Final Report Prepared for the Chisago City Park Board

Report 1/6

Submitted by:

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Executive Summary

This report makes recommendations regarding natural features in Chisago City based on the vision expressed in the Chisago City Comprehensive Plan (Thibault Associates 2002). Beginning in September and ending in December, six groups of students from the University of Minnesota’s College of Natural Resources gathered data about the community that would be useful to projects focused on natural features, trails, parks, and education. The specific objective of this report is to inventory and provide recommendations for natural features of value to Chisago City.

Chisago City is located roughly 30 miles north east of the Twin Cites area and has a population of approximately 2,622. Farmland and agriculture are prevalent in the area, as are mixed coniferous and deciduous forest. Water is also a dominant feature, as there are many lakes connected through channels and aquatic linkages. Given these natural characteristics, it is clear that preserving Chisago City’s natural features is essential to maintaining the community’s character.

For the report, the Chisago City study area was divided into two distinct zones: within the municipality, and within the Phased Urban Growth Areas. The zones were based on the Chisago City Comprehensive Plan’s Phased Urban Growth Map. In all, we identified seven sites within the municipality as particularly valuable of the community’s natural features. Similarly, we focused on five sites outside of the municipality but within the Phased Growth Areas that were of value to the community.

The recommendations presented in this report focus on possible management strategies for each site specific to the natural feature. In summary, the recommendations for sites within the municipality of Chisago City and within the Phased Urban Growth Area emphasize preservation, restoration, and utilization options:

- **Preservation**: Schlimmer’s Point site, site North of School Lake, site North of Wallmark Lake, Prairie-Camp Ojiketa, and site South of Green Lake.
- **Restoration**: Baseball Backstop site, Primary School site, and site between Lake Ellen and Lake Emily.
- **Utilization**: Lindberg Farm site, Water Tower Park site, Rotary Club Trail-South of School Lake site, and Agricultural Field site.
Introduction

Communities throughout Minnesota have encountered increasingly more difficult choices as municipal planners have worked to preserve existing natural resources. For a community to plan its development along a responsible course, it is necessary for its citizens and governing officials to know exactly what natural resources exist within the community. Without a working knowledge of their community’s unique features, city planners cannot be expected to make judicious land use decisions. The City of Chisago has invited students from the University of Minnesota’s College of Natural Resources to assist them in gathering the requisite knowledge of the community’s natural areas. Ultimately, students from the Problem Solving in Natural Resources course will present six individual reports to city officials, each addressing a specific subset of natural resources-related issues. Together, the six reports will offer a cohesive set of recommendations that city officials can utilize in future natural resource decision making. This report aims to inventory, classify, and prioritize the natural features within the greater Chisago City region to support planners in making informed decisions with regards to Chisago City’s management of natural features.

Municipal planners can protect the integrity and long-term health of a community if they work to ensure that growth is carefully planned and coordinated. With a development plan in place, a community can increase its chances for sustainable growth, and by preserving the community’s valuable natural features for future generations, it can ensure its longevity and health. Communities experiencing rapid growth often envision themselves at a crucial decision-making juncture: allow development to proceed, or safeguard natural areas? One option, however, is not exclusive of the other, and with a proactive commitment to steward the community’s natural features, planners can accomplish both.

Communities would be wise to preserve and restore natural features for a variety of reasons. First, thriving and plentiful natural features are of significant intrinsic value to citizens. A community surrounded by a healthy natural environment can provide habitat for scores of wildlife species, and citizens by and large find such community traits valuable. Additionally, residents of open, green communities appreciate the aesthetic value that a healthy natural environment provides. Ensuring that your natural features are viable can, in fact, increase the standard of living in your community. Moreover, communities with thriving natural features often realize economic benefits as a result. For instance, restoring a degraded lakeshore could bring an unexpected increase in recreation revenue. Indeed, preservation of the valuable natural features determines the long-term growth potential of the economy; without its valuable natural features, a community becomes considerably less attractive for continued economic growth. Given the benefits of a healthy natural environment, it is critically important for community planners to have a thorough understanding of the natural features that exist. Provided with this knowledge, they
can then work to ensure that their community’s natural features remain healthy and viable.

**Vision Statement**

The citizens and officials of Chisago City have demonstrated through the creation of their city’s Comprehensive Plan that they are invested in their community’s future. The Chisago City Comprehensive Plan 2002-2020 provides a common vision for Chisago City’s future by encouraging all expansions to meet certain recommendations and requirements. All projects should share the common vision of expanding, enhancing, and preserving the community. Specifically, the Comprehensive Plan provides a framework for the preservation of natural features by laying out the following goals:

- **Greenbelt**: Preserve open space around Chisago City to inhibit unplanned development and maintain the city’s identity. Establishing natural boundaries (greenbelts) to the west, north, and south of the Chisago City Planning Area.
- **Growth Strategy**: Growth and expansion of Chisago City shall be phased (controlled) and focused on maintaining harmony between the environment, development and fiscal soundness consistent with the following subgoals and objectives.
- **Nature**: Protect the natural environment—lakes, wetlands, creeks and streams, woods and wildlife and these amenities to carefully shape growth and expansion of the community (Thibault Associates 2002)

The citizens of Chisago City have codified very specific objectives for the area’s development, and their commitment to protecting the community’s natural features underscores the importance and urgency of this project.

**Goals and Objectives**

Though the breadth of this report is substantial, there are several specific objectives that lie within the broader framework. To support the goals of the Comprehensive Plan this report will:

- Inventory both the region’s terrestrial and aquatic features;
- Utilize a land classification guide to document land use surrounding the community’s valuable natural features;
- Provide a series of recommendations for critical land use management related to natural features.
Site Description

The City of Chisago is in the southern portion of Chisago County, Minnesota, roughly thirty miles northeast of St. Paul (Figure 1). The St. Croix River flows south approximately 20 miles to the east on the Wisconsin border. Historic and modern transportation routes surround the city, with U.S. Interstate 35 running north and south approximately 12 miles west of the city. The main thoroughfare through Chisago City is Minnesota State Highway 8, a thoroughfare that runs from U.S. Interstate 35 to the Wisconsin border.

Chisago City’s natural features have a great influence on the lives of its citizens. Chisago City is dominated by an extensive lake system. These lakes have influenced the town’s development in many ways, with impacts ranging from the placement of roads to the evolution of the tourism-based economy. Chisago City is home to 2,622, but the opportunity for outdoor sports and recreation draws more people from the nearby Twin Cities, with lake-based tourism particularly heavy during the weekends. In addition, close proximity to the Twin City Metro Area offers an easy commute for professionals; accordingly, an increasingly greater percentage of Chisago City’s residents work in the Twin Cities area. This new Chisagoan stands in contrast to the more traditional, predominantly Northern European farmers who originally settled the area.

Wetlands are a significant feature in and around the lakes. Much of the original wetlands have been drained for agricultural purposes. Today, efforts are taken to preserve more of these wetlands. They provide habitat for important biodiversity in the region. They also serve as filters, protecting the quality of the water in the many lakes. The size and location of wetlands now plays a role in determining where development occurs, as people are increasingly conscious of the importance of wetlands.

The soil and climate of Chisago City have also facilitated the development of an agricultural community. The town is located on the Broadleaf Woodland zone with Oak savannah in the northern part of Chisago City, and prairie grasses in the south. On the edge of the Anoka sand plain, reliable precipitation and rich soils cater to growing crops. Currently, 43 percent of the land use in the study area is agricultural, primarily wheat, soybeans, corn, and dairy. A railroad that once connected Chisago City to St. Paul to the south and Duluth to the north strengthened the agriculture in the area by opening new markets to producers. However, with the closing of this line in the 1940s, recreational tourism to the lakes and other natural and historic areas became the dominant industry in Chisago City.
Figure 1. Map of Chisago City, Chisago County, Minnesota. (Bob Wolf Communications, www.co.chisago.mn.us/_derived/chimap.htm_txt_map.gif, 1997)
Chisago City has experienced many changes in the past 150 years. The unique natural places that define the community have always remained. These natural features have often influenced the city’s growth and expansion.

**Methods**

To familiarize ourselves with Chisago City, we needed to obtain information about a variety of subjects using a range of methods. We had to understand development plans and what their collective values and beliefs are about their resources. We also had to understand current land uses and special natural features. Planning is very important for a town that is growing rapidly, and a focused site evaluation may prevent the city from overlooking valued parcels of land.

We began by closely analyzing the Chisago City Comprehensive Plan that states the goals for development in Chisago City for the next twenty years (Thibault Associates 2002). This plan helped us understand the background and history of the city and provided a framework for addressing the complex problems that Chisago City will face in the future. The goals and objectives of the plan formed the justification for this report as we began to focus on important natural features.

To gauge the seriousness of natural resources problems and concerns in the city, we attended a bimonthly Chisago City Park Board meeting. This meeting provided an opportunity to introduce ourselves to the city officials, focus on the city’s major issues, and listen to the opinions of Park Board members concerning their community’s development. Major leaders of the Park Board and Planning Commission were in attendance, and the open question-and-answer period and small group sessions provided a valuable format for observation and discussion.

Our primary Chisago City contact person, Rachel Coyne, gave us a list of contacts and phone numbers of active citizens of Chisago City. More specifically, this list focused on citizens knowledgeable about the area’s natural features; individuals on the list ranged from planning commission members to local bait shop owners. To more accurately assess how citizens, leaders, and politicians felt about the upcoming plans and recreation around Chisago City, we contacted some of these people. We divided the contacts by topic: planning, park boards, and political leaders within Chisago City. Community leaders ranged across the spectrum, including the former president of the Chisago Lakes Restoration Association, the Chisago City Planning Commissioners, and the City Administrator. Over the telephone and in person, we interviewed a total of ten individuals to gauge their opinions of the current issues. Questions ranged from their perspectives on recreational opportunities in Chisago City, to population increases of the last ten years, and the quality of the natural features in Chisago City. Again, these questions were framed to provide insight into
citizens’ perspectives on the current natural resources issues in Chisago City. From these interviews, we developed criteria for natural feature selection.

Using the Chisago City Zoning Map (Figure 2), we divided the study area into two distinct types: sites within the municipality, and sites within the Phased Growth areas. The municipality is defined as the highly developed area that surrounds the center of town in approximately a half-mile radius. Within the municipality, we focused on natural areas that satisfied one or more of the following criteria: area is underutilized; area has high potential for restoration; area is particularly popular according to public opinion; and/or area has high preservation potential based on its wildlife or plant community.

For lands within the Phased Growth areas, the area’s status according to Phased Urban Growth Map was a primary factor affecting consideration (Figure 3). Codified in the Comprehensive Plan, this Phased Urban Growth Map provided a rough framework for the sequence of development in Chisago City over the next 20 years. We focused first on the areas in which development was predicted to occur between 2002 and 2007 (Figure 3). These areas were predominantly composed of large tracts of agricultural fields, marshland, and hills. Following that analysis, we conducted a partial assessment of the lands in which development is anticipated to occur between 2007 and 2012. In this category of land, we focused both on areas south of Green Lake and areas north Chisago Lake.

In both the Phased Growth Areas and the municipal sites we assessed site characteristics: soil type; existing resources; ownership status; vegetative cover and potential habitat possibilities; and appraised value of the land. The Soil Survey of Chisago County was a major asset for identifying soils and resources. This survey describes the soil types found throughout all of Chisago County. We then determined how soil types would benefit a particular land use.

The Minnesota Land Cover Classification System was also important for determining the vegetative cover (MN DNR 2001). Within the municipality, we assessed each selected site for vegetative cover to the family level. We walked the accessible properties and documented major species on each site. Within the Phased Growth Areas, all study areas were assessed from public access points by driving on public roads and looking from vistas. This Minnesota Land Cover Classification System is composed of five digit numbers assigned to a specific vegetative cover (e.g., 31000 denotes Coniferous Forests); in conducting our Land Classification surveys, we scrutinized land to the third degree (e.g., 321, Deciduous Forest).

For areas that were inaccessible for legal or other reasons, we used aerial and topographical maps. These maps provided information on major landforms that may not have been visible from public access. The aerial and topographic maps were on a scale of 3-4:1 inches to miles. This was the most accurate way to document existing
Figure 2. Chisago City Zoning Map, 2002. (Chisago City 2002)
Figure 3. Phased Growth Map of Chisago City, Comprehensive Plan, 2002. (Thibault 2002)
natural features given that numerous hills, lakes, and other natural features on large parcels of land were not visible from public access. Finally, plat maps were used to identify ownership of selected lands. Determining current ownership was an important step toward identifying future land management possibilities.

After the initial data collection, we evaluated parcels based on their potential for restoration, protection, and development in the future. Ultimately, we aimed to provide a variety of land use options for municipal planners to consider during future land use planning.

Inventory

The natural features of the Chisago area are classified as either terrestrial or aquatic. Because the specific characteristics of these systems play a role in determining the use of that feature, it was first necessary to gain an understanding of the natural environment itself. To do so, we analyzed the aquatic and terrestrial systems and human dimensions of land use in general and then characteristics and the Minnesota Land Cover Classification System, for specific sites.

Aquatic Systems
This report identifies five lakes of particular importance within the Chisago City region (Figure 2). According to the Department of Natural Resources classification system, four of these lakes are considered General Development Lakes (Chisago Lake, Lake Ellen, Lake Emily, Green Lake), with only one classified as a Natural Environmental Lake (School Lake). Department of Natural Resources data is available for the following lakes in the Chisago City region:

- Chisago Lake, a large lake of approximately 873 acres, reaches 34 feet at its maximum depth. A natural channel links Chisago Lake to South Lindstrom Lake. Due to their proximity, both lakes are managed as one for primary and secondary fisheries. Four public access sites provide entry points for anglers, with the lake supporting a strong recreation industry throughout the year. However, Chisago Lake’s location within an increasingly urbanized watershed has meant increased nutrient input within the lake, which has in turn jeopardized the lake’s overall water quality (MN DNR 2000).

- Green Lake, at 1,714 acres, is the largest lake in Chisago County. The lake is composed of three individual basins: the northern basin, or “Little Green”; the main, centrally located basin; and a number of bays located near the southern region of the lake. Anglers and recreational users access the lake through three public entry points. The lake is managed primarily
for walleye, northern pike, and black crappie, and according to the Department of Natural Resources 2001 survey, Green Lake’s fisheries appear to be in adequate health. Algal blooms limit visibility in Green Lake during the summer months to between 4 and 5 feet, though the average water clarity is 7 feet (MN DNR 2001). Additionally, Green Lake is connected by a pipe with Lake Ellen and Swamp Lake; ultimately, weeds and litter flow from Green Lake to Lake Ellen (Mrozinski 2003).

**Terrestrial Systems**

Chisago City is located along the divide between two distinctly different terrestrial zones. According to data from the Ecological Classification System utilized by the Minnesota DNR, Chisago City is situated along the border of two “ecoregions”: Eastern broadleaf forest and prairie parklands (MN DNR 2002). The natural vegetation for the region is entirely brushland and grassland, with the brushland areas consisting primarily of aspen-oak forest land (MN DNR 1994). In these aspen-oak areas, one would expect to encounter small, dense aspen stands with occasional elms, ash, and basswood scattered throughout.

In the grasslands, however, the land is primarily marshland. In fact, the grassland common within the study area—consisting of wet prairies, marshes, and sloughs—are home to marsh-grasses, flags, rushes, wild rice, willow, and alder-brush. Specific plant communities in the area might include alder swamp, willow swamp, rich fen, wet, meadow, and cattail marsh. In addition to its rich variety of plants, Chisago County is also home to a wide variety of animal species. Though a County Biological Survey has not been completed for Chisago County, the following species are known to inhabit the region:

- **Mammals**: Virginia opossum; arctic shrew; masked shrew; Northern short-tailed shrew; Eastern mole; star-nosed mole; big brown bat; little brown myotis; Eastern cottontail hare; snowshoe hare; Eastern chipmunk; fox squirrel; gray squirrel; red squirrel; thirteen-lined ground squirrel; woodchuck; plains pocket gopher; American beaver; common muskrat; common porcupine; deer mouse; house mouse; meadow jumping mouse; meadow vole; southern red-backed vole; white-footed mouse; American badger; black bear; common raccoon; coyote; Eastern spotted skunk; ermine; gray fox; mink; Northern river otter; red fox; striped skunk; and white-tailed deer (Wovcha 1995).

- **Amphibians and reptiles**: blue-spotted salamander; mudpuppy; redback salamander; tiger salamander; American toad; bullfrog; chorus frog; Cope’s gray treefrog; Eastern gray treefrog; green frog; mink frog; Northern cricket frog; Northern leopard frog; spring peeper; wood frog; Blanding’s turtle; common map turtle; painted turtle; snapping turtle; spiny softshell turtle; wood turtle; five-lined skink; prairie skink;
bullsnake; Eastern gardner snake; Eastern hognose snake; fox snake; milk snake; plains garter snake; redbelly snake; and smooth green snake (Wovcha 1995).

Soils
Chisago City lies on the eastern edge of the dominant land formation in the area, the Anoka Sand Plain. The soils around Chisago City are predominantly sand (USDA 1995). Nebish loam, which has equal portions of sand, silt, and clay, is the most common in the area. Due to the high quantity of surface water area in Chisago City, most of the soils provide a poor to moderate foundation for any development. Seelyeville muck is another soil that is prominent around the lakeshores and major marshlands. The subsurface of central Chisago City consists almost entirely of Nebish loam and Beltrami loam, both of which are described from a building standpoint as moderately to slightly difficult (Table 1).

Table 1. General soil types and descriptions of Chisago City area. (From Soil Survey of Chisago, Minnesota, 1995)

<table>
<thead>
<tr>
<th>Soil #</th>
<th>General Soil Descriptions</th>
<th>Prime farmland (X = yes)</th>
<th>Paths &amp; Trails</th>
<th>Picnic areas</th>
<th>Dwellings w/ basements</th>
</tr>
</thead>
<tbody>
<tr>
<td>540</td>
<td>Seelyeville muck</td>
<td>X</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>40D</td>
<td>Nebish loam 12-15% slopes</td>
<td>moderate</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>40F</td>
<td>Nebish loam 25-40% slopes</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>40B</td>
<td>Nebish loam 2-6% slopes</td>
<td>X</td>
<td>slight</td>
<td>slight</td>
<td>slight</td>
</tr>
<tr>
<td>678</td>
<td>Beltrami loam thick solum</td>
<td>X</td>
<td>slight</td>
<td>moderate</td>
<td>severe</td>
</tr>
<tr>
<td>40C</td>
<td>Nebish loam 6-12% slopes</td>
<td>X</td>
<td>slight</td>
<td>moderate</td>
<td>moderate</td>
</tr>
<tr>
<td>75</td>
<td>Bluffton loam</td>
<td>X</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>346</td>
<td>Talmoon loam</td>
<td>X</td>
<td>moderate</td>
<td>moderate</td>
<td>severe</td>
</tr>
<tr>
<td>161</td>
<td>Isanti loamy fine sand</td>
<td>X</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>722</td>
<td>Blomford loamy sand, lacustrine substratum</td>
<td>X</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>544</td>
<td>Cathro muck</td>
<td>X</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>726</td>
<td>Kratka loamy fine sand, thick solum</td>
<td>X</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>543</td>
<td>Markey muck</td>
<td>X</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
</tbody>
</table>

Slight: soil properties are generally favorable and limitations are minor and easily overcome  
Moderate: limitations can be overcome or alleviated by planning, design, or special maintenance.   
Severe: soil properties are unfavorable and limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

Human Dimension and Planning
In the past 20 years, Chisago County has experienced a population increase of 59.8 percent. The proximity to the Twin Cities Metro Area has been the major contribution to the population boom, as residents commute from towns such as
Chisago City, which are within 45 minutes of the metro area. This rapid growth justifies the need to address the Phased Urban Growth Map (Figure 3) as outlined by the Chisago City Comprehensive Plan.

The Phased Urban Growth Map attempts to predict development around Chisago City through the year 2012 (Figure 3). The boundaries of predicted development coincide with the Comprehensive Plan Study Area (Figure 1). Within the boundary, four stages of growth are mapped: presently developed (brown), development from 2002-2007 (red), development from 2008-2012 (orange), and development post 2012 (green).

There are several human pressures on the environment in and around the Chisago City area. One of those pressures is lakeshore development. The city itself contains 117.5 acres of lakeshore and open water. In the entire study area, lakeshore and open water total 3,802 acres (Thibault Associates 2002). Most of the lakeshore inside the municipality surrounding Little Green Lake, Green Lake, and Chisago Lake, is already developed as residential property. Portions of lakes bordering the municipality, School Lake, Lake Martha, Lake Ellen, Lake Emily, and Wallmark Lake, have been zoned for residential properties with development in progress (Figure 2).

The fate of the lakes depends on the present development strategies and homeowner conservation practices. Inadequate planning and homeowner neglect could lead to degraded lakeshore, which can lead to degraded lake water quality and fisheries. For example, poor construction and excavation near lakes can cause massive erosion and soil additions to the water, decreasing sunlight for photosynthetic organisms, disrupting the balance of the lake’s food web. Mowed shoreline can facilitate fertilizer runoff which increases nitrogen and phosphorous loads in lake water, favoring algae blooms and invasive species. Mowed grass can also attract large groups of geese which browse on short shoreline vegetation, ultimately retaining the short vegetation. The geese can actually increase phosphorous loads in the water and create unpleasant shoreline from excess wastes. Degraded lakeshore can be restored and/or conserved through various techniques, preventing intense human impacts.

Agriculture is dominant in Chisago City’s landscape. Currently, agricultural land within the city totals 144.8 acres. The entire study area encompasses 6,896 acres of agricultural land (Thibault Associates 2002). Major crops grown in the area include corn, soybeans, and wheat. Pastureland for beef cattle also exists in the agricultural landscape. Though these land uses produce valuable food sources, they may also put pressure on surrounding natural features. Agricultural practices have the potential to create excess nutrient runoff, soil erosion, and biodiversity loss through monoculture crops. However, crop rotation, windbreaks, and soil conservation methods can ease the negative pressures associated with conventional agricultural practices.
Pressure is increasing on agricultural land for residential development. A desire to retain the pastoral character of the Chisago City should be considered in planning efforts. Restoring or preserving the natural feature such as oak savannah, marsh, prairie, woodlands, and wetlands can coincide with proactive management and planning to protect rural feature like existing farm roads, tree lines, and agricultural structures in the face of pending development (Heyer 1990).

Criteria Development
An inventory of land parcels inside the municipality of Chisago City and in the Phased Urban Growth area surrounding the city was done to create a list of example sites for further recommendation (Figure 4). These sites represent a variety of land characteristics, management, and uses.

- **Within Municipality**
  1. Water Tower Park, located north of Highway 8;
  2. Agricultural Field, located north of Highway 8, near Water Tower Park;
  3. Primary School, located on County Road 23;
  4. Backstop, located on County Road 23, across from Primary School;
  5. Schlimmer’s Point, located off southeastern shore of Chisago Lake;
  6. Rotary Club Trail-South of School Lake located on southwest and southern shore of School Lake;
  7. Prairie-Camp Ojiketa, located between eastern shore of Green Lake and County Road 23.

- **Phased Urban Growth Areas**
  1. North of School Lake, located northwest of Highway 77, between School Lake and Lake Mattson;
  2. North of Wallmark Lake, located east of Highway 77, north of Wallmark Lake;
  3. Lake Ellen/Lake Emily; located north of Highway 8, between Lake Ellen and Lake Emily;
  4. South of Green Lake, located on the south edge of Green Lake, east of County Road 23;
  5. Lindberg Farm, located east of Highway 8, on western shore of Green Lake.

To evaluate natural resources in the Chisago City study area, we developed two sets of criteria; a set for evaluating land parcels located only within the municipality and a second for land parcels located in the Phased Growth areas, as outlined by the Comprehensive Plan Phased Growth Map (Thibault Associates 2002). We developed the criteria based on natural features and current land use characteristics.
Within Municipality Phased Growth

1 Water Tower Site  A North of School Lake
2 Agricultural Field  B North of Wallmark Lake
3 Primary School  C Lake Ellen/Lake Emily
4 Backstop  D South of Green Lake
5 Schlimmer’s Point (Eagle Island)  E Lindberg Farm
6 Rotary Club Trail
7 Prairie, Camp Ojiketa

Figure 4: Municipal (numbers) and Phased Growth (letters) Site Locations, Chisago City, 2003. (Thibault 2002)
Municipal sites were selected initially if they were considered underutilized (Table 2). Following this selection, sites needed to satisfy one or more of the following criteria: restoration potential, identified as important by Chisago citizens, and preservation potential. If the given site satisfied the appropriate criteria, the site was further evaluated. Documentation of the characteristics of the sites followed to determine possible site prescriptions (Table 3).

**Table 2.** Municipal site selection criteria, Chisago City, Minnesota, 2003.

<table>
<thead>
<tr>
<th>Sites within municipality</th>
<th>Site currently underutilized</th>
<th>Site has restoration potential</th>
<th>Site has value as important to Chisago City residents</th>
<th>Site has preservation potential – contains valuable wildlife/plant communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Tower Site</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Agricultural Field</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Primary School</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Backstop Area</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schlimmer's Point (Eagle Island)</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Rotary Club Trail-South of School Lake</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Prairie in Camp Ojiketa</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The sites range in size from approximately 0.3 acres to approximately 40 acres (Figures 5-9). The other five sites fall between these two values, with the majority of sites larger than 20 acres. Ecosystem type between the sites varies as well. Woodland, prairie, and lakeshore vegetation constitute the vast majority of the ecosystem types. Indications suggest that each of these sites is mostly underutilized, or unused; most having some footpaths or other light human use. These characteristics imply that the sites would benefit from some form of management.

Each of these sites maintains remnants of original ecosystem vegetation (Table 4). Woodland sites contain woody species such as basswood, maple, aspen, and sumac in addition to herbaceous species like asters, ferns, and native grasses. Prairie sites harbor native grasses and herbaceous species like goldenrod and monarda. Lakeshore and waterway vegetation sites are dominated by cattails, grasses, and some woody species such as willows, cedars, and maples. The sites also vary in diversity of species composition and cover.

Soils on each of the sites consist of mostly a mixture of loams and mucks (Table 5). Loamy soils, most of which are good for building trails, parks, and some buildings constitute a majority of the soils on the sites. However, some muck and sandy soils on sites are not favorable for building trails, parks, or buildings. These soils are found along waterways, lakeshore, and wetland locations.
Table 3. Characteristics of seven sites within the municipality chosen for further recommendation, Chisago City, Minnesota, 2003.

<table>
<thead>
<tr>
<th>SITE</th>
<th>Estimated Size</th>
<th>Location</th>
<th>Ecosystem Type</th>
<th>Major Uses</th>
<th>Major Problems</th>
<th>Ownership</th>
<th>Zoning Code</th>
<th>Property value of entire site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Tower Park</td>
<td>30 acres</td>
<td>North of Hwy 8</td>
<td>Woodland</td>
<td>Unused, some foot paths</td>
<td>refuse, some invasive species</td>
<td>City</td>
<td>Townhouse</td>
<td>~$280,000</td>
</tr>
<tr>
<td>Agricultural Field</td>
<td>5 acres</td>
<td>Near Water Tower Park</td>
<td>Fallow field</td>
<td>Fallow</td>
<td>Non-natives</td>
<td>Private</td>
<td>Office Residential</td>
<td>~$350,000</td>
</tr>
<tr>
<td>Primary School</td>
<td>4.5 acres</td>
<td>On primary school property</td>
<td>Prairie/Dry stream</td>
<td>Unused, some foot paths</td>
<td>Non-natives</td>
<td>School</td>
<td>Single Family Small Lot</td>
<td>Tax exempt</td>
</tr>
<tr>
<td>Backstop</td>
<td>0.3 acres</td>
<td>Adjacent to school property, behind Parmly</td>
<td>Prairie and planted grasses</td>
<td>Unused, some foot paths</td>
<td>Ball field run down, non-natives</td>
<td>Private</td>
<td>Townhouse</td>
<td>~$210,000</td>
</tr>
<tr>
<td>Schlimmer’s Point (Eagle Island)</td>
<td>20 acres</td>
<td>Middle of Chisago Lake</td>
<td>Lakeshore vegetation</td>
<td>Unused, local fishing around island</td>
<td>Encroaching vegetation</td>
<td>Private</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Rotary Club Trail</td>
<td>30 acres</td>
<td>South of edge School Lake</td>
<td>Lakeshore vegetation/ Woodland/ Open field</td>
<td>Unused at present</td>
<td>Low species diversity on site</td>
<td>City</td>
<td>Light Industrial</td>
<td>$400,000</td>
</tr>
<tr>
<td>Prairie near Camp Ojiketa</td>
<td>40 acres</td>
<td>On Camp Ojiketa property</td>
<td>Prairie/Forest</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Private</td>
<td>None</td>
<td>~$1.78 mil</td>
</tr>
</tbody>
</table>
Figure 5. Highlighted municipal Sites 1 - Water Tower site and Site - 2 Agricultural Field locations within Chisago City. (From www.GlobeXplorer.com, 2003)
Figure 6. Highlighted municipal Site - 3 Primary School and Site - 4 Backstop locations within Chisago City. (From www.GlobeXplorer.com, 2003)
Figure 7. Highlighted municipal Site 5 - Schlimmer’s Point (Eagle Island) location within Chisago City. (From www.GlobeXplorer.com, 2003)
Figure 8. Highlighted municipal Site 6 - Rotary Club Trail - South of School Lake location within Chisago City. (From www.GlobeXplorer.com, 2003)
Figure 9. Highlighted municipal Site 7 - Prairie; Camp Ojiketa location within Chisago City. (From www.GlobeXplorer.com, 2003)
Table 4. Family level vegetation identification for the seven municipal sites, Chisago City, Minnesota, 2003.

<table>
<thead>
<tr>
<th>Herbaceous species</th>
<th>Water Tower Site</th>
<th>*Agricultural Field</th>
<th>Primary School</th>
<th>Backstop</th>
<th>*Schlimmer’s Point (Eagle Island)</th>
<th>Rotary Club Trail - South of School Lake</th>
<th>*Prairie, Camp Ojiketa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asters</td>
<td>Grasses (native and cultivated annual species)</td>
<td>Asters</td>
<td>Monarda</td>
<td>Cattails</td>
<td>Sweet Clover</td>
<td>Native and introduced grasses</td>
<td>Goldenrod</td>
</tr>
<tr>
<td>Ferns</td>
<td>Oat and other grasses</td>
<td>Oat and other grasses</td>
<td>Native and other grasses</td>
<td>Cocklebur</td>
<td>Black Eyed Susan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native grasses</td>
<td>Milkweed</td>
<td>Milkweed</td>
<td>Goldenrod</td>
<td>Goldenrod</td>
<td>Oat Grass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clover</td>
<td>Goldenrod</td>
<td>Goldenrod</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catnip</td>
<td>Cattails</td>
<td>Thistles</td>
<td></td>
<td></td>
<td>Aster</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue Eyed Grass (Iris)</td>
<td>Thistles</td>
<td>Hoary Vervain</td>
<td></td>
<td></td>
<td>Goldenrod</td>
<td>Reed Canary Grass</td>
<td></td>
</tr>
<tr>
<td>White Snakeroot</td>
<td>Burdocks/Cockleburs</td>
<td>Canada Thistle</td>
<td></td>
<td></td>
<td>Cattails</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cattails</td>
<td>Burdocks/Cockleburs</td>
<td>Monarda</td>
<td></td>
<td></td>
<td>Milkweed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burdocks/Cockleburs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submerged Lilies and Irises</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lemna</td>
<td>Goldenrod</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goldenrod</td>
<td>Milkweed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milkweed</td>
<td>Monarda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monarda</td>
<td>Thistles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Species</td>
<td>Water Tower Park</td>
<td>*Agricultural Field</td>
<td>Primary School</td>
<td>Backstop</td>
<td>*Schlimmer's Point (Eagle Island)</td>
<td>Rotary Club Trail -South of School Lake</td>
<td>*Prairie in Camp Ojiketa</td>
</tr>
<tr>
<td>---------------</td>
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<td>---------</td>
<td>-------------------------------</td>
<td>------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Boxelder</td>
<td>Willow</td>
<td>Staghorn Sumac</td>
<td>Oak</td>
<td>Sumac</td>
<td>Ash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspen</td>
<td>Dogwood</td>
<td>American Elm</td>
<td>Maple</td>
<td>White Cedar</td>
<td>Birch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspen/Cottonwood</td>
<td>American Elm</td>
<td>Red Pine-planted</td>
<td>Ash</td>
<td>Maple</td>
<td>Ash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oak</td>
<td>Sumac</td>
<td>Amur Maple</td>
<td>Boxelder</td>
<td>Maple</td>
<td>Ash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maple</td>
<td>Tamarack</td>
<td>Arborvitae</td>
<td>Ash</td>
<td>Birch</td>
<td>Sumac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ash</td>
<td>Cottonwood</td>
<td>Red Oak</td>
<td>Grapevine</td>
<td>Aspen</td>
<td>American Linden/Basswood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grapevine</td>
<td>White Pine</td>
<td>Basswood</td>
<td>American Linden/Basswood</td>
<td>Aspen</td>
<td>American Linden/Basswood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Locust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Elm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maple</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspen/Cottonwood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virginia Creeper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper Birch</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staghorn Sumac</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bur Oak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grapevine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Cedar</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Special Features**

- Creek and water habitat, many birds, and deer, does have downed trees, concrete, garbage, and metal
- Adjacent to Water Tower Park, very open
- Dried creek bed, right on school property
- Has older baseball backstop on property, borders Parmly property
- Has nesting Bald Eagles, only boat accessible
- Completely unused, reported heron habitat
- On Camp Ojiketa land, borders marsh land, mowed for maintenance, some interspersed trees

*These sites were inaccessible for accurate vegetation identification due to nature of ownership. Instead, the organisms listed were viewed from nearby locations and selected from ecosystems typical of that area.*
Table 5. Soil types and descriptions for recommended sites in Chisago City municipality. (From Soil Survey of Chisago, Minnesota, 1995)

<table>
<thead>
<tr>
<th>% cover</th>
<th>Soil #</th>
<th>Municipal Sites</th>
<th>Prime farmland (X = yes)</th>
<th>Paths &amp; trails</th>
<th>Picnic areas</th>
<th>Dwellings with basements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Watertower Park (Site 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80%</td>
<td>40B</td>
<td>Nebish loam 2-6% slopes</td>
<td>X</td>
<td>slight</td>
<td>slight</td>
<td>slight</td>
</tr>
<tr>
<td>10%</td>
<td>678</td>
<td>Beltrami loam thick solum</td>
<td>X</td>
<td>slight</td>
<td>moderate</td>
<td>severe</td>
</tr>
<tr>
<td>10%</td>
<td>544</td>
<td>Cathro muck</td>
<td></td>
<td></td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>40B</td>
<td>Nebish loam 2-6% slopes</td>
<td>X</td>
<td>slight</td>
<td>slight</td>
<td>slight</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural Field (Site 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80%</td>
<td>75</td>
<td>Bluffton loam</td>
<td></td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>13%</td>
<td>346</td>
<td>Talmoon loam</td>
<td>X</td>
<td>moderate</td>
<td>moderate</td>
<td>severe</td>
</tr>
<tr>
<td>7%</td>
<td>40B</td>
<td>Nebish loam 2-6% slopes</td>
<td>X</td>
<td>slight</td>
<td>slight</td>
<td>slight</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50%</td>
<td>40B</td>
<td>Nebish loam 2-6% slopes</td>
<td>X</td>
<td>slight</td>
<td>slight</td>
<td>slight</td>
</tr>
<tr>
<td>50%</td>
<td>346</td>
<td>Talmoon loam</td>
<td>X</td>
<td>moderate</td>
<td>moderate</td>
<td>severe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Backstop (Site 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>161</td>
<td>Isanti loamy fine sand</td>
<td></td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85%</td>
<td>540</td>
<td>Seelyeville muck</td>
<td></td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>15%</td>
<td>40F</td>
<td>Nebish loam 25-40% slopes</td>
<td></td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15%</td>
<td>40B</td>
<td>Nebish loam 2-6% slopes</td>
<td>X</td>
<td>slight</td>
<td>slight</td>
<td>slight</td>
</tr>
<tr>
<td>60%</td>
<td>346</td>
<td>Talmoon loam</td>
<td>X</td>
<td>moderate</td>
<td>moderate</td>
<td>severe</td>
</tr>
<tr>
<td>10%</td>
<td>75</td>
<td>Bluffton loam</td>
<td></td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
</tr>
<tr>
<td>15%</td>
<td>678</td>
<td>Beltrami loam thick solum</td>
<td>X</td>
<td>slight</td>
<td>moderate</td>
<td>severe</td>
</tr>
</tbody>
</table>

*Slight:* soil properties are generally favorable and limitations are minor and easily overcome  
*Moderate:* limitations can be overcome or alleviated by planning, design, or special maintenance.  
*Severe:* soil properties are unfavorable and limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.
Phased Growth sites were evaluated with a numerical point scale to reflect the urgency or perceived pressure on a particular site (Table 6). Phased growth sites were initially evaluated only if they fell within the 2002-2007 development zone (red), or the 2008-2012 development zone (orange) from the Phased Urban Growth Map of the Comprehensive Plan (Figure 3) (Thibault Associates 2002). This criteria requirement was of primary importance because we wanted to evaluate sites that had a likelihood of current or future development. If the given site satisfied these criteria, we evaluated its restoration or preservation potential. To assess sites for these criteria, we used the Minnesota Land Cover Classification System (MN DNR 2001). This system helped us quantify and describe existing vegetation and land use on the sites. Evaluating sites through this method determined whether remnant vegetation existed and if it could be preserved or whether some restoration of the site from its current land use was more appropriate. Next, the site had to satisfy a size requirement, greater than approximately 30 acres. The final criterion is a measurement of pressure as a result of development. This criteria evaluates future development, unexpected development, current development and no present development.

The largest Phased Growth site was approximately 50 acres, with the smallest site at 30 acres, as stipulated by the selected criteria (Table 7). Most of the sites evaluated were zoned as agricultural land in private ownership. Land management issues on each site predict that restoration, utilization, or other management could be employed and may be beneficial to the specific sites.

**Minnesota Land Cover Classification System**

As previously mentioned, the Minnesota Land Cover Classification System was used to evaluate existing and remnant vegetation on sites in the Phased Growth areas. All areas that fell within the 2002-2007 and the 2008-2012 development areas on the Phased Growth Map were evaluated with this system (Figure 10). From this primary evaluation, we selected example sites based on our criteria, each of which has unique combinations of land cover types. The dominate land cover types from the classification system assigned to the sites include use as pasture, row crops, mixed coniferous-deciduous forest, planted or maintained grasses or as artificial surfaces with sparse vegetation (Figures 11-15). The classification of each site allowed us to see where remnant vegetation existed and what types of local land use could influence the site in question.

Soil type on each of the sites varies widely (Table 8). Most of the soil is dominated by mucks and loams, many of which have large slopes. There are a few sites that have large quantities of loam with a very small slope that can be considered for building sites because they could support buildings, trails, and parks. Most of those sites are located on broad open areas, with some distance from waterways or lakeshore.
Table 6: Phased Growth Areas Selection Criteria, Chisago City, Minnesota, 2003.

<table>
<thead>
<tr>
<th>Sites Within Phased Growth Area</th>
<th>Future Developmen t Stage</th>
<th>Restorative Potential</th>
<th>Preservation Potential - Wildlife/Plant Communities</th>
<th>Size of Site (&gt;30 acres)</th>
<th>Pressure/Urgency of Protection</th>
<th>Total</th>
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<td>6</td>
</tr>
<tr>
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<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
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<td>Private</td>
<td>Nebish loam 12-15% slopes/</td>
<td>Wetland preservation</td>
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<td>Restoration</td>
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<td>Rural/ Agricultural</td>
<td>Private</td>
<td>Talmoon loam</td>
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Table 7: Characteristics of Sites in Phased Growth Areas, Chisago City, Minnesota, 2003.
Table 8. Soil types and descriptions from sites in Phased Urban Growth Areas, Chisago City, Minnesota, 2003. (From Soil Survey of Chisago, Minnesota, 1995).

<table>
<thead>
<tr>
<th>% cover</th>
<th>Soil #</th>
<th>Phased Growth Sites</th>
<th>Prime farmland</th>
<th>Paths &amp; Trails</th>
<th>Picnic areas</th>
<th>Dwellings w/ basements</th>
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</thead>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>Seelyeville muck</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
<td></td>
</tr>
<tr>
<td>25%</td>
<td>40D</td>
<td>Nebish loam 12-15% slopes</td>
<td>moderate</td>
<td>severe</td>
<td>severe</td>
<td></td>
</tr>
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<td>Nebish loam 25-40% slopes</td>
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</tr>
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<td>slight</td>
<td>slight</td>
</tr>
<tr>
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<td>678</td>
<td>Beltrami loam thick solum</td>
<td>X</td>
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<td>moderate</td>
<td>severe</td>
</tr>
<tr>
<td>2%</td>
<td>40C</td>
<td>Nebish loam 6-12% slopes</td>
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<td>moderate</td>
<td>moderate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
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<td>40D</td>
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<tr>
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<td>Nebish loam 2-6% slopes</td>
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<td>severe</td>
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<tr>
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<td>161</td>
<td>Isanti loamy fine sand</td>
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<td>severe</td>
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<tr>
<td>1%</td>
<td>544</td>
<td>Cathro muck</td>
<td>severe</td>
<td>severe</td>
<td>severe</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Lake Ellen/Lake Emily</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>544</td>
<td>Cathro muck</td>
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</tr>
<tr>
<td>25%</td>
<td>40C</td>
<td>Nebish loam 6-12% slopes</td>
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<td>moderate</td>
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<td></td>
</tr>
<tr>
<td>25%</td>
<td>678</td>
<td>Beltrami loam thick solum</td>
<td>X</td>
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<td>moderate</td>
<td>severe</td>
</tr>
<tr>
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</tr>
<tr>
<td>5%</td>
<td>40D</td>
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<tr>
<td>15%</td>
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Table 8 continued.

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<th>% cover</th>
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<th>Prime farmland</th>
<th>Paths &amp; Trails</th>
<th>Picnic areas</th>
<th>Dwellings w/ basements</th>
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<td>Beltrami loam thick solum</td>
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</tr>
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<tr>
<td>5%</td>
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<td>Bluffton loam</td>
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<tr>
<td>20%</td>
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<td>severe</td>
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<td>161</td>
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<td>severe</td>
<td>severe</td>
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<td>severe</td>
</tr>
<tr>
<td>2%</td>
<td>544</td>
<td>Cathro muck</td>
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<tr>
<td>80%</td>
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<td>Talmoon loam</td>
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<td>Markey muck</td>
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</tbody>
</table>

*Slight:* soil properties are generally favorable and limitations are minor and easily overcome  
*Moderate:* limitations can be overcome or alleviated by planning, design, or special maintenance.  
*Severe:* soil properties are unfavorable and limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.
Figure 10: Phased Growth Vegetation Classification (Superimposed on map from Thibault 2003)

1 square=500 sq ft

- 131 Artificial/sparse trees
- 140 Artificial <25% vegetation
- 618 Wetland, emergent vegetation
- 222 Planted shrub/vine vegetation
- 612 Medium-tall grassland
- 331 Coniferous/deciduous mix (upland)

- 241 Row crops
- 233 Maintained grasses
- 132 <10% impervious w/perennial grasses
- 323 Deciduous/wetland
- 321 Deciduous forest
- 614 Wetland/grasses
- 121 Artificial surface with con/dec shrubs
- 242 Closely seeded cropland
232 Planted or maintained grasses
618 Permanently flooded emergent vegetation
331 Mixed coniferous-deciduous forest
241 Row crops (corn)
142 Exposed earth
211 Planted, maintained or cultivated coniferous trees
Water

Figure 11: Land Classification of Site A - North of School Lake
131 Artificial surfaces with perennial grasses with sparse trees
618 Permanently flooded emergent vegetation
331 Mixed coniferous-deciduous forest
241 Row crops (corn)
321 Deciduous forest
Generally urbanized
Water

Figure 12: Land Classification of Site B - North of Wallmark Lake
Figure 13: Land Classification of Site C - Lake Ellen/Lake Emily
233 Planted or maintained grasses or forbs
618 Permanently flooded emergent vegetation
331 Mixed coniferous-deciduous forest
241 Row crops (corn)
131 Artificial surface with sparse trees (25-90% vegetative cover)
Water

Figure 14: Land Classification of Site D - South of Green Lake
131 Artificial surfaces with perennial grasses with sparse trees
618 Permanently flooded emergent vegetation
331 Mixed coniferous-deciduous forest
241 Row crops
140 Artificial surfaces, less than 25% vegetation
          Generally urbanized
          Water

Figure 15: Land Classification of Site E - Lindberg Farm
Recommendations

In any community, natural features management based on preservation, restoration, and utilization are vital for overall community health. Preserving healthy natural features is an important means by which to retain quality habitat, highlight the aesthetic value of entire natural systems, and protect recreation dependent upon those features. Restoration management is an equally important way to recover aesthetic and economic value that has been lost due to neglect. Utilization is also an effective strategy, as natural features can be managed to increase the quality of life and realize full economic potential.

In each management option, managers have to evaluate the values provided by each natural feature. A natural feature’s intrinsic value is measured by its ability to provide quality habitat for wildlife and vegetation within an area or community; sites with substantial intrinsic value often have rich species biodiversity. Aesthetic value is based on citizens’ view of the landscape and the emotional value they associate with picturesque features, such as lakes in a community. Economic value is defined in terms of the opportunities natural features can provide for purposes such as education, recreation, fishing, or tourism. To apply the proper management tool, and use managers must assess the intrinsic, aesthetic, and economic value of natural features that will ultimately determine the quality of natural areas in a community.

Chisago City has several opportunities to enhance the quality of existing natural features. The following recommendations are examples of how the community can accentuate the multiple values of a site and enhance the important features found there. Recommendations are divided into two groups. On one hand, recommendations for sites within the municipality demonstrate what can be done for natural features in areas that have already been developed. On the other hand, recommendations for sites within the Phased Urban Growth Area demonstrate what can be planned for natural features in the future as Chisago City continues to expand (Figure 4).

Recommendations for sites within Chisago City

Recommendation 1: Preservation of Schlimmer’s Point and Prairie in Camp Ojiketa

Preservation is a management strategy for saving wildlife and natural features that currently exist, a genuine benefit for Chisago City. Preserved areas increase the quality of life through aesthetically pleasing views as well increasing intrinsic value in the knowledge that healthy wildlife populations exist in the community (Duerksen et al. 1997). Preservation management strategies also lead to increased biodiversity and improved water systems. In addition, these areas can serve as a links to the past through educational efforts demonstrating how surrounding areas looked prior to
development. Preserved natural features serve as a foundation for enhanced recreation opportunities, tourism, and land values.

**Schlimmer’s Point Site:** This site is an island off the Southeastern shore of Chisago Lake (Figure 7). This site’s preservation priority is a bald eagle’s nest that exists on the southern shore of the island. The primary management goal for Schlimmer’s Point is to ensure that the bald eagle is safe and undisturbed so that it continues to return to the nest. Bald eagles are valuable species for their ecological and aesthetic importance. As top level predators, eagles keep the populations of their prey under control. They are also beautiful to view as they soar effortlessly above homes and recreational boaters. As a threatened species protected by law, bald eagles are rare and users of Chisago Lake are fortunate to have the opportunity to see them (DNR 2002).

Currently, Schlimmer’s Point is privately owned and managed. The vegetation is mostly woodlands and low brush (Table 3). Preserving the natural vegetation would encourage a variety of wildlife, especially the continued nesting of eagle pairs. Preserving tall trees, including dead snags, give eagles nesting and perching options in the event that a disturbance such as a blow-down, eliminates the eagle’s current nesting tree.

Two suggested options for encouraging preservation of this site include private landowner easements and education of recreational users in the area. Working with the landowner is vital for preserving Schlimmer’s Point. The city can advocate responsible land management while establishing a relationship with the current land owner. One land management technique that should be considered is a conservation easement. This technique would encourage the owner to protect the island as habitat for the eagle and other wildlife (Appendix B). Meanwhile, the city would benefit from the relationship by retaining such a remarkable bird in the community. Educating the public and lake recreational users about the eagle’s presence would help them to avoid disturbing it. Education coupled with conservation easement strategies strengthens the community’s planning decisions and also makes local governments and citizens alike more confident in future land use decisions (Allman 1997). Educational opportunities include creating signage on and near the island and also at boat access sites. A community outreach program is another option for public education.

**Prairie Site in Camp Ojiketa:** This site is located on the eastern shore of Green Lake along Highway 23 (Figure 9). Tracts of native prairie are rare as well as ecologically and aesthetically valuable to the community. The root systems of the prairie grasses protect the top soil from erosion, which protects the watershed from sedimentation. Prairies are also biologically diverse. This diversity allows them to thrive even when conditions are poor. Certain prairie flowers are able to bloom even in dry seasons when other plants are withered. Protecting natural areas like this prairie goes beyond
mere plant protection. It also provides corridors for diverse fauna to travel through (Table 3).

This restored prairie is privately owned by Camp Ojiketa. The City of Chisago could begin conversations with the owners of Camp Ojiketa to find an agreement that would benefit the camp and also preserve the prairie for the benefit of the city. One option for these parties to consider is a conservation easement. This would restrict the uses allowed on the prairie to protect it from development or other activities that would harm the natural community. This could be done through an agreement between the city and the camp or with a land trust organization (Appendix B). Overall, preservation management of the few remaining intact sites within Chisago City will provide intrinsic, aesthetic, and economic value for the community.

Recommendation 2: Restoration of Primary Elementary School Site and the Backstop Site

Restoration management is the primary recommendation for two sites within Chisago City. “Restoring ecosystems is regarded as one of few ways to reverse trends of environmental degradation caused by unsuitable land uses. Attempts to cultivate marginal lands, to intensively graze arid lands, and to urbanize unstable lands have resulted in landscapes possessing few cultural or natural benefits to society. There is growing interest in restoring ecosystems to improve water quality, increase biodiversity, reduce soil loss, and minimize catastrophic flooding” (Galatowitsch 1996). Successful restoration management techniques range from controlling exotic species to the reintroduction of native species (NLREEP 2003). The key to restoration is finding a site that has the potential to increase in value as a result of the management strategy; in Chisago City, the ultimate goal of restoration is to ensure that land value increases for residents of the community.

Though it can be a fairly simple means by which to increase land value, restoration often involves technical challenges. A few of the challenges include planning, selecting appropriate techniques, and consulting with restoration experts (Allman 1997). Planning will necessitate public involvement by a workforce if restoration projects are to be successful. Selecting appropriate restoration methods can be another challenge, as inappropriate methods can have negative impacts if they are not suitable for the specific system. Restoration efforts often require professional consultation, but funding is necessary to acquire their services. Communities can reduce this expense by working with nonprofit organizations, locally based experts, and/or service groups such as the Boy Scouts of America.

Communities across the country have successfully restored their natural features, thereby increasing the value of those features. The Fairmount Park Commission in suburban Philadelphia has been remarkably successful in motivating citizens to contribute to restoration efforts. By involving community members in ecological restoration projects such as streambank restorations, invasive species removals, and
general cleanups, the Park Commission has invested citizens in their community’s health and simultaneously decreased the cost of restoration (Appendix C).

**Primary School**: site is located west of Green Lake on County Road (Figure 6). Prominent natural features on this site include a dry creek bed and prairie-like vegetation (Table 4). This site presently has a healthy population of native species; however, it also contains exotic species such as purple loosestrife and non-native species such as black locust. Given its location in the center of the community, the Primary School site has the potential to be used by a great number of Chisago City residents if the site is properly restored.

One easy restoration technique involves simply removing the agronomic weeds and invasive species on this site. Given the very small population of purple loosestrife currently inhabiting the area, eradication of the species require is a very realistic goal. (Details on specific techniques for eradicating invasive species can be found in Appendix C of this report.) Once the area has been cleared of invasive species, the next step is to reintroduce native prairie species (Appendix C). The site’s public ownership status, coupled with its current vegetative cover, renders it a very viable candidate for restoration. A coordinated volunteer effort could easily restore much of this site’s original value (Table 3).

If this site is replanted with native vegetation, students from the Primary School can learn about natural prairies of Minnesota through hands-on interaction with this restored ecosystem. To that end, students can become actively involved in the restoration effort. Parents stand to benefit as well: they can participate in the restoration with their children or, like other members of the community, simply enjoy the aesthetic benefits that will come with a restored Primary School site. This site has great potential to serve as an educational tool for students and other residents of Chisago City alike.

**Backstop Site**: This site is situated on County Road 23 across from the Primary School site (Figure 6). This site contains a neglected baseball field and is surrounded by a mix of native prairie vegetation and non-native plant cover (Table 4). This site’s high multiuse potential makes it a prime candidate for restoration. Specifically, the baseball diamond can be restored for its intended use, while the prairie perimeter can be linked to the restored Primary School to create an expansive natural feature within an urban environment. This land is currently under private ownership, and given that the grass on the site is occasionally mowed, it is actively maintained to some extent. With this site’s close proximity to the Primary School, a restored prairie could increase both sites’ potential for educational usage.

Similar concerns exist for the Backstop Site and the Primary School, particularly the agronomic weed populations and non-native species. As a result, many of the same restoration techniques used on the Primary School site can be employed here.
Removing weeds would be a realistic first step, followed by revegetation with native species (Appendix C). Then, the degraded baseball diamond could be refurbished and brought back to a useable state. Again, this site’s location in the center of Chisago City means that, adequately restored, it could serve as a resource for many residents of the community. To achieve these restoration goals, it may be necessary for the city to form a partnership with the private landowner. In this way, the community benefits from use of the property while the landowner retains rights to the land. From the landowner’s perspective, inspiration often stems from a desire to strengthen community identity (DNR 2003). On the other hand, given the site’s small acreage, the city may be in a position to realistically acquire this property outright (Appendix D). Motivated by escalating property taxes and/or tax incentives associated with donating land to public agencies, landowners are often open to an outright donation of property (Allman 1997). Chisago City would be wise to explore either of these two options as it relates to restoration efforts on the Backstop Site.

Recommendation 3: Utilization of Water Tower Park Site, Agricultural Field Site, and the Rotary Club-South of School Lake Site

The primary goal of utilization is to create opportunities based on natural features for environmental education, tourism, recreation, and economic value. The natural features and characteristics of a particular site determine the uses that are ultimately available for communities.

Utilization is needed on sites with high potential that are unused or underused. These types of sites can range from run-down building sites to formerly grazed pasture or agricultural land that is now fallow. Recognizing and acknowledging that a site could be better used for another purpose protects that site from being lost permanently. For example, when land use is optimized and a trail is established or a park is created, it often provides an economic boon to tourism. In addition, creating new value in natural features enhances a community’s image, drawing new businesses to the region. As the city’s image improves through efficient planning and conscientious use of resources, the economic value of utilizing underused natural features becomes evident.

**Water Tower Park Site:** This site, which is located north of Highway 8, contains wetlands, woodlands, and a free flowing stream system (Figure 5). Common buckthorn, a problematic and invasive species found throughout Minnesota, is also present on the site (Table 4). The site does have some lightly used trails. The site is easily found within the city and is well known to the community. Water Tower Park is in close proximity to a large neighborhood in need of recreational opportunities. The property is owned by Chisago City, therefore providing a wide range of future utilization management options. The wetlands appear to be intact, but would need to be assessed at a higher technical level to ascertain the best utilization option for this natural feature. The woodlands support a diverse array of woody and herbaceous species that could be identified for educational purposes (Table 4).
Buckthorn removal would be a necessary step towards utilization in the woodland area (Appendix C). The infestation is still relatively low, which makes removal a feasible option that should be undertaken before buckthorn out-competes native woodland species. Removing the remaining pieces of concrete, culverts, and other debris would also need to be done to allow the site to be utilized best. Major soil types on the site are adequate for constructing trails, buildings, or other structures that would be appropriate for the intended use of Water Tower Park (Table 5). Once these necessary steps have been taken, full utilization of the natural features on this site is possible as outlined by the Chisago City Park Board (City of Chisago 2002).

**Agricultural Field Site:** This site is located north of Highway 8 adjacent to the Water Tower Park site (Figure 5). This area has relatively flat topography and high quality soils with minimal building limitations (Table 5). This privately owned land is currently used in an agricultural setting. The site also contains a woodland border with a species composition much like that of the Water Tower Park site (Table 4). Though the land is easily accessed by newly constructed trails and by paved roads, utilization of this site depends on the wishes of the current owner. Similar to the strategies outlined in the Backstop Site recommendation, the city can proactively begin a dialogue with the land owner about cooperative management strategies. In doing so, both sides can work to realize the high value of the natural features that exist there.

**Rotary Club Trail - South of School Lake Site:** This site is located around the southern and southeastern shores of School Lake (Figure 8). There are two fairly distinct areas within this site, as it encompasses not only the southern shores of School Lake, but also extends into a flat agricultural land to the south. The shoreline, where the Rotary Club is already planning to build a walking trail, is lined with woodland species and grasses and serves as habitat for many waterfowl and other birds (Table 4). In addition, it also serves as an important buffer between the lake system and the surrounding landscape. Buffers such as this are critically important to ecosystem health because they reduce and slow runoff, filter remaining runoff, and increase infiltration into the soil system (DNR 2003). The flat agricultural land that lines the lakeshore contains many agronomic weeds and is generally void of native vegetation. Chisago City currently owns the entire land parcel, and although there are no active land uses for the flat open portion of the site, this ownership status facilitates future land management decisions concerning the site’s natural features. The flat open area could be utilized through passive land management strategies; because future development in the area is likely, this management can be effectively executed with a minimal investment of time and money. Simply seeding native grasses or other vegetation can improve the aesthetic value, improve soil quality, and enhance habitat integrity for wildlife (Prairie Restorations Inc. 2003). In addition, debris from former land uses on the site would need to be removed for this site to be fully utilized.
Effective utilization of sites within Chisago City can enhance the economic values of the city by improving the natural features. These site descriptions illustrate what can be changed about specific natural features so that sites are utilized as the city deems appropriate.

**Recommendations for Sites in Phased Urban Growth Areas**

**Recommendation 4: Preservation of Site North of School Lake, Site North of Wallmark Lake, and Site South of Green Lake**

After evaluating Phased Urban Growth Areas, certain sites have emerged as having high preservation potential. As previously mentioned, preservation gives the community an improved quality of life through aesthetic and intrinsic values. In addition, preserving valuable natural features helps to maintain the rural character of the Chisago Lakes area (Heyer 1990). Citizens of Chisago City have indicated that parks and open spaces are important to the community. Preservation management strategies can help to balance development with natural features protection for parks and open spaces.

*North of School Lake*: This site is just northwest of Highway 77, located between School Lake and Lake Mattson (Figure 4). Natural features on this site include substantial woodlands and lakeshore (Table 7). In addition, the site possesses rural character and has numerous pastoral views. According to the Phased Urban Growth Map, development in this area was not anticipated before 2008, but housing developments are currently under construction. Nevertheless, many of the unique natural features in this area are still intact, and the city has an opportunity to preserve the natural features of the area before further development begins. Preservation efforts in and around this site will support intrinsic values of a functioning ecosystem as well as enhance the economic value of homes nearby.

Kept intact through a long-term preservation strategy, the site could potentially reduce habitat fragmentation and increase connectivity with other natural features, creating a natural wildlife corridor in the process (DNR 2002). Functioning properly, wildlife corridors facilitate the natural movement of animals across a variety of ecosystems with minimal interaction with streets and other human structures. Due to the site’s proximity to the Carlos Avery Wildlife Refuge, the natural features on this site could contribute to an viable corridor for wildlife movement in the Chisago Lakes region (Appendix F). This site could also create a corridor around School Lake, linking it to the Rotary Club Trail to the south. This natural area corridor would also serve as a buffer zone between lakeshore and housing developments, establishing a greenbelt like that described in the Comprehensive Plan (Thibault Associates 2002).

To employ these preservation suggestions, significant planning and coordination are necessary. The city can explore a number of options for preserving the natural features of the site, among them encouraging landowners to apply responsible land
management practices. Effective landowner education involves providing stakeholders with: “An understanding of the value of natural areas in general, the particular features and basic needs of natural communities characteristic of the region, the impacts of varying land uses, optional protection tools, and appropriate conservation practices” (Allman 1997). This approach is less intensive than land management strategies such as easements and land trusts, but if conducted effectively, landowner education programs can positively impact the health and sustainability of natural areas (Allman 1997). Another suggestion is to work with the landowners in the area to directly obtain land for preservation uses. This could be achieved through easements or other partnerships between the city and the landowner. (Conservation easements are discussed in more depth in Appendix B of this report.)

*North of Wallmark Lake:* This site is located east of Highway 77 and directly north of Wallmark Lake (Figure 4). This site is situated between residential developments. The area is predicted to be developed between 2002–2007 (Figure 3). This area contains a free-flowing stream, wetlands, and a natural corridor to Wallmark Lake. The northwestern portion of the site is bordered by agriculturally dominated land use, while land to the northeast has been developed for residential housing (Figure 12). This site, with its important riparian zone, is ideally positioned to act as a buffer between Wallmark Lake to the south and agricultural or residential pressures to the north. In addition, the site could function as a wildlife corridor, allowing for the unrestricted movement of animal species. Any strategy employed at this site—whether easements, other land acquisition methods, or general homeowner education programs—needs to invest the community in the principles behind preservation.

*South of Green Lake:* This site is located east of County Road 23 and south of Green Lake (Figure 4). This site lies in an area where development is predicted to occur between 2008–2012 (Figure 3). Long-term expansion of Chisago City will occur to the south, as much of the area north of Highway 8 has been or is being developed. In terms of natural features, this area is dominated by open pastures, wetlands, and rolling hills (Figure 14). In addition, this site extends to the southwestern border of Chisago Lake, one of the largest lakes in the area. Although expansion in a southerly direction may not occur until 2008, the valuable natural features present in this large site lend added urgency to a long-term preservation management plan.

By pursuing preservation options before expansion accelerates, Chisago City would be taking a proactive approach to setting aside land and vegetation that is aesthetically valuable. Chisago City can meet its goal of controlling the amount of growth that occurs if they begin to acquire and preserve natural features in and around this site. This is identified as a priority listed in the city’s Comprehensive Plan (Thibault 2002). Another important component of preservation within this site involves shoreline protection principles as laid out by the Minnesota Department of Natural Resources.
(Appendix G). Preserving the area to the south of Chisago City’s lake system can also have positive impact on the hydrology and water quality of the entire region.

**Recommendation 5: Restoration of Lake Ellen/Lake Emily site**

*Lake Ellen/Lake Emily Site:* This site is situated west of Little Green Lake and just north of Highway 8 (Figure 4). The lakes are two of the smaller water bodies in the Chisago Lakes region, but the site surrounding these two lakes is home to valuable natural features such as woodland borders, shoreline, and a broad open field (Figure 13).

On this site, between these two bodies of water, is a large piece of land with high restoration potential. This piece of land is sandwiched between several housing developments, and although neighborhood residents currently utilize the area around the lakes for recreational activities such as walking, the potential exists for even greater use on this site.

There are several ways in which this site can be restored to natural prairie conditions, thereby achieving greater aesthetic and economic value. One option would be to have the city develop a partnership with the private landowner, ultimately working to enroll the landowner in a Landowner Registry Program. This type of program can be easily initiated by a local government agency, and they provide incentives for landowners to adopt responsible management practices. Recognition of enrollment usually takes the form of a plaque or certificate, and although this may seem unlikely to entice a landowner to significantly alter his management methods, it can be surprisingly effective.

Landowner Registry Programs offer professional assistance to landowners concerning their management practices, an offer that appeals to landowners; often it is this tradeoff, coupled with a desire to act as a responsible steward of the land, that convinces landowners to enroll (Allman 1997). Similarly, a conservation easement in the future is a possibility for this site. Given its unique location and high restorative potential, the prospect exists that a landowner could be persuaded to donate the management rights in exchange for monetary compensation. (Again, conservation easements are discussed in more detail in Appendix B of this report.)

**Recommendation 6: Utilization of Lindberg Farm**

*Lindberg Farm:* This site located just east of Highway 8 (Figure 4). This large tract of land bordering Green Lake has the potential to fulfill a number of roles for Chisago City. Prominent natural features on the site include dense woodland, lakeshore, and level terrain (Figure 15). The site is easily accessible from the highway as well as the waterfront, and the lakeshore provides numerous opportunities for aquatic-based activities. The soil is high quality and very suitable for construction.
Although the land is privately owned, the possibility exists again for Chisago City to establish a partnership with the current landowner. This land is currently serving as an agricultural site, but given the quality of its natural features this site could also be utilized under different land management practices. Fortunately, the steps that would need to be taken prior to adoption of new management techniques are not overwhelming because site reclamation or restoration is not necessary. In fact, with an agreement in place between the current landowner and Chisago City, a new land management strategy could be immediately implemented. This site, because of its large size, meets the requirements for the large park set out in the Comprehensive Plan; if this land could be procured, that specific land use designation would be a viable option for Chisago City. Strategies for overcoming financial obstacles in obtaining land management rights are outlined in Appendix H.

Conclusions

Chisago City is home to a wide variety of valuable natural features. The objective of this report was to inventory the natural features of Chisago City and, through an analysis of our findings, provide recommendations for land use management options. We spent many hours identifying natural features on sites located within the municipality, and we spent a great deal of time inventorying the natural features on sites inside the Phased Urban Growth Area. After determining that a particular site contained valuable natural features, we classified the natural flora and fauna present on that site and offered recommendations for possible land use strategies, namely preservation, restoration, or utilization. Employing these land management options appropriately, Chisago City can actively increase the value of its natural features.

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http://prairieresto.com/index.html
Appendix A: Soil Descriptions for Soil Types Found Within the Chisago City Area

40B  Well drained soil used for corn, soybeans, small grain and hay

40C  Well drained used for corn, soybeans, small grain, and hay

40D  Well mostly high topography unusable for agriculture

40F  Same as 40D only more extreme

75  Bluffton loam very poorly drained major crops are soybeans, corn, and small grain. Drainage system would be needed for this soil

161  Isanti loamy fine sand: very poorly drained soil. Corn, soybeans and, small grain are major crops and a drainage system would be needed for this soil.

346  Talmoon loam: poorly drained major crops are corn, soybeans, and small grain and a drainage system would be needed for this type.

540  Seelyeville muck: very poorly drained major crops are corn, specialty crops, and cultured sod and a drainage system would be needed.

543  Markey Muck: very poorly drained. Major crops are specialty crops, cultured sod, and corn.

544  Catro muck: very poorly drained. Major crops are specialty crops, cultured sod, and corn and a drainage system would be needed.

678  Beltrami loam, thick solum: somewhat poorly drained and moderately will drained. Major crops are corn, soybeans, small grain, and hay.

722  Blomford loamy sand, lacustrine substratum: poorly drained major crops are corn, soybeans, and hay. A drainage system would be needed.

726  Kratka loamy fine sand, thick solum: very poorly drained and major crops are corn and small grain. A drainage system would be needed for this soil.
Appendix B: Conservation Easement Definition and Information

Adapted from *Land Protection Options; A Handbook for Minnesota Landowners*. The Nature Conservancy, the Minnesota Department of Natural Resources, The Trust for Public Land, and the Minnesota Land Trust.

Conservation easements are a voluntary way for landowners can ensure a piece of property is perpetually protected, while at the same time retain the property title. In these legally-binding agreements, the landowner sells the management rights to a public or private organization. Easements represent a very appealing tool for preserving natural areas. For the landowner, benefits include not only the comfort of knowing that a property will be permanently preserved, but also the economic advantages of entering into such a contract. Although the terms of each easement are agreed upon on an individual basis, nearly all contain tax incentives for the individual relinquishing the land management rights. If the agency purchasing the easement is a local government, the benefits derived are two-fold: they have protected a valuable natural area into perpetuity, and they have ensured that the land remains under private ownership (and is still subject to property taxes at a lower rate).

Definition of a “conservation easement” as by Chapter 84C of the Minnesota Statutes: “a conservation easement may be established on land in order to assure its availability for agricultural, forest, recreational, or open space use, protecting natural resources, maintaining or enhancing air or water quality, or preserving the historical, architectural, archaeological, or cultural aspects.”

Conservation easement provisions may limit:
- **Structure construction, location, renovation**
- **Utility expansion**
- **Agricultural use (grazing, haying, tilling) or specified areas, while allowing such uses in other areas covered by the easement**
- **Alteration of water bodies and courses**
- **Removal or alteration of vegetation, except for specified purposes**
- **Extent of recreation use**
- **Extent of motorized vehicle use in specified areas**

Key aspects of perpetual conservation easements:
- **Landowner retains title to the property and all associated rights and obligations of ownership aside from those that are restricted and transferred to the organization in the easement**
- **Property retains its private status; an easement does not require that land be open to the public unless access has been agreed to by the landowner**
- **May be donated or sold to a qualifying organization**
- **Runs with the title to land; all future owners are bound by its terms**
C  May dramatically reduce property’s resale value
C  Does not freeze a property’s value; values may still be expected to rise over time, although not at the rate of unrestricted properties
Appendix C: Restoration Project Example Websites

There are many sites on the internet that may help with restoration techniques.

The Windstar Land Conservancy is an organization in charge of a 1000 acre plot of land in Colorado. On their site they give details about projects they are working on within this land. They talk about restoring ponds and irrigation systems. They also mention monitoring.
http://www.wstar.org/Windstar/LandConservancy/wlands.htm

The Fairmont Park Commission in Pennsylvania has restored many areas into parks. They explain in detail each park and the process on how it was restored. They include pictures on their website to see what the parks have become. Included are links to other similar sites involved with species and restoration in general.
http://www.nlreep.org/

The National Park Service also has a site on the internet that contains a detailed account on restoration at a specific site. From definitions to roles and responsibilities, this could be used as a sort of precedent for land restoration.
http://www.nature.nps.gov/rm77/Restore.htm

Another great site is the University of Minnesota Horticultural restoration techniques. This site provides programs and extensive information on restoration and different areas where this has been implemented. It also gives an extensive overview on why we restore lands.
http://www.hort.agri.umn.edu/h5015/rrr.htm
Appendix D: References for Restoration Techniques, Easements, and Land Conservation Options

Exotic species awareness and eradication

Invasive aquatic species information:
www.protectyourwaters.net

Invasive/harmful exotic species programs and links:
http://www.dnr.state.mn.us/exotics/links.html

Native species, threatened species and prairie restoration


Minnesota's Native Prairie Bank Program:
http://www.dnr.state.mn.us/prairierestoration/prairiebank.html

Minnesota's Native Plants, Selected Technical References:
http://files.dnr.state.mn.us/ecological_services/nhnrp/BIBTECH.pdf

Minnesota’s Native Vegetation: A Key to Natural Communities:
http://files.dnr.state.mn.us/ecological_services/nhnrp/nckey.pdf

Minnesota's List of Endangered, Threatened, and Special Concern Species:
http://www.dnr.state.mn.us/ecological_services/pubs.html

Land management strategies

Land Protection Options; A handbook for Minnesota Landowners, The Nature Conservancy, Minnesota Department of Natural Resources, Trust for Public Land, and Minnesota Land Trust: http://files.dnr.state.mn.us/assistance/landprot.pdf

Natural Areas: Protecting A Vital Community Asset, A Sourcebook for Minnesota Local Governments and Citizens, Laurie Allman:

Appendix E: Land Acquisition Techniques for Local Governments


A. Local Government Land Acquisition to Protect Natural Areas

What it is:
The transfer of land (by purchase or donation) from private to public ownership, so that title is held by a local government unit

What it accomplishes:
Local control over the use and development of a property, including right to manage public access in order to sustain the site's natural features and processes

When it may be appropriate:
1) When local residents are generally supportive of the site's protection and its designation as a natural preserve and/or a site has natural features of local, regional, or state significance
2) When the community has the capability (human and financial resources) to provide for the site's management on an ongoing basis

B. Acquisition by Private Conservation Organizations and by State and Federal Natural Resource Agencies that Specialize in Natural Areas Protection

What it is:
Land is acquired by a private conservation organization or by a government entity other than the local government unit

What it accomplishes:
Management of the site according to the mission of the acquiring organization or agency, giving priority to those features the considers significant

When it may be appropriate:
1) When the acquiring agency's goals for the site promote the overall integrity of the site's natural features and are compatible with those aspects of the site valued by the local community
2) When the acquiring agency has expertise in management of the site to protect those functions and features of value to the community
3) As an alternative when a local unit of government would like to see an area designated for protection but does not wish to (or is unable to) take on the responsibilities or costs of acquiring/managing the land
4) When the site contains outstanding natural features of state or regional significance
**C. Perpetual Conservation Easements**

*What it is:*
A legally binding agreement made between a landowner (public or private) and a qualifying organization (also public or private), in which permanent limits are established on a property's use and development

*What it accomplishes:*
Permanent protection for a site's natural features, to the degree that such protection is provided for in the terms of the easement

*When it may be appropriate:*
1) To protect the natural and open space values of public land planned for sale to private parties or to other public agencies
2) To provide permanent protection of required open space in subdivisions and other developments
3) To provide the appropriate level of protection for highly fragile and environmentally sensitive features (e.g., groundwater recharge areas, high quality natural communities, rare species habitat) that are found within existing public parks or on other public lands
4) To promote voluntary private landowner conservation measures

**D. Transfer of Development Rights (TDR) Programs**

*What it is:*
A system adopted by a local unit of government in which landowners in a designated preservation (also called "sending") zone may sell development rights to a broker or land developer, who then uses the purchased rights to increase their allowable building density in another area designated as a "receiving" zone

*What it accomplishes:*
A reduction in level of development that occurs in the sending zone, thereby serving the purpose of protecting natural areas, agricultural lands, and other open space land values, while compensating landowners who relinquish specified development rights to their property

*When it may be appropriate:*
1) When there is high demand for housing or other development in the receiving zone, such that a good market may be expected for the development credits offered for sale by landowners in the sending zone
2) When the administering government agency has the resources necessary to set up and oversee the program on an ongoing basis
3) When protection from development is sought for a specific geographic area
4) When residents residing in the receiving zone are amenable to the increased density such a plan would bring to their area
E. Purchase of Development Rights (PDR) Programs

What it is:
A formal program by which a unit of government or nonprofit organization purchases conservation easements (development rights) to privately owned land for the purpose of protecting the land's natural features, open space or agricultural values. Commonly set up with a "willing seller" policy.

What it accomplishes:
Keeps land in private ownership while establishing permanent, legally binding protection for a site's natural features, to the degree that such protection is specified in the terms of the easements

When it may be appropriate:
1) When a funding mechanism can be identified to finance the purchase of easements
2) When the administering unit of government or nonprofit organization has the staffing and administrative capability to set up and oversee the program on an ongoing basis
3) As an alternative for local protection of high priority natural areas when a community does not have the financial resources to acquire fee simple interest
4) When a local government unit prefers protection methods that compensate landowners for restricted development, as opposed to limiting development through zoning or other regulatory means

G. Multilevel Government Partnerships

What it is:
Representatives from two or more jurisdictions work cooperatively to make decisions regarding the management and use of a resource such as a watershed, natural area, or system of natural areas in which all jurisdictions share an interest. May be informal (as in a cooperative agreement related to specific project) or formal (as in creation of a permanent special district with an official governing body)

What it accomplishes:
Opportunity to incorporate the varied perspectives and interests of the different jurisdictions into the vision for management of a natural asset, to provide a unified approach to management for natural areas or features that cross jurisdictional boundaries, and (in some cases) to create a vehicle for raising and directing funds toward its management and protection

When it may be appropriate:
1) For natural areas in public or private ownership that cross jurisdictional boundaries
2) For adjacent properties owned by differing public entities, such as a parcel of city-owned land adjacent to a parcel of land owned and managed by the county or state
3) To pool resources for a particular land protection project or initiative
Green Corridors

Picture it. It’s a network of wild lands, farms, and open spaces laced together across large expanses of two counties. These counties, Washington County and Chisago County, are not isolated from development. Rather, they lie directly in the path of booming expansion from a large metro area. Still, they have managed to retain these green corridors of public and private land where native plants and wildlife can thrive, and where family farms drive the seasons with their time-honored cycles of planting and harvesting. There is confidence among residents that these lands will forever remain as open space, because they have been provided with protection in the form of conservation easements and other legal tools chosen by landowners and by local communities for that purpose.

This is the shared vision of the future held by the many community groups, private organizations, public agencies — that is to say, the people — who are working together on an initiative that has come to be known simply as the “Green Corridor Project.”

Primary collaborators in the Green Corridor Project include Washington County, Chisago County, 1000 Friends of Minnesota, Land Stewardship Project, Minnesota Farmer’s Union, Minnesota Land Trust, Rural Community Initiative, and The Trust for Public Land.

Michael Pressman of the non-profit organization 1000 Friends of Minnesota was involved in the project from the outset. He comments on the collaborative team that led the initiative. “People came to the table with different priorities — agriculture, for example, or water quality — but everyone worked to create a larger vision that would encompass all the concerns. We all agreed that citizen opinion should drive the process. The statewide organizations such as the Minnesota Land Trust and The Trust for Public Land did not come in with an agenda, but rather were there as a resource to help communities implement their own visions.”

A Response to Booming Population Growth

In recent years, the two counties have experienced astounding population growth and associated land use change. In the 20-year period from 1980-2000, the State Planning Department has documented population increases of 59.8% for Chisago County and 77.1% for Washington County.
It was in 1996, in response to these unprecedented rates of change, that the Land Stewardship Project and 1000 Friends of Minnesota initiated the Green Corridor Project. A grant from the Minnesota Legislature, as recommended by the Legislative Commission on Minnesota Resources (LCMR) helped support the first step in the process: the identification of “opportunity areas” where conservation measures might be focused.

**Ecological Information a Vital Tool**

In the criteria established for mapping, native plant communities mapped by the DNR’s Minnesota County Biological Survey (MCBS) were assigned a ranking of “10” for conservation value, the highest possible rank. As richly detailed in the book *Minnesota’s St. Croix River Valley and Anoka Sandplain*, published by the University of MN Press, the two-county area is part of a larger ecological region. The book’s co-author and editor Dan Wovcha is a plant ecologist with the MCBS program. He describes the native vegetation that characterizes the region: “This area is a kind of meeting ground for the state’s northern and southern flora. You can find white pine-hardwood forest as well as oak savanna and prairie. Because of the St. Croix River, which borders these counties on the east, you also find rare communities such as...”

Lands on these maps were identified by the Green Corridor Project as having high natural resource conservation values. Criteria used to determine mapped areas included rare features data from the DNR as well as other data sources.

The Green Corridor Project partners are working on providing conservation options and incentives to landowners for land protection. These maps can be viewed on the Web site: [www.1000fom.org/conservation.htm#greencorridor](http://www.1000fom.org/conservation.htm#greencorridor).
seepage meadows, that are restricted here to river terraces.” Many of the remnant native plant communities that MCBS ecologists documented in the area are vulnerable to development and could benefit from protection efforts associated with the Green Corridor Project. “Seepage meadows are especially sensitive,” says Wovcha, “because they are fed by groundwater flows that can be easily disrupted by development that occurs quite a distance away.” Cold-water trout streams that are part of the same inter-related aquatic system provide important habitat for wildlife, including the Louisiana waterthrush, a rare songbird. The two counties are also home to other rare animal species, including the Blanding’s turtle and red-shouldered hawk.

Following mapping of opportunity areas, the next step in the Corridor Project was to assemble a “toolbox” of practical methods for protecting the land’s conservation values. A primary information source for these protection tools was the book *Natural Areas: Protecting a Vital Community Asset; A Sourcebook for Minnesota Local Governments and Citizens*, available from the DNR. Four primary tools were selected: (1) Perpetual conservation easements, to be donated by landowners on a voluntary basis to a qualifying public agency or nonprofit organization; (2) Land acquisition by public agencies or nonprofit organizations, exclusively on a willing seller basis; (3) Purchase of development rights (PDR) from willing sellers, and; (4) Transfer of development rights (TDR) programs, by which landowners in designated preservation areas would be given “development right credits” which they could then sell to developers who wished to “spend” the credits outside the corridor in designated areas better suited for higher density development. Open space initiatives using similar tools had been successful across the county, in places such as Montgomery County, Maryland and closer to home in Dunn Township, Wisconsin. But would it work here? Could the envisioned Green Corridor in Washington and Chisago Counties become a reality?

There are a lot of people out there who really would rather not see their land developed, but they’re concerned about whether they’re leaving enough of a financial legacy for their children. The land protection tools associated with the Green Corridor Project have the potential to do both; it can be a win-win situation.

— Marion Heemsbergen, Chisago County Environmental Services Director

Using local government plans, community input gathered through a series of public meetings, and natural resources data from a variety of sources including the Minnesota County Biological Survey (MCBS), criteria were established to evaluate land for inclusion in the corridor as an opportunity area. Maps were developed indicating areas with value for agriculture, natural habitat diversity, scenic quality, and environmental sensitivity (e.g. erosion-prone soils). Of particular interest were such lands that linked or enhanced existing protected sites such as parks or preserves. In the above map, most of the dark green areas are plant communities mapped by the MCBS.

The maple basswood forest native plant community occurs on cool moist slopes in the St. Croix River Valley.
Making it Work

It looks promising, according to Matt Mega, present coordinator for the program at 1000 Friends of Minnesota. “There has been real progress,” says Mega. “All four tools are now in place and numerous conservation projects have been completed.” Both counties have taken official steps to protect land within the corridor, citing “preservation of rural character” as a primary objective. In February of 2000, Washington County adopted an ordinance authorizing a PDR program expressly to enable purchase of development rights “within and adjacent to” the designated Green Corridor. As of December, 2002, according to Jane Harper, Washington County’s Principal Planner, easements have been established on four parcels within the corridor as part of this program. In June of 2001, Chisago County adopted a TDR statute designating the mapped Green Corridor as the protection area from which development credits may be transferred to other areas. Chisago County has also created a Task Force to zero in on the most important areas and make recommendations for their protection. Presently under consideration by the task force is creation of an overlay zone that would set special protection standards (re. road set-backs, cell-tower routes, gravel pits) for a four-mile wide area that would run the length of the county’s eastern border along the St. Croix River.

To date, the Minnesota Land Trust has accepted donations of perpetual conservation easements on more than 1300 acres within the corridor. Land acquisitions are underway as well; for example, 118 acres are slated for acquisition in May Township using funding from Washington County, the Minnesota legislature, and the DNR Metro Greenways Program. The acquisitions will protect a number of sites documented by the MCBS program. “It will be an ongoing process,” says Mega.

To make the corridor function as a safe harbor for native plant communities and wildlife will require an understanding of their needs. “We’re happy to provide landowners in the corridor with information that can help,” says Hannah Dunevitz, a regional plant ecologist with the DNR’s Natural Heritage and Nongame Research Program. “Resource people available through the Ecological Services Division represent wide-ranging areas of expertise — and if we can’t provide the answers you’re seeking, we’ll refer you to someone who can.”

The Sunrise River and its associated wetlands are part of a green corridor opportunity area in Chisago County.

Contact Information

Department of Natural Resources
Ecological Services Division
Regional Plant Ecologists

Northwestern Minnesota
Janet Boe – 218-755-4421

Central Minnesota
Hannah Dunevitz – 651-772-7570

Southeastern Minnesota
Ann Pierce – 507-280-5076

Web site: www.dnr.state.mn.us/ ecological_services/programs.html

Local contacts, Washington and Chisago Counties
Jane Harper, Washington County
651-430-6011

Tom Delaney, Chisago County
651-257-0454
Appendix G: Shoreline Restoration and Preservation Techniques

Adapted from: A guide to buying and managing shoreland, Minnesota Department of Natural Resources, 2003.
http://www.dnr.state.mn.us/shorelandmgmt/guide/waterquality.html

Best management practices
“What can I do to improve water quality and shorelands?” The way land is managed has a large impact on the quality of water and ecology of lakes, rivers, and shorelands. The DNR has adopted management guidelines called Best Management Practices (BMPs) that help maintain and improve quality shoreland environments.

The following are basic principles that property owners can observe to help improve water quality and shorelands. More details are available in the Best Management Practices Guides that have been prepared for agriculture, forestry management, and urban areas.

C Filter Strips - These are areas adjacent to the shores of water bodies that help prevent contaminants from entering the water. The best filter strip is mature woodland with full ground-level, mid-story, and upper-story growth. The filter's effectiveness drops off as the amount of vegetation decreases. Full-height native prairie grasses along the shore are more effective as filters than short mowed lawns. The width of the filter strip also affects its filtering capability. For agricultural lands, a minimum width of 50 feet is required. Maintain or plant native vegetation over as much of the property as possible to provide the best filtration.

C Sewage Treatment - Maintaining a proper sewage system will prevent contaminants from leaking into the groundwater and surface waters.

C Erosion and Sediment - Soil erosion and sediment contain nutrients that promote excessive algae and bacteria in lakes. Stabilize and correct erosion problems as they occur by using mulch, sod, and other methods to minimize soil exposure and loss.

C Lawns and Gardens - Carefully evaluate the need for lawn area. Watering can waste valuable groundwater. Lawns are poor at filtering out contaminants in runoff water before it enters the lake. Lawn fertilizers, pesticides, and herbicides have a tendency to reach the water systems and degrade them. Plant gardens away from the water's edge, use only safe additives, and control erosion.

C Toxic Chemicals - Avoid using toxic chemicals as much as possible. Use biodegradable soaps and household products, and carefully handle gasoline and motor oils, especially when on or near water. Properly dispose of used oil, paint products, and other toxins.

C Storm Water Runoff - Natural storm water runoff can usually be handled by the natural landscape. Increased runoff can be caused by buildings, roads, driveways, and patios. These changes add “hard” surfaces that are
impermeable to water. Concentrations of storm water can cause flooding, erosion, and loss of valuable water, which otherwise would infiltrate and recharge groundwater systems. Building sizes and hard surfaces should be minimized to help reduce the amount of runoff.

Species and Habitat Diversity - Diversity applies to both the plant and animal communities. Diversity makes plant communities more interesting and stimulating to humans, as well as more ecologically sound. Diverse and balanced species populations are healthier because they are more resistant to disease and other changes in the environment. Shoreland areas provide a unique ecological zone that is required for certain plant and animal species. Destroying this to replace it with lawn and unnecessary structures robs the community of this diversity. Once this type of landscape is destroyed, it is difficult to replace. Maintain as much of the natural landscape as possible to promote a diverse, interesting, and healthy environment for plants, animals, and yourself!

Eutrophication - This is the process where lakes change because of an overabundant supply of nutrients. Excess phosphorus, nitrogen, and other materials in the lake cause rapid growth of aquatic weeds and algae. This growth leads to the buildup of muck on the bottom, and the replacement of sport fish, such as bass and walleye, by rough fish like carp. No wonder eutrophic lakes are said to "age." The natural process can be slowed or even reversed by proper land use management practices and the maintenance of properly designed sewage treatment systems. It is important to remember that once a lake has become severely degraded, even the most costly methods may not be able to restore it. Full and active participation in your local lake property owners association is the best way to see that everyone cooperates in protecting the lake from overenrichment of nutrients (eutrophication).

Scenic values and visual qualities
Many people value natural river and lakeshore. Visual quality comes from a sense of the untouched “natural” look. Shoreland management recognizes this value and tries to achieve it by setting minimum standards. Shoreland property owners have the privilege and the responsibility to preserve and develop their land in harmony with the natural environment. Voluntary compliance in the following areas, in addition to the setbacks, lot sizes, and other requirements mandated by local zoning, will help achieve this goal.

Vegetative Screening - Native vegetation along the shore presents the most natural edge to water bodies. Preserving the natural vegetation protects the integrity of the shore. Plant additional native vegetation and replace diseased trees to improve the visual quality and screening effect.

Structures usually make the most dramatic change to the appearance of the shore so they should be designed as sensitively as possible.
- **Size** - Minimize the overall size of the structure and the profile facing the water. Face appropriate rooms toward the view of the water. Don't have bathrooms, storage rooms, closets, and garages or other windowless or small-windowed rooms face the water. Minimize building height and excessive roofs.

- **Building Materials** - Select materials that are natural or have a natural appearance that blend in with the surroundings. This is important for siding as well as roofing materials.

- **Color** - Color adds to our environment; however, too much color or inappropriately bright colors in the landscape can appear harsh. Carefully select your structure's color to blend in with the surroundings. Use accents to add color. Flowers and vegetation provide good accent colors.

- **Accessory Structures** - If an accessory structure is needed, limit it to one. Excess structures add visual clutter to the shoreland. Incorporating storage and other uses into the main structure can eliminate the need for additional structures. If required, the structures must be built according to the local shoreland zoning ordinance. Use the same design principles as above and locate the structures away from the view of the lake and public roads.

- **Docks and Boat Storage** - If these structures are necessary, limit their impact by keeping the size to a minimum and designing them to blend in with the shoreline.

- **Shore Alteration** - Maintaining natural filter strips should limit the need to alter the shore. Erosion control devices such as retaining walls can have a negative visual impact. The DNR discourages the construction of retaining walls because of their unnatural appearance and high failure rate. Shoreline alterations should be designed as sensitively as possible, using natural materials such as rock riprap and vegetative screening. A DNR Waters permit may be required.
Appendix H: Funding Opportunities for Preservation and Protection Projects

Adapted from: Natural areas: protecting a vital community asset. Minnesota Department of Natural Resources. Laurie Allman, 1997. 

A. Locally initiated funding
1. Acquisitions using general funds/cash
2. Disbursement from special funds
3. Bonding measures
4. Special district or government agency
5. Benefit assessment districts
6. Certificates of participation (leases, installment sales agreements, loan agreements)
7. Grassroots/citizen fundraising initiatives
8. Acquisition of tax forfeiture lands
9. Acquisition via bargain sales

B. State funding sources
1. Natural and Scenic Area Grant Program
2. Minnesota Environment and Natural Resources Trust Fund, Future Resources Fund, and Great Lakes Protection Account
3. Minnesota Native Prairie Bank Program

C. Federal Programs
1. Intermodal Surface Transportation Efficiency Act (ISTEA)
2. Wetland Acquisition Program
3. Wetland Reserve Program

Further description and contact information for these programs can be found on the website listed above.