

ECOLOGICAL ASSESSMENT AND MANAGEMENT PLAN

FOR

SETTLERS PRAIRIE PARK

TOWN OF MIDDLETON, WISCONSIN



APRIL 2013



Where Science & Stewardship Meet

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April 2013

Ecological Assessment and Management Plan for

SETTLERS PRAIRIE PARK

PREPARED FOR TOWN OF MIDDLETON, WISCONSIN

BY BIOLOGIC ENVIRONMENTAL CONSULTING

ACKNOWLEDGEMENTS

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Suggested citation format:

BioLogic Environmental Consulting. 2013. Ecological Assessment and Management Plan for Settlers Prairie Park.
Mount Horeb, Wisconsin

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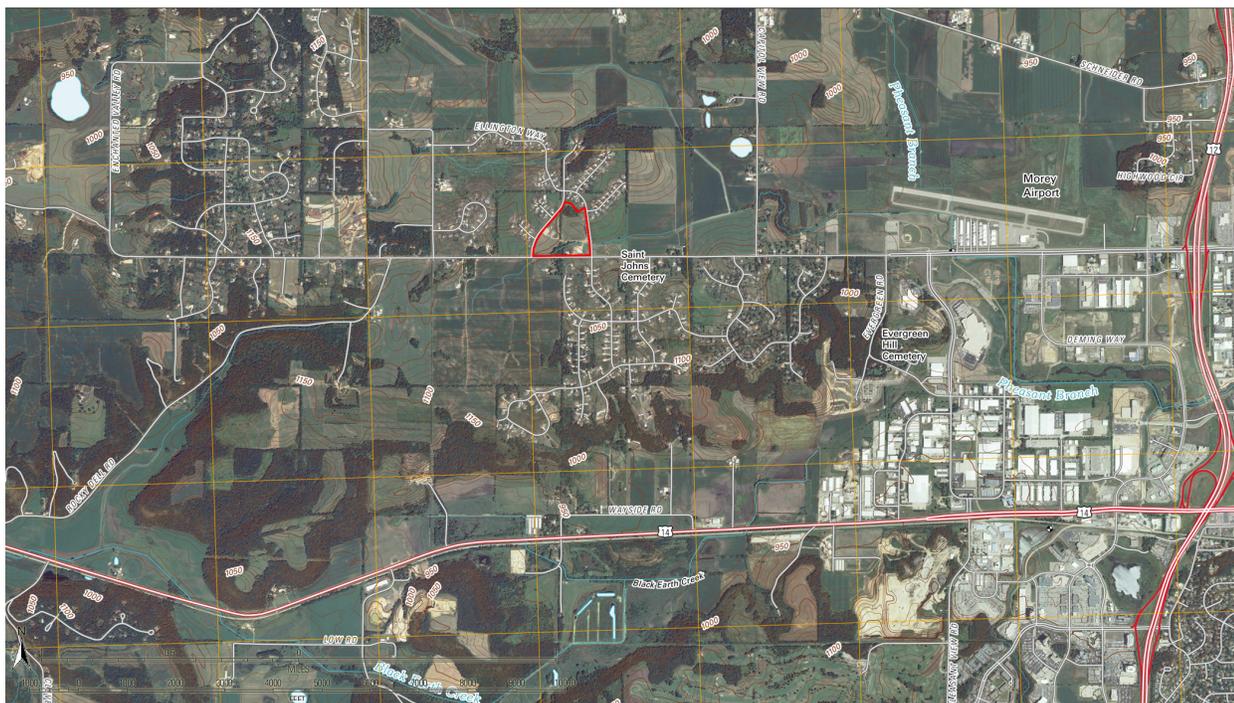


Figure 1. Settlers Prairie Park, outlined in red at the center of this 2008 airphoto, is a 19.5-acre park located between Ellington Way, Bergamot Road, and Airport Road in the Town of Middleton, Wisconsin. The park is near the headwaters of unnamed tributary of the North Fork of Pheasant Branch Creek, which drains into Lake Mendota. *Airphoto credit: US Geological Survey.*

EXECUTIVE SUMMARY

This assessment and management plan offers a summary of past and present ecological conditions of Settlers Prairie Park, and science-based land stewardship recommendations. Settlers Prairie Park, a 19.5-acre community park on the north side of the Town of Middleton, Wisconsin, offers a variety of amenities to Town residents. These include soccer fields, tennis courts, a playground, shelter, softball field and over 6 acres of undeveloped woodland and prairie. The scope of this ecological assessment and management plan is limited to the natural, undeveloped areas of the park.

In late 2011, the Town of Middleton Park Commission arranged for this report. This action was pursuant to public interest in park vegetation management, a request from the Town Board, and a recommendation in the Town of Middleton 2008 Comprehensive Outdoor Recreation Plan (CORP) calling for the completion of planning and development of Settlers Prairie Park.

The management recommendations for the park are based on the results of vegetation surveys conducted by a forester and ecologists in 2011-2012, guidance from the 2008 CORP, surveys of town residents conducted in 2003 and early 2012, and four Park Commission meetings during 2012-2013. This site-specific data and public feedback led us to establish the following objectives for managing the park's natural areas:

- A. Establish and Maintain Native Plant Communities
- B. Provide Multiple Opportunities for Education and Recreation
- C. Minimize Impacts to Adjoining Neighborhoods
- D. Utilize External Funding and Partnerships

These objectives guide our recommendations for managing Settlers Prairie Park:

1. Restore the 1.9-acre North Woodland to oak woodland
2. Maintain native wet-mesic woodland and ground layer plants¹ in the South Woodland and Swale
3. Maintain existing prairie and continue conversion of former fenceline to prairie/savanna
4. Identify and remove hazard trees
5. Develop interpretive signs and programming for park visitors
6. Improve softball field turf conditions or convert the field to an alternative use
7. Create secondary trails
8. Remove weed trees gradually to maintain woodland character and encourage oak regeneration
9. Provide replacement screening as weed trees and shrubs are removed
10. Obtain external funding
11. Link with other organizations

Settlers Prairie Park contains three distinct natural areas (Fig. 2). The north end of the park supports a 1.9-acre woodland containing black oak, black cherry, hackberry, and box elder. The west-central region of the park contains 3.1 acres of restored prairie and former fenceline. The south end of the park consists of a 2.2-acre mesic woodland dominated by silver maple and cottonwood, and a swale dominated by reed canary grass. Within this swale flows an unnamed intermittent tributary to the North Fork of Pheasant Branch Creek, which drains into Lake Mendota. The north and south woodlands were identified as critical or sensitive natural areas during a town-wide ecological assessment (Zimmerman and Kailing, 1990).

Although the natural areas of the park are relatively small in size, they warrant active management due to their proximity to neighborhoods, a Montessori school, and the restored prairie

1. Wet-mesic vegetation grows in soils that rarely dry out during the growing season. These soils are typically found along streambanks, in wetlands, lowlands, or at the bases of slopes.



Figure 2. 2010 aerial photo of Settlers Prairie Park with natural area management zones: North Woodland, Prairie / Savanna, and South Woodland and Swale. Red line is park property boundary, yellow lines are private property parcel boundaries. *Airphoto: Dane County*

outlots of Prairie Home Estates. Active management of the park's vegetation will maximize the benefits these natural areas offer park visitors and surrounding communities. These benefits include providing wildlife habitat, facilitating educational opportunities, screening objectionable views, filtering stormwater runoff, and improving downstream water quality.

Ecological surveys conducted in 2011-2012 identified 94 plant species in the park. 86 percent were native, 14 percent non-native. Ten percent of all species found in Settlers Prairie Park are considered invasive. Although the proportion of native species is greater than non-native species, cover and abundance of non-native invasive species is significant throughout the site.

Over the past decade, the population of invasive plants in the park has been greatly reduced

through ad-hoc removal efforts conducted by the Town, contractors, and volunteers. These efforts were typically in response to an immediate management concern or request from the public.

This management plan allows the Town to make strategic, well-informed land management decisions at Settlers Prairie Park. Proactive and well-timed reduction of weed species, removal of undesirable tree species, selective planting projects, and the implementation of a prescribed fire regime will improve the biological diversity and habitat quality of the prairie and woodlands of Settlers Prairie Park. Once fully established, these native plant communities will provide food and shelter for wildlife, improve aesthetics of the park, and benefit downstream water quality, while requiring minimal maintenance, with no mowing, fertilizing, or watering required.

INTRODUCTION

This assessment and management plan offers a summary of past and present ecological conditions of Settlers Prairie Park. The plan includes science-based land stewardship recommendations supplemented by a survey of town residents conducted in early 2012. In late 2011, the Town of Middleton Park Commission arranged for this report. This action was pursuant to public interest in park vegetation management, a request from the Town Board, and a recommendation in the Town of Middleton 2008 Comprehensive Outdoor Recreation Plan calling for the completion of planning and development of Settlers Prairie Park.

Summary of Existing Conditions

Settlers Prairie Park hosts a mix of developed park areas (e.g. soccer fields, tennis courts) and natural areas. The natural areas in the park include a restored prairie, dry-mesic woodland, wet-mesic woodland, and unmowed areas dominated by non-native pasture grasses and forbs.

The woodland vegetation at the north side of the park is comprised of mature black oak, hackberry and elm mixed with younger box elder and black cherry, and a variety of native and non-native shrubs, forbs and grasses. The woodland to the south consists primarily of bur oak, cottonwood, silver maple and box elder trees. Of the 94 species identified in the survey, 86 percent are native, 14 percent are non-native. Ten percent of all species

in the park are classified as invasive species by the Wisconsin DNR (Table 1).

Records from a Public Land Survey conducted in the 1830s (Appendix A) indicate that the

Table 1. Species observed at Settlers Prairie Park in 2011-2012. Invasive species observed included native (e.g. box elder) or non-native (e.g. buckthorn). Numbers of invasive species presented here do not contribute to the total number of species observed for each life form.

Form	Number of species			
	Native	Non-native	Invasive	Total
Trees	10	1	2	11
Shrubs	8	1	3	9
Forbs (wildflowers)	48	7	7	55
Graminoids (grasses, sedges, rushes)	11	4	1	15
Vines	3	1	0	4
Total	81	13	11	94

forested acreage surrounding Settlers Prairie Park consisted of rolling hills occupied by bur oak and white oak plant communities. Aerial photographs show that the entire area was farmed from 1937 until the late 1980s, with the exception of the park's north and south woodlands. The north and south woodlots were identified as critical or sensitive natural areas in a town-wide ecological assessment (Zimmerman and Kailing, 1990).

Vegetation management within the park has primarily involved maintaining turfgrass and planting trees in the developed park areas and removing weeds and invasive brush in the natural areas. Weed management in the prairie section of the park has been underway since 2004, focused on the elimination of invasive and weedy plant populations. In late 2009, the Town began removing invasive trees and shrubs within the north woodland. In the summer of 2011, Town staff removed additional invasive trees and brush along a formerly wooded fencerow that ran north-south from Airport Road to the north woodland. In 2012, the Town began replanting trees in the former fencerow.

Opportunities

Settlers Prairie Park contains both prairie and oak woodlands, presenting the uncommon opportunity to restore and conserve these rare plant communities. Prior to European settlement, the dominant plant communities in southern Wisconsin were oak savanna, prairie, and oak woodlands. Frequent, low-intensity ground fires and grazing by elk, bison or deer would have reduced the proliferation of shrubs and saplings

and maintained a more open tree canopy and diverse ground-layer in oak woodlands. Intact remnants of oak woodlands are rare today (Epstein 2002). Restoring and maintaining native

vegetation in the park offers an opportunity for regional water quality improvement. Settlers Prairie is situated in the headwaters of an unnamed tributary to the North Fork of Pheasant Branch Creek, which feeds into Lake Mendota. The position of the park high in the watershed reduces the likelihood of negative impacts from upstream land use. Headwater protection is essential to maintaining water quality in the larger watershed. The Lake Mendota watershed has been identified as a priority watershed by the Wisconsin Department of Resources (WDNR). WDNR has offered cost-sharing for projects reducing nonpoint source water pollution within priority watersheds.

Settlers Prairie Park comprises 19.5 of the Town's 283 acres of parkland. Although small in size, this parcel houses a unique hybrid park, which presents the opportunity to protect and enhance both native plant communities and water quality, while offering passive and active recreational and educational opportunities and family use areas.

Constraints

The relatively small size of Settlers Prairie Park limits the ability for the land to support a highly diverse plant and animal community in the absence of active management. The existing prairie and woodland have a high edge-to-patch ratio, which limits their value to wildlife and resilience to invasion by non-native invasive species. Invasive species are one of the greatest threats to Wisconsin's biological diversity, second only to habitat loss and fragmentation.

Despite these limitations, and because the Park is adjacent to the restored outlots of Prairie Home Estates, the prairie and oak woodlands within the Park may serve as part of a larger patch of wildlife habitat, rather than a small habitat island.

METHODS

Property Location

Settlers Prairie Park is located in Dane County, Wisconsin, north of Airport Road, west of Ellington Way and east of Bergamot Way in the Town of Middleton (Fig. 2). It straddles the dividing line separating the southwest and southeast quarter-quarters of the northeast quarter of Section 5, Township 7 North, Range 8 East (US Geological Survey 1983). The Park falls within the Six Mile and Pheasant Branch Creek Watershed (Appendix A).

Vegetation Survey

All survey units were systematically walked during site visits made on October 19, 2011, June 6, 2012 and June 19, 2012. A record was kept of all observed species in each survey unit during each visit. Species difficult to identify in the field were vouchered and keyed out in the office.

In addition to species presence, surveyors recorded:

1. Relative species abundance (rare, uncommon, common, abundant, dominant).
2. Distribution within the survey unit.
3. Canopy and sub-canopy species and their relative abundance.
4. Location and abundance of invasive species.

A tree survey was also conducted in December 2011, using accepted forest biometry methods. Tree species and diameter at breast height (dbh) were recorded. Trees were also assessed for merchantability, by estimating number of sawlogs, sawbolts and/or pulp sticks in each tree, where applicable.

Since this plan was written for a variety of audiences, all plants are referenced by their common names, rather than scientific names. Scientific names of all species referenced in this plan are presented in Appendix B.

Survey Units

The Park was divided into three survey units based on vegetation type and location: North Woodland, South Woodland and Swale, and Prairie/Savanna (Fig. 2).

Abiotic Factors

Abiotic information was recorded during each visit. Additional information was obtained from secondary sources, including the Dane County Soil Survey, topographic maps, the Dane County Geographical Information System database, and the Town of Middleton Comprehensive Outdoor Recreation Plan (CORP) (2008) and Town of Middleton Comprehensive Plan (2009). Abiotic information includes:

- (1) Topography, including slope and aspect.
- (2) Soil type.
- (3) Natural and cultural features.
- (4) Prior disturbance and the resulting effect.
- (5) Special management needs, opportunities, and concerns.

Airphoto Analysis

Analysis of aerial photographs often provides important historical information and insights into changes in land cover and land use practices not readily observable in the field. In order to assess these types of changes at Settlers Prairie Park, a series of aerial photos from 1937 to 2010 was visually assessed for changes in the extent and location of vegetation types, and changes in infrastructure (e.g. roads, buildings) and other cultural features.

Oral and cultural history

Historical information relating to cultural and socially significant relics of the site were verified with the Middleton Historical Society. Cultural features remaining at a site can provide insight into previous social practices that may have influenced land uses and vegetation.

SURVEY RESULTS

Cultural History

Settlers Prairie Park is located on the old shoreline of glacial Lake Yahara. As such, there is a chance that archaeological sites dating from the late Ice Age are located within the park. Additionally, the Park is located on the southeast side of a hill near a former wetland. At a site with identical settings in Middleton in recent years, two Late Woodland period villages, one with human graves, have been discovered (Rosebrough, 2013).

Original land survey maps from the 1830s show no cabins, trails, or villages in the area (Rosebrough, 2013), and detailed plat maps from 1862 indicate much of the Middleton area was still original timberland. Early settlers to the area were “Yankees,” who began arriving from the northeastern United States in the 1840s.

Immediately prior to the Civil War, German immigrants from a small area in Mecklenburg and neighboring German-speaking states began to migrate to the area. These immigrants often were either related or acquainted. Their migration paused during the Civil War, but resumed in earnest in the late 1860s and 1870s, introducing dairy farming to the state and cultivating fields for agriculture (Petty, 2013; Pope, 2013).

A plat map from 1873 shows the earliest documented owners of the Settlers Prairie Park area to be the Blumenthal family, from Prussia. The 1870 Census reports that Johann Blumenthal was a retired farmer who lived with his wife, Dorthea. They resided either next to or with their son, Charles, also a farmer, his first wife, Sophia, and their two children. Sophia was originally from Strohkirchen-Hagenow, Mecklenburg, which is a village only four miles north of the village of Picher. The Joachim Goth family, who lived on what is now Pope Farm Conservancy in Middleton, was from the same town. Sophia’s mother’s maiden name was Brumm. The Brumms, also from the Picher-Hagenow area in Mecklenburg, were among the earliest German

Airphoto analysis

Analysis of a series of aerial photographs from 1937 (the earliest available year) to 2000 reveals various changes to Settlers Prairie and the surrounding landscape (Fig 3). The dominant land use of the site was clearly farmland until the mid 1990s.

Based on the tree and shrub lines seen in early photographs, the site was divided into several individual farms. The tree line running north to south through the middle of the property in

earlier images is prominent in even the most recent photo. Both woodland units have remained tree-covered since before 1937, yet both have undergone significant changes. Until 1962, individual trees can be distinguished in the north woodland; thereafter, the gaps between the trees are filled in with additional vegetation.

The influx of additional vegetation was likely due to the rapid growth of certain fast-growing tree species as result of fire suppression or discontinuation of grazing. These species include

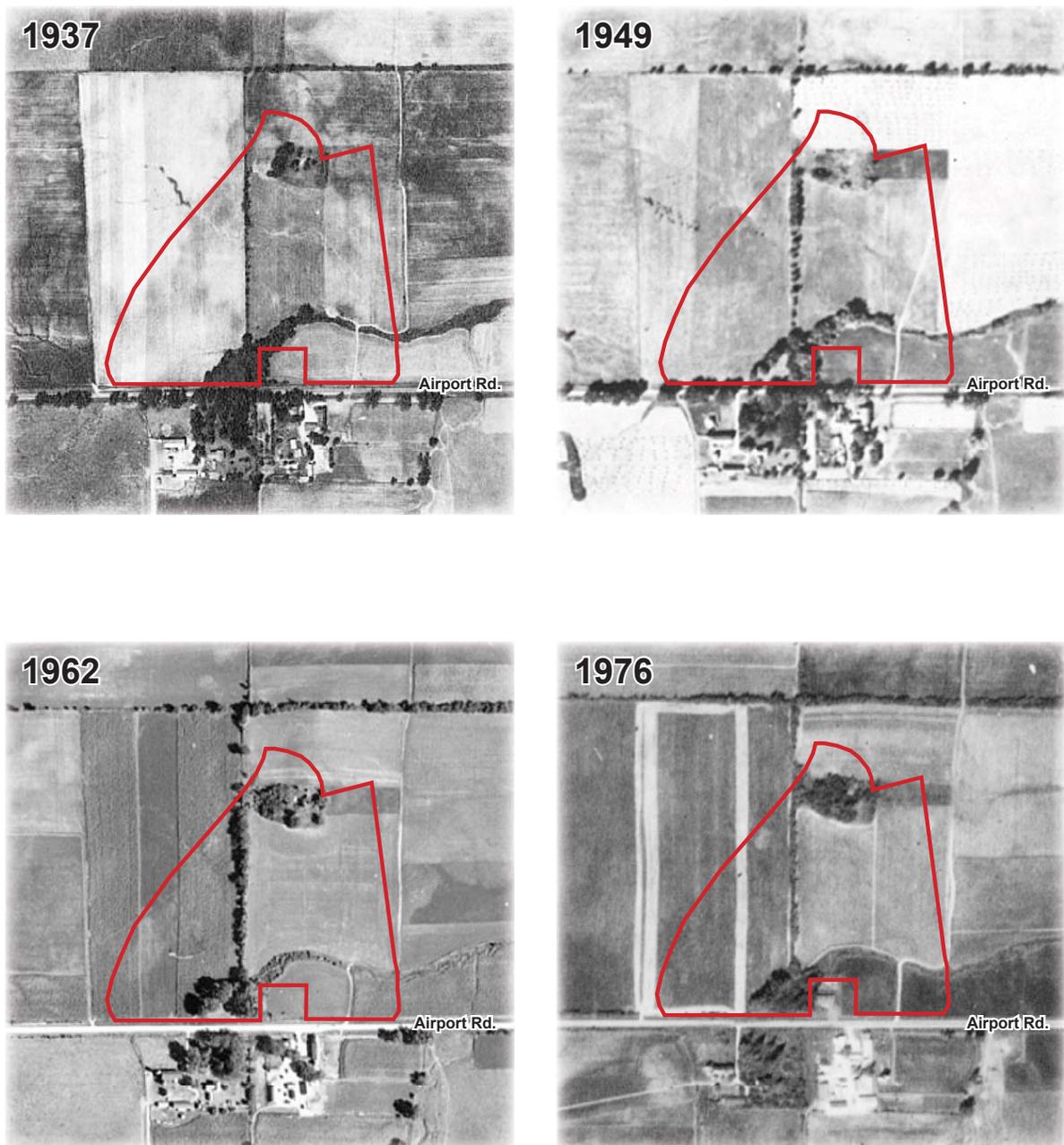


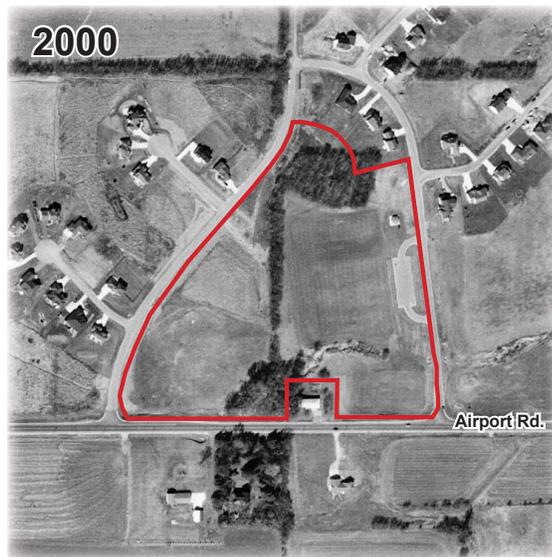
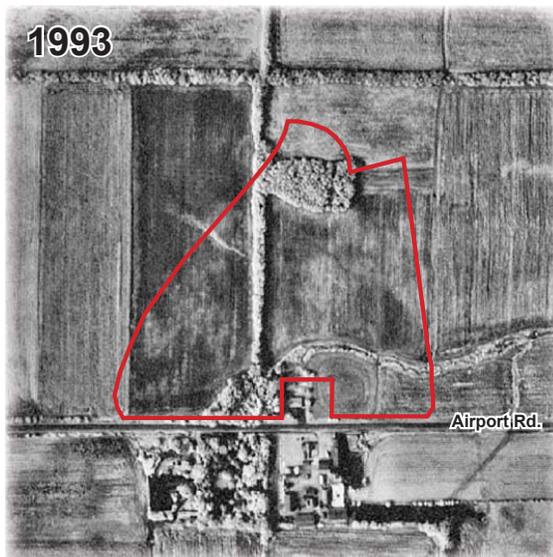
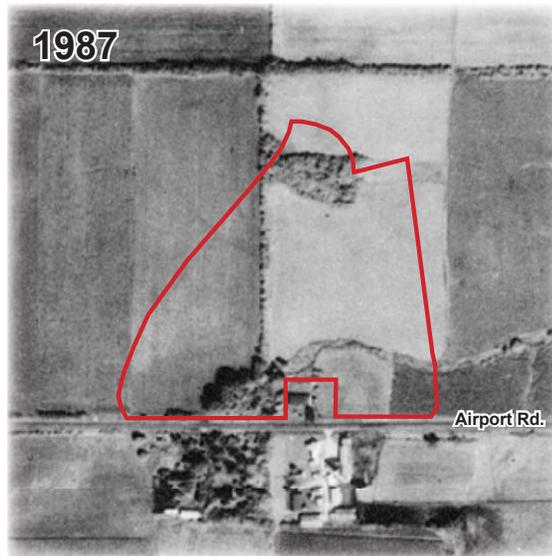
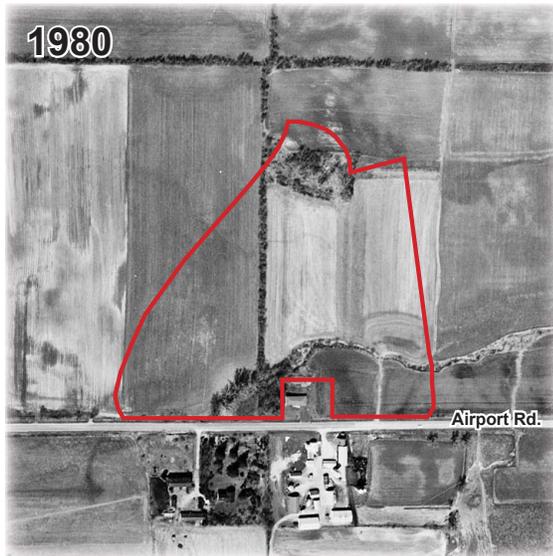
Figure 3. Aerial photographs of Settlers Prairie from 1937 to 2000. Property line in red. North at top for all photos.

box elder, black cherry and elm, as well as invasive shrubs like buckthorn and honeysuckle. The South Woodland and Swale contained a definitive tree and shrub corridor following the stream channel in early photographs. By 1962, however, this vegetation is extremely diminished, possibly due to clearing of trees for timber resources and installation of drain tiles for agricultural purposes. In contrast to the North Woodland, the South Woodland and Swale shows a decrease in tree and shrub density over time. Comparison of the most recent images reveals

rapid development surrounding the area in the middle 1990s. A large contributor to this trend is the Prairie Home Estates development which donated the original land parcel for Settlers Prairie Park. The east and west boundaries of the park are visible in the 2000 photograph as roads connecting the residential parcels.

Existing cultural features

According to the Town's 2008 Comprehensive Outdoor Recreation Plan (CORP), Settlers



Prairie Park is a designated Community Park. Community Parks are intended to accommodate the recreational needs of multiple neighborhoods and serve to preserve unique landscapes and open spaces. The original Prairie Home Estates plat dedicated approximately eight acres for a park. Eight acres would have met the size criteria for a Neighborhood Park only. Sensing an opportunity to develop the Park further, the Town decided to enlarge the Park through the purchase of an additional 12 acres in 1997. The additional acreage was acquired with the assistance of a 50% grant from the WDNR Knowles-Nelson Stewardship Program. Construction of one regulation soccer field, one practice soccer field, a large shelter (with electrical service), and paved, off-street parking followed the same year. Between 2000 and 2002 the Town added a softball field, playground, walking trail and off-street parking to the west side of the park. The park now includes seven picnic tables, two tennis courts, two shelters, two portable restroom facilities, six soccer fields, one softball field and two play sets with slides and mini swings (Fig. 4).

The softball field currently receives little use



Figure 4. Cultural features of Settlers Prairie Park.

according to the 2012 Town Survey and Town staff, as well as comments from the public made at a February 2013 Park Commission meeting. This is due to unsatisfactory turf conditions, low demand, or both. Improving turf conditions or converting the field to an alternative use should receive consideration.

In addition, a paved, multi-purpose primary trail traverses the Park from southeast to northwest. The 2008 CORP defines *Primary trails* as those located within greenways, parks, and natural resource areas that served as major links between Town parks and facilities as well as other destinations. As such, this trail segment will ultimately form part of a larger system of local trails called the North Middleton Trail, which is planned to traverse the section of Town north of Airport Road from east to west. Another planned trail linkage between Settlers Prairie Park and Pope Farm Park, called the Settlers Prairie Park - Pope Farm Park Trail, is yet to be developed as a major north-south linkage although some segments are in place. No secondary trails exist within the Park.

Support for recreational trails in the Town is quite high. A 2003 survey to assess the park and recreational interests of residents revealed that developing bike lanes/paths and completion of walking and cross-country trails was strongly supported by 86% of respondents (CORP 2008).

Soils

Seven soil types are present at Settlers Prairie Park (Fig. 5, Table 2). Five of the seven present an erosion hazard if disturbed. The Kidder soils, Dodge silt loam, and McHenry silt loam formed on the tops and shoulders of glacial moraines. Parent material is either glacial till or loess deposited over glacial till. The Virgil and St. Charles silt loam soils are found on till plains derived from loess blown on top of glacial till. They occupy lower landscape positions than the previously mentioned soils. Lastly, the Radford silt loam formed from silty alluvium deposited along drainage ways and stream terraces. Loess is fine, windblown dust

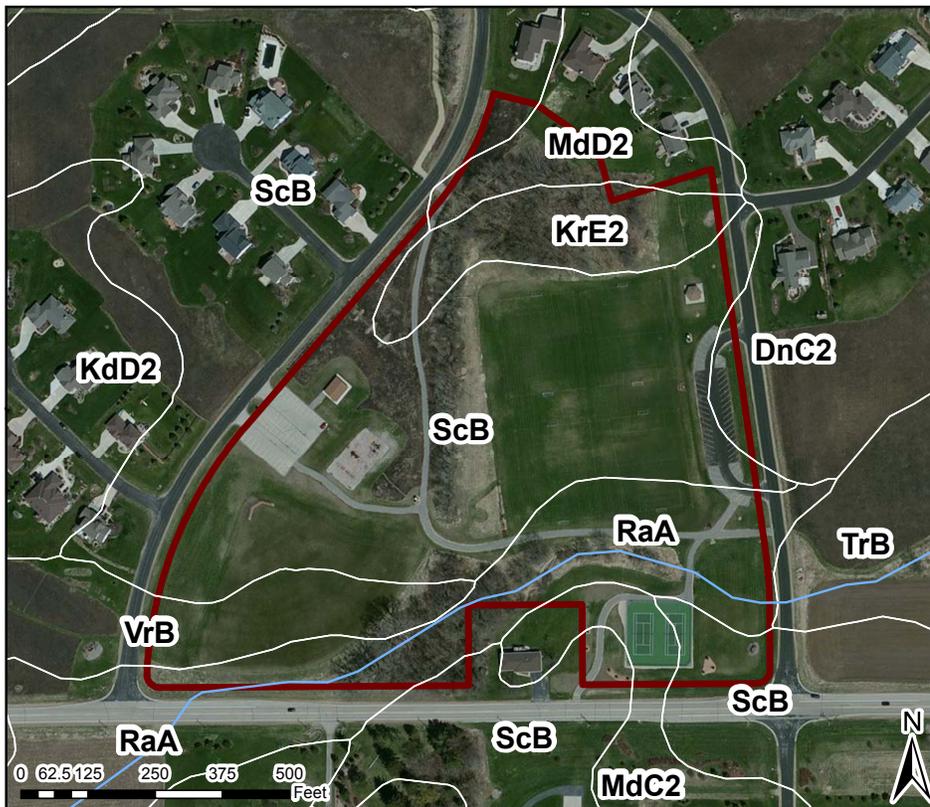
derived mostly from glacial sediment carried by outwash rivers (Dott Jr. and Attig, 2004).

Eroded soils are present at the south edge of the North Woodland, and along the stream channel within the South Woodland and Swale.

Erosion in the north woodland is likely due to disturbance from sledding activities (Fig. 6). The soil erosion in the South Woodland and Swale is caused by runoff from lands south and west of Airport Road. This erosion is causing the banks of the stream channel to collapse, widening the stream channel and exposing bare soil. Some of this soil, along with soil from sites upstream, is deposited at the west end of the culverts at the southeast corner of the park.

Table 2. First two letters indicate soil type, third letter indicates slope class (A: 0-2%, B: 2-6%, C: 6-12%, D: 12-20%, E: 20-30%, F: 30-45%), and number indicates erosion degree (2: moderately eroded, 3: severely eroded).

Map unit symbol	Map unit name	Acres* (% of total)
DnC2	Dodge silt loam, 6 to 12 percent slopes, eroded	0.4 (1.9%)
KrE2	Kidder soils, 20 to 35 percent slopes, eroded	2.0 (9.8%)
MdC2	McHenry silt loam, 6 to 12 percent slopes, eroded	0.6 (2.9%)
MdD2	McHenry silt loam, 12 to 20 percent slopes, eroded	0.9 (4.2%)
RaA	Radford silt loam, 0 to 3 percent slopes	3.8 (18.3%)
ScB	St. Charles silt loam, 2 to 6 percent slopes	11.5 (55.5%)
VrB	Virgil silt loam, 1 to 4 percent slopes	1.5 (7.4%)



Legend

- Settlers Prairie Park
- North Pheasant Branch Tributary

Figure 5. Soil mapping units of Settlers Prairie Park.



Figure 6. Rill erosion on the south-facing slope of the North Woodland. The initial soil disturbance was likely caused by sledding.

Geology and topography

Settlers Prairie Park sits atop the Johnstown Moraine, a ridge that marks the maximum extent of the Green Bay Lobe during the Wisconsin Glaciation period 13,000 to 15,000 years ago. The Johnstown Moraine is often low and somewhat indistinct, but in this vicinity it forms a fairly dramatic ridge running roughly northwest to southeast as evidenced by the large rise in elevation west of Quisling Park on Airport Road. A corresponding drop in elevation just west of Hillcrest Drive marks the other end of the moraine.

Ridges build up at moraines as a result of the massive amount of crushed rock, sand, silt, and clay continually deposited at glacial margins. This unsorted, compact debris is referred to as till and it underlies the entire park and surrounding neighborhoods. Rolling and/or hummocky terrain is typical of moraines. Although most of the Park has this typical rolling topography, the North Woodland and the area just east of, and paralleling, the bike path are steeper than 12 percent slope.

The highest point, approximately 1,030 feet above sea level, is located at the very north end of the



Figure 7. Topography of park. Orange contour lines represent 2-foot elevation intervals.

Park along the north property line. The lowest point, approximately 974 feet above sea level, is in the southeast corner of the property along an east flowing, unnamed tributary of the North Fork of Pheasant Branch. There is a change in relief of approximately 56 feet on the property (Fig. 7).

Vegetation

NORTH WOODLAND

The North Woodland is comprised of small diameter box elder, black cherry, black oak, elm, and hackberry trees. There are seven tree species present at the Park, all of which are native (Table 3). The few mature oaks present are growing on the southern edge of the woodland along the toe of the slope (Fig. 7). This topographic position affords them greater access to light and increases their ability to survive. Currently, there is no oak regeneration in the shady woodland interior.

The western portion of the North Woodland was forested prior to 1937, while the eastern portion was used as a farm dump beginning around mid-century. Refuse is still present in this dump. Although historical airphotos indicate continuous forest cover in this area since 1937, no trees have reached even a moderate-sized diameter, suggesting a history of browsing by livestock or wood harvesting for firewood, posts, or other uses.

A relative lack of historic disturbance in the western half of the woodland has allowed a fair



Figure 8. Black oak in north woodland. Black oak is an indicator of drier, fire-dependent plant communities.

quality herbaceous layer, including several conservative ² plants (red baneberry and wild geranium), to persist there. Conversely, the eastern half of the woodland is quite weedy. Overall, there are 36 native herbaceous ground layer species (Table 3). They are a mixture of forest (shade) species, sun-loving (prairie) species, and a few savanna species (mixed sun and shade). Overall abundance and diversity is relatively low and most are generalist species that do well in a variety of habitats of varying quality. Examples of the woodland species include agrimony, Jack-in-the-pulpit, enchanter's nightshade, fragrant

Table 3. Number and proportion of native and non-native species in the North Woodland Unit.

Form	Native		Non-native		Total
	Number	%	Number	%	
Trees	7	100	0	0	7
Shrubs	4	50	4	50	8
Forbs (wildflowers)	32	76	10	24	42
Graminoids (grasses, sedges, rushes)	4	50	4	50	8
Vines	1	33	2	67	3
Total	48	71	20	29	68

². The concept of species conservatism is an index of floristic quality and fidelity to a specific natural plant community. Coefficients of conservatism range from 0 to 10 and represent an estimated probability that a plant is likely to occur in an undegraded landscape. Rare plants have C values between 5 - 10; plants more frequently found on the landscape (e.g. box elder) have low or no C value.



Figure 9. Prairie species, such as spiderwort pictured here, are found in sunnier edges and canopy gaps of the North Woodland.

bedstraw, sweet cicely, and lopseed. Species more typical of prairies and savannas include common milkweed, New England aster, horseweed, bee balm, Canada and tall goldenrod, wild geranium, calico aster, white snakeroot, false Solomon's seal, and white vervain. These species may owe their continued presence to the light made available by the high edge-to-area ratio of this small woodland. Unfortunately, none are very abundant. The prairie species occur primarily near the sunnier edges or within canopy gaps (Fig. 9)

There are 14 exotic herbaceous ground layer species. Most are accidentally introduced agricultural weeds such as motherwort, mullein, burdock, lamb's quarter, yellow rocket, Canada thistle, creeping Charlie, dandelion, red and white clover, and Queen Anne's lace. These species thrive on disturbance and access to sunlight. Six of the exotic groundlayer species are listed as invasive by the Wisconsin Department of Natural Resources and the Invasive Plants Association of Wisconsin: garlic mustard, Canada thistle, Queen Anne's lace, leafy spurge, burdock, and reed canary grass (Appendix C). Of these, garlic mustard and burdock are particularly problematic, as prolific seed production causes them to spread very quickly. Presently, garlic mustard is not very abundant and will be relatively easy to control, assuming follow-up action is maintained until eradication. Burdock and motherwort are more widespread and will require vigilant management, especially if light becomes more available through canopy disturbance.

The woodland has 10 shrub species. Six are native and four are exotic. Three of the four exotic shrubs also carry invasive status, buckthorn, honeysuckle, and multi-flora rose. The other exotic shrub is the European highbush cranberry, a horticultural escapee that provides berries for wildlife; its berries are less nutritious and desirable than the native American highbush cranberry. The majority of the honeysuckle and buckthorn were removed during the winter of 2009-2010, but regrowth and reestablishment from the existing seed bank will continue to degrade the woodland in the absence of follow-up management. Most of these shrub species require high light environments, with the exception of buckthorn. Consequently, they are restricted to the sunnier edges or the semi-open area at the center of the woodland near the old farm dump.

Native shrubs present include hazelnut, black raspberry, red raspberry, prickly wild gooseberry, elderberry and smooth sumac. All are a welcome component of the Woodland and provide valuable food for wildlife, however, their abundance is very low compared to the invasive shrubs. Exceptions include raspberry and blackberry, commonly referred to as brambles, which are moderately abundant, especially beneath canopy gaps. Although brambles are native, they can prevent desirable wildflower establishment by producing shade at ground level. They can also make the site difficult to access and enjoy.

There are three vine species in the North Woodland - two are native and one is exotic. Native vines include wild grape and American bittersweet. Both are relatively common in southern Wisconsin, and provide valuable wildlife food. The exotic vine is bittersweet nightshade, which is fairly abundant in the eastern end of the woodland. It can be somewhat aggressive in sites with a history of soil disturbance and access to light.

In the absence of management, black cherry, hackberry, box elder, and mulberry will continue to grow and reproduce, limiting the development of a diverse ground layer through the dense shade these species create (Fig. 10). Shade creates ideal conditions for the proliferation of garlic mustard.

This species competes vigorously for resources, making it difficult for most other species to persist.

SOUTH WOODLAND AND SWALE

Large cottonwood, silver maple, and bur oak trees form the canopy in the South Woodland and Swale. Box elder, elm, black cherry, silver maple, and bur oak saplings form the sub-canopy while honeysuckle, buckthorn, various brambles, and gooseberries dominate the shrub layer. In total there are nine tree species and six shrub species (Table 4). The presence of cottonwood and silver maple reflect this woodland's lower landscape position and moist soils relative to the North Woodland. An intermittent tributary of the North Fork of Pheasant Branch flows through the South Woodland and Swale. The banks of the stream channel are collapsing in the wooded area of this management zone, due in part to sparse ground-layer vegetation in this area.

Somewhat weedy, generalist forbs including enchanters nightshade, white snakeroot, and Virginia stickseed occupy the ground layer. Few desirable, native herbaceous or shrub species have colonized this area due to its disturbance history and isolation from similar native habitat patches. The woodland is ringed by a dense growth of European pasture grasses on the west edge and reed canary grass on the east edge. The stream channel provides a conduit for additional moisture, sediment, and nutrients, which exacerbate the spread of reed canary grass. Reed canary grass is one of Wisconsin's most widespread wetland invasive plants. By competitively excluding nearly all other wetland vegetation, this species reduces the diversity and habitat quality of any area that it invades.

PRAIRIE / SAVANNA

Big bluestem dominates this low diversity prairie planting. Low diversity results either



Figure 10. View of South Woodland, former fenceline, and prairie, as seen from the North Woodland in June 2012. Dense shade in both woodlands, as seen in the foreground, limits oak regeneration and the persistence of a diverse native ground layer flora.

Table 4. Number and proportion of native and non-native species in the South Woodland Unit.

Form	Native		Non-native		Total species
	Number	%	Number	%	
Trees	9	100	0	0	9
Shrubs	3	50	3	50	6
Forbs	11	73	4	27	15
Graminoids	2	50	2	50	4
Vines	2	67	1	33	3
Total	27	73	10	27	37

from poor site preparation, a species-poor seed mix, or both. Only a handful of mid-summer blooming wildflower species, such as bee balm, yellow coneflower, rosinweed, white wild indigo, and wild mint add noticeable color or texture to this unit (Fig. 11). A total of five native grasses and 19 native forbs are present. With the exception of big bluestem, these species are not abundant (Table 5). Portions of the prairie are populated by monotypic patches ragweed and smooth brome, a Eurasian grass imported for pasture and hay. Other non-native grasses such as Kentucky bluegrass are also abundant, but do not pose a significant management concern.

Weed management and prescribed burning in this unit has eliminated or significantly reduced other, more aggressive non-native weed species such as crown vetch, leafy spurge, sweet clovers, box elder, thistles, and bird's-foot trefoil. In 2011, the prairie was sown with prairie seed donated by Dane County Parks. Continued weed management, interseeding, and properly-timed prescribed fire will facilitate an increase in the abundance and diversity of prairie species within the planting. In 2012, the Town crew planted bur oak and sugar maple within the east half of the planting, between the bike path and the soccer field. Some of the newly planted trees showed signs of drought stress or transplant stress during late 2012.

Land Management to Date

2004

September: Initial assessment of Settlers Prairie Park by BioLogic Environmental Consulting LLC. Follow up spot spray of Canadathistle, bird's-foot trefoil, and crown vetch occurs later the same month. An ATV boom sprayer is employed to spray leafy spurge.



Figure 11. White wild indigo (*Baptisia alba*) blooming in the prairie unit in June 2012.

Table 5. Number and proportion of native and non-native species in the Prairie Unit.

Form	Native		Non-native		Total species
	Number	%	Number	%	
Trees	3	100	0	0	3
Shrubs	2	67	1	33	3
Forbs	19	68	9	32	28
Graminoids	5	56	4	44	9
Vines	1	100	0	0	1
Total	30	68	14	32	44

2005

July: BioLogic spot sprays leafy spurge, thistle, crown vetch, reed canary grass, bird's-foot trefoil, and box elder seedlings. Sweet clover, mullein, and Queen Anne's lace are cut and removed.

2006

July: The prairie areas of the park are spot sprayed for bird's-foot trefoil, crown vetch, thistle, burdock, and leafy spurge. Sweet clover is cut and removed.

2007

July: The prairie area of the park are spot sprayed for leafy spurge, crown vetch, thistle, reed canary grass, burdock, and bird's-foot trefoil. Cut and removed weeds include white and yellow sweet clover. Box elder, honeysuckle, and other brush are cut and treated with herbicide.

2008

June and July: The prairie areas of the park are spot sprayed for bird's-foot trefoil, thistle, crown vetch, leafy spurge, and other weeds.

2009

June: The prairie areas of the park are spot sprayed for bird's-foot trefoil and leafy spurge. Sweet clover and thistle are pulled and removed.

November: Prescribed burn of prairie portion of the park.

November and December: Honeysuckle and buckthorn along the treeline area and western edge of the North Woodland are cut and stacked per suggestion from Richard Oberle, Town Board member.

2010

March: Initial round of honeysuckle and buckthorn cutting and treating is completed in the North Woodland.

June: Bird's-foot trefoil, curly dock, and leafy spurge are sprayed in the prairie portion of the park. Sweet clover and thistle are cut and removed.

2011

March: BioLogic sends memorandum of conditional support for Jerry Wagner's plan to remove most, if not all, trees with the exception of oak and hickory along the treeline per conversations earlier in the month.

April: Prescribed burn of prairie portion of the park.

May: The prairie area is interseeded with several species donated by Dane County Parks.

June: Garlic mustard is pulled in the North Woodland. Sweet clover and thistle are cut and removed.

August: Town staff removes all trees along the bike path except oak, and begin broadcast herbicide application for weed control.

October: Leafy spurge and Canada thistle are spot sprayed and burdock is cut and removed along the North Woodland perimeter.

2012

April: Prescribed burn of prairie portion of the park.

December: Student volunteers from Madison Community Montessori School remove buckthorn and honeysuckle from the North Woodland.

Future Development

The frequency and volume of stormwater flowing through the park has been and will be influenced by surrounding land use. The Prairie Home Estates drainage east of Ellington Way has a history of erosion problems (Comprehensive Plan, 2009). About five years ago, plans were put into motion to build additional residences south of Airport Road. These plans were ultimately shelved due to the economy at the time. Future development within the watershed south of Settlers Prairie Park should incorporate best management practices to reduce stormwater volume before it enters the park. The Town of Middleton's Comprehensive Plan (2009) and 2030 Vision Statement highlight ground and surface water quality and erosion control as a priority, and consideration should be given to the effect of additional development in a historical problem area.

MANAGEMENT RECOMMENDATIONS

Overview

Sound land management is based on an understanding of current conditions, a set of objectives describing desired future conditions, and ecological principles. Objectives for the future condition of Settlers Prairie Park and recommendations for meeting those objectives are outlined in this section. The ecological principles used to formulate the management recommendations are listed here:

1. When managing natural areas, it is important to consider that the site functions as a whole. Within the context of Settlers Prairie Park, each management area (e.g. South Woodland, Prairie, North Woodland) should be managed in concert with the others to achieve larger, property- or Town-wide goals that could not be achieved by managing on a unit basis.

2. Management for one species or habitat type is nearly always management against other species or habitat types. For instance, one plot of land cannot be managed simultaneously for grassland birds and forest birds. Therefore, effective management attempts to produce as diverse a spectrum of habitat types as possible in order to attract as many species as possible within the constraints imposed by the site. It is sometimes necessary to select and manage for one habitat type.

3. Habitat fragmentation results in a patchwork of interior and 'edge' habitats that support a different range of plant and animal species. Tracts with a high proportion of edge habitat may be limited in the degree of species diversity they can support and are also more susceptible to invasion by weeds and therefore harder to maintain. Habitat corridors that link to adjacent edge habitats can effectively reduce isolated fragments and increase interior habitat.

4. Historically, natural ecological processes maintained the landscape without substantial human intervention. Until the late 1800s, natural and human-caused fires swept across the Wisconsin landscape for hundreds of miles, killing brush, maintaining savanna and prairie plant communities, and regenerating oak. Currently, many natural ecological processes are unable to maintain the landscape and promote biodiversity because the landscape is too fragmented. Consequently, human intervention in the form of active management is required. Benign neglect generally creates more problems than it solves and results in the loss of species and their habitats.

Management Plan Limitations

Natural resource management plans must be flexible because the resources they manage constantly change, because new information is often acquired, new technologies are developed, new insights are reached, and because budgets fluctuate. This nor any other management plan should be viewed as conclusive or absolute. Instead, it should be viewed for what it is: a

blueprint providing information, guidance, and a starting point for the ongoing process of ecologically based, thoughtful land stewardship.

Successful management requires monitoring to provide feedback on the effectiveness of the activities and to discover new information. Careful and diligent monitoring and evaluation allows appropriate and necessary changes to be made to the management plan, a process known as *adaptive management*. Changes should be made in consultation with all interested parties and a qualified ecologist.

Objectives and Recommendations

Objectives are concise, general statements describing a specific component of a site's desired future condition. They are the basis for developing recommendations.

Recommendations are specific actions undertaken to achieve a given objective. Recommendations can be short- or long-term and can be either ongoing or occur once.

Input from the 2008 Town of Middleton Comprehensive Outdoor Recreation Plan, the 2009 Town of Middleton Comprehensive Plan and the 2012 Settlers Prairie Park Survey, as well as public feedback at Town of Middleton Park Commission meetings helped guide the management recommendations provided in this report.

Relevant objectives from the 2008 Town of Middleton Outdoor Recreation Plan for this project include the following:

- Ensure protection of wildlife and plant life, watershed areas, aquifer recharge areas, oak savanna and native prairie areas. (Goal D)
- Encourage an interconnected network of parkland and conservation land to provide high quality wildlife habitat and counter habitat fragmentation. (Goal E)
- Identify existing or potential funds in park fees, grants or other sources to

develop long range projections. (Goal D)

- Identify both existing and potential schools, parks, paths, Ice Age Trail and community connection points. (Goal E)

Relevant objectives from the Environmental Protection section of the 2009 Town of Middleton Comprehensive Plan include the following:

- Encourage native plantings or existing quality vegetation to be utilized and maintained in landscaping plans for new and existing developments.
- Encourage the clustering of lots to provide large open green space areas that better serve as wildlife habitat and accommodate recreation uses. These areas may take the form of unbroken forested areas, prairies, wetlands or other natural features.
- New development should be designed to preserve and maintain large, unbroken forested areas and natural corridors. The Town should encourage a network of interconnected natural areas that may serve as natural features and habitat as well as corridors for recreational use.
- Identify and protect groundwater recharge areas from inappropriate development.

In 2012, the Town of Middleton distributed a survey to all town residents north of Highway 14, to obtain their comments and feedback on the management of Settlers Prairie Park. This survey was designed to gauge resident opinions regarding management goals, active and passive recreational opportunities, and park use. Appendix E provides a copy of the survey and results. In terms of natural areas, respondents suggested more trees for shade and wind or noise buffers, and responded more negatively to removal of former tree lines than any other single topic. Respondents sent a clear signal that the reestablishment of trees is an important factor in satisfaction with the Park.

Issues from the 2012 survey receiving the strongest support most relevant to this project include the following:

- Preservation of woodland character
- Support of native landscape restoration

- Development of recreational trails

OBJECTIVE A: ESTABLISH AND MAINTAIN NATIVE PLANT COMMUNITIES

Existing native plant communities are protected and enhanced, and additional communities are established to the extent possible given the limitations of size, surrounding land use, and available resources. Non-native species abundance is minimized to protect native flora and fauna.

RECOMMENDATION 1:

Restore the North Woodland Unit to Oak Woodland

The North Woodland already has a healthy population of black oak and other hardwoods. The Town of Middleton values forests as important resources for recreational opportunities, wildlife habitat, air quality enhancement, and aesthetic beauty. Areas of non-commercial woodland are limited to about one percent of the Town's total land area (Town of Middleton Comprehensive Plan, 2008). Therefore, it is important to restore the remaining wooded parcels to healthy woodland systems that support biodiversity.

The presence of higher quality native herbaceous species in the North Woodland such as spiderwort, hairy sweet cicely and white baneberry suggest the potential for the establishment of a diverse oak woodland ground layer, given the right canopy conditions.

Oak woodland restoration requires three steps:

1. Prepare site to eliminate unwanted vegetation, create appropriate light conditions and invigorate native seed bank.
2. Encourage existing native ground layer species and enhance composition as needed.
3. Post-planting management.

Forest management

Although the North Woodland retains a forested structure, it still requires management to maintain and enhance the diversity and viability of native ground layer plants and trees. Primary management needs include reduction of weedy pioneer³ tree species and invasive species control, notably buckthorn, honeysuckle, multiflora rose and garlic mustard populations. Pioneer tree species present on site include box elder and black cherry, which are not normally a significant component of oak woodlands.

Removal of aggressive trees and invasive shrubs will reestablish appropriate light conditions for slower-growing trees, such as oaks, and provide them greater access to available water, space and soil nutrients. The reduction of more competitive and non-native species increases the likelihood of latent native wildflower seed germination and facilitates regeneration and growth of native tree seedlings. A suitable target to promote an open oak woodland character would be between forty and eighty percent native tree canopy cover.

The recommended clearing method is manual cutting with a chainsaw. Chemical girdling may also be a viable alternative in the interior of the woodland. In this method, the undesirable tree is either girdled and the cut treated with an appropriate herbicide, or a basal bark treatment is applied in a band around the trunk near the base of the tree. The advantage of chemical girdling is that it allows for a slow canopy opening to reduce the risk of vigorous weed response. However, there is no control as to when and where the tree will fall, which can create aesthetic issues and safety concerns. Consult a forester or arborist to determine the most appropriate methods for culling undesirable trees for a specific area. Remove trees only when ground is dry or frozen to minimize soil erosion. To avoid spreading oak wilt, do not cut trees between April 1 and October 30.

Invasive species control

Invasive brush removal should be a priority in

³ Pioneer species are those tree species that become established in an area after a disturbance, such as fire, logging or grazing. They are usually fast-growing, short-lived and effectively compete with native tree species for site resources

order to release the sunlight, water, and soil nutrients required for the establishment of the native ground layer within the unit. Due to the size and slope of the North Woodland Unit, brush control via prescribed fire, hand-cutting, or brush-sawing of woody invasives is recommended in lieu of brush mowing. A significant portion of the southern hillside has already been cut and treated with selective herbicide. Brush-sawing can be done during most times of the year. All cut stems or resprouts of invasive brush should be treated with herbicide, to reduce the need for follow-up control. Broadcast application of herbicide is not recommended, due to the presence of desirable native species.

Scattered populations of garlic mustard are present in the North Woodland. Controlling this species requires immediate action and constant monitoring. Early spring and late fall are the best times to focus on removal of garlic mustard. Garlic mustard seedlings germinate early in the spring. The foliage of second-year plants remain green through the fall and winter, making them easy to locate and susceptible to selective herbicide application while desirable plants are dormant. Hand-pulling of second-year garlic mustard plants is recommended in areas where native spring ephemerals⁴ are present.

Native plant maintenance and enhancement

Variations in canopy density during the tree removal process will create a range of light conditions within the North Woodland. These variations will produce differences in the composition and abundance of understory vegetation, depending on available seed bank and suppressed plants. A variety of native woodland forbs and shrubs are present in the western half of the woodland, which could serve as seed sources for the lower-quality eastern half. Forested conservancy areas within the town could also serve as a seed source.

⁴ Spring ephemerals are a woodland wildflower guild that flower and fruit in the months of April and May. These plants take advantage of the available sunlight, soil moisture and nutrients before the trees develop leaves and close the forest canopy.

Due to past land use, the eastern half will take longer to build diversity than the western half of the unit. Supplemental seeding or planting of woodland species may be desirable, depending on the rate and distribution of native species recovery. Wait a full growing season following the removal of invasive trees and shrubs prior to adding additional native species. Attempting to seed into dense weeds or improper light conditions is a waste of resources.

Primary management needs include reduction of weedy pioneer tree species and invasive species control

In order to sustain the oak community of the North Woodland, it is important to preserve existing black oak seedlings and saplings and introduce new oak species to replace the existing oaks when they die. The addition of white or bur oak and hickory trees to the North Woodland is recommended. Black oak is fairly susceptible to a range of diseases and insects, and trees already stressed from drought, old age or injury are more likely to be adversely affected by additional stressors.

Post-Planting Management

Plan on follow-up herbicide treatment to resprouts of previously cut box elder, black cherry and invasive shrubs, which will be stimulated by increased light penetration to the ground layer as the tree canopy is opened.

Management does not cease once the desired condition of a plant community is achieved. Weed seeds will continue to arrive via wind, water, wildlife and humans. Weeds will continue to reappear because they are present in the surrounding environment and the seed bank if they were present prior to restoration. Periodic inspection will allow detection and elimination of weed problems while they are small and easily manageable. Weed control methods include prescribed burning, mowing, pulling, or spot spraying.

RECOMMENDATION 2:**Maintain native wet-mesic woodland and ground layer plants in the South Woodland and Swale**

Maintenance of this area as a native wet-mesic woodland requires three steps:

1. Site preparation to eliminate unwanted vegetation, create appropriate light conditions and invigorate native seed bank.
2. Encourage existing native ground layer species and stabilize streambanks
3. Post-planting management.

Note the similarity of these steps to the oak woodland restoration process outlined in Recommendation 1. The most significant difference in managing the South Woodland and Swale is the added attention to stabilizing the streambanks in this area. This recommendation is in accordance with one of the Environmental Protection Objectives of the 2009 Town of Middleton Comprehensive Plan to “identify and protect groundwater recharge areas.” The stream channel in the South Woodland Swale is a headwater for the North Fork of Pheasant Branch Creek, which feeds Lake Mendota. Not only are headwater streams important links to larger surface flow, they are also vital to groundwater recharge, help prevent silt and sediment accumulation in downstream lakes and rivers, and recycle nutrient inputs to the system. The function of the stream channel can be improved by protecting and bolstering the soil substrate with native plantings suitable for erosion control.

Invasive species control

Retention of native trees tolerant to wet conditions is a priority, as well the preservation of bur oaks present at higher elevations. The existing cottonwoods and silver maples are two of the native tree species that grow well in moist soils. Female box elder and invasive shrubs should be removed in order to promote growth of oak saplings and ground layer vegetation in the understory (Fig. 13).

Reed canary grass is also a priority management



Figure 13. Stormwater runoff in the swale at the south end of Settlers Prairie Park. The swale was formerly lined by box elders, as evidenced by the tree stump in the foreground. These trees were removed by the Town crew to reduce streambank erosion. After the trees were removed, the bare soil areas of the channel were colonized by cool-season grasses.

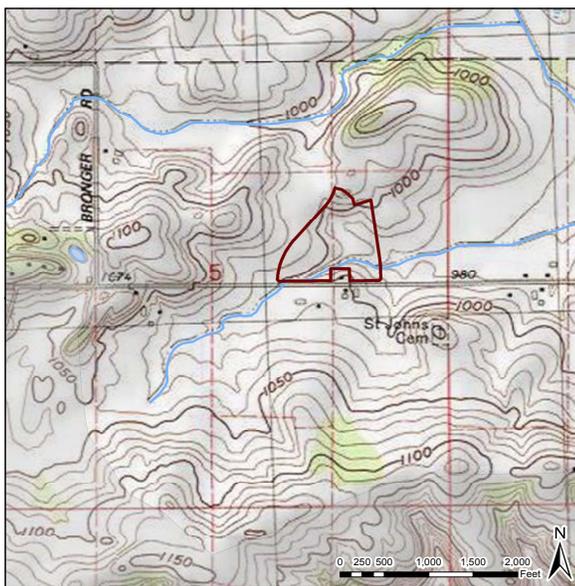
issue in this unit as it can quickly form monotypes when left unmanaged. Other herbaceous weeds were not as abundant in this unit, but should also be monitored and controlled as part of the management plan. For a comprehensive guide to reed canary grass control, please consult the Wisconsin DNR’s Reed Canary Grass Management Guide (PUB-FR-428-2009).

Preservation of soil structure and protection of water quality

The South Woodland and Swale is located at the lowest elevation within the Park. This area receives runoff from the immediate landscape to the west and southwest (Fig. 14). The Prairie Home Estates drainage east of Ellington Way has experienced a history of erosion problems since the onset of development (Town of Middleton Comprehensive Plan, 2009), and possible development south of Airport Road will

eventually contribute more impervious surfaces and infiltration issues in this area. Along with the preservation of native tree species already present in the unit, we recommend managing a portion of this unit as a vegetated swale. This will address current and forthcoming needs of water infiltration and erosion control in the park. Addition of shrub pockets along the ditch edge and appropriate herbaceous species within the channel that promote infiltration and soil stabilization would be appropriate actions towards this goal. See Recommendation 5 for details.

As a means to promote awareness of the ecological enhancement of the Park, a planting project in this unit would be suitable as a community-based initiative that invites neighborhood user groups and residents to assist in bed preparation, planting and maintenance activities. The northern section of the South Woodland Unit, just south of the bike path, would be a highly visible and easily accessible area to work with volunteers (Fig. 15). Although plant plugs would require more of an economic investment, they are more amenable to citizen participation. Plugs can be laid out



Legend
 Settlers Prairie Park
 Streams & Creeks

Figure 14. Topography of Settlers Prairie Park and the surrounding landscape. An unnamed tributary of the North Fork of Pheasant Branch Creek flows through the south end of the park. Contour interval 20 feet.

in the planting pattern prior to participants' arrival, and there is an immediate appreciation of the work by being able to see the plants in the ground. Interpretive signs discussing the local watershed and native plant attributes could be an additional component of the project.

Post-Planting

Management

Many of the same principles discussed in Objective 1 for

the oak woodland can be applied to the South Woodland savanna. Post-planning management is important to the recovery of native species and the maintenance of community structure. Activities beyond the initial restoration phase will need to be planned and budgeted for (Appendix F).

Variations in canopy density will produce differences in understory species recovery

RECOMMENDATION 3.

Maintain existing prairie and continue conversion of former fenceline to prairie/savanna.

In 2012, in response to neighborhood concerns, Town staff began planting trees in the prairie and former fenceline between the soccer fields and bike path. This tree planting effectively began the process of converting this area to savanna.

A savanna is a plant community with trees as an important component, but at a density "...so low that it allows grasses and other herbaceous vegetation to become the actual dominants of the community." (Curtis 1959). Savanna is an appropriate habitat type for an area adjacent to prairie - trees within the savanna are adapted to fire, and wide spacing between trees allows for a diverse ground layer to flourish. In addition, any savanna trees planted in this area will take on an open-grown form, providing the maximum amount of screening per tree.

Prairie and Savanna Maintenance



Figure 15. Open-grown bur oak in Pope Farm Conservancy.

The existing prairie planting is at least 10 years old and will only require a minimal level of annual monitoring and weed management. Managing the former fenceline as a savanna will help protect the existing prairie from weed invasion. Since the savanna is adjacent to an existing prairie, is surrounded by excellent firebreaks (asphalt and soccer field), and has undergone nearly 2 seasons of weed management, it should not incur a substantial increase in park maintenance costs for the Town.

Seeding

The Prairie/Savanna unit would benefit from interseeding of additional prairie grasses and wildflowers. Interseeding with a limited number of native prairie species was done in May of 2011 and two burns were conducted since 2009. Seed for enhancing the diversity of this area can be collected from other town parks/conservancies, or obtained from Dane County or another entity that distributes volunteer-collected prairie seeds. The former fenceline will need to be planted with a prairie mix, along with fire-adapted savanna trees such as white oak and bur oak.

Any seeds sown or trees planted on the site should be native, local ecotype prairie and savanna species. A comprehensive list of prairie and savanna species can be found in John Curtis's *Vegetation of Wisconsin* (1959). Landscape trees planted in the developed areas of the park adjacent to the prairie/savanna should be at least 50' away from this area, or at the north or east boundaries of the site, to reduce any adverse effect they may have on the prairie planting or prairie

maintenance activities (e.g. spraying, burning)

Burning

Fire is a natural ecosystem process that is necessary for maintaining prairies. Land managers use prescribed burns as a tool for managing prairie vegetation (Fig. 16). For most prairies, a prescribed burn every two to three years is adequate to curb shrub growth and promote native species diversity. The timing of the burn should be adjusted to meet specific resource management needs (e.g. top killing of brush, removal of thatch for interseeding, or weed reduction). Rotate the burning season to avoid adversely impacting a subset of the species on the site, such as early blooming forbs. The most recent burn was in April 2012. Ideally, the next scheduled burn would occur in the fall of 2013 or spring/fall 2014.

Monitoring and weed management

Further monitoring and removal of undesirable plant species is recommended, especially during the spring and summer. Manual removal of weeds may be the best approach in this case, given the small size of the prairie unit and community comments regarding herbicide use collected in the 2012 Settlers Prairie Park Survey (Appendix E). More persistent weed species, such as leafy spurge, should be spot sprayed with a selective herbicide before the plants set seed.



Figure 16. Prescribed burn.

OBJECTIVE B:

PROVIDE MULTIPLE OPPORTUNITIES FOR EDUCATION AND RECREATION

Visitors are offered hands-on and passive educational opportunities. Volunteers are actively recruited to assist with restoration and management. Community access and recreational use compatible with natural resource protection is encouraged. Public safety is protected.

RECOMMENDATION 4.

Identify and remove hazard trees

Prioritize the removal of standing dead trees if they are considered a hazard to Park visitors. Where possible, retain snags and downed wood for wildlife. Consider surveying and marking Park boundary prior to any tree work close to private property.

RECOMMENDATION 5.

Develop interpretive signs and programming for park visitors

Enhancing park visitors' understanding of the local cultural history, natural features and land stewardship activities will enrich their visit and promote a sense of place for this Community Park. Interpretive signs are a simple and effective way to engage visitors and explain the purposes and benefits of management activities that may have a long-term benefit to the community, but could be unsightly in the short term (e.g. weed tree removal, regrading)

The visual impact of 'before' and 'after' photographs can be effective in illustrating information. In addition to providing a permanent record that future land managers will find useful, the 'before' photo displayed on a sign provides the reader with what the landscape once was, while the view beyond the sign provides the visitor with the real 'after' image.

Information can also be provided on the



Figure 17. Currently there are no interpretive signs at Settlers Prairie Park.

signs regarding local groups active in park stewardship, with contact information for additional restoration activities and environmental education opportunities at the Park.

Potential interpretive sign subjects: native prairie species and adaptation to fire, oak savanna historical development and maintenance, soil stabilizing plants, pollinators

RECOMMENDATION 6.

Improve softball field turf conditions, or convert the field to an alternative use.

The softball field currently receives little use according to Town staff and residents, due to unsatisfactory turf conditions. Improving turf conditions or converting the field to an alternative use should receive consideration. The Town crew began the process of turf improvement by amending the soil with compost in 2012. In February 2013, the Park Commission was presented with a decision table presenting potential future management for this area (Appendix G). A representative of West Middleton Baseball and Softball present at this Park Commission meeting noted that the fields were not used by their organization due to the danger of rocks in the field just below the soil surface. The Park Commission voted to maintain this area as a softball field through 2013, due to the lack of other fields in the northern part of the town.

RECOMMENDATION 7.**Create secondary trails**

The Town of Middleton's 2008 CORP recommends establishing secondary trails to allow neighborhood residents to access the primary trail network. The Park currently has no secondary trail system. A secondary trail could be established within the North Woodland, connecting the east and west areas of the park, providing visitors an opportunity to explore the flora, wildlife, terrain and vistas offered by the North Woodland (Fig 18). Due to the presence of steep slopes, best management practices should be followed for trail construction.

OBJECTIVE C: MINIMIZE IMPACTS TO ADJOINING NEIGHBORHOODS

The Town strives to be a good neighbor by minimizing the impacts of maintenance, development, and public use of Settlers Prairie Park on the adjoining neighborhoods.

RECOMMENDATION 8.**Remove weed trees gradually to maintain woodland character and encourage oak regeneration**

The 2012 park survey (Appendix E) showed that one of the top community concerns regarding previous park management activities was the loss of the tree line along the bike path. If the Town wishes to manage the North Woodland as an oak woodland, then trees and shrubs suppressing oaks and oak regeneration should be removed from the area. Appropriate neighbor notification should be given in advance of the work.

While the restoration of a healthy and sustainable woodland canopy often requires the removal of lower quality tree species, it is also important to maintain local community support and active stewardship of the Park. Restoration efforts should concentrate on selective and gradual removal of

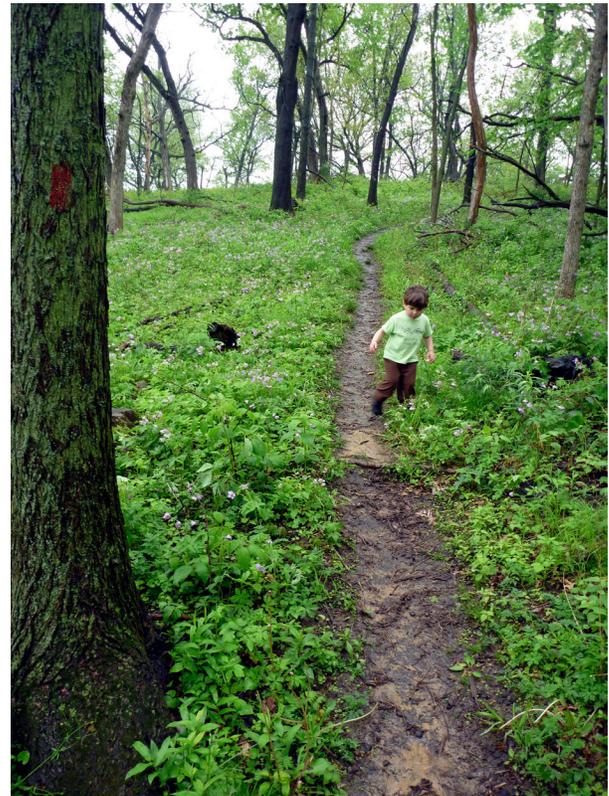


Figure 18. Hiker on one of Town of Middleton's secondary trails. A secondary trail could be established within the North Woodland, connecting the east and west areas of the park, providing visitors an opportunity to explore the flora, wildlife, terrain and vistas offered by the North Woodland.

less desirable tree species, while trying to replace some of the lost screening by the planting of appropriate native shrubs and tree seedlings. Where safe to do so, snags and dead trees should be retained to accommodate wildlife habitat.

Proactive measures should be taken to heighten the awareness of restoration actions and long-term goals for the Park. The installation of temporary interpretive panels or signs adjacent to work zones or the scheduling of naturalist-guided tours may be beneficial for this purpose.

RECOMMENDATION 9.**Provide replacement screening as trees and shrubs are removed**

Since the 2012 park survey identified loss of tree line as a primary concern of community members, care should be taken to rebuild vegetative screening lost in the removal of non-native or undesirable

species. Consider planting native shrubs and trees, consistent with southern Wisconsin's prairie and savanna landscape, along sight lines between residences and objectionable views.

Locations outside of the park's natural areas may be the best location for screening. Ideal locations for screening include the land southeast of the soccer field, land between the bike path and swale, and the hilltop at the northeast corner of the park. Appendix H provides a list of recommended native trees and shrubs suitable for planting in the park's natural areas.

OBJECTIVE D: UTILIZE EXTERNAL FUNDING AND PARTNERSHIPS

Public and private funds are obtained for development, restoration, and management. Partnerships are developed with organizations and individuals.

RECOMMENDATION 10.

Obtain external funding

Appendix I provides a list of potential funding sources for park development, ecological restoration, and educational and community involvement opportunities the Town may wish to pursue.

RECOMMENDATION 11.

Link with other organizations

Create cooperative arrangements with conservation organizations, schools, civic groups, and others to use Settlers Prairie Park for field trips, projects, and other educational activities, as well as for outdoor recreation opportunities. In exchange, they may be able to supply seeds, plants, other materials, or labor. In 2012, students and teachers from Madison Community Montessori School volunteered their time removing invasive buckthorn and honeysuckle from the North Woodland.

Examples of other partnerships include:

1. Dane County Parks
2. The Prairie Enthusiasts - Empire Sauk Chapter
3. Other local schools.
4. Boy-, Girl-, and Eagle Scouts.
5. Nearby neighborhood associations.
6. Madison Audubon Society

IMPLEMENTATION SCHEDULE

The table in Appendix F provides a suggested timeline for implementation of the previously outlined activities. The schedule may require adjustments based on available funding and resources. Planting plans should be delayed until weeds are under control. It is best to begin interpretive planning as soon as possible to keep the community informed of current and ongoing management goals.

SUMMARY

The management of Settlers Prairie Park offers excellent opportunities to restore the biological legacies of prairie and oak woodland communities and enhance quality wildlife habitat, within the context of a community park. It also offers an opportunity to educate and engage the surrounding community in the Town of Middleton's conservation objectives to preserve high quality wildlife habitat and to protect native plant communities for recreation and enjoyment.

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APPENDIX A

SUPPLEMENTAL INVENTORY

FIELD NOTES FROM THE WISCONSIN PUBLIC LAND SURVEY
(northeast ¼ of Section 5, Township 7 North, Range 8 East)

Township 7 North		Range 8 East	
South	Between sections 4 & 5	West	On random between sections 5 & 8
30-55	Burr Oak 9	40-00	Set Temp ^o ¼ section post
40-00	Set Oak post for ¼ sec. corner	80-26	Intersected E ^W bound ^o 17 N of post
	Burr Oak 14 N75E 53		Land the same
	Do 14 N86W 49		
57-87	Burr Oak 12		
80-00	Set Oak post for corner to sections 4, 5, 8, 9		
	W Oak 16 N73W 17	East	Corrected between sec 5 & 8
	Burr Oak 10 N80E .63	40-13	Set Oak post for ¼ section corner on true line
	Land rolling second rate		W Oak 30 S71W 42
	Timber 13 W & Burr Oak		Burr Oak 12 N29E 1-37
		80-26	Section corner

RELEVANT PAGES FROM THE 1990 ZIMMERMAN AND KAILING REPORT

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: North Line.

Map Key: B Resource District: 3

Quarter Sections: NW 4 & NE 5.

Sensitive Sites: 1, 91(a), 91(b).

General Description: An "island" of quality oak forest with adjacent, small wetland areas; area continues into adjacent Springfield Township.

Biotypes: Oak forest, and small temporary ponds and waterways.

Watershed Characteristics: Setting--Ridge west of North Fork of Pheasant Branch Creek. Input Area--400 acres (waterway leading to North Fork). Output--North Fork Pheasant Branch Creek.

Aspect: Northwest, North, and Northeast in Sensitive Site 1, flat in Sites 91(a) and 91(b).

Slopes: 12%

Soils: Forest slopes--McHenry, steep, erodible; Wetland areas--Batavia and Grays silt loams, over sand or gravel.

Land Uses: Forest--natural; Wetlands--ditching and fallow. No development or roads at present.

Most Important Natural Resources: A quality natural unit for plant and animal diversity which may in part serve as a benchmark for regeneration efforts elsewhere; ponds and waterways are important habitat for amphibians and invertebrates, and may be important to groundwater recharge.

Natural Resource Management Requirements: Maintain forest quality and diversity of species; restore wetland and waterway habitat.

Priority Land Use Objectives: Preservation and management to maintain total area as a contiguous natural unit.

Means of Control: Overlay zoning or special natural area protection to limit development.

Monitoring Requirements: a) species abundance and diversity; b) natural groundcover; c) wetland hydroperiod; d) pest species populations; and e) biotype continuity.

TOWN OF MIDDLETON NATURAL RESOURCE DISTRICT EVALUATIONS

District Name: North Fork Pheasant Branch Countryside.

Map Key: 3

Sections: 4, 5, & 6.

General Characteristics: Rural agricultural (with a few settlements and woodlots).

Topography: Rolling, slopes to southeast, 950-1150 feet.

Geology: Ground moraine over dolomite.

Vegetation: Associated with dairy farms, ditched waterways and drying ponds, and several oak woodlots.

Soils: Silt loams.

Hydrology: Part of six-square mile watershed of the North Fork of Pheasant Branch Creek; probably has an important role in groundwater discharge.

Natural History: Formerly oak-hickory forests with some oak savannas; ponds and natural creek waterways.

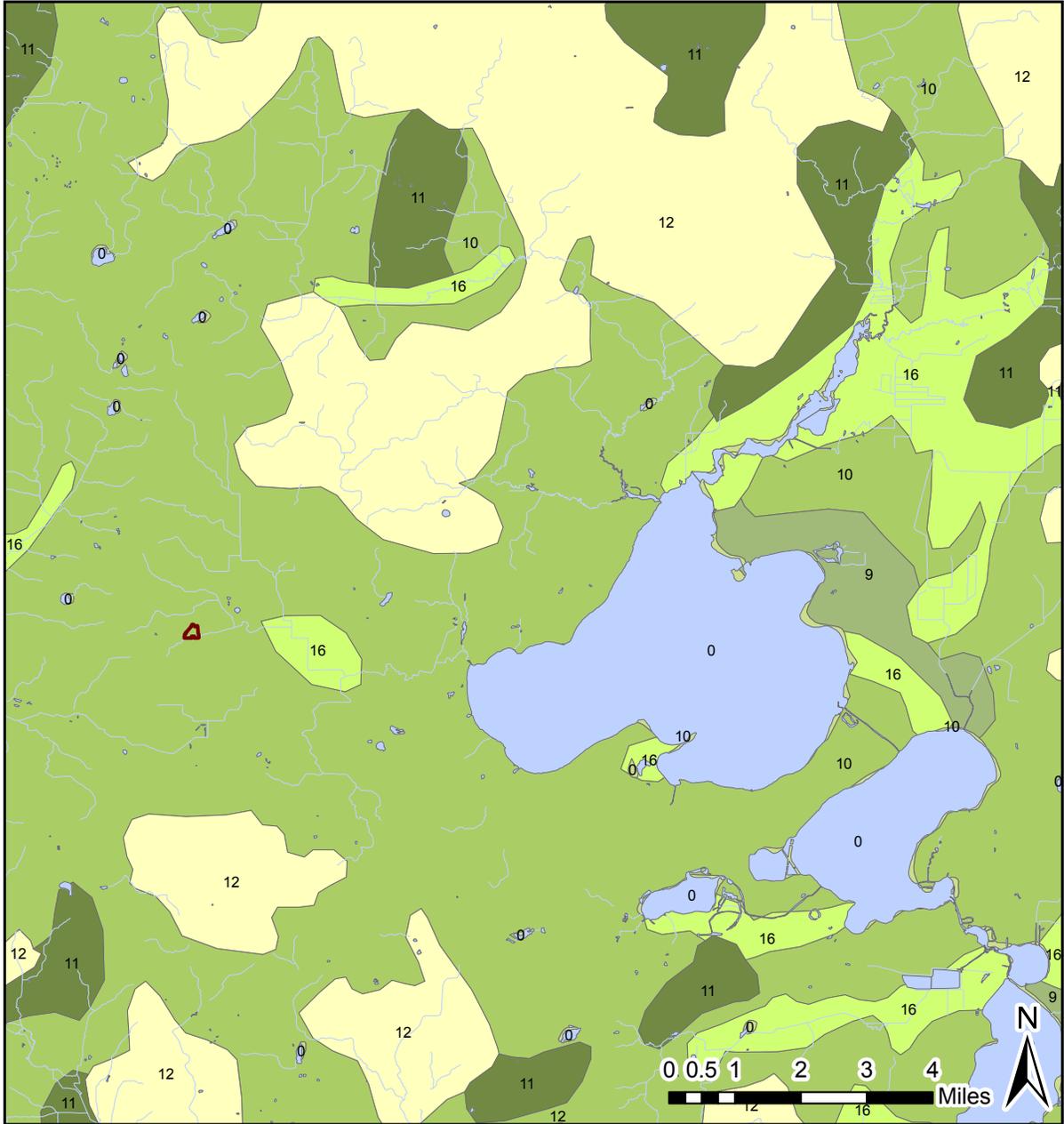
Scenic Beauty: Rural landscape.

Historic Importance: Glacial landscape feature and with landmark evidence of early settlement.

Most Important Natural Resources: Restoration potential for woodlands and wetlands; headwaters of important Lake Mendota tributary, the North Fork of Pheasant Branch Creek; groundwater recharge; special use agricultural soils.

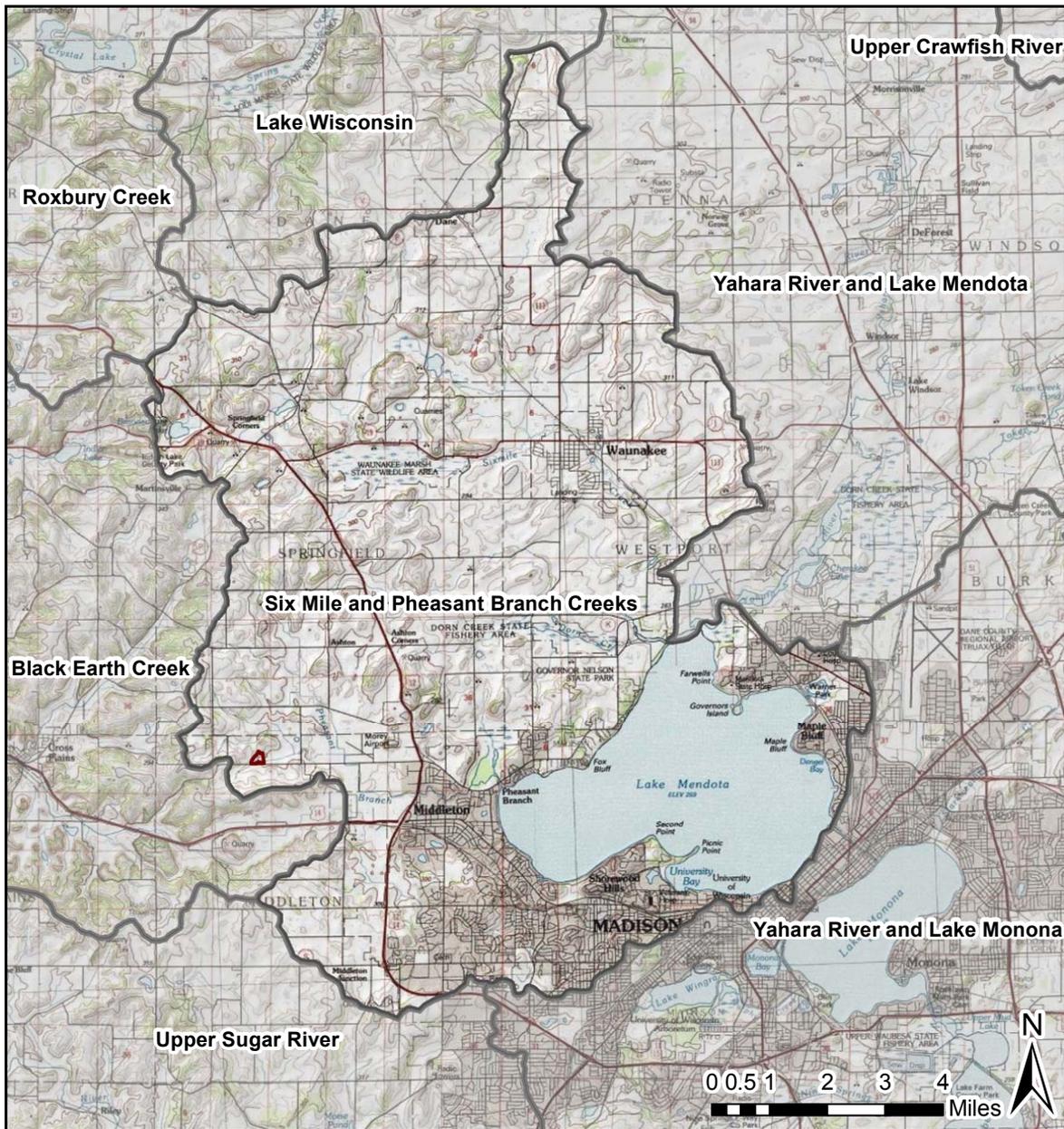
Priority Land Use Objectives: Floodplain wetland restoration; riparian conservancy and stormwater management facility; agricultural preservation balanced with residential development.

HISTORIC LAND COVER OF SETTLERS PRAIRIE AND SURROUNDING AREA



- Settlers Prairie Park
- Oak - white, black & bur
- Prairie
- Oak openings - bur, white & black
- Sugar maple, basswood, & oak (red, white & black)
- Marsh & sedge meadow, wet prairie, lowland shrubs
- Lakes
- Rivers, Streams & Creeks

SETTLERS PRAIRIE PARK WATERSHED CONTEXT



Legend

- Settlers Prairie Park
- Watersheds

APPENDIX B

VEGETATION SURVEY RESULTS

Annotated List of Observed Species

Scientific name	Common Name	Native or Exotic	Invasive Species	North Woodland	South Woodland	Prairie
Trees						
<i>Acer negundo</i>	Box elder	N		X	X	X
<i>Acer saccharinum</i>	Silver maple	N			X	X
<i>Catalpa speciosa</i>	Catalpa (seedlings)	N			X	
<i>Celtis occidentalis</i>	Hackberry	N		X	X	
<i>Populus deltoides</i>	Cottonwood	N			X	
<i>Prunus serotina</i>	Black cherry	N		X	X	
<i>Prunus virginiana</i>	Choke cherry	N		X	X	
<i>Quercus macrocarpa</i>	Bur oak	N		X	X	
<i>Quercus velutina</i>	Black oak	N		X		
<i>Salix spp.</i>	Willow	N				X
<i>Ulmus spp.</i>	Elm	N		X		
Shrubs						
<i>Corylus americana</i>	Hazelnut	N		X		
<i>Lonicera x bella</i>	Honeysuckle	E	X	X	X	X
<i>Rhamnus cathartica</i>	Common buckthorn	E	X	X	X	
<i>Rhus glabra</i>	Smooth sumac	N		X (edge)		
<i>Ribes cynosbati</i>	Prickly wild gooseberry	N		X	X	
<i>Ribes lacustre</i>	Bristly black currant	N			X	
<i>Rosa arkansana</i>	Prairie Rose	N				X
<i>Rosa multiflora</i>	Multiflora rose	E	X	X (edge)		
<i>Rubus idaeus</i>	Red raspberry	N		X		X

Scientific name	Common Name	Native or Exotic	Invasive Species	North Woodland	South Woodland	Prairie
<i>Rubus occidentalis</i>	Black raspberry	N		X	X	X
<i>Sambucus canadensis</i>	Elderberry	N		X		
<i>Viburnum opulus</i>	European cranberry-bush	E		X	X	
Forbs						
<i>Actaea pachypoda</i>	White Baneberry	N		X		
<i>Alliaria petiolata</i>	Garlic mustard	E	X	X		
<i>Ambrosia artemisiifolia</i>	Common ragweed	N		X		X
<i>Ambrosia trifida</i>	Giant ragweed	N			X	X
<i>Arctium minus</i>	Burdock	E	X	X		
<i>Asclepias incarnata</i>	Swamp milkweed	N				X
<i>Asclepias syriaca</i>	Common milkweed	N		X (edge)		X
<i>Aster lateriflorus</i>	Calico aster	N		X (edge)		
<i>Aster novae-angliae</i>	New England aster	N				X
<i>Baptisa alba</i>	White indigo	N				X
<i>Circaea lutetiana</i>	Enchanter's nightshade	N		X	X	
<i>Cirsium arvense</i>	Canada thistle	E	X	X		X
<i>Cirsium vulgare</i>	Bull thistle	E		X		X
<i>Erigeron strigosus</i>	Daisy fleabane	N		X		X
<i>Conyza canadensis</i>	Horseweed	N		X		
<i>Daucus carota</i>	Queen Anne's lace	E	X	X	X	X
<i>Echinacea pallida</i>	Purple coneflower	N				X
<i>Eupatorium rugosum</i>	White snakeroot	N		X	X	
<i>Euphorbia esula</i>	Leafy spurge	E	X	X		X

Scientific name	Common Name	Native or Exotic		Invasive Species	North Woodland	South Woodland	Prairie
		Native	Exotic				
<i>Galium aparine</i>	Annual bedstraw		N		X		
<i>Gaura biennis</i>	Gaura		N				X
<i>Geranium maculatum</i>	Wild geranium		N		X		
<i>Geum canadense</i>	White avens		N		X	X	
<i>Hackelia virginiana</i>	Virginia stick seed		N		X	X	
<i>Helianthus giganteus</i>	Tall sunflower		N			X	X
<i>Helianthus strumosus</i>	Woodland sunflower		N		X		X
<i>Lactuca spp.</i>	A tall lettuce		N		X		
<i>Laportea canadensis</i>	Wood nettle		N		X		
<i>Leonurus cardiaca</i>	Motherwort		E		X	X	
<i>Lotus corniculata</i>	Bird's foot trefoil		E	X			X
<i>Maianthemum racemosum</i>	False Solomon's seal		N		X		
	Starry false						
<i>Maianthemum stellatum</i>	Solomon's-s-seal		N		X		
<i>Melilotus alba</i>	White sweet clover		E	X			X
<i>Monarda fistulosa</i>	Bee balm		N		X (edge)		X
<i>Nepeta cataria</i>	Catnip		N		X		
<i>Oenothera biennis</i>	Evening primrose		N		X		
<i>Osmorhiza claytonii</i>	Hairy sweet cicely		N		X		
<i>Osmorhiza longistylis</i>	Smooth sweet cicely		N		X		
<i>Oxalis corniculata</i>	Common wood sorrel		N		X		X
<i>Penstemon digitalis</i>	False foxglove		N				X
<i>Polygonatum biflorum</i>	Solomon's seal		N		X		
<i>Potentilla recta</i>	Sulphur cinquefoil		N				X
<i>Ratibida pinnata</i>	Yellow coneflower		N		X (edge)		X

Scientific name	Common Name	Native or Exotic	Invasive Species	North Woodland	South Woodland	Prairie
<i>Rudbeckia hirta</i>	Black-eyed susan	N		X (edge)		X
<i>Rumex crispus</i>	Curly dock	E		X		
<i>Silene latifolia</i>	White campion	E		X		X
<i>Silphium integrifolium</i>	Rosinweed (rosette)	N				X
<i>Silphium perfoliatum</i>	Cup-plant	N				X
<i>Silphium terebinthinaceum</i>	Prairie dock	N				X
<i>Smilax</i>	Smilax	N		X		
<i>Solidago canadensis</i>	Canada goldenrod	N		X (edge)	X	X
<i>Solidago rigida</i>	Stiff goldenrod	N		X (edge)		X
<i>Solidago speciosa</i>	Showy goldenrod	N				X
<i>Stachys palustris</i>	Wild mint	N				X
<i>Symphotrichum pilosum</i>	Frost aster	N		X	X	X
<i>Taraxacum officinale</i>	Dandelion	E				X
<i>Toxicodendron radicans</i>	Poison ivy	N		X		
<i>Tradescantia ohioensis</i>	Spiderwort	N		X (edge)		X
<i>Trifolium pratense</i>	Red clover	E				X
<i>Urtica dioica</i>	Stinging nettle	N		X	X	
<i>Verbascum thapsus</i>	Mullein	E		X (edge)		
<i>Viola sororia</i>	Common blue violet	N		X	X	
Graminoids						
<i>Agrostis gigantea</i>	Red top	N			X	
<i>Alopecurus carolinianus</i>	Annual foxtail	E				X
<i>Andropogon gerardii</i>	Big bluestem	N				X
<i>Bouteloua curtipendula</i>	Side-oats grama	N				X

Scientific name	Common Name	Native or Exotic	Invasive Species	North Woodland	South Woodland	Prairie
<i>Bromus erectus</i>	Smooth brome	E		X	X	X
<i>Carex pensylvanica</i>	Pennsylvania sedge	N		X (edge)		
<i>Carex spp.</i>	Unidentified sedge	N		X		
<i>Dactylis glomerata</i>	Orchard grass	N			X	
<i>Elytrigia repens</i>	Quack grass	E		X		
<i>Festuca/Poa canadensis</i>	Fescue/ KY Bluegrass	N				X
<i>Panicum virgatum</i>	Switchgrass	N				X
<i>Phalaris arundinacea</i>	Reed canarygrass	E	X	X	X	X
<i>Poa canadensis</i>	Kentucky bluegrass	E		X (edge)		X
<i>Schizachyrium scoparium</i>	Little blue-stem	N				X
<i>Setaria pumila</i>	Yellow foxtail	N		X		
<i>Sorghastrum nutans</i>	Indian grass	N		X (edge)		X
Vines						
<i>Celastrus scandens</i>	American bittersweet	N		X		
<i>Parthenocissus quinquefolia</i>	Virginia creeper	N		X	X	
<i>Solanum dulcamara</i>	Bittersweet nightshade	E		X	X	
<i>Vitis riparia</i>	Wild grape	N		X	X	X

2011 TREE SURVEY RESULTS

Methods

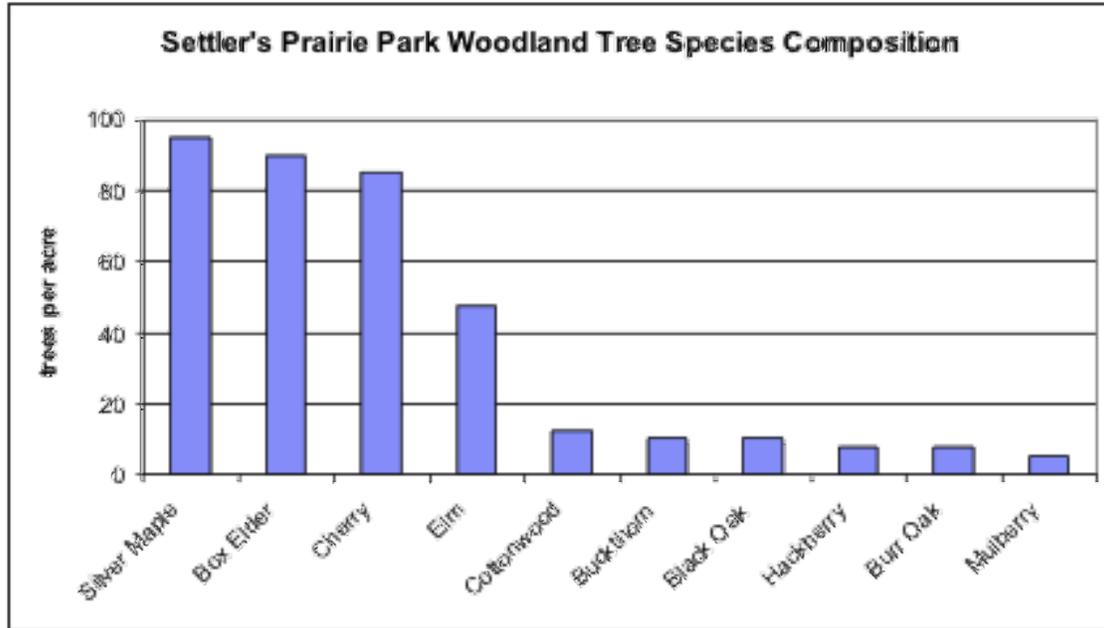
The Town of Middleton's Settler's Prairie Park trees were surveyed based upon methodology outlined in the City of Middleton's Emerald Ash Borer Readiness Plan, December 2009, and according to accepted forest biometry methods. Settler's Prairie Park forested acreage was estimated to be 2.7 acres, with two distinct tracts to the north and south of the soccer fields treated as a single "Stand". Four fixed area sample plots representing 0.1 acres, with a radius of 37.25 feet per plot, were measured, with 2 in each separate tract. All trees greater than 1" in diameter within the plot boundary were tallied. Tree species and diameter at breast height (dbh) were recorded. Trees were also assessed for merchantability, by estimating number of sawlogs, sawbolts and/or pulp sticks contained in each tree, where applicable. Not all trees are merchantable, and these measures should serve only as a reference, and by no means imply silvicultural recommendations.

Findings

According to estimates from this inventory, the Settler's Prairie Park woodlands have 370 trees per acre (estimated 999 total trees), and an average basal area of 95 square feet per acre. Tree density is relatively constant throughout the woodlot, with basal areas measuring from 110 to 160 square feet per acre for the three plots. The South stand, along Airport Road, is composed of primarily silver maple and box elder, with four very large cottonwoods ranging from 35 to 57 inches dbh. Small diameter elm and cherry are also present in the South stand. Buckthorn and honeysuckle are among the invasive species present there. The North stand is dominated by pole-sized black cherry and box elder, with black oaks, hackberry and elm also present. A few small bur oaks are in the eastern portion of the North stand. Buckthorn has been cut and treated, but threatens desirable oak regeneration without continued management. Between the two stands, 10 species were observed in the Settler's Prairie Park woodlands (Figure 1).

2011 Tree Survey Results continued

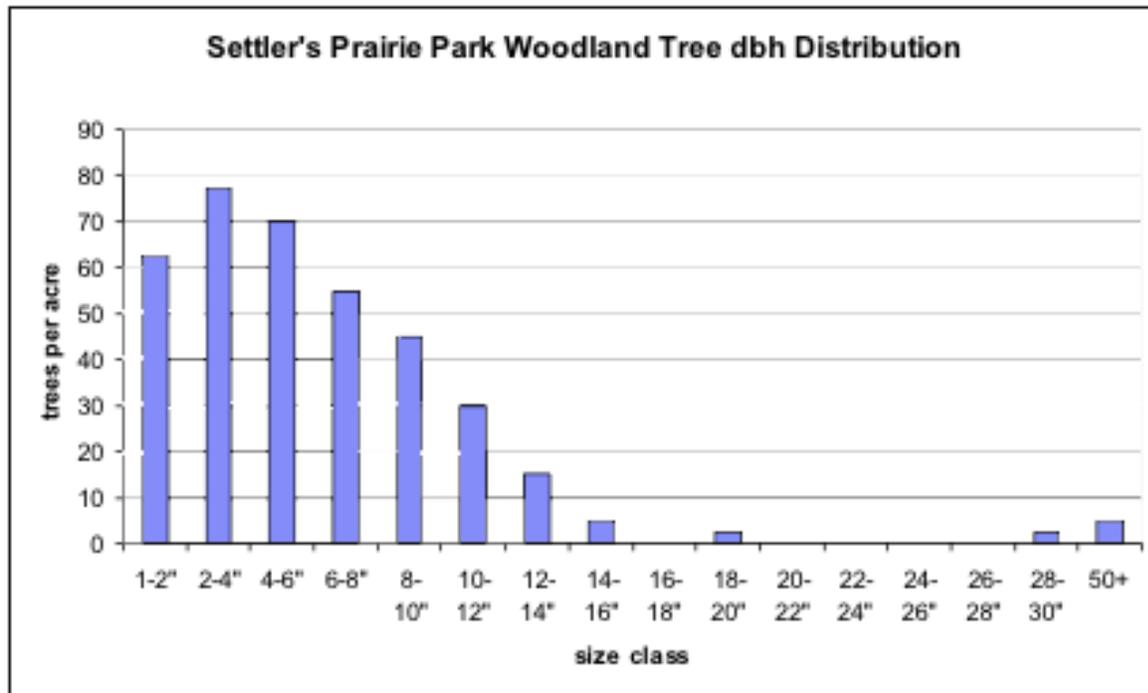
Figure 1. Tree species composition of Settler's Prairie Park Woodland, per Adaptive Restoration LLC inventory, 11/12/2011.



The most prevalent size class in the Settler's Prairie Park woodland is at diameter at breast height (dbh) of 2-4 inches, with nearly 21% of all trees, followed closely by trees with dbh 4-6 inches (19%), and dbh 1-2 inches (17%). Most of these small trees are silver maple, box elder, cherry and elm, and are most prevalent in the South stand. The North stand has more pole-sized and small sawtimber trees, with prevalent dbh's ranging from 6 to 12 inches. Four cottonwood trees of dbh 35, 51, 51 and 57 inches respectively tower over the South stand. These trees may be considered "Specimen trees", but are at high risk of wind damage, evidenced by a large limb lost from the largest cottonwood.

2011 Tree Survey Results continued

Figure 2. Tree diameter distribution of Settler's Prairie Park Woodland, per Adaptive Restoration LLC inventory, 11/12/2011.



The inventory estimates over 8,000 board feet per acre in standing trees, along with 13.2 cords per acre in lesser quality material. This assessment of utilization potential is likely skewed due to the huge cottonwoods in the South stand and the variability within the small stands. Though these trees likely have much greater value as standing trees, merchantability estimates such as this may be used as a baseline for future growth of the stand, even where conventional harvests are not likely to occur.

APPENDIX C

NR40 REGULATED INVASIVE PLANTS OF WISCONSIN

Regulated Terrestrial Invasive Plants in WI



Princess tree
(Paulownia tomentosa)



Sawtooth oak
(Quercus acutissima)



Scotch broom
(Cytisus scoparius)



Wineberry
(Rubus phoenicalasius)



Porcelain berry
(Ampelopsis brevipedunculata)



Chinese yam
(Dioscorea oppositifolia)



Japanese honeysuckle
(Lonicera japonica)



Mile-a-minute vine
(Polygonum perfoliatum)



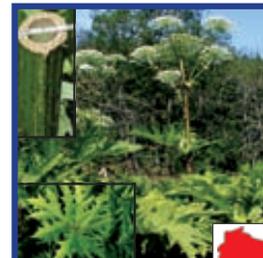
Kudzu
(Pueraria lobata)



Pale swallow-wort
(Vincetoxicum rossicum)



Yellow star thistle
(Centaurea solstitialis)



Giant hogweed
(Heracleum mantegazzianum)



Perennial pepperweed
(Lepidium latifolium)



Chinese or Sericea lespedeza
(Lespedeza cuneata)



Giant knotweed
(Polygonum sachalinense)



Spreading hedgeparsley
(Torilis arvensis)



Restricted Species	Prohibited/Restricted Species	Tree	Vine	Grass
Prohibited Species		Shrub	Forb	

For more information about NR 40 (WI's Invasive Species Rule), Restricted, or Prohibited species please visit: www.dnr.wi.gov/invasives/classification

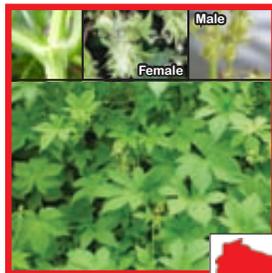
Regulated Terrestrial Invasive Plants in WI



Japanese stilt grass
(Microstegium vimineum)



Amur honeysuckle
(Lonicera maackii)



Japanese hops
(Humulus japonicus)



Black swallow-wort
(Vincetoxicum nigrum)



Wild chervil
(Anthriscus sylvestris)



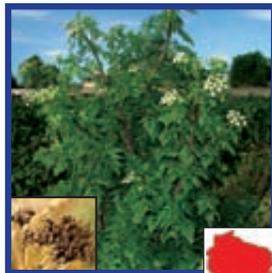
Hill mustard
(Bunias orientalis)



Celandine
(Chelidonium majus)



European marsh thistle
(Cirsium palustre)



Poison hemlock
(Conium maculatum)



Hairy willow herb
(Epilobium hirsutum)



Japanese hedgeparsley
(Torilis japonica)



Tall or Reed manna grass
(Glyceria maxima)



Lyme grass or Sand ryegrass
(Leymus arenarius)



Tree-of-heaven
(Ailanthus altissima)



Common buckthorn
(Rhamnus cathartica)



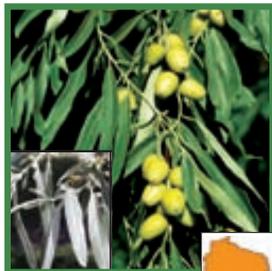
Glossy buckthorn
(Rhamnus frangula)



Restricted Species	Prohibited/Restricted Species	Tree	Vine	Grass
Prohibited Species		Shrub	Forb	

For more information about NR 40 (WI's Invasive Species Rule), Restricted, or Prohibited species please visit: www.dnr.wi.gov/invasives/classification

Regulated Terrestrial Invasive Plants in WI



Russian olive
(Elaeagnus angustifolia)



Autumn olive
(Elaeagnus umbellata)



Morrow's honeysuckle
(Lonicera morrowii)



Tartarian honeysuckle
(Lonicera tatarica)



Bell's honeysuckle
(Lonicera x bella)



Multiflora rose
(Rosa multiflora)



Oriental bittersweet
(Celastrus orbiculatus)



Garlic mustard
(Alliaria petiolata)



Creeping bellflower
(Campanula rapunculoides)



Plumeless thistle
(Carduus acanthoides)



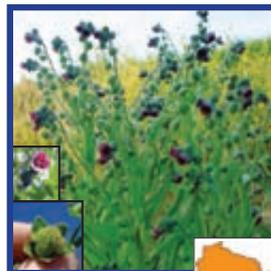
Musk thistle
(Carduus nutans)



Spotted knapweed
(Centaurea biebersteinii)



Canada thistle
(Cirsium arvense)



Hound's tongue
(Cynoglossum officinale)



Common teasel
(Dipsacus fullonum subsp. sylvestris)



Cut-leaved teasel
(Dipsacus laciniatus)



Restricted Species	Prohibited/Restricted Species	Tree	Vine	Grass
Prohibited Species		Shrub	Forb	

For more information about NR 40 (WI's Invasive Species Rule), Restricted, or Prohibited species please visit: www.dnr.wi.gov/invasives/classification

Regulated Terrestrial Invasive Plants in WI



Helleborine orchid
(*Epipactis helleborine*)



Cypress spurge
(*Euphorbia cyparissias*)



Leafy spurge
(*Euphorbia esula*)



Hemp nettle
(*Galeopsis tetrahit*)



Dame's rocket
(*Hesperis matronalis*)



Purple loosestrife
(*Lythrum salicaria*)



Wild parsnip
(*Pastinaca sativa*)



Japanese knotweed
(*Polygonum cuspidatum*)



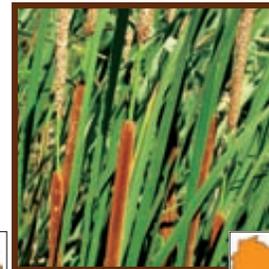
Tansy
(*Tanacetum vulgare*)



Phragmites
(*Phragmites australis*)



Narrow-leaved cattail
(*Typha angustifolia*)



Hybrid cattail
(*Typha x glauca*)

Please report any **prohibited** species (as indicated by red on the maps). Provide the following data: exact location, land ownership (if known), population size, a photo or voucher specimen, and your contact information. **To report a sighting send an email to:**

Invasive.Species@wi.gov or CALL 608-267-7438

Restricted Species	Prohibited/Restricted Species	Tree	Vine	Grass
Prohibited Species		Shrub	Forb	

For more information about NR 40 (WI's Invasive Species Rule), Restricted, or Prohibited species please visit: www.dnr.wi.gov/invasives/classification

Bureau of Endangered Resources
and Division of Forestry
Wisconsin Department of Natural Resources
Box 7921
Madison, WI 53707-7921



The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and functions under an Affirmative Action Plan. If you have any questions, please write to Equal Opportunity Office, Department of Interior, Washington, D.C. 20240

DNR PUB-FR-464-2010



This publication is available in alternative format (large print, Braille, audio tape, etc.) upon request. Please call (608) 267-7694.

Design and Layout by Bonnie Reichert

APPENDIX D: RELEVANT RESOURCES

WI Department of Natural Resources Grant Agreement for Town of Middleton Second Community Park Acquisition

State of Wisconsin
Department of Natural Resources:
Box 7921
Madison, Wisconsin 53704

RECREATION AIDS GRANT AGREEMENT
OR PROJECT FUNDING AGREEMENT
8700-65 Rev. 9-93

<p>Sponsor:</p> <p style="text-align: center;">Town of Middleton</p>	<p>Project Number:</p> <p style="text-align: center;">UGS - 76</p>
--	--

<p>Project Title:</p> <p style="text-align: center;">Town of Middleton Second Community Park Acquisition</p>
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<p>Period Covered By this Agreement:</p> <p style="text-align: center;">Date of approval through June 30, 2000</p>	<p>Name of Program:</p> <p style="text-align: center;">Urban Green Space Program</p>
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Project Scope and Description of Project:

The Town of Middleton shall participate in the Urban Green Space Program by providing the following items:

- The Town of Middleton shall purchase approximately 1.5 acres of land for public outdoor recreation purposes.

<p>Project Cost:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding-left: 20px;">Total Cost:</td> <td style="text-align: right;">\$ 80,000</td> </tr> <tr> <td style="padding-left: 20px;">Fund Support:</td> <td style="text-align: right;">50%</td> </tr> <tr> <td style="padding-left: 20px;">State Aid Amount:</td> <td style="text-align: right;">\$ 40,000</td> </tr> <tr> <td style="padding-left: 20px;">Sponsor Share:</td> <td style="text-align: right;">\$ 40,000</td> </tr> </table>	Total Cost:	\$ 80,000	Fund Support:	50%	State Aid Amount:	\$ 40,000	Sponsor Share:	\$ 40,000	<p>The following documents are hereby incorporated into and made part of this agreement:</p> <ol style="list-style-type: none"> Chapter NR 50 , Wisconsin Administrative Code . Recreation Aids Application
Total Cost:	\$ 80,000								
Fund Support:	50%								
State Aid Amount:	\$ 40,000								
Sponsor Share:	\$ 40,000								

1. The State of Wisconsin Department of Natural Resources (Department) and the Sponsor mutually agree to perform this agreement in accordance with the Urban Green Space Program and with the project proposal, application, terms, promises, conditions, plans, specifications, estimates, procedures, maps, and assurances attached hereto and made a part hereof.
 2. The Department hereby promises, in consideration of the covenants and agreements made by the Sponsor herein, to obligate to the sponsor the amount of \$40,000, and to tender to the Sponsor that portion of the obligation which is required to pay the Department's share of the costs based upon the state providing 50 percent of the eligible project costs. The Sponsor hereby promises, in consideration of the promises made by the Department herein, to execute the project described herein in accordance with this agreement.
 3. The Sponsor agrees to comply with all applicable Wisconsin Statutes and Wisconsin Administrative Codes in fulfilling terms of this agreement. In particular, the Sponsor agrees to comply with the provisions of Chapter NR 50, Wis. Adm. Code, attached hereto and made a part hereof.
 4. The Department agrees that the Sponsor shall have sole control of the method, hours worked, and time and manner of any performance under this agreement other than as specifically provided herein. The department reserves the right not only to inspect the job site or premises for the sole purpose of insuring that the performance is progressing or has been completed in compliance with the agreement. The Department takes no responsibility of supervision or direction of the performance of the agreement to be performed by the Sponsor or the sponsor's employees or agents. The Sponsor is an Independent Contractor for all purposes, not an employee or agent of the Department. The Department further agrees that it will exercise no control over the selection and dismissal of the Sponsor's employees or agents.
 5. This agreement, together with any referenced parts and attachments, shall constitute the entire agreement and previous communications or agreements pertaining to the subject matter of this agreement are hereby superseded. Any revisions, including cost adjustments, must be made by an amendment to this agreement or other written documentation, signed by both parties, prior to the termination date of the agreement. Time extensions to the agreement may be granted to the sponsor by the Department in writing without the requirements of Sponsor signature.
 6. The sponsor may rescind this agreement in writing at any time prior to the starting of the project and before expending any funds. After the project has been started or funds expended, this agreement may be rescinded, modified, or amended only by mutual agreement in writing.
 7. Failure by the Sponsor to comply with the terms of this agreement shall not cause the suspension of all obligations of the State hereunder if, in the judgement of the Secretary of the Department, such failure was due to no fault of the sponsor. In such case, any amount required to settle at minimum costs any irrevocable obligations properly incurred shall be eligible for assistance under this agreement, at the Department's discretion.
 8. The Sponsor agrees, to save, keep harmless, defend and indemnify the Department and all its officers, employees and agents, against any and all liability claims, costs of whatever kind and nature, for injury to or death of any person or persons, and for loss or damage to any property (state or other) occurring in connection with or in any way incident to or arising out of the occupancy, use, service, operation or performance of work in connection with this agreement or omissions of Sponsor's employees, agents or representatives.
 9. The Sponsor agrees to reimburse the Department of any and all funds the Department deems appropriate in the event the Sponsor fails to comply with the conditions of this agreement or project proposal as described, or fails to provide public benefits as indicated in the project application, proposal description or this agreement. In addition, should the Sponsor fail to comply with the conditions of this agreement, fail to progress due to nonappropriation of funds, or fail to progress with or complete the project to the satisfaction of the Department, all obligations of the Department under this agreement may be terminated, including further project cost payment.
- Other Conditions -
10. Property acquired or developed with assistance from this program shall not be converted to uses inconsistent with public outdoor recreation without the approval of this Department
 11. All facilities constructed with assistance from this program must be accessible to persons with disabilities.
 12. All existing overhead utility services if feasible shall be buried and any new utility services provided through this project must be installed underground.
 13. The sponsor must assure compliance with the Historic Properties State Statute (s. 66.037) or have a clearance letter from the State Historic Preservation Officer.
 14. The Sponsor agrees, to save, keep harmless, defend and indemnify the Department and all its officers, employees and agents, against any and all liability claims, costs of whatever kind and nature related to any and all environmental hazards associated with the purchase of property or rights in property that are purchased with Department grant funds, by the Sponsor.

15. The following special project terms and conditions were added to this agreement before it was signed by the parties hereto:
1. Acquisition of real property shall be in accordance with state guidelines for preparation of appraisals and relocation assistance.
 2. The following clause must be entered in the deed: By the acceptance of this deed, the sponsor, for itself and its successors and assign, hereby covenants and agrees not to sell, lease, assign or mortgage the premises herein described without prior written approval of the Secretary of the Department of Natural Resources, his designee, or any successor.

Check here if you request advanced payment. _____

Indicate below where the check will be mailed if different from the authorized representative listed on the application.

The persons signing for the Sponsor represents both personally and as an agent of his or her principal that he or she is authorized to execute this agreement and bind his or her principal, either by a duly adopted resolution or otherwise.

By _____
 (Signature)

 (Title)

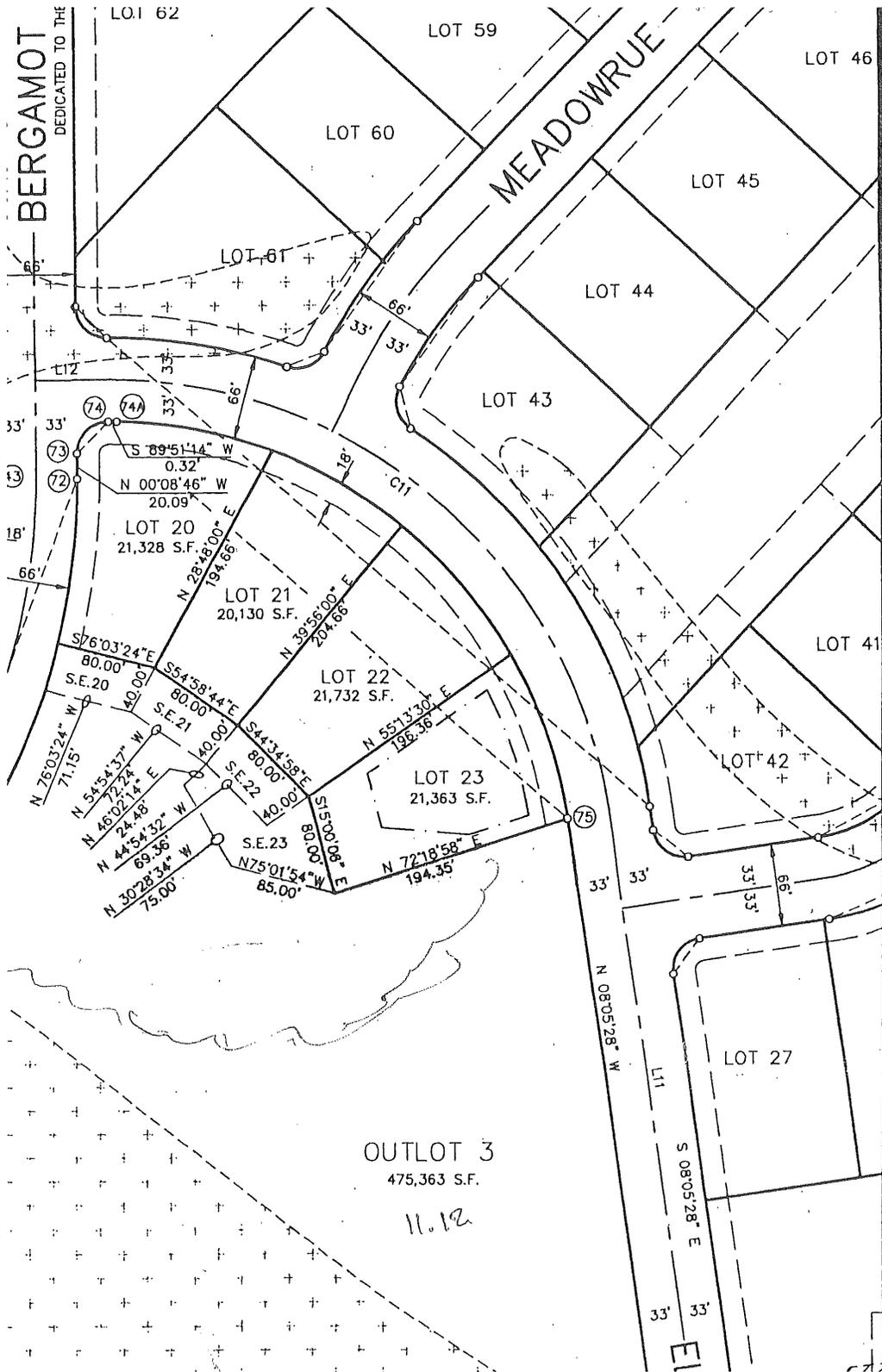
 (Date)

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
FOR THE SECRETARY

By Kathryn A. Curtner
 Kathryn A. Curtner, Director
 Bureau of Community Financial Assistance

10/13/97
 (Date)

Easements Within Settlers Prairie Park



APPENDIX E

2012 SETTLERS PRAIRIE PARK SURVEY and RESULTS

(287 respondents)

Settlers Prairie Community Park Survey

This survey seeks your feedback in regard to Settlers Prairie Park (SPP) and is being conducted in conjunction with the development of an ecological assessment and management plan for the property. SPP is one of two “*Community Parks*” as designated by the Town of Middleton. According to the Town, *Community Parks* are larger in size and serve a broader purpose than neighborhood parks. The focus of a community park is on meeting the recreational needs of multiple neighborhoods or large sections of the community. Additionally, community parks may serve to preserve unique landscapes and open spaces. They allow for group activities and other uses that are not feasible or desirable at the neighborhood level. Community parks should also be developed for both active and passive recreational activities. Community parks should serve several neighborhoods. The service area should generally be 1/2 to 3 miles in radius.

Please reference the attached aerial photo with the park’s boundaries – 19.5 acres total – delineated in yellow. Feel free to draw on the photo and make any notes you believe would be useful to planners.

1) How often do you visit Settler’s Prairie Park (SPP)?

- daily (8%)
- weekly (19%)
- monthly (13%)
- a few times/year (29%)
- never (31%)

2) What existing facilities do you use at SPP? (check all that apply)

- | | |
|--------------------------------|----------------------|
| -soccer fields (21%) | -shelters (16%) |
| -baseball/softball field (10%) | -playground (30%) |
| -tennis courts (37%) | -restrooms (24%) |
| -volleyball court (1%) | -walking trail (53%) |
| -picnic tables (17%) | -other? (kiosk 4%) |

3) What activities are you or your family most likely to participate in at SPP? (check all that apply)

- | | |
|-------------------------------|---|
| -tennis (38%) | -family/neighborhood gatherings (21%) |
| -soccer (21%) | -walking/jogging/other exercise (61%) |
| -baseball/softball (12%) | -children’s games/play (20%) -pet exercise (31%) |
| -sports/other recreation (9%) | -nature-based activities like bird watching (21%) |
| -other? (2%) | |

4) What facilities do you feel SPP is lacking? Please list:

None (31%)	Trail Links (5%)
Miscellaneous (20%)	Baseball Improvements (4%)
Ice Skating (14%)	Tennis (4%)
Trees (13%)	Lighting (4%)
Basketball Court (11%)	Skateboard Facility (3%)
Off-Leash Dog Area (7%)	Parking (3%)
Bathrooms (6%)	

5) Are there any park areas you feel are particularly attractive/aesthetically appealing? _____
Why?

Overall Complimentary (14%)	Tennis Courts (4%)
None (11%)	Playground (3%)
Trails (10%)	Shelters (2%)
Prairie (8%)	Former Tree Line (1%)
Misc/Other (8%)	Soccer Field (1%)
Woodlots (6%)	

6) Are there any park areas you feel are unsightly or unappealing? _____ Why?

Former Tree Lines (46%)
None (30%)
Miscellaneous (11%)
Porta-Potties (4%)
Uncomplimentary Overall (2%)
Woodlots (2%)

7) Please review some potential goals/recommendations for site management and indicate the importance of each: (strongly agree/agree/neutral/disagree/strongly disagree)

		Need More	About Right	Need Less	# Comments
A	Restore native plant communities and protect wildlife habitat where possible	36%	55%	8%	28
B	Build wildlife habitat improvements	51%	41%	8%	13
C	Provide opportunities for cultural and natural history education	26%	53%	20%	12
D	Provide opportunities for passive recreation	43%	52%	4%	16
E	Provide opportunities for active team-sport recreation	13%	72%	15%	12
F	Provide opportunities for alternative active recreation	49%	31%	19%	36
G	Provide accommodations and facilities for community or sporting events	18%	66%	15%	12
H	Minimize impacts to adjoining neighborhoods or landowners	23%	69%	8%	13
I	Increase visitor safety and enjoyment	24%	59%	18%	20
J	Reduce external inputs required for park maintenance	23%	68%	9%	22
K	Other?				14

APPENDIX F

Implementation Schedule

Objectives and Recommendations	2013	2014	2015	2016	2017	Comments
Objective A: Establish and Maintain Native Plant Communities						
R1: Restore the 1.9-acre North Woodland Unit to oak woodland	Invasive species removal, prescribed burn to prepare seedbed.	Remove invasive species, native seeding & tree planting as needed, weed management, prescribed burn.	Seeding & tree planting as needed, weed management, prescribed burn.	Seeding & tree planting as needed, weed management, prescribed burn.	Seeding & tree planting as needed, weed management, prescribed burn.	Remove non-oak woodland tree species in phases to maintain screening. Plant additional oak and hickory within canopy gaps. Remove trash from former dump within woodland.
R2: Maintain existing native wet-mesic trees and ground layer plants in the South Woodland and Swale	Remove woody invasives (e.g. buckthorn)	Plan and site prep for bioswale	Grade and plant bioswale, weed management	Monitor and manage weeds	Monitor and manage weeds	Plant additional wet-mesic native trees if desired (e.g. swamp white oak). Coordinate planting with streambank restoration.
R3: Maintain existing prairie and continue conversion of former fenceline to prairie/savanna	Interseed, plant savanna trees, Monitor and manage weeds. Prescribed burn.		Weed monitoring and management	Monitor and manage weeds. Prescribed burn.		Control weed populations (hand-pulling, herbicide application), interseed with additional natives. Plant only fire-adapted trees in this area (e.g. bur oak). Acquire seeds from Dane County if possible.
Objective B: Provide Multiple Opportunities for Education and Recreation						
R4: Identify/remove hazard trees.	As needed					
R5: Develop interpretive signs and programming for park visitors	Identify funding sources, acquire funding	Acquire funding/install signage, conduct programs	Acquire funding and design/install signage, conduct programs	Conduct public programs, update signs if needed	Conduct public programs, update signs if needed	Low cost, temporary interpretive signs should be used to explain land management activities or highlight current events in the park and surrounding community.
R6: Improve softball field turf conditions, or convert the field to an alternative use.	To be done by Town Crew					
R7: Create secondary trails	A natural surface walking path could be established in the North Woodland.					

Objectives and Recommendations	2013	2014	2015	2016	2017	Comments
Objective C: Minimize Impacts to Adjoining Neighborhoods						
R8. Remove weed trees gradually to maintain woodland character and encourage oak regeneration.		Within context of Recommendation 1 and 2				Girdling for larger trees.
R9. Provide replacement screening as trees and shrubs are removed.	As needed, in tandem with or shortly after tree/brush removal					Consider planting trees on east side of park. Near prairie, plant only fire-tolerant native species (e.g. bur oak, white oak)
Objective D: Utilize External Funding and Partnerships						
R10. Obtain external funding.	As needed. Develop in-house calendar of conservation/land management grant deadlines. Establish budget for grantwriting.					
R11. Link with other organizations.	As soon as possible.					

APPENDIX G

5-year cost projection

Recommendations	2013	2014	2015	2016	2017	Comments
R1: Restore the 1.9-acre North Woodland Unit to oak woodland	\$3,100	\$3,800	\$1,800	\$900	\$900	Includes cost of invasive species control/removal, prescribed burning, overseeding and tree/shrub planting (2015). Assumes seed will be donated by County or collected from Town conservancy lands.
R2: Maintain existing native wet-mesic trees and ground layer plants in the South Woodland and Swale	\$3,100	\$3,100	\$3,100	\$15,000	\$1,200	Plant additional wet-mesic native trees if desired (e.g. swamp white oak). Coordinate planting with streambank restoration. 2015 includes cost of re-grading non-forested swale and converting to bioswale, Estimate from Verbeicher
R3: Maintain existing prairie and continue conversion of former fenceline to prairie/savanna	\$3,100	\$3,100	\$1,800	\$1,500	\$1,200	2013 includes seeding and tree planting/replacement cost. 2014-2017 include monitoring/maintenance costs (e.g. burning, weeding)
R4: Identify/remove hazard trees.						
R5: Develop interpretive signs and programming for park visitors	\$750	\$750	\$750	\$500	\$500	Consulting time for researching grants, developing 1 sign or presenting 2 programs per year.
R6. Improve softball field turf conditions, or convert the field to an alternative use.						\$25,000 estimated cost given by Jerry Wagner at Feb. 2013 Park Commission Meeting
R7. Create secondary trails	\$1,900					Cut brush, mark route, grading for erosion control if needed
Total	\$11,950	\$10,750	\$7,450	\$17,900	\$3,800	

APPENDIX H

Recommended tree and shrubs

TREES

Scientific name	Common Name
<i>Carya ovata</i>	Shagbark hickory
<i>Quercus alba</i>	White oak
<i>Quercus bicolor</i>	Swamp white oak
<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus rubra</i>	Red oak
<i>Quercus velutina</i>	Black oak

SHRUBS

Scientific name	Common Name	Flower color	Height
<i>Ceanothus americanus</i>	New Jersey tea	white	1-3'
<i>Cornus alternifolia</i>	Pagoda dogwood	white	to 25'
<i>Corylus americana</i>	American hazelnut	yellow	4-10'
<i>Diervilla lonicera</i>	Bush honeysuckle	yellow	1'
<i>Physocarpus opulifolius</i>	Ninebark	white	3-10'
<i>Prunus americana</i>	Wild plum	white	6-10'
<i>Rosa blanda</i>	Early Prairie Rose	pink	3'
<i>Rosa caroliniana</i>	Pasture rose	pink	2-4'
<i>Sambucus canadensis</i>	Elderberry	white	5-10'
<i>Viburnum lentago</i>	Nannyberry	white	8-15'
<i>Viburnum rafinesquianum</i>	Arrowwood viburnum	white	8-15'
<i>Viburnum trilobum</i>	American highbush cranberry	white	to 12'

APPENDIX I

Relevant Funding Sources

Grant	Description
Dane County Partners for Recreation and Conservation (PARC)	The Partners for Recreation & Conservation (PARC) Grant Program provides capital financial assistance to local units of government or nonprofits for outdoor recreation and conservation projects that have the potential to generate significant regional benefits. The 2013 Dane County Budget includes \$1-million in matching funds for eligible projects. Grants will be awarded for up to 50% of the project costs, not to exceed \$250,000.
Dane County Environmental Council Community Partners Grant	The Community Partners Program provides funding for small projects that promote environmental education, conservation, and restoration of Dane County's natural resources. The maximum award in the Community Partners Program is \$1000
U.S. Fish and Wildlife Service North American Wetlands Conservation Act grants (NAWCA)	Provides up to \$75,000 for long-term protection, restoration, and/or enhancement of wetlands and associated uplands habitats for the benefit of all wetlands-associated migratory birds.
Wisconsin DNR Lake Protection Grants	Restoration of wetlands and shorelands that will protect a lake's water quality or its natural ecosystem. These grants are limited to \$100,000. Special wetland incentive grants of up to \$10,000 are eligible for 100 percent state funding if the project is identified in the sponsor's comprehensive land use plan.
C.D. Besadny Conservation grant	Provides financial support to public and private organizations or government agencies working on natural resource projects and programs at a small-scale, local level. Grants range from \$100 to \$1,000 and must be matched 100% by recipient organizations either through cash or in-kind donations.
John C. Bock Foundation	Funds the educational, research, and conservation activities of qualified organizations directly engaged in the preservation and protection of landscapes containing mature woodlands.

Grant	Description
Madison Community Foundation Community Impact Grants	Funding for a variety of projects. Letter of inquiry required.
Wisconsin DNR Urban Forestry Grants	Grants are to support new, innovative projects, not to subsidize routine forestry activities. Applicants may request from \$1,000 to \$25,000 with a dollar-for-dollar match.