



**NATURAL
RESOURCES
INVENTORY**
**LOWER WELLS
CREEK
WATERSHED**

JUNE 2001



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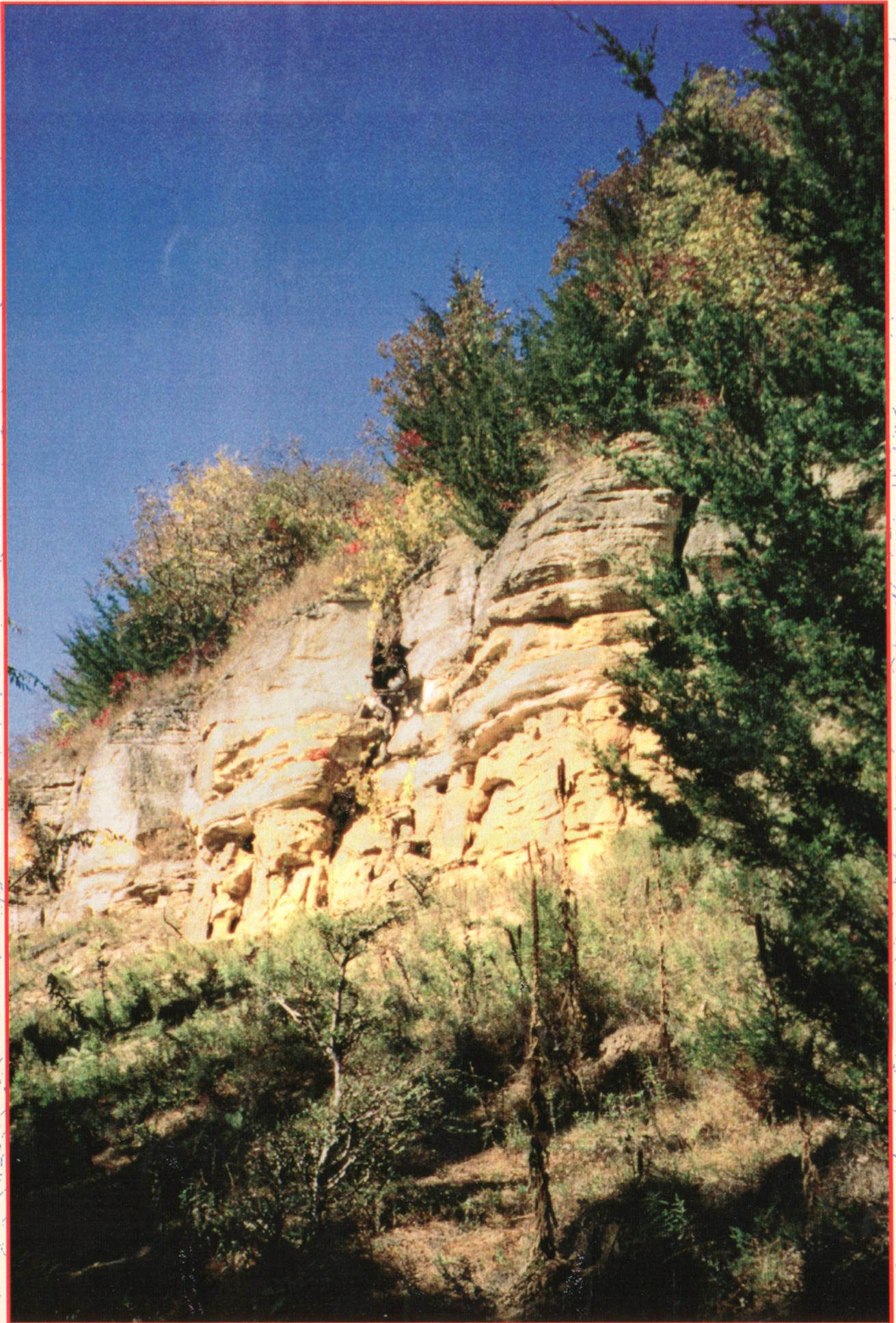


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Most importantly, the residents and landowners of the watershed!



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1. INTRODUCTION

The citizens of Lower Wells Creek Watershed (LWCW) have demonstrated a strong interest in maintaining the quality and values found within the watershed and the nearby communities. One clear example of this interest is involvement in the Wells Creek Watershed Partnership, a partnership of private landowners and public agencies developed to foster local stewardship and management of natural resources. The quality of life here is due in large part to the values that come with being part of a rural, largely agricultural community. Other values are associated with natural amenities such as the Mississippi River, breathtaking blufflands, and their associated forest, prairies, and wetlands. These natural areas contribute to the quality of life in Lower Wells Creek Watershed by providing opportunities for active and passive recreation and by providing such functions as fish and wildlife habitat, stormwater infiltration, erosion control, and in many cases, generation of income. The condition of these natural areas influences the quality of life, and will become increasingly important as this area receives increased development pressure.

This natural resource inventory covers an area of approximately 6,000 acres, defined by the watershed boundaries on the north and south sides, County Highway 5 on the upstream portion, and the Mississippi River on the northeast.

Many areas in Minnesota have lost the high quality natural resources that remain in Lower Wells Creek Watershed, and are seeking to protect the remaining fragments or in some cases undertake restoration projects. Once lost or severely degraded, most communities are very difficult to reconstruct or restore to full functionality. The staff and officials of Goodhue County, Minnesota DNR, and the Wells Creek Watershed Partnership have acknowledged the need to inventory and plan for the significant natural areas that remain in the watershed today. This enables landowners and government officials to effectively integrate these



features into the decision-making process as land use activities and infrastructure change through time.

The characteristics of this particular watershed are found nowhere else in the world. Similar landscapes are found in the blufflands region of Southeast Minnesota, Western Wisconsin, and Northeast Iowa, but each watershed offers variations from their apparent similarity. This uniqueness makes the Lower Wells Creek Watershed ecologically different from any other place on earth, and very importantly, provides a *sense of place* or home to its residents. The residents of the Wells Creek Watershed have already developed a strong forum for the exchange of ideas relating to the wise use of the landscape upon which they live. The natural areas around them inspire admiration, and in many cases, provide a source of income. As part of the recommendations of this Report, we have suggested several sites containing high quality natural communities, threatened and endangered species, watercourses, wetlands, and steep slopes worthy of special management and protection.

For the purposes of this inventory "natural areas" are geographic units in which the dominant plants and animals are native or indigenous to the Blufflands Region of Southeast Minnesota.

The term "natural community" is also used in this report. A "natural community" is a distinctive group of plants and animals that usually occur together, and are native to the area, such as a bedrock bluff prairie or dry oak forest. Each of the "natural areas" may contain one or more "natural communities".

While many areas of the watershed, including farms and rural residential properties, have some ecological and historic value, this inventory was designed to focus only on the most natural areas (that is, those least disturbed by human activities). Where cultural features occur in natural areas, they are evaluated as part of the Natural Resources Values Criteria evaluation methodology and are referenced in the natural area site descriptions.

This inventory and its recommendations suggest that the natural areas of Lower Wells Creek Watershed be evaluated on an ecological basis. Simply put, an ecosystem (or "habitat") is where things live. An ecosystem includes the interacting group of physical elements (soil, water, etc.) and



biological elements including plants, animals, and human communities. All of these elements and their linkages are considered in the inventory and recommendations for the natural areas in Lower Wells Creek Watershed. This approach focuses on protecting and managing all parts of the ecosystem rather than focusing on a single species or area of the watershed.

Managing on an ecosystem basis integrates scientific knowledge and human values toward a general goal of sustaining the greatest ecological function of the landscape in the Lower Wells Creek Watershed. Science suggests that a key measure of ecosystem health is the diversity of native plants and animals present in a given area. Healthy, diverse ecosystems are a desirable goal because they provide for the basic needs of all living things, and allow the landscape to adapt to changing conditions. Urbanization and other human activities typically reduce the native diversity of landscapes, replacing woodlands and prairies with lawns, and boulevards planted to nonnative trees, shrubs, and grasses. Landscapes dominated by nonnative plants often have difficulty surviving times of drought and disease. In addition, the unique local plant communities, once lost, leaves a landscape no longer expressing local character. A key element of this plan is retaining areas of diverse natural communities that maintain a healthy and inspirational landscape, and can express the unique history of Lower Wells Creek Watershed.

Overall Goal of Natural Resource Management

To protect and enhance the health of natural areas, so they may be enjoyed by future generations. This natural resource inventory is part of attaining that goal and provides the information for effective natural resource management, and the potential to further diversify the local economy.

Objectives

The specific objectives identified for this inventory are:

- To identify and inventory significant natural areas within the study area.



- To develop criteria and a practical evaluation methodology to evaluate the inventory results from an ecological and local perspective.
- To use the evaluation methodology to rank natural communities according to their ecological values.
- To develop recommendations for management and protection of the natural resources based on ecological and local values.
- To develop creative alternatives for protection and linkage of natural areas.

Rationale for Managing Natural Resources

There are many reasons why it is important to manage natural resources in largely rural areas such as the Lower Wells Creek Watershed. Some of the most important reasons are:

- Native plant and animal species and natural communities have evolved together for a long time, and are particularly suited to this environment. Over the long term, they will maintain a healthy landscape that can adapt to disease, weather extremes, or other natural disturbances, and should require less management than species that are less suited to the environment of the area. These attributes make native plants and their maintenance regimes better suited than nonnatives to many agricultural and forestry applications. These species and natural communities offer a varied and interesting environment that illustrates the unique history of the area, and provides diverse opportunities for recreation and education.
- The high quality natural communities that occur in the Lower Wells Creek Watershed are rare in Minnesota and the Upper Midwest. These communities are worth protecting and enhancing because they are rare. Once these areas are severely degraded, they are difficult to restore to natural condition, and nearly impossible to completely reconstruct. High quality areas can also serve as sources of native seed for restoration of degraded areas.



- Urban and rural residential developments adjacent to high quality natural areas typically command higher real estate prices than those without such amenities. These properties also tend to hold or increase their value over time, as high quality natural areas become scarcer on a regional basis. For example, some corporations look for such nearby amenities when locating headquarters or to provide a high quality setting for their businesses.
- Integration of natural areas and their management into the diversification of rural and agricultural economies. The sound management of natural areas for their overall quality is often consistent with the goals of agriculture and forestry. For example, in forests, well-planned timber cutting and/or prescribed fires have the potential to improve forest composition, and rate of growth of canopy trees by removing weedy shrubs and trees that cause increased competition for available nutrients and water. Also, regular fires on prairies reduce brush invasion and can increase seed and forage production. This increase in seed production can be a source of income through the collection of native seed for sale.

Guiding Ecological Principles

Some ecological principles that are important components of protecting or enhancing natural areas in the watershed include the following:

- The health of natural communities depends on their size. In general, smaller and more fragmented communities support fewer species, are more vulnerable to extinction and invasions, and are less able to maintain or recover their diversity, particularly if other sources of native populations are not available nearby. Planning, therefore, emphasizes improving connectivity, avoiding fragmentation of contiguous habitats, protecting natural waterways, buffering natural areas, and identifying critical habitats. Connections between communities along natural corridors may help to maintain diversity and health by allowing plants and animals to migrate and reproduce.
- People are part of nature. The decisions and actions of humans have been a major force shaping the natural



resources of Lower Wells Creek Watershed. Humans and their values must be an important component in shaping the future of natural areas in the Watershed. Planning for integration of agricultural, rural residential, and commercial land uses with natural areas must consider the use of buffers, recreational uses, and educational opportunities provided by natural areas.

- Species are interdependent, and our knowledge of all the interactions within natural communities is limited. Planning should be focused on maintaining healthy natural communities and the processes that sustain them and "saving all the parts", since we don't always understand how all components function.
- Introductions of exotic species (plant and animal species not native to the area) reduce native diversity, the quality of habitat, and the health of natural areas. Exotics should be excluded or controlled. Appropriate methods for controlling exotic species include cutting, burning, herbicide application, and biological controls.
- Planning should consider ecological boundaries and long timeframes. Some of the health of natural areas will be influenced by surrounding areas. For example, the activities in the bluff tops have a direct influence on the quality of habitats within Wells Creek and the abandoned channel of the Mississippi River. Areas along the bluff terraces are part of a major migratory corridor for songbirds; therefore, the ways in which Lower Wells Creek Watershed and its residents care for the landscape can partially influence the function of other natural areas, some as far away as South America. These connections should be understood to assist the Watershed Partnership in planning for its own resources.



Executive Summary

This report presents the Natural Resources Inventory for the Watershed of Lower Wells Creek. The Study Area for this Natural Resource Inventory encompasses approximately 13,000 acres within the Watershed of Lower Wells Creek in Goodhue County, Minnesota. The Study Area is defined by the watershed boundaries, with the south/west extent being County Highway 5 and the north/east extent being the Mississippi River.

This inventory was designed to focus on the most natural areas within the project area (those least disturbed by human activity) for the purpose of study and planning. By using a variety of tools, including infrared aerial photographs, MN Natural Heritage Database, and National Wetlands Inventory, it was possible to identify areas suitable for field investigation. These sites were then visited in September and October, 1998, to inventory plant species and to classify and qualitatively rank natural communities.

The system used for the classification and ecological ranking of the identified communities is the same one used by the MN DNR, County Biological Survey (MCBS). The MCBS is a program that is nationally recognized for its exceptional work, and the classification and ecological ranking system it has developed. By using this system to identify natural areas, the watershed has a technically sound set of information that can be used and easily interpreted by other natural resource professionals in the future. Another part of the inventory process included overall natural resources evaluations, and recommendations for the ecologically sound management of individual community types, with an eye toward their perpetuation.

Recommendations for maintaining the quality of natural resources in Lower Wells Creek Watershed are made with farm operators, rural residential landowners, and public land managers in mind. These recommendations suggest how each of us can play a positive role as stewards of the land. Since many of the natural communities identified in this Report will be managed by farm operators and rural residential landowners, it is important for this information to be shared with all residents of the watershed. The information provided in this Report will help landowners make informed decisions about management of their property and the effects that management has on human and natural neighbors.

The most extensive portion of this Report is the natural community inventories for each of the 8 geographic management sites in the study area. There are 9 different natural community types identified on about 13,000 total acres in the study area. The most extensive natural community type is oak forest, followed by oak woodland-brushland. The Study Area also includes a significant acreage of bedrock-bluff prairie along the numerous south and west-facing bluffs. Other natural communities documented in the Study Area include floodplain forest, lowland hardwood forests, shrub swamp, emergent marsh, and moist and dry cliffs. The balance of the Study Area, not natural communities, is dominated by agricultural and rural residential land uses. Wells Creek is the defining resource for the watershed. It provides a critical corridor between the Mississippi River and large contiguous natural areas within the watershed and historically has supported a trout fishery.

The Lower Wells Creek Watershed is fortunate to have the high quality natural resources that define it today. The oak forests, prairies, and bluffs provide remarkable beauty and breathtaking views throughout the seasons. This report provides information upon which sound decisions regarding natural resources can be made. These decisions must serve to integrate varied interests and land use potentials with the greater goal of a sustainable rural community and economy, which strongly hinge on the quality of natural communities.

I. Introduction

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II. NATURAL COMMUNITIES OF LOWER WELLS CREEK WATERSHED

The following is a brief description of the major natural community types that currently exist in Lower Wells Creek Watershed. The descriptions draw from field surveys in Lower Wells Creek Watershed, and from resources in Minnesota's Native Vegetation: A Key to Natural Communities (1993), and Minnesota's St. Croix River Valley and Anoka Sandplain: A Guide to Native Habitats (1995).

Prairie and Savanna Communities

Bedrock Bluff Prairies - Lower Wells Creek Watershed is fortunate to have many good quality prairies, many of which are still connected. Bedrock bluff prairies are grassland communities with grasses and forbs (other flowering, nonwoody plants) usually less than 30 inches high. The plants grow on thin soil over bedrock. A few shrubs such as red cedar, smooth sumac or sand cherry may be interspersed with the grasses and exposed rocks. Fires, wind erosion, and rodent burrows may regularly disturb these sites and help to maintain the native flora. Characteristic plants may include silky aster, harebell, prairie larkspur, pasque flowers, side oats grama, little blue stem, and plains muhly and junegrass. Rock outcrops are also common in these communities and host plants such as smooth cliffbrake fern, lyre-leaved rock cress, columbine and harebells. Common birds may include Eastern kingbird, meadowlark, and goldfinches. Common animals may include ground squirrels, American toads, and garter snakes, as well as the state threatened Timber rattlesnake. Aggressive weeds such as white sweet clover and leafy spurge, and woody plants such as eastern red cedar, prickly ash, and buckthorn may cause management problems. These species often invade bluff prairies following disturbance from grazing or following long periods where there is an absence of fires.

Sand-Gravel Prairies - Intact sand-gravel prairies no longer exist in the Lower Wells Creek Watershed area. Prairie plantings in old fields that are found on Mississippi River Terraces have the best potential for fitting into this classification. These will recover slowly and their return to high quality may be measured in decades, even with intense management. Sand-gravel prairies typically occur on well-drained periglacial deposits largely composed of coarse sands and gravels, such as river terraces. Sand-gravel prairies are open grasslands with patches of forbs, and exposed soil areas that are often created by a combination of wind erosion and animal burrowing and digging activities. Sand-gravel prairie development has also been influenced strongly by periodic fires and drought. They tend to favor plant species dependent on fire for regeneration and those capable of withstanding drought conditions. Typical woody plants

include smooth sumac, wild rose, and leadplant. Characteristic graminoids and forbs include indian grass, side oats grama, prairie dropseed, and junegrass. Characteristic forbs include rough blazingstar, grey goldenrod, stiff goldenrod, large-flowered penstemon, hoary puccoon, butterfly weed, and large-leafed pussy-toes. Common animal species include mourning dove, field sparrow, western meadowlark, pocket gophers, red fox, American toad, and garter snakes. Threats include invasion by nonnative grasses, such as Kentucky bluegrass and smooth brome, and invasion by woody plants.

Wet Prairies - Although not currently documented in this study area, wet prairies would have historically occurred here; particularly along portions of Wells Creek. Wet prairie is an open, shallow wetland community covered with patches of grasses and sedges up to 36 inches or more in height. Forbs and shrubs occur in scattered patches. Common shrubs include slender willow and red-osier dogwood. Forbs include cup plant, pale-spiked lobelia, culver's root, bedstraws, great st. johnswort, asters, prairie blazingstar, and tall meadow rue. Common graminoids include big bluestem, prairie cordgrass, blue-joint, and sedges. Common bird species include song sparrow, red-wing blackbird, and American goldfinch. Animals include shrews, voles, mice, and a variety of frogs, toads, and salamanders. Nonnative pasture grasses such as bluegrass and reed-canary grass have often been introduced in these areas and become dominant in disturbed areas. In the absence of fires, shrubs may dominate some areas and changes in hydrology or water quality associated with urban development degrade wet prairies and encourage domination by exotic and aggressive plant species.

Dry Oak Savanna - These are relatively open communities of scattered, generally short, open-grown bur oaks above a layer of grasses and forbs. Trees may be widely scattered, and found in groves with hazelnut or oak brush. Natural disturbances such as gopher mounds and badger excavations are common. Common plant species include the tree species bur, pin, and black oak; the forbs prairie rose, leadplant, wild lupine, butterfly weed, purple prairie clover, bird-foot violet, northern bedstraw, and various asters. Common grasses include little bluestem, big bluestem, prairie dropseed, and other short grasses. Common animal species include mourning dove, indigo bunting, sparrows, squirrels, pocket gophers, and white-tail deer. Grazing or farming activities, which reduce grass and forb species diversity and encourage exotics such as leafy spurge, european buckthorn, and sweet clovers, has often degraded these areas. Regular fires before settlement maintained these communities, and cessation of fires encourages the spread of woody shrubs such as sumac, prickly ash, european buckthorn, and red cedar. Many areas of Lower Wells Creek Watershed which historically contained oak savanna have today succeeded to oak woodland or forest. This succession has largely been brought about by the absence of fires; and differences in grazing influences between elk, and domestic cattle.

Forest Communities

Dry Oak Forest - A deciduous forest with oaks mainly under 50 feet, few subcanopy trees, a dense shrub layer, and patchy ground layer of moderate diversity. Typical canopy trees include pin and bur oak, with open-grown trees often common. Black cherry, trembling aspen and paper birch are common in the subcanopy. The shrub layer typically includes hazelnut, gray dogwood, gooseberry, and raspberries. The ground layer includes Virginia creeper, wild grape, bracken fern, wild geranium, Pennsylvania sedge, and a variety of spring ephemeral flowers. Typical animal species include woodpeckers, chickadees, vireos, chipmunk, squirrels, and white-tail deer. Past logging may be indicated by absence of larger, single-stem trees and woody debris. Grazing and fragmentation by roads and trails often reduce diversity of shrub and ground species in forest communities, and encourage invasion by non-native plants. European buckthorn, prickly ash, and tatarian honeysuckle are particular problems in dry oak communities.

Mesic Oak Forest - Canopy trees are typically taller in mesic oak forest than in dry oak forests, and pin oak is replaced by red oak in the canopy. Large, single-stemmed trees more than 15 inches in diameter are common, with a variety of woody plants at all heights, and a mixed ground layer of seedlings and forbs (broad-leaved flowering plants). Common tree species include white, red and bur oak, with basswood, ironwood, butternut, bitternut hickory, black cherry, birch, and sometimes musclewood, in the subcanopy. Shrubs may include chokecherry, hazelnut, silky and pagoda dogwood, and other fruiting shrubs. The ground layer frequently includes wild grape, Virginia creeper, poison ivy, wild geranium, black snakeroot, and a variety of ferns and spring ephemerals, such as round-lobed hepatica. Animals are typical of those found in other oak communities, including songbirds, flycatchers, bluejays, chipmunk, squirrels, white-tail deer, and a variety of frogs and American toad. Past logging and grazing may have removed canopy trees and reduced diversity in ground flora. Buckthorn and tatarian honeysuckle are common invaders. Although not common in this area, oak wilt may spread in disturbed stands, particularly in areas of active construction or late spring/early summer cutting.

Oak Woodland-Brushland - Oak woodland communities are former savannas characterized by a patchy canopy (intermediate between savanna and forest) dominated by open-grown bur and pin oaks, with a pronounced shrub layer containing oak seedlings and sprouts. Oak brushland can have a shrub layer dominated by multiple stemmed oak “shrubs” caused by frequent top-killing of the stems, often by intense fires. The ground layer includes herbs and other woody plants characteristic of both dry oak forests and prairie communities. Fire scars may be evident on older trees. Common plants include bur, red and pin oaks, hazelnut, gray dogwood, and other fruit bearing shrubs, such as Virginia creeper, leadplant, hog peanut, bracken fern, pointed-leaf tick trefoil, and woodland sunflowers. Animals include mourning dove, catbird, indigo bunting, squirrels, coyotes, and white-tail deer. These communities have often been degraded by grazing, soil compaction, and suppression of fires. These activities lead to invasion by exotic species

such as Kentucky bluegrass, European buckthorn, tatarian honeysuckle. In the LWCW, the presence of these exotic species has significantly reduced species diversity of Oak Woodland - Brushland communities. Also of concern to the integrity of Oak woodland-brushland in the LWCW are elm saplings, eastern red cedar, and aspen.

White Pine-Hardwood Forest – A mixed deciduous-conifer forest with a more or less continuous canopy. At least 30 percent of the canopy is composed of white pine, which form a supercanopy over 80 feet in height. The deciduous canopy, typically 50-80 feet tall, commonly has red oak, bur oak, and red maple. The shrub and herb layer of this forest type can be quite variable, but are usually represented by species typical of other forest types in the area. Similarly, animal species of this community type are similar to other mesic forests in the area. In the LWCW, no remnants of native white pine-hardwood forest exist. A small remnant does exist just outside the watershed on a terrace south of Wells Creek. Although the pines appear to have been planted it was classified as such because it fits the community characteristics very well and has at least partial function of a remnant community of this type.

Lowland Hardwood Forest - A deciduous forest with a variable canopy coverage from 50 to 100 percent. Lowland hardwood forests occur on mineral soils and are most often found in ravines, stream terraces, and at the base of north-facing slopes in the LWCW. Common tree species include, green ash, american elm, eastern cottonwood, basswood, and bur oak. Subcanopy trees may include ironwood, red elm, and boxelder. Common shrubs include red osier dogwood, pagoda dogwood, prickly ash, hazelnut, and gray dogwood. The ground layer often has a mix of upland and wetland species and may include Virginia creeper, ferns, sedges, woodland horsetail, green-headed coneflower, and jack-in-the-pulpit. A wide range of common forest animals and birds use these forests as habitats. Lowland hardwood forests have typically been degraded first by grazing or draining, and later by the subsequent invasion of exotic plant species such as european buckthorn and reed canary grass. Logging and trail development can also fragment these areas and spread exotic species.

Wetland Communities

Floodplain Forests - These forests have patchy to closed canopies (10-80 percent canopy cover) of large trees, which may be more than 70 feet in height. Vines are often common, but shrubs are typically absent. The ground layer is generally quite sparse and may include grasses, sedges, and forbs, often in large, single-species patches. Evidence of stream processes such as old oxbow ponds, channels as well as fallen trees, debris piles, and dead logs are common. Typical canopy trees include silver maple, green ash, black willow, and eastern cottonwood. Common plant species include wild grape, Virginia creeper, wood nettles, various sedge species, and cardinal flowers. Common animal species include red-bellied woodpeckers, black-capped chickadees, nuthatches, vireos and redstarts, raccoons, treefrogs and spring peepers. Threats to

these communities include erosion from upland areas, stormwater runoff and accompanying sediments and pollutants, and alterations in hydrology or shorelines. Floodplain forests were once common along the Mississippi River. Many of these forests were inundated and subsequently eliminated in the lower portions of dam pools following construction of the Lock and Dam system on the Mississippi River.

Mixed Emergent Marsh - These marshes are open wetland communities dominated by grasses and forbs, but with cattails being less than half of the vegetative cover. The area may include open water pools and channels containing floating or submerged plants. These marshes are found particularly along the margins of rivers and lakes. Common graminoid species include blue-joint, soft-stem bulrush and sedges. Common forbs include boneset, joe pye weed, smartweeds, and water plantain. Common animal species include geese and ducks, redwing blackbirds, common yellowthroat, muskrat, raccoons, and a variety of frogs. Threats to these communities include hydrologic changes from draining, ditching, and dams. Excess runoff of nutrients and sediments from agricultural and urban land uses, and water table fluctuations also threaten these communities. These actions frequently lead to invasion by exotic species such as reed canary grass, cattail, and purple loosestrife. Mixed emergent marsh wetlands possibly occurred in some side valleys and along the lower reaches of Wells Creek. Because these communities have always been rare in the LWCW, they take on added significance as natural communities.

Cattail Marsh – Cattails dominate over half the vegetation in these open wetlands. The cattails may be rooted or floating in large mats. Open water pools and channels are often present, with floating or submerged aquatic vegetation. While cattails are the dominant plant, these communities commonly include swamp milkweed, touch-me-not, arrowhead, beggar ticks, and joe pye weed. Animals include geese, ducks, red-wing blackbirds, songbirds, muskrats, raccoons, frogs, and toads. Threats to these communities include hydrologic alteration from ditches and dikes, nutrient-rich runoff, and invasion by exotic plants such as purple loosestrife. One small cattail marsh was documented in the LWCW. It was likely part of the conveyance of surface water prior to ditching of the side valley in which it occurs.

Wet Meadow/Rich Fen - Open, shallow wetland communities with a cover of sedges or grasses. Forbs are often inconspicuous. Shrubs may include willows in clumps. Sedges may form raised tussocks composed of roots. These communities may be flooded in the spring, with water levels receding during the growing season. Common plants may include blue-joint grass, tussock sedge, and lake sedge. Other characteristic plants include woolgrass, blue vervain, meadowsweet, and blue flag iris. Common animals include song and swamp sparrows, redwing blackbirds, songbirds, shrews, mice, raccoons, and a variety of frogs and toads. Grazing, haying, changing hydrology, and nutrient-rich runoff may degrade these areas and encourage invasion by

exotic species such as reed canary grass and purple loosestrife. The two community types are similar, with rich fens often dominated by wiregrass or tussock sedge. Wet meadow/Rich fens in the LWCW were likely found along portions of Wells Creek and its side valleys. This community type is mostly found in the abandoned channel of the Mississippi River now and mapped as part of a larger shrub swamp. These channels have been invaded by purple loosestrife and reed canary grass. Native shrubs are also encroaching on this channel.

Shrub Swamp, Seepage Subtype – These subtypes are shallow wetland communities that typically occur in small to medium basins, and broad shallows along sluggish streams in Minnesota. In the LWCW, this community occurs on organic (muck) soils along the abandoned channel of the Mississippi River. It is found in a complex that also includes wet meadow, emergent marsh and calcareous fen. These are fed by springs and seeps within, and along the edge of the wetland. Common species in shrub swamps are a number of different willows including pussy willow and Bebb’s willow, as well as red osier dogwood. The ground layer contains species typical of wet meadow, including numerous sedge species, blue-joint grass, northern marsh and sensitive fern, and joe-pye weed. Shrub swamps often result from withholding of fire in wet meadows, allowing shrubs to colonize areas where fires had previously prevented their establishment.

Other Natural Communities

Dry Cliffs - Dry cliffs may be covered by a sparse vegetation community of lichens, mosses, and small herbs growing on steep slopes or exposed bedrock. Plants must be capable of tolerating extended dry periods and limited, low-fertility soils. Common plant species include harebell, columbine, cliff-brake, and woodsia ferns. Cliff cavities, particularly in Jordan Sandstone may be homes for a variety of birds and reptiles, such as belted kingfishers, phoebes, swallows, bats, lizards, and snakes. These cavities are particularly important for the State Threatened Timber rattlesnake as winter hibernacula. Threats to these communities include trampling, rock climbing, and road and urban development, which cause erosion. Dry cliffs occur frequently in the Lower Wells Creek Watershed area and are most commonly associated with rock outcrops on bluff prairies as well as some bluffs lines. Dry Cliff communities that occur within the study area are relatively small and were not mapped as separate areas.

Moist Cliffs - These cliffs support more dense vegetation than dry cliffs, including mosses, liverworts, ferns, and other herbs. They are generally in shady areas of north-facing slopes or narrow ravines. Moisture may be available from groundwater seeps or condensation on rock surfaces. Common plant species include conehead and umbrella liverworts, touch-me-not, and bulblet, fragile and polypody ferns. Animals may be similar to those found on dry cliffs, though reptiles do not find them suitable for basking. Phoebes, swallows, and bats are common animal residents of cliff cavities. Trampling, gully erosion, road construction, and other development

may cause erosion and encourage invasion by exotic species such as buckthorn. Occurring in only a few small locations in the Study Area, these were not mapped separately but mapped as part of other communities. These small areas are most closely associated with the mesic forests south of Wells Creek.

Conifer Plantations - Large plantations of conifers were often planted in rural portions of the Lower Wells Creek Watershed area after the 1930s because they were believed to prevent erosion. Often these are single species groves of red pines, planted closely together in rows, while in other cases, a mixture of species is planted. Some of the conifers that have been commonly planted in Lower Wells Creek Watershed include red pine, scotch pine, white pine, jack pine, white spruce, and tamarack. During the early years of a plantation, the ground cover continues as a field or prairie, as it was previously. Eventually, the shade created by the conifers and acid from needle drop eliminate most ground cover vegetation and the community's ground layer becomes highly simplified or bare. The plantations may provide shelter from wind, cover, and breeding areas for songbirds, owls, and other species, but also create a dense monoculture with low diversity. These dense stands require thinning with age to preserve the health of the trees.

Old Fields - Old fields is a term used to describe areas that were grazed or farmed, but where active cultivation has ceased. These often have a simplified vegetation community, dominated by smooth brome or other non-native grasses. A few prairie forbs such as yarrow and sunflowers may remain, and aggressive clonal plants such as goldenrod may form large, single-species colonies, which are characteristic identifiers for these areas. The fields may also include red cedar individuals or glades and tree saplings. While these communities may provide some food and cover for birds and other animals, they have a low diversity of native plants. Regular controlled burns may help to control non-native species, and bring back some native plants. These areas may be good candidates for prairie restoration or planting of oak/other tree seedlings.

III. Natural Resources Inventory Methodology

This natural resource inventory was completed on approximately 13,000 acres within the Lower Wells Creek Watershed, also referred to as the “Study Area” in this Report. The Study Area includes the area inside the watershed boundary east and north of County Highway 5 to the Mississippi River. The inventory identified 8 different mapping units, which are also referred to as sites in this Report. Within the 8 sites, a total of 128 individual natural communities, comprising approximately 6,000 acres, were field surveyed. All natural resource inventory sites and communities are shown on the Lower Wells Creek Watershed Natural Resource Inventory Map.

The Natural Resource Inventory Methodology includes the following steps:

1. Identification of Natural Area Sites and Delineation of Natural Communities;
2. Field Inventory of Natural Communities;
3. Classification of Natural Communities;
4. Ecological Ranking of Natural Communities;
5. Evaluation of Natural Resource Values; and
6. Evaluation of Aesthetic and Cultural Resource Values.

Identification of Natural Areas

The boundaries of natural areas and natural communities were delineated using stereo pairs of 1:15840 scale, infrared aerial photographs. All natural area and natural community boundaries, as well as any other relevant information, such as other biological surveys, was then drawn on overlay maps. At this time, a review of all existing information on natural resource features was conducted. This existing information included such sources as National Wetland Inventory Maps, DNR County Biological Survey data bases and maps, and MN Geological Survey reports.

Field Inventory of Natural Communities

The field inventory is a qualitative assessment of natural communities. The field survey included identification of major plant species in the canopy, subcanopy, shrub and ground cover of forest and woodland natural communities. In non-forested natural communities such as

wetlands or prairies, dominant grasses and forbs (other non-woody plants) were identified. The field inventory emphasized gathering data on disturbance indicators of natural communities. Disturbance indicators include invasion by exotic species, erosion, grazing and logging activities. This information provides a solid starting point both for understanding the present condition of the natural community as well as for developing future management objectives. Field work for this Report was conducted 22 September to 14 October, 1998.

Classification of Natural Communities

Minnesota's Native Vegetation, A Key to Natural Communities (Minnesota Department of Natural Resources, 1993) was used to identify and classify the natural areas sites. This key is the best available statewide guide to the classification of native plant communities. Field inspection indicated that some portions of the sites identified in the Lower Wells Creek Watershed are dominated by non-native vegetation, therefore, they are not classified in the Key. These areas were given common descriptive names to identify the plant community types, such as old field and Conifer plantation. Appendix A summarizes the natural community types found for each site in Lower Wells Creek Watershed, as well as documented plant species for each community.

Ecological Ranking of Natural Communities

To provide further information to the Watershed about the quality of natural areas that were surveyed, each natural community was assigned an ecological ranking, ranging from A to D, with "A" quality communities being the highest in ecological quality, and "D" communities being the lowest. Standard ecological criteria that are used to evaluate the health of natural communities were used to determine the quality rankings. These criteria include degree of native species diversity, age of trees, and amount of disturbance, such as invasion by non-native plant species. The rankings reflect how closely the community area being studied resembles an intact or pristine community of its type in the local area. The "A" quality communities are most like intact natural areas. The "D" quality communities have been highly altered from this standard. Due to the high level of human activity in urbanizing landscapes, "A" quality communities are rare. The rankings used in this report are based on the same set of criteria as those used by the Minnesota County Biological Survey in their statewide rankings.

Additional factors need to be considered by the Watershed and its residents to prioritize sites for management, such as surrounding land uses, suitability for active or passive recreational use, cost of restoration and management activities, and other criteria. This ranking is of ecological qualities only, and provides a starting point for evaluating natural areas in the watershed.

To summarize, the ecological rankings found on maps in this Report are:

- A A community of excellent quality – approaches pre-settlement condition
- B Good Quality – minimal disturbance
- C Fair Quality – significant disturbance, but restorable
- D Poor Quality – high level of disturbance; restorable, but only with a great deal of effort
- NA Ranking system does not apply / not restorable to original condition

Communities with excellent to good (A to B) quality, generally exhibit little disturbance and are high in species richness (number of species). For example, forest communities would be comprised of old growth trees and have a rich collection of shrub and ground cover species characteristic of the natural community type. Disturbances from human activities and invasion by nonnative shrubs such as buckthorn would be absent or minimal. Fair quality (C quality) natural communities have been disturbed by grazing farming, or other activities, but with proper management techniques such as prescribed burning, could be upgraded to a higher quality. Poor quality (D quality) natural communities are severely disturbed and can only be restored to a higher quality with considerable effort and expense.

Poor quality natural communities generally have had their characteristic plant species assemblage replaced by weedy native species or nonnative species. Communities assigned an NA do not meet minimum standards to be classified as a natural community. These communities are extremely altered from their original composition, or are human created environments such as conifer plantations and old fields. Ecological ranking for each community is summarized in Appendix A.

Evaluation of Natural Resource Values

Each of the eight sites was evaluated for Rare Feature Values, Natural Community Integrity Values, Wildlife Habitat Values and Aesthetic/Cultural Values. This evaluation was conducted at a site scale because these values are based on the overall quality of a natural area and how well the natural area is linked to other local and regional natural areas. Examples of this are the sites within the Mississippi River Corridor where individual sites receive direct wildlife habitat value. This value is derived from being within the Mississippi River Migratory Flyway where large numbers of bird species migrate each year. The following criteria were used to evaluate natural resource values for rare features, natural community integrity, wildlife habitat, and aesthetics.

Rare Features

Value	Criteria
High	Documented endangered species and/or natural communities within site boundaries.
Moderate	Documented endangered species and/or natural communities adjacent to site - high potential for endangered species to be present on site due to good quality habitat.
Low	No documented endangered species and/or natural communities within site boundaries - low potential for occurrence of endangered species.

Natural Community Integrity

Value	Criteria
High	Several natural communities with EO rank of BC or higher - good diversity of different natural communities.
Moderate	One or less natural communities with EO rank of BC or higher - moderate diversity of natural communities.
Low	All natural communities with EO rank of C or lower - large proportion of site consist of human created environments (e.g., agricultural land) - low diversity of natural communities.

Wildlife Habitat

Value	Criteria
High	High diversity of good quality natural communities within local or regional corridors (e.g., Mississippi River Flyway) and/or sites containing critical or unusual habitat (e.g., native prairie, waterfowl feeding areas). Observations and records indicate high abundance and diversity of species.

Moderate Good diversity of natural communities within local corridors. Habitat most suitable for habitat-generalist-type species (e.g., deer and raccoons). Observations and records indicate good abundance of wildlife.

Low Low diversity and quality of natural communities with poor connectivity to other wildlife habitat areas. Generally, areas of intensive agricultural or urban land use.

Aesthetics

Value

High

Criteria

Outstanding aesthetic resources such as scenic vistas, rock outcrops or unusual landscapes.

Moderate

Aesthetic resources are above average for Lower Wells Creek Watershed Area

Low

No significant aesthetic qualities for the region or watershed.

IV. RECOMMENDATIONS

Management Strategies for Natural Communities

Following are general management strategies for prairie, savanna, wetland and forest communities. These management strategies are intended to be general in scope; therefore more specific management recommendations may be necessary for individual natural communities and sites.

Prairie and Savanna Management

Prior to European settlement the health of prairie and savanna plant communities was maintained by the two dominant forces of fire and native grazers. Fires probably occurred annually to every few years on most sites. Some of these occurred naturally, while most were set by native peoples to aid hunting and other activities. Fires maintained the open structure of prairies by controlling the growth and spread of trees and shrubs, removing accumulated plant litter, warming the soil in spring, and returning nutrients to the soil. Following Euroamerican settlement, fires have been generally suppressed, leading to the spread of shrubs, trees, and exotic plants in prairie and savanna communities, and loss of diversity of native grasses and forbs. The activities of large and small mammals and insects also helped to maintain prairie communities by their grazing patterns, spreading seeds, burrowing to loosen soils, and pollination of flowering plants.

In addition to the suppression of fires, most prairies and savannas have been influence by long-term domestic cattle grazing. High stocking rates and long, intense pasturing periods generally reduces native forb richness and encourages the dominance of weedy plants (such as goldenrod and thistle) that are unpalatable to livestock. Other factors responsible for the decline of prairie and savanna communities includes tree planting, plowing and too frequent mowing.

Throughout the state, less than one half of one percent of the prairie and savanna landscapes that once existed in Minnesota remain. From an ecological perspective, the goal for managing the remaining remnants should be to maintain or restore as much of the original composition, structure and function as possible. This can be accomplished through controlling problem species; reintroducing of appropriate native plant materials; and re-establishing or mimicking the processes that helped to maintain these plant communities such as fire and well-planned grazing.

Prairie and savanna management should consider the following actions, as potentially appropriate for each site:

- Remove exotic species with appropriate methods. Cutting and herbicide treatment are typically most appropriate for tree and shrub species such as black locust, sumac, tatarian honeysuckle, and European buckthorn. Repeated herbicide treatments may be needed for other exotic species such as leafy spurge and reed canary grass.
- Remedy disturbance problems, where possible, by minimizing use of trails/field roads where erosion is occurring, reduce or rotate grazing to maintain plant populations, or other appropriate means. Grazing management may include using a paddock system where cattle graze intensely for very short periods of time and are rotated through pastures, or by using different livestock/breeds. For example, Scottish highland cattle have the potential to utilize thorny shrubs as forage in overgrown oak woodlands.
- Use prescribed burns to control cool season grasses and other exotics, remove accumulated plant litter, encourage germination from the seed bed, and to maintain the health of the prairie for the long term. Burns may be scheduled annually at first, and reduced to every 3-4 years, depending on amount of litter available to successfully support a burn. Vary the burn regime over the long-term to include both fall and spring burns.
- Well-planned and safely executed prescribed fire is often an effective and lowest cost means of accomplishing many goals for improving community quality. However, **prescribed fire should only be applied with the assistance of, or by trained and experienced persons.** The bluffs of the LWCW provide opportunities for management of landscapes with fire. Previously established logging and field roads, as well as grazed and plowed areas already in existence, can provide adequate firebreaks. Many of the tools used for agriculture can also be used in carrying out safe controlled burns, including sprayers, mowers, rakes, discs, and water tanks. Technical assistance may be available from the MN DNR and other interested parties on how to plan and carry out controlled burns successfully. Time and effort required are higher the first few times a burn is conducted on a site, but familiarity with techniques and specific site conditions make later burns easier and less time consuming. These activities can pay dividends in increased forage, brush control, native species richness, and increased seed production of native species. It may also help to reduce erosion in the long-term because of an increase plant stem density and root mass.
- If elimination of exotics and prescribed burns over several seasons fail to restore desired diversity, consider plant community restoration through overseeding of cut and burned areas,

or by seeding select areas. Prairies and savanna reconstructions may require maintenance through infrequent mowing or prescribed burn regimes (burning is preferred over mowing when possible). It is recommendable that use native seed from local sources (within 100 miles of wild population seed origin).

- In general, savannas should be burned less frequently than prairies and droughty sites burned less frequently than mesic or wet sites. Average burn frequency for the dry prairies and savannas that characterize LWCW is approximately three years, with a range of 1-20+ years. In addition, burn frequency should be nearly annual the first couple of years if control of invasive species is a management objective.
- In general, more frequent fires favor grass species and less frequent fires favor brush, trees and flowers.
- Seasonal timing can have a profound effect on species composition. Current information indicates that spring fires, conducted prior to April 15, tend to favor cool season grasses and summer-blooming forbs. Late spring fires (April 15 – June 1) tend to favor warm season (usually native) grasses and usually negatively effect forbs and tree/shrub species. Summer burns would mimic lightning set fires, and although these did occur, they appear to have been less of an influence on the presettlement landscape than human-set fires. Current information indicates that fall fires (after September 1) are most effective at maintaining a balance between grass and forb species and controlling brush. There is also reason to believe, based on historical records that frequent fall burns most closely mimic the presettlement burning pattern used by Native Americans in the Upper Midwest.
- Mowing can also be used on sites with adequate accessibility and low risk for site disturbance. Mowing somewhat mimics the effect of grazing and can give many of the benefits that prescribed burning can. Proper timing and techniques in mowing can be used to maintain a healthy balance between grasses and forbs.
- Management of native communities, especially prairie, must also consider effects on the animal populations that are dependent on the community. The influence of management activities i.e. burning are not completely understood on animals such as butterflies (invertebrates). To minimize the potential for devastating impacts on community obligate species and/or fire sensitive species, management should be carried out so as not to influence the entire area upon which these species depend. An example would be not burning an entire prairie at once; this would leave refugia for the species of concern and allow for potential recolonization of burned areas.

- Monitor the effectiveness of management activities, and changes in plant and animal species in managed areas. Adjust activities as needed based on monitoring results. This is an extremely important part of management and can not be overemphasized, particularly as it relates to agricultural and traditional forestry techniques applied to native communities. No formula or technological trickery can replace the value of understanding all the components of a landscape and adapting management in response to changes in natural communities.

Wetland and Management

Wetland plant communities are frequently altered or degraded by changes in hydrologic regimes associated with agricultural or urban development. Compared to intact natural communities, intense logging and farming, and urban development alter the quantity and quality of stormwater entering wetlands. This occurs through increasing stormwater runoff and associated sediments and nutrient loads, and by draining, filling and ditching wetlands. Agriculture and urban development can also alter groundwater flows, typically diminishing flows through withdrawals for drinking water or increasing the amount of impervious surface area. Altering these flows may de-water and alter seepage communities and fens.

Goals for wetland plant communities may include maintaining or restoring native plant communities and their species richness by re-establishing or approximating original hydrology and natural processes, and providing desirable wildlife habitat. Some communities with variable hydrology, such as cattail marshes and wet meadows, may be relatively easy to restore or enhance, while more specialized communities like fens and seepage swamps may be nearly impossible to restore if hydrologic conditions have been dramatically changed.

Some strategies for enhancing or restoring native plant communities in wetlands include the following:

- When possible, maintain or restore the natural hydrologic regime, limiting “bounce” from storm events and maintaining ground water flows. Use infiltration and vegetation strategies to reduce runoff from the watershed area that drains to the wetland, or use ponding or other best management practices to moderate storm flows, and remove sediments and nutrients from stormwater before it enters the wetland.
- Remove or control invasive exotic species. Repeated herbicide treatments may be used to control reed canary grass and purple loosestrife. Biological controls, such as weevils, have also shown some promise in managing purple loosestrife. Hand removal of exotics by

digging may be effective in areas where invasions are limited. In forested wetlands, such as floodplain forest buckthorn removal may be required, using cutting and herbicide treatments. **It is very important to use herbicides that are licensed for use in wetland areas, wear protective gear, and to closely follow directions.**

- Establish a vegetative buffer around wetland areas, to filter runoff, slow stormwater flows, and provide essential upland habitat needed by many species that use both wetlands and uplands as habitat during their lifecycles. Prohibit cutting, dumping or other alteration of buffers.
- Plant native wetland and upland plants in wetland areas and buffers. Plantings should use native species, and may include aquatic plants, grasses, forbs, shrubs, and trees to provide structural diversity and improve habitat.
- Maintain dead and fallen trees or add nesting structures if desired to improve wildlife habitat.
- Monitor management efforts and revise strategies as needed to meet goals.

Stream Management

Streams face many of the same negative influences as wetlands. (Changes in historical stream flows and the increased rate of erosion that is often associated with activities such as ditching, dredging, rowcrop agriculture, and development.) Erosion from outside the stream floodplain in the form of sheet and gully erosion can contribute substantial amounts of sediment to streams. Erosion of streambanks and larger cut bank slopes can contribute a significant amount of sediment as well. Two large cut banks occur within the study area. These contribute a substantial amount of sediment to the stream and contribute to a dominance of the stream bottom by sands and silts. These cut banks occur in Sections 23 and 29 of Florence Township.

Following settlement, conversion of natural communities for agriculture caused an increase in runoff. The increased runoff and erosion caused erosion of the stream channel and exceptionally high sedimentation rates in the floodplain of Wells Creek. Past DNR fisheries studies indicate that sediment deposits in tributaries range from 1.0 to 1.5 feet, with 10-13 feet of deposition in the lower main channel of Wells Creek. This erosion and sedimentation was most active from the late 1800's through the 1930's, after which it returned to a lower level. Research on the growth of the delta of Wells Creek (Long Point) documents that it has grown substantially since 1974. Indications are that this may be a "purging" of excess coarse-grain sediments from the lower reaches of Wells Creek. Purging is a process that has been accelerated by channelization

and levee building downstream from the Canadian Pacific Line railroad tracks, eventually causing increased sedimentation of Lake Pepin.

Following are management strategies for maintaining and restoring the diversity and health of the stream corridor:

- Identify areas of gully erosion associated with bluff ravines and cooperatively work with landowners to modify land use practices on bluff tops to reduce runoff and erosion. Examples include contour strip cropping, installation of filter strips (or alfalfa for hay) on downslope edges of crop fields, grassed waterways, terracing, no-till or reduced tillage methods of cropping. If erosion is severe, areas should be targeted for installation of detention ponds, bioengineering, or some other appropriate corrective measure.
- Manage upland plant communities for their greatest health and functionality. Quality native plant communities typically have a high stem density and rain infiltration rate, and excellent soil-binding characteristics. Prairie remnants have demonstrated the ability to infiltrate (without runoff) approximately 10 inches of rain in one hour. This amount is 10 to 20 times higher than that of turf grass lawns. Sheet and rill erosion can be greatly reduced by increasing the overall quality of native communities.
- Where possible, develop creative strategies for the management of stormwater before it reaches Wells Creek. This might include dechannelization of intermittent flow tributaries as well as reconstruction of wetlands to serve as temporary storage areas for excess stormwater. Although not always compatible with individual farming operations, these types of activities improve the watershed as a whole and should at least be considered as a means of reducing stream sedimentation and bounce.
- Monitor and adjust grazing within the floodplain of Wells Creek and its tributaries to minimize erosion and maximize infiltration of rain water. If required, adjust length of time in pasture, create a paddock system of rotational grazing, incorporate native grasses for warm season forage production, reduce stocking rate, or limit access to stream banks if erosion becomes excessive. There is a wealth of practical information regarding these techniques that can be found among local graziers in the watershed area, and even the globe, through sustainable farming organizations active in Southeast Minnesota and Northeast Iowa, and through Universities and Natural Resource managers.

Forest Management

Most of the forest areas in the Lower Wells Creek Watershed have been heavily grazed and in some cases, logged over. Forest communities in the Lower Wells Creek Watershed are generally associated with ravines and steep slopes and are therefore sensitive to the impacts of erosion and sedimentation. In addition, roads and trails frequently fragment forest communities. All of these activities encourage invasion by aggressive exotic species-particularly buckthorn and tatarian honeysuckle. Fragmentation also reduces the value of the forest community for wildlife species such as migratory songbirds that require “interior” forest areas well buffered from human disturbances.

Following are management strategies for maintaining and restoring the diversity and health of forest communities:

- Avoid cutting trees in areas containing exotic shrub species. Where cutting trees is necessary, cut exotic shrubs and treat with a basal application of an appropriate herbicide. Where developments are proposed within or adjacent to forest areas, removal and treatment of exotic shrubs could be incorporated into the overall site preparation process.
- Mast-bearing trees such as oak and hickory should be given particular protection due to their value to wildlife. Other trees through their seeds or buds also serve as important food sources for wildlife; these include maples, elms, aspens, basswood, and birch.
- Large trees, particularly those containing cavities, should not be removed unless absolutely necessary. Likewise, dead standing and down trees should not be removed unless they present a safety hazard. While humans perceive a forest with dead trees as messy, dead trees are important because they harbor a high diversity of plants and animals throughout their decomposition cycle. (Note that sanitation cuts may be necessary where oak wilt or dutch elm disease is present)
- Encourage removal of weedy and/or exotic tree species such as Siberian elm, boxelder, Russian olive, black locust, and eastern red cedar. Plant higher value native trees and shrubs following removal.
- Oak forest communities are adapted to fires and can often be improved through prescribed burns. However, **prescribed fire should only be applied with the assistance of, or by trained and experienced persons.** Prescribed burns will generally increase diversity of grasses and forbs, encourage oak seedling germination and sprouting and kill back exotic or invasive shrub species. Where oak forest communities occur adjacent to prairie and savanna

communities, fires from prescribed burns should be allowed to burn into the oak forest. Burn more frequently in when first applying fire, and less frequently as exotic species are controlled. Include both spring and fall burns in the management regime.

- Maple-basswood and lowland hardwood forest communities are generally not adapted to fires and should not be burned frequently. Likewise, prescribed burns in oak forest communities will generally discourage succession to a more mesic forest community such as maple-basswood.

Although not common in the area, oak wilt is a particular concern in Lower Wells Creek Watershed due to the dominance of oaks throughout most of the watershed. Oak wilt is spread by construction activity or other root/stem damage during the growing season. Openings created by oak wilt can accentuate invasion by exotic species if not replanted or managed to restore oak woodlands. Control oak wilt using methods recommended by the Minnesota DNR Division of Forestry. Oak trees should not be cut, pruned, or injured between April 15 and July 1 of each year. Exposed roots injured by construction activities are just as likely to result in oak wilt infection as cut branches. If injury occurs, the wound should be treated with a tree wound dressing within 15 minutes or less to reduce the infection potential. A vibratory plow should be used to sever roots along the edge of any construction area known to have oak wilt within one mile. This should be done prior to beginning work to prevent the transfer of oak wilt fungus from exposed roots and allow for regeneration at the point of cutting. Tree protection zones should be fenced to prevent entry or compaction by construction equipment. Soil and construction materials should not be stored within the tree protection zone, as this can result in contamination of the tree protection zone and/or other construction sites.

Agriculture, Forestry and Natural Areas

Often agricultural/traditional forestry activities and management of natural areas are painted as being too different from each other to be compatible. It is true that on the better quality natural areas there is less potential for compatibility of agriculture/forestry and maintaining the integrity and function of the natural community. However, natural resource managers, farm operators and foresters are more frequently teaming together to accomplish the goals of providing income while maintaining or improving the ecological quality of natural communities. One local example of this is the rotational grazing system used by Ralph Lentz along Sugar Loaf Creek. Through on-the-farm adaptation of a paddock system integrating moveable electric fences and cool and warm season grass pastures, Ralph has been able to curb stream bank erosion and maintain or improve water quality on much of his property.

Another example of natural community management positively influencing the economy in the LWCW is the use of controlled fires in managing natural areas. If managed and planned properly, fire can serve to improve seed production of prairie plants, as well as increase forage production. This seed can be marketed and provide additional household income for farming operations, helping to diversify the economic base of the area. *Note: there are some generally accepted guidelines for seed collection on natural areas. Landowners interested in seed collection for income should seek advice from a qualified natural resource manager on levels of seed collecting that will not harm natural community quality.* Well-timed fire can also increase forage production of both warm and cool season grasses, where operations allow some fuel (dead grass) to accumulate.

Fire can also play an important role in the integrated management of some forested communities. This is particularly true in oak dominated communities, which are fire adapted. Well-planned and executed fires in forested communities can serve to reduce competition from brush and pole-size trees, allowing canopy trees to grow faster. Oak communities also have a ground flora that generally responds in a positive way to applied fire. This can increase the number of plants, and with the increased root mass at the soil surface, thereby reduce soil erosion. It is important to note that each natural area has its own set of conditions and will respond differently to applied management. Knowledge of conditions is critical in applying the most effective management.

Grazing and logging have both been applied to many of the natural areas in the LWCW in the past. Both can be compatible with natural areas management if they do not compromise, in the long-term, the composition, structure, and function of the area to which they are applied. Additional specific recommendations regarding logging are given earlier in this section. In-depth knowledge of plant species and their interaction with each other, as well as close monitoring of response to management are critical to the success of adaptive management and the successful marriage of agriculture/forestry and natural areas management.

Specific Recommendations

These recommendations provide guidance on the preservation and management of natural area sites and natural communities.

Priority Natural Communities

Priority natural communities are those communities with a ranking of BC (good quality) or higher and are listed in Table IV-1. These communities should be given special consideration for future protection and management due to their quality. Where summertime surveys have not been completed by the DNR County Biological Survey, follow up survey work is recommended, particularly for threatened and endangered plants and animals. A listing of natural communities recommended for follow-up survey work is included in this section.

Table IV-1
Priority Natural Communities

Community ID	Community Type	Ranking
1-1	Dry Prairie, Southeast Bedrock Bluff Subtype	BC
1-6	Dry Prairie, Southeast Bedrock Bluff Subtype	BC
2-11	Dry Prairie, Southeast Bedrock Bluff Subtype	BC
2-16	Dry Prairie, Southeast Bedrock Bluff Subtype	BC
2-20	Dry Prairie, Southeast Bedrock Bluff Subtype	BC
2-21	Dry Oak Forest	BC
2-22	Oak Woodland-Brushland	BC
2-24	Mesic Oak Forest	B
2/3-32	Mesic Oak Forest	B
3-45	Oak Woodland-Brushland	BC
4-48	Dry Prairie, Southeast Bedrock Bluff Subtype	BC
4-50	Dry Prairie, Southeast Bedrock Bluff Subtype	B
4-59	Mesic Oak Forest	BC
5-75	Mesic Oak Forest	B
5-77	Dry Oak Forest	BC
6-204	Mesic Oak Forest	B/BC
6-204b	Mesic Oak Forest	BC
6-220a,b	Mesic Oak Forest	BC
7-83	Floodplain Forest, Silver Maple Subtype	BC
7-90	Floodplain Forest, Silver Maple Subtype	B
8-109	Mesic Oak Forest	BC

Natural Communities in Need of Follow-up Survey Work

Good quality natural communities identified in the Study area that provide specialized habitat for threatened and endangered plants and animals should be surveyed during the summer. Most of these communities are bedrock bluff prairies and oak forests that were not field visited during the MN County Biological Survey. Although some species were identifiable during this survey (such as autumn coralroot and American *Panax*), it may be possible that populations of these and other species were not identified during this inventory. This is a result of it being conducted during the late fall, when the potential for locating many spring and early summer blooming

plants is low. Follow-up survey work (during the growing season) for threatened and endangered species is recommended for the following natural communities:

- Some of the large, contiguous tracts of oak forest on the south side of Wells Creek, especially those in the draw straddling Sections 19 and 20 in Florence Township.
- The Shrub Swamp in the abandoned Mississippi River Channel to search for additional springs, rare species, and potential existence of additional Calcareous Fens.
- Select prairies in Sites 1, 2, 3, and 8. Some of these may host rare species, field survey for this inventory did not allow a truly thorough search for rare species.

Critical Areas for Connectivity

A common theme throughout this report has been the connectivity between natural resource areas. Linking natural areas within natural resource corridors adds values to those areas connected. These values are realized through a greater diversity of flora and fauna and a healthier overall ecosystem. The presence of a corridor also allows genetic material to flow among otherwise isolated natural areas, maintaining the gene pool of plants and animals for future generations. Humans also realize the benefits of corridors through enhanced recreational opportunities such as expanded trail systems. However, where sensitive natural resources are present, recreational uses would need to be limited to avoid negative impacts.

The use of corridors embodies many of the specific and general recommendations, and management strategies provided in this report. Corridors provide the overall framework under which these recommendations can most effectively be carried out. A considerable proportion of the land area within the Study Area is sensitive to development due to unsuitable soils, steep slopes, wetlands, or floodplains. For this reason, including land in corridors does not necessarily decrease land available for residential development, agriculture, or transportation. Corridors can be maintained as part of adjacent developments, construction of public infrastructure, or as part of large regional corridor projects.

Some of the key areas that could be included in corridors are:

- Bluff lines, particularly the bluff line just north of Highway 61, and north of County Highway 2.
- Contiguous parcels of forest, especially the three major side valleys and Kohn Hill south of Wells Creek.

- Where natural areas are separated by existing agricultural fields and/or future development, create corridors at least 150 feet wide along natural drainage ways or other features. Old fields that exist as fingers on bluff tops could be planted to prairie species or savanna trees such as bur oak.
- Communities with rare species should remain as connected as possible. This would allow for natural movement of genetic material among these sites over time.
- Development should not fragment or infringe on intact good quality natural communities, steep slopes, or other ecologically sensitive areas

Natural Areas with Good Restoration Potential

Most natural communities have some restoration potential; however, given that human and monetary resources are often a limiting factor for restoration, the following natural communities are suggested. Prior to undertaking a restoration effort, a plan should be developed that identifies the goals of the restoration and how it will be implemented.

Before and after monitoring should also be carried out to document success/failure of the restoration effort and to provide feedback on whether management strategies should be altered. Although “scientific” monitoring is difficult to carry out because of the amount of time and money that can be involved, it is still important to have some documentation of managed locations so that activities can be adjusted to suit desired outcomes. One low cost means of documenting is photographs. These should be taken during successive years at the same time in the growing season. They should be taken in the same direction from a known, fixed landmark such as a fence corner post, rock outcrop, or large tree. The goal is to document effectiveness of management techniques, such as brush reduction on a prairie or oak woodland-brushland.

- Sites 1, 2, 3, and 8, particularly the oak woodland-brushland (which could be restored to savanna), and the prairies. All of which would respond very positively to the reintroduction of controlled fire.
- Site 4, communities in this site are restorable, but only with a great deal of effort. Management with fire may be a low cost alternative to full restoration that would help maintain the landscape and community continuity between sites 3 and 4.
- Site 8, the entire bluff line would benefit from being managed as one unit with active restoration.

- Old fields within Frontenac State Park would require the least effort and cost for prairie reconstruction with interseeding and continued application of prescribed fire.
- Site 7: The oak woodlands on this site provide the greatest opportunity for low cost restoration of savanna with the removal of exotics, reintroduction of fire, interseeding, and other compatible activities.

COMMUNITY DESCRIPTIONS

Site 1

Site 1 is located in the northwestern portion of the study area. It is characterized by at least five bluffs dominated by bluff prairie, as well as their draws. This site is bordered by County Highway 5 on the west and south, a gravel road on the east, and the watershed boundary to the north. Rowcrop fields on the flatter areas of the bluff top and toe border of the natural areas. Past grazing and logging, as well as the absence of fire, have largely defined the natural communities of this site since the time of settlement. Bedrock bluff prairies best resemble their presettlement character.

Natural Resource Values

Natural communities present within this site include bedrock bluff prairie, oak woodland-brushland, and dry and mesic oak forest. These communities vary in qualitative rank from very good to poor. The rare features value for this site is ranked moderate due to the lack of documented rare species and no communities receiving an excellent qualitative rank. The Natural Community Integrity value is considered high because of the quality of the bedrock bluff prairies. Likewise, the Wildlife Habitat value was high due to the quality bluff prairies interspersed with oak woodland-brushland, dry oak forest, and mesic oak forest providing an ecologically diverse landscape to be utilized by wildlife. The aesthetic criteria were also ranked high because of the marvelous views of the Wells Creek valley from the bluff prairies and the views of the bluffs from the valley floor.

Site 1 Community Descriptions

Community 1-1

Dry Prairie, Southeast Bedrock Bluff Subtype **Rank: BC**

This community consists of three large and one smaller prairie on south-facing bluffs. These prairies were likely connected in the past, but recent invasion by brush and small trees in the draws has separated them. This site has a history of grazing, and according to a local landowner, was retired from that activity almost 30 years ago. These prairies are dominated by native grasses with nonnative grasses occurring only occasionally near the tops, bottoms, and draws. Native forbs are well represented, including some that are sensitive to disturbance such as hoary puccoon and heart-leaved alexanders. These are less common here than on prairies of better quality. These prairies are larger and better connected than any other bluff prairies in the Lower Wells Creek Watershed (LWCW) and offer remarkable vistas of the surrounding valley. The west prairie of this community is particularly interesting because of its long, narrow ridge with prairie on either side.

The largest single disturbance to these prairies is the suppression of fire. In the absence of fire, especially following the release from grazing, this site will eventually be overgrown by invasive species. Along with this site, the adjacent communities on this bluff complex would benefit greatly from active management.

Community 1-2

Oak Woodland-Brushland

Rank: CD

This community occurs on a steep, east-northeast facing slope. It appears to have been formerly pastured with some tree cutting. The soils of this community are thin, with much of the slope having sloughed cobbles of bedrock. The plant community is characterized by scattered bur oak trees, some open grown, with younger trees in between. The shrub layer varies from moderate to thick. One cored 19-inch bur oak near the top of the slope was 95 years of age. The grasses and forbs of this community are dominated by nonnatives, including smooth brome and white sweet clover. Natives play a secondary role with Indian grass, big bluestem, side-oats grama grass, and sky blue aster being most common. Grazing appears to have been the most influential activity on the composition of this community.

Community 1-3

Oak Woodland-Brushland

Rank: C

Found in the draws, on hilltops, and at the base of slopes around the prairies of Community 1, this oak woodland-brushland is of moderate quality. It is characterized by large, open-grown bur oaks with low, spreading crowns. The shrub layer is dominated by the non-thorny natives smooth sumac, gray dogwood, and eastern red cedar. The ground layer is varied in composition, but generally characterized by nonnative pasture grasses that have replaced native species such as those found in Community 1. In the absence of fire, and because of the past grazing regime, brush and small trees have colonized this community. As with the adjacent bluff prairies, this community appears to have been grazed for an extended period of time and recently retired from that activity.

Community 1-4

Dry Oak Forest

Rank: CD

This moderately poor quality Dry Oak forest occurs on the upper portions of a closed valley. It has a broken canopy of large bur and black oaks with smaller, even-aged basswood, elm, poplar, and white birch. Cut stumps indicate that the west-facing slope on this site had larger trees removed approximately 5-10 years ago. The east-facing slope showed no signs of recent tree

cutting and was of better quality. Throughout the site, the brush layer is thick to very thick and dominated by thorny species including gooseberry, blackberry, and prickly ash. The graminoid and forb layer is dominated by species that colonize disturbed areas and includes white snakeroot, Canada goldenrod, Ontario aster, and yellow honewort. Grazing, as well as release of the site from grazing, and the long-term suppression of fire has allowed thorny brush species to increase their presence on this site.

Community 1-5

Mesic Oak Forest

Rank: CD

This relatively poor quality community is characterized by large bur, white and black oak, and white birch, all of which are scattered. Smaller, more even-aged saplings comprise much of the crown cover. These pole-sized trees include basswood, black cherry, elm, and bigtooth aspen. The brush layer is very thick and dominated by thorny species including the nonnative European buckthorn, and natives gooseberry and prickly ash. The ground layer contains many species but is dominated by natives indicative of past disturbance. These include black snakeroot, yellow honewort, and Pennsylvania sedge. In the absence of active management, this community will likely transition into a mixed hardwood forest with black cherry, basswood, and elm becoming more important as canopy components and oak becoming less prevalent. This site is also experiencing some moderately severe gully erosion several feet deep along the slope above County Road 5.

Community 1-6

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: BC

This prairie occurs on south and southwest-facing slopes. Much of the prairie is above County Road 5. Although these prairies are experiencing rather heavy brush encroachment by eastern red cedar and gray dogwood, they are of overall good to excellent quality. Encroaching brush makes up about 30 percent of the total cover for these prairies. The graminoid and forb composition was good for grazing in the past and is represented by at least 40 species. These include species that are sensitive to intense grazing such as prairie dropseed grass, prairie clovers, and hoary puccoon. This prairie is experiencing quicker brush encroachment than prairies immediately to the east. Without some type of active management, such as tree/brush removal and reintroduction of controlled fire, these prairies will likely be lost in the next 20-40 years.

Community 1-7
Dry Oak Forest

Rank: CD

This forest community of moderately low quality has a relatively closed canopy. It is dominated by open grown bur, black, and white oaks, particularly on the upper slopes. One open-grown 24-inch bur oak that was cored was determined to be 126 years old. Other second growth trees are made up of relatively quick growing species, which include white birch, quaking aspen, and elm. The draws of this community are dominated by species historically confined to floodplains, such as black willow, box elder, cottonwood, and green ash. The shrub layer is thick and dominated by the nonnative European buckthorn, some reaching 20 feet in height. The graminoid and forb layer varies in quality, but is generally dominated by a few species that commonly follow disturbance. These species include Canada goldenrod, smooth brome, bluegrass, Ontario aster, and yellow honewort. The smooth brome and bluegrass were likely introduced to this site as part of farming activities to increase the presence of European pasture grasses. Grazing is the single most important land use activity to influence this community. The general character of the site indicates that it had a more open canopy in the past or scattering of trees.

Community 1-8
Mesic Oak Forest

Rank: CD

On a generally west-facing slope adjacent to the previous community, this forest has a nearly closed canopy dominated by bur oaks. Other important components of the canopy include white birch and quaking aspen. Less common are black oak, basswood, and hackberry. The shrub layer is fairly thick, but dominated by non-thorny natives. These include hazel, red-berried elder, dogwood, and many species of tree saplings. The ground layer is moderately diverse and not dominated by just a few species. The most common forb in this community was pointed-leaved tick trefoil. The presence of fences and the composition of the shrub and ground layer indicate that grazing took place in the past, but was not severe enough to cause extensive alteration of the community.

Community 1-9
Mesic Oak Forest

Rank: D

This oak forest averages about 80 percent canopy closure and is generally dominated by bur, white, black, and red oak. Also playing an important role in the canopy are white birch and quaking aspen. One cored 13-inch white oak was found to be 67 years old. Logging, which took place approximately 20-35 years ago removed most oak trees over 18 inches in diameter.

Stumps revealed that most of the removed trees were over 100 years of age. The shrub layer varies in composition from thick to sparse. It is dominated by numerous native species, most notably pagoda dogwood. Overall, there were 13 species of native, and 2 nonnative species in the shrub layer. The ground layer is relatively diverse. The most common graminoid is Pennsylvania sedge, with pointed-leaved tick trefoil and Ontario aster being the most common forbs.

The greatest single reason for the low rank of this community is the selective logging of oak species. Of secondary importance are increased erosion, both sheet and rill, which was spurred by logging activities. The site will likely improve in rank as smaller oak trees mature. The overall trend in this community without active management is toward dominance by a mixed group of hardwood species other than oak.

Site 2

Site 2 is composed of three connected ridge lines. One of which faces Wells Creek to the south, while the other two are part of long, side-valleys to Wells Creek and face southwest and northeast. Natural communities within the site form a mosaic of bluff prairies and oak communities, all on moderate to severely steep slopes. As with nearby sites, rowcrop agriculture borders the natural communities at the tops and bottoms of the slopes. Many of the forested communities in this site, particularly lowland hardwood forest, have found their origin within the last 150 years as a result of land use that followed settlement.

Natural Resource Values

Natural communities present in Site 2 include bedrock bluff prairie, oak woodland-brushland, mesic and dry oak forest, emergent marsh, and lowland hardwood forest. These rank in quality from good to very poor, with prairies being of the better quality. The Rare Features Value for this site is moderate. The Natural Community Integrity Value is high, a result of the large number of natural community types in the site and the high ranking of bluff prairies. The Wildlife Habitat Value for this site is high because of the connectivity of natural communities along the bluff line and the potential for use by a large number of species. The Aesthetic Value is high as well because of the visual appeal of these bluffs from the valley below and the remarkable views offered from the bluff prairies.

Site 2 Community Descriptions

Community 2-9

Mesic Oak Forest

Rank: D

Described in Site 1 Community descriptions. Please refer to Community 1-9.

Community 2-10

Lowland Hardwood Forest

Rank: C

This floodplain forest occurs along an intermittent tributary of Wells Creek. It has a supercanopy of eastern cottonwood. Dominant canopy species include black willow, box elder, with elm and green ash less common. The shrub layer varies from moderate to thick and is dominated by black raspberry, prickly gooseberry, common elderberry, and European buckthorn. The most common grasses and forbs are reed canary grass, stinging nettle, white snakeroot, and Ontario aster. This community is of recent origin with even the largest trees likely less than 60 years of age. Overall, the quality of this community varies by location. Some areas have moderate representation of native species, while others are dominated by nonnative species and indicative of lower quality. The intermittent stream that flows through this community shows some signs of erosion and disturbance associated with runoff.

Community 2-11

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: BC

These prairies are of good to excellent quality and include two large and two smaller prairies. The smaller of these have a more brush encroachment than the larger two, but all are similar in species composition and appear to have similar histories. Overall, the brush cover on all prairies is about 50 percent. These prairies have a substantial number of species, including several that are indicative of higher quality and/or sensitive to heavy grazing. Among those species are purple and white prairie clover, false boneset, and prairie dropseed grass. Several other species of note that occur on these prairies include western sunflower, which is not found abundantly on other prairies in the LWCW and compass plant, a species that reaches its northern extent in the Blufflands Region near the Wells Creek Watershed. Compass plant is often considered to symbolize tallgrass prairie. The southern prairies offer scenic vistas of the Wells Creek floodplain and forests to the south.

Community 2-12

Dry Oak Forest

Rank: D

This dry oak forest is characterized by large, open-grown bur oaks with second growth of young, even-aged trees including black cherry, black oak, and box elder. A 24-inch cored bur oak was determined to be 121 years of age. Many of the smaller trees in this community are multiple-stemmed, indicating release from some type of activity that prevented them from growing freely.

This activity was likely grazing. The eastern portion of this community has been grazed more recently and/or more heavily than the western portion, which has more tree cover. The shrub layer in this community is thick and dominated by the nonnative European buckthorn, as well as several species of thorny natives. The ground layer is sparse to non-existent, sometimes being completely devoid of grasses and forbs, while some places are dominated by buckthorn seedlings. This lack of ground cover reduces the amount of forage in the grazed portions of this community, while and increases the risk of sheet and rill erosion.

Community 2-13

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: D

This prairie is of generally poor quality. Brush makes up nearly half of the cover. It is dominated by eastern red cedar, European buckthorn, prickly ash, and several other species. This prairie shows signs of extensive grazing with the prairie species dominated by the grasses side-oats grama and little bluestem, as well as the nonnative Kentucky bluegrass. Forbs are scattered and include sky blue aster, butterfly milkweed, and leadplant. Despite its poor quality, this prairie would respond positively to active management. In the absence of some type of management, this prairie will likely be lost to brush and weedy trees in the next 20 years.

Community 2-14

Dry Oak Forest

Rank: CD

This forested community has a nearly closed canopy that is dominated by large black and bur oak, and to a lesser degree, white birch and basswood. Many of the black oaks in this community are multiple stemmed indicating release from probably either fire or grazing. Most bur oaks have open grown form, but most lower branches are dead or dying because they are being shaded by younger trees. This community also has a number of curiously shaped mature bur oak in drier locations that are shorter than normal with very twisty trunks and limbs. Smaller trees in this community are even-aged and commonly composed of elm, basswood, and black cherry. The shrub layer of this community is moderately thick and dominated by European buckthorn. The ground layer is sparse and dominated by species that follow disturbance to plant communities, including white snakeroot, Ontario aster, and sweet cicely.

Community 2-15

Dry Oak Forest

Rank: C

This community is relatively similar in structure to the previous community. The somewhat broken canopy is dominated by open-grown black and bur oak averaging 20 inches in diameter. Trees playing a secondary role in the canopy include basswood and elm. The shrub layer in this

forest, which varies from thick to nearly impenetrable, is dominated by European buckthorn, and to a lesser degree, prickly ash. The ground layer is of better quality than the previous community and characterized by species less associated with disturbance. The ground layer of this community is among the more diverse for a dry oak forest in the LWCW. The lower qualitative rank of C was given to this community due to the dominance of European buckthorn and to a lesser degree, evidence of at least moderate past grazing.

Community 2-16

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: BC

This community consists of four separate bluff prairies of similar quality. Overall, these prairies are of good quality, receiving a qualitative rank of BC from the Minnesota County Biological Survey. Based on prairie species composition, this prairie might deserve a higher ranking, but parts of these prairies are dominated by nonnative cool season pasture grasses and threatened by brush encroachment, which lowers the rank. This prairie, like others in the area, was grazed for a long period of time and retired in the past few decades. Encroaching brush is dominated by eastern red cedar, with other species playing a lesser role. Common grasses on this prairie include side-oats grama, indian grass, little bluestem, and plains muhly grass. Forbs indicative of better quality include pasque flower, indian paintbrush, purple prairie clover, hoary puccoon, and upland aster. Also found on this prairie was great plains ladies' tresses, a small inconspicuous species of orchid. This was the only documented location of this species in the LWCW. Although the overall quality of this community is high, these prairies are in immediate danger of being lost to brush encroachment. Some may be closed-in by red cedars in as few as 10 years.

Community 2-17

Dry Oak Forest

Rank: CD

This dry oak forest is largely confined to the draws between community 16, as well as the tops and bottoms of slopes. The tree composition varies depending on location on slope, but is generally dominated by open grown bur and black oak, with multiple-stemmed white birch. Some of the bur oak exceed 30 inches in diameter. Playing a secondary role are eastern red cedar, elm, and basswood. The shrub layer is thick and dominated by prickly ash and European buckthorn, which became established in the absence of fire and the presence of grazing. The ground layer is relatively sparse and dominated by Pennsylvania sedge with the most common forb being bedstraw.

A portion of this community, at the slope base, is currently grazed. The shrub layer here is relatively thin, with thorny species scattered, and the ground layer dominated by a few species associated with grazing. There are many pole-sized trees filling in the canopy and overtaking the

relatively open-grown oaks. This small grazed area, although influenced by grazing, provides a very scenic setting. Many biologists believe that historically savanna and woodland would have had a similar appearance, although a much different species composition in the subcanopy and ground layer.

Community 2-18

Mesic Oak Forest

Rank: CD

This moderately poor quality oak forest has a canopy dominated by white oak, with black oak, bur oak, and black cherry occurring occasionally. The larger trees in the canopy average about 12 inches in diameter. One multi-stemmed white oak, 22 inches in diameter was cored and found to be 115 years of age. This tree was the largest seen in the community, with others generally being younger and second growth following logging that took place 30 or more years ago. The subcanopy of this community is dominated by elm and smaller oaks. The presence of oaks in the subcanopy indicates good regeneration, a trait that is becoming less common in oak communities.

The shrub layer is thick to impenetrable in some places and is dominated by European buckthorn, prickly ash, and blackberry. The opportunity for brush to become so dense results from a combination of factors including lack of fire, logging, and potentially grazing. The ground layer contains species most commonly associated with disturbance and/or transition from an open community to a more forested one. The most common ground layer species are white snakeroot, yellow honewort, and black snakeroot. This community was given a relatively low rank because of the incomplete recovery from a history of logging and grazing. These activities have altered the canopy composition to be dominated by young trees, allowed the dominance of brush, and have changed substantially the ground layer species.

Community 2-19

Emergent Marsh-Cattail Marsh

Rank: D

This emergent marsh occurs as a depression in a cattle pasture. It is dominated by broad-leaved cattail, and the nonnatives reed canary grass and purple loosestrife. Other species present include softstem bulrush, sedges, and goldenglow. Historically, this wetland appears to have been part of a sedge/wet meadow that conveyed this portion of Wells Creek. Following ditch construction, this wetland receives and stores less water than it would have in the past. Influenced by changes in the quantity and quality of surface water it receives, the invasion by the aggressive native cattail, and nonnative purple loosestrife, this community was given a low qualitative ranking.

Community 2-20

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: BC

This community includes eight separate prairies grouped together based on similar composition and history of use. The six western prairies are currently in private ownership, while the eastern two, (and half of the largest) are MN DNR Forestry land. According to a conversation that a County Biological Survey Biologist had with a resident living at the base of the prairie in 1990, these prairies were grazed *lightly* for many years and taken out of grazing some time around 1970. “Cat steps”, ledge-like trails resulting from long-term grazing, are apparent for some distance on these prairies. Brush cover is approximately 10 percent on all prairies and dominated by eastern red cedar. Overall, the quality of these prairies is good.

Dominant grasses include indian grass, little bluestem, side-oats grama, hairy grama, and big bluestem. The most common forbs are gray goldenrod and silky aster. Species indicative of better quality occur less frequently and include prairie dropseed grass, purple prairie clover, and prairie violet. The two eastern prairies have compass plant growing on them, a species often thought to epitomize tallgrass prairie. On bluff prairies, compass plant nears its northern extent of distribution in the LWCW. Overall, the slope is very steep, with loose platy cobbles across the face. Sandstone outcrops are common about half-way upslope on these prairies. These host species such as prairie mugwort and smooth cliffbrake fern. The greatest current threat to these prairies is the encroachment of brush and trees. To maintain the prairies, periodic fires must be reintroduced, possibly in tandem with brush cutting and/or closely monitored grazing. According to DNR personnel, the southeast slope of state Forest land was burned in 1994. This practice should be continued.

Community 2-21

Dry Oak Forest

Rank: BC

This moderately good quality forest is dominated by bur and black oak, with aspen, black cherry, basswood, and white birch playing a secondary role. Many of the oaks have multiple stems. Most oaks are approximately 14 inches in diameter. One 13-inch oak was cored and determined to be 102 years old. Some tree cutting or logging is evident, but appears to have taken place over 40 years ago. The brush layer of this forest is moderate in thickness and dominated by non-thorny species such as black cherry, species that would tend to indicate moderate grazing. This is consistent with remarks made by a nearby resident on the grazing regime for the bluff prairies. Likewise, the ground layer is somewhat diverse, being represented by at least 20 species, none of which is truly dominant or indicative of extremely heavy grazing pressure.

Community 2-22**Oak Woodland-Brushland****Rank: BC**

This community occurs around the prairies in Community 20. Although some areas of canopy closure are found in this community, much of it is dominated by thick brush among scattered trees with a mix of prairie and woodland ground species. For this reason, it was classified as an Oak Woodland-Brushland rather than a Dry Oak Forest. The dominant trees in this community are black and bur oak, with white birch being somewhat less important. Many of the bur oaks are open-grown. Many trees also have multiple stems indicating release from an activity such as grazing and/or fire. The brush layer is the dominating aspect of this community. It varies from thick to completely impenetrable. It is dominated by bur oak saplings, smooth sumac, prickly ash, and European buckthorn. The graminoid and forb layer has at least 40 species, many of which are found in prairie or open woodland. It is likely that much of this community was historically part of the prairie of Community 20, but has been recently colonized by woody species.

Community 2-23**No Community Classification****Rank: NA**

This site is an old field on a hill top that has been partially recolonized by native trees, shrubs, and ground layer species. It has also been planted with some ecologically out-of-place tree species. Because they occur on DNR Forest land, the trees may be part of a demonstration planting. It includes species such as tamarack (larch), white pine, and black walnut. None of these species would have occurred historically in this ecological setting. Sapling size pin and bur oak are the most common native volunteer tree species. Some prairie species, including indian grass are also colonizing the cool season grass cover planted at retirement of the crop field.

Community 2-24**Mesic Oak Forest****Rank: B**

This good quality oak forest is found on a generally northeast facing slope. The dominant tree species is red oak, with white oak, white birch, and aspen being of secondary importance. Average tree size of oak species is about 14 inches, with some reaching 24 inches in diameter. One cored 22-inch red oak was determined to be 85 years of age. There are a number of stumps indicating cutting, possibly more than 60 years ago. The shrub layer is most often moderately thick, but can be quite thick. It is dominated by pagoda and silky dogwood, and elm and cherry saplings.

The ground layer is of generally good quality and dominated by many native species. The upper slopes tend to have pointed-leaved tick trefoil as the most common forb, while lady, maidenhair, and sensitive fern become more common down slope. Like many of the forested communities in the LWCW area, there are a number of locations on this slope that have recent windfalls. These are not extensive, and do not affect the overall qualitative ranking of the forest. Because this forest has had a chance to recover from the activity of logging, and because it has a moderately good assemblage of shrub and ground layer species, it was given a B rank.

Community 2-25

Lowland Hardwood Forest

Rank: C

This community occurs along an intermittent stream of Wells Creek and in select portions of the higher portions of the floodplain to Wells Creek itself. This forest is of relatively recent origin, likely less than 75 years of age. It has a scattered supercanopy of eastern cottonwood with a broken canopy dominated by elm, green ash, and box elder. Also present and locally dominant in the canopy are black walnut, green ash, black willow, aspen, and several upland tree species. Silver maple becomes more important in this community within the floodplain of Wells Creek. The shrub layer is variable and contains species of both brushy upland and floodplain. Common shrub species include wild plum, blackberry, dogwood, and common elderberry. Likewise, the ground layer is a mix of upland and flood tolerant species. Most common are white snakeroot, wild goldenglow, nettle, hog peanut, and yellow honewort. The intermittent stream that courses through this community has fairly stable slopes. It is apparent in some places, particularly the upper portion, that there are occasional episodes of excessive erosion followed by periods of stabilization. Based on field examination alone, it is difficult to estimate the length of time between erosional events. It appears that some substantial erosion took place earlier in the summer of 1998 during a period of unusually heavy rainfalls.

Community 2-27

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: D

This poor quality prairie is composed of one moderately sized, and one small prairie. These are dominated by native and nonnative grasses and native forbs that follow moderate to heavy grazing. The lower slope of the large prairie is dominated completely by nonnative species. Nonnative species include birdfoot trefoil, butter-n-eggs, and smooth brome. Native species indicative of undisturbed prairie are either absent or present in very low numbers. These include Canada wildrye, indian grass, side-oats grama, and sky blue aster. The greatest single past influence on this community was grazing. It appears to have been moderately intense and included overseeding of nonnatives and/or supplemental feeding of outside hay to cattle that

contained seeds of nonnative species which were distributed around the prairie in animal waste. Without some form of active management, these prairies will likely be lost to brush and trees in the next 10 to 30 years.

Community 2-28

Mesic Oak Forest

Rank: D

This recently logged forest occurs on a northeast-facing slope and is part of MN DNR Forest land. The canopy cover averages about 40 percent and is dominated by young red oak. Secondary members of the canopy include white birch, elm, moose maple, and basswood. Average canopy tree size is about 10 inches. One 12-inch red oak that was cored was found to be 73 years of age. The shrub layer varies and is moderately thick to very thick as the canopy is more open. It is dominated by native non-thorny species including moose maple and silky dogwood. The ground layer is generally diverse with many natives co-dominating. Most notable of these are lady fern, maidenhair fern, zigzag goldenrod, and bishop's cap. Overall, the species composition of this community is good. The greatest single factor affecting the qualitative rank is the logging that altered the canopy, which took place approximately 10 or 20 years ago. Oak regeneration in this community appears to be fairly good and should lead to an improved quality in the next 50 years if further disturbance is prevented.

Community 2-29

Mesic Oak Forest

Rank: C

The canopy of this small forest is dominated by red and white oak that average about 16 inches in diameter. Some of the larger trees reach 24 inches in diameter, with one cored 20-inch red oak found to be 91 years of age. The shrub layer is somewhat sparse and dominated by thorny species such as prickly gooseberry and European buckthorn. The ground layer is dominated by a handful of native species, some of which tend to increase under grazing. These include Pennsylvania sedge, self-heal, and white snakeroot. The presence of these species, along with fences, tends to indicate a history of grazing, although not recent. With continued minimal use, the shrub and ground layer diversity of this forest will likely improve, along with overall quality.

Community 2-32

Dry Oak Forest

Rank: B

Description for this community is given in Site 3, under Community 3-32.

Site 3

Site 3 is composed of two large and one smaller side valley to Wells Creek. Oak Woodland-Brushland and forested communities make up the majority of this Site, while bluff prairies are of generally better quality. Slopes in this site tend to be steep and are oriented in a variety of directions, but most commonly east and southeast. This site also contains several shallow ravines in forested areas, some that reach over 20 feet in depth. These tend to be well-vegetated and recovering from past episodes of excessive erosion.

Natural Resource Values

Site 3 is given a moderate Rare Features Value because of the number of communities documented by the County Biological Survey and because of the potential for the prairies to host animal species such as rare snakes and insects. Natural Community Integrity Value is high for this site due to the high community ranks of bluff prairies and oak forest, as well as the interspersed and diversity of community types. The Wildlife Habitat Value for the site is high due to the likely use of these communities as migration corridors associated with the Mississippi River. Likewise, the aesthetic values are high because of the aesthetic appeal of some of the better quality forest and prairie, as well as the vistas offered. This is particularly true of the aesthetic appeal of Community 3-38 and the views it offers of the surrounding landscape.

Site 3 Community Descriptions

Community 3-30

Dry Prairie, Southeast Bedrock Bluff Subtype **Rank: C**

This community consists of five separate prairies on southeast to southwest facing slopes. Common grasses and forbs in this community include side-oats grama, little bluestem, hairy grama, gray goldenrod, and silky aster. Species present, but not common, that are indicators of higher quality include cylindrical blazingstar, prairie dropseed, and silky aster. The overall quality of these prairies is variable and some areas show signs of previous disturbance. They are also being encroached on by brush. For these reasons, this community was given a moderate qualitative ranking of C.

Community 3-31

Oak Woodland-Brushland **Rank: C**

This community occurs around the previously described bedrock bluff prairies. It has a canopy cover that varies from approximately 30-100 percent closed. The mature trees are dominated by

open-grown bur oaks, some of which are multiple-stemmed. Other common, smaller trees include quaking aspen, basswood, black cherry, and hackberry. One open-grown, 19-inch bur oak tree was cored and found to be 156 years old. Many of the open-grown bur oaks are beginning to show signs of lower limb die-off and a general decline in health. This is from shading of lower limbs by young brush and trees.

The shrub layer in this community varies from thick to impenetrable. There were 15 species documented in this layer, which was dominated by prickly ash and European buckthorn. The graminoid and forb layer was sparse and varied. Near prairie openings, species from that community persisted, while areas shaded for many years were dominated by white and black snakeroot, and Pennsylvania sedge. Without active intervention, this community will become a dry oak forest, a classification that has already been applied by the County Biological Survey.

Community 3-32

Dry Oak Forest

Rank: B

This dry oak forest is dominated by bur and black oak, as well as aspen. Many of the canopy trees are multiple-stemmed and have few lower limbs. Average dominant trees are 18 inches or more in diameter, with many exceeding 30 inches. The coring of an 18-inch bur oak determined its age to be 110. The largest trees may exceed 200 years in this community. The subcanopy of this community is dominated by box elder. The shrub layer is sparse to moderately thick and dominated by the thorny species prickly gooseberry and European buckthorn. The presence of thorny shrubs and fences tends to indicate that this forest has been grazed in the past. The ground layer is well-represented by native species that are indicative of better quality, including red baneberry, lady fern, and wild sarsparilla. Within this community is a steep ravine that is stable and well-vegetated. The lack of erosion correlates well with land use practices uphill. Contour strip-cropping, terracing, and infrequent pasturing all help to prevent erosion in this ravine.

Community 3-33

Dry Oak Forest

Rank: C

Canopy cover in this community ranges from 60-90 percent and is dominated by bur and black oak averaging 18 inches in diameter. The bur oak are generally open-grown, while black oak and other tree species tend to be second growth, having straight trunks and small lower limbs. There are some areas on the slope where white birch forms nearly solid stands. One bur oak, 18 inches in diameter, was cored and found to be 112 years of age. The shrub layer accounts for much of the lowered quality rank in this community since it is thick and dominated by European buckthorn. The ground layer is of moderate quality and dominated by white snakeroot and

pointed-leaved tick trefoil. This community shows no signs of logging, but was likely grazed in the past. The draws in this forest do not show any signs of significant erosion.

Community 3-34

Mesic Oak Forest

Rank: C

This mesic oak forest occurs on east and south-facing slopes. It is characterized by generally steep slopes with several deep ravines. The community is generally white and red oak-dominated, particularly on the upper and south-facing slopes. One white oak, that was of moderate size for this community, was cored and found to be 110 years of age. The lower slopes, ravines, and canopy openings tend to be dominated by box elder, elm, and white birch. Some logging/wood cutting is evident. Aside from an area that looks to have been part of a recent “Timber Stand Improvement (TSI)” cut, most cutting appears to have taken place over 50 years ago.

The shrub layer varies from moderate on the east-facing slope, to thick and very thick on the west-facing slope. The portion of the forest recently TSI cut is impenetrable by foot because of extremely thick blackberry. The ground layer is varied as well, from moderately good to moderately poor with the better quality occurring on the east-facing slope. Erosion does not appear to be a problem in the ravines of this community, probably being owed to the terracing, ponding, and light grazing that takes place on the bluff top around it. Overall, this community is of moderate to moderately poor quality, making it borderline in quality between C and CD rank. Periodic canopy disturbance, generally poor quality of the shrub layer, and to a lesser degree evidence of past grazing cause this community to be given a lowered ranked.

Community 3-35

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: C

This community consists of four separate bluff prairies on south to southwest-facing bedrock knobs. The overall quality and composition of this community is similar to that of Community 30. The farthest northwest prairie is dominated more by grasses and has less brush cover than the other three. Common grasses and forbs in this community include hairy grama, side-oats grama, little bluestem, silky aster, and gray goldenrod. Species that would indicate a higher quality are found in fewer numbers here than in Community 30, and include prairie dropseed, cylindrical blazingstar, and silky aster. The overall quality of these prairies is moderate, each shows signs of previous grazing, and are being encroached on by brush.

Community 3-36

Mesic Oak Forest

Rank: C

This community occurs on the southwest and north-facing slopes of a draw. The canopy is dominated by white birch, bur and black oak, and small elms. The oaks generally average 14 inches, with some trees reaching 22 inches. One bur oak, 19.5 inches in diameter, was cored and found to be 140 years of age. The shrub layer is moderately thick in this community, but nowhere is it impenetrable. Prickly ash and Missouri gooseberry are the dominant shrubs. These species tend to indicate a history of some level of grazing, as do the fences in the area. The ground layer is somewhat poor in quality and dominated by pointed-leaved tick trefoil and Pennsylvania sedge.

Community 3-37

Oak Woodland Brushland

Rank: CD

This community has much the same tree composition as Community 36. However, the larger trees are more scattered leaving the spaces between to be colonized by saplings and brush. The fences in this community, along with the severely impacted ground layer, indicate this community has a history of intense grazing. It is often impossible to walk upright in the shrub layer, which is dominated by European buckthorn and prickly ash. In contrast, this community has a grove of scenic Herculean-like bur oaks that have open growth form. These trees average 30 inches in diameter with some exceeding 40, and they often have lower limbs 12 to 18 inches in diameter. It is often difficult to estimate tree age without a coring, but based on the age of a much smaller bur oak just to the north, it is not unreasonable to expect that these large bur oaks well exceed 200 years of age. Unfortunately, some of these picturesque trees are beginning to show signs of declining health. Much of this is related to the shading of lower limbs, which then die and serve as points of entry for agents that can lead to heart rot and other decay-related problems.

Community 3-38

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: C

This prairie, although being of only moderate quality, provides an aesthetically pleasing setting, as well as an exceptional view of the Wells Creek valley. The prairie is situated on either side, and at the end of a long, linear bedrock ridge sometimes only several feet wide at the top. Scattered eastern red cedar, horizontal juniper, and white birch are set among a uniform carpet of native grasses and flowers creating an almost English garden-like setting. Another point of interest for this prairie is the presence of jack pine of different sizes. These were very likely introduced to this site, but have adapted well and are successfully reproducing. Much of the

slopes on this prairie are exceedingly steep, with loose platy cobbles on the face. The lower slope is dominated by sandstone outcrops and loose, sandy soils formed by their breakdown.

This community is dominated by native grasses, including side-oats grama, little bluestem, hairy grama, and plains muhly grass. Common forbs include purple prairie clover, gray goldenrod, and sky blue aster. The presence of cat steps, dominance by (native) grasses and relatively diminished representation of native forbs suggests that this prairie was grazed at a moderately intense level for many years. At the base of the hill, the affects of grazing are most pronounced, with nonnative grasses and cattle paths dominant in the loose, sandy soils.

The greatest single influence of the recent past on this community is that of grazing. The greatest single threat to its existence is encroachment by brush and trees. As with other bluff prairies in the LWCW, earnest attempts should be made to reintroduce controlled fires to this prairie and the surrounding oak communities.

Community 3-39

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: C

This prairie is just east of Community 38 and consists of three separate prairies, one of which is split from Community 38 by a fence. These two communities were differentiated from each other based on slight differences in composition and inferred management. The largest of the three prairies of Community 39 has a field access road on its face that was recently cut. This has not revegetated well, allowing minor erosion and the opportunity for weedy brush and trees to become established.

The brush cover of Community 39 is currently under 20 percent. It is generally dominated by eastern red cedar, but eastern cottonwood is common in some areas. Grasses are dominant on these prairies, with the most common being little bluestem, plains muhly, and side-oats grama. Other common grasses include the natives big bluestem and Indian grass, and the European grasses smooth brome, and Canada and Kentucky bluegrass. The most common native forbs include silky aster and gray goldenrod. Overall, few forb species indicative of higher quality are common. Brush and tree encroachment is the biggest threat to the integrity of this community. Efforts should be made to control these through controlled fires and/or brush removal if the prairie is to be maintained. The field road up the face of the center prairie would serve as an ideal firebreak for such an activity.

Community 3-40**Dry Oak Forest****Rank: C**

This forest occurs on moderately steep slopes. It is dominated by generally open-grown bur oak that average about 28 inches in diameter. One bur oak, 35-inches in diameter, was cored and found to be 134 years of age. There appears to be two age classes of open-grown bur oak in this community, those that are over 25 inches in diameter and those 10-20 inches in diameter. Other than bur oak, common tree species include black oak, as well as pockets of quaking aspen. The shrub layer is moderate to thick and dominated by the thorny species European buckthorn and prickly ash. The ground layer shows signs of past grazing with white snakeroot the most common species. Other frequently encountered species include pointed-leaved tick trefoil and Pennsylvania sedge. Species indicative of higher quality were generally absent from the ground cover.

Community 3-41**Mesic Oak Forest****Rank: C**

This mesic oak forest is codominated by red and white oak that average approximately 14 inches in diameter but reach up to 24 inches in diameter. There are no signs of logging in this community, but like adjacent communities, it was likely grazed in the past. One 18-inch red oak was cored and found to be 70 years old. The shrub layer is moderately thick, with prickly ash, buckthorn, and hazelnut common. The ground layer is similar in species composition to Community 40, but contains additional species indicative of mesic oak forest, such as yellow bellwort, and lady fern.

Community 3-42**Lowland Hardwood Forest****Rank: C**

This forested community is found on the lower slopes and in a drainage way in a small valley. The canopy is variable and ranges from 50-100 percent in closure. It is dominated by green ash and box elder, both of which average approximately 11 inches in diameter. The shrub layer also has box elder common in it, along with elm, European buckthorn, and blackberry. Common graminoid and forb species include sweet cicely, virginia waterleaf, and yellow honewort. Overall, the quality of this community is moderate, partly owed to its recent origin and also to the grazing that appears to have taken place.

Community 3-44**Dry Prairie, Southeast Bedrock Bluff Subtype****Rank: C**

This bedrock bluff prairie occurs on a southwest-facing knob and is generally dominated by native grasses. The shrub cover is approximately 20 percent and dominated by eastern red cedar and sumac. Dominant grasses include side-oats grama grass and indian grass, as well as big bluestem. Because of the apparent intense past grazing, the prairie has a relatively poor representation of native forbs. The most common of these are leadplant and sky blue aster. Because of the relatively poor representation of native forbs, particularly those indicating higher quality, this prairie was only given a moderate rank of C.

Community 3-45

Oak Woodland-Brushland

Rank: BC

This community occurs around the bedrock bluff prairie described above. It is one of the better quality Oak Woodland-Brushlands in the LWCW. It is dominated by bur and pin oak with stately open-grown forms. The shrub layer is thick and dominated by American hazel, prickly ash, and to a lesser degree, buckthorn. The graminoids and forbs are represented by a number of species that are associated with savanna and woodland. These include horse gentian, northern bedstraw, woodland sunflower, wild columbine, and silky wildrye. Closer to the prairie opening, the species composition is dominated by members of that community. Overall, this community is of recent origin and will likely continue its expansion at the expense of the prairie unless fires or cutting are used to slow or reverse the trend.

Community 3-46

Mesic Oak Forest

Rank: C

This community is found on a generally northeast-facing slope that varies from moderately steep to steep. Red and white oak are the dominant tree species and average about 14 inches in diameter. One multiple-stemmed, 16-inch red oak was cored and found to be 118 years of age. There has been some logging on this slope, with oaks being the tree most commonly removed. Logging skid-roads are evident on the slope with some associated substantial erosion in places. Overall, logging appears to have been light on the upper slopes and heavy on the lower slopes, and performed about 10 or 20 years ago.

The shrub layer of this community is moderate on the upper slope and dominated by native, non-thorny species, but thick near the lower slopes with thorny species dominating. Native non-thorny species include moose maple, elm, silky dogwood, and sugar maple. Thorny species are dominated mostly by blackberry and black raspberry.

The ground layer is relatively intact and well represented by species indicative of mesic oak forests. Some ground layer species are yellow bellwort, lady fern, maidenhair fern, and Jacob's

ladder. Despite logging, the quality of this forest is still moderate, and should improve in quality. With the recent removal of oaks by logging, this community will likely become much more dominated by basswood in the next 50 years if left undisturbed.

Community 3-47

Mesic Oak Forest

Rank: D

This mesic oak forest is currently pastured. It is dominated by bur oak that are generally of open-grown form. Other common canopy trees include black cherry and elm, with white birch, butternut, sugar maple, and black walnut occurring occasionally. The shrub layer is sparse in this community and dominated by prickly gooseberry. Because this community has been grazed for an extended period of time, the ground layer is composed of approximately 50 percent nonnative pasture grasses. The remainder of graminoids and forbs are composed of species able to withstand frequent “topping” by grazers. One open-grown bur oak 27 inches in diameter was cored and found to be 174 years of age, easily placing its origin prior to Euro-American settlement. Because of intense past grazing that led to the alteration of species composition and overall structure, this community received a relatively low ranking. Continued grazing will make recovery to a substantially improved rank unlikely. However, this activity does not appear to be causing further impacts on the landscape, such as gully erosion that can sometimes be associated with heavier grazing.

Site 4

Site 4 is one of the larger sites within the study area. It encompasses a long ridge line with a generally southern aspect, a west-facing side valley slope, as well as a northeast-facing slope above the abandoned channel of the ancient Mississippi River Valley. It is dominated by a variety of communities, including bluff prairie, oak woodland-brushland, and oak forests, with small areas of lowland hardwood forest. Likewise, it is influenced by a variety of human inhabitants and uses. These include logging, grazing, rural residential development, a vacation home, and a golf course/downhill ski area. The many different land use pressures this site receives has more heavily impacted the natural communities than on other sites. In some cases fragmenting them and substantially compromising their quality and function.

Natural Resource Values

Site 4 is given a moderate Rare Features Value, a result of the presence of rare communities/species on the steep slope and cliffs north of the golf course, as well as the several highly ranked communities within the site. Natural Community Integrity Value for the site is also high for this reason. The Wildlife Habitat and Aesthetic Values are both high as a result of

the proximity to the Mississippi River migration corridor and the outstanding view offered from the eastern bluff prairie of the site.

Site 4 Community Descriptions

Community 4-46

Mesic Oak Forest

Rank: C

This community is partially found within both Sites 3 and 4. A complete description is given in Community 3-46

Community 4-48

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: BC

This community consists of two separate prairies on southwest-facing knobs. Overall, the quality of these is good to very good. The presence of fences and the general dominance by grasses indicates a history of grazing. These prairies are approximately 30 percent covered by brush, particularly red cedar, sumac, white birch, and horizontal juniper, in descending order. Spruce seedlings were also planted in several locations on these prairies. Graminoid and forb species present that indicate better quality include prairie dropseed, plains muhly, narrow-leaf puccoon, cylindrical blazingstar, and prairie coreopsis. Despite the overall good quality of these prairies, brush encroachment, tree planting, and severe gully erosion, which is to bedrock in some places, threaten the integrity and existence of these prairies.

Long-term management of this community, as well as the adjacent Oak Woodland-Brushland, should involve the reintroduction of controlled fires. If fire is not reintroduced to these communities, or some other means of controlling brush used, they will become relatively low quality forests with potential loss of function and species richness.

Community 4-49

Oak Woodland-Brushland

Rank: C

This community occurs on the same west/southwest slope that Community 48 does, and surrounds it. It is dominated by open-grown bur oaks that average 22 inches in diameter, but range from 8 to 36. These trees have extraordinarily twisted growth forms. Along with the shrub and ground layer, these give this community a curious appearance that is appealing. Many places in this community retain the appearance of a dry oak savanna.

One 17.5-inch bur oak with an open-grown form was determined to be 223 years of age, making it one of the oldest trees cored during this inventory. Other common trees occurring as even-aged second growth include multiple-stemmed white birch, as well as aspen and elm. The shrub layer is varied, but typically dominated by horizontal juniper and prickly ash. Graminoid and forb species commonly include Pennsylvania sedge, white snakeroot, and various prairie species. Other species of interest include pearly everlasting and pale vetchling. Overall, the quality of this community is relatively good.

Community 4-50

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: B

Consisting of two separate bluff prairies on southwest-facing knobs, this community is characterized by an overall good quality and 20 percent brush cover. The presence of old electric fences and the overall species composition indicate a history of grazing on these prairies. The face of these prairies has platy dolomite cobbles, with sandstone outcrops and extremely steep slopes about half way up the bluff.

Dominant grasses include big and little bluestem, side-oats and hairy grama grass, indian grass, plains muhly, and prairie dropseed. The latter two of these indicates better quality. Forbs present that are indicative of better quality include cylindrical blazingstar, silky aster, false boneset, white and purple prairie clover, as well as white camass. Species associated with rock outcrops include draba, smooth cliffbrake fern, sand cherry, and columbine. The greatest current threat to the integrity of this prairie is the increasing presence of brush, particularly eastern red cedar. The reintroduction of controlled burning and/or the removal of brush would help to prevent the loss of this community to brush encroachment.

Community 4-51

Mesic Oak Forest

Rank: CD

This forest occurs on an east-facing slope and is dominated by red and white oak, with quaking aspen also being common. Although small portions of this forest have been logged in the last 10-20 years, and others more recently damaged by wind, it is generally still oak dominated. The overall canopy closure is about 90 percent. One cored white oak, 18 inches in diameter, was found to be 124 years of age.

The shrub layer of this forest is thick and dominated by thorny species, including European buckthorn and Missouri gooseberry. The ground layer, although having many species documented, is dominated by buckthorn seedlings, Ontario aster, and to a lesser degree, hog peanut. The first two of these is indicative of heavy disturbance. Because of the disturbance in

the shrub and ground layer, as well as a past history of logging, this site was given a relatively low rank. If undisturbed in the near future, this community should improve in quality in the next 25 to 50 years.

Community 4-52

Oak Woodland-Brushland

Rank: CD

Stretching for about one half mile of bluffline, this oak woodland-brushland varies in canopy cover from 25-100 percent. It is dominated by open-grown bur and black oak, which average 19 inches in diameter. One open-grown 23-inch bur oak that was cored and determined to be 158 years of age. Other common, second growth trees include white birch, aspen, and eastern red cedar. The shrub layer is thick with the most common species being prickly ash, European buckthorn, smooth sumac, black raspberry, and poison ivy. The graminoid and forb layer varies from being dominated by prairie species near openings, to those of a disturbed dry oak forest. Common species here include leafy satin grass, white snakeroot, hog peanut, and the nonnative pasture grass Canada bluegrass. Because of the dominance of the shrub layer by European buckthorn and disturbance of grazing and field roads, this community received the ranking of CD.

Community 4-53

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: CD

This community is composed of three separate bluff prairies. Each is relatively small, and encroached upon by brush. The eastern prairie of this community is separated from the other two by a distance of about one half mile. This isolates it from meaningful exchange of seed and other biological components among other prairies. But based on similarity of size, past land use, and overall composition, it was decided to group these three prairies for the purpose of description.

Brush cover on these prairies averages about 40 percent, with the eastern two nearing 100 percent in some places. Eastern red cedar is the most dominant shrub, with smooth sumac also commonly occurring. Graminoid and forb species indicative of higher quality are either absent from these prairies or occur only occasionally. Common grass species include side-oats grama, indian grass, and little bluestem. Forbs occurring in this community include sky blue aster, leadplant, and gray goldenrod. Based on the absence of species indicative of higher quality prairie, and the presence of the nonnative grasses smooth brome, Canada bluegrass, and yellow foxtail, it appears that this site had a history of intensive grazing. For this reason, these prairies are ranked CD in quality. The view from the top of these bluff prairies is noteworthy, providing an excellent vista of the patchwork of fields, Wells Creek, and distant forests.

Community 4-54
Mesic Oak Forest

Rank: C

Found on a northeast-facing slope that is moderate to steep, this mesic oak forest is of moderate quality. The canopy of this community is generally closed and dominated by tall, straight-trunked black and white oak, which average about 18 inches in diameter. Other species found in the canopy include bur and red oak, white birch, and only rarely, elm. One 17-inch white oak was cored and found to be 102 years of age. The shrub layer is moderate to sparse in thickness and generally dominated by native species. These include chokecherry, Missouri gooseberry, silky dogwood, and red-berried elder.

The ground layer has a moderate number of species present. None of these are dominant, but some would tend indicate at least light grazing in the past. Species typical of mesic oak forest that are found here include zigzag goldenrod, lady fern, enchanter's nightshade, and pointed-leaved tick trefoil. There were some pockets of oak and other trees on this hillside that had wind damage, likely from violent storms earlier this year. Overall, the composition of this community is moderately good. With continued time away from grazing, this community should improve the composition of the ground and shrub layers and its overall quality.

Community 4-55
Oak Woodland-Brushland

Rank: CD

This oak woodland-brushland is found on a mostly south-facing ridge line that extends for over one mile. The canopy cover varies from almost none, to about 80 percent. The dominant tree species of this community are open-grown bur and black oak. One cored bur oak, 30-inches in diameter was found to be 103 years of age. The shrub layer is thick and sometimes impenetrable. It defines the vertical structure of this community in most places. It is dominated by both thorny and smooth-stemmed species including black cherry, prickly ash, smooth sumac, and European buckthorn. The ground layer is varied in composition, being influenced by prairie species close to the bluff prairies it surrounds; and by savanna/dry oak forest species elsewhere. Some species found here are: heart-leaved aster, tall anemone, leafy satin grass, and three-seeded mercury.

Portions of this site, particularly the areas adjacent to the golf course and the on eastern half of the slope, show signs of moderate to heavy disturbance. Some of these impacts include earthmoving, pushing of trees, brush and debris into the woods, clear cutting for vista, gully erosion, recent construction of a private lane on the slope, and to a lesser degree, a past history of grazing. These influences have compromised the overall quality of this community and cause the lowered ranking. Despite this, the species composition of this community is generally good.

Suspension of activities that negatively impact this community, coupled with active management, including controlled burns, would improve quickly the quality of this site.

Community 4-56

Mesic Oak Forest

Rank: D

This highly fragmented oak forest occurs along the north-facing bluff associated with a ski/golf area. Dominant tree species include red and white oak. One 17-inch bur oak on the edge of a fairway was cored and found to be 143 years of age. Trees of similar size that had been recently cut were found to be from 70 to 160 years of age. The shrub layer of this community is dominated by shade-tolerant tree species, particularly sugar maple basswood and elm. The ground layer is varied and represented by species typical of mesic oak forest in the interior of patches, while the edges are dominated by weedy, often nonnative species. The canopy in this forest will likely become maple-basswood forest in the next 50-100 years as oaks are gradually replaced by those species.

Because this community is so highly fragmented, and left with so little of its former function, it received a D ranking, the highest ranking possible for its condition. Efforts to offset the fragmentation of this community could include planting of local origin oak saplings with native shrubs, grasses, and forbs under them on the non-play areas of the golf course. This could be done on top of the ridge and between greens to improve connectivity of forest and woodland on opposing sides of the slope.

Community 4-57

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: D

This community consists of two small, and one larger bluff prairie. These prairies are surrounded by the oak woodland-brushland of Community 56. They are characterized by a dominance of grasses, with a strong representation of nonnative pasture grasses in some locations. Common native grasses include big bluestem, little bluestem, and side-oats grama. Nonnatives present include Canada bluegrass, quack grass, yellow foxtail, and white sweet clover. Forbs are present on these prairies in reduced numbers, including heath aster, sky blue aster, and bastard toadflax. One of the most notable features of these prairies are the sandstone outcrops that occur about half way up the slope. Many are visible from County Highway 2 and provide added aesthetic value. The altered species composition caused by grazing, and to a lesser degree, the recent vacation home construction at the bluff top result in the lowered ranking of this community. Despite its low ranking, this site and surrounding oak woodland-brushland have good restoration potential. Reintroduction of controlled burns, as well as wood cutting of the brush layer in targeted locations, would help to improve its rank. In addition, the top of the

eastern-most prairie offers a remarkably beautiful and inspiring view of Lower Wells Creek and Lake Pepin.

Community 4-58

Mesic Oak Forest

Rank: D

This small patch of forest occurs immediately adjacent to County Highway 2. The eastern portion of this community is on nearly level ground and contains a number of shade-tolerant trees such as maple and basswood, while the western portion is more hilly and has a canopy dominated by oak species. Some limited wood cutting had been done in this community, approximately 10 years ago and also over 50 years ago. One 27-inch red oak in the eastern portion of this community was cored and found to be 136 years of age. The shrub layer varies from sparse to moderate from east to west. Sugar maple seedlings and American hazel are common, with other species of tree seedlings, brambles, and bristly greenbrier less common. The ground layer is varied, but generally dominated by species characteristic of open woodland. These include bottlebrush grass, woodland sunflower, horse gentian, false solomon's seal, and Culver's root. This community is small in size, and has been somewhat fragmented by things such as utility line right-of-way cuts. Because of these disturbances, the community received the lowered rank of D.

Community 4-59

Mesic Oak Forest

Rank: BC

This oak dominated forest occurs on the north-facing slope east of Frontenac Ski area. It is characterized by relatively small diameter, multiple-stemmed trees, little shrub cover, and a carpeting of ferns and forbs. Red and white oak are the most common species in the canopy, with one cored 18-inch red oak found to be 60 years of age. The relatively young age and straight, multiple stems of canopy trees and absence of cut stumps would tend to indicate release of this site from an activity such as grazing. The presence of fences would tend to support this possibility.

Locations in the forest where gaps in the canopy exist tend to have thick patches of sugar maple seedlings. These will likely be canopy members in the next 100 years if the forest is left to its own devices. The ground layer is generally species rich with carpets of interrupted fern and scatterings of wild geranium, hog peanut, lady fern, and zigzag goldenrod. Other notables include rice cutgrass, yellow bellwort, and maidenhair fern. The relatively young age of canopy trees keeps this forest from being ranked higher, but it will increase in rank quickly with no disturbance. This is a very aesthetically pleasing forest to walk in and should be considered for long-term management that will conserve its high quality and appearance.

Community 4-60

Oak Woodland Brushland

Rank: D

Occurring on the slopes below Community 56, this oak woodland-brushland is characterized by disturbance and fragmentation. It is dominated by scattered oaks, with quaking aspen commonly forming large clones between them. The shrub layer is variable, but often dominated by smooth sumac. The ground layer is represented by species indicative of disturbance with nonnative grasses and forbs occurring occasionally. The fragmentation of this community is a result of the development of ski runs, which causes a loss of continuity in community structure and functionality. The south-facing slope of this community contains a small bedrock bluff prairie that has a primitive road cut across it. Because it appears grass dominated, is disturbed by a road, and is heavily encroached on by brush, it has been included in this community. Because of fragmentation and the disturbance this community receives, it was given a low qualitative rank.

Community 4-61

Mesic Oak Forest

Rank: D

This community occurs on a northeast-facing slope and is surrounded by agricultural field and a quarry on the north side. It is characterized by a mix of oak, sugar maple, green ash, and quaking aspen. Bur and black oak comprise the apparently older trees of this group. Some tree removal has taken place in this community. The shrub layer is thick with hazel, European buckthorn, and tree seedlings common. The ground layer is dominated by species indicative of disturbance, however patches of open woodland species occur occasionally. These include bottlebrush grass, heart-leaved aster, and starry false solomon's seal. Overall, this community is small, and because of its history of disturbance, was given a low ranking. The location of this site at the junction of Highway 61 and County Highway 2, along with the quarry to the north, would make a nice city or roadside park. Working together, local residents may want to consider it for such a purpose, or as an addition to the Sportsmen's Club across the road.

Site 5

Site 5 is composed of several long side valleys that are found south of Wells Creek. The slopes of these side valleys tend to be moderately steep to steep. These are dominated by dry and mesic oak forest with one white pine-hardwood forest and one bluff prairie occurring. Also found in this site are communities associated with Wells Creek itself, such as lowland hardwood forest, floodplain forest, and river beach. These form large, contiguous tracts of forested community similar to those found in Site 6. These large, intact forests are important for rare species and

forest dependent wildlife that do not tolerate fragmentation of habitat. Larger resource issues facing this site include some active gully erosion, and bank erosion of Wells Creek. Also of substantial impact in some areas is the use of logging techniques that cause a loss of community function and species composition, as well as increase sheet and rill erosion.

Natural Resource Values

The Rare Features value for this site is moderate because of the contiguous forest communities of good to very good quality. Although no rare species were documented in this Site, the potential for undocumented populations of rare species is good. The Natural Community Integrity and Wildlife Habitat values are high. This is a result of the large tracts of forest making this site suitable for species that are sensitive to fragmentation and smaller tracts. The aesthetic value assigned to this site is moderate. Few landscape views are offered from bluff tops, and few forests offer exceptionally picturesque settings.

Site 5 Community Descriptions

Community 5-25

Lowland Hardwood Forest

Rank: C

Please see the description for Community 2-25

Community 5-62

Lowland Hardwood Forest

Rank: CD

This lowland hardwood forest occurs on a terrace of the Wells Creek floodplain. Eastern cottonwood forms a scattered supercanopy, with some trees reaching 60 inches in diameter. Common canopy species include black walnut, green ash, and black willow. Green ash and black walnut are generally tall and straight with the lowest limbs often 15 feet or more above the ground. One cored 16-inch black walnut was approximately 45 years old. Some tree cutting has taken place in this community, several stumps present were of silver maple. The shrub layer of this community is varied, but often contains black walnut seedlings, as well as box elder, common elderberry, gooseberry, and brambles. The ground layer is likewise varied with virginia waterleaf, wood nettle, and spotted touch-me-not common. Other ground layer species present include the natives goldenglow, yellow honewort, horse parsnip, wildrye, virgin's bower, and angelica. Nonnatives present include reed canary grass, stinging nettle, chickweed, and creeping charlie. Some areas of this community are currently or formerly grazed, as evidenced by fences, presence of nonnatives, and loose, fluffy soil. Because of the recent origin of this community, the influence of grazing, and the wood cutting activities, this community was given a somewhat

lowered rank. In general, these parcels should continue to improve in rank, particularly in the absence of intense grazing and wood cutting.

Community 5-63

River Beach, Sand Subtype

Rank: CD

This community occurs in numerous places along Wells Creeks. These generally occur along the inside bends of the stream with sand deposition resulting during periods of high water. They vary in composition based on proximity to the stream channel and stream terrace height. Some portions of this community would probably otherwise not be classified as river beach, but for the purpose of classification on a broader scale are considered a part of it. These include areas dominated by shrubs or small trees within the floodplain commonly hosting such species as sandbar and Bebb's willow, black locust, and black walnut. By far, the dominant part of this mapped community can be classified as river beach. Species present on the driest part of these beaches include many also found on dry prairies, such as sand dropseed, muhly grass, tall wormwood, and yarrow. Other areas that are wetter and show less evidence of sand deposition have species such as angelica, American groundnut, prairie cordgrass, and New England aster. Nonnatives present along much of this community include reed canary grass, purple loosestrife, wild parsnip, and Kentucky bluegrass. In some places these nonnatives form solid stands, lowering the overall quality of the community.

Based on aerial photos, it appears that a disproportionate amount of the sand for these beach communities comes from just a few large erosional features. One of these is located on MN DNR State Forest land in the NW one-fourth of Section 20 in Florence Township. This is located on the outside of a sharp bend of Wells Creek, with slopes approximately 30-40 feet high. This erosion does not appear to be directly related to land use on DNR property, but rather related to stream dynamics driven by the watershed conditions upstream. Conversations with DNR Biologists indicate that Division of Forestry staff is aware of the situation and currently working on a means to stabilize the bank. Another large eroded bank is located in the north one-half of Section 23 in Florence Township. It is much larger than the one described above and may be 50 feet tall, with a total length of over 500 feet. Apart from these two erosional features, cut banks associated with the outside bends of Wells Creek tend to average 5 to 8 feet in height.

Community 5-66

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: C

Situated along a southwest-facing slope, this bluff prairie is of moderate quality. The brush cover is about 25 percent and dominated by smooth sumac, with white birch, and eastern red

cedar playing a secondary role. Common native grasses include indian grass, side-oats grama, and little bluestem. Other native grasses and forbs, indicative of higher quality are either not present, or are found in reduced numbers. Species present that fit this category include rough blazingstar, hoary puccoon, prairie coreopsis, and prairie dropseed grass. The face of this slope is steep and covered by platy dolomite cobbles. About half way up the slope are numerous sandstone outcrops, which host species with an affinity for sandy soils, such as tall wormwood. Because of the apparent history of grazing that has caused a shift in species composition, this community received only a moderate rank. Efforts to conserve this prairie should include the reintroduction of controlled burns.

Community 5-67

Oak Woodland-Brushland

Rank: CD

With a canopy that varies from almost none to approximately 80 percent, trees in this community are dominated by black and bur oak. These average approximately 16 inches and usually have an open-grown form. One 16-inch bur oak was cored and found to be 178 years of age. Second growth around these older oaks is dominated by aspen, birch, and smaller oaks. The shrub layer is thick and dominated by oak saplings, prickly ash, and European buckthorn. White snakeroot and Pennsylvania sedge are the most common species in the ground layer, with others being represented from prairie and dry oak forest. Overall, the quality of this community is moderately poor, partly due to the past influence of grazing.

Community 5-68

Mesic Oak Forest

Rank: C

This oak forest occurs along the slopes of a north-facing draw. The canopy closure averages about 85 percent and is dominated by often open-grown bur oak and white birch. One 16-inch bur oak cored near the top of the hill was determined to be 178 years of age. The shrub layer is moderately thick, but easily walked through. It is dominated by prickly ash and European buckthorn. The most common forbs in the ground layer are pointed-leaved tick trefoil and zigzag goldenrod, while the most common graminoid is Pennsylvania sedge. This community shows signs of a history of grazing, has a field road across part of it, and has some problems with gully erosion. These factors serve to lower the overall quality of this site. Control of erosion, as well as continued rest from other impacts, will help this otherwise good quality community to reach a higher ranking.

Community 5-69
Mesic Oak Forest

Rank: D

This community is similar to Community 68 in the species present. However, it shows signs of logging approximately 20 or 30 years ago. Trees removed during that event were selectively oaks in the 18 to 30 inch diameter range. One 26-inch oak that was logged was 120 years old, putting it in a similar age class to the bur oak cored in Community 68. Because of past logging, and grazing, and the thick nonnative dominated brush layer that followed these, this community was given a low rank. Recovery without disturbance should see this community slowly recover to a better rank in the next 50 years. Active management of this site, particularly management of European buckthorn, would help speed this process substantially.

Community 5-70
Mesic Oak Forest

Rank: C

This community is dominated by white and red oak with almost none of them having an open-grown form. These generally average 19 inches in diameter, with one cored 21-inch white oak found to be 153 years of age. Many of the red oaks are multiple-stemmed, indicating release from some regular activity such as grazing and/or fire. This forest was logged 20-30 years ago, with approximately 50 percent of the canopy oaks removed. The shrub layer is correspondingly thick where there are canopy openings. It is dominated by blackberry and prickly gooseberry, with ironwood and silky dogwood also present. The ground layer has numerous species, but about half of these are indicative of disturbance. The most common forbs include pointed-leaved tick trefoil and yellow honewort. Overall, the quality of this site has been compromised by logging and apparent grazing. With continued time away from these activities, this forest will improve in quality.

Community 5-71
Dry Oak Forest

Rank: C

This forest was logged in the recent past, with removal of approximately 40 percent of the canopy. Common tree species include black and bur oak. The shrub layer of this community is dominated by American hazel and prickly ash, with European buckthorn and black cherry also common. The ground layer is moderately diverse, but generally dominated by a handful of species. These include Pennsylvania sedge, pointed-leaved tick trefoil, and elm-leaved goldenrod. Overall the quality of this community is moderate, being impacted by the past activity of logging, and to a lesser degree, grazing. Rest from these activities will allow this community to gradually improve in quality

Community 5-72
Mesic Oak Forest

Rank: CD

This community occurs on an east-northeast facing slope along a portion of a long forested valley. It has a canopy dominated by red and white oak, as well as black cherry and American elm. This community was logged approximately 50 or 60 years ago. More recently, there was extensive windfall damage in the summer of 1998 to trees on the lower portions of this slope. One cored 15-inch white oak was found to be 111 years of age, while a cored 8-inch moose maple in the subcanopy was found to be about 40 years of age. The shrub layer varies, but has moose maple as the most common component. Lower on the slopes, thorny species become much more prevalent, sometimes making walking difficult. The graminoid and forb diversity is moderately good. The most common species here are pointed-leaved tick trefoil, sweet cicely, lopseed, and yellow honewort. Because of the slow recovery from a history of logging, and to a lesser degree grazing, this community was given a relatively low rank. In the next 25-50 years, this community should continue to recover to a higher rank if it is kept from excessive disturbance.

Community 5-73
Lowland Hardwood Forest

Rank: CD

This community is located in the lowest portions of a long valley that is oriented north-south. It has a meandering ravine running through it that becomes quite deep, about twenty feet deep, near its confluence with Wells Creek. There is a recreational trail (Grant-in-Aid?) that follows this ravine. The community is composed of a curious mix of species that seem to be drawn from upland and lowland forest, and mesic prairie. The canopy of this community is dominated by black walnut, with bur oak less common. Other tree species found in this community include cottonwood, black locust, bigtooth aspen, box elder, and quaking aspen. The shrub layer varies from moderate to thick and includes species such as, prickly ash, European buckthorn, Iowa crabapple, and brambles. The graminoid and forb layer is generally dominated by a few nonnative or weedy native species that follow grazing. These include Kentucky bluegrass and natives Canada goldenrod and white snakeroot. Other common native forbs and grasses include virginia waterleaf, wood nettle, virginia mountain mint, oxeye false sunflower, agrimony, and pointed-leaved tick trefoil. Because of the past influence of grazing on this community, it was given a lowered rank.

Community 5-74**Oak Woodland-Brushland****Rank: CD**

This community occurs in several locations, these are grouped together based on similarities in species composition and structure, with less importance applied to the varied slopes/landforms on which they occur. In general, it has a broken to scattered canopy consisting of mostly large, open-grown bur and pin oak averaging 24 inches or more in diameter. One 20-inch open grown bur oak growing along a relatively flat area south of Highways 61 and 2 was cored and found to be 184 years of age. These open-grown trees have second growth from sapling to small tree size beginning to overtake them. Also common is a thick brush layer, generally dominated by prickly ash, smooth sumac, gray dogwood, and European buckthorn. The graminoid and forb layer is variable, but typically dominated by native species indicative of at least moderate grazing in most places. Chief among these are white snakeroot and Pennsylvania sedge. Overall, the quality of this community is moderately poor, justifying a rank of CD. Despite this rank, the community could improve in quality with the reintroduction of controlled fire and the management of the shrub, small tree, and ground layer. In the absence of active management, many of these areas will convert to dry oak forests in the next 50 years.

Community 5-75**Mesic Oak Forest****Rank: B**

This good quality mesic oak forest has a canopy dominated by red oak, most of which are 10-20 inches in diameter. Other tree species found include white oak, basswood, and moose maple. Common shrub layer species include silky dogwood, elm, Missouri gooseberry, moose maple, and fly honeysuckle. The graminoid and forb layer is species rich and includes members that are indicative of higher quality. Some of these include red baneberry, broad-leaved panic grass, a species of bulblet fern, and one orchid species. This is a very picturesque forest, with vaulting red oaks over carpets of ferns, mosses, and woodland flowers. The relatively thin shrub layer in many places provides the opportunity to see for quite a distance in this forest. Because of its species composition and structure, as well as the relatively low level of disturbance, this community was given a B rank. Along with surrounding forests, this community should be managed for its large, contiguous area and quality. Any activities that would serve to fragment these larger tracts of forest should be discouraged and highly scrutinized.

Community 5-76**Dry Prairie, Southeast Bedrock Bluff Subtype****Rank: D**

This small, isolated prairie occurs on a west-facing slope on DNR State Forest land. It is composed of two small prairies separated by a line of eastern red cedar that mark the location of a former fence. Brush cover on this prairie is approximately 30 percent and dominated by quaking aspen, prickly ash, and eastern red cedar. This prairie is dominated by native the grasses side-oats grama, big and little bluestem, and Indian grass. The few forbs present indicate past grazing, with species indicative of higher quality such as white prairie clover and prairie dropseed grass only occurring occasionally. Because of the change in species composition brought about by past land use, this prairie was given the lowered rank of D. Despite its low rank, this prairie is deserving of management, including the application of prescribed fire, and/or brush cutting.

Community 5-77

Dry Oak Forest

Rank: BC

This dry oak forest is dominated by large bur and pin oaks, many of which have an open-grown form. Many of these are showing signs of decline, including dead or dying limbs and heart rot. These large oaks are surrounded by younger, second growth trees including oak, black cherry, and white birch. One second growth bur oak, 16 inches in diameter was cored and found to be 119 years of age. The shrub layer is moderately thick, particularly in areas dominated by the open-grown oaks. Common shrub species include ironwood, prickly ash, Missouri gooseberry, and black cherry. The ground and forb layer is variable, and includes species such as Pennsylvania sedge, pointed-leaved tick trefoil, rattlesnake plantain, and wintergreen. Overall, the quality of this forest is relatively good, justifying a rank of BC.

This community includes a steep north-facing on the northeastern most segment of the several units. It includes some white pine of various age classes among a similar canopy to above. These white pine include some as old as possibly 40 or 50 years. These are presumably colonizing this hillside from the white pines planted below in Community 81. The seeds may be reaching the hill by wind dispersal, or more likely animal transport. The white pine in Community 81 were most likely planted about 100 years ago; therefore, these stands can not be considered remnant white pine. However, there is the possibility that through time these stands of mixed pine-hardwood forest could begin to function more like the remnant stands.

Community 5-78

Mesic Oak Forest

Rank: D

This community was recently logged, with a large percent of the canopy removed. It appears to have been cut in the last 5-10 years. The community is currently dominated by extremely thick resprouts of oak, ironwood, and white birch. Sometimes these are thick enough to prevent

forward progress on foot. The ground layer is patchy with Pennsylvania sedge and gooseberry common. Overall, the quality of this community as a mesic oak forest is extremely poor. To recover to a C rank or better, this community will require at least 30-50 years with minimal disturbance.

Community 5-79

Mesic Oak Forest

Rank: CD

This community is similar in species composition to some of the surrounding mesic oak forests. However, it appears to have had a slightly different history of land use. The oaks present in this community are generally large, some of the black and white oaks approach 36 inches in diameter. Logging and/or woodcutting appear to have taken place about 40-60 years ago. This activity did not affect substantially the composition of the community, with the current canopy closure 85-100 percent. The Presence of fences and thorny shrubs tend to indicate a history of grazing. This is also supported by the lack of many species in the ground layer. Because of the reduction in species richness (number of species) caused by past disturbance, this community ranks relatively low.

Community 5-80

Dry Oak Forest

Rank: D

This forest occurs on a generally southeast-facing slope that varies from moderate to moderately steep. Much of the slope has been recently logged, giving the community a low rank as a result. Based on a general inspection, it appears that the species most removed were oak. Remaining trees include bur and black oak, basswood, elm, quaking aspen, and black cherry. Most of these are in the pole-size range of 6-12 inches in diameter. The shrub layer is generally thick and dominated by European buckthorn, prickly ash, and American hazel. The graminoid and forb layer is of poor quality with many of the species present indicative of moderate to severe disturbance. These include yellow honewort, kidney-leaf buttercup, yellow foxtail, common ragweed, and Canada thistle.

Community 5-81

White Pine-Hardwood Forest

Rank: C

Although this community is highly unlikely to be a remnant of original white pine stand, it is classified as such based on the composition, structure, and perceived function of the community. This forest occurs on a terrace of Wells Creek, and on a somewhat steep north-facing slope that descends to the creek. It has a supercanopy of white pine that average 24 inches in diameter, with some reaching 32 inches. One 25-inch white pine was cored and determined to be 90 years

of age. The canopy of this forest is largely composed of black and white oak that range in size from 12-30 inches in diameter. One 22-inch black oak was cored and found to be 103 years of age. This would tend to indicate that the site had some oak component, either sapling or larger, prior to presumed planting of the white pine.

There is a range of different white pine and oak sizes within this forest, indicating good reproduction in the past. The shrub layer is moderately thin with ironwood and red-berried elder most common. The graminoid and forb layer is relatively sparse. It includes species such as bloodroot, wild sarsparilla, false solomon's seal, Canada mayflower, and rattlesnake plantain. The ground layer should continue to increase in cover and species richness with minimal outside disturbance. The several inch deep duff layer is largely composed of needle-drop from pine. This may begin to negatively influence tree reproduction and overall species composition if it is allowed to deepen. This community appears to have been lightly logged over 50 years ago, with no significant impacts to the community composition or structure.

Overall, this site is remarkably picturesque. It is the only site in the LWCW where mature pines and oaks form a cathedral-like canopy on a nearly level site. The views offered are reminiscent of those found farther north in Minnesota. This community was given a good rank due to the presence of species characteristic for the community type and because many white pines are around old growth status (100 years of age). The fact that these pine were highly likely to have been introduced by planting is disregarded for the purposes of this classification and ranking. Community composition, structure, and function were the overriding factors in that process.

Community 5-88

Lowland Hardwood Forest

Rank: D

This lowland hardwood forest occurs in two separate units along Wells Creek. These are separated by approximately one-quarter mile. The western portion of this community occurs near a MN DNR State Forest land access point that has a foot path and bridge across Wells Creek. The canopy of this community is generally patchy and averages 75 percent coverage. It is dominated by box elder and black willow. Trees playing a role of secondary importance in the canopy include eastern cottonwood, elm, black walnut, basswood, and hackberry. The shrub layer is sparse to moderate, with gooseberry being the most common species. The ground layer varies in quality from moderate to very poor. It is often dominated by nonnative species, presumably introduced as part of pasture management at some point in the past. The nonnatives reed canary grass, creeping charlie, and stinging nettle are most common. Native species present include cup plant, goldenglow, Virginia waterleaf, and tall meadow rue. The section of Wells Creek that runs through this community has a variety of bottom materials including gravels,

sands and silts in riffles, runs, and pools. Overall, this forest community is of generally poor quality, showing signs of past disturbance, justifying a rank of D

Community 5-89

Oak Woodland-Brushland

Rank: C

This community occurs on a south-facing slope and has a patchy canopy. Common trees include eastern red cedar, white birch, and bur oak. The shrub layer is patchy as well with open areas having an abundance of grasses, including little bluestem and side-oats. This hillside appears to have a history of grazing, resulting in reduced overall species composition. The limited information gathered for this particular community indicates moderate past land use justifying a quality rank of C.

Community 5-215

Lowland Hardwood Forest

Rank: CD

Please refer to full description for Community 6-215.

Community 5-220

Mesic Oak Forest

Rank: C

Please refer to full description for Community 6-220.

Site 6

This site has the largest, best quality, and most intact forest communities in the LWCW. The most common natural communities are mesic and dry oak forest. These occur along a number of long, sometimes twisting side valleys with moderately steep to steep slopes. There are no less than one increasingly uncommon or rare species, including one animal and three plants. The contiguous nature of the forests within this site make it highly suitable for species of plants and animals that are sensitive to forest edges and the impacts they entail. Along with Site 5, this area should be managed on a landscape-scale for these large tracts of forest, with appropriate methods of management and restoration applied to ensure their maintenance and/or improvement.

Natural Resources Values

The Rare Features Value for this site is high as a result of having three species of rare or legally protected, or MN DNR tracked plants. One rare bird species was also documented near the west edge of Site 7, adding significance to the Rare Features Value of this site. The Natural Community Integrity value is also high for this site with several forested communities being BC

ranked or better. Because of the large, contiguous nature of the forests of this site, their likely appeal to neotropical songbirds (songbirds that migrate between Central or South America and the United States/Canada), as well as proximity of the site to the Mississippi River migration corridor, this site is ranked high for Wildlife Habitat Value. The Aesthetic value for this site is ranked as moderate. Although there are few vistas out from bluff tops, many areas in these forests are aesthetically appealing.

Community 6-62

Lowland Hardwood Forest

Rank: CD

See community description 5-62

Community 6-63

River Beach, Sand Subtype

Rank: CD

See community description 5-63

Community 6-64

Mesic Oak Forest

Rank: D

This forest is situated on a south to west facing slope. It is bordered above by nearly level crop ground and below by lowland forests of Wells Creek. The canopy of this forest is generally closed and dominated by second growth, which followed logging. Common canopy trees include bur oak, pin oak, and cherry. Less common are basswood, aspen, white birch and hackberry. One 18-inch bur oak was cored and found to be 187 years of age, indicating exceptionally slow growth. The shrub layer commonly contains American hazel and ironwood, a species conspicuously absent from most oak forests in the LWCW. The ground layer has relatively few species in it, most represented by those that follow disturbance including virginia stickseed, Pennsylvania sedge, and white snakeroot. Overall, the quality of this community is generally poor, a result of past disturbance.

Community 6-65

Lowland Hardwood Forest

Rank: D

This young forest is likely retired pasture that is currently used as a recreational/camping area by private individuals. The dominant tree is box elder in this community, with black walnut, green ash, and cottonwood less common. Very few trees are over eight or ten inches in diameter. The shrub layer is dominated by tree species and thorny shrub species including European buckthorn, wild plum, and brambles. The ground layer is dominated by nonnative pasture grasses and weedy forbs. Because of the excessive amount of past and present disturbance, as well as the recent origin of this community, it is given a rank of D.

Community 6-84
Mesic Oak Forest

Rank: D

This forest was selectively logged for oak and other hardwoods such as black cherry about 10 years ago. There was a prior logging about 65 years before that. Most of the recently cut trees were about 60 years of age. Few oaks remain in the canopy and there is little oak regeneration occurring. The most common tree remaining is moose maple averaging 12 inches in diameter. The brush layer is moderate to very thick and dominated by American hazel, moose maple, and blackberry. The ground layer is variable, sometimes dominated by species indicative of disturbance, while other times species of moderate quality are present. The most common species in the ground layer include interrupted fern and white snakeroot. This hillside has numerous logging and skid roads cut across it. These appear to have been revegetated with a nonnative cool season pasture grass mix. Grazing was also a likely past land use of this community, based on the overall species composition and the presence of “armed” shrubs. Because of the disturbances associated with two loggings, this community received the low qualitative rank of D.

Community 6-85
Mesic Oak Forest

Rank: D

This heavily grazed oak forest has a canopy cover ranging from 35-95 percent, increasing upslope. There is some wood cutting taking place in the pasture. It is difficult to determine whether this is for trying to increase pasture (reduce canopy cover) or for home/shop wood burning. The most common tree species include white and red oak, moose maple, aspen, white birch, and black cherry. The shrub layer is moderate to sparse in thickness, with gooseberry and American hazel most common. Both of these are species capable of withstanding heavy grazing. The graminoid and forb layer is dominated by nonnative cool season pasture grasses, particularly on the lower slopes. Native ground cover increases somewhat upslope. Because of the consistent long-term influence of grazing on species composition, and forest structure and function, this community received a low ranking of D.

Community 6-87
Mesic Oak Forest

Rank: D

This forest of recent origin has a generally closed canopy dominated by bur and black oak. One 20-inch black oak was cored and found to be 49 years of age, quite young for an oak of that size. Other occasionals in the canopy include black walnut and black cherry. Less common are scotch and red and white pine, all planted in patches on the edge. These are generally under 20 years of age. The shrub layer is thick to very thick and dominated by prickly ash, gooseberry, and

buckthorn. The ground layer is dominated by Virginia stickseed and sweet cicely. The young trees of this community and the composition of the shrub and ground layer would tend to indicate intense grazing on this hillside for an extended period of time. Because of this overall composition and the large role human activities have had in shaping its current composition, this community was given the low qualitative rank of D.

Community 6-201

Mesic Oak Forest

Rank: C

Found on a generally north-facing slope, this forest has a canopy dominated by black oak and black cherry. Canopy height ranges from 40-60 feet, with nearly continuous cover. Other trees found less frequently include white and bur oak, red elm, and basswood. The shrub layer has at least 12 species, most common are smooth juneberry, brambles, elder, cherry, prickly ash, and hazel. European buckthorn is also common, but is not a dominant component. The ground layer also has moderate species richness and includes some members indicative of better quality oak forest. These are mitterwort, wild ginger, and starry false solomon's seal. This forest has indications of former logging, including logging roads and cut stumps. The species composition, in general, also reflects moderate disturbance. These factors justify a moderate ranking of C.

Community 6-202

Oak woodland-Brushland

Rank: D

This community is actually an old field that has recovered just enough native character to be classified as an oak woodland-brushland. Young bur and black oak, and aspen are the most common tree species. These are all under fifteen feet in height. The most common brush is staghorn sumac and brambles, especially blackberry. The ground layer is composed largely of nonnatives that are persisting following retirement from agriculture. The most common native species include bracken fern, yellow wood sorrel, and Canada goldenrod. This opening in the woods will likely change to an open forest in the next 50 years. Because of its lack of native character and past disturbance, it is given a poor qualitative ranking.

Community 6-203

Oak Woodland-Brushland

Rank: D

This community occurs along an intermittent stream. It has a patchy canopy with black oak averaging 20 inches in diameter, and box elder common. The shrub layer is moderate to thick and dominated by gooseberry, European buckthorn, brambles, silky dogwood, and box elder. The ground layer has large patches of maidenhair, lady, and interrupted ferns, which are aesthetically pleasing. Also common in the ground layer are bluebead lily, cheeses, and sweet

cically. Because of the variable quality of the community composition and structure, and the past influence of human activities, this community received a low qualitative ranking.

Community 6-204

Mesic Oak Forest

Rank: B/BC

This community covers an exceptionally large area. It was all considered together based on species composition, community structure, and apparent land use history. Overall, the quality of this community is good to very good. The dominant canopy species include white, black, and bur oak with black cherry, white birch, and basswood being important components as well. The canopy is nearly continuous and averages approximately 70 feet in height. The shrub layer is variable, but moderately sparse in most places. Common shrubs include elder, cherry, elm, and bitternut hickory. European buckthorn is found in this community, but is largely confined to the edges. Likewise, the ground layer is of good quality. Species commonly encountered here include lady, maidenhair, and interrupted fern, hog peanut, and false-nettle. As with Communities 204a/b, this forest has some windfalls of recent origin. The good overall quality of this forested complex is reinforced by the sighting of birds such as the pileated woodpecker.

Community 6-204a

Mesic Oak Forest

Rank: CD

This forest appears to have been part of 204/b, with some recent events changing the overall quality. These activities may have been windfalls, with wood cutting to follow or logging of trees. The presence of cut stumps and the following dominance by aspen serve as additional indicators of some disturbance. Because of the level of disturbance, these pockets of oak forest within the larger community 204 were considered separately for ranking.

Community 6-204b

Mesic Oak Forest

Rank: BC

Despite recent windfalls, and evidence of past logging and quarry activities, this forest is of good overall quality. White and black oak are most common in the canopy, with seven other tree species noted. The shrub layer is moderate to thick, with buckthorn being more common near roads. Other common shrub species include brambles, smooth juneberry, silky dogwood, and gooseberry. Maidenhair, lady, and interrupted fern are all common in the ground layer, with false-nettle and hog peanut also being common. The overall quality of this site justifies a good rank.

Community 6-205**Mesic Oak Forest****Rank: D**

This forest occurs at the top of a dissected drainage and is bordered on three sides by agricultural crop fields. The most common trees in the nearly continuous canopy include white and bur oak, white birch, and some exceptionally large box elder. Smaller trees in the canopy include white birch and green ash. The shrub layer is thick to impenetrable and dominated by European buckthorn. The buckthorn is thick enough to impoverish the ground layer. This is accomplished by light interception, outcompeting native plants for water and nutrients, and creating a chemically hostile environment in the soil that prohibits normal development of other species of plants. Because of the prevalence of species in the canopy and shrub layer that indicate disturbance, and some logging of oaks, this community received a low rank.

Community 6-206**Mesic Oak Forest****Rank: D**

This forest shows a history of selective logging of oaks. The most common canopy tree remaining is young quaking aspen, most of which are very closely spaced. Other trees are most commonly black oak, white birch, and basswood. The shrub layer is generally thick and dominated by brambles, gooseberry, and European buckthorn. The ground layer is disturbed in many locations, with the better quality being found along ravines and steeper slopes. Common graminoids and forbs include Pennsylvania sedge, sweet cicely, stinging nettle, and chickweed. Because this forest has been strongly influenced by past land use, it receives a low qualitative ranking.

Community 6-207**Oak Woodland-Brushland****Rank: C**

Found on a south and southwest-facing slope, this oak dominated community has scattered oak trees with other tree species in the canopy. The upper slopes of this community tend to have more white birch, aspen, and sumac than the lower slopes, which are more oak dominated. The shrub layer is of good quality for this community type, representing much of the plant species' richness. At least nine species of shrubs are found here, with brambles, prickly ash, staghorn sumac, silky dogwood, and gooseberry most common. European buckthorn is found occasionally, and not dominant in any location. The ground layer commonly has wild geranium, sweet cicely, yellow honewort, and hog peanut. The presence of species in the ground layer that indicate recovery from disturbance. For this reason, the community was given only a moderate ranking.

Community 6-208**Dry Prairie, Southeast Bedrock Bluff Subtype****Rank: CD**

This prairie has about 40 percent brush cover, which is dominated by prickly ash, sumac, and to a lesser degree, brambles and European buckthorn. The dominant grass is Indian grass, with side-oats grama, and little and big bluestem common. Forbs that are common include bergamot, yarrow, and new england aster. Species indicative of high quality prairie such as prairie coreopsis and leadplant occur only occasionally here. Because of the overall composition of this prairie and the encroachment by brush it is given a low ranking. Improvements to this prairie could be made by reintroducing prescribed fire. The trail that traverses the slope the prairie is on could serve as a firebreak for such an effort, allowing one half of the prairie to be burned at a time.

Community 6-209**Mesic Oak Forest****Rank: D**

This forested community occurs as an isolated linear habitat along a north-facing slope near Frontenac. Common canopy trees include black and white oak, as well as green ash, black walnut, and box elder. Black oaks average about 12 inches and are the largest trees. The shrub layer is dominated by tree saplings, gooseberry, and European buckthorn. The ground layer varies in quality with sweet cicely, large-leaf aster, red baneberry, and false solomon's seal all commonly found. Because this is a linear community of small size and has buckthorn dominant in the shrub layer, it received a poor qualitative ranking.

Community 6-215**Lowland Hardwood Forest****Rank: CD**

This large, forested community varies slightly in species composition and three-dimensional structure based on current and past land use practices. These were considered together because of the number of similarities they share and their perceived functionality in the landscape. Common canopy species in this community includes red elm, eastern cottonwood, box elder, white birch, quaking aspen, and green ash. The composition of the shrub and ground layers varies and represents a collection of species from both upland and lowland communities, whose distribution is dependent on relation to surface and ground water. Some of the shrub species include brambles, common elderberry, buckthorn, box elder, and willow. Common ground layer species include motherwort, bergamot, false-nettle, virginia waterleaf, stinging nettle, and reed canary grass. Overall, the quality of this community is moderately poor. This is a result of the recent origin of the community, land use history, and potential changes of the landscape from historical hydrologic conditions.

Community 6-218**No Community Classification****Rank: NA**

This site is a pine plantation dominated by red and white pine. These appear to have been planted about 50 or 60 years ago, possibly associated with some of the “wildlife” plantings commonly performed following the droughts of the 1930s. The existing cover into which these were planted was a field of nonnative smooth brome. The shrub layer is moderate and dominated by brambles, buckthorn, gooseberry, and common elder. Although white pine is native to some dry cliffs in this area, these are very likely not of local genetic type. Red pine is not native to this area, but is often used with white pine in “wildlife habitat plantings”.

Community 6-220a,b & 6-221**Mesic Oak Forest****Rank: 220 – C****220a- BC****220b- BC****221 - CD**

This community includes several contiguous tracts on east and west-facing slopes of a long valley. These were considered together because they have similar compositions, but differences in at least one aspect of the communities structure, function, or land use history. In areas with no logging and minimal windfall damage, the canopy is dominated by black, bur, red and white oak. Most of these are forest grown, with tall, straight trunks, and often reach 24 inches in diameter. Other common canopy tree species include red elm, white birch, quaking and bigtooth aspen, and black cherry. The shrub layer varies from sparse to moderately thick based on community quality, with native species common including silky and gray dogwood, pin cherry, and common elderberry. European buckthorn is present throughout, but only common in areas of disturbance. The ground layer is variable, but of generally good quality. Some species indicative of good quality include wild ginger, white baneberry, early meadow rue, jack-in-the-pulpit, and bloodroot.

Community 6-220 is found mostly on State Forest land, and because of apparent past logging and the disturbances associated with these activities, was given a lower rank. Some aggressive species are present in this community, particularly near logging skid trails.

Community 6-220a is of similar composition to 220, but has a distinctly less disturbance, little buckthorn present, and a better quality ground flora. Some of these species include wood anemone, bloodroot, starry false solomon’s seal, maidenhair fern, and wild ginger. Community 220a is associated with some of the ravines in this community.

Community 6-220b received a rank of BC, largely because it appeared to have less logging than some of the surrounding areas of shallower slope. **Community 221** was given a lowered rank due to the logging of most oaks, leaving aspen as the dominant canopy tree with thick brush often found underneath

Overall, the quality of these forest tracts is good. Efforts should be made to keep a continuous canopy cover intact and use management practices that allow representation of a wide range of tree age classes, as well as promote the greatest number of native species and functionality at the shrub and ground layer.

Community 6-224

Mesic Oak Forest

Rank: D

This oak forest has been influenced by the past activities of logging and storm windfalls. Some areas in this community are of better quality and resemble the better portions of Community 220, but overall it is of much lower quality. The canopy of this forest is broken in most places and dominated by black oak, some reaching 30 inches. Other common species include small sugar maple, as well as bigtooth aspen and white birch. The shrub layer varies from moderate to impenetrable where the canopy has been opened up. Common shrub species include brambles, buckhorn, and common elderberry. The ground layer varies from good to poor quality and is very closely associated with the previous land use. It appears, based on marked trees, that this area is slated for additional tree removal in the near future. Some red oaks have been planted with deer protection in certain areas, these were especially damaged near fields. The overall quality of this site is poor and received a rank of D. If the red oak seedlings mature and the area receives minimal disturbance for the next few decades, this forest should improve its qualitative rank. Without intervention, much of the oak component in this forest will be lost in the next 50 years. The resulting forest would likely be dominated by a collection of sugar maple, white birch and aspen.

Community 6-226

No Community Classification

Rank: NA

This community is an old field that has been retired long enough to have been colonized by small aspen, cottonwood, and birch. Small oaks are less common. This area grades into the surrounding oak woods. The ground layer is dominated by nonnative species that are persisting from their planting in the field. These include a collection of mostly nonnatives, with some native species beginning to recolonize. Nonnatives include Kentucky bluegrass, smooth brome, sulfur cinquefoil, and millet. Native species most common include sweet cicely, annual sunflower, ragweed, Canada goldenrod, and woodland sunflower.

Site 7

This site is composed mostly of communities along the floodplain of Wells Creek. These include Floodplain Forest, Lowland hardwood Forest, and Wet Meadow. Upland areas have Oak Woodland-Brushland as the dominant community type, with Oak and mixed hardwood forests less common. This site has experienced a wide range of human activities including quarrying, logging, grazing, row cropping, and ditching/channelization. Residential development in Frontenac and rural residential development south of Frontenac/Highway 61 have also impacted local resources.

One of the most influential results of human activity since European settlement is the large amount of sediment transport to this Site as a result of upstream land use and channelization downstream of the rail road tracks within the site. In the time period 1895-1989 the delta of Wells Creek, known as Long's Point has grown a total of 100 acres (575,153 cubic yards of fill) into Lake Pepin as a result of this sedimentation. Two-thirds of this deposition occurred from 1974-1989.

Natural Resources Values

Although no rare plants occur within this site, one rare bird species was documented. The rare bird documented on this site is the red-shouldered hawk, a species of raptor typically associated with large-unbroken bottomland forests. These birds of prey are sensitive to human disturbance and also known to use upland forests occasionally. The Natural Community Integrity Value for this community is moderate, with some oak and floodplain forest communities with BC or better qualitative ranks. The Wildlife Habitat Value is high because of the diversity of forested habitat types and its occurrence within the Mississippi River migration corridor. The Aesthetic Value for this site is ranked low. Some nice views are found within the floodplain forests northeast of Highway 61, but most communities are disturbed enough, or overrun by invasive species to the point that it distracts from their aesthetic quality.

Community 7-74

Oak Woodland-Brushland

Rank: CD

Please see community description 5-74

Community 7-82

Dry Oak Forest

Rank: C

This disturbed forest occurs along a south-facing slope along Wells Creek, and includes a small portion of mesic oak forest along a low draw. It has a nearly continuous closed canopy

dominated of bur, black, and white oak averaging 16 inches in diameter. One 16-inch white oak was cored and found to be 107 years of age. The canopy also includes quaking aspen, American elm, white birch, and butternut. The shrub layer is variable, but generally moderate in thickness. It is dominated by gooseberry and elm/moose maple saplings.

Likewise, the graminoid and forb layer is variable. The drier areas contain species such as Pennsylvania sedge and three-seeded mercury, while some wetter areas contain species such as golden glow and golden alexanders. Some areas, particularly west of the gravel road, have indications of heavier disturbance from grazing. The draw portion of this community bordering the gravel road also shows a history of dumping of household goods and trash. Because of the past impacts of land use and the ongoing problems associated with dumping, this community received a lower rank than it otherwise would have.

Community 7-83

Floodplain Forest, Silver Maple Subtype

Rank: BC

This relatively young floodplain forest has a canopy largely composed of silver maple, with black willow a common associate. Some areas have had some tree cutting in the past few decades. In these areas, young elm, green ash, and black walnut are more common. One 14-inch diameter elm was cored and found to be about 35 years of age. Most of the canopy and second growth trees have tall, straight trunks, many of these have the lowest limbs 20 or more feet above the ground. The shrub layer is sparse, with the most common species being common elderberry, box elder, and black locust. Frequent species in the ground layer include wood nettle, virginia waterleaf, and clearweed. Wells Creek has a sandy bottom throughout most of this community. No riffles with gravel or rocky bottom were noted. There were also no locations of significant bank erosion noted. This community was of sufficient quality to be ranked BC by MCBS biologists.

Community 7-84

Mesic Oak Forest

Rank: D

Please see community description 6-84

Community 7-86

Wet Meadow

Rank: D

This wet meadow is associated with the floodplain of Wells Creek and is fed by a small spring-fed stream to the southwest. It appears to have periodic inundation from flooding. Water was standing in shallow low spots and deeper pools at the time of the field visit. The community is dominated by reed canary grass with pockets of shrubs and weedy native sedges and forbs. The

total shrub cover of the wet meadow is under 25 percent, with peach-leaf, sand-bar, and black willow common. Occasional species in the ground layer include the natives marsh aster, common reed grass, tussock sedge, and ground nut. Purple loosestrife is the dominant nonnative forb, forming single-species patches in some places. Overall, the quality of this community is low because of the past influence of nonnative species introduction, and grazing likely.

Community 7-90

Floodplain Forest, Silver Maple Subtype

Rank: B

This forested community is found in the lowest reaches of the floodplain of Wells Creek. The canopy is typically dominated by silver maple, with eastern cottonwood being more common in some areas. These trees average 16 and 24 inches in diameter, respectively. Many of the silver maples have multiple trunks. One cored 17-inch silver maple was approximately 50 years of age. Other less common canopy tree species include green ash, black willow, and black walnut. The subcanopy of the forest is dominated by box elder and smaller black willow. The graminoid and forb layer is varied, but dominated by the native species wood nettle, clearweed, bedstraw, and virginia wild rye. Nonnative species are common in some small areas and include reed canary grass, moneywort, creeping charlie, common plantain, and stinging nettle. The stream bed along this section of Wells Creek is dominated by shallow water over sand, with little change in depth or character.

Some disturbances associated with this community include the presence of stream dredge that was cast in a long pile along the southern side of Wells Creek east of Highway 61. This is not allowing floodwater from Wells Creek or the Mississippi River to influence the area as it would have historically. But this is likely a small influence on community function. Overall, the quality of this forest is good, justifying the B rank originally given by the MN County Biological Survey. This forest offers an aesthetically appealing setting in which to walk, with lofty canopies and tall, massive trunks giving the feeling of walking among giants. As this community continues to mature, the quality and aesthetic appeal should continue to increase.

Community 7-91

Oak Woodland-Brushland

Rank: CD

This oak dominated community has a broken canopy dominated by bur and black oak. One 17.5-inch bur oak along highway right-of-way was cored and found to be 120 years of age. A total of nine species of trees were documented as components of the canopy. Fifteen species were documented in the very thick shrub layer. Dominant shrubs include prickly ash, European buckthorn, black cherry, and prickly gooseberry. The graminoid and forb layer includes a spectrum of species of prairie, savanna, and dry oak forest. The most common species were

associated with a past land use history of grazing. These include Kentucky bluegrass, yellow honewort, cleavers, and white snakeroot.

Some native and nonnative brush clearing and prescribed burning has been performed by State Park Resource Management Crews on the northeast side of Highway 61. This small area is of dramatically better quality than the larger portion of the site on the southwest side. The southwest portion of this community would benefit greatly from both the clearing of brush and the reintroduction of prescribed fires. The small area already cleared and burned serves as the best example in the LWCW of how Oak Woodland-Brushland quality can be improved dramatically by these resource management activities.

Community 7-92

No Community Classification

Rank: NA

This area lies along the floodplain of Wells Creek. Because it does not have the characteristics of communities described for classification and ranking, it did not receive either. It is dominated by nonnative pasture grasses, with “bats” of sandbar willow and scattered eastern cottonwood. This community is part of the same retired pasture of which Community 93 is a part. Without active management, it is likely that much of this “community” will become a young floodplain forest.

Community 7-93

No Community Classification

Rank: NA

This area is given no community classification. It has a scattering of bur and black oak trees with a limited amount of brush, particularly thorny shrubs, underneath. The ground layer is dominated by nonnative grasses, indicating its former use as a pasture. The scattered, open-grown oak trees create a vista reminiscent of savanna, a community very common in the LCWC in the past. Because of the highly altered species composition of the graminoid and forb layer, this community does not have enough native character to be considered for classification and ranking. Despite this, the site appears to be in moderate to good condition for use as a pasture in the future. This site is a good candidate for the reintroduction of native grasses and forbs and the implementation of a paddock/rotational grazing system. In this regard, it would serve as a good demonstration area for graziers for the better understanding of pasture management and the role that cattle can play in compatible diversification of agriculture and landscape ecology.

Community 7-102

Dry Oak Forest

Rank: D

Please see community description 8-102.

Community 7-103

Shrub Swamp, Seepage Subtype

Rank: C

Please see community description 8-103.

Community 7-112

Old Field

Rank: NA

This is an old agricultural field that was retired and planted to nonnative cool season grasses. In areas where native grasses have not been planted, these species persist with some small amount of brush and tree encroachment, probably less than 1 percent total cover. The road that borders the west side of this old field was recently upgraded. With this activity came the regrading and reseeding of the road ditches. This roadside was planted with species native to the Upper Midwest, but includes lance-leaf coreopsis, a species not native to this location. The species list provided in the appendix section gives the roadside planting species in the “canopy” column, while other species are listed in their appropriate columns.

Community 7-113

Lowland Hardwood Forest

Rank: C

This open forest of recent origin is located on a gentle west-facing slope that was part of the abandoned channel of the Mississippi River. The canopy consists of scattered large bur oak and black walnut trees, with second growth largely made up of younger black walnut. A few of the black walnut are massive and measure in excess of 40 inches in diameter. The shrub layer is patchy and dominated by black currant and black raspberry. The ground layer shows signs of past disturbance, probably grazing, with single species patches common. Species found here include the nonnative reed canary grass, and natives wood nettle, ragweed, and yellow honewort. This site was given a moderate ranking partly due to the active management of the parks resources, which will improve this community’s ranking through time.

Community 7-113b

Oak Woodland-Brushland

Rank: CD

This woodland is found just south of, and connected to, Community 113. It is characterized by large open-grown bur and pin oak averaging 24 inches in diameter, with a scattered second growth of other trees under them. The second growth trees include black walnut, box elder, and black cherry. The shrub layer varies from sparse to moderately thick. It is dominated by species of a generally short stature including prickly ash, gray dogwood, smooth sumac, black raspberry, and gooseberry. Nonnative grasses are common in the graminoid and forb layer with native

species locally abundant. Natives identified include leafy satin grass, virginia wildrye, and native brome grass. Overall, the quality of this community reflects its apparent past use as pasture, causing a ranking that is moderately poor. However, this site is being actively managed as a native community and should improve in quality through time.

Community 7-114

Oak Woodland-Brushland

Rank: D

This oak woodland is found on a nearly level terrace of the Mississippi River and its abandoned channel. It is characterized by open-grown bur and black oaks of moderate size. These trees are very picturesque in form with twisted trunks and limbs. One 19-inch bur oak was found to be 102 years of age. Gaps in the canopy are relatively small and generally filled by chokecherry of different sizes. The defining layer of this community is the shrub layer, which is completely dominated by European buckthorn. This dense thicket is difficult to walk upright in and compromises, in a very significant way, the aesthetics and function of this community. The total canopy closure of the shrub layer has caused a near total loss of the ground layer. The most common plants found here are European buckthorn seedlings, with white snakeroot and kidney-leaf buttercup running a distant second in percent cover. The total impact of European buckthorn has caused a loss of community structure, composition, and function. For this reason, it was given a very poor rank.

Despite its rank, this community has wonderful potential for restoration. The flat aspect of the ground makes it ideal for the lowest cost restoration possible. The European buckthorn should be cut from this site, with the stumps treated in a safe and appropriate manner to prevent resprouting. This should be followed quickly by seeding of native species found in the area and the regular use of controlled, prescribed fires. This site, along with some sites immediately to the south, offer the best opportunities for restoration of oak woodland/savanna on river terraces in the LWCW. Restorations such as these have the potential to resurrect a park-like savanna of grasses and wildflowers bathed by shafts of light streaming through a canopy of oak trees.

Community 7-210

Oak Woodland-Brushland

Rank: D

Common canopy trees in this community are black and white oaks, some of which reach 24 inches in diameter, as well as black cherry and eastern cottonwood. There are abundant signs of logging as well as some indication of grazing. The shrub layer is dominated by prickly ash, European buckthorn, and silky dogwood. Although the ground layer contains some species indicative of an intact community, such as woodland sunflower and false solomon's seal, it is

generally dominated by weedy species. These include sweet cicely, catnip, and motherwort. The influences of past land use cause a lowered ranking of D for this site.

Community 7-211

Oak Woodland-Brushland

Rank: CD

This community is adjacent to an old field. It is dominated by open-grown bur and red oaks of various sized. The general appearance and species composition of the shrub and ground layer tend to indicate a history of grazing for this community. Dominant tree species include bur and black oak up to 24 inches in diameter, and black cherry. The shrub layer is dominated by prickly ash and brambles. European buckthorn is present, but not common. The ground layer is made up of species common in former pastures. These include nonnatives such as Kentucky bluegrass, smooth brome, reed canary grass, and butter-n-eggs. Native species are also common, but dominated by weedy species such as bergamot, Canada goldenrod, common milkweed, and pilose aster. Overall, the quality of this site is poor and was given a moderately poor qualitative ranking.

Community 7-212

Oak Woodland-Brushland

Rank: C

This community occurs on a south-facing slope that borders the floodplain of Wells Creek. It is dominated by large open-grown bur and black oaks about 20 inches in diameter. Other trees that occur as second growth among these oaks include quaking aspen, black cherry, and to a lesser degree, black walnut. The shrub layer is thick in most places and codominated by at least 10 different species of shrubs. Among these are the nonnatives European buckthorn and tatarian honeysuckle. The ground layer is moderately rich in species, but dominated by those indicative of disturbance. These include Canada goldenrod, sweet cicely, smooth brome and chickweed. This community appears to have a history of grazing, which reduced the number of native species and the overall stability of this woodland. For this reason, it was given only a moderate rank. This oak woodland, along with other adjacent oak communities, could improve dramatically with management. The removal of brush and the reintroduction of regular controlled fires would help this community improve dramatically in quality.

Community 7-213

Lowland Hardwood Forest

Rank: D

Found along the floodplain and low-lying terraces of Wells Creek, this forested community provides a picturesque view of the creek. Dominant trees in the canopy of this forest include green ash, some of which reach 24 inches in diameter, and box elder. Also common are eastern

cottonwood snags. The shrub layer is moderately thick with European buckthorn and common elderberry prevalent. The ground layer has many species sharing dominance including the natives false-nettle, virginia waterleaf, and mayapple. By far, the dominant group of plants consists of nonnatives, including chickweed, reed canary grass, stinging nettle, cheeses, and motherwort. Because of the lack of richness in species and the prevalence of nonnative species, this community was given a low rank.

Community 7-214

Oak Woodland-Brushland

Rank: CD

This oak community occurs along a flat terrace and north-facing slope along Wells Creek. It is bordered on by retired pasture, and on the southeast and east by a rural residential neighborhood. This woodland appears to have been grazed in the past and retired, possibly as many as 30 or 40 years ago. It is characterized by large, open-grown bur, black and white oaks, with a second growth of other tree species. These include box elder, green ash, and elm. The shrub layer is thick to very thick and dominated by European buckthorn, gooseberry, and prickly ash. Also found occasionally are the nonnatives Siberian elm and tatarian honeysuckle. The ground layer has species present that indicate former moderate disturbance, with some indicative of slightly better quality. Common graminoids and forbs include Pennsylvania sedge, virginia waterleaf, northern bedstraw, and red baneberry. Overall, the quality of this site is moderately poor, mostly a result of the dominance of invasive nonnative shrubs, especially European buckthorn.

This community could improve dramatically in quality with the removal of nonnative brush species and the reintroduction of controlled burns as a management tool. The presence of nonnative shrubs, especially European buckthorn, reduces the wildlife habitat value for most species, particularly songbirds. Birds are attracted to these nonnative shrubs because of the abundance of berries they produce, and ingest them readily. Because of the laxative affect of buckthorn berries the birds receive little or no nutritional value from the berry and simple serve as a mode of transportation for buckthorn seeds. These seeds then sprout and form dense thickets replacing a more diverse native flora with an ecologically impoverished one.

Site 8

This site exists as a somewhat separate watershed from the other sites. It finds its origin in a ridgeline separated from the other sites by an abandoned channel of the Mississippi River. The surface waters originating from this site do not join Wells Creek until just before it enters Lake Pepin. The upland communities are dominated by bedrock bluff prairie, oak woodland-brushland, and oak forest. These are generally of moderate quality. The mesic oak forest of Community 8-109 was the highest ranked of all communities in this site.

The most significant resource of this site is the seepage shrub swamp found in the abandoned channel of the Mississippi River. Although impacted by road and railroad construction, the springs, shrub swamp, wet meadow, and calcareous fens found within Site 8 and to the west of the watershed are exceptionally significant. Calcareous fens are unique and rare in wetlands in Minnesota, particularly along this portion of the Mississippi River. Every reasonable effort should be made to prevent further degradation of this resource. See the *Management Recommendations* section for further details on the management of wetland communities. Overall, management of the upland communities for their greatest native integrity and function will assist in maintaining or improving the quality of the shrub swamp into which they drain.

The uplands of this site have been impacted by several activities. Those that have impacted the largest land area include localized intensive grazing as well as widespread logging/wood cutting. Another substantial impact on the landscape are two quarries north of Frontenac Ski and extensive heavy equipment activity in a ravine to the east of the quarries. The natural communities found in Site 8 are either moderately poor or poor in quality. Communities in Site 8 could benefit greatly from management of natural communities for their integrity.

Natural Resources Values

The Rare Features Value for this site is moderate, a result of the existing shrub swamp/wet meadow, as well as the documented nearby calcareous fen. Natural Community Integrity Value for the site is moderate as well because of the presence of a large number of community types, and the BC quality ranking of Community 8-109. The Wildlife Habitat Value high because of the likely use of the site by a large number of songbird, reptile, mammal, and amphibian species. The diversity of habitats provides the opportunity for use by a larger number of species. The Aesthetic Value for this site is high because of the remarkable views from the top of two bluff prairies of Community 8-104.

Community 8-102

Dry Oak Forest

Rank: D

This oak community occurs on a gently sloping site nestled between Frontenac and a large wetland/shrub swamp to the north. It is characterized by large, open-grown bur and black oak with second growth of other trees around them. The bur oaks average over 20 inches, and reach 36. One 23-inch white oak with an open-grown form was cored and found to be 194 years of age. Second growth trees in this community most commonly include black cherry, basswood, and aspen. The brush layer is thick to almost impenetrable and dominated by European buckthorn, with other thorny shrubs and tree saplings being somewhat less important. The

ground layer is dominated by species that follow disturbance, including white snakeroot and sweet cicely.

Based on the species composition of this community, it appears that it was grazed intensely for a long period of time and retired. Following retirement, the remaining weakly competitive community was colonized by brush and aggressive native and nonnative species. Because of the highly altered community composition, this community received the low rank of D. Despite the low rank, this community would serve the residents of Frontenac as an excellent managed natural area for hiking. The quality of this site could be quickly and dramatically improved with the removal of buckthorn and other brush and the reintroduction of safely controlled prescribed fires. A good example of the results for these types of resource management activities exists at several locations in Frontenac State Park.

Community 8-103

Shrub Swamp, Seepage Subtype

Rank: C

This community occurs within an abandoned channel of the Mississippi River that was active during flood events associated with recession of the last ice sheets in the Wisconsinan Glacial event. This community was classified by the MN County Biological Survey as a Shrub Swamp, Seepage Subtype. It is characterized by approximately 50 percent shrub cover dominated by Bebb's willow, red osier dogwood, and other willow species. Common graminoids found in this community include lakebank, tussock, and retrorse sedges, broad-leaved cattail, and to a lesser degree, bluejoint and reed canary grass. The aggressive, nonnative purple loosestrife is the forb that has the greatest total coverage in this community. It forms large single-species patches in some areas. Other common forbs include angelica, spotted joe-pye weed, marsh marigold, willow-herb, and northern marsh fern, as well as many others.

At least seven springs/seeps contribute to the hydrology of this wetland complex near Frontenac alone. There are likely more springs associated with this wetland, as well as the distinct possibility that additional calcareous fens exist. At least one calcareous fen was identified one mile to the west, and former MCBS Biologist, Hannah Dunevitz, feels strongly that there may be others in this area that have not yet been documented.

The integrity of this community has been compromised by several past and present activities. It was likely a wet meadow, calcareous fen complex at the time of settlement. Withholding of periodic fires from this landscape, coupled with probable changes in water regime, have caused a shift from a more open community (wet meadow/fen) to a shrub swamp. Ditching and road building have somewhat altered the historical hydrologic regime also contributing to the colonization of the community by shrubs. One indication that this community was more open in

the past is the presence of sun-loving plants, particularly swamp lousewort, under dense shrub cover.

This community is the only one of its kind in the LWCW. The nearby presence of other shrub swamp, as well as documented Calcareous Seepage Fen, give added significance to these communities, which occur on a historically important landform, the abandoned Mississippi River channel. It is advisable that a more in-depth survey be performed of vegetation, hydrologic, and other components, with an eye toward long-term management of this rare resource. Elements which have potential to maintain or restore the integrity and function of this community include maintenance or improvement of hydrologic regime, minimizing impacts of surrounding land use practice such as grazing and impervious surface, eliminating alterations of groundwater levels, halting invasion by nonnatives purple loosestrife and reed canary grass, and restoration of the historically important influence of fire.

Community 8-104

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: D

This community consists of one large prairie and a smaller second one. It occurs on a sandstone-faced bluff that is currently heavily grazed. Brush covers approximately 30 percent of the prairie, especially eastern red cedar. The species composition of the prairie has been highly altered and is dominated in many places by nonnatives including Canada bluegrass, redtop, foxtail, catnip, burdock, and red clover. Common native species in this pasture that tend to be weedy include western ragweed, hoary vervain, prairie mugwort, sandbur, and clammy ground cherry. Common native grasses include side-oats and hairy grama, panicum, little bluestem, and sand dropseed. Native species indicative of better quality are generally absent from this community, with the exception of prairie violet and plains muhly grass occurring occasionally.

The current condition of this prairie requires that a low qualitative ranking be given. Some potential actions for prairie improvement include reduction of stocking rate or implementing rotational grazing practices, along with brush clearing and reintroduction of planned, controlled burns. This would improve the overall quality of the prairie and potentially provide better forage. The climb to the top of this bluff requires some expenditure of energy, but is well worth the effort because it offers remarkably striking views of the surrounding area and Lake Pepin.

Community 8-105

Oak Woodland-Brushland

Rank: CD

This community is currently grazed and dominated by open-grown bur and black oaks, with white and red oaks occurring occasionally on the east- and southeast-facing slopes. Second growth under the open-grown oaks is dominated by eastern red cedar, white birch, and various shrubs. The ground layer is dominated by nonnative grasses and weedy forbs. These include the nonnative grass redtop as well as the natives white snakeroot, hog peanut, Pennsylvania sedge, and white vervain. Grazing has the greatest single impact on this community affecting the species composition and function of this bluff community. Overall, the quality of this community is poor, but could recover quickly with some adjustments in grazing regime, the reintroduction of fire, and the removal of brush. Removal of brush through mechanical means or fire would also help increase the amount of pasture/forage available to grazers. As with the previous community, the climb to the top of this bluff is well worth the effort because it offers breathtaking views of the surrounding area and Lake Pepin.

Community 8-106

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: CD

This community includes three separate bluff prairies, the easternmost of which is split with Community 104. Although these prairies are not currently grazed, they show a history of grazing with patches of nonnative grasses and reduced native species richness. Common grasses on these prairies include side-oats grama, little and big bluestem, and Indian grass. Other species indicative of better quality that occur infrequently include prairie dropseed and leafy satin grass, as well as hoary puccoon and purple prairie clover. Overall, the quality of this prairie is relatively poor. With active management, as with other communities on this ridgeline, this prairie could improve dramatically in quality.

Community 8-107

Old Field

Rank: NA

This community was formerly utilized for agriculture. At this point in its history, it is difficult to determine whether this was used for row crops, hay, or cleared for grazing. The ground layer here is composed largely of nonnative grasses and forbs, as well as some weedier native species. This entire field has been colonized by wild plum and brambles, as well as quaking aspen and black cherry. This area will likely become forest dominated by a collection of tree species that are capable of quickly colonizing abandoned agricultural fields. Down slope, this area grades into Community 116.

Community 8-108**Lowland Hardwood Forest****Rank: D**

This forest occurs on a terrace of the abandoned channel of the Mississippi River and on the slopes surrounding it. It is currently grazed by beef cattle. It has a ground layer dominated by nonnative pasture grasses and a handful of native species capable of withstanding frequent grazing. **The shrub layer is patchy and thick in small.** It is dominated by brambles, gooseberry, and other thorny species. The largest trees of this community are generally white and pin oak, which occur occasionally. The most common species of tree is black walnut, which averages about 10 inches in diameter. One curiosity of this community is the abundance of blackberry lily. This ornamental from Asia is rarely found outside of cultivated gardens, but seems to be quite frequent in this grazed woodland. It is not found in adjacent communities, which might lead to the speculation that grazers may enable establishment or help to transport the seed, which is borne in purple-black fruits bunched together resembling a blackberry.

Community 8-109**Mesic Oak Forest****Rank: BC**

This good quality mesic oak forest is found on four different northeast-facing slopes of moderate steepness. It is generally characterized by a closed canopy of red and white oaks, a shrub layer that is moderately thick, and a ground layer of good quality. Red oaks in the canopy average about 24 inches in diameter, while some bur oaks approach 40 inches in diameter. One cored 24-inch red oak was found to be 149 years of age, placing its establishment some time shortly after Euroamerican settlement in this area. Other occasional tree species include white birch, basswood, pin oak, black cherry, sugar maple, and moose maple. The shrub layer is species rich, having at least 14 species present. The most common of these include black cherry, other tree saplings, and pagoda dogwood. Likewise, the ground layer is of good quality in most areas. It includes species such as wild yam, maidenhair fern, elm-leaved goldenrod, and pointed-leaved tick trefoil. There is some evidence of logging or woodcutting on some slopes. Based on the condition of the stumps, it appears that this activity took place 60-90 years ago. Overall, the quality of this forest is moderately good, justifying the rank of BC.

Community 8-110**Dry Prairie, Southeast Bedrock Bluff Subtype****Rank: C**

This community consists of two prairies on opposite sides of a valley. These were considered together because of their similarity in species composition and apparent land use history. The brush cover on these prairies is about 40 percent in most places. Generally, the brush is short, and dominated by smooth sumac. Surprisingly, there are no red cedar on these two prairies; but

there is some creeping juniper, a species that is less associated with overtaking prairies aggressively. The upper slopes of these prairies tend to be lower quality than the lower slopes. Likewise, the lower on the slope, the more outcrops of rock. Dominant grasses on these prairies are side-oats grama, little bluestem, and indian grass. The most common forb is prairie coreopsis, with species indicative of higher quality occurring less frequently or rarely. These include prairie violet, purple prairie clover, rough blazingstar, and prairie dropseed. Overall, the quality of this prairie is moderate because of the influence of past land use and the current encroachment of brush.

Community 8-111

Dry Prairie, Southeast Bedrock Bluff Subtype

Rank: C

Five widely separated bluff prairies make up this community. Although they are isolated from each other by their inability to effectively exchange plant materials, they were grouped together for consideration based on similarities in species composition and past land use history. Several of these prairies have about 50 percent brush cover, while the two larger have decidedly less. Common grasses on these prairies are side-oats grama, Indian grass, and big and little bluestem. The prairies are dominated by these grasses, with forbs and grasses indicative of higher quality found less frequently. Some of these include narrow-leaf puccoon, blue-eyed grass, prairie dropseed, false boneset, and prairie dropseed. The prairie that has a power line running up it has provided an interesting set of circumstances on its lower slopes. Many of the species found at the lower edge of this prairie may provide some glimpse of a collection of plants formerly found in open oak woods and savanna-like settings prior to these being overgrown by small trees and brush. Species present here include horse gentian, oxeye false sunflower, sky blue aster, Indian grass, and others. Because of past evidence of grazing, brush encroachment, and the impacts of land use on the species composition of these prairies, they were given only a moderate ranking.

Community 8-115

Oak Woodland-Brushland

Rank: CD

This oak woodland occurs along several southwest-facing slopes above the abandoned channel of the Mississippi River. It is dominated by open-grown bur oak and quaking aspen, with black oak less common. The canopy is broken in most places, a result of inherent community structure, grazing, wood cutting, windfall, or some combination of these. The brush layer varies from moderate to extremely thick and is dominated in most places by European buckthorn and prickly ash. The ground layer is variable as well, with the most common species being indicative of some level of disturbance. These include Pennsylvania sedge, indian grass, white snakeroot, side-oats grama grass, and yellow honewort. Because of the land use history for this site, it was given a moderately low rank. This community, along with adjacent communities, would benefit

greatly from management of nonnative species in the shrub layer, as well as the potential reintroduction of prescribed fire. The numerous trails and field access roads along this slope make ideal firebreaks, minimizing cost and risk associated with burning.

Community 8-116

Mesic Oak Forest

Rank: D

A canopy of quaking aspen, bur and pin oak dominate this forest. The canopy is patchy, a result of past and present activities that include logging, wood cutting, grazing, and windfall. Many of the larger trees removed by human activities were oaks, with others such as aspen, box elder, and cherry being removed less commonly. The shrub layer is moderate to thick and dominated by the thorny species prickly ash and European buckthorn. The ground layer also reflects the disturbances mentioned above, with species such as yellow honewort, sweet cicely, and white snakeroot common. Overall, the quality of this community is low. Improvement of rank will be difficult without a long-range management plan aimed at improving species richness (number of native species) and also guiding the composition of the canopy.

Appendix A
Natural Resource Inventory-Community Survey

Lower Wells Creek Watershed: Natural Resources by Area

Appendix A: Natural Resources Inventory – Community Survey

Area 1-1

Dry Prairie (bedrock bluff subtype)

RANK BC

STATUS 3

Canopy

Shrub

<i>Physocarpus opulifolius</i>	Ninebark
<i>Pinus sylvestris</i>	Scotch pine
<i>Corylus americana</i>	American hazelnut
<i>Prunus serotina</i>	Black cherry
<i>Rhus glabra</i>	Smooth sumac
<i>Cornus foemina</i>	Gray dogwood
<i>Lonicera tatarica</i>	Tartarian honeysuckle
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Robinia pseudoacacia</i>	Black locust
<i>Juniperus virginiana</i>	Red cedar
<i>Juniperus communis</i>	Bush juniper
<i>Acer negundo</i>	Box elder
<i>Rubus occidentalis</i>	Black raspberry
<i>Rhus radicans</i>	Poison ivy
<i>Vitis riparia</i>	Wild grape
<i>Celastrus scandens</i>	Climbing bittersweet

Forbs

<i>Daucus carota</i>	Queen Anne's lace
<i>Solidago canadensis</i>	Canada goldenrod
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Verbena stricta</i>	Hairy blue vervain
<i>Aster ericoides</i>	Heath aster
<i>Verbascum thapsus</i>	Mullein
<i>Galium</i>	Bedstraw; Cleavers
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Cirsium</i>	Common thistle; Plumed thistle
<i>Campanula rotundifolia</i>	Harebell
<i>Amorpha canescens</i>	Lead-plant
<i>Aster sericeus</i>	Silky aster
<i>Linum sulcatum</i>	Yellow flax
<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Apocynum</i>	Dogbane; Indian hemp
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Viola pedatifida</i>	Prairie bird-foot violet
<i>Chrysanthemum leucanthem</i>	Ox-eye daisy
<i>Anemone virginiana</i>	Thimbleweed
<i>Trifolium repens</i>	White clover
<i>Trifolium pratense</i>	Red clover
<i>Anemone cylindrica</i>	Thimbleweed
<i>Solidago missouriensis</i>	Missouri goldenrod
<i>Solidago rigida</i>	Stiff goldenrod
<i>Sisyrinchium campestre</i>	Blue-eyed-grass
<i>Lobelia spicata</i>	Rough-spiked lobelia
<i>Antennaria neglecta</i>	Pussytoes
<i>Onosmodium molle</i>	False gromwell
<i>Melilotus alba</i>	White sweet-clover

Graminoids

<i>Bromus inermis</i>	Smooth brome
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Andropogon gerardii</i>	Big bluestem
<i>Sorghastrum nutans</i>	Indian grass
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Panicum</i>	Panic grass
<i>Agrostis stolonifera</i>	Redtop
<i>Sporobolus heterolepis</i>	Prairie dropseed
<i>Poa compressa</i>	Canada bluegrass
<i>Muhlenbergia cuspidata</i>	Plains muhly
<i>Eragrostis trichodes</i>	Sand love grass

Appendix A: Natural Resources Inventory -- Community Survey

<i>Oxalis stricta</i>	Yellow wood-sorrel
<i>Hedeoma hispida</i>	Mock pennyroyal
<i>Galium boreale</i>	Northern bedstraw
<i>Comandra umbellata</i>	Bastard toad-flax
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint
<i>Monarda fistulosa</i>	Wild bergamot
<i>Medicago lupulina</i>	Black medick
<i>Oenothera biennis</i>	Common evening-primrose
<i>Antennaria plantaginifolia</i>	Plantain-leaved pussytoes
<i>Physalis heterophylla</i>	Clammy ground-cherry
<i>Ratibida pinnata</i>	Gray-headed coneflower
<i>Zizia aptera</i>	Heart-leaved alexanders
<i>Geum triflorum</i>	Prairie smoke
<i>Helianthus occidentalis</i>	Western sunflower
<i>Gentianella quinquefolia</i>	Stiff gentian
<i>Cirsium discolor</i>	Field thistle
<i>Coreopsis palmata</i>	Stiff tickseed
<i>Heuchera richardsonii</i>	Alum-root
<i>Asclepias syriaca</i>	Common milkweed
<i>Artemisia campestris</i>	Tall wormwood
<i>Solidago speciosa</i>	Showy goldenrod
<i>Lithospermum canescens</i>	Hoary puccoon
<i>Helopsis helianthoides</i>	Ox-eye

Appendix A: Natural Resources Inventory – Community Survey

Area 1-4

Oak Forest, Dry

RANK CD

STATUS 4

Canopy		Shrub	Forbs	Graminoids			
<i>Quercus macrocarpa</i>	Bur oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Muhlenbergia mexicana</i>	Mexican satin grass
<i>Betula papyrifera</i>	Paper birch	<i>Rubus occidentalis</i>	Black raspberry	<i>Trifolium pratense</i>	Red clover	<i>Carex pensylvanica</i>	pennsylvania sedge
<i>Populus tremuloides</i>	Quaking aspen	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Sanicula gregaria</i>	Black snakeroot	<i>Carex</i>	Sedge
<i>Quercus velutina</i>	Black oak	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Solidago canadensis</i>	Canada goldenrod	<i>Bromus inermis</i>	Smooth brome
<i>Ulmus americana</i>	American elm	<i>Acer negundo</i>	Box elder	<i>Geranium maculatum</i>	Wild geranium	<i>Dactylis glomerata</i>	Orchard-grass
<i>Tilia americana</i>	Basswood	<i>Lonicera fetarica</i>	Tartarian honeysuckle	<i>Gentianella quinquefolia</i>	Stiff gentian		
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Rhus radicans</i>	Poison ivy	<i>Aster ontarionis</i>	Ontario aster		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Polemonium reptans</i>	Jacob's ladder		
		<i>Vitis riparia</i>	Wild grape	<i>Fragaria virginiana</i>	Common strawberry		
				<i>Galium boreale</i>	Northern bedstraw		
				<i>Cryptotaenia canadensis</i>	Honewort		
				<i>Trifolium repens</i>	White clover		
				<i>Daucus carota</i>	Queen Anne's lace		
				<i>Arctium minus</i>	Common burdock		
				<i>Urtica dioica</i>	Stinging nettle		
				<i>Epiobium</i>	Willow-herb		
				<i>Pilea pumila</i>	Clearweed		
				<i>Thalictrum dioicum</i>	Early meadow rue		
				<i>Taraxacum officinale</i>	Common dandelion		
				<i>Osmorhiza claytonii</i>	Sweet Cicely		
				<i>Geum canadense</i>	White avens		
				<i>Phryma leptostachya</i>	Lopseed		
				<i>Circaea lutetiana</i>	Enchanter's nighthshade		
				<i>Viola</i>	Violet		

Appendix A: Natural Resources Inventory -- Community Survey

Area 1-5

Oak Forest, Mesic

RANK CD

STATUS 2

Canopy

<i>Betula papyrifera</i>	Paper birch
<i>Quercus alba</i>	White oak
<i>Tilia americana</i>	Basswood
<i>Quercus velutina</i>	Black oak
<i>Quercus macrocarpa</i>	Bur oak
<i>Prunus serotina</i>	Black cherry
<i>Populus grandidentata</i>	Big-toothed aspen

Shrub

<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Viburnum lentago</i>	Nannyberry
<i>Zanthoxylum americanum</i>	Prickly ash
<i>Corylus americana</i>	American hazelnut
<i>Rhus radicans</i>	Poison ivy
<i>Prunus serotina</i>	Black cherry
<i>Ulmus americana</i>	American elm
<i>Lonicera tatarica</i>	Tartarian honeysuckle
<i>Acer negundo</i>	Box elder
<i>Ribes missouriense</i>	Missouri gooseberry
<i>Celtis occidentalis</i>	Hackberry
<i>Cornus alternifolia</i>	Pagoda dogwood
<i>Prunus virginiana</i>	Chokecherry
<i>Parthenocissus inserta</i>	Virginia creeper
<i>Vitis riparia</i>	Wild grape

Forbs

<i>Viola canadensis</i>	Rugulose violet
<i>Osmorhiza claytonii</i>	Sweet Cicely
<i>Actaea rubra</i>	Red baneberry
<i>Phryma leptostachya</i>	Lopseed
<i>Anemone virginiana</i>	Thimbleweed
<i>Hackelia virginiana</i>	Virginia slickseed
<i>Helianthus hirsutus</i>	Woodland sunflower
<i>Smilax lasioneura</i>	Carrion-flower
<i>Urtica dioica</i>	Stinging nettle
<i>Plantago major</i>	Common plantain
<i>Agrimonia gryposepala</i>	Agrimony
<i>Athyrium angustum</i>	Lady fern
<i>Cryptotaenia canadensis</i>	Honowort
<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil
<i>Geranium maculatum</i>	Wild geranium
<i>Eupatorium rugosum</i>	Common snakeroot

Graminoids

<i>Carex pensylvanica</i>	pensylvania sedge
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Appendix A: Natural Resources Inventory -- Community Survey

Area 1-6

Dry Prairie (bedrock bluff subtype)

RANK BC

STATUS 3

Canopy

Shrub

Prunus serotina Black cherry
Cornus foemina Gray dogwood
Rhus glabra Smooth sumac
Rhamnus cathartica Common buckthorn
Quercus macrocarpa Bur oak
Ulmus americana American elm
Rhus radicans Poison ivy
Juniperus virginiana Red cedar
Juniperus communis Bush juniper
Rubus occidentalis Black raspberry
Ulmus pumila Siberian elm
Populus tremuloides Quaking aspen
Physocarpus opulifolius Ninebark
Celastrus scandens Climbing bitterweet

Forbs

Amorpha canescens Lead-plant
Lactuca Lettuce
Daucus carota Queen Anne's lace
Aster oolentangiensis Sky-blue aster
Viola pedatifida Prairie bird-foot violet
Lithospermum canescens Hoary puccoon
Kuhnia eupatorioides False boneset
Aster ericoides Heath aster
Solidago canadensis Canada goldenrod
Gentianella quinquefolia Stiff gentian
Pycnanthemum virginianum Virginia mountain-mint
Solidago rigida Stiff goldenrod
Galium concinnum
Aster sericeus Silky aster
Anemone virginiana Thimbleweed
Gnaphalium obtusifolium Sweet everlasting
Campanula rotundifolia Harebell
Monarda fistulosa Wild bergamot
Verbena stricta Hairy blue vervain
Dalea candida White prairie-clover
Apocynum Dogbane; Indian hemp
Artemisia ludoviciana Western mugwort; White sag
Oenothera biennis Common evening-primrose
Verbascum thapsus Mullein
Asclepias verticillata Whorled milkweed
Petalostemon purpureum Purple prairie-clover
Comandra umbellata Bastard toad-flax
Linaria vulgaris Butter-and-eggs
Liatris cylindracea Cylindric blazing-star
Solidago nemoralis Gray goldenrod
Potentilla argentea Silvery cinquefoil
Solidago speciosa Showy goldenrod

Graminoids

Sorghastrum nutans Indian grass
Sporobolus heterolepis Prairie dropseed
Bouteloua curtipendula Side-oats grama
Panicum Panic grass

Appendix A: Natural Resources Inventory – Community Survey

Ratibida pinnata

Gray-headed coneflower

Area 1-7

Oak Forest, Dry

RANK CD

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Cornus foemina</i>	Gray dogwood	<i>Solidago canadensis</i>	Canada goldenrod	<i>Bromus inermis</i>	Smooth brome
<i>Betula papyrifera</i>	Paper birch	<i>Acer negundo</i>	Box elder	<i>Aster ontarionis</i>	Ontario aster	<i>Muhlenbergia mexicana</i>	Mexican salin grass
<i>Populus tremuloides</i>	Quaking aspen	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Phytolacca leptostachya</i>	Lopseed		
<i>Salix nigra</i>	Black willow	<i>Rubus occidentalis</i>	Black raspberry	<i>Athyrium angustum</i>	Lady fern		
<i>Acer negundo</i>	Box elder	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Senecio jacobinae</i>	Black snakeroot		
<i>Populus deltoides</i>	Cottonwood	<i>Rubus allegheniensis</i>	Common blackberry	<i>Cacalia</i>	Indian-plantain		
<i>Prunus serotina</i>	Black cherry	<i>Vitis riparia</i>	Wild grape	<i>Arctium minus</i>	Common burdock		
<i>Ulmus americana</i>	American elm	<i>Parthenocissus inserta</i>	Virginia creeper	<i>Galium</i>	Bedstraw; Cleavers		
<i>Fraxinus pennsylvanica</i>	Green ash			<i>Anemone virginiana</i>	Thimbleweed		
<i>Quercus macrocarpa</i>	Bur oak			<i>Osmorhiza claytonii</i>	Sweet Cicely		
				<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
				<i>Daucus carota</i>	Queen Anne's lace		

Appendix A: Natural Resources Inventory – Community Survey

Area 1-8

Oak Forest, Mesic

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Rubus occidentalis</i>	Black raspberry	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Carex pennsylvanica</i>	pennsylvania sedge
<i>Betula papyrifera</i>	Paper birch	<i>Prunus serotina</i>	Black cherry	<i>Oenothera</i>	Evening-primrose	<i>Carex blanda</i>	woodland sedge
<i>Populus tremuloides</i>	Quaking aspen	<i>Prunus virginiana</i>	Chokecherry	<i>Viola</i>	Violet		
<i>Tilia americana</i>	Basswood	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Smilacina racemosa</i>	False Solomon's-seal		
<i>Quercus velutina</i>	Black oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Geum canadense</i>	White avens		
<i>Acer spicatum</i>	Mountain maple	<i>Corylus americana</i>	American hazelnut	<i>Amphicarpaea bracteata</i>	Hog-peanut		
<i>Celtis occidentalis</i>	Hackberry	<i>Acer negundo</i>	Box elder	<i>Agrimonia gryposepala</i>	Agrimony		
		<i>Tilia americana</i>	Basswood	<i>Aster ontarionis</i>	Ontario aster		
		<i>Rhus radicans</i>	Poison ivy	<i>Hackelia virginiana</i>	Virginia slickseed		
		<i>Cornus foemina</i>	Gray dogwood	<i>Cryptotaenia canadensis</i>	Honewort		
		<i>Sambucus pubens</i>	Red-berried elder	<i>Geranium maculatum</i>	Wild geranium		
		<i>Celtis occidentalis</i>	Hackberry	<i>Circaea luteiflora</i>	Enchanter's nightshade		
		<i>Fraxinus pennsylvanica</i>	Green ash	<i>Eupatorium rugosum</i>	Common snakeroot		
		<i>Comus amomum</i>	Silky dogwood	<i>Athyrium angustum</i>	Lady fern		
		<i>Zanthoxylum americanum</i>	Prickly ash	<i>Verbena urticifolia</i>	White vervain		
		<i>Rubus allegheniensis</i>	Common blackberry	<i>Galium</i>	Bedstraw; Cleavers		
		<i>Vitis riparia</i>	Wild grape	<i>Adiantum pedatum</i>	Maidenhair-fern		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Sanicula marilandica</i>	Black snakeroot		
				<i>Pilea pumila</i>	Clearweed		
				<i>Arisaema triphyllum</i>	Jack-in-the-pulpit		

Appendix A: Natural Resources Inventory -- Community Survey

Area 1-8

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Corylus americana</i>	American hazelnut	<i>Galium concinnum</i>		<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Cornus alternifolia</i>	Pagoda dogwood	<i>Erigeron strigosus</i>	Daisy fleabane	<i>Elymus villosus</i>	Wild-rye
<i>Quercus alba</i>	White oak	<i>Sambucus pubens</i>	Red-berried elder	<i>Geranium maculatum</i>	Wild geranium		
<i>Tilia americana</i>	Basswood	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Adiantum pedatum</i>	Maidenhair-fern		
<i>Betula papyrifera</i>	Paper birch	<i>Prunus serotina</i>	Black cherry	<i>Anemone virginiana</i>	Thimbleweed		
<i>Populus tremuloides</i>	Quaking aspen	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Aster ontarionis</i>	Ontario aster		
<i>Acer negundo</i>	Box elder	<i>Celtis occidentalis</i>	Hackberry	<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Prunus serotina</i>	Black cherry	<i>Rubus occidentalis</i>	Black raspberry	<i>Helianthus hirsutus</i>	Woodland sunflower		
<i>Celtis occidentalis</i>	Hackberry	<i>Ulmus americana</i>	American elm	<i>Solidago canadensis</i>	Canada goldenrod		
<i>Robinia pseudoacacia</i>	Black locust	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Athyrium angustum</i>	Lady fern		
		<i>Cornus foemina</i>	Gray dogwood	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
		<i>Prunus virginiana</i>	Chokecherry	<i>Smilacina racemosa</i>	False Solomon's-seal		
		<i>Lonicera tatarica</i>	Tartarian honeysuckle	<i>Geum canadense</i>	White avens		
		<i>Rhus radicans</i>	Poison ivy	<i>Osmunda claytoniana</i>	Interrupted fern		
		<i>Viburnum lentago</i>	Nannyberry	<i>Mitella diphylla</i>	Miterwort		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Aralia nudicaulis</i>	Wild sarsaparilla		
		<i>Vitis riparia</i>	Wild grape	<i>Pilea pumila</i>	Clearweed		
				<i>Urtica dioica</i>	Stinging nettle		
				<i>Dryopteris</i>	Shield-fern; Wood-fern		

Appendix A: Natural Resources Inventory – Community Survey

Area 2-10

Lowland Hardwood Forest

RANK C

STATUS 3

Canopy		Shrub		Forbs		Graminoids	
<i>Populus deltoides</i>	Cottonwood	<i>Lonicera tatarica</i>	Tartarian honeysuckle	<i>Impatiens capensis</i>	Spotted touch-me-not; Jewel	<i>Phalaris arundinacea</i>	Reed canary grass
<i>Salix nigra</i>	Black willow	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Urtica dioica</i>	Stinging nettle		
<i>Acer negundo</i>	Box elder	<i>Rhus radicans</i>	Poison ivy	<i>Arisaema triphyllum</i>	Jack-in-the-pulpit		
<i>Ulmus americana</i>	American elm	<i>Quercus macrocarpa</i>	Bur oak	<i>Pastinaca sativa</i>	Parsnip		
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Solidago canadensis</i>	Canada goldenrod		
		<i>Rubus occidentalis</i>	Black raspberry	<i>Aster simplex</i>	Marsh aster		
		<i>Rhamnus cathartica</i>	Common buckthorn	<i>Monarda fistulosa</i>	Wild bergamot		
		<i>Cornus foemina</i>	Gray dogwood	<i>Heracleum lanatum</i>	Cow-parsnip		
		<i>Cornus amomum</i>	Silky dogwood	<i>Eupatorium rugosum</i>	Common snakeroot		
		<i>Sambucus canadensis</i>	Common elder	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
		<i>Rhus glabra</i>	Smooth sumac	<i>Oxalis stricta</i>	Yellow wood-sorrel		
				<i>Viola</i>	Violet		
				<i>Aster ontariensis</i>	Ontario aster		
				<i>Geum canadense</i>	White avens		
				<i>Galium concinnum</i>			
				<i>Solidago canadensis</i>	Canada goldenrod		
				<i>Geranium maculatum</i>	Wild geranium		
				<i>Sanicula gregaria</i>	Black snakeroot		
				<i>Smilax lasioneura</i>	Carrion-flower		
				<i>Urtica dioica</i>	Stinging nettle		
				<i>Mateuccia struthiopteris</i>	Ostrich fern		

Appendix A: Natural Resources Inventory – Community Survey

Area 2-11

Dry Prairie (bedrock bluff subtype)

RANK BC

STATUS 3

Canopy

Shrub

Juniperus virginiana
Rhus glabra
Quercus macrocarpa
Rhamnus cathartica
Prunus serotina
Lonicera tatarica
Cornus foemina
Zanthoxylum americanum
Prunus virginiana
Prunus americana
Juniperus communis
Pinus sylvestris
Physocarpus opulifolius
Rubus allegheniensis
Celastrus scandens
Vitis riparia
Populus tremuloides

Red cedar
 Smooth sumac
 Bur oak
 Common buckthorn
 Black cherry
 Tartarian honeysuckle
 Gray dogwood
 Prickly ash
 Chokecherry
 Wild plum
 Bush juniper
 Scotch pine
 Ninebark
 Common blackberry
 Climbing bittersweet
 Wild grape
 Quaking aspen

Forbs

Coreopsis palmata
Eupatorium rugosum
Monarda fistulosa
Aster oolentangiensis
Daucus carota
Solidago speciosa
Amorpha canescens
Solidago canadensis
Rafibida pinnata
Anemone virginiana
Viola pedatifida
Comandra umbellata
Veronicastrum virginicum
Oenothera biennis
Aquilegia canadensis
Asclepias tuberosa
Dalea candida
Helianthus hirsutus
Aster ericoides
Kuhnia eupatorioides
Helopsis helianthoides
Solidago riddellii
Helianthus laetiflorus
Silphium laciniatum
Petalostemon purpureum
Helianthus occidentalis
Solidago nemoralis
Liatris aspera
Physalis heterophylla
Apocynum cannabinum
Artemisia frigida
Silphium laciniatum

Stiff tickseed
 Common snakeroot
 Wild bergamot
 Sky-blue aster
 Queen Anne's lace
 Showy goldenrod
 Lead-plant
 Canada goldenrod
 Gray-headed coneflower
 Thimbleweed
 Prairie bird-foot violet
 Bastard toad-flax
 Culver's root
 Common evening-primrose
 Columbine
 Butterfly-weed
 White prairie-clover
 Woodland sunflower
 Heath aster
 False boneset
 Ox-eye
 Riddell's goldenrod
 Showy sunflower
 Compass-plant
 Purple prairie-clover
 Western sunflower
 Gray goldenrod
 Rough blazing star
 Clammy ground-cherry
 Indian hemp
 Prairie sagewort
 Compass-plant

Graminoids

Sorghastrum nutans
Bromus kalmii
Elymus canadensis
Bouteloua curtipendula
Schizachyrium scoparium
Andropogon gerardii
Poa compressa
Sporobolus heterolepis
Muhlenbergia cuspidata

Indian grass
 Kalm's brome
 Nodding wild-rye
 Side-oats grama
 Little bluestem
 Big bluestem
 Canada bluegrass
 Prairie dropseed
 Plains muhly

Appendix A: Natural Resources Inventory – Community Survey

Area 2-12

Oak Forest, Dry

RANK D

STATUS 3

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Prunus serotina</i>	Black cherry
<i>Acer negundo</i>	Box elder
<i>Betula papyrifera</i>	Paper birch

Shrub

<i>Ribes missouriense</i>	Missouri gooseberry
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Zanthoxylum americanum</i>	Prickly ash
<i>Rhus glabra</i>	Smooth sumac
<i>Lonicera tatarica</i>	Tartarian honeysuckle
<i>Rubus occidentalis</i>	Black raspberry
<i>Vitis riparia</i>	Wild grape
<i>Parthenocissus inserta</i>	Virginia creeper
<i>Celastrus scandens</i>	Climbing bittersweet

Forbs

<i>Rhamnus cathartica</i>	Common buckthorn
<i>Viola</i>	Violet
<i>Pluchea leptostachya</i>	Lopseed
<i>Eupatorium rugosum</i>	Common snakeroot
<i>Monarda fistulosa</i>	Wild bergamot

Graminoids

Area 2-13

Dry Prairie (bedrock bluff subtype)

RANK D

STATUS 3

Canopy

Shrub

<i>Juniperus virginiana</i>	Red cedar
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Ulmus americana</i>	American elm
<i>Prunus</i>	Plum; Cherry
<i>Juniperus virginiana</i>	Red cedar

Forbs

<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Asclepias tuberosa</i>	Butterfly-weed
<i>Amorpha canescens</i>	Lead-plant

Graminoids

<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Poa compressa</i>	Canada bluegrass
<i>Schizachyrium scoparium</i>	Little bluestem

Appendix A: Natural Resources Inventory -- Community Survey

Area 2-14

Oak Forest, Dry

RANK CD

STATUS 3

Canopy	Shrub	Forbs	Graminoids	Peck's sedge
<i>Quercus velutina</i> Black oak	<i>Zanthoxylum americanum</i> Prickly ash	<i>Eupatorium rugosum</i> Common snakeroot	<i>Carex peckii</i>	
<i>Quercus macrocarpa</i> Bur oak	<i>Rhamnus cathartica</i> Common buckthorn	<i>Aster ontariensis</i> Ontario aster		
<i>Tilia americana</i> Basswood	<i>Rubus occidentalis</i> Black raspberry	<i>Osmorhiza chilensis</i> Chilean sweet cicely		
<i>Betula papyrifera</i> Paper birch	<i>Acer negundo</i> Box elder	<i>Arctium minus</i> Common burdock		
<i>Ulmus americana</i> American elm	<i>Rhus radicans</i> Poison ivy	<i>Pyrola</i> Wintergreen		
<i>Prunus serotina</i> Black cherry	<i>Cornus amomum</i> Silky dogwood	<i>Asarum canadense</i> Wild ginger		
<i>Acer negundo</i> Box elder	<i>Ribes americanum</i> Wild black currant	<i>Rosa arkansana</i> Prairie rose		
	<i>Vitis riparia</i> Wild grape			
	<i>Parthenocissus inserta</i> Virginia creeper			

Appendix A: Natural Resources Inventory – Community Survey

Area 2-15

Oak Forest, Dry

RANK C

STATUS 3

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus macrocarpa</i>	Bur oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Solidago missouriensis</i>	Missouri goldenrod		
<i>Betula papyrifera</i>	Paper birch	<i>Prunus serotina</i>	Black cherry	<i>Anemone virginiana</i>	Thimbleweed		
<i>Populus tremuloides</i>	Quaking aspen	<i>Rubus occidentalis</i>	Black raspberry	<i>Aquilegia canadensis</i>	Columbine		
<i>Acer negundo</i>	Box elder	<i>Viburnum lentago</i>	Nannyberry	<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Tilia americana</i>	Basswood	<i>Juniperus virginiana</i>	Red cedar	<i>Aster ontarionis</i>	Ontario aster		
<i>Ulmus americana</i>	American elm	<i>Lonicera tatarica</i>	Tartarian honeysuckle	<i>Aster prenanthoides</i>	Crooked-stemmed aster		
		<i>Rhus radicans</i>	Poison ivy	<i>Prunella vulgaris</i>	Heal-all		
		<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Arctium minus</i>	Common burdock		
		<i>Prunus virginiana</i>	Chokecherry	<i>Amphicarpaea bracteata</i>	Hog-peanut		
		<i>Vitis riparia</i>	Wild grape	<i>Viola</i>	Violet		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Galium boreale</i>	Northern bedstraw		
				<i>Zizia aurea</i>	Golden alexanders		
				<i>Asarum canadense</i>	Wild ginger		
				<i>Trifolium repens</i>	White clover		
				<i>Aralia nudicaulis</i>	Wild sarsaparilla		
				<i>Lathyrus ochroleucus</i>	Pale vetchling		
				<i>Aster cordifolius</i>	Heart-leaved aster		
				<i>Agrimonia gryposepala</i>	Agrimony		
				<i>Fragaria vesca</i>	Wood strawberry		
				<i>Sanicula marilandica</i>	Black snakeroot		
				<i>Triosteum perfoliatum</i>	Horse-gentian		

Appendix A: Natural Resources Inventory -- Community Survey

Area 2-16

Dry Prairie (bedrock bluff subtype)

RANK BC

STATUS 3

Canopy

Shrub

<i>Juniperus virginiana</i>	Red cedar
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Rhus glabra</i>	Smooth sumac
<i>Cornus foemina</i>	Gray dogwood
<i>Rhus radicans</i>	Poison ivy
<i>Corylus americana</i>	American hazelnut
<i>Juniperus communis</i>	Bush juniper
<i>Vitis riparia</i>	Wild grape
<i>Parthenocissus inserta</i>	Virginia creeper
<i>Celastrus scandens</i>	Climbing bittersweet

Forbs

<i>Medicago sativa</i>	Alfalfa
<i>Melilotus alba</i>	White sweet-clover
<i>Solidago canadensis</i>	Canada goldenrod
<i>Verbena stricta</i>	Hairy blue vervain
<i>Amorpha canescens</i>	Lead-plant
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Aster ericoides</i>	Heath aster
<i>Daucus carota</i>	Queen Anne's lace
<i>Aster sericeus</i>	Silky aster
<i>Solidago riddellii</i>	Riddell's goldenrod
<i>Pulsatilla nuttalliana</i>	Pasque-flower
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint
<i>Anemone cylindrica</i>	Thimbleweed
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Onosmodium molle</i>	False gromwell
<i>Lithospermum incisum</i>	Narrow-leaved puccoon
<i>Lithospermum canescens</i>	Hoary puccoon
<i>Solidago ptarmicoides</i>	Upland aster
<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Castilleja coccinea</i>	Indian paint-brush
<i>Rosa arkansana</i>	Prairie rose
<i>Lobelia spicata</i>	Rough-spiked lobelia
<i>Comandra umbellata</i>	Bastard toad-flax
<i>Sisyrinchium campestre</i>	Blue-eyed-grass
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Lactuca</i>	Lettuce
<i>Antennaria plantaginifolia</i>	Plantain-leaved pussytoes
<i>Plantago major</i>	Common plantain
<i>Viola pedatifida</i>	Prairie bird-foot violet
<i>Physalis heterophylla</i>	Clammy ground-cherry
<i>Campanula rotundifolia</i>	Harebell
<i>Liatris cylindracea</i>	Cylindric blazing-star

Graminoids

<i>Bromus inermis</i>	Smooth brome
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Poa compressa</i>	Canada bluegrass
<i>Phleum pratense</i>	Timothy
<i>Sporobolus heterolepis</i>	Prairie dropseed
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Andropogon gerardii</i>	Big bluestem
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Sorghastrum nutans</i>	Indian grass
<i>Muhlenbergia cuspidata</i>	Plains muhly
<i>Bouteloua hirsuta</i>	Hairy grama

Appendix A: Natural Resources Inventory -- Community Survey

<i>Spiranthes magnicamporum</i>	Great plains ladies'-tresses
<i>Artemisia campestris</i>	Tall wormwood
<i>Oenothera biennis</i>	Common evening-primrose
<i>Rafibida pinnata</i>	Gray-headed coneflower
<i>Solanum carolinense</i>	Horse-nettle
<i>Asclepias tuberosa</i>	Butterfly-weed
<i>Gnaphalium obtusifolium</i>	Sweet everlasting
<i>Euphorbia corollata</i>	Flowering spurge
<i>Pellaea glabella</i>	Smooth cliff-brake

Area 2-17

Oak Woodland-Brushland

RANK CD

STATUS 4

Canopy		Shrub		Forbs		Graminoids	
<i>Tilia americana</i>	Basswood	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Galium</i>	Bedstraw; Cleavers	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus macrocarpa</i>	Bur oak	<i>Rhus glabra</i>	Smooth sumac			<i>Bromus inermis</i>	Smooth brome
<i>Ulmus americana</i>	American elm	<i>Corylus americana</i>	American hazelnut				
<i>Juniperus virginiana</i>	Red cedar	<i>Parthenocissus inserta</i>	Virginia creeper				
		<i>Celastrus scandens</i>	Climbing bitternweet				
		<i>Vitis riparia</i>	Wild grape				

Appendix A: Natural Resources Inventory – Community Survey

Area 2-18

Oak Forest, Mesic

RANK CD

STATUS 2

Canopy		Shrub		Forbs		Graminoids
<i>Quercus alba</i>	White oak	<i>Corylus americana</i>	American hazelnut	<i>Eupatorium rugosum</i>	Common snakeroot	
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Laportea canadensis</i>	Wood nettle	
<i>Quercus velutina</i>	Black oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Urtica dioica</i>	Stinging nettle	
<i>Tilia americana</i>	Basswood	<i>Rubus occidentalis</i>	Black raspberry	<i>Sanicula gregaria</i>	Black snakeroot	
<i>Prunus serotina</i>	Black cherry	<i>Cornus amomum</i>	Silky dogwood	<i>Cryptotaenia canadensis</i>	Honewort	
<i>Quercus macrocarpa</i>	Bur oak	<i>Fraxinus pennsylvanica</i>	Green ash	<i>Athyrium angustum</i>	Lady fern	
		<i>Ribes missouriense</i>	Missouri gooseberry	<i>Aralia nudicaulis</i>	Wild sarsaparilla	
		<i>Vitis riparia</i>	Wild grape	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Aster ontariensis</i>	Ontario aster	
				<i>Galium concinnum</i>		
				<i>Arctium minus</i>	Common burdock	

Area 2-19

Cattail Marsh

RANK D

STATUS 5

Canopy		Shrub		Forbs		Graminoids
		<i>Salix lucida</i>	Shining willow	<i>Lythrum salicaria</i>	Purple loosestrife	<i>Typha latifolia</i> Broad-leaved cattail
				<i>Rudbeckia laciniata</i>	Goldenglow	<i>Scirpus validus</i> Softstem bulrush
						<i>Phalaris arundinacea</i> Reed canary grass
						<i>Carex</i> Sedge

Appendix A: Natural Resources Inventory – Community Survey

Area 2-20

Dry Prairie (bedrock bluff subtype)

RANK BC

STATUS 3

Canopy

Shrub

Rhus radicans Poison ivy
Rhus glabra Smooth sumac
Rhamnus cathartica Common buckthorn
Prunus serotina Black cherry
Rubus occidentalis Black raspberry
Celastrus scandens Climbing bitlersweet

Forbs

Lactuca Lettuce
Petalostemon purpureum Purple prairie-clover
Aster colentangiensis Sky-blue aster
Aster sericeus Silky aster
Solidago nemoralis Gray goldenrod
Gnaphallum obtusifolium Sweet everlasting
Amorpha canescens Lead-plant
Ratibida pinnata Gray-headed coneflower
Viola pedatifida Prairie bird-foot violet
Aster ericoides Heath aster
Comandra umbellata Bastard toad-flax
Physalis heterophylla Clammy ground-cherry
Antennaria plantaginifolia Plantain-leaved pussytoes
Verbena stricta Halcy blue vervain
Pellaea glabella Smooth cliff-brake
Artemisia frigida Prairie sagewort
Asclepias verticillata Whorled milkweed
Euphorbia Spurge
Polygonatum commutatum Giant Solomon's-seal
Rosa arkansana Prairie rose
Silphium laciniatum Compass-plant

Graminoids

Sorghastrum nutans Indian grass
Andropogon gerardii Big bluestem
Eragrostis spectabilis Purple love grass
Panicum Panic grass
Bouteloua curtipendula Side-oats grama
Muhlenbergia cuspidata Plains muhly

Appendix A: Natural Resources Inventory -- Community Survey

Area 2-21

Oak Forest, Dry

RANK BC

STATUS 3

Canopy

<i>Pinus banksiana</i>	Jack pine
<i>Quercus velutina</i>	Black oak
<i>Quercus macrocarpa</i>	Bur oak
<i>Populus tremuloides</i>	Quaking aspen
<i>Prunus serotina</i>	Black cherry
<i>Tilia americana</i>	Basswood
<i>Betula papyrifera</i>	Paper birch

Shrub

<i>Zanthoxylum americanum</i>	Prickly ash
<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry
<i>Prunus serotina</i>	Black cherry
<i>Acer negundo</i>	Box elder
<i>Ulmus americana</i>	American elm
<i>Rhus radicans</i>	Poison Ivy
<i>Prunus virginiana</i>	Chokecherry
<i>Cornus amomum</i>	Silky dogwood
<i>Vitis riparia</i>	Wild grape
<i>Parthenocissus inserta</i>	Virginia creeper

Forbs

<i>Agrimonia gryposepala</i>	Agrimony
<i>Rudbeckia laciniata</i>	Goldenglow
<i>Lactuca</i>	Lettuce
<i>Solidago ulmifolia</i>	Bog goldenrod
<i>Fragaria virginiana</i>	Common strawberry
<i>Verbena urticifolia</i>	White vervain
<i>Viola</i>	Violet
<i>Polygonatum commutatum</i>	Giant Solomon's-seal
<i>Aster ontariensis</i>	Ontario aster
<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil
<i>Geum canadense</i>	White avens
<i>Geranium maculatum</i>	Wild geranium
<i>Athyrium angustum</i>	Lady fern
<i>Eupatorium rugosum</i>	Common snakeroot
<i>Laportea canadensis</i>	Wood nettle

Graminoids

<i>Carex pensylvanica</i>	pensylvania sedge
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Appendix A: Natural Resources Inventory -- Community Survey

Area 2-22

Oak Woodland-Brushland

RANK BC

STATUS 4

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Betula papyrifera</i>	Paper birch
<i>Populus tremuloides</i>	Quaking aspen
<i>Tilia americana</i>	Basswood
<i>Juniperus virginiana</i>	Red cedar

Shrub

<i>Cornus amomum</i>	Silky dogwood
<i>Vitis riparia</i>	Wild grape
<i>Parthenocissus inserta</i>	Virginia creeper
<i>Colostrus scandens</i>	Climbing bittersweet
<i>Quercus macrocarpa</i>	Bur oak
<i>Rhus glabra</i>	Smooth sumac
<i>Zanthoxylum americanum</i>	Prickly ash
<i>Rhus radicans</i>	Poison ivy
<i>Prunus serotina</i>	Black cherry
<i>Prunus virginiana</i>	Chokecherry
<i>Rhamnus cathartica</i>	Common buckthorn

Forbs

<i>Eupatorium rugosum</i>	Common snakeroot
<i>Ampicarpaea bracteata</i>	Hog-peanut
<i>Solidago ulmifolia</i>	Bog goldenrod
<i>Solidago canadensis</i>	Canada goldenrod
<i>Agrimonia gryposepala</i>	Agrimony
<i>Daucus carota</i>	Queen Anne's lace
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Geum canadense</i>	White avens
<i>Ralibida pinnata</i>	Gray-headed coneflower
<i>Verbena urticifolia</i>	White vervain
<i>Anemone virginiana</i>	Thimbleweed
<i>Smilacina racemosa</i>	False Solomon's-seal
<i>Rosa arkansana</i>	Prairie rose
<i>Circaea lutetiana</i>	Enchanter's nightshade
<i>Aster ontarionis</i>	Ontario aster
<i>Hypericum pyramidatum</i>	Great St. John's-wort
<i>Polemonium reptans</i>	Jacob's ladder
<i>Oxalis stricta</i>	Yellow wood-sorrel
<i>Helianthus hirsutus</i>	Woodland sunflower
<i>Teraxacum officinale</i>	Common dandelion
<i>Euphorbia corollata</i>	Flowering spurge
<i>Physalis heterophylla</i>	Clammy ground-cherry
<i>Desmodium illinosum</i>	Pointed-leaved tick-trefoil
<i>Lactuca</i>	Lettuce

Graminoids

<i>Carex pensylvanica</i>	pensylvania sedge
<i>Equisetum</i>	Horsetail; Scouring-rush

Appendix A: Natural Resources Inventory -- Community Survey

Area 2-23

RANK NA STATUS NA

Canopy

Shrub

<i>Quercus velutina</i>	Black oak
<i>Quercus macrocarpa</i>	Bur oak
<i>Rhus glabra</i>	Smooth sumac
<i>Rubus occidentalis</i>	Black raspberry
<i>Juglans nigra</i>	Black walnut
<i>Larix laricina</i>	Tamarack; American larch
<i>Pinus strobus</i>	White pine
<i>Pinus resinosa</i>	Red pine; Norway pine

Forbs

<i>Solidago</i>	Goldenrod
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Graminoids

<i>Poa</i>	Blue grass, Meadow grass
<i>Bromus</i>	Brome-grass
<i>Sorghastrum nutans</i>	Indian grass

Appendix A: Natural Resources Inventory – Community Survey

Area 2-24

Oak Forest, Mesic

- RANK B

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Cornus alternifolia</i>	Pagoda dogwood	<i>Asarum canadense</i>	Wild ginger	<i>Carex pensylvanica</i>	pensylvania sedge
		<i>Ulmus</i>	Elm	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
<i>Populus deltoides</i>	Coltonwood	<i>Acer negundo</i>	Box elder	<i>Hydrophyllum virginianum</i>	Virginia waterleaf		
<i>Betula papyrifera</i>	Paper birch	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Populus tremuloides</i>	Quaking aspen	<i>Prunus serotina</i>	Black cherry	<i>Anemone virginiana</i>	Thimbleweed		
<i>Quercus alba</i>	White oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Galium concinnum</i>			
<i>Quercus velutina</i>	Black oak	<i>Rhus radicans</i>	Poison ivy	<i>Sanicula gregaria</i>	Black snakeroot		
		<i>Prunus virginiana</i>	Chokecherry	<i>Solidago ulmifolia</i>	Bog goldenrod		
		<i>Corylus americana</i>	American hazelnut	<i>Lactuca</i>	Lettuce		
		<i>Acer spicatum</i>	Mountain maple	<i>Phryma leptostachya</i>	Lopseed		
				<i>Eupatorium rugosum</i>	Common snakeroot		
				<i>Actaea rubra</i>	Red baneberry		
				<i>Smilax lasioneura</i>	Carrion-flower		
				<i>Urtica dioica</i>	Stinging nettle		
				<i>Uvularia grandiflora</i>	Yellow bellwort		
				<i>Athyrium angustum</i>	Lady fern		
				<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
				<i>Aralia nudicaulis</i>	Wild sarsaparilla		
				<i>Osmorhiza longistylis</i>	Anise-root		
				<i>Adiantum pedatum</i>	Maidenhair-fern		
				<i>Mitella diphylla</i>	Miterwort		

Appendix A: Natural Resources Inventory -- Community Survey

Area 2-25

Lowland Hardwood Forest

Canopy		Shrub		Forbs		Graminoids	
<i>Populus deltoides</i>	Cottonwood	<i>Ribes americanum</i>	Wild black currant	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Phalaris arundinacea</i>	Reed canary grass
<i>Juglans nigra</i>	Black walnut	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Rudbeckia laciniata</i>	Goldenglow	<i>Elymus canadensis</i>	Nodding wild-rye
<i>Acer negundo</i>	Box elder	<i>Cornus amomum</i>	Silky dogwood	<i>Urtica dioica</i>	Stinging nettle	<i>Poa pratensis</i>	Kentucky bluegrass
<i>Ulmus americana</i>	American elm	<i>Prunus americana</i>	Wild plum	<i>Pilea pumila</i>	Clearweed	<i>Agropyron repens</i>	Quack grass
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Stellaria</i>	Chickweed; Starwort	<i>Bromus inermis</i>	Smooth brome
<i>Salix nigra</i>	Black willow	<i>Sambucus canadensis</i>	Common elder	<i>Amphicarpaea bracteata</i>	Hog-peanut		
<i>Populus tremuloides</i>	Quaking aspen	<i>Lonicera tatarica</i>	Tartarian honeysuckle	<i>Sanicula gregaria</i>	Black snakeroot		
<i>Tilia americana</i>	Basswood	<i>Rubus strigosus</i>	Red raspberry	<i>Leonurus cardiaca</i>	Motherwort		
<i>Prunus serotina</i>	Black cherry	<i>Rubus occidentalis</i>	Black raspberry	<i>Galium concinnum</i>			
<i>Acer saccharum</i>	Sugar maple	<i>Cornus foemina</i>	Gray dogwood	<i>Cryptotaenia canadensis</i>	Honewort		
		<i>Vitis riparia</i>	Wild grape	<i>Adiantum pedatum</i>	Maidenhair-fern		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Aster novae-angliae</i>	New England aster		
				<i>Aster simplex</i>	Marsh aster		
				<i>Aster ontarioensis</i>	Ontario aster		
				<i>Arctium minus</i>	Common burdock		
				<i>Erigeron strigosus</i>	Daisy fleabane		
				<i>Plantago major</i>	Common plantain		
				<i>Polygonum pennsylvanicum</i>	Pennsylvania smartweed		
				<i>Solidago gigantea</i>	Giant goldenrod		
				<i>Monarda fistulosa</i>	Wild bergamot		
				<i>Pastinaca sativa</i>	Parsnip		
				<i>Stachys tenuifolia</i>	Rough hedge-nettle		
				<i>Helianthus tuberosus</i>	Jerusalem artichoke		
				<i>Solidago canadensis</i>	Canada goldenrod		
				<i>Helenium autumnale</i>	Sneezeweed		
				<i>Impatiens capensis</i>	Spotted touch-me-not; Jewel		
				<i>Viola</i>	Violet		
				<i>Veronicastrum virginicum</i>	Culver's root		

Appendix A: Natural Resources Inventory -- Community Survey

Area 2-27

Dry Prairie (bedrock bluff subtype)

RANK D

STATUS 3

Canopy

Shrub

Rhus glabra
Quercus macrocarpa
Quercus velutina
Prunus americana
Rhus radicans
Juniperus virginiana
Juniperus communis
Rhus typhina
Celastrus scandens

Smooth sumac
 Bur oak
 Black oak
 Wild plum
 Poison ivy
 Red cedar
 Bush juniper
 Staghorn sumac
 Climbing bittersweet

Forbs

Aster oolentanglonis
Aster ericoides
Ratibida pinnata
Potentilla simplex
Linum sulcatum
Prunella vulgaris
Gnaphalium obtusifolium
Lespedeza capitata
Anemone cylindrica
Agrimonia gryposepala
Lotus corniculatus
Aster ontariensis
Asclepias verticillata
Solidago nemoralis
Anemone virginiana
Amorpha canescens
Petalostemon purpureum
Viola pedatifida
Galium boreale
Monarda fistulosa
Solidago missouriensis

Sky-blue aster
 Heath aster
 Gray-headed coneflower
 Old-field cinquefoil
 Yellow flax
 Heal-all
 Sweet everlasting
 Round-headed bush-clover
 Thimbleweed
 Agrimony
 Bird's-foot trefoil
 Ontario aster
 Whorled milkweed
 Gray goldenrod
 Thimbleweed
 Lead-plant
 Purple prairie-clover
 Prairie bird-foot violet
 Northern bedstraw
 Wild bergamot
 Missouri goldenrod

Graminoids

Bouteloua curtipendula
Sorghastrum nutans
Elymus canadensis
Andropogon gerardii
Panicum

Side-oats grama
 Indian grass
 Nodding wild-rye
 Big bluestem
 Panic grass

Appendix A: Natural Resources Inventory -- Community Survey

Area 2-28

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Acer spicatum</i>	Mountain maple	<i>Adiantum pedatum</i>	Maidenhair-fern	<i>Elymus villosus</i>	Wild-rye
		<i>Quercus alba</i>	White oak	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
<i>Betula papyrifera</i>	Paper birch	<i>Ulmus americana</i>	American elm	<i>Athyrium angustum</i>	Lady fern		
		<i>Cornus amomum</i>	Silky dogwood	<i>Matteuccia struthiopteris</i>	Ostrich fern		
<i>Ulmus americana</i>	American elm	<i>Corylus americana</i>	American hazelnut	<i>Eupatorium rugosum</i>	Common snakeroot		
		<i>Viburnum lentago</i>	Nannyberry	<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
<i>Acer spicatum</i>	Mountain maple	<i>Ribes americanum</i>	Wild black currant	<i>Amphicarpaea bracteata</i>	Hog-peanut		
		<i>Rhus radicans</i>	Poison ivy	<i>Mitella diphylla</i>	Milkwort		
<i>Tilia americana</i>	Basswood	<i>Parthenocissus inserta</i>	Virginia creeper	<i>Osmunda claytoniana</i>	Interrupted fern		
		<i>Vitis riparia</i>	Wild grape	<i>Aster ontarionis</i>	Ontario aster		
				<i>Helianthus hirsutus</i>	Woodland sunflower		
				<i>Geranium maculatum</i>	Wild geranium		
				<i>Geum</i>	Avens		
				<i>Uvularia grandiflora</i>	Yellow bellwort		
				<i>Fragaria virginiana</i>	Common strawberry		
				<i>Agrimonia gryposepala</i>	Agrimony		
				<i>Circaea lutetiana</i>	Enchanter's nightshade		

Appendix A: Natural Resources Inventory -- Community Survey

Area 2-20

Oak Forest, Mesic

- RANK C

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Lactuca</i>	Lettuce	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus alba</i>	White oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Sanicula gregeia</i>	Black snakeroot		
<i>Betula papyrifera</i>	Paper birch	<i>Juniperus virginiana</i>	Red cedar	<i>Aster ontariensis</i>	Ontario aster		
<i>Prunus serotina</i>	Black cherry	<i>Corylus americana</i>	American hazelnut	<i>Prunella vulgaris</i>	Heal-all		
				<i>Maianthemum canadense</i>	Canada mayflower		
				<i>Eupatorium rugosum</i>	Common snakeroot		
				<i>Agrimonia gryposepala</i>	Agrimony		
				<i>Circaea lutetiana</i>	Enchanter's nightshade		
				<i>Rosa arkansana</i>	Prairie rose		
				<i>Sanicula marilandica</i>	Black snakeroot		
				<i>Phryma leptostachya</i>	Lopseed		
				<i>Aster cordifolius</i>	Heart-leaved aster		
				<i>Galium aparine</i>	Cleavers		
				<i>Aquilegia canadensis</i>	Columbine		

Appendix A: Natural Resources Inventory -- Community Survey

Area 2-32

Oak Forest, Dry

RANK B

STATUS 3

DNR Rare Features

County Biological Site Dry Oak Forest, Southeast Section

Canopy	Shrub	Forbs	Graminoids
<i>Quercus velutina</i> Black oak	<i>Corylus americana</i> American hazelnut	<i>Eupatorium rugosum</i> Common snakeroot	<i>Carex pensylvanica</i> pennsylvania sedge
<i>Quercus macrocarpa</i> Bur oak	<i>Sambucus pubens</i> Red-berried elder	<i>Aster ontarionis</i> Ontario aster	
<i>Populus tremuloides</i> Quaking aspen	<i>Parthenocissus inserta</i> Virginia creeper	<i>Phryma leptostachya</i> Lopseed	
<i>Fraxinus pennsylvanica</i> Green ash	<i>Rhamnus cathartica</i> Common buckthorn	<i>Geranium maculatum</i> Wild geranium	
<i>Acer negundo</i> Box elder	<i>Ribes cynosbati</i> Prickly gooseberry; Dogberry	<i>Osmorhiza claytonii</i> Sweet Cicely	
<i>Ulmus americana</i> American elm	<i>Cornus alternifolia</i> Pagoda dogwood	<i>Desmodium glutinosum</i> Pointed-leaved tick-trefoil	
<i>Tilia americana</i> Basswood	<i>Rhus radicans</i> Poison ivy	<i>Actaea rubra</i> Red baneberry	
<i>Quercus alba</i> White oak	<i>Rubus occidentalis</i> Black raspberry	<i>Helianthus hirsutus</i> Woodland sunflower	
<i>Quercus rubra</i> Northern red oak; Common red oak	<i>Rubus strigosus</i> Red raspberry	<i>Aralia nudicaulis</i> Wild sarsaparilla	
<i>Betula papyrifera</i> Paper birch		<i>Pteridium aquilinum</i> Bracken	
<i>Ulmus rubra</i> Red elm; Slippery elm		<i>Solidago flexicaulis</i> Zig-zag goldenrod	
		<i>Athyrium angustum</i> Lady fern	
		<i>Geum canadense</i> White avens	
		<i>Pilea pumila</i> Clearweed	

Appendix A: Natural Resources Inventory – Community Survey

Area 3-30

Dry Prairie (bedrock bluff subtype)

RANK C

STATUS 3

Canopy

Shrub

<i>Rhus glabra</i>	Smooth sumac
<i>Cornus foemina</i>	Gray dogwood
<i>Populus tremuloides</i>	Quaking aspen
<i>Prunus pumila</i>	Sand cherry
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Rhus radicans</i>	Poison ivy
<i>Physocarpus opulifolius</i>	Ninebark
<i>Juniperus communis</i>	Bush juniper
<i>Celastrus scandens</i>	Climbing bittersweet
<i>Vitis riparia</i>	Wild grape

Forbs

<i>Liatris cylindracea</i>	Cylindric blazing-star
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Coreopsis palmata</i>	Stiff tickseed
<i>Aster sericeus</i>	Silky aster
<i>Comandra umbellata</i>	Bastard toad-flax
<i>Amorpha canescens</i>	Lead-plant
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Aster ericoides</i>	Heath aster
<i>Anemone virginiana</i>	Thimbleweed
<i>Campanula rotundifolia</i>	Harebell
<i>Ratibida pinnata</i>	Gray-headed coneflower
<i>Verbena stricta</i>	Hairy blue vervain
<i>Euphorbia corollata</i>	Flowering spurge
<i>Monarda fistulosa</i>	Wild bergamot
<i>Rosa arkansana</i>	Prairie rose
<i>Helianthus laetiflorus</i>	Showy sunflower
<i>Antennaria neglecta</i>	Pussytoes
<i>Aquilegia canadensis</i>	Columbine
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Pellaea glabella</i>	Smooth cliff-brake
<i>Artemisia campestris</i>	Tall wormwood
<i>Linum sulcatum</i>	Yellow flax
<i>Antennaria perlinii</i>	Pussytoes
<i>Onosmodium molle</i>	False gromwell
<i>Draba reptans</i>	Carolina whitlow-grass
<i>Sisyrinchium campestre</i>	Blue-eyed-grass
<i>Senecio aureus</i>	Golden ragwort
<i>Lithospermum incisum</i>	Narrow-leaved puccoon
<i>Scutellaria leonardi</i>	Leonard's skullcap
<i>Viola pedatifida</i>	Prairie bird-foot violet

Graminoids

<i>Bromus kalmii</i>	Kalm's brome
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Elymus canadensis</i>	Nodding wild-rye
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Muhlenbergia cuspidata</i>	Plains muhly
<i>Sporobolus heterolepis</i>	Prairie dropseed
<i>Panicum</i>	Panic grass
<i>Poa compressa</i>	Canada bluegrass
<i>Bouteloua hirsuta</i>	Hairy grama
<i>Carex heliophila</i>	sun-loving sedge
<i>Carex abdita</i>	
<i>Panicum depauperatum</i>	Narrow-leaved Panicum

Appendix A: Natural Resources Inventory -- Community Survey

Area 3-31

Oak Woodland-Brushland

RANK C

STATUS 4

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Anemone virginiana</i>	Thimbleweed	<i>Carex pensylvanica</i>	pennsylvania sedge
<i>Populus tremuloides</i>	Quaking aspen	<i>Celtis occidentalis</i>	Hackberry	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Prunus serotina</i>	Black cherry	<i>Prunus virginiana</i>	Chokecherry	<i>Sanicula gregaria</i>	Black snakeroot	<i>Sorghastrum nutans</i>	Indian grass
<i>Celtis occidentalis</i>	Hackberry	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Elymus canadensis</i>	Nodding wild-rye
<i>Tilia americana</i>	Basswood	<i>Cornus amomum</i>	Silky dogwood	<i>Aster ontarioensis</i>	Ontario aster		
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Rubus occidentalis</i>	Black raspberry				
<i>Betula papyrifera</i>	Paper birch	<i>Corylus americana</i>	American hazelnut				
<i>Acer negundo</i>	Box elder	<i>Cornus foemina</i>	Gray dogwood				
<i>Populus deltoides</i>	Cottonwood	<i>Ribes missouriense</i>	Missouri gooseberry				
<i>Quercus velutina</i>	Black oak	<i>Fraxinus pennsylvanica</i>	Green ash				
		<i>Prunus americana</i>	Wild plum				
		<i>Juniperus virginiana</i>	Red cedar				
		<i>Rhus glabra</i>	Smooth sumac				
		<i>Vitis riparia</i>	Wild grape				
		<i>Menispermum canadense</i>	Canada moonseed				

Appendix A: Natural Resources Inventory -- Community Survey

Area 3-33

Oak Forest, Dry

- RANK CD

STATUS 3

DNR Rare Features

County Biological Site Dry oak Forest, Rank C

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Betula papyrifera</i>	Paper birch
<i>Tilia americana</i>	Basswood
<i>Ulmus americana</i>	American elm
<i>Prunus serotina</i>	Black cherry
<i>Populus tremuloides</i>	Quaking aspen

Shrub

<i>Prunus virginiana</i>	Chokecherry
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Ribes missouriense</i>	Missouri gooseberry
<i>Cornus foemina</i>	Gray dogwood
<i>Vitis riparia</i>	Wild grape
<i>Parthenocissus inserta</i>	Virginia creeper

Forbs

<i>Eupatorium rugosum</i>	Common snakeroot
<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil
<i>Osmorhiza claytonii</i>	Sweet Cicely
<i>Galium boreale</i>	Northern bedstraw
<i>Solidago flexicaulis</i>	Zig-zag goldenrod
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Phryma leptostachya</i>	Lopseed

Graminoids

<i>Carex pennsylvanica</i>	pensylvania sedge
----------------------------	-------------------

Appendix A: Natural Resources Inventory -- Community Survey

Area 3-34

Oak Forest, Mesic

- RANK C

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Smilacina racemosa</i>	False Solomon's-seal	<i>Carex pensylvanica</i>	pensylvania sedge
		<i>Zanthoxylum americanum</i>	Prickly ash	<i>Aster ontarioensis</i>	Ontario aster		
<i>Quercus macrocarpa</i>	Bur oak	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Ranunculus abortivus</i>	Kidney-leaf buttercup		
		<i>Sambucus pubens</i>	Red-berried elder	<i>Sanicula gregaria</i>	Black snakeroot		
<i>Quercus alba</i>	White oak	<i>Rubus occidentalis</i>	Black raspberry	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Prunus serotina</i>	Black cherry	<i>Cornus alternifolia</i>	Pagoda dogwood	<i>Cryptotaenia canadensis</i>	Honewort		
		<i>Cornus amomum</i>	Silky dogwood	<i>Asarum canadense</i>	Wild ginger		
<i>Betula papyrifera</i>	Paper birch	<i>Parthenocissus inserta</i>	Virginia creeper	<i>Adiantum pedatum</i>	Maidenhair-fern		
		<i>Ribes missouriense</i>	Missouri gooseberry	<i>Impatiens capensis</i>	Spotted touch-me-not; Jewel		
<i>Ulmus americana</i>	American elm			<i>Pilea pumila</i>	Clearweed		
				<i>Galium boreale</i>	Northern bedstraw		
<i>Acer negundo</i>	Box elder			<i>Circaea lutetiana</i>	Enchanter's nightshade		
				<i>Phryma leptostachya</i>	Lopseed		
<i>Populus tremuloides</i>	Quaking aspen			<i>Athyrium angustum</i>	Lady fern		
				<i>Polemonium reptans</i>	Jacob's ladder		
				<i>Geranium maculatum</i>	Wild geranium		
				<i>Aralia nudicaulis</i>	Wild sarsaparilla		
				<i>Sanicula marilandica</i>	Black snakeroot		
				<i>Osmunda claytoniana</i>	Interrupted fern		
				<i>Uvularia grandiflora</i>	Yellow bellwort		
				<i>Viola canadensis</i>	Rugulose violet		
				<i>Onoclea sensibilis</i>	Sensitive fern		

Appendix A: Natural Resources Inventory -- Community Survey

Area 3-35

Dry Prairie (bedrock bluff subtype)

RANK C

STATUS 3

DNR Rare Features

County Biological Site Southeast Section, Bedrock Bluff Prairie

Canopy

Shrub

<i>Juniperus communis</i>	Bush juniper
<i>Physocarpus opulifolius</i>	Ninebark
<i>Rhus radicans</i>	Poison ivy
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Prunus pumila</i>	Sand cherry
<i>Populus tremuloides</i>	Quaking aspen
<i>Cornus foemina</i>	Gray dogwood
<i>Rhus glabra</i>	Smooth sumac
<i>Celastrus scandens</i>	Climbing bittersweet
<i>Vitis riparia</i>	Wild grape

Forbs

<i>Euphorbia corollata</i>	Flowering spurge
<i>Verbena stricta</i>	Hairy blue vervain
<i>Ratibida pinnata</i>	Gray-headed coneflower
<i>Campanula rotundifolia</i>	Harebell
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Amorpha canescens</i>	Lead-plant
<i>Comandra umbellata</i>	Bastard toad-flax
<i>Aster sericeus</i>	Silky aster
<i>Coreopsis palmata</i>	Stiff tickseed
<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Liatris cylindracea</i>	Cylindric blazing-star
<i>Linum sulcatum</i>	Yellow flax
<i>Artemisia campestris</i>	Tall wormwood
<i>Pellaea glabella</i>	Smooth cliff-brake
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Aquilegia canadensis</i>	Columbine
<i>Antennaria neglecta</i>	Pussytoes
<i>Helianthus laetiflorus</i>	Showy sunflower
<i>Rosa arkansana</i>	Prairie rose
<i>Monarda fistulosa</i>	Wild bergamot

Graminoids

<i>Andropogon gerardii</i>	Big bluestem
<i>Muhlenbergia cuspidata</i>	Plains muhly
<i>Sporobolus heterolepis</i>	Prairie dropseed
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Elymus canadensis</i>	Nodding wild-rye
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Bromus kalmii</i>	Kalm's brome

Appendix A: Natural Resources Inventory -- Community Survey

Area 3-36

Oak Forest, Mesic

RANK C STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Betula papyrifera</i>	Paper birch	<i>Rhus radicans</i>	Poison ivy	<i>Galium</i>	Bedstraw; Cleavers		
<i>Ulmus</i>	Elm	<i>Prunus serotina</i>	Black cherry	<i>Sanicula marilandica</i>	Black snakeroot		
<i>Tilia americana</i>	Basswood	<i>Cornus amomum</i>	Silky dogwood	<i>Smilacina racemosa</i>	False Solomon's-seal		
<i>Prunus serotina</i>	Black cherry	<i>Prunus virginiana</i>	Chokecherry	<i>Agrimonia gryposepala</i>	Agrimony		
		<i>Corylus americana</i>	American hazelnut	<i>Geranium maculatum</i>	Wild geranium		

Area 3-37

Oak Woodland-Brushland

RANK CD STATUS 4 DNR Rare Features
County Biological Site MCBS classified Mesic Oak Forest

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Betula papyrifera</i>	Paper birch	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Osmorhiza claytonii</i>	Sweet Cicely	<i>Elymus</i>	Wild-rye
<i>Quercus macrocarpa</i>	Bur oak	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Galium boreale</i>	Northern bedstraw	<i>Sorghastrum nutans</i>	Indian grass
		<i>Juniperus communis</i>	Bush juniper	<i>Agrimonia gryposepala</i>	Agrimony		
		<i>Juniperus virginiana</i>	Red cedar	<i>Aster</i>			
		<i>Vitis riparia</i>	Wild grape				
		<i>Parthenocissus inserta</i>	Virginia creeper				
		<i>Rhus radicans</i>	Poison ivy				
		<i>Prunus serotina</i>	Black cherry				
		<i>Prunus virginiana</i>	Chokecherry				
		<i>Corylus americana</i>	American hazelnut				

Appendix A: Natural Resources Inventory -- Community Survey

Area 3-38

Dry Prairie (bedrock bluff subtype)

RANK C

STATUS 3

DNR Rare Features

County Biological Site Dry Prairie, C Rank

Canopy

Shrub

<i>Juniperus virginiana</i>	Red cedar
<i>Juniperus communis</i>	Bush juniper
<i>Rhus glabra</i>	Smooth sumac
<i>Populus tremuloides</i>	Quaking aspen
<i>Betula papyrifera</i>	Paper birch

Forbs

<i>Anemone virginiana</i>	Thimbleweed
<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Aster sericeus</i>	Silky aster
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint
<i>Aster ericoides</i>	Heath aster
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Viola pedatifida</i>	Prairie bird-foot violet
<i>Artemisia campestris</i>	Tall wormwood
<i>Euphorbia glyptosperma</i>	Ridge-seeded spurge

Graminoids

<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Andropogon gerardii</i>	Big bluestem
<i>Muhlenbergia cuspidata</i>	Plains muhly
<i>Sporobolus heterolepis</i>	Prairie dropseed
<i>Bouteloua hirsuta</i>	Hairy grama
<i>Sporobolus asper</i>	Rough dropseed

Area 3-39

Dry Prairie (bedrock bluff subtype)

RANK C

STATUS 3

Canopy

<i>Populus deltoides</i>	Cottonwood
<i>Betula papyrifera</i>	Paper birch

Shrub

<i>Rubus occidentalis</i>	Black raspberry
<i>Juniperus virginiana</i>	Red cedar
<i>Rhus glabra</i>	Smooth sumac
<i>Prunus virginiana</i>	Chokecherry
<i>Juniperus communis</i>	Bush juniper
<i>Vitis riparia</i>	Wild grape
<i>Parthenocissus inserta</i>	Virginia creeper

Forbs

<i>Aster colentangiensis</i>	Sky-blue aster
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Aster sericeus</i>	Silky aster
<i>Ratibida pinnata</i>	Gray-headed coneflower
<i>Teucrium canadense</i>	Germander
<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Aster ericoides</i>	Heath aster
<i>Helopsis helianthoides</i>	Ox-eye
<i>Coreopsis palmata</i>	Stiff tickseed
<i>Melilotus alba</i>	White sweet-clover
<i>Amorpha canescens</i>	Lead-plant
<i>Solidago missouriensis</i>	Missouri goldenrod
<i>Solidago canadensis</i>	Canada goldenrod

Graminoids

<i>Andropogon gerardii</i>	Big bluestem
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Poa compressa</i>	Canada bluegrass
<i>Panicum depauperatum</i>	Narrow-leaved Panicum
<i>Eragrostis</i>	Lovegrass
<i>Bromus inermis</i>	Smooth brome
<i>Muhlenbergia cuspidata</i>	Plains muhly
<i>Sorghastrum nutans</i>	Indian grass
<i>Poa pratensis</i>	Kentucky bluegrass

Appendix A: Natural Resources Inventory – Community Survey

Area 3-40

Oak Forest, Dry

RANK C

STATUS 3

DNR Rare Features

County Biological Site Mesic Oak Forest, Rank C

Canopy		Shrub		Forbs		Graminoids	
<i>Pinus sylvestris</i>	Scotch pine	<i>Acer negundo</i>	Box elder	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Carex pensylvanica</i>	pennsylvania sedge
<i>Pinus resinosa</i>	Red pine; Norway pine	<i>Comus foemina</i>	Gray dogwood	<i>Arctium minus</i>	Common burdock		
<i>Populus tremuloides</i>	Quaking aspen	<i>Prunus virginiana</i>	Chokecherry	<i>Hypericum pyramidatum</i>	Great St. John's-wort		
<i>Acer negundo</i>	Box elder	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Agrimonia gryposepala</i>	Agrimony		
<i>Prunus serotina</i>	Black cherry	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Aster ontarionis</i>	Ontario aster		
<i>Quercus velutina</i>	Black oak	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Galium</i>	Bedstraw; Cleavers		
<i>Quercus macrocarpa</i>	Bur oak	<i>Rhus radicans</i>	Poison ivy	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Botula papyrifera</i>	Paper birch	<i>Ulmus americana</i>	American elm	<i>Amphicarpaea bracteata</i>	Hog-peanut		
<i>Tilia americana</i>	Basswood	<i>Parthenocissus inserta</i>	Virginia creeper	<i>Anemone virginiana</i>	Thimbleweed		
<i>Quercus alba</i>	White oak	<i>Vitis riparia</i>	Wild grape	<i>Rosa arkansana</i>	Prairie rose		
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Cellis occidentalis</i>	Hackberry	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
		<i>Ribes missouriense</i>	Missouri gooseberry	<i>Geum canadense</i>	White avens		
				<i>Phryma leptostachya</i>	Lopseed		
				<i>Urtica dioica</i>	Stinging nettle		
				<i>Viola</i>	Violet		
				<i>Ranunculus abortivus</i>	Kidney-leaf buttercup		
				<i>Hackelia virginiana</i>	Virginia slickseed		
				<i>Botrychium virginianum</i>	Rattlesnake-fern		

Appendix A: Natural Resources Inventory – Community Survey

Area 3-41

Oak Forest, Mesic

RANK D

STATUS 2

DNR Rare Features

County Biological Site Mesic Oak Forest, Rank C

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus alba</i>	White oak	<i>Corylus americana</i>	American hazelnut	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Cornus</i>	Dogwood; Cornel	<i>Arctium minus</i>	Common burdock		
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Prunus virginiana</i>	Chokecherry	<i>Agrimonia gryposepala</i>	Agrimony		
		<i>Ribes</i>	Currant; Gooseberry	<i>Aster ontarionis</i>	Ontario aster		
		<i>Ulmus americana</i>	American elm	<i>Amphicarpaea bracteata</i>	Hog-peanut		
		<i>Rhus radicans</i>	Poison ivy	<i>Dasmodium glutinosum</i>	Pointed-leaved tick-trefoil		
				<i>Uvularia</i>	Bellwort		
				<i>Athyrium angustum</i>	Lady fern		

Area 3-42

Lowland Hardwood Forest

RANK C

STATUS 4

Canopy		Shrub		Forbs		Graminoids	
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Sambucus canadensis</i>	Common elder	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Elymus canadensis</i>	Nodding wild-rye
<i>Juglans nigra</i>	Black walnut	<i>Acer negundo</i>	Box elder	<i>Sanicula gregaria</i>	Black snakeroot	<i>Phalaris arundinacea</i>	Reed canary grass
<i>Acer negundo</i>	Box elder	<i>Ulmus americana</i>	American elm	<i>Osmorhiza claytonii</i>	Sweet Cicely		
		<i>Rhamnus cathartica</i>	Common buckthorn	<i>Hydrophyllum virginianum</i>	Virginia waterleaf		
		<i>Juglans nigra</i>	Black walnut	<i>Galium aparine</i>	Cleavers		
		<i>Fraxinus pennsylvanica</i>	Green ash	<i>Urtica dioica</i>	Stinging nettle		
		<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Cryptotaenia canadensis</i>	Honewort		
		<i>Rubus allegheniensis</i>	Common blackberry	<i>Pilea pumila</i>	Clearweed		
		<i>Vitis riparia</i>	Wild grape	<i>Impatiens capensis</i>	Spotted touch-me-not; Jewel		
		<i>Clematis virginiana</i>	Virgin's bower	<i>Laportea canadensis</i>	Wood nettle		
				<i>Aster ontarionis</i>	Ontario aster		
				<i>Rudbeckia laciniata</i>	Goldenglow		
				<i>Aster novae-angliae</i>	New England aster		

Appendix A: Natural Resources Inventory -- Community Survey

Area 3-44

Dry Prairie (bedrock bluff subtype)

RANK C

STATUS 3

DNR Rare Features

County Biological Site Dry Bedrock Bluff Prairie, C Rank

Canopy

Shrub

<i>Juniperus virginiana</i>	Red cedar
<i>Prunus serotina</i>	Black cherry
<i>Rhus glabra</i>	Smooth sumac
<i>Juniperus communis</i>	Bush juniper
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Rubus allegheniensis</i>	Common blackberry
<i>Vitis riparia</i>	Wild grape

Forbs

<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Solidago rigida</i>	Stiff goldenrod
<i>Solidago canadensis</i>	Canada goldenrod
<i>Amorpha canescens</i>	Lead-plant
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Aster sericeus</i>	Silky aster
<i>Euphorbia corollata</i>	Flowering spurge
<i>Anemone virginiana</i>	Thimbleweed

Graminoids

<i>Sorghastrum nutans</i>	Indian grass
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Sporobolus heterolepis</i>	Prairie dropseed
<i>Andropogon gerardii</i>	Big bluestem
<i>Muhlenbergia cuspidata</i>	Plains muhly

Area 3-45

Oak Woodland-Brushland

RANK BC

STATUS 4

DNR Rare Features

County Biological Site Classified as Mesic Oak Forest, 1990

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Betula papyrifera</i>	Paper birch
<i>Ulmus</i>	Elm
<i>Prunus serotina</i>	Black cherry

Shrub

<i>Zanthoxylum americanum</i>	Prickly ash
<i>Ribes missouriense</i>	Missouri gooseberry
<i>Rhus radicans</i>	Poison ivy
<i>Prunus serotina</i>	Black cherry
<i>Prunus virginiana</i>	Chokecherry
<i>Corylus americana</i>	American hazelnut
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Juniperus virginiana</i>	Red cedar
<i>Rhus glabra</i>	Smooth sumac

Forbs

<i>Triosteum perfoliatum</i>	Horse-gentian
<i>Teucrium canadense</i>	Gemander
<i>Physalis heterophylla</i>	Clammy ground-cherry
<i>Galium boreale</i>	Northern bedstraw
<i>Aquilegia canadensis</i>	Columbine
<i>Helianthus hirsutus</i>	Woodland sunflower
<i>Amphicarpaea bracteata</i>	Hog-peanut

Graminoids

<i>Elymus villosus</i>	Wild-rye
<i>Sorghastrum nutans</i>	Indian grass
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Carex</i>	Sedge

Appendix A: Natural Resources Inventory -- Community Survey

Area 3-46

Oak Forest, Mesic

RANK C

STATUS 2

DNR Rare Features

County Biological Site Mesic Oak Forest, Rank C

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Acer spicatum</i>	Mountain maple	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Rubus occidentalis</i>	Black raspberry	<i>Solidago flexicaulis</i>	Zig-zag goldenrod	<i>Oryzopsis asperifolia</i>	Moutain rice-grass
<i>Quercus velutina</i>	Black oak	<i>Prunus virginiana</i>	Chokecherry	<i>Circaea lutetiana</i>	Enchanter's nightshade		
<i>Quercus alba</i>	White oak	<i>Cornus alternifolia</i>	Pagoda dogwood	<i>Phryma leptostachya</i>	Lopseed		
<i>Tilia americana</i>	Basswood	<i>Ulmus</i>	Elm	<i>Thalictrum dioicum</i>	Early meadow rue		
<i>Populus tremuloides</i>	Quaking aspen	<i>Cornus foemina</i>	Gray dogwood	<i>Aquilegia canadensis</i>	Columbine		
<i>Ulmus americana</i>	American elm	<i>Cornus amomum</i>	Silky dogwood	<i>Uvularia sessifolia</i>	Pale bellwort		
<i>Betula papyrifera</i>	Paper birch	<i>Acer saccharum</i>	Sugar maple	<i>Aster ontarionis</i>	Ontario aster		
<i>Juglans cinerea</i>	Butternut	<i>Parthenocissus inserta</i>	Virginia creeper	<i>Sanicula marilandica</i>	Black snakeroot		
<i>Juglans nigra</i>	Black walnut	<i>Vitis riparia</i>	Wild grape	<i>Athyrium angustum</i>	Lady fern		
				<i>Ranunculus abortivus</i>	Kidney-leaf buttercup		
				<i>Adiantum pedatum</i>	Maidenhair-fern		
				<i>Geranium maculatum</i>	Wild geranium		
				<i>Aralia racemosa</i>	American spikenard		
				<i>Smilacina racemosa</i>	False Solomon's-seal		
				<i>Osmunda claytoniana</i>	Interrupted fern		
				<i>Amphicarpaea bracteata</i>	Hog-peanut		
				<i>Polygonatum commutatum</i>	Giant Solomon's-seal		
				<i>Polemonium reptans</i>	Jacob's ladder		

Appendix A: Natural Resources Inventory -- Community Survey

Area 3-47

Oak Forest, Mesic

RANK D

STATUS 2

DNR Rare Features

County Biological Site Mesic Oak Forest, Rank C; 1990

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Prunus serotina</i>	Black cherry
<i>Betula papyrifera</i>	Paper birch
<i>Juglans cinerea</i>	Butternut
<i>Ulmus americana</i>	American elm
<i>Acer saccharum</i>	Sugar maple
<i>Juglans nigra</i>	Black walnut

Shrub

<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry
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Forbs

Graminoids

Appendix A: Natural Resources Inventory -- Community Survey

Area 4-48

Dry Prairie (bedrock bluff subtype)

RANK C

STATUS 3

DNR Rare Features

County Biological Site Dry Prairie, Rank C; 1990

Canopy

Shrub

<i>Rhus glabra</i>	Smooth sumac
<i>Juniperus virginiana</i>	Red cedar
<i>Juniperus communis</i>	Bush juniper
<i>Rhus radicans</i>	Poison ivy
<i>Zanthoxylum americanum</i>	Prickly ash
<i>Rubus occidentalis</i>	Black raspberry
<i>Lonicera laterica</i>	Tartarian honeysuckle
<i>Physocarpus opulifolius</i>	Ninebark
<i>Corylus americana</i>	American hazelnut

Forbs

<i>Artemisia frigida</i>	Prairie sagewort
<i>Antennaria neglecta</i>	Pussytoes
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Anemone virginiana</i>	Thimbleweed
<i>Aster sericeus</i>	Silky aster
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Aquilegia canadensis</i>	Columbine
<i>Aster ericoides</i>	Heath aster
<i>Petalostemon candidum</i>	White prairie-clover
<i>Gnaphalium obtusifolium</i>	Sweet everlasting
<i>Hypericum pyramidatum</i>	Great St. John's-wort
<i>Oenothera biennis</i>	Common evening-primrose
<i>Monarda fistulosa</i>	Wild bergamot
<i>Lobelia spicata</i>	Rough-spiked lobelia
<i>Arabis lyrata</i>	Lyre-leaved rock-cress
<i>Lithospermum canescens</i>	Hoary puccoon
<i>Solidago rigida</i>	Stiff goldenrod
<i>Verbena stricta</i>	Hairy blue vervain
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint
<i>Viola pedatifida</i>	Prairie bird-foot violet
<i>Liatris cylindracea</i>	Cylindric blazing-star
<i>Liatris aspera</i>	Rough blazing star
<i>Coreopsis palmata</i>	Stiff tickseed
<i>Antennaria plantaginifolia</i>	Plantain-leaved pussytoes
<i>Kuhnia eupatorioides</i>	False boneset
<i>Physalis heterophylla</i>	Clammy ground-cherry
<i>Solidago canadensis</i>	Canada goldenrod
<i>Campanula rotundifolia</i>	Harebell
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Onosmodium molle</i>	False gromwell

Graminoids

<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Panicum depauperatum</i>	Narrow-leaved Panicum
<i>Bouteloua hirsuta</i>	Hairy grama
<i>Poa compressa</i>	Canada bluegrass
<i>Eragrostis</i>	Lovegrass

Appendix A: Natural Resources Inventory -- Community Survey

Area 4-49

Oak Woodland-Brushland

RANK C

STATUS

DNR Rare Features

County Biological Site Oak Woodland-Brushland, Rank
CD; 1990

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Aquilegia canadensis</i>	Columbine	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Betula papyrifera</i>	Paper birch	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Bromus kalmii</i>	Kalm's brome
<i>Populus tremuloides</i>	Quaking aspen	<i>Juniperus communis</i>	Bush juniper	<i>Viola</i>	Violet		
<i>Juniperus virginiana</i>	Red cedar	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Aster ontarionis</i>	Ontario aster		
<i>Ulmus americana</i>	American elm	<i>Corylus americana</i>	American hazelnut	<i>Osmorhiza claytonii</i>	Sweet Cicely		
		<i>Physocarpus opulifolius</i>	Ninebark	<i>Lathyrus ochroleucus</i>	Pale vetchling		
		<i>Populus tremuloides</i>	Quaking aspen	<i>Anaphalis margaritacea</i>	Pearly everlasting		
		<i>Viburnum lentago</i>	Nannyberry	<i>Vicia americana</i>	American vetch		
		<i>Prunus virginiana</i>	Chokecherry				
		<i>Cornus amomum</i>	Silky dogwood				
		<i>Ulmus</i>	Elm				
		<i>Vitis riparia</i>	Wild grape				
		<i>Parthenocissus inserta</i>	Virginia creeper				

Appendix A: Natural Resources Inventory – Community Survey

Area 4-50

Dry Prairie (bedrock bluff subtype)

RANK B

STATUS 3

DNR Rare Features

County Biological Site Bedrock Bluff Dry prairie, C Rank;
1990

Canopy

Shrub

<i>Juniperus virginiana</i>	Red cedar
<i>Juniperus communis</i>	Bush juniper
<i>Rhus glabra</i>	Smooth sumac
<i>Cornus foemina</i>	Gray dogwood
<i>Prunus serotina</i>	Black cherry
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Prunus pumila</i>	Sand cherry
<i>Physocarpus opulifolius</i>	Ninebark
<i>Prunus americana</i>	Wild plum
<i>Rhus radicans</i>	Poison ivy
<i>Vitis riparia</i>	Wild grape
<i>Celastrus scandens</i>	Climbing bitter-sweet

Forbs

<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Anemone virginiana</i>	Thimbleweed
<i>Aster sericeus</i>	Silky aster
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Campanula rotundifolia</i>	Harebell
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Verbena stricta</i>	Hairy blue vervain
<i>Kuhnia eupatorioides</i>	False boneset
<i>Coreopsis palmata</i>	Stiff tickseed
<i>Liatris aspera</i>	Rough blazing star
<i>Liatris cylindracea</i>	Cylindric blazing-star
<i>Viola pedatifida</i>	Prairie bird-foot violet
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint
<i>Solidago rigida</i>	Stiff goldenrod
<i>Aquilegia canadensis</i>	Columbine
<i>Aster ericoides</i>	Heath aster
<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Dalea candida</i>	White prairie-clover
<i>Monarda fistulosa</i>	Wild bergamot
<i>Lobelia spicata</i>	Rough-spiked lobelia
<i>Amorpha canescens</i>	Lead-plant
<i>Euphorbia corollata</i>	Flowering spurge
<i>Anemone cylindrica</i>	Thimbleweed
<i>Zigadenus eleg-glauc-comple</i>	White camas
<i>Sisyrinchium campestre</i>	Blue-eyed-grass
<i>Antennaria neglecta</i>	Pussytoes
<i>Antennaria plantaginifolia</i>	Plantain-leaved pussytoes
<i>Artemisia campestris</i>	Tall wormwood
<i>Draba reptans</i>	Carolina whitlow-grass
<i>Comandra umbellata</i>	Bastard toad-flax

Graminoids

<i>Andropogon gerardii</i>	Big bluestem
<i>Sorghastrum nutans</i>	Indian grass
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Muhlenbergia cuspidata</i>	Plains muhly
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Sporobolus heterolepis</i>	Prairie dropseed
<i>Eragrostis spectabilis</i>	Purple love grass
<i>Bouteloua hirsuta</i>	Hairy grama
<i>Panicum depauperatum</i>	Narrow-leaved Panicum
<i>Poa compressa</i>	Canada bluegrass
<i>Poa pratensis</i>	Kentucky bluegrass

Appendix A: Natural Resources Inventory – Community Survey

<i>Oenothera biennis</i>	Common evening-primrose
<i>Physalis heterophylla</i>	Clammy ground-cherry
<i>Pellaea glabella</i>	Smooth cliff-brake
<i>Linum sulcatum</i>	Yellow flax
<i>Hedeoma hispida</i>	Mock pennyroyal
<i>Arabis lyrata</i>	Lyre-leaved rock-cress
<i>Polygonatum commutatum</i>	Giant Solomon's-seal
<i>Triosteum perfoliatum</i>	Horse-gentian
<i>Aster laevis</i>	Smooth blue aster
<i>Apocynum cannabinum</i>	Indian hemp
<i>Ratibida pinnata</i>	Gray-headed coneflower

Area 4-51

Oak Forest, Mesic

RANK CD

STATUS 2

DNR Rare Features

County Biological Site Oak Woodland-Brushland, Rank C: 1990

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Rubus occidentalis</i>	Black raspberry	<i>Smilax lasioneura</i>	Carrion-flower	<i>Carex pennsylvanica</i>	pennsylvania sedge
<i>Quercus alba</i>	White oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Smilacina racemosa</i>	False Solomon's-seal	<i>Carex blanda</i>	woodland sedge
<i>Ulmus americana</i>	American elm	<i>Fraxinus pennsylvanica</i>	Green ash	<i>Laportea canadensis</i>	Wood nettle		
<i>Acer negundo</i>	Box elder	<i>Celtis occidentalis</i>	Hackberry	<i>Rhamnus cathartica</i>	Common buckthorn		
<i>Tilia americana</i>	Basswood	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Athyrium angustum</i>	Lady fern		
<i>Celtis occidentalis</i>	Hackberry	<i>Acer negundo</i>	Box elder	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Lonicera tatarica</i>	Tartarian honeysuckle	<i>Geranium maculatum</i>	Wild geranium		
<i>Betula papyrifera</i>	Paper birch	<i>Rhus radicans</i>	Poison ivy	<i>Aralia racemosa</i>	American spikenard		
<i>Prunus serotina</i>	Black cherry	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Aster ontarionis</i>	Ontario aster		
<i>Populus tremuloides</i>	Quaking aspen	<i>Prunus serotina</i>	Black cherry	<i>Amphicarpaea bracteata</i>	Hog-peanut		
<i>Quercus velutina</i>	Black oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Circaea luteliana</i>	Enchanter's nightshade		
		<i>Rubus allegheniensis</i>	Common blackberry	<i>Viola</i>	Violet		
		<i>Sambucus pubens</i>	Red-berried elder	<i>Hackelia virginiana</i>	Virginia stickseed		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Eupatorium rugosum</i>	Common snakeroot		
		<i>Vitis riparia</i>	Wild grape	<i>Geum canadense</i>	White avens		
				<i>Helianthus hirsutus</i>	Woodland sunflower		
				<i>Fragaria virginiana</i>	Common strawberry		

Appendix A: Natural Resources Inventory – Community Survey

Area 4-52

Oak Woodland-Brushland

RANK CD

STATUS 4

DNR Rare Features

County Biological Site Rank C, 1990

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Juniperus virginiana</i>	Red cedar
<i>Juglans nigra</i>	Black walnut
<i>Betula papyrifera</i>	Paper birch
<i>Populus tremuloides</i>	Quaking aspen
<i>Populus deltoides</i>	Cottonwood
<i>Acer negundo</i>	Box elder
<i>Quercus alba</i>	White oak
<i>Tilia americana</i>	Basswood

Shrub

<i>Zanthoxylum americanum</i>	Prickly ash
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Cornus amomum</i>	Silky dogwood
<i>Rhus glabra</i>	Smooth sumac
<i>Prunus americana</i>	Wild plum
<i>Juniperus communis</i>	Bush juniper
<i>Quercus</i>	Oak
<i>Celtis occidentalis</i>	Hackberry
<i>Rubus occidentalis</i>	Black raspberry
<i>Rhus radicans</i>	Poison ivy
<i>Corylus americana</i>	American hazelnut
<i>Prunus virginiana</i>	Chokecherry
<i>Smilax hispida</i>	Green-briar
<i>Celastrus scandens</i>	Climbing bittersweet
<i>Vitis riparia</i>	Wild grape

Forbs

<i>Amphicarpaea bracteata</i>	Hog-peanut
<i>Eupatorium rugosum</i>	Common snakeroot
<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil
<i>Osmorhiza claytonii</i>	Sweet Cicely
<i>Solidago flexicaulis</i>	Zig-zag goldenrod
<i>Aquilegia canadensis</i>	Columbine
<i>Comandra umbellata</i>	Bastard toad-flax
<i>Linaria vulgaris</i>	Butter-and-eggs
<i>Amorpha canescens</i>	Lead-plant
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Verbena urticifolia</i>	White vervain
<i>Cirsium arvense</i>	Canada thistle
<i>Aster ontariensis</i>	Ontario aster
<i>Galium aparine</i>	Cleavers

Graminoids

<i>Carex pensylvanica</i>	pensylvania sedge
<i>Muhlenbergia mexicana</i>	Mexican salin grass
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Poa compressa</i>	Canada bluegrass
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Panicum depauperatum</i>	Narrow-leaved Panicum

Appendix A: Natural Resources Inventory -- Community Survey

Area 4-53

Dry Prairie (bedrock bluff subtype)

RANK CD

STATUS 3

DNR Rare Features

County Biological Site: Bedrock bluff Prairie, C Ranked, 1990

Canopy

Shrub

<i>Juniperus virginiana</i>	Red cedar
<i>Rhus glabra</i>	Smooth sumac
<i>Cornus foemina</i>	Gray dogwood
<i>Physocarpus opulifolius</i>	Ninebark
<i>Rhus typhina</i>	Staghorn sumac
<i>Quercus macrocarpa</i>	Bur oak

Forbs

<i>Heliopsis helianthoides</i>	Ox-eye
<i>Amorpha canescens</i>	Lead-plant
<i>Viola pedatifida</i>	Prairie bird-foot violet
<i>Cirsium discolor</i>	Field thistle
<i>Triosteum perfoliatum</i>	Horse-gentian
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Oxalis stricta</i>	Yellow wood-sorrel
<i>Anemone virginiana</i>	Thimbleweed

Graminoids

<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Setaria glauca</i>	Yellow foxtail
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Muhlenbergia cuspidata</i>	Plains muhly
<i>Bromus inermis</i>	Smooth brome
<i>Poa compressa</i>	Canada bluegrass
<i>Sorghastrum nutans</i>	Indian grass

Appendix A: Natural Resources Inventory -- Community Survey

Area 4-54
Oak Forest, Mesic

RANK C

STATUS 2

DNR Rare Features

County Biological Site Mesic Oak Forest, Rank CD; 1990

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus alba</i>	White oak	<i>Ulmus americana</i>	American elm	<i>Teucrium canadense</i>	Germander	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus macrocarpa</i>	Bur oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Carex blanda</i>	woodland sedge
<i>Quercus velutina</i>	Black oak	<i>Prunus serotina</i>	Black cherry	<i>Aster cordifolius</i>	Heart-leaved aster		
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Cryptotaenia canadensis</i>	Honewort		
<i>Betula papyrifera</i>	Paper birch	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Phryma leptostachya</i>	Lopseed		
<i>Ulmus</i>	Elm	<i>Prunus virginiana</i>	Chokecherry	<i>Osmorhiza claytonii</i>	Sweet Cicely		
		<i>Cornus amomum</i>	Silky dogwood	<i>Eupatorium rugosum</i>	Common snakeroot		
		<i>Juniperus virginiana</i>	Red cedar	<i>Circaea lutetiana</i>	Enchanter's nightshade		
		<i>Rubus occidentalis</i>	Black raspberry	<i>Athyrium angustum</i>	Lady fern		
		<i>Acer spicatum</i>	Mountain maple	<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
		<i>Rubus allegheniensis</i>	Common blackberry	<i>Aster ontarionis</i>	Ontario aster		
		<i>Sambucus pubens</i>	Red-berried elder	<i>Sanicula gregaria</i>	Black snakeroot		
		<i>Vitis riparia</i>	Wild grape	<i>Viola</i>	Violet		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Onoclea sensibilis</i>	Sensitive fern		
				<i>Anemone virginiana</i>	Thimbleweed		

Appendix A: Natural Resources Inventory – Community Survey

Area 4-55

Oak Woodland-Brushland

RANK CD

STATUS 4

DNR Rare Features

County Biological Site Mesic Oak Forest, Rank CD

Canopy		Shrub	Forbs	Graminoids		
<i>Quercus macrocarpa</i>	Bur oak	<i>Sambucus pubens</i>	Red-berried elder	<i>Eupatorium rugosum</i>	Common snakeroot	
<i>Quercus velutina</i>	Black oak	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Galium aparine</i>	Cleavers	
<i>Betula papyrifera</i>	Paper birch	<i>Prunus serotina</i>	Black cherry	<i>Sanicula gregaria</i>	Black snakeroot	
<i>Juniperus virginiana</i>	Red cedar	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Osmorhiza claytonii</i>	Sweet Cicely	
<i>Ulmus americana</i>	American elm	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Aster cordifolius</i>	Heart-leaved aster	
<i>Populus deltoides</i>	Cottonwood	<i>Acer negundo</i>	Box elder	<i>Cryptotaenia canadensis</i>	Honewort	
<i>Quercus alba</i>	White oak	<i>Viburnum lentago</i>	Nannyberry	<i>Anemone virginiana</i>	Thimbleweed	
		<i>Rhus radicans</i>	Poison ivy	<i>Aster ontariensis</i>	Ontario aster	
		<i>Tilia americana</i>	Basswood	<i>Circaea lutetiana</i>	Enchanter's nightshade	
		<i>Rubus allegheniensis</i>	Common blackberry	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	
		<i>Rhus glabra</i>	Smooth sumac	<i>Solidago flexicaulis</i>	Zig-zag goldenrod	
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Urtica dioica</i>	Stinging nettle	
		<i>Vitis riparia</i>	Wild grape	<i>Rosa arkansana</i>	Prairie rose	
				<i>Smilax lasioneura</i>	Carrion-flower	
				<i>Vorbania urticifolia</i>	White vervain	
				<i>Prenanthes racemosa</i>	Smooth rattlesnake-root	
				<i>Acalypha rhomboidea</i>	Three-seeded mercury	
					<i>Muhlenbergia mexicana</i>	Mexican salin grass

Appendix A: Natural Resources Inventory -- Community Survey

Area 4-56

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus alba</i>	White oak	<i>Acer saccharum</i>	Sugar maple	<i>Aster ontariensis</i>	Ontario aster	<i>Muhlenbergia mexicana</i>	Mexican satin grass
<i>Prunus serotina</i>	Black cherry	<i>Ulmus americana</i>	American elm	<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
<i>Acer saccharum</i>	Sugar maple	<i>Rubus occidentalis</i>	Black raspberry	<i>Aster cordifolius</i>	Heart-leaved aster		
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Celtis occidentalis</i>	Hackberry	<i>Eupatorium rugosum</i>	Common snakeroot		
		<i>Cornus amomum</i>	Silky dogwood	<i>Osmorhiza claytonii</i>	Sweet Cicely		
		<i>Tilia americana</i>	Basswood				
		<i>Rhus radicans</i>	Poison ivy				
		<i>Parthenocissus inserta</i>	Virginia creeper				
		<i>Vitis riparia</i>	Wild grape				

Area 4-57

Dry Prairie (bedrock bluff subtype)

RANK D

STATUS 3

DNR Rare Features

County Biological Site Bedrock Bluff Prairie, Ranked C by CBS in 1990

Canopy		Shrub		Forbs		Graminoids	
		<i>Juniperus virginiana</i>	Red cedar	<i>Aster oolentangiensis</i>	Sky-blue aster	<i>Andropogon gerardii</i>	Big bluestem
		<i>Vitis riparia</i>	Wild grape	<i>Solidago canadensis</i>	Canada goldenrod	<i>Schizachyrium scoparium</i>	Little bluestem
				<i>Melilotus alba</i>	White sweet-clover	<i>Bouteloua curtipendula</i>	Side-oats grama
				<i>Aster ericoides</i>	Heath aster	<i>Poa compressa</i>	Canada bluegrass
				<i>Comandra umbellata</i>	Bastard toad-flax	<i>Sporobolus heterolepis</i>	Prairie dropseed
						<i>Muhlenbergia cuspidata</i>	Plains muhly

Appendix A: Natural Resources Inventory -- Community Survey

Area 4-58

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Celtis occidentalis</i>	Hackberry	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Carex pensylvanica</i>	pennsylvania sedge
<i>Quercus macrocarpa</i>	Bur oak	<i>Acer saccharum</i>	Sugar maple	<i>Galium aparine</i>	Cleavers	<i>Elymus hystrix</i>	Bottlebrush grass
<i>Tilia americana</i>	Basswood	<i>Corylus americana</i>	American hazelnut	<i>Cryptotaenia canadensis</i>	Honewort		
<i>Acer saccharum</i>	Sugar maple	<i>Juglans nigra</i>	Black walnut	<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Juglans nigra</i>	Black walnut	<i>Fraxinus nigra</i>	Black ash	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Pilea pumila</i>	Clearweed		
		<i>Cornus amomum</i>	Silky dogwood	<i>Phryma leptostachya</i>	Lopseed		
		<i>Zanthoxylum americanum</i>	Prickly ash	<i>Viola</i>	Violet		
		<i>Prunus virginiana</i>	Chokecherry	<i>Hackelia virginiana</i>	Virginia stickseed		
		<i>Rubus allegheniensis</i>	Common blackberry	<i>Smilacina stellata</i>	Starry false Solomon's-seal		
		<i>Smilax hispida</i>	Green-briar	<i>Helianthus hirsutus</i>	Woodland sunflower		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Agrimonia gryposepala</i>	Agrimony		
				<i>Veronicastrum virginicum</i>	Culver's root		
				<i>Anemone virginiana</i>	Thimbleweed		
				<i>Triosteum perfoliatum</i>	Horse-gentian		
				<i>Smilax lasioneura</i>	Carion-flower		
				<i>Circaea lutetiana</i>	Enchanter's nightshade		

Appendix A: Natural Resources Inventory -- Community Survey

Area 4-61

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Tilia americana</i>	Basswood	<i>Prunus virginiana</i>	Chokecherry	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Elymus hystrix</i>	Bottlebrush grass
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Corylus americana</i>	American hazelnut	<i>Aster cordifolius</i>	Heart-leaved aster		
<i>Quercus macrocarpa</i>	Bur oak	<i>Ulmus rubra</i>	Red elm; Slippery elm	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
<i>Prunus serotina</i>	Black cherry	<i>Tilia americana</i>	Basswood	<i>Smilacina stellata</i>	Starry false Solomon's-seal		
<i>Acer saccharum</i>	Sugar maple	<i>Acer saccharum</i>	Sugar maple	<i>Desmodium canadense</i>	Tick-trefoil		
<i>Populus tremuloides</i>	Quaking aspen	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Helianthus hirsutus</i>	Woodland sunflower		
<i>Quercus velutina</i>	Black oak	<i>Rubus strigosus</i>	Red raspberry				
		<i>Acer negundo</i>	Box elder				
		<i>Cornus foemina</i>	Gray dogwood				
		<i>Zanthoxylum americanum</i>	Prickly ash				
		<i>Menispermum canadense</i>	Canada moonseed				
		<i>Vitis riparia</i>	Wild grape				

Appendix A: Natural Resources Inventory – Community Survey

Area 5-62

Lowland Hardwood Forest

RANK CD

STATUS 4

Canopy	Shrub	Forbs	Graminoids	Wild-rye
<i>Populus deltoides</i> Cottonwood	<i>Rubus occidentalis</i> Black raspberry	<i>Helianthus tuberosus</i> Jerusalem artichoke	<i>Elymus virginicus</i>	Reed canary grass
<i>Fraxinus pennsylvanica</i> Green ash	<i>Juglans nigra</i> Black walnut	<i>Heracleum lanatum</i> Cow-parsnip	<i>Phalaris arundinacea</i>	Nodding wild-rye
<i>Juglans nigra</i> Black walnut	<i>Salix</i> Willow	<i>Hydrophyllum virginianum</i> Virginia waterleaf	<i>Elymus canadensis</i>	Fringed brome
<i>Salix nigra</i> Black willow	<i>Sambucus canadensis</i> Common elder	<i>Laportea canadensis</i> Wood nettle	<i>Bromus ciliatus</i>	
<i>Ulmus rubra</i> Red elm; Slippery elm	<i>Acer negundo</i> Box elder	<i>Impatiens capensis</i> Spotted touch-me-not; Jewel		
<i>Quercus macrocarpa</i> Bur oak	<i>Ribes americanum</i> Wild black currant	<i>Urtica dioica</i> Stinging nettle		
<i>Quercus velutina</i> Black oak	<i>Celtis occidentalis</i> Hackberry	<i>Geum macrophyllum</i> Big-leaf avens		
<i>Prunus serotina</i> Black cherry	<i>Ribes missouriense</i> Missouri gooseberry	<i>Pilea pumila</i> Clearweed		
<i>Tilia americana</i> Basswood	<i>Rhamnus cathartica</i> Common buckthorn	<i>Osmorhiza claytonii</i> Sweet Cicely		
<i>Acer saccharinum</i> Silver maple; Soft maple	<i>Clematis virginiana</i> Virgin's bower	<i>Cryptotaenia canadensis</i> Honewort		
	<i>Smilax hispida</i> Green-briar	<i>Galium triflorum</i> Three-flowered bedstraw		
	<i>Parthenocissus inserta</i> Virginia creeper	<i>Viola</i> Violet		
		<i>Rudbeckia laciniata</i> Goldenglow		
		<i>Stellaria</i> Chickweed; Starwort		
		<i>Solidago gigantea</i> Giant goldenrod		
		<i>Angelica atropurpurea</i> Angelica		

Appendix A: Natural Resources Inventory -- Community Survey

Area 5-63

River Beach

Canopy		Shrub		Forbs		Graminoids	
<i>Salix bebbiana</i>	Bebb's willow	<i>Salix exigua</i>	Sand-bar willow	<i>Lythrum salicaria</i>	Purple loosestrife	<i>Phalaris arundinacea</i>	Reed canary grass
<i>Robinia pseudoacacia</i>	Black locust	<i>Fraxinus nigra</i>	Black ash	<i>Pastinaca sativa</i>	Parsnip	<i>Equisetum laevigatum</i>	Smooth scouring-rush
<i>Juglans nigra</i>	Black walnut	<i>Robinia pseudoacacia</i>	Black locust	<i>Angelica atropurpurea</i>	Angelica	<i>Poa pratensis</i>	Kentucky bluegrass
<i>Populus deltoides</i>	Cottonwood	<i>Acer negundo</i>	Box elder	<i>Viola</i>	Violet	<i>Bromus inermis</i>	Smooth brome
		<i>Cornus stolonifera</i>	Red-osier dogwood	<i>Hydrophyllum virginianum</i>	Virginia waterleaf	<i>Sporobolus cryptandrus</i>	Sand dropseed
		<i>Vitis riparia</i>	Wild grape	<i>Solidago gigantea</i>	Giant goldenrod	<i>Muhlenbergia</i>	Satin-grass; Muhly grass
		<i>Apios americana</i>	Groundnut	<i>Urtica dioica</i>	Stinging nettle	<i>Setaria glauca</i>	Yellow foxtail
				<i>Teucrium canadense</i>	Germander		
				<i>Polygonum pennsylvanicum</i>	Pennsylvania smartweed		
				<i>Helianthus tuberosus</i>	Jerusalem artichoke		
				<i>Monarda fistulosa</i>	Wild bergamot		
				<i>Melilotus alba</i>	White sweet-clover		
				<i>Artemisia campestris</i>	Tall wormwood		
				<i>Achillea millefolium</i>	Yarrow		

Appendix A: Natural Resources Inventory – Community Survey

Area 5-66

Dry Prairie (bedrock bluff subtype)

RANK C

STATUS 3

Canopy

Shrub

<i>Juniperus virginiana</i>	Red cedar
<i>Rhus glabra</i>	Smooth sumac
<i>Rubus occidentalis</i>	Black raspberry
<i>Prunus americana</i>	Wild plum
<i>Cornus foemina</i>	Gray dogwood
<i>Prunus serotina</i>	Black cherry
<i>Quercus macrocarpa</i>	Bur oak
<i>Juniperus communis</i>	Bush juniper
<i>Celastrus scandens</i>	Climbing bittersweet

Forbs

<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Liatris aspera</i>	Rough blazing star
<i>Artemisia ludoviciana</i>	Western mugwort; White sag
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Aster ericoides</i>	Heath aster
<i>Gnaphalium obtusifolium</i>	Sweet everlasting
<i>Monarda fistulosa</i>	Wild bergamot
<i>Comandra umbellata</i>	Bastard toad-flax
<i>Aster sericeus</i>	Silky aster
<i>Liliospermum canescens</i>	Hoary puccoon
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Coreopsis palmata</i>	Stiff tickseed
<i>Viola pedatifida</i>	Prairie bird-foot violet
<i>Lobelia spicata</i>	Rough-spiked lobelia
<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Anemone cylindrica</i>	Thimbleweed
<i>Artemisia campestris</i>	Tall wormwood
<i>Amorpha canescens</i>	Lead-plant
<i>Polygonatum commutatum</i>	Giant Solomon's-seal

Graminoids

<i>Sorghastrum nutans</i>	Indian grass
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Poa compressa</i>	Canada bluegrass
<i>Panicum depauperatum</i>	Narrow-leaved Panicum
<i>Muhlenbergia cuspidata</i>	Plains muhly
<i>Sporobolus heterolepis</i>	Prairie dropseed
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Bouteloua hirsuta</i>	Hairy grama

Appendix A: Natural Resources Inventory -- Community Survey

Area 5-67

Oak Woodland-Brushland

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Juniperus virginiana</i>	Red cedar	<i>Ratibida pinnata</i>	Gray-headed coneflower	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Juniperus communis</i>	Bush juniper	<i>Monarda fistulosa</i>	Wild bergamot	<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Betula papyrifera</i>	Paper birch	<i>Quercus</i>	Oak	<i>Pycnanthemum virginianum</i>	Virginia mountain-mint	<i>Sorghastrum nutans</i>	Indian grass
<i>Populus tremuloides</i>	Quaking aspen	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Aster novae-angliae</i>	New England aster		
<i>Populus deltoides</i>	Cottonwood	<i>Prunus americana</i>	Wild plum	<i>Gallium boreale</i>	Northern bedstraw		
		<i>Prunus serotina</i>	Black cherry	<i>Viola</i>	Violet		
		<i>Cornus foemina</i>	Gray dogwood	<i>Geranium maculatum</i>	Wild geranium		
		<i>Zanthoxylum americanum</i>	Prickly ash	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
		<i>Prunus virginiana</i>	Chokecherry	<i>Eupatorium rugosum</i>	Common snakeroot		
		<i>Rhus radicans</i>	Poison ivy	<i>Anemone virginiana</i>	Thimbleweed		
		<i>Celtis occidentalis</i>	Hackberry	<i>Amphicarpaea bracteata</i>	Hog-peanut		
		<i>Acer negundo</i>	Box elder	<i>Verbena uticifolia</i>	White vervain		
		<i>Vitis riparia</i>	Wild grape	<i>Helianthus hirsutus</i>	Woodland sunflower		
		<i>Celastrus scandens</i>	Climbing bitlersweet	<i>Hackelia virginiana</i>	Virginia stickseed		
		<i>Rubus occidentalis</i>	Black raspberry				
		<i>Corylus americana</i>	American hazelnut				

Appendix A: Natural Resources Inventory -- Community Survey

Area 5-68

Oak Forest, Mesic

Canopy		Shrub		RANK C	STATUS 2	Graminoids		
<i>Quercus macrocarpa</i>	Bur oak	<i>Rhamnus cathartica</i>	Common buckthorn		<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Prunus serotina</i>	Black cherry		<i>Helianthus hirsutus</i>	Woodland sunflower		
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Cornus</i>	Dogwood; Cornel		<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
<i>Betula papyrifera</i>	Paper birch	<i>Quercus rubra</i>	Northern red oak; Common red oak		<i>Athyrium angustum</i>	Lady fern		
<i>Tilia americana</i>	Basswood	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry		<i>Maianthemum canadense</i>	Canada mayflower		
<i>Quercus alba</i>	White oak	<i>Ulmus rubra</i>	Red elm; Slippery elm		<i>Geranium maculatum</i>	Wild geranium		
		<i>Ribes missouriense</i>	Missouri gooseberry		<i>Eupatorium rugosum</i>	Common snakeroot		
		<i>Acer negundo</i>	Box elder		<i>Sanicula marilandica</i>	Black snakeroot		
		<i>Cornus foemina</i>	Gray dogwood		<i>Teucrium canadense</i>	Germander		
		<i>Rhus radicans</i>	Poison ivy		<i>Aster ontarionis</i>	Ontario aster		
					<i>Agrimonia gryposepala</i>	Agrimony		
					<i>Galium</i>	Bedstraw; Cleavers		
					<i>Osmorhiza claytonii</i>	Sweet Cicely		
					<i>Polemonium reptans</i>	Jacob's ladder		
					<i>Pteridium aquilinum</i>	Bracken		
					<i>Uvularia sessilifolia</i>	Pale bellwort		
					<i>Solidago ulmifolia</i>	Bog goldenrod		
					<i>Triosteum perfoliatum</i>	Horse-gentian		

Appendix A: Natural Resources Inventory -- Community Survey

Area 5-69

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Triosteum perfoliatum</i>	Horse-gentian	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Prunus serotina</i>	Black cherry	<i>Solidago ulginosa</i>	Bog goldenrod		
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Cornus</i>	Dogwood; Cornel	<i>Pteridium aquilinum</i>	Bracken		
<i>Betula papyrifera</i>	Paper birch	<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Uvularia sessilifolia</i>	Pale bellwort		
<i>Tilia americana</i>	Basswood	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Polemonium reptans</i>	Jacob's ladder		
<i>Quercus alba</i>	White oak	<i>Ulmus rubra</i>	Red elm; Slippery elm	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Juglans nigra</i>	Black walnut	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Galium</i>	Bedstraw; Cleavers		
		<i>Acer negundo</i>	Box elder	<i>Cryptotaenia canadensis</i>	Honewort		
		<i>Cornus foemina</i>	Gray dogwood	<i>Agrimonia gryposepala</i>	Agrimony		
		<i>Rhus radicans</i>	Poison ivy	<i>Aster ontariensis</i>	Ontario aster		
				<i>Teucrium canadense</i>	Germander		
				<i>Sanicula marilandica</i>	Black snakeroot		
				<i>Eupatorium rugosum</i>	Common snakeroot		
				<i>Geranium maculatum</i>	Wild geranium		
				<i>Maianthemum canadense</i>	Canada mayflower		
				<i>Athyrium angustum</i>	Lady fern		
				<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
				<i>Helianthus hirsutus</i>	Woodland sunflower		
				<i>Desmodium</i>	Tick-trefoil		

Appendix A: Natural Resources Inventory -- Community Survey

Area 5-70

Oak Forest, Mesic

RANK C

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus alba</i>	White oak	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Helianthus hirsutus</i>	Woodland sunflower	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Corylus americana</i>	American hazelnut	<i>Polemonium reptans</i>	Jacob's ladder		
<i>Prunus serotina</i>	Black cherry	<i>Prunus serotina</i>	Black cherry	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Tilia americana</i>	Basswood	<i>Prunus virginiana</i>	Chokecherry	<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Ulmus americana</i>	American elm	<i>Ostrya virginiana</i>	Ironwood; Hop hornbeam	<i>Amphicarpaea bracteata</i>	Hog-peanut		
<i>Betula papyrifera</i>	Paper birch	<i>Cornus amomum</i>	Silky dogwood	<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
<i>Acer saccharum</i>	Sugar maple	<i>Rubus occidentalis</i>	Black raspberry	<i>Phryma leptostachya</i>	Lopseed		
		<i>Ribes missouriense</i>	Missouri gooseberry	<i>Galium</i>	Bedstraw; Cleavers		
		<i>Zanthoxylum americanum</i>	Prickly ash	<i>Aralia nudicaulis</i>	Wild sarsaparilla		
		<i>Acer saccharum</i>	Sugar maple	<i>Geranium maculatum</i>	Wild geranium		
		<i>Sambucus pubens</i>	Red-berried elder	<i>Osmunda claytoniana</i>	Interrupted fern		
		<i>Vitis riparia</i>	Wild grape	<i>Adiantum pedatum</i>	Maidenhair-fern		
		<i>Menispermum canadense</i>	Canada moonseed	<i>Circaea luteoliana</i>	Enchanter's nightshade		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Asarum canadense</i>	Wild ginger		
				<i>Milella diphylla</i>	Milerwort		
				<i>Pteridium aquilinum</i>	Bracken		
				<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
				<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
				<i>Uvularia grandiflora</i>	Yellow bellwort		
				<i>Cryptolaenia canadensis</i>	Honewort		

Appendix A: Natural Resources Inventory – Community Survey

Area 5-71

Oak Forest, Dry

RANK C

STATUS 3

DNR Rare Features

County Biological Site Mesic Oak Forest, No Rank given; 1990

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Corylus americana</i>	American hazelnut	<i>Triosteum perfoliatum</i>	Horse-gentian	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Smilax lasioneura</i>	Carrion-flower		
		<i>Rhamnus cathartica</i>	Common buckthorn	<i>Solidago ulmifolia</i>	Bog goldenrod		
		<i>Prunus serotina</i>	Black cherry	<i>Aralia racemosa</i>	American spikenard		
		<i>Sambucus pubens</i>	Red-berried elder	<i>Smilacina racemosa</i>	False Solomon's-seal		

Area 5-72

Oak Forest, Mesic

RANK CD

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Tilia americana</i>	Basswood	<i>Carya cordiformis</i>	Bitternut hickory	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Acer rubrum</i>	Red maple	<i>Athyrium angustum</i>	Lady fern		
<i>Quercus velutina</i>	Black oak	<i>Rhus radicans</i>	Poison ivy	<i>Geranium maculatum</i>	Wild geranium		
<i>Quercus alba</i>	White oak	<i>Rubus occidentalis</i>	Black raspberry	<i>Sanicula gregaria</i>	Black snakeroot		
<i>Prunus serotina</i>	Black cherry	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Ulmus americana</i>	American elm	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Aster ontarionis</i>	Ontario asler		
<i>Acer negundo</i>	Box elder	<i>Rubus strigosus</i>	Red raspberry	<i>Phryma leptostachya</i>	Lopseed		
<i>Acer spicatum</i>	Mountain maple	<i>Sambucus pubens</i>	Red-berried elder	<i>Cryptotaenia</i>	Honewort		
		<i>Berberis thunbergii</i>	Japanese barberry	<i>Eupatorium rugosum</i>	Common snakeroot		
		<i>Menispermum canadense</i>	Canada moonseed	<i>Uvularia grandiflora</i>	Yellow bellwort		
				<i>Sanicula marilandica</i>	Black snakeroot		
				<i>Botrychium virginianum</i>	Rattlesnake-fern		
				<i>Smilax lasioneura</i>	Carrion-flower		
				<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
				<i>Adiantum pedatum</i>	Maidenhair-fern		
				<i>Pteridium aquilinum</i>	Bracken		

Appendix A: Natural Resources Inventory -- Community Survey

Area 5-73

Lowland Hardwood Forest

		RANK CD	STATUS 4
Canopy			
<i>Juglans nigra</i>	Black walnut		
<i>Quercus macrocarpa</i>	Bur oak		
<i>Populus deltoides</i>	Cottonwood		
<i>Robinia pseudoacacia</i>	Black locust		
<i>Populus grandidentata</i>	Big-toothed aspen		
<i>Acer negundo</i>	Box elder		
<i>Populus tremuloides</i>	Quaking aspen		
Shrub			
<i>Rubus occidentalis</i>	Black raspberry		
<i>Zanthoxylum americanum</i>	Prickly ash		
<i>Pyrus ioensis</i>	Iowa crab		
<i>Rhamnus cathartica</i>	Common buckthorn		
<i>Cornus amomum</i>	Silky dogwood		
<i>Rubus allegheniensis</i>	Common blackberry		
Forbs			
<i>Aster cordifolius</i>	Heart-leaved aster		
<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
<i>Stellaria</i>	Chickweed; Starwort		
<i>Laportea canadensis</i>	Wood nettle		
<i>Agrimonia gryposepala</i>	Agrimony		
<i>Verbena urticifolia</i>	White vervain		
<i>Viola novae-angliae</i>	New England violet		
<i>Heliopsis helianthoides</i>	Ox-eye		
<i>Teucrium canadense</i>	Germander		
<i>Hydrophyllum virginianum</i>	Virginia waterleaf		
<i>Pilea pumila</i>	Clearweed		
<i>Rudbeckia laciniata</i>	Goldenglow		
<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Solidago canadensis</i>	Canada goldenrod		
Graminoids			
	<i>Poa pratensis</i>		Kentucky bluegrass
	<i>Bromus ciliatus</i>		Fringed brome

Area 5-74

Oak Woodland-Brushland

		RANK CD	STATUS 4
Canopy			
<i>Quercus macrocarpa</i>	Bur oak		
<i>Prunus serotina</i>	Black cherry		
<i>Ulmus americana</i>	American elm		
<i>Quercus velutina</i>	Black oak		
<i>Juniperus virginiana</i>	Red cedar		
<i>Populus tremuloides</i>	Quaking aspen		
<i>Juglans nigra</i>	Black walnut		
Shrub			
<i>Rhamnus cathartica</i>	Common buckthorn		
<i>Cornus foemina</i>	Gray dogwood		
<i>Rhus glabra</i>	Smooth sumac		
<i>Prunus serotina</i>	Black cherry		
<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry		
<i>Rhus radicans</i>	Poison ivy		
<i>Quercus velutina</i>	Black oak		
<i>Parthenocissus inserta</i>	Virginia creeper		
<i>Vitis riparia</i>	Wild grape		
<i>Smilax hispida</i>	Green-brier		
Forbs			
<i>Ambrosia trifida</i>	Great ragweed		
<i>Phryma leptostachya</i>	Lopseed		
<i>Galium</i>	Bedstraw; Cleavers		
<i>Smilacina stellata</i>	Starry false Solomon's-seal		
<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Oenothera</i>	Evening-primrose		
Graminoids			
	<i>Bromus inermis</i>		Smooth brome

Appendix A: Natural Resources Inventory -- Community Survey

Area 5-75

Oak Forest, Mesic

RANK B

STATUS 2

DNR Rare Features

County Biological Site Mesic Oak Forest, No Rank given, 1990

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Cornus amomum</i>	Silky dogwood	<i>Actaea rubra</i>	Red baneberry	<i>Carex pensylvanica</i>	pennsylvania sedge
		<i>Ulmus</i>	Elm	<i>Osmunda claytoniana</i>	Interrupted fern	<i>Panicum latifolium</i>	Broad-leaved panic grass
<i>Tilia americana</i>	Basswood	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Mitella diphylla</i>	Miterwort		
<i>Acer spicatum</i>	Mountain maple	<i>Diervilla lonicera</i>	Bush honeysuckle	<i>Adiantum pedatum</i>	Maidenhair-fern		
<i>Quercus alba</i>	White oak	<i>Acer spicatum</i>	Mountain maple	<i>Hepatica americana</i>	Round-lobed hepatica		
<i>Quercus macrocarpa</i>	Bur oak	<i>Rhus radicans</i>	Poison ivy	<i>Uvularia grandiflora</i>	Yellow bellwort		
<i>Prunus serotina</i>	Black cherry	<i>Sambucus pubens</i>	Red-berried elder	<i>Smilax lasioneura</i>	Carriion-flower		
				<i>Athyrium angustum</i>	Lady fern		
				<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
				<i>Asarum canadense</i>	Wild ginger		
				<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
				<i>Amphicarpaea bracteata</i>	Hog-peanut		
				<i>Dryopteris</i>	Shield-fern; Wood-fern		
				<i>Smilacina racemosa</i>	False Solomon's-seal		
				<i>Cypripedium calceolus</i>	Yellow lady-slipper		
				<i>Thalictrum dioicum</i>	Early meadow rue		
				<i>Pteridium aquilinum</i>	Bracken		

Area 5-76

Dry Prairie (bedrock bluff subtype)

RANK D

STATUS 3

Canopy		Shrub		Forbs		Graminoids	
		<i>Juniperus virginiana</i>	Red cedar	<i>Aster oolentangiensis</i>	Sky-blue aster	<i>Bouteloua curtipendula</i>	Side-oats grama
		<i>Populus tremuloides</i>	Quaking aspen	<i>Dalea candida</i>	White prairie-clover	<i>Schizachyrium scoparium</i>	Little bluestem
		<i>Prunus serotina</i>	Black cherry	<i>Anemone cylindrica</i>	Thimbleweed	<i>Sorghastrum nutans</i>	Indian grass
		<i>Zanthoxylum americanum</i>	Prickly ash	<i>Potentilla argentea</i>	Silvery cinquefoil	<i>Andropogon gerardii</i>	Big bluestem
				<i>Amorpha canescens</i>	Lead-plant	<i>Sporobolus heterolepis</i>	Prairie dropseed

Appendix A: Natural Resources Inventory – Community Survey

Area 5-77

Oak Forest, Dry

RANK BC

STATUS 3

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Ostrya virginiana</i>	Ironwood; Hop hombear	<i>Amphicarpaea bracteata</i>	Hog-peanut	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
<i>Prunus serotina</i>	Black cherry	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Goodyera pubescens</i>	Downy rattlesnake plantain		
<i>Acer spicatum</i>	Mountain maple	<i>Prunus serotina</i>	Black cherry	<i>Pyrola</i>	Wintergreen		
<i>Betula papyrifera</i>	Paper birch	<i>Vitis riparia</i>	Wild grape	<i>Solidago ulmifolia</i>	Bog goldenrod		
<i>Pinus strobus</i>	White pine	<i>Rubus</i>	Bramble	<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Fraxinus pennsylvanica</i>	Green ash			<i>Cryptotaenia canadensis</i>	Honewort		
<i>Juglans cinerea</i>	Butternut			<i>Pteridium aquilinum</i>	Bracken		
<i>Quercus alba</i>	White oak			<i>Athyrium angustum</i>	Lady fern		
<i>Juniperus virginiana</i>	Red cedar			<i>Asarum canadense</i>	Wild ginger		

Area 5-78

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus alba</i>	White oak	<i>Betula papyrifera</i>	Paper birch	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Ostrya virginiana</i>	Ironwood; Hop hombear	<i>Amphicarpaea bracteata</i>	Hog-peanut		
<i>Betula papyrifera</i>	Paper birch	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Prunus serotina</i>	Black cherry	<i>Ribes</i>	Currant; Gooseberry				
		<i>Rubus</i>	Bramble				

Appendix A: Natural Resources Inventory -- Community Survey

Area 5-78

Oak Forest, Mesic

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Corylus americana</i>	American hazelnut	<i>Cryptotaenia canadensis</i>	Honewort		
<i>Quercus macrocarpa</i>	Bur oak	<i>Prunus serotina</i>	Black cherry	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Quercus alba</i>	White oak	<i>Prunus virginiana</i>	Chokecherry	<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Prunus serotina</i>	Black cherry	<i>Cornus amomum</i>	Silky dogwood	<i>Phryma leptostachya</i>	Lopseed		
<i>Tilia americana</i>	Basswood	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Galium</i>	Bedstraw; Cleavers		
<i>Ulmus americana</i>	American elm	<i>Sambucus pubens</i>	Red-berried elder				
<i>Betula papyrifera</i>	Paper birch	<i>Rhamnus cathartica</i>	Common buckthorn				
<i>Acer spicatum</i>	Mountain maple						

Area 5-80

Oak Forest, Dry

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Ranunculus abortivus</i>	Kidney-leaf buttercup	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus macrocarpa</i>	Bur oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Smilax lasioneura</i>	Carrion-flower	<i>Setaria glauca</i>	Yellow foxtail
<i>Populus tremuloides</i>	Quaking aspen	<i>Corylus americana</i>	American hazelnut	<i>Solidago flexicaulis</i>	Zig-zag goldenrod	<i>Festuca</i>	Fescue
<i>Tilia americana</i>	Basswood	<i>Quercus</i>	Oak	<i>Circaea lutetiana</i>	Enchanter's nightshade	<i>Poa</i>	Blue grass; Meadow grass
<i>Ulmus</i>	Elm	<i>Parthenocissus inserta</i>	Virginia creeper	<i>Phryma leptostachya</i>	Lopseed		
<i>Prunus serotina</i>	Black cherry	<i>Vitis riparia</i>	Wild grape	<i>Cryptotaenia canadensis</i>	Honewort		
				<i>Osmorhiza claytonii</i>	Sweet Cicely		
				<i>Aster ontariensis</i>	Ontario aster		
				<i>Ambrosia artemisiifolia</i>	Common ragweed		
				<i>Sonchus</i>	Sow-Thistle		

Appendix A: Natural Resources Inventory -- Community Survey

Area 5-81

White Pine-Hardwood Forest

RANK C STATUS 2

Canopy		Shrub		Forbs		Graminoids
<i>Pinus strobus</i>	White pine	<i>Ostrya virginiana</i>	Ironwood; Hop hornbeam	<i>Maianthemum canadense</i>	Canada mayflower	
<i>Quercus velutina</i>	Black oak	<i>Carya cordiformis</i>	Bitternut hickory	<i>Smitacina racemosa</i>	False Solomon's-seal	
<i>Quercus alba</i>	White oak	<i>Rubus occidentalis</i>	Black raspberry	<i>Goodyera pubescens</i>	Downy rattlesnake plantain	
<i>Betula papyrifera</i>	Paper birch	<i>Rubus allegheniensis</i>	Common blackberry	<i>Laportea canadensis</i>	Wood nettle	
<i>Tilia americana</i>	Basswood	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Aralia nudicaulis</i>	Wild sarsaparilla	
<i>Prunus serotina</i>	Black cherry	<i>Sambucus pubens</i>	Red-berried elder	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	
<i>Acer spicatum</i>	Mountain maple	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Sanguinaria canadensis</i>	Bloodroot	
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Pilea pumila</i>	Clearweed	

Area 5-88

Lowland Hardwood Forest

RANK D STATUS 4

Canopy		Shrub		Forbs		Graminoids
<i>Salix nigra</i>	Black willow	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Ranunculus pennsylvanicus</i>	Bristly buttercup	<i>Phalaris arundinacea</i> Reed canary grass
<i>Acer negundo</i>	Box elder	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Urtica dioica</i>	Stinging nettle	
<i>Populus deltoides</i>	Cottonwood			<i>Rudbeckia laciniata</i>	Goldenglow	
<i>Ulmus rubra</i>	Red elm; Slippery elm			<i>Silphium perfoliatum</i>	Cup-plant	
<i>Juglans nigra</i>	Black walnut			<i>Glechoma hederacea</i>	Creeping charlie	
<i>Tilia americana</i>	Basswood			<i>Hydrophyllum virginianum</i>	Virginia waterleaf	
<i>Celtis occidentalis</i>	Hackberry			<i>Thalictrum dasycarpum</i>	Tall meadow rue	

Appendix A: Natural Resources Inventory -- Community Survey

Area 5-89

Oak Woodland-Brushland

RANK C

STATUS 4

Canopy		Shrub		Forbs		Graminoids	
<i>Betula papyrifera</i>	Paper birch					<i>Schizachyrium scoparium</i>	Little bluestem
<i>Quercus macrocarpa</i>	Bur oak					<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Quercus velutina</i>	Black oak					<i>Poa</i>	Blue grass; Meadow grass
<i>Juniperus virginiana</i>	Red cedar						

Area 6-201

Oak Forest, Mesic

RANK C

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Prunus serotina</i>	Black cherry	<i>Amelanchier laevis</i>	Smooth juneberry	<i>Aster macrophyllus</i>	Large-leaved aster	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Hydrophyllum virginianum</i>	Virginia waterleaf		
<i>Quercus macrocarpa</i>	Bur oak	<i>Rubus</i>	Bramble	<i>Menispermum canadense</i>	Canada moonseed		
<i>Quercus alba</i>	White oak	<i>Sambucus canadensis</i>	Common elder	<i>Uvularia grandiflora</i>	Yellow bellwort		
<i>Ulmus rubra</i>	Red elm; Slippery elm	<i>Prunus serotina</i>	Black cherry	<i>Viola sororia</i>	Common blue violet		
<i>Tilia americana</i>	Basswood	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Smilacina racemosa</i>	False Solomon's-seal		
		<i>Corylus americana</i>	American hazelnut	<i>Asarum canadense</i>	Wild ginger		
		<i>Betula papyrifera</i>	Paper birch	<i>Stellaria media</i>	Common chickweed		
		<i>Ribes</i>	Currant; Gooseberry	<i>Geranium maculatum</i>	Wild geranium		
		<i>Ulmus rubra</i>	Red elm; Slippery elm	<i>Rhus radicans</i>	Poison ivy		
		<i>Cornus amomum</i>	Silky dogwood	<i>Gallium trifidum</i>	Small bedstraw		
		<i>Cornus alternifolia</i>	Pagoda dogwood	<i>Osmorhiza claytonii</i>	Sweet Cicely		
		<i>Prunus virginiana</i>	Chokecherry	<i>Mitella nuda</i>	Millerwort; Naked bishop's-ca		
		<i>Vitis riparia</i>	Wild grape	<i>Urtica dioica</i>	Stinging nettle		
				<i>Pteridium aquilinum</i>	Bracken		
				<i>Adiantum pedatum</i>	Maidenhair-fern		
				<i>Althium angustum</i>	Lady fern		

Appendix A: Natural Resources Inventory – Community Survey

Area 6-204

Oak Forest, Mesic

RANK B/BC

STATUS 2

DNR Rare Features

County Biological Site mesic oak forest
 Element Occurrence *Panax quinquefolius*
 Element Occurrence Autumn coral-root, *Corallorhiza odontorhiza*

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Sambucus canadensis</i>	Common elder	<i>Athyrium angustum</i>	Lady fern	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus alba</i>	White oak	<i>Acer negundo</i>	Box elder	<i>Geranium maculatum</i>	Wild geranium		
<i>Quercus macrocarpa</i>	Bur oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Oxalis stricta</i>	Yellow wood-sorrel		
<i>Prunus serotina</i>	Black cherry	<i>Ribes</i>	Currant; Gooseberry	<i>Rhus radicans</i>	Poison ivy		
<i>Ulmus rubra</i>	Red elm; Slippery elm	<i>Prunus pensylvanica</i>	Pin cherry	<i>Matteuccia struthiopteris</i>	Ostrich fern		
<i>Betula papyrifera</i>	Paper birch	<i>Ulmus americana</i>	American elm	<i>Onoclea sensibilis</i>	Sensitive fern		
<i>Tilia americana</i>	Basswood	<i>Carya cordiformis</i>	Bitternut hickory	<i>Galium boreale</i>	Northern bedstraw		
<i>Juglans nigra</i>	Black walnut			<i>Dryopteris</i>	Shield-fern; Wood-fern		
				<i>Vitis riparia</i>	Wild grape		
				<i>Viola</i>	Violet		
				<i>Amphicarpaea bracteata</i>	Hog-peanut		
				<i>Adiantum pedatum</i>	Maidenhair-fern		
				<i>Anemonella thalictroides</i>	Rue-anemone		

Appendix A: Natural Resources Inventory -- Community Survey

Area 6-204a

Oak Forest, Mesic

RANK CD

STATUS 2

DNR Rare Features

County Biological Site Mesic Oak Forest, 1990

Canopy	Shrub	Forbs	Graminoids
<i>Populus grandidentata</i> Big-toothed aspen	<i>Sambucus canadensis</i> Common elder	<i>Athyrium angustum</i> Lady fern	
<i>Populus tremuloides</i> Quaking aspen	<i>Rubus</i> Bramble	<i>Galium</i> Bedstraw; Cleavers	
<i>Betula papyrifera</i> Paper birch	<i>Rhamnus</i> Buckthorn	<i>Osmorhiza claytonii</i> Sweet Cicely	
<i>Quercus macrocarpa</i> Bur oak	<i>Prunus pensylvanica</i> Pin cherry	<i>Vitis riparia</i> Wild grape	
<i>Quercus velutina</i> Black oak	<i>Prunus serotina</i> Black cherry	<i>Urtica dioica</i> Stinging nettle	
<i>Quercus alba</i> White oak	<i>Acer negundo</i> Box elder	<i>Parthenocissus inserta</i> Virginia creeper	
<i>Prunus serotina</i> Black cherry	<i>Ribes</i> Currant; Gooseberry	<i>Aster macrophyllus</i> Large-leaved aster	
		<i>Geranium maculatum</i> Wild geranium	
		<i>Actaea rubra</i> Red baneberry	

Appendix A: Natural Resources Inventory – Community Survey

Area 6-204B

Oak Forest, Mesic

RANK BC

STATUS 2

DNR Rare Features

County Biological Site Mesic oak Forest, 1990

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Adiantum pedatum</i>	Maidenhair-fern	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus alba</i>	White oak	<i>Rubus</i>	Bramble	<i>Osmunda claytoniana</i>	Interrupted fern		
<i>Carya ovata</i>	Shagbark hickory	<i>Amelanchier</i>	Juneberry; Serviceberry; Saska	<i>Athyrium angustum</i>	Lady fern		
<i>Prunus serotina</i>	Black cherry	<i>Ribes</i>	Currant; Gooseberry	<i>Viola sororia</i>	Common blue violet		
<i>Betula papyrifera</i>	Paper birch	<i>Prunus serotina</i>	Black cherry	<i>Rhus radicans</i>	Poison ivy		
<i>Quercus alba</i>	White oak	<i>Prunus pennsylvanica</i>	Pin cherry	<i>Boehmeria cylindrica</i>	False nettle		
<i>Quercus macrocarpa</i>	Bur oak	<i>Cornus amomum</i>	Silky dogwood	<i>Amphicarpaea bracteata</i>	Hog-peanut		
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Corylus americana</i>	American hazelnut	<i>Fraxinus pennsylvanica</i>	Green ash		
<i>Ulmus rubra</i>	Red elm; Slippery elm	<i>Ulmus rubra</i>	Red elm; Slippery elm	<i>Solidago ulmifolia</i>	Bog goldenrod		
<i>Populus grandidentata</i>	Big-toothed aspen	<i>Sambucus canadensis</i>	Common elder	<i>Vitis riparia</i>	Wild grape		
				<i>Circaea</i>	Enchanter's Nightshade		
				<i>Parthenocissus inserta</i>	Virginia creeper		
				<i>Actaea rubra</i>	Red baneberry		
				<i>Anemone thalictroides</i>	Rue-anemone		
				<i>Aster macrophyllus</i>	Large-leaved aster		
				<i>Uvularia grandiflora</i>	Yellow bellwort		
				<i>Smilacina racemosa</i>	False Solomon's-seal		

Appendix A: Natural Resources Inventory -- Community Survey

Area 6-205

Oak Forest, Mesic

- RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus alba</i>	White oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Aster macrophyllus</i>	Large-leaved aster	<i>Carex pensylvanica</i>	pennsylvania sedge
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Acer negundo</i>	Box elder	<i>Rumex obtusifolius</i>	Bitter dock	<i>Poa</i>	Blue grass; Meadow grass
<i>Quercus macrocarpa</i>	Bur oak	<i>Ribes</i>	Currant; Gooseberry	<i>Boehmeria cylindrica</i>	False nettle		
<i>Prunus serotina</i>	Black cherry	<i>Cornus amomum</i>	Silky dogwood	<i>Gallium boreale</i>	Northern bedstraw		
<i>Acer negundo</i>	Box elder	<i>Rubus</i>	Bramble	<i>Boehmeria cylindrica</i>	False nettle		
<i>Betula papyrifera</i>	Paper birch	<i>Prunus serotina</i>	Black cherry	<i>Anemoneella thalictroides</i>	Rue-anemone		
<i>Populus grandidentata</i>	Big-toothed aspen	<i>Prunus pennsylvanica</i>	Pin cherry	<i>Circaea</i>	Enchanter's Nightshade		
<i>Quercus velutina</i>	Black oak	<i>Acer saccharum</i>	Sugar maple	<i>Actaea rubra</i>	Red baneberry		
		<i>Corylus americana</i>	American hazelnut	<i>Osmorhiza claytonii</i>	Sweet Cicely		
		<i>Sambucus canadensis</i>	Common elder	<i>Athyrium angustum</i>	Lady fern		
		<i>Cornus foemina</i>	Gray dogwood	<i>Actaea pachypoda</i>	White baneberry		
		<i>Zanthoxylum americanum</i>	Prickly ash	<i>Anemone virginiana</i>	Thimbleweed		
		<i>Lonicera latanica</i>	Tartarian honeysuckle	<i>Rosa arkansana</i>	Prairie rose		
		<i>Vitis riparia</i>	Wild grape	<i>Menispermum canadense</i>	Canada moonseed		
		<i>Rhus radicans</i>	Poison ivy	<i>Malva</i>	Mallow		
				<i>Solidago speciosa</i>	Showy goldenrod		
				<i>Geranium maculatum</i>	Wild geranium		

Appendix A: Natural Resources Inventory -- Community Survey

Area 6-206

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Ribes</i>	Currant; Gooseberry	<i>Urtica dioica</i>	Stinging nettle	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Populus tremuloides</i>	Quaking aspen	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Osmorhiza claytonii</i>	Sweet Cicely	<i>Cacalia</i>	Indian-plantain
<i>Betula papyrifera</i>	Paper birch	<i>Rubus</i>	Bramble	<i>Actaea rubra</i>	Red baneberry		
<i>Tilia americana</i>	Basswood	<i>Parthenocissus inserta</i>	Virginia creeper	<i>Stellaria media</i>	Common chickweed		
				<i>Smilacina stellata</i>	Starry false Solomon's-seal		
				<i>Nepeta cataria</i>	Catnip		
				<i>Adiantum pedatum</i>	Maidenhair-fern		
				<i>Athyrium angustum</i>	Lady fern		
				<i>Dryopteris</i>	Shield-fern; Wood-fern		
				<i>Circaea alpina</i>	Small enchanter's nightshade		

Area 6-207

Oak Woodland-Brushland

RANK C

STATUS 4

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Juniperus virginiana</i>	Red cedar	<i>Viola sororia</i>	Common blue violet		
<i>Prunus serotina</i>	Black cherry	<i>Rubus</i>	Bramble	<i>Anemone thalictroides</i>	Rue-anemone		
<i>Quercus velutina</i>	Black oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Geranium maculatum</i>	Wild geranium		
<i>Ulmus rubra</i>	Red elm; Slippery elm	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Betula papyrifera</i>	Paper birch	<i>Rhus typhina</i>	Staghorn sumac	<i>Amphicarpaea bracteata</i>	Hog-peanut		
<i>Populus tremuloides</i>	Quaking aspen	<i>Corylus americana</i>	American hazelnut	<i>Cryptotaenia canadensis</i>	Honewort		
		<i>Cornus amomum</i>	Silky dogwood	<i>Menispermum canadense</i>	Canada moonseed		
		<i>Ribes</i>	Currant; Gooseberry	<i>Stellaria media</i>	Common chickweed		
		<i>Rosa arkansana</i>	Prairie rose	<i>Aster macrophyllus</i>	Large-leaved aster		
		<i>Vitis riparia</i>	Wild grape				
		<i>Parthenocissus inserta</i>	Virginia creeper				
		<i>Rhus radicans</i>	Poison Ivy				

Appendix A: Natural Resources Inventory -- Community Survey

Area 6-208

Dry Prairie (bedrock bluff subtype)

RANK BC

STATUS 3

DNR Rare Features

County Biological Site Bedrock Bluff Prairie, Rank BC;
1990

Canopy		Shrub		Forbs		Graminoids	
<i>Tilia americana</i>	Basswood	<i>Juniperus virginiana</i>	Red cedar	<i>Daucus carota</i>	Queen Anne's lace	<i>Sorghastrum nutans</i>	Indian grass
<i>Prunus americana</i>	Wild plum	<i>Rhus typhina</i>	Staghorn sumac	<i>Monarda fistulosa</i>	Wild bergamot	<i>Andropogon gerardii</i>	Big bluestem
		<i>Rubus</i>	Bramble	<i>Achillea millefolium</i>	Yarrow	<i>Elymus canadensis</i>	Nodding wild-rye
		<i>Rhamnus cathartica</i>	Common buckthorn	<i>Aster novae-angliae</i>	New England aster	<i>Muhlenbergia</i>	Satin-grass; Muhly grass
		<i>Prunus pensylvanica</i>	Pin cherry	<i>Aster oolentangiensis</i>	Sky-blue aster	<i>Schizachyrium scoparium</i>	Little bluestem
		<i>Zanthoxylum americanum</i>	Prickly ash	<i>Amorpha canescens</i>	Lead-plant	<i>Bromus kalmii</i>	Kalm's brome
		<i>Rosa arkansana</i>	Prairie rose	<i>Coreopsis palmata</i>	Stiff tickseed	<i>Bouteloua curtipendula</i>	Side-oats grama
		<i>Amelanchier laevis</i>	Smooth Juneberry	<i>Artemisia ludoviciana</i>	Western mugwort; White sag	<i>Carex heliophila</i>	sun-loving sedge
		<i>Viburnum trilobum</i>	High-bush cranberry	<i>Lactuca scariola</i>	Prickly lettuce	<i>Carex pensylvanica</i>	pennsylvania sedge
		<i>Rhus radicans</i>	Poison ivy	<i>Aster simplex</i>	Marsh aster	<i>Bouteloua hirsuta</i>	Hairy grama
		<i>Prunus pumila</i>	Sand cherry	<i>Linum sulcatum</i>	Yellow flax		
				<i>Linaria vulgaris</i>	Butter-and-eggs		
				<i>Aquilegia canadensis</i>	Columbine		
				<i>Arabis lyrata</i>	Lyre-leaved rock-cress		
				<i>Castilleja sessiliflora</i>	Downy painted cup		
				<i>Euphorbia corollata</i>	Flowering spurge		
				<i>Comandra umbellata</i>	Bastard toad-flax		
				<i>Antennaria parlinii</i>	Pussytoes		
				<i>Helianthus rigidus</i>	Stiff sunflower		
				<i>Lithospermum canescens</i>	Hoary puccoon		
				<i>Viola pedata</i>	Bird-foot violet		
				<i>Anemone cylindrica</i>	Thimbleweed		
				<i>Aster sericeus</i>	Silky aster		
				<i>Pulsatilla nuttalliana</i>	Pasque-flower		
				<i>Sisyrinchium campestre</i>	Blue-eyed-grass		
				<i>Phlox pilosa</i>	Prairie phlox; Downy phlox		
				<i>Zigadenus</i>	Death Camas		

Appendix A: Natural Resources Inventory -- Community Survey

Area 6-208

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Osmorhiza claytonii</i>	Sweet Cicely	<i>Carex pensylvanica</i>	pennsylvania sedge
<i>Acer negundo</i>	Box elder	<i>Ribes</i>	Currant; Gooseberry	<i>Aster macrophyllus</i>	Large-leaved aster	<i>Poa pratensis</i>	Kentucky bluegrass
<i>Quercus alba</i>	White oak	<i>Prunus serotina</i>	Black cherry	<i>Uvularia grandiflora</i>	Yellow bellwort		
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Ulmus rubra</i>	Red elm; Slippery elm	<i>Actaea rubra</i>	Red baneberry		
		<i>Zanthoxylum americanum</i>	Prickly ash	<i>Smilacina racemosa</i>	False Solomon's-seal		
		<i>Cornus amomum</i>	Silky dogwood	<i>Menispermum canadense</i>	Canada moonseed		
		<i>Rhus radicans</i>	Poison ivy	<i>Rumex obtusifolius</i>	Bitter dock		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Viola pubescens</i>	Smooth yellow violet		

Area 6-215

Lowland Hardwood Forest

RANK CD

STATUS 4

Canopy		Shrub		Forbs		Graminoids	
<i>Populus tremuloides</i>	Quaking aspen	<i>Rhus typhina</i>	Staghorn sumac	<i>Solidago canadensis</i>	Canada goldenrod	<i>Poa pratensis</i>	Kentucky bluegrass
<i>Acer negundo</i>	Box elder	<i>Cornus</i>	Dogwood; Cornel	<i>Monarda fistulosa</i>	Wild bergamot		
<i>Ulmus rubra</i>	Red elm; Slippery elm	<i>Salix</i>	Willow	<i>Aster simplex</i>	Marsh aster		
<i>Populus deltoides</i>	Coltonwood	<i>Rubus</i>	Bramble	<i>Trifolium pratense</i>	Red clover		
<i>Quercus velutina</i>	Black oak	<i>Cornus amomum</i>	Silky dogwood	<i>Heuchera</i>	Alumroot		
		<i>Corylus americana</i>	American hazelnut	<i>Cerastium arvense</i>	Field chickweed		
		<i>Ribes</i>	Currant; Gooseberry	<i>Leonurus cardiaca</i>	Motherwort		
				<i>Verbascum thapsus</i>	Mullein		
				<i>Helianthus hirsutus</i>	Woodland sunflower		
				<i>Cirsium discolor</i>	Field thistle		
				<i>Rafibida pinnata</i>	Gray-headed coneflower		
				<i>Bidens frondosa</i>	Leafy beggar-ticks		

Appendix A: Natural Resources Inventory -- Community Survey

Area 6-218

		RANK NA	STATUS NA				
Canopy		Shrub		Forbs		Graminoids	
<i>Pinus resinosa</i>	Red pine; Norway pine	<i>Rubus</i>	Bramble	<i>Solidago canadensis</i>	Canada goldenrod	<i>Bromus inermis</i>	Smooth brome
<i>Pinus strobus</i>	White pine	<i>Ribes</i>	Currant; Gooseberry				
		<i>Rhamnus cathartica</i>	Common buckthorn				
		<i>Sambucus</i>	Elder				

Appendix A: Natural Resources Inventory -- Community Survey

Area 6-220a,b;221

Oak Forest, Mesic

RANK BC, C

STATUS 2

DNR Rare Features

County Biological Site Mesic Oak Forest, Rank C; 1990

Canopy	Shrub	Forbs	Graminoids
<i>Quercus velutina</i> Black oak	<i>Sambucus canadensis</i> Common elder	<i>Athyrium angustum</i> Lady fern	<i>Carex pensylvanica</i> pennsylvania sedge
<i>Quercus alba</i> White oak	<i>Ribes</i> Currant; Gooseberry	<i>Matteuccia struthiopteris</i> Ostrich fern	<i>Carex blanda</i> woodland sedge
<i>Ulmus rubra</i> Red elm; Slippery elm	<i>Rhamnus cathartica</i> Common buckthorn	<i>Geranium maculatum</i> Wild geranium	<i>Muhlenbergia mexicana</i> Mexican satin grass
<i>Betula papyrifera</i> Paper birch	<i>Acer negundo</i> Box elder	<i>Asarum canadense</i> Wild ginger	<i>Elymus villosus</i> Wild-rye
<i>Populus grandidentata</i> Big-toothed aspen	<i>Cornus amomum</i> Silky dogwood	<i>Actaea rubra</i> Red baneberry	
<i>Prunus serotina</i> Black cherry	<i>Lonicera tatarica</i> Tartarian honeysuckle	<i>Viola</i> Violet	
<i>Quercus macrocarpa</i> Bur oak	<i>Cornus foemina</i> Gray dogwood	<i>Uvularia grandiflora</i> Yellow bellwort	
<i>Populus tremuloides</i> Quaking aspen	<i>Prunus pensylvanica</i> Pin cherry	<i>Galium boreale</i> Northern bedstraw	
<i>Acer saccharum</i> Sugar maple	<i>Rubus allegheniensis</i> Common blackberry	<i>Tiarella cordifolia</i> Foamflower	
	<i>Prunus serotina</i> Black cherry	<i>Actaea pachypoda</i> White baneberry	
	<i>Tilia americana</i> Basswood	<i>Aster cordifolius</i> Heart-leaved aster	
	<i>Rubus occidentalis</i> Black raspberry	<i>Caulophyllum thalictroides</i> Blue cohosh	
	<i>Ribes cynosbati</i> Prickly gooseberry; Dogberry	<i>Geranium maculatum</i> Wild geranium	
	<i>Vitis riparia</i> Wild grape	<i>Adiantum pedatum</i> Maidenhair-fern	
	<i>Parthenocissus inserta</i> Virginia creeper	<i>Smilacina racemosa</i> False Solomon's-seal	
		<i>Anemone quinquefolia</i> Wood anemone	
		<i>Hydrophyllum virginianum</i> Virginia waterleaf	
		<i>Arisaema triphyllum</i> Jack-in-the-pulpit	
		<i>Sanguinaria canadensis</i> Bloodroot	
		<i>Pteridium aquilinum</i> Bracken	
		<i>Onoclea sensibilis</i> Sensitive fern	
		<i>Geum canadense</i> White avens	
		<i>Solidago speciosa</i> Showy goldenrod	
		<i>Aster ericoides</i> Heath aster	
		<i>Osmorhiza claytonii</i> Sweet Cicely	
		<i>Anemone virginiana</i> Thimbleweed	
		<i>Solidago canadensis</i> Canada goldenrod	
		<i>Aster macrophyllus</i> Large-leaved aster	

Appendix A: Natural Resources Inventory – Community Survey

Area 6-224

Oak Forest, Mesic

RANK D STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Amelanchier</i>	Juneberry; Serviceberry; Saska	<i>Athyrium angustum</i>	Lady fern	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Acer saccharum</i>	Sugar maple	<i>Rubus</i>	Bramble	<i>Geranium maculatum</i>	Wild geranium	<i>Poa pratensis</i>	Kentucky bluegrass
<i>Populus grandidentata</i>	Big-toothed aspen	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Solidago speciosa</i>	Showy goldenrod		
<i>Betula papyrifera</i>	Paper birch	<i>Sambucus canadensis</i>	Common elder	<i>Caulophyllum thalictroides</i>	Blue cohosh		
		<i>Cornus</i>	Dogwood; Cornel	<i>Adiantum pedatum</i>	Maidenhair-fern		
		<i>Ribes</i>	Currant; Gooseberry	<i>Galium boreale</i>	Northern bedstraw		
		<i>Vitis riparia</i>	Wild grape	<i>Taraxacum officinale</i>	Common dandelion		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Pteridium aquilinum</i>	Bracken		

Area 6-226

RANK NA STATUS NA

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus velutina</i>	Black oak	<i>Prunus serotina</i>	Black cherry	<i>Menispermum canadense</i>	Canada moonseed	<i>Poa pratensis</i>	Kentucky bluegrass
<i>Populus deltoides</i>	Collonwood	<i>Prunus pensylvanica</i>	Pin cherry	<i>Helianthus annuus</i>	Common sunflower	<i>Bromus inermis</i>	Smooth brome
<i>Betula papyrifera</i>	Paper birch			<i>Aster simplex</i>	Marsh aster		
<i>Populus grandidentata</i>	Big-toothed aspen			<i>Solidago canadensis</i>	Canada goldenrod		
<i>Acer saccharum</i>	Sugar maple			<i>Bidens frondosa</i>	Leafy beggar-ticks		
				<i>Ambrosia artemisiifolia</i>	Common ragweed		
				<i>Potentilla simplex</i>	Old-field cinquefoil		
				<i>Helianthus hirsutus</i>	Woodland sunflower		
				<i>Anemone virginiana</i>	Thimbleweed		
				<i>Osmorhiza claytonii</i>	Sweet Cicely		
				<i>Actaea rubra</i>	Red baneberry		
				<i>Rhus radicans</i>	Poison ivy		

Appendix A: Natural Resources Inventory -- Community Survey

Area 6-64

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Ostrya virginiana</i>	Ironwood; Hop hornbeam	<i>Hackelia virginiana</i>	Virginia stickseed	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Prunus serotina</i>	Black cherry	<i>Celtis occidentalis</i>	Hackberry	<i>Aster ontarionis</i>	Ontario asler	<i>Carex blanda</i>	woodland sedge
<i>Tilia americana</i>	Basswood	<i>Corylus americana</i>	American hazelnut	<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Quercus velutina</i>	Black oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Solidago ulmifolia</i>	Bog goldenrod		
<i>Juglans cinerea</i>	Butternut	<i>Sambucus pubens</i>	Red-berried elder	<i>Circaea luteoliana</i>	Enchanter's nightshade		
<i>Juglans nigra</i>	Black walnut	<i>Rubus occidentalis</i>	Black raspberry	<i>Teucrium canadense</i>	Germander		
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Ulmus rubra</i>	Red elm; Slippery elm				
<i>Celtis occidentalis</i>	Hackberry	<i>Prunus americana</i>	Wild plum				
<i>Populus tremuloides</i>	Quaking aspen	<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry				
<i>Betula papyrifera</i>	Paper birch	<i>Vitis riparia</i>	Wild grape				
		<i>Parthenocissus inserta</i>	Virginia creeper				

Area 6-65

Lowland Hardwood Forest

RANK D

STATUS 4

Canopy		Shrub		Forbs		Graminoids	
<i>Acer negundo</i>	Box elder	<i>Juglans nigra</i>	Black walnut	<i>Daucus carota</i>	Queen Anne's lace	<i>Poa pratensis</i>	Kentucky bluegrass
<i>Juglans nigra</i>	Black walnut	<i>Acer negundo</i>	Box elder	<i>Verbena stricta</i>	Hairy blue vervain	<i>Setaria glauca</i>	Yellow foxtail
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Monarda fistulosa</i>	Wild bergamot		
<i>Populus deltoides</i>	Cottonwood	<i>Prunus americana</i>	Wild plum	<i>Agrimonia gryposepala</i>	Agrimony		
		<i>Rubus occidentalis</i>	Black raspberry	<i>Aster ontarionis</i>	Ontario aster		

Appendix A: Natural Resources Inventory -- Community Survey

Area 6-84

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids
<i>Quercus alba</i>	White oak	<i>Corylus americana</i>	American hazelnut	<i>Osmunda claytoniana</i>	Interrupted fern	
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Fraxinus pennsylvanica</i>	Green ash	<i>Epilobium</i>	Willow-herb	
<i>Acer rubrum</i>	Red maple	<i>Acer rubrum</i>	Red maple	<i>Pilea pumila</i>	Clearweed	
<i>Ulmus</i>	Elm	<i>Rubus allegheniensis</i>	Common blackberry	<i>Smilax lasioneura</i>	Carion-flower	
<i>Betula papyrifera</i>	Paper birch	<i>Rhus glabra</i>	Smooth sumac	<i>Adiantum pedatum</i>	Maidenhair-fern	
<i>Tilia americana</i>	Basswood	<i>Sambucus pubens</i>	Red-berried elder	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	
		<i>Rhamnus cathartica</i>	Common buckthorn	<i>Laportea canadensis</i>	Wood nettle	
		<i>Acer negundo</i>	Box elder	<i>Eupatorium rugosum</i>	Common snakeroot	
		<i>Vitis riparia</i>	Wild grape	<i>Athynium angustum</i>	Lady lem	
				<i>Pteridium aquilinum</i>	Bracken	

Area 6-85

Oak Forest, Mesic

RANK D

STATUS 2

Canopy		Shrub		Forbs		Graminoids
<i>Quercus alba</i>	White oak	<i>Ribes</i>	Currant; Gooseberry			<i>Poa</i> Blue grass, Meadow grass
<i>Acer rubrum</i>	Red maple	<i>Corylus americana</i>	American hazelnut			<i>Agrostis stolonifera</i> Redtop
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Parthenocissus inserta</i>	Virginia creeper			<i>Festuca</i> Fescue
<i>Quercus velutina</i>	Black oak	<i>Celastrus scandens</i>	Climbing bittersweet			
<i>Populus tremuloides</i>	Quaking aspen	<i>Vitis riparia</i>	Wild grape			
<i>Betula papyrifera</i>	Paper birch					
<i>Prunus serotina</i>	Black cherry					
<i>Ulmus americana</i>	American elm					

Appendix A: Natural Resources Inventory – Community Survey

Area 6-87

Oak Forest, Mesic

RANK D

STATUS 2

Canopy	
<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Juglans nigra</i>	Black walnut
<i>Prunus serotina</i>	Black cherry
<i>Pinus sylvestris</i>	Scotch pine
<i>Pinus strobus</i>	White pine
<i>Pinus resinosa</i>	Red pine; Norway pine

Shrub	
<i>Rubus occidentalis</i>	Black raspberry
<i>Ribes missouriense</i>	Missouri gooseberry
<i>Prunus serotina</i>	Black cherry
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Ulmus</i>	Elm
<i>Acer negundo</i>	Box elder
<i>Celtis occidentalis</i>	Hackberry
<i>Sambucus pubens</i>	Red-berried elder

Forbs	
<i>Hackelia virginiana</i>	Virginia stickseed
<i>Osmorhiza claytonii</i>	Sweet Cicely
<i>Leonurus cardiaca</i>	Motherwort
<i>Eupatorium rugosum</i>	Common snakeroot
<i>Rosa arkansana</i>	Prairie rose
<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil
<i>Pilea pumila</i>	Clearweed
<i>Viola</i>	Violet
<i>Aster ontariensis</i>	Ontario aster
<i>Urtica dioica</i>	Stinging nettle
<i>Smilacina stellata</i>	Starry false Solomon's-seal
<i>Geranium maculatum</i>	Wild geranium
<i>Cryptotaenia canadensis</i>	Honewort
<i>Smilacina racemosa</i>	False Solomon's-seal

Graminoids

Appendix A: Natural Resources Inventory -- Community Survey

Area 7-112

		RANK NA		STATUS NA			
Canopy		Shrub		Forbs		Graminoids	
<i>Andropogon gerardii</i>	Big bluestem	<i>Acer negundo</i>	Box elder	<i>Solidago canadensis</i>	Canada goldenrod	<i>Bromus inermis</i>	Smooth brome
<i>Schizachyrium scoparium</i>	Little bluestem	<i>Rubus occidentalis</i>	Black raspberry	<i>Aster pilosus</i>		<i>Agropyron repens</i>	Quack grass
<i>Sorghastrum nutens</i>	Indian grass	<i>Ulmus</i>	Elm	<i>Asclepias verticillata</i>	Whorled milkweed	<i>Poa pratensis</i>	Kentucky bluegrass
<i>Ratibida pinnata</i>	Gray-headed coneflower	<i>Juniperus virginiana</i>	Red cedar	<i>Daucus carota</i>	Queen Anne's lace	<i>Agrostis stolonifera</i>	Redtop
<i>Coreopsis lanceolata</i>	Lance-leaved coreopsis	<i>Cornus foemina</i>	Gray dogwood	<i>Cirsium vulgare</i>	Bull thistle	<i>Setaria glauca</i>	Yellow foxtail
<i>Agrostis stolonifera</i>	Redtop	<i>Lonicera tatarica</i>	Tartarian honeysuckle	<i>Rosa arkansana</i>	Prairie rose		
<i>Bouteloua curtipendula</i>	Side-oats grama			<i>Asclepias syriaca</i>	Common milkweed		
<i>Rudbeckia hirta</i>	Black-eyed Susan			<i>Gnaphalium obtusifolium</i>	Sweet everlasting		
<i>Trifolium pratense</i>	Red clover			<i>Verbena stricta</i>	Hairy blue vervain		
<i>Elymus canadensis</i>	Nodding wild-rye			<i>Solidago rigida</i>	Stiff goldenrod		
<i>Heliopsis scabra</i>	Ox-eye			<i>Verbescum thapsus</i>	Mullein		
<i>Panicum virgatum</i>	Switchgrass			<i>Linaria vulgaris</i>	Butter-and-eggs		
<i>Monarda fistulosa</i>	Wild bergamot			<i>Fragaria virginiana</i>	Common strawberry		
<i>Achillea millefolium</i>	Yarrow						
<i>Phleum pratense</i>	Timothy						
<i>Astragalus canadensis</i>	Canada milk-vetch						

Appendix A: Natural Resources Inventory – Community Survey

Area 7-113

Lowland Hardwood Forest

RANK CD

STATUS 4

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Juglans nigra</i>	Black walnut
<i>Acer negundo</i>	Box elder
<i>Prunus serotina</i>	Black cherry
<i>Quercus velutina</i>	Black oak

Shrub

<i>Rubus occidentalis</i>	Black raspberry
<i>Ribes americanum</i>	Wild black currant
<i>Sambucus canadensis</i>	Common elder
<i>Acer negundo</i>	Box elder
<i>Parthenocissus inserta</i>	Virginia creeper
<i>Vitis riparia</i>	Wild grape
<i>Celastrus scandens</i>	Climbing bitternsweet

Forbs

<i>Urtica dioica</i>	Stinging nettle
<i>Laportea canadensis</i>	Wood nettle
<i>Galium</i>	Bedstraw; Cleavers
<i>Osmorhiza claytonii</i>	Sweet Cicely
<i>Cryptotaenia canadensis</i>	Honewort

Graminoids

<i>Phalaris arundinacea</i>	Reed canary grass
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Area 7-113b

Oak Woodland-Brushland

RANK D

STATUS 4

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Juglans nigra</i>	Black walnut
<i>Acer negundo</i>	Box elder
<i>Prunus serotina</i>	Black cherry

Shrub

<i>Zanthoxylum americanum</i>	Prickly ash
<i>Prunus serotina</i>	Black cherry
<i>Lonicera tatarica</i>	Tartarian honeysuckle
<i>Juniperus virginiana</i>	Red cedar
<i>Cornus foemina</i>	Gray dogwood
<i>Rhus glabra</i>	Smooth sumac
<i>Parthenocissus inserta</i>	Virginia creeper
<i>Vitis riparia</i>	Wild grape
<i>Celastrus scandens</i>	Climbing bitternsweet

Forbs

<i>Cryptotaenia canadensis</i>	Honewort
<i>Geum canadense</i>	White avens
<i>Eupatorium rugosum</i>	Common snakeroot
<i>Phytolacca leptostachya</i>	Lopseed
<i>Aster ontariensis</i>	Ontario aster
<i>Viola sororia</i>	Common blue violet
<i>Monarda fistulosa</i>	Wild bergamot
<i>Antennaria neodioica</i>	Pussytoes
<i>Prenanthes alba</i>	White rattlesnake-root
<i>Cirsium discolor</i>	Field thistle
<i>Solidago canadensis</i>	Canada goldenrod
<i>Dianthus armeria</i>	Deptford pink

Graminoids

<i>Bromus kalmii</i>	Kalm's brome
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Muhlenbergia mexicana</i>	Mexican satin grass
<i>Elymus virginicus</i>	Wild-rye

Appendix A: Natural Resources Inventory – Community Survey

Area 7-114

Oak Woodland-Brushland

RANK D

STATUS 4

DNR Rare Features

County Biological Site Oak Woodland-Brushland; 1990

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Prunus virginiana</i>	Chokecherry

Shrub

<i>Rhamnus cathartica</i>	Common buckthorn
<i>Zanthoxylum americanum</i>	Prickly ash
<i>Ribes missouriense</i>	Missouri gooseberry
<i>Lonicera tatarica</i>	Tartarian honeysuckle
<i>Celtis occidentalis</i>	Hackberry

Forbs

<i>Rhamnus cathartica</i>	Common buckthorn
<i>Eupatorium rugosum</i>	Common snakeroot
<i>Renunculus abortivus</i>	Kidney-leaf buttercup
<i>Agrimonia gryposepala</i>	Agrimony

Graminoids

<i>Carex pensylvanica</i>	pensylvania sedge
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Area 7-210

Oak Woodland-Brushland

RANK D

STATUS 4

Canopy

<i>Quercus velutina</i>	Black oak
<i>Fraxinus pennsylvanica</i>	Green ash
<i>Populus deltoides</i>	Cottonwood
<i>Quercus alba</i>	White oak
<i>Prunus serotina</i>	Black cherry
<i>Acer saccharum</i>	Sugar maple
<i>Quercus macrocarpa</i>	Bur oak

Shrub

<i>Zanthoxylum americanum</i>	Prickly ash
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Rubus</i>	Bramble
<i>Ribes</i>	Currant; Gooseberry
<i>Prunus pensylvanica</i>	Pin cherry
<i>Acer negundo</i>	Box elder
<i>Cornus amomum</i>	Silky dogwood
<i>Ulmus rubra</i>	Red elm; Slippery elm
<i>Rosa arkansana</i>	Prairie rose
<i>Cornus</i>	Dogwood; Cornel
<i>Vitis riparia</i>	Wild grape

Forbs

<i>Nepeta cataria</i>	Catnip
<i>Osmorhiza claytonii</i>	Sweet Cicely
<i>Aster macrophyllus</i>	Large-leaved aster
<i>Solidago nemoralis</i>	Gray goldenrod
<i>Leonurus cardiaca</i>	Motherwort
<i>Helianthus hirsutus</i>	Woodland sunflower
<i>Hydrophyllum virginianum</i>	Virginia waterleaf
<i>Geranium maculatum</i>	Wild geranium
<i>Boehmeria cylindrica</i>	False nettle
<i>Smilacina racemosa</i>	False Solomon's-seal
<i>Actaea rubra</i>	Red baneberry

Graminoids

<i>Poa pratensis</i>	Kentucky bluegrass
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Appendix A: Natural Resources Inventory -- Community Survey

Area 7-211

Oak Woodland-Brushland

RANK CD

STATUS 4

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Prunus serotina</i>	Black cherry

Shrub

<i>Zanthoxylum americanum</i>	Prickly ash
<i>Rubus</i>	Bramble
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Juniperus virginiana</i>	Red cedar

Forbs

<i>Monarda fistulosa</i>	Wild bergamot
<i>Rumex crispus</i>	Curly dock
<i>Rhus radicans</i>	Poison ivy
<i>Galium boreale</i>	Northern bedstraw
<i>Solidago canadensis</i>	Canada goldenrod
<i>Linaria vulgaris</i>	Butter-and-eggs
<i>Asclepias syriaca</i>	Common milkweed
<i>Aster pilosus</i>	
<i>Bidens aristosa</i>	Tickseed-sunflower
<i>Artemisia ludoviciana</i>	Western mugwort; White sag
<i>Verbena stricta</i>	Hairy blue vervain
<i>Helianthus grosseserratus</i>	Sawtooth sunflower

Graminoids

<i>Poa pratensis</i>	Kentucky bluegrass
<i>Bromus inermis</i>	Smooth brome

Area 7-212

Oak Woodland-Brushland

RANK C

STATUS 4

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Populus tremuloides</i>	Quaking aspen
<i>Prunus serotina</i>	Black cherry
<i>Juglans nigra</i>	Black walnut

Shrub

<i>Acer negundo</i>	Box elder
<i>Zanthoxylum americanum</i>	Prickly ash
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Rubus</i>	Bramble
<i>Ribes</i>	Currant; Gooseberry
<i>Lonicera bella</i>	
<i>Prunus serotina</i>	Black cherry
<i>Rhus glabra</i>	Smooth sumac
<i>Corylus americana</i>	American hazelnut
<i>Juniperus virginiana</i>	Red cedar
<i>Vitis riparia</i>	Wild grape

Forbs

<i>Galium boreale</i>	Northern bedstraw
<i>Solidago canadensis</i>	Canada goldenrod
<i>Osmorhiza claytonii</i>	Sweet Cicely
<i>Monarda fistulosa</i>	Wild bergamot
<i>Hydrophyllum virginianum</i>	Virginia waterleaf
<i>Aster macrophyllus</i>	Large-leaved aster
<i>Geranium maculatum</i>	Wild geranium
<i>Heuchera richardsonii</i>	Alum-root
<i>Stellaria media</i>	Common chickweed

Graminoids

<i>Poa pratensis</i>	Kentucky bluegrass
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Appendix A: Natural Resources Inventory -- Community Survey

Area 7-213

Lowland Hardwood Forest

RANK D

STATUS 4

Canopy	
<i>Fraxinus pennsylvanica</i>	Green ash
<i>Acer negundo</i>	Box elder
<i>Populus deltoides</i>	Cottonwood

Shrub	
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Sambucus canadensis</i>	Common elder
<i>Vitis riparia</i>	Wild grape

Forbs	
<i>Boehmeria cylindrica</i>	False nettle
<i>Stellaria media</i>	Common chickweed
<i>Viola pubescens</i>	Smooth yellow violet
<i>Hydrophyllum virginianum</i>	Virginia waterleaf
<i>Urtica dioica</i>	Stinging nettle
<i>Malva neglecta</i>	Common mallow
<i>Leonurus cardiaca</i>	Motherwort
<i>Viola sororia</i>	Common blue violet
<i>Podophyllum peltatum</i>	May-apple; Mandrake

Graminoids

Area 7-214

Oak Woodland-Brushland

RANK CD

STATUS 4

Canopy	
<i>Quercus velutina</i>	Black oak
<i>Ulmus rubra</i>	Red elm; Slippery elm
<i>Acer negundo</i>	Box elder
<i>Quercus alba</i>	White oak
<i>Fraxinus pennsylvanica</i>	Green ash
<i>Quercus macrocarpa</i>	Bur oak
<i>Acer saccharum</i>	Sugar maple

Shrub	
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Ribes</i>	Currant; Gooseberry
<i>Zanthoxylum americanum</i>	Prickly ash
<i>Lonicera tatarica</i>	Tartarian honeysuckle
<i>Ulmus pumila</i>	Siberian elm
<i>Prunus serotina</i>	Black cherry
<i>Cornus amomum</i>	Silky dogwood
<i>Sambucus canadensis</i>	Common elder

Forbs	
<i>Galium boreale</i>	Northern bedstraw
<i>Geranium maculatum</i>	Wild geranium
<i>Smilacina racemosa</i>	False Solomon's-seal
<i>Viola sororia</i>	Common blue violet
<i>Hydrophyllum virginianum</i>	Virginia waterleaf
<i>Boehmeria cylindrica</i>	False nettle
<i>Aralia nudicaulis</i>	Wild sarsaparilla
<i>Actaea rubra</i>	Red baneberry
<i>Althium angustum</i>	Lady fern
<i>Oxalis montana</i>	Common wood-sorrel
<i>Helianthus hirsutus</i>	Woodland sunflower
<i>Anemone thalictroides</i>	Rue-anemone

Graminoids

Carex pensylvanica pensylvania sedge

Appendix A: Natural Resources Inventory -- Community Survey

Area 7-82

Oak Forest, Dry

RANK C

STATUS 3

DNR Rare Features

County Biological Site Oak Woodland-Brushland, No Rank given; 1990

Canopy		Shrub	Forbs	Graminoids
<i>Quercus macrocarpa</i>	Bur oak	<i>Fraxinus pennsylvanica</i>	<i>Rudbeckia laciniata</i>	<i>Carex pensylvanica</i>
<i>Quercus velutina</i>	Black oak	<i>Ulmus americana</i>	<i>Acalypha rhomboidea</i>	pensylvania sedge
<i>Quercus alba</i>	White oak	<i>Acer spicatum</i>	<i>Teucrium canadense</i>	
<i>Populus tremuloides</i>	Quaking aspen	<i>Cacalia</i>	<i>Desmodium glufinosum</i>	
<i>Ulmus americana</i>	American elm	<i>Ribes cynosbati</i>	<i>Eupatorium rugosum</i>	
<i>Betula papyrifera</i>	Paper birch	<i>Rubus occidentalis</i>	<i>Smilacina racemosa</i>	
<i>Juglans cinerea</i>	Butternut	<i>Sambucus canadensis</i>	<i>Geranium maculatum</i>	
		<i>Prunus serotina</i>	<i>Viola</i>	
		<i>Celtis occidentalis</i>	<i>Zizia aurea</i>	
		<i>Rhus radicans</i>	<i>Amphicarpaea bracteata</i>	
		<i>Juglans cinerea</i>		
		<i>Comus amomum</i>		
		<i>Ostrya virginiana</i>		
		<i>Parthenocissus inserta</i>		
		<i>Vitis riparia</i>		

Appendix A: Natural Resources Inventory – Community Survey

Area 7-83

Floodplain Forest (Silver Maple)

RANK BC

STATUS 3

DNR Rare Features

County Biological Site Floodplain Forest

Canopy	
<i>Salix nigra</i>	Black willow
<i>Ulmus rubra</i>	Red elm; Slippery elm
<i>Fraxinus pennsylvanica</i>	Green ash
<i>Populus deltoides</i>	Cottonwood
<i>Juglans nigra</i>	Black walnut
<i>Fraxinus nigra</i>	Black ash
<i>Tilia americana</i>	Basswood
<i>Acer saccharinum</i>	Silver maple; Soft maple

Shrub	
<i>Sambucus canadensis</i>	Common elder
<i>Zanthoxylum americanum</i>	Prickly ash
<i>Rubus occidentalis</i>	Black raspberry
<i>Acer negundo</i>	Box elder
<i>Robinia pseudacacia</i>	Black locust
<i>Vitis riparia</i>	Wild grape
<i>Clematis virginiana</i>	Virgin's bower
<i>Apios americana</i>	Groundnut

Forbs	
<i>Laportea canadensis</i>	Wood nettle
<i>Hydrophyllum virginianum</i>	Virginia waterleaf
<i>Solidago gigantea</i>	Giant goldenrod
<i>Geum macrophyllum</i>	Big-leaf avens
<i>Galium</i>	Bedstraw, Cleavers
<i>Viola</i>	Violet
<i>Rudbeckia laciniata</i>	Goldenglow
<i>Urtica dioica</i>	Stinging nettle
<i>Aster ontarionis</i>	Ontario aster
<i>Teucrium canadense</i>	Germander
<i>Osmorhiza claytonii</i>	Sweet Cicely
<i>Eupatorium rugosum</i>	Common snakeroot
<i>Pilea pumila</i>	Clearweed
<i>Stellaria</i>	Chickweed, Starwort
<i>Impatiens capensis</i>	Spotted touch-me-not; Jewel
<i>Angelica atropurpurea</i>	Angelica

Graminoids	
<i>Phalaris arundinacea</i>	Reed canary grass
<i>Elymus</i>	Wild-rye

Area 7-86

Wet Meadow

RANK D

STATUS 3

Canopy	
<i>Salix nigra</i>	Black willow
<i>Fraxinus nigra</i>	Black ash
<i>Ulmus</i>	Elm

Shrub	
<i>Salix nigra</i>	Black willow
<i>Cornus stolonifera</i>	Red-osier dogwood
<i>Salix exigua</i>	Sand-bar willow
<i>Salix amygdaloides</i>	Peach-leaved willow
<i>Apios americana</i>	Groundnut
<i>Vitis riparia</i>	Wild grape

Forbs	
<i>Solidago gigantea</i>	Giant goldenrod
<i>Impatiens capensis</i>	Spotted touch-me-not; Jewel
<i>Helianthus grosseserratus</i>	Sawtooth sunflower
<i>Convolvulus sepium</i>	Hedge bindweed
<i>Aster simplex</i>	Marsh aster
<i>Matteuccia struthiopteris</i>	Ostrich fern
<i>Thalictrum dasycarpum</i>	Tall meadow rue
<i>Rudbeckia laciniata</i>	Goldenglow

Graminoids

Appendix A: Natural Resources Inventory – Community Survey

Area 7-80

Floodplain Forest (Silver Maple)

RANK B

STATUS 3

DNR Rare Features

County Biological Site Floodplain Forest, Rank B; 1990

Canopy		Shrub		Forbs		Graminoids	
<i>Populus deltoides</i>	Cottonwood	<i>Sambucus canadensis</i>	Common elder	<i>Laportea canadensis</i>	Wood nettle	<i>Bromus ciliatus</i>	Fringed brome
<i>Acer saccharinum</i>	Silver maple; Soft maple	<i>Acer negundo</i>	Box elder	<i>Pilea pumila</i>	Clearweed	<i>Carex tribuloides</i>	blunt broom sedge
<i>Fraxinus pennsylvanica</i>	Green ash	<i>Salix exigua</i>	Sand-bar willow	<i>Viola</i>	Violet	<i>Phalaris arundinacea</i>	Reed canary grass
<i>Juglans nigra</i>	Black walnut	<i>Menispermum canadense</i>	Canada moonseed	<i>Galium</i>	Bedstraw; Cleavers	<i>Elymus virginicus</i>	Wild-rye
<i>Salix nigra</i>	Black willow	<i>Vitis riparia</i>	Wild grape	<i>Impatiens capensis</i>	Spotted touch-me-not; Jewel	<i>Leersia virginica</i>	White grass
<i>Acer negundo</i>	Box elder	<i>Apios americana</i>	Groundnut	<i>Aster ontariensis</i>	Ontario aster		
		<i>Prunus virginiana</i>	Chokecherry	<i>Rudbeckia laciniata</i>	Goldenglow		
		<i>Juglans nigra</i>	Black walnut	<i>Lysimachia nummularia</i>	Moneywort		
		<i>Lonicera tatarica</i>	Tartarian honeysuckle	<i>Glechoma hederacea</i>	Creeping charlie		
		<i>Acer negundo</i>	Box elder	<i>Plantago major</i>	Common plantain		
		<i>Oenothera</i>	Evening-primrose	<i>Urtica dioica</i>	Stinging nettle		
				<i>Polygonum amphibium</i>	Water smartweed		
				<i>Ranunculus abortivus</i>	Kidney-leaf buttercup		
				<i>Anisaema triphyllum</i>	Jack-in-the-pulpit		
				<i>Geum macrophyllum</i>	Big-leaf avens		
				<i>Stachys tenuifolia</i>	Rough hedge-nettle		
				<i>Epilobium</i>	Willow-herb		
				<i>Lythrum salicaria</i>	Purple loosestrife		
				<i>Leonurus cardiaca</i>	Motherwort		

Appendix A: Natural Resources Inventory -- Community Survey

Area 7-91

Oak Woodland-Brushland

RANK CD STATUS 4

Canopy

<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak
<i>Fraxinus pennsylvanica</i>	Green ash
<i>Celtis occidentalis</i>	Hackberry
<i>Prunus serotina</i>	Black cherry
<i>Juglans nigra</i>	Black walnut
<i>Tilia americana</i>	Basswood
<i>Acer saccharum</i>	Sugar maple
<i>Betula papyrifera</i>	Paper birch

Shrub

<i>Ribes cynosbati</i>	Prickly gooseberry; Dogberry
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Celtis occidentalis</i>	Hackberry
<i>Acer negundo</i>	Box elder
<i>Lonicera tatarica</i>	Tartarian honeysuckle
<i>Zanthoxylum americanum</i>	Prickly ash
<i>Prunus virginiana</i>	Chokecherry
<i>Juniperus virginiana</i>	Red cedar
<i>Quercus velutina</i>	Black oak
<i>Rubus occidentalis</i>	Black raspberry
<i>Rubus allegheniensis</i>	Common blackberry
<i>Rhus glabra</i>	Smooth sumac
<i>Prunus americana</i>	Wild plum
<i>Tilia americana</i>	Basswood
<i>Quercus macrocarpa</i>	Bur oak
<i>Celastrus scandens</i>	Climbing bittersweet

Forbs

<i>Polemonium reptans</i>	Jacob's ladder
<i>Galium trifidum</i>	Small bedstraw
<i>Hackelia virginiana</i>	Virginia stickseed
<i>Viola</i>	Violet
<i>Geum canadense</i>	White avens
<i>Laportea canadensis</i>	Wood nettle
<i>Aster ontariois</i>	Ontario aster
<i>Teucrium canadense</i>	Germander
<i>Mitella diphylla</i>	Miterwort
<i>Eupatorium rugosum</i>	Common snakeroot
<i>Geranium maculatum</i>	Wild geranium
<i>Smilacina racemosa</i>	False Solomon's-seal
<i>Leonurus cardiaca</i>	Motherwort
<i>Galium aparine</i>	Cleavers
<i>Solidago gigantea</i>	Giant goldenrod
<i>Helianthus hirsutus</i>	Woodland sunflower
<i>Verbena urticifolia</i>	White vervain
<i>Achillea millefolium</i>	Yarrow
<i>Monarda fistulosa</i>	Wild bergamot
<i>Rosa arkansana</i>	Prairie rose
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil
<i>Anemone virginiana</i>	Thimbleweed
<i>Lespedeza capitata</i>	Round-headed bush-clover
<i>Triosteum perfoliatum</i>	Horse-gentian
<i>Cryptotaenia canadensis</i>	Honewort
<i>Cirsium discolor</i>	Field thistle
<i>Pastinaca sativa</i>	Parsnip
<i>Lactuca</i>	Lettuce
<i>Heliopsis helianthoides</i>	Ox-eye
<i>Hydrophyllum virginianum</i>	Virginia waterleaf
<i>Phryma leptostachya</i>	Lopseed

Graminoids

<i>Poa pratensis</i>	Kentucky bluegrass
<i>Bromus kalmii</i>	Kalm's brome
<i>Muhlenbergia mexicana</i>	Mexican satin grass
<i>Phalaris arundinacea</i>	Reed canary grass
<i>Elymus virginicus</i>	Wild-rye

Appendix A: Natural Resources Inventory -- Community Survey

Area 7-82

		RANK NA	STATUS NA		
Canopy				Shrub	Forbs
<i>Populus deltoides</i>	Cottonwood			<i>Salix</i>	Willow
				<i>Salix exigua</i>	Sand-bar willow
					Graminoids
					<i>Phalaris arundinacea</i>
					Reed canary grass

Area 7-83

		RANK NA	STATUS NA		
Canopy				Shrub	Forbs
<i>Quercus macrocarpa</i>	Bur oak			<i>Ribes</i>	Currant; Gooseberry
<i>Quercus velutina</i>	Black oak			<i>Rubus</i>	Bramble
<i>Populus deltoides</i>	Cottonwood				
<i>Acer negundo</i>	Box elder				
<i>Juniperus virginiana</i>	Red cedar				
					Graminoids
					<i>Poa</i>
					Blue grass; Meadow grass
					<i>Bromus inermis</i>
					Smooth brome
					<i>Agrostis stolonifera</i>
					Redtop
					<i>Phalaris arundinacea</i>
					Reed canary grass
					<i>Agropyron repens</i>
					Quack grass

Appendix A: Natural Resources Inventory -- Community Survey

Area 8-102

Oak Forest, Dry

RANK D

STATUS 3

Canopy		Shrub		Forbs		Graminoids
<i>Quercus macrocarpa</i>	Bur oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Osmorhiza claytonii</i>	Sweet Cicely	
<i>Quercus alba</i>	White oak	<i>Celtis occidentalis</i>	Hackberry	<i>Eupatorium rugosum</i>	Common snakeroot	
<i>Acer negundo</i>	Box elder	<i>Sambucus canadensis</i>	Common elder	<i>Geum canadense</i>	White avens	
<i>Prunus serotina</i>	Black cherry	<i>Prunus virginiana</i>	Chokecherry	<i>Pilea pumila</i>	Clearweed	
<i>Tilia americana</i>	Basswood	<i>Fraxinus</i>	Ash	<i>Urtica dioica</i>	Stinging nettle	
<i>Acer saccharinum</i>	Silver maple; Soft maple	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Mitella diphylla</i>	Miterwort	
<i>Quercus velutina</i>	Black oak	<i>Acer saccharum</i>	Sugar maple	<i>Cryptotaenia canadensis</i>	Honewort	
<i>Populus tremuloides</i>	Quaking aspen	<i>Ulmus</i>	Elm	<i>Aralia racemosa</i>	American spikenard	
<i>Acer spicatum</i>	Mountain maple	<i>Cornus alternifolia</i>	Pagoda dogwood	<i>Prunella vulgaris</i>	Heat-all	
		<i>Viburnum lentago</i>	Nannyberry	<i>Geranium maculatum</i>	Wild geranium	
		<i>Lonicera tatarica</i>	Tartarian honeysuckle	<i>Sanicula gregaria</i>	Black snakeroot	
		<i>Corylus americana</i>	American hazelnut	<i>Smilax lasioneura</i>	Carion-flower	
		<i>Cornus foemina</i>	Gray dogwood			
		<i>Vitis riparia</i>	Wild grape			

Appendix A: Natural Resources Inventory -- Community Survey

Area 8-103

Willow Swamp

RANK C

STATUS 4

DNR Rare Features

County Biological Site Shrub Swamp, Seepage Subtype

Canopy		Shrub		Forbs		Graminoids	
<i>Acer saccharinum</i>	Silver maple; Soft maple	<i>Salix bebbiana</i>	Bebb's willow	<i>Angelica atropurpurea</i>	Angelica	<i>Typha latifolia</i>	Broad-leaved cattail
<i>Betula papyrifera</i>	Paper birch	<i>Comus stolonifera</i>	Red-osier dogwood	<i>Eupatorium maculatum</i>	Spotted Joe-pye weed	<i>Carex retrorsa</i>	retorse sedge
		<i>Rhamnus cathartica</i>	Common buckthorn	<i>Asclepias incarnata</i>	Swamp milkweed	<i>Carex lacustris</i>	lakebank sedge
		<i>Viburnum trilobum</i>	High-bush cranberry	<i>Lythrum salicaria</i>	Purple loosestrife	<i>Carex stenilis</i>	sterile sedge
				<i>Nasturtium officinale</i>	Water cress	<i>Scirpus cyperinus</i>	Wool-grass
				<i>Saxifraga pennsylvanica</i>	Swamp saxifrage	<i>Scirpus fluviatilis</i>	River bulrush
				<i>Pedicularis lanceolata</i>	Swamp lousewort	<i>Phragmites australis</i>	Common reed grass
				<i>Geum macrophyllum</i>	Big-leaf avens		
				<i>Solidago gigantea</i>	Giant goldenrod		
				<i>Impatiens capensis</i>	Spotted touch-me-not; Jewel		
				<i>Onoclea sensibilis</i>	Sensitive fern		
				<i>Fragaria virginiana</i>	Common strawberry		
				<i>Epilobium</i>	Willow-herb		
				<i>Heracleum lanatum</i>	Cow-parsnip		
				<i>Thelypteris palustris</i>	Northern marsh fern		
				<i>Eupatorium perfoliatum</i>	Common boneset		
				<i>Arisaema triphyllum</i>	Jack-in-the-pulpit		
				<i>Caltha palustris</i>	Marsh marigold		

Appendix A: Natural Resources Inventory -- Community Survey

Area 8-104

Dry Prairie (bedrock bluff subtype)

RANK D

STATUS 3

Canopy

Shrub

Quercus macrocarpa
Betula papyrifera
Juniperus virginiana
Ulmus pumila
Rhus glabra
Rhamnus cathartica
Celastrus scandens
Vitis riparia
Parthenocissus inserta

Bur oak
 Paper birch
 Red cedar
 Siberian elm
 Smooth sumac
 Common buckhorn
 Climbing bittersweet
 Wild grape
 Virginia creeper

Forbs

Ambrosia coronopifolia
Artemisia frigida
Verbena stricta
Verbascum thapsus
Ambrosia artemisiifolia
Cannabis sativa
Artemisia campestris
Solidago nemoralis
Physalis heterophylla
Viola pedatifida
Euphorbia corollata
Anemone cylindrica
Nepeta calaria
Achillea millefolium
Linaria vulgaris
Asclepias verticillata
Aster oolentangiensis
Amorpha canescens
Plantago major
Taraxacum officinale
Trifolium pratense
Arctium minus
Oenothera biennis
Medicago lupulina
Comandra umbellata
Pycnanthemum virginianum

Western ragweed
 Prairie sagewort
 Hairy blue vervain
 Mullein
 Common ragweed
 Hemp; Marijuana
 Tall wormwood
 Gray goldenrod
 Clammy ground-cherry
 Prairie bird-foot violet
 Flowering spurge
 Thimbleweed
 Catnip
 Yarrow
 Butter-and-eggs
 Whorled milkweed
 Sky-blue aster
 Lead-plant
 Common plantain
 Common dandelion
 Red clover
 Common burdock
 Common evening-primrose
 Black medick
 Bastard toad-flax
 Virginia mountain-mint

Graminoids

Poa compressa
Poa pratensis
Bouteloua curtipendula
Setaria glauca
Panicum depauperatum
Elymus canadensis
Sporobolus asper
Bouteloua hirsuta
Sporobolus cryptandrus
Schizachyrium scoparium
Eragrostis spectabilis
Muhlenbergia cuspidata
Stipa spartea
Agrostis stolonifera
Sorghastrum nutans
Cenchrus longispinus

Canada bluegrass
 Kentucky bluegrass
 Side-oats grama
 Yellow foxtail
 Narrow-leaved Panicum
 Nodding wild-rye
 Rough dropseed
 Hairy grama
 Sand dropseed
 Little bluestem
 Purple love grass
 Plains muhly
 Porcupine grass
 Redtop
 Indian grass
 Sandbur

Appendix A: Natural Resources Inventory -- Community Survey

Area 8-105

Oak Woodland-Brushland

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Juniperus virginiana</i>	Red cedar	<i>Galium</i>	Bedstraw; Cleavers	<i>Carex pensylvanica</i>	pennsylvania sedge
<i>Populus tremuloides</i>	Quaking aspen	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Elymus canadensis</i>	Nodding wild-rye
<i>Prunus serotina</i>	Black cherry	<i>Populus tremuloides</i>	Quaking aspen	<i>Sanicula gregaria</i>	Black snakeroot		
<i>Quercus velutina</i>	Black oak	<i>Ulmus pumila</i>	Siberian elm	<i>Amphicarpaea bracteata</i>	Hog-peanut		
		<i>Prunus serotina</i>	Black cherry	<i>Adiantum pedatum</i>	Maidenhair-fern		
		<i>Rubus occidentalis</i>	Black raspberry	<i>Athyrium angustum</i>	Lady fern		
		<i>Ribes missouriense</i>	Missouri gooseberry	<i>Verbena urticifolia</i>	White vervain		
				<i>Solidago ulmifolia</i>	Bog goldenrod		
				<i>Helianthus hirsutus</i>	Woodland sunflower		

Area 8-106

Dry Prairie (bedrock bluff subtype)

Canopy		Shrub		Forbs		Graminoids	
		<i>Juniperus communis</i>	Bush juniper	<i>Solidago canadensis</i>	Canada goldenrod	<i>Sorghastrum nutans</i>	Indian grass
		<i>Juniperus virginiana</i>	Red cedar	<i>Aster ericoides</i>	Heath aster	<i>Sporobolus heterolepis</i>	Prairie dropseed
				<i>Teucrium canadense</i>	Germander	<i>Bromus inermis</i>	Smooth brome
				<i>Solidago rigida</i>	Stiff goldenrod	<i>Muhlenbergia mexicana</i>	Mexican satin grass
				<i>Petalostemon purpureum</i>	Purple prairie-clover		
				<i>Lactuca</i>	Lettuce		
				<i>Monarda fistulosa</i>	Wild bergamot		
				<i>Campanula rotundifolia</i>	Harebell		
				<i>Aster sericeus</i>	Silky aster		
				<i>Rosa arkansana</i>	Prairie rose		
				<i>Ralibida pinnata</i>	Gray-headed coneflower		
				<i>Lithospermum canescens</i>	Hoary puccoon		
				<i>Helianthus laetiflorus</i>	Showy sunflower		

Appendix A: Natural Resources Inventory -- Community Survey

Area 8-107

- RANK NA STATUS NA

Canopy

Shrub

Prunus americana
Rubus
Ribes
Juglans nigra
Quercus
Populus tremuloides
Prunus serotina

Wild plum
 Bramble
 Currant; Gooseberry
 Black walnut
 Oak
 Quaking aspen
 Black cherry

Forbs

Solidago canadensis
Geum

Canada goldenrod
 Avens

Graminoids

Poa

Blue grass; Meadow grass

Area 8-108

Lowland Hardwood Forest

RANK D STATUS 4

Canopy

<i>Juglans nigra</i>	Black walnut
<i>Ulmus</i>	Elm
<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus velutina</i>	Black oak

Shrub

Ribes
Rubus occidentalis
Rubus allegheniensis

Currant; Gooseberry
 Black raspberry
 Common blackberry

Forbs

Belamcanda chinensis

Blackberry lily

Graminoids

Poa

Blue grass; Meadow grass

Festuca

Fescue

Agrostis stolonifera

Redtop

Bouteloua curtipendula

Side-oats grama

Appendix A: Natural Resources Inventory – Community Survey

Area 8-109

Oak Forest, Mesic

RANK BC

STATUS 2

DNR Rare Features

County Biological Site Mesic Oak Forest, 1990

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Prunus serotina</i>	Black cherry	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Carex pensylvanica</i>	pennsylvania sedge
		<i>Celtis occidentalis</i>	Hackberry	<i>Desmodium glutinosum</i>	Pointed-leaved lick-trefoil	<i>Carex blanda</i>	woodland sedge
<i>Betula papyrifera</i>	Paper birch	<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Sanicula gregaria</i>	Black snakeroot	<i>Bromus kalmii</i>	Kalm's brome
<i>Tilia americana</i>	Basswood	<i>Rhus radicans</i>	Poison ivy	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Quercus macrocarpa</i>	Bur oak	<i>Acer negundo</i>	Box elder	<i>Smilax lasioneura</i>	Carion-flower		
<i>Quercus velutina</i>	Black oak	<i>Ribes missouriense</i>	Missouri gooseberry	<i>Viola</i>	Violet		
<i>Prunus serotina</i>	Black cherry	<i>Ulmus</i>	Elm	<i>Botrychium virginianum</i>	Rattlesnake-fern		
<i>Acer rubrum</i>	Red maple	<i>Prunus virginiana</i>	Chokecherry	<i>Helianthus hirsutus</i>	Woodland sunflower		
<i>Acer saccharum</i>	Sugar maple	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Smilacina racemosa</i>	False Solomon's-seal		
		<i>Zanthoxylum americanum</i>	Prickly ash	<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
		<i>Rubus occidentalis</i>	Black raspberry	<i>Solidago ulmifolia</i>	Bog goldenrod		
		<i>Sambucus pubens</i>	Red-berried elder	<i>Adiantum pedatum</i>	Maidenhair-fern		
		<i>Acer saccharum</i>	Sugar maple	<i>Osmunda claytoniana</i>	Interrupted fern		
		<i>Cornus alternifolia</i>	Pagoda dogwood	<i>Athyrium angustum</i>	Lady fern		
		<i>Vitis riparia</i>	Wild grape	<i>Pteridium aquilinum</i>	Bracken		
		<i>Parthenocissus inserta</i>	Virginia creeper	<i>Aster ontariensis</i>	Ontario asler		
				<i>Aralia nudicaulis</i>	Wild sarsaparilla		
				<i>Uvularia grandiflora</i>	Yellow bellwort		
				<i>Dioscorea villosa</i>	Wild yam		
				<i>Asarum canadense</i>	Wild ginger		
				<i>Phryma leptostachya</i>	Lopseed		
				<i>Geranium maculatum</i>	Wild geranium		
				<i>Apocynum androsaemifolium</i>	Spreading dogbane		

Appendix A: Natural Resources Inventory -- Community Survey

Area 8-110

Dry Prairie (bedrock bluff subtype)

RANK C

STATUS 3

DNR Rare Features

County Biological Site Bedrock Bluff Prairie, 1990

Canopy

Shrub

<i>Rubus occidentalis</i>	Black raspberry
<i>Rhus glabra</i>	Smooth sumac
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Cornus foemina</i>	Gray dogwood
<i>Celtis occidentalis</i>	Hackberry
<i>Juniperus communis</i>	Bush juniper
<i>Celastrus scandens</i>	Climbing bitternut

Forbs

<i>Liatris aspera</i>	Rough blazing star
<i>Helianthus laetiflorus</i>	Showy sunflower
<i>Solidago canadensis</i>	Canada goldenrod
<i>Ratibida pinnata</i>	Gray-headed coneflower
<i>Anemone cylindrica</i>	Thimbleweed
<i>Artemisia ludoviciana</i>	Western mugwort; White sag
<i>Kuhnia eupatorioides</i>	False boneset
<i>Coreopsis palmata</i>	Stiff tickseed
<i>Monarda fistulosa</i>	Wild bergamot
<i>Aster encoides</i>	Heath aster
<i>Euphorbia corollata</i>	Flowering spurge
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Asclepias tuberosa</i>	Butterfly-weed
<i>Aster sericeus</i>	Silky aster
<i>Solidago missouriensis</i>	Missouri goldenrod
<i>Campanula rotundifolia</i>	Harebell
<i>Solidago rigida</i>	Stiff goldenrod
<i>Viola pedatifida</i>	Prairie bird-foot violet
<i>Antennaria plantaginifolia</i>	Plantain-leaved pussytoes
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Ranunculus rhomboideus</i>	Prairie buttercup
<i>Linum sulcatum</i>	Yellow flax
<i>Physalis heterophylla</i>	Clammy ground-cherry
<i>Comandra umbellata</i>	Bastard toad-flax
<i>Artemisia frigida</i>	Prairie sagewort
<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Solidago nemoralis</i>	Gray goldenrod

Graminoids

<i>Sporobolus heterolepis</i>	Prairie dropseed
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Andropogon gerardii</i>	Big bluestem
<i>Muhlenbergia mexicana</i>	Mexican salin grass
<i>Muhlenbergia cuspidata</i>	Plains muhly
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Sorghastrum nutans</i>	Indian grass
<i>Elymus canadensis</i>	Nodding wild-rye

Appendix A: Natural Resources Inventory – Community Survey

Area 8-111

Dry Prairie (bedrock bluff subtype)

RANK C

STATUS 3

DNR Rare Features

County Biological Site: Bedrock Bluff Prairie; 1990

Canopy

Shrub

<i>Rubus occidentalis</i>	Black raspberry
<i>Rhus glabra</i>	Smooth sumac
<i>Juniperus virginiana</i>	Red cedar
<i>Cornus foemina</i>	Gray dogwood
<i>Diervilla lonicera</i>	Bush honeysuckle
<i>Prunus serotina</i>	Black cherry
<i>Quercus macrocarpa</i>	Bur oak
<i>Juniperus communis</i>	Bush juniper
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Vitis riparia</i>	Wild grape
<i>Celastrus scandens</i>	Climbing bittersweet

Forbs

<i>Triosteum perfoliatum</i>	Horse-gentian
<i>Helianthus helianthoides</i>	Ox-eye
<i>Aster oolentangiensis</i>	Sky-blue aster
<i>Antennaria plantaginifolia</i>	Plantain-leaved pussytoes
<i>Gnaphalium obtusifolium</i>	Sweet everlasting
<i>Linum sulcatum</i>	Yellow flax
<i>Lobelia spicata</i>	Rough-spiked lobelia
<i>Cirsium</i>	Common thistle; Plumed this
<i>Viola pedatifida</i>	Prairie bird-foot violet
<i>Amorpha canescens</i>	Lead-plant
<i>Kuhnia eupatorioides</i>	False boneset
<i>Monarda fistulosa</i>	Wild bergamot
<i>Aster pilosus</i>	
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint
<i>Prenanthes alba</i>	White rattlesnake-root
<i>Lithospermum canescens</i>	Hoary puccoon
<i>Asclepias verticillata</i>	Whorled milkweed
<i>Solidago missouriensis</i>	Missouri goldenrod
<i>Solidago canadensis</i>	Canada goldenrod
<i>Lithospermum incisum</i>	Narrow-leaved puccoon
<i>Hypoxis hirsuta</i>	Yellow star-grass
<i>Petalostemon purpureum</i>	Purple prairie-clover
<i>Aster sericeus</i>	Silky aster
<i>Anemone cylindrica</i>	Thimbleweed
<i>Solidago nemoralis</i>	Gray goldenrod

Graminoids

<i>Docteloua curtipendula</i>	Side-oats grama
<i>Sorghastrum nutans</i>	Indian grass
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Eragrostis spectabilis</i>	Purple love grass
<i>Panicum depauperatum</i>	Narrow-leaved Panicum
<i>Sporobolus heterolepis</i>	Prairie dropseed

Appendix A: Natural Resources Inventory – Community Survey

Area 8-115

Oak Woodland-Brushland

RANK CD

STATUS 4

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Cryptotaenia canadensis</i>	Honewort	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Eupatorium rugosum</i>	Common snakeroot		
<i>Populus tremuloides</i>	Quaking aspen	<i>Rubus</i>	Bramble	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil		
		<i>Cornus foemina</i>	Gray dogwood	<i>Smilacina racemosa</i>	False Solomon's-seal		
		<i>Juniperus virginiana</i>	Red cedar	<i>Galium</i>	Bedstraw, Cleavers		
		<i>Ribes</i>	Currant, Gooseberry	<i>Agrimonia gryposepala</i>	Agrimony		
		<i>Corylus americana</i>	American hazelnut				
		<i>Acer negundo</i>	Box elder				

Area 8-116

Oak Forest, Mesic

RANK D

STATUS 2

DNR Rare Features

County Biological Site Mesic Oak Forest, Ranked C or higher, 1990

Canopy		Shrub		Forbs		Graminoids	
<i>Quercus macrocarpa</i>	Bur oak	<i>Prunus serotina</i>	Black cherry	<i>Eupatorium rugosum</i>	Common snakeroot	<i>Carex pensylvanica</i>	pensylvania sedge
<i>Quercus velutina</i>	Black oak	<i>Celtis occidentalis</i>	Hackberry	<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	<i>Carex blanda</i>	woodland sedge
<i>Quercus rubra</i>	Northern red oak; Common red oak	<i>Quercus</i>	Oak	<i>Sanicula gregaria</i>	Black snakeroot		
<i>Quercus alba</i>	White oak	<i>Acer negundo</i>	Box elder	<i>Osmorhiza claytonii</i>	Sweet Cicely		
<i>Populus tremuloides</i>	Quaking aspen	<i>Ulmus</i>	Elm	<i>Cryptotaenia canadensis</i>	Honewort		
<i>Prunus serotina</i>	Black cherry	<i>Ribes</i>	Currant, Gooseberry	<i>Solidago flexicaulis</i>	Zig-zag goldenrod		
<i>Juglans nigra</i>	Black walnut	<i>Rhamnus cathartica</i>	Common buckthorn	<i>Athyrium angustum</i>	Lady fern		
<i>Betula papyrifera</i>	Paper birch	<i>Zanthoxylum americanum</i>	Prickly ash	<i>Aster ontarionis</i>	Ontario aster		
<i>Acer rubrum</i>	Red maple	<i>Rubus occidentalis</i>	Black raspberry	<i>Geranium maculatum</i>	Wild geranium		
<i>Tilia americana</i>	Basswood	<i>Rubus allegheniensis</i>	Common blackberry				
		<i>Parthenocissus inserta</i>	Virginia creeper				



Appendix B
Fact Sheet on Exotic Species Control

FACT SHEET #1

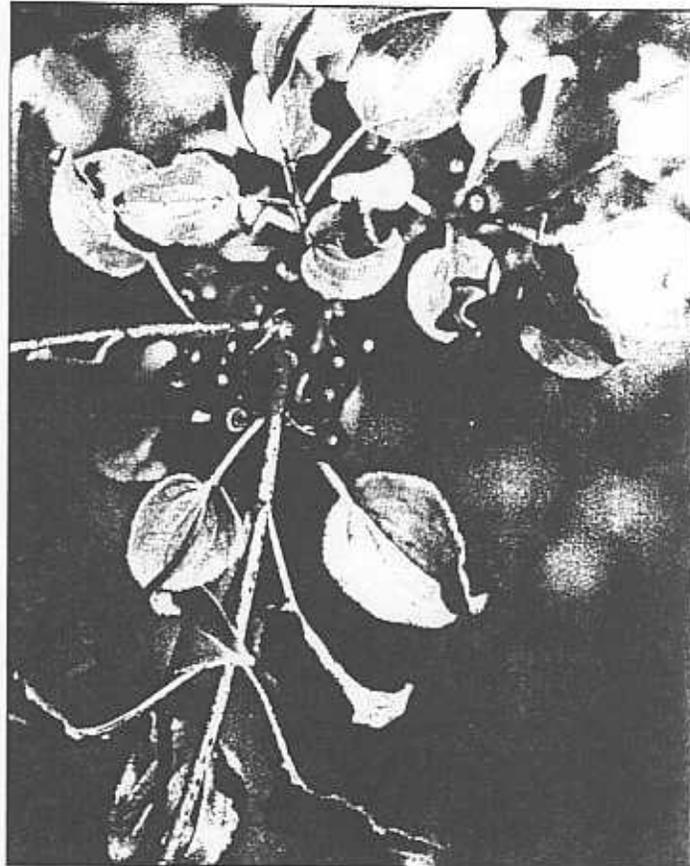
European (Common) Buckthorn *Rhamnus cati*

Description:

Shrub or small tree reaching height of 25' (7.6m); trunk diameter up to 10" (25cm); crown spreading and irregular; bark gray to brown, rough textured when mature and often confused with *Prunus sp.* Inner bark yellow. Twigs often tipped with a spine. Small black fruits up to 1/4" (0.6cm) diameter containing 3-4 seeds typical. Leaves broadly elliptic, rounded to pointed at the tip, and toothed. Upper and lower leaf surfaces smooth. Upper leaf surface dark glossy green. Leaves stay green late into fall, after all other leaves have fallen.

Concern:

Endemic to Eurasia, *R. cathartica* was introduced to North America as an ornamental shrub. It is native to Eurasia. The fruit causes a severe laxative effect, readily distributing its seeds when eaten by birds. Common buckthorn invades mainly woodlands and savannahs, although it may also be found in prairies and open fields. Once established, it crowds or shades out native shrubs and herbs, often completely obliterating them. MN Interagency Exotic Species Task Force 1991 future threat ranking of SEVERE, current threat SEVERE.



European Buckthorn, *Rhamnus cathartica* leaves and mature berries

Controls:

Late March to Early May: Prescribed fire is one method proposed for controlling buckthorn in natural areas. In the upper Midwest, burns conducted as soon as leaf litter is dry should lower resprouting vigor, due to low carbohydrate levels. Burning every year or every other year in established stands may be required for 5-6 years or more. Unfortunately buckthorn seedlings often occur in areas with little litter to carry a fire more often than once every 3-4 years. Fire will top kill a mature plant, but resprouting does occur. Buckthorn seedlings appear to be very vulnerable to fire, perhaps due to their poorly established root structure. Uprooting of smaller seedlings with a weed wrench is another non-chemical control.

May to October: McHenry County, IL Conservation District (MCICD) reports excellent results using 20% **Garlon 3A (Trichlopyr)** in water with dye on cut stumps during the growing season. Product label suggests avoiding the spring sap flow. **Garlon 3A** undiluted applied to cut stumps between first budding in May, through summer, to hard freeze in fall was 95% effective in preventing resprouting (Boudreau and Willson).

Mid-August to October: MN DNR Region V State Parks Resource Management has been using a fall cut with immediate stump application of a 5:1 water:**Roundup (Glyphosate)** solution using a hand sprayer. Initial checks indicate a >85% control overall. Kline, 1983 in Wisconsin, used a 5:1 water:Roundup solution on cut stumps in August/September with 100% control.

Winter: 20% **Garlon 4** with an oil, such as Penevator, and dye on cut stumps was reported as effective by MCICD. Frill application is also effective. Experiments at the University of Wisconsin Arboretum report good results using a 12.5% solution on cut stumps, or a 6% solution basal bark treatment to stems < 3 inches dbh.

This information is not an endorsement of particular products or practices. Pesticide use must follow label directions and applicable state and federal laws.

Minnesota Department
of Natural Resources
Region V (507)285-7432

Sources on file with MN DNR Region V State Parks Resource Manager-
TNC Element Stewardship Abstract for *R. cathartica* and *R. frangula*
Illinois Nature Preserves Commission Vegetation Management Guideline on Exotic Buckthorns
Buckthorn Research and Control at Pipestone National Monument, D. Boudreau & G. Willson, authors

FACT SHEET #2

Exotic Honeysuckles *Lonicera tartarica*, *L. x bella*, *L. maackii*, *L.*

Description:

Upright deciduous shrubs; reaching heights to 20'; leaves opposite, entire. Flowers in May or June. Tartarian honeysuckle has generally pink flowers but may vary from white to red; Amur and Morrow's flower white, yellow with age. The hybrid of Tartarian and Morrow's has characteristics of both parents. Fruits red or yellow in pairs in the axils of the leaves. Careful identification of honeysuckle species is necessary before attempting control measures. In the *Manual of Vascular Plants of Northeastern United States and Canada*, Gleason and Cronquist note that native bush honeysuckles have smooth flower styles (narrow area of pistil above ovary); styles hairy in exotics. In the northern half of Minnesota, native bush or shrub honeysuckles are *L. villosa*, and *L. oblongifolia* (found in swamps, wet woods and bogs), and *L. canadensis*. Native climbing or twining forms are *L. dioica* (statewide), *L. sempervirens* and *L. hirsuta* in the south, and *L. prolifera* in far southeast MN only.



Honeysuckle, *Lonicera* species, probably *L.*

Concern:

Endemic to Russia, Asia and Western Europe. bush honeysuckles were introduced to North America as ornamental shrubs and used as wildlife habitat. Commercial propagation continues with many cultivars of bush honeysuckles available. Abundant fruits are readily eaten by birds and thereby widely dispersed. As bush honeysuckles tolerate a variety of moisture regimes and habitats. Seedlings establish in disturbed vegetated areas. Honeysuckles out-compete native plants because of earlier leaf expansion and later leaf senescence. Research has also suggested allelopathic effects, inhibiting the growth of other plants. MN Interagency Species Task Force 1991 current threat ranking for Tartarian honeysuckle is SEVERE, future ranking

Control:

March to May: Prescribed burning in fire adapted communities will kill seedlings and top kill. Repeated fire may be necessary for adequate control. (INPC guideline)

August to October: Application of a 5:1 water:Roundup (glyphosate) solution by hand sprayer has been used successfully by MN DNR Region 5 Resource Management. Cut stumps as low as possible for herbicide application surface. Honeysuckle's tough wood and cutting low to the ground, where the bark, often require frequent sharpening of tools. A 4:1 solution, applied as above, is also noted in guidelines and TNC ESA as the preferred control method. Untreated cut plants readily resprout; propagate from broken roots.

This information is not an endorsement of particular products or practices. Pesticide use must follow label directions and applica-

Description:

Siberian elm is distinguished by small, elliptic, smooth above, toothed leaves, nearly even at the base, 0.8-2.6" (2-7cm) long. Alternate simple leaves short pointed at the tip and tapering or rounded at asymmetrical base; dark green above, paler and nearly hairless beneath. Mature height 50-70', round crown of slender, spreading branches; rough bark gray or brown and shallowly furrowed at maturity; nearly hairless twigs and small, blunt buds. Flowers greenish, lack petals, occurring in small drooping clusters of 2-5. Fruit one-seeded, smooth, circular, 0.4-0.6" (10-15mm) wide, in clusters.

Concern:

A native of northern China, eastern Siberia, Manchuria and Korea, Siberian elm was introduced to the U.S. in the 1860's for its hardiness and fast growth in a variety of moisture regimes and habitats, including droughts and cold winters. Seeds are produced early in spring and spread by the wind. Germination rate is high and seedlings soon establish in the bare ground found early in the growing season. Near a seed source seedling thickets quickly crowd out and dominate native vegetation, especially in disturbed or sparsely vegetated areas. MN Interagency Exotic Species Task Force 1991 current threat ranking of MODERATE, future threat ranking of SEVERE.

Siberian elm *Ulmus pumilla***Control:**

March-May: A regular regime of prescribed burning in fire adapted communities will kill seedlings. Removal of site seed sources by other methods is necessary for adequate control.

Mid-May to July: Trees girdled in mid-May to early July will die over 1-2 years without sprouting if cut properly. Cut through the bark slightly deeper than the cambium in two parallel cuts 3-4 inches apart, then knock bark off with a blunt object such as the back of an axe head or dull end of a girdling bar. The xylem must remain intact; if girdled deeply the tree will respond as if cut down, i.e. it will resprout.

April to September: During the growing season, seedlings can be hand pulled and small trees carefully removed with a grub hoe or weed wrench. Although labor intensive, large trees can be cut down and resprouts trimmed as needed.

April to September- After spring sap flow and through the growing season, a cut stump application of water:Roundup (glyphosate) solution between 9:1(10%) and 4:1(20%) concentration by hand sprayer is effective. DNR State Parks Region V Resource Management used a 4:1 Roundup solution with good results.

This information is not an endorsement of particular products or practices. Pesticide use must follow label directions and applicable state and federal regulations.

Description:

Black locust is a fast growing tree, height 40-100' (12-30m); mature trees have furrowed dark brown bark with flat-topped ridges, seedlings and sprouts have long thorns and grow rapidly. Leaves alternate, pinnately compound, 7-21 elliptic or rounded leaflets, dark green above, pale beneath. Fragrant white flowers appearing in May or June have a yellow blotch on the uppermost petal, and appear in drooping racemes. Fruit pods are smooth, 2-4" (5-10cm) long, containing 4-8 seeds.

Concern:

Black locust is native to the southeastern United States on the lower slopes of the Appalachian Mountains, with outliers north along the slopes and forest edges of southern Illinois, Indiana, and Missouri. This tree has been planted extensively for its nitrogen fixing abilities, to provide nectar for honey bees, hardwood lumber, erosion control and as fence posts. It is commonly found in disturbed areas such as old fields, degraded woods, and roadsides. The trees prefer sites with full sun and little competition. Black locust reproduces vigorously by root suckering and stump sprouting to form groves of trees interconnected by a common fibrous root system. Physical damage to roots and stems increases suckering and sprouting, making control difficult. Once established, black locust crowds out native vegetation in prairies, upland forests and oak savannahs. MN Interagency Exotic Species Task Force 1991 current threat ranking of MODERATE. future threat ranking of SEVERE.



Black locust, *Robinia pseudoacacia*, in flower

Control:

Mid-June to August: Hand application of 6.25% Roundup (glyphosate) solution (15:1 water:Roundup) to cut stumps has been used by MN DNR Region V State Parks Resource Management. Resprouting and suckering from dense clones may require follow up treatment after a few years*. Literature also describes good to excellent success at this concentration.

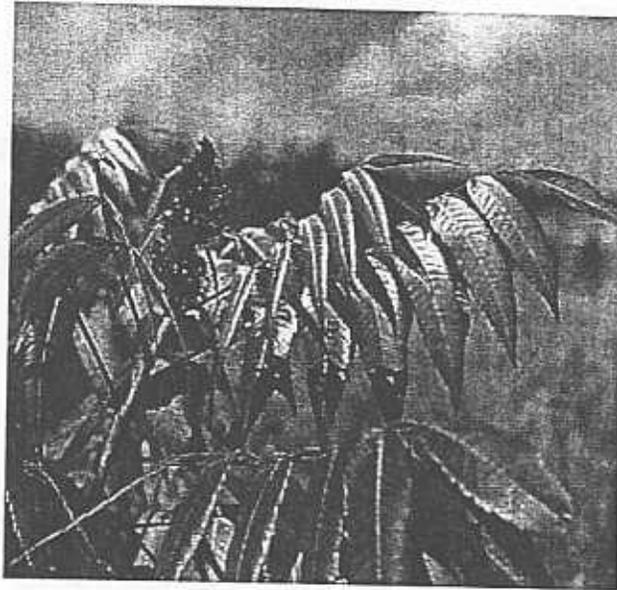
Year-round: A 25% Garlon 4 solution in basal oil applied with backpack sprayers has been used on cut stumps by the Scientific and Natural Areas Program in Minnesota. Thoroughly wet the cut stump and bark below the cut down to the root collar, but avoid runoff.

*Apparently killed plants can resprout several years after most all treatments, requiring annual or every other year monitoring.

This information is not an endorsement of particular products or practices. Pesticide use must follow label directions and applicable state and federal regulations.

Staghorn and Smooth Sumac

Rhus typhina and *R. glabra*



Description:

Staghorn sumac is a shrub or occasionally a small tree, height to 32'(10m), bark smooth and gray, twigs velvety-hairy; leaves odd-pinnate; leaf oblong lanceolate and serrate; flower in terminal panicles appearing in June; fruit drupe more or less spherical, thickly covered with crimson hairs. Wood soft and greenish yellow. Smooth sumac is similar to the above species except that twigs are glabrous (covered with a fine waxy, removable powder imparting a whitish cast to surface).

Concern:

Staghorn and smooth sumac are native North America. Sumac generally grows in dry, rocky, or gravelly soil. Sumac is also tolerant of other well drained conditions and well adapted to conditions on bluff prairies and dry prairies sites, growing in the open and in transition areas between woods and prairie. Plants spread profusely by suckering, forming dense, low islands of cover. Sumac clusters readily cover other prairie vegetation, especially in the absences of periodic fire. Although fire or repeated cutting stimulates new growth, nutrient stores are eventually depleted. Considering the small acreage of native prairie remaining, uncontrolled sumac spread imperils the community.

Control:

March to May: Prescribed burning in fire adapted communities will kill seedlings and top kill mature plants; periodic fire combined with cutting (described below) should control spread of sumac species. Some research (TNC; INPC) guidelines showed more vigorous growth with spring burns: August burns were suggested for areas not in a cutting regime.

Late May to Early July: Sumac should be cut with loppers, or swede saws for large plants, as low to the ground as possible to avoid resprouting and safety hazards. In areas of heavy sumac cover, where underlying vegetation would be damaged by dropping cuttings, remove and stack in a less sensitive area for later burning.

Late July through August: Return to early summer site to cut resprouts, further depleting the energy stores of the plants and deterring growth in the next season.

MN DNR Region V State Parks Resource Management has found that after 3-5 years of cutting twice a year, an occasional prescribed fire and/or cutting controls sumac cover on bluff prairies.

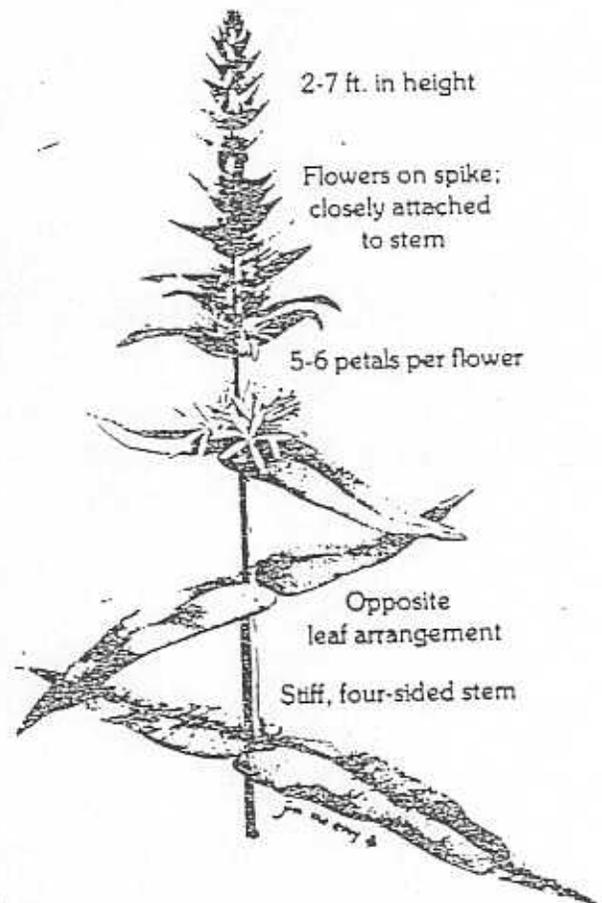
HOW TO CONTROL PURPLE LOOSESTRIFE

In 1987, purple loosestrife was designated a noxious weed in Minnesota. This has created much demand for information about the most effective purple loosestrife control methods. This summary sheet is intended to provide private land owners, agricultural inspectors and resource managers and others with the most current approved control techniques, as well as, guidelines for obtaining the necessary permits.

Presently, only about two percent of the suitable habitat for loosestrife in Minnesota is infested. However, once loosestrife invades an area, it can spread and become unmanageable very quickly. Loosestrife is currently found in most of the state's 87 counties with 1,470 separate populations reported, yet some loosestrife colonies are still small and can be managed with known control measures.

IDENTIFYING PURPLE LOOSESTRIFE

Purple loosestrife is a hardy perennial that can grow up to seven feet tall. Its stems are usually four sided with opposite leaf arrangement. The flowers are on a long spike closely attached to the stem. The flowers are purple-magenta in color with 5 to 6 petals per flower. Purple loosestrife blooms from mid-July to early September. This is the best time to recognize its bright flowers which can be seen on lakeshores, wetlands, streambanks and even in gardens. For more information on identifying purple loosestrife, a color brochure is available (see reference section in handbook).



REPORTING PURPLE LOOSESTRIFE SITES

If you find purple loosestrife in your area, it should be reported to the DNR's Purple loosestrife Program. New, small infestations should be reported since these are of highest priority for control. A standardized report form is available and should be used when reporting loosestrife. A sample of this postcard size report form can be found in the reference section of this Exotic Species Handbook. Reporting loosestrife infestations helps monitor the spread of loosestrife and efficiently control loosestrife statewide.



AN MDA Pest Alert

GARLIC MUSTARD --- Biology and Control

Biology

Garlic mustard (*Alliaria petiolata*) is a highly invasive exotic plant, out-competing native plants and effectively erasing plant diversity in the herb strata. A single plant can self-pollinate and take over a site in less than a decade.

Garlic mustard is a biennial herb, native to Europe and currently found in Minnesota. It is also found in 27 other states and several Canadian provinces. It is named for the garlic odor of its leaves when crushed.

Garlic mustard forms low rosettes and bears a strong resemblance to violets (*Viola sp.*) in its first year. It is distinguished from violets by a slender white taproot with an "S" shaped crook just below the stem (Illustration 1). Second year plants send up 2 to 3 foot flower stalks with terminal flower clusters. Flowers are white with four petals about a quarter of an inch long and bloom in spring (Illustrations 2 and 3).

Seeds are small and black. They form inside a silique, which bursts forcefully when mature (Illustration 4). Seeds may travel 6 or more feet and number below a hundred to nearly a thousand. Seed dispersal usually occurs in late spring or early summer and may be human or animal assisted. Water may also play a role in riparian areas but seeds do not float well. Seeds may be viable for five or six years, though they usually germinate the second year.

Uses include green salads and possibly medicinal applications.

Control

Garlic mustard is very difficult to control. Seeds may be viable for up to 6 years. Until the seed bank is exhausted, annual treatment may be necessary. Mechanical, chemical and prescribed burn treatments are control options. There are currently no available biological control agents.

Mechanical Controls

Hand Pulling: effective for small populations and can be done most of the year. Bag and dispose of seed capsules to prevent seed dispersal.

Cutting: effective for medium to large populations, depending on resources. Cut stems when in flower (late spring/early summer) at ground level.

Herbicidal Control

Glyphosate Foliar Spray: effective where mechanical control measures are not feasible or are impractical. Apply a 2% solution of glyphosate and water plus a non-ionic surfactant to all garlic mustard leaf surfaces. Glyphosate is non-selective---treat in early spring to avoid non-target vegetation. Refer to the manufacturer's label for specific information and restrictions regarding use.

Prescribed Burn

Prescribed burns should not be undertaken lightly; there are many regulations regarding burning. Mid-intensity fires are needed to control garlic mustard. Sites where garlic mustard is well established may not have the fuel necessary for a mid-intensity fire.

Appendix C
Glossary of Technical Terms

APPENDIX C

¹Glossary of Technical Terms*

Alluvium Material, such as sand and gravel, deposited by running water. River terraces and outwash plains are examples of landforms composed of alluvium.

Barrens Usually refers to an area with sparse vegetation or stunted plants, caused by harsh growing conditions such as infertile, droughty, or thin soils; also, a plant community that has very sparse cover or is composed of stunted plants.

Bedrock Any solid rock exposed at the earth's surface or covered by unconsolidated material such as till, gravel, or sand.

Blowout An area, on a dune or other sand deposit, where wind has eroded a bowl-shaped hollow in the sand. Blowouts generally are sparsely vegetated.

Bog A wetland composed of a layer of acidic peat on which grows a specialized group of herbs and low shrubs. Bogs are distinguished from closely related poor fens by extremely nutrient-poor conditions and the absence of most of the minerotrophic species that occur in poor fens.

Bounce In Hydrologic references, the rise in level in a wetland or lake resulting from a rainstorm event.

Brushland An upland plant community composed of shrubs and tree sprouts.

Buffer A strip of unknown vegetation.

Calcareous Describes a soil or substrate that contains a significant amount of calcium carbonate.

Canopy Aerial branches and leaves of terrestrial plants; generally the tallest layer of foliage in a plant community.

Colluvium A deposit of rock and soil at the base of a cliff or slope, formed by gravitational action.

Colonial nesting birds Species that nest in colonies (groups or aggregations), either with others of the same species or in mixed-species aggregations.

Cover The proportion of the ground shaded when the living plant canopy is projected vertically downward; also a general term used to describe any component of the habitat that conceals animals from view.

DBH (diameter at breast height) – a standard measure of tree trunk diameter taken approximately 4.5 feet above the ground level.

Dominant Describes a plant species that shapes the character of a community by virtue of its size, abundance, dense shade, or effects on soils. Dominant species generally influence the presence, growth, and distribution of other plant species in the community.

Downcutting The process by which a river or stream erodes and lowers its bed, eventually resulting in the formation of a valley or ravine.

Drift (glacial) Rock material, such as boulders, gravel, sand, silt, or clay, removed from one area and deposited in another by glaciers. Drift includes material deposited directly by glacial ice, such as till, as well as material deposited indirectly, such as outwash.

Ecosystem The interacting group of physical elements (such as soils, water, etc.), plants, animals, and human communities that inhabit a particular place.

Emergent Describes a plant capable of surviving indefinitely with its root system and lower stem in water and its upper stem above water (e.g., cattails).

End moraine A typically hilly landform composed of material deposited at the margin of a glacier.

Ephemeral habitat A temporary habitat created by low intensity, short-lived fluctuations in environmental factors.

Esker A long, often serpentine hill or ridge composed of sand and gravel deposited by meltwater streams flowing in a channel in a decaying ice sheet.

Exotic species A species that has been introduced to an area by humans or that is present in the area as a result of human-caused changes. (same as non native species.)

Fen a wetland community composed of sedges, grasses, forbs, and sometimes shrubs, that develops on peat in shallow basins.

Floating-leaved plants Aquatic plants that root on lake, pond, or river bottoms and have leaves that float on the water surface at the end of long, flexible stems (e.g., water-lilies).

Floodplain A flat area adjacent to a stream or river channel, created by erosion and deposition of sediment during regular flooding. Signs of

¹ Many of the definitions used in this section are borrowed from Minnesota's St. Croix River Valley and Anoka Sandplain. Worcha et al, Minnesota DNR, 1995.

¹ flooding include debris caught in trees and ice scars at the bases of trees.

Forb A general term for broad-leaved, herbaceous plants.

Forest A plant community with a nearly continuous to continuous canopy (70 to 100% cover) of mature trees.

Forest-grown tree A tree that matured within a closed-canopy forest. Forest-grown trees tend to have narrow crowns and tall, straight trunks with few lower limbs.

Graminoid An herbaceous plant with linear, "grasslike" leaves that typically are oriented vertically. Graminoids include grasses, sedges, and rushes.

Greenway or Greenway Corridor A linear open space area, usually composed of natural vegetation, or vegetation that is more natural than surrounding land uses. May include paths or recreational trails.

Ground layer A vegetation layer, mostly less than 3 feet tall, of grasses, forbs, and woody plants.

Ground moraine A broad and level or gently undulating landform composed of material that was deposited underneath and sometimes at the margin of a glacier as the ice sheet melted; also referred to as a till plain.

Grove A general term for a patch of trees less than 2 acres in area.

Grub A tree or shrub whose aboveground shoots are repeatedly killed by fire or browsing but whose root system survives and continues to send up new shoots. The root system of a grub may be several hundred years old; the above ground shoots are generally much younger.

Habitat The locality, site, and particular type of local environment in which plants, animals, and other organisms live.

Herb A plant lacking a persistent above ground woody stem. Herbs include broad-leaved flowering plants, ferns, grasses, sedges, and others.

Hydrophyte A plant adapted to growing in water or on wet soils that are periodically saturated and deficient in oxygen.

Ice block lake A lake that occurs in a depression that was formed when a block of glacial ice was buried or surrounded by till or outwash sand, and then melted.

Ice scar A scar on a floodplain tree caused by abrasion by ice floes during spring flooding.

Inflorescence An arrangement of flowers on a plant, such as in a cluster or along a stalk.

Lacustrine Refers to features (such as sediments, landforms, plant communities, or animal communities) that were formed by or are associated with a lake.

Landform A land feature, such as plain, plateau, or valley, formed by a particular geologic process.

Life form Characteristic structural features and growth pattern of plant species (e.g., broad-leaved deciduous shrub).

Litter layer Relatively undecomposed organic matter and debris on top of soil layer.

Loess Fine material consisting predominantly of silt with fine sand and clay. Loess is often deposited by wind.

Marsh A plant community of shallow wetland basins, dominated by herbaceous, emergent aquatic plants such as cattails and bulrushes.

Marshes usually have standing water throughout the growing season.

Meltwater Water released by melting glacial ice.

Mesic A general term describing upland habitats that are intermediate between wet and dry; also used to describe plants and plant communities that occur in mesic habitats.

Microhabitat A small, specialized habitat.

Mineral soil A soil composed mostly of inorganic matter, including clay, silt, sand, and gravel. Mineral soils usually have less than 20% organic matter but may have organic surface layers up to 12 inches thick.

Minerotrophic A general term describing wetlands with nutrient levels that fall between very low (such as in bogs) and very high (such as in seepage meadows).

Moraine Rock and mineral debris deposited directly by glacial ice. Moraines most often consist of unsorted rock and mineral particles.

Muck A dark-colored organic soil of highly decomposed plant material in which the original plant parts are not recognizable.

MUSA (Metropolitan Urban Service Area) The area designated by the Metropolitan Council of the twin cities area to receive urban services such as central sewer, urban streets, etc.

Native habitat A habitat formed and occupied by native plants and animals and little modified by logging, farming, ditching, flood control, and the like.

Native species A species that occurs naturally within a given region.

¹ Many of the definitions used in this section are borrowed from Minnesota's St. Croix River Valley and Anoka Sandplain, Worcha et al, Minnesota DNR, 1995.

Native vegetation Vegetation, composed of native plants, that has been little modified by human activities such as logging, farming, ditching, or the introduction of nonnative species.

Natural area Geographic area in which the dominant plants and animals are native species.

Natural community An assemblage that tends to recur over space and time of native plants and animals that interact with each other and with their abiotic habitats in ways that have been little modified by nonnative plant and animal species. Natural communities are classified and described according to their vegetation, successional status, topography, hydrologic conditions, landforms, substrates, soils, and natural disturbance regimes (such as wildfires, windstorms, normal flood cycles, and normal infestation by native insects and microorganisms).

Nonnative species A species that has been introduced to an area by humans or that is present in the area as a result of human-caused changes.

Nutrients Elements such as phosphorus and nitrogen that are required for plant growth. When excess amounts are transported in stormwater they may encourage excessive algae or other plant growth in receiving water bodies.

Open-grown tree A tree that has matured in an open setting, such as a prairie or savanna. Open-grown trees tend to have broad crowns and thick, spreading lower limbs.

Organic soil A soil in which the upper surface layers contain more than 25% organic matter.

Outcrop Bedrock that projects above the soil.

Outwash plain A plain formed of sorted and stratified material—such as layers of sand and gravel—carried from an ice sheet and deposited by glacial meltwater.

Parent material The weathered rock or partly weathered soil material from which topsoil develops.

Peat soil A dark brown or black organic soil consisting largely of undecomposed or slightly decomposed plants. Peat soils usually form where persistent excessive moisture slows or inhibits the decay of plant material.

Persistent vegetation Wetland vegetation formed by emergent hydrophytic plants with stems that normally remain standing until the

beginning of the following growing season (e.g., cattails and bulrushes).

Prairie An upland plant community composed of grasses and forbs. Prairies generally lack trees; shrubs, if present, are not prominent.

Presettlement A term used for convenience to denote the time period before Euro-American settlers moved into the Region. The Region was actually settled by American Indians for thousands of years before European-Americans arrived.

Range (geographic) The limits of the geographic distribution of a species or group.

Reintroduced species Species that had been eliminated from areas where they occurred historically and were later released back into the area by humans.

Remnant A portion or fragment of a natural community that has survived while the rest of the community has been destroyed by logging, urban development, clearing of land for cultivation, and other human activities.

Rhizome A horizontal underground plant stem.

Savanna An upland plant community formed of prairie herbs with scattered trees or groves of trees. The canopy cover of trees in a savanna is generally between 10 and 70%.

Sedge Any of a number of grasslike plants of the family Cyperaceae.

Sedimentation The process by which matter (usually soil particles) settles on a substrate following transport by water, wind, or ice.

Seepage The slow, diffuse oozing of groundwater onto the earth's surface.

Shrub layer A vegetation layer, usually less than 6 feet high, of shrubs and tree seedlings.

Shrub swamp A wetland community dominated by a nearly continuous to continuous canopy (70 to 100% cover) of shrubs, such as willows and alders.

Subcanopy A vegetation layer, composed of patches of individuals of approximately equal height, that is lower than the canopy layer; often refers to a layer of saplings, tall shrubs, or small trees between 6 and 35 feet high.

Submergent Describes an aquatic plant that grows entirely under water.

Substrate The surface layer of organic or mineral material—such as till, outwash, or bedrock—from which the soil is formed.

Succession The change in vegetation over time.

Swale A broad, shallow depression in a till plain or broad river plain.

Swamp A wetland community with a fairly continuous to continuous canopy of shrubs or trees, such as speckled alder, black ash, or

¹ Many of the definitions used in this section are borrowed from Minnesota's St. Croix River Valley and Anoka Sandplain, Worcha et al, Minnesota DNR, 1995.

tamarack. Swamps generally occur in shallow basins or wet depressions.

¹**Talus** Rocks and other coarse mineral debris that accumulate at the base of a cliff or steep slope.

Terrace A sandy and gravelly alluvial plain bordering a river. Terraces represent former river floodplains, left stranded when the river level dropped because of channel downcutting or decreased flow. Terraces are ordinarily level or nearly level and are seldom flooded.

Till Unstratified and unsorted material deposited directly by a glacier. Till consists of clay, sand, gravel, or boulders mixed in any proportion.

Till plain A broad and level or gently undulating landform composed of material that was deposited underneath and at the margin of a glacier as the ice sheet melted; also referred to as a ground moraine.

Transitional habitat A habitat present between two adjacent natural communities (for example, the edge of a forest along a wet meadow).

Transitional habitats often have features that set them apart from the habitats formed by either of the adjacent communities.

Understory The vegetation occurring below the canopy in a plant community.

Vine A plant with long, weak stem that grows along the ground or climbs on other vegetation for support.

Wetland Habitats where the soil is saturated or covered with water for part of the year.

Woodland A wooded habitat characterized by an interrupted tree canopy; also used as a general term to describe any tract of land with trees growing on it.

Woodland-brushland An upland plant community composed of a patchy canopy (10 to 70% cover) of mature trees and a dense understory of shrubs, tree shoots, and saplings. Usually the trees occur in scattered groves with dense thickets of brush between them.

Woody plant A perennial plant with a secondarily thickened, lignified stem.

¹ Many of the definitions used in this section are borrowed from Minnesota's St. Croix River Valley and Anoka Sandplain. Worcha et al, Minnesota DNR, 1995.

ABOUT THIS MAP:

This map is derived from a combination of data sets. The information on this map is only as accurate as the original source material.

Natural Communities:

The natural communities data set is from 1998 field work within Goodhue County based upon the Minnesota Land Cover Classification System data set attributes and digitizing recommendation by the Minnesota Department of Natural Resources, Metro District. Field work data and report resource material collected by Paul Bockenstedt, Bonestroo, Rosene, Anderlik & Associates.

Major, Township and Municipal Roads:
Collection of Goodhue County roads derived from the 2001 Mn/DOT Base Map data.

Watershed Basins:

The data set is derived from the 1995 DNR, Division of Waters, major and minor watershed basin boundaries data set.



Data Disclaimer:
Goodhue County assumes NO liability for the accuracy or completeness of this map OR any responsibility for any associated direct, or indirect or consequential damages that may result from its use or misuse.

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Data collected in 1998 under the direction of Mn Department of Natural Resources 1997 Grant to Goodhue County Land Use Management Department

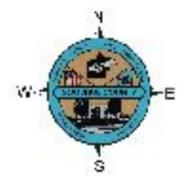


Natural Resource Inventory

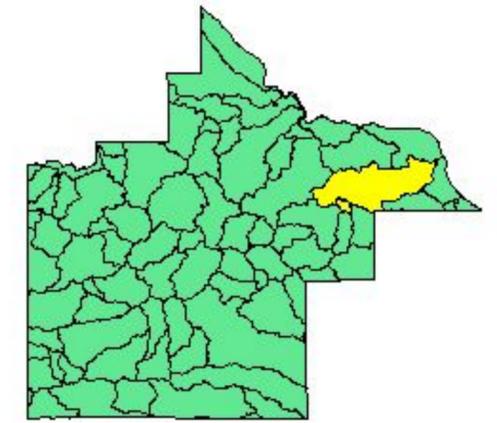
Lower Wells Creek Watershed

Site 1

LEGEND



- Natural Communities - Site 1
- Site 1 Boundary
- Major Roads**
 - U.S. Trunk Highway
 - MN Trunk Highway
 - County State-aid Highway
 - County Road
 - Township Roads
 - Municipal Streets
- Watershed Basins



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Watershed Basins:

The data set is derived from the 1995 DNR, Division of Waters, major and minor watershed basin boundaries data set.



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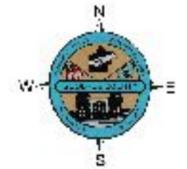


Natural Resource Inventory

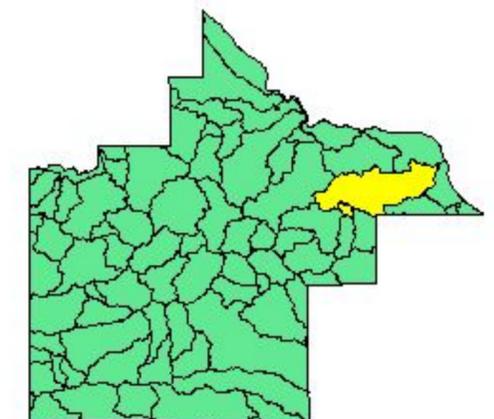
Lower Wells Creek Watershed

Site 2

LEGEND



- Natural Communities - Site 2
- Site 2 Boundary
- Major Roads**
- U.S. Trunk Highway
- MN Trunk Highway
- County State-aid Highway
- County Road
- Township Roads
- Municipal Streets
- Watershed Basins

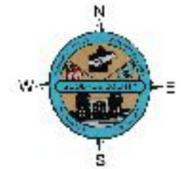


Natural Resource Inventory

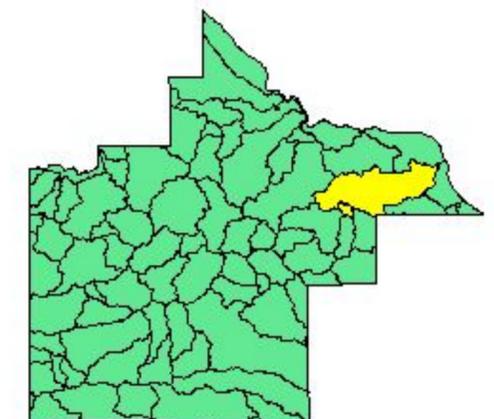
Lower Wells Creek Watershed

Site 3

LEGEND



- Natural Communities - Site 3
- Site 3 Boundary
- Major Roads**
- U.S. Trunk Highway
- MN Trunk Highway
- County State-aid Highway
- County Road
- Township Roads
- Municipal Streets
- Watershed Basins



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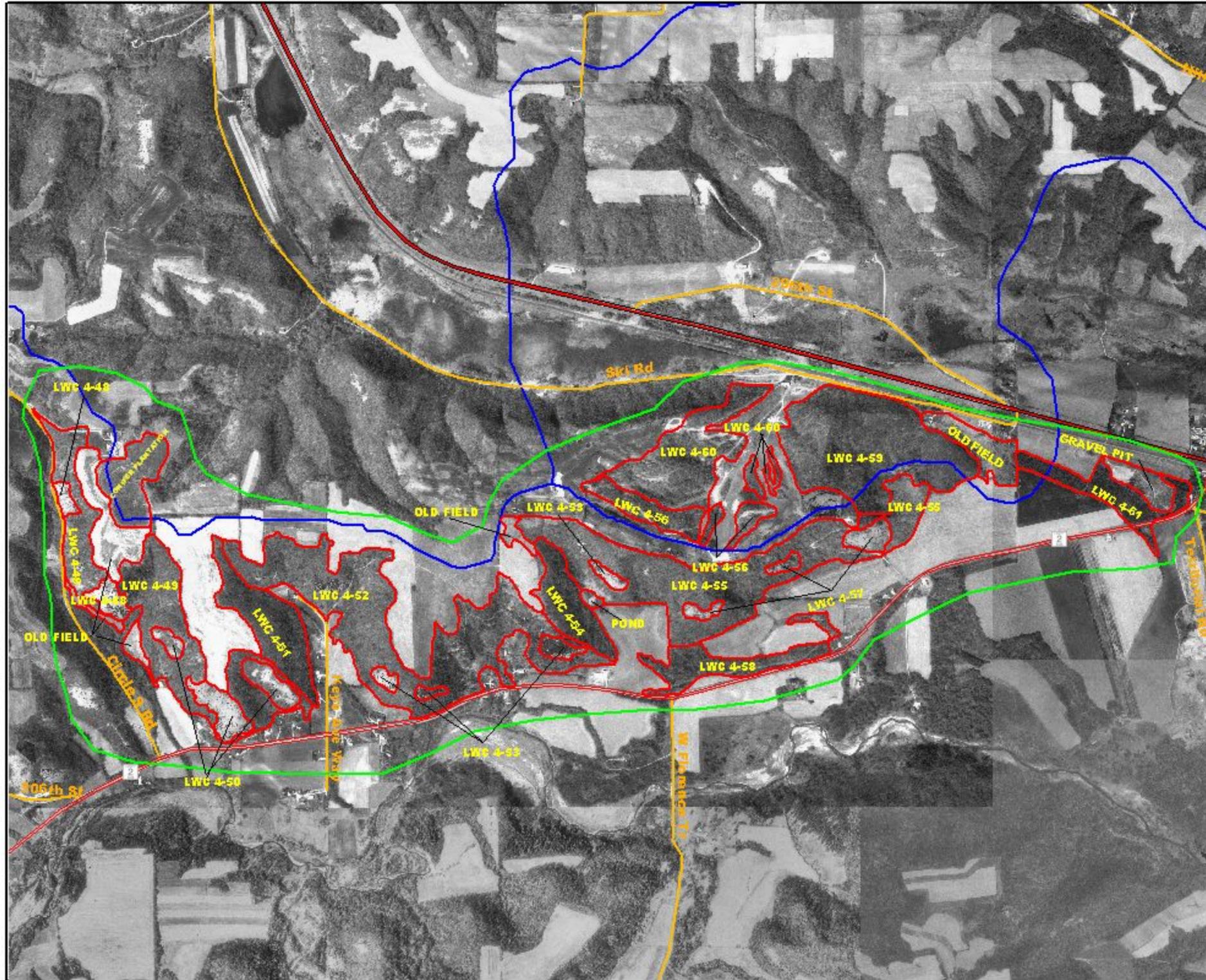


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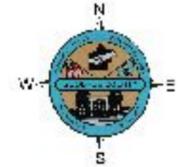


Natural Resource Inventory

Lower Wells Creek Watershed

Site 4

LEGEND



- Natural Communities - Site 4
- Site 4 Boundary
- Major Roads**
 - U.S. Trunk Highway
 - MN Trunk Highway
 - County State-aid Highway
 - County Road
 - Township Roads
 - Municipal Streets
 - Watershed Basins



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Major, Township and Municipal Roads:
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Watershed Basins:

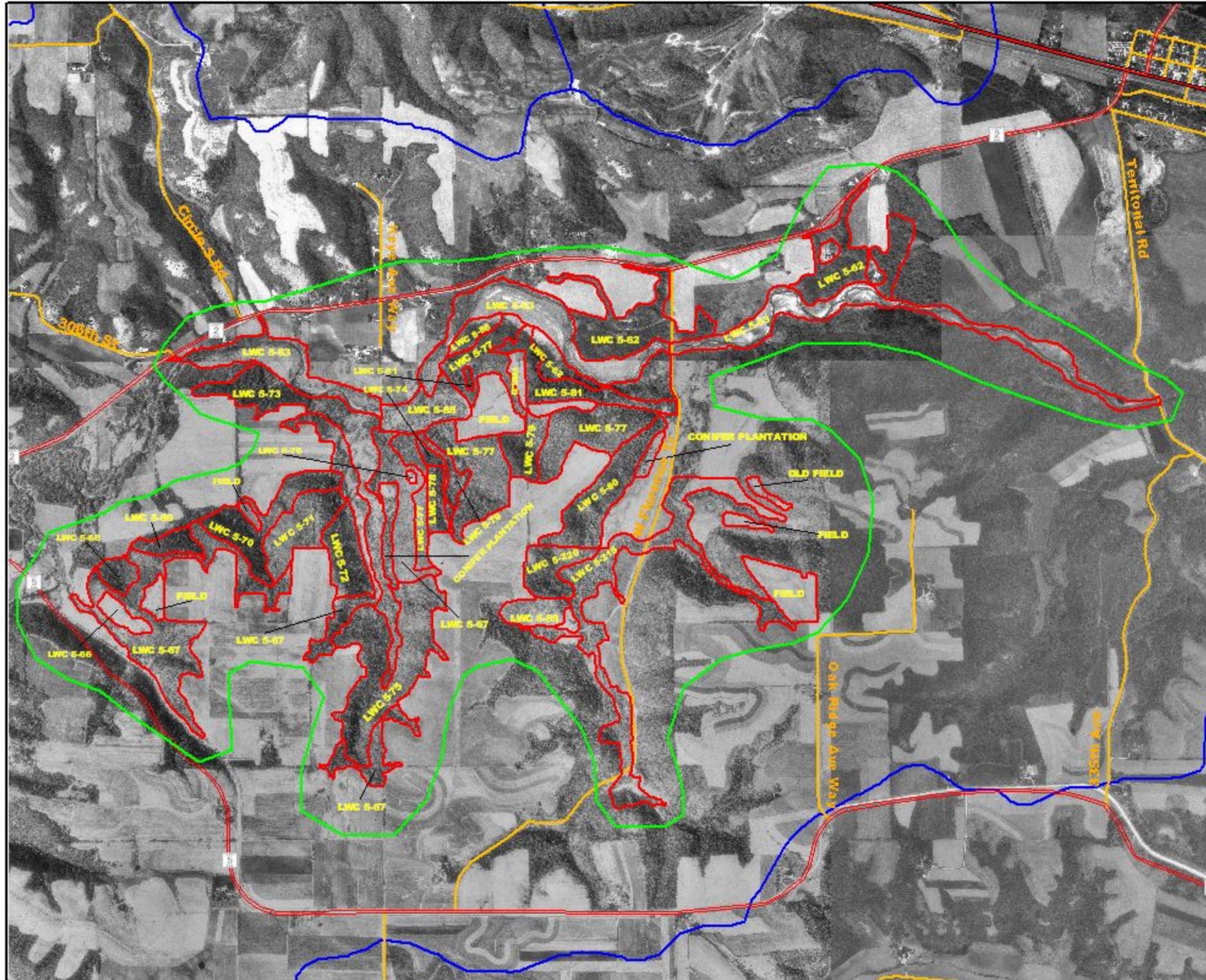
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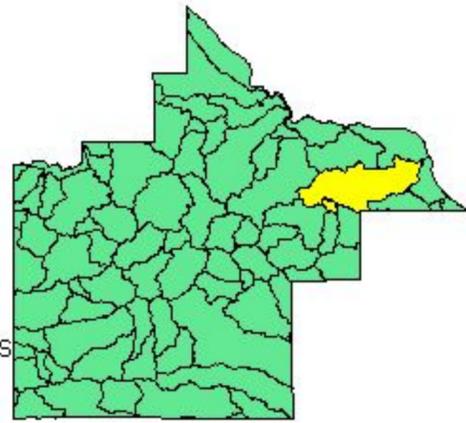
Natural Resource Inventory

Lower Wells Creek Watershed

Site 5

LEGEND

- ▭ Natural Communities - Site 5
- ▭ Site 5 Boundary
- Major Roads**
- ▬ U.S. Trunk Highway
- ▬ MN Trunk Highway
- ▬ County State-aid Highway
- ▬ County Road
- ▬ Township Roads
- ▬ Municipal Streets
- ▭ Watershed Basins



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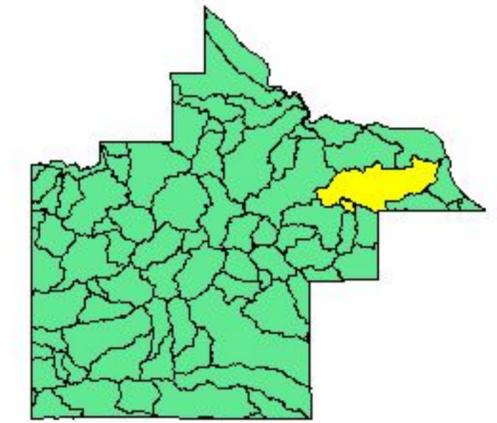
Natural Resource Inventory

Lower Wells Creek Watershed

Site 6

LEGEND

- ▭ Natural Communities - Site 6
- ▭ Site 6 Boundary
- Major Roads
 - ▬ U.S. Trunk Highway
 - ▬ MN Trunk Highway
 - ▬ County State-aid Highway
 - ▬ County Road
 - ▬ Township Roads
 - ▬ Municipal Streets
 - ▬ Watershed Basins



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Watershed Basins:

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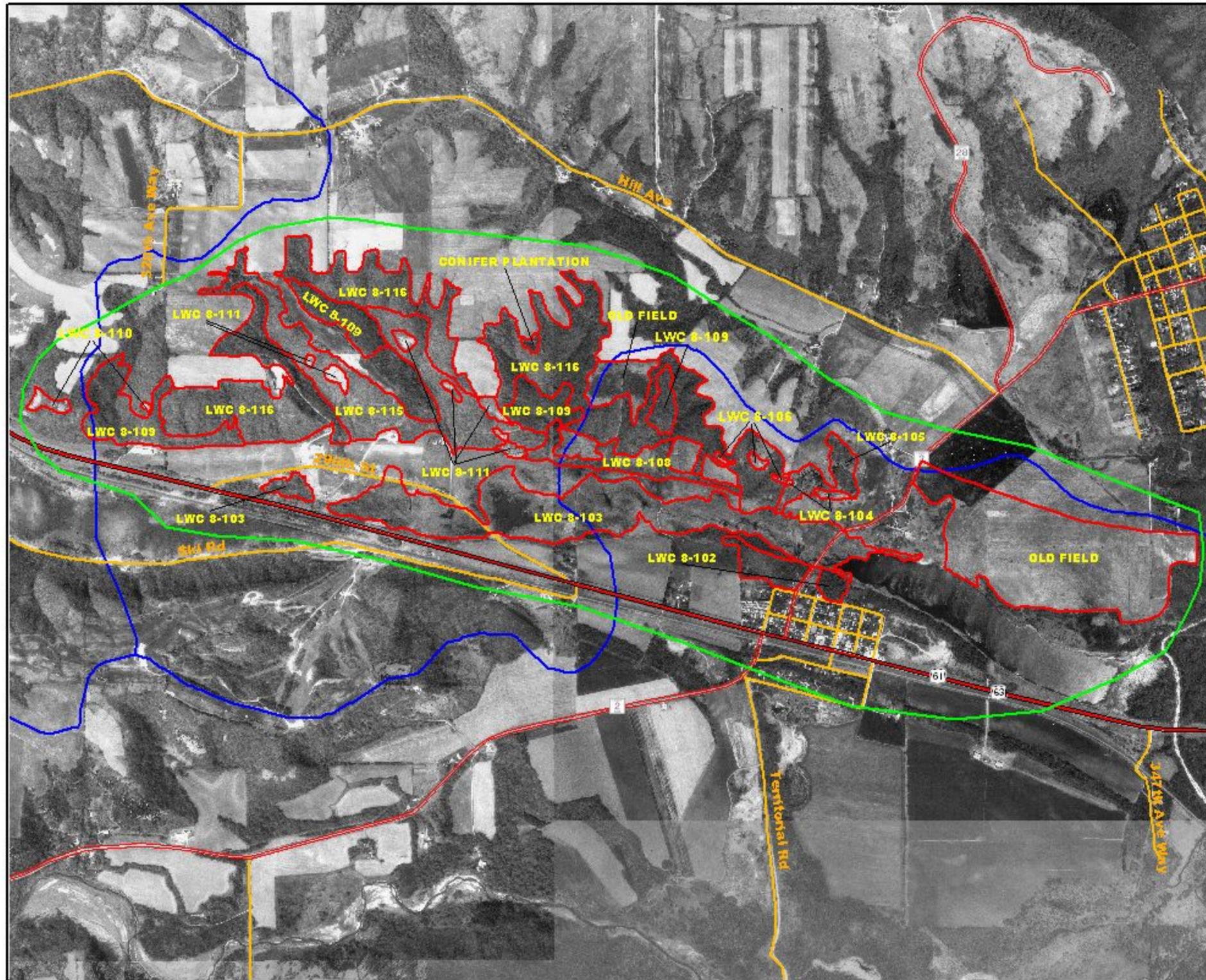


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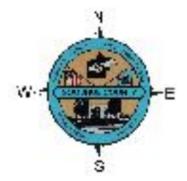


Natural Resource Inventory

Lower Wells Creek Watershed

Site 8

LEGEND



- Natural Communities - Site 8
- Site 8 Boundary
- Major Roads**
 - U.S. Trunk Highway
 - MN Trunk Highway
 - County State-aid Highway
 - County Road
 - Township Roads
 - Municipal Streets
- Watershed Basins

