Lake View Hill Park Restoration & Management Plan Review & Update —2014

An evaluation of ecological restoration treatment effectiveness and recommendations for adaptive management following implementation of the 10-Year Lake View Conservancy Restoration & Management Plan, Dane County Parks, Madison WI (2003)

Lakeview Woods – Zone I 2014, following >10 years of restoration treatments.

Lakeview Woods – Zone III 2014, recently brushed understory.

Parks Division, Dane County Parks

Applied Ecological Services, Inc.

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Introduction

In 1999, Dane County Parks in partnership with the Friends of Lake View Woods Conservancy (today known as Friends of Lake View Hill Park or FOLVHP) commissioned a baseline habitat assessment by Applied Ecological Services (AES) to determine the ecological health of the woodland resource and to recommend steps for improvement. The results presented in the Vegetative and Habitat Assessment for Lakeview Woods Conservancy (AES 1999) suggested significant degradation of the natural communities had occurred due to general lack of management to address problems such as proliferation of invasive shrubs, loss of the herbaceous groundlayer, soil erosion, and lack of oak regeneration. These deleterious conditions rendered the woodland community less resilient to other problems caused by deer and human activities.

Recommendations made in the 1999 assessment included establishing a series of demonstration test plots to determine the best strategy for restoring ecological health to the varying degraded woodland conditions. Treatments and strategies deployed in the test plots included those typical of woodland and savanna restoration: brushing of excessive and non-native woody growth, use of controlled burning, selective and targeted use of herbicides to control invasive and noxious weeds, and enhancement seeding and planting of appropriate native species. The test plot program was also used to train neighborhood volunteers to support the ongoing and future restoration efforts in the woodland and surrounding areas of the Park. Treatment effects measured in the test plots from 2001 – 2002 provided the basis for establishing the goals, objectives, tasks and strategies of the Lake View Conservancy Restoration and Management Plan (AES 2003). A separate restoration plan was developed for the Esch Addition (AES 2004).

Implementation of the plan commenced in 2005 with financial support from an Urban Forestry Grant. By 2006, new FOLVHP leadership initiated a moratorium on the use of herbicide. Restoration treatments continued on a selective basis through 2009, when both the test plots and the original 1999 permanent baseline transects were again sampled to measure change. The County reset the restoration program in 2009 to employ basal bark treatments to treat larger areas of buckthorn in the woodland. This program was challenged by neighboring landowners and chemical treatments were again discontinued.

In 2013, Dane County Parks and FOLVHP requested that AES conduct a review of the 10-Year Restoration Plan as provided for in the Plan and in keeping with the adaptive management approach embraced by the Plan as a guiding principle.

Approach for Reviewing the Plan

To conduct the Plan review, we gathered and developed the following information to evaluate treatment effects and effectiveness and to provide the basis for adaptive management recommendations:

I. Lake View Hill Park and Esch Addition management history from 1999 – 2014, including annual burn plans, restoration recommendations and activity records, and volunteer logs.

II. Site assessment in late 2013 and during the 2014 growing season, including a site-wide floristic inventory and map to measure overall increases in diversity and restoration success since the 1999 study, an investigation to assess basal bark treatment outcomes in Zone III (see map in Appendix IV, Attachment 2), and a record of site assessment observations and recommendations.

III. Analysis of test plot and transect data from 1999, 2001, 2002, and 2009, comparing treatment effects on vascular herbaceous and woody plant cover within the herb layer (measured within 1 meter height of the ground surface).

In Appendices I – III of this supplemental document, we present the results and analyses of these investigations. Using this information, we revisit and re-evaluate the guiding principles, goals and objectives, tasks and strategies of the 2003 Plan. We also use this information to address key questions and concerns expressed by County Parks land managers and volunteer stewards to help guide land management decisions in three principle management areas of the Park: the Forest/Savanna Communities of the "Hill", the No-Mow Lawn Areas, and the Esch Addition woodlands. Relevant maps and other exhibits from the 2003 Restoration & Management Plan are included in Appendix IV.

Plan Review & Recommendations

Following is a review of key elements of the 2003 Lake View Conservancy Restoration and Management Plan: plan rationale, guiding principles (restoration philosophy and approach), goals and objectives, and restoration actions and strategies. For purposes of this review, we do not recreate each element in its entirety. We refer the reader to the 2003 Plan document for the full narrative of each element.

In the following discussion, we refer to Lake View Conservancy as the Park, which includes the larger woodland, the Esch Addition, and other areas of the hill that are now managed as natural settings.

Plan Rationale

Today, the reasons for undertaking the restoration of the oak woodland community remain relevant. The woodland community and other areas of the Park remain a significant natural resource and gathering place for the Lake View neighborhood, and recovery of the health of the woodland and surrounding natural communities in the Park and their long-term resiliency remains a desirable outcome for members of the community. Pride in the beauty and increasing health of the woodland community is demonstrated in the increasing numbers of park users and the quality of interpretive signage featured on the trail system.

As stated in the Plan, the "purpose of the Plan is to provide a framework and set of implementation tools for reversing the trend of degradation in Lake View Woods and ensuring the long-term viability of the oak woodland community". Given the level of interest in how the early restoration would be undertaken, it was important that these actions be detailed in a plan based in science and tested onsite with the participation of volunteer stewards. Indeed, over the past 10 years many areas of the woodland have responded positively to the restoration techniques and practices for rehabilitating and managing

degraded natural systems that were proposed in the original plan, as demonstrated in recent studies. And, some techniques demonstrated onsite have been controversial, such as use of chemical herbicides to control invasive species. In meeting these challenges, having a plan has provided a foundation for decision making to sustain the restoration effort while addressing the concerns of the community.

As stated in the plan, regular monitoring and reporting will continue to be important to inform land managers, volunteers, and community stakeholders of the need to make adjustments to achieve the identified restoration and management goals and performance milestones. The current plan review is in response to another stated recommendation in the plan, to "review and revise the plan periodically (every ten-fifteen years), to ensure its relevance to the restoration and management needs of Lake View Conservancy (the Park) and to the goals and objectives of Dane County Parks' land management and its volunteer stewardship program". This Plan review is an opportunity for Dane County Parks and community stakeholders to revisit their commitment to the Plan.

Guiding Principles (Restoration Philosophy & Approach)

The guiding principles of Ecological Restoration, Ecosystem Health, and Adaptive Management remain viable to the restoration and management of the natural communities of the Park. Although many areas of the woodland community were significantly degraded by past land uses such as pasturing livestock and waste dumping, other areas maintained sufficient oak woodland canopy structure and native understory seed banks to justify employing an Ecological Restoration approach that honors pre-settlement conditions where possible. Native seed banks have in fact responded positively to restoration efforts. Uncommon species such as the lovely Canadian white violet (*Viola canadensis*) and spikenard (*Aralia racemosa*), one of the largest non-woody plants in our flora, have appeared in higher quality areas following repeated burning. The appearance of such conservative species justifies efforts to maintain the integrity of the oak woodland flora and to continue to enhance the floristic diversity of the community with appropriate native vascular plant species as recommended in the Plan. Such efforts will contribute significantly to the overall biological diversity of the site and of the larger area, as Lake View Hill is an important natural link between remnant woodland and wetland communities to the south along Lake Mendota such as Maple Bluff and Warner Park and the extensive Cherokee Marsh complexes along the Yahara River to the north. Such efforts are particularly important for enhancing the diversity of pollinating insects, which play an important role in maintaining the biological integrity of the woodland community and thereby contributing to Ecosystem Health.

The principle of Adaptive Management, an iterative decision-making process combined sometimes with experimentation, has been very useful in undertaking restoration in the Park. This is particularly important where fire has been difficult to employ due to lack of reliable fine combustible fuel in the form of oak leaf litter. As demonstrated early on in the test plots, the north slope areas which lack mature oaks in the canopy and therefore lack oak leaf litter to serve as a fine fuel source have not carried fire sufficiently enough to augment mechanical removal of woody understory brush. As stated in the Plan, such areas will have to rely on mechanical and chemical control methods alone to be successful, while gradually establishing a continuous understory herb layer of grasses, sedges, and wildflowers capable of

providing the fine fuel source. Another situation that underscores the importance of Adaptive Management has been the appearance of new invasive plant species that have responded positively to the restoration efforts by expanding their frequency and cover. Such species include Japanese hedge parsley (*Torilis japonica*), which is becoming increasingly widespread in some sectors of the woodland. Oriental bittersweet (*Celastrus orbiculatus*), a rapidly growing woody vine, has also spread significantly in the northern sector of the woodland, and should receive focused attention.

Perhaps the greatest challenge requiring an adaptive approach at LVHP will come with the increasing changes in climate projected by scientists in Wisconsin (WICCI 2011). By the middle of the century, statewide annual average temperatures could warm by as much as 6-7◦F, accompanied by increases in the number of days over 90◦F and by increases in precipitation and the number of large storm events. In addition to a broad range of societal and economic concerns, these changes are expected to have wide ranging impacts on the resiliency of natural systems, with the overall effect being a loss of biological diversity through the extinction or displacement of individual species and their interactions with a host of other organisms. The restoration and management of the Park's natural communities has already provided a timely response to mitigate the impacts of climate change, by removing invasive species and re-establishing a diverse understory capable of protecting soils and providing habitat for many other organisms. The Park's restored natural communities also provide important natural services to improve air and water quality, which will become increasingly compromised by climate change in Madison's urban setting without these services.

Goals and Objectives

The long-term goals of the plan continue to reflect the vision of Dane County Parks and FOLVHP. The name of the property has been changed to reflect the transition of the Conservancy to Park status.

1. To maintain Lake View Hill Park as a natural and cultural centerpiece for the Lake View Neighborhood, as well as an important natural resource for Dane County.

2. To protect and enhance the oak woodland community through an ongoing restoration, management, and monitoring program, which includes volunteer stewardship training and public education, focused on enjoyment, appreciation and protection of the natural environment.

The objectives for undertaking the restoration program are also in keeping with the current management of the Park and its natural assets. As above, the name of the property has been changed to reflect the transition of the Conservancy to Park status, in addition to including the naturalized No-Mow Lawn areas and Esch Addition in the restoration program.

1. To restore the natural oak woodland communities of the hill and Esch Addition and the naturalized lawn areas of Lake View Hill Park to a healthy state that allows a sustained, low-maintenance, low-cost commitment to long-term management.

2. To restore and manage natural and naturalized vegetation communities so that native biodiversity and ecological functions are restored wherever possible.

3. To enhance habitat features to attract and sustain wildlife.

4. To develop an awareness and understanding of Lake View Hill Park's ecological and cultural significance.

5. To enliven a sustainable relationship between the community and nature by involving citizens, organizations and agencies in the restoration effort.

6. To monitor and adapt management prescriptions as necessary to achieve the goals of the Plan.

Restoration Actions & Strategies

The following summary of key tasks and strategies presented in detail in the 2003 plan, provides proposed revisions where text is italicized.

Prescribed Burning:

- Continue to implement prescribed burns and develop a long-term fire management strategy for clearly defined management units, with clearly defined burn prescriptions.
- Initially apply fire to areas where sufficient oak leaf litter is concentrated, and where brushing treatments have occurred and a sufficient fine fuel load has been established through re-vegetation efforts.
- Train willing volunteers to safely assist in prescribed burns, and continue to educate the public on the ecological benefits of fire.
- Monitor and document the effects of prescribed burn treatments, and adjust the burn prescription and management strategy accordingly.
- *Experiment with augmented fuels in areas where oak leaf litter is absent, by soliciting lawn oak leaf litter from the neighborhood.*
- *Once invasive shrubs are under control with the help of fire, adjust burn prescriptions to begin to favor soil, litter, and habitat structure in the understory that contributes to insect and other wildlife diversity.*

Controlling Exotic Plant Species

- Reduce the cover and seed source of exotic shrubs and trees as much as possible (70-90% reduction) within the woodland, as well as encourage through education the replacement of exotic shrubs with more ecologically desirable native counterparts in adjacent properties.
- Conduct exotic shrub removal in phases to accommodate the available funds allocated to the project.
- Continue shrub removal from the existing test plot areas and along internal trails, to maintain the restoration process currently underway in those locations and to enhance access to new treatment areas.
- *Begin to approach neighboring landowners to gain their cooperation in extending the treatments to the property boundary and beyond, if possible.*
- Monitor the effectiveness of removal and control methods and adjust these methods accordingly.
- Monitor re-sprouting treated stems and re-treat as necessary.

- Train volunteers to identify exotic species, as well as train them in the control and management techniques necessary to maintain a healthy woodland system and sustain the effects of initial costly treatments. *Explore ways to train volunteers to use new Iphone and Android apps to map and identify invasive species for management purposes.*
- Replace exotic shrubs with a diversity of native shrubs and fruiting trees appropriate for the woodland community, to restore structural diversity and nesting and feeding opportunities for nesting and visiting bird species.
- Educate the public on the importance of controlling exotic shrubs and trees.

Re-establishing Native Plant Communities & Species

- Use well established seeding and planting techniques to enhance native biodiversity, increase native plant cover, and improve habitat quality for plant and animal life.
- Re-introduce native plant species appropriate for the southern Wisconsin woodland and savanna community types identified at Lake View Hill Park, based on the best knowledge of the flora and composition of these communities.
- When possible, apply a reasonable geographic limit for the collection of wild and commercially-grown native seed, in this case the physiographic province (i.e. natural area division) in which Lake View Hill Park is located [Division 5 Southern Ridges and Lowlands: (5C) oak savanna and prairie (Hole and Germain 1944)].
- Encourage the use of volunteer wild-collected seed from existing sources on-site and from appropriate nearby off-site locations, to minimize the added cost of purchasing seed for commercial sources and to minimize the effort required to hand-collect seed from remote locations.
- Initiate restoration along the main trails in Lake View Woods, where existing diversity and cover are the greatest, to invigorate the production of seed for use in expanding this zone of diversity to adjacent depauperate areas.
- Use short-lived non-native species, such as annual rye grass, only where necessary to establish fine fuels, such as in areas where groundcover vegetation and oak leaf litter are sparse, to carry fire in the early stages of restoration.
- Identify off-site locations that are easily accessible and with similar community composition to the target restored woodland communities at Lakeview, for conducting supervised volunteer off-site seed collection.

Restoring Rare Native Plant Populations

- Monitor the populations of rare species identified in the 1999 baseline study, specifically yellow giant hyssop (*Agastache nepatoides*), and watch for the re-appearance of other rare species throughout the restoration and management program.
- *With proper authorization*, propagate rare species from approved locally collected seed, outplant into suitable sites, and enhance the size of existing populations of rare plants.
- Manage threats to rare plants, such as invasive species, trampling, lack of natural disturbances and loss of specific growing requirements.
- Use trail closures, barriers and signage to reduce trampling and discourage the collection of wildflowers.

Restoring Native Shrubs and Small Trees

- Protect existing native shrub cover and diversity.
- Re-introduce a selection of native shrub and small tree species known to be native to the region and to the target woodland communities, such as American hazelnut, bladdernut, witch hazel, Iowa crab, hawthorn, nannyberry, and wild plum.
- Regularly monitor the presence and cover of exotic shrubs, and remove these to the extent possible using the most economical and effective methods available.
- Educate the public on the far-reaching ecological consequences of invasive exotic shrubs, particularly the loss of native plant and animal diversity, *the decline of soil health and water quality with the loss of ground cover*, and the increasing costs of restoration over time with the loss of the native seed bank.

Stimulating Oak Regeneration

- Re-introduce natural disturbance processes, such as fire, to stimulate oak reproduction.
- Remove competing exotic shrubs and trees.
- Thin the young tree canopy of shade-tolerant/shade-producing species, such as white ash, boxelder, and wild black cherry to allow light levels necessary for oak seedling germination, establishment, and advanced growth (30-50% of full sunlight).
- Plant oaks in locations where oak acorn production is low or non-existent.
- Protect planted trees from fire, until they reach a size tolerant of occasional exposure to cool spring fires.

Increasing Breeding Bird Diversity and Population Sizes

- Increase the area of disturbance dependant habitat, moving the structure and composition of Lake View Hill Park as closely as possible in the direction of its pre-settlement savanna-like conditions, to increase nesting opportunities for birds that are less area-sensitive.
- Educate the public on the importance of restoring small urban habitat fragments for wildlife.
- Conduct annual bird censuses to monitor the effects of restoration on breeding and visiting bird populations.
- Expand the annual bird surveys to include adjacent forested neighborhood tracts and backyard feeding stations, to determine the effective habitat size of the woodland community.
- Close unnecessary trails (secondary trails) to minimize disturbance to interior woodland areas.
- *Begin to monitor insect diversity, important to pollination and as a food source for birds and other wildlife.*

Removing Debris and Spoils and Filling Excavated Pits

- Restore the topography and soils in disturbed areas as closely as possible to their original conditions to enhance establishment and long-term success of native plant and animal communities.
- Remove or cover the old dumpsite with local soil, if possible, or, if necessary, a suitable alfisol soil (forest soil type) from off-site, and re-vegetate with the seed and plant mix recommended for the Management Unit.

- Fill all excavated pits with local soil, if possible, and re-vegetate with seed and plant mix recommended for the Management Unit.
- Remove soil mounds constructed in unofficial trails and use in filling nearby pits. Return the topography as closely as possible to the original grade and re-vegetate with an appropriate seed and plant mix recommended for the Management Unit.

Managing Dead Standing Trees For Habitat

- Leave all dead standing trees for wildlife habitat, except those identified as hazard or diseased trees.
- Close and re-vegetate secondary, un-maintained foot trails to increase area available for cavity tree habitat.
- Educate the public regarding the importance of cavity trees to wildlife, and the necessity of removing hazard and selected diseased trees for the public safety.

Enhancing Public Safety

- Create attractive open-woodland vistas, with greatly enhanced native understory displays of wildflowers resulting from the increased light.
- Remove poison ivy only where it proliferates along main trails. Currently, poison ivy populations are insignificant in most areas of the Park.
- Remove dead trees and branches that pose a hazard to the public utilizing the primary managed trails in the Park. (The trees will be removed by the County according to the City Tree Ordinance, under the direction of the City of Madison Forester.)

Key Questions and Concerns of County and FOLVHP Volunteers

1. *Where and what treatments have worked to achieve the goals of the original adopted plan, and what needs to occur to maintain gains in these locations?*

   Answer: The original test plot results reported in 2003 and the outcomes of the recent floristic inventory and assessment and the test plot statistical analysis (see Appendix II and III) indicate a proven strategy and approach for achieving the goals of the plan in all areas of the Park. This includes effective removal of exotic woody growth and use of herbicide to prevent resprouting; application of prescribed burning to continue to manage exotic woody growth and its seedbank, and to stimulate native seedbanks and vegetation; enhancement seeding and planting to re-establish diverse plant and animal communities; and monitoring to trigger adaptive management and ensure successful outcomes. In areas where use of fire is limited due to lack of proper fuels, a fine fuel source of oak leaf litter and ground cover vegetation will need to be encouraged through cover seeding and contributions from neighborhood lawns. Over time, with control of exotic woody species, the primary maintenance treatment will be periodic prescribed burning and enhancement seeding and planting, in addition to monitoring and managing the herbaceous

weedy populations that will continue to respond along with the natives to the restoration treatments, as the data have shown.

2. *Where and what treatments have not worked to achieve the goals of the original adopted plan, and what needs to happen in these locations to improve performance?*

   Answer: Reinvasion by invasive woody vegetation has occurred in the mesic sites such as on the north slopes, where prescribed burning has not been regularly achieved or effective. In these locations as stated in the answer to question #1, the full range of treatments will be necessary to achieve performance, including the extra effort to build fuel loads for effective use of fire. Cutting without use of herbicide has been demonstrated to stimulate resprouting, thus amplifying the problem and cost and effort to achieve control.

3. *Define areas where the public can return to conduct wild crafting safely (collection of edibles, such as mushrooms, fruits, nuts, and herbs).*

   Answer: Wild crafting use including non-exploitive and non-consumptive gathering of mushrooms, wild fruit, nuts and herbs in the Park could be allowed under some set of guidelines. Those could include, a) only harvest up to 25% of mushrooms, nuts and herbs and coordinate with others to ensure 75% remains, b) contribute to harvesting seed for plants needed in the restoration efforts to help restore the woods, and c) coordinate with Parks department leadership and volunteer steward leader so that harvesting can be monitored. Where herbicides have been applied, at minimum, areas should be posted for the length of time as directed on the manufacturer's label and MSSD documentation. An additional effort to help Park visitors make choices about collecting edibles from the Park would be to post to the Parks website the zones of active restoration activity involving use of herbicide on an annual basis.

4. *What changes have occurred in the understory resulting from increased light levels?*

   Answer: As originally hypothesized and documented with the data analysis, as invasive brush has been reduced, light levels and ground story vegetation have increased concurrently. As the data shows, both native and non-native species have benefited from the stimulating effects of increased light. In this case, when comparing species numbers (Appendix III, Figure III-2), the ratio of native to non-native species remained constant from 1999 to 2009 (ratio of 4.3), meaning that as the number of native species increased with restoration, so did the non-native species. Encouragingly, however, the vegetative cover produced by native species increased by two-fold over non-native species cover during that time. Also, during this time, conservative species have begun to emerge from the seedbank, benefitting from the improved growing conditions created by the establishing herbaceous layer.

5. *What impacts have occurred due to the presence of the deer herd?*

   Answer: Since restoration has begun, deer browse damage appears to have diminished, particularly in areas where a continuous diverse herblayer has been successfully established in the woodland understory. Prior to restoration, deer browse damage was observed along the margins of trails where higher light levels stimulated ground cover and diversity, and in the dense shaded interior of degraded woodland areas where browsing singled out rare isolated small patches of delectable herbaceous growth. Now, protected by a continuous herbaceous cover, even rarer plants and oak seedlings are less susceptible to browse damage. Similar results were documented in a decade long study of deer browse impacts in the Forest Preserves in the metro Chicago area in Illinois (Witham and Jones, 1992).

6. *How effective has fire been in controlling buckthorn saplings?*

   Answer: Where sufficient fine fuels are available, repeated prescribed burning has been very effective in controlling buckthorn saplings, resprouts, and seedlings, within three to four years. In Test Plot 4 on the ridge, stems up to ¾ inch in diameter were effectively killed by repeated burning.

7. *What invasive species are increasing or decreasing and what are the management implications?*

   Answer: While the *number* of both native and non-native herbaceous species has been increasing with restoration as discussed above, *cover* by most of the non-native species has been in decline and is being outcompeted by native cover. The analysis in Appendix III, Figures III-4 and III-5 provides results for dominant native and non-native species that achieved a significant level of absolute cover in the herblayer of the study transects and plots by 2009. Few non-native increasers in the herblayer are noted, with the exception of buckthorn seedlings, indicating that continued burning and expansion of burning into yet-to-be-restored areas of the Park will be critical to prevent a resurgence of this species into the shrublayer. Other non-native invasive species of note observed during the recent assessment to be increasing within the last five years in the woodland and other locations within the Park include Japanese hedge parsley (*Torilis japonica*) and Oriental bittersweet (*Celastrus orbiculatus*). These species should be prioritized for control due to their ability to spread rapidly. The deployment of trained volunteers with phone apps could effectively search and mark locations of these species to support ongoing control efforts.

8. *What native species are increasing, what species introductions have failed, and what are the management implications?*

   Answer: The analysis in Appendix III, Figures III-2 through III-5 provides species number and cover results comparing native and non-native species in the herblayer of the study transects and plots by 2009. Several native species have increased with restoration and a few have decreased (see

Figures III-4 and III-5). Increasers include both Bryophytes (mosses and liverworts) and vascular plants. Leading the list of increasing perennial forbs is white snakeroot (*Eupatorium rugosum*), followed by woodland Joe-pye (*Eupatorium purpureum*), and white avens (*Geum canadense*), as well as the annual clearweed (*Pilea pumila*). These natives have been reliable early colonizers providing cover to stabilize soils and conditioning the soils for successive populations of native species. Other increasers include seedlings of white ash (*Fraxinus americana*) and blackberry (*Rubus allegheniensis*). With the invasion into Wisconsin by the emerald ash borer, it is anticipated that as the canopy trees die-out, this species will remain for some length of time a component of the groundstory only, until the seedbank is depleted. Most species introduced as seed or plants have been more or less successful in becoming established and adding to the diversity of the restored woodland/savanna communities. Introductions should continue to follow the plan guidelines for species appropriate for target restored communities, and using caution when introducing species that are rare or with invasive tendencies.

9. *The surrounding grounds of the dorm are currently targeted for control of non-native invasive trees, shrubs, and herbaceous species to prevent spread and seed rain, among them black locust, white mulberry, thistles, and reed canary grass. Have these treatments been successful or not, and, if not, what could be done to improve control efforts in these areas?*

   Answer: Control of invasive species in these settings has not achieved desired levels. Focused attention and follow-through will be necessary, with clear goals established for desired outcomes (see assessment and recommended strategies for No-Mow Lawns in Attachment II, Table II-9). Successful control of invasive species and noxious weeds in these areas and elsewhere in the Park would benefit significantly from coordination and collaboration with neighboring landowners to control invasive species seed sources and prevent dumping of lawn clippings and other materials into the Park boundaries which creates disturbed conditions favorable to ongoing invasions.

10. *What simple native plantings can be included to enhance filtration and infiltration strategically along steep slopes of the mowed lawn?*

    Answer: Mowed lawn areas in many locations on sloped ground can be planted with deep-rooted natives to create attractive naturalized settings mirroring the woodland/savanna communities in other areas of the Park. This is an inexpensive approach to buffering and infiltrating runoff from adjacent parking lots and mowed lawns.

11. *What negative or positive impacts will occur as a result of removing selected large conifers (white and red pine, and Norway spruce) from the densely planted tree row downslope of the dorm (intended to open up the canopy to allow remaining trees to extend their branches, improve understory light conditions to enhance soil stabilizing fine rooted plants, and to open sight lines to the lake).*

Answer: Reduction or removal of the mature conifers in the tree row could allow for stabilizing soils and diversifying the understory with desirable deep-rooted native species, thus improving habitat quality, and increasing the infiltration function to more effectively mitigate stormwater runoff. Negative impacts would include an aesthetic change, and reduction of winter roosting and nesting habitat for some bird species, particularly for abundant urban birds such as the common crow (a nest scavenger) and the invasive European starling.

12. *How effective have brush removal treatments been in Zones II and III, where basal bark treatments and cutting have occurred without the use of herbicide?*

Answer: Please see the results of the study conducted in this area in Appendix II-B.

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Appendix I. Lake View Hill Park and Esch Addition management history from 1999 – 2014, including annual burn plans for years 2010 – 2014 (Figures I-1 – I-6).

Year	Site Assessment & Planning	Brush & Canopy Management Zones	Burn Management Zones	Weed Control Management Zones	Enhancement Seeding & Planting Zones	Monitoring Data Collection	Comments
1999	Lake View Conservancy Assessment					Baseline Transects T 1 – T4	
2000	Test Plots						
2001	Test Plots	TP 1 – 4	TP 1 – 4		TP1 – 4 (A1, B1, C1 plots); 1000 plant plugs, seed	TP 1 – 4	Cut-stump treat, chip and trail dress; plant plugs and seed produced from collections on site, from other Dane County properties, and purchased from native nursery
2002	Test Plots		TP 1 – 4			TP 1 – 4	
2003	Lake View Conservancy & Expansion Area Plan					TP 1 – 4	Test Plot results reported in Plan
2004	Esch Addition Plan; apply for Urban Forestry Grant						
2005	Execute Urban Forestry Grant project	Zone I-Y1 black locust removal (.30 ac) Zone III-Y2 all target species (portion of 1.18 ac along main E-W trail); Esch Addition black locust removal	Zone I, Zone III-Y2, TP 1 & 2 (7.39 ac)		20 – 30 lbs seed 2000 plant plugs in treatment zones	Treatment evaluation	Urban Forestry Grant (10K/10K match) Cut-stump treat, chip and trail dress Plant plugs and seed produced from collections on site and from other Dane County properties
2006	Urban Forestry Grant extended to burn Esch Addition; *FOLVHP moratorium on use of herbicide*	Follow-up woody resprout control in Zone I-Y1 (1.27 ac) and TP 1 (*not conducted due to herbicide moratorium resulting in uncontrolled regrowth*); manual resprout control experiment in Zone I-Y1 and Esch Addition by FOLVHP	Zone I-Y1, 6, 10; Zone III-Y2; TP 2 – 4 Esch Addition where possible (2.3 ac; partial burn 2006)	First year for garlic mustard control; thistles, burdock, and woody resprouts (*managed by FOLVHP volunteers w/o herbicide due to moratorium*)	478 plant plugs	Treatment evaluation	FOLVHP develops restricted-use herbicide policy; follow-up control treatments to woody resprouts did not occur as planned, e.g. cut-no treat subplots in TP1, TP2; noxious herbaceous weeds controlled using non-chemical techniques (hand-pulling, weed-wrench, cans, mulching, etc.) Plant plugs and seed produced from collections on site and other Dane County properties
2007	"No Mow Meadows" established in South Lawn; *FOLVHP moratorium on use of herbicide*	Follow-up woody resprout control in Zone I-Y1 (1.27 ac) and TP 1 (*not conducted due to herbicide moratorium resulting in uncontrolled regrowth*); manual resprout control experiment in Zone I-Y1 and Esch Addition by FOLVHP	Zone I-Y1, 6, 10; Zone III-Y2; TP2 – 4 (6.25 ac); 2.3 ac Esch Addition was scheduled but did not burn	Garlic mustard, thistles, burdock, woody resprouts in Esch and Zone I-Y1 (*managed by FOLVHP volunteers w/o herbicide due to moratorium*)	480 plant plugs	Monitor black locust resprouts in newly established Zone I-Y1 and Esch Addition study transects	FOLVHP moratorium on use of herbicide; experiment by FOLVHP volunteers in Esch Addition and Zone I-Y1 using non-chemical techniques (hand-pulling, weed-wrench, cans, mulching, etc.); two 50-m transects established in Esch and a 100-m transect in Zone I-Y1 to measure resprouts and herblayer Plant plugs and seed produced from collections on site and other Dane County properties
2008	FOLVHP moratorium lifted	Zone I-Y1 black locust resprouts *(treatment experiment comparing chemical vs non-chemical techniques);* manual resprout control in Esch Addition by FOLVHP	Zone I, Zone III-Y2, TP 1- 4	Garlic mustard, thistles, burdock, woody resprouts in Esch and Zone I-Y1 (*FOLVHP volunteers continue to manage w/o herbicide*)	Seed collected by volunteers onsite	Monitor new Zone I-Y1 Test Plot to compare herbicide formulations; resample Zone I-Y1 and Esch transects	Test Plot established in Zone I-Y1 to compare herbicide formulations for controlling black locust resprouts: Aminopyralid (Milestone) vs Triclopyr (Garlon 4) on cut stumps and on young regrowth foliage.
2009	Basal Bark Treatment Plan (DCP)?	Brushing and tree removal (January and April)	April 10 and May 3 (see FOLVHP 2009 activities record in FOLVHP's volunteer records.	Garlic mustard (hand-pull May), thistle (cut June/July), reed canary grass (cut June), burdock and buckthorn (dig July)	Enhancement seeding April (using seed collected onsite in 2008 and seed from other Dane County Parks); seed collected by volunteers onsite (Sept/Oct)	1999 Baseline Transects and 2001 – 2002 Test Plots Resampled; bird inventory (May)	Several new species observed, including *Trillium recurvatum*, *Orchis spectabilis*. See additional details in document entitled General Restoration Activities by Date at Lake View Park 2009 in FOLVHP's volunteer records.
2010	No record	No record	See 2010 Burn Plan in Figure I-1, 6.8 ac including Esch Addition, part of Zone II, and the south extension of Zone IV and adjacent areas	No record	No record	No record	Assume activities resemble those of the previous year.

Year	Site Assessment & Planning	Brush & Canopy Management Zones	Burn Management Zones	Weed Control Management Zones	Enhancement Seeding & Planting Zones	Monitoring Data Collection	Comments
2011	FOLVHP Conceptual Treatment Recommendations (see in FOLVHP volunteer records); 2011 Burn Plan (see in Figure I-2)	No record	See 2011 Burn Plan in Figure I-2, including part of Zone 1, Zone III, and West No Mow Area	No record	No record	No record	Assume many activities resemble those of the previous year; discontinue basal bark treatment, and return to cut-treat brush removal method?; continue to maintain no-mow meadows in south lawn area and mowed trails
2012	FOLVHP Conceptual Treatment Recommendations (see in FOLVHP volunteer records); 2012 Burn Plan (see in Figure I-3)	Cemetery and Zone II-Y3, Y-5 (March, Oct/Nov); Zone III-Y2, Zone I-Y6 (April); Zone III-Y-4 (Nov)	See 2012 Burn Plan in Figure I-3; no map, but describes two areas: 1) Esch Addition "the rectangular unit SE of the Human Services building, with more oak leaf litter in the upper half…", and 2) "long narrow unit along west boundary of the Park…" (Zone II)	Garlic mustard (hand-pull May); stickseed, burdock (dig June – Sept)	Volunteers broadcast seed (April)	Bird inventory (May)	Previously brushed woody material stacked (Jan/March; chipped material used to maintain trails); Brush removal method cut and stack; brushing conducted in collaboration with Blackhawk Church and others (see 2012 Vol Hrs Report for other work teams in FOLVHP volunteer records; Hog Pen activities conducted by Scouts (April, Oct) as part of goal to preserve and interpret cultural significance (including historic refuse pile and ice skating rink/holding pond feature); fire lane cleared in December by County; arborist evaluation proposed
2013	Friends of Lake View Hill Park Work Plan for 2013 (see FOLVHP volunteer records); 2003 Plan Review/Update initiated	Zone III-Y2, Zone I-Y6 (April); Zone II-Y-5, Zone III-Y4 (Oct/Nov)	See 2013 Burn Plans in Figure I-4: Zone II and part of the picnic area or west No Mow area to the south (5.3 ac), and southern portions of Zones III and IV (4 ac); and Figure I-5: an add-on burn unit Zone I-Y1 area above parking lot; burn occurred April 20	Garlic mustard (hand-pull May/June); buckthorn, Queen Anne's lace (dig/cut August/Sept)	Volunteers broadcast seed (April); collect bottlebrush seed (Sept/Oct)	Site assessment, photo documentation, and timed floristic inventory by AES; bird inventory (May)	Previously brushed woody material stacked (Jan/Feb; chipped material used to maintain trails); large downed trees/logs are removed to facilitate burning; fire lane cleared in April by FOLVHP and December by County; Hog Pen activities conducted by Scouts (Oct) as part of goal to preserve and interpret cultural significance (including historic refuse pile and ice skating rink/holding pond feature); walkway cleared in historic cultural areas by volunteers (June); see 2013 Vol Hrs Report for other work teams in FOLVHP volunteer records.
2014	Friends of Lake View Hill Park Work Plan for 2014 (see FOLVHP volunteer records); 2003 Plan Review/Update continued	Zone III-Y2, Zone I-Y6 (May); Gallo Woods (Sept); brush/clear Havey East (December)	See 2014 Burn Plan in Figure I-6: all of Zone I north of the mowed southern E-W trail above the parking lot; oak leaves are collected from neighborhood to spread in burn test area with limited fine fuels (Nov)	Garlic mustard (hand-pull May/June); burdock (cut June); wild black cherry seedlings (cut July); Queen Anne's lace (pull August)	Plant shrubs and broadcast seed (April); plant 7 oak trees (May); collect bottlebrush grass and other native seed onsite (Sept/October)	New 100-m transect in Zone III to measure resprouts, site assessment, and photo documentation by AES; bird survey (May)	Initial site assessment presentation at FOLVHP annual meeting (February); previously brushed woody material stacked (March/April/May); large downed trees/logs are removed to facilitate burning; oak trees donated by County, planted by FOLVH (May); chipped material used to maintain trails April); management activities around detour path (October); County clears brushed material from Havey East (December); see 2014 Vol Hrs Report for other work teams in FOLVHP volunteer records.

Figure I-1. 2010 Burn Plan.

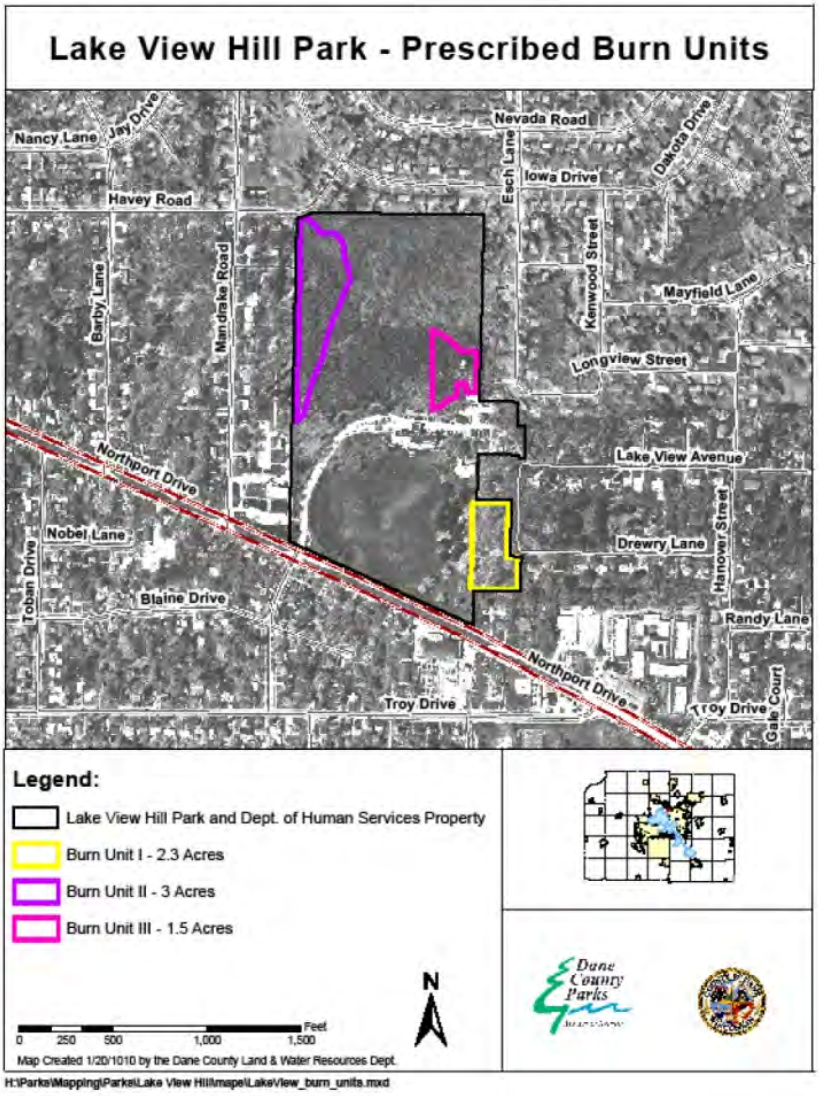


Figure I-2. 2011 Burn Plan.

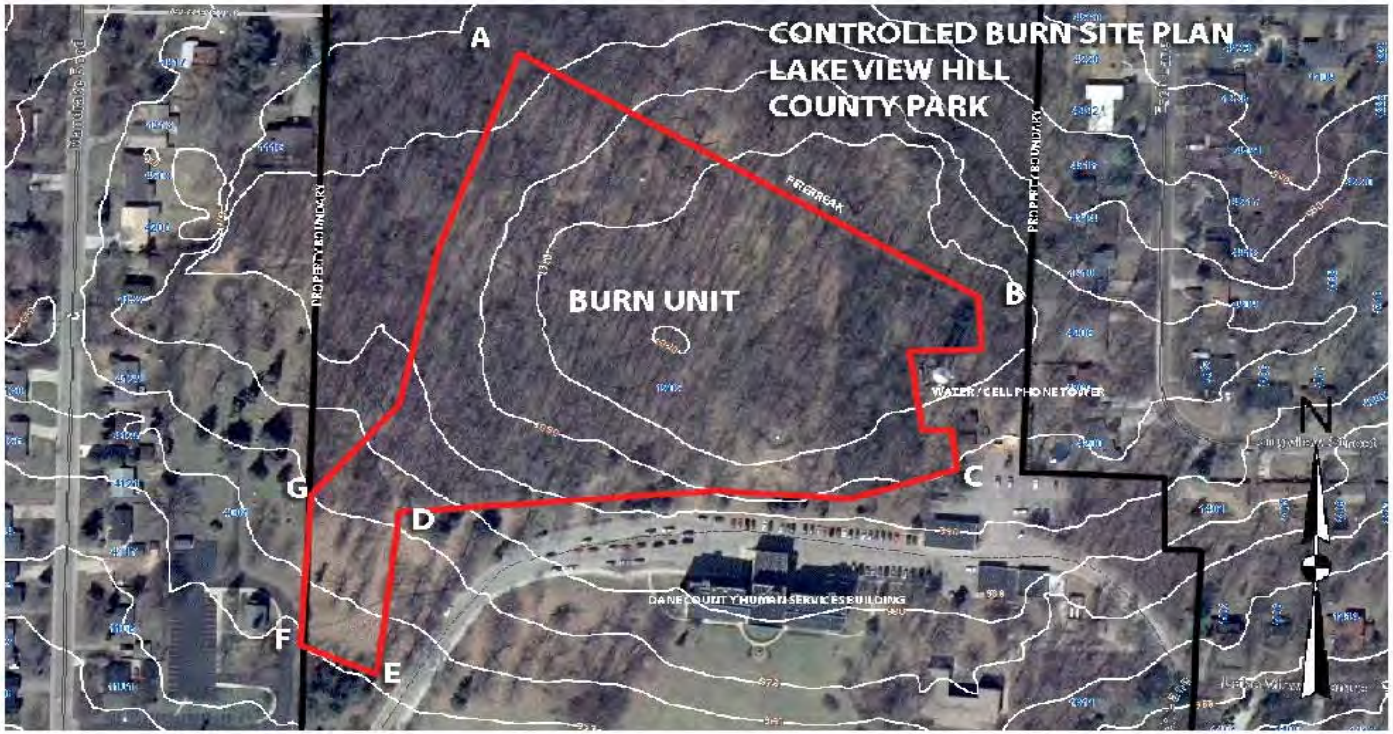
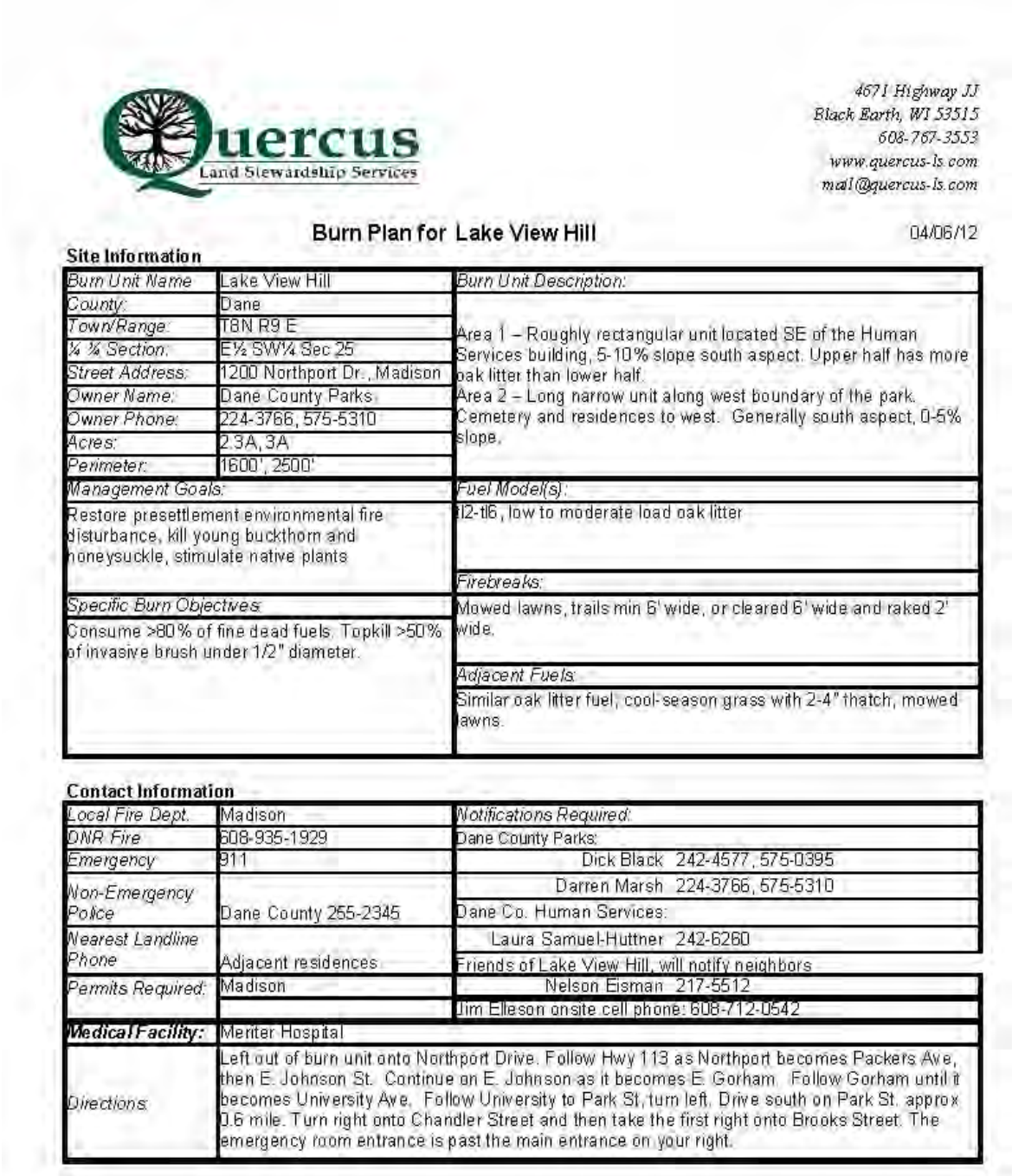


Figure I-3. 2012 Burn Plan.



Quercus Land Stewardship Services

4671 Highway JJ
Black Earth, WI 53515
608-767-3553
www.quercus-ls.com
mail@quercus-ls.com

Burn Plan for Lake View Hill

04/06/12

Site Information

Burn Unit Name	Lake View Hill	*Burn Unit Description:*
County:	Dane	Area 1 – Roughly rectangular unit located SE of the Human Services building, 5-10% slope south aspect. Upper half has more oak litter than lower half. Area 2 – Long narrow unit along west boundary of the park. Cemetery and residences to west. Generally south aspect, 0-5% slope.
Town/Range:	T8N R9 E	
¼ ¼ Section:	E½ SW¼ Sec 25	
Street Address:	1200 Northport Dr., Madison	
Owner Name:	Dane County Parks	
Owner Phone:	224-3766, 575-5310	
Acres:	2.3A, 3A	
Perimeter:	1600', 2500'	
Management Goals:		*Fuel Model(s):*
Restore presettlement environmental fire disturbance, kill young buckthorn and honeysuckle, stimulate native plants		2-tl6, low to moderate load oak litter
		Firebreaks:
Specific Burn Objectives:		Mowed lawns, trails min 6' wide, or cleared 6' wide and raked 2' wide.
Consume >80% of fine dead fuels. Topkill >50% of invasive brush under 1/2" diameter.		*Adjacent Fuels:*
		Similar oak litter fuel; cool-season grass with 2-4" thatch, mowed lawns.

Contact Information

Local Fire Dept.	Madison	*Notifications Required:*
DNR Fire	608-935-1929	Dane County Parks:
Emergency	911	Dick Black 242-4577, 575-0395
Non-Emergency Police	Dane County 255-2345	Darren Marsh 224-3766, 575-5310
		Dane Co. Human Services:
Nearest Landline Phone	Adjacent residences	Laura Samuel-Huttner 242-6260
		Friends of Lake View Hill, will notify neighbors
Permits Required:	Madison	Nelson Eisman 217-5512
		Jim Elleson onsite cell phone: 608-712-0542
Medical Facility:	Meriter Hospital	
Directions:	Left out of burn unit onto Northport Drive. Follow Hwy 113 as Northport becomes Packers Ave, then E. Johnson St. Continue on E. Johnson as it becomes E. Gorham. Follow Gorham until it becomes University Ave. Follow University to Park St, turn left. Drive south on Park St. approx 0.6 mile. Turn right onto Chandler Street and then take the first right onto Brooks Street. The emergency room entrance is past the main entrance on your right.	

Burn Prescription

Dates	Mar 15 – May 15			*Predicted Fire Behavior*				
Wind direction	any, prefer S			*as calculated for the forecast weather conditions by the*				
Weather Conditions				*BehavePlus fire modeling program,*			*for **grass** fuel models:*	
Temp. °F:	45	to	75	*Flame Length of*	0.5	to	24 ft.	
RH %	25	to	60	*Rate of Spread of*	1	to	240 ch/hr	
Mid-flame Wind:	3	to	10				*for **timber litter** fuel models:*	
				Flame Length of	1	to	4 ft.	
				Rate of Spread of	1	to	20 ch/hr	

Fine particulate air quality rating must be good or moderate.
See http://dnrmaps.wisconsin.gov/imf/imf.jsp?site=wisards or Madison Public Health 266-4821.

Operation Plans

Ignition Plan:	
Light a test fire at a downwind corner, assess whether observed fire behavior is consistent with expectations, and the fire can be expected to meet the burn objective and be safely managed with the resources on hand. If not, shut down the burn. If so, continue ignition. Advance along edges into wind with two ignition teams. blacken edges to 50' in from breaks. Ignite along upwind edges after downwind edges are black to >100' in from breaks. Adapt ignition plan to local wind conditions as appropriate.	
Hazards:	Urban area, park visitors, traffic on access drive.
Holding Concerns	Similar oak litter fuel to E of both units. Protect adjacent lawns.
Escape Routes:	Firebreaks, black areas
Safety Zones:	Black areas, mowed lawns
Smoke Management:	Northport Dr. to S. Residences to E and W. Burn only with adequate atmospheric lifting conditions to prevent smoke from affecting visibility on Northport Dr.
Communications	Burn boss, squad bosses and at least one member of each crew will have radios.
Mop-up Requirement:	100% extinguished

Contingency Plan

In case of escape, assign 1 squad boss, and crew members as required, to monitor fireline(s). Bring up ATV pumper or Type 7 engine. Direct attack spotfire, working from an anchor point along flanks toward head. If direct attack is unsuccessful, drop back to suitable downwind location, establish a line and ignite along edge. Call 911 if unable to contain.

Resource Requirements

Minimum Equipment						*Minimum Personnel*	
Back cans	3	*Radios*	4	*ATV pumper 25gal*		*Burn leader*	1
Drip torches	2	*Road signs*	3	*Type 7 Engine*	1	*Squad boss*	1
Chain saws	1			*Portable pump*		*Crew member*	2

Minimum safety equipment for all burn crew personnel:
Leather boots, leather gloves, hardhat, eye protection, fire-retardant coveralls or shirt and pants.

Crew

Jim Elleson, plus at least three of the following: Jeff Meier, Jaya Elleson, Kevin Oimoen, Alex Wenthe, Denny Connor

Attachments

- *BehavePlus run(s)*
- *General location map*
- *Burn Unit and Surrounding Area map*
- *Hospital location map*

Other Notes

Liability Statement

Wisconsin law provides that anyone who sets a fire and allows it to escape is liable for damages and for the cost of suppression by the DNR or local fire department. Quercus Land Stewardship Services carries liability insurance that covers such damages and costs resulting from our prescribed burning activities. However, landowners should be aware that they or their insurance carrier could also be held liable in the unlikely event of an escape.

Approvals

Prepared by: JSE Date: 4/6/12

Revisions:
1
By: ____ Date: ____

Approved by: JSE Date: 4/6/12

Accepted by: _____ Date: ____

BehavePlus Results for Lake View Hill

BehavePlus 3.0.2 (Build 265)

Run Date 1/11/08

Inputs

Fuel Model	gr3, tl6	Live Herbaceous Moisture	30 %
1-h Moisture	6,7,8,9 %	Midflame Wind Speed (upslope)	0,4,8,10 mi/h
10-h Moisture	10 %	Slope Steepness	10 %

Results for: Surface Rate of Spread (maximum) (ch/h)

1-h moisture %	Fuel Model gr3				Fuel Model tl6			
	Midflame Wind Speed, mi/h				Midflame Wind Speed, mi/h			
	0	4	8	10	0	4	8	10
6	3.1	54.5	121.8	158.5	1	4.8	11.8	16.2
7	2.9	50.4	112.7	146.6	0.9	4.5	11	15
8	2.7	47	105.1	136.8	0.9	4.2	10.3	14.1
9	2.6	44.2	98.8	128.6	0.8	4	9.8	13.3

Results for: Flame Length (ft)

1-h moisture %	Fuel Model gr3				Fuel Model tl6			
	Midflame Wind Speed, mi/h				Midflame Wind Speed, mi/h			
	0	4	8	10	0	4	8	10
6	1.9	7	10.2	11.5	1.2	2.4	3.7	4.2
7	1.8	6.6	9.6	10.9	1.1	2.3	3.5	4
8	1.7	6.3	9.2	10.3	1.1	2.2	3.3	3.8
9	1.6	6.1	8.8	9.9	1	2.1	3.2	3.7

Back/Flank/Head Fire. Fuel Model gr3. 1-hr moisture = 7%

Wind, mi/h	Rate of Spread (ch/hr)			Flame Length (ft)		
	Back	Flank	Head	Back	Flank	Head
4	3.6	6.7	50.4	2	2.6	6.6
8	3.3	6.4	112.7	1.9	2.6	9.6
10	3.1	6.1	146.6	1.8	2.5	10.9

1-hour moisture for Feb, Mar, Apr, Aug, Sep, Oct; slope <30%, and time from noon to 4 pm:

	RH									
Temp	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74
30-49	6	6	7	8	8	8	9	10	10	11
50-69	6	6	7	7	8	8	9	9	10	10
70-89	5	6	6	7	8	8	9	9	9	10

for other conditions, see tables in Fireline Handbook

Day of Burn Checklist for Lake View Hill Date _____

Crew Assignments

Burn Leader	Jim Elleson							
Squad Boss								
Crew Members								

Notifications Made (List)

Contact	Time	Contact	Time

Crew Briefing

▫ Objectives of burn	▫ Smoke Management
▫ Exact area of burn. Maps distributed.	▫ Staging: vehicles, equipment, resources
▫ Burn Unit Description: fuels, firebreaks, adjacent fuel	▫ Communications: radios, cell phones, landline phone, whistles
▫ Expected fire behavior	▫ Source of water
▫ Hazards, Holding Concerns	▫ Mopup requirements
▫ PPE Check	▫ Contingency plan
▫ Crew Assignments	▫ Hospital map and Emergency contact list in each truck
▫ Equipment Assignments	▫ Contact with the public
▫ Ignition plan	▫ Questions
▫ Escape Routes/ Safety Zones	
▫ Opportunity to decline participation. Anything that will prevent full physical performance?	

Go-No-Go Checklist

Yes__	No__	Are **ALL** fire prescription elements met?
Yes__	No__	Are **ALL** smoke management specifications met?
Yes__	No__	Are **ALL** permits and clearances obtained?
Yes__	No__	Have **ALL** the required notifications been made?
Yes__	No__	Are **ALL** required personnel in the prescribed fire plan on site?
Yes__	No__	Is **ALL** required equipment in the prescribed fire plan on site?
Yes__	No__	Has the contingency planning process adequately considered fuels adjacent to and within a reasonable proximity to the burn area?
Yes__	No__	Has the availability of **ALL** contingency resources been checked, and are they available?
Yes__	No__	Are the on-site holding forces adequate for containment under the expected conditions?
Yes__	No__	Have **ALL** personnel viewed the areas they are responsible for?
Yes__	No__	Have **ALL** personnel discussed the items in the Briefing Checklist?
Yes__	No__	Have **ALL** personnel been shown a map of the entire burn unit?
Yes__	No__	Do **ALL** crew members accept their assignments?
Yes__	No__	Do **ALL** crew members understand the emergency protocols and communications plan?
Yes__	No__	In **YOUR OPINION**, can the prescribed fire meet the planned objectives, and can it be carried out according to the approved plan?
Yes__	No__	Has a test fire been conducted and are conditions deemed safe enough to continue?

I certify that I have reviewed the burn objectives and that all the above questions were answered "**YES**."

_____ _____

Burn Leader Date

Observed Plant Phenology

Forecast Weather

Weather forecast obtained from _____, _____(date), _____(time)

Time	Temp	RH	Dewpoint	Wind Dir/Spd	Vent. Index	Mix Height	Transport Wind

Operations/Weather/Fire Behavior Log

Time	Notes	Temp/RH	Wind Spd/Dir	Fuel	Fire	FL/ROS

Results

% area burned _____ % fuel consumed _____

Notes

(Progress and extent of burn, ignition pattern, fire behavior, live:dead fuel ratio, suggested revisions to burn plan, etc.)

Figure I-4. 2013 Burn Plan.

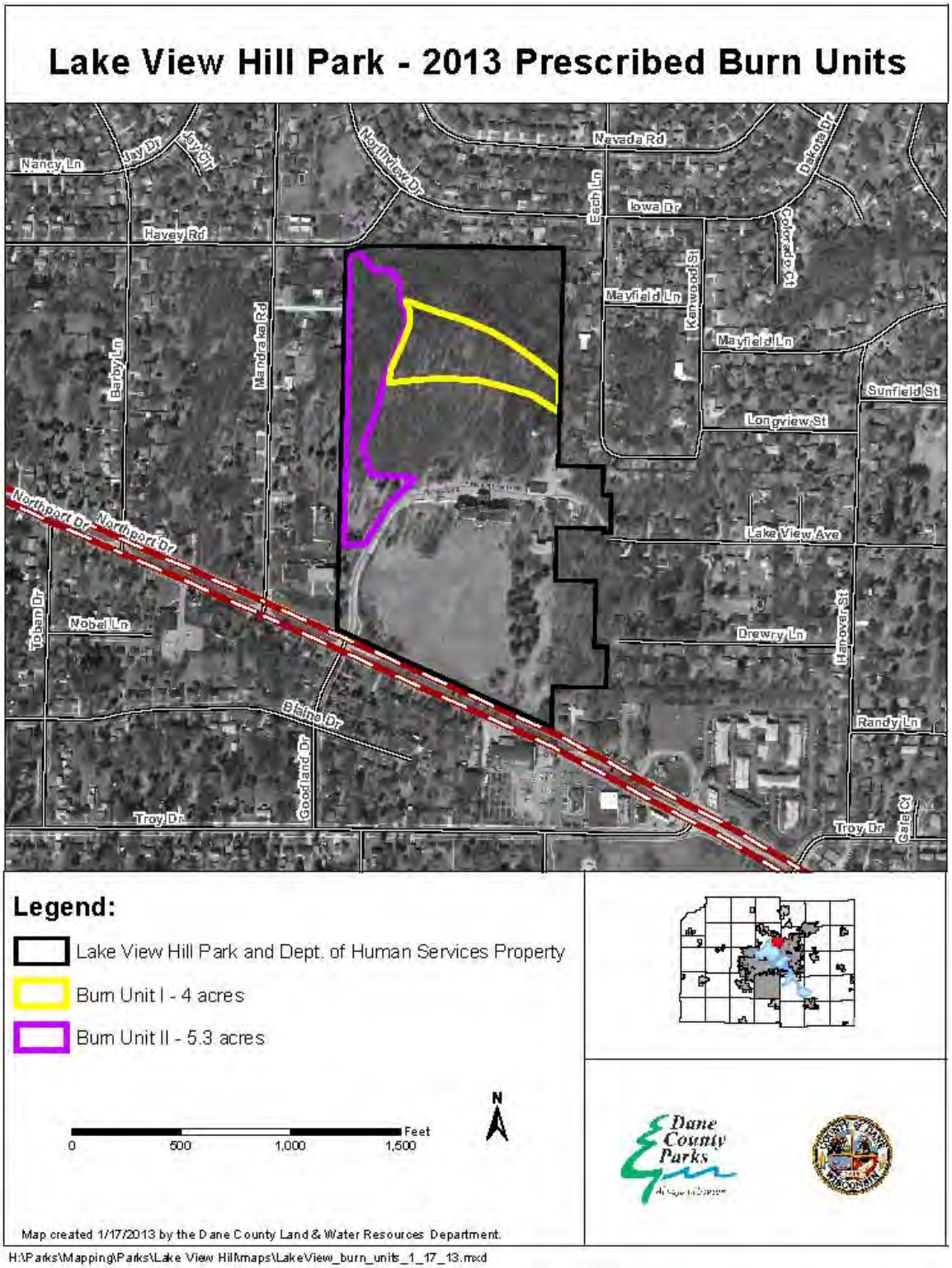
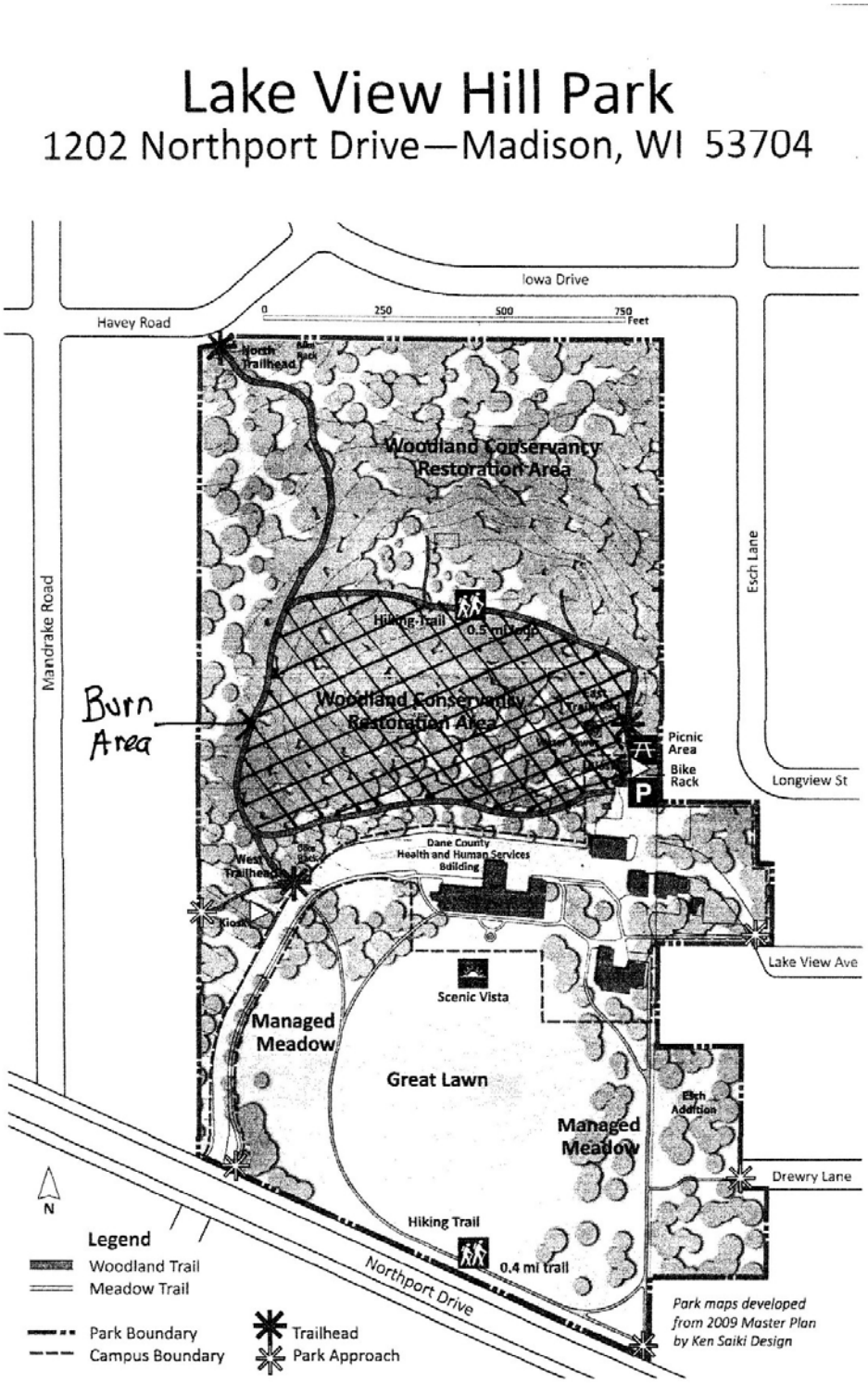


Figure I-5. 2013 Burn Plan—Additional Area.

Figure I-6. 2014 Burn Plan.



Appendix II. Site Assessment & Recommendations 2013 – 2014

Results from site investigations in fall 2013 and during the 2014 growing season, including:

- **II-A (pg 29)—Floristic Inventory & Ecological Assessment—Fall 2013: a site-wide floristic inventory and ecological assessment to measure overall increases in diversity and restoration treatment success,**
- **II-B (pg 62)—Basal Bark Treatment Outcomes in Zone III—2014: a study to assess basal bark treatment outcomes in Zone III, and**
- **II-C (pg 68)—Site Assessment & Recommendations: a summary of site observations and recommended strategies for continued restoration and management of Lake View Hill Park natural communities and naturalized areas.**

II-A - Floristic Inventory & Ecological Assessment—Fall 2013

A floristic inventory and ecological assessment with photo record was conducted in late 2013 to compare with the original inventory conducted in 1999 to demonstrate increases in floristic diversity resulting from restoration efforts implemented during the past decade. The inventory was conducted in representative natural communities and cultural cover types (No-Mow Lawns) within the principal habitats in the Park (see map in Figure II-1 for cover type classifications and photo locations). Individual species lists from the 2013 inventory are presented in Table Set II-5, and a total 2013 listing in Table II-3. The total species list from 1999 is presented for comparison in Table II-4.

The summary table below (Table II-1) provides a comparison of key variables related to floristic diversity comparing the results of the 2013 and 1999 inventories. Although the 2013 inventory was conducted late in the growing season, the results show a positive trend in increasing native floristic quality (increasing native diversity) as demonstrated by the increase in the Native Floristic Quality Index from 41.2 in 1999 to 45.0 in 2013. This trend is supported by a similar positive trend in the Native Mean Coefficient of Conservative (Native Mean C) value from 4.06 to 4.23 during that same period. These trends are supportive of the trends measured in the test plot and transect data analysis presented Appendix III of this document. An additional summary of FQI data and a classification of level of restoration for all representative types are presented in Table II-2.

Table II-1. Comparison of 2013 and 1999 floristic inventories in Lake View Woods (see total species lists in Tables II-3 and II-4).

Year	Total Species	Native Species	Non-Native Species	Native Woody Species/Vines	Native Forbs/Ferns	Native Grasses	Native Sedges	Native Floristic Quality Index[1] (FQI)	Native Mean C
2013	156	113	43	33	66	8	6	45.0	4.23
1999	142	103	39	37	57	2	7	41.2	4.06

[1] Native Floristic Quality Index (FQI) is calculated as the native mean coefficient of conservatism (C value assigned to each species in the floristic inventory) multiplied by the square root of the number of native species. This value is intended to speak only to the degree of floristic integrity and presence of conservative species on a site. It does not, however, provide a measure of the quality or integrity of the vegetative community and its overall ecological health.

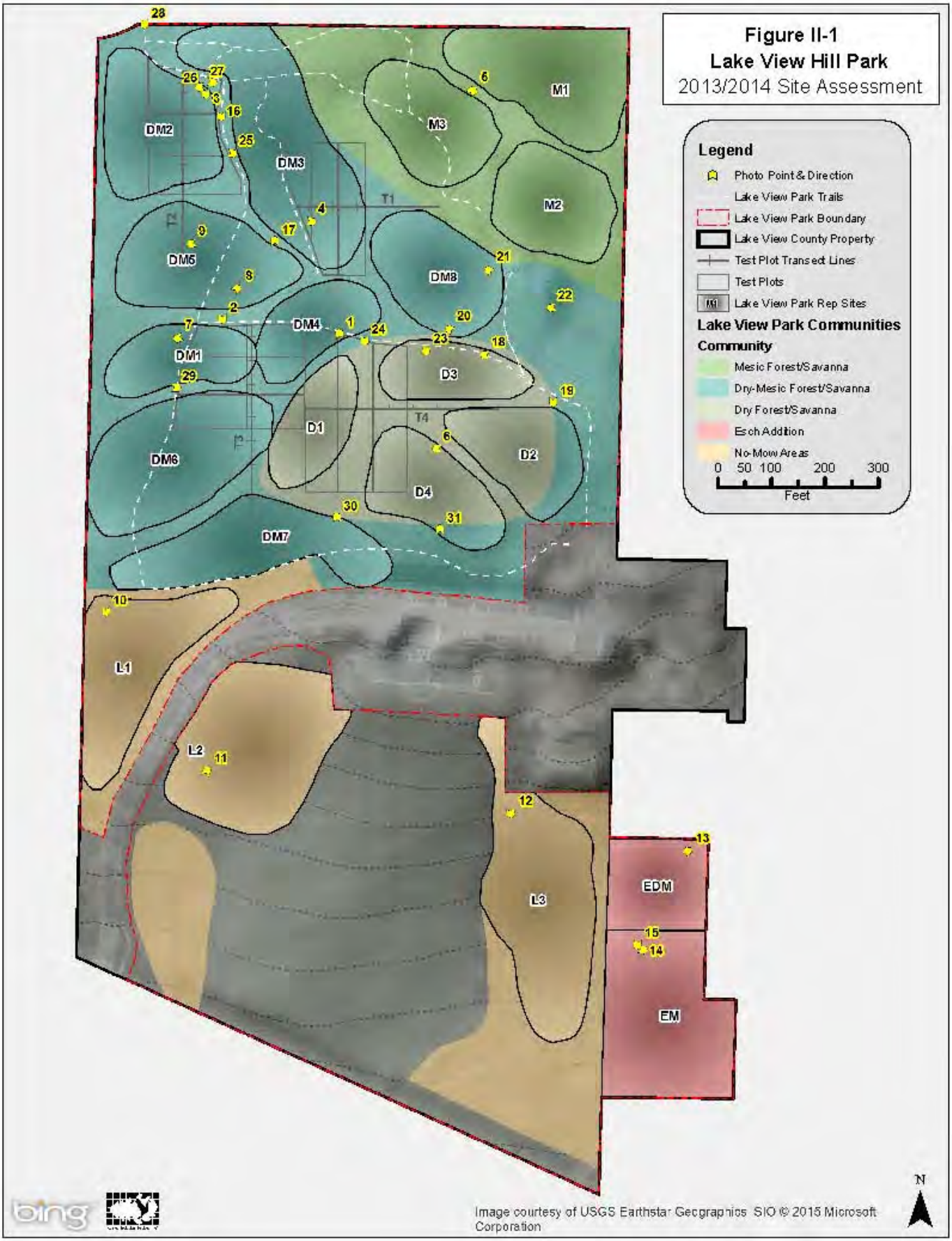


Figure II-1
Lake View Hill Park
2013/2014 Site Assessment
Legend
Photo Point & Direction
Lake View Park Trails
Lake View Park Boundary
Lake View County Property
Test Plot Transect Lines
Test Plots
M1 Lake View Park Rep Sites
Lake View Park Communities
Community
Mesic Forest/Savanna
Dry-Mesic Forest/Savanna
Dry Forest/Savanna
Esch Addition
No-Mow Areas
0 50 100 200 300
Feet
M1
M2
M3
DM1
DM2
DM3
DM4
DM5
DM6
DM7
DM8
D1
D2
D3
D4
L1
L2
L3
EDM
EM
T1
T2
T3
T4
Image courtesy of USGS Earthstar Geographics SIO © 2015 Microsoft Corporation
N

Table II-2. Summary of Floristic Quality & Level of Restoration by Representative Sites in Lake View Hill Park in 2013/2014. In this analysis, data is used to order sites by Native FQI and to assign a level of restoration score base on the duration of restoration treatments. This information is useful for prioritizing restoration efforts and for tracking restoration treatment effectiveness.

Communities & Representative Sites (see map in Fig II-1)	Total Species	Native Species	Non-native Species	Native Woody/Vines	Native forbs/ferns	Native Grasses	Native Sedges	Native Mean C	Native FQI	Level of Restoration 4=Advanced 3=Moderate 2=Early 1=None
Dry Forest/Savanna										
D1	63	59	4	21	31	5	2	4.3	33.2	4
D2	47	34	13	9	18	4	3	4.0	23.2	3
D3	31	29	2	8	15	4	2	3.7	20.1	4
D4	24	19	5	7	9	1	2	3.5	15.4	4
Dry-Mesic Forest/Savanna										
DM1	62	57	5	19	31	4	3	4.2	31.5	3
DM2	55	42	13	13	25	1	3	4.2	27.2	3
DM3	49	35	14	8	24	3	0	3.7	21.8	2
DM4	29	25	4	9	14	2	0	4.1	20.4	4
DM5	27	20	7	7	11	1	1	3.9	17.2	2
DM6	32	24	8	11	12	0	1	2.8	13.7	3
DM7	24	15	9	9	4	1	1	3.5	13.7	3
DM8	16	14	2	7	7	0	0	3.5	13.1	3
Mesic Forest/Savanna										
M1	30	21	9	8	12	0	1	3.4	15.7	1
M2	16	10	6	3	5	0	2	3.4	10.8	1
M3	17	10	7	3	6	0	1	2.8	8.9	1
No-Mow Areas										
L1	33	24	9	7	14	1	2	3.4	16.7	2
L2	21	10	11	4	5	0	1	3.6	11.4	2
L3	22	7	15	5	2	0	0	3.4	9.1	2
Esch Addition										
EDM	36	28	8	8	14	3	3	4.0	21.0	3
EM	34	21	13	7	10	2	2	4.0	18.1	2

Table II-3. 2013 Floristic Inventory Results.

Common and scientific names of plants found at the Lake View Hill Park (AES 2013). Nt=native, Ad=adventive (introduced or non-native), B=biennial, P=perennial, A=annual, H=herbaceous (non-woody plants), W=woody, FORB=broad-leaved herbaceous plants other than grasses on grass-like plants, CRYPTOGAM=plants not producing seeds, such as ferns and mosses. Scientific names in caps also identify adventive or non-native species, some of which are invasive and may require special management attention.

SITE	Lake View Woods
LOCALE	Total Species Fall 2013
DATE	11/3/2013
BY	SIA, SML

FLORISTIC QUALITY DATA			NATIVE	72.4%		ADVENTIVE	27.6%
113	Native Species	19	Tree	12.2%	4	Tree	2.6%
156	Total Species	7	Shrub	4.5%	5	Shrub	3.2%
4.23	Native Mean C	5	W-Vine	3.2%	2	W-Vine	1.3%
3.06	w/Adventives	2	H-Vine	1.3%	0	H-Vine	0.0%
44.97	Native FQI	52	P-Forb	33.3%	11	P-Forb	7.1%
38.27	w/Adventives	2	B-Forb	1.3%	6	B-Forb	3.8%
1.68	Native W	11	A-Forb	7.1%	5	A-Forb	3.2%
1.97	w/Adventives	8	P-Grass	5.1%	8	P-Grass	5.1%
		0	A-Grass	0.0%	2	A-Grass	1.3%
		6	P-Sedge	3.8%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		1	Cryptogam	0.6%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACARHO	0	Acalypha rhomboidea	3	FACU	Nt A-FORB	THREE-SEEDED MERCURY
ACENEG	0	Acer negundo	-2	FACW-	Nt TREE	BOX ELDER
ACENIG	5	Acer nigrum	5	UPL	Nt TREE	BLACK MAPLE
ACESAU	3	Acer saccharum	3	FACU	Nt TREE	SUGAR MAPLE
AGANEP	5	Agastache nepetoides	3	FACU	Nt P-FORB	YELLOW GIANT HYSSOP
AGASCR	5	Agastache scrophulariaefolia	5	UPL	Nt P-FORB	PURPLE GIANT HYSSOP
AGRGRY	2	Agrimonia gryposepala	2	FACU+	Nt P-FORB	TALL AGRIMONY
AGRPUB	5	Agrimonia pubescens	5	UPL	Nt P-FORB	SOFT AGRIMONY
AGRREP	*	AGROPYRON REPENS	3	FACU	Ad P-GRASS	QUACK GRASS
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
AMBARE	0	Ambrosia artemisiifolia elatior	3	FACU	Nt A-FORB	COMMON RAGWEED
AMPBRB	4	Amphicarpaea bracteata	0	FAC	Nt P-FORB	UPLAND HOG PEANUT
ANTNEG	4	Antennaria neglecta	5	UPL	Nt P-FORB	CAT'S FOOT
AQUCAN	6	Aquilegia canadensis	1	FAC-	Nt P-FORB	WILD COLUMBINE
ARARAC	10	Aralia racemosa	5	UPL	Nt P-FORB	SPIKENARD
ARCLAP	*	ARCTIUM LAPPA	5	UPL	Ad B-FORB	GREAT BURDOCK
ARCMIN	*	ARCTIUM MINUS	5	UPL	Ad B-FORB	COMMON BURDOCK
ARITRI	4	Arisaema triphyllum	-2	FACW-	Nt P-FORB	JACK-IN-THE-PULPIT
ASCEXA	9	Asclepias exaltata	5	UPL	Nt P-FORB	POKE MILKWEED
ASCSYR	0	Asclepias syriaca	5	UPL	Nt P-FORB	COMMON MILKWEED
ASTAZU	8	Aster azureus	5	UPL	Nt P-FORB	SKY-BLUE ASTER
ASTLAE	9	Aster laevis	5	UPL	Nt P-FORB	SMOOTH BLUE ASTER
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
ASTSAD	2	Aster sagittifolius drummondii	3	[FACU]	Nt P-FORB	DRUMMOND'S ASTER
BIDFRO	1	Bidens frondosa	-3	FACW	Nt A-FORB	COMMON BEGGAR'S TICKS
BROINE	*	BROMUS INERMIS	5	UPL	Ad P-GRASS	HUNGARIAN BROME
BROPUB	5	Bromus pubescens	2	FACU+	Nt P-GRASS	WOODLAND BROME
CACATR	8	Cacalia atriplicifolia	5	UPL	Nt P-FORB	PALE INDIAN PLANTAIN
CAMAME	3	Campanula americana	0	FAC	Nt A-FORB	TALL BELLFLOWER
CAMRAP	*	CAMPANULA RAPUNCULOIDES	5	UPL	Ad P-FORB	EUROPEAN BELLFLOWER
CARCOR	7	Carya cordiformis	3	[FACU]	Nt TREE	BITTERNUT HICKORY
CAROVT	5	Carya ovata	3	FACU	Nt TREE	SHAGBARK HICKORY
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CELORB	*	CELASTRUS ORBICULATUS	5	UPL	Ad W-VINE	ORIENTAL BITTERSWEET

CHEALB	*	CHENOPODIUM ALBUM	1	FAC-	Ad A-FORB	LAMB'S QUARTERS
CHEMUR	*	CHENOPODIUM MURALE	5	UPL	Ad A-FORB	NETTLE-LEAVED GOOSEFOOT
CIRARV	*	CIRSIUM ARVENSE	5	UPL	Ad P-FORB	FIELD THISTLE
CIRLUC	1	Circaea lutetiana canadensis	3	FACU	Nt P-FORB	ENCHANTER'S NIGHTSHADE
CONARV	*	CONVOLVULUS ARVENSIS	5	UPL	Ad P-FORB	FIELD BINDWEED
CORALT	9	Cornus alternifolia	1	[FAC-]	Nt TREE	PAGODA DOGWOOD
CORRAC	1	Cornus racemosa	-2	FACW-	Nt SHRUB	GRAY DOGWOOD
CUSGRO	4	Cuscuta gronovii	-5	[OBL]	Nt A-FORB	COMMON DODDER
CXBEBB	6	Carex bebbii	-5	OBL	Nt P-SEDGE	BEBB'S OVAL SEDGE
CXCEPP	3	Carex cephalophora	3	FACU	Nt P-SEDGE	SHORT-HEADED BRACTED SEDGE
CXHIRT	5	Carex hirtifolia	5	UPL	Nt P-SEDGE	HAIRY WOOD SEDGE
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
CXROSE	4	Carex rosea	5	UPL	Nt P-SEDGE	CURLY-STYLED WOOD SEDGE
CXSPAR	3	Carex sparganioides	0	FAC	Nt P-SEDGE	LOOSE-HEADED BRACTED SEDGE
DACGLO	*	DACTYLIS GLOMERATA	3	FACU	Ad P-GRASS	ORCHARD GRASS
DIOVIL	7	Dioscorea villosa	1	FAC-	Nt H-VINE	WILD YAM
DRYSPI	8	Dryopteris spinulosa	-2	FACW-	CRYPTOGAM	SPINULOSE SHIELD FERN
ELYCAN	4	Elymus canadensis	1	FAC-	Nt P-GRASS	CANADA WILD RYE
ELYVIL	5	Elymus villosus	3	FACU	Nt P-GRASS	SILKY WILD RYE
ELYVIR	4	Elymus virginicus	-2	FACW-	Nt P-GRASS	VIRGINIA WILD RYE
EREHIE	2	Erechtites hieracifolia	3	FACU	Nt A-FORB	FIREWEED
EUPMAM	4	Eupatorium maculatum	-5	OBL	Nt P-FORB	SPOTTED JOE PYE WEED
EUPPER	4	Eupatorium perfoliatum	-4	FACW+	Nt P-FORB	COMMON BONESET
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FESELA	*	FESTUCA ELATIOR	2	FACU+	Ad P-GRASS	TALL FESCUE
FESRUB	*	FESTUCA RUBRA	1	FAC-	Ad P-GRASS	RED FESCUE
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
FRAPES	1	Fraxinus pennsylvanica subintegerrima	0	FAC	Nt TREE	GREEN ASH
GALCIH	7	Galium circaezans hypomalacum	5	[UPL]	Nt P-FORB	HAIRY WILD LICORICE
GALTRF	5	Galium triflorum	2	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
GERMAC	4	Geranium maculatum	5	[UPL]	Nt P-FORB	WILD GERANIUM
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
GLEHED	*	GLECHOMA HEDERACEA	3	FACU	Ad P-FORB	CREEPING CHARLIE
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
HELSTR	5	Helianthus strumosus	5	UPL	Nt P-FORB	PALE-LEAVED SUNFLOWER
HESMAT	*	HESPERIS MATRONALIS	5	UPL	Ad P-FORB	DAME'S ROCKET
HYPPYR	10	Hypericum pyramidatum	-1	FAC+	Nt P-FORB	GREAT ST. JOHN'S WORT
HYSPAT	5	Hystrix patula	5	UPL	Nt P-GRASS	BOTTLEBRUSH GRASS
IMPCAP	3	Impatiens capensis	-3	FACW	Nt A-FORB	ORANGE JEWELWEED
JUNTEN	0	Juncus tenuis	2	[FACU+]	Nt P-FORB	PATH RUSH
JUNVIC	2	Juniperus virginiana crebra	3	FACU	Nt TREE	RED CEDAR
LACFLO	5	Lactuca floridana	1	FAC-	Nt B-FORB	BLUE LETTUCE
LEEVIR	7	Leersia virginica	-3	FACW	Nt P-GRASS	WHITE GRASS
LEOCAR	*	LEONURUS CARDIACA	5	UPL	Ad P-FORB	MOTHERWORT
LIGVUL	*	LIGUSTRUM VULGARE	1	FAC-	Ad SHRUB	COMMON PRIVET
LONPRO	7	Lonicera prolifera	5	UPL	Nt W-VINE	YELLOW HONEYSUCKLE
LONTAT	*	LONICERA TATARICA	5	[UPL]	Ad SHRUB	TARTARIAN HONEYSUCKLE
MALPUM	*	MALUS PUMILA	5	UPL	Ad TREE	APPLE
MEDLUP	*	MEDICAGO LUPULINA	1	FAC-	Ad A-FORB	BLACK MEDICK
MELALB	*	MELILOTUS ALBA	3	FACU	Ad B-FORB	WHITE SWEET CLOVER
MELLOF	*	MELILOTUS OFFICINALIS	3	FACU	Ad B-FORB	YELLOW SWEET CLOVER
MENCAN	6	Menispermum canadense	-1	FAC+	Nt W-VINE	MOONSEED
MONFIS	4	Monarda fistulosa	3	FACU	Nt P-FORB	WILD BERGAMOT
MORALB	*	MORUS ALBA	0	FAC	Ad TREE	WHITE MULBERRY
MUHMEX	5	Muhlenbergia mexicana	-3	FACW	Nt P-GRASS	LEAFY SATIN GRASS
NEPCAT	*	NEPETA CATARIA	1	FAC-	Ad P-FORB	CATNIP
OSMCLO	3	Osmorhiza claytonii	4	FACU-	Nt P-FORB	HAIRY SWEET CICELY
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
PANLAT	5	Panicum latifolium	3	FACU	Nt P-GRASS	BROAD-LEAVED PANIC GRASS
PARQUI	2	Parthenocissus quinquefolia	1	FAC-	Nt W-VINE	VIRGINIA CREEPER
PENCAL	7	Penstemon calycosus	3	FACU	Nt P-FORB	SMOOTH BEARD TONGUE
PHAARU	*	PHALARIS ARUNDINACEA	-4	FACW+	Ad P-GRASS	REED CANARY GRASS
PHLPRA	*	PHLEUM PRATENSE	3	FACU	Ad P-GRASS	TIMOTHY
PHRLEP	4	Phryma leptostachya	5	UPL	Nt P-FORB	LOPSEED
PHYAME	1	Phytolacca americana	1	FAC-	Nt P-FORB	POKEWEED

PHYVIG	4	Physalis virginiana	5	UPL	Nt P-FORB	LANCE-LEAVED GROUND CHERRY
PILPUM	5	Pilea pumila	-3	FACW	Nt A-FORB	CLEARWEED
PINSTR	9	Pinus strobus	3	FACU	Nt TREE	WHITE PINE
PINSYL	*	PINUS SYLVESTRIS	5	UPL	Ad TREE	SCOTCH PINE
PLALAN	*	PLANTAGO LANCEOLATA	0	FAC	Ad P-FORB	ENGLISH PLANTAIN
POAPRA	*	POA PRATENSIS	1	FAC-	Ad P-GRASS	KENTUCKY BLUE GRASS
POLERE	2	Polygonum erectum	3	FACU	Nt A-FORB	ERECT KNOTWEED
POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
POLPEN	0	Polygonum pensylvanicum	-4	FACW+	Nt A-FORB	PINKWEED
POLPER	*	POLYGONUM PERSICARIA	1	[FAC-]	Ad A-FORB	LADY'S THUMB
POPGRA	6	Populus grandidentata	3	FACU	Nt TREE	LARGE-TOOTHED ASPEN
POTSIS	4	Potentilla simplex	4	FACU-	Nt P-FORB	COMMON CINQUEFOIL
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
PRUVIR	3	Prunus virginiana	3	[FACU]	Nt SHRUB	CHOKE CHERRY
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RHURAD	2	Rhus radicans	-1	FAC+	Nt W-VINE	POISON IVY
RHUTYP	1	Rhus typhina	5	UPL	Nt TREE	STAGHORN SUMAC
RIBAME	7	Ribes americanum	-3	FACW	Nt SHRUB	WILD BLACK CURRANT
ROBPSE	*	ROBINIA PSEUDOACACIA	4	FACU-	Ad TREE	BLACK LOCUST
ROSMUL	*	ROSA MULTIFLORA	3	FACU	Ad SHRUB	MULTIFLORA ROSE
RUBALL	3	Rubus allegheniensis	2	FACU+	Nt SHRUB	COMMON BLACKBERRY
RUBIDS	3	Rubus idaeus strigosus	4	FACU-	Nt SHRUB	RED RASPBERRY
RUBOCC	2	Rubus occidentalis	5	UPL	Nt SHRUB	BLACK RASPBERRY
RUDLAC	5	Rudbeckia laciniata	-4	FACW+	Nt P-FORB	WILD GOLDEN GLOW
RUDSUB	9	Rudbeckia subtomentosa	2	FACU+	Nt P-FORB	SWEET BLACK-EYED SUSAN
RUDTRI	3	Rudbeckia triloba	1	FAC-	Nt A-FORB	BROWN-EYED SUSAN
SAMCAN	1	Sambucus canadensis	-2	FACW-	Nt SHRUB	ELDERBERRY
SANGRE	2	Sanicula gregaria	-1	FAC+	Nt P-FORB	CLUSTERED BLACK SNAKEROOT
SCRMAR	4	Scrophularia marilandica	4	FACU-	Nt P-FORB	LATE FIGWORT
SETFAB	*	SETARIA FABERI	2	FACU+	Ad A-GRASS	GIANT FOXTAIL
SETVIV	*	SETARIA VIRIDIS	1	[FAC-]	Ad A-GRASS	GREEN FOXTAIL
SILPER	5	Silphium perfoliatum	-2	FACW-	Nt P-FORB	CUP PLANT
SMIECI	5	Smilax ecirrhata	5	UPL	Nt P-FORB	UPRIGHT CARRION FLOWER
SMILAS	5	Smilax lasioneura	5	[UPL]	Nt H-VINE	COMMON CARRION FLOWER
SOLCAN	1	Solidago canadensis	3	FACU	Nt P-FORB	CANADA GOLDENROD
SOLDUL	*	SOLANUM DULCAMARA	0	FAC	Ad W-VINE	BITTERSWEET NIGHTSHADE
SOLGIG	4	Solidago gigantea	-3	FACW	Nt P-FORB	LATE GOLDENROD
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
STATEH	5	Stachys tenuifolia hispida	-4	FACW+	Nt P-FORB	MARSH HEDGE NETTLE
TAROFF	*	TARAXACUM OFFICINALE	3	FACU	Ad P-FORB	COMMON DANDELION
TILAME	5	Tilia americana	3	FACU	Nt TREE	AMERICAN LINDEN
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
TRIPER	5	Triosteum perfoliatum	5	UPL	Nt P-FORB	LATE HORSE GENTIAN
TRIREP	*	TRIFOLIUM REPENS	2	FACU+	Ad P-FORB	WHITE CLOVER
ULMAME	3	Ulmus americana	-2	FACW-	Nt TREE	AMERICAN ELM
ULMRUB	4	Ulmus rubra	0	FAC	Nt TREE	SLIPPERY ELM
URTDIO	*	URTICA DIOICA	-1	FAC+	Ad P-FORB	STINGING NETTLE
VERTHA	*	VERBASCUM THAPSUS	5	UPL	Ad B-FORB	COMMON MULLEIN
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN
VERVIR	7	Veronicastrum virginicum	0	FAC	Nt P-FORB	CULVER'S ROOT
VIBOPU	*	VIBURNUM OPULUS	3	[FACU]	Ad SHRUB	EUROPEAN HIGHBUSH CRANBERRY
VIOCAN	9	Viola canadensis	5	UPL	Nt P-FORB	CANADA VIOLET
VIOSOR	3	Viola sororia	1	FAC-	Nt P-FORB	COMMON BLUE VIOLET
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

Table II-4. 1999 Floristic Inventory Results.

Common and scientific names of plants found at the Lake View Conservancy (AES 1999). Nt=native, Ad=adventive (introduced), B=biennial, P=perennial, A=annual, H=herbaceous (non-woody plants), W=woody, FORB=broad-leaved herbaceous plants other than grasses on grass-like plants, CRYPTOGAM=plants not producing seeds, such as ferns and mosses. Scientific names in caps also identify adventive or non-native species, some of which are invasive and may require special management attention.

Lake View Woods, Madison, WI
Total Species List
Summer 1999
AES, Inc.

FLORISTIC QUALITY DATA			NATIVE		ADVENTIVE	
103	Native Species	18	Tree	12.7%	3	Tree 2.1%
142	Total Species	10	Shrub	7.0%	6	Shrub 4.2%
4.06	Native Mean C	7	W-Vine	4.9%	2	W-Vine 1.4%
2.94	w/Adventives	2	H-Vine	1.4%	0	H-Vine 0.0%
41.19	Native FQI	38	P-Forb	26.8%	14	P-Forb 9.9%
35.08	w/Adventives	2	B-Forb	1.4%	4	B-Forb 2.8%
1.62	Native W	13	A-Forb	9.2%	6	A-Forb 4.2%
1.96	w/Adventives	2	P-Grass	1.4%	4	P-Grass 2.8%
		0	A-Grass	0.0%	0	A-Grass 0.0%
		7	P-Sedge	4.9%	0	P-Sedge 0.0%
		0	A-Sedge	0.0%	0	A-Sedge 0.0%
		4	Cryptogam	2.8%		

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACARHO	0	Acalypha rhomboidea	3	FACU	Nt A-FORB	THREE-SEEDED MERCURY
ACENEG	0	Acer negundo	-2	FACW-	Nt TREE	BOX ELDER
ACTRUB	10	Actaea rubra	3	[FACU]	Nt P-FORB	RED BANEBERRY
AGANEP	5	Agastache nepetoides	3	FACU	Nt P-FORB	YELLOW GIANT HYSSOP
AGRGRY	2	Agrimonia gryposepala	2	FACU+	Nt P-FORB	TALL AGRIMONY
AGRPER	3	Agrostis perennans	1	FAC-	Nt P-GRASS	THIN GRASS
ALLTRT	7	Allium tricoccum	3	FACU	Nt P-FORB	WILD LEEK
AMBARE	0	Ambrosia artemisiifolia elatior	3	FACU	Nt A-FORB	COMMON RAGWEED
AMPBRB	4	Amphicarpaea bracteata	0	FAC	Nt P-FORB	UPLAND HOG PEANUT
ANEQUI	7	Anemone quinquefolia	5	[UPL]	Nt P-FORB	WOOD ANEMONE
ARCLAP	*	ARCTIUM LAPPA	5	UPL	Ad B-FORB	GREAT BURDOCK
ARCMIN	*	ARCTIUM MINUS	5	UPL	Ad B-FORB	COMMON BURDOCK
ARITRI	4	Arisaema triphyllum	-2	FACW-	Nt P-FORB	JACK-IN-THE-PULPIT
ASCEXA	9	Asclepias exaltata	5	UPL	Nt P-FORB	POKE MILKWEED
ASTLAE	9	Aster laevis	5	UPL	Nt P-FORB	SMOOTH BLUE ASTER
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
ASTPUP	8	Aster puniceus	-5	OBL	Nt P-FORB	BRISTLY ASTER
ATHFIM	8	Athyrium filix-femina michauxii	0	FAC	CRYPTOGAM	LADY FERN
BERTHU	*	BERBERIS THUNBERGII	4	FACU-	Ad SHRUB	JAPANESE BARBERRY
BIDFRO	1	Bidens frondosa	-3	FACW	Nt A-FORB	COMMON BEGGAR'S TICKS
CAMAME	3	Campanula americana	0	FAC	Nt A-FORB	TALL BELLFLOWER
CARCOR	7	Carya cordiformis	3	[FACU]	Nt TREE	BITTERNUT HICKORY
CAROVT	5	Carya ovata	3	FACU	Nt TREE	SHAGBARK HICKORY
CAUTHA	8	Caulophyllum thalictroides	5	UPL	Nt P-FORB	BLUE COHOSH
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CELORB	*	CELASTRUS ORBICULATUS	5	UPL	Ad W-VINE	ORIENTAL BITTERSWEET
CHEALB	*	CHENOPODIUM ALBUM	1	FAC-	Ad A-FORB	LAMB'S QUARTERS
CHEMUR	*	CHENOPODIUM MURALE	5	UPL	Ad A-FORB	NETTLE-LEAVED GOOSEFOOT
CIRARV	*	CIRSIUM ARVENSE	5	UPL	Ad P-FORB	FIELD THISTLE
CIRLUC	1	Circaea lutetiana canadensis	3	FACU	Nt P-FORB	ENCHANTER'S NIGHTSHADE
CIRVUL	*	CIRSIUM VULGARE	4	FACU-	Ad B-FORB	BULL THISTLE

COMCOM	*	COMMELINA COMMUNIS	0	FAC	Ad A-FORB	COMMON DAY FLOWER
CONSEP	1	Convolvulus sepium	0	FAC	Nt P-FORB	HEDGE BINDWEED
CORALT	9	Cornus alternifolia	1	[FAC-]	Nt TREE	PAGODA DOGWOOD
CORRAC	1	Cornus racemosa	-2	FACW-	Nt SHRUB	GRAY DOGWOOD
CRAMOL	2	Crataegus mollis	4	FACU-	Nt TREE	DOWNY HAWTHORN
CXBLAN	1	Carex blanda	0	FAC	Nt P-SEDGE	COMMON WOOD SEDGE
CXCEPP	3	Carex cephalophora	3	FACU	Nt P-SEDGE	SHORT-HEADED BRACTED SEDGE
CXGRAL	10	Carex gracillima	2	FACU+	Nt P-SEDGE	PURPLE-SHEATHED GRACEFUL SEDG
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
CXROSE	4	Carex rosea	5	UPL	Nt P-SEDGE	CURLY-STYLED WOOD SEDGE
CXSPAR	3	Carex sparganioides	0	FAC	Nt P-SEDGE	LOOSE-HEADED BRACTED SEDGE
CXTENE	8	Carex tenera	1	[FAC-]	Nt P-SEDGE	NARROW-LEAVED OVAL SEDGE
DACGLO	*	DACTYLIS GLOMERATA	3	FACU	Ad P-GRASS	ORCHARD GRASS
DENLAC	5	Dentaria laciniata	3	FACU	Nt P-FORB	TOOTHWORT
DIOVIL	7	Dioscorea villosa	1	FAC-	Nt H-VINE	WILD YAM
DRYSPI	8	Dryopteris spinulosa	-2	FACW-	CRYPTOGAM	SPINULOSE SHIELD FERN
EPICOL	3	Epilobium coloratum	-5	OBL	Nt P-FORB	CINNAMON WILLOW HERB
EPIHEL	*	EPIPACTIS HELLEBORINE	5	UPL	Ad P-FORB	HELLEBORINE ORCHID
ERIANS	0	Erigeron annuus	1	FAC-	Nt B-FORB	ANNUAL FLEABANE
ERIPUL	10	Erigeron pulchellus	3	FACU	Nt P-FORB	ROBIN'S PLANTAIN
ERYALB	5	Erythronium albidum	5	UPL	Nt P-FORB	WHITE TROUT LILY
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
FRAPEP	5	Fraxinus pennsylvanica	-3	FACW	Nt TREE	RED ASH
GALAPA	1	Galium aparine	3	FACU	Nt A-FORB	ANNUAL BEDSTRAW
GALCIH	7	Galium circaezans hypomalacum	5	[UPL]	Nt P-FORB	HAIRY WILD LICORICE
GERMAC	4	Geranium maculatum	5	[UPL]	Nt P-FORB	WILD GERANIUM
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
GLEHED	*	GLECHOMA HEDERACEA	3	FACU	Ad P-FORB	CREEPING CHARLIE
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
HEMFUL	*	HEMEROCALLIS FULVA	5	UPL	Ad P-FORB	ORANGE DAY LILY
HYPPER	*	HYPERICUM PERFORATUM	5	UPL	Ad P-FORB	COMMON ST. JOHN'S WORT
IMPCAP	3	Impatiens capensis	-3	FACW	Nt A-FORB	ORANGE JEWELWEED
JUGCIN	8	Juglans cinerea	2	FACU+	Nt TREE	BUTTERNUT
JUNTEN	0	Juncus tenuis	2	[FACU+]	Nt P-FORB	PATH RUSH
LAMAMP	*	LAMIUM AMPLEXICAULE	5	UPL	Ad A-FORB	HENBIT
LEOCAR	*	LEONURUS CARDIACA	5	UPL	Ad P-FORB	MOTHERWORT
LEPCAM	*	LEPIDIUM CAMPESTRE	5	UPL	Ad B-FORB	FIELD CRESS
LEPVIR	0	Lepidium virginicum	4	FACU-	Nt A-FORB	COMMON PEPPERCRESS
LIGVUL	*	LIGUSTRUM VULGARE	1	FAC-	Ad SHRUB	COMMON PRIVET
LONPRO	7	Lonicera prolifera	5	UPL	Nt W-VINE	YELLOW HONEYSUCKLE
LONTAT	*	LONICERA TATARICA	5	[UPL]	Ad SHRUB	TARTARIAN HONEYSUCKLE
MATSTR	10	Matteuccia struthiopteris	-3	FACW	CRYPTOGAM	OSTRICH FERN
MENCAN	6	Menispermum canadense	-1	FAC+	Nt W-VINE	MOONSEED
MENCAR	*	MENTHA X CARDIACA	-5	OBL	Ad P-FORB	LITTLE-LEAVED MINT
MORALB	*	MORUS ALBA	0	FAC	Ad TREE	WHITE MULBERRY
MUHRAC	*	MUHLENBERGIA RACEMOSA	5	[UPL]	Ad P-GRASS	UPLAND WILD TIMOTHY
NARPSE	*	NARCISSUS PSEUDONARCISSUS	5	UPL	Ad P-FORB	DAFFODIL
NEPCAT	*	NEPETA CATARIA	1	FAC-	Ad P-FORB	CATNIP
OSMCLO	3	Osmorhiza claytonii	4	FACU-	Nt P-FORB	HAIRY SWEET CICELY
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
PARINS	1	Parthenocissus inserta	3	FACU	Nt W-VINE	THICKET CREEPER
PARQUI	2	Parthenocissus quinquefolia	1	FAC-	Nt W-VINE	VIRGINIA CREEPER
PHAARU	*	PHALARIS ARUNDINACEA	-4	FACW+	Ad P-GRASS	REED CANARY GRASS
PHRLEP	4	Phryma leptostachya	5	UPL	Nt P-FORB	LOPSEED
PILPUM	5	Pilea pumila	-3	FACW	Nt A-FORB	CLEARWEED
PINSYL	*	PINUS SYLVESTRIS	5	UPL	Ad TREE	SCOTCH PINE
PLAMAJ	*	PLANTAGO MAJOR	-1	FAC+	Ad P-FORB	COMMON PLANTAIN
PLARUG	0	Plantago rugelii	0	FAC	Nt A-FORB	RED-STALKED PLANTAIN
POAPRA	*	POA PRATENSIS	1	FAC-	Ad P-GRASS	KENTUCKY BLUE GRASS
PODPEL	4	Podophyllum peltatum	3	FACU	Nt P-FORB	MAY APPLE
POLPEN	0	Polygonum pensylvanicum	-4	FACW+	Nt A-FORB	PINKWEED
POLPVI	9	Polypodium virginianum	5	UPL	CRYPTOGAM	POLYPODY
POPDEL	2	Populus deltoides	-1	FAC+	Nt TREE	EASTERN COTTONWOOD
POPGRA	6	Populus grandidentata	3	FACU	Nt TREE	LARGE-TOOTHED ASPEN
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY

PRUVIR	3	Prunus virginiana	3	[FACU]	Nt SHRUB	CHOKE CHERRY
PRUVUV	*	PRUNELLA VULGARIS	5	[UPL]	Ad P-FORB	LAWN PRUNELLA
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RANABO	0	Ranunculus abortivus	-2	FACW-	Nt A-FORB	SMALL-FLOWERED BUTTERCUP
RANREC	5	Ranunculus recurvatus	-3	FACW	Nt A-FORB	HOOKED BUTTERCUP
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RHURAD	2	Rhus radicans	-1	FAC+	Nt W-VINE	POISON IVY
RHUTYP	1	Rhus typhina	5	UPL	Nt TREE	STAGHORN SUMAC
RIBAME	7	Ribes americanum	-3	FACW	Nt SHRUB	WILD BLACK CURRANT
RIBMIS	5	Ribes missouriense	5	UPL	Nt SHRUB	WILD GOOSEBERRY
ROBPSE	*	ROBINIA PSEUDOACACIA	4	FACU-	Ad TREE	BLACK LOCUST
ROSMUL	*	ROSA MULTIFLORA	3	FACU	Ad SHRUB	MULTIFLORA ROSE
RUBALL	3	Rubus allegheniensis	2	FACU+	Nt SHRUB	COMMON BLACKBERRY
RUBIDS	3	Rubus idaeus strigosus	4	FACU-	Nt SHRUB	RED RASPBERRY
RUBOCC	2	Rubus occidentalis	5	UPL	Nt SHRUB	BLACK RASPBERRY
RUMCRI	*	RUMEX CRISPUS	-1	FAC+	Ad P-FORB	CURLY DOCK
SAMCAN	1	Sambucus canadensis	-2	FACW-	Nt SHRUB	ELDERBERRY
SCRMAR	4	Scrophularia marilandica	4	FACU-	Nt P-FORB	LATE FIGWORT
SMIECI	5	Smilax ecirrhata	5	UPL	Nt P-FORB	UPRIGHT CARRION FLOWER
SMILAS	5	Smilax lasioneura	5	[UPL]	Nt H-VINE	COMMON CARRION FLOWER
SMIRAC	3	Smilacina racemosa	3	FACU	Nt P-FORB	FEATHERY FALSE SOLOMON'S SEAL
SMISTE	5	Smilacina stellata	1	FAC-	Nt P-FORB	STARRY FALSE SOLOMON'S SEAL
SMITAH	5	Smilax tamnoides hispida	5	UPL	Nt W-VINE	BRISTLY CAT BRIER
SOLCAN	1	Solidago canadensis	3	FACU	Nt P-FORB	CANADA GOLDENROD
SOLDUL	*	SOLANUM DULCAMARA	0	FAC	Ad W-VINE	BITTERSWEET NIGHTSHADE
SOLGIG	4	Solidago gigantea	-3	FACW	Nt P-FORB	LATE GOLDENROD
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
SPHINT	4	Sphenopholis intermedia	0	FAC	Nt P-GRASS	SLENDER WEDGE GRASS
STEMED	*	STELLARIA MEDIA	3	FACU	Ad A-FORB	COMMON CHICKWEED
TAROFF	*	TARAXACUM OFFICINALE	3	FACU	Ad P-FORB	COMMON DANDELION
TILAME	5	Tilia americana	3	FACU	Nt TREE	AMERICAN LINDEN
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
TRIHYB	*	TRIFOLIUM HYBRIDUM	1	FAC-	Ad P-FORB	ALSIKE CLOVER
TRIPER	5	Triosteum perfoliatum	5	UPL	Nt P-FORB	LATE HORSE GENTIAN
ULMAME	3	Ulmus americana	-2	FACW-	Nt TREE	AMERICAN ELM
ULMRUB	4	Ulmus rubra	0	FAC	Nt TREE	SLIPPERY ELM
URTPRO	2	Urtica procera	-1	FAC+	Nt P-FORB	TALL NETTLE
VERPEE	0	Veronica peregrina	5	UPL	Nt A-FORB	PURSLANE SPEEDWELL
VIBLEN	5	Viburnum lentago	-1	FAC+	Nt SHRUB	NANNYBERRY
VIBOPU	*	VIBURNUM OPULUS	3	[FACU]	Ad SHRUB	EUROPEAN HIGHBUSH CRANBERRY
VIBPRU	5	Viburnum prunifolium	3	FACU	Nt SHRUB	BLACK HAW
VIOPUB	5	Viola pubescens	4	FACU-	Nt P-FORB	YELLOW VIOLET
VIOSOR	3	Viola sororia	1	FAC-	Nt P-FORB	COMMON BLUE VIOLET
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

Table Set II-5. 2013 Floristic Inventory Results from Representative Communities & Sites (see Figure II-1 and Table II-2).

SITE Lake View Hill Park
LOCALE D1
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA			NATIVE			ADVENTIVE	
59	Native Species	11	Tree	17.5%	0	Tree	0.0%
63	Total Species	3	Shrub	4.8%	1	Shrub	1.6%
4.32	Native Mean C	5	W-Vine	7.9%	1	W-Vine	1.6%
4.05	w/Adventives	2	H-Vine	3.2%	0	H-Vine	0.0%
33.20	Native FQI	25	P-Forb	39.7%	0	P-Forb	0.0%
32.13	w/Adventives	1	B-Forb	1.6%	1	B-Forb	1.6%
1.93	Native W	5	A-Forb	7.9%	1	A-Forb	1.6%
2.02	w/Adventives	5	P-Grass	7.9%	0	P-Grass	0.0%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		2	P-Sedge	3.2%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		0	Cryptogam	0.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACARHO	0	Acalypha rhomboidea	3	FACU	Nt A-FORB	THREE-SEEDED MERCURY
ACENIG	5	Acer nigrum	5	UPL	Nt TREE	BLACK MAPLE
ACESAU	3	Acer saccharum	3	FACU	Nt TREE	SUGAR MAPLE
AGANEP	5	Agastache nepetoides	3	FACU	Nt P-FORB	YELLOW GIANT HYSSOP
AGRGRY	2	Agrimonia gryposepala	4	FACU+	Nt P-FORB	TALL AGRIMONY
AGRPUB	5	Agrimonia pubescens	5	UPL	Nt P-FORB	SOFT AGRIMONY
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
AQUCAN	6	Aquilegia canadensis	1	FAC-	Nt P-FORB	WILD COLUMBINE
ARITRI	4	Arisaema triphyllum	-2	FACW-	Nt P-FORB	JACK-IN-THE-PULPIT
ASCEXA	9	Asclepias exaltata	5	UPL	Nt P-FORB	POKE MILKWEED
ASTAZU	8	Aster azureus	5	UPL	Nt P-FORB	SKY-BLUE ASTER
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
BIDFRO	1	Bidens frondosa	-3	FACW	Nt A-FORB	COMMON BEGGAR'S TICKS
BROPUB	5	Bromus pubescens	4	FACU+	Nt P-GRASS	WOODLAND BROME
CACATR	8	Cacalia atriplicifolia	5	UPL	Nt P-FORB	PALE INDIAN PLANTAIN
CARCOR	7	Carya cordiformis	3	[FACU]	Nt TREE	BITTERNUT HICKORY
CAROVT	5	Carya ovata	3	FACU	Nt TREE	SHAGBARK HICKORY
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CELORB	*	CELASTRUS ORBICULATUS	5	UPL	Ad W-VINE	ORIENTAL BITTERSWEET
CIRLUC	1	Circaea lutetiana canadensis	3	FACU	Nt P-FORB	ENCHANTER'S NIGHTSHADE
CORRAC	1	Cornus racemosa	-2	FACW-	Nt SHRUB	GRAY DOGWOOD
CXCEPP	3	Carex cephalophora	3	FACU	Nt P-SEDGE	SHORT-HEADED BRACTED SEDGE
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
DIOVIL	7	Dioscorea villosa	1	FAC-	Nt H-VINE	WILD YAM
ELYVIL	5	Elymus villosus	3	FACU	Nt P-GRASS	SILKY WILD RYE
ELYVIR	4	Elymus virginicus	-2	FACW-	Nt P-GRASS	VIRGINIA WILD RYE
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GALCIH	7	Galium circaezans hypomalacum	5	[UPL]	Nt P-FORB	HAIRY WILD LICORICE
GERMAC	4	Geranium maculatum	5	[UPL]	Nt P-FORB	WILD GERANIUM
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
HELSTR	5	Helianthus strumosus	5	UPL	Nt P-FORB	PALE-LEAVED SUNFLOWER
HYSPAT	5	Hystrix patula	5	UPL	Nt P-GRASS	BOTTLEBRUSH GRASS
IMPCAP	3	Impatiens capensis	-3	FACW	Nt A-FORB	ORANGE JEWELWEED
LONPRO	7	Lonicera prolifera	5	UPL	Nt W-VINE	YELLOW HONEYSUCKLE
MENCAN	6	Menispermum canadense	-1	FAC+	Nt W-VINE	MOONSEED
MUHMEX	5	Muhlenbergia mexicana	-3	FACW	Nt P-GRASS	LEAFY SATIN GRASS
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
PARQUI	2	Parthenocissus quinquefolia	1	FAC-	Nt W-VINE	VIRGINIA CREEPER
PILPUM	5	Pilea pumila	-3	FACW	Nt A-FORB	CLEARWEED

POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RHURAD	2	Rhus radicans	-1	FAC+	Nt W-VINE	POISON IVY
RUBALL	3	Rubus allegheniensis	4	FACU+	Nt SHRUB	COMMON BLACKBERRY
RUBIDS	3	Rubus idaeus strigosus	2	FACU-	Nt SHRUB	RED RASPBERRY
RUDSUB	9	Rudbeckia subtomentosa	4	FACU+	Nt P-FORB	SWEET BLACK-EYED SUSAN
RUDTRI	3	Rudbeckia triloba	1	FAC-	Nt A-FORB	BROWN-EYED SUSAN
SILPER	5	Silphium perfoliatum	-2	FACW-	Nt P-FORB	CUP PLANT
SMILAS	5	Smilax lasioneura	5	[UPL]	Nt H-VINE	COMMON CARRION FLOWER
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
TRIPER	5	Triosteum perfoliatum	5	UPL	Nt P-FORB	LATE HORSE GENTIAN
ULMAME	3	Ulmus americana	-2	FACW-	Nt TREE	AMERICAN ELM
ULMRUB	4	Ulmus rubra	0	FAC	Nt TREE	SLIPPERY ELM
VERVIR	7	Veronicastrum virginicum	0	FAC	Nt P-FORB	CULVER'S ROOT
VIOCAN	9	Viola canadensis	5	UPL	Nt P-FORB	CANADA VIOLET
VIOSOR	3	Viola sororia	1	FAC-	Nt P-FORB	COMMON BLUE VIOLET
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		2	P-Sedge	3.2%	0	P-Sedge	0.0%
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GALCIH	7	Galium circaezans hypomalacum	5	[UPL]	Nt P-FORB	HAIRY WILD LICORICE
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POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
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QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RHURAD	2	Rhus radicans	-1	FAC+	Nt W-VINE	POISON IVY
RUBALL	3	Rubus allegheniensis	4	FACU+	Nt SHRUB	COMMON BLACKBERRY
RUBIDS	3	Rubus idaeus strigosus	2	FACU-	Nt SHRUB	RED RASPBERRY
RUDSUB	9	Rudbeckia subtomentosa	4	FACU+	Nt P-FORB	SWEET BLACK-EYED SUSAN
RUDTRI	3	Rudbeckia triloba	1	FAC-	Nt A-FORB	BROWN-EYED SUSAN
SILPER	5	Silphium perfoliatum	-2	FACW-	Nt P-FORB	CUP PLANT
SMILAS	5	Smilax lasioneura	5	[UPL]	Nt H-VINE	COMMON CARRION FLOWER
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
TRIPER	5	Triosteum perfoliatum	5	UPL	Nt P-FORB	LATE HORSE GENTIAN
ULMAME	3	Ulmus americana	-2	FACW-	Nt TREE	AMERICAN ELM
ULMRUB	4	Ulmus rubra	0	FAC	Nt TREE	SLIPPERY ELM
VERVIR	7	Veronicastrum virginicum	0	FAC	Nt P-FORB	CULVER'S ROOT
VIOCAN	9	Viola canadensis	5	UPL	Nt P-FORB	CANADA VIOLET
VIOSOR	3	Viola sororia	1	FAC-	Nt P-FORB	COMMON BLUE VIOLET
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE D3
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA				NATIVE	93.5%		ADVENTIVE	6.5%
29	Native Species	6	Tree	19.4%	0	Tree	0.0%	
31	Total Species	1	Shrub	3.2%	1	Shrub	3.2%	
3.72	Native Mean C	1	W-Vine	3.2%	0	W-Vine	0.0%	
3.48	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%	
20.06	Native FQI	14	P-Forb	45.2%	1	P-Forb	3.2%	
19.40	w/Adventives	1	B-Forb	3.2%	0	B-Forb	0.0%	
2.17	Native W	0	A-Forb	0.0%	0	A-Forb	0.0%	
2.29	w/Adventives	4	P-Grass	12.9%	0	P-Grass	0.0%	
		0	A-Grass	0.0%	0	A-Grass	0.0%	
		2	P-Sedge	6.5%	0	P-Sedge	0.0%	
		0	A-Sedge	0.0%	0	A-Sedge	0.0%	
		0	Cryptogam	0.0%				

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACENEG	0	Acer negundo	-2	FACW-	Nt TREE	BOX ELDER
AGRGRY	2	Agrimonia gryposepala	4	FACU+	Nt P-FORB	TALL AGRIMONY

ARITRI	4	Arisaema triphyllum	-2	FACW-	Nt P-FORB	JACK-IN-THE-PULPIT
BROPUB	5	Bromus pubescens	4	FACU+	Nt P-GRASS	WOODLAND BROME
CACATR	8	Cacalia atriplicifolia	5	UPL	Nt P-FORB	PALE INDIAN PLANTAIN
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CIRARV	*	CIRSIUM ARVENSE	5	UPL	Ad P-FORB	FIELD THISTLE
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
CXROSE	4	Carex rosea	5	UPL	Nt P-SEDGE	CURLY-STYLED WOOD SEDGE
ELYVIL	5	Elymus villosus	3	FACU	Nt P-GRASS	SILKY WILD RYE
ELYVIR	4	Elymus virginicus	-2	FACW-	Nt P-GRASS	VIRGINIA WILD RYE
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GALTRF	5	Galium triflorum	4	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
HELSTR	5	Helianthus strumosus	5	UPL	Nt P-FORB	PALE-LEAVED SUNFLOWER
HYPPYR	10	Hypericum pyramidatum	-1	FAC+	Nt P-FORB	GREAT ST. JOHN'S WORT
HYSPAT	5	Hystrix patula	5	UPL	Nt P-GRASS	BOTTLEBRUSH GRASS
JUNTEN	0	Juncus tenuis	4	[FACU+]	Nt P-FORB	PATH RUSH
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RUBALL	3	Rubus allegheniensis	4	FACU+	Nt SHRUB	COMMON BLACKBERRY
SOLCAN	1	Solidago canadensis	3	FACU	Nt P-FORB	CANADA GOLDENROD
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE D4
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA				NATIVE	79.2%		ADVENTIVE	20.8%
19	Native Species	6	Tree	25.0%	0	Tree	0.0%	
24	Total Species	1	Shrub	4.2%	1	Shrub	4.2%	
3.53	Native Mean C	0	W-Vine	0.0%	0	W-Vine	0.0%	
2.79	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%	
15.37	Native FQI	8	P-Forb	33.3%	0	P-Forb	0.0%	
13.68	w/Adventives	1	B-Forb	4.2%	2	B-Forb	8.3%	
3.11	Native W	0	A-Forb	0.0%	2	A-Forb	8.3%	
3.13	w/Adventives	1	P-Grass	4.2%	0	P-Grass	0.0%	
		0	A-Grass	0.0%	0	A-Grass	0.0%	
		2	P-Sedge	8.3%	0	P-Sedge	0.0%	
		0	A-Sedge	0.0%	0	A-Sedge	0.0%	
		0	Cryptogam	0.0%				

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
ARCMIN	*	ARCTIUM MINUS	5	UPL	Ad B-FORB	COMMON BURDOCK
CAROVT	5	Carya ovata	3	FACU	Nt TREE	SHAGBARK HICKORY
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
CXROSE	4	Carex rosea	5	UPL	Nt P-SEDGE	CURLY-STYLED WOOD SEDGE
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
HYSPAT	5	Hystrix patula	5	UPL	Nt P-GRASS	BOTTLEBRUSH GRASS
LONTAT	*	LONICERA TATARICA	5	[UPL]	Ad SHRUB	TARTARIAN HONEYSUCKLE
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
POLGVI	2	Polygonum virginianum	0	[FAC-]	Ad A-FORB	LADY'S THUMB

POLPER	*	POLYGONUM PERSICARIA	1	FAC	Nt P-FORB	WOODLAND KNOTWEED
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
RUBOCC	2	Rubus occidentalis	5	UPL	Nt SHRUB	BLACK RASPBERRY
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
TRIPER	5	Triosteum perfoliatum	5	UPL	Nt P-FORB	LATE HORSE GENTIAN
ULMAME	3	Ulmus americana	-2	FACW-	Nt TREE	AMERICAN ELM
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN

SITE Lake View Hill Park
LOCALE DM1
DATE 11/3/2013
BY Apfelbaum

FLORISTIC QUALITY DATA			NATIVE		ADVENTIVE	
57	Native Species	11	Tree	17.7%	0	Tree	0.0%
62	Total Species	4	Shrub	6.5%	1	Shrub	1.6%
4.18	Native Mean C	3	W-Vine	4.8%	2	W-Vine	3.2%
3.84	w/Adventives	1	H-Vine	1.6%	0	H-Vine	0.0%
31.52	Native FQI	27	P-Forb	43.5%	0	P-Forb	0.0%
30.23	w/Adventives	2	B-Forb	3.2%	1	B-Forb	1.6%
2.12	Native W	2	A-Forb	3.2%	1	A-Forb	1.6%
2.16	w/Adventives	4	P-Grass	6.5%	0	P-Grass	0.0%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		3	P-Sedge	4.8%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		0	Cryptogam	0.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACENEG	0	Acer negundo	-2	FACW-	Nt TREE	BOX ELDER
AGANEP	5	Agastache nepetoides	3	FACU	Nt P-FORB	YELLOW GIANT HYSSOP
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
ARITRI	4	Arisaema triphyllum	-2	FACW-	Nt P-FORB	JACK-IN-THE-PULPIT
ASTAZU	8	Aster azureus	5	UPL	Nt P-FORB	SKY-BLUE ASTER
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
BROPUB	5	Bromus pubescens	4	FACU+	Nt P-GRASS	WOODLAND BROME
CAMAME	3	Campanula americana	0	FAC	Nt A-FORB	TALL BELLFLOWER
CARCOR	7	Carya cordiformis	3	[FACU]	Nt TREE	BITTERNUT HICKORY
CAROVT	5	Carya ovata	3	FACU	Nt TREE	SHAGBARK HICKORY
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CELORB	*	CELASTRUS ORBICULATUS	5	UPL	Ad W-VINE	ORIENTAL BITTERSWEET
CIRLUC	1	Circaea lutetiana canadensis	3	FACU	Nt P-FORB	ENCHANTER'S NIGHTSHADE
CORRAC	1	Cornus racemosa	-2	FACW-	Nt SHRUB	GRAY DOGWOOD
CXHIRT	5	Carex hirtifolia	5	UPL	Nt P-SEDGE	HAIRY WOOD SEDGE
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
CXROSE	4	Carex rosea	5	UPL	Nt P-SEDGE	CURLY-STYLED WOOD SEDGE
DIOVIL	7	Dioscorea villosa	1	FAC-	Nt H-VINE	WILD YAM
ELYVIL	5	Elymus villosus	3	FACU	Nt P-GRASS	SILKY WILD RYE
ELYVIR	4	Elymus virginicus	-2	FACW-	Nt P-GRASS	VIRGINIA WILD RYE
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
FRAPES	1	Fraxinus pennsylvanica subintegerrima	0	FAC	Nt TREE	GREEN ASH
GALCIH	7	Galium circaezans hypomalacum	5	[UPL]	Nt P-FORB	HAIRY WILD LICORICE
GALTRF	5	Galium triflorum	4	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
GERMAC	4	Geranium maculatum	5	[UPL]	Nt P-FORB	WILD GERANIUM
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
HELSTR	5	Helianthus strumosus	5	UPL	Nt P-FORB	PALE-LEAVED SUNFLOWER
HYPPYR	10	Hypericum pyramidatum	-1	FAC+	Nt P-FORB	GREAT ST. JOHN'S WORT
HYSPAT	5	Hystrix patula	5	UPL	Nt P-GRASS	BOTTLEBRUSH GRASS
LACFLO	5	Lactuca floridana	1	FAC-	Nt B-FORB	BLUE LETTUCE
LONPRO	7	Lonicera prolifera	5	UPL	Nt W-VINE	YELLOW HONEYSUCKLE
MENCAN	6	Menispermum canadense	-1	FAC+	Nt W-VINE	MOONSEED

MONFIS	4	Monarda fistulosa	3	FACU	Nt P-FORB	WILD BERGAMOT
OSMCLO	3	Osmorhiza claytonii	2	FACU-	Nt P-FORB	HAIRY SWEET CICELY
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
PENCAL	7	Penstemon calycosus	3	FACU	Nt P-FORB	SMOOTH BEARD TONGUE
PHRLEP	4	Phryma leptostachya	5	UPL	Nt P-FORB	LOPSEED
PILPUM	5	Pilea pumila	-3	FACW	Nt A-FORB	CLEARWEED
POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
PRUVIR	3	Prunus virginiana	3	[FACU]	Nt SHRUB	CHOKE CHERRY
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RUBALL	3	Rubus allegheniensis	4	FACU+	Nt SHRUB	COMMON BLACKBERRY
RUBIDS	3	Rubus idaeus strigosus	2	FACU-	Nt SHRUB	RED RASPBERRY
RUDSUB	9	Rudbeckia subtomentosa	4	FACU+	Nt P-FORB	SWEET BLACK-EYED SUSAN
SANGRE	2	Sanicula gregaria	-1	FAC+	Nt P-FORB	CLUSTERED BLACK SNAKEROOT
SCRMAR	4	Scrophularia marilandica	2	FACU-	Nt P-FORB	LATE FIGWORT
SMIECI	5	Smilax ecirrhata	5	UPL	Nt P-FORB	UPRIGHT CARRION FLOWER
SOLCAN	1	Solidago canadensis	3	FACU	Nt P-FORB	CANADA GOLDENROD
SOLDUL	*	SOLANUM DULCAMARA	0	FAC	Ad W-VINE	BITTERSWEET NIGHTSHADE
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
TRIPER	5	Triosteum perfoliatum	5	UPL	Nt P-FORB	LATE HORSE GENTIAN
ULMAME	3	Ulmus americana	-2	FACW-	Nt TREE	AMERICAN ELM
ULMRUB	4	Ulmus rubra	0	FAC	Nt TREE	SLIPPERY ELM
VIOSOR	3	Viola sororia	1	FAC-	Nt P-FORB	COMMON BLUE VIOLET
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE DM2
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA			NATIVE		ADVENTIVE	
42	Native Species	7	Tree	12.7%	1	Tree	1.8%
55	Total Species	2	Shrub	3.6%	3	Shrub	5.5%
4.19	Native Mean C	2	W-Vine	3.6%	2	W-Vine	3.6%
3.20	w/Adventives	2	H-Vine	3.6%	0	H-Vine	0.0%
27.16	Native FQI	22	P-Forb	40.0%	3	P-Forb	5.5%
23.73	w/Adventives	1	B-Forb	1.8%	2	B-Forb	3.6%
1.93	Native W	2	A-Forb	3.6%	1	A-Forb	1.8%
1.93	w/Adventives	1	P-Grass	1.8%	1	P-Grass	1.8%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		3	P-Sedge	5.5%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		0	Cryptogam	0.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACENEG	0	Acer negundo	-2	FACW-	Nt TREE	BOX ELDER
AGASCR	5	Agastache scrophulariaefolia	5	UPL	Nt P-FORB	PURPLE GIANT HYSSOP
AGRPUB	5	Agrimonia pubescens	5	UPL	Nt P-FORB	SOFT AGRIMONY
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
AMPBRB	4	Amphicarpaea bracteata	0	FAC	Nt P-FORB	UPLAND HOG PEANUT
ARCMIN	*	ARCTIUM MINUS	5	UPL	Ad B-FORB	COMMON BURDOCK
ASCEXA	9	Asclepias exaltata	5	UPL	Nt P-FORB	POKE MILKWEED
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
CACATR	8	Cacalia atriplicifolia	5	UPL	Nt P-FORB	PALE INDIAN PLANTAIN
CAMAME	3	Campanula americana	0	FAC	Nt A-FORB	TALL BELLFLOWER
CAROVT	5	Carya ovata	3	FACU	Nt TREE	SHAGBARK HICKORY
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CELORB	*	CELASTRUS ORBICULATUS	5	UPL	Ad W-VINE	ORIENTAL BITTERSWEET
CIRARV	*	CIRSIUM ARVENSE	5	UPL	Ad P-FORB	FIELD THISTLE
CIRLUC	1	Circaea lutetiana canadensis	3	FACU	Nt P-FORB	ENCHANTER'S NIGHTSHADE
CXBEBB	6	Carex bebbii	-5	OBL	Nt P-SEDGE	BEBB'S OVAL SEDGE
CXCEPP	3	Carex cephalophora	3	FACU	Nt P-SEDGE	SHORT-HEADED BRACTED SEDGE

CXHIRT	5	Carex hirtifolia	5	UPL	Nt P-SEDGE	HAIRY WOOD SEDGE
DIOVIL	7	Dioscorea villosa	1	FAC-	Nt H-VINE	WILD YAM
ELYVIR	4	Elymus virginicus	-2	FACW-	Nt P-GRASS	VIRGINIA WILD RYE
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GALTRF	5	Galium triflorum	4	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
GLEHED	*	GLECHOMA HEDERACEA	3	FACU	Ad P-FORB	CREEPING CHARLIE
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
HELSTR	5	Helianthus strumosus	5	UPL	Nt P-FORB	PALE-LEAVED SUNFLOWER
LIGVUL	*	LIGUSTRUM VULGARE	1	FAC-	Ad SHRUB	COMMON PRIVET
MENCAN	6	Menispermum canadense	-1	FAC+	Nt W-VINE	MOONSEED
MORALB	*	MORUS ALBA	0	FAC	Ad TREE	WHITE MULBERRY
PHAARU	*	PHALARIS ARUNDINACEA	-4	FACW+	Ad P-GRASS	REED CANARY GRASS
PHYHET	3	Physalis heterophylla	5	UPL	Nt P-FORB	CLAMMY GROUND CHERRY
POPGRA	6	Populus grandidentata	3	FACU	Nt TREE	LARGE-TOOTHED ASPEN
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RUBIDS	3	Rubus idaeus strigosus	2	FACU-	Nt SHRUB	RED RASPBERRY
RUDLAC	5	Rudbeckia laciniata	-4	FACW+	Nt P-FORB	WILD GOLDEN GLOW
RUDSUB	9	Rudbeckia subtomentosa	4	FACU+	Nt P-FORB	SWEET BLACK-EYED SUSAN
RUDTRI	3	Rudbeckia triloba	1	FAC-	Nt A-FORB	BROWN-EYED SUSAN
SAMCAN	1	Sambucus canadensis	-2	FACW-	Nt SHRUB	ELDERBERRY
SANGRE	2	Sanicula gregaria	-1	FAC+	Nt P-FORB	CLUSTERED BLACK SNAKEROOT
SCRMAR	4	Scrophularia marilandica	2	FACU-	Nt P-FORB	LATE FIGWORT
SMIECI	5	Smilax ecirrhata	5	UPL	Nt P-FORB	UPRIGHT CARRION FLOWER
SMILAS	5	Smilax lasioneura	5	[UPL]	Nt H-VINE	COMMON CARRION FLOWER
SOLCAN	1	Solidago canadensis	3	FACU	Nt P-FORB	CANADA GOLDENROD
SOLDUL	*	SOLANUM DULCAMARA	0	FAC	Ad W-VINE	BITTERSWEET NIGHTSHADE
SOLGIG	4	Solidago gigantea	-3	FACW	Nt P-FORB	LATE GOLDENROD
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
TRIPER	5	Triosteum perfoliatum	5	UPL	Nt P-FORB	LATE HORSE GENTIAN
URTDIO	*	URTICA DIOICA	-1	FAC+	Ad P-FORB	STINGING NETTLE
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN
VIBOPU	*	VIBURNUM OPULUS	3	[FACU]	Ad SHRUB	EUROPEAN HIGHBUSH CRANBERRY
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE DM3
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA				NATIVE		ADVENTIVE	
35	Native Species	5	Tree	10.2%	2	Tree	4.1%
49	Total Species	2	Shrub	4.1%	1	Shrub	2.0%
3.69	Native Mean C	1	W-Vine	2.0%	2	W-Vine	4.1%
2.63	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
21.80	Native FQI	16	P-Forb	32.7%	5	P-Forb	10.2%
18.43	w/Adventives	1	B-Forb	2.0%	1	B-Forb	2.0%
0.94	Native W	6	A-Forb	12.2%	3	A-Forb	6.1%
1.53	w/Adventives	3	P-Grass	6.1%	0	P-Grass	0.0%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		0	P-Sedge	0.0%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		1	Cryptogam	2.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACENEG	0	Acer negundo	-2	FACW-	Nt TREE	BOX ELDER
ARCMIN	*	ARCTIUM MINUS	5	UPL	Ad B-FORB	COMMON BURDOCK
ARITRI	4	Arisaema triphyllum	-2	FACW-	Nt P-FORB	JACK-IN-THE-PULPIT
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
BIDFRO	1	Bidens frondosa	-3	FACW	Nt A-FORB	COMMON BEGGAR'S TICKS
BROPUB	5	Bromus pubescens	4	FACU+	Nt P-GRASS	WOODLAND BROME

CACATR	8	Cacalia atriplicifolia	5	UPL	Nt P-FORB	PALE INDIAN PLANTAIN
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CELORB	*	CELASTRUS ORBICULATUS	5	UPL	Ad W-VINE	ORIENTAL BITTERSWEET
CHEMUR	*	CHENOPODIUM MURALE	5	UPL	Ad A-FORB	NETTLE-LEAVED GOOSEFOOT
CIRARV	*	CIRSIUM ARVENSE	5	UPL	Ad P-FORB	FIELD THISTLE
CIRLUC	1	Circaea lutetiana canadensis	3	FACU	Nt P-FORB	ENCHANTER'S NIGHTSHADE
CUSGRO	4	Cuscuta gronovii	-5	[OBL]	Nt A-FORB	COMMON DODDER
DRYSPI	8	Dryopteris spinulosa	-2	FACW-	CRYPTOGAM	SPINULOSE SHIELD FERN
ELYVIL	5	Elymus villosus	3	FACU	Nt P-GRASS	SILKY WILD RYE
ELYVIR	4	Elymus virginicus	-2	FACW-	Nt P-GRASS	VIRGINIA WILD RYE
EREHIE	2	Erechtites hieracifolia	3	FACU	Nt A-FORB	FIREWEED
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GALTRF	5	Galium triflorum	4	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
GLEHED	*	GLECHOMA HEDERACEA	3	FACU	Ad P-FORB	CREEPING CHARLIE
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
LEOCAR	*	LEONURUS CARDIACA	5	UPL	Ad P-FORB	MOTHERWORT
MALPUM	*	MALUS PUMILA	5	UPL	Ad TREE	APPLE
MORALB	*	MORUS ALBA	0	FAC	Ad TREE	WHITE MULBERRY
NEPCAT	*	NEPETA CATARIA	1	FAC-	Ad P-FORB	CATNIP
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
POLPEN	0	Polygonum pensylvanicum	-4	FACW+	Nt A-FORB	PINKWEED
POLPER	*	POLYGONUM PERSICARIA	1	[FAC-]	Ad A-FORB	LADY'S THUMB
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RUBALL	3	Rubus allegheniensis	4	FACU+	Nt SHRUB	COMMON BLACKBERRY
RUBOCC	2	Rubus occidentalis	5	UPL	Nt SHRUB	BLACK RASPBERRY
RUDSUB	9	Rudbeckia subtomentosa	4	FACU+	Nt P-FORB	SWEET BLACK-EYED SUSAN
RUDTRI	3	Rudbeckia triloba	1	FAC-	Nt A-FORB	BROWN-EYED SUSAN
SANGRE	2	Sanicula gregaria	-1	FAC+	Nt P-FORB	CLUSTERED BLACK SNAKEROOT
SOLAME	0	Solanum americanum	2	FACU-	Nt A-FORB	BLACK NIGHTSHADE
SOLDUL	*	SOLANUM DULCAMARA	0	FAC	Ad W-VINE	BITTERSWEET NIGHTSHADE
SOLGIG	4	Solidago gigantea	-3	FACW	Nt P-FORB	LATE GOLDENROD
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
STATEH	5	Stachys tenuifolia hispida	-4	FACW+	Nt P-FORB	MARSH HEDGE NETTLE
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
URTDIO	*	URTICA DIOICA	-1	FAC+	Ad P-FORB	STINGING NETTLE
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE DM4
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA				NATIVE		ADVENTIVE	
25	Native Species	6	Tree	20.7%	0	Tree	0.0%
29	Total Species	1	Shrub	3.4%	2	Shrub	6.9%
4.08	Native Mean C	2	W-Vine	6.9%	0	W-Vine	0.0%
3.52	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
20.40	Native FQI	12	P-Forb	41.4%	0	P-Forb	0.0%
18.94	w/Adventives	1	B-Forb	3.4%	1	B-Forb	3.4%
1.60	Native W	0	A-Forb	0.0%	1	A-Forb	3.4%
1.93	w/Adventives	2	P-Grass	6.9%	0	P-Grass	0.0%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		0	P-Sedge	0.0%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		1	Cryptogam	3.4%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
AQUCAN	6	Aquilegia canadensis	1	FAC-	Nt P-FORB	WILD COLUMBINE

ARCMIN	*	ARCTIUM MINUS	5	UPL	Ad B-FORB	COMMON BURDOCK
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CORALT	9	Cornus alternifolia	1	[FAC-]	Nt TREE	PAGODA DOGWOOD
CORRAC	1	Cornus racemosa	-2	FACW-	Nt SHRUB	GRAY DOGWOOD
DRYSPI	8	Dryopteris spinulosa	-2	FACW-	CRYPTOGAM	SPINULOSE SHIELD FERN
ELYVIL	5	Elymus villosus	3	FACU	Nt P-GRASS	SILKY WILD RYE
ELYVIR	4	Elymus virginicus	-2	FACW-	Nt P-GRASS	VIRGINIA WILD RYE
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GALTRF	5	Galium triflorum	4	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
GERMAC	4	Geranium maculatum	5	[UPL]	Nt P-FORB	WILD GERANIUM
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
MENCAN	6	Menispermum canadense	-1	FAC+	Nt W-VINE	MOONSEED
POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
SANGRE	2	Sanicula gregaria	-1	FAC+	Nt P-FORB	CLUSTERED BLACK SNAKEROOT
SCRMAR	4	Scrophularia marilandica	2	FACU-	Nt P-FORB	LATE FIGWORT
SMIECI	5	Smilax ecirrhata	5	UPL	Nt P-FORB	UPRIGHT CARRION FLOWER
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
TILAME	5	Tilia americana	3	FACU	Nt TREE	AMERICAN LINDEN
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
ULMAME	3	Ulmus americana	-2	FACW-	Nt TREE	AMERICAN ELM
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN
VIBOPU	*	VIBURNUM OPULUS	3	[FACU]	Ad SHRUB	EUROPEAN HIGHBUSH CRANBERRY
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE DM5
DATE 11/3/2013
BY Apfelbaum

FLORISTIC QUALITY DATA							
		NATIVE	74.1%		ADVENTIVE	25.9%	
20	Native Species	7	Tree	25.9%	0	Tree	0.0%
27	Total Species	0	Shrub	0.0%	3	Shrub	11.1%
3.85	Native Mean C	0	W-Vine	0.0%	2	W-Vine	7.4%
2.85	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
17.22	Native FQI	8	P-Forb	29.6%	0	P-Forb	0.0%
14.82	w/Adventives	1	B-Forb	3.7%	2	B-Forb	7.4%
1.50	Native W	1	A-Forb	3.7%	0	A-Forb	0.0%
1.89	w/Adventives	1	P-Grass	3.7%	0	P-Grass	0.0%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		1	P-Sedge	3.7%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		1	Cryptogam	3.7%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACARHO	0	Acalypha rhomboidea	3	FACU	Nt A-FORB	THREE-SEEDED MERCURY
ACENIG	5	Acer nigrum	5	UPL	Nt TREE	BLACK MAPLE
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
ARCLAP	*	ARCTIUM LAPPA	5	UPL	Ad B-FORB	GREAT BURDOCK
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
CELORB	*	CELASTRUS ORBICULATUS	5	UPL	Ad W-VINE	ORIENTAL BITTERSWEET
CORALT	9	Cornus alternifolia	1	[FAC-]	Nt TREE	PAGODA DOGWOOD
CXHIRT	5	Carex hirtifolia	5	UPL	Nt P-SEDGE	HAIRY WOOD SEDGE
DRYSPI	8	Dryopteris spinulosa	-2	FACW-	CRYPTOGAM	SPINULOSE SHIELD FERN
ELYVIR	4	Elymus virginicus	-2	FACW-	Nt P-GRASS	VIRGINIA WILD RYE
EUPPER	4	Eupatorium perfoliatum	-4	FACW+	Nt P-FORB	COMMON BONESET
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GALTRF	5	Galium triflorum	4	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED

LONTAT	*	LONICERA TATARICA	5	[UPL]	Ad SHRUB	TARTARIAN HONEYSUCKLE
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
SCRMAR	4	Scrophularia marilandica	2	FACU-	Nt P-FORB	LATE FIGWORT
SOLDUL	*	SOLANUM DULCAMARA	0	FAC	Ad W-VINE	BITTERSWEET NIGHTSHADE
ULMRUB	4	Ulmus rubra	0	FAC	Nt TREE	SLIPPERY ELM
VIBOPU	*	VIBURNUM OPULUS	3	[FACU]	Ad SHRUB	EUROPEAN HIGHBUSH CRANBERRY

SITE Lake View Hill Park
LOCALE DM6
DATE 11/3/2013
BY Apfelbaum

FLORISTIC QUALITY DATA			NATIVE		ADVENTIVE	
24	Native Species	7	Tree	21.9%	0	Tree	0.0%
32	Total Species	2	Shrub	6.3%	3	Shrub	9.4%
2.79	Native Mean C	2	W-Vine	6.3%	2	W-Vine	6.3%
2.09	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
13.68	Native FQI	8	P-Forb	25.0%	0	P-Forb	0.0%
11.84	w/Adventives	1	B-Forb	3.1%	1	B-Forb	3.1%
1.00	Native W	3	A-Forb	9.4%	2	A-Forb	6.3%
1.38	w/Adventives	0	P-Grass	0.0%	0	P-Grass	0.0%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		1	P-Sedge	3.1%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		0	Cryptogam	0.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACARHO	0	Acalypha rhomboidea	3	FACU	Nt A-FORB	THREE-SEEDED MERCURY
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
BIDFRO	1	Bidens frondosa	-3	FACW	Nt A-FORB	COMMON BEGGAR'S TICKS
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CELORB	*	CELASTRUS ORBICULATUS	5	UPL	Ad W-VINE	ORIENTAL BITTERSWEET
CHEMUR	*	CHENOPODIUM MURALE	5	UPL	Ad A-FORB	NETTLE-LEAVED GOOSEFOOT
CIRLUC	1	Circaea lutetiana canadensis	3	FACU	Nt P-FORB	ENCHANTER'S NIGHTSHADE
CORALT	9	Cornus alternifolia	1	[FAC-]	Nt TREE	PAGODA DOGWOOD
CORRAC	1	Cornus racemosa	-2	FACW-	Nt SHRUB	GRAY DOGWOOD
CXCEPP	3	Carex cephalophora	3	FACU	Nt P-SEDGE	SHORT-HEADED BRACTED SEDGE
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
LIGVUL	*	LIGUSTRUM VULGARE	1	FAC-	Ad SHRUB	COMMON PRIVET
LONTAT	*	LONICERA TATARICA	5	[UPL]	Ad SHRUB	TARTARIAN HONEYSUCKLE
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
PHYAME	1	Phytolacca americana	1	FAC-	Nt P-FORB	POKEWEED
PILPUM	5	Pilea pumila	-3	FACW	Nt A-FORB	CLEARWEED
POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
POLPER	*	POLYGONUM PERSICARIA	1	[FAC-]	Ad A-FORB	LADY'S THUMB
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
PRUVIR	3	Prunus virginiana	3	[FACU]	Nt SHRUB	CHOKE CHERRY
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RHURAD	2	Rhus radicans	-1	FAC+	Nt W-VINE	POISON IVY
SCRMAR	4	Scrophularia marilandica	2	FACU-	Nt P-FORB	LATE FIGWORT
SOLDUL	*	SOLANUM DULCAMARA	0	FAC	Ad W-VINE	BITTERSWEET NIGHTSHADE
ULMAME	3	Ulmus americana	-2	FACW-	Nt TREE	AMERICAN ELM
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE DM7
DATE 11/3/2013
BY Apfelbaum

FLORISTIC QUALITY DATA			NATIVE			ADVENTIVE	
15	Native Species	8	Tree	33.3%	0	Tree	0.0%
24	Total Species	1	Shrub	4.2%	4	Shrub	16.7%
3.53	Native Mean C	0	W-Vine	0.0%	0	W-Vine	0.0%
2.21	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
13.68	Native FQI	3	P-Forb	12.5%	1	P-Forb	4.2%
10.82	w/Adventives	1	B-Forb	4.2%	1	B-Forb	4.2%
1.73	Native W	0	A-Forb	0.0%	3	A-Forb	12.5%
2.25	w/Adventives	1	P-Grass	4.2%	0	P-Grass	0.0%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		1	P-Sedge	4.2%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		0	Cryptogam	0.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
CAROVT	5	Carya ovata	3	FACU	Nt TREE	SHAGBARK HICKORY
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CHEMUR	*	CHENOPODIUM MURALE	5	UPL	Ad A-FORB	NETTLE-LEAVED GOOSEFOOT
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
ELYVIR	4	Elymus virginicus	-2	FACW-	Nt P-GRASS	VIRGINIA WILD RYE
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
HESMAT	*	HESPERIS MATRONALIS	5	UPL	Ad P-FORB	DAME'S ROCKET
LIGVUL	*	LIGUSTRUM VULGARE	1	FAC-	Ad SHRUB	COMMON PRIVET
LONTAT	*	LONICERA TATARICA	5	[UPL]	Ad SHRUB	TARTARIAN HONEYSUCKLE
POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
POLPER	*	POLYGONUM PERSICARIA	1	[FAC-]	Ad A-FORB	LADY'S THUMB
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
PRUVIR	3	Prunus virginiana	3	[FACU]	Nt SHRUB	CHOKE CHERRY
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
TILAME	5	Tilia americana	3	FACU	Nt TREE	AMERICAN LINDEN
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
ULMAME	3	Ulmus americana	-2	FACW-	Nt TREE	AMERICAN ELM
VIBOPU	*	VIBURNUM OPULUS	3	[FACU]	Ad SHRUB	EUROPEAN HIGHBUSH CRANBERRY

SITE Lake View Hill Park
LOCALE DM8
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA			NATIVE			ADVENTIVE	
14	Native Species	5	Tree	31.3%	0	Tree	0.0%
16	Total Species	1	Shrub	6.3%	1	Shrub	6.3%
3.50	Native Mean C	1	W-Vine	6.3%	0	W-Vine	0.0%
3.06	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
13.10	Native FQI	6	P-Forb	37.5%	0	P-Forb	0.0%
12.25	w/Adventives	1	B-Forb	6.3%	1	B-Forb	6.3%
1.07	Native W	0	A-Forb	0.0%	0	A-Forb	0.0%
1.13	w/Adventives	0	P-Grass	0.0%	0	P-Grass	0.0%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		0	P-Sedge	0.0%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%

			0	Cryptogam	0.0%		

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GALTRF	5	Galium triflorum	4	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
POLGVI	2	Polygonum virginianum	0	FACW-	Nt W-VINE	RIVERBANK GRAPE
PRUSER	1	Prunus serotina	3	FAC	Nt P-FORB	WOODLAND KNOTWEED
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	WILD BLACK CHERRY
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Nt TREE	RED OAK
RIBAME	7	Ribes americanum	3	FACU	Ad SHRUB	COMMON BUCKTHORN
SANGRE	2	Sanicula gregaria	-3	FACW	Nt SHRUB	WILD BLACK CURRANT
ULMAME	3	Ulmus americana	-1	FAC+	Nt P-FORB	CLUSTERED BLACK SNAKEROOT
VITRIP	2	Vitis riparia	-2	FACW-	Nt TREE	AMERICAN ELM

SITE Lake View Hill Park
LOCALE M1
DATE 11/3/2013
BY Apfelbaum

FLORISTIC QUALITY DATA			NATIVE			ADVENTIVE	
21	Native Species	6	Tree	20.0%	1	Tree	3.3%
30	Total Species	1	Shrub	3.3%	4	Shrub	13.3%
3.43	Native Mean C	1	W-Vine	3.3%	1	W-Vine	3.3%
2.40	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
15.71	Native FQI	10	P-Forb	33.3%	1	P-Forb	3.3%
13.15	w/Adventives	1	B-Forb	3.3%	1	B-Forb	3.3%
2.14	Native W	1	A-Forb	3.3%	1	A-Forb	3.3%
2.43	w/Adventives	0	P-Grass	0.0%	0	P-Grass	0.0%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		1	P-Sedge	3.3%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		0	Cryptogam	0.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACENEG	0	Acer negundo	-2	FACW-	Nt TREE	BOX ELDER
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
CAROVT	5	Carya ovata	3	FACU	Nt TREE	SHAGBARK HICKORY
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CELORB	*	CELASTRUS ORBICULATUS	5	UPL	Ad W-VINE	ORIENTAL BITTERSWEET
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GALTRF	5	Galium triflorum	4	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
LEOCAR	*	LEONURUS CARDIACA	5	UPL	Ad P-FORB	MOTHERWORT
LIGVUL	*	LIGUSTRUM VULGARE	1	FAC-	Ad SHRUB	COMMON PRIVET
LONTAT	*	LONICERA TATARICA	5	[UPL]	Ad SHRUB	TARTARIAN HONEYSUCKLE
MALPUM	*	MALUS PUMILA	5	UPL	Ad TREE	APPLE
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
PILPUM	5	Pilea pumila	-3	FACW	Nt A-FORB	CLEARWEED
POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
POLPER	*	POLYGONUM PERSICARIA	1	[FAC-]	Ad A-FORB	LADY'S THUMB
POPGRA	6	Populus grandidentata	3	FACU	Nt TREE	LARGE-TOOTHED ASPEN
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RUBIDS	3	Rubus idaeus strigosus	2	FACU-	Nt SHRUB	RED RASPBERRY

SCRMAR	4	Scrophularia marilandica	2	FACU-	Nt P-FORB	LATE FIGWORT
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN
VIBOPU	*	VIBURNUM OPULUS	3	[FACU]	Ad SHRUB	EUROPEAN HIGHBUSH CRANBERRY
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE M2
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA				NATIVE			ADVENTIVE	
10	Native Species	3	Tree	18.8%	0	Tree	0.0%	
16	Total Species	0	Shrub	0.0%	2	Shrub	12.5%	
3.40	Native Mean C	0	W-Vine	0.0%	1	W-Vine	6.3%	
2.13	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%	
10.75	Native FQI	3	P-Forb	18.8%	0	P-Forb	0.0%	
8.50	w/Adventives	1	B-Forb	6.3%	2	B-Forb	12.5%	
1.70	Native W	1	A-Forb	6.3%	1	A-Forb	6.3%	
2.19	w/Adventives	0	P-Grass	0.0%	0	P-Grass	0.0%	
		0	A-Grass	0.0%	0	A-Grass	0.0%	
		2	P-Sedge	12.5%	0	P-Sedge	0.0%	
		0	A-Sedge	0.0%	0	A-Sedge	0.0%	
		0	Cryptogam	0.0%				

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACENEG	0	Acer negundo	-2	FACW-	Nt TREE	BOX ELDER
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
ARCMIN	*	ARCTIUM MINUS	5	UPL	Ad B-FORB	COMMON BURDOCK
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CXROSE	4	Carex rosea	5	UPL	Nt P-SEDGE	CURLY-STYLED WOOD SEDGE
CXSPAR	3	Carex sparganioides	0	FAC	Nt P-SEDGE	LOOSE-HEADED BRACTED SEDGE
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GALTRF	5	Galium triflorum	4	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
LONTAT	*	LONICERA TATARICA	5	[UPL]	Ad SHRUB	TARTARIAN HONEYSUCKLE
PILPUM	5	Pilea pumila	-3	FACW	Nt A-FORB	CLEARWEED
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
SOLDUL	*	SOLANUM DULCAMARA	0	FAC	Ad W-VINE	BITTERSWEET NIGHTSHADE
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN

SITE Lake View Hill Park
LOCALE M3
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA				NATIVE			ADVENTIVE	
10	Native Species	2	Tree	11.8%	0	Tree	0.0%	
17	Total Species	0	Shrub	0.0%	3	Shrub	17.6%	
2.80	Native Mean C	1	W-Vine	5.9%	0	W-Vine	0.0%	
1.65	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%	
8.85	Native FQI	5	P-Forb	29.4%	1	P-Forb	5.9%	
6.79	w/Adventives	1	B-Forb	5.9%	2	B-Forb	11.8%	
2.20	Native W	0	A-Forb	0.0%	1	A-Forb	5.9%	
2.82	w/Adventives	0	P-Grass	0.0%	0	P-Grass	0.0%	
		0	A-Grass	0.0%	0	A-Grass	0.0%	
		1	P-Sedge	5.9%	0	P-Sedge	0.0%	
		0	A-Sedge	0.0%	0	A-Sedge	0.0%	
		0	Cryptogam	0.0%				

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD

ARCMIN	*	ARCTIUM MINUS	5	UPL	Ad B-FORB	COMMON BURDOCK
CAMRAP	*	CAMPANULA RAPUNCULOIDES	5	UPL	Ad P-FORB	EUROPEAN BELLFLOWER
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CXSPAR	3	Carex sparganioides	0	FAC	Nt P-SEDGE	LOOSE-HEADED BRACTED SEDGE
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
LONTAT	*	LONICERA TATARICA	5	[UPL]	Ad SHRUB	TARTARIAN HONEYSUCKLE
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
SCRMAR	4	Scrophularia marilandica	2	FACU-	Nt P-FORB	LATE FIGWORT
SMIECI	5	Smilax ecirrhata	5	UPL	Nt P-FORB	UPRIGHT CARRION FLOWER
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN
VIBOPU	*	VIBURNUM OPULUS	3	[FACU]	Ad SHRUB	EUROPEAN HIGHBUSH CRANBERRY
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE L1
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA							
24	Native Species	6	Tree	18.2%	0	Tree	0.0%
33	Total Species	0	Shrub	0.0%	1	Shrub	3.0%
3.42	Native Mean C	1	W-Vine	3.0%	0	W-Vine	0.0%
2.48	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
16.74	Native FQI	13	P-Forb	39.4%	3	P-Forb	9.1%
14.27	w/Adventives	1	B-Forb	3.0%	0	B-Forb	0.0%
2.00	Native W	0	A-Forb	0.0%	0	A-Forb	0.0%
1.91	w/Adventives	1	P-Grass	3.0%	5	P-Grass	15.2%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		2	P-Sedge	6.1%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		0	Cryptogam	0.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACESAU	3	Acer saccharum	3	FACU	Nt TREE	SUGAR MAPLE
AGRGRY	2	Agrimonia gryposepala	2	FACU+	Nt P-FORB	TALL AGRIMONY
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
ASTSAD	2	Aster sagittifolius drummondii	3	[FACU]	Nt P-FORB	DRUMMOND'S ASTER
CAMRAP	*	CAMPANULA RAPUNCULOIDES	5	UPL	Ad P-FORB	EUROPEAN BELLFLOWER
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
CXSPAR	3	Carex sparganioides	0	FAC	Nt P-SEDGE	LOOSE-HEADED BRACTED SEDGE
DACGLO	*	DACTYLIS GLOMERATA	3	FACU	Ad P-GRASS	ORCHARD GRASS
ELYVIR	4	Elymus virginicus	-2	FACW-	Nt P-GRASS	VIRGINIA WILD RYE
ERIPUL	10	Erigeron pulchellus	3	FACU	Nt P-FORB	ROBIN'S PLANTAIN
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FESELA	*	FESTUCA ELATIOR	2	FACU+	Ad P-GRASS	TALL FESCUE
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
JUNVIC	2	Juniperus virginiana crebra	3	FACU	Nt TREE	RED CEDAR
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
PHAARU	*	PHALARIS ARUNDINACEA	-4	FACW+	Ad P-GRASS	REED CANARY GRASS
PHLPRA	*	PHLEUM PRATENSE	3	FACU	Ad P-GRASS	TIMOTHY
PLALAN	*	PLANTAGO LANCEOLATA	0	FAC	Ad P-FORB	ENGLISH PLANTAIN
POAPRA	*	POA PRATENSIS	1	FAC-	Ad P-GRASS	KENTUCKY BLUE GRASS
POTSIS	4	Potentilla simplex	4	FACU-	Nt P-FORB	COMMON CINQUEFOIL
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
SOLCAN	1	Solidago canadensis	3	FACU	Nt P-FORB	CANADA GOLDENROD
SOLGIG	4	Solidago gigantea	-3	FACW	Nt P-FORB	LATE GOLDENROD
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD

TILAME	5	Tilia americana	3	FACU	Nt TREE	AMERICAN LINDEN
TRIREP	*	TRIFOLIUM REPENS	2	FACU+	Ad P-FORB	WHITE CLOVER
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN
VIOSOR	3	Viola sororia	1	FAC-	Nt P-FORB	COMMON BLUE VIOLET
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE L2
DATE 11/3/2013
BY Apfelbaum

FLORISTIC QUALITY DATA				NATIVE		ADVENTIVE	
10	Native Species	4	Tree	19.0%	0	Tree	0.0%
21	Total Species	0	Shrub	0.0%	0	Shrub	0.0%
3.60	Native Mean C	0	W-Vine	0.0%	0	W-Vine	0.0%
1.71	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
11.38	Native FQI	3	P-Forb	14.3%	4	P-Forb	19.0%
7.86	w/Adventives	0	B-Forb	0.0%	1	B-Forb	4.8%
3.50	Native W	2	A-Forb	9.5%	1	A-Forb	4.8%
2.76	w/Adventives	0	P-Grass	0.0%	4	P-Grass	19.0%
		0	A-Grass	0.0%	1	A-Grass	4.8%
		1	P-Sedge	4.8%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		0	Cryptogam	0.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
AGRREP	*	AGROPYRON REPENS	3	FACU	Ad P-GRASS	QUACK GRASS
AMBARE	0	Ambrosia artemisiifolia elatior	3	FACU	Nt A-FORB	COMMON RAGWEED
ANTNEG	4	Antennaria neglecta	5	UPL	Nt P-FORB	CAT'S FOOT
ASCSYR	0	Asclepias syriaca	5	UPL	Nt P-FORB	COMMON MILKWEED
ASTAZU	8	Aster azureus	5	UPL	Nt P-FORB	SKY-BLUE ASTER
CONARV	*	CONVOLVULUS ARVENSIS	5	UPL	Ad P-FORB	FIELD BINDWEED
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
DACGLO	*	DACTYLIS GLOMERATA	3	FACU	Ad P-GRASS	ORCHARD GRASS
FESRUB	*	FESTUCA RUBRA	1	FAC-	Ad P-GRASS	RED FESCUE
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
MEDLUP	*	MEDICAGO LUPULINA	1	FAC-	Ad A-FORB	BLACK MEDICK
MELLOF	*	MELILOTUS OFFICINALIS	3	FACU	Ad B-FORB	YELLOW SWEET CLOVER
PLALAN	*	PLANTAGO LANCEOLATA	0	FAC	Ad P-FORB	ENGLISH PLANTAIN
POAPRA	*	POA PRATENSIS	1	FAC-	Ad P-GRASS	KENTUCKY BLUE GRASS
POLERE	2	Polygonum erectum	3	FACU	Nt A-FORB	ERECT KNOTWEED
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
SETVIV	*	SETARIA VIRIDIS	1	[FAC-]	Ad A-GRASS	GREEN FOXTAIL
TAROFF	*	TARAXACUM OFFICINALE	3	FACU	Ad P-FORB	COMMON DANDELION
TRIREP	*	TRIFOLIUM REPENS	4	FACU+	Ad P-FORB	WHITE CLOVER
ULMRUB	4	Ulmus rubra	0	FAC	Nt TREE	SLIPPERY ELM

SITE Lake View Hill Park
LOCALE L3
DATE 11/3/2013
BY Apfelbaum

FLORISTIC QUALITY DATA			NATIVE			ADVENTIVE	
7	Native Species	4	Tree	18.2%	3	Tree	13.6%
22	Total Species	0	Shrub	0.0%	1	Shrub	4.5%
3.43	Native Mean C	1	W-Vine	4.5%	0	W-Vine	0.0%
1.09	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
9.07	Native FQI	1	P-Forb	4.5%	3	P-Forb	13.6%
5.12	w/Adventives	1	B-Forb	4.5%	1	B-Forb	4.5%
1.00	Native W	0	A-Forb	0.0%	1	A-Forb	4.5%
2.00	w/Adventives	0	P-Grass	0.0%	5	P-Grass	22.7%
		0	A-Grass	0.0%	1	A-Grass	4.5%
		0	P-Sedge	0.0%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		0	Cryptogam	0.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
AGRREP	*	AGROPYRON REPENS	3	FACU	Ad P-GRASS	QUACK GRASS
ALLPET	*	ALLIARIA PETIOLATA	0	FAC	Ad B-FORB	GARLIC MUSTARD
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
BROINE	*	BROMUS INERMIS	5	UPL	Ad P-GRASS	HUNGARIAN BROME
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CHEALB	*	CHENOPODIUM ALBUM	1	FAC-	Ad A-FORB	LAMB'S QUARTERS
CIRARV	*	CIRSIUM ARVENSE	5	UPL	Ad P-FORB	FIELD THISTLE
DACGLO	*	DACTYLIS GLOMERATA	3	FACU	Ad P-GRASS	ORCHARD GRASS
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GLEHED	*	GLECHOMA HEDERACEA	3	FACU	Ad P-FORB	CREEPING CHARLIE
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
HESMAT	*	HESPERIS MATRONALIS	5	UPL	Ad P-FORB	DAME'S ROCKET
MORALB	*	MORUS ALBA	0	FAC	Ad TREE	WHITE MULBERRY
PHAARU	*	PHALARIS ARUNDINACEA	-4	FACW+	Ad P-GRASS	REED CANARY GRASS
PINNIG	*	PINUS NIGRA	5	UPL	Ad TREE	AUSTRIAN PINE
PINSTR	9	Pinus strobus	3	FACU	Nt TREE	WHITE PINE
PINSYL	*	PINUS SYLVESTRIS	5	UPL	Ad TREE	SCOTCH PINE
POAPRA	*	POA PRATENSIS	1	FAC-	Ad P-GRASS	KENTUCKY BLUE GRASS
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
SETFAB	*	SETARIA FABERI	4	FACU+	Ad A-GRASS	GIANT FOXTAIL
VITRIP	2	Vitis riparia	-2	FACW-	Nt W-VINE	RIVERBANK GRAPE

SITE Lake View Hill Park
LOCALE EDM
DATE 11/3/2013
BY Lehnhardt

FLORISTIC QUALITY DATA			NATIVE			ADVENTIVE	
28	Native Species	7	Tree	19.4%	2	Tree	5.6%
36	Total Species	1	Shrub	2.8%	2	Shrub	5.6%
3.96	Native Mean C	0	W-Vine	0.0%	0	W-Vine	0.0%
3.08	w/Adventives	0	H-Vine	0.0%	0	H-Vine	0.0%
20.98	Native FQI	13	P-Forb	36.1%	1	P-Forb	2.8%
18.50	w/Adventives	1	B-Forb	2.8%	1	B-Forb	2.8%
2.82	Native W	0	A-Forb	0.0%	2	A-Forb	5.6%
2.97	w/Adventives	3	P-Grass	8.3%	0	P-Grass	0.0%
		0	A-Grass	0.0%	0	A-Grass	0.0%
		3	P-Sedge	8.3%	0	P-Sedge	0.0%
		0	A-Sedge	0.0%	0	A-Sedge	0.0%
		0	Cryptogam	0.0%			

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
AGANEP	5	Agastache nepetoides	3	FACU	Nt P-FORB	YELLOW GIANT HYSSOP
CARCOR	7	Carya cordiformis	3	[FACU]	Nt TREE	BITTERNUT HICKORY

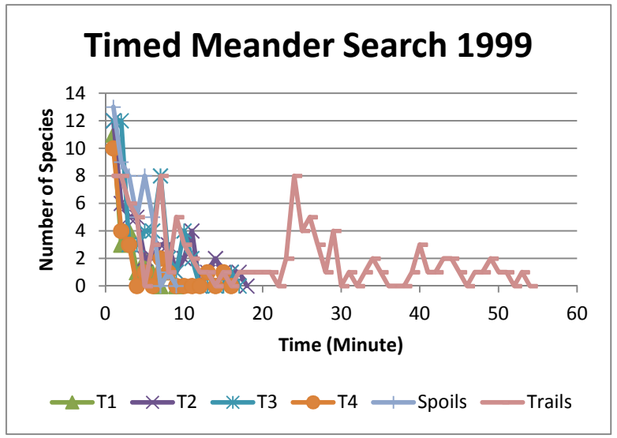
CAROVT	5	Carya ovata	3	FACU	Nt TREE	SHAGBARK HICKORY
CELOCC	3	Celtis occidentalis	1	FAC-	Nt TREE	HACKBERRY
CHEMUR	*	CHENOPODIUM MURALE	5	UPL	Ad A-FORB	NETTLE-LEAVED GOOSEFOOT
CXPENS	5	Carex pensylvanica	5	UPL	Nt P-SEDGE	COMMON OAK SEDGE
CXROSE	4	Carex rosea	5	UPL	Nt P-SEDGE	CURLY-STYLED WOOD SEDGE
CXSPAR	3	Carex sparganioides	0	FAC	Nt P-SEDGE	LOOSE-HEADED BRACTED SEDGE
ELYCAN	4	Elymus canadensis	1	FAC-	Nt P-GRASS	CANADA WILD RYE
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
GALTRF	5	Galium triflorum	4	FACU+	Nt P-FORB	SWEET-SCENTED BEDSTRAW
GEUCAN	1	Geum canadense	0	FAC	Nt P-FORB	WOOD AVENS
GLEHED	*	GLECHOMA HEDERACEA	3	FACU	Ad P-FORB	CREEPING CHARLIE
HACVIR	0	Hackelia virginiana	1	FAC-	Nt B-FORB	STICKSEED
HELSTR	5	Helianthus strumosus	5	UPL	Nt P-FORB	PALE-LEAVED SUNFLOWER
HYSPAT	5	Hystrix patula	5	UPL	Nt P-GRASS	BOTTLEBRUSH GRASS
JUNVIC	2	Juniperus virginiana crebra	3	FACU	Nt TREE	RED CEDAR
LEEVIR	7	Leersia virginica	-3	FACW	Nt P-GRASS	WHITE GRASS
LONTAT	*	LONICERA TATARICA	5	[UPL]	Ad SHRUB	TARTARIAN HONEYSUCKLE
MELALB	*	MELILOTUS ALBA	3	FACU	Ad B-FORB	WHITE SWEET CLOVER
MORALB	*	MORUS ALBA	0	FAC	Ad TREE	WHITE MULBERRY
OXASTR	0	Oxalis stricta	5	UPL	Nt P-FORB	COMMON WOOD SORREL
POLGVI	2	Polygonum virginianum	0	FAC	Nt P-FORB	WOODLAND KNOTWEED
PRUSER	1	Prunus serotina	3	FACU	Nt TREE	WILD BLACK CHERRY
QUEALB	5	Quercus alba	0	FAC	Nt TREE	WHITE OAK
QUERUB	7	Quercus rubra	3	FACU	Nt TREE	RED OAK
ROBPSE	*	ROBINIA PSEUDOACACIA	2	FACU-	Ad TREE	BLACK LOCUST
ROSMUL	*	ROSA MULTIFLORA	3	FACU	Ad SHRUB	MULTIFLORA ROSE
RUBOCC	2	Rubus occidentalis	5	UPL	Nt SHRUB	BLACK RASPBERRY
SANGRE	2	Sanicula gregaria	-1	FAC+	Nt P-FORB	CLUSTERED BLACK SNAKEROOT
SMIECI	5	Smilax ecirrhata	5	UPL	Nt P-FORB	UPRIGHT CARRION FLOWER
SOLULM	5	Solidago ulmifolia	5	UPL	Nt P-FORB	ELM-LEAVED GOLDENROD
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
TRIPER	5	Triosteum perfoliatum	5	UPL	Nt P-FORB	LATE HORSE GENTIAN
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN

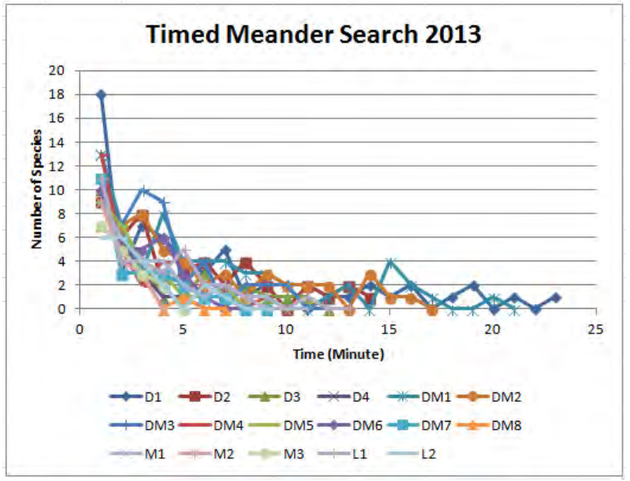
SITE Lake View Hill Park
LOCALE EM
DATE 11/3/2013
BY Lehnhardt

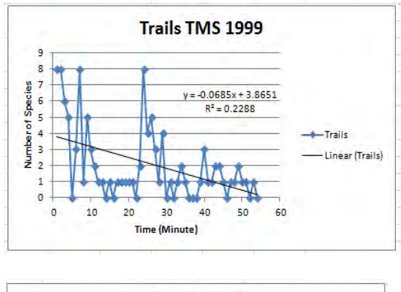
FLORISTIC QUALITY DATA								
21	Native Species		6	Tree	17.6%	2	Tree	5.9%
34	Total Species		1	Shrub	2.9%	1	Shrub	2.9%
3.95	Native Mean C		0	W-Vine	0.0%	2	W-Vine	5.9%
2.44	w/Adventives		0	H-Vine	0.0%	0	H-Vine	0.0%
18.11	Native FQI		9	P-Forb	26.5%	3	P-Forb	8.8%
14.23	w/Adventives		0	B-Forb	0.0%	2	B-Forb	5.9%
2.48	Native W		1	A-Forb	2.9%	1	A-Forb	2.9%
2.71	w/Adventives		2	P-Grass	5.9%	1	P-Grass	2.9%
			0	A-Grass	0.0%	1	A-Grass	2.9%
			2	P-Sedge	5.9%	0	P-Sedge	0.0%
			0	A-Sedge	0.0%	0	A-Sedge	0.0%
			0	Cryptogam	0.0%			

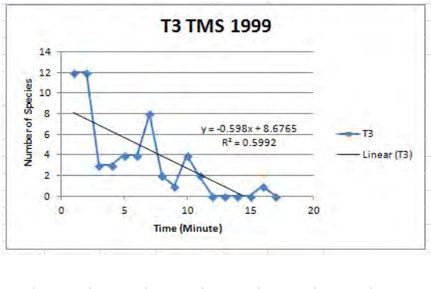
ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACENEG	0	Acer negundo	-2	FACW-	Nt TREE	BOX ELDER
AGANEP	5	Agastache nepetoides	3	FACU	Nt P-FORB	YELLOW GIANT HYSSOP
ARCMIN	*	ARCTIUM MINUS	5	UPL	Ad B-FORB	COMMON BURDOCK
ASTLAT	4	Aster lateriflorus	-2	FACW-	Nt P-FORB	SIDE-FLOWERING ASTER
CAROVT	5	Carya ovata	3	FACU	Nt TREE	SHAGBARK HICKORY
CELORB	*	CELASTRUS ORBICULATUS	5	UPL	Ad W-VINE	ORIENTAL BITTERSWEET
CXROSE	4	Carex rosea	5	UPL	Nt P-SEDGE	CURLY-STYLED WOOD SEDGE
CXSPAR	3	Carex sparganioides	0	FAC	Nt P-SEDGE	LOOSE-HEADED BRACTED SEDGE
DACGLO	*	DACTYLIS GLOMERATA	3	FACU	Ad P-GRASS	ORCHARD GRASS
ELYCAN	4	Elymus canadensis	1	FAC-	Nt P-GRASS	CANADA WILD RYE

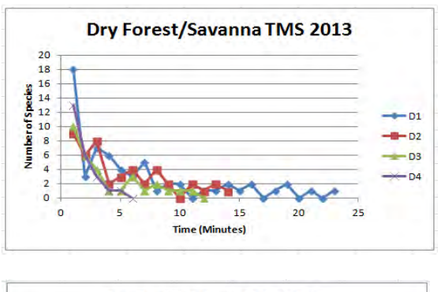
EUPPUR	7	Eupatorium purpureum	5	UPL	Nt P-FORB	PURPLE JOE PYE WEED
EUPRUG	4	Eupatorium rugosum	5	UPL	Nt P-FORB	WHITE SNAKEROOT
FRAAMA	5	Fraxinus americana	3	FACU	Nt TREE	WHITE ASH
GLEHED	*	GLECHOMA HEDERACEA	3	FACU	Ad P-FORB	CREEPING CHARLIE
HELSTR	5	Helianthus strumosus	5	UPL	Nt P-FORB	PALE-LEAVED SUNFLOWER
HYPPYR	10	Hypericum pyramidatum	-1	FAC+	Nt P-FORB	GREAT ST. JOHN'S WORT
HYSPAT	5	Hystrix patula	5	UPL	Nt P-GRASS	BOTTLEBRUSH GRASS
JUNVIC	2	Juniperus virginiana crebra	3	FACU	Nt TREE	RED CEDAR
LEOCAR	*	LEONURUS CARDIACA	5	UPL	Ad P-FORB	MOTHERWORT
MORALB	*	MORUS ALBA	0	FAC	Ad TREE	WHITE MULBERRY
PLALAN	*	PLANTAGO LANCEOLATA	0	FAC	Ad P-FORB	ENGLISH PLANTAIN
PRUVIR	3	Prunus virginiana	3	[FACU]	Nt SHRUB	CHOKE CHERRY
RHACAT	*	RHAMNUS CATHARTICA	3	FACU	Ad SHRUB	COMMON BUCKTHORN
RHUTYP	1	Rhus typhina	5	UPL	Nt TREE	STAGHORN SUMAC
ROBPSE	*	ROBINIA PSEUDOACACIA	2	FACU-	Ad TREE	BLACK LOCUST
RUDTRI	3	Rudbeckia triloba	1	FAC-	Nt A-FORB	BROWN-EYED SUSAN
SCRMAR	4	Scrophularia marilandica	2	FACU-	Nt P-FORB	LATE FIGWORT
SETFAB	*	SETARIA FABERI	4	FACU+	Ad A-GRASS	GIANT FOXTAIL
SOLCAN	1	Solidago canadensis	3	FACU	Nt P-FORB	CANADA GOLDENROD
SOLDUL	*	SOLANUM DULCAMARA	0	FAC	Ad W-VINE	BITTERSWEET NIGHTSHADE
TORJAP	*	TORILIS JAPONICA	5	UPL	Ad A-FORB	JAPANESE HEDGE PARSLEY
ULMAME	3	Ulmus americana	-2	FACW-	Nt TREE	AMERICAN ELM
VERTHA	*	VERBASCUM THAPSUS	5	UPL	Ad B-FORB	COMMON MULLEIN
VERURU	5	Verbena urticifolia	5	UPL	Nt P-FORB	HAIRY WHITE VERVAIN

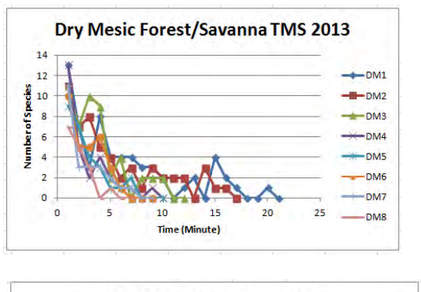


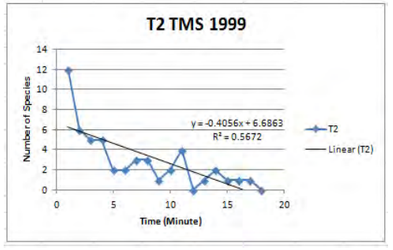


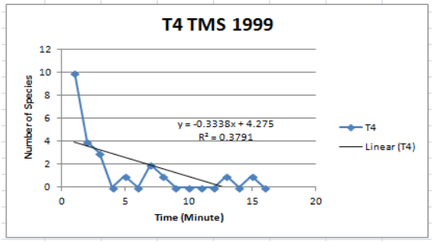


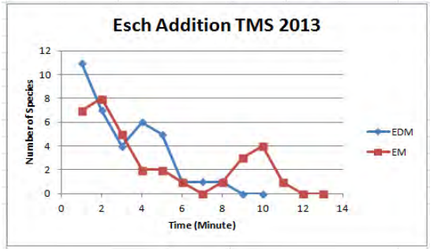


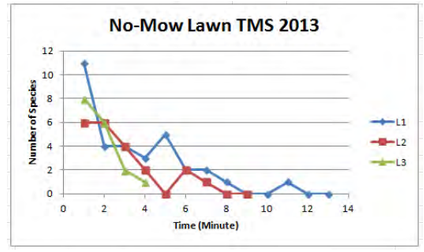


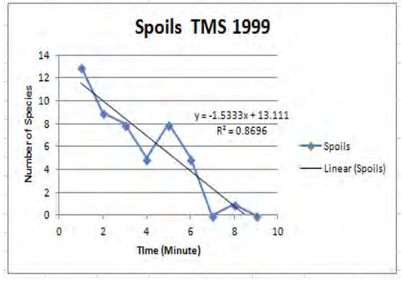


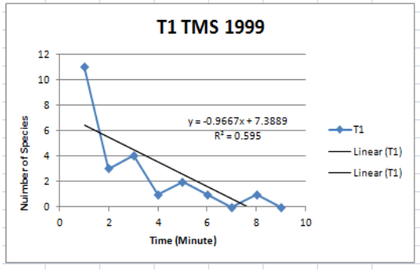












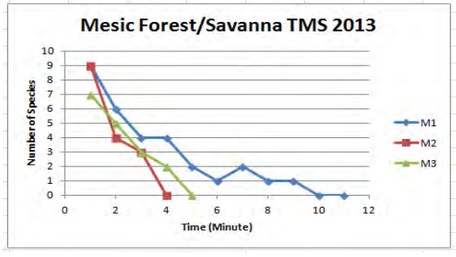
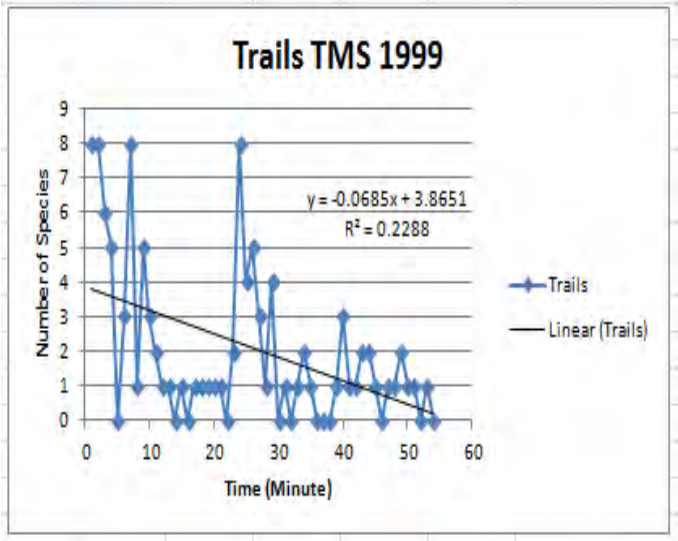


Figure II-2. Linear regression analysis comparing 1999 and 2013 Timed Meander Search (TMS) data. Within the two panels of charts above, the larger charts at the top represent composites of all data collected from individual sites. Individual sites are presented in the charts below (1999 sites include areas bisected by study transects T1 – T4, trail corridors, and the highly disturbed spoils area; 2013 sites by community with multiple sample locations per Fig II-1).

The following figure panels (II-3 through II-7) compare 1999 with 2013 TMS results from proximate locations on the site, beginning with the highest measured floristic quality to the lowest. Floristic data used in this analysis is included in Tables II-3 through Table Set II-5. For example, the single chart in Figure II-3 represents the trail corridor (within 2 – 3 feet on either side of the trail at the time of the 1999 study), which bisects the site in multiple directions and aspects (see trail locations in Attachment 1 – 6 maps). Prior to removing invasive shrubs, the trail corridor was the only area of the woodland that allowed light levels capable of supporting the floristic diversity that approximates that of a relatively intact natural community of the upper Midwest[2] (Trails TMS FQI=34.4, as noted just below the chart). Because a search of the trail corridor was not conducted in 2013, and because of the wide-ranging extent of the trail investigation and the much greater length of the search (55 minutes), this data was not used to compare to other more restricted 2013 search areas.

In a more typical example, the panel in Figure II-4 compares the search results from Transect 3 (see map in Figure II-1, and in Attachment 2), which had a 1999 pre-treatment FQI value of 25.32, with that of four nearby search areas in 2013 (DM1, DM4, DM6, and DM7). In all cases, the searches yielded 10 – 13 species within the first minute, with searches extending from 9 to 21 minutes as new species were encountered. However, the longest extended search (21 minutes) occurred in DM1, with the highest FQI of 31.5 (30.23, when adventive, aka non-native species, are included in the calculation), and highest Native Mean C of 4.18 (only 3.84 with adventive species). This area is inclusive of the seeded and planted portion of Test Plot 3 dating back to 2002 and 2003 at the start of the study, demonstrating a significant increase in floristic diversity as a result of the accumulated benefits of this and other subsequent restoration efforts, including regular prescribed burning.

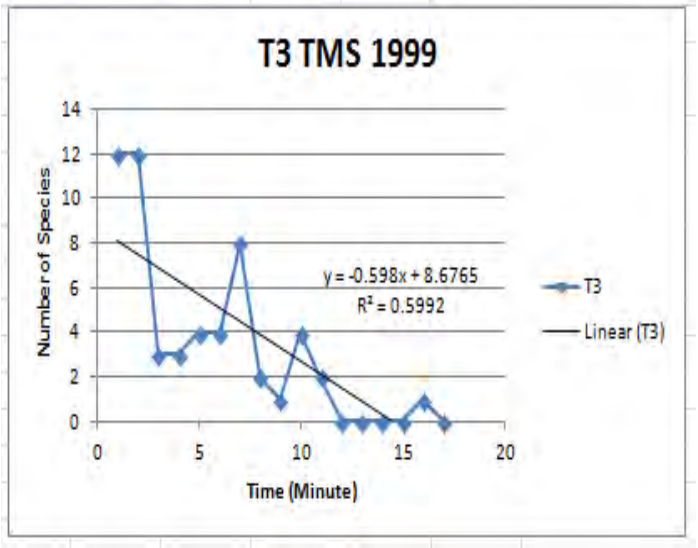


a) FQI 34.41

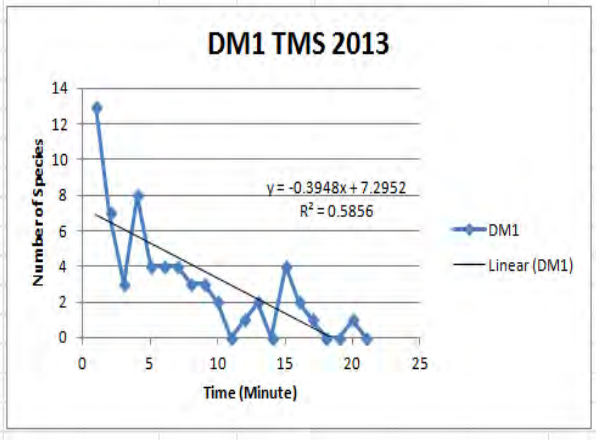
Figure II-3. Trails TMS 1999. Search data along the more open aspect trail corridor demonstrates the sites capability of supporting greater diversity when available light is increased in the understory. This search also demonstrates the greater patch diversity along the trails, with periodic spikes in new species encounter rates throughout the 55 minute search.

[2] Floristic Quality Index values of 35 or more and mean C values of 3.5 or higher are generally considered to have sufficient floristic quality to be at least of marginal natural area quality in the Chicago Region (Swink & Wilhelm 1994).

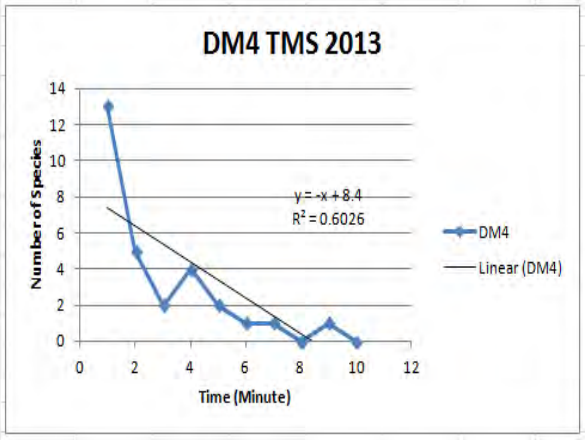
Figure II-4.



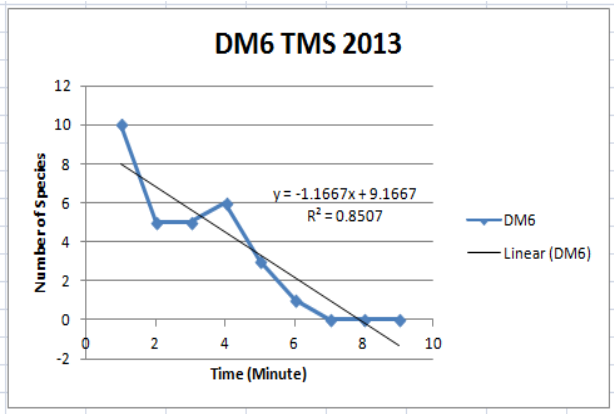
a) FQI 25.32



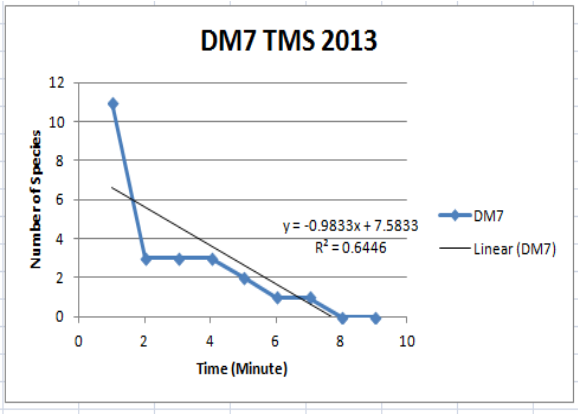
b) FQI 31.5



c) FQI 20.4

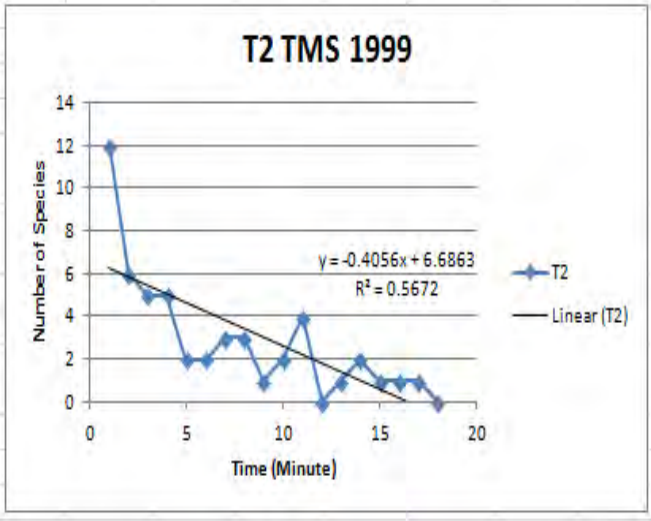


d) FQI 13.7

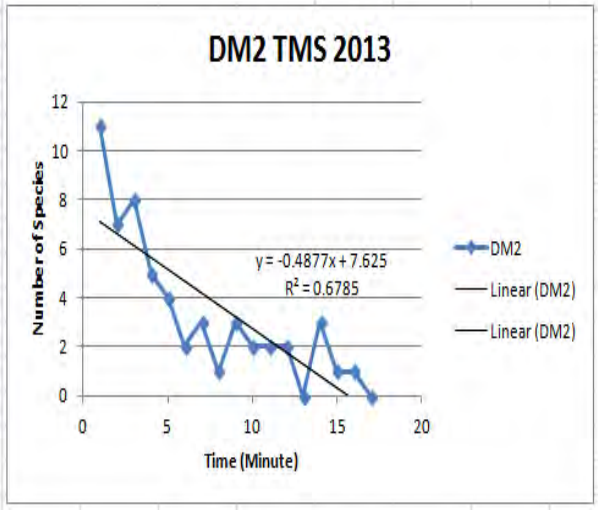


e) FQI 13.7

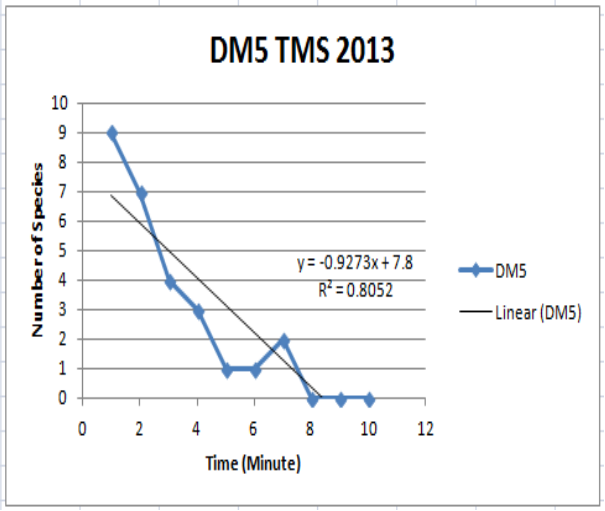
Figure II-5.



a) FQI 25.00

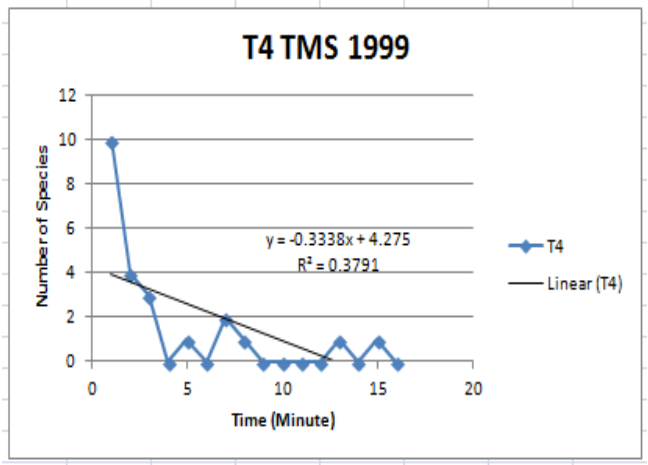


b) FQI 27.2

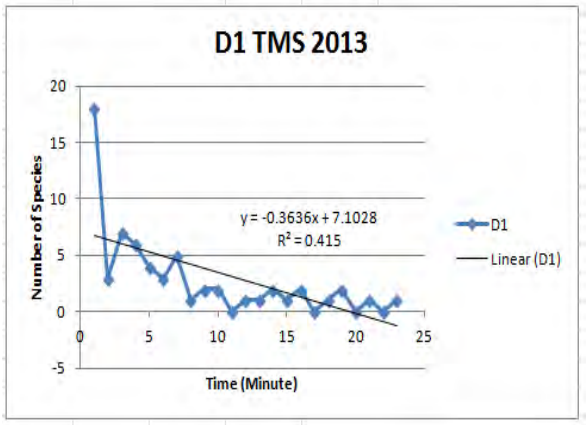


c) FQI 17.2

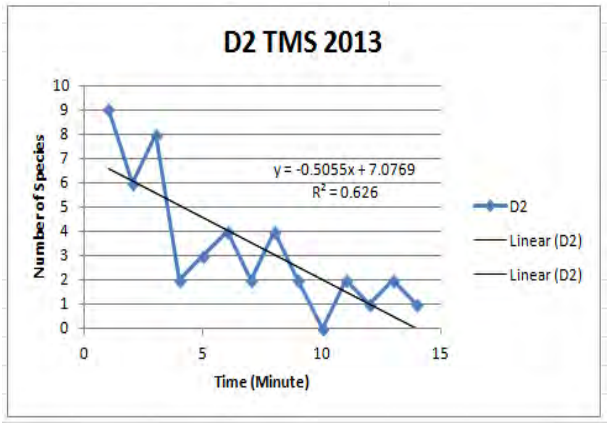
Figure II-6.



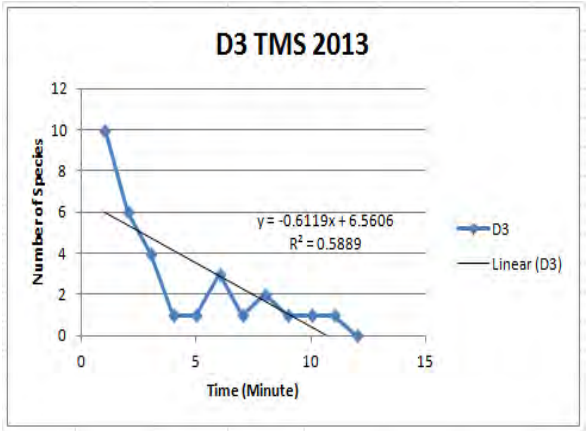
a) FQI 21.47



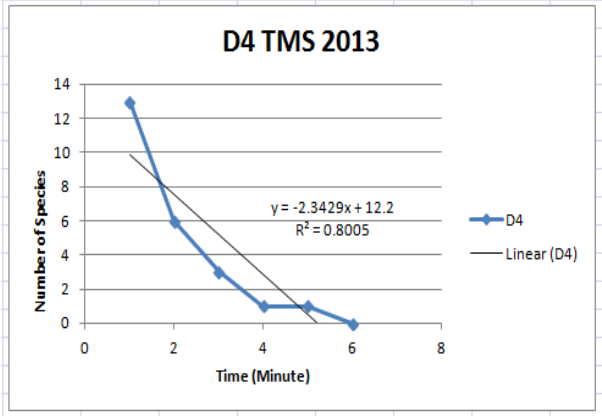
b) FQI 33.2



c) FQI 23.2

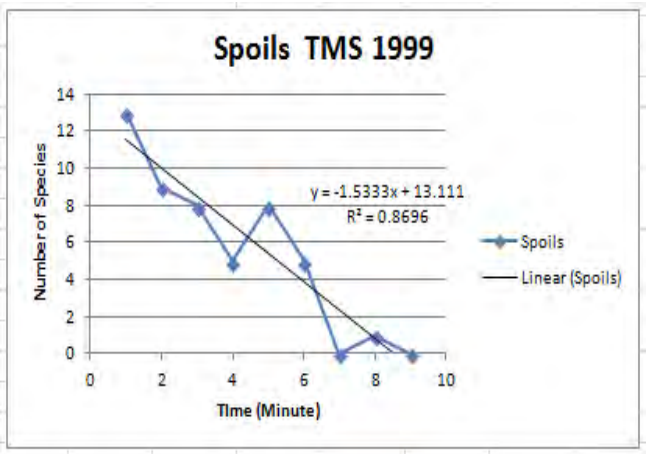


d) FQI 20.1

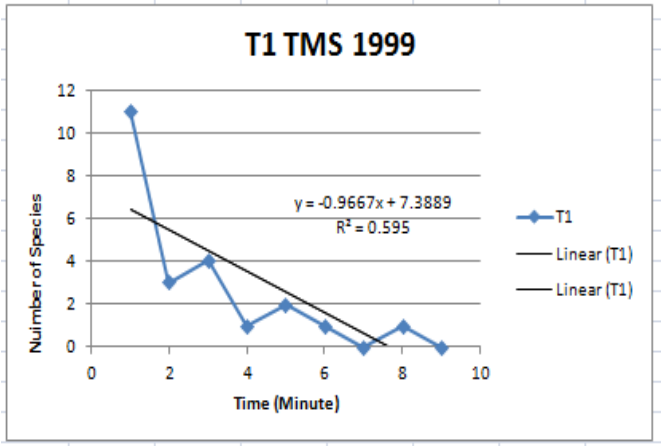


e) FQI 15.4

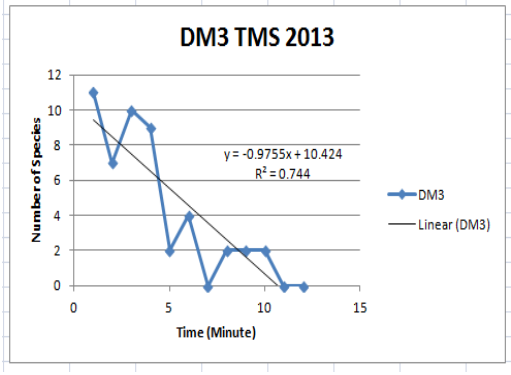
Figure II-7.



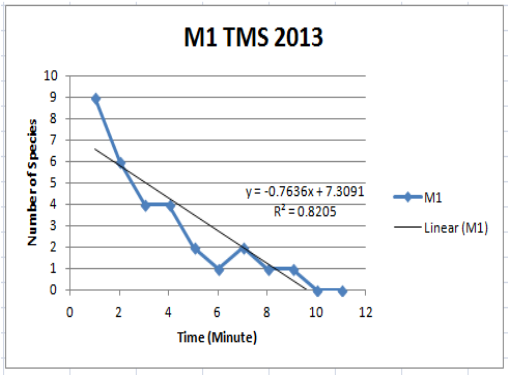
a) FQI 17.24



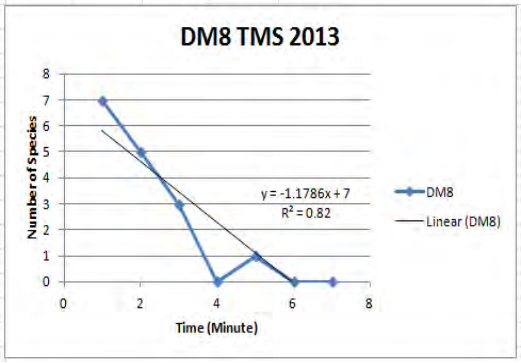
b) FQI 16.03



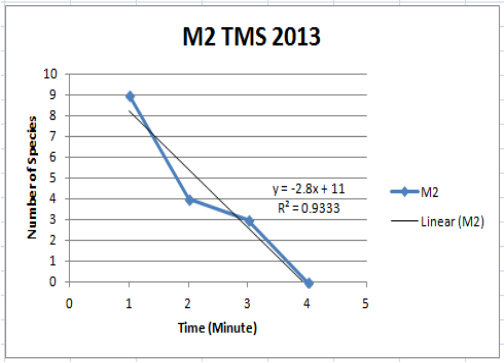
c) FQI 21.8



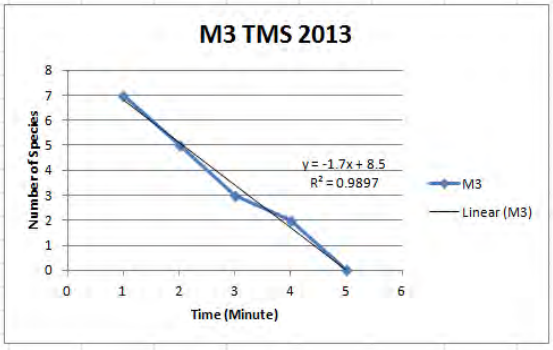
d) FQI 15.7



e) FQI 13.1



f) FQI 10.8



II-B - Basal Bark Treatment Outcomes in Zone III—2014

Introduction

In 2008 – 2009, the County desired to accelerate common buckthorn and honeysuckle shrub removal beginning in Zones II and III by employing a basal bark treatment strategy versus the cut stump treatment strategy previously used in the test plots. Both methods are similar in that they are stem treatments versus foliar treatments. As a result, both treatments minimize the risk of herbicide drift inherent in foliar applications, as the herbicide is introduced directly to the phloem stream of the plant versus absorbed through the leaves to be translocated elsewhere in the plant. In addition, both treatments have the same seasonal application window for treatment effectiveness, which is autumn, when chemicals can be most effectively absorbed and translocated to roots along with the plants sugars and nutrients. The difference between the two treatment strategies are generally considered to be the following:

Basal bark treatment:

1. Treatment: herbicide is applied directly to the unaltered bark of the standing tree by painting or spraying a band on all sides of the lower 12 to 18 inches of the tree from early spring to mid-fall. Some species can be treated in winter. This treatment is most effective on young trees with thin bark up to about 10" in diameter.
2. Herbicide: the selected herbicide is mixed with an oil- or petroleum-based carrier and applied until the bark is saturated. Low volatile ester or oil-soluble formulations are best for this use, such as 20% triclopyr or imazapyr in 80% crop oil.
3. Advantages: cost effective way to kill large number of stems over larger areas. Stems are left standing in place to die and fall over, so no additional cost to handle cut stems.
4. Drawbacks: where imazapyr is used for basal bark treatment, excess herbicide can wash off the bark and create a dead zone in the soil around the tree. Dense stands left in place can be difficult to work in to do necessary followup restoration treatments such as re-treating resprouts, prescribed burning, other invasive species control, and enhancement seeding and planting. If many stems are killed together in a group, it may draw negative attention in a highly visible area. If stems must later be cut down and removed, the wood will harden in the first few years, making sawing difficult.

Cut stump treatment:

1. Treatment: stem is cut and herbicide solution is applied to the cut surface, particularly targeting the exposed outer ring or cambium. This can be done with a sponge applicator to prevent dripping.
2. Herbicide: typical formulations are glyphosate (50% product in water), triclopyr or imazapyr (each 20% product in crop oil).
3. Advantages: significantly minimizes herbicide drift and quantities of herbicide used. Produces more immediate results by clearing the understory of unwanted brush.

4. Drawbacks: because herbicide should be applied soon after cutting (within an hour), a crew of two is generally needed for treatment. This is a more costly method upfront, as the treatment requires that stems be mechanically cut, and stems are typically removed and chipped, if large.

The basal bark treatment program was challenged by local citizens concerned about the increased use of herbicide and the visible increase in droplet and overspray to surrounding vegetation, and this treatment strategy was discontinued as a result. The abrupt discontinuation of treatment caused significant regrowth with increased stem densities in many areas (from re-sprouting stems and new seedlings). Followup efforts to cut regrowth and burn had limited success, particularly where fine fuel loads (oak leaf litter) were insufficient for carrying fire. A key question in the plan review therefore is to explore the outcomes of the basal bark treatment strategy and to make recommendations for addressing followup management needed in these areas.

Methods

To better understand treatment effectiveness, we established a single study transect in Zone III, where basal bark treatments had occurred since 2009. In an area with visibly varying stem densities, we positioned a 100 m transect so that the 0 - 50 m reach of the transect overlapped an area with visibly high resprout numbers (see Figure II-1 and Figure II-2) and the 50 – 100 m reach overlapped an adjacent area where stem densities were visibly reduced (see Figure II-3). Based on anecdotal evidence, surviving and resprouting treated stems in this area were cut sometime following the initial basal bark treatment, but the newly cut live stems were not treated with herbicide, which allowed them to resprout. Many of the current resprouting stems are the result of that series of treatments. Also, based on the burn records for the site (see Appendix I burn maps), the low stem density area likely experienced more than one subsequent prescribed fire event (2011 and 2013), which appears to have contributed to the lower current stem densities.

On May 3, 2014, Susan Lehnhardt and Jim Hughes counted the stems of all woody species growing within a 1 m wide belt paralleling the right side of the 100 m transect tape. Species and stem numbers were recorded on a data form and summarized by species. The summary results are presented in Table II-1, II-2, and II-3.

Figure II-8. Study transect (100 m transect tape visible right of center in the photo) measuring shrub density in Zone III (the northwest sector of the site just east of the N-S Havey Road entrance trail). View is from 0 m location looking south on May 3, 2014. The 0 – 50 m segment of the transect bisects an area with a high number of resprouts from surviving basal bark treated buckthorn and honeysuckle stems, which were subsequently cut but not chemically treated and which resprouted a second time.

Figure II-9. Shrub density transect, view from 50 m location looking back north toward 0 m location, May 3 2014, providing an additional view of conditions in the dense re-sprout stand described in Figure II-8.

Figure II-10. Shrub density transect, view from 50 m location looking south into the 50 – 100 m transect segment, where invasive shrub control has been successful. Repeated burn treatments (2011, 2013) have helped to control re-sprouting and subsequent woody understory growth.

Results

The results of the individual stem counts and a summary of native to non-native species counts are presented in Table II-1, Table II-2, and Table II-3. The results indicate that the high stem density area had twice as many stems as the low stem density area, and of those 85% of the stems were non-native species and largely represented by common buckthorn. Oriental bittersweet (*Celastrus orbiculatus*) and Tartarian honeysuckle are two additional important invasive species in the high stem density area.

Table II-6. Summary results from high density stem count transect (0 – 50 m) and low density stem count transect (50 – 100 m).

Transect	Total Stems	Native Stems	Non-native Stems	Important Species
High Density Stem Count (0 – 50 m)	306	46	260	182 - Common buckthorn (NN) 39 - Oriental bittersweet (NN) 33 – Tartarian honeysuckle (NN) 33 – Elderberry (N)
Low Density Stem Count (50 – 100 m)	151	41	110	108 - Common buckthorn (NN) 29 – Elderberry (N)

Table II-7. High density shrub count, 0 – 50 m transect segment.

SHRUB DENSITY (Stem Count) **Shrubs tallied in 1x100m belt**						
Location:	**Lake View Hill Park Woods**					
Transect:	**0 – 50 m segment of high density resprouts along 100 m x 1 m belt transect in basal bark treatment area with no fire on west side of Zone III parallel to Havey Rd Trail**					
Date:	**May 3, 2014**					
Samplers:	**S. Lehnhardt, J. Hughes**					
	Transect Segment					
Species Name (* non-native species)	**0-10**	**10-20**	**20-30**	**30-40**	**40-50**	**Totals**
**Rhamnus cathartica*	29	88	31	34		182
**Celasturs orbiculatus*	25	13		1		39
**Lonicera tatarica*	12	21				33
Sambucus canadensis	22	7	1	3		33
Acer negundo	2	1		2		5
**Berberis thunbergii*	5					5
Ribes americanum	3					3
Viburnum lentago	1					1
Prunus serotina	1					1

Juniperus virginiana crebra	1					1
**Rosa multiflora*	1					1
Prunus virginiana				1		1
Rubus occidentalis				1		1
				Native stems		46 (15%)
				Non-native stems		260 (85%)
				Total stems		**306**

Table II-8. Low density shrub count, 50 – 100 m transect segment.

SHRUB DENSITY (Stem Count) **Shrubs tallied in 1x100m belt**						
Location:	**Lake View Hill Park Woods**					
Transect:	**50 – 100 m segment of lower density resprouts along 100 m x 1 m belt transect in basal bark treatment area followed by fire on west side of Zone III parallel to Havey Rd Trail**					
Date:	**May 3, 2014**					
Samplers:	**S. Lehnhardt, J. Hughes**					
Transect Segments						
Species Names (*non-native species)	**50-60**	**60-70**	**70-80**	**80-90**	**90-100**	**Totals**
**Rhamnus cathartica*	31	57	5	3	12	108
Sambucus canadensis	29					29
Prunus serotina	1		7			8
Acer negundo	2	1				3
**Celastrus orbiculatus*	1		1			2
Fraxinus americana	1					1
				Native stems		41 (27%)
				Non-native stems		110 (73%)
				Total stems		**151**

Discussion

The data supports the visual assessment made in the field of the two adjacent burned and unburned areas, indicating a significant reduction of woody shrub stems and resprouts occurred in the burned area. Because much of the north sector of the site has poorly distributed oak leaf litter and currently supports sparse to no existing fine fuels in the form of senesced herbaceous layer vegetation, these areas are incapable of carrying fire necessary for controlling woody growth. Where fuels are adequate, however,

such as in the area of low density stem count, fire has helped to significantly reduce stem numbers of resprouting common buckthorn and other woody plants. This observation is in line with the test plot findings in 2003 that indicated where fine fuels are available, fire will be an important tool in controlling woody growth, including invasive common buckthorn and honeysuckle. Where fine fuels are absent or inadequate, eradication of common buckthorn and other invasive woody plants will require mechanical and chemical treatment methods to be effective.

Creative fuel loading using leaf litter from neighborhood lawns may be an option worth testing on a limited basis in poor fuel areas, used in conjunction with the more labor intensive but effective cut and stump treatment method with followup resprout treatment as needed. Safety is an important issue when adding loose leaf material that will be combusted, as this material may be easily carried by the wind from the source of ignition. One way to ensure the fuels are integrated into the forest floor as with naturally fallen leaf litter is to distribute collected leaves in the fall to allow winter snows to settle and compact the litter. This will allow fire to move through the litter as it does in natural leaf litter material, without significantly dislodging it from the ground. An exception is where litter is loosened with rakes, allowing wind to pick-up and carry burning leaf material.

Enhancement seeding of natives, particularly grasses and sedges, will also, over time, help to provide fine fuels for controlled burning. Under the right late fall conditions, burning may be possible utilizing intact leaf litter from other north sector tree species—ash, elm, cherry—which otherwise typically breaks down more readily under winter snow pack, unlike oak leaf litter which holds up through the following spring.

Conclusions

Land mangers controlling invasive woody growth in areas of the woodland and other areas of the Park, where initial fine fuels are absent or of insufficient quantities to carry fire, can achieve successful control only through the combined use of mechanical and chemical control methods, until fine fuels can be established. During early brushing activity in these areas, cutting alone without the use of herbicide and fire is not effective and only contributes to a proliferation of woody stems due to resprouting and growth of new seedlings responding to increased available light. Where fuels are adequate however (which is the goal throughout the site), effective repeated followup controlled burning in conjunction with initial cut and stump treating is the most cost effective strategy, as demonstrated in the test plots. In the long run, this strategy, although requiring more time and effort to build proper fuel loads in some areas, will also ensure lower levels of herbicide use on the site and effective long term control of resprouting and of new seedlings.

Oriental bittersweet (*Celastrus orbiculatus*) is another important invasive species that appears to have expanded on the site in recent years. This species is capable of rapid expansion and should be controlled before stem numbers proliferate.

II-C . Site Assessment & Recommendations

The following table compiles the field observations and associated recommendations made and developed during the late 2013 and 2014 field investigations. The table is organized by community type as presented in the site map Figure II-1. The assessment of restoration treatment effectiveness or treatment response is organized by the following categories and target responses:

- Structure & Composition: oak-dominated tree canopy allowing 30 – 50% ambient light levels capable of supporting new oak cohorts (new seedlings and saplings to replace old and dying oaks). Removal of the invasive shrub layer and replacement by native shrubs. Maintenance of standing (snags) and downed trees to provide habitat for cavity nesting birds and other wildlife.
- Groundlayer: re-establishment of a continuous, diverse, soil-stabilizing native ground cover capable of providing habitat for a wide range of faunal groups (insects, birds, mammals, herpetofauna).
- Invasive Species: reduction and control of invasive species to the level allowing diverse native plant and animal communities to dominate and flourish.

Table II-9.

			Lake View Hill Park - Site Assessment & Recommendations 2013 – 2014	
Communities	**Restoration Response**	**No.**	**Assessment**	**Recommended Strategies:**
Dry Forest/Savanna (D1 - 4)	**Structure & Composition**	**1**	Since the start of the restoration program, much of the ridgetop has benefited from repeated controlled ground fires. This burning regime has successfully controlled and reduced the seedbank of buckthorn and honeysuckle, and has opened the understory and increased the available light for re-establishing and accelerating growth of ground cover vegetation and oak seedlings.	Maintain open conditions and greater understory light levels by implementing a long-term 2-4 year burn rotation (burn 4 out of 10 years). This will also help to control new buckthorn and honeysuckle seedlings emerging from the seedbank (especially where soils are disturbed by digging or animal burrowing activity) or by reintroduction by wildlife.
		2	Significant reduction of downed logs and other woody debris (DWD) has occurred by direct removal of the material in order to facilitate safe and efficient burning. Reduction has also occurred in general as a result of several successive years of burning and natural decay. Downed trees in various stages of decay are important habitat for mammals and for many invertebrates, such as woodland snails, that are an important food source for birds and other wildlife. Downed wood is also an important part of the carbon cycle in woodland systems needed to maintain energy flow to support biodiversity and other ecosystem functions. Rotting logs also support a wide diversity of fungi and bryophytes (mosses and liverworts) that are important habitat for small organisms and are fascinating to observe.	In areas where intensive remedial prescribed burning has advanced the control of buckthorn seedlings and helped to establish native ground cover, begin to retain DWD, particularly large downed trees, to diversify ground story habitat structure. Ongoing controlled burning will help to moderate accumulation of smaller diameter DWD.
		3	Local deer herds appear to be causing only moderate to minor browse damage, particularly where native ground cover vegetation has become more continuous and diverse, and thus more resilient. However, some herbivory of young oak seedlings (a favorite browse of deer and frequently damaged (Burroughs and Dudek 2008)) may be occurring, as new seedlings do not appear to be advancing into the shrub or sapling layer (due also to repeated ground fires, which top-kill young seedlings). Volunteers have been caging young oaks in some locations in an effort to protect them from deer browse damage. In some sparsely vegetated areas, where browse damage was more conspicuous, damage was primarily observed on the native plant white snakeroot (*Eupatorium rugosum*), and occasionally on purple joe-pye weed (*Eupatorium purpureum*), both of which grow abundantly throughout this zone.	Non-lethal methods for controlling deer herd numbers include costly or labor-intensive methods that can have limited to highly variable effectiveness over time, such as repellents, fencing, harassment (with loud noises), habitat modification, trap and translocation, and reproductive controls (Van Clef 2004). Of these methods, regularly applied repellents, such as capsaicin, garlic, sulfur compounds, ammonium soaps, and blood meal, can be cost-effective in smaller areas and when used to protect small, rare or uncommon plant populations or individual plants, such as *Trillium* spp, *Lillium* spp, and oak seedlings. Habitat modification, which involves reducing the edge habitat that deer prefer and creating foraging areas to draw deer away from protected areas is considered highly unpredictable and cost prohibitive. Lake View Hill Park may in fact serve as such a foraging area that is minimizing damage to neighborhood ornamental landscape plantings. The restoration of healthy oak woodland and savanna habitat, that has been underway for the past 10 years or more, is effectively reducing edge habitat by opening up the woodland understory and creating a dense continuous ground cover of mulitple plant species. This strategy will concurrently create a more resilient vegetative community without the use of additional deterrent methods.

Communities	Restoration Response	No.	Assessment	Recommended Strategies:
Dry Forest/Savanna (D1 - 4)		**4**	Seedlings of both the black oak (*Quercus rubra*, *Q. velutina*) and white oak (*Q. alba*) groups are observed in some areas; however, older oaks continue to die. Accelerated regeneration and advanced growth of seedlings beyond the herblayer need to occur to create replacement cohorts and to increase age class diversity.	Protect oak seedlings with cages where possible, particularly in areas with sparse concealing ground cover vegetation. Work to increase fine fuel coverage where needed (in the absence of oak leaf litter, which is otherwise well-distributed in this zone), to stimulate seedbank response of grasses, sedges, forbs, and acorn germination. Begin to reduce the burn cycle to allow advancement of seedlings that have been repeatedly top-killed by frequent fire in the early stages of restoration. The root systems of some of these plants should be several years old by now, allowing more rapid growth to occur, once released from regular burning.
	Groundlayer	**5**	Flowering and seed-producing native forbs, sedges, and grasses are successfully spreading beyond the original seeded and planted areas, augmented more or less by subsequent enhancement seeding and by a seed bank response, which has included uncommon species like spikenard (*Aralia racemosa*), poke milkweed (*Asclepias exaltata*), and Canada violet (*Viola canadensis*). However, it is important to continue to diversify and accelerate the establishment and spread of existing and new species to build and maintain a continuous native ground cover to hold the site against invasive species and damage from deer herbivory.	Most locations in this zone will continue to benefit from enhancement seeding and planting of desirable, community-appropriate native species, including hand-collected seed from on-site and approved off-site locations. This effort will be important in areas that have not yet achieved the targeted continuous herb layer.
	Invasive Species	**6**	Repeated burning has successfully controlled new buckthorn and honeysuckle seedlings in many areas of the ridge; however, due to a long-lived seedbank and new introductions by various animal vectors, it will be important to continue to annually survey for areas with significant buckthorn seedlings and intensify prescribed burns as needed in these specific areas. Where the problem may become severe, a spring burn followed by fall burn in the same year after mid-October can take advantage of new oak leaf litter as fuel.	Follow the recommended 2-4 year burn rotation to continue to control new populations that may appear due to localized soil disturbance and new seed introductions. Shorten the burn rotation where needed in targeted areas, where new populations get out of hand.
		7	Japanese hedge parsley (*Torilis japonica*) is a tap-rooted, invasive Eurasian plant, variously classified as a winter annual or biennial forb resembling Queen Anne's lace and other members of the parsley family. Tiny white flowers form loose umbels that develop at the end of erect branches, blooming in July and August. Clustered fruits are small, oval, slightly flattened and bristly that disperse by sticking to fabric and fur. Seed germination has been observed in fall and in spring (Kirk et al. 2011), producing first year basal rosettes. This plant is a relatively recent invader of southern Wisconsin woodlands and savannas, and is becoming widespread in several areas of LVHP. Because it can quickly spread and form large patches, it should be **prioritized for control**. Restoration managers continue to study treatment effects of this species to better understand plant phenology and best timing and method of treatment applications (Kirk et al. 2011).	A good resource document for learning more about this plant, including recommended control strategies and treatment techniques, can be found online (Kirk et al. 2011) https://www.aldoleopold.org/Programs/JHPreport2011.pdf. This report also contains an effective method for monitoring and mapping populations for treatment and followup control. Hand-pulling, mechanical control, and chemical control are recommended methods. Hand-pulling is recommended for small populations. Flowering plants should be bagged and removed from the site and disposed of safely to prevent spread of seed that may continue to mature. Weed-whipping larger populations requires timing consideration, as plants can re-flower if cut too early in the growing season. Late fall or early spring is a good time to hand-pull or chemically treat the basal rosettes (use wick application to minimize particle drift), before plants mature, flower, and set seed. Hand-pulling of first year rosettes will likely be more successful in deeper friable (crumbly) soil types on the site. As with other hand-pulling activities, minimize soil disturbance as much as possible to prevent bringing more weed seeds to the surface (this is more likely than bringing native seeds to the surface in long-term, highly disturbed locations).

Communities	Restoration Response	No.	Assessment	Recommended Strategies:
Dry Forest/Savanna (D1 - 4)		**8**	Oriental bittersweet (*Celastrus orbiculatus*) is a fast and densely-growing woody vine with colorful orange berries that develop in the fall and resembles the native American bittersweet (*Celastrus scandens*). The invasive plant can be distinguished by its rounded versus elliptical leaves and its flowers and fruits which occur along the stem in leaf axils, versus at the ends of the stems. OB is becoming conspicuous along the trail in the area of Test Plot 2 near the Havey Road trail entrance. If not controlled, this shade-tolerant vine can shade out other vegetation including spring ephemerals, and damage trees by growing into the canopy, girdling trees and making them susceptible to wind damage. This species is a prolific seed producer and also spreads by underground roots that form new stems.	Oriental bittersweet should be prioritized for control, due to its ability to spread rapidly. And it should be monitored closely over the entire site. OB can be controlled by hand-pulling, mechanical, and chemical treatment methods. Small, young infestations in the herblayer can be pulled, and should be removed from the area. For more established invasions, larger stems can be cut during the late fall or early spring dormant season with hand pruners and treated with a formulation of triclopyr used with penetrating oil, or a 20% active ingredient solution of glyphosate (Czarapata 2005). See also other online weed control sources for best control methods (IPAW, MIPN, WDNR), as best practices and methods are always improving thanks to regional and nationwide weed control networking .
		9	Areas of blackberry (*Rubus allegheniensis*), where growth is heavy and is not being controlled successfully by fire alone, can be cut and, where acceptable, young sprouts can be treated selectively with a wick application of an appropriate glyphosate formulation to create gaps in the . Where chemical use is undesirable to allow wild collection of fruit, control treatments should be limited to cutting and burning.	Because blackberry is clonal and can develop extensive stands, treatments can be focused on creating gaps in the populations using wick herbicide applications.
Dry-MesicForest/Savanna(DM 1 - 8)	**Structure & Composition**	**1**	Many of the structure and composition observations and recommendations made above in the Dry Forest/Savanna sections are applicable here in the Dry-Mesic Forest/Savanna section, particularly where the use of prescribed fire has been successfully implemented for a number of consecutive years (Test Plot 3 and areas under the water tower and along the north side of the main east-west trail). Other areas, where invasive shrubs are still being managed and where burning is inconsistent due to insufficient fine fuels, will require continued management using mechanical and chemical control methods.	Continue to implement burning on a regular basis to control invasive woody growth, particularly new seedlings from the long-lived seedbank and ongoing introduction by birds and other animals. Where oaks are absent from the canopy, and thus where oak leaf litter is absent from the groundlayer, explore alternative fuel strategies, including an initial heavier cover crop seeding of native woodland grasses previously used elsewhere on the site, such as Virginia and silky wild rye (*Elymus virginicus*, *E. villosus*), woodland brome (*Bromus pubescens*), and bottlebrush grass (*Hystrix patula*, aka *Elymus hystrix*).
		2	In some sectors where the basal bark treatment method was applied to buckthorn, we observed incomplete mortality that may have resulted from ineffective treatment method, incomplete or interrupted treatment, or other causes (see more discussion about this in Appendix II-B). Early on, the treatment to larger buckthorn stems appeared to be successful, but subsequent treatments appeared to achieve only minimal results, resulting in resprouting and widespread new seedling growth from the seedbank, particularly where followup fire was not possible due to lack of fine fuel.	Aggressive use of prescribed fire is proposed to assist in removing and controlling new seedling growth (see further discussion in Appendix II-B). Larger resprouting stems will more easily be controlled by cutting or re-cutting and applying herbicide to cut stems. A strategy for augmenting fine fuels with oak leaf litter gathered from the neighborhood can be tested in this setting, as elsewhere in the Park where the oak canopy is absent (see more discussion about this in Appendix II-B, and elsewhere in this section).
		3	Many areas in this sector need help to accelerate oak regeneration, which has potential to be hindered by deer herbivory (see discussion above in number 3 in the Dry Forest/Savanna section).	See discussion in numbers 3 and 4 above in the Dry Forest/Savanna section .
		4	As in the Dry Forest/Savanna, once invasive shrub growth is under control, begin to allow downed trees to remain in place to decay and provide habitat for wildlife and to diversity the forest/savanna understory structure (see discussion in number 2 above in the Dry Forest/Savanna section).	See discussion in number 2 above in the Dry Forest/Savanna section .

Communities	Restoration Response	No.	Assessment	Recommended Strategies:
Dry-MesicForest/Savanna(DM 1 - 8)	**Groundlayer**	**5**	Many areas, particularly those where past agricultural land uses and other disturbances were most intensive (such as around the old farrowing house foundation and paddock at Test Plot 1, and in the area of the old refuse pile and cinder spoils) or areas where the invasive shrub canopy has been recently opened, still harbor many weedy and invasive species or lack ground cover in general, and need focused enhancement seeding of native grasses, sedges, forbs, and ferns, to accelerate the establishment of native cover in these locations.	Where fire can be effectively applied, broadcast enhancement seed mixes comprised of appropriate Dry-Mesic Forest/Savanna species as specified in the original plan or as otherwise approved for introduction into this community by the County naturalist.
	Invasive Species	**6**	Japanese hedge parsley is colonizing rapidly in trail side locations (human and deer trails) and needs aggressive early control to prevent widespread growth.	See discussion in number 7 above in Dry Forest/Savanna section.
		7	Canada thistle (*Circium arvense*) is becoming well established in some locations.	Apply herbicide in spring and late summer using wick application to minimize drift. Seed heads can also be removed to prevent spread by wind dissemination.
		8	Patches of reed canary grass (*Phalaris arundinacea*) continue to expand and multiply in the Park. While growth is fortunately much slower in the shallow upland soils of the Park, compared to growth in deep organic soils of wetland settings, this species is beginning to displace more diverse assemblages of native grass, sedge, and forb species, including the only population of broad-leaved panic grass (*Panicum latifolium*) at the woodland edge above the parking lot. Czarapata (2005) reports it as increasingly being found invading forested sites, limiting tree regeneration. This species should be closely monitored in the Park and removed, while populations are small.	Reed canary grass (rcg) is difficult to control due to its ability to form a dense sod. Several control methods are recommended by Czarapata. Stems of small clones (2' in diameter) can be tied together just before flowering in early summer, cutting off and bagging the inflorescences, and applying 20% a.i. glyphosate to the cut stems. Mow larger clones in mid-September, followed by an application of 5% a.i. solution of glyphosate in October. Increased control has been reported from a fall application of herbicide because the plant is actively translocating food to the plant roots prior to dormancy (Tu 2004). Tu's recommended treatment strategy combines a late spring or early summer (June) mow or burn, followed by an August mow, and late fall herbicide application (this can be carefully wick applied where rcg forms small patches, avoiding contact with entangled natives), with follow-up the next season. Tu also had 100% control of rhizomes using shade cloth or landscape cloth; however care must be taken to avoid smothering native associates. Treated areas must be planted or seeded to re-establish competitive native vegetation. In locations where native sedges or grasses are growing with rcg, collect seed for later propagation.
		9	Heavy growths of bittersweet nightshade aka deadly nightshade (*Solanum dulcamara*) have developed near rear lot areas of neighboring properties, which likely have developed where lawn clippings may have been regularly disposed of for many years. In these and other areas, creeping Charlie (*Glechoma hederacea*) and motherwort (*Leonurus cardiaca*) have also colonized.	Despite being a perennial plant, bittersweet nightshade roots grow close to the surface, allowing the plant to be easily hand-pulled without leaving viable roots behind. This can be done any time during the growing season before the berries turn red, although moist ground conditions will make pulling easier. Both creeping Charlie and motherwort can be hand pulled during the spring and late summer/fall. Motherwort basal rosettes can also be pulled any time the ground is not frozen. Encourage neighboring property owners to discontinue disposing of lawn clippings and other landscaping material in the woods.
		10	Oriental bittersweet invasion is occurring around Test Plot 1 (see discussion in number 8 above in Dry Forest/Savanna section).	See discussion in number 8 above in Dry Forest/Savanna section.

Communities	Restoration Response	No.	Assessment	Recommended Strategies:
Dry-MesicForest/Savanna(DM 1 - 8)	**Invasive Species**	**11**	European highbush cranberry aka European guelder rose (*Viburnum opulus*) is common to abundant in many areas along the north, west, and east property lines. It resembles the native highbush cranberry (*Viburnum trilobum*) and can be distinguished by the following leaf characters: leaf surfaces of the native plant are thinly covered with appressed (flattened) hairs, while the native plant has no hair on the leaf surface (glabrous); the small pair of glands at the juncture between the base of the leaf and the leaf stalk (leaf petiole) are small and columnar on the native, compared to those on the non-native which are larger and depressed or dish-shaped. The fruits of the non-native plant are bitter and reported to be avoided by birds, although bird dissemination is a likely vector for the spread of this species.	*Viburnum opulus* should be cut and stump treated. Until that can be accomplished, fruiting heads should be removed wherever possible to reduce spread.
Mesic Forest/Savanna (M 1 -3)	**Structure & Composition**	**1**	The Mesic Forest/Savanna in the northeastern portion of the property has largely remained unmanaged, due to how the restoration plan prioritized it as the most disturbed area of the site and thus possessing less restoration potential than other areas, where restoration was initiated early on. Thus, structure and composition remain largely the same as conditions described and measured in 1999, with a dense understory invasive shrublayer and lack of available light to support adequate ground cover vegetation.	Mechanical removal of the invasive understory shrubs and thinning of selected canopy trees, particularly boxelder, will be the first step in undertaking restoration in this area. It is anticipated that with the spread of the Emerald Ash Borer in the state, the Park's ash trees will eventually begin to disappear from the canopy, thus contributing to increased open canopy conditions on the site. Brush removal will need to include the use of herbicide to cut stumps, to prevent resprouting. The large amount of DWD in this area may need to be reduced concurrently or even ahead of brushing activity to facilitate safe and efficient management of woody material. Prescribed burning to control new seedlings and resprouts will require enhancement of fuel loads as recommended in numbers 1 and 2 above in the Dry-Mesic Forest/Savanna section.
	Groundlayer	**2**	Mesic Forest/Savanna areas have very poor understory floristic diversity and extensive exposed soils that need to be stabilized against erosion and recolonization by invasives, once brushing and canopy thinning are completed and higher light availability can stimulate ground cover growth.	Following the initial cover seeding of native grasses as proposed in other poorly vegetated understory areas (see recommendation in numbers 1 and 2 above in the Dry-Mesic Forest/Savanna section), continue to conduct enhancement seeding and planting until a continuous diverse herblayer is established.
	Invasive Species	**3**	Patches and individual stems of the ornamental ground cover species creeping bellflower (*Campanula rapunculoides*) are found here and elsewhere in the Park. This invasive species is capable of forming larger patches that crowd out native plants.	Czarapata recommends pulling or cutting this plant close to the ground to prevent seed production. Because this plant is a perennial, monitor cut or pulled plants closely to determine if regrowth occurs, requiring wick application of an appropriate herbicide.
No-Mow Lawns (L 1 - 3)	**Structure & Composition**	**1**	In the northwest sector of the No-Mow Lawn areas under the oak canopy (L1 and to some degree L2, see accompanying map), the released lawns have developed a mix of non-native forage grasses, native grasses and sedges, native composites [goldenrods, fleabanes, and the uncommon robin's plantain (*Erigeron pulchellus*)], and many oak seedlings (all of this particularly coming up under the white oak canopy in L1).	All areas, particularly the areas with the native assemblages developing, would benefit from light ground fires on a 3-5 year rotation to reduce the colonization by buckthorn that is occurring along the northern margins of the woodland along the nearby east west trail. Enhancement seeding following fire would begin to diversify areas of the lawn with low native grass, sedge, and forb diversity.

Communities	Restoration Response	No.	Assessment	Recommended Strategies:
No-Mow Lawns (L 1 - 3) cont…	**Structure & Composition cont…**	**2**	In the eastern sector of the No-Mow area (L3 on the map), many areas where mowing has ceased are mostly dominated by cool season non-native grasses (Kentucky bluegrass, orchard grass, tall fescue, etc.). These areas are also more prone to colonization by a number of weedy and invasive species, such as Canada thistle, reed canary grass, common buckthorn and white mulberry seedlings, creeping Charlie, and more.	A decision has to be made on the future of the No-Mow lawn areas. If the goal is to allow these to remain fallow and successionally proceed to old field and shrub vegetation (which is what has happened to the lower Esche addition over the years), then be prepared for this becoming a seed source for invasive plants into the rest of the Park. If the goal is to shift to native savanna understory (such as under the white oaks, Austrian fir, White pine, and white mulberry) and grassland in former open mowed lawn areas, then the site would benefit from mowing (removal of clippings) and drilling of native savanna/grassland grasses, sedges and forb seeds using no-till drilling techniques. After one year of mowing, release the planted areas from mowing and administer prescribed burning three of the next five years to establish the native plant communities. If you wish to accelerate this process and better ensure its success, consider herbicide spraying (one treatment in early spring and a second treatment in late summer treatment, followed by a fall dormant seeding) to reduce the cover of nonnative grasses so that the native species can establish most successfully.

Communities	Restoration Response	No.	Assessment	Recommended Strategies:
No-Mow Lawns (L 1 - 3)	**Invasive Species**	**3**	Highly invasive species such as Canada thistle, reed canary grass, and woody invasives such as buckthorn, honeysuckle, white mulberry, and others should be controlled to encourage native community establishment, and to prevent spread into other areas of the Park and surrounding properties by wind, birds, humans and other mammals. White mulberry (*Morus alba*), a plant introduced from Asia [and not to be confused with the native red mulberry (*M. rubra*) of wooded floodplain settings], has been questioned as a target species in the Park. While considered by some to be a food source for people and animals (the ripened fruit is safe to eat), un-ripened fruit can cause stomach irritation, nervous system stimulation, and hallucinations (Czarapata 2005). Milky sap from the bark is toxic and can cause skin irritation, so caution should be used when handling cut stems. The seed are spread widely by birds. The non-native mulberry is known to unfortunately hybridize with the native species, which is another reason to remove white mulberry from the landscape. Key leaf characters can easily distinguish the two species: *M. alba* leaves are glabrous (smooth with no hairs) below or with hairs concentrated along the major veins, and routinely with 3-5 lobes; *M. rubra* leaves are evenly pubescent (hairy) below and commonly without lobes.	Continue to aggressively control invasive species. All perennial invasives described here will require an approved application of herbicide to achieve successful control. See Czarapata and other online weed control sources for best control methods (IPAW, MIPN, WDNR), as best practices and methods are always improving thanks to regional and nationwide weed control networking .
		4	Concern was expressed regarding competition from Canada goldenrod (*Solidago canadensis*), a native which can form large dense clones that exclude other species in part by chemical exudates from roots and other plant parts (allelopathy). Goldenrods are often blamed unfairly as the cause of hay fever, which is primarily caused by ragweeds (especially giant ragweed), which bloom around the same time of the year (Czarapata 2005). According to Czarapata, wildlife use of goldenrods is low in comparison to its abundance on the landscape.	Where concentrations of goldenrod are considered problematic due to excluding other plant diversity, control can be achieved by mowing of clones in midsummer to help decrease abundance. To reduce spread by seed, flower heads can be cut off in peak bloom, and followed by application of a strong solution of glyphosate to the cut surface if complete removal is desired (Czarapata 2005).
Esch Addition(EDM, EM)	**Structure &Composition**	**1**	Since removal of the black locust canopy, largely in the lower Esch property (see zone EM on the map), the mesic understory in this area has developed a dense shrublayer of Tartarian honeysuckle, boxelder, common buckthorn, and a few other species, that is now shading the groundlayer.	Shrub removal and an aggressive annual prescribed burning program can be undertaken to achieve a savanna or open woodland structure and understory composition. Continue to seed into the ashes following each fire with native savanna/woodland grasses, sedges, and forbs. In lieu of planting trees, distribute seed of red oak, basswood, bur oak, white oak, and hackberry, to begin regenerating the canopy. Where fine fuels are absent, which is largely the case in this location, a campaign of collecting and distributing oak leaf litter from the neighborhood in the fall can be undertaken. Allow snow compaction to occur over winter, and conduct an early spring burn (late March to mid-April). This strategy is currently being tested in other locations of the Park in poor fuel areas.

Communities	Restoration Response	No.	Assessment	Recommended Strategies:
Esch Addition(EDM, EM)	**Groundlayer**	**2**	The Dry-Mesic Forest setting of the upper Esch property (see zone EDM on the map) has a much better established understory flora of grasses, sedges, and forbs, although pale-leaved sunflower (*Helianthus strumosus*) has formed monocultures or simple polycultures with a few other species in some locations. As described above, the groundlayer of EM by comparison is developing slowly, and enhancement can occur more aggressively to improve diversity and soil stability.	Species diversity can be improved in monocultural stands of sunflower by sowing other native savanna grass/sedge/forb seeds after each prescribed burn. Establishment may be accelerated by temporarily cutting back the sunflower stems for a season to allow successful germination and growth of the seeded species to occur. This can be conducted in experimental patches initially. A more aggressive enhancement strategy is needed in EM to improve the groundlayer cover and diversity through enhancement seeding and control of competing weedy species.
	Invasive Species	**3**	While removal of black locust has been successful in many locations in the Esch property, resprouting continues to occur in some areas, and long term monitoring and control efforts are required.	As has been demonstrated on the site, removal of black locust is extremely difficult, due its clonal growth habit and ability to spread laterally, root sucker, and stump sprout following any disturbance. Thus, cutting without applying herbicide will stimulate sprouting and clonal spread. Czarapata recommends several options for treatment and an experimental approach to determine best results on a site by site basis.

Appendix III. Analysis of test plot and transect data from 1999, 2001, 2002, and 2009.

In this section, we present the findings of the statistical analysis of the vegetation data collected during four sampling periods at Lake View Woods. Sampling was initiated in 1999 in four permanent vegetation study transects, followed in 2001 and 2002 with sampling in four demonstration test plots associated with the original transects (see transect and test plot locations in Appendix IV, Attachment 2, which presents the Exhibit 6 map from the 2003 Restoration and Management Plan). In 2009, all transects and test plots were re-sampled. The results of this analysis are intended to support the recommendations for ongoing restoration efforts in Lake View Hill Park, and to provide a database for future onsite studies to measure long-term responses to ecological restoration and other site management practices.

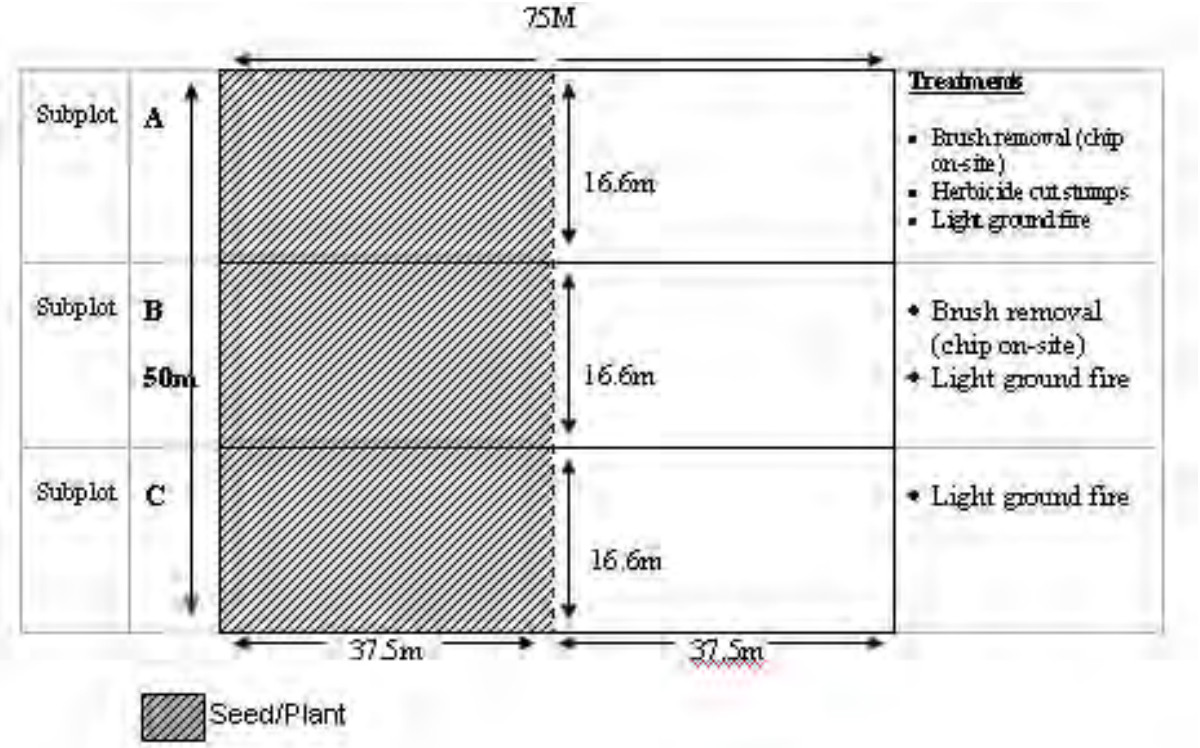
Test Plot Design and Treatments

During the 1999 habitat assessment, four 100 m permanent study transects (Transects 1 – 4) were established to measure existing conditions of representative areas and to provide baseline data before restoration and management activities were initiated. Beginning in 2001, four .75 to 1-acre test plots (Test Plots 1- 4) were positioned over a 50 m reach of each baseline transect, in a controlled replicated plot design. Each plot was divided into six sub-plots (Subplots A, A1, B, B1, C, C1), each receiving one or more restoration treatments involving burning, brushing, herbicide application, and reintroduction of native herbaceous species as seed and live plant plugs (Figure III-1). Only Subplot C2, which received the burn-only treatment, required use of the pretreatment baseline data collected from the associated 1999 transect as the unburned control for measuring burn-only treatment effects. Controls for all other treatments occurred within the test plot boundary. Treatments were applied seasonally during 2000 – 2002 according to the lower panel in Figure III-1. The map graphic in Appendix IV, Attachment 2, which shows the test plot layout and describes treatment applications, also provides a description of conditions in each test plot prior to treatment. All test plots were monitored in 2001 and 2002 for responses to treatments. In 2002, volunteers assisted with data collection.

Brushing and Thinning—Treatments were initiated in the winter of 2000 and 2001, with all Subplot A and Subplot B areas brushed of targeted exotic and over-abundant native shrubs and thinned of young selected tree species (non-native white mulberry and native boxelder, cherry, and ash) up to 6 inches in diameter at breast height (dbh). Larger stems of target trees were girdled and left standing. Cut material was chipped and applied to onsite trails. Subsequent to brush removal, all cut stems and girdled trees in all Subplot A areas were chemically treated with a glyphosate formulation (Garlon 4A) in a 25% solution with diluent blue, a mineral oil carrier. Follow-up brushing, thinning, and herbicide treatments have been conducted in the test plots at various times, following the last test plot data collection effort.

Prescribed Burning – Mid-spring (mid-April) fires were applied to all Subplot areas of each test plot having adequate fine fuels in both 2001 and 2002. Fires were managed to avoid igniting the significant downed woody debris in Test Plots 1 and 3. These and subsequent burn treatments through 2014 are documented in the compiled management history in the table in Appendix I and in the accompanying series of burn plans for years 2010 – 2014 (Figures I-1 through I-6).

Figure III-1. Test Plot Design



Treatment Schedule	2000				2001				2002			
	1	2	3	4	1	2	3	4	1	2	3	4
Brushing				X				X				
Herbiciding				X				X				
Burning						X		X		X		
Monitoring							X				X	
Reporting				X				X				X
Seeding/Planting						X	X	X		X	X	X

Seeding and Planting – Seed of 22 native savanna/oak woodland species were hand collected at Token Creek Park and Lake View Conservancy by volunteers in fall 2000 for reintroduction into all A1, B1, and C1 Subplots. A portion of the collected seed was used to produce 1000 plant plugs (a collaboration between FOLVHP volunteers and TCRN – Taylor Creek Restoration Nurseries). All plugs, but those of a few slower-growing species, were installed in the A1, B1, and C1 Subplots in spring 2001. The remaining plugs were installed in 2002. Seed from an additional 13 species purchased from TCRN were introduced into the Subplots. Volunteer stewards were actively involved in all phases of the seeding and planting treatments. Installation of the live plugs was executed in cooperation with the Sun Prairie Boy Scouts as an Eagle Scout project.

Vegetation Monitoring – All Subplot treatments were monitored during the 2001 and 2002 growing season, and subsequently in 2009, by measuring the following variables: 1) herbaceous layer species frequency, percent cover, and importance, 2) shrub stem density and canopy intercept, 3) tree canopy intercept, stem density, and basal area. In addition, shrub stem mortality, survivorship, and re-sprouts were tallied along a transect bisecting subplot treatments A, B, and C. Transects established in 1999 that bisect and extend 50 m beyond each test plot were sampled again in 2009. Only data from the herbaceous layer are included in the present analysis. All subplots were surveyed for total species presence.

Additional Measurements Not Included in this Analysis

The results of the following studies can be found in the 2003 Restoration and Management Plan.

Seedbank Study – Soil samples were collected from each Test Plot (Subplots A, B, C) at the start of the study in 2001 and grown out in two grow/harvest cycles in a controlled greenhouse setting. All species were identified and seedling frequencies tallied.

Light Level Measurements – Light levels were systematically measured in the test plots in 2001, 2002, and 2009 using a hand-held quantum meter (Basic Quantum Meter, Model BQM by Spectrum Technologies, Inc.), which approximates the light wavelengths important for plant photosynthesis. Readings were taken in ten locations across each treatment subplot (A, B, and C), averaged, and compared to light level readings in adjacent open conditions (parking lot under the water tower). The goal of restoration in Lake View Woods is to reduce shading in the understory, thus increasing light levels supportive of woodland and savanna ground cover vegetation, and of oak seedling germination and establishment (30-50% of full sunlight).

Bird Survey – Birds were surveyed twice during the breeding season from four sample point locations (see bird sample point locations in Appendix IV, Exhibit 6) selected to represent the diversity of habit types present, and spaced to minimize redundancy of observations. Two survey points (2 and 3) were proximate to test plot treatments, and two survey points were not (1 and 4). Survey methods tallied the number of bird species heard vocalizing or observed perched or in flight over one-minute intervals at each survey point location, until no new species were heard or observed (usually 15-20 minutes). Birds audible from immediately adjacent wooded and open neighborhood properties were recorded in the survey.

Statistical Analysis

For this phase of the study, we analyzed vegetative response to treatment effects using the combined cover of both vascular herbaceous and woody vegetation within the structural herb layer only (the herb layer being defined as all vegetative growth occurring within 1 meter of the ground surface). The results at this time do not include the measurements of the shrub and tree canopy layers, which will be included in a subsequent analysis. Treatments included in the analysis were prescribed burning, brushing of undesirable woody growth, use of herbicide (to control resprouting), and enhancement seeding and

planting. The experimental design included 4 plots, with 6 subplots (A1, A2, B1, B2, C1, C2) in each plot; and 4 permanent 100m transects, one of which bisected each plot (50m located within the plot and 50 meters which extended beyond the plot). Pre-treatment conditions were based on measurements taken in 1999 from 10, $1m^2$ quadrats along the entire length of each 100m transect. Measurements in 4 quadrats in each subplot in 2001, 2002, and 2009 were used to measure post-treatment conditions. A schematic of treatments applied in each subplot is presented in Table III-1.

Table III-1. Treatments by subplot.

		Treatments			
		Burn	Brush	Herbicide	Plant/Seed
Subplots	A1	*	*	*	*
	A2	*	*	*	
	B1	*	*		*
	B2	*	*		
	C1	*			*
	C2	*			
Transect	Q1 – Q3**	(T1, T4)			
	Q8 – Q10	(T2, T3)			

Note: * indicates that a treatment was conducted in the corresponding subplot.
** 1999 data from quadrats 1 – 3 in transects 1 and 4 are used for burn treatment control, quadrats 8 – 10 are used for transects 2 and 3.

We compared responses of two vegetation functional groups: 1) native and non-native species, and 2) species with similar growth habits or physiognomies (functional types)—forb/cryptogam (herbaceous flowering plants other than grasses, and ferns), grass/sedge (graminoid or grass-like species), and tree/shrub/vine (woody plant species).

Treatment effects were analyzed by pairwise comparison of subplots and selected quadrats in each transect as presented in Table III-2. The analysis scenario was applied to each vegetation group (native vs non-native and functional type), so that a total of 12 variance analyses were conducted. The results are presented in Tables III-3A – 3C, which compare treatment effects by plot (Table III-3A), by year (Table III-3B), and by plot and functional plant group (Table III-3C).

Statistical significance was tested at the 95% probability level, so that in any comparison (with the exception of the burn-only treatment in C2), significance in measuring treatment effects was achieved only when two or more tests were found to be significant, i.e. two or more symbols appear in any one cell in Tables III-3A – 3C. Where there are no symbols or only one symbol in a cell, no-significant treatment effects were measured. In the case of the burn-only treatment, only one symbol in a cell is needed to achieve significance.

Table III-2. Subplot and treatment scenarios allowing pairwise comparisons.

	A1	A2	B1	B2	C1	C2	Transect*
A1		**Plant/Seed**	**Herbicide**				
A2				**Herbicide**			
B1				**Plant/Seed**	**Brush**		
B2						**Brush**	
C1						**Plant/Seed**	
C2							**Burn**
Transect							

Note: *1999 pretreatment conditions

Results and Analysis

Pairwise Treatment and Control Comparisons

The following discussion summarizes the results of the statistical analysis of herbaceous layer cover in response to the individual treatments of burning, brushing, herbiciding, and seeding/planting as measured in the pairwise treatment and control comparisons described below and presented in Tables III-3A (Plot by Plot Comparison), III-3B (Year by Year Comparison), and III-3C (Plot/Functional Group Comparison). In this analysis, where no significant treatment effects occur, the average cover in the treatment and control subplots is statistically the same across plots, years, or functional groups.

1. **Plot by Plot Comparison of Individual Treatment Effects on Non-Native and Native Herbaceous Cover (Table III-3A)**

- **Burning**
  The burn-only treatment effects, as measured in the pairwise comparison between Subplot C2 where burn-only occurred and the 1999 pre-burn transect quadrats, show significant differences for non-native species cover between some plots (Plots 1 and 3, and Plots 2 and 3), and for native species cover between Plots 1 and 4, and Plots 2 and 4. Where no significant differences were measured, the average cover of native and non-native species before and after fire in the C2 subplots and the 1999 pre-burn controls were statistically the same, indicating fire effects were not detectable, either due to insufficient fuels and lack of fire and other factors.

- **Brushing**
  The brushing treatment effects, as measured in the pairwise comparison between Subplots B1/B2 where stems were cut but not treated with herbicide to control resprouting and the control Subplots C1/C2 where stems were not cut, show significant differences in non-native species cover between

some plots (Plots 1 and 3, and Plots 2 and 4). There were no significant differences in treatment effects for native species cover among any of the plots.

- **Herbicide**
  The herbicide treatment effects, as measured in the pairwise comparison between Subplots A1/A2 where cut stems were treated with herbicide to control resprouting and the control Subplots B1/B2 where stems were cut but not treated with herbicide, show significant differences for non-native species cover among some plots (between Plot 2 and Plots 3 and 4). There were no significant differences in treatment effects for native species cover among any of the plots.

- **Planting and Seeding**
  The planting and seeding treatment effects, as measured in the pairwise comparison between Subplots A1/B1/C1 where planting and seeding occurred and the control Subplots A2/B2/C2 where no seeding and plating occurred, show significant differences for non-native species cover among several plots (between Plot 4 and Plots 1 and 2, and between Plots 2 and 3). There were also significant differences in planting and seeding treatment effects for native species cover between the same set of plots.

2. Year by Year Comparison of Individual Treatment Effects on Non-Native and Native Cover (Table III-3B)

- **Burning**
  In a year by year comparison, significant treatment effects were measured for native species cover between the burn-only C2 subplots and the 1999 pre-burn controls between 2002 and 2009.

- **Brushing**
  There were no significant treatment effects measured for non-native cover in the B1/B2 brushing treatment and C1/C2 control subplots in the year by year comparison. There were however significant brushing treatment effects for native species cover among some years (comparing both 2001 and 2002 with 2009).

- **Herbicide**
  There were significant treatment effects measured for non-native cover in the A1/A2 herbicide treatment and B1/B2 control subplots between 2002 and 2009. There were also significance differences in treatment effects for native species cover comparing both 2001 and 2002 with 2009.

- **Planting and Seeding**
  There were no significant treatment effects measured for non-native cover in the A1/B1/C1 enhancement seeding and planting and the A2/B2/C2 control subplots among any of the years. There were however significant treatment effects measured for native species cover comparing both 2001 and 2002 with 2009.

3. Plot/ Functional Group Comparisons of Treatment Effects (Table III-3C).

- **Burning**
  There were significant treatment effects measured for the cover of the functional groups in the burn-only C2 subplots and the 1999 pre-burn controls when comparing Plots 1 and 4.

- **Brushing**
  There were significant differences in treatment effects measured for graminoid (grass/sedge) and woody (tree/shrub/vine) species in the C1B1 brushing treatment and C2B2 control when comparing Plots 2 and 3.

- **Herbicide**
  There were significant differences in treatment effects measured for graminoid (grass/sedge) species in the A1B1 herbicide treatment and A2B2 control among several plots (comparing Plots 1 and 2, and Plots 2 with Plots 3 and 4), and for forb and cryptogam (spore-producing plants including ferns) species when comparing Plots 2 with Plots 3 and 4.

- **Planting and Seeding**
  There were significant differences in treatment effects measured for forbs and cryptogam species in the A1A2, B1B2, and C1C2 seeding and planting treatment and control subplots among several plots (comparing Plots 1 with Plots 3 and 4, and comparing Plots 2 with Plots 3 and 4), and for graminoid species when comparing Plots 2 with Plots 3 and 4.

Table III-3 A – C. Analysis of Herbaceous Layer Cover in Response to Treatments

More than one symbol (highlighted cells) indicates a significant response, where $p < 0.05$ (greater than 95% confidence), with exception of the burn-only treatment where a single symbol indicates a significant response.

Δ = Adventive (non-native) species
∑ = Native species

Table III-3 A. Plot by Plot Comparison

	burn_non-native			
Plot	1	2	3	4
1				
2				
3	Δ	Δ		
4				

	burn_native			
Plot	1	2	3	4
1				
2				
3				
4	∑	∑		

∞ = A_C1B1, ≠ = A_C2B2
□ = N_C1B1, ◊ = N_C2B2

	brush_non-native			
Plot	1	2	3	4
1				
2				
3	∞ ≠	≠		
4	∞	∞ ≠		

	brush_native			
Plot	1	2	3	4
1				
2				
3	□			
4	□			

! = A_A1B1, @ = A_A2B2
~ = N_A1B1, ¤ = N_A2B2

	herbicide_non-native			
Plot	1	2	3	4
1				
2				
3	!	! @		
4	!	! @	!	

	herbicide_native			
Plot	1	2	3	4
1				
2				
3		¤		
4	¤	¤		

* = A_A1A2, $ = A_B1B2,^ = A_C1C2
# = N_A1A2, % = N_B1B2,« = N_C1C2

	plant_non-native			
Plot	1	2	3	4
1				
2	*			
3	$	* $		
4	* $	* $		

	plant_native			
Plot	1	2	3	4
1				
2				
3	«	% «		
4	# «	# % «	#	

Table III-3B. Year by Year Comparison

Δ = Adventive (non-native) species
∑ = Native species

	burn_non-native			
Year	1999	2001	2002	2009
1999				
2001				
2002				
2009				

	burn_native			
Year	1999	2001	2002	2009
1999				
2001				
2002				
2009			∑	

∞ = A_C1B1, ≠ = A_C2B2
□ = N_C1B1, ◊ = N_C2B2

	brush_non-native			
Year	1999	2001	2002	2009
1999				
2001				
2002				
2009		≠		

	brush_native			
Year	1999	2001	2002	2009
1999				
2001				
2002				
2009		□ ◊	□ ◊	

! = A_A1B1, @ = A_A2B2
~ = N_A1B1, ¤ = N_A2B2

	herbicide_non-native			
Year	1999	2001	2002	2009
1999				
2001				
2002				
2009		!	!@	

	herbicide_native			
Year	1999	2001	2002	2009
1999				
2001				
2002		¤		
2009		~ ¤	~ ¤	

* = A_A1A2, $ = A_B1B2,^ = A_C1C2
# = N_A1A2, % = N_B1B2,« = N_C1C2

	plant_non-native			
Year	1999	2001	2002	2009
1999				
2001				
2002				
2009				

	plant_native			
Year	1999	2001	2002	2009
1999				
2001				
2002				
2009		# %	# % «	

F = ForbCryp
G = Graminoid (Grass Sedge)
W = Woody (Tree Shrub Vine)

Table III-3C. Plot/Functional Group Comparison				
	burn			
Plot	1	2	3	4
1				
2				
3				
4	F			

F^1 = C1B1, F^2 = C2B2
G^1 = C1B1, G^2 = C2B2
W^1 = C1B1, W^2 = C2B2

	brush			
Plot	1	2	3	4
1				
2	G^2			
3		G^2 W^2		
4		G^2		

F^3 = A1B1, F^4 = A2B2
G^3 = A1B1, G^4 = A2B2
W^3 = A1B1, W^4 = A2B2

	herbicide			
Plot	1	2	3	4
1				
2	G^3 G^4			
3	F^3	F^3 G^3 G^4		
4		F^4 G^3 G^4		

F^5 = A1A2, F^6= B1B2, F^7= C1C2
G^8 = A1A2, G^9 = B1B2, G^{10}= C1C2
W^{11} = A1A2, W^{12}= B1B2, W^{13}= C1C2

	plant			
Plot	1	2	3	4
1				
2	G^9			
3	F^6 F^7	F^6 G^8 G^9		
4	F^5 F^7	F^6 F^7 G^8 G^9		

Species Diversity and Total Cover Comparisons

The following series of bar charts (Figures III-2 through III-5) make comparisons of native and non-native species numbers and total cover in both the transects and in the test plots. Key information from the charts is provided in the figure captions.

Photography

Baseline and 2009 conditions from 0-meter transect end points are compared in photos in Figures III-6 a – h. The photos show a clear shift from an understory of low-diversity woody cover dominated largely by common buckthorn and honeysuckle 1999 to one dominated by herbaceous plants by 2009. The exception is Test Plot 1, where the 0-meter point is located within an area where restoration has not yet been undertaken. Conditions in 2013 and 2014 were captured in a series of panoramic photos that are provided in a geospatial database linked to the map graphic in Figure II-1 (see numbered photo points).

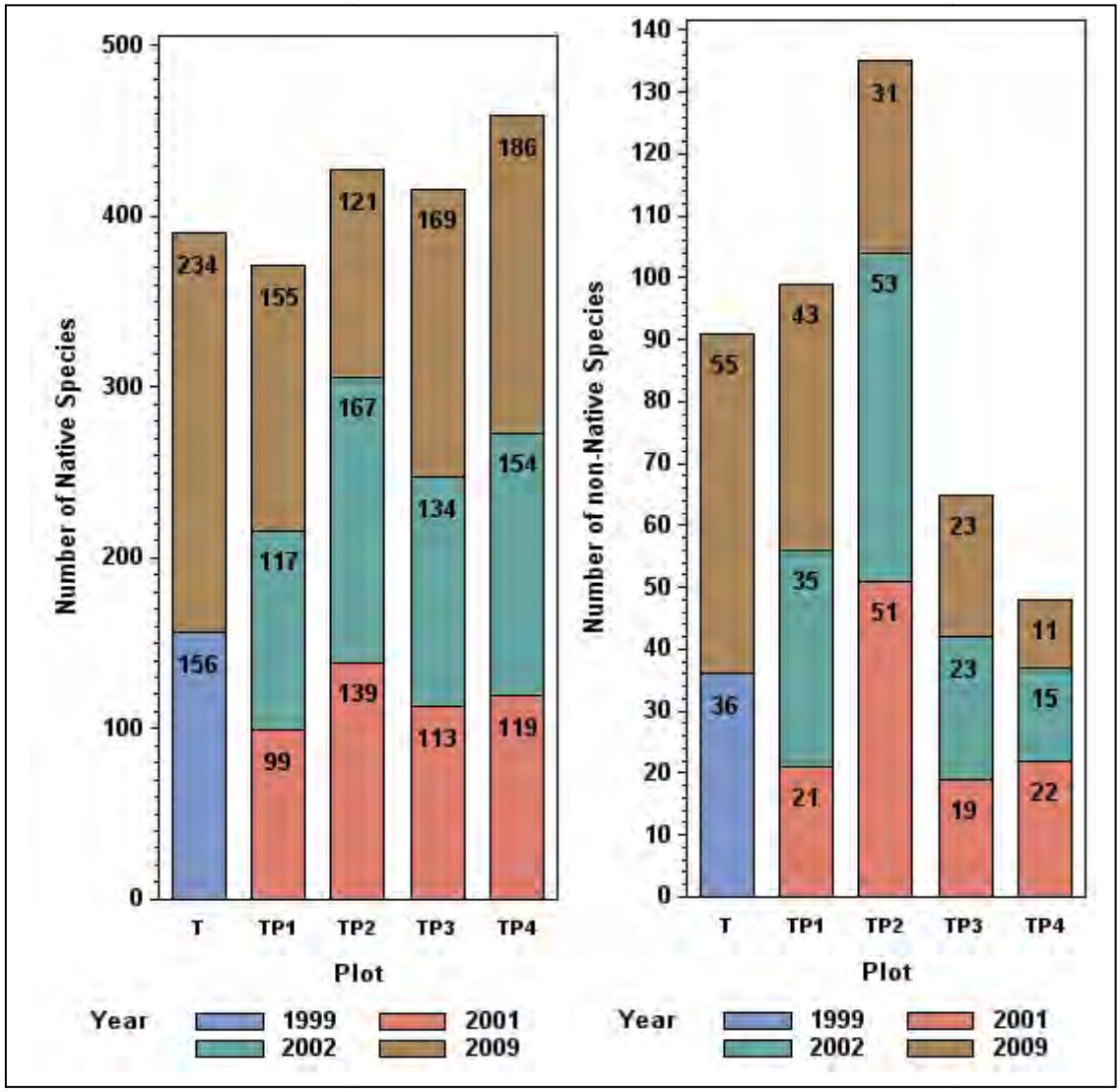


Figure III-2. Comparison of the number of native versus non-native species in the herb layer in transects and test plots from 1999 through 2009. The ratios of N:NN species numbers as indicated in the graphs are presented in the accompanying table. By 2009, the number of native species has increase beyond the number of non-native species in the transects and in TP2, TP3, and TP4.

	T	TP1	TP2	TP3	TP4
1999	4.3				
2001		4.7	2.7	5.9	5.4
2002		3.3	3.2	5.8	10.3
2009	4.3	3.6	3.9	7.3	16.9

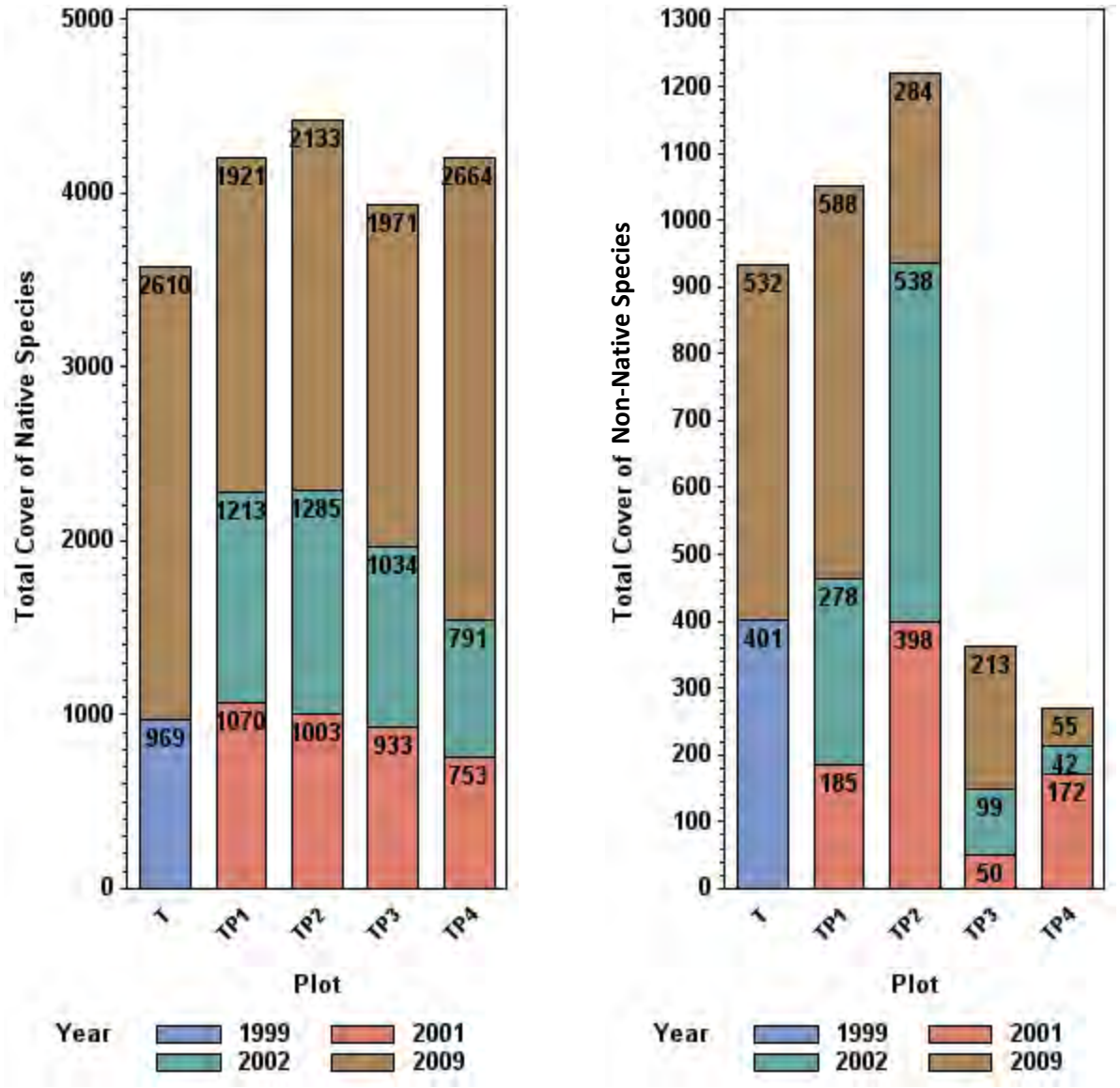


Figure III-3. Comparison of native versus non-native species cover in the herb layer in transects and test plots from 1999 through 2009. The ratios of N:NN species cover numbers as indicated in the graphs are presented in the accompanying table. By 2009, cover by native species has increase beyond that of non-native species cover in the transects and in TP2 and TP4.

	T	TP1	TP2	TP3	TP4
1999	2.4				
2001		5.8	2.5	18.7	4.4
2002		4.4	2.4	10.4	18.3
2009	4.9	3.3	7.5	9.3	48.4

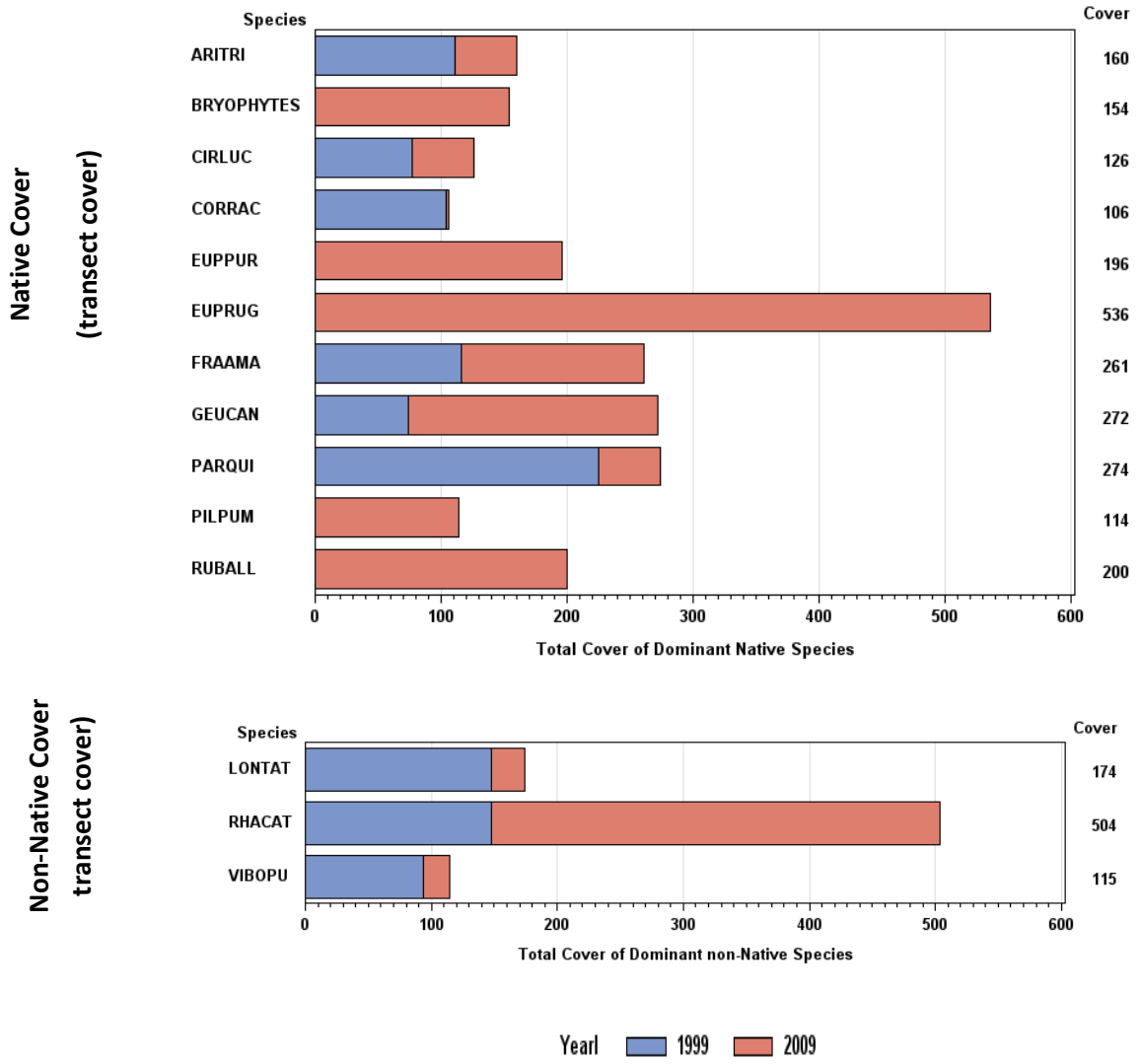


Figure III-4. Comparison of total cover for dominant native and non-native species (>100% absolute cover) as measured in transects between 1999 and 2009. By 2009, total cover by the perennial native composite white snake root (*Eupatorium rugosum*), not present in the 1999 data, exceeds that of all other natives, including the seedlings of the invasive non-native common buckthorn (*Rhamnus cathartica*). Bryophytes and three other native vascular plant species, also not represented in the 1999 data, reach a level of dominance by 2009: woodland Joe-pye (*Eupatorium purpureum*), the annual clearweed (*Pilea pumila*), and blackberry (*Rubus allegheniensis*). Tartarian honeysuckle (*Lonicera tatarica*) and European guelder rose (*Viburnum opulus*) have both declined in total cover in herb layer since 1999. Total cover by the native spring ephemeral Jack-in-the-pulpit (*Arisaema triphyllum*) declines by 2009, suggesting possible fire sensitivity. White ash (*Fraxinus americana*) maintains dominance in the herblayer over any other regenerating canopy tree species, including oak, suggesting replacement of dying canopy oaks with younger cohorts may require supplemental planting. The likelihood of ash seedlings reaching and remaining in the canopy is diminished by the increasing movement of the emerald ash borer into southern Wisconsin.

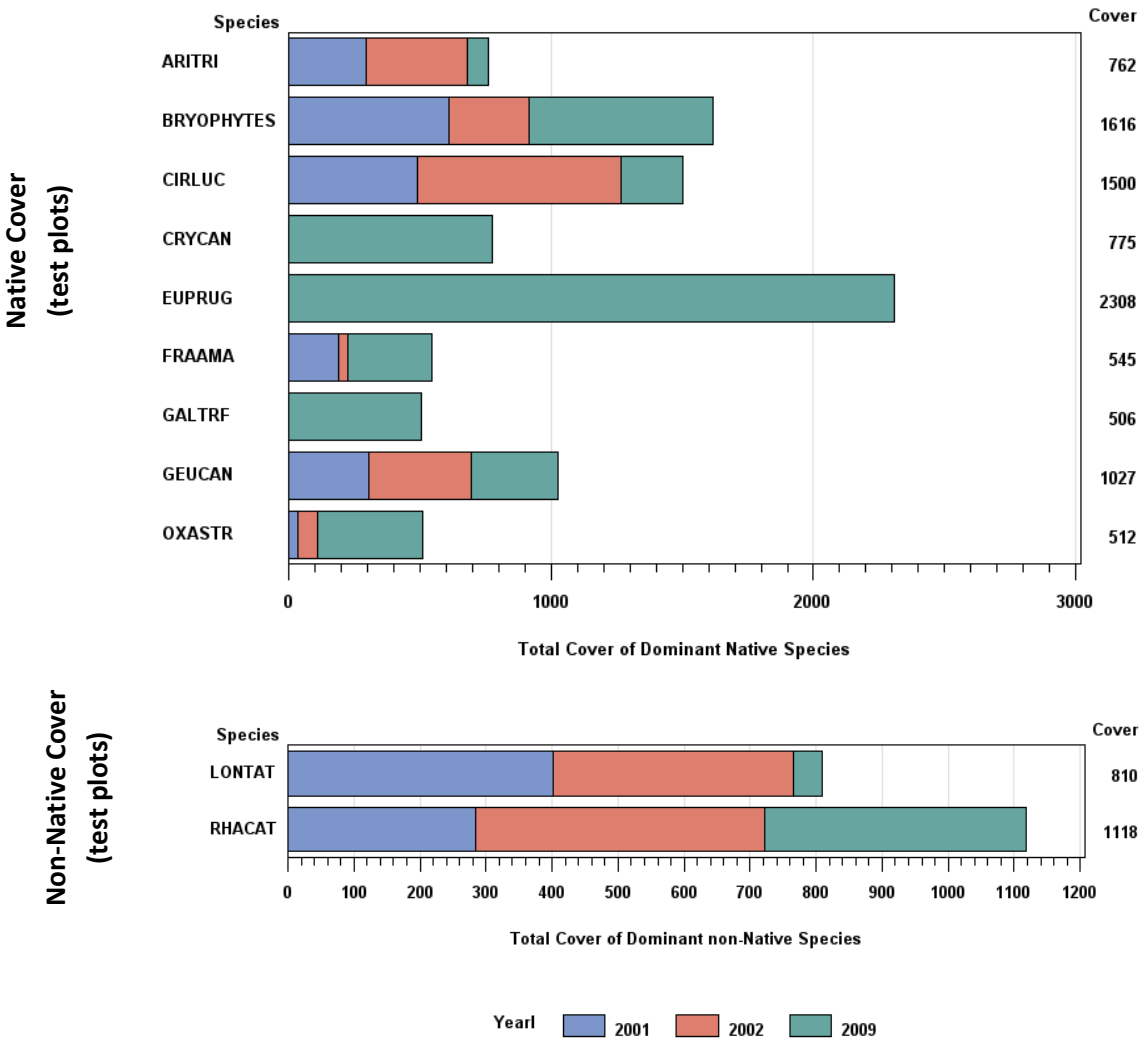


Figure III-5. Comparison of total cover for dominant native and non-native species (>500% absolute cover) as measured in test plots over three years (2001, 2002, 2009). As in the transect data, total cover of white snake root exceeds all other species, both native and non-native. This data suggests that its cover developed significantly sometime after 2002 and the initial test plot establishment, when this species was planted. This data also shows a significant reduction of Tartarian honeysuckle by 2009 and an increase in the total cover of buckthorn since 2001, when the buckthorn canopy was removed. Two native species sweet-scented bedstraw (*Galium triflorum*) and honewort (*Cryptotaenia canadensis*) appear in the test plot data in 2009.

Figure III-6. Photos comparing conditions in Transects 1 – 4 in 1999 and 2009.

a) TEST PLOT 1 – 1999

b) TEST PLOT 1 – 2009

c) TEST PLOT 2 – 1999

d) TEST PLOT 2 – 2009

e) TEST PLOT 3 – 1999

f) TEST PLOT 3 – 2009

g) TEST PLOT 4 – 1999

h) TEST PLOT 4 – 2009

Discussion

- **Plot by Plot Comparisons:**
  Planting, burning, brushing and herbicide treatments, in that order, all produced significant treatment effects in the plot by plot comparisons for both native and non-native cover in the herblayer. The strong response from planting suggests 1) the importance of adding native species propagules where the seed bank may be depleted, and 2) the additional cover from the seeded and plugged vegetation creates a more favorable environment for those species emerging from the seedbank, and together hastening the establishment of a continuous herblayer.

- **Year by Year Comparisons:**
  Planting, brushing and herbicide, and burning all had significant treatment effects, particularly for native cover in the herblayer, by year 2009, compared to all early test plot years. This suggests that, in highly disturbed settings such as this site, treatment effects need time to develop and become measurable in the field. This has been found in similar restoration research projects, where a span of several years is needed for seed banks and native species to re-establish, even with the addition of seed and plug plantings. Assuming restoration and management continue without interruption, this statistical trend of increased treatment effect over time would suggest benefits will continue to accrue into the future, including increased cover of native forb, grass, and sedge species, and the appearance of rarer species. The appearance of conservative species has in fact already begun to occur in areas with eight years or more of treatment history, with the appearance of American spikenard (*Aralia racemosa*) and Canadian white violet (*Viola canadensis*), both with a Coefficient of Conservatism[3] (C value) of 7 in the Wisconsin flora.

- **Plot and Functional Group Comparisons:**
  Grass and forb functional groups showed the greatest response to treatments, particularly in Test Plots 3 and 4, where significant treatment effects were measured for planting and use of herbicide, followed by effects of brushing and burning. Again, these treatments when integrated have the greatest impacts, as seeding and planting under a dense invasive shrub canopy would yield little to no restoration benefit without the benefits of the other treatments.

Summary & Conclusions

- Based on the overall treatment effects analysis, the strength of the treatment effects on vegetation cover in the herblayer, particularly that of native cover, was observed in the order of planting (including seeding), application of herbicide, brushing and burning (burning being inconsistent across the site, but having a significant effect in Test Plot 4 on the ridge under the oak/hickory

[3] A value of 0 – 10 assigned by experts to every native vascular plant species of a regional flora, based on the degree to which a species can tolerate disturbance and its fidelity to undegraded conditions, with 0 being the most tolerant of disturbance and 10 being the least tolerant.

canopy). In practical application, an integrated approach combining all treatments in proper succession (brushing in combination with herbicide application to cut stumps, followed by burning and subsequent enhancement seeding and planting, which benefits significantly from all other treatments) is necessary to maximize restoration benefits. This strategy should be continued in the restoration and management of the woodland communities at Lake View Hill Park.

- The data suggests that the significant differences between treatment effects are most apparent between the more mesic, less combustible test plots (Test Plots 1 and 2) on the north-facing slopes compared to the more combustible dry to dry-mesic plots on the ridge top and west-facing slopes (Test Plots 3 and 4). These slope and aspect variables are augmented by variation in disturbance history, particularly for Plots 1 and 2 which both occur in locations where either a historic hog confinement structure and paddock was situated (Test Plot 1) or where an open field was maintained for sometime before advancing to a stand of aspen and black locust (Test Plot 2; see the 1937 aerial image on the inside cover of the 2003 Lake View Restoration and Management Plan). Mature oak trees are largely absent within and in the vicinity of these plots. On the other hand, Test Plots 3 and 4 are located on the ridge top where some of the largest diameter oaks continue to dominate the canopy and produce reliable quantities of combustible fine fuel.

- The conditions in the previous bullet point, particularly the lack of combustible fine fuels and lack of effective fire treatments, help to explain why the mesic (Test Plots 1 and 2) and the dry to dry-mesic plots (Test Plots 3 and 4) have diverged in their response to treatments, as suggested in the analysis. For example, in the dry to dry-mesic plots in upland ridge settings, the brushing, herbiciding of cut stumps, burning and seeding/planting treatments all had significant effects toward encouraging native herbaceous plant cover and discouraging non-native herbaceous and woody plant cover (the latter including invasive buckthorn and honeysuckle). The opposite occurred in the mesic test plots, where native species cover increased, along with a concurrent increase in non-native herbaceous and woody plant cover.

- The inconsistent nature of applying prescribed burning treatments within a plot, and within any given year across all plots, appears to have had a pronounced effect on evaluating the treatment effects of prescribed burning in restoring the mesic and dry to dry-mesic understory. By its nature, prescribed burning, unlike brushing, seeding, or application of herbicide, occurs only where and when conditions for supporting combustion are favorable—adequate loading of dry, fine fuel, and low enough humidity and wind speeds (influenced by exposure to sun and wind) must co-occur in time and space on the land in order to conduct a controlled burn. Ecologically speaking, inconsistent burn results (patchy burns) at the landscape scale are in fact desirable because they increase the diversity of responses of the natural system in contrast to the somewhat uniform responses or homogenization measured in completely blackened landscapes. Nevertheless, testing prescribed fire effects in highly heterogeneous woodland test plot settings, with scattered or only patchy appropriate fuel loads and combustibility, has in this study contributed to detecting significant burn treatment effects in our test results only where adequate fine fuels are regularly

available (under oak canopy on the ridge and adjacent areas). The lack of burn treatment effects, which were anticipated on the north slope, given the poor burning conditions, does not diminish the role of prescribed fire and the benefits it has profited management efforts at Lake View Hill Park, particularly on the ridge top and in adjacent areas with adequate fuels in the form of oak leaf litter. These results also suggest that the effects of prescribed burning will perhaps become more measurable at the ground story level beyond these initial years of study, once burning can be more consistently applied in other areas of woods and plot locations.

In other investigations we have conducted, prescribed burning treatment effects are typically found to most strongly correlate with reductions in the cover of woody vegetation, such as invasive shrub cover, canopy intercept, and stem density. Although not included in the present analysis, reductions of woody stems were measured in areas where consistent burning occurred in the Park's woodland settings (Test Plots 3 and 4), and where initial brushing and use of herbicide to reduce resprouting from cut stumps was followed by resprout treatments and effective burning (Test Plots 3 and 4, and in part Test Plot 2). The use of fire, after a decade or more, in heavy soils (such as the silt and clay loams found in the Park) also typically correlates with the regeneration of oak and hickory seedlings, as these species require a mineralized seed bed for successful germination (in other words, a fire scar on the ground). Germination rates in such conditions can often occur at a rate of thousands to tens of thousands of seedlings per acre, if the burning coincides with good hard mast (acorn and nut) production years. In lighter soils (sands and fine sands and silts) the response of oak regeneration is rapid, typically within the first or second prescribed burn. The herblayer data tells us that white ash seedlings continue to be a dominant component in the understory based on total cover in both the transect data (see Figure III-4) and in the test plots (see Figure III-5), compared to oak and hickory seedlings, which do not reach a level of dominance in this analysis. This suggests that replacement of dying canopy oaks with younger cohorts may require supplemental planting. The likelihood of ash seedlings reaching and remaining in the canopy will be diminished by the increasing movement of the emerald ash borer into southern Wisconsin.

- Previous observations made following completion of the 2003 test plot study continue to be relevant. The following observations were made in 2003:

    - Firing in the test plots has been of sufficient intensity, where oak leaf litter provides continuous fuel and produces sufficiently high temperatures, to stress and even kill small diameter (1/4-3/4 inch) stems of woody growth, including re-sprouting cut, but chemically un-treated, stems. Firing should continue to be used to initiate reduction of the shrub canopy, where oak leaf litter is sufficient (generally, the south end of the site and upper north slope), while cutting and herbicide treatments should be applied to areas, where oak leaf litter is sparse or absent.

    - Removal of exotic shrubs and trees and thinning of the understory canopy have achieved increased light levels, resulting in an increase in oak seedling production in two of the test plots (Test Plots 3 and 4). Light meter readings, however, suggest light levels remain below the target 30-50% of full sunlight conditions, necessary for germination and advanced

growth of oaks. Monitoring for oak seedling survivorship should be made part of an annual vegetation monitoring effort in all treatment areas. In treatment areas where oak acorn production is minimal, due to the absence of mature canopy oaks, acorns should be hand broadcasted from collections made on site or from approved neighborhood locations.

- Soil seed banks are insufficient in many locations to provide adequate soil-stabilizing cover and species diversity following brushing and burning treatments, and therefore appropriate seed and plant materials should be introduced into treatment areas. Some desirable species are present in sufficient numbers on site, to provide a seed source for collections and propagation.

Appendix IV. Map Exhibits from 2003 Restoration & Management Plan

Map, target community species lists, and implementation schedule exhibits from the 2003 Restoration & Management Plan are provided for quick reference in the following Attachments 1 – 8.

Attachment 1. Ecological Land Cover & Cultural Features as Mapped in 1999 Baseline Study (Exhibit 5 from the Lake View Conservancy Restoration and Management Plan, AES 2003).

EXHIBIT 5.
ECOLOGICAL LAND COVER & CULTURAL FEATURES
AS MAPPED IN 1999 BASELINE STUDY
LAKE VIEW CONSERVANCY

Property Boundary
Primary Trails
Secondary Trails

Vegetation Cover
- Mesic Young-Growth Woods (occasional large red and white oaks/white ash and boxelder/dense buckthorn and honeysuckle/enchanter's night shade and white avens)
- Dry-Mesic White Oak-Red Oak Woods (black cherry and ash/buckthorn, dogwood, and honeysuckle/woodbine and Jack-in-the-pulpit)
- Dry-Mesic White Oak-Hickory (black cherry/dogwood and honeysuckle/woodbine and wild geranium)
- Picnic Grounds (oaks, conifers, and mixed hardwoods)

1. Aspen
2. Black locust
3. Storm damage 1991 and oak wilt infestation-hazard tree removal and re-stocking

Rare or Unusual Plant Populations
4. Yellow giant hyssop (Agastache nepetoides), State Threatened Species; in 1999 a population of 6 in west location and 3 in east location.
5. Tall milkweed (Asclepias exaltata), special-interest plant species; in 1999 a population of 1.
6. Helleborine (Epipactis helleborine), non-native orchid; in 1999 a population of 1

Cultural Features
7. Cement foundation
8. Spoils pile and fill area
9. Unconfirmed cultural feature (earthen berm)
10. Water tower and communications antenna
11. Cement pond
12. Dane County Health and Human Services Complex
13. Church
14. Cemetery
15. Mowed lawn
16. Conifer buffer
17. Old quarry

0 100' 200' 400'
SCALE: 1"= 200'
N W E S

Drawn by: t.e.g.
Date: 12-10-2002

Dane County Parks
Dane County Parks Commission
4318 Robertson Road
Madison, Wisconsin 53714

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17921 Smith Road, P.O. Box 256
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E-mail: info@appliedeco.com

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Attachment 2. Baseline Transect, Test Plot and Bird Survey Locations (Exhibit 6 from the Lake View Conservancy Restoration and Management Plan, AES 2003).

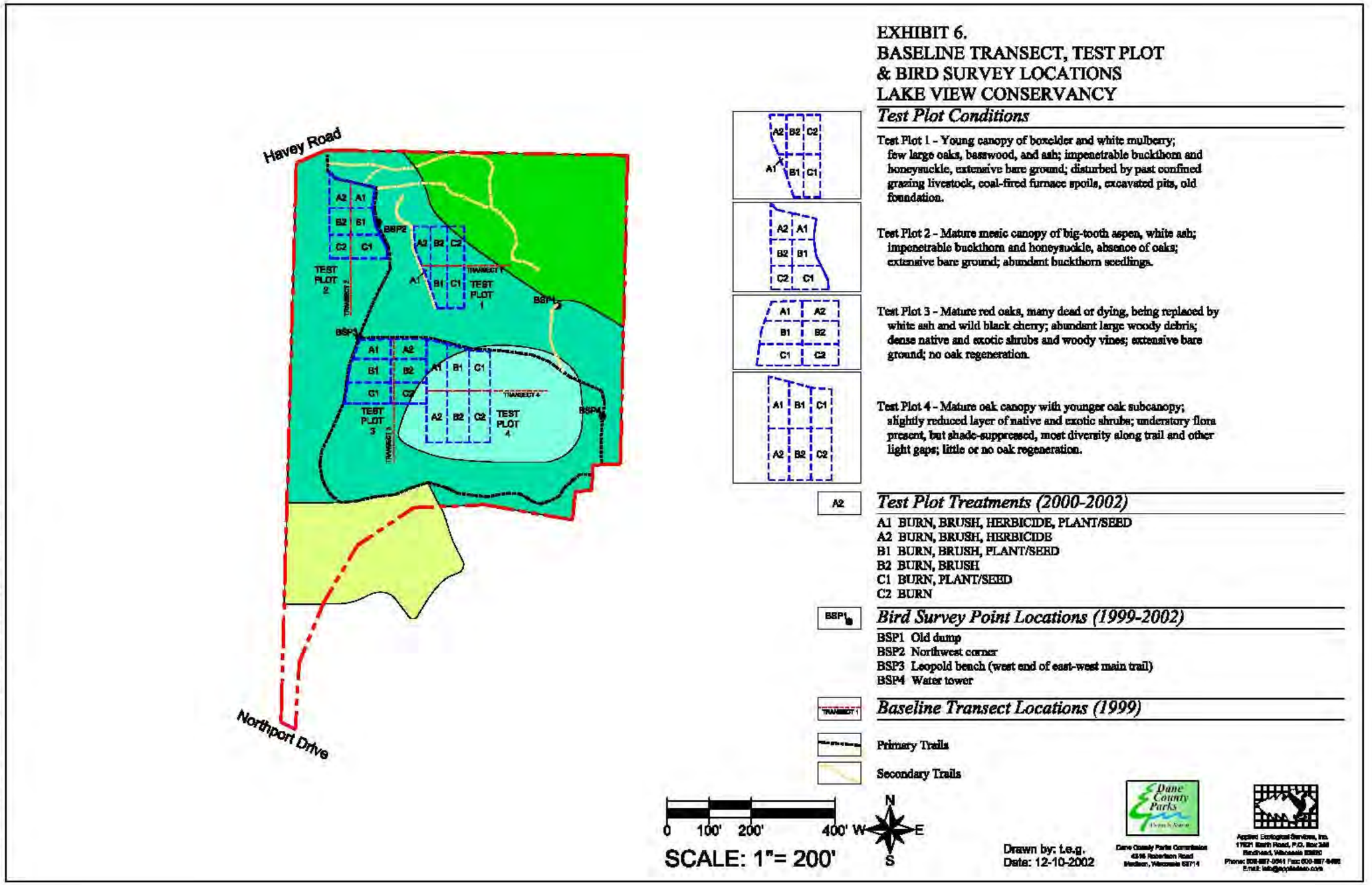

EXHIBIT 6.
BASELINE TRANSECT, TEST PLOT & BIRD SURVEY LOCATIONS LAKE VIEW CONSERVANCY

Test Plot Conditions

Test Plot 1 - Young canopy of boxelder and white mulberry; few large oaks, basswood, and ash; impenetrable buckthorn and honeysuckle, extensive bare ground; disturbed by past confined grazing livestock, coal-fired furnace spoils, excavated pits, old foundation.

Test Plot 2 - Mature mesic canopy of big-tooth aspen, white ash; impenetrable buckthorn and honeysuckle, absence of oaks; extensive bare ground; abundant buckthorn seedlings.

Test Plot 3 - Mature red oaks, many dead or dying, being replaced by white ash and wild black cherry; abundant large woody debris; dense native and exotic shrubs and woody vines; extensive bare ground; no oak regeneration.

Test Plot 4 - Mature oak canopy with younger oak subcanopy; slightly reduced layer of native and exotic shrubs; understory flora present, but shade-suppressed, most diversity along trail and other light gaps; little or no oak regeneration.

Test Plot Treatments (2000-2002)

A1 BURN, BRUSH, HERBICIDE, PLANT/SEED
A2 BURN, BRUSH, HERBICIDE
B1 BURN, BRUSH, PLANT/SEED
B2 BURN, BRUSH
C1 BURN, PLANT/SEED
C2 BURN

Bird Survey Point Locations (1999-2002)

BSP1 Old dump
BSP2 Northwest corner
BSP3 Leopold bench (west end of east-west main trail)
BSP4 Water tower

Baseline Transect Locations (1999)

Primary Trails

Secondary Trails

Attachment 3. Target Ecological Communities (Exhibit 7 from the Lake View Conservancy Restoration and Management Plan, AES 2003).

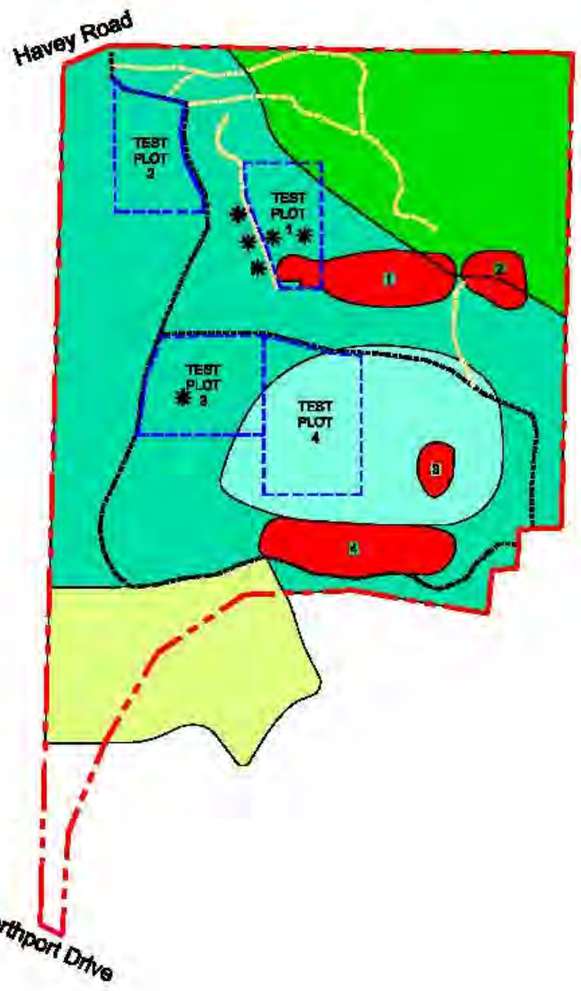

EXHIBIT 7.
TARGET ECOLOGICAL COMMUNITIES
LAKE VIEW CONSERVANCY

Target Ecological Communities & Special Management Areas

Southern mesic forest (3.22 acres) - cool, shaded northeast-facing slopes, well-drained soil, low shrub density, low stature (<18") herb layer; sugar/black maple, basswood, red elm, and red oak, bladdernut, wild leek, mayapple, blue cohosh, bloodroot, long-awned wood grass, cerulean warbler, red-eyed vireo, ovenbird, woodpecker (hairy and red-bellied).

Southern dry-mesic forest (9.43 acres) - higher exposure, mid-and lower slopes on well-drained soils, highest shrub density, moderate-stature herb layer (~18"); red and white oak, basswood, sugar/black maple, alternate-leaved dogwood, wild geranium, bottlebrush grass, pointed tick trefoil, bellwort, wood thrush, American redstart, blue-gray gnatcatcher, veery, squirrel (gray, flying, and fox).

Southern dry forest (2.29 acres) - ridge top and upper slopes, dry, shallow soils, conspicuous shrub layer, increased-stature herb layer (>18"); oaks (black, white, bur, and red), wild black cherry, American hazelnut, gray dogwood, feathery false solomon's seal, wild geranium, Pennsylvania sedge,shinning bedstraw, scarlet tanager, downy woodpecker, rose breasted grosbeak, cardinal, blue jay, red-headed woodpecker, squirrel (gray, flying, and fox).
Note: over time, the regular use of fire may move dry and dry-mesic forest to a more savanna-like community, with a reduced shrub layer.

Proposed expansion of Southern dry-mesic forest (2.22 acres)

1 Coal-fired furnace spoils (clinkers)

2 Old dump

3 Anthropogenic earthwork protected by the Office of the State Archaeologist (disturbance activities occurring within a 5-foot buffer must be coordinated with the Burial Sites Preservation Office)

4 Black locust infestation

Test Plot Boundaries

Approximate location of excavated pits and mounds.

Primary Trails

Secondary trails proposed for closure and revegetation.

0 100' 200' 400' W N E S

SCALE: 1"= 200'

Drawn by: t.e.g.
Date: 12-10-2002

Dane County Parks

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4318 Robertson Road
Madison, Wisconsin 53714

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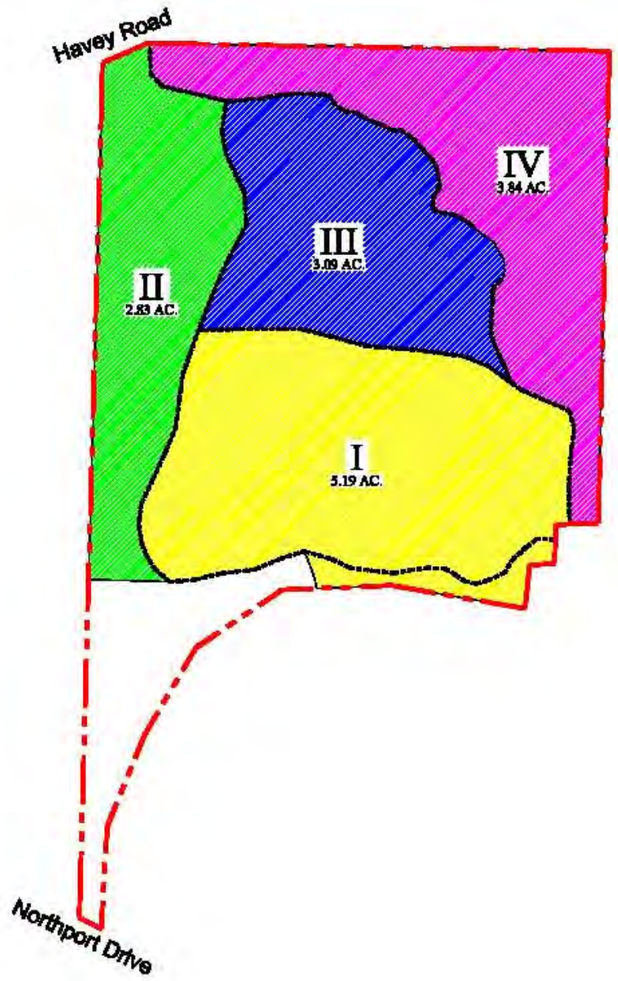
Attachment 4. Management Units-Burn Zones & Schedule (Exhibit 8 from the Lake View Conservancy Restoration and Management Plan, AES 2003).

EXHIBIT 8.
MANAGEMENT UNITS-BURN ZONES & SCHEDULE
LAKE VIEW CONSERVANCY



Management Units-Burn Zones

- Zone I — Burn 4 out of 10 years
- Zone II — Burn 3 out of 10 years
- Zone III — Burn 3 out of 10 years
- Zone IV — Burn 1 out of 10 years
- Trails

Zone	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
I	■		■				■			■
II				■	■				■	
III			■		■			■		
IV										■

0 100' 200' 400'

N W E S

SCALE: 1"= 200'

Drawn by: t.e.g.
Date: 12-10-2002

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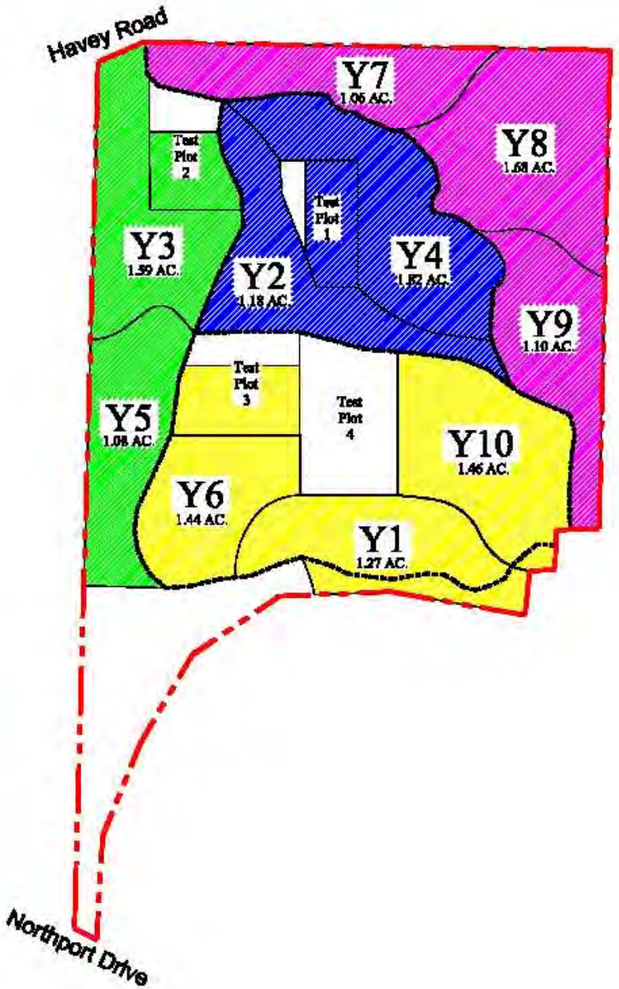
Attachment 5. Management Units-Brushing Zones & Schedule (Exhibit 9 from the Lake View Conservancy Restoration and Management Plan, AES 2003).

EXHIBIT 9.
MANAGEMENT UNITS-BRUSHING ZONES & SCHEDULE
LAKE VIEW CONSERVANCY



Management Units-Brushing Zones

- Zone I-Years 1, 6, & 10
- Zone II-Years 3 & 5
- Zone III-Years 2 & 4
- Zone IV-Years 7, 8 & 9
- Trails

Zone	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
I	Y1					Y6				Y10
II			Y3		Y5					
III		Y2		Y4						
IV							Y7	Y8	Y9	

0 100' 200' 400'

N W E S

SCALE: 1"= 200'

Drawn by: t.e.g.
Date: 12-10-2002

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Attachment 6. Management Units-Seeding/Planting Zones & Schedule (Exhibit 10 from the Lake View Conservancy Restoration and Management Plan, AES 2003).

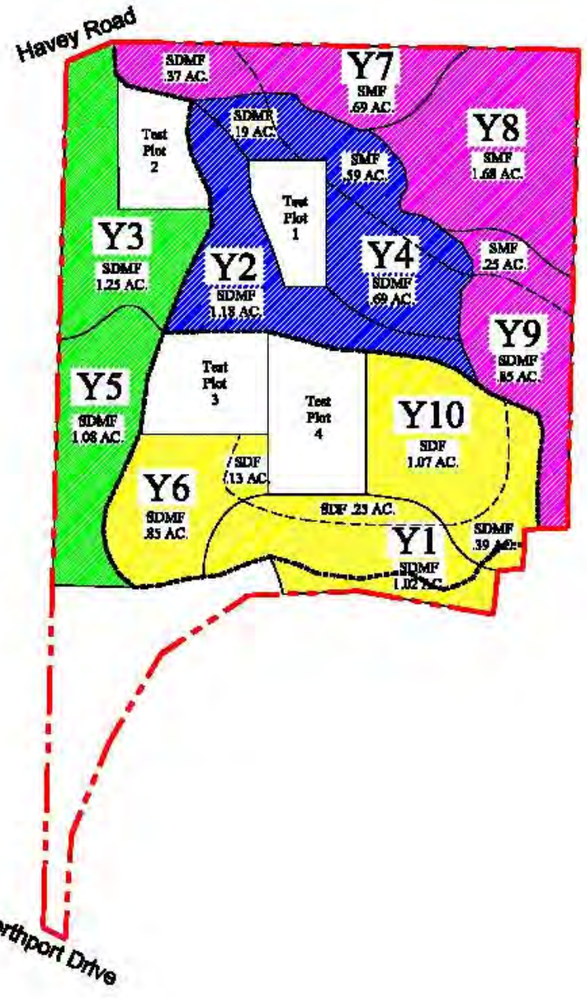

EXHIBIT 10.
MANAGEMENT UNITS-SEEDING/PLANTING ZONES & SCHEDULE
LAKE VIEW CONSERVANCY

Management Units-Seeding/Planting Zones

Zone I
Y1-SDF (.25 AC.), SDMF (1.02 AC.)
Y6-SDF (.13 AC.), SDMF (.85 AC.)
Y10-SDF (1.07 AC.), SDMF (.39 AC.)

Zone II
Y3-SDMF (1.25 AC.)
Y5-SDMF (1.08 AC.)

Zone III
Y2-SDMF (1.18 AC.)
Y4-SMF (.59 AC.), SDMF (.88 AC.)

Zone IV
Y7-SMF (.69 AC.), SDMF (.37 AC.)
Y8-SMF (1.68 AC.)
Y9-SMF (.25 AC.), SDMF (.85 AC.)

Trails

Zone	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
I	Y1S	Y1P				Y6F	Y6SP			Y10SP
II			Y3F	Y3SP	Y5SP					
III		Y2F	Y2SP	Y4F	Y4SP					
IV							Y7F	Y7SP Y8F	Y8SP Y9F	Y9SP

0 100' 200' 400'
SCALE: 1"= 200'
N W E S

Drawn by: t.e.g.
Date: 12-10-2002

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Attachment 7. Target Plant Communities-Seeding/Planting Lists (Exhibit 11 from the Lake View Conservancy Restoration and Management Plan, AES 2003).

EXHIBIT 11.
TARGET PLANT COMMUNITIES-SEEDING/PLANTING LISTS
LAKE VIEW CONSERVANCY

Seeding/Planting Lists & Specifications

SDF – Southern Dry Forest (6 acres)

- Seed a minimum of 50% of each Seeding/Planting Zone with a fuel matrix mix including at least two grass species from the list together with an appropriate annual or short-lived perennial cover crop mix at a rate of 20 lbs/acres, or a rate sufficient to provide an early fuel matrix.
- Plant a minimum of 1000 plugs/acre using a minimum of 25 grass, sedge, and forb species selected from the following list.
- Plant no more than a total of 30 stems/acre of the shrub and vine species listed.
- *Species growing at Lakeview Woods Conservancy providing a potential seed source.

Shrubs & Vines:

*Corylus americana	American hazelnut
*Celastrus scandens	Climbing bittersweet
*Lonicera prolifera	Yellow honeysuckle
Rosa blanda	Early wild rose

Grasses:

*Bromus pubescens	Woolland brome
*Elymus villosus	Silky wildrye
Festuca obtusa	Nodding fescue
*Hystrix patula	Bottlebrush grass

Sedges:

*Carex pensylvanica	Common oak sedge
*Carex rosea	Curby-styled wood sedge
Carex brevipila	Hairy wood sedge

Forbs & Ferns:

Adiantum pedatum	Maidenhair fern
*Agastache nepetoides	Yellow giant hyssop
Aquilegia canadensis	Columbine
Anemone quinquefolia	Thimbleweed
*Anemone quinquefolia	Wood anemone
*Arisaema triphyllum	Pole milkweed
*Arisaema triphyllum	Jack-in-the-pulpit
Aster shortii	Short's aster
*Athyrium filix-femina michauxii	Lady fern
Botrychium virginianum	Rattlesnake fern
Ceanothus americanus	New Jersey tea
Cypripedium parviflorum	Yellow lady's slipper
*Desmodium glutinosum	Pointed tick trefoil
*Fragaria virginiana	Wild strawberry
*Geranium maculatum	Wild geranium
*Helianthus strumosus	Pale-leaved sunflower
*Monarda fistulosa	Wild bergamot
*Osmorhiza claytonii	Hairy sweet cicely
Polemonium reptans	Jacob's ladder
Phlox subulata	Moss pink
Polygonatum canaliculatum	Solomon's seal
Prenanthes alba	Lion's foot
Sanguinaria canadensis	Bloodroot
*Solidago ulmifolia	Elm-leaved goldenrod
Tiarella cordifolia	Foamflower
*Veronicastrum virginicum	Culver's root

Fuel Matrix:

Lolium multiflorum	Annual rye
Avena sativa	Cereal oats

SDMF – Southern Dry-Mesic Forest (16 acres)

- Seed a minimum of 50% of each Seeding/Planting Zone with a fuel matrix mix including at least two grass species from the list together with an appropriate annual or short-lived perennial cover crop mix at a rate of 20 lbs/acres, or a rate sufficient to provide an early fuel matrix.
- Plant a minimum of 1000 plugs/acre using a minimum of 25 grass, sedge, and forb species selected from the following list.
- Plant 2-inch caliper trees of the species listed, as necessary to replace boxelder, mulberry, and other weedy trees removed from the canopy.
- Plant no more than a total of 40 stems/acre of the shrub and vine species listed.
- *Species growing at Lakeview Woods Conservancy providing a potential seed source.

Trees:

*Quercus alba	White oak
*Quercus rubra	Red oak

Shrubs & Vines:

*Cornus alternifolia	Pagoda dogwood
*Cornus rugosa	Round-leaved dogwood
*Corylus americana	American hazelnut
*Celastrus scandens	Climbing bittersweet
*Lonicera prolifera	Yellow honeysuckle
*Sambucus canadensis	Elderberry

Grasses:

*Agrostis perennans	Thin grass
Brachyelytrum erectum	Long-awned wood grass
*Bromus pubescens	Woolland brome
*Elymus villosus	Silky wild rye
*Hystrix patula	Bottlebrush grass

Sedges:

*Carex cephalophora	Short-headed bracted sedge
*Carex gracillima	Graceful sedge
*Carex hirtifolia	Hairy wood sedge
*Carex pensylvanica	Common oak sedge
*Carex rosea	Curly-styled wood sedge
*Carex sparganioides	Loose-headed bracted sedge

Forbs &Ferns:

Actaea pachypoda	White baneberry
Adiantum pedatum	Maiden hair fern
*Allium tricoccum	Wild leek
*Anemone quinquefolia	Wood anemone
Aruncus virgatus	Tall anemone
*Arisaema triphyllum	Jack-in-the-pulpit
Aster shortii	Short's aster
*Athyrium filix-femina michauxii	Lady fern
Botrychium virginianum	Rattlesnake fern
*Campanula americana	Tall bellflower
*Caulophyllum thalictroides	Blue cohosh
*Desmodium laevigata	Tick trefoil
*Desmodium glutinosum	Pointed tick trefoil
Fragaria virginiana	Wild strawberry
*Geranium maculatum	Wild geranium
*Helianthus strumosus	Pale-leaved sunflower
Hydrophyllum virginianum	Virginia waterleaf
*Osmorhiza claytonii	Hairy sweet cicely
Osmunda claytoniana	Interrupted fern
*Caulophyllum giganteum	Mayapple
Polygonatum canaliculatum	Solomon's seal
*Phlox subulata	Lopseed
Prenanthes alba	Lion's foot
Sanguinaria canadensis	Bloodroot
*Solidago ulmifolia	Elm-leaved goldenrod
*Triantenum perfoliatum	Late horse gentian
Uvularia grandiflora	Bellwort
Veronicastrum virginicum	Culver's root
*Viola pubescens	Yellow violet

Fuel Matrix:

Lolium multiflorum	Annual rye
Avena sativa	Cereal oats

SMF – Southern Mesic Forest 6 acres)

- Seed a minimum of 50% of each Seeding/Planting Zone with a fuel matrix mix including at least two grass species from the list together with an appropriate annual or short-lived perennial cover crop mix at a rate of 20 lbs/acres, or a rate sufficient to provide an early fuel matrix.
- Plant a minimum of 1500 plugs/acre using a minimum of 25 grass, sedge, and forbs species selected from the following list.
- Plant 2-inch caliper trees of the species listed, as necessary to replace boxelder, mulberry, and other weedy trees removed from the canopy.
- Plant no more than a total of 10 stems/acre of the shrub and vine species listed.
- *Species growing at Lakeview Woods Conservancy providing a potential seed source.

Trees:

Acer nigrum	Black maple
*Quercus rubra	Red oak

Shrubs & Vines:

*Cornus alternifolia	Pagoda dogwood
*Celastrus scandens	Climbing bittersweet
*Lonicera prolifera	Yellow honeysuckle
*Sambucus canadensis	Elderberry
*Viburnum lentago	Nannyberry

Grasses:

*Agrostis perennans	Thin grass
Brachyelytrum erectum	Long-awned wood grass
*Bromus pubescens	Woolland brome

Sedges:

*Carex cephalophora	Short-headed bracted sedge
*Carex gracillima	Graceful sedge
*Carex pensylvanica	Common oak sedge
*Carex rosea	Curly-styled wood sedge
*Carex sparganioides	Loose-headed bracted sedge

Forbs & Ferns:

Actaea pachypoda	White baneberry
Adiantum pedatum	Maiden hair fern
*Allium tricoccum	Wild leek
*Anemone quinquefolia	Wood anemone
*Arisaema triphyllum	Jack-in-the-pulpit
*Athyrium filix-femina michauxii	Lady fern
Botrychium virginianum	Rattlesnake fern
*Campanula Americana	Tall bellflower
*Caulophyllum thalictroides	Blue cohosh
Claytonia virginica	Spring beauty
*Dentaria laciniata	Toothwort
Dicentra cucullaria	Dutchman's breeches
*Dryopteris spinulosa	Spinulose shield fern
Erythronium albidum	White trout lily
*Geranium maculatum	Wild geranium
Hepatica acutiloba	Sharp-lobed hepatica
Hydrophyllum virginianum	Virginia waterleaf
Impatiens biflora	Jewelweed
*Matteuccia struthiopteris	Ostrich fern
*Osmorhiza claytonii	Hairy sweet cicely
*Podophyllum peltatum	Mayapple
Polygonatum canaliculatum	Solomon's seal
Prenanthes alba	Lion's foot
Sanguinaria canadensis	Bloodroot
Solidago flexicaulis	Zig-zag goldenrod
*Solidago ulmifolia	Elm-leaved goldenrod
Trillium flexipes	Drooping trillium
Trillium recurvatum	Red trillium
Uvularia grandiflora	Bellwort
*Viola pubescens	Yellow violet

Fuel Matrix:

Lolium multiflorum	Annual rye
Avena sativa	Cereal oats

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Attachment 8. Lake View Conservancy Master Schedule for Restoration, Monitoring & Volunteer Activities (Exhibit 12 from the Lake View Conservancy Restoration and Management Plan, AES 2003).

EXHIBIT 12.
LAKE VIEW CONSERVANCY MASTER SCHEDULE FOR RESTORATION, MONITORING & VOLUNTEER ACTIVITIES

LAKE VIEW CONSERVANCY - MASTER SCHEDULE FOR RESTORATION, MONITORING & VOLUNTEER ACTIVITIES

ACTIONS	C= Contractor Cb= Burning Cbr= Brushing Cc= Consulting Cp= Plants Cs= Seed V= Volunteers P= Parks Staff	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
BURN	Cb, V	Cb 5.19 ac V 10 hrs		Cb 8.23 ac V 20 hrs	Cb 2.83 ac V 10 hrs	Cb 5.92 ac V 10 hrs		Cb 5.19 ac V 10 hrs	Cb 3.09 ac V 10 hrs	Cb 2.83 ac V 10 hrs	Cb 3.34 ac V 10 hrs	Cb 37.17 ac V 100 hrs
BRUSH, THIN CANOPY & HERBICIDE	Cbr, V, P	Cbr 1.27 ac V 10 hrs P 10 hrs	Cbr 1.18 ac V 10 hrs P 10 hrs	Cbr 1.25 ac V 10 hrs P 10 hrs	Cbr 1.47 ac V 10 hrs P 10 hrs	Cbr 1.08 ac V 10 hrs P 10 hrs	Cbr .98 ac V 10 hrs P 10 hrs	Cbr 1.06 ac V 10 hrs P 10 hrs	Cbr 1.68 ac V 10 hrs P 10 hrs	Cbr 1.10 ac V 10 hrs P 10 hrs	Cbr 1.46 ac V 10 hrs P 10 hrs	Cbr 12.53 ac V 100 hrs P 100 hrs
INSTALL SEEDS & PLANTS (Seeding rate 4 lbs/ac; Planting rate 1000 plugs/ac)	Cs, V	(Seed 1.27 ac) Cs 3 hrs V 2 hrs	(Seed 1.18 ac) (Plant 1.27 ac) Cs 8 hrs V 20 hrs	(Seed 2.43 ac) (Plant 1.18 ac) Cs 8 hrs V 20 hrs	(Seed 2.72 ac) (Plant 1.25 ac) Cs 8 hrs V 20 hrs	(Seed 2.55 ac) (Plant 2.55 ac) Cs 8 hrs V 40 hrs	(Seed .98 ac) Cs 3 hrs V 2 hrs	(Seed 2.04 ac) (Plant .98 ac) Cs 8 hrs V 15 hrs	(Seed 2.74 ac) (Plant 1.06 ac) Cs 8 hrs V 20 hrs	(Seed 2.78 ac) (Plant 1.68 ac) Cs 8 hrs V 25 hrs	(Seed 2.56 ac) (Plant 2.56 ac) Cs 16 hrs V 40 hrs	(Seed 21.25 ac) (Plant 12.53 ac) Cs 78 hrs V 204 hrs
MONITOR (Site Inspections & Quantitative Sampling)	Cc, V	Cc 5 hrs V 10 hrs	Cc 5 hrs V 10 hrs	Cc 5 hrs V 10 hrs	Cc 5 hrs V 10 hrs	Cc 75 hrs V 20 hrs	Cc 5 hrs V 10 hrs	Cc 5 hrs V 10 hrs	Cc 5 hrs V 10 hrs	Cc 5 hrs V 10 hrs	Cc 75 hrs V 20 hrs	Cc 190 hrs V 120 hrs
COLLECT & CLEAN SEED /PROPAGATE PLANTS	Cs, Cp, Cc, V	Cs 24 hrs Cc 12 hrs V 30 hrs	Cs 24 hrs Cp 1,270 Cc 12 hrs V 30 hrs	Cs 24 hrs Cp 1,180 Cc 10 hrs V 30 hrs	Cs 24 hrs Cp 1,250 Cc 8 hrs V 30 hrs	Cs 24 hrs Cp 2,550 Cc 6 hrs V 30 hrs	Cs 24 hrs Cc 4 hrs V 30 hrs	Cs 24 hrs Cp 980 Cc 2 hrs V 30 hrs	Cs 24 hrs Cp 1,060 Cc 2 hrs V 30 hrs	Cs 24 hrs Cp 1,680 Cc 2 hrs V 30 hrs	Cs 24 hrs Cp 2,560 Cc 2 hrs V 30 hrs	Cs 240 hrs Cp 12,530 Cc 60 hrs V 300 hrs
PHOTO /FILM DOCUMENTATION	Cc, V	Cc 8 hrs V 10 hrs	Cc 8 hrs V 10 hrs	Cc 8 hrs V 10 hrs	Cc 8 hrs V 10 hrs	Cc 8 hrs V 10 hrs						Cc 40 hrs V 50 hrs
REPAIR DISTURBED AREAS /EARTH DAY	Cc, V, P	Zone I Cc 6 hrs V 25 hrs P 5 hrs	Zone III Cc 6 hrs V 25 hrs P 5 hrs	Zone III Cc 6 hrs V 25 hrs P 5 hrs	Zone III Cc 6 hrs V 25 hrs P 5 hrs	Zone III Cc 6 hrs V 25 hrs P 5 hrs	Zone IV Cc 6 hrs V 25 hrs P 5 hrs	Zone IV Cc 6 hrs V 25 hrs P 5 hrs	Zone IV Cc 6 hrs V 25 hrs P 5 hrs	Zone IV Cc 6 hrs V 25 hrs P 5 hrs	Zone IV Cc 6 hrs V 25 hrs P 5 hrs	Cc 60 hrs V 250 hrs P 50 hrs
CLOSE & RE-VEGETATE TRAILS	Cs, Cp, Cc, V								Cs .15 ac Cp 150 Cc 8 hrs V 20 hrs	Cs .15 ac Cp 150 Cc 8 hrs V 20 hrs	Cs .15 ac Cp 150 Cc 8 hrs V 20 hrs	Cs .45 ac Cp 450 Cc 24 hrs V 60 hrs
MAINTAIN TRAILS & HAZARD TREES	V, P	V 8 P 8	V 8 P 8	V 8 P 8	V 8 P 8	V 8 P 8	V 8 P 8	V 8 P 8	V 8 P 8	V 8 P 8	V 8 P 8	V 80 P 80
TOTAL PROJECTED TIME, MATERIALS & SERVICES REQUIREMENTS	Cb, Cbr, Cc, Cp, Cs, V, P	Cb 5.19 ac Cbr 1.27 ac Cc 34 hrs Cp 0 plts Cs 24 hrs V 105 hrs P 23 hrs	Cb 0 ac Cbr 1.18 ac Cc 39 hrs Cp 1,270 plts Cs 34 hrs V 113 hrs P 23 hrs	Cb 8.23 ac Cbr 1.25 ac Cc 37 hrs Cp 1,180 plts Cs 34 hrs V 133 hrs P 23 hrs	Cb 2.83 ac Cbr 1.47 ac Cc 35 hrs Cp 1,250 plts Cs 34 hrs V 123 hrs P 23 hrs	Cb 5.92 ac Cbr 1.08 ac Cc 103 hrs Cp 2,550 plts Cs 24 hrs V 153 hrs P 23 hrs	Cb 0 ac Cbr .98 ac Cc 18 hrs Cp 0 plts Cs 24 hrs V 85 hrs P 23 hrs	Cb 5.19 ac Cbr 1.06 ac Cc 21 hrs Cp 980 plts Cs 24 hrs V 108 hrs P 23 hrs	Cb 3.09 ac Cbr 1.68 ac Cc 29 hrs Cp 1,060 plts Cs 24 hrs V 133 hrs P 23 hrs	Cb 2.83 ac Cbr 1.10 ac Cc 29 hrs Cp 1,680 plts Cs 24 hrs V 138 hrs P 23 hrs	Cb 3.34 ac Cbr 1.46 ac Cc 107 hrs Cp 2,560 plts Cs 24 hrs V 163 hrs P 23 hrs	Cb 37.17 ac Cbr 12.53 ac Cc 482 hrs Cp 12,530 plts Cs 340 hrs V 1,254 hrs P 230 hrs

GUIDING PRINCIPLES

Ecosystem Health: Integrity & sustainability of all elements & functions of a natural community, including stable soils, diverse plant & animal communities, water retention & infiltration, & capacity to change & adapt to disturbance.

Adaptive Management: A flexible management strategy responsive to the inherent variability in a natural community's response to restoration intervention; a process of evaluation, adjustment, refinement and change.

Ecological Restoration: Process of intentionally altering a site to establish, to the degree possible, a defined, indigenous, historic (pre-settlement-like) ecosystem.

LONG-TERM GOALS

To maintain Lakeview Woods Conservancy as a natural & cultural centerpiece for the Lakeview Neighborhood & larger community of Dane County.

To protect & enhance the oak woodland community through an ongoing restoration, management, & monitoring program, which includes volunteer stewardship training & public education, focused on enjoyment, appreciation & protection of the natural environment.

SPECIFIC OBJECTIVES

To restore the natural oak woodland community of Lakeview Woods Conservancy to a healthy state that allows a sustained, low-maintenance, low-cost commitment.

To restore & manage natural vegetation communities so that native biodiversity & ecological functions are restored wherever possible.

To enhance habitat features to attract & sustain wildlife.

To develop public awareness & understanding of Lakeview Woods Conservancy's ecological & cultural significance.

To evolve a sustainable relationship between the community & nature by involving citizens, organizations, & agencies in the restoration effort.

To monitor & adapt management prescriptions as necessary to achieve the goals of this Plan.

ACTIONS & STRATEGIES

- Controlling exotic invasive plant species
- Thinning overcrowded young tree canopy
- Increasing understory light levels
- Introducing prescribed burning
- Restoring native plant diversity & cover
- Restoring rare native plant populations
- Restoring native shrubs & small trees
- Stimulating oak regeneration
- Increasing breeding bird diversity & population sizes
- Remediating soil disturbances such as pits, spoils, refuse piles, & unmaintained secondary trails
- Removing hazard & diseased trees, but maintaining adequate dead-standing trees & woody debris for wildlife habitat
- Enhancing public safety
- Maintaining public trails & interpretive signage
- Monitoring restoration response & performance

YEAR 10 PERFORMANCE MILESTONES

Reduce by a minimum of 80% black locust, common buckthorn, Tartarian honeysuckle, & white mulberry.

Reduce as necessary wild black cherry, white ash, boxelder, & American elm, to achieve 30-50% of full sunlight conditions.

Achieve 30-50% of full sunlight, or a level necessary to achieve oak regeneration & groundcover performance.

Implement prescribed burning on a regular basis, using appropriate burn cycles & burn intensities to achieve diversity, cover, & structure performances.

Achieve a minimum of 75 species native to the target restoration communities; achieve a minimum of 80% groundcover.

Maintain populations of Agastache nepetoides & reintroduce appropriate native rare species in cooperation with the Wisconsin Bureau of Endangered Species.

Achieve native shrub & small tree species at rates appropriate to the target communities.

Increase oak seedling cover to levels that allow detectable advanced growth within 15-20 years.

Increase bird species richness & numbers 10-20% above current levels.

Achieve full remediation & revegetation of disturbed soils (pits, spoils, etc.).

Remove hazard trees per the City Ordinance requirements; maintain a minimum of 3 dead-standing trees per acre for wildlife outside of a 20-foot safety zone on either side of the main trail.

Maintain the open woodland vista along main trails; remove garlic mustard along main trails.

Maintain the main trails with wood chips produced on site or from off-site, except for wood chips containing exotic species material. Post permanent interpretive signage at main trail entrances explaining the restoration principles & goals.

Repeat baseline monitoring at all transects in year 5 & year 10. Report the findings to the County & public.

VOLUNTEER ACTIVITIES

- Collect native seeds from on-site & appropriate off-site locations
- Assist with propagation of seed to produce live plugs for transplanting to site
- Assist with controlled burns
- Assist with brushing & thinning
- Assist with vegetation, bird, and light level monitoring activities
- Assist with the production of a documentary video of the restoration project

MONITORING TASKS

- Measure light levels in treated areas following treatment
- Monitor resprouts of treated exotic shrubs
- Repeat baseline monitoring methods in years 5 & 10; measure woody & herbaceous canopy intercept, stem density, basal area, percent cover, and species diversity in a timed survey
- Measure breeding bird diversity in a timed point survey
- Optional - Sample soil variables, including microbial diversity, in years 1 & 10

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