

### Chapter 4: Natural Resources Stewardship

#### Introduction

The gently rolling topography and diverse ecology of Lake Elmo Park Reserve provide a tremendous opportunity for establishment of a truly natural recreational and educational amenity for Metropolitan area residents. In addition to the many water features on the site, there are significant native woodland and savanna remnants, and several large, old fields have been restored to prairie during the past few years. It was stated in the original park master plan that the goal for the park’s landscape is to restore it to “pre-settlement conditions”. It is appropriate to also consider people’s preferences for habitat and esthetics, such as forest versus prairie (both of which are native to the park) as we prepare a plan for management of the park’s landscape. In addition to the typical ecological information (soils, topography, hydrology, etc.), this plan will incorporate user preferences for landscape type and management/maintenance parameters so as to develop a restorative landscape plan that is practical, sustainable and valued by its users.

#### Vegetative Cover

The existing vegetation of Lake Elmo Park Reserve is categorized as five significant types, as shown on Fig. 4.1, including old field, cropland, prairie restoration, significant oak forest and mesic forest or woodland. The woodland areas cover portions of the inner area of the park and appropriately buffer the two main lakes (Lake Elmo and Eagle Point Lake) as well as the multiple smaller water bodies and wetlands. The Mesic forest includes indicator species such as red oak, white oak, aspen, birch, and ironwood.

Agricultural vegetation is also prominent in the park reserve. Areas to the northwest and southeast are currently used for crops, predominantly corn and soybeans. The “old field” areas have generally been seeded with a non-native pasture mix and are managed primarily by mowing, however, prairie restoration projects are also underway and have converted some of the farm fields into native, tall-grass prairie. Herbaceous prairie plants that have been re-introduced include grass species such as big bluestem, Indian grass, Canada wild rye, switch grass and cord grass as well as prairie forbs including asters, indigo, wild bergamot, black-eyed susan, and goldenrod. The native prairie plants stabilize the soil, are adapted to the local climate and their seeds provide an abundant source of food for insects, birds, and other wildlife throughout the year.



Undulating oak savanna landscape



Existing "Old Field" at the Lake Elmo Park Reserve



Oak savanna around the edges of a kettle pond



Old Field and Corn



Tallgrass prairie and oak forest



Mesic Forest

The “significant oak forest” is a remnant of an oak forest in the northern part of the park. The forest topography consists of rolling hills with scattered low areas including two kettle ponds. This remnant of majestic oak trees is also infested with the invasive buckthorn species which inhibits growth of native, understory plants and shades the ground so thoroughly that the forest is unable to regenerate itself.

The existing vegetative cover in the park is predominantly old field grassland. The woodlands are disconnected, which means there is a lack of forested corridors and edges to accommodate wildlife movement throughout the park. Forest corridors of native shade trees and shrubs are important as food for wildlife and provide cover for protection and movement throughout the site. Increasing the number of shade trees and restoring the landscape to oak savanna, where conditions are suitable on the site, are measures that would improve wildlife habitat and create an attractive, natural environment for park visitors.

### **Management and Control of Invasive Plant Species**

Controlling invasive plants is one of the major challenges in restoring habitat areas. The most prominent and aggressive exotic plants are buckthorn and reed canary grass but other species such as mulberry, honeysuckle, amur maple, spotted knapweed, purple loosestrife and Canada thistle are also of concern. A proliferation of exotic plants prevents regeneration of native species and consequently degrades or eliminates habitat for many insect, animal and bird species. It is important, from an educational perspective, that park visitors have the opportunity to experience native plant communities. Parks that are infested with exotic plants confuse people as to what really constitutes a natural landscape. It is often assumed that if a plant is green and in a park, it must be natural and good. Greater public awareness of what constitutes a healthy, native landscape will aid in the control of problem plants throughout our landscapes.

The plan recommends that the park be cleared of exotic plants. Eliminating invasive plants and on-going maintenance of the desired ecosystems in the park will require significant, long term management, manpower and funding. Because of the heavy infestations on the site, it is more important to address the removal and perpetual management of exotic invasives than to plant new trees and shrubs. Removing the exotics will allow sunlight to reach the soil where a bank of native seeds is already in place; the seeds will sprout and indigenous plants will have an opportunity to regenerate themselves.

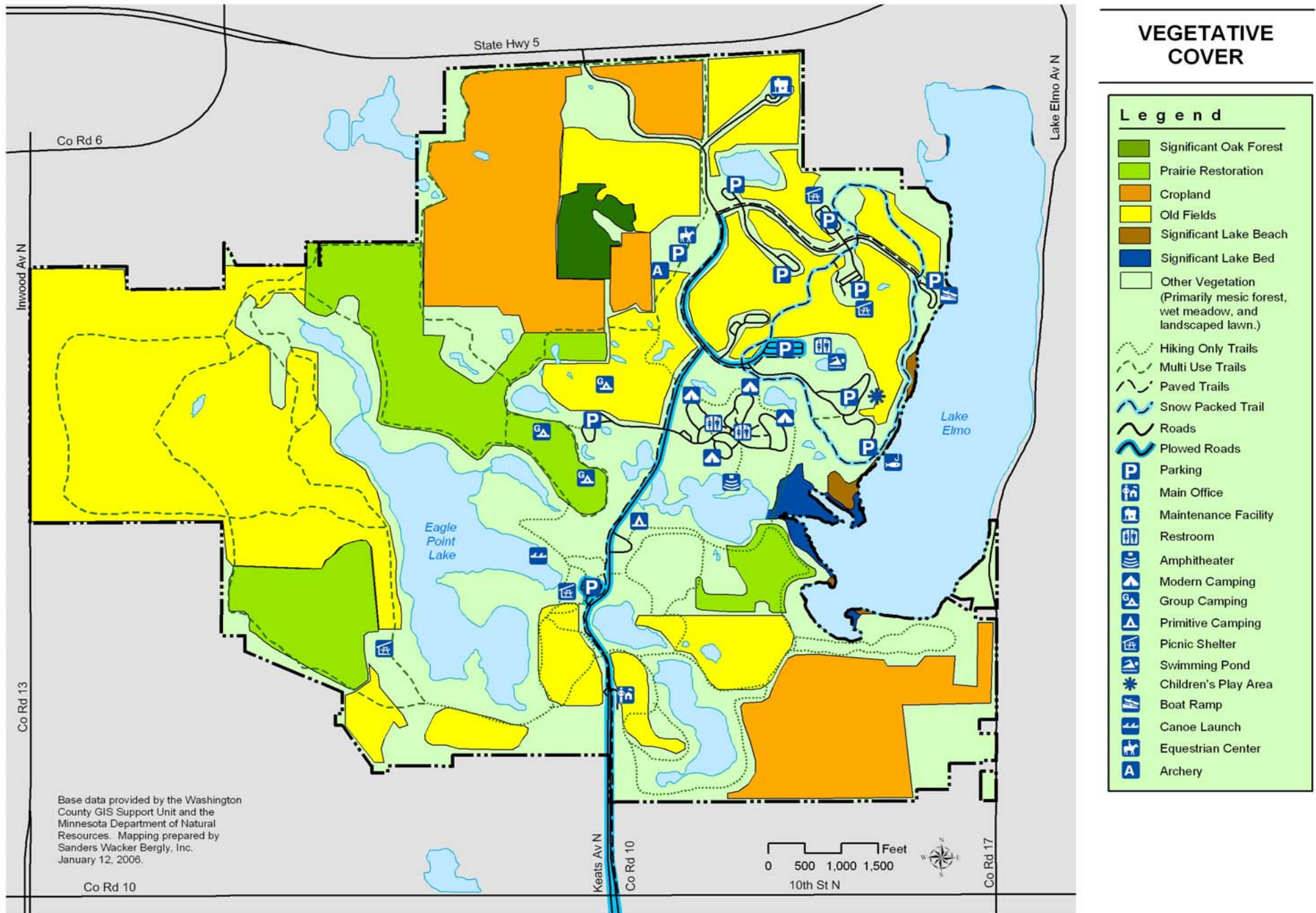


Figure 4.1



Tallgrass prairie in the winter sunlight



Restored wetland



Prairie

### Soils and Topography

The upland surface soils in Lake Elmo Park Reserve are primarily sandy loam, a moderate to well-drained soil which provides a good growing medium for crops and pasture and is considered to be suitable for woodland and prairie. The sandy loam has a moderate, natural fertility and medium to low organic matter content. The upland subsoils generally have a high content of gravelly sand which results in moderate to rapid permeability.

Soils identified as silt loam are present in numerous low areas scattered throughout much of the park as indicated on Fig 4.2. They are poorly drained soils and have a high water table. These soils tend to be collection points for surface water, as either drainage ways or depressions, and support wetland and wet meadow plant communities. Refer to Appendix D for a complete list of specific soil types and related characteristics.

The topography (see Fig. 4.3) of the park consists primarily of a gently undulating landscape with lower elevations frequent in the south-central area of the site and in conjunction with the two large lakes and multiple water bodies. There are relatively few steep slopes over 18% and the highest points occur in the western extremities of the park. The gently undulating landscape, with moderate to well-drained soils, is conducive to an oak savanna restoration.

### Landscape Ecology and Sustainability

It is desirable to have a landscape that is sustainable with a high level of ecological quality and integrity. In the most simple of terms, landscape ecology represents the relationships between people, ecosystems, species, energy, pollutants, disturbance, conservation and other influences on the landscape. Landscapes are in a state of constant change caused by the actions of all living organisms as well as natural forces such as weather, fire, water. Landscape ecology is the dynamic relationship between all of these aspects.

Sustainability is a term that represents a practice and/or design that limits or moderates the input of energy and chemicals into the landscape in order to promote long-term plant health, water quality, wildlife habitat, and human health. Sustainability and landscape ecology promote a balance of human and natural forces. Though they are ideological terms, they represent key values related to promoting long-term health of the environment, humans, plants, and wildlife.

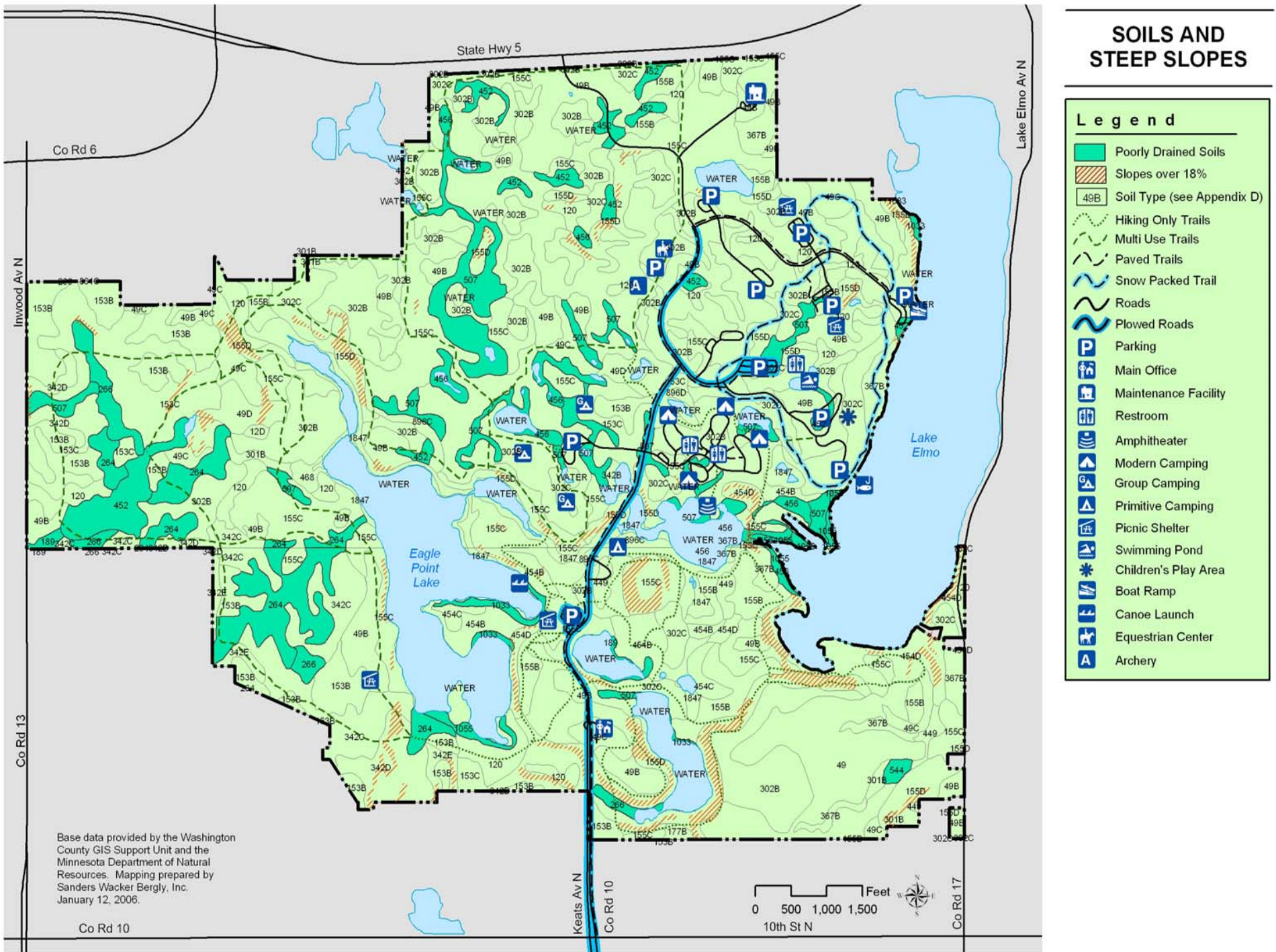


Figure 4.2

Lake Elmo Park Reserve is an example of a landscape which has both human factors and natural factors influencing its ecology and sustainability. The plan recommends pursuit of the following goals to attain a more sustainable landscape:



Late summer prairie flowers and grasses

- Minimize lawn area to reduce mowing and the use of fertilizer.
- Minimize the use of herbicides and fertilizers to reduce the amount of nutrients and chemicals that will eventually reach water bodies as runoff.
- Minimize the use of gasoline powered engines to protect air quality.
- Analyze existing soils, topography and other site characteristics to aid in nurturing appropriate native plant communities.
- Propagate diverse native plant communities using species that are suitable for specific site conditions.

Properly managed plant communities will be regenerative, plant diversity will increase, wildlife populations will be sustained and the park ecosystems will enrich educational and recreational experiences of park visitors.

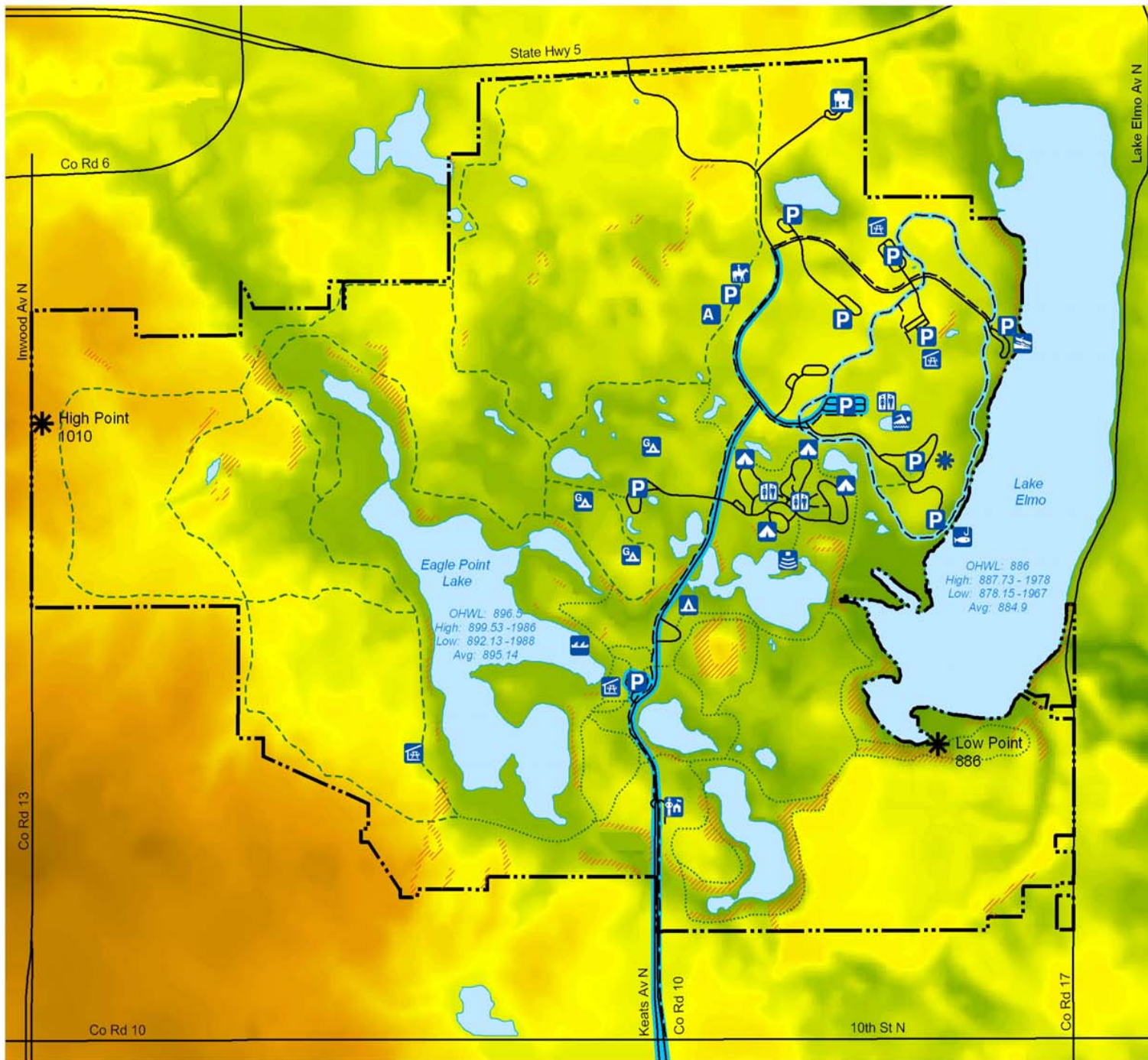
### **Natural Resource Education and Interpretation**

Currently, there are several areas of the park that have high levels of ecological integrity and beauty. Most of these are located in the east and south-central areas of the park, where not surprisingly, most of the parks use and development has taken place. The plan recommends locating interpretive signs and information on the ecology of the park along the existing paths and near picnic shelters, play structures and other high use areas to help visitors better understand the park's natural features.



Wetland

The plan further recommends that Eagle Point Lake be made more accessible by adding carefully planned nature trails and bird and wetland observation facilities. The plan also recommends construction of a nature/interpretive center building to be located on the knoll at the eastern shore of Eagle Point Lake. The facility will open up vistas to the lake and provide indoor space for displays and education. Refer to Chapter 5 for more information on the proposed nature center.



## TOPOGRAPHIC RELIEF

### Legend

- Lower Elevations  
Low Point = 886
- Intermediate Elevations
- Higher Elevations  
High Point = 1010
- Slopes over 18%
  
- Hiking Only Trails
- Multi Use Trails
- Paved Trails
- Snow Packed Trail
- Roads
- Plowed Roads
- P Parking
- MO Main Office
- MF Maintenance Facility
- R Restroom
- A Amphitheater
- MC Modern Camping
- GC Group Camping
- PC Primitive Camping
- PS Picnic Shelter
- SP Swimming Pond
- C Children's Play Area
- BR Boat Ramp
- CL Canoe Launch
- EC Equestrian Center
- A Archery

Base data provided by the Washington County GIS Support Unit and the Minnesota Department of Natural Resources. Mapping prepared by Sanders Wacker Bergly, Inc. January 12, 2006.

0 500 1,000 1,500 Feet



Figure 4.3

### Restorative Landscape Plan

The landscape management plan described in the 1978 Master Plan suggests development of plant communities to “resemble a mosaic that mimics the vegetative cover that was present prior to the arrival of European settlers in the Mid-1800’s”. The concept in the current Restorative Landscape Plan, shown in Fig. 4.4, supports that premise and recommends protection and restoration of oak savanna, prairie, forests, and wetlands in areas where soils and aspect are appropriate for each respective ecosystem.

During the planning process, stakeholders expressed a preference for a variety of ecosystems that were once native to the park. The Restorative Landscape Plan recommends re-establishment and/or expansion of five major plant communities or ecosystem types as follows:

- *Upland Forest* - dominated by red, bur and white oaks with some native maple, ash and elm.
- *Oak Savanna* - consists of a maximum 30% canopy cover by bur oak trees; short prairie grasses such as little bluestem and prairie dropseed and prairie forbs would dominate the ground layer. This community is most often found in areas having gentle topography and dry, sandy soils.
- *Prairie* - tall grasses mixed with prairie forbs.
- *Aspen Glade* - found primarily in the low-lying areas of Lake Elmo Park Reserve. The plant community consists of thick clones of Aspens with other species tolerant of semi-wet conditions.
- *Wetland* - grasses, sedges, forbs and emergent plants are present in fluctuating water levels and provide significant habitat for water fowl.



Oak savannah



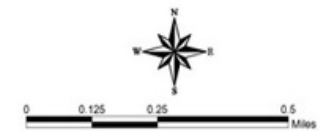
Prairie grasses in an oak clearing

Ecological succession is a natural process where plant species replace each other over time. Each stage of plant succession first gains a foothold, thrives, then declines and gradually gives way to the next dominant plant community. Temporary, successional plant communities (like an aspen glade for example) are replaced by more stable plant communities (like maple/basswood forest) until a sort of equilibrium in the landscape is reached. Succession is also influenced by disturbance, such as a windstorm, disease, or fire and can be accelerated and directed by proper management.

A range of factors was considered in the process of determining where each ecotype is most suitable. Factors such as slopes, soils, previous conditions, wetland buffers and low lying areas were studied in order to develop the restorative landscape plan. Oak savanna is the predominant landscape type in the ecological history of Washington County. In addition, from an aesthetic standpoint, this landscape type is also appropriate due to the open quality which allows for long-distance views and provides habitat for

# RESTORATIVE LANDSCAPE PLAN

- Upland Forest
- Oak Savanna
- Prairie
- Aspen Glade
- Wetlands



Aerial photograph and parcel data provided by Washington County GIS Support Unit in May of 2005. This data is intended for general planning purposes only.

Washington County Parks  
with  
Sanders Wacker Bergly, Inc.  
Savanna Designs  
Amy Ollendorf

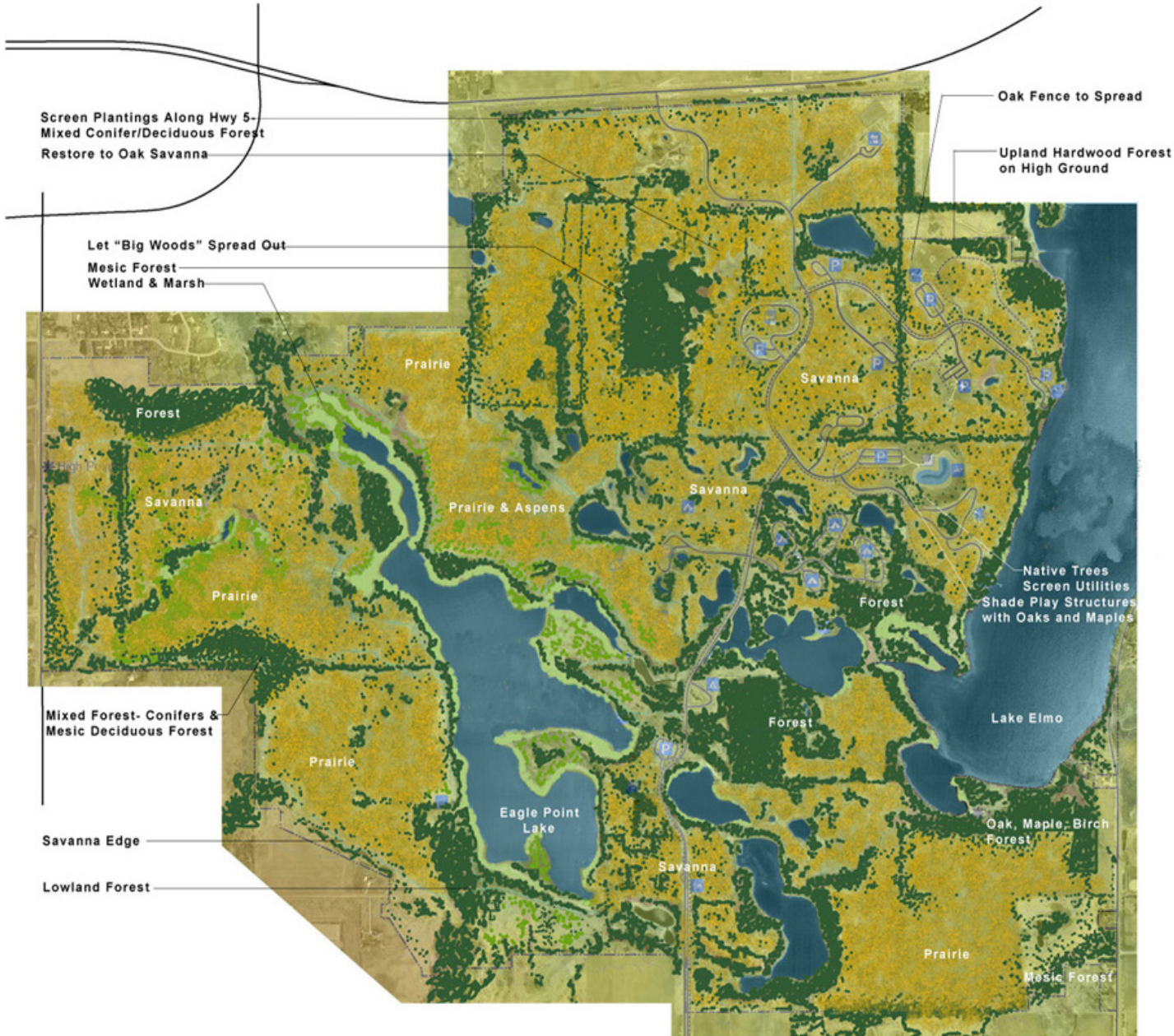
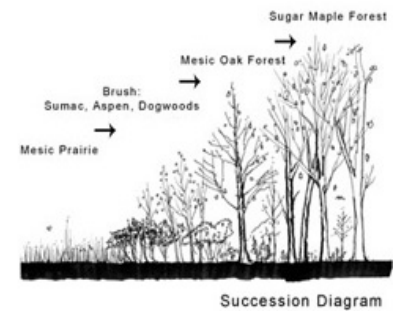


Figure 4.4

many species of birds and wildlife. The trees in the savanna landscape provide shade and create variety and interest in the appearance and character of the site. They are also desirable in settings for park activities such as picnicking, playing and camping.

Management techniques should be designed to maintain the vitality of desirable plant communities. For example, if a prairie plant community, dominated by grasses and forbs (prairie flowers) is left alone, more aggressive shrub species will move in and, over time, shade out the prairie plants. Eventually, sapling trees will appear and out-compete most of the shrub species; giving way to a mature shade tree plant community. If the goal for an area is to preserve a prairie plant community, it can be maintained with management techniques of fire and mowing. While prairie, savanna, forests and wetlands are native to this area, disturbance regimes, such as fire, are important to maintain them and regenerate the plant life cycles.

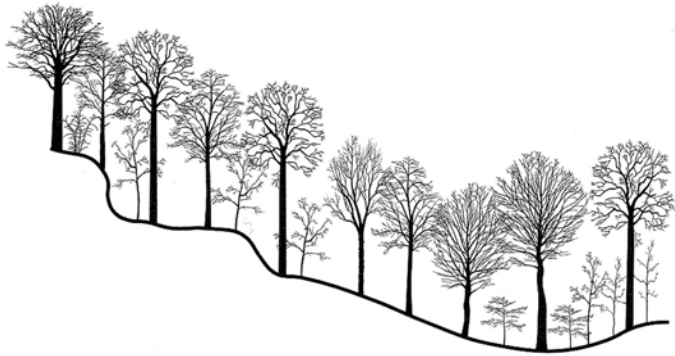
Where the goal is to expand existing or develop additional woodlands, the installation of native woodland plantings, time and ecological succession will allow the forest ecosystem to expand in the park. As mentioned earlier in this chapter, control of invasive plant species is essential to provide opportunities for natural succession to play its role in the perpetuation of desirable landscapes.

The locations of wetland plant communities are determined by conditions of elevation, soil and hydrology. Aquatic and emergent plants flourish in locations where prairie and woodland plants are unable to survive. Wetland habitats can be improved by managing water levels, stabilizing erodible soils and seeding or planting native species. For additional information on wetland management and habitat improvement refer to the publication titled “Lake Elmo Park Reserve Wetland and Habitat Management Project” by Barr Engineering Company.

The five native ecosystem types proposed in the Restorative Landscape Plan provide for a high level of habitat diversity, which will attract and provide a home for an array of animals, birds, and butterflies as well as provide and an interesting and inviting landscape for park visitors. The following pages contain lists of plant species proposed for use in the establishment of the recommended ecotypes.

Landscape Types and Plant lists

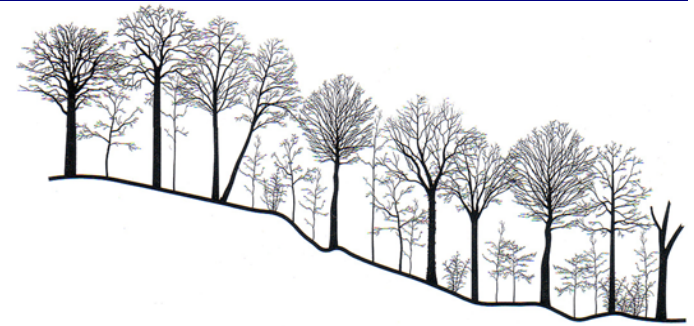
<b>Oak Savanna</b>	
	<b>Botanical Names</b>
<b><u>Shade Trees</u></b>	
Bur Oak	<i>Quercus macrocarpa</i>
White Oak	<i>Quercus alba</i>
Northern Pin Oak	<i>Quercus ellipsoidalis</i>
Hawthorn	<i>Crataegus crusgalli</i>
Black Cherry	<i>Prunus serotina</i>
<b><u>Shrubs</u></b>	
American Hazelnut	<i>Corylus americana</i>
Chokecherry	<i>Prunus virginiana</i>
Gray Dogwood	<i>Cornus racemosa</i>
Juneberries, Serviceberry	<i>Amelanchier canadensis</i>
Nannyberry	<i>Viburnum lentago</i>
<b><u>Groundcover</u></b>	
Little bluestem	<i>Schizachyrium scoparium</i>
Big Bluestem	<i>Andropogon gerardii</i>
Prairie dropseed	<i>Sporobolus heterolepis</i>
Hairy grama	<i>Bouteloua hirsuta</i>
Porcupine grass	<i>Stipa spartea</i>
Gray goldenrod	<i>Solidago nemoralis</i>
Purple prairie clover	<i>Petalostemon purpureum</i>
Rough blazingstar	<i>Liatris aspera</i>
Rigid sunflower	<i>Helianthus rigidus</i>
Tall cinquefoil	<i>Potentilla arguta</i>
Sky-blue aster	<i>Aster oolentangiensis</i>
Silky aster	<i>Aster sericeus</i>
Dotted blazingstar	<i>Liatris punctat</i>
Wild lupine	<i>Lupinus perennis</i>
Butterfly weed	<i>Asclepias tuberosa</i>



Upland Forest: Mesic Forest

<b>Upland Forest- Mesic</b>	
	<b>Botanical Names</b>
<b>Mesic Oak Forest</b>	
<b><u>Shade &amp; Evergreen Trees</u></b>	
White Oak	<i>Quercus alba</i>
Red Oak	<i>Quercus rubra</i>
Bur Oak	<i>Quercus macrocarpa</i>
Basswood	<i>Tilia americana</i>
Northern Pin Oak	<i>Quercus ellipsoidalis</i>
Ironwood	<i>Ostrya virginiana</i>
Black Cherry	<i>Prunus serotina</i>
Paper Birch	<i>Betula papyrifera</i>
Red maple	<i>Acer rubrum</i>
Butternut	<i>Juglans cinerea</i>
<b><u>Shrubs</u></b>	
American Hazelnut	<i>Corylus americana</i>
Chokecherry	<i>Prunus virginiana</i>
Prickly ash	<i>Zanthoxylum americanum</i>
Red-berried elder	<i>Sambucus pubens</i>
Nannyberry	<i>Viburnum lentago</i>
Red Raspberry	<i>Rubus strigosus</i>
Juneberries	<i>Amelanchier spp.</i>
Pagoda dogwood	<i>Cornus alternifolia</i>
<b><u>Groundcover</u></b>	
Wild Geranium	<i>Geranium maculatum</i>
Lopseed	<i>Phyrma leptostachya</i>
Hog-peanut	<i>Amphicarpa bracteata</i>
Canada mayflower	<i>Maianthemum canadense</i>
Lady Fern	<i>Athyrum angustum</i>
Wild Sarsparilla	<i>Aralia nudicaulis</i>

False Solomon's seal	<i>Smilacina racemosa</i>
Columbine	<i>Aquilegia canadensis</i>
Wild grape	<i>Vitus riparia</i>
Virginia Creeper	<i>Parthenocissus inserta</i>
<b>Maple Basswood Forest</b>	
	<b>Botanical Names</b>
<b><u>Shade &amp; Evergreen Trees</u></b>	
Sugar Maple	<i>Acer saccharum</i>
Canada Hemlock	<i>Tsuga canadensis</i>
Basswood	<i>Tilia americana</i>
American Elm	<i>Ulmus americana</i>
Ironwood, Hophornbeam	<i>Ostrya virginiana</i>
White Ash	<i>Fraxinus americana</i>
Red Oak	<i>Quercus rubrum</i>
White Oak	<i>Quercus alba</i>
Northern Pin Oak	<i>Quercus ellipsoidalis</i>
Balsam Fir	<i>Abies balsamea</i>
White Pine	<i>Pinus strobus</i>
Paper Birch	<i>Betula papyrifera</i>
Black Cherry	<i>Prunus serotina</i>
<b><u>Shrubs</u></b>	
American Hazelnut	<i>Corylus americana</i>
Chokecherry	<i>Prunus virginiana</i>
Gray Dogwood	<i>Cornus racemosa</i>
Juneberries, Serviceberry	<i>Amelanchier canadensis</i>
Nannyberry	<i>Viburnum lentago</i>
<b><u>Groundcover</u></b>	
Baneberry	<i>Actaea alba</i>
Anemone	<i>Anemone quinquefolia</i>
Wild Sarsparilla	<i>Aralia nudicalus</i>
Big-leaved aster	<i>Aster macrophyllus</i>
Bluebead Lily	<i>Clintonia borealis</i>



Upland Forest: Maple Basswood Forest

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Wood Fern	<i>Dryopteris austriaca</i>
Northern Bedstraw (scented)	<i>Galium triflorum</i>
False Lily of the Valley	<i>Maianthemum canadense</i>
Northern Bishops Cap	<i>Mitella nuda</i>
Hairy Solomon's Seal	<i>Polygonatum pubescens</i>
Large flowered Trillium	<i>Trilium graniflour</i>
Smooth Violet	<i>Viola pubescens</i>
<b>Aspen Glade</b>	
	<b>Botanical Names</b>
<b><u>Trees</u></b>	
Aspen	<i>Populous tremuloides</i>
Black Alder	<i>Prunus serotina</i>
Alder	<i>Alnus incana</i>
<b><u>Shrubs</u></b>	
American Hazelnut	<i>Corylus americana</i>
Chokecherry	<i>Prunus virginiana</i>
Gray Dogwood	<i>Cornus racemosa</i>
Sumac	<i>Rhus typhinia</i>
Juneberries, Serviceberry	<i>Amelanchier canadensis</i>
Arrowwood Viburnum	<i>Viburnum dentatum</i>
Nannyberry	<i>Viburnum lentago</i>
Diervilla lonicera	<i>Bush Honeysuckle</i>
<b><u>Grasses</u></b>	
Little bluestem	<i>Schizachyrium scoparium</i>
Big Bluestem	<i>Andropogon gerardii</i>
Indian Grass	<i>Sorghastrum nutans</i>
Canada blue-joint grass	<i>Calamagrostis canadensis</i>
Sedge	<i>Carex</i>

<b>Prairie:</b>	
	<b>Botanical Names</b>
<b><u>Groundcover</u></b>	
Little bluestem	<i>Schizachyrium scoparium</i>
Big Bluestem	<i>Andropogon gerardii</i>
Prairie dropseed	<i>Sporobolus heterolepis</i>
Hairy grama	<i>Bouteloua hirsuta</i>
Porcupine grass	<i>Stipa spartea</i>
Gray goldenrod	<i>Solidago nemoralis</i>
Purple prairie clover	<i>Petalostemon purpureum</i>
Rough blazingstar	<i>Liatris aspera</i>
Rigid sunflower	<i>Helianthus rigidus</i>
Tall cinquefoil	<i>Potentilla arguta</i>
Sky-blue aster	<i>Aster oolentangiensis</i>
Silky aster	<i>Aster sericeus</i>
Dotted blazingstar	<i>Liatris punctat</i>
Wild lupine	<i>Lupinus perennis</i>
Butterfly weed	<i>Asclepias tuberosa</i>
Chokecherry	<i>Prunus virginiana</i>
Redtwig Dogwood	<i>Cornus sericea</i>
Gray Dogwood	<i>Cornus racemosa</i>
Juneberries, Serviceberry	<i>Amelanchier canadensis</i>
Winterberry	<i>Illex verticillata</i>
<b>Wetland/Pond Plants</b>	
	<b>Botanical Names</b>
<b><u>Trees</u></b>	
Quaking Aspen	<i>Populus tremuloides</i>
Cottonwood	<i>Populus deltoides</i>
<b><u>Shrubs</u></b>	
Gray Dogwood	<i>Cornus racemosa</i>
Redtwig Dogwood	<i>Cornus sericea</i>

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<b>Grasses, Sedges, Forbs and Emergent plants)</b>	
	<b>Botanical Names</b>
Boneset	<i>Eupatorium perfoliatum</i>
Broadleaved arrowhead	<i>Sagittaria latifolia</i>
Bluejoint grass	<i>Calamagrostis canadensis</i>
Softstem bullrush	<i>Scirpus validus</i>
Sedge	<i>Carex scoparia</i>
Fox sedge	<i>Carex vulpinoidea</i>
Woolgrass	<i>Scirpus cyperinus</i>
Cattail	<i>Typha latifolia</i>
Bulb-bearing water-hemlock	<i>Cicuta bulbifera</i>
Northern marsh fern	<i>Thelypteris palustris</i>
Swamp milkweed	<i>Asclepias incarnata</i>
Marsh bellflower	<i>Campanula aparinoides</i>
Marsh cinquefoil	<i>Potentilla palustris</i>
Joe Pye weed	<i>Eupatorium maculatum</i>
Turtlehead	<i>Chelone glabra</i>
Sweetflag	<i>Acorus calamus</i>
Water Plantain	<i>Alisma trivale</i>
Marsh marigold	<i>Caltha palustris</i>
Pickerelweed	<i>Pontedira cordata</i>