



MICHIGAN DEPARTMENT OF  
ENVIRONMENT, GREAT LAKES, AND ENERGY

# Michigan's Wetland Monitoring and Assessment Program

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Katie Fairchild

Wetland Monitoring and Coastal Wetland Analyst

248-508-8204 | [FairchildK@michigan.gov](mailto:FairchildK@michigan.gov)

# Michigan's Wetland Monitoring & Assessment Strategy

## State of Michigan Wetland Monitoring and Assessment Strategy



Department of Environmental Quality  
Water Resources Division

March 2015

- Quantity and Quality
- Status & Trends
- Evaluation of regulatory program

# Wetland Assessment and Monitoring: Intensive Site Assessment

- Michigan Wetland Monitoring Project (MIWMM)
- Began field work in 2016
- Currently in second 5-year cycle
- Aligned with National Wetland Condition Assessment - intensification

# MIWM Protocols – EGLE

- NWCA Point Verification and Assessment Area
- NWCA Vegetation Protocol
- MiRAM (Michigan Rapid Assessment Method)



# MIWM Protocols – CMU

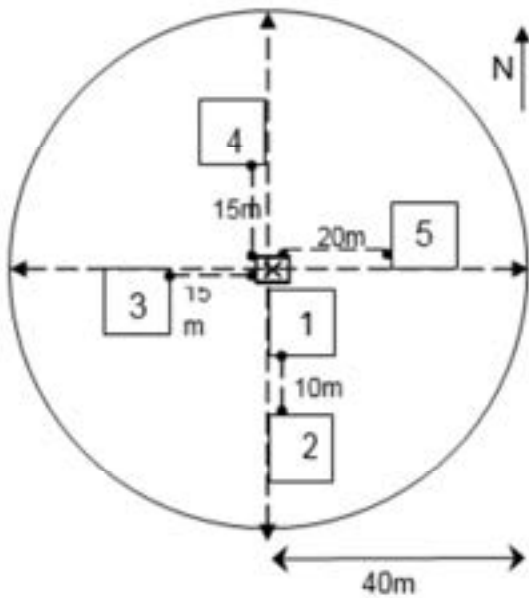
- Only sites with water
- Macroinvertebrates (CMU) dip netting and timed pick count, ID in lab
- Water Chemistry
  - Field: temperature, DO, pH, specific conductivity, transparency tube clarity
  - Lab: alkalinity, turbidity, phosphorus (P), [nitrate+nitrite]-nitrogen, ammonium-nitrogen, chlorophyll-a, total nitrogen (TN), total phosphorus (TP), chloride, color

# Assessment Area

- Follows NWCA site layout
- 2 hectare circle (standard)
- Directional Transects
- 5 Vegetation Plots

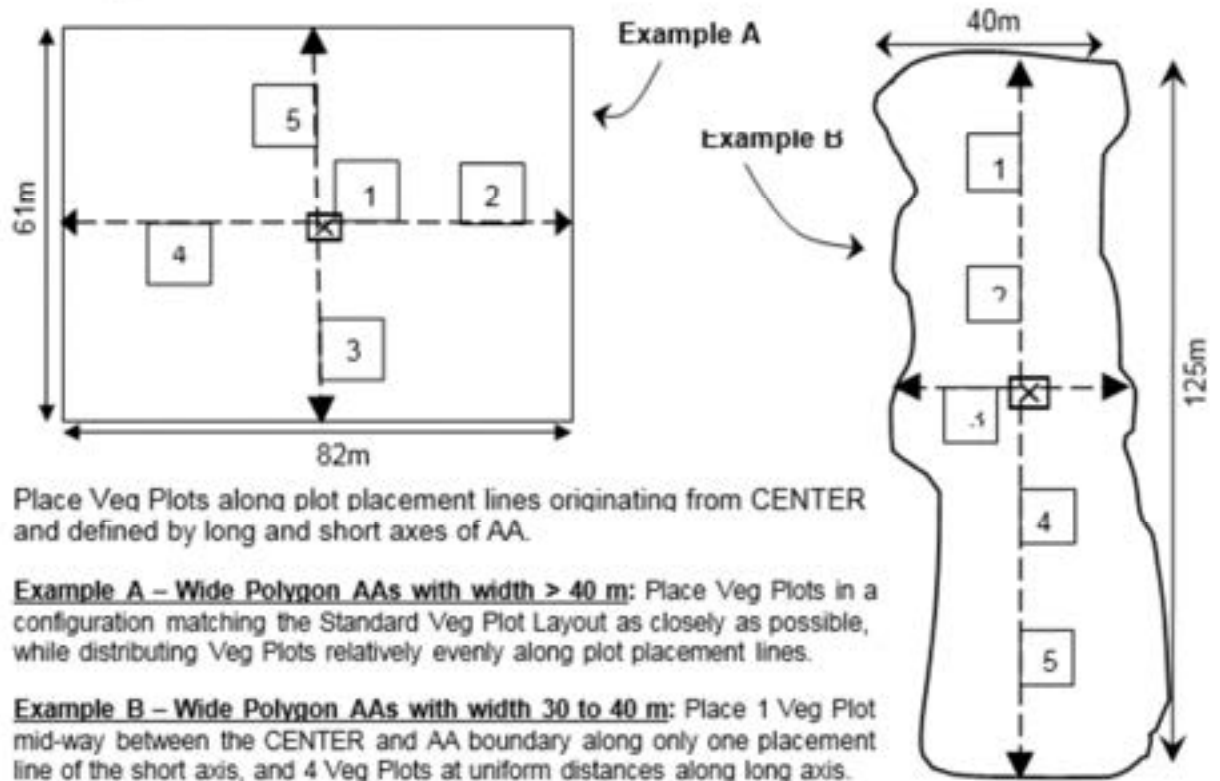


**Plate 1. Standard Veg Plot Layout – Circular AA (½ hectare)**



Place Veg Plots at specified locations on plot placement lines oriented through the AA CENTER on cardinal directions. Veg Plot 1 is placed 2m from the CENTER.

**Plate 2. Wide Polygon AA Veg Plot Layout – AA = ½ hectare polygon, width and length > 30m.**



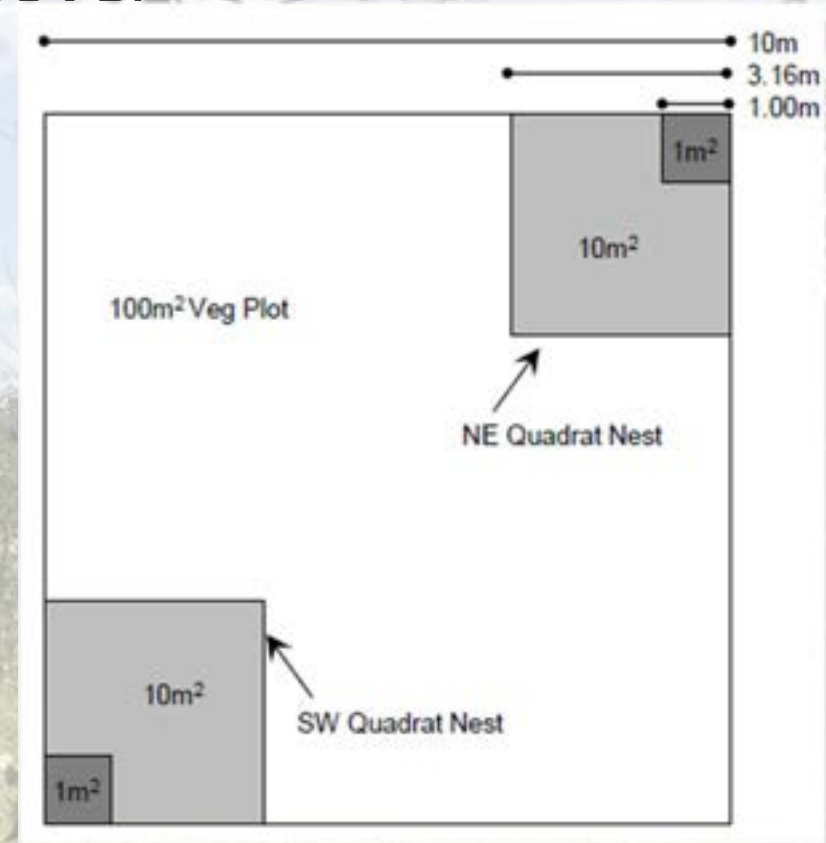
Place Veg Plots along plot placement lines originating from CENTER and defined by long and short axes of AA.

**Example A – Wide Polygon AAs with width > 40 m:** Place Veg Plots in a configuration matching the Standard Veg Plot Layout as closely as possible, while distributing Veg Plots relatively evenly along plot placement lines.

**Example B – Wide Polygon AAs with width 30 to 40 m:** Place 1 Veg Plot mid-way between the CENTER and AA boundary along only one placement line of the short axis, and 4 Veg Plots at uniform distances along long axis.

# Vegetation

- Species Presence and Percent Cover
- Cover by Vertical Strata
- Bryophytes, Lichens, Algae
- Ground Surface Attributes
- Standing Dead Trees
- Tree Species Cover and Counts





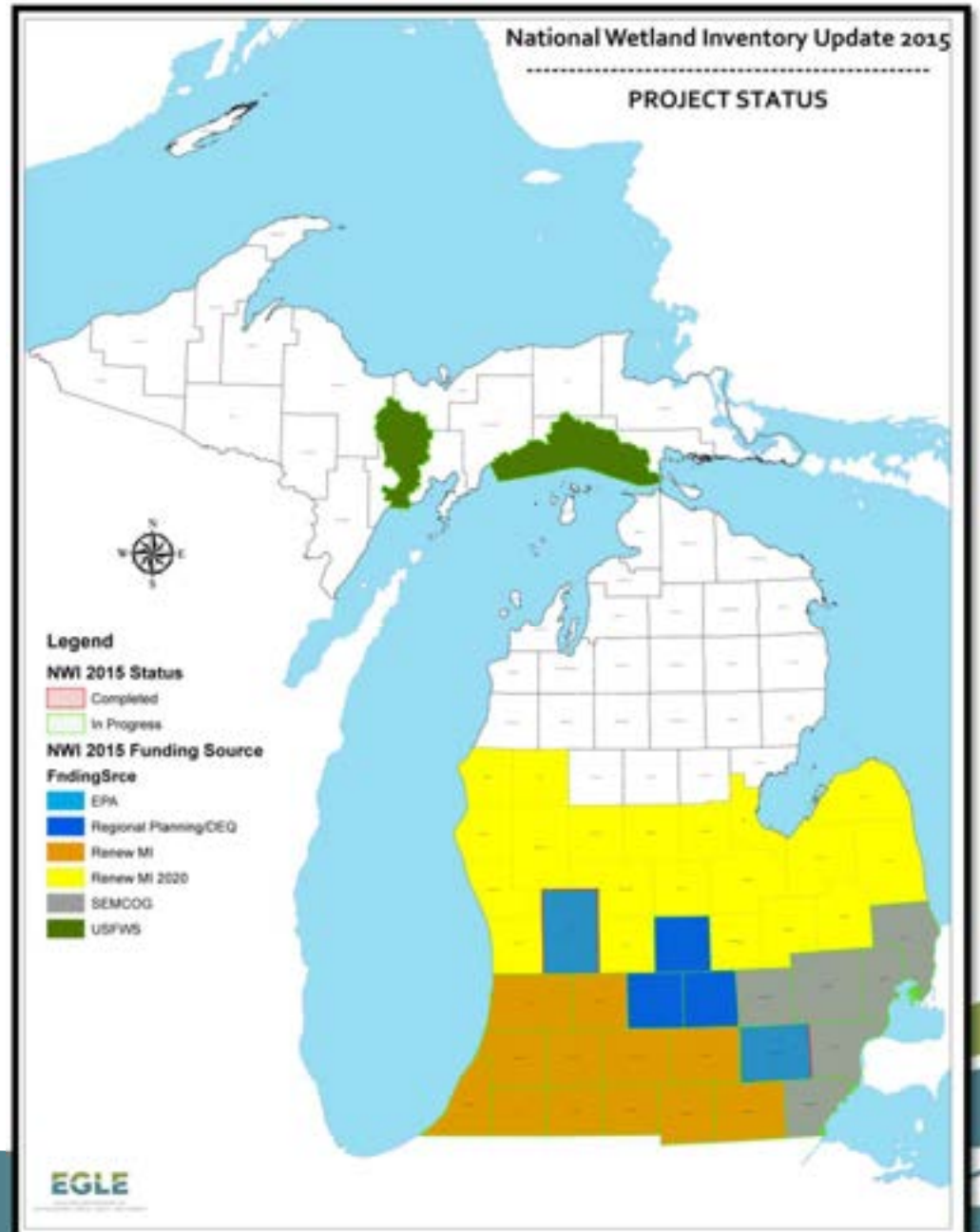
# MiRAM

## 7 Metrics for Measuring Wetland Functional Value

- 1) Wetland Size and Distribution
- 2) Buffers and Surrounding Land Use
- 3) Hydrology
- 4) Habitat Alteration and Habitat Structure Development
- 5) Special Situations
- 6) Vegetation, Interspersion, and Habitat Features
- 7) Scenic, Recreational, and Cultural Value

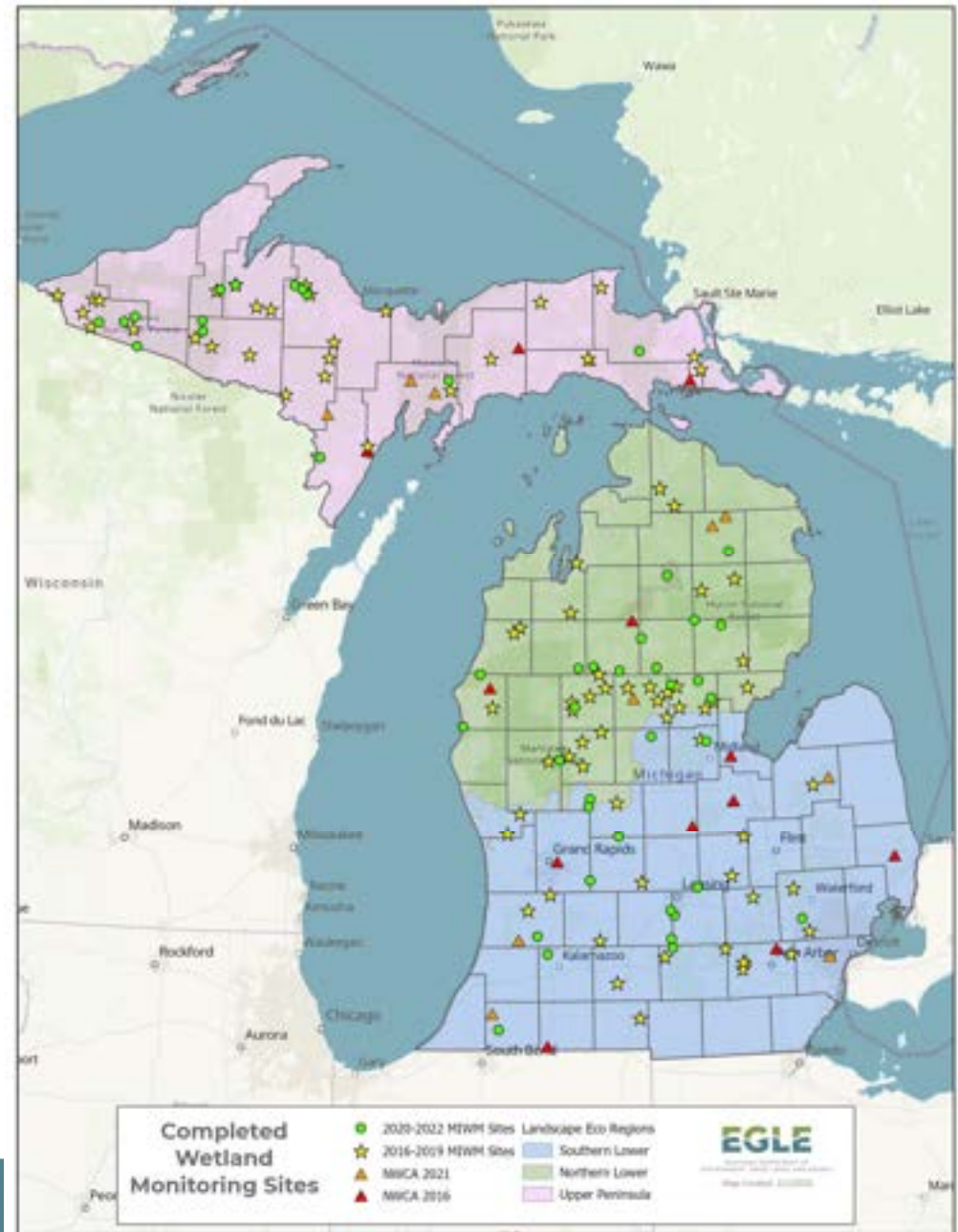
# Site Selection

- 2005 NWI polygons
- Points randomly generated by region
- Property owner permission, aerial evaluation, etc.
- Working on updating NWI in MI to 2015 NWI
  - Partners
  - Funding



# Site Distribution

- Goal of 100 sites per 5-year cycle
  - Including NWCA sites
  - Subset of revisit sites
- Three Ecoregions
  - Southern Lower Peninsula
  - Northern Lower Peninsula
  - Upper Peninsula



# Wetlands Map Viewer

The screenshot displays the EGLE Wetlands Map Viewer interface. At the top, there is a navigation bar with links for EGLE, Contacts, Permits, Online Services, Program, and Locations, along with the MI.gov logo. The main header reads "EGLE Wetlands Map Viewer" and "Department of Environment, Great Lakes, and Energy".

On the left side, there is a "Map Legend" section with the following options:

- Map View
- Search Tools
- Share
- Map Legend
- Base Maps
- About

The "Map Legend" section includes a description: "Change what items you see on the map by using the checkboxes". The legend items are:

- Wetland Data
- Stream Data
- Coastal Data
- Historic Landcover
- SSURGO Soils
- Wetlands Monitoring
  - Cycle 2016-2019
  - Cycle 2020-2024
- Other Data
- Functional Tool Layers

The main map area shows a map of Michigan with various wetland data points represented by blue triangles. The map includes labels for major cities and towns, as well as the Great Lakes (Lake Superior, Lake Michigan, Lake Huron, Lake Erie, and Lake St. Clair). The map also shows major roads and geographical features.

[www.mi.gov/wetlands](http://www.mi.gov/wetlands)

# Monitoring Information

EGLE | Contacts | Permits | Online Services | Programs | Locations | MI.gov

## EGLE Wetlands Map Viewer

Department of Environment, Great Lakes, and Energy

### Monitoring Information

▼ 1 Result(s) Found

MIWM\_37 - 9/15/2017

Region:	
Wetland Target:	PRL-FD
Total Species:	65
Total Non-Native:	2

### Part 303 Wetland Data

- Wetland (Hydric) Soils
- National Wetlands Inventory 2005


### SSURGO Soils

► Results

### Hydric Soils

The map displays a rural landscape with several roads including Miller Rd, Red Oak Rd, Cherry Creek Rd, and Camp 10 Rd. Water features such as the Au Sable River and various creeks (Bassett Creek, Little Creek, Ashmun Creek) are shown in blue. A specific wetland location is marked with a blue circle on Red Oak Rd. The interface includes navigation controls (back, zoom in, zoom out, refresh, home) and a scale bar indicating 0, 0.5, and 1 mile.

# Wetlands Monitoring Database

 **Wetlands Monitoring**  
The Department of Environment, Great Lakes, and Energy

Survey Forms Reports Logout Kathleen

**Survey Search** Start Date:  End Date:  [Any Site](#)

Date	Site	PV-1	AA-1	V-1	V-2	V-3	V-4	MiRAM	Summary
06/23/2020	MIWM20-205	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> Summary
06/30/2020	MIWM20-201	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> Summary
07/01/2020	MIWM20-206	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> Summary
07/02/2020	MIWM20-216	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> Summary
07/15/2020	MIWM20-5	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> Summary
07/28/2020	MIWM20-203	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> Summary
07/29/2020	MIWM20-7	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> Summary
07/30/2020	MIWM20-4	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> View/Edit	<input checked="" type="checkbox"/> Summary

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# Database Reports



## Reports

V2 Species Count

V-2 Species Count Adv.

V-4 Number of Tree Species

Habitat Structure - Water and Debris

Habitat Structure - Sphagnum Moss

MiRAM Report

Non-Native Species

Tree Strata

### V2 Species Count

18 Records Found

Start Date:

1/30/2020

End Date:

1/30/2021

Any Site



Site	Date	Species Count
MIWM20-205	6/23/2020	73
MIWM20-201	6/30/2020	38
MIWM20-206	7/1/2020	48
MIWM20-216	7/2/2020	50
MIWM20-5	7/15/2020	71
MIWM20-203	7/28/2020	74
MIWM20-7	7/29/2020	42
MIWM20-4	7/30/2020	81

# 2016 – 2019 Report

Michigan's Wetland Monitoring Program  
2016-2019



May 2023

**EGLE**

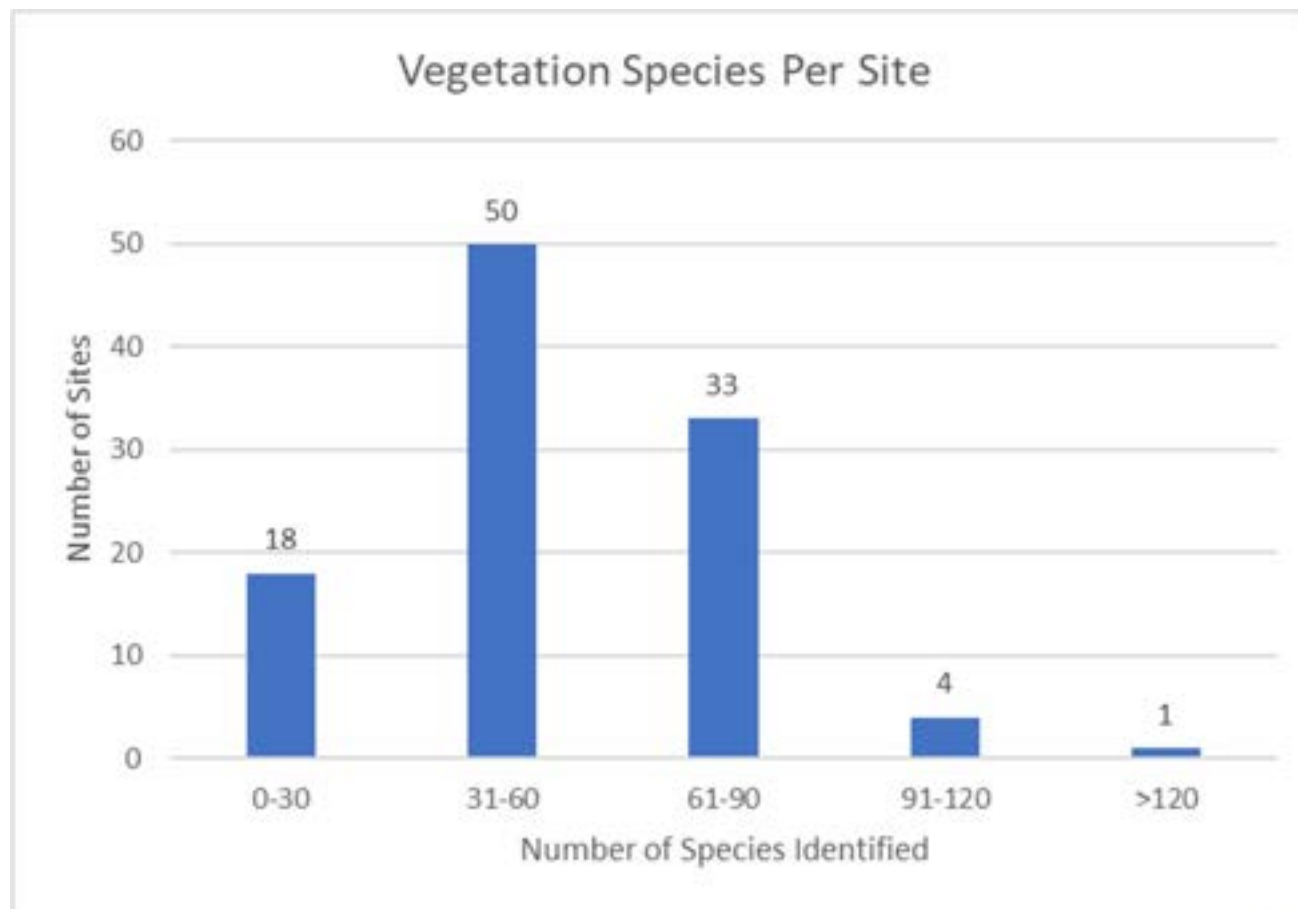
Michigan Department of Environment, Great Lakes and Energy

- Preliminary findings on first cycle of sites
- Baseline to inform future evaluation
- Consider which data to track for trends



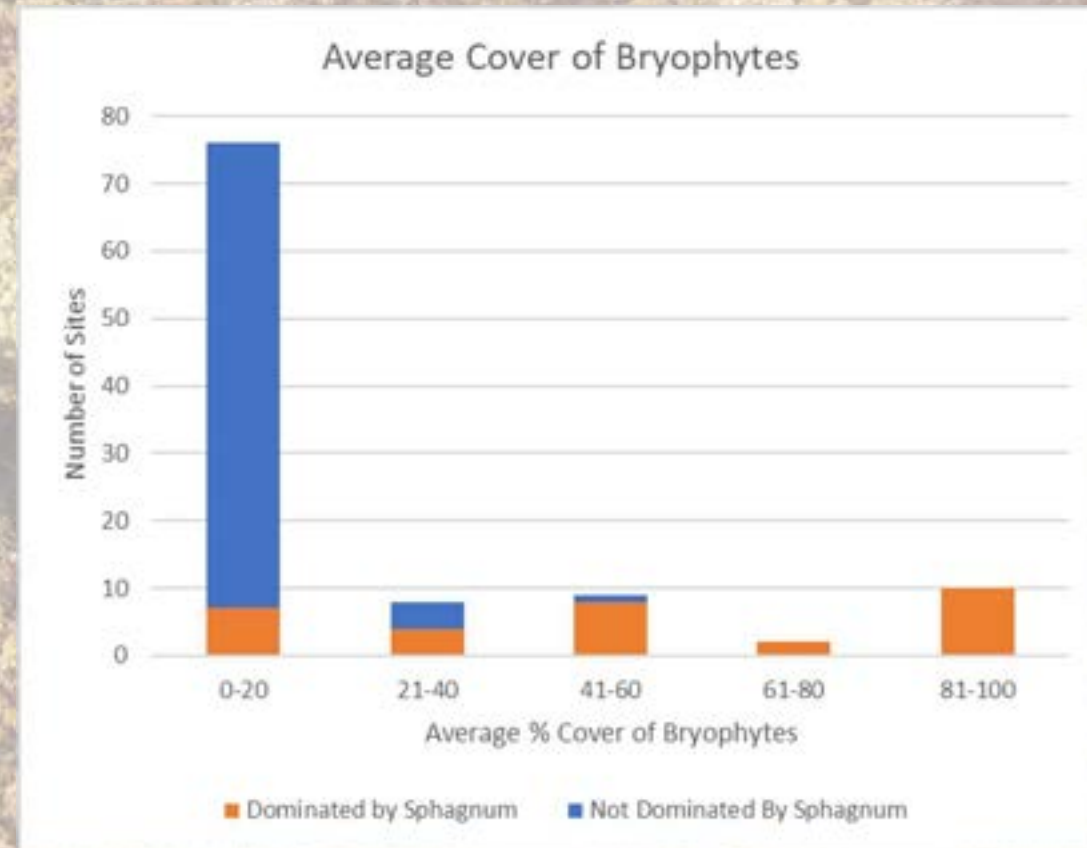
# Vascular Species Presence and Cover

- Min: 13 Max: 127 Mean: 53.68



# Percent Cover and Categorical Data for Non-Vascular Taxa

- Of the 97 sites sampled, 35 sites had bryophytes dominated by Sphagnum (36% of all sites sampled)
- Of those 35 sites, there was an average of 48% total cover of Sphagnum.



# Snag and Tree Counts and Tree Cover

- *Fraxinus pennsylvanica* is the second most frequently found tree species on sites with living trees. This is despite the severe losses across the state from the spread of emerald ash borer since 2002.
- Of the top 10 most frequently found tree species, *Acer saccharinum* has the highest mean percent cover and largest mean dbh.
  - a mean percent cover of 17.92%, reaching larger DBH than the other top 10 most frequently found tree species.

# Snag and Tree Counts and Tree Cover

<b>Top 10 Tree Species</b>			
<b>Species</b>	<b>Frequency</b>	<b>Mean % Cover</b>	<b>Top DBH</b>
Acer rubrum	68	11.26	5-10CM
Fraxinus pennsylvanica	44	6.76	5-10CM
Ulmus americana	38	7.08	11-25CM
Betula papyrifera	31	6.33	5-10CM
Quercus rubra	31	2.48	11-25CM
Pinus strobus	28	2.53	5-10CM
Abies balsamea	27	8.57	5-10CM
Acer saccharinum	23	17.92	26-50CM
Picea mariana	23	9.92	5-10CM
Prunus serotina	22	2.3	5-10CM

# Non-native Species

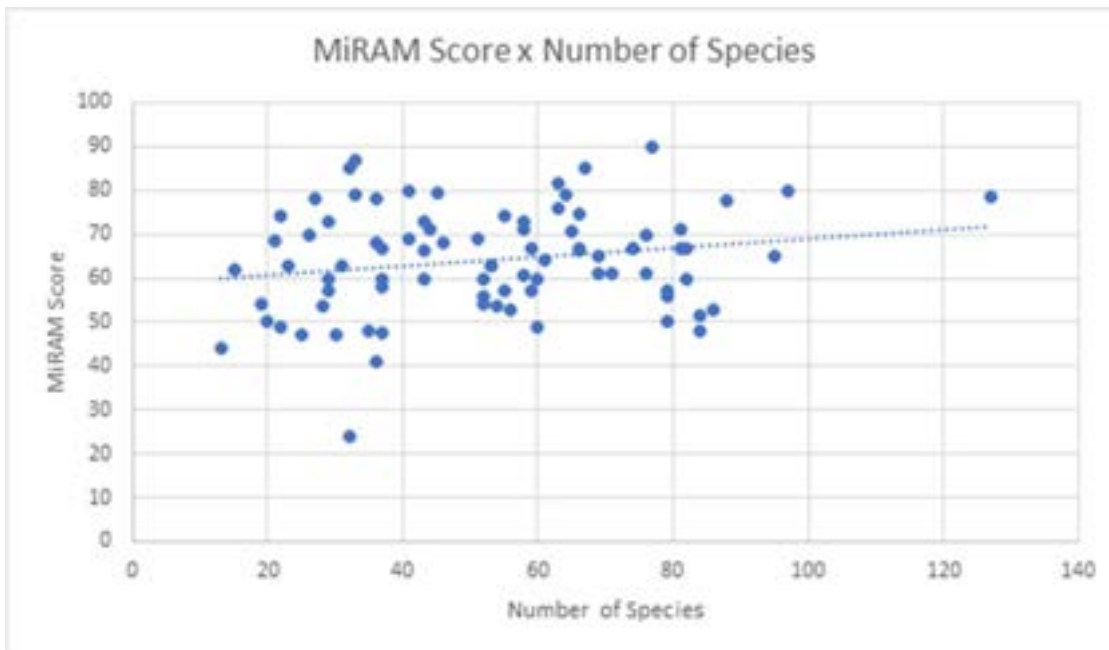
- Min: 0      Max: 11      Mean: 3.71
- Of the top 10 most frequently observed non-native species, only two have an average percent cover of more than 2% - *Frangula alnus* and *Lonicera tatarica*.
- Many of the non-native species found most frequently are not wetland rated species. This is especially common in wetland types that do not stay inundated or saturated throughout the year, such as forested wetlands.
- Site with the highest avg % with 16% nonnative coverage:
  - *Typha angustifolia* present in all 5 plots (95%, 95%, 95%, 85%, and 90%, respectively).
  - This site also had additional nonnative species present, but the percent coverage across all plots for the others were in the single digits, with the exception of *Phalaris arundinacea* with 10% coverage in plot five.
  - This site is located in Kent County – SLP Region.
- Of sites with non-native recorded, average % cover is 1.695

# Non-native Species

<b>Top 10 Non Native Species</b>		
<b>Species</b>	<b>Frequency</b>	<b>Avg % Cover</b>
Solanum dulcamara	32	0.36
Taraxacum officinale	21	0.03
Rosa multiflora	17	1.37
Rhamnus cathartica	13	1.76
Agrostis gigantea	11	1.3
Alliaria petiolata	11	1.28
Elaeagnus umbellata	10	0.45
Frangula alnus; rhamnus frangula	9	4.69
Rumex crispus	8	0.25
Lonicera tatarica	6	4.21

# MiRAM Scores

- High: 90 (70 species)
- Low: 24 (32 species)
- Average: 64.11



- General trend of increasing MiRAM scores as species number increases.
- This could be attributed to increases in habitat features and interspersions allowing for an increased diversity of vegetation.
- Sites with a relatively lower number of total species can receive higher MiRAM scores due to a variety of factors. This demonstrates that total number of species alone is not the only indicator of wetland functional value

# Looking Ahead

- Finalize report of 2016-2019 MIWM data
- Developing Web and Outreach Content on MIWM findings
- Continued app and database improvements
- Planning year 5 of 2020-2024 cycle

