FILE

City of Lake Elmo
City Council Workshop/Special Council Meeting
3800 Laverne Avenue North
Lake Elmo, MN 55042

October 11, 2011

6:30 p.m. – 8:30 p.m. (?)

Proposed Agenda *

1. a. Presentation on Natural Resource Management Plan for Sunfish Lake Park – Kathy Widin, City Forester
   b. Presentation of book on History of Sunfish Lake Park - Park Commissioner Judy Blackford

2. Update on Eagle Scout Project – Eric Eitzman

3. Consider Adoption of Special Event Permit Ordinance

4. Library Update

5. Adjourn

** *A social gathering may or may not be held at the Lake Elmo Inn following the meeting* **

Acknowledgements

Thanks to the Collaborators/Supporters of this project:

MNDNR – Community Conservation Assistance Grant Program
The City of Lake Elmo, Staff, City Council and Parks Commission
Carol Kriegler, Program Assistant – Parks, City of Lake Elmo
Jyneen Thatcher, Washington Conservation District
John Hanson, Barr Engineering, Valley Branch Watershed District
Three Rivers Park District – info. on Releve sampling method
Andrew Kegley – GPS/GIS consultation
Janet Van Sloun Larson – Restoration Specialist City of Minnetonka
Hannah Texler, Ecological Services Div., MNDNR
Sharon Sarappo – field biologist and expert birder
Linda Kellar – expert birder, member of St. Paul Audubon
Diane Hilscher – Hilscher Design & Ecology
Mark Popovich, Darren Smith – Tree Inspectors/Survey Assistance
Peter Widin – Mich. Tech. Univ. – Bird and Field Survey Assistance

June 2011

Natural Resource Management Plan
Sunfish Lake Park, Lake Elmo, MN

Katharine D. Widin, Ph.D.
Forestry Consultant, City of Lake Elmo
Plant Health Associates, Inc.

Jim Eckberg, M.S.
Plant Ecologist
Minnesota Native Landscapes

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Author Biographies

Katharine D. Widin, Ph.D. – is a plant pathologist and forestry consultant in private practice. She has operated her consulting business, Plant Health Associates, Inc., in the Twin Cities since 1983. Dr. Widin received her M.S. and Ph.D. degrees in Plant Pathology from the Univ. of Minn. and an undergraduate degree in Biology from Kenyon College in Gambier, Ohio. Dr. Widin is currently the forestry consultant/consulting arborist for four St. Croix Valley area communities, including the City of Lake Elmo. She also has private clients for whom she does work including tree inventories, tree preservation plans, plant insect and disease diagnostic work, tree appraisals, writing and lecturing. Dr. Widin writes the "Plant Health" column for Northern Gardener magazine, the publication of the Minn. Horticultural Society, and is an ISA (International Society of Arboriculture) Certified Arborist.

Jim Eckberg, M.S. – received a B.A. in Biology from Gustavus Adolphus College and an M.S. degree in Ecology, Evolution and Behavior from the Univ. of Nebraska-Lincoln. During the time spent on field work for this management plan, Mr. Eckberg was a Plant Ecologist with Minnesota Native Landscapes, as well as being a research fellow in the Dept. of Soil, Water and Climate at the Univ. of Minnesota. He is currently a graduate student in the Department of Agronomy and Plant Genetics at the Univ. of Minn. and an NSP Invasive Species and Genotype IGERT Trainee in Risk Analysis.

Natural Resource Management Plan
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Executive Summary: In 2010, a project was undertaken in Sunfish Lake Park, a 284 acre passive use park in Lake Elmo, to identify native plant communities and threats to those communities within and near the park. The city received a grant for much of this work through the MNDNR Community Conservation Assistance grant program. This information on park natural resources is the result of vegetation sample plot observations, informal surveys of frogs and birds, and information collected from area residents, the Valley Branch Watershed District, the Washington Conservation District, and the Ecological Services Division of the Minn. Dept. of Natural Resources. The resulting observations have been put together to provide information on what natural resources, specifically plant community types, are present in the park, what factors threaten those native plant communities, and what types of management can best be used to improve those plant communities and the natural resources of the park. The major plant community type within the park (MN native plant community designation) is Southern Dry Mesic Oak Forest (MHs37) with some elements of the fire-dependent community type, Pin Oak-Bur Oak Woodland (FDs37b). Wetland and prairie plant communities were also identified. The plant communities found in ground surveys generally compared fairly well to general plant community types identified in the Minnesota Land Cover Classification System (MLCCS); however, there were few sugar maple or basswood found in plots or ground surveys. The project work identified invasive plants, especially European buckthorn, as the main factor negatively affecting native plant communities and diversity within the park. Management recommendations, resulting from current, known, effective management practices, are included for the major invasive plants found.

Introduction

General Management Goals

The management goals for Sunfish Lake Park are to: protect and enhance the natural resources of the site, to improve the native plant communities, improve wildlife habitat, and improve the nature experience of park users who visit the site to hike, cross-country ski, go horseback riding, watch wildlife, and enjoy the open spaces.

Natural Resource Management Plan

In order to protect and enhance the native plant communities of the site, woods, prairie, wetlands, it is necessary to know what is on the site and what threatens the native plant communities there. To accomplish that, it was decided that a natural resource management plan was necessary. A significant component of the natural resource management plan includes a sampling inventory of the native plant communities present on site with noted situations of special concern which threaten the integrity and viability of the native plant communities. The health and well-being of native plant communities is critical in providing wildlife habitat, preventing soil erosion and maintaining or improving water quality.

Work for this plan was supported by a Community Conservation Assistance grant from the Minn. Dept. of Natural Resources and also by the City of Lake Elmo.

Sunfish Lake Park - Natural Resource Information

Ecological Aspects and Landscape Context

Sunfish Lake Park is located in Washington County, in the City of Lake Elmo (Township 29, Range 21W, covering parts of sections 10, 14, 15 and 16) and is accessed by an entrance off Hwy. 5 to the south. It is a park of 284 acres and has been noted as a regionally significant natural area by the Minn. DNR. The park is just north of the Lake Elmo Park Reserve and is part of an ecological corridor from the Tri-Lakes area of Lake Elmo, down through the LE Park Reserve, south of Sunfish Lake Park.

Fig. 1. Metro Conservation Corridors 2007

Fig. 2. Regionally Significant Terrestrial and Wetland Ecological Areas 2003

The park is located in a geological area termed the St. Paul-Baldwin Plains and Moraines which consists of a large end moraine complex and areas of outwash plains with soils such as clay loams, loams, sandy loams and loamy sands. Topography is gently rolling with areas of steep slopes and ravines through woods and around water bodies.

Fig. 3. Soils Map Sunfish Lake Park

Fig. 4. Topographic Map of Eastern Half of Sunfish Lake Park

Pre-European settlement vegetation

The pre-European settlement vegetation in this area, taken from information collected by land surveyor's in the mid-1800's (provided by the MN County Biological Survey, Ecological Services Division, MN DNR) consisted primarily of oak openings and barrens with the primary plant communities being oak and aspen savanna. Tallgrass prairie and maple-basswood forest were also found there.

Fig. 6. Current Forest Communities Sunfish Lake Park

Land Use History

The land use history of the Sunfish Lake Park area since European settlement was as farmland and woodland. Some areas of the woodlands were probably used at some point for cattle grazing, based on the disturbance vegetation that exists today. The disturbance vegetation including the prevalent gooseberry, other less palatable plant species, and invasive plants. The land for the park was acquired by the City of Lake Elmo in 1974 through purchases of land from several local property owners. The original intent for the park area was to "be used for preservation of natural wilderness, hiking trails, nature areas, and cross-country skiing." Trails for hiking and cross-country skiing were laid out and constructed in 1975. In the 1970's a number of trees were planted in Sunfish Lake Park, many of them conifers on the south side of the park. From 1979-1987, excess water, which was threatening lake homes NW of the park, was pumped out of Lake Jane and into City Park Pond in Sunfish Lake Park. This resulted in raising water levels in major wetland areas of the park which reportedly resulted in some tree loss and changes in native vegetation, particularly in and around City Park Pond. Additional trees were planted after this event.

Additional land uses within the park boundaries are a landfill on the west side, which is currently in the final stages of remediation for PFC groundwater contamination, the new prairie restoration, and agricultural land, both to the south of the park. There are now also residential developments to the north, east and southeast of the park boundaries.

Conservation Easement

In June 2010, the City took measures to protect Sunfish Lake Park by establishing a Conservation Easement with the Minnesota Land Trust. The purpose of this Easement is to preserve and protect the park in perpetuity, according to defined conservation values, by confining the development, management and use of the land to activities that are consistent with these defined conservation values.

The Conservation Easement language outlines land use restrictions in detail and generally prohibits any activity on, or use of the land, that is inconsistent with the purposes of the Easement. These prohibitions specifically include any intrusion or future development that would interfere with the essential scenic quality of the land or the visual enjoyment of the open and natural character of the land by the general public. The terms of this Easement are specifically intended to provide a significant public benefit by:

- Providing an opportunity for the public to learn about, experience, and enjoy the out-of-doors in a significant and relatively undisturbed natural setting

- Protecting natural habitat that contributes to a larger complex of protected forest and wetlands that support a variety of wildlife and plants, both terrestrial and aquatic

- Protecting the water quality and near-shore aquatic habitat of Sunfish Lake by restricting development of the lakeshore of the Protected Property

Fig. 7. Aerial Photo. Sunfish Lake Park area 1936

Fig. 8. Map - Current and Future Land Use Sunfish Lake Local Watershed.

Soils

The majority of soils in the area of Sunfish Lake Park are sandy loams which generally are considered to be well-drained. Most of the soils south of the park are sandy and silt loams, which are well- drained. In 1994, a staff person at the Washington Soil and Water Conservation District issued a report that listed the soils in the park as "gravelly, sandy and severely erodible". In and around water bodies soils are silt loams and loamy sands.

Fig. 9. Map. Soils Sunfish Lake Park, and Soils by Drainage Class Sunfish Lake Park

Current Land Cover and Vegetation

The current land cover vegetation in Sunfish Lake Park is considered to be mainly dry mesic oak woods, with some wetland areas and grassland areas, including several small areas of remnant prairie. There is a new 20 acre prairie restoration south of the middle woodland area of the park, which was seeded in spring 2010, also partially funded with a Community Conservation Assistance Grant from the MN DNR (see Appendix for list of species planted in restored prairie). The Minn. Land Cover Classification System (MLCCS) has classified most of the park area with native plant communities as "Forests" with several different types of forest including oak forest (central) mesic subtype in the central portion of the park, aspen forest in the northeast and southeast park areas and maple-basswood forest (east central) in the west and southwest areas of the park.

Fig. 10. Aerial Photo – Sunfish Lake Park - 2006 Farm Service Agency Sunfish Lake Park

Fig. 11. Aerial Photo – Area1- Prairie Restoration & Area 2 - Nat. Res. Mgt. Plan

Fig. 12. Map – Sunfish Lake Park Minnesota Land Cover Classification System (MLCCS)

Fig. 13. Map - Sunfish Lake Park MN County Biological Survey (MCBS) Native Plant Communities

Fig. 14. Map - Sunfish Lake Park Natural Plant Communities Based on MN Land Cover Classification System (MLCCS)

The MLCCS map for Natural Plant Communities shows about half of Sunfish Lake Park as being composed of native plant communities of moderate quality. Most of the area around City Park Pond is shown to consist of poor quality plant communities and the southeast edge of the park and west powerline right-of-way are shown to have native species present in altered natural plant communities.

Wetland system vegetation is covered somewhat in maps of macrophyte surveys done for Sunfish Lake in 1997, 2008 and 2010 (Barr Engin.) and provided by Valley Branch Watershed

District. The macrophyte survey included submerged aquatic plants, floating leaf plants and emergent vegetation. No aquatic vegetation was found in the middle of the lake.

Fig. 15. Map - Macrophyte Survey for Sunfish Lake 2010

Sunfish Lake has been listed as a "nutrient impaired water body" by the MN Pollution Control Agency. It is a shallow lake and sediment loading from the watershed area has had a negative effect on water quality. According to the Valley Branch Watershed District 2005 management plan for Sunfish Lake , low water levels historically have resulted in poorer water quality in the lake. Valley Branch Watershed District is working to improve lake water quality. The dry conditions in years preceding 2010 have resulted in very low water levels for Sunfish Lake with dry land in the west lake basin. Sunfish Lake is classified as an "aesthetic viewing" water body by Valley Branch Watershed District.

Fig. 16. Map - Sunfish Lake Watershed

Fig. 17. Map - Washington County Impaired Waters

Impacts to Park Natural Resources

Since the area is part of the Twin Cities metro area, urban development is one of the major disturbances around the area of Sunfish Lake Park. Natural disturbances in the subsection include fire, tornados and high wind events. Increasing occurrence of invasive plants, exotic earthworms affecting litter layers, plus soil erosion during heavy rain events (on slopes with exposed soils, and down ravines from neighboring developments) also create areas of disturbance which can negatively affect native plant communities and associated wildlife populations.

Diseases such as oak wilt present a threat in terms of changing the prevalence of some tree species and creating openings which can cause increases in populations of invasive plants. Dutch elm disease, white pine blister rust, and butternut canker also occur but have less impact on creating disturbance openings. Exotic insects such as gypsy moth and emerald ash borer are present in areas within 2-15 miles of the park, respectively, and could be a major threat to certain tree species and plant community types within the park in the future.

The quality of native plant communities and quality of water bodies and wetland systems will certainly affect the quality of wildlife habitat for the area.

Survey Methods

Releve´ Sampling Method: For determining the types of plant communities and vegetation which exist in Sunfish Lake Park, we used the Releve´sample plot method. This method has been used by the Minn. County Biological Survey (MCBS) MNDNR and will provide information which can be added to the on-line data base of known vegetation for this part of Minnesota. One of the conditions of the DNR Community Conservation Assistance grant which provided much of the funding used for this study and management plan, was to use the information gathered to "assess the accuracy of the plant communities, invasive species and

overall quality identified in the Washington County's MN Land Cover Classification System (MLCCS) data".

Plot Establishment: Plots were established by walking through the park and looking for distinct types of plant communities representative of the range of plant community types in the park. The plots were marked out with flagging, woodland plots were 400 sq. meters in size and prairie and wetland plots were 100 sq. meters. All woody and herbaceous plants, both native and non-native, in 4 layers (overstory, understory, shrub and groundlayer) were identified to species, if possible, and amount of cover represented by each type of plant was estimated. Notes were taken as to the amount of litter layer, distance to a change in community type, and any bird, reptile, amphibian, insect, or mammal which was in or near each plot and could be identified by sight or sound. Twenty-five vegetation plots were established. Several of the wetland plots were "species list only" as it was difficult to determine percent cover at the time of season when the Releve' plot data was collected.

Fig. 18. Map – 2010 Plot Locations (GIS)

Photo 1. Photo - Plot Establishment and Survey Spring 2010

Results of Natural Resource Surveys

Summary of Results from 2010 Releve' Vegetation Plots

There were19 plots which were predominantly woodland type plant communities. Most of these could be characterized as Southern Dry Mesic Oak Forest (MHs37) with some elements of the fire-dependent community type, Pin Oak-Bur Oak Woodland (FDs37b). The major plant type which separates most woodland types from the single classification of Southern Dry Mesic Oak Forest, is the preponderance of northern pin oak, rather than red oak, as a canopy tree species. Also, the relative scarcity of sugar maple and basswood indicate a different classification. Support for the MHx37 classification includes the lack of dominant trees with open growth characteristics in many areas of the park. This suggests that fire has not occurred in these forests for an extended period and canopy closure occurred several decades ago.

Several woodland plots would be considered sub-types of a larger woodland classification, such as areas dominated by paper birch, aspen and ironwood. Some unusual, though not rare, plants found in the plots included: downy rattlesnake plantain (Goodyera pubescens), rattlesnake fern (Botrychium virginianum), alum root (Heuchera richardsonii), Indian pipe (Monotropa uniflora) and nodding Trillium (Trillium cernuum). Tables of the most common and least common plant species found in the woodland plots follow (Data sheets for the 25 vegetation sample plots are in the Appendix p.):

Table 1. Most Common Plants in Woodland Plots (not necessarily in order of prevalence)

Trees (overstory/understory)	Shrubs	Ground Layer
northern pin oak bur oak white oak bur-white oak hybrid bigtooth aspen paper birch black cherry red maple ironwood Am. elm quaking aspen chokecherry boxelder	gooseberry red-berried elder raspberry highbush cranberry gray dogwood serviceberry prickly ash hazelnut Amur maple	Canada mayflower rue anemone tick trefoil(pointed leaved) kidney leaf buttercup wood anemone bedstraw baneberry false Solomon's seal hog peanut hooked buttercup jack-in-the-pulpit sweet cicely lady fern shinleaf wild strawberry Penn sedge violets wild geranium enchanter's nightshade wild sarsaparilla white snakeroot Va. Creeper grapevine

Table 2. Least Common Plants in Woodland Plots (not necessarily in order of prevalence)

Trees (overstory/understory)	Shrubs	Ground Layer
silver maple cottonwood hackberry basswood sugar maple green ash black walnut Siberian elm Eastern red cedar	winterberry nannyberry pagoda dogwood dwarf bush honeysuckle arrowwood viburnum Euonymus glossy buckthorn red-osier dogwood roundleaf dogwood	downy rattlesnake plantain rattlesnake fern nodding Trillium Indian pipe dogbane cutleaf nightshade daisy fleabane alum root Scribner's panicum wild columbine interrupted fern early meadow rue starry sedge sessile bellwort sensitive fern large-leaved aster white wood aster Can. goldenrod poison ivy Ky bluegrass butter and eggs spreading wood fern spinulose wood fern

Table 3. Plant Species in Wetland Edge Plots (not necessarily in order of prevalence)

Sedges, Rushes, Grasses	Forbs/Wildflowers	Other Plants
fox sedge	arrowhead	duckweed
Bebb's sedge	Bidens	cattail
porcupine sedge	bull thistle	sensitive fern
tussock sedge	musk thistle	
yellow lake sedge	Can. thistle	
reed canary grass	stinging nettle	
spike rush	smartweed	
fowl manna grass	blue vervain	
soft stem bulrush	bugle weed	
river bulrush	boneset	
	Can. goldenrod	
	marsh milkweed	
	jewelweed	
	blue flag iris	
	sensitive fern	
	lance-leaved aster	
	purple loosestrife	
	water calla	
	water plantain	
	common bur reed	

There were two vegetation plots with predominantly prairie wildflower and grass species. The types of prairie plant communities identified for these plots were UPs14 – southern dry savanna, and UPs13 – southern dry prairie. The plant species found in these plots included:

Table 4. Plant Species in Prairie Plots (not necessarily in order of prevalence)

Grasses & Sedges	Wildflowers
Ky bluegrass	heath aster
big bluestem	lance-leaved aster
porcupine grass	sky blue aster
little bluestem	showy goldenrod
panic grass	gray goldenrod
prairie cordgrass	stiff goldenrod
reed canary grass	Can. goldenrod
Indian grass	plantain
love grass	heal-all
foxtail	yarrow
switch grass	common milkweed
graceful sedge	round-headed bush clover
Penn sedge	ground cherry
	smart weed
	ragweed
	common mullein
	spotted knapweed
	evening primrose
	golden Alexander
	prairie bedstraw
	prairie coreopsis
	wild bergamot
	anise hyssop
	black-eyed Susan
	purple prairie clover

Photos 2-7. Less CommonWildflowers and Ferns of Sunfish Lake Park

nodding Trillium (JE)
round-leaved shinleaf (KW)
downy rattlesnake plantain (KW)
Indian pipe (KW)
fern hillside Plot 15 (KW)
rattlesnake fern (KW)

Plant Community Characterization Based on DNR Plant Community Types

(Comparison to MN County. Biological. Survey and MN Land Cover Classification System (MLCCS) Data)

The most commonly identified plant community in the 2010 vegetation plots in Sunfish Lake Park was MHs37 southern dry-mesic oak forest. Since northern red oak was not identified in the field plots, this plant community type is more similar to FDs37 southern dry mesic oak (maple) woodland, which has a larger northern pin oak component, a dominant tree species in these woods. Bur oak, white oak and a white/bur oak hybrid were also found. The types of plant communities found were in some cases similar to the MLCCS map and a number of plant species were similar to those found in DNR Releve plot sampling in 1971 and 1987 as well as a Nature Conservancy review of vegetation on a neighboring property to the north. Plants found were also similar to those reported anecdotally by Judith Blackford, a parks commissioner and property owner north of the park. Some of the plant community classifications in the MLCCS mapping system were inaccurate in terms of what was found at the site. Some wooded areas were listed as "Low Intensity Urban", "Grassland" and "Cropland". One notable difference between the MLCCS plant community map and what we found in our survey plots and elsewhere in the park, was that we only found a few sugar maples and in only 1 plot. Most other maples on higher sites were red maple and on lower sites, silver maple and red maple. We also found only small basswood seedlings/saplings in the survey plots in the park, and saw only a few larger basswood along trails or in other areas we were in. One other notable tree species which would be expected to be in the woodland communities found in the park, but not prevalent as canopy or sub-canopy trees in any of the plots or other areas visited, was hackberry. We noted several small seedlings/saplings in plots, and several young trees along trails, but no larger trees. More sugar maple, basswood and hackberry may be present in other areas of the park, but do not represent, from the results of this study, a large component of the park tree population.

Soils in Sunfish Lake Park

The soils in Sunfish Lake Park are predominantly sands, silt loams and sandy loams. The soil types in the vegetation plots and the designations for the sites from the Washington County Soils map are listed for each plot:

Table 5. Soil Types from County Soils Map and Plot Samples in Sunfish Lake Pk.

Plot No.	Soil Type (for plot location from Wash. County Soils map)	Soil Type (from samples collected at each vegetation plot)
1	Antigo Silt Loam	clay loam w/sand
2	Mahtomedi-Kingsley Complex	clay loam
3	Poskin Silt Loam	sandy loam
4	Poskin Silt Loam	sandy-silt loam
5	Poskin Silt Loam	silt loam
6	Rosholt Sandy Loam	sandy loam
7	Chetek Sandy Loam	silt loam
8	Rosholt Sandy Loam	silt loam
9	Baronett Silt Loam	silt loam w/sand
10	Mahtomedi-Kingsley Complex	sandy loam
11	Mahtomedi Loamy Sand	sandy loam
12	Chetek Sandy Loam	sandy loam
13	Mahtomedi-Kingley Complex	silt loam
14	Chetek Sandy Loam	silt loam
15	Chetek Sandy Loam	sandy loam
16	Chetek Sandy Loam	sandy loam
17	Chetek Sandy Loam	silt loam w/fine sand
18	Chetek Sandy Loam	silt loam
19	(listed as "water" on map)	dark clay loam
20	Mahtomedi-Kingsley Complex	fine sand
21	Mahtomedi-Kingsley Complex	fine sand
22	Antigo Silt Loam	silt loam
23	Mahtomedi-Kingsley Complex	fine sand w/silt
24	Comstock Silt Loam	silt loam
25	Comstock Silt Loam	fine sand w/silt

The soil samples taken at each vegetation plot, for the most part, coordinated quite well with the soils indicated for those locations on the Washington County Soils map.

Bird Surveys

Since Sunfish Lake Park is part of an ecological corridor for wildlife from the Tri-Lakes area down through the Lake Elmo Park Reserve, and represents a large area of contiguous woods, which is required by some bird species, we were interested in doing several surveys for birds in the park. Several expert birders took part in surveys done in July 2010 and May 2011. Another expert birder and member of the St. Paul Audubon club provided lists of birds seen and/or heard in Sunfish Lake Park from 2009 through June of 2011. These surveys included 77

different species and included songbirds, waterfowl, shore birds and raptors. Birds found, which are known to require large areas of contiguous woodland for breeding, include scarlet tanager, indigo bunting, ovenbird and others. Seasonal migrants such as a variety of warblers, white-throated sparrows and sandhill cranes were also found. Of the bird species documented in the park, 11 are listed by the MN Dept. of Natural Resources as "species of greatest conservation need" (sgcn). These are species for which populations in Minnesota are rare, declining, or vulnerable. These species are: white-throated sparrow, ovenbird, rose-breasted grosbeak, hooded warbler, brown thrasher, bald eagle, Eastern wood peewee, wood thrush, sandhill crane, least flycatcher and Acadian flycatcher. Also listed in the SFL Park bird surveys are several species considered "MN species of concern" (MNSPC) which can include species which are extremely uncommon in Minnesota, or have unique or highly specific habitat requirements and deserve careful monitoring of their status. This category can also include species on the periphery of their range which are not listed as threatened, and those species once threatened or endangered which now have increasing, or protected, stable populations in the state. The "special concern" species found in the recent bird surveys in Sunfish Lake Park are: hooded warbler and bald eagle.

Photo 8. Tree Swallows Sunfish Lake Park (KW)

Frog Survey, Reptiles/Amphibians Seen

An evening survey of frogs in wetland basins was done in May 2010 by Jim Eckberg. Frogs/toads found in this calling survey included: American toad, Western chorus frog, Cope's gray tree frog, and the eastern gray tree frog. These frogs are common throughout much of the Twin Cities area. Cope's gray tree frogs are typically associated with open habitats such as prairie, whereas the eastern gray tree frog is associated with woodlands. Other amphibians/reptiles seen/heard in daytime during site visits were: green frog, snapping turtle and painted turtle. At least four vernal pools were seen in wooded areas of the park and several more in open, grassy areas. These temporary seasonal wetlands and important habitat for amphibians and other wildlife.

Photo 9. Snapping Turtle Sunfish Lake Park (KW)

Other Wildlife

The park is home to, or used as an ecological corridor by, many other types of wildlife, which were not specifically surveyed for during this study. Native plants, and to a lesser extent, introduced plants, serve as food, resting, nesting or breeding sites for wildlife. The native plant communities are important in providing quality habitat components to wildlife. Other types of wildlife noted during surveys of plant communities, or by others, are listed in the Appendix.

Quality of Native Plant Communities Found in Plots

Almost all vegetation plots contained plants other than natives. European buckthorn was the most common non-native plant in woodland plots. Reed canary grass and

Canada thistle were the most common non-native plants in wetland plots. For plants seen which are on the sub-group lists of State Prohibited Noxious Weeds: Eradicate List (none so far), Controlled List: Canada thistle, musk thistle, garlic mustard, wild parsnip and spotted knapweed and Restricted Noxious Weeds: European buckthorn and glossy buckthorn. Other non-natives found which are often considered invasive are: burdock, Japanese barberry, and ginnala or Amur maple. In all areas with non-native plants, these plants are competing with native plants for sunlight, water, space and other resources. In some cases, the invasive plants are also allelopathic to other plants, producing chemicals which inhibit growth of plants growing near them.

The quality of natural plant communities found during this survey was somewhat different than the quality shown on the Sunfish Lake Park Natural Communities Map Fig. 14. We found that significant portions of the southernmost woodlands (SW part of the park) were of poor quality, rather than moderate quality. Also, there were several good quality areas found in north-central portions of the park where plant communities were shown on the MLCCS map to be of poor quality.

Regeneration of dominant overstory trees, such as several oak species and maples, was seen in most woodland vegetation plots as groundlayer seedlings. Areas with a lot of Eur. buckthorn seemed to have about the same regeneration (estimated amount of cover of tree seedlings, particularly oak, in plots) as plots with less buckthorn. Plots with high buckthorn populations, however, often had less diversity in ground-layer vegetation than plots with less buckthorn. Several vegetation plots were definitely considered to be of higher quality and less invaded by non-native plants. These plots included woodland plots numbered 3, 12, 16, and 21, wetland plot #25 and prairie remnant plot #22.

There was a moderate amount of plant diversity in most vegetation plots set up in Sunfish Lake Park. Even plots with the greatest amount of European buckthorn still had representatives of native species associated with the identified plant community type and we were still able to categorize the plant community types represented. Diversity of ground layer plants, especially spring ephemerals, was fairly good, though some native plants were struggling in areas colonized heavily by non-natives. The level of diversity of plant material, which was found still existing in vegetation plots which were invaded by non-native plants, is very encouraging in terms of populations of native plants which would be able to re-colonize areas under a management regime for control of non-natives.

Other Natural Resource Management

Prairie Restoration 2010

In 2010 a prairie restoration was seeded on 20 acres of agricultural land just south of the main woodland area in Sunfish Lake Park. The area was planted with grass and forb species believed to have been present in this area prior to European settlement. The seed mix was procured from local genotypes. A number of species in the restoration reflect species found in the existing prairie remnant on the west side of the entrance drive, just south of the parking lot. This prairie had good establishment conditions in 2010 and has done very well to date. Additional prairie forb (wildflower) seedlings, most found in the original seeding mix, were planted in clusters scattered through the prairie in fall of 2010 and spring of 2011 to provide areas of visual enhancement and opportunities for interpretation. The prairie restoration project will result in habitat for wildlife species which are dependent on mesic tall grass prairie to

complete their life cycle. The area will be managed and monitored in future years to maintain its quality and exclude invasive plants as much as possible.

Plant List (Appendix)

Soil Erosion

The soils of Sunfish Lake Park are considered highly erodible. Soil erosion can have serious impacts on growth and regeneration of native plants. Erosion can uproot native plants and can set up disturbance sites which are more prone to colonization by invasive, non-native plants. Areas of concern regarding erosion would be along steep portions of trails, hillsides with little or no litter layer and fewer ground-layer plants, places where hikers are going off-trail due to downed trees or wet areas, and ravines on the north side of the park which have run-off from development to the north. Valley Branch Watershed District does not currently have plans to stabilize the north side ravines from run-off from development north of the park. Some areas in the park which have steep slopes and have low litter layer, probably due to presence of exotic earthworms, are experiencing erosion of soil to areas further down the slope. In these areas there tend to be more invasive plants.

Fig. 19. Map – SFL Pk Trails Map

Management Recommendations

Invasive Plants

Higher quality native plant communities with fairly intact native plant populations, and which have the least amount of infestation by invasive plants, should be the highest management priority. Removing invasive plants at this stage is much easier, less damaging to existing native plants and plant communities, and more cost effective, than trying to remove invasive plants from large areas where they are a dominant component of the plant community. European buckthorn is ubiquitous in the park and, since it is one of the largest and most common woody invasive plants which can cause significant damage to native woodland plant communities, it should be given highest priority for management of the woody invasives in the park. Garlic mustard can have a significant impact on native woodland vegetation and should also be considered a high priority for management. There are at least 20 garlic mustard infestation sites along trails and probably more elsewhere in park woodlands. Canada thistle is a significant invasive plant in drying wetland basins and other open areas with disturbed native vegetation, such as the power line right-of-way on the west side of the park. This should also receive a high priority for management. Other state prohibited noxious weeds which are in relatively small populations in the park and should be controlled, are musk thistle, wild parsnip and spotted knapweed. Burdock is not yet on the state prohibited noxious weed list but can overrun areas by trails, and other areas where soil has been disturbed, and disrupt native plant communities. This invasive plant should also be controlled.

Canada Thistle

Fig. 20. 2010 map of Canada Thistle Infestation Areas (in portions of highlighted wetlands only)

Photo 10. Canada Thistle

Canada thistle is a prohibited noxious weed in the state of Minnesota. At Sunfish Lake Park, there are large infestations of Canada thistle in two wetlands and the portion of Sunfish Lake that is within the park boundaries. Canada thistle is a perennial weed and it is also clonal meaning that a single plant will form a very large patch with numerous thistle stalks. Chemical treatment is usually the only effective way to control Canada thistle. Due to their large reserves of energy in their roots, mowing is not effective and the biocontrol agents that have been released also have minimal effects on these plants. Canada thistle should be sprayed before they set seed.

It is important to consider control of Canada thistle within the larger context of restoring and managing the wetlands at Sunfish Lake Park. Control of Canada thistle would be beneficial as part of a future plan that considers 1) control of other weedy species and 2) follow-up restoration including seeding and other management to restore these areas. In other words, control of Canada thistle will benefit the wetlands but not as much as a comprehensive plan that involves follow-up restoration and a clear plan of the target goal for restoration of the wetlands.

A selective herbicide treatment is effective in controlling Canada thistle growing in large patches. The herbicide, Transline ©, does not affect grasses and sedges, and these will remain alive after the herbicide treatment. Also, the areas to be sprayed have very few native aster species that would be affected by Transline©, so, in areas heavily infested with Canada thistle, one might expect minimal impacts on native plants.

Garlic Mustard

Fig. 21. 2011 GIS map of Garlic Mustard Infestations Along Trails

Photos 11 & 12. Garlic Mustard (1st year rosette and 2nd year flower/seed stalk)

Garlic mustard (*Alliaria petiolata*) is an invasive plant of European origin which is causing problems for woodland plant communities throughout the Midwest as well as in eastern states, and in some areas in the Rocky Mountains. Introduced to this country by European settlers in the 19th century due to its culinary and medicinal uses, garlic mustard escaped cultivation and become an unwelcome invader of wooded areas where it shades out native

ground-layer plants. The first record of garlic mustard in Minnesota was an herbarium specimen collected in 1933, and it is now widely distributed, especially in central and southeastern Minnesota. It was placed on the Minnesota Noxious Weed list in 1999 and is currently a state prohibited noxious weed.

Garlic mustard is a biennial plant which means its life cycle takes two years to complete. Seed germinates in early spring and the plant grows as a rosette close to the ground in the first year. In the second year the plant produces a flowering stalk in spring and early summer and seeds form shortly after flowering. The first year rosettes have 3-8 leaves which are rounded or kidney-shaped. The leaves are scalloped on the edges and remain green all winter. The second year plants have alternate leaves which are heart-shaped to triangular and have teeth on the edges. Both leaves and stems smell like garlic when they're crushed, especially in the early part of the growing season. Garlic mustard blooms in the spring and the flowering stalk is 1-4 ft. tall with 4-petalled white flowers which form on the ends of the main stem and side branches. Small black seeds ripen in July and August in 1-2 inch long capsules which shatter, casting the seed. More than 100 seeds can be produced per plant. Garlic mustard seed does not usually germinate immediately after ripening, and seed can remain viable in the soil up to five years.

Once seed is out of the capsule, it can be further dispersed by animals, flowing water and by means of human foot and vehicle traffic as well as other human activities. Unlike many other invasive plants which more often colonize disturbed areas, garlic mustard can also readily invade high quality native woodlands, both upland and floodplain sites, displacing native herbaceous plant species and endangering insect and wildlife species which depend on the native plants to survive. Other plants which garlic mustard resembles, particularly in the rosette stage, are violets and creeping Charlie.

The garlic mustard plant is shade-tolerant and occurs more often in shady than sunny areas. It occurs mainly at wood edges and interiors and is often found along trails.

Controlling garlic mustard consists of several different methods, depending on the age of the plant and the extent of the population in the management area:

Garlic Mustard Management

Hand Pulling – this works best for small infestations and should be done at or just before flowering. Pulling up plants can cause soil disturbance and damage desirable species, so tamp soil back down after plant is out. If seeds have started to develop on plants, do not pull plants or leave them in piles or on the ground, as seeds can still develop on plants which remain moist after pulling.

Cutting – Cut plants close to the soil as flowering begins (flower stalk elongating or fully out, but before seed development). Power cutting equipment can be used if infestation is large. Cutting plants earlier than just before flowering can cause re-sprouting of plants.

Chemical – Infestations can also be controlled with the herbicide glyphosate (formerly "Round-Up" only, now sold under various trade names) at 1-2% active ingredient in late fall or early

spring. These times are when native plants are dormant, but garlic mustard is green and easily targeted. Glyphosate is not selective about the plants it kills, so avoid herbicide drift during spraying, dripping herbicide spray off target plants and leaking sprayers or spray wands. Always read the label, mix and apply herbicide correctly and wear recommended safety equipment and clothing.

Burning – Use of flame torches and prescribed burns can control garlic mustard populations, but the use of fire is a specialized procedure and should only be done by persons trained in these management methods. Burn permits may also be required. In some cases, garlic mustard populations can be increased by burning, and management decisions should be made by persons knowledgeable in treating garlic mustard infestations with burning techniques.

Biological Controls – Research is being undertaken at the Univ. of Minnesota, as well as in other states, regarding the use of several different biological control agents. Biological control, using insect pests, has worked well with invasive plants such as purple loosestrife and leafy spurge.

Plants with seeds should be destroyed. Do not compost garlic mustard since the temperatures of most compost piles do not get hot enough to destroy the seeds. When controlling an infestation, work to removing flowering plants first and go from the least infested to more infested areas as you work. Seeds can easily be carried from place to place by people who have been in a garlic mustard infested area. Clean off equipment, shoes, pant cuffs and pockets after being around garlic mustard seed stalks. Seeds can also be carried in soil from infested areas and on tires of off-road vehicles.

No matter which control method is used, sites with garlic mustard populations will need to be monitored for at least five years after management, to check for any re-sprouting or emerging plants.

Photo 13. European Buckthorn

Buckthorn Control Strategies at Sunfish Lake Park

Common, or European, buckthorn (Rhamnus cathartica) is a state restricted noxious weed, and the most dominant non-native, invasive plant at Sunfish Lake Park. Multiple options are available to control buckthorn and tailoring a buckthorn control strategy to accommodate different densities of buckthorn may prove to be the most effective strategy to controlling buckthorn across Sunfish Lake Park.

Initial Removal

Buckthorn to be targeted first should be female trees, especially large ones, bearing fruit. This will help cut down on the amount of seed available in the park. Gradually, other buckthorn can also be removed.

Traditional cut and chemical treatment options:

The most common approach to controlling common buckthorn is to cut the stem approximately one to four inches from the base and apply a chemical treatment to the stump. Garlon 3A or 4 effectively prevents re-sprouting when applied to the stump within 2 hours of cutting. Both types of Garlon contain the same active ingredient (triclopyr) and can be effective in stump and basal bark treatments. Garlon 3A is water-based and most effective when applied to the surface of the cut stump whereas Garlon 4, oil-based, is more effective in basal bark treatment (see below). Glyphosate at 15-25% active ingredient can also be effective when applied directly to cut stumps when temperatures are above freezing.

Time of season

The best time of the year to control buckthorn is the fall (October, November) as buckthorn retains its leaves later than other vegetation. At this time, buckthorn is most susceptible to chemical application and other native plants are generally dormant. Buckthorn cutting and treating can also occur throughout the winter. However, freezing temperatures restrict the use of Garlon to the oil-based Garlon 4 which has a lower freezing temperature. Spring and early summer are generally the least favorable times of year to control buckthorn because actively growing buckthorn is less susceptible to chemical treatments and the native vegetation is more vulnerable to damage.

Alternative strategies

Buckthorn has a widespread and dense distribution at Sunfish Lake Park. There are alternative approaches to managing buckthorn that can be highly effective while curbing management costs. Buckthorn that is less than two inches in stem width can be controlled with a **basal bark treatment** by Garlon 4. Garlon 4, not 3A, will be absorbed through the bark of medium to small sized buckthorn. This method is effective and treated buckthorn decays in two to four years.

A second alternative approach is to cut and treat buckthorn as described above and **leave buckthorn in the woods to decay**. When the buckthorn is cut and pushed to the ground layer, it generally decays in two to four years. Leaving cut buckthorn can be appropriate in areas where it has not formed a dense thicket as this will reduce costs of removal. However, in areas of dense buckthorn, piled buckthorn can be an eye sore and cause dense shading on the ground layer.

Forestry mowers, which cut and /or shred and mulch woody vegetation, can sometimes be a useful tool in areas where buckthorn is the primary understory and ground vegetation. This is a drastic approach, however, and its use should be carefully considered. Native plants in the understory should be surveyed before using this technique.

Follow-up Control

It is important to control buckthorn resprouts one year following initial removal efforts. Increased sunlight to the forest floor can stimulate vigorous recruitment of buckthorn seedlings

from the seed bank. Foliar sprays conducted in the late fall are necessary to control potential pulses of buckthorn seedling germination. Buckthorn resprouts are best controlled with a foliar application of herbicide in the late fall when native plants are dormant. There are several types of herbicides which can be used.

Recommendations

Controlling buckthorn at Sunfish Lake Park will be a long-term process that should employ many or most of the above activities in areas where they achieve cost-effective control of large areas of buckthorn. Other considerations can dictate what practices are used such as public tolerance for leaving buckthorn deadfall in the forest or requirements of any grant programs that may require buckthorn to be removed for biomass energy. Allowing contractors the leverage to use multiple control strategies that do not impact site quality will help minimize control costs and allow large areas to be controlled.

A combination of cutting and treating buckthorn greater than two inches diameter and basal bark treating buckthorn less than two inches in diameter should be employed in areas with moderate to low density of buckthorn. Finally removal of buckthorn is highly costly and potential strategies to reduce cost should be explored. It may be difficult to effect large-scale control of buckthorn until there is an effective biological control.

Reed Canary Grass (*Phalaris arundinacea* L.) Control

Background:

Reed Canary Grass is dominant in many wetlands of Sunfish Lake Park. It is unclear how long Reed Canary Grass has been present in these wetlands; however, typical invasions quickly lead to the formation of persistent seed banks. Controlling Reed Canary Grass should involve a multifaceted approach that accounts for a potentially large and persistent seed bank.

Approach:

A combination of controlled burns and herbicide treatments is a typical approach to controlling reed canary grass. Reinhardt and Galatowitsch (2004) conducted large-scale field studies on the most effective control methods. Their study showed that mid-August to mid-September glyphosate herbicide treatments (Rodeo) were more effective at controlling reed canary grass as compared to a May herbicide application treatment. Further, combining herbicide treatments with consecutive burning can reduce seedbanks. Impacting the seed banks is crucial because their research suggests that the primary challenge to restoring wetlands infested with reed canary grass is that the persistent seed banks contribute to re-invasions by reed canary grass.

Reinhardt and Galatowitsch (2004) suggest that two rounds of herbicide treatments and burning were effective in eradicating reed canary grass populations. At Sunfish Lake Park, consecutive herbicide treatments and re-evaluation of the wetlands to adjust methods appropriately to changing site conditions, might be an appropriate course of action. The first spray can occur in August or September in areas completely dominated by reed canary grass.

However, subsequent herbicide applications should account for potential native species that recruit from the seed bank. To minimize non-target effects on native vegetation, herbicide applications should be made when the native vegetation is dormant and reed canary grass is still growing. Typically the native plants go into dormancy after the first killing freeze and reed canary grass remains green for a short period thereafter.

After reed canary grass populations have been controlled and if native vegetation does not recruit into these wetlands, the wetlands should be re-seeded using one of the BWSR seed mixtures. Our releve surveys of these wetlands revealed that almost all areas are heavily degraded, thus a BWSR seed mixture is appropriate because it is difficult to infer the exact plant community of these wetlands.

Experts suggest that management and restoration of wetland areas highly infested with reed canary grass should be carefully considered due to the high inputs of time, materials and money needed to eradicate reed canary grass and re-plant. Most agree that areas with a small amount of infestation would be areas to manage first.

Less Common Invasive Plants

Japanese Barberry (Berberis thunbergii) – This invasive plant was found in low levels in the park. Its presence should continue to be monitored and existing individual plants should be removed and destroyed.

Photo 14. Japanese Barberry.

Tatarian Honeysuckle (Lonicera tatarica)– This plant is present in Sunfish Lake Park in moderate levels. Though common, it is less of a problem than European buckthorn.

Glossy Buckthorn (Rhamnus frangula)– Though seen in the park, this plant is present at a much lower level than its relative European buckthorn. Both plants are on the state restricted noxious weed list. It can be a problem particularly in wet sites. This plant should be monitored in wetland edge areas particularly.

Amur (ginnala) Maple (Acer ginnala) – This woody plant is particularly prevalent at the west end of the park where larger Acer ginnala have been planted. It also can be seen near the parking lot, in open areas of the park, and also has been found in woodland vegetation plots. It is becoming more prevalent in woodland and grassy areas where it has not been planted and is considered somewhat invasive. The city should decide if they are going to remove this plant in Sunfish Lake Park to limit its spread within the park.

Grecian Foxglove (Digitalis lanata) - This plant is on the prohibited noxious weed list for the state and is one of three plants on this list which are to be eradicated if found. Though present in Washington County, Grecian foxglove has not yet been documented at Sunfish Lake Park. The city should continue to monitor for the presence of Grecian foxglove in park and open space areas of the city. Pulling is one method of management for small populations, but persons pulling this plant should be sure to wear thick gloves as chemicals in the plant can affect the heart.

Photo 15. Grecian Foxglove.

Spotted Knapweed (Centaurea maculosa) – This plant is a state prohibited noxious weed and is on the controlled list. It is found in Sunfish Lake Park but not in large populations. The plant can be pulled and destroyed when found, if infestation is small. Persons pulling spotted knapweed should wear thick gloves to avoid serious dermatitis.

Burdock (Arctium minus) – This plant is not currently on the state noxious weed list but is colonizing in almost pure stands in disturbed soil along trails in many areas of the park. Digging out seedling plants and removing and bagging or burning seed heads will provide some measure of control. The plant spreads by seed only.

Photo 16. Burdock.

Wild Parsnip (Pastinaca sativa) – This plant has recently moved into Minnesota and is on the state prohibited noxious weed list. Hand pull or cut before seed set and remove plant from area. Persons handling the plant should not come into contact with the sap, since it causes a rash and blistering (phytophotodermatitis) in the presence of sunlight.

Photo 17. Wild Parsnip

Musk of Nodding Thistle (Carduus nutans) – This plant is on the state prohibited noxious weed list. It is larger than Canada thistle, with a large, drooping seed head. Musk thistle forms colonies mainly in areas of disturbed soil. Pull or mow in the early bloom stage.

Other Impacts to Native Plant Populations

Oak Wilt

This fungal wilt disease of oaks, caused by Ceratocystis fagacearum, has been present in Sunfish Lake Park for a number of years. The city has done some management (removal of currently wilting pin oaks to reduce spore production, root graft disruption to prevent underground spread of the fungus) but only in areas which are fairly accessible to equipment and work crews. The last oak wilt management was done a few years ago in a woodland on the south side of the west basin of Sunfish Lake. Oak wilt infection centers further into the park have largely gone untreated. Oaks constitute a major component of the tree canopy in Sunfish Lake Park and an effort should be made to control the disease. A survey of oak wilt infection centers in the park was completed in 2008 by the forestry consultant. **Fig. 22** shows the extent of oak wilt in the park at that time. Death of affected oaks creates openings in the woods that are often filled with invasive plant species and degrades the native oak plant community. Another oak wilt survey should be done in the park in 2011 and management recommendations developed for the current areas affected.

Fig. 22. (* GIS map of oak wilt infection centers 2008)

Soil Erosion

To lessen the extent of erosion of trails in the rolling terrain and erodible soils in Sunfish Lake Park, horse use in Sunfish Lake Park is not allowed in park in early spring.
The City of Lake Elmo also passed an ordinance in 1980 banning mountain biking in the park because the topography and soils tend to erosion There are "water bars" embedded across steep areas of trails and these have been moderately successful and curbing erosion of soil on steep trails. We would recommend that all trails be inspected for erosion and that mitigation of damage from erosion be done where it is needed.

Water Management and Wetlands

In this decade, there have been a number of years of low rainfall. Therefore there are now lower water levels not only in lake and wetland basins in the park, but also in lakes north of the park. Due to lower water levels in lakes north of the park, Valley Branch Watershed District does not have plans to raise water levels in wetlands and lakes in the park at this time. Fluctuating water levels can adversely affect some populations of native plants in lake and wetland basins. The watershed district treated Sunfish Lake with alum in 2008 in an attempt to improve water quality and plans another possible treatment in 2012.

Invasive Insect Pests

Emerald Ash Borer (Agrilis planipennis) (EAB) is a non-native insect pest introduced to North America in the 1990's from Asia, probably in wooden shipping materials. It was identified in Michigan in 2002. It has killed millions of ash trees in the state of Michigan and has now spread to thirteen states as well as several Canadian provinces.. All species of ash appear to be susceptible. In Minnesota, green ash is the species most commonly planted in urban and suburban landscapes and it also occurs naturally in native woodlands. White ash is occasionally planted and occurs naturally in native woodlands. Black ash is a species primarily found in wet areas, such as black ash swamps in northern Minnesota. Site and soil moisture factors do not seem to make much difference in terms of a tree's susceptibility to EAB. Current evidence from Michigan and Ohio show that once EAB becomes established it takes about five years to infest and kill the majority of the ash trees in a community.

EAB can fly only a few miles on it's own and natural spread is about 4 miles per year. It can spread much faster by the movement of infested ash wood such as bark-intact logs and firewood or in living, infested ash trees.

In April 2009 EAB was found near Victory, Wisconsin, south of LaCrosse, about one mile from the Minnesota border. EAB was found in St. Paul May 13, 2009. About 70 trees, which were known to be infested, were removed in June 2009. In spring of 2010, EAB was also found in Houston County in SE Minnesota and in several areas of Minneapolis within a mile or so of the original infestation area in St. Paul. Infested trees were removed in 2010 from the sites found in Minneapolis last year and more infested ash will be removed this spring from new areas found this year. Quarantines prohibiting the movement of ash trees, logs, bark-intact lumber and firewood have been enacted for Houston, Ramsey and Hennepin Counties. Removal of infested trees is considered management only, not eradication. Experts agree that we will not be able to

eradicate this insect, only manage it to slow its spread and the ensuing damage. Several small parasitic wasps, a form of biological control, have been released this year in both southeastern Minnesota and in St. Paul in an attempt to manage the pest and slow down its development and rate of spread.

EAB is difficult to discover in the early stages of infestation. Most infestations are found by seeing woodpecker feeding injury, flecking of bark and patches where the birds have gone after EAB larvae under the bark. Infestation often occurs at the tops of trees first and EAB adults may lay eggs on the same tree, or group of trees, which they emerged from, causing re-infestations.

This insect has not been found in either Lake Elmo or Washington County at this time. It will, however, at some point be found in this area and ash trees will need to be treated with insecticide in order to survive.

EAB will have some impact on ash in native plant communities in Sunfish Lake Park. Ash are found in several areas of the park, particularly in the northeastern part on the north side of Sunfish Lake. Elsewhere they occur sporadically and were not a significant component in either overstory or understory tree populations in areas sampled. This insect should have little overall impact on native plant communities in the park.

Gypsy Moth

A large infestation of gypsy moth (844 acres) was found last year in the City of Grant. Gypsy moth monitoring traps have been set out around the state for many years, and is the means by which most infestations are found. Gypsy moth was brought to this country in the 1800's in an attempt to start a silkworm industry in the U.S.. Moths escaped in Massachusetts and the insect has been moving west ever since. It is now firmly entrenched in the eastern half of Wisconsin and has been found in small populations in various places in Minnesota for a number of years. This is the first confirmed gypsy moth infestation in Washington County since 1984 and the largest the Minn. Dept. of Agric. (MDA) gypsy moth manager has seen in the state. The larvae (caterpillars) do most of the feeding damage and feed on leaves of many types of shade and evergreen trees, with oaks being a favorite food. The MDA is managing this infestation in Grant with sprays in May and June of a biopesticide (Btk) which specifically targets gypsy moth caterpillars. Gypsy moth, being a non-native insect has few natural enemies here to keep it in check. It is related to the forest tent caterpillar, which is native to North America.

Gypsy moth, having a wide plant host range, could have an impact on native plant communities in Sunfish Lake Park, especially oak woodlands. I would recommend continuing to monitor the status of the gypsy moth infestation in Grant and also continue to monitor the park for any signs of this insect.

Exotic Earthworms and Woodland Litter Layer

There are no native earthworms (night crawlers) in North America, so the large worms that we see in soil are all introduced. They are helpful in agricultural areas, but in woodlands they churn soil, and digest the litter layer of leaves and small branches on the forest floor. This

layer normally protects tree roots and serves as a germination bed for seeds, so the bare soil left after earthworm activity is harmful to the regeneration and survival of native plants. In the presence of buckthorn and whitetail deer, the problems for native plants are magnified. There is no control as yet for exotic earthworms except to avoid introducing them into areas where they are not present.

Prairie Restoration Management

Efforts to establish prairie on 20 acres of former agricultural land in the southern portion of the park began in 2010. Management of the area through the 2011 growing season will include two complete site mowings for the control of annual weeds, and four herbicide spot spraying events for the control of perennial noxious weeds. Monitoring of the site will be ongoing so that mowing and spraying events are timed for optimal effectiveness. Herbicide spot sprayings will be reduced to three during the 2012 and 2013 seasons and to two during the 2014 season. Late fall weed grass herbicide treatments are scheduled for October 2012 and 2014. A prescribed burn is anticipated for early May 2012 and 2014. Once the prairie is deemed established, prescribed burns are anticipated every three years.

Priority Recommendations for Management and Restoration

In managing invasive plants, the first priority for places to begin, would be the highest quality plant communities, i.e. the ones with the most native plants, and least invasives. Sites with rare or uncommon plant species would also be high priority. Once populations of invasive plants are being managed, and are at lower levels, enhancement and restoration of native plant communities can be done. Restoration would include regeneration of native plants, and planting of native vegetation which naturally exists in the plant communities found in the park. These native plants will benefit wildlife, prevent soil erosion, and enhance the resident populations of native plants. Plant lists for re-planting and restoration of sites with existing native species, should only be done once invasive species have been removed and area monitored for regeneration of native ground layer plants. If re-planting of native species is indicated, cues for replacement plants could be taken from species in vegetation plots and species listings for indicated plant community classifications.

Recommended Future Projects/Monitoring

1. continue to monitor exotic species/invasive plants
2. continue to map areas of different invasive species
3. plan for control of invasive plants
4. organize volunteer management efforts for invasive plants
5. map oak wilt infection centers 2011 and make management recommendations
6. more plant identification and plant community characterization especially for wetland areas
7. education and interpretation re: native plants, birds, wildlife, invasive plant management
8. monitor and improve areas with soil erosion problems
9. monitor native species in areas of invasive species management
10. plan for further studies of birds and wildlife populations in the park
11. work with Jyneen Thatcher to update Wash. Cons. Dist. MLCCS database to reflect differences in plant communities found in some areas of park
12. deer exclosures in areas of invasive plant management to see what impact deer may have on regeneration of native plants

Conclusion

This management plan is a product of field work and collection of vegetation and other natural resource data from the park, and compilation of much information generated over previous decades regarding the park and its features. We have learned much about the types of plant communities the park contains and also the factors which threaten the integrity and survival of the native plant communities within and near the park boundaries. We have learned more about the diversity of native plants which grow here and also about some of the birds and other wildlife which live in, or pass through, the park. We have been able to compare our findings with those of scientists and non-scientists and compare our results to plant community information found in ground surveys, or, in some cases, inferred by aerial photo interpretation. This is all useful information as the City of Lake Elmo moves forward and makes management decisions for the natural resources in Sunfish Lake Park.

Sunfish Lake Park is an important area not only to the City of Lake Elmo, but as a regionally significant ecological area. At present, invasive plants throughout the park and soil erosion along trails and ravines are the largest threats to the native plant populations which exist there. I urge the City to continue the work started with this management plan project, and utilize the information presented to improve the quality of the native plant communities within the park for wildlife and the enjoyment of current and future park users.