AGENDA

CHARTER TOWNSHIP OF MERIDIAN
LAND PRESERVATION ADVISORY BOARD
REGULAR MEETING
Wednesday June 14, 2023 6:00 pm
Central Park Pavilion
5151 Marsh Rd, Okemos, MI 48864

1. CALL MEETING TO ORDER

2. PUBLIC COMMENT

3. APPROVE AGENDA
   A. June 14, 2023

4. APPROVE MINUTES
   A. April 12, 2023

5. COMMUNICATIONS
   A. Parks and Recreation Family Fun Guide Release
   B. Location update for summer 2023 meetings

6. DISCUSSION ITEMS
   A. 730 Knightsford Lane Drainage Issue Conclusion
   B. Input on Water Quality section of the Climate Sustainability Plan

7. REPORTS
   A. STAFF REPORT: Stewardship Coordinator, Emma Campbell
      a. Update on current preservation projects & issues
         i. Update on preservation signage
         ii. Lake Lansing South Preserve
         iii. Floristic Inventory for Burn Management Areas
         iv. Native Transplant Inventory
      b. Stewardship update
   B. ENVIRONMENTAL COMMISSION REPORT: Board Member, Kendra Grassesschi
   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, July 12, 2023 at 6 pm at the Central Park Pavilion, 5151 Marsh Road, Okemos, MI 48864.

11. ADJOURNMENT

CHARTER TOWNSHIP OF MERIDIAN
LAND PRESERVATION ADVISORY BOARD REGULAR MEETING MINUTES
Township Service Center
2100 Gaylord C. Smith Court | Haslett, MI
Wednesday, April 12, 2023, 6 PM

PRESENT: Board Members: Steve Thomas, Kris Parnell, Kendra Grasssesschi, Kathy Fay.
ABSENT: Jamie Hiller, Mark Stephens.
STAFF: Emma Campbell, Stewardship Coordinator
TOWNSHIP: Trustee Courtney Wisinski.

1. CALL MEETING TO ORDER

Vice Chair Thomas calls to the meeting to order at 6:04 pm.

2. PUBLIC COMMENT
   A. NONE.

3. APPROVE AGENDA
   A. April 12, 2023

Commissioner Grassesschi would like to amend the April 12, 2023 agenda and table Item 6A until the next meeting.

Commissioner Grasssesschi moved to approve the April 12, 2023 Agenda and place on file as amended. Board member Parnell seconded.

Voice vote: unanimous.

4. APPROVE MINUTES
   A. March 8, 2023

Board member Parnell makes a motion to place the March 8, 2023 minutes on file. Board member Fay seconded.

Voice vote: Unanimous.

5. COMMUNICATIONS
   A. Towns Hall Building Renovations
      a. Town Hall is currently being renovated for the summer of 2023, which will cause board meetings to be held at a different location than the Township Service Center. Location change will be updated at the next meeting.

6. DISCUSSION ITEMS
   A. Overview of Green Burial letter of support (Tabled until more information is gathered)
   B. May meeting reschedule date

a. 17th, 24th, or 31st
b. It was decided to move the May meeting to the 31st at 6 pm located at the Township Service Center
c. Emma Campbell will notify the appropriate staff of this change

C. Meeting protocol refresher
   a. Public comment is allowed once at the beginning of each meeting as well as at the end of each meeting
   b. We can give 3-5 minutes for each public comment. If we decide to enforce this time limit, we must begin to enforce it for each meeting from this point forward.
   c. The chair is responsible for enforcing;
      i. Time limits for public comment
      ii. Bringing conversations and issues back when they stray off topic. Phrases to enforce this;
         1. "Point of order, I believe the discussion has wandered from topic."
         2. "I would like to make a motion so we can proceed with this project."
      iii. Calling on board members when they raise their hands for discussion, questions, and/or input on agenda items
   d. The board discusses issues in the past with too much engagement with public during public comment, which lengthens this portion of the meeting
      i. Board members may ask public questions during the agenda item being discussed
   e. The board takes a straw vote to issue a 3 minute time limit to all public comments. This will be the protocol moving forward at all future Land Preservation Advisory Board meetings
      i. Presentations on the agenda do not have a time limit and may allow for more discussion on the topic at hand
      ii. During Action Items the board is able to call on public, experts, and staff to ask questions about the issue, but it is not a discussion back and forth

D. 730 Knightsford Lane Drainage Issue Recap
   a. Emma Campbell introduces the issue and goes over the timeline included in the packet
   b. Board members comments:
      i. There is a concern with surface water runoff into the ground water at the preserve in that location. Surface water coming from neighborhoods have a higher chance of containing pesticide and fertilizer runoff
      ii. Where is the water coming from?
         1. It is converging from all sides, including the preserve and the adjacent properties. The Schultz property is the lowest point in that area.
      iii. There is a concern with the precedent this will set for all preserves in the Township with adjacent neighbors experiencing flooding issues due to outdated permitting and building of infrastructure.
      iv. More information is expected to be presented at the May meeting from the homeowners. Engineers installed a well monitor to gather information on the ground water levels per Land Preservation Board approval.

7. REPORTS
   A. STAFF REPORT: Stewardship Coordinator, Emma Campbell
      a. Update on current preservation projects & issues
         i. Preserve rule signage: signs are now delivered and parks utility workers are adding preserve signs throughout the summer
         ii. Wetland education signage has been designed and is being looked over by the Environmental Commission for Wetland Education funding allocation
            1. Signs include educational/interpretive information about wetland ecology and conservation, as well as ordinance signage for wetland buffer protection
         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
      b. Stewardship work for Spring 2023
         i. Prescribed burns at Red Cedar Glen Preserve and Davis Foster were both successful and met management goals
         ii. Invasive work is focused on herbaceous invasive species located in sensitive areas
            1. Earth Day events will occur at Harris Nature Center, including removing invasive plants and sowing native seeds from the Planting a Native Meridian program
         iii. Native plant transplants will be coming at the end of May for planting at preserves. Species include:
            1. Solidago speciose (showy goldenrod)
            2. Solidago juncea (early goldenrod)
            3. Symphyotrichum laeve (smooth blue aster)
            4. Erigeron pulchellus (Robin's plantain)
            5. Zizia aurea (golden alexander)
            6. Prunus Americana (wild plum)
            7. Asclepias tuberosa (butterfly weed)
   B. ENVIRONMENTAL COMMISSION REPORT: Board Member, Kendra Grassesschi
      a. Commissioner Grassesschi is pleased to report that fellow board Vice Chair, resident, and MCC volunteer, Steve Thomas, has been awarded the Stewardship Award from the Environmental Commission. He will be honored at the May meeting
      b. Recycle-a-Rama Township recycling event is happening on April 22nd for residents
      c. Work continues on the Climate Sustainability Plan and fellow board members are urged to add their input. Board member Yu Man Lee and Commissioner Grassesschi have been working together to develop the water quality section of the plan. An updated draft of the plan will be sent out.
   C. PARK COMMISSION REPORT: Board Member, Mark Stephens
      A. None, Commissioner Stephens absent.

9. PUBLIC COMMENT
   a. None.

10. OTHER MATTERS AND BOARD MEMBERS' COMMENTS
    a. Revaluate land acquisition protocol. What would we want to look for in potential future acquisitions if they are brought the board? We currently have met the goals of land acquisition in the Land Preservation Program, so what are the goals moving forward?

11. ANNOUNCEMENTS
    a. Next Land Preservation Advisory Board Meeting: Wednesday, May 31, 2023 at 6 pm at the Township Service Center, 2100 Gaylord C. Smith Court, Haslett 48840. **Update as of 6/8/2023; all summer meetings will be held at the Central Park pavilion located at 5151 Marsh Road, Okemos 48864.**

12. ADJOURNMENT

Board member Parnell moves to adjourn the meeting. Commissioner Grassesschi seconded.

Vice Chair Thomas adjourned the meeting at 7:26 pm.

730 Knightsford Lane Drainage Issue Overview

1. Mr. Schultz contacted Township staff in October of 2021 about flooding issues to their basement after a large storm event that took place in June of 2021. Damage was incurred to their basement.
2. Mr. Schultz and his engineer attended the November 2021 meeting to discuss the issue with the board.
3. Staff members met and wrote a letter of recommendation on next steps in January of 2022, one of the priorities being to contact the Ingham County Drain Office for their recommendations prior to moving forward with the Township.
4. In April of 2022 the Ingham County Drain Commissioner wrote a letter of recommendation after meeting with Mr. Schultz and his engineer.
    a. The ICDC came to the conclusion that Mr. Schultz's lot would not currently meet ICDC standards.
    b. The ICDC recommended utilizing the preserve property as an emergency overflow to prevent future flooding – directing flow onto Meridian property, then west toward Van Atta Road.
        i. Flow toward Van Atta Road then enters the easterly roadside ditch, under the jurisdiction of the Ingham County Road Department.
        ii. The flow would then pass through a cross culvert adjoining the drain on Meridian property.
        iii. A flowage easement would have to be created by the Township with specific conditions, and be the responsibility of the landowner at 730 Knightsford Lane.
5. Township staff met to discuss all options with Mr. Schultz and Mr. Ensign, his engineer.
    a. A new letter of recommendation was sent in May of 2022 with conditions and stipulations pending approval from the Land Preservation Advisory Board and the Township Board.
6. In July of 2022 Township Staff met with Mr. Schultz and Mr. Powers from Redwood Landscaping to discuss the details of swale construction and work that has been done to improve flow.
    a. Retention pond will be/was dug out to improve short-term filtration (not a long term solution)
    b. The culvert under the driveway at the property was cleaned out and opened up partially
7. At the November 9, 2022 meeting, the board discussed the drainage issue at length with Mr. & Mrs. Schultz, Mr. Ensign (project engineer) and Mr. Powers (landscaper).
    a. Concerns voiced from board members:
        i. Surface water runoff from the adjacent private properties will run into ground water at the preserve wetland. There is a concern of ground water contamination that would otherwise not happen.
        ii. Hydrology is hypersensitive in this area; native plants depend on the consistency of hydrology to thrive and persist.
        iii. Disturbed soil from excavation could cause invasive species to come into this area (reed canary grass).
        iv. The precedent that this would set on all preserves could be an issue in the future. Preserves may be taking on extra water from all homeowners flooding

issues as large flood events increase, and this could be a detriment to the native flora and fauna at preserves.

b. Suggestions from the board for alternative solutions to the issue:
    i. Install monitoring wells at the proposed swale site on Davis Foster Preserve to gather more information on the ground water level at the site. If the ground water level is determined to be well below the proposed swale depth, the surface water will not necessarily be an issue.
        1. The board would prefer to have monitoring wells installed through spring to get a more accurate reading on the ground water levels, but board members also understand this is an urgent issue for the landowner.
    ii. Get a cost estimate on installing a pipe that would direct water to the existing drain on the western side of the preserve property, which would help the surface water from mixing with ground water.
    iii. Get a cost estimate for option #3 from the ICDC recommendation letter, constructing a berm with pumps to provide a barrier between the overflow from the private retention basin and Mr. Schultz's house. A pump will be required to drain trapped water behind the berm.
c. The meeting concludes with the homeowners agreeing to address the concerns of the board members and to reconvene in May of 2023 to conclude the discussion and make a decision on the issue.
d. May of 2023: Mr. Schultz informs staff member, Emma Campbell, that they have decided to utilize solutions on their private property to alleviate the drainage issue. They will undertake the following changes in hopes it will mitigate flooding:
    i. Cleaning out the drainage basin to allow more water runoff.
    ii. Planting native species around the drainage basin to mitigate flooding and absorb more water than is currently possible.
    iii. Installing a sump pump to take on any extra overflow from the drainage basin.
e. Staff member, Emma Campbell, informed Mr. & Mrs. Schultz that we can reconvene at any time if the issue persists after making the changes on their private property.

Water Management

Water and how it is managed impact almost all aspects of society, in particular health, food production, water supply and sanitation, ecosystem functions, and community recreation. Particularly useful and comprehensive discussions of these issues have been compiled by the EPA (see https://www.epa.gov/sites/default/files/2016-04/documents/ow-climate-change-adaptation-plan.pdf) as part of the agency's broader documentation on climate adaptation (see https://www.epa.gov/system/files/documents/2021-09/epa-climate-adaptation-plan-pdf-version.pdf).

Major issues relevant to water management and climate change in Meridian Township: are weather changes such as increasingly extreme weather trends with potential to bring flooding or drought, the municipal water supply, and wastewater disposal. Energy requirements for drinking water production and wastewater treatment are also significant issues.

Past and Current Progress:

Stormwater: The Township's web site has a large section on storm water management and pollution prevention (https://www.meridian.mi.us/community/green-meridian/stormwater-management) including the #Pollution Isn't Pretty series of 30-second videos that range from "Sanitary Sewers vs Storm Sewers" and "Washing Your Car" to "Pesticides and Fertilizers", "Green Infrastructure and Low Impact Development", and "Managing Riparian Lands". Further information is regularly distributed via educational booths and materials at local community events. However, the challenges presented by the changing climate raise additional considerations.

Per federal requirements, as a municipality with a separate storm sewer system, Meridian Township must apply for a stormwater discharge permit every five years. To promote a regional approach to stormwater management, the Township is a member of the Greater Lansing Regional Committee for Stormwater Management, which provides technical and educational initiatives to reduce pollution from stormwater runoff.

Objective 1: **Increase the use of green stormwater infrastructure and other best management practices to reduce stormwater runoff, improve water quality of streams and lakes, and reduce flooding.** *(Maybe include a measurable deliverable on the amount of green infrastructure the township will install by a certain date)*

Strategies

1. Partner with the Ingham County Drain Commissioner to control and minimize storm water runoff.
2. In all future development projects, promote and incentivize the use of green stormwater infrastructure such as porous pavement, rain gardens, bioswales, riparian buffers, retention ponds, and the reuser of storm water for irrigation purposes
3. Limit construction of new impervious surfaces.
4. Review and update planning policies as needed to accommodate expected changes in storm surges and extreme weather events.

Wetlands: Wetlands cover over 25% of Meridian Township and play key roles in maintaining healthy watersheds and communities while providing resilience to extreme precipitation and

drought events. Due to their ecological and social value, in 2011 the "no net loss" policy was adopted by the Board of Commissioners which stipulates a wetland drained or filled must be replaced by a wetland of equal or greater size. To further their protection, the Township created a wetland ordinance which regulates all wetlands 0.25 acre in size or larger, as well as wetlands contiguous to permanent water bodies. Information regarding the wetland ordinance is located at https://www.meridian.mi.us/community/green-meridian/wetland-protection. The Township maintains a wetland inventory map and incorporates considerations of wetlands into their site plan review processes. Between the Environmental Commission, the Wetland Education Team, and the Meridian Conservation Corps, resources have been developed for use by residents, developers, landscapers, and contractors to recognize and protect wetlands by preserving and developing buffers and vegetation strips and avoiding unecessary use of fertilizers, pesticides, and herbicides, on lawns and other managed landscapes.

Objective 2: **Protect wetland ecosystem health and services by strengthening policies and activities that favor wetland area expansion, enhance wetland quality and resilience, and build public awareness of the value and stewardship of wetlands.**

Strategies

1. Inventory: Regularly (every 5 years?) compile and assess an updated inventory of the township's wetland quantity and quality, including updates from the State of Michigan's wetland maps and information from wetland delineations performed as part of the Township's permitting processes.
2. Protection: (a) Regularly review, strengthen, and enforce the Township's existing wetland-relevant ordinances to protect and increase wetland acreage in the Township and address gaps or additional needs in wetland protection. (b) Develop policies to prefer infill development over "sprawl" projects within or impacting wetlands, floodplains, wetland and floodplain fringe areas, and water retention areas.
3. Expansion: Continue to acquire land preserves, while protecting existing wetlands and expanding their buffer areas. Identify priority areas of existing Township properties that could be restored to wetlands, and encouraging buffer expansion around existing wetlands.Distribute seasonal educational materials and provide educational programs on wetlands' critical importance, protective functions, and stewardship opportunities.
4. Education: Create public signage, seasonally distributed materials, and programs on wetlands' critical importance, protective functions, stewardship opportunities, and the value of vegetation with low requirements for supplemental watering.

Municipal Water: Across the region, people rely almost exclusively on groundwater for their drinking water. Locally, East Lansing Meridian Water & Sewer Authority uses 30 municipal drinking water wells to supply the township's ~75,000 residences and businesses with safe and reliable drinking water. To further protect the quality and quantity of our drinking water, Meridian Township is a member of the Groundwater Management Board which focuses on both technical and educational initiatives to protect the future use of groundwater resources. Additionally, East Lansing Meridian Water & Sewer Authority maintains a wellhead protection plan for both the City of East Lansing and Meridian Township. This plan is part of a voluntary program through the State of Michigan to protect groundwater-based public water supply systems from potential sources of contamination. For a community that relies almost exclusively on groundwater for drinking water needs, these plans help to protect the quality and quantity of this key resource.

Objective 3: **Incorporate the goals of the East Lansing Meridian Water Sewer Authority's wellhead protection plan into Meridian Township activities.**

Strategies

1. Continue to incorporate wellhead protection into the Township's planning process, especially with a focus on zoning issues and subdivision control practices.
2. Coordinate with other communities, organizations, wellhead protection teams, and stakeholders to assure protection of regional drinking water sources.
3. Implement strategies from the Master Plan which protect groundwater resources and recharge areas.
4. Focus on the integration of activities, especially education and post-construction control requirements, required under the Township's Stormwater Phase II NPDES Permit with the goals of wellhead protection plan.
5. Continue to identify abandoned wells within wellhead protection areas and work towards their permanent closure.

Water Treatment: Sanitary sewerage collection, treatment, and disposal for the Township occurs in a treatment plant near the border between East Lansing and Lansing. Over the past two decades, the sanitary sewerage systems in the greater Lansing area, including Meridian Township, have been separated from stormwater sewers to prevent discharge of raw sewage into the environment. This separation minimizes the potential for impacts of extreme rain events on sanitary wastewater treatment. Water and sewage treatment demand high energy inputs and require significant infrastructure and upkeep.

Objective 4: Continue to maintain the infrastructure needed for both water and sewage treatment while promoting public education on where their drinking water comes from and the importance of reducing their water consumption.

Strategies

1. Inventory: Use building audits of township buildings to identify water fixtures and practices to decrease water usage. Incentivize similar policies in the permitting of new construction projects.
2. Protection: Ensure that township infrastructure and emergency personnel are in close contact with East Lansing Meridian Water & Sewer Authority and Lansing Board of Water & Light regarding storm, drought, or other emergency water safety and supply plans and strategies. Of particular importance is wellhead protection, both of operational wells and of potentially abandoned wells that could contaminate groundwater sources.
3. Reduction: Minimize water usage at Township facilities by developing systems to use environmentally collected waters and incentivize similar practices for large-scale users.
4. Education: Educate the community on where their drinking water comes from, and on how to reduce landscape and residential usage and protect water supplies to gain their support and participation in the process.

LAKE LANSING NORTH FIREMON PLAN

Goals and Objectives of Burns and Fire Ecology Management That Can Be Monitored

Goal: the overall desired outcome of treatment

1. There are multiple goals for the Meridian Township's Lake Lansing North Land Preserve fire management program. **1.** Support the oak and hickory seedlings that are currently present **2.** Improve the overall native plant diversity. **3.** Increase the native wildflower density. **4.** Improve habitat for songbirds, small mammals, snakes, and turtles. **5.** Improve habitat for native insects. **6.** Continue to steer this land preserve towards a more natural, remnant state.

Objective: the quantifiable measures used to evaluate the outcome

1. Examples) **1.** Increase suitable growing conditions for oaks and hickories within the sample plots by killing 90% or more of the shade tolerant seedlings and saplings within 1 year of each burn and increase the frequency of oak/hickory species by 2 individuals per sample plot after each burn. **2.** Increase the Floristic Quality Index score for sample plots by 5 points after each burn until a score of 35 is achieved, increase native species richness in sample plots by 1 species after each burn until 20 species is achieved, and increase the relative % cover of native species in sample plots by 3% after each burn until 100% coverage is achieved. **3.** Increase the relative % coverage in sample plots of native forbs by 5% after each burn until 75% coverage is achieved and increase the native forbs species richness in the sample plots by 1 species after each burn until 10 species is achieved. **4.** *Some measurable metric about wildlife habitat component (food, shelter, mating grounds, nesting sites, nesting materials, cover to hide in, etc)*. **5.** *Some measurable metric about pollinator habitat component (food, larval host plants, shelter, cover to hide in, etc).* **6.** Close the gap between Total Mean C and Native Mean C until the difference is 0.
2. It is helpful to identify the critical objectives that need to remain unchanged and which can be altered in the future. We will denote these in a more specific plan.

Determining the Sample Area and Spatial Stratification

Lake Lansing North is a rugged, rolling, wooded terrain that is comprised mostly of deciduous hardwood forest. There are some significantly wetter areas that have been identified as vernal pools and wetlands. A high ridge runs down the center of the preserve. Prior to European settlement it is thought that this land may have supported oak-hickory forests, mixed conifer swamps, wet prairies, or a black oak barren. The boundary for the survey area that will contain the nested sample plots is the fire breaks (or if the fire jumps, then the edge of the area that was burned). The size of the sample plots will depend on the size of the burn unit that year. The sampling areas that we will focus on will either have oaks or hickories already existing within the plots or will consist of suitable growing conditions for these two tree species. The sample areas will not include non-forested community types such as traditional cattail/phragmites wetlands or meadows that exist on this property. A control site will be surveyed outside of the existing burn units (just across the trail from the burn unit) to provide a representation of native flora without the occurrence of fire.

Figure 1: Ariel overview with of Lake Lansing North with the conservation easement parcel outlined in black to delineate the boundary of the land that is managed by Meridian Township but still owned by Ingham County Parks in their Lake Lansing North County Park.

Sampling Design

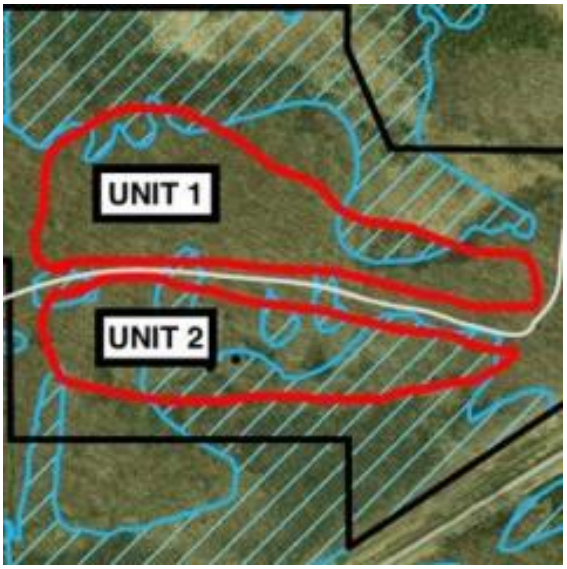
Calculating sample statistics

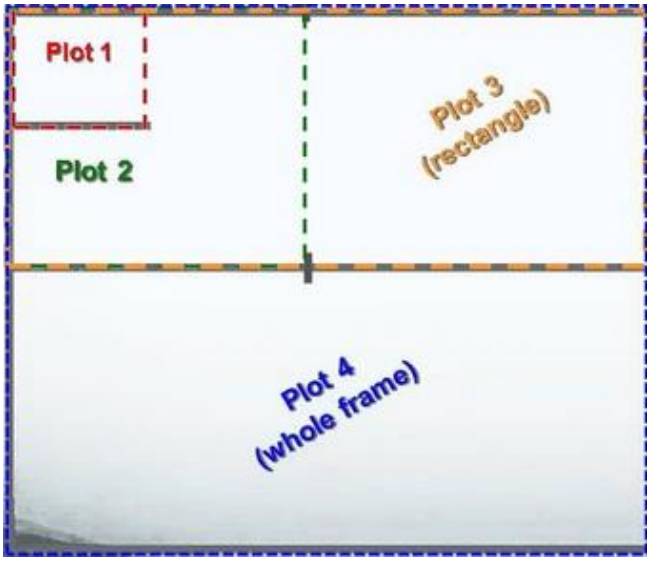
1. Estimate the number of 8-hour workdays available to finish the monitoring project
2. Cost of renting a vehicle for the period of sampling- *$0, we have a work truck that can transport up to 5 people*
3. Cost to outfit each crew with supplies- *$0, all wardrobe supplies are at cost to the employees working the project*
4. Equipment needs for sampling- *GPS, cell phones (camera, SEEK), flags or flagging tape, 10 meter long tape measurer, clipboard, data entry forms, pen*
5. Estimate of time invested in sampling plots- *1 plot an hour is realistic for a two person crew at this site as the terrain is not too challenging, there is no drive time between plots just short hikes for this area*

Calculating the number of polygons to be sampled

To monitor for our goals, we will be surveying areas that have existing oaks and hickories or have the proper conditions for these species to exist there but may not currently be present. Due to the size of our burns being relatively small each burn unit will be treated as one stand and equal the entire survey area. For example, since there are two burn units (in the figure below) these will be treated as two separate survey areas that will require their own set of sample plots. Each survey area should have a minimum of 5 sample plots. FIREMON recommends that plots be randomly placed throughout the survey area. It is recommended to weigh the number of plots per polygon by size of the burn area. At each random point in the burn area, we propose setting up nested plots. Nested plots are good a

sampling technique to employ when trying to account for the frequency of species in small plots that are representative of the entire burn unit.





The smallest sub-plot should by 2 ft x 2 ft, the second smallest subplot should be 4 ft x 4 ft, the third smallest subplot should be 8 ft x 8 ft, and the largest subplot should be 16 ft x 16 ft.

Establishing Control Plots

Control plots are established in areas outside the perimeter of your treatment unit in order to collect reference data that will be used to compare against your post treatment data. It is important to use the same amount of survey effort in the control plots as the treatment plots. Control plots allow you to assess the effects of factors other than fire (such as weather or wildlife) on the characteristics that you are monitoring for. Monitoring projects that focus on statistically quantifying the changes in forested understories plant composition requires several control plots. A minimum of 3 control plots is recommended by FIREMON per survey area if statistical analysis is being conducted. The control plots should share a boundary with the treatment area and be randomly placed along the boundary.

Sampling Overview

The following metrics will be collected during each survey session for each sampling plot:

Survey data- **Date, surveyor name, duration of survey**.

Plot Description- **coordinates, location within burn unit, plot identification (name or number), plot size (m^2), % bare ground, photos, plot type (treatment or control)**.

Species Composition Method- This method is used to acquire inventory data over large areas using few field technicians. This method addresses changes in plant species cover and composition over time. **List of all herbaceous and woody species observed**.

Cover/Frequency Methods- This method is used for monitoring the changes in plant species (that are under 3 feet tall) cover and frequency. This method is favored over the point intercept method for this

monitoring project as some species of interest are considered rare which are easier to detect when sampling with quadrats. **Estimate % cover of plot by each species.**

Density Methods- This method is used for monitoring changes in plant species number. This method works best for grasses, forbs, shrubs, and small trees. This method is particularly useful for sampling rare plants. This method is also useful for gathering information on seedling emergence, survival, and mortality. **Count the number of stems of each species.**

Sampling Steps

1. Start form by filling out: **Date, surveyor name, coordinates, location w/in burn unit, plot identification, plot size, % bare ground, photos, plot type (control or treatment), and survey start time**.
2. Walk around the entire sample plot to familiarize oneself with vegetation layers and common plant species.
3. Enter the smallest nested sub-plot
    a. **Record each species that is observed**
    b. **Record the estimated % cover of plot by each species that is observed**
    c. **Record the number of stems of each species**
4. Enter the second smallest nested sub-plot
    a. **Walk transects in order to cover the entire area**
    b. **Record each species that is observed**
    c. **Record the estimated % cover of plot by each species that is observed**
    d. **Record the number of stems of each species**
5. Enter the third smallest nested sub-plot
    a. **Walk transects in order to cover the entire area**
    b. **Record each species that is observed**
    c. **Record the estimated % cover of plot by each species that is observed**
    d. **Record the number of stems of each species**
6. Enter the largest nested sub-plot
    a. **Walk transects in order to cover the entire area**
    b. **Record each species that is observed**
    c. **Record the estimated % cover of plot by each species that is observed**
    d. **Record the number of stems of each species**
7. Wrap up the survey by filling out: **survey end time**

Data Processing Overview

Once the field data has all been collected bring the forms back to the office so that a Floristic Quality Assessment for each sample plot can be generated. Completing a FQA is important for monitoring vegetation changes over time, comparing the effectiveness of fire management, and distinguishing between high- and low-quality areas.

Processing Steps

1. Log into https://universalfqa.org/
   USERNAME: fisher@meridian.mi.us
   PASSWORD: FourToedSalamander2023!
2. Click **New Transect/Plot**
3. Select the FQA database- **Michigan, 2014**
4. Select the Cover Method- **% Cover**
5. Fill in Date and Location- **select from list or add a new site**
6. Fill in Details
   a. Assessment Name- **Year_Season_PlotID**
   b. Practitioner- **Surveyors Initials**
   c. Lat and Long
   d. **Private** (viewable only by you)
7. Transect/Plot Design
   a. Plot
      i. Plot Size- for entire sample plot
      j. Quadrat/Subplot Size- **add sizes for all nested plots, separate each subplot size with a " , "**
8. Quadrats/Subplots
   a. Click **Add New Quadrat/Subplot**
      i. **Quadrat/subplot**
         1. Quadrat/Subplot Number or Name- **Number that is associated with that group of nested plots. Letter that is associated with that particular subplot.** *(A = smallest nested plot, B = second smallest nested plot, C = third smallest nested plot, D = largest nested plot)*
         2. Lat and Long- **N/A**
         3. % Bare Ground- **type in data from field sheets**
         4. % Water- **N/A**
      ii. To Add Species Individually- this seems to be easier because spelling errors are corrected this way.
         1. Type in **Scientific Name or Common Name**
         2. Select a **% Cover**
      iii. Click on **Save**
9. Finished?
   a. Click **Save and View Results**

If everything was done correctly you should get a results summary that looks something like this:

TEST02

» Date & Location:

2023-05-17
Test

» FQA Database:

Region: Michigan
Year Published: 2014
Description:
Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014. Michigan Floristic Quality Assessment Database. Herbarium, University of Michigan, Ann Arbor, MI and Michigan Natural Features Inventory, Michigan State University, Lansing, MI. http://michiganflora.net

» Details:

Practitioner: RS
Latitude:
Longitude:
Community Code:
Community Name:
Community Type Notes:
Weather Notes:
Duration Notes:
Environmental Description:
Other Notes:
This assessment is public (viewable by all users of this website).

» Transect/Plot Design:

Transect or Plot: Transect
Plot Size (m^2):
Quadrat/Subplot Size (m^2):
Transect Length (m):
Sampling Design Description:
Cover Method: Daubenmire 1959

» Conservatism-Based Metrics:

Total Mean C: 4
Cover-weighted Mean C: 4
Native Mean C: 4
Total FQI: 6.9
Native FQI: 6.9
Cover-weighted FQI: 6.9
Cover-weighted Native FQI: 6.9
Adjusted FQI: 40
% C value 0: 0%
% C value 1-3: 33.3%
% C value 4-6: 66.7%
% C value 7-10: 0%

» Species Richness:

Total Species: 3
Native Species: 3 (100%)
Non-native Species: 0 (0%)

» Species Wetness:

Mean Wetness: 3
Native Mean Wetness: 3

» Duration Metrics:

Annual: 0 (0%)
Perennial: 3 (100%)
Biennial: 0 (0%)

Native Annual: 0 (0%)
Native Perennial: 3 (100%)
Native Biennial: 0 (0%)

» Physiognomic Relative Importance Values:

Physiognomy	Frequency	Coverage	Relative Frequency (%)	Relative Coverage (%)	Relative Importance Value
Native forb	2	196	66.7	66.7	66.7
Native vine	1	98	33.3	33.3	33.3

» Species Relative Importance Values:

Species	Family	Acronym	Nativity	C	W	Physiognomy	Duration	Frequency	Coverage	Relative Frequency (%)	Relative Coverage (%)	Relative Importance Value
Podophyllum peltatum	Berberidaceae	PODPEL	native	3	3	forb	perennial	1	98	33.3	33.3	33.3
Parthenocissus quinquefolia	Vitaceae	PARQUI	native	5	3	vine	perennial	1	98	33.3	33.3	33.3
Geranium maculatum	Geraniaceae	GERMAC	native	4	3	forb	perennial	1	98	33.3	33.3	33.3

» Quadrat/Subplot Level Metrics:

Quadrat/Subplot	Species Richness	Native Species Richness	Total Mean C	Native Mean C	Total FQI	Native FQI	Cover-weighted FQI	Cover-weighted Native FQI	Adjusted FQI	Mean Wetness	Mean Native Wetness	Latitude	Longitude
TESTTTTTTTTTTTT	3	3	4	4	6.9	6.9	6.9	6.9	40	3	3	n/a	n/a
Average	3	3	4	4	6.9	6.9	6.9	6.9	40	3	3	n/a	n/a
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	n/a	n/a

» Quadrat/Subplot TESTTTTTTTTTTTT Species:

Scientific Name	Family	Acronym	% Cover	Cover Range (Midpt)	Nativity	C	W	Physiognomy	Duration	Common Name
Geranium maculatum	Geraniaceae	GERMAC	98	6: 95-100% (97.5)	native	4	3	forb	perennial	wild geranium
Parthenocissus quinquefolia	Vitaceae	PARQUI	98	6: 95-100% (97.5)	native	5	3	vine	perennial	virginia creeper
Podophyllum peltatum	Berberidaceae	PODPEL	98	6: 95-100% (97.5)	native	3	3	forb	perennial	may-apple

Interpreting THE FQA Results

In the above figure the portions of the results that are contained within the red boxes are the most relevant to analyzing whether or not we are meeting pre-established objectives and in turn our goals for the fire management project that have been set for Lake Lansing North. There is a lot of information in the summary report from the FQA so this section is written to help with digesting the results and solidifying the connections.

- **Total Mean C**- This is the mean coefficient of conservatism value of all species present in the entire sample plot (combination of the values from the nested plots)
- **Native Mean C**- This is the mean coefficient of conservatism value of all native species present in the entire sample plot (combination of the values from the nested plots)

If the difference between these two C values is greater than 5, this suggests that the native species have been compromised by non-native species! This connects to our objective to **c**lose the gap between Total Mean C and Native Mean C until the difference is 0. This connects to our overall goal to continue to steer this land preserve towards a more natural, remnant state.

- **Total FQI**- This is the total floristic quality index for the entire sample plot (combination of the values from the nested plots). Score interpretation:
  - **1-19 = low quality**
  - **20-35 = high quality**
  - **>35 = exceptional quality**

This connects to our specific objective to increase the Floristic Quality Index score for sample plots by 5 points after each burn until a score of 35 is achieved. This objective connects to our goal to improve the overall native plant diversity.

- **Species Richness: Native Species**- This is the total number of species of native plants that were found in the entire sample plot (combination of the values from the nested plots).

This connects to our specific objective to increase native species richness in sample plots by 1 species after each burn until 20 species is achieved. This objective connects to our goal to improve the overall native plant diversity.

- **Physiognomic Relative Importance Values: Native Forbs and Frequency**- This is the total number of native forbs species that were found in the entire sample plot (combination of the values from the nested plots).

This connects to our specific objective to increase the native forbs species richness in the sample plots by 1 species after each burn until 10 species is achieved. This objective connects to our goals to improve the overall native plant diversity, improve habitat for native pollinators, and continue to steer this land preserve towards a more natural, remnant state.

- **Physiognomic Relative Importance Values: Native Forbs and Relative % Coverage**- This is the total density of all native forbs that were found in the entire sample plot (combination of the values from the nested plots).

This connects to our specific objective to increase the relative % coverage in sample plots of native forbs by 5% after each burn until 75% coverage is achieved. This objective connects to our goals to improve habitat for native pollinators and continue to steer this land preserve towards a more natural, remnant state.

- **Physiognomic Relative Importance Values: Relative Coverage**- This is the density of all native plants that were found in the entire sample plot (combination of the values from the nested plots).

This connects to our specific objective to increase the relative % cover of native species in sample plots by 3% after each burn until 100% coverage is achieved. This objective connects to our goals to continue to steer this land preserve towards a more natural, remnant state.

- **Species Relative Importance Values: Species and Frequency**- This is the complete list of all species (native and non-native) that were found in the entire sample plot (combination of the values from the nested plots) and the number of stems of each species that were found in the entire sample plot (combination of the values from the nested plots).

This connects to our specific objectives to increase suitable growing conditions for oaks and hickories within the sample plots by killing 90% or more of the shade tolerant seedlings and saplings within 1 year of each burn and to increase the frequency of oak/hickory species by 2 individuals per sample plot after each burn. These objectives connect to our goals to support the oak and hickory seedlings & saplings that are currently present and continue to steer this land preserve towards a more natural, remnant state.