

Pittsfield Township Parks
Invasive Species Inventory and Management Plan
Pittsfield Charter Township, Washtenaw County, Michigan

Pittsfield Township Parks and Recreation

February 12, 2019

ASTI ENVIRONMENTAL



TABLE OF CONTENTS

<u>Section</u>	<u>page</u>
Title Page	i
Table of Contents	ii
1.0 INTRODUCTION	1
2.0 LAYOUT OF THE REPORT AND MAPS	3
3.0 PRIORITIZATION	3
4.0 TREATMENT METHODS	5
5.0 RESULTS _ INDIVIDUAL PARKS DESCRIPTIONS	6
5.1 Pittsfield Preserve	6
5.2 Marshview Meadows Park	14
5.3 Wall Park	18
5.4 Hickory Woods Park	23
5.5 Montibeller Park	28
5.6 Lillie Park	33
5.7 Morgan Woods Nature Area	37
5.8 Woolley Park	41
5.9 Kirtland Hills Park	46
5.10 Seyfried Park	49
5.11 Prairie Park	50
6.0 SUMMARY	54
Appendix A Tables	
Appendix B Invasive Species Treatment Methods	

1.0 INTRODUCTION

Increasingly, the scientific community, land management agencies, and municipal officials are recognizing the extent of invasive species infestations and the threat they present to native plant and wildlife species, aesthetics, green infrastructure services, and other ecologic and economic systems. The National Invasive Species Council, established by Executive Order in 1999, defines invasive species as, "species that are nonnative to the ecosystem under consideration, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health."¹

Invasive plant species may negatively impact natural systems by:

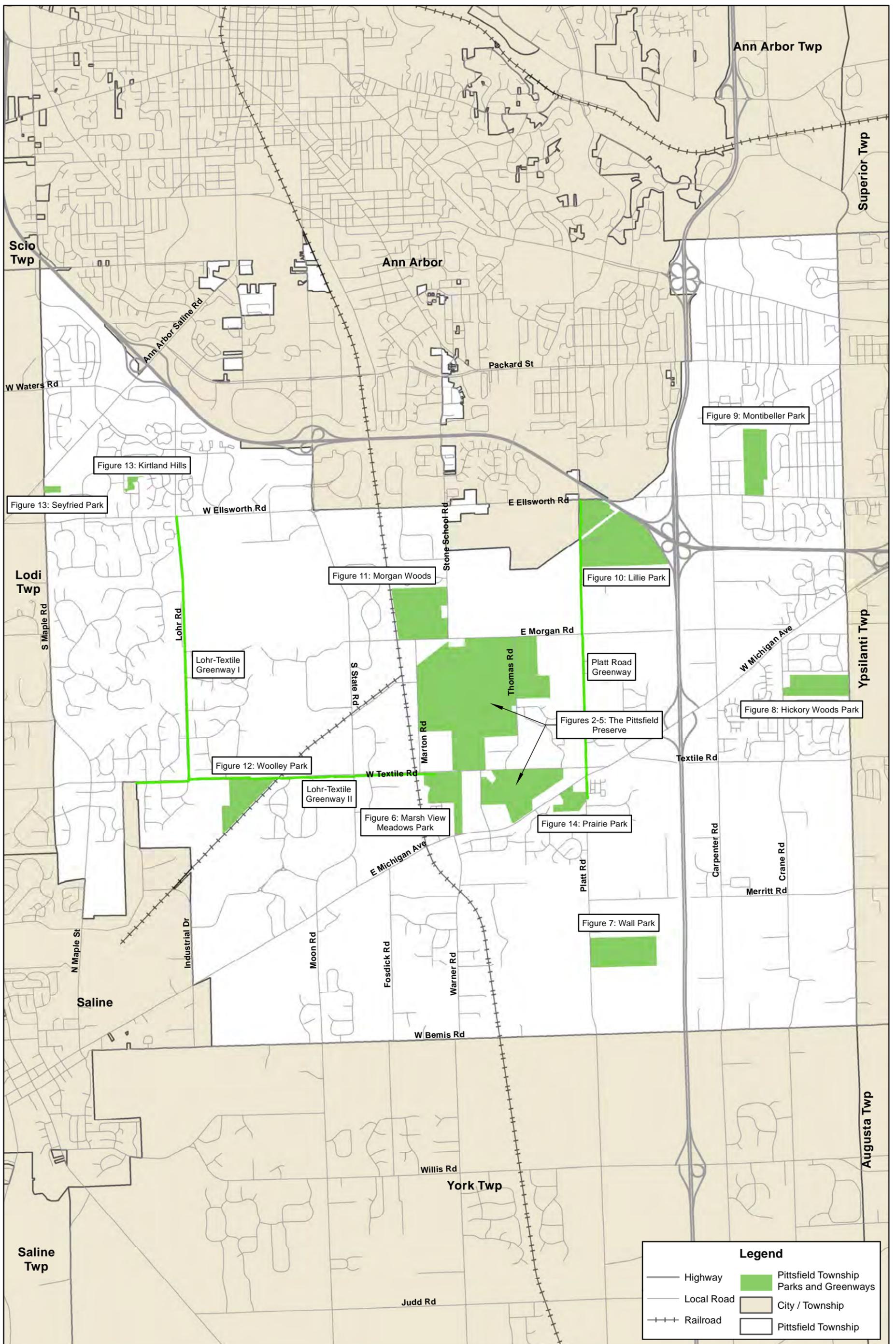
- Displacing plants and resources that are more suitable habitat and food resources for wildlife,
- Disrupting or eliminating critical components of the food chain, particularly the availability of invertebrates,
- Being unpalatable or toxic to wildlife - allelopathic effects of some invasive plants, such as buckthorn, prevent the establishment of native seedlings and have been shown to interfere with amphibian reproduction and survival,
- Disrupting mutualistic mycorrhizal relationships with their native plant hosts, and
- Diminishing the amount and quality of recreational opportunities including, hunting, bird watching, hiking, etc.

Recognizing the potential threats to the Township's parks and natural areas, the Pittsfield Township Parks Department, contracted ASTI Environmental (ASTI) to identify and map invasive plant species within the following 11 park properties (Figure 1) owned and operated by Pittsfield Township:

- Pittsfield Preserve (Figures 2 -5)
- Marshview Meadows Park (Figure 6)
- Wall Park (Figure 7)
- Hickory Woods Park (Figure 8)
- Montibeller Park (Figure 9)
- Lillie Park (Figure 10)
- Morgan Woods Nature Area (Figure 11)
- Woolley Park (Figure 12)
- Kirtland Hills Park (Figure 13)
- Seyfried Park (Figure 13), and
- Prairie Park (Figure 14)

Site visits to each of these parks and preserves were conducted in late summer and early fall 2018. The overarching purpose of these assessments was to assist the Parks Department in developing management recommendations and priorities for invasive species management in each park and across the township's park system.

¹ Higman, Phyllis, and Susan Campbell. 2009. Meeting the Challenge of Invasive Plants: A Framework for Action. Michigan Department of Natural Resources (MDNR), Wildlife Division, Michigan Natural Features Inventory. Lansing, Michigan.



Invasive Species Assessment & Management Plan

Pittsfield Township, MI

0 1,750 3,500 7,000 Feet



2.0 LAYOUT OF THE REPORT AND MAPS

The narratives, maps, and photos in the body of this report describe the type and quality of the habitats found within each park, historical land cover as interpreted from General Land Survey notes circa 1816-1856, invasive species locations and management priorities for each park, and observations regarding other ecosystem management issues.

Notes regarding invasive species observed during ASTI's site walks have been simplified into a series of maps with a consistent format identifying the major habitat types in each park, concentrations of invasive plant species, and the areas ASTI recommends for focused invasive species treatment. Areas within each individual park prioritized for treatment are shown with color-coded crosshatching: high priority (red), moderate priority (orange), and lower priority areas that should be monitored for worsening conditions or new invasions (yellow). Circled numbers on the maps indicate the locations of areas of interest described in the corresponding text. Habitat types noted on the maps are described according to nomenclature developed by the Michigan Natural Features Inventory.² Alternative descriptions of forested habitat types observed, as provided in the report text, follow conventions of the Society of American Foresters.³ Habitat type boundaries are approximate and do not represent formal wetland boundary delineations. Whereas the maps describe the invasive plant treatment priorities within each park, priorities across the park system are described in Tables 5 and 6, Appendix A.

In developing these recommendations, ASTI has relied upon frameworks and guiding principles developed by the Michigan Department of Natural Resources (MDNR), the Michigan Natural Features Inventory (MNFI), and the Midwest Invasive Plant Network (MIPN). ASTI has included a few plant species not specifically listed by the MDNR and MNFI as Action List species but that are listed as invasive, restricted, or on watch lists of plants exhibiting invasive behavior by other states within the MIPN and/or by the City of Ann Arbor.

3.0 PRIORITIZATION

In recommending action priorities, ASTI has relied upon generally accepted concepts from conservation ecology and the *Framework for Action*⁴ developed by the Michigan Department of Natural Resources (MDNR) and MNFI. This framework follows similar prioritization schemes employed by the USDA Forest Service, the National Park Service, the National Invasive Species Council, and the Wildlife Society. Specifically, the recommendations for each individual park seek to:

- First - Protect high quality resources by preventing invasive species infestation
- Second - Detect and treat/remove small areas of new introductions before they spread, working from the advancing front of an invasion back toward the denser center, and
- Third - Control and manage well established populations of invasive plants and restore the native ecosystems in those locations.

² Cohen, J.G., Kost, M.A., Slaughter, B.S., and D.E. Albert, 2015. Field Guide to the Natural Communities of Michigan. Michigan State University Press, East Lansing, Michigan.

³ Society of American Foresters. 1980. Forest Cover Types of the United States and Canada. F,H, Eyre, Editor. Society of American Foresters. Washington, DC.

⁴ Higman, Phyllis, and Susan Campbell. 2009. Meeting the Challenge of Invasive Plants: A Framework for Action. Michigan Department of Natural Resources (MDNR), Wildlife Division, Michigan Natural Features Inventory. Lansing, Michigan.

The MDNR's *Framework for Action*⁵ lists invasive plant species by region across the state and places them into the following four action categories (A through D):

A-List Species

Medium to high threat; mostly isolated occurrences, treat wherever found

B-List Species

Medium to high threat; mostly local - found in some areas but not others; designate areas for eradication, suppression, or containment; may choose to control based upon specific management goals and situations

C-List Species

Medium to high threat; widespread; may choose to control based upon specific management goals and situations

D-List Species

More information required; may choose to control based upon specific management goals and situations

These categories of recommended action are based upon the following assumptions:

- "It is more cost effective to address species before they are well-established,
- Species posing a higher threat generally should be a higher priority for treatment,
- Treatments should be prioritized where success is likely, and
- It sometimes is advantageous to treat species posing any level of threat where resources permit."

The list of invasive plant species and associated action categories, developed for the MDNR for southern Michigan, is provided in Table 3, Appendix A. ASTI identified a total of 26 invasive plant species within Pittsfield Township Parks; nine of these species were found in most of the parks investigated. With the exception of one A-list species (Norway maple) and one species listed by the MDNR as both a B- and C-List species (Scots Pine), the remainder of these plants are listed as C-List species.

Although the majority of invasive species observed within Pittsfield Township parks are described as C-List species, this does not imply a low threat level or imply that treatment and prevention are less important, it simply notes that these species are not new to the state, that they are widespread and can be difficult to contain. ASTI finds the majority of these species to be highly aggressive and recommends that the Pittsfield Township Parks Department identify and schedule resources and actions to manage and, if possible, eradicate these plants species as possible.

In general, invasive plants were found to be well established in most of the Township's parks and eradicating them will be a formidable task. As noted in the description of maps in this

⁵ I Higman, Phyllis, and Susan Campbell. 2009. Meeting the Challenge of Invasive Plants: A Framework for Action. Michigan Department of Natural Resources (MDNR), Wildlife Division, Michigan Natural Features Inventory. Lansing, Michigan.

report, ASTI identified areas as high, moderate, or lower priority (to be monitored). Because invasive plant species are ubiquitous across large areas of the Pittsfield Township Parks, ASTI differentiated between the high and moderate categories in an effort to protect each park's highest quality resources and focusing on areas most likely to be encountered by park visitors, and on areas previously highlighted by park system managers through trail development and the placement of observation decks and interpretive signage (e.g., opening key viewpoints). Table 2 (Appendix A) summarizes the various species in each park listed as high or medium priority for treatment or removal.

Layered on top of the prioritization scheme for each individual park is an analysis of which parks to prioritize across the entire system. Similar to the process used for individual parks, ASTI's recommendations focus on protecting the highest quality habitats found throughout the park system, the parks that appear to receive the most visitor traffic, and areas where the Township has previously placed considerable investment in trail and other amenity development. ASTI's priority recommendations across the park system are provided in the report summary (Section 6).

4.0 TREATMENT METHODS

In general, management of invasive trees and shrubs involves the "cut and treat" method cutting individual stems and painting the cut stump with herbicide. Some tree species respond better to a method referred to as "drill and fill" wherein one or more holes are drilled at the base of the tree with herbicide injected into the holes. Girdling, cutting a band through the bark and cambium encircling the tree may also be used either in place of or addition to the drill and fill method.

Herbaceous plants are generally treated by spraying the foliage and/or basal rosettes with herbicide or by hand-wicking, which involves wiping individual plant stems with herbicide coated gloves. Some herbaceous species are best pulled by hand and some require cutting and removing the flowers before they go to seed; followed by subsequent herbicide treatment.

Oak and prairie systems are adapted to fire. Where possible, prescribed fire as a management tool may be advantageous to treat large acreages, to reduce or eliminate invasive species, and to stimulate native plant species. In some cases, mowing may provide similar benefits to prescribed fire. Both fire and mowing may exacerbate the growth of particular noxious species; e.g., mowing exacerbates seed dispersal of common teasel and fire favoring colonization by Oriental bittersweet.

Table 4 (Appendix A) presents information regarding both the preferred methods and timing for each invasive plant species discussed in this report. Additional information is provided in narrative form in Appendix B. Table 5 summarizes ASTI's recommendations for each of these techniques for each park; recommended priorities for each park are included in the specific park text descriptions below.

5.0 RESULTS - INDIVIDUAL PARK DESCRIPTIONS

5.1. PITTSFIELD PRESERVE

Park Description:

The Pittsfield Preserve is the Township's largest park and natural area and contains the greatest diversity of habitat types. It encompasses a variety of active agricultural fields, planted prairies, upland forest patches and several scrub-shrub and forested wetland systems. The Preserve is located between Morgan Road on the north and Michigan Avenue (US-12) on the south and by Marton Road on the west and Platt Road on the east. The Preserve is additionally bisected by Textile (east-west) and Thomas Roads (north-south) (Figures 2 through 5).

Land cover maps developed from circa 1816-1856 General Land Office (GLO) surveys⁶ indicate that 80 percent of the 528-acre Pittsfield Preserve was historically oak-hickory forest and approximately 17 percent was lowland hardwood swamp. A relatively small area (13.1 acres, 2.5%) was mapped as tamarack swamp. Today, most of the Preserve is agricultural fields and or former farm fields that have been replanted to prairie. Large areas of high quality oak-hickory forest (① Figure 2) also still remain. The canopy of these areas is dominated by a variety of oaks (black, northern red, white, and bur oaks) with smaller areas of beech-sugar maple forest (②) and forested wetland areas dominated by silver maple (③). Large inundated shrub swamps dominated by buttonbush and willows also still remain. These appear to be locally important for a variety of waterfowl staging for fall migration and likely serve as nesting, feeding, and cover habitats for a variety of duck species at other times of the year.

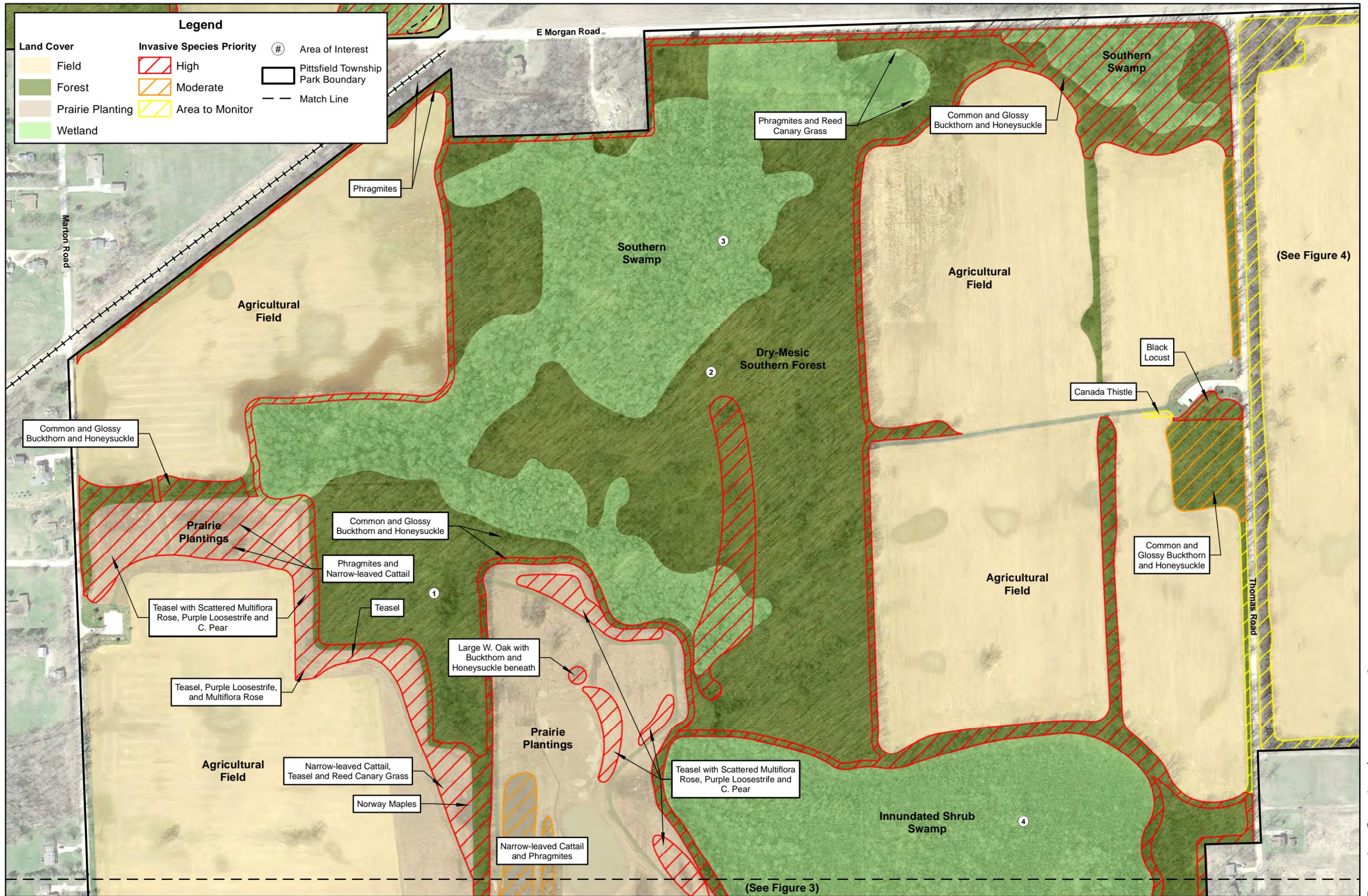
Invasive Species and Management Recommendations:

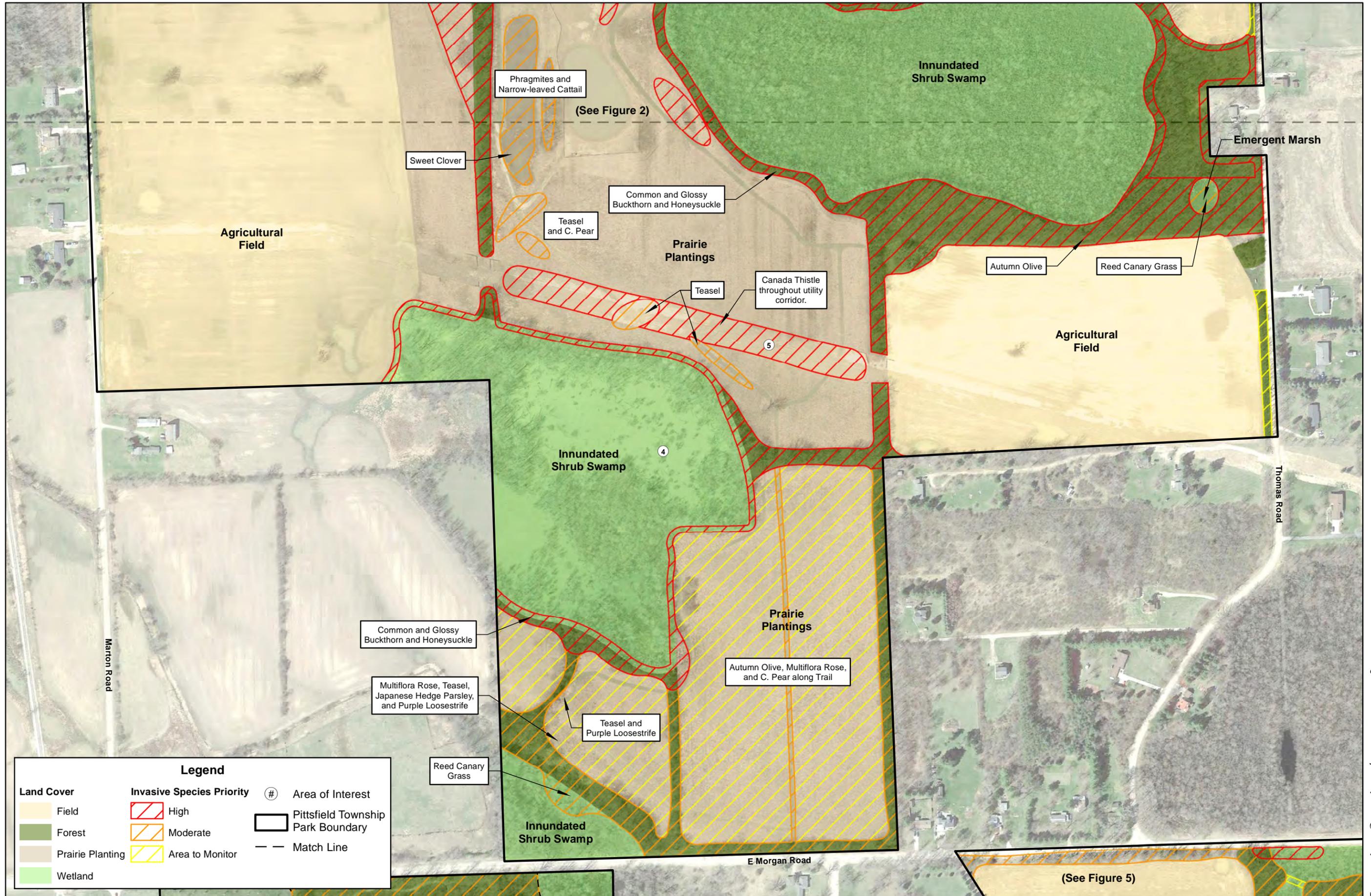
The primary species of concern within the Pittsfield Preserve and recommended management prescriptions are:

- Herbicide applications for common teasel and common reed within the prairie areas and small wetland pockets,
- Cut and treat stumps of shrubs, particularly Callery pear within the prairies or prescribed burning of the prairies,
- Hand-pulling small populations of white and yellow sweet-clover and Japanese hedge parsley also within the prairie areas,
- Foliar herbicide applications in the patch of Canada thistle that follows the utility corridor across the south end of the northern Preserve unit (Figure 3), and
- Cut stump treatment of common and glossy buckthorn, Callery pear, autumn olive, and multiflora rose along the forest perimeter, particularly in the northernmost forest block and along the edges of large wetland complexes. Note that it may be possible to mow some forest edges to remove invasive shrubs.

The primary treatment methods for these species are foliar herbicide application for *Phragmites*, basal rosette herbicide treatment and /or hand removal using a dandelion digger for teasel, hand-pulling as noted for hedge parsley and sweet-clovers, and cut-stump herbicide application for invasive shrubs. Within the large prairie areas mowing coupled with herbicide

⁶ Albert, Dennis A. and Patrick J. Comer; cartography by Helen Enander. 2008. Atlas of Michigan's Forests, Grasslands, and Wetlands: an interpretation of the 1816-1856 General land Office surveys. Michigan Natural Features inventory. Michigan State University Press, East Lansing, Michigan.



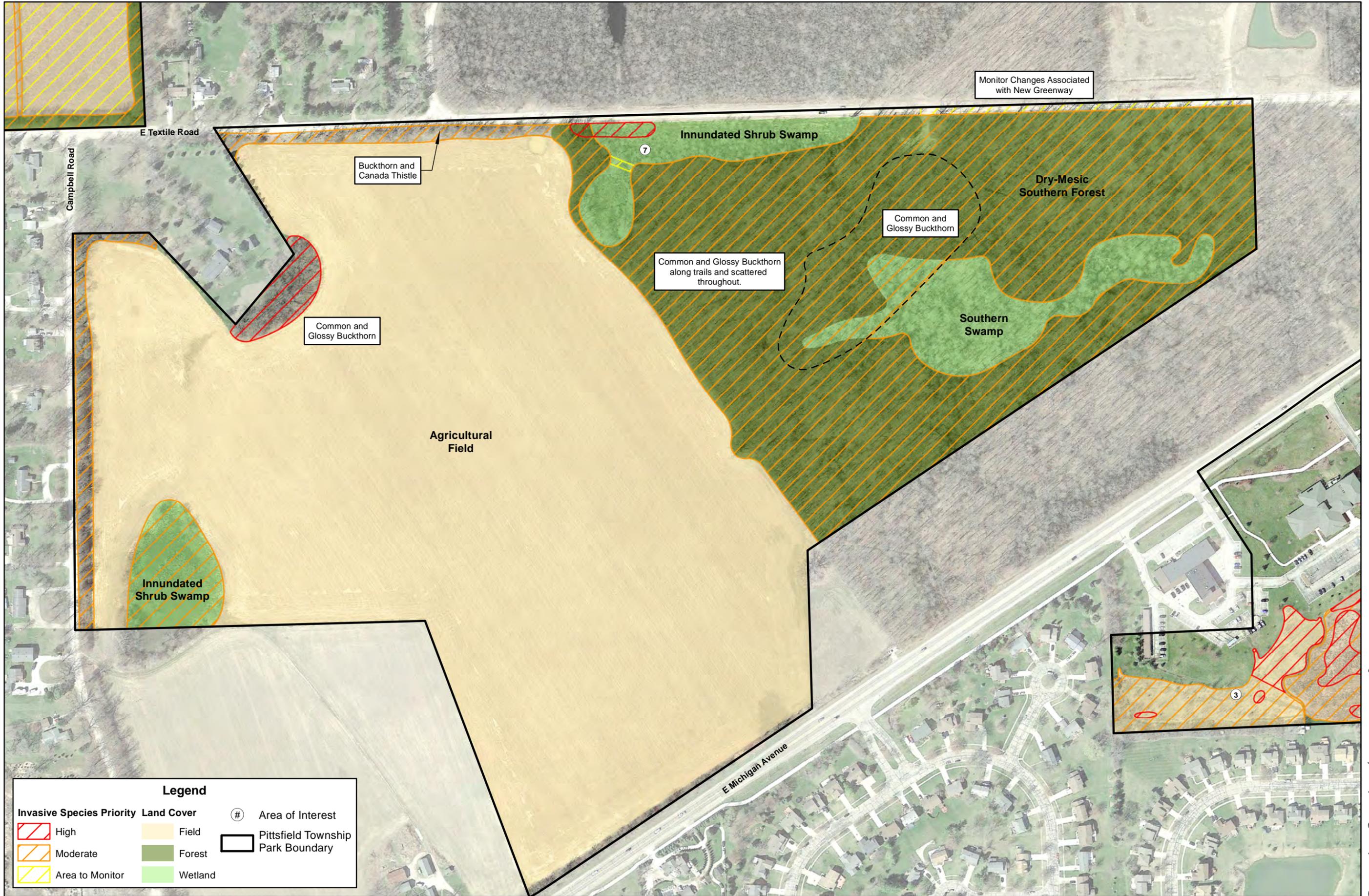




Invasive Species Assessment & Management Plan

Pittsfield Township, MI





treatment or prescribed burns may be utilized to kill invasive shrubs and stimulate native plant regeneration.

Special/Priority Areas for Management:

The majority of the Preserve's trail network highlights planted prairie areas and the prairies, although not historically recorded on the property, are important for both the diversity of wildlife habitat they provide and the vistas they provide for park users. Several areas within the prairies, especially adjacent to the trails are being threatened by the invasion of common teasel, invasive shrubs such as autumn olive, Callery pear, and multiflora rose, and in wetter areas, by *Phragmites*. Secondary threats include Canada thistle, white and yellow sweet-clover, purple looserife, and narrow-leaved cattail. A band of Canada thistle, concentrated along the utility corridor ⑤ between the two larger shrub wetlands would seemingly be easy to treat before it spreads to the adjacent prairie and wetlands.

ASTI recommends treating these areas, focusing on the trail edges but also including removal of shrubs scattered through the prairies. Callery pear, in particular, appears to be spreading rapidly and should be addressed before it gains more of a stronghold and to keep these areas open and valuable to local bird and other wildlife populations. Common reed (*Phragmites*) is present in small patches in the wetter prairie areas and small marsh pockets. Due to its relatively small foothold at present, its aggressive rate of spread, and its lack of habitat value relative to other invasive species, ASTI recommends also focusing on these patches early.

In addition to noting the importance of the prairie areas, ASTI also notes that the northern block of forest ① ② contains some of the highest quality wooded habitats throughout the Township's park system and that its interior, at present, exhibits relatively few invasive species. This is not the case with woodlands in many of the other Township parks, so ASTI not only recommends these actions as a priority within the Pittsfield Preserve but also as a system-wide priority.

Invasive shrubs have become established along the edges of the forest block and within one band in the forest interior. Similarly, common and glossy buckthorn, and reed canary grass in some areas along the water's edge threaten to spread to the interior of the buttonbush/willow swamps. ASTI recommends removal of invasive shrubs, particularly common and glossy buckthorn, Callery pear, multiflora rose, and autumn olive before the existing populations spread further to forest and wetland interiors.

Although noted as a lower priority, the isolated nature of the small forest block ⑥ shown in Figure 4 may lend itself well to the use of prescribed fire to manage invasive shrubs. Similarly, because invasive shrubs are more widespread within the forested portion of the Pittsfield Preserve south of Textile Road (Figure 5), that area may also benefit from the use of prescribed fire. Note that this portion of the Preserve abuts the Harwood Heritage Preserve operated by the Washtenaw County Parks and Recreation Commission and the two parks agencies may find .it beneficial to manage these areas cooperatively.

PHOTOS

Pittsfield Preserve, Pittsfield Township, Michigan



Photo 1. The northernmost block of forest in the Pittsfield Preserve exhibits an open understory. The trails highlight several species of large diameter oaks as well as beech-maple forests. Although invasive buckthorn and honeysuckle shrubs are present, they are, as yet, concentrated along the perimeter.

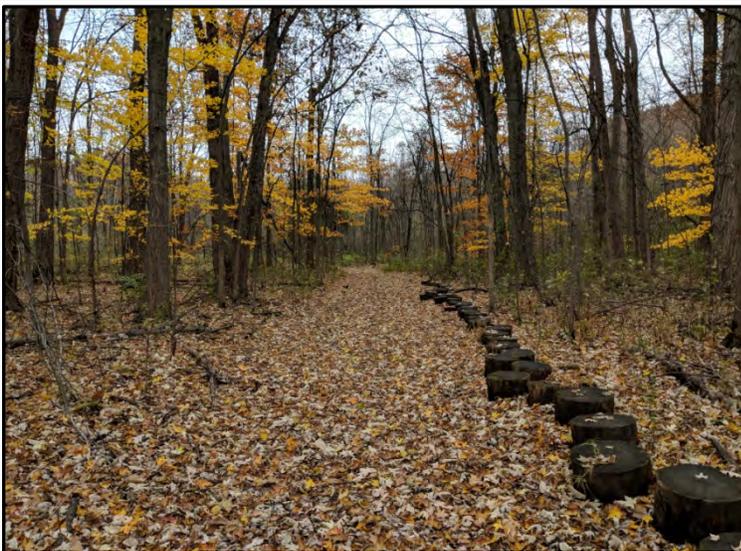


Photo 2. The trails highlight several species of large diameter oaks as well as beech-maple forests. Just off this trail is one of the few areas where invasive shrubs are concentrated within the forest interior.



Photo 3. The planted prairies within the Pittsfield Preserve provide wonderful vistas across large sections of the park. Invasive shrubs are scattered through these fields, but primarily along the trails.

PHOTOS

Pittsfield Preserve, Pittsfield Township, Michigan



Photo 4. Rattlesnake master is one of the many prairie plants found here.



Photo 5. The Preserve also contains several inundated shrub (buttonbush and willow) swamps, providing habitat for Canada geese, mallards, wood ducks and other species.



Photo 6. A portion of the Textile Road Greenway will soon pass through the southern unit of the Pittsfield Preserve. A buttonbush swamp in this area (left of photo) already exhibits an infestation of common reed (*Phragmites*). This new opening in the canopy will need to be monitored for new invasive species introductions and spread.

Trail Linkages/Signage Recommendations:

The existing trail system is extensive and user-friendly. ASTI's only recommendation for additional trail linkages is the possible addition of spur trails to the edge of the shrub swamps.

One additional trail note concerns the section of new greenway being built along the south side of Textile Road ⑦. The opening of a portion of the forest and the wetland crossing there provide a new conduit for invasive species infestation. This area will need to be monitored over time.

Signage recommendations include adding educational signs or kiosks regarding the history of the site, native prairie plantings, and noting some of the larger oaks of various species. ASTI also noted that each of the boxes provided for trail maps were empty at the time of our site visits and some of the trail maps mounted on posts were in disrepair due to vandalism. ASTI recommends adding the trail map to the Parks Department webpage for download.

5.2 MARSHVIEW MEADOWS

Park Description:

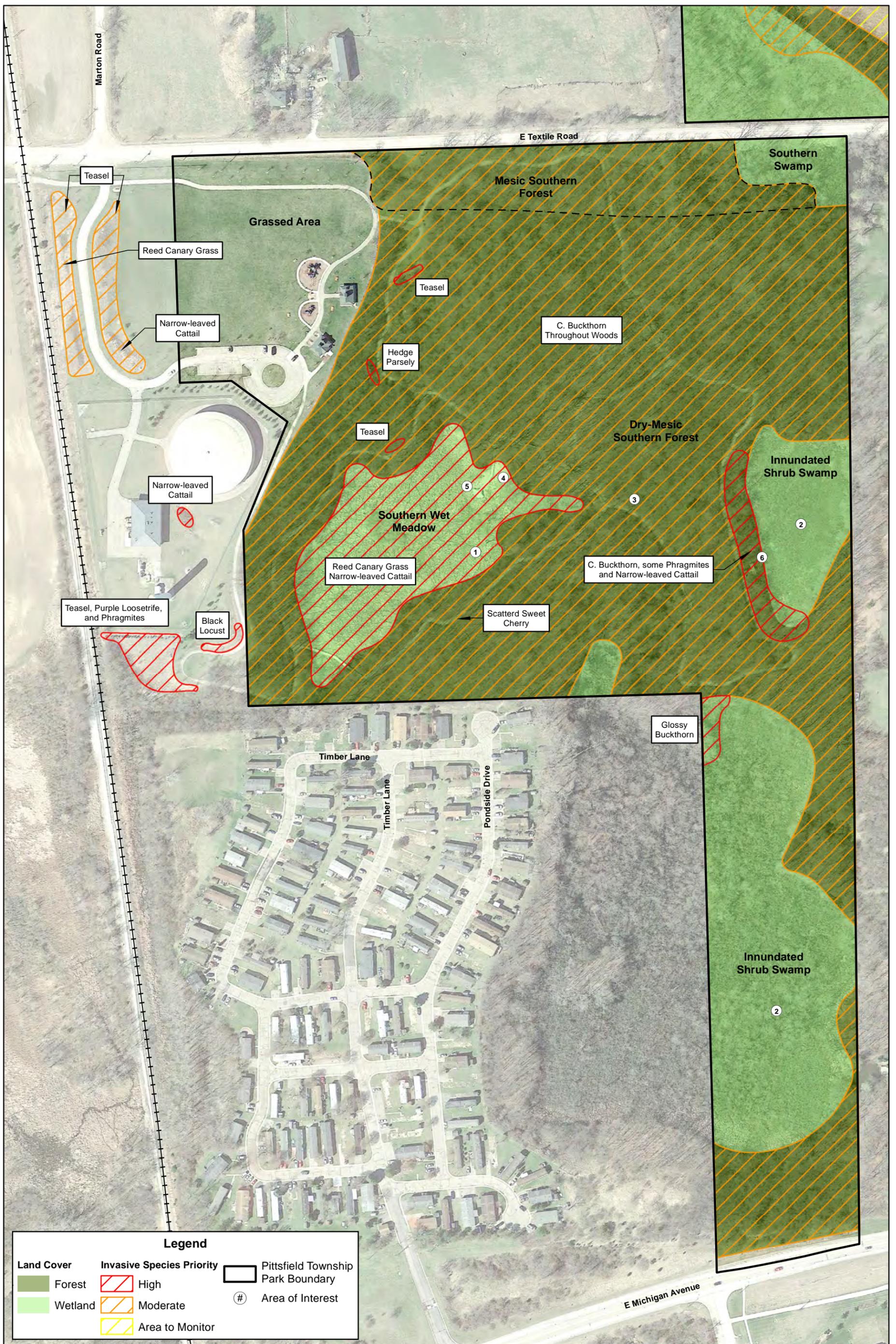
Marshview Meadows is located immediately south of Textile Road with its northeast corner across the road from a portion of the Pittsfield Preserve. It abuts Michigan Avenue on the south (Figure 6). The park contains a number of amenities including a covered picnic pavilion, restrooms, playground, trails and open grassed areas suitable for picnicking or a variety of sports. Natural areas within the park include southern wet meadow (① Figure 6), inundated shrub swamp ②, and southern forested wetlands, and dry-mesic southern forest dominated by black cherry and shagbark hickory ③.

GLO land survey data indicate that the Marshview Meadows property historically contained areas of lowland hardwood swamp (5.3 acres), tamarack swamp (12.1 acres), oak-hickory forest (25.8 acres), and 13.8 acres of wet prairie.

Invasive Species and Management Recommendations:

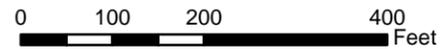
The primary invasive species concerns within and recommended management prescriptions for Marshview Meadows are:

- Foliar herbicide application and/or prescribed fire to control aquatic invasive plants, particularly narrow-leaved cattail, reed canary grass, and, to a lesser extent, purple loosestrife in and around the wet meadow,
- Hand-pulling and/or spraying of common teasel and Japanese hedge parsley patches along the trail,
- Girdling and or drill and fill to kill a small patch of black locust trees along a bend in the trail outside the main woodland, and
- Cut-stump herbicide applications to control common and glossy buckthorn abutting the parks' major wetland areas, particularly near the overlook and signage highlighting the park's easternmost buttonbush swamp.



Invasive Species Assessment & Management Plan

Pittsfield Township, MI



Client: Pittsfield Township Parks & Recreation
 Created by: BJG, November 9, 2018, ASTI Project 10785
 Imagery: Google Earth (April 2017)

Figure 6
 Marsh View Meadows Park

PHOTOS

Marshview Meadows Park, Pittsfield Township, Michigan



Photo 1. The view from the overlook of the sedge meadow, for which the park is named, is blocked by an invading stand of narrow-leaved cattail (photo background). Much of the sedge meadow has been overrun by reed canary grass (foreground); another invasive species.



Photo 2. A short spur added to the existing trail system could highlight this grove of swamp white oaks at the northeast end of the sedge meadow.

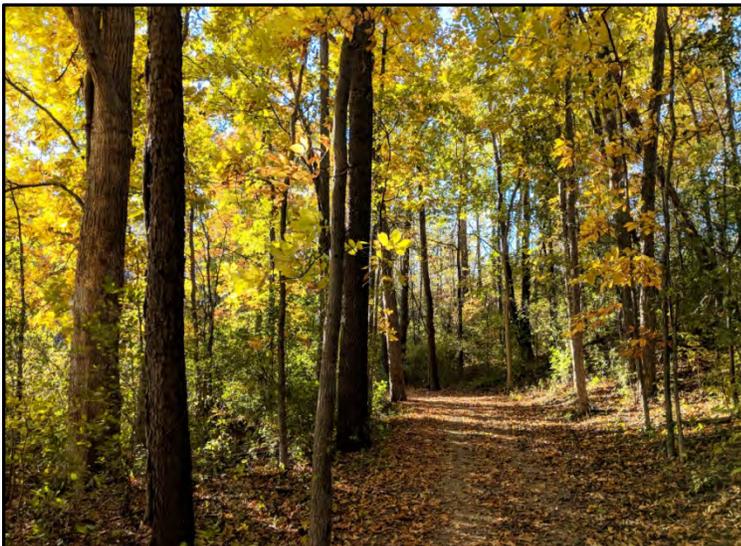


Photo 3. Trails through the woods provide a pleasant place to walk, but the understory is filled with invasive buckthorn and honeysuckle shrub species.

PHOTOS

Marshview Meadows Park, Pittsfield Township, Michigan



Photo 4. Glossy buckthorn is just getting established at the north end of the southernmost buttonbush swamp.



Photo 5. If the glossy buckthorn spreads further it could endanger native plants like this Michigan holly (winterberry).



Photo 6. Despite the overlook and educational kiosk, common and glossy buckthorn, along with honeysuckle, block the view of the eastern buttonbush swamp.

Special/Priority Areas for Management:

An overlook with benches, interpretive signage, and the park's name all highlight the wet meadow as the signature feature of Marshview Meadows Park. That view is threatened by infestation of invasive grasses (narrow-leaved cattail, reed canary grass) and forbs (purple loosestrife), and by both invasive (common and glossy buckthorn) and native shrubs (willow and dogwood). ASTI recommends managing all of these to keep this central wetland open and serving as an interpretive feature. It is the largest and best example of a southern wet meadow community type within the Township's park system.

Treating or removing common teasel, Japanese hedge parsley, and black locust trees along the path are secondary to measures to restore the wet meadow. However, these actions are still deemed important because these populations are small and should be addressed before they spread.

Finally, common and glossy buckthorn and a variety of honeysuckles are both ubiquitous and thick throughout the forested portions of the park. ASTI recommends cutting and treating these to open the view from the overlook at the easternmost buttonbush swamp, and treating glossy buckthorn population just beginning to infiltrate the north edge of the southernmost buttonbush swamp. Beyond these priority areas, ASTI recommends establishing a schedule to treat other forested areas over time, beginning from the edges of the wetlands and working outward. Additional details describing recommended methods for treating and removing the invasive plants noted above can be found in Table 4, Appendix A, and in Appendix B.

Trail Linkage/Signage Recommendations:

The existing trail network is extensive and includes views of most of the parks major vegetation communities. Short spurs could be added to highlight a small grove of swamp white oak at the northeast end of the wet prairie and the north end of the southernmost buttonbush swamp. Existing signage is useful and interesting; however, signage at the overlooks for both the sedge meadow and buttonbush swamp overlooks are rendered a bit obsolete due to the invasive species issues in these locations. Secondary, possibly temporary, signage could be added at these locations to highlight Parks Department actions to restore these habitats.

Other:

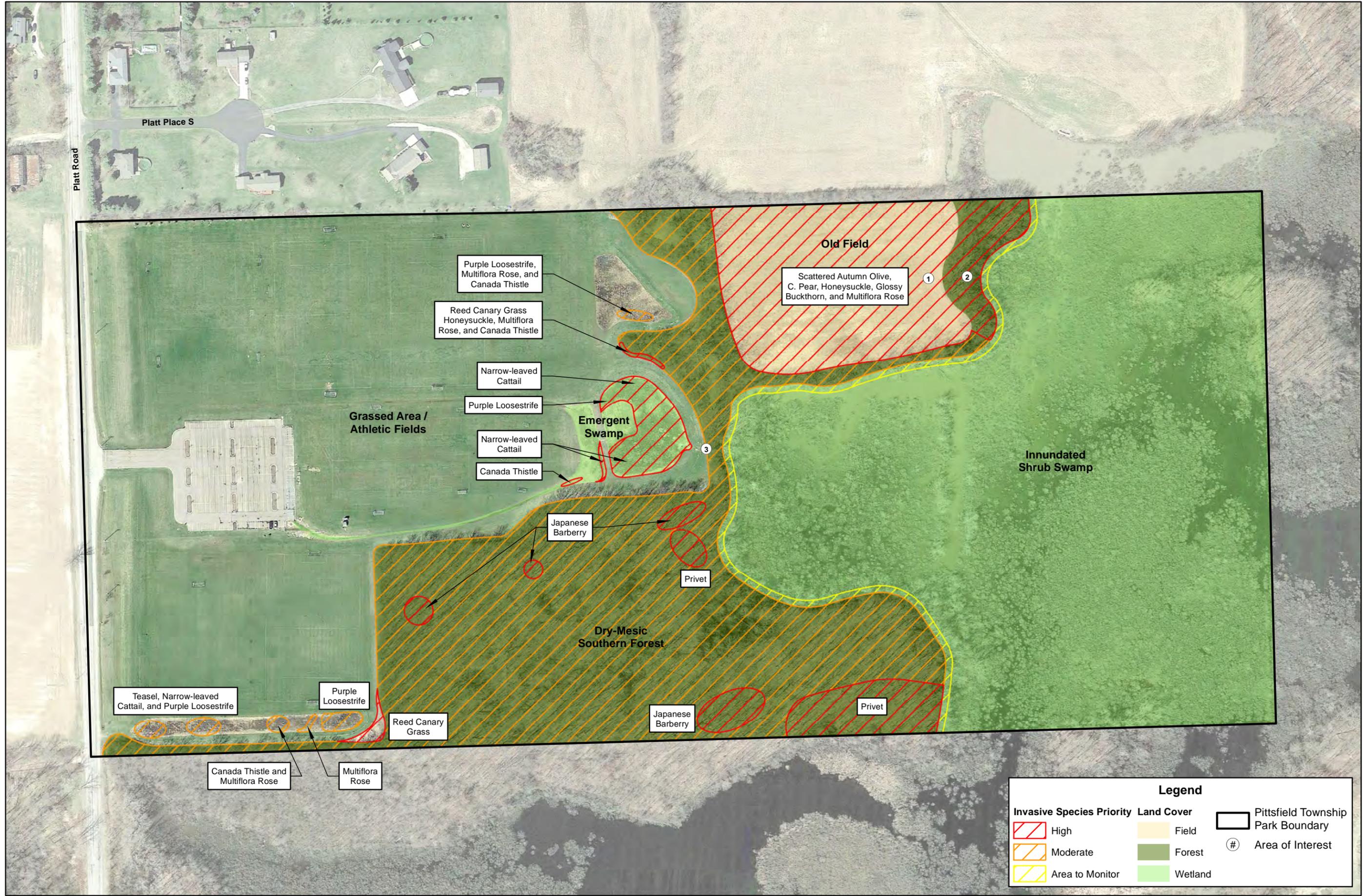
During site investigations, ASTI noted several "social trails" leading from private residences into the park.

5.4 WALL PARK

Park Description:

The principal use of Wall Park appears to be the several soccer fields in the western half of the park. However, the park does contain some very nice forested and wetland areas as well. The park is bordered on the west by Platt Road and backs up to a very large forested and scrub-shrub wetland complex, owned in part by the prison, on the east and south (Figure 7).

Historically, the area of Wall Park was recorded as tamarack swamp and oak-hickory forest. Much of the remaining natural area within this park is a mix of dry-mesic southern forest and possibly wet-mesic flatwood grading into a very large scrub-shrub and forested wetland complex that extends off site to the south and east. The park also includes an area of



approximately 4.5 acres that appears to have previously been agricultural field that is now converting to old field habitat.

Invasive Species and Management Recommendations:

Because Wall Park has no trail system or other amenities facilitating use of, or visitation to, the woods and wetland areas, and because invasive shrubs are already established throughout the forest, there is little reason to conduct extensive invasive species management actions within Wall Park until such time as further park development is desired. However, ASTI recommends prioritizing the following:

- Hand-pulling or cut-stump treatment of several small patches of common privet and Japanese barberry before they spread further.
- Controlling invading shrubs, particularly autumn olive, Callery pear, and multiflora rose, within the old field (① Figure 7). Mowing, fire, or cut-stump treatment may all be utilized here.
- Cut-stump treatment of invasive shrubs (common and glossy buckthorn, honeysuckle species) within the adjacent forested edge between the field and the swamp ②,

Special/Priority Areas for Management:

Invasive species management within Wall Park should focus first on removing small pockets of privet and Japanese barberry within the woods and invasive shrub species from the old field habitat along the north edge of the park. This area is currently dominated by goldenrod species, but could be managed further through the use of mowing, fire, or cut-stump treatment. Fire or mowing may release additional species currently hidden in the field, but additional prairie species could be planted here if greater diversity is desired.

Similarly the forested wetland edge adjacent to the field contains a number of swamp white oaks but exhibits early stage glossy and common buckthorn and honeysuckle encroachment. Treating this area will help protect this special wetland resource while also opening areas for additional oak regeneration. The remainder of the woods exhibits relatively advanced populations of common and glossy buckthorn and honeysuckle, which may be treated as resources allow and/or when trail systems are planned.

Finally, the outlet of the stormwater drainage system ③ should also be monitored to prevent introduction of narrow-leaved cattail, purple loosestrife, reed canary grass, or Canada thistle to the larger wetland complex. This could be further prevented by treating these species along the drainage swale from the parking lot and within the detention areas. Further information regarding recommended methods for treating and removing the invasive plants noted here may be found in Tables 4 and 5, Appendix A, and in Appendix B.

Trail Linkage/Signage Recommendations:

There is currently no trail system within Wall Park. A trail system could be designed to highlight the mature oak and hickory trees, the expansive buttonbush swamp, and the open field.

PHOTOS

Wall Park, Pittsfield Township, Michigan



Photo 1. The woods at Wall Park are quite beautiful, but an understory of invasive buckthorn, honeysuckle, and other shrubs threatens to shade out native plant reproduction on the forest floor.



Photo 2. An old field in the northeast part of the park exhibits some prairie plants. Treatment and removal of scattered invasive shrubs will help maintain this open field.



Photo 3. A large and diverse scrub-shrub wetland is located at the eastern end of Wall Park. If trails are developed through the field and or woods here, views of the wetland should be highlighted. Glossy and common buckthorn and small patches of reed canary grass are becoming established in the forested fringe of this wetland.

PHOTOS

Wall Park, Pittsfield Township, Michigan



Photo 4. A pocket of *Carex stricta* (tussock sedge) between the larger open marsh and the surrounding oak-hickory forest.



Photo 5. Near the wetland pocket above a concentration of Japanese barberry is another invading shrub.



Photo 6. Trail development within the Wall Park Woods and/or invasive species treatments will need to be informed by the property boundary and restrictions on adjacent properties.

Other:

Deer stands were noted within the southern border of the woodland during ASTI site investigations. Installing boundary signs and/or developing a trail system could help deter illegal park uses.

5.4 HICKORY WOODS PARK

Park Description:

Hickory Woods is a well-visited park with a variety of amenities including a playground, a covered pavilion, and a network of paved and mowed trails. It is located on the eastern-most edge of Pittsfield Township, south of I-94 and is bounded by Crane and Munger Roads at its east and west ends, respectively, and by residential areas along its north and south sides (Figure 8).

GLO survey data note that, whereas most of the Township's park properties were historically oak-hickory forest, this area was oak barren, a community type consisting of savanna with scattered and clumped tree and shrubs mixed with grasses and dry sand prairie. As such, the large prairie plantings that dominate the eastern end of the park, coupled with the park's approximately 4.7-acre oak-hickory woodlot, approximate the combination of habitats that may have been present here 200 hundred years ago.

Invasive Species and Management Recommendations:

- Hickory Woods' signature "natural" areas are the prairie plantings (1 Figure 8) that ring three sides of the park. As such, the primary invasive species threats within the park are the potential spread of common teasel, spotted knapweed, and Canada thistle. Small patches of invasive trees within the prairie areas (i.e., black locust at the east end of the northernmost prairie band and tree-of-Heaven in the larger prairie area) should also be removed to prevent their spread. ASTI recommends prescribed burning within all or most of the prairie areas. Small areas of Japanese hedge parsley, spotted knapweed, and white and yellow sweet clover may be hand-pulled or sprayed, and basal rosettes of teasel may be sprayed or removed by hand using a dandelion digger if burning does not provide adequate control. Please note that prairie plantings in the western half of the park are dominated by Canada thistle. Canada thistle is not effectively controlled using fire alone and herbicide applications before and after fire will likely be necessary.
- The oak-hickory woods (2) is overrun with invasive understory shrubs; primarily common buckthorn and honeysuckle with Callery pears invading along the eastern edge. ASTI recommends thinning of the tree canopy to allow regeneration of young oaks and to recreate an open structure more akin to oak savanna, followed by prescribed fire within the woods to control the invasive understory shrubs.

Special/Priority Areas for Management:

Locations, severity and prioritization of invasive species within Hickory Woods Park are shown in Figure 8. ASTI recommends prioritizing removal and treatment of teasel from the main prairie, with a secondary focus on the scattered patches of spotted knapweed and Canada thistle.

It is ASTI's understanding that residents living adjacent to the park have expressed significant interest in how the park is to be cared for and that they are open to the possibility of prescribed



burning as a management tool. Due to the potential for further spread of teasel and other invaders following mowing, and the difficulty in adequately cleaning equipment to prevent this spread, ASTI recommends prescribed burning for the prairie planting areas.

The prairie should be burned in the late spring of next year and then on a semi-regular schedule every three to five years. Spring burns in prairies tend to fare better than fall burns as the grasses will have dried over winter to provide better fuel. Burning will encourage the growth of warm-season grasses like big bluestem and also suppress shrub growth within the prairie.

Additional post-burn seeding may be conducted in the fall to further native grass establishment. Suggested species for augmentation seeding include big bluestem, Indian grass, and side-oats grama. These species are represented in the prairie at present but their presence is limited. Additional forbs, including milkweed, butterfly weed, prairie dock, prairie blazing star, and flowering spurge may also be seeded to benefit both native bird and pollinator populations.

Teasel management in the prairie will likely require several years and an integrated approach of biomass removal (pulling, cutting seed and flower heads), herbicide treatment or torching of basal rosettes, and prescribed burning to be effective. Burning may also encourage warm-season grass growth. However, burning teasel does little to stem its growth in subsequent seasons and the native grass seed bank may not be sufficient to out-compete the teasel.

As noted above, the oak-hickory woods in Hickory Woods Park are overrun with invasive understory shrubs; limiting both views through the woods and native species regeneration. Although invasive shrubs are already established and relatively self-contained here, ASTI still identifies restoration of the understory as a priority. Due to the number of stems to treat however, this may be an area to consider for prescribed burning. Oak forest burns may be conducted either, in the fall after leaf litter is cured or in early spring before green-up. Any adult buckthorn trees should be treated prior to the burn, as fire is best suited to control small diameter shrubs. Please note that ASTI observed large piles of logs and cut tree slash within the woods. These should be removed prior to any burn so they do not concentrate the fire and create conditions that are too hot for the survival of desirable tree species.

If cut-stump treatment is preferred for the woods, it may be easiest to start with less dense patches and work towards pushing the shrub line back every year. As the shrubs thin out a controlled burn may encourage native associate plants to colonize the forest.

Invasive species within the park's retention pond ③ (i.e., *Phragmites* and narrow-leaved cattail) have few suitable areas in which to spread, so these may be ranked lowest on the list of Hickory Woods priorities. However, the area surrounding the detention pond exhibits a number of terrestrial invasive species including Canada thistle, Japanese hedge parsley, reed canary grass, buckthorn, honeysuckle, and teasel. Treating these areas should be considered a moderate priority to prevent reintroductions within managed prairie and forest areas.

Additional descriptions of the methods for treating and removing the invasive plants noted here are provided in Tables 4 and 5 and Appendix B.

PHOTOS

Hickory Woods Park, Pittsfield Township, Michigan



Photo 1. A diverse assemblage of prairie plantings at Hickory Woods Park are a highlight of the Pittsfield Township park system; providing color for park visitors and habitat for a variety of pollinator insects and birds.



Photo 2. Common teasel is an aggressive invader of the prairies at Hickory Woods.



Photo 3. Restoring the oak-hickory woods at Hickory Woods Park is also a high priority.

PHOTOS

Hickory Woods Park, Pittsfield Township, Michigan



Photo 4. The dense understory of buckthorn and honeysuckle will require a multi-year effort as new recruits will come back from the established seed bank. Fire is proposed as a possible restoration tool in both the woods and adjacent prairie.



Photo 5. Buckthorn and honeysuckle are the principal invasive species within the woodlot interior, but Callery (Bradford) pear is invading from the edge. Callery pears are also invading the meadow and should be treated in both locations.



Photo 6. This interpretive sign asks park residents to notify the Parks Department if they see invasive species, but the invasive shrubs are already well-established and changing succession processes within the woods.

Trail Linkage/Signage Recommendations:

The existing trail system, both paved and mown, is extensive and allows the public to reach areas of interest within the park. ASTI did not note additional areas for expanding the existing trail network. ASTI did observe that there are entrances to the trail system and park from the neighboring residential neighborhoods, these and the main path entrance to the prairie may be prime locations for additional signage regarding the proper removal of invasive seeds from shoes after walking through the park to help stem the spread of invasive plants leaving or entering the park areas. Additionally, should controlled burning be utilized, educational signage describing the ecological benefits of fire could also be added. It may be noted that one existing sign along the paved path at the north end of the woods ④ discusses invasive species and urges individuals to report sightings to the Parks Department. Unfortunately, as noted, invasive shrub infestation is already well established throughout the woods. Perhaps additional, temporary signage could be added to describe efforts to control and eradicate invasive species.

Other:

The prairie areas are frequented by goldfinches and butterflies; these populations could be further supported with augmented seeding as noted above. Seed may also be collected from existing small populations of big bluestem and hoary vervain already growing in the prairie. Only a small percentage of the seed should be removed from the plants per season (up to one third).

5.5 MONTIBELLER PARK

Park Description:

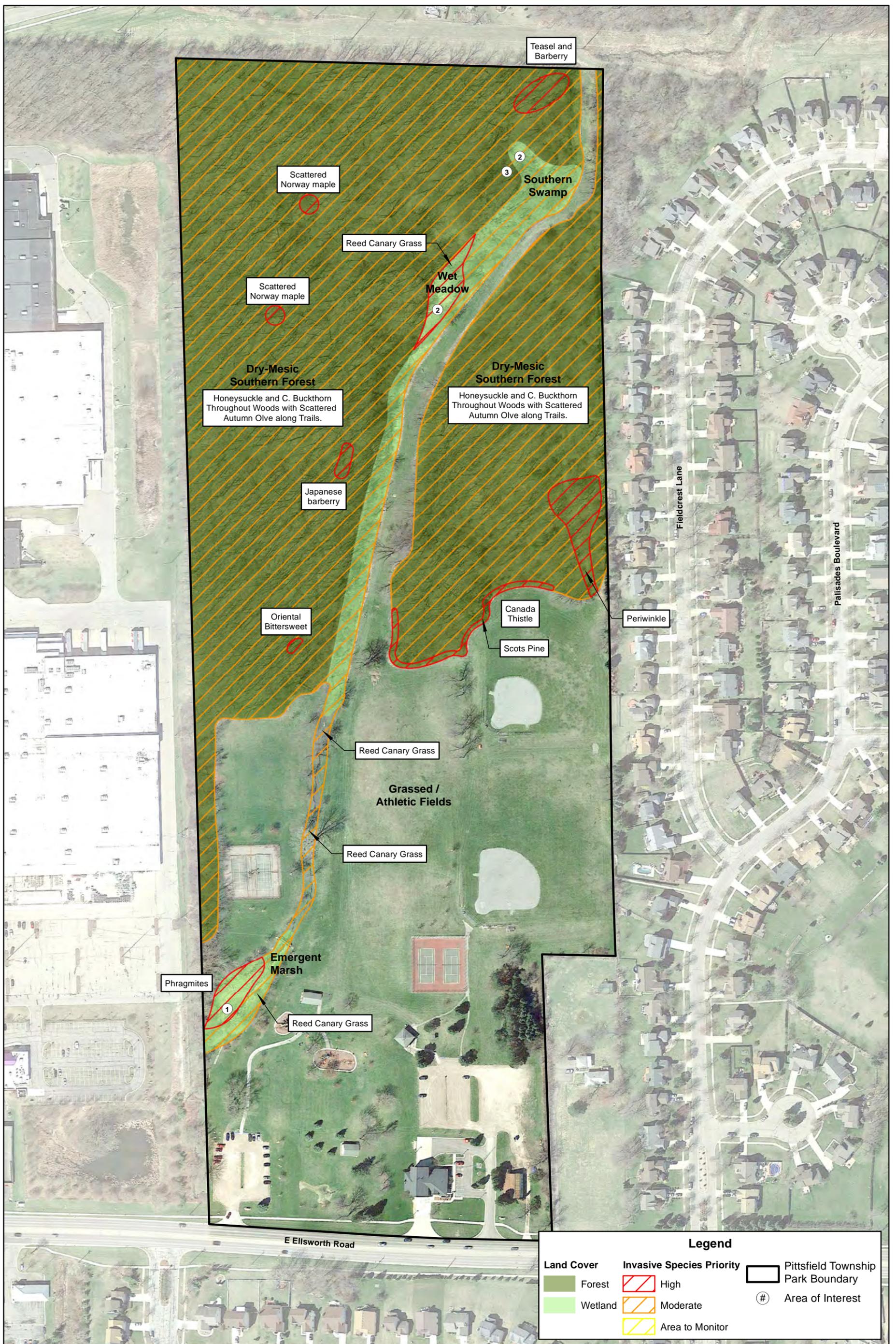
Montibeller Park (Figure 9) is Pittsfield Township's northeastern-most park and includes playground equipment, tennis courts and ball fields, grassed open areas, and wooded trails. It is bordered on the south by Ellsworth Road, abuts the back of a shopping center anchored by Meijer on the east, and by a township fire station and residential housing on the east and north.

Approximately 60 percent (29.6 acres) of the park is still oak-hickory forest (Dry-Mesic Southern Forest); the same land cover mapped by GLO surveyors in the mid-1800s. A small strip of lowland hardwood forest adjoins Paint Creek as it flows through the park and the woods also encompass small areas of forested and emergent wetland. Open grassed areas, recreational courts and fields, playgrounds, picnic areas, and a parking lot make up the remainder of the park.

Invasive Species and Management Recommendations:

The primary invasive species of concern within Montibeller Park and recommended management prescriptions are:

- Foliar spraying to control a relatively small patch of common reed located at the south end of Paint Creek ①,
- Girdling and/or drill and fill herbicide treatment to control scattered Norway maples (MDNR A-list species),
- Hand-pulling or spray treatments to eliminate small pockets of Canada thistle and Japanese barberry,



Invasive Species Assessment & Management Plan

Pittsfield Township, MI



- Foliar spraying to control pockets of oriental bittersweet and common periwinkle (*Vinca*) along the easternmost path, and
- Foliar spraying of reed canary grass in wet meadow and forested wetland habitats near the north end of the park ②,
- Although ASTI ecologists have not observed Scots pine to be an aggressive colonizer, it is one of the few MDNR B-List species found within Pittsfield Township parks. A few individuals found along the south edge of the eastern forest block could be removed or girdled if desired.

Further detail regarding recommended methods for treating and removing the invasive plant species noted here can be found in Tables 4 and 5, Appendix A and in Appendix B.

Special/Priority Areas for Management:

ASTI's recommended priority areas, listed above, are shown in Figure 9.

Invasive shrubs (buckthorn and honeysuckle species) are well established throughout the majority of the Montibeller Park woods. As such, ASTI designates treatment of these shrubs as a moderate priority to be conducted over time as resources allow. Please note that these forest blocks do include areas of relatively high quality. Due to the density of existing buckthorn and honeysuckle, prescribed fire or even mowing may be considered tools for the woods at Montibeller Park.

If cut-stump herbicide treatment is desired, ASTI recommends starting at the south end of the western forest block and moving north and east over time. If a prescribed burn is initiated in the park, care should be taken to protect fire-sensitive species such as the yellow birch adjacent to and near Paint Creek at the park's northern end ③. Pre-burn removal of fuel near the base of these trees can serve as a fire break to provide added protection.

Trail Linkage/Signage Recommendations:

ASTI did not note additional areas for expanding the existing trail network, but did note what are assumed to be unofficial trails from residential areas on the east and to/from the Meijer shopping center on the west. Signage in these areas could encourage park users to properly clean their shoes so that they do not exacerbate the spread of invasive species or could at least describe Pittsfield Parks' invasive species management efforts. Additional signage could also describe the Paint Creek system and its importance.

Other:

Herpetology records from 2015-2016 indicate the occurrence of Butler's garter snake (*Thamnophis butleri*) along Montibeller Park's northern edge (near Paint Creek's exit). Butler's garter snake is listed in Michigan as a species of special concern. Previous sightings may indicate that this species is living within the park and that hibernacula may exist there. The care and maintenance of the wet prairie area is therefore especially important as a habitat type frequented by this species. Special planning considerations may be warranted for Butler's garter snake and other herptile species prior to the use of prescribed fire, mowing, or herbicide.

PHOTOS

Montibeller Park, Pittsfield Township, Michigan



Photo 1. The southern half of Montibeller Park is primarily open mown grass areas, providing a variety of picnic, sports, and other opportunities for park users.



Photo 2. This patch of *Phragmites* near the south end of the park, and the headwaters of Paint Creek, should be treated before it spreads further.

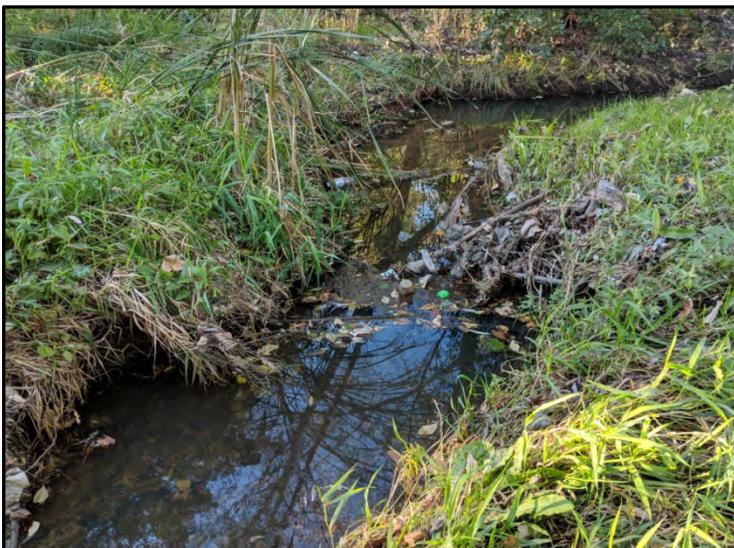


Photo 3. Paint Creek runs through the center of the park and is choked with trash and reed canary grass.

PHOTOS

Montibeller Park, Pittsfield Township, Michigan



Photo 4. The mown trail running between the two large blocks of woods in the north end of Montibeller Park.



Photo 5. The southwest portion of the woods, in particular contains some very nice trees, but the understory is dominated by buckthorn.



Photo 6. The park even contains a small grove of yellow birch near the north end of the park. A state-designated special concern garter snake species has been recorded in this general area and should be considered before implementing invasive species treatments.

5.6 LILLIE PARK

Park Description:

Lillie Park is a heavily used park offering multiple uses. Park amenities include soccer fields and other recreational sports areas, pavilions, a playground, paved and dirt walking trails and several small lakes. Native communities in the park include dry-mesic southern forest, emergent marsh edging the lakes, and old field habitats. Prior to major European settlement, the 150-acre site that is now Lillie Park was recorded to consist entirely of oak-hickory forest. The lakes and old field areas are remnants of former sand and gravel mining on the site.

Lillie Park is bordered on the north by Ellsworth Road and I-94, on the west by Platt Road and by agricultural lands to the south (Figure 10). A utility corridor cuts through the park diagonally, separating it into two relatively distinct parts. During our site inspections, ASTI ecologists noted that the utility corridor is used as a part of the park and serves as an additional walking, biking, and running trail connecting the two halves of the park.

Invasive Species and Management Recommendations:

- The primary invasive species concern within Lillie Park is the well-established presence of common reed (*Phragmites*), and to a lesser extent narrow-leaved cattail surrounding Turtle Rock Pond and Haven Lake¹. Eradicating these populations will require repeat herbicide treatments over several years. If water levels allow, some areas around Turtle Rock Pond might be mowed to speed or ease control efforts.
- Because it appears to be a higher profile area of the park and because individual populations are relatively small, a second priority is foliar herbicide applications to treat an assortment of *Phragmites*, Canada thistle, common teasel, and crown vetch in the north end of the park. Hand-pulling is recommended for additional concentrations of spotted knapweed, and cut-stump treatment is recommended to eliminate common buckthorn in these same areas amongst the paved walkways. Crown vetch appears to have been seeded in this area to provide slope/soil stabilization².
- ASTI has also highlighted small rain garden areas adjacent to the playground to eliminate Canada thistle and reed canary grass that have overtaken these beds. This is noted as a priority for the aesthetics of the playground area and should be relatively easy to successfully control due to their small size.

Special/Priority Areas for Management:

Areas ranked as Lillie Park's highest priorities and the target plant species are listed above and noted on Figure 10. Management of invasive shrubs, particularly buckthorns and honeysuckles within the park's forested areas, and autumn olive, honeysuckles, common buckthorn, and multiflora rose in old field habitats are categorized as moderate priority. These areas are already heavily infested with these shrubs species.

Within this larger effort, ASTI recommends beginning in the high quality forest areas of the Lillie Woods loop just off the east end of the parking lot and within Giants' Grove⁴. Initial efforts to reduce invasive shrub coverage could also be conducted in Songbird Field. Treatment of invasive shrubs should expand outward from these areas over time, as resources allow. Further



PHOTOS

Lillie Park, Pittsfield Township, Michigan



Photo 1. The entrance to Lillie Woods at Lillie Park.

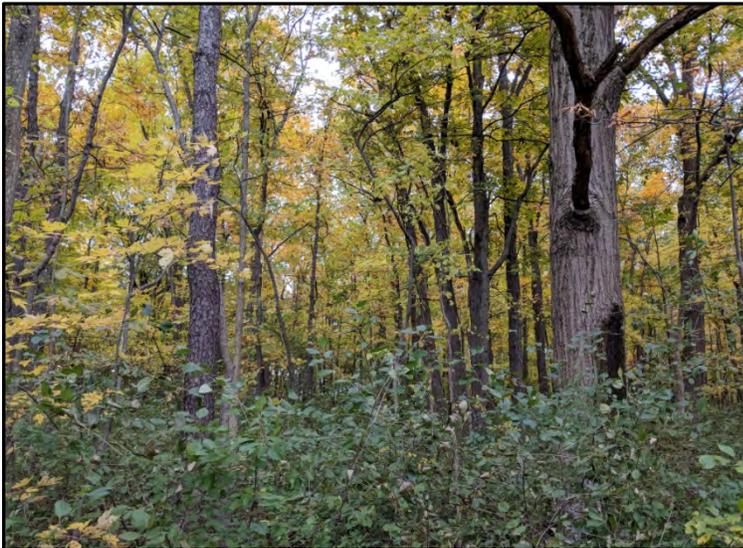


Photo 2. Big, beautiful oaks, hickories, and black cherries contest with an understory of invasive shrubs in Giants Grove.



Photo 3. Phragmites (common reed), along with purple loosestrife and narrow-leaved cattail, have become established around Turtle Rock Pond; treatment of these species in this location is a high priority within Lille Park.

PHOTOS

Lillie Park, Pittsfield Township, Michigan

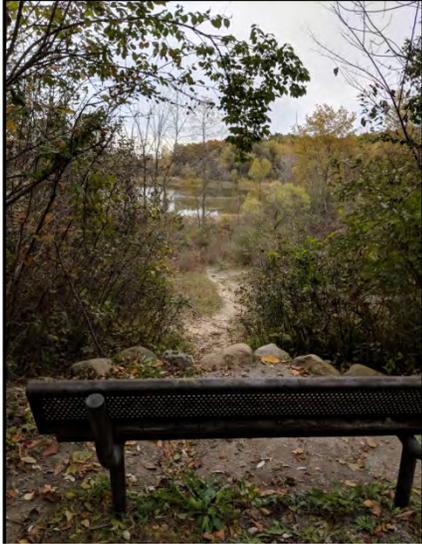


Photo 4. Erosion from people leaving the trail to get to the lake's edge on the west side of Turtle Rock Pond.



Photo 5. Further erosion observed near the east end of Turtle Rock Pond.



Photo 6. Lillie Park abuts the Johns Preserve managed by the Legacy Land Conservancy. Legacy uses fire in this preserve to combat common buckthorn in the understory. Note the difference in understory shrub growth in this picture. The left side of this picture/post is Lillie Park; Johnson Preserve is on the right.

detail regarding recommended methods for treating and removing the invasive plant species noted here can be found in Tables 4 and 5, Appendix A and in Appendix B.

It should be noted that the south edge of Lillie Park abuts the Johnson Preserve **5** managed by Legacy Land Trust. The Land Trust used cut-stump herbicide treatments there to initially control buckthorn and honeysuckle and currently maintains control of invasive forest shrubs on that preserve using prescribed fire. Their efforts appear to have been highly successful. Because of the acreage of the forested and old field areas impacted by invasive shrub species in Lillie Park, fire may be the most cost-effective method and could be done in conjunction with the Legacy Land Trust. The accompanying photos of Lillie Park show the difference in the understory shrub coverage at the border between Lillie Park and the Johnson Preserve.

Other:

Significant erosion in need of stabilization and repair was observed at both the west and east ends of Turtle Rock Pond (accompanying photos).

5.7 MORGAN WOODS NATURE AREA

Park Description:

Morgan Woods is an undeveloped park immediately northwest of the larger Pittsfield Preserve property. It is bound by Stone School and Morgan Roads on the east and south, respectively, and by a utility corridor right-of-way and the Ann Arbor Railroad on the west (Figure 11).

Land cover maps developed from circa 1816-1856 General Land Office (GLO) surveys identify the area as historically consisting of oak-hickory forest with a small area of mixed hardwood swamp in the park's southeast corner. Today, almost half (approximately 48.5 acres) of the approximately 98.3-acre park consists of Mesic Southern Forest. Agricultural fields make up an additional 42 acres. The park also includes a small tree farm (**1** Figure 11) with planted black walnuts (*Juglans nigra*) and four areas of Inundated Shrub [buttonbush] Swamp **2**; two at the north end of the woods, one in the southeast corner at the intersection of Stone School and Morgan Roads, and one in the corn field.

Dominant & Associate Plant Species:

The parks' agricultural fields contain corn in the southeast **3** and a cover crop of clover and grasses near the north end of the park **4**. The park's main forest canopy is dominated by sugar maple (*Acer saccharum*), with a smaller, lower elevation section near the south end of the park dominated by red maple (*A. rubrum*) **5**. Associate canopy species include basswood (*Tilia americana*), northern red oak (*Quercus rubra*), American beech (*Fagus grandifolia*), shagbark hickory (*Carya ovata*) white and red ash (*Fraxinus americana* and *F. pennsylvanica*), common buckthorn (*Rhamnus cathartica*) and, in the driest areas, white oak (*Q. alba*) and black cherry (*Prunus serotina*).

The mid-story of the woods is dominated by sugar maple. The shrub and herbaceous layers are notably sparse, which is likely due to heavy shading of the forest floor. Plants observed in these lower layers were dominated by sugar maple and ash seedlings and saplings along with patches of American bladdernut (*Staphylea trifolia*), white baneberry (*Actaea pachypoda*), prickly-ash (*Zanthoxylum americanum*), bluestem goldenrod (*Solidago caesia*), and wood nettle



Invasive Species Assessment & Management Plan

Pittsfield Township, MI



Client: Pittsfield Township Parks & Recreation
 Created by: BJG, November 9, 2018, ASTI Project 10785
 Imagery: Google Earth (April 2017)

Figure 11
 Morgan Woods

(*Laportea canadensis*). Wetland areas in the park are dominated by buttonbush (*Cephalanthus occidentalis*) but also include narrow-leaved cattail (*Typha angustifolia*), common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), purple loosestrife (*Lythrum salicaria*), black willow (*Salix nigra*), clearweed (*Pilea pumila*), and lake sedge (*Carex lacustris*).

Invasive Species and Management Recommendations:

The primary invasive species of concern within Morgan Woods and recommended management prescriptions are:

- Cut-stump treatment of common buckthorn in the forested areas, and
- Foliar herbicide application to common reed and reed canary grass in the wetland in the park's southeast corner. This same wetland also contains some narrow-leaved cattail and, to a lesser extent, purple loosestrife. All of these should be addressed to restore open water habitat in a portion of this wetland.

Special/Priority Areas for Management:

Locations, severity, and prioritization of invasive species in Morgan Woods Park are presented in Figure 1. ASTI recommends restoring buttonbush swamp areas of the park, particularly in the southeast corner, as the first priority ⑦, followed by removal of common buckthorn in the woods. Buckthorn infestation of the woods is densest along the edges and scattered within the forest itself. Controlling buckthorn along the forest edge will help slow the spread of buckthorn across the property ⑧.

There is a small but expanding patch of *Phragmites* in the wetland at the intersection of Morgan and Stone School Roads and a couple additional patches along the Morgan Road ditch line ⑨. Treating *Phragmites* in these locations is essential to prevent its further spread within the wetland. It should be noted however; a larger population of common reed is well established directly across Morgan Road to the south, partially within the Pittsfield Preserve, that will continue as a source for recolonization.

It should be noted that, approximately 10-15 years ago, the southeast corner wetland exhibited open water and was a locally important spring breeding site for a variety of amphibians. All of the site's wetlands and a small vernal pool ⑥ exhibited low water levels during ASTI's site visit. No wildlife use of the vernal pool was observed and it is not known whether it is utilized seasonally for herptile mating/cover habitat. Removing buckthorn and other invasive vegetation within and along the wetland boundaries may help increase water levels.

Recommended methods for treating/removing common buckthorn, reed canary grass, and common reed are presented in Tables 4 and 5, Appendix A, and in Appendix B.

Trail Linkage/Signage Recommendations:

As noted, Morgan Woods is, as yet, undeveloped. With the exception of a farm road near the north end of the property, the park contains no established trail system. Future trail development could highlight one or more of the buttonbush swamps on the site, a vernal pool within the woods, and a number of large oaks and maple in excess of 40 inches in diameter.

PHOTOS

Morgan Woods Nature Area, Pittsfield Township, Michigan



Photo 1. Heavy shade from the forest canopy and a sparse understory typify much of Morgan Woods Nature Area forest.



Photo 2. American bladdernut is one of the understory shrubs found in Morgan Woods.



Photo 3. Morgan Woods contains three small areas of buttonbush swamp. Common buckthorn growing around the edges threaten to dry out these areas, upsetting the delicate hydrologic balance buttonbush require. Treating and removing buckthorn in the vicinity of these swamps and along the edges of the woods are priorities for this nature area.

Other:

Forested areas in Morgan Woods Park are dominated by sugar maple, and may be categorized as either a Sugar Maple or Sugar Maple-Basswood forest cover type. These are considered climax communities that perpetuate themselves over long periods of time because sugar maple is able to out-compete other species to regenerate under its own shade. Although ash saplings are well represented in the understory, the continued presence of emerald ash borer in southern Michigan would indicate that mature ash are not likely to become a significant component of the park's forest. Beech may increase relative to the sugar maple over time because it is even more shade tolerant and able to take advantage of smaller canopy openings from wind throw and other disturbance.

GLO survey notes indicate that much of what is now Morgan Woods was oak-hickory forest. These species remain as only small components of the stand. The site exhibits too much shade for oak regeneration. Management initiatives to significantly open the canopy (logging, fire, etc.) will be required if the Pittsfield Township Parks Department wishes to restore all or portions of Morgan Woods to pre-European settlement conditions. Establishing oak forest, or prairie, or some other desired type may more readily be accomplished within the areas of the park currently in agriculture.

Two final notes: ASTI ecologists noted that the woods appeared to exhibit more fungus and rot than normally observed in local forest lands. Fruiting bodies of various fungi were noted on both standing live trees and downed logs. This is largely an anecdotal observation, but may be attributed to the significant over story shading and resultant lack of airflow through the woods.

Additionally, although not evident during ASTI's site investigations, township residents pointed out that Morgan Woods contains trillium and other spring ephemeral wildflowers. Invasive species management efforts should be preceded by locating and protecting these species.

5.8 WOOLLEY PARK

Park Description:

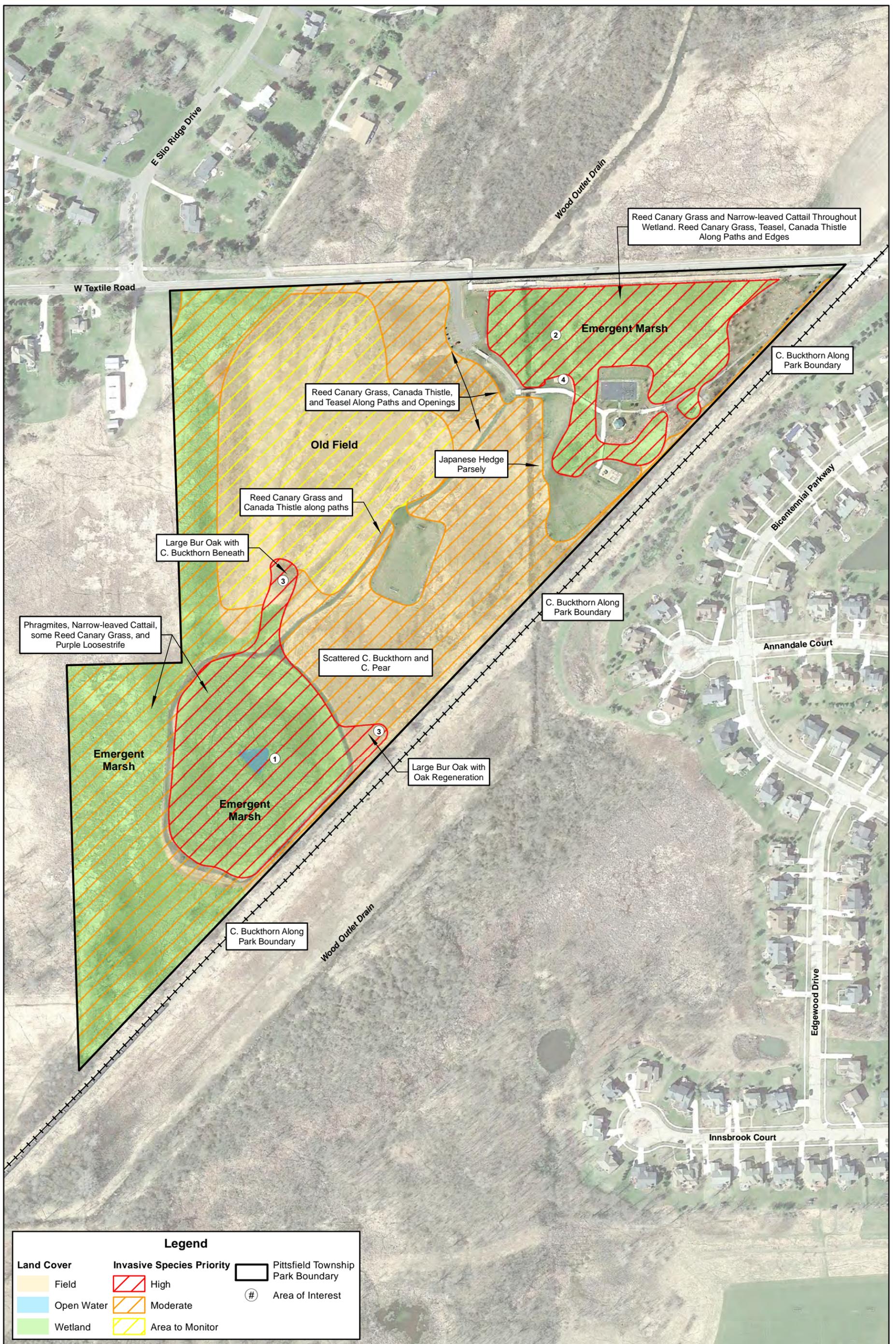
Amenities in Woolley Park include recreational fields, covered picnic pavilions and grills, a playground, a butterfly garden, walking trails, Frisbee golf, and a par course. Natural communities within the park are primarily emergent marsh and old field habitats, both of which are being impacted by invasive species.

Woolley Park is bordered on the north by West Textile Road, by a mix of open space and residential housing along the west, and by a railway and residential uses on the east (Figure 12).

GLO survey data indicate that the Woolley Park area was historically tamarack swamp and wet prairie, with a very small area of oak-hickory forest. The park remains primarily wetland but the species composition has shifted to be dominated by invasive grasses, with smaller forb and shrub components.

Invasive Species and Management Recommendations:

High priority invasive species concerns and action plans for Woolley Park include the following:



Invasive Species Assessment & Management Plan

Pittsfield Township, MI



Client: Pittsfield Township Parks & Recreation
 Created by: BJG, November 9, 2018, ASTI Project 10785
 Imagery: Google Earth (April 2017)

Figure 12
 Woolley Park

- Herbicide treatment to control common reed within the circle trail loop ① near the south west end of the park,
- Foliar herbicide treatments to control narrow-leaved cattail and associated species within the emergent marsh bordering Textile Road and the boardwalk ②, and
- Invasive shrub control (primarily common buckthorn and Callery pear) near and beneath two large specimen bur oaks ③ near the loop trail at the south end of the park. The purpose of this effort is to both highlight these large oaks, perhaps with additional tail spurs or loops, and to provide room for continued oak regeneration.

Special/Priority Areas for Management: The species and locations deemed by ASTI to have the highest priority are listed above and shown on Figure 12. Although treating *Phragmites*, inside the trail loop leaves a wall of *Phragmites* directly across the trail to serve as a ready source for recolonization, the smaller inner loop area was selected in an effort to expand the small remaining pocket of open water in the center of the marsh.

The emergent marsh contiguous to the boardwalk and Textile Road exhibits less common reed, but is instead primarily impacted by narrow-leaved cattail. A mix of other invasive grasses, forbs, and shrubs are also found here and all may be addressed by the same foliar spray program. This area is the entrance and face of the park, and although narrow-leaved cattail does provide some habitat value, it tends to dominate wetlands as a monoculture and it is hoped that eliminating or reducing its footprint will allow other, native species to reappear. This area also abuts other high profile areas of the parks adjacent to picnic and playground facilities.

The park contains at least two large specimen bur oaks. Releasing them from the pressure and competition of an invasive shrub understory will allow them to thrive and provide growing room for sapling oaks that are already present.

One other focus area is the butterfly garden ④, which has been overrun by Canada thistle. This is a small area that could be restored and highlighted. To do so will require eliminating the thistle (hand-pulling and/or foliar herbicide) and reseeding the garden with species like butterfly weed, gray-headed coneflower, and milkweed to attract a diverse array of pollinators.

Continued expansion of treatment out from these initial locations is recommended over time, but is categorized as lower importance. It should be recognized, however, that the Wood Outlet Drain and adjacent upland and wetland habitats will continue to serve as a source for new invasions. Invasive species control in Woolley Park, like all Pittsfield Township Parks, will need to be continued and monitored into the future.

Further information regarding invasive species in Woolley Park is provided in Figure 12. Additional information regarding the methods and timing for treating invasive plants may be found in Appendices A and B.

PHOTOS

Woolley Park, Pittsfield Township, Michigan



Photo 1. The mitigation wetland at the entrance to Woolley Park is dominated by narrow-leaved cattail.



Photo 2. Canada thistle, another invasive species, has overrun the butterfly garden.



Photo 3. Reed canary grass foreground and narrow-leaved cattail dominate this area of the park near the playground and picnic pavilion. This same wetland area wraps around to the park entrance along the Textile Road Greenway boardwalk and is recommended as a high priority treatment area for Woolley Park.

PHOTOS

Woolley Park, Pittsfield Township, Michigan



Photo 4. Reed canary grass slows the flow of the Wood Outlet Drain.



Photo 5. ASTI recommends treating the *Phragmites* within the inner loop of trail near the south end of the park. The purpose for starting in this location is to create additional open water habitat.

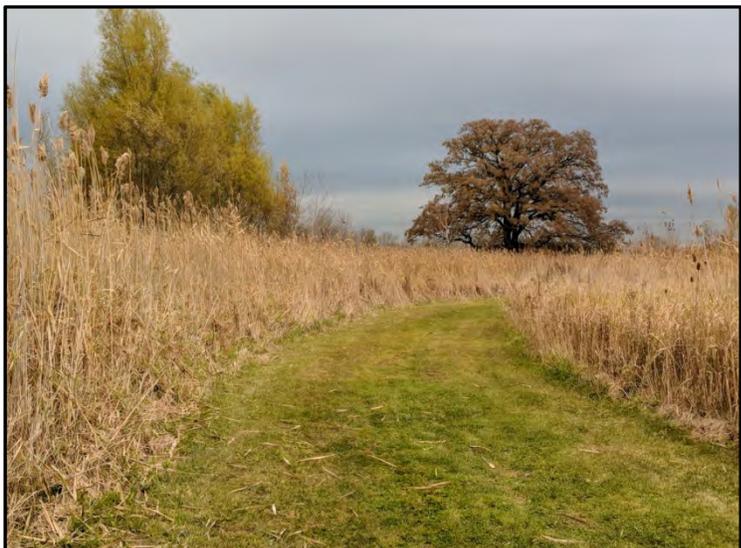


Photo 6. Treated areas will need to be monitored closely for new growth, but lower priority areas of common reed will remain, for a time, just across the path.

5.9 KIRTLAND HILLS

Park Description:

Kirtland Hills is a small (4.4-acre), neighborhood park situated within the Kirtland Hills residential community. Features of the park include a short loop of mown trail and a swing set/playground situated near the park's center. The park is located off Burnham Drive, south of I-94 and Ann Arbor-Saline Road and north of Ellsworth Road. Kirtland Hills Park is bordered on all sides by residences (Figure 13).

The area is identified as having been oak-hickory forest historically, but is now primarily old field ① and a lowland forest type ② that contains pockets of wetland but is not quite southern hardwood swamp in its entirety.

Invasive Species and Management Recommendations:

Invasive species control actions within Kirtland Hills Park are not a priority across the Pittsfield Township system as a whole, but within the park itself, ASTI identified the following priorities:

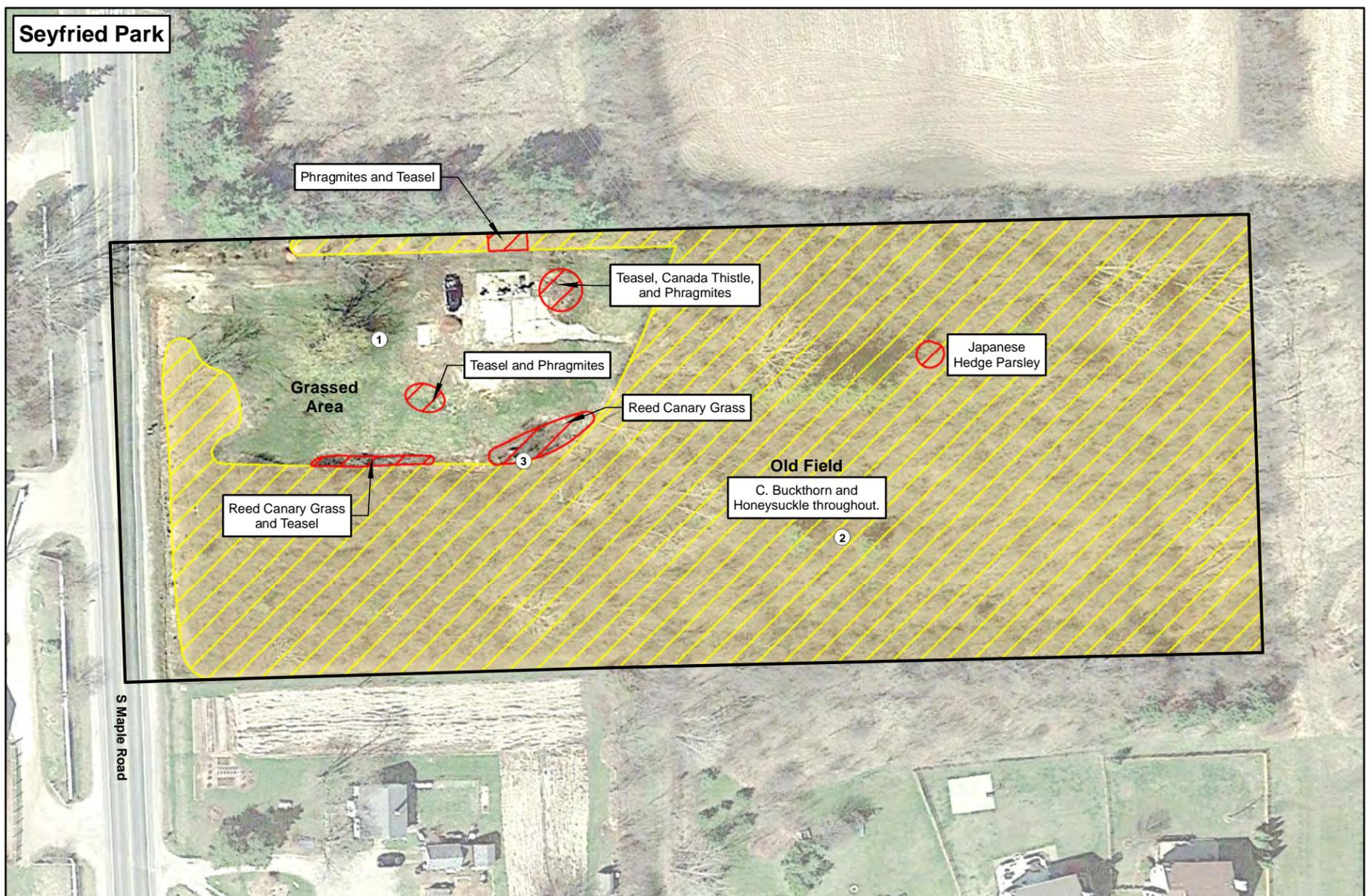
- Priority invasive species within Kirtland Hills Park are the most aggressive of those observed at this location: common teasel, and common reed. Common teasel threatens to expand rapidly in the north end of the park and near the entrance off Burnham Road. Several small patches of *Phragmites* should be treated in the near future to prevent their spread. Purple loosestrife is intermixed with both the teasel and at least one of the *Phragmites* patches and may be treated concurrently.
- Additionally, Canada thistle has taken over the wood chip area of the playground ③ and should be treated or pulled and fully removed. Caution should be taken when treating this population so that it does not adversely affect children and other individuals that use the playground equipment.

Special/Priority Areas for Management:

The particular invasive species within Kirtland Hills and their general locations are shown in Figure 13 with the highest priority locations and populations listed above.

Additional invasive species management actions for Kirtland Hills Park include the lower priorities of removal and cut-stump treatment of invasive shrubs (common buckthorn, honeysuckle, and Callery pear) near the park entrance and throughout the woods and old field areas, and hand-pulling to remove white sweet-clover.

Thistle removal in the playground and the removal of shrubs and sweet-clover are activities that could involve volunteers from the surrounding neighborhood. The park is a manageable size and the invasive shrubs are scattered enough that hand-pulling using a weed grubbing tool may be possible here. This may be tried and evaluated to determine if this method causes too much ground disturbance for surrounding native species.



Invasive Species Assessment & Management Plan

Pittsfield Township, MI



PHOTOS

Kirtland Hills and Seyfried Parks, Pittsfield Township, Michigan



Photo 1. Invasive buckthorn, honeysuckle, and Callery pear line the entrance to Kirtland Hills Park (left) and a patch of teasel and purple looserife are located along the trail on the right.



Photo 2. Some of the old field habitat along the trail near the north end of Kirtland Hills.



Photo 3. Small patches of buckthorn, Canada thistle, reed canary grass, and common reed have popped along the former house foundation at Seyfried Park.

Other:

Areas where neighbors have dumped lawn refuse near entrances at both the south and north ends of the park were observed during ASTI's site investigations. This is not only unsightly, but also carries the risk of introducing and spreading invasive species from residential lawns and landscaping. Signage may discourage such activity, but involving the neighbors in management of the park may be more effective.

5.10 SEYFRIED PARK

Park Description:

Seyfried Park is a small park located on South Maple Road just south of the Ann Arbor-Saline Road intersection. It is bordered to the north by agriculture fields and to the south by residential properties (Figure 13). Like Kirtland Hills it is a small (4-acre) park, but Seyfried Park is not a part of a neighborhood per se and appears to be a former residence and farm **1** or portion thereof.

Historically the area was identified as Beech-Sugar Maple-Basswood-Northern Red Oak mixed forest, but it appears to have been previously cleared and is now turning from old field to a stand of common buckthorn **2** with scattered box elder, eastern cottonwood, willows, and silver maple. A few Norway spruce appear to be remnants of the former homestead.

Invasive Species and Management Recommendations:

Invasive species control within Seyfried Park is not a priority across the Pittsfield Township park system as a whole, but within the park itself ASTI identified the following priorities that address small patches of invasive species within the open area of the park:

- Because the site is not wet, the common reed is not likely to spread readily. However, teasel rosettes, Canada thistle, and reed canary grass may spread across the adjacent lawn area from their current small patches at two corners of the old house foundation. Follow-up treatment may be necessary in subsequent growing seasons.
- Additional small patches of reed canary grass along the south and east edges of the clearing **3** should also be prioritized to limit their spread.
- One small patch of Japanese hedge parsley within the wooded area, just east of the clearing, should also be removed while it is small.

Special/Priority Areas for Management:

Invasive shrubs (common buckthorn and honeysuckle species) dominate approximately 80 percent of the property. Beyond the locations and species listed above, treatment of the invasive shrubs in Seyfried Park is not considered a priority. Instead, it may be conducted over time as resources and plans for this park allow.

Trail Linkage/Signage Recommendations:

There is no existing trail system in Seyfried Park. Should trails or other uses be planned or developed for this park, priorities for the park may change.

Other:

Old farming equipment and other refuse has been dumped just inside the woods east of the clearing and along the south edge of the clearing and should be removed as planning for this park proceeds. The lawn area of this park may be suitable for playground equipment. The large willow at the entrance is attractive and would provide shade for a picnic table or other amenities.

5.11 PRAIRIE PARK

Park Description:

Prairie Park is located at the intersection of Michigan Avenue/US-12 and Platt Road, behind the Pittsfield Township municipal offices. It includes a playground, picnic spots, paved and mowed walking trails, and interpretive signage. It appears to be a well known and used park, likely due to its location at the Township Hall and the site of the Pittsfield Township farmers' market, and due to its proximity to a number of neighborhoods (Figure 14).

GLO survey data indicate that approximately three-quarters of the site was historically oak-hickory forest, with the remainder having been lowland hardwood swamp. Current vegetative communities may be described as wet-mesic prairie ① or southern wet meadow with emergent marsh ② with old field ③ habitats in smaller areas. The existing prairie areas were planted but have experienced and exhibit significant disturbance and invasive species are well established.

Invasive Species and Management Recommendations:

This is a high profile park, with a great deal of potential, but that is significantly impacted by invasive species. ASTI recommends the following priority actions for Prairie Park:

- Initial invasive species treatments should focus on the two most aggressive invaders: common reed (*Phragmites*) and common teasel. Both are already well-established and will require multi-year programs to eradicate. Teasel colonies are already so established that mowing may make sense for the majority of the prairie. However, ASTI suspects that mowing of adjacent lawn and the trails through the park may be a contributing factor to the spread of teasel through the park. If mowing is employed it will need to be coupled with herbicide treatment of the basal rosettes and prior removal of existing and new seed heads.

As detailed in the plans for the Hickory Woods prairie, teasel management will take several years and an integrated approach of biomass removal (pulling, cutting seed and flower heads, burning or, possibly, mowing) along with herbicide treatments will be the most effective approach. Burning teasel does little to stem its growth in subsequent seasons and the native grass seed bank may be insufficient to out-compete the teasel; however, burning can stimulate growth of native, warm-season grasses.

If teasel patches can be removed via digging, spraying of basal rosettes, or seed head cutting this would be preferable as it leads to less spread. Mowing can then be used to remove large areas of teasel biomass for chemical treatment in the next growing season. However, the entire prairie could be mown at one time (instead of focused on patches) if this makes sense for a timeline. The exterior teasel stands that threaten to spread should be the first patches to receive chemical treatment the following year. The biomass left by mowing could

PHOTOS

Prairie Park, Pittsfield Township, Michigan



Photo 1. The prairie plantings at Prairie Park attract a variety of bird species, but those same birds help spread invasive species such as the Callery pear and common teasel shown here.



Photo 2. A view of the Pittsfield Township Hall from across the emergent marsh along the south edge of the park.



Photo 3. The stormwater swale along Platt Road on the left contains several invasive plants species: reed canary grass, teasel, Canada thistle, Callery pear, autumn olive, common buckthorn, multiflora rose, purple loosestrife and others.

PHOTOS

Prairie Park, Pittsfield Township, Michigan



Photo 4. This intersection of paths near the playground exhibits another combination of invasive species: Callery pear, reed canary grass, teasel, and Canada thistle in the foreground; common reed and narrow-leaved cattail in the background.



Photo 5. the photo at left shows the density of common teasel basal rosettes; demonstrating the difficulty in controlling this species.



Photo 6. Interpretive signage in Prairie Park explains how the prairie helps the Township reduce energy use and their carbon footprint. It will require time and resources, however, to restore the plant communities in the park to maximize habitat for native wildlife.

then be burned instead of being moved about. Again, this will encourage native grass growth and assist in the recolonization of the area. ***Caution should be taken while mowing all parts of the prairie with careful cleaning of mowers between patches of different invasive plants.***

- A similar, parallel, multi-year program to control common reed should also be employed for Prairie Park. Hand-wicking herbicide treatments may be used in small patches that are just getting established along the south boundary of the park and within the old field area, but foliar spraying, and possibly mowing, will likely be necessary in the larger stands at the center of the park.

It should be noted that narrow-leaved cattail, also an invasive species, is generally the plant that moves into an area following successful *Phragmites* control. Although this is not ideal, and the cattail may then become the focus of subsequent control efforts, it does provide more value as nesting, feeding, and cover habitat for native birds, muskrats, and other species than common reed.

- The stormwater swale along Platt Road **4** is overrun with teasel and a variety of other invasive species. This area is also noted in Figure 14 as a high priority; primarily to reduce its potential as a source of subsequent invasive species introduction and spread once control programs have begun.

Special/Priority Areas for Management:

The locations and species noted above are shown in Figure 14. Secondary priorities for Prairie Park invasive species management include treating purple loosestrife along a drainage behind the police station, treatment of reed canary grass and Canada thistle along the park trails, and removing invasive shrubs scattered throughout the old field and prairie segments of the park.

Trail Linkage/Signage Recommendations:

The park has a number of interesting interpretive signs regarding Township history and how the native plantings in Prairie Park allow the Township to reduce mowing costs and the township's carbon footprint. Additional signage might focus on the value of prairie to birds and pollinator insects.

6.0 SUMMARY

ASTI investigated eleven of Pittsfield Township's parks and preserves and developed maps and descriptions, presented above, for invasive plant species priorities within each. A total of 26 invasive plant species were found throughout the park system and nine of those were found in all but one park. The majority of these are classified as C-List Acton Species ⁷ by the Michigan Department of Natural Resources; meaning they present a moderate to high threat but that control actions are difficult due to the ubiquitous nature of these species throughout southeast Michigan. Reducing or eradicating these species within all or a high priority subset of the parks will present a daunting, multi-year challenge.

⁷ Higman, Phyllis, and Susan Campbell. 2009. Meeting the Challenge of Invasive Plants: A Framework for Action. Michigan Department of Natural Resources (MDNR), Wildlife Division, Michigan Natural Features Inventory. Lansing, Michigan.

This report provides recommended priorities for each of the 11 parks inspected, but recognizes that priorities must also be established across the park system as a whole. As such, ASTI identified the following six parks to represent the highest quality natural resources and to be focal parks for township resident visitation and usage. This prioritization also attempted to identify where invasive species control efforts conducted in the near term would address invasive plant populations that were not quite fully established, thereby preventing further spread and infestation.

ASTI's Recommendations for Highest Priority Parks:

- Hickory Woods Park
- Pittsfield Preserve
- Marshview Meadows Park
- Prairie Park
- Lillie Park
- Montibeller Park

This list of priority parks is not intended to imply that the remaining parks are not worth the Township's investment to treat and control invasive species. It simply recognizes that resources are limited and invasive species infestations will continue to grow over time. It is ASTI's opinion that attacking the highest priority concerns in these parks early-on will help limit exacerbation of these problem populations and protect high quality resources. It may be beneficial to address high priority actions in other parks before attacking moderate or lower priorities in the parks listed above.

It should be noted that It is apparent from the variety of amenities and possible activities within the parks, the number of people observed using park trails and recreation areas during our site visits, and by the comments provided by residents in the Township's master plan and parks planning surveys, that residents love and frequent the parks and that the Pittsfield Township Parks Department has succeeded in providing a variety of quality opportunities for residents to enjoy the outdoors, gather with family and friends, and participate in activities that lead to healthy lifestyles.

Having developed a number of parks and recreational opportunities for township residents, the Parks and Recreation Commission has expressed interest in expanding their role as natural resource stewards and land managers and to begin the process of controlling invasive species on park lands. The Parks Department anticipates the purchase of a large mower in 2019 and has decided to use the rough cost of that capital expenditure as the basis for budgeting invasive species efforts in subsequent years.

Differences in weather, sites access, the degree or density of invasive species infestation, the individual species and their best management practices all influence the cost of invasive species management. That said, rough cost estimates and a proposed schedule of activities are presented in Table 6.

ASTI gathered rough cost estimates for prescribed burning, cut-stump, and foliar herbicide applications from local invasive species contractors, and recent bid costs from another southeast Michigan township for shrub removal using a brushhog/mower. In total, initial

treatment of the high and moderate priority areas infested with invasive species is estimated to cost approximately \$301,000. This value does not include follow-up monitoring and treatment to ensure that initial control efforts are successful.

Information presented in Table 6 is based upon the following assumptions:

- Project costs assume that initial activities will be conducted by contractors specializing in invasive species control and management,
- Full time and seasonal Parks and Recreation staff may ultimately receive the necessary training and licensure to take over some invasive species efforts (e.g., physical removal and herbicide applications). As such, a composite hourly rate of existing full-time Parks staff has been used to estimate costs; this seems in line with expected contractual costs in the near term,
- Year 1 of the schedule focuses on invasive species control and improvements at Hickory Woods Park based upon resident and park user input,
- Subsequent schedule years are based upon the priorities identified in this report and Pittsfield Township Parks' anticipated annual budget,
- It is assumed that initial invasive species control efforts will require follow-up in subsequent years. Roughly one-third of each year's budget is allocated for follow-up inspections and herbicide treatments or other actions on sites treated the previous year.

7.0 ADDITIONAL RESOURCES

The following is a short list of manuals and other online resources that provide additional detail regarding best practices for individual invasive species:

Michigan Invasive Species website

https://www.michigan.gov/invasives/0,5664,7-324-68002_71240---,00.html

Illinois Nature Preserves Commission – Vegetation Management Manual (Illinois Department of Natural Resources)

<https://www.dnr.illinois.gov/INPC/Pages/INPCManagementGuidelines.aspx>

APPENDIX A

TABLES

Table 1. Invasive Plant Species Observed within Individual Pittsfield Township Parks and Preserves

Common Name	Scientific Name	Pittsfield	Marshview	Hickory	Montibeller	Morgan	Woolley	Kirtland	Seyfried	Count			
		Preserve	Meadows	Wall Park	Woods	Park	Lillie Park	Woods	Park		Hills	Park	Prairie Park
Amur honeysuckle	<i>Lonicera maackii</i>	√	√	√	√	√	√	√	√	√	√	√	10
Autumn olive	<i>Elaeagnus umbellata</i>	√	√	√	√	√	√	√	√	√	√	√	10
Black locust	<i>Robinia pseudoacacia</i>	√	√		√	√			√				5
Callery (Bradford) pear	<i>Pyrus calleryana</i>	√	√	√	√	√	√		√	√		√	8
Canada thistle	<i>Cirsium arvense</i>	√	√	√	√	√	√	√	√	√		√	9
Common buckthorn	<i>Rhamnus cathartica</i>	√	√	√	√	√	√	√	√	√	√	√	10
Common periwinkle*	<i>Vinca minor</i>				√								1
Common privet*	<i>Ligustrum vulgare</i>			√									1
Common reed	<i>Phragmites australis</i>	√	√	√	√	√	√	√	√	√	√	√	10
Common teasel	<i>Dipsacus fullonum</i>	√	√	√	√	√	√	√	√	√	√	√	10
Crown vetch	<i>Coronilla varia</i>				√		√						2
Glossy buckthorn	<i>Rhamnus frangula</i>	√	√	√	√	√	√	√	√	√		√	9
Japanese barberry	<i>Berberis thunbergii</i>			√		√							3
Japanese hedge parsley	<i>Torilis japonica</i>	√	√	√	√	√	√		√		√		8
Multiflora rose	<i>Rosa multiflora</i>	√	√	√	√	√	√	√	√	√	√	√	10
Narrow-leaved cattail	<i>Typha angustifolia</i>	√	√	√	√	√	√		√	√		√	8
Norway maple	<i>Acer platanoides</i>	√	√	√		√					√		5
Oriental bittersweet	<i>Celastrus orbiculata</i>					√							1
Purple loosestrife	<i>Lythrum salicaria</i>	√	√	√	√	√	√	√	√	√	√	√	10
Reed canary grass	<i>Phalaris arundinacea</i>	√	√	√	√	√	√	√	√	√	√	√	10
Scots pine	<i>Pinus sylvestris</i>					√					√		2
Spotted knapweed	<i>Centaurea maculosa</i>	√			√		√		√				4
Tartarian honeysuckle	<i>Lonicera tatarica</i>	√	√	√	√	√	√	√	√	√	√	√	10
Tree-of-Heaven	<i>Ailanthus altissima</i>	√			√								2
White sweet-clover	<i>Melilotus alba</i>	√	√		√		√		√				5
Yellow sweet-clover	<i>Melilotus officinalis</i>	√			√		√						3

Table 2. Priority Species By Park and Priority Parks for Action

		Pittsfield Preserve	Marshview Meadows	Wall Park	Hickory Woods	Montibeller Park	Lillie Park	Morgan Woods	Woolley Park	Kirtland Hills	Seyfried Park	Prairie Park	Count
Common Name	Scientific Name												
Amur honeysuckle	<i>Lonicera maackii</i>	H	M	H	H	M	M	M	M	M	M	M	10
Autumn olive	<i>Elaeagnus umbellata</i>	H	M	H	M	M	M	M	M	M	M	M	10
Black locust	<i>Robinia pseudoacacia</i>	M	H		M	M				M			5
Callery (Bradford) pear	<i>Pyrus calleryana</i>	H	M	H	M	M	M		H	M		H	8
Canada thistle	<i>Cirsium arvense</i>	H	M	M	H	H	H	M	M	H	H	M	10
Common buckthorn	<i>Rhamnus cathartica</i>	H, M	H, M	H, M	H, M	M	M	H, M	H	M	M	M	10
Common periwinkle*	<i>Vinca minor</i>					H							1
Common privet*	<i>Ligustrum vulgare</i>			M									1
Common reed	<i>Phragmites australis</i>	H	M	M	M	H	H	H	H	H	M	H	10
Common teasel	<i>Dipsacus fullonum</i>	H	H	M	H	M	H	M	M	H	H	H	10
Crown vetch	<i>Coronilla varia</i>				M		H						2
Glossy buckthorn	<i>Rhamnus frangula</i>	H, M	H, M	M		M	H, M	M	M	M		M	8
Japanese barberry	<i>Berberis thunbergii</i>	M		M		H							3
Japanese hedge parsley	<i>Torilis japonica</i>	H	H	M	M	M	M		M		M		8
Multiflora rose	<i>Rosa multiflora</i>	H	M	H	M	M	M	M	M	M	M	M	10
Narrow-leaved cattail	<i>Typha angustifolia</i>	H	H				H		H				
Norway maple	<i>Acer platanoides</i>	M	M	M		H					M		5
Oriental bittersweet	<i>Celastrus orbiculata</i>					H							1
Purple loosestrife	<i>Lythrum salicaria</i>	M	M	M	M	M	M	H	M	H	M	M	10
Reed canary grass	<i>Phalaris arundinacea</i>	M	H	M	M	H	H	H	M	M	H	M	10
Scots pine	<i>Pinus sylvestris</i>					M					M		2
Spotted knapweed	<i>Centaurea maculosa</i>	M			H		H			M			4
Tartarian honeysuckle	<i>Lonicera tatarica</i>	H	M	H	H	M	M	M	M	M	M	M	10
Tree-of-Heaven	<i>Ailanthus altissima</i>	M			M								2
White sweet-clover	<i>Melilotus alba</i>	H	M		M		M			M			5
Yellow sweet-clover	<i>Melilotus officinalis</i>	H			M		M						3

# of high priority species	14	6	6	6	7	8	4	4	4	3	3
# of medium priority species	8	12	11	13	12	11	8	10	11	10	9

**Table 3. Regional Invasive Plant List for Priority Action
Southern Lower Peninsula**

A-List Species		C-List Species (cont'd)	
Common Name	Scientific Name	Common Name	Scientific Name
Amur cork-tree	<i>Phellodendron amurense</i>	Bell's honeysuckle	<i>Lonicera X bella</i>
Black jetbead	<i>Rhodotypos scandens</i>	Black locust*	<i>Robinia pseudoacacia</i>
European frog-bit	<i>Hydrocharis morsus-ranae</i>	Canada thistle*	<i>Cirsium arvense</i>
Giant hogweed	<i>Heracleum mantegazzianum</i>	Common buckthorn*	<i>Rhamnus cathartica</i>
Hydrilla	<i>Polygonum sachalinensis</i>	Curly-leaf pondweed	<i>Potamogeton crispus</i>
Japanese stilt grass	<i>Microstegium vimineum</i>	Eurasian water milfoil	<i>Myriophyllum spicatum</i>
Kudzu	<i>Pueraria lobata</i>	Eupropean fly honeysuckle	<i>Lonicera xylosteum</i>
Norway maple*	<i>Acer platanoides</i>	Garlic mustard	<i>Alliaria petiolata</i>
Pale swallowwort	<i>Vincetoxicum rossicum</i>	Glossy buckthorn*	<i>Rhamnus frangula</i>
Black swallowwort	<i>Vincetoxicum nigrum</i>	Japanese honeysuckle	<i>Lonicera japonica</i>
Reed mannagrass	<i>Glyceria maxima</i>	Morrows honeysuckle	<i>Lonicera morrowii</i>
Water-hyacinth	<i>Eichhornia crassipes</i>	Multiflora rose*	<i>Rosa multiflora</i>
B-List Species		Oriental bitersweet*	<i>Celastrus orbiculata</i>
Common Name	Scientific Name	Purple loosestrife*	<i>Lythrum salicaria</i>
Baby's breath	<i>Gypsophila paniculatus</i>	Reed canary grass*	<i>Phalaris arundinacea</i>
Flowering rush	<i>Butomus umbellatus</i>	Common reed*	<i>Phragmites australis</i>
Japanese knotweed	<i>Polygonum cuspidatum</i>	Scots pine*	<i>Pinus sylvestris</i>
Leafy spurge	<i>Euphorbia esula</i>	Spotted knapweed*	<i>Centaurea maculosa</i>
Russian olive	<i>Elaeagnus angustifolia</i>	Tartarian honeysuckle*	<i>Lonicera tatarica</i>
Scots pine*	<i>Pinus sylvestris</i>	Tree-of-Heaven*	<i>Ailanthus altissima</i>
C-List Species		Variable-leaf watermilfoil	<i>Myriophyllum heterophyllum</i>
Common Name	Scientific Name	D-List Species	
Amur honeysuckle*	<i>Lonicera maackii</i>	Common Name	Scientific Name
Autumn olive*	<i>Elaeagnus umbellata</i>	Black alder	<i>Alnus glutinosa</i>
Japanese barberry*	<i>Berberis thunbergii</i>	European highbush cranberry	<i>Viburnum opulus</i>
		Lesser naiad	<i>Najas minor</i>

Not listed by MNFI for Priority Action	
Common Name	Scientific Name
Callery (Bradford) pear*	<i>Pyrus calleryana</i>
Common periwinkle*	<i>Vinca minor</i>
Common privet*	<i>Ligustrum vulgare</i>
Common teasel*	<i>Dipsacus fullonum</i>
Crown vetch*	<i>Coronilla varia</i>
Cutleaf teasel	<i>Dipsacus laciniatus</i>
Hybrid cattail	<i>Typha Xglauca</i>
Japanese hedge parsley*	<i>Torilis japonica</i>
Narrow-leaved cattail*	<i>Typha angustifolia</i>
Siberian elm	<i>Ulmus pumila</i>
Sweet cherry	<i>Prunus avium</i>
White sweet-clover*	<i>Melilotus alba</i>
Yellow sweet-clover*	<i>Melilotus officinalis</i>

* indicates invasive species observed in one or more Pittsfield Township Parks

Table 4. Species Specific Treatment Methods and Schedule Recommendations

	January	February	March	April	May	June	July	August	September	October	November	December
Forbs												
Woodlands												
Garlic Mustard		torch rosettes			hand pull							foliar spray rosettes
Dame's Rocket		torch rosettes			hand pull							foliar spray rosettes
Bittercress		torch rosettes			hand pull							foliar spray rosettes
Motherwort					hand pull							
Japanese Knotweed						foliar spray						
Japanese Hedge Parsley					hand pull							
Celendine Poppy					hand pull							
Lily of the Valley					foliar spray							
Golden Archangel									foliar spray			
Prairies												
Burdock			foliar spray									
Sweet Pea			foliar spray		hand pull							
Spotted Knapweed			foliar spray		hand pull							
Crown Vetch					foliar spray							
Yellow Sweet Clover							hand pull					
White Sweet Clover							hand pull					
Mullein					foliar spray		hand pull					
Teasel					foliar spray							foliar spray rosettes
Wetlands												
Reed Canary Grass			foliar spray				glove application			foliar spray		
Purple Loosestrife							glove application	cut seeds				
Canada Thistle							glove application					
Narrow-Leaved Cattail							glove application					
Phragmites							glove application					
Woody Plants												
Shrubs												
Common Buckthorn		cut and treat		foliar spray								cut and treat
Glossy Buckthorn		cut and treat										cut and treat
Japanese Honeysuckle		cut and treat										cut and treat
Autumn Olive		cut and treat										cut and treat
Privet		cut and treat										cut and treat
Multiflora Rose		cut and treat										cut and treat
Japanese Barberry		cut and treat										cut and treat
Burning Bush/Winged Wahoo		cut and treat										cut and treat
Trees												
Tree of Heaven		basal bark										basal bark
Norway Maple	drill and fill											drill and fill
Black Locust		basal bark										basal bark
Black Alder		cut and treat										cut and treat
Vines/Groundcovers												
Oriental Bittersweet		cut and treat				foliar spray			foliar spray			
Vinca						foliar spray						
English Ivy						foliar spray						
Golden Archangel									foliar spray			

cut and treat	foliar spray	basal bark	glove treatment	drill and fill
glyphosate 26.9% triclopyr 22.2 %	glyphosate 2-5% triclopyr 2-5% Glypho 2.5% + Imazapyr 1%	triclopyr 13.6%	glyphosate 2%	glyphosate 26.9% triclopyr 22.2%

Table 6. Proposed Schedule and Budget for Recommended Invasive Species Control

Park Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Hickory Woods Park										
Treat high priority areas & burn larger prairie (east 1/2 of park)	\$4,100									
Control shrubs and burn oak woods, treat/burn moderate priority areas		\$8,200								
Repeat burn(s) on 3-5 year cycle					\$12,300					\$12,300
Pittsfield Preserve (North I & II)										
Treat high priority areas in farm fields and prairie areas		\$ 9,000								
Treat high priority areas in woods and forested wetland edges		\$39,200								
Treat moderate priority areas in farm fields and prairie areas			\$4,600							
Treat moderate priority areas in woods and forested wetland edges			\$8,300							
Marshview Meadows Park										
Hand-wick and/or foliar Herbicide application in southern wet meadow		\$1,500								
Cut-stump treatment of view at buttonbush overlook		\$800								
Cut-stump, hand-pulling, drill & fill, and foliar spray treatments in remaining high priority areas		\$200								
Cut-stump treatments in moderate priority areas			\$8,500	\$34,100						
Prairie Park										
Foliar spray, cut-stump, and hand-pulling in priority areas		\$4,300								
Burn larger wet-mesic prairie			\$1,600				\$1,600			
Remove buckthorn in moderate priority areas (cut-stump herbicide)				\$4,700						
Lillie Park										
Mow and spray high priority areas (some hand-pulling)		\$2,900								
Cut-stump herbicide treatments in moderate priority areas				\$7,100	\$33,700	\$4,600	\$3,700			
Montibeller Park										
Foliar spray of <i>Phragmites</i> areas (possible hand-wicking in northern wet meadow area)		\$1,700								
Cut-stump and foliar spraying in remaining high & moderate priority areas						\$36,000				
Morgan Woods										
Cut-stump and foliar herbicide treatments in high priority areas (mowing may be possible along forest edge)			\$13,300							
Cut stump and hand-pulling in moderate and monitoring areas						\$1,300				
Wall Park										
Cut-stump treatments and burn old field			\$2,300							
Cut-stump, foliar spray, and hand-pulling in high priority areas			\$900							
Cut-stump treatments moderate priority and monitoring areas						\$4,100	\$14,000			
Pittsfield Preserve North III & South										
Cut-stump treatments in high priority areas			\$1,300							
Cut-stump treatments in moderate priority and monitoring areas							\$26,700	\$20,700		
Woolley Park										
Mowing, cut-stump, & foliar spray in high priority areas			\$3,200							
Mowing, cut-stump, & foliar spray in moderate priority areas								\$7,100		
Kirtland Hills Park										
Hand-pull, cut-stump treatments, and/or foliar treatments in high priority areas			\$100							
Monitor and cut-stump treatments in monitoring areas								\$300		
Seyfried Park										
Hand-pull and foliar treatments in high priority areas				\$100						
Monitor and cut-stump treatments in monitoring areas								\$200		
<i>Reserve for Follow-up on Prior Year(s) Treatments</i>		\$ 2,100	\$ 24,000	\$ 24,000	\$ 24,000	\$ 24,000	\$ 24,000	\$ 24,000	\$ 24,000	\$ 24,000
Annual Totals	\$4,100	\$69,900	\$68,100	\$70,000	\$70,000	\$70,000	\$70,000	\$52,300	\$24,000	\$36,300

APPENDIX B

INVASIVE SPECIES TREATMENT METHODS BY SPECIES

Appendix X: Recommended Management Practices for Invasive Species

Herbaceous invasives

Canada thistle

- Mowing is effective for removal of biomass, but is not recommended after seed set as this may spread seed further
- Foliar application of Aquaneat (Glyphosate) to rosettes and mature plants is recommended applied per label instructions
 - 2% by active ingredient is typical

Crown vetch

- Foliar application of Garlon 3A (Triclopyr) from mid-summer to early fall per label instructions
 - 2% by active ingredient is typical

Japanese hedge parsley

- Mechanical removal (pulling) in early summer

Narrow-leaved cattail

- Handwick application of Aquaneat in patchy populations in mid-late summer per label instructions
- Foliar application of dense stands in mid-late summer
 - 2-4% by active ingredient is typical

Phragmites

- Handwick application of Aquaneat in patchy populations in mid-late summer per label instructions
- Foliar application of dense stands in mid-late summer
 - 2-4% by active ingredient is typical

Reed canary grass

- Handwick satellite populations or in areas where overspray is a concern
- Foliar application of Aquaneat before seed set (spring to mid-summer)
 - 2% by active ingredient is typical for either method

Spotted knapweed

- Mechanical removal in early summer

Teasel

- Herbicide throughout the growing season
 - Rosettes in spring and again in summer, pre-flower in summer
 - Foliar application of Aquaneat is recommended applied per label instructions
 - 2% by active ingredient is typical

- Cut flower heads upon bloom (late summer, early fall) or remove whole plant by digging
- Mowing is effective for removal of biomass, but is not recommended after seed set as this may spread seed further

White and Yellow sweet clover

- Mechanical removal in early summer

Woody invasives

Autumn olive

- Cut/stump application of Aquaneat is effective any time of year except during sap flow in spring
- More time consuming, but less overspray. Better on satellite populations or in areas where overspray is a great concern
 - 1:1 ratio of herbicide to water is recommended
- Foliar application of herbicide (4%) is also effective but will result in overspray to non-target species. If non-target species are of no concern (e.g. large stands of shrubs and nothing else) foliar application may be most effective

Black alder

- Cut/stump application of Aquaneat is effective any time of year except during sap flow in spring
- More time consuming, but less overspray. Better on satellite populations or in areas where overspray is a great concern
 - 1:1 ratio of herbicide to water is recommended
- Foliar application of herbicide (4%) is also effective but will result in overspray to non-target species. If non-target species are of no concern (e.g. large stands of shrubs and nothing else) foliar application may be most effective

Black locust

- Basal bark with Pathfinder II (Triclopyr) any time of year
 - Ready-mixed formula is available at 13.6%

Common and glossy buckthorn

- Cut/stump application of Aquaneat is effective any time of year except during sap flow in spring
 - More time consuming, but less overspray. Better on satellite populations or in areas where overspray is a great concern
 - 1:1 ratio of herbicide to water is recommended
- Foliar application of herbicide (4%) is also effective but will result in overspray to non-target species. If non-target species are of no concern (e.g. large stands of shrubs and nothing else) foliar application may be most effective

Honeysuckle

- Cut/stump application of Aquaneat is effective any time of year except during sap flow in spring
 - More time consuming, but less overspray. Better on satellite populations or in areas where overspray is a great concern
 - 1:1 ratio of herbicide to water is recommended
- Foliar application of herbicide (4%) is also effective but will result in overspray to non-target species. If non-target species are of no concern (e.g. large stands of shrubs and nothing else) foliar application may be most effective

Japanese barberry

- Mechanical removal of smaller patches may be effective and should be done before berries develop
- Foliar application of either Aquaneat or Garlon 3A per label instructions from later spring to early fall is also effective; better choice for larger patches and areas where overspray is not an issue
 - 2-4% by active ingredient is typical

Multiflora rose

- Foliar application of Garlon 3A (Triclopyr) from mid-summer to early fall per label instructions
 - 4% by active ingredient is typical
- Cut/stump treatment with Aquaneat is also possible in areas where infestation is not large or where water is a concern
 - 1:1 ratio of herbicide to water is recommended
- If growing season has passed or larger individuals are found basal bark application of Pathfinder II is effective

Oriental bittersweet

- Foliar application of Garlon 3A from mid-summer to early fall (before plant yellows) per label instructions
 - 4% by active ingredient is typical
- If growing season has passed or larger individuals are found basal bark application of Pathfinder II is effective

Privet

- Cut/stump application of Aquaneat is effective any time of year except during sap flow in spring
- More time consuming, but less overspray. Better on satellite populations or in areas where overspray is a great concern
 - 1:1 ratio of herbicide to water is recommended
- Foliar application of herbicide (4%) is also effective but will result in overspray to non-target species. If non-target species are of no concern (e.g. large stands of shrubs and nothing else) foliar application may be most effective

Purple loosestrife

- Handwick application of Aquaneat per label instructions
 - 2% is typical

Tree-of-Heaven

- Basal bark with Pathfinder II any time of year

Other management comments:

Controlled burning may help top-kill woody invasives. However, it will exacerbate the growth of oriental bittersweet, so control of those plants pre-burning is essential. Controlled burning is highly recommended in prairies of all types (i.e. upland or wet prairies) and in woodlands where oak litter is prevalent. Burning can occur in either the fall or spring, however, it seems woodland burning is more effective in late fall (November) and prairie burning in later spring (late April-May) once grasses have dried out. Controlled burns should ideally not be carried out every year, rather, every three or so years as needed to allow fuel to reestablish.

Damaging (e.g. cutting, pulling, etc.) of black locust or tree-of-heaven will result in the plant sending out suckers to repopulate the area. It is essential that these plants are only treated by basal bark methods.

Basal bark methods can be utilized on any woody invasive and could be a way to treat after the growing season has ended, where cut/stump is not viable or during sap flow. Pathfinder II is effective for any of these species.

ASTI ENVIRONMENTAL
ENVIRONMENTAL INVESTIGATION, REMEDIATION, COMPLIANCE AND
RESTORATION PROJECTS THROUGHOUT THE GREAT LAKES SINCE 1985.

OUR SERVICES INCLUDE:

- **ASBESTOS, LEAD, MOLD, AND RADON ASSESSMENTS**
- **BROWNFIELD/GREYFIELD REDEVELOPMENT ASSISTANCE**
- **DEVELOPMENT INCENTIVES AND GRANT MANAGEMENT**
- **ECOLOGICAL ASSESSMENTS AND RESTORATION**
- **ENVIRONMENTAL ASSESSMENTS AND IMPACT STATEMENTS**
- **ENVIRONMENTAL OPPORTUNITIES ASSESSMENT**
- **GIS MAPPING**
- **HAZARD MITIGATION PLANNING**
- **MINING AND RECLAMATION ASSISTANCE**
- **REMEDIATION IMPLEMENTATION, OPERATION AND MAINTENANCE**
- **PHASE I ESA AND ENVIRONMENTAL DUE DILIGENCE ASSESSMENTS**
- **REGULATORY COMPLIANCE AND PERMITTING**
- **SOIL AND GROUNDWATER ASSESSMENTS**
- **SOIL AND GROUNDWATER REMEDIATION**
- **STORAGE TANK COMPLIANCE AND CLOSURE**
- **THREATENED AND ENDANGERED SPECIES SURVEYS**
- **WATERSHED AND STORMWATER MANAGEMENT PROGRAMS**
- **WETLAND DELINEATION, PERMITTING, MITIGATION AND BANKING**