



**AGENDA**  
CHARTER TOWNSHIP OF MERIDIAN  
LAND PRESERVATION ADVISORY BOARD  
REGULAR MEETING  
Wednesday October 11, 2023 6:00 pm  
Lake Lansing North Preserve  
1000 Wild Ginger Trail, Haslett MI 48840

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1. CALL MEETING TO ORDER
2. PUBLIC COMMENT
3. APPROVE AGENDA
  - A. October 11, 2023
4. APPROVE MINUTES
  - A. September 13, 2023
5. COMMUNICATIONS
  - A. Board member term limits
  - B. Red Cedar River Stewardship Pledge
6. DISCUSSION ITEMS
  - A. Stewardship Goals for 2024
    - a. Will be discussed at the November 8 board meeting, please bring your suggestions and input with you at this time
  - B. Lake Lansing North Preserve Stewardship Initiatives
    - a. Stewardship work happening at Lake Lansing North is the foundation of how we would like to stewardship implemented at all preserves in the future
7. REPORTS
  - A. STAFF REPORT: Stewardship Coordinator, Emma Campbell
    - a. Update on current preservation projects & issues
      - i. Cornell-Sweetwood Update
      - ii. Update on preservation signage
      - iii. Lake Lansing South Preserve
  - B. ENVIRONMENTAL COMMISSION REPORT: Board Member, Kendra Grasseschi
  - C. PARK COMMISSION REPORT: Board Member, Mark Stephens
8. PUBLIC COMMENT
9. OTHER MATTERS AND BOARD MEMBERS' COMMENTS
10. ANNOUNCEMENTS
  - A. Next Land Preservation Advisory Board Meeting: Wednesday, November 8, 2023 at 6 pm at the Meridian Township Service Center, 2100 Gaylord C. Smith Court, Haslett Michigan 48840.
11. ADJOURNMENT

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Individuals with disabilities requiring auxiliary aids or services should contact the Meridian Township Land Preservation Advisory Board by contacting: Director LuAnn Maisner, 5151 Marsh Road, Okemos, MI 48864 or 517.853.4600 - Ten Day Notice is Required.

Meeting Location: 1000 Wild Ginger Trail, Haslett, MI 48840

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CHARTER TOWNSHIP OF MERIDIAN  
LAND PRESERVATION ADVISORY BOARD REGULAR MEETING MINUTES  
Central Park Pavilion  
5151 Marsh Road | Okemos, MI  
Wednesday, September 13, 2023, 6 PM

PRESENT: Board Members: Steve Thomas, Kris Parnell, Mark Stephens, Jamie Hiller.  
ABSENT: Yu Man Lee, Kendra Grassesschi, & Kathy Fay  
STAFF: Emma Campbell, Stewardship Coordinator  
TOWNSHIP: Courtney Wisinski.

1. CALL MEETING TO ORDER

Chair Hiller called the meeting to order at 6:05 pm.

2. PUBLIC COMMENT

A. None.

3. APPROVE AGENDA

A. September 13, 2023

**Commissioner Stephens moved to approve the September 13, 2023 Agenda to place on file. Board member Parnell seconded.**

**Voice vote: unanimous.**

4. APPROVE MINUTES

A. June 14, 2023

Chair Hiller offers an amendment to the September 13, 2023 minutes, Item 6.A, correcting 'Water Quality' within the Climate Sustainability plan to 'Water Management'.

**Commissioner Stephens makes a motion to place the June 14, 2023 minutes on file as amended. Vice Chair Thomas seconded.**

**Voice vote: Unanimous.**

5. COMMUNICATIONS

A. Deer Management Season 2023

- a. Management Season starts October 1, 2023 and goes until January 1, 2024
- b. 44 Township properties and 27 private properties will be managed
- c. 67 volunteer hunters from the Township have been registered with the program for 2023. They have all completed mandatory training, safety inspections, and a proficiency test
- d. 300 Deer Management Assistant Permits (DMAPs) have been approved by the Michigan Department of Natural Resources

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**Trustee Wisinski moved to place Deer Management Season 2023 on file as communicated. Vice chair Thomas seconded.**

### 6. DISCUSSION ITEMS

- A. Red Cedar Glen Preserve Overview & Stewardship Plan
  - a. Briefing of stewardship in Red Cedar Glen Preserve
  - b. Signage development and installation for no bikes on side trails. Bikes are only allowed on the main white trail. Red Cedar Glen is the only Township preserve that allows bikes, but only on a specific trail for safe passage.
    - i. Signage for sensitive areas that have deer trails, but run parallel to established trails
    - ii. Adding verbiage to “No Bikes Allowed” trail signage
    - iii. Add white trail posts for white trail at RCG
  - c. Ember Oaks subdivision/Schroeder contract erosion and drainage area inquiry by Commissioner Stephens.
    - i. Is there any residual maintenance to perform? Staff member Campbell will look into shared files to follow up.
- B. Board meeting locations for fall 2023
  - a. October meeting location at Lake Lansing North Preserve to discuss stewardship goals (1000 Wild Ginger Trail in Okemos).
  - b. November meeting location at Township Service Center (2100 Gaylord C. Smith Court in Haslett).

### 7. REPORTS

- A. STAFF REPORT: Stewardship Coordinator, Emma Campbell
  - a. Update on current preservation projects & issues
    - i. Cornell-Sweetwood Update
    - ii. Preserve rule signage: signs are now delivered and parks utility workers are adding preserve signs throughout the summer
    - iii. Lake Lansing South Preserve Mowing Policy
      - 1. Mowing from neighbors continues on the preserve
      - 2. Stewardship plans will move forward, managing invasive teasel
      - 3. 1442 Haslett Road parcel delineation is still under legal review
    - iv. Fall Stewardship 2023
      - 1. Volunteer numbers are on the rise, working with more school groups, MSU collaborations are back!
      - 2. Fantastic Fungi walk
      - 3. Contractual management and spending of funds
    - v. Deer Management 2023
      - 1. Overview of program for 2023
      - 2. MSU Tick and Deer Research
- B. ENVIRONMENTAL COMMISSION REPORT: Board Member, Kendra Grassesschi
  - a. Commissioner Grassesschi is absent.
- C. PARK COMMISSION REPORT: Board Member, Mark Stephens
  - a. Commissioner Stephens: E bikes will be discussed at next meeting and the

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information brought to a Land Preservation Advisory Board meeting. This is of interest to both the Parks Commission and Land Preservation Advisory Board as e-bike use increases in parks and preserves.

9. PUBLIC COMMENT

A. None.

10. OTHER MATTERS AND BOARD MEMBERS' COMMENTS

A. Trustee Wisinski will be meeting to discuss term limits for LPAB members.

B. The land acquisition process is under review by the Township Board.

11. ANNOUNCEMENTS

A. Next Land Preservation Advisory Board Meeting: Wednesday, October 11, 2023 at 6 pm at Lake Lansing North Preserve, 1000 Wild Ginger Trail, Haslett, MI 48840.

12. ADJOURNMENT

Board member Parnell moves to adjourn the meeting. Trustee Wisinski seconded.

**Chair Hiller adjourned the meeting at 7:22 pm.**



## Description of Management Activities for Township Parks & Preserves

### 1. Invasive Species Removal and Monitoring

- a. The invasive species management plan is outlined in a separate Township document. Management activities include mechanical removal of herbaceous species throughout the spring, summer and fall. Chemical treatments are conducted throughout the summer and fall months by licensed staff and trained volunteers (this includes foliar, basal, and cut-stump treatment).
- b. Priority species include: oriental bittersweet, common/glossy buckthorn, invasive phragmites, Japanese knotweed, reed canary grass, Japanese hedge parsley, field thistle, spotted knapweed, autumn olive, and honeysuckle.
- c. Properties currently undergoing active invasive species management include: Nancy Moore Park, Harris Nature Center, Eastgate Park, Legg Park, Hartrick Park, Hillbrook Park, Ted Black Woods, Brattin Woods Park, Lake Lansing North Preserve, Davis-Foster Preserve, Foster-Crouse Preserve, Towar Woods Preserve, Lake Lansing South Preserve, Central Meridian Uplands, Sower Woods Preserve, Tihart-Cornell Wetland Preserve, Southwest Meridian Uplands & Serafine Preserve, Red Cedar Glen Preserve, Forest Grove Preserve, North Ridge Preserve, Tihart Preserve, Ponderosa Preserve.

### 2. Establishment & Restoration of Native Plant Communities

- a. As priority invasive species are removed, native plant communities will re-establish themselves naturally in areas where diversity and resilience is high. Township properties such as Red Cedar Glen Preserve, & Ted Black Woods Park have a historic seed bank that is extremely diverse. Areas like these will thrive with the removal of invasive species. Other areas such as Tihart Preserve have been farmed for many years, and need more intentional plantings of native seed and transplants. Intentional plantings are done utilizing native seed collected from parks and preserves where we believe populations are historically remnant in the area. Using these populations will enhance the local genetic diversity of the native plant population in the Township. If we deem that a population is remnant (not planted) seed will be collected by volunteers and used in two ways.
  - i. Certain species of seed will be sent to local native plant nurseries (Wildtype, Designs By Nature, Feral Flora) to be grown and transplanted back into suitable parks and preserves. Species selected will be of the rare type, or a large quantity of species deemed suitable for several properties. All activities are coordinated through the Meridian Conservation Corps for volunteer opportunities. These properties are mapped, inventoried and monitored to evaluate species success, planting techniques, soil quality, resilience, and long-term management.
  - ii. Other species from seed collected will be processed and sowed as seed during spring or fall in suitable sites. These properties are mapped,

inventoried and monitored to evaluate species success, planting techniques, soil quality, resilience, and long-term management.

- b. Properties currently undergoing active establishment or restoration of native plant communities include: Nancy Moore Park, Sower Woods Preserve, Lake Lansing North Preserve, Davis-Foster Preserve, Red Cedar Glen Preserve, Serafine Preserve, Southwest Uplands Preserve, Legg Park, Lake Lansing South Preserve, Harris Nature Center, Hartrick Park, Towar Woods Preserve, Brattin Woods Park, Red Cedar Natural Area, Tihart Preserve, & Ponderosa Preserve

### **3. Species Inventory**

- a. Species inventory is an important management tool to prioritize areas of high importance and ecological value that need management now. Inventories also guide management decisions, funding and resource allocation. Currently all properties are under inventory at different levels of detail. Inventory is taken during field visits (Land Stewardship Coordinator, Stewardship Intern), during volunteer events, and through individual volunteers. Species lists are ever changing, as species are added, and include insects, fungi, plants, and wildlife.

### **4. Oak Management**

- a. Due to the diverse array of organisms that oaks support, they have been identified as a priority species in the Township. Certain preserves and parks are being managed to support oaks species. Management activities include: prescribed fire, tree caging & monitoring, planting oak seeds and transplants, forest understory management to promote more sunlight. We have been working with the MSU Forestry Department and local ecologists to develop our plan for the restoration of oak systems.
- b. Oak management is currently happening at the following Township properties: Davis-Foster Preserve, Red Cedar Glen Preserve, Lake Lansing North Preserve, Tihart Preserve & Ponderosa Preserve

### **5. Prescribed Fire**

- a. Prescribed fire is used for invasive species management, restoration of oak species and other fire dependent species, and nutrient cycling.
- b. It is currently used at the following Township properties: Davis-Foster Preserve, Red Cedar Glen Preserve & Lake Lansing North Preserve.
  - i. Future properties for prescribed fire management: Tihart Preserve, Ted Black Woods, Legg Park, Harris Nature Center.

### **6. Deer Management**

- a. The Meridian Township Deer Management Program is in its 11<sup>th</sup> year and is an integral part of conserving native communities in our natural areas, as well as keeping the local deer herd as healthy as possible. The program runs from October 1<sup>st</sup> to January 1<sup>st</sup> of each year and is archery hunting only. It is a community program made up of 67 resident volunteers.

## **Description of Volunteer Activities**

1. All volunteer activities since 2020 have been orchestrated through the Township's program, the Meridian Conservation Corps (MCC). This organization has been formed around the idea that volunteer stewards will be the ones to turn the tide of conservation in the Township for future generations. With the volume of natural area and green space

to enact stewardship upon, volunteers are essential to meeting the goals of the Master Stewardship Plan

2. Various activities are planned and completed through the MCC, but community stewardship opportunities are also created through wants and needs of community members and local groups. The following occur on an annual, to monthly, to bi-weekly basis:
  - a. **Invasive Species Strike Team:** about 30% of the work completed through community stewardship is invasive species removal at priority sites throughout Township parks and preserves. The MCC's Invasive Species Strike Team, is a corps group of volunteers that have undergone training and hands on field identification and removal in order to create a larger network of invasive species management. New volunteers are continually recruited and trained as interest arises.
    - i. Removal of invasive species happens all year long and is often an activity at the bi-weekly Stewardship Saturdays, which are every other Saturday from 9:30 am to 12 pm.
  - b. **Cleanup Crew:** about 15% of volunteer work is contributed to litter pickup. Litter and improper disposal of items in parks and preserves is a huge source of pollution in the Township. In an effort to focus on wetland education and stewardship, wetland cleanups at local preserves have been a core element to this stewardship. Efforts are also based on residential complaints received, often certain areas along major roadways in the Township.
  - c. **Forest Watch:** this program offers a more passive form of volunteer stewardship aimed toward those community members who enjoy using the trails, and can log their daily observations to notify us of trail maintenance, local species inventory, as well as daily happenings at the parks and preserves. Volunteers can fill out a form for data collection through an application on their phone or computer.
  - d. **Planting a Native Meridian:** about 40% of volunteer work is contributed to our native plant program. This program focuses on the establishment of native plant populations throughout the Township. Volunteers are given the opportunity to learn about the benefits of native species and the effect that invasive species have on the sharp decline of these populations. In the spring seeds and transplants are intentionally planted at various parks and preserves. This process educates the community on native plant identification, as well as growing conditions and the restoration of historic ecosystems. In the late-summer/fall season gears are shifted toward seed collection, processing and dispersal. This is a wonderful opportunity for volunteers to understand the full extent of these natural processes.
    - i. This program will continue to expand to grow seed collected from the Township in an established greenhouse in addition to sending them to native nurseries in the area. The greenhouse will also serve as a hub for native plant workshops and offer other valuable volunteer opportunities.

The goal is to increase the square footage of native plants in the Township as well as the importance of these species and their recovery in our natural areas.

- e. **Vernal Pool Patrol:** Meridian Township is a proud partner of the Vernal Pool Project, a statewide program focused on the inventory and data collection of vernal pools throughout Michigan. This information is important in the future of vernal pool management as well as future protections afforded to these small wetlands. Participants go through rigorous training on how to identify, monitor, and care for vernal pools. Each volunteer can choose areas to monitor in the Township through the online mapping application. Once they have chosen their sites, they head out in the field three times a year to collect data and determine the health and status of the pool.

## Meridian Township

### Stewardship Efforts at Lake Lansing North Preserve

2020 – 2023



#### **Prescribed Burn Program**

28 acres of the conservation easement has been designated for 3 prescribed burns; the first in 2014, one in spring of 2021, and a planned burn for fall of 2023. This is the only site that has received consistent burning within the conservation easement to our knowledge.

- Location: (1000 Wild Ginger Trailhead) within the bounds of the orange trail, as well as the area to the south of the orange trail up to the wetland edge and to the right of way directly to the east
- A floristic survey is currently being developed to study the flora present at all prescribed burn sites, Lake Lansing North Preserve included.
  - The first survey is planned for fall of 2023. Spring, summer, and fall surveys will be conducted annually to gather information on the success of prescribed burns.
  - Areas outside of the burn units will be surveyed as well as a control site.

#### **Native Plant Restoration | Planting a Native Meridian Program**

Native seed collection, sowing of native seeds, and transplanting first year plants was started in 2021 in order to grow and nurture remnant populations within the Township. All seeds are collected locally from what is believed to be remnant native populations. Plant species can be uncommon to rare, with very small and scattered populations present in one to a few locations on Township land. Some of the plants are more common and are also given to homeowners for use in their yards. Areas that are seeded or planted are ecological valuable areas, and/or being heavily managed for invasive species.

June 18, 2022

- Location: North side of main trail, about halfway down from the trailhead; areas marked with flags
- Plant species: all transplants planted have been grown from native seed collected from remnant populations located within Lake Lansing North Preserve as well as other locations within the Township parks and preserves.
  - *Solidago hispida* (hairy goldenrod); 37 plants total
  - *Solidago speciosa* (showy goldenrod); 37 plants total
  - *Asclepias exaltata* (poke milkweed); 21 plants total
  - *Eutrochium maculatum* (Joe pye weed); 38 plants total
  - *Symphyotrichum laeve* (smooth blue aster); 12 plants total

November 11, 2022

- Location: Southern & Northern plots off main trail, about halfway down from the trailhead; areas marked with flags
- Plant species: all transplants planted have been grown from native seed collected from remnant populations located within Lake Lansing North Preserve. These remnant populations are currently small and scattered in the preserve.
  - *Taenidia integerrima* (yellow pimpernel); 6 plants total
  - *Helianthemum canadense* (common frostweed); 7 plants total
  - *Desmodium rotundifolium* (round-leaved tick trefoil); 38 plants total
  - *Lespedeza hirta* (hairy bush-clover); 21 plants total

June 8, 2023

- Location: Southern & Northern plots off main trail, about halfway down from the trailhead; areas marked with flags
- Plant species: all transplants planted have been grown from native seed collected from remnant populations located within Lake Lansing North Preserve as well as other locations within the Township parks and preserves.
  - *Symphytotrichum laeve* (smooth blue aster); 38 plants total
  - *Solidago speciosa* (showy goldenrod); 38 plants total
  - *Erigeron pulchellus* (robin's plantain); 76 plants total

### **Invasive Removal & Management**

The Meridian Conservation Corps has spent several workdays removing invasive species from the conservation easement in LLNP. Most of the work has been concentrated in prescribed burn areas where higher diversity & density of native plant species is observed.

Invasive species removed:

- Autumn Olive (hand pulled and/or cut stump treatment)
- Japanese hedge parsley (hand pulled)
- Sweet woodruff (patches mapped and treated with herbicide in 2020 by a volunteer steward; treatments by staff will resume in 2023-2024)
- Multiflora rose (hand pulled and/or cut stump treatment)
- Broadleaf helleborine (hand dug up)
- Japanese barberry (cut stump treatment and/or hand pulled)

### **Vernal Pool Patrol**

Lake Lansing North Preserve has several verified vernal pools present that are studied and utilized to train Vernal Pool Patrol volunteers.

Fairy shrimp are abundant in these pools, and native vegetation such as skunk cabbage, cinnamon ferns and yellow lady's slipper are found in these areas. Blue spotted salamanders are abundant and have been observed breeding. Four toed salamanders and Blanding's turtles have also been observed in both 2021 and 2022 in the area surrounding the pools.

# • LAKE LANSING PARK NORTH 120 ACRE ACQUISITION •

## INGHAM COUNTY PARKS & MERIDIAN TOWNSHIP LAND PRESERVATION ADVISORY BOARD STEWARDSHIP PLAN

*(Draft, Approved by LPAB – January 17, 2012)*

### **Executive Summary**

Ingham County Parks acquired this 120 acre natural area in October 2010 through a combination of Michigan Natural Resources Trust Fund, Meridian Township Land Preservation Advisory Board, community philanthropy, and Ingham County funds. Meridian Township Land Preservation Advisory Board included a Conservation Easement along with its contribution to the purchase, in order to conserve the natural values of the land. The goal of this document is to address how conservation of its natural features can be advanced, given what we know about the land. The property forms an approximate triangle surrounding the Trails at Lake Lansing neighborhood, on the east side of E. Lake Drive. Since the mid-1980's, the trails on this land have been constructed and maintained as part of the Ingham County Parks Lake Lansing Park North (also known as North Park) trail system by agreement with the previous owner, HDI Builders. The trails are used for nature viewing, walking, running and cross-country skiing. Stewardship activities to inventory native species, map, monitor, and control invasive species, and restore native habitats have been ongoing through a community-based volunteer program with Ingham County Parks and Mid-Michigan Stewardship Initiative. Management of the 120 acre acquisition is integrated with stewardship of the adjacent 440 acres in North Park and the neighboring properties owned by Meridian Township (Transfer Station and Spengler Marsh), as well as privately owned property south of the Grand Trunk Railroad and along E. Lake Drive.

### **Introduction**

The Land Preservation program aims to preserve and enhance the Township's natural heritage, natural resources, and open space for current and future generations. This 120 acre acquisition presents a unique situation in that the land is owned and managed by Ingham County Parks. The county park system shares the aim of conserving Lake Lansing Park North's natural features while maintaining low-impact trail use, and continuing to build community educational and volunteer programs and research projects that enhance our understanding, conservation, and appreciation of nature.

Ingham County Parks and the Mid-Michigan Stewardship Initiative have drafted this stewardship plan based on site visits and ongoing technical recommendations from the following professional ecologists, botanists, wildlife biologists, and land stewards:

*Christopher Reidy, State Biologist for the Natural Resources Conservation Service.* Chris is an expert in botany and native fauna. He guides statewide USDA projects involving hydrologic and native plant restoration of former farmlands.

*Christopher May, Director of Stewardship for The Nature Conservancy, Michigan.* Chris oversees the stewardship of the 35,000 acres of natural areas owned and managed by The Nature Conservancy in Michigan, including extensive wetland holdings. We also benefit from his experience in overseeing volunteer land steward efforts and his advice on effective techniques for invasive species control.

*Steve Thomas, Conservation Associate in Ecology, Michigan Natural Features Inventory.* Steve is an ecologist who performs wetland assessments and botanical inventories, and previously worked with Chicago Wilderness in prescribed burns and ecological restoration. Steve has identified several woodland and vernal pool sites at North Park as high-quality natural areas.

*Doug Landis, Professor of Entomology at Michigan State University.* Doug's research is aimed at natural area restoration to support diverse insect and wildlife communities. He has consulted on high-priority areas in North Park for prescribed burns, prairie restoration, and canopy-opening in the woodlands, as well as identifying areas that have undergone changes in land use.

*Additional consultants:*

*Members of the Meridian Township Land Preservation Advisory Board.* Board members performed a site visit in summer 2008 and identified some invasive species control priorities, as well as the high-quality natural features of the land, resulting in its acquisition.

*Lisa Brush, Executive Director of the Stewardship Network.* Lisa oversees this public-private partnership in natural areas stewardship and invasive species control across Michigan and Indiana and is an expert in community networking.

*David Mindell, Owner, PlantWise Native Landscape and Ecological Restoration.* David is a forest ecologist and natural area restoration and prescribed ecological burn expert. He has provided valuable advice on prairie and woodland restoration.

*Bill Schneider, Owner Wildtype Native Plant Nursery and Ecological Services.* Bill is an expert in native plant propagation and restoration, including in wetlands. His crew works on restoration projects throughout Michigan.

*Daniel Kennedy, Wildlife Biologist, Department of Natural Resources.* Dan has provided guidance in deer management planning.

*Phyllis Higman, Senior Conservation Scientist, Michigan Natural Features Inventory.* Phyllis is an expert in botany and native plant communities and invasive species early detection and rapid response, with a focus on wetland species.

*Vernon Stephens, Wildlife Division, Michigan Department of Natural Resources.* Vern is a leader in the Mid-Michigan Stewardship invasive species control partnership with MSU. He also advises on techniques for invasive species control, and collaborates on prairie restoration and native plant propagation at North Park.

*Susan Tangora, Wildlife Division, Department of Natural Resources.* Sue coordinates the development of shared goals and projects in invasive species control across multiple agencies in Michigan, including the Mid-Michigan Stewardship/Ingham County Parks *Phragmites* control project in the Lake Lansing watershed.

*Kit Rich and Kati Adams, Park Naturalists at Harris Nature Center.* Kit and Kati have participated in educational programming and interpretive walks, and Mid-Michigan Stewardship's regional invasive species control effort.

*Justin Schlanser, DVM, Zoological Medicine Resident, MSU and Potter Park Zoo.* In spring and summer, 2010, Justin carried out herpetological research (to establish baseline xenobiotic and parasite levels in turtles) in North Park and provided data on turtle species and locations.

*Jason Martina and Professor Steven Hamilton, Kellogg Biological Station, MSU.* They are completing a multi-year study of nutrient cycling in *Phragmites* colonies in North Park.

*Richard Merritt, University Distinguished Professor of Entomology, MSU.* Rich and his graduate student, Michael Higgins, carried out a multi-year study of invertebrate/nutrient relationships in seasonal ponds in North Park.

*David Ewert, Ornithologist, The Nature Conservancy.* Dave is an international expert on migratory songbirds and has provided 10 years of detailed bird observations (species and counts) for North Park. He identified deer-browsing and fire-suppression as causes of shifting tree species in North Park, as well as indicating conifer habitats favored by the park's less common songbirds.

## **Site Description**

*Area:* 120 acres

*Location:* East of E. Lake Drive, surrounding the Trails at Lake Lansing neighborhood, north of the Grand Trunk Railroad and Meridian Township Recycling Center, and south of the intersection of Oakpark Trail with East Lake Drive, in sections 1 and 2, Meridian Charter Township, Michigan. See Figure 1.

*Parcel I.D. numbers:* 33-02-02-01-326-003, 33-02-02-01-375-001, 33-02-02-01-351-003, 33-02-02-02-476-007

## **Adjacent Properties and Land Use**

The property surrounds the Trails at Lake Lansing neighborhood to the west. It is bounded on the north and east by wetlands and woodlands in North Park, and on the south by marshes and ponds belonging to Meridian Township, the Trustees of the Blanchard Estate, and the Country Place neighborhood. Its hydrology is closely connected with that of Lake Lansing, into which its wetlands drain.

## Natural Communities

Of the 500 acres classified in Lake Lansing North Park, 61.7% are forested, the majority of which is natural woodland. The remaining forested acres consist of tree plantations or other cultural (human-modified) sites. Wetlands comprise 46.7% of the surveyed area, the majority of which is southern wet meadow (16.3%), dominated by the sedges *Carex lacustris* and *Carex stricta* or southern shrub-carr (14.5%), which is dominated by willows (*Salix* spp.) and dogwood (*Cornus* spp). Although representing only 1.1% of the total acreage of the park, the rich tamarack swamp and adjacent shrub-carr near the southern boundary of the 120 acre acquisition (Figure 2) host several species not found elsewhere in the park including leatherleaf (*Chamaedaphne calyculata*), showy lady's slipper (*Cypripedium reginae*), smooth white violet (*Viola macloskeyi* ssp. *pallens*) and small green wood orchid (*Platanthera clavellata*). Uplands are primarily a combination of dry and dry-mesic southern forest, dominated by black oak (*Quercus velutina*) and Penn sedge (*Carex pensylvanica*). See the Michigan Natural Feature Inventory natural community type definitions at <http://web4.msue.msu.edu/mnfi/index.cfm>. Their natural community entries for dry and dry-mesic southern forest state the following on biodiversity conservation:

*“Fire is the single most significant factor in preserving oak ecosystems. The use of prescribed fire is an imperative management tool for promoting oak regeneration, deterring the succession of shade-tolerant species, and reducing the encroachment by invasive shrubs such as honeysuckles and autumn olive. Fire management should be orchestrated in conjunction with the management of fire-dependent communities such as oak barrens, dry sand prairie, prairie fen, and coastal plain marsh. Many current dry-mesic southern forests are degraded oak openings that have been long deprived of fire. Open canopy conditions can be restored by mechanical thinning or girdling. Restored sites will need to be maintained by periodic prescribed fire and may require investment in native plant seeding where seed and plant banks are inadequate. Herbicide application to stumps is likely necessary where woody invasive species or red maple are well established.*

*Monitoring and control efforts to detect and remove invasive species are critical to the long-term viability of dry southern forest.”*

## Rare Plants

From March 2010 through October 2011, a vascular plant inventory project was undertaken at Lake Lansing Park North by Christopher Reidy, State Biologist for the Natural Resources Conservation Service. Chris follows in the footsteps of the father of American horticulture, Liberty Hyde Bailey, Professor at MSU from 1885-88, who collected plants extensively in the Lake Lansing area, particularly in the area that is now North Park. When given the opportunity to host a visit by the preeminent biologist Alfred Russel Wallace (co-founder of the theory of evolution, along with Charles Darwin), Bailey “went out with my old gray mare and the buggy all day with Alfred Russell Wallace, wandering through the fields; we went out to Pine Lake in Michigan, ten miles away, which is now Lake Lansing.”

The comprehensive botanical information Chris Reidy has collected in the past two years is being used to document existing conditions, including species diversity and natural community types. Specimens of each (non-threatened or endangered) plant have been deposited in the MSU

Herbarium, and a manuscript on the observations is being prepared for publication. A total of 660 species/subspecies of vascular plants in 104 families have been documented, as summarized in Appendix 2. Of these species, 78% are native and 22% are introduced. 98 are county records (first record of occurrence), 2 are state records, one is state threatened (*Carex trichocarpa*), one is state endangered (*Hypericum sphaerocarpum*), and one was believed to have been extirpated in Michigan (*Eleocharis radicans*). Five orchid species have been identified, and 56 species of sedges (genus *Carex*). Dry southern forests commonly occupy the park's knolls, while its lowlands contain a mosaic of southern hardwood swamp, shrub-carr and wet meadow.

At the end of the first year of the botanical survey, Chris Reidy calculated the Floristic Quality Index (FQI) for Lake Lansing Park North based on the habitat specificity and species diversity. Both Swink and Wilhelm (Flora of the Chicago Region) and Herman et al. (Floristic Quality Assessment for Michigan) indicate that most sites register FQI scores < 20. If the FQI is >35, the site is noteworthy from a statewide perspective. Sites with an FQI >50 are extremely rare and are of significant importance statewide. Looking only at the native species, North Park has an FQI of 84. Even including the non-natives found, the FQI value is 76. Thus, the sheer number of species at the park makes it a hotspot of biodiversity in the state. Previous work by Alan Fryday (Assistant Curator of the MSU Herbarium) and colleagues identified more than 60 species of lichens in the park, which also supports its great biodiversity.

## **Invasive Plants**

As with most natural areas near human settlements, Lake Lansing Park North is also endowed with a diversity of invasive species. For the southern 120 acres, the most widespread and problematic for its ecological health are autumn olive (*Elaeagnus umbellata*), Japanese barberry (still commonly planted in nearby gardens; *Berberis thunbergii*) and a combination of narrowleaf and hybrid cattail (*Typha angustifolia* and *Typha X glauca*). There are small (< ¼ acre) patches of invasive common reed (*Phragmites australis*) on Township property near the tamarack swamp, and a more extensive infestation of *Phragmites* on adjacent properties south of the railroad tracks. Common and glossy buckthorn (*Rhamnus cathartica* and *Frangula alnus*) are found sporadically on the 120 acres. The second largest Japanese knotweed (*Polygonum cuspidatum*) colony in the Lake Lansing watershed is found at the northwest corner of the property, along East Lake Drive. Localized infestations of garlic mustard (*Alliaria petiolata*) and ground ivy (*Glechoma hederacea*) occur along the northern and eastern boundaries of the Trails at Lake Lansing neighborhood with the park. Private landowners have been highly cooperative in garlic mustard control, and its extent has significantly decreased over a four-year period. Reed canary grass (*Phalaris arundinacea*) is becoming widespread in the sedge meadows in North Park and throughout the wetlands of Mid-Michigan. Due to its extent, this species likely will require biological control, similar to the *Galerucella* beetles that were tested by Doug Landis (MSU entomologist) and colleagues in Lake Lansing Park North and which eventually brought purple loosestrife under control. An emerging invasive species along the trail system is Japanese hedge parsley (*Torilis japonica*), resembling Queen Anne's lace (*Daucus carota*), which spreads aggressively by attachment of its Velcro-like seeds to walkers and wildlife. The locations or contours of these and 20 other exotic species in North Park have been mapped by Ingham County Parks and Mid-Michigan Stewardship using GPS. This location data is stored

overlaid with aerial photographs and trail locations (Figure 3) in Lake Lansing Park North in the publically available Google Maps system at <http://g.co/maps/3kdjy>.

Management of invasive species will be aided significantly by the experience Mid-Michigan Stewardship Initiative and Ingham County Parks have in tackling autumn olive, barberry, Phragmites, Japanese knotweed, and garlic mustard infestations in North Park. Nine acres of heavy autumn olive infestation have been cleared to date, and the foci of the autumn olive infestation as well as satellite areas are well characterized (see contours for this species at <http://g.co/maps/3kdjy>). Barberry is more uniformly spread and is being treated alongside autumn olive. The same is true for garlic mustard and Phragmites, for which Mid-Michigan Stewardship leads regional campaigns each year. In 2011, 20,000 pounds of garlic mustard were pulled through the Stewardship Network effort in Mid-Michigan, and 35 infested acres of Phragmites and 2 acres of Japanese knotweed were treated and/or mowed. This involved mapping, treating, and monitoring 66 sites spread across thousands of acres, as well as documenting and applying for Ingham County Road Commission and Department of Environmental Quality aquatic nuisance treatment permits. Forty landowners cooperated with Mid-Michigan Stewardship in the Phragmites/knotweed control program this year, along with Ingham County Parks, Meridian Township, MSU, and the Lake Lansing Watershed Advisory Committee, which contributed financial support. Six volunteers worked a total of 270 hours on the Phragmites control project, with similar staff commitment by Ingham County Parks. On a yearly basis, the park's stewardship program engages more than 300 different volunteers from the community, and these volunteers contributed 2630 hours in the field in 2010. The stewardship program is designed to teach volunteers about nature at each restoration outing, as well as engage them in invasive species identification and control. Additional education is done via project-related signage developed for the park and seasonally changing informational displays on the stewardship kiosk at the Sandhill trailhead. The Lake Lansing Watershed Phragmites project was viewed by DEQ and MNFI to be such a success that the Great Lakes Commission's Symposium on *Phragmites Invasions in Michigan: Building Capacity for Management* selected Lake Lansing Park North for its educational field trip in March. The local project team presented its progress on botanical inventorying and wetland restoration, distinguishing native from invasive Phragmites, and effective Phragmites control techniques.

### **Water Features, Wetlands, and Floodplains**

The property includes a matrix of wetland types, as shown in Figure 2: hardwood swamp, southern shrub-carr, southern wet meadow, and rich tamarack swamp. Five glacial kettle depressions occur in a series just south of the blue trail, imbedded within the belt of dry-mesic southern forest. They are seasonally inundated and likely to host interesting invertebrate species. An invertebrate study on a nearby seasonally inundated hardwood swamp along Wild Ginger Trail was the basis for a Ph.D. thesis by Michael Higgins, working with Richard Merritt at MSU.

There are two excavated ponds on the property. One is found between the street called Oakpark Trail and the North Park's blue trail. It apparently was dug during the development of the Trails at Lake Lansing neighborhood, perhaps associated with nearby wetland filling along Oakpark Trail and Wild Ginger Trail in the late 1980's or early 1990's. A second small excavated pond is found next to a utility pole by the railroad tracks and tamarack swamp. It provides habitat for green herons, spatterdock (*Nuphar*), and arrowhead (*Sagittaria*).

The hydrology of these wetlands in relation to Lake Lansing is beginning to be understood. Water on the southern 120 acres comes primarily from the south, with heavy flow northward via culverts under the railroad tracks during spring rains. The water then flows west through Township marshes and along a small ditch adjacent to a residence on the west side of Lake Drive (formerly the site of a stream, according to long-time residents), where it enters Lake Lansing. Other water entering the tamarack swamp area flows to the northeast, where it enters a swale just east of the blue/orange trail intersection, then flows through the central southern wet meadow and enters the lake primarily through the Clawson drain. Groundwater flow is also a major factor in this area, evidenced by both the plant types (seep-associated species like skunk cabbage) and seasonal fluctuations in the kettle ponds, which are groundwater fed. The tamarack swamp is one of the most unique and sensitive habitats in the park, and changes in water levels (and their causes) are thus important to monitor.

## **Wildlife**

Michigan Natural Feature Inventory records indicate that rare (state special concern, threatened or endangered species) species such as Blanchard's cricket frog, least shrew, barrens buckmoth, woodland vole, and king rail have been identified in the area. Chris Reidy observed territorial (nesting-related) behavior of the state special concern marsh wren in the southern wet meadow immediately north of the 120 acre acquisition. Sandhill cranes use several areas of the park for nesting and are commonly seen and heard. Blandings' turtle (special concern) sightings are also common, with at least five observations in the past two years in diverse reaches of the park. Snapping turtles breed in North Park, and the 2010 turtle study by Dr. Justin Schlanser established that painted turtles are also common, while Chris Reidy has observed musk turtle. A number of higher-quality wetlands in the park are nurseries for wood frogs, spring peepers, and chorus frogs, with green frogs, leopard frogs, and American toads also common in the area. David Ewert noted that two uncommon bird species, blue-winged warblers and kinglets, frequent the tree plantations east of the 120 acres. Barred and great horned owls have also been noted in that area by Chris Reidy and Leslie Kuhn. Wild turkeys are common, especially in the northern reaches of the park. Coyote packs are sporadically heard near the residential areas, and dens of coyotes and foxes are found in several areas. White-tailed deer are highly abundant (frequently observed in herds of 5-15 individuals) and heavily browse the park's herbaceous plants and saplings, with the result that deer-resistant ferns and sedges dominant the woodland understory. Deer bedding areas are seen everywhere among the cattails and *Phragmites* colonies in the park. Muskrat lodges are common in the western part of North Park. In fact, the marshlands south of the railroad tracks were used as a muskrat farm in the 1930's.

## **Notable Trees**

In the 1800's before heavy logging occurred, the eastern shores of Lake Lansing were once the home for the most substantial white pine forest in Ingham County. Remnant giant white pines are found in North Park, and a goal in the coming year is to compile GPS records of these Big Tree locations so they can be adequately protected. A 4' diameter swamp white oak, likely 300 years old (nicknamed "Ma Bailey", since she certainly was here when Bailey performed his surveys), has been found near the eastern junction of the blue and orange trails. Chris Reidy has

also found what could be the largest serviceberry tree in the state, near the northern boundary of North Park.

### **Soils Information**

A soil map from the Natural Resources Conservation Service (NRCS) is available (Figure 4), and its soil type boundaries largely align with natural communities boundaries (Figure 2). Professor Randy Schaetzl of MSU Department of Geography has expressed interest in having his graduate students perform a detailed soil survey of North Park that would provide new insights and clarify regions where the NRCS soil boundaries do not align well with changes in plant communities. Another gain from such new data, which would include soil drainage, would be to provide more specific guidance on native plant choices when restoring areas that had been heavily infested with invasive species.

### **Topographic Map Information**

The USGS topological map for this area is shown in Figure 5, emphasizing the east-west sandy ridge along the blue trail which is 10-20' higher than the surrounding wetlands. This ridge is directly in line with Wild Ginger Trail. Historically, together the two formed Hardy Road, one of early roads in the area.

### **Structures**

No structures exist on the land, except for a fire hydrant placed halfway along the southern leg of the blue trail, dating from the 1970-80's.

### **Trash or Potentially Hazardous Conditions**

There is little trash in the area. However, metal debris from previous land uses, including rusted wire fencing in several sections on either side of the blue trail, a large steel gate (at the eastern blue/orange trail junction), and car parts and deer stands (concentrated on the southern peninsula; see Figure 3) are found. Their locations are noted in the Google Maps system (<http://g.co/maps/3kdjy>). Removal of these items would enhance safety and esthetics.

### **Parcel History**

The lake area was settled by Native Americans and then early Europeans. Copies of deeds for the land going back to 1837 indicate that the central 120 acres directly east of Sunset Cove (see Figure 3) were first purchased from the U.S. government by Henry Cleveland. Farming and timber operations were carried out between the east side of the lake and Green Road, encompassing parts of what is now North Park. Conifer plantations now existing on the east side of the park were established by a more recent owner, Walter Price, in the mid-20<sup>th</sup> century. Harvesting of Christmas trees from that area by the daughters of the next owners, John & Florence Snell, raised enough money to put them through college in the 1960's. The tan brick farmhouse that still stands on Green Road just north of the railroad (tucked into the southeast corner of North Park) is one of the earliest significant residences in the Haslett area. The land's

history includes other colorful episodes. In the late 1870's, when the central part of North Park was Smith Farm, Liberty Hyde Bailey spent so much time collecting plants there that he ended up marrying the Smith's daughter, Annetta. She was also a student at Michigan Agricultural College (now MSU). The southern peninsula of the 120 acres, which is now remarkable for its relatively open woods (characteristic of woodlands in the 1800's and before, when fire was a natural part of the environment), was used around the 1960's as a site for drag racing. Occasional car parts can be found in that area. Historic aerial photos are available from as early as 1938, giving us a sense of how the landscape has changed. The main differences between 1938 and 2011 (Figures 6 and 3, respectively) are the construction of the Trails at Lake Lansing neighborhood, reforestation of adjacent areas that had been cleared for farming, and excavation of ponds just south of the railroad tracks.

### **Easements and Restrictions**

The Land Preservation Advisory Board has a conservation easement on the property, and the present stewardship plan is intended to provide more detailed guidance on how the property can best be conserved. Additional easements on the property involve a Consumers Energy (and possibly DTE) power line corridor that runs along the southern edge of the property, parallel to the railroad tracks. Meridian Township's Land Management Coordinator, Jane Greenway, is researching those easements and ways in which they affect the land's management and trail connections. Canadian National Railroad owns a narrow strip of land along the railroad tracks, possibly encompassing the two-track road that was formerly the Interurban Railway bed, which links the blue trail (near the junction with the green and orange trails) to the trail along the southern peninsula on the acquired 120 acres (see Figure 3).

### **Historic or Pre-settlement Condition**

Historically most of the 120 acre area is likely to have been oak-hickory forest and hardwood swamp, according to the Michigan Natural Features Inventory (MNFI; Figure 7). However, the MNFI map is a coarse scale interpretation and does not include the known historical prevalence of mature upland pine along the east shore of Lake Lansing in the mid-1800's. Based on the current presence of many forb species that are characteristic of barrens, Chris Reidy believes that parts of the 120 acres may have been black oak barrens historically. He will assess this further by studying tree age distribution. Current conditions reflect both similarities and differences with historical conditions. In uplands, oaks are still dominant and hickory is present, but red maple and black cherry dominate the younger trees, likely due to fire suppression. The recently common ash trees in the area have succumbed to emerald ash borer, but there remain diverse species in the understory, including serviceberry, sassafras, witch hazel, and occasional ironwood and spicebush. MNFI's historical land cover map shows the wetlands to have been mixed conifer swamp (Figure 7), consistent with the current remnant of rich tamarack swamp in the same area. The surrounding wetlands are now primarily shrub-carr (likely the product of wet meadows and tamarack swamps undergoing fire suppression). The small wetland region assessed by MNFI historically to be wet prairie is clearly now wet meadow.

## Management Opportunities and Recommendations

- Monitor and control invasive species, focusing on Phragmites, autumn olive, garlic mustard, Japanese knotweed, barberry, hedge parsley, and ground ivy. Early detection and rapid response to new invasive species should continue. The goals are to steadily decrease the burden of well-established invasive species, eradicate newly emerging invasive species before they become established, and widely inform and engage the public in addressing these species on their own.
- Manage the park deer population. Establish a deer management plan and ongoing managed hunt that reduces the level of deer browsing and restores the ability of diverse plants (not only deer-repellent species) in the understory to thrive and reproduce. Education should be a major part of this, as neighborhood gardening and wildlife-feeding practices contribute to the deer problem.
- Design and install (ideally with neighborhood participation) a native plant, deer-resistant garden at the neighborhood trail entrance to the 120 acres, including interpretive signage. This is near the intersection of Woodwind Trail and Wild Ginger Trail in the Trails at Lake Lansing neighborhood (see Figure 3).
- Conduct prescribed ecological burns to promote health of the forests and other natural communities. Fire was a traditional part of the landscape that is essential to the health of oak woodlands (see Natural Communities section, above), and aids in keeping the tree canopy open. The open canopy transmits light needed by native forbs, shrubs, and tree seedlings in the understory. In addition, fire tends to reduce woody invasive shrubs and shift the equilibrium in favor of native plants. Burns also stimulate the growth of native plants by activating seeds and making nutrients available. Burns are recommended during the fall or spring dormant season, or roughly from October through April, depending upon weather and current management goals. The three highest-quality areas for prescribed burns with readily definable burn perimeters have been identified by the park's scientific advisors (Doug Landis, Chris Reidy, Steve Thomas, and David Mindell) and are shown in Figure 8.
- Selectively harvest trees in densely overgrown and non-native areas to increase woodland biodiversity.
- Restore wetlands with native plants in areas in which Phragmites infestation has been controlled (reduced to 1% coverage or less). According to Bill Schneider and Chris Reidy, in the absence of removing Phragmites thatch by burning, and reseedling if the native plant seed bank proves insufficient, the cleared areas may be quickly invaded by non-native cattails or reed canary grass. The Oakpark Trail *Phragmites* site is expected to be cleared of *Phragmites* and ready for restoration in 2013. This would first involve a prescribed burn in fall 2013 or the following early spring to remove the heavy Phragmites thatch in that area.
- Enhance the native plant diversity of the dry prairie-like uplands under the Consumers power lines by collecting and propagating native plant seeds at the site (see Figure 3).
- Continue to address potential human and wildlife safety issues:
  - Prune branches overhanging the trails so they are low and flat to the ground to avoid potential injuries.

- Remove wire fencing, deer stands, and metal and glass debris when a trail vehicle becomes available in 2012. A number of debris locations are already marked at <http://g.co/maps/3kdjy>
- Address trail erosion/tripping hazards by installing sandbars made of natural materials (e.g., logs; see Figure 9) in steeper areas through the pine plantations
- Evaluate whether inexpensive curb modifications along wetlands in the Trails at Lake Lansing neighborhood could reduce Blandings' turtle mortality. This occurs when turtles enter the road then cannot crawl over the high curbs and are hit by cars.
- Design and place occasional interpretive signs and directional trail markers to enhance community appreciation of the land's natural features
- Enhance the two-track trail on the southern peninsula, which is currently brushy or muddy in some areas, by installing boardwalks where needed to traverse wet areas and cross a ditch between the southern peninsula trail and the two-track road that parallels the railroad. (See Figure 3)
- Construct a wooden wetland overlook (similar to that at the north end of the blue trail, about 0.5 mile south of Sandhill Shelter) with interpretive signage on the southern peninsula (Figure 3) to enhance visitors' understanding of the importance of wetlands for wildlife habitat and water quality.
- Once Phragmites infestations are substantially under control, address narrowleaf/hybrid cattail infested areas near the tamarack swamp and in the shrub-carr region at the southern and northwestern corners of the property.
- Continue community ecological education and engagement through invasive species removal/native plant restoration outings led by Ingham County Parks and Mid-Michigan Stewardship. Also continue hosting community-oriented stewardship workshops and presentations centered on the park's natural features.
- Construct a pedestrian gate at the Woodwind Trail neighborhood entrance, similar to those in MSU natural areas, to discourage bicyclists and other wheeled vehicles from entering the trails. Bicycling is disallowed but still occurs, increasing erosion problems and the spread of invasive seeds such as hedge parsley and garlic mustard. Include a gate that allows occasional entrance by a trail vehicle (e.g., Gator) for maintenance.
- Place a second stewardship information kiosk near the neighborhood trail entrance, since many who enter the trails there walk locally, and do not have a chance to see the information at the Sandhill Shelter trail entrance.
- Continue to work with adjacent property owners to ensure they recognize invasive species and other threats to their natural areas, and help them address those problems.

### **Acceptable Uses of Property**

- Walking, running, cross-country skiing
- Wildlife viewing and nature study
- Research that supports the natural value of the land (e.g., wildlife and plant inventories; DNA analysis to assess possible phragmites hybridization; soil surveys; hydrologic modeling; controlled comparison of efficacy of different invasive species treatments)
- Dog walking with leashes when trails are not in use for skiing
- Managed hunting for deer population management, [as approved by the owner, Ingham County Parks](#)

- Seed collection or plant division for use in native plant restoration on-site, under the supervision of Ingham County Parks
- Plant voucher specimen collection for deposit in the MSU Herbarium collection, for non-threatened/endangered species.
- Invasive species removal
- Photography

### **Unacceptable Uses of Property**

- Bicycling or wheeled/motorized vehicles, except for park maintenance vehicles designed for trail use
- Removal of plants or animals
- Off-leash pets
- Camping, except when approved by the owner, Ingham County Parks, as part of an organized educational activity (e.g., Girl Scouts)
- Trapping and fishing
- Horseback riding
- Campfires
- Construction of forts, tree houses, etc.
- Construction or maintenance of hunting stands or blinds
- Earth-moving/grading, adding fill, paving, or constructing permanent structures
- Dumping of trash or debris

### **Scope and Cost of Recommendations**

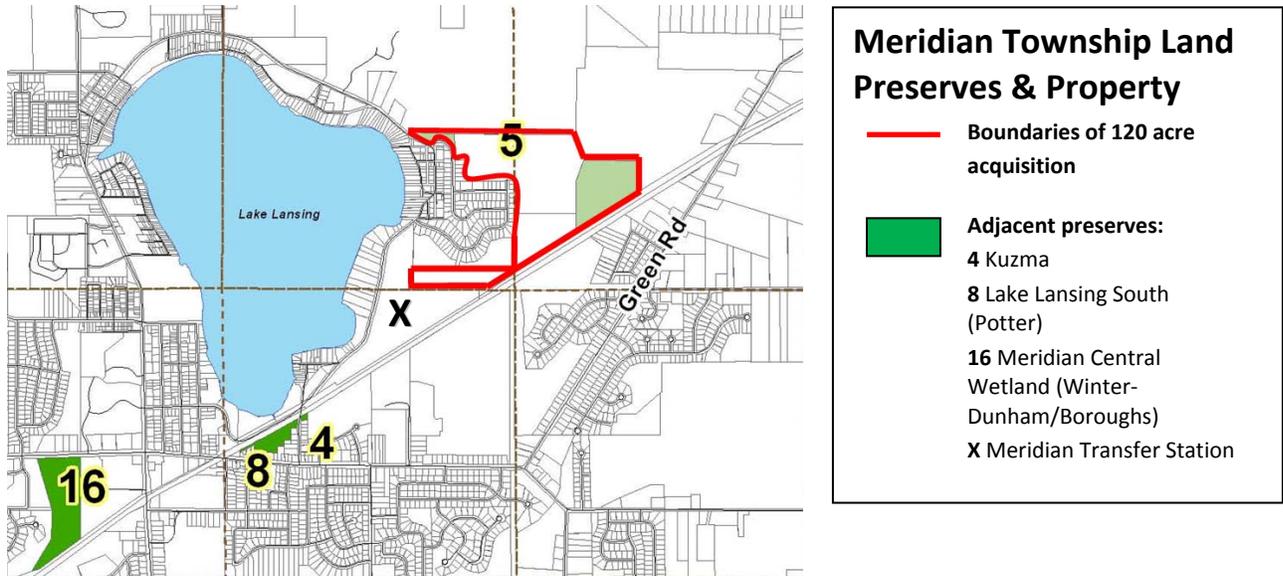
Here, ICP indicates Ingham County Parks, whereas LPAB indicates the Meridian Township Land Preservation Advisory Board.

- ICP: trail maintenance, trash removal (several times a week) and debris removal.
- ICP: southern trail enhancement and interpretive signage, boardwalk and wetland overlook construction
- ICP: deer-resistant native-plant garden and interpretive signage design & installation
- ICP: invasive species monitoring and mapping; native species monitoring and mapping
- ICP: establishing partnerships on natural area conservation and restoration with neighboring landowners
- ICP: engaging and educating the community via restoration outings, workshops, presentations, flyers and informational signage
- ICP: supporting the cost of prescribed burning and partnering with Vern Stephens of the DNR on a prairie installation demonstration project sited near the center of the northern leg of the blue trail (see Figure 3)
- ICP: preparing sites for all four prescribed burns (anticipated to take one week of 2 staff members' labor, clearing leaves from the trails and around deadwood to create burn perimeters)
- Meridian Twp: constructing pedestrian-friendly bicycle exclusion gate at neighborhood entrance

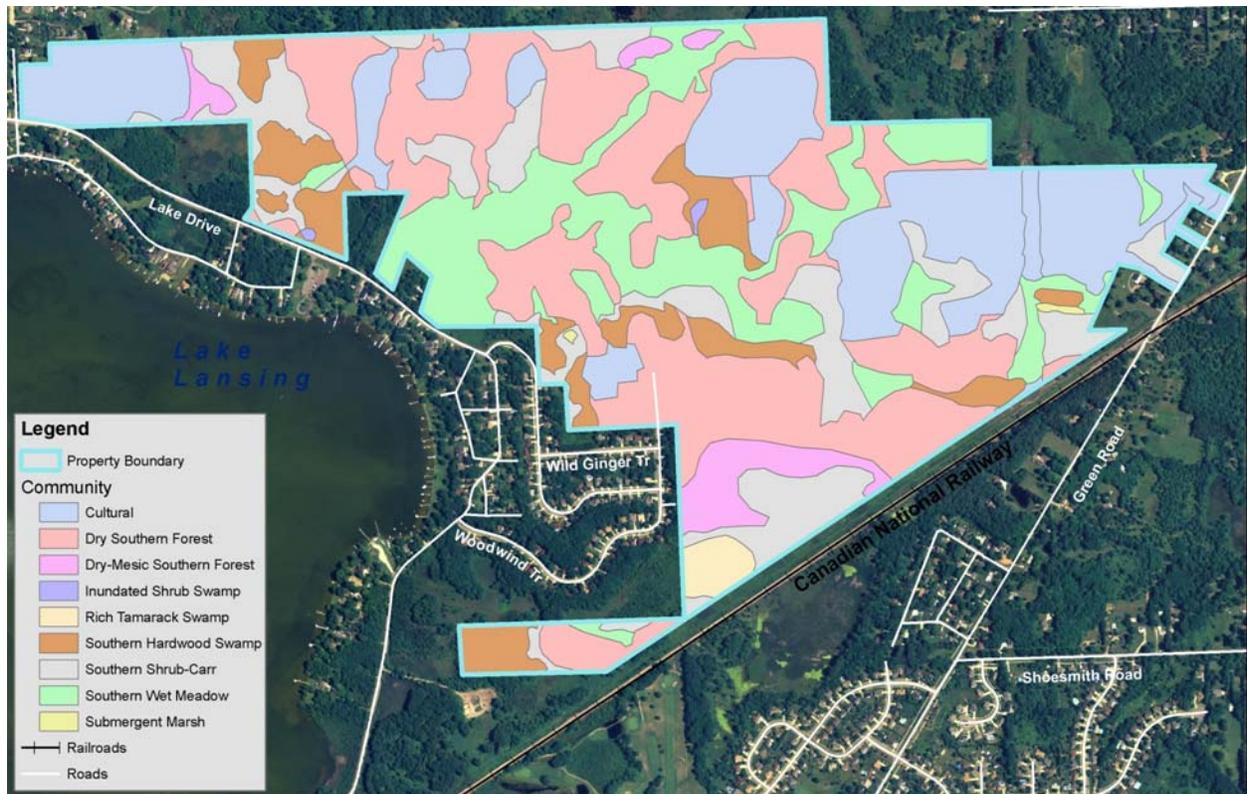
- Meridian Twp: supporting prescribed burns at sites 1-3 for two successive years, followed by evaluation of the ecological effects on those sites. Cost: \$5990 in year 1. It is suggested that we pre-commit to the recommended second-year burns, which will guarantee the same cost in year 2. This price reflects a 35% discount over the cost of doing the burns individually and covers almost 30 acres in area. See Appendix 3.
- Meridian Twp: supporting restoration of the previously Phragmites infested Oakpark pond area in 2013. A prescribed burn of that area to remove thatch would likely cost \$1,000, based on an existing quote for a similar area.

**Appendix 4 provides site photographs**

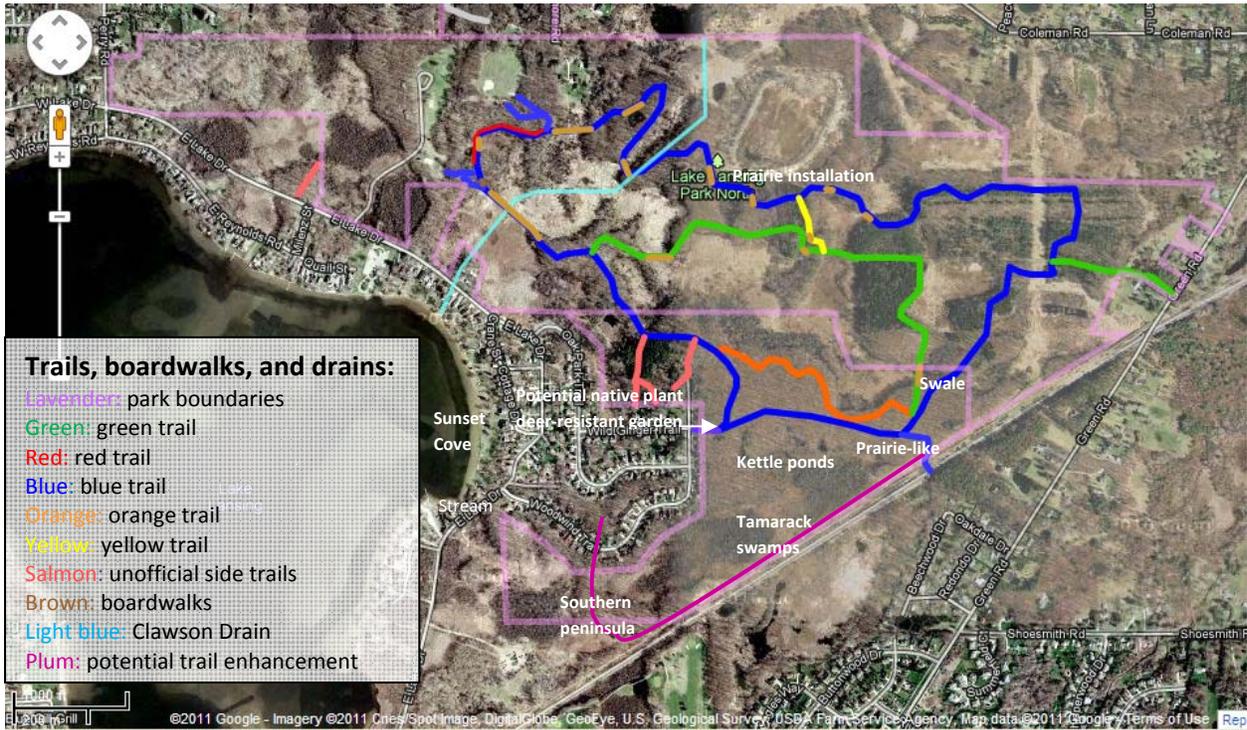
**Figure 1. Relationship of 120 acre acquisition to other Meridian Township properties.**



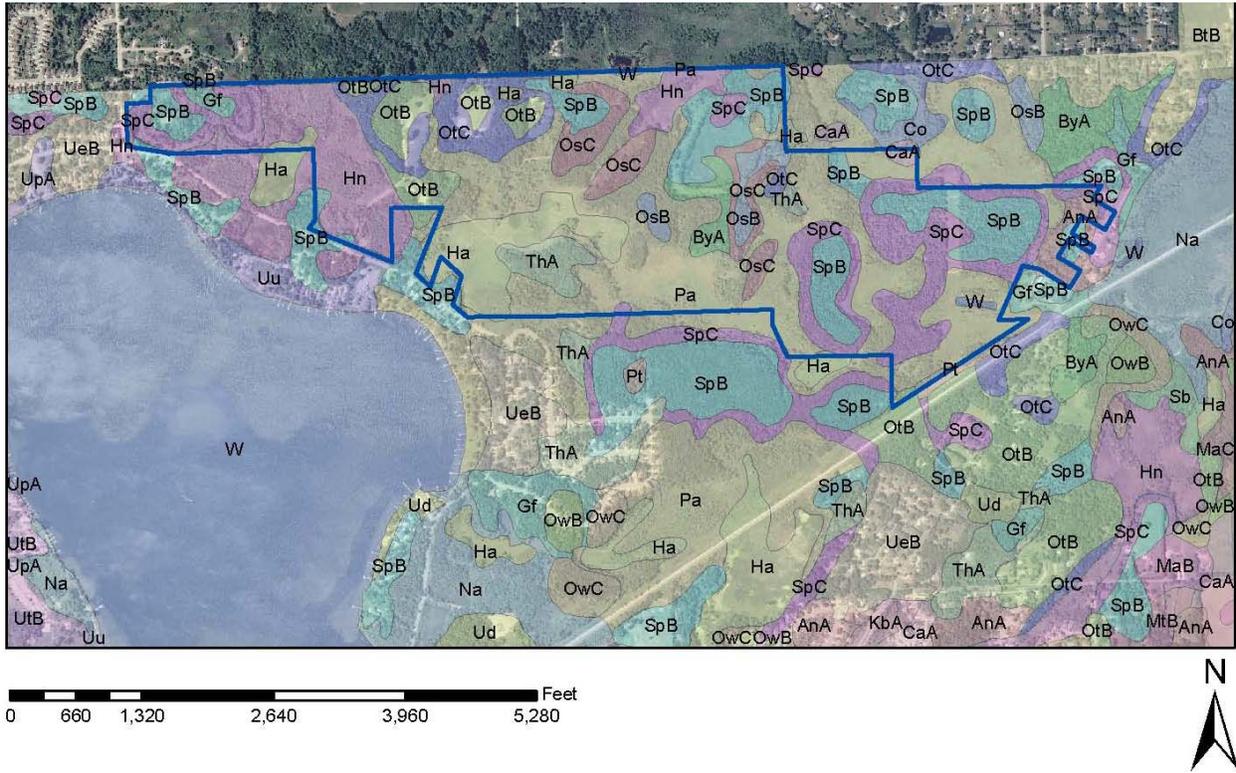
**Figure 2. Natural communities of Lake Lansing Park North**  
(Courtesy of Christopher Reidy, 2011)



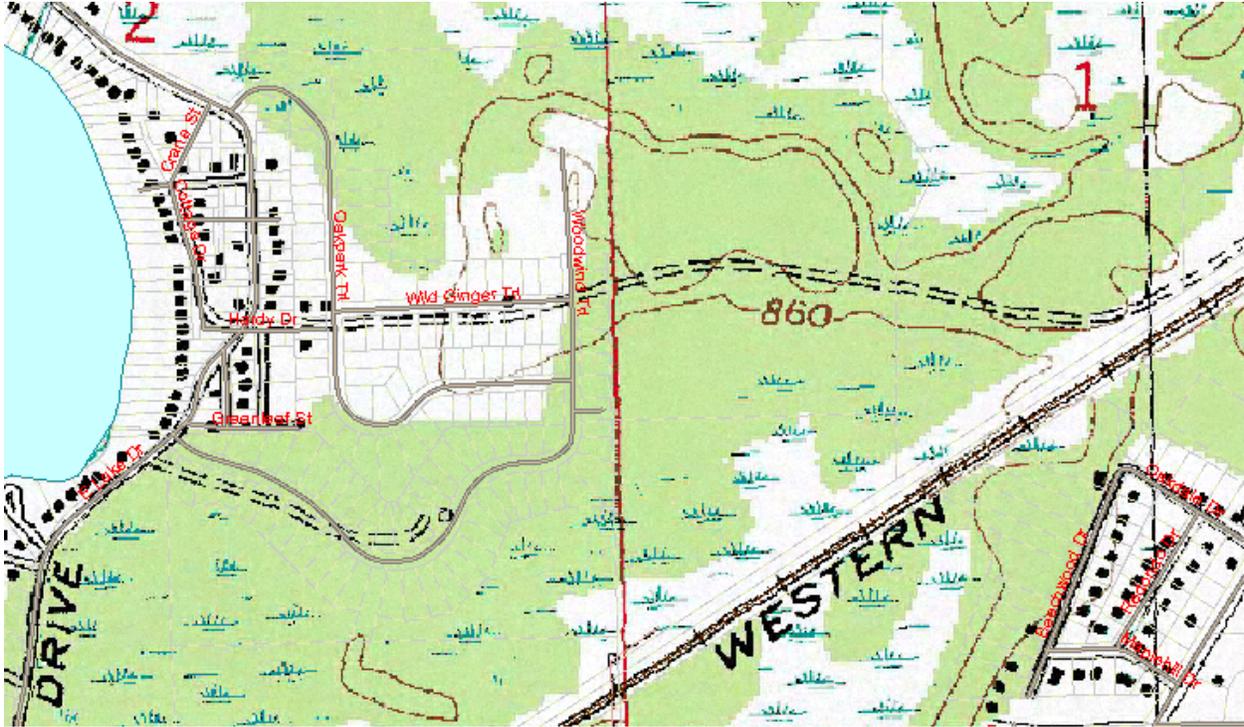
**Figure 3. 2011 Aerial photo of Lake Lansing Park North**



**Figure 4. Natural Resources Conservation Service soil types in Lake Lansing Park North.** See soil type definitions at <http://soils.usda.gov/technical/classification/osd/index.html> (Courtesy of Christopher Reidy)



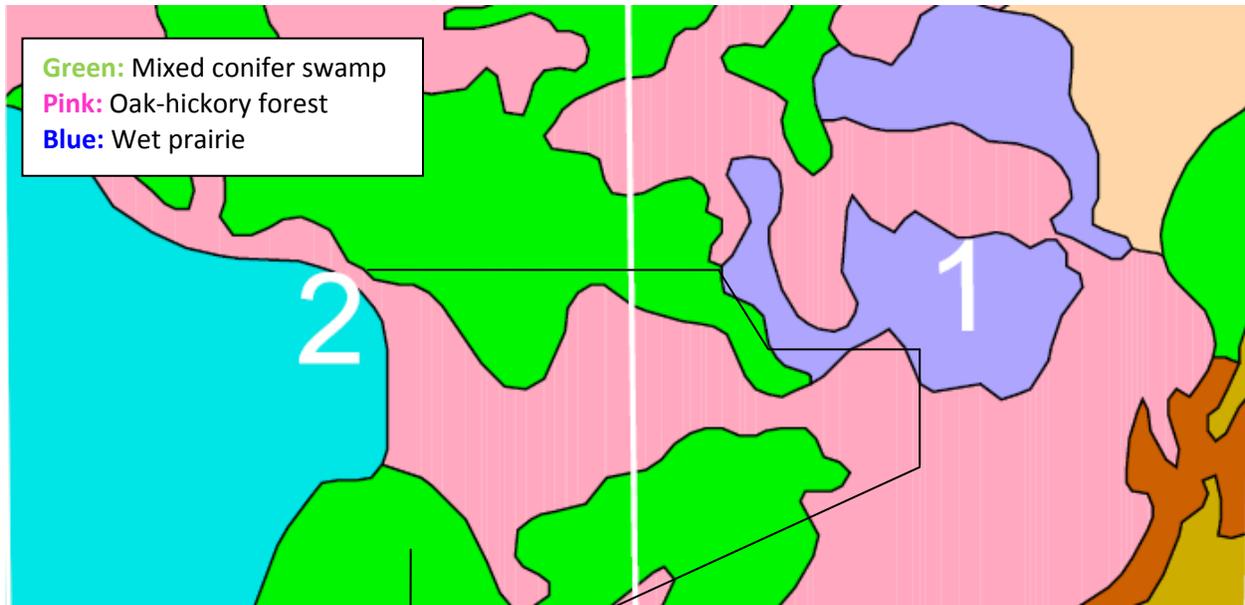
**Figure 5. USGS topographic contours for the southern sector of Lake Lansing Park North. Isocontours appear as brown lines, separated by 10' in altitude relative to sea level.**



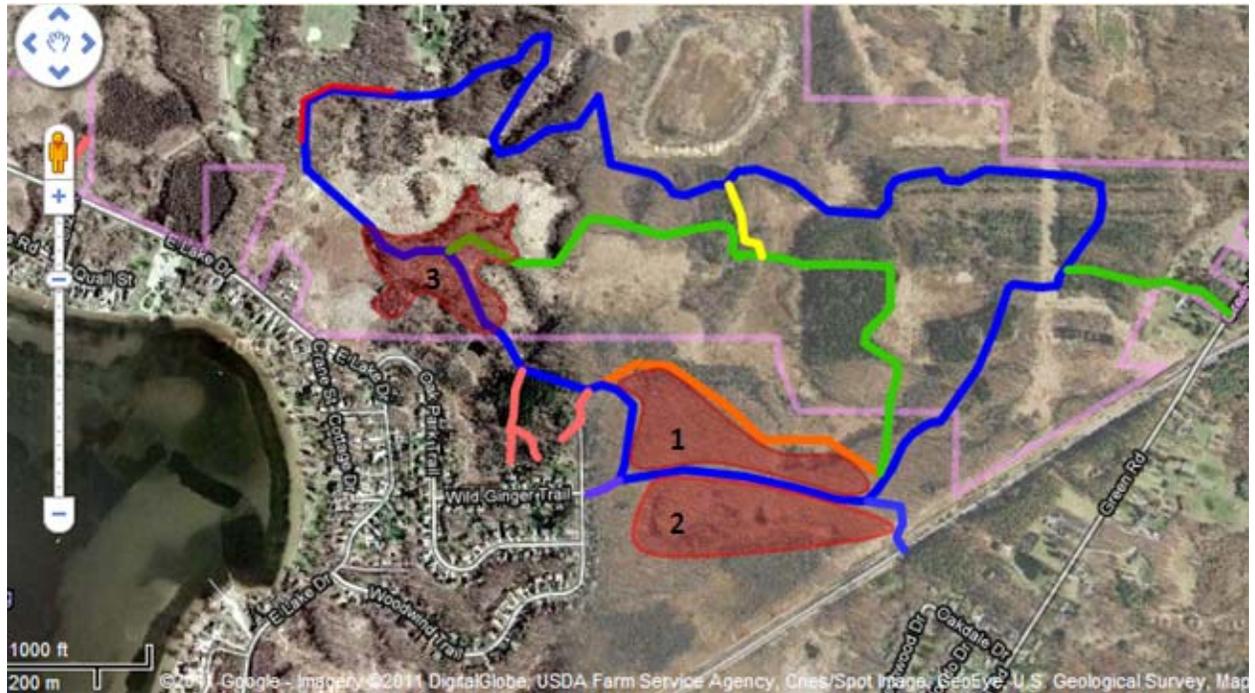
**Figure 6. Historical aerial photo of Lake Lansing North Park area from August 22, 1938.**



**Figure 7. Historical condition of the land according to Michigan Natural Features Inventory review of soil types and early land survey data.** Thin black lines indicate approximate edges of the 120 acre land acquisition.



**Figure 8. Three recommended woodland areas (red contours) for prescribed burns.**



**Figure 9. Effective method for reducing trail erosion and walking hazards in sandy areas.** Photo shows sandbars constructed from local logs and held in place by steel bars driven into the soil, along the Valles Caldera Trail in northern New Mexico, which is maintained by the USDA as a National Preserve.



**Lake Lansing Park North Vascular Plant Inventory (Chris Reidy, Natural Resources Conservation Service, 2011)**

<b>Family</b>	<b>Species</b>	<b>Authority</b>	<b>Subspecies/Variety</b>	<b>Subspecies/Variety Authority</b>
Aceraceae	Acer negundo	L.	var. violaceum	(G. Kirchn.) H. Jaeger
Aceraceae	Acer nigrum	Michx. f.		
Aceraceae	Acer rubrum	L.		
Aceraceae	Acer saccharinum	L.		
Aceraceae	Acer saccharum	Marsh.	var. saccharum	
Alismataceae	Alisma subcordatum	Raf.		
Alismataceae	Alisma triviale	Pursh		
Alismataceae	Sagittaria cuneata	Sheldon		
Alismataceae	Sagittaria latifolia	Willd.		
Amaranthaceae	Amaranthus tuberculatus	(Moq.) Sauer		
Anacardiaceae	Rhus copallinum	L.	var. latifolia	Engl.
Anacardiaceae	Rhus typhina	L.		
Anacardiaceae	Toxicodendron radicans	(L.) Kuntze	ssp. negundo	(Greene) Gillis
Anacardiaceae	Toxicodendron vernix	(L.) Kuntze		
Apiaceae	Cicuta bulbifera	L.		
Apiaceae	Cicuta maculata	L.	var. maculata	
Apiaceae	Cryptotaenia canadensis	(L.) DC.		
Apiaceae	Daucus carota	L.		
Apiaceae	Osmorhiza claytonii	(Michx.) C.B. Clarke		
Apiaceae	Osmorhiza longistylis	(Torr.) DC.		
Apiaceae	Sanicula canadensis	L.		
Apiaceae	Sium suave	Walter		
Apiaceae	Taenidia integerrima	(L.) Drude		
Apiaceae	Torilis japonica	(Houtt.) DC.		
Apiaceae	Zizia aurea	(L.) W.D.J. Koch		
Apocynaceae	Apocynum androsaemifolium	L.		
Apocynaceae	Apocynum cannabinum	L.		
Apocynaceae	Vinca minor	L.		
		(L.) Powell, Savolainen & Andrews		
Aquifoliaceae	Ilex mucronata			
Aquifoliaceae	Ilex verticillata	(L.) A. Gray		
Araceae	Arisaema triphyllum	(L.) Schott	ssp. triphyllum	
Araceae	Peltandra virginica	(L.) Schott		
Araceae	Symplocarpus foetidus	(L.) Salisb. ex Nutt.		
Araliaceae	Aralia nudicaulis	L.		
Asclepiadaceae	Asclepias exaltata	L.		
Asclepiadaceae	Asclepias incarnata	L.	ssp. incarnata	
Asclepiadaceae	Asclepias syriaca	L.		
Asclepiadaceae	Asclepias tuberosa	L.	ssp. interior	Woodson
		(L.) Britton, Sterns & Poggenb.		
Aspleniaceae	Asplenium platyneuron		var. platyneuron	
Asteraceae	Achillea millefolium	L.		
Asteraceae	Ageratina altissima	(L.) King & H. Rob.	var. altissima	
Asteraceae	Ambrosia artemisiifolia	L.	var. elatior	(L.) Descourtils
Asteraceae	Ambrosia trifida	L.	var. trifida	
Asteraceae	Antennaria howellii	Greene	ssp. neodioica	(Greene) Bayer
Asteraceae	Antennaria parlinii	Fernald		
Asteraceae	Arctium minus	Bernh.		
Asteraceae	Artemisia campestris	L.	ssp. caudata	(Michx.) H.M. Hall & Clem.
Asteraceae	Artemisia vulgaris	L.	var. vulgaris	
Asteraceae	Bidens cernua	L.		
Asteraceae	Bidens connata	Muhl. ex Willd.		
Asteraceae	Bidens coronata	(L.) Britton		
Asteraceae	Bidens frondosa	L.		
Asteraceae	Centaurea stoebe	L.	ssp. micranthos	(Gugler) Hayek
Asteraceae	Chondrilla juncea	L.		

Asteraceae	<i>Cichorium intybus</i>	L.		
Asteraceae	<i>Cirsium arvense</i>	(L.) Scop.		
Asteraceae	<i>Cirsium muticum</i>	Michx.		
Asteraceae	<i>Cirsium vulgare</i>	(Savi) Ten.		
Asteraceae	<i>Conyza canadensis</i>	(L.) Cronquist		
Asteraceae	<i>Doellingeria umbellata</i>	(Mill.) Nees	var. <i>umbellata</i>	
Asteraceae	<i>Erechtites hieraciifolia</i>	(L.) Raf. ex DC.	var. <i>hieraciifolia</i>	
Asteraceae	<i>Erigeron annuus</i>	(L.) Pers.		
Asteraceae	<i>Erigeron philadelphicus</i>	L.	var. <i>philadelphicus</i>	
Asteraceae	<i>Erigeron strigosus</i>	Muhl. ex Willd.	var. <i>strigosus</i>	
Asteraceae	<i>Eupatoriadelphus maculatus</i>	(L.) King & H. Rob.	var. <i>maculatus</i>	
Asteraceae	<i>Eupatorium perfoliatum</i>	L.	var. <i>perfoliatum</i>	
Asteraceae	<i>Eurybia macrophylla</i>	(L.) Cass.		
Asteraceae	<i>Euthamia graminifolia</i>	(L.) Nutt.	var. <i>graminifolia</i>	
Asteraceae	<i>Helianthus divaricatus</i>	L.		
Asteraceae	<i>Helianthus giganteus</i>	L.		
Asteraceae	<i>Hieracium aurantiacum</i>	L.		
Asteraceae	<i>Hieracium caespitosum</i>	Dumort.		
Asteraceae	<i>Hieracium piloselloides</i>	Vill.		
Asteraceae	<i>Hieracium scabrum</i>	Michx.		
Asteraceae	<i>Hieracium venosum</i>	L.		
Asteraceae	<i>Hieracium x flagellare</i>	Willd.	var. <i>flagellare</i>	
Asteraceae	<i>Lactuca biennis</i>	(Moench) Fernald		
Asteraceae	<i>Lactuca canadensis</i>	L.		
Asteraceae	<i>Lapsana communis</i>	L.		
Asteraceae	<i>Leucanthemum vulgare</i>	Lam.		
Asteraceae	<i>Packera aurea</i>	(L.) A. Lšve & D. Lšve		
Asteraceae	<i>Prenanthes altissima</i>	L.		
Asteraceae	<i>Pseudognaphalium obtusifolium</i>	(L.) Hilliard & B.L. Burt	ssp. <i>obtusifolium</i>	
Asteraceae	<i>Rudbeckia hirta</i>	L.	var. <i>pulcherrima</i>	Farw.
Asteraceae	<i>Solidago altissima</i>	L.		
Asteraceae	<i>Solidago caesia</i>	L.		
Asteraceae	<i>Solidago gigantea</i>	Aiton		
Asteraceae	<i>Solidago hispida</i>	Muhl. ex Willd.	var. <i>hispida</i>	
Asteraceae	<i>Solidago juncea</i>	Aiton		
Asteraceae	<i>Solidago nemoralis</i>	Aiton	var. <i>nemoralis</i>	
Asteraceae	<i>Solidago patula</i>	Muhl. ex Willd.	var. <i>patula</i>	
			ssp. <i>rugosa</i> var.	
Asteraceae	<i>Solidago rugosa</i>	Mill.	<i>rugosa</i>	
Asteraceae	<i>Solidago speciosa</i>	Nutt.	var. <i>jejunifolia</i>	(Steele) Cronquist
Asteraceae	<i>Sonchus arvensis</i>	L.	ssp. <i>uliginosus</i>	(M. Bieb.) Nyman
Asteraceae	<i>Sonchus asper</i>	(L.) Hill		
		(Torr. & A. Gray) A. Lšve		
Asteraceae	<i>Symphotrichum boreale</i>	& D. Lšve		
Asteraceae	<i>Symphotrichum cordifolium</i>	(L.) G.L. Nesom		
Asteraceae	<i>Symphotrichum firmum</i>	(Nees) G. L. Nesom		
Asteraceae	<i>Symphotrichum laeve</i>	(L.) A. Lšve & D. Lšve	var. <i>laeve</i>	
			ssp. <i>lanceolatum</i> var.	
Asteraceae	<i>Symphotrichum lanceolatum</i>	(Willd.) G.L. Nesom	<i>lanceolatum</i>	
Asteraceae	<i>Symphotrichum lateriflorum</i>	(L.) A. Lšve & D. Lšve	var. <i>lateriflorum</i>	
Asteraceae	<i>Symphotrichum ontarionis</i>	(Wiegand) G.L. Nesom		
Asteraceae	<i>Symphotrichum oolentangiense</i>	(Riddell) G.L. Nesom	var. <i>oolentangiense</i>	
Asteraceae	<i>Symphotrichum pilosum</i>	(Willd.) G.L. Nesom	var. <i>pilosum</i>	
Asteraceae	<i>Symphotrichum puniceum</i>	(L.) A. Lšve & D. Lšve	var. <i>puniceum</i>	
Asteraceae	<i>Symphotrichum urophyllum</i>	(Lindl.) G.L. Nesom		
Asteraceae	<i>Taraxacum officinale</i>	F.H. Wigg.	ssp. <i>officinale</i>	
Asteraceae	<i>Tragopogon dubius</i>	Scop.		

Asteraceae	Tragopogon lamottei	Rouy		
Balsaminaceae	Impatiens capensis	Meerb.		
Berberidaceae	Berberis thunbergii	DC.		
Berberidaceae	Podophyllum peltatum	L.		
Betulaceae	Betula papyrifera	Marsh.	var. papyrifera	
Betulaceae	Betula pumila	L.	var. pumila	
Betulaceae	Carpinus caroliniana	Walter	ssp. virginiana	(Marsh.) Furlow
Betulaceae	Corylus americana	Walter		
Betulaceae	Ostrya virginiana	(Mill.) K. Koch	var. virginiana	
Bignoniaceae	Catalpa spp.			
Boraginaceae	Hackelia virginiana	(L.) I.M. Johnst.		
Boraginaceae	Myosotis stricta	Link ex Roem. & Schult. (M. Bieb.) Cavara & Grande		
Brassicaceae	Alliaria petiolata	(L.) L.		
Brassicaceae	Alyssum alyssoides	(L.) Heynh.		
Brassicaceae	Arabidopsis thaliana	(L.) Bernh.		
Brassicaceae	Arabis glabra	W.T. Aiton		
Brassicaceae	Barbarea vulgaris	(L.) W.D.J. Koch		
Brassicaceae	Bassica nigra	(L.) DC.		
Brassicaceae	Berteroa incana	(Schreb. ex Muhl.) Britton, Sterns & Poggenb.		
Brassicaceae	Cardamine bulbosa	Muhl. ex Willd.		
Brassicaceae	Cardamine pensylvanica	L.		
Brassicaceae	Draba verna	L.		
Brassicaceae	Erysimum cheiranthoides	L.		
Brassicaceae	Hesperis matronalis	L.		
Brassicaceae	Lepidium campestre	(L.) W.T. Aiton		
Brassicaceae	Lepidium virginicum	L.	var. virginicum	
Brassicaceae	Thlaspi arvense	L.		
Cabombaceae	Brasenia schreberi	J.F. Gmel.		
Campanulaceae	Campanula aparinoides	Pursh		
Campanulaceae	Lobelia inflata	L.		
Campanulaceae	Lobelia siphilitica	L.	var. siphilitica	
Caprifoliaceae	Lonicera dioica	L.		
Caprifoliaceae	Lonicera maackii	(Rupr.) Herder		
Caprifoliaceae	Lonicera tatarica	L. Zabel [morrowii ? tatarica]		
Caprifoliaceae	Lonicera x bella	L.	ssp. canadensis	(L.) R. Bolli
Caprifoliaceae	Sambucus nigra	L.		
Caprifoliaceae	Viburnum acerifolium	L.		
Caprifoliaceae	Viburnum lentago	L.		
Caprifoliaceae	Viburnum opulus	L.	var. americanum	Aiton
Caprifoliaceae	Viburnum opulus	L.	var. opulus	
Caprifoliaceae	Viburnum recognitum	Fernald		
Caryophyllaceae	Arenaria serpyllifolia	L.		
Caryophyllaceae	Cerastium fontanum	Baumg.	ssp. vulgare	(Hartm.) Greuter & Burdet
Caryophyllaceae	Cerastium semidecandrum	L.		
Caryophyllaceae	Dianthus armeria	L.		
Caryophyllaceae	Lychnis coronaria	(L.) Desr.		
Caryophyllaceae	Saponaria officinalis	L.		
Caryophyllaceae	Silene antirrhina	L.		
Caryophyllaceae	Silene latifolia	Poir.	ssp. alba	(Mill.) Greuter & Burdet
Caryophyllaceae	Stellaria longifolia	Muhl. ex Willd.		
Caryophyllaceae	Stellaria media	(L.) Vill.		
Celastraceae	Celastrus orbiculatus	Thunb.		
Celastraceae	Euonymus alatus	(Thunb.) Siebold		
Celastraceae	Euonymus obovatus	Nutt.		
Ceratophyllaceae	Ceratophyllum demersum	L.		

Chenopodiaceae	Chenopodium album	L.	var. album	
Cistaceae	Helianthemum bicknellii	Fernald		
Cistaceae	Helianthemum canadense	(L.) Michx.		
Cistaceae	Lechea mucronata	Raf.		
Clusiaceae	Hypericum majus	(A. Gray) Britton		
Clusiaceae	Hypericum mutilum	L.		
Clusiaceae	Hypericum prolificum	L.		
Clusiaceae	Hypericum punctatum	Lam.		
Clusiaceae	Triadenum fraseri	(Spach) Gleason		
Convolvulaceae	Calystegia sepium	(L.) R. Br.	ssp. americana	(Sims) Brummitt
Convolvulaceae	Convolvulus arvensis	L.		
Cornaceae	Cornus alternifolia	L. f.		
Cornaceae	Cornus canadensis	L.		
Cornaceae	Cornus florida	L.		
Cornaceae	Cornus obliqua	Raf.		
Cornaceae	Cornus racemosa	Lam.		
Cornaceae	Cornus sericea	L.	ssp. sericea	
Cornaceae	Nyssa sylvatica	Marsh.		
Crassulaceae	Penthorum sedoides	L.		
Cucurbitaceae	Echinocystis lobata	(Michx.) Torr. & A. Gray		
Cupressaceae	Juniperus communis	L.	var. depressa	Pursh
Cupressaceae	Juniperus virginiana	L.	var. virginiana	
Cuscutaceae	Cuscuta cephalanthi	Engelm.		
Cyperaceae	Carex alata	Torr.		
Cyperaceae	Carex albursina	Sheldon		
Cyperaceae	Carex aquatilis	Wahlenb.	var. aquatilis	
Cyperaceae	Carex atherodes	Spreng.		
Cyperaceae	Carex aurea	Nutt.		
Cyperaceae	Carex bebbii	Olney ex Fernald		
Cyperaceae	Carex blanda	Dewey		
Cyperaceae	Carex buxbaumii	Wahlenb.		
Cyperaceae	Carex canescens	L.	ssp. disjuncta	(Fernald) Toivonen
Cyperaceae	Carex cephalophora	Muhl. ex Willd.		
Cyperaceae	Carex comosa	Boott		
Cyperaceae	Carex conoidea	Schkuhr ex Willd.		
Cyperaceae	Carex crinita	Lam.	var. crinita	
Cyperaceae	Carex cristatella	Britton		
Cyperaceae	Carex deweyana	Schwein.	var. deweyana	
Cyperaceae	Carex diandra	Schrank		
Cyperaceae	Carex disperma	Dewey		
Cyperaceae	Carex gracilescens	Steud.		
Cyperaceae	Carex gracillima	Schwein.		
Cyperaceae	Carex granularis	Muhl. ex Willd.		
Cyperaceae	Carex grisea	Wahlenb.		
Cyperaceae	Carex hystericina	Muhl. ex Willd.		
Cyperaceae	Carex interior	L.H. Bailey		
Cyperaceae	Carex lacustris	Willd.		
Cyperaceae	Carex lasiocarpa	Ehrh.	var. americana	Fernald
Cyperaceae	Carex leptalea	Wahlenb.	ssp. leptalea	
Cyperaceae	Carex leptonervia	(Fernald) Fernald		
Cyperaceae	Carex lupulina	Muhl. ex Willd.		
Cyperaceae	Carex muehlenbergii	Schkuhr ex Willd.	var. muehlenbergii	
Cyperaceae	Carex normalis	Mack.		
Cyperaceae	Carex pellita	Muhl. ex Willd.		
Cyperaceae	Carex pensylvanica	Lam.		
Cyperaceae	Carex pseudocyperus	L.		
Cyperaceae	Carex radiata	(Wahlenb.) Small		
Cyperaceae	Carex retrorsa	Schwein.		
Cyperaceae	Carex rosea	Schkuhr ex Willd.		

Cyperaceae	Carex sartwellii	Dewey	var. sartwellii	
Cyperaceae	Carex scoparia	Schkuhr ex Willd.	var. scoparia	
Cyperaceae	Carex siccata	Dewey		
Cyperaceae	Carex sparganioides	Muhl. ex Willd.		
Cyperaceae	Carex stipata	Muhl. ex Willd.	var. stipata	
Cyperaceae	Carex stricta	Lam.		
Cyperaceae	Carex swanii	(Fernald) Mack.		
Cyperaceae	Carex tenera	Dewey		
Cyperaceae	Carex tetanica	Schkuhr		
Cyperaceae	Carex tonsa	(Fernald) E.P. Bicknell	var. rugosperma	(Mack.) Crins
Cyperaceae	Carex tribuloides	Wahlenb.	var. tribuloides	
Cyperaceae	Carex tuckermanii	Dewey		
Cyperaceae	Carex utriculata	Boott		
Cyperaceae	Carex vulpinoidea	Michx.		
Cyperaceae	Cyperus bipartitus	Torr.		
Cyperaceae	Cyperus diandrus	Torr.		
Cyperaceae	Cyperus erythrorhizos	Muhl.		
Cyperaceae	Cyperus lupulinus	(Spreng.) Marcks		
Cyperaceae	Cyperus odoratus	L.		
Cyperaceae	Cyperus strigosus	L.		
Cyperaceae	Dulichium arundinaceum			
Cyperaceae	Eleocharis acicularis	(L.) Roem. & Schult.		
Cyperaceae	Eleocharis elliptica	Kunth		
Cyperaceae	Eleocharis erythropoda	Steud.		
Cyperaceae	Eleocharis flavescens	(Poir.) Urb.		
Cyperaceae	Eleocharis radicans	(A. Dietr.) Kunth (Muhl. ex Bigelow) A.		
Cyperaceae	Schoenoplectus acutus	Lšve & D. Lšve	var. acutus	
Cyperaceae	Schoenoplectus pungens	(Vahl) Palla	var. pungens	
Cyperaceae	Schoenoplectus tabernaemontani	(C.C. Gmel.) Palla		
Cyperaceae	Scirpus atrovirens	Willd.		
Cyperaceae	Scirpus cyperinus	(L.) Kunth		
Cyperaceae	Scirpus pendulus	Muhl.		
Dennstaedtiaceae	Pteridium aquilinum	(L.) Kuhn	var. latiusculum	(Desv.) Underw. ex A. Heller
Dioscoreaceae	Dioscorea villosa	L.		
Dryopteridaceae	Athyrium filix-femina	(L.) Roth	ssp. angustum	(Willd.) R.T. Clausen
Dryopteridaceae	Dryopteris carthusiana	(Vill.) H.P. Fuchs		
Dryopteridaceae	Dryopteris cristata	(L.) A. Gray (Muhl. ex Willd.) A.		
Dryopteridaceae	Dryopteris intermedia	Gray (Tuck.) Underw. (pro sp.) [cristata ? intermedia]		
Dryopteridaceae	Dryopteris x bootii			
Dryopteridaceae	Matteuccia struthiopteris	(L.) Todaro		
Dryopteridaceae	Onoclea sensibilis	L.		
Dryopteridaceae	Polystichum acrostichoides	(Michx.) Schott	var. acrostichoides	
Elaeagnaceae	Elaeagnus umbellata	Thunb.		
Equisetaceae	Equisetum arvense	L.		
Equisetaceae	Equisetum fluviatile	L.		
Equisetaceae	Equisetum hyemale	L.	var. affine	(Engelm.) A.A. Eaton
Equisetaceae	Equisetum laevigatum	A. Braun		
Equisetaceae	Equisetum x ferrissii	Clute (pro sp.) [hyemale ? laevigatum]		
Ericaceae	Chamaedaphne calyculata	(L.) Moench		
Ericaceae	Gaultheria procumbens	L.		
Ericaceae	Gaylussacia baccata	(Wangenh.) K. Koch		
Ericaceae	Vaccinium angustifolium	Aiton		
Ericaceae	Vaccinium corymbosum	L.		

Euphorbiaceae	<i>Acalypha rhomboidea</i>	Raf.		
Euphorbiaceae	<i>Chamaesyce maculata</i>	(L.) Small		
Euphorbiaceae	<i>Euphorbia corollata</i>	L.		
Fabaceae	<i>Amphicarpaea bracteata</i>	(L.) Fernald	var. <i>bracteata</i>	
Fabaceae	<i>Apios americana</i>	Medik.		
Fabaceae	<i>Desmodium canadense</i>	(L.) DC.		
Fabaceae	<i>Desmodium glabellum</i>	(Michx.) DC. (Muhl. ex Willd.) Alph.		
Fabaceae	<i>Desmodium glutinosum</i>	Wood		
Fabaceae	<i>Desmodium nudiflorum</i>	(L.) DC.		
Fabaceae	<i>Desmodium paniculatum</i>	(L.) DC.	var. <i>paniculatum</i>	
Fabaceae	<i>Desmodium rotundifolium</i>	DC.		
Fabaceae	<i>Lathyrus ochroleucus</i>	Hook.		
Fabaceae	<i>Lathyrus venosus</i>	Muhl. ex Willd.		
Fabaceae	<i>Lespedeza capitata</i>	Michx.		
Fabaceae	<i>Lespedeza frutescens</i>	(L.) Hornem.		
Fabaceae	<i>Lespedeza hirta</i>	(L.) Hornem.	ssp. <i>hirta</i>	
Fabaceae	<i>Lotus corniculatus</i>	L.	var. <i>corniculatus</i>	
Fabaceae	<i>Medicago lupulina</i>	L.		
Fabaceae	<i>Medicago sativa</i>	L.	ssp. <i>sativa</i>	
Fabaceae	<i>Melilotus officinalis</i>	(L.) Lam.		
Fabaceae	<i>Robinia pseudoacacia</i>	L.		
Fabaceae	<i>Securigera varia</i>	(L.) Lassen		
Fabaceae	<i>Trifolium campestre</i>	Schreb.		
Fabaceae	<i>Trifolium hybridum</i>	L.		
Fabaceae	<i>Trifolium pratense</i>	L.		
Fabaceae	<i>Trifolium repens</i>	L.		
Fabaceae	<i>Vicia caroliniana</i>	Walter		
Fabaceae	<i>Vicia villosa</i>	Roth		
Fagaceae	<i>Fagus grandifolia</i>	Ehrh.		
Fagaceae	<i>Quercus alba</i>	L.		
Fagaceae	<i>Quercus bicolor</i>	Willd.		
Fagaceae	<i>Quercus ellipsoidalis</i>	E.J. Hill		
Fagaceae	<i>Quercus macrocarpa</i>	Michx.	var. <i>macrocarpa</i>	
Fagaceae	<i>Quercus rubra</i>	L.	var. <i>rubra</i>	
Fagaceae	<i>Quercus velutina</i>	Lam. (L.) Britton, Sterns &		
Gentianaceae	<i>Bartonia virginica</i>	Poggenb.		
Gentianaceae	<i>Centaurium pulchellum</i>	(Sw.) Druce		
Gentianaceae	<i>Gentiana andrewsii</i>	Griseb.	var. <i>andrewsii</i>	
Geraniaceae	<i>Geranium maculatum</i>	L.		
Geraniaceae	<i>Geranium sibiricum</i>	L.		
Grossulariaceae	<i>Ribes americanum</i>	Mill.		
Grossulariaceae	<i>Ribes cynosbati</i>	L.		
Grossulariaceae	<i>Ribes hirtellum</i>	Michx.		
Haloragaceae	<i>Proserpinaca palustris</i>	L.		
Hamamelidaceae	<i>Hamamelis virginiana</i>	L.		
Iridaceae	<i>Iris germanica</i>	L.		
Iridaceae	<i>Iris virginica</i>	L.	var. <i>shrevei</i>	(Small) E.S. Anderson
Iridaceae	<i>Iris xvinicolor</i>	Small (pro sp.)		
Iridaceae	<i>Sisyrinchium albidum</i>	Raf.		
Juglandaceae	<i>Carya cordiformis</i>	(Wangenh.) K. Koch		
Juglandaceae	<i>Carya glabra</i>	(Mill.) Sweet		
Juglandaceae	<i>Carya ovata</i>	(Mill.) K. Koch		
Juglandaceae	<i>Juglans nigra</i>	L.		
Juncaceae	<i>Juncus alpinoarticulatus</i>	Chaix		
Juncaceae	<i>Juncus articulatus</i>	L.		
Juncaceae	<i>Juncus biflorus</i>	Elliott		
Juncaceae	<i>Juncus brachycephalus</i>	(Engelm.) Buchenau		
Juncaceae	<i>Juncus canadensis</i>	J. Gay ex Laharpe		

Juncaceae	<i>Juncus dudleyi</i>	Wiegand		
Juncaceae	<i>Juncus effusus</i>	L.	var. <i>solutus</i>	Fernald & Wiegand
Juncaceae	<i>Juncus greenii</i>	Oakes & Tuck.		
Juncaceae	<i>Juncus nodosus</i>	L.	var. <i>nodosus</i>	
Juncaceae	<i>Juncus tenuis</i>	Willd.		
Juncaceae	<i>Juncus torreyi</i>	Coville		
Juncaceae	<i>Luzula multiflora</i>	(Ehrh.) Lej.	ssp. <i>multiflora</i>	
Lamiaceae	<i>Glechoma hederacea</i>	L.		
Lamiaceae	<i>Leonurus cardiaca</i>	L.	ssp. <i>cardiaca</i>	
Lamiaceae	<i>Lycopus americanus</i>	Muhl. ex W. Bartram		
Lamiaceae	<i>Lycopus uniflorus</i>	Michx.	var. <i>uniflorus</i>	
Lamiaceae	<i>Mentha arvensis</i>	L.		
Lamiaceae	<i>Mentha x piperita</i>	L. (pro sp.) [aquatica ? spicata]		
Lamiaceae	<i>Monarda fistulosa</i>	L.	ssp. <i>fistulosa</i>	
Lamiaceae	<i>Nepeta cataria</i>	L.		
Lamiaceae	<i>Prunella vulgaris</i>	L.	ssp. <i>lanceolata</i>	(W. Bartram) Hultžn
Lamiaceae	<i>Pycnanthemum virginianum</i>	(L.) T. Dur. & B.D. Jacks. ex B.L. Rob. & Fernald		
Lamiaceae	<i>Scutellaria galericulata</i>	L.		
Lamiaceae	<i>Scutellaria lateriflora</i>	L.	var. <i>lateriflora</i>	
Lauraceae	<i>Lindera benzoin</i>	(L.) Blume	var. <i>benzoin</i>	
Lauraceae	<i>Sassafras albidum</i>	(Nutt.) Nees		
Lemnaceae	<i>Lemna minor</i>	L.		
Lemnaceae	<i>Lemna trisulca</i>	L.		
Lemnaceae	<i>Lemna turionifera</i>	Landolt		
Lemnaceae	<i>Spirodela polyrhiza</i>	(L.) Schleid.		
Lemnaceae	<i>Wolffia columbiana</i>	Karst.		
Lentibulariaceae	<i>Utricularia macrorhiza</i>	Leconte		
Liliaceae	<i>Asparagus officinalis</i>	L.		
Liliaceae	<i>Erythronium</i> spp.			
Liliaceae	<i>Hemerocallis fulva</i>	(L.) L.		
Liliaceae	<i>Lilium michiganense</i>	Farw.		
Liliaceae	<i>Maianthemum canadense</i>	Desf.		
Liliaceae	<i>Maianthemum racemosum</i>	(L.) Link	ssp. <i>racemosum</i>	
Liliaceae	<i>Maianthemum stellatum</i>	(L.) Link		
Liliaceae	<i>Polygonatum pubescens</i>	(Willd.) Pursh		
Liliaceae	<i>Trillium grandiflorum</i>	(Michx.) Salisb		
Lycopodiaceae	<i>Lycopodium digitatum</i>	Dill. ex A. Braun		
Lythraceae	<i>Decodon verticillatus</i>	(L.) Elliott		
Lythraceae	<i>Lythrum salicaria</i>	L.		
Menyanthaceae	<i>Menyanthes trifoliata</i>	L.		
Molluginaceae	<i>Mollugo verticillata</i>	L.		
Monotropaceae	<i>Monotropa hypopithys</i>	L.		
Monotropaceae	<i>Monotropa uniflora</i>	L.		
Moraceae	<i>Morus alba</i>	L.		
Najadaceae	<i>Najas flexilis</i>	(Willd.) Rostk. & Schmidt		
Nymphaeaceae	<i>Nuphar lutea</i>	(L.) Sm.	ssp. <i>advena</i>	(Aiton) Kartesz & Gandhi
Nymphaeaceae	<i>Nymphaea odorata</i>	Aiton	?	
Oleaceae	<i>Fraxinus americana</i>	L.		
Oleaceae	<i>Fraxinus nigra</i>	Marsh.		
Oleaceae	<i>Fraxinus pennsylvanica</i>	Marsh.		
Oleaceae	<i>Ligustrum obtusifolium</i>	Siebold & Zucc.		
Onagraceae	<i>Circaea lutetiana</i>	L.	ssp. <i>canadensis</i>	(L.) Asch. & Magnus
Onagraceae	<i>Epilobium coloratum</i>	Biehler		
Onagraceae	<i>Epilobium leptophyllum</i>	Raf.		
Onagraceae	<i>Epilobium strictum</i>	Muhl. ex Spreng.		
Onagraceae	<i>Ludwigia palustris</i>	(L.) Elliot		

Onagraceae	Oenothera biennis	L.		
Onagraceae	Oenothera villosa	Thunb.	ssp. villosa	
Ophioglossaceae	Botrychium dissectum	Spreng.		
		(A. Braun ex Dowell) A.		
Ophioglossaceae	Botrychium matricariifolium	Braun ex W.D.J. Koch		
Ophioglossaceae	Botrychium multifidum	(S.G. Gmel.) Trevis.		
Ophioglossaceae	Botrychium virginianum	(L.) Sw.		
Orchidaceae	Cypripedium parviflorum	Salisb.	pubescens	(Willd.) Knight
Orchidaceae	Cypripedium reginae	Walter		
Orchidaceae	Epipactis helleborine	(L.) Crantz		
Orchidaceae	Goodyera pubescens	(Willd.) R. Br.		
Orchidaceae	Liparis loeselii	(L.) Rich.		
Orchidaceae	Platanthera clavellata	(Michx.) Luer		
Orobanchaceae	Conopholis americana	(L.) Wallr.		
Osmundaceae	Osmunda cinnamomea	L.	var. cinnamomea	
Osmundaceae	Osmunda claytoniana	L.		
Osmundaceae	Osmunda regalis	L.	var. spectabilis	(Willd.) A. Gray
Oxalidaceae	Oxalis dillenii	Jacq.		
Oxalidaceae	Oxalis stricta	L.		
Phytolaccaceae	Phytolacca americana	L.	var. americana	
Pinaceae	Larix laricina	(Du Roi) K. Koch		
Pinaceae	Picea abies	(L.) Karst.		
Pinaceae	Picea glauca	(Moench) Voss		
Pinaceae	Pinus strobus	L.		
Pinaceae	Pinus sylvestris	L.		
Plantaginaceae	Plantago aristata	Michx.		
Plantaginaceae	Plantago lanceolata	L.		
Plantaginaceae	Plantago major	L.		
Plantaginaceae	Plantago rugelii	Decne.	var. rugelii	
Poaceae	Agrostis gigantea	Roth		
Poaceae	Agrostis perennans	(Walter) Tuck.		
Poaceae	Agrostis scabra	Willd.		
Poaceae	Agrostis stolonifera	L.		
Poaceae	Andropogon gerardii	Vitman		
Poaceae	Andropogon virginicus	L.	var. virginicus	
Poaceae	Aristida oligantha	Michx.		
		(Schreb. ex Spreng.) P.		
Poaceae	Brachyelytrum erectum	Beauv.		
Poaceae	Bromus arvensis	L.		
Poaceae	Bromus ciliatus	L.	var. ciliatus	
Poaceae	Bromus inermis	Leyss.	ssp. inermis	
Poaceae	Bromus latiglumis	(Shear) Hitchc.		
Poaceae	Bromus pubescens	Muhl. ex Willd.		
Poaceae	Bromus tectorum	L.		
Poaceae	Calamagrostis canadensis	(Michx.) P. Beauv.	var. canadensis	
Poaceae	Cenchrus longispinus	(Hack.) Fernald		
Poaceae	Cinna arundinacea	L.		
Poaceae	Dactylis glomerata	L.	ssp. glomerata	
		(L.) P. Beauv. ex Roem.		
Poaceae	Danthonia spicata	& Schult.		
Poaceae	Dichanthelium acuminatum	(Sw.) Gould & C.A. Clark	var. fasciculatum	(Torr.) Freckmann
Poaceae	Dichanthelium boreale	(Nash) Freckmann		
Poaceae	Dichanthelium columbianum	(Scribn.) Freckmann		
Poaceae	Dichanthelium dichotomum	(L.) Gould	var. dichotomum	
Poaceae	Dichanthelium latifolium	(L.) Gould & C.A. Clark		
Poaceae	Dichanthelium linearifolium	(Scribn. ex Nash) Gould		

Poaceae	Dichanthelium oligosanthes	(Schult.) Gould	var. scribnerianum	(Nash) Gould
Poaceae	Dichanthelium sphaerocarpon	(Elliot) Gould		
Poaceae	Digitaria cognata	(Schult.) Pilg. (Schreb.) Schreb. ex Muhl.		
Poaceae	Digitaria ischaemum	(L.) Scop.		
Poaceae	Digitaria sanguinalis	(L.) P. Beauv.		
Poaceae	Echinochloa crus-galli	(L.) Gaertn.		
Poaceae	Eleusine indica	L.	var. hystrix	
Poaceae	Elymus hystrix	(L.) Gould		
Poaceae	Elymus repens	L.	var. virginicus	
Poaceae	Elymus virginicus			
Poaceae	Eragrostis cilianensis	(All.) Vign. ex Janchen		
Poaceae	Eragrostis minor	Host		
Poaceae	Eragrostis spectabilis	(Pursh) Steud.		
Poaceae	Festuca brevipila	Tracey		
Poaceae	Festuca rubra	L.		
Poaceae	Festuca subverticillata	(Pers.) Alexeev		
Poaceae	Glyceria canadensis	(Michx.) Trin.		
Poaceae	Glyceria septentrionalis	Hitchc.		
Poaceae	Glyceria striata	(Lam.) Hitchc.		
Poaceae	Holcus lanatus	L.		
Poaceae	Leersia oryzoides	(L.) Sw.		
Poaceae	Lolium perenne	L.	ssp. perenne	
Poaceae	Milium effusum	L.	var. cisatlanticum	Fernald
Poaceae	Muhlenbergia frondosa	(Poir.) Fernald		
Poaceae	Muhlenbergia glomerata	(Willd.) Trin.		
Poaceae	Muhlenbergia mexicana	(L.) Trin.		
Poaceae	Muhlenbergia schreberi	J.F. Gmel.		
Poaceae	Muhlenbergia sylvatica	(Torr.) Torr. ex A. Gray		
Poaceae	Panicum capillare	L.		
Poaceae	Panicum virgatum	L.	var. virgatum	
Poaceae	Phalaris arundinacea	L.		
Poaceae	Phleum pratense	L.		
Poaceae	Phragmites australis	(Cav.) Trin. ex Steud.	ssp. americanus	Saltonstall
Poaceae	Phragmites australis	(Cav.) Trin. ex Steud.		
Poaceae	Poa annua	L.		
Poaceae	Poa bulbosa	L.		
Poaceae	Poa compressa	L.		
Poaceae	Poa nemoralis	L.	ssp. nemoralis	
Poaceae	Poa palustris	L.		
Poaceae	Poa pratensis	L.	ssp. pratensis	
Poaceae	Poa saltuensis	Fernald & Wiegand		
Poaceae	Poa trivialis	L.		
Poaceae	Puccinellia distans	(Jacq.) Parl.		
Poaceae	Schedonorus phoenix	(Scop.) Holub		
Poaceae	Schizachyrium scoparium	(Michx.) Nash	var. scoparium	
Poaceae	Setaria faberi	Herrm.		
Poaceae	Setaria pumila	(Poir.) Roem. & Schult.	ssp. pumila	
Poaceae	Setaria viridis	(L.) P. Beauv.	var. viridis	
Poaceae	Sphenopholis intermedia	(Rydb.) Rydb.		
Poaceae	Sporobolus cryptandrus	(Torr.) A. Gray		
Poaceae	Vulpia octoflora	(Walter) Rydb.	var. octoflora	
Polygalaceae	Polygala polygama	Walter		
Polygonaceae	Polygonum amphibium	L.	var. stipulaceum	Coleman
Polygonaceae	Polygonum arenastrum	Jord. ex Boreau		
Polygonaceae	Polygonum aviculare	L.		
Polygonaceae	Polygonum convolvulus	L.	var. convolvulus	

Polygonaceae	<i>Polygonum cuspidatum</i>	Siebold & Zucc.		
Polygonaceae	<i>Polygonum lapathifolium</i>	L.		
Polygonaceae	<i>Polygonum persicaria</i>	L.		
Polygonaceae	<i>Polygonum punctatum</i>	Elliott	?	
Polygonaceae	<i>Polygonum sagittatum</i>	L.		
Polygonaceae	<i>Polygonum scandens</i>	L.	var. <i>scandens</i>	
Polygonaceae	<i>Polygonum tenue</i>	Michx.		
Polygonaceae	<i>Polygonum virginianum</i>	L.		
Polygonaceae	<i>Rumex acetosella</i>	L.		
Polygonaceae	<i>Rumex crispus</i>	L.	ssp. <i>crispus</i>	
Polygonaceae	<i>Rumex obtusifolius</i>	L.		
Polygonaceae	<i>Rumex orbiculatus</i>	A. Gray		
Polypodiaceae	<i>Polypodium virginianum</i>	L.		
Portulacaceae	<i>Claytonia virginica</i>	L.	var. <i>virginica</i>	
Potamogetonaceae	<i>Potamogeton foliosus</i>	Raf.		
Potamogetonaceae	<i>Potamogeton gramineus</i>	L.		
Potamogetonaceae	<i>Potamogeton illinoensis</i>	Morong (Willd.) Rostk. & Schmidt		
Potamogetonaceae	<i>Potamogeton zosteriformis</i>			
Primulaceae	<i>Lysimachia ciliata</i>	L.		
Primulaceae	<i>Lysimachia quadrifolia</i>	L.		
Primulaceae	<i>Lysimachia terrestris</i>	(L.) Britton, Sterns & Poggenb.		
Primulaceae	<i>Lysimachia thyrsoflora</i>	L.		
Primulaceae	<i>Trientalis borealis</i>	Raf.	ssp. <i>borealis</i>	
Pteridaceae	<i>Adiantum pedatum</i>	L.		
Pyrolaceae	<i>Chimaphila maculata</i>	(L.) Pursh		
Pyrolaceae	<i>Pyrola americana</i>	Sweet		
Pyrolaceae	<i>Pyrola elliptica</i>	Nutt.		
Ranunculaceae	<i>Anemone quinquefolia</i>	L.	var. <i>bifolia</i>	Farw.
Ranunculaceae	<i>Anemone virginiana</i>	L.	var. <i>virginiana</i>	
Ranunculaceae	<i>Aquilegia canadensis</i>	L.		
Ranunculaceae	<i>Caltha palustris</i>	L.	var. <i>palustris</i>	
Ranunculaceae	<i>Hepatica nobilis</i>	Schreb.	<i>obtusata</i>	(Pursh) Steyerem.
Ranunculaceae	<i>Ranunculus abortivus</i>	L.		
Ranunculaceae	<i>Ranunculus pensylvanicus</i>	L. f.		
Ranunculaceae	<i>Ranunculus recurvatus</i>	Poir.	var. <i>recurvatus</i>	
Ranunculaceae	<i>Ranunculus sceleratus</i>	L.		
Ranunculaceae	<i>Thalictrum dasycarpum</i>	Fisch. & AvĚ-Lall.		
Ranunculaceae	<i>Thalictrum dioicum</i>	L.		
Rhamnaceae	<i>Ceanothus americanus</i>	L.		
Rhamnaceae	<i>Frangula alnus</i>	Mill.		
Rhamnaceae	<i>Rhamnus cathartica</i>	L.		
Rosaceae	<i>Agrimonia gryposepala</i>	Wallr.		
Rosaceae	<i>Agrimonia pubescens</i>	Wallr.		
Rosaceae	<i>Amelanchier arborea</i>	(Michx. f.) Fernald	var. <i>arborea</i>	
Rosaceae	<i>Amelanchier laevis</i>	Wiegand		
Rosaceae	<i>Comarum palustre</i>	L.		
Rosaceae	<i>Crataegus crus-galli</i>	L.		
Rosaceae	<i>Crataegus succulenta</i>	Schrad. ex Link		
Rosaceae	<i>Fragaria virginiana</i>	Duchesne	ssp. <i>virginiana</i>	
Rosaceae	<i>Geum aleppicum</i>	Jacq.		
Rosaceae	<i>Geum canadense</i>	Jacq.	var. <i>canadense</i>	
Rosaceae	<i>Geum urbanum</i>	L.		
Rosaceae	<i>Malus coronaria</i>	(L.) Mill.		
Rosaceae	<i>Malus pumila</i>	Mill.		
Rosaceae	<i>Photinia floribunda</i>	(Lindl.) K.R. Robertson & Phipps		
Rosaceae	<i>Physocarpus opulifolius</i>	(L.) Maxim.	var. <i>intermedius</i>	(Rydb.) B.L. Rob.
Rosaceae	<i>Potentilla argentea</i>	L.	var. <i>argentea</i>	

Rosaceae	Potentilla recta	L.		
Rosaceae	Potentilla simplex	Michx.		
Rosaceae	Prunus americana	Marsh.		
Rosaceae	Prunus serotina	Ehrh.	var. serotina	
Rosaceae	Prunus virginiana	L.	var. virginiana	
Rosaceae	Pyrus communis	L.		
Rosaceae	Rosa carolina	L.	var. carolina	
Rosaceae	Rosa multiflora	Thunb.		
Rosaceae	Rosa palustris	Marsh.		
Rosaceae	Rubus allegheniensis	Porter	var. allegheniensis	
Rosaceae	Rubus flagellaris	Willd.		
Rosaceae	Rubus hispidus	L.		
Rosaceae	Rubus idaeus	L.	ssp. strigosus	(Michx.) Focke
Rosaceae	Rubus occidentalis	L.		
Rosaceae	Rubus pubescens	Raf.	var. pubescens	
Rosaceae	Sorbus aucuparia	L.		
Rosaceae	Spiraea alba	Du Roi	var. alba	
Rosaceae	Spiraea spp.			
Rubiaceae	Cephalanthus occidentalis	L.		
Rubiaceae	Galium aparine	L.		
Rubiaceae	Galium asprellum	Michx.		
Rubiaceae	Galium boreale	L.		
Rubiaceae	Galium circaeans	Michx.	var. hypomalacum	Fernald
Rubiaceae	Galium lanceolatum	Torr.		
Rubiaceae	Galium obtusum	Bigelow	ssp. obtusum	
Rubiaceae	Galium odoratum	(L.) Scop.		
Rubiaceae	Galium pilosum	Aiton	var. pilosum	
Rubiaceae	Galium tinctorium	(L.) Scop.		
Rubiaceae	Galium trifidum	L.		
Rubiaceae	Galium triflorum	Michx.		
Rubiaceae	Mitchella repens	L.		
Rutaceae	Zanthoxylum americanum	Mill.		
Salicaceae	Populus deltoides	Bartram ex Marsh.		
Salicaceae	Populus grandidentata	Michx.		
Salicaceae	Populus tremuloides	Michx.		
		(Aiton) Sm. (pro sp.)		
Salicaceae	Populus x canescens	[alba ? tremula]		
Salicaceae	Salix alba	L.		
Salicaceae	Salix amygdaloides	Andersson		
Salicaceae	Salix bebbiana	Sarg.		
Salicaceae	Salix candida	Flueggž ex Willd.		
Salicaceae	Salix discolor	Muhl.		
Salicaceae	Salix eriocephala	Michx.		
Salicaceae	Salix interior	Rowlee		
Salicaceae	Salix nigra	Marsh.		
Salicaceae	Salix pedicellaris	Pursh		
Salicaceae	Salix petiolaris	Sm.		
Salicaceae	Salix sericea	Marsh.		
		Simonkai [alba ?		
Salicaceae	Salix x sepulcralis	?pendulina]		
Santalaceae	Comandra umbellata	(L.) Nutt.	ssp. umbellata	
Saxifragaceae	Mitella diphylla	L.		
Saxifragaceae	Saxifraga pensylvanica	L.		
Scrophulariaceae	Agalinis purpurea	(L.) Pennell		
Scrophulariaceae	Agalinis tenuifolia	(Vahl) Raf.		
Scrophulariaceae	Chelone glabra	L.		
Scrophulariaceae	Linaria vulgaris	Mill.		
Scrophulariaceae	Lindernia dubia	(L.) Pennell	var. dubia	
Scrophulariaceae	Mimulus ringens	L.	var. ringens	
Scrophulariaceae	Pedicularis canadensis	L.	canadensis	

Scrophulariaceae	Pedicularis lanceolata	Michx.		
Scrophulariaceae	Scrophularia lanceolata	Pursh		
Scrophulariaceae	Verbascum thapsus	L.		
Scrophulariaceae	Veronica anagallis-aquatica	L.		
Scrophulariaceae	Veronica arvensis	L.		
Scrophulariaceae	Veronica serpyllifolia	L.	ssp. serpyllifolia	
Scrophulariaceae	Veronica verna	L.		
Scrophulariaceae	Veronicastrum virginicum	(L.) Farw.		
Simaroubaceae	Ailanthus altissima	(Mill.) Swingle (Engelm. ex Kunth) S.		
Smilacaceae	Smilax ecirrhata	Watson		
Smilacaceae	Smilax tamnoides	L.		
Solanaceae	Physalis heterophylla	Nees	var. heterophylla	
Solanaceae	Solanum americanum	Mill.		
Solanaceae	Solanum carolinense	L.	var. carolinense	
Solanaceae	Solanum dulcamara	L.	var. dulcamara	
Sparganiaceae	Sparganium emersum	Rehmann		
Sparganiaceae	Sparganium eurycarpum	Engelm.		
Thelypteridaceae	Thelypteris palustris	Schott	var. pubescens	(G. Lawson) Fernald
Tiliaceae	Tilia americana	L.	var. americana	
Typhaceae	Typha angustifolia	L.		
Typhaceae	Typha latifolia	L.		
		Godr. (pro sp.)		
		[angustifolia or		
		domingensis ? latifolia]		
Typhaceae	Typha x glauca			
Ulmaceae	Celtis occidentalis	L.		
Ulmaceae	Ulmus americana	L.		
Ulmaceae	Ulmus pumila	L.		
Ulmaceae	Ulmus rubra	Muhl.		
Urticaceae	Boehmeria cylindrica	(L.) Sw.		
Urticaceae	Parietaria pensylvanica	Muhl. ex Willd.		
Urticaceae	Pilea fontana	(Lunell) Rydb.		
Urticaceae	Pilea pumila	(L.) A. Gray		
Urticaceae	Urtica dioica	L.	ssp. gracilis	(Aiton) Seland.
Verbenaceae	Phryma leptostachya	L.		
Verbenaceae	Verbena hastata	L.		
Verbenaceae	Verbena stricta	Vent.		
Verbenaceae	Verbena urticifolia	L.	var. urticifolia	
Violaceae	Viola labradorica	Schrank		
Violaceae	Viola macloskeyi	Lloyd	ssp. pallens	(Banks ex Ging) M.S. Baker
Violaceae	Viola nephrophylla	Greene		
Violaceae	Viola odorata	L.		
Violaceae	Viola pubescens	Aiton	pubescens	
Violaceae	Viola sagittata	Aiton	var. sagittata	
Violaceae	Viola sororia	Willd.		
Vitaceae	Parthenocissus quinquefolia	(L.) Planch.		
Vitaceae	Parthenocissus vitacea	(Knerr) Hitchc.		
Vitaceae	Vitis aestivalis	Michx.	var. bicolor	Deam
Vitaceae	Vitis riparia	Michx.		

September 16, 2011



Leslie Kuhn  
Ingham County Parks &  
Meridian Township Land Preservation  
Haslett, MI

**Re: Prescribed Ecological Burns at Lake Lansing Park North**

Dear Leslie:

It was a pleasure walking with you, Pat, and Nick as we viewed the potential burn sites. Please accept this letter as a proposal to conduct prescribed ecological burns during the spring of 2012 on the woodlands and possible prairie establishment site within Lake Lansing Park North. The cost to complete the burns is as follows:

Individual pricing—

- Woodland Unit 1: \$3,100
- Woodland Unit 2: \$3,100
- Woodland Unit 3: \$2,950
- Berm planting (4A): \$1,300
- Berm planting (entire): \$2,600

“Packaged” discounts—

- Units 1 and 2 combined: \$4,250
- Units 1, 2, and 3 combined: \$6,250
- Units 1, 2, 3, and 4A combined: \$6,850 (1, 2, and 3=\$5,990, 4A=\$850)
- Units 1, 2, and 4A: \$4,700 (1 and 2=\$3,885, 4A=\$815)
- Unit 1 OR 2, and 4A: \$3,600 (1 OR 2=\$2,536, 4A=\$1,064)

PlantWise would be responsible for:

- creating a burn plan (a detailed document describing emergency contacts, what ecological benefits will be derived from the burn, appropriate weather conditions in which the burn could take place, and the proposed crew make up);
- discussing this burn plan with the Fire Chief and obtaining the necessary burn permit from him (assuming this to be a simple, straightforward process);
- supplementing burn breaks, as needed;
- notifying all necessary parties immediately prior to the burn;
- conducting the burn itself;
- providing \$1,000,000/\$2,000,000 of Comprehensive General Liability and Comprehensive Automobile Liability insurance.



Meridian Township Land Preservation/Ingham County Parks would be responsible for:

- blowing breaks around the perimeter of the woodland unit(s) and around dead, standing trees, as time allows;
- notifying neighbors, if you felt this to be necessary.

We bring extensive experience to the project:

Burn Boss Experience and Training:

**David Mindell**

Experience: Conducted (as Burn Boss) more than 500 burns (covering over 6,000 acres). Burns have been conducted in countless communities throughout Michigan.

Training: **National Wildlife Coordinating Group:** *Firefighter Training (S-130); Beginning Wildland Fire Behavior (S-190) - Certified at Level I; Intermediate Wildland Fire Behavior (S-290) - Certified at Level I; Introduction to Wildland Fire Behavior Calculations (S-390) - Certified at Level I.* **The Nature Conservancy:** *Workshop on Ecological Burning/Prescribed Fire Burn Boss (Rx-300).*

**Crew**

Experience: More than 20 years combined experience in participating in prescribed burns in a diversity of southern Michigan habitats. Fluent in the use of all burn equipment.

References / Prior Experience (many more available upon request):

- Huron Clinton Metropolitan Authority (HCMA), Southeastern Michigan  
Numerous prairie, woodland, and wetland sites  
Contact: Paul Muelle, Chief of Natural Resources (810) 227-2757 x 5152
- Ingham County Drain Commission, E Lansing, Michigan  
Tollgate Planting and Golf Course Natural Areas  
Contact: Paul Pratt, Deputy Commissioner (517) 676-8391
- Washtenaw County Parks and Recreation, Ann Arbor, Michigan  
Numerous wetland, prairies, and woodlands  
Contact: Shawn Severance, Naturalist (734) 971-6337 x 327

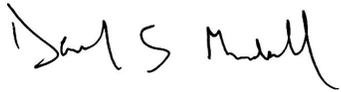
Burns are conducted in a safe, effective manner in full cooperation with the local fire department. Burn personnel wear full safety equipment and have fire suppression equipment on hand at all times.

Because the conditions for conducting the burn are so weather dependent, we would not be able to identify the specific burn date ahead of time. Rather, I would contact you as soon as I know that the weather will be conducive to conducting an effective burn (which is not likely to be more than one to two days ahead of the burn). Our ideal window for burning would be sometime in the range of

April 1-15, in an effort to minimize impacts on turtles, while maximizing impacts on woody invaders.

If you have questions regarding this proposal feel free to contact me by phone or e-mail. I look forward to working with you on this project.

Sincerely,

A handwritten signature in black ink that reads "David S. Mindell". The signature is written in a cursive style with a large, stylized 'D' and 'M'.

David Mindell  
Owner

**Appendix 4 - Site Photos**  
**Natural Features of the Lake Lansing Park North 120 Acre Acquisition**



Dry-mesic southern forest (oak-hickory woods) near the southwestern trail entrance in mid-May.



Tamarack (*Larix laricina*).



Glacial kettle pond (groundwater-fed vernal pool) south of the blue trail in springtime, with May apples (*Podophyllum peltatum*).



Jack in the pulpit (*Arisaema triphyllum*).



Shelf fungus on log.

(Photos courtesy of Leslie Kuhn, Mid-Michigan Stewardship Initiative, unless noted otherwise)

## Natural Features, continued



White-tailed deer at the eastern intersection of the blue and orange trails. A remnant steel gate and broken barbed-wire fence are seen at left. (Photo courtesy of Wendy Koerner)



Swamp milkweed (*Asclepias incarnata*) along wet meadow edge. (Photo courtesy of Mike Pique)



Woodland sunflower (*Helianthus divaricatus*) along the blue trail.



Swamp white oak (*Quercus bicolor*) at boundary between dry-mesic southern woods and dry prairie-like area.

**Flora and Fauna Observed in Lake Lansing Park North by Christopher Reidy**



Christopher Reidy, State Biologist for Michigan, Natural Resources Conservation Service, surveying the flora of Lake Lansing Park North in summer 2011. (Photos courtesy of Leslie Kuhn and Christopher Reidy)



Blandings turtle (*Emydoidea blandingii*; state special concern) observed along the blue trail. (Photo courtesy of Christopher Reidy)



Arctic skipper butterfly, rarely observed south of Canada. (Photo courtesy of Christopher Reidy)



Orchids of the southern woods and wetlands of Lake Lansing North Park: showy lady's slipper (upper-left), small green wood orchid (upper right), and yellow lady's slipper (lower panel). (Photos courtesy of Christopher Reidy)

## Natural Area Restoration and Community Education Activities



Above: autumn olive restoration outing in summer 2010. (Photo courtesy of Andy Cease, Ingham County Parks/AmeriCorps)



MSU Forestry Club autumn olive and Japanese barberry removal outing in February 2011, led by Nicholas Sanchez (Ingham County Parks/AmeriCorps).

Bottom left: glossy buckthorn removal workday with Kate Lederle (DEQ), Dave Caszatt (Meridian LPAB), Chris Reidy (NRCS), Steve Thomas (MNFI), Molly Reidy, Jim Hewitt, and Andy Cease (ICP/AmeriCorps).



Below: garlic mustard rosettes between the red pine plantation in North Park and the Trails at Lake Lansing neighborhood, prior to treatment in 2011.



## ***Natural Area Restoration Activities, continued***



Preparing for the Great Lakes Committee Phragmites Symposium field trip to Lake Lansing Park North in March 2011. From left to right: Steve Thomas (MNFI), Phyllis Higman (MNFI), Chris Reidy (NRCS), Kathe Glassner-Shwayder (GLC), Daria Hyde (MNFI), and Suzan Campbell (MNFI).

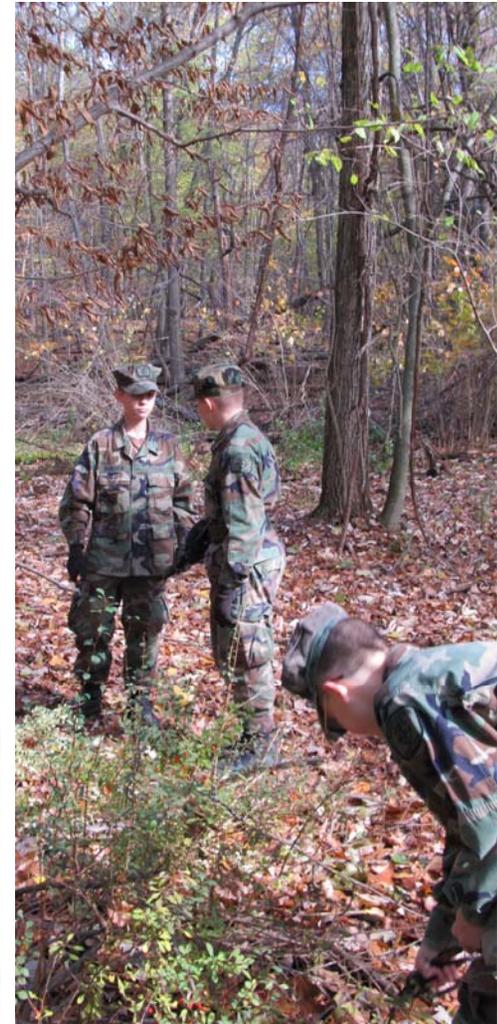


Dense garlic mustard and dame's rocket infestation at the Meridian Township Transfer Station (adjacent to Lake Lansing Park North) being treated by Ingham County Parks and Mid-Michigan Stewardship in fall 2011.

Habitat Restoration Techniques workshop taught by Christopher May, Stewardship Director for The Nature Conservancy in Michigan, at Lake Lansing Park North in October 2011, as part of Mid-Michigan's Stewardship Network series.



## Natural Area Restoration Activities, continued



Volunteers and park staff, including Lake Lansing Parks Manager Patrick Witte, during their late August through September watershed-wide treatment of 66 sites infested by invasive phragmites and Japanese knotweed, including sites on the southern 120 acres. Signs explaining the project and its ecological goals have been installed along Lake Drive and in the park.

Navy Sea League Cadets (7-13 year-olds) removing Japanese barberry near the kettle ponds in the southern woods.

# Lake Lansing North

