioica* (13); *Cacalia muhlenbergii* (5); *Allium cernuum* (3); *Carex woodii* (2); *Arisaema dracontium* [2] (1); *Dicentra canadensis* (1); *Geum laciniatum* [3] (1).
Maple basswood Forest (MB) **24 : 27%**	*Carex woodii* (9); *Allium cernuum* (6); *Carex jamesii* (3); *Dryopteris goldiana* (2); *Athyrium thelypterioides* (1); *Jeffersonia diphylla* [4] (1); *Panax quinquefolius* (1); *Sanicula trifoliata* (1).
Talus slope - algific subtype (TL) **11 : 13%.**	*Adoxa Moschatelliana* (5); *Chrysosplenium iowense* (4); *Dryopteris goldiana* (1); *Allium cernuum* (1).
Seepage meadow (SM) **6 : 7%**	*Carex laevivaginata* (5); *Geum laciniatum* (1).
Oak forest (OA) **6 : 7%**	*Desmodium cuspidatum* (4); *Orobanche uniflora* (1); *Panax quinquefolius* (1).
Old field [5] (OF) **4 : 4%**	*Eryngium yuccifolium* (2); *Aster pilosus* (1); *Silene nivea* (1).
Oak forest - dry subtype (OD) **3 : 3%**	*Taenidia integerrima* (3).
Talus slope (TA) **2 : 2%**	*Arabis laevigata* (1); *Panax quinquefolius* (1)
Moist cliff (MC) **2 : 2%**	*Arabis laevigata* (1); *Poa wolfii* (1).
Black ash swamp - seepage subtype (BA) **2 : 2%**	*Allium cernuum* (1); *Carex woodii* (1).
Northern hardwood - conifer forest (NH) **2 : 2%**	*Allium cernuum* (1); *Panax quinquefolius* (1).

[1] n = Total number of EORs within the community type in the Ecological Area : Percent total of all EORs within Ecological Area.

[2] Occurs at the ecotone of maple-basswood forest with lowland hardwood forest.

[3] Occurs within an unmapped wet meadow inside a lowland hardwood forest.

[4] Occurs within an unmapped maple-basswood forest inside an oak forest.

[5] May contain small remnants of various natural communities.

Table 9. Relevé plots sampled within the Forestville/Mystery Cave Ecological Area[1].
Arranged generally along a continuum from dry to wet (23 permanent;10 unmarked plots).

Relevé #	Field Tag	Data Sheet	Native Plant Community (ecological quality rank)	Legal Location
*4991	--	F95-30	Dry prairie-bedrock bluff (A)	T102N-R12W SW, SW 16
4979	P	F95-18	Dry prairie-bedrock bluff (CD)	T102N-R12W NE, NW, SW, SW 25
4974	78	F95-14	Oak forest dry subtype (BC)	T102N-R12W SW, NE, NW 13
4975	85	F95-15	Oak forest (dry-mesic) (B)	T102N-R12W NW, NW, NE 13
4977	88	F95-16	Oak forest (dry-mesic) (B)	T102N-R11W NW, NE, SW 18
4813	P	F94	Oak forest (dry-mesic) (B)	T102N-R12W NW, NW, NW 25
4978	64	F95-17	Oak forest (dry-mesic) (B)	T102N-R12W NW, NW 25
4971	41	F95-12	Oak forest (dry-mesic) (B)	T102N-R11W NW, SE, NE 18
*4810	--	F94	Oak forest (dry-mesic) (BC)	T102N-R12W NE, SE 23
4976	08	F95-15b	Oak forest (dry-mesic) (C)	T102N-R11W SW, SE, SW 07
4967	60	F95-8	Oak forest mesic subtype (AB)	T102N-R12W SW, SW, SW 13
4980	81	F95-19	Oak forest mesic subtype (BC)	T102N-R12W SE, SE, NE 13
4814	P	F94	Oak forest mesic subtype (BC)	T102N-R12W SW, NE, SW 24
4960	P	F95-1	Maple basswood forest (AB)	T102N-R12W NW, SW, SW 13
4961	P	F95-2	Maple basswood forest (B)	T102N-R12W SW, SW 13
4973	98	F95-13b	Maple basswood forest (BC)	T102N-R12W NE, SE, NE 18
4962	P	F95-3	Lowland hardwood forest (AB)	T102N-R12W NE, SW 13
4963	P	F95-4	Lowland hardwood forest (BC)-	T102N-R12W NE, SW 13
4968	P	F95-9	Lowland hardwood forest (C)	T102N-R12W NE, NE, SW 13
4965	59	F95-6	Lowland hardwood forest (C)	T102N-R12W NW, SE NW 25
4816	P	F94	Black ash swamp seepage subtype (B)	T102N-R11W NW, SW, NW 18
4812	P	F94	Black ash swamp seepage subtype (C)	T102N-R12W SW, SE, SW 12
4969	P	F95-10	Seepage meadow (C)	T102N-R11W SW, NW, SE 18
4809	--	F94	Seepage meadow (BC) (Mixed emergent marsh inclusion)	T102N-R12W NW, SW 24

Table 9. Continued.

4966	--	F95-7	Talus slope algific subtype (AB)	T102N-R12W NW, NE, SW, SW 25
*4981	--	F95-20	Talus slope algific subtype (A)	T102N-R12W NE, NE, NW 27
*4811	--	MDL-F15	Talus slope algific subtype (AB)	T102N-R12W NW, NW 27
4964	--	F95-5	Talus slope algific subtype (B)	T102N-R12W SW, NE 25
*4985	--	F95-24	Talus slope algific subtype (C)	T102N-R12W NE, SE, SW, NE 15
4815	--	F94	Northern hardwood - conifer forest (A)	T102N-R12W SE, SW, SW 25
*4984	--	F95-23	Northern hardwood - conifer forest (BC)	T102N-R12W SW, SW, SE, NW 14
4970	83	R95-11	White pine - hardwood forest (BC)	T102N-R12W SW, SE, SE 13
4972	91	R95-13	White pine - hardwood forest (C)	T102N-R11W NE, SW, SW 07

* outside park statutory boundary
[1] Includes non permanent plots (-) and permanent plots (P) not labeled with metal tag.

Table 10. Relevé plots sampled within the Forestville/Mystery Cave Ecological Area, summarized by aspect, slope position, elevation, slope gradient and soil characteristics.

Relevé #	Native Plant Community	Rank	Aspect	Slope Position	Elevation	Grade	Soils
*4991	Dry prairie - bedrock bluff subtype	A	SW	Crest	1340	5%	clayey silt, some cobbles
4979	Dry prairie - bedrock bluff subtype	CD	SW	Ridge Crest	1260	25%	gravelly, yellow silt, thin, compact
4974	Oak forest - dry subtype	BC	SE	Upper	1210	80%	rocky, cobbly
4975	Oak forest -dry-mesic	B	SE	Crest	1240	5%	compact silt
4977	Oak forest -dry-mesic	B	E	Upper	1240	8%	dark silt with thick humus/duff
4813	Oak forest-dry-mesic	B	N	Upper	1250	25%	yellow silt
4978	Oak forest -dry-mesic	B	NE	Upper	1270	8%	dark grey silt
4971	Oak forest -dry-mesic	B	SE	Middle	1140	15%	rich organic silt
*4810	Oak forest-dry-mesic	BC	NW	Middle	1250	25%	yellow silt
4976	Oak forest -dry-mesic	C	NE	Upper - Middle	1220	15%	grey silt
4967	Oak forest - mesic	AB	NE	Middle	1125	15%	dark silt
4980	Oak forest - mesic	BC	SE	Middle	1110	45%	dark, organic silt
4814	Oak forest - mesic	BC	NW	Lower	1130	30%	dark, friable silty loam compact a horizon 2" to grey clay, little organic layer
4960	Maple-basswood forest	AB	N	Middle	1080	10%	fine silt
4961	Maple-basswood forest	B	N	Middle	1070	15%	fine silt
4973	Maple-basswood forest	BC	NE	Toe	1120	20%	dark organic, fine silt

Table 10. Relevé plots sampled within the Forestville/Mystery Cave Ecological Area, summarized by aspect, slope position, elevation, slope gradient and soil characteristics.

Relevé #	Native Plant Community	Rank	Aspect	Slope Position	Elevation	Grade	Soils
4962	Lowland hardwood forest	AB	Level	Alluvial Flats	1040	0%	silty alluvium
4963	Lowland hardwood forest	BC	Level	Alluvial Flats	1035	0%	silt alluvium
4968	Lowland hardwood forest	C	Level	Alluvial Flats	1040	0%	dark, silt-loam
4965	Lowland hardwood forest	Cd	Level	Alluvial Flats	1060	0%	clayey silt alluvium
4816	Black ash swamp - seepage subtype	B	NW	Middle-ravine	1140	10%	wet soil, peat?
4812	Black ash swamp - seepage subtype	C	N	Middle-ravine	1140	10%	organic muck
4969	Seepage meadow	C	E	Flat	1120	2%	organic, wet clay
4809	Seepage meadow (mixed emergent marsh inclusion)	BC	NE	Depression	1040	0%	alluvial clay (seepage pool in ox-bow meander)
4966	Talus slope - algific subtype	A	E	Middle	1230	125%	dark silt loam cobbles
*4981	Talus slope - algific subtype	A	N	Lower	1200	50%	dark, wet silt, organic cobbles
*4811	Talus slope - algific subtype	AB	N	Lower	1140	70%	cobbles, dark silt, organic, 3 or 4 vests
4964	Talus slope - algific subtype	B	N	Middle	1220	65%	dark organic silt gravel, outcrops, cobbles
*4985	Talus slope - algific subtype	C	N	Lower	1150	125%	dry rubble, wet mesic, thick mossy, loose rubble, dark silty, colluvium, organic
4815	Northern hardwoods - conifer forest	A	NW	Middle	1250	100%	organic, silty colluvium with cobbles and outcrops,

Table 10. Relevé plots sampled within the Forestville/Mystery Cave Ecological Area, summarized by aspect, slope position, elevation, slope gradient and soil characteristics.

Relevé #	Native Plant Community	Rank	Aspect	Slope Position	Elevation	Grade	Soils
*4984	Northern hardwoods - conifer forest	BC	N	Lower	1120	65%	dark Friable silt, mossy cobbles
4970	White pine - hardwood forest	BC	N	Crest	1230	20%	deep silt: dark 3" to yellow sub layers, rich humus.
4972	White pine - hardwood forest	C	NW	Lower	1040	45%	sand and silty sand from glacial outwash of St. Peter sandstone.

Table 11. Ecological systems and native plant community types within the Forestville/Mystery Cave Ecological Area.
(see Appendix 3 for descriptions of native plant community types).

Fire Dependent System

Dry Prairie - Bedrock Bluff Subtype
Oak Woodland-brushland
Oak Forest - Dry Subtype

Mesic Forest System

Oak Forest - Dry-mesic
Oak Forest - Mesic Subtype
Maple Basswood Forest
White Pine - Hardwood Forest

Riparian System

River Beach
Lowland Hardwood Forest

Wet Forest / Wet Meadow Systems

Black Ash Swamp - Seepage Subtype
Seepage Meadow

Cliff System

Dry Cliff
Moist Cliff
Talus Slope

Cold Karst System

Talus Slope - Algific Subtype
Moist Cliff - Maderate Subtype
Northern Hardwood - Conifer Forest

Table 12. The number of algific talus slopes and maderate cliffs within stream valleys containing cold karst of the Galena Formation [1, 2].

Stream valleys within the Ecological Area of Forestville/Mystery Cave State Park are underlined.

Major Rivers Strongly Cold to Weakly Cold	Large Streams [4] Strongly Cold to Weakly Cold	Large spring-fed tributaries Strongly to Moderately Cold	Medium-sized Streams Weakly Cold	Small Primary Spring-fed tributaries Moderately to Weakly Cold
South Branch Root River (15)	Spring Valley Creek (9)	**Canfield Creek (9)**	Lost Creek (Upper Bear Cr.) (1)	Wildcat Canyon Creek (2)
North Branch Root River (4)	Deer Creek (6)	**Forestville Creek (2)**	Jordan Creek (1)	Mahood's Creek (3)
Upper Iowa River [3] (3)	Bear Creek (1)	Kedron Brook (1)		

[1] Numerals in parenthesis "( )" denotes the number of cold-producing habitats (polygons) delineated on MCBS county maps for Fillmore and Olmsted Counties (MNDNR - MCBS 1997a, 1997b).

[2] Columns are arranged according to the cold-producing quality of the karst system and stream order.

[3] Includes small algific slopes in lateral ravines (more algific talus slopes are found nearby across the Iowa border).

[4] The three large streams are tributaries to the Middle Branch Root River, one of four major watersheds dissecting the Galena bedrock in Minnesota.

Table 13. Rare animals and animal aggregations identified by MCBS for surveys in Forestville/Mystery Cave State Park.

[Species are associated with their primary habitats. State statuses reflect the 1996 list revision with previous statuses in parentheses. Species with " * " were added to the state list in 1996. Species and aggregations identified as "Element" do not have state statuses but are tracked by the NHIS Rare Features database.]

Species		State status
	DECIDUOUS FORESTS	
Mammals:	Northern myotis *(Myotis septentrionalis)*	Special Concern
	Eastern pipistrelle *(Pipistrellus subflavus)*	Special Concern
	Bat maternity colonies and hibernacula	Element
	Woodland vole *(Microtus pinetorum)*	Special Concern
Birds:	Red-shouldered Hawk *(Buteo lineatus)*	Special Concern
	Acadian flycatcher *(Empidonax virescens)**	Special Concern
	Cerulean warbler *(Dendroica cerulea)**	Special Concern
	Louisiana waterthrush *(Seiurus motacilla)*	Special Concern
Reptiles:	Rat snake *(Elaphe obsoleta)*	Special Concern
	Fox snake *(Elaphe vulpina)*	Element (1993: Special Concern)
	FOREST EDGES and OPENINGS	
Mammals:	Eastern spotted skunk *(Spilogale putorius)*	Threatened (1993: Special Concern)
Reptiles:	Five-lined skink *(Eumeces fasciatus)*	Special Concern (1993: Endangered)
	Racer *(Coluber constrictor)*	Special Concern
	Eastern hognose snake *(Heterodon platirhinos)*	Element (1993: Special Concern)
	Gopher snake *(Pituophis catenifer)*	Special Concern
	Milk snake *(Lampropeltis triangulum)*	Element (1993: Special Concern)
	Timber rattlesnake *(Crotalus horridus)*	Threatened (1993: Special Concern)
	PRAIRIES (native and restored) and OLD FIELDS	
Mammals:	Least shrew *(Cryptotis parva)*	Special Concern
	W. harvest mouse *(Reithrodontomys megalotis)*	Element
	Prairie vole *(Microtus ochrogaster)*	Special Concern
Birds:	Upland sandpiper *(Bartramia longicauda)*	Element (1993: Special Concern)
	Loggerhead shrike *(Lanius ludovicianus)*	Threatened
	Henslow's sparrow *(Ammodramus henslowii)*	Endangered (1993: Special Concern)
	AQUATIC HABITATS	
Reptiles:	Snapping turtle *(Chelydra serpentina)*	Special Concern
	Blanding's turtle *(Emydoidea blandingii)*	Threatened
Amphibians:	Northern cricket frog *(Acris crepitans)*	Endangered (1993: Special Concern)
	Bullfrog *(Rana catesbeiana)*	Element (1993: Special Concern)
	Pickerel frog *(Rana palustris)*	Element (1993: Special Concern)

Table 14. Locations and habitats of MCBS animal surveys in or near Forestville/Mystery Cave State Park. (Refer to Figure 6 for a map of these locations.)

Mammal Surveys			
Small mammal trap grids (7 total)			
	T102N	R12W	NWSE12	maple-basswood forest
	T102N	R12W	SESE12	old field
	T102N	R12W	SWNE13	restored prairie
	T102N	R12W	SWSW13	maple-basswood forest
	T102N	R12W	NESE13	oak-hickory forest
	T102N	R12W	NENW24	old field
	T102N	R12W	SWSW24	lowland hardwood forest
Foraging bat stops (12 total; * indicates ANABAT stops)			
	T102N	R11W	NWNW7	wooded creek
	T102N	R11W	NWNW19	wooded sinkhole, farmland
	T102N	R11W	NWNE19	wooded creek
	T102N	R12W	SENW13*	lowland hardwood forest, river edge (2 stops)
	T102N	R12W	NWNE13*	lowland hardwood and lawn (2 stops)
	T102N	R12W	NENE13	open river vegetation, lawn
	T102N	R12W	SWNE13	lawn and restored prairie (2 stops)
	T102N	R12W	SENW24*	lawn, overgrown oak woodland
	T102N	R12W	NWSW24*	lowland hardwood, river edge
Bird Surveys			
Point counts (36 total)			
	T102N	R11W	NESW7	deciduous forest
	T102N	R11W	SESW7	deciduous forest
	T102N	R11W	NENW18	deciduous forest (2 points)
	T102N	R11W	SWNW18	deciduous forest (2 points)
	T102N	R11W	SENW18	deciduous forest (2 points)
	T102N	R11W	NWNE18	deciduous forest (4 points)
	T102N	R11W	SWNE18	deciduous forest (2 points)
	T102N	R11W	NWSE18	deciduous forest
	T102N	R12W	NWNE12	deciduous forest
	T102N	R12W	SWNE12	deciduous forest (2 points)
	T102N	R12W	NESW12	deciduous forest
	T102N	R12W	SWSW12	deciduous forest
	T102N	R12W	NWSE12	deciduous forest
	T102N	R12W	NWSW13	deciduous forest
	T102N	R12W	SWSW13	deciduous forest
	T102N	R12W	SESW13	deciduous forest
	T102N	R12W	NWSE13	deciduous forest
	T102N	R12W	SWSE13	deciduous forest (2 points)
	T102N	R12W	SESE13	deciduous forest
	T102N	R12W	SWNE24	deciduous forest and forest edge (2 points)
	T102N	R12W	NESW24	deciduous forest and forest edge (2 points)
	T102N	R12W	NWNW25	deciduous forest

Table 14. Continued.

Point counts			
	T102N	R12W	SENW25	deciduous forest
	T102N	R12W	NWSW25	deciduous forest
	T102N	R12W	NESW25	deciduous forest
Red-shouldered hawk playbacks (8 total)			
	T102N	R11W	SWSW18	deciduous forest
	T102N	R12W	SENW24	lowland hardwood forest
	T102N	R12W	NWSW24	lowland hardwood forest
	T102N	R12W	NWNW25	lowland hardwood forest
	T102N	R12W	SENW25	lowland hardwood forest
	T102N	R12W	NESW25	lowland hardwood forest
	T102N	R12W	SWNW24	lowland hardwood forest
	T102N	R12W	SWNE13	lowland hardwood forest
Amphibian and Reptile Surveys				
Anuran surveys (8 total)			
	T102N	R12W	SESE1	lowland hardwoods, intermittent stream
	T102N	R12W	SENW13	lowland hardwoods, South Branch Root River
	T102N	R12W	NENE13	forest-grassland edge, backwaters
	T102N	R11W	SWSE18	forest edge, stream
	T102N	R12W	NWSE23	forest edge, South Branch Root River
	T102N	R12W	NENE24	oak forest, vernal pool (sinkhole)
	T102N	R12W	SWNE24	lowland hardwoods, South Branch Root River
	T102N	R12W	NWSW24	seepage meadow, lowland hardwoods, oxbow
Coverboards (11 total)			
	T102N	R12W	SESE12	old field (3 locations)
	T102N	R12W	NENW13	oak forest (historic rattlesnake den site)
	T102N	R12W	SWNE13	restored prairie
	T102N	R12W	SENE13	restored prairie
	T102N	R12W	SWSW13	deciduous forest
	T102N	R12W	SWNW24	deciduous forest edge (historic rattlesnake den site)
	T102N	R12W	NWNE24	old field, forest edge
	T102N	R12W	NENE24	oak forest, vernal pool (sinkhole)
	T102N	R12W	NWSW24	old field
Drift fences (3 total)			
	T102N	R12W	SWSE12	maple basswood forest/lowland hardwoods
	T102N	R12W	NENE13	lowland hardwood forest
	T102N	R11W	NWNW18	oak forest, maple basswood forest
Herp searches (4 total)			
	T102N	R12W	NENW13	oak forest
	T102N	R12W	SWNE14	bluff prairie, rock outcrop
	T102N	R12W	SWNW24	deciduous forest edge
	T102N	R12W	SWNE24	deciduous forest
Turtle traps (1 total)			
	T102N	R12W	NWSW24	oxbow, emergent marsh, seepage meadow

Table 15. Mammals documented or likely to occur in Forestville/Mystery Cave State Park.

Habitat categories

Forested upland: Dry-to-mesic forests, such as maple-basswood, oak, and white pine forests.
Semi-open upland: Savannas, over-grown prairies, and upland brushlands.
Open upland: Prairies, old fields, pastures, agricultural fields, and lawns.
Forested lowland: Moist-to-wet forests, such as lowland hardwood and floodplain forests.
Semi-open lowland: Shrub swamps.
Open lowland: Fens, wet prairies, and marshes.

Recorded by MCBS in park	Common name	Scientific name	Associated habitats in the Paleozoic Plateau						Comments
			Forested upland	Semi-open upland	Open upland	Lowland - forest	Semi-open lowland	Open lowland	
	New World opossums								
★	Virginia opossum	*Didelphis virginiana*		●	●		●	●	
	Insectivores								
★	Masked shrew	*Sorex cinereus*	●	●	●	●	●	●	widespread
★	Northern short-tailed shrew	*Blarina brevicauda*	●	●	●	●	●	●	widespread
	Least shrew	*Cryptotis parva*		●	●				rare, habitat present in park
★	Eastern mole	*Scalopus aquaticus*	●	●	●				
	Bats								
★	Little brown myotis	*Myotis lucifugus*	●	●	●	●	●	●	year-round resident
★	Northern myotis	*Myotis septentrionalis*	●	●	●	●	●	●	year-round resident
★	Eastern red bat	*Lasiurus borealis*	●	●	●	●	●	●	summer resident
	Hoary bat	*Lasiurus cinereus*	●	●	●	●	●	●	summer resident
	Silver-haired bat	*Lasionycteris noctivagans*	●	●	●	●	●	●	summer resident
★	Eastern pipistelle	*Pipistrellus subflavus*	●	●	●	●	●	●	year-round resident
★	Big brown bat	*Eptesicus fuscus*	●	●	●	●	●	●	year-round resident
	Carnivores								
★	Coyote	*Canis latrans*	●	●	●				
	Red fox	*Vulpes vulpes*		●	●		●	●	
	Common gray fox	*Urocyon cinereoargenteus*	●	●					
★	Common raccoon	*Procyon lotor*	●	●	●	●	●	●	widespread, often dens in caves
	Ermine	*Mustela erminea*	●	●	●	●	●	●	widespread
	Mink	*Mustela vison*	●	●	●	●	●	●	widespread, associated with water

Table 15. Continued.

Recorded by MCBS in park	Common name	Scientific name	Associated habitats in the Paleozoic Plateau: Forested upland	Semi-open upland	Open upland	Lowland - forest	Semi-open lowland	Open lowland	Comments
★	American badger	*Taxidea taxus*		●	●				
★	Northern river otter	*Lutra canadensis*	●	●	●	●	●	●	uncommon, associated with water
★	Striped skunk	*Mephitis mephitis*		●	●		●	●	
	Bobcat	*Lynx rufus*		●	●		●	●	
	Ungulates								
★	White-tailed deer	*Odocoileus virginianus*	●	●	●	●	●	●	widespread
	Rodents								
★	Eastern chipmunk	*Tamias striatus*	●	●					
★	Woodchuck	*Marmota monax*	●	●	●				
★	Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*		●	●		●	●	common in open habitats
★	Eastern gray squirrel	*Sciurus carolinensis*	●	●					
	Eastern fox squirrel	*Sciurus niger*		●	●				recorded in Fillmore County
★	Red squirrel	*Tamiasciurus hudsonicus*	●	●		●	●		
	Southern flying squirrel	*Glaucomys volans*	●						likely occurs in forested areas in park
★	Plains pocket gopher	*Geomys bursarius*		●	●				common in open habitats
	American beaver	*Castor canadensis*	●					●	
	Western harvest mouse	*Reithrodontomys megalotis*			●				rare, old record from Forestville
★	White-footed mouse	*Peromyscus leucopus*	●	●		●	●		widespread in woody habitats
★	Southern red-backed vole	*Clethrionomys gapperi*				●			COUNTY RECORD for Fillmore
★	Meadow vole	*Microtus pennsylvanicus*		●	●		●	●	common in habitats with graminoids
	Woodland vole	*Microtus pinetorum*	●		●	●			rare, habitat present in park
★	Meadow jumping mouse	*Zapus hudsonius*			●			●	
	Norway rat	*Rattus norvegicus*			●				non-native species
	House mouse	*Mus musculus*			●				non-native species
	Lagomorphs								
★	Eastern cottontail	*Sylvilagus floridanus*		●	●				

[Other mammals recorded from the Paleozoic Plateau, but unlikely to occur in the park include: Hayden's shrew (*Sorex haydeni*), Least shrew (*Cryptotis parva*), Gray wolf (Canis lupus), Long-tailed weasel (*Mustela frenata*), Least weasel (*Mustela nivalis*), Eastern spotted skunk (*Spilogale putorius*), Mountain lion (*Puma concolor*), Mule deer (*Odocoileus hemionus*), Franklin's ground squirrel (Spemophilus franklinii), Plains pocket mouse (Perognathus flavescens), Prairie deer mouse (Peromyscus maniculatus bairdii), Prairie vole (Microtus ochrogaster), Common muskrat (*Ondatra zibethicus*), and White-tailed jackrabbit (*Lepus townsendii*).]

Table 16. Small mammals taken from trap grids and drift fences in Forestville/Mystery Cave State Park. (Refer to Figure 6 for locations of sampling sites.)

Habitat categories

OF: old field
Pr: restored prairie
OaH: oak-hickory forest
Oa-m: mesic oak forest
MB: maple-basswood forest
LH: lowland hardwood forest

Species	Trap grids							Drift fences		
	OF	OF	Pr	OaH	MB	MB	LH	Oa-m	MB	LH
Masked shrew	4	1	2		1					3
Northern short-tailed shrew					1			1		
Thirteen-lined ground squirrel			1							
Eastern chipmunk						1				
Red squirrel					1					
White-footed mouse				23	12	8	5	3	1	1
Southern red-backed vole							6			
Meadow vole	3	39	63					1		3
Meadow jumping mouse							1			1
Total # of species	2	2	3	1	4	2	3	3	1	4
Captures/trapnight	0.06*	0.33	0.55	0.19*	0.13	0.07*	0.10*	0.01	<0.01	0.02

(* traplines disturbed by raccoons or humans)

Table 17. Summary of foraging bat activity at Forestville/Mystery Cave State Park, 20-21 August 1999. (Recorded by ANABAT detector; see Figure 8 for sonographs of representative calls).

Location	Historic Forestville	Picnic Area	Fisherman's Bridge	Group Camp	Canfield Creek
Time	22:19 - 22:29 hrs	21:23 - 22:00 hrs	22:37 - 23:05 hrs	20:27 - 23:39 hrs	20:09 - 21:33 hrs
Calls/minute	2.5	2.9	1.1	0.3	3.7

Species	Proportion of total calls				
Litte brown myotis	0.86	0.96	0.17	0.83	0.67
Northern myotis	0.14	0.04	0.03	0.07	0.06
Big brown bat				0.05	0.01
Eastern pipistrelle			0.80	0.05	0.25
Red bat					0.01

Table 18. Band information of bats returning to Mystery Cave during fall, 1996.

Band #	Species	Sex	Band Date	Recovery Date	Minimum Age (yrs)
UMN 3282	Little brown myotis	Male	2 Jan 1988	5 Sep 1996	8
UMN 689	Little brown myotis	Male	9 Jan 1983	5 Sep 1996	13
UMN 3251	Little brown myotis	Male	2 Jan 1988	19 Sep 1996	8
UMN 608	Little brown myotis	Male	9 Jan 1983	19 Sep 1996	13
(DJT) 485	Little brown myotis	Male	30 Jan 1982	19 Sep 1996	14
(DJT) 309	Little brown myotis	Male	26 Jan 1980	19 Sep 1996	16
(DJT) 90	Little brown myotis	Female	1 Jan 1980	19 Sep 1996	16

Table 19. Breeding-season birds documented or likely to occur in Forestville/Mystery Cave State Park.

Habitat categories

Wetland: Wetlands, marshes, lakes, streams, rivers, beaches.
Grass/open: Prairies, old fields, pastures, hayfields, and cultivated fields.
Shrub/edge: Forest-shrub edge, shrubby openings, savannas, and developed areas.
Deciduous: Upland and lowland deciduous forests, overgrown woodlands, and savannas.
Widespread: Widespread or wide-ranging, including aerial foragers, found in wide variety of habitats.

Recorded by MCBS in park	Common Name	Associated Habitats in the Paleozoic Plateau					
		Wetland	Grass/open	Shrub/edge	Deciduous	Widespread	Comments
★	Great Blue Heron	●					
★	Green Heron	●					
★	Turkey Vulture					●	
★	Canada Goose	●					
★	Wood Duck	●					
★	Mallard	●					
	Blue-winged Teal	●					limited suitable habitat in park
★	Cooper's Hawk				●		
★	Red-tailed Hawk		●				
	American Kestrel		●				probably occurs in park
★	Ring-necked Pheasant		●				non-native species
★	Ruffed Grouse				●		
★	Wild Turkey				●		
	Killdeer		●				limited suitable habitat in park
	Spotted Sandpiper	●					limited suitable habitat in park
	American Woodcock				●		probably occurs in park
★	Rock Dove					●	non-native species
	Mourning Dove					●	probably occurs in park
★	Black-billed Cuckoo				●		
★	Yellow-billed Cuckoo				●		
	Eastern Screech-Owl				●		probably occurs in park
★	Great Horned Owl					●	

Table 19. Continued.

Recorded by MCBS in park	Common Name	Associated Habitats in the Paleozoic Plateau					
		Wetland	Grass/open	Shrub/edge	Deciduous	Widespread	Comments
★	Barred Owl				●		
	Long-eared Owl				●		rare; may occur in park
	Common Nighthawk					●	probably occurs in park
	Whip-poor-will				●		probably occurs in park
★	Chimney Swift					●	
★	Ruby-throated Hummingbird					●	
★	Belted Kingfisher	●					
★	Red-headed Woodpecker					●	
★	Red-bellied Woodpecker				●		
★	Yellow-bellied Sapsucker				●		
★	Downy Woodpecker					●	
★	Hairy Woodpecker					●	
★	Northern Flicker					●	
★	Pileated Woodpecker				●		
★	Eastern Wood-Pewee				●		
★	Acadian Flycatcher				●		
★	Willow Flycatcher			●			shrub/savanna specialist
★	Least Flycatcher				●		
★	Eastern Phoebe					●	
★	Great Crested Flycatcher				●		
	Eastern Kingbird		●				probably occurs in park
★	Yellow-throated Vireo				●		
★	Warbling Vireo				●		
★	Red-eyed Vireo				●		
★	Blue Jay					●	
★	American Crow					●	
★	Purple Martin					●	
★	Tree Swallow					●	
★	Northern Rough-winged Swallow					●	
★	Bank Swallow					●	

Table 19. Continued.

Recorded by MCBS in park	Common Name	Associated Habitats in the Paleozoic Plateau					
		Wetland	Grass/open	Shrub/edge	Deciduous	Widespread	Comments
★	Barn Swallow					●	
★	Cliff Swallow					●	
★	Black-capped Chickadee					●	
	Tufted Titmouse				●		rare
★	White-breasted Nuthatch				●		
	Brown Creeper				●		may occur in park
★	House Wren					●	
★	Winter Wren				●		rare in Paleozoic Plateau
★	Blue-gray Gnatcatcher				●		
	Eastern Bluebird		●				probably occurs in park
★	Veery				●		rare in Paleozoic Plateau
★	Wood Thrush				●		
★	American Robin					●	
★	Gray Catbird			●			
	Brown Thrasher			●			probably occurs in park
	European Starling					●	non-native species; probably occurs in park
★	Cedar Waxwing					●	
★	Blue-winged Warbler			●			
★	Yellow Warbler			●			
★	Cerulean Warbler				●		
★	American Redstart				●		
★	Ovenbird				●		
★	Louisiana Waterthrush				●		
★	Mourning Warbler				●		rare in Paleozoic Plateau
★	Common Yellowthroat			●			
★	Scarlet Tanager				●		
	Eastern Towhee			●			shrub/savanna specialist; probably occurs in park
★	Chipping Sparrow					●	
★	Field Sparrow			●			
	Vesper Sparrow		●				may occur in park

Table 19. Continued.

Recorded by MCBS in park	Common Name	Associated Habitats in the Paleozoic Plateau					
		Wetland	Grass/open	Shrub/edge	Deciduous	Widespread	Comments
★	Song Sparrow					●	
★	Northern Cardinal					●	
★	Rose-breasted Grosbeak					●	
★	Indigo Bunting					●	
★	Bobolink		●				
★	Red-winged Blackbird	●					
	Eastern Meadowlark		●				may occur in park
★	Common Grackle					●	
★	Brown-headed Cowbird					●	
	Orchard Oriole			●			shrub/savanna specialist; probably occurs in park
★	Baltimore Oriole				●		
	House Finch					●	probably occurs in park
★	American Goldfinch					●	
	House Sparrow					●	non-native species; probably occurs in park

Table 20. Migrant birds observed in Forestville/Mystery Cave State Park during May 1996.

Blue-winged Teal *(Anas discors)***
Broad-winged Hawk *(Buteo platypterus)***
Solitary Sandpiper *(Tringa solitaria)*
Olive-sided Flycatcher *(Contopus cooperi)*
Yellow-bellied Flycatcher *(Empidonax flaviventris)*
Alder Flycatcher *(Empidonax alnorum)*
Ruby-crowned Kinglet *(Regulus calendula)*
Swainson's Thrush *(Catharus ustulatus)*
Tennessee Warbler *(Vermivora peregrina)*
Nashville Warbler *(Vermivora ruficapilla)*
Magnolia Warbler *(Dendroica magnolia)*
Yellow-rumped Warbler *(Dendroica coronata)*
Black-and-white Warbler *(Mniotilta varia)*
Prothonotary Warbler *(Protonotaria citrea)*
Northern Waterthrush *(Seiurus noveboracensis)*
Connecticut Warbler *(Oporornis agilis)*
Wilson's Warbler *(Wilsonia pusilla)*
Canada Warbler *(Wilsonia canadensis)*

(** species that may nest in the park)

Table 21. Frequencies of occurrence of selected forest and "edge" bird species among state parks within the Paleozoic Plateau.
[*Edge* species are italicized; n = number of point counts; x = species detected at <10% of point counts.]

Abbreviations:

FOR: Forestville State Park
BCV: Beaver Creek Valley State Park
CAR: Carley State Park
GRB: Great River Bluffs State Park
JL: John Latsch State Park
WW: Whitewater State Park
SE: Southeast (Fillmore, Goodhue, Houston, Olmsted, Wabasha, Winona)

Species	State Parks						SE
	FOR n=34	BCV n=17	CAR n=12	GRB n=12	JL n=11	WW n=19	n=286
Mourning Dove		0.12	0.08	0.17	x	0.11	x
Red-bellied Woodpecker	0.24	0.12		0.42	x	0.11	0.22
Yellow-bellied Sapsucker	x	x			0.36	0.16	0.12
Pileated Woodpecker	x		x	x	0.18		x
Eastern Wood-Pewee	0.79	0.53	0.67	0.83	0.64	0.63	0.71
Least Flycatcher	x	0.18					x
Great Crested Flycatcher	0.44	0.35	0.25	0.33	x	0.68	0.34
Yellow-throated Vireo	0.21	0.24			0.36	x	0.18
Red-eyed Vireo	0.71	0.24	0.42	0.50	0.82	0.47	0.47
Blue Jay	0.21	0.47	0.58	0.67	0.36	0.68	0.39
American Crow	0.32	0.41	0.50	0.25	x	0.63	0.28
Black-capped Chickadee	0.15	0.24	0.25		x	0.26	0.21
White-breasted Nuthatch	0.35	0.18	0.17	0.25	0.27	0.37	0.29
House Wren	0.26	0.59	0.42	0.33	0.36	0.42	0.36
Blue-gray Gnatcatcher	0.21	0.24	x		0.36	0.26	0.24
Veery	0.18	0.12					x
Wood Thrush	0.32	x		0.17	0.27	x	0.17
American Robin	0.41	0.47	x	0.50	0.18	0.53	0.29
Gray Catbird	x	0.41	0.17	0.25		0.11	0.21
Yellow Warbler		0.41				0.11	0.10
Cerulean Warbler		x			0.18		x
American Redstart	0.38	0.76	0.58	0.17	0.36	0.21	0.35
Ovenbird	0.44	0.12	0.50	0.50	0.36	0.42	0.44
Common Yellowthroat	x	x	0.33	x		0.16	x
Scarlet Tanager	0.29	0.18		x	0.18		0.17
Song Sparrow	0.15	0.24	0.33		x	x	0.14
Northern Cardinal	0.21	0.12	0.58	0.50	0.27	0.37	0.33
Rose-breasted Grosbeak	0.18	0.24		0.25	0.64	0.21	0.33
Indigo Bunting	0.35	0.47	0.50	0.17	x	0.21	0.21
Brown-headed Cowbird	0.29	0.35	0.33	0.33	0.18	0.32	0.29
Baltimore Oriole	0.12	0.35			0.27	0.26	0.13
American Goldfinch	x	0.47	0.17	x		0.11	0.16

Table 22. Amphibians and reptiles documented in Forestville/Mystery Cave State Park.
(List includes all herpetofauna likely to occur in the Paleozoic Plateau.)

Occurrence categories

★ Species recorded in park by MCBS

○ Species reported in park by other sources

Habitat categories

Forest: All upland and lowland forests and woodlands.

Grassland: Prairies, old fields, pastures, and lawns.

Wetland: Shrub swamps and emergent marshes.

Lake: Lakes, ponds, and adjacent beaches.

Riparian: Rivers, streams, and adjacent shorelines.

Occurrence	Common name	Scientific name	Associated habitats in the Paleozoic Plateau					
			Forest	Grassland	Wetland	Lake	Riparian	Comment
	Salamanders							
	Mudpuppy	*Necturus maculosus*				●	●	Often associated with rocky streams and river
○	Tiger salamander	*Ambystoma tigrinum*	●	●	●			Breeds in fishless wetlands
	Frogs and Toads							
★	American toad	*Bufo americanus*	●	●	●			Abundant throughout park
★	Cope's gray treefrog	*Hyla chrysoscelis*		●	●			Breeds in shallow wetlands, typically associated with grassland, shrubland habitat
○	Gray treefrog	*Hyla versicolor*	●		●			Breeds in fishless wetlands, typically associated with woodland habitat
★	Spring peeper	*Pseudacris crucifer*	●		●			Breeds in fishless wetlands
○	Western chorus frog	*Pseudacris triseriata*		●	●			Breeds in fishless wetlands
★	Green frog	*Rana clamitans*			●	●	●	Often associated with streams and ditches
	Pickerel frog	*Rana palustris*	●		●		●	Associated with cool rivers and streams
★	Northern leopard frog	*Rana pipiens*		●	●	●		Present in park
	Wood frog	*Rana sylvatica*	●		●			Unlikely to occur in park

Table 22. Continued.

Occurrence	Common name	Scientific name	Associated habitats in the Paleozoic Plateau					
			Forest	Grassland	Wetland	Lake	Riparian	Comment
	Turtles							
	Common map turtle	*Graptemys geographica*					●	Unlikely to occur in park
	False map turtle	*Graptemys pseudogeographica*					●	Unlikely to occur in park
	Ouachita map turtle	*Graptemys ouachitensis*					●	Unlikely to occur in park
★	Snapping turtle	*Chelydra serpentina*			●	●	●	Present in wide variaty of aquatic habitats
★	Painted turtle	*Chrysemys picta*			●	●		Park has limited suitable habitat
○	Blanding's turtle	*Emydoidea blandingii*		●	●			Record in database, limited habitat in park
	Wood turtle	*Clemmys insculpta*	●				●	Unlikely to occur in park
	Smooth softshell	*Apalone mutica*					●	Unlikely to occur in park
	Spiny softshell	*Apalone spinifera*					●	Associated with rivers and lakes
	Lizards							
	Six-lined racerunner	*Cnemidophorus sexlineatus*		●				Associated with open habitat and sandy soils
	Five-lined skink	*Eumeces fasciatus*	●					Associated with rock outcrops

Table 22. Continued.

Occurrence	Common name	Scientific name	Associated habitats in the Paleozoic Plateau					
			Forest	Grassland	Wetland	Lake	Riparian	Comment
	Snakes							
	Racer	*Coluber constrictor*		●				Unlikely to occur in park
○	Timber rattlesnake	*Crotalus horridus*	●					Dens are associated with rock outcrops, snakes are observed annually in park
	Ringneck snake	*Diadophis punctatus*	●					May be present in the park, often associated with rock outcrops
○	Fox snake	*Elaphe vulpina*	●					Associated with forest edges, specimen collected 2 miles west of Macrosite
	Western hognose snake	*Heterodon nasicus*		●				Unlikely to occur in park
	Eastern hognose snake	*Heterodon platirhinos*	●					Often associated with forest openings and edges
○	Milk snake	*Lampropeltis triangulum*	●					Often associated with forest edges
○	Northern water snake	*Nerodia sipedon*	●		●	●	●	Occupies river and stream edges and associated backwaters
	Gopher (Bull) snake	*Pituophis catenifer*		●				Unlikely to occur in park
	Brown snake	*Storeria dekayi*	●					Not documented in or near park but may be present
★	Redbelly snake	*Storeria occipitomaculata*	●					Abundant in park within forest and forest-edge habitat
	Plains garter snake	*Thamnophis radix*		●				Unlikely to occur in park
★	Common garter snake	*Thamnophis sirtalis*	●					Present in park

Appendices

Appendix 1a

Rare Features Database Print-outs: An Explanation of Fields

The Rare Features database is part of the Natural Heritage Information System,
and is maintained by the Natural Heritage and Nongame Research Program,
a unit within the Section of Ecological Services,
Minnesota Department of Natural Resources (DNR).

Field Name: [Full (non-abreviated) field name, if different]. Further explanation of field.

-C-

CBS Site: [County Biological Survey site number]. In each county, the numbering system begins with 1.

CLASS: A code which classifies features by broad taxonomic group: NC = natural community; SA = special animal; SP = special plant; GP = geologic process; GT = geologic time; OT = other (e.g. colonial waterbird colonies, bat hibernacula).

Cty: [County]. Minnesota counties (ordered alphabetically) are numbered from 1 (Aitkin) to 87 (Yellow Medicine).

CURRENT STATUS: Present protection status, from 0 (owner is not aware of record) to 9 (dedicated as a Scientific and Natural Area).

-D-

DNR Region: 1=NW, 2=NE, 3=E Central, 4=SW, 5=SE, 6= Minneapolis/St. Paul Metro.

DNR Quad: [DNR Quadrangle code]. DNR-assigned code of the U.S. Geologic Survey topographic map on which the rare feature occurs.

-E-

ELEMENT or Element: See "Element Name (Common Name)"

Element Name (Common Name): The name of the rare feature. For plant and animal species records, this field holds the scientific name, followed by the common name in parentheses; for all other elements (such as plant communities, which have no scientific name) it is solely the element name.

EO RANK: [Element Occurrence Rank]. An evaluation of the quality and condition of natural communities from A (highest) to D (lowest).

EO Size: [Element Occurrence Size]. The size in acres (often estimated) of natural communities.

-F-

FED STATUS: [Federal Status]. Status of species under the Federal Endangered Species Law: LE=endangered, LT=threatened, C=species which have been proposed for federal listing.

Federal Status: See "FED STATUS"

Forestry District: The Minnesota DNR's Division of Forestry district number.

-G-

GLOBAL RANK: The abundance of an element globally, from G1 (critically imperiled due to extreme rarity on a world-wide basis) to G5 (demonstrably secure, though perhaps rare in parts of its range). Global ranks are determined by the Conservation Science Division of The Nature Conservancy.

-I-

INTENDED STATUS: Desired protection status. See also "CURRENT STATUS." If a complete list of protection status codes is needed, please contact the Natural Heritage Program.

-L-

LAST OBSERVED or Last Observed Date or Last Observation: Date of the most recent record of the element at the location.

Latitude: The location at which the occurrence is mapped on Natural Heritage Program maps. NOTE: There are various levels of precision in the original information, but this is not reflected in the latitude/longitude data. For some of the data, particularly historical records, it was not possible to determine exactly where the original observation was made (e.g. "Fort Snelling", or "the south shore of Lake Owasso"). Thus the latitude/longitude reflect the mapped location, and not necessarily the observation location.

Legal: Township, range and section numbers.

Long: [Longitude]. See NOTE under "Latitude"

-M-

MANAGED AREA or Managed Area(s): Name of the federally, state, locally, or privately managed park, forest, preserve, etc., containing the occurrence, if any. If this field is blank, the element probably occurs on private land. If "(STATUTORY BOUNDARY)" occurs after the name of a managed area, the location may be a private inholding within the statutory boundary of a state forest or park.

Map Sym: [Map Symbol].
MN STATUS: [Minnesota Status]. Legal status of plant and animal species under the Minnesota endangered species law: END=endangered, THR=threatened, SPC=special concern, NON= no legal status, but rare and may become listed if declines continue. This field is blank for natural communities and colonial waterbird nesting sites, which have no legal status in Minnesota, but are tracked by the database.

-N-

NC Rank: [Natural Community Rank].

-O-

Occ #: [Occurrence Number]. The occurrence number, in combination with the element name, uniquely identifies each record.
OCCURRENCE NUMBER: See "Occ #"
OF OCCURS: The number of records existent in the database for each element within the area searched.
Ownership: Indicates whether the site is publicly or privately owned; for publicly owned land, the agency with management responsibility is listed.

-P-

Precision: Precision of locational information of occurrence: C (confirmed) = known within 1/4 mile radius, U (unconfirmed) = known within 1/2 mile, N (non-specific) = known within 1 mile, G (general) = occurs within the general region, X (unmappable)=location is unmappable on USGS topographic quadrangles (often known only to the nearest county), O (obscure/gone)=element no longer exists at the location.
PS: [Primary Section]. The section containing all or the greatest part of the occurrence.

-Q-

Quad Map: See "DNR Quad"

-R-

Rec #: [Record number].
RNG or Rng: [Range number].

-S-

SECTION or Section: [Section number(s)]. Some records are given only to the nearest section (s), but most are given to the nearest quarter-section or quarter-quarter-section (e.g., SWNW32 denotes the SW1/4 of the NW1/4 of section 32). A "0" is used as a place holder when a half-section is specified (e.g., 0N03 refers to the north 1/2 of section 3). When a occurrence crosses section boundaries, both sections are listed, without punctuation (e.g., the NE1/4 of section 19 and NW1/4 of section 20 is displayed as "NE19NW20").
Site: A name which refers to the geographic area within which the occurrence lies. If no name for the area exists (a locally used name, for example), one is assigned by the County Biological Survey or the Natural Heritage Program.
Source: The collector or observer of the rare feature occurrence.
S RANK: [State Rank]. A rank assigned to the natural community type which reflects the known extent and condition of that community in Minnesota. Ranks range from 1 (in greatest need of conservation action in the state) to 5 (secure under present conditions). A "?" following a rank indicates little information is available to rank the community. Communities for which information is especially scarce are given a "U", for "rank undetermined". The ranks do not represent a legal status. They are used by the Minnesota Department of Natural Resources to set priorities for research, inventory and conservation planning. The state ranks are updated as inventory information becomes available.
State Status: See "MN STATUS"

-T-

TWP or Twp: [Township number].

-V-

Verification: A reflection of the reliability of the information on which the record is based. The highest level of reliability is "verified," which usually indicates a collection was made or, in the case of bird records, nesting was observed. Plant records based on collections made before 1970 are unverified.
Voucher: The museum or herbarium where specimens are maintained, and the accession number assigned by the repository. In the case of bald eagles, this is the breeding area number.

-W-

Wildlife Area: The Minnesota DNR's Section of Wildlife administrative number.

Data Security

Locations of some rare features must be treated as sensitive information because widespread knowledge of these locations could result in harm to the rare features. For example, wildflowers such as orchids and economically valuable plants such as ginseng are vulnerable to exploitation by collectors; other species, such as bald eagles, are sensitive to disturbance by observers. For this reason, we prefer that publications not identify the precise locations of vulnerable species. We suggest describing the location only to the nearest section. If this is not acceptable for your purposes, please call and discuss this issue with the Environmental Review Specialist for the Heritage and Nongame Research Program at 651/296-7863.

Revised 11/2000

Appendix 1b

APPENDIX 1B: NATIVE PLANT COMMUNITIES WITHIN THE
FORESTVILLE/MYSTERY CAVE ECOLOGICAL AREA

Element: BLACK ASH SWAMP SEEPAGE SUBTYPE #15
S Rank: S3
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 12
Quad Map: FOUNTAIN (X21B)
Latitude: 43 39' 6" Long: 92 13' 0"
Precision: approx. boundaries have been determined
Voucher: RELEVE 1994 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 27 May 1994
SEVERAL UPLAND SPRINGS WERE LOCATED IN CREEK VALLEYS OF FORESTVILLE PARK. THESE WERE FOUND AT ELEVATION 1130-1160 FT ON BENCH TERRACES ABOVE PLATTEVILLE LIMESTONE OUTCROPS, ON HILL SLOPES AND IN LATERAL RAVINES WHERE SMALL AREAS WITH SATURATED SOIL MAINTAIN BLACK ASH SWAMPS DOMINATED BY AN OPEN, SUPER CANOPY OF FRAXINUS NIGRA AGED OVER 100 YEARS OLD. W/IN CANOPY GAPS ARE HERBS TYPICAL OF MARSHES WITH FOREST SPECIES: CALTHA PALUSTRIS, SYMPLOCARPUS FOETIDUS.

Element: BLACK ASH SWAMP SEEPAGE SUBTYPE #17
S Rank: S3
EO Size: EO Rank: C Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESWNE24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 50" Long: 92 13' 18"
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 May 1995
BLACK ASH SEEPAGE SWAMP ON FLOODPLAIN OF SOUTH BRANCH ROOT RIVER AT BASE OF NW-FACING SLOPE NEAR MOUTH OF CANFIELD CREEK. CANOPY OF LARGE, SCATTERED FRAXINUS NIGRA. WET AREA DOM BY CALTHA PALUSTRIS WITH CAREX STIPATA, C. LAEVIVAGINATA, ANGELICA ATROPURPUREA, C. RETRORSA, C. LACRUSTRIS, C. TRICHOCARPA.

Element: BLACK ASH SWAMP SEEPAGE SUBTYPE #18
S Rank: S3
EO Size: EO Rank: BC Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVYEY 1994); K.BOLIN (DNR PARKS)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 53" Long: 92 13' 28"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 June 1994
GROUNDWATER EMERGES FROM UPLAND SPRINGS OR SEEPS IN GULLIES OF OLD GROWTH MAPLE BASSWOOD FOREST. LARGEST GULLY ASCENDS UPSLOPE TO 1080-1120FT ELEVATION WHERE WATER POOLS WITH CALTHA PALUSTRIS, CINNA ARUNDINACEA AND BLACK ASH (40-50CM DBH). SURROUNDING WET-MESIC SOILS WITH SUGAR MAPLE (30-40CM DBH) & BASSWOOD (UP TO 100CM DBH); NUMEROUS TIP-UPS AND FALLEN LIMBS. 2ND SPRING HEAD NEAR FOREST EDGE AT OLD HOUSE SITE: DISTURBED WITH BOX ELDER & ELMS.

Element: BLACK ASH SWAMP SEEPAGE SUBTYPE #19
S Rank: S3
EO Size: EO Rank: BC Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWNW18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 21" Long: 92 12' 30"
Precision: approx. boundaries have been determined
Voucher: RELEVE 1994 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 29 August 1994
SEEPAGE AREA IN SMALL RAVINE OF EAST FACING BLUFF. ROCKY SATURATED SOIL (30X100 FT AREA) ON RAVINE BED BETWEEN 1100-1160 FT ELEVATION NEAR TALUS BASE & GALENA OUTCROP. BLACK ASH CANOPY (50-75% COVER). SUBCANOPY (>75% COVER; 5-60M TALL) DOM BY SUGAR MAPLE & RED ELM. SHRUB LAYER 50-75% COVER: CARPINUS, CRATAEGUS, STAPHYLEA, EUONYMOUS ATROPURPUREUS. HERBS 100% COVER: SAXIFRAGA, SYMPLOCARPUS, CALTHA PALUSTRIS, LOBELIA SIPHILITICA. FRAXINUS NIGRA DBH 56CM @ 178 YEARS.

Element: DRY CLIFF (SOUTHEAST) #20
S Rank: S3
EO Size: EO Rank: B Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0E23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 20" Long: 92 13' 55"
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 September 1994
Voucher: Verification: verified
DRY CLIFF - POSSIBLY MADERATE ON LOWER SLOPE, NW-ASPECT, ON OUTSIDE BEND OF ANCIENT MEANDER, UPPER THIRD DRY CLIFF: JUNIPERUS VIRGINIANA, OSTRYA & POPULUS TREMULOIDES WITH SCATTERED TREES OF PINUS STROBUS AND NARROW PRAIRIE AT PRECIPICE. CANOPY 50-70% COVER ON COLLUVIUM BETWEEN CLIFF TIERS, COMPRISED OF OVERARCHING TREES: Q. MACROCARPA, Q. RUBRA & ACER SACCHARUM. SUBCANOPY/SHRUB LAYER 5M TALL, PATCHY TO THICK; INCLUDES TAXUS CANADENSIS.

Element: DRY CLIFF (SOUTHEAST) #21
S Rank: S3
EO Size: EO Rank: BC Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 37" Long: 92 15' 40"
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 10 October 1994
Voucher: Verification: verified
SERIES OF DRY CLIFFS IN DRY VALLEY (UNDERGROUND STREAM), TRIBUTARY TO SOUTH BRANCH ROOT RIVER. CLIFFS TO 40M TALL, SOUTH TO WEST ASPECT. GRADES INTO MAPLE BASSWOOD FOREST WITH WET-MESIC TALUS.

Element: DRY CLIFF (SOUTHEAST) #22
S Rank: S3
EO Size: EO Rank: B Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0S0N14
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 38" Long: 92 14' 27"
Precision: approx. boundaries have been determined
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 09 June 1995
Voucher: Verification: verified
SOUTH FACING BLUFF OF FORESTVILLE CREEK DOMINATED MOSTLY BY DRY CLIFF WITH DRY OAK FOREST ON CRESTS, NARROW RIDGES & UPPER PORTION OF COLLUVIAL SLOPES. DOM BY OPEN-GROWN QUERCUS MACROCARPA WITH CROOKED TRUNKS & JUNIPERUS VIRGINIANA ALSO WITH SOME PINUS STROBUS. OVERALL CANOPY 50-75% COVER. SUBCANOPY 75% COVER WITH OSTRYA, J. VIRGINIANA & Q.MACROCARPA. SHRUB LAYER 25-50% COVER WITH PRICKLY ASH. HERBS INCLUDED ZIZIA AUREA, COREOPIS PALMATA, AGALINIS SP., AMORPHA CANESCENS.

Element: DRY PRAIRIE (SOUTHEAST) BEDROCK BLUFF SUBTYPE #262
S Rank: S3
EO Size: EO Rank: CD Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1995) & K.BOLIN (DNR PARKS)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENWSWSW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 50" Long: 92 13' 18"
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 16 August 1995
Voucher: RELEVE 1995 Verification: verified
NARROW STRIP OF DRY PRAIRIE ON NARROW CREST OF RIDGE SPUR. DOM BY BOUTELOUA CURTIPENDULA & POA PRATENSIS WITH SCHIZACHYRIUM SCOPARIUM, SORGHASTRUM NUTANS, & ANDROPOGON GERARDII. WOODY SPECIES BEING CUT BACK BY PARK STAFF. FORB DIVERSITY FAIR WITH MOST SPECIES OCCASIONALLY OCCURRING THROUGHOUT. DOMINANTS INCLUDE: PETALOSTEMON PURPUREUM, KUHNIA EUPATORIOIDES, SOLIDAGO RIGIDA, GALIUM BOREALE, LITHOSPERMUM CANESCENS, PULSATILLA NUTTALLIANA, AMBROSIA ARTEMISIIFOLIA

Element: LOWLAND HARDWOOD FOREST #72
S Rank: S4
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVYEY 1994)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W 0S12 Wildlife Area: 510
Quad Map: FOUNTAIN (X21B) Forestry District: 533
Latitude: 43 38' 53" Long: 92 13' 15" Last Obs.: 27 May 1994
Precision: approx. boundaries have been determined
Voucher: Verification: verified
LOWLAND HARDWOOD FOREST ON CHANNELED FLOODPLAINS WITHIN CREEK VALLEYS. MIXED CANOPY VARIES IN COVER AND TREE DBH. CANOPY 50-75% COVER; CROWNS 20-25M TALL; MOST PREVALENT DBH 30-40CM; FREQUENT LARGE DBH TREES UP TO 118CM. SOME STANDS DOM BY BLACK WALNUT; MOST AREAS ARE A MIXTURE OF AMERICAN ELM, COTTONWOOD, HACKBERRY, RED OAK AND BUR OAK. SUBCANOPY NEARLY ABSENT TO 25-50% COVER; SHRUB LAYER 25% COVER IN SHADED AREAS TO 75% IN OPEN SUN. ABUNDANT SPRING EPHEMERALS.

Element: LOWLAND HARDWOOD FOREST #73
S Rank: S4
EO Size: EO Rank: B Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVYEY 1994); K.BOLIN (DNR PARKS)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W 0N1312 Wildlife Area: 510
Quad Map: FOUNTAIN (X21B) Forestry District: 533
Latitude: 43 38' 43" Long: 92 12' 51" Last Obs.: 06 June 1994
Precision: approx. boundaries have been determined
Voucher: RELEVES Verification: verified
LARGE TREES ON CHANNELED FLOODPLAIN AT CONFLUENCE OF FORESTVILLE CREEK WITH SOUTH BRANCH ROOT RIVER. ECOLOGICAL QUALITY VARIES NEAR DEVELOPED AREAS DUE TO LOWER TREE DENSITY, DBH AND CANOPY COVER. CANOPY COVER 50-80%; CROWNS 10-30M TALL; MOST PREVALENT DBH 35-45CM WITH LARGER TREES TO 84CM INFREQ-COMMON. DOMINANTS VARY: BASSWOOD, SUGAR MAPLE, BURR OAK AND ROCK ELM. SUBCANOPY PATCHY COVER. SHRUBS SPARSE. DIVERSE SPRING FLORA BUT SOME AREAS MOSTLY RANK HERBS.

Element: LOWLAND HARDWOOD FOREST #74
S Rank: S4
EO Size: EO Rank: CD Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. & LEE,M. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R11W 07 Wildlife Area: 510
Quad Map: FOUNTAIN (X21B) Forestry District: 533
Latitude: 43 39' 10" Long: 92 12' 2" Last Obs.: 25 July 1994
Precision: approx. boundaries have been determined
Voucher: Verification: verified
POOR LOWLAND HARDWOODS IN CORRIDOR OF SOUTH BRANCH ROOT RIVER. CANOPY 60% COVER: SCATTERED LARGE TREES (50-60CM) WITH GROVES OF YOUNG TREES (<30CM); BOX ELDER, GREEN ASH, BUR OAK, SOME BASSWOOD. NO SUBCANOPY. SHRUB LAYER THICK (75% COVER). INCLUDES 2ND GROWTH MAPLE BASSWOOD FOREST. ON LOWER BLUFF SLOPE WITH NE-ASPECT: SELECTIVELY LOGGED/GRAZED (VERY DECAYED STUMPS); MAPLE CANOPY 100% COVER, 15-25M TALL, DBH 15-45 CM. LOW HERB DIVERSITY: WEEDY FERN PATCHES. COMPACTED SOIL.

Element: LOWLAND HARDWOOD FOREST #75
S Rank: S4
EO Size: EO Rank: BC Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R11W 0E18 Wildlife Area: 510
Quad Map: FOUNTAIN (X21B) Forestry District: 533
Latitude: 43 38' 20" Long: 92 11' 44" Last Obs.: 16 August 1994
Precision: approx. boundaries have been determined
Voucher: Verification: verified
MATURE LOWLAND HARDWOODS IN CREEK VALLEY ON DEEPLY CHANNELED FLOODPLAIN (5-10 FT ABOVE STREAMBED). DOMINATED BY SUGAR MAPLE. CANOPY 50% COVER, DBH 30-50CM, FREQUENT ELM SNAGS & TIP-UPS. SUBCANOPY 50% COVER; 5-10M TALL. SHRUBS SPARSE. RANK HERB LAYER WITH LAPORTEA CANADENSIS, CRYPTOTAENIA, OSMORHIZA LONGISTYLIS & RUDBECKIA LACINIATA SHADING HYDROPHYLLUM VIRGINIANUM, H. APPENDICULATUM, & ISOPYRUM. ONE STAND: CANOPY 75% COVER, DOM BY B. WALNUT, ELM, BUR OAK, BASSWOOD.

Element: LOWLAND HARDWOOD FOREST #76
S Rank: S4
EO Size: EO Rank: C Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 2425
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 50" Long: 92 13' 18"
Voucher: RELEVE 1994 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 07 September 1994

YOUNG, HETEROGENEOUS LOWLAND HARDWOOD FOREST ON FORMERLY GRAZED FLOODPLAIN OF CANFIELD CREEK. CANOPY 60% COVER, CROWNS 10-20M TALL, TYPICAL DBH 20CM, OCCASIONAL LARGE TREES 40-50CM DBH, RARELY TO 65CM. INCLUDES: FRAXINUS PENSLYVANICA, ACER NEGUNDO, ACER SACCHARUM, ULMUS AMERICANA, QUERCUS MACROCARPA & SALIX. SUBCANOPY & SHRUB LAYERS WITH CELTIS OCCIDENTALIS & ACER SACCHARUM. HERB FLORA WITH SPRING EPHEMERALS AND RANK LAPORTEA CANADENSIS.

Element: LOWLAND HARDWOOD FOREST #77
S Rank: S4
EO Size: EO Rank: B Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0SNW14
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 17" Long: 92 14' 30"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 June 1995

OLD GROWTH? LOWLAND HARDWOOD FOREST ON CHANNELED ALLUVIUM OF FORESTVILLE CREEK WEST OF PARK, NEXT TO PRIVATE CAMPGROUND. INTERUPTED CANOPY, CROWNS 30-35M TALL, TYPICAL DBH 50-70CM, BROAD SPREADING TREES, DOM BY ACER SACCHRUM, QUERCUS RUBRA, WITH TILIA AMERICANA & FRAXINUS NIGRA. SUBCANOPY 85% COVER, 10M TALL, DBH 15-25CM WITH ACER NEGUNDO & SALIX NIGRA. SHRUB LAYER 5-50% COVER, PATCHY THICK IN PLACES. RANK MESIC HERBS: CRYPTANDRUS CANADENSIS, LAPORTEA, CAREX TRIBULOIDES.

Element: LOWLAND HARDWOOD FOREST #78
S Rank: S4
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSE19
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 0" Long: 92 19' 2"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 21 August 1995

SMALL PARCEL OF LOWLAND HARDWOODS FENCED FROM LIVESTOCK. CANOPY 25-50% COVER, CROWNS 5-30M TALL, WITH TILIA AMERICANA, JUGLANS NIGRA, ULMUS SPP., ACER NEGUNDO, FRAXINUS NIGRA. MORE OPEN AREAS DOMINATED BY TALL QUERCUS MACROCARPA (30M TALL). SUBCANOPY WITH CELTIS OCCIDENTALIS. SHRUB LAYER 5-30% COVER WITH ULMUS, ACER, CORNUS ALTERNIFOLIA. HERB LAYER WITH LAPORTEA CANADENSIS, POLYGONUM VIRGINIANAUM, LEERSIA VIRGINICUM, SCROPHULARIA MARILANDRICA, GLECHOMA HEDERACEA.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #16
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(FIELD NOTES 1980); FORESTVILLE SP MANAGEMENT PLAN (1978, P.128)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 150E14
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 15" Long: 92 14' 50"
Precision: approx. boundaries have not been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: July 1980

MAPLE-BASSWOOD FOREST DOM BY ACER SACCHARUM WITH MANY MATURE TREES ALONG BLUFFS OF FORESTVILLE CREEK AND A TRIBUTARY IN SW1/4 OF SECT. 14. SCATTERED PINUS STROBUS (TO 75 CM DBH) AND TAXUS CANADENSIS. MANY STUMPS ON MUCH OF THE AREA. PAST GRAZING ESPECIALLY HEAVY NORTH OF CREEK. SILT LOAM SOILS ON STEEP SLOPES IN RED-WING LACRESCENT UPLANDS GEOMORPHIC REGION. ECOLOGICAL SIGNIFICANCE UNKNOWN. REQUIRES HERITAGE FIELD SURVEY.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #20
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ROE,E.I.
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NESW20 Wildlife Area: 510
Quad Map: CHERRY GROVE (X20D) Forestry District: 533
Latitude: 43 37' 18" Long: 92 18' 15" Last Obs.: 27 March 1968
Precision: approx. boundaries have not been determined
Voucher: Verification: unverified
MAPLE-BASSWOOD FOREST WOODLOT DOM BY QUERCUS MACROCARPA, Q. ALBA, ULMUS AMER, & TILIA. 2 ABIES & SEVERAL PINUS STROBUS SEEDLINGS APPEAR TO BE OF NATURAL ORIGIN. NUMEROUS JUNIPERUS VIRG (1M IN HEIGHT) LOAM, SILT LOAM OR CLAY LOAM OVER BEDROCK ON MODERATE W-FACING SLOPE. IN KENYON-TAOPI PLAIN GEOMORPHIC REGION. ECOLOGICAL SIGNIFICANCE OF THIS SMALL WOODLOT UNKNOWN; HERITAGE FIELD SURVEY APPROPRIATE WHEN NEARBY AREAS ARE SURVEYED.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #150
S Rank: S2
EO Size: 30 acres EO Rank: AB Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: Private
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.; M.LEE (CO BIOL SURVEY 1995) & K.BOLIN (DNR PARKS)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W SWSW13 Wildlife Area: 510
Quad Map: FOUNTAIN (X21B) Forestry District: 533
Latitude: 43 37' 59" Long: 92 13' 32" Last Obs.: 15 June 1995
Precision: approx. boundaries have been determined
Voucher: RELEVES Verification: verified
OLD GROWTH MAPLE-BASSWODD FOREST ON NORTH-FACING, LOWER SLOPES AND SWALES. INCLUDES MESIC OAK F ON RIDGE CRESTS AND HIGHER SLOPES W/ STEEPER GRADIENTS. CANOPY 90% COVER WITH SOME GAPS(TIP-UP/SNAGS); CROWNS 25-30 M TALL; TYPICAL DBH 25-40CM WITH ABUNDANT LARGE TREES UP TO 88CM DBH. RED OAK 59CM @ 172 RINGS. SUGAR MAPLE DECREASES UPSLOPE WITH RED & WHITE OAK BECOMING DOMINANT. LARGE BASSWOOD & WHITE ASH COMMON THROUGHOUT. EXCELLENT STRUCTURE & HERB DIVERSITY.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #160
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W 0S12 Wildlife Area: 510
Quad Map: FOUNTAIN (X21B) Forestry District: 533
Latitude: 43 38' 57" Long: 92 13' 15" Last Obs.: 27 May 1994
Precision: approx. boundaries have been determined
Voucher: Verification: verified
MAPLE BASSWOOD FORESTS ON LOWER SLOPES OF CREEK VALLEYS ESPECIALLY ON NORTH FACING BLUFFS WITH UPLAND SPRINGS AND SEEPS. CANOPY 80% COVER; CROWN 25M TALL DOMINATED BY SUGAR MAPLES AND RED ELM WITH LESSER AMOUNTS OF RED OAK AND BASSWOOD. THE MOST PREVALENT DBH IS 25-40 CM, WITH OCCASIONAL LARGE TREES TO 89CM. SUBCANOPY 50-75% COVER WITH RED ELM, MAPLE AND IRONWOOD. SHRUB LAYER 25% COVER: STYPHYLEA TRIFOLIA. MESIC GROUNDLAYER WITH SPRING FLOWERS. SILT LOAM.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #161
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R11W 0S070N18 Wildlife Area: 510
Quad Map: FOUNTAIN (X21B) Forestry District: 533
Latitude: 43 38' 38" Long: 92 12' 30" Last Obs.: 16 August 1994
Precision: approx. boundaries have been determined
Voucher: Verification: verified
SEVERAL IMM TO MATURE STANDS WITHIN LATERAL RAVINES OF BROAD, DISSECTED RIDGE & LOWER SLOPES OF NORTH FACING BLUFFS NEXT TO SO BR ROOT RIVER & CREEK TRIBUTARY. MAPLE/RED OAK CANOPY (60-90% COVER; CROWNS 15-25M TALL), PREVALENT DBH 20-40CM; INFREQUENT LARGE TREES TO 60CM. SUBCANOPY VARIES (10-75% COVER; 5-15M TALL). SHRUB LAYER MOSTLY 5-25% COVER BUT SOME AREAS THICK. MESIC HERB LAYER 50-75% COVER: LAPORTEA, GERANIUM, CAULLOPHYLLUM. GRADE 40% SLOPE, CLAY SILT LOAM.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #163
S Rank: S2
EO Size: EO Rank: BC Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SE13NE24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 50" Long: 92 12' 56"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 May 1994
IN MATURING MAPLE BASSWOOD FOREST DOMINATED BY ACER SACCHARUM, DBH 20-35CM AND TILIA AMERICANA, DBH 8-15CM; ALSO WITH POPULUS GRANDIDENTATA. GAPS CREATED BY DEAD ELMS. MESIC HERBS: ANEMONE QUINQUEFOLIA, CAREX PEDUNCULATA, DICENTRA CUCULLARIA, POLEMONIUM REPTANS, ALLIUM CERNUUM. W-ASPECT, LOWER SLOPE, <20% GRADE, DARK CLAY-SILT LOAM (MOIST FROM ADJACENT SEEPS), TALUS.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #164
S Rank: S2
EO Size: EO Rank: BC Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SW24NWNW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 50" Long: 92 13' 18"
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 September 1994
MATURING MAPLE BASSWOOD FOREST WITHIN SMALL, FORKED RAVINE WITH STEEP SIDE-SLOPES. INCLUDES TALUS SLOPES, ROCK OUTCROPS, SEEPAGE AREAS (IN RAVINE CHANNEL) AND OLD, ALLUVIAL BENCH TERRACE AT CONFLUENCE WITH CANFIELD CREEK VALLEY. DOM BY TILIA AMERICANA & ACER SACCHARUM WITH SOME BETULA ALLEGHANIENSIS. CANOPY 100% COVER (EXCEPT WHERE PATCHY ON STEEP 70% SLOPES), TYPICAL DBH 15-35CM, LARGE OAKS OCCASSIONAL ON UPPERSLOPES, 50-55CM DBH. HERB FLORA RICH W/ MOSSES & MESIC SPP.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #165
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 37" Long: 92 15' 40"
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 10 October 1994
MAPLE-BASSWOOD FOREST ON STEEP SLOPES OF DRY, MEADERING TRIBUTARY TO SOUTH BRANCH ROOT RIVER (STREAM FLOWS UNDERGROUND). CANOPY 60-80% COVER, CROWNS 20-25M TALL, TYPICAL DBH 20-30CM & 35-45 CM, OCCASIONAL LARGE TREES TO 55CM; DOM BY ACER SACCHARUM, TILIA AMERICANA. INCLUDES DRY CLIFF & WET-MESIC TALUS ON SUPER-STEEP SLOPES, CLAY-SILT LOAM. MESIC HERBS NOT SURVEYED.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #166
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SE10
Quad Map: WYKOFF (X20A)
Latitude: 43 38' 19" Long: 92 15' 5"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 June 1995
MAPLE BASSWOOD FOREST AND YOUNG REGROWTH OF LOWLAND HARDWOOD FOREST DOM BY ACER SACCHARUM & TILIA AMERICANA. N-ASPECT OF MEANDERING DRY VALLEY. CANOPY 80% COVER, 25M TALL, TYPICAL DBH 40-45CM. SUBCANOPY CLOSED (100% COVER) ACER SACCHARUM, & TILIA AMERICANA. SHRUB LAYER 50% COVER. CLAY SILT LOAM, COMPACTED. SOME WET-MESIC TALUS.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #167
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0WSESESW10
Quad Map: WYKOFF (X20A)
Latitude: 43 38' 53" Long: 92 15' 38"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 June 1995
MAPLE-BASSWOOD FOREST, MOSTLY YOUNG, DENSE CANOPY ON DEEPLY-DISSECTED, STEEP SLOPES SURROUNDING CLIFF. INCLUDES UNGRAZED LOWLAND HARDWOOD WITH TYPICAL DBH 10-15 CM, LARGE TREES OCCASSIONAL TO 40 CM DBH, SEVERAL SNAGS PRESENT. ANCIENT MEANDER CUT INTO BEDROCK EXPOSING NORTH FACING GALENA OUTCROPS AND 5-10M TALL CLIFFS & DRY TO WET-MESIC TALUS (15M VERTICAL HGT) COVERED W/ CYSTOPTERIS BULBIFERA, RUBUS STRIGOSUS, DIRCA PALUSTRIS. DRY FALLS OVER BEDROCK IN RAVINES.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #168
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0S0N15
Quad Map: WYKOFF (X20A)
Latitude: 43 38' 18" Long: 92 15' 4"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 02 June 1995
MESIC OAK BECOMING MAPLE-BASSWOOD FOREST ON NORTH-FACING BLUFF OF FORESTVILLE CREEK. NW15: DOM BY QUERCUS RUBRA, CANOPY 50-75% COVER, CROWNS 25M TALL, TYPICAL DBH 30-40CM, SOME LARGE ACER SACCHARUM & TILIA W/ DBH 50-60CM. NE15: ACER DBH 30-40CM, DENSE CANOPY NEARLY CLOSED. UNDERSTORY VARIES, THICK IN CANOPY GAPS. SHRUB LAYER DENSE W/ ACER, CORNUS ALTERNIFOLIA. HERBS 50-75% COVER: CAREX PEDUNCULATA, CYSTOPTERIS BULBIFERA. ROCK OUTCROPS & TALUS, GRADE 50-60% SLOPE.

Element: MAPLE-BASSWOOD FOREST (SOUTHEAST) #169
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENE30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 56" Long: 92 18' 32"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 21 August 1995
MAPLE BASSWOOD FOREST WITH ROCK OUTCROPS & WET-MESIC TALUS ON STEEP LOWER SLOPES OF N-NW FACING BLUFF OF SOUTH BRANCH ROOT RIVER. NARROW BAND OF CANOPY DBH 40-55CM DOM BY ACER SACCHARUM, CELTIS OCCIDENTALIS & ALSO WITH TILIA AMERICANA, JUGLANS CINEREA, ULMUS. OAKS ARCHING OVER GALENA LIMESTONE OUTCROPS WITH MOSSY LEDGES & SLUMPS WITH URTICA DIOICA, LAPORTEA CANADENSIS, IMPATIENS CAPENSIS, HYDROPYLLUM APPENDICULATUM, PARTHENOCISSUS INSERTA. EVIDENCE OF MASS EROSION.

Element: MOIST CLIFF (SOUTHEAST) MADERATE SUBTYPE #12
S Rank: S3
EO Size: EO Rank: A Current Status: 2 Intended Status: 28
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0NNENW26
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 57" Long: 92 14' 38"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: May 1985
VERY LARGE AND SPECTACULAR CLIFF 300' X 2600' ALONG ROOT RIVER. MOSTLY UNDISTURBED. SUCCINEID SNAILS PRESENT IN VERY LARGE NUMBERS. FOR PRESERVATION PURPOSES, FREST RANKS THIS CLIFF FIRST OF NINE KNOWN MADERATE CLIFFS IN MINNESOTA. CORRESPONDS TO FREST #MN41.

Element: MOIST CLIFF (SOUTHEAST) MADERATE SUBTYPE #16
S Rank: S3
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: FREST,T. (MN SUCCINEA SURVEY 1986)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NWSESW25 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 36' 18" Long: 92 13' 30" Last Obs.: 1985
Precision: approx. boundaries have been determined
Voucher: Verification: verified
CANFIELD CREEK 10. LARGE & SPECTACULAR MADERATE CLIFF ABOVE BIG SPRING & CANFIELD CREEK, N-NW FACING IN DUNLEITH-DUBUQUE FORMATION. CLIFF MEASURES 150 X 1000 FT. CLIFF IS UNDISTURBED W/ASSOCIATED SPRING, CAVE OPENINGS & COLLUVIAL SLOPE. VERY LARGE POPULATION OF SUCCINEA SP 3 & SMALL POPULATION OF SUCCINEA SP 4 OBSERVED AT SITE.

Element: MOIST CLIFF (SOUTHEAST) MADERATE SUBTYPE #17
S Rank: S3
EO Size: EO Rank: B Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NENE15NW14 Wildlife Area: 510
Quad Map: FOUNTAIN (X21B) Forestry District: 533
Latitude: 43 38' 38" Long: 92 14' 55" Last Obs.: 14 June 1995
Precision: approx. boundaries have been determined
Voucher: Verification: verified
MADERATE CLIFF WITH THICK-MOSSY OVERHANGS AND WET-DRIPPING ROCK SURFACES. NE ASPECT, WET-MESIC CLIFF AND TALUS WITH WHITE PINE AT PRECIPICE. TALUS TO 1/3 OF TOTAL HEIGHT. GALENA CLIFF UPPER HALF 5-10M HIGH. DRY, ROCKY STREAMBED AT BASE. CANOPY DOM BY ACER CF. NIGRUM, 50% COVER OVERALL, CROWNS 5-15M TALL. SHRUB COVER 50-75% COVER. TALUS COVERED WITH CYSTOPTERIS BULBIFERA, ADIANTUM PEDATUM & ARISAEMA TRIPHYLLUM. ECOLOGICAL QUALITY UNCERTAIN NEEDS SNAIL SURVEY.

Element: NORTHERN HARDWOOD-CONIFER FOREST (SOUTHEAST) #2
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: SATHER,N.; MORLEY,T.1977, CUSHING,E.J.
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W SWSW25 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 36' 18" Long: 92 13' 30" Last Obs.: August 1979
Precision: approx. boundaries have been determined
Voucher: Verification: verified
ON STEEP N FACING LIMESTONE CLIFF ABOVE CANFIELD CREEK. ABIES IS REPRODUCING. PINUS STROBUS, TAXUS CAN., JUNIPERUS VIRG., BETULA PAP., OSTRYA, TILIA ALSO PRESENT. KNOWN AS BIG SPRING'S BALSAM CLIFF. MAY INCLUDE MOIST CLIFF (DRIFTLESS AREA) COMMUNITY. HERITAGE FIELD SURVEY REQUIRED.

Element: NORTHERN HARDWOOD-CONIFER FOREST (SOUTHEAST) #4
S Rank: S2
EO Size: EO Rank: BC Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W SWSWNENW14 Wildlife Area: 510
Quad Map: FOUNTAIN (X21B) Forestry District: 533
Latitude: 43 38' 15" Long: 92 14' 35" Last Obs.: 09 June 1995
Precision: approx. boundaries have been determined
Voucher: Verification: verified
SMALL NORTHERN HARDWOODS CONIFER STAND ABOVE TALUS SLOPE ON LOWER-MIDDLE SLOPE WITH NORTH ASPECT. PINUS STROBUS CANOPY 25-50% COVER, CROWNS <35M TALL, TYPICAL DBH 50-65CM. ABIES BALSAMEA CANOPY 1-5% COVER, 2-10M TALL, DBH 10-15CM. DECIDU-OUS CANOPY 25-50% COVER, <20M TALL, TYPICAL DBH 15-25CM, COMMON LARGE TREES 40-55CM DBH: ACER SACCHARUM, FRAXINUS NIGRA & SOME BETULA ALLEGHANIENSIS. ECOTONAL HERBS MOSTLY DRY-MESIC WITH MESIC INCLUSIONS. DARK SILT, MOSS-COVERED TALUS.

Element: OAK FOREST (SOUTHEAST) DRY SUBTYPE #53
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNE27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 37" Long: 92 15' 40"
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 10 October 1994.
DRY OAK FOREST DOM BY QUERCUS MACROCARPA WITH CROOKED TRUNKS, ESPECIALLY ON SOUTH ASPECT SLOPES. Q.ALBA, Q.ELLIPSOIDALIS, PRUNUS SEROTINA & DYING JUGLANS CINEREA ON DEEPER SOIL OF RIDGE CRESTS. QUERCUS RUBRA & TILIA PREVALENT AT SLOPE BASE. OVERALL CANOPY 50-75% COVER, CROWNS 20-25M TALL, TYPICAL DBH 25-35CM, LARGE TREES OCCASSIONAL. SUBCANOPY DOM BY OSTRYA, 10M TALL, >75% COVER. RIBES 5-25% COVER. HERB LAYER ABSENT. W,S-ASPECT, 50% SLOPE, DARK CLAY LOAM & COBBLES.

Element: OAK FOREST (SOUTHEAST) DRY SUBTYPE #54
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSE19
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 5" Long: 92 19' 0"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 21 August 1995
DRY OAK FOREST, DRY LIMESTONE OUTCROPS & SMALL PRAIRIE OPENINGS ON STEEP, SOUTH FACING BLUFF OF SOUTH BRANCH ROOT RIVER. DOM BY QUERCUS ELLIPSOIDALIS WITH ULMUS SPP., OSTRYA AND QUERCUS MACROCARPA. THICK PATCHY SHRUB LAYER WITH BLACKBERRY BRAMBLES. OPEN AREAS WITH CAREX PENSYLVANICA. SMALL PRAIRIE OPENINGS, 5 X 10M AREA, WITH SCHIZACHYRIUM SCOPARIUM, SORGHASTRUM NUTANS, RATIBIDA LACINIATA, CEANOTHUS OVATA, PYCNANTHEMUM. UPPERSLOPES 2ND REGROWTH WITH RECENT STUMPS.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #248
S Rank: S2
EO Size: 30 acres EO Rank: AB Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1995); K.BOLIN & M.WHITE (DNR PARKS)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 50" Long: 92 13' 18"
Voucher: RELEVES Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 18 May 1995
OLD GROWTH MESIC OAK FOREST ON UPPER SLOPE & CREST OF RIDGE SPUR BETWEEN MEANDERS OF CANFIELD CREEK. SUPERCANOPY 50-75% COVER; CROWNS 25-35M TALL; TYPICAL DBH 50-65CM WITH OCCASSIONAL MAX SIZE TO 85CM DBH (QUERCUS RUBRA 57CM @ 115 RINGS); DOM BY Q.RUBRA, Q.ALBA W/ FREQUENT FRAXINUS AMERICANA & TILIA. CANOPY 50-75% COVER; 15-25M TALL; DBH 15-25CM; ACER SACCHARUM, CARYA CORDI-FORMIS, ULMUS AMERICANA, OSTRYA VIRGINIA. GOOD STRUCTURE & SPECIES DIVERSITY.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #274
S Rank: S2
EO Size: EO Rank: CD Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0E20
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 24" Long: 92 17' 35"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 21 August 1995
DRY MESIC OAK FOREST ON UPPER SLOPES & ROLLING CRESTS WITH MAPLE BASSWOOD FOREST ON STEEP N-W FACING SLOPES WITH GALENA OUTCROPS ABOVE FLOODPLAIN. CANOPY 70-85% COVER, CROWNS 15-25M TALL, EVEN-AGED STAND WITH MULTIPLE-TRUNKS, TYPICAL DBH 20-35 CM, INFREQ LARGE TREES 40-50CM DBH, DOM BY Q. RUBRA, Q. ELLIPSOIDALIS, & FRAXINUS AMERICANA, TILIA AMERICANA, JUGLANS NIGRA & GROVES OF BIG-TOOTHED ASPEN SUBCANOPY 50-75% COVER, 5-10M TALL. SHRUB LAYER 50-75% COVER. COMMON HERBS.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #275
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 30NW29SW20
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 3" Long: 92 18' 25"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 21 August 1995
SELECTIVELY CUT DRY-MESIC OAK FOREST ON SMALL RIDGES & GENTLE UPPER SLOPES DOM BY QUERCUS ALBA, Q.RUBRA WITH FRAXINUS AMERICANA, PRUNUS SEROTINA. SUGAR MAPLE DOM LOWER SLOPES & RAVINES. CANOPY 50-75% COVER, CROWNS 10-25M TALL. GAPS COMMON. DEAD SNAGS RARE. SUBCANOPY DOMINATES IN GAPS, 75% COVER, 10-20M TALL, DENSELY SHADING GROUND; DOM BY OSTRYA, ULMUS RUBRA, TILIA, FRAXINUS, ACER SACCHARUM & DYING JUGLANS CINEREA. SHRUB LAYER 5-25% COVER. FEW HERB SPECIES.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #280
S Rank: S2
EO Size: EO Rank: BC Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVYEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0N1312
Quad Map: FOUNTAIN (X21B)
Latitude: 43 39' 5" Long: 92 13' 25"
Precision: approx. boundaries have been determined
Voucher: RELEVE 1994 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 27 May 1994
POSSIBLE OLD GROWTH ON BROAD RIDGE CRESTS DISSECTED BY CREEK VALLEYS; INCLUDES 2 MILES OF THE EAST FACING BLUFF OF SOUTH BRANCH ROOT RIVER. CANOPY COMPOSITION AND QUALITY VARIES WITH TOPOGRAPHY, ASPECT AND PREVIOUS LAND USE HISTORY WHICH SELECTIVELY LOGGED SOME PORTIONS; MAY ALSO HAVE BEEN GRAZED. OVERALL CANOPY 80% COVER, CROWNS 20-30M TALL, MOST PREVALENT DBH 20-30CM; LARGE OAKS UP TO 81CM COMMON TO OCCASIONAL. GOOD STRUCTURE. HERB LAYER DEPAUPERATE.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #281
S Rank: S2
EO Size: EO Rank: BC Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W 0S0718
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 30" Long: 92 12' 0"
Precision: approx. boundaries have been determined
Voucher: RELEVES Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 15 August 1995
MESIC & DRY-MESIC OAK FOREST ON DISSECTED, BROAD RIDGE WHICH IS THE NORTHEAST FACING BLUFF OF SO BR ROOT RIVER & INCLUDES SMALL CREEK VALLEY. MIXED QUALITY VARIES WITH DENSITY OF LARGE TREES. CANOPY 80% COVER, RED & WHITE OAK CO-DOMINATE, IMMATURE TREES: DBH 25-35 CM WITH LARGE TREES COMMON IN SOME STANDS TO 65 CM. OCCASIONAL GAPS FROM STANDING SNAGS/TIP-UPS. SUBCANOPY <70% COVER W/ ACER, OSTRYA, & CELTIS. SHRUBS SPARSE. DIVERSE DRY-MESIC HERBS ABUNDANT.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #282
S Rank: S2
EO Size: EO Rank: BC Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994) & C. JUHNKE (DNR PARKS)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SE13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 7" Long: 92 12' 55"
Precision: approx. boundaries have been determined
Voucher: RELEVE 1994 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 September 1994
MESIC & DRY-MESIC FOREST ON NORTH TO NE-FACING BLUFF & ANCIENT BENCH TERRACES OF SO BRANCH ROOT RIVER. SUPERCANOPY (>25M TALL) VARIES FROM 50-75% COVER ON SANDY-SILT TERRACE TO 5-25% COVER ON STEEP UPPERSLOPE WITH ROCKY, SILT-CLAY LOAM. RED OAK COMMON WITH HIGH AMOUNTS OF MAPLE, BASSWOOD, WHITE ASH; LESSER AMOUNTS OF ASPEN & BIRCH (N'PIN OAK LOCALLY ABUNDANT BELOW W/ SOME BUR OAK). UNDERSTORY LAYERS GOOD. MOSTLY DRY-MESIC HERBS WITH MESIC HERBS AROUND UPLAND SPRINGS.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #283
S Rank: S2
EO Size: EO Rank: AB Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SE13NE24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 50" Long: 92 12' 40"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 May 1994
MATURE/OLD GROWTH, DRY-MESIC OAK FOREST DOM BY QUERCUS RUBRA & Q.ALBA. STRAIGHT BOLES COMMON, DBH 45-52 CM. STANDS WITH VARIOUS SIZE CLASSES AND NO STUMPS. SHRUB LAYER 25-50% COVER. ACER SACCHARUM IN SHRUB LAYER & SEEDLINGS. HERB LAYER 50-75% COVER DOM BY CAREX PENSLYVANICA WITH DRY-MESIC AND SOME MESIC HERBS. PINUS STROBUS STANDS INCLUDED IN AREA. SPRINGS EMERGING MIDSLOPE, BELOW TERRACE, AND FLOWING OVER TALUS FORMING POOLS OVER TERRACES ON THE LOWER SLOPE.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #284
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 2425
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 50" Long: 92 13' 18"
Voucher: RELEVE 1994 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 15 September 1994
MATURE MESIC OAK FOREST DOM BY QUERCUS RUBRA WITH ABUNDANT Q. ALBA & SOME POPULUS TREMULOIDES. CONTINUOUS CANOPY WITH TYPICAL DBH 35-45CM, LARGE TREES COMMON 50-60CM DBH. BEST BASAL AREA 140 SQ FT/ACRE. (Q.RUBRA 56 CM DBH @ 115 RINGS). SUBCANOPY WITH ABUNDANT ACER SACCHARUM, ALSO OSTRYA, CRATAEGUS, PRUNUS SEROTINA. SPARSE SHRUB LAYER. PATCHY HERB LAYER. AREAS WITH OLD FENCE. NW-ASPECT, CLAY LOAM WITH DEEP A HORIZON. EAST FACING BLUFF OF CANFIELD CREEK.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #285
S Rank: S2
EO Size: EO Rank: BC Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESE23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 2" Long: 92 14' 0"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 September 1994
MESIC TO DRY, EVEN-AGED, MATURING OAK FOREST ON BROAD RIDGE CREST DESCENDING TO NARROW RIDGE SPUR. CANOPY 80-90% COVER, CROWNS 30M TALL, TYPICAL DBH 25-30CM, DOM BY QUERCUS RUBRA, POPULUS TREMULOIDES, FRAXINUS AMERICANA, PRUNUS SEROTINA. SUBCANOPY 25-50% COVER, 10-15M TALL, DOM BY OSTRYA, CARYA CORDIFORMIS. SHRUB LAYER 50-75% COVER, 5M TALL, FRAXINUS, ULMUS & ACER NEGUNDO. NARROW RIDGE SPUR IS COVERED WITH YOUNG POPULUS GRANDIDENTATA SURROUNDING MATURE TREES AT CREST.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #286
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0E23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 20" Long: 92 13' 55"
Voucher: RELEVE 1994 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 September 1994
DRY MESIC FOREST ON NARROW RIDGE SPUR. INTERUPTED CANOPY 50-75% COVER, DOM BY QUERCUS RUBRA, Q. ALBA, BETULA PAPYRIFERA & FRAXINUS AMERICANA. TYPICAL DBH 20-30CM, LARGE TREES COMMON 30-40CM DBH; LARGER TREES HARVESTED. DEBRIS AND TIPUPS INFREQUENT, NO SNAGS. SUBCANOPY 50-75% COVER DOM BY OSTRYA. SEEDLING 5-25% COVER: VERY DIVERSE CANOPY SPECIES. MESIC TO DRY-MESIC HERBS. NW-ASPECT ABOVE GALENA LIMESTONE CLIFF, COBBLES & SILT LOAM THINLY COVERING BEDROCK, SINK HOLES.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #287
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NW27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 37" Long: 92 15' 40"
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 10 October 1994
DRY-MESIC OAK FOREST ON CREST DESCENDING ONTO NARROW RIDGE SPUR ABOVE ALGIFIC TALUS SLOPE. CANOPY 50-90% COVER, CROWNS 15-25M TALL, TYPICAL DBH 25-35CM, OCCASIONAL TO FREQUENT LARGE TREES 40-50CM, MULTIPLE-STEMMED OAKS; DOM BY Q. RUBRA, Q. ALBA, Q. ELLIPSOIDALIS, POPULUS TREMULOIDES & BETULA PAPYRIFERA. SUBCANOPY 50-75% COVER, 3-10M TALL, DOM BY OSTRYA, Q.ALBA, ACER SACCHARUM. SHRUB LAYER THICK WITH RIBES SPP. POOR HERB DIVERSITY, GRAZED, OLD STUMPS THROUGHOUT.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #288
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0E22
Quad Map: WYKOFF (X20A)
Latitude: 43 37' 35" Long: 92 15' 5"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 13 June 1995
MANAGED FOREST OF MOSTLY EVEN-AGED TREES EXCEPT IN RAVINES. CANOPY 70-85% COVER, TYPICAL DBH 25-35 CM, OCCASIONAL LARGE TREES TO 50-60CM DBH, DOM BY QUERCUS RUBRA, TILIA AMERICANA (MULTI-STEMMED), WITH STANDS OF POPULUS GRANDIDENTATA, ALSO JUGLANS CINEREA, Q.MACROCARPA, ACER SACCHARUM. OPEN CANOPY AREAS WITH THICK SHRUB LAYER & RANK HERBS. SNAGS RARE TO OCCASIONAL. SUBCANOPY 25-50% COVER, 5-10M TALL: CARYA CORDIFORMIS & ULMUS RUBRA. SHRUB LAYER 5-75%: CARPINUS, CORNUS.

Element: OAK FOREST (SOUTHEAST) MESIC SUBTYPE #296
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NE23NW24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 40" Long: 92 13' 40"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 27 May 1994
DRY OAK FOREST CO-DOMINATED BY QUERCUS MACROCARPA, Q.ALBA & Q.RUBRA WITH LESSER AMOUNTS OF TILIA AMERICANA & FRAXINUS AMERICANUS. CANOPY 70% COVER, CROWNS 10-15M TALL, DBH 20-30CM. SW-ASPECT, UPPER SLOPE NEAR CREST OF NARROW RIDGE. DARK, FRIABLE LOAM & COBBLESTONES. SUBCANOPY/SHRUB LAYER 50-75% BECOMING DENSE IN PLACES. HERBS: HELIANTHUS STRUMOSUS, GERANIUM MACULATUM, RHUS RADICANS, TAENIDIA INTEGERRIMA. DRY-MESIC FOREST PREVALENT ON COLLUVIAL SOIL OF LOWER SLOPES.

Element: OAK WOODLAND-BRUSHLAND (SOUTHEAST) #273
S Rank: S4
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SE22SW23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 8" Long: 92 14' 50"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 13 June 1995
WOODLAND BRUSHLAND ON THIN SOIL OVER BED ROCK & STEEP SOUTH FACING SLOPES, DOM QUERCUS ALBA & Q. MACROCARPA WITH JUNIPEUS VIRGINIANA. CANOPY 70% COVER, TYPICAL DBH 20-30CM, LARGER TREES INFREQ 35-45CM DBH. RIDGE CRESTS WITH DEEPER SOIL DOM BY Q. ELLIPSOIDALIS, CANOPY 50-75% COVER, 10-15M TALL, MULTIPLE STEMS. SUBCANOPY DOM BY OSTRYA VIRGINIANA. SHRUB LAYER PATCHY 25-50% COVER. HERB LAYER WITH CAREX PENSLYVANICA, PEDICULARIS CANADENSIS, LATHYRUS VENOSUS, KRIGIA SP.

Element: SEEPAGE MEADOW #14
S Rank: S3
EO Size: EO Rank: C Current Status: Intended Status:
Site: FOREST VILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. & LEE,M. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 8" Long: 92 13' 43"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 15 May 1995
TUSSOCK SEDGE DOMINATED MEADOW WITH SATURATED SOIL & SHALLOW POOLS. PERCHED ON FLOODPLAIN TERRACE. AT BASE OF SOUTH FACING SLOPE. RECEIVING GROUNDWATER FROM UPLAND SPRING EMERGING AT 1140 FT ELEVATION. PORTIONS OF THE MEADOW ARE OUTSIDE PARK. CAREX STRICTA DOMINATES WITH SCATTERED PLANTS OF CAREX LAEVIVAGINATA & OTHER GRAMINOIDS (GLYCERIA STRIATA, POA PALUSTRIS, CAREX STIPATA). THE FEW FORB SPECIES HAD LOW ABUNDANCE: CALTHA PALUSTRIS, PHYSOSTEGIA VIRGINIANA, CARDAMINE.

Element: SEEPAGE MEADOW #15
S Rank: S3
EO Size: EO Rank: C Current Status: Intended Status:
Site: FOREST VILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W 0WSE18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 7" Long: 92 11' 44"
Precision: approx. boundaries have been determined
Voucher: RELEVE 1994 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 16 August 1994
SEVERAL SEEPAGE AREAS AND SPRINGS ON GULLIES, BENCH TERRACES AND FLOODPLAIN OF CREEK VALLEY AT ABOUT 1120-1140FT ELEVATION. NESWSE18: SEEPAGE MEADOW, 70 X 20M AREA W/ POOLS & DIFFERENT SEDGE ZONES (CAREX STRICTA/ C. HAYDENII; C. LACUSTRIS; CAREX LANUGINOSA/C.PRAIREA/C.HYSTRICINNA & CALAMAGROSTIS). FORBS COMMON, E.G., SAXIFRAGA PENSLYVANICA, THELYPTERIS PALUSTRIS, CARDAMINE. ELSEWHERE: BLACK ASH & SKUNK CABBAGE; FRAXINUS NIGRA CANOPY 50% COVER, DBH 16-38CM WITH MARSH HERBS.

Element: SEEPAGE MEADOW #20
S Rank: S3
EO Size: EO Rank: BC Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSW24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 50" Long: 92 13' 18"
Voucher: RELEVE 1994 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 07 September 1994
OPEN WATER MARSH IN OXBOW SLOUGH FED BY SEEPS. DRAINAGEWAY TO SOUTHEAST INTO CANFIELD CREEK IS A DEGRADED WET MEADOW DOMINATED BY CAREX TRICHOCARPA WITH WEEDY COMPOSITES AND OTHER FORBS. MARSH BORDER DOM BY ZIZANIA AQUATILIS & CAREX LACUSTRIS. OXBOW IS OLD RIVER CHANNEL WITH STANDING WATER MAINTAINED BY SPRINGS. OPEN WATER DOM BY CHARA, A CALCIOPHILIC ALGAE. 200-300 METER LINEAR MARSH WITH EUPATORIUM PERFOLIATUM, IMPATIENS CF. PALLIDA, SAGITTARIA LATIFOLIA.

Element: TALUS SLOPE #5
S Rank: SU
EO Size: EO Rank: BC Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNWNE27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 48" Long: 92 15' 27"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 10 October 1994
WEAKLY ALGIFIC, DRIPPING OUTCROPS NEAR CREST WITH SOME VENTS. SEVERAL TIERS OF GALENA OUTCROPS: 3M TALL MIDSLOPE; AT BASE, WET MOSS-COVERED CLIFF 5M TALL. RAVINE ASCENDS SLOPE WITH STAIR-STEP, ROCK-LINED BED RECESSED INTO CLIFF WALL. N-ASPECT SLOPE, DARK, CLAY-SILT LOAM WITH COLLUVIAL HUMUS & COBBLES, 50-60% SLOPE. WET SEEP AREAS WITH MOSSES, CYSTOPTERIS. CANOPY 50% COVER, CROWNS 20-25M TALL, TYPICAL DBH 25-35 CM; FREQUENT LARGE TREES DOM BY TILIA AMERICANA, ACER.

Element: TALUS SLOPE #6
S Rank: SU
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NWSENW27 Wildlife Area: 510
Quad Map: CHERRY GROVE (X20D) Forestry District: 533
Latitude: 43 36' 44" Long: 92 15' 42" Last Obs.: 10 October 1994
Precision: approx. boundaries have been determined
Voucher: Verification: verified
MOSS COVERED CLIFF & TALUS WITH SEEP (4X30M AREA). WEEDY MESIC FLORA. WET AREAS DOM BY IMPATIENS.

Element: TALUS SLOPE ALGIFIC SUBTYPE #1
S Rank: S2
EO Size: 1 acres approx. EO Rank: Current Status: 1 Intended Status: 6
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T. (FINAL REPORT NORTHERN DRIFTLESS AREA SURVEY 1983)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W SWNE24 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 37' 26" Long: 92 12' 55" Last Obs.: 1982
Precision: approx. boundaries have been determined
Voucher: Verification: verified
THREE SLOPES (CORRESPONDING TO FREST MN6, MN7 MN8) OVERLOOKING THE SOUTH BRANCH OF THE ROOT RIVER. MN7 IS A SMALL NORTH-FACING GALENA SLOPE, MOSTLY FERN COVERED (NWSWNE). VENTS ARE VERY DIFFUSE, POORLY DEFINED AND UNEXPOSED. THICK SOIL COVER MN6 IS A NW-FACING, BI-LEVEL GALENA SLOPE (SWSWNE). VENTS ARE SMALL, VEGETATED. ABUNDANT ADOXA MOSCHATELLINA; ALSO RELICT VERTIGO SPP.

Element: TALUS SLOPE ALGIFIC SUBTYPE #2
S Rank: S2
EO Size: 1 acres approx. EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T. (FINAL REPORT NORTHERN DRIFTLESS AREA SURVEY 1983)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NWNWSE24 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 37' 16" Long: 92 13' 3" Last Obs.: 1982
Precision: approx. boundaries have been determined
Voucher: Verification: verified
LARGE AND UNDISTURBED SLOPE (CORRESPONDS TO FREST MN9) WITH WEAK CIRCULATION AND THICK SOIL COVER; VENTS MOSTLY DIFFUSE AND ILL-DEFINED. SINKHOLE TERRAIN EXTENDS CONSIDERABLE DISTANCE ONTO UP-LAND. NW-FACING BI-LEVEL SLOPE HIGH ABOVE SOUTH BRANCH OF ROOT RIVER. PLANT SPECIES ADOXA MOCHATELLINA AND SNAIL SPECIES VERTIGO HUBRICHTI OCCUR AT SITE.

Element: TALUS SLOPE ALGIFIC SUBTYPE #3
S Rank: S2
EO Size: EO Rank: B Current Status: 2 Intended Status: 28
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NWNWSE23 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 37' 8" Long: 92 13' 45" Last Obs.: 25 May 1982
Precision: approx. boundaries have been determined
Voucher: Verification: verified
LARGE, COMPLEX SLOPE WITH RATHER WEAK CIRCULATION. MUCH OPEN ROCK, SOME OVER-STEEP TALUS. SINKS EXTEND SEVERAL HUNDRED YARDS BACK INTO UPLAND FIELD. ABIES BALSAMEA, CHRYSOSPLENIUM IOWENSE, ADOXA MOSCHATELLINA AND PINUS STROBUS PRESENT. MUCH OF SITE GRAZED, PARTICULARLY EAST END. CORRESPONDS TO FREST #M18

Element: TALUS SLOPE ALGIFIC SUBTYPE #4
S Rank: S2
EO Size: EO Rank: A Current Status: 2 Intended Status: 28
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENWNW26
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 47" Long: 92 14' 50"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 25 May 1982
COMPLEX SITE WITH EXTENSIVE WEAK TALUS AT WEST END TO HIGH PERCHED SINSINAWA SEGMENT IN THE MIDDLE TO MOIST CLIFF ON EAST END. UPLAND SINKS TO ALGIFIC SLOPES PENETRATE 1/8 MI. VERY GOOD CHRYSOSPLENIUM IOWENSE AND GYMNOCARPIUM SITE. ALSO ABIES BALSAMEA AND SUCCINEA CHITTANGOENSIS (RELICT SNAIL SPP). FLOODPLAIN OF ROOT RIVER IS GRAZED, UPLAND IS FARMED TO BLUFF EDGE. ONE OF THE BEST EXAMPLES OF A FULL-SCALE GALENA SLOPE. CORRESPONDS TO FREST SITE #MN16.

Element: TALUS SLOPE ALGIFIC SUBTYPE #36
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSWSE24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 6" Long: 92 13' 3"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1982
VERY SMALL WEAK N-NE GALENA ALGIFIC SLOPE IN SMALL GULLY IN FORESTVILLE STATE PARK, ABOVE SOUTH BRANCH OF ROOT RIVER. LEGAL PUTS OCCURRENCE JUST EAST OF PARK BOUNDARY.

Element: TALUS SLOPE ALGIFIC SUBTYPE #37
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNWSE24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 12" Long: 92 13' 6"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1982
LARGE BUT WEAK BI-LEVELED GALENA ALGIFIC SLOPE (NW-FACING), IN FORESTVILLE STATE PARK, ABOVE SOUTH BRANCH OF ROOT RIVER. LEGAL PUTS OCCURRENCE JUST EAST OF PARK BOUNDARY.

Element: TALUS SLOPE ALGIFIC SUBTYPE #38
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESWSW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 18" Long: 92 13' 30"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1982
LARGE GOOD COMPOSITE GALENA ALGIFIC SLOPE ABOVE BIG SPRING. UPPER SLOPE IN ABIES STAND. PLANT SPECIES GYMNOCARPIUM ROBERTIANUM OCCURS AT SITE 300 FEET EAST OF SPRING. SNAIL SPECIES OF A LARGE UNIDENTIFIED SUCCINEID IS FOUND 50-100 FEET EAST OF SPRING ON EXPOSED TALUS AND AT BASE OF HIGH BLUFF. OTHER LANDSNAILS FOUND INCLUDE DISCUS CATSKILLENSIS, VERTIGO HUBRICHTI, V. OCCULTA AND VALLONIA GRACILICOSTA.

Element: TALUS SLOPE ALGIFIC SUBTYPE #39
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NWSESW25 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 36' 15" Long: 92 13' 22" Last Obs.: 1982
Precision: approx. boundaries have been determined
Voucher: Verification: verified
SMALL, BUT INTENSE EXPOSED AND PASTURED ALGIFIC SLOPE ON LOW GALENA KNOB JUST ABOVE FLOOD PLAIN. PLANT SPECIES GYMNOCARPIUM ROBERTIANUM COMMONLY OCCURS AT SITE.

Element: TALUS SLOPE ALGIFIC SUBTYPE #40
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NESESW25 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 36' 15" Long: 92 13' 15" Last Obs.: 1982
Precision: approx. boundaries have been determined
Voucher: Verification: verified
LARGE GALENA ALGIFIC SLOPE ON NORTH FACE OF FIRST TRIBUTARY TO THE NORTH OF BIG SPRING. PLANT SPECIES GYMNOCARPIUM ROBERTIANUM COMMONLY OCCURS AT SITE.

Element: TALUS SLOPE ALGIFIC SUBTYPE #41
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NESW25 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 36' 27" Long: 92 13' 16" Last Obs.: 1982
Precision: approx. boundaries have been determined
Voucher: Verification: verified
STREAM DRIFT ALGIFIC SLOPE AT BASE OF GALENA-PRAIRIE DU CHIEN SLOPE ON WEST SIDE OF CREEK.

Element: TALUS SLOPE ALGIFIC SUBTYPE #42
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NENESW25 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 36' 30" Long: 92 13' 12" Last Obs.: 1982
Precision: approx. boundaries have been determined
Voucher: Verification: verified
SMALL BIFURCATING GALENA ALGIFIC SLOPE UP SMALL TRIBUTARY NEAR MAJOR BRANCH. VERY FEW LANDSNAILS WERE NOTICED ALIVE AT SITE. A GOOD B. PAPYRIFERA POPULATION WAS FOUND.

Element: TALUS SLOPE ALGIFIC SUBTYPE #43
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W 0ESENW25 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 36' 40" Long: 92 13' 15" Last Obs.: 1982
Precision: approx. boundaries have been determined
Voucher: Verification: verified
MODERATE-SIZED GALENA ALGIFIC SLOPE ABOVE MAIN CREEK. PLANT SPECIES B. PAPYRIFERA AND G. ROBERTIANUM OCCUR AT SITE IN LARGE POPULATIONS.

Element: TALUS SLOPE ALGIFIC SUBTYPE #44
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W 0WNENW25 Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) Forestry District: 533
Latitude: 43 36' 35" Long: 92 13' 20" Last Obs.: 1982
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DRIFT AT BASE OF WEAK GALENA ALGIFIC SLOPE; NW-FACING.

Element: TALUS SLOPE ALGIFIC SUBTYPE #46
S Rank: S2
EO Size: EO Rank: Current Status: 8 Intended Status: 8
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: The Nature Conservancy
Managed Area(s): SAXIFRAGE HOLLOW R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W NWNWSE21 Wildlife Area: 510
Quad Map: CHERRY GROVE (X20D) Forestry District: 533
Latitude: 43 37' 18" Long: 92 16' 38" Last Obs.: 1982
Precision: approx. boundaries have been determined
Voucher: Verification: verified
LARGE COMPOSITE GALENA ALGIFIC SLOPE ALONG ROOT RIVER. LARGE POPULATIONS OF PLANT SPECIES CHRYSOSPLENIUM IOENSE AND ADOXA MOSCHATELLINA OCCUR AT SITE.

Element: TALUS SLOPE ALGIFIC SUBTYPE #65
S Rank: S2
EO Size: EO Rank: A Current Status: 1 Intended Status: 9
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. & M.LEE (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN DNR Region: 5
Legal : T102N R12W 0N0NNW27 Wildlife Area: 510
Quad Map: CHERRY GROVE (X20D) Forestry District: 533
Latitude: 43 36' 54" Long: 92 15' 51" Last Obs.: 05 October 1994
Precision: approx. boundaries have been determined
Voucher: RELEVES Verification: verified
NORTH FACING SLOPE ABOUT 1/3 MILES IN LENGTH ALONG THE S BRANCH ROOT RIVER. A COMPLEX OF ALGIFIC TALUS SLOPES, MADERATE CLIFFS, RESURGENT SPRING & NORTHERN HARDWOOD CONIFER FOREST WITH WHITE PINE, YELLOW BIRCH & SOME BALSAM FIR. ELEVATION 1130-1200FT INCLUDING 30 FT HIGH, FRACTURED-LIMESTONE CLIFF WITH COLD-AIR VENTS (PROSSER/STEWARTVILLE FORMATION). SEVERAL AREAS OF COLD, MOSS-COVERED TALUS: CHRYSOSPLENIUM, MITELLA NUDA, RIBES HUDSONIANUM, GYMNOCARPIUM ROBERTIANUM

Element: TALUS SLOPE ALGIFIC SUBTYPE #66
S Rank: S2
EO Size: EO Rank: AB Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: ZAGER,S. & LEE,M.(CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSENWSW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 20" Long: 92 13' 35"
Precision: approx. boundaries have been determined
Voucher: RELEVE 1995 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 May 1995
ALGIFIC TALUS SLOPE ON UPPER SLOPE, NEAR CREST OF NORTHWARDLY DESCENDING, NARROW RIDGE-SPUR WHICH FORMS A PORTION OF THE BLUFF OF AN ANCIENT, WIDE MEANDER OF CANFIELD CREEK. E-ASPECT, SUPER-STEEP 125% SLOPE, ELEVATION ABOUT 1230 FT, NEAR THE PROSSER/STEWARTVILLE INTERFACE OF THE GALENA LIMESTONE GROUP. ABOVE 50 FT CLIFF WITH INTERMITTENT, RESURGENT SPRING AT BASE. VERY COLD, SILTY SOIL & AIR VENTS WITH RHAMNUS ALNIFOLIA, RIBES HUDSONIANUM, RUBUS STRIGOSUS.

Element: TALUS SLOPE ALGIFIC SUBTYPE #67
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: BOLIN,K., WHITE,M. & ZAGER,S.(CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0ENWNW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 53" Long: 92 13' 33"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 September 1995
SMALL, WEAKLY ALGIFIC TALUS SLOPE AT BASE OF EAST-FACING BLUFF FORMING BANK OF CANFIELD CREEK. TALUS ABOUT 7 X 10 METER AREA WITH 80% SLOPE, THINLY COVERED WITH WET-MESIC PEAT SOIL. THIS IS NEXT TO MOSS-COVERED, GALENA LIMESTONE CLIFF BELOW A STAND OF WHITE PINES. CIRCAEA ALPINA, RUBUS STRIGOSUS, ASTER PRENANTHOIDES, BLEPHILA HIRSUTA, POLYMNIA CANADENSIS, EUPATORIUM RUGOSUM. ALSO WITH A MEDIUM SIZED POPULATION OF ALLIUM CERNUUM (PLANTS CA 100'S).

Element: TALUS SLOPE ALGIFIC SUBTYPE #76
S Rank: S2
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNESW30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 19" Long: 92 19' 4"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 29 September 1983
ON LOWER, N-FACING SLOPE ABOVE ROOT RIVER, EAST OF SMALL CREEK VALLEY. GALENA LIMESTONE: WISE-LAKE AND SMALL PATCH OF SINSINAWA SLOPE. OPEN CANOPY & MOSS COVERED W/ NO LITTER. VENTS SMALL & ALL COVERED. SINK-HOLES & FISSURES EXTEND 200 YARDS INWARD. UPLAND GRAZED TO SLOPE EDGE. LITTLE CANOPY BUFFER, BUT CREEK VALLEY OK; UPLAND BADLY GRAZED. INTERESTING SMALL SITE WITH LIMITED FLORA. NEEDS FURTHER SURVEY FOR SNAILS & PLANTS. LARGE EQUISETUM SCIRPOIDES POPULATION.

Element: TALUS SLOPE ALGIFIC SUBTYPE #78
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995) & M.WHITE, K.BOLIN (DNR PARKS)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 57" Long: 92 13' 36"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 16 August 1995
SMALL AREA OF MILDLY ALGIFIC TALUS OR WET-MESIC TALUS. NE-ASPECT, UPPER SLOPE NEAR CREST, WITHIN GULLY OF CONVEX SLOPE & RIDGE AT MOUTH OF SMALL, FORKED RAVINE (JOINING BLUFF OF CANFIELD CREEK). DARK SILTY COLLUVIUM WITH RICH HUMUS COVERING COBBLES. BENEATH GALENA LIMESTONE OUTCROPS.

Element: TALUS SLOPE ALGIFIC SUBTYPE #79
S Rank: S2
EO Size: EO Rank: BC Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESWNE15
Quad Map: WYKOFF (X20A)
Latitude: 43 38' 19" Long: 92 15' 11"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 02 June 1995
DRY TO WET-MESIC TALUS, THICKLY COVERED WITH FEATHERMOSS, LIVERWORTS & DIMINUITIVE CYSTOPTERIS BULBIFERA. DRY RUBBLE BORDERS EITHER SIDE WITH BOULDERS AND PLATY LIMESTONE. SEVERAL COLD PRODUCING VENTS WITH ICE. RUBBLE COVERED WITH DARK SILTY COLLUVIUM, STEEP 125% SLOPE. ALGIFIC PORTION SMALL CRESCENT 15X25M AREA. NEAR LARGE RESURGENT SPRING. ABOVE IS MOIST CLIFF, 10-20M TALL WITH CREVICES, RECESSES, AND SEVERAL LEDGES. OPEN FISSURES HAVE STRONG, COLD BREEZE.

Element: TALUS SLOPE ALGIFIC SUBTYPE #80
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0NSW14
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 15" Long: 92 14' 46"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 02 June 1995
TWO SMALL ALGIFIC SLOPES EACH ABOUT 30-40M LONG. MOIST TALUS, COLD VENTS AND GROUNDWATER SEEPS BELOW ON FLOODPLAIN. MOIST CLIFFS 2-7M TALL, BALSAM FIR ABOVE SLOPE. COOL AIR PULSATING FROM VENTS. TALUS THICKLY COVERED WITH FEATHER MASS.

Element: WHITE PINE-HARDWOOD FOREST (SOUTHEAST) MESIC SUBTYPE #20
S Rank: S2
EO Size: EO Rank: B Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENWNE24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 43" Long: 92 12' 55"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 May 1994
IN WHITE PINE-HARDWOOD FOREST DOMINATED BY QUERCUS ALBA WITH Q. MACROCARPA AND Q. RUBRA COMMON. WHITE PINE 10-30% CANOPY, LARGE TREES TO 65CM DBH. DECIDUOUS CANOPY 70-85% COVER. FEW SHRUBS. COMMON MESIC FORBS: ASARUM CANADENSE, SANGUINARIA CANADENSIS. WHITE PINES ON THIN SOIL OVER BEDROCK. UPPER SLOPE, ELEV 1200-1240 FT, NE-ASPECT, SLOPE 70% GRADE EXCEPT ON BENCH TERRACE, DRY-MESIC SILT, FRACTURED, PLATY DOLOMITE (PROSSER LIMESTONE).

Element: WHITE PINE-HARDWOOD FOREST (SOUTHEAST) MESIC SUBTYPE #21
S Rank: S2
EO Size: EO Rank: BC Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 50" Long: 92 13' 18"
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 May 1995
MATURING WHITE PINE IN SCATTERED STANDS ON CLIFF EDGES AND OTHER AREAS WITH THIN SOIL OVER BEDROCK. PINE CANOPY 10-50% COVER, DBH 30-45CM. ASSOCIATED WITH NORTHERN HARDWOOD CONIFER FOREST AND ALGIFIC SLOPES. USUALLY ON UPPERSLOPES ON DRY TO DRY MESIC SOIL WITH QUERCUS MACROCARPA OR WITH BETULA ALLEGHANIENSIS ON ROCK OUTCROPS NEAR WET-MESIC SOILS.

Element: WHITE PINE-HARDWOOD FOREST (SOUTHEAST) MESIC SUBTYPE #22
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. & M.LEE (CO BIOL SURVEY 1994)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSW22
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 2" Long: 92 16' 0"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 11 August 1994

WHITE PINE HARDWOOD FOREST IMMATURE AND SELECTIVELY LOGGED. ON CREST ABOVE 5 M TALL GALENA CLIFF. PINE CANOPY 25% COVER, CROWNS 20-30M TALL, TYPICAL DBH 30-40CM, RARE LARGE TREES 50-60CM DBH. DECIDUOUS CANOPY 50-75% COVER, 10-20M TALL, TYPICAL DBH 20-30 CM, SOME RECENT SELECT CUTTING & FREQ STUMPS. SUBCANOPY 25-50% COVER, 5-10M TALL. SHRUB LAYER 50-75% COVER, 2-5M TALL W/ DIRCA PALUSTRIS & CARPINUS. RANK HERB LAYER: OSMUNDA CLAYTONIANA & ATHYRIUM ANGUSTUM ABUND.

Element: WHITE PINE-HARDWOOD FOREST (SOUTHEAST) MESIC SUBTYPE #23
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NW14
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 28" Long: 92 14' 42"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 09 June 1995

WHITE PINE HARDWOODS ON WEST ASPECT CREST OF DRY CLIFF. PINE 30-50 CM DBH, CROWNS 20-30M TALL, ALSO WITH JUNIPERUS VIRGINIANA. DECIDUOUS CANOPY 75% COVER, 5-10M TALL, DOM BY QUERCUS MACROCARPA, BETULA PAPYRIFERA, QUERCUS ELLIPSOIDALIS. SUBCANOPY 50% COVER, FILLING GAPS CREATED BY LOGGING. SEVERAL SNAGS PRESENT. DRY-MESIC HERBS WITH CAREX PENSYLVANICA DOM, ALSO WITH VIOLA PEDATA & ANEMONE VIRGINIANA.

Element: WHITE PINE-HARDWOOD FOREST (SOUTHEAST) MESIC SUBTYPE #24
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENE15
Quad Map: WYKOFF (X20A)
Latitude: 43 38' 38" Long: 92 15' 2"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 June 1995

PARTIALLY GRAZED WHITE PINE HARDWOODS. PINE CANOPY 10-20% COVER, CROWNS 30-35M TALL, DBH 22-46CM. DECIDUOUS CANOPY 75% COVER, TYPICAL DBH 30-40CM, DOM BY QUERCUS RUBRA (MANY CROOKED TRUNKS) & BETULA PAPYRIFERA WITH ABUNDANT Q.ALBA AND SOME ACER SACCHARUM. SUBCANOPY >75% COVER DOM BY OSTRYA. SHRUB LAYER 1-5% COVER WITH RIBES SPP., CORYLUS AMERICANA & JUNIPERUS COMMUNIS. DRY-MESIC HERBS: CAREX PENSLYVANICA, GERANIUM MACULATUM, GALIUM COCCINEUM, SILENE STELLATA

Element: WHITE PINE-HARDWOOD FOREST (SOUTHEAST) MESIC SUBTYPE #25
S Rank: S2
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S. (CO BIOL SURVEY 1995)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SW14
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 7" Long: 92 14' 42"
Precision: approx. boundaries have been determined
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 09 June 1995

FORMERLY GRAZED, WHITE PINE ON THIN SOIL OVER LIMESTONE OF NARROW RIDGE-SPURS & ABOVE CLIFFS. PINE COVER 5-25%, MOSTLY SCATTERED TREES, TYPICAL DBH 20-35CM, CROWNS 30M TALL. GROVES OF POPULUS GRANDIDENTATA. SUBCANOPY 75% COVER, 7M TALL DOM BY OSTRYA. SHRUBS SPARSE. GRASSES SPARSE BENEATH SMALL ELMS AND PINES. INACCESSIBLE AREAS WITH PRAIRIE REMNANTS WITH POA PRETENSIS, CAREX PENSYLVANICA, AMORPHA CANESCENS, LITHOSPERMUSM CANESCENS, PHLOX PILOSA, LESPEDEZA CAPITATA.

Appendix 1c

APPENDIX 1C: RARE PLANT SPECIES RECORDS WITHIN THE
FORESTVILLE/MYSTERY CAVE ECOLOGICAL AREA
MnDNR, Natural Heritage and Nongame Research Program

Element: ADOXA MOSCHATELLINA (MOSCHATEL) #19
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: 8 Intended Status: 9
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: The Nature Conservancy
Managed Area(s): SAXIFRAGE HOLLOW R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(6116)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNE21
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 26" Long: 92 16' 36"
Precision: within 0.25 mile, confirmed
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: June 1982
Voucher: MIN Verification: verified
IN VALLEY OF SOUTH BRANCH ROOT RIVER, CA 2.5 MILES NORTH OF CHERRY GROVE. LOCALLY ABUNDANT ON N-FACING ALGIFIC TALUS SLOPE IN GALENA FORMATION OUTCROP. WITH CHRYSOSPLENIUM IOWENSE, CYSTOPTEROUS BULBIFERA. SWNE SEC 21, T102N R12W.

Element: ADOXA MOSCHATELLINA (MOSCHATEL) #40
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: 2 Intended Status: 28
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(10075)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESE23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 14" Long: 92 13' 56"
Precision: within 0.25 mile, confirmed
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 03 May 1985
Voucher: MIN Verification: verified
OCCASIONAL ON ALGIFIC TALUS SLOPE AT BASE OF NW-FACING BLUFF OVERLOOKING SOUTH BRANCH ROOT RIVER, CA 3 MILES N-NW OF GREENLEAFTON. WITH CHRYSOSPLENIUM IOWENSE. SW1/4 NE1/4 SE1/4 SEC 23; T102N R12W.

Element: ADOXA MOSCHATELLINA (MOSCHATEL) #41
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: 2 Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(10085)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENW26
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 55" Long: 92 14' 35"
Precision: within 0.25 mile, confirmed
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 03 May 1985
Voucher: MIN Verification: verified
FREQUENT ON ALGIFIC TALUS SLOPE AT BASE OF N-NW-FACING BLUFF OVERLOOKING SOUTH BRANCH ROOT RIVER, CA 3 MILES N-NW OF GREENLEAFTON. NW1/4 NE1/4 NW1/4 SEC 26 T102N R12W.

Element: ADOXA MOSCHATELLINA (MOSCHATEL) #49
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.(SIGHT RECORD)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNWSE24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 16" Long: 92 13' 3"
Precision: within 0.25 mile, confirmed
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1982
Voucher: Verification: sight or sound rec.
PLANT SPECIES OCCURS ON ALGIFIC TALUS SLOPE #2.

Element: ADOXA MOSCHATELLINA (MOSCHATEL) #99
State Status: SPECIAL CONCERN
EO Size: EO Rank: BC Current Status: 0 Intended Status: 7
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D., ZAGER,S.C. & OSTLIE,W.(MDL908)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENW27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 54" Long: 92 15' 40"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 19 May 1995
INFREQUENT ON ALGIFIC TALUS SLOPE ALONG SOUTH BRANCH ROOT RIVER, 2.25 MILES NE OF CHERRY GROVE. IN COOL, MOIST, ORGANIC SOIL. UNDER SPARSE CANOPY OF BETULA LUTEA. ASSOC W/ CHRYSOSPLENIUM IOWENSE, CIRCAEA ALPINA, CYSTOPTERIS BULBIFERA, SAXIFRAGA FORBESII, CRYPTOGRAMMA STELLERI, RIBES HUDSONIANUM, RHAMNUS ALNIFOLIA. FULL BLOOM. OCCURS ALONG 1/3 MILE STRETCH ON EXTENSIVE ALGIFIC SLOPE WITH MANY NORTHERN SPECIES.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #26
State Status: THREATENED
EO Size: EO Rank: B Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: LEE,M.D.(MDL 725)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWNE07
Quad Map: FOUNTAIN (X21B)
Latitude: 43 39' 15" Long: 92 11' 54"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 25 July 1994
OCCAS ON GENTLE, NW-FACING OAK-FOREST SLOPE ALONG S BRANCH ROOT RIVER, 1.25 MI NE OF FORESTVILLE TOWNSITE. POP IN NARROW BAND FROM TOP OF 3M CLIFFS AT RIVER LEVEL BACK 10M UPSLOPE ALONG 200M STRETCH. UNDER VARIED DECIDUOUS CANOPY IN SANDY-SILT SOIL. SLOPE VARIES 5-20 DEG. ASSOC: ASARUM CANA, SOLIDAGO FLEXI, ASTER PRENAN, GALIUM CONCIN, RHUS RADIC. 150-200 PLANTS, FULL BLOOM. THREAT FROM PROPOSED BIKE TRAIL FROM FORESTVILLE SPK TO PRESTON PASSING THROUGH POPULATION.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #27
State Status: THREATENED
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D.(MDL 724)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W NWNW18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 40" Long: 92 12' 31"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 25 July 1994
LOCAL AT BASE OF 200 FT, WNW-FACING OAK FOREST SLOPE ALONG SOUTH BRANCH ROOT RIVER, 1/3 MI E OF FORESTVILLE TOWNSITE. IN MOIST SILTY-CLAY, 1-2M ABOVE STREAM LEVEL ALONG 25M STRETCH. ASSOC WITH CAREX SPRENGELLII, SOLIDAGO FLEXICANDIS, GERANIUM MACULATUM, RANUNCULUS HISPIDUS, GALIUM CONCINNUM. 20-30 PLANTS. CANOPY OF ACER SACCHARUM ALONG STREAM. MOST PLANTS VEGETATIVE, 10% FULL BLOOM. PLANTS SOMEWHAT DEPAUPERATE HERE. PRECISE LOC ON EOR.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #28
State Status: THREATENED
EO Size: EO Rank: BC Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D.(MDL 789)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSE23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 7" Long: 92 14' 4"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 09 August 1994
INFREQUENT ON UPPER SLOPE ABOVE ALGIFIC TALUS SLOPE IN MAPLE-BASSWOOD FOREST UNDER CANOPY OF BETULA PAPYRIFERA AND THICK UNDERSTORY OF CORNUS RUGOSA. IN SMALL RAVINE JUST OFF SOUTH BRANCH ROOT RIVER. NORTH & NORTHEAST ASPECT, 30 DEG SLOPE. IN RICH ORGANIC SILT AMONGST MOSSY TALUS. ASSOC WITH CYSTOPTERIS BULBIFERA, MAIANTHEMUM CANADENSE, ASARUM CANADENSE, MITELLA DIPHYLLA, DIERVILLA LANICERA. 50-75 PLANTS IN 5 X 30M BAND IMMEDIATELY UPSLOPE FROM ALGIFIC VENTS.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #29
State Status: THREATENED
EO Size: EO Rank: BC Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 771)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SW30SWNW30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 36" Long: 92 19' 30"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 August 1994

OCCASIONAL, LOCALLY COMMON, ALONG 1/3 MI OF SOUTH BRANCH ROOT RIVER. 75-100 PLANTS TOTAL ON LOWER SLOPE OF 80 FT NE & NW-FACING SLOPES. POPULATION BISECTED BY MAJOR RAVINE FROM SOUTH. ASSOC WITH CAREX DEWEYANA, C. BLANDA, C. CONVOLUTA, C. PECKII, SOLIDAGO FLEXICAULIS, CYSTOPTERIS BULBIFERA. IN GRAZED & RECENTLY PARTIALLY CUT MAPLE-BASSWOOD FOREST. DARK, SILTY-CLAY SOIL. SLOPE RANGES FROM 10-45 DEG. MANY PLANTS ON LUSH, MOSSY TALUS SLOPE. PRECISE LOC ON EOR.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #47
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(24041)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWNW18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 25" Long: 92 12' 27"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 May 1994

ALONG SMALL STREAM IN HARDWOOD SEEP, WITH CALTHA PALUSTRIS, SYMPLOCARPUS FOETIDUS. ONE COLONY SEEN, WITH SEVERAL HUNDRED PLANTS; ALL STERILE.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #48
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status: 9
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(941005-1)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNWNE27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 48" Long: 92 15' 29"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 05 October 1994

IN MOIST TALUS OF SELECTIVELY CUT MAPLE BASSWOOD FOREST DOMINATED BY TILIA AMERICANA, 50-75% CANOPY. N-ASPECT, LOWER MIDSLOPE, (BELOW SOLID LIMESTONE OUTCROPS). ROCK TALUS AND RUBBLE GALENA STONE. RICH HUMUS, SILTY COLLUVIUM. 50 PLANTS WITH NEW SHOOTS. ASSOCIATES: ACTAEA RUBRA, ASARUM CANADENSE, HEPATICA ACUTILOBA, MITELLA DIPHYLLA.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #49
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(940517-3)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSWSE13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 59" Long: 92 13' 41"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 May 1994

IN MATURING MAPLE BASSWOOD FOREST DOMINATED BY ACER SACCHARUM, DBH 20-35 CM AND TILIA, 8-15 CM DBH. GAP CREATED BY DEAD ULMUS. W-ASPECT, 8% GRADE, SLOPE BASE, DARK CLAY SILT LOAM (MOIST FROM ADJACENT SEEP) ROCKY TALUS. 50 PLANTS WITHIN 25 METER AREA AND FREQUENT AROUND SEEP AREA AT FOOTSLOPE. ASSOCIATES: ANEMONE QUINQUEFOLIA, CAREX PEDUNCULATA, DICENTRA CUCULLARIA, POLEMONIUM REPTANS, MITELLA DIPHYLLA.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #50
State Status: THREATENED
EO Size: | EO Rank: | Current Status: | Intended Status:
Site: FORESTVILLE PARK | CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: JUHNKE,C.M.(167)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENESW24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 22" Long: 92 13' 12"
Precision: within 0.25 mile, confirmed
Voucher: | Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 May 1994

1991: WOODS EDGE ON RIVER FLAT AT BASE OF STEEP NW-FACING SLOPE WITH TREFOIL, LYCHNIS, VERVAIN, CLEARWEED. 1994: RE-OBSERVATION BY S. ZAGER OF CHARLES JUHNKE COLLECTION #167. LOWLAND HARDWOOD FOREST ON ALLUVIUM AT BASE OF NE ASPECT SLOPE.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #51
State Status: THREATENED
EO Size: | EO Rank: | Current Status: | Intended Status:
Site: CANFIELD CREEK | CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(950816-1)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENWNWNW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 55" Long: 92 13' 31"
Precision: within 0.25 mile, confirmed
Voucher: MIN | Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 16 August 1996

ALGIFIC TALUS SLOPE (C-RANKED) VEGETATION AT BASE ALONG CREEK, EAST ASPECT, 80% GRADE. TALUS WITH WET-MESIC PEATY SOIL (NOT THICK). ON TALUS, LOWER SLOPE NEAR EDGE OF STREAM. BENEATH CANOPY OF SHRUBBY FRAXINUS NIG, STAPHYLEA TRIF. IN VICINITY OF ROCK OUTCROPS. 100 PLANTS, POST-BLOOM & SETTING SEED, SENESCENT PLANTS & OTHERS WITH EMERGING LEAVES (NEXT YEAR'S GROWTH?). ASSOC SPP: ARALIA RACE, PARTHENOCISSUS INSER, CYSTOPTERIS BULB. (PREV COLL: ZAGER (940906-2) MIN).

Element: ALLIUM CERNUUM (NODDING WILD ONION) #52
State Status: THREATENED
EO Size: | EO Rank: | Current Status: | Intended Status: 1
Site: CANFIELD CREEK | CBS Site #: 17
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: ZAGER,S.(940914-1)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESWNESW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 22" Long: 92 13' 18"
Precision: within 0.25 mile, confirmed
Voucher: MIN | Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 September 1994

IN BALSAM FIR-MAPLE BASSWOOD FOREST (NORTHERN CONIFER HARDWOOD FOREST) 300 FT DOWNSTREAM FROM SPRING. ON TALUS SLUMP BECOMING RE-VEGETATED. W-ASPECT, ELEVATION 1130-1150 FT, LOWER SLOPE, STEEP 100% SLOPE (70% GRADE OVERALL), SILTY CLAY LOAM & COBBLES. 15 VEGETATIVE PLANTS IN 2 X 2 METER AREA. EXTENSIVE POPULATION EXTENDS 1/4 MILE DOWNSTREAM TO NEXT SIDE RAVINE. ASSOCIATES: GALIUM CONCINNUM, CYSTOPTERIS BULBIFERA, ASARUM CANADENSIS, HYDROPHYLLUM VIRGINIANUM.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #61
State Status: THREATENED
EO Size: | EO Rank: | Current Status: | Intended Status:
Site: FORESTVILLE CREEK | CBS Site #: 18
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(950614-1)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0NNESE10
Quad Map: WYKOFF (X20A)
Latitude: 43 39' 4" Long: 92 15' 7"
Precision: within 0.25 mile, confirmed
Voucher: MIN | Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 June 1995

2 MI WEST OF FORESTVILLE STATE PARK. IN SMALL MAPLE-BASSWOOD FOREST. CANOPY 85% COVER, CROWN 25 METERS HIGH, MOST PREVALENT DBH 40-45CM. DENSE UNDERSTORY OF ACER SACCHARUM. N-ASPECT, LOWER SLOPE, DARK CLAYEY SILT, COMPACTED. VEGETATIVE PLANTS 200-300 ALONG FOOTSLOPE PERIPHERAL TO WET-MESIC TALUS. ASSOCIATES: CAULLOPHYLLUM THALICTROIDES, ASARUM CANADENSE, GERANIUM MACULATUM, ARISAEMA TRIPHYLLUM, ADIANTUM PEDATUM.

Element: ALLIUM CERNUUM (NODDING WILD ONION) #71
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: ZAGER,S.(950504-1)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0ENW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 44" Long: 92 13' 19"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 May 1995
IN CANFIELD CREEK FOREST LAND, FORESTVILLE STATE PARK. IN LOWLAND HARDWOOD FOREST DOMINATED BY ACER NEGUNDO. MOST PREVALENT DBH 30-40CM, OPEN CANOPY 50% COVER. NO UNDERSTORY LAYERS. AT BASE OF WEST ASPECT BLUFF, SLOPE 0-50% GRADE, FOOTSLOPE-LOWER SLOPE, DARK SILTY LOAM. TEN VEGETATIVE PLANTS IN ONE CLUSTER, NUMEROUS SCATTERED SMALL CLUSTERS. ASSOCIATES: ALLIUM BURDICKII, PODOPHYLLUM PELTATUM, HYDROPHYLLUM VIRGINIANUM, CAULOPHYLLUM THALICTROIDES, DENTARIA.

Element: ARABIS LAEVIGATA (SMOOTH ROCK-CRESS) #3
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(6119)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENE20
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 24" Long: 92 17' 22"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: June 1982
SOUTH SIDE OF SOUTH BRANCH ROOT RIVER, ABOUT 2.5 MILES N OF CHERRY GROVE. INFREQUENT ON N-FACING WOODED SLOPE. SENE SEC 20, T102N R12W.

Element: ARABIS LAEVIGATA (SMOOTH ROCK-CRESS) #23
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: ZAGER,S. (SIGHT RECORD)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNWSW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 23" Long: 92 13' 20"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 September 1994
100 YARDS EAST OF CANFIELD CREEK SOURCE OF BIG SPRING. IN MESIC NORTHERN HARDWOOD CONIFER FOREST. WET-MESIC COLLUVIUM, DARK ORGANIC SILT, COBBLY TALUS, GALENA OUTCROPS. SW-ASPECT, GRADE 100% SLOPE, ELEVATION 1250 FT, UPPER SLOPE. SCATTERED PLANTS IN RELEVE. ASSOCIATES: ARABIS SHORTII, ALLIUM CERNUUM, IMPATIENS PALLIDA, MIANTHEMUM CANADENSIS.

Element: ARISAEMA DRACONTIUM (GREEN DRAGON) #30
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: JUHNKE,C. (PHOTO RECORD)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESESE19
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 2" Long: 92 18' 31"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 08 July 1993
MOIST WOODS ON GRADUAL WEST-FACING SLOPE EAST OF HISTORIC ENTRANCE TO MYSTERY CAVE; WITH JACK-IN-THE PULPIT.

Element: ASTER PILOSUS (WHITE HEATH ASTER) #4
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: TENNEY,M.(586)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESENW24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 25" Long: 92 13' 13"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 03 September 1982
S/SW-FACING OPEN SLOPE, OPEN WITH ASTER SP, SOLIDAGO SP, LESPIDEZA CAPITATA, AND GRASSES. (S.C. ZAGER: COORDINATES DON'T MATCH AREA DESCRIPTIONS; THERE ARE NO S/SW-FACING SLOPES. 1996).

Element: ATHYRIUM THELYPTERIOIDES (SILVERY SPLEENWORT) #34
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(940516-2)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESW12
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 50" Long: 92 13' 16"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 16 May 1994
MAPLE BASSWOOD FOREST DOMINATED BY HETEROGENEOUSLY AGED, MATURING ACER SACCHARUM, ULMUS RUBRA, CANOPY 15 METERS HEIGHT, 40 CM DBH. SUBCANOPY 75% COVER WITH ULMUS & ACER. N-ASPECT, BASE SLOPE (1100 FEET ELEVATION) DARK CLAY SILT, COLLUVIUM, FRIABLE, WELL-DRAINED. 20-25 PLANTS IN 50 METER AREA. PRUNUS VIRGINIANA (SEEDLING), ARISAEMA TRIPHYLLUM, ISOPYRUM BITERNATUM, GERANIUM MACULATUM.

Element: CACALIA MUEHLENBERGII (GREAT INDIAN-PLANTAIN) #5
State Status: No Legal Status
EO Size: EO Rank: BC Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 803)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESE23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 16" Long: 92 13' 59"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 11 August 1994
DOZEN PLANTS IN PASTURED AREA ALONG SOUTH BRANCH ROOT RIVER 1/4 MI DOWNSTREAM FROM TWP ROAD BRIDGE OVER STREAM. IN FULL SUNLIGHT WITH VERBENA URTICIFOLIA, CIRSIUM VULGARE. HEAVILY GRAZED AREA BUT CATTLE DON'T EAT THIS PLANT. MATURE FRUITS. PRECISE LOC ON EOR.

Element: CACALIA MUEHLENBERGII (GREAT INDIAN-PLANTAIN) #6
State Status: No Legal Status
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 770)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNW30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 40" Long: 92 19' 28"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 August 1994
7 PLANTS ON BANKS OF SOUTH BRANCH ROOT RIVER. PASTURED AREA, IN PARTIAL SHADE. DARK ALLUVIAL SAND 1M ABOVE STREAM LEVEL. ASSOC SPP: GEUM LACINIATUM, CAREX EMORYI, PHALARIS ARUNDINACEA. ON AND IN VICINITY OF SMALL ISLAND. IMMATURE FRUITS. PRECISE LOC ON EOR.

Element: CACALIA MUEHLENBERGII (GREAT INDIAN-PLANTAIN) #7
State Status: No Legal Status
EO Size: EO Rank: B Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 772)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESW30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 32" Long: 92 19' 16"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 August 1994
FREQUENT ALONG 100M STRETCH SOUTH BRANCH ROOT RIVER. 35 PLANTS IN PASTURED AREA IN CANOPY OPENINGS. DARK, ALLUVIAL SAND. ASSOC SPP: NAPAEA DIOICA, CAREX EMORYI, AGROSTIS STOLONIFERA. 32 PLANTS ON SMALL ISLAND. CATTLE DON'T SEEM TO TOUCH THIS PLANT. PRECISE LOC ON EOR.

Element: CACALIA MUEHLENBERGII (GREAT INDIAN-PLANTAIN) #8
State Status: No Legal Status
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 801)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESE22
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 8" Long: 92 15' 2"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 11 August 1994
OCCASIONAL ALONG BANKS OF SOUTH BRANCH ROOT RIVER. IN FULL SUNLIGHT IN GRAZED PASTURE. ASSOC SPP: AGROSTIS STOLONIFERA, MONARDA FISTULOSA, THALICTRUM DASYCARPUM, RUMEX CRISPUS. 15 PLANTS IN GROUPS OF 5 & 10 ALONG 200M STRETCH OF VALLEY FLOOR. PRECISE LOC ON EOR.

Element: CACALIA MUEHLENBERGII (GREAT INDIAN-PLANTAIN) #9
State Status: No Legal Status
EO Size: EO Rank: AB Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D.(MDL 793)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSW22
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 59" Long: 92 15' 55"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 11 August 1994
OCCASIONAL TO LOCALLY ABUNDANT ALONG SOUTH BRANCH ROOT RIVER. IN HEAVILY GRAZED PASTURE IN FULL AND PARTIAL SUNLIGHT. ASSOC SPP: VERBENA URTICIFOLIA, VERNONIA FASCICULATA, CIRSIUM VULGARE, POA PRATENSIS. 50-100 PLANTS, MOST IN ONE PATCH. IN FRUIT. PRECISE LOC ON EOR.

Element: CAREX JAMESII (JAMES' SEDGE) #2
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(940527-2)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENESWSW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 57" Long: 92 13' 28"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 27 May 1994
IN MAPLE BASSWOOD FOREST. WEST FACING SLOPE, 20% GRADE, SIDE OF ROLLING SERIES OF RIDGES, LOWER SLOPE OF BLUFF, MID-SLOPE ON NARROW RIDGE PROJECTION. DARK, SILTY, LOAM OVER CLAY, MOIST, ORGANIC SOIL. FEW SCAT CESPITOSE CLUMPS. MESIC HERB COVER 50%. ASSOCIATES: GERANIUM MACULATUM, CAREX JAMESII, ERYTHRONIUM. (PREV COLL: WHEELER,G.A. (#8327) MIN, 6/14/1984. MOIST RICH WOODS ABOUT 0.25 MILES WEST OF HORSE TRAIL ON GENTLE W-FACING SLOPE).

Element: CAREX JAMESII (JAMES' SEDGE) #8
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: WHEELER,G.A.(8354)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W 07
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 49" Long: 92 12' 24"
Precision: within 0.50 mile
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 19 June 1984
MOIST, RICH WOODS 0.5 MILES NORTHEAST OF MEIGHEN STORE AND ADJACENT TO THE SOUTH BRANCH ROOT RIVER. (1 DUP #8361).

Element: CAREX JAMESII (JAMES' SEDGE) #10
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: WHEELER,G.A.(8315)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 36" Long: 92 13' 0"
Precision: within 0.50 mile
Voucher: 774871 MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 June 1984
FORESTVILLE STATE PARK. 0.75 MILES SOUTH OF HORSE TRAIL ROAD. PLANT GROWING IN A MOIST RICH WOODS ON A RATHER STEEP SLOPE NEAR THE SOUTH BRANCH ROOT RIVER.

Element: CAREX LAEVIVAGINATA (SMOOTH-SHEATHED SEDGE) #10
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(SIGHT RECORD)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNWNWSW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 10" Long: 92 13' 44"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 15 August 1994
AT WEST PARK BORDER, NORTH SIDE OF FORESTVILLE CREEK AT BASE OF SOUTH FACING SLOPE. WET SEEPAGE MEADOW DOMINATED BY SEDGES. SPRING FED BY SEEPAGE AT 1130 FT ELEVATION. DEPRESSION IN LEVEL ALLUVIUM, WET-MESIC CLAY. SCATTERED CESPITOSE PLANTS IN 0.5 ACRE AREA (VEGETATIVE CULMS IDENTIFIED BY SMOOTH VENTRAL SHEATHS). ASSOCIATES: CAREX STRICTA.

Element: CAREX LAEVIVAGINATA (SMOOTH-SHEATHED SEDGE) #12
State Status: THREATENED
EO Size: EO Rank: CD Current Status: 0 Intended Status: 6
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.C.(MDL899)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNESW24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 14" Long: 92 13' 24"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 May 1995
LOCAL, RARE IN SMALL SEEPAGE MEADOW/SWAMP AT BASE OF STEEP, WEST-FACING SLOPE ALONG CANFIELD CREEK 1/4 MILE UPSTREAM FROM ITS JUNCTION WITH THE SOUTH BRANCH ROOT RIVER. UNDER INTERRUPTED CANOPY OF LARGE FRAXINUS NIGRA. 10 PLANTS ALONG 50M STRETCH OF SEEPAGE FLOW. ASSOC W/ CALTHA PALUSTRIS, ANGELICA ATROPURPUREA, CAREX STIPATA, C. RETRORSA, C. TRICHOCARPA.

Element: CAREX LAEVIVAGINATA (SMOOTH-SHEATHED SEDGE) #16
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(950605-2)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWNWSE18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 7" Long: 92 11' 52"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 05 June 1995
FORESTVILLE STATE PARK 1/4 MILE EAST OF HORSE AREA. IN SEEPAGE MEADOW DOMINATED BY SKUNK CABBAGE (SYMPLOCARPUS FOETIDUS) & IMPATIENS SPP. IN WET SATURATED SOIL ON LOWER SLOPE OF EAST ASPECT BLUFF, 15% GRADE, ELEVATION 1140 FT, GENTLE SEEPAGE FLOW OVER WIDE AREA. TWO LARGE GENETS EACH 50X25 CM AREA, MOSTLY VEGETATIVE CULMS. ASSOCIATES: SYMPLOCARPUS FOETIDUS, CAREX STRICTA, IMPATIENS SPP, ASTER PUNICEUS.

Element: CAREX LAEVIVAGINATA (SMOOTH-SHEATHED SEDGE) #17
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(950614-4A)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENWNW14
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 36" Long: 92 14' 42"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 June 1995
2 MI WEST OF FORESTVILLE STATE PARK. IN PASTURED SEDGE MEADOW ALONG SPRING FED CREEK. WET-MESIC SOIL ON BANK 100 METERS FROM SPRING. TWO OR THREE LARGE CLUMPS AMID POA PALUSTRIS. ASSOCIATES: CAREX VULPINOIDEA, HELENIUM AUTUMNALES, PHRAGMITES COMMUNIS, SCIRPUS FLUVIATILE.

Element: CAREX LAEVIVAGINATA (SMOOTH-SHEATHED SEDGE) #23
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: TENNEY,M.(166)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESENW24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 31" Long: 92 13' 4"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 03 June 1982
LEVEL, MOIST AREA NEAR FLOODPLAIN.

Element: CAREX WOODII (WOOD'S SEDGE) #15
State Status: SPECIAL CONCERN
EO Size: EO Rank: BC Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 774)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENW30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 43" Long: 92 19' 12"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 August 1994
LOCALLY ABUNDANT IN GRAZED MAPLE-BASSWOOD FOREST ON LOWER SLOPE OF 80 FT, W-FACING, 15 DEG SLOPE ALONG SOUTH BRANCH ROOT RIVER. ASSOC WITH CAREX CONVOLUTA, C. SPRENGELLII, FESTUCA OBTUSA, ELYMUS HYSTRIX. 20 X 20M PATCH. PRECISE LOC ON EOR.

Element: CAREX WOODII (WOOD'S SEDGE) #20
State Status: SPECIAL CONCERN
EO Size: EO Rank: BC Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 779)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENW20
Quad Map: WYKOFF (X20A)
Latitude: 43 37' 49" Long: 92 18' 8"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 August 1994
LOCALLY COMMON IN YOUNG MAPLE-BASSWOOD FOREST DOMINATED BY ACER SACCHARUM, TILIA AMERICANA, ALONG SOUTH BRANCH ROOT RIVER. ON LOWER SLOPE OF 120 FT, NW-FACING 20 DEG SLOPE, IN DARK, SILTY-CLAY. ASSOC SPP: CAREX SPRENGELLII, C. BLANDA, GERANIUM MACULATUM, CIRCAEA LUTETIANA, PARTHENACISSUS. PRECISE LOC ON EOR.

Element: CAREX WOODII (WOOD'S SEDGE) #30
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 1
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(SIGHT RECORD)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESWNW30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 36" Long: 92 19' 30"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 August 1994
ALONG THE SOUTH BRANCH ROOT RIVER LESS THAN 0.5 MILE EAST OF COUNTY ROAD 114 BRIDGE. HEAVILY GRAZED AND LOGGED FOREST WITH SEVERAL COW PATHS. IN DISTURBED MAPLE BASSWOOD FOREST DOMINATED BY YOUNG TILIA AMERICANA AND ACER SACCHARUM (CROWN 10 METERS HIGH; DBH 20 CM). NE ASPECT, 15-25% SLOPE, LOWER SLOPE ABOVE RIVER BANK, SILTY CLAY, COMPACT, ELEVATION 1260 FT. ASSOCIATES: CAREX HIRTIFOLIA, CAREX CONVOLUTA, JUNCUS TENUIS TENUIS, CAREX CF DEWEYANA.

Element: CAREX WOODII (WOOD'S SEDGE) #31
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(940517-2)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESENE13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 17" Long: 92 12' 37"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 May 1994
IN MATURING MAPLE BASSWOOD FOREST WITH MATURE TREES COMMON. DOMINATED BY ACER SACCHARUM, QUERCUS ALBA. SILT LOAM, ON RIM OF SINKHOLE TWENTY FEET ABOVE FLOODPLAIN. LOWER SLOPE OF WEST ASPECT BLUFF. SCATTERED CLONAL PATCHES IN 100 METER AREA. FREQUENT ON LOWER SLOPE. ASSOCIATES: PODOPHYLLUM PELTATUM, CAREX BLANDA, MENISPERMUM CANADENSE.

Element: CAREX WOODII (WOOD'S SEDGE) #32
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(SIGHT RECORD)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSWSE13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 58" Long: 92 13' 0"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 May 1994
IN FORESTVILLE STATE PARK. PERIPHERAL TO SEEPAGE AREA ON SIDES & CREST OF SMALL CONVEX RIDGE BELOW BENCH TERRACE ON MIDSLOPE. DRY-MESIC TO WET SOIL. SEDGE FORMS SOD OVER EXTENSIVE AREA.

Element: CAREX WOODII (WOOD'S SEDGE) #33
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(SIGHT RECORD)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWSWNW18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 25" Long: 92 12' 27"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 02 June 1994
FORESTVILLE STATE PARK, 100 FT FROM HORSE TRAIL IN RAVINE NEAR SEEP. IN OLD GROWTH STAND OF MAPLE BASSWOOD FOREST DENSE SHADE FROM SUPERCANOPY WITH DBH 50-63 CM, LOWER CANOPY MOSTLY 30 CM DBH. DOMINANTS INCLUDE ACER SACCHARUM AND QUERCUS RUBRA. N-ASPECT, DARK ORGANIC SILT, THICK DUFF, FRIABLE, MOIST, SLOPE 20% GRADE. SCATTERED PLANTS NOT SOD FORMING, CESPITOSE CLUMPS IN 100 METER AREA. ASSOCIATES: HYDROPHYLLUM VIRGINIANUM, MENISPERMUM CANADENSE, ASARUM CANADENSE,

Element: CAREX WOODII (WOOD'S SEDGE) #34
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(SIGHT RECORD)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SENWNESW07
Quad Map: FOUNTAIN (X21B)
Latitude: 43 39' 3" Long: 92 12' 7"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 16 August 1994
LOWLAND HARDWOOD FOREST, DISTURBED HETEROGENEOUS CANOPY 50% COVER, CROWN 25 METERS HIGH, MOST PREVALENT DBH 40-50 CM, WITH CELTIS OCCIDENTALIS, OSTRYA VIRGINIANA & JUGLANS NIGRA. SUBCANOPY 25% COVER, 5-10 METERS HIGH, THICKETS OF SHRUBS SCATTERED THROUGHOUT. FOOTSLOPE, LEVEL. CAREX FORMING SOD. ASSOCIATES: LAPORTEA CANADENSIS, AMPHICARPA BRACTEATA, RIBES CYANOSBATI, PILEA SPP, CAMPANULA AMERICANA, ELYMUS VIRGINICUS, RUBUS OCCIDENTALIS.

Element: CAREX WOODII (WOOD'S SEDGE) #35
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(SIGHT RECORD)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSWSW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 59" Long: 92 13' 41"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 15 August 1994
IMMEDIATELY WEST OF PARK OFFICE ON BOTH SIDES OF ROAD. MAPLE BASSWOOD FOREST AND W/ SUPER CANOPY OF 25-75% COVER; INFREQUENT TO FREQ TREES WITH DBH 40-50 CM, GREATER THAN 20-25 METERS HIGH. DOM BY ACER SACCHARUM WITH INCREASING AMOUNTS OF ULMUS RUBRA/U. THOMASII, ALSO QUERCUS RUBRA AND Q. ALBA. EAST TO NE ASPECT, LOWER SLOPE; <10% SLOPE GRADE; NEAR SEEPAGE AREAS AND SWALES, CLAY LOAM AND SILT LOAM. SCATTERED CESPITOSE PLANTS OR SMALL CLONAL PATCHES. ASSOC: CAREX JAMESII.

Element: CAREX WOODII (WOOD'S SEDGE) #36
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(940516-1)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESW12
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 49" Long: 92 13' 11"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 16 May 1994
MATURE MAPLE BASSWOOD FOREST DOMINATED BY ACER SACCHARUM, TILIA AMERICANA. CLOSED CANOPY WITH ULMUS AMERICANA, QUERCUS ALBA. N-ASPECT, LOWER SLOPE, ELEVATION 1140FT, 40% GRADE, DARK CLAY-SILT LOAM, MOIST TO WET (NOT SATURATED), PERIPHERAL TO SEEP. ABUNDANT IN THIS ZONE TO OCCASIONAL WHEN DRY. RARE IN WEST PORTION OF FOREST. ASSOCIATES: ISOPYRUM BITERNATUM, RANUNCULUS SPP., CYSTOPTERIS BULBIFERA, SOLIDAGO FLEXICAULIS, MATTEUCCIA STRUTHIOPTERIS.

Element: CAREX WOODII (WOOD'S SEDGE) #37
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: ZAGER,S.(940906-3)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0NNENWNW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 58" Long: 92 13' 37"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 September 1994
IN MAPLE-BASSWOOD FOREST DOMINATED BY TILIA AMERICANA & ACER SACCHARUM WITH OSTRYA VIRGINIANA. CLOSED SHADE TO SUBSTRATE. ON COLLUVIAL SILTY SOIL, WET MESIC, RICH HUMUS. ON TERRACE LEDGE AT MOUTH OF EAST RUNNING RAVINE ABOVE CREEK ALLUVIUM. SEDGE FORMS BROKEN SOD ON LEVEL AREA. ASSOCIATES: ASARUM CANADENSE, DESMODIUM GLUTINOSUM, HYDROPHYLLUM VIRGINIANUM, GALIUM CONCINNUM.

Element: CAREX WOODII (WOOD'S SEDGE) #54
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(950602-2)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSWSENE15
Quad Map: WYKOFF (X20A)
Latitude: 43 38' 20" Long: 92 15' 10"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 02 June 1995
IN MATURING, SLIGHTLY GRAZED MAPLE BASSWOOD FOREST. MOST PREVALENT DBH 30-40 CM; CANOPY >90% COVER, 15-25M HIGH, NEARLY CLOSED. SPARSE SHRUB LAYER. ORGANIC SILT, WELL DRAINED, FRIABLE SOIL. SEDGE COLONY 2X4 METER AREA. ASSOCIATES: HYDROPHYLLUM VIRGINIANUM, SANQUINARIA CANADENSIS, VIOLA PUBESCENS.

Element: CAREX WOODII (WOOD'S SEDGE) #55
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(9506271)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENE12
Quad Map: FOUNTAIN (X21B)
Latitude: 43 39' 29" Long: 92 12' 44"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 27 June 1995
FORESTVILLE STATE PARK. IN MAPLE-BASSWOOD FOREST-LOWLAND HARDWOOD FOREST ECOTONE DOMINATED BY MATURE QUERCUS MACROCARPA, ULMUS RUBRA. CANOPY 25 METERS HIGH, 80% COVER. SUBCANOPY CLOSED BY ACER SACCHARUM, CELTIS, ULMUS SPP. NEAR UPLAND SPRING. CAREX FORMING BROKEN MAT 25 METERS AREA. WET MESIC HERBS: LAPORTEA CANADENSIS WITH SANQUINARIA, SOLIDAGO FLEXICAULIS, STAPHYLEA TRIFOLIA.

Element: CHRYSOSPLENIUM IOWENSE (IOWA GOLDEN SAXIFRAGE) #3
State Status: ENDANGERED
EO Size: EO Rank: Current Status: 8 Intended Status: 9
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: The Nature Conservancy
Managed Area(s): SAXIFRAGE HOLLOW R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(6115)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNE21
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 26" Long: 92 16' 36"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: June 1982
IN THE VALLEY OF THE S BRANCH ROOT RIVER, ABOUT 2.5 MI N OF CHERRY GROVE. N-FACING ALGIFIC TALUS SLOPE. LOCALLY ABUNDANT WITH CYSTOPTERIS BULBIFERA, ADOXA MOSCHATELLINA. SWNE SEC 21, T102N R12W.

Element: CHRYSOSPLENIUM IOWENSE (IOWA GOLDEN SAXIFRAGE) #4
State Status: ENDANGERED
EO Size: EO Rank: D Current Status: 2 Intended Status: 2
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(6123)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESE23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 14" Long: 92 13' 56"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: June 1982
ON THE S-SIDE S BRANCH ROOT RIVER, CA 3.5 MI NE OF CHERRY GROVE. INFREQUENT HERE ON SMALL ALGIFIC TALUS SLOPE. SWNESE SEC 23, T102N R12W.

Element: CHRYSOSPLENIUM IOWENSE (IOWA GOLDEN SAXIFRAGE) #5
State Status: ENDANGERED
EO Size: EO Rank: B Current Status: 2 Intended Status: 89
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(6124)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNW26
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 52" Long: 92 14' 44"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: June 1982
ON THE S-SIDE OF S BRANCH ROOT RIVER, CA 3 MILES NE OF CHERRY GROVE. LOCALLY ABUNDANT ON ALGIFIC TALUS SLOPE. WITH CYSTOPTERIS BULBIFERA, MITELLA NUDA, ADOXA MOSCHATELLINA. SENWNW SEC 26, T102N R12W.

Element: CHRYSOSPLENIUM IOWENSE (IOWA GOLDEN SAXIFRAGE) #7
State Status: ENDANGERED
EO Size: EO Rank: A Current Status: 0 Intended Status: 7
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 904)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENW27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 53" Long: 92 15' 48"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 19 May 1995
OCCAS TO LOCALLY COMMON ON ALGIFIC TALUS SLOPE ALONG 1/4 MI STRETCH OF S BRANCH ROOT RIVER 2 MI NE OF CHERRY GROVE. 500-1000 PLANTS CONCENTRATED AROUND COLD AIR FISSURES THRU MOSS-COVERED TALUS & GALENA LIMESTONE EXPOSURES ON LOWER SLOPE OF 150 FT, 40 DEG, N-FACING SLOPE. LOCATED 5-15M ABOVE STREAM. ASSOC: MITELLA NUDA, CIRCAEA ALP, BETULA LUT, RHAMNUS ALNIF, GYMNOCARPIUM ROBERT, RIBES HUDSO. 3 POP CNTRS TOTAL 5X50M AREA. ICE FILM UNDER 1 VENT. ELEV 1130 FT. UPSLOPE AREA FORSTD

Element: DESMODIUM CUSPIDATUM VAR. LONGIFOLIUM (BIG TICK-TREFOIL) #13
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: Owner unknown
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: TENNEY,M.(552)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWNENW18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 31" Long: 92 12' 10"
Precision: within 0.25 mile, confirmed
Voucher: 782534MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 18 August 1982
MOIST DECIDUOUS WOODS ALONG TRAILSIDE WITH HOG PEANUT, LOPSEED, RED OAK, BASSWOOD & AMERICAN ELM.

Element: DESMODIUM CUSPIDATUM VAR. LONGIFOLIUM (BIG TICK-TREFOIL) #14
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: Owner unknown
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: TENNEY,M.(554)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W NWSESW07
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 54" Long: 92 12' 13"
Precision: within 0.25 mile, confirmed
Voucher: 782525MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 18 August 1982
LOCATED IN RICH, MOIST DECIDUOUS WOODS WITH HOG PEANUT, BLACKBERRY, SOLIDAGO SP., POISON IVY, BASSWOOD, SUGAR MAPLE & RED OAK.

Element: DESMODIUM CUSPIDATUM VAR. LONGIFOLIUM (BIG TICK-TREFOIL) #15
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK
Ownership: Owner unknown
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: TENNEY,M.(493)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNWNE13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 32" Long: 92 13' 15"
Precision: within 0.25 mile, confirmed
Voucher: 782399 MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 29 July 1982
LOCATED IN SMALL, MOIST DEPRESSION NEAR TRAIL WITH NORTHERN BEDSTRAW, COCKLEBUR, BOTTLE-BRUSH GRASS, RED OAK, BUR OAK.

Element: DESMODIUM CUSPIDATUM VAR. LONGIFOLIUM (BIG TICK-TREFOIL) #16
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: Owner unknown
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: TENNEY,M.(555)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWSENW18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 18" Long: 92 12' 9"
Precision: within 0.25 mile, confirmed
Voucher: 782614 MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 19 August 1982
LOCATED IN MOIST DECIDUOUS WOODS ALONG TRAILSIDE WITH HELIANTHES SP, HONEWORT, HOG PEANUT, GINSENG, BRACKEN FERN, POPULUS SP, BUR & RED OAK. 1ST COLL #550, 782612 MIN 8/18/1982, NWSENW18.

Element: DICENTRA CANADENSIS (SQUIRREL-CORN) #41
State Status: SPECIAL CONCERN
EO Size: EO Rank: C Current Status: 0 Intended Status: 6
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D.(MDL900)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENESW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 8" Long: 92 13' 14"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 18 May 1995
RARE IN LOWLAND HARDWOOD FOREST ALONG THE SOUTH BRANCH ROOT RIVER 1/2 MILE SW OF THE HISTORIC FORESTVILLE TOWNSITE. ON THE EAST (SE) SIDE OF CO RD 12. CANOPY OF MATURE ULMUS THOMASII, TILIA AMERICANA, ACER CF NIGRUM. DEEP, ALLUVIAL SILT-LOAM. 12 INFLORESENCES SEEN IN RELATIVELY INTENSIVE SEARCH OF 20 ACRES. GROWING AMONGST DECAYING ELM LOGS W/ HYDROPHYLLUM VIRGINIANUM, H.APPENDICULATUM, GALIUM APARINE, ISOPYRUM BITERNATUM, MERTENSIA VIRGINICA.

Element: DRYOPTERIS GOLDIANA (GOLDIE'S FERN) #37
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(940526-1)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWSWNW18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 25" Long: 92 12' 27"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 26 May 1994
IN OPEN MAPLE-BASSWOOD FOREST DOMINATED BY MATURING ACER SACCHARUM, MOST PREVALENT DBH 20-30 CM, FEW MAX SIZE ABOUT 50 CM DBH OF QUERCUS RUBRA. CANOPY 70%, 10-20 METERS HGT. N-ASPECT, LOWER SLOPE TO RAVINE BOTTOM, ELEVATION 1100 FT, 60% GRADE, COBBLESTONES, DARK SILTY LOAM, HIGH IN ORGANIC MATERIALS. NE-FACING RAVINE. PLANTS TO ONE METER HIGH. SCATTERED PLANTS IN LOCAL AREA. ASSOCIATES: HYDROPHYLLUM APPENDICULATUM, LAPORTEA CANADENSIS, CAREX BLANDA.

Element: DRYOPTERIS GOLDIANA (GOLDIE'S FERN) #46
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: JUHNKE,C.M.(283)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W NWSWNW18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 30" Long: 92 12' 30"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 01 September 1991
ROCKY WET WOODS ON WEST-FACING SLOPE WITH INDIAN-PIPE, OAK, BASSWOOD.

Element: DRYOPTERIS GOLDIANA (GOLDIE'S FERN) #47
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: TENNEY,M.(212)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWNWNW18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 40" Long: 92 12' 31"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 17 June 1982
NEAR BASE OF WEST-FACING DECIDUOUS SLOPE WITH SUGAR MAPLE, BASSWOOD, AND MITERWORT.

Element: ERYNGIUM YUCCIFOLIUM (RATTLESNAKE-MASTER) #49
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: SMITH,W.R.(14541)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENW24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 32" Long: 92 13' 18"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 18 July 1988
FORESTVILLE STATE PARK. IN SMALL GRASSY SPOT ON THE WEST SIDE OF THE SOUTH BRANCH ROOT RIVER. ABOUT 20 PLANTS.

Element: ERYNGIUM YUCCIFOLIUM (RATTLESNAKE-MASTER) #65
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: JUHNKE,C.M.(304)
DRY MEADOW WITH SOME NATIVE PRAIRIE FLORA, SMOOTH ASTER, AZURE ASTER.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENENW24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 37" Long: 92 13' 12"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 18 September 1991

Element: GEUM LACINIATUM VAR. TRICHOCARPUM (ROUGH AVENS) #5
State Status: No Legal Status
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 769)
UNCOMMON ALONG BANKS OF SOUTH BRANCH ROOT RIVER. MOSTLY IN FULL SUNLIGHT IN PASTURED AREA. ASSOC WITH CAREX EMORYI, PHALARIS ARUNDINACEA, PHYSOSTEGIA VIRGINIANA, MENTHA ARVENSIS, CACALIA MUHLENBERGIA. 4 PLANTS ALONG 100M STRETCH.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNW30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 45" Long: 92 19' 28"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 August 1994

Element: GEUM LACINIATUM VAR. TRICHOCARPUM (ROUGH AVENS) #8
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(940907-2)
IN OLD OXBOW SLOUGH OR MEANDER MAINTAINED BY SPRING FROM NORTH FACING BLUFF. AT EDGE OF MUDDY BANK ON DRAINED SOIL. ASSOCIATES: MONARDA FISTULOSA, RUDBECKIA LACINIATA.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSW24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 21" Long: 92 13' 36"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 07 September 1994

Element: JEFFERSONIA DIPHYLLA (TWINLEAF) #33
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: TENNEY,M.(266)
RICH, MOIST UPLAND WOODS WITH WALNUT, BASSWOOD, SWEET CICELY.
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWNESE07
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 59" Long: 92 11' 33"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 23 June 1982

Element: NAPAEA DIOICA (GLADE MALLOW) #5
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(6121)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENE20
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 24" Long: 92 17' 22"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 03 June 1982
S BANK OF S BRANCH ROOT RIVER, CA 2.5 MILES N OF CHERRY GROVE. 5-10 PLANTS SEEN IN WOODED, LEVEL AREA ADJACENT TO RIVER. SENE SEC 20, T102N R12W.

Element: NAPAEA DIOICA (GLADE MALLOW) #10
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(14538)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNW20
Quad Map: WYKOFF (X20A)
Latitude: 43 37' 48" Long: 92 18' 15"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 18 July 1988
ABOUT 5 MILES SE OF SPRING VALLEY, ON NORTH SIDE OF SOUTH BRANCH ROOT RIVER.

Element: NAPAEA DIOICA (GLADE MALLOW) #11
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: SMITH,W.R.(14537)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESE19
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 14" Long: 92 18' 34"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 18 July 1988
FORESTVILLE SP. BETWEEN SOUTH BRANCH ROOT RIVER (EAST SIDE) AND ACCESS ROAD TO MYSTERY CAVE. 250 OR MORE PLANTS.

Element: NAPAEA DIOICA (GLADE MALLOW) #12
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(14536)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNE24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 44" Long: 92 12' 59"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 18 July 1988
FORESTVILLE SP, ON THE WEST BANK OF THE SOUTH BRANCH ROOT RIVER, ABOUT 0.2 MILES EAST OF CAMPGROUND. 500 OR MORE PLANTS.

Element: NAPAEA DIOICA (GLADE MALLOW) #13
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(14535)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNE13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 30" Long: 92 12' 56"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 18 July 1988
FORESTVILLE STATE PARK, BETWEEN CSAH 12 & SOUTH BRANCH ROOT RIVER. ABOUT 10 PLANTS OBSERVED AT EDGE OF PARK PICNIC GROUNDS. (PREV COLL: TENNEY,M. 0NWE13, (6/21/1986).

Element: NAPAEA DIOICA (GLADE MALLOW) #36
State Status: THREATENED
EO Size: EO Rank: CD Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 802)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNW26
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 56" Long: 92 14' 48"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 11 August 1994
3 PLANTS ON BANK OF SOUTH BRANCH ROOT RIVER IN PARTIAL SUNLIGHT AT BASE OF 150 FT, W-FACING SLOPE. ASSOC WITH PHALARIS ARUNDINACEA, RUDBECKIA LACINIATA. PRECISE LOC ON EOR.

Element: NAPAEA DIOICA (GLADE MALLOW) #37
State Status: THREATENED
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 800)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSE22
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 5" Long: 92 15' 27"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 11 August 1994
5 PLANTS ON BANK OF SOUTH BRANCH ROOT RIVER. IN FULL SUNLIGHT. RICH ALLUVIAL SOIL. ASSOC WITH PHALARIS ARUNDINACEA, SILPHIUM PERFOLIATUM, ANGELICA ATROPURPUREA, URTICA DIOICA, ARCTIUM MINUS. IN FRUIT. PRECISE LOC ON EOR.

Element: NAPAEA DIOICA (GLADE MALLOW) #38
State Status: THREATENED
EO Size: EO Rank: CD Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D.(MDL 794)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSW22
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 5" Long: 92 15' 57"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 11 August 1994
2 PLANTS ALONG BANK OF SOUTH BRANCH ROOT RIVER. AT BASE OF 120 FT, E-FACING FORESTED SLOPE. IN PARTIAL SHADE. ASSOC WITH RUDBECKIA LACINIATA. BOTH PLANTS VEGETATIVE. PRECISE LOC ON EOR.

Element: NAPAEA DIOICA (GLADE MALLOW) #39
State Status: THREATENED
EO Size: 12 acres — EO Rank: B — Current Status: — Intended Status:
Site: SOUTH ROOT 1 — CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 775)
Location: FILLMORE COUNTY, MN — DNR Region: 5
Legal : T102N R12W SWSE19 — Wildlife Area: 510
Quad Map: CHERRY GROVE (X20D) — Forestry District: 533
Latitude: 43 37' 3" Long: 92 19' 3" — Last Obs.: 04 August 1994
Precision: within 0.25 mile, confirmed
Voucher: MIN — Verification: verified
FREQUENT ALONG 300M STRETCH OF SOUTH BRANCH ROOT RIVER. ON BOTH BANKS. ASSOC WITH PHALARIS ARUNDINACEA, RUDBECKIA LACINIATA, URTICA DIOICA, APIOS AMERICANA. IN CANOPY OPENINGS. 40 PLANTS THIS STRETCH IN SMALL GROUPS. PRECISE LOC ON EOR.

Element: NAPAEA DIOICA (GLADE MALLOW) #40
State Status: THREATENED
EO Size: — EO Rank: C — Current Status: — Intended Status:
Site: SOUTH ROOT 1 — CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 773)
Location: FILLMORE COUNTY, MN — DNR Region: 5
Legal : T102N R12W NESW30 — Wildlife Area: 510
Quad Map: CHERRY GROVE (X20D) — Forestry District: 533
Latitude: 43 36' 34" Long: 92 19' 17" — Last Obs.: 04 August 1994
Precision: within 0.25 mile, confirmed
Voucher: MIN — Verification: verified
3 PLANTS ALONG BANK OF SOUTH BRANCH ROOT RIVER. IN CANOPY OPENINGS IN MOIST, RICH, ALLUVIAL SAND. ASSOC WITH CACALIA MUHLENBERGIA, CAREX EMORYI, AGROSTIS STOLONIFERA. AREA GRAZED RATHER HEAVILY. IMMATURE FRUITS. PRECISE LOC ON EOR.

Element: NAPAEA DIOICA (GLADE MALLOW) #48
State Status: THREATENED
EO Size: — EO Rank: C — Current Status: — Intended Status:
Site: SOUTH ROOT 2 — CBS Site #: 15
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D. & ZAGER,S.(MDL 780)
Location: FILLMORE COUNTY, MN — DNR Region: 5
Legal : T102N R12W SWSE17 — Wildlife Area: 510
Quad Map: WYKOFF (X20A) — Forestry District: 533
Latitude: 43 37' 52" Long: 92 17' 48" — Last Obs.: 04 August 1994
Precision: within 0.25 mile, confirmed
Voucher: MIN — Verification: verified
3 PLANTS ON BANK OF SOUTH BRANCH ROOT RIVER. IN FULL SUNLIGHT. ASSOC SPP: PHALARIS ARUNDINACEA, RUDBECKIA LACINIATA, ANGELICA ATROPURPUREA, PHYSOSTEGIA VIRGINIANA, URTICA DIOICA. IMMATURE FRUITS. PRECISE LOC ON EOR.

Element: NAPAEA DIOICA (GLADE MALLOW) #74
State Status: THREATENED
EO Size: — EO Rank: — Current Status: — Intended Status:
Site: FORESTVILLE PARK — CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(SIGHT RECORD)
Location: FILLMORE COUNTY, MN — DNR Region: 5
Legal : T102N R12W NENWSW24 — Wildlife Area: 510
Quad Map: GREENLEAFTON (X21C) — Forestry District: 533
Latitude: 43 37' 19" Long: 92 13' 28" — Last Obs.: 06 September 1994
Precision: within 0.25 mile, confirmed
Voucher: — Verification: sight or sound rec.
AT SOUTHWEST CORNER OF CANFIELD CREEK NEAR CONFLUENCE WITH SOUTH BRANCH ROOT RIVER. IN YOUNG LOWLAND HARDWOOD FOREST DOMINATED BY EVEN AGED STAND OF ACER NEGUNDO. CANOPY 60-70% COVER; CROWN 10-15 METERS HIGH, OCCASIONAL LARGE TREES OF CELTIS OCCIDENTALIS (DBH 89CM). ALLUVIAL SOIL. ONE SMALL PLANT OBSERVED (BASAL LEAVES 50CM HIGH). ASSOCIATES: GEUM CANADENSE, HYDROPHYLLUM VIRGINIANUM, LAPORTEA CANADENSIS, EUPATORIUM RUGOSUM.

Element: NAPAEA DIOICA (GLADE MALLOW) #88
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: JUHNKE,C. (PHOTO RECORD)
PLANT OBSERVED & PHOTOGRAPHED IN FORESTVILLE STATE PARK.

Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESESE19
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 2" Long: 92 18' 34"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.

DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 June 1993

Element: OROBANCHE UNIFLORA (ONE-FLOWERED BROOMRAPE) #8
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: MORLEY,T.(1199)
MOIST DECIDUOUS WOODS, GENTLE N SLOPE, WITH CLOVER AND GRASSES.

Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESE18
Quad Map: WYKOFF (X20A)
Latitude: 43 38' 13" Long: 92 18' 37"
Precision: within 0.50 mile
Voucher: 603354 MIN Verification: verified

DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: June 1967

Element: PANAX QUINQUEFOLIUS (AMERICAN GINSENG) #35
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: 2 Intended Status: 28
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: SMITH,W.R.(9959)
CA 3 MILES N-NW OF GREENLEAFTON, IN THE VALLEY OF SOUTH BRANCH ROOT RIVER. TWO PLANTS SEEN ON STEEP, WOODED, N-FACING TALUS SLOPE. WITH TAXUS, BETULA LUTSA, ABIES BALSAMEA, RIBES HUDSONIANA. T102N R12W, NW1/4 NW1/4 SEC 26.

Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNW26
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 49" Long: 92 14' 45"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified

DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: September 1984

Element: PANAX QUINQUEFOLIUS (AMERICAN GINSENG) #160
State Status: SPECIAL CONCERN
EO Size: EO Rank: CD Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LEE,M.D.(MDL 792)
UNCOMMON IN OAK FOREST ON S-FACING SLOPE IN SMALL RAVINE OFF SOUTH BRANCH ROOT RIVER. ROCKY SILTY-CLAY SOIL. ASSOC WITH TAENIDIA INTEGERRIMA, PHRYMA LEPTOSTACHYA, AMPHICARPAEA BRACTEATA, SOLIDAGO ULMIFOLIA, CAREX PENNSYLVANICA. IN FRUIT. PRECISE LOC ON EOR.

Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNW27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 55" Long: 92 16' 3"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified

DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 11 August 1994

Element: PANAX QUINQUEFOLIUS (AMERICAN GINSENG) #177
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(940906-1)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNENENE26
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 56" Long: 92 13' 48"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 September 1994
MATURING MAPLE-BASSWOOD FOREST ON EAST ASPECT SLOPE. CANOPY DOMINATED BY ACER SACCHARUM, 25 METERS HIGH, 100% COVER, DBH 15-35 CM; WITH OCCASIONAL QUERCUS RUBRA/Q. ALBA (DBH 52-55 CM) IN STAND. DARK RICH COLLUVIAL SOIL, UPPER SLOPE. TWO COLLECTED PLANTS WITH 12 RIPE BERRIES (PLANTED IN VICINITY). ASSOCIATES: ASARUM CANADENSE, SOLIDAGO FLEXICAULIS, UVULARIA GRANDIFLORA, ANEMONELLA THALICTROIDES, MITELLA DIPHYLLA.

Element: PANAX QUINQUEFOLIUS (AMERICAN GINSENG) #238
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: TENNY,M.(SITE RECORD)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SWSENW18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 18" Long: 92 12' 9"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 23 August 1998
LOCATED IN MOIST DECIDUOUS WOODS ALONG TRAILSIDE WITH HELIANTHES SP., HONEWORT, HOG PEANUT, DESMODIUM CUSPIDATUM VAR LONGIFOLIUM, BRACKEN FERN, POPULUS SP, BUR & RED OAK.

Element: POA WOLFII (WOLF'S BLUEGRASS) #12
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.& LEE,M.(940811-1)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNWNENW27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 53" Long: 92 15' 47"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 11 August 1994
SCATTERED PLANTS IN CREVICES OF NORTH FACING DRY TO WET CLIFF WITH ALGIFIC TALUS ABOVE AND IN SOLUTION GULLIES. N-ASPECT, GALENA LIMESTONE. MOSSES & LIVERWORTS, CYSTOPTERIS PROTRUSA, C. BULBIFERA, CIRCAEA ALPINA, RUBUS STRIGOSUS, IMPATIENS SPP.

Element: SANICULA TRIFOLIATA (BEAKED SNAKEROOT) #40
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: TENNEY,M.(579)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENESW12
Quad Map: FOUNTAIN (X21B)
Latitude: 43 39' 12" Long: 92 12' 40"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 27 August 1982
GRADUAL WEST SLOPE NEAR SPRING FED STREAM WITH OSMORHIZA SP., GALLIUM SP., CRYPTATAENIA CANADENSIS, EUPATORIUM SP., ACER SACCHARUM, BOTRYCHIUM VIRGINIANUM, AND OSTRYA VIRGINIANA. (S.C. ZAGER: SITE DOES NOT MATCH PLACEMENT ON MAPS, I THINK TENNEY TRANSPOSED LOCATION. 1997).

Element: SILENE NIVEA (SNOWY CAMPION) #12
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: TENNEY,M.(374)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESESE12
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 53" Long: 92 12' 35"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 07 July 1982
ROADSIDE, DRY, IN OPEN CANOPY WITH TALL MEADOW RUE.

Element: TAENIDIA INTEGERRIMA (YELLOW PIMPERNEL) #24
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.& LEE,M.(940811-2)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNWNWNW27
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 55" Long: 92 16' 3"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 11 August 1994
DRY-MESIC OAK FOREST (C QUALITY) 75-85% CANOPY COVER DOMINATED BY RED OAK, MOST PREVALENT SIZE DBH 20-40CM; CROOKED BOLES. SUBCANOPY 50% COVER MOSTLY OSTRYA VIRGINIANA. MIDSLOPE, SILT LOAM WITH COBBLESTONES. ABOUT 30 PLANTS WITH FRUIT & FLOWERS IN LOCAL AREA. ASSOCIATES: SOLIDAGO ULMIFOLIA, VIBURNUM RAFINESQUIANUM, PHYRMA LEPTOSTACHYA, GERANIUM MACULATUM, AMPHICARPA BRACTEATA.

Element: TAENIDIA INTEGERRIMA (YELLOW PIMPERNEL) #25
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(940527-3)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWNWNW24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 40" Long: 92 13' 42"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 27 May 1994
IN DRY OAK FOREST ECOTONE WITH MESIC FOREST. QUERCUS MACROCARPA, Q. ALBA, AND Q. RUBRA CODOMINANT WITH LESSER AMOUNTS OF TILIA AMERICANA & FRAXINUS AMERICANA. CANOPY 70% COVER, 10-15 METERS HIGH, MOST PREVALENT SIZE DBH 20-30 CM; NO LARGER TREES. SHRUB LAYER-SUBCANOPY 50-75% COVER, DENSE IN PLACES. SW-ASPECT, UPPER SLOPE NEAR CREST OF NARROW RIDGE, DARK, FRIABLE LOAM, WELL DRAINED WITH COBBLESTONES. TAENIDIA IN FLOWER. HERB FLORA CHARACTERISTIC OF OPEN WOODS.

Element: TAENIDIA INTEGERRIMA (YELLOW PIMPERNEL) #29
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: ZAGER,S.(950706-2)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENENW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 32" Long: 92 13' 18"
Precision: within 0.25 mile, confirmed
Voucher: MIN Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 July 1995
FORESTVILLE STATE PARK. BELOW SCENIC OVERLOOK IN DRY OAK FOREST OR OAK WOODLAND BRUSHLAND INCLUSION AT NEAR CREST, UPPER SLOPE. DOMINATED BY QUERCUS MACROCARPA, ULMUS RUBRA, & CELTIS OCCIDENTALIS. CANOPY 50-75% COVER; OPEN GROWN TREES TO 15 METERS CROWN HEIGHT. SE-ASPECT, ELEVATION 1150-1200 FT, SILT DARK ORGANIC WITH COBBLES. PLANTS SCATTERED IN OPEN WOODS. ASSOCIATES: RUBUS ALLEGHENIENSIS, CORNUS FOEMINA RACEMOSA, FESTUCA OBTUSA, SCROPHULARIA MARILANDICA.

Appendix 1d

APPENDIX 1D: RARE ANIMAL SPECIES AND ANIMAL AGGREGATIONS WITHIN THE
Minnesota Natural Heritage Database — FORESTVILLE/MYSTERY CAVE ECOLOGICAL AREA — 12:58 Monday, NOVEMBER 19, 2001
Element Occurrence Records — MnDNR, Natural Heritage and Nongame Research Program — Copyright 2001 State of Minnesota DNR

Element: BAT CONCENTRATION #2
Location: FILLMORE COUNTY, MN | DNR Region: 5
Legal : T102N R12W SESE19 | Wildlife Area: 510
EO Size: | EO Rank: A | Current Status: 6 | Intended Status: 89 | Quad Map: CHERRY GROVE (X20D) | Forestry District: 533
Site: SOUTH ROOT 1 | CBS Site #: 14 | Latitude: 43 37' 2" Long: 92 18' 32" | Last Obs.: 24 February 2001
Ownership: MN DNR Parks and Recreation | Precision: within 0.25 mile, confirmed
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001) | Voucher: | Verification: verified
MYSTERY CAVE I. PORTION OF THE MYSTERY CAVE SYSTEM THAT EXTENDS FROM THE COMMERCIAL ENTRANCE TO THE INCLINE. BASED ON THE 2001 WINTER BAT COUNT, MYSTERY 1 CONTAINED 217 BATS (11% OF THE TOTAL BATS HIBERNATING IN THE ENTIRE CAVE). HIBERNATING SPECIES DOCUMENTED WERE MYOTIS LUCIFUGUS, M. SEPTENTRIONALIS, PIPISTRELLUS SUBLFLAVUS. THIS CAVE SYSTEM SUPPORTS THE LARGEST NUMBER OF HIBERNATING BATS OF ANY KNOWN NATURAL CAVE IN MINNESOTA.

Element: BAT CONCENTRATION #5
Location: FILLMORE COUNTY, MN | DNR Region: 5
Legal : T102N R12W NENE30 | Wildlife Area: 510
EO Size: | EO Rank: D | Current Status: | Intended Status: | Quad Map: CHERRY GROVE (X20D) | Forestry District: 533
Site: SOUTH ROOT 1 | CBS Site #: 14 | Latitude: 43 36' 57" Long: 92 18' 37" | Last Obs.: 21 March 1989
Ownership: Private | Precision: within 0.25 mile, confirmed
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: NORDQUIST,G.E.(CO BIOL SURVEY 1989) | Voucher: | Verification: verified
OLD STILL CAVE. 50 METERS UPRIVER FROM OLD MYSTERY CAVE. SMALL CAVE WITH A SINGLE, SMALL ENTRANCE & CHARACTERIZED BY RELATIVELY HIGH TEMPERATURE & HUMIDITY WINTER BAT COUNTS RANGED FROM 4 TO 22 BATS, INCLUDING MYOTIS LUCIFUGUS, MYOTIS SEPTENTRIONALIS, AND PIPISTRELLUS SUBFLAVUS.

Element: BAT CONCENTRATION #19
Location: FILLMORE COUNTY, MN | DNR Region: 5
Legal : T102N R12W NESE20 | Wildlife Area: 510
EO Size: | EO Rank: A | Current Status: | Intended Status: | Quad Map: CHERRY GROVE (X20D) | Forestry District: 533
Site: SOUTH ROOT 2 | CBS Site #: 15 | Latitude: 43 37' 21" Long: 92 17' 29" | Last Obs.: 24 February 2001
Ownership: MN DNR Parks and Recreation | Precision: within 0.25 mile, confirmed
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001) | Voucher: | Verification: verified
MYSTERY CAVE II. PORTION OF THE MYSTERY CAVE SYSTEM THAT EXTENDS FROM THE MYSTERY CAVERNS ENTRANCE TO DRAGON'S JAW LAKE. BASED ON THE 2001 WINTER BAT COUNT, MYSTERY II CONTAINED 1,446 BATS (71% OF THE TOTAL BATS HIBERNATING IN THE ENTIRE CAVE). HIBERNATING SPECIES DOCUMENTED WERE MYOTIS LUCIFUGUS, MYOTIS SEPTENTRIONALIS, PIPISTRELLUS SUBFLAVUS, EPTESICUS FUSCUS. THIS CAVE SYSTEM SUPPORTS THE LARGEST NUMBER OF HIBERNATING BATS OF ANY KNOWN NATURAL CAVE IN MN.

Element: BAT CONCENTRATION #23
Location: FILLMORE COUNTY, MN | DNR Region: 5
Legal : T102N R12W NENE30 | Wildlife Area: 510
EO Size: | EO Rank: C | Current Status: | Intended Status: | Quad Map: CHERRY GROVE (X20D) | Forestry District: 533
Site: SOUTH ROOT 1 | CBS Site #: 14 | Latitude: 43 36' 58" Long: 92 18' 36" | Last Obs.: 24 February 2001
Ownership: Private | Precision: within 0.25 mile, confirmed
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001) | Voucher: | Verification: verified
OLD MYSTERY CAVE. A SMALL CAVE, COMMERCIALIZED DURING THE 1930'S AND ACCESSIBLE THROUGH A SINGLE ENTRANCE. EXHIBITS A RANGE OF TEMPERATURES ANDINTERNAL CONDITIONS. WINTER COUNTS RANGED FROM 13 TO 43 BATS & INCLUDED MYOTIS LUCIFUGUS, M. SEPTENTRIONALIS, PIPISTRELLUS SUBFLAVUS, AND EPTESICUS FUSCUS.

Element: BAT CONCENTRATION #27
Location: FILLMORE COUNTY, MN | DNR Region: 5
Legal : T102N R12W NESW20 | Wildlife Area: 510
EO Size: | EO Rank: A | Current Status: | Intended Status: | Quad Map: CHERRY GROVE (X20D) | Forestry District: 533
Site: SOUTH ROOT 2 | CBS Site #: 15 | Latitude: 43 37' 24" Long: 92 18' 7" | Last Obs.: 24 February 2001
Ownership: MN DNR Parks and Recreation | Precision: within 0.25 mile, confirmed
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001) | Voucher: | Verification: verified
MYSTERY CAVE III. PORTION OF THE MYSTERY CAVE SYSTEM THAT HAS NO KNOWN EXTERNAL ENTRANCE AND EXTENDS WESTWARD FROM DRAGON'S JAW LAKE (MYSTERY II). BASED ON THE 2001 BAT COUNT, MYSTERY III CONTAINED 375 BATS (18% OF THE TOTAL BATS HIBER-NATING IN THE ENTIRE CAVE). HIBERNATING BATS DOCUMENTED WERE MYOTIS LUCIFUGUS, M. SEPTENTRIONALIS, AND PIPISTRELLUS SUBFLAVUS. THIS CAVE SYSTEM SUPPORTS THE LARGEST NUMBER OF HIBERNATING BATS OF ANY KNOWN NATURAL CAVE IN MINNESOTA.

Element: COLONIAL WATERBIRD NESTING SITE #202
Location: FILLMORE COUNTY, MN | DNR Region: 5
Legal : T102N R12W NWSE30 | Wildlife Area: 510
EO Size: | EO Rank: | Current Status: | Intended Status: | Quad Map: CHERRY GROVE (X20D) | Forestry District: 533
Site: SOUTH ROOT 1 | CBS Site #: 14 | Latitude: 43 36' 30" Long: 92 19' 0" | Last Obs.: 1989
Ownership: Owner unknown | Precision: within 0.25 mile, confirmed
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: MAXSON,G. | Voucher: | Verification: verified
FORESTVILLE. GREAT BLUE HERON

Element: CROTALUS HORRIDUS (TIMBER RATTLESNAKE) #22
Location: FILLMORE COUNTY, MN | DNR Region: 5
State Status: THREATENED | Legal : T102N R12W 24 | Wildlife Area: 510
EO Size: | EO Rank: | Current Status: 1 | Intended Status: 1 | Quad Map: FOUNTAIN (X21B) | Forestry District: 533
Site: FORESTVILLE PARK | CBS Site #: 19 | Latitude: 43 37' 30" Long: 92 13' 10" | Last Obs.: 1992
Ownership: MN DNR Parks and Recreation | Precision: within 0.50 mile
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: PARK VISITOR; MORIARTY,J. | Voucher: | Verification: sight or sound rec.
1985: OBSERVATION MADE IN SECTION 24 BY J. MORIARTY DURING 1985 HERP SOCIETY'S SE MINNESOTA AMPHIBIAN AND REPTILE SURVEY. 1992: ONE ADULT OBSERVED BY A PARK VISITOR ON 8/8/92 SUNNING ITSELF ON A DOWNED OAK TREE.

Element: CROTALUS HORRIDUS (TIMBER RATTLESNAKE) #101
Location: FILLMORE COUNTY, MN | DNR Region: 5
State Status: THREATENED | Legal : T102N R12W NENW24 | Wildlife Area: 510
EO Size: | EO Rank: | Current Status: | Intended Status: | Quad Map: FOUNTAIN (X21B) | Forestry District: 533
Site: FORESTVILLE PARK | CBS Site #: 19 | Latitude: 43 37' 48" Long: 92 13' 15" | Last Obs.: 01 August 1992
Ownership: MN DNR Parks and Recreation | Precision: within 0.25 mile, confirmed
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: LAIRD,J. (DNR GREEN SLIP) | Voucher: | Verification: sight or sound rec.
7/25/92: ONE ADULT 4-5 FEET IN LENGTH OBSERVED ON B LOOP ROAD BY A. MCCASLIN, ASST PARK MANAGER; SNAKE WAS CAPTURED & RELEASED ELSEWHERE IN THE PARK. 8/1/92: ONE ADULT 4-5 FEET IN LENGTH, DARK BROWN IN COLOR, OBSERVER BY J.M. LAIRD AT THE PARK INTERPRETIVE CENTER; CAPTURED & LATER RELEASED.

Element: CROTALUS HORRIDUS (TIMBER RATTLESNAKE) #114
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE CREEK CBS Site #: 18
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: HALL,C.D.(CO BIOL SURVEY 1996)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENW14
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 23" Long: 92 13' 56"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 28 August 1996
3 TIMBER RATTLESNAKES WERE OBSERVED AMONG ROCK OUTCROPS ON SW-FACING SLOPE. HABITAT CONSISTED OF GRASSY OPENINGS WITHIN DEGRADED OAK FOREST ALONG THE RIDGE. HAY FIELDS WERE PRESENT ABOVE AND BELOW THE RIDGE. ALL 3 SNAKES APPEARED TO BE AT LEAST 1M IN TOTAL BODY LENGTH. PHOTOS WERE TAKEN OF THE SNAKES AND HABITAT.

Element: DENDROICA CERULEA (CERULEAN WARBLER) #12
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: STUCKER,S. & C.SCHUMACHER(CO BIOL SURVEY 1996)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 48" Long: 92 13' 30"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 05 June 1996
BREEDING SEASON OBSERVATION. 1 MALE HEARD SINGING ALONG CANFIELD CREEK. HABITAT WAS LOWLAND HARDWOODS & OAK-MAPLE-BASSWOOD FOREST ADJACENT TO CREEK.

Element: DENDROICA CERULEA (CERULEAN WARBLER) #15
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: STUCKER,S. & C.SCHUMACHER (CO BIOL SURVEY 1996)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SESW07
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 52" Long: 92 12' 6"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 03 June 1996
BREEDING SEASON OBSERVATION. ONE MALE HEARD SINGING. HABITAT WAS OAK FOREST ON SLOPE NEAR SMALL OPENING, IN RAVINE. ACADIAN FLYCATCHER PRESENT IN SAME AREA.

Element: DENDROICA CERULEA (CERULEAN WARBLER) #16
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: STUCKER,S. & C.SCHUMACHER (CO BIOL SURVEY 1996)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNE13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 32" Long: 92 13' 4"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 03 May 1996
BREEDING SEASON OBSERVATION. TWO SINGING MALES HEARD ALONG SOUTH BRANCH ROOT RIVER. HABITAT WAS OAK FOREST ON SOUTH-FACING SLOPE.

Element: DENDROICA CERULEA (CERULEAN WARBLER) #17
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: STUCKER,S. & C.SCHUMACHER (CO BIOL SURVEY 1996)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 28" Long: 92 13' 27"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 June 1996
BREEDING SEASON OBSERVATION. ONE SINGING MALE SEEN/HEARD. HABITAT WAS LOWLAND HARDWOODS ALONG CREEK, WITH OAK FOREST ON ADJACENT SLOPES.

Element: DENDROICA CERULEA (CERULEAN WARBLER) #18
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: STUCKER,S. & C.SCHUMACHER (CO BIOL SURVEY 1996)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSW12
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 58" Long: 92 13' 35"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 03 June 1996
BREEDING SEASON OBSERVATION. ONE MALE HEARD SINGING. HABITAT WAS MATURE OAK FOREST, W/BASSWOOD AND SUGAR MAPLE.

Element: EMPIDONAX VIRESCENS (ACADIAN FLYCATCHER) #14
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: STUCKER,S. (CO BIOL SURVEY 1996)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SENE18
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 23" Long: 92 11' 28"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 06 June 1996
BREEDING SEASON OBSERVATION. ONE MALE HEARD SINGING. BIRD SANG FROM SEVERAL PERCHES ALONG A 100-METER STRETCH OF STREAM. HABITAT WAS MATURE MAPLE-BASSWOOD FOREST, WITH TALL SUGAR MAPLES & BASSWOOD UP TO 60 CM DBH. RATHER DENSE UNDERSTORY OF OSTRYA, CARPINUS, AND SUGAR MAPLE SAPLINGS. OPEN SHRUB-HERBACEOUS LAYERS. NEARBY SMALL, CLEAR-FLOWING STREAM WITH ERODED BANKS AND MIX OF ROCKY & MUDDY STREAMBED. STREAM WIDTH APPROXIMATELY 2 METERS.

Element: EMPIDONAX VIRESCENS (ACADIAN FLYCATCHER) #15
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: STUCKER,S. AND C.SCHUMACHER (CO BIOL SURVEY 1996)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSW12
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 48" Long: 92 13' 35"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 31 May 1996
BREEDING SEASON OBSERVATION. ONE SINGING MALE SEEN AND HEARD. HABITAT WAS MATURE OAK FOREST W/SOME SUGAR MAPLES, ON SLOPE NEAR INTERMITENT STREAM.

Element: EMPIDONAX VIRESCENS (ACADIAN FLYCATCHER) #16
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: STUCKER,S. & C.SCHUMACHER (CO BIOL SURVEY 1996)
Location: FILLMORE COUNTY, MN
Legal : T102N R11W SESW07
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 52" Long: 92 12' 6"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 03 June 1996
BREEDING SEASON OBSERVATION. ONE MALE HEARD SINGING. HABITAT WAS OAK FOREST ON SLOPE NEAR SMALL OPENING, IN RAVINE. CERULEAN WARBLER PRESENT IN SAME AREA.

Element: EMPIDONAX VIRESCENS (ACADIAN FLYCATCHER) #60
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: STUCKER,J.H. (BIODIVERSITY OF SE MN FORESTED STREAMS)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 44" Long: 92 13' 26"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 01 June 1996
BREEDING SEASON OBSERVATION. ONE SINGING MALE PRESENT ALONG CANFIELD CREEK.

Element: EMYDOIDEA BLANDINGII (BLANDING'S TURTLE) #604
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: BRAASCH,M.AND M.ROOT(DNR GREEN SLIP)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SE13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 8" Long: 92 12' 50"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 04 September 1991
ONE MALE BLANDINGS TURTLE, 8.5 INCHES LONG, SEEN CROSSING ROAD JUST NW OF UNLOADING SPUR.

Element: LAMPETRA APPENDIX (AMERICAN BROOK LAMPREY) #37
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: MDNR FISHERIES
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 24" Long: 92 13' 16"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 07 May 1987
3 SPECIMENS SAMPLED DURING STREAM SURVEY OF FORESTVILLE CREEK AT RIVER MILE 0.1. DISTANCE CALCULATED BY MAP WHEEL.

Element: LAMPETRA APPENDIX (AMERICAN BROOK LAMPREY) #38
State Status: No Legal Status
EO Size: | EO Rank: | Current Status: | Intended Status:
Site: FORESTVILLE CREEK | CBS Site #: 18
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: MDNR FISHERIES
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 14
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 20" Long: 92 14' 22"
Precision: within 0.50 mile
Voucher: | Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 05 May 1987
1 SPECIMEN SAMPLED DURING STREAM SURVEY OF FORESTVILLE CREEK AT RIVER MILE 1.5. DISTANCE CALCULATED BY MAP WHEEL.

Element: LAMPETRA APPENDIX (AMERICAN BROOK LAMPREY) #52
State Status: No Legal Status
EO Size: | EO Rank: | Current Status: | Intended Status:
Site: FORESTVILLE PARK | CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: MDNR FISHERIES
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NW24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 32" Long: 92 13' 18"
Precision: within 0.25 mile, confirmed
Voucher: | Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 13 September 1990
1 SPECIMEN SAMPLED DURING STREAM SURVEY OF THE SOUTH BRANCH OF ROOT RIVER 11 SEPT 1986 AT RIVER MILE 28.6 (A-LOOP CAMPGROUND). NUMBER OF SPECIMENS NOT PROVIDED IN 1990 SURVEY.

Element: LAMPETRA APPENDIX (AMERICAN BROOK LAMPREY) #54
State Status: No Legal Status
EO Size: | EO Rank: | Current Status: | Intended Status:
Site: SOUTH ROOT 3 | CBS Site #: 16
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: MDNR FISHERIES
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SE23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 21" Long: 92 14' 13"
Precision: within 0.25 mile, confirmed
Voucher: | Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 09 September 1986
1 SPECIMEN SAMPLED DURING STREAM SURVEY OF THE SOUTH BRANCH OF ROOT RIVER AT RIVER MILE 31.5 ON 30 SEPT 1981, 1 SAMPLED ON 18 SEPT 1984, & 1 SAMPLED IN 1986. CALCULATED BY MAP WHEEL. STATION IS 0.1 MILES UPSTREAM OF TOWNSHIP ROAD.

Element: LAMPETRA APPENDIX (AMERICAN BROOK LAMPREY) #63
State Status: No Legal Status
EO Size: | EO Rank: | Current Status: | Intended Status:
Site: SOUTH ROOT 3 | CBS Site #: 16
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: MDNR FISHERIES
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SW22
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 14" Long: 92 15' 35"
Precision: within 0.25 mile, confirmed
Voucher: | Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 27 October 1986
2 SPECIMENS SAMPLED DURING STREAM SURVEY OF THE SOUTH BRANCH OF ROOT RIVER AT RIVER MILE 33.8. DISTANCE CALCULATED BY MAP WHEEL.

Element: LAMPETRA APPENDIX (AMERICAN BROOK LAMPREY) #69
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: MDNR FISHERIES
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NW22
Quad Map: WYKOFF (X20A)
Latitude: 43 37' 32" Long: 92 15' 56"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 27 October 1986
7 SPECIMENS SAMPLED DURING STREAM SURVEY OF THE SOUTH BRANCH OF ROOT RIVER AT RIVER MILE 35.6 (COUNTY ROAD 5) ON 5 SEPT 1974; 3 SPECIMENS ON 10 SEPT 1986; 3 SPECIMENS ON 27 OCT 1986. DISTANCE CALCULATED BY MAP WHEEL.

Element: LAMPROPELTIS TRIANGULUM (MILK SNAKE) #1
State Status: No Legal Status
EO Size: EO Rank: Current Status: 1 Intended Status: 1
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: MORIARTY,J. 1985 REPORT TO DNR NONGAME
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 24
Quad Map: FOUNTAIN (X21B)
Latitude: 43 37' 30" Long: 92 13' 10"
Precision: within 0.50 mile
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1985
REPORTED BY PARK STAFF TO JOHN MORIARTY.

Element: LAMPROPELTIS TRIANGULUM (MILK SNAKE) #9
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: WHITE,M.(DNR PARKS 1995); WARNER, GUNDERSON & HAYWARD (1948); SWANSON,G.(1933)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 22" Long: 92 13' 11"
Precision: within 0.25 mile, confirmed
Voucher: JFBM-1324 Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1995
3 SPECIMENS COLLECTED IN FILLMORE COUNTY. THE FIRST COLLECTED IN THE COUNTY BY G. SWANSON ON MAY 14, 1933 (JFBM-77). THE SECOND TWO COLLECTED AT FORESTVILLE BY WARNER, GUNDERSON AND HAYWARD ON JUNE 24, 1948 (JFBM-1323 AND 1324). ONE SNAKE OBSERVED NEAR THE ANGLER'S PARKING LOT BY M. WHITE IN 1995.

Element: MYOTIS SEPTENTRIONALIS (NORTHERN MYOTIS) #6
State Status: SPECIAL CONCERN
EO Size: EO Rank: C Current Status: 1 Intended Status: 6
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSW20
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 1" Long: 92 18' 28"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 February 2001
NORTHERN MYOTIS (MYSTERY CAVE I). A FEW INDIVIDUALS REGULARLY OBSERVED HIBERNATING IN THIS PORTION OF THE CAVE. MOST ARE FOUND IN PASSAGES CLOSE TO THE ENTRANCE.

Element: MYOTIS SEPTENTRIONALIS (NORTHERN MYOTIS) #15
State Status: SPECIAL CONCERN
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 1
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENE30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 58" Long: 92 18' 36"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 February 2001
NORTHERN MYOTIS (OLD MYSTERY CAVE). A FEW INDIVIDUALS FOUND CONSISTENTLY DURING WINTER SURVEYS.

Element: MYOTIS SEPTENTRIONALIS (NORTHERN MYOTIS) #16
State Status: SPECIAL CONCERN
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSE20
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 22" Long: 92 17' 56"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 February 2001
NORTHERN MYOTIS (MYSTERY CAVE II). A FEW INDIVIDUALS (LESS THAN 5) HAVE BEEN OBSERVED HIBERNATING IN THIS PORTION OF THE CAVE DURING WINTER COUNTS. THE ACTUAL NUMBER MAY BE HIGHER DUE TO THE DIFFICULTY OF IDENTIFYING MYOTIS TO SPECIES LEVEL WHERE THEY ROOST IN THE TALLER PASSAGES.

Element: MYOTIS SEPTENTRIONALIS (NORTHERN MYOTIS) #17
State Status: SPECIAL CONCERN
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 1989)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESW20
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 23" Long: 92 18' 11"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 February 1989
NORTHERN MYOTIS (MYSTERY CAVE III). ONE OR TWO INDIVIDUALS HAVE BEEN FOUND HIBERNATING IN THIS PORTION OF THE CAVE SYSTEM DURING WINTER COUNTS. THE ACTUAL NUMBER MAY BE HIGHER DUE TO THE DIFFICULTY OF IDENTIFYING MYOTIS TO SPECIES WHERE THEY ROOST IN THE TALLER PASSAGES.

Element: MYOTIS SEPTENTRIONALIS (NORTHERN MYOTIS) #18
State Status: SPECIAL CONCERN
EO Size: EO Rank: D Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: NORDQUIST,G.E.(CO BIOL SURVEY 1989)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENE30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 57" Long: 92 18' 37"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 21 March 1989
NORTHERN MYOTIS (OLD STILL CAVE). ONLY ONE INDIVIDUAL WAS FOUND HIBERNATING IN THIS CAVE DURING WINTER SURVEYS BETWEEN 1983 AND 1989.

Element: MYOTIS SEPTENTRIONALIS (NORTHERN MYOTIS) #19
State Status: SPECIAL CONCERN
EO Size: EO Rank: A Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 1999)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 18" Long: 92 13' 13"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 20 August 1999

NORTHERN MYOTIS. A SINGLE PASS WAS RECORDED, ANABAT CALL SEQUENCE ON FILE. THE FORAGING ACTIVITY OF BATS WAS FOCUSED OVER THE RIVER AND AT THE FOREST EDGE. LOCATION IN 1996 USED THE SKYE DETECTOR AND RECORDED MYOTIS SPECIES AND ONE POSSIBLE LASIURUS BOREALIS.

Element: MYOTIS SEPTENTRIONALIS (NORTHERN MYOTIS) #20
State Status: SPECIAL CONCERN
EO Size: EO Rank: B Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 1999)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENE13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 32" Long: 92 12' 53"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 20 August 1999

NORTHERN MYOTIS. A FEW PASSES RECORDED NEAR THE RIVER. ANABAT CALL SEQUENCES ON FILE. FORAGING ACTIVITY PRIMARILY ASSOCIATED WITH THE RIVER, WITH OCCASIONAL PASSES OVER THE OPEN LAWNS. MYOTIS LUCIFUGUS ALSO RECORDED. ANABAT RECORDINGS TAKEN BETWEEN 22:19 AND 22:29 HOURS. PREVIOUS SURVEYS AT THIS LOCATION USED THE SKYE DETECTOR AND RECORDED MYOTIS SPECIES AND EPTESICUS FUSCUS.

Element: MYOTIS SEPTENTRIONALIS (NORTHERN MYOTIS) #21
State Status: SPECIAL CONCERN
EO Size: EO Rank: A Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 1999)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNE13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 29" Long: 92 13' 9"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 20 August 1999

NORTHERN MYOTIS. SEVERAL PASSES RECORDED AMONG HEAVY BAT FORAGING ACTIVITY. MAJORITY OF BATS WERE MYOTIS LUCIFUGUS. ANABAT CALL SEQUENCES ON FILE. MOST OF FORAGING ACTIVITY WAS CONCENTRATED OVER THE RIVER, CLOSE TO THE WATER SURFACE AND AT MID-CANOPY HEIGHT. ANABAT RECORDINGS WERE TAKEN BETWEEN 21:23 AND 22:00 HOURS. BAT SURVEYS AT SAME LOCATION IN 1996 USED THE SKYE DETECTOR AND RECORDED A LOT OF FORAGING ACTIVITY BY MYOTIS SPP.

Element: MYOTIS SEPTENTRIONALIS (NORTHERN MYOTIS) #22
State Status: SPECIAL CONCERN
EO Size: EO Rank: A Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 1999)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSW24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 22" Long: 92 13' 27"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 21 August 1999

NORTHERN MYOTIS. A FEW PASSES RECORDED AMONG NUMEROUS BATS FORAGING ALONG THE RIVER CORRIDOR, 21 AUG 1999. ANABAT CALL SEQUENCES ON FILE. FORAGING ACTIVITY PRIMARILY ALONG THE FOREST EDGE OF CANFIELD CREEK AND ROOT RIVER. OTHER SPECIES RECORDED INCLUDED MYOTIS LUCIFUGUS, PIPISTRELLUS SUBFLAVUS, EPTESICUS FUSCUS, AND LASIURUS BOREALIS. ANABAT RECORDINGS TAKEN FROM 20:09 TO 21:33 HOURS. MIST NET SET IN 1996 CAPTURED NO BATS, ALTHOUGH PRESENT IN THE VICINITY.

Element: MYOTIS SEPTENTRIONALIS (NORTHERN MYOTIS) #23
State Status: SPECIAL CONCERN
EO Size: EO Rank: C Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 1999)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENW24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 27" Long: 92 13' 26"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 21 August 1999
NORTHERN MYOTIS. A FEW PASSES RECORDED AMONG BATS FORAGING IN THE CLEARING AROUND THE GROUP CAMP SHELTER. ANABAT CALL SEQUENCES ON FILE. OTHER SPECIES RECORDED WERE MYOTIS LUCIFUGUS, EPTESICUS FUSCUS, & LASIURUS BOREALIS. ANABAT RECORDINGS TAKEN FROM 20:27 TO 23:39 HOURS.

Element: NOVASUCCINEA N. SP. MINNESOTA A (MINNESOTA PLEISTOCENE AMBERSNAIL) #5
State Status: THREATENED
EO Size: EO Rank: Current Status: 2 Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SESW23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 0" Long: 92 14' 31"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1985
LANDSNAILS FOUND ON MOIST CLIFF #1 TO 150 FEET ABOVE STREAM LEVEL, ALSO IN TALUS AND ONTO SURFACE OF ALGIFIC PORTIONS. PROBABLY BEST SUCCINEA SITE FOUND BY FREST.

Element: NOVASUCCINEA N. SP. MINNESOTA A (MINNESOTA PLEISTOCENE AMBERSNAIL) #6
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESWSW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 18" Long: 92 13' 30"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1985
CANFIELD CREEK 10. VERY LARGE POPULATION OF LANDSNAILS FOUND ON CLIFF FACE AND TOP OF TALUS TO 150 FEET ABOVE CREEK LEVEL AT MOIST CLIFF SITE #16.

Element: NOVASUCCINEA N. SP. MINNESOTA B (IOWA PLEISTOCENE AMBERSNAIL) #3
State Status: ENDANGERED
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESWSW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 18" Long: 92 13' 30"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1985
CANFIELD CREEK 10. SMALL POPULATION OF LANDSNAILS FOUND ON CLIFF FACE AND TOP OF TALUS TO 150 FT ABOVE CREEK LEVEL AT MOIST CLIFF SITE #16.

Element: PIPISTRELLUS SUBFLAVUS (EASTERN PIPISTRELLE) #15
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: NORDQUIST,G.(CO BIOL SURVEY 1989) AND BIRNEY,E.(1985)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENE30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 57" Long: 92 18' 37"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 21 March 1989
EASTERN PIPISTRELLE. (OLD STILL CAVE). A COUPLE OF INDIVIDUALS WERE CONSISTENTLY FOUND HIBERNATING IN THIS CAVE DURING WINTER SURVEYS BETWEEN 1983 AND 1989.

Element: PIPISTRELLUS SUBFLAVUS (EASTERN PIPISTRELLE) #17
State Status: SPECIAL CONCERN
EO Size: EO Rank: A Current Status: 6 Intended Status: 89
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SWSW20
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 1" Long: 92 18' 22"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 February 2001
EASTERN PIPISTRELLE (MYSTERY CAVE I). MOST INDIVIDUALS OF THIS SPECIES THAT HIBERNATE IN THE MYSTERY CAVE SYSTEM ARE FOUND IN THIS PORTION OF THE CAVE (51%) TWENTY-THREE INDIVIDUALS WERE FOUND DURING WINTER, 2001. THIS PORTION OF MYSTERY CAVE APPEARS ESPECIALLY IMPORTANT TO HIBERNATING PIPISTRELLES.

Element: PIPISTRELLUS SUBFLAVUS (EASTERN PIPISTRELLE) #29
State Status: SPECIAL CONCERN
EO Size: EO Rank: B Current Status: Intended Status:
Site: SOUTH ROOT 1 CBS Site #: 14
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NENE30
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 36' 58" Long: 92 18' 36"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 February 2001
EASTERN PIPISTRELLE (OLD MYSTERY CAVE). SEVERAL INDIVIDUALS FOUND HIBERNATING IN THIS CAVE DURING WINTER SURVEYS IN THE 1980'S. HIGHEST NUMBERS WERE RECORDED IN THE BACK ROOM AND LESS THAN 10 INDIVIDUALS FOUND IN THE MAIN PASSAGES OF THE CAVE. DURING WINTER 2001, 19 INDIVIDUALS WERE COUNTED IN THE MAIN PASSAGES.

Element: PIPISTRELLUS SUBFLAVUS (EASTERN PIPISTRELLE) #30
State Status: SPECIAL CONCERN
EO Size: EO Rank: A Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESE20
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 19" Long: 92 17' 21"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 February 2001
EASTERN PIPISTRELLE (MYSTERY CAVE II). THIS PORTION OF THE MYSTERY CAVE SYSTEM SUPPORTS THE SECOND HIGHEST NUMBER OF HIBERNATING INDIVIDUALS OF THIS SPECIES (44%). TWENTY INDIVIDUALS WERE FOUND DURING WINTER, 2001. THEY WERE DISTRIBUTED THROUGHOUT THIS SECTION OF THE CAVE, WITH THE GREATEST DENSITIES CLOSER TO THE ENTRANCE (CAROUSEL AREA, 4TH AND 5TH AVENUES).

Element: PIPISTRELLUS SUBFLAVUS (EASTERN PIPISTRELLE) #31
State Status: SPECIAL CONCERN
EO Size: EO Rank: C Current Status: Intended Status:
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 2001)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESW20
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 24" Long: 92 18' 7"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 February 2001
EASTERN PIPISTRELLE (MYSTERY CAVE III). A FEW INDIVIDUALS HAVE BEEN FOUND HIBERNATING IN THIS PORTION OF THE CAVE SYSTEM DURING WINTER COUNTS. TWO INDIVIDUALS WERE FOUND DURING WINTER, 2001 (4% OF THE TOTAL COUNT OF THIS SPECIES IN THE CAVE).

Element: PIPISTRELLUS SUBFLAVUS (EASTERN PIPISTRELLE) #32
State Status: SPECIAL CONCERN
EO Size: EO Rank: A Current Status: Intended Status:
Site: FORESTVILLE PARK CBS Site #: 19
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 1999)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENW13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 18" Long: 92 13' 13"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 20 August 1999
EASTERN PIPISTRELLE. A COUPLE OF INDIVIDUALS MAKING REPEATED PASSES OVER THE BRIDGE AND ALONG THE RIVER CORRIDOR. ANABAT CALL SEQUENCES ON FILE. FORAGING ACTIVITY APPEARED TO BE FOCUSED OVER THE RIVER AND AT THE FOREST EDGE. OTHER SPECIES RECORDED WERE MYOTIS LUCIFUGUS AND M. SEPTENTRIONALIS. ANABAT RECORDINGS TAKEN BETWEEN 22:37 AND 23:05 HOURS. BAT SURVEY AT SAME LOCATION IN 1996 USED THE SKYE DETECTOR AND RECORDED MYOTIS SPECIES & ONE POSSIBLE LASIURUS BOREALIS.

Element: PIPISTRELLUS SUBFLAVUS (EASTERN PIPISTRELLE) #33
State Status: SPECIAL CONCERN
EO Size: EO Rank: A Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY) FORESTVILLE/MYSTERY CAVE STATE PARK
Source: NORDQUIST,G.E.(CO BIOL SURVEY 1999)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWSW24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 22" Long: 92 13' 27"
Precision: within 0.25 mile, confirmed
Voucher: Verification: photo rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 21 August 1999
EASTERN PIPISTRELLE. SEVERAL INDIVIDUALS RECORDED FORAGING ALONG THE RIVER CORRIDOR IN THE EARLY EVENING OF 21 AUG 1999. ANABAT CALL SEQUENCES ON FILE. ACTIVITY WAS LARGELY RESTRICTED TO THE FOREST EDGE OF CANFIELD CREEK AND ROOT RIVER. OTHER SPECIES RECORDED INCLUDED MYOTIS LUCIFUGUS, M. SEPTENTRIONALIS, EPTESICUS FUSCUS, AND LASIURUS BOREALIS. ANABAT RECORDINGS TAKEN FROM 20:09 TO 21:33 HOURS. MIST NET SET IN 1996 CAPTURED NO BATS, ALTHOUGH IN THE VICINITY.

Element: REITHRODONTOMYS MEGALOTIS (WESTERN HARVEST MOUSE) #15
State Status: No Legal Status
EO Size: EO Rank: Current Status: 1 Intended Status:
Site: FORESTVILLE PARK
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: GUNDERSON,H.L.AND HAYWARD(208)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 13
Quad Map: FOUNTAIN (X21B)
Latitude: 43 38' 35" Long: 92 12' 50"
Precision: within 0.50 mile
Voucher: 2510 JFBM Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: June 1948
WESTERN HARVEST MOUSE. FORESTVILLE. 3 DUP(226,232,239, JFBM 2511-2513). FENCEROW WITH TALL GRASS. AGRICULTURAL UPLAND.

Element: SEIURUS MOTACILLA (LOUISIANA WATERTHRUSH) #62
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: STUCKER,S.(CO BIOL SURVEY 1996) & J.HATHAWAY(BIODIV OF SE MN FORESTED STREAMS)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 46" Long: 92 13' 28"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 July 1996
POSITIVE NESTING. ADULTS AT NEST W/2+ YOUNG, FOUND ON 4 JUNE. HABITAT WAS DECIDUOUS FOREST, W/MANY LARGE TREES, ALONG CANFIELD CREEK. DIVERSE LOWLAND HARDWOOD ON VALLEY BOTTOM. BASSWOOD DOMINANT(?), W/ASH, BLACK WILLOW, OAK, & SUGAR MAPLE. CANOPY COVER 85-90%; WEEDY GROUND COVER. NUMEROUS SMALL, PARTIALLY SUBMERGED ROCKS IN STREAM. ERODED BANKS W/EXPOSED ROOTS. SINGING MALE IN SWSW24 ON 2 MAY, PERHAPS FROM SAME PAIR.

Element: SEIURUS MOTACILLA (LOUISIANA WATERTHRUSH) #63
State Status: SPECIAL CONCERN
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Parks and Recreation
Managed Area(s): FORESTVILLE/MYSTERY CAVE STATE PARK R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: STUCKER,S.(CO BIOL SURVEY 1996) & J.HATHAWAY(BIODIV OF SE MN FORESTED STREAMS)
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 26" Long: 92 13' 23"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 14 July 1996
POSITIVE NESTING. ADULTS SEEN CARRYING FOOD, BUT NEST NOT FOUND. BIRDS SEEN ON SEVERAL OCCASIONS, FROM 2 MAY THROUGH JULY 14. HABITAT WAS DECIDUOUS FOREST ALONG CANFIELD CREEK. DIVERSE LOWLAND HARDWOODS ON VALLEY BOTTOM, W/LARGE BASS-WOODS DOMINANT; ALSO WALNUT, OAK, SUGAR MAPLE, AND COTTONWOOD. OAK-MAPLE-BASSWOOD FOREST W/ SCATTERED WHITE PINES ON ADJACENT SLOPES. STREAM 3-5 METERS IN WIDTH. SCATTERED PATCHES OF EXPOSED ROCKS IN STREAM. ERODED BANKS & FALLEN LOGS.

Element: VERTIGO HUBRICHTI (HUBRICHT'S VERTIGO) #5
State Status: No Legal Status
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNWSE24
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 20" Long: 92 13' 5"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1982
SNAIL SPECIES OCCURS ON ALGIFIC TALUS SLOPE #2.

Element: VERTIGO HUBRICHTI HUBRICHTI (MIDWEST PLEISTOCENE VERTIGO) #1
State Status: ENDANGERED
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SE23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 13" Long: 92 13' 59"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 25 May 1982
SMALL POPULATION OF SNAILS LOCATED ON LARGE, COMPLEX ALGIFIC TALUS SLOPE WITH WEAK CIRCULATION. SLOPE HAS MUCH OPEN ROCK, SOME OVERSTEEP TALUS. SINKS EXTEND SEVERAL HUNDRED YARDS BACK INTO UPLAND FIELD. ASSOC PLANT SPP INCLUDES ABIES BALSAMEA, CHRYSOPLENIUM IOWENSE, ADOXA MOSCHATELLINA & PINUS STROBUS. MUCH OF SITE GRAZED, PARTICULARLY EAST END. VERTIGO HUBRICHTI VARIABILIS ALSO OBSERVED AT SITE.

Element: VERTIGO HUBRICHTI HUBRICHTI (MIDWEST PLEISTOCENE VERTIGO) #2
State Status: ENDANGERED
EO Size: EO Rank: Current Status: 2 Intended Status: 28
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENWNW26
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 52" Long: 92 14' 46"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 May 1982
A MEDIUM SIZE POPULATION OF LANDSNAILS WITH EVIDENCE OF REPRODUCTION FOUND ON AN ALGIFIC TALUS SLOPE ALONG THE SOUTH BRANCH OF THE ROOT RIVER. IN ASSOCIATION WITH A LARGE POPULATION OF HENDERSONIA OCCULTA & A VERY SMALL POP OF VERTIGO HUBRICHTI VARIABILIS.

Element: VERTIGO HUBRICHTI VARIABILIS N. SUBSP. (VARIABLE PLEISTOCENE VERTIGO) #1
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SE23
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 37' 13" Long: 92 13' 59"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 1982
SMALL POPULATION OF SNAILS LOCATED ON LARGE, COMPLEX ALGIFIC TALUS SLOPE WITH WEAK CIRCULATION. SLOPE HAS MUCH OPEN ROCK, SOME OVERSTEEP TALUS. SINKS EXTEND SEVERAL HUNDRED YARDS BACK INTO UPLAND FIELD. ASSOC PLANT SPP INCLUDE ABIES BALSAMEA, CHRYSOPLENIUM IOWENSE, ADOXA MOSCHATELLINA & PINUS STROBUS. MUCH OF SITE GRAZED, PARTICULARLY EAST END. VERTIGO HUBRICHTI HUBRICHTI ALSO OBSERVED AT SITE.

Element: VERTIGO HUBRICHTI VARIABILIS N. SUBSP. (VARIABLE PLEISTOCENE VERTIGO) #2
State Status: THREATENED
EO Size: EO Rank: Current Status: 2 Intended Status: 28
Site: SOUTH ROOT 3 CBS Site #: 16
Ownership: Private
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENWNW26
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 52" Long: 92 14' 47"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 May 1982
VERY SMALL POPULATION LOCATED ON GALENA ALGIFIC TALUS SLOPE ALONG THE SOUTH BRANCH OF THE ROOT RIVER. SLOPE IS LARGE, N-FACING, STEEP & COMPLEX. LARGE POPULATIONS OF PLANT SPP SAMBUCUS PUBENS & CHRYSOPLENIUM IOENSE OCCUR AT SITE. SNAIL SPP HENDERSONIA OCCULTA & VERTIGO HUBRICHTI HUBRICHTI ALSO OCCUR.

Element: VERTIGO HUBRICHTI VARIABILIS N. SUBSP. (VARIABLE PLEISTOCENE VERTIGO) #3
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W SENESW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 20" Long: 92 13' 16"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 23 May 1982
A SMALL POPULATION OF LANDSNAILS WITH EVIDENCE OF REPRODUCTION FOUND ON AN ALGIFIC TALUS SLOPE ALONG FIRST TRIBUTARY OF CANFIELD CREEK NORTH OF BIG SPRING. IN ASSOCIATION WITH A MINIMAL POPULATION OF DISCUS CATSKILLENSIS AND A SMALL POPULATION OF HENDERSONIA OCCULTA.

Element: VERTIGO HUBRICHTI VARIABILIS N. SUBSP. (VARIABLE PLEISTOCENE VERTIGO) #4
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: MN DNR Forestry (State Forest and Con-Con Land)
Managed Area(s): R.J.DORER STATE FOREST
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NESWSW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 14" Long: 92 13' 30"
Precision: within 0.25 mile, confirmed
Voucher: Verification: sight or sound rec.
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 23 May 1982
A SMALL POPULATION OF LANDSNAILS WITH EVIDENCE OF REPRODUCTION FOUND ON A SLOPE WITH LARGE ALGIFIC AND MADERATE COMPONENTS. SITE IS ALONG CANFIELD CREEK. IN ASSOCIATION WITH VERTIGO OCCULTA, HENDERSONIA OCCULTA AND RELICT POPULATIONS OF DISCUS CATSKILLENSIS AND VALLONIA GRACILICOSTA.

Element: VERTIGO HUBRICHTI VARIABILIS N. SUBSP. (VARIABLE PLEISTOCENE VERTIGO) #5
State Status: THREATENED
EO Size: EO Rank: Current Status: 8 Intended Status: 8
Site: SOUTH ROOT 2 CBS Site #: 15
Ownership: The Nature Conservancy
Managed Area(s): SAXIFRAGE HOLLOW R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W NWNWSE21
Quad Map: CHERRY GROVE (X20D)
Latitude: 43 37' 18" Long: 92 16' 38"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 03 June 1982
VERY SMALL POPULATION LOCATED ON LARGE COMPOSITE GALENA ALGIFIC TALUS SLOPE ALONG ROOT RIVER. LARGE POPULATIONS OF PLANT SPP CHRYSOPLENIUM IOENSE & ADOXA MOSCHATELLINA OCCUR AT SITE.

Element: VERTIGO HUBRICHTI VARIABILIS N. SUBSP. (VARIABLE PLEISTOCENE VERTIGO) #6
State Status: THREATENED
EO Size: EO Rank: Current Status: Intended Status:
Site: CANFIELD CREEK CBS Site #: 17
Ownership: Owner unknown
Managed Area(s): R.J.DORER STATE FOREST (STATUTORY BNDRY)
Source: FREST,T.
Location: FILLMORE COUNTY, MN
Legal : T102N R12W 0ESENW25
Quad Map: GREENLEAFTON (X21C)
Latitude: 43 36' 40" Long: 92 13' 15"
Precision: within 0.25 mile, confirmed
Voucher: Verification: verified
DNR Region: 5
Wildlife Area: 510
Forestry District: 533
Last Obs.: 24 May 1982
VERY SMALL POPULATION LOCATED ON MODERATE-SIZED GALENA ALGIFIC TALUS SLOPE ABOVE MAIN CREEK. LARGE POPULATIONS OF PLANT SPP B. PAPYRIFERA & G. ROBERTIANUM OCCUR AT SITE.

Appendix 2a

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MINNESOTA NATURAL HERITAGE PROGRAM                          DNR RELEVE #:4991
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835                          10:06 Tuesday, NOVEMBER 20, 2001

      ----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------


GENERAL INFORMATION
Surveyor's Releve #: R95-30                                   EO Rec #:     0
*Surveyor's ID Code: SCZ  (Scott C. Zager)
Date: 26  Month: SEP  Year: 1995  (e.g. 04 JUL 1993)
CBS Site #:  15  or Site Name:
DNR Ownership Code: 00  (Private Ownership)
*NC Code: DPSEBB  (Dry Prairie (Southeast) Bedrock Bluff Subtype)
Commun. Ranking in Releve:A   Stand typical of Commun. Type:_  Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN     *County Code: 23  (Fillmore)
Quad Codes   DNR: X20A  Universal: 43092F3  (Wykoff)
Township: 102N (e.g. 143N)  Range: 12W (e.g. 32W)
QQRT: SW QRT: SW of Section 16
Latitude:  43 degrees, 38 minutes, 2 seconds            LL/GPS registration:
Longitude: 92 degrees, 17 minutes, 13 seconds           *Accuracy: _  Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 100  Elev. (ft.): 1340  Slope: 05SW      Slope Position: _
*ECS Subsection:  23  (Rochester Plateau)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40   (Red Wing-La Crescent Uplands)

Remarks: Exct prairie w/diverse forbs abund and well dispersed in open areas.
         Wdy cover 60% but w/sev open areas. Wdy cover mostly Rhus glabra.
         Upper slope to crest SW aspect.  Quarry across road

OTHER DATA COLLECTED
Soils: N   Forestry: N  o=old growth   Water Chemistry: N   Publication: N
                        y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Needleleaf Evergreen, Height: .0-2m, Cover barely present
     1.  Juniperus virginiana        (Red cedar)

Woody Broadleaf Deciduous, Height: .0-2m, Cover almost absent
     +.  Rhus glabra        (Smooth sumac)

Graminoid, Height: .0-2m, Cover continuous
     3.  Schizachyrium scoparium        (Little Bluestem)
     2.  Bouteloua curtipendula        (Side-oats grama)
     2.  Sorghastrum nutans        (Indian grass)
     1.  Carex        (Sedge)
     +.  Elymus canadensis        (Nodding wild-rye)
     +.  Panicum cf. oligosanthes        (Scribner's panic grass)
     +.  Poa compressa        (Canada bluegrass)

Forb, Height: .0-2m, Cover patchy
     1.  Gentianella quinquefolia        (Stiff gentian)
     1.  Helianthus rigidus        (Stiff sunflower)
     1.  Ratibida pinnata        (Gray-headed coneflower)
     1.  Silphium laciniatum        (Compass-plant)
     1.  Solidago canadensis
     1.  Solidago rigida        (Stiff goldenrod)
     +.  Amorpha canescens        (Lead-plant)
     +.  Anemone cylindrica        (Thimbleweed)
     +.  Artemisia ludoviciana        (Western mugwort, White sage)
     +.  Asclepias verticillata
     +.  Aster ericoides        (Heath aster)
     +.  Aster laevis        (Smooth aster)
     +.  Aster oblongifolius        (Aromatic aster)
     +.  Gentiana alba
     +.  Heliopsis helianthoides        (Ox-eye)
     +.  Helianthus tuberosus        (Jerusalem artichoke)
     +.  Kuhnia eupatorioides        (False boneset)
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Forb, Height: .0-2m, Cover patchy (continued)

+. cf. Lathyrus (Veiny pea)
+. Lespedeza capitata (Round-headed bush-clover)
+. Liatris aspera (Rough blazing star)
+. Lithospermum canescens (Hoary puccoon)
+. Onosmodium cf. molle
+. Petalostemon candidum (White prairie-clover)
+. Phlox pilosa (Prairie phlox, downy phlox)
+. Solidago nemoralis (Gray goldenrod)
+. Solidago speciosa (Showy goldenrod)
+. Zizia aptera (Heart-leaved alexanders)
R. Asclepias viridiflora OP (Green milkweed)
R. Pedicularis canadensis (Wood-betony)
R. Viola cf. pedata (Bird-foot violet)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4979
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-18 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 16 Month: AUG Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 17 or Site Name: Canfield Creek State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: DPSEBB (Dry Prairie (Southeast) Bedrock Bluff Subtype)
Commun. Ranking in Releve:CD Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21C Universal: 43092E2 (Greenleafton)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SW QRT: SW of Section 25
Latitude: 43 degrees, 36 minutes, 16 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 36 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 100 Elev. (ft.): 1260 Slope: 25SW Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: LLWL
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: 5 x 20 m. plot, Gravelly silt loam compact

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 2-5m, Cover barely present
1. Betula papyrifera (Paper birch)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover almost absent
1. Lonicera tatarica (Tartarian Honeysuckle)
+. Ceanothus herbaceus (New Jersey tea)
+. Corylus americana (American hazelnut)
+. Physocarpus opulifolius (Ninebark)
+. Quercus macrocarpa (Bur oak)
+. Quercus macrocarpa (Bur oak)
+. Rhamnus cathartica (Common buckthorn)
+. Unknown or Indeterminable Plant
R. Amorpha canescens (Lead-plant)
R. Prunus (Plum; Cherry)

Graminoid, Height: .0-.5m, Cover patchy
2. Bouteloua curtipendula (Side-oats grama)
2. Poa pratensis (Kentucky bluegrass)
+. Carex cf. richardsonii
+. Schizachyrium scoparium (Little Bluestem)
R. Andropogon gerardii OP (Big bluestem)
R. Panicum cf. oligosanthes (Scribner's panic grass)
R. Setaria glauca (Yellow foxtail)
R. Sorghastrum nutans OP (Indian grass)

Forb, Height: .0-.5m, Cover patchy
2. Kuhnia eupatorioides (False boneset)
2. Petalostemon purpureum (Purple prairie-clover)
1. Ambrosia artemisiifolia (Common ragweed)
1. Aster oolentangiensis (Sky-blue aster)
1. Galium boreale (Northern bedstraw)
1. Lithospermum canescens (Hoary puccoon)
1. Pulsatilla nuttalliana (Pasque-flower)

Forb, Height: .0-.5m, Cover patchy (continued)

1. Solidago rigida (Stiff goldenrod)
+. Anemone cylindrica (Thimbleweed)
+. Apocynum cannabinum (Indian hemp)
+. Asclepias verticillata
+. Aster cf. ericoides (Heath aster)
+. Erigeron strigosus (Daisy fleabane)
+. Hieracium scabrum (Rough hawkweed)
+. Lactuca canadensis (Canada wild lettuce)
+. Lithospermum caroliniense (Hairy puccoon)
+. Medicago sativa (Alfalfa)
+. Monarda fistulosa (Wild bergamot)
+. Physalis heterophylla (Clammy ground-cherry)
+. Plantago rugelii (Rugel's plantain)
+. Scutellaria lateriflora (Mad-dog skullcap)
+. Solidago canadensis
+. Solidago missouriensis (Missouri goldenrod)
+. Tragopogon dubius (Yellow goat's-beard)
+. Vicia americana (American vetch)
+. Viola cf. sororia (Common blue violet)
R. Geum triflorum OP (Prairie smoke)
R. Heliopsis helianthoides OP (Ox-eye)
R. Oenothera (Evening-Primrose)
R. Unknown or Indeterminable Plant

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4974
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-14 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 5 Month: JUL Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: OASEDR (Oak Forest (Southeast) Dry Subtype)
Commun. Ranking in Releve:BC Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NE QRT: NW of Section 13
Latitude: 43 degrees, 38 minutes, 32 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 18 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1210 Slope: 80SE Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Ecotonal due to aspect/elevation. Thin silty, organic soil with cobble and loose slabs of limestone. Mostly open grown burr oaks with tilia in lower border of plot. Rock outcrops below level crest.

OTHER DATA COLLECTED
Soils: N Forestry: Y o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 10-20m, Cover interrupted
3. Quercus macrocarpa (Bur oak)
2. Juglans nigra (Black walnut)
2. Tilia americana (Basswood)
2. Ulmus americana (American elm)
2. Ulmus rubra (Red elm, slippery elm)
1. Celtis occidentalis (Hackberry)
1. Fraxinus americana (White ash)
+. Quercus alba (White oak)
R. Quercus ellipsoidalis OP (Northern pin oak)
R. Ulmus rubra DD (Red elm, slippery elm)

Woody Broadleaf Deciduous, Height: 2-10m, Cover patchy
2. Ulmus rubra (Red elm, slippery elm)
1. Celtis occidentalis (Hackberry)
1. Fraxinus americana (White ash)
1. Ostrya virginiana (Ironwood, hop hornbeam)
+. Tilia americana (Basswood)
R. Quercus rubra (Northern red oak)

Woody Broadleaf Deciduous, Height: .5-2m, Cover interrupted
2. Cornus foemina (Gray dogwood)
2. Ribes missouriense
1. Corylus americana (American hazelnut)
1. Prunus virginiana (Chokecherry)
1. Staphylea trifolia (Bladdernut)
+. Celtis occidentalis (Hackberry)
+. Fraxinus americana (White ash)
+. Viburnum rafinesquianum (Downy arrowwood)
+. Zanthoxylum americanum (Prickly-ash)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover rare
1. Cornus foemina (Gray dogwood)
1. Staphylea trifolia (Bladdernut)
+. Celtis occidentalis (Hackberry)
+. Lonicera cf. morrowii
+. Prunus virginiana (Chokecherry)
+. Viburnum lentago (Nannyberry)
R. Quercus rubra (Northern red oak)
R. Tilia americana (Basswood)

Climber, Height: .5-2m, Cover almost absent
+. Menispermum canadense (Canada moonseed)

Graminoid, Height: .0-.5m, Cover rare
1. Bromus pubescens
1. Carex convoluta
1. Carex sparganioides
+. Brachyelytrum erectum (Bearded short-husk)
+. Carex blanda
+. Elymus virginicus (Wild-rye)
+. Festuca obtusa (Nodding fescue)

Forb, Height: .0-2m, Cover patchy
1. Lonicera prolifera (Grape honeysuckle)
1. Menispermum canadense (Canada moonseed)
1. Parthenocissus quinquefolia (Virginia creeper)
1. Smilacina racemosa (False Solomon's-seal)
1. Solidago ulmifolia (Bog goldenrod)
1. Viola pubescens (Smooth yellow violet)
NON 1. Vitis riparia (Wild grape)
+. Amaranthus (Amaranth)
+. Aquilegia canadensis (Columbine)
+. Asarum canadense (Wild ginger)
+. Asclepias exaltata (Poke milkweed)
+. Aster cf. urophyllus
+. Chenopodium (Goosefoot)
+. Circaea lutetiana (Enchanter's nightshade)
+. Desmodium glutinosum (Pointed-leaved tick-trefoil)
+. Erigeron philadelphicus (Philadelphia fleabane)
+. Galium concinnum
+. Geranium maculatum (Wild geranium)
+. Geum canadense (White avens)
+. Helianthus tuberosus (Jerusalem artichoke)
+. Polymnia canadensis (Leaf-cup)
+. Prenanthes alba (White rattlesnake-root)
+. Ranunculus abortivus (Kidney-leaf buttercup)
+. Rhus radicans
+. Rubus occidentalis (Black raspberry)
+. Sanguinaria canadensis (Bloodroot)
+. Scrophularia marilandica (Figwort)
+. Silene stellata (Starry campion)
+. Smilax ecirrata (Carrion-flower)
+. Smilax herbacea (Carrion-flower)
+. Smilacina stellata (Starry false Solomon's-seal)
+. Solidago ulmifolia (Bog goldenrod)
+. Taraxacum officinale (Common dandelion)
+. Thalictrum dioicum (Early meadow rue)
+. Triosteum perfoliatum (Horse-gentian)
+. Unknown or Indeterminable Plant
+. Uvularia grandiflora (Yellow bellwort)
+. Viola (Violet)
R. Arctium minus (Common burdock)
NON R. Taenidia integerrima (Yellow pimpernel)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4975
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-15 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 6 Month: JUL Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: OASEDR (Oak Forest (Southeast) Dry Subtype)
Commun. Ranking in Releve:B Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NW QRT: NE of Section 13
Latitude: 43 degrees, 38 minutes, 38 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 9 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1240 Slope: 05SE Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Dry-mesic oak forest maturing in old growth trees. Mode 25-45cm dbh.
Med size rare to infrequent >50cm dbh. soil clyey silt mostly compactd
on broad ridge with sinkholes, soil lacks humus layer,

OTHER DATA COLLECTED
Soils: N Forestry: Y o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 10-35m, Cover continuous
3. Quercus alba (White oak)
2. Ulmus americana (American elm)
1. Juglans nigra (Black walnut)
1. Quercus rubra (Northern red oak)
1. Ulmus rubra (Red elm, slippery elm)
+. Carya cordiformis (Bitternut hickory)
+. Fraxinus nigra (Black ash)
R. Acer saccharum OP (Sugar maple)
SPC R. Juglans cinerea DD (Butternut)
R. Prunus serotina OP (Black cherry)
R. Tilia americana OP (Basswood)

Woody Broadleaf Deciduous, Height: 2-10m, Cover interrupted
3. Carya cordiformis (Bitternut hickory)
2. Tilia americana (Basswood)
2. Ulmus americana (American elm)
1. Fraxinus americana (White ash)
1. Ostrya virginiana (Ironwood, hop hornbeam)
+. Amelanchier (Juneberry; Serviceberry; Saska)
+. Quercus alba (White oak)
R. Acer saccharum (Sugar maple)
R. Celtis occidentalis (Hackberry)
R. Prunus serotina (Black cherry)

Woody Broadleaf Deciduous, Height: .5-2m, Cover rare
1. Corylus americana (American hazelnut)
1. Fraxinus americana (White ash)
+. Carya cordiformis (Bitternut hickory)
+. Ostrya virginiana (Ironwood, hop hornbeam)
+. Zanthoxylum americanum (Prickly-ash)
R. Prunus virginiana (Chokecherry)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover patchy

3.	Ribes missouriense	
1.	Carya cordiformis	(Bitternut hickory)
1.	Corylus americana	(American hazelnut)
1.	Fraxinus americana	(White ash)
+.	Acer saccharum	(Sugar maple)
+.	Cornus alternifolia	(Pagoda dogwood)
+.	Prunus serotina	(Black cherry)
+.	Prunus virginiana	(Chokecherry)
+.	Ulmus rubra	(Red elm, slippery elm)
R.	Celtis occidentalis	(Hackberry)
R.	Quercus rubra	(Northern red oak)
R.	Tilia americana	(Basswood)

Graminoid, Height: .0-2m, Cover almost absent

+.	Carex convoluta	
+.	Leersia virginica	(White grass)
R.	Carex	(Sedge)

Forb, Height: .0-2m, Cover rare

1.	Geranium maculatum	(Wild geranium)
+.	Arisaema triphyllum	(Jack-in-the-pulpit)
+.	Athyrium angustum	(Lady fern)
+.	Circaea lutetiana	(Enchanter's nightshade)
+.	Geum canadense	(White avens)
+.	Parthenocissus quinquefolia	(Virginia creeper)
+.	Podophyllum peltatum	(May-apple, mandrake)
+.	Smilacina racemosa	(False Solomon's-seal)
+.	Thalictrum dioicum	(Early meadow rue)
NON +.	Vitis riparia	(Wild grape)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4977
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-16 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 15 Month: AUG Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: OASEME (Oak Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:B Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 11W (e.g. 32W)
QQRT: NE QRT: SW of Section 18
Latitude: 43 degrees, 38 minutes, 13 seconds LL/GPS registration:
Longitude: 92 degrees, 12 minutes, 10 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1240 Slope: 08E Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: LLWL
*Geomorphic Unit: 39 (Harmony-Plainview Uplands)

Remarks: Old growth, dry-mesic oak forest dom by Q.rubra, Q alba,
Q velutina in area. Sangs and debris abund, gaps freq. canopy 30m
SE aspect of E facing bluff ridge spur. 8%grade,

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover interrupted
3. Quercus alba (White oak)
3. Quercus rubra (Northern red oak)

Woody Broadleaf Deciduous, Height: 10-20m, Cover rare
2. Amelanchier (Juneberry; Serviceberry; Saska)
2. Ulmus americana (American elm)
2. Ulmus rubra (Red elm, slippery elm)
1. Celtis occidentalis (Hackberry)
1. Ostrya virginiana (Ironwood, hop hornbeam)
1. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: 2-10m, Cover rare
2. Acer negundo (Box elder)
2. Ostrya virginiana (Ironwood, hop hornbeam)
2. Ulmus rubra (Red elm, slippery elm)
1. Acer saccharum (Sugar maple)
1. Crataegus (Hawthorn)
+. Amelanchier (Juneberry; Serviceberry; Saska)
+. Fraxinus pennsylvanica (Green ash)
+. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: .5-2m, Cover rare
1. Corylus americana (American hazelnut)
+. Acer saccharum (Sugar maple)
+. Amelanchier (Juneberry; Serviceberry; Saska)
+. Celtis occidentalis (Hackberry)
+. Fraxinus cf. pennsylvanica (Green ash)
+. Tilia americana (Basswood)
R. Carya cordiformis (Bitternut hickory)
R. Prunus serotina (Black cherry)
R. Ribes missouriense

Woody Broadleaf Deciduous, Height: .0-.5m, Cover almost absent

	+.	Carya cordiformis	(Bitternut hickory)
	+.	Cornus alternifolia	(Pagoda dogwood)
	+.	Corylus americana	(American hazelnut)
	+.	Quercus rubra	(Northern red oak)
	+.	Viburnum rafinesquianum	(Downy arrowwood)
	R.	Cornus foemina	(Gray dogwood)

Graminoid, Height: .0-.5m, Cover almost absent

	+.	Festuca obtusa	(Nodding fescue)

Forb, Height: .0-.5m, Cover interrupted

	2.	Osmorhiza longistylis	(Anise-root)
	1.	Impatiens	(Balsam; Jewelweed)
	1.	Phryma leptostachya	(Lopseed)
	+.	Adiantum pedatum	(Maidenhair fern)
	+.	Amphicarpaea bracteata	(Hog-peanut)
	+.	Asarum canadense	(Wild ginger)
	+.	Aster cordifolius	(Heart-leaved aster)
	+.	Athyrium angustum	(Lady fern)
	+.	Botrychium virginianum	(Rattlesnake-fern)
	+.	Caulophyllum thalictroides	(Blue cohosh)
	+.	Circaea lutetiana	(Enchanter's nightshade)
	+.	Cryptotaenia canadensis	(Honewort)
	+.	Desmodium glutinosum	(Pointed-leaved tick-trefoil)
	+.	Dryopteris carthusiana	(Spinulose shield fern)
	+.	Eupatorium rugosum	(Common snakeroot)
	+.	Galium concinnum	
	+.	Geranium maculatum	(Wild geranium)
	+.	Geum canadense	(White avens)
	+.	Laportea canadensis	(Wood nettle)
	+.	Pilea pumila	(Clearweed)
	+.	Polemonium reptans	(Jacob's ladder)
	+.	Pteridium aquilinum	(Bracken)
	+.	Rhus radicans	
	+.	Sanguinaria canadensis	(Bloodroot)
	+.	Sanicula gregaria	(Black snakeroot)
	+.	Smilax ecirrata	(Carrion-flower)
	+.	Smilax herbacea	(Carrion-flower)
	+.	Smilacina racemosa	(False Solomon's-seal)
	+.	Solidago ulmifolia	(Bog goldenrod)
	+.	Thalictrum dioicum	(Early meadow rue)
	+.	Uvularia grandiflora	(Yellow bellwort)
	+.	Viola pubescens	(Smooth yellow violet)
NON	+.	Vitis riparia	(Wild grape)
	R.	Monotropa uniflora	(Indian pipe)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4813
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 8 Month: SEP Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 17 or Site Name:
DNR Ownership Code: 20 (Mn Dnr Forestry (State Forest and Con-Con Land))
*NC Code: OASEME (Oak Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:B Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21C Universal: 43092E2 (Greenleafton)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NW QRT: NW of Section 25
Latitude: 43 degrees, 36 minutes, 55 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 41 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1250 Slope: 25NW Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Dry-mesic forest dom by Q. rubra. Modal dbh 35-45cm; max 50-63cm. Lrge trees nearly gone. Soil yellow silt loam; no A-horizon, little humus, duff (20% bare ground). Dense shade. 54cm Q. rubra = 118yrs.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover interrupted
4. Quercus rubra (Northern red oak)
+. Fraxinus americana (White ash)
+. Populus grandidentata (Big-toothed aspen)
R. Ulmus rubra DD (Red elm, slippery elm)

Woody Broadleaf Deciduous, Height: 2-10m, Cover continuous
5. Ostrya virginiana (Ironwood, hop hornbeam)
+. Carpinus caroliniana (American hornbeam, blue beech)
R. Acer saccharum (Sugar maple)

Woody Broadleaf Deciduous, Height: .5-2m, Cover barely present
1. Ostrya virginiana (Ironwood, hop hornbeam)
+. Carya cordiformis (Bitternut hickory)
+. Fraxinus americana (White ash)
+. Ribes missouriense

Woody Broadleaf Deciduous, Height: .0-.5m, Cover barely present
1. Ostrya virginiana (Ironwood, hop hornbeam)
+. Acer saccharum (Sugar maple)
+. Carpinus caroliniana (American hornbeam, blue beech)
+. Carya cordiformis (Bitternut hickory)
+. Cornus alternifolia (Pagoda dogwood)
+. Fraxinus americana (White ash)
+. Prunus virginiana (Chokecherry)
+. Quercus rubra (Northern red oak)
+. Ulmus americana (American elm)
+. Viburnum rafinesquianum (Downy arrowwood)
NON +. Vitis riparia (Wild grape)
R. Tilia americana (Basswood)

Graminoid, Height: .0-.5m, Cover barely present
1.2 Carex convoluta
+.1 Brachyelytrum erectum (Bearded short-husk)

Forb, Height: .0-2m, Cover interrupted
1. Amphicarpaea bracteata (Hog-peanut)
1. Desmodium glutinosum (Pointed-leaved tick-trefoil)
1. Osmunda claytoniana (Interrupted fern)
1. Solidago ulmifolia (Bog goldenrod)
1. Thalictrum (Meadow-Rue)
+. Adiantum pedatum (Maidenhair fern)
+. Anemonella thalictroides (Rue-anemone)
+. Aralia nudicaulis (Wild sarsaparilla)
+. Asarum canadense (Wild ginger)
+. Athyrium angustum (Lady fern)
+. Diervilla lonicera (Bush honeysuckle)
+. Fragaria virginiana (Common strawberry)
+. Galium boreale (Northern bedstraw)
+. Galium concinnum
+. Geranium maculatum (Wild geranium)
+. Helianthus strumosus (Woodland sunflower)
+. Hepatica acutiloba (Sharp-lobed hepatica)
+. Mitella diphylla (Miterwort)
+. Osmorhiza claytonii (Sweet cicely)
+. Podophyllum peltatum (May-apple, mandrake)
+. Polemonium reptans (Jacob's ladder)
+. Pteridium aquilinum (Bracken)
+. Pyrola elliptica (Common pyrola)
+. Sanguinaria canadensis (Bloodroot)
+. Sanicula gregaria (Black snakeroot)
+. Smilax ecirrata (Carrion-flower)
+. Smilacina stellata (Starry false Solomon's-seal)
+. Solidago flexicaulis (Zig-zag goldenrod)
+. Uvularia grandiflora (Yellow bellwort)
+. Zizia aurea (Golden alexanders)
R. Asclepias exaltata (Poke milkweed)
R. Aster
R. Botrychium virginianum (Rattlesnake-fern)
R. Corallorhiza maculata (Spotted coral-root)
R. Eupatorium maculatum (Spotted Joe-pye weed)
R. Lathyrus ochroleucus (Pale vetchling)
R. Polygonatum commutatum (Giant Solomon's-seal)
R. Prenanthes alba (White rattlesnake-root)
R. Ranunculus abortivus (Kidney-leaf buttercup)
R. Smilax herbacea (Carrion-flower)

Lichen/Moss, Height: .0-.5m, Cover rare
2. Unknown or Indeterminable Plant

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4978
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-17 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 16 Month: AUG Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 17 or Site Name: Canfield Creek
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: OASEME (Oak Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:B Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21C Universal: 43092E2 (Greenleafton)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NW QRT: NW of Section 25
Latitude: 43 degrees, 36 minutes, 52 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 39 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1270 Slope: 08NE Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: LLWL
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Dry mesic oak forest, dom. by Old growth Q rubra & Q alba.
Areas seemed selectively logged in past with areas of smaller Tilia &
several multiple trunks. Tag # 64. Loess silt

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover continuous
4. Quercus alba (White oak)
4. Quercus rubra (Northern red oak)
1. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: 10-20m, Cover patchy
2. Acer saccharum (Sugar maple)
2. Ostrya virginiana (Ironwood, hop hornbeam)
1. Tilia americana (Basswood)
1. Ulmus rubra (Red elm, slippery elm)

Woody Broadleaf Deciduous, Height: 2-10m, Cover interrupted
2. Corylus americana (American hazelnut)
2. Fraxinus pennsylvanica (Green ash)
2. Ostrya virginiana (Ironwood, hop hornbeam)
1. Cornus alternifolia (Pagoda dogwood)
1. Prunus serotina (Black cherry)
+. Carya cordiformis (Bitternut hickory)

Woody Broadleaf Deciduous, Height: .5-2m, Cover interrupted
2. Corylus americana (American hazelnut)
2. Fraxinus pennsylvanica (Green ash)
2. Prunus serotina (Black cherry)
1. Zanthoxylum americanum (Prickly-ash)
+. Acer negundo (Box elder)
+. Carya cordiformis (Bitternut hickory)
+. Cornus alternifolia (Pagoda dogwood)
+. Ribes missouriense
+. Ulmus rubra (Red elm, slippery elm)
SPC R. Juglans cinerea (Butternut)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover barely present

	1.	Ulmus rubra (Red elm, slippery elm)
	+.	Acer saccharum (Sugar maple)
	+.	Carya cordiformis (Bitternut hickory)
	+.	Cornus alternifolia (Pagoda dogwood)
	+.	Cornus foemina (Gray dogwood)
	+.	Corylus americana (American hazelnut)
	+.	Fraxinus cf. pennsylvanica (Green ash)
	+.	Prunus serotina (Black cherry)
	+.	Prunus virginiana (Chokecherry)
	+.	Quercus alba (White oak)
	+.	Quercus rubra (Northern red oak)
	+.	Ribes missouriense
	+.	Tilia americana (Basswood)
	+.	Viburnum rafinesquianum (Downy arrowwood)
	+.	Zanthoxylum americanum (Prickly-ash)

Graminoid, Height: .0-.5m, Cover almost absent

	+.	Brachyelytrum erectum (Bearded short-husk)
	+.	Carex pensylvanica
	+.	Carex cf. sparganioides
	+.	Elymus hystrix (Bottlebrush grass)
	+.	Festuca obtusa (Nodding fescue)

Forb, Height: .0-.5m, Cover patchy

	2.	Podophyllum peltatum (May-apple, mandrake)
	1.	Amphicarpaea bracteata (Hog-peanut)
	1.	Athyrium angustum (Lady fern)
	1.	Desmodium glutinosum (Pointed-leaved tick-trefoil)
	1.	Pteridium aquilinum (Bracken)
	+.	Arisaema triphyllum (Jack-in-the-pulpit)
	+.	Caulophyllum thalictroides (Blue cohosh)
	+.	Circaea lutetiana (Enchanter's nightshade)
	+.	Galium concinnum
	+.	Galium triflorum (Three-flowered bedstraw)
	+.	Geranium maculatum (Wild geranium)
	+.	Geum canadense (White avens)
	+.	Laportea canadensis (Wood nettle)
	+.	Osmorhiza claytonii (Sweet cicely)
	+.	Osmorhiza longistylis (Anise-root)
	+.	Parthenocissus quinquefolia (Virginia creeper)
	+.	Polemonium reptans (Jacob's ladder)
	+.	Potentilla (Cinquefoil)
	+.	Rhus radicans
	+.	Sanguinaria canadensis (Bloodroot)
	+.	Smilax ecirrata (Carrion-flower)
	+.	Smilax herbacea (Carrion-flower)
	+.	Smilacina racemosa (False Solomon's-seal)
	+.	Solidago flexicaulis (Zig-zag goldenrod)
	+.	Solidago ulmifolia (Bog goldenrod)
	+.	Thalictrum dioicum (Early meadow rue)
	+.	Triosteum perfoliatum var. aurantiacum (Horse-gentian)
	+.	Uvularia grandiflora (Yellow bellwort)
	+.	Viola pubescens (Smooth yellow violet)
NON	+.	Vitis riparia (Wild grape)
	R.	Aralia nudicaulis (Wild sarsaparilla)
	R.	Fragaria virginiana (Common strawberry)
	R.	Menispermum canadense (Canada moonseed)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4971
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-12 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 28 Month: JUN Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: OASEME (Oak Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:B Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 11W (e.g. 32W)
QQRT: SE QRT: NE of Section 18
Latitude: 43 degrees, 38 minutes, 26 seconds LL/GPS registration:
Longitude: 92 degrees, 11 minutes, 37 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1140 Slope: 15SE Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: RLWL
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Dry-mesic oak forest, Mature canopy 25-30m:Mode DBH 35-35cm,
Max DBH, Infrequent 50-65cm. Dense shade to substrate ecotonal w/
maple/basswood forest. Narrow ridge descending.Rich organic

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover continuous
3. Quercus alba (White oak)
2. Quercus rubra (Northern red oak)
2. Tilia americana (Basswood)
+. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: 5-20m, Cover patchy
3. Acer saccharum (Sugar maple)
2. Ostrya virginiana (Ironwood, hop hornbeam)
1. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: 2-5m, Cover patchy
2. Carpinus caroliniana (American hornbeam, blue beech)
1. Acer saccharum (Sugar maple)
1. Ostrya virginiana (Ironwood, hop hornbeam)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover rare
1. Carpinus caroliniana (American hornbeam, blue beech)
1. Prunus virginiana (Chokecherry)
+. Acer saccharum (Sugar maple)
+. Fraxinus (Ash)
+. Lonicera prolifera (Grape honeysuckle)
+. Quercus rubra (Northern red oak)
+. Ribes missouriense

Graminoid, Height: .0-.5m, Cover rare
SPC 2. Carex woodii
1. Carex hirtifolia
+. Carex cf. blanda
+. Carex cf. deweyana
+. Carex pensylvanica
+. Carex (Sedge)

Graminoid, Height: .0-.5m, Cover rare (continued)

+.	Elymus hystrix	(Bottlebrush grass)
+.	Festuca obtusa	(Nodding fescue)

Forb, Height: .0-.5m, Cover patchy

2.	Osmunda claytoniana	(Interrupted fern)
2.	Sanicula gregaria	(Black snakeroot)
1.	Asarum canadense	(Wild ginger)
1.	Athyrium angustum	(Lady fern)
1.	Caulophyllum thalictroides	(Blue cohosh)
1.	Cryptotaenia canadensis	(Honewort)
1.	Hydrophyllum virginianum	(Virginia waterleaf)
1.	Thalictrum dioicum	(Early meadow rue)
+.	Actaea rubra	(Red baneberry)
+.	Adiantum pedatum	(Maidenhair fern)
+.	Allium tricoccum	(Wild leek)
+.	Aster cordifolius	(Heart-leaved aster)
+.	Aster cf. lanceolatus	(Panicled aster)
+.	Desmodium glutinosum	(Pointed-leaved tick-trefoil)
+.	Eupatorium rugosum	(Common snakeroot)
+.	Galium aparine	(Cleavers)
+.	Galium concinnum	
+.	Geum canadense	(White avens)
+.	Mitella diphylla	(Miterwort)
+.	Osmorhiza claytonii	(Sweet cicely)
+.	Osmorhiza longistylis	(Anise-root)
+.	Parthenocissus quinquefolia	(Virginia creeper)
+.	Phlox divaricata	(Blue Phlox)
+.	Phryma leptostachya	(Lopseed)
+.	Podophyllum peltatum	(May-apple, mandrake)
+.	Polemonium reptans	(Jacob's ladder)
+.	Pyrola elliptica	(Common pyrola)
+.	Sanguinaria canadensis	(Bloodroot)
+.	Smilax ecirrata	(Carrion-flower)
+.	Solidago flexicaulis	(Zig-zag goldenrod)
+.	Trillium flexipes	(Declining trillium)
+.	Uvularia grandiflora	(Yellow bellwort)
+.	Viola pubescens	(Smooth yellow violet)
R.	Laportea canadensis	(Wood nettle)
R.	Triosteum perfoliatum	(Horse-gentian)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4810
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 6 Month: SEP Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 16 or Site Name:
DNR Ownership Code: 00 (Private Ownership)
*NC Code: OASEME (Oak Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:BC Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21C Universal: 43092E2 (Greenleafton)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NE QRT: SE of Section 23
Latitude: 43 degrees, 37 minutes, 24 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 55 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1250 Slope: 25NW Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Dry-mesic forest on narrow ridge spur. Modal dbh 20-30cm; max 30-35cm common. Larger trees cut in past. Occas debris & tip-ups. No snags. Soil yellowish silty loam. Sinkholes & some cobbles present.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Needleleaf Evergreen, Height: 2-10m, Cover almost absent
+. Juniperus virginiana (Red cedar)

Woody Broadleaf Deciduous, Height: 10-35m, Cover interrupted
3. Quercus rubra MS (Northern red oak)
2. Quercus alba (White oak)
1. Betula papyrifera (Paper birch)
1. Fraxinus americana (White ash)

Woody Broadleaf Deciduous, Height: 2-10m, Cover interrupted
4. Ostrya virginiana (Ironwood, hop hornbeam)
1. Quercus macrocarpa (Bur oak)
+. Acer saccharum (Sugar maple)
+. Carpinus caroliniana (American hornbeam, blue beech)
+. Fraxinus cf. americana (White ash)
+. Quercus rubra (Northern red oak)
+. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: .5-2m, Cover patchy
2. Cornus foemina (Gray dogwood)
1. Fraxinus cf. americana (White ash)
1. Ostrya virginiana (Ironwood, hop hornbeam)
1. Ribes missouriense
1. Zanthoxylum americanum (Prickly-ash)
+. Staphylea trifolia (Bladdernut)
+. Ulmus rubra (Red elm, slippery elm)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover rare
2. Prunus virginiana (Chokecherry)
2. Ulmus rubra (Red elm, slippery elm)
1. Acer saccharum (Sugar maple)
1. Cornus foemina (Gray dogwood)
1. Corylus americana (American hazelnut)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover rare (continued)
1. Fraxinus cf. americana (White ash)
1. Prunus serotina (Black cherry)
+. Acer negundo (Box elder)
+. Carpinus caroliniana (American hornbeam, blue beech)
+. Cornus rugosa (Round-leaved dogwood)
+. Parthenocissus quinquefolia (Virginia creeper)
+. Quercus alba (White oak)
+. Quercus rubra (Northern red oak)
+. Ribes missouriense
+. Tilia americana (Basswood)
+. Viburnum rafinesquianum (Downy arrowwood)
NON +. Vitis riparia (Wild grape)
+. Zanthoxylum americanum (Prickly-ash)

Graminoid, Height: .0-2m, Cover patchy
3. Carex pensylvanica
1. Elymus hystrix (Bottlebrush grass)
+. Carex cf. sparganioides

Forb, Height: .0-2m, Cover rare
1. Amphicarpaea bracteata (Hog-peanut)
1. Athyrium angustum (Lady fern)
1. Hepatica acutiloba (Sharp-lobed hepatica)
1. Pedicularis canadensis (Wood-betony)
1. Solidago ulmifolia (Bog goldenrod)
+. Adiantum pedatum (Maidenhair fern)
+. Agrimonia (Agrimony)
+. Anemonella thalictroides (Rue-anemone)
+. Aquilegia canadensis (Columbine)
+. Arenaria lateriflora (Sandwort)
+. Asarum canadense (Wild ginger)
+. Aster cordifolius (Heart-leaved aster)
+. Aster
+. Desmodium glutinosum (Pointed-leaved tick-trefoil)
+. Eupatorium rugosum (Common snakeroot)
+. Galium boreale (Northern bedstraw)
+. Galium concinnum
+. Gentianella quinquefolia (Stiff gentian)
+. Geranium maculatum (Wild geranium)
+. Geum canadense (White avens)
+. Heuchera richardsonii (Alum-root)
+. Lonicera prolifera (Grape honeysuckle)
+. Osmorhiza cf. claytonii (Sweet cicely)
+. Oxalis (Wood-Sorrel; Sheep-Sorrel)
+. Podophyllum peltatum (May-apple, mandrake)
+. Polemonium reptans (Jacob's ladder)
+. Prenanthes alba (White rattlesnake-root)
+. Pteridium aquilinum (Bracken)
+. Rhus radicans
+. Smilax ecirrata (Carrion-flower)
+. Solidago flexicaulis (Zig-zag goldenrod)
+. Unknown or Indeterminable Plant
+. Veronicastrum (Culver's-Root)
+. Viola pubescens (Smooth yellow violet)
R. Anemone cf. virginiana (Thimbleweed)
R. Caulophyllum thalictroides (Blue cohosh)
R. Sanguinaria canadensis (Bloodroot)
R. Uvularia grandiflora (Yellow bellwort)
R. Zizia aurea (Golden alexanders)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4976
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-15B EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 15 Month: AUG Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: OASEME (Oak Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:C Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 11W (e.g. 32W)
QQRT: SE QRT: SW of Section 7
Latitude: 43 degrees, 38 minutes, 43 seconds LL/GPS registration:
Longitude: 92 degrees, 12 minutes, 14 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1220 Slope: 15NE Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: RLWL
*Geomorphic Unit: 39 (Harmony-Plainview Uplands)

Remarks: Dry mesic oak forest; canopy 20-25m hgt; 85% cover; snags rare to occ.
Tipups & downed logs common, stumps very decayed occassional
Densely shaded to substrate N asp bluff with ridges & swales

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover continuous
4. Quercus rubra (Northern red oak)
3. Quercus alba (White oak)
2. Tilia americana (Basswood)
2. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: 10-20m, Cover interrupted
3. Acer saccharum (Sugar maple)
2. Fraxinus americana (White ash)
2. Quercus alba (White oak)
+. Carya cordiformis (Bitternut hickory)
+. Ostrya virginiana (Ironwood, hop hornbeam)

Woody Broadleaf Deciduous, Height: 2-10m, Cover rare
2. Acer saccharum (Sugar maple)
2. Ostrya virginiana (Ironwood, hop hornbeam)
1. Carya cordiformis (Bitternut hickory)

Woody Broadleaf Deciduous, Height: .5-2m, Cover patchy
3. Fraxinus cf. americana (White ash)
3. Fraxinus cf. pennsylvanica (Green ash)
1. Ostrya virginiana (Ironwood, hop hornbeam)
+. Acer saccharum (Sugar maple)
+. Prunus serotina (Black cherry)
+. Prunus virginiana (Chokecherry)
+. Ribes missouriense
+. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover rare
1. Tilia americana (Basswood)
+. Acer saccharum (Sugar maple)
+. Cornus alternifolia (Pagoda dogwood)
+. Cornus foemina (Gray dogwood)

DNR RELEVE #: 4976 continued, Page 2

Woody Broadleaf Deciduous, Height: .0-.5m, Cover rare (continued)

+. Fraxinus cf. americana (White ash)
+. Prunus virginiana (Chokecherry)
+. Quercus rubra (Northern red oak)
+. Ribes cf. missouriense
+. Ulmus americana (American elm)
R. Prunus serotina (Black cherry)

Graminoid, Height: .0-.5m, Cover almost absent

+. Brachyelytrum erectum (Bearded short-husk)
+. Carex pensylvanica

Forb, Height: .0-.5m, Cover rare

1. Parthenocissus quinquefolia (Virginia creeper)
+. Adiantum pedatum (Maidenhair fern)
+. Amphicarpaea bracteata (Hog-peanut)
+. Arisaema triphyllum (Jack-in-the-pulpit)
+. Asarum canadense (Wild ginger)
+. Athyrium angustum (Lady fern)
+. Desmodium glutinosum (Pointed-leaved tick-trefoil)
+. Galium concinnum
+. Geranium maculatum (Wild geranium)
+. Geum canadense (White avens)
+. Hepatica acutiloba (Sharp-lobed hepatica)
+. Rhus radicans
+. Smilax herbacea (Carrion-flower)
+. Solidago ulmifolia (Bog goldenrod)
+. Thalictrum dioicum (Early meadow rue)
+. Viola pubescens (Smooth yellow violet)
R. Monotropa uniflora (Indian pipe)
R. Rosa blanda (Smooth wild rose)
R. Sanguinaria canadensis (Bloodroot)
R. Smilacina racemosa (False Solomon's-seal)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4967
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-8 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 18 Month: MAY Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: OASEME (Oak Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:AB Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SW QRT: SW of Section 13
Latitude: 43 degrees, 37 minutes, 54 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 43 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1125 Slope: 15NE Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Dark silty-clay, organic deep.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover continuous
3. Quercus rubra (Northern red oak)
2. Fraxinus americana (White ash)
2. Quercus alba (White oak)
2. Tilia americana (Basswood)
2. Ulmus rubra (Red elm, slippery elm)
1. Carya cordiformis (Bitternut hickory)

Woody Broadleaf Deciduous, Height: 10-20m, Cover interrupted
2. Acer saccharum (Sugar maple)
2. Carya cordiformis (Bitternut hickory)
2. Ostrya virginiana DD (Ironwood, hop hornbeam)
2. Ulmus americana (American elm)
2. Ulmus rubra (Red elm, slippery elm)
1. Prunus serotina OP (Black cherry)
1. Tilia americana (Basswood)
+. Ostrya virginiana (Ironwood, hop hornbeam)

Woody Broadleaf Deciduous, Height: 2-10m, Cover continuous
3. Acer saccharum (Sugar maple)
2. Ostrya virginiana (Ironwood, hop hornbeam)
1. Carya cordiformis (Bitternut hickory)
+. Amelanchier (Juneberry; Serviceberry; Saska)
+. Ostrya virginiana DD (Ironwood, hop hornbeam)
+. Tilia americana (Basswood)
+. Ulmus rubra (Red elm, slippery elm)
R. Carya cordiformis DD (Bitternut hickory)
R. Fraxinus cf. americana (White ash)
R. Tilia americana DD (Basswood)

Woody Broadleaf Deciduous, Height: .5-2m, Cover rare
- 1. Acer saccharum (Sugar maple)
- 1. Carpinus caroliniana (American hornbeam, blue beech)
- 1. Ribes missouriense
- +. Fraxinus (Ash)
- +. Fraxinus DD (Ash)
- +. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover rare
- 1. Acer saccharum (Sugar maple)
- 1. Prunus virginiana (Chokecherry)
- 1. Ribes missouriense
- +. Carpinus caroliniana (American hornbeam, blue beech)
- +. Carya cordiformis (Bitternut hickory)
- +. Cornus alternifolia (Pagoda dogwood)
- +. Fraxinus (Ash)
- +. Quercus rubra (Northern red oak)
- +. Tilia americana (Basswood)
- +. Ulmus rubra (Red elm, slippery elm)

Graminoid, Height: .0-.5m, Cover almost absent
- +. Carex albursina
- +. Carex hirtifolia
- +. Elymus hystrix (Bottlebrush grass)
- R. Carex cf. blanda

Forb, Height: .0-2m, Cover interrupted
- 2. Dentaria laciniata (Cut-leaved toothwort)
- 2. Erythronium albidum (White trout-lily)
- 2. Geranium maculatum (Wild geranium)
- 1. Galium aparine (Cleavers)
- 1. Podophyllum peltatum (May-apple, mandrake)
- 1. Viola pubescens (Smooth yellow violet)
- +. Adiantum pedatum (Maidenhair fern)
- +. Allium tricoccum (Wild leek)
- +. Anemone quinquefolia
- +. Arisaema triphyllum (Jack-in-the-pulpit)
- +. Asarum canadense (Wild ginger)
- +. Athyrium angustum (Lady fern)
- +. Caulophyllum thalictroides (Blue cohosh)
- +. Circaea lutetiana (Enchanter's nightshade)
- +. Claytonia virginica (Virginia spring-beauty)
- +. Dicentra cucullaria (Dutchman's-breeches)
- +. Geum canadense (White avens)
- +. Hepatica acutiloba (Sharp-lobed hepatica)
- +. Hydrophyllum virginianum (Virginia waterleaf)
- +. Mitella diphylla (Miterwort)
- +. Osmunda claytoniana (Interrupted fern)
- +. Parthenocissus (Virginia Creeper; Woodbine)
- +. Ranunculus abortivus (Kidney-leaf buttercup)
- +. Sanguinaria canadensis (Bloodroot)
- +. Smilax (Greenbrier; Catbrier)
- +. Smilacina racemosa (False Solomon's-seal)
- +. Smilacina racemosa (False Solomon's-seal)
- +. Thalictrum dioicum (Early meadow rue)
- +. Trillium flexipes (Declining trillium)
- +. Viola sororia (Common blue violet)
- R. Actaea rubra (Red baneberry)
- R. Impatiens (Balsam; Jewelweed)
- R. Osmorhiza longistylis (Anise-root)
- R. Solidago flexicaulis (Zig-zag goldenrod)
- R. Uvularia grandiflora (Yellow bellwort)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4980
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-19 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 7 Month: SEP Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: OASEME (Oak Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:BC Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SE QRT: NE of Section 13
Latitude: 43 degrees, 38 minutes, 13 seconds LL/GPS registration:
Longitude: 92 degrees, 12 minutes, 37 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1110 Slope: 45SE Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 39 (Harmony-Plainview Uplands)

Remarks: Mesic oak forest dominated by Q. rubra, Mode 30-40 cm, No max size dbh
Crooked boled trees, plot with 3 large tipups,moderate decay.
Snags rare to occasional. No outcrops. Near stone bldg.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover interrupted
4. Quercus rubra (Northern red oak)
+. Fraxinus americana (White ash)

Woody Broadleaf Deciduous, Height: 5-20m, Cover continuous
3. Ulmus americana (American elm)
2. Acer saccharum (Sugar maple)
2. Juglans nigra (Black walnut)
2. Ostrya virginiana (Ironwood, hop hornbeam)
2. Quercus rubra (Northern red oak)
1. Celtis occidentalis (Hackberry)
1. Fraxinus americana (White ash)
1. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: .5-5m, Cover interrupted
4. Zanthoxylum americanum (Prickly-ash)
1. Acer saccharum (Sugar maple)
1. Corylus americana (American hazelnut)
1. Ribes missouriense
1. Ulmus americana (American elm)
+. Celtis occidentalis (Hackberry)
+. Fraxinus nigra (Black ash)
+. Ostrya virginiana (Ironwood, hop hornbeam)
+. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover barely present
1. Viburnum rafinesquianum (Downy arrowwood)
+. Acer saccharum (Sugar maple)
+. Carya cordiformis (Bitternut hickory)
+. Celtis occidentalis (Hackberry)
+. Cornus alternifolia (Pagoda dogwood)
+. Prunus virginiana (Chokecherry)
+. Quercus rubra (Northern red oak)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover barely present (continued)

	+.	Tilia americana	(Basswood)
	+.	Ulmus americana	(American elm)

Graminoid, Height: .0-.5m, Cover barely present

	1.	Carex convoluta	
	+.	Carex hirtifolia	
	+.	Elymus hystrix	(Bottlebrush grass)

Forb, Height: .0-.5m, Cover patchy

	2.	Asarum canadense	(Wild ginger)
	1.	Aralia nudicaulis	(Wild sarsaparilla)
	1.	Circaea lutetiana	(Enchanter's nightshade)
	1.	Desmodium glutinosum	(Pointed-leaved tick-trefoil)
	1.	Galium boreale	(Northern bedstraw)
	1.	Galium concinnum	
	1.	Lonicera prolifera	(Grape honeysuckle)
	1.	Parthenocissus	(Virginia Creeper; Woodbine)
	1.	Uvularia grandiflora	(Yellow bellwort)
	+.	Amphicarpaea bracteata	(Hog-peanut)
	+.	Dioscorea villosa	(Wild yam)
	+.	Eupatorium rugosum	(Common snakeroot)
	+.	Galium aparine	(Cleavers)
	+.	Galium triflorum	(Three-flowered bedstraw)
	+.	Geranium maculatum	(Wild geranium)
	+.	Geum canadense	(White avens)
	+.	Hackelia virginiana	(Virginia stickseed)
	+.	Osmorhiza claytonii	(Sweet cicely)
	+.	Polemonium reptans	(Jacob's ladder)
	+.	Rhus radicans	
	+.	Sanguinaria canadensis	(Bloodroot)
	+.	Sanicula marilandica	(Black snakeroot)
	+.	Smilax ecirrata	(Carrion-flower)
	+.	Solidago flexicaulis	(Zig-zag goldenrod)
	+.	Solidago ulmifolia	(Bog goldenrod)
	+.	Viola pubescens	(Smooth yellow violet)
NON	+.	Vitis riparia	(Wild grape)
	R.	Anemone virginiana	(Thimbleweed)
	R.	Ranunculus abortivus	(Kidney-leaf buttercup)
	R.	Unknown or Indeterminable Plant	

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4814
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 15 Month: SEP Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 17 or Site Name:
DNR Ownership Code: 20 (Mn Dnr Forestry (State Forest and Con-Con Land))
*NC Code: OASEME (Oak Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:BC Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21C Universal: 43092E2 (Greenleafton)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NE QRT: SW of Section 24
Latitude: 43 degrees, 37 minutes, 12 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 18 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1130 Slope: 30NW Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Mature forest dom by Q. rubra w/abund Q. alba. Modl dbh = 35-45cm; max 50-60cm common. Dense shade. Soil drk clay loam, compact, little orgnc matter. Approaches dry-mesic. 56cm Q.rub = 115yrs. Old fence

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover continuous
4. Quercus rubra (Northern red oak)
3. Quercus alba (White oak)
+. Populus tremuloides OP (Quaking aspen)

Woody Broadleaf Deciduous, Height: 10-20m, Cover interrupted
3. Acer saccharum (Sugar maple)
3. Quercus alba (White oak)

Woody Broadleaf Deciduous, Height: 2-10m, Cover continuous
5. Ostrya virginiana (Ironwood, hop hornbeam)
+. Prunus serotina (Black cherry)
R. Crataegus (Hawthorn)

Woody Broadleaf Deciduous, Height: .5-2m, Cover barely present
1. Ostrya virginiana (Ironwood, hop hornbeam)
+. Acer saccharum (Sugar maple)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover barely present
2. Acer saccharum (Sugar maple)
2. Prunus serotina (Black cherry)
1. Ulmus rubra (Red elm, slippery elm)
+. Cornus alternifolia (Pagoda dogwood)
+. Fraxinus cf. americana (White ash)
+. Quercus rubra (Northern red oak)
+. Ribes cynosbati (Prickly gooseberry, dogberry)
+. Ribes missouriense
+. Tilia americana (Basswood)
+. Zanthoxylum americanum (Prickly-ash)
R. Acer negundo (Box elder)
R. Viburnum rafinesquianum (Downy arrowwood)

Graminoid, Height: .0-2m, Cover rare
- 2. Carex cf. pensylvanica
- 1. Carex pedunculata
- +. Brachyelytrum erectum (Bearded short-husk)
- +. Carex albursina
- +. Carex hirtifolia
- +. Elymus hystrix (Bottlebrush grass)
- R. Festuca (Fescue)

Forb, Height: .0-2m, Cover patchy
- 1. Adiantum pedatum (Maidenhair fern)
- 1. Desmodium glutinosum (Pointed-leaved tick-trefoil)
- 1. Glechoma hederacea (Creeping charlie)
- 1. Osmunda claytoniana (Interrupted fern)
- +. Actaea rubra (Red baneberry)
- +. Amphicarpaea bracteata (Hog-peanut)
- +. Asarum canadense (Wild ginger)
- +. Aster cf. lateriflorus (Side-flowering aster)
- +. Athyrium angustum (Lady fern)
- +. Fragaria virginiana (Common strawberry)
- +. Galium concinnum
- +. Geranium maculatum (Wild geranium)
- +. Geum canadense (White avens)
- +. Hepatica acutiloba (Sharp-lobed hepatica)
- +. Hydrophyllum virginianum (Virginia waterleaf)
- +. Mitella diphylla (Miterwort)
- +. Osmorhiza claytonii (Sweet cicely)
- +. Phryma leptostachya (Lopseed)
- +. Podophyllum peltatum (May-apple, mandrake)
- +. Polemonium reptans (Jacob's ladder)
- +. Solidago ulmifolia (Bog goldenrod)
- +. Thalictrum dioicum (Early meadow rue)
- +. Uvularia grandiflora (Yellow bellwort)
- +. Viola pubescens (Smooth yellow violet)
- R. Caulophyllum thalictroides (Blue cohosh)
- R. Erigeron strigosus (Daisy fleabane)
- R. cf. Silene (Catchfly; Campion)
- R. Unknown or Indeterminable Plant

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4960
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-1 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 15 Month: MAY Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name:
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: MBSEXX (Maple-Basswood Forest (Southeast))
Commun. Ranking in Releve:AB Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SW QRT: SW of Section 13
Latitude: 43 degrees, 37 minutes, 57 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 38 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1080 Slope: 10N Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Old growth maple/basswood forest in mesic swale between narrow ridges.
Concave side slopes approaching 20% grade on each side of plot.
Healthy large Juglans cineara.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover continuous
4. Acer saccharum (Sugar maple)
2. Quercus alba (White oak)
2. Tilia americana (Basswood)
1. Fraxinus nigra OP (Black ash)
SPC 1. Juglans cinerea (Butternut)
1. Quercus rubra OP (Northern red oak)
1. Ulmus rubra (Red elm, slippery elm)
R. Ulmus DD (Elm)

Woody Broadleaf Deciduous, Height: 10-20m, Cover rare
1. Carya cordiformis (Bitternut hickory)
1. Ulmus rubra (Red elm, slippery elm)
R. Ulmus rubra DD (Red elm, slippery elm)

Woody Broadleaf Deciduous, Height: 2-10m, Cover barely present
2. Acer saccharum (Sugar maple)
2. Carya cordiformis (Bitternut hickory)
1. Ostrya virginiana (Ironwood, hop hornbeam)
R. Crataegus OP (Hawthorn)

Woody Broadleaf Deciduous, Height: .1-.5m, Cover rare
2. Ribes cynosbati (Prickly gooseberry, dogberry)
1. Carya cordiformis (Bitternut hickory)
1. Ribes missouriense
+. Acer saccharum (Sugar maple)
+. Ulmus (Elm)
R. Acer negundo (Box elder)
R. Cornus alternifolia DD (Pagoda dogwood)
R. Viburnum lentago (Nannyberry)

Woody Broadleaf Deciduous, Height: .0-.1m, Cover almost absent
+. Carya cordiformis (Bitternut hickory)
+. Cornus alternifolia (Pagoda dogwood)
+. Ribes cynosbati (Prickly gooseberry, dogberry)

Graminoid, Height: .0-.5m, Cover barely present
1. Carex cf. hirtifolia
+. Carex albursina
+. Carex cf. blanda
+. Carex cf. convoluta
+. Carex (Sedge)
+. Carex (Sedge)
+. Carex (Sedge)
+. Elymus (Wild Rye)

Forb, Height: .0-.5m, Cover interrupted
2. Erythronium albidum (White trout-lily)
2. Geranium maculatum (Wild geranium)
2. Isopyrum biternatum (False rue-anemone)
1. Dentaria laciniata (Cut-leaved toothwort)
+. Adiantum pedatum (Maidenhair fern)
+. Agastache scrophulariaefolia (Purple giant-hyssop)
+. Arisaema triphyllum (Jack-in-the-pulpit)
+. Athyrium angustum (Lady fern)
+. Blephilia hirsuta (Wood-mint)
+. Caulophyllum thalictroides (Blue cohosh)
+. Circaea lutetiana (Enchanter's nightshade)
+. Claytonia virginica (Virginia spring-beauty)
+. Cystopteris protrusa (Fragile fern)
+. Galium aparine (Cleavers)
+. Geum canadense (White avens)
+. Laportea canadensis (Wood nettle)
+. Polygonum virginianum (Virginia knotweed)
+. Ranunculus abortivus (Kidney-leaf buttercup)
+. Ranunculus hispidus (Hispid buttercup)
+. Sanguinaria canadensis (Bloodroot)
+. Smilacina racemosa (False Solomon's-seal)
+. Solidago flexicaulis (Zig-zag goldenrod)
+. Viola pubescens (Smooth yellow violet)
+. Viola cf. sororia (Common blue violet)
R. Arabis cf. perstellata (Rock-cress)
R. Mitella diphylla OP (Miterwort)
R. Scrophularia (Figwort)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4961
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-2 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 15 Month: MAY Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: MBSEXX (Maple-Basswood Forest (Southeast))
Commun. Ranking in Releve:B Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SW QRT: SW of Section 13
Latitude: 43 degrees, 38 minutes, 2 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 38 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1070 Slope: 15N Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: E descending, small ridge along side road about 10-15 ft. above fldpln
Releve includes N-aspect slope to the foot of small ridges.
Heterogeneous stand. Releve includes larger trees >45cm dbh

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover continuous
4. Tilia americana (Basswood)
3. Quercus rubra (Northern red oak)
2. Acer saccharum (Sugar maple)
1. Fraxinus nigra OP (Black ash)

Woody Broadleaf Deciduous, Height: 5-20m, Cover interrupted
3. Acer saccharum (Sugar maple)
2. Ostrya virginiana (Ironwood, hop hornbeam)
1. Carpinus caroliniana (American hornbeam, blue beech)
1. Tilia americana (Basswood)
+. Carya cordiformis (Bitternut hickory)

Woody Broadleaf Deciduous, Height: 2-5m, Cover patchy
1. Acer saccharum (Sugar maple)
1. Carpinus caroliniana (American hornbeam, blue beech)
1. Cornus alternifolia (Pagoda dogwood)
1. Corylus americana (American hazelnut)
+. Carya cordiformis (Bitternut hickory)
+. Crataegus (Hawthorn)
+. Ostrya virginiana (Ironwood, hop hornbeam)
+. Prunus virginiana (Chokecherry)
+. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: .1-2m, Cover rare
2. Ribes missouriense
+. Acer saccharum (Sugar maple)
+. Carpinus caroliniana (American hornbeam, blue beech)
+. Carya cordiformis (Bitternut hickory)
+. Cornus alternifolia (Pagoda dogwood)
+. Corylus americana (American hazelnut)
+. Fraxinus cf. americana (White ash)
+. Prunus virginiana (Chokecherry)

Woody Broadleaf Deciduous, Height: .1-2m, Cover rare (continued)

+.	Quercus rubra	(Northern red oak)
+.	Rhus radicans	
+.	Viburnum lentago	(Nannyberry)
R.	Acer negundo	(Box elder)
R.	Cornus alternifolia	(Pagoda dogwood)
R.	Lonicera cf. dioica	(Wild Honeysuckle)
R.	Tilia americana	(Basswood)

Woody Broadleaf Deciduous, Height: .0-.1m, Cover almost absent

+.	Acer saccharum	(Sugar maple)
+.	Fraxinus	(Ash)
R.	Euonymus atropurpureus	(Wahoo)

Graminoid, Height: .0-2m, Cover rare

SPC 2.	Carex woodii	
+.	cf. Brachyelytrum	(Shorthusk)
+.	Carex cf. blanda	
+.	Carex cf. convoluta	
+.	Carex	(Sedge)
+.	Elymus cf. villosus	(Wild-rye)

Forb, Height: .0-2m, Cover patchy

2.	Erythronium albidum	(White trout-lily)
1.	Asarum canadense	(Wild ginger)
1.	Dentaria laciniata	(Cut-leaved toothwort)
1.	Geranium maculatum	(Wild geranium)
1.	Isopyrum biternatum	(False rue-anemone)
+.	Actaea rubra	(Red baneberry)
+.	Adiantum pedatum	(Maidenhair fern)
+.	Allium tricoccum	(Wild leek)
+.	Anemone quinquefolia	
+.	Arisaema triphyllum	(Jack-in-the-pulpit)
+.	Athyrium angustum	(Lady fern)
+.	Caulophyllum thalictroides	(Blue cohosh)
+.	Circaea lutetiana	(Enchanter's nightshade)
+.	Claytonia virginica	(Virginia spring-beauty)
+.	Galium aparine	(Cleavers)
+.	Galium concinnum	
+.	Geum canadense	(White avens)
+.	Hepatica acutiloba	(Sharp-lobed hepatica)
+.	Hydrophyllum virginianum	(Virginia waterleaf)
+.	Mitella diphylla	(Miterwort)
+.	Osmunda claytoniana	(Interrupted fern)
+.	Podophyllum peltatum	(May-apple, mandrake)
+.	Ranunculus hispidus	(Hispid buttercup)
+.	Sanguinaria canadensis	(Bloodroot)
+.	Smilacina racemosa	(False Solomon's-seal)
+.	Solidago flexicaulis	(Zig-zag goldenrod)
+.	Thalictrum dioicum	(Early meadow rue)
+.	Thalictrum dioicum	(Early meadow rue)
+.	Trillium flexipes	(Declining trillium)
+.	Uvularia grandiflora	(Yellow bellwort)
+.	Viola pubescens	(Smooth yellow violet)
R.	Polygonum virginianum	(Virginia knotweed)
R.	Ranunculus abortivus	(Kidney-leaf buttercup)
R.	Rubus cf. strigosus	(Red raspberry)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4973
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-13B EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 28 Month: JUN Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: MBSEXX (Maple-Basswood Forest (Southeast))
Commun. Ranking in Releve:BC Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 11W (e.g. 32W)
QQRT: SE QRT: NE of Section 18
Latitude: 43 degrees, 38 minutes, 22 seconds LL/GPS registration:
Longitude: 92 degrees, 11 minutes, 33 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1120 Slope: 20NE Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: RLWL
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Mature Maple/basswood with several dead ulmus snags. Gaps filled with subcanopy acer, substrata very open, dense shade, community similar to lowland hardwoods Mod DBH 25-35, max 45-80 common in plot

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover interrupted
2. Acer saccharum (Sugar maple)
1. Quercus alba (White oak)
1. Tilia americana (Basswood)
+. Ulmus DD (Elm)
R. Fraxinus nigra OP (Black ash)

Woody Broadleaf Deciduous, Height: 5-20m, Cover interrupted
3. Acer saccharum (Sugar maple)
2. Ostrya virginiana (Ironwood, hop hornbeam)
1. Tilia americana (Basswood)
1. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: .5-5m, Cover rare
2. Acer saccharum (Sugar maple)
2. Ostrya virginiana (Ironwood, hop hornbeam)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover rare
1. Ribes missouriense
+. Acer saccharum (Sugar maple)
+. Prunus virginiana (Chokecherry)
+. Ulmus rubra (Red elm, slippery elm)
R. Tilia americana (Basswood)

Graminoid, Height: .0-.5m, Cover barely present
SPC 1. Carex woodii
1. Elymus hystrix (Bottlebrush grass)
+. Brachyelytrum erectum (Bearded short-husk)
+. Carex cf. blanda
+. Carex pedunculata
+. Festuca obtusa (Nodding fescue)

Forb, Height: .0-.5m, Cover continuous

2.	Cryptotaenia canadensis	(Honewort)
2.	Laportea canadensis	(Wood nettle)
2.	Sanicula gregaria	(Black snakeroot)
1.	Adiantum pedatum	(Maidenhair fern)
1.	Athyrium angustum	(Lady fern)
1.	Caulophyllum thalictroides	(Blue cohosh)
1.	Geranium maculatum	(Wild geranium)
1.	Hydrophyllum virginianum	(Virginia waterleaf)
1.	Osmorhiza longistylis	(Anise-root)
1.	Podophyllum peltatum	(May-apple, mandrake)
1.	Solidago flexicaulis	(Zig-zag goldenrod)
+.	Allium tricoccum	(Wild leek)
+.	Aralia nudicaulis	(Wild sarsaparilla)
+.	Asarum canadense	(Wild ginger)
+.	Aster cordifolius	(Heart-leaved aster)
+.	Aster lanceolatus	(Panicled aster)
+.	Circaea lutetiana	(Enchanter's nightshade)
+.	Dryopteris carthusiana	(Spinulose shield fern)
+.	Galium aparine	(Cleavers)
+.	Geum canadense	(White avens)
+.	Hepatica acutiloba	(Sharp-lobed hepatica)
+.	Mitella diphylla	(Miterwort)
+.	Osmunda claytoniana	(Interrupted fern)
+.	Phlox divaricata	(Blue Phlox)
+.	Smilax ecirrata	(Carrion-flower)
+.	Thalictrum dioicum	(Early meadow rue)
+.	Uvularia grandiflora	(Yellow bellwort)
+.	Viola pubescens	(Smooth yellow violet)
R.	Heracleum lanatum	(Cow-parsnip)
R.	Matteuccia struthiopteris OP	(Ostrich fern)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4962
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-3 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 16 Month: MAY Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: LHXXXX (Lowland Hardwood Forest)
Commun. Ranking in Releve:AB Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NE QRT: SW of Section 13
Latitude: 43 degrees, 38 minutes, 11 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 22 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1040 Slope: 00LV Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Lowland hardwoods dominated by Quercus macrocarpa.
Debris common from tip-ups and fallen limbs. Well Drained.
Basal area:110 sq ft/acre. Silty alluvial soil-channeled.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover continuous
4. Quercus macrocarpa (Bur oak)
3. Fraxinus nigra (Black ash)
2. Juglans nigra (Black walnut)
2. Tilia americana (Basswood)
1. Fraxinus pennsylvanica (Green ash)

Woody Broadleaf Deciduous, Height: 5-20m, Cover interrupted
3. Ulmus rubra (Red elm, slippery elm)
2. Acer saccharum (Sugar maple)
2. Tilia americana (Basswood)
2. Ulmus americana (American elm)
1. Acer negundo (Box elder)
1. Crataegus (Hawthorn)
1. Quercus macrocarpa (Bur oak)
R. Celtis occidentalis OP (Hackberry)

Woody Broadleaf Deciduous, Height: 2-5m, Cover barely present
1. Ulmus rubra (Red elm, slippery elm)
+. Celtis occidentalis (Hackberry)
+. Prunus virginiana (Chokecherry)
+. Tilia americana (Basswood)
+. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: .0-2m, Cover barely present
1. Ribes missouriense
+. Acer saccharum (Sugar maple)
+. Prunus virginiana (Chokecherry)
+. Tilia americana (Basswood)
+. Ulmus rubra (Red elm, slippery elm)
R. Viburnum lentago (Nannyberry)

Graminoid, Height: .0-2m, Cover barely present

1.	Elymus cf. hystrix	(Bottlebrush grass)
+.	Carex cf. amphibola	
+.	Carex hirtifolia	
+.	Carex sprengelii	
+.	Carex	(Sedge)
R.	Carex albursina	

Forb, Height: .0-2m, Cover continuous

4.	Hydrophyllum virginianum	(Virginia waterleaf)
2.	Isopyrum biternatum	(False rue-anemone)
2.	Podophyllum peltatum	(May-apple, mandrake)
2.	Ranunculus hispidus	(Hispid buttercup)
1.	Erythronium albidum	(White trout-lily)
1.	Galium aparine	(Cleavers)
1.	Laportea canadensis	(Wood nettle)
+.	Asarum canadense	(Wild ginger)
+.	Blephilia hirsuta	(Wood-mint)
+.	Caulophyllum thalictroides	(Blue cohosh)
+.	Claytonia virginica	(Virginia spring-beauty)
+.	Cystopteris protrusa	(Fragile fern)
+.	Dentaria laciniata	(Cut-leaved toothwort)
+.	Dicentra cucullaria	(Dutchman's-breeches)
+.	Geranium maculatum	(Wild geranium)
+.	Geum canadense	(White avens)
+.	Osmorhiza claytonii	(Sweet cicely)
+.	Osmorhiza longistylis	(Anise-root)
+.	Phlox divaricata	(Blue Phlox)
+.	Ranunculus abortivus	(Kidney-leaf buttercup)
+.	Urtica dioica	(Stinging nettle)
+.	Viola pubescens	(Smooth yellow violet)
+.	Viola sororia	(Common blue violet)
R.	Allium burdickii	(Wild leek)
R.	Smilacina racemosa	(False Solomon's-seal)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4963
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-4 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 16 Month: MAY Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: LHXXXX (Lowland Hardwood Forest)
Commun. Ranking in Releve:BC Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NE QRT: SW of Section 13
Latitude: 43 degrees, 38 minutes, 11 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 16 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1035 Slope: 00LV Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Clayey silt, canopy 50% cover in releve, 65% overall.
Horse trail in SE corner

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover patchy
2. Acer cf. nigrum (Black maple)
2. Ulmus thomasii (Rock elm)
1. Celtis occidentalis (Hackberry)
+. Ulmus thomasii OP DD (Rock elm)

Woody Broadleaf Deciduous, Height: 10-20m, Cover patchy
2. Acer nigrum (Black maple)
1. Acer negundo (Box elder)
1. Celtis occidentalis (Hackberry)
1. Fraxinus nigra (Black ash)
1. Tilia americana (Basswood)
1. Ulmus cf. americana (American elm)
1. Ulmus thomasii DD (Rock elm)

Woody Broadleaf Deciduous, Height: 2-10m, Cover rare
2. Acer negundo (Box elder)
1. Acer cf. saccharum (Sugar maple)
1. Celtis occidentalis (Hackberry)
1. Juglans nigra (Black walnut)
1. Prunus virginiana (Chokecherry)
1. Ulmus rubra (Red elm, slippery elm)
1. Zanthoxylum americanum (Prickly-ash)
+. Fraxinus nigra (Black ash)
+. Prunus virginiana DD (Chokecherry)
+. Tilia americana (Basswood)
R. cf. Celtis DD (Hackberry)
R. Fraxinus nigra DD (Black ash)

Woody Broadleaf Deciduous, Height: .0-2m, Cover rare

1. Acer saccharum (Sugar maple)
1. Prunus virginiana (Chokecherry)
1. Ribes missouriense
1. Rubus occidentalis (Black raspberry)
1. Rubus strigosus (Red raspberry)
1. Ulmus (Elm)
+. Euonymus atropurpureus (Wahoo)
+. Tilia americana (Basswood)
+. Viburnum lentago (Nannyberry)
+. Zanthoxylum americanum (Prickly-ash)
R. Fraxinus nigra (Black ash)
R. Quercus macrocarpa (Bur oak)
R. Sambucus canadensis (Common Elder)

Graminoid, Height: .0-2m, Cover rare

2. Elymus hystrix (Bottlebrush grass)
+. Carex albursina
+. Carex cf. amphibola
+. Carex sprengelii
+. Phalaris arundinacea (Reed canary grass)

Forb, Height: .0-2m, Cover continuous

3. Hydrophyllum virginianum (Virginia waterleaf)
2. Glechoma hederacea (Creeping charlie)
2. Isopyrum biternatum (False rue-anemone)
1. Erythronium albidum (White trout-lily)
1. Galium aparine (Cleavers)
1. Hydrophyllum appendiculatum (Appendaged waterleaf)
1. Laportea canadensis (Wood nettle)
1. Ranunculus hispidus (Hispid buttercup)
1. Rudbeckia laciniata (Goldenglow)
+. Allium tricoccum (Wild leek)
+. Arctium minus (Common burdock)
+. Asarum canadense (Wild ginger)
+. Blephilia hirsuta (Wood-mint)
+. Claytonia virginica (Virginia spring-beauty)
+. Dicentra cucullaria (Dutchman's-breeches)
+. Geranium maculatum (Wild geranium)
+. Geum canadense (White avens)
+. Mertensia virginica (Virginia bluebells)
+. Phlox divaricata (Blue Phlox)
+. Podophyllum peltatum (May-apple, mandrake)
+. Ranunculus abortivus (Kidney-leaf buttercup)
+. cf. Solidago
+. Urtica dioica (Stinging nettle)
+. Viola sororia (Common blue violet)
R. Caulophyllum thalictroides (Blue cohosh)
R. Plantago cf. major (Common plantain)
R. Smilacina racemosa (False Solomon's-seal)
R. Unknown or Indeterminable Plant
R. Viola pubescens (Smooth yellow violet)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4968
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-9 EO Rec #: 0
*Surveyor's ID Code: MDL (Michael D. Lee)
Date: 18 Month: MAY Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: LHXXXX (Lowland Hardwood Forest)
Commun. Ranking in Releve:C Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NE QRT: SW of Section 13
Latitude: 43 degrees, 38 minutes, 14 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 13 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1040 Slope: 00LV Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Young stand with scattered large trees, much down logs & debris
Tree core: 21cmn Ulmus americana Basal area: 80-90 sq ft/acre.
Debris mainly Ulmus. Crataegus crus-galli state Record?? N

OTHER DATA COLLECTED
Soils: Y Forestry: N o=old growth Water Chemistry: N Publication:
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover patchy
3. Celtis occidentalis (Hackberry)
1. Ulmus thomasii (Rock elm)
R. Quercus macrocarpa OP (Bur oak)

Woody Broadleaf Deciduous, Height: 10-20m, Cover rare
2. Ulmus thomasii (Rock elm)
1. Celtis occidentalis (Hackberry)
+. Ulmus thomasii DD (Rock elm)

Woody Broadleaf Deciduous, Height: 2-10m, Cover interrupted
3. Celtis occidentalis (Hackberry)
2. Acer saccharum (Sugar maple)
2. Ulmus americana (American elm)
2. Zanthoxylum americanum (Prickly-ash)
1. Acer negundo (Box elder)
1. Fraxinus nigra (Black ash)
1. Juglans nigra (Black walnut)
1. Ulmus thomasii (Rock elm)
+. Crataegus (Hawthorn)
+. Prunus virginiana (Chokecherry)
+. Ulmus DD (Elm)
+. Viburnum lentago (Nannyberry)

Woody Broadleaf Deciduous, Height: .0-2m, Cover barely present
+. Prunus virginiana (Chokecherry)
+. Ribes missouriense
+. Viburnum lentago (Nannyberry)
+. Zanthoxylum americanum (Prickly-ash)

Graminoid, Height: .0-2m, Cover patchy

	3.	Elymus cf. hystrix	(Bottlebrush grass)
	+.	Carex sprengelii	
	+.	Phalaris arundinacea	(Reed canary grass)
	R.	Carex albursina	

Forb, Height: .0-2m, Cover continuous

	4.	Hydrophyllum virginianum	(Virginia waterleaf)
	3.	Isopyrum biternatum	(False rue-anemone)
	2.	Erythronium albidum	(White trout-lily)
	2.	Galium aparine	(Cleavers)
	1.	Asarum canadense	(Wild ginger)
	1.	Hydrophyllum appendiculatum	(Appendaged waterleaf)
	1.	Laportea canadensis	(Wood nettle)
	1.	Mertensia virginica	(Virginia bluebells)
	+.	Claytonia virginica	(Virginia spring-beauty)
	+.	Dicentra cucullaria	(Dutchman's-breeches)
	+.	Geum canadense	(White avens)
	+.	Phlox divaricata	(Blue Phlox)
	+.	Ranunculus hispidus	(Hispid buttercup)
	R.	Caulophyllum thalictroides OP	(Blue cohosh)
SPC	R.	Dicentra canadensis OP	(Squirrel-corn)
	R.	Trillium flexipes	(Declining trillium)
	R.	Viola cf. sororia	(Common blue violet)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4965
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-6 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 18 Month: MAY Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 17 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: LHXXXX (Lowland Hardwood Forest)
Commun. Ranking in Releve:CD Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21C Universal: 43092E2 (Greenleafton)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SE QRT: NW of Section 25
Latitude: 43 degrees, 36 minutes, 37 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 20 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1060 Slope: 00LV Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Large extent of this CD lowland hardwood forest along Canfield Creek.
Basal Area: 90 Square feet/acre. Decaying elms on forest floor common
Soil a clayey silt-deep.

OTHER DATA COLLECTED
Soils: Forestry: o=old growth Water Chemistry: Publication:
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 10-20m, Cover interrupted
3. Acer negundo (Box elder)
2. Fraxinus nigra (Black ash)
2. Prunus serotina (Black cherry)
SPC 1. Juglans cinerea OP (Butternut)
1. Populus tremuloides (Quaking aspen)
1. Tilia americana OP (Basswood)
+. Celtis occidentalis (Hackberry)
+. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: 2-10m, Cover interrupted
3. Fraxinus nigra (Black ash)
2. Acer negundo (Box elder)
2. Tilia americana (Basswood)
1. Acer saccharum (Sugar maple)
1. Crataegus (Hawthorn)
1. Lonicera tatarica (Tartarian Honeysuckle)
1. Prunus americana (Wild plum)
1. Prunus serotina (Black cherry)
1. Quercus macrocarpa (Bur oak)
1. Ulmus americana (American elm)
1. Ulmus rubra (Red elm, slippery elm)
1. Ulmus thomasii (Rock elm)
1. Zanthoxylum americanum (Prickly-ash)
+. Acer negundo DD (Box elder)
R. Ulmus americana DD (American elm)

Woody Broadleaf Deciduous, Height: .0-2m, Cover interrupted
4. Ribes missouriense
+. Rubus occidentalis (Black raspberry)
+. Sambucus canadensis (Common Elder)
+. Tilia americana (Basswood)
+. Zanthoxylum americanum (Prickly-ash)

Climber, Height: 10-20m, Cover barely present
NON 1. Vitis riparia (Wild grape)
R. Parthenocissus quinquefolia (Virginia creeper)
R. Rhus radicans

Graminoid, Height: .0-2m, Cover barely present
1. Elymus cf. villosus (Wild-rye)
+. Carex amphibola var. turgida
+. Carex hirtifolia
+. Carex cf. oligocarpa
+. Carex sprengelii
+. Unknown or Indeterminable Plant
R. Carex albursina

Forb, Height: .0-2m, Cover continuous
4. Galium aparine (Cleavers)
3. Isopyrum biternatum (False rue-anemone)
2. Hydrophyllum appendiculatum (Appendaged waterleaf)
2. Hydrophyllum virginianum (Virginia waterleaf)
2. Laportea canadensis (Wood nettle)
1. Blephilia hirsuta (Wood-mint)
1. Glechoma hederacea (Creeping charlie)
1. Podophyllum peltatum (May-apple, mandrake)
+. Allium tricoccum (Wild leek)
+. Asarum canadense (Wild ginger)
+. Caulophyllum thalictroides (Blue cohosh)
+. Claytonia virginica (Virginia spring-beauty)
+. Dicentra cucullaria (Dutchman's-breeches)
+. Erythronium albidum (White trout-lily)
+. Geranium maculatum (Wild geranium)
+. Geum canadense (White avens)
+. Osmorhiza longistylis (Anise-root)
+. Phlox divaricata (Blue Phlox)
+. Rudbeckia laciniata (Goldenglow)
+. Scrophularia marilandica (Figwort)
+. Smilacina racemosa (False Solomon's-seal)
+. Solidago flexicaulis (Zig-zag goldenrod)
+. Trillium flexipes (Declining trillium)
+. Viola pubescens (Smooth yellow violet)
+. Viola cf. sororia (Common blue violet)
R. Arisaema triphyllum (Jack-in-the-pulpit)
R. Ranunculus abortivus (Kidney-leaf buttercup)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4816
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 29 Month: AUG Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: BAXXSE (Black Ash Swamp Seepage Subtype)
Commun. Ranking in Releve:B Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 11W (e.g. 32W)
QQRT: SW QRT: NW of Section 18
Latitude: 43 degrees, 38 minutes, 27 seconds LL/GPS registration:
Longitude: 92 degrees, 12 minutes, 28 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1200 Slope: 20NW Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 39 (Harmony-Plainview Uplands)

Remarks: Tip-ups common. Flowing spring. Wet soil, no muck. Galena limestone outcrops & rocky talus present(?). Stake at southwest corner of plot. Some barbed wire imbedded in black ash(?).

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover interrupted
4. Fraxinus nigra (Black ash)
1. Acer saccharum (Sugar maple)
R. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: 5-20m, Cover continuous
4. Acer saccharum (Sugar maple)
3. Ulmus rubra (Red elm, slippery elm)
2. Tilia americana (Basswood)
1. Acer negundo (Box elder)
1. Fraxinus nigra (Black ash)

Woody Broadleaf Deciduous, Height: .5-5m, Cover interrupted
2. Acer saccharum (Sugar maple)
2. Tilia americana (Basswood)
1. Carpinus caroliniana (American hornbeam, blue beech)
1. Ribes americanum (Wild black currant)
1. Ribes cynosbati (Prickly gooseberry, dogberry)
1. Staphylea trifolia (Bladdernut)
+. Acer negundo (Box elder)
+. Celtis occidentalis (Hackberry)
+. Cornus alternifolia (Pagoda dogwood)
+. Crataegus (Hawthorn)
+. Euonymus atropurpureus (Wahoo)
+. Fraxinus nigra (Black ash)
+. Quercus cf. alba (White oak)
+. Ulmus rubra (Red elm, slippery elm)
+. Viburnum lentago (Nannyberry)
R. Fraxinus pennsylvanica (Green ash)
R. Ostrya virginiana (Ironwood, hop hornbeam)
R. Prunus virginiana (Chokecherry)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover barely present
1. Parthenocissus inserta (Virginia creeper)
1. Rhus radicans
+. Acer negundo (Box elder)
+. Cornus alternifolia (Pagoda dogwood)
+. Fraxinus nigra (Black ash)
+. Menispermum canadense (Canada moonseed)
+. Ostrya virginiana (Ironwood, hop hornbeam)
+. Ribes cynosbati (Prickly gooseberry, dogberry)
+. Staphylea trifolia (Bladdernut)
+. Ulmus rubra (Red elm, slippery elm)
NON +. Vitis riparia (Wild grape)
+. Zanthoxylum americanum (Prickly-ash)

Graminoid, Height: .0-2m, Cover almost absent
+. Carex albursina
+. Carex pedunculata
+. Elymus hystrix (Bottlebrush grass)
+. Elymus virginicus (Wild-rye)

Forb, Height: .0-2m, Cover continuous
3. Impatiens capensis (Spotted touch-me-not, jewel-we)
3. Laportea canadensis (Wood nettle)
2. Asarum canadense (Wild ginger)
2. Symplocarpus foetidus (Skunk cabbage)
1. Solidago flexicaulis (Zig-zag goldenrod)
1. Solidago gigantea (Giant goldenrod)
+. Adiantum pedatum (Maidenhair fern)
+. Aralia nudicaulis (Wild sarsaparilla)
+. Arenaria lateriflora (Sandwort)
+. Arisaema triphyllum (Jack-in-the-pulpit)
+. Aster cf. lanceolatus (Panicled aster)
+. Aster prenanthoides (Crooked-stemmed aster)
+. Bidens (Bur-Marigold; Beggar-Ticks)
+. Caulophyllum thalictroides (Blue cohosh)
+. Circaea lutetiana (Enchanter's nightshade)
+. Clematis virginiana (Virgin's bower)
+. Cystopteris bulbifera (Bulblet fern)
+. Equisetum hyemale (Tall scouring-rush)
+. Equisetum ferrissii (Scouring-rush)
+. Fragaria virginiana (Common strawberry)
+. Geranium maculatum (Wild geranium)
+. Geum canadense (White avens)
+. Glechoma hederacea (Creeping charlie)
+. Helianthus grosseserratus (Sawtooth sunflower)
+. Hepatica acutiloba (Sharp-lobed hepatica)
+. Hydrophyllum appendiculatum (Appendaged waterleaf)
+. Hydrophyllum virginianum (Virginia waterleaf)
+. Lobelia siphilitica (Great lobelia)
+. Lysimachia ciliata (Fringed loosestrife)
+. Mitella diphylla (Miterwort)
+. Phlox divaricata (Blue Phlox)
+. Polymnia canadensis (Leaf-cup)
+. Prunella vulgaris (Heal-all)
+. Rubus occidentalis (Black raspberry)
+. Rudbeckia laciniata (Goldenglow)
+. Sanguinaria canadensis (Bloodroot)
+. Saxifraga pensylvanica (Swamp saxifrage)
+. Scutellaria lateriflora (Mad-dog skullcap)
+. Senecio aureus (Golden ragwort)
+. Silphium perfoliatum (Cup-plant)
+. Smilacina racemosa (False Solomon's-seal)
+. Solidago canadensis
+. Thalictrum dasycarpum (Tall meadow rue)
+. Thalictrum dioicum (Early meadow rue)
+. Urtica dioica (Stinging nettle)
+. Uvularia grandiflora (Yellow bellwort)
+. Viola pubescens (Smooth yellow violet)
R. Scrophularia marilandica (Figwort)
R. Smilax ecirrata (Carrion-flower)
R. Taraxacum (Dandelion)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4812
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 29 Month: AUG Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name:
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: BAXXSE (Black Ash Swamp Seepage Subtype)
Commun. Ranking in Releve: Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SE QRT: SW of Section 12
Latitude: 43 degrees, 38 minutes, 43 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 25 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1140 Slope: 10N Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: In seepage area at base of ravine. Dom by Frax nigr: typical size = 8-25cm dbh, max 45-55cm. Herb layer dom by Symp foet & Lapo cana. Muck soil. Stake at NW corner of plot. Plot incl some oak forest.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover rare
2. Fraxinus nigra (Black ash)
+. Quercus alba (White oak)

Woody Broadleaf Deciduous, Height: 5-20m, Cover interrupted
2. Acer saccharum (Sugar maple)
2. Fraxinus nigra \ (Black ash)
2. Fraxinus pennsylvanica (Green ash)
2. Tilia americana (Basswood)
2. Ulmus rubra (Red elm, slippery elm)
+. Crataegus (Hawthorn)
R. Acer negundo (Box elder)

Woody Broadleaf Deciduous, Height: .5-5m, Cover patchy
2. Acer saccharum (Sugar maple)
1. Fraxinus pennsylvanica (Green ash)
1. Ribes missouriense
+. Cornus alternifolia (Pagoda dogwood)
+. Fraxinus nigra (Black ash)
+. Viburnum lentago (Nannyberry)
R. Acer negundo (Box elder)
R. Ulmus rubra (Red elm, slippery elm)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover almost absent
+. Fraxinus pennsylvanica (Green ash)
+. Prunus virginiana (Chokecherry)
+. Quercus alba (White oak)
+. Quercus rubra (Northern red oak)
+. Tilia americana (Basswood)
+. Viburnum lentago (Nannyberry)
NON +. Vitis riparia (Wild grape)

Graminoid, Height: .0-.5m, Cover rare

	2.	Leersia virginica	(White grass)
SPC	1.	Carex woodii	
	+.	Carex albursina	
	+.	Carex hirtifolia	
	+.	Carex	(Sedge)

Forb, Height: .0-.5m, Cover continuous

	2.	Impatiens capensis	(Spotted touch-me-not, jewel-we)
	2.	Laportea canadensis	(Wood nettle)
	2.	Pilea pumila	(Clearweed)
	2.	Symplocarpus foetidus	(Skunk cabbage)
	1.	Adiantum pedatum	(Maidenhair fern)
	1.	Athyrium angustum	(Lady fern)
	1.	Hydrophyllum virginianum	(Virginia waterleaf)
	1.	Mitella diphylla	(Miterwort)
	+.	Amphicarpaea bracteata	(Hog-peanut)
	+.	Arisaema triphyllum	(Jack-in-the-pulpit)
	+.	Asarum canadense	(Wild ginger)
	+.	Aster prenanthoides	(Crooked-stemmed aster)
	+.	Cryptotaenia canadensis	(Honewort)
	+.	Cystopteris bulbifera	(Bulblet fern)
	+.	Dryopteris carthusiana	(Spinulose shield fern)
	+.	Eupatorium rugosum	(Common snakeroot)
	+.	Galium triflorum	(Three-flowered bedstraw)
	+.	Geranium maculatum	(Wild geranium)
	+.	Geum canadense	(White avens)
	+.	Hepatica acutiloba	(Sharp-lobed hepatica)
	+.	Hydrophyllum appendiculatum OP	(Appendaged waterleaf)
	+.	Lobelia siphilitica	(Great lobelia)
	+.	Parthenocissus inserta	(Virginia creeper)
	+.	Phlox divaricata	(Blue Phlox)
	+.	Scutellaria lateriflora	(Mad-dog skullcap)
	+.	Smilacina racemosa	(False Solomon's-seal)
	+.	Solidago flexicaulis	(Zig-zag goldenrod)
	+.	Thalictrum dioicum	(Early meadow rue)
	+.	Viola pubescens	(Smooth yellow violet)
	R.	Desmodium glutinosum	(Pointed-leaved tick-trefoil)
	R.	Impatiens pallida	(Pale touch-me-not, jewel-weed)
	R.	Smilax ecirrata	(Carrion-flower)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4969
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-10 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 5 Month: JUN Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: SMXXXX (Seepage Meadow)
Commun. Ranking in Releve:C Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 11W (e.g. 32W)
QQRT: NW QRT: SE of Section 18
Latitude: 43 degrees, 38 minutes, 5 seconds LL/GPS registration:
Longitude: 92 degrees, 11 minutes, 51 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 100 Elev. (ft.): 1120 Slope: 02E Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: RLWL
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Seepage meadow at base of terrace on broad creek valley. E aspect.
Above terrace is another seepage area from base of bluff about 1140ft.
Seepage meadow level w/rivulels of flowing water. plot 5x20m

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 20-35m, Cover rare
2. Salix nigra (Black willow)
+. Acer negundo OP (Box elder)

Graminoid, Height: .0-2m, Cover patchy
3. Glyceria cf. striata (Fowl manna grass)
2. Carex stipata
2. Poa palustris (Fowl meadow grass)
THR 1. Carex laevivaginata
1. Carex stricta
+. Carex lanuginosa
+. cf. Elymus (Wild-rye)
+. Phalaris arundinacea (Reed canary grass)

Forb, Height: .0-2m, Cover patchy
3. Caltha palustris (Marsh marigold)
2. Aster puniceus (Red-stemmed aster)
2. Barbarea vulgaris (Yellow rocket, winter-cress)
2. Eupatorium maculatum (Spotted Joe-pye weed)
2. Impatiens (Balsam; Jewelweed)
2. Symplocarpus foetidus (Skunk cabbage)
1. cf. Aster
1. Cardamine bulbosa (Spring cress)
1. Helenium autumnale (Sneezeweed)
1. cf. Physostegia (Obedient Plant)
1. Solidago gigantea (Giant goldenrod)
1. Unknown or Indeterminable Plant
1. Unknown or Indeterminable Plant
+. Cirsium arvense (Canada thistle)
+. Cirsium cf. discolor (Field thistle)
+. Equisetum arvense (Field horsetail)
+. Equisetum fluviatile (Water horsetail)
+. Parthenocissus inserta (Virginia creeper)

Forb, Height: .0-2m, Cover patchy (continued)

+.	Rumex altissimus	(Water dock)
+.	Rumex crispus	(Curly dock)
+.	Solidago canadensis	
R.	Hydrophyllum virginianum OP	(Virginia waterleaf)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4809
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 7 Month: SEP Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name:
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: MEFOXX (Mixed Emergent Marsh (Forest))
Commun. Ranking in Releve:BC Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21C Universal: 43092E2 (Greenleafton)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NW QRT: SW of Section 24
Latitude: 43 degrees, 37 minutes, 20 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 36 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 100 Elev. (ft.): 1040 Slope: 00LV Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Open water marsh in oxbow slough fed by seeps. Entire marsh borderd by
wild rice. Seepage area dominated by Carex lacustris. Drainage to SE
into Canfield Creek thru? wet meadow dom by Carex trichocar.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 5-10m, Cover barely present
1. Fraxinus pennsylvanica (Green ash)
R. Juglans nigra OP (Black walnut)
R. Ulmus rubra OP DY (Red elm, slippery elm)

Woody Broadleaf Deciduous, Height: .5-5m, Cover barely present
+. Acer negundo OP (Box elder)
+. Amorpha fruticosa (False indigo)
R. Ribes missouriense
R. Tilia americana DY (Basswood)
R. Zanthoxylum americanum OP (Prickly-ash)

Climber, Height: .5-2m, Cover almost absent
NON +. Vitis riparia OP (Wild grape)

Graminoid, Height: .0-2m, Cover continuous
4. Zizania palustris var. interior
1. Leersia oryzoides (Rice cut grass)
+. Agrostis stolonifera (Redtop)
+. Carex comosa
+. Carex cristatella
+. Carex trichocarpa
+. Carex vulpinoidea
+. Elymus wiegandii (Wild-rye)
+. Unknown or Indeterminable Plant (Blue Grass; Meadow Grass)
+. Scirpus validus (Softstem bulsush)
R. Bromus inermis OP (Smooth brome)
R. Carex cf. emoryi
R. Carex lacustris OP
R. Carex cf. laeviconica
R. Elymus virginicus OP (Wild-rye)
R. Muhlenbergia cf. frondosa OP (Swamp satin grass)
R. Phalaris arundinacea OP (Reed canary grass)

Forb, Height: .0-2m, Cover patchy

	2.	Bidens cernua (Nodding bur-marigold)
	1.	Bidens frondosa (Leafy beggar-ticks)
	1.	Helenium autumnale (Sneezeweed)
	1.	Impatiens capensis (Spotted touch-me-not, jewel-we)
	1.	Rudbeckia laciniata (Goldenglow)
	+.	Angelica atropurpurea (Angelica)
	+.	Asclepias incarnata (Swamp milkweed)
	+.	Aster lanceolatus (Panicled aster)
	+.	Aster prenanthoides (Crooked-stemmed aster)
	+.	Bidens comosa (Red-stemmed aster)
	+.	Cicuta bulbifera (Bulb-bearing water-hemlock)
	+.	Epilobium coloratum (Purple-leaved willow-herb)
	+.	Eupatorium perfoliatum (Common boneset)
	+.	Eupatorium rugosum (Common snakeroot)
NON	+.	Geum laciniatum var. trichocarpum (White avens)
	+.	Glechoma hederacea (Creeping charlie)
	+.	Helianthus tuberosus (Jerusalem artichoke)
	+.2	Iris virginica var. shrevei (Southern blue flag)
	+.	Lobelia siphilitica (Great lobelia)
	+.	Pilea pumila (Clearweed)
	+.	Prunella vulgaris (Heal-all)
	+.	Rubus strigosus (Red raspberry)
	+.	Sagittaria latifolia (Broad-leaved arrowhead)
	+.	Scutellaria lateriflora (Mad-dog skullcap)
	+.	Solidago gigantea (Giant goldenrod)
	+.	Stachys (Hedge-Nettle)
	+.	Thalictrum dasycarpum (Tall meadow rue)
	+.	Verbena urticifolia (White vervain)
	R.	Amaranthus (Amaranth)
	R.	Amaranthus (Amaranth)
	R.	Amorpha fruticosa (False indigo)
	R.	Anemone cylindrica (Thimbleweed)
	R.	Asclepias syriaca OP (Common milkweed)
	R.	Aster cordifolius OP (Heart-leaved aster)
	R.	Blephilia hirsuta (Wood-mint)
	R.	Chelone glabra (Turtlehead)
	R.	Chenopodium (Goosefoot)
	R.	Echinocystis lobata (Wild cucumber)
	R.	Eupatorium purpureum OP (Sweet Joe-pye weed)
	R.	Ludwigia (False Loosestrife)
	R.	Lycopus uniflorus OP (Northern bugleweed)
	R.	Physostegia virginiana (Obedient Plant)
	R.	Verbena hastata OP (Blue vervain)
	R.	Vernonia OP (Ironweed)

Forb, Height: .0-.1m, Cover continuous

	5.	UNKNOWN OP
	1.	Lemna minor OP (Lesser duckweed)
	+.	Elodea canadensis OP (Elodea)
	+.	Potamogeton cf. foliosus OP

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4966
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-7 EO Rec #: 11241
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 17 Month: MAY Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 17 or Site Name: Canfield Creek
DNR Ownership Code: 20 (Mn Dnr Forestry (State Forest and Con-Con Land))
*NC Code: TAXXAL (Talus Slope Algific Subtype)
Commun. Ranking in Releve:A Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21C Universal: 43092E2 (Greenleafton)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SE QRT: NW of Section 25
Latitude: 43 degrees, 36 minutes, 20 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 35 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 25 Elev. (ft.): 1230 Slope: 12NE Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Algific slope. E facing with Rhamnus alnifolia, Ribes hudso.
Rocky cliff 50 ft with abandoned spring channel
descending ridge spur. Silt loam, cold air vents.cold soil

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: 10-20m, Cover almost absent
+. Betula papyrifera (Paper birch)
+. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: .0-2m, Cover interrupted
4. Rhamnus alnifolia (Alder-leaved buckthorn)
2. Ribes hudsonianum (Northern black currant)
1. Cornus alternifolia (Pagoda dogwood)
1. Sambucus pubens (Red-berried Elder)
+. Prunus virginiana (Chokecherry)
R. Cornus foemina OP (Gray dogwood)
R. Diervilla lonicera (Bush honeysuckle)

Graminoid, Height: .0-.5m, Cover barely present
1. Carex eburnea

Forb, Height: .0-2m, Cover interrupted
4. Cystopteris bulbifera (Bulblet fern)
1. Rubus strigosus (Red raspberry)
+. Actaea rubra (Red baneberry)
+. Aquilegia canadensis (Columbine)
+. Arabis hirsuta (Hairy rock-cress)
+. Cryptogramma stelleri (Slender cliff-brake)
+. Cystopteris protrusa (Fragile fern)
+. Fragaria virginiana (Common strawberry)
+. Impatiens (Balsam; Jewelweed)
+. Urtica dioica (Stinging nettle)
+. Zigadenus elegans (White camas)
R. Arabis (Rock-Cress)
R. Campanula rotundifolia (Harebell)
R. Galium boreale (Northern bedstraw)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4981
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: R95-20 EO Rec #: 20511
*Surveyor's ID Code: MDL (Michael D. Lee)
Date: 19 Month: MAY Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 16 or Site Name: Keim Algific Slope
DNR Ownership Code: 00 (Private Ownership)
*NC Code: TAXXAL (Talus Slope Algific Subtype)
Commun. Ranking in Releve:A Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X20D Universal: 43092E3 (Cherry Grove)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NE QRT: NW of Section 27
Latitude: 43 degrees, 36 minutes, 52 seconds LL/GPS registration:
Longitude: 92 degrees, 15 minutes, 38 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 100 Elev. (ft.): 1200 Slope: 50N Slope Position: _
*ECS Subsection: 23 (Rochester Plateau)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Centered on largest cold area
One of the largest Chrysosplenium concentrations along this 1/4mile
Algific SLope

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Needleleaf Evergreen, Height: 10-20m, Cover almost absent
R. Pinus strobus DD (White pine)

Woody Broadleaf Deciduous, Height: 10-20m, Cover rare
2. Betula alleghaniensis
1. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: 2-10m, Cover rare
2. Betula alleghaniensis
1. Cornus foemina ssp. racemosa (Gray dogwood)
1. Sambucus pubens (Red-berried Elder)
R. Viburnum trilobum OP (High-bush cranberry)

Woody Broadleaf Deciduous, Height: .0-2m, Cover barely present
1. Rhamnus alnifolia (Alder-leaved buckthorn)
1. Ribes hudsonianum (Northern black currant)
1. Rubus strigosus (Red raspberry)
+. Betula alleghaniensis
R. Salix cf. bebbiana OP (Bebb's willow)

Graminoid, Height: .0-.5m, Cover barely present
+. Carex cf. eburnea
+. Carex peckii

Forb, Height: .0-.5m, Cover continuous
END 2. Chrysosplenium iowense (Golden saxifrage)
2. Circaea alpina (Small enchanter's nightshade)
2. Cystopteris bulbifera (Bulblet fern)
2. Impatiens pallida (Pale touch-me-not, jewel-weed)
2. cf. Stellaria (Chickweed; Starwort)
1. Saxifraga pensylvanica (Swamp saxifrage)
SPC +. Adoxa moschatellina (Moschatel)
+. Arabis hirsuta var. pycnocarpa (Hairy rock-cress)

Forb, Height: .0-.5m, Cover continuous (continued)

+.	Cryptogramma stelleri	(Slender cliff-brake)
+.	Galium boreale	(Northern bedstraw)
+.	Gymnocarpium robertianum	(Northern oak fern)
+.	Rubus pubescens	(Dwarf blackberry)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4811
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: MDL F15 EO Rec #: 20511
*Surveyor's ID Code: LAZ (Michael Lee and Scott Zager)
Date: 11 Month: AUG Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 16 or Site Name:
DNR Ownership Code: 00 (Private Ownership)
*NC Code: TAXXAL (Talus Slope Algific Subtype)
Commun. Ranking in Releve:AB Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X20D Universal: 43092E3 (Cherry Grove)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NW QRT: NW of Section 27
Latitude: 43 degrees, 36 minutes, 56 seconds LL/GPS registration:
Longitude: 92 degrees, 15 minutes, 54 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 25 Elev. (ft.): 1140 Slope: 70N Slope Position: _
*ECS Subsection: 23 (Rochester Plateau)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Talus present in association w/5-10m high Galena cliff.
Talus composed of cobbles covered w/thin layer of dark silty humus.
3-4 vents present. Stones very cold (35 deg F) & dripping.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Broadleaf Deciduous, Height: .5-2m, Cover barely present
1. Sambucus canadensis (Common Elder)
+. Ribes hudsonianum (Northern black currant)
R. Betula papyrifera OP (Paper birch)
R. Cornus foemina ssp. racemosa OP (Gray dogwood)
R. Cornus rugosa OP (Round-leaved dogwood)
R. Rhamnus alnifolia OP (Alder-leaved buckthorn)

Graminoid, Height: .0-.5m, Cover almost absent
+. Elymus (Wild Rye)
+. Poa palustris (Fowl meadow grass)

Forb, Height: .5-2m, Cover patchy
2. Impatiens pallida (Pale touch-me-not, jewel-weed)
2. Rubus strigosus ## (Red raspberry)
1. Eupatorium rugosum (Common snakeroot)
1. Urtica dioica (Stinging nettle)
R. Arisaema triphyllum (Jack-in-the-pulpit)

Forb, Height: .0-.5m, Cover continuous
4. Circaea alpina (Small enchanter's nightshade)
2. Cystopteris bulbifera (Bulblet fern)
2. Pilea cf. pumila (Clearweed)
1. Galium triflorum (Three-flowered bedstraw)
+. Arabis perstellata var. shortii (Rock-cress)
+. Campanula rotundifolia (Harebell)
+. Cryptogramma stelleri (Slender cliff-brake)
+. Cystopteris protrusa (Fragile fern)
+. Galium boreale (Northern bedstraw)
+. Mitella diphylla (Miterwort)
R. Aquilegia canadensis (Columbine)
R. Mitella nuda OP (Miterwort, naked bishop's-cap)
R. Ranunculus abortivus (Kidney-leaf buttercup)

Forb, Height: .0-.5m, Cover continuous (continued)
R. Stellaria (Chickweed; Starwort)
R. Unknown or Indeterminable Plant

Lichen/Moss, Height: .0-.1m, Cover interrupted
3. Unknown or Indeterminable Plant
2. Unknown or Indeterminable Plant

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4964
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-5 EO Rec #: 18604
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 17 Month: MAY Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 17 or Site Name: Canfield Creek
DNR Ownership Code: 20 (Mn Dnr Forestry (State Forest and Con-Con Land))
*NC Code: TAXXAL (Talus Slope Algific Subtype)
Commun. Ranking in Releve:B Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21C Universal: 43092E2 (Greenleafton)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SW QRT: SW of Section 25
Latitude: 43 degrees, 36 minutes, 38 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 11 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1220 Slope: 65NE Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: N-aspect, met mesic, dark organic silt with gravel.
Rock outcrop moss covered. N-facing slope 60% grade
Balsam fir NE corner , Pinus West of plot

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Needleleaf Evergreen, Height: 20-35m, Cover almost absent
R. Pinus strobus OP (White pine)

Woody Needleleaf Evergreen, Height: 10-20m, Cover barely present
1. Abies balsamea (Balsam fir)

Woody Broadleaf Deciduous, Height: 10-20m, Cover almost absent
1. Acer saccharum OP (Sugar maple)
R. Betula papyrifera OP (Paper birch)

Woody Broadleaf Deciduous, Height: 5-10m, Cover rare
1. Acer saccharum (Sugar maple)
1. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: 2-5m, Cover interrupted
3. Corylus americana (American hazelnut)
2. Viburnum trilobum (High-bush cranberry)
1. Acer negundo (Box elder)
1. Acer saccharum (Sugar maple)
1. Cornus alternifolia (Pagoda dogwood)
1. Sambucus pubens (Red-berried Elder)
+. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: .0-2m, Cover rare
1. Corylus americana (American hazelnut)
1. Rhamnus alnifolia (Alder-leaved buckthorn)
1. Viburnum rafinesquianum (Downy arrowwood)
+. Acer saccharum (Sugar maple)
+. Cornus alternifolia (Pagoda dogwood)
+. Diervilla lonicera (Bush honeysuckle)
+. Prunus virginiana (Chokecherry)
+. Ribes missouriense
+. Sambucus pubens (Red-berried Elder)

Woody Broadleaf Deciduous, Height: .0-2m, Cover rare (continued)
+. Tilia americana (Basswood)
+. Viburnum trilobum (High-bush cranberry)

Graminoid, Height: .0-.5m, Cover rare
2. Carex pedunculata
1. Carex peckii
R. Unknown or Indeterminable Plant

Forb, Height: .0-2m, Cover interrupted
3. Cystopteris bulbifera (Bulblet fern)
2. Circaea alpina (Small enchanter's nightshade)
1. Asarum canadense (Wild ginger)
1. Dicentra cucullaria (Dutchman's-breeches)
1. Impatiens (Balsam; Jewelweed)
1. Mitella diphylla (Miterwort)
+. Actaea rubra (Red baneberry)
+. Adiantum pedatum (Maidenhair fern)
+. Anemone quinquefolia
+. Aquilegia canadensis (Columbine)
+. Arabis hirsuta var. pycnocarpa (Hairy rock-cress)
+. Aralia nudicaulis (Wild sarsaparilla)
+. Arenaria cf. lateriflora (Sandwort)
+. Caulophyllum thalictroides (Blue cohosh)
+. Cryptogramma stelleri (Slender cliff-brake)
+. Equisetum variegatum (Variegated scouring-rush)
+. Galium concinnum
+. Galium triflorum (Three-flowered bedstraw)
+. Glechoma hederacea (Creeping charlie)
+. Gymnocarpium robertianum (Northern oak fern)
+. Hepatica acutiloba (Sharp-lobed hepatica)
+. Hydrophyllum virginianum (Virginia waterleaf)
+. Lonicera cf. prolifera (Grape honeysuckle)
+. Maianthemum canadense (Canada mayflower)
+. Polymnia canadensis (Leaf-cup)
+. Rubus pubescens (Dwarf blackberry)
+. Rubus strigosus (Red raspberry)
+. Solidago flexicaulis (Zig-zag goldenrod)
+. Thalictrum dioicum (Early meadow rue)
+. Trillium flexipes (Declining trillium)
+. Urtica dioica (Stinging nettle)
R. Athyrium angustum (Lady fern)
R. Geum canadense (White avens)
R. Polemonium reptans (Jacob's ladder)
R. Polygonatum commutatum (Giant Solomon's-seal)
R. Sanguinaria canadensis (Bloodroot)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4985
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: R95-24 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 2 Month: JUN Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 18 or Site Name: Mystry Cave Forestvill Ecoarea
DNR Ownership Code: 00 (Private Ownership)
*NC Code: TAXXAL (Talus Slope Algific Subtype)
Commun. Ranking in Releve:C Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X20A Universal: 43092F3 (Wykoff)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SW QRT: NE of Section 15
Latitude: 43 degrees, 38 minutes, 20 seconds LL/GPS registration:
Longitude: 92 degrees, 15 minutes, 12 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 100 Elev. (ft.): 1150 Slope: 99N Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: Dry to wet-mesic mesic, thickly covered w/feather moss and liverworts
And covered w/diminuitive Cystopteris bulbifera. Dry rubble borders on
side w/ boulders platy limestone. Sev. cold vents with ice.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Needleleaf Evergreen, Height: .0-2m, Cover almost absent
1. Taxus canadensis (Canada yew)

Woody Broadleaf Deciduous, Height: .0-2m, Cover barely present
1. Ribes americanum (Wild black currant)
1. Sambucus pubens (Red-berried Elder)
+. Cornus alternifolia (Pagoda dogwood)
+. Ulmus rubra (Red elm, slippery elm)

Graminoid, Height: .0-.5m, Cover almost absent
R. Agrostis scabra OP (Rough bent-grass)

Forb, Height: .0-.5m, Cover interrupted
4. Cystopteris bulbifera (Bulblet fern)
3. Impatiens (Balsam; Jewelweed)
1. Aquilegia canadensis (Columbine)
1. Asarum canadense (Wild ginger)
1. Circaea alpina (Small enchanter's nightshade)
1. Cryptogramma stelleri (Slender cliff-brake)
1. Galium triflorum (Three-flowered bedstraw)
+. Arabis hirsuta (Hairy rock-cress)
+. Cystopteris protrusa (Fragile fern)
+. Galium aparine (Cleavers)
+. Laportea canadensis (Wood nettle)
+. Parthenocissus inserta (Virginia creeper)
+. Taraxacum officinale (Common dandelion)
+. Urtica dioica (Stinging nettle)
R. Aster cf. urophyllus OP
R. Campanula rotundifolia OP (Harebell)
R. Cerastium nutans OP
R. Cystopteris fragilis OP (Fragile fern)
R. Ranunculus abortivus OP (Kidney-leaf buttercup)
R. Solidago flexicaulis OP (Zig-zag goldenrod)

Lichen/Moss, Height: .0-.1m, Cover interrupted

+.	Conocephalum	(moss)
+.	Marchantia	(moss)
+.3	Rhodobryum roseum	(moss)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4815
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 14 Month: SEP Year: 1994 (e.g. 04 JUL 1993)
CBS Site #: 17 or Site Name: Canfield Creek
DNR Ownership Code: 20 (Mn Dnr Forestry (State Forest and Con-Con Land))
*NC Code: NFSEXX (Northern Hardwood-Conifer Forest (Southeast))
Commun. Ranking in Releve:A Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21C Universal: 43092E2 (Greenleafton)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: NE QRT: SW of Section 25
Latitude: 43 degrees, 36 minutes, 20 seconds LL/GPS registration:
Longitude: 92 degrees, 13 minutes, 19 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1250 Slope: 45NW Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: On northwest-facing very steep slope. Wet-mesic to dry-mesic. Soil organic colluvium with cobbles & talus. Several outcrops of Galena sandstone.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Needleleaf Evergreen, Height: 20-35m, Cover rare
2. Abies balsamea (Balsam fir)
2. Pinus strobus (White pine)

Woody Needleleaf Evergreen, Height: 10-20m, Cover rare
2. Abies balsamea (Balsam fir)

Woody Needleleaf Evergreen, Height: 2-10m, Cover rare
2. Abies balsamea (Balsam fir)

Woody Needleleaf Evergreen, Height: .5-2m, Cover barely present
1. Taxus canadensis (Canada yew)
+. Abies balsamea (Balsam fir)

Woody Broadleaf Deciduous, Height: 20-35m, Cover barely present
1. Acer saccharum (Sugar maple)

Woody Broadleaf Deciduous, Height: 10-20m, Cover patchy
3. Acer saccharum (Sugar maple)
1. Tilia americana (Basswood)

Woody Broadleaf Deciduous, Height: 2-10m, Cover rare
2. Acer saccharum (Sugar maple)
1. Ostrya virginiana (Ironwood, hop hornbeam)
1. Ulmus rubra (Red elm, slippery elm)
+. Betula papyrifera (Paper birch)

Woody Broadleaf Deciduous, Height: .5-2m, Cover interrupted
2. Cornus alternifolia (Pagoda dogwood)
1. Corylus cornuta (Beaked hazelnut)
1. Rhamnus alnifolia OP (Alder-leaved buckthorn)
+. Carpinus caroliniana (American hornbeam, blue beech)
+. Cornus rugosa (Round-leaved dogwood)

Woody Broadleaf Deciduous, Height: .5-2m, Cover interrupted (continued)

	+.	Ribes cynosbati (Prickly gooseberry, dogberry)
	+.	Ribes missouriense
	+.	Tilia americana (Basswood)
	+.	Ulmus rubra (Red elm, slippery elm)
	+.	Viburnum rafinesquianum (Downy arrowwood)
	+.	Viburnum trilobum (High-bush cranberry)
	R.	Quercus alba (White oak)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover rare

	2.	Prunus virginiana (Chokecherry)
	1.	Cornus alternifolia (Pagoda dogwood)
	1.	Sambucus canadensis (Common Elder)
	+.	Acer saccharum (Sugar maple)
	+.	Tilia americana (Basswood)
	+.	Zanthoxylum americanum (Prickly-ash)
	R.	Amelanchier (Juneberry; Serviceberry; Saska)
	R.	Lonicera tatarica (Tartarian Honeysuckle)

Climber, Height: .0-.5m, Cover barely present

	1.	Parthenocissus inserta (Virginia creeper)
	+.	Diervilla lonicera (Bush honeysuckle)
	+.	Lonicera prolifera (Grape honeysuckle)
	+.	Rhus radicans

Graminoid, Height: .0-2m, Cover almost absent

	+.	Brachyelytrum erectum (Bearded short-husk)
	+.	Carex eburnea
	+.	Carex cf. pedunculata

Forb, Height: .0-2m, Cover patchy

	2.	Cystopteris bulbifera (Bulblet fern)
	2.	Impatiens pallida (Pale touch-me-not, jewel-weed)
	1.	Asarum canadense (Wild ginger)
	+.	Actaea rubra (Red baneberry)
	+.	Adiantum pedatum (Maidenhair fern)
THR	+.	Allium cernuum (Nodding wild onion)
	+.	Amphicarpaea bracteata (Hog-peanut)
	+.	Anemone virginiana (Thimbleweed)
	+.	Aquilegia canadensis (Columbine)
NON	+.	Arabis laevigata (Smooth rock-cress)
	+.	Arabis perstellata var. shortii (Rock-cress)
	+.	Arisaema triphyllum (Jack-in-the-pulpit)
	+.	Campanula rotundifolia (Harebell)
	+.	Circaea alpina (Small enchanter's nightshade)
	+.	Cornus canadensis OP (Bunchberry)
	+.	Cryptogramma stelleri AT (Slender cliff-brake)
	+.	Cystopteris fragilis AT (Fragile fern)
	+.	Fragaria virginiana OP (Common strawberry)
	+.	Galium boreale OP (Northern bedstraw)
	+.	Galium concinnum
	+.	Galium triflorum AT (Three-flowered bedstraw)
	+.	Hydrophyllum virginianum (Virginia waterleaf)
	+.	Laportea canadensis (Wood nettle)
	+.	Maianthemum canadense (Canada mayflower)
	+.	Mitella diphylla (Miterwort)
	+.	Mitella nuda OP (Miterwort, naked bishop's-cap)
	+.	Pilea pumila OP (Clearweed)
	+.	Prenanthes alba (White rattlesnake-root)
	+.	Rubus strigosus OP (Red raspberry)
	+.	Sanguinaria canadensis (Bloodroot)
	+.	Silene cf. stellata (Starry campion)
	+.	Solidago flexicaulis (Zig-zag goldenrod)
	+.	Thalictrum dioicum (Early meadow rue)
	R.	Athyrium angustum (Lady fern)
	R.	Solidago canadensis

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4984
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: R95-23 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 9 Month: JUN Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 18 or Site Name:
DNR Ownership Code: 00 (Private Ownership)
*NC Code: NFSEXX (Northern Hardwood-Conifer Forest (Southeast))
Commun. Ranking in Releve:BC Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SE QRT: NW of Section 14
Latitude: 43 degrees, 38 minutes, 15 seconds LL/GPS registration:
Longitude: 92 degrees, 14 minutes, 36 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1120 Slope: 65N Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: N. hardwoods, white pine mode DBH 50-65cm trees No large trees in plot
Except one leaning outside, 40-55 cm trees are common.
Stream at base , steep rocky hill 10-20 yds below.

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Needleleaf Evergreen, Height: 20-35m, Cover patchy
3. Pinus strobus (White pine)
R. Pinus strobus DD (White pine)

Woody Needleleaf Evergreen, Height: 2-10m, Cover barely present
R. Abies balsamea (Balsam fir)

Woody Needleleaf Evergreen, Height: .0-2m, Cover almost absent
R. Abies balsamea (Balsam fir)
R. Pinus strobus (White pine)

Woody Broadleaf Deciduous, Height: 10-20m, Cover patchy
2. Acer saccharum (Sugar maple)
1. Fraxinus nigra (Black ash)
1. Ostrya virginiana (Ironwood, hop hornbeam)
+. Tilia americana (Basswood)
R. Quercus rubra OP (Northern red oak)

Woody Broadleaf Deciduous, Height: 5-10m, Cover rare
1. Acer saccharum (Sugar maple)
1. Carpinus caroliniana (American hornbeam, blue beech)
1. Fraxinus nigra (Black ash)
+. Betula alleghaniensis
+. Quercus alba OP (White oak)

Woody Broadleaf Deciduous, Height: .5-5m, Cover continuous
2. Cornus alternifolia (Pagoda dogwood)
2. Corylus cornuta (Beaked hazelnut)
1. Ribes missouriense
+. Cornus rugosa (Round-leaved dogwood)
+. Prunus virginiana (Chokecherry)
+. Tilia americana (Basswood)
+. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: .5-5m, Cover continuous (continued)
+. Viburnum rafinesquianum (Downy arrowwood)
R. Sambucus canadensis (Common Elder)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover rare
1. Cornus alternifolia (Pagoda dogwood)
1. Dirca palustris (Leatherwood)
+. Acer saccharum (Sugar maple)
+. Carya cordiformis (Bitternut hickory)
+. Cornus rugosa (Round-leaved dogwood)
+. Diervilla lonicera (Bush honeysuckle)
+. Fraxinus nigra (Black ash)
+. Ostrya virginiana (Ironwood, hop hornbeam)
+. Prunus virginiana (Chokecherry)
+. Tilia americana (Basswood)
R. Smilax (Greenbrier; Catbrier)
R. Ulmus americana OP (American elm)

Graminoid, Height: .0-.5m, Cover almost absent
1. Brachyelytrum erectum (Bearded short-husk)
+. Carex convoluta
+. Carex pedunculata
+. Carex pensylvanica
+. Poa (Blue Grass; Meadow Grass)

Forb, Height: .0-2m, Cover interrupted
3. Asarum canadense (Wild ginger)
2. Adiantum pedatum (Maidenhair fern)
2. Rhus radicans
1. Cystopteris bulbifera (Bulblet fern)
+. Actaea rubra (Red baneberry)
+. Anemone quinquefolia
+. Apocynum androsaemifolium (Spreading dogbane)
+. Aquilegia canadensis (Columbine)
+. Arenaria lateriflora (Sandwort)
+. Arisaema triphyllum (Jack-in-the-pulpit)
+. Athyrium angustum (Lady fern)
+. Circaea lutetiana (Enchanter's nightshade)
+. Fragaria vesca (Wood strawberry)
+. Hepatica acutiloba (Sharp-lobed hepatica)
+. Hydrophyllum virginianum (Virginia waterleaf)
+. Lathyrus venosus (Veiny pea)
+. Maianthemum canadense (Canada mayflower)
+. Matteuccia struthiopteris (Ostrich fern)
+. Parthenocissus quinquefolia (Virginia creeper)
+. Ranunculus abortivus (Kidney-leaf buttercup)
+. Ranunculus hispidus (Hispid buttercup)
+. Smilacina racemosa (False Solomon's-seal)
+. Solidago flexicaulis (Zig-zag goldenrod)
+. Taraxacum officinale (Common dandelion)
+. Thalictrum dioicum (Early meadow rue)
+. Uvularia grandiflora (Yellow bellwort)
+. Viola pubescens (Smooth yellow violet)
R. Menispermum canadense (Canada moonseed)
R. Rubus cf. strigosus (Red raspberry)
R. Trillium flexipes (Declining trillium)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4970
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: R95-11 EO Rec #: 0
*Surveyor's ID Code: Z&J
Date: 12 Month: JUN Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 19 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: WHSEME (White Pine-Hardwood Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:BC Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 12W (e.g. 32W)
QQRT: SE QRT: SE of Section 13
Latitude: 43 degrees, 37 minutes, 52 seconds LL/GPS registration:
Longitude: 92 degrees, 12 minutes, 52 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1230 Slope: 20N Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: SSR
*Geomorphic Unit: 39 (Harmony-Plainview Uplands)

Remarks: White pine-hardwood, N-aspect, large tipups and broken limbs.
Old barbed fence near north border of plot. Side of knoll of narrow
ridge spur between knolls on bluff East of River.

OTHER DATA COLLECTED
Soils: N Forestry: Y o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Needleleaf Evergreen, Height: 20-35m, Cover rare
2. Pinus strobus (White pine)

Woody Needleleaf Evergreen, Height: 5-10m, Cover barely present
1. Juniperus virginiana (Red cedar)
1. Pinus strobus (White pine)
+. Pinus strobus DD (White pine)

Woody Needleleaf Evergreen, Height: .0-.1m, Cover almost absent
R. Pinus strobus (White pine)

Woody Broadleaf Deciduous, Height: 20-35m, Cover interrupted
4. Quercus rubra (Northern red oak)
2. Quercus alba (White oak)
1. Acer cf. nigrum (Black maple)
+. Betula papyrifera OP (Paper birch)

Woody Broadleaf Deciduous, Height: 5-20m, Cover continuous
5. Ostrya virginiana (Ironwood, hop hornbeam)
2. Acer saccharum (Sugar maple)
2. Quercus alba (White oak)
1. Quercus macrocarpa (Bur oak)
1. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: .5-5m, Cover barely present
1. Acer saccharum (Sugar maple)
1. Ostrya virginiana (Ironwood, hop hornbeam)
+. Fraxinus cf. americana (White ash)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover barely present

	4.	Ribes missouriense	
	1.	Acer saccharum	(Sugar maple)
	+.	Lonicera prolifera	(Grape honeysuckle)
	+.	Ostrya virginiana	(Ironwood, hop hornbeam)
	+.	Prunus serotina	(Black cherry)
	+.	Prunus virginiana	(Chokecherry)
	+.	Quercus rubra	(Northern red oak)
	+.	Tilia americana	(Basswood)
	+.	Ulmus americana	(American elm)
	+.	Viburnum rafinesquianum	(Downy arrowwood)
	R.	Zanthoxylum americanum	(Prickly-ash)

Graminoid, Height: .0-2m, Cover rare

	2.	Carex pensylvanica	
	+.	Carex albursina	
	+.	Carex cf. blanda	
	+.	Carex convoluta	

Forb, Height: .0-2m, Cover rare

	1.	Anemone quinquefolia	
	1.	Aralia nudicaulis	(Wild sarsaparilla)
	1.	Aralia nudicaulis	(Wild sarsaparilla)
	1.	Galium concinnum	
	1.	Osmorhiza claytonii	(Sweet cicely)
	1.	Phryma leptostachya	(Lopseed)
	+.	Adiantum pedatum	(Maidenhair fern)
	+.	Antennaria plantaginifolia	(Plantain-leaved pussytoes)
	+.	Aquilegia canadensis	(Columbine)
	+.	Arenaria lateriflora	(Sandwort)
	+.	Aster cordifolius	(Heart-leaved aster)
	+.	Athyrium angustum	(Lady fern)
	+.	Botrychium virginianum	(Rattlesnake-fern)
	+.	Cryptotaenia canadensis	(Honewort)
	+.	Geranium maculatum	(Wild geranium)
	+.	Hackelia virginiana	(Virginia stickseed)
	+.	Helianthus strumosus	(Woodland sunflower)
	+.	Osmunda claytoniana	(Interrupted fern)
	+.	Parthenocissus quinquefolia	(Virginia creeper)
	+.	Prenanthes alba	(White rattlesnake-root)
	+.	Pyrola elliptica	(Common pyrola)
	+.	Ranunculus abortivus	(Kidney-leaf buttercup)
	+.	Rhus radicans	
	+.	Rhus radicans	(Poison ivy)
	+.	Sanguinaria canadensis	(Bloodroot)
	+.	Silene stellata	(Starry campion)
	+.	Taraxacum officinale	(Common dandelion)
	+.	Thalictrum dioicum	(Early meadow rue)
	+.	Viola pubescens	(Smooth yellow violet)
	R.	Arctium minus	(Common burdock)
	R.	Polygonatum commutatum	(Giant Solomon's-seal)
NON	R.	Vitis riparia	(Wild grape)

MINNESOTA NATURAL HERITAGE PROGRAM DNR RELEVE #:4972
Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4007
(612) 296-2835 10:06 Tuesday, NOVEMBER 20, 2001

----- FINAL RELEVE REPORT FORM, MINNESOTA VEGETATION DATABASE ------

GENERAL INFORMATION
Surveyor's Releve #: F95-13 EO Rec #: 0
*Surveyor's ID Code: SCZ (Scott C. Zager)
Date: 29 Month: JUN Year: 1995 (e.g. 04 JUL 1993)
CBS Site #: 190 or Site Name: Forestville State Park
DNR Ownership Code: 40 (Mn Dnr Parks and Recreation)
*NC Code: WHSEME (White Pine-Hardwood Forest (Southeast) Mesic Subtype)
Commun. Ranking in Releve:C Stand typical of Commun. Type:_ Releve typical of Stand:_

LOCATIONAL INFORMATION
State Code: MN *County Code: 23 (Fillmore)
Quad Codes DNR: X21B Universal: 43092F2 (Fountain)
Township: 102N (e.g. 143N) Range: 11W (e.g. 32W)
QQRT: SW QRT: SW of Section 7
Latitude: 43 degrees, 38 minutes, 52 seconds LL/GPS registration:
Longitude: 92 degrees, 12 minutes, 22 seconds *Accuracy: _ Marker: _

RELEVE INFORMATION
Releve Size (sq. m.): 400 Elev. (ft.): 1040 Slope: 45NW Slope Position: _
*ECS Subsection: 24 (Blufflands)
Minnesota Soil Atlas Mapping Unit: RLWL
*Geomorphic Unit: 40 (Red Wing-La Crescent Uplands)

Remarks: A small (<5acre) stand of white pines, hardwoods select logged.
Subcanopy closed with acer saccharrum, super canopy 50-75% 30-35m hgt
Canoy 25m; 25%cover (Quercus alba/rubra) Mode DBH 15-25cm

OTHER DATA COLLECTED
Soils: N Forestry: N o=old growth Water Chemistry: N Publication: N
y=forestry
* = Variables with computerized code dictionaries (See Releve Handbook)

Woody Needleleaf Evergreen, Height: 20-35m, Cover interrupted
4. Pinus strobus (White pine)

Woody Needleleaf Evergreen, Height: 5-10m, Cover almost absent
+. Pinus strobus (White pine)

Woody Broadleaf Deciduous, Height: 20-35m, Cover rare
2. Acer saccharum (Sugar maple)
2. Quercus alba (White oak)
+. Betula papyrifera (Paper birch)
+. Quercus rubra OP (Northern red oak)

Woody Broadleaf Deciduous, Height: 5-20m, Cover continuous
5. Acer saccharum (Sugar maple)
1. Ostrya virginiana (Ironwood, hop hornbeam)
1. Ulmus americana (American elm)

Woody Broadleaf Deciduous, Height: .5-5m, Cover barely present
+. Acer saccharum (Sugar maple)
+. Celtis occidentalis DD (Hackberry)

Woody Broadleaf Deciduous, Height: .0-.5m, Cover barely present
1. Acer saccharum (Sugar maple)
+. Carya cordiformis (Bitternut hickory)
+. Fraxinus (Ash)
+. Prunus virginiana (Chokecherry)
+. Quercus rubra (Northern red oak)
+. Ribes missouriense
+. Ulmus americana (American elm)
R. Celtis occidentalis (Hackberry)
R. Ostrya virginiana (Ironwood, hop hornbeam)
R. Ribes cynosbati (Prickly gooseberry, dogberry)
R. Viburnum lentago (Nannyberry)

Graminoid, Height: .0-.5m, Cover barely present

+. Brachyelytrum erectum (Bearded short-husk)
+. Carex albursina
+. Carex blanda
+. Carex pedunculata

Forb, Height: .0-.5m, Cover patchy

1. Asarum canadense (Wild ginger)
1. Athyrium angustum (Lady fern)
1. Osmunda claytoniana (Interrupted fern)
+. Actaea rubra (Red baneberry)
+. Adiantum pedatum (Maidenhair fern)
+. Anemone quinquefolia
+. Arisaema triphyllum (Jack-in-the-pulpit)
+. Caulophyllum thalictroides (Blue cohosh)
+. Circaea lutetiana (Enchanter's nightshade)
+. Galium concinnum
+. Geranium maculatum (Wild geranium)
+. Geum canadense (White avens)
+. Hepatica acutiloba (Sharp-lobed hepatica)
+. Hydrophyllum virginianum (Virginia waterleaf)
+. Impatiens (Balsam; Jewelweed)
+. Laportea canadensis (Wood nettle)
+. Lonicera prolifera (Grape honeysuckle)
+. Pilea (Clearweed)
+. Polygonatum commutatum (Giant Solomon's-seal)
+. Sanguinaria canadensis (Bloodroot)
+. Smilax ecirrata (Carrion-flower)
+. Solidago flexicaulis (Zig-zag goldenrod)
+. Viola pubescens (Smooth yellow violet)
R. Ranunculus abortivus (Kidney-leaf buttercup)

Appendix 2b

Summary of plant species for 33 selected releves.

#	SpCode	Species Name
3	ABIEBALS	Abies balsamea (Balsam fir)
15	ACERNEGU	Acer negundo (Box elder)
2	ACERNIGR	Acer nigrum (Black maple)
24	ACERSAC2	Acer saccharum (Sugar maple)
9	ACTARUBR	Actaea rubra (Red baneberry)
17	ADIAPEDA	Adiantum pedatum (Maidenhair fern)
1	ADOXMOSC	Adoxa moschatellina (Moschatel)
1	AGASSCRO	Agastache scrophulariaefolia (Purple giant-hyssop)
1	AGRIMONI	Agrimonia (Agrimony)
1	AGROSCAB	Agrostis scabra (Rough bent-grass)
1	AGROSTOL	Agrostis stolonifera (Redtop)
1	ALLIBURD	Allium burdickii (Wild leek)
1	ALLICERN	Allium cernuum (Nodding wild onion)
6	ALLITRIC	Allium tricoccum (Wild leek)
2	AMARANTH	Amaranthus (Amaranth)
1	AMBRARTE	Ambrosia artemisiifolia (Common ragweed)
4	AMELANCH	Amelanchier (Juneberry; Serviceberry; Saska)
2	AMORCANE	Amorpha canescens (Lead-plant)
1	AMORFRUT	Amorpha fruticosa (False indigo)
9	AMPHBRAC	Amphicarpaea bracteata (Hog-peanut)
1	ANDRGERA	Andropogon gerardii (Big bluestem)
3	ANEMCYLI	Anemone cylindrica (Thimbleweed)
6	ANEMQUIN	Anemone quinquefolia var. bifolia
2	ANEMTHAL	Anemonella thalictroides (Rue-anemone)
3	ANEMVIRG	Anemone virginiana (Thimbleweed)
1	ANGEATRO	Angelica atropurpurea var. occidentalis (Angelica)
1	ANTEPLAN	Antennaria plantaginifolia (Plantain-leaved pussytoes)
1	APOCANDR	Apocynum androsaemifolium (Spreading dogbane)
1	APOCCANN	Apocynum cannabinum (Indian hemp)
9	AQUICANA	Aquilegia canadensis (Columbine)
2	ARABHIRS	Arabis hirsuta (Hairy rock-cress)
1	ARABIS	Arabis (Rock-Cress)
1	ARABLAEV	Arabis laevigata (Smooth rock-cress)
3	ARABPERS	Arabis perstellata var. shortii (Rock-cress)
2	ARABVAPY	Arabis hirsuta var. pycnocarpa (Hairy rock-cress)
7	ARALNUDI	Aralia nudicaulis (Wild sarsaparilla)
3	ARCTMINU	Arctium minus (Common burdock)
5	ARENLATE	Arenaria lateriflora (Sandwort)
13	ARISTRIP	Arisaema triphyllum (Jack-in-the-pulpit)
1	ARTELUDO	Artemisia ludoviciana (Western mugwort, White sage)
22	ASARCANA	Asarum canadense (Wild ginger)
2	ASCLEXAL	Asclepias exaltata (Poke milkweed)
1	ASCLINCA	Asclepias incarnata (Swamp milkweed)
1	ASCLSYRI	Asclepias syriaca (Common milkweed)
2	ASCLVERT	Asclepias verticillata
1	ASCLVIRI	Asclepias viridiflora (Green milkweed)
6	ASTECORD	Aster cordifolius (Heart-leaved aster)
2	ASTEERIC	Aster ericoides (Heath aster)
1	ASTELAEV	Aster laevis (Smooth aster)
4	ASTELANC	Aster lanceolatus (Panicled aster)
1	ASTELATE	Aster lateriflorus (Side-flowering aster)
1	ASTEOBLO	Aster oblongifolius (Aromatic aster)
1	ASTEOOLE	Aster oolentangiensis (Sky-blue aster)
3	ASTEPREN	Aster prenanthoides (Crooked-stemmed aster)
1	ASTEPUNI	Aster puniceus (Red-stemmed aster)
3	ASTER	Aster
2	ASTEUROP	Aster urophyllus
18	ATHYANGU	Athyrium angustum (Lady fern)
1	BARBVULG	Barbarea vulgaris (Yellow rocket, winter-cress)
2	BETUALLE	Betula alleghaniensis
8	BETUPAPY	Betula papyrifera (Paper birch)
1	BIDECERN	Bidens cernua (Nodding bur-marigold)
1	BIDECOMO	Bidens comosa (Red-stemmed aster)
1	BIDEFRON	Bidens frondosa (Leafy beggar-ticks)
1	BIDENS	Bidens (Bur-Marigold; Beggar-Ticks)
5	BLEPHIRS	Blephilia hirsuta (Wood-mint)
3	BOTRVIRG	Botrychium virginianum (Rattlesnake-fern)
2	BOUTCURT	Bouteloua curtipendula (Side-oats grama)
9	BRACEREC	Brachyelytrum erectum (Bearded short-husk)
1	BRACHYEL	Brachyelytrum (Shorthusk)
1	BROMINER	Bromus inermis (Smooth brome)

Summary of plant species for 33 selected releves.

#	SpCode	Species Name
1	BROMPUBE	Bromus pubescens
1	CALTPALU	Caltha palustris (Marsh marigold)
4	CAMPROTU	Campanula rotundifolia (Harebell)
1	CARDBULB	Cardamine bulbosa (Spring cress)
11	CAREALBU	Carex albursina
3	CAREAMPH	Carex amphibola var. turgida
8	CAREBLAN	Carex blanda
1	CARECOMO	Carex comosa
8	CARECONV	Carex convoluta
1	CARECRIS	Carex cristatella
1	CAREDEWE	Carex deweyana
3	CAREEBUR	Carex eburnea
1	CAREEMOR	Carex emoryi
8	CAREHIRT	Carex hirtifolia
1	CARELACU	Carex lacustris
1	CARELAE1	Carex laeviconica
1	CARELAE2	Carex laevivaginata
1	CARELANU	Carex lanuginosa
1	CAREOLI1	Carex oligocarpa
2	CAREPECK	Carex peckii
7	CAREPEDU	Carex pedunculata
7	CAREPENS	Carex pensylvanica
1	CARERICH	Carex richardsonii
3	CARESPAR	Carex sparganioides
4	CARESPRE	Carex sprengelii
1	CARESTIP	Carex stipata
1	CARESTRI	Carex stricta
1	CARETRIC	Carex trichocarpa
1	CAREVULP	Carex vulpinoidea
4	CAREWOOD	Carex woodii
7	CAREX	Carex (Sedge)
8	CARPCARO	Carpinus caroliniana ssp. virginiana (American hornbeam, blue beech)
11	CARYCORD	Carya cordiformis (Bitternut hickory)
16	CAULTHAL	Caulophyllum thalictroides (Blue cohosh)
1	CEANHERB	Ceanothus herbaceus (New Jersey tea)
10	CELTOCCI	Celtis occidentalis (Hackberry)
1	CERANUTA	Cerastium nutans
1	CHELGLAB	Chelone glabra (Turtlehead)
2	CHENOPOD	Chenopodium (Goosefoot)
1	CHRYIOWE	Chrysosplenium iowense (Golden saxifrage)
1	CICUBULB	Cicuta bulbifera (Bulb-bearing water-hemlock)
5	CIRCALPI	Circaea alpina (Small enchanter's nightshade)
12	CIRCLUTE	Circaea lutetiana ssp. canadensis (Enchanter's nightshade)
1	CIRSARVE	Cirsium arvense (Canada thistle)
1	CIRSDISC	Cirsium discolor (Field thistle)
7	CLAYVIRG	Claytonia virginica (Virginia spring-beauty)
1	CLEMVIRG	Clematis virginiana (Virgin's bower)
1	CONC GNS	Clematis (moss)
1	CORAMACU	Corallorhiza maculata (Spotted coral-root)
17	CORNALTE	Cornus alternifolia (Pagoda dogwood)
1	CORNCANA	Cornus canadensis (Bunchberry)
8	CORNFOEM	Cornus foemina ssp. racemosa (Gray dogwood)
4	CORNRUGO	Cornus rugosa (Round-leaved dogwood)
9	CORYAMER	Corylus americana (American hazelnut)
2	CORYCORN	Corylus cornuta (Beaked hazelnut)
9	CRATAEGU	Crataegus (Hawthorn)
5	CRYPCANA	Cryptotaenia canadensis (Honewort)
6	CRYPSTEL	Cryptogramma stelleri (Slender cliff-brake)
9	CYSTBULB	Cystopteris bulbifera (Bulblet fern)
2	CYSTFRAG	Cystopteris fragilis (Fragile fern)
5	CYSTPROT	Cystopteris protrusa (Fragile fern)
4	DENTLACI	Dentaria laciniata (Cut-leaved toothwort)
10	DESMGLUT	Desmodium glutinosum (Pointed-leaved tick-trefoil)
1	DICECANA	Dicentra canadensis (Squirrel-corn)
6	DICECUCU	Dicentra cucullaria (Dutchman's-breeches)
5	DIERLONI	Diervilla lonicera (Bush honeysuckle)
1	DIOSVILL	Dioscorea villosa (Wild yam)
1	DIRCPALU	Dirca palustris (Leatherwood)
3	DRYOCART	Dryopteris carthusiana (Spinulose shield fern)
1	ECHILOBA	Echinocystis lobata (Wild cucumber)
1	ELODCANA	Elodea canadensis (Elodea)

Summary of plant species for 33 selected releves.

#	SpCode	Species Name
1	ELYMCANA	Elymus canadensis (Nodding wild-rye)
11	ELYMHYST	Elymus hystrix (Bottlebrush grass)
2	ELYMUS	Elymus (Wild Rye)
3	ELYMVILL	Elymus villosus (Wild-rye)
3	ELYMVIRG	Elymus virginicus (Wild-rye)
1	ELYMWIEG	Elymus wiegandii (Wild-rye)
1	EPILCOLO	Epilobium coloratum (Purple-leaved willow-herb)
1	EQUIARVE	Equisetum arvense (Field horsetail)
1	EQUIFLUV	Equisetum fluviatile (Water horsetail)
1	EQUIHYEM	Equisetum hyemale var. affine (Tall scouring-rush)
1	EQUIVARI	Equisetum variegatum (Variegated scouring-rush)
1	EQUIXXFE	Equisetum ferrissii E. hyemale var. affine X E. laevigatum (Scouring-rush)
1	ERIGPHIL	Erigeron philadelphicus (Philadelphia fleabane)
2	ERIGSTRI	Erigeron strigosus (Daisy fleabane)
7	ERYTALBI	Erythronium albidum (White trout-lily)
3	EUONATRO	Euonymus atropurpureus (Wahoo)
2	EUPAMACU	Eupatorium maculatum (Spotted Joe-pye weed)
1	EUPAPERF	Eupatorium perfoliatum (Common boneset)
1	EUPAPURP	Eupatorium purpureum (Sweet Joe-pye weed)
7	EUPARUGO	Eupatorium rugosum (Common snakeroot)
5	FESTOBTU	Festuca obtusa (Nodding fescue)
1	FESTUCA	Festuca (Fescue)
1	FRAGVESC	Fragaria vesca ssp. americana (Wood strawberry)
6	FRAGVIRG	Fragaria virginiana (Common strawberry)
10	FRAXAMER	Fraxinus americana (White ash)
4	FRAXINUS	Fraxinus (Ash)
12	FRAXNIGR	Fraxinus nigra (Black ash)
7	FRAXPENN	Fraxinus pennsylvanica (Green ash)
11	GALIAPAR	Galium aparine (Cleavers)
8	GALIBORE	Galium boreale ssp. septentrionale (Northern bedstraw)
14	GALICONC	Galium concinnum
7	GALITRI2	Galium triflorum (Three-flowered bedstraw)
1	GENTALBA	Gentiana alba
2	GENTQUIN	Gentianella quinquefolia ssp. occidentalis (Stiff gentian)
20	GERAMACU	Geranium maculatum (Wild geranium)
21	GEUMCANA	Geum canadense (White avens)
1	GEUMLACI	Geum laciniatum var. trichocarpum (White avens)
1	GEUMTRIF	Geum triflorum (Prairie smoke)
6	GLECHEDE	Glechoma hederacea (Creeping charlie)
1	GLYCSTRI	Glyceria striata (Fowl manna grass)
2	GYMNROBE	Gymnocarpium robertianum (Northern oak fern)
2	HACKVIRG	Hackelia virginiana (Virginia stickseed)
2	HELEAUTU	Helenium autumnale (Sneezeweed)
1	HELIGROS	Helianthus grosseserratus (Sawtooth sunflower)
2	HELIHELI	Heliopsis helianthoides ssp. occidentalis (Ox-eye)
1	HELIRIGI	Helianthus rigidus (Stiff sunflower)
2	HELISTRU	Helianthus strumosus (Woodland sunflower)
3	HELITUBE	Helianthus tuberosus (Jerusalem artichoke)
12	HEPAACUT	Hepatica acutiloba (Sharp-lobed hepatica)
1	HERALANA	Heracleum lanatum (Cow-parsnip)
1	HEUCRICH	Heuchera richardsonii (Alum-root)
1	HIERSCA2	Hieracium scabrum (Rough hawkweed)
5	HYDRAPPE	Hydrophyllum appendiculatum (Appendaged waterleaf)
16	HYDRVIRG	Hydrophyllum virginianum (Virginia waterleaf)
3	IMPACAPE	Impatiens capensis (Spotted touch-me-not, jewel-we)
4	IMPAPALL	Impatiens pallida (Pale touch-me-not, jewel-weed)
7	IMPATIEN	Impatiens (Balsam; Jewelweed)
1	IRISVIRG	Iris virginica var. shrevei (Southern blue flag)
6	ISOPBITE	Isopyrum biternatum (False rue-anemone)
4	JUGLCINE	Juglans cinerea (Butternut)
7	JUGLNIGR	Juglans nigra (Black walnut)
3	JUNIVIRG	Juniperus virginiana (Red cedar)
2	KUHNEUPA	Kuhnia eupatorioides var. corymbulosa (False boneset)
1	LACTCANA	Lactuca canadensis (Canada wild lettuce)
14	LAPOCANA	Laportea canadensis (Wood nettle)
1	LATHOCHR	Lathyrus ochroleucus (Pale vetchling)
2	LATHVENO	Lathyrus venosus var. intonsus (Veiny pea)
1	LEERORYZ	Leersia oryzoides (Rice cut grass)
2	LEERVIRG	Leersia virginica (White grass)
1	LEMNMINO	Lemna minor (Lesser duckweed)
1	LESPCAPI	Lespedeza capitata (Round-headed bush-clover)

Summary of plant species for 33 selected releves.

#	SpCode	Species Name
1	LIATASPE	Liatris aspera (Rough blazing star)
2	LITHCANE	Lithospermum canescens (Hoary puccoon)
1	LITHCARO	Lithospermum caroliniense ssp. croceum (Hairy puccoon)
3	LOBESIPH	Lobelia siphilitica (Great lobelia)
1	LONIDIOI	Lonicera dioica (Wild Honeysuckle)
1	LONIMORR	Lonicera morrowii
8	LONIPROL	Lonicera prolifera (Grape honeysuckle)
3	LONITATA	Lonicera tatarica (Tartarian Honeysuckle)
1	LUDWIGIA	Ludwigia (False Loosestrife)
1	LYCOUNIF	Lycopus uniflorus (Northern bugleweed)
1	LYSICILI	Lysimachia ciliata (Fringed loosestrife)
3	MAIACANA	Maianthemum canadense (Canada mayflower)
1	MARC GNS	Maianthemum (moss)
2	MATTSTRU	Matteuccia struthiopteris var. pensylvanica (Ostrich fern)
1	MEDISATI	Medicago sativa (Alfalfa)
4	MENICANA	Menispermum canadense (Canada moonseed)
2	MERTVIRG	Mertensia virginica (Virginia bluebells)
12	MITEDIPH	Mitella diphylla (Miterwort)
2	MITENUDA	Mitella nuda (Miterwort, naked bishop's-cap)
1	MONAFIST	Monarda fistulosa (Wild bergamot)
2	MONOUNIF	Monotropa uniflora (Indian pipe)
1	MUHLFRON	Muhlenbergia frondosa (Swamp satin grass)
1	OENOTHER	Oenothera (Evening-Primrose)
1	ONOSMOLL	Onosmodium molle
8	OSMOCLAY	Osmorhiza claytonii (Sweet cicely)
7	OSMOLONG	Osmorhiza longistylis (Anise-root)
8	OSMUCLAY	Osmunda claytoniana (Interrupted fern)
19	OSTRVIRG	Ostrya virginiana (Ironwood, hop hornbeam)
1	OXALIS	Oxalis (Wood-Sorrel; Sheep-Sorrel)
2	PANIOLIG	Panicum oligosanthes (Scribner's panic grass)
2	PARTHENO	Parthenocissus (Virginia Creeper; Woodbine)
5	PARTINSE	Parthenocissus inserta (Virginia creeper)
9	PARTQUIN	Parthenocissus quinquefolia (Virginia creeper)
2	PEDICANA	Pedicularis canadensis (Wood-betony)
1	PETACAND	Petalostemon candidum (White prairie-clover)
1	PETAPURP	Petalostemon purpureum (Purple prairie-clover)
4	PHALARUN	Phalaris arundinacea (Reed canary grass)
8	PHLODIVA	Phlox divaricata ssp. laphamii (Blue Phlox)
1	PHLOPILO	Phlox pilosa ssp. fulgida (Prairie phlox, downy phlox)
4	PHRYLEPT	Phryma leptostachya (Lopseed)
1	PHYSHETE	Physalis heterophylla (Clammy ground-cherry)
1	PHYSOPUL	Physocarpus opulifolius (Ninebark)
2	PHYSVIR2	Physostegia virginiana (Obedient Plant)
1	PILEA	Pilea (Clearweed)
5	PILEPUMI	Pilea pumila (Clearweed)
6	PINUSTRO	Pinus strobus (White pine)
1	PLANMAJO	Plantago major (Common plantain)
1	PLANRUGE	Plantago rugelii (Rugel's plantain)
2	POA	Poa (Blue Grass; Meadow Grass)
1	POA COMP	Poa compressa (Canada bluegrass)
2	POA PAL2	Poa palustris (Fowl meadow grass)
1	POA PRAT	Poa pratensis (Kentucky bluegrass)
12	PODOPELT	Podophyllum peltatum (May-apple, mandrake)
8	POLEREPT	Polemonium reptans (Jacob's ladder)
3	POLYCANA	Polymnia canadensis (Leaf-cup)
4	POLYCOMM	Polygonatum commutatum (Giant Solomon's-seal)
2	POLYVIR2	Polygonum virginianum (Virginia knotweed)
1	POPUGRAN	Populus grandidentata (Big-toothed aspen)
2	POPUTREM	Populus tremuloides (Quaking aspen)
1	POTAFOLI	Potamogeton foliosus
1	POTENTIL	Potentilla (Cinquefoil)
5	PRENALBA	Prenanthes alba (White rattlesnake-root)
1	PRUNAMER	Prunus americana (Wild plum)
9	PRUNSERO	Prunus serotina (Black cherry)
1	PRUNUS	Prunus (Plum; Cherry)
22	PRUNVIRG	Prunus virginiana (Chokecherry)
2	PRUNVULG	Prunella vulgaris (Heal-all)
4	PTERAQUI	Pteridium aquilinum var. latiusculum (Bracken)
1	PULSNUTT	Pulsatilla nuttalliana (Pasque-flower)
3	PYROELLI	Pyrola elliptica (Common pyrola)
17	QUERALBA	Quercus alba (White oak)

Summary of plant species for 33 selected releves.

#	SpCode	Species Name
1	QUERELLI	Quercus ellipsoidalis (Northern pin oak)
8	QUERMACR	Quercus macrocarpa (Bur oak)
17	QUERRUBR	Quercus rubra (Northern red oak)
14	RANUABOR	Ranunculus abortivus (Kidney-leaf buttercup)
6	RANUHISP	Ranunculus hispidus (Hispid buttercup)
1	RATIPINN	Ratibida pinnata (Gray-headed coneflower)
5	RHAMALNI	Rhamnus alnifolia (Alder-leaved buckthorn)
1	RHAMCATH	Rhamnus cathartica (Common buckthorn)
1	RHODROSE	Rhamnus roseum (moss)
1	RHUSGLAB	Rhus glabra (Smooth sumac)
12	RHUSRADI	Rhus radicans
1	RHUSVARY	Rhus radicans var. rydbergii (Poison ivy)
2	RIBEAMER	Ribes americanum (Wild black currant)
5	RIBECYNO	Ribes cynosbati (Prickly gooseberry, dogberry)
3	RIBEHUDS	Ribes hudsonianum (Northern black currant)
25	RIBEMISS	Ribes missouriense
1	ROSABLAN	Rosa blanda (Smooth wild rose)
4	RUBUOCCI	Rubus occidentalis (Black raspberry)
2	RUBUPUBE	Rubus pubescens (Dwarf blackberry)
9	RUBUSTRI	Rubus strigosus (Red raspberry)
4	RUDBLACI	Rudbeckia laciniata (Goldenglow)
1	RUMEALTI	Rumex altissimus (Water dock)
1	RUMECRIS	Rumex crispus (Curly dock)
1	SAGILATI	Sagittaria latifolia (Broad-leaved arrowhead)
1	SALIBEBB	Salix bebbiana (Bebb's willow)
1	SALINIGR	Salix nigra (Black willow)
5	SAMBCANA	Sambucus canadensis (Common Elder)
4	SAMBPUBE	Sambucus pubens (Red-berried Elder)
16	SANGCANA	Sanguinaria canadensis (Bloodroot)
4	SANIGREG	Sanicula gregaria (Black snakeroot)
1	SANIMARI	Sanicula marilandica (Black snakeroot)
2	SAXIPENS	Saxifraga pensylvanica (Swamp saxifrage)
2	SCHISCOP	Schizachyrium scoparium (Little Bluestem)
1	SCIRVALI	Scirpus validus var. creber (Softstem bulsush)
3	SCROMARI	Scrophularia marilandica (Figwort)
1	SCROPHUL	Scrophularia (Figwort)
4	SCUTLATE	Scutellaria lateriflora (Mad-dog skullcap)
1	SENEAURE	Senecio aureus (Golden ragwort)
1	SETAGLAU	Setaria glauca (Yellow foxtail)
1	SILENE	Silene (Catchfly; Campion)
3	SILESTEL	Silene stellata (Starry campion)
1	SILPLACI	Silphium laciniatum (Compass-plant)
1	SILPPERF	Silphium perfoliatum (Cup-plant)
2	SMILAX	Smilax (Greenbrier; Catbrier)
11	SMILECIR	Smilax ecirrata (Carrion-flower)
5	SMILHERB	Smilax herbacea (Carrion-flower)
14	SMILRACE	Smilacina racemosa (False Solomon's-seal)
2	SMILSTEL	Smilacina stellata (Starry false Solomon's-seal)
6	SOLICANA	Solidago canadensis
17	SOLIFLEX	Solidago flexicaulis (Zig-zag goldenrod)
3	SOLIGIGA	Solidago gigantea (Giant goldenrod)
1	SOLIMISS	Solidago missouriensis (Missouri goldenrod)
1	SOLINEMO	Solidago nemoralis (Gray goldenrod)
2	SOLIRIGI	Solidago rigida (Stiff goldenrod)
1	SOLISPEC	Solidago speciosa (Showy goldenrod)
8	SOLIULMI	Solidago ulmifolia (Bog goldenrod)
2	SORGNUTA	Sorghastrum nutans (Indian grass)
1	STACHYS	Stachys (Hedge-Nettle)
3	STAPTRIF	Staphylea trifolia (Bladdernut)
2	STELLARI	Stellaria (Chickweed; Starwort)
3	SYMPFOET	Symplocarpus foetidus (Skunk cabbage)
1	TAENINTE	Taenidia integerrima (Yellow pimpernel)
4	TARAOFFI	Taraxacum officinale (Common dandelion)
1	TARAXACU	Taraxacum (Dandelion)
2	TAXUCANA	Taxus canadensis (Canada yew)
2	THALDASY	Thalictrum dasycarpum (Tall meadow rue)
16	THALDIOI	Thalictrum dioicum (Early meadow rue)
1	THALICTR	Thalictrum (Meadow-Rue)
26	TILIAMER	Tilia americana (Basswood)
1	TRAGDUBI	Tragopogon dubius (Yellow goat's-beard)
7	TRILFLEX	Trillium flexipes (Declining trillium)

Summary of plant species for 33 selected releves.

#	SpCode	Species Name
2	TRIOPER2	Triosteum perfoliatum (Horse-gentian)
1	TRIOVAAU	Triosteum perfoliatum var. aurantiacum (Horse-gentian)
16	ULMUAMER	Ulmus americana (American elm)
18	ULMURUBR	Ulmus rubra (Red elm, slippery elm)
4	ULMUS	Ulmus (Elm)
3	ULMUTHOM	Ulmus thomasii (Rock elm)
12	UNKNOWN	UNKNOWN
7	URTIDIOI	Urtica dioica ssp. gracilis (Stinging nettle)
13	UVULGRAN	Uvularia grandiflora (Yellow bellwort)
1	VERBHAST	Verbena hastata (Blue vervain)
1	VERBURTI	Verbena urticifolia (White vervain)
1	VERNONIA	Vernonia (Ironweed)
1	VERONIC1	Veronicastrum (Culver's-Root)
9	VIBULENT	Viburnum lentago (Nannyberry)
11	VIBURAFI	Viburnum rafinesquianum (Downy arrowwood)
3	VIBUTRIL	Viburnum trilobum (High-bush cranberry)
1	VICIAMER	Vicia americana (American vetch)
1	VIOLA	Viola (Violet)
1	VIOLPED1	Viola pedata (Bird-foot violet)
20	VIOLPUBE	Viola pubescens (Smooth yellow violet)
7	VIOLSORO	Viola sororia (Common blue violet)
12	VITIRIPA	Vitis riparia (Wild grape)
13	ZANTAMER	Zanthoxylum americanum (Prickly-ash)
1	ZIGAELEG	Zigadenus elegans (White camas)
1	ZIZAVAIN	Zizania palustris var. interior
1	ZIZIAPTE	Zizia aptera (Heart-leaved alexanders)

1610 total plant records, 382 species from 33 releves.

Releve Numbers included

4991	4979	4974	4975	4977	4813	4978	4971	4810	4976	4967	4980	4814	4960	4961
4973	4962	4963	4968	4965	4816	4812	4969	4809	4966	4981	4811	4964	4985	4815
4984	4970	4972												

APPENDIX 3. Description of Native Plant Community Types with Significance Tables

Ecological Systems and Native Plant Community Types

Fire Dependent System

Dry Prairie - Bedrock Bluff Subtype
Oak Woodland-Brushland

Mesic Forest System

Oak Forest - Dry-Mesic
Oak Forest - Mesic
Maple Basswood forest
White Pine - Hardwood Forest

Riparian System

River Beach
Lowland Hardwood Forest

Wet Forest / Wet Meadow Systems

Black Ash Swamp - Seepage Subtype
Seepage Meadow

Cliff System

Dry Cliff
Moist Cliff
Talus Slope

Cold Karst System

Talus Slope - Algific Subtype
Moist Cliff - Maderate Subtype
Northern Hardwood - Conifer Forest

APPENDIX 3. Continued.

Dry Prairie - Bedrock Bluff Subtype

Total Area of Dry Bluff Prairie as mapped by MCBS and arranged by the following locations:	Acreage	Acres of High Quality Dry Bluff Prairie (BC rank or better)
Park Statutory Boundary	0.5	0 (0%)
Forestville / Mystery Cave Ecological Area	9.7	2 (21%)
Fillmore County	370	-
Paleozoic Plateau	6546	-

General Description

Dry bluff prairies within the Ecological Area occupy small openings with south to southwest aspects on upper slopes and on crests of narrow ridge-spurs. Within the park's Ecological Area, the only mapped bluff prairies are remnants on shallow soils over small benches of resistant limestone. There are also some small inclusions of prairie vegetation in narrow bands along cliff edges.

Characteristic Shrub Species

Lead-plant *(Amorpha canescens)*
New Jersey tea *(Ceanothus americanus)*
Ninebark *(Physocarpus opulifolius)*

Characteristic Forb Species

Aromatic aster *(Aster oblongifolius)*
Bastard toad-flax *(Comandra umbellata)*
Bird-foot violet *(Viola pedata)*
Canada goldenrod *(Solidago canadensis)*
Cleland's evening-primrose *(Oenothera clelandii)*
Compass-plant *(Silphium laciniatum)*
False boneset *(Kuhnia eupatorioides)*
False gromwell *(Onosmodium molle)*
Flowering spurge *(Euphorbia corollata)*
Gray goldenrod *(Solidago nemoralis)*
Gray-headed coneflower *(Ratibida pinnata)*
Green milkweed *(Asclepias viridiflora)*
Hairy puccoon *(Lithospermum caroliniense ssp. croceum)*
Heart-leaved alexanders *(Zizia aptera)*
Heath aster *(Aster ericoides)*
Hoary puccoon *(Lithospermum canescens)*
Leonard's skullcap *(Scutellaria leonardi)*
Ox-eye *(Heliopsis helianthoides ssp. occidentalis)*
Pasque-flower *(Pulsatilla patens)*
Prairie bird-foot violet *(Viola pedatifida)*
Prairie phlox, downy phlox *(Phlox pilosa ssp. fulgida)*
Prairie smoke *(Geum triflorum)*
Purple prairie-clover *(Petalostemon purpureum)*
Rough blazing star *(Liatris aspera)*
Rough hawkweed *(Hieracium scabrum)*
Round-headed bush-clover *(Lespedeza capitata)*
Showy goldenrod *(Solidago speciosa)*
Smooth aster *(Aster laevis)*
Starry false Solomon's-seal *(Smilacina stellata)*
Stiff gentian *(Gentianella quinquefolia ssp. occidentalis)*
Stiff goldenrod *(Solidago rigida)*
Stiff sunflower *(Helianthus rigidus)*
Stiff tickseed *(Coreopsis palmata)*
Virginia mountain-mint *(Pycnanthemum virginianum)*
White prairie-clover *(Petalostemon candidum)*
Wild bergamot *(Monarda fistulosa)*

Characteristic Graminoid Species

Canada bluegrass *(Poa compressa)*
Indian grass *(Sorghastrum nutans)*
Little Bluestem *(Schizachyrium scoparium)*
Nodding wild-rye *(Elymus canadensis)*
Panic grass *(Panicum spp. = Dichanthelium spp.)*
Side-oats grama *(Bouteloua curtipendula)*

APPENDIX 3. Continued.

Oak Woodland - Brushland

Total Area of Oak Woodland-Brushland as mapped by MCBS and arranged by the following locations:	Acreage	Acres of High Quality Oak Woodland - Brushland (BC rank or better)
Park Statutory Boundary	0	0 (0%)
Forestville / Mystery Cave Ecological Area	25	0 (0%)
Fillmore County	460	-
Paleozoic Plateau	8183	-

General Description

The one mapped occurrence of oak woodland within the Ecological Area is on a narrow ridge-spur between the South Branch Root River and a large ravine. The soils are silt loams originating from loess. Cobblestones are present and these occasionally form a dry talus slope. There are frequent exposures of bedrock. Woodlands have open to interrupted canopies and the shrub layer is patchy to dense (25-50% cover) with a diverse array of shrub species. All trees are about the same age and diameter, most are short with crown heights ranging from 30-45 feet. Patchy openings free of brush are dominated by Pennsylvania sedge (*Carex pensylvanica*). Prairie forbs are found along the edge of the cliff. White oak (*Quercus alba*) and bur oaks (*Quercus macrocarpa*) are frequent on the thinner soils near cliff edges while northern pin oak occupies deeper soil on the ridge crest.

Dominant Tree Species

Bur oak *(Quercus macrocarpa)*
Northern pin oak *(Quercus ellipsoidalis)*
White oak *(Quercus alba)*

Associate Canopy Tree Species

Big-toothed aspen *(Populus grandidentata)*
Butternut *(Juglans cinerea)*
Paper birch *(Betula papyrifera)*
Quaking aspen *(Populus tremuloides)*
Red cedar *(Juniperus virginiana)*
Red oak, northern *(Quercus rubra)*
White pine *(Pinus strobus)*

Characteristic Shrub Species

American hazelnut *(Corylus americana)*
Gray dogwood *(Cornus foemina ssp. racemosa)*
Prickly-ash *(Zanthoxylum americanum)*

Characteristic Forb Species

Columbine *(Aquilegia canadensis)*
Elegant bedstraw *(Galium concinnum)*
Golden alexanders *(Zizia aurea)*
Northern bedstraw *(Galium boreale ssp. septentrionale)*
Rough gerardia *(Agalinis aspera)*
Stiff goldenrod *(Solidago rigida)*
Stiff tickseed *(Coreopsis palmata)*
Thimbleweed *(Anemone cylindrica)*
Two-flowered Cynthia *(Krigia biflora)*
Veiny pea *(Lathyrus venosus var. intonsus)*
Wood-betony *(Pedicularis canadensis)*

Characteristic Graminoid Species

Pennsylvanian sedge *(Carex pensylvanica)*
Side-oats grama *(Bouteloua curtipendula)*

APPENDIX 3. Continued.

Dry Oak Forest

Total Area of Dry Oak Forest as mapped by MCBS and arranged by the following locations:	Acreage	Acres of High Quality Dry Oak Forests (BC rank or better)
Park Statutory Boundary	13	13 (100%)
Forestville / Mystery Cave Ecological Area	46	16 (35%)
Fillmore County	1060	-
Paleozoic Plateau	5877	-

General Description

Dry oak forests occupy narrow bands on upper slopes of steep bluffs and around cliffs associated with deeply-cut valley meanders. They have south to southwest aspects. The shallow soils are silt loams originating from loess. Cobblestones are often present and occasionally form a dry talus slope. There are frequent exposures of bedrock. Dry oak forests are dominated by bur oak, northern pin oak, paper birch and aspens. There is a distinct subcanopy and the shrub density is evenly dispersed to patchy. Many dry oak forests are unmapped inclusions within dry-mesic oak forest.

Dominant Tree Species

Bur oak *(Quercus macrocarpa)*
Northern pin oak *(Quercus ellipsoidalis)*
White oak *(Quercus alba)*

Associate Canopy Tree Species

American elm *(Ulmus americana)*
Big-toothed aspen *(Populus grandidentata)*
Black cherry *(Prunus serotina)*
Paper birch *(Betula papyrifera)*
Quaking aspen *(Populus tremuloides)*
Red oak, northern *(Quercus rubra)*
White ash *(Fraxinus americana)*

Characteristic Subcanopy

Ironwood, hop hornbeam *(Ostrya virginiana)*
White ash *(Fraxinus americana)*

Characteristic Shrub Layer

American hazelnut *(Corylus americana)*
Black raspberry *(Rubus occidentalis)*
Gray dogwood *(Cornus foemina ssp. racemosa)*
High-bush blackberry *(Rubus allegheniensis)*
Poison ivy *(Rhus radicans)*
Prickly-ash *(Zanthoxylum americanum)*
Red cedar *(Juniperus virginiana)*

Characteristic Forb Species

Golden alexanders *(Zizia aurea)*
Heart-leaved aster *(Aster cordifolius)*
Wild geranium *(Geranium maculatum)*
Woodland sunflower *(Helianthus strumosus)*

Characteristic Graminoid Species

Mountain rice-grass *(Oryzopsis asperifolia)*
Pennsylvanian sedge *(Carex pensylvanica)*

APPENDIX 3. Continued.

Dry-Mesic Oak Forest

Total Area of Mesic and Dry-mesic Oak Forests as mapped by MCBS and arranged by the following locations:	Acreage	Acres of High Quality Mesic and Dry-mesic Oak Forests (BC rank or better)
Park Statutory Boundary	1476	885 (58%)
Forestville / Mystery Cave Ecological Area	1909	975 (51%)
Fillmore County	9650	-
Paleozoic Plateau	53709*	-

* combined Oak forest and Oak forest mesic subtype

General Description

Dry-mesic oak forests occupy upper slopes and broad ridge crests between the South Branch Root River and its tributaries. They are also found on exposed east or west facing bluffs. All dry-mesic oak forests are on level to gently sloping terrain. Most soils on ridge crests are silt loams derived from wind-blown sediments (loess). In one instance a dry-mesic oak forest grows on a large, bedrock terrace on the outside meander of the river where it is shallowly covered by glacial outwash deposits of sand and silt (sandy silt-loam). Karst holes are common in dry-mesic forests on large ridge crests and the surrounding plateau. Dry-mesic oak forests tend to have interrupted canopies, due to higher incidences of wind damage. The canopy is dominated mostly by white oak (*Quercus alba*) and northern pin oak (*Quercus ellipsoidalis*) with lesser amounts of red oak (*Quercus rubra*). Shrub canopy is patchy to dense.

Dominant Tree Species

Northern pin oak *(Quercus ellipsoidalis)*
Red oak, northern *(Quercus rubra)*
White oak *(Quercus alba)*

Associate Canopy Trees Species

Basswood *(Tilia americana)*
Big-toothed aspen *(Populus grandidentata)*
Bitternut hickory *(Carya cordiformis)*
Black cherry *(Prunus serotina)*
Black walnut *(Juglans nigra)*
Bur oak *(Quercus macrocarpa)*
Butternut *(Juglans cinerea)*
Green ash *(Fraxinus pennsylvanica)*
Hackberry *(Celtis occidentalis)*
Paper birch *(Betula papyrifera)*
Quaking aspen *(Populus tremuloides)*
Red elm, slippery elm *(Ulmus rubra)*
White ash *(Fraxinus americana)*
White pine *(Pinus strobus)*

Characteristic Subcanopy

Ironwood, hop hornbeam *(Ostrya virginiana)*

Characteristic Shrub Layer

American hazelnut *(Corylus americana)*
Black raspberry *(Rubus occidentalis)*
Chokecherry *(Prunus virginiana)*
Climbing bittersweet *(Celastrus scandens)*
Downy arrowwood *(Viburnum rafinesquianum)*
Gray dogwood *(Cornus foemina ssp. racemosa)*
Juneberry - species unknown - *(Amelanchier spp.)*
Missouri gooseberry *(Ribes missouriense)*
Nannyberry *(Viburnum lentago)*
Pagoda dogwood *(Cornus alternifolia)*
Poison ivy *(Rhus radicans)*
Prickly-ash *(Zanthoxylum americanum)*
Prickly gooseberry, dogberry *(Ribes cynosbati)*
Smooth wild rose *(Rosa blanda)*
Virginia creeper *(Parthenocissus quinquefolia)*
Wild grape *(Vitis riparia)*

APPENDIX 3. Continued.

Characteristic Forb Species

Agrimony *(Agrimonia gryposepala)*
Black snakeroot *(Sanicula gregaria)*
Elm-leaved goldenrod *(Solidago ulmifolia)*
Bracken fern *(Pteridium aquilinum var. latiusculum)*
Common pyrola *(Pyrola elliptica)*
Common snakeroot *(Eupatorium rugosum)*
Early meadow rue *(Thalictrum dioicum)*
Elegant bedstraw *(Galium concinnum)*
Golden alexanders *(Zizia aurea)*
Hog-peanut *(Amphicarpaea bracteata)*
Horse-gentian *(Triosteum perfoliatum var. aurantiacum)*
Horse-gentian *(Triosteum perfoliatum)*
Jacob's ladder *(Polemonium reptans)*
Lopseed (Phryma leptostachya)
Pointed-leaved tick-trefoil *(Desmodium glutinosum)*
Poke milkweed *(Asclepias exaltata)*
Rattlesnake-fern *(Botrychium virginianum)*
Rough bedstraw *(Galium asprellum)*
Spotted coral-root *(Corallorhiza maculata)*
Sweet cicely *(Osmorhiza claytonii)*
Thimbleweed *(Anemone virginiana)*
Virginia stickseed *(Hackelia virginiana)*
Wild geranium *(Geranium maculatum)*
Wood-betony *(Pedicularis canadensis)*

Characteristic Graminoids

Dewey's sedge *(Carex deweyana)*
Long-stalked sedge *(Carex pedunculata)*
Pennsylvanian sedge *(Carex pensylvanica)*
Right-angle sedge *(Carex normalis)*
Sparganium-like sedge *(Carex sparganioides)*

APPENDIX 3. Continued.

Mesic Oak Forest

Total Area of Mesic and Dry-mesic Oak Forests as mapped by MCBS and arranged by the following locations:	Acreage	Acres of High Quality Mesic and Dry-mesic Oak Forests (BC rank or better)
Park Statutory Boundary	1476	885 (58%)
Forestville / Mystery Cave Ecological Area	1909	975 (51%)
Fillmore County	9650	-
Paleozoic Plateau	53709*	-

* combined Oak forest and Oak forest mesic subtype

General Description

Mesic oak forests occupy well-drained moist areas on lower slopes and terraces, especially in ravines and small valleys. They are also found on steep, mid to upper slopes on a talus of limestone cobble. Soils are nutrient-poor silt loams derived from alluvial or colluvial deposits or clay loams with cobblestones. Mesic oak forests have closed canopies dominated by red oak (*Quercus rubra*) with lesser amounts of white oak (*Quercus alba*), basswood (*Tilia american*) and sugar maple (*Acer saccharum*). Sugar maples dominate the subcanopy layer and densely shade the herbaceous and sparse shrub layers.

Dominant Tree Species

Red oak, northern *(Quercus rubra)*

Associate Canopy Tree Species

Basswood *(Tilia americana)*
Bitternut hickory *(Carya cordiformis)*
Sugar maple *(Acer saccharum)*

Characteristic Subcanopy

American elm *(Ulmus americana)*
American hornbeam (*Carpinus caroliniana* ssp. *virginiana*)
Juneberry - species unknown -*(Amelanchier spp.)*
Red elm, slippery elm *(Ulmus rubra)*
Sugar maple *(Acer saccharum)*

Characteristic Shrub Layer

American hazelnut *(Corylus americana)*
Black raspberry *(Rubus occidentalis)*
Chokecherry *(Prunus virginiana)*
Climbing bittersweet *(Celastrus scandens)*
Downy arrowwood *(Viburnum rafinesquianum)*
Gray dogwood *(Cornus foemina ssp. racemosa)*
Juneberry - species unknown - *(Amelanchier spp.)*
Missouri gooseberry *(Ribes missouriense)*
Nannyberry *(Viburnum lentago)*
Pagoda dogwood *(Cornus alternifolia)*
Poison ivy *(Rhus radicans)*
Prickly-ash *(Zanthoxylum americanum)*
Prickly gooseberry, dogberry *(Ribes cynosbati)*
Smooth wild rose *(Rosa blanda)*
Virginia creeper *(Parthenocissus quinquefolia)*
Wild grape *(Vitis riparia)*

APPENDIX 3. Continued.

Characteristic Forb Layer

Bloodroot *(Sanguinaria canadensis)*
Blue cohosh *(Caulophyllum thalictroides)*
Blue Phlox *(Phlox divaricata ssp. laphamii)*
Blunt-lobed woodsia *(Woodsia obtusa)*
Bulblet fern *(Cystopteris bulbifera)*
Canada moonseed *(Menispermum canadense)*
Cleavers *(Galium aparine)*
Enchanter's nightshade *(Circaea lutetiana ssp. canadensis)*
Erect carrion-flower *(Smilax ecirrata)*
Honewort *(Cryptotaenia canadensis)*
Indian pipe *(Monotropa uniflora)*
Interrupted fern *(Osmunda claytoniana)*
Lady fern *(Athyrium angustum)*
Maidenhair fern *(Adiantum pedatum)*
Maryland figwort *(Scrophularia marilandica)*
Pale vetchling *(Lathyrus ochroleucus)*
Smooth yellow violet *(Viola pubescens)*
Spinulose shield fern *(Dryopteris carthusiana)*
Starry campion *(Silene stellata)*
Stinging nettle *(Urtica dioica ssp. gracilis)*
Virginia stickseed *(Hackelia virginiana)*
White avens *(Geum canadense)*
Wild ginger *(Asarum canadense)*
Wild sarsaparilla *(Aralia nudicaulis)*
Wood anemone *(Anemone quinquefolia var. bifolia)*
Yellow bellwort *(Uvularia grandiflora)*
Yellow lady-slipper *(Cypripedium calceolus)*
Zig-zag goldenrod *(Solidago flexicaulis)*

Characteristic Graminoids

Dewey's sedge *(Carex deweyana)*
Long-stalked sedge *(Carex pedunculata)*
Pennsylvanian sedge *(Carex pensylvanica)*
Right-angle sedge *(Carex normalis)*
Sparganium-like sedge *(Carex sparganioides)*
Sprengel's sedge *(Carex sprengelii)*
Wood-straw sedge *(Carex tenera var. echinodes)*
Rolled-up sedge *(Carex convoluta (= C. rosea))*
Nodding fescue *(Festuca obtusa)*
Graceful sedge *(Carex gracillima)*

APPENDIX 3. Continued.

Maple-Basswood Forest

Total Area of Maple-basswood Forests as mapped by MCBS and arranged by the following locations:	Acreage	Acres of High Quality Maple-basswood Forests (BC rank or better)
Park Statutory Boundary	164	39 (24%)
Forestville / Mystery Cave Ecological Area	273	61 (22%)
Fillmore County	2170	-
Paleozoic Plateau	13280	-

General Description

Maple-basswood forests occur on various landforms that receive only indirect sunlight: 1) on north-facing, lower slopes extending on to channeled floodplains of small to medium sized valleys, 2) at the base of high bluffs formed by bedrock escarpments bordering the South Branch Root River, 3) within narrow, lateral ravines that steeply cut into the bluffs, and 4) surrounding upland springs on small bench terraces. Soils are a mixture of organic material, silt and cobblestones that accumulates as colluvium. Rich maple-basswood forests – which are the most floristically diverse forests – have soils with a high organic content. These are comprised of fine, silty loams that are dark, moist and friable. Upslope, maple-basswood forests are drier with less organic material as they grade into mesic red oak forests.

In maple-basswood forests, where the combination of low light and high moisture is secure, dependable niches develop for obligate species exclusively adapted to such conditions. Often maple-basswood forests occupy land where these ecological conditions are enhanced, especially near springs and seeps at the bases of high bluffs or within deep, narrow valleys or ravines. Older maple-basswood forests are biologically diverse communities with rich productive soils. In a natural landscape dominated by drier forests, they maximize biological diversity by moderating the extreme summer climate. In the past these forests were protected from fire. Rich maple-basswood forests are relatively small in area. They are generally long and linear in configuration along bluffs or isolated, circular patches within ravings or surrounding seeps on terraces and slopes. The rarest plants are often found in the wettest, darkest microhabitats that may be less than a few feet wide.

Dominant Tree Species

Basswood *(Tilia americana)*
Red oak, northern *(Quercus rubra)*
Sugar maple *(Acer saccharum)*

Associate Canopy Tree Species

American elm *(Ulmus americana)*
Black ash *(Fraxinus nigra)*
Butternut *(Juglans cinerea)*
Red elm, slippery elm *(Ulmus rubra)*
White oak *(Quercus alba)*

Characteristic Subcanopy

American elm *(Ulmus americana)*
American hornbeam *(Carpinus caroliniana ssp. virginiana)*
Bitternut hickory *(Carya cordiformis)*
Chokecherry *(Prunus virginiana)*
Dotted hawthorn *(Crataegus punctata)*
Ironwood, hop hornbeam *(Ostrya virginiana)*
Red elm, slippery elm *(Ulmus rubra)*
Sugar maple *(Acer saccharum)*

APPENDIX 3. Continued.

Characteristic Shrub Layer

American hornbeam *(Carpinus caroliniana ssp. virginiana)*
Beaked hazelnut *(Corylus cornuta)*
Bladdernut *(Staphylea trifolia)*
Bush honeysuckle *(Diervilla lonicera)*
Canada moonseed *(Menispermum canadense)*
Grape honeysuckle *(Lonicera prolifera)*
Leatherwood *(Dirca palustris)*
Nannyberry *(Viburnum lentago)*
Pagoda dogwood *(Cornus alternifolia)*
Prickly gooseberry, dogberry *(Ribes cynosbati)*
Wahoo *(Euonymus atropurpureus)*

Characteristic Forb Species

Blue cohosh *(Caulophyllum thalictroides)*
Bulblet fern *(Cystopteris bulbifera)*
Cut-leaved toothwort *(Dentaria laciniata)*
Declining trillium *(Trillium flexipes)*
Dutchman's-breeches *(Dicentra cucullaria)*
Early meadow rue *(Thalictrum dioicum)*
Erect carrion-flower *(Smilax ecirrata)*
False rue-anemone *(Isopyrum biternatum)*
Fragile fern *(Cystopteris fragilis)*
Hispid buttercup *(Ranunculus hispidus)*
Lady fern *(Athyrium angustum)*
Leaf-cup *(Polymnia canadensis)*
Maidenhair fern *(Adiantum pedatum)*
May-apple, mandrake *(Podophyllum peltatum)*
Miterwort *(Mitella diphylla)*
Ostrich fern *(Matteuccia struthiopteris var. pensylvanica)*
Protruding fragile fern *(Cystopteris protrusa)*
Purple giant-hyssop *(Agastache scrophulariaefolia)*
Red baneberry *(Actaea rubra)*
Rue-anemone *(Anemonella thalictroides)*
Sharp-lobed hepatica *(Hepatica acutiloba)*
Smooth yellow violet *(Viola pubescens)*
Three-flowered bedstraw *(Galium triflorum)*
Three-leaved black snakeroot *(Sanicula trifoliata)*
Virginia spring-beauty *(Claytonia virginica)*
Virginia waterleaf *(Hydrophyllum virginianum)*
White rattlesnake-root *(Prenanthes alba)*
White trout-lily *(Erythronium albidum)*
Wild ginger *(Asarum canadense)*
Wild leek *(Allium burdickii)*
Wild leek *(Allium tricoccum)*
Wood anemone *(Anemone quinquefolia var. bifolia)*
Wood-mint *(Blephilia hirsuta)*
Wood nettle *(Laportea canadensis)*
Yellow bellwort *(Uvularia grandiflora)*
Zig-zag goldenrod *(Solidago flexicaulis)*

Characteristic Graminoid Species

Charming sedge *(Carex blanda)*
Downy brome *(Bromus pubescens)*
Few-fruited sedge *(Carex oligocarpa)*
Graceful sedge *(Carex gracillima)*
Hairy-leaved sedge *(Carex hirtifolia)*
Hitchcock's sedge *(Carex hitchcockiana)*
James' sedge *(Carex jamesii)*
Long-stalked sedge *(Carex pedunculata)*
Rolled-up sedge *(Carex convoluta (= C. rosea))*
White-bear sedge *(Carex albursina)*
Wild-rye *(Elymus villosus)*
Wood's sedge *(Carex woodii)*

APPENDIX 3. Continued.

White Pine - Hardwood Forest

Total Area of White Pine - Hardwood Forest as mapped by MCBS and arranged by the following locations:	Acreage	Acres of High Quality White Pine - Hardwood Forest (BC rank or better)
Park Statutory Boundary	27.6	26.5 (96%)
Forestville / Mystery Cave Ecological Area	61	44 (73%)
Fillmore County	430	-
Paleozoic Plateau	1465*	-

* includes all subtypes

General Description

Naturally occurring stands of white pine (*Pinus strobus*) are characteristically found on shallow, silty soils over bedrock in narrow bands along cliff margins and bedrock terraces. These substrates are generally dry to dry-mesic but have some mesic inclusions due to the uneven terrain. On one bluff in the main park, overlooking the South Branch Root River, white pine stands are at several elevations on bench terraces created by different types of bedrock (Stewartville, Prosser and Platteville). Other stands grow midslope on sand residuum above St. Peter Sandstone and on dry talus slopes below limestone cliffs. White pines are also on rocky escarpments within areas mapped as northern hardwood conifer forests. The herbaceous flora beneath the white pines varies according to canopy closure and soil moisture. The following species list is organized to express these distinctions observed within the map unit.

No white pines were recorded during the original land survey in uplands of the main park. However, according to Winchell and Upham (1884), presettlement pine did exist along the rivers in Fillmore County but these were all cut for lumber. The oldest, extant pines within the Ecological Area are estimated to be about 120 years old and have originated since Euroamerican settlement. White pine appears to reproduce under its own canopy on steep bluffs and shallow soils over bedrock. Within the main park, white pine stands have trees in nearly all age classes which indicates a healthy and stable meta-population.

Dominant Tree Species

Sugar maple *(Acer saccharum)*
White pine *(Pinus strobus)*
White oak *(Quercus alba)*

Associate Canopy Tree Species

Bur oak *(Quercus macrocarpa)*
Red cedar *(Juniperus virginiana)*
Paper birch *(Betula papyrifera)*
Red oak, northern *(Quercus rubra)*

Characteristic Subcanopy

American elm *(Ulmus americana)*
Sugar maple *(Acer saccharum)*
Ironwood, hop hornbeam *(Ostrya virginiana)*

APPENDIX 3. Continued.

Characteristic Shrub Layer

American hornbeam *(Carpinus caroliniana ssp. virginiana)*
Bitternut hickory *(Carya cordiformis)*
Bush honeysuckle *(Diervilla lonicera)*
Canada yew *(Taxus canadensis)*
Chokecherry *(Prunus virginiana)*
Downy arrowwood *(Viburnum rafinesquianum)*
Leatherwood *(Dirca palustris)*
Nannyberry *(Viburnum lentago)*
Poison ivy *(Rhus radicans)*
Prickly gooseberry, dogberry *(Ribes cynosbati)*
Sugar maple *(Acer saccharum)*

Characteristic Forb Species
Co-occurrences in open canopies

Alum-root *(Heuchera richardsonii)*
Bird-foot violet *(Viola pedata)*
Harebell (*Campanula rotundifolia*)
Hoary puccoon *(Lithospermum canescens)*
Lead-plant *(Amorpha canescens)*
Northern bedstraw *(Galium boreale ssp. septentrionale)*
Plantain-leaved pussytoes *(Antennaria plantaginifolia)*
Prairie phlox, downy phlox *(Phlox pilosa ssp. fulgida)*
Round-headed bush-clover *(Lespedeza capitata)*
Thimbleweed *(Anemone virginiana)*
Wood-betony *(Pedicularis canadensis)*

Characteristic Forb Species
Co-occurrences in partial canopies of dry-mesic forests

Canada mayflower *(Maianthemum canadense)*
Columbine *(Aquilegia canadensis)*
Common burdock *(Arctium minus)*
Common pyrola *(Pyrola elliptica)*
Elegant bedstraw *(Galium concinnum)*
Elm-leaved goldenrod *(Solidago ulmifolia)*
Giant Solomon's-seal *(Polygonatum commutatum)*
Golden alexanders *(Zizia aurea)*
Heart-leaved aster *(Aster cordifolius)*
Honewort *(Cryptotaenia canadensis)*
Interrupted fern *(Osmunda claytoniana)*
Lopseed *(Phryma leptostachya)*
Sharp-lobed hepatica *(Hepatica acutiloba)*
Smooth yellow violet *(Viola pubescens)*
Sweet cicely *(Osmorhiza claytonii)*
Virginia stickseed *(Hackelia virginiana)*
White rattlesnake-root *(Prenanthes alba)*
Wild geranium *(Geranium maculatum)*
Wild sarsaparilla *(Aralia nudicaulis)*
Woodland sunflower *(Helianthus strumosus)*

Characteristic Graminoid Species
Co-occurrences in partial canopies of dry-mesic forests

Mountain rice-grass *(Oryzopsis asperifolia)*
Pennsylvanian sedge *(Carex pensylvanica)*

Characteristic Forb Species
Co-occurrences in closed canopy mesic forests

Bloodroot *(Sanguinaria canadensis)*
Blue cohosh *(Caulophyllum thalictroides)*
Early meadow rue *(Thalictrum dioicum)*
Kidney-leaf buttercup *(Ranunculus abortivus)*
Maidenhair fern *(Adiantum pedatum)*
Sandwort *(Arenaria lateriflora)*
Starry campion *(Silene stellata)*
Wild ginger *(Asarum canadense)*
Wood anemone *(Anemone quinquefolia var. bifolia)*

Characteristic Graminoid Species
Co-occurrences in closed canopies of mesic forests

Bearded short-husk *(Brachyelytrum erectum)*
Charming sedge *(Carex blanda)*
Long-stalked sedge *(Carex pedunculata)*
Rolled-up sedge *(Carex convoluta (= C. rosea))*
White-bear sedge *(Carex albursina)*

APPENDIX 3. Continued.

River Beach

Total Area of River Beach as mapped by MCBS and arranged by the following locations:	**Acreage**	**Acres of High Quality River Beach (BC rank or better)**
Park Statutory Boundary	0	-
Forestville / Mystery Cave Ecological Area	4	-
Fillmore County	30	-
Paleozoic Plateau	141	-

General Description

River beach is a sparsely vegetated community occurring on gravel and cobble limestone along banks of the South Branch Root River. The vegetation is zonal, usually with a distinct upper beach zone and one to several lower beach zones. This zonation is caused by periodic differences in exposure during the growing season as river levels fluctuate. There were no ecological ranks assigned to river beach communities found within the Ecological Area.

APPENDIX 3. Continued.

Lowland Hardwood Forest

Total Area of Lowland Hardwood Forest as mapped by MCBS and arranged by the following locations:	Acreage	Acres of High Quality Lowland Hardwood Forest (BC rank or better)
Park Statutory Boundary	296	108 (39%)
Forestville / Mystery Cave Ecological Area	329	151 (46%)
Fillmore County	1400	-
Paleozoic Plateau	3486	-

General Description

Lowland hardwood forests are a complex of dominant species occupying the modern alluvium of small to medium sized tributaries of the South Branch Root River. While flooding within the park can be intense, flood events are usually of brief duration and standing water is quickly removed. The alluvial silts and sands on these terraces are well drained by numerous old channels that form a network of mounds and ridges amid a series of depressions in meander scars. The distribution of vegetation within riparian forests is determined primarily by the flooding regime (intensity, frequency and duration) and by soil depth to the water table. Stream banks are between 2-10 feet in height indicating that the water table is well below the rooting zone of most flood-intolerant species. Stream beds are lined with cobblestones accumulated by glacial outwash. Shallow depressions on the terrace are ephemeral pools filled by Spring meltwater and become dry during Summer unless fed by groundwater. Much of the modern streambed rests upon impermeable limestone interbedded with shale layers. The shale creates a perched water table manifested by small inclusions of black ash swamps and seepage meadows. The valleys begin to widen where streams cut through the Platteville limestone into the softer, underlying St. Peter Sandstone.

The canopy is very diverse with several sun-loving species such as black walnut (*Juglans nigra*), Peach-leaved willow *(Salix amygdaloides*), bur oak (*Quercus macrocarpa*), box elder (*Acer negundo*) and cottonwood (*Populus deltoides*). However, large shade-tolerant trees are also common, for example: red elm (*Ulmus rubra*), rock elm (*Ulmus thomasii*), hackberry (*Celtis occidentalis*) and black maple (*Acer nigra*). In some stands, sugar maple (*Acer saccharum*) and basswood (*Tilia americana*) are co-dominants with black ash (*Fraxinus nigra*). This heterogeneous structure and composition is due in large part to the constantly meandering streams and the varying depths of the alluvium to the water table. High quality lowland hardwood forests have an interrupted canopy (50-75% cover) dominated by large trees with crown heights up to 120 feet and trunk girth of 20-30 inches DBH. One high quality stand within the main park has the best population of rock elms observed by MCBS in the Root River Valley. Several rock elms were recorded with diameters up to 24 inches. The subcanopy varies considerably ranging from sunny areas, where immature trees and saplings are absent, to darkly shaded areas, where young and immature trees are dense. Some riparian forests have scattered trees or groves of trees and no subcanopy. Others resemble woodlands dense with brush. Mesic well-drained areas are similar to rich maple-basswood forests with spring ephemerals that are later overshadowed by wood nettles.

APPENDIX 3. Continued.

Dominant Tree Species

Black maple *(Acer nigrum)*
Box elder *(Acer negundo)*
Bur oak *(Quercus macrocarpa)*
Sugar maple *(Acer saccharum)*

Associate Canopy Tree Species

American elm *(Ulmus americana)*
Basswood *(Tilia americana)*
Black walnut *(Juglans nigra)*
Black willow *(Salix nigra)*
Butternut *(Juglans cinerea)*
Cottonwood *(Populus deltoides)*
Green ash *(Fraxinus pennsylvanica)*
Hackberry *(Celtis occidentalis)*
Red elm, slippery elm *(Ulmus rubra)*
Rock elm *(Ulmus thomasii)*

Characteristic Subcanopy Layer

American elm *(Ulmus americana)*
Black ash *(Fraxinus nigra)*
Box elder *(Acer negundo)*
Chokecherry *(Prunus virginiana)*
Hackberry *(Celtis occidentalis)*
Rock elm *(Ulmus thomasii)*

Characteristic Shrub Layer

Black raspberry *(Rubus occidentalis)*
Chokecherry *(Prunus virginiana)*
Common Elder *(Sambucus canadensis)*
Dotted hawthorn *(Crataegus punctata)*
Missouri gooseberry *(Ribes missouriense)*
Nannyberry *(Viburnum lentago)*
Prickly-ash *(Zanthoxylum americanum)*
Silky willow *(Salix sericea)*
Wahoo *(Euonymus atropurpureus)*

Characteristic Forb Species

Angelica *(Angelica atropurpurea var. occidentalis)*
Anise-root *(Osmorhiza longistylis)*
Canada goldenrod *(Solidago canadensis)*
Clearweed *(Pilea pumila)*
Cleavers *(Galium aparine)*
Common burdock *(Arctium minus)*
Common snakeroot *(Eupatorium rugosum)*
Cow-parsnip *(Heracleum lanatum)*
False rue-anemone *(Isopyrum biternatum)*
False Solomon's-seal *(Smilacina racemosa)*
Giant goldenrod *(Solidago gigantea)*
Goldenglow *(Rudbeckia laciniata)*
Honewort *(Cryptotaenia canadensis)*
Jack-in-the-pulpit *(Arisaema triphyllum)*
Jerusalem artichoke *(Helianthus tuberosus)*
Leafy beggar-ticks *(Bidens frondosa)*
Maryland figwort *(Scrophularia marilandica)*
Maryland figwort *(Scrophularia marilandica)*
Stinging nettle *(Urtica dioica ssp. gracilis)*
Sweet cicely *(Osmorhiza claytonii)*
Tall bellflower *(Campanula americana)*
Tall meadow rue *(Thalictrum dasycarpum)*
Three-flowered bedstraw *(Galium triflorum)*
Virginia bluebells *(Mertensia virginica)*
Virginia knotweed *(Polygonum virginianum)*
Virginia knotweed *(Polygonum virginianum)*
Virginia waterleaf *(Hydrophyllum virginianum)*
White avens *(Geum canadense)*
White vervain *(Verbena urticifolia)*
Wild cucumber *(Echinocystis lobata)*
Wood-mint *(Blephilia hirsuta)*
Wood nettle *(Laportea canadensis)*

Forbs of Alluvial Maple-basswood Lowlands

Appendaged waterleaf *(Hydrophyllum appendiculatum)*
Blue cohosh *(Caulophyllum thalictroides)*
Blue Phlox *(Phlox divaricata ssp. laphamii)*
Common blue violet *(Viola sororia)*
Cut-leaved toothwort *(Dentaria laciniata)*
Declining trillium *(Trillium flexipes)*
False rue-anemone *(Isopyrum biternatum)*
Hispid buttercup *(Ranunculus hispidus)*
Kidney-leaf buttercup *(Ranunculus abortivus)*
May-apple, mandrake *(Podophyllum peltatum)*
Stinging nettle *(Urtica dioica ssp. gracilis)*
Virginia bluebells *(Mertensia virginica)*
Virginia spring-beauty *(Claytonia virginica)*
Virginia waterleaf *(Hydrophyllum virginianum)*
White avens *(Geum canadense)*
White trout-lily *(Erythronium albidum)*
Wild ginger *(Asarum canadense)*
Wild leek *(Allium tricoccum)*
Wild leek *(Allium burdickii)*
Wood nettle *(Laportea canadensis)*

APPENDIX 3. Continued.

Characteristic Graminoid Species

Ambiguous sedge *(Carex amphibola var. turgida)*
Bottlebrush grass *(Elymus hystrix)*
Charming sedge *(Carex blanda)*
Emory's sedge *(Carex emoryi)*
Reed canary grass *(Phalaris arundinacea)*
Rice cut grass *(Leersia oryzoides)*
Sprengel's sedge *(Carex sprengelii)*
Stout woodreed *(Cinna arundinacea)*
White grass *(Leersia virginica)*
White-bear sedge *(Carex albursina)*
Wild-rye *(Elymus villosus)*
Wild-rye *(Elymus wiegandii)*

APPENDIX 3. Continued.

Black Ash Swamps - Seepage Subtype

Total Area of Black Ash Seepage Swamp as mapped by MCBS and arranged by the following locations:	Acres	Acres of High Quality Black Ash Swamps (BC rank or better)
Park Statutory Boundary	19	6.8 (37%)
Forestville / Mystery Cave Ecological Area	19	6.8 (37%)
Fillmore County	20	-
Paleozoic Plateau	28*	-

*includes Black Ash Swamp (not included is 59 acres of Mixed Hardwood Swamp)

General Description

Black ash swamps are native plant communities found as inclusions on footslopes within lowland hardwood forests, or on midslopes within upland forests on terraces and ravines where seeps accentuate a clear demarcation between maples and red oaks. These forested wetlands are perched on impervious bedrock where standing water is maintained by springs emerging from exposures of Decorah shale and Platteville limestone. Within valleys of the park, springs emerge at elevations between 1120 and 1160 feet corresponding to various topographic positions ranging from footslopes to midslopes depending on the depth of the floodplain relative to the impervious layer of bedrock. On steep slopes, springs cascade directly to the floodplain. On level areas of floodplains, bedrock terraces, or ravine floors, these springs form seepage pools dominated by black ash and surrounded by mesic forests. In general, black ash seepage swamps are less than one acre in size. Often they are longer than wide (e.g., 100 x 30 feet). Shale-derived clay soils line the swamp basin and the soil is a peaty muck created by decomposition of herbaceous plants and detritus. Water flows in rivulets over saturated mud or pools in depressions around hummocks of black ash.

The black ash canopy is patchy (25-50% cover). The majority of trees are about 10 inches DBH, but sometimes they appear as a super canopy with girths between 15-20 inches DBH and crown heights up to 120 feet. Trees of this size class have been aged between 100-178 rings (Table 5). Smaller trees could be of similar age due to the stringent growing conditions imposed by saturated soil. The subcanopy usually fills the gaps created by the canopy, varying between interrupted to continuous cover (50-100%). The understory is comprised of trees of different heights, ranging from 15-60 feet. The herbaceous flora is a heterogeneous mix of mesic forest herbs and wetland herbs characteristic of wet meadows. The swamps in the park are often ringed by lawns of the narrow-leaved, Wood's sedge *(Carex woodii)*.

Dominant Tree Species

Black ash *(Fraxinus nigra)*

Associate Canopy Tree Species

(mostly from adjacent Maple-basswood Forest)

Basswood *(Tilia americana)*
Bur oak *(Quercus macrocarpa)*
Red oak, northern *(Quercus rubra)*
Sugar maple *(Acer saccharum)*
White oak *(Quercus alba)*

Characteristic Subcanopy Layer

Basswood *(Tilia americana)*
Black ash *(Fraxinus nigra)*
Box elder *(Acer negundo)*
Green ash *(Fraxinus pennsylvanica)*
Red elm, slippery elm *(Ulmus rubra)*
Sugar maple *(Acer saccharum)*

APPENDIX 3. Continued.

Characteristic Shrub Layer
(mostly from adjacent Maple-basswood Forest)

American hornbeam *(Carpinus caroliniana ssp. virginiana)*
Bladdernut *(Staphylea trifolia)*
Common Elder *(Sambucus canadensis)*
Dotted hawthorn *(Crataegus punctata)*
Nannyberry *(Viburnum lentago)*
Prickly gooseberry, dogberry *(Ribes cynosbati)*
Wahoo *(Euonymus atropurpureus)*

Characteristic Forb Species

Appendaged waterleaf *(Hydrophyllum appendiculatum)*
Crooked-stemmed aster *(Aster prenanthoides)*
Cup-plant *(Silphium perfoliatum)*
Golden ragwort *(Senecio aureus)*
Great lobelia *(Lobelia siphilitica)*
Jack-in-the-pulpit *(Arisaema triphyllum)*
Leaf-cup *(Polymnia canadensis)*
Mad-dog skullcap *(Scutellaria lateriflora)*
Marsh marigold *(Caltha palustris)*
Nodding wild onion *(Allium cernuum)*
Purple giant-hyssop *(Agastache scrophulariaefolia)*
Skunk cabbage *(Symplocarpus foetidus)*
Spotted touch-me-not, jewel-weed *(Impatiens capensis)*
Spring cress *(Cardamine bulbosa)*
Swamp saxifrage *(Saxifraga pensylvanica)*
Tall scouring-rush *(Equisetum hyemale var. affine)*
Turtlehead *(Chelone glabra)*
Virginia waterleaf *(Hydrophyllum virginianum)*
Wood nettle *(Laportea canadensis)*

Characteristic Graminoid Species

Downy brome *(Bromus pubescens)*
Hairy-leaved sedge *(Carex hirtifolia)*
Long-stalked sedge *(Carex pedunculata)*
Stout woodreed *(Cinna arundinacea)*
White grass *(Leersia virginica)*
White-bear sedge *(Carex albursina)*
Wild-rye *(Elymus virginicus)*
Wood's sedge *(Carex woodii)*

APPENDIX 3. Continued.

Seepage Meadow

Total Area of Seepage Meadow as Mapped by MCBS	Acreage	Acres of High Quality Seepage Meadow (BC rank or better)
Park Statutory Boundary	6.5	2.3 (35%)
Forestville / Mystery Cave Ecological Area	7.3	2.3 (31%)
Fillmore County	30	-
Paleozoic Plateau	713	-

General Description

Seepage meadows are open wetlands perched on impervious bedrock where standing water is maintained by springs emerging from exposures of Decorah shale and Platteville limestone. The soil is a peaty muck created by complete decomposition of the herbaceous wetland plants and detritus. Clay derived from shale lines the basin of the meadow allowing the water to form pools. These treeless wetlands form where the modern alluvium rests upon valley floors at the same elevation as shale (which prevents infiltration) and limestone (which prevents surface runoff by its resistence to channel erosion). They are also found on bedrock bench terraces where Platteville limestone is exposed. In one instance, an oxbow channel of the Root River receives groundwater from the base of the adjacent bluff creating an emergent marsh 2-4 feet in depth. It is dominated by wild rice and the pool is filled with Chara, a calcium-loving algae large enough to be confused as a vascular plant. The marsh then drains into a broad channel dominated by sedges.

Dominant Tree Species

Peach-leaved willow *(Salix amygdaloides)*

Characteristic Shrub Layer

Bebb's willow *(Salix bebbiana)*
False indigo *(Amorpha fruticosa)*
Red-osier dogwood *(Cornus stolonifera)*

Characteristic Forb Species

Angelica *(Angelica atropurpurea var. occidentalis)*
Broad-leaved arrowhead *(Sagittaria latifolia)*
Broad-leaved arrowhead *(Sagittaria latifolia)*.
Common boneset *(Eupatorium perfoliatum)*
Giant goldenrod *(Solidago gigantea)*
Glade mallow *(Napaea dioica)*
Golden ragwort *(Senecio aureus)*
Great Indian-plantain *(Cacalia muhlenbergii)*
Leafy beggar-ticks *(Bidens frondosa)*
Mad-dog skullcap *(Scutellaria lateriflora)*
Marsh marigold *(Caltha palustris)*
Nodding bur-marigold *(Bidens cernua)*
Northern bugleweed *(Lycopus uniflorus)*
Northern marsh-fern *(Thelypteris palustris)*
Obedient Plant *(Physostegia virginiana)*
Purple-leaved willow-herb *(Epilobium coloratum)*
Red-stemmed aster *(Aster puniceus)*
Rough avens *(Geum laciniatum var. trichocarpum)*
Skunk cabbage *(Symplocarpus foetidus)*
Sneezeweed *(Helenium autumnale)*
Snowy campion *(Silene nivea)*
Northern blue flag Iris *(Iris versicolor)*
Spring cress *(Cardamine bulbosa)*
Starry false Solomon's-seal *(Smilacina stellata)*
Swamp milkweed *(Asclepia incarnata)*
Swamp saxifrage *(Saxifraga pensylvanica)*
Tufted beggar-ticks *(Bidens comosa)*
Water horsetail *(Equisetum fluviatile)*

APPENDIX 3. Continued.

Characteristic Graminoid Layer

Awl-fruited sedge *(Carex stipata)*
Bluejoint *(Calamagrostis canadensis)*
Bristly sedge *(Carex comosa)*
Broad-leaved cattail *(Typha latifolia)*
Common reed *(Phragmites australis)*
Crested sedge *(Carex cristatella)*
Dark green bulrush *(Scirpus atrovirens)*
Emory's sedge *(Carex emoryi)*
Fowl manna grass *(Glyceria striata)*
Fowl meadow grass *(Poa palustris)*
Fox sedge *(Carex vulpinoidea)*
Hairy-fruited sedge *(Carex trichocarpa)*
Inland sedge *(Carex interior)*
Lake sedge *(Carex lacustris)*
Porcupine sedge *(Carex hystericina)*
Prairie sedge *(Carex prairea)*
Prairie wedge-grass *(Sphenopholis obtusata)*
Red top *(Agrostis stolonifera)*
Retrorse sedge *(Carex retrorsa)*
Rice cut grass *(Leersia oryzoides)*
River bulrush *(Scirpus fluviatilis)*
Smooth-cone sedge *(Carex laeviconica)*
Smooth-sheathed sedge *(Carex laevivaginata)*
Tussock sedge *(Carex stricta)*
Wooly sedge *(Carex lanuginosa)*

Other Species of Interest

Large algae *(Chara spp.)*
Elodea *(Elodea canadensis)*
Lesser duckweed *(Lemna minor)*
Wild rice *(Zizania palustris var. interior)*

APPENDIX 3. Continued.

Dry Cliff

Total Area of Dry Cliff as mapped by MCBS and arranged by the following locations:	**Acreage**	**Acres of High Quality Dry Cliff (BC rank or better)**
Park Statutory Boundary	2	0 (0%)
Forestville / Mystery Cave Ecological Area	81	38 (47%)
Fillmore County	1290	-
Paleozoic Plateau	1596	-

General Description

Dry cliffs are vertical bedrock exposures that receive no groundwater discharge and are typically hot and dry due to full exposure to sunlight. The majority of dry cliffs are within bedrock strata of the Stewartville Formation and Prosser Limestone. Mapped areas of dry cliff found are usually found on south to west facing escarpments at the higher elevations within the valleys. Mapped areas of dry cliff often include adjacent talus slopes and dry oak forest above the cliff. Naturally occurring stands of white pine are also found above cliffs, bench terraces and other bedrock outcrops; but these were always mapped separately as white pine - hardwood forest.

Characteristic Trees

Bur oak *(Quercus macrocarpa)*
Ironwood, hop hornbeam *(Ostrya virginiana)*
Paper birch *(Betula papyrifera)*
Quaking aspen *(Populus tremuloides)*
Red cedar *(Juniperus virginiana)*
Red oak, northern *(Quercus rubra)*
Sugar maple *(Acer saccharum)*
White oak *(Quercus alba)*
White pine *(Pinus strobus)*

Characteristic Shrub Layer

Ninebark *(Physocarpus opulifolius)*
Woodbine *(Parthenocissus inserta)*

Characteristic Forb Species

Alum-root *(Heuchera richardsonii)*
Harebell *(Campanula rotundifolia)*

Characteristic Graminoid Species

Ivory sedge *(Carex eburnea)*

APPENDIX 3. Continued.

Moist Cliff

Total Area of Moist Cliff as mapped by MCBS and arranged by the following locations:	Acreage	Acres of High Quality Moist Cliff (BC rank or better)
Park Statutory Boundary	11	11 (100%)
Forestville / Mystery Cave Ecological Area	37	28 (76%)
Fillmore County	380	-
Paleozoic Plateau	501	-

General Description

Moist cliffs are on north to east facing, forested bluffs or are otherwise protected from direct sunlight. A portion of the cliff receives some groundwater usually from interbedded shales within Cummingsville Formation. Mapped areas of moist cliff often include adjacent talus slopes. Naturally occurring stands of white pine are also found above cliffs, bench terraces and other bedrock outcrops; but these were always mapped separately as white pine - hardwood forest.

Characteristic Trees

Bur oak *(Quercus macrocarpa)*
Ironwood, hop hornbeam *(Ostrya virginiana)*
Paper birch *(Betula papyrifera)*
Quaking aspen *(Populus tremuloides)*
Red cedar *(Juniperus virginiana)*
Red oak, northern *(Quercus rubra)*
Sugar maple *(Acer saccharum)*
White oak *(Quercus alba)*
White pine *(Pinus strobus)*

Characteristic Shrub Layer

Canada yew *(Taxus canadensis)*
Downy arrowwood *(Viburnum rafinesquianum)*
Grape honeysuckle *(Lonicera prolifera)*
Woodbine *(Parthenocissus inserta)*

Characteristic Forb Species

American spikenard *(Aralia racemosa)*
Columbine *(Aquilegia canadensis)*
Delicate fragile fern (*Cystopteris tenuis*)
Harebell *(Campanula rotundifolia)*
Leaf-cup *(Polymnia canadensis)*
Northern bedstraw *(Galium boreale ssp. septentrionale)*
Slender cliff-brake *(Cryptogramma stelleri)*
Walking fern *(Camptosorus rhizophyllus)*
White rattlesnake-root *(Prenanthes alba)*

Characteristic Graminoid Species

Wolf's bluegrass *(Poa wolfii)*

APPENDIX 3. Continued.

Talus Slope

Total Area of Talus Slope as mapped by MCBS and arranged by the following locations:	**Acreage**	**Acres of High Quality Talus Slope (BC rank or better)**
Park Statutory Boundary	0	0 (0)
Forestville / Mystery Cave Ecological Area	4.8	2 (42%)
Fillmore County	10	-
Paleozoic Plateau	31	-

General Description

Talus accumulates at the bases of limestone outcrops and cliff. The talus can be sunny or darkly shaded. Some talus receives groundwater from seeps, others are dry piles of cobblestones. The vegetation on talus slopes is similar to that on dry or moist cliff depending on the context.

Northern Hardwood - Conifer Forest

Total Area of Northern Hardwood-Conifer Forest as mapped by MCBS and arranged by the following locations:	**Acreage**	**Acres of <u>High Quality</u> Northern Hardwood-Conifer Forest (BC rank or better)**
Park Statutory Boundary	0.5	0.5 (100%)
Forestville / Mystery Cave Ecological Area	15	6 (40%)
Fillmore County	20	-
Paleozoic Plateau	31	-

General Description

Northern hardwood - conifer forest within the Ecological Area is always associated with cold karst (see algific talus slope description). Cold-air vents and mossy talus are scattered throughout the best quality northern hardwood-conifer forests.

The total canopy of the northern hardwood-conifer forest is interrupted (50-75% cover). The numerous canopy gaps are due to bedrock exposures on super-steep bluffs. Balsam fir (*Abies balsamea*) is usually sparse, covering between 1-5% of the total canopy. However, in some small stands, balsam fir dominates up to 50% of the total canopy. Crown heights of balsam fir are between 10-20 meters tall. There is a super canopy of white pines on bedrock outcrops (5-25% cover) with crowns greater than 35 meters tall. Both white pine (*Pinus strobus*) and balsam fir appear to be reproducing as there are individuals in many age classes. The deciduous canopy is patchy (25-50% cover). Canada yew (*Taxus canadensis*) is abundant on dry, darkly-shaded, rock slopes. Its mesic flora is similar to rich maple-basswood forests, but it is distinguished by the presence of northern plants.

Dominant Tree Species

Balsam fir *(Abies balsamea)*
Basswood *(Tilia americana)*
Sugar maple *(Acer saccharum)*
White pine *(Pinus strobus)*
Yellow birch *(Betula alleghaniensis)*

Associate Canopy Tree Species

Black ash *(Fraxinus nigra)*
Paper birch (*Betula papyrifera*)
Yellow birch *(Betula alleghaniensis)*

Characteristic Subcanopy

American elm *(Ulmus americana)*
American hornbeam *(Carpinus caroliniana ssp. virginiana)*
Black ash *(Fraxinus nigra)*
Sugar maple *(Acer saccharum)*
White oak *(Quercus alba)*
Yellow birch *(Betula alleghaniensis)*

Characteristic Shrub Layer

Beaked hazelnut *(Corylus cornuta)*
Bush honeysuckle *(Diervilla lonicera)*
Bush juniper *(Juniperus communis)*
Canada yew *(Taxus canadensis)*
Downy arrowwood *(Viburnum rafinesquianum)*
Leatherwood *(Dirca palustris)*
Missouri gooseberry *(Ribes missouriense)*
Pagoda dogwood *(Cornus alternifolia)*
Red-berried Elder *(Sambucus pubens)*

APPENDIX 3. Continued.

Characteristic Forb Species

Canada mayflower *(Maianthemum canadense)*
Veiny pea *(Lathyrus venosus var. intonsus)*

Characteristic Graminoid Species

Bearded short-husk *(Brachyelytrum erectum)*
Pennsylvanian sedge *(Carex pensylvanica)*
Long-stalked sedge *(Carex pedunculata)*
Rolled-up sedge *(Carex convoluta (= C. rosea))*

APPENDIX 3. Continued.

Talus Slope-Algific Subtype and Moist Cliff-Maderate Subtype

Total Area of Algific Talus Slope as mapped by MCBS and arranged by the following locations:	**Acreage**	**Acres of High Quality Algific Talus Slope (BC rank or better)**
Park Statutory Boundary	8.8	3.6 (41%)
Forestville / Mystery Cave Ecological Area	38	27 (71%)
Fillmore County	60	-
Paleozoic Plateau	128	-

Total Area of Maderate Cliff as mapped by MCBS and arranged by the following locations:	**Acreage**	**Acres of High Quality Maderate Cliff (BC rank or better)**
Park Statutory Boundary	3	3 (100%)
Forestville / Mystery Cave Ecological Area	17	17 (100%)
Fillmore County	40	-
Paleozoic Plateau	76	-

General Description

Cold producing talus slopes — termed "algific" — are fed by cold air and water emitted from ice-storing cavities in the underlying bedrock. An interconnection of several different geologic features is necessary for a functioning system: sinkholes, fissures or fractures, ice cavities, impermeable shale or bentonite clay layers, and lateral vents to north-facing bluffs in deeply, dissected valleys (Frest 1981). Cold-producing karst creates a buffered habitat which is colder in the summer and slightly warmer in the winter than surrounding forest habitats. Maderate cliffs are north-facing carbonate cliffs that seep cold water but usually have minor cold air flow (Frest 1986a). Maderate cliffs form when talus has been eroded away from the bedrock leaving a sheer cliff. Nearly all the algific talus slopes and maderate cliffs of the area occur within the upper layers of the Galena bedrock group. These geologic features are best expressed in valleys exposing the contact zone of the Stewartville Formation with Prosser Limestone: bedrock strata within the Galena Group. Frest (1986a, 1987, 1991) used a different geologic nomenclature for this bedrock strata subdividing the Galena Group into several units ranging form the Rivoli Member to Sinsinawa Member within the Dunleith-Wise Lake Formations.

In winter, vertical openings within the fractured limestone allow cold air to sink into the upland holes and freeze groundwater dripping on the sides of the crevices and caverns. In summer, ice produces cold air and meltwater which flows along impervious shale layers through lateral vents to emerge on bluff slopes. Here it ventilates boulders and cobblestones of talus forming at the bases of bedrock exposures. This wet, super-cooled talus is usually shallowly covered by a rich organic soil having the consistency of sapric peat. If soil accumulation over the talus becomes too deep, it insulates the cold and the surface warms to temperatures uninhabitable by rare plants and snails. At the coldest sites, ambient late-summer temperatures of the air and soil are as low as 40-50 degrees Fahrenheit and ice is reachable within exposed vents that pour cold air to the surface. A bubble of humid air hangs over the slope and is held in place by the canopy of overhanging trees whose roots are unable to grow in

the coldest zones. Because ice persists longest on forested, north-facing slopes in deep valleys, that is where the cold producing systems are the largest and best developed. These sites occur mostly on outside bends of ancient meanders cut deep into the bedrock. The South Branch has a series of such bends with algific sites as do many of the Root River's tributaries and ravines.

The cold-producing karst habitats vary in temperature, moisture, slope position and size. The most important characteristic determining "coldness" of a particular location is the size of the ice-storing network of sinkholes, cavities and fissures or vents that supports it. Karst habitats are always best developed on north-facing slopes because that is where the most ice is formed and is maintained the longest – often throughout the summer. The bedrock strata supporting the cold habitats extends for more than eight miles through the South Branch of the Root River and its tributaries within the Ecological Area. Within this bedrock strata, there is a range of habitats varying by degree of coldness and moisture. Individual species of snails and plants are adapted to specific niches along this gradient. The coldest areas are restricted to particular areas, often localized around vents or small areas of talus. The slope also varies in the amount of moisture with some cliffs/talus seasonally dry to others which are continuously wet from groundwater seepage. The relative position of the cold habitats on the valley slopes also varies. Toward the headwaters of the valley, where the cold-producing bedrock is first exposed, cold habitats occur on lower slopes near the streambed.

Cold karst communities within the Ecological Area support up to six concentric zones of vegetation that appear to be directly associated with decreasing soil temperature. The first four zones are devoid of trees. Beginning at the center, these zones are as follows:

1) Cold Air Vents are the coldest zone where ice is within reach on sides of open crevices. Vents emit a strong breeze of cold air. Here Iowa golden saxifrage (*Chrysosplenium iowense*) is most abundant when found. Maderate cliffs or outcrops are placed in this zone even when they have no large visible vents but receive cold water along small cracks and crevices. These habitats also support the two subspecies of *Novisuccinea*: Minnesota Pleistocene Ambersnail (*Novasuccinea n. Sp.* Minnesota A), and the Iowa Pleistocene Ambersnail (*Novasuccinea n. sp.* Minnesota B). Each occurs on slightly different microhabitats on maderate cliffs and adjacent talus (Frest 1991).

2) **Centric Zones** are found where the soil and rock shallowly cover the vents. Ice can be found just beneath the soil and rock. These areas are covered by mosses with a few species of vascular herbaceous plants that are naturally diminutive or reduced in stature presumably due to the cold, these include when present: Iowa golden saxifrage, naked miterwort (*Mitella nuda*), bunchberry (*Cornus canadensis*), bulblet fern (*Cystopteris bulbifera*), protruding fragile fern (*Cystopteris protrusa*) and fragile fern (*Cystopteris fragilis*). Midwest Pleistocene Vertigo (*Vertigo hubrichti hubrichti*) inhabits sparsely covered, mossy areas in algific talus slopes where it feeds upon leaf litter – primarily birch (*Betula spp.*) and mountain maple (*Acer spicatum*) (Frest 1991).

3) **First Ring Zone** has taller hydrophilic species and more robust forms of species seen in the centric zone, these include: touch-me-not (*Impatiens capensis*), swamp saxifrage (*Saxifraga pensylvanica*), northern oak fern (*Gymnocarpium robertianum*) and dwarf raspberry (*Rubus pubescens*).

4) **Second Ring Zone** is marked by the first appearance of low northern black currant (*Ribes hudsonianum*) and alder-leaved buckthorn (*Rhamnus alnifolia*). Red raspberry (*Rubus strigosus*) is very abundant here.

APPENDIX 3. Continued.

5) **Outer Ring Zone** is comprised of mesic shrubs typical of such aspects in the region: high-bush cranberry (*Viburnum trilobum*), red-berried elder (*Sorbus pubens*), round-leaved dogwood (*Cornus rugosa*), and pagoda dogwood (*Cornus alternifolia*). Yellow birch (*Betula alleghaniensis*) and balsam fir (*Abies balsamea*) are first observed here. This zone is recognized as northern hardwood-conifer forest when large enough to be mapped separately.

6) **Surrounding Mesic Forest** has trees of normal stature, for example, species characteristic of maple-basswood or mesic oak forest. White pine (*Pinus strobus*) trees growing on bedrock are considered to be in this zone.

All of these features are present within the park's Ecological Area. The macrosite contains the complete system of cold-producing karst expressing the entire array of variation in cold habitats and the species they support. Efforts should be directed toward protecting the entire system.

The Ecological Area supports four of the seven known Minnesota populations of the State-endangered, Iowa Golden saxifrage - an ice-age relict on algific talus slopes that is more characteristic of the boreal regions in western Canada. One of the populations of Iowa golden saxifrage is thought to be the largest in the Paleozoic Plateau (Ostlie pers. comm.). There are also a number of plant species which are more common in northern Minnesota. Their presence within the Ecological Area is considered to be ecologically significant:

alder-leaved buckthorn (*Rhamnus alnifolia*)
balsam fir (*Abies balsamea*)
bunchberry (*Cornus canadensis*)
high-bush cranberry (*Viburnum trilobum*)
mountain ash (*Sorbus americana*)
naked miterwort (*Mitella nuda*)
northern black current (*Ribes hudsonianum*)
northern oak fern (*Gymnocarpium robertianum*)
panicled lungwort (*Mertensia c.f. paniculata*)
pink-flowered pyrola (*Pyrola asarifolia*)
small enchanter's nightshade (*Circaea alpina*)
yellow birch (*Betula alleghaniensis*)

Rare species such as Iowa golden saxifrage occur in Minnesota only in the coldest of these habitats and, hence, are very rare in the Midwest. The presence of Iowa golden saxifrage, as well as, several other associated species that co-occur together are biological anomalies whose presence within the Paleozoic Plateau are difficult to explain except through the glacial history of the area. They occupy small habitats, isolated and from each other in several valleys on both sides of the Mississippi in four states. It is likely that these species were part of the spruce boreal forest once widespread throughout the upper Midwest. As the climate warmed, populations of these plants and land snails must have diminished throughout the area, yet they have persisted on the cold producing karst systems since the last ice age and, therefore, are thought to be glacial relicts (Frest 1991, 1987).

Rare Land Snails

Most of the rare land snails found on algific slopes and maderate cliffs occur in no other known habitat (Ostlie 1990). The four snails described below inhabit distinct microhabitats within cold-producing areas of the Ecological Area. The presence of these snails on cold-producing karst habitats provide the most compelling evidence that modern populations of some species of plants and snails are Pleistocene relicts – that is they are decedents from populations that had a wider distributions during the maximum extent of the Wisconsin glacier (Frest 1987).

APPENDIX 3. Continued.

Snails of the genus *Vertigo* have been frequently found as fossils in glacial sediments in Midwest areas peripheral to the Wisconsin glacier (Frest 1987, Frest 1991, Frest and Dickson 1986). They were presumed extinct until their discovery within the Paleozoic Plateau in 1980 on algific talus slopes (Frest 1981). Extant populations were thought to be restricted to the Paleozoic Plateau, however, populations on similar habitats have been recently found on the Niagaran escarpment in northeastern Wisconsin (Nekola et al. 1996). Snails of the genus *Novisuccinea* are presently known to be extant on cold-producing limestone and dolomite cliffs in the Paleozoic Plateau of Iowa and Minnesota. *Novisuccinea* fossils have been found in the Loess Hills of southwest Iowa (Frest 1991). The following descriptions are summarized from Frest (1991).

Minnesota Pleistocene Ambersnail (*Novasuccinea n. Sp.* Minnesota A) is generally confined bedrock strata containing seep and vent opening areas on the lower portions of maderate cliffs in Galena bedrock. Typical colonies are elongate, narrow and positioned on different stratigraphic planes along the cliff face. All known sites are maderate cliffs, although snails are found on algific talus at certain locations. The subspecies is sometimes found in talus but not over nine feet from the cliff. This snail is tolerant of seasonally dry conditions and avoids nearby seep and spring areas. Fossils of this species have been found in late Pleistocene loess (Wisconsonian glaciation) in western Iowa. As of 1991, the subspecies is known for 13 sites, most of which are in Fillmore and Olmsted Counties, MN, a few sites are in Winneshiek County, IA (Frest 1991).

Iowa Pleistocene Ambersnail (*Novasuccinea n. sp.* Minnesota B) are known from Galena maderate cliffs, but not on algific talus slopes except at sites where both are present. Habitat requirements are similar to those of the Minnesota Pleistocene ambersnail, except that the Iowan subspecies tolerates drier situations. As of 1991, Iowa Pleistocene Ambersnail was known at 17 sites in Minnesota and Iowa. Fossils of this snail were found in Wisconsinan loess of southwest Iowa (Frest 1991).

Midwest Pleistocene Vertigo (*Vertigo hubrichti hubrichti*) is most common on the cold, undisturbed and well-forested algific sites where it typically occurs in small patches of decaying deciduous tree leaves (most often paper birch (*Betula papyrifera*) and mountain maple (*Acer spicatum*). Often the snails are in or immediately near cold vents in areas sparsely covered by moss (but never in complete moss coverage with no bare ground or rock). It does not occur in open talus. The species occurs less abundantly on maderate cliffs. As of 1991, there are a total of 23 sites for this subspecies in Minnesota, Iowa and Wisconsin. Fossils of this subspecies have been extensively found in Nebraska, Iowa, Illinois, Missouri, Indiana and Kentucky (Frest 1991).

Variable Pleistocene Vertigo (*Vertigo hubrichti variabilis n. Subsp*) is most abundant on the colder undisturbed and well-forested algific sites, where it occurs in small patches of decaying deciduous tree leaves, most often paper birch and Mountain maple. Often it is in front of open vents. This taxa avoids moss and fern covered areas, occurring in sparsely vegetated situation on large maderate cliffs especially in disturbed areas such as rodent runs. It is also found in forested portions of large algific sites particularly along cold cliff bases (Frest 1991).

APPENDIX 3. Continued.

Tree Species

Balsam fir *(Abies balsamea)*
Yellow birch *(Betula alleghaniensis)*

Characteristic Shrub Layer

Alder-leaved buckthorn *(Rhamnus alnifolia)*
American hornbeam *(Carpinus caroliniana ssp. virginiana)*
American mountain-ash (*Sorbus americana*)
Bebb's willow *(Salix bebbiana)*
Canada yew *(Taxus canadensis)*
Dwarf blackberry *(Rubus pubescens)*
High-bush cranberry *(Viburnum trilobum)*
Northern black currant *(Ribes hudsonianum)*
Pagoda dogwood *(Cornus alternifolia)*
Prickly gooseberry, dogberry *(Ribes cynosbati)*
Red-berried Elder *(Sambucus pubens)*
Red raspberry *(Rubus strigosus)*
Round-leaved dogwood *(Cornus rugosa)*
Wild black currant *(Ribes americanum)*

Characteristic Forb Species

Bulblet fern *(Cystopteris bulbifera)*
Bunchberry *(Cornus canadensis)*
dwarf raspberry (*Rubus pubescens*)
Dwarf scouring-rush *(Equisetum scirpoides)*
Fragile fern *(Cystopteris fragilis)*
Hairy rock-cress *(Arabis hirsuta var. pycnocarpa)*
Iowa golden saxifrage *(Chrysosplenium iowense)*
Miterwort, naked bishop's-cap *(Mitella nuda)*
Moschatel *(Adoxa moschatelliana)*
Nodding wild onion *(Allium cernuum)*
Northern oak fern *(Gymnocarpium robertianum)*
One-sided pyrola *(Pyrola secunda)*
Pale touch-me-not, jewel-weed *(Impatiens pallida)*
Pink-flowered pyrola (*Pyrola asarifolia*)
Protruding fragile fern *(Cystopteris protrusa)*
Rock-cress *(Arabis perstellata var. shortii)*
Rosey twisted-stalk *(Streptopus roseus)*
Slender cliff-brake *(Cryptogramma stelleri)*
Small enchanter's nightshade *(Circaea alpina)*
Swamp saxifrage *(Saxifraga pensylvanica)*
Tall lungwort *(Mertensia paniculata)*
Twinflower *(Linnaea borealis)*
White camas *(Zigadenus elegans)*

Characteristic Graminoid Layer

Ivory sedge *(Carex eburnea)*
Peck's sedge *(Carex peckii)*
Pointed wood-rush *(Luzula acuminata)*
Rough bent-grass *(Agrostis scabra)*

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