Natural Resources Inventory

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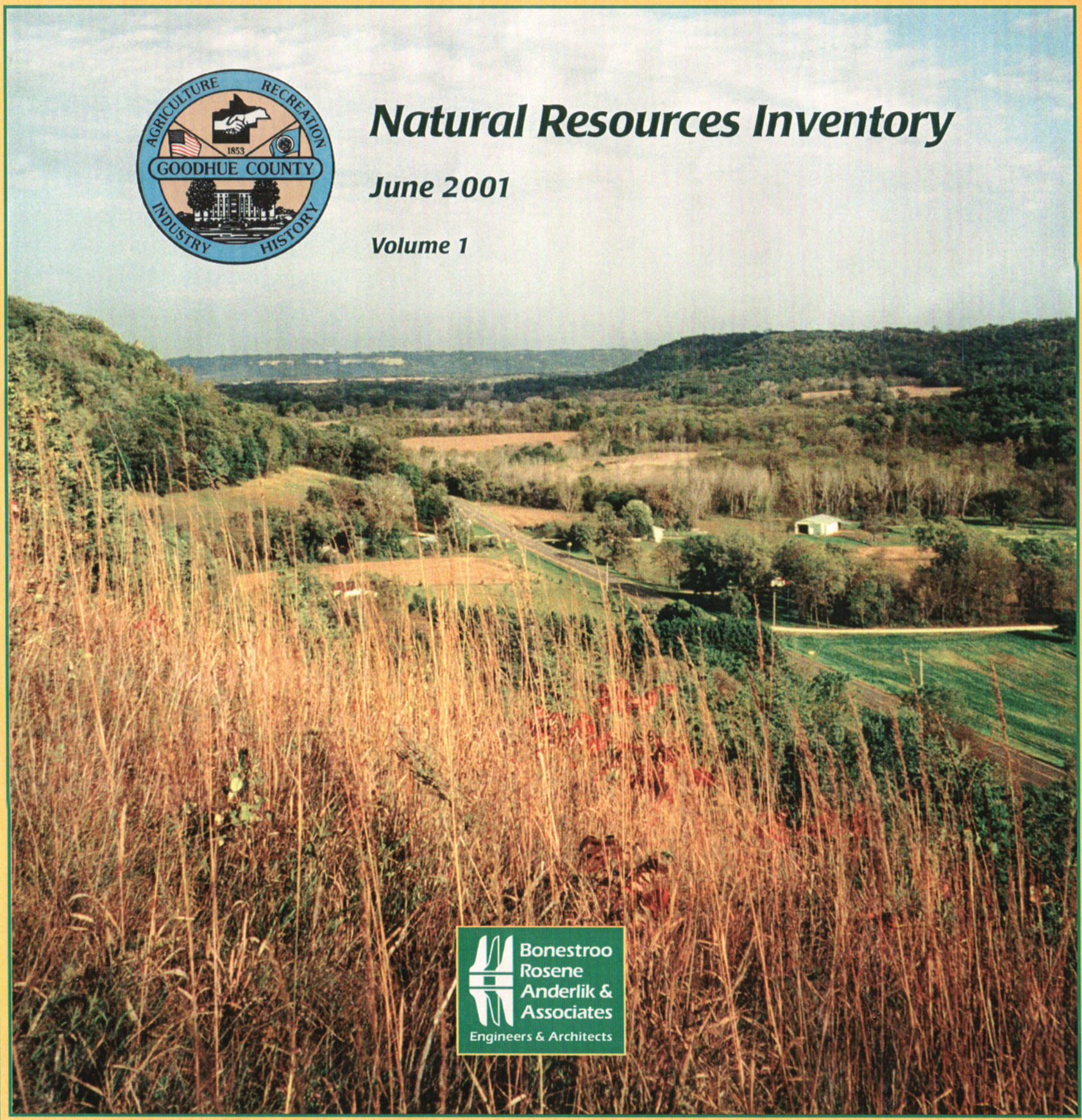

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We would like to acknowledge the following people and organizations for the time, information, donations, and help they graciously offered in order that the Natural Resources Inventory might be completed with current and correct information.

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EXECUTIVE SUMMARY

This report presents the Natural Resources Inventory for Goodhue County. The Study Area for this Natural Resource Inventory encompasses an estimated 60,000 acres of forest, wetland, and prairie within Goodhue County, Minnesota. The Study Area itself encompasses 488,300 acres, and includes three watersheds: the Cannon, Zumbro, and Mississippi & Lake Pepin.

This inventory was designed to focus on the most natural areas within the County (those least disturbed by human activity) and is designed to complement previous efforts undertaken by the MN DNR County Biological Survey. The purpose of this study is to document, as completely as possible, existing natural communities to provide a baseline of data for future reference, and especially 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 further investigation. These sites were then visited during the growing season in 2000 to inventory plant species and classify 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 (CBS). The MN CBS is a program that is nationally recognized for its exceptional natural resources documentation work, and the classification and ecological ranking system it has developed. By using this system to identify natural areas, the County Land Use Management staff and others have a well-grounded set of information. This can be used, and easily interpreted by laypersons, decision makers, and natural resource professionals in the future.

Another part of the inventory process included overall natural resources evaluations, as well as recommendations for ecologically sound management of individual community types, with an eye toward their perpetuation. Recommendations for maintaining the quality of natural resources in Goodhue County are made with a wide variety

of end users in mind. These recommendations seek to suggest how each of us can play a positive role as stewards of the land. Since it is likely that many of the natural communities identified in this report will be managed by farm operators, rural residential landowners, public land managers, and others, it will be important for this information to be shared with as residents as possible. The information provided in this report can help landowners make informed decisions about management they can carry out on their property and the effects of that management on their human and natural neighbors.

The most extensive portion of this report includes the natural community inventories for each of the 655 natural communities in the study area. The most frequently encountered natural community types were Oak Woodland-Brushland and Lowland Hardwood Forest, followed by Oak Forest. The Study Area also includes a significant acreage of Bedrock Bluff Prairies along the numerous south and west-facing bluffs. Other natural communities documented in the Study Area include Floodplain Forest, Lowland Hardwood Forests, Shrub Swamp, White Pine-Mixed Hardwood Forest, and Moist and Dry Cliffs. The balance of the Study Area that is not in natural communities, is dominated by agricultural, industrial, infrastructure, and rural residential land uses.

Goodhue County is extraordinarily fortunate to have the high quality natural resources it does, particularly since increasing rural and urban development pressures have caused dramatic decline of these resources in other inter-urban areas in Minnesota. The oak forests, prairies, and bluffs provide remarkable beauty and breathtaking views throughout the seasons. This report provides thorough information that complements the MN DNR County Biological Survey information collected during 1990-1992. Information upon which well-informed decisions about natural resources can be made. These decisions must serve to integrate the varied interests and land use potentials with the greater goal of a sustainable rural community and economy, which hinge so completely on the quality of natural communities.

1. Introduction

The citizens of Goodhue have continually demonstrated a strong interest in maintaining the quality and values found here. Examples of this interest are abundant including watershed partnerships, conservation organizations, volunteer efforts, and partnerships of private landowners and public agencies, all developed to foster local stewardship and management of natural resources. A large part of the quality of life in Goodhue is derived from the values that come with being part of a still-rural community. Other values are associated with the natural landscapes such as the Mississippi River, breathtaking blufflands, forests, prairies, and wetlands. These areas provide opportunities for active and passive recreation as well as providing functions such as fish and wildlife habitat, stormwater infiltration, erosion control, and in some cases additional farm/household income. In addition, the aesthetic qualities and desirability of these natural areas increases property values, especially as development pressures increase.

This natural resource inventory covers an estimated 60,000 acres, and includes 655 individual natural communities found within the Cannon, Zumbro, and Mississippi & Lake Pepin watersheds.

Many areas, especially those in southern Minnesota have lost the kinds of high quality natural resources that remain in Godhue County, and are seeking to protect the remaining fragments or in some cases undertake restoration projects. Once lost or severely

degraded, most natural communities cannot be reconstructed or restored to full functionality in a single human lifespan. The staff and officials of Goodhue County, Legislative Commission on Minnesota Resources, Minnesota DNR, Cities, Townships, Watershed Organizations, and others have acknowledged the need to inventory and plan for the significant natural areas that remain in Goodhue County today. This enables to effective integration of these features into the decision making process as land use activities and infrastructure change with the times.

The characteristics of Goodhue County 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 Goodhue County ecologically unlike any other place on earth, and very importantly provides a ***sense of place***, or home, to its residents. In some areas of the county, the residents have already developed a strong forum for the exchange of ideas relating to the wise use of the landscape upon which they live, such as the Goodhue County Partnership, and Cannon River Watershed Organization. The natural resources 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/or 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 Goodhue County 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 Goodhue County. 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 Goodhue County. 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 Goodhue County.**

Overall Goal of Inventory

To protect and enhance the health of natural areas, so they may be enjoyed by future generations. This natural resource inventory is the first step toward attaining this goal and provides the foundation for effective natural resource management and the potential integration of ecological principles into agricultural economy diversification.

Objectives

The specific objectives the Watershed identified for this inventory are:

- To identify and inventory significant natural areas within the study area that complements information already collected by the MN DNR County Biological Survey.
- To develop solid criteria and a practical evaluation methodology to evaluate the inventory results from both an ecological and local perspective.
- To use the evaluation methodology to rank natural communities according to their ecological characteristics.
- To develop recommendations for management and protection of the natural resources.
- 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 area such as the Goodhue County. Some of the most important reasons are:

- Native plant and animal species and natural communities have evolved together for tens of thousands of years in some instances, 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 Goodhue County are rare in Minnesota and the Upper Midwest, and 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 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. Some corporations also look for such nearby amenities for 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.

Guiding Ecological Principals

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 and protecting 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 Goodhue County for a long time. 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 in the natural areas.

- Species are interdependent, and our knowledge of all the interactions within natural communities is limited. Therefore, 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, and therefore exotics should be strongly discouraged. Likewise, appropriate methods for controlling exotic species should be explored and may include cutting, burning, herbicide application and biological controls.

- Planning should consider ecological boundaries and long time frames. 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 streams and rivers, and ultimately the Mississippi River in other states. Areas along the bluff terraces are part of a major migratory corridor for songbirds, and so the ways in which Goodhue County and its residents care for the landscape can cumulatively influence the function of other natural areas, some as far away as South America. These connections should be understood as much as possible to assist the county in planning for its own resources.

2. Major Landforms of Goodhue County

Three major landforms comprise the landscape of Goodhue County, ranging from undulating plains in the southwest corner, to dissected, rolling hills in the central portion of the county, and finally to the steep slopes and spectacular bluff-top vistas in the blufflands along the Mississippi River. These landforms form our predominant impression of an area, defining the topography as well as affecting current land use and the historic vegetation that occurred in an area. They are the result of the geologic history and show the effects of glacial advance and retreat, scouring winds, and massive melting events. Today and historically, the vegetation of an area remains strongly tied to the landscape. Steep, exposed, south and west facing slopes can become scorchingly hot and dry during the summer months, and support entirely different communities than can occur in moist, north-facing valleys or sheltered seeps. Topography prevented some of the fires that started on the plains or along bluffs from burning into the steep valleys, and shifted the plant communities towards fire-adapted species in the plains, and towards mesic, fire-sensitive species in the sheltered areas. Wind-blown loess deposits support different species than the fine, silty deposits left by stagnant meltwater ponds and river backwaters.

The major landforms of the area, the Minnesota and Northeast Iowa Morainal section, the Paleozoic Plateau, and the blufflands, are discussed below.

The Minnesota and Northeast Iowa Morainal Ecological Section

This landform covers the southwest corner and western edge of Goodhue County. The landscape in this region consists of gently rolling plains, with long, gradual slopes and open vistas that extend to the horizon. The southwestern section of this region also contains low, steep, parallel hills, old moraine ridges that formed when retreating glaciers stagnated and left piles of rocky debris along their melting edges. These hills overlay deep layers of gravel, clay, and other materials deposited by glacial meltwater. The underlying dolomite bedrock is mostly hidden, although rocky outcrops of the dolomite or sometimes limestone, shale, or sandstone are locally apparent along some of the dissected stream channels. On the surface, soils are strongly correlated with the dominant historic vegetation, which, in turn, is associated with the local topography and landscape. On the rolling plains, prairies predominated and soils here are generally well drained to somewhat poorly drained and fine-textured. Along the hilltops, woodland and forest soils developed. The region supports a network of small streams that form shallow valleys, as they flow into the North Fork Zumbro River and into the headwaters of Spring Creek. Lakes are generally absent from the Minnesota and Northeast Iowa Morainal landscape, including Goodhue County.

Prior to European settlement, tallgrass prairie covered most of this area. This grassland community was extensive, with tall stands of Indian grass and big bluestem intermingling with colorful flowers and

extending past the horizon. The gentle terrain allowed prairie fires to burn through the area regularly, and woody plant growth was limited to sheltered draws and some of the steeper slopes of the moraine hills. The moraine hills burned much less frequently and tended to support populations of prairie species as well as fire-tolerant bur oak, to form savanna and oak woodland communities. In other areas, where sheltered stream ravines were more pronounced and created a dissected landscape, or where stream orientation prevented prairie fires from burning through, fire-sensitive communities such as maple-basswood forest or mesic oak forest developed.

Today, nearly all of the landscape in this area is farmed. The deep, fertile prairie soils create excellent cropland, and most of the remaining prairie communities persist on arid slopes where farming and grazing is poor. Urban development also is affecting the area, as the local cities expand.

The Paleozoic Plateau Ecological Section

This landform runs in a slightly northeast-southwest trending band through the center of the County, and is the largest of the three major landforms in the area. The terrain here can be rugged along the major river channels, where stream channels have cut downward through glacial deposits. Adjacent upland areas have less relief, and tend to be gently sloping rather than deeply dissected. The underlying force that shapes much of this area is an ancient bedrock plateau that has a thick overlay of glacial till, and scattered pockets of loess along the western edge of the landform. The eastern edge has little till, and instead is covered by

loess. The underlying dolomite bedrock is buried across most of the terrain, often by as much as several hundred feet of glacial deposits. In other areas, especially in steep ravines and along river bluffs, outcrops of limestone, sandstone, shale and the bedrock dolomite are common. Soils in this region are formed from loess, glacial till, and alluvial deposits left during glacial melt episodes, and developed primarily under wooded communities. Most are medium-textured, and moderately to poorly drained.

Many of the creeks and rivers that have their origin in the moraine section to the west continue through this region, where they and their tributary streams have cut both ravines and some broader valleys through the glacial deposits. Along the eastern edge of the Paleozoic plateau, spring-fed streams maintain temperatures that are cold enough to support breeding populations of trout. There are few lakes and ponds in the generally level terrain.

The dissected character of the landscape around these drainages contains a variety of habitats, and as a result supports diverse plant communities. Much of the region was oak woodland-brushland, with pockets of oak savanna, small dry prairie openings, and aspen woodland. This community is relatively fire-tolerant and was probably subject to periodic burns from more severe prairie fires. Other areas, in the southwest corner of the landform and in a narrow band running north along the western edge of the plateau, were covered by tallgrass prairie. Moist, north-facing slopes along drainage ways almost certainly supported mesic forest communities including maple-basswood forest

and mesic oak forest, although such stands may have been too small to be readily discernible on maps that recreate historic vegetation from land survey data. Larger mesic forest communities also occurred on the slopes at the mouth of Wells Creek and along the Little Cannon River. Again, the northern and/or eastern exposures of these sites, combined with the steep slopes, provided excellent protection from the periodic fires that burned through the area.

Today, this area is heavily farmed, with only a small fraction of the landscape left in a natural or semi-natural state. Most of the remnant vegetation persists along the steep valley slopes that were not accessible to farm equipment, and of those, many have been or continue to be grazed. The tallgrass prairie has virtually disappeared, and only small patches of dry prairie persist on exposed hilltops and ridges.

The Blufflands Ecological Section

This region forms the northeastern edge of the county, where it borders the Mississippi River, and also occurs between the Paleozoic Plateau and the Minnesota and Northeast Iowa Moraine along the northwestern edge of the project area. The dominant feature of this landform is an ancient plateau that was buried beneath glacial till and loess, and subsequently deeply eroded by tributaries of the Mississippi River. The landscape tends to be strongly dissected, especially along the Mississippi, and steep bluffs often rise as much as 600 feet above the river and provide spectacular views of the surrounding landscape. The bedrock dolomite is generally buried beneath up to 50 feet of glacial drift; however, there are frequently large outcrops visible

along the valley walls of the Mississippi, and some smaller, local exposures along the western edge of the landform. In the valley walls of the tributary streams, younger sedimentary rocks form smaller outcrops, but these are often partially buried. Sinkholes are common in the southwestern portion of the landform, where limestone is common. The soils in this region are generally well-drained, on steep slopes, and derived from loess, till, and alluvial deposits. Prairie vegetation influenced soil development on the broader ridge tops; elsewhere, forest communities affected soils. A number of significant rivers drain through this landform into the Mississippi River, including the Root, Whitewater, Zumbro, and Cannon Rivers and their associated tributaries. As is true of the Paleozoic Plateau, the numerous groundwater discharge areas often combine flows to create coldwater trout streams.

Presettlement vegetation for this area was diverse, as determined by the wide range of growing conditions present in the landscape. Broad ridge tops and steep slopes with a south or western exposure often supported stands of fire-tolerant prairie communities and dry oak savanna. Along the base of the slopes, mesic oak forest communities developed, and in the most sheltered valleys, stands of maple-basswood forest. The broad valley of the Cannon River and its associated floodplain supported vegetation that would tolerate the heavy spring floods and associated erosion, including floodplain forest. Today, roughly half of the area—that which was formerly prairie or oak woodland or savanna-- is either cropped or grazed; the remainder, mostly in the valleys and ravines,

continues to support natural or semi-natural wooded communities. Because of the strikingly scenic nature of the steep landscape, the many rivers, and the attractive woodlands, this area remains a popular recreation destination.

3. NATURAL COMMUNITIES OF GOODHUE COUNTY

The following is a brief description of the major natural community types that still exist in Goodhue County. The descriptions draw from field surveys throughout the County, and from resources in Minnesota's St. Croix River Valley and Anoka Sandplain: A Guide to Native Habitats (1995), and Minnesota's Native Vegetation: A Key to Natural Communities. Following the community descriptions, later portions of this section discuss management recommendations for each of the community types. These recommendations have the potential to be used by public and private landowners to protect or enhance the natural community areas that remain in the County.

Prairie Communities

Dry Prairie, Bedrock Bluff Subtype –these plant communities developed on steep south- or west-facing slopes above the Mississippi rivers and their tributaries, where harsh growing conditions limited the establishment of all but the most drought-tolerant plants. The environment in these prairies is often extreme, with daytime soil temperatures exceeding 100 degrees, and the thin, sandy soils baked dry by the sun and wind. Bedrock bluff prairies often occur as small openings within oak woodland or dry forest communities, and developed where very thin layers of gravelly soil overlay the bedrock. They are marked by bedrock outcrops, piles of cobble- to boulder- sized

rock rubble, and often contain patches of exposed soil between the clumps of prairie plants. Typical graminoids (grasses and sedges) for this community type include side oats grama, hairy grama, porcupine grass, prairie dropseed, and little bluestem. Big bluestem usually is present, and Indian grass may occur although it generally is found on more mesic occurrences of the community type. Typical forbs include silky aster, heath aster, harebell, prairie birdsfoot violet, sky-blue aster, and prairie coreopsis. Kitten-tails and Hill's thistle are two state-listed rare plants that can sometimes be found in this community. Bedrock bluff prairies provide habitat for a range of animals, including eastern kingbird, meadowlarks, goldfinch, thirteen lined ground squirrel, and the white-footed mouse. Many of these, in turn, support predator populations, including red-tailed hawks and foxes, who may live in adjacent community types. The numerous rock outcrops provide basking opportunities for skinks and snakes, including the rare five-lined skink, milk snakes, and racers. Because growing conditions are so extreme, bedrock bluff prairies are less susceptible to woody plant invasion than other prairie communities, although sumac and red cedar are encroaching on some sites as a result of fire suppression. Bigger threats to this community are the pasture grasses that often persist in the wake of grazing, overgrazing, and housing and urban development adjacent to the prairies.

Dry Prairie, Sand-Gravel Subtype - These prairies were once more common in Goodhue County. They generally occur on sandy, gravelly soils that are well

drained and associated with river terraces formed during periglacial drainage and sediment deposition events. These communities 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. These communities are also strongly influenced by periodic fires and drought and tend to favor plant species dependent on fire for regeneration and those able to withstand droughty conditions. Typical woody plants include smooth sumac, prairie rose, and leadplant. Characteristic graminoids and forbs include hairy grama, side oats grama, prairie dropseed, and plains muhly grass. Characteristic forbs include rough blazingstar, grey goldenrod, stiff goldenrod, dotted blazingstar, hoary puccoon, butterfly milkweed, and large-leafed pussy-toes. Rare plants found on this type of prairie include kitten-tails and Hill's thistle. 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.

Dry Prairie, Hill Subtype – Hill Prairies are one of the most variable prairie community types, with species common to other dry prairie communities as well as some that are more characteristic of mesic sites. They generally develop on steep terrain such as valley side-slopes, often occur as openings in wooded communities, but can also occupy large areas. Soils are generally well drained and range from clayey to

sandy loam. Cobbles and piles of rock rubble are common, and there may be pockets of gravel as well. The vegetation in this community includes the graminoids big bluestem, porcupine grass, side-oats grama, sun-loving sedge, and prairie dropseed. Forb diversity in this community is often high, with spotted blazing star, pasque flower, silky aster, stiff goldenrod, thimbleweed, aromatic aster, and purple prairie clover just a few of the typical species. Rare plants are similar to those for other dry prairie communities, namely kitten-tails and Hill's thistle. Common animals include eastern and western meadowlarks, goldfinch, eastern kingbirds, pocket gophers, American toad, as well as predators such as red fox and various hawks that hunt the small rodents. The dry sandy soils provide excellent basking site for reptiles including the rare bullsnake, prairie skinks, and garter snakes. Fire suppression in this grassland community has allowed woody plants to become increasingly established. This is problematic because this increases the shading at a site, and can lead to the loss of prairie species. Past and current grazing can also alter community composition, by selectively removing preferred forage plants and introducing aggressive non-native species such as Kentucky and Canada bluegrass.

Mesic Prairie – Mesic prairies are grassland communities that developed on level to rolling land, over often deep, rich soils. It tends to be a grass-dominated community, and big bluestem, Indian grass, and prairie dropseed are typically dominant. On drier sites, little bluestem and other species characteristic of dry prairie communities become more important; in

wet areas, wet prairie species such as prairie cordgrass contribute to the community composition. Forb diversity is generally high, with purple prairie clover, white prairie clover, northern bedstraw, rough blazingstar, rattlesnake-root, prairie alumroot, and numerous other species common. Illinois tick-trefoil is a rare plant that occurs in mesic prairie. Wildlife found in this community generally consists of many of the same species that frequent old fields and other open grasslands, including eastern and western meadowlarks, field sparrows, American goldfinch, meadow voles, and striped skunks. As is true for the other prairie community types, mesic prairie also can support predator populations of snakes, red-tail hawks, and red foxes, which hunt the small mammals and insects of this community. Mesic prairies are one of the rarest communities in the region, because the landscape and soils were well-suited to agriculture and most of the prairies were converted to farmland historically. Today, only small remnants persist. Threats to this community include invasion by exotic species such as leafy spurge, road-salt runoff, herbicide drift from agricultural lands, and woody plant encroachment due to fire suppression.

Wet Prairies – An open community where the water table is frequently near the surface, wet prairies are characterized by a mix of forbs grasses and sedges 36 inches or more in height. Although infrequent, shrubs found in wet prairie include prairie willow, pussy willow and meadowsweet. Forbs include prairie and meadow blazingstar, pale-spiked lobelia, culver's root, bedstraws, sawtooth sunflower, asters, and tall

meadow rue. Common grasses include big bluestem, prairie cordgrass, blue-joint, and sedges. Common bird species include song sparrow, red-wing blackbird, and American goldfinch. Animals frequent to wet prairies 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, or invaded wet prairie and can become dominant in disturbed areas. In the absence of fires, shrubs may dominate some areas, and changes in hydrology or water quality with urban development or adjacent agriculture degrade wet prairies and encourage domination by exotic and aggressive plant species. Traditional use of these prairies included grazing and haying. Today, almost all wet prairies in the Goodhue County have been lost through conversion to crop land including dozing, regrading, and tiling of gentle slope swales.

Savanna and Woodland Communities

Dry Oak Savanna, Sand-Gravel Subtype - These are relatively open communities of scattered, 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 like gopher mounds and badger excavations are common. Common plant species include bur oak and northern pin oak, prairie rose, leadplant, heart-leaved alexanders, butterfly milkweed, purple prairie clover, bird-foot violet, prairie sage, and several species of aster. Common grasses include Indian grass, little and big bluestem, prairie dropseed, and sideoats grama.

Common animal species include mourning dove, indigo bunting, sparrows, squirrels, pocket gophers, and white-tail deer. These areas have often been degraded by grazing or farming activities. The impact of overgrazing is a reduction in grass and forb diversity, and forage quality and quantity, as well as invasion by exotics such as leafy spurge, knapweed, and sweet clover. Regular fires before settlement maintained these communities. Without fires, the spread of woody shrubs such as sumac, prickly ash and red cedar is increased. Many areas of Goodhue County that historically contained oak savanna have slowly been colonized by brush, and eventually trees to oak woodland or forest. This succession has largely been brought about by the absence of fires and periodic grazing by large animals such as bison and especially elk.

Oak Woodland-Brushland - Oak woodland communities are characterized by a somewhat variable canopy, from sparse to nearly closed. They are dominated by open-grown bur, white, and pin oaks, often with a pronounced shrub layer containing young oaks and shrubs. 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 shrubs include hazelnut, leadplant, gray dogwood, and other berry or nut producing shrubs. Common ground cover in oak woodlands include various prairie and woodland edge grasses, purple giant hyssop, hog peanut, bracken fern, pointed-leaf tick trefoil, satin grass, lily-leaved twayblade orchid, and woodland sunflowers.

Animals include mourning dove, catbird, indigo bunting, squirrels, coyotes, and white-tail deer. These communities have often been degraded by overgrazing and soil compaction. These activities lead to invasion by exotic species such as Kentucky bluegrass, European buckthorn, tatarian honeysuckle. As with many areas in the upper Midwest, the presence of these exotic species have significantly reduced species diversity of most Oak Woodland - Brushland.Communities in Goodhue County.

Forest Communities

Dry Oak Forest - A deciduous forest dominated by pin, bur, and less frequently white oak mainly under 50 feet, few subcanopy trees, a dense shrub layer, and patchy ground layer of moderate diversity. Typical canopy trees include northern pin oak, bur oak, and white oak, with black cherry, trembling aspen and paper birch in the subcanopy. The shrub layer typically includes hazelnut, gray dogwood, gooseberry, and raspberries. The ground layer includes wild sarsparilla, pointed-leaved tick trefoil, bracken fern, wild geranium, Pennsylvania sedge, and pale bellwort.

Typical animal species include woodpeckers, chickadees, vireos, chipmunk, squirrels, and white-tail deer. Past logging and/or fire 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 these forest communities, and encourage invasion by non-native plants. Buckthorn and tatarian honeysuckle are

problem nonnative species that often invade dry oak communities.

Mesic Oak Forest – Canopy trees are typically taller and straighter in mesic oak forest than in dry forests, and northern 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 tree seedlings, grasses, and flowers. Common tree species include white, red and bur oak, and basswood. Ironwood, bitternut hickory, black cherry, and hackberry are typically infrequent in the canopy, but tend to be common in the subcanopy. Shrubs may include chokecherry, downy arrowwood, pagoda and silky dogwood, and other fruiting shrubs. The ground layer frequently includes wild grape, Virginia creeper, wild geranium, black snakeroot and a variety of ferns and spring ephemerals, such as sharp-lobed hepatica.

Animals of mesic oak forest 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 toads. Past logging and grazing may have removed canopy trees, shifting species composition and reducing diversity in ground flora. Buckthorn and tatarian honeysuckle are common invaders in oak communities, and oak wilt may spread in disturbed stands, particularly in areas of active construction.

Maple-Basswood Forest/Basswood Forest – A closed-canopy forest community composed of shade-tolerant, fire-sensitive tree species. Many canopy trees may be large, with diameters over 20 inches. Maple-basswood

forests typically have a subcanopy of ironwood, and sugar maple and basswood saplings. The shrub layer is sparse, with a diverse ground layer. These forests usually include a diverse group of spring wildflowers that may be obscured during the summer by patches of wood nettle. Common canopy species include basswood, sugar maple, red elm, red oak, and green ash. Ironwood, bitternut hickory and black cherry may be common in the subcanopy particularly where canopy gaps occur. Silky and pagoda dogwood are common in the shrub layer. A wide variety of ferns, spring wildflowers, and sedges make up the rich ground layer.

The animals of deciduous forests include a variety of nesting songbirds, small mammals, frogs, toads, and white-tailed deer. Logging and grazing have typically changed the composition of these forests, especially the age distribution of trees. Disturbance has also opened areas to invasion by exotic species, especially buckthorn, Tartarian honeysuckle, and garlic mustard.

White Pine-Hardwood Forest – This community is 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.

Animal species of this community type are also similar to other mesic forests in the area. Within Goodhue County, few remnants of native white pine-hardwood

forest exist. These are largely confined to very steep, generally north-facing slopes along the bluffs and immediate side valleys of the Mississippi River. Also, there are some small white pine-hardwood forests where the pines appear to have been planted. These have been classified as a white pine-hardwood forest because they fit the community characteristics and have at least partial function of a remnant community of this type.

Lowland Hardwood Forest - A deciduous forest with a variable canopy, with coverage from about 50 to 100 percent. Lowland hardwood forest occur on mineral soils and are often located near the margins of lakes and wetlands, in ravines, and on the lower portions of north-facing slopes. Common tree species include, green ash, American elm, eastern cottonwood, basswood, bur oak and hackberry. Subcanopy trees may include ironwood, red elm and boxelder. Common shrubs include pagoda dogwood, prickly ash, hazelnut, and gray dogwood. The ground layer may include Virginia creeper, goldenglow, Virginia and Canada wildrye, sedges, woodland horsetail, rough hedge nettle and jack-in-the-pulpit.

A wide range of common forest animals and birds use these forests as habitats. These forests are often degraded by overgrazing and/or logged using unsustainable methods. Logging and trail development also fragment these areas and allows invasion by exotic species such as buckthorn and reed canary grass.

Floodplain forest - Floodplain forests develop in the active floodplains of rivers, and support plant communities that are tolerant of prolonged seasonal

inundation, sediment deposition, erosion, and of the ice scouring that can occur during spring break-up and flooding. This community is typically dominated by silver maple, black willow, and/or cottonwoods, and many of the canopy trees frequently have deep scars around the base, where ice gouges the trunk during the spring melt. Green ash, American elm, hackberry, boxelder, and basswood may be locally common as well. Subcanopy and understory layers are usually quite sparse, as the severe flooding and erosion limit seedling establishment and maturation. The ground layer, in turn, supports species that are adapted to the disturbance regime, and includes many annuals that produce abundant seed, as well as perennials that can spread vigorously through underground roots or stems. Typical species include stinging nettle, cleavers, various sedges, and wild-rye species. Vines are common, especially below canopy gaps, and often form a significant component of the total cover. Wild grape and Virginia creeper are common.

Floodplain forests can be extensive, especially in large rivers with extensive floodplains, and support a wide variety of wildlife species. Examples include cerulean warbler, red-shouldered hawks, several species of shrews, vireos, flycatchers, and eastern wood-peewees. Gray treefrogs, spring peepers, and wood frogs are also common. Threats to the community include upstream and upslope land uses which increase run-off rates and sedimentation, modification of natural flooding cycles by dams, and shoreline stabilization to facilitate navigation and recreational use.

Wetland Communities

Wet Meadow– These are open, shallow wetland communities with a cover of sedges or grasses. Forbs may be common if adequate nutrients are present, or absent if nutrient levels are low. Shrubs may include scattered willows or red osier dogwood. 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 lakebank sedge. Other characteristic plants include woolgrass, spotted joe-pye weed, boneset, meadowsweet, and blue flag iris.

Common animals include song and swamp sparrows, red-wing blackbirds, sedge wrens, shrews, mice, raccoons, toads, and a number of frog species. Intensive grazing and haying, as well as hydrology alteration and influx of nutrient-rich runoff may degrade these areas and encourage invasion by exotic species such as reed canary grass and purple loosestrife. Wet meadows in much of Goodhue County have generally been degraded by hydrologic alterations associated with past agricultural activities and tend to have various levels of infestation by reed canary grass, stinging nettle, and shrubs. However, some fine examples still occur in some larger expanses in various parts of the county, as well as swales on gentle slopes and hillside seeps in some active and former pasture ground in the south and west parts of the county.

Calcareous Fen – These wetland communities are relatively uncommon in Minnesota, and develop only in areas where water with high levels of dissolved calcium

salts and low levels of dissolved oxygen discharges to the surface. Soils are typically a shallow to deep peat. These unique growing conditions support a plant community that contains both rare species that are specifically adapted to this particular environment, as well as species that grow well in a variety of fen, wet meadow, or other wetland habitats. The groundlayer is typically dominated by wiregrass sedge, beaked sedge, spike rushes, and a species of bulrush. Forbs include starry false Solomon's seal, Kalm's lobelia, grass of Parnassus, and a variety of others, depending on local conditions. Shrubs are often common, including bog birch, sage-leaved willow, and shrubby cinquefoil.

These communities often support a variety of small mammals and amphibians, which in turn provide food for foxes, hawks, and other predator species. Several species of shrews, meadow voles, jumping mice, tiger salamanders, spring peepers, chorus frogs, and eastern garter snakes are all likely to find cover and food in calcareous seepage fens. These communities are threatened by a number of factors, including grazing, hydrologic alterations, and invasion by exotic species such as reed canary grass or purple loosestrife. Nutrient-rich runoff can significantly alter the vegetation composition, and sediment deposition can smother plants completely.

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 sweetflag, bur-reed, marsh bellflower, boneset, spotted joe pye weed, smartweeds and water plantain. Common animal species include Canada geese, ducks, red-wing blackbirds, common yellowthroat, muskrat, raccoons, and a number of frog species. 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. These actions frequently lead to invasion by exotic species such as reed canary grass cattail and purple loosestrife. Mixed emergent marsh wetlands occur along the Minnesota River and some larger interior water bodies in Savage.

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 marsh bellflower. Animals include Canada geese, several species of ducks, red-wing blackbirds, a variety of 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. Since cattail marshes are typically associated with wetland complexes (which are not characteristic for most landforms in Goodhue County)

only a few small cattail marshes were identified away from major river floodplains during this study.

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 home to a variety of birds and reptiles, including 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 on steep slopes associated with the bluffs of the Mississippi River and its immediate side valleys. These are most commonly with rock outcrops on bluff prairies as well as some of the bluff lines. Dry Cliff communities that occur within the study area are relatively small and were not mapped as separate areas as part of this study.

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, jewelweed, 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 in the deeply dissected bluffs along the Mississippi River and its side valleys.

Other Plant Assemblages

Although the plant assemblages described below may not be considered natural communities under the methods used during this Countywide Natural Community Inventory , they can provide important habitat for many generalist species, and some rare species of plants and animals. They can also be aesthetically important in the landscape, providing buffers from developed areas. In some cases, such as an old field, there may be opportunity to reconstruct a natural community such as mesic prairie that has been lost throughout a larger portion of the County.

Dry Oak Savanna, Bedrock Bluff Subtype – Bedrock Bluff savanna is not a community type recognized by the Minnesota DNR Natural Heritage Program, but since it seems to appear as a distinct assemblage of plants and animals, associated with specific soil and landscape traits within the project area, it warrants further discussion and description. It may be that this particular association has developed in the wake of

European settlement, as fire suppression allowed bur and pin oak to become established on bluff prairies. Tree growth is slow on these arid sites, and more the frequent fires prior to European settlement may have been sufficient to keep young trees from maturing and developing a true bedrock bluff savanna. Today, there are some scattered examples of this community type in the project area. It occurs on steep, exposed slopes or along blufftops, on thin sandy soils, and often occurs as openings within oak woodland or dry oak forest. Exposed bedrock outcrops are common, as are piles of cobble and small boulders. Plant species are those typical of bedrock bluff prairies, with hairy grama, side oats grama, little bluestem, porcupine grass, and switchgrass common. Forbs are those that are adapted to the hot dry conditions, including sky blue aster, cylindric blazing-star, birdsfoot coreopsis, and flowering spurge. The tree cover is quite sparse, and consists of widely scattered bur or pin oak. These are generally small and gnarly, with larger crowns as a result of growing in an open area. This community has good wildlife value, with meadowlarks, goldfinches, and several species of sparrow. Small mammals are common, including thirteen-lined ground squirrels, pocket gophers, and mice. The warm, sandy slopes and rock outcrops provide excellent basking sites for various lizards and snakes, including prairie skink, garter snakes, and the state listed bullsnake. This community faces threats from overgrazing and invasion by non-native grasses, and, to a lesser degree, invasion by woody shrubs. This is less of a problem in this community, simply because the

extreme conditions make woody plant establishment quite slow.

Conifer Plantation – Large plantations of conifers were often planted in many portions of southern Minnesota after the 1930s under the belief that they prevent erosion. Often these are single species groves of various pines and spruces, planted closely together in rows. When young, the ground cover continues as a field or prairie, as it was previously. Eventually, the shade created by the pines, and acid from needle-drop eliminates most ground cover vegetation and it becomes highly simplified or bare. The plantations provide shelter from wind, cover and breeding areas for songbirds, owls and other species, but also create a dense monoculture with low diversity. Depending on the original planting density, these plantations typically require thinning with age to preserve the health of the trees.

Old Field – "old field" is a term used to describe areas that were intensively grazed or cultivated, but where these activities have ceased. These often have a simplified vegetation community, dominated by smooth brome, Kentucky bluegrass, or other non-native grasses. A few prairie forbs such as yarrow remain. Also, 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 shrub thickets. 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 prairie plants. These areas are often good candidates for prairie, or savanna reconstruction.

4. Management Strategies for Natural Communities

Given below are some 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 in 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 influenced by long-term domestic cattle grazing. High stocking rates coupled with 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 Minnesota, 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 activities 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 and field roads where erosion is occurring, reduce or rotate grazing to maintain native plant populations, or other appropriate means. Graziers should consider using a paddock setup in their Grazing management system, where cattle graze intensely for very short periods of time and are rotated through pastures. Also, consideration might be given to using different livestock/breeds through time, some of which can help accompllish restoration goals. For example, Scottish highland cattle have the potential to utilize thorny shrubs as forage in overgrown oak woodlands.

- When appropriate and safe, use prescribed burns to accomplish multiple goals, including: 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 and plan to burn only a portion of an entire natural area in one burn season.

- Well-planned and safely executed prescribed fire is often an effective and lowest cost means of accomplishing many goals for improving natural community quality. However, **prescribed fire should**

only be applied with the assistance of, or by trained and experienced persons. Many natural communities throughout Goodhue County lend themselves to management with controlled 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. Some of these include 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 particular area, but familiarity with techniques and specific site conditions make later burns easier and less time consuming. Burning 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 nonnative removal and prescribed burning 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 periodic mowing or prescribed burn regimes. Also, when planting native grasses and flowers, it is highly recommended that native seed

from local sources (within 100 miles of wild population seed origin) be used.

- In general, savannas should be burned less frequently than prairies, and droughty sites burned less frequently than generally moist or wet sites. Average burn frequency for the dry prairies and savannas that characterize 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 in the application of fire can have a profound effect on species composition in prairies and forests. 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. The effects of mowing at different times of the year are somewhat similar to those given immediately above for prescribed fires.

- 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 permanently damaging animal populations, management should be carried out so as not to influence the entire area upon which these species depend. An example would be to not burn an entire prairie at once; this would leave places of refuge for the species of concern and allow for potential recolonization of areas to which management was applied.

- 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 should include maintaining or restoring native plant communities and their species richness by re-establishing or approximating original hydrology and natural processes. Appropriately managing the hydrology and vegetation of a wetland will, in turn create more 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 water level fluctuations (also known as "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.
- Where practical, minimize the use of new tile installation. Although tiles have the potential to increase crop production on marginal lands, they expedite the de-watering process of the landscape and have the potential to create greater "bounce" in downstream waterways. This can hinder the natural function of remaining wetlands by causing wide seasonal and rain event-driven changes in water level and leads to an overall loss in native plant and animal diversity.
- Make the most of opportunities through interested landowners for wetland restoration. If conditions allow, breaking tile lines, berming, blocking ditches, installing control structures and other similar activities can all be used to restore hydrology to wetlands. These restored wetlands serve to filter nutrients, trap sediments, allow for ground water recharge, reduce flooding downstream, and increase native plant and animal diversity.
- Do not flood existing quality natural communities. Although this is becoming less frequent, some very high quality native plant communities such as sedge meadows and wet meadows are still flooded under

the guise of "wetland enhancement". The result of flooding quality wet/sedge meadows is a dramatic reduction in native plant and animal diversity. Conserving these shallow wetland types is becoming increasingly important in Goodhue County because these communities were once very common in swales in the western part of the county and along streams, but are now rare, with only a handful of good examples remaining.

- Use appropriate tools for maintaining the character of wetlands. Throughout much of the western portion of the county, waterways, and to some degree, wetlands in swales still exist. They often support a relatively open plant community. Without management, these open areas can be encroached upon by brush and trees. If the goal for a particular waterway or swale is to maintain an open character, some active management through prescribed burning, mowing, and/or other activities may be necessary. Management strategies for open wetlands are often similar to those of prairie. Additional information can be found in the Prairie and Savanna Management section above.

- Maintain dead and fallen trees or add nesting structures such as wood duck boxes 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 pressures as wetlands. (Changes in historical stream flows and the increased rate of erosion that is often associated with activities such as ditching, dredging, intense 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, and contribute to a dominance of a stream bottom by sands and silts. This generally decreases the diversity of habitats for both plants and animals and prevents many species of aquatic organisms from reproducing and/or sustaining their populations.

Throughout much of the upper Midwest, following settlement, conversion of natural communities for agriculture caused an increase in runoff. The increased runoff and erosion caused erosion of stream channels and exceptionally high sedimentation rates in the floodplains of these streams. Throughout much of Goodhue County, this type erosion and sedimentation was active beginning the late 1800's and continues sporadically. The downcutting of streams, and nutrient and sediment transport are all accelerated by ditching, channelization of streams, levee building, and other drainage activities. This is further compounded by the drainage of wetlands and causes the eventual loss of in stream habitat in natural systems even as large as the Mississippi River.

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

- Identify areas of gully erosion associated with bluffs and 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/root density, rain infiltration rates, and excellent soil-binding characteristics. Prairie remnants on some soils have demonstrated the ability to infiltrate (without runoff) approximately 10 inches of rain in one hour for an indefinite period of time. This amount is 10 to 20 times higher than that of turf grass lawns and pastures that are dominated by nonnative cool season grasses and have some degree of soil compaction. Sheet and rill erosion can be greatly reduced by increasing the overall quality of native communities.

- Where possible, develop landscape-level strategies for the management of stormwater before it reaches streams and other bodies of water. This might include remeandering of channelized 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 landscape function as a whole. These should at least be considered as a means of reducing stream sedimentation, nutrient export, and storm event bounce.

- Work with landowners to monitor and adjust grazing practices along waterways and streams to minimize erosion and maximize infiltration of rain water, as well as minimizing the direct introduction of animal waste into streams. 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, and/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 throughout the world. Potential sources of information include the numerous sustainable farming organizations active in Southeast Minnesota and Northeast Iowa, and through Universities and Natural Resource managers.

Forest Management

Most of the forest areas within Goodhue County have been grazed at varying intensities, and in some cases, logged. Most of the forest communities in the eastern part of the County are 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.

- Where logging occurs, landowners should work with a reputable forester to create a harvesting plan and a plan for the long-term health and function of the forest. Working with a reputable forester can help to minimize disturbance to the site while logging occurs and in creating a contract with a logging company that will protect the rights of both the landowner and the logger. Working with a forester who has a broad-ecological perspective can also help to realize the goals of improving the overall health of the forest while providing some source of income.

- Oak dominated 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 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, or burned infrequently (10-50 year average interval). 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 that integrates 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.

5. Natural Resource Policy Recommendations

Below are general recommendations for review and possible adoption by Goodhue County Land Use Management, other County agencies, as well as Cities, Townships, Watershed organizations, and others to review and potentially implement. These recommendations are suggested with an eye toward managing resources on an ecosystem basis. This approach favors management of ecosystem health at the landscape level over management of a single species, and across property and geopolitical boundaries. Also, since the vast majority of the natural resources discussed in this report may potentially be managed by private citizens, it will be important to share information from this natural resource inventory with developers, citizens, and other groups.

Ordinances

Ordinances are one of the best tools for protecting natural resources. Adoption of soundly written ordinances can help to prevent unnecessary impact to natural resources at many different scales, from the entire County, to a small municipality.

Ordinances at the broader scale may seek to prevent things such as excessive tree removal on Mississippi River Bluff or placement of permanent structures on, or within a certain distance of steep and highly erodible slopes. In addition, ordinances could be established to minimize or prevent impacts from rural sprawl to some

of the best quality natural communities identified in this inventory and by the MN DNR MCBS.

In more urbanized areas, one example of an ordinance is one that provides for setbacks and buffers around sensitive natural areas identified in this inventory and by the MN DNR MCBS. Another example would be an ordinance to limit removal of trees and other vegetation, other than control of invasive and nonnative species on residential building lots. Ordinances could also allow for and encourage establishment of native trees, shrubs, grasses, and forbs in place of more conventional lawns and landscaping reducing excessive runoff, nutrient transport, and beautifying cityscapes. Language could also be provided which prohibits establishment of state-listed "weeds", although the term "weeds" should be as well defined as possible to prevent misinterpretation. Existing ordinances may already contain language that at least partially protects natural resources within urbanized areas. To ensure that their content is consistent with current natural resource management philosophies, these ordinances should be periodically reviewed, edited, and additional language or ordinances added/removed where necessary.

Land Use Zoning

Zoning can play an important role in modifying the impact that development has on natural resources in the County. To the extent possible, land uses should be compatible with landscape type, native plant and animal communities, and other natural features. Rural sprawl is currently one of the greatest single influences on natural resources in the United States and is, in

large part, the reason this inventory effort was undertaken. Wisely guiding land use through zoning efforts can have the potential of reducing the impact to the quality natural resources in rural areas identified in this report and by the MN DNR MCBS.

An example of land use zoning in a municipality might be providing for the lowest possible housing density adjacent to areas with significant natural communities. Clustered housing could also be encouraged through a Planned Unit Development (PUD) code in these types of areas. Clustered housing could be concentrated within areas with low natural resource and local values, while adjacent areas of high value could be retained as open space. Whether low densities or clustered housing are used, buffers around sensitive natural areas should be created, and if possible, both the buffer and natural area should be designated for permanent conservation.

Zoning at broader scales, such as County-wide could include limiting the placement of certain types of facilities close to sensitive resources. This might include the placement of confinement operations, manure lagoons, or the placement of homes or developments in relation to sensitive resources.

Conservation Easements

Where natural communities of significant value are identified that are held in private ownership, the city (and conservation organizations) can work with the landowner to create a conservation easement. This type of arrangement is particularly advantageous where significant natural areas are located on a parcel of private land and there is some concern for long-term management of these areas. Further information on

conservation easements and other options for land protection is provided in Appendix D.

Park Dedication

A strong tool for the conservation of open space is the use of park dedication. It is primarily used by municipalities and can help to create additional park land to protect/link existing natural areas, trails, or other natural amenities, as well as conserve natural communities and rare features. Park dedication typically requires that a predetermined percent of land area in a development be dedicated as parkland, or that the developer contribute a predetermined per-acre dollar amount to a fund that is used to purchase park land in lieu of dedication, or some combination of the these two. The information in this report should be shared with municipalities in the County for potential use in land protection strategies such as park dedication. The County should play an active role in enabling local communities to utilize the information in this inventory for that purpose.

Establish an Integrated Roadside Vegetation Management (IRVM) Program

IRVM is a decision-making and quality management process for maintaining roadside vegetation that integrates the needs of local communities and highway users; design, construction, and maintenance considerations; statutes and regulations; and technology with methods to economically manage roadsides for safety as well as environmental and visual quality.

There many locations throughout Goodhue County where quality native plant communities exist in road rights-of-way. These native plant communities provide beauty and add diversity to the landscape, as well as being some of the best weed fighters around. Native plant communities tend to be highly competitive (although not invasive themselves) and minimize or prevent establishment of weedy species such as ragweed, foxtail, Canada thistle and others. Also, because of the intensive rowcrop agriculture and continued loss of both pasture and wet swales in the southwestern half of the County, roadsides harbor most of the remaining habitats in that area, especially state rare mesic prairies. Managing these native roadside plant communities serves to not only foster our rural heritage, but also reduces roadside maintenance costs.

Plants found in the original prairie and savanna landscape of Goodhue County are well adapted for use in roadsides. They provide the best low-maintenance weed and erosion control. They are nearly always more cost-effective in the long-run than nonnatives that have been used in the past. For, example, some counties in Iowa that have implemented IRVM have seen as much as a 75% reduction in herbicide cost with a reduction in the incidence of weeds, and an increase in beneficial native plants and animals.

The Minnesota Department of Transportation, Erosion Control and Establishment unit, as well as the IRVM Assistance Office at the University of Northern Iowa and Bonnie Harper-Lore at the Federal Highway Administration can all provide technical assistance and

support in establishing such a program. It is recommended that Goodhue County consider adoption of IRVM to reduce overall roadside maintenance costs as well as prevent further loss of quality native plant communities in roadsides.

Cooperative Natural Resource Planning

Goodhue County hosts a wide variety of land uses and residents. A common thread that these people share is the landscape upon which they live. It is recommended that the information in this report be shared with all the varied interests who have a stake in natural resource conservation, including governmental agencies at all levels, non-governmental agencies (NGO's), and the citizens themselves. It is also recommended that at least one committee of citizens be formed to provide input at the County level for natural resource planning. This body might be called the "Goodhue County Natural Heritage Advisory Committee" could review and provide recommendations to the Goodhue County Land Use Management staff , County Commissioners, and/or others on land use issues related to natural resources.

In addition, a "Natural Resources Technical Advisory" group made up of public agency and non-governmental organizations could be formed. This Advisory Group could be used as a forum to share current services, goals, and on-the-ground accomplishments related to natural resources, helping to coordinate the most efficient use of physical and financial resources in managing natural communities. Some examples of groups that might participate in such a group include Goodhue County Land Use, Staff

from various cities and townships, MN DNR, U.S. Fish and Wildlife Service, Red Wing Conservation Leauge, Pheasants Forever, Land Stewardship Project, and others.

Such sharing of information and activities across geopolitical boundaries and agencies will continue to be important in bringing continuity to natural resource management within Goodhue County and with surrounding counties. Found on the next few pages is a table that lists some potential sources of funding for natural resource planning and on-the-ground management. This matrix is partially adapted from the *MN DNR Financial Assistance Directory*. It is intended to provide a starting point for public entities and private property owners who might be interested in actively managing their property for quality and function of natural communities.

Other Recommendations

Information Gathering

Sound management decisions are based on quality information. This concept is as true in the management of natural resources as it is in the management of a County, city or business. To maintain the long-term quality and management of its natural areas, the County should, by itself or in partnership with other interested parties, begin a long-term monitoring program of select species or natural community indicators. The world is ever-changing and sound management of natural resources requires the collection of scientific data to allow management strategies to adapt with these changing conditions.

Maintain and Link Large Tracts of Significant Natural Areas

Connectivity and size are both important factors affecting the function of natural areas. As a general rule, the larger an area is, the greater the diversity of plants and animals present. Larger natural areas are also more stable and able to withstand the affects of naturally occurring events such as drought, insects and disease, and wind storms. For these reasons, the largest high quality natural areas should be given the highest priority for protection and management. Smaller patches of natural communities and sites with good restoration potential should then be used to link larger areas. Linkages should consider corridors and natural areas outside the city as well as features within the city.

Maintain Undisturbed Vegetative Buffers Around Natural Areas

A buffer of undisturbed vegetation can provide a variety of benefits. The buffer should consist of a mixture of trees, shrubs, grasses, and forbs with the mixture dependent on the specific site. Buffers reduce the impacts of surrounding land uses by stabilizing soil to prevent erosion, filtering pollutants, providing habitat areas and cover for animals, and reducing problems related to human activities by blocking noise, glare from lights, and reducing disturbance. Even relatively narrow buffers of undisturbed vegetation can provide some benefits, but wider buffers will provide additional screening, water quality, and habitat benefits. Buffers will be most effective if most or all of the landowners around a natural area cooperate to make a continuous buffer. Landowners should avoid cutting vegetation, dumping grass clippings or other debris, and trampling vegetation within buffers. If a path is desired through the buffer, it should be mown or cut only as wide as is necessary for walking, and located so that it does not encourage erosion. Likewise, City trail systems should not be located where they defeat the purpose of natural buffers.

Use Plant Species Native to Goodhue County

Native trees, shrubs, grasses, and forbs can be planted in buffer areas or in degraded portions of natural areas. Species planted should be indigenous to the Goodhue County Area and its associated landforms. A good source of information on indigenous plants is the species list provided in Appendix A of this report. Plant species should be chosen based on the specific characteristics of the site including soils, slope, aspect, and adjacent natural community types and quality. If

possible, restore the site to replace the original natural community type that existed before conversion (i.e., prairie, oak forest).

Control Invasive Exotic Species

Several nonnative species (sometimes called "exotics") have become widespread problems in Goodhue County. The most significant of these include European buckthorn, Tatarian honeysuckle, Chinese elm, reed canary grass, black locust, garlic mustard, and leafy spurge. Some of these plants were unintentionally introduced, while others were intentionally introduced without an understanding that they would threaten native plant communities. These nonnatives invade native plant communities and some species can take over rapidly, eliminating native plants and leading to a loss of plant diversity and wildlife habitat. Often, disturbances from new road or home site construction serve as a pathway for introduction of these species to a natural community not yet invaded by exotic species. To control invasion by exotics, minimize disturbance to natural areas and surrounding buffer areas as much as possible, and avoid planting or providing openings for exotics to invade. Small populations of exotics may be controlled by hand removal or through direct application of appropriate herbicides. Some nonnative species, such as buckthorn also have the potential to impact agricultural production. For example, soybean aphids negatively impact rowcrops. The alternate hosts of soybean aphids are the nonnatives European and glossy buckthorn.

Education

County staff, a variety of other public agencies, and private landowners are all involved in making decisions that affect the quality of natural areas in Goodhue County. The better understanding that all of the participants in decision making have of the function of natural communities, the better and more uniform the management of these area will be. It is important for all interested parties to be informed about their natural resources and how they can be managed. Citizens could be made aware of the benefits of managing their property for natural communities through public meetings and workshops and/or development and circulation of a pamphlet or brochure.

Further Encourage the use of Agricultural BMP's

An important part of maintaining or improving surface water quality and general natural resources quality is to continue to partner with local residents to further increase the use of agriculutral Best Management Practices (BMP's). By increasing the availability of BMP information, farm operators can be an even more active partner in furthering the role BMPs play in improving productivity and long-term sustainability of their farming systems.

It is recommended that the County work with the NRCS, SWCD, Watershed Organizations and other affected parties to identify some priority for further increasing the use of BMPs. For areas that are at-risk, or are identified as needing focused attention, it would be advisable to monitor water quality in surface waters and/or runoff that would eventually make their way toward streams. In these priority areas, feedlots may need to be inventoried/monitored and stream banks, gullies, and steep slopes inspected for erosion damage.

Some important BMPs that can improve surface water quality include:

1. Woodland and Wetland Management

   Woodlands and wetlands provide many benefits to landowners in addition to income, including erosion control, removal of excess nutrients from surface water, water storage and groundwater recharge. Managing these areas for biological richness as well as income ensures their long-term quality as well as sustainable income.

2. Planned Grazing System

   Pastures are permanent grasslands utilized in farming operations. By integrating practices such as rotational grazing, planting native species with a higher summer forage value, and providing for rest of grazed areas, graziers can increase production <u>and</u> improve water quality and wildlife habitat value.

3. Critical Area Planting

   Including grassed waterways, contour buffer strips, field borders, filter strips, and other similar types of buffers. The planting of critical locations can help hold soil in place and maintain good water quality and wildlife habitat downstream

4. Contour Farming

   Steep slopes necessitate the use of some type of specialized system to minimize erosion and other negative affects. Contour farming, strip cropping,

and terracing are all examples of good management practices on steeper slopes that help minimize erosion and gullying. This in turn helps maintain better water quality and wildlife habitat on a particular parcel of land and areas downstream.

5. Water and sediment control basins

There are some areas within Goodhue County where gullies and ravines have formed because of excess runoff from agricultural fields. Reducing the amount of erosion in these areas depends both on using some of the previously listed BMPs upslope, as well as constructing water and sediment control basins to reduce the flashy nature of flows and provide the opportunity for sediment to settle-out. Sediment is the number one pollutant of surface waters in the agricultural regions of Minnesota.

6. Proactively address erosion control at construction sites

There are many opportunities to minimize the amount of sediment from construction sites that reaches surface waters and/or impacts natural communities. To accomplish this, watersheds, the Soil and Water Conservation District, Cities, and other agencies should work cooperatively to make sure that an erosion control plan is developed for construction sites, that the plans are implemented, and that all of the appropriate materials and structures (such as silt fence) are working correctly (inspection).

6. Community Description

This section of the Goodhue County Natural Resources Inventory report contains individual community descriptions. These are organized by watersheds of the study area including the Cannon, Zumbro, and North Mississippi and Lake Pepin watersheds. In addition, the Upper Wells Creek watershed was treated separately to be consistent with a previous effort that inventoried the Lower Wells Creek watershed. The community descriptions each contain a community code, community type, qualitative rank, and a written description of the community In addition, select natural communities also contain information on restoration potential, and management recommendations.

Appendix A includes lists of species found within each natural community. These are organized according to the different structural layers of a community and include species lists of trees, shrubs, grasses, flowers and other plant. Records of rate features and any previous work in a particular area by MnDNR County Biological Survey Plant Ecologists is also noted. On the following page, Table 1 summarizes natural communities by type and occurrence with in particular watersheds.

Goodhue County Natural Resources Inventory – Summary of Natural Communities

Community Type	Number of Occurrences in Watershed Area								
	CRE	CRW	WZR	EZR	NMLP	SMLP	UWC	LWC	Total
Aspen Forest	-	-	-	-	-	1	-	-	**1**
Dry Oak Forest	21	7	2	1	1	16	8	14	**70**
Mesic Oak Forest	19	10	7	9	-	13	11	40	**109**
Maple Basswood Forest	5	8	9	3	1	2	-	-	**28**
Lowland Hardwood Forest	23	17	19	19	1	12	3	11	**105**
White Pine-Hardwood Forest	-	-	-	-	-	-	-	1	**1**
Oak Woodland-Brushland	37	23	20	12	6	19	22	25	**164**
Oak Savanna	1	-	-	-	-	-	-	-	**1**
Dry Oak Savanna	1	-	-	-	3	-	4	-	**8**
Dry Oak Savanna – Barrens subtype	-	-	-	-	1	-	-	-	**1**
Dry Oak Savanna – Sand-Gravel subtype	1	-	-	-	2	-	-	-	**3**
Mesic Oak Savanna	1	-	-	-	-	-	-	-	**1**
Dry Prairie	7	6	1	-	1	-	4	-	**19**
Dry Prairie- Bedrock Bluff subtype	15	12	1	7	1	20	8	23	**87**
Dry Prairie- Sand-Gravel subtype	-	-	-	1	1	-	-	-	**2**
Dry Prairie-Hill subtype	-	-	1	-	-	-	-	-	**1**
Dry Prairie -Barrens subtype	6	1	-	-	-	-	-	-	**7**
Mesic Prairie	1	1	1	-	-	-	-	-	**3**
Floodplain Forest	4	3	-	-	3	3	1	-	**14**
Floodplain Forest – Silver Maple subtype	1	-	-	-	-	-	-	2	**3**
Willow Swamp	-	-	1	-	-	-	-	1	**2**
Cattail Marsh	-	-	-	-	-	1	-	1	**2**
Wet Prairie	-	2	1	-	-	-	-	-	**3**
Calcareous Seepage Fen	-	-	1	-	-	-	-	-	**1**
Seepage Meadow	-	2	-	-	-	-	-	-	**2**
Wet Meadow	5	6	7	3	1	1	-	1	**24**
River Beach	-	-	-	-	-	-	-	1	**1**
Conifer Plantation	-	-	-	-	-	-	1	-	**1**
Cedar Glade	1	-	-	-	-	-	-	-	**1**
Total	**149**	**98**	**71**	**55**	**22**	**88**	**62**	**120**	
TOTAL COMMUNITIES DOCUMENTED IN GOODHUE COUNTY NRI									665

CRE = Cannon River East
CRE = Cannon River West
WZR = West Zumbro River
EZR = East Zumbro River
NMLP = North Mississippi/Lake Pepin
SMLP = South Mississippi/Lake Pepin
UWC = Upper Wells Creek
LWC = Lower Wells Creek

7. Community Descriptions for The Upper Wells Creek Watershed

UWC-1

Lowland Hardwood Forest Rank: D

This is the Clay Banks Pit site. It was mined for clay in the decades following settlement, first by a German immigrant named John Paul and later by the Red Wing Pottery company. This entire area shows signs of disturbance, most of which is all likely associated with the clay extraction process. It has about 75 percent canopy cover and is dominated by species that indicate disturbance on this upland landscape.

Dominant trees include 12 – 16 inch diameter cottonwood and quaking aspen. The shrub layer varies from moderate to very thick with the natives black raspberry, prickly gooseberry and chokecherry most common. The ground layer is a mix of nonnatives and natives that typify disturbed sites. Overall, this site is of poor quality.

UWC-2

Mesic Oak Forest Rank: CD

This woodland has been recently disturbed by selective cutting and a large number of logs have been left along the field edge. Black cherry and oaks were the most frequently cut species.

Overall, this community has about 60 to 70 percent canopy cover. Pin and white oak are the most common canopy trees with other hardwoods composing the remainder. The shrub layer varies from sparse to moderately thick with the natives Missouri gooseberry, chokecherry, and elderberry most common. European buckthorn is present and will likely spread, in the canopy gaps that were created by the logging. The ground layer varies, but is generally species poor, with some signs of former grazing. Common or occasional species here include stinging nettle, shining bedstraw, red baneberry, and rough avens. Due to the cutting of the best quality hardwoods and the apparent disturbance of the ground layer, this community was given a relatively low rank.

UWC-3

Lowland Hardwood Forest Rank: D

This community lies just south of County Road 9 and includes several parcels separated by narrow bands of mowed or cropped areas. Canopy cover ranges from about 65 to 90 percent, and is dominated by cottonwood averaging about 20 inches in diameter. The subcanopy and shrub layer are dominated by boxelder and prickly gooseberry. The ground layer varies, but is generally of poor quality and dominated by native species typical of sites that have been disturbed historically.

Overall, past disturbance has strongly impacted the quality of the site. Although this assemblage of plants is common on similar parcels of land in this area, it is

not generally representative of a natural community type that would have occurred here historically.

UWC-4

Dry Oak Savanna Rank: CD

This dry oak savanna occurs in a steep, grazed pasture with some sandstone outcrops. Although dominated by grasses, there are also a number of native forbs here. Canopy cover is between 20 and 30 percent, with open-grown bur and pin oaks about 14 inches in diameter most common. One 29-inch diameter bur oak on this hillside was found to be 132 years old. Secondary growth between the oaks includes eastern red cedar, paper birch, and plum.

The nonnative Kentucky bluegrass is common here, as well as the native species sideoats grama and little bluestem. Other native grasses include porcupine grass, big bluestem, and a species of panic grass. The most common forbs include roundheaded bushclover, frostweed, prairie alumroot, yarrow, and harebells.

The general quality of this savanna is moderately poor due to heavy grazing pressure and the lack of more conservative prairie and savanna species. This community would benefit from activities such as rotational grazing, an updated grazing management plan, reintroduction of fire and the removal of brush such as eastern red cedar. Although this community is of generally poor quality, it holds added significance due to the rarity of intact bedrock savannas within Goodhue County and southeastern Minnesota.

UWC-5

Oak Woodland-Brushland Rank: D

This oak woodland-brushland is found adjacent to the Dry Oak Savanna UWC-4, and, like the preceding community, is also grazed. The most common trees here are some medium bur oak averaging about 14 inches in diameter. Unlike the trees in the adjacent savanna, many of the trees have intermingling crowns and there are few open-grown specimens. Canopy cover is generally over 75 percent with closure in some areas. Grazing has suppressed most of the shrub layer; typical species include boxelder, European buckthorn and chokecherry. The ground layer in this community is somewhat more impacted than that of the neighboring savanna. It is generally dominated by bluegrass and Pennsylvania sedge, and most of the forbs species are those that increase with grazing, including white snakeroot.

UWC-6

Oak Woodland-Brushland Rank: D

Medium-size (18 inch diameter) bur oak dominate this pastured oak woods , with white oak, black cherry, and quaking aspen also contributing to the total canopy cover of about 75 percent.. The shrub layer is moderately thick and dominated by thorny species that tend to increase as a result of moderately heavy grazing. The ground layer is sparse and dominated by nonnative pasture grasses including redtop and Kentucky bluegrass. Due to the grazing and the resulting low species diversity of the site it was given a low qualitative ranking.

UWC-7

Dry Oak Forest Rank: CD

This forest varies in both canopy closure and species composition. In some areas the canopy appears relatively intact, with desirable hardwood species such as bur and red oak, black cherry, elm and paper birch. In other areas, particularly those that show signs of significant disturbance, tree species such as cottonwood are more common. Canopy cover varies from 60 to 90 percent.

The shrub layer varies from moderate to thick with Missouri gooseberry and European buckthorn most common. The ground layer is also variable, with the most common species indicating significant past disturbance, probably through overgrazing. Typical ground layer species include cleavers, Virginia waterleaf, and stinging nettle. Due to past disturbance, this community was given a relatively low qualitative ranking.

UWC-8

Mesic Oak Forest Rank: C

This generally north-facing slope has been logged in the last 10 to 20 years. The canopy cover is patchy, with a shrub layer that is very thick below the canopy gaps created by logging. The most common canopy species include white birch, white and red oak, and basswood. These generally average about 12 inches in diameter. Most stumps of the logged trees exceed 18 to 20 inches in diameter.

The most common shrub species include pagoda dogwood, chokecherry, ironwood and sugar maple saplings. The ground layer is generally species rich and characteristic of a quality mesic forest. Some of these species include bishop's cap, bellwort, lady fern, maidenhair fern, nodding trillium, hepatica and many others. Some species found occasionally that indicate disturbance include sweet cicely and yellow honewort. Despite the logging, this community will likely revert to a much better quality in the next 50 years, if left undisturbed.

UWC-9

Dry Oak Forest Rank: C

This forested area is grazed and varies both in composition and quality. It is generally dominated by a patchy canopy of bur and pin oaks, although there are some areas that include more basswood, black cherry and paper birch. The shrub layer is generally open, but dominated by species that increase with moderate to heavy grazing such as prickly gooseberry, ironwood, European buckthorn, and eastern red cedar.

The ground layer is species poor overall. Most of the area is dominated by nonnative pasture grasses, especially Kentucky bluegrass, however, there are some small areas, particularly on south-facing slopes with reduced grazing, where some desirable native species occur. Some of these include wild geranium, alum root, woodland phlox, northern bedstraw and Jacob's

ladder. Because of grazing impacts, this community received a lowered qualitative rank.

UWC-10

Dry Oak Savanna Rank: C

This dry savanna occurs on a very steep slope with sandstone outcrops and platey cobbles. The tree cover is about 25 percent, dominated by bur oak averaging 20 inches in diameter. Shrubs such as eastern red cedar, elm, quaking aspen, and paper birch are beginning to encroach on the hillside, adding about 10 percent additional woody cover.

This savanna is grazed by sheep, but still contains some native species. These presumably persist because the timing of the grazing prevents the sheep from fully utilizing them. Some small refugia on the steepest parts of the slope, rock outcrops, and the wet northwest corner host the majority of native forbs. The most common grasses here include the nonnative Kentucky bluegrass, as well as the natives little bluestem, sideoats grama, plains muhly, and hairy grama. The most common native forbs include columbine, northern bedstraw, gray goldenrod, heart-leaved aster, and others.

In addition to the dry savanna, there is a small area of wet meadow in the northeast corner. It is dominated by sedges (Hayden's sedge), Canada anemone, Virginia mountain mint, golden alexanders, satin grass, and prairie phlox. Because of its small size, it is included with the adjacent savanna community.

Overall, the quality of this community is moderate, owing to the impacts from moderate to heavy long-term grazing. Implementing activities such as rotational grazing, updating the grazing management plan, as well as using traditional natural resource management tools such as prescribed fire, brush removal, mowing and spot herbicide treatment would improve forage production and the overall quality of the savanna.

UWC-11

Mesic Oak Forest Rank: C

This forest has a nearly closed canopy dominated by red oak and basswood, with white and bur oak, sugar maple, and paper birch also present, but less frequent. This community has been both logged over 30 years ago, as well as grazed in the past. The shrub layer is dominated by elm and sugar maple seedlings, indicating that the community may transition to a forest dominated by sugar maple. The ground layer varies in quality and is dominated by desirable natives in some areas, while other areas have a predominance of species indicative of disturbance. This forest is of moderate quality and should continue to improve in the future if significant disturbance is prevented.

UWC-12

Dry Oak Forest Rank: C

This oak dominated forest is found on several adjacent hillsides. It is characterized by 80 to 100 percent canopy cover. Bur oaks are the most common tree species and average about 18 inches in diameter.

Other tree species include white oak, black cherry, hackberry, elm and quaking aspen. These form a scenic setting, with a nearly cathedral-like canopy in many places.

The shrub layer varies from moderate to thick, with thorny species dominant. The ground layer is generally species poor and, combined with the thorniness of the shrub layer, indicates that the site has been grazed, probably until recently. Despite the past pressure from grazing on this community, it has good restoration potential and could, with active management, recover in a relatively short time. This potential allows the site ranking to be elevated somewhat.

UWC-13

Oak Woodland-Brushland Rank: D

The species composition of this community is similar to the adjacent UWC-12. However, there are more canopy gaps, open-grown oaks, and some openings with remnants of prairie/savanna species. Overall, this community is of generally poor quality due to the history of grazing, and warrants a correspondingly lower rank.

UWC-14

Bedrock Bluff Prairie Rank: CD

This community includes several bedrock bluff prairies on either side of County Road 3. These prairies are of only moderate quality and appear to have been grazed in the past. Recent invasion of the prairies by brush and the poor forb diversity contribute to the lowered

overall rank. Despite past disturbance, some native forbs indicating better quality continue to persist in small numbers, including pasque flower, hoary puccoon, prairie violet, and prairie dropseed grass.

UWC-15

Dry Oak Forest **Rank: CD**

This oak dominated forest shows some sign of past cutting or logging. It is of moderately good quality where cutting has not occurred. The poorer quality areas coincide with cut stumps, some of which exceed 40 inches in diameter. The shrub and ground layers vary in quality also, with the densest thickets below the canopy gaps. Overall, this forest is of only moderate quality, but should improve significantly if disturbance is minimized over the next 40 or 50 years.

UWC-16

Dry Oak Forest **Rank: D**

This oak dominated community has a patchy canopy, characterized by pin and bur oak averaging about 14 inches in diameter. Other trees of secondary importance include aspen, birch, and black cherry. The shrub layer varies from thick to nearly impenetrable and is dominated by thorny species including prickly ash, European buckthorn, and gooseberry. The tremendous thickness of these “armed” shrubs indicates heavy past disturbance. The ground layer is generally species poor and dominated by plants also associated with disturbance. Due to the high degree of disturbance, this community was given a low qualitative rank. In time, this community will likely

become a closed canopy forest, but will remain a thick and tangled brushland in the interim.

UWC-17

Dry Prairie

This community includes several small prairies that are surrounded by oak woodland-brushland. These prairies are generally grass dominated, indicating past grazing (consistent with the neighboring communities). Brush is encroaching on these prairies and comprises about 35 percent of the total cover. Species of interest here include cylindric blazingstar, downy painted cup, and sand cherry.

UWC-18

Oak Woodland-Brushland Rank: D

This canopy in this woodland is characterized by a broken canopy of bur and pin oak, over a dense shrub layer of Japanese barberry and European buckthorn. The groundlayer reflects the site's grazing history, with an abundance of non-native grasses and forbs. There are some scattered patches of native groundcover, but overall species composition is poor, and results in a low qualitative ranking. This woodland has restoration potential and may be a good candidate for a revised grazing plan, to allow for greater forage production as well as improved species diversity and wildlife habitat.

UWC-19

Dry Oak Savanna Rank: D

This savanna-like area is characterized by scattered bur and pin oaks, with eastern red cedar and other

brush that cattle find unpalatable making up about 30 to 60 percent of the total cover. The area is very heavily grazed with erosion and cat steps (terrace-like lines across a hill that result primarily from excessive cattle traffic and trail creation, as well as some down slope movement of soil particles evident in many spots. Despite this, some native prairie and savanna species continue to persist, either because they are not palatable or they are growing below thorny brush. Although this community is given the lowest qualitative rank, it has restoration potential. If the landowner expresses interest, this site would be a good candidate for an updated grazing plan to improve both forage production and native biodiversity, as mentioned in UWC-18.

UWC-20

Bluff Prairie **Rank: CD**

This site consists of several small bluff prairie openings in a surrounding matrix of oak woodland-brushland. Although the sites are grass-dominated, with little bluestem, sideoats grama, porcupine grass, and hairy grama, they also host some species that are typically associated with better quality sites. Forbs of interest include blue-eyed grass, silky aster, prairie violet, hoary puccoon, and Leonard's skullcap. Brush covers about 15% of the site, with non-thorny tree saplings most common. Overall, the two prairies to the northeast are of moderate quality, while the prairies to the southwest are of somewhat lower quality, and heavily dominated by non-native grasses. The ranking assignment reflects this range in quality.

UWC-21

Oak Woodland-Brushland Rank: CD

This oak woodland-brushland has about 60 percent canopy cover, with a mix of open-grown and forest-grown oak trees. The brush layer is dominated by prickly ash and European buckthorn and varies from thick to very thick. The composition of the ground layer is moderate to poor quality and indicates both past disturbance and the increase in shade that has resulted from the increase in shrub and tree colonization.

UWC-22

Not Used

UWC-23

Oak Woodland-Brushland Rank: D

This oak-dominated community has a variable canopy, with a total cover around 70 percent. Bur oak predominate, with most specimens ranging between 16 and 18 inches in diameter. In addition, a mix of young quaking aspen and occasional American elm has grown into the areas between the oaks. European buckthorn dominates the moderate to thick shrub layer, and the ground layer is composed mostly of disturbance tolerant species such as cleavers and stinging nettle. Overall, the composition of the shrub and ground layer indicates that the area has been grazed, and this past disturbance and poor species composition are reflected in the low qualitative ranking for this site.

UWC-24

Oak Woodland-Brushland Rank: D

The patchy, open canopy in this oak-woodland-brushland is dominated by medium diameter (14" - 16" dbh) bur oak and northern pin oak, with a co-canopy of younger northern pin oak and paper birch. In the shrub layer, stands of young black cherry and abundant common buckthorn form dense cover. The ground layer is dominated by disturbance species, with several small patches of prairie in open areas. These show signs of past heavy grazing and are significantly degraded. Overall, species composition and the structure of the site suggest that the area has been grazed historically and was probably logged 20 to 30 years ago. These factors combine to give the area a reduced qualitative rank.

UWC-25

Mesic Oak Forest Rank: CD

This young mixed oak forest shows signs of past grazing, and seems to be recovering well from logging of the larger oaks 30 to 50 years ago. Currently, the canopy is composed of a mix of hardwood species, including bur oak, hackberry, black cherry, red oak, and sugar maple, over a mixed shrub layer. Common shrubs are those typical of mesic forest, including pagoda dogwood and silky dogwood, as well as American hazel, highbush cranberry, and young sugar maple. Ground layer species are also typical of mesic forest habitats. Here, grazing increasers such as Pennsylvania sedge, sweet cicely, and honewort are common, as well as a variety of other woodland species. Among these are blue cohosh, Jack in the

pulpit, Canada mayflower, bloodroot, and several species of fern. Much of the area is in moderate to poor quality and in the early stages of recovery, although the prognosis is good if further disturbance is limited. Because of the preponderance of sugar maple in the understory layer and the apparently poor reproduction and establishment of young oaks, the community will continue to shift towards a maple-basswood type as it matures.

UWC-26

Lowland Hardwood Forest Rank: D

This community occurs in a low lying area along a drainage way/wash. A mix of cottonwood, black willow, and box elder dominates the broken canopy. The shrub and ground layers are variable, with much young boxelder in the shrub layer and patches of Kentucky bluegrass, Canada goldenrod, and wild parsnip in the ground layer. The poor overall diversity and predominance of disturbance-adapted species cause this site to receive a lower qualitative ranking.

UWC-27

Dry Prairie
Rank D

This community is impacted by past and current grazing, which has shifted the species composition

towards cool season pasture grasses such as smooth brome and Kentucky bluegrass. There are some stands of the native grasses side-oats grama and Indian grass present, and silky aster, an attractive native prairie species, occurs here as well although grazing pressures have reduced the overall forb diversity. Smooth sumac and European buckthorn are encroaching on the site. Overall, the low diversity and encroaching brush contribute to a reduced qualitative rank.

UWC-28

Oak Woodland-Brushland **Rank D**

This woodland-brushland is dominated by a canopy of bur oak, over a subcanopy of younger American elm and black cherry. The dense shrub layer is composed of thorny species including European buckthorn, gooseberry, and Japanese barberry; since thorny species typically increase when an area is grazed, their predominance is a good indication that this site has been grazed. Ground layer composition is similarly indicative of past grazing, with low overall diversity and a preponderance of grazing increasers such as Kentucky bluegrass and cleavers. Fences in this community are woven, suggesting that this pastured woodland was used by sheep. The low diversity and significant levels of past disturbance contribute to give this site a low rank.

UWC-29

Bedrock Bluff Prairie **Rank: BC**

This prairie community lies on a steep slope, with many platey cobbles across the face. Native species are common, and the forb diversity at the site is unusually rich and abundant. Total forb cover is nearly 50 percent, with over 40 native species documented. While a number of these are common species that readily colonize disturbed sites, some more conservative species are also present, albeit in lower numbers. Some of the forbs present include bird's foot violet, grass-leaved goldenrod, rough blazing star, prairie larkspur, prairie coreopsis, and Leonard's skullcap. Grass diversity is good, and includes the native species prairie dropseed, which is not generally tolerant of heavy disturbance, as well as side oats grama, big and little bluestem, Indian grass, porcupine grass, and Canada wild rye. The nonnative Kentucky bluegrass is common as well. Shrub cover is increasing, with both woodland and edge species, as well as prairie natives, on site. Typical shrubs include buckthorn, prickly ash, and sumac, as well as leadplant, sand cherry, and plum.

Overall, the site is in moderately good to good condition. The southern portion of the site has been grazed, and is in somewhat poorer condition than the northern section, which has not been grazed. The site would benefit from active management such as prescribed burn and/or brush clearing.

UWC 30

Dry Oak Savanna Rank: CD

This community is adjacent to UWC-27, and is somewhat intermediate between a savanna and an

oak-woodland brushland. The canopy is very patchy to open, and dominated by medium (18") diameter bur oak, most of which are contorted and gnarly, with spreading canopies and heavy limbs. The shrub layer is generally dense. Prickly ash and paper birch dominate, with an occasional red cedar or thicket of gray dogwood. The ground layer includes species that are typical of prairies, as would be expected in a savanna community, as well as species more typical of a dry oak forest. Non-native species such as Kentucky bluegrass are common, especially in clearings or other open areas. Some of the prairie species found here include sky-blue aster, bee-balm, and bird's foot violet. Species that are more common in wooded or forested communities include hog peanut, Pennsylvania sedge, northern bedstraw, and wild sarsaparilla. There are some areas with erosion, where runoff from cropland on top of the hill courses through areas with little vegetation. There are also some extremely attractive areas, with nice savanna vistas of the twisted oaks over an open understory. At the southeast end, the site transitions quickly into a mesic oak forest with dense secondary growth (UWC-31).

UWC 31

Mesic Oak Forest Rank: D

This site contains a very dense growth of young elm and occasional paper birch, with only a few larger oak in the canopy. The area was apparently logged selectively, with most of the oak removed between 30 and 40 years ago. The lower elevations were not cut. The shrub layer is sparse to absent across much of the site, with a few European buckthorn and ironwood

saplings the most common species. Ground layer cover is similarly sparse and of low diversity, disturbance tolerant species such as white snakeroot, Pennsylvania sedge, enchanter's nightshade, and lopseed relatively frequent. Overall, the site is of poor quality, with low diversity and little regeneration of oaks or other hardwoods.

UWC 32

Mesic Oak Forest Rank: C

This oak-dominated community has some characteristics that suggest it is a dry oak forest that is transitioning towards a more mesic type. The canopy is composed of a mix of bur and red oak, with northern pin oak, black cherry, basswood, and American elm also present. Many of the oaks have multiple stems, suggesting that the site was logged, probably around 60 years ago. The patchy shrub layer includes a mix of species, including American hazel, European buckthorn, prickly gooseberry, hawthorne, and nannyberry. Ground layer species are typical of forest or woodland communities, and there are mesic community associates such as wild ginger, Canada mayflower, nodding trillium, and greater lady's bells, and dry community associates including pointed-leaved tick trefoil. Overall, the site offers good structural and species diversity, and is in relatively good condition.

UWC 33

Bedrock Bluff Prairie Rank: C

The steep slopes of this community are marked by platey cobbles and sandy outcrops, with a good cover by native species. Grasses include the native species Indian grass, big and little bluestem, Canada wild rye and porcupine grass, as well as the non-native Kentucky bluegrass. Forb diversity is good. Bird's foot violet, sky-blue aster, sheep sorrel, purple prairie clover, and blue-eyed grass are among the species present, as well as species that are more weedy. Shrubs at this site include smooth sumac and bittersweet, the prairie natives sand cherry and leadplant, and some scotch pine. One problem species that is present and reproducing is the Siberian Pea shrub, a non-native species that is invasive and problematic in areas south of Minnesota, and has the potential to become a problem within Minnesota. If there is interest, continued monitoring and/or removal of this plant is appropriate. In addition, there is some erosion on site, mostly around and under the Siberian pea shrub. This site is a good candidate for active management, including removal of the pine and Siberian pea shrub and the implementation of prescribed burns to help maintain the prairie.

UWC 34

Oak Woodland Brushland Rank: D

This community is marked by a patchy, broken canopy of medium-size (16" diameter) bur and northern pin oak, with a number of smaller black cherry and honey locust. The shrub layer is dense, and dominated by the

non-native invasive species European buckthorn and Siberian pea shrub. There are some young black walnut and basswood present, although these form only a minor component of the total shrub cover. Because of the dense shade cast by the shrub layer, ground layer cover is sparse. Species which are well-adapted to disturbance, such as reed canary grass and white snakeroot, are common; there are also some species that are typically associated with a brushland or more open habitat, including pointed-leaved tick trefoil and bee balm. In addition, there is a small population of yellow lady-slipper.

As noted in the description for UWC 33, the Siberian pea shrub is an invasive species that is not yet well-established in Minnesota. Successful control and/or eradication of existing populations are an important strategy for preventing this species from becoming more widely spread, and is warranted in this case if there is landowner interest. Overall, the low plant diversity and preponderance of disturbance-tolerant species combine to give this site a minimal qualitative ranking.

UWC 35

Bedrock Bluff Prairie **Rank: CD**

This prairie is dominated by the non-native grasses Kentucky bluegrass and Canada bluegrass, with some native grasses and forbs present as well. Native species that occur here include Indian grass and big bluestem, with some heath aster, silky aster, and stiff goldenrod;

overall, forb diversity and population size are low. Non-native species include smooth brome and clovers, in addition to the bluegrass species mentioned above. Brush levels are high on this site, with much smooth sumac, and lower levels of prostrate juniper, American plum, buckthorn, and young cottonwood. There is some evidence of brush-cutting, and ATV trails criss-cross the site. Management recommendations for this site include continuing the brush removal, limiting ATV use, and considering implementing a prescribed burn program to set back the brome and bluegrass and promote the prairie species. In general, the site is in poor to moderately poor condition due to the abundance of bluegrass and brome, and the relatively low presence of prairie species.

UWC 36

Oak Woodland-Brushland Rank: CD

The canopy in this community is dominated by a mix of bur oak, cottonwood, elm, and green ash, for a total cover of about 50 percent. Prickly ash and gooseberry contribute to the patchy shrub cover, and their population levels are a good indication that the site has been heavily grazed in the past, since livestock tend to browse non-thorny species. As a result, the thorny species, such as prickly ash and gooseberry, generally spread and flourish. The ground layer species are similarly indicative of grazing, with much Kentucky bluegrass in clearings and stinging nettle in more shaded areas. Other species found include sweet cicely, Pennsylvania sedge, smooth brome, and Canada goldenrod. The site is currently used as a pasture, and current grazing activity appears to be lighter than that

which the site has experienced in the past. In general, the low diversity and preponderance of disturbance-tolerant and non-native species contribute to the relatively low qualitative ranking for this site.

UWC 37

Oak Woodland-Brushland **Rank: D**

Bur oak and quaking aspen dominate the patchy canopy in this woodland, with an occasional cottonwood and very occasional black oak contributing to the total cover. The oaks are of moderate size, with both species averaging around 14 inches diameter, and many of them are beginning to decay. The aspen and cottonwood are generally smaller, ranging from 10 to 12 inches diameter, respectively. The shrub layer varies from moderately thick to thick, and includes black cherry and quaking aspen saplings as well as European buckthorn and prickly gooseberry. The ground layer is dominated by nonnative species, and the native species present tend to be those that increase as a result of disturbance. Typical species include Canada goldenrod, stinging nettle, and cleavers.

Evidence suggests that the site has been logged, perhaps 30 – 40 years ago, and it is currently used as a pasture. Overall, the species composition, predominance of weedy species, and poor condition of the canopy trees combine to give this site a minimal qualitative rank.

UWC 38

Dry Prairie

Rank: D

This prairie site has only a few native species present, and is dominated by cool-season pasture grasses including smooth brome and Kentucky bluegrass. The forb component is quite low, and consists primarily of Missouri goldenrod. Much of the area was planted with blue spruce, white pine, and plum 10- 15 years ago, and smooth sumac and black cherry have colonized the site. There are a few young bur oak present. Despite these factors, the site does meet some minimum standards to be qualified as prairie, but receives a minimal ranking.

UWC 39

Bedrock Bluff Prairie Rank: D

This community has been converted to a horse pasture, and is dominated primarily by Kentucky bluegrass, although some native species are still present, including side oats grama grass and silky aster. Other species were not identifiable due to grazing pressures, which are severe. Since the adjacent house is of recent construction and the intense grazing may be a recent phenomenon, it is likely that native species persist in the seedbank and, under appropriate management, the site could both recover and also provide better forage.

UWC 40

Oak Woodland-Brushland Rank: D

This grazed community contains a mixed canopy of bur and black oaks, boxelder, green ash, and quaking aspen. The oaks are of good size, with the black oaks

averaging 18 inches in diameter and the bur oak around 14 inches in diameter, and there are no indications that the site has been logged. Together, the canopy species cover about 70% of the area. The shrub layer is thick to very thick, and dominated by thorny species, such as European buckthorn, prickly gooseberry, and prickly ash. The ground layer is generally of poor quality. Sweet cicely, stinging nettle, Kentucky bluegrass, and cleavers are all common, as is typical of pastured woodlands. In general, the poor species diversity, preponderance of species that increase with grazing, and lack of more desireable natives contribute to give this site a minimal ranking.

UWC 41

Bedrock Bluff Prairie Rank C

This community contains a mix of native and non-native species, with the nonnatives Kentucky bluegrass, Canada bluegrass, and smooth brome dominating the ground cover. The most common native species include big bluestem and side oats grama, with leadplant, purple prairie clover, blue-eyed grass, silky aster, and heath aster also present. Brush levels are increasing, and both smooth sumac and red cedar are encroaching and shading out the prairie plants. In fact, after reviewing the 1993 aerial photos of the area the prairie appears to be shrinking. Overgrazing is also affecting the community's viability. This site would benefit from an updated grazing management plan, which could enhance the condition of the prairie as well as improving the forage quality for livestock. Additional benefits would arise from brush removal, and possibly implementing a prescribed burn regime. Because the

site has good potential to improve with appropriate management, its qualitative rank was upgraded slightly from what its current condition might otherwise warrant.

UWC 42

Oak Woodland-Brushland Rank: CD

This oak woodland-brushland has an interrupted canopy dominated by good sized (16 – 18" diameter) bur oak, with many younger specimens of white oak, basswood, quaking aspen, American elm, and green ash contributing to form a total canopy cover of 70 – 80%. Prickly gooseberry and prickly ash dominate the shrub layer, along with European buckthorn and some young black cherry. In the ground layer, there are small patches of prairie below canopy gaps. Otherwise, ground cover is patchy, with grazing increasers such as sweet cicely, stinging nettle, cleavers, and smooth brome common. Reed canary grass dominates low-lying areas. In addition, there are a few small prairie openings below gaps in the canopy. Several wild turkey were sighted during the field inventory. Overall, the site is in moderate to moderately poor condition, and the presence of the prairie openings improves its ranking somewhat.

UWC 43

Bedrock Bluff Prairie Rank: CD

This attractive prairie has good cover by several native grasses, including big and little bluestem, prairie dropseed, and sideoats grama. Non-native grasses

here include smooth brome and Canada bluegrass. Overall forb diversity is moderate to low, with a mix of more common native species such as Canada goldenrod and yarrow, non-natives including white sweet clover and common mullein, as well as the more desirable native species silky and heath asters, and lead plant. There is some tree cover by young quaking aspen and red cedar. In general, the site is in moderately poor condition, due primarily to the low diversity, especially of forb species. It provides good wildlife habitat, and several grouse were noted during the field survey. It is also worth noting that a large gully is beginning to form, about 30 yards from the road.

UWC 44

Dry Prairie
Rank: D

This site is heavily dominated by smooth brome, to the virtual exclusion of all other species. There are some scattered clumps of little bluestem, but few other native species are present. Red cedar, green ash, and planted Siberian pea shrub are also present. Efforts to control the Siberian pea shrub may be appropriate, as it has become invasive in other Midwestern states and has the potential to become a problem in Minnesota should it become established. The very low diversity contributes to this site's minimal ranking.

UWC 45

Bedrock Bluff Prairie Rank: CD

This site is very similar to UWC 43, with nearly identical species composition and distribution. It differs primarily in the levels of tree and brush cover, which are slightly higher on this site and lend a more savanna-like appearance, and in recent land use history. UWC 45 has been pastured more recently, and is still being lightly grazed. These differences are enough to break it out as a separate site, although overall quality and condition are not significantly different.

UWC 46 do not map

UWC 47

Mesic Oak Forest **Rank: D**

This community occupies a low-lying area at the base of several steep slopes. Recent logging has removed many of the trees, and there are still piles of logs scattered throughout the site. The remaining canopy cover is quite patchy, and dominated by basswood, a mix of relatively short (30 – 50' tall) red and white oaks with average diameters around 16 inches, and a number of smaller diameter paper birch and quaking aspen. Young American elm and prickly gooseberry dominate the shrub layer, with some chokecherry also present. The ground layer is moderately diverse, and includes a number of species with prickly fruit. Typical species include sweet cicely, cleavers, northern bedstraw, and wild geranium as well as a species of

sedge. These can be indicative of past grazing, as the fruit clings to the hide of the livestock and is dispersed through the site. Numerous old roads run through the site, perhaps for past logging access. Overall, the site is fairly disturbed, and lacks the canopy structure and forb diversity necessary to qualify for a higher qualitative ranking.

UWC 48

Oak Woodland-Brushland **Rank: CD**

This woodland has a patchy canopy of mixed oak, with black oak, white oak, and bur oak all present. The bur oak are largest, with diameters averaging between 14 and 16 inches. The black oak and white oak are somewhat smaller, averaging 10 – 12 inches in diameter. Black cherry and quaking aspen form the remainder of the canopy. Shrub cover is also patchy, and contains a mix of gooseberrys, poison ivy, and an occasional pagoda dogwood. Ground cover is patchy to absent, with areas of cleavers, wild geranium, and stinging nettle. Currently, the area is being used as a pasture, and, while grazing pressures are intense, the landowner is also taking steps to manage the property. Some steep, highly erodable land around the creek has been fenced off, and there is evidence that a rotational grazing strategy is being used. Overall, the site is in moderately poor condition.

UWC 49

Bedrock Bluff Prairie **Rank: CD**

This site includes two prairie communities with heavy levels of brush invasion. The ground layer contains good cover by prairie natives, including little bluestem and sideoats grama, and relatively high levels of porcupine grass. Forbs that are present include lead plant, silky aster, stiff and old-field goldenrods, and golden alexanders. The brush cover on this site is quite high, with significant levels of smooth sumac and quaking aspen. Young black cherry forms a minor component of the brush coverage. There is some light grazing here as well. Overall, the site has some diversity, and receives a moderately poor qualitative rank. However, this community faces a real risk of vanishing in the near future, as the woody plant population continues to increase. Brush removal and possible implementation of prescribed fire is appropriate, if the landowner desires to maintain this area as a prairie. Since the area appears to be grazed occasionally, managing for prairie and implementing a grazing plan may simultaneously improve forage at this site as well as its ecological value.

UWC 50

Oak Woodland Brushland Rank: CD

This woodland community has a patchy canopy dominated by bur oak and black oak, with some basswood and American elm contributing to give a total canopy cover of 40 – 60%. Basswood dominates the patchy understory. In the shrub layer, total cover is relatively sparse. Thorny species are common, including raspberry and gooseberries. In addition, scattered thickets of gray dogwood, and boxelder and black cherry saplings are found throughout the site.

The ground layer shows some signs of disturbance, with a mix of bur-fruited plants such as cleavers and sweet cicely, and woodland/forest species such as northern bedstraw and Jack-in-the-pulpit. Overall, this is an attractive area, and the open shrub layer has allowed a moderately diverse ground layer to persist. Generally, the site is in moderate to moderately poor condition.

UWC 51

Bedrock Bluff Prairie **Rank: D**

This prairie site shows signs that it has been heavily pastured for many years, and is, accordingly, dominated by cool-season pasture grasses such as smooth brome and Kentucky bluegrass. Little bluestem is one prairie native that tolerates grazing quite well, and it forms a significant component of the ground cover here. However, it is one of the few prairie species present and overall diversity at the site is quite low. Thus, the site receives a minimal ranking.

UWC 52

Lowland Hardwood Forest **Rank: CD**

This wooded community has developed in the low-lying areas along a stream corridor. The canopy constituents are fairly typical for this community type, including a mix of medium-sized cottonwood, basswood, black willow, and green ash, as well as some boxelder and black cherry. Total canopy cover is patchy, averaging around 50 %. Shrub cover is sparse, with only occasional black cherry saplings and patches of prickly gooseberry. Most of the diversity in this

community is represented in the ground layer. Here, the species present indicate some past disturbance, as many are bur-fruited or somewhat weedy in character. Common species include cleavers, wild parsnip, burdock, stinging nettle, and patches of reed canary grass. In general, the low levels of desirable native species diminish the qualitative ranking of the site, while the lack of a dense shrub layer of prickly or non-native species tends to increase its rank slightly. These combine to yield a moderately poor value for the site.

UWC 53

Oak Woodland-Brushland Rank: CD

This community provides an excellent example of an oak forest that has converted to an oak woodland-brushland. The canopy species are tall and straight with small canopies, as is typical of trees that developed in a shady, closed-canopy environment, although the current canopy coverage is patchy, averaging 50 – 60%, with a dense layer of brush below. This, combined with the numerous roads through the site, strongly suggests that the area has been logged selectively, probably with the removal of desirable hardwood species. Currently the canopy is a mix of 14 – 16 inch diameter bur oak, with smaller basswood and green ash, and an occasional white oak. The shrub layer has probably expanded significantly since the area was logged, as a result of the higher light levels on the forest floor. Red cedar, black cherry, gooseberry, and boxelder dominate this layer. On the ground, typical species are those indicative of grazing or other disturbance, including sweet cicely, stinging nettle, and Kentucky bluegrass. Despite the past

disturbance, the area has potential to improve, and thus receives a moderately poor ranking.

UWC 54

Bedrock Bluff Prairie Rank: CD

This prairie community contains a mix of native and non-native species, with pasture grasses such as Kentucky bluegrass and smooth brome dominant. There is also a good diversity of native grasses on site, including big and little bluestem, side oats grama, porcupine grass, and plains muhly grass. Forb diversity is low. Many of the species are disturbance-tolerant and are not reliably associated with good-quality sites, however they do contribute to overall diversity at this remnant prairie. Typical species include clover and Canada goldenrod, as well as silky aster, stiff goldenrod, and a species of dogbane. In addition, there are patches of red cedar and smooth sumac colonizing the area. While the site does not appear to be grazed currently, species composition indicates that it has been grazed historically. In addition, portions of the site are used for hay. Overall, the site has some moderate diversity although forb diversity is low, and warrants a moderately poor qualitative ranking. The site also provides wildlife value, and wild turkey were flushed during the field survey.

UWC 55

Oak Woodland-Brushland Rank: D

This oak community is dominated by medium size (14 – 16 inch diameter) bur oak, with some black cherry, cottonwood, and occasional white oak forming the remainder of the sparse canopy. Recent logging activity has opened up the canopy significantly, and piles of oak logs remain on the site. The shrub layer is currently patchy, although it is likely to increase in the wake of logging due to the increased amount of light penetrating through the fragmented canopy. Typical species include prickly ash, European buckthorn, and prickly gooseberry. Ground cover is also patchy, with a mix of pasture grasses and native forbs that increase as a result of grazing. Kentucky bluegrass, smooth brome, black snakeroot, and sweet cicely are common. Overgrazing is contributing to erosion problems on the steep slopes in this community, and this is likely to be compounded as the shrub layer increases and shades out ground layer species. The level of past disturbance and the low species diversity warrants a minimal ranking for this site. However, brush control and an updated grazing plan would help reduce erosion and minimize runoff impacts to the creek that runs through the site.

UWC 56

Oak Woodland-Brushland Rank: CD

This community has a species composition very similar to the preceding site, UWC 55, with a sparse canopy of bur oak and mixed hardwoods, and a shrubby brush layer dominated by thorny species such prickly ash, European buckthorn, and gooseberry. The ground layer is also typical of grazed woodland sites, with stinging nettle, sweet cicely, northern bedstraw, and

the pasture grasses Kentucky bluegrass and smooth brome. This site has been logged quite recently, and while grazed in the past, has not been as heavily impacted as site UWC 56. Because the levels of disturbance are somewhat less here, it receives a slightly higher qualitative rank than the preceding community.

UWC 57

Bedrock Bluff Prairie **Rank: BC**

This attractive prairie community contains a mix of native and non-native species. Several species of native grass are present, including big and little bluestem, Indian grass, side oats grama, and prairie dropseed; the latter species is of interest because it does not tolerate heavy grazing, and its presence indicates that past grazing on the site was, at best, light. There are also moderate levels of the non-native Kentucky bluegrass. Forb diversity is moderate. Some of the native species on site include sky-blue, silky, and heath asters, a species of blazing star, purple prairie clover, and blue-eyed grass. Non-natives include clover and common mullein. Overall, the site is in moderately good condition, with low to moderate diversity and only low levels of problem species such as the Kentucky bluegrass. There is some woody plant encroachment onto the site, including red cedar, smooth sumac, gray dogwood, and some young black cherry trees. If there is interest in managing this

prairie, it would benefit from having the woody plants removed and being treated with prescribed fire. If, after several years, it is apparent that there is not enough viability or diversity in the seed bank to allow species diversity at the site to increase, it may be appropriate to interseed with local ecotypes of appropriate species.

UWC 58

Oak Woodland-Brushland Rank: CD

Bur and white oak dominate the patchy canopy of this woodland community, with occasional paper birch filling in to yield a total canopy cover of 50 – 60 percent. The oak are of moderate size; diameters range from 12 – 14 inches for the white oak, and the bur oak are slightly larger, with diameters between 14 and 16 inches. There is a distinct subcanopy of sugar maple and black cherry. The shrub layer ranges from moderately thick to thick, and is dominated by prickly ash, European buckthorn, and gooseberry. The ground layer shows many signs of disturbance, and most of the species are bur-fruited or thorny species that typically increase with grazing. These include cleavers and sweet cicely, with many gooseberry and black cherry seedlings. Although this community qualifies as an oak woodland now, due to its patchy canopy, as the young sugar maples mature and fill in the canopy gaps this site will develop into a mesic, maple-basswood forest community type. Its overall condition as that community type is unknown, as typical mesic forest shrub and ground layer species do not appear to be present.

UWC 59

Lowland Hardwood Forest Rank: D

It is likely that this community developed in the wake of past logging that removed the mature hardwoods, and species typical of a lowland hardwood community then either colonized the site, or were present in the understory prior to disturbance and grew to dominate the site after the canopy species were removed. Now, the canopy is composed of American elm, basswood, quaking aspen, paper birch, and green ash, all with diameters between 10 and 12 inches. Some bur oak in the same size class are also present. The uniform size of the current canopy species supports the idea that the area was clear-cut historically, as many of these species have similar growth rates under open conditions, and are probably roughly the same age. In the shrub layer, cover is moderately thick to thick, with prickly ash, black raspberry, gooseberry, and European buckthorn. The ground layer is dominated by a few species, including cleavers and stinging nettle. The dense brush, predominance of thorny species, and poor diversity in the ground layer suggest that the area has been heavily grazed in the past. Because of this, and because the community has changed significantly from its historical condition (which was probably oak forest or maple-basswood forest), it receives a minimum qualitative ranking.

UWC 60 no data sheet

UWC 61

Dry Prairie

Rank: CD

This prairie community contains a mix of native and non-native species, ranging from aggressive, non-native cool season grasses such as Kentucky and Canada bluegrasses, to more conservative prairie species such as prairie dropseed grass. Other grasses at this site include smooth brome, a non-native, and the native species big and little bluestem. The forb component of the site is similarly split between native and non-native or disturbance-tolerant native species. Examples of the former include sky-blue aster, silky aster, and lead plant; disturbance-tolerant and non-native species include Canada goldenrod, sweet clovers, and field clovers. Woody plant cover is high enough to lend the area a savanna-like appearance, and red cedar, cottonwood, and black cherry contribute to this cover. The species composition and presence of fences reveal the areas grazing history. The site has the potential to improve with management. Appropriate activities, if there is interest, include removing the shrubs and trees, implementing a prescribed burn program to restrain the non-native cool season grasses, and possibly interseeding with local ecotype prairie species.

UWC 62

Oak Forest Rank: C

Bur oak, black oak, white oak, and cottonwood dominate the canopy in this mixed oak forest, with some quaking aspen, paper birch, and box elder also present. The oaks are of moderate size, with the bur oaks averaging between 14 and 16 inches in diameter, the white oak 12 to 14 inches in diameter, and the black oak somewhat smaller. Shrub cover is moderate

to thick. Species range from those characteristic of mesic habitats, such as the occasional pagoda dogwood, to those typical of drier oak communities such as chokecherry, to thorny species including several species of gooseberry. Ground cover is patchy, with Pennsylvania sedge, maidenhair fern, cleavers, and some wild geranium. There are some indications that the site has been grazed, but this activity appears to have ceased some years ago. Overall, the site is in moderate condition and is likely to improve if allowed to continue its natural succession.

UWC 63

Bedrock Bluff Prairie **Rank: D**

This site includes 4 separate prairie communities of similar quality. They appear to have been grazed heavily until fairly recently, and are heavily dominated by non-native cool season pasture grasses, such as Kentucky bluegrass and smooth brome. Little bluestem, which is very tolerant of grazing, is common on the site; big bluestem is present as well, albeit in much lower numbers. The number of additional prairie species on site is limited, with only leadplant and heath aster noted during the field survey. There is some brush encroachment, mostly by red cedar and quaking aspen. Due to the low numbers and poor diversity of prairie species, and the preponderance of sod-forming non-native grasses, the site was given a minimal qualitative ranking.

UWC 64

Dry Prairie

Rank: C

This attractive prairie contains a mix of native and non-native grasses and forbs, in a savanna-like setting with sparse trees. Native grasses dominate the cover, and include common species such as big and little bluestem and sideoats grama, as well as the more conservative prairie dropseed. Some non-native grasses occur as well, including Kentucky bluegrass and smooth brome, but these form a minor component of the cover. Forb diversity is moderate. Sky-blue aster, silky aster, purple prairie clover, and stiff goldenrod occur throughout the site, as well as species planted for forage, such as field clovers and sweet clover. Tree and brush cover is patchy to sparse. Four to six inch diameter quaking aspen are scattered throughout. Smooth sumac is abundant, and there is also some red cedar and planted Siberian pea shrub, the latter of which is beginning to spread. Woven fencing around the site indicates that it has been grazed in the past, most likely by sheep. Overall, the site is in moderate condition. It has some diversity of native species and only minor levels of problem species such as sod-forming grasses, but is also threatened by the increasing levels of woody plant cover. The Siberian pea shrub is especially problematic, as noted in earlier site descriptions, as it has became quite invasive in other Midwestern states and, as it becomes more widely dispersed, has a very real potential to become a problem in Minnesota. If there is interest in maintaining and/or improving the site, brush and tree

removal and the implementation of a prescribed burn program would be appropriate.

UWC 65

Mesic Oak Forest Rank: CD

This oak-dominated community supports a patchy to closed canopy dominated by bur and white oak, and some black walnuts. There are also a number of planted pines within the site. The shrub layer is sparse to moderately thick. Red cedar are common, as well as smooth sumac and some young black cherry. The ground cover is in moderately good condition. Typical species include sedges, the non-native Kentucky bluegrass, jack-in-the-pulpit, and wild geranium. Areas have been planted with Siberian pea shrub, and this invasive non-native species is beginning to spread within this community. Overall, the site is in moderately poor condition, given the relatively low diversity, but the ranking is improved by the lack of severely aggressive species such as European buckthorn.

UWC 66

Dry Oak Forest Rank : D

This community contains a mix of dry-mesic oak forest with some scattered bluff prairie openings. Overall canopy cover ranges from 65-75%, with primarily bur oak and aspen in the canopy. Other canopy species include paper birch, with occasional American elm and green ash. In the shrub layer, cover is sparse overall although smooth sumac has heavily invaded the prairie openings. Elsewhere, prickly gooseberry and prickly

ash are more common. The presence of these thorny shrubs, combined with the woven fencing on-site, indicates that the area was grazed historically, probably by sheep. ON the ground layer, the species composition also suggest past grazing, with an abundance of bur-fruited or unpalatable species such as stinging nettle, sweet cicely, and cleavers. Other species include wild geranium, Jacob's ladder, northern bedstraw, and wild strawberry. Overall, the site is in relatively poor condition, and past land use has significantly reduced the diversity of species that otherwise would occur here.

UWC 67

Dry Prairie

Rank: CD

This prairie community contains a nice mix of native grasses and forbs, and relatively low levels of pasture grasses. Common natives include leadplant, big and little bluestem, Indian grass, and prairie dropseed, and the forbs silky aster and blue-eyed grass. Non-native species include smooth brome, sweet clover, and common mullein. There is patchy cover by smooth sumac and some red cedar. Fences and the species composition both indicate that the site was grazed historically, although this activity apparently ceased 5 - 10 years ago. The low levels of non-native species help increase the qualitative ranking of this site, even though forb diversity is low. The site would benefit from brush removal and the implementation of a prescribed burn program, if the landowner is interested in active management of the site.

UWC 68

Oak Forest Rank: D

This wooded community contains a nearly closed canopy dominated by oaks, with a mix of other deciduous species in the canopy and subcanopy. Medium diameter (12 – 14 inches) bur oak are the most frequent, with some smaller (10 – 12 inch diameter) whit and black oak also present. Other species include American elm, basswood, quaking aspen, and paper birch. The shrub layer is thick to moderately thick, and dominated by gooseberry, European buckthorn, and prickly ash. Black cherry saplings and chokecherry occur in low levels. In the ground layer, most of the species are bur-fruited or tolerant of disturbed/compacted soils, and strongly suggest the area has been grazed heavily in the past. Typical plants include cleavers, sweet cicely, and honewort. Because of the dense shrub layer, dominance by invasive or armed shrubs, and the lack of more conservative woodland species in the ground layer, this site receives a minimal ranking.

UWC 69

Mesic Oak Forest Rank: CD

This wooded community is dominated by bur and white oaks, with quaking aspen, cottonwood, black cherry, and green ash also contributing to the total canopy cover of 60 – 70%. The shrub layer is moderately thick to thick, and dominated by thorny species. European buckthorn is abundant, as well as prickly gooseberry and scattered thickets of gray dogwood. The patchy ground cover includes a mix of grassland and

woodland species, ranging from Canada goldenrod and wild geranium to lady fern and white snakeroot. There is some evidence of past tree planting. Overall, the site is moderate condition, although it does face threats from the population of Siberian pea shrub that was planted on site.

UWC 70

Dry Oak Forest Rank CD

A mix of black, bur, and white oak dominates the canopy in this oak community. Other species present include some green ash and black cherry, for a total canopy cover between 70 and 80%. Thorny species including European buckthorn dominate the patchy shrub layer. Young basswood, boxelder, and black cherry saplings are also common. Ground is also patchy, and includes many species that are tolerant of grazing or otherwise indicate past disturbance, including cleavers and white snakeroot.

UWC 71

Bedrock Bluff Prairie Rank: D

This prairie and savanna community show many signs of past grazing activity. The area is heavily dominated by pasture species such as Kentucky bluegrass, smooth brome, and clovers, with only low levels of prairie species. Among the more frequent prairie species present are little bluestem and porcupine grass, and a few leadplant. Brush levels on the site are moderate,. Smooth sumac, black cherry, and black walnut are all present, as well as some bur oak. The overall high levels of non-native species and correspondingly low

levels of prairie natives indicate that a minimal qualitative ranking is appropriate.

UWC 72

Bedrock Bluff Prairie Rank: C

This community shows signs that it was grazed historically, but seems to be making a good recovery. Native short grass prairie species such as little bluestem and sideoats grama dominate, and other prairie grasses including prairie dropseed, big bluestem, and Indian grass are common. Forb diversity is fairly low, with silky aster and purple prairie clover typical native species. Non-native species include several clovers, thistle, ox-eye daisy, and common mullein. Shrubs are beginning to dominate portions of the site. Overall, the site is in moderately good condition.

UWC 73

Mesic Oak Forest Rank: CD

Within this oak community, there are a variety of different species that contribute to the total canopy cover of 75%-80%. Medium (14 – 16 inch diameter) bur oak are the most common. White oak, black oak, black cherry, and American elm are also present. Most of the trees are of small to moderate size and have diameters ranging between 10 and 14 inches. The shrub layer is quite thick, with an abundance of thorny shrubs and saplings of the some of the canopy species. European buckthorn is common. Ground layer species are generally those tolerant of some level of disturbance;

typical species include thimbleweed, motherwort, white snakeroot, and stinging nettle. There are patches of reed canary grass in low-lying areas.

UWC 74

Bedrock Bluff Prairie Rank: C

This site consists of 5 separate prairies of moderate quality, with areas of brush growing up in and around the communities. The most common grasses on these prairies include the non-native Kentucky bluegrass and the natives side oats grama, little bluestem, and prairie dropseed. Forb diversity is fairly low. The site includes several clovers, which were likely planted for forage in the past or were introduced incidentally as a result of grazing, and also has the native species purple prairie clover, silky aster, and stiff goldenrod. Several houses are being built nearby. Overall, the low levels of non-native or severely aggressive species and the dominance by natives give this site its moderate ranking.

UWC 75

Oak Woodland-Brushland Rank: D

This woodland community shows many signs of past disturbance. The canopy is quite open, with total cover between 25 and 50%, and includes a mix of 8 – 12 inch diameter bur and white oak, some boxelder, and basswood, black cherry, and cottonwood. Shrub cover is dense and dominated by European buckthorn and prickly ash, as would be expected in a site that has been heavily grazed or that has been logged, where increased light levels allow shrub populations to

increase. On the ground, species composition is again characteristic of disturbed sites. The most common species (cleavers, sweet cicely, and stinging nettle) are either bur-fruited and readily dispersed by livestock, or unpalatable and tolerant of compacted soils. Old logging roads criss-cross the area. The heavy levels of past disturbance and low overall diversity justify a minimal qualitative ranking for this site.

UWC-76

Conifer Plantation **Rank: NA**

This conifer plantation contains a mix of 12 inch diameter red pine and ponderosa pine, with a few oaks in the understory. Since this is a planted community rather than a naturally-occurring assemblage of plants, there are no qualitative ranking criteria established and the site is not ranked.

UWC-77

Oak Woodland-Brushland **Rank: D**

This poor quality oak woodland-brushland is dominated by bur and pin oak averaging over 20 inches in diameter. Other trees include trembling aspen, and planted black walnut and red pine. The shrub layer is thick and dominated mostly by thorny species including European buckthorn, gooseberry and blackberry. The ground layer is species poor and dominated by introduced species such as smooth brome, or native species that indicate past disturbance such as Pennsylvania sedge and cleavers.

UWC-78

Dry Oak Forest **Rank: D**

Dominated by bur and black oak, as well as paper birch, trembling aspen, and boxelder, this dry oak forest is of generally poor quality. Based on the relatively uniform size of the trees, and their relatively small diameters, (12 inches for the oaks, 2- 6 inches for the the softwood species), it is likely that this site was clear-cut historically and the existing community is the result of post-logging regeneration. There are also some pockets of planted pine and spruce. The shrub layer is very dense and dominated by thorny species, especially the nonnative European buckthorn. The ground layer is similarly poor in quality and dominated by species indicating disturbance, including sweet cicely and cleavers.

UWC-79

Mesic Oak Forest Rank: AB

This very good quality oak community has a nearly continuous canopy dominated by red oak, basswood, and red elm, with an occasional green ash. Larger oaks average about 12 inches in diameter. The shrub layer includes gooseberry and black cherry seedlings. The ground layer is generally diverse, and hosts a rich complement of ferns. Species found in the ground layer include wild ginger, bloodroot, jack-in-the-pulpit; and bracken, maidenhair, and lady ferns. The site is somewhat difficult to access, given its location across the creek and on some steep slopes, but these traits may have helped to minimize impacts and helped the area maintain its quality. The steep slopes may also account, to some degree, for the relatively small diameters of the trees, as steep slopes often are somewhat unstable and larger trees tend to topple. The

good structure and composition of this forest is given added value by the seeps and damp areas found above the creek.

UWC-80

Mesic Oak Forest **Rank: CD**

The canopy composition of this community is very similar to that of UWC-79, but has been significantly impacted by past logging. Common tree species include red oak, basswood, bur oak, and green ash. The understory and ground layers are dominated by disturbance-adapted species. The most common species in the shrub layer is gooseberry, and the ground layer is dominated by sweet cicely, Kentucky bluegrass, Virginia waterleaf, stinging nettle and burdock.

UWC-81

Oak Woodland-Brushland **Rank: D**

The canopy of this community is characterized by widely spaced open-grown bur oaks. Second-growth trees between them include black walnut, paper birch, and elm. The shrub layer is very thick and dominated by prickly ash, European buckthorn, and other thorny or otherwise unpalatable species. The ground layer is generally poor in quality and also indicates past grazing. Common species here include Kentucky bluegrass, creeping Charlie, cat mint, yarrow and columbine. The apparent past disturbance, erosion, trails and poor species composition contribute to yield a low qualitative rank.

UWC-82

Mesic Oak Forest **Rank: BC**

This good quality community has a canopy dominated by bur, white and black oak, with average diameters around 10 inches. Other canopy members include paper birch, red elm, basswood, and trembling aspen. Also present are some planted spruce trees. The shrub layer is patchy, and some areas are relatively open and dominated by natives, such as gray and pagoda dogwoods, while others are thick and dominated by nonnatives or thorny natives, including prickly ash, European buckthorn, and gooseberry. There are some small planted spruce scattered through the site. The ground layer is also variable. Desirable native species found here include tall anemone, violet, columbine, maidenhair fern, golden alexanders, and lady fern. Species in the ground layer that indicate disturbance include honewort, cleavers, and poison ivy.

UWC-83

Oak Woodland-Brushland **Rank: C**

The canopy of this community consists of widely spaced, 12 inch diameter bur oak, with eastern red cedar, black walnut and trembling aspen colonizing the area between the oaks. The shrub layer is generally thick with prickly ash, European buckthorn and other thorny or other unpalatable species. The ground layer is varied, but still contains some species that are indicative of better quality sites. Some of these include harebell, hoary puccoon, prairie coreopsis, roundheaded bushclover and little bluestem. This community received a lowered rank due to the level of brush invasion, although restoration is still reasonable

at this point. Restoration would require removal of the brush and colonizing trees, and management to promote the prairie species in the ground layer.

UWC-84

Bedrock Bluff Prairie **Rank: BC**

This small, good quality bluff prairie is dominated by short native grasses, including little bluestem, sideoats grama, and prairie three-awned grass. Forb diversity is moderate, with two species of coreopsis, harebells, columbine, and narrow leaved pussytoes. Of particular note is the population of kittentails, a state-listed threatened species that is native to bluff and prairie habitats. The quality of this site varies, with areas of greatest diversity occurring on the steeper, less accessible slopes. The site faces pressure from invading brush, including sumac, raspberries, chokecherry, and eastern red cedar, as well as some pine and spruce trees Overall, this prairie is of good quality, but without managing the brush through fire and/or cutting, this prairie, and the kitten-tails population, will likely be lost in the next few decades.

UWC-85

Dry Oak Forest **Rank: C**

This forest has a relatively closed canopy dominated by bur and black oak. These average about 16 inches in diameter. Other common canopy trees include red elm and quaking aspen, averaging about six to eight inches in diameter. The shrub cover is moderate and dominated by boxelder and black cherry with only

occasional European buckthorn. The ground layer has species such as red baneberry, false nettle, and virginia creeper common. Overall, the site is in moderately good condition, with only low levels of invasive shrubs, and a ground layer diversity that has been impacted by past grazing.

UWC-86

Oak Woodland-Brushland **Rank: CD**

This oak woodland is characterized by attractive, open-grown bur oaks that average over 20 inches in diameter. Secondary tree species include bitternut hickory and paper birch. The shrub layer is moderate and dominated by species that tend to be found in disturbed habitats. Some of these include raspberry, European buckthorn and prickly ash. Nonnative pasture grasses and exotic species that persist in pastures dominate the ground layer. In addition, recent road building and associated erosion have impacted the community, and contribute to the overall lowered qualitative rank of this community.

UWC-87

Oak Woodland-Brushland **Rank: NA**

Adjacent to UWC-82, this community has been severely degraded and currently shows signs of very heavy disturbance. It is missing most of the species typical of a described natural community, and the species present are characteristic of extremely degraded sites. It is classified as an Oak Woodland-brushland because this is the community for which it most closely resembles the minimum standards.

UWC-88

Oak Woodland-Brushland **Rank: D**

This community was formerly grazed, with the most recent grazing taking place in the western portion. It is characterized by scattered open-grown bur oak with second growth of smaller elm, eastern red cedar, boxelder and various species of brush. The overall brush and small tree cover is approximately 40 percent. The shrub layer varies, but is generally thick. The ground layer is dominated by nonnative species, particularly nonnative pasture grasses such as Kentucky bluegrass. Due to the extensive grazing pressure and the resulting change in community composition, this community was given a relatively low rank of D.

UWC-89

Bedrock Bluff Prairie **Rank: BC**

This formerly grazed bedrock bluff prairie occurs as several sites within a matrix of light brush cover, in an area surrounded by oak woodland-brushland. Overall, the quality of this prairie is very good, with little brush invasion and some more conservative forb species. Brush cover ranges from 20 to30 percent between these bluff prairies with eastern red cedar and horizontal juniper most common. The most common grasses include little and big bluestem, plains muhly, prairie dropseed and Indian grass. The most frequently encountered native forbs include white camass, pasque flower, sky blue and silky asters, and purple prairie

clover. Also present on the southeastern-most small prairie was compass plant. This icon of the tallgrass prairie reaches the northern edge of its range here and was found on only one other site in the (lower) Wells Creek Watershed. Because of the good species diversity and low levels of brush invasion, the site was given a moderately good qualitative ranking. If there is interest, the site would be a good candidate for active management to preserve and possibly improve its quality. Possible activities include brush removal and prescribed burn implementation.

UWC-90

Oak Woodland-Brushland Rank: BC

This community is characterized by large, open-grown bur and pin oaks that average over 20 inches in diameter, with some bur oaks reaching 40 inches. Smaller trees are filling in between the oaks, with quaking aspen, eastern red cedar and white birch common. The shrub layer is generally moderate in thickness and dominated by natives such as prickly ash, dogwood, cherry, and others. The ground layer is a mix of prairie and dry oak forest species and is generally of moderate to good quality. Frequently encountered species here include windflower, hog peanut, wild geranium, pointed-leaved tick trefoil, heart-leaved aster, and American vetch. Some lower quality patches are also part of this community. These generally occur on the lower slopes and drainage ways.

The good quality of this site is enhanced by the adjacent high quality bedrock bluff prairie, UWC-89.

UWC-91

Dry Oak Forest Rank: CD

This community occurs on a generally north-facing slope and occupies an ephemeral drainage. Although no logging was readily apparent, the canopy of this forest is patchy and the species composition inconsistent, suggesting disturbance in the past. The composition also suggests that this forest is transitioning to a closed-canopy forest dominated by trees capable of reproducing in a shady setting. The canopy is generally dominated by red and bur oak with other trees such as butternut, black walnut, and basswood less common. The shrub layer varies, but is generally moderate and dominated by native species. The ground layer is dominated by natives, and is a mix of species that are present in disturbed settings as well as some that indicate stability and better quality.

UWC-92

Floodplain Forest
Rank: D

This forest has a broken to continuous canopy of trees that average about 12 inches in diameter. Common trees include boxelder, black willow, silver maple and cottonwood. Boxelder is the most common member of the subcanopy/shrub layer. The ground layer is much reduced in diversity, and dominated by the nonnative pasture grass Kentucky bluegrass. The community is

grazed as two separate parcels, resulting in the lowered ranking.

UWC-93

Mesic Oak Forest Rank: C

This oak forest includes parcels under several different ownerships. Overall, it is of moderate to moderately good quality. Areas visited showed no signs of recent logging although many of the trees were young and multiple-stemmed, a probable indication of past logging activities. The shrub layer is generally sparse, and dominated by native species including pagoda dogwood, chokecherry, ironwood, and others. The ground layer varies in quality. The most common ground layer species include wild geranium, interrupted fern, maidenhair fern, pointed-leaved tick trefoil, poison ivy, blue cohosh and others, all of which are typical for this community type.

UWC-94

Oak Woodland-Brushland Rank: D

This community includes parcels under several different ownerships, and occurs on most of the south-facing slopes adjacent to UWC-93. Much of this community may have been grazed in the past as indicated by the recent flush of brush and tree growth and the disturbed ground layer. Overall, this community is of relatively poor quality due to past disturbance. Despite this, it will likely improve in quality in the next few decades if no significant disturbance takes place.

UWC 95

Bedrock Bluff Prairie **Rank: C**

This appealing site has a number of attractive features. It overlooks a small cemetery at the base of its steep slopes, and generally offers some striking views of the surrounding landscape. An abundance of songbirds were present during the mid-June site visit. Aggressive, sod-forming grasses such as Kentucky bluegrass are rare here, and the site is dominated by native grasses. Clumps of prairie dropseed, sideoats grama, Indian grass, and little bluestem dominate the site. The native forbs whorled milkweed, silky aster, and stiff goldenrod are common, and there are also non-native species present as well. Most of the non-natives are forage plants, including alfalfa and clover. Smooth sumac levels on the site are increasing, and this, combined with encroachment by red cedar and thickets of gray dogwood, may threaten the long-term viability of this site. If there is interest in maintain the prairie community, management activities including brush removal and implementing a prescribed burn program are appropriate.

UWC 96

Dry Oak Forest **Rank: C**

This wooded community contains a patchy canopy with 60 -70% cover, with a mix of oaks, quaking aspen, basswood, cottonwood, and black walnut making up the species composition. While oaks form a relatively minor part of the canopy structure, it is likely that the community will mature into an oak forest with time, so it is listed as such here. The understory and shrub layers of the community are relatively patchy and

consist of patches of European buckthorn, prickly gooseberry, blackberry, and young black cherry. Ground layer species include wild geranium, cleavers, honewort, and white snakeroot. These native species are generally common, and tend to increase in the wake of disturbance and may indicate past grazing at the site. Overall, invasive species levels at this site are fairly low, and the site has the potential to improve with time, warranting a moderate qualitative ranking.

UWC 97

Oak Woodland-Brushland Rank: CD

Within this wooded community, there are a number of signs of past grazing, ranging from old fences to the overall plant species composition. The canopy cover here is patchy, ranging between 30 – 50% cover, with a mix of bur and white oak, quaking aspen, black cherry, cottonwood, and basswood. The oaks range in size from 10 – 14 inches, with the bur oak being slightly larger; the other species tend be smaller and have diameters from 8 to 10 inches. Shrub cover is quite thick, as would be anticipated in an area that was grazed heavily then released. Most of the species are "armed," or thorny. Typical plants include European buckthorn and prickly gooseberry, as well as smooth sumac, blackberry, and young saplings of the canopy species. Most of the ground layer species are bur-fruited, such as black snakeroot, honewort, and cleavers. Patches of reed canary grass are also present.

UWC 98

Oak Woodland-Brushland Rank: CD

This large site is broken up into several different parcels with differing land uses. Some of the area is laying fallow, although it shows signs of past grazing. Other areas are currently pastured, and cattle, sheep, and horses are all present. Total canopy cover ranges from 50 – 70% and is dominated by medium bur oak. Other common species include basswood, black cherry, and quaking aspen. The shrub layer is quite thick, and, as is typical in grazed areas, is dominated by thorny species such as prickly ash, European buckthorn, and prickly gooseberry. Ground layer species are also those typical of disturbed sites. There are patches of Kentucky bluegrass, as well as cleavers, stinging nettle, and sweet cicely.

UWC 99

This site has been heavily overgrazed and no longer qualifies as a natural community, thus no community type or rank is given.

UWC 100

Oak Woodland-brushland Rank: D

As is the case with UWC 98, this woodland community is currently used as pasture. However, this site is experiencing severe overgrazing, and is in poorer condition. The patchy canopy includes bur, black, and white oak, as well as quaking aspen and basswood. The dense shrub layer is dominated by European buckthorn, prickly ash, and gooseberry, over a ground layer of cleavers and sweet cicely. Because of the poor species composition, the site receives a minimal qualitative ranking.

UWC 101

Dry Prairie

Rank: CD

The vegetation at this site indicates that it has been grazed in the past, although no such activity appears to have taken place within the last 10 years. Overall, the site is dominated by the non-native pasture species smooth brome and Kentucky bluegrass, with lower levels of native species. The more common natives at this site include side oats grama, little bluestem, and Indian grass, which are generally tolerant of grazing. Forb diversity is low. Stiff and Missouri goldenrods dominate the site. Other forbs include leadplant, a prairie native, and common mullein and sweet clover, which are Eurasian in origin. Brush levels vary across the site, and are highest in the southwest section of the area. Here, there is a savanna-like appearance with red cedar, a few prostrate juniper, and quaking aspen. Because of the overall low species diversity and the preponderance of non-native grasses, the site warrants a low qualitative ranking.

UWC 102

Dry Prairie

Rank: D

This community includes three separate parcels of prairie, which are all currently grazed. Pasture grasses such as Kentucky bluegrass, Canada bluegrass, and smooth brome dominate the cover. The native grasses big and little bluestem and Indian grass occur less frequently, and prairie dropseed, while present, is fairly scarce. Forb cover is similarly weighted towards

pasture species, especially clovers. The native forbs at this site include whorled milkweed, which tends to increase with grazing, silky aster, and heath aster. The low levels of natives, low forb diversity, and abundance of the pasture grasses warrant a low qualitative ranking for this site.

UWC 103

Dry Prairie
Rank: CD

This prairie community has high levels of smooth sumac and some red cedar on site, but retains very good cover by native grasses. The native grasses here include Indian grass, big and little bluestem, and prairie dropseed. Forb diversity and population levels are quite low, and this causes the qualitative value of the site to decrease. Forbs that are present include pale-spike lobelia, purple prairie clover, and bee balm.

Community Descriptions for The North Mississippi-Lake Pepin Watershed

NMLP-1

Oak Woodland-Brushland Rank: D

This disturbed oak woodland has been logged (perhaps clear cut) and grazed in the past. Medium diameter (8" average) white birch and quaking aspen dominate the broken canopy, with some larger (12" diameter) bur and pin oaks occasionally present. The shrub layer

varies in thickness, but is nearly impenetrable throughout much of the site. European buckthorn dominates the shrub thicket, with occasional gooseberry, black raspberry and American hazel. The ground layer is in moderate to poor condition in most places. In addition, there is moderate to severe erosion of a cut bank along the north-south trending streambed. For these reasons, this site has been assigned a somewhat lower rank of "CD".

NMLP-2

Oak Woodland-brushland **Rank: CD**

This oak woodland is similar in character to the previous community, although grazing appears to have been ceased earlier here. A wide variety of tree species occur here. Some of these include several species of oak, aspen, cottonwood, elm, red cedar, white birch, and others. The shrub layer is thick and hosts mostly native species. The ground layer includes a mix of disturbed woodland species and, less frequently, prairie species that are tolerant of persistent grazing. The lower elevations of this community are bordered by old fields and pastured open areas. The hill tops of this community are generally cropped right to the edge of the steeper slopes. This has led to extensive erosion on the hillside due to increased runoff. This community also includes a small portion of lowland hardwood forest in the bottom of this side valley to the Vermillion River.

NMLP-3

Oak Woodland-brushland **Rank: CD**

This oak dominated woodland occurs in several locations along a side valley of the Vermillion River. The canopy is patchy, although younger trees are now crowding the once scattered oaks. The most common large trees are bur and pin oak that average over 16 inches in diameter. Other trees found here include boxelder, basswood, quaking aspen, cottonwood, and scattered thick stands of black walnut. All of the parcels appear to have been grazed historically. The thick shrub layer contains a mix of natives and nonnatives including black cherry, boxelder, gooseberry, sumac, red cedar, and European buckthorn. The ground layer is also a mix of native and nonnative species, including wood nettle, sweet cicely, bedstraw, woodbine and others. Because of the apparently long history of above average disturbance levels, this woodland was given a somewhat lowered rank of "CD".

NMLP-4

Lowland Hardwood Forest Rank: D

This forest occurs in the lowest elevations of a side valley of the Vermillion River. The canopy is somewhat variable, although overall it is dominated by medium diameter (12") boxelder below a scattered supercanopy of larger (24" diameter) cottonwood. Boxelder saplings and European buckthorn dominate the shrub layer. The ground layer reflects the frequent disturbance and erosion/deposition events and is composed of a combination of nonnatives and weedy natives. Because of the recent origin of the forest, the history of disturbance, and the poor short-term opportunity for

quality improvement, this forest was given a minimum rank of “D”.

NMLP-5

Dry Oak Savanna Rank: CD

This former pasture and old field occurs in several widely scattered parcels. It is characterized by scattered bur and pin oak that average over 20 inches in diameter. Between these are some younger trees, particularly black walnut that forms thick stands in some areas. The shrub layer includes species such as chokecherry, sumac, red cedar, and the nonnative Siberian elm. The ground layer includes a mix of native and nonnative species. The native species found here tend to be tolerant of some disturbance. Among these are bergamot, yarrow, flowering spurge, and germander. Nonnative species are mostly represented by the cool season pasture grasses smooth brome, Kentucky bluegrass, and the nonnative forb alfalfa. Although it received a moderately low rank, this community has some restoration potential and would benefit from the reintroduction of prescribed fire and native plants that have been extirpated by disturbances.

NMLP-6

Dry Oak Savanna Rank: BC

This small oak savanna is found near the Dakota County border, about three fourths of a mile west of Highway 316. It occurs in several small parcels within a larger active pasture. The areas of the pasture that are dominated by nonnative species include smooth

brom and Kentucky bluegrass as their most common components. The savanna portions are characterized by scattered bur and pin oak of several sizes, with the larger specimens averaging over 24 inches in diameter. Other smaller trees and brush found occasionally include boxelder, cedar, prickly ash, cherry, brambles, elm and European buckthorn. The most common native grasses include Indian grass, little and big bluestem, and porcupine grass. The most common forbs include white camass, birdsfoot violet, purple prairie clover, smooth blue aster, and pale-spiked lobelia. The good species composition of this savanna, as well as the overall structure, gives this community a good rank. Because dry savannas are rare, this parcel has added importance when viewed on a county-wide scale.

NMLP-7

Oak Woodland-Brushland **Rank: D**

This former oak forest has had most of the oaks logged, and the remaining scattered trees are mostly of low quality, with few younger oaks present. Boxelder, quaking aspen and the nonnative Siberian elm are among the most common of the remaining species. Boxelder are the largest, with average diameters around 12 inches. The shrub layer is thick and tangled with the nonnative species European buckthorn and Siberian elm common, as well as black cherry, black raspberry, and gooseberry. The ground layer has been substantially disturbed by equipment, and perhaps past grazing. The most common species here is the nonnative stinging nettle.

NMLP-8

Dry Prairie

Rank: D

This small prairie lies on the south side of 225th Street. Some portions appear to be formerly tilled, and the entire area is experiencing increased pressure from brush encroachment, especially from sumac, cherry, and green ash. The graminoids and forbs present are mostly those species tolerant of disturbance. Some of these include the nonnative grass smooth brome, and the natives little bluestem, flowering spurge, bergamot, and Canada goldenrod. Because of the level of past disturbance, this prairie was given a minimum ranking. Despite this, this prairie is a candidate for restoration. Potential activities could include spot mowing, prescribed burning, and the interseeding of appropriate native species.

NMLP-9

Dry Oak Savanna Rank: D

This oak savanna community occurs between the edges of larger woodlands and adjacent crop fields. The most common trees are large (average diameter over 24|"), open-grown pin and bur oak. Other, occasional, smaller trees include red cedar and white birch. The shrub layer is sparse to moderate with sumac, brambles, and gooseberry among the most frequently species. The ground layer is in moderately poor condition with a mix of native and nonnative species that indicate a history of grazing and/or other disturbances. Species seen most here include the nonnatives smooth brome, Kentucky bluegrass, catnip,

and campion. The most common native species include Canada goldenrod and yarrow. Although the structural character of this savanna is evident, the species composition of the shrub and ground layer dictate that a lowered rank of "D" is appropriate. If native grasses and forbs were reintroduced, along with historic processes such as managed fire, this oak community would improve in quality quickly. In addition, it provides an important buffer between the oak woods lower on the slope, and excessive runoff and sedimentation from adjacent crop fields.

NMLP-10

Dry Oak Forest Rank: CD

Found on steep slopes along each side of County Road 19, this forest is of moderately poor quality. The most common trees in the often patchy canopy include pin oak, boxelder, cottonwood, and quaking aspen. The pin oak and cottonwood are the largest trees in most places, averaging about 24 inches in diameter. The shrub layer is thick to very thick and includes the nonnative European buckthorn as well as the natives prickly ash, sumac, boxelder and cherry saplings, and gooseberry. The abundance of thorny species suggests a long history of grazing. The ground layer is generally poor in composition and composed of a patchy mix of nonnatives and natives. Some of these include smooth brome, stinging nettle, bergamot, Canada goldenrod, lady fern, and maidenhair fern. Because of the impacted nature of much of this community, it was given a somewhat reduced qualitative rank of "CD".

NMLP-11

Dry Oak Savanna Rank: C

This rare community occurs on the west side of 145th Avenue. I has been grazed historically, and contains about 20 percent total brush and tree cover. The most common trees are widely spaced bur and pin oaks that average over 20 inches in diameter. The most common shrubs include wild plum, Siberian elm, a nonnative species, sumac and red cedar. The ground layer is variable in quality from moderately poor in most places to very good in a small portion of the roadside along 145th Avenue. The most frequently encountered species here that are typically found in good quality prairies include little bluestem, dotted blazingstar, black-eyed susan, porcupine grass, and flowering spurge. Although this prairie has been impacted in the past by grazing and other activities, it has added importance because dry oak savanna is such a rare community type. This savanna would provide an excellent opportunity to restore a dry savanna.

NMLP-12

Floodplain Forest
Rank: CD

This cut-over forest occurs adjacent to the Vermillion River and is surrounded by communities mapped as significant by the MN DNR MCBS biologists. The most common trees here are silver maple and red elm, the former of which average about 15 inches in diameter. The red elm rarely exceed 10 inches in diameter. The shrub layer has black willow as the most common component. The ground layer is variable in quality, with some areas dominated by natives, others by

nonnatives, and, more typically, a combination of the two. Some common species found here include reed canary grass, hop sedge, stinging nettle, giant goldenrod, rough hedge nettle, bugleweed, Canada blue joint grass, joe-pye weed, and smartweeds. One portion of this community is occupied by a small sedge meadow. If considered by itself, the sedge meadow would likely rank as "C" quality or better. Because the larger forest has been logged and experienced some other forms of disturbance, it was given a moderately low rank of "CD".

NMLP-13

Oak Woodland-Brushland Rank: C

This oak woodland occurs on the edge of the Mississippi River just east of County Road 18. Although the character of the remnant savanna is still evident, the area is becoming colonized by silver maples and boxelder that are moving upslope from the river's edge, their more typical habitat. In the absence of periodic fires and/or moderate grazing, the shrub layer is also thick. It is dominated by a mix of natives and nonnatives including European buckthorn, elm, gooseberry, brambles, green ash and sumac. The ground layer varies in quality and composition with the best examples of savanna type flora persisting in the areas where canopy gaps have persisted. Among the more desirable species in the ground layer were prairie coneflower, sand reedgrass, roundheaded bushclover, and dogbane. This savanna-like area, although degraded, provides a good opportunity for restoration of a rare native community type.

NMLP-14

Floodplain Forest

Rank: C

This forest occurs just south of NMLP-13, along the Mississippi River. It is dominated by large cottonwood and silver maple, with smaller boxelder common. The shrub layer is sparse to absent throughout most of the forest, as is typical for this community type. The ground layer is composed mostly of native species. Some of these include blueflag iris, marsh milkweed, softstem bulrush, arrowhead and stinging nettle. Although small, this community was given a moderately good rank because of the minimal influence of nonnatives here.

NMLP-15

Oak Savanna, Sand-gravel Subtype

Rank: D

This small savanna is found on a terrace of the Mississippi/Vermillion River floodplain just south of County Road 13. The most remarkable feature of this community is the grove of large, open-grown bur oaks with average diameters of over 20 inches. Other, smaller trees occur less frequently, including cottonwood, green ash, and planted fir trees. The shrub layer is sparse to moderately thick, and supports a mix of boxelder, common elderberry, gooseberry, European buckthorn, prickly ash, and brambles. The ground layer retains a few native species, but is mostly dominated by nonnative pasture grasses, particularly smooth brome, quackgrass, and Kentucky bluegrass. Although this savanna received a minimum ranking of

"D", it has good restoration potential. With little effort, native grasses and forbs could be reintroduced and the area managed with a combination of perhaps fire, grazing and mowing. Since remaining dry oak savannas are extraordinarily rare in Minnesota, restoration of such sites is well worth the effort.

NMLP-16

Dry Prairie, Sand-gravel Subtype Rank: BC

This exceptionally good quality small prairie is found along both sides of the Canadian Pacific Railroad and south of Church Road. Brush levels are low in this prairie and consist mostly of small green ash, bur oak, and Siberian elm. The prairies shrubs prairie willow, prairie rose, and leadplant are also found occasionally. The most common native grasses here include sideoats grama, big and little bluestem, sand reedgrass, porcupine grass and Indian grass. Native forbs found here include hoary puccoon, roundheaded bushclover, tall wormwood, dotted blazingstar, large-flowered beardtongue, prairie coreopsis, spiderwort, and stiff goldenrod. Overall, this prairie is of good quality, and is significant on a countywide basis. In addition, this provides an excellent opportunity to restore a historic plant community.

NMLP-17

Floodplain Forest
Rank: D

This floodplain forest is found along a low-lying area of the Mississippi and Vermillion Rivers. It has been substantially disturbed by the building of a berm along

the west side of at least one agricultural field. Additionally, the lower areas have a small amount only low levels of tree cover and a ground layer that is dominated by the nonnative reed canary grass. Because of these impacts, the forest was given a minimal rank of "D".

NMLP-18

Oak Savanna, Sand-gravel Subtype

Rank: D

This oak savanna is found just west of Larson Lake and County Road 18. Although the ground layer is significantly different than what would have occurred historically, the tree canopy and composition is similar enough to the standard to consider the community a savanna. The most common trees found here are short, open-grown bur oaks that approach 30 inches in diameter. Other smaller trees among the bur oaks include cottonwood, quaking aspen, and boxelder. The shrub layer is influenced by grazing, with sumac and Siberian elm most common. The most frequently encountered nonnative species in the ground layer include smooth brome and quackgrass, with common mullein, stinging nettle, catnip, and hoary alyssum also present. The most frequently encountered natives include ground cherry, horseweed, and yarrow. Despite the poor rank, this community presents a golden opportunity to restore a very rare plant community type. With little effort, a moderately diverse mix of native prairie/savanna species could be reintroduced to improve forage quantity/quality, as well as to provide habitat for native species.

NMLP-19

Oak Savanna, Sand-gravel Subtype
Rank: C

This savanna is found on the southwest side of the Canadian Pacific railroad tracks and the Prairie Island Nuclear facility. It has approximately 30 percent cover by trees and shrubs. The most common trees here include large, open-grown bur oak that average almost 24 inches in diameter, with more numerous pin oaks averaging about 10 inches in diameter. Shrubs are expanding their coverage quickly, with staghorn sumac most common. Other shrubs include wild rose, raspberry, and poison ivy. The ground layer is a mix of native and nonnative species. The most common natives include big bluestem, woodland sunflower, purple prairie clover, windflower, stiff goldenrod, and roundheaded bushclover. Although the surrounding area has been completely taken over by trees, this historic plant community continues to persist. Former grazing and other activities have caused a somewhat lowered rank, but this savanna could be easily restored by using a combination of fire, seeding, and perhaps grazing.

NMLP-20

Wet Meadow Rank: NA

This former wet meadow is probably best characterized as a reed canary grass monotype. For this reason it

was not given a qualitative rank. It was classified as a wet meadow because that is what it would have been historically. Native species present here include scattered patches of sedges, prairie cordgrass, and a few forbs, including smartweeds. This community dovetails with surrounding MCBS-mapped communities.

NMLP-21

Dry Prairie, Bedrock Bluff Subtype Rank: C

This prairie community is found in several parcels on west-facing slopes adjacent to 145th Avenue. Brush and tree cover average about 20 percent with large, open-grown bur oak and occasional small black walnut. The shrub layer is a mix of thorny natives and nonnatives, including black raspberry, cherry, sumac, and European buckthorn. The ground layer also includes a mix of native and nonnative species. Most prominent among the native species are black-eyed susan, little bluestem, yarrow, pale-spiked lobelia, and harebell. Nonnatives found at least occasionally include Kentucky bluegrass and smooth brome. Because of recent disturbance in the area of this prairie and because of the apparent history of grazing/introduction of nonnatives, this prairie was given only a modest rank of "C".

NMLP-22

Maple-Basswood Forest
Rank: C

This small forest is found along the south side of Collischan Road on DNR owned land. It appears to

have been either an oak dominated or mixed hardwood forest prior to logging that took place many years ago. The trees that became dominant in the aftermath include basswood that approach 30 inches in diameter, and smaller pin oak, white birch, and quaking aspen. The shrub layer is in good condition in many areas, while others are dominated by the nonnatives European buckthorn and Tartarian honeysuckle. The ground layer is also in generally good condition with bedstraw, lady and sensitive ferns, wild geranium, wood anemone, and jack-in-the-pulpit encountered frequently. Because of the mix of tree species that became dominant after logging, it does not have a tree species mix that is typical of any one forest type. This made classification somewhat problematic. Although sugar maple was absent from this forest, basswood comprises the largest component of the canopy and for this reason the forest was still classified as a maple-basswood forest.

NMLP-23

Dry Oak Forest Rank: C

This dry oak forest is found just east of Highway 316 and south of 230th Street Way. It is oriented along the slopes of a northeast to southwest trending valley that drains northeast, to the Vermillion River. The most common trees are multi-stemmed pin and bur oaks, which average about ten inches in diameter. Also common are black cherry, elm, bitternut hickory and others. It appears that the forest has been logged at least two times in the last 60 years, although it does not appear to have been grazed (at least not in the recent past). The shrub layer is variable in quality, as is

the ground layer. Overall, the history of logging and the more recent fragmenting of the forest by home building has caused a lowered rank of an otherwise good quality forest.

8. COMMUNITY DESCRIPTIONS FOR THE SOUTH MISSISSIPPI-LAKE PEPIN WATERSHED

SMLP-1

Maple-Basswood Forest
Rank: CD

This young, second growth forest is composed mostly of young trees and is found on a north-facing slope adjacent to County Road 5. The current composition may have resulted from multiple past logging. Basswood trees are conspicuously absent from this forest. The shrub layer and ground layer reflect past disturbance and contribute to the overall lowered rank. This forest was visited by MCBS staff and is listed as Site #6 in their Countywide inventory.

SMLP-2

Oak Woodland-Brushland Rank: D

Mostly found on south-facing slopes overlooking Sugarloaf Creek, this woodland was likely savanna in the past. Scattered, open-grown oaks dot the hillsides, with dense stands of younger trees and brush between them. The ground layer reflects past grazing with a predominance of nonnative grasses and native forbs capable of tolerating disturbance. This woodland is experiencing a significant problem with black locust

trees that were planted at some point in the past and are spreading quickly throughout the area.

SMLP-3

Dry Prairie, Bedrock Bluff Subtype **Rank: CD**

This prairie is found in several parcels on a south-facing ridge overlooking Sugarloaf Creek. Overall, the species composition of this prairie is poor, an apparent result of long-term grazing. Similar to the previous community, this prairie is experiencing a problem with invading black locust that were planted at some point in the past and are spreading quickly.

SMLP-4

Dry Oak Forest **Rank: CD**

This oak forest appears to have been selectively cut in the past. As a result the canopy is a mix of widely spaced larger trees and regeneration of a mix of hardwood species. The shrub and ground layers reflect past disturbance. As a result this forest received a somewhat lowered rank. This community was visited by MCBS staff during their inventory of the county.

SMLP-5

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

This nice quality bluff prairie is found north of County Road 5 in a side valley of Sugarloaf Creek. Although there is about 25 percent brush cover, of mostly red cedar, there is an overall good composition to the prairie. Native grasses include big and little bluestem, Indian grass, sideoats and hairy grama, and plains muhly. The numerous forbs include silky and sky blue

aster, gray goldenrod, purple prairie clover, and yellow flax.

SMLP-6

Dry Prairie, Bedrock Bluff Subtype Rank: D

This prairie occurs in a long strip overlooking County Road 5. It is quickly being overtaken by brush and has a ground layer that is a mix of native and nonnative species. The most common nonnative in the ground layer is smooth brome. This prairie was visited by MCBS staff during their county wide inventory.

SMLP-7

Mesic Oak Forest Rank: BC

Found on the south side of 335th Street, this oak dominated forest lies on a generally north-facing slope. The most common trees in the closed canopy are red and bur oak that average about 12 inches in diameter. Other, smaller trees found occasionally include basswood, black cherry, white birch, aspen, bur oak, and elm. The shrub layer includes a mix of tree seedlings, native shrubs, and nonnative shrubs. Some of the native shrub species found here include gooseberry, black raspberry, pagoda and silky dogwoods, ironwood, and downy arrowwood. The only nonnative shrub found here in any abundance was European buckthorn, which is somewhat thick in some areas along the dry ridges and hill tops. The ground layer is in good condition with yellow bellwort, pointed-leaf tick trefoil, lady fern, black-fruited mountain ricegrass, and spikenard all found at least occasionally. Despite some logging that appears to

have taken place perhaps 30 to 40 years ago, this forest is in good condition. More recently, a significant hail storm the first week of July, 2000 defoliated most areas of the Sugarloaf Creek valley.

SMLP-8

Dry Oak Forest Rank: C

Found mostly on south-facing slopes, this dry oak forest is of moderate quality. The most common trees include bur and pin oak. These are relatively small and average perhaps 14 inches in diameter. Other less common trees include red oak, aspen, basswood, and white birch. The shrub layer is thick to very thick, with some nearly impenetrable thickets of European buckthorn and prickly ash along some portions of south-facing slopes where the canopy cover is patchy. The ground layer is somewhat poor in quality, with disturbance-adapted species such as honewort, white snakeroot, and sweet cicely common; species that are less tolerant of disturbance are infrequent or absent. Overall, this forest is of moderate quality, despite the condition of the shrub and ground layer in some areas.

SMLP-9

Lowland Hardwood Forest Rank: D

This low forest is found along Sugarloaf Creek and at the base of north-facing slopes in the vicinity. The most common trees include boxelder, cottonwood and black willow, all of which average less than 14 inches in diameter. The shrub layer varies from absent to moderately thick with boxelder saplings, common elderberry, and gooseberry most common. The ground

layer is dominated by species that increase following disturbance, including reed canary grass and stinging nettle.

SMLP-10

Lowland Hardwood Forest Rank: CD

This may have formerly been an oak woodland that has become overgrown by smaller trees including elm, black cherry, cottonwood, hackberry, boxelder, and Siberian elm. The shrub layer is moderate to thick, with European buckthorn, gray dogwood, and smooth sumac among the more frequently encountered species. The ground layer is a mix of native and nonnative species, with the nonnative pasture grasses smooth brome and Kentucky bluegrass most common. Overall, this is a substantially disturbed area and was given a rank of "CD".

SMLP-11

Oak Woodland-Brushland Rank: D

This woodland includes several parcels, most of which are linear in shape and were likely pastured in the past. They are characterized by large, open-grown bur oaks with younger aspen, elm, cherry, and other trees colonizing the areas between the oaks. The shrub layer is dense to impenetrable with prickly ash and buckthorn most common. The ground layer is dominated by weedy natives and nonnative species, with only an occasional patch of desirable natives. In addition, development in the last few decades has further fragmented these small areas. Because of the level of past disturbance and generally poor

composition, this woodland was given a minimum rank.

SMLP-12

Oak Woodland-Brushland **Rank: CD**

Located northwest of Claybank, this woodland has a broken canopy of large, open-grown bur oak. It is grazed and as a result has a nearly absent shrub layer, with the exception of a few thorny native species. The ground layer is dominated by grasses, particularly nonnative pasture grasses.

SMLP-13

Oak Woodland-Brushland **Rank: CD**

This community along the upper reaches of Hay Creek near 350th Street is characterized by large (diameters greater than 26 inches), scattered, open-grown bur oaks. Between these are younger trees, including aspen, boxelder, and cottonwood, as well as a number of thorny shrub species. The most common shrub here is European buckthorn. The ground layer composition is poor overall, with a prevalence of nonnative pasture grasses that indicates a history of grazing. Infrequent native ground cover species include avens and Virginia waterleaf.

SMLP-14

Oak Woodland-Brushland **Rank: CD**

This variable character of this oak woodland ranges from areas of scattered trees, to small groves with intermingled crowns. All of these areas have been

grazed historically, and have a ground cover that is dominated by nonnative pasture grasses and disturbance-tolerant natives. The shrub layer is variable in thickness, with thorny species common, including European buckthorn. Included in this community are a small dry prairie that is of moderate quality and a small area dominated by boxelder, which could be considered as lowland hardwood forest.

SMLP-15

Dry Oak Forest Rank: C

This diverse oak forest covers a large area and includes several parcels. The most common large trees include bur and pin oak. These average about 14 inches in diameter. Other, smaller trees found at least occasionally include elm, aspen, sugar maple, white birch, basswood, bitternut hickory, and hackberry. These combine to form a nearly continuous canopy cover in most places. The shrub layer is made up of saplings of canopy trees, as well as American hazel, chokecherry, ironwood, bitternut hickory, and European buckthorn. The ground layer is in the best condition on steeper slopes and areas that have not been grazed as heavily in the past. Some of these ground layer species include maidenhair and lady ferns, zigzag goldenrod, bishop's cap, yellow bellwort, and red baneberry. Overall, this forest is in moderately good condition and should improve in quality if grazing, logging, and other disturbances are kept to a minimum over the next few decades.

SMLP-16

Lowland Hardwood Forest Rank: C

This young forest is mostly confined to the Hay Creek floodplain and the immediate vicinity. It is characterized by a patchy canopy of elm, boxelder, black walnut, basswood, green ash, cottonwood and black willow. The shrub layer is variable, with common elderberry, chokecherry, brambles, gooseberry, and European buckthorn all found at least occasionally. The ground layer also varies, with some areas dominated by the weedy species reed canary grass and stinging nettle and others hosting the natives Virginia waterleaf, wood nettle, goldenglow, giant goldenrod, and cup plant. Overall, this forest is in moderate to moderately low condition, in part due to the presence of nonnatives and in part because of the early developmental stage of the canopy.

SMLP-17

Maple-Basswood Forest

Rank: BC

This forest includes several parcels of similar composition and quality, although they all have somewhat different land-use histories. The generally closed canopy of this forest is dominated by basswood, sugar maple, and red, pin and white oak, with black cherry, white birch and bitternut hickory all found occasionally. The largest trees are tall and straight, forming a cathedral-like appearance in some places. Other areas have been logged, perhaps as much as 60 years ago, and still have a “brushy” character at the shrub and ground levels. The most common constituents of the shrub layer are sugar maple saplings, ironwood trees, and pagoda dogwood. The ground layer is in good condition with the native

graminoids silky wildrye, Pennsylvania sedge, and wide-leaved sedge present. Some of the forbs found here include blue cohosh, elm-leaved goldenrod, wild ginger, hepatica, yellow bellwort, lady fern, and interrupted fern. Because of the generally good quality and the prospect for continued improvement in quality, this forest was given a rank of "BC".

SMLP-18

Lowland Hardwood Forest Rank: D

This very young forest occurs along Hay Creek and an abandoned railroad right-of-way. Typical trees here include boxelder, black willow, and cottonwood. These generally average about 10 to 12 inches in diameter, with the occasional cottonwood or black willow exceeding 20 inches. The shrub layer is mostly sparse with common elderberry, boxelder saplings, and gooseberry most frequent. The ground layer is a mix of nonnatives (especially reed canary grass and stinging nettle) and the natives Virginia wildrye, goldenglow, wood nettle, Virginia waterleaf, and giant goldenrod. Because of the youth of this forest and its disturbed state, this forest was given a low rank. This should improve in time as the trees mature and if disturbance is minimal.

SMLP-19

Oak Woodland-Brushland Rank: CD

This includes several parcels just south of Red Wing, in the vicinity of Trout Brook and Spring Creek. Most of these parcels have a history of grazing, and while many of them have not been grazed for at least several

decades, several are still currently used as pasture. These woodlands are characterized by large bur and pin oaks, sometimes as scattered individuals and sometimes in stands with crowns intermingling. These oaks are mostly over 16 inches in diameter. Other common trees include aspen, red cedar, boxelder, elm, black cherry and white birch. The shrub layer is generally thick across these parcels. The most common species found here are saplings of the above listed trees (except oaks), prickly ash, and the nonnatives European buckthorn and Tartarian honeysuckle. The ground layer is generally in poor condition. The many bare spots result partially from the grazing history, but more a result of the recent increase in shade created by pioneering trees. Because of the transition of this community toward a mixed hardwood forest and away from oak woodland/savanna, this community was given a moderately low rank of "CD".

SMLP-20

Dry Oak Forest Rank: C

This forest occurs in several parcels in the vicinity of County Road 1 and 287th Street. These parcels are generally located on north- and east-facing slopes and are adjacent to, or across valleys from, SMLP-19. The canopy here is patchy, but generally averages over 80 percent cover. The most common trees are bur, red, and pin oak, all of which average over 16 inches in diameter. Other trees, including basswood, elm, paper birch, and aspen comprise a small part of the total canopy here. The shrub layer varies from moderately sparse to thick where logging has taken place. The

most common member of the shrub layer is the ironwood tree, with pagoda and silky dogwood, downy arrowwood, and European buckthorn also present. The ground layer tends to be in good condition across these parcels. Species seen here include maidenhair fern, columbine, Pennsylvania sedge, lady fern, and Virginia stickseed. Overall, this forest is in moderately good condition. As this forest recovers from past logging and other activities, it will improve in quality.

SMLP-21

Dry Prairie, Bedrock Bluff Subtype Rank: BC

This community includes several prairies on south-facing bluffs. These tend to be species rich despite the apparent past grazing on all of the sites. The most frequently encountered grasses here include Indian grass, big and little bluestem, plains muhly, June grass, prairie dropseed, and sideoats grama. Forbs that are found occasionally here include sky blue, silky and aromatic aster, rough and dotted blazingstar, prairie violet, prairie coreopsis, puccoon, purple prairie clover and windflower. Although the amount of brush invasion on these parcels varies, it averages about 20 to 30 percent. The most frequent colonizers include red cedar, sumac, white birch, black cherry, dogwood, and European buckthorn. Because the overall quality of these prairies is good, this community was given a moderately high rank of “BC”.

SMLP-22

Lowland Hardwood Forest Rank: CD

This low-lying forest is found along Hay Creek and some tributary valley bottoms. The age and composition of the forest varies somewhat, but the overall quality is similar across the site. The most common trees in the patchy canopy are black walnut, elm, and boxelder, all with average diameters around 12 inches. Silver maple, while present, occurs less frequently. The shrub layer is dominated by common elderberry, European buckthorn, black raspberry, and red osier dogwood. The ground layer hosts plant species typical of this community type, including Virginia waterleaf, Canada wildrye, goldenglow, and white snakeroot. Also found here are the nonnative species reed canary grass, creeping charlie, and stinging nettle. In some of the upper drainage areas within this community, there are a few areas of severe erosion, with recent down cuts exceeding ten feet. Because this forest is still developing, it was given a moderately low rank.

SMLP-23

Mesic Oak Forest **Rank: BC**

Many of the oaks in the canopy of this forest have multiple stems, indicating disturbance by logging and/or grazing. These activities appear to have taken place over 50 years ago and the forest has recovered very well. The most common tree here is red oak, which average over 18 inches in diameter. White, pin, and bur oaks of similar size are also present. Younger, second growth trees that are less prominent in the canopy include black cherry, hackberry, basswood, sugar maple and white birch. The shrub layer is dominated by native species including ironwood,

pagoda and silky dogwood, American hazel, nannyberry, prickly gooseberry, and red maple saplings. The ground layer is also of good quality and includes maidenhair and lady fern, pyrola, wild geranium, wild ginger, early meadow rue, blue cohosh and yellow bellwort. Because of the good species composition and structure of this forest, it was given a moderately high rank. If disturbance is minimal, this forest should improve even more in the coming decades.

SMLP-24

Oak Woodland-Brushland Rank: C

This oak community occurs on generally south-facing slopes in the vicinity of Hay Creek Trail. It includes areas that were most likely savanna in the past, as well as some small prairie remnants. Due to time limitations of the project, only a small portion of this community was investigated on foot. Future consideration of this area should include a more thorough ground inventory. The canopy of this woodland is patchy with bur and pin oaks common. Smaller trees, especially aspen and white birch, are filling in the canopy, and the brush layer is expanding as well. The most common shrubs here include prickly ash, gray dogwood, buckthorn, sumac, and oak saplings. The ground layer is mostly a mix of woodland edge species with some introduced pasture grasses locally common. Because of the predominance of oaks and remaining prairie openings, this oak woodland was given a moderate rank of “C”.

SMLP-25

Dry Prairie, Bedrock Bluff Subtype Rank: BC

This nice quality community includes several parcels of prairie on steep, south-facing slopes. Most of these lie on a ridge that extends west from the intersection of Highway 58 and Hay Creek Trail, while several small, isolated parcels occur about one half mile to the north. The parcel most thoroughly investigated by foot is the largest, just west of Hay Creek Trail; other parcels were photointerpreted. Average brush cover across these prairies is about 25 percent, with some reaching nearly 60 percent. The most common brush species here include bur oak, red cedar, sumac, dogwood, and aspen. Planted trees and shrubs including black walnut, and the nonnatives black locust, caragena, and others are quickly invading some portions of the largest prairie.

The most common native grasses include sideoats grama, little and big bluestem, hairy grama, Indian grass, prairie dropseed, and plains muhly. Forbs found here that are associated with good quality prairie include sky blue and silky asters, purple prairie clover, hoary puccoon, prairie coreopsis, showy tick trefoil, downy painted cup, aromatic aster, and the State Special Concern species, Hill's thistle. Because of the good quality and composition of this prairie, and the presence of a rare species, it was given a moderately high rank. If the problematic nonnative species and encroaching brush are not managed, these prairie parcels will likely continue to decline in quality. Some of the sites are small enough that, without active management, they are likely to be lost within 10 years.

SMLP-26

Dry Prairie, Bedrock Bluff Subtype Rank: C

This prairie is found in several parcels that center around Highway 58. Some parcels are relatively small, while others cover nearly 20 acres. One parcel adjacent to Hay Creek is grazed, while the one more thoroughly investigated is just west of the junction of Highway 58 and 325th Street. The soil of these prairies tends to be sandy as a result of the weathered sandstone outcrops here. Average brush and small tree cover across these prairies is around 30 percent, although it exceeds 40 percent on others. The most common species of brush here include red cedar, smooth sumac, white birch, and the nonnative conifer scotch pine. The most common native grasses include Indian grass, big and little bluestem, plains muhly, and sideoats grama. The most common forbs seen here include silky, sky blue, and aromatic aster, columbine, heart-leaved alexanders, rough and cylindric blazingstar, hoary puccoon, prairie violet, and harebells. The plant species composition of these prairies tends to be moderately good to good, but the encroaching brush causes an overall lowering of an otherwise moderately good rank. Conserving these prairies will require some active management that uses a combination of burning, and perhaps brush cutting and grazing.

SMLP-27

Dry Oak Forest **Rank: CD**

This oak forest occurs on a predominantly north-facing slope. It is dominated by white, bur, and pin oaks, most of which average over 12 inches in diameter. The canopy is patchy, which may be a result of grazing and/or logging, although evidence of the latter was not readily visible. The shrub layer is thicker than would normally be found in a dry oak forest, and the ground layer reflects past disturbance. Because of these factors, the forest was given a somewhat lowered rank of "CD".

SMLP-28

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

This community includes two small prairies perched on knobs overlooking County Road 3. Both of these prairies show significant signs of former disturbance, most likely grazing, but are recovering. The brush cover for these small prairies averages about 30 percent, with some areas exceeding 50 percent. The most common pioneering trees and shrubs include aspen, cedar, oak saplings, sumac, and European buckthorn. The most common native grasses found here include big and little bluestem, prairie dropseed, sideoats grama, and Indian grass. The most common native forbs include leadplant, sky blue, silky, and aromatic aster, yellow flax, prairie violet, prairie coneflower, and false boneset. Because of past disturbance and the encroachment of brush, this prairie was given a moderate rank of "C".

SMLP-29

Oak Woodland-Brushland Rank: CD

This woodland is characterized by a broken canopy with about 20 percent oaks, making it a borderline "oak community". These oaks average about 18 inches in diameter, with smaller elm, basswood, black walnut, boxelder, white birch, and red cedar forming the balance of the community. The shrub layer is also fairly dense and dominated by the nonnative European buckthorn. The ground layer is in moderately poor condition and appears to have been grazed. Overall, this woodland is in moderately poor condition, and will likely become a lowland hardwood forest as the smaller trees replace oaks in the canopy.

SMLP-30

Dry Oak Forest Rank: C

This oak forest is composed mostly of pin, white, bur and red oaks that average about 12 inches in diameter. The canopy specimens are of nearly uniform size, and their tall, straight appearance suggests they are of about the same age. Since there are no indications of any past logging of large trees, these oaks may have sprouted following removal of grazing from the site, perhaps fifty or 60 years ago. Other trees that are found less frequently in the canopy include aspen, red maple, and white birch. The shrub layer is moderately diverse with chokecherry, prickly ash, nannyberry, gooseberry, downy arrowwood, and maple-leaf viburnum present. The ground layer is in moderately poor condition, also presumably from past grazing and is the primary reason for the moderate rank of this scenic forest. If disturbances are minimized during the

next several decades, this forest should improve to a "B" rank, or better on its own.

SMLP-31

Oak Woodland-brushland Rank: D

This community includes several parcels, some of which are currently pastured and others that have been grazed historically. All have been substantially altered as a result. The most common trees here are scattered, open-grown bur and pin oaks. Younger trees, including elm, boxelder, and cottonwood, as well as other species, are filling in the spaces between these larger oaks. The brush layer is moderately dense to nearly impenetrable. Common shrubs here include red cedar and the nonnative European buckthorn. The ground layer is disturbed, with few native species remaining after the prolonged grazing. Because of the shift in composition and quality of the shrub and ground layers, this community was given a lowered rank of "D".

SMLP-32

Dry Prairie, Bedrock Bluff Subtype Rank: C

Found on a bluff line that extends east from Highway 58 and roughly parallel to Old Church Road, this community includes several parcels of similar quality. They are found on moderately steep to very steep slopes with sandstone derived soils, and offer striking views of the adjacent landscape. They tend to be grass dominated with some nonnatives present locally, indicating past grazing and perhaps overseeding. The

brush cover varies between these prairies, but is generally about 10 to 20 percent. The prairie closest to Highway 58 has a low-growing species of cedar as the most common shrub. Common grasses at this site include big and little bluestem, Indian grass, sideoats grama, prairie dropseed, plains muhly, and the nonnatives Canada bluegrass and smooth brome. Forbs were less common than would be expected on a high quality prairie, and included sky blue, heath, and silky asters, gray goldenrod, narrow-leaved puccoon, purple prairie clover, yellow flax, and dotted blazingstar. Because of the past influence of grazing and the resulting dominance by grasses, this prairie was given a moderate rank of "C".

SMLP-33

Dry Oak Forest **Rank: C**

This oak forest is dominated by relatively young bur and pin oaks, with white oak, red oak, elm, aspen, white birch, and other species less common. The oaks average about 12 inches in diameter, while the other species are smaller. The shrub layer is moderate in thickness with a nice complement of native species, similar to SMLP-30. The ground layer is in moderate condition in most places, with disturbance tolerant species common. Because of the apparent youth of the trees and the disturbance of the ground layer, this community was given only a moderate rank of "C".

SMLP-34

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

This prairie parcel is found on the east side of Flueger Road. Brush cover is around 20 percent, and is dominated by sumac, red cedar, and gray dogwood. The most common grasses encountered include Indian grass, prairie dropseed, sideoats grama, big and little bluestem, plains muhly, and the nonnatives Canada bluegrass and smooth brome. Typical forbs include purple prairie clover, gray goldenrod, sky blue, heath, and silky aster, narrow-leaved puccoon, yellow flax, and dotted blazingstar, although overall forb levels are relatively low, due to past grazing. Because of this and of the brush encroachment, this prairie was given a moderate rank of "C".

SMLP-35

Oak Woodland-Brushland **Rank: C**

The canopy of this woodland varies from sparse and dominated by open-grown bur and pin oaks, to patchy and up to 70 percent cover with groves of tall, straight bur oak. Between these larger oaks are smaller aspen, red cedar, dogwood, and young oaks on south-facing slopes. North-facing slopes have more young elm, white birch, and aspen. Some limited logging appears to have taken place in some areas of this community. The shrub layer varies from sparse to moderately thick, depending on the aspect of the slope, and is dominated by native species. The ground layer is in fair condition with a mix of disturbance tolerant and better quality native species, as well as some nonnative species that have persisted in the aftermath of past grazing. Overall, this is a moderate quality woodland with some restoration potential and was given a rank of "C".

SMLP-36

Oak Woodland-Brushland **Rank: CD**

This woodland is similar to SMLP-35, but is still being grazed. As a result, the ground layer and shrub layer are in a more disturbed state. Because of the sustained species shift caused by grazing, this community was given a somewhat lowered rank of "CD".

SMLP-37

Mesic Oak Forest **Rank: C**

This oak forest is found along a generally north-facing ridgeline just south of County Road 21. Overall, these parcels are in moderate condition. The nearly closed canopy is dominated by bur and pin oak that average about 12 inches in diameter. Smaller aspen and white birch are also common here. Other trees found occasionally include large white and red oak, and smaller basswood, black cherry, and bitternut hickory. The largest trees in the canopy are widely spaced, but tall and straight. The shrub layer varies from somewhat sparse to moderately dense with a mix of native and nonnative species present. Some of the native shrubs found here include nannyberry, cherry, silky dogwood, maple-leaf viburnum, and red maple. The ground layer is patchy in quality, and appears to be recovering well from past grazing that was ceased perhaps as long ago as 40 years. Frequent native species in the ground layer include lady fern, Pennsylvania sedge, shining bedstraw, satin grass, maidenhair fern, and Canada wildrye.

SMLP-38

Dry Prairie, Bedrock Bluff Subtype Rank: BC

This is a small prairie within the City of Red Wing. It occurs on very steep slopes with bedrock outcrops and loose soils formed from the sandstone. The steepest portions of the prairie have very little brush cover, which is likely a result of the combination of hot, droughty soils, and past grazing. Areas with shallower slopes and those along the margins of the prairie are beginning to be affected by brush encroachment, which totals about 15%. Chief among these are smooth sumac, aspen and oak saplings, and gray dogwood. The most common native grasses encountered here include big and little bluestem, prairie dropseed, sideoats and hairy grama, plains muhly and porcupine grass. Some of the native forbs include gray goldenrod, downy painted cup, rough and dotted blazingstar, prairie coreopsis, pasque flower, and purple prairie clover. Overall, this prairie is very nice quality, with added importance because it is found within a city. If actively managed, brush cutting, burning, and broad-scale monitoring should be included.

SMLP-39

Oak Woodland-Brushland Rank: CD

This woodland surrounds SMLP-38 above Hay Creek Trail. The most common trees here include large open-grown bur and pin oaks, with a thick stand of young red and white oak, aspen, white birch and black

cherry between them. The shrub layer is thick to nearly impenetrable. Typical shrubs at this site include European buckthorn, prickly ash, gray dogwood, blackberry, hazel, and bittersweet. The ground layer has been affected by grazing, which has reduced the diversity both here and in the shrub layer. Although their overall cover is sparse, the native graminoids and forbs white snakeroot. Pennsylvania sedge, and feverwort are present. Because of the dramatic shift in species composition, this woodland was given a moderately low rank.

SMLP-40

Dry Oak Forest Rank: CD

This forest is found along the slopes of a side valley of Bullard Creek, just east of Flueger Road. All of the land is either currently or formerly grazed, with some selective tree cutting taking place along the southwest-facing slope. The most common trees in this forest are aspen, and red, bur, pin, and white oaks. The oaks tend to average 18 inches or more in diameter, while the aspen tend to be less than 8 inches diameter. The shrub layer is sparse to absent as a result of prolonged grazing. The most common species seen include prickly ash, gooseberry, and gray dogwood. The ground layer also reflects the long-term grazing, and the most frequent species are those that are either tolerant of intense grazing, or unpalatable to cattle. The grazing-tolerant species include the non-native pasture grasses which were introduced for forage; unpalatable species include the natives Pennsylvania sedge, columbine, white snakeroot, and heart-leaved

aster. Small populations of the native silky wild rye are also present.

SMLP-41

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

This prairie includes several parcels. The westernmost of these are not currently grazed, while the eastern parcels are grazed by sheep. Overall, these prairies have about 20 percent cover by shrubs and small trees. The higher percentage of brush cover occurs on the east parcels, where low junipers and red cedars are common. Other brush and small trees found throughout includes white birch, aspen, gray dogwood, smooth sumac, and prickly ash. The most common native grasses include little and big bluestem, prairie dropseed, Indian grass, sideoats and hairy grama, and plains muhly. Also common is the nonnative Canada bluegrass, a grass that was introduced in the U.S. for its drought tolerance. Unfortunately, it has low forage value for most forms of livestock. The most common native forbs include columbine, Virginia mountain mint, harebell, purple prairie clover, prairie sagewort, pasque flower, prairie violet, heath aster, and white camass. Although this prairie has a generally good species composition, the encroachment by brush and the increased erosion from grazing cause the rank to be reduced somewhat.

SMLP-42

Dry Oak Forest Rank: C

This oak forest is found in several parcels, one of which is on a generally east-facing slope, whereas the others are on west- to north-facing slopes. The canopy cover of the forest ranges from about 65 percent in some areas to closed in others. The most common trees are bur, pin, white, and red oak, with aspen, black cherry, white birch and others also present. The shrub layer varies from very thick in areas that were retired from grazing some time ago, to moderate in areas that were retired more recently. The ground layer generally reflects a history of grazing and is somewhat species poor. Overall, the quality of this forest is only moderate, due to past disturbance.

SMLP-43

Dry Prairie, Bedrock Bluff Subtype Rank: CD

This community includes several parcels of dry prairie that lie east of Wulff Valley Lane. They average 50 to 60 percent brush cover, predominantly low juniper (*Juniperus communis*). The dominance of this shrub across these prairies sets them apart from other prairies in the area, with only a few others of similar character elsewhere in the county. Other species of shrubs and small trees that are less common here include the natives black raspberry, prickly ash, red cedar, and bur oak seedlings, and the nonnative Japanese barberry, Siberian elm, and European buckthorn. Native grasses here include sideoats

grama, little and big bluestem, Indian grass, plains muhly, and prairie dropseed. Common or occasional native forbs include prairie violet, gray goldenrod, silky, sky blue, and aromatic asters, pasque flower, purple prairie clover, smooth white lettuce, frostweed, and marbleseed. This prairie has a generally good composition, but due to the large percentage of cover from brush was given a lowered rank.

SMLP-44

Oak Woodland-brushland Rank: BC

This oak woodland is occurs in draws and on slopes that are southeast- to northwest-facing, and much of it is adjacent to the above-mentioned prairie. The canopy cover varies from about 35 percent to nearly closed in some small areas. The dominant trees are open-grown bur and pin oaks. Younger trees include aspen, black cherry, elm, and others. The shrub layer is also variable, but is open in many areas with only a ground layer of grasses and forbs. The ground layer consists of a mix of native and nonnative species, the latter of which were likely introduced in an attempt to increase forage production. Because many groves of oaks are relatively open in the shrub and ground layer, and because of the limited problems with nonnative species in most areas, this community was given a relatively good rank.

SMLP-45

Mesic Oak Forest Rank: C

This forest lies on a north-facing slope, and appears to have a history of grazing and logging (approximately 40 to 60 years ago). Paint markings on some of the trees in portions of the site may suggest that a portion of this site might be logged in the next year or two. The canopy of the forest is dominated by red and white oak, with white birch, basswood, poplar, black cherry, sugar and red maple, and bur oak less common. The shrub layer is thick and dominated by thorny species, which usually indicates grazing in a forest of this type. The ground layer is in moderate condition with a mix of species indicating past disturbance, and others common in better quality forests. Although generally good in quality, this forest was given a moderate rank due to past grazing/logging and its current stage of recovery.

SMLP-46

Wet Meadow **Rank: C**

This wetland community is adjacent to Highway 61 in an abandoned channel of the Mississippi River. It is contiguous with a complex of wetland communities mapped by the MN DNR County Biological Survey, including a fen. In addition to wet meadow, this wetland includes small pockets of cattail marsh, as well as some floodplain forest. The most common native graminoids found here include white grass, tussock and lakebank sedges, bluejoint , woolgrass, and dark green bulrush. Also found here in abundance are the nonnative species reed canary grass and narrow-leaved cattail, the latter of which is native to the east coast region of the country but not to Minnesota. The most frequently encountered forbs include the natives

boneset, spotted joe-pye weed, marsh milkweed, water dock, smartweed, and bur-reed. Nonnative forbs found at least occasionally include purple loosestrife and stinging nettle. Shrubs that dot the wetland include red osier dogwood, speckled alder, and several species of willows. Despite the prevalence of nonnative species here, this wetland was given a moderate ranking, in part due to the fact that it adjoins a better quality wetland that was mapped by the MN County Biological Survey.

SMLP-47

Oak Woodland-brushland Rank: CD

Found on a north-northeast-facing ridge just southeast of Hill Road and Frontenac State Park, this oak woodland is of moderately poor quality. The canopy cover of this community is patchy as a result of past grazing and tree cutting. The most common tree species are bur and pin oak, quaking aspen, white birch, and basswood. The shrub layer varies from moderate to thick, with many of the thorny species that typically increase as a result of grazing. These include blackberry, black raspberry, prickly ash, and gooseberry. The ground layer is in moderately poor condition with nonnative grasses and grazing-tolerant native forbs most common. Some of these include white snakeroot, Kentucky bluegrass and smooth brome. Because of the history of intense grazing and the resulting shift in species composition, this woodland was given a lowered rank.

SMLP-48

Lowland Hardwood Forest Rank: CD

This forest occurs in the lowest portions of an intermittently flowing stream adjacent to Hill Road. The canopy is patchy and dominated by boxelder and elm. These tree species tend to follow disturbance and this, combined with the general composition of the forest, suggests that this forest is of recent origin. The shrub layer is disturbed and includes brambles, common elderberry, gooseberry, and a rare pagoda dogwood. The ground layer also shows signs of disturbance from grazing and erosion/deposition of sediment. Frequent species here include the nonnatives reed canary grass, Kentucky bluegrass, stinging nettle, motherwort, chickweed, burdock, and less frequently the natives Pennsylvania sedge, smartweed, calico aster, and Virginia wildrye. Because of the magnitude of past disturbance, this community was given a low rank of "CD".

SMLP-49

Mesic Oak Forest Rank: CD

This forest is found in the vicinity of Hill Avenue on generally northeast-facing slopes. As with the surrounding communities, this forest appears to have a history of grazing. The patchy canopy is dominated by young black cherry, and bur, pin, and white oak that average about 10 inches in diameter. Other, less frequent, species include quaking aspen, white birch, and elm. The shrub layer includes a mix of thorny shrubs and black cherry saplings. The ground layer is in moderate condition. Species found here include

calico aster, lady fern, kidneyleaf buttercup, Virginia stickseed, and white snakeroot.

SMLP-50

Oak Woodland-Brushland Rank: C

This woodland is found in the area of Hill Avenue and generally occurs on southwest-facing slopes. The canopy across the area is broken to absent, and consists primarily of bur and pin oaks. Most of these are open-grown, but some form groves of tall, straight trees. Other, smaller trees that are present include quaking aspen, cottonwood, elm, hackberry, and black cherry. The shrub layer is thick with shrubs and small trees. The most common shrubs here include prickly ash, hazel, European buckthorn, Tartarian honeysuckle, gray dogwood, and chokecherry. The ground layer is generally disturbed and appears to have been grazed in the past. The most common species include Canada goldenrod, wild geranium, bluegrass, honewort, avens, bergamot, and bull thistle. Some areas are dominated by brush, and a few smaller south-facing knobs are dominated by prairie.

SMLP-51

Mesic Oak Forest Rank: C

This forest is found on generally south-facing slopes. Similar to surrounding communities, this forest appears to have a history of grazing. The patchy to closed canopy is dominated by young bur, pin, and white oak and black cherry, with average diameters slightly over 11 inches. Other trees include white birch, quaking aspen, and elm. The shrub layer varies

from sparse to moderate with a mix of shrubs and tree saplings. The ground layer is in fair condition and includes calico aster, lady fern, Pennsylvania sedge, wild geranium, maidenhair fern, and white snakeroot.

SMLP-52

Dry Oak Forest **Rank: BC**

Found mostly south of Hill Avenue on a north-facing slope, this forest is of good quality. The canopy of this forest is nearly closed in most places and is dominated by large pin, bur, and white oaks that average over 16 inches in diameter. Despite the steep slopes, this forest has been logged in the past. Other canopy species include white birch, black cherry, basswood, bigtooth aspen, sugar maple, red oak and elm. The shrub layer is moderate in thickness and dominated by native species including gray dogwood, American hazel, and gooseberry. The ground layer has good to very good composition in most places and is dominated by natives typical of this community type. Some of these include lady fern, pointed-leaf tick trefoil, wild geranium, interrupted fern, yellow bellwort, bottlebrush grass, hog peanut, elm-leaved goldenrod, and columbine. Because of the good species composition of the ground layer of the forest and the regeneration of oaks after logging, this forest received a high rank.

SMLP-53

Dry Oak Forest **Rank: C**

Located on a south-facing slope above the Hidden Valley development, this is a moderate quality forest.

It is characterized by large (average diameter 18 inches) bur and pin oaks that are widely scattered across most of the slope, and in groves closer to the top. A dense second growth of ironwood, aspen, sugar maple, black cherry, and elm has colonized the areas between the oaks. The distribution of trees and the general character of the forest tend to indicate past grazing. The shrub layer is generally sparse, but thick in select areas. The most common shrubs are prickly ash, Tartarian honeysuckle, and European buckthorn. The ground layer is somewhat sparse with Pennsylvania sedge common, and broad-leaf sedge, white snakeroot, and avens found occasionally. This forest is transitioning from an oak woodland near the top, and will soon become maple-basswood forest in the lowest elevations.

SMLP-54

Dry Prairie, Bedrock Bluff Subtype **Rank: B**

This prairie is found in several patches on the crest of a south-facing slope, above the previous community. The ridge line is extraordinarily narrow due to the cliff faces on the north side (river side). The prairies tend to be small, with steep slopes and numerous rock outcrops. Brush has made extensive progress into the prairie, pushing up to the driest and hottest portions. The most common brush includes small bur and pin oaks, white birch trees, Tartarian honeysuckle, European buckthorn, quaking aspen, and American hazel. The most common native grasses include little and big bluestem, Indian grass, sideoats and hairy grama, porcupine grass, plains muhly, prairie dropseed and satin grass. The most common native forbs

include leadplant, windflower, prairie sagewort, aromatic aster, and pasque flower. Additionally, hairy goldenrod was found on the peaks of rock outcrops. Although there has been significant encroachment of brush into this prairie, the good quality species composition suggests that a "B" rank is warranted.

SMLP-55

Mesic Oak Forest **Rank: BC**

This nice quality oak forest is found on moderately steep north-facing slopes on the Mississippi National Golf Links property. With few exceptions, the canopy is closed and dominated by tall, straight red, white, bur and pin oaks that average about 18 inches in diameter. Other, smaller trees that are found occasionally include white birch, elm, bigtooth aspen, basswood, and black cherry. The shrub layer is sparse in most places, but has an abundance of thorny brambles. Some frequent members of the shrub layer include American hazel, blackberry, black raspberry, and young boxelder. The ground layer is generally diverse and dominated by species typical of the community type. Some of these include lady and maidenhair ferns, bishop's cap, columbine, interrupted fern, pointed-leaf tick trefoil, and zigzag goldenrod. Because of the nice quality, cathedral-like appearance of the oak canopy, and the fact that it occurs within a city, this forest was given a good qualitative rank.

SMLP-56

Oak Woodland-Brushland **Rank: CD**

Occurring in several parcels in the vicinity of the Mississippi National Golf Links, this oak community is found on a south-facing ridge and on either side of Lehrbach Road. The woodland is characterized by widely spaced, open-grown bur and pin oak trees with younger aspen and shrubs between them. The shrub layer is dominated by the nonnatives European buckthorn and Tartarian honeysuckle. The ground layer is generally only moderate in quality, with species such as white snakeroot, hairy wood chess, Pennsylvania sedge, and satin grass frequently encountered. If actively managed, these woodlands would improve in quality, particularly the parcel on the Mississippi National Golf Links property. However, in their current state, they are only able to garner a rank of "CD".

SMLP-57

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

This prairie is located just south of the Mississippi National Golf Links on a south-facing slope. It has about 10 to 20 percent brush cover by aspen, smooth sumac, brambles, gray dogwood, red cedar, Tartarian honeysuckle and European buckthorn. Also, there is an exceptionally large amount of bittersweet on this hillside. The most common native grasses found here include Indian grass, big and little bluestem, sideoats grama, sun-loving sedge, prairie dropseed, and plains muhly. The forb composition is good, with many species present that are typical for the community type. Some of these include leadplant, prairie coreopsis, purple and white prairie clover, narrow-leaf puccoon, downy painted cup, prairie violet, and rough

blazingstar. Minimal shrub cover and quality species composition help to give this community a high qualitative rank of "BC".

SMLP-58

Dry Oak Forest Rank: C

This forest is similar in species composition and structure to SMLP-55. Notable exceptions include the greater percentage of non-oak species in the canopy, a thicker shrub layer that includes the nonnatives European buckthorn and Tartarian honeysuckle, as well as a ground layer that is not quite as species-rich. For these reasons, it was given a modest rank of "C".

SMLP-59

Lowland Hardwood Forest Rank: CD

Found along the lower portions of a west-facing slope adjacent to Lehrbach Road, this forest is dominated by young black walnut. Other trees that are not as common as the walnut include quaking aspen, white birch, and pin and black oak. The shrub layer varies from thick to absent and may be a function of how long ago the different areas were removed from grazing. The ground layer is generally dominated by nonnative species, particularly nonnative, cool season pasture grasses including Kentucky bluegrass. Because of the apparently recent origin of the walnuts and because of past disturbance by grazing, this forest was given a low qualitative rank.

SMLP-60

Aspen Forest Rank: D

Found mostly on a north-facing slope, this forest appears to have been grazed and probably logged in the past. Based on the composition of adjacent forest parcels, it is likely that this forest was logged for oaks, after which aspen became dominant. In addition to aspen, other trees found in this forest include white birch, elm, boxelder, and others. All of these average about 10 inches in diameter. The shrub layer is quite variable, ranging from sparse to very thick. Both the shrub layer and the ground layer are somewhat species poor. Because of the past "high-grading" to remove oaks and the other apparent disturbance, this forest was classified as an aspen forest, and given a low qualitative rank.

SMLP-61

Dry Oak Forest **Rank: C**

This oak forest has a canopy composed mostly of pin and bur oaks, with aspen, hackberry, black cherry, and several other species also present. These form a nearly closed canopy of good structural character. The shrub layer varies from moderately thin to moderately thick and is mostly dominated by natives. The ground layer is generally diverse and dominated by species common for this community type. Some of these include white snakeroot, lady fern, wild geranium, columbine, interrupted fern, pointed-leaf tick trefoil, and zigzag goldenrod. Some fragmentation has occurred in this forest as a result of development in the area. The impacts of this could be reduced if residents planted oaks in their yard, and included shrubs and ground cover of locally native species. This would help restore

some habitat value and reduce the amount of lawn nutrient transport and stormwater runoff.

SMLP-62

Dry Prairie, Bedrock Bluff Subtype Rank: B

This prairie includes several parcels within the City of Red Wing, all of which have developments immediately adjacent. These prairies are in good condition and their overall size is remarkable, since many bluff prairies in the region have been overrun by brush. The total shrub cover of these prairies is about five percent, with smooth sumac, quaking aspen, black cherry, and eastern red cedar most common. The most common native grasses include big and little bluestem, Indian grass, sideoats and hairy grama, plains muhly and prairie dropseed. Contributing to the overall quality, few areas of nonnative grasses were seen, and they were all minor in coverage. Some of the common forbs seen here include purple prairie clover, gray goldenrod, dotted and cylindric blazingstar, silky, sky blue, and aromatic asters, prairie coreopsis, hoary puccoon, harebell, and prairie sagewort. Because of the size, intact nature, and quality species composition of these prairies, the community was given a high qualitative rank. However, this prairie is receiving some disruptive pressure from the adjacent housing development. Some residents are planting nonnnative shrubs, trees, and flowers in portions of the prairie, as well as cutting, or dumping yard waste. These prairies are of significant enough quality to warrant distributing information about how to be a good neighbor to the prairie.

SMLP-63

Lowland Hardwood Forest **Rank: CD**

This forest is found along a small valley that appears to have had a road running up the bottom at one time. Although there are large, scattered oaks here, younger trees form the majority of the tree cover. Among these are boxelder, elm, cottonwood, hackberry, and especially black walnut. The shrub layer is moderate in thickness and composed mostly of the nonnatives Tartarian honeysuckle, European buckthorn, and winged wahoo. Similarly, the ground layer is disturbed and dominated by a mix of many nonnatives and a few natives. Because of the past disturbances noted here, this community was given a relatively low qualitative rank.

SMLP-64

Lowland Hardwood Forest **Rank: CD**

This forested community is found in several parcels within the City of Red Wing. They were probably oak dominated communities in the past, but because of the recent recruitment of young, second growth trees, are becoming more dominated by lowland hardwood species. In addition to the several oak species found here, the canopy and subcanopy includes elm, white birch, aspen, and very commonly black walnut. The shrub layer is moderate to thick and dominated by nonnative species, especially European buckthorn and Tartarian honeysuckle. The ground layer is also disturbed and is likely shifting from woodland species to species more typical of a closed forest. Because of past disturbance and more recent fragmentation from

development, this forest is of moderately low quality, earning a “CD” rank.

SMLP-65

Oak Woodland-Brushland **Rank: CD**

This woodland occupies mostly south-facing slopes adjacent to community SMLP-64. As with the previous community, all of these parcels are found within the City of Red Wing. The patchy canopy is dominated by bur and pin oaks, many of which are open-grown. Between these larger oaks are aspen, elm, boxelder, and white birch. Also found occasionally here are several nonnative trees including Siberian elm, as well as planted black locust and pines. The shrub layer varies from thick to very thick with European buckthorn and Tartarian honeysuckle most common. The ground layer is a mix of natives that are adapted to colonizing disturbed sites, and nonnatives. Because of the generally poor composition of this community, it was given a lowered rank.

SMLP-66

Lowland Hardwood Forest **Rank: D**

This forest is found at the base of Barn Bluff just above Highway 61. Much of the area that makes up this forest has been disturbed in the past, and there is an old road in the site. The ground layer is dominated by a mix of nonnative grasses and weedy native forbs. Nonnatives found here include smooth brome and Kentucky bluegrass. The most common natives include Canada goldenrod, calico aster, and Pennsylvania

sedge. The shrub cover varies from sparse to very thick with the nonnatives European buckthorn and Tartarian honeysuckle common. The most common trees are Siberian elm, American elm, cottonwood, black walnut, and some planted conifers. The overall canopy cover of trees is about 35 percent. Because of past disturbance and the development of a forest from pioneering lowland and nonnative trees and shrubs, this forest was given a minimum rank of “D”.

9. Community Descriptions for The Cannon River East Watershed

CRE-1

Dry Prairie, Barrens Subtype Rank: C

This dry prairie is on a sandy terrace of the Little Cannon River, in the Cannon River Valley. It lies just east of Highway 52 and is bordered on the east by commercial and residential development. It is characterized by very droughty soils composed of sand that appears to have been formerly worked by wind. This is indicated by apparent blowouts, a feature typically associated with sand dunes. Brush covers 10 to 20 percent of the site, brush cover, with the higher coverage at the north end. The most common shrub and small tree species include Siberian elm, eastern red cedar, and smooth sumac. Common native graminoids include sand dropseed, porcupine grass, sand reedgrass, ciliate-leaved paspalum, june grass, and sandbur. The most frequently encountered native forbs include silky prairie clover, roundheaded bushclover, cottonweed, woolly plantain, large flowered beardtongue, narrow-leaved puccoon, and rhombic-petaled evening primrose. This prairie has been substantially impacted both by commercial development and by excessive ATV riding. There is some indication that this site is also in danger of being further impacted or destroyed by commercial development in the near future. The barrens prairie type is considered to be very rare in southeastern Minnesota. As the Cannon Falls area grows,

consideration should be given to protecting and managing this small and unique site. Suitable activities include removing brush, thinning pine trees on the north side, reintroducing fire, limiting ATV traffic, and reintroducing appropriate native seed/plants.

CRE-2

Oak Woodland-Brushland Rank: CD

This oak woodland lies immediately north of CRE-1 and just south of the Cannon River floodplain. The dominant tree cover varies between native hardwoods such as pin and bur oak, to a mix of introduced pines and oaks. The bur oaks typically occur as large, open-grown trees interspersed with dense stands of younger trees. These include pin oak, black cherry, quaking aspen, and the introduced red pine. Prairies, especially sand prairies, were incorrectly viewed in the past as "waste ground" and were often planted with pines and other introduced species under the guise of improving habitat. Unfortunately, planting trees and shrubs in prairies and savannas results in a dramatic loss of native habitat, and eliminates those species that require open areas in order to survive. This loss of ground layer species can, over time, lead to an increase in erosion, particularly on slopes.

The shrub layer here varies from sparse to very thick depending on the general age of the younger trees. Where young trees are common, the brush tends to be thicker. The most common shrub species include smooth sumac, European buckthorn, and red cedar. The ground layer is species poor, reflecting the recent alteration of this community from a barrens savanna to

a pine-oak woods. A few barrens prairie/savanna species persist below gaps in the tree canopy, but these too will be lost as the canopy closes. The most common ground species include nonnative bluegrasses and motherwort, as well as the natives white snakeroot and sarsparilla. As with CRE-1, some ATV damage is found here. However, it is not as severe as in CRE-1 and areas west of Highway 52 and might recover on its own over the course of several decades. Because of the planting of pines and the conversion of this former barrens savanna/prairie to a species-poor woodland it was given a relatively low rank of CD. Without intervention, this community will likely become a dry, mixed oak/pine forest in the coming decades.

CRE-3

Floodplain Forest

Rank: C

This moderately young forest has a patchy canopy, mostly made up of tall, straight trees. The most common of these are cottonwood, elm, black willow, green ash, black walnut, and silver maple. Most of these are between 12 and 18 inches in diameter. The shrub layer varies from sparse to moderate with the greatest density found in openings and on the edge of the Little Cannon/Cannon Rivers. The most frequently encountered shrub species include prickly ash, European buckthorn, and boxelder. The ground layer is in moderately good condition, and the most common species are those typical of floodplain forests. Some of these include touch-me-not, tall bellflower, jack-in-the-pulpit, goldenglow, Virginia wildrye, and wood nettle. Nonnatives found in the ground layer include

stinging nettle and reed canary grass. Some ATV trails are evident, however damage here is minor compared to some of the significant gullying caused by ATV use in adjacent communities. Overall, this forest is in moderate condition and should improve in quality as the canopy trees become older.

CRE-4

Lowland Hardwood Forest Rank: D

This area appears to be a former field that has been pastured, and which is now reverting to forest. It is dominated by cottonwood, green ash, and elm. Common shrubs include chokecherry, European buckthorn, and Siberian elm. The ground layer is dominated by species that are typically associated with disturbance, including wood nettle, creeping charlie, smooth brome, day lily, and giant goldenrod. Because this is a community of recent origin, it was given a low rank of "D".

CRE-5

Dry Prairie
Rank: D

This prairie is an old field that has been colonized by prairie species from the surrounding area. It has been planted with pines that make up about one half of the total cover. Other brush is common and includes prickly ash, red cedar, smooth sumac, and bur oak saplings. The ground layer is mostly dominated by the nonnative grass smooth brome. However, natives commonly occur here also, and include round-headed bushclover, gray goldenrod, frostweed, long-bearded

hawkweed, rough blazingstar, and sky blue aster. This prairie meets the minimum conditions for classification, and has added significance due to the presence of the uncommon plant long-bearded hawkweed.

CRE-6

Dry Prairie, Bedrock Bluff Subtype Rank: C

This prairie occurs along a south- to southwest-facing slope, characterized by moderate slopes in most places with a caprock of dolomite. This creates a very steep slope covered by platey cobbles at the top. It is reported by one of the landowners to have been completely open about 40 years ago. Currently, it has about 80 percent cover by eastern red cedar, and to a lesser degree, small trees and shrubs. The most common native grasses found here include sideoats grama, big and little bluestem, indian grass, and prairie dropseed. The nonnative Canada bluegrass is also common in many areas as a result of being introduced over 50 years ago in an attempt to provide additional forage for cattle. The most common native forbs include narrow-leaved and hoary puccoon, bastard toadflax, prairie violet, pasque flower, Virginia mountain mint, and Loesel's twayblade orchid. Two State-listed species of note that occur on the Molenaar's property include the State Threatened kitten-tails and the State Special Concern Hill's thistle. Although this prairie has been impacted dramatically by the invasion of red cedar and brush, existing prairie openings of quality and the presence of several state-listed species enable a moderate ranking of "C".

Late in the summer of 2000, the Molenaar's had a Prairie Stewardship Plan written for their property. Soon after, they began actively restoring the prairie on their hillside. Their efforts and dedication are impressive, especially considering that they are long-since retired. Through their consideration for the prairie, this hillside should improve incrementally in the coming years.

CRE-7

Lowland Hardwood Forest Rank: C

This forest is located on north and east-facing slopes and has canopy coverage of about 70 percent. Bur and red oak are fairly common, as are elm and green ash. Other trees found less frequently include hackberry, bigtooth and quaking aspen, basswood, and cottonwood. No stumps were seen indicating that logging had not occurred in the last 50 to 75 years. The most common species in the shrub layer are European buckthorn, prickly ash, and young elm, hackberry, and black walnut trees. The ground layer is in moderately poor condition with white snakeroot, sweet cicely, clearweed, enchanter's nightshade, and motherwort common.

CRE-8

Oak Woodland-Brushland Rank: C

This woodland is dominated by open-grown bur oaks with smaller pin oak, black cherry and hackberry filling-in the areas between them. The shrub layer is generally thick, with European buckthorn, ironwood, elm, bur oak, and prickly ash most common. The

ground layer is of moderate quality with silky wildrye, lopseed, enchanter's nightshade, honewort, and black snakeroot found frequently. Because of the transition to a brushy woodland and the resulting reduction in species diversity, this community was given a moderate rank of "C".

CRE-9

Lowland Hardwood Forest Rank: CD

This forest was being grazed at the time of the field visit. Although the grazing is only of moderate intensity, it has enabled a significant infestation of the nonnative scotch thistle to develop. Common trees include elm, and hackberry, with bur oak less common. The shrub layer is dense and dominated by thorny species. The ground layer is also in moderately poor condition, with honewort, clearweed, enchanter's nightshade and white snakeroot common.

CRE-10

Cedar Glade Rank: NA

This is not a recognized natural community type according to the MN DNR Natural Heritage Program methods and was therefore given no rank. The community was given this classification because it has near total coverage by eastern red cedar. In addition, it was being used as a pasture during the field visit in the summer of 2000.

CRE-11

Lowland Hardwood Forest Rank: CD

This forest is dominated by elm and boxelder, with bur oak, hackberry, basswood, and green ash less common. European buckthorn and tree saplings dominate the shrub layer. The ground layer is in moderately poor condition with the nonnatives stinging nettle and fescue grass common. The most commonly found native species include lopseed, honewort, clearweed, and enchanter's nightshade.

CRE-12

Oak Woodland-brushland Rank: C

This woodland is found on both the north and south sides of County Road 17. It is generally dominated by pin and bur oak and aspen, with their overall canopy cover about 70 percent. Other, less common trees include white birch, black cherry, elm, basswood, and elm. The shrub layer contains a very large number of species with prickly ash, European buckthorn, and American hazel common. The ground layer is variable in quality, with some areas being sparse and quite disturbed and others having moderate diversity. Some of the more common species include black snakeroot, lopseed, sweet cicely, honewort, white snakeroot, enchanter's nightshade, and white avens. Species associated with better quality include wild sarsparilla, showy orchis, bloodroot, and maidenhair and lady ferns.

CRE-13

Dry Prairie
Rank: C

This sandy prairie is found along the perimeter of an agricultural field and along the bluff line on the north side of the Cannon River. It is in moderate condition and is becoming overgrown with red cedar and sumac. The most common native grasses found here include big bluestem, sideoats grama, Canada wildrye, and little bluestem. The common forbs include butterfly milkweed, stiff goldenrod, white and purple prairie clovers, silverleaf scurf-pea, and prairie larkspur. Overall, the composition of this prairie is good, but the qualitative ranking was lowered due to brush expansion. Because of the generally good species richness of this prairie, it is a good candidate for active management. Restoration activities should include brush clearing and the reintroduction of prescribed fire.

CRE-14

Dry Prairie

Rank: D

This prairie is found in several parcels along the upper portions of valleys that extend northward from the Cannon River. About half of the general cover of this community is composed of nonnative plant species, particularly pasture grasses such as smooth brome and Kentucky bluegrass. The most common natives include big bluestem, stiff goldenrod, prairie coneflower, and bergamot. Because the species composition is generally poor, this community was given a rank of “D”.

CRE-15

Oak Woodland-Brushland

Rank: C

This community has about 75 percent cover of aspen, oak, and brush. Common members of the brush layer include blackberry, European buckthorn, Missouri gooseberry, and elm saplings. The ground cover is generally sparse with bottlebrush grass, pointed-leaf tick trefoil, white snakeroot, enchanter's nightshade, and silky wildrye seen most frequently. Historically, this hillside above the Cannon River, and the adjacent valley were probably oak savanna. The conversion to a brushier community has reduced the species richness of the site. Despite this, the community still retains enough desirable qualities for a "C" rank.

CRE-16

Lowland Hardwood Forest

Rank: CD

Found in a valley extending northwest from County Road 17, this woodland is dominated by boxelder and elm. These species have become the most common trees, filling in gaps between the once-dominant bur oak. The shrub layer is sparse to moderate, with tree seedlings and thorny shrubs most common. The most frequently encountered plants in the ground layer include honewort, enchanter's nightshade, stinging nettle, white avens, and sweet cicely. Because of the transition to having more brush and the reduction in species in the ground layer that followed, this community was given the low rank of "CD".

CRE-17

Mesic Oak Forest Rank: C

This oak forest has about 70 percent canopy cover, with bur, and pin oak comprising approximately half of the canopy. Other tree species found here include quaking and bigtooth aspen, white birch, black cherry, basswood, and elm. The shrub layer is moderately thick, with a mix of native and nonnative species. The ground layer is moderate in quality with species such as rattlesnake fern, lady, maidenhair, and interrupted ferns, as well as sarsaparilla, bloodroot, and pointed-leaf tick trefoil. Overall, the quality of this forest is good, since it has experienced only moderate past grazing and shows no visible signs of logging. For these reasons it was given a rank of "C".

CRE-18

Lowland Hardwood Forest Rank: C

This forest has a patchy canopy that is dominated by black walnut, boxelder, elm, and green ash. A few larger cottonwoods and silver maples also occur here. The shrub layer is moderately dense and includes saplings of the canopy species as well as blackberry, gooseberry, and common elderberry. The ground layer is in moderately good condition with whitegrass, touch-me-not, tall bellflower, white snakeroot, honewort, and Virginia waterleaf all common. Although this community does not appear to have been grazed, it was logged about 40 to 50 years ago. Because of this disturbance, the relatively young age of succeeding trees, and the composition of the ground layer, this community was given the moderate rank of "C".

CRE-19

Oak Woodland-brushland **Rank: CD**

Large, open-grown oaks are scattered through this community, with numerous younger trees and shrubs that have grown between them. The most common of these are eastern red cedar, quaking aspen, pin oak and elm. In the absence of appropriate grazing levels and fire, this community has quickly been colonized by a thick layer of brush, including prickly ash, Missouri gooseberry, and hackberry, elm, and oak saplings. The ground layer is in moderately poor condition, reflecting the recent transition from an open to a closed canopy. The most common species here include black snakeroot, enchanter's nightshade, and white snakeroot.

CRE-20

Mesic Oak Forest **Rank: C**

With a nearly closed canopy, this forest has a mix of open-grown, wide crowned oaks, as well as tall, straight bur and pin oaks that developed under closed-canopy conditions. Other common trees include quaking aspen and white birch, with one small stand of sugar maple present. A portion of the forest appears to have been clear-cut, while some other areas may have been logged more than 50 years ago. The shrub layer is moderately thick and dominated by thorny shrubs, especially prickly ash. Additional members of the shrub layer include a mix of other shrubs and saplings of the canopy species. The ground layer is in moderately good condition. Some species present that are indicative of better quality forests include showy orchis, lady fern, zigzag goldenrod, wild ginger, fragile

fern, and interrupted fern. Despite the past disturbances of logging and perhaps grazing, this forest is in moderately good condition.

CRE-21

Oak Woodland-brushland **Rank: CD**

Found on a south-facing bluff above the Cannon River, this oak woodland is characterized by a moderately dense canopy of open-grown bur oaks. Areas between these large oaks are nearly filled in by groups of red cedar and young hardwood trees. The cedar and young hardwoods are a recent phenomenon on this slope that was formerly bluff prairie and savanna. Although the shrub layer is only moderately thick in many places, the ground layer has not retained the composition of savanna and prairie, due in large part to past grazing. Common members of the shrub layer include European buckthorn, and black cherry, chokecherry, elm, and hackberry saplings. The most frequent ground layer species include pointed-leaf tick trefoil, lopseed, black snakeroot, and enchanter's nightshade, and Virginia creeper.

CRE-22

Not Used

CRE-23

Oak Woodland-brushland **Rank: D**

This former savanna and bluff prairie contains some very large bur oak with open-grown characteristics. There is a dense undergrowth of red cedar, prickly ash

and buckthorn. The ground layer is sparse due to the rapid increase in shade caused by shrub colonization and the most common species include white snakeroot, burdock, and white avens. Although there are a few prairie remnants that persist in very small canopy openings, these will likely become overtaken by brush within a few years. Because of the rapid transition of this community from relatively open to nearly closed and the dramatic decline in species richness that resulted, this community was given a low qualitative rank.

CRE-24

Dry Prairie, Sand-gravel Subtype Rank: D

This prairie occurs on a terrace of the Cannon River on both sides of the Cannon River. It lies to the northeast of the high school. Most of this community appears to be old field that has been recolonized by a number of prairie species. The area on the north side of the river has about 50 percent shrub cover with Siberian elm and eastern red cedar common. All areas have a ground cover dominated by smooth brome, bluegrass and other nonnative cool season grasses, with some moderate quality patches of prairie scattered throughout the site. The prairie areas contain sideoats grama, Canada wildrye, and big and little bluestem as the most common native grasses. The most common forbs include silverleaf scurf-pea, stiff goldenrod, heath aster, and tall boneset. Also of interest is the colonization of dry, shady areas on the north parcel by Loesel's twayblade. Because this community is characterized by past disturbance and few plant species have been able to quickly recolonize the site, it

was given a poor rank. Despite this, the parcel on the south side of the river provides an excellent opportunity for the City of Cannon Falls to manage and restore a rare community type. Efforts have already been made to reconstruct a prairie closer to the school and additional activities should include restoration of this river terrace prairie. Some activities for this site could include prescribed burning and the reintroduction of additional, local ecotype native grasses and forbs.

CRE-25

Floodplain Forest

Rank: C

This forest is mostly associated with a flood raceway in the floodplain of the Cannon River. The site appears flood regularly, with debris evident in shrubs and other areas. The site does not appear to have been cut or logged in the past and most of the trees are relatively young, with most under 18 inches. The canopy is nearly closed in most places and the most common trees include silver maple and black willow. Other trees that are more common on the slightly higher ground include black walnut, cottonwood, boxelder, and elm. A subcanopy includes occasional boxelder and the shrub layer is nearly absent in most places. The ground layer contains species commonly found in floodplain forest. Some of these include wood nettle, Virginia wildrye, goldenglow, sneezeweed, and white grass. The presence of nonnative species, including stinging nettle and chickweed, as well as the relatively young age of the canopy trees are the two primary reasons for the moderate grade of this community.

Despite this, it should improve to a "B" level rank in the next ten to twenty years if left undisturbed.

CRE-26

Dry Prairie, Barrens Subtype **Rank: CD**

This prairie includes what appears to be former pasture adjacent to the access road to Northern Hardwoods. The brush cover of this area is about 20 percent, but exceeds 50 percent in some areas along the margins. The most common brush species include Siberian elm and red cedar. The most common native graminoids include Indian grass, sand dropseed, a species of panic grass, and purple lovegrass. Forbs present that are characteristic for this community type include silky prairie clover, narrow-leaf and hoary puccoon, cudweed, oxeye false sunflower, and stiff and gray goldenrods. Because the species characteristic of better quality communities are found only occasionally and because most of the site appears to have been cultivated historically, this community was given a low qualitative rank. Because this community occurs on sandy soil, it is a good candidate for restoration. Potential activities include brush removal, prescribed burning and minimizing damage from trails and ATVs.

CRE-27

Lowland Hardwood Forest **Rank: D**

This forest is found along a terrace and small hill adjacent to the Cannon River. It is mostly made up of young boxelder and Siberian elm interspersed with scattered mature pin and bur oaks. The shrub layer is

generally thick and dominated by thorny shrubs. The ground layer is a mix of nonnative grasses and disturbance tolerant native forbs in drier areas, and native sedges, grasses and flowers in the moister, low-lying areas. Because of the recent origin of the boxelder and nonnative Siberian elm, this community was given a low rank. However, it would be a nice community to manage along with adjacent prairie areas.

CRE-28

Oak Woodland-Brushland Rank: C

This community includes several parcels along the bluffs of the Cannon River. Most of these appear to be former prairie, savanna, or open woodlands that have more recently been colonized by brush and young trees. The most common trees include bur and pin oak, with young quaking aspen, green ash, black walnut, red cedar, and elm found occasionally. The most common shrubs are black raspberry, blackberry, dogwood, and prickly ash. The ground layer includes woodland sunflower, elm-leaved goldenrod, white snakeroot, Pennsylvania sedge, and false Solomon's seal. Overall, the quality of this community is moderate to good and was given a rank of "C".

CRE-29

Lowland Hardwood Forest Rank: CD

Found along a lateral valley and associated delta along the Cannon River, this community is characterized by a patchy to closed canopy dominated by young elm and green ash. Scattered among these are some large

cottonwood, and a few black willow. The shrub layer is variable and includes a mix of upland and lowland shrubs and small trees. Included here are boxelder, oak, common elderberry, and others. The ground layer is generally represented by species tolerant of disturbance and indicates both past grazing and the recent canopy closure following colonization by trees. Although this forest will likely improve as it matures, its current youth and species composition cause a moderately low ranking of "CD".

CRE-30

Dry Oak Forest Rank: C

This forest is one of the larger contiguous tracts in the area. The topography ranges from steep to shallowly sloped, with several different slope exposures present. The most common canopy trees are bur, pin, and white oak that average over 14 inches in diameter. Other trees that are locally common include white birch, quaking aspen, bitternut hickory, and, to a lesser degree, red oak and sugar maple. The shrub layer varies substantially depending on the slope direction and position. In some areas it is sparse, giving a hall-like appearance to the area under the oaks, while others are very thick and difficult to negotiate. The most common species here include ironwood, downy arrowwood, American hazel, nannyberry, red cedar, and fly honeysuckle. The ground layer is likewise variable depending on the location, and on the impact of past grazing. Overall, this forest is of good quality and should continue to improve through time.

CRE-31

Oak Woodland-Brushland **Rank: D**

This includes several distinct parcels that are characterized by large, scattered, open-grown oaks, with a generally dense shrub layer composed of small trees and shrubs. The ground layer is mostly in poor condition and in most places is either actively or formerly grazed. Because of the level of past disturbance, this community was given a low qualitative rank.

CRE-32

Oak Woodland-Brushland **Rank: C**

This community has scattered, open-grown oaks, but unlike the previous community some gaps still exist in the canopy and the ground layer species composition is better. Because of the patchy canopy and a moderate representation of native species characteristic for the community type, this area was given a rank of "C".

CRE-33

Lowland Hardwood Forest **Rank: C**

Found in a narrow strip between the Cannon River and the Sunset Trail, this forest is of moderate quality. It has a sparse canopy of trees with about 25 percent total cover. Sometimes the trees occur in small groves, while in other areas they are present as scattered individuals. The most common large trees include cottonwood, elm, black willow and to a lesser degree boxelder and eastern red cedar. The shrub layer is patchy, with prickly ash, wild rose, false indigo, and gray dogwood most common. The ground layer is a mix of native species and introduced species.

Nonnative species found here include bluegrass, smooth brome, and quackgrass. The most frequent native ground cover includes several species of sedge, big bluestem, Canada wildrye, goldenglow, sawtooth sunflower, Indian grass, purple giant hyssop, and cup plant. Although the species composition of this community would indicate a higher ranking, the small size and fragmentation caused a ranking of "C". Similar parcels are located within the city of Cannon Falls, and are mapped under the same description.

CRE-34

Oak Woodland-Brushland **Rank: C**

This woodland includes several separate parcels of similar character and quality. It is characterized by large, open-grown pin and bur oak with younger trees, including quaking aspen and elm, in between. The shrub layer varies from sparse to moderately thick in some places. The ground layer is also variable, with some savanna and prairie species persisting along edges and in small openings, while much of the site has species that are typical of young, disturbed woodlands. The bluff just north of County Road 24 and west of County Road 24 hosts some prairie species and should be searched in the future for the possible occurrence of species such as kitten-tails.

CRE-35

Oak Woodland-Brushland **Rank: CD**

Moderately poor in quality, this community contains large pin and bur oaks with a moderately dense shrub

layer of young trees and shrubs. These include plum, elm, prickly ash, dogwood, and boxelder. Nonnative pasture grasses, including Kentucky bluegrass, dominate the ground layer. These conditions cause a lowered qualitative rank of "CD".

CRE-36

Dry Oak Forest **Rank: BC**

Although this former woodland/savanna has been impacted in the past by grazing and limited tree cutting, it is transitioning very nicely into a quality dry oak forest. The most common members in the nearly closed canopy are bur and pin oak that average about 19 inches in diameter. Other, less common trees include bitternut hickory, basswood, elm, and black walnut. The shrub layer varies from sparse to thick with prickly ash and prickly gooseberry common. The ground layer has a good representation of species found in woodlands and oak forests. Some of these include wild sarsaparilla, yellow bellwort, pointed-leaf tick trefoil, wild geranium, hairy wood chess grass, and zigzag goldenrod.

CRE-37

Mesic Prairie **Rank: C**

This small roadside prairie remnant approximately 200 meters long is found along County Road 25. This community likely established as prairie species colonized the roadside from the adjacent savanna in the past. The adjacent savanna is now a woodland and the prairie/savanna species are far less frequent there than they would have been in the past. Although few

native grasses are found in this prairie, it has a moderately good representation of native forbs. Some of these include compass plant, golden alexanders, smooth blue aster, rough blazingstar, wild licorice, prairie phlox, stiff goldenrod, veiny pea, butterfly milkweed, and approximately a dozen others. The good composition of native species is helping to prevent weedy species from becoming well-established in this roadside, as well as providing color and important biological diversity to the area.

Mesic prairies were once the most widespread natural community in southeastern Minnesota outside of the blufflands area. Today, less than one tenth of one percent of these remain, with even a smaller fraction of those in moderate to good condition. This inherent rarity makes mesic prairie worthy of protection and active management. Roadsides are places characterized by disturbance, but measures can be taken to manage this prairie that are compatible with good road system management. The greatest impact to this prairie is the apparent annual mowing by road crews during the growing season. Mowing of this roadside prairie during the growing season should be ceased, it only makes invasion of the roadside by weedy species more liekly. It is recommended that if mowing is perceived as something that must happen that it be conducted after mid-October, and the frequency reduced to perhaps only once every few years to keep brush from increasing. <u>This roadside should, under no circumstances, be broadcast sprayed with a broadleaf herbicide.</u> This would likely result in a total loss of this prairie. Mesic prairies are among the

rarest natural community types in Minnesota, and this is one of only about one half dozen mesic prairies remaining in the county. All of these are small and host species that are unique or uncommon for the region. Efforts should be made to work with the County Highway Department, MN DNR Roadside Biologist in New Ulm, and other DNR and DOT staff to adequately sign and protect this prairie.

CRE-38

Oak Woodland-Brushland Rank: BC

This former savanna has become more overgrown by brush and small trees over the course of the last few decades. Despite this, it still retains a good representation of native species and is one of the better examples of oak woodland in the area. It is characterized by scattered, large, open-grown bur and pin oaks. These have young clones of aspen, some small trees, and brush between them. The total canopy cover by trees and shrubs ranges from almost continuous to none, with an average of about 40 percent. Areas with higher canopy cover have species in the ground layer that are characteristic of savannas and dry oak forests. Former pastured areas, and a few old fields have mostly prairie species present, with savanna species being less common. Overall, this community is of good quality and has added importance because of the interconnectedness of open and partially wooded areas, and because it is adjacent to a nice roadside prairie (CRE-37).

CRE-39

Lowland Hardwood Forest Rank: CD

This community occupies the lowest portions of a drainage in a gently to moderately rolling area just east of County Road 25. The entire area is either currently pastured or appears to be formerly pastured. The most common tree species include boxelder, elm, and to a lesser degree green ash. The shrub layer varies from sparse in the areas that are intensively grazed, to thick in areas that have not been grazed for an extended period of time. Both the shrub and ground layers are dominated by nonnative species, including European buckthorn, Kentucky bluegrass, orchardgrass, Canada thistle and others.

CRE-40

Dry Prairie, Barrens Subtype Rank: CD

This prairie lies to the north and south of 318th Way in Cannon Falls. Most portions appear to have been plowed in the past, while a few small areas in the north were perhaps only grazed. There is about 20 percent cover by eastern red cedar, sumac and dogwood on this prairie. The most common native grasses include purple lovegrass, Indian grass, sand reedgrass, rough dropseed, paspalum, porcupine grass, and little and big bluestem. Some of the more frequent native forbs include round-headed bushclover, windflower, wild strawberry, ground cherry, and stiff sunflower. Other native forbs found here that are associated with quality prairie include silky prairie clover, hoary puccoon, rough blazingstar, rhombic-petaled evening primrose, and anise hyssop. Overall, the quality of this prairie is at best moderate, although some pockets of better quality are found here. Despite its current condition, this prairie has good restoration potential and is of a

prairie subtype (barrens prairie) that is exceedingly rare in this region.

CRE-41

Oak Woodland-Brushland Rank: C

This former savanna and bedrock prairie have become overrun with eastern red cedar that forms a nearly impenetrable thicket in most places. Scattered large, open-grown bur oak average over 20 inches in diameter, while most cedars are less than ten inches in diameter and about 15 feet tall. Sumac, buckthorn and other brush have colonized the few gaps. Despite this, there are a few small pockets of quality prairie remaining. Occurring in one very small canopy opening is a population of the State Threatened kitten-tails that totals about 15 individuals. Without active clearing of the immediate area, this population may be lost in the next 10 years. Other prairie species found nearby include big bluestem, pasque flower, prairie violet, a species of panicum, sky blue aster, silky aster, and Loesel's twayblade.

CRE-42

Oak Woodland-Brushland Rank: D

This oak woodland is found in an area that roughly parallels Valley Trail. It has large, open-grown bur oaks scattered throughout with a thick second growth of young elm, aspen, cedar, and prickly ash. One shrub species, multiflora rose, was found in a pasture just to the east of Valley Trail. Multiflora rose is a very invasive plant in states to the south and east and although it is not well known in Minnesota may become

a larger problem in the future. Where it occurs in partially wooded pastures (as evidenced in states to the south and east), it dramatically reduces the amount of forage and should be watched to make sure that it does not expand its range. The ground layer in this community is in poor condition in most places, which is likely a result of intense past grazing. Overall, this woodland itself is in poor condition but should improve on its own through time if stocking rates and intensities are reduced.

CRE-43

Lowland Hardwood Forest Rank: D

This forest is found on one north-facing knob and in a low drainage area near Valley Trail. Both areas appear to have been colonized recently by lowland tree species, with the lower drainage area formerly being more open, and the hillside appearing to have been an oak dominated community. Boxelder, elm, cottonwood, and ash are the most common trees within the site. Beneath these is a thick shrub layer, and a disturbed ground layer dominated by reed canary grass and stinging nettle. Because of its recent origin and poor species composition, this forest was given a qualitative rank of "D".

CRE-44

Dry Oak Forest Rank: B

This is a very nice quality dry oak forest just west of County Road 8. The canopy of the forest averages 85 to 90 percent cover, with tree sizes generally ranging from about 8 to 20 inches in diameter. The most

common canopy species include bur oak, pin oak, bitternut hickory, and black cherry. The most common trees in the subcanopy are ironwood and bitternut hickory. Other species of woody plants found in the shrub layer include gooseberry, and American hazel. The ground layer is in good condition with many species present that are typical of oak forests. Some of these include yellow bellwort, tall bellflower, pointed-leaf tick trefoil, wild geranium, silky wild rye, giant purple hyssop, and false Solomon's seal. The good species composition, and relatively small amount of past disturbance help to give this forest the high qualitative rank of "B".

CRE-45

Oak Woodland-Brushland **Rank: D**

This oak woodland is in generally poor condition with the east portion formerly grazed and the west portion grazed at the time of field visit. Both areas have large, open-grown bur and pin oaks with a very dense shrub layer composed of small trees and thorny shrubs. Some of these include elm, poplar, dogwood, prickly ash, and European buckthorn. The ground layer is generally dominated by nonnative cool season grasses and native plants that are capable of withstanding frequent disturbance. For these reasons, the community was given a lowered rank of "D".

CRE-46

Dry Oak Forest **Rank: CD**

This oak forest is characterized by bur oaks that are closely spaced and generally small in diameter. The

shrub layer is moderate to dense with a ground layer that is composed of nonnatives in most areas. Because of the influence of grazing and the transition of this community to a forest from one that was more open, this community was given a moderately poor qualitative rank of "CD".

CRE-47

Maple-Basswood Forest

Rank: B

This small, high quality forest is on an east-facing slope adjacent to Clark Valley Trail. Although there has been some limited tree cutting in the past, the canopy structure and the species composition are good. The most common trees found here are sugar maple and red oak, with black cherry and basswood found occasionally. The shrub layer is moderate in thickness in some areas, but sparse overall. The most common species found here are chokecherry, ironwood, bitternut hickory, pagoda dogwood, juneberry, and sugar maple saplings and seedlings. The forb species found most frequently in the ground layer include yellow bellwort, hepatica, lopseed, bloodroot, tick trefoil, sarsaparilla, zigzag goldenrod, lady fern, and approximately two dozen other species. The most common graminoids include silky wild rye, bottlebrush grass, wood reed, Pennsylvania sedge, and broad-leaved woodland panic grass. Although small, this community was still given a high rank because of the minimal recent disturbance and the good species composition.

CRE-48

Maple-Basswood Forest

Rank: C

This maple-basswood forest occurs across several northward flowing valleys and ravines. It varies in composition based on past land use. Some areas have been influenced by logging, some by grazing, and others by both. The most common trees found here are sugar maple and red oak, black cherry and basswood. Other areas include pockets of black walnut, hackberry, boxelder and other trees. The shrub layer is moderately dense in most areas, but very thick in others. The most common species found here are chokecherry, brambles, ironwood, bitternut hickory, pagoda dogwood, juneberry, and sugar maple saplings and seedlings. The forb species found most frequently in the ground layer include yellow bellwort, hepatica, lopseed, bloodroot, tick trefoil, wild sarsaparilla, zigzag goldenrod, lady fern, and approximately two dozen other species. The most common graminoids include silky wild rye, bottlebrush grass, wood reed, Pennsylvania sedge, and broad-leaved woodland panic grass. Because of past grazing and logging activities, and recent fragmentation due to home construction, this forest was given a moderate rank of "C". If additional disturbance is withheld, it should improve to at least a "BC" rank in the next few decades.

One additional species of note, western ironweed *Vernonia baldwinii* occurs in a pasture near the northeast side of this forest. Minnesota is not considered part of the normal range for this species and the possibility exists that it could have been

introduced through shipping of cattle, horses, hay, or some other means. Although it is not likely part of a population that occurred here historically, it is interesting and represents the only verified population for this species in Minnesota.

CRE-49

Maple-Basswood Forest Rank: C

This forest is in generally poor condition, although it appears to be recovering from the past impacts from logging and grazing. The most common trees in the canopy are sugar maple, basswood, elm, boxelder, red oak, ash, and bitternut hickory. The shrub layer varies from moderately thick to thick with gooseberry and Tartarian honeysuckle common. The sparse ground layer is dominated by disturbance-oriented species, although some natives associated with better quality communities are beginning to reestablish here. This forest, although heavily disturbed in the past was given a moderate rank, in part due to the apparent trend towards recovery and self-improvement.

CRE-50

Oak Woodland-Brushland Rank: CD

This community includes several parcels that were formerly grazed. The canopy in these parcels is characterized by scattered large, open-grown bur and pin oaks. Other trees including elm, hickory, boxelder and others fill in the areas between the oaks. The brush layer varies from moderate to very thick with a mix of thorny shrubs, tree saplings, and red cedar. The ground layer is dominated by nonnative cool

season pasture grasses in most places, with a few areas containing woodland edge species that are tolerant of frequent disturbance. Because of the past history of grazing and the resulting shift in community structure and composition, this community was assigned a rank of CD.

CRE-51

Dry Oak Forest Rank: CD

This community is found in several parcels with a history of grazing and tree cutting. Overall, the most frequent canopy trees include bur and pin oak. In most areas, there is a thick second growth of young elm, boxelder, and aspen, as well as some sugar maple, bitternut hickory and others. The shrub layer is moderately dense in most places with gooseberry and other thorny shrubs the most common species. The shrub layer is somewhat less thick in the areas that have been grazed more recently. The ground layer varies slightly in quality, but is generally dominated by species tolerant of some grazing including white snakeroot, avens, and nonnative cool season pasture grasses,

CRE-52

Oak Woodland-Brushland Rank: C

This woodland-brushland is found in several parcels just east of Highway 52. The parcels vary in structure, with some areas characterized by scattered, open-grown bur and pin oaks and other areas with small groves of oaks that are tall and straight with crowns intermingling. It appears that all of these areas have

been grazed in the past, with some more recently affected than others. The shrub layer in most places is thick and dominated by thorny shrubs, especially prickly ash. The ground layer reflects the history of grazing with nonnative cool season grasses and disturbance-tolerant native species most common. Plant species typically associated with better quality are rare or absent here. Because of the history of disturbance, this community was given only a moderate rank. Despite this, some areas have good restoration potential. One landowner at the end of 327th Way appears to have planted switchgrass in a former pasture. Although the native species diversity of the site has not increased dramatically because of the introduction of one species of grass, it does represent an improvement in habitat value and community function. Additional efforts could focus on reintroduction of local ecotype plant materials of other appropriate native grasses and forbs.

CRE-53

Oak Woodland-Brushland **Rank: C**

This community includes numerous parcels of various sizes, mostly along a long, south-facing ridgeline just north of Skunk Hollow Trail. Almost all of these appear to have been grazed to varying degrees in the past. The most common large trees include bur and pin oak, most of which are scattered and appear to be open-grown. The shrub layer is variable in thickness depending on whether it is currently grazed, or how long ago it was retired from grazing. In general most of the areas have a thick to very thick shrub layer with prickly ash, sumac, European buckthorn, eastern red

cedar, and dogwood most common. Plants tolerant of grazing dominate the ground layer in most areas, and nonnative pasture grasses are common. The exception to this is one area south of 337th Way where there is still some savanna-like character to the landscape. Many of the south-facing slopes, particularly the steepest ones, have some prairie and savanna plants remaining. A conversation with the owner revealed that he had grazed the area with beef and dairy cattle until 1988 and has only been doing some spot mowing with a tractor to maintain a picnic area since then. This property would provide a good opportunity for savanna management, although management of this area with prescribed fire, a necessary tool, would be difficult since field roads and other obvious firebreaks are lacking.

CRE-54

Lowland Hardwood Forest Rank: CD

This forested community is mostly confined to the floodplain of Butler Creek and a few lateral feeder streams that flow intermittently. The most common tree here is boxelder, which forms an even-aged stand under scattered larger black willow. Black walnut, elm, and cottonwood occur infrequently in the site. The shrub layer is generally thick with many saplings and pole-sized boxelders and thickets of prickly ash, European buckthorn and other "armed" shrubs. The ground layer is dominated by disturbance tolerant species, especially the nonnatives stinging nettle and reed canary grass. Other less frequent plants include the native species angelica, goldenglow, and various sedges.

CRE-55

Maple-Basswood Forest
Rank: CD

This forest adjoins a much larger maple-basswood forest that was identified as high quality by the Minnesota DNR County Biological Survey in the early 1990's. It occurs in two separate areas. The north area is currently grazed and occurs as a slot in the larger forest. The southern area occurs on the south-southeast edge of the larger forest and has been grazed and perhaps logged. The canopy in these segments is dominated by oak, sugar maple, and, to a lesser degree, aspen and elm. The shrub layer is variable, but is generally sparse due to extensive grazing. The ground layer also reflects grazing activities and is in generally poor condition. Despite having been substantially disturbed in the past, the rank of this forest was upgraded slightly due to the fact that it is contiguous to a larger, better quality forest.

CRE-56

Dry Oak Forest Rank: B

This forest occupies a north-south valley with some east-west side valleys. Most of the community is dominated by bur and pin oaks. Some of the south-facing slopes are more open in character and somewhat resemble an oak woodland-brushland, while some of the north-facing slopes have a more closed canopy that includes sugar maple, and resemble mesic oak forest. Despite the breadth of plant species and canopy cover found here, the entire area was treated as one community because of the land use history of past

grazing. Most of the larger trees are over 12 inches in diameter, with some evidence of past tree cutting particularly on more mesic slopes. The shrub layer varies from moderately thick to sparse, with the thickest areas found on south slopes and in areas with a patchy canopy. The most common species in the shrub layer include ironwood and prickly ash, with gooseberry, red cedar, Japanese barberry, and sugar maple and basswood seedlings occurring less frequently. The ground layer is a mix of closed and open woodland species. Some of the most frequently encountered of these were elm-leaved and zigzag goldenrods, tall anemone, heart-leaved aster, columbine, wild ginger, and hog peanut. Overall, this community is in good condition and was given a qualitative rank of "B".

CRE-57

Oak Woodland-Brushland Rank: D

This woodland is found in several parcels that occur near County Road 25. Past grazing has substantially impacted all of these sites. The most common large trees are bur and pin oak. Most of these are widely spaced, and along with boxelder, elm, aspen and other smaller trees total about 80 to 90 percent canopy cover for the area. The shrub layer is moderate in most places and composed mostly of thorny shrubs such as gooseberry, prickly ash, and European buckthorn. The ground layer is dominated by species tolerant of disturbance, especially stinging nettle. Because past alterations to this community have reduced both its ecological function and native species richness, this woodland was given a "D" rank.

CRE-58

Wet Meadow **Rank: CD**

This wet meadow lies on the east side of Highway 56 and was grazed by horses at the time of the field visit for this study. It borders a stream with a floodplain less than 100 yards wide in most places. Surrounding this are hills that rise, rather steeply, to a height of about 15 to 20 feet. The most common species here are side-flowering aster, New England aster, cattail, several species of sedge, and the nonnative reed canary grass. Although in generally poor condition, this wet meadow was inventoried because of the increasing rarity of this community type and its restoration potential.

CRE-59

Sedge Meadow **Rank: BC**

Although grazed in the past, this small sedge meadow appears to be in good condition. It is on the northeast side of the intersection of Highview Road and Highway 52. The most common species here include tussock sedge, great blue lobelia, prairie cordgrass, asters, blue flag iris, and others. Even though it is less than 3 acres in total size, the general quality warranted that the community be inventoried. For these reasons, it was given a rank of "BC."

CRE-60

Dry Oak Forest **Rank: BC**

This forest is found on the southeast side of Cannon Falls. It has a canopy that averages about 85 to 90 percent closure and is dominated by tall, straight trees.

The most common of these are bur and pin oak that average about 18 inches in diameter, and boxelder, elm, aspen, basswood, and sugar maple being smaller and less frequent. The shrub layer varies from moderate to sparse depending on the slope position and the amount of past disturbance. The areas that seem to be the least disturbed are those just below the crest of hills, and those with some bedrock near the surface. The most common members of the shrub layer include bitternut hickory, ironwood, sugar maple saplings, and prickly ash. The ground layer is in good condition with most areas dominated by species typical of oak forests. Some of these include wild geranium, lopseed, wild sarsaparilla, pointed-leaf tick trefoil, bloodroot, and zigzag goldenrod. Although there are some small areas of higher disturbance, most of the site is in good to very good condition. For this reason, and because it occurs within the city of Cannon Falls, this forest was given a rank of "BC".

CRE-61

Oak Woodland-Brushland **Rank: CD**

This small woodland occurs in several parcels that are separated spatially, but similar in composition and quality. It is a mix of open-grown and tall, straight oaks with many younger aspen, elm, cottonwood, boxelder, and others. The shrub layer in areas that are not currently grazed is moderate to thick, with species such as prickly ash and European buckthorn common. Currently grazed parcels have fewer shrubs. The ground layer also shows signs of disturbance and is dominated by species such as wood nettle, white snakeroot, stinging nettle, Virginia waterleaf, sweet

cicely, honewort, and nonnative pasture grasses. Because of past disturbance, and overall poor composition, this community was given a relatively poor rank.

CRE-62

Dry Oak Forest **Rank: CD**

This dry oak forest is similar in species composition to CRE-61, but has a more closed canopy. As with the previous community, the level of disturbance and fact that the forest is in the early stages of recovery cause a lowered rank of CD.

CRE-63

Dry Oak Forest **Rank: BC**

This forest is found in several parcels that are adjacent to CRE-64, and CRE-61. It has a somewhat broken canopy that averages about 80 percent cover and is dominated by bitternut hickory, bur and pin oaks, black cherry, hackberry, and white birch. Most of these trees average over 14 inches in diameter. There are many smaller trees between these, including boxelder, aspen, and elm. The shrub layer is variable with silky dogwood, boxelder, gooseberry, bitternut hickory saplings, and hazel most common. The ground layer is in good condition and shows minimal past disturbance. Some of the more common graminoids include bottlebrush grass, hairy wood chess, and Pennsylvania sedge. The most frequently encountered forb species found here include purple joe-pye weed, purple giant hyssop, golden alexanders, wild yam, woodland sunflower, elm-leaved goldenrod, heart-leaved aster,

and feverwort. Overall, the species composition of this forest is good and justifies a rank of "BC".

CRE-64

Mesic Oak Forest **Rank: B**

This forest is connected to CRE-63 and occupies east- and north-facing slopes. Trees that are more common here than in the previous community are red oak, basswood, black cherry, and hackberry. The shrub and ground layers are similar, with false Solomon's seal, wild ginger, and spikenard also present in this community. Because of the good composition and structure of this forest, and because it adjoins other high quality forests, this community was given a qualitative rank of "B".

CRE-65

Oak Woodland-Brushland **Rank: BC**

This woodland has about 40 percent tree cover and is found on a south-facing slope with bedrock outcrops and steep slopes. The most common large trees are large, open-grown bur oak. There are thick stands of eastern red cedar, elm, and aspen dispersed through the area. The shrub layer varies from absent to very thick, with prickly ash and European buckthorn most common. The ground layer is also variable, with nonnative pasture grasses common in the poor quality areas. Those areas with a good quality ground cover are dominated by species common to bedrock bluff prairies and savannas. Some of these include sideoats grama grass, big bluestem, Indian grass, aromatic

aster, leadplant, sky blue aster, hoary puccoon, and false boneset. One uncommon characteristic of the ground layer here is the near-dominance by wood betony. This partially parasitic plant forms a nearly continuous mat throughout a large portion of the area with prairie. Overall, the quality of this community is good and the fact that roads border both sides of the site make it a good candidate for restoration. Possible activities to improve the site include brush removal and the use of prescribed burns during mid-April to mid-May.

CRE-66

Dry Oak Savanna **Rank: D**

This savanna is found on a narrow band along a south-southeast-facing slope. It is characterized by scattered large, open-grown bur and pin oaks with smaller clones of aspen and a few white birch. The total canopy cover of trees is about 40 percent. This hillside is intensively pastured, but appears to still host some smaller stands of native grass. This community, although poor quality, was included in this survey because savannas are becoming increasingly rare, and because it appears to have some restoration potential that could improve both the amount of forage available and the site's ecological quality. As such, this hillside would be a good candidate for a customized grazing/savanna restoration plan.

CRE-67

Oak Woodland-Brushland **Rank: D**

This woodland includes several isolated parcels of similar composition and quality. They are characterized by scattered, large bur and pin oak. Areas that are currently grazed tend to be more open than parcels that have been retired for various amounts of time. Younger trees and brush fill in much of the area between these larger oaks in the retired pastures. Some of these include aspen, elm, boxelder, cherry, prickly ash, buckthorn and others. The ground layer is generally in poor condition with a mix of nonnative pasture grasses including Kentucky bluegrass, and native forbs that tend to increase as result of moderate to intensive grazing pressure. Overall, the past disturbance and recent origin of smaller trees and thick brush combine to cause a lowered rank of "D" here.

CRE-68

Lowland Hardwood Forest **Rank: D**

This young forest has a patchy canopy with some scattered older oaks. This suggests that this community was more open historically, and probably evolved from an oak woodland-brushland. The most common trees other than oaks include black willow, elm, and boxelder. The shrub layer varies from moderately sparse to thick with a mix of native and nonnative species present. The ground layer is composed mostly of nonnative pasture grasses. Because of the change from oak woodland to lowland hardwood forest, the apparent past disturbance, and dominance by nonnatives in the ground layer, this community was given a minimum ranking.

CRE-69

Lowland Hardwood Forest Rank: CD

The patchy canopy of boxelder, black willow, cottonwood, and ash suggests that this forest is of recent origin. Most of the canopy trees found here are about 10 inches in diameter and colonized what might have been open pasture in the past. The shrub layer varies depending on tree cover and proximity to the creek. The ground layer is generally sparse with the most common species typical of disturbed areas. Some of these include motherwort, stinging nettle, reed canary grass, Kentucky bluegrass, avens, and others. Overall, this forest is generally poor in quality but may improve in time if left undisturbed.

CRE-70

Wet Meadow/Seepage Meadow Rank: C

This seepage/wet meadow occurs in several locations that are spread over several miles of landscape, extending from the intersection of Highways 52 and 8 to the north. They are considered together because of their similar species composition and land use. All of these parcels have been influenced in the past by grazing, with cattle still present in most of them. Most occur along the edges of small, ephemeral waterways. One complex of small seeps is found on a west-facing slope and may actually be a heavily degraded fen, although a field investigation was not conducted here. The most common species found in these parcels include tussock sedge, violet, angelica, mountain mint, willow-herb, boneset, dark green bulrush, and prairie cordgrass. Because of the impacts of long-term, intense grazing, these meadows are in only moderate

condition. The west-facing hillside to the east of Willowbrook Trail should be visited if land use changes are proposed, to determine whether it is a calcareous community and if so, whether it is restorable.

CRE-71

Dry Oak Forest Rank: C

This forest is found in several locations that range from a north-facing slope to a nearly level landscape. These areas would have mostly likely been open woodland in the past. All are currently or formerly grazed, with large bur and pin oak common. These form a patchy canopy with the gaps becoming filled-in with "weedy" trees such as boxelder, and aspen, as well as black cherry, hackberry, and small oaks. The shrub layer is moderately thick with European buckthorn, black raspberry, and prickly ash most common. The ground layer is in moderate condition with a mix of disturbance-oriented species such as honewort, and more desirable species including purple giant hyssop, wild sarsaparilla, yellow bellwort, and tall bellflower. Despite past disturbance, the parcels that are not currently grazed appear to be recovering well. If additional disturbance is withheld, this community could improve in rank within the next few decades.

CRE-72

Lowland Hardwood Forest Rank: CD

This community includes low areas along Belle Creek as well as some upland areas that have been colonized by trees typical of low-lying areas. The most common tree species here are boxelder and elm that average

less than 12 inches in diameter. The shrub layer is moderately thick to thick, and dominated by tree saplings and native shrubs including common elder and gooseberry. The ground layer is dominated by native species that are adapted to disturbance and commonly found in lowland forests, including Virginia waterleaf and wood nettle. Because this forest is very young and has a relatively low number of native species, it was given a lowered rank of "CD".

CRE-73

Oak Woodland-Brushland **Rank: CD**

Found in several separate parcels, this oak woodland is in generally poor condition. They were likely grazed in the past and some portions have had trees removed. The average canopy cover is about 60 percent, although it ranges from approximately 50 to 75 percent. The most common trees are large, open-grown bur oak that average over 16 inches in diameter. Canopy gaps are filling in with younger, secondary growth trees including hackberry, basswood, and black cherry with average diameters around 10 inches. As these younger trees mature, this woodland will likely become a mixed hardwood forest in the next several decades.

The shrub layer is moderately thick to impenetrable with thorny species and those unpalatable to cattle most common. The ground layer is also dominated by species that cattle avoid grazing such as white snakeroot, or nonnatives that have been introduced such as bluegrass. Because of the level of past disturbance, and because substantial recovery will not

likely occur for decades, this woodland was given a lowered rank of “CD”.

CRE-74

Dry Prairie, Bedrock Bluff Subtype **Rank: D**

This is a small dry prairie on a south-facing slope. Overall, the quality of this prairie is poor as a result of intense past grazing and the introduction of nonnative species to the site. The most common grass is the nonnative smooth brome. The most common native species include big bluestem, Indian grass, sideoats grama grass, stiff goldenrod, prairie sage, and aromatic aster. These occur sporadically, and represent a group of plants that are tolerant of extended periods of moderate disturbance. Brush cover on this prairie is about 30 to 40 percent in most places with red cedar and boxelder most common. Without active management, this hillside may transition to a poor quality brushland in the next few decades.

CRE-75

Lowland Hardwood Forest **Rank: D**

This forest occurs mostly along Belle Creek and the immediately adjacent areas. The canopy is patchy, with boxelder that average about 10 inches in diameter most common. Larger black willow and cottonwood occur less frequently. The shrub layer is moderate to sparse and dominated by disturbance-tolerant species, as is the case with the ground layer as well. The most common species in the ground layer include the nonnatives stinging nettle and reed canary grass, with the natives wood nettle, angelica, and goldenglow also

present. Because of the amount of past disturbance here and the recent origin of thick tree cover, this community was given a low qualitative rank.

CRE-76

Oak Woodland-Brushland Rank: D

Found along several side valleys and bluffs bordering the Cannon River, this oak woodland is a mix of degraded savanna and prairie that has been invaded by eastern red cedar. Black walnut, boxelder, and aspen have colonized many of the areas between the mature oaks, resulting in a nearly closed canopy. The shrub layer is thick to impenetrable in most places with prickly ash and red cedar most common. The ground layer is poor quality and sparse in many areas, primarily due to the recent and dramatic increase in shade. Because of the many changes and disturbances in this community it was given a low qualitative rank.

CRE-77

Dry Prairie
Rank: D

This community consists of many small prairie openings in the previous communities, mostly CRE 76. These openings are largely confined to hot, dry, steep slopes and bedrock outcrop areas. The most common grasses found here are Indian grass, big bluestem, sideoats grama, and porcupine grass. Typical forbs include gray goldenrod, leadplant, smooth blue aster, and columbine. Although the composition of these prairies is fair, their small size and isolation from one another cause a lowered rank.

CRE-78

Dry Oak Forest Rank: CD

This forest was probably logged in the past as indicated by old, overgrown roads through the woods. The most common large trees here are pin, bur, and white oak, with smaller elm, black walnut, boxelder, white birch, eastern red cedar and ironwood common as well. The shrub layer is in generally good condition with black cherry, brambles, gooseberry, and prickly ash, and eastern red cedar. The most frequent members of the ground layer include bloodroot, Canada goldenrod, starry false Solomon's seal, lady fern and wood anemone.

CRE-79

Lowland Hardwood Forest Rank: D

This low-lying area along the Cannon River is dominated by boxelder, green ash, cottonwood, and willow, most of which exceed 12 inches in diameter. The shrub layer is patchy, but invaded by the nonnative European buckthorn in many places. The ground layer also varies in quality, but is disturbed in most places. The most common natives here include sunflower, black snakeroot, sweet cicely, and wild grape. Common nonnative species include stinging nettle and chickweed. Because of the recent origin of this forest and past disturbance of the area the community was given a low rank.

CRE-80

Dry Oak Forest Rank: C

This forest has a somewhat broken canopy dominated by bur and red oak, and white birch that average over 14 inches in diameter. Other, smaller trees include red elm, boxelder and ironwood. The shrub layer is moderate to sparse in thickness with blackberry and black cherry saplings most common. European buckthorn is found only occasionally throughout most of this woods. The ground layer is in generally good condition with lady fern, wild geranium, black snakeroot, bloodroot, wild ginger, and jack-in-the-pulpit present. Overall, the structure and composition of this forest is moderately good, justifying a rank of "C".

CRE-81

Dry Oak Forest Rank: C

This dry oak forest is on a generally north-facing slope, with the best quality portions of the community on the steeper and less accessible areas of the site. Although oaks are common, other trees such as basswood, white birch, and elm are as frequent. The shrub layer is in generally good condition with gooseberry most common. This would tend to indicate a history of moderate grazing. The ground layer is in generally good condition with yellow bellwort, lady fern, Pennsylvania sedge, and wild ginger common. Other forbs that occur less frequently include bloodroot, blue cohosh, carrion flower, and rattlesnake root. Roadbuilding, house refuse, and junk piles have impacted some areas of this forest, causing a reduction in rank in an otherwise nice quality area.

CRE-82

Lowland Hardwood Forest Rank: D

This forest occurs mostly along the low-lying areas of a valley extending south from the Cannon River. Much of this forest has been impacted by land uses including tree cutting, refuse dumping, and intensive grazing that have resulted in extreme gully erosion and the loss of many native plant species. The most common trees found here include elm, green ash, bur oak and boxelder. The shrub layer varies considerably, with the narrower portions of the valley and higher elevations having a thick cover of European buckthorn and prickly ash, while the lower areas are more open and have a sparse shrub layer. The ground layer also varies, with the upper portions having a sparse to absent ground cover and the lower areas dominated by disturbance tolerant species such as the nonnatives stinging nettle and reed canary grass. Because of the general state of disturbance here, the forest was given a minimum ranking of "D".

CRE-83

Dry Prairie
Rank: CD

This prairie has been heavily grazed and encroached on by brush, especially eastern red cedar. Nonnative pasture grasses are common in most areas, except where steep slopes occur. The most common native species include the grasses sideoats grama and big bluestem, and the forbs bergamot, gray goldenrod, tall anemone, hoary vervain, and yarrow. Despite the heavy disturbance, this community does host a very small population of kitten-tails, a State Threatened species.

For this reason, it was given a slightly higher rank than its overall condition would normally warrant.

CRE-84

Mesic Oak Forest **Rank: C**

This forest is found mostly on north-facing slopes in a side valley just south of the Cannon River. Overall, the quality of this forest is good since it exhibits no excessive erosion and has a generally good species composition.

The closed canopy includes white and bur oak that are mostly over 18 inches in diameter. Other smaller trees that are also common include elm, basswood, and boxelder. The shrub layer contains mostly native species, especially cherries, juneberry, and saplings of canopy trees. The ground layer includes Virginia waterleaf, wood anemone, maidenhair fern, lady fern, and sunflower.

CRE-85

Lowland Hardwood Forest **Rank: CD**

This forest is found along Belle Creek and is generally of moderate to poor quality. The canopy is broken and dominated by small trees of species that generally colonize areas following disturbance. The most common of these are black willow and boxelder that range from several inches to one foot in diameter. The shrub layer is sparse to moderate in most areas with small trees, common elderberry, and staghorn sumac common. The ground layer varies in quality, with heavily disturbed areas dominated by nonnatives,

particularly reed canary grass and stinging nettle. The most frequently encountered natives include Canada wildrye, sawtooth sunflower, sneezeweed, and touch-me-not.

CRE-86

Lowland Hardwood Forest **Rank: D**

This forest has a similar species composition to CRE-85 with the exceptions that the trees are younger and the ground layer is even more dominated by the nonnatives reed canary grass and stinging nettle. Because of the prevalence of these problem species, this forest was given a minimum rank of "D".

CRE-87

Wet Meadow **Rank: CD**

This wetland community lies within the floodplain of the Cannon River just west of Highway 61 and south of the Cannon Valley Trail. It includes a former slough of the Cannon River that was isolated, and perhaps impounded, by the building of a rail bed that has since been abandoned and converted to a recreational trail. Although much of this community is dominated by the nonnative reed canary grass there are still some areas that have moderate to good native species composition. These areas include a number of sedge and rush species, joe pye weed, boneset, sawtooth sunflower, sneezeweed, and a number of other desirable native species. Although these natives are present, they do not comprise a significant enough area to justify a ranking above "CD".

CRE-88

Dry Oak Forest **Rank: CD**

This dry oak forest is found on a slope adjacent to the Cannon River floodplain near Highway 61. The canopy of this forest is dominated by large bur oak that average over 20 inches in diameter. Other, younger trees range from four to twelve inches in diameter, with black walnut, elm, and basswood most frequent. The shrub layer is thick in most places and dominated by a mix of thorny native species such as prickly ash, raspberry and gooseberry, as well as the nonnative European buckthorn. The ground layer varies from moderate to poor in quality. Nonnatives are common here including stinging nettle, catnip, and European buckthorn seedlings. The most common native in the ground layer is woodland sunflower. The impacts of nonnatives, past land use, and of quarrying activities cause a lowered ranking of "CD" for this forest.

CRE-89

Oak Woodland-brushland **Rank: D**

This oak woodland is found in several parcels in the vicinity of Welch Shortcut Road and Circle Drive. It includes areas that were likely former savanna and prairie, but have been substantially changed by land use activities and encroaching brush and trees. The most common large trees include bur and pin oak with many smaller trees and brush between them. The most common of these include red cedar, green ash, cultivated apple, aspen, prickly ash, boxelder, European buckthorn, brambles, and cherry. The ground layer varies considerably based on past use and the degree of colonization by trees and shrubs. The

most common plants among these parcels are nonnative pasture grasses such as Kentucky bluegrass and smooth brome, as well as red clover and common mullein. The most common natives seen were vervain and Canada goldenrod, both of which prosper in areas of periodic disturbance. Because of the substantial shift in composition in these parcels in the past few decades they have a reduced ecological function, earning it a "D" rank.

CRE-90

Oak Woodland-Brushland Rank: D

This parcel of former savanna is near the peak of a bluff on the north side of the Cannon River, and southeast of Circle Drive. The most common large tree is bur oak many of which exceed 16 inches in diameter. Other, smaller trees include basswood, pin oak, red cedar, aspen, green ash, and boxelder. These combine to create a canopy with about 70 percent average cover. The shrub layer is thick to very thick and contains a large infestation of European buckthorn. Natives that are common in the shrub layer include prickly ash, gooseberry, gray dogwood, and sumac. The species composition of the ground layer has been substantially impacted by past land use. This has resulted in dominance by species that are nonnative and/or tolerant of frequent disturbance. The most common of these are stinging nettle and poison ivy.

CRE-91

Dry Prairie
Rank: C

This prairie appears to have been used for agriculture in the past, and may have even been plowed, perhaps over 50 or 75 years ago. It has a brush cover of about ten percent, composed of eastern red cedar, green ash saplings, sumac, aspen and cherry. Both native and nonnative grasses are present here. The most common nonnative grass is smooth brome, while the most common native grasses include Indian grass and little bluestem. The most common native forbs include smooth blue aster, heath aster, stiff goldenrod, windflower, showy tick trefoil, and butterfly milkweed. These prairie species likely recolonized this area from the adjacent savanna and prairie, most of which have since become overrun by brush and small trees. This prairie does have good restoration potential and would be a good candidate for brush removal and the regular application of prescribed fire.

CRE-92

Oak Woodland-Brushland Rank: D

This area occupies portions of a south-southwest-facing slope above the Cannon River. It was formerly savanna and is characterized by scattered large, open-grown bur oaks. Between these is a dense growth of young trees and shrubs including pin oak, green ash, basswood, elm, prickly ash, European buckthorn, brambles, and gooseberry. The ground layer reflects the abrupt transition from relatively open to densely shaded and is sparse to absent in many areas. The most common species found here include heart-leaved aster, starry false Solomon's seal, bloodroot and wild geranium. The recent colonization by brush and small trees have started a transition of this area from

savanna to forest. As a result, it will take several decades for appropriate species to colonize the site, displace nonnatives, and improve the overall quality.

CRE-93

Dry Prairie, Bedrock Bluff Subtype **Rank: B**

This dry prairie is found in patches along a steep, south-facing slope overlooking the Cannon River. It is located just to the southeast of Circle Drive. These parcels were likely one large prairie in the past, perhaps as recently as 30 or 40 years ago. Since then, brush and small trees have colonized the prairie from moister draws and lower slopes. The most common native grasses on the prairies are Indian grass, sideoats grama, and big and little bluestem. The most common forbs here include smooth blue and silky aster, prairie coreopsis, windflower, and a remarkably large population of leadplant. Also of interest on this prairie are scattered, small populations of the State Special Concern species, Hill's thistle, a native thistle found on quality dry prairies. Because of the presence of this listed species and the generally good quality, it was given a "B" rank.

CRE-94

Dry Oak Forest **Rank: B**

This good quality forest occupies a south-facing slope adjacent to the Cannon River valley and is just down slope from the previous dry prairie. The nearly closed canopy is made up of mostly pin and white oaks that average over 20 inches in diameter. Other, smaller trees that occur occasionally include basswood, aspen,

and black walnut. There are numerous gaps in the canopy where trees have been blown down by storms. This will likely cause a shift in canopy composition as the smaller, faster growing species race to the canopy ahead of any oaks that might regenerate. The shrub layer is moderate in both quality and thickness. The most common species here are chokecherry and gooseberry. The ground layer has a generally good composition with wild ginger, violet, Virginia waterleaf, Pennsylvania sedge, bloodroot, and yellow bellwort all common. Because of the minimal recent disturbance by humans in this forest, it was given a moderately high rank of "B".

CRE-95

Dry Oak Forest Rank: BC

This somewhat small parcel of dry oak forest is located on the south side of County Road 41 just to the west of Highway 19. Overall, the quality of this forest is good, with little infestation by nonnative species. One notable exception to this is the presence of the nonnative European buckthorn along the edges. The canopy of this forest is closed or nearly so in most places. The most common trees are pin and white oak that average about 11 inches in diameter. As a whole, the shrub layer is only moderate in thickness, with gooseberry the most common species. The ground layer is in good condition, with lady fern, wild geranium, violet, red baneberry, yellow bellwort, and maidenhair fern all present.

CRE-96

Lowland Hardwood Forest Rank: CD

This forest occurs mostly as a thin band adjacent to Highway 19 and along Spring Creek. The canopy consists of young boxelder, black willow, silver maple, black walnut, and elm, with average diameters around eight inches. The shrub layer is moderate in thickness with European buckthorn, gooseberry, and common elderberry all frequent. The ground layer includes a mix of upland and stream edge species including touch-me-not, cup plant, common milkweed, and Virginia waterleaf. Common nonnatives found here include reed canary grass and stinging nettle. Because of the linear nature of this community and the fact that it is very young with nonnatives common, it was given a moderately poor rank of "CD".

CRE-97

Oak Woodland-Brushland Rank: D

Found mostly along a northeast-facing slope east of Spring Creek and south of Mill Road, this woodland is of generally poor quality. The most common trees are large, open-grown bur and pin oak that average about 12 inches in diameter. Oak saplings, white birch, red cedar, elm, basswood, and aspen have filled in the areas between these older trees. The shrub layer is thick to nearly impenetrable with prickly ash, gooseberry, and European buckthorn common. Grazing has substantially impacted the ground layer. This is reflected by the species present including the nonnatives stinging nettle and chickweed. The most common native species include lady fern, goldenrod, and columbine.

CRE-98

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

This prairie is found along a bluff line that trends from south-southwest facing to nearly west-facing. Brush cover is thickest in the western portion, where it approaches 90 percent. The most common component of this brush is eastern red cedar, although other species are present as well. The ground layer is of better quality in the east where prairie comprises about 50 percent of the cover. The most common native grasses include sideoats grama, little bluestem, Indian grass, and big bluestem. The most common native forbs include smooth blue and silky asters, pasque flower, harebell, windflower, and flowering spurge. Of particular note is the presence of Hill's thistle, a State Special Concern species, and kitten-tails, a State Threatened species. Although this prairie would otherwise receive a lower rank, the presence of two state-listed species justifies increasing the rank to "BC".

CRE-99

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

This prairie is in good condition in most areas, although the quality is lower where earthmoving and pine planting has occurred. Total brush and tree cover is about 20 percent with jack pine, red pine, Chinese elm (also known as Siberian elm), black locust, and ash all occasional to common. The most frequent species of brush includes sumac, cedar, Tartarian honeysuckle and brambles. Despite the level of brush and tree encroachment, the composition of this prairie is good, particularly on the steepest slopes. The most common

native grasses include sideoats grama, big and little bluestem, Indian grass, and purple lovegrass. The most common native forbs include prairie phlox, heath and silky aster, Virginia mountain mint, spiderwort, purple prairie clover, cudweed, and leadplant. Since it is adjacent to park land, this prairie is a good candidate for ecological restoration. Recommended activities would include cutting of nonnative and invasive species, reintroduction of fire, and the collection of native seed from the site to seed into other areas of the prairie that are disturbed.

CRE-100

Oak Woodland-Brushland Rank: C

Found near the area of Highways 61 and 316, this woodland occurs as several isolated parcels in largely agricultural land. All of these have the appearance of former savannas, and are characterized by stately bur, white and pin oaks. These large, open-grown oaks average between 20 and 30 inches diameter in most areas. Other, smaller trees between these oaks include hackberry, elm, ironwood, and black cherry as well as white oak saplings. The most common brush includes the native species chokecherry and gray dogwood, with the nonnative European buckthorn occurring only occasionally. The ground layer varies among these parcels based on past grazing levels and any history of tree cutting. The most common species found here include false Solomon's seal, Pennsylvania sedge, wild geranium, Canada goldenrod, and sweet cicely. Overall, these parcels are in good condition despite past grazing, and more recent storm blowdown of canopy trees.

CRE-101

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

This prairie is found on a south-facing slope just west of County Highway 7 and is of good quality. There is little establishment of brush or small trees here, especially on the steepest slopes. The most common trees are very widely scattered large, open-grown bur oaks. Together with elm, aspen, boxelder, red cedar, and sumac, there is less than ten percent cover by brush and trees. The most common native grasses found here include little and big bluestem, sideoats grama, and Indian grass. Forbs encountered that are typical of nice quality prairie include heath and silky asters, birdsfoot violet, butterfly milkweed, harebell, stiff goldenrod, and oxeye false sunflower. Also found here was a small population of the State Special Concern species Hill's thistle, contributing to an overall rank of "BC".

CRE-102

Dry Oak Forest **Rank: C**

Found in several parcels just east of County Road 6, this forest is dominated by white and pin oak that average about 15 inches in diameter. These form a nearly closed canopy across most of the site. Smaller trees include green ash, sugar maple, and elm. The shrub layer is moderately sparse with small buckthorn, cherry, and gooseberry found occasionally. The ground layer exhibits minimal signs of disturbance. The most frequently encountered species here include lady fern, maidenhair fern, blue cohosh, Pennsylvania sedge, wild geranium, red baneberry, and yellow

bellwort. Overall, this forest is of moderate quality and was given a rank of "C".

CRE-103

Dry Oak Forest Rank: C

This oak community occurs in a large parcel of forest on the south side of the Cannon River and north of Leeson Lane. The most common members of the canopy are large bur oak that average over 20 inches in diameter. Common smaller trees include basswood, white birch, sugar maple, boxelder and elm. These smaller trees are becoming more important in the composition of flat or gently sloped areas in this forest due to logging. The shrub layer varies from sparse, below areas with a thick canopy, to moderately thick in some areas that have been logged. Typical shrubs include gooseberry, cherry, and gray dogwood. The ground layer, too, varies depending on whether the area was logged and how intensively it was grazed in the past. The more common plants in the ground layer include wild geranium, sweet cicely, black snakeroot, and Pennsylvania sedge.

CRE-104

Dry Prairie
Rank: BC

Located between Highway 61 and the Cannon River, this prairie is of good quality. It has minimal brush cover, with the exception of some encroachment from the edges inward. One notorious shrub species that occurs here is multiflora rose. Although only a few plants were noted, this species has become highly

invasive in other parts of the Midwest and should either be monitored to make sure it doesn't spread, or should be removed. Some large, open-grown bur oaks occur here, mostly along small swales in the south-facing slope. The most common native grasses here are sideoats and hairy grama, Indian grass, big and little bluestem, and prairie dropseed. Some of the more common forbs include heath aster, purple prairie clover, spiderwort, silky and smooth blue aster, leadplant, and birdsfoot violet. The quality of this prairie warrants some type of active management to maintain its character. Brush encroachment should be prevented, and maintenance activities such as prescribed burning and brush clearing are appropriate here.

CRE-105

Dry Oak Forest Rank: CD

This forest varies considerably across the several properties contained in its boundaries, with a canopy that varies from broken to nearly continuous. Grazing also occurs in much of the forest. The most common canopy trees here include pin and bur oak that average about 12 inches in diameter. Common smaller trees include white birch, elm, and black cherry. The shrub layer is moderately thick in most places and thorny species that tend to increase as a result of grazing, including prickly ash, raspberry, blackberry, and gooseberry, are common. The nonnnative European buckthorn is also common. The ground layer is somewhat poor in composition with disturbance tolerant species such as white snakeroot, sweet cicely, and the nonnative common mullein frequent.

CRE-106

Dry Prairie, Bedrock Bluff Subtype Rank: B

These parcels of prairie are found within an oak woodland that lies northwest of the intersection of County Road 7 and White Rock Road. The four prairie knobs total only about three to four acres, but are of nice quality. This is particularly true for the two western parcels. The western parcel hosts the State Special Concern species Hill's thistle, while the next parcel to the east hosts Hill's thistle and the State Threatened Valerian. The latter of these rare plants is typically found in mesic to wet prairies, but Valerian is known in southeast Minnesota to occur infrequently in dry, calcareous prairies, as is the case here. Brush cover among these parcels varies from about 25 percent to approximately 75 percent with sumac, prickly ash, and eastern red cedar most common. The most frequent native grasses include Indian grass, big and little bluestem, sideoats grama, prairie dropseed, and plains muhly. The forb composition of the prairie is good, with heath, silky and aromatic asters, purple prairie clover, leadplant, hoary puccoon, prairie violet, rough blazingstar, stiff gentian, prairie onion, butterfly milkweed and many others present. The nonnative forbs wild carrot and wild parsnip are also present and their establishment here was probably enhanced by past grazing. The prairie opening with valerian and Hill's thistle has been mowed, presumable to keep brush down for deer hunting line-of-sight. This is consistent with prairie management if conducted at the right time (July, or more preferably during the dormant season). Overall, these prairie parcels are good

candidates for active management with brush cutting and possibly prescribed fire.

CRE-107

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

This prairie is a former pasture on a south-facing slope just east of White Rock Trail. It was likely part of a continuous prairie that connected to CRE-106, perhaps as recently as 40 or 50 years ago. It has about 40 percent brush cover, composed primarily of eastern red cedar and prickly ash. Unlike the previous community, nonnative pasture grasses are prevalent here. The most common of these are Canada and Kentucky bluegrass, and smooth brome. The most common forbs here are narrow-leaf puccoon, sky blue aster, marbleseed, Virginia mountain mint, oxeye false sunflower, and prairie sage. The western most portion of this prairie has the steepest slopes with rock outcrops, and a loose, cobbled face. Past intense and long-term grazing has substantially impacted the composition of this prairie. It received a somewhat improved rank because it is contiguous with wet meadow, oak woodland, and because there are better quality prairies only several hundred yards away.

CRE-108

Dry Oak Forest **Rank: CD**

This oak community is found in several parcels in the vicinity of County Road 8 and 362nd Street. The composition and structure of these varies, but their overall quality is similar. They are considered together for that reason. The canopy of most areas is

dominated by pin and bur oaks that typically form a nearly closed canopy. In areas where canopy gaps occur, other species such as boxelder, elm, cottonwood, and green ash are filling in. The shrub layer is typically thick and composed of a mix of native thorny species (prickly ash and gooseberry), and nonnatives (European buckthorn and Tartarian honeysuckle). The ground layer is generally dominated by species tolerant of moderate disturbance including white snakeroot and Pennsylvania sedge.

CRE-109

Oak Woodland-Brushland Rank: D

Located just south of the intersection of County Road 7 and County Road 1, this oak woodland stretches along a generally north-facing slope. Some portions of this community are currently grazed, and all have been grazed in the past. The most common trees here are bur, pin, and red oak, most of which have crowns that touch. One current pasture is the exception to this where trees have a total canopy cover of about 50 percent. Smaller trees fill-in gaps in the canopy. These consist of green ash, aspen, elm, and cottonwood. The shrub layer is absent where heavy grazing has occurred, but is thicker where grazing has not been practiced for some time. The ground layer is mostly comprised of nonnatives and natives tolerant of frequent or intense disturbance. Most common among these are the nonnative pasture grasses including Kentucky bluegrass.

CRE-110

Mesic Oak Forest Rank: BC

This nice quality forest is located south of County Road 1 and west of County Road 7. It includes several properties with differing land-use histories. Some portions have been logged twice in approximately the last 50 to 60 years. These appear to have been clear cut, based on the even-aged regeneration of trees and signs of elevated levels of erosion. Some of the stumps of oaks approach 40 inches in diameter, indicating that they were probably open-grown. Most of this community appears to have also been grazed in the past. Despite these past disturbances, some portions of the forest are in good condition and would probably achieve a "B" rank if they were to be graded separately. However, other areas are of only moderate quality, causing an otherwise good rank to be slightly downgraded.

The most common canopy trees here include bur, pin, and red oak, green ash, black walnut, basswood, black cherry, aspen, hackberry, and elm. The shrub layer is a mix of seedlings for tree species present in the canopy, as well as ironwood, prickly ash, chokecherry, and silky dogwood. Of note is the fact that few nonnative shrubs are present here. The ground layer in any area varies depending on the amount of disturbance from past logging and grazing. Native graminoids found here include bottlebrush grass, Pennsylvania sedge, woodland panic-grass, and black-seeded mountain rice grass. Forbs found here that tend to be present in good quality forests include wild sarsaparilla, lady fern, yellow bellwort, wild ginger, wild yam, zigzag goldenrod, heart-leaved aster, and purple giant hyssop. Because of the good species composition of

this forest and the overall quality, it was given a rank of "BC". This forest is a good candidate for a long-term management plan, such as a Forest Stewardship Plan.

CRE-111

Dry Oak Forest Rank: CD

Most of this forest is grazed and dominated by tall, straight bur oak trees that typically have crowns intermingling. Other, smaller trees occurring occasionally include boxelder, black cherry, quaking aspen, and pin oak. The shrub layer is thick with the nonnatives European buckthorn and Tartarian honeysuckle common. The ground layer also shows signs of long-term disturbance with nonnative pasture grasses such as Kentucky bluegrass common. Because of past disturbance and the shifts in species composition that followed, this forest was given a relatively low rank of "CD".

CRE-112

Maple-Basswood Forest
Rank: CD

This forest is mostly dominated by sugar maples over 16 inches in diameter, but occasional basswood and red oak averaging about 12 in diameter are found in the canopy. Frequent stumps indicate that there were more oaks present in the past, but these have been cut. Because of intense grazing the shrub layer is nearly absent, with the exception of a few thorny species including prickly ash. The ground layer is mostly composed of nonnatives and a handful of natives that

tolerate heavy disturbance. Although a forest that is as significantly disturbed in the shrub and ground layers as this one would typically receive a minimum grade, this forest was given a slightly improved rank due to the presence of large trees and a nearly continuous cover in the canopy.

CRE-113

Lowland Hardwood Forest **Rank: CD**

Found mostly along Belle Creek, this forest has developed recently on areas that were formerly more open. These were perhaps utilized as pasture in the past. The larger trees that form a supercanopy are cottonwoods. These occur infrequently and have an average diameter of about 24 inches. Smaller trees include boxelder, elm, black walnut and black willow. These tend to average about 12 inches in diameter. Also present are large bur oaks, which tend to occur at elevations that are not influenced by flooding. The shrub layer contains mostly natives and includes common elder, gooseberry, brambles, and infrequently sandbar willow. The ground layer is a mix of natives and nonnatives. Nonnatives found here include reed canary grass and stinging nettle. The most common natives include cow parsnip, wood nettle, goldenglow, Canada wildrye, Virginia waterleaf, and clearweed. Because of the recent origin of this forest and the somewhat poor species composition, it was given a lowered rank of “CD”.

CRE-114

Wet Meadow **Rank: CD**

Just south of 370th Street, this wet meadow is found in a former pasture. It lies at the uppermost reaches of the Belle Creek watershed. Although the east portion has somewhat higher brush cover, the average for the entire site is probably less than 15 percent including red osier dogwood and willow. The most common graminoids here include tussock sedge, white grass, dark green bulrush, cattail, other sedge species, and the nonnative reed canary grass. The most common forbs include purple willow-herb, mint, sawtooth sunflower, bugleweed, swamp milkweed and boneset. Although disturbed by past grazing, this wet meadow has good restoration potential and would benefit from periodic prescribed burns. Since most wetlands of this type have been drained by ditching or tiling in Goodhue County, these wet swales are becoming increasingly rare. Their importance in maintaining native diversity on a nearly monocultural landscape of nonnative plants should not be overlooked.

CRE-115

Oak Woodland-Brushland Rank: C

This woodland includes several parcels that are of similar quality, although there is some variation in structure and species composition. The largest trees across these parcels are bur and pin oak, with aspen, cherry, ash, and birch common as smaller trees. The shrub layer contains a mix of native and nonnative shrubs, some of which are thorny and others that are not “armed”. The ground layer has some native species, a few of which are found in better quality communities. However, these comprise a relatively small amount of the total cover and their presence is

overshadowed by the large amount of nonnative grasses and nonnative shrub seedlings found here. Overall, this woodland is in moderate condition with the quality of the ground layer helping to buoy the rank of this community to “C”.

CRE-116

Dry Prairie

Rank: D

This south-facing slope has exposures of St. Peter sandstone, and the decomposition of this has resulted in sandy soils throughout the slope. This prairie likely hosted a mix of barrens and bluff prairie species in the past. Intense grazing has caused a loss of many of the native species that might otherwise be used to distinguish between these prairie subtypes. Widely scattered bur oak are found on the hillside along with a thick cover of eastern red cedar. The ground layer is a mix of native plants and nonnative pasture/weed species. The most frequent native species include sideoats grama grass, paspalum, hairy grama, heath aster, bergamot, prairie sage, and little bluestem. Overall, the quality of this prairie is poor. Despite this, there is opportunity for improvement that would not only benefit the quality of the prairie, but increase the forage production on this hill as well. Suggested activities include brush cutting, prescribed burning, rotation of pastures/paddocks, longer rest intervals between grazing periods, and shorter (but possibly more intense) grazing efforts.

CRE-117

Dry Prairie

Rank: CD

This prairie occurs in two parcels just east of 180th Avenue. The soils are sandy and derived from St. Peter sandstone that is near the surface in many places in this gently rolling landscape. The south parcel is in poor condition and dominated by nonnative pasture grasses. It is very intensively grazed with very few plants over four inches in height. The north parcel was formerly grazed and is in better general condition. However, the north parcel has a greater presence of brush and small trees including smooth sumac, blackberry, and black cherry. The most common native grasses here include big and little bluestem, Indian grass, prairie dropseed, and Leiberg's panic grass. Nonnative grasses found here include Kentucky and Canada bluegrass, redtop, and smooth brome. The most common native forbs include black-eyed Susan, leadplant, showy goldenrod, flowering spurge, cudweed, tall wormwood, and pussytoes. Overall, these parcels are in moderately poor to poor condition. Despite this, sand prairies are easier to restore than most other natural community types. Suitable activities for the south site include reduce/rotate grazing, reintroduce native grasses (especially big bluestem, which is excellent forage), rest pastures periodically, cut brush and apply fire to stimulate forage production. The north site will need brush control in the near future as well as the application of prescribed fire to remain viable.

CRE-118

Oak Woodland-brushland Rank: D

This oak woodland hosts several prairie parcels, including CRE-106 and CRE-107. It includes a generally east-west trending valley that is shallow, but has steep sides. This entire area was grazed in the past, and has since been colonized by very thick brush and small trees. The most common large trees include aspen, green ash, and boxelder, with an occasional oak. The shrub layer is lush, very thick to impassable, and dominated by thorny shrubs and brambles. The ground layer varies somewhat in quality, but is generally sparse and in poor condition. Some species found here include Kentucky bluegrass, avens, white snakeroot, honewort, and sweet cicely. Because of the apparently dramatic change of this valley from semi-open to impenetrable thicket, as well as the perceived loss of native diversity that followed, this community was given a minimum ranking of "D".

CRE-119

Mesic Oak Forest **Rank: C**

With a nearly closed canopy dominated by oak, hackberry, black cherry, boxelder, and green ash, this forest has a history of past grazing. The larger red oak trees in the canopy average about 18 inches diameter, while most other tree species are smaller. The shrub layer varies from sparse to moderately thick and is a mix of nonnatives (especially buckthorn) and natives. The ground layer varies in quality as well, with wild geranium, blue cohosh, lady fern, bloodroot, and zigzag goldenrod locally common. Overall, the quality of this site is moderate. With continued rest from grazing and logging, this forest should improve in quality.

CRE-120

Dry Prairie

Rank: CD

This prairie lies on the west side of Highway 61, on a generally east-facing slope. The area appears to have been grazed in the past, subsequently may have been planted with some native flowers, and has since become slightly colonized by boxelder, American elm, and Siberian elm. The most common native species include black-eyed Susan, bergamot, common milkweed, yarrow, prairie coneflower, and purple prairie clover. Native grasses are conspicuously absent from this community with the nonnatives timothy, quackgrass, and smooth brome most common. Overall, the quality of this community is moderate to poor, although it does have good potential for improvement with supplemental seeding and some mowing/prescribed burning.

10. COMMUNITY DESCRIPTIONS FOR THE CANNON RIVER WEST WATERSHED

CRW-1

Dry Prairie, Bedrock Bluff Subtype Rank: D

This dry prairie is found on a generally north-facing slope that is moderately steep and dissected. At the time of field inventory this prairie was being grazed. Prairie species are found in small areas and are composed largely of species that cattle find unpalatable, including prairie larkspur and prairie sage. Based on the areas of erosion and altered species composition, it appears that the grazing pressure is too intensive to sustain the scattered patches of prairie found here. Despite the disturbed character of this prairie, it has added importance because it is located near McKnight prairie, and other mesa-like bluff prairies in the surrounding few miles.

CRW-2

Oak Woodland-Brushland Rank: D

Found immediately to the north of CRW-1, this oak woodland-brushland is of recent origin. It is characterized by widely scattered open-grown bur oaks with dense growth of younger brush and trees between them. These younger trees average about 10 inches in diameter and are dominated by box elder and black

cherry. The brush layer is very thick in most places and dominated by prickly ash, European buckthorn, Siberian elm, eastern red cedar, and brambles. Based on the species composition and overall character, it appears that this site was intensively grazed for many years and then retired. After the cattle were removed, trees and thorny shrubs quickly colonized this moderately inclined north slope. Because of the apparent past disturbance and the early stage of recovery that this area is in, it was given a low qualitative rank of "D".

CRW-3

Dry Prairie

Rank: C

This prairie is found in two parcels that are approximately one-quarter mile apart. The northern segment lies completely within an abandoned Chicago Great Western railroad right-of-way, while the southern segment includes both the old rail bed and a south-facing hillside to the east. The quality of this prairie is moderately poor in the rail bed portions where land is cultivated on either side. The portion east of the rail bed is of somewhat better quality and includes some species that indicate this. The most common prairie species in this community include big bluestem, prairie rose, porcupine grass, prairie sage, stiff goldenrod, and prairie coneflower. Species found less often that associated with high quality prairies include purple prairie clover, prairie phlox, leadplant, and spiderwort.

On the east side of the north portion of this community, the landowner has planted switchgrass, presumably for habitat. The growth character of the grass seems to indicate that it is a cultivated variety and may not have a local wild population origin. Despite this, it serves as an important buffer to the remnants of prairie in the abandoned rail right-of-way and should be viewed as generally beneficial. Overall, the quality of these prairie parcels is moderate due to the pressures exerted by rowcrop agriculture in the north parcel, and the pending encroachment by brush in the south segment.

CRW-4

Floodplain Forest

Rank: D

This community lies in a low spot in an east-west oriented wetland area, and separates the two parcels of CRW-3. It appears to be of relatively recent origin with the largest cottonwoods averaging less than 14 inches in diameter. The canopy in nearly closed in most places and consists of boxelder, cottonwood, silver maple, and quaking aspen where slight rises occur. The shrub layer and ground layer are sparse under the thick canopy. Common species found here include red-osier dogwood, reed canary grass, rough avens, and several species of sedge. Because of the generally poor species composition of this community and apparently recent origin, it was given a lowered qualitative rank.

CRW-5

Wet Meadow Rank: BC

This community occurs in three narrowly separated parcels that straddle the abandoned Chicago Great Western rail bed and Highway 56. The eastern segments are characterized by several inches of standing water, a species composition characteristic for quality wet meadows, and little shrub encroachment. Plant species most frequently encountered here include Canada bluejoint grass, tussock sedge, red-stemmed aster, water hemlock, spotted joe pye weed, rattlesnake grass and many others. The quality of this area is good to very good.

The west segment may have been pastured in the past and appears to be recovering well from past influences. It is characterized by wet soils, but little or no standing water. The most common species here include phlox, Canada anemone, monkey flower, marsh milkweed, prairie sedge, and bluejoint grass. The shrub cover throughout this community averages about 15 percent, but in small areas may approach 75percent. Because this community exhibits good overall composition, it was given a rank of "BC".

CRW-6

Oak Woodland-Brushland Rank: D

This community is found on a generally north-facing slope between the abandoned Chicago Great Western railroad and Highway 56. It is characterized by mostly young trees, particularly quaking aspen, black cherry, and pin oak. These are growing close to one another and seldom exceed 10 inches in diameter. Areas between these young trees are densely packed with shrubs and other smaller trees. Plants found in the

shrub layer include red cedar, sumac, prickly ash, European buckthorn, and Tartarian honeysuckle. Due to apparent past disturbance, likely from intense grazing, and the recent shift to a wooded community, this area was given a low qualitative rank of "D".

CRW-7

Dry Prairie, Barrens Subtype Rank: B

This nice quality prairie is tucked into a small area just east of Highway 56 and just south of 310th Street Way. It is found on a bedrock knob with sandy soils and is surrounded by young trees and shrubs. The species composition of this prairie is good to exceptional with many species that are found only on better quality prairies. Some of the most frequently encountered species include pasque flower, hoary puccoon, prairie larkspur, prairie dropseed, silky prairie clover, prairie smoke, big and little bluestem, and leadplant. Approximately two dozen other species indicative of quality dry prairies were also seen during the brief site visit. Brush and young tree cover is beginning to establish in this prairie and accounts for the downgrading of the community from what might otherwise be an "A" or "AB" rank. The most common encroaching woody species are the nonnatives Siberian elm and black locust, and the aggressive natives eastern red cedar, prickly ash, quaking aspen, and eastern cottonwood. This prairie is a good candidate for restoration efforts and/or relocation of seed to prairies that are actively managed. Without intervention such as fire and brush clearing this prairie will be lost within the next 20 to 30 years.

CRW-8

Dry Prairie, Bedrock Bluff Subtype Rank: B

This large prairie is found between Spring Creek and Highway 56. It is of good quality, and represents one of the largest prairies west of Highway 52 in Goodhue County. The topography of the site includes some steep south-facing bluffs, but is more typically characterized by gentle slopes and valleys. The prairie hosts a large number of native plant species, with approximately 50 species noted in a short walk-through in June, 2000. The diversity in any one area is moderate, and the high number of species present is a result of the overall size of the site and interconnectedness of the prairies. Some of the most common species here include little bluestem, prairie violet, big bluestem, prairie dropseed, purple prairie clover, prairie larkspur, ground plum, white camass, prairie phlox, hoary puccoon, great plains muhly, harebells, silverleaf scurf-pea, and rough blazingstar. Also present is a species that approaches the eastern extent of its range in Goodhue County; this is prairie turnip, a member of the pea family. Shrub cover varies by location in this community, but generally ranges from 20-60 percent. The most common species include red cedar, coralberry, prickly ash, sumac, boxelder, and the nonnatives Siberian elm and European buckthorn.

This community supports a wide variety of wildlife and serves as a large habitat area within corridors that stretch from the Cannon River to the Dennison prairies to the south and west. It should be considered for

management of some type, including cutting brush, and the responsible application of prescribed fire.

CRW-9

Oak Woodland-Brushland Rank: D

This forest of variable composition occurs along Spring Creek and also occupies a north-facing hill adjacent to CRW-8. Common tree species here include eastern red cedar, quaking aspen, boxelder, black cherry and Siberian elm. The shrub layer is thick and dominated by species associated with disturbance such as prickly ash and European buckthorn. The ground layer is generally sparse, indicating past disturbance as well as the recent origin of the tree cover. Although moderately poor in quality, the site's proximity to a quality prairie makes it a good candidate for active management.

CRW-10

Dry Prairie, Bedrock Bluff Subtype Rank: C

This community is a segment of a larger prairie that extends for several miles along a long bluff line. This community is fenced into different pastures and was intensely grazed by beef cattle at the time of the field visit. The general height of most plants was less than four inches. Despite this, good quality prairie persists on the steepest slopes, near outcrops, and where the face of the slope is covered with platey cobbles. Common prairie grasses in these areas include big and little bluestem, prairie dropseed, sideoats grama, and hairy grama grass. These pastures also include pasque flower, prairie sage, prairie violet, stiff goldenrod,

white camass, ground plum, smooth blue violet, prairie turnip, purple prairie clover, plus many more. Overall, the areas where prairie is concentrated are of good quality. However, the community was given a lowered rank due to the nonnative pasture grasses that dominate many areas, and the intensity of the grazing activity. This community represents a good opportunity to actively manage the grazing intensity and duration for the benefit of both the prairie and the landowners' income. The owner was working with the Goodhue County SWCD to write a grazing management plan in 2000. The results of that plan were expected to include rotational grazing, supplemental seeding, and correction of high erosion areas. This site may also be a good candidate for registry with a conservation organization such as The Nature Conservancy.

CRW-11

Lowland Hardwood Forest Rank: C

This forest lies on the south side of the Cannon River and is composed of a mix of cottonwood, black willow, ash, and elm. It grades from floodplain to river terrace that rarely is influenced by high water. The canopy is broken and the site appears to have a history of grazing. Smaller trees and shrubs on the site include European buckthorn and eastern red cedar. The ground layer is composed of a mix of nonnative pasture grasses and a few native species capable of withstanding some grazing, including sideoats grama and Indian grass. The patchy canopy and open character of this community are aesthetically pleasing. However, the community was only given a moderate rank due to the prevalence of nonnative ground cover

and the history of gravel mining on a portion of the site.

CRW-12

Floodplain Forest
Rank: C

This forest occurs along Prairie Creek to the east and west of Highway 56. It is characterized by a nearly closed to closed canopy dominated by elm, boxelder, black cherry, black willow and cottonwood, with average diameters between 10 and 14 inches. The shrub cover varies according to the amount of canopy closure but is generally moderate to thick. The most common species here include boxelder, elm, and black walnut saplings, as well as elderberry, European buckthorn, currant, and brambles. The ground layer also varies in composition, sometimes dominated by the nonnatives reed canary grass and stinging nettle. In most areas the natives Canada and Virginia wildrye, goldenglow, wood nettle and rough hedge nettle dominate the ground layer. Also found here is the state listed glade mallow, which was previously documented during the MN County Biological Survey and relocated during this inventory. Overall, the quality of this forest is moderate to good, but was given a lowered rank due to the dominance of reed canary grass and stinging nettle in some areas.

CRW-13

Dry Prairie, Bedrock Bluff Subtype Rank: D

This small prairie lies on the northeast side of the intersection of Highway 56 and 345th Street. It

contains some pockets that are of better quality, but these are small. In general, nonnative cool season pasture grasses and brush dominate the site. The most common native species include silverleaf scurf-pea, leadplant, Indian grass, little and big bluestem, and spiderwort. The most common brush species include sumac, Siberian elm, red cedar, and black cherry. During the field visit for this report, ATV damage was noted. This damage was beginning to cause significant erosion on the slope and has impacted the best quality segments in this community.

CRW-14

Dry Prairie, Bedrock Bluff Subtype Rank: D

This large prairie has been grazed in the past, and brush and small trees are encroaching on the site. Native species comprise approximately 50 percent of the cover. The most common native grasses found here include big bluestem, Indian grass, and sideoats grama. The most common forbs include stiff goldenrod, heart-leaved alexanders, prairie violet, aromatic aster, prairie smoke, silverleaf scurf-pea, and grass-leaved goldenrod. Brush cover comprises approximately 10 percent of the total area, but will likely increase quickly in cover over the course of the next 20 years without active management. Because of the low overall cover of native prairie species and the encroaching brush, this community was given a relatively low rank of "D".

CRW-15

Lowland Hardwood Forest Rank: D

This forest occurs on a moist east-facing slope. It has a nearly closed canopy of green ash, black cherry, boxelder, quaking aspen, cottonwood, red cedar, and planted pines. The shrub and ground layer exhibit signs of past disturbance and indicate a recent origin of the forest. Because this community occurs outside of its normal landscape context (stream terrace) and because of the apparent past disturbance, this community was given the low qualitative rank of "D".

CRW-16

Wet Meadow **Rank: CD**

This community is found on the west side of Highway 58 and is generally of poor quality. It extends across several property boundaries, each of which has a different management regime. Some areas are currently grazed, while others have been grazed historically and are currently retired. Native and nonnative grasses and sedges dominate most of this community. The most common of these include reed canary grass, redtop, tussock sedge, Canada bluejoint and several other species of sedges and grasses. Forbs are scattered, with the greatest concentration just south of 357th Street. The most common of these are spotted joe pye weed, tall meadow rue, sawtooth sunflower, red-stemmed aster and marsh phlox. Because of the influence of intense grazing, either past or present, this community was given an overall rank of "CD".

CRW-17

Dry Prairie, Bedrock Bluff Subtype **Rank: B**

This prairie is owned by the Umbanhower family and is being actively restored. This prairie is on a generally north-facing slope, giving the area from the midslope down a more mesic character. For these reasons and the overall high quality, it is unusual in the region and is worthy of continued management and possibly permanent protection if the landowners so choose. A brief walk-through of the site documented well over 50 species of desirable prairie plants. Some of these include prairie phlox, prairie larkspur, pasque flower, white camass, alum root, heart-leaved alexanders, Virginia mountain mint, ground plum, and vetchling. Native grasses found here include prairie dropseed, porcupine grass, big and little bluestem, Indian grass, and sideoats grama. The species rattlesnake master, listed as state Special Concern, was found here and was reportedly reintroduced as part of the ecological restoration efforts. This prairie, in conjunction with prairies elsewhere on this ridgeline, is vitally important for supporting a functioning prairie system and support several species of rare plants. In addition to rattlesnake master, the Federally Threatened species prairie bushclover *Lespedeza leptostachya* was found on several properties adjacent to the Umbanhower's prairie. This site is a suitable recipient site for prairie bushclover and it may colonize from adjacent property.

CRW-18

Seepage Meadow **Rank: D**

This community is a perched seep near the crest of a west-northwest facing hillside. It has been disturbed in the past, but appears to be slowly recovering. Common native species include woolly sedge, boneset,

dark green bulrush, spotted joe pye weed, and cut-leaved water horehound. The most frequent nonnative species is reed canary grass, which occurs sporadically. Because of the small size of this community, its past disturbance and the fact that it is surrounded by low quality forest, this wet meadow was given a rank of "D".

CRW-19

Lowland Hardwood Forest Rank: C

This forested community occurs on a generally north-facing slope. It appears to have been grazed and more open in the past. It is characterized by some scattered bur oaks, with black walnut, butternut, hackberry, and black cherry also present. The shrub layer is somewhat patchy, but overall is moderately in thickness. Small native trees, blackberries, and raspberries dominate this layer. This forest should continue to improve in quality on its own during the next few decades.

CRW-20

Lowland Hardwood Forest Rank: C

This forest is found on either side of Highway 56, both in the valley bottom and on the sideslopes. It appears to have been formerly more open and dominated by oaks, with a recent recruitment of other tree species. The most common of these are bur oak, black walnut, elm, black willow, cottonwood, and boxelder. The shrub layer is generally thick and is composed of a mix of native tree saplings and native and nonnative shrubs, including European buckthorn, gooseberry, and black raspberry. The ground layer is sparse and also

exhibits signs of disturbance. Common species here include avens, violet, and Virginia waterleaf. Because of the recent origin of this closed forest, and the species poor ground layer, this community was given the modest rank of "C".

CRW-21

Wet Prairie/Wet Meadow **Rank: C**

This low lying area includes several swales and a former pasture. The wet meadow portions of the community are of moderate quality and contain a mix of native and nonnative graminoids. The most common nonnatives are reed canary grass, red top, and wild parsnip. Native graminoids found here include tussock sedge, Buxbaum's sedge, woolly sedge, and Canada bluejoint grass. Forbs found in the swales include spotted joe pye weed, marsh vetchling, and sawtooth sunflower. There is also a remarkably large population of northern bog-orchids here, containing perhaps more than 1,000 individuals. This wet meadow grades upslope into wet prairie that was formerly pastured. Some of the more common species in the wet prairie section include prairie cordgrass, golden alexanders, New England aster, and Virginia mountain mint.

This community also has an increasing presence of shrubs, most notably red-osier dogwood, pussy willow, and gray dogwood. Overall, the quality of this community is moderate because of the apparent past grazing and the encroachment by brush. Although this community received a qualitative rank of "C", it has

added importance due to the fact that wet prairies are extraordinarily rare throughout the upper Midwest.

CRW-22

Lowland Hardwood Forest Rank: D

This forest is a recent development on swale edges and waterways that were likely grazed in the past. This activity probably maintained the open character of the site, with trees and shrubs quickly colonizing the site once the livestock were removed. The most common tree species here is box elder, with cottonwood, black willow, and a few other species also present. The shrub layer varies from sparse to moderate with red osier dogwood and willows most common. The ground layer in these areas is characterized by nonnative pasture grasses and weedy nonnative flowers. Some of these include reed canary grass, Kentucky bluegrass, Canada thistle, stinging nettle, and wild parsnip. Because of the degree of disturbance and the mostly poor species composition, this community was given the minimum rank of "D".

CRW-23

Wet Meadow Rank: BC

This small wet meadow is found in an active pasture, and is of surprisingly good quality. It has approximately equal portions of upland and wet meadow, with the upland areas still hosting a few prairie species dispersed among the pasture grasses. The swale is generally sedge dominated with tussock, fox, Hayden's, and other sedges most common. Other graminoids include softstem bulrush, prairie cordgrass,

Canada bluejoint, and woolgrass. The most common flowers found were marsh milkweed, sneezeweed, boneset, marsh phlox, black-eyed susan, and spotted joe pye weed. Despite the apparently long history of grazing, this wet meadow has remained in moderately good condition.

This community also hosts a disproportionately large number of grassland birds including dickcissel, meadowlark and bobolink. Remarkably, at least four pairs of bobolinks were active in this pasture of about 20 acres. Although bobolink probably occur elsewhere in the county, this site is the only location where they were seen during this study. Because this area supports a large number of grassland birds and provides a good example of a wet meadow with a relatively high position on the surrounding landscape, it has added significance. This site is a good candidate for additional management such as working with the landowner to try and improve native habitat and improving/increasing forage with an new/updated grazing plan. Additional habitat partnering activities should also be considered on adjacent properties to improve the long-term chances of survival for the bobolink population. Because of the good quality, surrounding upland habitat, aesthetically pleasing scenery, and the grassland bird species it supports, this community was given a relatively good rank of "BC".

CRW-24

Oak Woodland-Brushland **Rank: CD**

This oak woodland occurs in two small parcels that lie on either side of 10th Avenue. Both have a history of grazing and are dominated by large bur oak that form a nearly closed canopy. These oak average about 24 inches in diameter, with one 21-inch oak being aged at 117 years. The shrub layer is generally absent as a result of grazing. The ground layer is a mix of native and nonnative grasses, with flowers found infrequently. The most common native grasses include hairy wood chess, silky wildrye, and bottlebrush grass. Nonnative pasture grasses found here include rye, smooth brome, Kentucky bluegrass, and orchard grass. Forbs present are mostly species tolerant of regular disturbance including white avens, clovers, and dandelions. The east parcel is also used as a boneyard for old farm equipment, although this does not substantially impact the quality of the area. Overall, the species composition of this woodland is moderately poor. Despite this, it has very good restoration potential and the cathedral-like canopy of the oaks is increasingly uncommon and scenic.

CRW-25

Lowland Hardwood Forest Rank: C

This forest is found along the westernmost tributary of the Little Cannon River and some adjacent slopes. It is characterized by large bur oaks that average nearly two feet in diameter, with other younger trees of various species intermixed. Some of these other trees include black walnut, black cherry, and hackberry. Together, these form a nearly closed canopy. The shrub layer is moderately thick to nearly impenetrable in some places. The most common species here include

chokecherry, prickly ash, nannyberry, false indigo, and highbush cranberry. The ground layer varies, with the better quality portions being found near the Little Cannon River. Some of the more common species here include cup plant, hog peanut, Virginia waterleaf, Virginia wildrye, and red baneberry. As this forest matures it will continue to improve in quality and is very scenic along the river. The recent filling-in of the canopy, and current species composition give this community a moderate quality ranking of "C".

CRW-26

Oak Woodland-brushland Rank: CD

This community includes a pasture that is currently grazed intensively as well as a portion in the north that was grazed in the past. The entire area has scattered large, open-grown bur and pin oaks that average over 18 inches in diameter. The north portion has a virtually closed canopy resulting from second growth of elm, boxelder and other species. The south portion retains a patchy canopy. Both areas have a thick to nearly impenetrable shrub layer below the trees. The most common shrub species include boxelder saplings, European buckthorn, prickly ash, and gooseberry. The ground layer of the north portion is sparse due to a combination of past intense grazing and the recent dramatic increase in shade. The south area has a sparse ground layer under shrubs and trees, while the open areas are dominated by nonnative pasture grasses and weedy prairie forbs. There are several small patches of wet/sedge meadow that are in somewhat better condition than the surrounding pasture. Common species here include tussock sedge,

boneset, blue vervain, and other native sedges and rushes.

Because of the shift in species composition caused by intense grazing, and the recent origin of a closed canopy in the north portion, this community was given a relatively low rank of "CD".

CRW-27

Dry Oak Forest Rank: CD

This is a small dry oak forest that is found on a nearly level, to gently north sloping hill. The canopy is dominated by bur and pin oak that average just under 20 inches in diameter. Areas between these oaks are filled in by younger basswood, elm, and quaking aspen. The shrub layer varies from sparse to moderately thick and is dominated by black raspberry, prickly ash, gooseberry, hackberry, and gray dogwood. The ground layer shows signs of past grazing and recent canopy closure including through the dominance of disturbance-adapted species such as honewort, Virginia waterleaf, and white snakeroot. Other species present in the ground layer that are typically found in dry oak forests include wild geranium, purple joe pye weed, pointed-leaved tick trefoil, woodland sunflower, and horse gentian. Although this forest should quickly improve in quality in the next few decades, the current species composition warrants a rank of "CD".

CRW-28

Oak Woodland-Brushland Rank: D

This oak woodland includes a south-facing hillside and the floodplain along the Little Cannon River. The site has a history of grazing and appears to have been retired from active use for several years, possibly more than 15 years ago. The most common trees here include large bur oak and many smaller trees including elm, red cedar, and boxelder. The shrub layer varies from moderately thick to thick, with cedar, prickly ash, and European buckthorn most common. Because this community has been substantially impacted by grazing, and also because of the recent flush of growth by trees and brush, it was given a lowered rank of "D".

CRW-29

Lowland Hardwood Forest Rank: D

Similar to the adjacent community CRW-28, this forest is found along the Little Cannon River and its immediate side valleys. It also is characterized by large, scattered bur oaks and a dense growth of young trees, including boxelder, elm, black cherry, hackberry and others. The shrub layer varies from relatively sparse where grazing still occurs to moderately thick in some other areas. Likewise, the ground layer is most dominated by nonnative pasture grasses in grazed areas. Other areas show slightly more diversity as intense grazing has been ceased. Because the oaks comprise a small portion of the total canopy in this forest relative to the other species characteristic of lowlands, this community was classified as a lowland hardwood forest. Also, because of the level of past and present impacts, it was given a qualitative rank of "D".

CRW-30

Wet Meadow **Rank: C**

This wet swale appears to have been pastured in the past, but is currently not used and has intact hydrology. It consists of an east-west trending sloped wetland on the north side of County Road 24. Although part of the wet meadow is dominated by the nonnative reed canary grass, some other portions including a small piece of wet prairie are in good condition. The most common native graminoid species found here include prairie cordgrass, Canada bluejoint grass, tussock sedge and other sedges. Forb species of interest include prairie phlox, compass plant, marsh marigold, New England aster, fringed loosestrife, and Canada anemone. There is some brush and small tree encroachment in this community, including red osier dogwood and elm; these cover about 10 percent of the total area. Because of the intact hydrology and the presence of some species associated with better quality communities, this community was given a somewhat upgraded rank of "C".

CRW-31

Dry Prairie, Bedrock Bluff Subtype **Rank: D**

This prairie is found in several segments that appear to be periodically grazed, as indicated by intact electrical fencing. The prairies are a mix of native species and nonnative pasture grasses/weeds. There is about 15 percent brush cover, consisting primarily of red cedar. The most common native species include marbleseed, boneset, ground plum, aromatic aster, birdsfoot violet, little bluestem, and sideoats grama. Nonnative plant species include Kentucky bluegrass, timothy, black

medic, Queen Ann's lace, and several species of thistle. Because of the long history of intense grazing, this community has relatively low native species richness and qualitative rank. Despite this, it has good restoration potential and is a good candidate for adjusting the grazing regime to benefit both the prairie and the income of the operator.

CRW-32

Wet Prairie Rank: CD

This community contains a degraded wet prairie and wet meadow. It trends in a northeast-southwest alignment, with the southwest part currently being grazed. Portions have been ditched, as part of past attempts at drainage. Despite current and past land uses, this area retains some native plants found in better quality communities. Among these are the native graminoids tussock sedge, Buxbaum's sedge, rattlesnake grass, and awl-fruited sedge. Native forbs present include Virginia mountain mint, golden alexanders, prairie loosestrife, turk's cap lily, and northern bog-orchid. The most common nonnatives include reed canary grass and redtop. Also, there are some dense thickets of shrubs and small trees, including red osier dogwood, pussy willow, and quaking aspen. These make up about 20 percent of the total cover. Because of the rarity of remaining wet prairies in the county, and the restoration potential of this community, it is a good candidate for active management.

CRW-33

Floodplain Forest

Rank: CD

This low-lying forest is found in a south-trending side valley of the Little Cannon River. It is characterized by a patchy to closed canopy dominated by black willow and boxelder, with average diameters around 12 inches. Other trees found less frequently include cottonwood and elm. The shrub layer varies from moderate to sparse based on canopy gaps and proximity to water flows. The most common species here include common elderberry, redosier dogwood, willow, and false indigo. The ground layer also varies in quality with some areas dominated by nonnatives and others that are better quality. Common nonnatives here include reed canary grass, stinging nettle and wild parsnip. Desirable native species found here include cup plant, angelica, Canada anemone, sawtooth sunflower, cow parsnip, and rough hedge nettle. Because of the relatively young age of the trees and the prevalence of reed canary grass, this community was given the somewhat lowered rank of CD.

CRW-34

Oak Woodland-Brushland **Rank: D**

This community includes several parcels that are separated by some distance. These are variable in structure, and some parcels are nearly closed in by small trees and shrubs, while others retain a more open character. All are currently or historically grazed. The largest trees are generally scattered bur oaks, with other oaks occurring less frequently. The area between these oaks is filled by a variety of trees and shrubs

including elm, boxelder, gooseberry, prickly ash, European buckthorn, cedar, chokecherry, and brambles. The ground layer is also variable in character, but generally dominated by nonnative pasture grasses and native plants that are tolerant of moderate to intense grazing pressure. Some of these include Canada wildrye, Virginia waterleaf, and avens. Overall, this community is of low quality and thus was given a rank of "D".

CRW-35

Mesic Oak Forest **Rank: D**

This forest includes several parcels that have been disturbed to varying degrees. The average canopy cover of these parcels is about 70 percent, with some areas that have been logged several times having about 50 percent canopy cover. The most common trees found here include red oak, basswood, green ash, bur oak, and rarely, sugar maple. The shrub layer is moderately thick to thick with both tree saplings and shrubs common. The ground layer also varies depending on the intensity and frequency of past disturbance. Common species include the nonnatives Kentucky bluegrass, reed canary grass, and burdock. Natives include Canada wildrye, bottlebrush grass, and white snakeroot. Because of the past influence of grazing and logging, this community was given a rank of "D".

CRW-36

Mesic Oak Forest **Rank: CD**

This forest includes several parcels in different areas. They are generally characterized by a closed canopy dominated by bur oak and elm, with lesser amounts of black cherry, black walnut and basswood. The shrub layer is variable depending on past/current grazing. The most common species in the shrub layer include common elderberry, prickly ash, green ash seedlings, and red raspberry. The ground layer is dominated by nonnative grasses in pastures areas with disturbance tolerant natives more common elsewhere. The general composition of species in the ground layer is only fair to poor. Because of these indicators, the community was given a somewhat lowered rank of "CD".

CRW-37

Mesic Oak Forest Rank: C

These forest parcels occur on several north-facing slopes along the same ridgeline, the northern portions of which are dominated by oak, the southern ones have a larger percentage of sugar maple. One of the southern segments, along with an adjacent forest that was mapped as Maple-basswood Forest by the MN DNR Minnesota County Biological Survey, has been substantially fragmented by a housing/golf course development. Overall, the most dominant trees are bur and red oak that average about 14 inches in diameter. Elm, hackberry, and sugar maple are less common. One 20-inch sugar maple cut during golf course construction was 110 years old when it was removed. The configuration of the growth rings on the tree, as well as the presence of surrounding stumps, indicate that this forest was probably clear-cut about 50 years ago. The shrub cover varies from sparse to moderately

thick. Sugar maple saplings are common in this layer, with prickly ash, European buckthorn, nannyberry, chokecherry, and bitternut hickory seedlings also present. The ground layer is also variable and is most disturbed where grazing appears to have been regularly practiced. Species found in the ground layer include wood anemone, woodland sunflower, wild geranium, bottlebrush grass, red baneberry, and pointed-leaved tick trefoil. Overall, the quality of this site is moderate having been influenced in the past by grazing and logging and recently by landscape alteration associated with development.

CRW-38

Oak Woodland-Brushland Rank: CD

Found along the south-facing portions of the same bluff line that hosts CRW-37, these oak woodland-brushland parcels are of moderately poor quality. They are characterized by large bur oaks and some large pin oaks. In some places these trees have an open-grown form, while in others they form groves with intermingling crowns. Between these is a second growth of young cedar, elm, boxelder, and oaks. The shrub layer is generally thick and filled with thorny species, especially European buckthorn and prickly ash. The ground layer varies in quality, but is generally species poor. Some of the more common species here include white snakeroot, wildrye, bottlebrush grass, and Pennsylvania sedge. Most of these parcels appear to have had their openness maintained by grazing in the past, with an influx of young trees and shrubs after grazing subsided.

CRW-39

Dry Prairie, Bedrock Bluff Subtype Rank: D

Although this prairie is classified as a bedrock prairie, there are very few areas where bedrock is actually exposed. The site is characterized by rounded hills with gentle swales in-between. The prairie was no doubt used as pasture in the past and retired in the last several decades. It has about 25 percent cover by shrubs and young trees, including some large planted groups of ash, walnut, and other trees. Shrubs include prickly ash, cedar, dogwood, sumac, and plum. Natives comprise about half of the total cover for this area. The most common native grasses include Indian grass, heavy-fruited sedge, sideoats grama, prairie dropseed, and porcupine grass. The most common forbs include stiff, gray, and Canada goldenrods, prairie coneflower, leadplant, silverleaf scurf-pea, golden alexanders, and smooth blue aster. Common nonnatives include smooth brome, Kentucky bluegrass, Canada bluegrass, and wild carrot. Because the area is a mix of native and nonnative plant species, and because of past disturbance, this prairie was given the relatively low qualitative rank of D. In spite of the rank, this community has very good restoration potential and would likely require relatively modest inputs to improve.

CRW-40

Dry Prairie
Rank: CD

The eastern parcel of this prairie occurs on a hilltop rather than a slope, making it exceptionally unusual.

Most remnant prairies are found on steep, rocky slopes, or other areas unsuitable for conversion to agriculture. The community appears to have been a former pasture, and may have been crop farmed in the early 1900's. Since these activities stopped, the site has begun to recover and prairie species are once again dominant in many areas. The western parcel occurs on a west-facing slope and was pastured more recently.

The most common native graminoids in this community include Indian grass, big and little bluestem, and rough and prairie dropseed, with sun-loving and Bicknell's sedges also present. The most common native flowers include heath aster, stiff goldenrod, false boneset, and oxeye false sunflower. Smooth blue aster, wild licorice, prairie phlox, and butterfly milkweed are also present, although these species occur less frequently. The most common nonnatives include Canada bluegrass, smooth brome, and timothy. Shrub cover averages about 20 percent with eastern red cedar, smooth sumac, and elm most common. This is a good example of a prairie on a landform other than steep slopes. It also has very good restoration potential if management is started in the next ten years. For these reasons, this prairie, albeit of only moderately poor quality, is a good candidate for management.

CRW-41

Mesic Oak Forest — Rank: CD

This forest is found on a generally east-northeast facing slope with much of it heavily impacted by grazing. The canopy is in moderately good condition

despite some limited tree cutting. It is dominated by basswood, sugar maple, and white oak with bur oak, bitternut hickory, and hackberry co-dominant. These trees average about 16 inches in diameter. The shrub layer is sparse in most places with only limited recruitment of tree seedlings, due to grazing pressures. The most common species here is elm, with European buckthorn, gooseberry, and ironwood less common. The ground layer appears to have been heavily impacted by grazing as well, although some spring blooming plants may persist and were not seen due to the July field visit. The most frequent ground layer species include sweet cicely, wood nettle, bottlebrush grass, and Virginia waterleaf. Because of the pronounced impact of grazing, this community received a moderately poor rank. Appropriate reduction or removal of grazing should allow the condition of this forest to improve in quality within a few decades.

CRW-42

Lowland Hardwood Forest Rank: CD

Found along a tributary of the Little Cannon and characterized by a patchy canopy, this lowland hardwood forest is of moderately poor quality. The canopy has bur oak averaging about 18 inches as the most common tree, with occasional black walnut, quaking aspen, boxelder, and black willow. The shrub layer varies in density, and is thickest in areas that are not grazed. Boxelder and prickly ash are the most common species in the understory/shrub layer, and indicate a shift in the future composition of the canopy. The ground layer is generally dominated by the

nonnative grasses reed canary grass and Kentucky bluegrass. Because of moderately intense human use and the fact that the community is changing from oak woodland to a disturbed, lowland hardwood forest community, this site was given a somewhat lowered rank of CD.

CRW-43

Dry Prairie, Bedrock Bluff Subtype **Rank: B**

This prairie includes three separate parcels, of which the east and south parcels are somewhat lower quality (perhaps "C"). The other parcel is of exceptionally good quality and is worthy of active management. The following description focuses on that better quality area, which is found on a moderate west- to southwest-facing slope. It is characterized by having small exposures of bedrock and a face of loose platey cobbles. It has about 25 percent brush cover that is composed primarily of eastern red cedar, bitternut hickory and smooth sumac. The most common native grasses include porcupine grass, prairie dropseed, big bluestem, sideoats grama grass, and plains muhly. Forbs present that indicate better quality include smooth blue aster, prairie violet, pasque flower, hoary puccoon, heart-leaved alexanders, rough blazingstar, purple prairie clover, prairie coreopsis, and others. Nonnatives occur in only small amounts with Kentucky bluegrass, Canada bluegrass, and white sweet clover found rarely. Overall, this parcel has exceptional species composition, and aesthetic character. If brush were removed, this prairie would likely improve to an "A" rank. This prairie is a good candidate for some

type of planning assistance and active restoration work.

CRW-44

Dry Prairie, Bedrock Bluff Subtype Rank: BC

This south-facing slope overlooks a tributary of the Little Cannon River west of County Road 24. Red cedar, smooth sumac, and prickly ash cover roughly 50 percent of the site, and these brushy species are spreading quickly. The prairie is dominated mostly by native grasses including big bluestem, Indian grass, sideoats grama, and prairie dropseed. The most common forbs include wild rose, leadplant, purple prairie clover, and sky blue aster. The sandy soils also support dotted blazingstar, prairie violet, and toothed evening primrose. Although this prairie was has been grazed in the past, and more recently severely impacted by ATV misuse, the prairie still supports a significant population of the state-listed Special Concern species, Hill's thistle. Because of the presence of a large number of forbs including Hill's thistle, this prairie was given an elevated rank of "BC".

CRW-45

Oak Woodland-Brushland Rank: CD

This community includes several hillsides that support a mix of groves of large bur oak and scattered single oaks. A moderately dense to dense growth of young trees and shrubs occurs across the site, and varies in character depending on location. In some areas it is dominated by red cedar, others by planted pines, and still others by a mix of elm, quaking aspen, boxelder,

prickly ash and European buckthorn. The ground layer varies in composition and quality, with some of the more open areas retaining remnants of prairie and savanna species, while other, recently shaded sites, are generally poor in quality with weedy species such as catnip and nonnative pasture grasses. Because of the apparent transition of this community from savanna to brushy woodland, and because of the resulting decrease in diversity, this community was given the relatively low rank of "CD".

CRW-46

Oak Woodland-brushland Rank: D

This community is adjacent to CRW-45 and is similar in species composition. However, this community lacks the pine plantations and is also slightly more disturbed from past logging and grazing. Because of the substantial disturbance to this area, it was given a rank of "D".

CRW-47

Seepage Meadow Rank: C

This wetland is found on north- and east-facing slopes near 343rd Street. The most common native species found here include lurid and awl-fruited sedges, dark green bulrush, sensitive fern, fringed loosestrife, and great St. John's wort. This wetland also shows signs of grazing, including the presence of the nonnative grasses Kentucky bluegrass and reed canary grass. Although somewhat impacted, it retains a fairly open character and a reasonable complement of native species. For these reasons, it was given a rank of "C".

CRW-48

Dry Prairie

Rank: D

This southwest-facing slope includes some old field that has been recolonized by prairie species. Overall, its condition is moderately poor, though it does have restoration potential. The most common native species here include little bluestem, marbleseed, stiff goldenrod and thimbleweed. Brush species found here include eastern red cedar, staghorn sumac, prickly ash, and small oak trees.

CRW-49

Not Used

CRW-50

Lowland Hardwood Forest Rank: D

Dominated by boxelder, red maple, and Siberian elm, this forest is found in narrow strips along drainage ways and side valley slopes south of 343rd Street. The forest appears to be of recent origin and to have had some disturbance in the past. This is substantiated by the generally poor ground cover, thick shrub layer, and areas of erosion. The most common shrub species here include common elderberry, gooseberry, raspberries, cherry, prickly ash, red cedar and European buckthorn. The ground layer is dominated by stinging nettle, poison ivy, giant ragweed, and a nonnative chickweed. Overall, the quality of this community is poor. Efforts to improve this site might include planting of more desirable tree species and management of disturbances.

CRW-51

Lowland Hardwood Forest Rank: D

This woodland is a collection of retired pasture that has been planted with pines, along with areas associated with the upper end of a slope drainage. The most common species of trees include boxelder and red pine. The shrub and ground layer also reflect past disturbance and the recent origin of the trees. For these reasons, the community was given a low rank.

CRW-52

Maple-Basswood Forest
Rank: D

This forest occurs on a north-facing slope, is mostly pastured, and has been substantially impacted by that activity. The most common tree species include black walnut, elm, bitternut hickory, green ash, basswood, red oak and sugar maple. Most of these exceed 12 inches in diameter. The shrub layer is sparse in most places and is dominated by Missouri gooseberry, red cedar, ironwood, and sugar maple saplings. The ground layer has been overseeded with nonnative pasture grasses. The most prevalent of these are redtop, Kentucky bluegrass and orchard grass. The most common native species include honewort, sweet cicely, and Virginia stickseed, all species that are adapted to disturbance and tend to increase in grazed woods. Some species typically found in communities of better quality are tall bellflower, bloodroot, and showy orchis. Several seepage meadows also occur along this slope and contain somewhat better species composition than the surrounding grazed forest.

Overall, this community has been substantially altered by intensive use and received a rank of “D”.

CRW-53

Maple-Basswood Forest
Rank: C

Found on several slopes and across one east-west trending ravine, this sugar maple dominated forest is of moderately poor quality. This is largely due to the past tree cutting and historic grazing that ceased some time ago. The most common trees found in the canopy are sugar maple, with basswood, bur oak, and red oak occurring occasionally. The subcanopy includes many of the same species as are found in the canopy, with several sizes and ages of trees present. This is a desireable trait that indicates the community is regenerating itself, and is often lacking in forests today. The shrub layer is patchy, with dense stands of young sugar maple concentrated below canopy gaps. The ground layer is somewhat diverse, but variable in quality. In areas where grazing appears to have been heaviest, weedy native and nonnative species dominate. Other areas exhibit better quality with species such as zigzag goldenrod, rattlesnake fern, wild ginger and bellwort present. Because of past disturbance, widely varying quality in the ground layer, and the more recent problems of erosion, this community was given the moderate rank of “C”.

CRW-54

Mesic Oak Forest Rank: BC

Dominated by red, white, bur and pin oak, this oak forest occurs on gently rolling ground, and a south-facing slope. Other trees found in this community include black cherry, green ash, and elm. The shrub layer is generally moderately thick and dominated by small trees, as well as gooseberry, black raspberry, and prickly ash. The ground layer is surprisingly good in composition. It includes yellow bellwort, blue cohosh, zigzag goldenrod, pointed-leaf tick trefoil, and maidenhair fern. The generally good species composition, particularly in the ground layer, along with the fact that few nonnatives are found here, give this forest a high qualitative rank of "BC".

CRW-55

Lowland Hardwood Forest **Rank: D**

Found on a north-facing slope, this forest appears to have been grazed and logged in the past, and perhaps planted to black walnut. This species is now codominant with elm in the canopy. Found less frequently are quaking aspen, black cherry, bigtooth aspen, and red and bur oak. The shrub layer varies from sparse to very thick with disturbance tolerant species common. The ground layer is also composed of species that follow disturbance including white snakeroot and honewort. Because this forest has generally poor species composition throughout, it was given a relatively low rank of "D".

CRW-56

Lowland Hardwood Forest **Rank: CD**

This forest is found along the Little Cannon River and some immediately adjacent low-lying areas. It occurs on several different properties and has been influenced by several different management activities, particularly grazing. The most common trees here include box elder that are about 12 inches in diameter. Other trees of similar diameter include black willow, cottonwood, elm, and to a lesser degree bur oak and green ash. The shrub layer varies, but is generally sparse with tree saplings common. The ground layer contains a mix of native and nonnative species. Most frequent among these are the nonnative reed canary grass and the native Virginia wildrye. Native species encountered occasionally include wild goldenglow, cow parsnip, angelica, cupplant, tall bellflower, and tall meadow rue. Because of the abundance of non-native species, and because the trees appear to have colonized this site fairly recently, it was given a somewhat lowered rank.

CRW-57

Maple-Basswood Forest

Rank: CD

This forest community is found on a north-facing slope adjacent to County Road 9. It is characterized by sugar maple, basswood, and red oak, with lesser amounts of bitternut hickory, bigtooth aspen, and others. The larger trees average about 12 to 14 inches in diameter. The subcanopy and shrub layer vary in thickness, with the sparsest cover in areas that are grazed regularly. Areas that have been logged but not recently grazed have a shrub layer that is moderate in thickness and dominated by sugar maple saplings and poles. The ground layer also varies and has been dramatically

influenced by grazing, which reduces the diversity of desirable ground layer species. Some of the species encountered at least occasionally in the ground layer include bottlebrush grass, maidenhair fern, black-seeded mountain rice grass, yellow bellwort, blue cohosh, and nodding trillium. Because the better quality areas are found in small patches among those disturbed by logging and/or grazing, this community was given a rank of "CD". Despite this, it does have good prospects for recovery with adjustments to grazing and logging practices and the frequency with which they're applied.

CRW-58

Mesic Oak Forest Rank: C

This forest contains examples of both dry and mesic oak forest, with their location dependent on the slope, position, and dryness of soil. Because a majority of this community exhibits a more mesic-like character it was classified as such. The most common tree in this nearly closed canopy forest is red oak, with bur and pin oak less common. Also found here are white ash, bitternut hickory, black cherry, basswood, and sugar maple. The largest oaks are generally about 14 inches in diameter, with several size classes of other species present. The shrub layer is variable, with the greater thickness associated with the dry, south-facing slope. The most common species here include chokecherry and ironwood. Sugar maple seedlings make up a large portion of the shrub layer in more mesic locations. The ground layer is of moderately good quality. Some of the species found here at least occasionally include zigzag goldenrod, pointed-leaf tick trefoil, sarsparilla,

Jacob's ladder, blue cohosh, and Pennsylvania sedge. Past grazing and logging have impacted this site, but it appears to be recovering well from these disturbances, and, with minimal additional disturbance, should continue to improve.

CRW-59

Oak Woodland-Brushland Rank: D

At the time of inventory this community was intensively grazed by horses in the south and beef cattle in the northwest. This has caused a significant shift in species composition that has favored nonnative species over better- quality natives, as well as causing excessive erosion in some areas. The area is characterized by scattered bur and pin oak with younger elm, boxelder, and stands of aspen. The shrub layer varies from absent in the northwest to thick in the south and is dominated by sumac, red cedar, prickly ash, apple, ironwood, and elm. The ground layer is dominated by Kentucky bluegrass, particularly in the northwest. Some prairie species that persist in the southern portion include wild licorice, Virginia mountain mint, heath aster, sideoats grama, and bergamot. Because of the intensity of grazing, recent erosion, and the prevalence of brush, this community was given a lowered qualitative rank.

CRW-60

Lowland Hardwood Forest Rank: D

This forest includes several parcels along a slope that extends around a bluff line. Canopy cover varies from patchy to closed. The oldest class of trees throughout

are bur, pin and red oak that are widely spaced on south-facing slopes and have nearly touching crowns in some other areas. Between these are young elm, boxelder, ash, and others. Because the total cover of oaks is low, this community was classified as a lowland hardwood forest rather than an oak woodland-brushland. The shrub layer varies from thick to nearly impenetrable and, similar to the ground layer, is dominated by species that follow disturbance. Shrubs include prickly ash, European buckthorn, and gooseberry. Ground layer species include honewort, white snakeroot, and stinging nettle.

CRW-61

Oak Woodland-Brushland Rank: C

This woodland is found in several contiguous properties north of CSAH 57, and one parcel to the southwest of the same road. Composition of this community is quite variable with some areas heavily grazed and dominated by nonnative pasture grasses; and others ungrazed, with a more closed canopy, and a thick brush layer. These are considered together because of their similar overall quality. The most significant portions of this community include a small prairie in a currently ungrazed portion in the east, several seepage meadow inclusions that are perched on hillsides, and a small dry prairie that lies on the northeast side of the area. This last small prairie hosts a population of the state Special Concern plant Hill's thistle. This species seems to be tolerant of light to moderate grazing, but may be lost from this community if not allowed to periodically recover from

this activity. Because of these three areas, the community rank was improved to "C".

CRW-62

Maple-Basswood Forest
Rank: BC

As part of a large contiguous forested area, this maple-basswood forest is of very good quality. It occupies a north-facing slope and associated hillside drainages. The most common trees here are basswood and sugar maple that average over 14 inches in diameter. Other less common trees include white ash, red oak, bur oak, and quaking aspen. Several size classes of trees are represented here, indicating that the forest has had the opportunity to mature without being grazed or logged in the recent past. The shrub layer is sparse, with patches of sugar maple seedlings occurring where canopy gaps allow sufficient light to the forest floor. Other members of the subcanopy and shrub layer include elm, chokecherry, bitternut hickory, prickly gooseberry, and ironwood. The ground layer is generally in good condition and only a few areas contain higher levels of disturbance-tolerant species. The most frequently encountered species in the ground layer include wild geranium, enchanter's nightshade, nodding trillium, yellow bellwort, bottlebrush grass, and bloodroot. Because this forest is had only minor to moderate disturbance, and because it is part of a large unbroken tract of forest, this community was given the good rank of "BC".

CRW-63

Mesic Oak Forest Rank: BC

Along with CRW-62, this community is part of a very large tract of forest. It is also similar to CRW-62 in having been logged at some point in the past, but also retains several size classes of trees. The most common members of the canopy include bur, pin, and white oak, with white ash, basswood, aspen, butternut, and bitternut hickory found occasionally. The subcanopy and shrub layers are sparse to moderate in thickness with sugar maple seedlings, brambles, ironwood, and several other species. The ground layer is in good condition, with a nice representation of species that are typically associated with oak forest communities. Some of these include sarsparilla, goldenglow, zigzag goldenrod, satin grass, rattlesnake fern, Canada mayflower, wild geranium, and purple giant hyssop. Because of the good species composition of the forest, condition of the canopy, and the fact that it is part of a large contiguous forest, it was given a good rank of "BC".

CRW-64

Oak Woodland-Brushland **Rank: C**

This forest has sporadic canopy cover as a result of logging on most of the site approximately 20 to 30 years ago, which removed many of the larger oaks. As a result, canopy coverage is generally less than 70 percent. This has enabled brush to become thick in places, with raspberry and blackberry common. It has also allowed ground layer plants with a high light requirement to become more dominant. Among these are bottlebrush grass, Canada wildrye, woodland sunflower, Canada milk vetch, and white vervain. Oak regeneration is moderate in this parcel, but they will

likely not be as dominant in the canopy as they were prior to logging. Other trees present include boxelder, aspen, and black cherry. This community will once again become an oak forest as the canopy fills in. However, this may take several decades since many of the younger trees are still less than 10 inches in diameter.

CRW-65

Mesic Oak Forest Rank: B

Found on mostly gently rolling ground with rich soils, this forest is of good quality. Most of the community was logged perhaps 40 years ago and is recovering well. The only other sign of significant human activity is the mowing of ATV trails that lead to the numerous deer stands constructed throughout the forest. The most common members of the canopy include white ash, bur, pin, and white oak, elm, black cherry, aspen, and only rarely red oak. Most of these larger trees average between 10 and 14 inches. The subcanopy includes small trees for the species mentioned above, as well as many ironwood. The shrub layer is sparse to moderate in most places and includes nannyberry, chokecherry, silky dogwood, American hazel, pagoda dogwood and several others. Thorny and nonnative shrubs are found only rarely. The ground layer includes a nice complement of species found in quality oak forests. Some of these include tall bellflower, bottlebrush grass, silky wildrye, spikenard, sarsparilla, goldenglow, oval-leaf milkweed, and hog peanut. Overall, the quality of this forest is very good, making it worthy of a “B” rank.

CRW-66

Maple-Basswood Forest
Rank: C

This forest is quite variable in its three-dimensional structure, presumably due to past grazing and tree cutting. In some areas there are widely spaced, open-grown sugar maple and basswood in the canopy, with a very dense second growth of small trees and shrubs. In other areas there is a nearly continuous canopy of sugar maple, red oak, basswood, and bitternut hickory. The most common species found in the shrub layer were sugar maple, elm, ash, and bitternut hickory seedlings, and gooseberry. Similar to the canopy and shrub layer, the ground layer varies in composition. Some species found here include wild geranium, enchanter's nightshade, blue cohosh, honewort, and calico aster. This forest should improve in quality quickly as long as additional disturbance is withheld.

CRW-67

Dry Oak Forest Rank: C

This forest is found along a lengthy east-west trending slope that faces south. It is dominated by bur and pin oak that form a nearly continuous canopy. Where gaps occur, other trees have filled-in, including black walnut, ash, sugar maple, and elm. The shrub layer varies from moderately thick to thick with European buckthorn and prickly ash most common. The ground layer is a mix of disturbance-oriented species such as honewort, white snakeroot, and Virginia stickseed. Others are more characteristic for the community type including enchanter's nightshade, blue cohosh,

Pennsylvania sedge, and figwort. Because the species composition for this forest is of moderate quality, it received a "C" rank.

CRW-68

Lowland Hardwood Forest Rank: CD

This forest occurs along the Little Cannon River between Highway 52 and Oxford Mill Road, south of Highway 19. In general this forest is relatively young and dominated by species of trees that tend to follow release from activities such as grazing. The most common trees here include boxelder, willow, and cottonwood. The shrub layer varies in thickness and contains many young trees. The ground layer is dominated in most places by nonnative grasses, particularly reed canary grass and bluegrass, with native forbs less common. There is also some ATV damage to this community, mostly concentrated near Highway 52. See CRW-69 for additional information. Because of the apparently recent origin of this forest and past disturbance, this community was given a moderately low rank of "CD".

CRW-69

Oak Woodland-Brushland Rank: D

Found adjacent to CRW-68, this oak woodland varies in composition and quality. Several portion of the community are currently or formerly used for grazing. It is characterized by large, open-grown bur oaks that sometimes stand alone but more often have crowns that intermingle with neighboring trees. The shrub layer varies in thickness depending on how recently a

particular area was grazed. The most common shrubs include nonnative and/or disturbance tolerant species such as prickly ash, buckthorn, honeysuckle, and eastern red cedar. The ground layer is dominated by nonnative cool season pasture grasses in most places, with native grasses and flowers comprising a small portion of the total cover. In addition to grazing and limited tree cutting, some areas in this community have been heavily impacted by ATV use. These Off Road Vehicles are very common in the Cannon Falls area and cause substantial damage to the sandy soils and slopes. One area just west of Highway 52 has a notch approximately 10-15 feet deep cut into a hillside from ATV damage. This has also resulted in a large sediment plume at the bottom of the hill. Because of the prevalence of nonnative plants and the continuing pressure posed by ATV's, this community was given a low qualitative rank of "D".

CRW-70

Oak Woodland-Brushland Rank: D

This oak woodland crosses several property lines with the character of the community dependent on past management practices. Some areas are quite scenic, with large, open-grown bur and pin oak and only a small amount of other brush and tree growth. Other areas have a dense shrub layer composed of young trees, and especially European buckthorn. The ground layer is dominated by species that typically follow disturbance, such as white snakeroot. Because of the dense shrub layer, prevalence of nonnative shrubs, and species poor ground layer, this woodland was given a low qualitative rank.

CRW-71

Dry Prairie

Rank: C

This prairie is found on a southwest-facing hillside overlooking 57th Avenue, and offers a remarkable view of the countryside. The prairie occurs in patches along the hillside and is most concentrated in areas where bedrock is at or near the surface. The most common native species include big bluestem, plains muhly, sideoats grama, and porcupine grass. The most common forbs here are showy sunflower, purple prairie clover, aromatic aster, false boneset, and prairie coneflower. The nonnative grass smooth brome is also common here. Although the prairie community is of moderately poor quality, it was given a somewhat improved rank due to the scenic vista and the large expanse of bluff line that is still open.

CRW-72

Lowland Hardwood Forest Rank: CD

This forest includes both the floodplain and some adjacent terraces of the Little Cannon River west of County Road 14. Some areas are actively pastured, while others have been retired from this activity for varying lengths of time. It includes a mix of floodplain and lowland hardwood forest species such as elm, ash, and cottonwood closer to the river, with the higher ground mostly dominated by bur oak. The shrub layer varies from sparse to moderate with small trees and a few grazing tolerant shrubs such as prickly ash. Nonnative cool season grasses dominate the ground layer.

CRW-73

Dry Prairie, Bedrock Bluff Subtype Rank: C

This prairie is found in several parcels that occur on steep, south-facing slopes, with many areas of exposed bedrock and platey cobbles. Shrubs are encroaching on this prairie quickly. The south parcel is approximately 60 to 80 percent brush covered, with eastern red cedar and sumac most common. The most common native grasses include big and little bluestem, indian grass, prairie dropseed, plains muhly, and sideoats grama. The most common forbs include hoary puccoon, rough blazingstar, leadplant, purple prairie clover, aromatic aster and pasque flower. Although this prairie was probably very open only 20 or 30 years ago, it is quickly becoming significantly overgrown. This, along with impacts from development, serves to lower the rank of this prairie to a "C".

CRW-74

Oak Woodland-Brushland Rank: D

Overall, this is a low quality oak woodland characterized by open-grown oaks in many areas. Other areas lack the oak component, and have open-grown ironwood instead. The shrub layer is moderate to very thick and dominated by thorny and nonnative species. The ground layer shows signs of former grazing and is sparse in many places. The northern most portion of this community was not accessible by foot for this inventory, but appears logged and also disturbed. For this reason, it was considered as part of the areas that could be accessed. The site was given a

lower rank of "D" due to the abundance of disturbance-adapted native and non-native species, generally poor structure, and general lack of conservative species.

CRW-74

Dry Oak Forest Rank: C

This community has been somewhat fragmented by development and road building, but still retains moderate quality in most areas. The canopy cover for this forest averages over 80 percent with pin and bur oak most common. Other, younger trees include elm, aspen, bitternut hickory, black cherry, and, rarely, sugar maple. The shrub layer varies in thickness, but is generally moderate with native species most common. The ground layer is of moderate quality with some minor signs of past disturbance. Some of the more common species here include pointed-leaf tick trefoil, Canada mayflower, enchanter's nightshade, hog peanut, and false Solomon's seal. Although this forest is generally of good quality, it was given a somewhat lowered rank due to the impact of development and fragmentation.

CRW-76

Lowland Hardwood Forest Rank: BC

This is a nice quality lowland hardwood forest in a somewhat hidden valley. With the exception of a few agricultural fields among the different forest types, this is part of a very large forest complex. It is also contiguous to several sites mapped as good quality by the MN County Biological Survey. The most common

trees in the canopy include black willow, elm, and black walnut, most of which average over 14 inches in diameter. The shrub layer has patches of boxelder in some places and elm scattered throughout. The ground layer is generally in good condition and does not seem to have been too adversely affected by past grazing. The most common species here include Virginia wildrye, tall bellflower, goldenglow, rice cutgrass, sedge, purple willow-herb, and Canada wildrye. Because of its generally good condition and the fact that it is adjacent to other communities of even better quality, this forest was given a rank of "BC".

CRW-77

Dry Oak Forest **Rank: CD**

This forest has a canopy that varies from patchy to closed. It is dominated by pin and bur oak that average about 18 inches in diameter. Some of these are open-grown, while most are tall and straight. Many of them are multiple-stemmed, with evidence of logging or tree cutting, probably over fifty years ago. There is a dense second growth of other species, most notably quaking aspen. The shrub layer varies from moderate to thick with ironwood and young elm most common. Other members of the shrub layer include quaking aspen, black cherry, basswood, and green ash. The ground layer is moderate in quality, with recently shaded areas having only sparse coverage. The most

common species here include wild geranium, hog peanut, and Pennsylvania sedge. Because of the generally poor composition and structure of this forest, plus the past disturbance, it was given a moderately low rank of "CD". Despite this, it should improve during the next several decades if logging and grazing are withheld or practiced sparingly.

CRW-78

Oak Woodland-Brushland Rank: D

This oak woodland consists of several parcels of varying structural makeup. In some parcels it is grazed and relatively open, while in other areas it has nearly 100 percent cover by trees and shrubs. Young trees between the larger oaks most often consist of elm, boxelder, and aspen. The shrub layer varies, but is most often dominated by thorny native and nonnative species. The ground layer has a high percentage of nonnative pasture grasses, including Kentucky bluegrass, while the most common natives tend to be disturbance-adapted specie such as white snakeroot. Because of the history of grazing and the resulting loss of native species, this community was given the low rank of "D".

CRW-79

Dry Prairie, Bedrock Bluff Subtype Rank: D

Found on a south-facing hillside just north of County State Aid Highway 44, this prairie is small and occurs along the edge of the bluffline. It is formerly grazed,

as evidenced by the dominance of native grasses including big bluestem, sideoats grama, and little bluestem. Only a few native forbs were seen including prairie violet and marbleseed. Shrubs are increasing in cover quickly on this prairie, and currently comprise about 70 percent of the total cover. Current disturbance of some area include mowing of trails through the adjacent woodland and also on the prairie. If some action is not taken in the next ten to twenty years to manage this prairie through activities such as brush clearing and/or burning, this prairie will be lost to brush expansion.

CRW-80

Dry Oak Forest Rank: CD

This small dry oak forest lies at the top of the ridge adjacent to the previous two communities. It has a closed canopy in most places, with tall bur oaks forming cathedral-like ceilings in many places. The ground layer is in moderate condition, with natives common in most areas. The major factor causing a downgrading of this community is the domination by European buckthorn in the shrub layer. Management of the buckthorn alone would likely improve this community from a CD rank to a BC or C.

CRW-81

Lowland Hardwood Forest Rank: CD

This community includes areas that are currently grazed as well as areas that have been grazed historically but are not actively pastured today. The most common canopy trees include boxelder, elm, and

silver maple, and occasional bur oak, with average diameters around 10 inches. The shrub layer is moderately thick and dominated by European buckthorn, elderberry, gooseberry, brambles, and plum. These thorny species tend to indicate a history of at least moderate, if not more intense grazing. The ground layer is dominated by a mix of species common to low-lying forests. Some of these include Canada wildrye, wood nettle, stinging nettle, reed canary grass, and Virginia waterleaf. Because of the recent origin of tree cover and the history of grazing, this community is somewhat species poor and was given a rank of CD.

CRW-82

Dry Prairie, Bedrock Bluff Subtype **Rank: CD**

This prairie occurs as a long band along a moderately sloped hillside. It was grazed historically, and appears to have been seeded with nonnative pasture grasses, particularly Canada bluegrass and smooth brome. The most common native grasses include sideoats grama, Indian grass, big and little bluestem and prairie dropseed. Forbs encountered at least occasionally include prairie smoke, yellow coneflower, heath aster, prairie cinquefoil, purple prairie clover, and bergamot. Shrubs cover roughly 40 percent of the area, and, based on changes since the 1993 aerial photo, they are encroaching onto the site quickly. This encroachment is the primary reason for the lowered rank of the site, and brush will probably engulf the prairie within the next ten to fifteen years unless active management is implemented.

CRW-83

Oak Woodland-Brushland **Rank: D**

This includes several parcels separated by some distance. A mix of bur oak groves and scattered individual bur oak characterizes the site, over a somewhat variable underbrush. Where scattered oaks are found there is usually either a dense stand of young trees or thorny shrubs. The ground layer tends to be dominated by nonnative grasses where light levels are moderate to high, and is generally sparsely vegetated in areas that have had a recent increase in shade cover. Due to disturbance, these parcels were given a lowered rank of "D".

CRW-84

Wet Meadow **Rank: C**

This wet meadow has been grazed in the past, and the mapping of the community includes some adjacent upland areas. Some species associated with overgrazing, including Canada thistle and reed canary grass, occur in areas of the site. Overall, the quality of the site is moderate with the good representation of native graminoids and forbs and only occasional presence by nonnative species. The most common native graminoids include prairie cordgrass, a number of sedge species, rice cutgrass, softstem bulrush, and dark green bulrush. The most common native forbs include great blue lobelia, angelica, sneezeweed, spotted joe pye weed, sawtooth sunflower, bugleweed, golden alexanders, and fringed loosestrife. This site has good restoration potential and would be relatively easy to manage with prescribed fire, since it is surrounded by plowed ground on most sides.

CRW-85

Dry Oak Forest Rank: C

This parcel of woods lies just south of a quarry that appears to be periodically active and just west of County Road 1. It is characterized by broken canopy, a result of past logging or wood cutting. The most common canopy specimens include bur and red oak that average about 22 inches in diameter. Other trees include black cherry, boxelder, and pin oak. The shrub layer varies from moderate to nearly impenetrable, with the thicker portions coinciding with canopy gaps. The most common species in the shrub layer include European buckthorn, gooseberry, boxelder, and silky dogwood. The quality of the ground layer varies, and some areas are in moderate condition and dominated by native, and others are in poor condition, with an abundance of nonnatives and species that increase with disturbance. The most common desirable natives include pointed-leaf tick trefoil, lady fern, bottlebrush grass, and wild geranium.

CRW-86

Mesic Oak Forest Rank: D

This forest has a similar canopy composition to CRW-86, but the soils are slightly more mesic and there has been substantially more disturbance. One bur oak cut about ten years ago was found to be 110 years of age. It appears that the parcel was formerly used as some type of cabin retreat for hunting. The east-west swale was dammed and the resulting impoundment used for duck hunting. The cabin now appears to be abandoned and the earthen portion of the dam has been breached,

and there has been substantial earthmoving in the adjacent upland areas. Because of the dominance of disturbance-oriented species in the shrub and ground layer, as well as the earthmoving, this community was given a low rank of "D". Management of the area to remove exotics would improve the quality of the site. The impoundment structure represents an opportunity for surface water quality and quantity management. It is recommended that a qualified surface water manager assess the utility of restoring the structure. Cost-share partners for implementation could include the Natural Resources Conservation Service or the Goodhue County Soil and Water Conservation District.

CRW-87

Mesic Oak Forest Rank: C

This forest is characterized by a broken canopy, a result of past logging or wood cutting. The most common trees in the canopy are bur and pin oak that average about 20 inches in diameter. Other trees include black cherry, boxelder, and pin oak. The shrub layer varies from moderately thick to nearly impenetrabl, with the thicker portions coinciding with canopy gaps. The most common species in the shrub layer include European buckthorn, gooseberry, boxelder, and silky dogwood. The ground layer varies in quality, with some areas in moderate condition and dominated by native species, and other areas of poor quality with many nonnatives and species that increase under disturbance. The most common desirable natives include wild sarsaparilla, spikenard, pointed-leaf tick trefoil, lady fern, bottlebrush grass, and wild geranium.

CRW-88

Maple-Basswood Forest
Rank: C

This is a large area of forest, the northern portion of which is dominated by sugar maple and basswood, while the southern portion has a higher percentage of oaks in the canopy. The most common tree species include sugar maple, basswood, white ash, white birch, bur oak, and quaking aspen. Maples and basswoods average about 12 inches in diameter, while some of the larger bur oaks exceed 40 inches in diameter. The shrub layer varies in density from moderate to thick, with ironwood common throughout and sugar maple saplings forming dense stands where patches of light reach the forest floor. The most common graminoids and forbs found here include Pennsylvania sedge, zigzag goldenrod, lady fern, wild ginger, maidenhair fern, yellow bellwort, black-seeded mountain rice grass, and interrupted fern. Some additional spring flowers may be present in this forest, but due to the seasonal timing of this visit, they were not apparent. Additionally, this site has almost no leaf litter layer on the ground in many areas, indicating that it might be infested with nonnative earthworms. These have the potential to alter the ecology and increase erosion in maple and basswood dominated forests. This site was given a lowered rank due to the history of cutting, the relatively small size of canopy trees, and the apparently sparse ground layer.

CRW-89

Oak Woodland-Brushland Rank: CD

This formerly hillside has been grazed to varying degrees in the past. Since its release from grazing, the formerly open areas between the bur oaks have been colonized by brush and other tree species, especially black walnut. The shrub layer varies from thick to very thick and thorny and nonnative species are common. Several small prairie parcels persist, one of which is in moderately good quality. However, these opening are being rapidly overtaken by brush and are therefore mapped as part of the surrounding woodland. The most common brush species here include smooth sumac, European buckthorn, prickly ash, and hackberry saplings. The ground layer includes woodland sunflower, white snakeroot, honewort, and avens. In addition to past disturbance which has altered the species composition, there is active down cutting in some drainage ravines, some of which are about five feet deep.

CRW-90

Mesic Prairie **Rank: C**

This small roadside prairie is one of the few remaining mesic prairies in Goodhue County. Mesic prairies once covered a substantial portion in the western part of the county, but were almost completely converted to row crop agriculture. Since there are so few mesic prairies remaining, this small parcel is especially significant. It is found along Highway 56, mostly on the east side between mileposts 91.9 and 92. The most common native grasses include prairie cordgrass and big

bluestem, with the nonnative Kentucky bluegrass also common. The most common forbs include meadow blazingstar, flowering spurge, prairie phlox, golden alexanders, showy tick trefoil, prairie coneflower, and stiff goldenrod. Although this prairie is small, it has a good representation of native grasses and forbs. Every effort should be made to prevent encroachment or destruction (either intentional or unintentional) of this prairie. Roadside maintenance activities such as mowing and herbicide application can permanently damage prairies and should not be used here: this roadside prairie should, under no circumstances, be broadcast sprayed with a broadleaf herbicide. This would likely result in a total loss of this prairie. Mesic prairies are among the rarest natural community types in Minnesota, and this is one of less than ten mesic prairies remaining in the county. All of these are small and host species unique or uncommon for the region. Efforts should be made to work with the MN DNR Roadside Biologist in New Ulm and other DNR and DOT staff to adequately sign and protect this prairie.

CRW-91

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

This small prairie was photo-interpreted due to its isolation and difficulties accessing the site. It has approximately 25 percent cover by shrubs and small trees, particularly eastern red cedar. The ground layer appears to be in moderately good condition based on the 1993 color infrared aerial photo. For this reason, it was given a moderate rank of "C". If there is some proposed encroachment on this prairie in the future, a

site visit to field check the area first is highly recommended.

CRW-92

Lowland Hardwood Forest Rank: C

This forest is found in several parcels that occur along tributaries of the Little Cannon River. They are characterized by a nearly closed canopy dominated by boxelder and elm, both of which average about 12 inches in diameter. Less common are cottonwood and green ash. The shrub layer varies from moderately thick to thick, with native species common. Among these are chokecherry and common elderberry. The ground layer varies in quality depending on proximity to the streambed, and current and former land use. The most common species include wood nettle, avens, Virginia creeper, Virginia waterleaf, goldenglow, and angelica. The portion of the stream between 63rd Avenue and 408th Street is very scenic and isolated, with many hidden corners and banks. Control of upstream erosion might allow for some type of sport fishery in this area. If landowners are receptive, it might be pursued with the help of appropriate conservation agencies. Also, there are some ATV trails here that are causing erosion. Their use should be reduced in this area, although some limited riding may keep erosion to an acceptably low level.

NOTE: One small population of garlic mustard was also noted here adjacent to 63rd Avenue. This nonnative member of the mustard family is known to expand quickly and displace nearly all native plants as it does so. Only a handful of garlic mustard plants were seen

during this inventory. Later inspection of the population size is warranted if there is any interest in controlling this species in the area.

CRW-93

Dry Oak Forest Rank: C

Found on generally north-facing slopes on either side of 63rd Avenue, this oak forest has a closed canopy that is generally dominated by pin and bur oak that average over 18 inches in diameter. Other trees found occasionally in the canopy include quaking aspen, green ash, black cherry, and bitternut hickory. Sugar maple is found only rarely throughout most of the canopy, but is common in the subcanopy and shrub layer. As a result it will become a more important part of the canopy in the next 50 years. The shrub layer is generally thick, but dominated by native shrubs and tree saplings. Some of these include prickly ash, elm, gooseberry, silky dogwood, basswood, chokecherry, and green ash. The ground layer has a fairly good representation of native graminoids and forbs. The most common species here include wild sarsparilla, elm-leaved goldenrod, satin grass, false Solomon's seal, bottlebrush grass, yellow bellwort, and several dozen others. Runoff from adjacent crop ground has significantly increased the rate of erosion on these hillsides with recent erosion events cutting some ravines ten to twenty feet deep. Overall, the quality of this forest is good, but due to excessive runoff from agricultural fields and the bulldozing of woodland edge trees into piles and ravines, it was given a lowered rank of "C".

CRW-94

Oak Woodland-Brushland Rank: D

This oak dominated community includes several parcels south of County Highway 9 and east of County Highway 14. Much of it was photointerpreted for this inventory, due to access issues. The canopy cover is quite variable across this community, and ranges from sparse cover dominated by large oaks, to a nearly closed canopy where brush and small trees fill in the areas between the oaks. The shrub layer commonly contains ash, elm, boxelder, aspen, prickly ash, buckthorn, and dogwood. The ground layer varies as well, but is often dominated by nonnative grasses and weedy forbs. For these reasons, this community was given a relatively low rank of "D".

CRW-95

Maple-Basswood Forest
Rank: C

This forest occurs on several properties and is mostly confined to north slopes that vary from slight to severe, with some cliffs and/or outcroppings along the stream. Portions of this forest have a gallery-like appearance to them, with a high, thick canopy and sparse shrub layer. The area also overlooks a very scenic tributary valley of the Little Cannon River. Several properties in this natural community have been logged several times in the past, as well as recently. Intensive row crop agriculture, along with logging and perhaps grazing have contributed to some very severe gullying on sideslopes. Some of these gullies approach 20 feet in depth, with active downcutting still in

progress. Although some portions of this community are very nice quality (perhaps "B" rank), others have been heavily impacted and are deteriorating under current management practices. For this reason, this otherwise good quality forest was given the modest rank of "C".

CRW-96

Oak Woodland-brushland Rank: D

This oak woodland occurs in several separated parcels that are of similar quality. It is characterized by a patchy canopy with larger bur and pin oak, and occasional white and red oak as well. Many of the bur oak are large, with wide, spreading canopies and heavy branches, indicating that they developed in the open. Younger trees and shrubs fill in the areas between these larger oaks, especially elm, boxelder, poplar, prickly ash, brambles and dogwood. The ground layer is characterized by a combination of nonnative pasture species, and more frequently oak woodland species tolerant of some disturbance such as white snakeroot and Pennsylvania sedge. Because of the apparent history of grazing on most of these parcels, and because of the recent increase in brush and lower quality trees, this community was given a minimum rank of "D".

CRW-97

Oak Woodland-Brushland Rank: BC

This moderately open oak woods has a patchy canopy with bur oak common. These typically exceed 20 inches in diameter. Other smaller trees include elm,

boxelder, and black cherry. The shrub layer is moderate with scattered small trees and a few shrubs, including European buckthorn, and common elderberry. Some tree cutting is apparent, with a few oaks removed. It is unclear whether these trees were removed periodically, or all at once. The ground layer is in moderate to good condition. Some of the more common grass species here include bottlebrush grass, silky wildrye, and hairy wood chess. The most frequently encountered forbs here include woodland sunflower, false Solomon's seal, wild yam, carrion flower, wild cucumber, and touch-me-not. This oak woodland was given a moderately good rank due to the fairly diverse ground layer and also because, unlike most oak woodlands, only modest encroachment has occurred from brush and young trees.

CRW-98

Wet Meadow Rank: C

This formerly grazed swale appears to be recovering well. The mapped area includes some adjacent upland areas that are in moderately good condition. It remains mostly open, with about 20 percent cover by shrubs and small trees. The most common graminoids here include tussock sedge, bulrushes, and several other species of sedges and grasses. The most common forbs seen include spotted joe-pye weed, sawtooth sunflower, boneset, and sneezeweed. Because there appear to have been no attempts to drain this wetland, and because it appears to be in moderately good condition it was given a rank of "C".

CRW-99

Maple-Basswood Forest

Rank: C

This forest is south of County Highway 9, just west of 70th Avenue. It is characterized by a closed canopy made up of trees that generally average about 12 inches in diameter. Most frequent among these are basswood, sugar maple, green ash, red oak, and elm. The shrub layer contains many small trees and is moderately thick with shrubs. The most common shrubs include prickly ash, prickly gooseberry, and sugar maple seedlings. The most common ground cover includes Pennsylvania sedge. Because of the apparent history of grazing and perhaps repeated tree cutting, this community was given a modest rank of "C".

CRW-100

Mesic Prairie — Rank: D

This prairie is a former pasture that is generally species-poor. However, the landowner is actively managing the property for the prairie species and the property is expected to dramatically improve in quality through time. The owner's family has owned the land for over 50 years. He indicated that the land was grazed throughout the growing season in most years by dairy cattle, but that this parcel was far enough away from the farm buildings that it may not have been grazed very heavily.

This attractive site lies on a north to northeast facing slope above a small, meandering stream, and offers

some very scenic views of the wet prairie and fields to the north of the site. Overall, shrubs cover about 20 to 30 percent of the area, primarily as thickets of wild plum and red osier dogwood, and occasional small clumps of red cedar. There are a few European buckthorn as well. The site supports a variety of prairie forbs, including abundant patches of golden alexanders, some gray-headed coneflower, stiff goldenrod, bee-balm, and New England aster. No native grasses were noted. Non-native species include extensive cover by Kentucky bluegrass and smooth brome, and the forbs Queen Anne's lace, sweet clover, parsnip, and dandelions.

Despite the history of heavy grazing and the generally species-poor character of many areas, it has great potential as a restoration of an exceedingly rare community type. Added importance is placed on parcels such as this because of the fact that it has never been plowed. Efforts should be made to work with the landowner to enable his efforts to restore this prairie and provide the opportunity for long-term protection through a Prairie Bank, Prairie Tax Exemption or similar.

11. Community Descriptions for the East Zumbro River Watershed

EZR-1

Wet Meadow Rank: C

This small wetland community occurs along the north end of a Mesic Oak Forest community (EZR-7), and appears to be in moderate condition. The site was not field checked due to time and budget considerations, and this assessment is based on aerial photo analysis. Vegetation at this site likely includes dense stands of various graminoids, including Canada bluejoint grass, lake sedge, and tussock sedge. Because much of the adjacent land has been disturbed (tilled and/or pastured), reed canary grass has become established here, and is especially abundant around the perimeter of this community. Forb levels are typically low in this habitat, and characteristic species include joe-pye weed, boneset, and marsh milkweed.

EZR-2

Wet Meadow Rank: D

This wet meadow community has been disturbed by past grazing, which has shifted the species composition towards a reed canary grass dominated community. Deeper areas contain stands of broad-leaved cattail, and there are still some scattered clumps of sedge. Small thickets of shining willow are present. The heavy level of past disturbance and resulting very

low species diversity suggest that a low qualitative rank is appropriate.

EZR-3

Lowland Hardwood Forest Rank: CD

The patchy canopy in this wooded community includes abundant cottonwood, black willow, and boxelder, with lower levels of green ash and American elm. A few bur oak are present. Shrub cover is fairly light, with species that tend to increase with grazing predominant. This includes prickly gooseberry, European buckthorn, and some poison ivy. Disturbance-tolerant/non-native plants also characterize the ground layer. Reed canary grass is quite common, and there are patches of stinging nettle and wild parsnip. Because past disturbances have reduced species diversity significantly, the site receives a moderately low qualitative rank.

EZR-4

Lowland Hardwood Forest Rank: D

This community consists of two separate cover types located contiguous to each other, but overall condition is similar enough to warrant listing them together here. In addition, historically they were all part of the same community, and, if allowed to experience natural succession, the more open areas would mature to lowland hardwood forest. The northern-most and southern-most sections of the site are currently pastured, and are dominated by pasture grasses such as Kentucky bluegrass and smooth brome, as well as

some species of sedge. These areas have relative sparse levels of trees, with total cover around 25 percent. Species present are typical of the community type, including green ash, boxelder, and cottonwood. The more forested middle section contains a more closed canopy with green ash, cottonwood, some black willow, and an occasional bur oak, over a shrubby brush layer. Ground cover is more sparse in this area, due to the lower light levels.

EZR-5

Mesic Oak Forest **Rank: CD**

This mesic forest community contains an unusually diverse canopy, with bur and black oak, green ash, sugar maple, basswood, quaking aspen, and other species contributing to the total cover of 45 – 60 percent. Many of these are relatively small and young, and have moved into a canopy position since the area was logged 30 or more years ago. Sugar maple dominates the understory, and is likely to eventually dominate the canopy when the community matures, resulting in an eventual shift to a maple-basswood forest. The shrub layer is quite patchy, and dominated by young saplings of canopy species, especially sugar maple and black cherry. The ground layer is thick. Species tolerant of grazing are most common, with little representation of typical mesic forest herbs. However, if any spring ephemerals persist in this mesic community nearly all of them would have been dormant at the time of the field survey, and would not have been tallied. Common species include stinging nettle, black snakeroot, and honewort, as well as some scattered patches of maidenhair fern. A number of

houses have been built on the east side of the community. Because the shrub layer is so sparse and the community has the potential to improve with time, it receives a moderately low qualitative ranking.

EZR-6

Oak Woodland-Brushland Rank: CD

This woodland community has a patchy to interrupted canopy dominated by large (16 – 18 inch diameter) bur oak. The remainder of the canopy includes a mix of somewhat smaller (10 – 12 inch diameter) species typical of mesic communities, including red oak, American elm, green ash, and basswood. There are a few young sugar maple present as well, and it is likely that, given sufficient time, the site will transition into a mesic oak or maple-basswood forest. The brush layer is moderately thick to thick, with a mix of native and non-native species. European buckthorn and prickly gooseberry occur frequently. Other species include nannyberry, black cherry saplings, and some wild grape. Ground layer cover is patchy, and includes black snakeroot, daisy fleabane, wild parsnip, and beebalm. The portions of the site on the east side and along the south side of the road are currently grazed, and, based on the species composition, the rest of the site has also been grazed in the past.

EZR-7

Mesic Oak Forest Rank: C

This forested community has experienced some levels of past disruption and its current condition is somewhat closer to a woodland type rather than a

forest, but based on current condition the site is likely to develop into a closed-canopy community within the next 20 years. Currently, canopy cover at the site is patchy, ranging from 40 – 50%. Large (18 – 22 inch diameter) bur and black oak form a major component of the canopy, with elm, boxelder, quaking aspen, cottonwood, and other species also contributing. There has been some die-back of canopy species, which has contributed to the patchy cover. The shrub layer is fairly dense, with patches of gray dogwood, occasional blackberry, and abundant prickly gooseberry. The ground layer contains a number of species that suggest the area has been grazed in the past, as well a few slightly more conservative species. Some examples include Kentucky bluegrass, witchgrass, black snakeroot, honewort, cleavers, and maidenhair fern. Overall, the site is in moderately poor condition but is likely to improve with time, so is upgraded slightly in its qualitative ranking.

EZR-8

Lowland Hardwood Forest Rank: D

This forested community is currently being grazed, and, in general, is in a fairly disturbed condition. The canopy is a mix of green ash, cottonwood, and black willow, with a variable shrub layer of European buckthorn and prickly gooseberry. The ground cover is a patchy mix of typical species, including stinging nettle and honewort. The low overall diversity and disturbed condition of the site warrant a low qualitative rank.

EZR 9 no data sheet

EZR -10

Lowland Hardwood Forest Rank: D

This community is in low-lying, wet area, and has a canopy dominated by black willow and quaking aspen. The brush layer is very thick, with typical species including European buckthorn, and a ground cover with some reed canary grass, stinging nettle, and other disturbance-adapted species. Overall quality of the site is low, with poor diversity and significant disruption from past disturbance.

EZR-11

Lowland Hardwood Forest Rank: CD

This site consists of two different areas with slightly different land-use histories, but with overall similarities in their structure and composition. Canopy cover ranges from 30 - 50 percent and is dominated by cottonwood. Black willow, boxelder, and green ash form the remainder of the cover. The shrub layer varies from thick to moderate, and contains some thickets of gray dogwood as well as patches of prickly gooseberry and blackberry. The patchy ground cover is thickest below canopy gaps, and is mostly dominated by reed canary grass, motherwort, a species of sedge, and wild parsnip.

EZR-12

Mesic Oak Forest Rank: D

This forested community has been grazed intensively as recently as 1999, and shows significant alteration in

species composition and community structure as a result. These effects include a ground layer dominated by bur-fruited or unpalatable species, an abundance of thorny shrubs, and a lack of typical mesic forest herbs and little to no regeneration of canopy species. In its current condition, the forest canopy is patchy and dominated by bur oak, black oak, white oak, and black cherry, over a thick layer of European buckthorn and prickly gooseberry. A few pagoda dogwood, a typical mesic forest shrub, persist in the shrub layer. On the ground, diversity is generally low. Common species include sweet cicely, stinging nettle, and some white snakeroot. Because of the level of past disturbance, the low overall diversity, and the lack of species that would typically be associated with this community type this area receives a low qualitative ranking.

EZR-13

Mesic Oak Forest Rank: CD

This mesic oak forest has an interrupted canopy, with total cover ranging from 60 – 70 percent. Typical species include some moderately large bur oak (diameters 16 – 18 inches), some similarly sized cottonwood, and smaller (10-14 inch diameter) elm, black cherry, quaking aspen, and green ash. Portions of the site have been logged in recent history, but this activity seems to have been restricted to areas along the road. Young black cherry saplings heavily dominate the dense shrub and understory layers. Other members of this layer include gray dogwood and prickly gooseberry, and only low levels of the invasive European buckthorn. The ground layer is in fairly good

condition, with a mix of forest species that tolerate moderate disturbance and some grazing increasers. Typical species include Canada goldenrod, lady fern, thimbleweed, cleavers, honewort, and jack-in-the-pulpit.

EZR-14

Oak Woodland-Brushland Rank: D

This community supports a patchy canopy that varies from large-crowned bur oak to stands of smaller trees that are good colonizers and that are often found in lowland hardwood communities or disturbed woodlands. These other species include green ash, quaking aspen, and American elm, all with diameters in the 10 – 12 inch range. The shrub layer is somewhat patchy, and tends to be thickest in clearings around the mixed hardwoods. Typical species include black cherry saplings, blackberry, some prickly ash and gooseberry, and pagoda dogwood. Grazing increasers dominate the ground layer, and pasture grasses are common. A few prairie species persist at the northeastern end of the site, but are a minor presence in an area otherwise dominated by Kentucky bluegrass and smooth brome.

EZR-15

Lowland Hardwood Forest Rank: D

The species composition of this community is best described as lowland hardwood forest, although the historical/pre-settlement vegetation here was likely something different. The site occurs in two stands that are nearly a mile apart, and separated by agricultural

fields. The site to the northwest is currently grazed. Both areas have a patchy to interrupted canopy dominated by green ash, and lower levels of quaking aspen and American elm also present. The trees are relatively young, with diameters ranging from 12 to 14 inches. Shrub layer density varies widely both between the two sites and within the southeastern site, where portions contain virtually no shrub and understory and other portions have patchy to light cover. The ground cover at these areas is similarly sparse, with strong indications of the area's grazing history. Smooth brome and Kentucky bluegrass are relatively common. Other species include natives that are bur-fruited or rhizomatous, and typically respond to grazing and/or soil compaction. These include sweet cicely, cleavers, and stinging nettle. Because of past disturbance levels, the low overall diversity, and the fact that this community is apparently second or third growth indicate a low qualitative ranking.

EZR-16

Mesic Oak Forest **Rank: C**

This site includes a large area of wooded ravines that drain north into the North Fork Zumbro River, as well as a portion of an old railway grade. The area is predominantly mesic oak forest, with portions somewhat overgrown with lowland hardwood forest species and other small areas that are more woodland-like in structure. Conversation with a local landowner indicate that most of the area was grazed by sheep, until a flood wiped out the fencing. In addition, much of the area was logged selectively around 50 years ago, which accounts for the current structure and

composition of the canopy. Today, evidence of past grazing is strongest in the clearings, where vegetation has been substantially altered.

Currently, the canopy contains a diverse mix of medium size trees (diameters range from 10 – 16 inches, depending on the species). Some examples include bur, white, and black oak (diameters between 14 and 16 inches), somewhat smaller basswood, black cherry, quaking aspen, and several other species. The shrub layer is diverse, with a mix of disturbance-adapted woodland species, edge species, and some more conservative forest species. Pagoda and silky dogwood are some of the more conservative species, chokecherry tends to prefer slightly drier edge or woodland habitats, and blackberry, smooth sumac, prickly gooseberry, and European buckthorn are well adapted to disturbance. An additional small population of Siberian pea shrub may have been planted. Some areas along the eastern and southeastern edges of the site contain some degraded prairie stands; otherwise, the ground layer is dominated by a mix of pasture grasses and grazing-tolerant woodland species such as motherwort and black snakeroot. Overall, the site is in moderate condition. This ranking is affected by the fact that it covers a large area, even though the site itself is fragmented and includes a lot of edge habitat, and it is contiguous with a larger network of natural community types along the North Fork Zumbro River. The past disturbance and lack of more conservative native species, especially in the ground layer, also affects this ranking.

EZR-17

Lowland Hardwood Forest **Rank: C**

This community occupies the low areas along the North Fork Zumbro River, and connects with the northern boundary of community EZR 16. Past sheep grazing has maintained many openings in the community, and it currently is a mosaic of patchy forest and small- to medium openings, with some remnant bluff prairie on the northern bluff top (EZR 18). The canopy at the site ranges from 30 to 40 percent cover, with many black willow and cottonwoods. Boxelder, elm, and green ash are common, and bur and other oaks dominate many of the areas along the upper banks of the river. Brush cover is generally light to non-existent, probably a result of the sheep grazing. Reed canary grass dominates the cover in openings, otherwise woodland and/or edge species such as stinging nettle, white snakeroot, and cleavers predominate. Cattails and sedges are common in low-lying wet areas. Ranking of the area is affected by its overall large size and connectivity to other natural communities, as well as its current composition.

EZR-18

Bedrock Bluff Prairie **Rank: C**

This prairie community runs along the bluff top on the northern bank of the North Zumbro River, and it offers some very scenic views of the river and the landscape to the south. Its western edge is bounded by a large gravel/rock pit. Pasture grasses dominate the western end of the site, but towards the center and eastern edges, the quality of the site improves. Here, there are populations of sideoats grama, big bluestem, Indian

grass, and prairie dropseed, and the forbs harebell, purple prairie clover, whorled milkweed, and stiff goldenrod. While many of the forbs tend to increase with grazing, they do contribute to the diversity at the site and add to its aesthetic qualities. There is some tree and brush encroachment on site, mostly around the perimeter but red cedar is becoming established in the interior of the site as well. Other woody species include the prairie native leadplant, as well as the woodland or edge species such as gray dogwood, smooth sumac, and some bur and black oak. Overall, the site is in moderately good condition, as evident in the relatively low levels of invasive pasture grasses, and its qualitative rank is additionally improved by it connectivity to site EZR-17.

EZR-19

Mesic Oak Forest **Rank: C**

This forest community occupies the bluff top and steep, north-facing slope along the North Fork Zumbro River. It is an attractive site, with a number of tall, straight, small-canopied trees and a moderate understory. The interrupted canopy is dominated by a mix of bur, white, and black oak, with some basswood, black cherry, and occasional sugar maple. Sugar maple becomes more common along the north facing slope, and, if that area was large enough to map separately, it would be listed as a maple-basswood forest. The shrub layer includes some blackberry, young black cherry, and moderately high levels of gray dogwood. Ground layer species strongly indicate past grazing on the site. The species present include stinging nettle, cleavers, and white snakeroot. It is possible that

additional, spring ephemeral species may be present, especially in steeper areas that were likely not grazed as heavily, but their presence could not be evaluated at the time of the mid-summer field visit.

EZR-20

Oak Woodland-Brushland Rank: D

This woodland community is heavily grazed, and, below a canopy of mixed hardwoods and some oaks, has rather sparse vegetation. The shrub layer is virtually absent, and the patchy ground cover is dominated by pasture grasses and native species that tolerate significant disturbance. Because this community has been significantly altered from it natural state, it receives a minimal ranking.

EZR-21

Lowland Hardwood Forest Rank: CD

This forest community occupies an area around some stream meanders, and contains a mix of species that are adapted to wet sites. The canopy is interrupted to closed, with total cover ranging between 60 and 70 percent. The dominant species are mostly of moderate size (8 – 10 inches), although the few bur oak tend to be larger, with diameters around 18 inches. Cottonwood, green ash, and black willow make up the remainder of the canopy. The shrub layer is moderately thick, and nearly monotypic with prickly gooseberry. Ground cover is relatively sparse and dominated by species that tolerate or increase with grazing. Reed canary grass is common, as well as

stinging nettle and wild parsnip. Overall, the quality of the site has been impacted by past grazing, which has reduced the overall diversity of the ground and shrub layer, and limited the reproduction of canopy species.

EZR-22

Lowland Hardwood Forest **Rank: C**

This large area is just southeast of the intersection between Highway 58 and 420th Street, in a setting bisected by a small meandering stream. The patchy canopy and understory are a mix of different species in various size categories, including some large (16 – 18 inch diameter) green ash, basswood, and cottonwood, and some slightly smaller (10 – 14 inch diameter) black cherry, quaking aspen and bur oak. The density of the shrub layer varies from non-existent to moderate, and is dominated by prickly gooseberry, blackberry, and gray dogwood. Wild grapes occasionally clamber from the ground layer into the middle and upper layers of the understory. Ground layer species are fairly typical of a grazed lowland hardwood forest, and include stinging nettle, sweet cicely, cleaver, and wild parsnip, among others. Where conditions are wet enough and there is enough light, reed canary grass grows. One other noteworthy characteristic for this site are the high levels of downed wood and debris, which can provide very good cover for wildlife. This site's ranking is improved by the moderately diverse canopy and the low levels of invasive species, as well as its large size and good edge to interior ratio.

EZR-23

Lowland Hardwood Forest **Rank: CD**

This community is found along the edges of a branch of Trout Brook in the vicinity of 215th Avenue. It is a very narrow habitat that is bordered by a mix of current and former pasture, and tilled ground. Although there is some variability in the structure and composition of this community across its length, the overall quality is moderately low. The most common trees here are black willow, cottonwood, and green ash that average about 12 to 16 inches in diameter. Less common are large bur oak and basswood. The average canopy cover here varies from about 20 to 50 percent, depending on location. Also, in certain areas there has been some tree cutting. The shrub layer varies from moderately sparse to moderately thick, and is patchy, with gray dogwood, prickly gooseberry, and cherry most common. The ground layer is largely composed of species that indicate disturbance, and has a large nonnative component. Some of the nonnatives include reed canary grass, Kentucky bluegrass, stinging nettle, wild parsnip, and a number of agricultural weeds that have managed to establish among areas most disturbed by flooding. Because of the large runoff from adjacent agricultural ground, this linear community is under exceptional pressure to carry unnaturally large amounts of water. As a result, the stream is downcutting, there are large areas that are flooded on a regular basis, as well as much sediment being deposited along its length. These land use by-products have left the stream and forest in a semi-permanent state of disturbance. Although there are some parcels in permanent cover along this stream, the areas where rowcrops are planted to the edge of the stream are good opportunities to plant additional

buffer strips to filter nutrients and somewhat reduce the speed at which large volumes of water reach Trout Brook. Any efforts to install buffer strips here should take into account tile systems that can bypass filter strips and deposit large volumes of water directly into the stream.

EZR-24

Dry Prairie, Bedrock Bluff Subtype **Rank: D**

This small prairie is found on a west-facing slope within a larger pasture that occurs along Trout Brook. The entire pasture appears to be treated as one unit and is very intensively grazed. The prairie has about 10 to 20 percent brush and small tree cover and is largely dominated by a mix of native and nonnative grasses. Few native forbs appear to have persisted amid the intensity of the grazing here. Overall, the quality of the prairie is low. Despite this, it does have good restoration potential and could be restored in a manner that benefits both the quality of the prairie and the amount of forage it produces for the grazier.

EZR-25

Dry Prairie, Bedrock Bluff Subtype **Rank: CD**

This small prairie is found in three small parcels on southwest-facing slopes. The largest is surrounded by pioneer trees on the sides and lower slopes, and a house on the upslope side. Another parcel is a small roadside prairie along 432nd Street. The north prairie parcel was formerly grazed and retired from this activity by about 1970. All three parcels include a fairly large amount of nonnative weeds and pasture

grasses. The most common native grasses here include sideoats grama, big and little bluestem, indian grass, and to a lesser degree prairie dropseed. The most common native forbs include sky blue aster, oxeye false sunflower, leadplant, windflower, prairie coneflower, prairie smoke, purple prairie clover, and great St. johnswort. Nonnative species found at least occasionally include wild parsnip, Kentucky bluegrass, bull thistle and others. Brush comprises a small portion of the north prairie, in large part due to the diligent efforts of Bill McDonald who owns the parcel. Although small, this parcel would be a good candidate for additional restoration planning and on-the-ground activities thanks to the landowner's motivation.

EZR-26

Lowland Hardwood Forest Rank: CD

This forest occurs along Trout Brook in a north-south trending valley. It appears to be formerly pastures like the small prairie parcels nearby. The most common trees here include green ash averaging about 12 inches in diameter and cottonwood that averages about 18 inches in diameter. Less common trees include elm, basswood, and boxelder. The shrub layer is generally thick with gooseberry, black raspberry, dogwood, prickly ash, and the nonnative European buckthorn most common. The ground layer is generally disturbed and appears to be in the early stages of colonization by shade tolerant native species such as maidenhair fern, although some canopy gaps still support plants more commonly found in open areas such as bergamot. Although generally disturbed at this time, this forest

should improve quickly in quality if given adequate opportunity to recover.

EZR-27

Maple-basswood Forest Rank: CD

This forest is found along the south bank of Trout Brook and in a gentler sloped area to the south. The most common trees in the patchy canopy include green ash, basswood, oak, sugar maple, cottonwood, and boxelder, with black willow more common in low areas. The shrub layer is moderate in thickness with many tree seedlings, gooseberry, black raspberry, dogwood, and the nonnatives European buckthorn and Tatarian honeysuckle present. The ground layer is moderately poor in quality, which is in large part due to the activity of grazing that still takes place in some portions of the community. The most common species in the ground layer include bergamot, hedge nettle, maidenhair fern and the nonnatives stinging nettle, wild parsnip, and motherwort. Although the canopy is in moderately good condition, the overall quality of the forest is lowered due to the impacts visible in the shrub and ground layers.

EZR-28

Lowland Hardwood Forest Rank: CD

This forest is found along Trout Brook south of 425th Street. The patchy canopy is dominated by green ash that average about 15 inches in diameter. Other trees that occur at least occasionally include black willow, cottonwood, quaking aspen, basswood, and shgar maple. The shrub layer is somewhat thick and includes

a mix of tree saplings, dogwood, and gooseberry. The ground layer is disturbed, reflecting past grazing that was at least moderately intense for many years. The most common species here include reed canary grass, wild parsnip, Canada thistle, and stinging nettle, all of which are nonnative. In addition to grazing, this forest has also been cut over in the past, removing many of the trees. Because of the extensive amount of disturbance, this community was given a lowered rank.

EZR-29

Mesic Oak Forest **Rank: C**

This oak community is very small and was inventoried primarily because it is adjacent to a larger Lowland Hardwood Forest. The most common trees include bur, white, and red oak, as well as white birch, and quaking aspen. The shrub layer is thick and dominated by natives including raspberry, gooseberry, dogwood, and tree saplings. The ground layer is somewhat disturbed, but is mostly dominated by natives including white snakeroot, false Solomon's seal, and Jacob's ladder. Overall, this forest is moderate quality, despite its small size.

EZR-30

Lowland Hardwood Forest **Rank: D**

This small low-lying forest is found along one of the lateral branches of Trout Brook. The most common trees are black willow, bur oak, green ash, cottonwood, and quaking aspen. The shrub and ground layers are both substantially disturbed. Because of the level of

disturbance, small size, and relative isolation, this community was given a minimum rank of "D".

EZR-31

Mesic Oak Forest **Rank: CD**

This forest is found in several parcels that are part of a larger complex of forest, woodland, and prairie along the Zumbro River in the vicinity of the intersection of 460th Street and 222nd Avenue. The most common trees in the mostly closed canopy are bur oaks that average about 20 inches in diameter. Other trees found here include cottonwood, basswood, pin oak and white birch. The shrub layer and ground layers exhibit signs of disturbance that would tend to indicate a history of grazing. Common shrubs include gooseberry, prickly ash, wolfberry, and the nonnative European buckthorn. The ground layer includes Pennsylvania sedge, sweet cicely, and Kentucky bluegrass as the most common members. With rest from disturbance, this forest should improve in quality through-time, but is currently in moderately poor condition due to the composition of the shrub and ground layers.

EZR-32

Mesic Oak Forest **Rank: C**

This forest is found in several parcels that are part of a larger complex of forest, woodland, and prairie along the Zumbro River in the vicinity of the intersection of 460th Street and 222nd Avenue. The canopy across these parcels averages about 50 to 60 percent and is dominated by bur oak and basswood that average

about 18 inches in diameter. Other less common trees include black cherry, green ash, white and red oak and elm. These trees vary in size from an average of about 8 inches to 15 inches. The Shrub layer is moderate to sparse in thickness with a number of species of tree saplings, raspberry, gooseberry, dogwood, red cedar, and the nonnative European buckthorn present. The ground layer is in moderate condition with cleavers, sweet cicely, wild geranium, northern bedstraw and black snakeroot frequently encountered. Overall, the forest is in fair condition and appears to be recovering well from past grazing. With rest from disturbance, this forest should only improve in quality.

EZR-33

Maple-basswood Forest **Rank: C**

This forest is contiguous with and west of a parcel of forest mapped as quality Maple-basswood Forest by the MN DNR County Biological Survey. The canopy composition of the two forests is similar, being dominated by a mix of sugar maples, basswood, oaks, and to a lesser degree other species. The shrub and ground layer of this particular forest have been heavily impacted by grazing. This has caused a reduction in overall quality of the forest and a loss of species typical of better quality areas. This forest is significantly disturbed, but was given a somewhat elevated rank due to the fact that is adjoins a quality forest and is part of a much larger habitat corridor along the Zumbro River.

EZR-34

Dry Prairie, Sand-gravel Subtype **Rank: CD**

This small, isolated prairie is found on a south-facing slope on a terrace of the Zumbro River. It is in moderately poor quality and partially dominated by nonnative cool season pasture grasses, including smooth brome and Kentucky bluegrass. It is also beginning to become encroached upon by brush, including smooth sumac, eastern red cedar, and gray dogwood. Some of the more common natives found here include big and little bluestem, and sideoats grama grass, as well as the forbs purple prairie clover, leadplant, heath aster, and harebell. Although this is, at best, a moderate quality site, it has added importance due to the fact that it is an uncommon prairie type in southeast Minnesota.

EZR-35

Oak Woodland-Brushland Rank: D

This pastured woods is just north of the intersection of Highway 60 and 465th Street. The patchy canopy is a mix of large canopied oaks and other deciduous trees, over a brushy layer of gooseberry and buckthorn. Pasture grasses dominate the ground layer. The site is significantly impacted by overgrazing, and thus receives a low qualitative rank.

EZR-36

Oak Woodland-Brushland Rank: CD

This large site is part of an active pasture, although the dense thorny brush appears to be restricting livestock access to the area. The canopy is an attractive mix of moderately sized bur oak (diameter 16 – 18 inches) and some slightly smaller quaking aspen, green ash,

basswood, and black cherry with diameters averaging between 10 and 14 inches. Total cover is patchy to interrupted, between 65 and 75 percent closed. On the ground, bur-fruited or rhizomatous species that tend to increase in grazed areas predominate. Species include Canada goldenrod, sweet cicely, and cleavers.

EZR-37

Oak Woodland-Brushland Rank: CD

This small wooded tract appears to be an old farmstead, and probably was grazed at some point in the past. Now, it does not appear to be in active use, although all of the bordering land is farmed for hay. The sparse canopy is a mix of bur oak, white oak, green ash, and basswood, over a patchy layer of brambles and gooseberry. The ground layer is typical of former pasture, with Kentucky bluegrass, smooth brome, and Canada goldenrod. Because of the general levels of past disturbance and the lack of species characteristic of an oak woodland, the site receives a minimal qualitative rank.

EZR-38

Maple-Basswood Forest
Rank: C

This forested community occurs as two sites separated by a narrow tract of plowed ground, southwest of the intersection between County Road 11 and 230th Avenue. The canopy of this site is a mix of species typical of the community type, as well as some early successional species that quickly colonize disturbed areas. Fourteen – sixteen inch diameter basswood are

one of the more common canopy trees, and the remainder of the interrupted cover is composed of bur oak, quaking aspen, box elder, and sugar maple. Although the community is typed as a maple-basswood forest, in fact sugar maple is a relatively minor component of the total cover. However, overall canopy composition is most similar to that type, and the site also includes some shrub and forb species that are more characteristic of mesic communities, so it is listed as such here. The shrub cover is moderate to light, and includes some thorny species that tend to increase with grazing, such as prickly gooseberry and blackberry, as well as gray dogwood and the somewhat more conservative silky dogwood. The ground layer also indicates past grazing, with such bur-fruited species as honewort, cleavers, and black snakeroot, and some rhizomatous plants such as false Solomon's seal. The light shrub layer and lack of severely invasive species such as buckthorn suggest that canopy species reproduction is possible, and the site is likely to improve in quality over the next several decades. Thus, it warrants a moderate qualitative ranking.

EZR-39

Lowland Hardwood Forest Rank: C

This wooded community lies on some steep slopes just east of 230th Avenue and north of 510th Street. The patchy canopy is heavily dominated by green ash, with lower levels of American elm, black willow, quaking aspen, and basswood. A number of trees have fallen, which might be the result of the steep slopes; these areas are often not stable enough to support large trees, and once trees reach a certain size on a given

slope, they often have a tendency to topple. The brush layer is moderately thick to thick and heavily dominated by prickly gooseberry. Gray dogwood, blackberry, and American plum are also common. In the ground layer, species are fairly typical of the community type, with reed canary grass, stinging nettle, hedge nettle, and some sneezeweed; some of these plants, such as the reed canary grass and sneezeweed, are also typical of open wetland communities. Overall, there is a moderately good level of native species and only low levels of invasive non-natives, and the site is in moderately good condition.

EZR-40

Lowland Hardwood Forest Rank: D

This lowland hardwood forest includes lowlands around Trout Brook that lie in the northern half of section 13. This stream meanders widely across the landscape, and most of the wooded community that remains persists as a narrow band along the creek and the small ravines that feed into it. The entire area shows signs of past grazing, although only small portions of it are grazed today. In general, the patchy canopy is a mix of 8 – 10 inch diameter trees including quaking aspen, green ash, American elm, and boxelder, with a few slightly larger cottonwood. Thorny species dominate the shrub layer as a result of past grazing; typical species include prickly gooseberry, blackberry, and European buckthorn. In the ground layer, cover is a mix of native and non-native species. Patches of reed canary grass are

dispersed throughout the site and are especially abundant in open areas along the flowage way. Elsewhere, the species composition shifts towards a mix of smooth brome, Kentucky bluegrass, and stinging nettle. Shaded areas that remain consistently moist support populations of jewelweed, an attractive native annual.

EZR-41

Bedrock Bluff Prairie **Rank: D**

This site consists of two prairie openings on south or southwest-facing slopes within community EZR-40. The expansion of EZR-40 has impacted these sites, and they are quite small, with trees and brush closing in around the edges. Pasture grasses such as smooth brome and Kentucky bluegrass are common, and the site grades into reed canary grass wetlands near the base of the slope. Native species on site include low levels of prairie dropseed, little bluestem and side oats grama, as well as some leadplant. Most of the encroaching brush within the open areas of the community is either smooth sumac or quaking aspen. Due to the high levels of the sod-forming pasture grasses, low overall diversity, and small size of these sites they warrant a low qualitative ranking.

EZR-42

Bedrock Bluff Prairie **Rank: C**

This prairie community is on a west-facing slope near the north end of community EZR-43. Native grasses dominate the slope, and typical species include Indian

grass, prairie dropseed, little bluestem, and low levels of big bluestem. The non-native pasture grasses Kentucky bluegrass and smooth brome are also present, but at significantly lower levels than the native species. Forb diversity is relatively low and limited to attractive, common species such purple prairie clover and a species of *Liatris*, probably rough blazing star. Bee balm, leadplant, and Canada goldenrod also are present. Based on the plant composition, which does not include more conservative species and tends to be dominated by species that tolerate or even increase with grazing, it is very likely that the site was pastured at least lightly sometime in the past. However, the levels of sod-forming non-native grasses are low, and site is in moderate condition. There is some brush encroachment from the surrounding forest, with such species as smooth sumac, quaking aspen, and prickly ash, and, if there is interest in managing the site, brush removal is appropriate.

EZR-43

Lowland Hardwood Forest **Rank: C**

This wooded tract marks the continuation of site EZR-40, along Trout Brook, into the southern half of section 13. This portion of the forest is in somewhat better condition than the northern section, and has a canopy dominated by a mix of deciduous species, a dense shrub layer, and a variable ground layer. The tree composition includes cottonwood, black cherry, American elm, sugar maple, and, most frequently, some large diameter (12 – 16 inch) green ash. The trees in this community tend to be larger than those in EZR 40, with sizes ranging from 12 to 16 inches. Many

of the shrub species are “armed,” or thorny, including much European buckthorn and some gooseberries. Small thickets of gray dogwood occur sporadically throughout the site. Reed canary grass dominates the ground layer below canopy gaps. Otherwise, ground layer species are predominantly native, including hedge nettle, wild parsnip, and clearweed. There are also many patches of stinging nettle. Overall, the site is in moderate condition, despite the abundance of European buckthorn, and still retains some moderate species diversity.

EZR-44

Maple-Basswood Forest

Rank: C

This stand of forest is bordered on three sides by the meandering Trout Brook, and grades into the lowland hardwood forest of community EZR-43 along the stream. The site is attractive, with a patchy canopy of sugar maple and green ash, as well as some American elm and basswood. Most of the species occur in a variety of size categories, suggesting a mixed-age stand that may have persisted on this site for some time. Oaks are common in portions of the site, and the site almost certainly contained more oak historically than it does today. European buckthorn is common in the shrub layer. Other shrub species include gray dogwood, blackberry, and gooseberry. In the ground layer, cover is a mix of pasture grasses such as Kentucky bluegrass and smooth brome below canopy gaps, some reed canary grass in low-lying open areas, patches of clearweed, and an occasional maidenhair fern. Spring ephemeral species characteristic of the

community type may be present, but their presence could not be evaluated at the time of the late July field visit. It is also possible that past and present grazing pressures have eliminated them, or substantially reduced their population. Overall, the site is in moderate condition, with a nice variety of size classes of the canopy species.

EZR-45

Oak Woodland -Brushland Rank: D

This woodland community occupies an area that was apparently retired from grazing several years ago. Currently, the area is fairly open, with scattered oak, green ash, quaking aspen, and European buckthorn above a mix of pasture grasses.

EZR-46

Mesic Oak Forest Rank: CD

Although this forested tract is isolated from other natural communities by virtue of its location in the middle of some agricultural fields, it is large enough to retain a fairly good interior: edge ratio and may provide good habitat for some animals species that have minimum area requirements. However, the total canopy cover has been disrupted by past logging, and the loss of mature elms due to Dutch elm disease. In fact, comments by the Minnesota County Biological Survey ecologists indicate that the logging was a direct result of the Dutch elm disease. Today, total canopy cover is around 60 percent, in a community dominated by bur oak and black oak. Other canopy components

include basswood, sugar maple, and a few American elm. Most of these trees are of good size, and diameters range between 14 and 20 inches, depending on the species. European buckthorn dominates the brush layer. Other shrub layer species include gray dogwood, gooseberry, and some young black cherry. ON the ground, total cover is patchy, with apparently low diversity. Visible species include false Solomon's seal, Jacob's ladder, cleavers, and stinging nettle. It is possible that additional, spring ephemeral species are present, but their presence could not be evaluated during the late July field visit. Overall, the site is in moderately poor condition. While there is some moderate diversity in the canopy, recent canopy disruptions due to the Dutch elm disease and the concomitant logging allowed the levels of European buckthorn to increase, and overall diversity at the site is low.

EZR-47

Oak Woodland-Brushland Rank: CD

This community supports a patchy canopy of bur and black oak, with some basswood. Most of the trees are moderately sized, and diameters range between 14 and 18 inches. Shrub cover is quite thick, with an abundance of thorny species that suggests a grazing history for this area. Common species include prickly ash, gooseberry, and European buckthorn. Ground layer species are also typical of grazed areas, with scattered patches of Kentucky bluegrass and smooth brome, reed canary grass and sedges around wet areas, and white snakeroot and Jacob's ladder also

present. Overall, the site is in moderately poor condition, with only low levels of natives in the ground and shrub layers, and most of the species in those layers are characteristic of disturbed sites.

EZR-48

Lowland Hardwood Forest Rank: D

This wooded community contains a mix of species in the patchy canopy, including basswood, sugar maple, bur oak, green ash, and boxelder. Most of the canopy species are of moderate size, with diameters between 14 and 16 inches. The shrub layer is only moderately thick, and is notable for its lack of invasive species such as European buckthorn. Instead, it consists of a mix of pagoda dogwood, black cherry, and prickly gooseberry. The ground layer is a mix of non-native, planted forage species such as Kentucky bluegrass and smooth brome, reed canary grass in low-lying areas, and disturbance-tolerant forest herbs such as black snakeroot and stinging nettle. Overall, the species present are typical of grazed areas, and the area is still used as a pasture. In general, it is in relatively poor condition, with low diversity.

EZR-49

Dry Oak Forest Rank: C

This community occurs as several outlying pockets of woodland that are mostly surrounded by agricultural land. The canopy is diverse, with a mix of oak forest, mesic forest, and disturbance-tolerant species that contribute to a total canopy cover of 60-70 percent. Typical species include bur and black oaks, quaking

aspen, black cherry, American elm, basswood, and some sugar maple. The shrub layer is generally thick, with a number of thorny species that indicate the site was grazed historically. European buckthorn occurs sporadically, and there are numerous thick patches of prickly gooseberry, blackberry, and gray dogwood. Ground layer species are similarly indicative of past grazing as many of the species present are bur-fruited and are readily dispersed by livestock, and/or unpalatable. Species present include stinging nettle, black snakeroot, and cleavers. The site is moderately diverse and overall of good size, and receives a moderate qualitative rank.

EZR-50

Lowland Hardwood Forest **Rank: C**

This forest community occurs at the eastern edge of the project area, where County Road 11 runs along the county line. The site occupies a small ravine that drains east into Wabasha County, as well as a small portion of the adjacent upland area. The upland area tends to resemble a maple-basswood forest in composition, but is both small, and grades into the lowland hardwood forest, so they are treated together as one unit here. The canopy is a mix of basswood, cottonwood, sugar maple, bur oak, and green ash, with total cover around 60 – 70 percent. Most of the trees are moderately large, with diameters between 14 and 18 inches. The shrub layer is moderately thick, and includes both native and non-native species. Silky dogwood is found sporadically throughout the site. Other species here include European buckthorn, blackberry, and prickly gooseberry, all thorny species

that often indicate a history of grazing. The ground layer is notable in that it is not heavily dominated by grazing increasers such as honewort. While some grazing increasers are present, including stinging nettle, the ground layer consists of common native species such as jewelweed, jack-in-the-pulpit, wild geranium, and some Canada goldenrod. The slightly disturbed nature of the ground layer and the levels of thorny shrub species indicate that the area was grazed historically, but this activity probably ceased more than 30 years ago, and the site appears to be recovering. Thus, it receives a moderate qualitative ranking.

EZR-51

Lowland Hardwood Forest Rank: CD

This site occupies much of the low-lying land and associated drainage corridors along Pine Island Creek, at the eastern edge of Goodhue County. Species composition and site structure are fairly typical of grazed lowland forest communities, with a canopy of American elm, green ash, cottonwood, and occasional black willow. The shrub layer is moderately thick, and as a result of grazing the composition has shifted towards thorny species that are generally not browsed by livestock. European buckthorn, prickly gooseberry, blackberry, and thickets of gray dogwood are all common. The ground layer is composed of a mix of honewort, stinging nettle, some jack in the pulpit, and, in moist clearings and along the stream bank, patches of reed canary grass. Because of the disturbed nature of the site, it receives a moderately low qualitative ranking.

EZR-52

Bedrock Bluff Prairie Rank: C

This prairie community consists of six moderately sized clearings along the southwest-facing slope above Pine Island Creek. Generally, they are in moderately good shape, with a mix of native grasses and forbs in addition to some pasture species. Typical natives include the grasses big bluestem, little bluestem, and side oats grama, and the forbs blue-eyed grass and heath aster, as well as some leadplant. Non-natives include Kentucky bluegrass, Canada bluegrass, and smooth brome, and the forbs sweet clover and common mullein. There is some shrub encroachment by smooth sumac and red cedar. The northern-most sites are in better overall condition, with much lower levels of the non-native pasture species, and slightly more diversity than the southern sites. There is excellent connectivity between these prairie openings, and as such they are good candidates for management, if there is landowner interest. Possible strategies include brush removal and implementing a prescribed burn program to help set-back the non-natives and help encourage the warm-season native species, and possibly interseeding local ecotype seed to improve the diversity at this attractive site.

EZR-53

Wet Meadow Rank: CD

This site consists of two sections of grassland, an eastern section which is pastured, and an western section which appears to have been retired from grazing recently. Most of the cover is degraded wet

meadow, with some patches of disturbed wet prairie. The dominant species include lake sedge and tussock sedge, as well as another species of sedge, prairie cordgrass, and a species of manna grass. Joe pye weed, angelica, and boneset comprise most of the apparent forb population. Trees and brush cover around five percent of the area, and are mostly restricted to areas along the stream channel. There are also some inclusions of upland within the community. As would be expected in a grazed area, these are dominated by Kentucky bluegrass, smooth brome, clovers, and other forage plants. The site retains some diversity of native species despite the grazing pressures, and is, overall, in moderate to moderately poor condition.

EZR-54

Dry Prairie

Rank: C

This prairie community occurs alternates with the oak woodland community of EZR-55, in the midst of some agricultural fields. The prairie itself tends to occupy the southwest-facing portions of the slopes, with the hilltops dominated by pasture species. Typical natives include prairie dropseed, side oats grama, Indian grass, and big bluestem for the grasses, as well as the forbs sky blue aster, purple prairie clover, old-field goldenrod, and heath aster. Brome grass occurs sporadically within the nice patches of prairie. In general, the site is in moderately good condition, with the actual prairie areas supporting only low levels of the non-native exotic pasture grasses.

EZR-55

Oak Woodland-Brushland Rank: CD

This woodland community in the draws, and lower and upper edges on the same west-facing slope as the previous prairie community. The surrounding landscape is dominated by agricultural fields. The patchy to open canopy is dominated by a mix of oaks, with scattered younger growth of aspen and black cherry in the understory. The shrub layer is variable, with European buckthorn and prickly gooseberry abundant.

EZR-56

Oak Woodland-Brushland Rank: D

This disturbed woodland community supports a thick secondary growth of oak, green ash, and elm below a patchy canopy of mixed oaks. The brush layer is similarly thick, with many disturbance-adapted species such as prickly gooseberry and European buckthorn, and only very low levels of desirable native species. The ground layer is similarly disturbed, and most of the species present are bur-fruited, unpalatable to livestock, and generally tolerant of compacted or disturbed ground. Typical species include honewort, cleavers, and stinging nettle. Because of the significant levels of past disturbance the site receives a minimum qualitative ranking.

12. Community Descriptions for The West Zumbro River Watershed

WZR-1

Maple-Basswood Forest
Rank: CD

This small forest lies on the south side of Monkey Valley Road, along a tributary of the North Fork of the Zumbro River. The canopy of this forest is nearly closed, with oak, sugar maple, and basswood on the slopes and lowland hardwood forest species more common along the valley bottom. The shrub and ground layers have been disrupted by past and current grazing, and the ground layer includes a mix of nonnative species and native species tolerant of sustained disturbance. Although this forest has value to wildlife due to its proximity to other forests along the Zumbro River, it was given a lowered rank due to its long grazing and the resulting impacts on species composition.

WZR-2

Mesic Oak Forest Rank: C

This forest is just north of a large forest parcel mapped by the MN DNR MCBS. It lies south of Highway 60 and west of Monkey Valley Hollow. The canopy within this community is closed or nearly so in most places, with basswood, bur oak, and boxelder common. These larger trees average about 14 inches in diameter. Other, less common, components of the canopy

include sugar maple, black cherry, and quaking aspen. The shrub layer is moderately thick in areas where grazing apparently ceased more than 20 years ago, while those areas still grazed have a more sparse shrub cover. Common shrubs include silky dogwood, black raspberry, and European buckthorn. The ground layer diversity is low, and it is slowly recovering from the past grazing. Species composition is a mix of natives, including white snakeroot, bergamot, and fleabane, and nonnatives such as wild parsnip, which is prominent here. Although this forest has good potential for improvement, its current condition warrants a rank of "C".

WZR-3

Maple-Basswood Forest

Rank: C

This community includes several parcels of forest west of Kenyon, on either side of Highway 60. The northern parcel occurs along a tributary valley to the North Fork Zumbro River, and the southern along the main branch of the river. Canopy cover in this community approaches 100 percent in most places, with bur oak and basswood common. These average about 17 inches in diameter. Other, less common trees include American elm, pin oak, green ash, and sugar maple. The southeast portion of the northern parcel has a much higher percent of sugar maple in the canopy than other areas. There are many smaller sugar maples and few small oaks in this forest, indicating that the community will eventually shift to a maple-basswood forest in the absence of active management. The shrub

layer is moderately thick in most places, with the exception of one small area that is currently grazed. Common species include black cherry, gooseberry and European buckthorn. The ground layer is variable in quality, but is in at least moderate condition in most places. The most frequently encountered ground layer species include bedstraw, sweet cicely, wild geranium, and honewort. Overall, this forest is in moderately good condition, and continues to recover from past grazing.

WZR-4

Lowland Hardwood Forest Rank: CD

This low-lying forest occurs in two parcels adjacent to the previous community. This forest is of moderately low quality as a result of past grazing and subsequent colonization by some pioneer species of trees. These trees contribute to a patchy canopy of black willow, cottonwood, elm, boxelder, and ash. The shrub layer is moderately sparse across most of the site, although there are some localized thickets. The ground layer is generally dominated by reed canary grass and other nonnative pasture grasses. Native species occur less frequently here, and are mostly those plants that are adapted to a disturbance regime more intense than that normally experienced in a Lowland Hardwood Forest.

WZR-5

Oak Woodland-Brushland Rank: C

Located near the intersection of 50th Avenue and 450th Street, this woodland occurs as several parcels that differ somewhat in structure but are similar in quality and species composition. Both areas were pastured at the time of the field visit and have a patchy canopy that is dominated by large bur oaks. Smaller trees are more abundant, and include quaking aspen, green ash, American elm, and basswood. The shrub layer is moderate to thick. Dogwood and wild grape are common, and there are some thorny species present as well. The ground layer is disturbed and reflects the grazing history. Species here include sweet cicely, stinging nettle, wild geranium, and white snakeroot. Although these parcels were likely more savanna-like in the past, they have been substantially changed by intensive, long-term grazing and the lack of natural disturbances such as fire.

WZR-6

Lowland Hardwood Forest **Rank: C**

This forest is found along the North Fork Zumbro River. The fringes of this community are higher in elevation and exhibit more characteristics of an upland forest. The lower areas flood more frequently as evidenced by the abundant debris in shrubs and small trees. Some portions are grazed and the overall canopy cover averages about 45 percent. Tree species found here include boxelder and cottonwood, with basswood, black willow, and black walnut occurring less frequently. The shrub layer is moderately thick to thick with a mix of native and nonnative species. Some of these include gooseberry, brambles, gray dogwood, and the nonnative European buckthorn. The ground

layer is variable, with the better quality occurring in the areas that are flooded less frequently. Overall, this forest is of moderate quality, earning a rank of "C".

WZR-7

Mesic Oak Forest **Rank: CD**

Lying just to the north of the Zumbro River, this forest is a mix of many different species, with a varied past land use. The patchy canopy is composed of a mix of several oak species, ash, elm, sugar maple, hackberry, black cherry and others. The western parcel contains more oaks and sugar maples than the east parcel does. The entire community appears to have a history of grazing. The shrub and ground layer both reflect this history and are dominated by thorny species, those unpalatable to cattle, and those that are tolerant of persistent grazing. Because of this, the forest was given a moderately low rank.

WZR-8 **Rank: NA**

Not Used

WZR-9

Lowland Hardwood Forest **Rank: CD**

This low-lying forest is found along the Zumbro River in the vicinity of 60th Avenue and 450th Street. The canopy includes green ash, elm, cottonwood, black willow, boxelder, and, to a lesser degree, bur oak. The shrub layer and ground layer both show signs of grazing, as well as the disturbance that is normally

associated with a floodplain forest. Because grazing has impacted the community in some places and because of the overall species composition, this forest was given a moderately low rank of "CD".

WZR-10

Mesic Oak Forest Rank: C

This community is actually several wooded parcels, some of which are widely separated. The most common trees include bur oak, green ash, basswood, and pin oak, most of which average about 16 inches in diameter. Other less common trees include elm, quaking aspen, and black cherry. The shrub layer is somewhat variable across these parcels, but is generally characterized by thorny species and those unpalatable to cattle. These include gooseberry, prickly ash, and chokecherry. Likewise, the ground layer also reflects a history of grazing, with the level of past use varying from site to site. The most frequently encountered species include stinging nettle, wild geranium, sweet cicely, and bedstraw. Because of the thick shrub layer and the apparent shift in species composition to disturbance-oriented plants, these forest parcels were given only a moderate rank of "C".

WZR-11

Lowland Hardwood Forest Rank: D

This grazed forest is found along the Zumbro River in the vicinity of 70th Avenue. The canopy is sparse to patchy, with green ash, basswood, and maple dominant. The shrub layer varies from absent to locally thick with disturbance tolerant species common.

The ground layer is generally dominated by the nonnative grasses reed canary grass, smooth brome and Kentucky bluegrass. Because of the persistent moderate to heavy grazing and the resulting influence on species composition, this forest was given a low rank of "D".

WZR-12

Oak Woodland-Brushland Rank: CD

This woodland occurs as several parcels that are separated by agricultural land. The canopies are patchy to closed, with bur and pin oak, quaking aspen, and basswood most common. The larger oaks average about 18 inches in diameter, while other trees tend to be smaller, with diameters around 12 inches. The shrub layer is moderate to thick with gray dogwood, brambles, chokecherry, and gooseberry found occasionally. The most common shrub among the parcels is the nonnative European buckthorn. The ground layer reflects a long history of grazing, with disturbance tolerant species, including stinging nettle and fleabane, common. Because of the prevalence of nonnative species in the shrub and ground layer and because of the history of grazing, this woodland was given a low qualitative rank.

WZR-13

Dry Prairie, Bedrock Bluff Subtype Rank: C

This grazed prairie is in moderately good condition and is worthy of future management. The most common native species found here include sideoats grama, and

little and big bluestem, as well as heath aster, leadplant, silky aster, and stiff goldenrod.

WZR-14

Lowland Hardwood Forest Rank: D

This site includes the forested areas in low-lying positions along a drainage way, as well as some upland areas that have been colonized by trees characteristic of lowland hardwood forest. The most common trees here include boxelder, Chinese elm, quaking aspen, green ash, and black willow. Most of these average between 10 and 16 inches in diameter. The shrub layer is thin to moderate, with gooseberry, gray dogwood, and black cherry most common. The disturbed ground layer is dominated by the nonnatives reed canary grass, stinging nettle and wild parsnip. Because this forest was formed by the recent colonization of previously non-forested areas, and because of the poor overall species composition, this community was given a poor rank.

WZR-15

Willow Swamp Rank: B

This willow swamp was visited and mapped by the Minnesota DNR County Biological Survey. It is in moderately good condition, although it has become increasingly invaded by woody species in the last ten years. This area should be considered for a prescribed burn or other active management in order to control the excessive pace of encroachment by shrubs and trees and maintain/improve the community quality.

WZR-16

Lowland Hardwood Forest **Rank: CD**

Portions of this community have been logged or otherwise cut over in the past. The remaining trees include green ash, black cherry, elm, boxelder, and basswood, most of which are between 12 and 14 inches in diameter. The canopy tends to be only slightly broken in most areas, with low-lying areas having a more open canopy. The shrub layer is moderate with black cherry seedlings, gooseberry, and the nonnative European buckthorn most common. The ground layer is dominated by the nonnative reed canary grass, with clearweed, and smooth brome also found occasionally. Overall, the quality of this forest is moderate to poor, justifying a rank of "CD".

WZR-17

Lowland Hardwood Forest **Rank: CD**

Found along the North Fork Zumbro River, this forest is of moderately poor quality. Some portions are currently grazed while others appear to have been grazed in the past. The most common trees include green ash, elm, cottonwood, boxelder and others. The shrub layer is most dense in the areas not currently grazed, and includes a mix of native and nonnatives, with many thorny species. The ground layer is composed of species tolerant of persistent grazing and indicates past disturbance. For these reasons the forest was given a moderately poor qualitative rank.

WZR-18

Oak Woodland-Brushland **Rank: D**

This former pasture is being colonized by a number of tree species, including bur and pin oak, cottonwood, and black willow. The oaks average about 13 inches in diameter, and the cottonwoods about 16. Shrubs are common, along with nonnative pasture grasses. Prairie species occur only rarely, and then below small openings in the canopy and brush layer. Due to the magnitude and length of disturbance from grazing, this community has a generally poor quality and was given a minimum rank.

WZR-19

Maple-Basswood Forest

Rank: C

This forest is found in one large contiguous patch, and a few smaller "satellite" parcels. Overall, the quality of the forest is moderate to moderately poor. Despite the generally poor composition of the forest, the overall rank was increased due to the rarity of the intact forests of this size. The most common trees include sugar maple, bur oak, basswood, elm, green ash and black cherry. Most of these average about 14 inches in diameter. Other trees that occur less frequently include elm, and boxelder. The shrub layer varies, but is typically thick, with European buckthorn and gooseberry common. The ground layer is also disturbed with clearweed, stinging nettle, sweet cicely and white snakeroot. Because of the rarity of such a large, contiguous patch of forest in this part of Goodhue County, it takes on added importance in the landscape. As such, it is a good candidate for active management, and worthy of working with landowners to minimize activities that permanently impact the site,

such as development, mining, clear cutting, or other similar activities

WZR-20

Lowland Hardwood Forest Rank: CD

This low-lying area is found along an upland drainage way. It has been grazed and has a sparse to patchy canopy of trees of various sizes. Some of these include elm, green ash, boxelder, and others. The shrub layer is variable in composition, as is the ground layer, although the most common species in the ground layer are nonnative cool season pasture grasses. Because of the past disturbances by grazing and the influence of surrounding cultivated ground, this forest is of generally low quality.

WZR-21

Maple-Basswood Forest
Rank: CD

This forest is part of a larger parcel of forest that extends to the south across the Dodge County border. The most common trees include sugar maple, basswood, bur oak, black cherry, and green ash. Most of these are 15 to 18 inches in diameter. There is also some evidence of past tree cutting, perhaps of oaks. Although oak currently dominate this prevalence of smaller sugar maple and large basswood have influenced the classification from oak forest to maple-basswood forest. The shrub layer indicates a history of grazing, with gooseberry most common. Other shrubs include European buckthorn, and chokecherry. The ground layer is also disturbed with honewort, black

snakeroot and stinging nettle most common. Despite the moderately low rank, this forest is significant because it is part of a much larger forest complex. Large patches of forest, such as this one, are becoming exceedingly rare in the western part of Goodhue County; this helps make this one worthy of active management and perhaps appropriate levels of protection, if the landowners are interested.

WZR-22

Lowland Hardwood Forest **Rank: C**

This community is an extension of MN County Biological Survey Sites 175 and 109, although it is of slightly lower quality. It extends in a corridor along the Zumbro River, and also along an old rail bed just to the south. The most common trees here include boxelder, elm, black and green ash, and silver maple. The shrub layer is patchy and varies from sparse to moderately dense with native species common. The ground layer includes a mix of native species typical of forests that flood periodically. Some of these include Virginia waterleaf, cleavers, and Virginia wildrye. Also included in this community is a small upland forest with a mix of oak, sugar maple and basswood. Although none were found during the brief field survey for this project, the areas along the river and west of the MCBS site should be checked for rare species, particularly glade mallow.

WZR-23

See Community Description for WZR-63

WZR-24

Mesic Oak Forest Rank: CD

This community includes two parcels that lie just to the north of the Zumbro River, and west of Zumbrota and Highway 52. Both of these parcels exhibit signs of past disturbance from grazing. The most common trees here are bur oak that average about 20 inches in diameter and form a nearly continuous canopy in many places. Other, less frequent, members of the canopy include green ash, basswood, quaking aspen and pin oak. The shrub layer is disturbed, but dominated by natives in most places. It includes pagoda dogwood, and more commonly prickly gooseberry. The ground layer gives the greatest indication of past disturbance and is dominated by species tolerant of moderate and/or prolonged disturbance. Some of these include sweet cicely and white snakeroot. Although the quality of this forest should improve in time as it continues to recover from past disturbance, its current condition warrants a relatively low qualitative rank.

WZR-25

Maple-Basswood Forest
Rank: D

Although the dominant mature trees in the canopy of this forest are oaks, there are many moderately sized sugar maples found here as well. Since these sugar maples will soon comprise a large part of the canopy, this parcel was classified as Maple-Basswood Forest. Other trees found occasionally in the nearly closed canopy include green ash and basswood. The site was logged approximately 10-20 years ago, and is currently in recovery. As a result, the shrub layer is

moderately thick and both it and the ground layer have more disturbance species present than would normally be expected. Despite the low rank of "D", this forest should improve in quality with time as it recovers from disturbance.

WZR-26

Maple-Basswood Forest
Rank: CD

MCBS staff field-checked this site during their Goodhue County inventor, and, while the site was visited during this inventory as well, much of the following description is based on field notes taken by MCBS staff ecologists. This large patch of forest has a nearly continuous canopy, with one cultivated agricultural field near the north end. Similar to the WZR 27, this south portion of this forest was logged approximately 10 to 20 years ago, while other portions were logged over 30 years ago. The most common trees in the canopy include several species of oaks, aspen, sugar maple, basswood, and a few others. Overall, the quality of this forest is moderately poor due to disturbance from logging. Despite this, the forest should improve in health if disturbance is withheld into the foreseeable future.

WZR-27

Oak Woodland-Brushland Rank: CD

This oak woodland is transitioning to an oak forest and currently has about 80 percent canopy cover. The most abundant trees include bur and pin oak, as well as aspen and black walnut, the latter of which is most

common in the north parcel and on north-facing slopes. The shrub layer varies in thickness. The ground layer also varies in quality, but is in moderately poor condition. Overall, this woodland is somewhat disturbed and was given a moderately low rank of "CD".

WZR-28

Oak Woodland-Brushland **Rank: D**

This formerly pastured south-facing hillside has about 50 percent cover by oaks and elms, mostly on the north and east sides. The south and west sides are a mix of nonnative grasses and a relatively thick stand of boxelder that averages about 8 inches in diameter. This community has been substantially disturbed. One exception to this is a seepage meadow about half way up the slope that is in moderate condition. During the summer of 2000, some limited ATV use of the area caused substantial impact. This woodland will likely transition to a mixed hardwood forest in the next 30 years.

WZR-29

Lowland hardwood Forest **Rank: CD**

This forest occurs in a strip along the North Fork Zumbro River and in a larger patch southeast of Branch Trail. The larger patch is situated higher on the landscape than the remainder of forest and was formerly dominated by oaks. Logging of oaks and the resulting expansion of elm and ash that followed have caused that segment to shift from oak forest to a lowland hardwood forest composition. The shrub layer is variable in thickness and composition, as is the

ground layer. Both tend to be of moderate to moderately poor composition. Overall, this forest is of somewhat poor quality, although it should improve with time if substantial disturbance is withheld.

WZR-30

Oak Woodland-Brushland Rank: D

This small oak woodland is found in a side valley that extends south of the Zumbro River. It is dominated by bur and pin oaks with elm, ash, and other hardwoods common. This woodland appears to have been grazed in the past. This woodland was not field investigated due to time limitations, but the community type and quality verified from the perimeter and from aerial photos.

WZR-31

Mesic Oak Forest Rank: D

This forest includes several separate properties with different management histories, ranging from logging, grazing, or both. Much of the logged area is regenerating to aspen and a variety of hardwoods, while oaks currently comprise a smaller percent of the composition than in the past. The general level of disturbance has caused a reduction in quality of this forest. Although it should improve in quality with time, it is currently in poor condition. This woodland was not field investigated due to time limitations, but the community type and quality verified from the perimeter and from aerial photos; as well as relying on MN DNR MCBS notes.

WZR-32

Dry Oak Forest **Rank: CD**

This relatively small forest is contiguous with the previous community. Together they form a moderately large patch of forest bordering the North Fork Zumbro River. The most common trees here include several species of oak, sugar maple, aspen, and other species of hardwoods. There appears to be a history of limited grazing and wood cutting in the forest. This woodland was was not field investigated due to time limitations, but the community type and quality verified from the perimeter and from aerial photos; as well as relying on MN DNR MCBS notes. Future efforts to inventory this forest should be made if a planned activity has the potential to alter the composition or quality.

WZR-33

Wet Prairie
Rank: B

This broad swale is found just south of 445th Street and west of 165th Avenue. It crosses several properties and is composed of a mix of wet prairie and sedge meadow that are of good quality. The areas bordering the cultivated fields, and those areas most heavily grazed in the past are of somewhat lower quality, but do not detract from the overall structure or function of this exceptional area.

In a brief walk-through of this site over 60 species of plants were noted at this species-rich site. Some grasses and sedges of note include tussock sedge, bluejoint, prairie cordgrass, prairie dropseed, big bluestem, Indian grass, switch grass, and satin grass. A large number of forb species were also noted,

including spotted joe-pye weed, golden alexanders, Virginia mountain mint, sawtooth sunflower, swamp saxifrage, bottle gentian, prairie smoke, marsh milkweed, prairie rose, alum root, marsh bellflower, and Canada anemone. One plant species of particular note here is the State Threatened valerian. Trees and shrubs comprise about 10 to 20 percent of the total cover and include boxelder, cottonwood, black willow, pussy willow, and red osier dogwood.

Also of interest is a prairie planting on the southeast side of this community into a formerly cultivated field. It does include some species not native to Minnesota, such as purple coneflower *Echinacea purpurea*, as well as some State Listed species including glade mallow *Napaea dioica* and rattlesnake master *Eryngium yuccifolium*. Overall, this is a good planting and it seems to be both strong and stable.

This natural community is one of the most species-rich communities in the West Zumbro River area, and one of just a few wet prairies in Goodhue County. Because it is such a rare community type, it is a good candidate for enrollment in a Prairie Bank or Exemption program. For these reasons, it is exceptionally important and efforts should be made to work with the landowners to manage and preserve this rare prairie/wet meadow complex.

WZR-34

Lowland Hardwood Forest **Rank: D**

This site lies to the north and south of 445th Avenue just west of Highway 52. It is a highly disturbed site that was formerly disturbed by rail road activities, road

building, quarrying, and most recently by gas pipeline construction, clearing and tilling. The most common trees here include aspen, boxelder, cottonwood, and others. The shrub layer is very thick and dominated by mostly thorny nonnatives. This pioneering plant community is of very poor quality and was given a minimum ranking of "D".

WZR-35

Wet Meadow **Rank: CD**

Found in a swale on the west side of 165th Avenue, this wet meadow is of moderately low quality. It is dominated by cattail, sedge, and a few species of nonnative pasture grasses. Also, the area was being grazed by beef cattle at the time of field visit. Despite these detractors, it still appears to have unaltered hydrology and a few native forbs, causing a slight elevation in rank. Modification of grazing regime could benefit this swale, and potentially increase the amount of forage available on a seasonal basis.

WZR-36

Oak Woodland-Brushland **Rank: D**

This community includes several parcels, some of which are grazed, while others are not. Despite the difference in grazing regime, these parcels all have somewhat similar structure and quality. They are characterized by tall bur oaks that tend to form a patchy canopy. Younger trees of secondary importance include aspen, boxelder and green ash. The brush layer tends to be thick, particularly in the areas no longer grazed. The ground layer is in poor condition

with a handful of weedy species and nonnative pasture grasses most common. Because of the impact of long-term, intense grazing, these woodlands were given a relatively low rank. Despite this, they are good candidates for restoration and/or modification in grazing practice. The planting of native cool season grasses could improve the overall quality of the sites, while providing increased forage (provided the grazing was conducted in a rest-rotation fashion, with adequate time for plant recovery between grazings).

WZR-37

Wet Meadow **Rank: CD**

This wet meadow is located in and around the Woodbury Wildlife Management Area. It is similar to WZR-35 in composition, although these parcels are not grazed. The most common group of plants here are sedges, with reed canary grass and other nonnative grasses comprising a smaller part of the total cover. This wet meadow also has a moderate amount of native forbs including smartweeds, marsh milkweed, and others. Brush and tree cover are locally abundant, and include boxelder, elm, willow, and one large thicket of wild plum. Overall, the quality is moderately low, but should improve with time. This is especially true for the parcel found within the DNR Wildlife Management Area.

WZR-38

Oak Woodland-Brushland **Rank: D**

This community is found in several shallow side valleys of the Zumbro River, north of County Road 11. These parcels all appear to have a history of grazing,

although are currently not used for that purpose. They are characterized by scattered, large, open-grown oaks with varying amounts of smaller brush and trees between them. The ground layer is generally dominated by nonnative pasture grasses with a few weedy forbs present. Overall the quality of these woodlands is low, in large part due to the poor composition of the ground layer.

WZR-39

Dry Prairie, Hill Subtype
Rank: C

This prairie type is considered uncommon in southeast Minnesota. This particular prairie occurs on a west-facing slope with sand-gravel soils and no apparent bedrock at the surface. It has a history of grazing and is in moderate to moderately poor condition in most places. In addition, shrubs are beginning to encroach onto this steep slope, although they currently only comprise about 10 percent of the total cover. Because of the history of grazing and the resulting shift in species composition, this prairie received a moderate ranking.

WZR-40

Oak Woodland-Brushland **Rank: CD**

This disturbed woodland is found in the same former pasture as the previous described dry prairie. It is characterized by nonnative pasture grasses in the ground layer, along with some weedy species, such as wild parsnip. The shrub layer varies from moderate to thick and is composed of a mix of thorny and non-

thorny shrubs and trees. Some of the most common tree species include bur oak, boxelder, and black cherry. Because of the history of grazing and the resulting substantial shift in plant community composition, this community was given a somewhat lowered rank of "CD".

WZR-41

Lowland Hardwood Forest Rank: D

This forest is similar to, and contiguous with WZR-29. It is found along the North Fork Zumbro River. Although some oaks and other hardwoods are present in the canopy, much of the total tree cover is made up of boxelder that colonized the area about 30 years ago. The shrub layer is variable in thickness and composition, as is the ground layer. Both tend to be of moderate to moderately poor composition. Overall, this forest is of somewhat poor quality, although it should improve with time.

WZR-42

Lowland Hardwood Forest Rank: CD

This forest is relatively young and is found in several parcels, two of which abut a forest mapped by the MN DNR MCBS. Overall, this forest is of moderately poor quality. Varied uses among these parcels, including grazing and tree cutting, have impacted their overall composition and structure. Oaks appear to be among the older trees here, but younger, faster growing trees such as elm and ash are common. Mature sugar maples occur in one valley. Throughout most of these parcels the shrub layer is sparse, although shrub cover

increases in some areas. The ground layer is generally sparse and indicates past disturbance since it has a number of nonnative or weedy species.

WZR-43

Dry Oak Forest Rank: C

Found in several locations, either isolated, or joined with larger tracts of forest, these oak communities have a nearly even-aged growth of trees in them. About 40 percent of the canopy cover is pin and bur oak. Other, less frequent, species include elm, cottonwood, boxelder, and others. The shrub layer is generally moderate in thickness and composed mostly of native species typical of oak forests. The ground layer exhibits the most signs of disturbance with several nonnative and disturbance tolerant species present.

WZR-44

Oak Woodland-Brushland Rank: CD

This small parcel of oak forest was clear cut around 1990 and has had generally good regeneration of oak trees. Despite the good regeneration, the composition of the former forest has been dramatically altered, particularly in the ground layer, where forest species have not prospered under the full sunlight. The slash from the logging activities was piled in windrows and will likely persist for many decades to come. Because of the abrupt recent transition from closed canopy to no canopy, this community was treated as an Oak Woodland. As the site recovers and the canopy once

again closes, it could be reclassified as forest in 30 to 50 years.

WZR-45

Oak Woodland-Brushland **Rank: D**

This woodland is found in several parcels south of Zumbrota. All of these are small, and relatively similar in composition. Canopy cover here ranges from about 25 to 75 percent. The most common trees are open-grown bur and pin oak that average about 16 inches in diameter. Less common here are quaking aspen, elm, boxelder, black cherry and hackberry. The shrub layer is moderate in thickness with European buckthorn and Tartarian honeysuckle most common. Other shrub species tend to be either thorny and/or unpalatable to cattle. The ground layer is moderately poor in quality with only a few native species indicative of quality present, including horse gentian and Pennsylvania sedge. Some past tree cutting in evident, and current or former grazing also influences the woodlands. Although these parcels have good restoration potential and would require relatively low inputs to improve, their current condition requires the low ranking.

WZR-46

Oak Woodland-Brushland **Rank: CD**

This oak woodland has a canopy cover that averages about 70 percent. It has been grazed historically,and has some significant erosion resulting from runoff from steep slopes that are cropped upslope. The most common species of trees here are bur and pin oak with aspen, black cherry, hackberry, and elm also present.

The shrub layer is thick and contains a mix of nonnative and thorny native species. Although the ground layer is disturbed, it does have some natives present including Virginia wildrye and Virginia waterleaf. These parcels have good restoration potential, despite the somewhat lowered rank.

WZR-47

Oak Woodland-Brushland **Rank: C**

Although similar in composition to the previous two communities, this oak woodland has experienced less overall disturbance and has a better species composition. These parcels have scattered large oaks with other, younger trees between them. The overall canopy cover is about 5 to 10 percent, except for the west side, where it approaches 80 percent in an oak grove. Some of the younger trees include small ash, boxelder, and elm. The shrub layer is variable, but generally sparse. Some of the shrubs found here include eastern red cedar, common elder, gooseberry, domestic apple, and most notably, hawthorn. The ground layer across much of the site includes a mix of nonnative pasture grasses with some weedier native species. There are also some areas where prairie species dominate, including sideoats grama grass, heath aster, bergamot, New England aster, prairie sage, marbleseed, Indian grass, and false boneset. The more open areas in this community are currently used for grazing dairy cattle.

The west-facing slope also contains a number of seeps that are in moderately good condition. Some of the species found here include tussock sedge, bluejoint,

satin grass, sneezeweed, boneset, prairie cordgrass, and spotted joe-pye weed. Overall, this community is in moderately good condition. Adding to this quality are the scenic views offered throughout this small valley. This pasture/woodland is worthy of active management and may a good candidate for modification of the grazing system that would both benefit the natural community and improve the forage production.

WZR-48

Lowland Hardwood Forest **Rank: C**

This linear natural community is found along the Middle Fork Zumbro River just west of Pine Island. Canopy cover varies, but averages about 75 percent. The most common trees here include boxelder, silver maple, elm, bur oak, green ash, quaking aspen, and black willow. The shrub layer varies from moderately sparse to very thick, partly in relation to the location of canopy gaps, and also in relation to elevation above the river. The most common shrubs include Tartarian honeysuckle, common elderberry, European buckthorn, gooseberry, and hawthorn. The ground layer is in good condition, with species representative of the community type common. Some of these include Virginia and Canada wildrye, Virginia waterleaf, goldenglow, wood nettle, cup plant, satin grass, and cow parsnip. Also found here is the State Listed plant glade mallow, which is found in several populations that range in size from a single plant to several dozen.

Recent disturbance to portions of this community include bulldozing of trees into the floodplain to

expand tillable crop acres and also dumping in some areas along roadways. This forest is in generally good condition and warrants management that helps to maintain or improve its quality. This is particularly important since it hosts a State Listed species.

WZR-49

Maple-Basswood Forest
Rank: D

This is a small forest that is characterized by a mix of sugar maple, bur oak, basswood, and elm trees. It is currently grazed by cattle. Because of the large number of cattle placed in this small area, there is virtually no shrub or ground layer remaining. In addition, much of the soil on the site has been worked-up by the cattle. Although this forest contains trees typical of a maple-basswood forest, little was visible at the time of the field visit to indicate that the quality of the forest would improve in the foreseeable future.

WZR-50

Maple-Basswood Forest
Rank: CD

Adjacent to the previous community, this forest is of somewhat better quality. It too has been grazed, and was also cut over. However, this forest has begun the process of recovery. Most trees are less than 12 inches in diameter, with sugar maple, basswood, and boxelder most common. The shrub layer varies from moderate to thick with red raspberry, European buckthorn, blackberry and other thorny species common. The ground layer is generally dominated by

nonnative or weedy native species, however, there are some individual plants of more conservative species that appear to have recently colonized the site. If additional disturbance is withheld during the next few decades, this forest should improve in quality on its own.

WZR-51

Lowland Hardwood Forest **Rank: CD**

Although this area was likely a more open, oak-dominated community in the past, it has been colonized by trees typically found in low-lying areas. For this reason it was classified as a Lowland Hardwood Forest. The most common trees are boxelder and elm. Along with green ash they comprise a majority of the trees, and all average about 12 inches in diameter. The oaks found here average about 18 inches in diameter. The shrub and ground layers are both disturbed and indicate past disturbance, which was likely grazing. The most common species here include European buckthorn, stinging nettle and Virginia waterleaf. Because of the lack of native ground cover and the recent advent of a closed canopy, some sheet and rill erosion is occurring. This is, in no small part, due to the cultivation of ground on the upper portions of the slope. Overall, the composition of this forest is somewhat low causing a rank of "CD".

WZR-52

Mesic Oak Forest **Rank: CD**

This forest crosses several property boundaries. It is quite variable in its three-dimensional structure, and,

to a lesser degree, in its species composition. Some areas have been logged in the past, some appear to have been grazed, and still others have experienced both. One portion of the forest was logged within the last year, with a reduction in canopy of about 75 percent. Large oaks, and to a lesser degree sugar maples were removed, and younger oaks left as a shelter species. One cut red oak, 18 inches in diameter, was aged at 94 years. Some resprouting of the oaks has taken place, but the prevalence of sugar maple seedlings and saplings in the understory suggests that this area will likely transition to maple-basswood forest in the next few decades. The most common trees here are white and bur oak, and elm, with basswood, aspen, pin and red oak, and sugar maple less common. The shrub layer is dominated by natives including ironwood, gray dogwood, bitternut hickory and prickly ash. The ground layer has a nice complement of native species in the logged area. However, some of those in the logged area appear to be severely stressed due to lack of canopy cover. Some of the more notable species in the ground layer include zigzag and elm-leaved goldenrod, blue cohosh, lady fern, hepatica, early meadow rue, heart-leaved aster, and Jacob's ladder. The most common graminoids include Pennsylvania sedge, bottlebrush grass, hairy wood chess, and woodland sedge. Other areas that have been primarily grazed, as well as the northwest corner, are of lower overall quality and have a poorer composition in the shrub and ground layers.

WZR-53

Maple-Basswood Forest

Rank: C

This forest occurs in several parcels and in fairly good condition, despite some recent wind damage to canopy trees. The most common trees in the generally closed canopy are sugar maple, basswood, and red, white, and bur oaks. Most of these average about 18 inches in diameter. The shrub layer is dominated by natives including ironwood, bitternut hickory, and sugar maple seedlings. The ground layer is in moderately good condition and is dominated by species typical of the forest type. Some of these include wild ginger, zigzag goldenrod, lady fern, early meadow rue, and Jacob's ladder. The most common grass-like plant found was Pennsylvania sedge. Some parcels of this forest appear to be owned by rural residential homes and do not appear to be under any pressure from their limited activities, which include wood cutting and minor trails. Still others are currently grazed, which has adversely affected the ground layer.

WZR-54

Maple-Basswood Forest

Rank: CD

The tree species composition of these forest parcels is similar to the previous community, but includes more pioneer species such as aspen and elm. The shrub layer is moderate in thickness and is characterized by species that are either tolerant of some grazing and/or thorny. Some of these include ironwood, prickly ash, red cedar and others. The ground layer is substantially disturbed due to the grazing and is dominated

primarily by nonnative, cool season grasses and a few unpalatable natives. Because of the substantial disturbance by grazing, this forest was given a lowered rank of "CD".

WZR-55

Oak Woodland-Brushland **Rank: CD**

This woodland is on a steep north-facing slope on the west side of Pine Island. It overlooks the Zumbro River and would afford a much more scenic view if the nonnative Siberian elm were removed and the piles of refuse were cleaned up. The patchy canopy consists of a mix of white birch, basswood, elm, red, pin, and bur oaks, as well as others. The shrub layer varies from moderately thick near the top, to sparse on steeper slopes and near rock outcrops. The ground layer is generally poor in composition and reflects a history of at least moderate disturbance. Overall, the quality of this woodland is moderately poor, although it could improve in quality with some minor management. It also seems to be a suitable site for an overlook park, since it offers such a nice view to the west.

WZR-57

Oak Woodland-Brushland **Rank: D**

These two woodlands lie on either side of 450th Street. Together they total about 15 acres, and are characterized by a mix of open-grown and forest-grown bur oaks. The shrub layer is dense and hosts young green ash, elm, and a very thick growth of European buckthorn. The ground layer is sparse and dominated by species typical of disturbed sites.

Although these two parcels are disturbed, they represent good opportunities for active management. With relative ease, native grasses and forbs could be reintroduced, the brush removed, and mowing or burning be used to maintain the area.

WZR-58

Lowland Hardwood Forest **Rank: D**

This relatively small woodland parcel is split by 450th Street. It was much more open in the recent past and includes a grove of oaks on the south end. More recently, this former pasture has been colonized by trees typical of lowland hardwood forests. Although these trees are still relatively small, the chances of this site being managed as a pasture, or other open area appear to be small. For these reasons, it was classified as a Lowland Hardwood Forest. The most common trees here include boxelder, elm, bur oak and silver maple. Within some parts of this community there are small wet prairie remnants, although they have been substantially impacted. Shrubs are scattered in patches, with sandbar willow common. The ground layer has nonnative cool season pasture grasses, including reed canary grass as the most common species. Overall, this community is of poor quality due to past disturbance and the recent generation of trees typically considered to be weedy in upland areas.

WZR-59

Lowland Hardwood Forest **Rank: C**

This forest occurs along the Zumbro River on the north side of Kenyon. It is characterized by tall, scattered

cottonwood, and somewhat smaller, but more evenly distributed boxelder. Other trees present include elm, black willow, silver maple, and green ash. The shrub layer is moderately thick, with some thickets found occasionally. The most common shrubs here are European buckthorn and common elderberry. The ground layer is a mix of native species, and nonnatives that persist from the former use of much of this site as pasture. Common nonnatives found here include stinging nettle, reed canary grass, and creeping charlie. The most frequently encountered natives in the ground layer include wood nettle, and Virginia and Canada wildrye. Overall, this community is in moderate condition and seems to be approaching early maturity as a patchy forest.

WZR-60

Wet Meadow **Rank: CD**

This sedge dominated wet meadow is found in a side valley of the Zumbro River, in an intensively used pasture. Overall, it appears to have retained much of its historic water regime with minimal shrub invasion. Moderate to intense grazing over a period of decades has impacted the species composition, resulting in a downgrading of its qualitative rank. Throughout the region, swale and side-hill seep types of wet meadow wetlands continue to be lost through human activity, making this type of community relatively important in a county-wide context.

WZR-61

Mesic Prairie **Rank: CD**

This small prairie occurs in several parcels, most of which are scattered along Highway 56. The largest area is along Pearl Creek just east of Highway 56 and hosts the greatest richness of plant species. The parcels along Highway 56 are generally open and have only minor tree and shrub invasion, but are subject to periodic disturbance characteristic of roadside maintenance such as mowing, herbicide treatment, and other activities. The larger patch of prairie has about 20 percent shrub and small tree cover, especially wild plum, gray dogwood, and red cedar. It was formerly used as pasture and nonnative pasture grasses including redtop, bluegrass, and reed canary grass still persist here. In addition, Pearl Creek was channelized at some point in the past, affecting the general hydrology and function of the landscape here.

The most common native grasses in this community include Indian grass, big bluestem, and prairie cordgrass. The most frequently encountered native forbs include Virginia mountain mint, goldenrod, sawtooth sunflower, stiff goldenrod, bergamot, golden alexanders, Culver's root, prairie coneflower, prairie sage, and compass plant. Although this prairie exhibits obvious signs of past disturbance from ditching and grazing, it represents one of just a handful of never-plowed blacksoil prairies in the county. Even though it is just a few acres, it may represent the largest non-roadside mesic prairie in Goodhue County today. For these reasons, this prairie is exceptionally important and every effort should be

made to work with the landowner to make sure the quality and composition of this prairie is maintained or improved. It represents a good opportunity for a group such as Pheasants Forever to manage wildlife habitat, conserve a rare resource, and perhaps assist the landowner economically. The importance of this tract cannot be overstated.

WZR-62

Oak Woodland-Brushland Rank: CD

This woodland community occurs as several parcels in Kenyon, and to the east of the city. They are moderately low in quality, partly due to past and present grazing practices. These parcels are characterized by large, open-grown oaks, mostly bur oaks that create a broken canopy. Secondary growth is filling in the canopy gaps. The shrub layer varies from moderately thick to nearly impenetrable with thorny species common. Nonnative cool season grasses such as Kentucky blue grass dominate the ground layer.

WZR-63

Calcareous Fen Rank: AB

This large Calcareous Fen complex represents one of the most significant finds of this inventory effort. Calcareous Fens are exceptionally rare in this part of Minnesota and are the most protected of all wetland types in the state. Fens are the only natural community

in the state of Minnesota that require the approval of the Governor before they can be impacted by human alteration. See the Natural Communities of Goodhue County section elsewhere in this report for a more detailed description of the unique characteristics and hydrologic function of Calcareous Fens.

This fen complex is found on a west- to southwest-facing slope above a spring-fed stream. It lies midway between County Highway 30 and 94th Avenue Way. Along with adjacent wet meadow, the complex totals approximately 40 acres. Only about half of the fen complex (northwest side) was accessible during this inventory effort. All of the site has been influenced by grazing and several landowners currently practice moderately intense grazing on their property. The greatest single disturbance to the fen is an excavated cattle watering pond near the top of the hill on the southeast edge. This was formed by excavating what was probably a discharge area. Natural recovery of this disturbance is unlikely over the next few centuries.

Calcareous Fens are characterized by groundwater upwelling through a discharge cone/mound that is elevated above the surrounding landscape, and that contains afloating mat of mosses. This particular fen has at least three discharge cones, and probably more. Because of the high pH of the water, plants with an ability to survive the high calcium and magnesium content of the water are typically dominant. Calcareous Fens support a number of species that are rare and/or found only in this community type, as well as an eclectic collection of wet prairie and wet meadow species. The field visit to this community was

completed in early November, a time when nearly all plant species have died back for the year making them difficult or not possible to identify. Despite this, over 50 species of plants were documented in a very brief walk-through, making it comparatively one of the more species-rich sites in this county-wide inventory.

Overall, there is little tree cover on the fen, except in areas of hydrologic alteration, heavy grazing, and at the edges of the wetland. Here, stunted quaking aspen averaging six inches in diameter are the most common tree. Shrubs are locally thick in areas where grazing has been ceased, but areas that are currently grazed only have about 10 percent total shrub cover. The most common shrubs are several species of willow, and redosier dogwood. The graminoid cover includes several species of sedge, most notably tussock, woolly, and wiregrass sedges, marsh muhly grass, bluejoint, softstem bulrush, spike rush, woolgrass, fringed brome, satin grass, and dark green bulrush. The eclectic mix of forbs includes angelica, skullcap, golden alexanders, marsh bellflower, marsh vetchling, Riddell's goldenrod, black-eyed susan, swamp saxifrage, turtlehead, Jacob's ladder, meadow blazingstar, and marsh marigold.

A fen such as this one is remarkable for southeast Minnesota and is worthy of at least being managed for its character, and is also a top candidate for protection. The landowners should be contacted to determine their level of interest in assistance with managing this unique feature and also their interest in enrollment in some type of tax exemption program for the fen.

WZR-64

Wet Meadow **Rank: C**

This wet meadow surrounds the Calcareous Fen (WZR-63), particularly on the downslope sides. It is more disturbed by grazing than the fen and is heavily trampled in some areas. Despite this, many of the plants characteristic of this community type have persisted. The most common natives include several species of sedge, especially the dominant tussock sedge, bluejoint, woolgrass, dark green bulrush, spotted joe-pye weed, boneset, turtlehead, black-eyed susan, marsh milkweed, Virginia mountain mint, and marsh marigold. The nonnative reed canary grass is dominant in patches and in disturbed swales, causing the qualitative rank to be downgraded to only moderate. Overall, the quality of this community is good, and it has additional importance due to the fact that it acts as a buffer for the fen, which it surrounds.

WZR-65

Wet Meadow **Rank: C**

This community includes several moderate quality parcels of wet meadow, two of which are found on the west edge of Wanamingo. All of these have been formerly grazed, with one of the meadows on the west side of Wanamingo still being grazed. The most common graminoid species here include tussock sedge, prairie cordgrass, Virginia wildrye, bluejoint, fringed brome, fowl bluegrass, other sedges and the nonnatives reed canary grass and Kentucky bluegrass.

Some of the forbs encountered here include Culver's root, common boneset, turtlehead, Virginia mountain mint, great blue lobelia, angelica, water dock, and marsh milkweed. Brush cover among these parcels averages about 20 percent with several species of willow, and redosier dogwood most common. Overall, these wet meadows are in relatively good condition and were given a rank of "C".

WZR-66

Dry Prairie

Rank: CD

This prairie occurs on a west-facing slope, just north of the Dodge County line near Highway 57. It appears to be grazed periodically, and perhaps intensively in the year preceding the field visit. It hosts a mix of natives and cool season pasture grasses, and has a total brush and tree cover of about 10 percent. The most common trees are large, scattered bur and pin oak, with younger boxelder and elm, as well as thickets of plum and other brush. The most common native grasses include big and little bluestem, Indian grass, sideoats grama, and prairie dropseed. Introduced, nonnative grasses include Kentucky bluegrass, smooth brome, and foxtail. The most common desirable forbs include prairie coneflower, showy and stiff goldenrod, purple prairie clover, silky aster, blazingstar, and oxeye false sunflower. Although this prairie has been impacted by intensive grazing, it is still a good candidate for active management, both for prairie qualities and for increased forage.

WZR-67

Oak Woodland-Brushland **Rank: D**

Found in several parcels, these woodlands are all of similar quality and generally similar composition. These have been grazed in the past and are characterized by groupings of open-grown oak trees with younger, denser growth of other trees. The shrub layer is variable, but often has thorny species as the primary component. The ground layer is generally dominated by nonnative cool season pasture grasses, although pockets of native prairie, wet meadow, and woodland edge species persist in small areas. Although most of these areas are scenic and have some restoration potential, their current condition requires that they receive a relatively low rank of "D".

WZR-68

Oak Woodland-Brushland **Rank: CD**

This small oak woodland is similar in species composition to the adjacent community WZR 67. This woodland is better in quality and also has a more closed canopy. Although this parcel would be classified as forest if it were larger, the small size and perimeter-to-interior ratio is such that it is most appropriately treated as a woodland. The most common tree species here are bur and pin oak, with ash, elm, aspen, and rarely sugar maple present. The shrub and ground layers are generally disturbed and have a large part of their plant cover made up of nonnative species. A few parcels have small pockets of native species typical of prairies and woodland edges. Overall, these parcels are of moderately poor quality, but have some restoration potential.

WZR-69

Wet Meadow Rank: CD

This is a very interesting community that is found in the floodplain and immediately adjacent areas of the Zumbro River just south of Branch Trail. This former pasture has a large amount of nonnative cool season grasses present, but also contains some native species in large quantities. Among the native species found here are sedges, Canada and Virginia wildrye, cup plant, and wild goldenglow. These are found among widely scattered willow, cottonwood, and other lowland trees that occur singly or in small groups along the stream bank. Although the nonnative species are common, the native flowers dominate the area visually with their color. This community, although not fitting the strict definition of a wet meadow, displays characteristics of a plant assemblage that was probably much more common along the middle reaches of reach river valleys in the past.

WZR-70

Oak Woodland-Brushland Rank: BC

This community is on a generally west-facing slope between 147th and 152nd Avenues. This former pasture includes about 50 percent open pasture and 50 percent former savanna, and now is being colonized by brush and trees. The most common large trees are bur and pin oak. Young aspen, ash, and elm are common, as are sumac, dogwood, and prickly ash. Still present in some areas are patches of prairie and native woodland edge species. This community will likely transition quickly to low quality woodland/forest in the next few

decades without active management including mowing, grazing, brush cutting, and/or fire.

WZR-71

Wet Meadow **Rank: CD**

This large wet meadow occurs in several swales just south of 490th Street. These are partially drained by surface ditches, which appear to have been only marginally successful. The site was pastured in the past and is a mix of areas dominated by natives and those that are a mix of nonnative/weedy species and natives. Some native graminoids found here include tussock sedge, several other species of sedges, rushes, dark green bulrush, and woolgrass. Forbs found here include spotted joe-pye weed, boneset, blue lobelia, and sneezeweed. Overall, this wet meadow is in moderate condition, although it lacks many of the plant species that are found in better quality areas. Because it is mostly surrounded by crop ground, this site is an excellent candidate for active restoration and management. Important activities in this effort would include spot mowing, reintroduction of select native wet prairie species in wetland edge areas, and the responsible application of prescribed fire. This site is a good candidate for partnering with the MN DNR and/or a private non-profit such as Pheasants Forever to accomplish these goals and utilize cost-share funds.

WZR-72

Oak Woodland-Brushland **Rank: CD**

This woodland includes several parcels that are separated by about one half mile. They are generally low quality and have all been impacted by grazing and other human activities in the past. The most common large trees are oaks, with the levels of smaller trees and shrubs varying in different parcels. Nonnative cool season grasses generally dominate the ground layer. This site was not field inventoried, but was photointerpreted due to time and budget limitations. Although these woodlands are moderately low in quality, they do have potential for improvement through restoration including brush management, reintroduction of native grasses and flowers, and other activities.