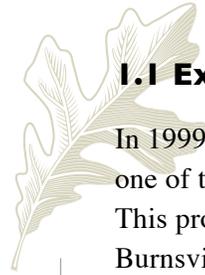


## 1.0 Introduction



### 1.1 Executive Summary

#### Why a Natural Resources Master Plan?

It is important to the health of our community and future generations to protect, preserve, and manage our natural resources. Natural resources offer opportunities for air and groundwater purification, carbon sequestration, storm-water management, sustaining biodiversity, passive recreation, education, improving the aesthetic appeal of a community, increased property values, and preserving an overall great place to live.



In 1999, Burnsville created its first Natural Resource Master Plan, and one of the first in all of the Minneapolis/St. Paul metropolitan area. This progressive act set in motion programs and policies to protect Burnsville's natural resources, such as a prairie management plan, a water resources management plan, and goose and deer management policies, and initiated a policy to direct the private development of remaining open space in an environmentally sound manner. Periodic updates to the plan were also recommended.

This 2007 Natural Resources Master Plan (NRMP) and the work behind it assesses the current state of natural resources in Burnsville and makes recommendations for their preservation and restoration on both public and private lands. This plan also reviews and makes recommendations for Burnsville's various natural resources related plans and policies, in order to synchronize the effort to manage natural resources.

In creating this document, a study was conducted to survey the ecological status of Burnsville's publicly owned upland natural areas. New in this plan is an extensive urban forestry component which evaluates and makes recommendations for street trees, developed park trees and natural areas forests. The entire city, including private lands, was mapped for land cover type (see Figure 1) which maps developed and undeveloped land throughout the city.

The inventory found that Burnsville has made great strides in protecting and improving water resources, protecting and restoring prairies, and is taking an ecological approach in developing private open space. Forces degrading Burnsville's natural resources, however, are mounting, and Burnsville should next direct attention to its upland natural resources, in particular its remaining natural woodlands and trees in built areas. Degradation caused by invasive plant species encroachment, and the stress put on native plant communities due to the urban heat island effect (caused by heat accumulated on pavement) and climate change are occurring at a surprisingly rapid rate and are degrading Burnsville's natural areas. Communities throughout the metro area are all facing these challenges.

To complement Burnsville's current work to protect natural resources, this plan recommends actions to be taken to protect and enhance its vulnerable natural resources. The plan makes recommendations for monitoring, land management and restoration of publicly and privately owned lands. Focus is now given to upland natural resources since diligent work has accomplished significant protection to the city's water resources. Recommendations of this plan include:



*Every citizen has an impact on Burnsville's natural resources, and has a role in their preservation.*



### **First Priority**

- Expand buckthorn and invasive species control program in all RMUs.
- Create a boulevard tree planting program. (50 trees/year)
- Create a Buckthorn Brush Pickup Program for private landowners.
- Conduct a Dutch elm disease program.
- Expand the built environment tree maintenance program for younger trees.
- Create a City Center RMU Sustainability Demonstration project.
- Reduce deer population to 5 deer per square mile in select woodland restoration areas.
- Provide staff support for implementing strategies. Create education programs on buckthorn, garlic mustard and tree planting.
- Consider establishing a parking lot shading ordinance.
- Conduct a native herbaceous plant sale in conjunction with the Annual Spring Tree Sale.
- Establish and conduct a monitoring program for natural areas and forests.
- Update Woodland Preservation ordinance & update planting related ordinances.

### **Second Priority**

- Expand existing prairie management program.
- Expand built environment tree pruning and removal budget for storm damaged and mature trees.
- Provide staff support to complete inventory of city park and street trees.
- Increase funding of existing oak wilt program.
- Create a Polka Dot Forest Regeneration Program.
- Consider establishing a Soil Protection ordinance.

This report is about solutions. The good news is that it's not too late to improve the quality of Burnsville's upland natural resources—and therefore, living conditions for the people of Burnsville. Here is where the people of Burnsville get involved. It will take the effort of every citizen to lighten negative impacts on Burnsville's natural resources, both on publicly and privately owned land.

*Sustainability—meeting our needs today without negatively affecting future generations’ ability to meet their needs*

## I.2 Introduction

Sustainability has become a focus within Burnsville government. A variety of efforts are underway to keep Burnsville a healthy place to live. Sustainability can be defined as meeting our needs today without negatively affecting future generations’ ability to meet their needs. The concept of sustainability also pertains to our natural resources. Are we protecting Burnsville’s natural resources to the extent that future generations can benefit as we do? Are there forces depleting Burnsville’s natural resources? What should be done to ensure the preservation and enhancement of Burnsville’s natural resources? These questions are answered in this plan document.

Natural resources—for the purpose of this plan—are water, soil, plants, wildlife, atmosphere and people. These manifest as terrestrial (upland), wildlife and aquatic natural communities, but also include the built environment. This plan takes a holistic look at Burnsville’s natural resources, irrespective of land-ownership boundaries, but focuses on terrestrial resources. Management of aquatic resources is discussed in detail in the Comprehensive Wetland Protection and Management Plan and in the Water Resources Management Plan.

### Burnsville’s Natural Resources



#### Water

In the form of precipitation, natural water bodies, and stormwater

#### Soil

Earth substrate that provides the basis for life

#### Plants

Native forests, prairies, wetlands and vegetation in parks, in home landscapes and open space

#### Wildlife

Birds, insects, mammals reptiles and amphibians

#### Atmosphere

Oxygen, CO<sup>2</sup>, sunlight and wind

#### People

Critical component of regenerating the environment

## I.3 History of the Plan

In 1999, the first Natural Resources Master Plan for Burnsville was completed. The plan was built on information derived from extensive field work, and the vision of the 1997 City Council’s End Statement on the Environment. The master plan suggested strategies to protect, preserve and manage natural resources, and to educate the community.

## Burnsville's End Statement on the Environment

In 1997, the Burnsville City Council adopted an end statement on the environment that articulated the following vision for the city's natural resources:

"People find Burnsville is an environmentally sensitive community ensuring preservation and enhancement of its natural resources."

In stating this vision, the city council identified several long-term commitments for the city and its citizens, including:

1. The people of Burnsville acknowledge their role in preserving and enhancing the city's natural resources.
2. The city ensures that development occurs in an environmentally sensitive manner.
3. The people find Burnsville to be an attractive, clean city and are willing to do what is necessary to preserve that characteristic.
4. The citizens of Burnsville recognize the value of preserving natural water bodies.

This 2007 Plan was commissioned to update the 1999 plan. It does so by:

1. evaluating changes in the quality of Burnsville's natural resources since that time
2. updating the strategy for protecting and managing natural resources
3. providing an added level of specific management actions and goals
4. providing an urban forest management plan for natural areas and for developed parks, streets and parking lots

Several other city plans manage aspects of Burnsville's natural resources, and they have been reviewed for consistency with this Master Plan. Recommendations for unifying and providing consistency within these plans are part of this Master Plan.

### 1.4 Purpose and Approach

The purpose of this plan is to evaluate the quality of existing natural resources in the City of Burnsville; identify strategies to protect, preserve and manage those resources; educate the community about the importance of doing so; and lastly, to educate the community on how to carry this out.

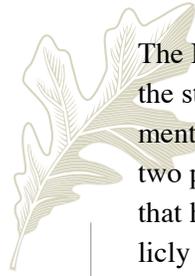
An ecological approach is being taken to protect and manage natural resources. Ecology is the study of interactions of plants and animals with their physical environment, and an ecological approach recognizes the interdependence of all natural resources. The function and value of any one natural resource is dependent on interactions with adjacent and connected resources, both natural and built.

This report sets forth a strategy for managing and therefore preserving Burnsville's terrestrial resources. This plan does not cover topics such as solid waste, potable water use, and waste water.



*Ecology is the study of interactions of plants and animals with their physical environment.*

## 2.0 Natural Resources Inventory



The Natural Resources Inventory has been a systematic accounting of the status of Burnsville’s natural resources. In an effort to focus management strategies, the Natural Resources Inventory has been broken into two parts. The first is the assessment of publicly owned natural areas that have not been developed, and the second is the assessment of publicly owned trees in the built environment.

This document refers to trees in the **built environment**. The built environment means developed parks (with lawn), street trees and public parking lots.

### 2.1 Natural Areas Inventory

The public upland natural areas owned by the citizens of Burnsville have been field evaluated to identify land cover type and for ecological quality.

#### 2.1.1 Natural Areas Inventory Process

The Minnesota Land Cover Classification System (MLCCS) was used to inventory land cover. This system classifies natural and cultural landscapes for use in planning. Results of the land cover type are displayed in Figure 1. Paired with this inventory is the ranking of the ecological quality of the same areas (Figure 2). The ecological quality assessment of Burnsville’s natural areas began with the review of existing Dakota County MLCCS maps. Ecologists took these maps

### Ecological Quality Ratings

*The ratings were based on the following criteria:*

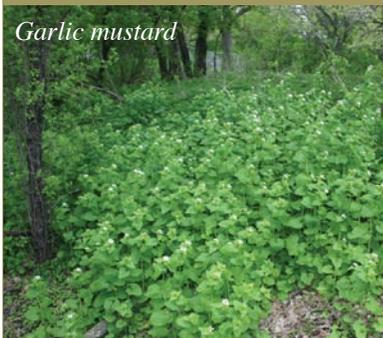
- High** Sites with little or no human disturbance, important to preserve. Less than 5 percent invasive species. High-quality sites include many species typical of the natural community. Few weedy plants, either native or nonnative, are present. Most natural processes are occurring, including disturbances such as fire or flooding, if appropriate. There is little or no evidence of human disturbances such as logging or livestock grazing.
- Medium** Sites with some disturbance, but with potential for restoration. Between 5 and 40 percent invasive species. Medium-quality sites often lack many of the species typical of the natural community. Weedy species may be abundant, but they are not more prevalent than typical native species. (In communities with multiple layers of vegetation, weedy species do not dominate any one layer.) While natural processes may be interrupted and human disturbance apparent, the nature of the community has not been altered beyond recognition.
- Low** Very disturbed sites, most appropriate for alternative uses or total restoration. 40 percent or more invasive species. Weedy species are common or dominant in any or all layers of vegetation. Natural processes are highly altered and extensive human disturbance is evident. The community may not resemble any naturally occurring community (that is, one described by DNR Natural Heritage Database).

with them to the city’s natural areas to examine each land cover unit (polygon). Each polygon was given a high, medium or low ecological quality rating. These ratings are relative assessments of the natural areas within Burnsville, and are not intended for broader comparison with natural areas in less urbanized settings.

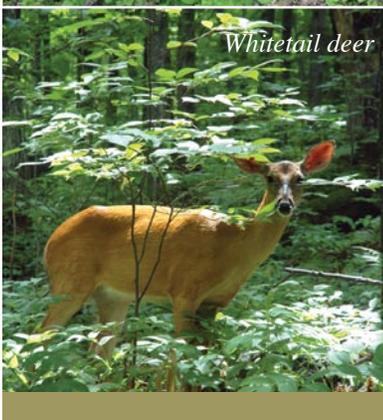
As in all urban areas, the natural resources of Burnsville receive significant stress from the surrounding cultural environment:

- heat and cold radiating off pavement
- invasive plant species
- habitat fragmentation by roads and development
- fertilizer and pesticide drift from lawn application
- lack of predators to keep animal populations in balance
- fire suppression
- soil compaction from construction and maintenance equipment
- other urban influences

Native woodland deterioration in the metropolitan area is due to two primary influences: 1) invasion of exotic plant species, and 2) deer over population.



Garlic mustard



Whitetail deer

## 2.1.2 Natural Areas Inventory Results

The ecological quality assessment of the public upland natural areas owned by the citizens of Burnsville evaluated the degree of ecosystem degradation as the result of human disturbance. Direct human disturbances have historically included activities such as logging, grazing, and tilling. There are also indirect disturbances to the ecosystem through the suppression of fire that allowed trees to overtake savannas, and the elimination of predators that resulted in growing deer populations. When land is disturbed, either directly or indirectly, natural cycles are interrupted; hydrologic and nutrient balances shift. This interrupts native plant life cycles and allows for weed invasion, causing further erosion and general degradation of habitat. The changes in the types of plants in a community in turn affect the types of insects, birds and animals that inhabit the community and that play a role in its sustained regeneration. Because of this, disturbance and invasive-plant-species invasion can develop into self-perpetuating problems that require active management to slow and reverse.

Despite the efforts implemented with adoption of the 1999 Natural Resources Master Plan, natural communities in Burnsville continue to experience a decrease in biodiversity. This is common throughout the Minneapolis/St. Paul metropolitan area, as native woodlands are rapidly deteriorating due to two primary influences: 1) the invasion of exotic plant species such as European buckthorn and garlic mustard, and 2) deer over population. There are other causes, but these are the most direct and easiest to control. Since 1999, extensive invasion of buckthorn has occurred. The result of this alarming rate and extent of invasion is that the vast majority of plant species in Burnsville's woodlands no longer have the ability to regenerate. The density of buckthorn poses a significant strain on the ability of oaks, the historic native dominant trees of the area, to regenerate. With the change in tree species, many song bird, mammal, amphibian and reptiles will be extirpated (locally extinct) from the city, along with countless plant species. Deer browse is also negatively impacting Burnsville's forests. A good effort is in place to control the population, but the program should be expanded in order to further protect the forests.

*If buckthorn is not controlled, future forests of Burnsville (in 50 years) will be an impenetrable thicket of buckthorn with very few other species.*

Knowing the types and quality of Burnsville's natural resources enables the citizens and the city staff to answer the question: what natural resources do we have, and in what condition are they? This plan has taken this information and presents a strategy for protecting and improving the city's natural resources. See Section 3.0.



*When land is disturbed (left), such as by grazing, native plant life cycles are interrupted, resulting in weed invasion. A highly degraded forest floor (right) will not support the natural regeneration of native trees and plants, requiring active management.*

### **2.1.3 Terrace Oaks Park Sample Inventory**

As part of the urban forest inventory, foresters conducted a detailed evaluation of the woodlands that comprise Terrace Oaks Park. This park was selected to represent Burnsville's natural areas due to its size and varied environments. A baseline inventory was conducted using a series of permanent plots that will allow for return inventories to aid in monitoring recommended restoration efforts.

Results show that Burnsville's largest park has significant buckthorn encroachment, and that native trees, especially oaks, have great difficulty reproducing. The good management efforts initiated by city staff, with the assistance of volunteers, should be stepped up to curb this problem. See Appendix A for more detail.

### **2.1.4 Historic Conditions**

For purposes of formulating a natural resources management approach, it has been helpful to review the native plant communities of Burnsville prior to European settlement. Figure 3 shows the native plant communities of Burnsville as they existed during the original land survey of 1853-1856. Although it is not necessarily possible or desirable to restore undeveloped lands of Burnsville to the communities shown on the map, it serves as a guide in thinking about what is suited for the local environmental conditions.

Prior to European settlement, most of the area that is now Burnsville was wooded to some extent while the remainder was open water, prairies or wetlands. Four different types of wooded areas could be found. These are listed in order of land covered by each community:

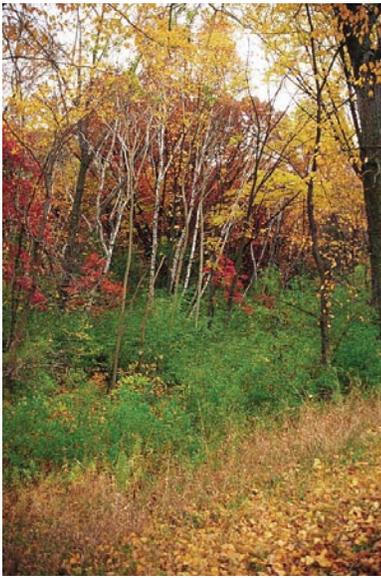
1. Oak Openings and Barrens (often called oak savannas). Fire dominated these areas, minimizing the presence of trees intolerant of fire such as maples and basswood. The result was an open park-like



*Buckthorn has taken over the forest understory in most of Terrace Oaks Park.*



*Some native grasses still remain in the oak savanna remnants of Terrace Oaks park, but are threatened.*



*In this photo, taken in mid-October, buckthorn's leaves are green. Buckthorn holds its leaves late into the fall. You can easily spot buckthorn from mid-October until the first of December by its green leaves.*

vista of scattered oaks growing amongst herbaceous woodland and prairie plants. Little of the expansive presettlement oak savanna remains in Minnesota.

2. **Big Woods Forest.** Fire was rare in these wooded areas and species such as sugar maple, basswood and elm made up a large portion of the canopy, though oaks, ash, ironwood and bitternut hickory could also be found. The forest canopy was continuous, or nearly so. Shade tolerant plants such as spring ephemeral wildflowers and ferns grew on the forest floor. The Trust for Public Land reports that only 0.01% of the original Big Woods remains in Minnesota. Remnants of the Big Woods are home to rare species like the dwarf trout lily.
3. **Aspen-Oak Land.** This was likely a transition area (in time and in space) between oak savannas and the Big Woods forest. After a long period without fire, shrubs and trees intolerant of fire would colonize an area. Aspen are a pioneer species that can colonize Openings and Barrens. Old oaks remained, growing high above young aspen creating a canopy that was varied in height and with varying amounts of shade on the forest floor. Other pioneer tree species such as boxelder and paper birch were likely found here as well, but in smaller numbers. Aspen-Oak land is frequently found in Burnsville today. Typically they are former oak savannas that have been colonized by a variety of trees in the absence of fire.
4. **River Bottom Forests.** These forests are still found along the Minnesota River. Tree diversity is not high but the function of these forests in facilitating silt deposition and filtering stormwater cannot be understated. Cottonwood, elm and silver maple are common. Flooding may be frequent or seldom, but soil moisture is typically in ample supply. Dutch Elm Disease has lowered the number of elms found in these forests over the past half-century, yet they still persist.

## **2.2 Built Environment Tree Inventory Process**

An inventory of publicly owned trees in the built environment was undertaken in the fall and early winter of 2006. Built environment trees, for the purpose of this plan, are defined as those trees that exist outside of natural areas, such as trees in groomed (developed) parks, in parking lots, in lawns and along streets. The inventory is broken into two components: 1) the developed city parks inventory, and 2) the street tree inventory.

Sample-based inventory techniques were used to tally and assess trees in maintained areas of parks and on city road right-of-ways. The assessment determined the effectiveness of current tree planting and mainte-

nance programs and makes recommendations for future plantings and maintenance needs.

To that end, several parks were selected to represent typical developed parks throughout the city. Park age, park size, usage and location within the city were factors used in park selection so that the selected parks were a faithful representation of all parks. Similarly, several neighborhoods were selected for a right-of-way inventory to represent different areas of the city with respect to such factors as age of the neighborhood, street width and traffic volume.

### **2.2.1 Developed City Parks Inventory**

Developed parks are those groomed parks in which trees grow within lawn.

A total of 467 trees were tallied, identified, measured and assessed in six parks: Burnhaven, Highland Forest, Sue Fischer Memorial, Echo, Wolk and South River Hills. This sampling allowed for statistical analysis of the trees in city parks.

Thirty six different species were found with green ash the most common accounting for over 21% of all trees.

The average diameter of all surveyed trees is 9.56 inches. All trees were rated for condition based on a scale of 0-10 with rating of 0 representing a dead tree while 10 represents a hypothetical, perfect tree.

- Trees rated in the 1-3 range are of poor quality and condition. No amount of pruning or other maintenance will improve the quality to great degree.
- Trees in the 4-5 range are of fair quality and condition.
- Trees in the 6-7 range are good overall.
- Those few trees ranged 8 or 9 are very good to excellent.

Most trees in this inventory fall in the 2-8 range with an average condition of 4.9.

Analysis of this data brings out several items of note. First, one species (green ash) is more than twice as common as the next most common species while the differences in representation between other species is relatively small. In other words, green ash accounts for too much of the overall park tree population which increases the exposure to tree loss from a single pest such as Emerald Ash Borer (see page 12). A lesser proportion of the city's urban forest would be lost from such an event if the city's tree population were more evenly distributed among many species. Of a positive note, all other trees are more evenly distributed among the remaining species.

## **Built Environment Tree Inventory**

The built environment tree inventory is broken down into two components:

1. Developed city parks inventory  
(467 trees inventoried across six parks)
2. Street tree inventory  
(564 trees inventoried across three neighborhoods of varying ages)

### Tree Species Distribution in Developed City Parks

Species	Percent	Species	Percent
Ash, green	21.6	Pine, white	4.1
Basswood/Lindens	9.0	Pine, Austrian	3.6
Crabapple	8.4	Spruce, white	3.2
Pine, Scots	7.7	Maple, silver	3.0
Hackberry	5.8	Ash, black	2.8
Maple, red	4.9	Hawthorn	2.1
Maple, Norway	4.3	All other	15.4
Honeylocust	4.1		

Second, the average condition of 4.9 is more typical of a natural, un-maintained woodland in the Twin Cities area rather than a maintained park. This hints to the need to increase tree pruning frequency in developed parks. Strategy 4 under Goal 3 (page 24) addresses this concern.

Finally, oaks of any species are rarely found planted in the maintained areas of city parks despite being common in Burnsville’s woodlands and historically one of the most common and important native trees in Burnsville. In fact, all oak species together only account 2.1% of all trees and most of the 10 trees counted in this inventory are swamp white oaks. This plan suggests that oaks be a high priority species for new plantings in Burnsville.

#### 2.2.2 Street Tree Inventory

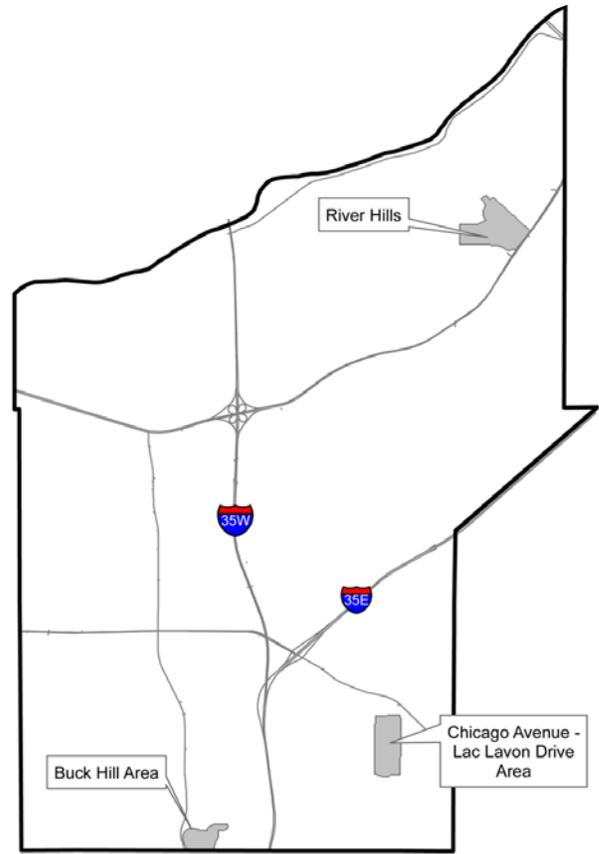
Three neighborhoods were selected to be part of the street tree sample inventory. The River Hills neighborhood is an older neighborhood in Burnsville and one of the few with trees planted in tree lawns formed by curb and sidewalks. A second neighborhood near Buck Hill (20 years old) was selected as a sample inventory area, as was a neighborhood between Chicago Avenue and Lac Lavon Drive, north of Crystal Lake Road and south of County Road 42 (also about 20 years old). A sample area representing the newest neighborhoods was not selected as these neighborhoods tend to have few, if any, street trees.

564 trees representing 38 species were counted and assessed for this three neighborhood inventory. The average diameter of all trees is 13.5 and the average condition is 4.7. The most common tree is green ash accounting for 48% of all trees, primarily due to its predominance in

the River Hills neighborhood. About 80% of the green ash were found in this neighborhood.

Although it is important to note the predominance of green ash, it is not unusual to find a predominance of one tree species in a neighborhood. The common texture, size, shape and color of a single species acts as a matrix that visually binds the landscape together. The result is more pleasing to the eye than an incongruity of colors, shapes and textures. However, in light of the lesson provided by Dutch elm disease where streets lined with a single elm species were decimated and now the potential threat of Emerald Ash Borer (see page 12), neighborhoods such as this may be especially hard hit if the threat becomes a reality.

A few of the species found in the road right-of-way are not commonly recommended as street trees. Cottonwoods are often too large for a space by a street and tend to shed too many twigs, while few people like the “cotton” shed each year. Colorado Blue spruce makes a good specimen tree in a lawn but can present site line problems near the road and often get infected with diseases that result in a shortened life span. In recent years Norway maple has fallen out of favor due to its shortened life span resulting from frequent splitting and a canker that deforms the trunk and opens the tree to decay.



*This map shows the locations of the three neighborhoods chosen for the street tree inventory.*

<b>Street Tree Inventory Species</b>			
<b>Species</b>	<b>Percent</b>	<b>Species</b>	<b>Percent</b>
Ash, green	48.2	Spruce, white	2.8
Spruce, Colorado Blue	13.7	Basswood/Linden	2.0
Maple, red	4.8	Cottonwood	1.8
Crabapple	4.6	Maple, sugar	1.6
Maple, silver	4.6	Olive, Russian	1.6

Also of note is that 18 of the 38 species are represented by a single tree. This is likely due to the fact that in the two neighborhoods other than River Hills, most if not all trees in the right of way were planted by homeowners or builders. Selection then comes from what is attractive or what is available rather than from a planting program that utilizes



*Evidence of Emerald Ash Borer damage along a residential street in Michigan.*



*Emerald ash borer is an exotic insect, metallic green in color and approximately 1/2 inch long. It is not yet in Minnesota.*

economy of scale while selecting the most tolerant species for streetside growing conditions. The diversity is good but the species selection is sometimes questionable. The good news here is that several of these infrequently found trees could be, and should be planted in greater numbers within the road right of ways. Honeylocust, hawthorn and Japanese tree lilac are examples. See Appendix B for a list of recommended and not recommended trees for Burnsville.

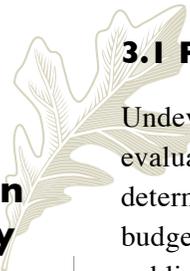
Like the representative sample of park trees, the overall condition of street trees is rather low indicated by the average of 4.71. It is very common for trees growing in the adverse conditions found along city streets to exhibit poorer growing conditions than those in parks. The City of Burnsville can combat this problem by increasing the maintenance and removal of dying trees or those in poor condition. Contributing to the low condition is the fact that few of the older green ash were properly pruned when young, so that a good branch structure could be maintained. The result is trees that frequently have side branches larger than the central leader and many of these large branches hang low above the street. The lesson learned here is that it is critical for the longevity of a street tree to be pruned regularly when young in order to establish the proper form. It is recommended to increase pruning efforts and budget for Burnsville's street trees.

### **Emerald Ash Borer**

The Emerald Ash Borer (EAB) is a small boring insect that feeds on ash trees. The greatest damage is done when the larva feed undetected under the bark. Eventually this cuts off the flow of water and nutrients resulting in a period of decline and, eventually, death of the infested tree. In Michigan, EAB has killed more than ten million ash trees in five years. Millions more have been removed as a preventive attempt to control the spread of the insect to unaffected areas.

The EAB has not yet been found in Minnesota but the threat is real. The sample inventories performed in preparation for this plan indicate large numbers of ash trees in the City of Burnsville. Therefore, there is reason to be concerned over the potential for losing many of these trees to this threat, the loss of associated benefits, and the cost of sanitation and control.

### 3.0 Strategy for Natural Resources Management on Public Property



### 3.1 Priorities for Natural Areas Management

Undeveloped land owned by the citizens of Burnsville has been field evaluated for ecological quality (See Figure 2) and has been ranked to determine where to most effectively invest a limited natural resources budget to preserve Burnsville’s highest ecological quality lands. All public lands in Burnsville are decreasing in ecological quality primarily due to invasive species. In order to guide decisions on where best to invest in preserving or restoring ecological quality, a priority ranking system was developed.

#### Priority A

Sites with rare species, and sites where plant community (especially forest understory) recovery is highly probable. These sites have a significant number of native species present which can serve as a seed source for reproduction. These sites will receive first priority for management funding. See Appendix C and Figure 5 for more information on rare and threatened species in Burnsville.

#### Priority B

Sites where plant community (especially forest understory) recovery is possible, but likelihood of success unknown. A seed bank study would be necessary to determine the likelihood of recovery. These sites will be managed by volunteer groups as they step forward. City staff will be available to direct volunteer groups. The ‘polka-dot’ forest regeneration program (see Section 3.1.5) will be made available for priority B sites.

The table on the next page lists publicly owned sites that rank for management as priority A or B.

All other public properties owned by the citizens of Burnsville will not be managed for invasive species at this time. These sites lack biodiversity due to invasive species encroachment and past land use. Restoration would require considerable expense and effort. Due to limited funding, these sites will not receive management through the city or by volunteers until all higher priority sites have been fully funded and managed. If strong citizen interest for restoring any of these properties arises, city staff will provide the expertise necessary to guide a restoration effort. The ‘polka-dot’ forest regeneration program (see section 3.1.5) will be made available for these sites.

Individual site management plans have been created for the sites listed in the Priority Sites for Management table on the next page. The management plans set forth are on-the-ground strategies for invasive species control to allow for native plant community regeneration. These plans can be found in Figures 6-23 and on the City of Burnsville web site at [www.ci.burnsville.mn.us](http://www.ci.burnsville.mn.us).

#### Priority A rankings for each site were determined by:

- Any site containing areas of plant community found to be of “high” ecological quality
- Any site that contain rare species designated in the Minnesota County Biologic Survey (MN DNR)
- All Resource Management Units (RMUs) because of their large acreage
- Sites where the level of disturbance is low enough to allow for effective management results in a relatively short time frame, and with lower costs.

#### Priority B rankings for each site were determined by:

- Sites where native forest canopy is intact along with some colonies of native understory vegetation.
- Sites where the extent and complexity of disturbances necessitate management actions that may take longer to complete, and at higher costs.

### Priority Sites for Management

Priority	Park Name/RMU	General Quality Range	Outcome to Effort Ratio
A	Alimagnet RMU	M	High
A	Bluff Valley RMU	M	Moderate–Low
A	City Center RMU	M	Moderate
A	Crystal Lake RMU	M	High
A	Forest Heights	H-L	High
A	Judicial Park	H-M	High
A	Kraemer RMU	H-L	High
A	Quarry RMU	H-M	High
A	Southwest RMU	M-L	Moderate
A	Sunset Pond RMU	M	High
A	Terrace Oaks RMU	M-L	Moderate
B	Chateaulin	M-L	Moderate
B	Crosstown West	M-L	Moderate
B	Hollows	M-L	Low
B	Krestwood	M	Moderate
B	Neill Park	M	Moderate
B	North River Hills	M-L	Moderate
B	Wellington Crest/Water Tower (north slope)	M	Moderate

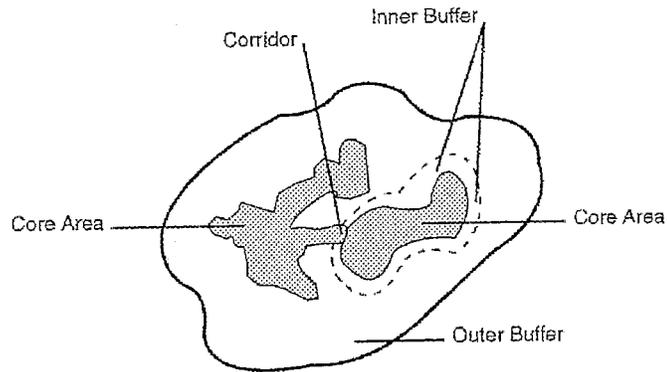
Resource management units (RMUs) as defined in the 1999 Natural Resources Master Plan are high concentrations of natural resource sites and important lakes and rivers. RMUs were created based on the concept that important resources are to be protected at the core of a resource complex. Figure 3.1 illustrates this concept. Following this concept, high priority areas are core sites for preservation and management.

The boundaries of the RMUs have been changed from those designated in the 1999 Plan (see Figure 4). The boundaries have been reduced to encompass only significant natural areas, excluding surrounding private property. Private property is not directly managed through this plan, but education and direct assistance programs recommended in Section 4 can influence these properties if the owners so choose. The boundaries have been reduced also to focus management efforts due to the limited management resources available.

#### **3.1.1 Greenways and Corridors**

Greenways and corridors potentially serve as movement pathways for plants and animals and bridge disjunct complexes of natural communi-

ties. Often they are linear and follow streams and rivers. Power line corridors can, to some extent, function as corridors for animal movement. However, these areas are strictly maintained to exclude the type of taller, forested growth that makes for more effective corridors. The scale of a greenway varies from a minimum of 200 feet in most cases to several thousand feet in the case of large river valleys. The Minnesota River Valley is an example of a large scale corridor.



**Figure 3.1**

Potential greenways were identified after being analyzed in the 1999 Natural Resources Master Plan. It was found that no significant linear greenways or corridors run through Burnsville, other than the river valley. The Minnesota River Valley runs along the northern border of the City of Burnsville and this area should be the focus of any efforts to connect areas managed by Burnsville and state and federal government agencies.

### **3.1.2 Revised Recommendations on Land Acquisition**

A list of lands recommended for acquisition was presented in the 1999 Plan. This recommendation was based on the Park and Natural Resources Commission recommendations to City Council in 1992. Land protection efforts focused on acquiring land which connects to existing habitat rather than acquiring land which is disjunct from existing habitat.

Follow-up on these goals show that the following properties still have potential for purchase, or may be preserved through a conservation easement or park dedication:

1. Minnegasco site: Still undeveloped; current land owners are in the process of restoring this forest.
2. Kraemer Nature Preserve (Chowen site): Consider expanding the existing Kraemer Nature Preserve through the city's use of its Park Dedication requirements.

All other sites recommended for acquisition in 1999 have been developed.

### 3.1.3 Natural Resources Management Strategies for RMUs and Individual Parks

Individual management strategy maps have been created for each of the Priority A and B sites listed in the Priority Sites for Management table on page 14. See Figures 6–23. Management for each site focuses on invasive species control. Within each site, invasive species control begins within that area that is of the highest ecological quality. It is important to protect these areas of highest biodiversity first in order to prevent further species extirpation. Common buckthorn, hybrid honeysuckle and garlic mustard are the primary invasive plant species in wooded areas, whereas spotted knapweed, leafy spurge and brome grass are encroaching into prairies and meadows.

After securing highest quality nodes within each site, management should proceed into areas of diminishing ecological quality. Removing invasive seed source from around the highest quality node reduces the likelihood of re-colonization. Invasive species removal continues in an outwardly manner as illustrated on the management maps until invasive species have been removed from the parcel. At that point the site should be evaluated for native species reintroduction, and kept on a maintenance schedule to remove occasional invasive species re-colonization.

### 3.1.4 Buckthorn Removal Strategies

Buckthorn removal in Burnsville’s natural areas is given high priority in this plan. Techniques and cost for its removal varies upon the extent of invasion on a site and the accessibility of the site for restoration crews. Appendix D contains a series of alternative removal techniques appropriate for different conditions within an infestation, as well as a table outlining the costs of buckthorn control. These techniques were developed by Prairie Restorations Inc. in conjunction with the City of Minnetonka for a series of parks in that city.

A five-year process was developed. Typically provided by a contractor, this process involves an intensive buckthorn removal event the first year to extricate all standing plants. After initial removal, four years are committed to intensive seedling management to kill resprouting stumps and to kill small seedlings that will germinate from seed stored in the ground. After the fifth year of control by a contractor, volunteers are used to walk each site (once per year) to pull any new seedlings that might venture onto the site. It is necessary to continue this once a year volunteer event indefinitely because birds spread buckthorn seed. See Appendix D for a detailed description of buckthorn removal techniques.



*Buckthorn control strategies include cutting the branches and leaving them on the ground to decompose.*

### Buckthorn Control Costs

Park Name or Resource Management Unit	Year 1 Buckthorn Removal Cost for Management Core Areas* (\$4,000/acre**)	Management Cost for Years 2–5 for Core Areas (\$1,700/acre/year)
Alimagnet RMU	\$4,500	\$2,000
Bluff Valley RMU	\$8,400	\$3,600
City Center RMU	\$3,600	\$1,500
Crystal Lake RMU	\$17,400	\$7,500
Forest Heights	\$1,500	\$4,000
Judicial Park	\$5,400	\$2,500
Kraemer RMU	\$0	\$0
Quarry RMU	\$17,400	\$7,500
Southwest RMU	\$900	\$500
Sunset Pond RMU	\$900	\$500
Terrace Oaks RMU	\$14,700	\$6,500

\* Management Core areas pertain to the acreage encircled with the yellow line on the individual site management maps.

\*\* Cost will vary depending on site characteristics.

### 3.1.5 Polka Dot Forest Regeneration Program

Some of the forests of Burnsville have evolved from land that was completely cleared for agriculture in the last century. Once farming ceased, the land was left fallow, then colonized by undesirable tree species such as boxelder, Siberian elm and Amur maple. These fast growing, weak wooded trees do not support a diversity of ground plain species, and are poor wildlife habitat. In the ecological inventory these forests rate as low quality, and they do not meet the criteria for management priority. Therefore, a concerted effort for management is not planned.

The polka dot forest regeneration program is designed to restore a minimal level of diversity to these forests by clearing small patches of undesirable vegetation and planting native trees, primarily oaks. These patches of oaks would grow and over time provide a seed source for the native forest to expand. In the future when resources become available to fund forest regeneration projects, restorationists will be able to build from these nodes of established native trees.

The program will be funded by grants or donations from local groups interested in seeing the forests of their neighborhood restored. Staff will be made available to coordinate site preparation and planting, but much of the establishment and maintenance work will be conducted by volunteers.



*Open areas such as this that are colonizing with weedy trees are great places to introduce native oaks through the “Polka Dot Forest Program.”*

### **3.1.6 Prairie Management and Regeneration**

Prairies and savanna remnants are an important component of the diverse natural features in Burnsville. As with many other cities and towns in southern Minnesota, Burnsville exists in part because the proximity of Big Woods timber and the prairie’s rich soils made the area attractive to settlers. The city recognizes this connection between its natural resources and its history, and continues to work toward maintaining the quality of those resources, including its prairie and savanna remnants.

An additional valuable function of prairies has become increasingly recognized in recent years. That is the ability of prairies to sequester, or hold, carbon. Carbon dioxide, or CO<sup>2</sup>, is a major greenhouse gas contributing to climate change. Prairie plants, unlike typical turf grasses, develop long roots that extend deep into the soil, and are long-lived. CO<sup>2</sup> taken up by the prairie plants goes into the formation of the roots, and is held there for the life of the plant. Even after the plants die, the carbon in their roots remains in the soil as part of other processes in the carbon cycle.



*Purple prairie clover is a native plant that could be reintroduced easily to Burnsville prairie remnants.*

Moreover, since prairie plants have evolved to the climate of the Upper Midwest, it takes far less effort to maintain them. Mowing, fertilizing and other maintenance activities that are normally important and intensive on turf grasses are not as vital and can even be unnecessary in prairie communities. Since these maintenance activities consume and release CO<sup>2</sup> and other carbon compounds, the use of prairie plantings can further reduce overall carbon release. The low maintenance requirements of prairie also save the City the time and expense that is required for upkeep of turf grass areas.

By protecting and expanding its prairie and savanna remnants, Burnsville recognizes both the historic and current value of these unique plant communities. Burnsville prepared the “City of Burnsville Prairie and Savanna Areas Management Plans” in 2005, with a 2006 update. This plan provides a detailed, comprehensive set of management goals and strategies for each of six areas within the City that have notable prairie and/or savanna restorations and remnants. Species lists, suggested plant palettes, information on monitoring and tools for maintenance are also reviewed. Because of the comprehensive approach to prairie management in the existing plan, there is no current need to prepare a new prairie management plan. The recommended approach to prairie and savanna management in Burnsville is to incorporate by reference the goals and strategies of the existing prairie plan, following the maintenance and monitoring direction provided there. Please refer to Section 5.0 Review of City Plans for a more detailed assessment of the existing prairie plan.

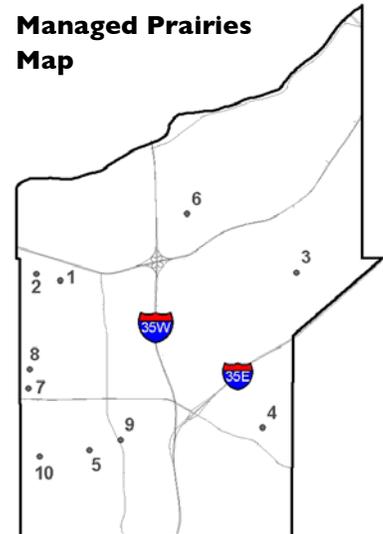
### 3.1.7 Monitoring to Evaluate Success

#### 3.1.7.1 Natural Areas Monitoring Recommendation

This plan calls for restoration projects in several forms. However, the installation of a restoration project does not guarantee that these objectives will be met or these goals achieved. Restoration of a plant community (through management) is a process for which the goal of biodiversity is achieved over time. Therefore monitoring is necessary to track the success of a project over time.

Monitoring efforts should be directed at evaluating two key measures: 1) species richness (or diversity) and 2) community (vegetation) structure—the vertical layering of vegetation and the horizontal distribution of species. Data gathered from a scheduled monitoring program are useful in measuring these attributes, and can guide future management efforts.

Monitoring of natural areas should include three habitat types 1) high quality forests where invasive plant species removal is occurring, 2) high quality forests where invasive plant species removal is not occurring, and 3) managed prairies.

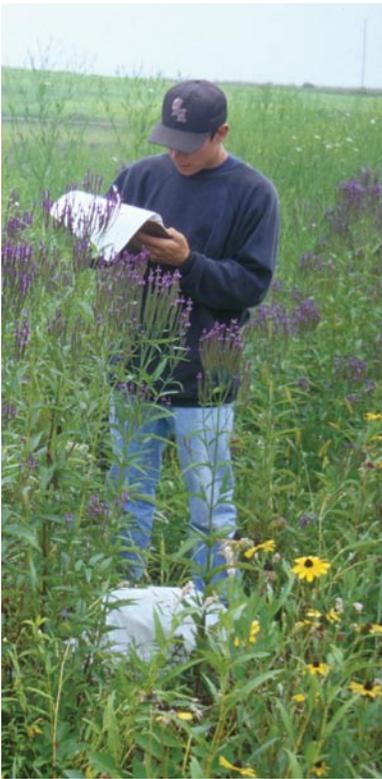


#### Key

1. Sue Fischer Prairie
2. Kraemer Prairie
3. Terrace Oaks Savanna
4. Alimagnet Prairie
5. Cam Ram Neighborhood Restoration
6. Cliff Fen Park Wet Meadow
7. Sunset Pond SW Prairie
8. Sunset Pond W Prairie
9. Day Park Prairie
10. Cam Ram Oak Savanna Restoration

**Species richness** is determined by the number of different plant species that grow in a given area. The greater the number of species, the greater the richness and the higher the ecological quality.

**Community structure** is the vertical layering of vegetation and the horizontal distribution of species.



*Monitoring allows land managers to evaluate the success of management practices, and indicates if changes are necessary.*

Burnsville currently conducts natural resources monitoring through three citizen-based programs:

- Lake water quality monitoring through the Citizen Assistance Monitoring Program
- Wetland monitoring through the Wetland Health Evaluation Program
- Bird surveys in each of the RMUs (every 5th year)

In high quality forests, a monitoring program utilizing permanent sampling transects and uniform sampling techniques should be employed. The relevé methodology is suggested to document species richness and community structure. One transect should be established for each high quality natural area with the length and number of sampling points based upon the size of the area. Large areas such as Cam Ram Park should have three to four locations. Smaller high quality areas should have at least one location that is representative of the overall site. Relevé plot placement is determined after initially observing the vegetation in each parcel and locating each of the plots to be representative of vegetation in the parcel.

Details on the relevé monitoring technique can be found in the Minnesota Department of Natural Resources 1999, Relevé Methods Manual.

RMUs with unmanaged high quality habitats should also be monitored in order to watch for potential degradation.

It is also recommended that prairies also be monitored to survey the effectiveness of their management program. Each site should receive three relevé plots located along a transect through each management area. Plot placement is determined after initially observing the vegetation in each parcel and locating the plot to be representative of vegetation in the parcel.

All three types of sites should be monitored once per year, ideally in the spring for forests, and mid summer for prairies.

### **3.2 Strategies for Management of the Built Environment**

Several goals have been identified to maximize the benefits of trees within the developed portions of Burnsville. For each of the following goals, one or more strategies are put forth to achieve maximum results in the most practical, efficient manner.

#### **Goal 1. Increase tree cover and diversity**

1. Begin an aggressive tree planting program on city right-of-ways. Many of the major thoroughfares have significant boulevard space or tree lawns that could sustain large trees. Most major U.S. cities have significant street tree populations flourishing in small or forbidding planting spaces. Burnsville has a lot of room to grow trees. It should be kept in mind that the value of tree benefits is nearly three times the cost of planting, maintenance and removal.
2. Expand on the sample inventories of street and park trees. Use the results to further guide the selection of trees to plant and the loca-

tions available to plant. If necessary use these inventories to update recommended and non-recommended tree lists.

3. Increase the ratio of overstory trees to smaller trees in city parks. The number of trees planted in city parks likely does not need adjustment. But an effective means for increasing tree canopy without increasing the number of trees planted is to utilize some large tree species. Showy trees such as crabapples and Japanese tree lilacs are always welcome, but large trees such as oaks, elms and “cottonless” cottonwoods provide relatively large canopy cover from a single tree while adding to the community’s tree height diversity—an important component in some bird-habitat requirements.

**Goal 2. Reduce and prevent tree loss due to existing and potential threats**

1. Continue the current oak wilt program with ongoing emphasis to the timely removal of possible spore producing, infected red oaks. Use the “Treat to the Line” method recommended by the Minnesota Department of Natural Resources whenever possible and when the situation warrants. Also called “Cut to the Line,” this treatment involves removing all oaks inside a created barrier line and optionally treating oak stumps with herbicide to ensure oaks inside the barriers will not regraft and continue to spread the disease. Though this is a radical treatment of oak wilt, it is appropriate when eradication of the disease is the goal.
2. Develop a Dutch elm disease program similar to the current oak wilt program. Many communities make the mistake of leaving diseased elms up too long, providing a host for the beetles that spread the disease. The sooner diseased elms can be removed, the better. Elms that are long dead from Dutch elm disease are no longer a threat to harbor spore spreading beetles. Priority should be given to removing recently diagnosed elms or those most recently dead.
3. Prepare for the event of an Emerald Ash Borer outbreak by occasional drive-by monitoring of the city’s significant ash population. This monitoring can be performed in conjunction with oak and elm inspections. The State of Minnesota has added Emerald Ash Borer to continuing education programs focused toward State Licensed Tree Inspectors. While there is still much to be learned about this pest, the use of state licensed tree inspectors will be key in early detection. Remove the poorest quality ash trees from city parks and on city streets whenever the opportunity arises. This pest prefers ash trees under stress; whenever a dying, diseased or significantly damaged ash is found, removal should be a priority. The city has a high percentage of its planted trees represented by ash species, which could present a significant financial burden should Emerald Ash Borer invade the area.



*Bare boulevards, like the one pictured above, offer wonderful tree-planting opportunities.*



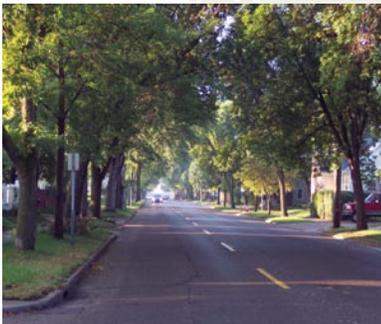
*This location offers space for street trees. Tree-lined streets shade the pavement and reduce heat; add beauty to the community; and can slow traffic by reducing the perceived width of the street.*

## Benefits of Trees

Trees provide many benefits to the environment and community. The past few decades of tree research has focused on documenting and quantifying the benefits of trees. Early on, researchers were quantifying the amount of greenhouse gases trees remove from the atmosphere (about ½ ton of carbon dioxide per tree per year) and pollutants (about 4.3 pounds of pollutants per tree per year). Since then, researchers have begun to document an ever growing list of benefits that may not be so obvious.



*Leaves and branches reduce the amount of rainwater that reaches the storm system—preventing flooding.*



*Trees reduce temperatures by shading streets and sidewalks.*

## Benefits to the Environment

In addition to the direct removal of greenhouse gases and pollutants, mentioned above, trees:

- Reduce temperatures by shading streets, sidewalks and other hardscapes, resulting in reduced use of electricity for cooling and a corresponding reduction of any non-renewable fuels used to generate that electricity. Furthermore, there is a reduction in the emission of greenhouse gases and pollutants associated with the use of fossil fuels.
- Increase the amount of water that reaches the groundwater table as rainfall follows tree root systems down below the soil surface.
- Intercept rain with leaves and branches reducing the amount of water that reaches the storm system, particularly when properly placed to grow over streets, sidewalks, parking lots and rooftops. This results in a downstream reduction in the erosive force of large volumes of runoff to natural water bodies and flooding.
- Add organic matter to the soil which further improves the water-holding capacity of the soil.
- Improve the resiliency of soil to respond to rain events by removing water from the soil which can reduce saturated conditions which exacerbate storm water load. One mature tree can capture over 5,000 gallons of water in a year.
- In whole, trees can reduce storm water by about 2% for each 5% increase in the community's tree canopy. Despite its many tree-covered subdivisions, Burnsville has many opportunities to increase the tree canopy along streets, sidewalks and parking lots.
- Reduce soil erosion with dense root systems. Less soil, contaminated or clean, reaches the storm water system, creeks and rivers.

## Benefits to the Community

Trees help promote pride in the community and a sense of place. Other benefits of trees affect us either directly or indirectly in our daily lives or have direct effects on our roads, utilities and businesses. Here is some of what we know to be true:

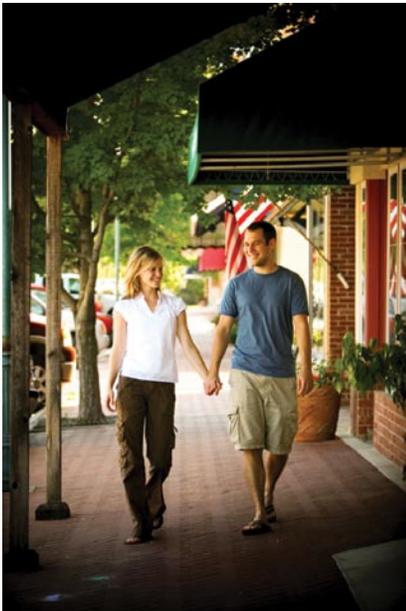
- Street trees are an important factor in reducing road maintenance costs. Recently, researchers showed that streets shaded by medium-sized trees required less frequent resealing than streets fully exposed to the sun.
- Tree-filled neighborhoods show lower levels of domestic violence.
- Street trees can calm traffic and lower traffic speed by reducing the perceived width of street. Streets without trees have the opposite effect, appearing “wide open.”
- Trees help reduce noise levels.
- Trees are known to shorten hospital stays.
- Trees can reduce workplace stress.
- Trees can be used to screen unsightly views.
- Our trees are part of the legacy from those who came before us.

Healthy trees in neighborhoods enhance property values:

- The sales price for a home increases by about 1% for each large front yard tree.
- But a single, large, specimen tree in a yard can add 10% to the property’s value.

Trees are also good for business. Surveys of shoppers in commercial districts with tree-lined streets reported that:

- They shop there more frequently
- They shop for longer periods of time



*Surveys indicate that shoppers spend more time and money in commercial districts with tree-lined streets.*

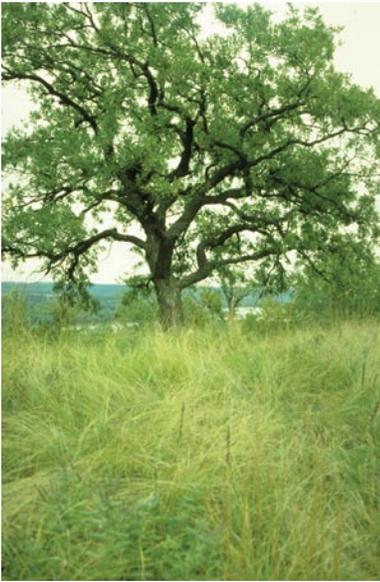
- They are more willing to pay for parking
- They spend, on average, 12% more on goods.

All when compared to shopping in areas without trees.



### Adding it All Up

When the benefits that can be quantified are weighed against the cost of trees (i. e. purchase, planting, pruning and removal), these benefits outweigh the cost by a margin of about three to one. This doesn’t include the benefits we cannot quantify such as community pride or reduction in stress and domestic violence. The City of Burnsville has been reaping and continues to reap these benefits, which started with proper planting of trees on streets and other city property, and by encouraging appropriate planting on private property. It is important to continue planting trees in Burnsville and ensure the urban forest is properly maintained to prevent an erosion of these benefits and an increase in costs associated with neglect.



*Burr oak is a highly desirable native tree that is drought tolerant and supports many wildlife species. Good in any landscape situation.*

### **Goal 3. Improve the quality and sustainability of tree plantings in the maintained areas of city parks**

1. Remove Siberian elms from parks regardless of their condition or health. Siberian elms are an exotic, potentially invasive tree that often has an unappealing form, can harbor Dutch elm disease—and the bark beetles that spread it—without obvious symptoms. There are not many Siberian elms currently growing in city parks, but if crews are on site removing other trees, any Siberian elm in that park should be removed during that trip. Also, the invasive nature of this tree makes it likely that more will be found in city parks over the coming years.
2. Finish the inventory of city parks begun as part of this Plan. Use the inventory to identify all trees of low quality or potentially hazardous and remove them.
3. Increase the number of desirable trees used in future park plantings. See the tables in Section 4.1.3 or desirable/recommended and undesirable/not recommended tree species.
4. Create a strict policy of formative pruning during the early years of a tree's growth. Current research points to avoiding pruning until a newly planted tree becomes established with the exception of removing damaged or dead branches and multiple leaders. Once established (two to five years), it is critical to improve the branch structure of young trees because it is quick, inexpensive, prevents large and expensive pruning projects years later and promotes healthy, attractive and stronger branch structure and an attractive overall shape.
5. Use more native, fruit-bearing trees and shrubs. Provide birds alternatives to buckthorn. Serviceberries, cranberrybush, mountain ash and plum are among several native plants used by birds for food, all adapted to our locale and attractive in flower.

### **Goal 4. Update Tree Preservation and Planting Related Ordinances**

Update current ordinances to reflect goals and strategies in this Natural Resources Master Plan using a discernment process to help the city determine:

- What it wishes to preserve, including which tree species, what size trees, forests versus individual trees, etc.
- Whom it wishes to hold accountable (who are the involved parties)
- Who will enforce the new policies/code
- How will it be enforced

The existing ordinances include:

- Woodland Protection Standards (Title 10, Chapter 8, Section 9) that holds builders and developers accountable for tree preservation and replacement,
- Title 8, Chapter 3, Section 3 that addresses planting on public right of ways,
- Title 11, Chapter 5, Section 5 that addresses tree planting in new subdivisions.

See Appendix E for specific recommended changes to tree-related ordinances.

### **3.2.1 Built Environment Tree Monitoring Recommendation**

Monitoring trees in maintained areas of parks and along the city streets, will allow the city to assess the effectiveness of the strategies laid out in this plan, identify new pests and stressors, and closely follow existing, chronic problems such as oak wilt, Dutch elm disease and invasive exotics. This monitoring can take place by several means.

1. Existing program of oak wilt inspections with the addition of elm and ash inspections. These additional inspections, performed in conjunction with the oak wilt inspections, will provide sufficient monitoring of the existing, chronic problems of oak wilt and Dutch elm disease while forming the first step to quick response should emerald ash borer infest the City's ash population.
2. Completing the street tree and park tree inventories. Some of the data collected during these inventories, like the sample inventories already performed, will complete the database of information on species diversity, size and age diversity, tree maintenance needs, planting opportunities, spatial distribution and tree survival. This information can then be used to assess past tree maintenance techniques and schedule new maintenance, focus planting efforts, adjust species diversity, respond to new or existing pests and assess the success of different tree species within the city.
3. Inspect all current and future exotic species control sites. No matter how effective the method of removing and controlling buckthorn, as long as mature trees and utility poles provide perch sites for birds, sites will be reseeded. Other plants such as Siberian elm and garlic mustard can reseed into previously controlled sites. Keep in mind: anything that can happen once can happen twice. Frequent monitoring of these sites is necessary to initiate a quick response that will make new infestations easier to remove than if left to thoroughly establish.
4. Frequent inspection of the "Polka Dot Forest." Young oaks planted in wooded parks will be particularly vulnerable. In the best of con-

**American Forests** (a non-profit organization that supports reforestation) suggests a 40% tree canopy for best building energy efficiency and comfort in cities. The tree canopy of Burnsville is currently at 24.5%.

ditions the survival rate of newly planted trees is often disappointing. But planted into a previously hostile growing environment out of site from casual inspection, these trees will require a commitment greater than what might be necessary for trees planted in a maintained area of a park. Response to new infestations of exotics will need to be quick to favor the growth of young oaks. Timely replacement of dead oak saplings can only be done if these sites are frequently monitored.

### 3.3 Strategies for Addressing Climate Change

One impending force that will affect Burnsville’s natural resources is climate change. Predictions indicate that Burnsville will experience more days over ninety degrees, increased wind, more intense but less frequent storm events, and less snow cover with higher average winter temperatures, among others. The ecosystem evolved under conditions other than what is now expected. This means that climate changes will affect natural resources. Increased drying of soils and lower water levels in lakes, wetlands and streams, stressed trees, frequent drought, intense (but infrequent) storm events, and many other effects will result.

Preparation for these changes should begin now and can happen in many ways. It is important to capture stormwater where it falls and infiltrate it into the ground for use by trees and to recharge ground water. This is suggested in the Water Management Plan through an infiltration requirement, and should be expanded throughout the city. It is important to shade buildings and pavement to keep ambient air temperatures moderate and save on energy costs. An urban forest canopy cover of fifty percent

will block winter winds, also saving on energy costs. The tree canopy cover of Burnsville is currently 24.5%.

It is important to pay attention to changes in our forests and wetlands to be sure that species are not being displaced by forces under our control (such as by invasive plant species and over grazing by deer). The challenges will become more evident in the next few years.

The strategies brought forward in this plan (and summarized in the conclusion)

all focus on the protection of natural resources, but at the same time strengthen them to face environmental change. Much can be done to sequester carbon and to reduce the release of greenhouse gases, while also saving energy costs and dependence on foreign oil. Suggested actions are listed in the table on pages 43 and 44. Many other actions not listed in the table can be taken in the areas of transportation, architecture and life style that are beyond the scope of this document.

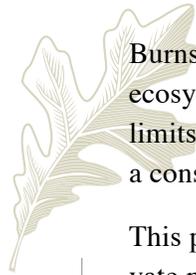
#### Climate change predictions include:

- More days over 90°
- Increased wind
- More intense but less frequent storm events
- Less snow cover with higher average winter temperatures

#### Preparation for climate change begins with:

- Capturing stormwater where it falls
- Appropriately shading buildings and pavement
- Monitoring changes in forests and wetlands

## 4.0 Strategy for Natural Resources Management on Private Property



Burnsville's natural resources are not confined to public property. Our ecosystem reaches across public and private land, and beyond the city limits. All properties affect neighboring lands so it is important to take a consistent ecological management approach throughout Burnsville.

This plan suggests two avenues of influencing the management of private property natural resources. The first approach is through education programs and the second through direct assistance programs.

### 4.1 Education Programs

When citizens understand environmental issues and the effect they are having on natural resources, they become motivated to change their behavior. Knowledge is crucial for the preservation of Burnsville's natural resources. Burnsville's public land is surrounded by private property. When both are managed to the ecological advantage, the expense and difficulty in managing both drops considerably.

Valuable information regarding Burnsville's natural resources could be provided to the citizens of Burnsville. The next page lists possibilities. One issue, however, looms greatest as a threat to natural areas in town—invasive plant encroachment in our woodlands. Two species are severely degrading the woodlands, and to control them requires that citizens remove these species from their property in concert with the efforts taken on public property. The invasive species of greatest concern are common buckthorn and garlic mustard.

#### 4.1.1 Buckthorn Education Program

An internet-based buckthorn education program is recommended. Busy citizens are most apt to investigate an issue if the information is presented in an easy-to-access format on their home computer. Video-based programs are especially effective.

Topics to address in this program include buckthorn identification and life cycle, the impact of buckthorn on our woodlands and wildlife, and techniques for removing buckthorn and prevention of its re-colonization.

#### 4.1.2 Garlic Mustard Education Program

Garlic mustard is an herbaceous, woodland understory plant that is invading metropolitan woodlands at an astonishingly fast rate. It quickly reproduces and displaces native wildflowers, ferns and grasses, completely eliminating them wherever it establishes.

This program should be web based as well, so that it is accessible at citizens' convenience. Citizens should understand how the plant affects the environment, how to identify it, and how to eradicate the plant.



*Garlic mustard invades forests and prevents tree regeneration. Home-owners should learn to identify and control this invasive species.*



*Internet-based education programs reach citizens in the convenience of their own homes.*

## Educational Program Suggestions

After first-priority education efforts are underway, further educational programs can be developed to protect Burnsville's natural resources. Suggestions for further educational programs include the following:

### *Education programs pertaining to privately owned lawn landscapes*

- Landscaping for energy efficiency. Learn how to place trees in your yard for best solar gain and wind protection. Save up to 15% on your heating and cooling bills.
- Alternatives to Lawn. Learn how to reduce the amount of fertilizer, pesticide, water and fossil fuels consumed in managing your lawn. Introduction to easy-to-care-for alternative ground covers to lawn. Reduce soil compaction (especially when planting trees)
- Capturing Valuable Stormwater on Your Property. Learn the value of treating stormwater as a resource. Learn why and how to collect water from roofs, driveways and streets. Learn about rainwater gardens, rain barrels and other techniques.
- How Climate Change will Affect Your Landscape. Learn what you can do in your yard to prepare for hotter summers, greater but less-frequent storm events, and higher winds. Learn how to prevent the release of carbon dioxide (the burning of fossil fuels) while culturing a landscape that sequesters carbon (through photosynthesis by deep-rooted plants).
- The importance of compost in the landscape to recycle nutrients, hold soil moisture, and sequester carbon. Learn how to build your own compost bin and put the final product to good use.
- Maintaining an Environmentally Sound Lawn. Learn how to care for a beautiful lawn without the use of fertilizers, water and pesticides.
- Cats on the Prowl. Learn about the destruction caused by feral cats.

### *Education programs pertaining to privately owned wooded areas*

- Residential forest management including the importance of biodiversity, and the removal of weedy, non-native trees such as Siberian elm, Amur and Norway maples.
- Adding diversity to forest understory by planting wildflowers, ferns and sedges. Learn about native wildflowers. Learn to protect and enhance what you have; add diversity.
- Urban Wildlife 101. Learn how wildlife survives in urban areas. Learn how best to serve their needs and not cause damage to the ecosystem as a whole.
- Tree diseases program. Learn how to prevent, identify and control tree diseases on your property, including Dutch elm disease, red oak wilt, emerald ash borer, and others.

### 4.1.3 Tree Planting Education Program

This program too could simply be information posted to the city’s web site. Most of the private land in the city was developed several decades ago. Therefore, many of the trees planted are now reaching maturity and the tree canopy is beginning to close. Here many of the benefits of trees are being realized. So in these maturing neighborhoods the issue is not “plant more trees” but rather, improve the quality of the urban forest by:

1. Replacing dying trees with tree species appropriate to the site and of better quality and higher potential value (see the Recommended Trees table in Appendix B). Trees once valued have since fallen out of favor because of poor performance or their ability to become invasive. An example is Norway maple. Invasive in some parts of the United States, this tree’s poor branch structure and propensity to develop cankers make this a high maintenance and short-lived tree. Short-lived or week-wooded trees like silver maple and boxelder (see the Trees not Recommended table in Appendix B), should be replaced with trees such as oaks and sugar maple when the opportunity arises. These trees are potentially of higher value and can become “legacy trees” that benefit the entire community. Encourage use of a recommended tree list for all landowners.
2. Tree selection should be guided by the adage “right tree in the right place.” Selected trees must be able to tolerate the growing conditions at that particular site. Honeylocust can thrive on dry sites, while it flounders on wet sites. Other trees such as bur oak are adaptable and can grow on dry, wet or mesic sites. The mature size of a tree must always be considered. Avoid planting tall trees under other trees or powerlines. Avoid planting trees with low-hanging branches near roads.
3. Promote proper maintenance of trees on private property by encouraging the use of International Society of Arboriculture (ISA) Certified Arborists and by timely removal of dead and dying trees.

### 4.2 Direct Assistance Programs

Publicly supported programs motivate private property owners to care for their land in an ecologically sound manner, and improve the overall quality of natural resources. Three of Burnsville’s existing programs illustrate this success. Similar programs can build on this model of preserving Burnsville’s natural resources. Current programs include:

1. The bare-root tree sale each spring
2. The Cul-du-Sac Island Improvement Grant Program
3. The Neighborhood Water Resources Grant Program



*Planting trees is not only good for the environment, it can be a fun family activity as well.*

#### **When planting trees along streets:**

- Call the city forester for free advice
- Get a free permit (required), so that appropriate species are planted
- Know where underground utilities are—they may prohibit the planting of trees along some streets

Two additional programs are suggested in this plan.

#### **4.2.1 Buckthorn Brush Pick-up Program**

One of the primary deterrents for citizens in removing buckthorn from their property is the difficulty of disposing brush that accumulates in the process. Most citizens do not own the equipment required to remove the brush. Burnsville could establish a program that, on appointment, city crews would remove and dispose of curbside buckthorn brush from private property. The City of Eagan has undertaken such a program. Burnsville could mimic this successful program for which Eagan finds to be economical and effective. Their program involves an initial visit to the property by a city forester to educate the property owner and to be sure they are removing the appropriate species and doing it in a way that is effective. Stringent guidelines for what, when and where the brush is picked up are set and enforced. This program would be an efficient way to access motivated citizens and spread the word about the importance of removing this invasive species.

It is recommended that Burnsville develop a buckthorn brush pickup program, the cost of which would be comparable to Eagan's program.

#### **4.2.2 Native Herbaceous Plant Sale Program**

Herbaceous plants are those non-woody herbs that grow in natural areas—be that prairie, savanna or woodland. Many of these species have been extirpated from local environments by invasive plant species, lack of burning, deer browse, and other causes. Because the seed source is gone, they may not regenerate after the destructive force is eliminated; for example, after buckthorn is removed. This program makes available these plants, along with providing information on which plants belong on individual sites, and how to prepare the site, plant and maintain the plants. This plant sale program could be dovetailed into the existing bare-root tree sale.

## 5.0 Review of City Plans



In an effort to harmonize Burnsville's plans and ordinances that support natural resources, they have been reviewed and recommendations have been written. Section 5.0 is a review of those plans.

### 5.1 Burnsville Comprehensive Plan (2000)

A local comprehensive plan is a public document that describes how a community agrees to develop over a specified time period. A Comprehensive Plan is a policy document that describes the goals, policies, and strategies intended to achieve the community's goals. Burnsville last updated its Comprehensive Plan in 2000 (adopted in December 1998) and is now in the process of the latest plan update with a targeted adoption date of September 2008.

When the 2000 Comprehensive Plan was prepared, the Metropolitan Council considered the Burnsville to be part of the "Urban Area" with the ability to serve all of Burnsville with links to the metropolitan utility, parks and transportation systems. The 2000 plan projected a desire to maintain a balance of land uses, ensure a strong tax base and provide a diverse housing stock. The Plan recognized that the city was fully developed and that redevelopment, contaminated sites clean up, reuse and renovation of existing structures and infill development would be the main development activities into the future. Since the adoption of the 2000 Comprehensive Plan, conceptual plans have been developed for Kraemer Quarry, the McGowan Property (amphitheater site), Minnesota River Quadrant, and Heart of the City that added park lands and natural resource holdings to the city.

The 2000 Comprehensive Plan is organized in a goals and policy framework. Goals are a general statement of community aspirations and desired objectives that project the broad social, economic, or physical state towards which Burnsville officially agrees to move. The Environment goals are the plan goals most closely targeted to the natural resources of Burnsville. Environment Goal #1 states that the city will "Promote the protection, conservation, and enhancement of natural resources within Burnsville for the community's long-term use, benefit, and passive enjoyment."

The 2000 Comprehensive Plan presents a number of policies for each of the plan goals; policies are an adopted course or method of action intended to be followed in order to accomplish the stated goals. A number of the Environment Policies (numbered below as per the 2000 Plan) are directly related to natural resource protection and management. The pertinent environmental policies state that the city shall:

#1. Continue to develop, redevelop, and maintain an organized system of open space, greenways, corridors, and active and passive parks to improve community character and protect natural resources.

#3. Manage the community's wildlife resources to protect and preserve native habitat and wildlife, and to protect human safety.

#6. Implement and maintain the Natural Resources Master Plan, and maximize opportunities to preserve such resources by partnering with County, State, Regional, Federal and private programs.

#7. Identify, preserve and maintain natural, recreational, and cultural landmarks that are unique and essential to Burnsville's identity.

#9. Continue to monitor and preserve open space in Southwest Burnsville, respecting its natural character.

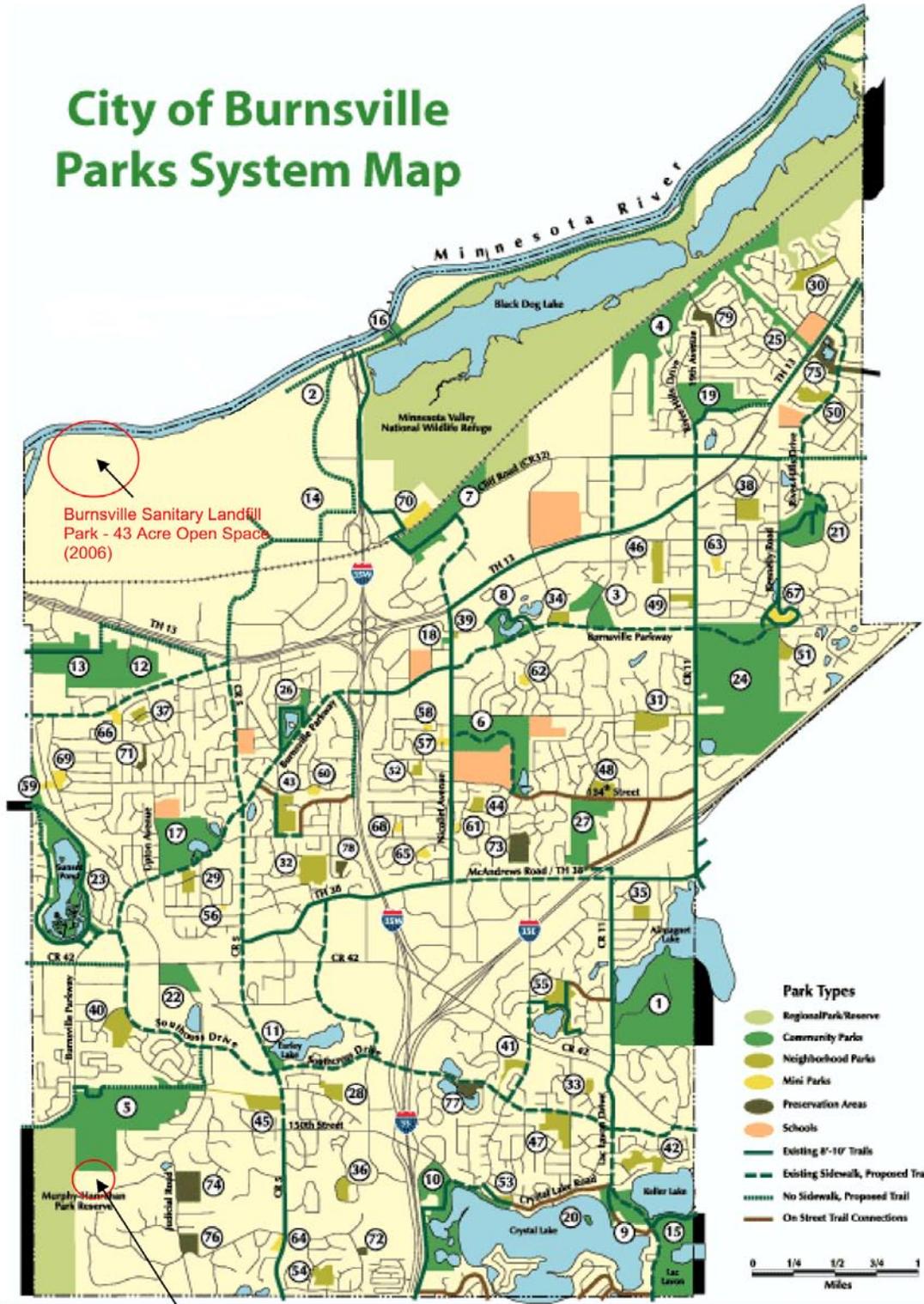
#22. Protect native vegetation, such as trees, understory growth, prairies, and other wildlife habitat; develop and implement an Urban Forest Management Plan designed to preserve and protect the trees within Burnsville; and require reforestation of areas cleared by development.

Since the 2000 Comprehensive Plan was adopted in 1998 two new parks have been planned for development in the Minnesota River Quadrant: a large park along the Minnesota River and a smaller park to be located on shore of the Kraemer quarry lake. The Minnesota River park will include land from the Burnsville Sanitary Landfill development which has already been determined and land from the McGowan landfill site. This land / trail access is anticipated to be obtained prior to or at the same time as the final platting and redevelopment of the Kraemer quarry. An additional area of park land will be added in the Southwest RMU adjacent to Cam Ram Park on the northwest corner of the Forest Park Heights development.

The locations of these new park parcels are shown on the map on the following page.

This 2007 Natural Resources Master Plan is considered to be part of the 2008 Comprehensive Plan. It is an implementation plan that follows the policies set forth in the 2000 Comprehensive Plan. This is accomplished by adding an urban forest component to this plan and by addressing the numbered points listed above.

# City of Burnsville Parks System Map



Forest Park Heights –  
7.91 Acre Open Space Dedication (2006)

## **5.2 Water Resources Management Plan**

The City of Burnsville Water Resources Management Plan was issued in October 2002. It is a comprehensive review of the management issues affecting the City's lakes, ponds, wetlands and other water resources, with recommendations for management strategies to address those issues. The Water Resources Management Plan outlines twelve goals for water resources planning and management functions. These goals tie into the 1997 End Statement on Environment and satisfy the requirements of MN Statutes 103B.201 and 103B.251 for water resources planning.

The plan reviews Burnsville water resources, including an overview of existing stormwater management, including proposed improvements and a review of alternatives for financing them. The plan summarizes a 1997 wetland and pond inventory and classification system, and provides detailed information on the City's Vermillion, Black Dog and Lower MN River watersheds and subwatersheds. For each subwatershed, the plan provides goals, identified problems and proposed solutions.

The plan advocates a "comprehensive approach to storm water management (which) requires management of water resources, drainage systems and land use in a unique combination of balance and prioritization." In taking this approach, the plan considers the entire hydrologic cycle, including the influence of varying land uses and cover types in the water cycle. In fact, Goal 12 of the overall plan is to "recognize the relationship between land use cover and water resources management."

This is the point where the Water Resources Management Plan is most closely coordinated with the 2007 Natural Resources Master Plan. Much of the water resources plan deals with treatment strategies and stormwater management designed to improve water quality in the lakes and wetlands. These management strategies for water quality solutions should be coordinated with the appropriate proposed NRMP management strategies. For example, the 2007 NRMP includes suggestions for promoting and expanding rain gardens, reducing areas of impervious surfaces and planting more trees for shade. These are all examples of recognizing the relationship between land use and water resources management (Goal 12).

It is recommended that the October 2002 Water Resources Management Plan remain in place for the management of the City's water resources, with incorporation of appropriate land management recommendations in the 2007 NRMP into the subwatershed action plans.

### **5.3 Minnesota Valley National Wildlife Refuge and Wetland Management District Comprehensive Conservation Plan**

The Comprehensive Conservation Plan (CCP) was approved in 2004, and provides a comprehensive overview of the natural resources of the Minnesota Valley National Wildlife Refuge (MVWNR). The 1400-acre Black Dog Unit of the MVWNR stretches along the northern border of Burnsville east of I-35W, and is contiguous with Cliff Fen, Black Dog, Tennesioux and Cedarbridge Parks. The CCP is an important tool for maintaining the ecological integrity of the refuge in the face of development pressures. Many of the management goals and strategies that the CCP details for the refuge can be extended into the contiguous Burnsville parks.

The CCP describes the natural communities and habitats of the refuge, as well as its land use history, geography, hydrology, climate, cultural and socioeconomic contexts. It details past, ongoing and planned activities for habitat management, fish and wildlife monitoring, public environmental education outreach and mitigation projects. Broad biological goals are set for six biological criteria:

- Floodplain Forests
- Wetlands
- Upland Forests
- Grasslands and Oak Savannas
- Land Protection
- Public Use

Within each goal, objectives are set for meeting the goal. In turn, specific management strategies are laid out to meet each objective.

The City of Burnsville should continue to coordinate management efforts in its contiguous parks with the applicable objectives and management strategies found in the CCP. Specifically, management of upland forest and transitions into wetlands and floodplain forest at Black Dog and Tennesioux Parks should follow or complement the management strategies found in the CCP for those resources. Partnership brings a unified effort to buckthorn removal and deer population control. Moreover, the implementation discussion in the CCP (Chapter 5) articulates the need and the benefit of working with local governments to “seek creative partnership opportunities to achieve (the CCP) vision for the future.” This NRMP and continuing work with the MVWNR staff accomplishes the goal of cooperating with the CCP.

## **5.4 Trail Master Plan (2000)**

The Trail Master Plan analyzed the status of the trail system in 2000 and made recommendations for its improvement. The new trails shown in the Plan do not impact public natural areas, therefore routing of new trails does not further dissect these habitats. When constructing new trails or repairing existing trails improvements to the surrounding environment would bolster the quality of Burnsville's natural resources. These improvements include:

- Plant trees to shade trail. This makes the trails more comfortable while extending the life of pavement and contributing to reducing stormwater runoff volumes.
- Plant deep- rooted native grasses and wildflowers along trails rather than turf grasses in order to reduce mowing, increase atmospheric carbon sequestration, increase stormwater infiltration and contribute to bird and butterfly habitat.
- When disturbing soil around trails, decompact the soils by deep tilling and adding organic matter. This allows for healthier vegetative growth along side trails, better stormwater infiltration and water storage in the soil for plant uptake, and greater carbon sequestration.

## **5.5 City of Burnsville Parks Master Plan**

The September 2000 Parks Master Plan recognizes that parks are an integral component of Burnsville's civic infrastructure. Since the park system was essentially complete at the time of the plan's preparation, the plan focuses on the quality of the parks over the quantity of parks. The plan analyzes existing conditions in the park system, including the types and distribution of parks, demographic trends affecting the parks and public perception of the system. The goals of the Parks Master Plan are organized into a series of maps, policies and recommendations called the Parks Framework Plan, which is divided into eight topics:

- Parks System Organization
- Natural Resources and Management Priorities in the Parks
- Park-Trail Connections
- Park Management Policies
- Gemstones in the Park System: A Framework for Park Enhancements
- Site-Specific Park Improvements
- Future Parks: A Conceptual Framework
- Potential New Facilities

In terms of using undeveloped portions of parks, portions of the Parks Framework Plan would clearly be superseded by the 2007 Natural Resources Master Plan. Specifically, the Park Framework Plan sections on Natural Resources and Management Priorities in the Parks, Park Management Policies and Site-Specific Park Improvements should be reviewed to identify policy and recommendations that will be updated by the 2007 NRMP, including the management strategy maps contained in the 2007 NRMP.

Other portions of the Parks Master Plan should remain as the primary guidance for managing Burnsville parks. These include the sections of the Parks Master Plan on trails, maintenance of basic park elements and renovation and replacement of facilities. The cost estimate for parks maintenance, provided in the plan's implantation section, should be updated where applicable.

### **5.6 Terrace Oaks Park Master Plan (1996)**

This plan created an ecological vision for the park and set goals for its use and management. The plan identifies invasive species as a concern for the quality of the park and states that an invasive species removal plan will be created.

This plan includes a strategy for managing invasive species in the park (see Figure 16). The 1996 plan also identifies that large populations of deer are a problem in the park. This plan recommends that the city re-evaluate its policy and deer removal to increase the number removed and therefore reduce the stress on the few native plants growing in the park.

Tree diseases, especially oak wilt are identified in the plan. Current, good efforts to control tree diseases in the park should continue.

Native prairie exists on the west end of the park north of the parking lot. The master plan recommends a selective burning regime be implemented along with reintroduction of native prairie species. A fire regime has been established in the park along with some buckthorn removal in the area of the prairie remnant. These efforts should be stepped up and this unique habitat area expanded.

With the implementation of this Natural Resources Master Plan, the natural resources management component has been removed from the Terrace Oaks Park Management Plan (TOPMP) and placed in this NRMP. Park use plans remain in the TOPMP.

## **5.7 Prairie and Savanna Management Plans (2005 with a 2006 update)**

The City of Burnsville has developed “Prairie and Savanna Areas Management Plans” that are updated annually. These plans focus on six main areas of prairie and/or savanna within the City, establishing goals and management strategies for each. The plans also provide management histories for each area and maintain current lists of plant and animal species observed within each area. The six areas of focus are:

- Alimagnet Park restored prairie;
- Cam Ram Park remnant oak savanna;
- Rudy Kraemer Nature Preserve restored and remnant prairie;
- Day Park;
- Sunset pond restored prairie;
- Terrace Oaks West Park restored prairie and remnant oak savanna.

The existing plan acknowledges that other prairie and savanna areas exist within the parks and other public lands. These include Wolk, Judicial, Loop and Cliff Fen Parks. Restoration plantings have also been installed in several other parks. In addition, the Minnesota Valley National Wildlife Refuge has within it an outstanding, diverse remnant prairie.

Management of the six focus areas began as early as 1987 for Alimagnet to 2002 for Day Park. Typical management activities have included mowing, spot-spraying and broadcast spraying. In some areas weeds have been pulled manually. Seed mixes that have been used have been typical to Minnesota prairies, and have been adjusted to the soil moisture regime.

It is recommended that the city continue to use the existing plan for guidance in managing the focus prairie areas. Restoration and management of additional prairie or savanna areas within the city should continue as time and staff area available. Additional suggestions for management of the focus prairie areas include incorporating fire management into selected areas, and restoration of additional prairie remnants in North River Hills and Chateaulin Parks.

Fire management (burning) is included as a management tool in the existing plan. Burning mimics the natural conditions under which prairie species evolved, and is the most effective means of controlling woody plant intrusion and eliminating non-natives. Public education and coordination with neighborhood groups can effectively overcome public resistance to fire management. These plant communities greatly benefit from fire. Burn management should continue in each park on a planned, but irregular schedule.

A recommended area for additional prairie restoration is in North River Hills and Chateaulin Parks. Areas currently in old field, non-native herbs and grasses should be prepared and seeded with prairie seed mixes similar to those used at Alimagnet. The specific sites within North River Hills Park are east of the ballfields and on either side of the path leading in from the southern entrance to the park. See the Management Plan Map for this park.

### **5.8 2001 Deer Management Program and the 2005 Update Report**

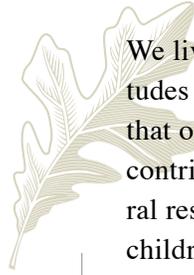
An in depth study was undertaken in 2001 to determine the impact of Burnsville's deer population on natural resources and to suggest strategies to reduce deer impact. Several strategies were suggested and adapted at that time including an education program, adoption of an ordinance banning deer feeding, and a harvesting program. Good progress has been made to reduce the impact of deer on Burnsville's native plant communities.

The field survey conducted for this plan found extensive browse damage to native woody vegetation in Burnsville's natural areas. Native trees are having a difficult time reproducing both because of deer browse and suppression by buckthorn. As buckthorn invasion expands to encompass large natural areas, deer concentrate feeding on preferred browse—native vegetation. Remaining populations of native plants are being severely impacted by deer browse.

The 2001 Deer Management Program refers to recommendations which have set desired deer populations for other communities as low as five per square mile. The report suggested fifteen deer per square mile would be adequate for Burnsville, and that has been the target goal since 2001. At this rate the woodlands are being stressed by deer browse. These woodlands require a five year respite from browse in order to recover. For this, the deer count in Burnsville would need to drop to five deer per square mile (John Moriarity, Ramsey County Wildlife Biologist personal communication). Due to the plant community stress observed in Burnsville's woodlands, staff should be authorized to manage deer to a 5-deer-per-square-mile density in areas being restored.



## 6.0 Conclusion



We live in a time of environmental change. It is important that our attitudes toward the environment change as well. We can no longer assume that our natural resources will continue to serve our needs without us contributing to their sustainability. We have to take care of our natural resources in order to reap the benefits and to preserve them for our children.

*The City of Burnsville has made good efforts to address natural resource issues.*

*For example, great strides have been taken to preserve and improve the city's water resources. But degrading forces are mounting, and require the attention of the citizens of Burnsville.*

Negative influences on our natural resources are increasing. Climate change is affecting—and will continue to affect—Burnsville's natural resources. Urban heat-island effect will continue to drive up building cooling costs. Invasive plant species have already established in our natural areas, and will continue to prevent native species from reproducing unless we step in. Wildlife populations are off balance. Stormwater is being sent downstream rather than being held on the land where it is needed. Soils are compacted and preventing healthy plant growth and stormwater infiltration.

### 6.1 Summary of Recommendations

A number of recommendations are made in this plan. Some are more urgent than others and all take some level of financial commitment. The tables below and on the following page bring these recommendations together in priority ranking.

### Summary of Strategies for Implementing Natural Resources Master Plan

#### Priority One

- A. Expand buckthorn and invasive species control program in all RMUs.
- B. Create a boulevard tree planting program. (50 trees/year)
- C. Create a Buckthorn Brush Pickup Program for private landowners.
- D. Conduct a Dutch elm disease program.
- E. Expand the built environment tree maintenance program for younger trees.
- F. Create a City Center RMU Sustainability Demonstration project.
- G. Reduce deer population to 5 deer per square mile in select woodland restoration areas.
- H. Provide staff support for implementing strategies. Create education programs on buckthorn, garlic mustard and tree planting. (+1.0 FTE)
- I. Consider establishing a parking lot shading ordinance. (Existing staff)
- J. Conduct a native herbaceous plant sale in conjunction with the Annual Spring Tree Sale. (Existing staff)
- K. Establish and conduct a monitoring program for natural areas and forests.
- L. Update Woodland Preservation ordinance & update planting related ordinances. (Existing staff)

## Summary of Strategies (continued)

### Priority Two

- A. Expand existing prairie management program.
- B. Expand built environment tree pruning and removal budget for storm damaged and mature trees.
- C. Provide staff support to complete inventory of city park and street trees. (+.35 FTE – Intern)
- D. Increase funding of existing oak wilt program.
- E. Create a Polka Dot Forest Regeneration Program.
- F. Consider establishing a Soil Protection ordinance. (Existing staff)

### Teach by Example

A potential project to show Burnsville's citizens how to initiate change in their landscape could be to retrofit the City Center complex (RMU) to reduce lawn and impervious surface, where practical, and replace them with deep-rooted plants that function to sequester carbon, and do not require the burning of fossil fuel for maintenance. This can be done in an attractive manner that inspires residents to do the same.



*The demonstration gardens at the Hennepin County recycling center educate and inspire the public.*

### Funding Plan

The strategies recommended in this plan are new or expanded programs that will supplement the programs identified in the 1999 Natural Resources Master Plan. Increased funding above and beyond what is currently allocated will be needed to address the issues identified, and to continue the city's work towards achieving the environmental end identified for our community. Operating budget funding to implement the strategies is proposed to be phased in over a four-year period. The phasing will require an increase of approximately .35 FTE (full time equivalent) per year, totaling 1.35 FTEs and an estimated \$163,000 at the end of year four. Additional capital funding of approximately \$60,000 would be necessary as well. The strategies will be implemented according to the two priorities identified in the strategy summary table.

### 6.2 Moving Forward

What can be done to protect Burnsville's natural resources in this period of environmental change? Many things, but first and foremost, it is essential that adequate budget and staff time be made available to meet the recommendations made in this plan.

Burnsville citizens can do many things to steward natural resources to a sustainable landscape in an effort to preserve native plant communities, to sequester carbon, reduce fuel consumption and dependence on foreign oil, to reduce energy needs and associated costs, and to create a beautiful, comfortable environment in which to live. Everyone must participate for successful change to happen. All of us can think of more ways to lighten our impact on the environment—and take action.

*Of note in the strategy is the need to devote more resources to the built environment forest. Many of Burnsville's trees are maturing, and many dying. To retain the canopy, regular pruning must occur, and to expand the canopy to 40%, additional trees must be planted.*

The table below (and on the following page) summarizes potential solutions for the primary natural resources issues Burnsville (and the region) is facing.

<b>Solutions for Change</b>	
<b>Impacts to Burnsville’s Natural Resources</b>	<b>Solutions to Reduce Impacts</b>
<p><b>Development</b></p> <ul style="list-style-type: none"> <li>• Destroys habitat</li> <li>• Compacts soil</li> <li>• Increases stormwater runoff</li> </ul>	<ul style="list-style-type: none"> <li>• Conservation housing development design to preserve open space</li> <li>• Soil protection (not disturbing or compacting soil) and remediation by decompacting</li> <li>• Alternative storm water management such as implementing rainwater gardens and green roofs</li> </ul>
<p><b>Urban heat island effect</b></p> <ul style="list-style-type: none"> <li>• Increases energy costs</li> <li>• Elevates overnight low temps, year round</li> <li>• Impacts human health</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce the amount of paved surfaces which absorb heat and prevent rain water infiltration.</li> <li>• Plant trees to shade streets, parking lots and buildings and reduce cooling costs.</li> </ul>
<p><b>Invasive plant species</b></p> <ul style="list-style-type: none"> <li>• Eliminates natural diversity and plant community resiliency</li> <li>• Causes soil erosion and water pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor their encroachment.</li> <li>• Control where ever possible.</li> <li>• Plant native plants where invasives have been eradicated.</li> </ul>
<p><b>Climate change</b></p> <ul style="list-style-type: none"> <li>• Extreme fluctuations in temperature</li> <li>• More days over ninety degrees</li> <li>• Increased intensity of humid and dry days</li> <li>• Increased rainfall intensity with decreased frequency</li> <li>• Decreased snow cover &amp; increased average winter temperatures</li> <li>• Increased wind</li> <li>• Increased competition from warmer-zone non-native species</li> <li>• Increased over wintering of insect pests</li> <li>• Increased stress on heat-intolerant species</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions for fighting climate change include everything found in this column of this table.</li> <li>• It is important to reduce lawn and plant deep rooted plants. Plants sequester carbon through photosynthesis and store it in the soil. In order to have healthy, deep rooted plants, loose, fertile soils are necessary. Loose soils allow roots to penetrate deep, and reach water in times of drought. Loose soils also allow for water to easily soak into the ground rather than running of the surface, where plants can use access it when it’s needed.</li> <li>• Plant trees which pull carbon out of the atmosphere and store it in their wood. When planted in the correct spot, they reduce energy use in buildings.</li> </ul>
<p><b>Soil compaction</b></p> <ul style="list-style-type: none"> <li>• Decreases storm water infiltration and soil water storage capacity</li> <li>• Decreases aquifer recharge</li> <li>• Supports fewer plants</li> <li>• Decreased carbon sequestration</li> <li>• Decreased plant growth; Trees do not mature</li> <li>• Favors many weed species</li> </ul>	<ul style="list-style-type: none"> <li>• Prevent compaction by keeping vehicles off natural areas and lawns.</li> <li>• Preserve natural areas.</li> <li>• Ameliorate compaction through aeration, deep tilling with the incorporation of organic matter, and by the introduction of soil microbes through compost tea.</li> <li>• Mulch or plant open soil. Never allow soils to be exposed.</li> </ul>

*continued on next page*

## Solutions for Change (continued)

### Impacts to Burnsville's Natural Resources

### Solutions to Reduce Impacts

#### Exporting stormwater (via pipes)

- Treats this precious resource as a waste product
- Deprives plantings of water
- Increases downstream flooding
- Is expensive
- Reduced groundwater recharge
- Reduced stream, lake and wetland base flow

- Capture stormwater in rainwater gardens, cisterns, green roofs, or a variety of other methods to hold stormwater on-site and soak it into the ground. This provides water to plants and recharges groundwater.
- Plant trees to capture stormwater.

#### Wildlife populations off balance

- Spreads disease
- Reduces wildlife diversity
- Degrades native plant communities through over browsing
- Destroys home landscapes
- Road kill/property damage
- Decreases water quality

- Reduce the deer populations to the carrying capacity of natural areas dominated by buckthorn.
- Continue goose control program

#### Unmanaged open space/forests

- Loss of biodiversity and plant community resiliency
- Lost habitat
- Soil erosion
- Open space fragmentation

- Control invasive plants
- Plant native trees
- Consolidate and expand existing open space through land purchase.