Appendix MNFI

MNFI Site Ranking by Community

MNFI Ecological Reports

Rattalee Lake Fens Site Ecological Summary

Huron River System Study Results

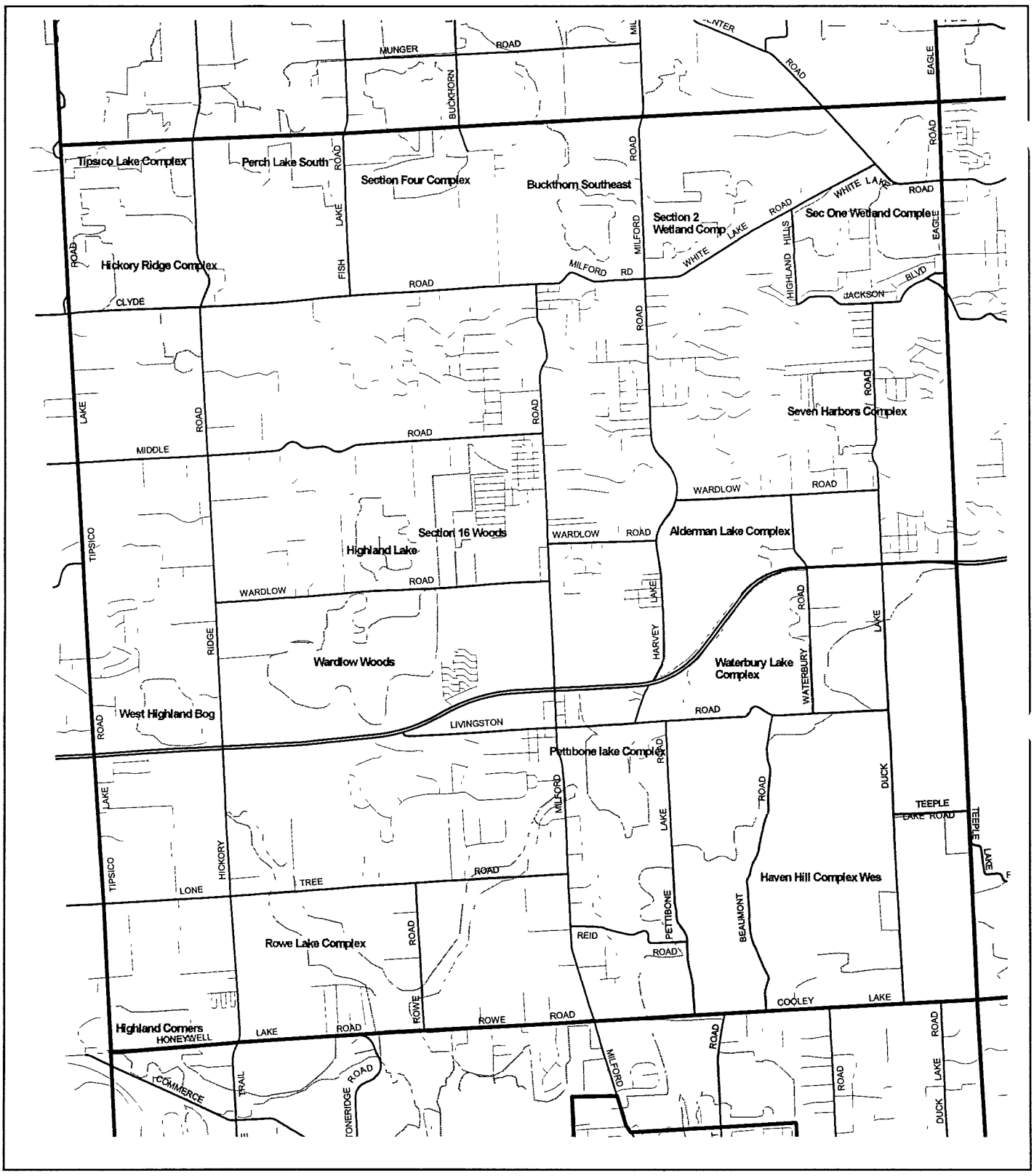
Identifying Our Natural Heritage—MNFI 1987 Inventory

S&H

Shiawassee & Huron Headwaters Resource Preservation Project

MICHIGAN NATURAL FEATURES INVENTORY SITE RANKING BY COMMUNITY

A complete listing of all sites identified and ranked by MNFI, grouped by community.



MNFI Sites
Highland Township

LEGEND

Roads

Community Boundary

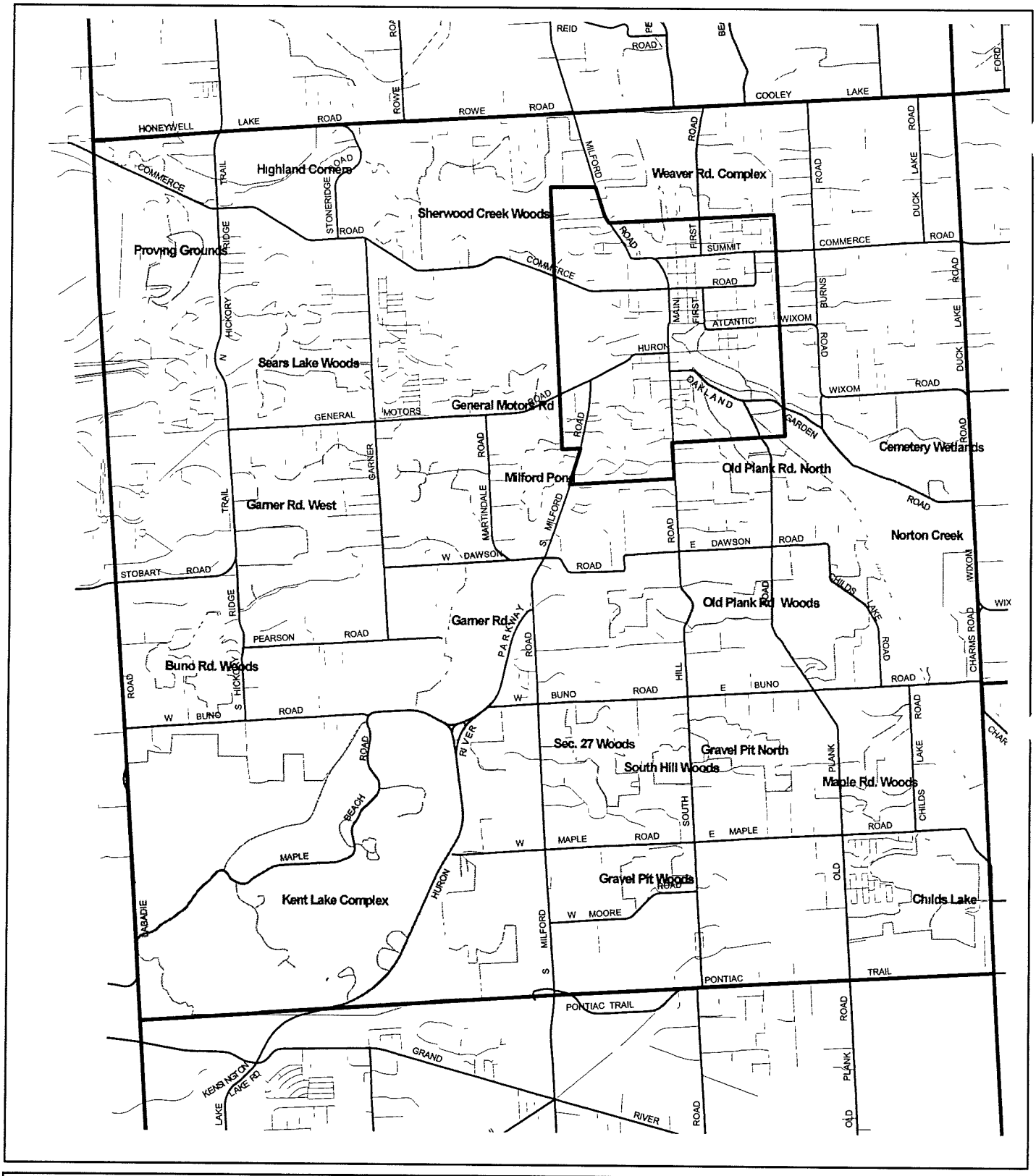
MNFI Sites

N

Shiawassee & Huron
Headwaters Resource Preservation Project

HIGHLAND TOWNSHIP MNFI SITES

SITE_NAME	SIZE	INTACTNESS	CORRIDOR	UPLAND_WET	RESTORABIL	KNOWN ELEMENT_OC	TOTAL
Haven Hill Complex West	3	3	0	1	2	2	11
Waterbury Lake Complex	3	3	0	1	2	0	9
Pettibone lake Complex	3	3	1	1	1	0	9
Hickory Ridge Complex	3	3	0	1	1	0	8
Wardlow Woods	3	3	0	1	1	0	8
Rowe Lake Complex	3	1	1	1	1	0	7
Sec One Wetland Complex	3	1	0	1	1	1	7
Perch Lake South	3	2	0	1	1	0	7
West Highland Bog	2	2	0	1	2	0	7
Alderman Lake Complex	3	2	0	1	1	0	7
Section 2 Wetland Complex	2	1	1	1	1	0	6
Buckhorn Southeast	2	1	1	1	1	0	6
Section 16 Woods	2	2	0	1	1	0	6
Highland Corners	2	2	0	1	1	0	6
Section Four Complex	2	2	0	1	0	0	5
Tipsico Lake Complex	2	1	0	1	1	0	5
Seven Harbors Complex	2	2	0	1	0	0	5
Highland Lake	2	1	0	1	1	0	5



MNFI Sites
Milford Township

LEGEND

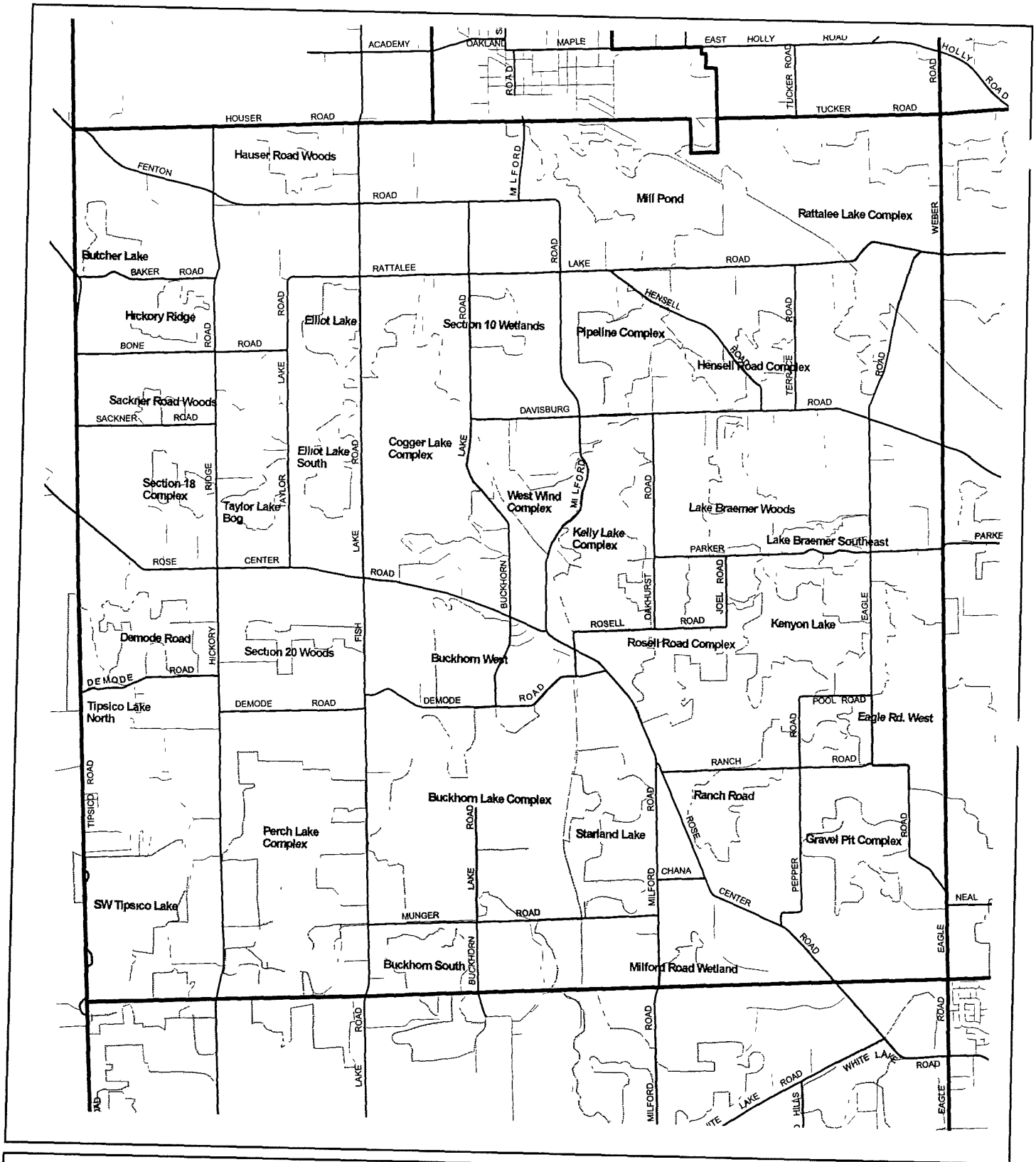
- Roads
- Community Boundary
- MNFI Sites

N

Shiawassee & Huron
Headwaters Resource Preservation Project

MILFORD TOWNSHIP AND MILFORD VILLAGE MNFI SITES

SITE_NAME	SIZE	INTACTNESS	CORRIDOR	UPLAND_WET	RESTORABIL	KNOWN ELEMENT_OC	TOTAL
Kent Lake Complex	3	2	2	1	1	1	10
Cemetery Wetlands	3	1	2	1	1	1	9
Sherwood Creek Woods	3	2	1	1	1	0	8
Garner Rd	3	1	2	1	1	0	8
Weaver Rd Complex	3	1	1	1	0	1	7
Old Plank Rd Woods	3	2	0	1	1	0	7
Norton Creek	3	1	1	1	1	0	7
Garner Rd West	3	1	1	1	0	0	6
Sears Lake Woods	2	2	0	1	1	0	6
Milford Pond	2	1	1	1	0	1	6
Old Plank Rd North	2	2	0	1	1	0	6
Childs Lake	2	1	1	1	0	0	5
General Motors Rd	1	1	2	1	0	0	5
Gravel Pit Woods	2	2	0	1	0	0	5
Highland Corners	1	2	0	1	0	0	4
Buno Rd Woods	2	1	0	1	0	0	4
Gravel Pit North	2	1	0	1	0	0	4
South Hill Woods	1	2	0	1	0	0	4
Sec 27 Woods	2	1	0	1	0	0	4
Proving Grounds	1	1	0	1	0	0	3
Maple Rd Woods	1	1	0	1	0	0	3



MNFI Sites
Rose Township

LEGEND

Roads

Community Boundary

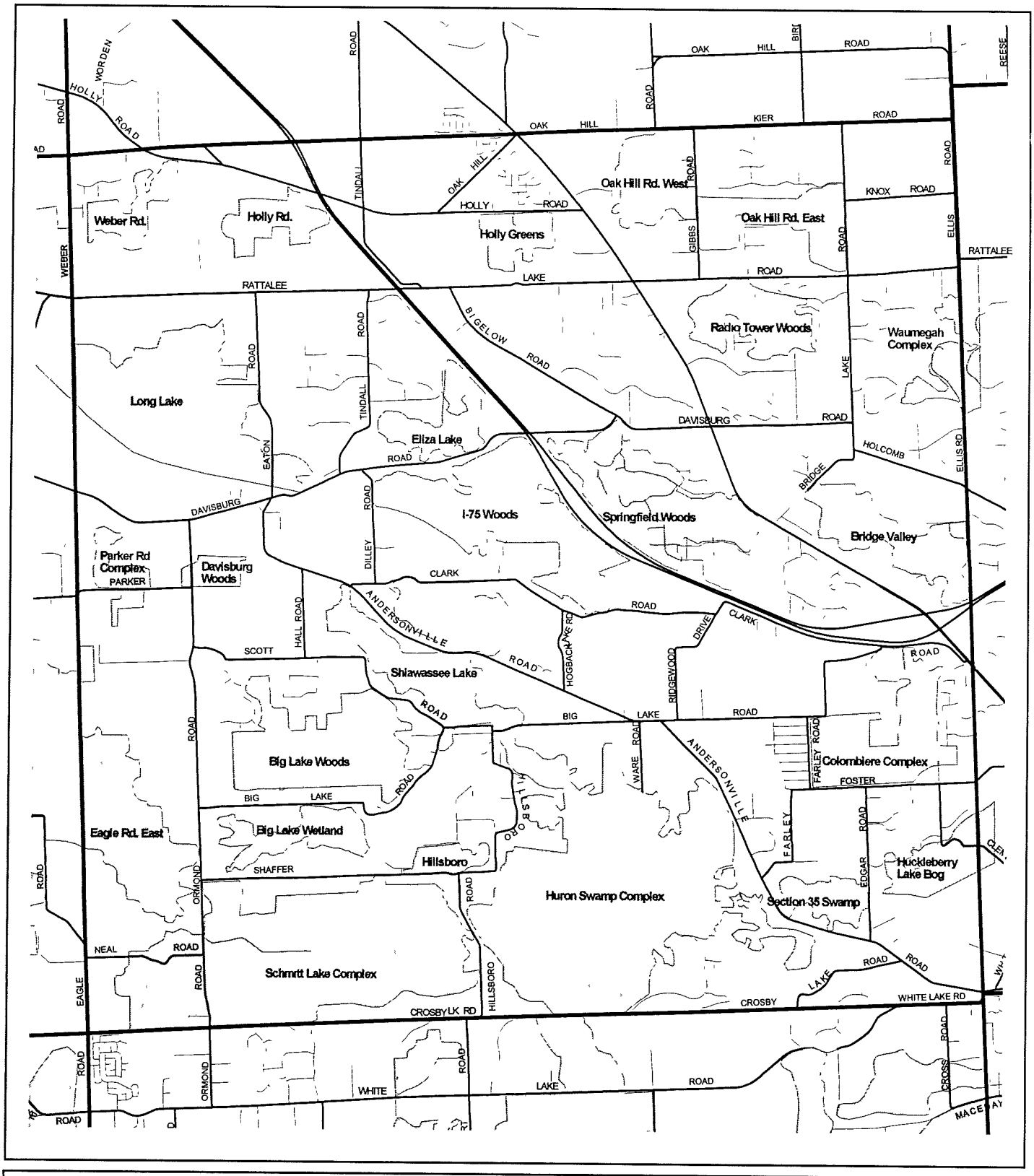
MNFI Sites

N

Shiawassee & Huron
Headwaters Resource Preservation Project

ROSE TOWNSHIP MNFI SITES

SITE_NAME	SIZE	INTACTNESS	CORRIDOR	UPLAND_WET	RESTORABIL	KNOWN ELEMENT_OC	TOTAL
Buckhorn Lake Complex	3	3	2	1	2	2	13
Perch Lake Complex	3	3	0	1	2	2	11
Rattalee Lake Complex	3	2	2	1	1	2	11
Mill Pond	3	3	2	1	1	0	10
Kenyon Lake	3	3	1	1	2	0	10
SW Tipsico Lake	3	3	0	1	2	0	9
Ranch Road	3	2	1	1	1	0	8
Rosell Road Complex	3	2	1	1	1	0	8
Buckhorn West	3	2	1	1	1	0	8
Lake Braemer Woods	2	2	1	1	2	0	8
Kelly Lake Complex	3	2	0	1	1	1	8
Pipeline Complex	3	2	1	1	1	0	8
Cogger Lake Complex	3	3	0	1	1	0	8
Starland Lake	3	2	0	1	1	0	7
Hensell Road Complex	2	2	1	1	1	0	7
Eagle Rd West	3	2	0	1	1	0	7
Butcher Lake	2	2	0	1	2	0	7
Section 18 Complex	2	3	0	1	1	0	7
Demode Road	3	2	0	1	1	0	7
Elliot Lake	2	2	0	1	2	0	7
West Wind Complex	3	2	0	1	0	0	6
Milford Road Wetland	1	2	1	1	1	0	6
Elliot Lake South	2	2	0	1	1	0	6
Hickory Ridge	2	2	0	1	1	0	6
Hauser Road Woods	2	2	0	1	1	0	6
Gravel Pit Complex	3	1	1	1	0	0	6
Section 10 Wetlands	2	1	0	1	1	0	5
Taylor Lake Bog	2	2	0	1	0	0	5
Lake Braemer Southeas	2	1	1	1	0	0	5
Section 20 Woods	2	1	0	1	1	0	5
Tipsico Lake North	2	1	0	1	0	0	4
Sackner Road Woods	1	1	0	1	1	0	4
Buckhorn South	2	1	0	1	0	0	4



MNFI Sites
Springfield Township

LEGEND

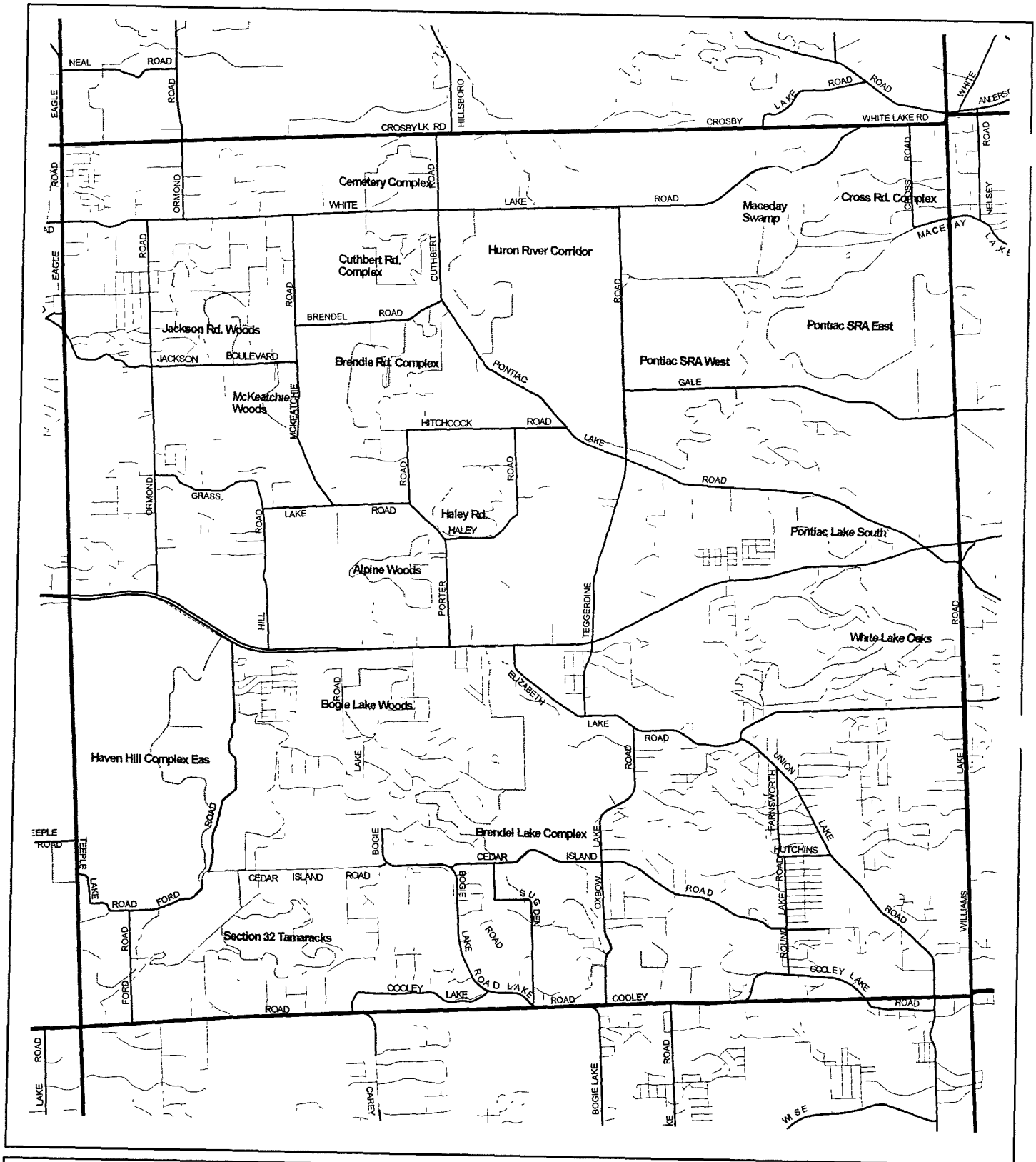
- Roads
- Community Boundary
- MNFI Sites

N

Shiawassee & Huron
Headwaters Resource Preservation Project

SPRINGFIELD TOWNSHIP MNFI SITES

SITE_NAME	SIZE	INTACTNESS	CORRIDOR	UPLAND_WET	RESTORABIL	KNOWN ELEMENT_OC	TOTAL
Long Lake	3	3	2	1	2	2	13
Huron Swamp Comple	3	3	2	1	2	2	13
I-75 Woods	3	3	2	1	1	2	12
Bridge Valley	3	2	1	1	0	2	9
Schmitt Lake Complex	3	3	0	1	2	0	9
Shiawassee Lake	3	2	1	1	1	0	8
Eagle Rd East	3	2	0	1	2	0	8
Eliza Lake	3	2	0	1	1	1	8
Radio Tower Woods	3	2	0	1	1	1	8
Big Lake Woods	3	3	0	1	1	0	8
Davisburg Woods	2	3	0	1	1	0	7
Weber Rd	2	3	0	1	1	0	7
Waumegah Complex	3	2	1	1	0	0	7
Huckleberry Lake Bog	2	2	0	1	1	1	7
Holly Rd	2	3	0	1	1	0	7
Holly Greens	2	3	0	1	0	0	6
Parker Rd Complex	2	2	0	1	1	0	6
Big Lake Wetland	3	2	0	1	0	0	6
Oak Hill Rd West	2	1	0	1	1	0	5
Oak Hill Rd East	2	1	0	1	1	0	5
Springfield Woods	3	1	0	1	0	0	5
Colombiere Complex	2	2	0	0	1	0	5
Section 35 Swamp	2	1	0	1	1	0	5
Hillsboro	2	1	0	1	0	0	4



MNFI Sites
White Lake Township

LEGEND

Roads

Community Boundary

MNFI Sites

N

Shiawassee & Huron
Headwaters Resource Preservation Project

WHITE LAKE TOWNSHIP MNFI SITES

SITE_NAME	SIZE	INTACTNESS	CORRIDOR	UPLAND_WET	RESTORABIL	KNOWN ELEMENT_OC	TOTAL
Pontiac SRA West	3	3	2	1	2	1	12
Haven Hill Complex Eas	3	3	0	1	2	2	11
Huron River Corridor	3	2	2	1	2	0	10
Pontiac SRA East	3	3	0	1	2	0	9
Brendel Lake Complex	3	2	2	1	1	0	9
White Lake Oaks	3	1	2	1	0	0	7
Cross Rd Complex	2	2	0	1	2	0	7
Cuthbert Rd Complex	2	3	0	1	1	0	7
McKeatchie Woods	2	2	0	1	1	0	6
Brendel Rd Complex	3	1	0	1	1	0	6
Pontiac Lake South	2	2	0	1	1	0	6
Alpine Woods	2	2	0	1	1	0	6
Section 32 Tamaracks	3	1	0	1	0	1	6
Maceday Swamp	2	2	0	1	1	0	6
Bogie Lake Woods	2	2	0	1	0	0	5
Haley Rd	2	1	0	1	0	0	4
Cemetery Complex	2	2	0	0	0	0	4
Jackson Rd Woods	2	1	0	1	0	0	4

Areas of Future Potential Study

MNFI identified numerous sites of potential ecological importance for future study Below is a list of each of these sites arranged by Watershed and Township.

Huron River Watershed

- **Springfield Township**. Eagle Road East, Schmitt Lake Complex, Big Lake Woods, portion of Huckleberry Lake Bog, Big Lake Wetland, Colombiere Complex, Section 35 Swamp, Shiawassee Lake, and Hillsboro.

- **Highland Township**· Pettibone Lake Complex, Haven Hill Complex West, Waterbury Lake Complex, Wardlow Lake, Alderman Lake Complex, Section One Wetland Complex, West Highland Bog, Rowe Lake Complex, Highland Corners, Section 16 Woods, Highland Lake, Section 4 Complex, Seven Harbors Complex, and Highland Lake.

- **White Lake Township**· Pontiac SRA West, Haven Hill Complex East, Pontiac SRA East, Brendel Lake Complex, Cross Road Complex, Cuthbert Road Complex, White Lake Oaks, Maceday Swamp, McKeatchie Woods, Brendle Road Complex, Pontiac Lake South, Alpine Woods, Section 32 Tamaracks, Bogie Lake Woods, Cemetery Complex, Jackson Road Woods, and Haley Road.

- **Milford Township**: Kent Lake Complex, Sherwood Creek Woods, Garner Road, Weaver Road Complex, Cemetery Wetlands, Old Plank Road Woods, Sears Lake Woods, Norton Creek, partially Milford Pond, Garner Road West, Gravel Pit Woods, Child's Lake, Highland Corners, Buno Road Woods, Gravel Pit North, South Hill Woods, Section 27 Woods, Proving Grounds, and Maple Road Woods.

- **Village of Milford**: portion of Sherwood Creek Woods, and portion of Weaver Road, and portion of Milford Pond.

Shiawassee River Watershed

- **Rose Township**: Rattalee Lake Complex, Mill Pond, Kenyon Lake, SW Tipsico Lake, Pipeline Complex, Cogger Lake Complex, Kelly Lake Complex, Lake Braemer Woods, Buckhorn West, Rosell Road Complex, Ranch Road, Butcher Lake, Eagle Road West, Elliot Lake, Hensell Road Complex, Section 18 Complex, Demoda Road, Hauser Road Woods, Hickory Ridge, Elliot Lake South, West Wind Complex, Milford Road Wetland, Gravel Pit Complex, Section 10 Wetlands, Taylor Lake Bog, Lake Braemer Southeast, Section 20 Woods, Sackner Road Woods, Tipsico Lake North, Starland Lake, and Buckhorn South.

- **Springfield Township**: Eagle Road East, Eliza Lake, Big Lake Woods, Weber Road, Holly Road, Davisburg Woods, Parker Road Complex, Shiawassee Lake, and Springfield Woods.

- **Highland Township**: Hickory Ridge, West Highland Bog, Section Four Complex, and Tipsico Lake Complex.

Clinton River Watershed

- **White Lake Township**: Cross Road Complex
- **Springfield Township**: Holly Greens, Oak Hill Road West and East, Radio Tower Woods, Waumegah Complex, Springfield Woods, and Bridge Valley.

MICHIGAN NATURAL FEATURES INVENTORY SITE ECOLOGICAL REPORTS

Based on Surveys or Incidental Observations in 1998 and 1999

Michigan Natural Features Inventory
Stevens T. Mason Building
Post Office Box 30444
Lansing, Michigan 48909-7944
Phone 517/373-1552
Fax 517/373-6705

SITE ECOLOGICAL REPORTS

Based on surveys or incidental observations in
1998 and 1999

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Charter Township of Highland

BUCKHORN SOUTHEAST

Site Ecological Report

Directions to Site
The Buckhorn Southeast site is located in the north central portion of Highland Township. Take Milford Road north to Clyde Road and head east for approximately 5 miles The site is located on the north side of the road.

General Site Description
The Buckhorn Southeast site is located in the Shiawassee watershed in northwestern Oakland County in the northern portion of the Jackson Interlobate sub-subsection (Albert 1994) This region lies between the extensions of two glacial lobes that extended into southern Michigan approximately 16,000 years ago The landscape exhibits a complicated topography due to the complex glacial ice activity that occurred in the area. It is characterized by rolling, broad, sandy outwash plains with numerous ice contact features creating a mosaic of steep ridges, scattered depressions, and outwash channels. At the Buckhorn Southeast site topography varies ranging from steep hills to narrow, relatively flat channels. The primary area of the site is approximately 210 acres in size and is characterized by scattered sandy knolls surrounded by low outwash channels. Plant communities found at the Buckhorn Southeast site include southern dry-mesic forest, southern mesic forest, old field, southern shrub-carr, emergent marsh, and southern wet meadow.

Similar to the Buckhorn Lake Complex, outwash channels are found throughout the Buckhorn Southeast site These outwash channels are low and wet, and dominated by two wetland communities: southern wet meadow and southern shrub-carr Both southern shrub-carr and southern wet meadow are comprised of a diverse group of native plants, and are common wetland communities throughout the Midwest A few pockets of emergent marsh are also found in the outwash channels.

The uplands in the Buckhorn Southeast site tend to be small knolls or hills scattered throughout the site isolated by outwash channels. Old fields and fragmented, young, southern dry-mesic forests dominate the uplands. A moderately sized third growth southern dry-mesic forest is found in the central portion of the site In addition, native prairie plant species such as black-eyed susan (*Rudbeckia hirta*), bee balm (*Monarda fistulosa*), and big bluestem (*Andropogon gerardii*) were found in a few of the old fields, suggesting potential for oak barrens or savanna restoration

Summary of Ecological Significance
Prior to fieldwork, Michigan Natural Features Inventory (MNFI) biologists considered including this site as part of the larger Buckhorn Lake Complex However, information obtained during field surveys showed that the quality of natural communities is much lower at the Buckhorn Southeast site relative to the Buckhorn Lake Complex For example, the prairie fen in the southern portion of Buckhorn Lake Complex abruptly changes to a degraded wet meadow and emergent marsh almost exactly at the township border between Rose and Highland. No high quality natural communities were found at this site and the majority of wetland and upland patches are very small in size. The presence of the carcass and shell of a Blanding's turtle (*Emydoidea blandingii*), state special concern, along the railroad tracks suggests that the site may be utilized by at least some herp species. The primary significance of the site is its location just to the south of the Buckhorn Lake Complex, and the northward flow of surface water from Buckhorn Southeast to the Buckhorn Lake Complex.

The site predominately consists of low narrow channels dominated by several common wetland communities shrub-carr, emergent marsh, and wet meadow. Typical plant species were found in each community. These three communities were found scattered throughout the channels, forming a mosaic of small patches that often intermix at the edges. The quality of wetlands at the site is moderate, however, the wet meadow and emergent marsh complex at the north end of the site contains significant amounts of purple loosestrife (*Lythrum salicaria*), a very aggressive, exotic wetland plant.

The uplands in Buckhorn Southeast are relatively small

and isolated due to the topography of the site, and degraded due to past land uses. The majority of uplands surveyed are either old field or early successional southern dry-mesic forest, although a few patches of second growth forest were documented A relatively large (though young) southern mesic forest is located in the central-east portion of the site Although the canopy trees are relatively small, indicating some sort of recent disturbance, the ground flora is quite diverse and abundant containing approximately 23 herbaceous species. Species found in the canopy include white ash (*Fraxinus americana*), red maple (*Acer rubrum*), American basswood (*Tilia americana*), and big-toothed aspen (*Populus grandidentata*) Species in the ground flora include white baneberry (*Actea pachypoda*), wild sarsparilla (*Aralia nudicaulis*), and Jack-in-the-pulpit (*Arisaema triphyllum*) An example of a typical southern dry-mesic forest at the site, is a block of second growth forest located on a kame surrounded by wetlands. The canopy is dominated by white, and black oak (*Quercus alba, Q velutina*), pignut hickory (*Carya glabra*), and big-toothed aspen (*Populus grandidentata*). Exotic species such as tartarian honeysuckle (*Lonicera tatartica*) and autumn olive (*Eleagnus umbellata*) are abundant in the understory, and exotic species, such as white swallowwort (*Vincetoxicum rossicum*), common St. John's wort (*Hypericum perforatum*), and Canada bluegrass (*Poa compressa*) are locally abundant in the ground cover

Several old fields are found scattered throughout the uplands dominated by exotic plant species such as brome grass (*Bromus inermis*), orchard grass (*Dactylis glomerata*), and spotted knapweed (*Centaurea maculosa*) A few of the old fields near the railroad tracks, however, also contain a few prairie plant species such as black-eyed susan, big bluestem, and bee balm. Since several of these old fields border wet meadow, they may provide summer habitat for the eastern massasauga rattlesnake (*Sistrurus c. catenatus*) state special concern, and nesting habitat for rare turtles such as Blanding's turtle, spotted turtle (*Clemmys guttata*), state special concern, and box turtle (*Terrepene c. carolina*), state special concern

Evidence of Disturbance

The old fields that are found throughout the uplands are abandoned agricultural fields, probably historically used for grazing or haying. Currently, they are dominated by exotic species such as brome grass, orchard grass, and spotted knapweed. All of the southern dry-mesic and southern mesic forest stands were probably logged near the turn of the century, and many of the present young woodlots were agricultural lands as recently as 20-30 years ago. Very little oak regeneration is found in the understory of these forests primarily due to years of fire suppression In addition, the understory of the southern dry-mesic forests is dominated by exotic plant species such as tartarian honeysuckle and common St. John's wort The Ohio-Chesapeake railroad runs through the middle of the entire site The railroad sprays herbicide along the tracks approximately 30-50 ft. out from the center of the tracks to suppress plant growth on the railroad bed The presence of purple loosestrife and abundance of cattails in the wet meadows indicates some type of artificial disturbance such as grazing, nutrient loading, hydrologic disruption, or soil compaction and exposure

Threats

Primary threats to the uplands are spread of exotic plants, fire suppression, and habitat fragmentation Approximately five exotic species were identified in the southern dry-mesic forests including tartarian honeysuckle, a highly invasive shrub. Continuation of fire suppression in the southern dry-mesic forests will eventually lead to a change in the species composition of the canopy, understory, and ground layer. As light demanding oaks die, they will be replaced by shade tolerant red maples.

Primary threats to the wetlands include spread of exotic plants, nutrient loading from adjacent uplands, and fire suppression The only exotic plant species identified in the wetlands during field surveys was purple loosestrife. Purple loosestrife was found primarily in the northern portion of the site. Increased residential development in the uplands could lead to increased water runoff and leaky septic systems both of, which could expose wetlands to increased nutrient and contaminant loading. Fire suppression will lead to a continued increase in shrubs, trees, and cattails in wet meadows and emergent marshes.

Ecological Boundary Explanation

The ***primary boundary*** represents the extent of connected upland and wetland communities remaining at the site.

The ***secondary boundary*** represents the minimal area needed to maintain the natural communities within the primary boundary. Due to the relatively small size of the site and lack of high quality natural communities, roads were used to determine the east, south, and west boundary, while the township border was used to define the northern boundary. This area primarily

includes both active and inactive agricultural land as well as low-density residential housing A narrow lake is also found in this area

Stewardship Considerations

Primary boundary: Additional development within the primary area should be avoided, minimized, or designed to have minimal impact on remaining natural communities and associated species The patches of southern dry-mesic forests will require prescribed burns and tree thinning in order to stimulate oak regeneration in the understory as well as herbaceous plants such as coreopsis (*Coreopsis tripteris*), sunflower (*Helianthus* spp), and pensylvania sedge (*Carex pensylvanica*) Burning will also help to control exotic plants, such as tartarian honeysuckle, in the southern dry-mesic forests. Exotic plants in the uplands need to be controlled and monitored White swallowwort is a very aggressive herb that forms colonies on the forest floor which are hard to eradicate. The presettlement vegetation of the uplands, as determined by the General Land Office (GLO) records, indicates that much of the uplands that are now old field, and early successional and closed canopy southern dry-mesic forest were once oak barrens in the early 1800's. If management for oak barrens is desired, a more intense fire and tree thinning management plan would have to be developed Since the old fields already contain some prairie species and only a few trees, exotic plants should be removed and the fields restored to oak barrens

Although the wetland communities within the Buckhorn Southeast site are in good to moderate condition, a population of purple loosestrife is located in the northern portion of the site In addition, purple loosestrife and reed canary grass (*Phalaris arundinacea*) were found in the portion of the Big Valley prairie fen just north of Buckhorn Southeast, although both species were contained to the banks of the stream Both of these species are considered to be highly invasive plants and once established are very difficult to eradicate It appears that both of these species may have originated from the northern portion of Buckhorn Southeast. Efforts should be made to eradicate this species from the site, and to monitor the results of management activities.

Secondary boundary: The primary concern within the secondary boundary is the protection of the flow and quality of ground and surface water that supports the wet meadows, emergent marshes, and shrub-carr communities The ground and surface water that originates at or near the Buckhorn Southeast site, eventually flows northward impacting the large prairie fen complex to the north, a portion of which lies within the secondary boundary. This is particularly true for the area on the east side of the railroad tracks Future development within this area should be designed to maximize contiguous natural open space, and provide adequate buffers to the natural communities within the primary boundary Any development that occurs in the north east portion of the site should be required to address surface water runoff, percolation, and ground water consumption Stewardship recommendations in this area include. minimizing the size of lawns; landscaping with native plants, (particularly prairie species), keeping precipitation on-site (especially on ridge tops), requiring wells to be drilled to a depth below the aquifer that supports the fen, and maintaining adequate septic systems In addition, several privately owned parcels within the northern portion of the secondary area are adjacent to the large prairie fen complex to the north Activities on these parcels could have a significant impact on the fen and associated flora and fauna. Efforts should be made to contact landowners adjacent to the prairie fen complex bordering the north end of the site, and inform them of the unique natural features in the area and how they can help conserve those features.

The majority of uplands in the secondary boundary are old fields or low density residential development A few scattered, isolated blocks of forest are found primarily on the west portion of the site. Efforts should be made to increase connectivity and native habitat by converting old fields to oak barrens or southern dry-mesic forest. Existing and future residential development in this area should be designed to maximize contiguous natural open space, and provide adequate buffers to the natural communities within the primary boundary

Recommendation for Future Studies

Given the presence of a Blanding's turtle carcass and shell and variety of habitat at the site, additional surveys for state listed turtles and snakes are recommended

Literature Cited:

Albert, D.A. 1994. Regional Landscape Ecosystems of Michigan, Minnesota and Wisconsin: A Working Map and Classification. USDA Forest Service, North Central Forest Experiment Station, General Technical Report NC-178.

Field Surveys

Key for terminology used in the following field surveys

N	(Native) – Species that are native to Michigan.
A	(Adventive) – Species that have been introduced and are not native to Michigan
Fern	A leafy plant with leaves undivided or divided several times into leaflets
Forb	A herbaceous plant with broad leaves, excluding the grasses and grasslike plants, a type of flowering herb
Grass	Plants, whose characteristics include stems that are jointed at nodes, are hollow and have sheathing leaves
Sedge	A tufted marsh plant, differing from the related grasses in having a one-seeded fruit and solid stems.
Shrub	A woody perennial plant, typically lower than most trees, having multiple stems that branch from the base without a well-defined main stem.
Tree	A woody plant characterized by one main trunk, bearing a more or less distinct and elevated crown of branches. Typically, trees are larger than shrubs.
Vine	A plant whose stem requires support and which climbs by tendrils or twining or creeps along the ground.
<T>	Species that is threatened
<SC>	Species that is of special concern

Animal Survey List
Buckhorn Southeast

There was no animal survey conducted at the Buckhorn Southeast site

Plant Survey List
Buckhorn Southeast

(Based on MNFI's surveys or incidental observations in 1999)

Buckhorn Southeast – Southern Dry-Mesic Forest

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Amelanchier arborea	JUNEBERRY
N Forb	Asclepias tuberosa	BUTTERFLY-WEED
N Tree	Carya glabra	PIGNUT HICKORY
N Sedge	Carex pensylvanica	SEDGE
A Forb	HYPERICUM PERFORATUM	COMMON ST. JOHN'S-WORT
N Forb	Lespedeza hirta	HAIRY BUSH-CLOVER
A Shrub	LONICERA TATARICA	SMOOTH TARTARIAN HONEYSUCKLE
A Grass	PHLEUM PRATENSE	TIMOTHY
A Grass	POA COMPRESSA	CANADA BLUEGRASS
N Tree	Populus grandidentata	BIG-TOOTHED or LARGE-TOOTHED ASPEN
N Tree	Quercus alba	WHITE OAK
N Tree	Quercus velutina	BLACK OAK
A Forb	VINCETOXICUM ROSSICUM	WHITE SWALLOW-WORT

Buckhorn Southeast – Southern Mesic Forest
This area is not mapped

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Acer rubrum	RED MAPLE
N Forb	Actaea pachypoda	WHITE BANEBERRY, DOLL'S-EYES
N Fern	Adiantum pedatum	MAIDENHAIR FERN
N Forb	Allium cernuum	NODDING WILD ONION
N Forb	Amphicarpaea bracteata	HOG-PEANUT
N Forb	Apocynum androsaemifolium	SPREADING DOGBANE
N Forb	Arisaema triphyllum	JACK-IN-THE-PULPIT
N Forb	Aster macrophyllus	BIG-LEAVED ASTER
N Tree	Carpinus caroliniana	HORNBEAM, BLUE-BEECH
N Forb	Circaea lutetiana	ENCHANTER'S-NIGHTSHADE
N Sedge	Carex pensylvanica	SEDGE
N Tree	Fraxinus americana	WHITE ASH
N Forb	Galium boreale	NORTHERN BEDSTRAW
N Forb	Geranium maculatum	WILD GERANIUM
N Shrub	Hamamelis virginiana	WITCH-HAZEL
N Forb	Hepatica acutiloba	SHARP-LOBED HEPATICA
N Vine	Parthenocissus quinquefolia	VIRGINIA CREEPER
N Forb	Podophyllum peltatum	MAY APPLE, MANDRAKE
N Tree	Populus grandidentata	BIG-TOOTHED or LARGE-TOOTHED ASPEN
N Tree	Prunus serotina	WILD BLACK CHERRY
N Shrub	Ribes cynosbati	PRICKLY or WILD GOOSEBERRY
N Forb	Sanicula trifoliata	BLACK SNAKEROOT
N Tree	Sassafras albidum	SASSAFRAS
N Forb	Smilacina racemosa	FALSE SPIKENARD
N Vine	Smilax tamnoides	BRISTLY GREEN-BRIER
N Forb	Solidago caesia	BLUE-STEMMED GOLDENROD
N Tree	Tilia americana	LINDEN; BASSWOOD
N Forb	Trillium cernuum	NODDING TRILLIUM
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Forb	Uvularia grandiflora	BELLWORT
N Shrub	Viburnum acerifolium	MAPLE-LEAVED ARROW-WOOD

Buckhorn Southeast - Southern Wet Meadow

Native/Adventive Physiography	Scientific Name	Common Name
N Grass	Bromus ciliatus	FRINGED BROME
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Forb	Cirsium muticum	SWAMP-THISTLE
N Shrub	Cornus amomum	SILKY or PALE DOGWOOD
N Sedge	Carex stricta	SEDGE
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Tree	Larix laricina	TAMARACK; LARCH
A Forb	LYTHRUM SALICARIA	PURPLE LOOSESTRIFE
N Forb	Mentha arvensis	WILD MINT

N Shrub	Potentilla fruticosa	SHRUBBY CINQUEFOIL
N Forb	Pycnanthemum virginianum	COMMON MOUNTAIN MINT
N Forb	Solidago canadensis	CANADA GOLDENROD
N Forb	Solidago patula	SWAMP GOLDENROD
N Fern	Thelypteris palustris	MARSH FERN
N Forb	Typha latifolia	BROAD-LEAVED CATTAIL

Buckhorn Southeast – Old Field
These areas were not surveyed

Buckhorn Southeast – Emergent Marsh
This area was not surveyed.

Buckhorn Southeast – Relict Conifer Swamp
This area is located at the southern end of Buckhorn Lake Complex (for more information, see the plant survey list for Buckhorn Lake Complex)

Buckhorn Southeast – Southern Shrub-Carr
These areas were not surveyed.

Buckhorn Southeast – Prairie Fen
This area is located at the southern end of Buckhorn Lake Complex (for more information, see the plant survey list for Buckhorn Lake Complex).

Charter Township of Milford
Village of Milford

GENERAL MOTORS ROAD

Site Ecological Report

Directions to Site
The General Motors Road site is located one mile west of the Village of Milford just south of the Huron River and west of Hubbell Pond. Follow General Motors Road west from Milford approximately .9 mile to the entrance of the wastewater treatment plant Proceed approximately ¼ mile further to a two track road on the north side of General Motors Road which leads directly into the site

General Site Description
The General Motors Road site is located in the Huron watershed in western Oakland County in the northern portion of the Jackson Interlobate sub-subsection (Albert 1994) This region lies between the extensions of two glacial lobes that extended into southern Michigan approximately 16,000 years ago The landscape of this area is characterized by rolling topography with numerous outwash channels and wetland depressions formed by the receding glaciers The General Motors site occupies a small (less than 80 acres), relatively flat parcel of land along the Huron River, located between the rolling topography of the surrounding landscape.

The western half of the site is dominated by old fields with a prevalence of exotic plant species such as spotted knapweed (*Centaurea maculosa*), common St. John's-wort (*Hypericum perforatum*), and brome grass (*Bromus inermis*) Occasional, presumably planted trees and weedy shrubs are scattered throughout including red cedar (*Juniperus virginiana*), Scot's pine (*Pinus sylvestris*), red pine (*Pinus resinosa*), autumn olive (*Elaeagnus umbellata*) and tartarian honeysuckle (*Lonicera tatarica*) A small fringe of degraded riparian forest borders the river and is characterized by species such as red oak (*Quercus rubra*), sugar maple (*Acer saccharum*), and black locust (*Robinia pseudo-acacia*) with thickets of tartarian honeysuckle and gray dogwood (*Cornus foemina*) in the understory A relict conifer swamp comprises the slightly lower, eastern portion of the site. Tamarack (*Larix laricina*) is scattered throughout this area, occurring in dense patches primarily in the central portions of the complex. Typical understory species include poison sumac (*Toxicodendron vernix*), red maple (*Acer rubrum*), and gray and red dogwood *(Cornus foemina, C stolonifera*) Small areas of southern shrub-carr also occur here and are dominated by thick groves of dogwood. Cattail (*Typha angustifolia*) is common throughout the site and forms a monoculture in the most open areas indicating an altered hydrology. A small component of exotic purple loosestrife (*Lythrum salicaria*) and glossy buckthorn (*Rhamnus cathartica*) also typical of wetlands with altered hydrology, was observed A sparse scattering of native species such as shrubby cinquefoil (*Potentilla fruticosa*) and mountain mint (*Pycnanthemum virginiana*) occur at the southwestern edge of the wetland complex providing some evidence for the occurrence of prairie fen historically.

Summary of Ecological Significance
All portions of this site are highly degraded as noted by the dominance of exotic species in the upland and wetland portions, and altered hydrology in the wetlands. Despite this fact, the site represents a significant area of undeveloped land near the west boundary of Milford Village, potentially providing recreational value to nearby township and village residents Although not harboring rare species or unique ecological features, this site is host to numerous common native plant and animal species providing a small refuge in a highly fragmented landscape. There is also some potential for restoration activities that would increase the site's biodiversity and provide research and educational opportunities.

Evidence of Disturbance
The site has experienced considerable degradation, first from a homestead, and more recently through the installation of two gas lines, that bisect the property. These factors have facilitated the establishment of exotic plant species at the site. Further, the site's hydrology has been altered by extensive development of the surrounding landscape including the damming of the Huron River to create Hubbell Pond to the northeast, the construction of Camp Dearborn to the north, and the placement of a wastewater treatment plant to the east.

Threats
Having already experienced considerable degradation, the most significant threat to the site is its potential development Further degradation of the water quality of the Huron River could also lead to an increase in exotic plant species such as purple loosestrife along the riverbanks.

Ecological Boundary Explanation
The ***primary boundary*** represents the total area of public land bounded by the Huron River, the wastewater treatment plant, and General Motors Road

The ***secondary boundary*** represents the land base immediately surrounding the site that drains into the Huron River

Stewardship Considerations
Primary boundary: The site should remain in its undeveloped state, as a green space for nearby residents, and refuge for native plant and animal species Efforts should be made to prevent off-road vehicle use and illegal dumping at the site Study of the presettlement land cover maps (Comer & Albert 1998) indicate that the upland portions of the site were oak barrens in the early 1800's Widely scattered oaks and a prairie groundlayer characterize this natural community Although there are few native prairie species present today, the area retains the open structure of oak barrens Natural community restoration using controlled burning and seeding of native prairie species could be used to restore the oak barrens community Such a restoration attempt would be facilitated by the site's small size and existing fire breaks (river, wetlands, and road). To minimize soil erosion and runoff from surrounding land uses, the riparian buffer along the river should be maintained

Although reversal of hydrologic change is not practical at this site, minimizing the further spread of exotic species such as purple loosestrife and glossy buckthorn should be undertaken. These species are extremely aggressive and often lead to a loss of biodiversity for both plants and associated animals at the sites where they occur All purple loosestrife and glossy buckthorn plants should be removed from the site and the areas where they occurred should be monitored annually

Recommendation for Future Studies
Surveys should be conducted for the tamarack tree cricket (*Oecanthus laricis*) state listed as special concern, in the relict conifer swamp, and for American bittern (*Botaurus lentiginosus*) state listed as special concern, in the cattail marshes.

Portion of Site in Village of Milford
There is also a portion of the General Motors Road site located within Milford Village that was studied by MNFI scientists, however, no specific inventories were taken. This portion is isolated to the immediate riparian zone (land adjacent to a water body) along the Huron River. As delineated by MNFI, this zone is on the south side of the Huron River and is approximately 100 feet wide. Field biologists who surveyed this portion of the site indicated that it was highly degraded and did not recommend any additional ecological surveys. Biologists noted that this area was highly manipulated (altered by human activities such as mowing, tree and shrub removal, additions of docks, etc) dominated by exotic plants, and had less ecological value than the portion of the General Motors Road site located in Milford Township to the west.

Literature Cited:

Albert, D A. 1994. Regional Landscape Ecosystems of Michigan, Minnesota and Wisconsin: A Working Map and Classification. USDA Forest Service, North Central Forest Experiment Station, General Technical Report NC-178

Comer P. J. & D. A. Albert. 1998 Michigan's Presettlement Vegetation, as Interpreted from the General Land Office Surveys 1816-1856 Michigan Natural Features Inventory, Lansing, MI

Field Surveys

Key for terminology used in the following field surveys

N	(Native) – Species that are native to Michigan
A	(Adventive) – Species that have been introduced and are not native to Michigan.
Fern	A leafy plant with leaves undivided or divided several times into leaflets
Forb	A herbaceous plant with broad leaves, excluding the grasses and grasslike plants, a type of flowering herb
Grass	Plants, whose characteristics include stems that are jointed at nodes, are hollow and have sheathing leaves
Sedge	A tufted marsh plant, differing from the related grasses in having a one-seeded fruit and solid stems
Shrub	A woody perennial plant, typically lower than most trees, having multiple stems that branch from the base without a well-defined main stem
Tree	A woody plant characterized by one main trunk, bearing a more or less distinct and elevated crown of branches Typically, trees are larger than shrubs.
Vine	A plant whose stem requires support and which climbs by tendrils or twining or creeps along the ground
<T>	Species that is threatened
<SC>	Species that is of special concern

Animal Survey List
General Motors Road

(Based on MNFI's surveys or incidental observations in 1998)

Common Name	Scientific Name	Status In MI [1]	Habitat/Community Type [2]
Birds			
American robin	*Turdus migratorius*	Increasing	Open woodland/open-lands
Black-capped Chickadee	*Parus atricapillus*	Increasing	Woodland/earl seral
Downy Woodpecker	*Picoides pubescens*	Decreasing in SE MI	Forests
Great-blue heron	*Ardea herodias*	Increasing	Wetlands/Lake shores
House wren	*Troglodytes aedon*	Increasing in S MI	Scrub-shrub uplands
Mourning Dove	*Zenaida macroura*	Slight decrease to stable	Open-lands
Red-winged blackbird	*Agelaius phoeniceus*	Declining	Emergent wetlands
Rufous-sided towhee	*Pipilo erththropthalmus*	Increase in SE MI	Woodlands/forest edge
Song Sparrow	*Melospiza melodia*	Declining to stable	Upland Shrub/forest edge
Turkey Vulture	*Cathartes aura*	Increasing	Woodlands/farmlands
Yellow warbler	*Dendroica petechia*	Increasing	Open woods/early seral
Mammals			
Raccoon	*Procyon lotor*	Common	Wetlands
White-tailed Deer	*Odocoilieus virginianus*	Common	Forest edge/grassland

[1] Status for birds based on Michigan Breeding Bird Surveys (1966 - 1996)
[2] Habitat/community refers to habitat or natural community in which animal was observed

Plant Survey List
General Motors Road

(Based on MNFI's surveys or incidental observations in 1998)

General Motors Road – Relict Conifer Swamp/Southern Wet Meadow

This survey list includes southern wet meadow and relict conifer swamp species but were not mapped separately

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Acer rubrum	RED MAPLE
N Forb	Aster umbellatus	TALL FLAT-TOPPED WHITE ASTER
N Shrub	Betula pumila	BOG BIRCH
A Forb	BERTEROA INCANA	HOARY ALYSSUM
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Sedge	Carex lacustris	SEDGE
N Sedge	Carex lasiocarpa	SEDGE
N Sedge	Carex stricta	SEDGE
N Shrub	Cephalanthus occidentalis	BUTTONBUSH
N Forb	Circaea lutetiana	ENCHANTER'S-NIGHTSHADE
N Shrub	Cornus foemina	GRAY DOGWOOD
N Shrub	Cornus stolonifera	RED-OSIER DOGWOOD
N Sedge	Eleocharis erythropoda	SPIKE-RUSH
N Forb	Epilobium coloratum	CINNAMON WILLOW-HERB
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Forb	Galium boreale	NORTHERN BEDSTRAW
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Forb	Iris virginica	SOUTHERN BLUE FLAG
N Tree	Larix laricina	TAMARACK; LARCH
N Grass	Leersia oryzoides	CUT GRASS
A Forb	MYOSOTIS SCORPIOIDES	COMMON FORGET-ME-NOT
N Fern	Onoclea sensibilis	SENSITIVE FERN
N Forb	Phryma leptostachya	LOPSEED
N Tree	Populus grandidentata	BIG-TOOTHED or LARGE-TOOTHED ASPEN
N Shrub	Potentilla fruticosa	SHRUBBY CINQUEFOIL
N Forb	Pycnanthemum virginianum	COMMON MOUNTAIN MINT
N Shrub	Physocarpus opulifolius	NINEBARK
A Tree	RHAMNUS CATHARTICA	COMMON BUCKTHORN
N Forb	Solidago gigantea	LATE GOLDENROD
N Forb	Solidago patula	SWAMP GOLDENROD
N Shrub	Spiraea alba	MEADOWSWEET
N Forb	Symplocarpus foetidus	SKUNK-CABBAGE
N Fern	Thelypteris palustris	MARSH FERN
N Forb	Toxicodendron radicans negundo	POISON-IVY
N Forb	Toxicodendron vernix	POISON SUMAC
A Forb	TYPHA ANGUSTIFOLIA	NARROW-LEAVED CAT-TAIL
N Forb	Zizia aurea	GOLDEN ALEXANDERS
A Forb	LYTHRUM SALICARIA	PURPLE LOOSESTRIFE

General Motors Road – Southern Swamp

Native/Adventive Physiography	Scientific Name	Common Name
A Tree	ROBINIA PSEUDOACACIA	BLACK LOCUST
N Tree	Salix nigra	BLACK WILLOW
N Tree	Acer negundo	BOX ELDER
N Shrub	Cornus foemina	GRAY DOGWOOD
N Tree	Populus tremuloides	QUAKING ASPEN
N Tree	Quercus rubra	RED OAK
A Shrub	LONICERA TATARICA	SMOOTH TARTARIAN HONEYSUCKLE
N Tree	Acer saccharum	SUGAR MAPLE, HARD MAPLE

General Motors Road - Old Field

Native/Adventive Physiography	Scientific Name	Common Name
A Shrub	ELAEAGNUS UMBELLATA	AUTUMN-OLIVE
A Forb	MEDICAGO LUPULINA	BLACK MEDICK
A Forb	VERBASCUM THAPSUS	COMMON MULLEIN
N Forb	Lepidium virginicum	COMMON PEPPERGRASS
A Forb	HYPERICUM PERFORATUM	COMMON ST JOHN'S-WORT
N Tree	Populus deltoides	COTTONWOOD
A Grass	BROMUS INERMIS	HUNGARIAN BROME, SMOOTH BROME
A Grass	POA PRATENSIS	KENTUCKY BLUEGRASS
N Shrub	Physocarpus opulifolius	NINEBARK
A Grass	DACTYLIS GLOMERA	ORCHARD GRASS
N Tree	Populus tremuloides	QUAKING ASPEN
N Tree	Quercus rubra	RED OAK
N Tree	Pinus resinosa	RED PINE
N Tree	Juniperus virginiana	RED-CEDAR
A Tree	PINUS SYLVESTRIS	SCOTS or SCOTCH PINE
A Forb	RUMEX ACETOSELLA	SHEEP or RED SORREL
N Forb	Solidago speciosa	SHOWY GOLDENROD
A Shrub	LONICERA TATARICA	SMOOTH TARTARIAN HONEYSUCKLE
A Forb	CENTAUREA MACULOSA	SPOTTED KNAPWEED
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Forb	Monarda fistulosa	WILD BERGAMOT
A Forb	DAUCUS CAROTA	WILD CARROT, QUEEN-ANNE'S-LACE
N Forb	Achillea millefolium	YARROW
A Forb	IRIS PSEUDACORUS	YELLOW FLAG

General Motors Road – Southern Shrub-Carr
This area was not surveyed.

Generals Motors Road – Emergent Marsh
This area was not surveyed.

Township of Rose

BUCKHORN LAKE COMPLEX

Site Ecological Report

Directions to Site
The Buckhorn Lake Complex is located in the south central portion of Rose Township Take Milford Road north until it dead-ends at White Lake Road. Go west on White Lake Road and then north on Buckhorn Lake Road for approximately 2 miles Head east on Perry Road until it dead-ends

General Site Description
The Buckhorn Lake Complex is located in the Shiawassee watershed in northwestern Oakland County in the northern portion of the Jackson Interlobate sub-subsection (Albert 1994) This region lies between the extensions of two glacial lobes that extended into southern Michigan approximately 16,000 years ago. The landscape exhibits a complicated topography due to the complex glacial ice activity that occurred in the area It is characterized by rolling, broad, sandy outwash plains with numerous ice contact features creating a mosaic of steep ridges, scattered depressions, and outwash channels At the Buckhorn Lake site, topography varies considerably ranging from steep hills with scattered depressions to broad, relatively flat channels. The primary area of the site is approximately 740 acres in size and is characterized by scattered sandy knolls surrounded by low outwash channels Several plant communities are found at the Buckhorn Lake site including southern dry-mesic forest, old field, relict conifer swamp, southern shrub-carr, southern wet meadow, and prairie fen

A series of interconnected outwash channels are found throughout the Buckhorn Lake Complex. These outwash channels are low and wet, and dominated by two wetland communities, southern wet meadow and southern shrub-carr. Both southern shrub-carr and southern wet meadow are comprised of a diverse group of native plants, and are common wetland communities throughout the Midwest A relatively large prairie fen with scattered pockets of relict conifer swamp is found along the headwaters of Buckhorn Creek in an area that passes through several small lakes and ponds A smaller prairie fen and relict conifer swamp complex is found along a small pond to the east of Buckhorn Lake Road. Prairie fens only occur in the glaciated interlobate region of the Midwest where cold, calcareous water seeps from the ground. A prairie fen, which is considered by The Nature Conservancy to be very rare throughout its range, also supports a number of rare plants and animals

The uplands in the Buckhorn Lake Complex tend to be small knolls or hills scattered throughout the site, isolated by outwash channels Old fields and fragmented, young, southern dry-mesic forests dominate the uplands A moderately sized second growth southern dry-mesic forest is found in the northern portion of the site This forest type is dominated by species of oak and hickory and contains several shallow depressions or vernal pools These vernal pools typically fill with water in the spring providing prime breeding habitat for frogs, toads, and salamanders. Vernal pools also tend to incubate large quantities of invertebrates, which are an important food source for migratory songbirds In addition, native prairie plant species such as black-eyed susan, beebalm, and Indian grass were found in several of the old fields, suggesting potential for oak barrens or savanna restoration.

Summary of Ecological Significance
The occurrence of a large, intact, high quality prairie fen complex along the west side of the railroad tracks, known as the big valley fen, coupled with a smaller prairie fen complex on the west portion of the site, renders the Buckhorn Lake Complex a site of high ecological value. To the west lies Perch Lake, a site of similar size, and to the south lies the Buckhorn Lake extension, another wetland and forested complex.

The big valley prairie fen is considered high quality because of its overall native plant species diversity, the occurrence of several rare species, the high proportion of sedges and grasses, and its large size and intactness. The fen in its entirety extends along the Ohio Chesapeake rail line stretching from the southern boundary of Rose Township north to the southern portion of Buckhorn Lake The fen is approximately 150 acres in size and stretches for approximately 2 miles. As such, it is one of the largest known fen

complexes in southern Michigan The Michigan Natural Features Inventory (MNFI) surveyed the portion of the prairie fen that is owned by the Michigan Nature Association (MNA) and is currently permanently protected from development The complex contains several different types of prairie fen such as a domed fen, hanging fen, and marls pool, provides habitat for a broad array of native plant and animal species including several rare species A good, viable population of poweshiek skipper (*Oarisma poweshiek*), state threatened, was found in the north central portion of the big valley prairie fen, and several clumps of small white lady's slipper (*Cypripedium candidum*), state threatened, was also found in the fen along the old railroad bed In addition, the eastern massasauga rattlesnake (*Massasauga catenatus catenatus*), state special concern, was documented in 1994 in the old field east of the fen from previous surveys in the area A painted turtle was observed during the surveys, and evidence of turtle nesting was documented along the hillside adjacent to the shallow lake owned by MNA. Currently, there is little evidence of direct disturbance to the fen, and the occurrence of exotic plant species such as glossy buckthorn (*Rhamnus frangula*) and purple loosestrife (*Lythrum salicaria*) is minimal

Another prairie fen complex is located west of Buckhorn Lake Road and surrounds a small irregular shaped pond. Due to the irregular shape of the pond, the fen is divided into three distinct patches, all of which are located along the pond The south and west patches of prairie fen are also bordered by degraded uplands, while the northern patch is bordered to the north by relict conifer swamp Although the size of each patch of fen is relatively small, together they contain a high diversity of plant species. The state threatened mat muhly (*Muhlenbergia richardsonis*), characteristic of prairie fens was found in fairly high local abundance in the southern patch of fen along the west-facing slope of the hill. Several specimens of tamarack tree cricket (*Oecanthus laricis*), state special concern, were recently collected from a stand of tamarack trees in the west patch of the fen. In addition, a Blanding's turtle (*Emydoidea blandingii*), state special concern, was observed trying to cross Buckhorn Lake Road near a southern shrub-carr wetland south of the prairie fen.

In addition to the rare species found during the 1999 field season, there is potential for several other rare plants and animals associated with prairie fen and other wetland communities to be discovered in the future. Potential rare plants include. prairie dropseed (*sporobolus heterolepis*), state threatened, edible valerian (*Valeriana ciliatus*), state listed as threatened, and Richardson's sedge (*Carex richardsonii*), state special concern Both prairie fen sites also contain habitat that could support populations of the blazing star borer moth (*Papaipema beeriana*), state special concern, the swamp metalmark butterfly (*Calephelis muticum*), state special concern, and the angular spittlebug (*Lepyronia angulifera*), state special concern The patches of relict conifer swamp at the big valley fen complex contain potential habitat for the tamarack tree cricket In addition, the southern shrub-carr, scattered along the southern wet meadows and prairie fens throughout the Buckhorn Lake Complex, could support populations of the copperbelly water snake (*Nerodia erythrogaster neglect),* state endangered and federally threatened The emergent marsh adjacent to the lake owned by MNA contains potential habitat for American bittern (*Botaurus lentiginosus*), state special concern.

The uplands in Buckhorn Lake Complex are relatively small and isolated due to the topography of the site, and largely degraded due to past land uses The majority of uplands surveyed were either old field or early successional southern dry-mesic forest, although a few patches of second growth forest were documented. There also appear to be potential areas of high quality southern dry-mesic forest that were not surveyed due to time constraints or lack of permission. A relatively large southern dry-mesic forest occurs in the central portion of the Buckhorn Lake Complex just north of where Buckhorn Lake Road dead-ends. The 115 acre block of second growth forest is dominated by white, black, and red oak (*Quercus alba, Q velutina, Q rubra*), pignut hickory (*Carya glabra*), black cherry *(Prunus serotina)*, and red maple (*Acer rubra*). A few large wide-spreading white oaks were found scattered throughout the forest. Downy arrow wood (*Viburnum refinesquianum*), American hazelnut (*Corylus americana*), and witch-hazel (*Hammamelis virginiana)* dominate the understory and the herbaceous layer is varied, but sparse, and includes species such as white lettuce (*Prenanthes alba*), may apple (*Podophyllum peltatum*), and early meadow-rue (*Thalictrum dioicum*). Exotic species, such as garlic mustard *(Alliaria petiolata)*, are locally abundant in the ground cover. In addition, several vernal pools are scattered throughout the eastern portion of the forest. These vernal pools are critical habitat to many amphibians such as the spotted salamander *(Ambystoma maculatum*), eastern tiger salamander (*Ambystoma tigrinum tigrinum*), and wood frog (*Rana sylvatica*). These species use vernal pools for mating, egg laying, and feeding during the aquatic

phase of their life cycle. The vernal pools also provide an important food source for resident and migrant neotropical birds, which feed on newly emerged insects during the spring. Although no rare bird species were documented during surveys, this forest tract is large enough to contain potential habitat for hooded warbler (*Wilsonia citrina*), state special concern, and Cooper's hawk (*Accipiter Cooperii*), also state special concern

A population of goldenseal (*Hydrastris canadensis*), state threatened, was found in a small southern dry-mesic to southern mesic forest located south of the forest tract described above Several hundred stems in patches approximately 10 to 20 meters in diameter were documented The forest, located between a southern wet meadow to the west and an old field with motor cross trails to the east, was characterized as unremarkable, and consists of a blend between southern dry-mesic and southern mesic forest plant species Tree species found in the canopy include· swamp white, white, black, and red oak *(Quercus bicolor, Q alba, Q velutina, Q rubra*), American basswood *(Tilia americana),* and shagbark and bitternut hickory *(Carya glabra, C cordiformis)*

Several old fields are found scattered throughout the uplands, however, they are dominated by exotic plant species such as brome grass (*Bromus inermis*), orchard grass (*Dactylis glomerata*), and spotted knapweed (*Centaurea maculosa*) A few of the old fields along the railroad tracks, however, also contain prairie plant species such as black-eyed susan *(Rudbeckia hirta)*, Indian grass *(Sorghastrum nutans)*, little bluestem grass *(Andropogon scoparius)*, and round-headed bush-clover *(Lespedeza capitata)*. Since several of these old fields border prairie fen and wet meadow, they may provide summer habitat for the eastern massasauga rattlesnake, and nesting habitat for rare turtles such as Blanding's turtle, spotted turtle, and box turtle.

Evidence of Disturbance

The two prairie fens and associated relict conifer swamp are relatively intact with very few exotic species. The old fields that are found throughout the uplands are abandoned agricultural fields, probably historically used for grazing or haying. Currently, they are dominated by exotic species such as brome grass *(Bromus inermis)*, orchard grass *(Dactylis glomerata)*, and spotted knapweed *(Centaurea maculosa)*. All of the oak-hickory forest stands were probably logged near the turn of the century, and many of the present young woodlots were agricultural lands as recently as 20 to 30 years ago. Very little oak regeneration is found in the understory of these forests due to years of fire suppression. Several wide trails and old stone fencerows were found in the western portion of the forest north of Buckhorn Lake Road A gas pipeline corridor cuts through the northern portion of the site, and a railroad borders the entire eastern edge of the big valley prairie fen Residential development fragments the fen at Munger Road and houses border the western edge of the fen south of Munger Road. ORV trails were found in the prairie fen west of the Buckhorn Lake Road pond, and residential development borders the eastern portion of the pond

Threats

A few exotic species such as purple loosestrife (*Lythrum salicaria*), glossy buckthorn (*Rhamnus cathartica*), and narrow-leafed cattail (*Typha angustifolia*) are found in small scattered pockets in the big valley prairie fen, and in greater abundance at the Buckhorn Lake Road prairie fen Autumn olive (*Elaeagnus umbellata*), another exotic, is found in the old fields and on the edge of some of the southern dry-mesic forest tracts This exotic shrub is likely to spread further into the forest via seed dispersal by birds, deer, and small mammals Continuation of fire suppression in the southern dry-mesic forest will eventually cause a change in the species composition of the canopy. As light demanding oaks die, they will be replaced by shade tolerant red maples This change is already taking place in some of the forest's understory. If ORV use increases in and around the prairie fen complexes, it will lead to soil erosion, creation of gullies in and along steep slopes, exposure of tree roots in the uplands, direct destruction of flora and fauna, and disruption of hydrology in the prairie fens

The disruption of the natural hydrology is the biggest threat to both prairie fen systems. Any factors affecting aquifer recharge, hydrologic head, and water chemistry will impact the prairie fen Detrimental effects on hydrology can occur through water consumption from groundwater recharge areas due to shallow water wells, or water diversion due to drain tiles, ditches, impervious surfaces such as parking lots, roads, roofs, and in urban areas with storm water sewers. Draw down of the water table within the fen can occur from ditches placed perpendicular to the flow of water or ponds created at the edge of the fen

Another major threat is the spread of exotic species. Glossy buckthorn *(Rhamnus frangula)* was found in small clumps throughout the big valley prairie fen and along the edges of the Buckhorn Lake Road fen. Glossy buckthorn could spread relatively quickly forming dense impenetrable thickets. Purple loosestrife

(Lythrum Salicaria) was found in the fen south of Munger Road although it was contained to the banks of the stream.

Other threats to the prairie fen include water runoff, overuse of fertilizers and herbicides from nearby areas, trampling (which directly kills plants and can change the pattern of water flow), leaky septic systems (which leak nutrients and contaminants into the groundwater), fire suppression, and habitat fragmentation which can alter hydrology, isolate plant and animal populations, and increase nest predation. Several areas of both fen complexes are becoming closed in due to shrub and tree invasion, particularly the Buckhorn Lake Road fen and the portion of the big valley fen south of Munger Road Historically, periodic fires spread from adjacent uplands into the fen and killed many of the shrubs and trees that had slowly invaded from adjacent communities

Ecological Boundary Explanation

The ***primary boundary*** represents the extent of the intact wetland complex and relatively intact oak-hickory forest. The Ohio Chesapeake rail line was designated as the eastern boundary since it's presence effectively isolates the site from any other portions of wetland that may have been part of the original wetland complex.

The ***secondary boundary*** represents the minimal area needed to maintain the unique natural features within the primary boundary. Since prairie fens depend on consistent ground water flow, several criteria that could affect ground water flow were used to determine this boundary such as topography, land use, and major roads. Due to the high correlation between roads and high elevations, roads were primarily used to determine the boundary lines.

Stewardship Considerations

Primary boundary: Because of the significance of this site and the relative fragility of the prairie fen, this site should be afforded maximum protection from disturbance No grazing, timber cutting, ORV traffic, mountain biking, or excessive foot traffic should be allowed within the prairie fen complexes. According to MNA representatives, people are frequently seen riding dirt bikes and ORV's through the prairie fen The ORV traffic probably originates from a dirt bike course located in an old field just to the east of the big valley fen. In addition, the railroad line which runs along the entire eastern edge of the big valley prairie fen, needs to develop an alternative to herbicide spraying to control the vegetative growth along the tracks Some alternatives to herbicide include brush removal by hand, which is more labor intensive, and prescribed burning. Additional development within the primary site should be avoided, minimized, or designed to have minimal impact Populations of exotic plant species within the prairie fen complex, such as purple loosestrife and glossy buckthorn should be monitored and controlled. Fragmentation of both the wetlands and uplands by utility rights-of-way, trails, and roads should be avoided to minimize impacts of exotic species and predation of bird and turtle nests. It may be advisable to conduct prescribed burns in the prairie fen to reduce shrub and tree growth and enhance the establishment of prairie plants. Prescribed burns however should be planned carefully to reduce any negative impacts on the rare insect and herp species

The patches of southern dry-mesic forests will require prescribed burns and tree thinning in order to stimulate oak regeneration in the understory as well as herbaceous plants such as coreopsis (*Coreopsis tripteris*), sunflower (*Helianthus spp*), and pensylvania sedge (*Carex pensylvanica*). The presettlement vegetation of the uplands, as determined by the General Land Office (GLO) records, indicates that much of the uplands that are now old field, and early successional and closed canopy southern dry-mesic forest, were once oak barrens in the early 1800's If management for oak barrens is desired, a more intense fire and tree thinning management plan would have to be developed. Since the old fields already contain some prairie species and only a few trees, exotic plants should be removed and the fields restored to oak barrens. In particular, restoration should focus on the largest old field in the primary boundary located north of Perry Road and to the east of the big valley fen This field is overrun with exotic plants and dissected by a dirt bike course Although this is a degraded old field, this parcel should be considered for acquisition due to its large size, proximity to the big valley prairie fen, and for control ORV use in the area.

In addition, this is the first large intact site that MNFI has surveyed that is entirely in private ownership. Efforts should be made to contact landowners within the primary boundary, primarily those within and along the prairie fen complex, and inform them of the unique natural features in the area, and how they can help conserve those features.

Secondary boundary: The primary concern within the secondary boundary is the protection of the flow and quality of ground water that supports both prairie fen complexes. Future development within this area should

be designed to maximize contiguous natural open space, and provide adequate buffers to the natural communities within the primary boundary Any development that occurs should be required to address surface water runoff, percolation, and ground water consumption Stewardship recommendations include minimizing the size of lawns, landscaping with native plants, particularly prairie species, keeping precipitation on-site (especially on ridge tops), requiring wells to be drilled to a depth below the aquifer that supports the fen, and maintaining adequate septic systems In addition, parcels immediately adjacent to the primary site should be encouraged to manage their lands in a way that enhances or provides an adequate buffer to the adjacent natural communities in the primary boundary Three areas that should require special attention are 1) the block of old field, agricultural land, and early successional forest to the west of the Buckhorn Lake Road fen, 2) the peninsula of residential land and old fields along Buckhorn Lake Road that almost splits the southern half of the site into two separate areas, and 3) the residential area south of Munger Road immediately adjacent to the prairie fen. Consideration should also be given to provide a natural corridor between Buckhorn Lake Complex and Perch Lake Complex to the west

In addition, several landowners own parcels that are adjacent to the prairie fen complexes Excessive activity could have a significant impact on the fen and associated flora and fauna Efforts should be to contact landowners adjacent to the prairie fen complex, and inform them of the unique natural features in the area, and how they can help conserve those features

Recommendation for Future Studies

Due to the presence of two prairie fen complexes, a detailed hydrologic study, that includes groundwater and surface water flows, should be undertaken to collect baseline data on the hydrologic regime and water quality of the site This information can be used to monitor any hydrologic changes over time, which may impact the prairie fen complexes In addition, the population size, distribution, and vigor of state listed plants and insects should be monitored over time, and additional surveys for amphibians, reptiles, insects, and several rare plants and bird species (mentioned in the summary of ecological significance section) are also recommended.

Literature Cited:

Albert, D.A 1994 Regional Landscape Ecosystems of Michigan, Minnesota and Wisconsin: A Working Map and Classification. USDA Forest Service, North Central Forest Experiment Station, General Technical Report NC-178.

Field Surveys

Key for terminology used in the following field surveys·

N	(Native) – Species that are native to Michigan
A	(Adventive) – Species that have been introduced and are not native to Michigan
Fern	A leafy plant with leaves undivided or divided several times into leaflets
Forb	A herbaceous plant with broad leaves, excluding the grasses and grasslike plants, a type of flowering herb
Grass	Plants, whose characteristics include stems that are jointed at nodes, are hollow and have sheathing leaves.
Sedge	A tufted marsh plant, differing from the related grasses in having a one-seeded fruit and solid stems
Shrub	A woody perennial plant, typically lower than most trees, having multiple stems that branch from the base without a well-defined main stem
Tree	A woody plant characterized by one main trunk, bearing a more or less distinct and elevated crown of branches Typically, trees are larger than shrubs.
Vine	A plant whose stem requires support and which climbs by tendrils or twining or creeps along the ground.
<T>	Species that is threatened
<SC>	Species that is of special concern

Animal Survey List
Buckhorn Lake Complex

(Based on MNFI's surveys or incidental observations in 1999)

Common Name	Scientific Name	Status In MI [1]	Habitat/Community Type [2]
Birds			
American crow	*Corvus brachyrhynchos*	Increasing	Forest edge
American goldfinch	*Carduelis tristis*	Declining	Old fields/woodlands
American robin	*Turdus migratorius*	Increasing	Woodland/open-lands
Black-capped chickadee	*Parus atricapillus*	Increasing	Mesic forest/forest edge
Blue jay	*Cyanocitta cristata*	Stable	Forest edge/woodlands
Brown-headed cowbird	*Molothrus ater*	Decreasing	Forest edge/open-lands
Chestnut-sided warbler	*Dendroica pennsylvanica*	Increasing	Shrubland/forest edge
Chipping sparrow	*Spizella passerina*	Increasing	Old fields/woods edge
Common yellowthroat	*Geothlypis trichas*	Stable	Shrub wetlands
Downy woodpecker	*Picoides pubescens*	Decreasing in SE MI	Mesic forest
Eastern phoebe	*Sayornis phoebe*	Increasing in southern MI	Forest edge/openlands
Eastern wood pewee	*Contopus virens*	Stable to increasing	Mesic forest
Field sparrow	*Spizella pusilla*	Declining	Old fields/shrublands
Gray catbird	*Dumetella carolinensis*	Increasing in S. MI	Shrubland/woodlands
Great-blue heron	*Ardea herodias*	Increasing	Wetland/lake shores
Indigo bunting	*Passerina cyanea*	Stable to increasing	Forest edge
Mallard duck	*Anas platyrhynchos*	Increasing in MI (decrease in SE MI)	Wetlands
Mourning dove	*Zenadia macroura*	Slight decrease	Open-lands
Northern cardinal	*Cardinalis cardinalis*	Increasing	Woodland/shrublands
Northern flicker	*Colaptes auratus*	Increasing	Woodlands
Red-bellied woodpecker	*Melanerpes carolinus*	Increasing in southern MI	Mesic forest/forest edge
Red-eyed vireo	*Vireo olivaceus*	Increasing	Mesic forest
Red-tailed hawk	*Buteo jamaicensis*	Local decline in SE MI	Woodlands/open-lands
Red-winged blackbird	*Agelaius phoeniceus*	Declining	Emergent wetlands
Rose-breasted grosbeak	*Pheucticus ludovicianus*	Decrease in SE MI	Second growth forest
Rufous-sided towhee	*Pipilo erythrophthalmus*	Increasing in SE MI and an overall decrease in MI	Forest edge
Scarlet tanager	*Piranga olivacea*	Increasing	Mesic forest
Song sparrow	*Melospiza melodia*	Declining to stable	Scrub-shrub
Tufted titmouse	*Parus bicolor*	Increasing	Woodlands/shrublands
Veery	*Catharus fuscescens*	Increasing in southern MI	Mesic forest
Yellow warbler	*Dendroica petechia*	Increasing	shrublands (wet or dry)
White-breasted nuthatch	*Sitta carolinensis*	Increasing	Woodlands
Wild turkey	*Meleagris gallopavo*	Increasing	Mixed woodlands
Willow flycatcher	*Empidonax traillii*	Decreasing	Shrublands
Wood duck	*Aix sponsa*	Increasing	Wooded wetlands
Yellow-throated vireo	*Vireo flavifrons*	Rare in MI	Mesic forest
Amphibians			
Green frog	*Rana clamitans melanota*	Common	Ponds/wetlands
Blanding's turtle	*Emydoidea blandingii*	Uncommon	Ponds/wetlands
Mammals			
Eastern chipmunk	*Tamias striatus*	Common	Woodlands
Eastern cottontail	*Sylvilagus floridanus*	Common	Forest edge/shrublands

Fox squirrel	*Sciurus niger*	Common	Woodlands
Grey squirrel	*Sciurus carolinensis*	Common	Woodlands
Raccoon	*Procyon lotor*	Common	Wetland/woodlands
White-tailed deer	*Odocoileus virginianus*	Common	Forest edge/open-land

[1] Status for birds based on Michigan Breeding Bird Surveys (1966 - 1996)
[2] Habitat/community refers to habitat or natural community in which animal was observed

Plant Survey List
Buckhorn Lake Complex

(Based on MNFI's surveys or incidental observations in 1999)

Buckhorn Lake Complex – Prairie Fen

Native/Adventive Physiography	Scientific Name	Common Name
N Grass	Agropyron trachycaulum	WHEATGRASS or SLENDER WHEAT GRASS
N Grass	Andropogon gerardii	BIG BLUESTEM GRASS, TURKEYFOOT
N Grass	Andropogon scoparius	LITTLE BLUESTEM GRASS
N Forb	Apocynum androsaemifolium	SPREADING DOGBANE
N Forb	Asclepias incarnata	SWAMP MILKWEED
N Forb	Aster laevis	SMOOTH ASTER
N Forb	Aster puniceus	SWAMP ASTER
N Forb	Aster umbellatus	TALL FLAT-TOP WHITE ASTER
N Shrub	Betula pumila	BOG BIRCH
N Grass	Bromus ciliatus	FRINGED BROME
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Forb	Campanula aparinoides	MARSH BELLFLOWER
N Forb	Cirsium muticum	SWAMP-THISTLE
N Sedge	Cladium mariscoides	TWIG-RUSH
N Shrub	Cornus amomum	SILKY or PALE DOGWOOD
N Shrub	Cornus foemina	GRAY DOGWOOD
N Shrub	Cornus stolonifera	RED-OSIER DOGWOOD
N Sedge	Carex diandra	SEDGE
N Sedge	Carex lacustris	SEDGE
N Sedge	Carex prairea	SEDGE
N Sedge	Carex sterilis	SEDGE
N Sedge	Carex stricta	SEDGE
N Sedge	Carex tetanica	SEDGE
N Forb	Drosera rotundifolia	ROUND-LEAVED SUNDEW
N Sedge	Eleocharis elliptica	GOLDEN-SEEDED SPIKE RUSH
N Sedge	Eleocharis rostellata	SPIKE-RUSH
N Forb	Euphorbia maculata	NODDING SPURGE
N Forb	Eupatorium perfoliatum	COMMON BONESET
N Forb	Galium tinctorium	STIFF BEDSTRAW
N Forb	Galium triflorum	FRAGRANT BEDSTRAW
N Forb	Geum rivale	PURPLE AVENS
N Grass	Glyceria striata	FOWL MANNA GRASS

N Forb	Hypoxis hirsuta	STAR-GRASS
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Forb	Iris virginica	SOUTHERN BLUE FLAG
N Tree	Larix laricina	TAMARACK, LARCH
N Forb	Liatris spicata	MARSH BLAZING STAR
N Forb	Lobelia kalmii	BOG LOBELIA
N Forb	Lycopus americanus	COMMON WATER HOREHOUND
N Forb	Lycopus uniflorus	NORTHERN BUGLE WEED
N Forb	Lysimachia quadriflora	WHORLED LOOSESTRIFE
A Forb	LYTHRUM SALICARIA	PURPLE LOOSESTRIFE
N Forb	Mentha arvensis	WILD MINT
N Grass	Muhlenbergia glomerata	MARSH WILD-TIMOTHY
N Fern	Onoclea sensibilis	SENSITIVE FERN
N Forb	Pedicularis lanceolata	SWAMP-BETONY; LOUSEWORT
N Grass	Phalaris arundinacea	REED CANARY GRASS
N Grass	Phragmites australis	REED, GIANT BULRUSH
N Tree	Populus tremuloides	QUAKING ASPEN
N Shrub	Potentilla fruticosa	SHRUBBY CINQUEFOIL
N Forb	Pycnanthemum virginianum	COMMON MOUNTAIN MINT
N Shrub	Rhamnus alnifolia	ALDER-LEAVED BUCKTHORN
A Shrub	RHAMNUS FRANGULA	GLOSSY BUCKTHORN
N Shrub	Rosa palustris	SWAMP ROSE
N Forb	Rubus pubescens	DWARF RASPBERRY
N Forb	Rudbeckia fulgida <SC>	BLACK-EYED SUSAN
N Forb	Rudbeckia hirta	BLACK-EYED SUSAN
N Forb	Rumex orbiculatus	GREAT WATER DOCK
N Shrub	Salix bebbiana	BEBB'S or BEAKED WILLOW
N Shrub	Salix candida	SAGE or HOARY WILLOW
N Shrub	Salix discolor	PUSSY WILLOW
N Shrub	Salix lucida	SHINING WILLOW
N Forb	Sarracenia purpurea	PITCHER-PLANT
N Sedge	Scirpus acutus	HARDSTEM BULRUSH
N Sedge	Scirpus americanus	THREE-SQUARE; BULRUSH
N Forb	Senecio aureus	GOLDEN RAGWORT
N Forb	Senecio pauperculus	BALSAM RAGWORT
N Forb	Solidago altissima	TALL GOLDENROD
N Forb	Solidago canadensis	CANADA GOLDENROD
N Forb	Solidago gigantea	LATE GOLDENROD
N Forb	Solidago ohioensis	OHIO GOLDENROD
N Forb	Solidago patula	SWAMP GOLDENROD
N Forb	Solidago riddellii	RIDDELL'S GOLDENROD
N Forb	Solidago uliginosa	BOG GOLDENROD
N Shrub	Spiraea alba	MEADOWSWEET
N Forb	Thalictrum dasycarpum	PURPLE MEADOW-RUE
N Fern	Thelypteris palustris	MARSH FERN
N Tree	Tilia americana	LINDEN; BASSWOOD
N Shrub	Toxicodendron vernix	POISON SUMAC
A Forb	TYPHA ANGUSTIFOLIA	NARROW-LEAVED CAT-TAIL
N Forb	Typha latifolia	BROAD-LEAVED CAT-TAIL

N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Forb	Valeriana uliginosa	BOG VALERIAN
N Forb	Viola nephrophylla	NORTHERN BOG VIOLET
N Forb	Zigadenus glaucus	WHITE CAMAS
N Forb	Zizia aurea	GOLDEN ALEXANDERS

Buckhorn Lake Complex – Old Field

Native/Adventive Physiography.	Scientific Name	Common Name
A Grass	BROMUS INERMIS	HUNGARIAN BROME, SMOOTH BROME
A Forb	CENTAUREA MACULOSA	SPOTTED KNAPWEED
A Grass	DACTYLIS GLOMERATA	ORCHARD GRASS
A Forb	DAUCUS CAROTA	WILD CARROT; QUEEN-ANNE'S-LACE
A Shrub	ELAEAGNUS UMBELLATA	AUTUMN-OLIVE
A Tree	MALUS PUMILA	APPLE
A Forb	LYTHRUM SALICARIA	PURPLE LOOSESTRIFE
A Forb	MELILOTUS ALBA	WHITE SWEET-CLOVER
N Forb	Oxalis fontana	YELLOW WOOD-SORREL
A Grass	PHLEUM PRATENSE	TIMOTHY
A Grass	POA COMPRESSA	CANADA BLUEGRASS
N Tree	Populus tremuloides	QUAKING ASPEN
N Tree	Prunus serotina	WILD BLACK CHERRY

Buckhorn Lake Complex - Old Field (prairie remnants)
This plant survey list was generated from a series of small prairie remnants along the railroad tracks These areas are mapped as Old Fields

Native/Adventive Physiography	Scientific Name	Common Name
N Forb	Achillea millefolium	YARROW
N Forb	Aletris farinosa	COLIC ROOT, STARGRASS
A Forb	ALLIARIA PETIOLATA	GARLIC MUSTARD
N Grass	Andropogon scoparius	LITTLE BLUESTEM GRASS
N Forb	Anemone canadensis	CANADA ANEMONE
N Forb	Asclepias syriaca	COMMON MILKWEED
A Forb	CENTAUREA MACULOSA	SPOTTED KNAPWEED
N Forb	Comandra umbellata	BASTARD-TOADFLAX
N Shrub	Corylus americana	HAZELNUT
N Shrub	Cornus foemina	GRAY DOGWOOD
N Sedge	Carex pensylvanica	SEDGE
N Fern	Equisetum arvense	COMMON or FIELD HORSETAIL
N Forb	Erigeron pulchellus	ROBIN'S PLANTAIN
N Forb	Fragaria virginiana	WILD STRAWBERRY
N Forb	Lespedeza capitata	ROUND-HEADED BUSH-CLOVER
N Forb	Monarda fistulosa	WILD BERGAMOT
N Fern	Onoclea sensibilis	SENSITIVE FERN
N Fern	Osmunda cinnamomea	CINNAMON FERN

N Fern	Osmunda regalis	ROYAL FERN
N Forb	Phlox divaricata	WOODLAND PHLOX
N Tree	Populus tremuloides	QUAKING ASPEN
N Shrub	Potentilla fruticosa	SHRUBBY CINQUEFOIL
N Forb	Potentilla simplex	OLD-FIELD or COMMON CINQUEFOIL
N Tree	Prunus serotina	WILD BLACK CHERRY
N Shrub	Rubus flagellaris	NORTHERN DEWBERRY
N Forb	Rudbeckia hirta	BLACK-EYED SUSAN
N Forb	Solidago nemoralis	OLD-FIELD GOLDENROD
N Grass	Sorghastrum nutans	INDIAN GRASS
A Forb	TARAXACUM OFFICINALE	COMMON DANDELION

Buckhorn Lake Complex – Southern Wet Meadow

Native/Adventive Physiography	Scientific Name	Common Name
N Forb	Aster puniceus	SWAMP ASTER
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Forb	Cardamine pratensis	CUCKOO-FLOWER
N Forb	Cicuta maculata	WATER HEMLOCK
N Shrub	Cornus stolonifera	RED-OSIER DOGWOOD
N Sedge	Carex lacustris	SEDGE
N Sedge	Carex prairea	SEDGE
N Sedge	Carex stricta	SEDGE
N Forb	Galium triflorum	FRAGRANT BEDSTRAW
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Fern	Onoclea sensibilis	SENSITIVE FERN
N Forb	Solidago patula	SWAMP GOLDENROD

Buckhorn Lake Complex – Southern Shrub-Carr
This area was not surveyed

Buckhorn Lake Complex – Emergent Marsh
This area was not surveyed

Buckhorn Lake Complex – Southern Dry-Mesic Forest
This area was not surveyed

Buckhorn Lake Complex - Relict Conifer Swamp
This area was not surveyed.

PERCH LAKE COMPLEX

Site Ecological Report

Directions to Site

The Perch Lake Complex is located in the southwestern portion of Rose Township between Hickory Ridge Road and Fish Lake Road From M-59, head north on Hickory Ridge Road to Clyde Road Continue approximately 1 5 miles on Hickory Ridge Road to the YMCA property Enter the site through the YMCA camp.

General Site Description

The Perch Lake Complex is located in the Shiawassee watershed in northwestern Oakland County in the northern portion of the Jackson Interlobate sub-subsection (Albert 1994) This region lies between the extensions of two glacial lobes that extended into southern Michigan approximately 16,000 years ago The landscape exhibits a complicated topography due to the complex glacial ice activity that occurred in the area. It is characterized by rolling, broad, sandy outwash plains with numerous ice contact features creating a mosaic of steep ridges, scattered depressions, and outwash channels The Perch Lake Complex site consists of gently rolling, sandy moraines surrounding a broad outwash plain. The uplands support southern dry-mesic forests, which surround an outwash plain harboring wetland forests and two glacial lakes Natural communities occurring at the Perch Lake Complex site include open bog, relict conifer swamp, mixed hardwood-conifer swamp, and southern dry-mesic forest.

The wetland complex located in the center of the Perch Lake Complex is the most ecologically significant area of the site A mixed conifer-hardwood forest dominates this area. In the center of the outwash plain sits a small lake bordered by a narrow band of open bog. The floating bog mat is dominated by sedges (*Carex* spp) and harbors a number of species that are relatively uncommon in southern Michigan. A larger open bog appears to surround Perch Lake on the north side of the site, however, biologists were unable to confirm this. North of the small lake, the hardwood – conifer swamp grades into a black spruce dominated relict conifer swamp This type of wetland forest is rare in southern Michigan. Where the land rises, the sandy, rolling uplands support a southern dry-mesic forest dominated by oak and hickory species Several active and abandoned agricultural fields border the southern dry-mesic forests.

Summary of Ecological Significance

The Perch Lake Complex is one of the largest forested complexes in the western portion of the project area Overall, the Perch Lake Complex consists of approximately 350 acres of contiguous wetlands, lakes, and upland forest One of the wetlands found at the site is a black spruce dominated relict conifer swamp This community is considered rare in southern Michigan In addition, a small open bog was found along the unnamed lake in the middle of the site, and it appears that there is an open bog surrounding Perch Lake approximately 15 acres in size. This portion of the site was not surveyed, however, due to lack of permission from the landowners. Bogs are a unique natural community that is considered uncommon, particularly in southern Michigan. 32 species of birds were documented at the site during breeding season including an osprey sited flying above the middle lake The presence of the three lakes combined with the relatively large size of the surrounding wetland forests also suggests that the Perch Lake Complex is an important stopover point for neo-tropical migrants

The hardwood-conifer swamp is the most dominant natural community in the outwash plain covering approximately 80 acres Here, occasional tamaracks occur with red maple (*Acer rubrum*), American elm (Ulmus americana), tulip tree (*Liriodendron tulipifera*), and swamp white oak (Quercus americana) in the canopy The shrub layer is dominated by highbush blueberry (*Vaccinium corymbosum*), spicebush (*Lindera benzoin*), and Michigan Holly (*Ilex verticilllata*) Currently, this community is undergoing significant change. In the mid-1800's, it is likely that this swamp was dominated by black spruce (*Picea mariana*) and tamarack (*Larix laricina*). Since then fire suppression in the surrounding uplands has allowed the thin barked red maple to become abundant throughout the uplands. Once established in the uplands, it was able to spread to the wetlands where it now thrives Today, dead standing and downed tamaracks are found throughout the hardwood-conifer swamp probably the result of having been shaded out by the taller, broad crowned red maples. These changes can also be seen in the shrub layer where dense patches of high-bush blueberry, winterberry, and spicebush occur along side areas free of shrubs. As the hardwoods come to dominate the swamp, the dense tree canopy prohibits adequate amounts of sunlight from

reaching the tamaracks and understory shrubs. This shading effect leads to a decline of conifers (tamarack and black spruce) and shrubs that are typical of conifer and hardwood-conifer swamps. In addition, exotic species such as glossy buckhorn (*Rhamnus frangula*) and Japanese barberry (*Berberis thunbergii*) are found scattered throughout the swamp

Several other wetland communities are scattered throughout the hardwood-conifer swamp matrix. Two of these communities are quite unique and considered uncommon or rare in southern Michigan. The first is a narrow strip of open bog located along the shore of the small, unnamed lake at the YMCA camp This bog is dominated by a floating mat of sphagnum moss which provides habitat for a number of plant species that are not commonly found this far south including large cranberry (*Vaccinium macrocarpon*), pitcher-plant (*Sarracenia purpurea*), and round-leafed sundew (*Drosera rotundifolia*). Its presence is evidence that natural ecological processes are intact along the small lake's edge Over time, the floating mat that supports the open bog will gradually expand lakeward. In addition, it is suspected that an open bog, approximately 10-15 acres in size, surrounds a large portion of Perch Lake This area of the site was not surveyed, however, due to lack of permission from the landowners, and should be a high priority for future surveys.

The second unique natural community is a black spruce dominated relict conifer swamp, approximately 15-20 acres in size, and is located in between the two lakes This community is considered uncommon in southern Michigan, and is known only in a few locations in Oakland County. Where it does occur it tends to form a dense thicket Common species in the canopy include black spruce (*Picea mariana*), tamarack (*Larix laricina*), and paper birch (*Betula papyrifera*) Like other southern Michigan black spruce swamps, the one at Perch Lake has a dense shrub layer dominated by high-bush blueberry, and a moss covered ground layer with abundant spinulose wood fern (*Dryopteris carthusiana*), pink lady's slipper (*Cypripedium acaule)*, and canada mayflower (*Maianthemum canadensis*) The size of the relict conifer swamp appears to be decreasing as many of the black spruce along the margins of the community are in decline Along the edge of the dense conifer swamp stand numerous dead and senescing black spruce. Red maple is the dominant tree in these areas, and its broad canopy appears to be preventing adequate amounts of sunlight from reaching the black spruce.

Surrounding the wet, forest dominated outwash plain is predominantly second and third growth southern dry-mesic forest Southern dry-mesic forests are now common in northwest Oakland County occurring today where once stood oak barrens, a community of widely scattered, fire tolerant trees and a ground flora rich in prairie species. Typical tree species in the canopy include red, black, and white oak (*Quercus rubra, Q velutina, and Q alba*), and pignut and shagbark hickory (*Carya glabra, and C ovata*). Species in the ground layer include spring beauty (*Claytonia virginica*), showy tick trefoil (*Desmodium canadense*), blue-stemmed goldenrod (*Solidago caesia*), and wild yam (*Dioscorea villosa*) Over time, however, fire suppression has allowed young trees to mature and fill the gaps between the scattered oaks. With less light reaching the ground, many of the prairie forbs and grasses as well as light demanding tree species declined in abundance. Today, shade tolerant species such as wild geranium (*Geranium maculatum*), jumpseed (*Polygonum virginianum*), white lettuce (*Prenanthes alba*) richweed (*Collinsonia canadensis*) red maple, basswood (*Tilia americana*), black cherry (*Prunus americana*) white ash (*Fraxinus americana*) and sugar maple (*Acer saccharum*) are becoming more common in the southern dry-mesic forests. In addition, several exotic plant species such as multi flora rose (*Rosa multiflora*), common buckthorn, (*Rhamnus cathatica*), and Norway maple (*Acer platanoides*), are found scattered throughout the forest Of the three, Norway maple is the most problematic in southern Michigan upland forests.

Vernal pools are also found scattered throughout the upland southern dry-mesic forests at the site. These ephemeral pools are important habitats for numerous amphibian species such as mole salamanders (*Ambystoma* spp.) and frogs such as the wood frog (*Rana sylvatica*). These amphibian species utilize ponds and vernal pools for mating, egg laying, and feeding during the aquatic phase of their life cycle.

Although no rare species were found during field surveys, there is potential habitat for several state listed birds and turtles. The two lakes also provide habitat for spotted turtle (*Clemmys guttata*) state special concern, Blanding's turtle (*Emydoidea blandingii*), state special concern, and box turtle (*Terrepene carolina carolina*) also state special concern. In addition, the two lakes nested within the contiguous forest dominated landscape provide great stopover habitat for neo-tropical migrants. The forest complex at the site offers good breeding habitat for forest interior bird species because it is large, intact, and has a diversity of

habitats This is particularly important because many species of forest interior birds have experienced sharp population declines due to extensive fragmentation of forests Potential rare forest interior species that may nest here include cerulean warbler (*Dendroica cerulea)* state special concern, prothonotary warbler (*Protonotaria citrea*) state special concern, and Cooper's hawk (*Accipiter cooperii*) also state special concern.

Evidence of Disturbance

The uplands and wetlands have had a considerable amount of disturbance in the past having likely been logged and then selectively cut At the time of the survey, a logging operation was underway at the southern dry-mesic forest located on the east side of the site just north of Fish Lake. It appeared that trees with large diameters were being selectively cut and removed This type of thinning may benefit many of the light demanding species such as black and white oak A number of tractor trails occur within the upland forests, and tractor ruts were present in the adjacent hardwood-conifer swamp. Numerous exotic plant species (mentioned earlier in the text) occur in both the uplands and wetlands

Threats

Residential development in the uplands may negatively impact the wetland forests in several ways Residential wells have the potential to lower the water table that currently supports the wetland forests Runoff of storm water, lawn chemicals, or fertilizers into the wetlands will likely have significant negative impacts on many species and make the natural communities more prone to invasion by exotics. In addition, the potential for introductions of invasive species increases with development as exotic plants are typically used in modern landscaping. A highly invasive, exotic shrub, glossy buckthorn (*Rhamnus frangula*), was found growing in dense patches in portions of the hardwood-conifer swamp and scattered throughout the relict conifer swamp. This species should be removed from the sites because of its ability to colonize and dominate wetland communities.

The black spruce relict conifer swamp will probably continue to decline in size if the red maples that surround it are not removed. The dominance of red maple within the adjacent hardwood-conifer swamp also poses a threat to the remaining tamarack within this community. The fires that moved across the uplands would likely have occasionally carried into the wetland forest Because both black spruce and tamarack seeds germinate readily following fire, occasional wildfires, which may kill many of the adult trees, also prepared the way for their regeneration. Seedlings of both tamarack and black spruce do not survive under the low light levels of a maple-dominated forest. No tamarack or black spruce seedlings or saplings were seen within the red maple dominated hardwood-conifer swamp If the conifer component of the swamp is to be maintained, the density of red maple and other broad-leaved tree species needs to be significantly reduced.

Ecological Boundary Explanation

The ***primary boundary*** represents the extent of the intact wetland complex and relatively intact oak-hickory forest in the surrounding uplands

The ***secondary boundary*** represents the minimal area needed to maintain the unique natural features within the primary boundary The east and west boundaries were determined by roads, the north boundary was determined by active agricultural land, and the south boundary was determined by development around Fish Lake

Stewardship Considerations

Primary Boundary: Glossy buckthorn and Japanese barberry should be removed from the hardwood-conifer swamp and relict conifer swamp Red maple and other broad-leaved tree species should be significantly thinned within the hardwood-conifer swamp. Red maple should also be removed from the relict conifer swamp. Common buckthorn, multiflora rose, and Norway maple should all be removed from the southern dry-mesic forest. The patches of southern dry-mesic forests will require prescribed burns and tree thinning in order to stimulate oak regeneration in the understory as well as herbaceous plants such as coreopsis (*Coreopsis tripteris*), sunflower (*Helianthus spp.*), and pensylvania sedge (*Carex pensylvanica*). The use of prescribed burning would likely be effective as an aid to control the spread of exotic species. The presettlement vegetation of the uplands, as determined by the General Land Office (GLO) records, indicates that much of the uplands that are early successional and closed canopy southern dry-mesic forest, were once oak barrens in the early 1800s. If management for oak barrens is desired, a more intense fire and tree thinning management plan would have to be developed. In addition, the upland and wetland forests in the southern portion of the site should be protected to maintain a direct link to Fish Lake, and a natural corridor between Fish Lake, the unnamed lake, and Perch Lake.

Secondary Boundary: The secondary boundary primarily consists of active and inactive agricultural land, old fields, residential development, an active YMCA camp, and isolated woodlots and wetlands. Since the primary cover type in the secondary boundary is old field, efforts should be made to allow these existing vegetated areas to remain open space and serve as a buffer for the natural communities within the primary area as well as wildlife corridors In particular, if the old fields surrounding Perch Lake were specifically managed for southern dry-mesic forest or oak barrens, these lands would connect Perch Lake and its adjacent natural communities to nearby forests and wetlands In addition, the old fields east of Perch Lake link this site with the high quality Buckhorn Lake Complex to the east. Residential areas surrounding the site should be encouraged to provide a native plant buffer between high use areas and the swamp. A buffer area that is a minimum 100 feet in width where natural succession is allowed to occur is preferred Other considerations for residential areas include maintenance of septic systems, minimal lawn areas, landscaping with native plants, and a designated area for lawn clippings that is a safe distance from the natural buffer area

Recommendation for Future Studies

Surveys for spring neo-tropical migratory birds, intensive-breeding bird surveys for forest interior bird species, and surveys for rare turtles around the two lakes are recommended. In addition, we strongly recommend surveying the open bog in the area surrounding Perch Lake.

Literature Cited:

Albert, D A 1994 Regional Landscape Ecosystems of Michigan, Minnesota and Wisconsin. A Working Map and Classification USDA Forest Service, North Central Forest Experiment Station, General Technical Report NC-178

Field Surveys

Key for terminology used in the following field surveys:

N	(Native) – Species that are native to Michigan.
A	(Adventive) – Species that have been introduced and are not native to Michigan.
Fern	A leafy plant with leaves undivided or divided several times into leaflets.
Forb	A herbaceous plant with broad leaves, excluding the grasses and grasslike plants; a type of flowering herb.
Grass	Plants, whose characteristics include stems that are jointed at nodes, are hollow and have sheathing leaves
Sedge	A tufted marsh plant, differing from the related grasses in having a one-seeded fruit and solid stems.
Shrubs	A woody perennial plant typically lower than most trees, having multiple stems that branch from the base without a well-defined main stem.
Tree	A woody plant characterized by one main trunk, bearing a more or less distinct and elevated crown of branches. Typically, trees are larger than shrubs.
Vine	A plant whose stem requires support and which climbs by tendrils or twining or creeps along the ground.
<T>	Species that is threatened
<SC>	Species that is of special concern

Animal Survey List
Perch Lake Complex

(Based on MNFI's surveys or incidental observations in 1999)

Common Name	Scientific Name	Status In MI [1]	Habitat/Community Type [2]
Birds			
American crow	*Corvus brachyrhynchos*	Increasing	Woodland/openlands
American goldfinch	*Carduelis tristis*	Declining	Old fields/woodlands
American robin	*Turdus migratorius*	Increasing	Woodland/open-lands
Black-capped chickadee	*Parus atricapillus*	Increasing in MI	Forest edge/mesic forest
Blue jay	*Cyanocitta cristata*	Stable	Forest edge/woodlands
Brown-headed cowbird	*Molothrus ater*	Decreasing	Forest edge/open-lands
Brown thrasher	*Toxostoma rufum*	Decreasing in MI	Forest edge
Chipping sparrow	*Spizella passerina*	Increasing	Old fields/woods edge
Common yellowthroat	*Geothlypis trichas*	Stable	Shrub wetlands
Downy woodpecker	*Picoides pubescens*	Decreasing in SE MI	Mesic forest
Eastern kingbird	*Tyrannus tyrannus*	Decreasing	Open-lands
Eastern wood pewee	*Contopus virens*	Stable to increasing	Mesic forest
European starling	*Sturnus vulgaris*	Increasing	Residential
Field sparrow	*Spizella pusilla*	Declining	Old fields/shrublands
Gray catbird	*Dumetella carolinensis*	Increasing in S MI	Shrubland/woodlands
Great-blue heron	*Ardea herodias*	Increasing	Wetland/lake shores
House wren	*Troglodytes aedon*	Increasing	Forest edge/shrublands
Indigo bunting	*Passerina cyanea*	Stable to increasing	Forest edge
Northern cardinal	*Cardinalis cardinalis*	Increasing	Woodland/shrublands
Ovenbird	*Seiurus aurocapillus*	Increasing in MI	Mesic forest
Red-bellied woodpecker	*Melanerpes carolinus*	Increasing in southern MI	Forest edge/mesic forest
Red-eyed vireo	*Vireo olivaceus*	Increasing	Mesic forest
Red-tailed hawk	*Buteo jamaicensis*	Local decline in SE MI	Woodlands/open-lands
Red-winged blackbird	*Agelaius phoeniceus*	Declining	Emergent wetlands
Scarlet tanager	*Piranga olivacea*	Increasing in MI	Mesic forest
Song sparrow	*Melospiza melodia*	Declining to stable	Scrub-shrub
Tufted titmouse	*Parus bicolor*	Increasing	Woodlands/shrublands
Turkey vulture	*Cathartes aura*	Increasing	Farmlands
White-breasted nuthatch	*Sitta carolinensis*	Increasing	Woodlands
Willow flycatcher	*Empidonax traillii*	Decreasing	Shrublands
Veery	*Catharus fuscesens*	Increasing in SE MI	Mesic forest
Yellow warbler	*Dendroica petechia*	Increasing	shrublands (wet or dry)
Amphibians			
Green frog	*Rana clamitans melanota*	Common	Ponds/wetlands
Mammals			
Fox squirrel	*Sciurus niger*	Common	Woodlands
Raccoon	*Procyon lotor*	Common	Wetland/woodlands
Red squirrel	*Tamiasciurus hudsonius*	Common	Conifers
White-tailed deer	*Odocoilieus virginianus*	Common	Forest edge/open-land

[1] Status for birds based on Michigan Breeding Bird Surveys (1966 - 1996)

[2] Habitat/community refers to habitat or natural community in which animal was observed.

Plant Survey List
Perch Lake Complex
(Based on MNFI's surveys or incidental observations in 1999)

Perch Lake Complex - Open Bog

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Acer rubrum	RED MAPLE
N Tree	Betula alleghaniensis	YELLOW BIRCH
N Forb	Calla palustris	WATER-ARUM; WILD CALLA
N Shrub	Chamaedaphne calyculata	LEATHERLEAF
N Sedge	Carex chordorrhiza	SEDGE
N Sedge	Carex lasiocarpa	SEDGE
N Sedge	Carex tenuiflora	SEDGE
N Shrub	Decodon verticillatus	WHORLED or SWAMP LOOSESTRIFE
N Forb	Drosera rotundifolia	ROUND-LEAVED SUNDEW
N Sedge	Dulichium arundinaceum	THREE-WAY SEDGE
N Forb	Nymphaea odorata	SWEET-SCENTED WATERLILY
N Forb	Sarracenia purpurea	PITCHER-PLANT
N Sedge	Scirpus validus	SOFTSTEM BULRUSH
N Shrub	Toxicodendron vernix	POISON SUMAC
N Forb	Triadenum fraseri	MARSH ST. JOHN'S-WORT
N Shrub	Vaccinium macrocarpon	LARGE CRANBERRY

Perch Lake Complex - Relict Conifer Swamp

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Acer rubrum	RED MAPLE
N Tree	Betula alleghaniensis	YELLOW BIRCH
N Tree	Betula papyrifera	PAPER BIRCH
N Sedge	Carex leptalea	SEDGE
N Forb	Cypripedium acaule	PINK LADY'S-SLIPPER; MOCCASIN FLOWER
N Fern	Dryopteris carthusiana	SPINULOSE WOODFERN
N Shrub	Gaylussacia baccata	HUCKLEBERRY
N Shrub	Ilex verticillata	WINTERBERRY; MICHIGAN HOLLY
N Tree	Larix laricina	TAMARACK; LARCH
N Forb	Maianthemum canadense	CANADA MAYFLOWER; LILY-OF-THE-VALLEY
N Shrub	Nemopanthus mucronata	MOUNTAIN HOLLY
N Fern	Osmunda cinnamomea	CINNAMON FERN
N Tree	Picea mariana	BLACK SPRUCE
A Shrub	RHAMNUS FRANGULA	GLOSSY BUCKTHORN
N Shrub	Vaccinium corymbosum	SMOOTH HIGHBUSH BLUEBERRY

Perch Lake Complex – Hardwood-Conifer Swamp
This area is not mapped

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Acer rubrum	RED MAPLE
N Forb	Aralia nudicaulis	WILD SARSAPARILLA
A Shrub	BERBERIS THUNBERGII	JAPANESE BARBERRY
N Tree	Betula papyrifera	PAPER BIRCH
N Sedge	Carex leptalea	SEDGE
N Fern	Dryopteris carthusiana	SPINULOSE WOODFERN
N Shrub	Ilex verticillata	WINTERBERRY, MICHIGAN HOLLY
N Tree	Larix laricina	TAMARACK, LARCH
N Shrub	Lindera benzoin	SPICEBUSH
N Tree	Liriodendron tulipifera	TULIP TREE
N Forb	Lycopus americanus	COMMON WATER HOREHOUND
N Forb	Maianthemum canadense	CANADA MAYFLOWER, LILY-OF-THE-VALLEY
N Tree	Quercus bicolor	SWAMP WHITE OAK
A Shrub	RHAMNUS FRANGULA	GLOSSY BUCKTHORN
N Shrub	Rubus hispidus	SWAMP DEWBERRY
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Shrub	Vaccinium corymbosum	SMOOTH HIGHBUSH BLUEBERRY

Perch Lake Complex – Southern Dry-Mesic Forest

Native/Adventive Physiography	Scientific Name	Common Name
A Tree	ACER PLATANOIDES	NORWAY MAPLE
N Tree	Acer rubrum	RED MAPLE
N Tree	Acer saccharum	SUGAR MAPLE, HARD MAPLE
N Forb	Actaea pachypoda	WHITE BANEBERRY, DOLL'S-EYES
N Forb	Arisaema triphyllum	JACK-IN-THE-PULPIT; INDIAN-TURNIP
N Tree	Carpinus caroliniana	HORNBEAM; BLUE-BEECH
N Tree	Carya glabra	PIGNUT HICKORY
N Tree	Carya ovata	SHELLBARK or SHAGBARK HICKORY
N Forb	Circaea lutetiana	ENCHANTER'S-NIGHTSHADE
N Forb	Claytonia virginica	SPRING-BEAUTY
N Forb	Collinsonia canadensis	RICHWEED
N Forb	Conyza canadensis	HORSEWEED
N Shrub	Corylus americana	HAZELNUT
N Tree	Cornus florida	FLOWERING DOGWOOD
N Sedge	Carex pensylvanica	SEDGE
N Forb	Desmodium canadense	SHOWY TICK-TREFOIL
N Vine	Dioscorea villosa	WILD YAM
N Tree	Fraxinus americana	WHITE ASH
N Forb	Galium aparine	ANNUAL BEDSTRAW
N Forb	Geranium maculatum	WILD GERANIUM
N Forb	Geum canadense	WHITE AVENS
N Shrub	Hamamelis virginiana	WITCH-HAZEL

N Tree	Ostrya virginiana	IRONWOOD; HOP HORNBEAM
N Forb	Podophyllum peltatum	MAY APPLE; MANDRAKE
N Forb	Polygonatum pubescens	DOWNY SOLOMON SEAL
N Forb	Polygonum virginianum	JUMPSEED
N Forb	Prenanthes alba	WHITE LETTUCE, RATTLESNAKE-ROOT
N Tree	Prunus serotina	WILD BLACK CHERRY
N Shrub	Prunus virginiana	CHOKE CHERRY
N Tree	Quercus alba	WHITE OAK
N Tree	Quercus bicolor	SWAMP WHITE OAK
N Tree	Quercus rubra	RED OAK
N Tree	Quercus velutina	BLACK OAK
N Forb	Ranunculus recurvatus	HOOKED CROWFOOT
A Tree	RHAMNUS CATHARTICA	COMMON BUCKTHORN
A Shrub	ROSA MULTIFLORA	JAPANESE or MULTIFLORA ROSE
N Shrub	Sambucus canadensis	ELDERBERRY; COMMON ELDER
N Tree	Sassafras albidum	SASSAFRAS
N Forb	Smilacina racemosa	FALSE SPIKENARD
N Forb	Solidago caesia	BLUE-STEMMED GOLDENROD
N Forb	Thalictrum dioicum	EARLY MEADOW-RUE
N Tree	Tilia americana	LINDEN; BASSWOOD
N Vine	Toxicodendron radicans	POISON-IVY
N Forb	Trillium grandiflorum	COMMON TRILLIUM
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Tree	Ulmus rubra	RED or SLIPPERY ELM
N Shrub	Viburnum acerifolium	MAPLE-LEAVED ARROW-WOOD
N Vine	Vitis riparia	RIVERBANK GRAPE
N Shrub	Zanthoxylum americanum	PRICKLY-ASH

Perch Lake Complex – Emergent Marsh
This area was not surveyed.

Perch Lake Complex – Southern Shrub-Carr
This area was not surveyed.

Charter Township of Springfield

HURON SWAMP

Site Ecological Report

Directions to Site
The Huron Swamp is located about 8 miles west of Pontiac. The best access point is through Indian Springs Metro Park From Pontiac, travel west on M-59 to Teggerdine Road, then 3 miles north to White Lake Road, then approximately 0.8-mile west to the park entrance The site is located north of the road leading into the park

General Site Description
The Huron Swamp is located in the Huron watershed in northwestern Oakland County in the northern portion of the Jackson Interlobate sub-subsection (Albert 1994) This region lies between the extensions of two glacial lobes that extended into southern Michigan approximately 16,000 years ago While steep hillsides and kettle depressions characterize the surrounding landscape, the Huron Swamp site sits in a broad, flat, sandy outwash plain The primary area of the site is approximately 1,850 acres in size and is comprised of a diverse array of natural communities dominated by southern swamp and southern mesic forest with scattered pockets of southern wet meadow, southern shrub-carr, vernal pools, and a small lake and prairie fen This site also forms the headwaters of the Huron River The site includes the Timberland Sanctuary, a 250-acre nature preserve owned by the Michigan Nature Association.

Southern swamp and southern mesic forest form a mosaic of closed canopy forest that occupies over 1,260 acres of the site. The southern swamp contains numerous soft bottomed (Houghton-Adrian muck), flooded depressions dominated by red maple (*Acer rubrum*) American elm (*Ulmus americana*) and black ash (*Fraxinus nigra)* The southern mesic forest is dominated by sugar maple (*Acer saccharum*) and American beech (*Fagus grandifolia*) and harbors a diverse understory and ground layer. Several different types of wetlands are scattered throughout the forest matrix including southern wet meadow, southern shrub-carr, and prairie fen. In addition, vernal pools, which occur throughout the site, provide important breeding habitat for amphibians, and insect rich food resources for songbirds migrating north in the spring.

Interspersed along the edges of the forested communities are patches of southern wet meadow and southern shrub-carr, diverse wetlands common throughout the Midwest Southern shrub-carr occupies a transition zone between the forests and the more open, sedge and grass dominated southern wet meadow. A small prairie fen borders Timberland Lake in Indian Springs Metro Park Considered rare throughout its range by The Nature Conservancy, the prairie fen community is concentrated in the glaciated interlobate region of the Midwest and supports many rare plants and animals

Old abandoned agricultural fields occur on several of the level and gently rolling uplands at the northern and eastern edges of the site These old fields are primarily dominated by exotic grasses such as smooth brome (*Bromus inermis*) but also contain a small number of native prairie species such as big bluestem (*Andropogon gerardii*), Culver's root (*Veronicastrum virginianum*), northern bedstraw (*Galium boreale*), and stiff goldenrod (*Solidago rigida*). This is especially true for the old fields in the northern portion of the site bordering the G.T.W railroad tracks

The southeast portion of the site has been developed as a park and contains several parking areas, a nature center, picnic sites, and a golf course Several trails run from the park area including an 8 mile paved bike path that circles the primary area of the Huron Swamp site

Summary of Ecological Significance
The Huron Swamp site is extremely important ecologically to southeast Michigan because it is a large wetland complex that forms the headwaters of the Huron River, and because of the high diversity of natural communities The large, contiguous mosaic of southern swamp and southern mesic forest that forms the primary area of the site represents an area of high quality and rarity within the surrounding rapidly developing urban/suburban landscape. The combination of large upland and wetland forests, old fields and wet meadows provide habitat for a significant number of native plants and animals. Any

changes to the hydrology or water quality of the Huron Swamp will have an impact on the ecological integrity and health of the upper Huron River ecosystem

The southern swamp and southern mesic forest are intricately linked, with islands of upland southern mesic forest found alongside the wetter, southern swamp The juxtaposition and diversity of upland and wetland habitats at this site is important for wildlife species that require an intact mosaic of upland and wetland habitats for successful reproduction and survival, these include amphibians, reptiles, and birds Throughout the more than 1,260 acres of closed canopy forest, many species of hardwoods share dominance in the canopy layer Tree species dominant in the southern swamp includes silver maple (*Acer saccharinum*), red maple, black ash, and green ash (*Fraxinus pennsylvanic)*. Dead standing trees and fallen logs are common throughout the swamp indicating extensive seasonal flooding and mortality of American elm from Dutch elm's disease. Sugar maple, red maple, bitternut hickory (*Carya cordiformis*), American beech, white ash (*Fraxinus americana*), white oak (*Quercus alba*), and red oak (*Q rubra*) are the dominant species in the southern mesic forest The understory and ground layer of the southern mesic forest harbors a highly diverse group of plants. Native shrubs include leatherwood (*Dirca palustris*), alternate-leafed dogwood (*Cornus alternifolia*), spicebush (*Lindera benzoin*) and blue-beech (*Carpinus caroliniana*) Characteristic groundlayer species include yellow trout lily (*Erythronium americanum*), wild blue phlox (*Phlox divaricata*) and common trillium (*Trillium grandiflorum*).

Vernal pools were found scattered throughout the forests These shallow, ephemeral wetlands provide critical habitat in the spring for many species of amphibians, which use the pools for mating, egg laying, and feeding during the aquatic phase of their life cycle as tadpoles and salamander larvae. The vernal pools are also critical to resident and migrant songbirds, which flock to the pools in spring to feed on newly emerged insects. The large block of closed-canopy forest provides many forest interior bird species with critical breeding habitat. This is particularly important because many species of forest-interior songbirds have recently experienced dramatic population declines primarily due to forest fragmentation. Forest-interior species found in the Huron Swamp which are experiencing population declines in Michigan include: wood thrush (*Hylocichla mustelina*), acadian flycatcher (*Empidorax virescens*), and rose-breasted grosbeak (*Pheuctius ludovicianus*) (Askins, 1993).

The large, closed-canopy forests of both uplands and wetlands also provide ideal habitat for larger bird species such as the red-shouldered hawk (*Buteo lineatus*) state listed as threatened In the spring of 1998, a pair of red-shouldered hawks was documented in the Huron Swamp and is thought to have nested there Once common throughout southern Michigan, this occurrence represents one of seventeen known nesting areas in the entire southern Lower Peninsula, and one of only six known nesting areas in southeast Michigan In addition, an occurrence of a Cooper's hawk (*Accipiter cooperii*) state listed as special concern, and a great blue heron rookery were documented in the forest complex during previous surveys

No rare plant species were documented in the forested communities during the field surveys. Rare plant species associated with southern swamp and/or southern mesic forest that have potential to occur here include: goldenseal (*Hydrastis canadensis*), state listed as threatened, twinleaf (*Jeffersonia dyphylla*) state listed as special concern, and ginseng (*Panax quinquefolius*), state listed as threatened

Included within the mosaic of southern swamp and southern mesic forest are patches of southern shrub-carr, southern wet meadow, and a small prairie fen Southern shrub-carr occupies a transition zone between the closed-canopy swamp forest and the more open southern wet meadow. Dense shrub thickets of gray dogwood (*Cornus racemosa*), pussy willow (*Salix discolor*), and sandbar willow (*Salix exigua*) dominate this community making walking difficult. Groundlayer diversity within the shrub-carr is high, comprised of species from both the southern swamp and southern wet meadow. The southern wet meadow, or sedge meadow, is dominated by sedges, particularly tussock sedge (*Carex stricta*) and lake sedge (*Carex lacustris*). Diversity in the southern wet meadow is high with 42 species recorded in a single visit, including yellow lady-slipper (*Cypripedium calceolus*), Joe-pye weed (*Eupatorium maculatum*), and common boneset (*Eupatorium perfoliatum*). The prairie fen bordering Timberland Lake in Indian Springs Metro Park is also an open, sedge-dominated community, but with a different species assemblage than that of the more wide-spread southern wet meadow. Prairie fen indicator species found at the Timberland Lake prairie fen include tamarack (*Larix laricina*), grass-of-parnassus (*Parnassia glauca*), shrubby cinquefoil

(*Potentilla fruticosa*), and Ohio goldenrod (*Solidago ohioensis*)

Several rare animals associated with prairie fen have the potential to occur here including: tamarack tree cricket (*Oecanthus laricis*) state listed as special concern, poweshiek skipper (*Oarisma poweshiek*) state listed as threatened, swamp metalmark (*Celephelis muticum*) state listed as special concern, and angular spittlebug (*Lepyronia angulifera*) state listed as special concern. In addition, copperbelly water snake (*Nerodia erythrogaster neglecta*) state listed as endangered and federally listed as threatened, has the potential to occur in the southern shrub-carr, southern wet meadow, prairie fen, ponds, and small streams located within the site Rare plants with the potential to be found in the prairie fen include Richardson's sedge (*Carex richardsonii*) state listed as special concern, white ladies-slipper (*Cypripedium candidum*) state listed as threatened, mat muhly (*Muhlenbergia richardsonis*) state listed as threatened, common valerian (*Valeriana ciliata*) state listed as threatened, and prairie dropseed (*Sporobolus heterolepis*) state listed as special concern

Several rare species, which are known to occur within the Huron Swamp site and utilize several different natural communities, include the eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*) state listed as special concern, and Blanding's turtle (*Emydoidea blandingii*) state listed as special concern The eastern massasauga rattlesnake will migrate in the spring from wetlands such as shrub-carr, swamp forest, wet meadow, and prairie fen to adjacent drier sites such as old fields in the summer. Blanding's turtles, which utilize small ponds for hibernation and feeding, require sunlit areas with moist, sandy soil, typical of old fields and forest clearings, for egg laying.

The old agricultural fields in the southeast corner of the site provide critical habitat for the bobolink (*Dolichonyx oryzivorus*), a grassland bird species whose population has declined precipitously Other grassland birds experiencing similar population declines such as the Henslow's sparrow (*Ammodramus henslowii*) state listed as special concern (being upgraded to state threatened pending legislative approval), also have the potential to occur here Because the old fields are adjacent to a vast wetland complex, they provide potential habitat for rare wetland species such as the eastern massasauga rattlesnake and Blanding's turtle, which utilize grassy uplands part of the year

Evidence of Disturbance

The abandoned agricultural fields contain many exotic species including smooth brome, autumn olive (*Elaeagnus umbellata*), and European buckthorn (*Rhamnus cathartica*) The northern portion of the site contains several abandoned homes, two-track roads and artificial ponds Walking trails are found throughout the site and act as pathways for the introduction and spread of several exotic species A pipeline running east and west bisects the center of the site and serves as a conduit for the introduction and spread of exotic species from peripheral areas into the primary area of the site

Threats

Residential and commercial development in the surrounding area represents a significant threat to the site's hydrology Lowering the local water table or altering the natural flood regime of the wetland ecosystems will negatively impact the Huron Swamp and the species that occur there Increased draw down of the aquifer due to shallow residential or commercial wells may reduce the amount of groundwater seeping into the wetlands and Huron River, alter the integrity of these ecosystems, and create significant changes in vegetation. A significant increase of runoff into the wetlands from surrounding residential and commercial development will also cause degradation of the wetlands and Huron River Higher water levels and additional sediment, nutrients, and other pollutants will eliminate many native species and may result in exotic plants such as reed canary grass (*Phalaris arundinacea*) and purple loosestrife (*Lythrum salicaria*) dominating the open wetlands.

Invasion by exotic plant species poses a significant threat to the integrity of the site. The southern mesic forest is ideal habitat for garlic mustard (*Alliaria petiolata*), a wide spread, and ecologically invasive species common to many Oakland County properties. If introduced in the Huron Swamp site, garlic mustard will rapidly spread and quickly degrade the forest. This threat is especially troublesome because of the high white-tailed deer (*Odocoileus virginianus*) density of the site Forests with severe garlic mustard infestations have often been found to have high deer densities and low plant species diversity Because deer herbivore is heavy in the southern mesic forest, the site is particularly vulnerable to invasion by garlic mustard. Even in the absence of exotics, deer populations will reduce native plant species diversity in many natural communities (Nuzzo, 1997).

Glossy buckthorn (*Rhamnus frangula*) is common in the Timberland Lake fen and, if not controlled, will

eventually dominate the fen and neighboring swamp forest understory The prairie fen, southern swamp, southern shrub-carr and southern wet meadow are all vulnerable to invasion by glossy buckthorn

Ecological Boundary Explanation

The ***primary boundary*** of the site represents the extent of the intact forest complex of southern swamp and southern mesic forest that dominates the site

The ***secondary boundary*** represents the approximate area needed to maintain the natural features within the primary boundary. Due to the large size and intactness of the site, the secondary boundary is primarily comprised of the remainder of the original site boundary (delineated during the initial phase of the project) and serves as a buffer to the forest interior This boundary also includes all streams and drains that flow into the Huron swamp complex. Of primary concern is the golf course located south and east of the Huron Swamp. Golf courses typically require large amounts of chemical inputs to maintain greens and fairways (such as fertilizers, herbicides, insecticides, and fungicides) This golf course is immediately adjacent to the southern portion of the Huron Swamp site and could impact the water quality of this area and the Huron River

Stewardship Considerations

Primary boundary: The closed canopy of the southern mesic and southern swamp should be maintained in order to ensure habitat for the red-shouldered hawk and other forest interior species such as the wood thrush and acadian flycatcher. It will be important to annually monitor the forest communities each May for garlic mustard. If garlic mustard is found, all plants should be removed from the site before they disperse their seeds (usually in June). The forest communities should also be monitored annually for highly invasive exotic shrubs such as glossy buckthorn, and all exotic shrubs should be removed. This is especially important where the forest borders old fields, because exotic shrubs such as autumn olive, European buckthorn, and exotic honeysuckle (*Lonicera tatarica*) are common here.

A management plan aimed at reducing the number of white-tailed deer in the Huron Swamp should be developed and implemented. In the absence of a natural predator, white-tailed deer populations remain artificially high and reduce plant species diversity through preferential browsing (Nuzzo, 1997).

All glossy buckthorn plants should be removed from the prairie fen and surrounding forest. Glossy buckthorn can be controlled by cutting plants at ground level and, immediately after making the cut, applying a 25% solution of Rodeo® (Glyphosate) directly to the stumps This method of control should be performed in winter to minimize impacts to other species. The fen and forest should be monitored annually and all glossy buckthorn plants should be removed (Hoffman, et.al. 1997)

Several exotic plants including Canada thistle (*Cirsium arvense*), bull thistle (*C vulgare*), and common teasel (*Dipsacus fullonum*) were found in the southern wet meadow at the northern part of the site. These species were concentrated along a trail bordering the southern wet meadow and should be removed and monitored annually.

The old fields should be maintained as grasslands to provide habitat for grassland nesting birds To discourage shrub encroachment the fields should be mowed every 2-4 years and mowing should only take place in the late summer (i.e., late July or August) The old fields provide a perfect opportunity to establish prairie. Many prairie species already grow along the railroad tracks bordering the north edge of the site. Seeds could be collected from these plants and from other nearby locations and introduced into the old fields. Prescribed burns should be conducted in the early spring or mid-to-late fall to encourage the growth and reproduction of native prairie species

Secondary boundary: The secondary boundary currently contains old fields, residential development, small woodlots, and a golf course. The boundary also contains two small tributaries that flow into the swamp Stewardship considerations are focused on the water quality and water regime of the Huron Swamp, and a buffer area for the forested complex. Private lands surrounding the site should be encouraged to provide a native plant buffer between high use areas and the swamp A buffer area that is a minimum 100 feet in width where natural succession is allowed to occur is preferred. Considerations for residential areas include maintenance of septic systems, minimal lawn areas, landscaping with native plants, and a designated area for lawn clippings that is a safe distance from the natural buffer area. Of primary concern is the golf course located along White Lake Road. Steps which will minimize runoff of chemicals from the golf course into the adjacent natural areas include: building natural detention ponds, using safe procedures for handling chemicals, incorporating natural buffers around waterways, and minimizing chemical inputs.

Recommendation for Future Studies

Additional surveys for grassland birds (such as Henslow's sparrow) in the old fields, reptiles (such as massasauga rattlesnake and copperbelly water snake) in the wetlands, and red-shouldered hawk nests in the forested areas, as well as additional surveys for rare plants in the southern swamp, southern mesic forest, and prairie fen are recommended A detailed hydrologic study should be undertaken to collect baseline data on the hydrologic regime and water quality of the Huron swamp This information can be used to monitor any long-term hydrologic or water chemistry changes that may impact the large intact southern swamp and southern mesic forest complex, as well as the upper Huron River ecosystem

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Nuzzo, Victoria 1997. Information received by personal communication

Field Surveys

Key for terminology used in the following field surveys·

N	(Native) – Species that are native to Michigan
A	(Adventive) – Species that have been introduced and are not native to Michigan.
Fern	A leafy plant with leaves undivided or divided several times into leaflets
Forb	A herbaceous plant with broad leaves, excluding the grasses and grasslike plants; a type of flowering herb
Grass	Plants, whose characteristics include stems that are jointed at nodes, are hollow and have sheathing leaves.
Sedge	A tufted marsh plant, differing from the related grasses in having a one-seeded fruit and solid stems
Shrub	A woody perennial plant, typically lower than most trees, having multiple stems that branch from the base without a well-defined main stem.
Tree	A woody plant characterized by one main trunk, bearing a more or less distinct and elevated crown of branches Typically, trees are larger than shrubs.
Vine	A plant whose stem requires support and which climbs by tendrils or twining or creeps along the ground.
<T>	Species that is threatened
<SC>	Species that is of special concern

Animal Survey List
Huron Swamp [1]

(Based on MNFI's surveys and incidental observations in 1998)

Common Name	Scientific Name	Status In MI[2]	Habitat/Community[3]
Birds			
Acadian flycatcher	*Empidorax virescens*	Statewide decline	Mesic forest
American crow	*Corvus brachyrynchus*	Statewide increase, local decline	Forest, urban
American goldfinch	*Carduelis tristis*	Declining	Old field
American redstart	*Setophaga ruticilla*	Stable	Mesic forest
American robin	*Turdus migratorius*	Increasing	Mesic forest
Barn swallow	*Hirundo rustica*	Increasing	Lake edge
Black-billed cuckoo	*Coccyzus erythropthalmus*	Declining	Forest edge
Black-capped chickadee	*Parus atricapillus*	Increasing	Forest edge
Blue jay	*Cyanocitta cristata*	Stable	Forest edge
Blue-winged warbler	*Vermivora pinus*	Increasing	Upland shrub
Bobolink	*Dolichonyx oryzivorus*	Statewide and local decline	Grassland
Brown headed cowbird	*Molothrus ater*	Decreasing	Forest edge
Cedar waxwing	*Bombycilla cedrorum*	Increasing	Forest edge
Chestnut-sided warbler	*Dendroica pennsylvanica*	Statewide increase	Young forest
Chipping sparrow	*Spizella passerina*	Increasing	Old field
Common yellowthroat	*Geothlypis trichas*	Stable	Scrub-shrub swamp
Eastern kingbird	*Tyrannus tyrannus*	Declining	Open-lands
Eastern meadowlark	*Sturnella magna*	Decreasing	Grassland
Eastern wood peewee	*Contopus virens*	Stable to increasing	Mesic forest
European starling	*Sternus vulgaris*	Stable	Urban/residential
Field sparrow	*Spizella pusilla*	Declining	Old field
Gray catbird	*Dumatella carolinensis*	Increasing in S. MI	Forest/forest edge
Great crested flycatcher	*Myiarchus crinitus*	Increasing	Forest edge
Horned lark	*Eromophila alpestris*	Declining to stable	Grasslands
Indigo bunting	*Passerina cyanea*	Stable to increasing	Field edge
Killdeer	*Charadrius vociferus*	Increasing	Open-lands/fields
Northern cardinal	*Cardinalis cardinalis*	Increasing	Mesic forest
Northern flicker	*Colaptes auratus*	Increasing	Mesic forest
Northern oriole	*Icterus galbula*	Declining to stable	Old field w/ trees
Ovenbird	*Seiurus aurocapillus*	Slight increase	Mesic forest
Red-bellied woodpecker	*Melanerpes carolinus*	Stable	Mesic forest
Red-eyed vireo	*Vireo olivaceus*	Increasing	Mesic forest
Red-shouldered hawk	*Buteo lineatus*	State threatened	Forest/wetland
Red-tailed hawk	*Buteo jamaicensis*	Local decline in SE MI	Forest edge
Red-winged blackbird	*Agelaius phoeniceus*	Declining	Emergent wetland
Ring-necked pheasant	*Phasianus colchicus*	Declining	Grassland
Rose-breasted grosbeak	*Pheucticus ludovicianus*	Decline in SE MI	Woodland
Scarlet tanager	*Piranga olivacea*	Slight increase	Mesic forest
Song sparrow	*Melospiza melodia*	Declining to stable	Upland shrub
Swamp sparrow	*Melospiza georgiana*	Statewide increase	Shrub carr
Tufted titmouse	*Parus bicolor*	Increasing	Mesic forest
Veery	*Catharus fuscescens*	Stable	Mesic forest
Warbling vireo	*Vireo gilvus*	Declining	Old field w/ trees

Willow flycatcher	*Empidonax traillii*	Decreasing	Shrublands
Wood thrush	*Hylocichla mustelina*	Declining	Southern swamp
Yellow-billed cuckoo	*Coccyzus americanus*	Statewide decline, local increase in SE MI	Forest edge
Yellow-throated vireo	*Vireo flavifrons*	Increasing	Mesic forest
Yellow warbler	*Dendroica petechia*	Increasing	Old field w/ trees
Amphibians			
Bullfrog	*Rana catesbeiana*	Locally common	Pond (permanent water generally)
Eastern gray treefrog	*Hyla versicolor*	Common	Temporary ponds in forest and old fields, swamps, perm lakes
Green frog	*Rana clamitans melanota*	Common	Pond (permanent water generally)
Wood frog	*Rana sylvatica*	Common	Mesic forest, temporary ponds
Insects: Butterflies			
Pearly crescentspot	*Phycoides tharos*	Common	Prairie fen
Wood nymph	*Cercyonis pegala*	Common	Prairie fen
Mammals			
Eastern chipmunk	*Tamias striatus*	Common	Forest
Whitetail deer	*Odocoileus virginianus*	Common	Mesic forest, grassland
Reptiles			
Common garter snake	*Thamnophis sirtalis*	Common	Prairie fen
Northern water snake	*Nerodia sipedon*	Common	Pond

[1] Within Indian Springs Metropark only.
[2] Status for birds based on Michigan Breeding Bird Surveys (1966-1996).
[3] Habitat/community refers to habitat or natural community in which animal observed within Indian Springs Metropark and/or general habitat in which animal is found

Plant Survey List
Huron Swamp

(Based on MNFI's surveys or incidental observations in 1998)

Huron Swamp - Southern Wet Meadow
This is not mapped due to the configuration of the area

Native/Adventive Physiography	Scientific Name	Common Name
N Forb	Typha latifolia	BROAD-LEAVED CAT-TAIL
A Forb	CIRSIUM VULGARE	BULL-THISTLE
A Forb	CIRSIUM ARVENSE	CANADIAN-THISTLE
N Forb	Eupatorium perfoliatum	COMMON BONESET
N Forb	Pycnanthemum virginianum	COMMON MOUNTAIN MINT
N Fern	Equisetum arvense	COMMON or FIELD HORSETAIL
A Forb	Dipsacum follunum	COMMON TEASEL
N Shrub	Sambucus canadensis	ELDERBERRY; COMMON ELDER
N Forb	Zizia aurea	GOLDEN ALEXANDERS
N Forb	Senecio aureus	GOLDEN RAGWORT
N Forb	Parnassia glauca	GRASS-OF-PARNASSUS

N Shrub	Cornus foemina	GRAY DOGWOOD
N Forb	Rumex orbiculatus	GREAT WATER DOCK
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Forb	Solidago gigantea	LATE GOLDENROD
A Forb	PRUNELLA VULGARIS	LAWN PRUNELLA
N Fern	Thelypteris palustris	MARSH FERN
N Forb	Erigeron philadelphicus	MARSH FLEABANE
N Forb	Lilium michiganense	MICHIGAN LILY
N Shrub	Salix discolor	PUSSY WILLOW
N Tree	Populus tremuloides	QUAKING ASPEN
N Shrub	Cornus stolonifera	RED-OSIER DOGWOOD
N Grass	Phalaris arundinacea	REED CANARY GRASS
N Forb	Galium asprellum	ROUGH BEDSTRAW
A Tree	ELAEAGNUS ANGUSTIFOLIA	RUSSIAN-OLIVE
N Shrub	Salix exigua	SANDBAR WILLOW
N Sedge	Carex aurea	SEDGE
N Sedge	Carex granularis	SEDGE
N Sedge	Carex lacustris	SEDGE
N Sedge	Carex rostrata	SEDGE
N Sedge	Carex stipata	SEDGE
N Sedge	Carex stricta	SEDGE
N Fern	Onoclea sensibilis	SENSITIVE FERN
N Shrub	Potentilla fruticosa	SHRUBBY CINQUEFOIL
N Forb	Symplocarpus foetidus	SKUNK-CABBAGE
N Forb	Cypripedium calceolus var. parviflorus	SMALL YELLOW LADY'S-SLIPPER
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Forb	Aster puniceus	SWAMP ASTER
N Shrub	Ribes hirtellum	SWAMP GOOSEBERRY
N Shrub	Ribes triste	SWAMP RED CURRANT
N Forb	Pedicularis lanceolata	SWAMP-BETONY; LOUSEWORT
N Forb	Cirsium muticum	SWAMP-THISTLE
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Forb	Fragaria virginiana	WILD STRAWBERRY

Huron Swamp - Old Field

Native/Adventive Physiography	Scientific Name	Common Name
N Grass	Andropogon gerardii	BIG BLUESTEM GRASS; TURKEYFOOT
N Tree	Quercus velutina	BLACK OAK
N Forb	Rudbeckia hirta	BLACK-EYED SUSAN
N Fern	Pteridium aquilinum	BRACKEN FERN
N Forb	Solidago canadensis	CANADA GOLDENROD
A Tree	RHAMNUS CATHARTICA	COMMON BUCKTHORN
N Forb	Asclepias syriaca	COMMON MILKWEED
A Forb	HYPERICUM PERFORATUM	COMMON ST. JOHN'S-WORT
N Forb	Veronicastrum virginicum	CULVER'S ROOT
N Forb	Euphorbia corollata	FLOWERING SPURGE
N Forb	Euthamia graminifolia	GRASS-LEAVED GOLDENROD
N Forb	Lithospermum canescens	HOARY PUCCOON
A Grass	BROMUS INERMIS	HUNGARIAN BROME; SMOOTH BROME
N Forb	Apocynum cannabinum	INDIAN HEMP; HEMP DOGBANE
A Forb	PRUNELLA VULGARIS	LAWN PRUNELLA
N Shrub	Spiraea alba	MEADOWSWEET

N Forb	Galium boreale	NORTHERN BEDSTRAW
A Forb	CHRYSANTHEMUM LEUCANTHEMUM	OX-EYE DAISY
N Forb	Cardamine pensylvanica	PENNSYLVANIA BITTER CRESS
N Grass	Phalaris arundinacea	REED CANARY GRASS
A Forb	POTENTILLA RECTA	ROUGH-FRUITED CINQUEFOIL
A Tree	ELAEAGNUS ANGUSTIFOLIA	RUSSIAN-OLIVE
A Shrub	LONICERA TATARICA	SMOOTH TARTARIAN HONEYSUCKLE
A Forb	CENTAUREA MACULOSA	SPOTTED KNAPWEED
N Forb	Solidago rigida	STIFF GOLDENROD
N Forb	Solidago altissima	TALL GOLDENROD
A Grass	PHLEUM PRATENSE	TIMOTHY
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Forb	Monarda fistulosa	WILD BERGAMOT
N Tree	Prunus serotina	WILD BLACK CHERRY
A Forb	DAUCUS CAROTA	WILD CARROT; QUEEN-ANNE'S-LACE
N Forb	Achillea millefolium	YARROW

Huron Swamp - Prairie Fen

Native/Adventive Physiography	Scientific name	Common Name
N Shrub	Rhamnus alnifolia	ALDER-LEAVED BUCKTHORN
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Forb	Galium labradoricum	BOG BEDSTRAW
N Shrub	Betula pumila	BOG BIRCH
N Forb	Solidago uliginosa	BOG GOLDENROD
N Forb	Valeriana uliginosa	BOG VALERIAN
N Forb	Eupatorium perfoliatum	COMMON BONESET
N Shrub	Juniperus communis	COMMON or GROUND JUNIPER
N Forb	Aster lanceolatus	EASTERN LINED ASTER
N Forb	Tofieldia glutinosa	FALSE ASPHODEL
A Shrub	RHAMNUS FRANGULA	GLOSSY BUCKTHORN
N Forb	Parnassia glauca	GRASS-OF-PARNASSUS
N Shrub	Cornus foemina	GRAY DOGWOOD
N Sedge	Eriophorum viridi-carinatum	GREEN-KEELED COTTON-GRASS
N Sedge	Scirpus acutus	HARDSTEM BULRUSH
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Forb	Campanula aparinoides uliginosa	MARSH BELLFLOWER
N Fern	Thelypteris palustris	MARSH FERN
N Forb	Triadenum fraseri	MARSH ST. JOHN'S-WORT
A Forb	TYPHA ANGUSTIFOLIA	NARROW-LEAVED CAT-TAIL
N Forb	Lycopus uniflorus	NORTHERN BUGLE WEED
N Forb	Solidago ohioensis	OHIO GOLDENROD
N Forb	Sarracenia purpurea	PITCHER-PLANT
N Shrub	Toxicodendron vernix	POISON SUMAC
N Shrub	Cornus stolonifera	RED-OSIER DOGWOOD
N Grass	Phragmites australis	REED; GIANT BULRUSH
N Forb	Drosera rotundifolia	ROUND-LEAVED SUNDEW
N Shrub	Salix candida	SAGE or HOARY WILLOW
N Sedge	Carex aquatilis	SEDGE
N Sedge	Carex diandra	SEDGE
N Sedge	Carex flava	SEDGE
N Sedge	Carex interior	SEDGE

N Sedge	Carex lasiocarpa	SEDGE
N Sedge	Carex prairea	SEDGE
N Sedge	Carex sartwellii	SEDGE
N Sedge	Carex sterilis	SEDGE
N Sedge	Carex stricta	SEDGE
N Shrub	Salix lucida	SHINING WILLOW
N Shrub	Potentilla fruticosa	SHRUBBY CINQUEFOIL
N Forb	Gentianopsis procera	SMALL FRINGED GENTIAN
N Sedge	Eleocharis rostellata	SPIKE-RUSH
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Forb	Solidago rigida	STIFF GOLDENROD
N Forb	Asclepias incarnata	SWAMP MILKWEED
N Shrub	Rosa palustris	SWAMP ROSE
N Forb	Saxifraga pensylvanica	SWAMP SAXIFRAGE
N Forb	Pedicularis lanceolata	SWAMP-BETONY, LOUSEWORT
N Tree	Larix laricina	TAMARACK, LARCH
N Sedge	Scirpus americanus	THREE-SQUARE, BULRUSH
N Forb	Lysimachia thyrsiflora	TUFTED LOOSESTRIFE
N Sedge	Cladium mariscoides	TWIG-RUSH
N Forb	Lysimachia quadriflora	WHORLED LOOSESTRIFE
N Shrub	Ilex verticillata	WINTERBERRY, MICHIGAN HOLLY

Huron Swamp – Southern Mesic Forest

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Cornus alternifolia	ALTERNATE-LEAVED DOGWOOD
N Tree	Fagus grandifolia	AMERICAN BEECH
N Forb	Galium aparine	ANNUAL BEDSTRAW
N Forb	Uvularia grandiflora	BELLWORT
N Tree	Populus grandidentata	BIG-TOOTHED or LARGE-TOOTHED ASPEN
N Tree	Carya cordiformis	BITTERNUT HICKORY
N Forb	Caulophyllum thalictroides	BLUE COHOSH
N Forb	Solidago caesia	BLUE-STEMMED GOLDENROD
N Grass	Hystrix patula	BOTTLEBRUSH GRASS
N Fern	Pteridium aquilinum	BRACKEN FERN
N Vine	Smilax tamnoides	BRISTLY GREEN-BRIER
N Shrub	Prunus virginiana	CHOKE CHERRY
N Fern	Polystichum acrostichoides	CHRISTMAS FERN
N Fern	Osmunda cinnamomea	CINNAMON FERN
N Forb	Trillium grandiflorum	COMMON TRILLIUM
N Forb	Luzula multiflora	COMMON WOOD RUSH
N Forb	Polygonatum pubescens	DOWNY SOLOMON SEAL
N Forb	Panax trifolius	DWARF GINSENG
N Forb	Thalictrum dioicum	EARLY MEADOW-RUE
N Forb	Circaea lutetiana	ENCHANTER'S-NIGHTSHADE
N Forb	Floerkea proserpinacoides	FALSE MERMAID
N Forb	Smilacina racemosa	FALSE SPIKENARD
N Fern	Dryopteris intermedia	GLANDULAR or EVERGREEN WOODFERN
N Forb	Cryptotaenia canadensis	HONEWORT
N Tree	Carpinus caroliniana	HORNBEAM; BLUE-BEECH
N Fern	Osmunda claytoniana	INTERRUPTED FERN
N Tree	Ostrya virginiana	IRONWOOD; HOP HORNBEAM
N Forb	Arisaema triphyllum	JACK-IN-THE-PULPIT, INDIAN-TURNIP

A Shrub	ROSA MULTIFLORA	JAPANESE or MULTIFLORA ROSE
N Forb	Polygonum virginianum	JUMPSEED
N Fern	Athyrium filix-femina	LADY FERN
N Shrub	Dirca palustris	LEATHERWOOD
N Tree	Tilia americana	LINDEN, BASSWOOD
N Grass	Brachyelytrum erectum	LONG-AWNED WOOD GRASS
N Fern	Adiantum pedatum	MAIDENHAIR FERN
N Shrub	Viburnum acerifolium	MAPLE-LEAVED ARROW-WOOD
N Fern	Equisetum palustre	MARSH-HORSETAIL
N Forb	Podophyllum peltatum	MAY APPLE, MANDRAKE
N Grass	Festuca subverticillata	NODDING FESCUE
N Forb	Potentilla simplex	OLD-FIELD or COMMON CINQUEFOIL
N Forb	Asclepias exaltata	POKE MILKWEED
N Shrub	Ribes cynosbati	PRICKLY or WILD GOOSEBERRY
N Tree	Populus tremuloides	QUAKING ASPEN
N Vine	Lonicera dioica	RED HONEYSUCKLE
N Tree	Acer rubrum	RED MAPLE
N Tree	Quercus rubra	RED OAK
N Forb	Solidago rugosa	ROUGH GOLDENROD
N Grass	Oryzopsis asperifolia	ROUGH-LEAVED RICE-GRASS
N Forb	Hepatica americana	ROUND-LOBED HEPATICA
N Forb	Anemonella thalictroides	RUE ANEMONE
N Sedge	Carex albursina	SEDGE
N Sedge	Carex amphibola	SEDGE
N Sedge	Carex crinita	SEDGE
N Sedge	Carex gracillima	SEDGE
N Sedge	Carex intumescens	SEDGE
N Sedge	Carex pedunculata	SEDGE
N Sedge	Carex pensylvanica	SEDGE
N Forb	Hepatica acutiloba	SHARP-LOBED HEPATICA
N Tree	Carya ovata	SHELLBARK or SHAGBARK HICKORY
N Forb	Symplocarpus foetidus	SKUNK-CABBAGE
N Forb	Galium trifidum	SMALL BEDSTRAW
N Forb	Ranunculus abortivus	SMALL-FLOWERED BUTTERCUP
N Forb	Corallorhiza maculata	SPOTTED or LARGE CORAL-ROOT
N Forb	Cardamine bulbosa	SPRING CRESS
N Tree	Acer saccharum	SUGAR MAPLE; HARD MAPLE
N Forb	Pedicularis lanceolata	SWAMP-BETONY; LOUSEWORT
N Forb	Dentaria diphylla	TWO-LEAVED TOOTHWORT
N Vine	Parthenocissus quinquefolia	VIRGINIA CREEPER
N Forb	Polygonum amphibium	WATER SMARTWEED
N Tree	Fraxinus americana	WHITE ASH
N Forb	Geum canadense	WHITE AVENS
N Forb	Actaea pachypoda	WHITE BANEBERRY, DOLL'S-EYES
N Forb	Prenanthes alba	WHITE LETTUCE; RATTLESNAKE-ROOT
N Tree	Quercus alba	WHITE OAK
N Forb	Galium circaezans	WHITE WILD LICORICE
N Tree	Prunus serotina	WILD BLACK CHERRY
N Forb	Geranium maculatum	WILD GERANIUM
N Shrub	Hamamelis virginiana	WITCH-HAZEL
N Forb	Anemone quinquefolia	WOOD ANEMONE
N Forb	Phlox divaricata	WOODLAND PHLOX
N Forb	Erythronium americanum	YELLOW TROUT LILY
N Forb	Viola pubescens	YELLOW VIOLET

Huron Swamp - Southern Swamp

Native/Adventive Physiography	Scientific Name	Common Name
N Forb	Mitella diphylla	BISHOP'S CAP
N Tree	Fraxinus nigra	BLACK ASH
N Forb	Pilea fontana	BOG CLEARWEED
N Forb	Solidago uliginosa	BOG GOLDENROD
N Forb	Maianthemum canadense	CANADA MAYFLOWER; LILY-OF-THE-VALLEY
N Fern	Osmunda cinnamomea	CINNAMON FERN
N Shrub	Rubus allegheniensis	COMMON BLACKBERRY
N Forb	Eupatorium perfoliatum	COMMON BONESET
N Fern	Equisetum arvense	COMMON or FIELD HORSETAIL
N Forb	Trillium grandiflorum	COMMON TRILLIUM
N Forb	Rubus pubescens	DWARF RASPBERRY
N Forb	Thalictrum dioicum	EARLY MEADOW-RUE
N Forb	Tiarella cordifolia	FOAMFLOWER; FALSE MITERWORT
N Grass	Glyceria striata	FOWL MANNA GRASS
N Grass	Poa palustris	FOWL MEADOW GRASS
N Forb	Senecio aureus	GOLDEN RAGWORT
N Shrub	Cornus foemina	GRAY DOGWOOD
N Forb	Apios americana	GROUNDNUT; INDIAN-POTATO
N Shrub	Viburnum opulus americanum	HIGHBUSH CRANBERRY
N Forb	Amphicarpaea bracteata	HOG-PEANUT
N Forb	Ranunculus recurvatus	HOOKED CROWFOOT
N Tree	Carpinus caroliniana	HORNBEAM, BLUE-BEECH
N Forb	Arisaema triphyllum	JACK-IN-THE-PULPIT, INDIAN-TURNIP
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Forb	Cypripedium calceolus pubescens	LARGE YELLOW LADY'S-SLIPPER
N Tree	Tilia americana	LINDEN, BASSWOOD
N Fern	Thelypteris palustris	MARSH FERN
N Forb	Caltha palustris	MARSH-MARIGOLD; COWSLIP
N Forb	Mitella nuda	NAKED MITERWORT
N Shrub	Viburnum lentago	NANNYBERRY; SHEEPBERRY
A Forb	TYPHA ANGUSTIFOLIA	NARROW-LEAVED CAT-TAIL
N Vine	Toxicodendron radicans	POISON-IVY
N Forb	Geum rivale	PURPLE AVENS
N Tree	Populus tremuloides	QUAKING ASPEN
N Fern	Botrychium virginianum	RATTLESNAKE FERN
N Tree	Fraxinus pennsylvanica	RED ASH
N Tree	Acer rubrum	RED MAPLE
N Grass	Phalaris arundinacea	REED CANARY GRASS
N Vine	Vitis riparia	RIVERBANK GRAPE
N Forb	Galium asprellum	ROUGH BEDSTRAW
N Fern	Osmunda regalis	ROYAL FERN
N Sedge	Carex bromoides	SEDGE
N Sedge	Carex interior	SEDGE
N Sedge	Carex lacustris	SEDGE
N Sedge	Carex stipata	SEDGE
N Sedge	Carex stricta	SEDGE
N Fern	Onoclea sensibilis	SENSITIVE FERN
N Forb	Symplocarpus foetidus	SKUNK-CABBAGE
N Forb	Juncus effusus	SOFT-STEMMED RUSH

N Forb	Iris virginica	SOUTHERN BLUE FLAG
N Shrub	Lindera benzoin	SPICEBUSH
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Forb	Trientalis borealis	STARFLOWER
N Forb	Smilacina stellata	STARRY FALSE SOLOMON-SEAL
N Tree	Acer saccharum	SUGAR MAPLE, HARD MAPLE
N Forb	Aster puniceus	SWAMP ASTER
N Forb	Asclepias incarnata	SWAMP MILKWEED
N Shrub	Ribes triste	SWAMP RED CURRANT
N Shrub	Rosa palustris	SWAMP ROSE
N Tree	Quercus bicolor	SWAMP WHITE OAK
N Forb	Aster umbellatus	TALL FLAT-TOP WHITE ASTER
N Forb	Lysimachia thyrsiflora	TUFTED LOOSESTRIFE
N Forb	Cicuta maculata	WATER HEMLOCK
N Fern	Equisetum fluviatile	WATER HORSETAIL
N Forb	Alisma plantago-aquatica	WATER-PLANTAIN
N Grass	Leersia virginica	WHITE GRASS
N Forb	Prenanthes alba	WHITE LETTUCE; RATTLESNAKE-ROOT
N Tree	Quercus alba	WHITE OAK
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Forb	Aralia nudicaulis	WILD SARSAPARILLA
N Shrub	Ilex verticillata	WINTERBERRY, MICHIGAN HOLLY
N Forb	Anemone quinquefolia	WOOD ANEMONE
N Forb	Laportea canadensis	WOOD NETTLE
N Sedge	Carex rosea	WOOD SEDGE
N Tree	Betula alleghaniensis	YELLOW BIRCH

Huron Swamp – Pine Plantation
This area was not surveyed

Huron Swamp – Southern Shrub-Carr
This area was not surveyed.

I-75 WOODS

Site Ecological Report

Directions to Site
The I-75 Woods site lies just east of the hamlet of Davisburg along the Shiawassee River between Dilley Road and I-75. The western portion of the site is state land and can be accessed directly from Dilley Road, just south of Davisburg Road A small pull-off area is located on the northwest corner of the property Access to other portions of the site will require permission from the various private landowners that own portions of the site.

General Site Description
The I-75 Woods site is located in the Shiawassee watershed in northwestern Oakland County in the northern portion of the Jackson Interlobate sub-subsection (Albert 1994) This region lies between the extensions of two glacial lobes that extended into southern Michigan approximately 16,000 years ago With its varied topography, the I-75 site typifies the complexity of this region and its complicated glacial history. The primary area of the site is approximately 425 acres and includes a portion of the broad Shiawassee River channel surrounded by a complex of ridges and scattered depressions The northwest portion of the site forms a large, predominantly wetland complex comprised of wooded, shrub, and herbaceous communities that drain into Davisburg Trout Pond and ultimately into the Shiawassee River. Davisburg Pond is a result of the small dam placed along the river channel. This pond is fed by several small tributaries that flow through a variety of natural communities located both on and off the site The central and eastern portions of the site are primarily rolling wooded uplands with scattered depressions that range from small vernal pools and large ponds with submergent and emergent aquatic vegetation to small pockets of lowland hardwoods. Several kames, conical shaped hills of sand and gravel deposited by the meltwaters of the receding glaciers, are found among the upland features

The wetlands within and directly surrounding the Shiawassee River channel and its tributaries form a mosaic that consists predominantly of southern shrub-carr and southern wet meadow with scattered patches of prairie fen. A tamarack swamp and upland oak-hickory forest border the south side of Davisburg Pond, and degraded oak barrens are found on its northwest border. A small, isolated stand of red pine also occurs in the middle of the wetlands on the northwest side of the river channel Of the wetland communities, prairie fen is the most unique, found only in the glaciated interlobate region of the Midwest where cold, calcareous water seeps from the ground Small areas of prairie fen occur in the wetlands south of Davisburg Pond and along the channel of the small tributary located in the southern portion of the site. Among these fen pockets are two small occurrences of a form of prairie fen known as a hanging fen Hanging fens occur on relatively steep slopes

Forested uplands dominate the eastern two thirds of the site, with pockets of wetland vegetation found in the numerous vernal pools and larger ponds. Small pockets of southern swamp, a deciduous wooded wetland community, border the scattered depressions primarily in the northern portions of the site In several places, these forested wetlands merge into large areas of shrub-carr or emergent marsh surrounding open water The uplands are predominantly vegetated by closed canopy forests of oak and hickory species Where sunlight is able to reach the forest floor, dry sand prairie species are evident. These species are associated with the oak barrens that were widespread in this region prior to European settlement Several old abandoned fields are found at the site and are almost completely dominated by exotic plant species One of these openings, however, contains a significant number and abundance of native dry and sand prairie plant species.

Summary of Ecological Significance
This site contains a large, high quality, and highly diverse wetland complex that lies along a stream corridor and a large upland forest interspersed with numerous wetland depressions. The juxtaposition and diversity of uplands and wetlands at this site is important for many species requiring differing habitats for different parts of their life history such as amphibians, reptiles, songbirds, and raptors The close proximity of the I-75 Woods site to several other key sites, including the Long Lake and Rattalee Lake sites (also located along the Shiawassee River corridor), illustrates the significance of the I-75 Woods from a landscape scale.

The wetlands within the site are primarily located along the Shiawassee River, Davisburg Pond, and tributaries

that flow into the pond This wetland complex consists of a mosaic of southern shrub-carr, southern wet meadow, prairie fen, and relict conifer swamp Over 95 native species were documented in this wetland complex, with sedges and grasses comprising over 24% of the flora The numerous pockets of prairie fen, including the two hanging fens, that occur within the complex represent a community type that is restricted to glaciated portions of the Midwest, and in Michigan to the interlobate sub-subsection. Calcareous-loving species such as tamarack *(Larix laricina)*, shrubby cinquefoil *(Potentilla fruticosa)*, Ohio goldenrod *(Solidago ohioensis)* and a diversity of sedges including *Carex prairea* and *Carex sterilis* characterize the prairie fen. In several areas, calcium precipitate, known as marl, has formed at the surface creating a white substrate where characteristic species such as grass-of-parnassus (*Parnassia glauca*) are found. Relict conifer swamp is characterized by a dominance of tamarack in the overstory and typical understory species include poison sumac (*Toxicodendron vernix*), Michigan holly (*Ilex verticillata*), and alder-leafed buckthorn (*Rhamnus alnifolia*) The southern wet meadow and shrub-carr matrix surrounding these prairie fen pockets, is dominated by more widespread species such as red-osier dogwood (*Cornus stolonifera*), tussock sedge (*Carex stricta*) and Joe-pye weed (*Eupatorium maculatum*). These species are more tolerant of the higher water levels typical of these communities. Purple loosestrife (*Lythrum salicaria*), an aggressive wetland exotic plant, occurred in several of the wetlands at the site but was not widespread The high diversity of native species, limited impact by invasive species, and lack of direct disturbances, are among the factors categorizing this as a high quality complex.

None of the rare plant or animal species associated with prairie fen was found during the 1998 field surveys. Considering the heterogeneity of the site and the large variance in optimal survey times for different species, further survey work is warranted. This is particularly true for the area immediately east of Davisburg Pond. This area was not explored due to the lack of landowner permissions. Potential plant species which may occur here and in the other pockets of prairie fen include· small white lady's slipper (*Cypripedium candidum*), listed by the state as threatened, prairie dropseed (*Sporobolus heterolepis*), state listed as threatened, edible valerian (*Valeriana ciliatus*), state listed as threatened, Richardson's sedge (*Carex richardsonii*) state listed as special concern, and mat muhly (*Muhlenbergia rechardsonis*), state listed as threatened. Further survey work is also warranted along the edges of the fen where wetland grades into upland. This area has the potential to harbor several rare prairie species such as furrowed flax (*Linum sulcatum*), state listed as special concern, and Virginia flax (*Linum virginianum*), state listed as threatened.

In addition, further survey work for rare animal species may be productive A population of compass plant (*Silphium terebinthinaceum*), the host plant for silphium borer moth (*Papaipema silphii*), state listed as threatened, was found although the moth was not observed during black-lighting efforts in 1998 However, since poor survey conditions for the moth occurred throughout the state, further surveys are recommended. The prairie fen also contains habitat which could support populations of. blazing star borer moth (*Papaipema beeriana),* state listed as special concern, swamp metalmark butterfly (*Calephelis muticum)*, state listed as special concern, red-legged spittlebug (*Prosapia ignipectus*), state listed as special concern, angular spittlebug (*Lepyronia angulifera*), state listed as special concern, and eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*), state listed as special concern In addition, the scattered pockets of relict conifer swamp contain habitat for the tamarack tree cricket (*Oecanthus laricis*), state listed as special concern, and the large matrix of shrub-carr contains habitat for copperbelly watersnake (*Nerodia erythrogaster neglecta*), federally listed as threatened and state listed as endangered.

Several emergent wetlands also occur at the site including two large marshes in the northeast portion of the site. Species that use emergent wetlands include. bull frogs (*Rana catesbiana*), green frogs (*Rana clamitans melanota*), greatblue (*Ardea herodias*) and green-backed herons (*Butorides striatus*), waterfowl soras (*Porzana carolina*), sandhill cranes (*Grus canadensis*), and common snipe *(Gallinago gallinago)*. In addition, there is potential for American bittern (*Botaurus lentiginosus*), state listed as special concern, and king rail (*Rallus elegans*), state listed as endangered, to occur in the southern wet meadows, emergent marshes, and prairie fens.

The uplands are predominantly closed canopy oak forest with mature white and black oaks (*Quercus alba, Q velutina*), and pignut hickory (*Carya glabra*) dominant in the canopy layer Understory tree species include red maple (*Acer rubrum*), white ash (*Fraxinus americana*), black cherry (*Prunus serotina*) and blackberry (*Rubus* spp.). There was little evidence of oak regeneration. With over 81 native species documented in the uplands, the oak forests are

considered to have relatively high species diversity Common species of the ground layer include common potentilla (*Potentilla simplex*), bedstraw (*Galium* spp), tick trefoils (*Desmodium* spp), enchanter's nightshade (*Circaea lutetiana*), and Pennsylvania sedge (*Carex pensylvanica*) Typical invasive species in the southern portion of the uplands include barberry (*Berberis thunbergii*) and honeysuckle (*Lonicera* is something missing here?) Garlic mustard (*Alliaria petiolata*), an aggressive woodland exotic, was found in the northern portion of the site It is hard to tell exactly how much of the existing uplands may have been forested historically. It is likely that oak barrens occupied all but the steepest slopes Due to fire suppression, these open oak barrens have since succeeded to closed canopy oak forest

Of particular note is a small-forested kame located in the west portion of the site near the railroad tracks The southern dry-mesic forest here is dominated by large black and white oaks with numerous gaps in the canopy that allow light to penetrate to the forest floor As a result, a significantly higher number of species typical of oak barrens were noted here than anywhere else that was surveyed at the I-75 Woods site These include species such as hazelnut (*Corylus americana*), bastard toadflax (*Comandra umbellata*), rockrose (*Helianthemum bicknellii*), hairy bush-clover (*Lespedeza hirta*), and common wood rush (*Luzula multiflora*) Due to the open community structure and species composition, this area has good potential for oak barrens restoration.

Numerous vernal pools are scattered throughout the oak-hickory forests in the eastern portion of the site These vernal pools are critical habitat to many amphibians such as the spotted *salamander (Ambystoma maculatum*), eastern tiger salamander (*Ambystoma tigrinum tigrinum*), and wood frog (*Rana sylvatica*). These species use vernal pools for mating egg laying, and feeding during the aquatic phase of their life cycle. The vernal pools also provide an important food source for resident and migrant neo-tropical birds, which feed on newly emerged insects during the spring The upland oaks provide ideal springtime foraging habitat to warblers who glean invertebrates off the catkins. Moreover, the forest complex at the site offers good breeding habitat for numerous forest interior species. This is particularly important because many species of forest interior songbirds have recently experienced sharp population declines, primarily due to forest fragmentation.

Potential animal species associated with upland forests that may occur at this site include red-shouldered hawk (*Buteo lineatus*), state listed as threatened, Cooper's hawk, (*Accipiter cooperi*), state listed as special concern, and several rare forest interior species such as cerulean warbler (*Dendroica cerulea*), state listed as special concern, and hooded warbler (*Wilsonia citrina*), state listed as special concern

Only a few abandoned old fields were surveyed in the primary area of the site, although numerous mowed trails through the wooded portion are regularly maintained and add to the extent of old field habitat. In addition, aerial photographs reveal numerous additional old fields in the central portion of the site This area was not surveyed due to a lack of landowner permission The vast majority of old fields and trails are dominated by exotic plant species such as brome grass (*Bromus inermis*), queen Anne's lace (*Daucus carota*), spotted knapweed (*Centaurea maculosa*), and several hawkweed species (*Hieracium).* However, several dry sand prairie species are found interspersed in the old fields including milkweed (*Asclepias tuberosa*), wild bergamot (*Monarda fistulosa*), and little bluestem (*Andropogon scoparius*). One opening, located in the southern portion of the site adjacent to the railroad tracks, contains a significant number and diversity of prairie plants and would be a good site for prairie restoration Some of the plants found in this opening include big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), stiff goldenrod (*Solidago rigida*), showy goldenrod (*S speciosa*), and wild lupine (*Lupinus perennis*). The old fields and openings also have some potential to house a variety of native grassland bird species including the vesper sparrow (*Pooecetes gramineus*), savannah sparrow (*Passerculus sandwichensis*), and grasshopper sparrow (*Ammodramus savannarum*) Since one of the old fields borders a prairie fen, it could also provide summer habitat for eastern massasauga rattlesnake. In addition, the occurrence of wild blue lupine in the openings provides potential habitat for the following animal species: Karner blue butterfly (*Lycaeides melissa samuelis*), federally endangered and state threatened, frosted elfin (*Incisalia irus*), state threatened, and Persius duskywing (*Erynnis persius persius*), state threatened.

Evidence of Disturbance

This site has seen considerable amounts of disturbance in the past, having likely been logged, hayed and/or grazed throughout Exotic species are found over much of the uplands, especially in the old field openings and along the numerous trails. Exotic species are less evident in the wetlands, however several

species were noted. Hydrologically, the rate, volume, and natural fluctuations of water flow through the Shiawassee River corridor has been altered by the dam located at the base of Davisburg Trout Pond

Threats

The most immediate threat evident at the I-75 Woods site is the continued spread of exotic species in both the upland and wetland communities Although not yet a serious problem for much of the site, several significant invasive species have a foothold and will spread if not controlled immediately. Barberry, and honeysuckle were found in fairly high numbers in the southern portion of the oak woods, small amounts of garlic mustard were observed in the northern portion, and numerous additional exotic species are well established in the old fields and trails. Likewise, in the wetlands, red top (*Agrostis gigantea*) and purple loosestrife are already present. Birds and mammals can spread seeds along the wetland corridor and established upland trails, and eventually into the forest interior Early control of these exotic species, especially garlic mustard and purple loosestrife, can be of considerable ecological and economic value, since once established, they are extremely difficult to control and are capable of outcompeting many native plants.

The disruption of the natural hydrology is another major threat to the prairie fen Any factors affecting aquifer recharge, ground water flow, or water chemistry will impact the prairie fen. Detrimental effects on hydrology can occur through water consumption from groundwater recharge areas due to shallow water wells, water diversion due to drain tiles or ditches, impervious surfaces (such as parking lots, roads and roofs) and urban areas with storm water sewers Drawdown of the water table within the fen can occur from ditches placed perpendicular to the flow of water or ponds created at the edge of the fen. Trampling in the fen can directly kill plants and change the pattern of water flow Negative impacts due to deterioration of water quality can result from overuse of fertilizers and herbicides from nearby areas or leaky septic systems that leak nutrients and contaminants into the groundwater. Finally, habitat fragmentation, one of the most prevalent results of development, can alter hydrology, isolate plant and animal populations, and increase predation on turtle and bird nests.

Ecological Boundary Explanation

The ***primary boundary*** of the site represents the primarily intact wetland and forest complex where intensive disturbance is absent The northern and southern boundaries are defined by the quality of natural communities while the east boundary is formed by Interstate-75, and the railroad tracks and Dilley Road define the west boundary.

The ***secondary boundary*** represents the approximate area needed to maintain the natural features within the primary boundary The secondary boundary primarily extends northward and southward to include tributaries that drain into the wetland complexes, and to provide a buffer for the uplands in the eastern portion of the site To the north, the boundary extends to include portions of the Eliza Lake site, which was identified by the Michigan Natural Features Inventory (MNFI) during the site identification phase of this project. One of the small tributaries that feed into Davisburg Pond originates here The southern boundary begins just south of Shiawassee Lake, runs along the eastern watershed boundary of the tributary originating from the lake, and finally follows Clark Road east to I-75. The eastern boundary extends to I-75 and the western boundary extends the primary boundary along Dilley Road south along the western watershed boundary of the tributary originating from Shiawassee Lake. The southern portion of the secondary boundary contains a large portion of the Shiawassee Lake site, which was identified by MNFI during the site identification phase of the project.

Stewardship Considerations

Primary boundary: Because of the quality of this site and the relative fragility of the prairie fens and relict tamarack swamps, the wetland complex should be afforded maximum protection from disturbance. No grazing, timber cutting, ORV traffic, or mountain biking should be allowed. Excessive foot traffic should be minimized. Additional development within the primary site should be avoided, minimized, or designed to have minimal impact. Immediate steps should be taken to eliminate purple loosestrife in the wetland complex and a yearly monitoring plan for this and other exotic species should be developed and implemented. The use of prescribed burning as a management tool should be considered Prescribed burns would benefit the prairie fen by reducing shrub and tree growth and enhancing conditions for the establishment of prairie species. Prescribed burns, however, should be planned carefully ahead of time in order to reduce any negative impacts on insect and herp (amphibian and reptile) populations and to determine appropriate fire frequency for enhancement of conditions suitable for seedling establishment.

Similarly, in the uplands, immediate control of garlic mustard should be undertaken and a yearly monitoring

plan for this and other exotic species should be developed and implemented The use of prescribed burning as an aid to control the spread of exotic species would likely be effective Burning in conjunction with tree thinning would have the added benefit of encouraging oak regeneration, which is currently lacking in the southern dry-mesic forests Although much of the forest should be retained intact for its benefit to breeding birds, portions of this upland are particularly conducive to prairie or oak barrens restoration through fire management and if necessary, supplemental seeding with prairie species. The openings in the southern portion of the site adjacent to the railroad tracks as well as the forested kame in the southwest section of the site, already contain numerous prairies species and are probably the best places to implement a prairie and oak barrens restoration project. In addition, both sites can provide a local seed source for future prairie or oak barrens restoration projects in the area. Due to a lack of landowner permission, the central portion of the site was not surveyed This area appears to contain several old fields with scattered trees that may be remnant oak barrens or contain remnant prairie species This area also appears to contain a relict conifer swamp, prairie fen, southern wet meadow, and southern dry-mesic forest Future surveys in this area will reveal the extent of various natural communities within the site as well as determine appropriate sites for oak barren restoration

Secondary boundary: This area currently consists of residential development, old fields, agricultural lands, small tributaries, a small lake, and several natural communities including. relict conifer swamp, shrub-carr and southern wet meadow The primary concerns in this area are· the water quality of the tributaries, ground water recharge near prairie fens and relict conifer swamps, runoff, and a buffer for the forested area in the eastern portion of the site. Future development within this area should be designed to maximize natural open space and provide a buffer to the primary boundary Any development that occurs should be required to address surface water runoff, percolation, and ground water consumption Stewardship recommendations include minimizing the size of lawns, landscaping with native plants, particularly prairie species, keeping precipitation on-site (especially on ridge tops), requiring wells to be drilled to a depth below the aquifer that supports the fen, and maintaining septic systems In addition, landowners immediately adjacent to the primary site should be encouraged to manage their lands as a natural buffer to the adjacent natural communities Softening the edge between the oak-hickory forest and adjacent open lands by allowing natural woody plant growth or planting appropriate native shrubs and trees is also recommended

Recommendation for Future Studies

Additional surveys for prairie fens and relict tamarack swamps and associated plant and insect species are strongly recommended, particularly east of Davisburg Pond if permission for access can be obtained Additional surveys for grassland birds in the old fields and openings, reptiles such as massasauga rattlesnake and copperbelly watersnake in the wetlands, and red-shouldered hawk and Cooper's hawk nests in the forested areas are also recommended. A detailed hydrologic study should be undertaken to collect baseline data on the hydrologic regime and water quality of the Shiawassee River corridor and tributaries. This information can be used to monitor any hydrologic or water chemistry changes over time that may impact the large wetland complex and the Shiawassee River system. Lastly, a detailed assessment of potential upland prairie or oak barren restoration areas should be undertaken in order to determine management priorities, goals, and objectives in the uplands.

Literature Cited:

Albert, D.A. 1994 Regional Landscape Ecosystems of Michigan, Minnesota and Wisconsin: A Working Map and Classification. USDA Forest Service, North Central Forest Experiment Station, General Technical Report NC-178

Field Surveys

Key for terminology used in the following field surveys

N	(Native) – Species that are native to Michigan
A	(Adventive) – Species that have been introduced and are not native to Michigan
Fern	A leafy plant with leaves undivided or divided several times into leaflets
Forb	A herbaceous plant with broad leaves, excluding the grasses and grasslike plants; a type of flowering herb
Grass	Plants, whose characteristics include stems that are jointed at nodes, are hollow and have sheathing leaves
Sedge	A tufted marsh plant, differing from the related grasses in having a one-seeded fruit and solid stems.
Shrub	A woody perennial plant, typically lower than most trees, having multiple stems that branch from the base without a well-defined main stem
Tree	A woody plant characterized by one main trunk, bearing a more or less distinct and elevated crown of branches Typically, trees are larger than shrubs
Vine	A plant whose stem requires support and which climbs by tendrils or twining or creeps along the ground
<T>	Species that is state listed as threatened
<SC>	Species that is state listed as of special concern

Animal Survey List
I-75 Woods

There was no animal survey conducted at the I-75 Woods site.

Plant Survey List
I-75 Woods

(Based on MNFI's surveys or incidental observations in 1998)

I-75 Woods – Southern Dry-Mesic Forest

Native/Adventive Physiography	Scientific Name	Common Name
N Vine	Celastrus scandens	AMERICAN or CLIMBING BITTERSWEET
N Forb	Galium áparine	ANNUAL BEDSTRAW
N Tree	Populus grandidentata	BIG-TOOTHED or LARGE-TOOTHED ASPEN
N Fern	Pteridium aquilinum	BRACKEN FERN
A Grass	POA COMPRESSA	CANADA BLUEGRASS
N Forb	Desmodium glutinosum	CLUSTERED-LEAVED TICK-TREFOIL
N Shrub	Rubus allegheniensis	COMMON BLACKBERRY
N Forb	Circaea lutetiana	ENCHANTER'S-NIGHTSHADE
N Forb	Galium triflorum	FRAGRANT BEDSTRAW
N Shrub	Rhus aromatica	FRAGRANT SUMAC
A Forb	ALLIARIA PETIOLATA	GARLIC MUSTARD
N Shrub	Cornus foemina	GRAY DOGWOOD
N Shrub	Corylus americana	HAZELNUT
N Forb	Cryptotaenia canadensis	HONEWORT
A Shrub	BERBERIS THUNBERGII	JAPANESE BARBERRY

A Shrub	ROSA MULTIFLORA	JAPANESE or MULTIFLORA ROSE
N Forb	Polygonum virginianum	JUMPSEED
N Fern	Athyrium filix-femina	LADY FERN
N Tree	Tilia americana	LINDEN, BASSWOOD
N Fern	Adiantum pedatum	MAIDENHAIR FERN
N Vine	Menispermum canadense	MOONSEED
N Forb	Desmodium nudiflorum	NAKED TICK-TREFOIL
N Forb	Potentilla simplex	OLD-FIELD or COMMON CINQUEFOIL
N Tree	Carya glabra	PIGNUT HICKORY
N Tree	Quercus palustris	PIN OAK
N Tree	Acer rubrum	RED MAPLE
N Tree	Quercus rubra	RED OAK
N Tree	Juniperus virginiana	RED-CEDAR
N Shrub	Euonymus obovata	RUNNING STRAWBERRY BUSH
N Tree	Sassafras albidum	SASSAFRAS
N Sedge	Carex pensylvanica	SEDGE
N Tree	Carya ovata	SHELLBARK or SHAGBARK HICKORY
N Forb	Desmodium canadense	SHOWY TICK-TREFOIL
N Shrub	Viburnum dentatum	SMOOTH ARROW-WOOD
N Vine	Parthenocissus quinquefolia	VIRGINIA CREEPER
N Tree	Fraxinus americana	WHITE ASH
N Tree	Quercus alba	WHITE OAK
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Tree	Prunus serotina	WILD BLACK CHERRY
N Shrub	Rubus strigosus	WILD RED RASPBERRY
N Shrub	Hamamelis virginiana	WITCH-HAZEL

I-75 Woods - Ponds

This survey of plant species was taken along the edges of open water

Native/Adventive Physiography	Scientific Name	Common Name
A Vine	SOLANUM DULCAMARA	BITTERSWEET NIGHTSHADE
N Shrub	Cephalanthus occidentalis	BUTTONBUSH
N Forb	Maianthemum canadense	CANADA MAYFLOWER, LILY-OF-THE-VALLEY
N Grass	Leersia oryzoides	CUT GRASS
N Forb	Rubus pubescens	DWARF RASPBERRY
N Forb	Boehmeria cylindrica	FALSE NETTLE
N Grass	Glyceria striata	FOWL MANNA GRASS
N Shrub	Cornus foemina	GRAY DOGWOOD
N Forb	Scutellaria lateriflora	MAD-DOG SKULLCAP
N Forb	Triadenum fraseri	MARSH ST. JOHN'S-WORT
N Grass	Phalaris arundinacea	REED CANARY GRASS
N Fern	Osmunda regalis	ROYAL FERN
N Sedge	Carex comosa	SEDGE
N Fern	Onoclea sensibilis	SENSITIVE FERN
N Fern	Dryopteris carthusiana	SPINULOSE WOODFERN
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Forb	Sium suave	WATER-PARSNIP
N Forb	Alisma plantago-aquatica	WATER-PLANTAIN
N Shrub	Salix eriocephala	WILLOW
N Shrub	Ilex verticillata	WINTERBERRY; MICHIGAN HOLLY

I-75 Woods – Relict Conifer Swamp

Native/Adventive Physiography	Scientific Name	Common Name
N Shrub	Rhamnus alnifolia	ALDER-LEAVED BUCKTHORN
N Tree	Fraxinus nigra	BLACK ASH
N Forb	Apios americana	GROUNDNUT, INDIAN-POTATO
N Tree	Tilia americana	LINDEN, BASSWOOD
N Shrub	Toxicodendron vernix	POISON SUMAC
N Forb	Geum rivale	PURPLE AVENS
N Forb	Solidago rugosa	ROUGH GOLDENROD
N Forb	Cypripedium reginae	SHOWY or QUEEN'S LADY-SLIPPER
N Tree	Larix laricina	TAMARACK, LARCH
N Forb	Zigadenus glaucus	WHITE CAMAS
N Shrub	Ribes americanum	WILD BLACK CURRANT

I-75 Woods – Southern Wet Meadow/Prairie Fen
This area is a blending of both characteristics.

Native/Adventive Physiography	Scientific Name	Common Name
N Shrub	Rhamnus alnifolia	ALDER-LEAVED BUCKTHORN
N Shrub	Salix bebbiana	BEBB'S or BEAKED WILLOW
N Grass	Andropogon gerardii	BIG BLUESTEM GRASS; TURKEYFOOT
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Forb	Galium labradoricum	BOG BEDSTRAW
N Shrub	Betula pumila	BOG BIRCH
N Forb	Lobelia kalmii	BOG LOBELIA
N Forb	Typha latifolia	BROAD-LEAVED CAT-TAIL
N Sedge	Scirpus atrovirens	BULRUSH
N Forb	Solidago canadensis	CANADA GOLDENROD
N Forb	Triglochin maritimum	COMMON BOG ARROW-GRASS
N Forb	Eupatorium perfoliatum	COMMON BONESET
N Forb	Pycnanthemum virginianum	COMMON MOUNTAIN MINT
N Forb	Scutellaria galericulata	COMMON SKULLCAP
N Forb	Lycopus americanus	COMMON WATER HOREHOUND
N Forb	Aster lanceolatus	EASTERN LINED ASTER
N Grass	Glyceria striata	FOWL MANNA GRASS
N Grass	Bromus ciliatus	FRINGED BROME
N Forb	Gentianopsis crinita	FRINGED GENTIAN
N Sedge	Eleocharis elliptica	GOLDEN-SEEDED SPIKE RUSH
N Forb	Euthamia graminifolia	GRASS-LEAVED GOLDENROD
N Forb	Parnassia glauca	GRASS-OF-PARNASSUS
N Shrub	Cornus foemina	GRAY DOGWOOD
N Forb	Rumex orbiculatus	GREAT WATER DOCK
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Grass	Muhlenbergia mexicana	LEAFY SATIN GRASS
N Forb	Campanula aparinoides	MARSH BELLFLOWER
N Grass	Muhlenbergia glomerata	MARSH WILD-TIMOTHY
A Forb	TYPHA ANGUSTIFOLIA	NARROW-LEAVED CAT-TAIL
N Shrub	Physocarpus opulifolius	NINEBARK
N Forb	Galium boreale	NORTHERN BEDSTRAW
N Forb	Viola nephrophylla	NORTHERN BOG VIOLET
N Forb	Lycopus uniflorus	NORTHERN BUGLE WEED

N Forb	Solidago ohioensis	OHIO GOLDENROD
N Shrub	Toxicodendron vernix	POISON SUMAC
A Forb	LYTHRUM SALICARIA	PURPLE LOOSESTRIFE
N Tree	Populus tremuloides	QUAKING ASPEN
N Shrub	Cornus stolonifera	RED-OSIER DOGWOOD
N Forb	Galium asprellum	ROUGH BEDSTRAW
N Forb	Juncus brachycephalus	RUSH
N Shrub	Salix candida	SAGE or HOARY WILLOW
N Shrub	Salix exigua	SANDBAR WILLOW
N Sedge	Carex flava	SEDGE
N Sedge	Carex hystericina	SEDGE
N Sedge	Carex prairea	SEDGE
N Sedge	Carex rostrata	SEDGE
N Sedge	Carex sartwellii	SEDGE
N Sedge	Carex sterilis	SEDGE
N Sedge	Carex stricta	SEDGE
N Shrub	Salix lucida	SHINING WILLOW
N Shrub	Potentilla fruticosa	SHRUBBY CINQUEFOIL
N Forb	Aster lateriflorus	SIDE-FLOWERING ASTER
N Forb	Aster laevis	SMOOTH ASTER
N Sedge	Scirpus validus	SOFTSTEM BULRUSH
N Forb	Iris virginica	SOUTHERN BLUE FLAG
N Forb	Aster puniceus	SWAMP ASTER
N Forb	Asclepias incarnata	SWAMP MILKWEED
N Forb	Pedicularis lanceolata	SWAMP-BETONY; LOUSEWORT
N Forb	Cirsium muticum	SWAMP-THISTLE
N Forb	Aster umbellatus	TALL FLAT-TOP WHITE ASTER
N Forb	Solidago altissima	TALL GOLDENROD
N Forb	Cicuta maculata	WATER HEMLOCK
A Forb	NASTURTIUM OFFICINALE	WATERCRESS
N Forb	Lysimachia quadriflora	WHORLED LOOSESTRIFE
N Forb	Mentha arvensis	WILD MINT

I-75 Woods – Old Field (Prairie Remnant)
This area is not mapped separately, but is included in the plant community category of Old Field

Native/Adventive Physiography	Scientific Name	Common Name
N Forb	Aster sagittifolius	ARROW-LEAVED ASTER
A Shrub	ELAEAGNUS UMBELLATA	AUTUMN-OLIVE
N Grass	Andropogon gerardii	BIG BLUESTEM GRASS, TURKEYFOOT
N Forb	Asclepias tuberosa	BUTTERFLY-WEED
N Forb	Solidago juncea	EARLY GOLDENROD
A Grass	BROMUS INERMIS	HUNGARIAN BROME, SMOOTH BROME
N Grass	Sorghastrum nutans	INDIAN GRASS
N Grass	Andropogon scoparius	LITTLE BLUESTEM GRASS
N Shrub	Rubus flagellaris	NORTHERN DEWBERRY
N Forb	Solidago speciosa	SHOWY GOLDENROD
N Forb	Aster laevis	SMOOTH ASTER
A Forb	CENTAUREA MACULOSA	SPOTTED KNAPWEED
N Forb	Apocynum androsaemifolium	SPREADING DOGBANE
N Forb	Solidago rigida	STIFF GOLDENROD
N Forb	Monarda fistulosa	WILD BERGAMOT
N Forb	Lupinus perennis	WILD LUPINE

N Forb	Achillea millefolium	YARROW

I-75 Woods – Old Field (Openings)
These areas are included in the plant community category of Old Field.

Native/Adventive Physiography	Scientific Name	Common Name
N Forb	Aster sagittifolius	ARROW-LEAVED ASTER
A Shrub	ELAEAGNUS UMBELLATA	AUTUMN-OLIVE
N Grass	Andropogon gerardii	BIG BLUESTEM GRASS; TURKEYFOOT
N Shrub	Rubus occidentalis	BLACK RASPBERRY
N Forb	Rudbeckia hirta	BLACK-EYED SUSAN
N Forb	Asclepias tuberosa	BUTTERFLY-WEED
N Forb	Solidago canadensis	CANADA GOLDENROD
N Forb	Euphorbia corollata	FLOWERING SPURGE
N Forb	Euthamia graminifolia	GRASS-LEAVED GOLDENROD
A Grass	BROMUS INERMIS	HUNGARIAN BROME; SMOOTH BROME
N Grass	Andropogon scoparius	LITTLE BLUESTEM GRASS
N Forb	Solidago nemoralis	OLD-FIELD GOLDENROD
A Forb	HIERACIUM AURANTIACUM	ORANGE HAWKWEED
N Vine	Vitis riparia	RIVERBANK GRAPE
N Forb	Lespedeza capitata	ROUND-HEADED BUSH-CLOVER
A Forb	CENTAUREA MACULOSA	SPOTTED KNAPWEED
N Forb	Monarda fistulosa	WILD BERGAMOT
N Tree	Prunus serotina	WILD BLACK CHERRY
A Forb	DAUCUS CAROTA	WILD CARROT; QUEEN-ANNE'S-LACE
N Forb	Achillea millefolium	YARROW
A Forb	MELILOTUS OFFICINALIS	YELLOW SWEET-CLOVER

I-75 Woods - Prairie Fen

Native/Adventive Physiography	Scientific Name	Common Name
N Shrub	Rhamnus alnifolia	ALDER-LEAVED BUCKTHORN
N Shrub	Salix bebbiana	BEBB'S or BEAKED WILLOW
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Forb	Solidago uliginosa	BOG GOLDENROD
N Forb	Lobelia kalmii	BOG LOBELIA
N Sedge	Scirpus atrovirens	BULRUSH
N Forb	Aletris farinosa	COLIC ROOT, STARGRASS
N Forb	Eupatorium perfoliatum	COMMON BONESET
N Forb	Pycnanthemum virginianum	COMMON MOUNTAIN MINT
N Forb	Lycopus americanus	COMMON WATER HOREHOUND
N Forb	Thalictrum dioicum	EARLY MEADOW-RUE
N Forb	Aster lanceolatus	EASTERN LINED ASTER
N Grass	Glyceria striata	FOWL MANNA GRASS
N Grass	Bromus ciliatus	FRINGED BROME
N Forb	Gentianopsis crinita	FRINGED GENTIAN
N Forb	Zizia aurea	GOLDEN ALEXANDERS
N Forb	Euthamia graminifolia	GRASS-LEAVED GOLDENROD
N Shrub	Cornus foemina	GRAY DOGWOOD
N Grass	Sorghastrum nutans	INDIAN GRASS
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Grass	Muhlenbergia mexicana	LEAFY SATIN GRASS

N Forb	Campanula aparinoides	MARSH BELLFLOWER
N Forb	Liatris spicata	MARSH BLAZING STAR
N Fern	Thelypteris palustris	MARSH FERN
N Forb	Parnassia palustris <T>	MARSH GRASS-OF-PARNASSUS
N Grass	Muhlenbergia glomerata	MARSH WILD-TIMOTHY
N Forb	Lilium michiganense	MICHIGAN LILY
N Forb	Galium boreale	NORTHERN BEDSTRAW
N Forb	Solidago ohioensis	OHIO GOLDENROD
N Forb	Silphium terebinthinaceum	PRAIRIE DOCK
N Shrub	Cornus stolonifera	RED-OSIER DOGWOOD
A Grass	AGROSTIS GIGANTEA	REDTOP
N Forb	Juncus brachycephalus	RUSH
N Shrub	Salix candida	SAGE or HOARY WILLOW
N Sedge	Carex diandra	SEDGE
N Sedge	Carex prairea	SEDGE
N Sedge	Carex stricta	SEDGE
N Sedge	Carex viridula	SEDGE
N Forb	Solidago speciosa	SHOWY GOLDENROD
N Forb	Cypripedium reginae	SHOWY or QUEEN'S LADY-SLIPPER
N Shrub	Potentilla fruticosa	SHRUBBY CINQUEFOIL
N Forb	Gentianopsis procera	SMALL FRINGED GENTIAN
N Sedge	Eleocharis rostellata	SPIKE-RUSH
N Forb	Hypoxis hirsuta	STAR-GRASS
N Forb	Solidago rigida	STIFF GOLDENROD
N Forb	Aster puniceus	SWAMP ASTER
N Forb	Solidago patula	SWAMP GOLDENROD
N Forb	Cirsium muticum	SWAMP-THISTLE
N Forb	Aster umbellatus	TALL FLAT-TOP WHITE ASTER
N Forb	Solidago altissima	TALL GOLDENROD
N Forb	Helianthus giganteus	TALL SUNFLOWER
N Tree	Larix laricina	TAMARACK; LARCH
N Sedge	Scirpus americanus	THREE-SQUARE; BULRUSH
N Forb	Chelone glabra	TURTLEHEAD
N Fern	Equisetum fluviatile	WATER HORSETAIL
N Forb	Prenanthes alba	WHITE LETTUCE; RATTLESNAKE-ROOT
N Tree	Ulmus americana	WHITE or AMERICAN ELM

I-75 Woods – Southern Dry-Mesic Forest

Native/Adventive Physiography	Scientific Name	Common Name
N Forb	Galium aparine	ANNUAL BEDSTRAW
A Shrub	ELAEAGNUS UMBELLATA	AUTUMN-OLIVE
N Forb	Comandra umbellata	BASTARD-TOADFLAX
N Forb	Uvularia grandiflora	BELLWORT
N Forb	Aster macrophyllus	BIG-LEAVED ASTER
N Tree	Populus grandidentata	BIG-TOOTHED or LARGE-TOOTHED ASPEN
N Shrub	Rubus occidentalis	BLACK RASPBERRY
N Forb	Rudbeckia hirta	BLACK-EYED SUSAN
N Tree	Quercus velutina	BLACK OAK
N Shrub	Vaccinium angustifolium	BLUEBERRY
N Forb	Solidago caesia	BLUE-STEMMED GOLDENROD
N Grass	Hystrix patula	BOTTLEBRUSH GRASS
N Fern	Pteridium aquilinum	BRACKEN FERN

N Vine	Smilax tamnoides	BRISTLY GREEN-BRIER
N Grass	Panicum latifolium	BROAD-LEAVED PANIC GRASS
N Forb	Lespedeza intermedia	BUSH-CLOVER
N Shrub	Vaccinium myrtilloides	CANADA BLUEBERRY
A Grass	POA COMPRESSA	CANADA BLUEGRASS
N Shrub	Prunus virginiana	CHOKE CHERRY
N Forb	Desmodium glutinosum	CLUSTERED-LEAVED TICK-TREFOIL
N Shrub	Rubus allegheniensis	COMMON BLACKBERRY
N Shrub	Juniperus communis	COMMON or GROUND JUNIPER
N Forb	Trillium grandiflorum	COMMON TRILLIUM
N Forb	Luzula multiflora	COMMON WOOD RUSH
N Shrub	Viburnum rafinesquianum	DOWNY ARROW-WOOD
N Forb	Polygonatum pubescens	DOWNY SOLOMON SEAL
N Forb	Solidago juncea	EARLY GOLDENROD
N Forb	Thalictrum dioicum	EARLY MEADOW-RUE
A Shrub	VIBURNUM OPULUS	EUROPEAN HIGHBUSH CRANBERRY
N Forb	Zizia aurea	GOLDEN ALEXANDERS
N Forb	Parnassia glauca	GRASS-OF-PARNASSUS
N Shrub	Cornus foemina	GRAY DOGWOOD
N Forb	Lespedeza hirta	HAIRY BUSH-CLOVER
N Shrub	Corylus americana	HAZELNUT
N Forb	Amphicarpaea bracteata	HOG-PEANUT
N Tree	Carpinus caroliniana	HORNBEAM, BLUE-BEECH
N Forb	Triosteum aurantiacum	HORSE-GENTIAN
N Forb	Monotropa uniflora	INDIAN PIPE
N Tree	Ostrya virginiana	IRONWOOD; HOP HORNBEAM
N Forb	Arisaema triphyllum	JACK-IN-THE-PULPIT; INDIAN-TURNIP
N Tree	Amelanchier arborea	JUNEBERRY
N Forb	Pyrola elliptica	LARGE-LEAVED SHINLEAF
A Forb	PRUNELLA VULGARIS	LAWN PRUNELLA
N Tree	Tilia americana	LINDEN; BASSWOOD
N Forb	Podophyllum peltatum	MAY APPLE; MANDRAKE
N Shrub	Spiraea alba	MEADOWSWEET
N Forb	Desmodium nudiflorum	NAKED TICK-TREFOIL
N Shrub	Viburnum lentago	NANNYBERRY; SHEEPBERRY
N Forb	Galium boreale	NORTHERN BEDSTRAW
N Forb	Potentilla simplex	OLD-FIELD or COMMON CINQUEFOIL
A Forb	HIERACIUM AURANTIACUM	ORANGE HAWKWEED
N Tree	Carya glabra	PIGNUT HICKORY
N Shrub	Zanthoxylum americanum	PRICKLY-ASH
N Vine	Lonicera dioica	RED HONEYSUCKLE
N Tree	Acer rubrum	RED MAPLE
N Tree	Quercus rubra	RED OAK
N Vine	Vitis riparia	RIVERBANK GRAPE
N Forb	Helianthemum bicknellii	ROCKROSE
N Forb	Hepatica americana	ROUND-LOBED HEPATICA
N Sedge	Carex cumulata	SEDGE
N Sedge	Carex gracillima	SEDGE
N Sedge	Carex pensylvanica	SEDGE
N Tree	Carya ovata	SHELLBARK or SHAGBARK HICKORY
N Shrub	Rhus copallina	SHINING or WINGED SUMAC
N Shrub	Viburnum dentatum	SMOOTH ARROW-WOOD
N Shrub	Vaccinium corymbosum	SMOOTH HIGHBUSH BLUEBERRY
N Forb	Lactuca canadensis	TALL LETTUCE

N Vine	Parthenocissus quinquefolia	VIRGINIA CREEPER
N Tree	Fraxinus americana	WHITE ASH
N Forb	Actaea pachypoda	WHITE BANEBERRY, DOLL'S-EYES
N Forb	Solidago hispida	WHITE GOLDENROD
N Forb	Prenanthes alba	WHITE LETTUCE; RATTLESNAKE-ROOT
N Tree	Quercus alba	WHITE OAK
N Forb	Galium circaezans	WHITE WILD LICORICE
N Tree	Prunus serotina	WILD BLACK CHERRY
N Forb	Geranium maculatum	WILD GERANIUM
N Forb	Fragaria virginiana	WILD STRAWBERRY
N Vine	Dioscorea villosa	WILD YAM
N Shrub	Gaultheria procumbens	WINTERGREEN
N Shrub	Hamamelis virginiana	WITCH-HAZEL
N Forb	Anemone quinquefolia	WOOD ANEMONE
N Forb	Pedicularis canadensis	WOOD-BETONY, LOUSEWORT
N Forb	Phlox divaricata	WOODLAND PHLOX
N Forb	Achillea millefolium	YARROW
N Forb	Viola pubescens	YELLOW VIOLET

I-75 Woods - Emergent Marsh

Native/Adventive Physiography	Scientific Name	Common Name
A Vine	SOLANUM DULCAMARA	BITTERSWEET NIGHTSHADE
N Forb	Verbena hastata	BLUE VERVAIN
N Forb	Pilea fontana	BOG CLEARWEED
N Forb	Typha latifolia	BROAD-LEAVED CAT-TAIL
N Shrub	Cephalanthus occidentalis	BUTTONBUSH
N Forb	Sagittaria latifolia	COMMON ARROWHEAD
N Forb	Eupatorium perfoliatum	COMMON BONESET
N Forb	Pycnanthemum virginianum	COMMON MOUNTAIN MINT
N Forb	Scutellaria galericulata	COMMON SKULLCAP
N Forb	Epilobium leptophyllum	FEN WILLOW-HERB
N Grass	Bromus ciliatus	FRINGED BROME
N Shrub	Cornus foemina	GRAY DOGWOOD
N Forb	Rumex orbiculatus	GREAT WATER DOCK
N Tree	Carpinus caroliniana	HORNBEAM; BLUE-BEECH
N Forb	Apocynum cannabinum	INDIAN HEMP; HEMP DOGBANE
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Shrub	Viburnum acerifolium	MAPLE-LEAVED ARROW-WOOD
N Forb	Campanula aparinoides	MARSH BELLFLOWER
N Fern	Thelypteris palustris	MARSH FERN
A Forb	TYPHA ANGUSTIFOLIA	NARROW-LEAVED CAT-TAIL
N Forb	Galium boreale	NORTHERN BEDSTRAW
N Tree	Quercus palustris	PIN OAK
N Tree	Acer rubrum	RED MAPLE
N Forb	Galium asprellum	ROUGH BEDSTRAW
N Sedge	Carex bromoides	SEDGE
N Sedge	Carex rostrata	SEDGE
N Sedge	Carex stricta	SEDGE
N Fern	Onoclea sensibilis	SENSITIVE FERN
N Tree	Acer saccharinum	SILVER MAPLE
N Forb	Symplocarpus foetidus	SKUNK-CABBAGE
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT

N Forb	Aster puniceus	SWAMP ASTER
N Forb	Asclepias incarnata	SWAMP MILKWEED
N Forb	Solidago altissima	TALL GOLDENROD
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Forb	Mentha arvensis	WILD MINT
N Shrub	Ilex verticillata	WINTERBERRY, MICHIGAN HOLLY

I-75 Woods – Southern Wet Meadow

Native/Adventive Physiography	Scientific Name	Common Name
N Shrub	Salix bebbiana	BEBB'S or BEAKED WILLOW
N Forb	Verbena hastata	BLUE VERVAIN
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Forb	Galium labradoricum	BOG BEDSTRAW
N Shrub	Betula pumila	BOG BIRCH
N Forb	Solidago uliginosa	BOG GOLDENROD
N Forb	Valeriana uliginosa	BOG VALERIAN
N Forb	Typha latifolia	BROAD-LEAVED CAT-TAIL
N Forb	Solidago canadensis	CANADA GOLDENROD
N Fern	Osmunda cinnamomea	CINNAMON FERN
N Forb	Epilobium coloratum	CINNAMON WILLOW-HERB
N Forb	Eupatorium perfoliatum	COMMON BONESET
N Forb	Sparganium eurycarpum	COMMON BUR-REED
N Forb	Pycnanthemum virginianum	COMMON MOUNTAIN MINT
N Fern	Equisetum arvense	COMMON or FIELD HORSETAIL
N Forb	Scutellaria galericulata	COMMON SKULLCAP
N Forb	Lycopus americanus	COMMON WATER HOREHOUND
N Forb	Rubus pubescens	DWARF RASPBERRY
N Forb	Aster lanceolatus	EASTERN LINED ASTER
N Forb	Utricularia intermedia	FLAT-LEAVED BLADDERWORT
N Grass	Glyceria striata	FOWL MANNA GRASS
N Grass	Bromus ciliatus	FRINGED BROME
N Forb	Parnassia glauca	GRASS-OF-PARNASSUS
N Forb	Rumex orbiculatus	GREAT WATER DOCK
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Forb	Juncus nodosus	JOINT RUSH
N Forb	Solidago gigantea	LATE GOLDENROD
N Forb	Campanula aparinoides	MARSH BELLFLOWER
N Fern	Thelypteris palustris	MARSH FERN
N Forb	Lathyrus palustris	MARSH PEA
N Grass	Muhlenbergia glomerata	MARSH WILD-TIMOTHY
N Forb	Caltha palustris	MARSH-MARIGOLD; COWSLIP
N Shrub	Spiraea alba	MEADOWSWEET
A Forb	TYPHA ANGUSTIFOLIA	NARROW-LEAVED CAT-TAIL
N Forb	Urtica dioica	NETTLE
N Shrub	Physocarpus opulifolius	NINEBARK
N Forb	Viola nephrophylla	NORTHERN BOG VIOLET
N Forb	Lycopus uniflorus	NORTHERN BUGLE WEED
N Forb	Solidago ohioensis	OHIO GOLDENROD
N Shrub	Toxicodendron vernix	POISON SUMAC
A Forb	LYTHRUM SALICARIA	PURPLE LOOSESTRIFE
N Shrub	Salix discolor	PUSSY WILLOW
N Shrub	Cornus stolonifera	RED-OSIER DOGWOOD

A Grass	AGROSTIS GIGANTEA	REDTOP
N Forb	Galium asprellum	ROUGH BEDSTRAW
N Shrub	Salix candida	SAGE or HOARY WILLOW
N Sedge	Carex comosa	SEDGE
N Sedge	Carex flava	SEDGE
N Sedge	Carex hystericina	SEDGE
N Sedge	Carex lacustris	SEDGE
N Sedge	Carex lasiocarpa	SEDGE
N Sedge	Carex prairea	SEDGE
N Sedge	Carex rostrata	SEDGE
N Sedge	Carex sterilis	SEDGE
N Sedge	Carex stricta	SEDGE
N Fern	Onoclea sensibilis	SENSITIVE FERN
N Shrub	Salix lucida	SHINING WILLOW
N Shrub	Potentilla fruticosa	SHRUBBY CINQUEFOIL
N Forb	Symplocarpus foetidus	SKUNK-CABBAGE
N Shrub	Salix petiolaris	SLENDER or MEADOW WILLOW
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Forb	Aster puniceus	SWAMP ASTER
N Shrub	Ribes hirtellum	SWAMP GOOSEBERRY
N Forb	Asclepias incarnata	SWAMP MILKWEED
N Forb	Cirsium muticum	SWAMP-THISTLE
N Forb	Aster umbellatus	TALL FLAT-TOP WHITE ASTER
N Forb	Solidago altissima	TALL GOLDENROD
N Tree	Larix laricina	TAMARACK; LARCH
N Forb	Lysimachia thyrsiflora	TUFTED LOOSESTRIFE
N Forb	Chelone glabra	TURTLEHEAD
N Grass	Elymus virginicus	VIRGINIA WILD-RYE
N Forb	Cicuta maculata	WATER HEMLOCK
N Forb	Polygonum amphibium	WATER SMARTWEED
N Forb	Ludwigia palustris	WATER-PURSLANE
N Forb	Lysimachia quadriflora	WHORLED LOOSESTRIFE
N Shrub	Decodon verticillatus	WHORLED or SWAMP LOOSESTRIFE
N Forb	Mentha arvensis	WILD MINT

I-75 Woods – Red Pine

This is an old plantation that was not surveyed.

LONG LAKE

Site Ecological Report

Directions to Site
Take Davisburg Road into the hamlet of Davisburg Head north on Eaton Rd approximately 6 miles to the township park parking lot on the west side of the road The site can be accessed by trails on the west side of the parking lot.

General Site Description
The Long Lake site is located in the Shiawassee watershed in northwestern Oakland County in the northern portion of the Jackson Interlobate sub-subsection (Albert 1994) This region lies between the extensions of two glacial lobes that extended into southern Michigan approximately 16,000 years ago The landscape exhibits a complicated topography due to the complex glacial ice activity that occurred in the area It is characterized by rolling, broad, sandy outwash plains with numerous ice contact features creating a mosaic of steep ridges, scattered depressions, and outwash channels At the Long Lake site, topography varies considerably, ranging from steep hills and scattered depressions on the north part of the site to the gently sloping channel of the Shiawassee River along the southern end The primary area of the site is approximately 600 acres in size. The Shiawassee River flows along the main channel of the outwash plain and is connected to Long Lake and Davis Lake as well as Rattalee Lake to the northwest of the site. Several plant communities are found at the Long Lake site, including southern dry-mesic forest, old field, relict conifer swamp, southern shrub-carr, southern wet meadow, and prairie fen

A relatively large southern dry-mesic forest is found in the northern portion of the site This forest type is dominated by species of oak and hickory and contains numerous shallow depressions or vernal pools. These vernal pools typically fill with water in the spring, providing prime breeding habitat for frogs, toads, and salamanders. Vernal pools also tend to incubate large quantities of invertebrates, which are an important food source for migratory songbirds. The forest also shelters a small pond, a lake, and several small shrubby wetlands in the scattered depressions. Bordering the forest are several old fields now dominated by exotic plants Along the southern border of the forest the land slopes down toward the outwash channel

Along the outwash channel, relict conifer swamp, southern shrub-carr, southern wet meadow and prairie fen surround Long Lake, Davis Lake, and border the Shiawassee River A small relict conifer swamp dominated by tamarack (*Larix laricina*) is found on a portion of the slope along Long Lake's north shore The remainder of the floodplain is a mosaic of southern shrub-carr, southern wet meadow and prairie fen In several places on the south side of the river, there are small pockets of upland forest Both southern shrub-carr and southern wet meadow are comprised of a diverse group of native plants, and are common wetland communities throughout the Midwest Prairie fen, however, only occurs in the glaciated interlobate region of the Midwest where cold, calcareous water seeps from the ground. Prairie fen, which is considered by The Nature Conservancy to be very rare throughout its range, also supports a number of rare plants and animals A unique type of prairie fen called a hanging fen is found on the slope along Long Lake's northwest shore.

Summary of Ecological Significance
Overall, the Long Lake site is an integral part of a large linear wet meadow and oak forest complex bordering the Shiawassee River and its headwaters To the northwest lies Rattalee Lake Fen, a site of similar size and quality. To the southeast lies I-75 Woods, another large wetland and forested complex. The occurrence of a large, intact, high quality prairie fen community along a major river corridor in close juxtaposition to a large block of upland forest, renders the Long Lake complex a site of exceptional ecological value. Together, these three adjacent sites (Long Lake, Rattalee Lake, and I-75 Woods) form a highly significant wetland corridor along the Shiawassee River.

Long Lake fen is considered high quality because of its overall native plant species diversity, the occurrence of several rare species, the high proportion of sedges and grasses, and its large size and intactness. Although the true hanging portion of the fen is restricted to the northwest side of Long Lake, the fen in its entirety extends along the entire river corridor covering approximately 265 acres. As such, it is one of the largest known fen complexes in southern Michigan Seventy-eight native plant species, 26% of which were

grasses and sedges, were documented at the site during two extended visits in May and an additional short visit in September The state threatened grass mat muhly (*Muhlenbergia richardsonis*), characteristic of prairie fens, was found in fairly high local abundance in the hanging portion of the fen Currently, there is little evidence of direct disturbance to the fen, and the occurrence of exotic plant species is minimal. Two rare insect species also characteristic of prairie fens, Poweshiek skipper (*Oarisma powesheik)* state listed as threatened, and red-legged spittlebug (*Prosapia ignipectus*) state listed as special concern, were documented at the site. Another rare insect species was also documented in the relict tamarack swamp, the tamarack tree cricket (*Oecanthus laricis*), state listed as special concern. In addition, an unconfirmed sighting of an eastern massasauga rattlesnake (*Sistrurus catenatus catenatus),* state listed as special concern, was reported during field surveys

In addition to the rare species found during the 1998 field season, there is potential for several other rare plants and animals associated with prairie fen to be discovered in the future. Potential rare plants include: small white lady's slipper (*Cypripedium candidum*), state listed as threatened, prairie dropseed (*Sporobolis heterolepis*), state listed as threatened, edible valerian (*Valeriana ciliatus*), state listed as threatened, and Richardson's sedge (*Carex richardsonii*), state listed as special concern. The prairie fen also contains habitat that could support populations of the blazing star borer moth (*Papaipema beeriana*), state listed as special concern, the swamp metalmark butterfly (*Calephelis muticum*), state listed as special concern, and the angular spittlebug (*Lepyronia angulifera*), state listed as special concern In addition, the southern shrub-carr areas scattered throughout the oak-hickory forest could support populations of the copperbelly water snake (*Nerodia erythrogaster neglect),* state endangered and federally threatened.

Immediately bordering the fen on the north, is a 200 acre block of second growth forest dominated by white, black, and red oak (*Quercus alba, Q. velutina, Q rubra*) and pignut hickory (*Carya glabra*) Occasional oaks with trunk diameters greater than 30 inches were observed. Red maple (*Acer rubrum*) and American hazelnut (*Corylus americana*) dominate the understory and the herbaceous layer is varied, but sparse, and includes species such as white lettuce (*Prenanthes alba*) and early meadow-rue (*Thalictrum dioicum*). Some pockets of the forest were more mesic in nature, dominated by red maple (*Acer rubrum*) in the overstory, and associated herbaceous species such as large flowered trillium (*Trillium grandiflorum*) and jack-in-the-pulpit (*Arisaema triphyllum*) in the ground layer A total of 68 native species were documented in a several hour survey period, giving the forest a fairly high plant species diversity The mix of southern dry-mesic uplands interspersed with wet depressions contributes to the forest's moderately high diversity. Exotic species were primarily localized along trails

Much of the forest on the steep ridges may have historically had a closed canopy. However, evidence of the more open oak barrens community typical of presettlement northern Oakland County, can be seen in the flatter portions of the forest. Here, species such as little bluestem (*Schizacyhrium scoparius*), lupine (*Lupinus perennis*), and bush-clover (*Lespedeza capitata*), were found in small, scattered openings within the forest matrix These species are representative of the herb layer of oak barrens Evidence of the prairie-like herbaceous component of presettlement oak barrens can also be seen along the southern border of the site where the wetlands gradually merge into upland at the railroad tracks The current closed canopy condition in these areas of the forest is likely the result of fire suppression

A great blue heron rookery was discovered in the southeastern portion of the forest, and an additional thirty-six bird species were either observed or heard during surveys conducted over the summer, including sandhill cranes. Although many of these species are relatively common, the forest tract probably serves as an important stop-over site for many migrating warblers due to its: 1) large size relative to other sites in southeastern Michigan, 2) numerous vernal pools and ponds scattered in the uplands, and 3) close juxtaposition to the large wetland complex along the Shiawassee River. These ponds and vernal pools also provide the necessary habitat for several native amphibians, particularly mole salamanders such as the blue spotted salamander (*Ambystoma maculatum*).

Several old fields are found in the uplands bordering the forest. Although these old fields are dominated by exotic plant species such as brome grass (*Bromus inermis*), orchard grass (*Dactylis glomerata*), and spotted knapweed (*Centaurea maculosa*), they have potential to house a variety of native grassland bird species including: vesper sparrow (*Pooecetes gramineus*), savannah sparrow (*Passerculus sandwichensis*), and grasshopper sparrow (*Ammodramus savannarum*). Since they border the prairie fen, the old fields may also provide summer habitat for massasauga rattlesnake. In addition, the

open structure and scattered oaks found in these old fields closely resembles the structure of the oak barrens that dominated this area in the early 1800's However, the plant species composition of the old fields is quite different from that of oak barrens.

On a larger scale, the Long Lake site encompasses a variety of habitats suitable for different life stages or activities that are critical to a number of wildlife species The red-shouldered hawk (*Buteo lineatus*), for example, typically nests in the upland forest, but forages in large wetland complexes like the one found at Long Lake The eastern massausaga rattlesnake mates and hibernates in prairie fens and moves into the adjacent uplands during the summer months to forage The Blanding's turtle (*Emydoidea blandingii*), like many turtles in Michigan, spends most of its time in wetlands, but prefers to nest in sandy uplands sometimes over 6 miles away. Thus, the close juxtaposition of the fen complex to this significant block of intact oak-hickory forest considerably increases the ecological value of the site This is particularly important for southeast Michigan where extensive forest fragmentation has already occurred

Evidence of Disturbance

The prairie fen and tamarack swamp are relatively intact with very few exotic species The old fields scattered throughout the uplands are abandoned agricultural fields probably used for grazing or haying. Currently, they are dominated by exotic species such as brome grass The oak-hickory forest is a second growth forest that was probably cut near the turn of the century Very little oak regeneration is found in the understory due to years of fire suppression Several narrow trails meander through the hilly oak-hickory forest. South of the lake, one trail merges into an old two-track road. A railroad borders the southern edge of the prairie fen and a dirt road runs along the southern edge of the forest and ends at a small lake within the forest. An overhead power line corridor runs across the site in a north-south direction near the western edge.

Threats

A few exotic species such as purple loosestrife (*Lythrum salicaria*) and glossy buckthorn (*Rhamnus cathartica*) are found scattered in small pockets in the prairie fen Autumn olive (*Elaeagnus umbellata*), another exotic, is found in the uplands particularly in the old fields and on the edge of the oak forest. This exotic shrub is likely to spread further into the oak forest via seed dispersal by birds, deer, and small mammals. Continuation of fire suppression in the oak forest will eventually cause a change in the species composition of the canopy As light demanding oaks die, shade tolerant sugar maples and red maples will replace them This change is already taking place in the forest's understory. Trails could also become vectors for spreading exotic plants into the forested area If mountain bike and/or ORV use increases dramatically, it will lead to soil erosion, widening of trails, creation of gullies in and along steep slopes, and exposure of tree roots Proper trail maintenance may help reduce these impacts Also, the use of mountain bikes and ORV's in sensitive areas (e.g., steep slopes) may need to be restricted

The disruption of the natural hydrology is the biggest threat to the prairie fen Any factors affecting aquifer recharge, hydrologic head, and water chemistry will impact the prairie fen. Detrimental effects on hydrology can occur through water consumption from groundwater recharge areas due to shallow water wells, or water diversion due to drain tiles, ditches, impervious surfaces such as parking lots, roads, and roofs, and urban areas with storm water sewers Draw down of the water table within the fen can occur from ditches placed perpendicular to the flow of water or ponds created at the edge of the fen. Other threats to the prairie fen include: water runoff, overuse of fertilizers and herbicides from nearby areas, trampling (which directly kills plants and can change the pattern of water flow), leaky septic systems (which leak nutrients and contaminants into the groundwater), and habitat fragmentation (which can alter hydrology, isolate plant and animal populations, and increase nest predation). Reed canary grass (*Phalaris arundinacea*) and cattail (*Typha spp*) two aggressive plant species that thrive in disturbed wetlands, were also found at the site and could become a problem if water quality and/or hydrology are altered.

Ecological Boundary Explanation

The ***primary boundary*** represents the extent of the intact wetland complex and relatively intact oak-hickory forest to the north. The railroad track was designated as the southern boundary since it's presence effectively isolates the site from any other portions of wetland that may have been part of the original wetland complex

The ***secondary boundary*** represents the minimal area needed to maintain the unique natural features within the primary boundary Since prairie fens depend on consistent ground water flow, several criteria that could affect ground water flow were used to determine this boundary such as topography, land use, and major roads. The northern boundary of the site was primarily

determined by ridge tops, while roads primarily determined the southern boundary

Stewardship Considerations

***Primary boundary*:** Because of the significance of this site and the relative fragility of the prairie fen, this site should be afforded maximum protection from disturbance. No grazing, timber cutting, ORV traffic, mountain biking, or excessive foot traffic should be allowed within the prairie fen Additional development within the primary site should be avoided, minimized, or designed to have minimal impact Populations of exotic plant species within the prairie fen complex, such as purple loosestrife, and glossy buckthorn, should be monitored and controlled Fragmentation of both the wetlands and uplands by utility rights-of-way, trails and roads should be avoided to minimize impacts of exotic species and predation of bird and turtle nests. It may be advisable to conduct prescribed burns in the prairie fen to reduce shrub and tree growth and enhance the establishment of prairie plants Prescribed burns however should be planned carefully to reduce any negative impacts on the rare insect and herp species. In addition, the oak-hickory forest will require prescribed burns and tree thinning in order to stimulate oak regeneration in the understory as well as herbaceous plants such as coreopsis (*Coreopsis tripteris*), sunflower (*Helianthus spp*), and pensylvania sedge (*Carex pensylvanica*) The presettlement vegetation of the uplands, as determined by the General Land Office (GLO) records, indicates that much of the site that is now closed canopy oak-hickory forest and old field was once oak barrens in the early 1800's If management for oak barrens is desired, a more intense fire and tree thinning management plan would have to be developed.

Secondary boundary: The primary concern within the secondary boundary is the protection of the flow and quality of ground water that supports the prairie fen. Future development within this area should be designed to maximize contiguous natural open space, and provide adequate buffers to the natural communities within the primary boundary Any development that occurs should be required to address surface water runoff, percolation, and ground water consumption. Stewardship recommendations include. minimizing the size of lawns, landscaping with native plants, particularly prairie species; keeping precipitation on-site (especially on ridge tops); requiring wells to be drilled to a depth below the aquifer that supports the fen; and maintaining adequate septic systems. In addition, parcels immediately adjacent to the primary site should be encouraged to manage their lands as a natural buffer to the adjacent natural communities. Softening the edge between the oak-hickory forest and open land by allowing natural woody plant growth or planting appropriate native shrubs and trees is also recommended

Recommendation for Future Studies

A detailed hydrologic study, that includes groundwater and surface water flows, should be undertaken to collect baseline data on the hydrologic regime and water quality This information can be used to monitor any hydrologic changes over time, which may impact the prairie fen complex. In addition, the composition, distribution, and population size of indicator plant species, and the population size and vigor of state listed plants and insects should be monitored over time. Additional surveys for amphibians, reptiles, insects (particularly butterflies), grassland birds, migratory songbirds (warblers), and several rare plant species (mentioned in the summary of ecological significance section) are also recommended

Literature Cited:

Albert, D.A. 1994. Regional Landscape Ecosystems of Michigan, Minnesota and Wisconsin: A Working Map and Classification. USDA Forest Service, North Central Forest Experiment Station, General Technical Report NC-178.

Field Surveys

Key for terminology used in the following field surveys

- N (Native) – Species that are native to Michigan
- A (Adventive) – Species that have been introduced and are not native to Michigan
- Fern A leafy plant with leaves undivided or divided several times into leaflets.
- Forb A herbaceous plant with broad leaves, excluding the grasses and grasslike plants, a type of flowering herb.
- Grass Plants, whose characteristics include stems that are jointed at nodes, are hollow and have sheathing leaves
- Sedge A tufted marsh plant, differing from the related grasses in having a one-seeded fruit and solid stems.
- Shrub A woody perennial plant, typically lower than most trees, having multiple stems that branch from the base without a well-defined main stem
- Tree A woody plant characterized by one main trunk, bearing a more or less distinct and elevated crown of branches Typically, trees are larger than shrubs
- Vine A plant whose stem requires support and which climbs by tendrils or twining or creeps along the ground
- <T> Species that is threatened
- <SC> Species that is of special concern

Animal Survey List
Long Lake

(Based on MNFI's surveys or incidental observations in 1998)

Common Name	Scientific Name	Status In MI [1]	Habitat/Community Type[2]
Birds			
American crow	*Corvus brachyrhynchos*	Increasing	- not applicable -
American goldfinch	*Carduelis tristis*	Declining	Old fields/woodlands
American robin	*Turdus migratorius*	Increasing	Woodland/open-lands
Black-throated green warbler	*Dendroica virens*	No data available	Mesic forests
Blue jay	*Cyanocitta cristata*	Stable	Forest edge/woodlands
Blue-winged warbler	*Vermivora pinus*	Increasing	Shrublands
Brown-headed cowbird	*Molothrus ater*	Decreasing	Forest edge/open-lands
Cedar waxwing	*Bombycilla cedrorum*	Increasing	- not applicable -
Chipping sparrow	*Spizella passerina*	Increasing	Old fields/woods edge
Common yellowthroat	*Geothlypis trichas*	Stable	Shrub wetlands
Eastern kingbird	*Tyrannus tyrannus*	Decreasing	Open-lands
Eastern wood pewee	*Contopus virens*	Stable to increasing	Mesic forest
European starling	*Sturnus vulgaris*	Increasing	Residential
Field sparrow	*Spizella pusilla*	Declining	Old fields/shrublands
Gray catbird	*Dumetella carolinensis*	Increasing in S. MI	Shrubland/woodlands
Great-blue heron	*Ardea herodias*	Increasing	Wetland/lake shores
Great-crested flycatcher	*Myiarchus crinitus*	Increasing	Forest edge
House finch	*Carpodacus mexicanus*	Increasing	Residential/farmlands
House wren	*Troglodytes aedon*	Increasing	Forest edge/shrublands
Indigo bunting	*Passerina cyanea*	Stable to increasing	Forest edge
Killdeer	*Charadrius vociferus*	Increasing	- not applicable -
Mourning dove	*Zenadia macroura*	Slight decrease	Open-lands
Northern cardinal	*Cardinalis cardinalis*	Increasing	Woodland/shrublands

Northern flicker	*Colaptes auratus*	Increasing	Woodlands
Red-eyed vireo	*Vireo olivaceus*	Increasing	Mesic forest
Red-tailed hawk	*Buteo jamaicensis*	Local decline in SE MI	Woodlands/open-lands
Red-winged blackbird	*Agelaius phoeniceus*	Declining	Emergent wetlands
Rose-breasted grosbeak	*Pheucticus ludovicianus*	Decrease in SE MI	Second growth forest
Sandhill crane	Grus canadensis	- not applicable -	Wetlands
Song sparrow	*Melospiza melodia*	Declining to stable	Scrub-shrub
Tree swallow	*Tachycineta bicolor*	Increasing	Wooded habitat near water
Tufted titmouse	*Parus bicolor*	Increasing	Woodlands/shrublands
Turkey vulture	*Cathartes aura*	Increasing	Farmlands
Willow flycatcher	*Empidonax traillii*	Decreasing	Shrublands
Yellow warbler	*Dendroica petechia*	Increasing	shrublands (wet or dry)
White-breasted nuthatch	*Sitta carolinensis*	Increasing	Woodlands
Amphibians			
Green frog	*Rana clamitans melanota*	Common	Ponds/wetlands
Insects			
American copper	*Lycaena phlaeas*	Common	Grasslands/old fields
A moth	*Papaipema unimoda*	Common	Prairie fen
European skipper	*Thymelicus lineola*	Abundant/Exotic	Grasslands/old fields
Mulberry wing skipper	*Poanes massasoit*	Local	Prairie fen/southern wet meadow
Poweshiek skipper	*Oarisma poweshiek*	State threatened	Prairie fen
Red-legged spittlebug	*Prosapia ignipectus*	Special concern	Grasslands/bluestem grasses
Tamarack tree cricket	*Oecanthus laricis*	Special concern	Relict conifer swamp
Mammals			
Eastern cottontail	*Sylvilagus floridanus*	Common	Forest edge/shrublands
Fox squirrel	*Sciurus niger*	Common	Woodlands
Raccoon	*Procyon lotor*	Common	Wetland/woodlands
White-tailed deer	*Odocoileus virginianus*	Common	Forest edge/open-land
Reptiles			
Eastern garter snake	*Thamnophis sirtalis*	Common	Numerous habitats
Map turtle	*Graptemys geographica*	Common	Lakes/rivers

[1] Status for birds based on Michigan Breeding Bird Surveys (1966 - 1996).
[2] Habitat/community refers to habitat or natural community in which animal was observed.

Plant Survey List
Long Lake

(Based on MNFI's surveys or incidental observations in 1998)

Long Lake – Ponds (Ice Block Depression)
This inventory of plant species was taken along the edges of open water.

Native/Adventive Physiography	Scientific Name	Common Name
N Sedge	Carex lasiocarpa	SEDGE
N Sedge	Carex stipata	SEDGE
N Sedge	Carex stricta	SEDGE

N Tree	Carpinus caroliniana	HORNBEAM, BLUE-BEECH
N Shrub	Cephalanthus occidentalis	BUTTONBUSH
N Forb	Eupatorium perfoliatum	COMMON BONESET
N Shrub	Ilex verticillata	WINTERBERRY; MICHIGAN HOLLY
N Tree	Larix laricina	TAMARACK, LARCH
N Forb	Spirodela polyrhiza	GREAT DUCKWEED
N Forb	Symplocarpus foetidus	SKUNK-CABBAGE
N Forb	Wolffia punctata	DOTTED WATER MEAL

Long Lake - Prairie fen

Areas within the Prairie Fen are interspersed with Southern Wet Meadow. These areas were not separately mapped

Physiography	Scientific Name	Common Name
N Forb	Agalinis purpurea	PURPLE GERARDIA
N Grass	Andropogon gerardii	BIG BLUESTEM GRASS, TURKEYFOOT
N Shrub	Aronia prunifolia	BLACK CHOKEBERRY
N Forb	Aster puniceus	SWAMP ASTER
N Shrub	Betula pumila	BOG BIRCH
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Sedge	Carex diandra	SEDGE
N Sedge	Carex flava	SEDGE
N Sedge	Carex sartwellii	SEDGE
N Sedge	Carex stricta	SEDGE
N Sedge	Carex tetanica	SEDGE
N Forb	Cicuta bulbifera	WATER HEMLOCK
N Sedge	Cladium mariscoides	TWIG-RUSH
N Shrub	Cornus foemina	GRAY DOGWOOD
N Shrub	Cornus stolonifera	RED-OSIER DOGWOOD
N Forb	Cypripedium calceolus pubescens	LARGE YELLOW LADY'S-SLIPPER
N Sedge	Eleocharis elliptica	GOLDEN-SEEDED SPIKE RUSH
N Sedge	Eleocharis rostellata	SPIKE-RUSH
N Tree	Fraxinus nigra	BLACK ASH
N Forb	Galium asprellum	ROUGH BEDSTRAW
N Forb	Galium trifidum	SMALL BEDSTRAW
N Forb	Helenium autumnale	SNEEZEWEED
N Forb	Hypoxis hirsuta	STAR-GRASS
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Forb	Iris virginica	SOUTHERN BLUE FLAG
N Forb	Krigia biflora	FALSE DANDELION
N Tree	Larix laricina	TAMARACK; LARCH
N Forb	Ludwigia palustris	WATER-PURSLANE
N Grass	Muhlenbergia richardsonis <T>	MAT MUHLY
N Grass	Muhlenbergia uniflora	MUHLY GRASS
N Forb	Parnassia glauca	GRASS-OF-PARNASSUS
N Grass	Phalaris arundinacea	REED CANARY GRASS
N Tree	Populus tremuloides	QUAKING ASPEN
N Shrub	Potentilla fruticosa	SHRUBBY CINQUEFOIL
N Forb	Pycnanthemum virginianum	COMMON MOUNTAIN MINT
N Shrub	Rhamnus alnifolia	ALDER-LEAVED BUCKTHORN
A Tree	RHAMNUS CATHARTICA	COMMON BUCKTHORN
N Shrub	Ribes hirtellum	SWAMP GOOSEBERRY
N Shrub	Rubus strigosus	WILD RED RASPBERRY
N Forb	Rumex orbiculatus	GREAT WATER DOCK

A Tree	SALIX ALBA	WHITE WILLOW
N Sedge	Scirpus americanus	THREE-SQUARE, BULRUSH
N Sedge	Scirpus cespitosus	BULRUSH
N Forb	Solidago ohioensis	OHIO GOLDENROD
N Forb	Thalictrum dioicum	EARLY MEADOW-RUE
N Fern	Thelypteris palustris	MARSH FERN
N Shrub	Toxicodendron vernix	POISON SUMAC
A Forb	TYPHA ANGUSTIFOLIA	NARROW-LEAVED CAT-TAIL
N Forb	Viola nephrophylla	NORTHERN BOG VIOLET
N Forb	Zigadenus glaucus	WHITE CAMAS
N Forb	Zizia aurea	GOLDEN ALEXANDERS
N Forb	Achillea millefolium	YARROW
N Grass	Andropogon scoparius	LITTLE BLUESTEM GRASS
N Forb	Apocynum cannabinum	INDIAN HEMP; HEMP DOGBANE
N Forb	Asclepias incarnata	SWAMP MILKWEED
N Forb	Aster laevis	SMOOTH ASTER
N Forb	Aster puniceus	SWAMP ASTER
N Shrub	Betula pumila	BOG BIRCH
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Forb	Caltha palustris	MARSH-MARIGOLD; COWSLIP
N Sedge	Carex diandra	SEDGE
N Sedge	Carex flava	SEDGE
N Sedge	Carex hystericina	SEDGE
N Sedge	Carex sterilis	SEDGE
N Sedge	Carex viridula	SEDGE
N Sedge	Cladium mariscoides	TWIG-RUSH
A Forb	DAUCUS CAROTA	WILD CARROT; QUEEN-ANNE'S-LACE
A Shrub	ELAEAGNUS UMBELLATA	AUTUMN-OLIVE
N Sedge	Eleocharis rostellata	SPIKE-RUSH
N Fern	Equisetum arvense	COMMON or FIELD HORSETAIL
N Sedge	Eriophorum viridi-carinatum	GREEN-KEELED COTTON-GRASS
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Forb	Eupatorium perfoliatum	COMMON BONESET
N Forb	Fragaria virginiana	WILD STRAWBERRY
N Forb	Galium asprellum	ROUGH BEDSTRAW
N Forb	Geranium maculatum	WILD GERANIUM
N Forb	Geum rivale	PURPLE AVENS
N Forb	Hypoxis hirsuta	STAR-GRASS
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Forb	Iris virginica	SOUTHERN BLUE FLAG
N Forb	Juncus brachycephalus	RUSH
N Tree	Larix laricina	TAMARACK; LARCH
N Forb	Lespedeza capitata	ROUND-HEADED BUSH-CLOVER
N Forb	Liatris spicata	MARSH BLAZING STAR
N Forb	Lithospermum canescens	HOARY PUCCOON
N Forb	Lupinus perennis	WILD LUPINE
N Forb	Luzula multiflora	COMMON WOOD RUSH
N Forb	Lycopus americanus	COMMON WATER HOREHOUND
N Forb	Lysimachia thyrsiflora	TUFTED LOOSESTRIFE
N Forb	Monarda fistulosa	WILD BERGAMOT
N Fern	Onoclea sensibilis	SENSITIVE FERN
A Forb	ONOPORDUM ACANTHIUM	SCOTCH THISTLE
N Forb	Onosmodium molle	FALSE GROMWELL
N Forb	Parnassia glauca	GRASS-OF-PARNASSUS

N Forb	Pedicularis lanceolata	SWAMP-BETONY, LOUSEWORT
N Forb	Phlox pilosa	PRAIRIE PHLOX
A Forb	POTENTILLA RECTA	ROUGH-FRUITED CINQUEFOIL
N Forb	Primula mistassinica	DWARF CANADIAN PRIMROSE
N Forb	Pycnanthemum virginianum	COMMON MOUNTAIN MINT
N Shrub	Rhamnus alnifolia	ALDER-LEAVED BUCKTHORN
N Shrub	Ribes hirtellum	SWAMP GOOSEBERRY
N Shrub	Rubus flagellaris	NORTHERN DEWBERRY
N Shrub	Salix candida	SAGE or HOARY WILLOW
N Sedge	Scirpus acutus	HARDSTEM BULRUSH
N Sedge	Scirpus cespitosus	BULRUSH
N Forb	Senecio aureus	GOLDEN RAGWORT
N Forb	Smilacina stellata	STARRY FALSE SOLOMON-SEAL
N Forb	Solidago gigantea	LATE GOLDENROD
N Forb	Solidago ohioensis	OHIO GOLDENROD
N Forb	Solidago patula	SWAMP GOLDENROD
N Forb	Solidago riddellii	RIDDELL'S GOLDENROD
N Fern	Thelypteris palustris	MARSH FERN
N Shrub	Toxicodendron vernix	POISON SUMAC
N Forb	Viola nephrophylla	NORTHERN BOG VIOLET
N Vine	Vitis riparia	RIVERBANK GRAPE

Long Lake – Southern Dry-Mesic Forest

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Acer rubrum	RED MAPLE
N Forb	Anemonella thalictroides	RUE ANEMONE
N Forb	Apocynum cannabinum	INDIAN HEMP, HEMP DOGBANE
N Forb	Aralia nudicaulis	WILD SARSAPARILLA
N Forb	Arisaema triphyllum	JACK-IN-THE-PULPIT; INDIAN-TURNIP
N Forb	Aster macrophyllus	BIG-LEAVED ASTER
N Forb	Aureolaria virginica	DOWNY FALSE FOXGLOVE
N Sedge	Carex gracillima	SEDGE
N Sedge	Carex laxiflora	SEDGE
N Sedge	Carex pensylvanica	SEDGE
N Sedge	Carex rugosperma	SEDGE
N Tree	Carya glabra	PIGNUT HICKORY
N Forb	Circaea lutetiana	ENCHANTER'S-NIGHTSHADE
N Forb	Collinsonia canadensis	RICHWEED
N Tree	Cornus florida	FLOWERING DOGWOOD
N Shrub	Cornus foemina	GRAY DOGWOOD
N Shrub	Corylus americana	HAZELNUT
N Forb	Erigeron philadelphicus	MARSH FLEABANE
N Tree	Fraxinus americana	WHITE ASH
N Forb	Galium circaezans	WHITE WILD LICORICE
N Forb	Galium lanceolatum	YELLOW WILD LICORICE
N Shrub	Gaultheria procumbens	WINTERGREEN
N Shrub	Gaylussacia baccata	HUCKLEBERRY
N Forb	Geranium maculatum	WILD GERANIUM
N Forb	Geum canadense	WHITE AVENS
N Shrub	Hamamelis virginiana	WITCH-HAZEL
N Forb	Hepatica americana	ROUND-LOBED HEPATICA
N Grass	Hystrix patula	BOTTLEBRUSH GRASS

N Shrub	Juniperus communis	COMMON or GROUND JUNIPER
N Forb	Krigia biflora	FALSE DANDELION
A Shrub	LONICERA TATARICA	SMOOTH TARTARIAN HONEYSUCKLE
N Forb	Luzula acuminata	HAIRY WOOD RUSH
N Forb	Maianthemum canadense	CANADA MAYFLOWER; LILY-OF-THE-VALLEY
N Grass	Oryzopsis asperifolia	ROUGH-LEAVED RICE-GRASS
N Forb	Osmorhiza claytonii	HAIRY SWEET-CICELY
N Grass	Panicum latifolium	BROAD-LEAVED PANIC GRASS
N Vine	Parthenocissus quinquefolia	VIRGINIA CREEPER
N Forb	Phytolacca americana	POKEWEED, INKBERRY
A Grass	POA COMPRESSA	CANADA BLUEGRASS
N Forb	Podophyllum peltatum	MAY APPLE; MANDRAKE
N Forb	Polygonatum pubescens	DOWNY SOLOMON SEAL
N Forb	Potentilla simplex	OLD-FIELD or COMMON CINQUEFOIL
N Forb	Prenanthes alba	WHITE LETTUCE, RATTLESNAKE-ROOT
N Tree	Prunus serotina	WILD BLACK CHERRY
N Fern	Pteridium aquilinum	BRACKEN FERN
N Forb	Pyrola elliptica	LARGE-LEAVED SHINLEAF
N Tree	Quercus alba	WHITE OAK
N Tree	Quercus rubra	RED OAK
N Tree	Quercus velutina	BLACK OAK
N Forb	Ranunculus abortivus	SMALL-FLOWERED BUTTERCUP
N Forb	Ranunculus recurvatus	HOOKED CROWFOOT
N Forb	Ranunculus sceleratus	CURSED CROWFOOT
N Shrub	Ribes cynosbati	PRICKLY or WILD GOOSEBERRY
N Shrub	Rubus allegheniensis	COMMON BLACKBERRY
N Shrub	Rubus occidentalis	BLACK RASPBERRY
N Tree	Sassafras albidum	SASSAFRAS
N Forb	Smilacina racemosa	FALSE SPIKENARD
N Forb	Taenidia integerrima	YELLOW-PIMPERNEL
A Forb	TARAXACUM OFFICINALE	COMMON DANDELION
N Forb	Thalictrum dioicum	EARLY MEADOW-RUE
N Forb	Trillium grandiflorum	COMMON TRILLIUM
N Forb	Uvularia grandiflora	BELLWORT
N Shrub	Vaccinium angustifolium	BLUEBERRY
N Shrub	Vaccinium corymbosum	SMOOTH HIGHBUSH BLUEBERRY
N Shrub	Vaccinium myrtilloides	CANADA BLUEBERRY
N Shrub	Viburnum acerifolium	MAPLE-LEAVED ARROW-WOOD
N Shrub	Viburnum rafinesquianum	DOWNY ARROW-WOOD
N Forb	Vicia caroliniana	PALE or WOOD VETCH
N Forb	Viola sororia	COMMON BLUE VIOLET
N Vine	Vitis riparia	RIVERBANK GRAPE
N Forb	Waldsteinia fragarioides	BARREN-STRAWBERRY

Long Lake – Relict Conifer Swamp
This area was not surveyed.

Long Lake – Southern Shrub-Carr
This area was not surveyed.

Charter Township of White Lake

HURON RIVER CORRIDOR

Site Ecological Report

Directions to Site
From Pontiac take M-59 west approximately 10 miles to Teggerdine Road. Go north on Teggerdine Road approximately 2.5 miles to Maceday Road. Go east (right) on Maceday Road and proceed approximately 100 yards to parking area, which is on the south side of Maceday Road The Huron River Corridor site is west of the parking area on the west side of Teggerdine Road.

General Site Description
The Huron River Corridor site is located in the Huron Watershed in northwestern Oakland County in the northern portion of the Jackson Interlobate sub-subsection (Albert 1994) This region lies between the extensions of two glacial lobes that extended into southeastern Michigan approximately 16,000 years ago The landscape is characterized by rolling, broad, sandy outwash plains with numerous ice contact features creating a mosaic of steep ridges, scattered depressions, and outwash channels. The Huron River Corridor site is contiguous with the Huron Swamp site to the north, which encompasses the headwaters of the Huron River The broad outwash plain continues south from the Huron Swamp through the entire length of the Huron River Corridor site occupying most of the eastern and southern portions of the site The river channel itself is quite narrow and shallow, while the remainder of the outwash plain forms a fairly level but complex matrix of southern shrub-carr, relict conifer swamp, southern swamp, southern mesic forest, and southern dry-mesic forest. In contrast, the northwest portion the Huron River Corridor consists of very hilly-forested uplands interspersed with numerous wet depressions in the form of permanent and vernal pools. The forested uplands are dominated by southern dry-mesic forest while several successional old fields are scattered along the edges of the forest matrix. The site is also bisected by a wide powerline right-of-way that runs northeast to southwest through the site. This has resulted in the creation of several large areas of wet meadow and old field.

Summary of Ecological Significance
This site contains a high quality, large and diverse forest complex that lies along the Huron River This site contains a high diversity of plants and animals particularly neotropical migratory songbirds, many of which are area-sensitive forest species such as wood thrush (*Hylocichla mustelina*), acadian flycatcher (*Empidonax virescens*), scarlet tanager (*Piranga olivacea*), and rose-breasted grosbeak (*Pheucticus ludovicianus*) A total of 28 species of songbirds were documented In addition, the close proximity of the Huron River Corridor to several key sites, including Huron Swamp and Pontiac Lake Recreation Area, which are also along the Huron River corridor, illustrates the significance of the Huron River Corridor from a landscape scale In conjunction, these three sites form an extensive and relatively intact wetland/upland complex along the upper Huron River and its headwaters.

The southern dry-mesic forest covers a large portion of this site This forest type is found primarily in the northwest area of the site, and is dominated by oak (*Quercus* spp) and hickory (*Carya* spp.) in the canopy layer with a diversity of species in the understory and ground layer. Although portions of this forest contain a significant component of tartarian honeysuckle (*Lonicera tatarica*) and black locust (*Robinia pseudoacacia*), much of it is comprised of native species. Over 87 plant species were documented in this community, 95% of which were native. Oak regeneration at the site, however, appears to be poor, most likely due to heavy deer browsing and a lack of sunlight The numerous ponds and vernal pools interspersed throughout typically contain a fringe of southern swamp species such as red maple (*Acer rubrum*) and black ash (*Fraxinus nigra*), Michigan holly (*Ilex verticillata*), skunk cabbage (*Symplocarpus foetidus*), and various sedges (*Carex* spp.). Often there is a more mesic character to the forest near these pools as evidenced by the presence of beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), and basswood (*Tilia americana*).

Similar to the Huron Swamp complex to the north, the mosaic of southern swamp found in the eastern portions of the site is of high quality It is dominated by species such as silver maple (*Acer saccharinum*), black ash, and red maple in the overstory, and red maple, musclewood (*Carpinus caroliniana*), spicebush (*Lindera benzoin*) and American elm (*Ulmus americana*) in the understory. The groundcover is very rich and includes a diversity of mosses, ferns, horsetails (*Equisetum* spp.), thick clusters of sedges and grasses, and a multitude of swamp-loving herbs such as marsh-marigold (*Caltha palustris*), Jack-in-the-pulpit (*Arisaema triphyllum*), and starflower (*Trientalis borealis*) The swamp forest merges to shrub-carr along the river corridor, where species such as dogwood (*Cornus foemina*) and willows (*Salix* spp) dominate. Where tamarack (*Larix laricina*) is present, portions of the corridor are classified as relict conifer swamp. Several additional pockets of relict conifer swamp occur in the wetland complex, most notably at Chittenden Lake, an unnamed relatively large pond to the west, and in the northeast portion of the site. This wetland mosaic is also interspersed with upland forests, primarily southern dry-mesic forest similar to that described above However, two significant small islands of southern mesic forest dominated by beech, sugar maple, and red oak with diameters (dbh) ranging from 12 to 32 inches were documented. These pockets of southern mesic forest are currently under consideration for element occurrence status by Michigan Natural Features Inventory.

Evidence of the oak barrens community thought to have occurred at this site historically can be seen in several scattered old fields bordering the forested matrix and along the overhead powerline opening. Most of these areas have a significant component of exotic species such as brome grass (*Bromus inermis*), spotted knapweed (*Centaurea maculosa*), and ox-eye daisy (*Chrysanthemum leucanthemum*). However, ground layer species typical of oak barrens, such as butterflyweed (*Asclepias tuberosa*), flowering spurge (*Euphorbia corollata*), and little bluestem (*Andropogon scoparius)*, are interspersed. A tiny pocket of dry sand prairie with a particularly high component of prairie species including two listed species, compass plant (*Silphium laciniatum*) state threatened, and white false indigo (*Baptisia lactea)* state special concern, was discovered at the southeast corner of the powerline along a hillside adjacent to Teggerdine Road. However, it is thought that this area was recently planted with prairie species and is not a remnant prairie. Additional native prairie species that occur here but may also have been introduced include yellow coneflower (*Ratibida pinnata*), false sunflower (*Heliopsis helianthoides*), and tall coreopsis (*Coreopsis tripteris*).

The large, intact and diverse nature of the site is of significant ecological value because of the high number of plant and animal species that are found there However, the juxtaposition and interspersion of upland and wetland forested habitats further increases the biodiversity value of the site Numerous animal species require both upland and wetland habitats for various phases of their life cycle. Permanent ponds and vernal pools at the site are important habitats for numerous amphibian species such as mole salamanders (*Ambystoma* spp.) and frogs such as the wood frog (*Rana sylvatica*). These amphibian species utilize ponds and vernal pools for mating, egg laying, and feeding during the aquatic phase of their life cycle As adults, they retreat after mating, to mesic or wetland forests where they spend the rest of their life cycle Turtles such as the Blanding's turtle (*Emydoidea blandingii*) utilize permanent ponds for virtually all of their life cycle except females, which rely on adjacent sandy upland areas to deposit eggs. Red-shouldered hawks *(Buteo lineatus)* require a heterogeneous landscape of wetland and upland forests and could potentially occur at this site This species often nests in upland or wetland forests while exploiting wetland habitats for foraging. The matrix of uplands and wetlands also provides ideal stopover habitat for neo-tropical migrant birds Wetland habitats (e.g., vernal pool and pond, and the river channel) provide an important source of food to migrants that feed on the newly emerged insects in the spring Migrating warblers in spring also exploit oak uplands as foraging habitat by gleaning invertebrates off the catkin fruits of many tree species, especially oaks The forest complex at the site offers good breeding habitat for forest interior bird species because it is large, intact, and has a diversity of habitats. This is particularly important because many species of forest interior birds have experienced sharp population declines due to extensive fragmentation of forests. Potential rare forest interior species that may nest here include cerulean warbler (*Dendroica cerulea)* state special concern, and prothonotary warbler (*Protonotaria citrea*) state special concern.

With the exception of white false indigo and compass plant, which are likely to have been recently introduced, no rare plant or animal species were found within the Huron River Corridor site in 1998. Considering the diversity of habitats at the site and the large variability of optimal survey windows for various

species, further survey work is warranted. This is particularly true for animal species such as the cerulean warbler, red-shouldered hawk *(Buteo lineatus)* state listed as threatened, and eastern massasauga rattlesnake *(Sistrurus catenatus catenatus)* state listed as special concern Additional survey work is also needed for spring neo-tropical migratory birds, which may utilize an area for a short period of time during migration The complex also has potential to house a variety of uncommon and rare species such as the Cooper's hawk (*Accipiter cooperii*) state listed as special concern, copperbelly water snake (*Nerodia erythrogaster neglecta*) federally listed as threatened and state listed as endangered, red-legged spittlebug (*Prosapia ignipectus*) state listed as special concern, tamarack tree cricket (*Oecanthus laricis*) state listed as special concern, and woodland vole (*Microtus pinetorum*) state listed as special concern The old field habitats have some potential to house a variety of native grassland birds such as Savannah sparrow (*Passerculus sandwichensis*), vesper sparrow (*Poocectes gramineus*), and grasshopper sparrow (*Ammodramus savannarum*) Several rare plants also have an optimal survey window including early spring flowering species such as goldenseal (*Hydrastis canadensis*) state listed as threatened, twinleaf (*Jeffersonia diphylla*) state listed as special concern, and showy orchis (*Galearis spectabilis*) state listed as special concern Later flowering species such as ginseng (*Panax quinquefolius*) state listed as threatened, and hairy angelica (*Angelica venenosa*) state listed as special concern, could also be found The first four of these species occur in southern mesic forest or the drier portions of southern swamp, while the latter occurs in southern dry-mesic forest

Evidence of Disturbance

Evidence of past human disturbance indicates logging, grazing and haying have occurred at the Huron River Corridor site. Presently, the site is bisected by a major power line right-of-way, and a trail system utilized by hikers, horseback riders, mountain bikers, and snowmobilers meanders through the site. These disturbances have provided vectors for the transport and establishment of exotic species. Exotic species are most prevalent in the old field portions of the site and along the edges of the forest matrix.

Threats

The most immediate threat to this site is the spread of exotic species. The forested areas are especially vulnerable to garlic mustard (*Alliaria petiolata*), a widespread ecologically invasive plant common to many Oakland County properties. The deer population at the site is quite high and contributes to the poor oak regeneration If the deer population is not reduced plant species diversity, habitat structural diversity, and animal species diversity may decline Also, the raccoon population appears to be very high at the site and poses a significant threat to turtle and ground-nesting bird species

Ecological Boundary Explanation

The ***primary boundary*** represents the relatively intact mosaic of uplands and wetlands found along the Huron River This site is bounded on the east by Teggerdine Road, the north by White Lake Road, the south by Pontiac Lake Road, and the west by Cuthbert Road

The ***secondary boundary*** represents the approximate area needed to maintain the natural features found within the primary boundary This area includes portions of the primary and secondary boundaries of the Huron Swamp site, the approximate southern and western watershed for the portion of the Huron River that runs through the site, and contiguous forest blocks

Stewardship Considerations

***Primary boundary*:**

The closed canopy of the southern mesic and southern swamp, as well as portions of the southern dry-mesic forest should be maintained in order to ensure habitat for the red-shouldered hawk and other forest interior species such as wood thrush and acadian flycatcher. Further fragmentation of intact-forested blocks by right-of-ways and recreational trails should be limited to reduce additional invasion of exotic species and resultant degradation of natural communities It will be important to annually monitor the forest communities each May for garlic mustard If garlic mustard is found, all plants should be removed from the site before they drop their seeds. The forest communities should also be monitored annually for exotic shrubs such as glossy buckthorn and black locust (*Robinia pseudoacacia*), and all exotic shrubs should be removed. This is especially important where the forest borders old field because exotic shrubs such as autumn olive, European buckthorn, and exotic honeysuckle (*Lonicera tatarica*) are common here.

A management plan aimed at reducing the number of white-tailed deer in the Huron River Corridor site and surrounding area should be developed and implemented In the absence of a natural predator, white-tailed deer populations remain artificially high and reduce species diversity through preferential browsing Raccoon numbers also need to be reduced through controlled harvest or naturally occurring

disease to minimize predation of turtle and bird eggs The extensive southern dry-mesic forests in the northwestern portion of the site have a relatively diverse understory but are lacking oak regeneration. Burning in conjunction with tree thinning would help encourage oak regeneration as well as increase forb diversity in the ground layer Although portions of this forest type should be retained for its benefit to breeding birds, the uplands at this site are particularly conducive to prairie or oak barrens restoration through fire management and if necessary, supplemental seeding with prairie species. The prairie restoration on the hillside along Teggerdine Road appears to be successful and demonstrates that prairie and oak barrens restoration will work well in the Huron River Corridor. Further fragmentation of intact-forested blocks by utility right-of-ways and recreational trails should be limited to reduce advancement of exotic species and resultant degradation of natural communities

Secondary boundary: A large portion of the secondary boundary is owned by either the Huron Clinton Metropolitan Authority or State of Michigan Land uses and cover types within this area include residential development, old fields, agriculture, a golf course, and areas for recreation such as camping, picnics, and trails Of primary concern is the golf course located along White Lake Road Golf courses typically require large amounts of chemical inputs to maintain greens and fairways (such as fertilizers, herbicides, insecticides, and fungicides). This golf course is immediately adjacent to the northern boundary of the primary area and could impact the water quality of the wetland and Huron River ecosystems Steps which will minimize runoff of chemicals from the golf course into the adjacent natural areas include building natural detention ponds, using safe procedures for handling chemicals, incorporating natural buffers around waterways, and minimizing chemical inputs.

The portions of the southern dry-mesic forest and southern swamp located east of Teggerdine Road should be managed in conjunction with the forested areas west of the road Although a road bisects these forests, these natural communities are for all intensive purposes ecologically connected as one unit. By managing the forests on both sides of Teggerdine Road as one unit, the interior area of the forest can be maximized providing additional nesting habitat for area sensitive bird species such as wood thrush, acadian flycatcher, Cooper's hawk, and red-shouldered hawk.

Recommendation for Future Studies

Surveys for spring neo-tropical migratory birds, intensive-breeding bird surveys for forest interior and grassland species, red-shouldered hawk, rare invertebrates and reptiles are recommended Concentrated surveys for rare plant species in the southern mesic forest and southern swamp could also be conducted Lastly, a detailed study of wastewater runoff from the golf course northeast of the site should be conducted

Literature Cited:

Albert, D. A 1994 Regional landscape ecosystems of Michigan, Minnesota and Wisconsin· A working map and classification USDA Forest Service, North Central Forest Experiment Station, General Technical Report NC-178.

Field Surveys

Key for terminology used in the following field surveys

N	(Native) – Species that are native to Michigan
A	(Adventive) – Species that have been introduced and are not native to Michigan
Fern	A leafy plant with leaves undivided or divided several times into leaflets
Forb	A herbaceous plant with broad leaves, excluding the grasses and grasslike plants, a type of flowering herb
Grass	Plants, whose characteristics include stems that are jointed at nodes, are hollow and have sheathing leaves
Sedge	A tufted marsh plant, differing from the related grasses in having a one-seeded fruit and solid stems.
Shrub	A woody perennial plant, typically lower than most trees, having multiple stems that branch from the base without a well-defined main stem
Tree	A woody plant characterized by one main trunk, bearing a more or less distinct and elevated crown of branches. Typically, trees are larger than shrubs.
Vine	A plant whose stem requires support and which climbs by tendrils or twining or creeps along the ground.
<T>	Species that is threatened
<SC>	Species that is of special concern

Animal Survey List
Huron River Corridor

(Based on MNFI's surveys or incidental observations in 1998)

Common Name	Scientific Name	Status In MI[1]	Habitat/Community Type[2]
Birds			
Acadian flycatcher	*Empidonax virescens*	Decreasing	Mesic forest
American robin	*Turdus migratorius*	Increasing	Open-lands/forest edge
American goldfinch	*Carduelis tristis*	Declining	Old field
Black-capped chickadee	*Parus atricapillus*	Increasing	Forest/forest edge
Blue jay	*Cyanocitta cristata*	Stable	Forest edge
Blue-winged warbler	*Vermivora pinus*	Increasing	Upland shrub
Chipping sparrow	*Spizella passerina*	Increasing	Old field
Common yellow-throat	*Geothlypis trichas*	Stable	Scrub-shrub swamp
Downy woodpecker	*Picoides pubescens*	Decrease in SE MI	Mesic forest
Eastern kingbird	*Tyrannus tyrannus*	Decreasing	Open-land
Eastern wood pewee	*Contopus virens*	Increase in S. MI	Mesic forest
Field sparrow	*Spizella pusilla*	Decreasing	Old field
Gray catbird	*Dumatella carolinensis*	Increasing in S. MI	Forest/forest edge
Great-crested flycatcher	*Myiarchus crinitus*	Increasing	Forest edge
Least flycatcher	*Empidonax minimus*	Increase in SE MI	Mesic forest
Northern oriole	*Icterus galbula*	Stable to decreasing	Open woods
Red-eyed vireo	*Vireo olivaceus*	Increasing	Mesic forest
Red-winged blackbird	*Agelaius phorniceus*	Declining	Emergent wetland
Rose-breasted grosbeak	*Pheucticus ludovicianus*	Decrease in SE MI	Woodlands
Rufous-sided towhee	*Pipilo erythrophthalmus*	Increase in SE MI	Woodlands/shrublands
Scarlet tanager	*Piranga olivacea*	Slight increase	Mesic forest
Song sparrow	*Melospiza melodia*	Declining to stable	Upland shrub
Tufted titmouse	*Parus bicolor*	Increasing	Mesic forest

Willow flycatcher	*Empidonax traillii*	Decreasing	Shrublands
Wood thrush	*Hylocichla mustelina*	Increase in SE MI	Mesic forest
Yellow-billed cuckoo	*Coccyzus americanus*	Increase in SE MI	Mesic forest
Yellow-throated vireo	*Vireo flavifrons*	Increasing	Mesic forest
Yellow warbler	*Dendroica petechia*	Increasing	Open woods/early seral
Mammals			
Raccoon	*Procyon lotor*	Common	Forest edge/wetlands
White-tailed deer	*Odocoileus virginianus*	Common	Forest edge
Eastern chipmunk	*Tamias striatus*	Common	Mesic forest
Amphibians			
Green frog	*Rana clamitans melanota*	Common	Ponds

[1] Status for birds based on Michigan Breeding Bird Surveys (1966 - 1996).
[2] Habitat/community refers to habitat or natural community in which animal was observed

Plant Survey List
Huron River Corridor

(Based on MNFI's surveys or incidental observations in 1998)

Huron River Corridor – Southern Mesic Forest

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Fagus grandifolia	AMERICAN BEECH
N Forb	Galium aparine	ANNUAL BEDSTRAW
N Sedge	Carex concinna <SC>	BEAUTY SEDGE
N Sedge	Carex conoidea	BEAUTY SEDGE
N Tree	Carya cordiformis	BITTERNUT HICKORY
A Tree	ROBINIA PSEUDOACACIA	BLACK LOCUST
N Shrub	Rubus occidentalis	BLACK RASPBERRY
N Tree	Juglans nigra	BLACK WALNUT
N Forb	Caulophyllum thalictroides	BLUE COHOSH
N Shrub	Prunus virginiana	CHOKE CHERRY
N Forb	Desmodium glutinosum	CLUSTERED-LEAVED TICK-TREFOIL
N Shrub	Rubus allegheniensis	COMMON BLACKBERRY
N Fern	Equisetum arvense	COMMON or FIELD HORSETAIL
N Forb	Trillium grandiflorum	COMMON TRILLIUM
N Forb	Luzula multiflora	COMMON WOOD RUSH
N Shrub	Viburnum rafinesquianum	DOWNY ARROW-WOOD
N Forb	Circaea lutetiana	ENCHANTER'S-NIGHTSHADE
N Forb	Smilacina racemosa	FALSE SPIKENARD
N Tree	Cornus florida	FLOWERING DOGWOOD
N Forb	Galium triflorum	FRAGRANT BEDSTRAW
N Forb	Lysimachia ciliata	FRINGED LOOSESTRIFE
N Shrub	Corylus americana	HAZELNUT
N Forb	Amphicarpaea bracteata	HOG-PEANUT
N Tree	Ostrya virginiana	IRONWOOD; HOP HORNBEAM
N Forb	Arisaema triphyllum	JACK-IN-THE-PULPIT, INDIAN-TURNIP

N Forb	Pyrola elliptica	LARGE-LEAVED SHINLEAF
N Tree	Tilia americana	LINDEN, BASSWOOD
N Grass	Brachyelytrum erectum	LONG-AWNED WOOD GRASS
N Fern	Adiantum pedatum	MAIDENHAIR FERN
N Shrub	Viburnum acerifolium	MAPLE-LEAVED ARROW-WOOD
N Forb	Erigeron philadelphicus	MARSH FLEABANE
N Forb	Podophyllum peltatum	MAY APPLE; MANDRAKE
N Forb	Lilium michiganense	MICHIGAN LILY
N Grass	Festuca subverticillata	NODDING FESCUE
N Forb	Potentilla simplex	OLD-FIELD or COMMON CINQUEFOIL
N Tree	Betula papyrifera	PAPER BIRCH
N Shrub	Mitchella repens	PARTRIDGE BERRY
N Tree	Carya glabra	PIGNUT HICKORY
N Shrub	Ribes cynosbati	PRICKLY or WILD GOOSEBERRY
N Forb	Actaea rubra	RED BANEBERRY
N Tree	Acer rubrum	RED MAPLE
N Tree	Quercus rubra	RED OAK
N Vine	Vitis riparia	RIVERBANK GRAPE
N Forb	Anemonella thalictroides	RUE ANEMONE
N Shrub	Euonymus obovata	RUNNING STRAWBERRY BUSH
N Tree	Sassafras albidum	SASSAFRAS
N Sedge	Carex albursina	SEDGE
N Sedge	Carex blanda	SEDGE
N Sedge	Carex cephaloidea	SEDGE
N Sedge	Carex cephalophora	SEDGE
N Sedge	Carex conjuncta	SEDGE
N Sedge	Carex crinita	SEDGE
N Sedge	Carex pensylvanica	SEDGE
N Tree	Carya ovata	SHELLBARK or SHAGBARK HICKORY
A Shrub	LONICERA TATARICA	SMOOTH TARTARIAN HONEYSUCKLE
N Forb	Agrimonia gryposepala	TALL AGRIMONY
N Vine	Parthenocissus quinquefolia	VIRGINIA CREEPER
N Tree	Fraxinus americana	WHITE ASH
N Forb	Geum canadense	WHITE AVENS
N Forb	Actaea pachypoda	WHITE BANEBERRY; DOLL'S-EYES
N Forb	Prenanthes alba	WHITE LETTUCE; RATTLESNAKE-ROOT
N Tree	Quercus alba	WHITE OAK
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Forb	Galium circaezans	WHITE WILD LICORICE
N Tree	Prunus serotina	WILD BLACK CHERRY
N Forb	Geranium maculatum	WILD GERANIUM
N Forb	Aralia nudicaulis	WILD SARSAPARILLA
N Vine	Dioscorea villosa	WILD YAM
N Sedge	Carex rosea	WOOD SEDGE
N Forb	Erythronium americanum	YELLOW TROUT LILY

Huron River Corridor – Southern Shrub-Carr

Native/Adventive Physiography	Scientific Name	Common Name
N Shrub	Rhamnus alnifolia	ALDER-LEAVED BUCKTHORN
N Forb	Mitella diphylla	BISHOP'S CAP
N Tree	Fraxinus nigra	BLACK ASH
N Fern	Osmunda cinnamomea	CINNAMON FERN

N Forb	Rubus pubescens	DWARF RASPBERRY
N Fern	Equisetum palustre	MARSH-HORSETAIL
N Forb	Caltha palustris	MARSH-MARIGOLD; COWSLIP
N Shrub	Toxicodendron vernix	POISON SUMAC
N Tree	Fraxinus pensylvanica	RED ASH
N Tree	Acer rubrum	RED MAPLE
N Forb	Galium asprellum	ROUGH BEDSTRAW
N Sedge	Carex bromoides	SEDGE
N Sedge	Carex lacustris	SEDGE
N Fern	Onoclea sensibilis	SENSITIVE FERN
N Forb	Symplocarpus foetidus	SKUNK-CABBAGE
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Shrub	Ribes triste	SWAMP RED CURRANT
N Tree	Ulmus americana	WHITE or AMERICAN ELM

Huron River Corridor – Southern Dry-Mesic Forest

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Fagus grandifolia	AMERICAN BEECH
N Tree	Populus grandidentata	BIG-TOOTHED or LARGE-TOOTHED ASPEN
N Tree	Quercus velutina	BLACK OAK
N Grass	Hystrix patula	BOTTLEBRUSH GRASS
N Shrub	Prunus virginiana	CHOKE CHERRY
N Forb	Desmodium glutinosum	CLUSTERED-LEAVED TICK-TREFOIL
N Shrub	Rubus allegheniensis	COMMON BLACKBERRY
N Forb	Luzula multiflora	COMMON WOOD RUSH
N Forb	Euphorbia corollata	FLOWERING SPURGE
A Forb	TRAGOPOGON DUBIUS	GOAT'S BEARD
N Shrub	Cornus foemina	GRAY DOGWOOD
A Forb	VICIA VILLOSA	HAIRY VETCH
N Tree	Carpinus caroliniana	HORNBEAM; BLUE-BEECH
N Tree	Tilia americana	LINDEN; BASSWOOD
N Shrub	Viburnum acerifolium	MAPLE-LEAVED ARROW-WOOD
N Forb	Podophyllum peltatum	MAY APPLE; MANDRAKE
N Forb	Potentilla simplex	OLD-FIELD or COMMON CINQUEFOIL
N Tree	Carya glabra	PIGNUT HICKORY
N Tree	Acer rubrum	RED MAPLE
N Shrub	Cornus rugosa	ROUND-LEAVED DOGWOOD
N Tree	Sassafras albidum	SASSAFRAS
N Sedge	Carex pedunculata	SEDGE
N Sedge	Carex pensylvanica	SEDGE
N Sedge	Carex tenera	SEDGE
N Tree	Carya ovata	SHELLBARK or SHAGBARK HICKORY
N Forb	Anemone virginiana	THIMBLEWEED
N Vine	Parthenocissus quinquefolia	VIRGINIA CREEPER
N Tree	Fraxinus americana	WHITE ASH
N Tree	Quercus alba	WHITE OAK
N Tree	Prunus serotina	WILD BLACK CHERRY
N Forb	Geranium maculatum	WILD GERANIUM

Huron River Corridor - Prairie Pocket
Small Old Field with prairie species

Native/Adventive Physiography	Scientific Name	Common Name
A Forb	MEDICAGO SATIVA	ALFALFA
A Shrub	ELAEAGNUS UMBELLATA	AUTUMN-OLIVE
A Forb	MEDICAGO LUPULINA	BLACK MEDICK
N Forb	Rudbeckia hirta	BLACK-EYED SUSAN
N Forb	Asclepias tuberosa	BUTTERFLY-WEED
A Grass	POA COMPRESSA	CANADA BLUEGRASS
N Fern	Equisetum arvense	COMMON or FIELD HORSETAIL
N Forb	Helianthemum canadense	COMMON ROCKROSE
N Forb	Silphium laciniatum <T>	COMPASS PLANT
N Forb	Erigeron strigosus	DAISY FLEABANE
A Forb	DIANTHUS ARMERIA	DEPTFORD PINK
N Forb	Heliopsis helianthoides	FALSE SUNFLOWER
N Forb	Euphorbia corollata	FLOWERING SPURGE
N Forb	Penstemon digitalis	FOXGLOVE BEARD-TONGUE
N Forb	Euthamia graminifolia	GRASS-LEAVED GOLDENROD
A Forb	BERTEROA INCANA	HOARY ALYSSUM
N Forb	Lithospermum canescens	HOARY PUCCOON
A Grass	BROMUS INERMIS	HUNGARIAN BROME, SMOOTH BROME
A Grass	POA PRATENSIS	KENTUCKY BLUEGRASS
A Forb	CHRYSANTHEMUM LEUCANTHEMUM TRIFOLIUM PRATENSE	OX-EYE DAISY RED CLOVER
A Forb	Vitis riparia	RIVERBANK GRAPE
N Vine	POTENTILLA RECTA	ROUGH-FRUITED CINQUEFOIL
A Forb	Carex muhlenbergii	SEDGE
N Sedge	Carex pensylvanica	SEDGE
N Sedge	RUMEX ACETOSELLA	SHEEP or RED SORREL
A Forb	CENTAUREA MACULOSA	SPOTTED KNAPWEED
A Forb	Panicum virgatum	SWITCH GRASS
N Grass	Coreopsis tripteris	TALL COREOPSIS
N Forb	Solidago altissima	TALL GOLDENROD
N Forb	Baptisia lactea <T>	WHITE FALSE INDIGO
N Forb	Monarda fistulosa	WILD BERGAMOT
N Forb	DAUCUS CAROTA	WILD CARROT; QUEEN-ANNE'S-LACE
A Forb	Achillea millefolium	YARROW
N Forb	Ratibida pinnata	YELLOW CONEFLOWER
N Forb		

Huron River Corridor – Ponds (Ice Block Depressions)
This survey of plant species was taken along the edges of open water

Native/Adventive Physiography	Scientific Name	Common Name
N Tree	Fraxinus nigra	BLACK ASH
N Shrub	Cephalanthus occidentalis	BUTTONBUSH
N Grass	Glyceria striata	FOWL MANNA GRASS
N Forb	Ranunculus recurvatus	HOOKED CROWFOOT
N Fern	Athyrium filix-femina	LADY FERN
N Tree	Tilia americana	LINDEN; BASSWOOD

N Tree	Fraxinus pennsylvanica	RED ASH
N Tree	Acer rubrum	RED MAPLE
N Sedge	Carex laevivaginata	SEDGE
N Sedge	Carex scabrata	SEDGE
N Forb	Symplocarpus foetidus	SKUNK-CABBAGE
N Forb	Impatiens capensis	SPOTTED TOUCH-ME-NOT
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Shrub	Ilex verticillata	WINTERBERRY, MICHIGAN HOLLY

Huron River Corridor - Southern Swamp

Native/Adventive Physiography	Scientific Name	Common Name
N Forb	Galium aparine	ANNUAL BEDSTRAW
N Forb	Aster macrophyllus	BIG-LEAVED ASTER
N Tree	Populus grandidentata	BIG-TOOTHED or LARGE-TOOTHED ASPEN
N Tree	Quercus velutina	BLACK OAK
N Forb	Sanicula canadensis	BLACK SNAKEROOT
N Tree	Juglans nigra	BLACK WALNUT
N Forb	Solidago caesia	BLUE-STEMMED GOLDENROD
N Forb	Trillium grandiflorum	COMMON TRILLIUM
N Shrub	Viburnum rafinesquianum	DOWNY ARROW-WOOD
N Forb	Circaea lutetiana	ENCHANTER'S-NIGHTSHADE
N Forb	Smilacina racemosa	FALSE SPIKENARD
N Shrub	Cornus foemina	GRAY DOGWOOD
N Forb	Ranunculus recurvatus	HOOKED CROWFOOT
N Forb	Arisaema triphyllum	JACK-IN-THE-PULPIT; INDIAN-TURNIP
N Tree	Tilia americana	LINDEN; BASSWOOD
N Forb	Podophyllum peltatum	MAY APPLE, MANDRAKE
N Tree	Carya glabra	PIGNUT HICKORY
N Forb	Asclepias exaltata	POKE MILKWEED
N Shrub	Ribes cynosbati	PRICKLY or WILD GOOSEBERRY
N Tree	Quercus rubra	RED OAK
N Sedge	Carex leptalea	SEDGE
N Forb	Ranunculus abortivus	SMALL-FLOWERED BUTTERCUP
N Forb	Agrimonia pubescens	SOFT AGRIMONY
N Tree	Rhus typhina	STAGHORN SUMAC
N Tree	Fraxinus americana	WHITE ASH
N Forb	Geum canadense	WHITE AVENS
N Forb	Prenanthes alba	WHITE LETTUCE; RATTLESNAKE-ROOT
N Tree	Quercus alba	WHITE OAK
N Tree	Ulmus americana	WHITE or AMERICAN ELM
N Tree	Prunus serotina	WILD BLACK CHERRY
N Forb	Geranium maculatum	WILD GERANIUM
N Forb	Viola pubescens	YELLOW VIOLET

Huron River Corridor - Wet Meadow

Native/Adventive Physiography	Scientific Name	Common Name
N Shrub	Salix bebbiana	BEBB'S or BEAKED WILLOW
N Grass	Calamagrostis canadensis	BLUE-JOINT GRASS
N Sedge	Scirpus atrovirens	BULRUSH
N Tree	Populus deltoides	COTTONWOOD

N Grass	Glyceria striata	FOWL MANNA GRASS
N Shrub	Cornus foemina	GRAY DOGWOOD
N Forb	Eupatorium maculatum	JOE-PYE WEED
N Shrub	Spiraea alba	MEADOWSWEET
N Shrub	Viburnum lentago	NANNYBERRY, SHEEPBERRY
N Shrub	Physocarpus opulifolius	NINEBARK
A Forb	LYTHRUM SALICARIA	PURPLE LOOSESTRIFE
N Sedge	Carex hystericina	SEDGE
N Sedge	Carex stipata	SEDGE
N Sedge	Carex stricta	SEDGE
N Sedge	Carex vulpinoidea	SEDGE
N Tree	Acer saccharinum	SILVER MAPLE
N Forb	Juncus effusus	SOFT-STEMMED RUSH
N Sedge	Carex straminea <SC>	STRAW SEDGE
N Forb	Aster puniceus	SWAMP ASTER
A Forb	MELILOTUS ALBA	WHITE SWEET-CLOVER
N Forb	Fragaria virginiana	WILD STRAWBERRY
N Sedge	Scirpus cyperinus	WOOL-GRASS, BULRUSH

Huron River Corridor - Relict Conifer Swamp
This area was not surveyed

RATTALEE LAKE FENS

Site Ecological Summary

Michigan Natural Features Inventory

Date: 07/30/87

Preparer: Kimberly Medley

RATTALEE LAKE FENS

Site Ecological Summary

State: Michigan

Site Code: 220

County: Oakland

Acres: Primary = 69
Secondary = 145

Township: Davisburg

USGS Quad Name: Davisburg

Town/Range: T4N,R7E

USGS Quad Code: 4208375

Section: 1, 12

Directions to Site: From the junction of Rattalee Lake Road and the Grand Trunk Western railroad, the site extends northeastward toward Rattalee Lake and southeastward along the Shiawassee River.

Site Description: Located on an outwash plain at the end moraine of the Saginaw lobe, this site supports the best remaining area of prairie fen vegetation bordering the poorly draining Shiawasee River. The soil within the river basin is a mildly alkaline, organic soil (Houghton muck), where characteristic prairie plants such as Carex spp. (dominant), Potentilla fructicosa, Solidago spp. and Aster spp. occur. Bordering the fen on a steep river terrace (30 feet), with predominately sandy soils, occur white and black oaks.

Summary of Ecological Significance: Located within the northeastern extension of the prairie peninsula, prairie fens are a relatively rare type of prairie restricted to poorly drained alkaline glacial deposits. Even more significant is the occurrence of this fen along a drainageway--a rare physiographic setting. The community at this site is highly rated because of its high plant diversity (100+ species), high proportion of both sedges and prairie plants, its overall large size, and the presence of a mostly oak-covered upland buffer (especially east-northeast of the river). Based on field surveys conducted by the Michigan Natural Features Inventory, this site is ranked as one of the best fens in the state and the best representative of fens located within the outwash plain of the Saginaw lobe. Grassland communities in general have suffered a severe loss of land area because of cultivation and grazing and consequently have an assemblage of rare plants. Several prairie fen plants, now rare in Michigan, have vigorous populations at this site: Cypripedium candidum (white lady-slipper, threatened), Sporobolus heterolepsis (prairie dropseed, threatened), Rudbeckia sullivantii (showy coneflower, special concern), and Carex richardsonii (Richardson's sedge, special concern). The white lady-slipper, an orchid restricted to the alkaline springs which are frequent in this habitat, has an estimated population of at least 200-300

clumps, which makes it one of the state's best occurrences. Oarisma powesheik (Poweshiek skipper, threatened) which is restricted to prairie vegetation with Eleocharis elliptica (spike-rush, its larvae host), occurs in this area (surveyed early 1970s). The disjunct occurrence of this butterfly in Michigan enhances the genetic variability of the species is therefore very important to its rangewide survival.

Other Values of Significance: Fens are typically restricted to a mildly to moderately alkaline organic soil bordered by sandy glacial deposits. It is important to note the occurrence of this type of landscape far beyond the limits established by this site proposal (as identified on the soil survey). The site will serve to preserve the best remaining remnant of a much more extensive area. Moreover, it serves to extend the area, because of more recent surveys, currently owned by the Michigan Nature Association (Clifford R. and Calla C. Burr Memorial Plant Preserve, 5.02 acres).

Ecological Boundary Explanation: The primary boundary has been drawn from MNFI field survey notes and the 1979 CIR photos to enclose the best representation of prairie fen along the Shiawassee River. The secondary boundary borders the railroad line to the southwest, includes the immediate upland area around the prairie fen, and extends along the railroad to the edge of the property owned by the Detroit Girl Scouts, Inc. (requires survey--soils indicate that it is a potential area of fen vegetation).

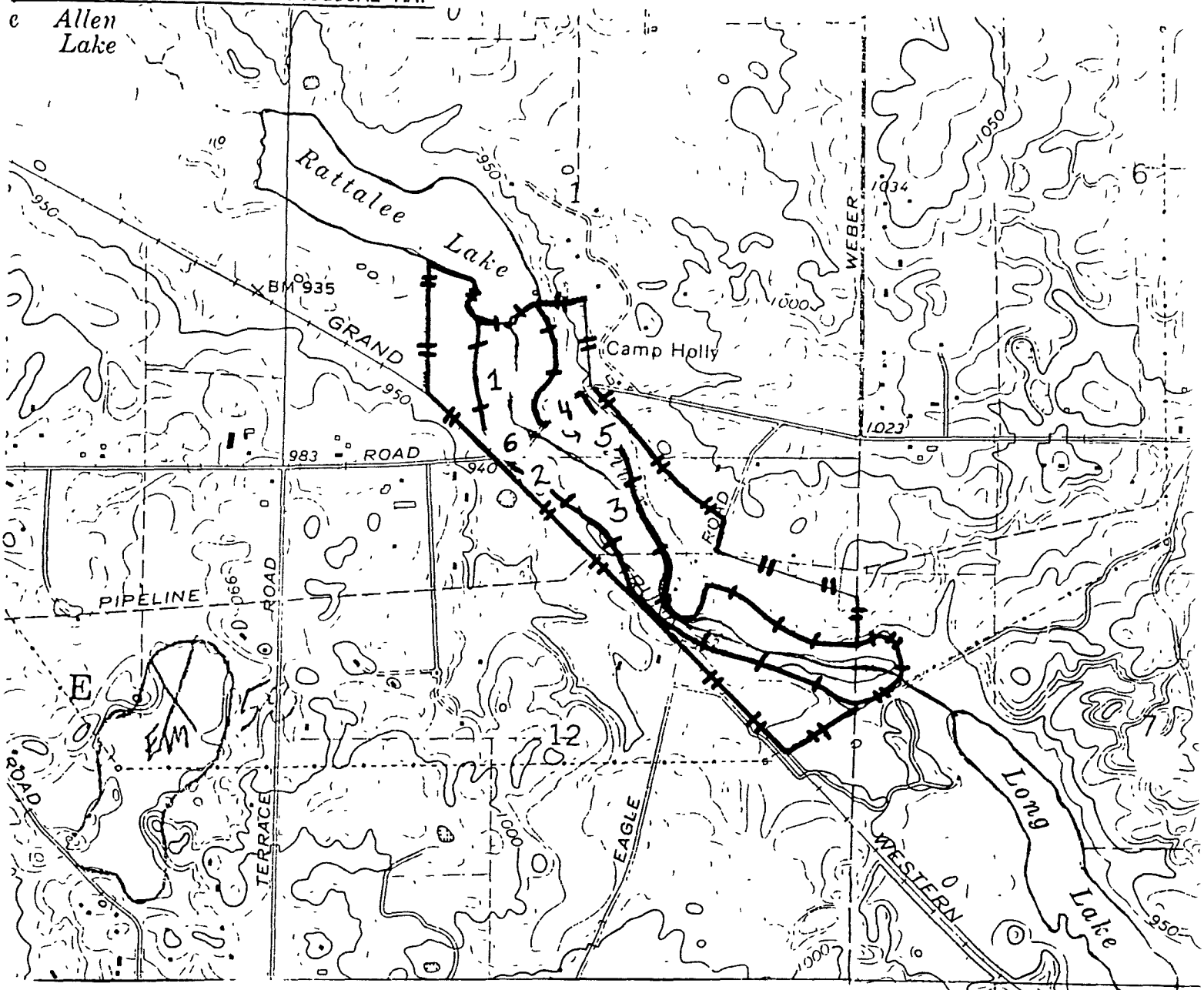
Stewardship Considerations: Because of the fragility of this habitat, protection from grazing, cutting, ORV traffic and extensive foot traffic should be prevented. It may be advisable to burn the area to reduce shrub growth and enhance the establishment of prairie plants. Maintenance of the prairie habitat is very important to the survival of the Poweshiek skipper butterfly and may encourage an introduction by the Mitchell's Satyr butterfly (Michigan threatened). Since the prairie fen is characterized by the hydrologic regime, any unnatural disruption of surface or groundwater flow would have a negative effect on the system.

Source: MNFI field surveys have been conducted by H. Ballard (July 6, 1985), Aldrich (?), and M. D. Tomboulian (August 20, 1985). Other references include:

Michigan Nature Association. 1983. 1983 Sanctuary Guidebook.

Opler, P.A., and G.O. Krizek. 1984. Butterflies East of the Great Plains. Baltimore: The John Hopkins University Press.

RATTALEE LAKE FENS ECOLOGICAL MAP



Primary boundary
Secondary boundary

1. Prairie fen is within the primary boundary
2. Oarisma poweshiek
3. Cypripedium candidum
4. Rudbeckia sullivantii
5. Sporobolus heterolepsis
6. Carex richardsonii

Scale: 1: 17,000

0 .5 mile

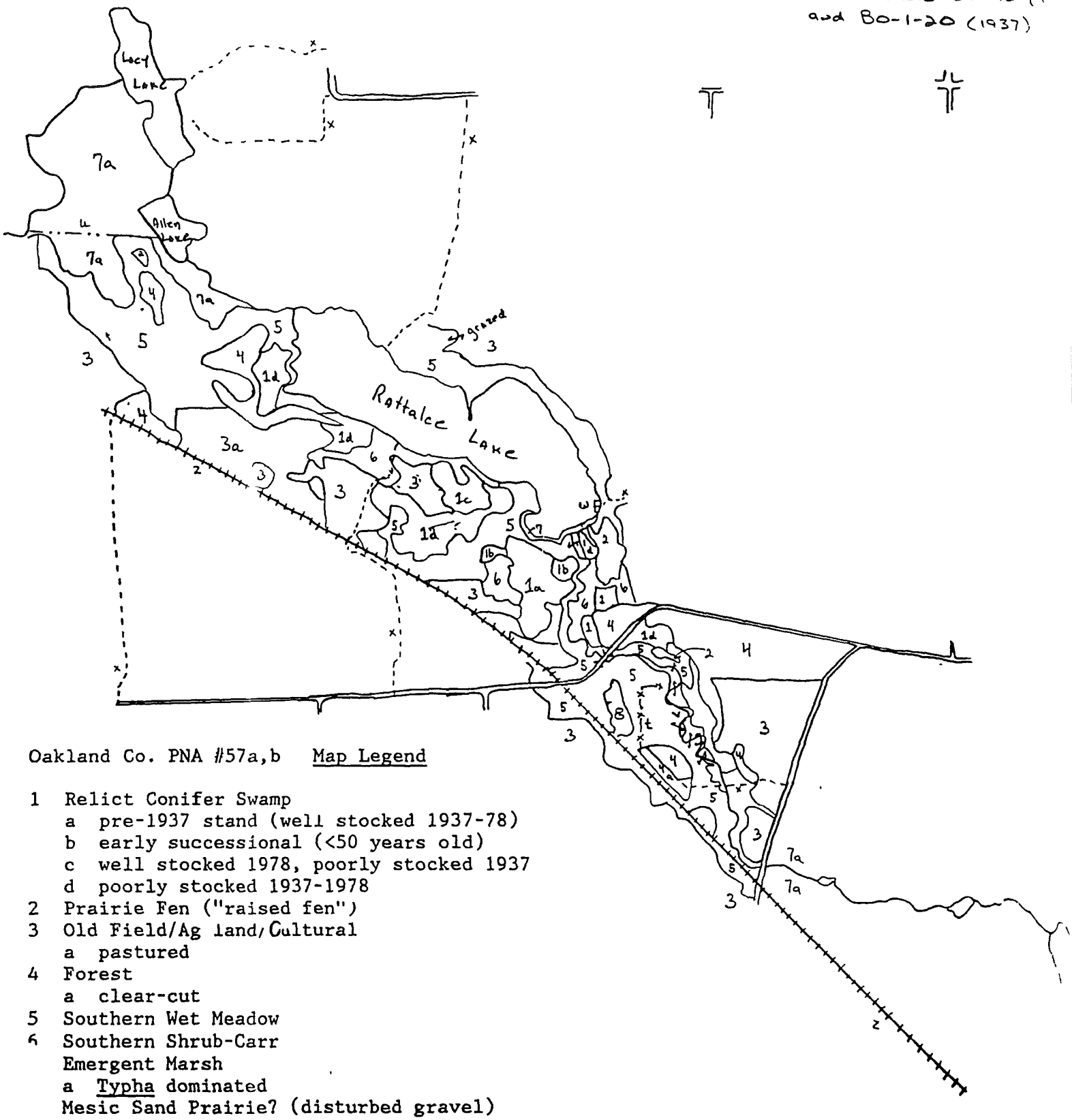
1 mile = 3.78"

N

Oakland Co. PNA #57a,b
Rattalee Lake

Scale 1 mi. = 4.57"
1: 13,874

Base: MDNR Photo 51-172 (1
and Bo-1-20 (1937)



Oakland Co. PNA #57a,b Map Legend

1 Relict Conifer Swamp
  a pre-1937 stand (well stocked 1937-78)
  b early successional (<50 years old)
  c well stocked 1978, poorly stocked 1937
  d poorly stocked 1937-1978
2 Prairie Fen ("raised fen")
3 Old Field/Ag land/Cultural
  a pastured
4 Forest
  a clear-cut
5 Southern Wet Meadow
6 Southern Shrub-Carr
  Emergent Marsh
  a Typha dominated
  Mesic Sand Prairie? (disturbed gravel)

u	ditch	x	trail
v	braided river channel	y	road
w	artificial beach	z	railroad

Mapped by: Gary Reese, MNFI

Oakland Land Conservancy

P.O. Box 80902
Rochester, MI 48308-0902
(810)752-2496

Rattalee Lake Fen

Clear water, rich in calcium and magnesium, seeps from the slopes surrounding Rattalee Lake, creating a unique wetland and natural area known as Rattalee Lake Fen. A great variety of plants and animals, many of which are rare and threatened in the state of Michigan, depends on this mineral rich water to survive.

The diversity of plant and animal life at this site makes it an exceptional natural area.

What Is a Fen?

Fens are most notably distinguished from other wetland communities by their mineral rich groundwater. Water saturated with calcium and magnesium that flows through the soils and peat creates the characteristic alkalinity of the fen. This unique groundwater quality provides habitats for a great variety of plants and animals, including many that cannot be found in any other type of community.

What Do Fens Need to Survive?

Fens are dependent upon the water which flows through them. The uninhibited flow of water in tiny streams throughout the fen prevents succession of the fen to shrub land or forest.

What can Damage a Fen?

It is critical to protect the water level, water flow and water quality of the fen. Any of the following changes could threaten its existence. Damming or ditching streams, surface irrigation, and installing drinking water wells can either raise or lower the water table. Soil compaction by off-road vehicles hinders water flow through the peat. Pollutants can enter the water from cropland, residential lots, or nearby roads. It is also important to protect the water source of the fen.

Unique Plants and Animals of Rattalee Lake

Take a stroll through Rattalee Lake Fen and the surrounding forested uplands and you might encounter foxes, wood thrushes, ovenbirds, as well as a variety of warblers. Wildflowers you might see include pitcher plants, fringed gentian, and the state-listed white ladyslipper and showy coneflower.

Source: Oakland Land Conservancy, adapted from information provided by The Nature Conservancy, Michigan Chapter. April 1996

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www.oaklandlandconservancy.org

Rattalee Lake Plant Community Descriptions

C = Southern Shrub Carr

This shrub-dominated community is characterized by fluctuating water levels and poor drainage conditions. It is located in muck soils next to streams, rivers and lakes. Dominant plants include grey dogwood (*Cornus racemosa*), red-osier dogwood (*Cornus stolonifera*), silky dogwood (*Cornus ammomum*), Michigan holly (*Ilex verticillata*), Bebb's willow (*Salix bebbii*), shining willow (*Salix lucida*), meadow willow (*Salix petiolaris*), sandbar willow (*Salix exigua*), pussy willow (*Salix discolor*), and common elder (*Sambucus canadensis*).

F = Prairie Fen/Southern Wet Meadow

This herb or herb-shrub wetland is located on saturated muck soils through which flow calcium and magnesium-rich groundwater. Dominant plants include shrubby cinquefoil (*Potentilla fruticosa*), little bluestem (*Andropogon scoparius*), Indian grass (*Sorghastrum nutans*), big bluestem (*Andropon gerardii*), tussock sedge (*Carex stricta*), northern dropseed (*Sporobolus heterolepis*), mat muhly (*Muhlenbergia richardsonis*), tamarack (*Larix laricina*), grey dogwood (*Cornus racemosa*), red-osier dogwood (*Cornus stolonifera)*, and pussy willow (*Salix discolor*).

M = Emergent Marsh

A shallow water marsh characterized by emergent herbs and grass-like plants as well as floating-leaved herbs at the shores of lakes and streams. Dominant plants include: water-plantain (*Alisma plantago-aquatica*), sedges (*Carex*), spike rushes (*Eleocharis*), manna grass (*Glyceria borealis*), white grass and cut grass (*Leersia*), duckweed (*Lemna*), yellow pond lilies (*Nuphar*), water lilies (*Nymphaea*), smartweeds and knotweeds (*Polygonum*), pickerelweed (*Pontederia cordata*), arrowheads (*Sagittaria*), bulrush (*Scirpus*), bur reeds (*Sparganium*), greater duckweed (*Spirodela*), cattails (*Typha*), water-meal (*Wolffia*), and wild rice (*Zizania aquatica*).

O = Old Field

This is an area that was cleared of woody vegetation in order to farm but which now lies fallow. It is characterized by opportunistic species which thrive in such disturbed areas.

Rattalee Lake Plant Community Descriptions (continued)

P = Mesic Sand Prairie

This grassland community can be prone to summer drought but is also sometimes inundated in early spring due to seasonally high water tables It is located on sandy soils that are strongly acidic with poor water retaining capacity. Dominant plants include little bluestem (*Andropogon scoparius*), sedges (*Carex spp.*), and big bluestem (*Andropogon gerardii*). Some plants which are characteristic of this community include spiked lobelia (*Lobelia spicata*), wild indigo (*Baptisia tinctoria*), hairy pinweed (*Lechea villosa*), dense blazing star (*Liatris spicata*), purple milkwort (*Polygala sanguina*), and arrow-leaved violet (*Viola sagittata*).

S = Relict Conifer Swamp

This forest community is located on saturated muck soils at stream headwaters or in kettle depressions Dominant plants consist of the following northern conifers· tamarack (*Larix laricina*), eastern arborvitae (*Thuja occidentalis*), and white Pine (*Pinus strobus*). Other plants which are typically present include spicebush (*Lindera benzoin*), highbush blueberry (*Vaccinium corymbosum*), poison sumac (*Toxicodendron vernix*), Michigan holly (*Ilex verticillata*), and nannyberry (*Viburnum lentago*).

W= Dry-Mesic Southern Forest

This oak or oak-hardwood forest type is found on sites with dry to moist ground composed of sandy loam and loam soils. Dry-Mesic Southern Forests are located on a great variety of landforms such as lake plains, hilly areas (kames or moraines), and sand dunes. Dominant plants include white oak (*Quercus alba*) and black oak (*Quercus velutina*). Other important species in this community include red maple (*Acer rubrum*), false shagbark hickory (*Carya ovalis*), white ash (*Fraxinus americana*), scarlet oak *(Quercus coccinea*), black cherry (*Prunus serotina*), sassafras (*Sassafras albidum*), and red oak (*Quercus rubra*).

HURON RIVER SYSTEM STUDY RESULTS

A Study by
the Huron River Watershed Council

THE QUALITY OF THE HURON RIVER HEADWATERS

Results of a Study by the Huron River Watershed Council (HRWC)
For more information, contact Joan Martin (734) 769-5971 or jmartin@hrwc org

The headwaters site of the Huron River is in excellent shape, except for recent sedimentation The River is beautiful, clear, and fairly small at the White Lake Road study site where it meanders in a gravel bed through an extensive lowland woods This site is 1000 yards downstream of the road, approximately three and a half miles below the origin of the River at Big Lake and a few miles west of Pontiac The watershed that drains into the river at this site covers 14 square miles, which is small compared to most of our 45 study sites on the Huron River and its tributaries It is the most pristine part of the Huron River system in our monitoring study and many parts of its watershed are relatively undisturbed The channel and the banks are in excellent shape, but the stream bed has received a lot of silt in the recent few years

This site has exceptional quality as measured by the most reliable indicator of river conditions, the composition of the benthic population Until two years ago, the benthic population was outstanding, with good diversity and more sensitive families than any other site in the Huron River system However, it is disturbing that the number of sensitive families has decreased since 1997, as shown in the table on page 3 (Sensitive families are unable to live in sites with organic pollution Polluted sites have no sensitive families The presence of a variety of sensitive families indicates good conditions in the river) Through the fall of 1997 the number of sensitive families present was always four or more In the three seasons since then the number has dropped to only one to three, including an especially thorough second search in May, 1999

What is exceptional about this site is that it is the only location where several families that are rarely found in other areas of the Huron River system are nearly always present They include *Perlodid* stoneflies, *Ephemerellid* mayflies, and *Glossosomatid* caddisflies, which require clean, cold water rich in oxygen While sensitive Corydalid dobsonflies are occasionally present at several other sites, they are always found here One sensitive family, the large, speedy *Metretopodid* mayfly has been found only at this site in both our study and the extensive study of the Huron River System by the DNR in 1992 Even more impressive is the presence of very sensitive group, the *Odontocerid* caddisflies, which are very rare in this area. We found them at this site in September, 1997, and Doug Bidlack had found them a short distance upstream in 1990

This location in the headwaters of the Huron River may serve as an example of what the Huron River can be However, we are very concerned about the recent decrease in sensitive families and increase in sediment We have found no other site like it, and it is crucial that it be protected from the potential deterioration that could result from the intensive use of land in its watershed

Invertebrates Living in the Huron River at White Lake Road May 1994 to May 1999

5/3/94	9/10/94	4/11/95	9/16/95	4/16/96	10/4/96	9/6/97	9/29/97	4/4/98	9/27/98	4/24/99	5/4/99	tolerance	
													Plecoptera - Stoneflies
12	6	24	1	5	11			20		10	35	2	Perlodidae
													Ephemeroptera - Mayflies
5	2		8			4	5		2	3	17	4	Baetidae - small minnow mayfly
											1		Caenidae - small square gills
8	11	34	3	31	50	1	21	23		1		1	Ephemerellidae - spiny crawler
11	32	18	20	4	20	10	20	6	17	8	6	4	Heptageniidae - flatheaded mayfly
1					4		3			1	4	2	Leptophlebiidae - pronggills
	4			2	2		5					2	Metretopodidae - cleftfooted minnow mayfl
									3				Siphlonuridae - primitive minnow mayfly
						1			1			4	Tricorythidae - little stout crawlers
													Zygoptera - Damselflies
9	10		20	1	6	6	8	1	16	1	3	5	Calopterygidae - broadwinged damselflies
													Anisoptera - Dragonflies
1							2	2	1	1	2	3	Cordulegastridae - biddies
		1										1	Gomphidae - clubtail
								1				9	Libellulidae - common skimmer
	5		7			3	5	1	6		5	3	Aeshnidae - darners
													Hemiptera - Bugs
	1	1	5	1	2		1		1				Belostomatidae - giant water bug
			1		2								Corixidae - water boatman
2			2		1	1	1		1				Gerridae - water strider
			2	1									Nepidae - water scorpion
									1				Notonectidae - backswimmers
2			2			1							Veliidae - broad shouldered water striders
													Megaloptera
1	3	3	3	3	3		3		1		2	0	Corydalidae - fishflies & dobsonflies
	3		1			3	1					4	Sialidae - alderflies
													Trichoptera - Caddisflies
2	11	11	2	7	1		1					0	Glossosomatidae - saddlecase makers
3			8		3		1		4			3	Helicopsychidae - snailcase makers
60	140	62	25	23	36	21	43	70	13	2	5	4	Hydropsychidae - common netspinners
								1				4	Hydroptilidae - micro caddisflies
				8								4	Leptoceridae - longhorned case makers
9	16	20	15	6	5		2	15	2		5	4	Limnephilidae - northern case makers
	1		2									6	Molannidae - hoodcase makers
1	13	15	3	3	15	2	4	1	5		4	3	Philopotamidae - fingernet caddisflies
			2						1			4	Phryganeidae - giant case makers
						1				1		6	Polycentropodidae - trumpetnet caddisfly
										15	24		Uenoidae
							2					0	Odontoceridae - strongcase makers
													Coleoptera - Beetles
					1								Dytiscidae - predaceous diving beetle
7	5	1	3	3	9	4	5		3		5	4	Elmidae - riffle beetle
			2										Gyrinidae - whirligig beetles
			2		4								Hydrophilidae - water scavenger beetles
													Diptera - True Flies
					11							2	Athericidae - watersnipe flies
1												6	Ceratopogonidae - biting midges
25	1				7	12	9	5	3	2	18	7	Chironomidae - midges
					1								Culicidae - mosquitoes
								1		3			Ptychopteridae - phantom crane fly
13			19	4	5	5	18	21	4	3	9	6	Simuliidae - black flies
										1			Stratiomyidae - soldier fly
	1		1		2		1			1	3	6	Tabanidae - horse & deer flies
3	4	3	1		10	1	7	2	9	3	1	3	Tipulidae - crane flies
													Annelida
				1			3						Oligochaeta - worms
													Gastropoda
						4	1						Ancylidae - limpet
					1	1	1				1		Lymnaeidae - river snail
	1	1				2	2			2	5		Physidae - pouch snail
										1			Viviparidae
	2				1	4	3		1				Sphaeriidae - fingernail clams
											2		Unionidae
Spring94	Fall 94	Spring95	Fall 95	Spring96	Fall 96	Fall 97	Fall97 #2	Spring98	Fall 98	Spring99	Spring99#2		**Crustacea**
	1						1						Decapoda - crayfish
1			1									6	Amphipoda - scuds
177	273	194	161	103	213	87	179	170	95	59	157		TOTAL
21	22	13	27	16	26	20	29	15	21	18	21		Diversity (# taxa)
4	4	2	3	3	4	4	5	2	4	4	4		# Mayfly taxa
5	5	4	7	5	5	3	6	4	5	3	4		# Caddisfly taxa
1	1	1	1	1	1	0	0	1	0	1	1		# Stonefly taxa
10	10	7	11	9	10	7	11	7	9	8	9		#EPT
5	5	5	4	5	7	1	6	2	1	3	3		**#sensitive families**

Totals for ALL collections	**All taxa**	**Mayfly taxa**	**Caddisfly taxa**	**Stonefly taxa**	Comments The Sensitive Families indicators of a high quality stream, are highlighted in gray
Total # taxa	**56**	**8**	**12**	**1**	
Sensitive Families	**Perlodidae, Ephemerellidae, Leptophlebiidae, Metretopodidae, Gomphidae, Glossisomatidae, Odontoceridae, Corydalidae**				

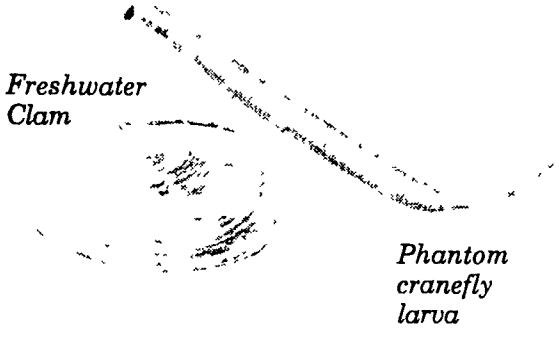
EVALUATING CREEK QUALITY

*The **Huron River Watershed Council** is a non-profit coalition of the communities and people in the basin, whose mission is to protect the entire watershed.*

***Riffles** are "wanna-be rapids" — where the water flows swiftly and ripples over a shallow, rocky or sandy bed.*

***Silt** is an important factor when considering a creek's quality. Silt in the riffles can limit the number of creatures living in a creek because it fills the spaces between rocks and reduces oxygen in the sediment and interstitial spaces.*

*The creatures living on the bottom of a river make up the **benthic population**. We study populations of the invertebrates, creatures that have no backbone, such as clams, immature insects, worms, and crayfish.*

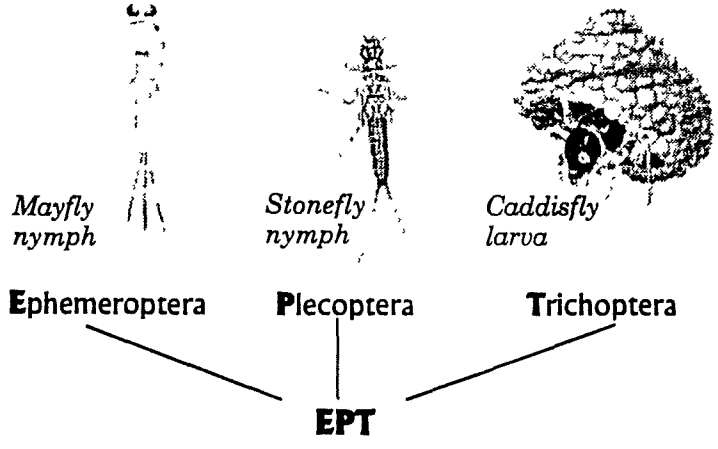


In order to evaluate the current state of the river and its streams, the **Huron River Watershed Council** has been working with local residents and aquatic biologists on a major study of the Huron River system since 1992. The study characterizes the physical state of the waterways and the **benthic populations** living in them Since the benthic population depends entirely on the quality of the stream, its composition reveals a great deal about the state of both the water quality and the physical health of the stream.

The quality is evaluated relative to other sites in the Huron system. Since larger streams have a more diverse population, each study site is adjusted for size to allow a valid comparison. The population in each stream site is sampled thoroughly in April and September, and all sites in this study have been sampled more than three times, most at least five, to develop a knowledge of the population.

Some of the characteristics that indicate good quality are stable banks with a broad corridor of trees and shrubs, riffles free of silt deposition, fairly stable temperatures, and a benthic population that includes a diverse variety of creatures, including several groups that are sensitive to organic pollution. The population in a degraded creek will be restricted to those few types of creatures hardy enough to survive.

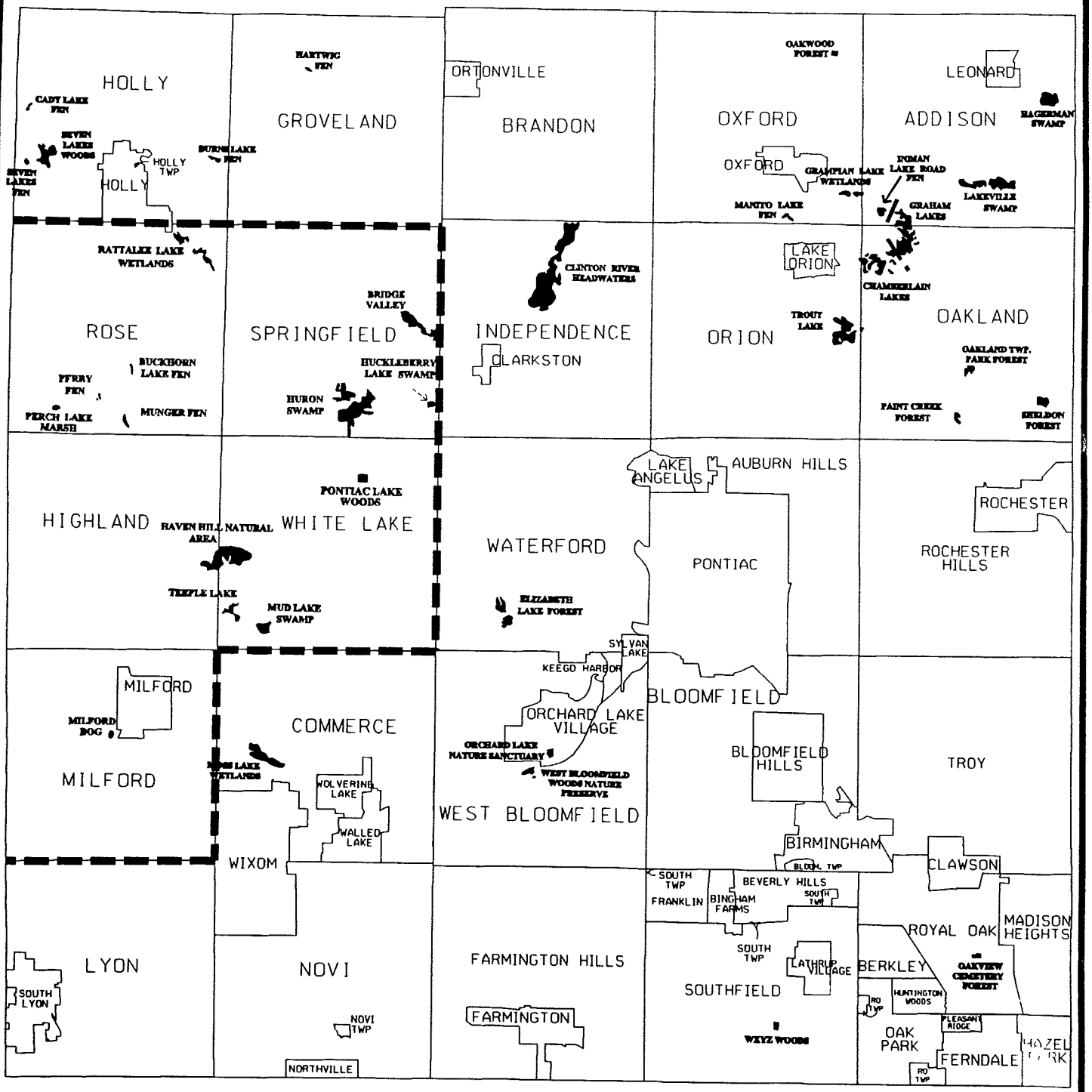
When the stream is healthy, a great diversity of creatures live there, including several that are sensitive to pollution. Since many mayflies, stoneflies, and caddisflies are sensitive to the quality of a site, we note the variety of them as an additional indicator of good quality This indicator is labeled the "EPT" because the latin names are Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichopera (caddisflies).



IDENTIFYING OUR NATURAL HERITAGE

MNFI 1987 Natural Areas
Inventory of Oakland County

1986-1987 NATURAL AREAS INVENTORY



IDENTIFYING OUR NATURAL HERITAGE

A NATURAL AREAS INVENTORY OF OAKLAND COUNTY

OAKLAND
COUNTY MICHIGAN
PLANNING DIVISION
Daniel T. Murphy, Oakland County Executive

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ACKNOWLEDGMENTS

The Oakland County Planning Division expresses its appreciation to the following organizations and agencies for providing assistance in the research and identification of natural areas, funding for the inventory, and the investigation of potential conservation actions. Their efforts are the foundation for preserving Oakland County's natural heritage.

Oakland County Board of Commissioners

....for the allocation of funds.

Michigan Natural Features Inventory
Michigan Department of Natural Resources

....for their research and identification of natural areas.

The Nature Conservancy, Michigan Chapter

....for pursuing protection measures.

EXECUTIVE SUMMARY

Staff of the Michigan Natural Features Inventory, a unit of the Department of Natural Resources, have recently completed a two-year natural areas inventory of Oakland County, Michigan, under contract to the Oakland County Planning Division. Between April, 1986 and December, 1987, the entire land surface of the county was systematically surveyed to locate and evaluate all remaining tracts of high natural quality and relatively undisturbed native vegetation. A total of 308 tracts were identified and evaluated by aerial reconnaissance. Of the approximately 112 tracts of high apparent quality and/or low disturbance that were subsequently ground surveyed, 37 qualified as natural areas, each having at least one natural community occurrence.

Many of the 37 natural areas contained several natural communities. A natural community is a grouping of plants and animals which co-exist because they require the same environmental factors (soils, hydrology, climate, geology, slopes, etc.). A total of 63 natural community occurrences were located, representing 16 of the 30 natural communities thought to exist in Oakland County prior to European settlement Of these occurrences, eight were of statewide, or Exceptional significance and 55 of county, or Notable significance. A total of 2992 acres, only **one-half of one percent** of Oakland County's land area, was identified as having significant natural communities present.

State ownership characterized 40% of all qualifying natural community occurrences, while other public ownership characterized 11% of occurrences. Corporate and private ownership comprised 49% of qualifying occurrences.

While development has eliminated much of the native landscape of Oakland County, the Natural Features Inventory demonstrates that remnant tracts continue to exist and many lack protection. Conservation of these natural areas and their native plant and animal populations can ensure maintenance of the county's diverse natural heritage. To foster such action, all Exceptional and Notable Areas have been prioritized based on the rarity and quality of the natural communities they support. Specific conservation actions have been suggested which will help preserve the biological diversity of Oakland County for future generations.

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INTRODUCTION

In 1986, the Oakland County Planning Division contracted with staff of the Michigan Natural Features Inventory (MNFI), a unit within the Michigan Department of Natural Resources, to complete an inventory of the County's remaining natural areas. The biologists, botanists and ecologists of the MNFI were looking for land areas supporting high quality native vegetation in a state similar to pre-European settlement. In a sense, the identified areas are the least altered by man and the most natural sites in the County. They harbor special plants, animals and geologic features. These natural areas are reservoirs of the County's biological diversity. They are our natural heritage.

This document is a summary of a larger 242 page document that was prepared by MNFI staff. A copy of the full report can be viewed at the Planning Division's offices. It contains a more detailed account of what is included in this document. To accompany the written word, Planning staff prepared a map showing the location of Oakland County's natural areas. A copy of the map may be purchased at the Planning Division offices for $2. After two years of field work, the ecologists identified 37 natural areas consisting of about 3000 acres and containing many rare plants and animals. All 37 areas are shown on the map. To arrive at the final 37 sites, four times that many were ground surveyed. Although they did not make the final list, these other sites may be of some local importance. Please contact the Planning Division for more information about these sites.

A standardized, objective approach for identifying natural areas was utilized. An extensive set of evaluative criteria and a systematic methodology ensured that the inventory ranked sites appropriately and included only the most natural areas.

INVENTORY METHODOLOGY

The Preliminaries

Before the MNFI biologists could begin research and reconnaissance for natural area identification, a list of evaluative criteria was needed to use in grading the sites' significance. It is not enough to say that they were looking for areas resembling pre-European settlement. Several criteria were considered in setting up a state-wide ranking system that was employed during Oakland County's inventory. Criteria included: size, impact of disturbances, species composition, both in numbers and diversity, threatened or endangered status, and the extent of buffering land surrounding the site. Adherence to these criteria eliminated many sites from consideration during the inventory. A detailed description of how each criterion is factored into the inventory is contained in the full report.

Based on the above listed criteria, qualifying natural areas can be classified into two broad significance categories. These are "exceptional" and "notable." A site of exceptional significance is important on a state-wide level. Notable sites are of county-wide significance. This whole grading system provided guidelines for reviewing natural areas.

Another consideration during the inventory was whether or not the site in question met the standards for that particular type of environment, or "natural community." The natural community is the basic unit for habitat management and environmental protection. A natural community is a natural grouping of plants and animals that coexist because they require similar environmental factors (soils, climate, hydrology, geology, slopes, etc.). An example of a natural community is a tamarack swamp - certain plants are grouped together there because they all require a similar degree of wetness, acidic soils, etc. When you go for a hike through the woods, by the swamp and across the fields you are probably passing through many natural communities. Only highly ranked examples of each natural community were included in the final listing of sites. A ranking system describing conditions for each type of natural community was developed by MNFI staff for use across Michigan.

Within Oakland County, there probably existed 30 natural communities prior to European settlement. At present, 16 natural communities ranging from marsh to prairie to forest have been identified in the county.

A 4-Step Process

A substantial amount of work on the natural areas inventory was completed before any field work was done. A four step process was utilized to ensure that a systematic, thorough inventory of the County was performed.

1. The first step in this process was to review all available natural surveys and plant collections. The first major study of Oakland County's vegetation and natural communities was completed by Marjorie Bingham in 1945. Her plant catalog totaled over 1600 species. A source that helped typify the species composition in Oakland County before much settlement was the General Land Office surveys. These surveys were done in the early 1800s. Although their primary intent was to chart the County's geography, much environmental information was also included by the surveyors. Other natural surveys were prepared within the last fifteen years for Oakland Township, and the Upper and Lower Clinton River Watershed. All surveys were reviewed. This first step enabled MNFI ecologists to enter the following three steps with the knowledge of what the County looked like before extensive settlement, where some rare plant species were located, and the distribution of particular natural communities.

2. Aerial photograph interpretation was the next step. MNFI staff reviewed photos dating back to 1937 and as current as 1986. With some interpretive experience, one can determine from aerial photographs where particular natural communities exist and how much they have been altered. Aerial photographs can show where wetlands have been drained and parts of forests harvested. An historical perspective can help show changes to the landscape. After this task, MNFI ecologists had identified over 300 potential natural area sites. The next two steps were used to narrow down this number.

3. Several reconnaisance flights were taken to refine the list of natural areas. Flights were taken in spring, when leaves do not obscure the ground, trunks and smaller species, and in summer, when wetland invader species could be spotted. Flying at less than 1000 feet, MNFI staff were able to see disturbed forests, invaded wetlands, and recently altered natural areas. During this step, a few new areas were identified, but almost half of the potential sites were eliminated from further consideration. The list was refined to less than 150 sites.

4. Finally, MNFI biologists and botanists were able to do what they love most - trudge through bogs, clamber over wooded knolls, poke around in the soil and record observations. Field work at the potential natural areas spanned two years. During ground survey, the presence of sensitive plants and animals was noted, the natural community boundaries were determined, natural quality and disturbances were recorded, species lists were compiled, soils were checked, and an overall evaluation was made using criteria mentioned earlier. Based on their field work, MNFI staff were able to refine the potential natural area list from about 150 to a finalized list of 37 sites.

A brief description of the final 37 sites is included in the next section. A work map showing the roughly 300 potential natural areas, and those which were ground surveyed, is available for viewing at the Oakland County Planning Division offices. The 37 natural areas are shown and described on a reproducible map.

INVENTORY RESULTS

Although it has been stated earlier that a total of 37 natural areas were identified, it is also important to note that at those 37 sites a total of 63 natural communities were identified. Therefore, several of the 37 sites are comprised of more than one natural community. For example, the Lakeville Swamp natural area is comprised of three natural communities; a cedar swamp, a wet meadow and a prarie fen.

Eight of the 63 natural communities are of exceptional, or state-wide, significance. The remaining 55 natural communities are of notable, or county-wide, significance. Each site is described below in terms of the number of natural communities occurring there and their significance.

Of the 37 natural areas, eleven occur in State Parks. Six sites have some other type of public ownership such as township, county or the Huron-Clinton Metropolitan Authority. The largest number of sites, 20, are in some type of private or corporate ownership. The combined acreage of all 37 sites is 2992, or only one-half of one percent of the County's land area.

In addition to identifying natural land areas, MNFI staff also located several significant natural features. The locations of 48 endangered, threatened and special concern plant species were identified. Fourteen animal species of endangered, threatened or special concern were identified. There were sightings of orchids, gentians and lady-slippers. Ecologists also spotted a copperbelly water snake, least shrew and spotted turtles. There were recordings of champion specimens of four tree species, including silver maple and northern pin oak. Several great blue heron rookeries were found. Outstanding glacial geological features were identified as well. A complete listing of all of these special natural features is included in the full report.

The following list of sites gives a brief description of the common species found at each site, the site's significance, its ownership, its size, and a suggested conservation action for its protection. Conservation actions are discussed further in the "What Next?" section. A detailed species listing for each natural community is included in the full report.

Site Descriptions

1. **CADY LAKE FEN** (Holly Township)

   This is a 5 acre prairie fen. A prairie fen is an herb-shrub wetland located in lime-rich muck. Dominant species here include sedges and birch. This site is privately owned and of county-wide significance. Protection of this site by the Wetlands Proctection Act (P.A. 203 of 1979) should be sufficient. Another alternative is enrollment in the Open Space Preservation Act. (P.A. 116)

2. **SEVEN LAKES WOODS** (Holly Township)

   This 103 acre dry-mesic southern forest lies entirely within Seven Lakes State Park. The mature second-growth forest is dominated by black, white and red oaks, red maple and black cherry. This site is of county-wide significance. Biologists suggest further protection of this site by dedication as a State Wild Area.

3. **SEVEN LAKES FEN** (Holly Township)

   This 6 acre prairie fen is also entirely within Seven Lakes State Park. It is characterized by bush cinquefoil, black-eyed susan and bluestem grasses. This site is of county-wide significance. Further protection of this site could occur by recognizing its importance in the park Master Plan as an undevelopable area.

4. **RATTALEE LAKE WETLANDS** (Rose Township)

   This 93 acre site consists of a 3 acre prairie fen and a 90 acre southern wet meadow. The site is owned by multiple private and corporate owners, including Detroit Girl Scouts, Detroit Edison and the Michigan Nature Association. The fen is of state-wide significance and is a potential site for acquisition and dedication as a natural area preserve. It is dominated by sedges, cinquefoil and bluestem grasses. The southern wet meadow is of county-wide significance and could be protected by the Wetlands Protection Act, Open Space Preservation (P.A. 116) or by acquisition. The meadow contains sedges, goldenrod, bulrush, cinquefoil, asters and gentians, among others. Two Threatened and two Special Concern plant populations and one Threatened invertebrate are found at the Rattalee Lake site.

5. **BURNS LAKE FEN** (Holly Township)

This 18 acre site is primarily a prairie fen, but is associated with other natural communities, including a wet meadow, marsh, conifer swamp and other wetlands. Dominant species include sedges, bulrush, goldenrod and cinquefoil. This site lies entirely within the Holly State Recreation Area and is considered of county-wide significance. Protection of this site in the park Master Plan is suggested.

6. **HARTWIG FEN** (Groveland Township)

This five acre site lies within the Holly State Recreation area on land owned by Detroit Edison. This prairie fen contains sedges, goldenrod, cinquefoil and larch, and is considered of county-wide significance. Because of several higher ranking fens in the county no protection plans are proposed. However, a management agreement between the State and Detroit Edison would help foster corporate involvement in the protection of the County's natural heritage.

7. **BRIDGE VALLEY** (Springfield Twp., Independence Twp.)

One of only three landscape complexes identified in Oakland County. The combination of several associated plant communities comprises a relatively undisturbed 151 acre example of how the landscape appeared prior to European settlement.

The site is characterized by a 40 acre prairie fen of state-wide significance and a 22 acre relict conifer swamp of county-wide significance. The prairie fen is the best example in Oakland County of an herb-shrub wetland on lime-rich muck. It is dominated by sedges, birch, rushes and dogwood. The relict conifer swamp contains tamarack, white pine and arborvitae. The remaining acreage at this site is not comprised of plant communities of particular significance but the acreage contributes to the glacial landscape complex.

Two Threatened and one Special-Concern plant communities are found at this site. The site is in multiple private ownership. Part of the site is registered with the Michigan Natural Areas Council as a Nature Reservation. Expansion of the protected boundaries is suggested by the biologists who performed the inventory. Protection might include registration of more land with the Michigan Natural Areas Council or the Nature Conservancy, or enrollment in P.A. 116 Open Space Preservation.

8. **CLINTON RIVER HEADWATERS** (Independence Township)

Six plant communities of county-wide significance comprise this 491 acre site. Together they make up one of only three landscape complexes in the County. This is the largest site in the County. Most of it lies within Independence Oaks County Park with some land privately owned.

The six communities include a hardwood-conifer swamp, prairie fen, southern wet meadow, emergent marsh, submergent marsh and mesic southern forest. Therefore, the number of dominant species found here is too extensive to list. The hardwood conifer swamp is the largest community, comprising 445 acres. It contains arborvitae, red maple, yew, spicebush and ferns. There are several alternatives for protection of this site. It is recommended that the public lands be designated a County Natural Area or protected in some way in the park plan. Suggested conservation actions for the private land include registry with the Nature Conservancy or enrollment in P.A. 116 Open Space Preservation Act.

One threatened plant population is found here. A small, unverified great blue heron rookery has been reported from this area.

9. **OAKWOOD FOREST** (Oxford Township)

This 21 acre forest is owned privately and is of county-wide significance. Species found here include mature red, white and black oaks, red maple and black cherry. Enrollment in P.A. 116 or registry with the Nature Conservancy would be effective protection measures. This site was likely an oak opening prior to European settlement. Much of Oakland County consisted of oak opening plant communities prior to settlement.

10. **MANITO LAKE FEN** (Oxford Township)

This 11 acre prairie fen is of county-wide significance. Dominant species include sedges and joe-pye weed. Also evident are tamarack, arborvitae and poison sumac. This site is owned privately, and should have adequate protection through the Wetlands Protection Act. There is one threatened plant population found here.

11. **GRAMPIAN LAKE WETLANDS** (Oxford Twp., Addison Twp.)

This 34 acre site consists of a 19 acre coastal plain marsh and a 15 acre bog. Both communities are of county-wide significance. The marsh contains rushes, St. John's wort, sundew and beggar ticks. It also contains two threatened plant species. The bog contains sedges, cattails, leather leaf shrubs and acidic soils. The site is owned by many private parties, including Camp Oakland. Alternatives for protection of this site include registration with the Nature Conservancy, use of the Wetlands Protection Act, or enrollment in the Open Space Preservation Act.

12. **INDIAN LAKE ROAD FEN** (Addison Township)

This 19 acre prairie fen is of county-wide significance. It is characterized by gray dogwood, pussy willow, sedge and royal fern. This site is privately owned. Use of the Wetlands Protection Act should protect this fen.

13. **CHAMBERLAIN LAKES** (Orion Twp., Oakland Twp.)

This 136 acre site lies entirely within the Bald Mountain State Recreation Area. It is characterized by three natural plant communities of county-wide significance. A 63 acre dry-mesic southern forest is the largest of the three communities. This upland forest has white, red and black oaks and hickories as dominant species. The second natural community is a prarie fen. This 34 acre fen is characterized by sedges, cinquefoil, goldenrod and pitcher plants. It lies in a rugged glacial topography. The final community found here is a 39 acre relict conifer swamp. Besides tamarack, black spruce is also dominant. While all three communities are not ranked high within the county, combined they would make a fine State Wild Area. This has been recommended to the State Wilderness and Natural Areas Board. One threatened plant species was found within the Chamberlain Lakes site.

14. **GRAHAM LAKES** (Oakland Twp., Addison Twp.)

This 194 acre site is comprised of a 65 acre fen and a 129 acre dry-mesic southern forest. The prarie fen is of state-wide significance. It is the second best fen in Oakland County and one of the biggest in the State. It contains willows, cinquefoil, red-osier dogwood and sedges. The soil is largely peat. Part of the Graham Lakes site is in private ownership, most of it lies within Bald Mountain State Recreation Area. It is suggested that the mapped acreage owned privately should be acquired and designated along with the already public lands as a State Wild Area. The forest is of county-wide significance and is characterized by red oak and white pine.

19. **OAKLAND TOWNSHIP PARK FOREST** (Oakland Township)

This 24 acre dry-mesic southern forest is of county-wide significance. It is characterized by black red and white oaks, sugar maple and basswood. Part of this site is in private ownership and part is owned by Oakland Township. For further protection of the private lands portion, perhaps enrollment in P.A. 116 or registration with the Nature Conservancy would help.

20. **TROUT LAKE** (Orion Twp., Oakland Twp.)

Four natural plant communities totally within Bald Mountain State Recreation Area combine for a total of 160 acres. The communities are of county-wide significance. It is suggested that a dry-mesic southern forest and a relict conifer swamp be designated as a State Wild Area. One prairie fen needs further study before designation and the fourth plant community, another prairie fen should be protected in the park master plan. The dry-mesic southern forest is 129 acres and largely comprised of mature red and white oaks. It sits on irregular glacial terrain. The prairie fens total 13 acres. The fen that needs no further study contains sedges, cinquefoil and birch trees. An 18 acre conifer swamp is comprised of many species, including arborvitae, ash, elde skunk cabbage, dewberry and lily of the valley.

21. **HUCKLEBERRY LAKE SWAMP** (Springfield Township)

This 11 acre relict conifer swamp is of county-wide significance. It contains tamarack, black spruce, highbush blueberries, mosses and pitcher plants. The swamp surrounds a glacial brown-water (due to tree tannins) pond. A shrub bog surrounds the swamp. The site is privately owned. Existing wetland protection laws should protect this site. Enrollment in the Open Space Preservation Act is another alternative.

22. **PONTIAC LAKE WOODS** (White Lake Township)

This is the only dry southern forest listed in the inventory. It is a 34 acre site totally within the Pontiac State Recreation Area. This site is of county-wide significance. Common species found here include black and white oak, flowering dogwood, and sedges. Further study on the distribution and rarity of this type of plant community is needed before final recommendations can be made. In the interim, protection in the park Master Plan is suggested

15. **LAKEVILLE SWAMP** (Addison Township)

Three plant communities of county-wide significance comprise this 141 acre site. A 115 acre wet meadow, 2 acre prarie fen and 29 acre relict conifer swamp overlap each other to make up the 141 acre total. The southern wet meadow is characterized by willows, sedges, asters, red-osier dogwood, joe-pye weed and spirea. The prarie fen contains sedges, bluestem grass, indian grass and spike gayfeather. Common plants of the relict conifer swamp are arborvitae, yew, fern, red maple and sarsaparilla. Two threatened plant populations are found here. This site is in multiple private ownership, including the Michigan Nature Association. It is suggested that additional land be acquired and added on to the existing Natural Area Preserve. Use of the Wetlands Protection Act is suggested for the interim.

16. **HAGERMAN SWAMP** (Addison Township)

This 43 acre southern swamp is of county-wide significance. It is characterized by a cover of sugar maple, green ash, spicebush, viburnum, fern and wood nettle. Many private owners comprise the ownership of this site. Many alternatives are suggested for the protection of this site, including the Wetlands Protection Act, the Open Space Preservation Act or registration with the Nature Conservancy.

17. **SHELDON FOREST** (Oakland Township)

This 46 acre site is comprised of a 36 acre southern swamp of state-wide significance and a 10 acre southern forest of county-wide significance. It lies entirely within Stoney Creek Metropark. The swamp contains red maple, sugar maple, ash, spicebush, wood nettle, ferns and skunk cabbage. The forest contains sugar maple, red maple, red oak, beech, black cherry, viburnum, fern and enchanter's nightshade. It is suggested that the Huron-Clinton Metro Authority designate this site as a Metropark Natural Area.

18. **PAINT CREEK FOREST** (Oakland Township)

This is the only southern floodplain forest listed in the inventory. It is a 17 acre site of county-wide significance. Common species found here include ash, willow, elm, red-osier dogwood, aster and cattails. The site is in multiple private hands. Further study of this site is needed before suggesting the most appropriate protection measure. However, in the interim such actions as enrollment in the Open Space Preservation Act and perhaps more protective zoning would be appropriate.

23. **HURON SWAMP** (Springfield Township)

Near the headwaters of the Huron River, this site is a 417 acre southern swamp of county-wide significance. Species found here include red maple, black ash, false mermaid and marsh marigold. Most of this site is located within Indian Springs Metropark, with the remainder in the Timberland Swamp Nature Sanctuary owned by the Michigan Nature Association. A great blue heron rookery is known to exist at this site. Further study is needed before suggesting the best conservation action. However, an interim measure, such as use of the Wetlands Protection Act, would be an effective conservation action.

24. **BUCKHORN LAKE FEN** (Rose Township)

This 4 acre prairie fen contains sedges, cinquefoil and Indian grass. It is of county-wide significance and is owned privately. A possible conservation action is enrollment in P.A. 116, Open Space Preservation Act. This is the smallest site in the Natural Areas Inventory.

25. **MUNGER FEN** (Rose Township)

Located in a stream valley, this prairie fen contains cinquefoil and 29 other recorded species. It is 14 acres and is considered of county-wide significance. This site is in multiple private ownership. Enrollment in the Open Space Preservation Act is a suggested conservation action.

26. **PERRY FEN** (Rose Township)

This 5 acre prairie fen is of state-wide significance. It is located within a wetland complex that includes marsh, wet meadow and ponds. In addition to a cover dominated by sedges, cinquefoil and bulrush, there are 38 other species present. Also of significance, this is a sandhill crane nesting site. This site is privately owned. Three potential protection measures for this site include the Open Space Preservation Act, Wetlands Protection Act and the Nature Conservancy's Registry program.

27. **PERCH LAKE MARSH** (Rose Township)

This 13 acre coastal plain marsh is characterized by blue-joint reedgrass and sedges. It is of county-wide significance and is owned by the YMCA. Suggested conservation alternatives include the Nature Conservancy Registry and use of the Wetland Protection Act.

28. **MILFORD BOG** (Milford Township)

The dominant species found in this 14 acre bog is the leatherleaf shrub. This site is of county-wide significance and is privately owned. As with most wetlands, use of the Wetlands Protection Act to protect this site is suggested. Also, enrollment in the Open Space Preservation Act would be beneficial.

29. **HAVEN HILL NATURAL AREA** (White Lake Twp., Highland Twp.)

The Haven Hill Natural Area is listed as a National Natural Landmark. It was one of the first State Natural Areas in Michigan. The area identified in this inventory is 335 acres large and is entirely within the Highland State Recreation Area. This site has two natural plant communities of state-wide significance and three of county-wide significance. These five communities combine to make a natural glacial landscape of county-wide significance. Also found here are one endangered, one threatened and one special concern plant species.

Two forests of 95 and 120 acres are the natural communities of state-wide significance. The smaller, drier forest contains red and white oaks and hickory as dominant species. The larger forest is characterized by white and bur oaks and sugar maple. The three other natural communities are all swamps. A 32 acre hardwood conifer swamp is characterized by ash, elm, tamarack and cedar. A 20 acre relict conifer swamp contains such species as arborvitae, birch, tamarack, poison sumac, black spruce and leatherleaf. The fifth community, a 67 acre southern swamp is characterized by elm, ash, basswood, hickory, spicebush and dogwoods.

There are no suggested conservation actions for this site since it is already well protected by its designation as a State Natural Area.

30. **TEEPLE LAKE** (White Lake Township)

This 34 acre site is comprised of a 31 acre southern wet meadow, a 2 acre prairie fen and a 1 acre mesic sand prairie. It lies wholly within Highland State Recreation Area. Only the 1 acre mesic sand prairie has been studied enough to designate it of county-wide significance. In fact, this sand prairie is the only high quality occurrence known to exist in Oakland County. The two other natural communities need further study before designation. All three communities need further study before suggesting conservation actions.

The southern wet meadow contains sedges, goldenrods, asters, blue-jo' reedgrass and joe-pye-weed. The prairie fen is characterized by cinquefoil, mountain-mint, several grasses, goldenrods and asters. The mesic sand prairie is dominated by Indian grass and big bluestem grass. One special concern plant population exists at the Teeple Lake site.

31. **MUD LAKE SWAMP** (White Lake Township)

This 57 acre relict conifer swamp is of state-wide significance. It is the highest ranking conifer swamp in Oakland County. Dominant species include tamarack, black spruce, poison sumac, sedges and cranberries. The swamp is in multiple private ownership. The ultimate conservation action for this site is acquisition for a natural area preserve. Effective conservation actions for the interim include use of the Wetlands Protection Act or enrollment in the Open Space Preservation Act.

32. **MOSS LAKE WETLANDS** (Commerce Township)

An 82 acre southern wet meadow, an 11 acre submergent marsh and a 4 acre emergent marsh make up this 97 acre wetlands site. It lies entirely wit Proud Lake State Recreation Area. The southern wet meadow is of state-wide significance. It is the largest acreage of lime-rich flats in Oakland County. Dominant species include reedgrass, sundew, pitcher plant and cinquefoil. The submergent marsh is of county-wide significance and contains bladderwort. The emergent marsh is of county-wide significance as well and contains rushes and cattails. It is suggested that this site be designated a State Natural Area for further protection.

33. **ELIZABETH LAKE FOREST** (Waterford Township)

Measures are currently being undertaken to acquire this site and protect it as a Waterford Township park. This site is comprised of 64 acres of mesic southern forest and 17 acres of dry-mesic southern forest. Both natural communities are of county-wide significance. The forests are characterized by red, black and white oaks, black cherry and red maple. The site is partially township owned already, but is mostly in private and corporate ownership.

34. **GLIEBERMAN WOODS** (West Bloomfield Township)

During the Natural Areas Inventory process this site became the object of much attention. The people of West Bloomfield Township knew of this site's community and environmental importance and actively pursued its acquisition. West Bloomfield Township has acquired the site with assistance from the state's Natural Resources Trust Fund. They have renamed it the West Bloomfield Woods Nature Preserve.

This site is a 37 acre dry-mesic southern forest of county-wide significance. Dominant species found here include oaks, hickory, flowering dogwood and witch-hazel. Several other species are evident as well.

35. **CRANBROOK NATURE SANCTUARY** (Orchard Lake Village)

As is evident by its name, this site is already sufficiently protected. The natural community within the sanctuary that was identified as having county-wide significance is a 24 acre mesic southern forest. The forest is dominated by very old red and white oaks, but also contains hickory, ash and red maple. A total of 59 species were documented here. The land is owned by Cranbrook Institute of Science.

36. **WXYZ WOODS** (Southfield)

This 18 acre dry-mesic southern forest is of county-wide significance. It is owned by WXYZ Radio. It has already been registered with the Michigan Nature Conservancy Registry program. Further protection should involve land management practices. The forest is dominated by white and red oaks but also includes sugar maple, sassafras, trillium and May-apple.

37. **OAKVIEW CEMETERY FOREST** (Royal Oak)

This 17 acre dry-mesic southern forest is characterized by red maple, red and white oak and beach. This site is located on land owned by the Oakview Cemetery Association. A suggested conservation action is registry with the Nature Conservancy.

WHAT NEXT?

Simply knowing where the County's natural areas are located would be sufficient only if those areas are sufficiently protected. However, since many of the 37 sites require further conservation actions to protect their natural quality, the natural areas inventory was only a fraction of the efforts needed to preserve our natural diversity and heritage. The next step is to undertake necessary conservation actions for each site.

Where to Start?

It would be extremely difficult to tackle all 37 sites at once. To be most effective, a priority listing should serve as a guide. Therefore, more important sites would be addressed first. Staff of the MNFI have suggested priorities and conservation actions for each site. Conservation actions were included in the previous site descriptions section and will be expanded on later. A simplified explanation of the suggested MNFI prioritization follows immediately. Further detail can be found in the full MNFI report.

There were some basic tenets used in determining priorties. First, sites that were ranked of state-wide significance should receive more immediate attention than sites of county-wide significance. Second, since 17 sites are already in partial or full public ownership, it should be easier to have an impact there than on private lands. Natural areas could be protected in park master plans or receive State Wild Area designations. Both of these measures are easier than acquiring private land.

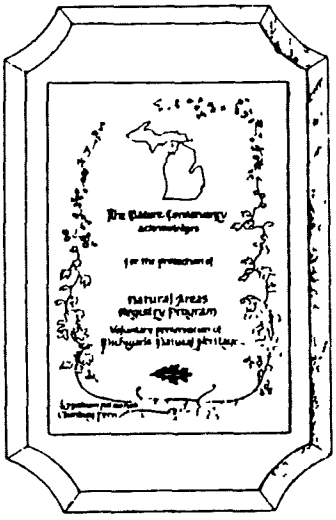
For the remaining 20 private sites, a variety of conservation actions were suggested, including acquisition. Sites that are highest on the priority list are suggested for acquisition. Other actions include enrollment in State and Nature Conservancy programs. Before listing the sites and their suggested priority and conservation action it is important to know what each protection measure for private land entails.

Protection Measures

1. Acquisition could be undertaken by a public agency such as the state, county, or local community, or a private conservation organization such as the Michigan Nature Association (MNA), the Audubon Society or The Nature Conservancy. Public acquisition may be assisted through the Natural Resources Trust fund.

2. Local zoning. Community officials could designate natural areas under either an existing or new zoning classification which would help prevent adverse environmental impacts arising from land development.

3. Enrollment in the State's Farmland and Open Space Preservation Act, P.A. 116 of 1974. This program allows farmers and open space landowners to enroll their land in a tax relief program that ensures the continued existence of the land in farming or open space for a minimum of 10 years.



4. Landowner notification and enlistment in the Nature Conservancy's Natural Areas Registry Program. This is a voluntary protection program in which the landowner agrees to notify the Nature Conservancy of any changes to the natural area or if they wish to sell their land. In return, the landowner receives a plaque, periodic newsletters and the satisfaction of knowing they have helped to preserve our natural diversity. Staff of the Nature Conservancy perform periodic follow-ups to ensure the sites' protection.

5. Restricted development under the Wetland Protection Act, P.A. 203 of 1979 or other pertinent state acts such as the Inland Lakes and Streams Act. These are effective interim protection measures.

Suggested Conservation Actions

The following table lists the priority and suggested conservation actions for the 20 private sites. Some areas may lend themselves to multiple actions. Such sites will have actions ordered by their relative degree of protection; most protective measure first, followed by an alternative measure. Interim protection measures such as the Wetlands Protection Act are often advisable to safeguard sites slated for acquisition or other strong, long-term protection. Interim measures may be used for all sites.

Priority*	Site Number and Name	Action	Comment
1	31. Mud Lake Swamp	Acquisition/P.A. 203	Best conifer swamp in County
2	7. Bridge Valley	Registry/P.A. 116	
3	26. Perry Fen	P.A. 116/Registry/P.A. 203	
4	4. Rattalee Lake Wetlands	Acquisition/P.A. 203	By Audubon or MNA
5	16. Hagerman Swamp	Acquisition/P.A. 203	By Audubon or MNA
6	15. Lakeville Swamp	Acquisition/P.A. 203	Additional lands by MNA
7	9. Oakwood Forest	Registry/P.A. 116	
8	11. Grampian Lake Wetlands	Registry/P.A. 116	
9	27. Perch Lake Marsh	Registry/P.A. 203	
10	37. Oakview Cemetery Forest	Registry	
11	1. Cady Lake Fen	P.A. 116/P.A. 203	
12	28. Milford Bog	P.A. 116/P.A. 203	
13	21. Huckleberry Lake Swamp	P.A. 116/P.A. 203	
14	18. Paint Creek Forest	Local Zoning	Better examples exist
15	12. Indian Lake Rd. Fen	Local Zoning/P.A. 203	Better examples exist
16	10. Manito Lake Fen	Local Zoning/P.A. 203	Better examples exist
17	25. Munger Fen	Local Zoning/P.A. 203	Better examples exist
18	24. Buckhorn Lake Fen	Local Zoning/P.A. 203	Better examples exist
19	36. WXYZ Woods	None needed	Nature Conservancy Registry
20	35. Cranbrook Nature Sanctuary	None needed	Protected already

*Many of the sites are almost inseparable in terms of priority. The groupings signify sites of very similar significance and recommended conservation actions.
P.A. 203 - Wetlands Protection Act
P.A. 116 - Farmland and Open Space Preservation Act
Registry - The Nature Conservancy Natural Areas Registry
MNA - Michigan Nature Association

Suggested protection measures for publicly owned sites differ from those for private sites. They are essentially self-explanatory, but footnotes are included to add further definition.

Site Number & Name	Action	Comment
2. Seven Lakes Woods	Potential State Wild Area	
3. Seven Lakes Fen	Protect in Park Plan	
5. Burns Lake Fen	Protect in Park Plan	
6. Hartwig Fen	Mgmt. agreement w/Detroit Edison	On easement through park
8. Clinton River Headwaters	Designate as County NA	Adjacent private lands are good too
13. Chamberlain Lakes	Potential State Wild Area	
14. Graham Lakes	Dedicate as State NA	One of largest fens in State
17. Sheldon Forest	Designate as Metropark NA	
19. Oakland Twp. Park Forest	Protect in Park Plan	Adjacent private lands are good too
20. Trout Lake	Potential State Wild Area	
22. Pontiac Lake Woods	Needs additional study	
23. Huron Swamp	Needs additional study	
29. Haven Hill Natural Area	Already sufficiently protected	A National Natural Landmark
30. Teeple lake	Needs additional study	
32. Moss Lake Wetlands	Dedicate as State NA	Best wet meadow in state at present
33. Elizabeth Lake Forest	Protect in Park Plan	Recently acquired
34. Glieberman Woods	Protect in Park Plan	Recently acquired

NA-Natural Area

State Wild Area-undisturbed land; motorized vehicles, mineral extraction and vegetation alteration prohibited

State Natural Area - need not be undisturbed land; same prohibitions as Wild Area

Opportunities

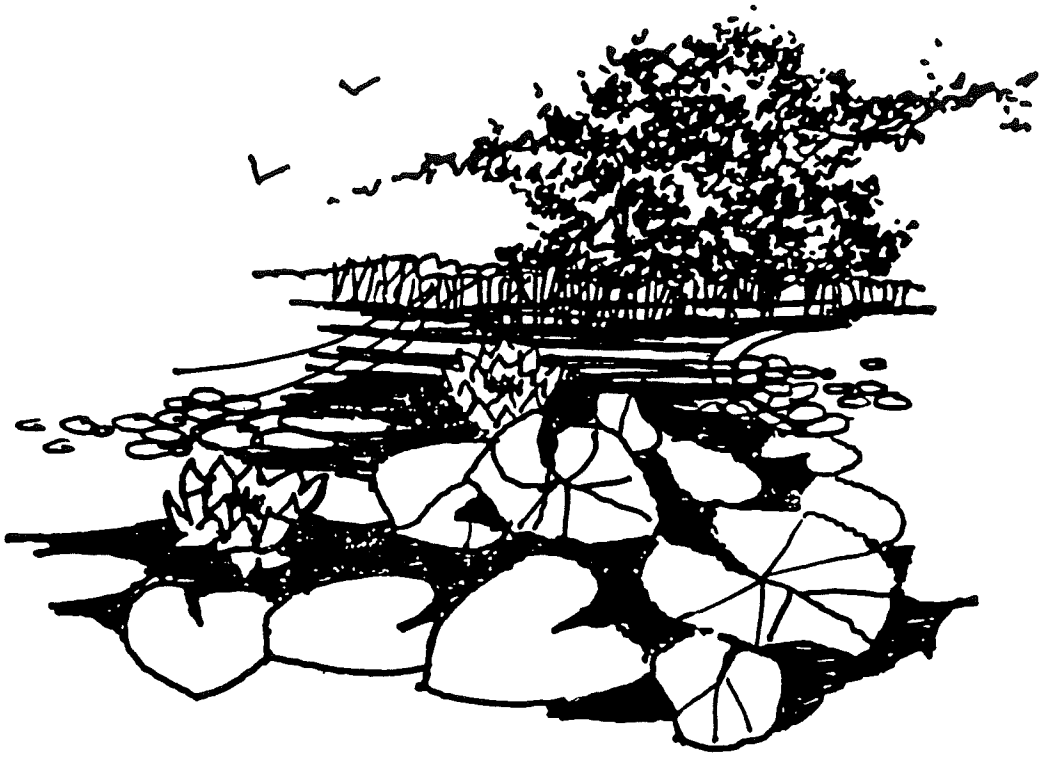
Results and recommendations of the Natural Areas Inventory for Oakland County offer many opportunities. Conservation actions could be taken by a number of individuals, organizations or agencies. Local, county, regional, and state officials could pursue some of the designations and planning considerations mentioned in this report to protect land they own. Knowing of special private lands, government officials could direct future acquisition efforts in the appropriate direction. In fact this has already occurred. Based in large part on information contained in the MNFI report, officials from both Waterford and West Bloomfield Townships have recently secured two of the county's 37 natural areas. Another direction for local officials is to investigate the possibility of rezoning to reflect the importance of natural areas.

Few of the above actions will occur unless there is strong promotion of the findings and recommendations of the MNFI study. Communication is the key. Therefore, an action required by the Planning Division before others might take their actions is the dissemination of MNFI information. An action plan for communication has been prepared and will be followed closely by the Planning Division. Once all of the right people are informed of the unique natural quality of these 37 sites, action towards their protection will be concerted.

In the future, the idea of a County Natural Areas Registry, similar to the Nature Conservancy's state registry, will be researched. In addition to targeting sites of county-wide significance, locally significant sites may be considered as well. A Natural Areas Registry for Oakland County would help protect the County's natural heritage at a low cost.

...AND IN CONCLUSION...

Despite continued growth, Oakland County still has several remnant tracts of native vegetation and landscape. The Natural Areas of Oakland County harbor many special plant and animal species, from orchids to shrews. Some Natural Areas are owned publicly, some privately. They occupy only one-half of one percent of the County's land area. They're located throughout the County. They represent Oakland County's biological diversity. Knowledge of such facts is not very important unless action is taken to ensure that they will remain as Oakland County's natural heritage.



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