Michigan Natural Resources Trust Fund Application 2020
Organization: Oakland Charter Township **TF20-0206**
Section A: Applicant Site and Project Information: Lost Lake Nature Park

***Is the application for site development or land acquisition?** Development ✔ Acquisition			
***Name of Applicant** (Government Unit) Oakland Charter Township	***SIGMA VSS** CV0023503	***SIGMA Address Code** 001	***County** Oakland County
***Name of Authorized Representative** Melinda Milos-Dale		***Title** Parks and Recreation Director	
***Address** 4393 Collins Road		***Telephone** (248) 651-4440 **Fax**(248) 601-0106	
***City** Rochester	***State** MI	***ZIP** 48306	***E-mail** mmdale@oaklandtownship.org
***State House District** District 46	***State Senate District** District 12	***U.S. Congress District** District 8	

***Proposal Title** (Not to exceed 60 characters)
Lost Lake Nature Park Expansion

***Proposal Description**

Fee simple acquisition of 235-acre addition to Oakland Township's existing 58-acre Lost Lake Nature Park. The parcel contains MNFI Priority 1 natural areas including prairie fen; a statewide priority in the Michigan Wildlife Action Plan, Clam Lake, and West Branch Stony Creek. It is of regional and statewide importance because of potential to protect and interpret high-quality natural areas vulnerable to extinction at either Global and/or Statewide level. The addition could connect trail and ecological corridors with Lost Lake Nature Park and Oakview Middle School, provide improved trail and vehicular access from collector roads, increase the length of park trails to more than 4 miles and provide public access to Clam Lake, West Branch Stony Creek, and highly-valued forests and wetlands including prairie fen and black spruce bog. The northern 10-acre farm field is proposed for active recreation and existing structures would be used as a Park Visitor Center and a Storage Building.

***Address of Site** 10-09-100-022 and 10-04-376-011	***City, Village or Township of Site** Rochester	***Zip** 48306
***County in which Site is located** Oakland	***Town, Range and Section Numbers of Site Location** *Letters must be upper-case:* *(examples: T02N, R13E, 22)* (Town) T04N (Range)R11E (Section)09	***Latitude/Longitude at park entrance** 42.733869 -83.110266

***Park Name**
Lost Lake Nature Park

SOURCES OF MATCHING FUNDS	PROJECT COST AMOUNTS
***Grant amount requested (round to the nearest hundred dollars)**	$3,081,000
Total Match	$1,027,000
Total Project Cost	$4,108,000
Percentage of match commitment **(Must be at least 25% of total project cost)**	25%
a) General Funds or Local Restricted Funds (Applicant's own cash)	$1,027,000
b) Force Account Labor/Materials (Applicant's own paid labor or materials)	
c) Federal or State Funds	

You have entered a value for item c). ***Please provide the information below for each federal or state program from which matching funds will be provided.*** *COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG) AND RECREATIONAL TRAILS PROGRAM (RTP) ARE THE ONLY FEDERAL FUNDS THAT CAN BE USED AS MATCH:*

*(1) Program Name	*Administering Agency	
*Contact Name for Administering Agency	*Telephone	*Amount

*Type of Funds

Grant funds awarded — Date grant funds approved

Grant funds applied for, not yet approved — Estimated approval date

Appropriated funds — Date appropriated

Other, explain

*Is documentation containing the scope of work and budget for the other grant funds included with application?
Yes No
*Is documentation (such as grant approval letter) that verifies the availability of funds included in the application?
Yes No

Check to add program information for additional State of Federal funds that will be used as Match.

(2) Program Name	Administering Agency	
Contact Name for Administering Agency	Telephone	Amount

Type of Funds

Grant funds awarded

Date grant funds approved

Grant funds applied for, not yet approved

Estimated approval date

Appropriated funds

Date appropriated

Other, explain

Is documentation containing the scope of work and budget for the other grant funds included with application?
Yes No

Is documentation (such as grant approval letter) that verifies the availability of funds included in the application?
Yes No

Check to add program information for additional State of Federal funds that will be used as Match.

(3) Program Name	Administering Agency	
Contact Name for Administering Agency	Telephone	Amount

Type of Funds

Grant funds awarded

Date grant funds approved

Grant funds applied for, not yet approved

Estimated approval date

Appropriated funds

Date appropriated

Other, explain

Is documentation containing the scope of work and budget for the other grant funds included with application?
Yes No

Is documentation (such as grant approval letter) that verifies the availability of funds included in the application?
Yes No

d) Cash Donations

You have entered a value for item d). ***Please list the individual sources and the amounts to be donated below.***

SOURCE	AMOUNT
*	
Total	**$0**

*Is a letter of intent from each donor included with the application?
Yes No

e) Donated Labor and/or Materials

You have entered a value for item e). ***Please include each item to be donated, the source, dollar value, and how the dollar value was determined.***

ITEM	SOURCE	DOLLAR VALUE	VALUATION METHOD
*			
	Total	$0	

*Is a letter of intent from each donor included with application?
Yes No

f) Donated Land Value (acquisition applications only)

You have entered a value for item f). ***Please describe how the value of the land donation was determined.***

*

*Is a letter from the landowner committing to the donation of a portion of fair market value and any conditions placed upon their commitment included with application?
Yes No

Section C1: Project Details

Land Acquisition Applications ONLY

***Interest acquired will be** (check all that apply)

- ✔ Fee Simple
- Easement
- Other

*What are the current land uses that exist on the parcel? (check all that apply)

- ✔ Undeveloped/natural land
- ✔ Agricultural
- ✔ Residential
- Commercial (including timber extraction)
- Recreational
- Other (describe)

*Any buildings on the site? No ✔ Yes

*Any encroachments or boundary disputes with neighbors? ✔ No Yes

*Was an assessor, appraiser, broker or listing used to justify the estimated appraised value? No ✔ Yes

Parcel Information Table

*Itemize estimated cost information for each parcel. For phased projects, the parcels and dollar amounts provided should include all phases.

	LANDOWNER	ACREAGE	STATE EQUALIZED VALUE (SEV)	(1) ESTIMATED APPRAISED VALUE ($)
1)	William M Fox Revocable Trust	36.42	$195,300	$618,200
2)	William M Fox Revocable Trust	199.22	$1,418,300	$3,381,800
3)				
4)				
5)				
	TOTALS	**235.64**	**$1,613,600**	**$4,000,000**

(2) ESTIMATED INCIDENTAL COSTS

Prorated Taxes	$39,400
Recording Fees	$200
Transfer Tax	$34,400
Title Insurance	$13,500
Appraisal Fees	$15,000
Closing Fees	$500
Environmental Assessment Costs	$5,000.00
TOTAL	**$108,000**

TOTAL APPRAISED VALUE (1)	$4,000,000
TOTAL INCIDENTAL COSTS (2)	$108,000
TOTAL ACQUISITION COSTS	**$4,108,000**

Comments:

Current landowner obtained initial appraisal used for this grant application.

Parcel 10-09-100-022, located at 1401 Lake George Road, Oakland, MI 48363, contains a 2500 sq ft bungalow that would be repurposed as a park visitor center, two smaller outbuildings that would be demolished, and a large historic barn that would be repurposed for storage of maintenance and natural area stewardship equipment and supplies.

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Section D: Justification of Need

*1) If you are submitting multiple acquisition or development applications, what is the priority for this application? (1 = highest) 1

*2) What page(s) of your recreation plan is the need for the proposed project discussed? From: 87 To: 106
If proposed project is on only one page, please enter the page number in both boxes

*3) What was the date(s) of public meeting to discuss submission of the grant application? 9/9/2020
Additional dates: 09/10/2020

*4) Did you gather public input from individuals with disabilities, their families, or advocates? ✔ No Yes

*5) Are you the primary provider of recreation services to any surrounding communities, as documented in your recreation plan? ✔ No Yes
List Communities:

*6) Explain how you plan to address safety considerations and crime prevention in the project area?
The main entrance to this park will be from Lake George Road, a collector road which supports natural and scheduled surveillance of the park by deputies from the Oakland County Sheriff's Department. The proposed parking lot will be visible from the Lake George Road park entry and will provide access to all looped trails. Park rules and regulations, including hours of operation (dusk to dawn), will be posted at the park entrance.

*7) Explain how you will make the public aware of the project, as well as the efforts you will use to publicize and promote your project. Include marketing methods that will effectively communicate with persons with disabilities.
When Lost Lake Nature Park Expansion is opened to the public there will be an opening celebration including a ribbon-cutting that will be widely advertised in the media across the region. This park's new programming will be promoted in Oakland Township municipal as well as Parks and Recreation newsletters; on the Township website, Facebook Instagram; Oakland Township's public access cable TV channel; and at special events including our fall festival, winter carnival, and summer concerts.

*8) Does the applicant have a formal recreation department or committee? Please explain below. For park committees, describe how members are appointed, their roles and responsibilities. List of members and meeting schedule.
Formal Recreation Department

Oakland Township Parks and Recreation Department's 10 employees report to a 7- member elected Parks and Recreation Commission that meets regularly on a monthly basis. Both the Commission and Department are described on pages 29 and 30 of the 2020-2024 5-year Master Plan.

1	NO	YES
1) *Questions 1 is for acquisition applications only - for development projects, leave blank and move to question 2.* Will the applicant have adequate funds on hand to complete the acquisition transaction without any third party assistance (i.e. loans, lines of credit, etc.) **until partial reimbursement and final audit is completed** (approximately 180 days after closing)?	✔	
* 2) Has applicant received DNR recreation grant(s) in the past?		✔
If yes, does applicant currently have an open, active grant?		✔
*3) Has applicant closed, sold, or transferred any parkland or recreation facilities in the past 5 years?	✔	
*4) Does applicant have a known unresolved conversion of grant-assisted parkland? (a conversion is a change from public outdoor recreation use to some other use)	✔	
*5) Does applicant have a "residents only" policy for this park or other parks or recreation facilities?	✔	
*6) Do you now or do you intend in the future to charge an entrance fee to the project site?	✔	
If yes, fee schedule and policy for reduced entrance fees for low-income users included with application?		

If yes, attach supporting Documentation on Required Attachments page.

*7) What is the applicant's current year budget for parks and recreation?	$3,103,900.00
*8) What are the estimated operation and maintenance costs associated with the project?	$34,631.00

Comments:
Active MNRTF grants include:
TF18-0098 Paint Creek Junction Park Northern Trailhead - This development project is expected to be constructed in Spring/Summer 2021.
TF19-0074- Marsh View Park Restrooms - In process of executing project agreement.
TF19-0081 - Bear Creek Nature Park Restrooms - In process of executing project agreement.

Regarding Question 7, $3,103,900.00 combines the 20/21 Parks and Recreation Millage and Land Preservation Millage budgets of $1,987,500 for Operations and Maintenance and $1,116,400 for Capital Improvements. The Land Preservation Millage funds would provide the majority of matching funds for this grant.

Regarding Question 8, see the attached Maintenance Plan that details the tasks and costs for natural area management, including invasive species control, and the maintenance of recreation and support facilities.

Section F: Site Conditions

	NO	YES	UNKNOWN
*1) Does the applicant, landowner, or others have knowledge that any portion of the property is or has been used for industrial purposes, including manufacturing and/or minerals' processing or extraction (sand, gravel, oil, or gas) at this time or in the past?	✔		
*2) Does the applicant, landowner, or others have knowledge that any portion of the property is currently being used or has been used in the past for a gas station, motor vehicle service or repair facility, commercial printing facility, dry cleaners, photo developing lab, junkyard, landfill, waste treatment, storage, processing or recycling or disposal facility?	✔		
*3) Does the applicant, landowner, or others have knowledge that any of the following are or have in the past been stored, discarded, or used on the property – automotive or industrial batteries, pesticides or other chemicals used in agricultural practices, paints, industrial waste, or other chemicals in drums or other containers?	✔		
*4) Does the applicant, landowner, or others have knowledge that fill dirt or other fill material of unknown origin is on this property or has in the past been placed on the property?	✔		
*5) Does the applicant, landowner, or others have knowledge of any evidence of leaks, spills, or stains from a substance other than water at this time or in the past?	✔		
*6) Does the applicant, landowner, or others have knowledge that there are or have in the past been waste disposal pits, lagoons, or ponds on the property?	✔		
*7) Does the applicant, landowner, or others have knowledge that there are at this time or have in the past been registered or unregistered storage tanks on the property?	✔		
*8) Does the applicant, landowner, or others have knowledge that contaminated groundwater lies below the property?	✔		
*9) If there is a water well on the property, does the applicant, landowner, or others have knowledge that contaminants have been identified in the well that exceeded legal standards or has the well been identified as contaminated by a government agency?	✔		

Section F: Site Conditions

	NO	YES	UNKNOWN
*10) Has the landowner been notified about any current violations of environmental laws pertaining to activities on the property or does applicant, landowner, or others have knowledge about past violations?	✔		
*11) Has the landowner been notified of any environmental assessments of the property that identified a) the presence of hazardous substances, petroleum products, or contamination; or b) the need for further assessment?	✔		
*12) Does the applicant, landowner, or others have knowledge that any hazardous substances, unidentified waste materials, tires, or automotive or industrial batteries have been dumped above ground, buried, or burned on the property?	✔		
*13) Is the property listed on any federal or state list of contaminated sites, including the site of a leaking underground storage tank?	✔		
*14) Does the applicant, landowner, or others have knowledge that any of the adjoining properties are currently being used or have been used in the past for the purposes listed in the previous questions 1-13?	✔		
*15) Has an environmental assessment been completed for the site? If yes, provide the most current on the Required Attachments page.	✔		
*16) Are permits required for the development of the site?	✔		

If yes, please complete the following table:

TYPE OF PERMIT	PERMITTING AGENCY	EFFORTS TAKEN TO OBTAIN PERMIT OR DETERMINING PERMIT REQUIREMENTS

If **'Yes'** or **'Unknown'** was selected for any of the questions on this page, please explain here:

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Section G: Natural Features of The Project Site

To the best of your knowledge, does the project site include:

***Great Lakes shoreline or Great Lakes connecting water frontage?**	✔ **No Yes**
If yes, name of Great Lake or Great Lakes connecting water:	
How many linear feet of shoreline or frontage?	
***Inland lake frontage?**	**No ✔ Yes**
If yes, name of water body:	Clam Lake
What is the size of the total water body in acres?	15
How many linear feet of frontage are on site?	1600
***River and/or tributary frontage?**	**No ✔ Yes**
If yes, name of water body:	West Branch of Stony Creek
How many linear feet of frontage?	3100
Is the river or tributary a state natural river or a federally dedicated wild and scenic river?	✔ No Yes
***Wetland acreage or frontage?**	**No ✔ Yes**

If yes, please list the number of acres of the type(s) of wetland(s) on site:

Marsh	7	Bog	4	Dune and swale complex	
Prairie		Forest	89	Boreal Forest	
Fen	7	Shrub	11	Type unknown	

Is documentation of type and quality with application?	No ✔ Yes
If yes, source of information:	MNFI, Floristic Quality Inventory
***Other water acreage or frontage?**	**No ✔ Yes**
If yes, name of other water body:	Tamarack Lake
Is the entire water body completely within the site boundaries?	✔ No Yes
How many linear feet of frontage or acres of water are on site?	500
***Sand dunes?**	✔ **No Yes**
If yes, list the number of acres of sand dunes on the site:	
Critical Not designed as critical, or designation unknown	
Is documentation of type and quality provided with application?	No Yes
If yes, source of information:	
***Dedicated state or federal listed wilderness or dedicated natural area or Pigeon River County State Forest land or inholding?**	✔ **No Yes**
If yes, name of area:	
How many acres on site?	

***Rare species or any other significant feature as defined by the Michigan Natural Features Inventory?** No ✔ Yes

If yes, list species or feature and status.

Eastern Massasauga Rattlesnake, Grasshopper and Henslow's Sparrows, Dickcissel, and Natural areas vulnerable to extinction. See narrative and maps.

If too many to list here, include in the application narrative.

Population/range locations denoted on site plan or other map? No ✔ Yes

Will the proposed park or park development:

* **Protect wildlife habitat** (for example, breeding grounds, winter deeryards, den sites)?	**No ✔ Yes**
If yes, list species:	Fish in W. Branch Stony Creek
How many acres of habitat does the site provide?	1.00
***Act as a wildlife corridor between existing protected areas or buffer an existing protected area?**	**No ✔ Yes**
If yes, name the existing park(s) or protected area(s):	Lost Lake Nature Park
How many acres are currently in protected status?	58.00
Is documentation of the ecological value of adjacent protected areas and/or the ability of the project site to act as a corridor/buffer provided with application?	No ✔ Yes
If yes, source of information:	2010 Plantwise LLC Mgt. Plan

Will the proposed park or park development provide new or additional:

***Water recreation opportunities?**	**No ✔ Yes**
***Motorized recreation opportunities (ORV and/or Snowmobile)?**	**✔ No Yes**
***Hunting Opportunities?**	**No ✔ Yes**
If yes, what seasons will be available? (for example, deer/firearm)	deer/archery
How many acres will be available for hunting?	147
***Fishing opportunities?**	**No ✔ Yes**
If yes, what type of fishing opportunities will be provided? (species/methods)	See MDNR Fishery Inventory
***Bird watching or other nature viewing opportunities?**	**No ✔ Yes**
If yes, what species can be viewed?	See 2 Bird Inventory Lists
*Nature interpretation or education opportunities?	**No ✔ Yes**

If yes, how are the interpretation or education opportunities provided? (check all that apply)

- ✔ Interpretive signage
- ✔ Interpretive brochures
- ✔ Nature center
- ✔ Part time or volunteer naturalist
- Full time naturalist

Have you formed a partnership with another organization to provide interpretive/educational services?	**No ✔ Yes**
If yes, name of organization	Dinosaur Hill Nature Preserve

Provided examples of interpretive materials, descriptions of classes, and other documentation on the interpretive/educational services provided with application:

Please find attached several pages from the Oakland Township Parks and Recreation Newsletter that include nature programs which we currently offer for children, families, and adults at a variety of Oakland Township parks. There are also pages of Natural Areas Stewardship programs and volunteer workday opportunities which include workshops regarding prescribed fire, unique plant communities and their inhabitants; invasive plant removal workdays, and weekly bird walks. Proposed program ideas for the project area include interpreting the site's high-quality plant communities, Stony Creek fishery, birds, and wildlife.

*** Will the site be open to the general public?** **No ✔ Yes**

List the hours open to the public:

	From	To	Closed
Sunday	Sunrise	Sunset	
Monday	Sunrise	Sunset	
Tuesday	Sunrise	Sunset	
Wednesday	Sunrise	Sunset	
Thursday	Sunrise	Sunset	
Friday	Sunrise	Sunset	
Saturday	Sunrise	Sunset	
Holidays	Sunrise	Sunset	

Comment:

How will the public reasonably able to access this site?

✔ Automobile
Boat
Public Transportation
Motorized Trail
✔ Non-Motorized Trail including Mountain Bike and Hiking Trails
Sidewalk or Pathway
Other (describe)

*** Is the proposed site a trail?** [✔] **Yes** [ ] **No**

Who is the primary intended user? (Check one)

Hikers/Pedestrians	Road Bicyclists	Equestrians
Mountain Bicyclists	Cross-Country Skiers	Snowmobilers
Other motorized vehicle users	Other, explain:	

Who are the secondary users?

Hikers/Pedestrians	Road Bicyclists	Equestrians
Mountain Bicyclists	Cross-Country Skiers	Snowmobilers
Other motorized vehicle users	Other, explain:	

Is the trail connected to another trail(s) or part of a larger trail network? No Yes

If yes, what is the name of the network?

How long Is the trail?
Total linear feet
Linear feet bituminous (paved)
Linear feet boardwalk (if applicable)
Linear feet sidewalk
Linear feet other hard surface

What is the width of the trail?
Linear feet

*** Is this proposed project part of the Iron Belle Trail (Governor's Showcase Trail)?**
[ ] Yes [✔] No

*I. Project Justification and Support:

1. Need for the Project

A. Community Recreation Plan: Survey results (p. 87) showed that the most requested Township park amenities are Rustic walking paths (62%) and Natural areas (41%). This project addresses these plan objectives which meet these needs:

Park Land Objective 1.3 (p. 95) recommends the development of partnerships with neighboring park/recreation and school agencies to develop a regional approach to trail connectivity.

Natural Area Stewardship Objective 5.6 (p. 99) recommends acquisition, protection, and/or management of natural areas adjacent to Township Parks.

The 5-Year Capital Improvement Plan includes annual funding for park land acquisition between 2020 and 2024 (p.104-106) and also in 2024 includes funding for a Lost Lake Nature Park Feasibility study for addition of boardwalk and trail from the Nature Center to Oakview Middle School (see concept plan p. 254).

B. Regional Initiative: The attached maps for Oakland County MNFI Natural Areas and Oakland County's Green Infrastructure Vision indicate that this project's 235 acres is a high priority for natural area preservation.

2. A. Alignment with SCORP

1)Foster Stewardship and Conservation: Oakland Township Parks and Recreation (OTPR) will direct its resources towards the protection, management and interpretation of imperiled native plant communities through implementation of Oakland County CISMA plan, partnering with local nature center to offer outdoor nature programs, and providing hands-on natural area stewardship.

2)Improve Collaboration: OTPR will continue collaboration with Dinosaur Hill Nature Preserve to offer outdoor nature programs and will explore connecting recreation facilities and programming with nearby Bald Mountain Recreation Area and Oakland County's Addison Oaks Park.

3) Improve Recreational Access: this project will provide opportunity to add 4+ miles of additional trails that will provide access to significant water features.

4) Provide Quality Experiences: a significant portion of OTPR's dedicated Land Preservation Millage is devoted to both the near-term and long-term maintenance of natural areas and access facilities.

5) Enhance Health Benefits: additional 4+miles of trails for hiking and bicycling will support physical activity and a healthy life style.

2. B. Alignment MNRTF Board Priorities

This project aligns with several board priorities. It is regionally significant because of the uniqueness and significance of the property's natural resources and this acquisition provides a natural area buffer to Oakland Township's Lost Lake Nature Park by providing a complete connection with the park's west and south sides.

3. Public Input

Grant application was available for review and comment online and at several public locations prior to public meetings on Sept. 9 and Sept. 10, 2020.

4. Public Support

Local, regional, and national recreation, conservation, and education agencies will provide letters of support.

*II. Project Description:

The LLNP Expansion offers resource protection and recreation opportunities within its 235 acres and through its connections to other natural habitats and recreation areas (see Concept Plan). The expansion area will increase LLNP's visibility by adding two new vehicular entries and parking lots on major collector roads : Lake George Road and Predmore Road. The project area is within walking distance of residential areas including an existing 535-lot manufactured home community to the north and three new subdivisions totaling 200 home sites to the south. Moreover, there will be a direct pedestrian connection on the west for the 560 students at

Lake Orion's Oakview Middle School to access proposed nature education and active recreation opportunities.

The project concept plan is compatible with this site's combination of unique natural areas and farm fields. The proposed four-mile trail system will be located to minimize environmental impacts while providing visitors with appropriate access to Lost Lake, Clam Lake, and Green Lake; Oakland Township's only black spruce bog, a 7-acre intact prairie fen, and Stony Creek tributaries. The new trail system will connect to the existing LLNP park facilities (trails, nature center, lakeside dock, and winter sledding hill), as well as proposed safety paths along Lake George, Kline, and Predmore roads; facilitating connections with trails at Addison Oaks County Park and Bald Mountain Recreation Area, located within .25 mile of the expansion site (see Trails and Pathways map, Master Plan p.134). Built recreation facilities will be limited to the northern actively-farmed 10-acres, which would be reserved for future active recreation, and to the farmstead at 1401 Lake George Road, where an existing residence would be converted to a visitor center. This center would be a starting point where visitors would gather for park programs and tours; displaying information about the unique natural communities, plants (shown in attached photos), and animals that inhabit this area, such as grassland birds of special concern and the eastern massasauga rattlesnake, and the history of natural area preservation by the Scripps family (The Detroit News) who lived here. The large barn, situated to the south of the visitor center, would be retained for storage of maintenance and natural area stewardship equipment and supplies. Two smaller deteriorated barns would be candidates for demolition.

The LLNP Expansion natural areas will be protected and stewarded. Any remaining farm fields would be converted to native vegetation in phases. If this park land acquisition is completed in 2021, the public could quickly start using the property's many existing walking trails and OTPR staff could construct an initial parking lot on Lake George Road. OTPRC would apply for supplemental funding within the next five years to convert the existing residence to a visitor center and to add an entry drive, parking lot and trail improvements.

*III. Natural Resource Access and Protection:

Natural Features and Recreation Opportunities

OTPR surveyed this site's natural communities, inventorying 281 plant species, for a total FQI of 58.7, indicating that this 235-acre property is a "rare natural area that may harbor an appreciative amount of Michigan's native biodiversity" (see attached Floristic Quality Assessment and Site Photos). This property is important because of the potential to protect high-quality natural areas vulnerable to extinction at either a Global and/or Statewide level. These include a Black Spruce Bog (G3), Rich Tamarack Swamp (G4, S3- vulnerable), Southern Hardwood Swamp (G3-vulnerable, S3-vulnerable), Prairie Fen (G3-vulnerable, S3-vulnerable), Southern Wet Meadow (G4, S3-vulnerable), Dry-Mesic Southern Forest (G4, S3- vulnerable), and Mesic Southern Forest (G2,3- imperiled to vulnerable, S3- vulnerable). See "LLNP Expansion Natural Communities" map. High-quality waterbodies found on this site; 3100 linear feet of the West Branch of the Stony Creek and 12.5 acres of Clam Lake, shown as "Critical Areas" for protection on the attached Stony Creek Subwatershed map, will provide new fishing opportunities. The proposed 4+ miles of trails will provide new opportunities for biking/hiking, nature interpretation, wildlife observation including grassland birds (state special concern), and controlled deer hunting on almost 150 acres (see Hunting Zone Map in attached Maintenance Plan, MDNR Fish Inventory, and bird inventories).

Green Infrastructure Plans

The attached maps of Oakland County Green Infrastructure and Michigan Natural Features Inventory (MNFI) Assessment of Oakland County Natural Areas show this property as a high-priority for natural area preservation. As MNFI recommends, "The highest priority for conservation action should be placed on the largest high-quality parcels that are adjacent to other potential high-quality parcels. Due to the relative rarity of

some of these (natural community) systems in southern Michigan, some of these types should be considered a priority regardless of size or landscape context." This last statement would be typical of the bog, swamp, fen and forest communities found on this property.

Natural Area Buffer

This property will buffer and connect with the western and southern boundaries of Oakland Township's existing 58-acre Lost Lake Nature Park (LLNP), which was purchased to protect Oak-Pine Barrens (rare and imperiled at the state level), Dry-Mesic Southern Forest, Emergent Marsh, and Southern Hardwood Swamp plant communities (see 2010 LLNP Management Plan). This property will provide additional habitat for the federally endangered eastern massasauga rattlesnake; documented at LLNP in 2009.

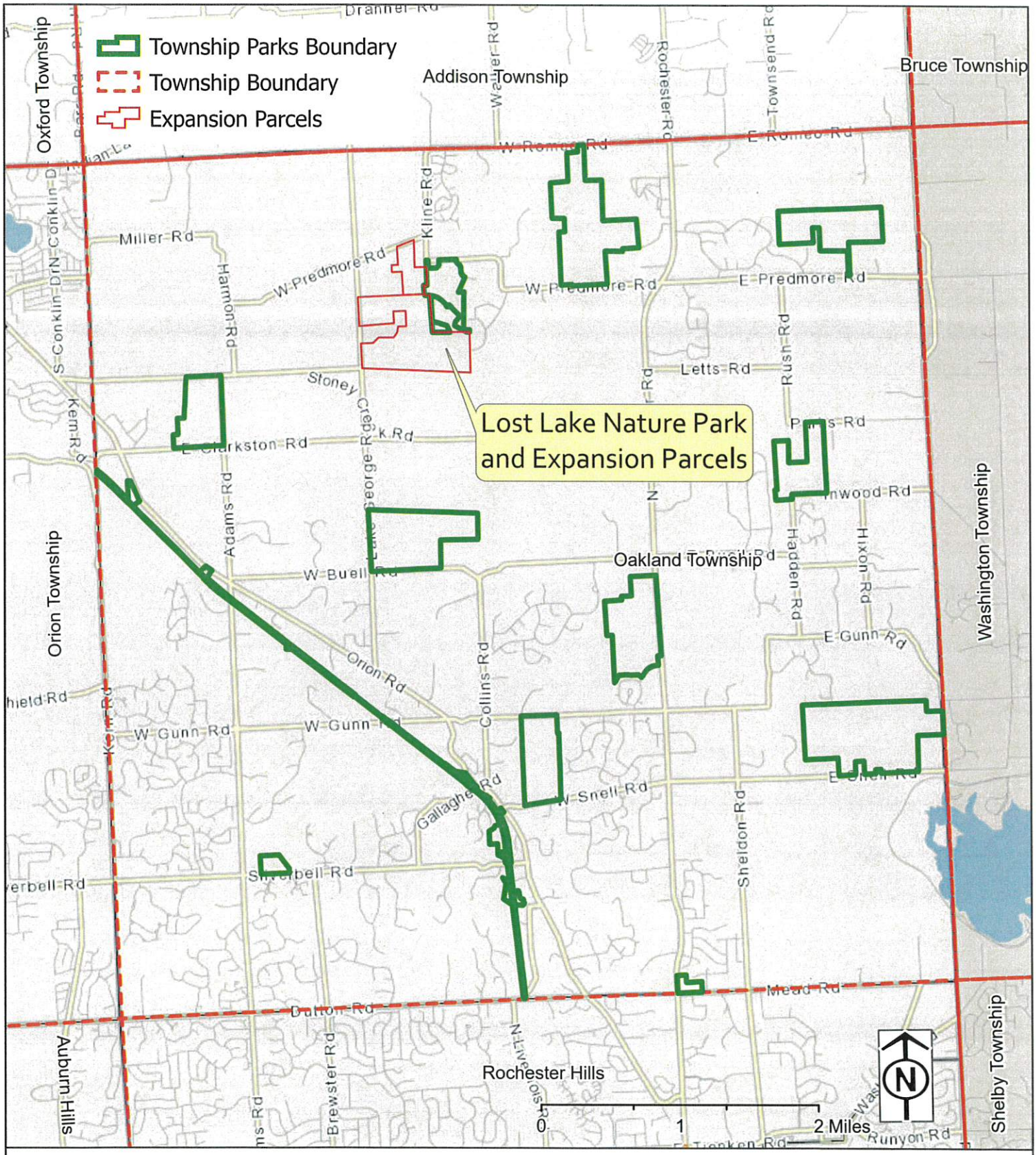
Site Maintenance

OTPR's Natural Areas staff will steward this property by controlling invasive species, reintroducing prescribed fire, implementing a deer management plan, and restoring natural communities using USFWS Partners for Fish and Wildlife grants.

*IV. Other Information:

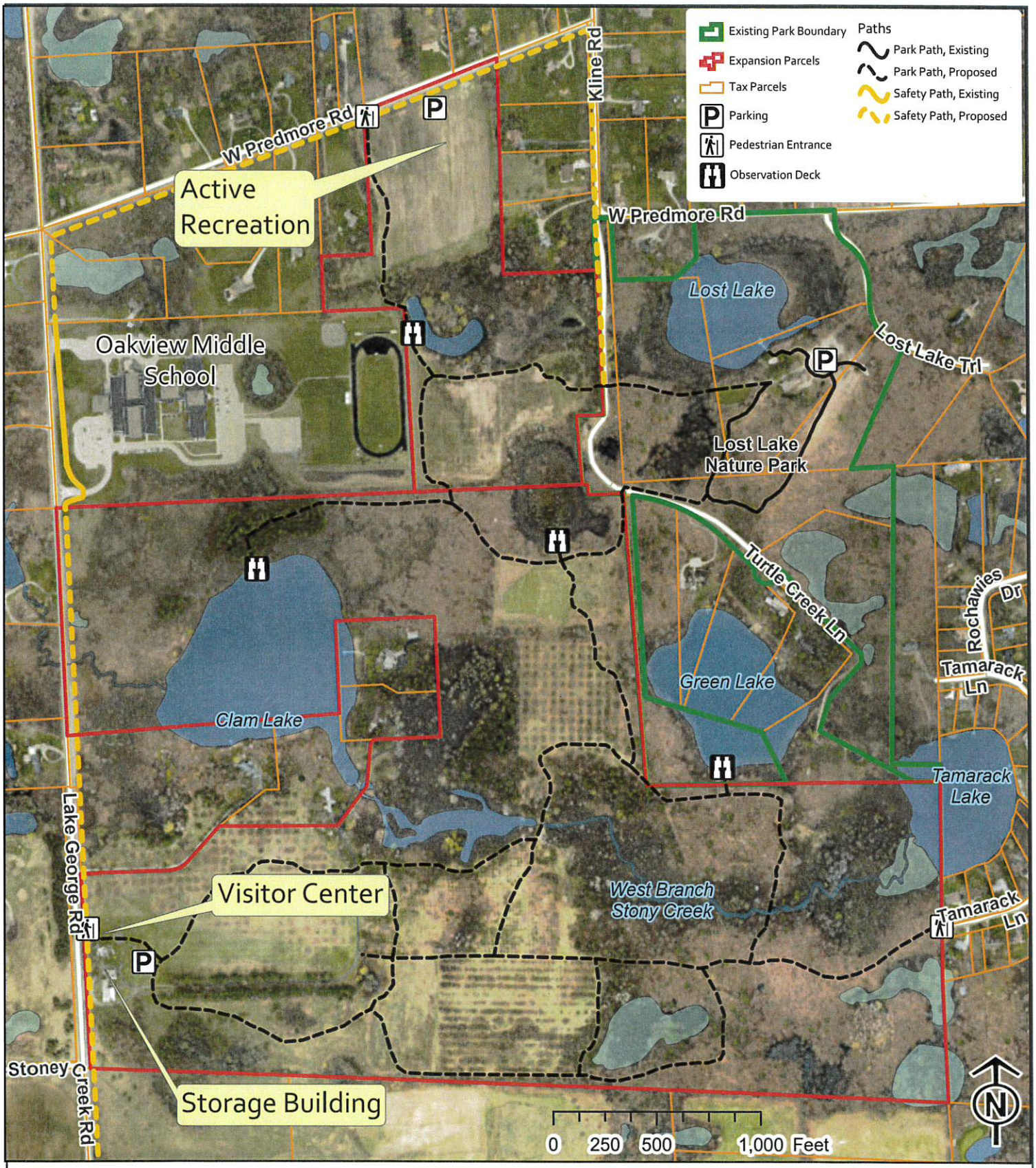
Site Management

OTPRC will use funding from the Township's dedicated Land Preservation and Parks 10-year millages, which total approximately 2 million dollars in tax revenue annually, to manage the LLNP Expansion to support ecological values, public access, and recreation. See attached proposed maintenance plan. OTPR will manage this additional property in coordination with the attached existing LLNP management plan using existing OTPR natural areas stewardship and maintenance staff and contractors. Oakland Township Parks and Recreation includes a staff of 10 permanent employees and 4 seasonal employees who report to an elected Parks and Recreation Commission.



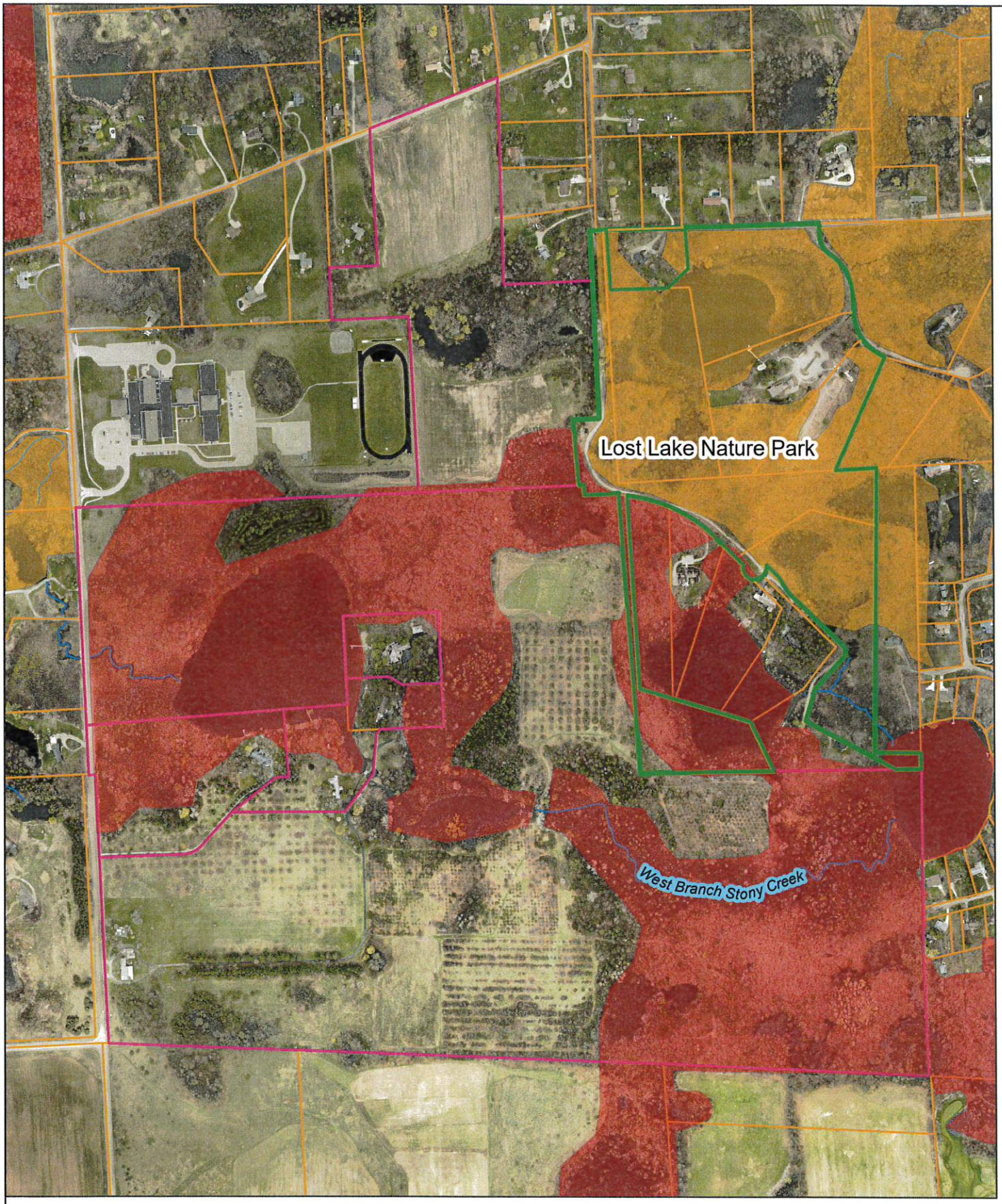
Oakland Township
Lost Lake Nature Park
Expansion Location Map
Michigan Natural Resources Trust Fund
Grant TF20-0206

Last Updated 5 Aug 2020



Oakland Township
Lost Lake Nature Park
Expansion Concept Plan
Michigan Natural Resources Trust Fund
Grant TF20-0206

Last Updated 26 Aug 2020



LOST LAKE NATURE PARK - 58 acres

Boundaries

- Fox Parcel Boundaries
- Oakland Township Park

2017 MNFI Potential Natural Areas

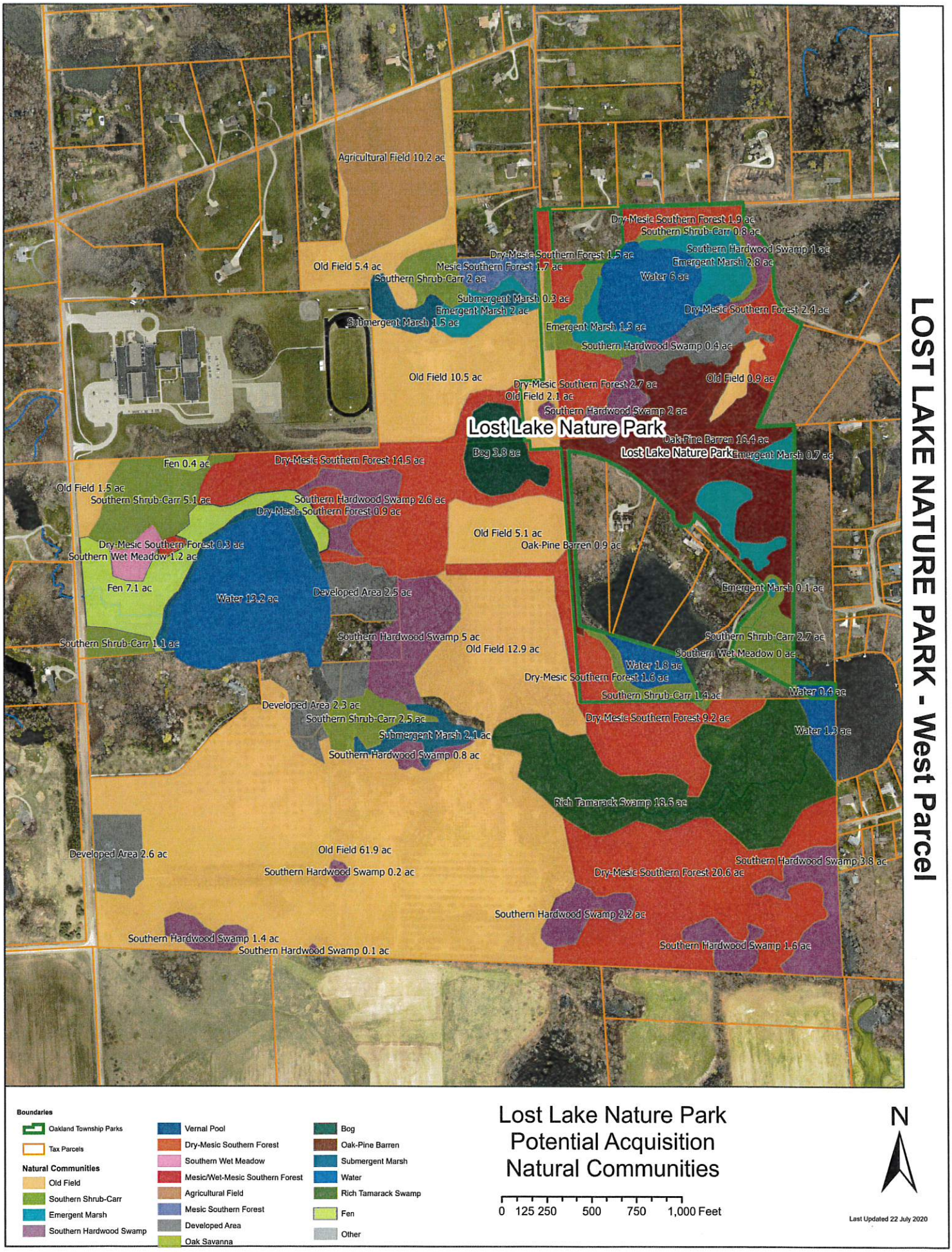
- Priority One
- Priority Two
- Priority Three

Michigan Natural Feature Inventory
Priority Natural Areas (2017)

0 125 250 500 750 1,000 Feet

N

Last Updated 22 July 2020


LOST LAKE NATURE PARK - West Parcel
Agricultural Field 10.2 ac
Old Field 5.4 ac
Mesic Southern Forest 1.7 ac
Southern Shrub-Carr 2 ac
Submergent Marsh 0.3 ac
Emergent Marsh 2 ac
Submergent Marsh 1.5 ac
Old Field 10.5 ac
Dry-Mesic Southern Forest 1.9 ac
Southern Shrub-Carr 0.8 ac
Dry-Mesic Southern Forest 1.5 ac
Southern Hardwood Swamp 1 ac
Emergent Marsh 2.8 ac
Water 6 ac
Dry-Mesic Southern Forest 2.4 ac
Emergent Marsh 1.3 ac
Southern Hardwood Swamp 0.4 ac
Old Field 0.9 ac
Dry-Mesic Southern Forest 2.7 ac
Old Field 2.1 ac
Southern Hardwood Swamp 2 ac
Lost Lake Nature Park
Oak-Pine Barren 16.4 ac
Lost Lake Nature Park
Emergent Marsh 0.7 ac
Bog 3.8 ac
Fen 0.4 ac
Dry-Mesic Southern Forest 14.5 ac
Old Field 1.5 ac
Southern Shrub-Carr 5.1 ac
Southern Hardwood Swamp 2.6 ac
Dry-Mesic Southern Forest 0.9 ac
Old Field 5.1 ac
Oak-Pine Barren 0.9 ac
Dry-Mesic Southern Forest 0.3 ac
Southern Wet Meadow 1.2 ac
Fen 7.1 ac
Water 13.2 ac
Developed Area 2.5 ac
Emergent Marsh 0.1 ac
Southern Shrub-Carr 1.1 ac
Southern Hardwood Swamp 5 ac
Old Field 12.9 ac
Southern Shrub-Carr 2.7 ac
Southern Wet Meadow 0 ac
Water 1.8 ac
Dry-Mesic Southern Forest 1.6 ac
Water 0.4 ac
Southern Shrub-Carr 1.4 ac
Developed Area 2.3 ac
Southern Shrub-Carr 2.5 ac
Dry-Mesic Southern Forest 9.2 ac
Water 1.3 ac
Submergent Marsh 2.1 ac
Southern Hardwood Swamp 0.8 ac
Rich Tamarack Swamp 18.6 ac
Developed Area 2.6 ac
Old Field 61.9 ac
Southern Hardwood Swamp 0.2 ac
Southern Hardwood Swamp 3.8 ac
Dry-Mesic Southern Forest 20.6 ac
Southern Hardwood Swamp 2.2 ac
Southern Hardwood Swamp 1.4 ac
Southern Hardwood Swamp 0.1 ac
Southern Hardwood Swamp 1.6 ac
Boundaries
Oakland Township Parks
Tax Parcels
Natural Communities
Old Field
Southern Shrub-Carr
Emergent Marsh
Southern Hardwood Swamp
Vernal Pool
Dry-Mesic Southern Forest
Southern Wet Meadow
Mesic/Wet-Mesic Southern Forest
Agricultural Field
Mesic Southern Forest
Developed Area
Oak Savanna
Bog
Oak-Pine Barren
Submergent Marsh
Water
Rich Tamarack Swamp
Fen
Other
Lost Lake Nature Park
Potential Acquisition
Natural Communities
0 125 250 500 750 1,000 Feet
N
Last Updated 22 July 2020

Green Infrastructure

TF20-0206

In 2009, a Green Infrastructure Vision was developed for Oakland County in order to identify areas in the landscape that are in need of local protection and link the remaining valuable ecological lands. These lands include large natural areas, important wildlife habitats, wetlands, riparian corridors, and areas that reflect key elements of Oakland County's biological diversity.

This locally driven initiative gathered input from a wide variety of stakeholders. In 2005, key stakeholders from Oakland Township participated in one of many work sessions focusing on natural resource connectivity. The area surrounding the proposed park has been identified as a key site and recreational link in the Green Infrastructure Vision.

What is Green Infrastructure?

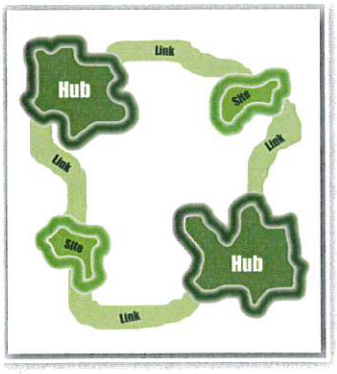
Green infrastructure is the interconnected network of open spaces, natural areas, and waterways. This network supports native species, maintains natural ecological processes, sustains air and water resources and contributes to health and quality of life. It also focuses on conservation values and the services provided by natural systems in concert with, instead of in opposition to, land development.

Benefits of Green Infrastructure

Green infrastructure provides a mechanism to identify and blend environmental and economic factors creating a multitude of social, economic, cultural and environmental benefits.

- Provides a sense of place and a unique identity
- Decreases cost of public infrastructure (i.e. stormwater management & water treatment systems)
- Increases both active and passive recreational opportunities
- Increases property values
- Helps preserve the unique quality of life
- Maintains the naturally functioning ecosystems
- Helps to attract new businesses and well qualified workers

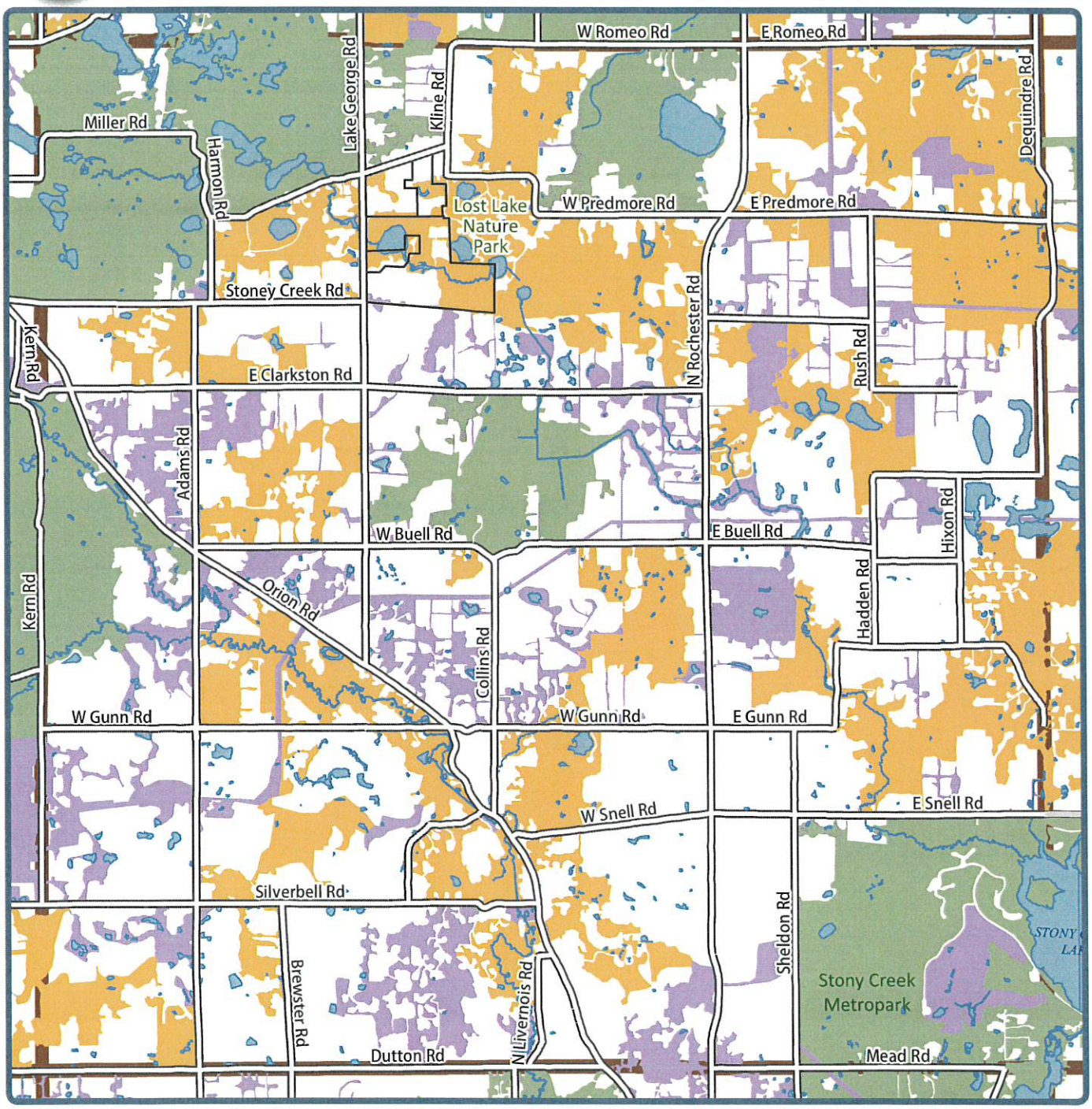
Components of a Green Infrastructure Network



- Hubs: Hubs anchor the network and provide an origin or destination for wildlife. Hubs range in size from large conservation areas to smaller parks and preserves. Hubs provide habitat for native wildlife and help maintain natural ecological processes.
- Sites: Smaller ecological landscape features that can serve as a point of origin or destination or include less extensive ecological important areas.
- Links: The connections that hold the network together and enable it to function. Links facilitate movement from one hub to another.

Green Infrastructure Map

TF20-0206



Road
Municipal Boundary
Lake or River
Area of Interest

Hub
Site
Link

Distance in Miles
0 1 2

Proposed park is located near:
1401 Lake George Rd, Oakland, MI 48363
42°46'48.4"N 83°10'42.2"W

Oakland Township

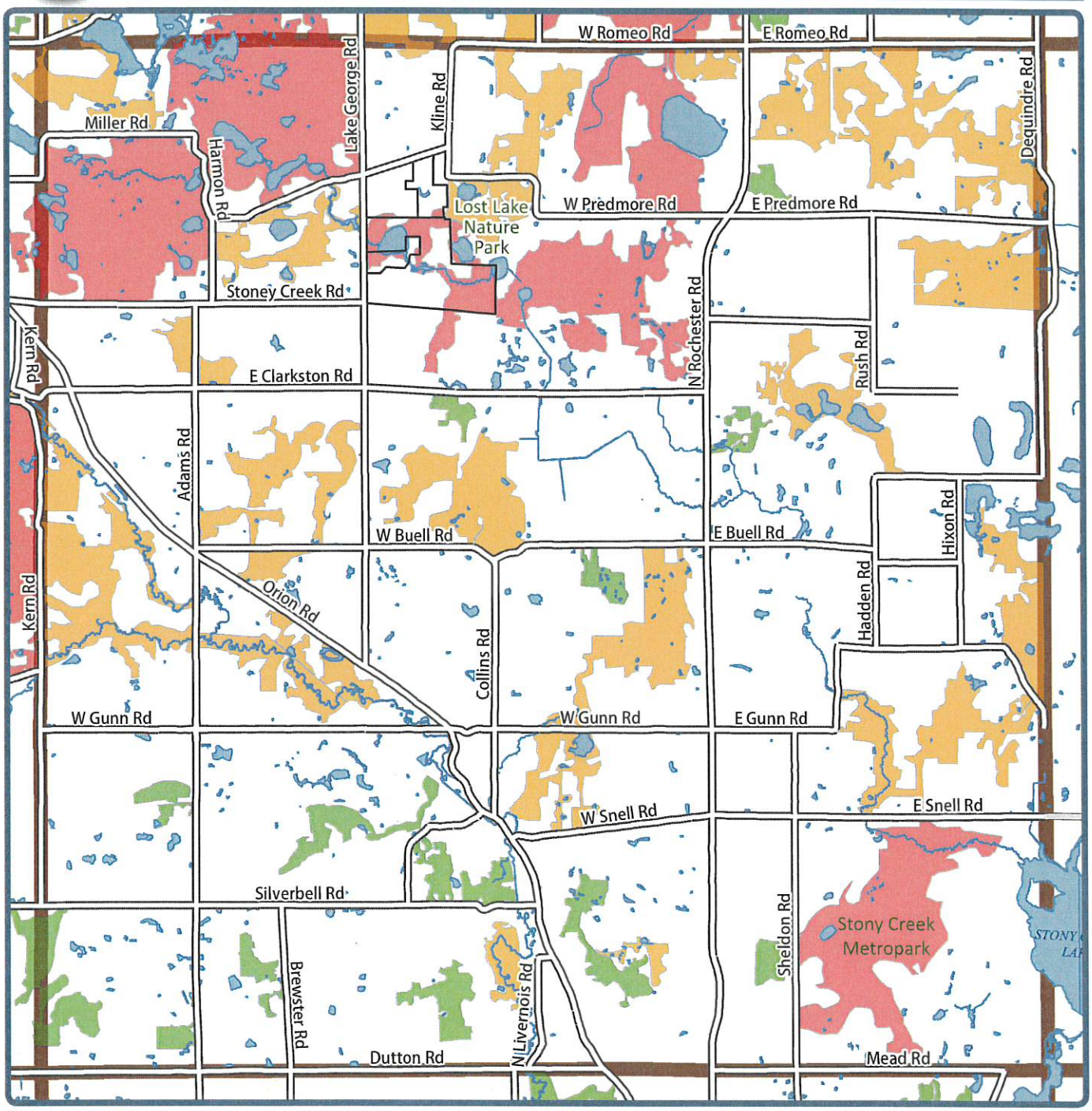
Lost Lake Nature Park Expansion

• 2020 Natural Resources Trust Fund Grant • Michigan Department of Natural Resources •

Map provided by:

2017 MNFI Natural Areas

TF20-0206



Road
Municipal Boundary
Lake or River
Area of Interest

Priority One
Priority Two
Priority Three

Distance in Miles
0 1 2

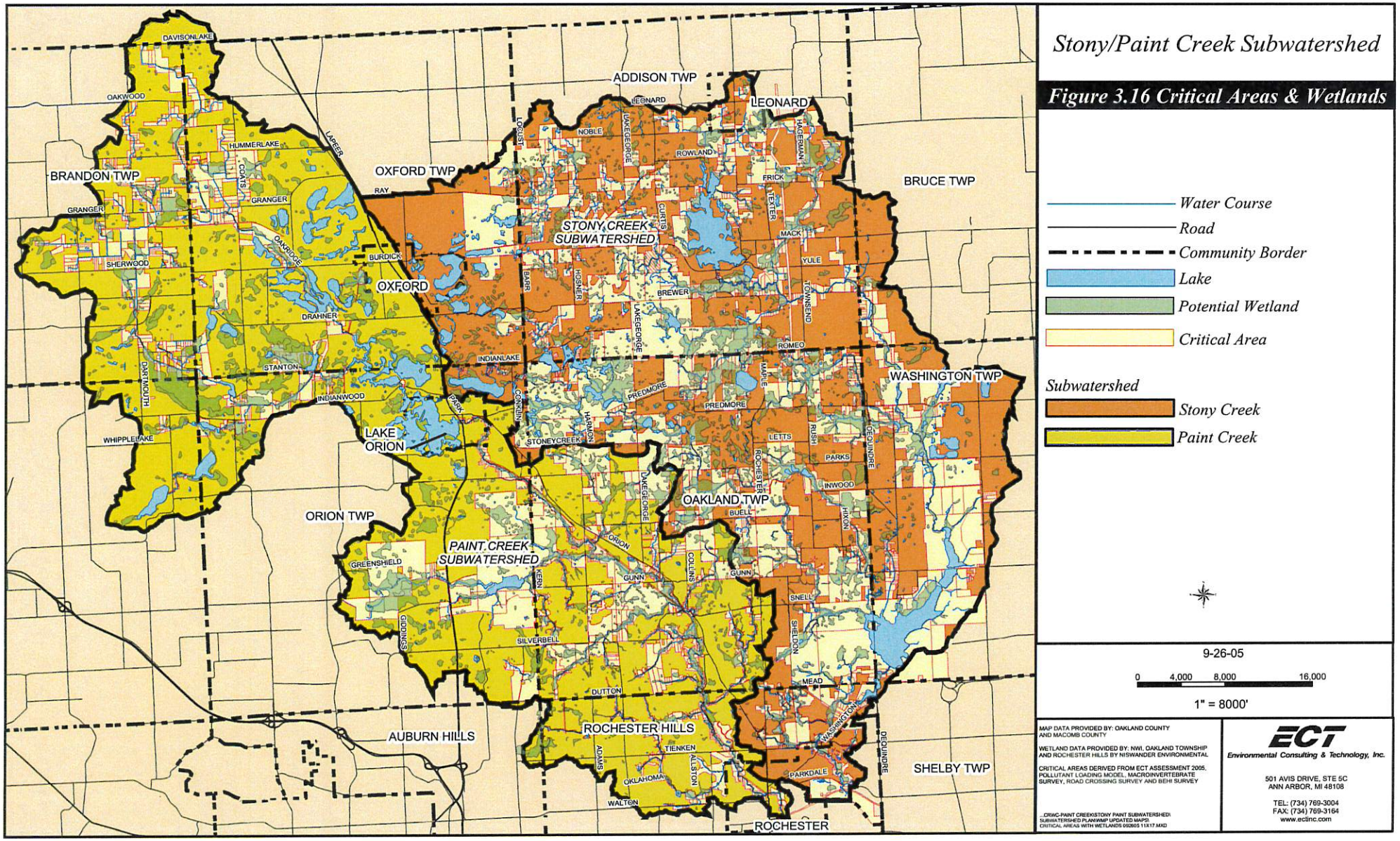
Proposed park is located near:
1401 Lake George Rd, Oakland, MI 48363
42°46'48.4"N 83°10'42.2"W

Oakland Township

Lost Lake Nature Park Expansion

• 2020 Natural Resources Trust Fund Grant • Michigan Department of Natural Resources •

Map provided by: Oakland County Michigan Economic Development & Community Affairs


Stony/Paint Creek Subwatershed
Figure 3.16 Critical Areas & Wetlands
Water Course
Road
Community Border
Lake
Potential Wetland
Critical Area
Subwatershed
Stony Creek
Paint Creek
STONY CREEK SUBWATERSHED
PAINT CREEK SUBWATERSHED
BRANDON TWP
OXFORD TWP
ADDISON TWP
BRUCE TWP
WASHINGTON TWP
OXFORD
LEONARD
LAKE ORION
ORION TWP
OAKLAND TWP
AUBURN HILLS
ROCHESTER HILLS
SHELBY TWP
ROCHESTER
DAVISON LAKE
OAKWOOD
HUMMER LAKE
COATS
GRANGER
LAPEER
RAY
BURDICK
SHERWOOD
OAKRIDGE
DRAHNER
STANTON
DARTMOUTH
INDIANWOOD
WHIPPLE LAKE
PARK
INDIAN LAKE
STONEY CREEK
CORUNNA
HARMON
LOCUST
NOBLE
LAKEGEORGE
ROWLAND
HAGERMAN
FRICK
TEXTER
CURTIS
MACK
YULE
BARR
HOSNER
BREWER
TOWNSEND
ROMEO
MAPLE
PREDMORE
LETTS
RUSH
DEQUINDRE
PARKS
INWOOD
ROCHESTER
HIXON
BUELL
ORION
COLLINS
GUNN
SNELL
SHELDON
MEAD
WASHINGTON
GREENSHIELD
KERN
GIDDINGS
SILVERBELL
DUTTON
TIENKEN
ADAMS
ALSTON
OKLAHOMA
WALTON
PARKDALE
9-26-05
0 4,000 8,000 16,000
1" = 8000'
MAP DATA PROVIDED BY: OAKLAND COUNTY AND MACOMB COUNTY
WETLAND DATA PROVIDED BY: NWI, OAKLAND TOWNSHIP AND ROCHESTER HILLS BY NISWANDER ENVIRONMENTAL
CRITICAL AREAS DERIVED FROM ECT ASSESSMENT 2005. POLLUTANT LOADING MODEL, MACROINVERTEBRATE SURVEY, ROAD CROSSING SURVEY AND BEHI SURVEY
...CRWC-PAINT CREEK\STONY PAINT SUBWATERSHED\ SUBWATERSHED PLAN\WMP UPDATED MAPS\ CRITICAL AREAS WITH WETLANDS 092605 11X17.MXD
ECT
Environmental Consulting & Technology, Inc.
501 AVIS DRIVE, STE 5C
ANN ARBOR, MI 48108
TEL: (734) 769-3004
FAX: (734) 769-3164
www.ectinc.com

Lost Lake Nature Park Expansion Maintenance Plan

Benjamin VanderWeide, Natural Areas Stewardship Manager
Melinda Milos-Dale, Parks Director
Doug Caruso, Maintenance Foreman
Oakland Township Parks and Recreation

September 2020

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Natural Areas Stewardship

Overall Observations and Site Description

Located along the western and southern borders of the existing Lost Lake Nature Park, the potential 235.6-acre addition to this park boasts a diverse mix of wetlands, forest, lakes, streams, and fields. The site contains 3100 feet of the West Branch of Stony Creek, 12.5 acres of 14.5-acre Clam Lake, and 1.25 acres of 7-acre Tamarack Lake. The property contains diverse topography, with flat to gently rolling hills throughout, except for the southeast corner with the steep slopes south of Stony Creek and adjacent hilly woodland.

Aerial photographs indicate that about 120 acres of this property were farmed in the 1940s. In the 1950s about half of the fields were planted to orchards or pine plantations. Around the same time the West Branch of Stony Creek was dammed just downstream of the outlet of Clam Lake, flooding adjacent wetlands to increase its surface area from about 11 acres to 14 acres. In the 1960s a second dam was constructed about 1000 feet downstream, flooding additional wetland area. Today many of the former orchards are being colonized by oak trees, and contain remnant prairie plants. 10 acres of the site are actively farmed, and an additional 20 acres were farmed in the last decade.

This property contains several rare or threatened natural communities. High quality prairie fen wetland wraps around the border of Clam Lake and extends along Stony Creek to Lake George Road. A black spruce bog, near the southern limit of its range in Michigan, boasts unique plants rarely found this far south in Michigan. Rich tamarack swamp lines the West Branch of Stony Creek near Tamarack Lake. Dry-mesic southern forest with few invasive plants occupies the southeast corner and an area east of Clam Lake.

Protecting these natural communities provides a biological corridor extending from Bald Mountain State Recreation Area, Addison Oaks Park, and the existing 58-acre Lost Lake Nature Park. The wetlands on the parcel provide natural stormwater filtration and storage, increasing water quality to downstream areas including Stony Creek Ravine Nature Park and Stony Creek Metropark. 281 plant species were observed on the site on a one-day visit, with a total Floristic Quality Index (FQI) of 58.7. The Michigan Floristic Quality Assessment manual (2001) notes that "Areas registering in the 50s and higher are extremely rare and represent a significant component of Michigan's native biodiversity and natural landscapes." While no

This property provides excellent opportunities for protection and viewing of game and non-game wildlife. Eastern massasauga rattlesnakes were documented in the existing Lost Lake Nature Park in 2009, and potential habitat for these federally threatened snakes exists throughout this property. 82 bird species have been documented at the existing Lost Lake Nature Park, 115 at nearby Addison Oaks Park, and 126 species at the nearby North Unit of Bald Mountain State Recreation Area. Several rare or declining grassland birds have been observed in the grassland immediately south of the property in the last five years, including Clay-colored sparrow, Field Sparrow, Henslow's Sparrow, Savannah Sparrow, Grasshopper Sparrow (state special concern), dickcissel (state special concern), eastern meadowlark. With wetlands, forest, grassland, and lakes, this property supports a variety of both migratory and nesting bird species.

Overall Goals and Intended Site Uses

The main natural resources management goals for this property are to protect and restore the high-quality natural features and to restore native cover and wildlife habitat to fields and wetlands where they have been modified by agriculture or other human use. The abundant water features present excellent recreation opportunities for park users, but access improvements and other development can potentially degrade these special areas if not done carefully. Any development intended for high-volume usage in the park should be concentrated in one area to maximize the area of the park that can function as a biological corridor. Trails should be located to minimize additional habitat fragmentation and prevent impacts to high quality natural areas, while allowing appropriate access and use as prescribed fire burn breaks.

Soils

The wetlands around the lakes, along the West Branch of Stony Creek, and pocket wetlands throughout the park are lined by Houghton and Adrian mucks. The muck soils occupy about 26% of property. Upland areas throughout the property are sandy soils. Oakville fine sands on flat to gentle slopes cover the uplands in the northern and central area of the property, occupying 13% of the property. The soils on the remainder of the property are Marlette sandy loam, Capac sandy loam, Oshtemo-Boyer loamy sand, Spinks loamy sand, Wasepi sandy loam, Metea loamy sand, Thetford loamy fine sand, Riddles sandy loam, and Tedrow loamy sand. The sandy loams and loams sands vary in their wetness and slope, occupying 52% of the property. 0.3% of the property in the northwest corner has Brookston and Colwood loams. The remaining 9% of the property is water. **See Map 1.**

Vegetation Circa 1800

Plant communities circa 1800 on this property were primarily black oak barrens, emergent marsh/shrub swamp, and wet prairie. Vegetation circa 1800 refers to the time before extensive colonization by immigrants of European descent in the early 1800s. The best estimate of vegetation during this period in Oakland Township was made by Michigan Natural Features Inventory scientists using original notes from the 1817 General Land Office survey of the township by Joseph Wampler, soils, hydrology, and current vegetation. The vegetation circa 1800 maps that resulted from this effort indicate broad patterns of the distribution of plant communities. Wetlands and smaller pockets of other plant communities were no doubt interspersed with the dominant plant communities. **See Map 2.**

Before European colonization southeast Michigan was inhabited by native people who exerted significant influence on the natural communities through their agricultural practices and use of prescribed fire. Lightning was probably also an important ignition source for fire. Over this limited area, soils and hydrology are the primary factors determining the abundance and spatial distribution of plant communities. However, fire historically maintained areas that are currently closed-canopy forests as more open, fire-dependent communities. These fire-dependent communities with low tree density were widespread in Oakland Township before European settlement and included prairies, oak barrens, and oak savannas. Descriptions below are from

management plans developed for Oakland Township Parks & Recreation by Plantwise (Plantwise 2010).

Black oak barrens comprised about 1.9% of Michigan's landscape at the time of the original surveys of Michigan. They were found on flat plains and rolling, gravelly hills on the interior portion of the southern Lower Peninsula, and probably burned quite frequently. Oakland County historically contained more black oak barren than any other county. The typical dominant tree was black oak, but Northern pin oak, white oak, and scarlet oak were also found. Prairie grasses and forbs were common in these savannas. Because of the absence of trees, much of this habitat was converted to farmland, but mostly abandoned in the 1930s because of the droughty and infertile soils. Much of this habitat that remains is in the process of succeeding to a closed-canopy oak forest, due to the lack of fire (Plantwise 2010).

Emergent marsh or **shrub swamp** historically comprised about 1.6% of Michigan's landscape, and was found throughout the entire state. Large marshes are found along the Great Lakes coast, and most of the inland marshes are small in size and border lakes and rivers. The surveyors were not very specific about this type of habitat, but it would generally have contained emergent aquatic plants such as cattails, bulrushes, grasses, and sedges, along with a varying component of shrubs. Common shrub species in this type of habitat would include dogwoods, willows and buttonbush. Shrub swamps are one of the few habitat types that have increased in coverage since settlement, from about 400,000 acres in the 1800's to over 1,100,000 acres in the 1980's. This increase resulted from the logging of hardwood swamps and the draining of emergent marshes, along with a decrease in fire frequency (Plantwise 2010).

Inland **wet prairie** comprised about 0.3% of Michigan's plant communities before European settlement, primarily in the southern lower peninsula. Most of the inland wet prairie was found in Jackson County, but was also present in Oakland County. These wet grasslands occurred adjacent to lakes, rivers, streams, and wetlands and in shallow depressions. Prairie cordgrass and bluejoint grass are the dominant plant species, with sedges, prairie grasses, and a diverse array of forbs interspersed. Very low tree densities were maintained by frequent fire and seasonal inundation. Most wet prairies were drained and converted to agriculture soon after settlement, leading to dramatic losses of this plant community. Fire suppression led to further degradation and loss of remaining wet prairies (Cohen et al. 2020).

Current Plant Communities

This property contains several high-quality remnants of natural communities (Cohen et al. 2020), particularly in the wetlands around the lakes and along the West Branch of Stony Creek. The diversity of this property, in topography, hydrology, and natural communities, makes it exceedingly rare in Oakland Township and southeast Michigan. Several of these plant communities are vulnerable (S3) at the state level, particularly prairie fen, rich tamarack swamp, and dry-mesic southern forest. While bog is secure (S4) at the state level, bogs are increasingly rare in the southern part of the state and their persistence is threatened due to climate change. Given the rapid pace of habitat fragmentation in the area due to development, the natural communities on this property serves an important role as a biological corridor connecting natural communities in Bald Mountain State Recreation Area to communities at Addison Oaks County

Park and the existing Lost Lake Nature Park. This property also protects 3100 feet of the West Branch of Stony Creek corridor. **See Map 3.**

Dry-mesic southern forest occupies about 15 acres in the central part of the property, and 30 acres in the southeast part of the property. The southeast corner in particular has steep topography. Black oak and white oak are typically common in dry-mesic southern forest. Most of this forest is notable for the low abundance of invasive plant species. The ground cover has abundant Penn sedge (*Carex pensylvanica*) and various other woodland grasses, sedges, and forbs. Groundcover diversity is lower than expected, potentially due to heavy browse by abundant white-tailed deer. Dry-mesic southern forest in southeast Michigan often occupies areas that were formerly oak savanna or oak barrens, but have converted to a closed-canopy forest due to fire suppression. Many of the smaller diameter trees in these forests are red maple and other fire-intolerant trees. Forested areas that have colonized former agricultural have higher density of invasive plant species, including oriental bittersweet and autumn olive. A patch of pale swallow-wort was also observed on the west end of the pine plantation north of Clam Lake.

Rich tamarack swamp borders the West Branch of Stony Creek between Clam Lake and Tamarack Lake. With little elevation change, the stream meanders slowly through this area. The dominant tree species, often occurring in pockets, is tamarack (*Larix larcina*), with occasional bur oak trees. Shrubs grow densely in the understory, with poison sumac (*Toxicodendron vernix*), silky dogwood (*Cornus amomum*), willows (*Salix* spp.), and glossy buckthorn (*Frangula alnus*) all common. Herbaceous plant are sparse where dense shrubs, but more open pockets support tussock sedge (*Carex stricta*), joe-pye (*Eutrochium maculatum*), and swamp goldenrod (*Solidago patula*). Whorled loosestrife (*Decodon verticillatus*) grows along the edge of stream, with yellow pond-lily (*Nuphar advena*) and sweet-scented water lily (*Nymphaea odorata*) in slow-moving backwaters. The primary management work in this area will be glossy buckthorn control.

Pockets of **southern hardwood swamp** occur throughout the southeast corner, central area, and southern old field areas of the property. Some of these wetland pockets have more abundant shrubs, while others have canopies of silver maple (*Acer saccharinum*), bur oak (*Quercus macrocarpa*), and red maple (*Acer rubrum*). A few of these wetlands have small infestations of invasive Phragmites, but they are generally intact and each has a unique plant community.

The northwest wetland complex includes **prairie fen**, **southern wet meadow**, and southern **shrub-carr**. The prairie fen lines Clam Lake, extends along the West Branch of Stony Creek all the way to Lake George Road, and a few other pockets in the wetland. With the exception of Phragmites near the road, the fen is beautifully diverse and intact and is very important to protect and steward. Prairie fens support unique plant and animal species and are a statewide priority in the Michigan Wildlife Action Plan. Shrubby cinquefoil, mountain mint, bog birch, Kalm's lobelia, sage willow, grass-of-parnassus, marsh wild-timothy, common bog arrow-grass, round-leaved sundew, and purple false foxglove are just a few of the unique plants in this prairie fen. Big bluestem, typically a prairie grass, growing in the fen along the edge of Clam Lake. An active beaver lodge is located in the fen along the West Branch of Stony Creek near the outlet to Clam Lake. The fen grades into southern wet meadow, with joe pye, boneset, and mountain mint scattered through the matrix of sedges. Furthest away from Clam Lake and the creek, southern

shrub-carr occupies the wetland. When fire is suppressed in fen and southern wet meadow, these wetlands often convert to shrub-carr. As a result, southern shrub-carr is one of the few wetland types that is more common today than in the past (Cohen et al. 2020).

A large portion of this property is former agricultural land and is classified as **old field**. Aerial photographs indicate that old fields were row crop agriculture until the 1950s, when they were planted to fruit orchards or pine plantations. Despite this recent agricultural history, some old fields had surprising levels of native plant diversity including wild lupine (*Lupinus perennis*), common frostweed (*Crocanthemum canadense*), butterfly milkweed (*Asclepias tuberosa*), showy goldenrod (*Solidago speciosa*), big bluestem (*Andropogon gerardii*). Young oak trees have established under the fruit trees in the orchard, and several large oak trees are found in the hedgerows between fields.

Approximately 10 acres on the north end of the property along Predmore Road is an active **agricultural field**. To prevent establishment of invasive plant species, fields should remain in active agriculture or be mowed annually until being planted to native vegetation or develop for recreation and park access.

Surrounding Land Uses

The east boundary for much of this property is the existing Lost Lake Nature Park. Within 0.25 miles of the property and 0.5 miles upstream along the West Branch of Stony Creek, the north unit of Bald Mountain Recreation Area protects a large tract of habitat northwest of Predmore and Lake George Roads. Addison Oaks County Park is 0.1 miles north of the property, separated by a row of residential lots. The habitat value of this parcel is greatly enhanced by these two existing protected areas. West of the northern part of the property is Oakview Middle School. Residential properties line the east and south side of Clam Lake to Lake George Road. Medium to large residential lots border the property on the east, west, and north boundaries. South of this property, over 700 acres are currently a golf course and active farm fields, but large subdivision developments are planned for these areas within the next 5-10 years. This large, undeveloped property with high quality natural areas is nearly the only one remaining in Oakland Township, and its protection is of utmost importance.

Site Concerns and Prioritization

1. Oriental bittersweet (*Celastus orbiculatus*) is well-established in some of the old orchard areas. Given the extensive agricultural disturbance on this property, Oriental bittersweet has the potential to establish and spread quickly. Oriental bittersweet should be managed aggressively, beginning in the high-quality upland areas. Where thorough control efforts must be delayed, mowing or methods should be used to reduce seed production and limit spread.
2. Invasive Phragmites is well-established along Lake George Road and in some of the pocket wetlands. The Phragmites along Lake George Road is encroaching on the fen and other wetlands, and should be prioritized for control as soon as possible.
3. Swallow-wort was detected in the pine plantation north of Clam Lake, and should be controlled as soon as possible to limit spread to other areas of the property.

4. Non-native shrubs should not be allowed to establish in old fields. Old fields should be mowed or burned annually and supplemented with native vegetation as time and budget allow.
5. Deer densities in other Oakland Township parks were estimated to be over 100 deer per square mile, on average in aerial surveys conducted in winter 2014, 2015, and. Michigan Natural Features Inventory Biologists recommend 15-20 deer per square mile to promote functional natural communities. Control measures will need to be taken to reduce deer damage to the natural communities, not to mention the threats to human health related to vehicle crashes and tick-borne diseases. Nearly 150 acres of the property could be included in a controlled archery hunt, given the 450-foot safety zone around structures. **See Map 5.**
6. Re-introduction of fire to fire-dependent communities. The dry-mesic southern forests, prairie fen, southern wet meadow, southern shrub-car, and other natural communities that historically existed on the site were maintained by periodic fire. As native communities are restored and native vegetation plant in old fields, prescribed fire should be used as a management tool where appropriate.

Natural Area Stewardship Management Actions

Natural areas stewardship work should prioritize control of high-priority invasive species and restoration of high-quality remnants. The large prairie fen is the highest priority for restoration work due to the high number of species that are fen specialists. Uplands around the fen and bog should be restored by removing invasive species and establishing native vegetation to protect water quality in these specialized wetlands.

1. Aggressively manage Oriental bittersweet. Sweep active control areas multiple times during the growing season, and work to reduce seed set in areas that cannot be actively controlled.
2. Aggressively manage Phragmites. This should include annual treatment of existing infestations and thorough monitoring of the remaining areas of the park.
3. Aggressively manage swallow-wort.
4. Sweep upland areas of the property annually for garlic mustard. Hand pull second-year plants in high quality areas.
5. Mow or burn old fields bi-annually, on average. Control invasive shrubs
6. Re-introduce fire to manage fire dependent communities (dry-mesic southern forest, prairie fen, southern wet meadow, southern shrub carr) and to encourage native plant species in old fields.
7. It is vital to establish a deer management program to prevent damage to understory and groundcover vegetation. Nearly 150 acres of the property could be included in a controlled archery hunt, given the 450-foot safety zone around structures. **See Map 5.**
8. Restore old field and agricultural fields to functional natural communities. This will require breaking drain tiles to restore hydrology in wet areas if present in connection with planting native vegetation.
9. Regularly assess effects of management actions and adapt future stewardship work as needed.

Natural Area Stewardship Monitoring Recommendations

1. Conduct targeted biological surveys of the property. High quality natural communities identified during the 2020 site visit may support rare, threatened, or endangered species. Survey for rare herpetofauna in the wetlands. Good information about such plants and animals present on the property is needed to properly manage the natural areas.
2. Establish photo-monitoring points to track ecological succession, native plant community establishment, and the progress of invasive species control efforts.
3. Perform annual rapid assessments in active habitat restoration areas to track the progress of work performed and inform future management.
4. Wild parsnip, teasel, and other priority invasive plants not yet observed on the property should be documented and controlled as soon as possible if found.

Natural Areas Stewardship Annual Budget

Table 1. Annual allocation of staff time and supplies for natural areas management for the first 10 years after acquisition.

Task	Estimated Annual Staff Hours	Estimated Staff Cost @ 16/hr	Estimated Annual Supplies Budget	Total
Invasive shrub control, including oriental bittersweet	300	$4800	$600	$5400
Garlic mustard control	40	$640	$25	$665
Phragmites control	40	$640	$100	$740
Swallow-wort control	16	$256	$50	$306
Restoration assessment, photo monitoring, botanical inventory	50	$800	$100	$900
Seeding native plants	40	$640	$2000	$2640
Mowing old fields	60	$960	$300	$1260
Total	**546 hours**	**$8736**	**$3175**	**$11,911**

Table 2. Annual budget for natural areas management contractors for the first 10 years after acquisition.

Task	Estimated Contractor Cost
Prescribed fire, approximately 40 acres annually	$4000
Forestry mowing	$2000
TOTAL	**$6000**

Recreation and Support Facilities

Recreation and support facilities on the Site Concept Plan for the expansion area include:

- conversion of an existing 2500 sq. ft. residential structure for use as a visitor center,
- conversion of large barn for use as a storage facility,
- 30-space parking lot and trail head,
- 4.2 mile multi-use trail system, including observation decks,
- 10-acres reserved for active recreation sports fields.

These amenities are proposed to be similar in materials, scope, and required maintenance to the existing facilities located at Oakland Township's Bear Creek Nature Park. Recommended maintenance actions, required resources and associated annual costs for the proposed expansion area are listed below.

Recreation and Support Facility Maintenance Recommendations

1. Payment for visitor center and storage barn utilities (electricity and gas), no cost for existing private well and septic systems.
2. Routine cleaning of visitor center and operational supplies.
3. Mowing trails, lawn area along entrance driveway and parking lot.
4. Power washing of wooden observation decks.
5. Litter control including weekly garbage and poop bag removal and one annual park wide clean up.
6. Snow removal including parking lot and entrance driveway.
7. Maintain gravel parking areas including grading and filling.
8. Portable toilet 6 months of the year.
9. Park and trail inspections.
10. Hazardous tree management along trail corridors and near observation decks.

Recreation and Support Facility Maintenance Annual Budget

Table 3. Annual allocation of labor and supplies for facility maintenance

Task	Frequency	Estimated Annual Contractor Cost	Estimated Annual Staff Hours	Estimated Staff Cost @ 20/hr	Estimated Annual Supplies Budget	Total
Visitor Center and Barn Utilities	Monthly	$3,000				$3,000
Visitor Center Cleaning/Supplies	Biweekly		100	$2,000	$500	$2,500
Mowing trails and lawn areas	Biweekly	$4200				$4200
Clean wooden observation decks	Annual		16	$320	$50	$370
Litter control	Weekly		50	$1000	$300	$1300
Snow removal	As Needed		25	$500		$500
Maintain gravel parking areas	As Needed		25	$500	$500	$1000
Portable toilet	6 months	$850				$850
Park and trail inspections	Biweekly		50	$1000		$1000
Hazardous Tree Mgt	Annual	$2000				$2000
TOTAL		**$10,050**	**266**	**$5320**	**$1350**	**$16,720**

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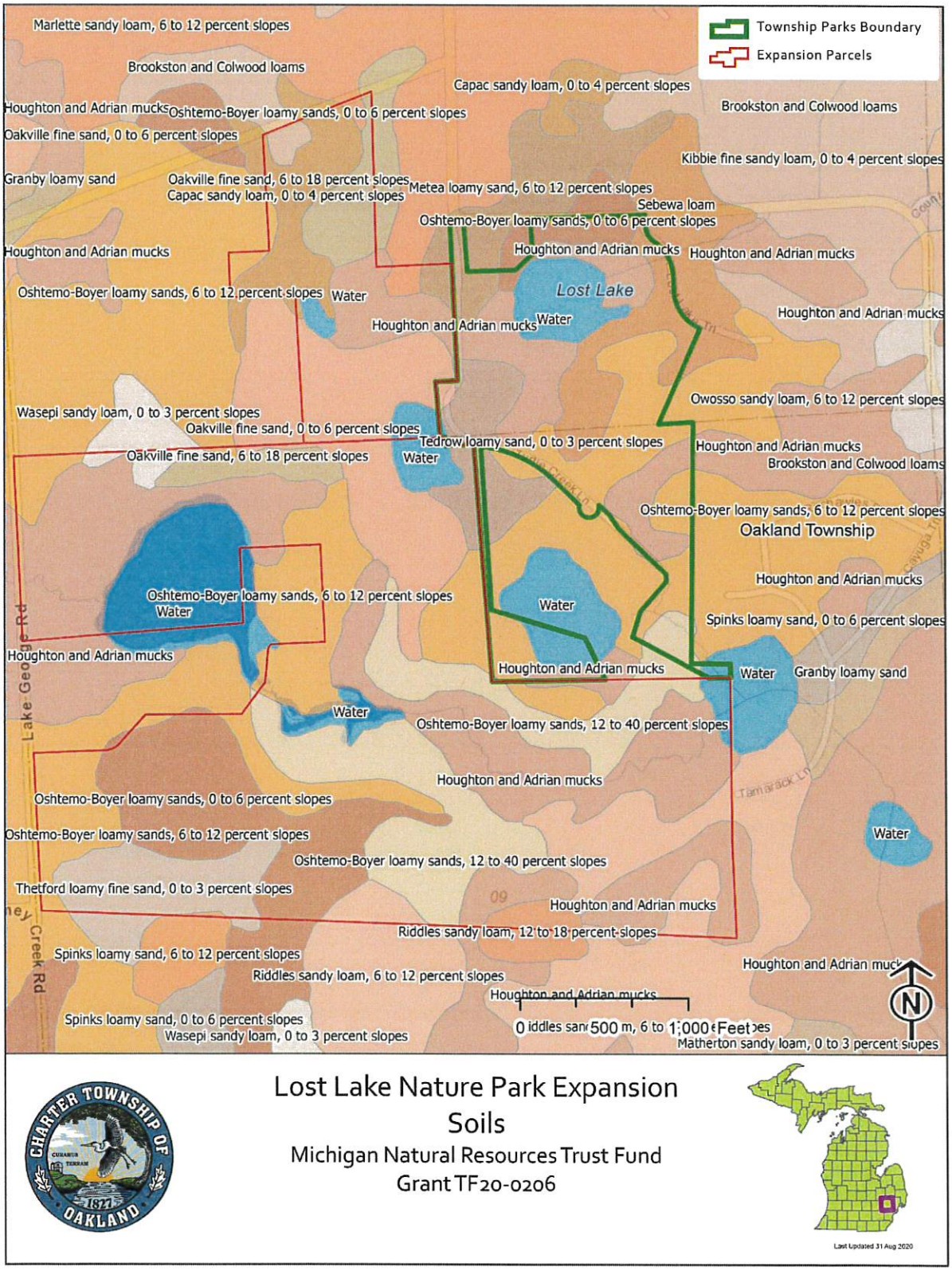
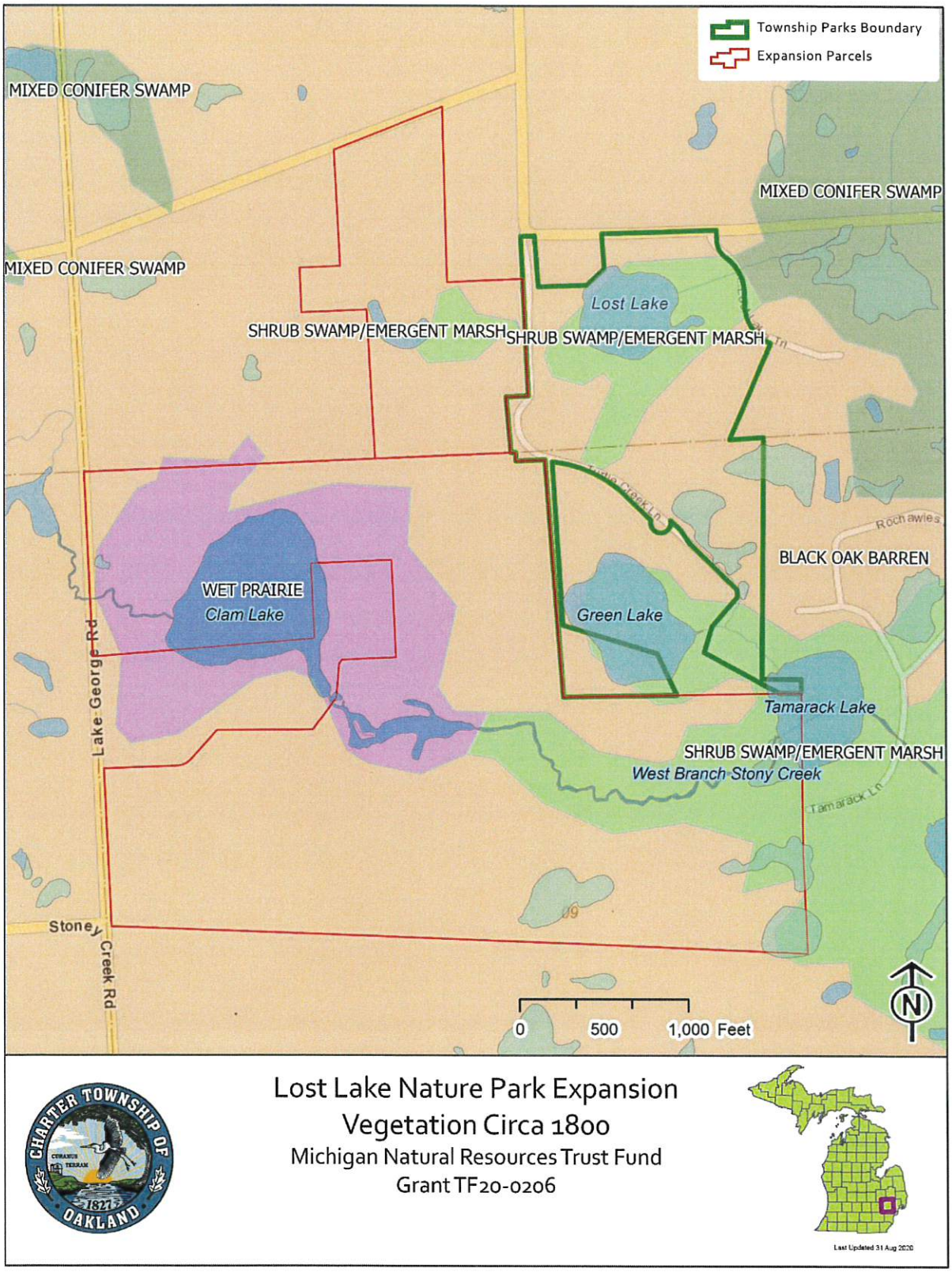
Maps

1. Soils
2. Pre-settlement Vegetation
3. Natural Communities
4. Stony Creek Ravine Nature Park Expansion Preliminary Site Development Plan
5. Hunting Safety Zone Map

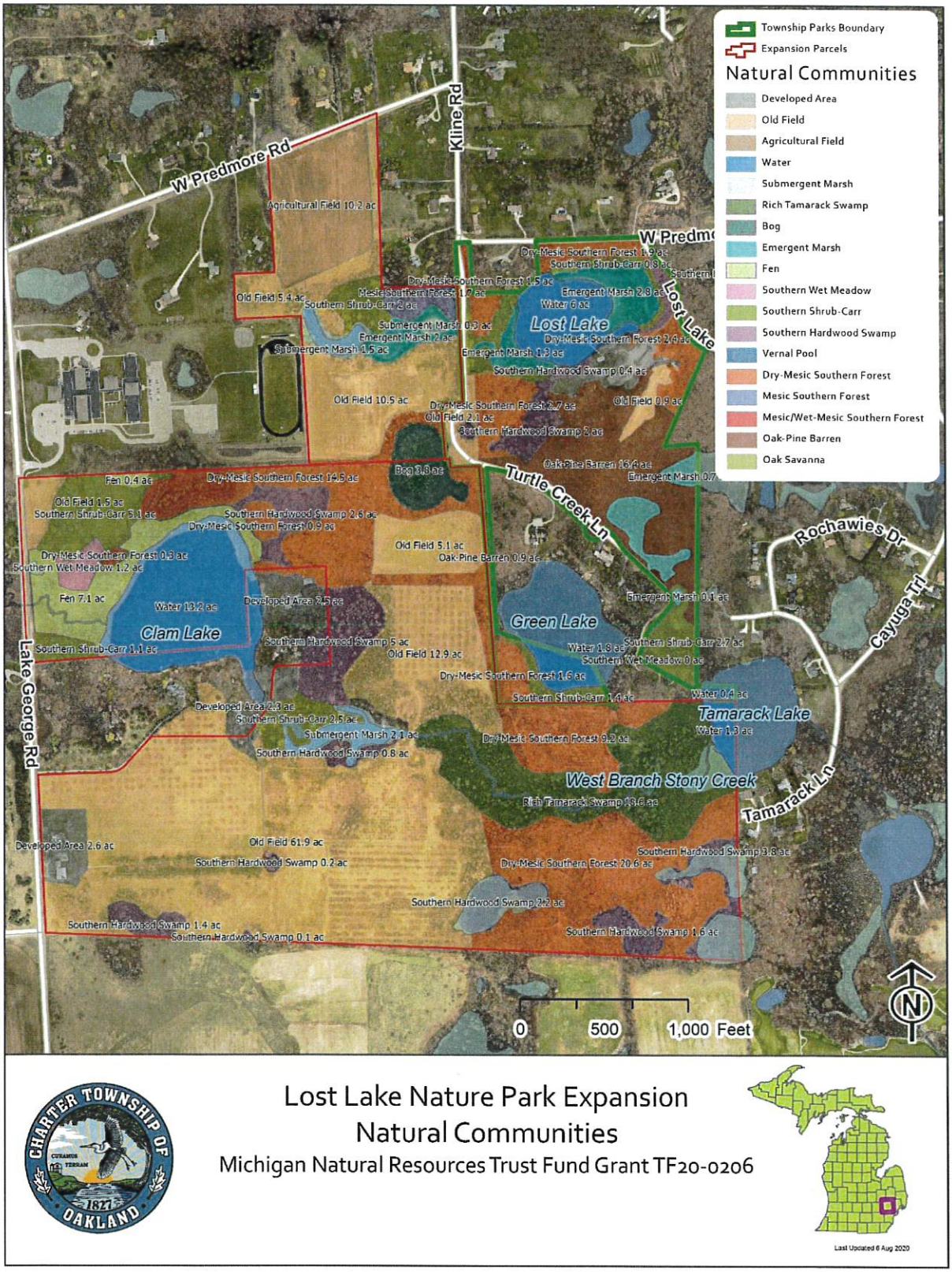
Map 1. Soils


Township Parks Boundary
Expansion Parcels
Marlette sandy loam, 6 to 12 percent slopes
Brookston and Colwood loams
Capac sandy loam, 0 to 4 percent slopes
Houghton and Adrian mucks
Oshtemo-Boyer loamy sands, 0 to 6 percent slopes
Oakville fine sand, 0 to 6 percent slopes
Granby loamy sand
Oakville fine sand, 6 to 18 percent slopes
Capac sandy loam, 0 to 4 percent slopes
Metea loamy sand, 6 to 12 percent slopes
Kibbie fine sandy loam, 0 to 4 percent slopes
Sebewa loam
Oshtemo-Boyer loamy sands, 0 to 6 percent slopes
Houghton and Adrian mucks
Houghton and Adrian mucks
Houghton and Adrian mucks
Oshtemo-Boyer loamy sands, 6 to 12 percent slopes
Water
Lost Lake
Houghton and Adrian mucks
Water
Houghton and Adrian mucks
Owosso sandy loam, 6 to 12 percent slopes
Wasepi sandy loam, 0 to 3 percent slopes
Oakville fine sand, 0 to 6 percent slopes
Tedrow loamy sand, 0 to 3 percent slopes
Houghton and Adrian mucks
Oakville fine sand, 6 to 18 percent slopes
Water
Brookston and Colwood loams
Oshtemo-Boyer loamy sands, 6 to 12 percent slopes
Oakland Township
Houghton and Adrian mucks
Oshtemo-Boyer loamy sands, 6 to 12 percent slopes
Water
Water
Spinks loamy sand, 0 to 6 percent slopes
Houghton and Adrian mucks
Houghton and Adrian mucks
Water
Granby loamy sand
Water
Oshtemo-Boyer loamy sands, 12 to 40 percent slopes
Houghton and Adrian mucks
Oshtemo-Boyer loamy sands, 0 to 6 percent slopes
Oshtemo-Boyer loamy sands, 6 to 12 percent slopes
Water
Oshtemo-Boyer loamy sands, 12 to 40 percent slopes
Thetford loamy fine sand, 0 to 3 percent slopes
Houghton and Adrian mucks
Riddles sandy loam, 12 to 18 percent slopes
Spinks loamy sand, 6 to 12 percent slopes
Houghton and Adrian muck
Riddles sandy loam, 6 to 12 percent slopes
Houghton and Adrian mucks
Spinks loamy sand, 0 to 6 percent slopes
Riddles sandy loam, 6 to 12 percent slopes
Wasepi sandy loam, 0 to 3 percent slopes
Matherton sandy loam, 0 to 3 percent slopes
Lake George Rd
Creek Rd
Tamarack Ln
0 500 m 1,000 Feet
N
Lost Lake Nature Park Expansion
Soils
Michigan Natural Resources Trust Fund
Grant TF20-0206
Last Updated 31 Aug 2020

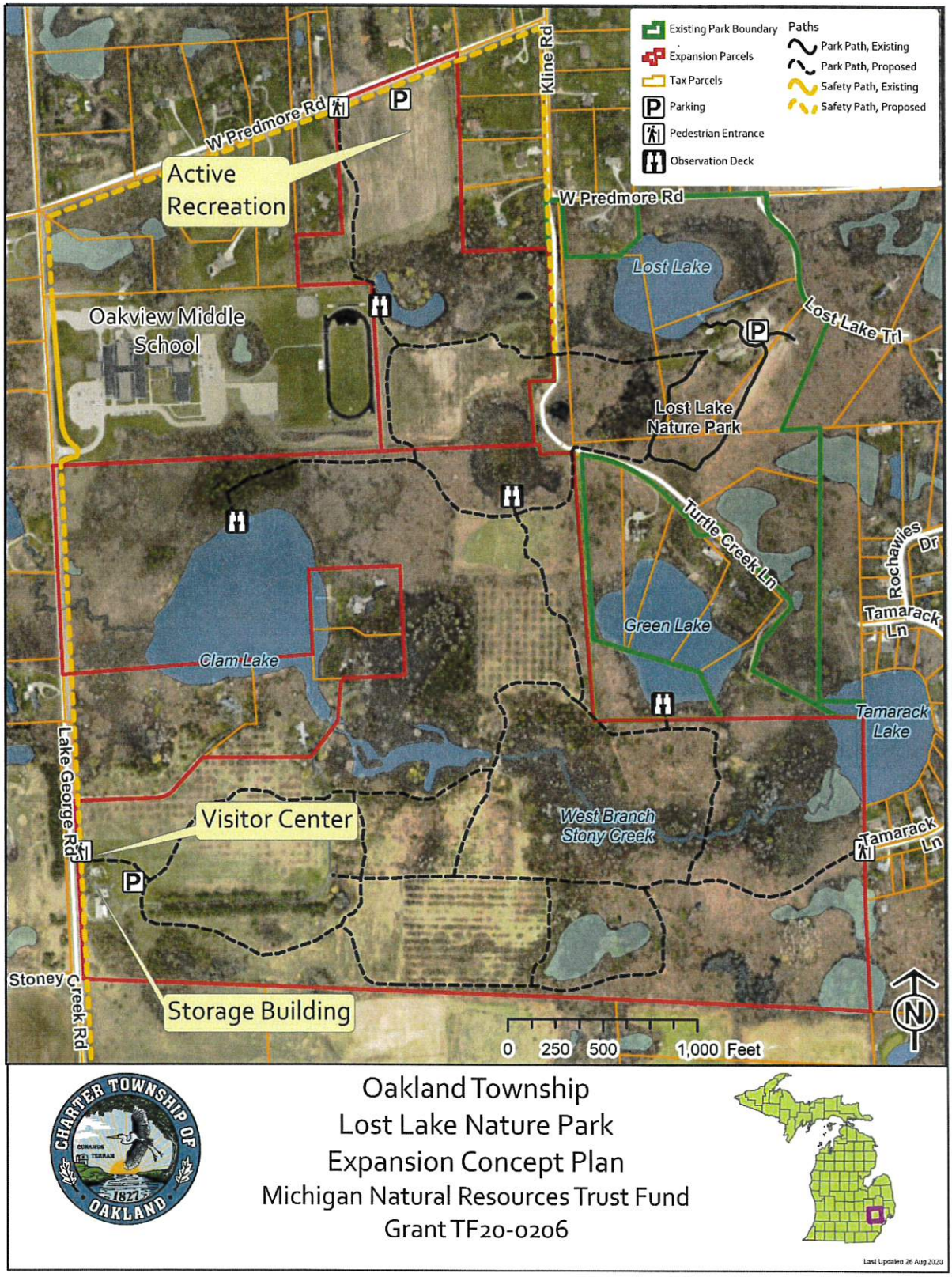
Map 2. Pre-Settlement Vegetation



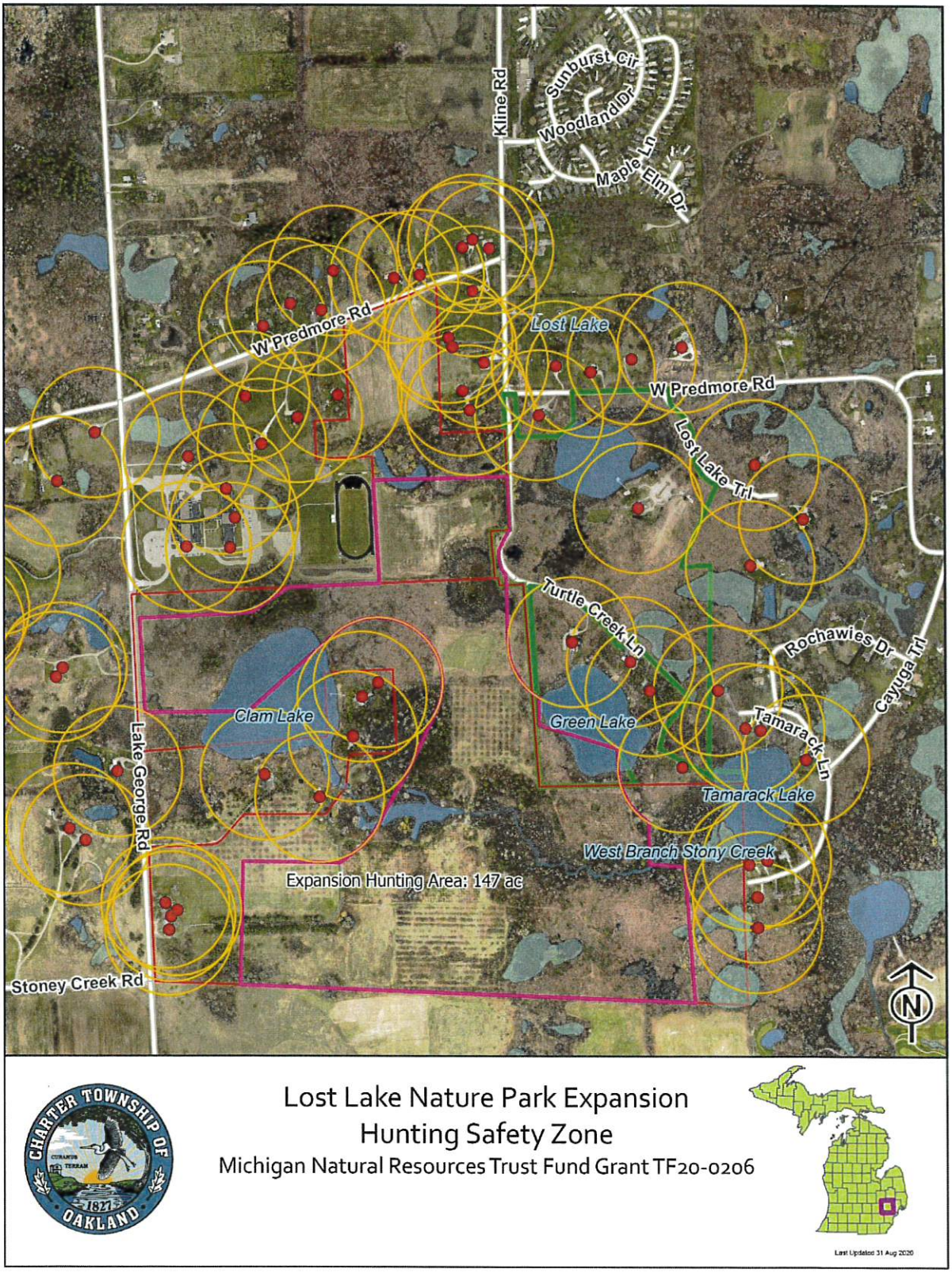
Map 3. Natural Communities



Map 4. Lost Lake Nature Park Development Concept Plan



Map 5. Lost Lake Nature Park Hunting Safety Zones



Lost Lake Nature Park

Comprehensive Management Plan

David Mindell
Matt Demmon
PlantWise, LLC
Ann Arbor, MI

May 2010

Table of Contents

Overall Observations and Site Description
Lost Lake Nature Park is a magnificent natural area. The plant communities here and the spaces they create for unique animal life make this perhaps the highest quality natural area in the Township's parks system. The park hosts a valuable diversity of habitat types, ranging from open water to droughty uplands, with an extensive mix of communities in between. It is this rich diversity of habitats, the rarity of some of them, and the overall high quality of the site that combines to create such a valuable ecological resource.

Relative to many nearby natural areas, Lost Lake Nature Park is in fairly pristine condition. However, several invasive plant species are present that have the potential to greatly reduce the site quality. These include the diffuse garlic mustard and dame's rocket scattered throughout the upland areas, a handful of patches of Asian bittersweet, and an abundance of red maples located in certain areas of the park in which they don't belong.

A spring, 2009 observation of an eastern Massasauga rattlesnake provides a strong incentive to promote more extensive restoration efforts throughout the snake's habitat in the southern portion of the park. Also near this area, the recently acquired portions of the park west and south of Green Lake offer a wonderful chance to expand the extent of high-quality upland and wetland areas to this larger complex of contiguous natural areas.

Of the plant communities, a portion of the upland can be characterized as an oak-pine barrens, garnering a G3/S2 global and state ranking (S2 means that it is "imperiled in the state because of rarity due to very restricted range, very few occurrences (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state"). This is one of a very small number of these sites throughout Michigan generally (the Michigan Natural Features Inventory (MNFI) community abstract notes that "this rare community constitutes less than 0.005% of the present vegetation" in the state).

Overall Goals and Intended Site Uses
From an ecological perspective, this is the highest quality park within the Township. Therefore, the primary goal for management here is to maximize biological diversity within each of the communities on site. Among these, the oak-pine barrens community is the most unique portion of the area and should take priority in management efforts.

A Massasauga rattlesnake was found on the site in the spring of 2009. This species likely moves back and forth between the southern wet meadow/southern shrub-carr at the south edge of the park and the adjacent upland area north of there. The wetlands in this area are becoming dramatically over-run by glossy buckthorn. If this continues, this shrub thicket will eliminate suitable habitat for this special concern animal species.

The site is also host to the annual winter festival, an event that prominently features the sledding hill. While this is a great way to bring users to the site, it is important that the area not become degraded as a result of this activity. Towards this end, sledding hill users should be guided away from the forested areas adjacent to the hill.

Soils
The upland areas of Lost Lake are generally composed of Oshtemo and Boyer loamy sands. These sandy upland soils types are very well-drained and droughty, which has contributed to the presence of the rare Oak-Pines Barren community on the site. The steep slopes found also contribute to the dominance of this drough-tolerant, fire-prone community. The wetland soils are Houghton and Adrian mucks. These are highly organic soils typically found in areas of saturated and submerged soils.

Pre-settlement Condition
Black oak barrens comprised about 1.9% of Michigan's landscape at the time of the original surveys of Michigan. They are found on flat sand plains and rolling, gravelly hills in the interior portion of the southern Lower Peninsula, and probably burned quite frequently. Oakland County historically contained more black oak barrens than any other county. The typical dominant tree was black oak, but Northern pin oak, white oak, and scarlet oak were also found. Prairie grasses and forbs were common in these savannas. Because of the lack of trees, much of this habitat was converted to farmland, but was largely abandoned by the 1930's due to the droughty and infertile soils. Much of this habitat that remains is in the process of converting to a close-canopied oak forest, due to the lack of fire.

Emergent marsh or **shrub swamp** historically comprised about 1.6% of Michigan's landscape, and was found throughout the entire state. Large marshes are found along the Great Lakes coast, and most of the inland marshes are small in size and border lakes and rivers. The surveyors were not very specific about this type of habitat, but it would generally have contained emergent aquatic plants such as cattails, bulrushes, grasses, and sedges, along with a varying component of shrubs. Common shrub species in this type of habitat would include dogwoods, willows and buttonbush. Shrub swamps are one of the few habitat types that have increased in coverage since settlement, from about 400,000 acres in the 1800's to over 1,100,000 acres in the 1980's. This increase resulted from the logging of hardwood swamps and the draining of emergent marshes, along with a decrease in fire frequency.

Current Plant Communities

The **oak-pine barrens** community at Lost Lake is an example of a state-threatened community type that is extremely rare in the southern portion of the Lower Peninsula and only slightly more common to the north. While pre-settlement maps indicate that the Lost Lake area was "black oak barrens," the presence of naturally occurring larger white pines on site suggest this to be the oak-pine barrens community. This assessment was confirmed by a former ecologist at MNFI who noted the presence of large, local genotype white pines, companion plants, and context within the landscape, as evidence of this plant community.

According to the MNFI, this community is typically found on droughty, infertile sandy and loamy soils, where fire and grazing (if large herbivores were present) would have

kept the canopy to between 5 and 60 percent cover. This community type would occur in the driest portions of the landscape, south facing slopes, ridge tops, steep terrain, and flat sand plains. Several types of wetlands would typically occur in depressions within the barrens. They would also grade into dry sand prairies and dry forest types. Frequent, low-intensity fires contribute to maintaining the open nature of this community, while less frequent wind throw events and high-intensity fires would further reduce the canopy of mature trees. The MNFI natural community description states that,

> "Numerous biotic factors influence the patterning of vegetation of oak-pine barrens. In addition to widely distributed overstory trees, barrens are characterized by scattered ant mounds. Mound-building ants play a crucial role in soil development of prairies and barrens; ants mix and aerate the soil as they build tunnels and bring soil particles and nutrients to the topsoil from lower soil horizons. Herbivores can limit woody establishment and growth. With their flammable properties, grasses and forbs help maintain the annual fire regime. Open canopy conditions are also preserved by the development of a dense herbaceous litter, which limits tree seedling establishment. Overstory trees influence vegetative composition by affecting the distribution of nutrients, light, and moisture.
>
> Oak-pine barrens and surrounding prairie habitat once supported a rich diversity of invertebrates including numerous species of butterflies, skippers, grasshoppers, and locusts. Mound-building ants and numerous grassland birds also thrived in barrens and prairies. The fragmented and degraded status of Midwestern oak-pine barrens, savannas, and prairies has resulted in the drastic decline of numerous insect and bird species associated with savanna habitats and prairie/savanna host plants. Where large-scale herbivores were abundant, grazing may have helped inhibit the succession of oak-pine barrens to woodland and forest.
>
> Fire is the single most significant factor in preserving oak-pine barrens landscapes. Where remnants of oak-pine barrens persist, the use of prescribed fire is an imperative management tool for maintaining an open canopy, promoting high levels of grass and forb diversity, deterring the encroachment of woody vegetation and invasive species, and limiting the success of canopy dominants. Fire intervals of one to three years bolster graminoid dominance, increase overall grass and forb diversity, and remove woody cover of saplings and shrubs. Burning at longer time intervals will allow for woody plant seedling establishment and persistence. Where rare species are a management concern, burning strategies should allow for ample refugia to facilitate effective post-burn recolonization. Fire management should be orchestrated in conjunction with that of adjacent fire-dependent upland and wetland communities such as dry sand prairie, coastal plain marsh, pine barrens, and dry northern forest. Degraded barrens that have been long deprived of fire often contain a heavy overstory component of shade-tolerant species, which can

be removed by mechanical thinning or girdling. Restored sites can be maintained by periodic prescribed fire and may require investment in native plant seeding where seed and plant banks are inadequate.

Historically, Native Americans played an integral role in fire regimes of barrens ecosystems, intentionally and/or accidentally setting fire to savanna, barrens, and prairie ecosystems. Destructive timber exploitation of pines (1890s) and oaks (1920s) combined with post-logging slash fires and attempts to farm the droughty soils destroyed or degraded oak-pine barrens across Michigan. In addition, alteration of the historical fire regime has shifted many of the vegetation types with barrens physiognomy into woodlands and forest. Fire suppression policies instituted in the 1920s resulted in the succession of open oak-pine barrens to closed-canopy forests dominated by black and white oaks with little advanced regeneration of oaks and pines and a vanishing graminoid component. Many sites formerly occupied by oak-pine barrens were also converted to pine plantations. The oak-pine barrens fragments that remain are often lacking the full complement of conifers, which were ubiquitously harvested. In addition to simplified overstory structure, these communities are often depauperate in floristic diversity as the result of fire suppression, livestock grazing, off-road vehicle activity, and the subsequent invasion of non-native species.

Monitoring and control efforts to detect and remove invasive species are critical to the long-term viability of oak-pine barrens. Invasive species that threaten the diversity and community structure of oak-pine barrens, especially in southern Lower Michigan, include common St. John's-wort (*Hypericum perforatum*), spotted knapweed (*Centaurea maculosa*), black swallow-wort (*Vincetoxicum nigrum*), white swallow-wort (*V. rossicum*), Canada bluegrass (*Poa compressa*), ox-eye daisy (*Chrysanthemum leucanthemum*), hoary alyssum (*Berteroa incana*), common buckthorn (*Rhamnus cathartica*), autumn olive (*Elaeagnus umbellata*), Eurasian honeysuckles (*Lonicera morrowii, L. japonica, L. maackii, L. sempervirens, L. tatarica, L. xbella,* and *L. xylosteum*), and multiflora rose (*Rosa multiflora*)." (MNFI)

The primary goal within this community is to maintain or increase the breadth of plant and animal diversity found here. A secondary goal for this area is to soften the transitions between the oak-pine barren patches and those immediately adjacent to them. This can be most effectively done by carrying management efforts across community borders.

These goals can be achieved by reducing the advanced degree of shade (a result of long term fire suppression) while maintaining the regular presence of fire, the predominant natural disturbance regime associated with this community, as described in the MNFI community description above.

- The canopy should gradually be opened by annually removing approximately 20% of the red maple and black cherry trees greater than 8" DBH. Trees could be girdled and left standing or cut in the winter (when the ground is frozen) and removed from the site. In either case, the girdle or cut surface should be painted with a concentrated solution of herbicide.
- These areas should be burned in a rotation of one to three years. A natural delineation would be to separate the units with a line from one of the large emergent marshes in the southern portion of the park to the next.
- Seek to expand management into the neighboring properties (into the property east of the oak-pine barren along the west side of Green Lake, and along the east side of the park (the property to the northwest of Tamarack Lake).

At Lost Lake, the **dry-mesic southern forest (DMSF)** community is a natural gradation from the oak-pine barrens and is typically found on less droughty sandy loam and loam soils. White and black oaks dominate, along with red oak on north slopes, and various hickories. Other trees such as black cherry, sassafras, white ash, and basswood can form a minor component of this community type. Many of the current communities described as DMSF were likely much more open in the 1800's and would have been described as one of the barren or savanna types. Frequent, low-intensity fires set back woody growth, and wind throw would have assured light for oak regeneration. Due to fire suppression, canopies have become much more closed, and more shade-tolerant tree types such as red maple have suppressed oak regeneration.

Many of the management considerations and invasive threats for the DMSF are the same as in the oak-pine barrens community. Fire is critical in maintaining the structure and diversity of oak forests, and thinning of sizable red maples and other trees that are preventing oak regeneration and hindering sun-loving forbs will help to encourage groundcover diversity and stimulate oak regeneration.

The DMSF patches adjacent to Lost Lake Trail and west of Lost Lake are generally in good condition and present excellent forest structure: a diversity of plants comprising the canopy, understory, and groundcover. In contrast, The DMSF southwest of Lost Lake has a dense canopy and virtually no understory or ground layer. In part, this is likely a result of deer browse, but the closed canopy is sure to be a cause of this as well. Gradually reducing the presence of maples and cherries in this area is imperative for increasing animal and plant diversity here. Finally, the patch in the far southwest corner of the park has great potential but is heavily invaded by a host of weeds. Once these are removed, this area could serve as an important corridor for animals moving from the forests and fields south and west of the park, to Green Lake.

Wetland Communities

Several types of wetland communities are present at Lost Lake. These areas are very dynamic, often succeeding from one type to another. They are greatly affected by water levels, which can change seasonally or over longer periods of time. Previously, beavers would have had much to do with establishing water levels. Fire is a secondary influence

on these wetland types, reducing shrub cover or overstory trees and allowing for more grasses, sedges, and rushes to thrive. Wind throw of shallowly rooted trees is also an important natural disturbance regime, allowing swamps to succeed to more open systems.

Emergent marshes are the wettest of these types, characterized by flooded soils and herbaceous vegetation. **Southern wet meadows** are also an open community type, maintained by fire, seasonal flooding, and beaver-induced flooding. These disturbances prevent conversion to **southern shrub-carr**, a community dominated by shrubs, whether patchy or thick, and containing an understory of herbaceous vegetation. Fire is infrequent, but wind throw of trees and short-term flooding prevent tree establishment.

> "Southern shrub-carr is a widespread community type in the Great Lakes region and likely occupies a greater percentage of wetland acreage today than it did in the 1800s due to fire suppression and alterations to hydrologic regimes. The community contributes significantly to the overall biodiversity of southern Michigan by providing habitat to a wide variety of plant and animal species including several rare species. However, southern shrub-carr has replaced many rare and declining wetland communities such as prairie fen, southern wet meadow, and rich tamarack swamp. Where shrub encroachment threatens to convert less common open wetlands to shrub-dominated systems, prolonged flooding, repeated prescribed fires, mowing, or herbicide application to cut shrub stumps can be employed to maintain open conditions. On sites that are succeeding to swamp forest, allowing succession to proceed unhindered will favor an increase of less common swamp systems. Southern shrub-carr can be maintained by cutting tree species. While southern shrub-carr has replaced many declining and rare communities, it does provide important ecosystem services, protecting water quality by assimilating nutrients, trapping sediment, and retaining storm water and floodwater." (MNFI)

The shrub-carr found in the southeastern portion of the park is a clear example of plant succession from a southern wet meadow, as described above. What started as an influx of gray dogwood and willow, rapidly accelerated with the addition of glossy buckthorn. This conversion is common throughout Oakland Township. In contrast, high-quality southern wet meadows, especially those adjacent to high-quality uplands, are far less prevalent.

As such, there is great value in eliminating the non-native shrubs and greatly reducing the invading native shrubs as well. The nearby sighting of the Massasauga rattlesnake only enhances the value of this plan of action. These efforts could also effectively connect the small southern wet meadow located at the end of Turtle Creek Lane with Tamarack Lake, creating an open migratory corridor alternative to the shrub thicket linking Tamarack and Green Lakes.

A mix of trees, such as red and silver maples and green and black ash, that tolerate short periods of root inundation, characterizes **southern hardwood swamps**. This community has a disturbance regime consisting mostly of blowdowns of the shallowly rooted trees, providing sun and microtopography (created by the tipped-up trees) for establishment of diverse vegetation. Fire frequency would have been infrequent to rare in swamps, occurring only during extreme drought or when adjacent to fire-prone communities.

The portion of swamp on the south side of Lost Lake is currently a thicket of Asian bittersweet. This area serves as a seed source for much of the remainder of the park. This is the highest priority action within this community.

Surrounding Land Uses

Lost Lake is currently fairly well buffered from surrounding land use concerns. A majority of the land around the preserve is composed of forest, either undeveloped or already developed residentially with large lots, still mostly forested. There is an old field and orchard to the southwest, but this is distant from the main part of the preserve. Several homeowners are in the center of the park, which increases edge effect between the preserve and unmanaged area. This could present a difficulty in managing for weeds such as Asian bittersweet and garlic mustard where private yards directly bound the smaller areas of the preserve. The closest developed area is the subdivision to the southeast. It is buffered by one large forested lot, but the large proportion of lawn and impervious surface adjacent to the wetland shared with the preserve could impact water quality, at least in that wetland.

Large-Scale Site Stresses

1. Invasive plants have the potential to dramatically alter this site. Asian bittersweet, garlic mustard, dame's rocket, red maple, and bush honeysuckles are of greatest concern in the drier portions of the park. Glossy buckthorn, and to a lesser extent *Phragmites*, are degrading the southern portions of the park and threaten the wetland habitats there.
2. Invasive earthworms can dramatically alter the mesic woods near Lost Lake if unused worms are discarded by fishermen. Signage should be created that cautions people against disposing of worms on the site (and trash cans should be placed strategically to make disposal as easy as possible).

Site Concerns and Prioritization

1. Maintaining the oak/pine barren community is the highest priority for the site, followed by the other communities.
    a. This element requires the manual removal of the groundcover invaders garlic mustard and dame's rocket, and the chemical control of Asian bittersweet wherever it occurs (there are currently four large populations of the plant with scattered seedlings near these infestations).
    b. Of lower priority, but nonetheless important in this community, is the thinning of the canopy, beginning with larger red maple trees, in order to stimulate additional groundcover species and oak regeneration.

2. Improve the habitat for the eastern massasauga rattlesnake(s) on site. This element involves the removal of encroaching shrubs (including glossy and common buckthorn, gray dogwood, and willows) and herbaceous invaders (*Phragmites australis,* or giant reed, and reed canary grass (*Phalaris arundinacea*)) in the southernmost wetlands on site.
3. Manage the wetlands surrounding Lost Lake.
4. Overall, work within the park should proceed as follows:
    a. Work throughout the oak-pine barren community;
    b. work through the shrub-carr/wetland communities northwest of Tamarack Lake, beginning from three points—at the lake edge, at the southern wet meadow, and from the emergent marsh;
    c. work throughout the DMSF units, beginning in those north of the bend, along Turtle Creek Road, then east of the entry drive, finishing in the southwest corner of the park;
    d. work the forest areas north of Lost Lake, moving from east to west.

Management Actions

1. All upland areas should be swept annually for garlic mustard and dame's rocket plants. Pulled plants should be hung off the ground (earlier in spring) or bagged and removed from the site (later in spring, when pulled plants can produce viable seed). The largest patches of garlic mustard were seen adjacent to the parking lots and toilets.
2. Patches of Asian bittersweet should be sprayed in late summer. These are scattered throughout the park. View map for known locations.
3. Reed canary grass and *Phragmites* should be herbicided where they are found near Tamarack Lake and along the creek joining the two lakes.
4. In the southern wetlands, shrubs should be cut, herbicided, and brush hauled from the site. Wood chips should not be blown into natural areas.
5. There are numerous dead young red maples as a result of the two recent prescribed burns. However, the west side of the park near the bend in Turtle Creek Lane is quite shaded by larger maples and cherries. 20% of these two species could be girdled or "drilled and filled" annually for four years to increase light levels here.
6. In addition to continued burning in the oak-pine barrens, spring prescribed burns should be implemented south of the creek, in the recently acquired parcel, and north of Lost Lake.
7. *Phragmites* and reed canary grass should be treated along the Lost Lake edge before they expand their presence.
8. Mowing along the south edge of Lost Lake should be reduced to minimize nutrient flow into the lake. Additionally, mowing should be conducted in a manner that keeps the clippings from being blown into the natural areas, as these clippings tend to be a source of invasive seed.
9. Avoid blowing leaf litter from mowed areas into woodland edges. Where leaf-blowing must happen, blown leaves should be gathered and transferred to a designated compost site. This will reduce smothering of native vegetation and alteration of nutrient/chemical cycling.

Monitoring Recommendations

1. Consider creating a deer exclosure within the oak-pine barren to monitor herbivory impacts.
2. Establish photo points such as:
   a) From base of sledding hill towards top of hill (to monitor impact of sledding activities).
   b) From utility pole in DMSF on west side of park, looking northeast (to monitor level of shade there and spread of ground layer vegetation).
   c) From broken white pine on knoll in southern section of park, looking north and south (to monitor quality of this area, which is representative of the oak-pine barrens).
   d) From Tamarack Lake looking northwest into sedge meadow (to monitor shrub encroachment).
   e) From southern wet meadow at end of Turtle Creek Lane, looking southeast (to monitor shrub removal efforts).

Undocumented Plant Species Observed

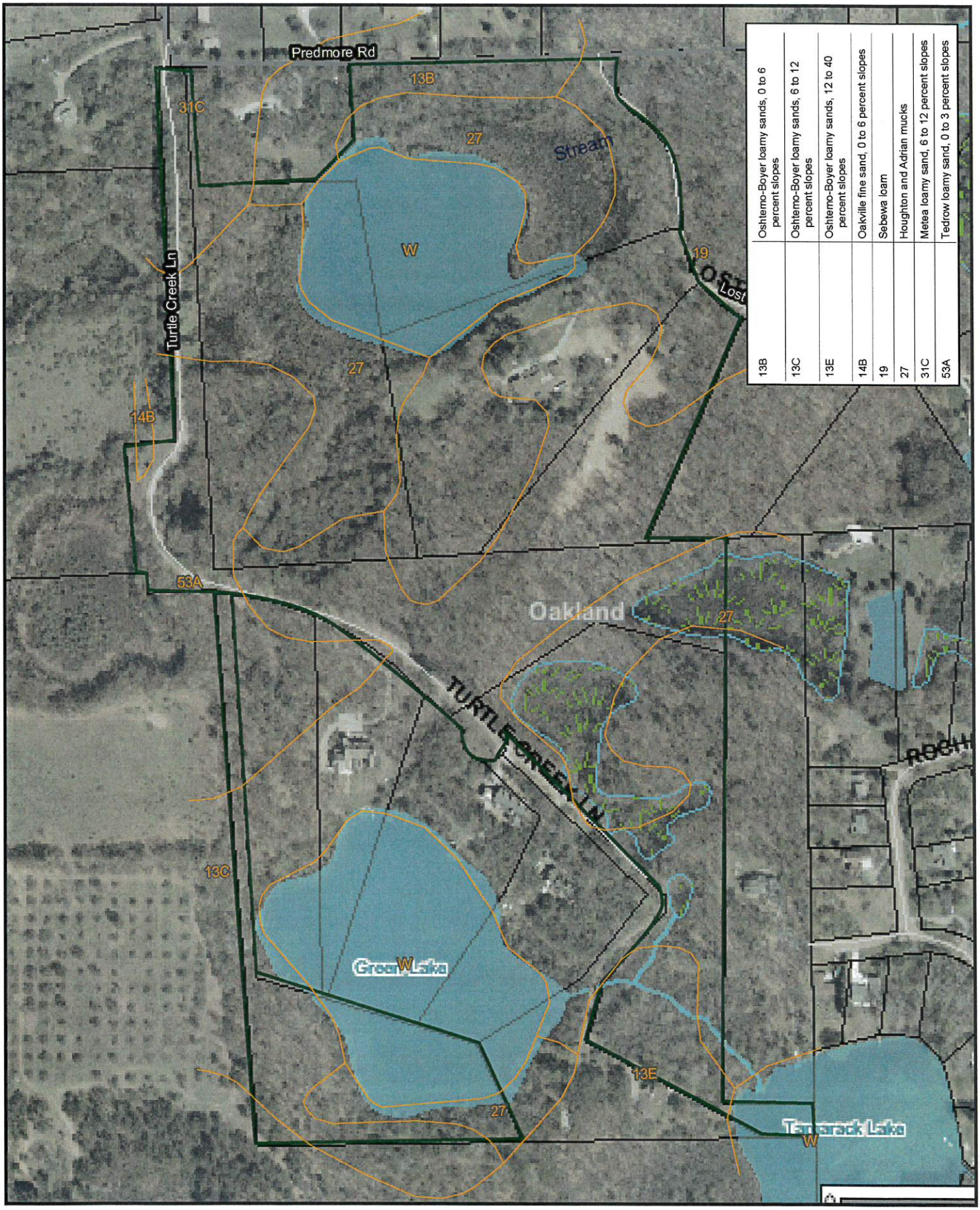
Oak-Barrens

Scientific Name	Common Name	Coefficient of Conservatism
Asclepias exaltata	Poke milkweed	6
Aureolaria virginica	Downy false foxglove	10
Coreopsis lanceolata	Sand coreopsis	8
Rosa carolina	Pasture rose	4
Solidago speciosa	Showy goldenrod	5

Wetlands

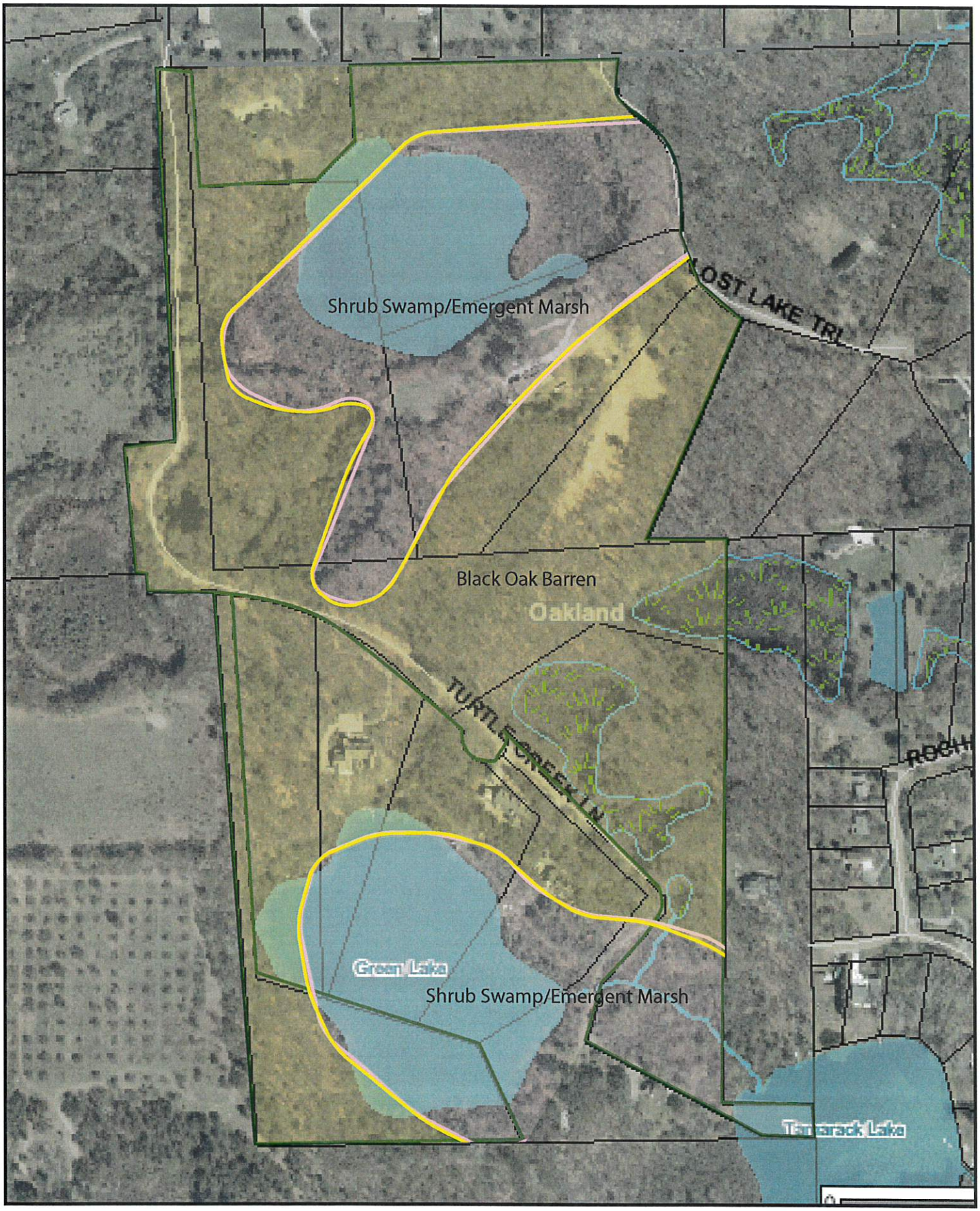
Anemone quinquefolia	Wood anemone	5
Cypripedium calceolus var. pubescens	Large yellow lady's-slipper	5
Phragmites australis	Giant reed	*
Physocarpus opulifolius	Ninebark	4
Polygontum biflorum	Solomon-seal	4
Rhamnus alnifolia	Alder-leaved buckthorn	8
Rhamnus frangula	Glossy buckthorn	*
Seneceo aureus	Golden ragwort	5
Solidago patula	Swamp goldenrod	6
Solidago rugosa	Rough goldenrod	3
Trillium grandiflorum	Common trillium	5
Zizia aureus	Golden Alexanders	6

* indicates non-native species



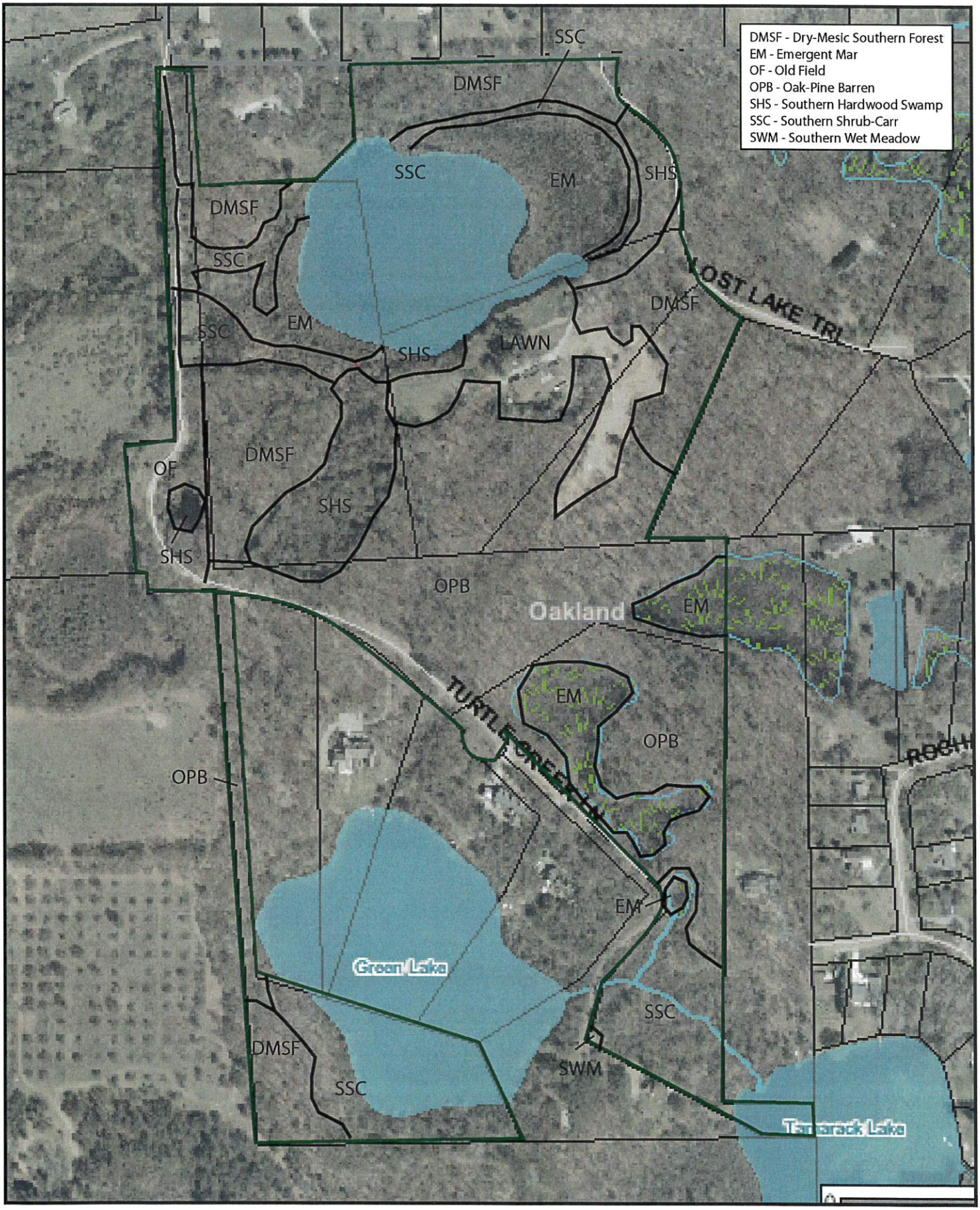
Lost Lake Park - Soil Types

Plantwise, LLC 2009



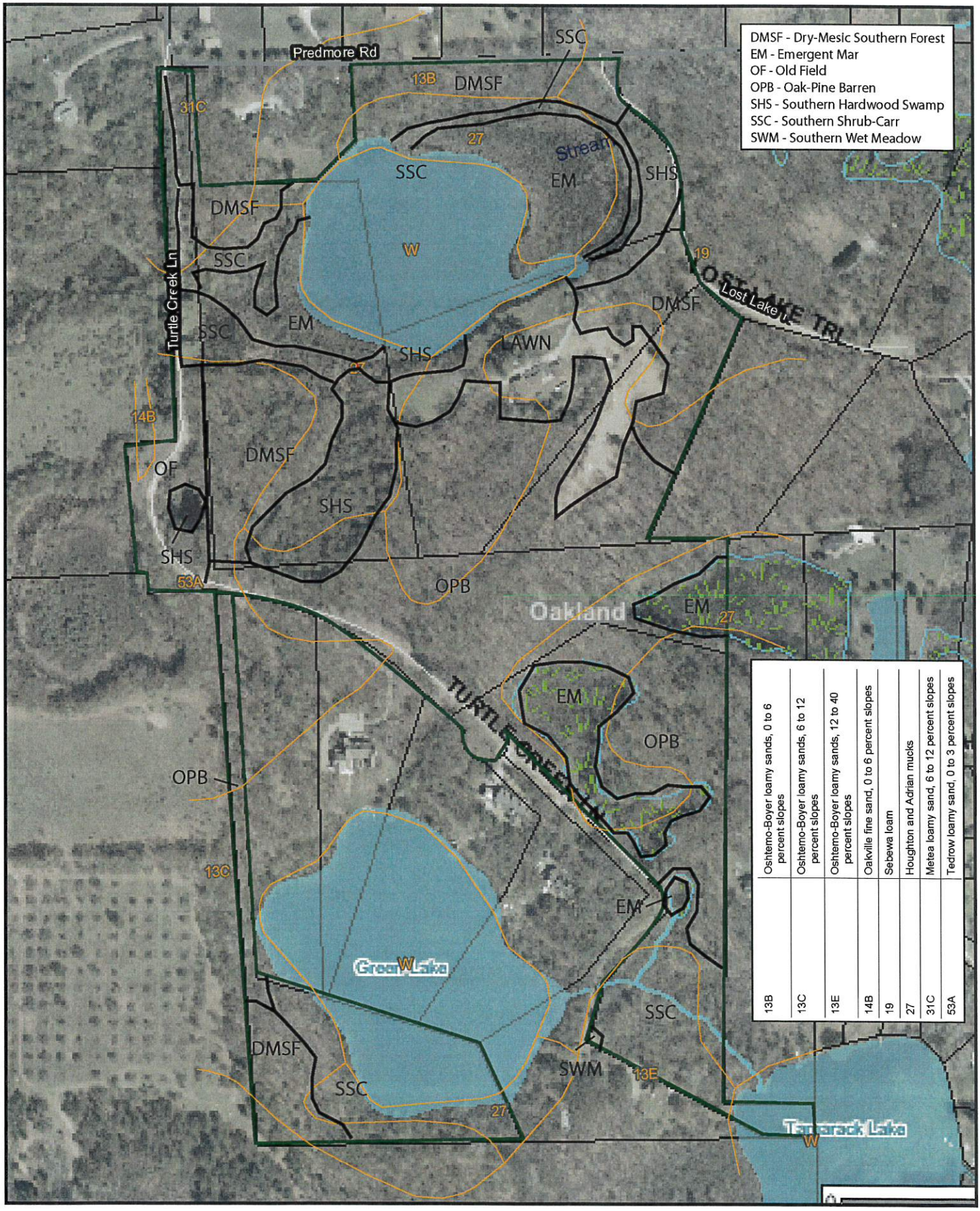
Lost Lake Park - Presettlement Vegetation Types

Plantwise, LLC 2009



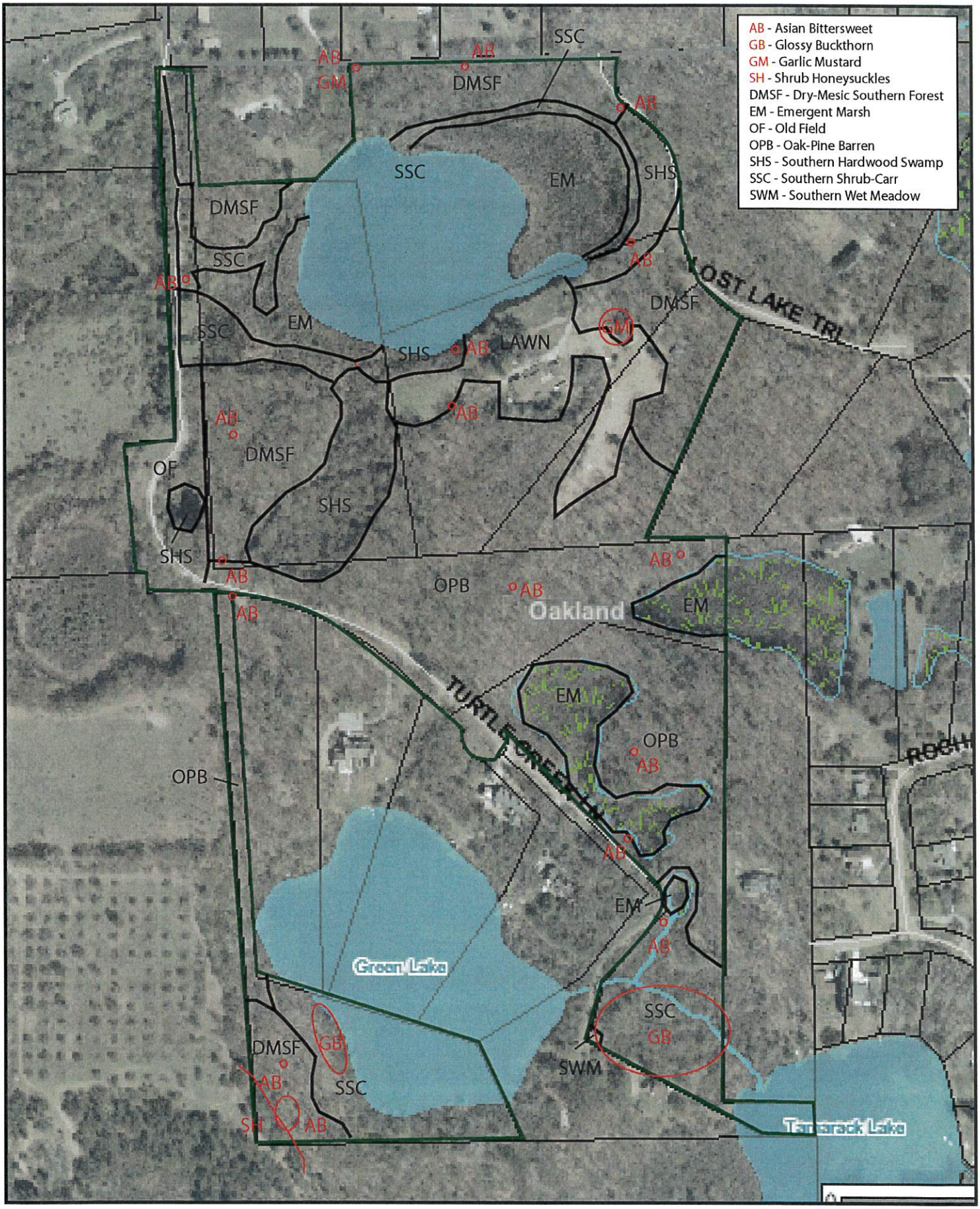
Lost Lake Park - Current Plant Communities

Plantwise, LLC 2009



Lost Lake Park - Current Plant Communities and Soil Types

Plantwise, LLC 2009



Lost Lake Park - Current Plant Communities and Invasive Locations

Plantwise, LLC 2009

LLNP West Parcel Floristic Quality Assessment

10-09-100-022 Entire Site
7/30/2020
10-09-100-022
Oakland
Oakland
Michigan
United States

FQA DB Region:	Michigan
FQA DB Publication Year:	2014
FQA DB Description:	Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014. Michigan Floristic Quality Assessment Database
Practitioner:	Ben VanderWeide
Latitude:	
Longitude:	
Weather Notes:	70-83, Sunny
Duration Notes:	9-3-2019: 6-8 pm and 7-30-2020: 8:30 am to 3:30 pm
Community Type Notes:	Prairie fen, dry-mesic southern forest, southern shrub-carr, southern wet meadow, southern hardwood swamp, mixe
Other Notes:	Includes parcel to the north 10-04-376-011
Private/Public:	Private

Conservatism-Based Metrics:

Total Mean C:	3.5
Native Mean C:	4.3
Total FQI:	58.7
Native FQI:	65.1
Adjusted FQI:	38.8
% C value 0:	22.4
% C value 1-3:	26.3
% C value 4-6:	36.7
% C value 7-10:	14.6
Native Tree Mean C:	3.6
Native Shrub Mean C:	4.6
Native Herbaceous Mean C:	4.3

LLNP West Parcel Floristic Quality Assessment

Species Richness:

Total Species:	281	
Native Species:	229	81.50%
Non-native Species:	52	18.50%

Species Wetness:

Mean Wetness:	-0.4
Native Mean Wetness:	-1.1

Physiognomy Metrics:

Tree:	31	11%
Shrub:	43	15.30%
Vine:	11	3.90%
Forb:	146	52%
Grass:	22	7.80%
Sedge:	16	5.70%
Rush:	2	0.70%
Fern:	10	3.60%
Bryophyte:	0	0%

Duration Metrics:

Annual:	20	7.10%
Perennial:	246	87.50%
Biennial:	15	5.30%
Native Annual:	14	5%
Native Perennial:	209	74.40%
Native Biennial:	6	2.10%

Species:

Scientific Name	Common Name	Family	Acronym	Native?	C	W	Physiognomy	Duration
Acer negundo	box-elder	Sapindaceae	ACENEG	native	0	0	tree	perennial
Acer platanoides	norway maple	Sapindaceae	ACEPLA	non-native	0	5	tree	perennial
Acer rubrum	red maple	Sapindaceae	ACERUB	native	1	0	tree	perennial
Acer saccharinum	silver maple	Sapindaceae	ACESAI	native	2	-3	tree	perennial

LLNP West Parcel Floristic Quality Assessment

Scientific Name	Common Name	Family	Acronym	Native?	C	W	Physiognomy	Duration
Achillea millefolium	yarrow	Asteraceae	ACHMIL	native	1	3	forb	perennial
Actaea rubra	red baneberry	Ranunculaceae	ACTRUB	native	7	3	forb	perennial
Agalinis purpurea	purple false foxglove	Orobanchaceae	AGAPUR	native	7	-3	forb	annual
Agrimonia gryposepala	tall agrimony	Rosaceae	AGRGRY	native	2	3	forb	perennial
Alisma subcordatum; a. plantag	southern water-plantain	Alismataceae	ALISUB	native	1	-5	forb	perennial
Alliaria petiolata	garlic mustard	Brassicaceae	ALLPET	non-native	0	3	forb	biennial
Ambrosia artemisiifolia	common ragweed	Asteraceae	AMBART	native	0	3	forb	annual
Amelanchier arborea	juneberry	Rosaceae	AMEARB	native	4	3	tree	perennial
Amphicarpaea bracteata	hog-peanut	Fabaceae	AMPBRA	native	5	0	vine	annual
Andropogon gerardii	big bluestem	Poaceae	ANDGER	native	5	0	grass	perennial
Antennaria parlinii	smooth pussytoes	Asteraceae	ANTPAL	native	2	5	forb	perennial
Apios americana	groundnut	Fabaceae	APIAME	native	3	-3	vine	perennial
Apocynum cannabinum; a. sibiri	indian-hemp	Apocynaceae	APOCAN	native	3	0	forb	perennial
Arisaema triphyllum	jack-in-the-pulpit	Araceae	ARITRI	native	5	0	forb	perennial
Aronia prunifolia	chokeberry	Rosaceae	AROPRU	native	5	-3	shrub	perennial
Asclepias incarnata	swamp milkweed	Apocynaceae	ASCINC	native	6	-5	forb	perennial
Asclepias syriaca	common milkweed	Apocynaceae	ASCSYR	native	1	5	forb	perennial
Asclepias tuberosa	butterfly-weed	Apocynaceae	ASCTUB	native	5	5	forb	perennial
Asparagus officinalis	garden asparagus	Asparagaceae	ASPOFF	non-native	0	3	forb	perennial
Asplenium platyneuron	ebony spleenwort	Aspleniaceae	ASPPLA	native	2	3	fern	perennial
Athyrium filix-femina	lady fern	Athyriaceae	ATHFIL	native	4	0	fern	perennial
Berberis thunbergii	japanese barberry	Berberidaceae	BERTHU	non-native	0	3	shrub	perennial
Berteroa incana	hoary alyssum	Brassicaceae	BERINC	non-native	0	5	forb	annual
Betula alleghaniensis	yellow birch	Betulaceae	BETALL	native	7	0	tree	perennial
Betula papyrifera	paper birch	Betulaceae	BETPAP	native	2	3	tree	perennial
Betula pumila	bog birch	Betulaceae	BETPUM	native	8	-5	shrub	perennial
Bidens cernua	nodding beggar-ticks	Asteraceae	BIDCER	native	3	-5	forb	annual
Bidens comosa	swamp tickseed	Asteraceae	BIDCOM	native	5	-3	forb	annual
Bidens trichosperma; b. coronat	tickseed-sunflower	Asteraceae	BIDTRI	native	7	-5	forb	annual
Brachyelytrum erectum	long-awned wood grass	Poaceae	BRAERE	native	7	5	grass	perennial
Bromus ciliatus	fringed brome	Poaceae	BROCIL	native	6	-3	grass	perennial
Bromus inermis	smooth brome	Poaceae	BROINE	non-native	0	5	grass	perennial
Calamagrostis canadensis	blue-joint	Poaceae	CALCAN	native	3	-5	grass	perennial

LLNP West Parcel Floristic Quality Assessment

Scientific Name	Common Name	Family	Acronym	Native?	C	W	Physiognomy	Duration
Caltha palustris	marsh-marigold	Ranunculaceae	CALPAR	native	6	-5	forb	perennial
Campanula aparinoides	marsh bellflower	Campanulaceae	CAMAPA	native	7	-5	forb	perennial
Carduus acanthoides	plumeless thistle	Asteraceae	CARACA	non-native	0	5	forb	biennial
Carex blanda	sedge	Cyperaceae	CXBLAN	native	1	0	sedge	perennial
Carex buxbaumii	sedge	Cyperaceae	CXBUXB	native	10	-5	sedge	perennial
Carex comosa	sedge	Cyperaceae	CXCOMO	native	5	-5	sedge	perennial
Carex hystericina	sedge	Cyperaceae	CXHYST	native	2	-5	sedge	perennial
Carex lacustris	sedge	Cyperaceae	CXLACU	native	6	-5	sedge	perennial
Carex lasiocarpa	sedge	Cyperaceae	CXLASI	native	8	-5	sedge	perennial
Carex leptalea	sedge	Cyperaceae	CXLEPA	native	5	-5	sedge	perennial
Carex pensylvanica	sedge	Cyperaceae	CXPENS	native	4	5	sedge	perennial
Carex rosea; c. convoluta	curly-styled wood sedge	Cyperaceae	CXROSE	native	2	5	sedge	perennial
Carex stricta	sedge	Cyperaceae	CXSTRI	native	4	-5	sedge	perennial
Carya glabra	pignut hickory	Juglandaceae	CARGLA	native	5	3	tree	perennial
Celastrus orbiculatus	oriental bittersweet	Celastraceae	CELORB	non-native	0	5	vine	perennial
Centaurea stoebe; c. maculosa	spotted knapweed	Asteraceae	CENSTO	non-native	0	5	forb	biennial
Cephalanthus occidentalis	buttonbush	Rubiaceae	CEPOCC	native	7	-5	shrub	perennial
Chamaedaphne calyculata	leatherleaf	Ericaceae	CHACAL	native	8	-5	shrub	perennial
Chelone glabra	turtlehead	Plantaginaceae	CHEGLB	native	7	-5	forb	perennial
Cicuta bulbifera	water hemlock	Apiaceae	CICBUL	native	5	-5	forb	perennial
Cicuta maculata	water hemlock	Apiaceae	CICMAC	native	4	-5	forb	biennial
Cinna arundinacea	wood reedgrass	Poaceae	CINARU	native	7	-3	grass	perennial
Circaea canadensis; c. lutetiana	enchanters-nightshade	Onagraceae	CIRCAN	native	2	3	forb	perennial
Cirsium arvense	canada thistle	Asteraceae	CIRARV	non-native	0	3	forb	perennial
Cirsium muticum	swamp thistle	Asteraceae	CIRMUT	native	6	-5	forb	biennial
Conium maculatum	poison-hemlock	Apiaceae	CONMAC	non-native	0	-3	forb	biennial
Conyza canadensis	horseweed	Asteraceae	CONCAN	native	0	3	forb	annual
Cornus amomum	silky dogwood	Cornaceae	CORAMO	native	2	-3	shrub	perennial
Cornus foemina	gray dogwood	Cornaceae	CORFOE	native	1	0	shrub	perennial
Cornus sericea; c. stolonifera	red-osier	Cornaceae	CORSER	native	2	-3	shrub	perennial
Corylus americana	hazelnut	Betulaceae	CORAMA	native	5	3	shrub	perennial
Cuscuta gronovii	common dodder	Convolvulaceae	CUSGRO	native	3	-3	vine	annual
Cyperus squarrosus; c. aristatus	umbrella sedge	Cyperaceae	CYPSQU	native	5	-5	sedge	annual

LLNP West Parcel Floristic Quality Assessment

Scientific Name	Common Name	Family	Acronym	Native?	C	W	Physiognomy	Duration
Dactylis glomerata	orchard grass	Poaceae	DACGLO	non-native	0	3	grass	perennial
Danthonia spicata	poverty grass; oatgrass	Poaceae	DANSPI	native	4	5	grass	perennial
Dasiphora fruticosa; potentilla f.	shrubby cinquefoil	Rosaceae	DASFRU	native	8	-3	shrub	perennial
Daucus carota	queen-annes-lace	Apiaceae	DAUCAR	non-native	0	5	forb	biennial
Decodon verticillatus	whorled or swamp loosestrif	Lythraceae	DECVER	native	7	-5	shrub	perennial
Desmodium canadense	showy tick-trefoil	Fabaceae	DESCAD	native	3	0	forb	perennial
Dianthus armeria	deptford pink	Caryophyllaceae	DIAARM	non-native	0	5	forb	annual
Dichanthelium latifolium; panicu	broad-leaved panic grass	Poaceae	DICLAT	native	5	3	grass	perennial
Doellingeria umbellata; aster u.	flat-topped white aster	Asteraceae	DOEUMB	native	5	-3	forb	perennial
Drosera rotundifolia	round-leaved sundew	Droseraceae	DROROT	native	6	-5	forb	perennial
Dryopteris carthusiana	spinulose woodfern	Dryopteridaceae	DRYCAR	native	5	-3	fern	perennial
Elaeagnus umbellata	autumn-olive	Elaeagnaceae	ELAUMB	non-native	0	3	shrub	perennial
Eleocharis palustris; e. smallii	spike-rush	Cyperaceae	ELEPAL	native	5	-5	sedge	perennial
Elymus hystrix; hystrix patula	bottlebrush grass	Poaceae	ELYHYS	native	5	3	grass	perennial
Elymus trachycaulus; agropyron	slender wheatgrass	Poaceae	ELYTRA	native	8	3	grass	perennial
Epilobium ciliatum	willow-herb	Onagraceae	EPICIL	native	3	-3	forb	perennial
Epilobium hirsutum	great hairy willow-herb	Onagraceae	EPIHIR	non-native	0	-3	forb	perennial
Equisetum arvense	common horsetail	Equisetaceae	EQUARV	native	0	0	fern	perennial
Equisetum fluviatile	water horsetail	Equisetaceae	EQUFLU	native	7	-5	fern	perennial
Eragrostis spectabilis	purple love grass	Poaceae	ERASPE	native	3	5	grass	perennial
Erigeron annuus	daisy fleabane	Asteraceae	ERIANN	native	0	3	forb	biennial
Erigeron philadelphicus	philadelphia fleabane	Asteraceae	ERIPHI	native	2	0	forb	perennial
Eriophorum virginicum	tawny cotton-grass	Cyperaceae	ERIVIG	native	8	-5	sedge	perennial
Euonymus alatus	winged euonymus	Celastraceae	EUOALA	non-native	0	5	shrub	perennial
Eupatorium perfoliatum	boneset	Asteraceae	EUPPER	native	4	-3	forb	perennial
Euphorbia corollata	flowering spurge	Euphorbiaceae	EUPCOR	native	4	5	forb	perennial
Eurybia macrophylla; aster m.	big-leaved aster	Asteraceae	EURMAC	native	4	5	forb	perennial
Euthamia graminifolia	grass-leaved goldenrod	Asteraceae	EUTGRA	native	3	0	forb	perennial
Eutrochium maculatum; eupator	joe-pye-weed	Asteraceae	EUTMAC	native	4	-5	forb	perennial
Fragaria virginiana	wild strawberry	Rosaceae	FRAVIR	native	2	3	forb	perennial
Frangula alnus; rhamnus frangul	glossy buckthorn	Rhamnaceae	FRAALN	non-native	0	0	shrub	perennial
Fraxinus americana	white ash	Oleaceae	FRAAME	native	5	3	tree	perennial
Fraxinus pennsylvanica	red ash	Oleaceae	FRAPEN	native	2	-3	tree	perennial

LLNP West Parcel Floristic Quality Assessment

Scientific Name	Common Name	Family	Acronym	Native?	C	W	Physiognomy	Duration
Galium asprellum	rough bedstraw	Rubiaceae	GALASP	native	5	-5	vine	perennial
Galium boreale	northern bedstraw	Rubiaceae	GALBOR	native	3	0	forb	perennial
Galium circaezans	white wild licorice	Rubiaceae	GALCIR	native	4	3	forb	perennial
Galium trifidum	small bedstraw	Rubiaceae	GALTRD	native	6	-3	forb	perennial
Gaultheria procumbens	wintergreen	Ericaceae	GAUPRO	native	5	3	shrub	perennial
Gaylussacia baccata	huckleberry	Ericaceae	GAYBAC	native	7	3	shrub	perennial
Geranium maculatum	wild geranium	Geraniaceae	GERMAC	native	4	3	forb	perennial
Geum canadense	white avens	Rosaceae	GEUCAN	native	1	0	forb	perennial
Geum rivale	purple avens	Rosaceae	GEURIV	native	7	-5	forb	perennial
Glyceria canadensis	rattlesnake grass	Poaceae	GLYCAN	native	8	-5	grass	perennial
Glyceria grandis	reed manna grass	Poaceae	GLYGRA	native	6	-5	grass	perennial
Glyceria striata	fowl manna grass	Poaceae	GLYSTR	native	4	-5	grass	perennial
Hackelia virginiana	beggars lice	Boraginaceae	HACVIR	native	1	3	forb	biennial
Hamamelis virginiana	witch-hazel	Hamamelidaceae	HAMVIR	native	5	3	shrub	perennial
Helianthus divaricatus	woodland sunflower	Asteraceae	HELDIV	native	5	5	forb	perennial
Helianthus giganteus	tall sunflower	Asteraceae	HELGIG	native	5	-3	forb	perennial
Hylodesmum glutinosum; desmo	clustered-leaved tick-trefoil	Fabaceae	HYLGLU	native	5	5	forb	perennial
Hylodesmum nudiflorum; desmo	naked tick-trefoil	Fabaceae	HYLNUD	native	7	5	forb	perennial
Hypericum perforatum	common st. johns-wort	Hypericaceae	HYPPER	non-native	0	5	forb	perennial
Ilex verticillata	michigan holly	Aquifoliaceae	ILEVER	native	5	-3	shrub	perennial
Impatiens capensis	spotted touch-me-not	Balsaminaceae	IMPCAP	native	2	-3	forb	annual
Iris virginica	southern blue flag	Iridaceae	IRIVIR	native	5	-5	forb	perennial
Juncus brachycephalus	rush	Juncaceae	JUNBRP	native	7	-5	rush	perennial
Juncus tenuis	path rush	Juncaceae	JUNTEN	native	1	0	rush	perennial
Juniperus virginiana	red-cedar	Cupressaceae	JUNVIR	native	3	3	tree	perennial
Larix laricina	tamarack	Pinaceae	LARLAR	native	5	-3	tree	perennial
Lathyrus palustris	marsh pea	Fabaceae	LATPAL	native	7	-3	vine	perennial
Leersia oryzoides	cut grass	Poaceae	LEEORY	native	3	-5	grass	perennial
Lemna minor	common duckweed	Araceae	LEMMIN	native	5	-5	forb	perennial
Lespedeza capitata	round-headed bush-clover	Fabaceae	LESCAP	native	5	3	forb	perennial
Leucanthemum vulgare; chrysan	ox-eye daisy	Asteraceae	LEUVUL	non-native	0	5	forb	perennial
Ligustrum vulgare	common privet	Oleaceae	LIGVUL	non-native	0	3	shrub	perennial
Lobelia kalmii	bog lobelia	Campanulaceae	LOBKAL	native	10	-5	forb	perennial

LLNP West Parcel Floristic Quality Assessment

Scientific Name	Common Name	Family	Acronym	Native?	C	W	Physiognomy	Duration
Lobelia siphilitica	great blue lobelia	Campanulaceae	LOBSIP	native	4	-3	forb	perennial
Lonicera morrowii	morrow honeysuckle	Caprifoliaceae	LONMOR	non-native	0	3	shrub	perennial
Lupinus perennis	wild lupine	Fabaceae	LUPPER	native	7	5	forb	perennial
Lycopus americanus	common water horehound	Lamiaceae	LYCAME	native	2	-5	forb	perennial
Lysimachia ciliata	fringed loosestrife	Myrsinaceae	LYSCIL	native	4	-3	forb	perennial
Lysimachia quadriflora	whorled loosestrife	Myrsinaceae	LYSQUR	native	10	-5	forb	perennial
Lysimachia quadrifolia	four-leaved loosestrife	Myrsinaceae	LYSQUL	native	8	3	forb	perennial
Lythrum salicaria	purple loosestrife	Lythraceae	LYTSAL	non-native	0	-5	forb	perennial
Maianthemum canadense	canada mayflower	Convallariaceae	MAICAN	native	4	3	forb	perennial
Maianthemum stellatum; smilac	starry false solomon-seal	Convallariaceae	MAISTE	native	5	0	forb	perennial
Malus prunifolia	crabapple	Rosaceae	MALPRU	non-native	0	5	tree	perennial
Medicago lupulina	black medick	Fabaceae	MEDLUP	non-native	0	3	forb	annual
Melilotus albus	white sweet-clover	Fabaceae	MELALB	non-native	0	3	forb	biennial
Melilotus officinalis	yellow sweet-clover	Fabaceae	MELLOF	non-native	0	3	forb	biennial
Mentha canadensis; m. arvensis	wild mint	Lamiaceae	MENCAS	native	3	-3	forb	perennial
Menyanthes trifoliata	buckbean	Menyanthaceae	MENTRI	native	8	-5	forb	perennial
Monarda fistulosa	wild-bergamot	Lamiaceae	MONFIS	native	2	3	forb	perennial
Monotropa uniflora	indian-pipe	Ericaceae	MONOUN	native	5	3	forb	perennial
Muhlenbergia glomerata	marsh wild-timothy	Poaceae	MUHGLO	native	10	-5	grass	perennial
Nuphar advena	yellow pond-lily	Nymphaeaceae	NUPADV	native	8	-5	forb	perennial
Nymphaea odorata	sweet-scented waterlily	Nymphaeaceae	NYMODO	native	6	-5	forb	perennial
Oenothera biennis	common evening-primrose	Onagraceae	OENBIE	native	2	3	forb	biennial
Onoclea sensibilis	sensitive fern	Onocleaceae	ONOSEN	native	2	-3	fern	perennial
Osmunda cinnamomea	cinnamon fern	Osmundaceae	OSMCIN	native	5	-3	fern	perennial
Osmunda regalis	royal fern	Osmundaceae	OSMREG	native	5	-5	fern	perennial
Oxalis stricta; o. fontana	yellow wood-sorrel	Oxalidaceae	OXASTR	native	0	3	forb	perennial
Packera aurea; senecio a.	golden ragwort	Asteraceae	PACAUR	native	5	-3	forb	perennial
Parnassia glauca	grass-of-parnassus	Parnassiaceae	PARGLA	native	8	-5	forb	perennial
Parthenocissus quinquefolia	virginia creeper	Vitaceae	PARQUI	native	5	3	vine	perennial
Pedicularis lanceolata	swamp-betony	Orobanchaceae	PEDLAN	native	8	-3	forb	perennial
Penthorum sedoides	ditch stonecrop	Penthoraceae	PENSED	native	3	-5	forb	perennial
Persicaria amphibia; polygonum	water smartweed	Polygonaceae	PERAMP	native	6	-5	forb	perennial
Persicaria punctata; polygonum	smartweed	Polygonaceae	PERPUN	native	5	-5	forb	annual

LLNP West Parcel Floristic Quality Assessment

Scientific Name	Common Name	Family	Acronym	Native?	C	W	Physiognomy	Duration
Persicaria virginiana; polygonum	jumpseed	Polygonaceae	PERVIR	native	4	0	forb	perennial
Phalaris arundinacea	reed canary grass	Poaceae	PHAARU	native	0	-3	grass	perennial
Phleum pratense	timothy	Poaceae	PHLPRA	non-native	0	3	grass	perennial
Phragmites australis var. australi	reed	Poaceae	PHRAUU	non-native	0	-3	grass	perennial
Physalis heterophylla	clammy ground-cherry	Solanaceae	PHYHET	native	3	5	forb	perennial
Physocarpus opulifolius	ninebark	Rosaceae	PHYOPU	native	4	-3	shrub	perennial
Picea mariana	black spruce	Pinaceae	PICMAR	native	6	-3	tree	perennial
Pilea pumila	clearweed	Urticaceae	PILPUM	native	5	-3	forb	annual
Pinus banksiana	jack pine	Pinaceae	PINBAN	native	5	3	tree	perennial
Pinus strobus	white pine	Pinaceae	PINSTR	native	3	3	tree	perennial
Pinus sylvestris	scotch pine	Pinaceae	PINSYL	non-native	0	3	tree	perennial
Plantago lanceolata	english plantain	Plantaginaceae	PLALAN	non-native	0	3	forb	perennial
Plantago major	common plantain	Plantaginaceae	PLAMAJ	non-native	0	3	forb	perennial
Poa compressa	canada bluegrass	Poaceae	POACOM	non-native	0	3	grass	perennial
Poa pratensis	kentucky bluegrass	Poaceae	POAPRA	non-native	0	3	grass	perennial
Podophyllum peltatum	may-apple	Berberidaceae	PODPEL	native	3	3	forb	perennial
Populus deltoides	cottonwood	Salicaceae	POPDEL	native	1	0	tree	perennial
Populus tremuloides	quaking aspen	Salicaceae	POPTRE	native	1	0	tree	perennial
Potentilla norvegica	rough cinquefoil	Rosaceae	POTNOR	native	0	0	forb	annual
Potentilla simplex	old-field cinquefoil	Rosaceae	POTSIM	native	2	3	forb	perennial
Prunella vulgaris	self-heal	Lamiaceae	PRUVUL	native	0	0	forb	perennial
Prunus serotina	wild black cherry	Rosaceae	PRUSER	native	2	3	tree	perennial
Pseudognaphalium obtusifolium	old-field balsam	Asteraceae	PSEOBT	native	2	5	forb	biennial
Pteridium aquilinum	bracken fern	Dennstaedtiaceae	PTEAQU	native	0	3	fern	perennial
Pycnanthemum virginianum	common mountain mint	Lamiaceae	PYCVIR	native	5	-3	forb	perennial
Quercus alba	white oak	Fagaceae	QUEALB	native	5	3	tree	perennial
Quercus macrocarpa	bur oak	Fagaceae	QUEMAC	native	5	3	tree	perennial
Quercus rubra	red oak	Fagaceae	QUERUB	native	5	3	tree	perennial
Quercus velutina	black oak	Fagaceae	QUEVEL	native	6	5	tree	perennial
Ranunculus abortivus	small-flowered buttercup	Ranunculaceae	RANABO	native	0	0	forb	perennial
Ranunculus pensylvanicus	bristly crowfoot	Ranunculaceae	RANPEN	native	6	-5	forb	annual
Rhamnus alnifolia	alder-leaved buckthorn	Rhamnaceae	RHAALN	native	8	-5	shrub	perennial
Rhamnus cathartica	common buckthorn	Rhamnaceae	RHACAT	non-native	0	0	tree	perennial

LLNP West Parcel Floristic Quality Assessment

Scientific Name	Common Name	Family	Acronym	Native?	C	W	Physiognomy	Duration
Rhus typhina	staghorn sumac	Anacardiaceae	RHUTYP	native	2	3	shrub	perennial
Ribes americanum	wild black currant	Grossulariaceae	RIBAME	native	6	-3	shrub	perennial
Robinia pseudoacacia	black locust	Fabaceae	ROBPSE	non-native	0	3	tree	perennial
Rosa carolina	pasture rose	Rosaceae	ROSCAR	native	4	3	shrub	perennial
Rosa multiflora	multiflora rose	Rosaceae	ROSMUL	non-native	0	3	shrub	perennial
Rosa palustris	swamp rose	Rosaceae	ROSPAL	native	5	-5	shrub	perennial
Rubus allegheniensis	common blackberry	Rosaceae	RUBALL	native	1	3	shrub	perennial
Rubus hispidus	swamp dewberry	Rosaceae	RUBHIS	native	4	-3	shrub	perennial
Rubus occidentalis	black raspberry	Rosaceae	RUBOCC	native	1	5	shrub	perennial
Rubus strigosus	wild red raspberry	Rosaceae	RUBSTR	native	2	0	shrub	perennial
Rudbeckia fulgida	black-eyed susan	Asteraceae	RUDFUL	native	9	-5	forb	perennial
Rudbeckia hirta	black-eyed susan	Asteraceae	RUDHIR	native	1	3	forb	perennial
Rumex orbiculatus	great water dock	Polygonaceae	RUMORB	native	9	-5	forb	perennial
Rumex verticillatus	water dock	Polygonaceae	RUMVER	native	7	-5	forb	perennial
Sagittaria latifolia	common arrowhead	Alismataceae	SAGLAT	native	4	-5	forb	perennial
Salix alba	white willow	Salicaceae	SALALB	non-native	0	-3	tree	perennial
Salix bebbiana	bebbs willow	Salicaceae	SALBEB	native	1	-3	shrub	perennial
Salix candida	hoary willow	Salicaceae	SALCAN	native	9	-5	shrub	perennial
Salix discolor	pussy willow	Salicaceae	SALDIS	native	1	-3	shrub	perennial
Salix nigra	black willow	Salicaceae	SALNIG	native	5	-5	tree	perennial
Sambucus canadensis	elderberry	Adoxaceae	SAMCAN	native	3	-3	shrub	perennial
Saponaria officinalis	bouncing bet	Caryophyllaceae	SAPOFF	non-native	0	3	forb	perennial
Sarracenia purpurea	pitcher-plant	Sarraceniaceae	SARPUR	native	10	-5	forb	perennial
Sassafras albidum	sassafras	Lauraceae	SASALB	native	5	3	tree	perennial
Schoenoplectus tabernaemontai	softstem bulrush	Cyperaceae	SCHTAB	native	4	-5	sedge	perennial
Scirpus atrovirens	bulrush	Cyperaceae	SCIATV	native	3	-5	sedge	perennial
Scirpus pendulus	bulrush	Cyperaceae	SCIPEN	native	3	-5	sedge	perennial
Scutellaria galericulata	marsh skullcap	Lamiaceae	SCUGAL	native	5	-5	forb	perennial
Scutellaria lateriflora	mad-dog skullcap	Lamiaceae	SCULAT	native	5	-5	forb	perennial
Securigera varia; coronilla v.	crown-vetch	Fabaceae	SECVAR	non-native	0	5	forb	perennial
Silene latifolia; s. pratensis	white campion	Caryophyllaceae	SILLAT	non-native	0	5	forb	annual
Sium suave	water-parsnip	Apiaceae	SIUSUA	native	5	-5	forb	perennial
Solanum dulcamara	bittersweet nightshade	Solanaceae	SOLDUL	non-native	0	0	vine	perennial

LLNP West Parcel Floristic Quality Assessment

Scientific Name	Common Name	Family	Acronym	Native?	C	W	Physiognomy	Duration
Solidago altissima	tall goldenrod	Asteraceae	SOLALT	native	1	3	forb	perennial
Solidago canadensis	canada goldenrod	Asteraceae	SOLCAN	native	1	3	forb	perennial
Solidago gigantea	late goldenrod	Asteraceae	SOLGIG	native	3	-3	forb	perennial
Solidago juncea	early goldenrod	Asteraceae	SOLJUN	native	3	5	forb	perennial
Solidago nemoralis	old-field goldenrod	Asteraceae	SOLNEM	native	2	5	forb	perennial
Solidago patula	swamp goldenrod	Asteraceae	SOLPAT	native	6	-5	forb	perennial
Solidago riddellii	riddells goldenrod	Asteraceae	SOLRID	native	6	-5	forb	perennial
Solidago rugosa	rough-leaved goldenrod	Asteraceae	SOLRUG	native	3	0	forb	perennial
Solidago speciosa	showy goldenrod	Asteraceae	SOLSPE	native	5	5	forb	perennial
Sparganium eurycarpum	common bur-reed	Typhaceae	SPAEUR	native	5	-5	forb	perennial
Spiraea alba	meadowsweet	Rosaceae	SPIALB	native	4	-3	shrub	perennial
Symphyotrichum firmum; aster	smooth swamp aster	Asteraceae	SYMFIR	native	4	-3	forb	perennial
Symphyotrichum lateriflorum; a	calico aster	Asteraceae	SYMLAT	native	2	0	forb	perennial
Taraxacum officinale	common dandelion	Asteraceae	TAROFF	non-native	0	3	forb	perennial
Thalictrum dasycarpum	purple meadow-rue	Ranunculaceae	THADAS	native	3	-3	forb	perennial
Thalictrum dioicum	early meadow-rue	Ranunculaceae	THADIO	native	6	3	forb	perennial
Thelypteris palustris	marsh fern	Thelypteridaceae	THEPAL	native	2	-3	fern	perennial
Thuja occidentalis	arbor vitae	Cupressaceae	THUOCC	native	4	-3	tree	perennial
Torilis japonica	hedge-parsley	Apiaceae	TORJAP	non-native	0	3	forb	annual
Toxicodendron radicans	poison-ivy	Anacardiaceae	TOXRAD	native	2	0	vine	perennial
Toxicodendron vernix	poison sumac	Anacardiaceae	TOXVER	native	6	-5	shrub	perennial
Tragopogon dubius	goats beard	Asteraceae	TRADUB	non-native	0	5	forb	biennial
Trientalis borealis	star-flower	Myrsinaceae	TRIBOR	native	5	0	forb	perennial
Trifolium pratense	red clover	Fabaceae	TRIPRA	non-native	0	3	forb	perennial
Trifolium repens	white clover	Fabaceae	TRIREP	non-native	0	3	forb	perennial
Triglochin maritima	common bog arrow-grass	Juncaginaceae	TRIMAR	native	8	-5	forb	perennial
Tussilago farfara	coltsfoot	Asteraceae	TUSFAR	non-native	0	3	forb	perennial
Typha angustifolia	narrow-leaved cat-tail	Typhaceae	TYPANG	non-native	0	-5	forb	perennial
Typha latifolia	broad-leaved cat-tail	Typhaceae	TYPLAT	native	1	-5	forb	perennial
Ulmus americana	american elm	Ulmaceae	ULMAME	native	1	-3	tree	perennial
Uvularia sessilifolia	merrybells	Convallariaceae	UVUSES	native	5	3	forb	perennial
Vaccinium corymbosum	highbush blueberry	Ericaceae	VACCOR	native	6	-3	shrub	perennial
Vaccinium myrtilloides	canada blueberry	Ericaceae	VACMYR	native	4	-3	shrub	perennial

LLNP West Parcel Floristic Quality Assessment

Scientific Name	Common Name	Family	Acronym	Native?	C	W	Physiognomy	Duration
Vaccinium oxycoccos	small cranberry	Ericaceae	VACOXY	native	8	-5	shrub	perennial
Verbascum thapsus	common mullein	Scrophulariaceae	VERTHA	non-native	0	5	forb	biennial
Verbena hastata	blue vervain	Verbenaceae	VERHAS	native	4	-3	forb	perennial
Verbena urticifolia	white vervain	Verbenaceae	VERURT	native	4	0	forb	perennial
Veronica scutellata	marsh speedwell	Plantaginaceae	VERSCU	native	6	-5	forb	perennial
Viburnum lentago	nannyberry	Adoxaceae	VIBLEN	native	4	0	shrub	perennial
Viburnum opulus	european highbush-cranberr	Adoxaceae	VIBOPU	non-native	0	-3	shrub	perennial
Vicia hirsuta	hairy vetch	Fabaceae	VICHIR	non-native	0	5	vine	annual
Viola sororia	common blue violet	Violaceae	VIOSOR	native	1	0	forb	perennial
Vitis riparia	river-bank grape	Vitaceae	VITRIP	native	3	0	vine	perennial
Wolffia columbiana	common water meal	Araceae	WOLCOL	native	5	-5	forb	perennial
Zanthoxylum americanum	prickly-ash	Rutaceae	ZANAME	native	3	3	shrub	perennial
Zizia aurea	golden alexanders	Apiaceae	ZIZAUR	native	6	0	forb	perennial

. Herbarium, University of Michigan, Ann Arbor, MI and Michigan Natural Features Inventory, Michigan State University, Lansing, MI. http://michigan

From: Harris, Cleyo (DNR) <HarrisC9@michigan.gov>
Sent: Tuesday, September 1, 2020 2:12 PM
To: Mindy Milos-Dale <mmdale@oaklandtownship.org>
Subject: RE: Request for Fishery Information RE West Branch Stony Creek

Hi Mindy,

I was able to get into the office today and look at our historical records. It looks like there was a small seining effort conducted on Clam Lake back in 1957. Those efforts found a variety of fish species that I identified in the table below along with what species we have observed in Graham Lakes, upstream of Clam Lake. There was also a temperature and dissolved oxygen profile survey conducted on Clam Lake that went as deep as 40 feet and also suggests Clam Lake is similar to Graham Lakes. In my professional opinion, it is highly likely that Clam Lake and Graham Lakes have a very similar fish community, in terms of species composition. It seems that an application to treat the lake with rotenone (piscicide) was sought out in 1957 as well but there is no record if the treatment was carried out.

Species	Graham Lakes	Clam Lakes (1957)
Banded killifish		X
Black Bullhead	X	
Blackchin Shiner	X	
Black Crappie	X	
Blacknose Dace	X	
Blacknose Shiner	X	
Bluegill	X	X
Bluntnose Minnow	X	X
Brown Bullhead	X	
Central Mudminnow	X	
Common Carp	X	
Common Shiner	X	X
Creek chub		X
Fathead Minnow	X	
Golden Shiner	X	
Grass Pickerel	X	
Green Sunfish	X	X
Hornyhead chub		X
Iowa Darter	X	X
Lake Chubsucker	X	
Largemouth Bass	X	X
Least darter		X
Longear Sunfish	X	X
Mimic shiner		X
Northern Pike	X	
Pumpkinseed	X	

Rock Bass	X	X
Tadpole Madtom	X	
White Sucker	X	
Yellow Bullhead	X	
Yellow Perch	X	X

Let me know if you need anything else. Thanks!

Cleyo Harris
Fisheries Biologist
MDNR Fisheries Division
7806 Gale Rd
Waterford, MI 48327
Office: 248-666-7444
Cell: 248-221-0328
DNR - Lake Erie Management Unit

Bird Species List for Field Immediately South of Potential Lost Lake Expansion.
66 Bird Species Observed 2011 to 2020, with majority 2016-2020.

Bird Species	Source eBird Checklists
Alder Flycatcher	S30304781
American Crow	S30346066
American Goldfinch	S30603508
American Robin	S37677464
Baltimore Oriole	S37771304
Barn Swallow	S57281585
Black-capped Chickadee	S57311628
Blue Jay	S57323976
Blue-gray Gnatcatcher	S57408906
Bobolink	S57561832
Brown Thrasher	S69882104
Brown-headed Cowbird	S8596024
Canada Goose	S30346095
Cedar Waxwing	
Chimney Swift	
Chipping Sparrow	
Clay-colored Sparrow	
Common Grackle	
Common Yellowthroat	
Cooper's Hawk	
Dickcissel	
Downy Woodpecker	
Eastern Bluebird	
Eastern Kingbird	
Eastern Meadowlark	
Eastern Towhee	
European Starling	
Field Sparrow	
Grasshopper Sparrow	
Gray Catbird	
Great Blue Heron	
Great Egret	
Green Heron	
Henslow's Sparrow	
Horned Lark	
House Finch	
House Sparrow	
House Wren	
Indigo Bunting	
Killdeer	
Mallard	
Mourning Dove	
Northern Bobwhite	

Bird Species List for Field Immediately South of Potential Lost Lake Expansion.
66 Bird Species Observed 2011 to 2020, with majority 2016-2020.

Bird Species
Northern Cardinal
Northern Flicker
Orchard Oriole
Pine Warbler
Red-bellied Woodpecker
Red-eyed Vireo
Red-tailed Hawk
Red-Winged Blackbird
Ring-billed Gull
Ruby-Throated Hummingbird
Sandhill Crane
Savannah Sparrow
Song Sparrow
Tree Swallow
Tufted Titmouse
Turkey Vulture
Warbling Vireo
White-breasted nuthatch
Wild Turkey
Willow Flycatcher
Wood Duck
Yellow Warbler
Yellow-throated Vireo

eBird Field Checklist

Lost Lake Nature Park

Oakland, Michigan, US

ebird.org/hotspot/L1020594

82 species (+6 other taxa) - Year-round, All Years

Date:_____
Start Time:_____
Duration:_____
Distance:_____
Party Size:_____
Notes:

This checklist is generated with data from eBird (ebird.org), a global database of bird sightings from birders like you. If you enjoy this checklist, please consider contributing your sightings to eBird. It is 100% free to take part, and your observations will help support birders, researchers, and conservationists worldwide.

Go to ebird.org to learn more!

Waterfowl

___Canada Goose *Branta canadensis*
___Wood Duck *Aix sponsa*
___Blue-winged Teal *Spatula discors*
___Mallard *Anas platyrhynchos*
___Ring-necked Duck *Aythya collaris*
___Bufflehead *Bucephala albeola*
___Hooded Merganser *Lophodytes cucullatus*
___Common Merganser *Mergus merganser*
___duck sp. *Anatinae sp.*

Grouse, Quail, and Allies

___Wild Turkey *Meleagris gallopavo*

Grebes

___Pied-billed Grebe *Podilymbus podiceps*

Pigeons and Doves

___Mourning Dove *Zenaida macroura*

Swifts

___Chimney Swift *Chaetura pelagica*

Cranes

___Sandhill Crane *Antigone canadensis*

Shorebirds

___Killdeer *Charadrius vociferus*
___Solitary Sandpiper *Tringa solitaria*

Gulls, Terns, and Skimmers

___Ring-billed Gull *Larus delawarensis*

Herons, Ibis, and Allies

___Great Blue Heron *Ardea herodias*
___Great Egret *Ardea alba*
___Green Heron *Butorides virescens*

Vultures, Hawks, and Allies

___Turkey Vulture *Cathartes aura*
___Cooper's Hawk *Accipiter cooperii*
___Red-tailed Hawk *Buteo jamaicensis*

Owls

___Barred Owl *Strix varia*

Kingfishers

___Belted Kingfisher *Megaceryle alcyon*

Woodpeckers

___Red-bellied Woodpecker *Melanerpes carolinus*
___Downy Woodpecker *Dryobates pubescens*
___Hairy Woodpecker *Dryobates villosus*
___Pileated Woodpecker *Dryocopus pileatus*
___Northern Flicker *Colaptes auratus*
___woodpecker sp. *Picidae sp.*

Tyrant Flycatchers: Pewees, Kingbirds, and Allies

___Eastern Wood-Pewee *Contopus virens*
___Eastern Phoebe *Sayornis phoebe*
___Great Crested Flycatcher *Myiarchus crinitus*
___Eastern Kingbird *Tyrannus tyrannus*
___flycatcher sp. (Tyrannidae sp.) *Tyrannidae sp.*

Vireos

___Warbling Vireo *Vireo gilvus*
___Red-eyed Vireo *Vireo olivaceus*

Jays, Magpies, Crows, and Ravens

___Blue Jay *Cyanocitta cristata*
___American Crow *Corvus brachyrhynchos*

Tits, Chickadees, and Titmice

___Black-capped Chickadee *Poecile atricapillus*
___Tufted Titmouse *Baeolophus bicolor*

Martins and Swallows

___Tree Swallow *Tachycineta bicolor*
___Barn Swallow *Hirundo rustica*

Kinglets

___Golden-crowned Kinglet *Regulus satrapa*
___Ruby-crowned Kinglet *Regulus calendula*

Nuthatches

___Red-breasted Nuthatch *Sitta canadensis*
___White-breasted Nuthatch *Sitta carolinensis*

Treecreepers

___Brown Creeper *Certhia americana*

Wrens

___House Wren *Troglodytes aedon*

Starlings and Mynas

___European Starling *Sturnus vulgaris*

Catbirds, Mockingbirds, and Thrashers

___Gray Catbird *Dumetella carolinensis*

Thrushes

___Eastern Bluebird *Sialia sialis*
___Veery *Catharus fuscescens*
___Hermit Thrush *Catharus guttatus*
___Wood Thrush *Hylocichla mustelina*
___American Robin *Turdus migratorius*

Waxwings

___Cedar Waxwing *Bombycilla cedrorum*

Old World Sparrows

___House Sparrow *Passer domesticus*

Finches, Euphonias, and Allies

___House Finch *Haemorhous mexicanus*
___American Goldfinch *Spinus tristis*

New World Sparrows

___Chipping Sparrow *Spizella passerina*
___Field Sparrow *Spizella pusilla*
___American Tree Sparrow *Spizelloides arborea*
___Fox Sparrow *Passerella iliaca*
___Dark-eyed Junco *Junco hyemalis*
___White-crowned Sparrow *Zonotrichia leucophrys*
___White-throated Sparrow *Zonotrichia albicollis*
___Song Sparrow *Melospiza melodia*
___Swamp Sparrow *Melospiza georgiana*
___Eastern Towhee *Pipilo erythrophthalmus*
___sparrow sp. *Passerellidae sp. (sparrow sp.)*

Blackbirds

___Baltimore Oriole *Icterus galbula*
___Red-winged Blackbird *Agelaius phoeniceus*
___Brown-headed Cowbird *Molothrus ater*
___Common Grackle *Quiscalus quiscula*
___blackbird sp. *Icteridae sp.*

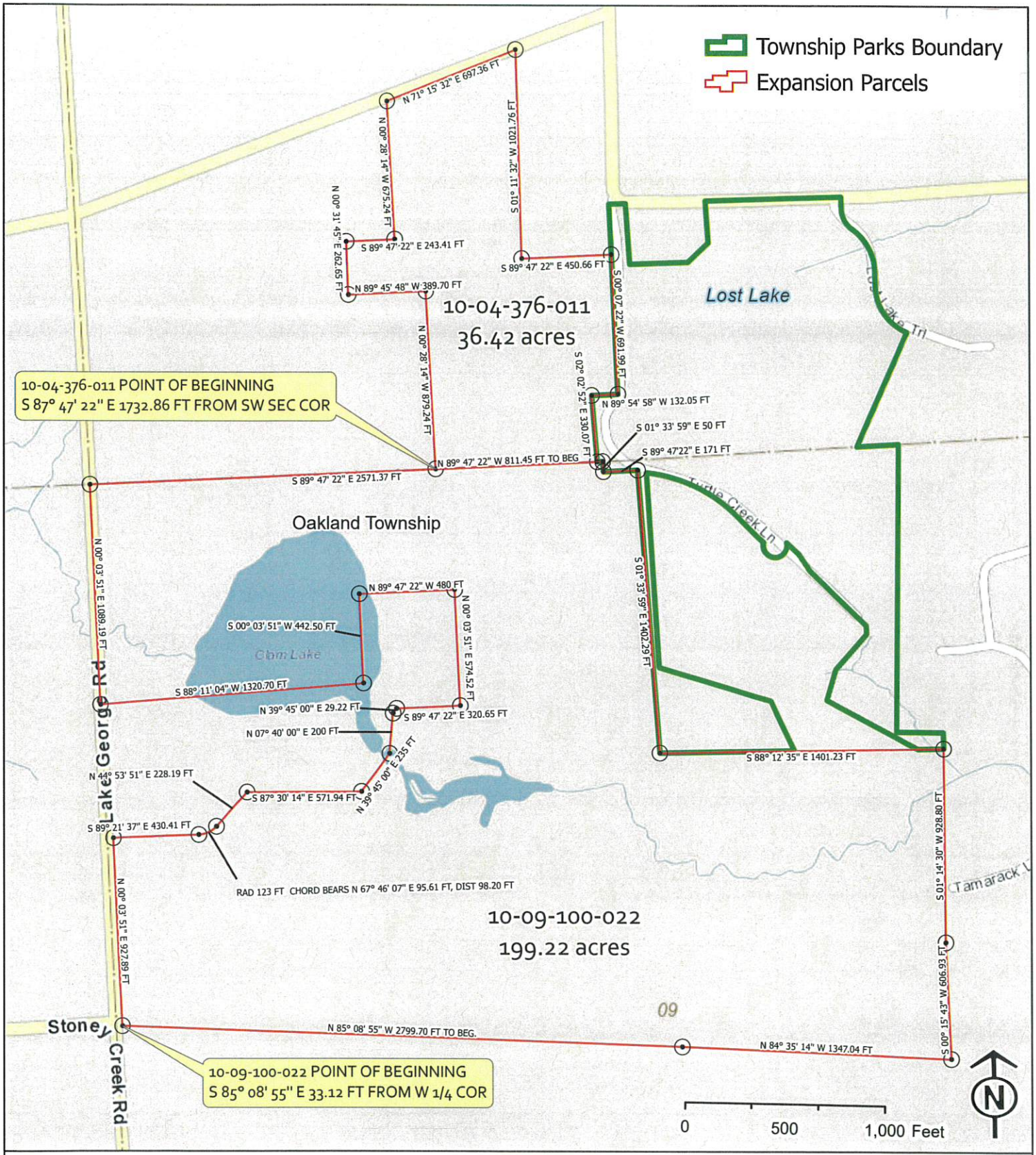
Wood-Warblers

___Common Yellowthroat *Geothlypis trichas*
___Bay-breasted Warbler *Setophaga castanea*
___Blackburnian Warbler *Setophaga fusca*
___Yellow Warbler *Setophaga petechia*
___Black-throated Blue Warbler *Setophaga caerulescens*
___Black-throated Green Warbler *Setophaga virens*
___warbler sp. (Parulidae sp.) *Parulidae sp.*

Cardinals, Grosbeaks, and Allies

___Scarlet Tanager *Piranga olivacea*
___Northern Cardinal *Cardinalis cardinalis*
___Rose-breasted Grosbeak *Pheucticus ludovicianus*
___Indigo Bunting *Passerina cyanea*

This field checklist was generated using eBird (ebird.org)



Oakland Township
Lost Lake Nature Park
Expansion Plat Map
Michigan Natural Resources Trust Fund
Grant TF20-0206

Last Updated 5 Aug 2020

2020 SUMMER TAXES

RETURN THIS PORTION WITH YOUR REMITTANCE

Charter Township of Oakland
4393 Collins Road
Rochester, MI 48306
Phone: 248-651-4440 ext 212 or 217

Amount shown if received by September 14, 2020

TOTAL	INTEREST	TOTAL PAID	BALANCE DUE
3,120.30	0.00	3,120.30	0.00

FOX, WILLIAM M
1285 LAKE GEORGE RD
OAKLAND, MI 48363-1125

08888 *

OFFICE HOURS
Monday-Friday, 8:00 a.m.-4:30 p.m.
Closed Saturdays, Sundays and Holidays

PARCEL I.D. NUMBER
N -10-04-376-011

WARNING: Check your Parcel I.D.Number before paying your TAXES. You are responsible if you pay on wrong parcel.

2020 SUMMER TAXES
Charter Township of Oakland

CODE NO.	*P.R.E. TAX BASE	PARCEL I.D. NUMBER	SCHOOL DIST.
	0	N -10-04-376-011 /	63230
% DECLARED AS P.R.E.	*NON-P.R.E. TAX BASE	TAXABLE VALUE	STATE EQUALIZED VALUE
	73,970	73,970	195,320

IMPORTANT: All taxes paid after September 14, 2020 shall be charged a penalty of one percent (1%) for each month, thereafter. Additional three percent (3%) penalty from February 16 - March 1, 2021

FOX, WILLIAM M

1285 LAKE GEORGE RD
OAKLAND, MI 48363-1125

Property Address

,

08888 *

T4N, R11E, SEC 4 PART OF E 1/2 OF SW 1/4 BEG AT PT DIST S 87-47-22 E 1732.86 FT FROM SW SEC COR, TH N 00-28-14 W 879.24 FT, TH N 89-45-48 W 389.70 FT, TH N 00-31-45 E 262.65 FT, TH S 89-47-22 E 243.

COUNTY OPERATING	4.02000	297.35
OIS ALLOCATED	0.19180	14.18
OIS VOTED	3.03620	224.58
OCC VOTED	1.51840	112.31
STATE EDUCATION	6.00000	443.82
SCHOOL OPERATING	18.00000	1,331.46
SCHOOL DEBT	7.49100	554.10
SCH SINKING FUND	1.92650	142.50

BEGINNING MARCH 2, 2021

All unpaid 2020 taxes must be paid to Andrew E Meisner, Oakland County Treasurer, 1200 N. Telegraph, Pontiac, MI 48341, with additional penalties. During the month of March, a revised statement from the Township Treasurer must accompany your remittance to the County Treasurer.

RETAIN THIS LOWER PORTION FOR YOUR RECORDS.
YOUR CANCELED CHECK IS YOUR RECEIPT

*P.R.E. = Principal Residence Exemption

TOTAL	Interest	Total Paid	Balance Due
3,120.30	0.00	3,120.30	0.00

LIBER 22173 PG 287

OAKLAND COUNTY TREASURER'S CERTIFICATE
I HEREBY CERTIFY that there are no TAX LIENS or TITLES held by the state or any individual against the within description and all TAXES on same are paid for five years previous to the date of this instrument as appears by the records in the office except as stated.

JAN 02 2001

C. HUGH DOHANY, County Treasurer
Sec. 135, Act 206, 1893 as amended

1222

LIBER 22173 PAGE 287
$9.00 DEED - COMBINED
$2.00 REMONUMENTATION
01/02/2001 03:59:22 P.M. RECEIPT# 316
PAID RECORDED - OAKLAND COUNTY
G. WILLIAM CADDELL, CLERK/REGISTER OF DEEDS

000071

WARRANTY DEED

Building Exchange Company, whose address is G-8445 S. Saginaw, Grand Blanc, Michigan, 48439, conveys and warrants to **The William M. Fox Revocable Trust U/T/A March 13, 1983**, whose address is 725 S. Rochester Road, Rochester Hills, MI 48307, property in the State of Michigan, County of Oakland, and Township of Oakland more specifically described in the attached Exhibit A.

This transaction is exempt pursuant to MCLA 207.526 (a) & (d) and MCLA 207.505 (a) & (d).

This property may be located within the vicinity of farmland or a farm operation. Generally accepted agricultural management practices which may generate noise, dust, odors and other associated conditions may be used and are protected by the Michigan Right to Farm Act.

Tax Identification Numbers ~~10-04-376-004 and 10-04-376-009~~. Part of 10-04-376-010
10-04-376-011

Additionally by its signature below, the Grantor transfers to the Grantee any and all land divisions available for the Subject Property.

Signed, sealed and delivered on this 14th day of December, 2000.

2P R E

In the Presence of:

Gordon W. VanWieren, Jr.

Gerald Hale Ladue

BUILDING EXCHANGE COMPANY,
a Virginia Corporation

By: Calvin Gatesman
Calvin Gatesman, Its Vice President

State of Michigan)
County of Oakland)ss

On this 14th day of December, 2000, before me appeared Calvin Gatesman who did acknowledge that he is the Vice-President of Building Exchange Company and that he executed the within Warranty Deed with the full knowledge of said corporation.

Gerald Hale Ladue
Notary Public, Oakland County
My Commission expires: 7-12-04

Drafted by and return to: Neil E. Wallace, Attorney
39 S. Main Street, Suite 20
Clarkston, MI 48346

O.K. - KB

EXHIBIT A

PARCEL 1

A parcel of land situated in the East 1/2 of the Southwest 1/4 of Fractional Section 4, Town 4 North, Range 11 East, described as beginning at a point in the centerline of Predmore Road, located South 87 degrees 58 minutes 54 seconds East, 1371.16 feet along the South line of Section 14 and North 01 degrees 20 minutes 14 seconds East, 1742.07 feet along the West line of the East 1/2 of the Southwest 1/4 of Section 4 to the centerline of Predmore Road and North 73 degrees 04 minutes 00 seconds East 587.41 feet along the centerline of Predmore Street from the Southwest corner of Section 4; thence North 73 degrees 04 minutes 00 seconds East 361.61 feet along the centerline of Predmore Road; thence South 03 degrees 00 minutes 00 seconds West 1348.92 feet; thence North 87 degrees 58 minutes 54 seconds West 340.00 feet; thence North 03 degrees 00 minutes 00 seconds East 1231.46 feet to the point of beginning. Reserving the Northerly 33 feet to the rights of the public in Predmore Road.

PARCEL 2 pt 10-04-376-011

Part of the East 1/2 of the Southwest 1/4, Section 4, Town 4 North, Range 11 East, beginning at a point distant South 87 degrees 58 minutes 54 seconds East 1371.16 feet from the Southwest section corner; thence North 01 degrees 20 minutes 14 seconds East 1142.07 feet; thence South 87 degrees 58 minutes 54 seconds East 220.00 feet; thence North 01 degrees 20 minutes 14 seconds East 675.24 feet; thence North 73 degrees 04 minutes 00 seconds East 335.75 feet; thence South 03 degrees 00 minutes 00 seconds West 1231.46 feet; thence South 87 degrees 58 minutes 54 seconds East 340 feet; thence North 03 degrees 00 minutes 00 seconds East 327.16 feet; thence South 87 degrees 58 minutes 54 seconds East 450.66 feet; thence South 01 degree 55 minutes 50 seconds West 691.99 feet; thence North 88 degrees 06 minutes 30 seconds West 132.05 feet; thence South 00 degrees 14 minutes 24 seconds East 330.07 feet; thence North 87 degrees 58 minutes 54 seconds West 1173.15 feet to beginning.

pt 10-04-376-011
pt 10-04-376-010

2020 SUMMER TAXES

RETURN THIS PORTION WITH YOUR REMITTANCE

Charter Township of Oakland
4393 Collins Road
Rochester, MI 48306
Phone: 248-651-4440 ext 212 or 217

Amount shown if received by September 14, 2020

TOTAL	INTEREST	TOTAL PAID	BALANCE DUE
31,009.37	0.00	31,009.37	0.00

FOX, WILLIAM
1285 LAKE GEORGE RD
OAKLAND, MI 48363-1125

08888 *

OFFICE HOURS
Monday-Friday, 8:00 a.m.-4:30 p.m.
Closed Saturdays, Sundays and Holidays

PARCEL I.D. NUMBER
N -10-09-100-022

WARNING: Check your Parcel I.D.Number before paying your TAXES. You are responsible if you pay on wrong parcel.

2020 SUMMER TAXES
Charter Township of Oakland

CODE NO.	*P.R.E. TAX BASE	PARCEL I.D. NUMBER	SCHOOL DIST.
	0	N -10-09-100-022 /	63230
DECLARED AS P.R.E.	*NON-P.R.E. TAX BASE	TAXABLE VALUE	STATE EQUALIZED VALUE
	735,100	735,100	1,418,300

IMPORTANT: All taxes paid after September 14, 2020 shall be charged a penalty of one percent (1%) for each month, thereafter. Additional three percent (3%) penalty from February 16 - March 1, 2021

FOX, WILLIAM

1285 LAKE GEORGE RD
OAKLAND, MI 48363-1125

Property Address
1401 LAKE GEORGE RD
OAKLAND, MI 48363-1148

08888 *

T4N, R11E, SEC 9 PART OF N 1/2 OF SEC BEG AT PT DIST S 85-08-55 E 33.12 FT FROM W 1/4 COR, TH N 00-03-51 E 927.89 FT, TH S 89-21-37 E 430.41 FT, TH ALG CURVE TO LEFT, RAD 123 FT, CHORD BEARS N 6

COUNTY OPERATING	4.02000	2,955.10
OIS ALLOCATED	0.19180	140.99
OIS VOTED	3.03620	2,231.91
OCC VOTED	1.51840	1,116.17
STATE EDUCATION	6.00000	4,410.60
SCHOOL OPERATING	18.00000	13,231.80
SCHOOL DEBT	7.49100	5,506.63
SCH SINKING FUND	1.92650	1,416.17

BEGINNING MARCH 2, 2021

All unpaid 2020 taxes must be paid to Andrew E Meisner, Oakland County Treasurer, 1200 N. Telegraph, Pontiac, MI 48341, with additional penalties. During the month of March, a revised statement from the Township Treasurer must accompany your remittance to the County Treasurer.

RETAIN THIS LOWER PORTION FOR YOUR RECORDS.
YOUR CANCELED CHECK IS YOUR RECEIPT

*P.R.E. = Principal Residence Exemption

TOTAL	Interest	Total Paid	Balance Due
31,009.37	0.00	31,009.37	0.00

LIBER 20078 PAGE 548

199455

LIBER 20078 PAGE 548
$15.00 DEED - COMBINED
$2.00 REMONUMENTATION
$23,650.00 TRANSFER TX COMBINED
06/07/1999 01:57:53 P.M. RECEIPT# 39911
PAID RECORDED - OAKLAND COUNTY
G. WILLIAM CADDELL, CLERK/REGISTER OF DEEDS

5-24-99

WARRANTY DEED

THE GRANTOR(S)

Helene D. Settles and Stuart David Cork, Co-Trustees of the Stephen M. DuBrul Trust U/T/A January 15, 1979 as to an undivided 1/2 interest

and

Helene D. Settles and Stuart David Cork, Co-Trustees of the Ella K. DuBrul Trust U/T/A May 13, 1983, as to an undivided 1/2 interest

whose address is: 2259 Tipperary Road, Kalamazoo, Michigan 49008

CONVEYS AND WARRANTS TO: WILLIAM M. FOX, TRUSTEE, William M. Fox Revocable Family Trust, u/t/a 3/10/83

whose address is: 725 South Rochester Road, Rochester Hills, Michigan 48307

the following described premises situated in the Township of Oakland, County of Oakland, and State of Michigan to wit:

Legal Description attached as Rider "A" containing 227acres more or less

STATE OF MICHIGAN REAL ESTATE TRANSFER TAX
OAKLAND 6/07/1999 39911
$3,025.00 CO
$20,625.00 ST
36507

Commonly known as 1401 Lake George Road, Oakland Township, Michigan

Part of Tax ID No. 10-09-100-015

for the sum of TWO MILLION SEVEN HUNDRED FIFTY THOUSAND ($2,750,000) DOLLARS

GRECO

subject to zoning ordinances, building and use restrictions, easements of record and real estate taxes, not yet due and further subject to any lien or encumbrance created by other than the Grantor since October 2, 1998 the date of a Land Contract between the parties pursuant to which this deed is given.

Dated this 2nd day of April, 1999

Signed in the Presence of:

John S. Barbour

Sandra K. Thompson

John S. Barbour

Sandra K. Thompson

Signed by:

STUART DAVID CORK, CO-TRUSTEE of the Stephen M. DuBrul Trust U/T/A January 15, 1979 as to an undivided 1/2 interest

HELENE D. SETTLES, CO-TRUSTEE of the Stephen M. DuBrul Trust U/T/A January 15, 1979 as to an undivided 1/2 interest

(Jurat and additional signatures appear on the following page 2 of this Warranty Deed)

LIBER 2007 PAGE 549

ATTACHMENT TO WARRANTY DEED

GRANTOR: The Stephen M. DuBrul Trust and the Ella K. DuBrul Trust

GRANTEE: William M. Fox, Trustee of the William M. Fox Revocable Family Trust

DATE OF WARRANTY DEED: April 2, 1999

PROPERTY ID. NO.: 227 acres more or less, part of 10-09-100-015

LAND DIVISION

The Grantor grants to the Grantee the right to make all division(s) under Section 109 of the land division act, Act No. 288 of the Public Acts of 1967.

NOTIFICATION OF PRIVATE ROAD

The Grantor and Grantee acknowledge that the road servicing the land described in said Warranty Deed, of which the property conveyed to above name Grantee by above Grantor, is a private road that is not required to be maintained by the Board of County Road Commissions.

This Notification is given as required by Section 261 of Act 288 of Public Acts of 1967 (MCLA 560.261)

MICHIGAN RIGHT TO FARM ACT

The Grantor and the Grantee acknowledge that the Property being conveyed may be located within the vicinity of farmland or a farm operation. Generally accepted agricultural and management practices which may generate noise, dust, odors, and other associated conditions may be used and are protected by the Michigan Right to Farm Act. This Notice is required by provisions of Michigan Law 560.109(3).

ACKNOWLEDGED:

GRANTOR:

Helene D. Settles, Co-Trustee

Stuart David Cork, Co-Trustee

2030 NOTICE

STATE OF MICHIGAN)
) ss
COUNTY OF Wayne)

liber 20078 6550

The foregoing instrument was acknowledged before me this 2nd day of April, 1998, by Helene D. Settles and Stuart David Cork, Co-Trustees of the Stephen M. DuBrul Trust U/T/A January 15, 1979 as to an undivided 1/2 interest, to me known to be the person(s) described in and who executed the foregoing instrument as a free act and deed.

SANDRA K. THOMPSON
Notary Public, Wayne County, MI
My Commission Expires July 19, 2002

Notary Public, County, Michigan

John S. Barbour

Sandra K. Thompson

STUART DAVID CORK, CO-TRUSTEE of the Ella K. DuBrul Trust U/T/A May 13, 1983 as to an undivided 1/2 interest

John S. Barbour

Sandra K. Thompson

HELENE D. SETTLES, CO-TRUSTEE of the Ella K. DuBrul Trust U/T/A May 13, 1983 as to an undivided 1/2 interest

STATE OF MICHIGAN)
) ss
COUNTY OF Wayne)

The foregoing instrument was acknowledged before me this 2nd day of April, 1998, by Helene D. Settles and Stuart David Cork, Co-Trustees of the Ella K. DuBrul Trust U/T/A May 13, 1983 as to an undivided 1/2 interest, to me known to be the person(s) described in and who executed the foregoing instrument as a free act and deed.

SANDRA K. THOMPSON
Notary Public, Wayne County, MI
My Commission Expires July 19, 2002

Notary Public, County, Michigan

When Recorded Return To: NEIL WALLACE, Atty. 395 S. MAIN ST. Suite 20, Clarkston, MI. 48346

Send Subsequent Tax Bills To: Grantee

Drafted by: John S. Barbour
Business Address
2711 E. Jefferson
Detroit, MI 48207

Tax Parcel # _____ Recording Fee _____ Revenue Stamp _____

203G FONDFEDA

RIDER A

LIBER 30078 6551

LEGAL DESCRIPTION:

Land in the Township of Oakland, County, Michigan, described as:

Part of the Southwest 1/4 of Section 4 and part of the North 1/2 of Section 9, Town 4 North, Range 11 East, Oakland Township, Oakland County, Michigan, described as: Beginning at a point on the East-West 1/4 line of Section 9, located South 85 degrees 08 minutes 33 seconds East, 33.12 feet (R), South 88 degrees 08 minutes 55 seconds East, 33.12 (M), from the West 1/4 corner of Section 9, Town 4 North, Range 11 East; thence North 00 degrees 03 minutes 51 seconds East, 286.43 feet along the East line of Lake George Road (33.00 feet 1/2 width); thence South 89 degrees 21 minutes 37 seconds East, 339.62 feet; thence South 89 degrees 21 minutes 37 seconds East, 339.62 feet; thence North 00 degrees 03 minutes 51 seconds East, 641.46 feet; thence South 89 degrees 21 minutes 37 seconds East, 90.79 feet; thence on a curve to the left (Range = 123.00 feet, Delta = 45 degrees 44 minutes 32 seconds, Long Chord = North 67 degrees 46 minutes 07 seconds East, 95.61 feet) an arc distance of 98.20 feet; thence North 44 degrees 53 minutes 51 seconds East, 228.19 feet; thence North 54 degrees 42 minutes 20 seconds East, 281.34 feet; thence South 88 degrees 47 minutes 30 seconds East, 69.25 feet; thence North 01 degrees 48 minutes 56 seconds West, 337.79 feet; thence South 88 degrees 11 minutes 04 minutes West, 997.07 feet (R), 996.87 feet (M), to the West line of Section 9; thence North 00 degrees 03 minutes 51 seconds East, 1089.59 feet (R), 1089.19 feet (M), to the Northwest corner of Section 9, Town 4 North, Range 11 East; thence North 00 degrees 32 minutes 34 seconds West, 880.04 feet (R), North 00 degrees 31 minutes 39 seconds West, 880.04 feet (M); thence South 89 degrees 47 minutes 22 seconds East, 1344.50 feet (R), South 89 degrees 45 minutes 47 seconds East, 1344.05 feet (M); thence South 00 degrees 32 minutes 18 seconds West, 879.99 feet (R), South 00 degrees 31 minutes 45 seconds West, 879.36 feet (M); thence South 89 degrees 47 minutes 22 seconds East; 1243.65 feet; thence South 01 degrees 31 minutes 28 seconds East, 50.00 feet (R), South 01 degrees 33 minutes 59 seconds East, 50.00 feet (M); thence South 89 degrees 47 minutes 22 seconds East, 171.00 feet; thence South 01 degrees 31 minutes 28 seconds East, 1402.75 feet (R), South 00 degrees 33 minutes 59 seconds East, 1402.29 feet (M); thence South 88 degrees 12 minutes 54 seconds East, 1402.23 feet (R), South 89 degrees 12 minutes 35 seconds East, 1402.23 feet (M) to the West line of TAMARACK HEIGHTS, according to the plat thereof as recorded in Liber 65, page 38, of Plats, Oakland County Records; thence South 01 degrees 08 minutes 55 seconds West, 928.98 feet (R), South 01 degrees 14 minutes 30 seconds West, 928.80 feet (M), along said West line of TAMARACK HEIGHTS; thence South 00 degrees 16 minutes 29 seconds West, 606.91 feet (R), South 00 degrees 15 minutes 43 seconds West, 606.93 feet (M); thence North 84 degrees 35 minutes 08 seconds West, 1347.38 feet (R), North 84 degrees 35 minutes 14 seconds West, 1347.04 feet (M), to the center of Section 9; thence North 85 degrees 08 minutes 33 seconds West, 2799.78 feet (R), North 85 degrees 08 minutes 55 seconds West, 2799.70 feet (M), along the East-West 1/4 line of Section 9 to the point of beginning. Excepting from the foregoing description a parcel of a land described as: Beginning at a point located South 89 degrees 47 minutes 22 seconds East, 1800.00 feet and South 00 degrees 03 minutes 51 seconds West, 720.77 feet from the Northwest corner of Section 9, Town 4 North, Range 11 East; thence from said point of beginning of exception South 00 degrees 03 minutes 51 seconds West, 453.75 feet; thence North 89 degrees 47 minutes 22 seconds West, 480.00 feet; thence North 00 degrees 03 minutes 51 seconds East, 453.75 feet; thence South 89 degrees 47

Continued on next page

minutes 22 seconds East, 480.00 feet to the point of beginning of exception.

SUBJECT TO A 60.00 FOOT WIDE EASEMENT FOR INGRESS AND EGRESS with others, described as part of the Northwest 1/4 of Section 9, Town 4 North, Range 11 East, Oakland Township, Oakland County, Michigan, the centerline of which is described as: Beginning at a point on the East line of Lake George Road, located South 85 degrees 08 minutes 55 seconds East, 33.12 feet (recorded South 85 degrees 08 minutes 33 seconds East, 33.00 feet) and North 00 degrees 05 minutes 31 seconds East, 380.00 feet from the West 1/4 corner of Section 9; thence from said point of beginning of centerline of 60.00 foot wide private easement for ingress and egress South 88 degrees 40 minutes East, 1240.00 feet; thence North 43 degrees 10 minutes East, 130.00 feet; thence North 01 degrees 15 minutes East, 470.00 feet; thence North 28 degrees 45 minutes West, 200.00 feet; thence North 39 degrees 45 minutes East, 235.00 feet; thence North 07 degrees 40 minutes East, 200.00 feet; thence North 39 degrees 45 minutes East, 240.00 feet; thence North 07 degrees 00 minutes East, 200.00 feet to the point of ending at the center of a 60.00 foot radius cul-de-sac.

Parcel Identification No.(part of) 10-09-100-019

LIBER 19217 PAGE 888

19E-190342713

STATE OF MICHIGAN REAL ESTATE TRANSFER TAX

OAKLAND
1 DEC 93
1011

$ 440.00-STATE
$ 3000.00-CITY
#100009440

$ 15.00 DEED
$ 2.00 REMONUMENTATION
$ 3440.00 TRANSFER TAX (COMBINED)
1 DEC 93 10:01 A.M. RECEIPT 108
PAID RECORDED - OAKLAND COUNTY
G. WILLIAM CADDELL
CLERK/REGISTER OF DEEDS

WARRANTY DEED

THE GRANTOR(S)

Helene D. Settles and Stuart David Cork, Co-Trustees of the Stephen M. DuBrul Trust U/T/A January 15, 1979 as to an undivided 1/2 interest

and

Helene D. Settles and Stuart David Cork, Co-Trustees of the Ella K. DuBrul Trust U/T/A May 13, 1983, as to an undivided 1/2 interest

whose address is: 2259 Tipperary Road, Kalamazoo, Michigan 49008

CONVEYS AND WARRANTS TO: WILLIAM M. FOX, TRUSTEE, William M. Fox Revocable Family Trust, u/t/a 3/10/83

whose address is: 725 South Rochester Road, Rochester Hills, Michigan 48307

the following described premises situated in the Township of Oakland, County of Oakland, and State of Michigan to wit:

- Legal Description attached as Exhibit "A"
  containing 5 acres more or less

Commonly known as 1401 Lake George Road, Oakland Township, Michigan

Part of Tax ID No. 10-09-100-015

for the sum of FOUR HUNDRED THOUSAND ($400,000) DOLLARS

subject to zoning ordinances, building and use restrictions, easements of record and real estate taxes, not yet due.

Dated this 2nd day of October, 1993

Signed in the Presence of:

Signed by: O.K. - KB

Neil Wallace
NEIL WALLACE
John Barbour
JOHN BARBOUR

STUART DAVID CORK, CO-TRUSTEE
of the Stephen M. DuBrul Trust U/T/A January 15, 1979 as to an undivided 1/2 interest

Neil Wallace
NEIL WALLACE
John Barbour
JOHN BARBOUR

HELENE D. SETTLES, CO-TRUSTEE
of the Stephen M. DuBrul Trust U/T/A January 15, 1979 as to an undivided 1/2 interest

(Jurat and additional signatures appear on the following page 2 of this Warranty Deed)

LIBER 19217 0890

RIDER A

3rd Page of Warranty Deed Between Helen and Stuart David Cook and William M Fox Trustee 10-2-92

LEGAL DESCRIPTION:

Land in the Township of Oakland, Oakland County, Michigan, described as:

Part of the North 1/2 of Section 9, Town 4 North, Range 11 East, Oakland Township, Oakland County, Michigan, described as: Beginning at a point on the East line of Lake George Road (33.00 feet 1/2 width), located South 85 degrees 08 minutes 33 seconds East, 33.12 feet (R), South 88 degrees 08 minutes 55 seconds East, 33.12 feet (M), and North 00 degrees 03 minutes 51 seconds East, 286.43 feet from the West 1/4 corner of Section 9; thence continuing North 00 degrees 03 minutes 51 seconds East, 641.46 feet along said East line of Lake George Road; thence South 89 degrees 21 minutes 37 seconds East, 339.62 feet; thence South 00 degrees 03 minutes 51 seconds West, 641.46 feet; thence North 89 degrees 21 minutes 37 seconds West, 339.62 feet to the point of beginning.

SUBJECT TO A 60.00 FEET EASEMENT FOR INGRESS AND EGRESS with others, described as part of the Northwest 1/4 of Section 9, Town 4 North, Range 11 East, Oakland Township, Oakland County, Michigan, the centerline of which is described as: Beginning at a point on the East line of Lake George Road, located South 85 degrees 08 minutes 55 seconds East, 33.12 feet (recorded South 85 degrees 08 minutes 33 seconds East, 33.00 feet) and North 00 degrees 03 minutes 51 seconds East, 380.00 feet from the West 1/4 corner of Section 9; thence from said point of beginning of centerline of 60.00 feet wide private easement for ingress and egress South 88 degrees 40 minutes East, 1240.00 feet; thence North 43 degrees 10 minutes East, 130.00 feet; thence North 01 degrees 15 minutes East, 470.00 feet; thence North 25 degrees 45 minutes West, 200.00 feet; thence North 39 degrees 45 minutes East, 235.00 feet; thence North 07 degrees 40 minutes East, 200.00 feet; thence North 39 degrees 45 minutes East, 240.00 feet; thence North 07 degrees 00 minutes East, 200.00 feet to the point of ending at the center of a 60.00 feet radius cul-de-sac.

Parcel Identification No. (part of) 10-09-100-015

LIBER 1921 PAGE 891

2nd Page of Warranty Deed between Helene and Stuart David Cook and William M Fox/Trustee 10-2-98

ATTACHMENT TO WARRANTY DEED

GRANTOR: The Stephen M. DuBrul Trust and the Ella K. DuBrul Trust

GRANTEE: William M. Fox, Trustee of the William M. Fox Revocable Family Trust

DATE OF WARRANTY DEED October 2, 1998

PROPERTY ID NO.: 5 acres more or less, part of 10-09-100-015

LAND DIVISION

The Grantor grants to the Grantee the right to make all divisions(s) under Section 108 of the land division act, Act No. 288 of the Public Acts of 1967.

NOTIFICATION OF PRIVATE ROAD

The Grantor and Grantee acknowledge that the road servicing the land described in said Warranty Deed, of which the property conveyed to above named Grantee by above Grantor, is a private road that is not required to be maintained by the Board of County Road Commissioners.

This Notification is given as required by Section 261 of Act 288 of Public Acts of 1967 (MCLA 560.261)

MICHIGAN RIGHT TO FARM ACT

The Grantor and the Grantee acknowledge that the Property being conveyed may be located within the vicinity of farmland or a farm operation. Generally accepted agricultural and management practices which may generate noise, dust, odors, and other associated conditions may be used and are protected by the Michigan right to farm act. This Notice is required by provisions of Michigan Law 560.109(3).

ACKNOWLEDGED:

GRANTOR:

Helene D. Settles, Co-Trustee

Stuart David Cook, Co-Trustee

GRANTEE:

William M. Fox, Trustee

2036 NMTICE