



Welcome to MiCorps Cooperative Lakes Monitoring Program's Annual Training.

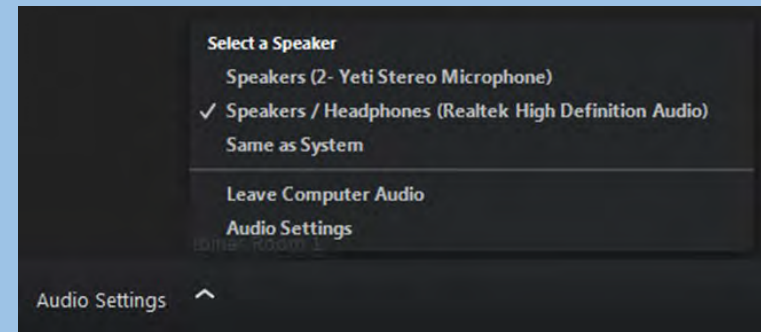
- For CLMP procedures and data forms please visit: micorps.net/lake-monitoring/clmp-documents/ and then click on the name of the parameter.

Today's Agenda:

9:00 AM – 9:15 AM	Welcome and CLMP Review
9:15 AM – 10:15 AM	<u>Secchi</u> Disk & Phosphorus
10:15 AM-10:30 AM	BREAK
10:30 AM – 12:00 PM	Chlorophyll-a (algae indicator)
12:00 PM – 1:00 PM	Lunch
1:00 PM – 2:00 PM	Dissolved Oxygen and Temperature
2:00 PM – 3:00 PM	Score the Shore
3:00 PM – 3:15 PM	BREAK
3:15 PM – 4:30 PM	Exotic Aquatic Plant Watch

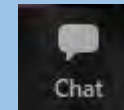
Getting Started

- Audio is through your computer speakers or headset: **You may not hear sound until training begins.**
- Use the **Audio Settings** option to do a sound check.
- During the webinar if you do not hear audio, make sure your sound is turned on then contact the **Help Desk**.



How to Ask Questions

- Click on the Chat Icon to submit a question to the presenters.



Help Desk

Call the Distance Learning Help Desk (800) 500-1554 for technical support.

Cooperative Lakes Monitoring Program training for

Exotic Aquatic Plant Watch (EAPW)



Erick Elgin



- 218-340-5731
- elgineri@msu.edu

MICHIGAN STATE
UNIVERSITY

Extension

Jo Latimore



- 517-432-1491
- latimor1@msu.edu

MICHIGAN STATE

U N I V E R S I T Y

An Underwater Forest

- High diversity
- Valuable habitat
- Increases water clarity
- Mitigates shoreline erosion

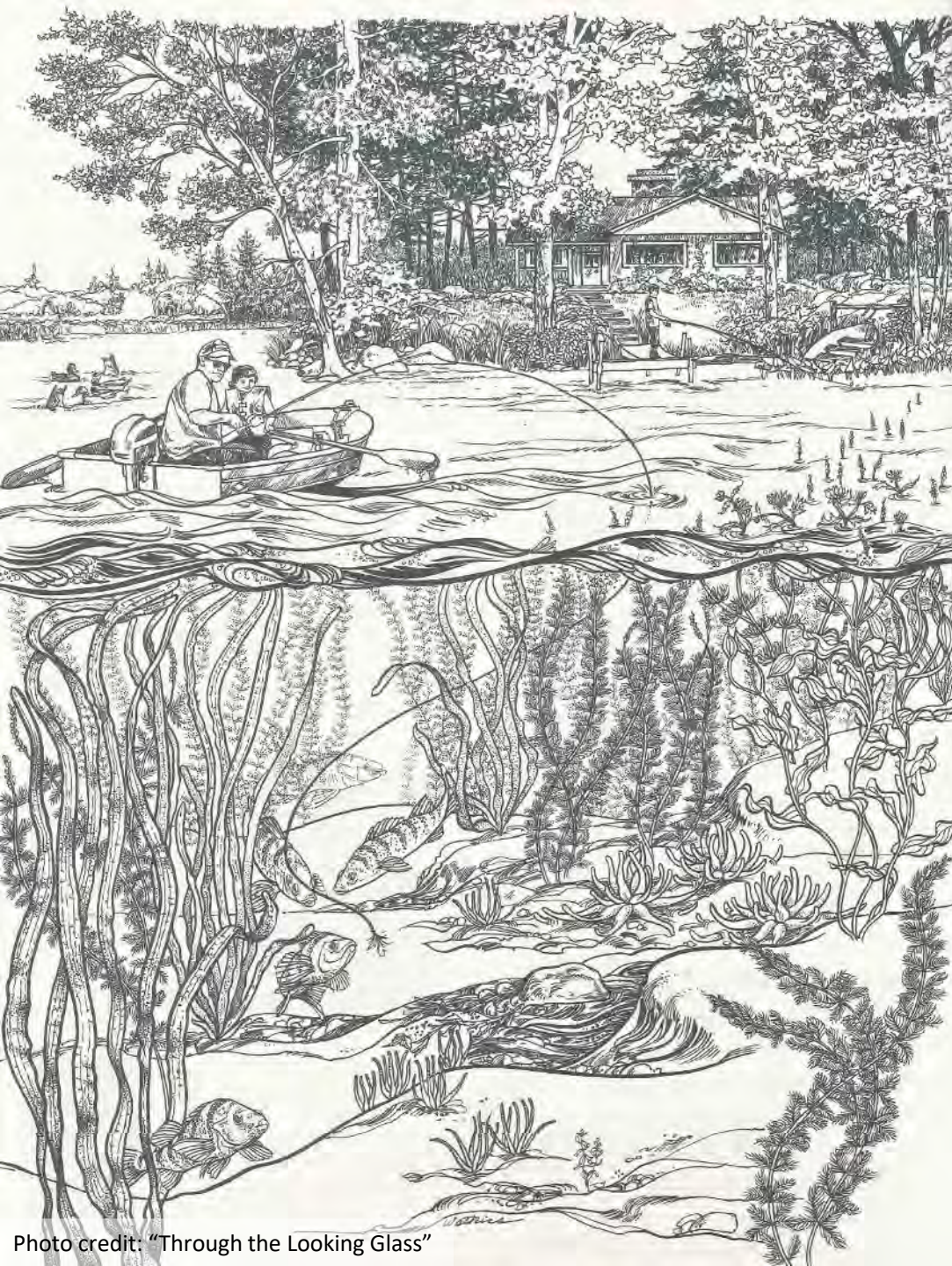


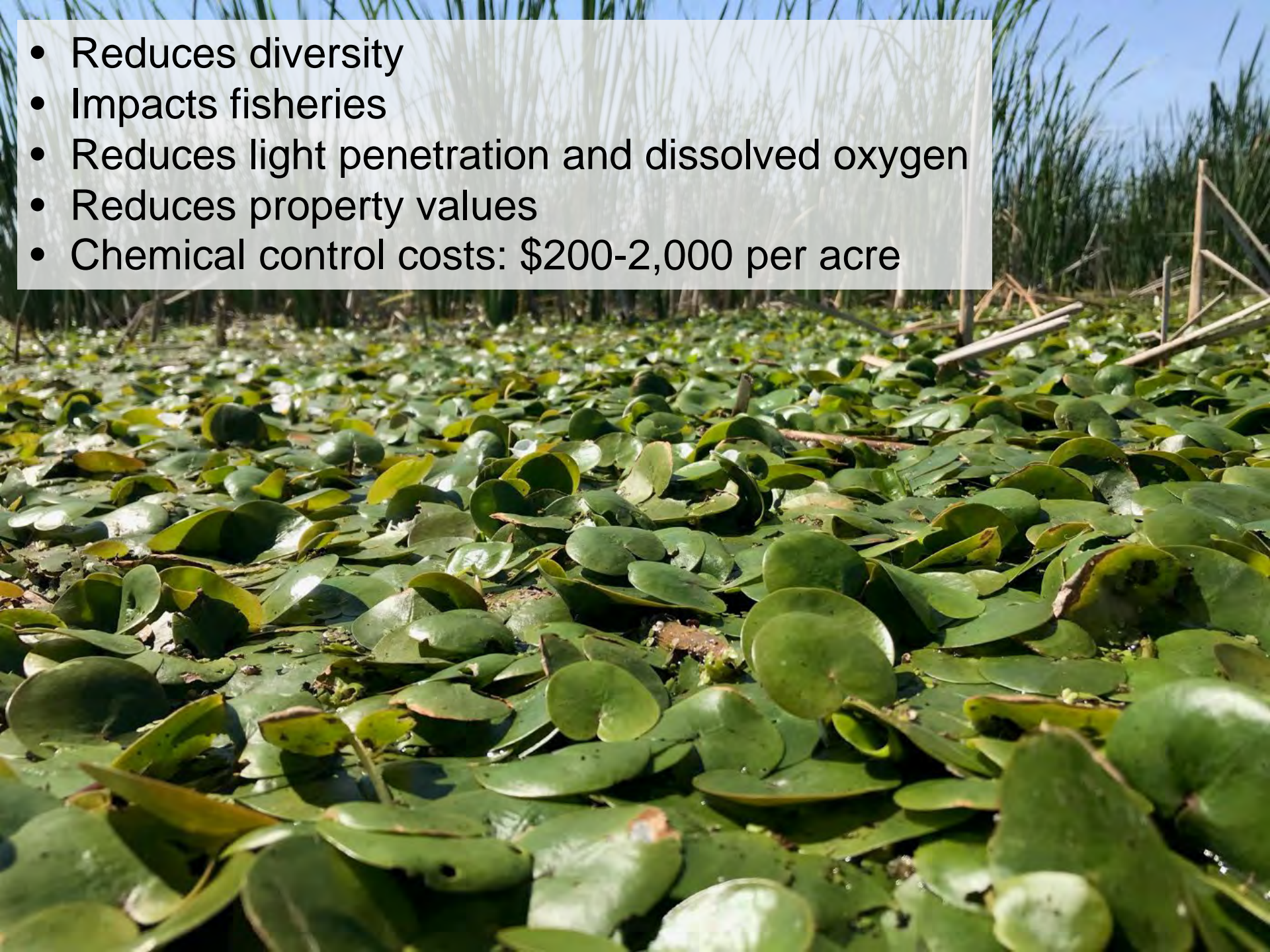
Photo credit: "Through the Looking Glass"



AQUATIC INVASIVE PLANTS



- Reduces diversity
- Impacts fisheries
- Reduces light penetration and dissolved oxygen
- Reduces property values
- Chemical control costs: \$200-2,000 per acre



Proactive Approach: Prevention



[Mobile Boat Wash](#)



[Educational Materials and Resources](#)



[Clean Boats, Clean Waters Grants](#)



[About](#)

HELP KEEP MICHIGAN'S WATER PURE



Prevention is not guaranteed

Popular lake closed due to infestation

Lake Manitou has been infested and closed to boating and fishing activities, possibly for years

Bud Fields Mar 1, 2007

Lake Manitou faces a costly solution for an invasive intruder

by Dave Kitchell Mar 4, 2007



"The sentiment around town is we should have just drained it and started over," Alex Long said of Lake Manitou Saturday at the Moose Lodge in Rochester.

MOST POPULAR

Articles



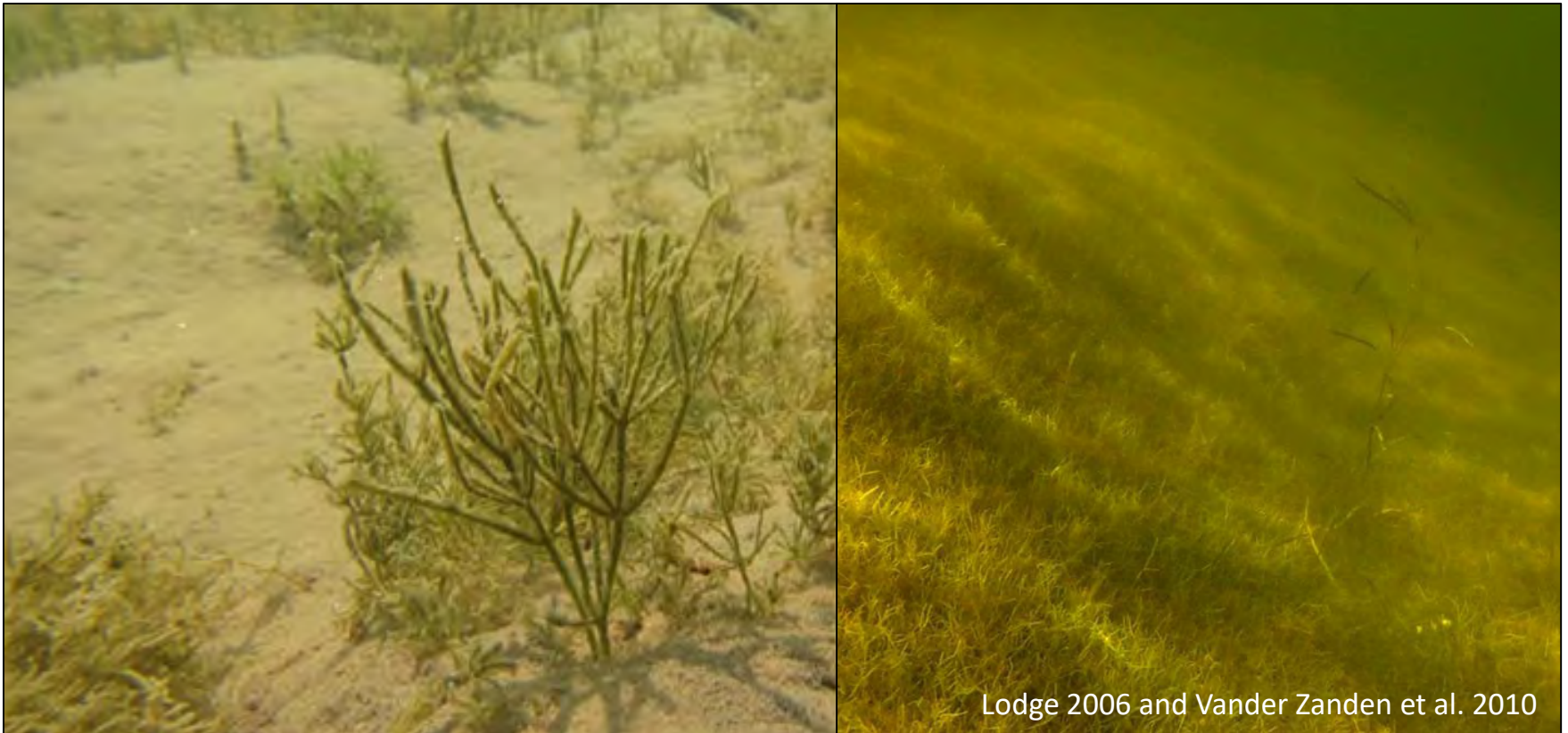
- Logan man caught half-mile from burglary residence



The next line of defense: Early Detection

Early Detection Goal: maximize the potential for eradication

The sooner you can detect the better



Early Detection Programs

1. Focus on most probable invaders
2. Target high risk areas for new invasions
3. Require continuous monitoring



Michigan's Early Detection Monitoring

MiCorps
Cooperative Lakes Monitoring Program

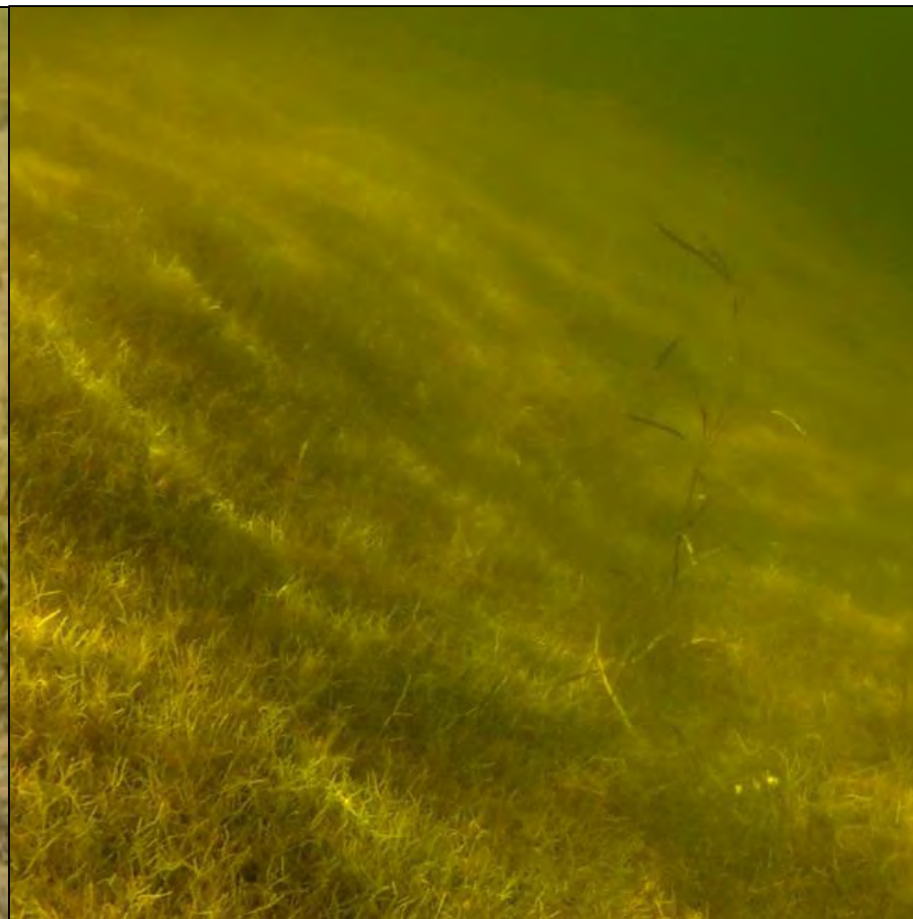
Exotic Aquatic Plant Watch

Visit MiCorps.net



Why get involved with the Exotic Aquatic Plant Watch?

Early Detection and Rapid Response Works!



Where is monitoring most valuable?

1. Lakes with no known invasive plants
2. Lakes that are managing existing populations of invasive plants and have them under good control.
3. Less valuable for lakes with invasive weeds covering large areas... **but** it can help you identify new invasives that may invade.



The key to **Early Detection?**

Know the Exotics!

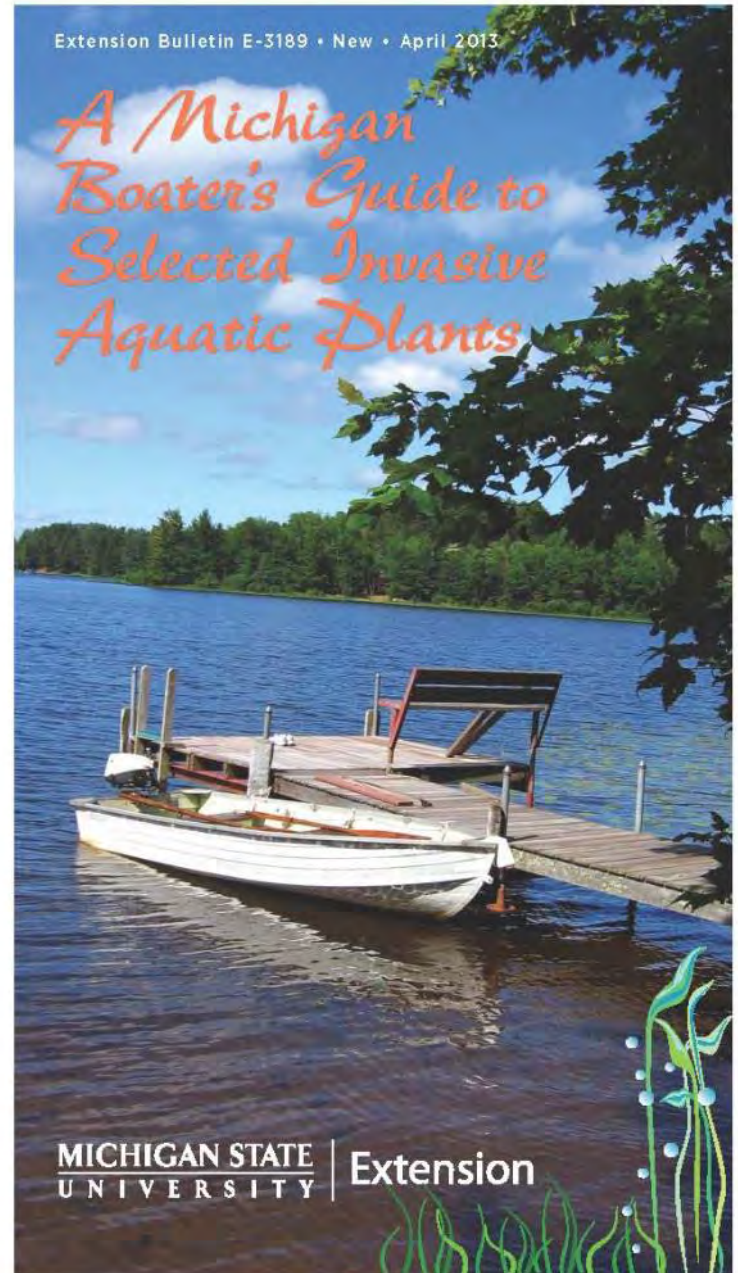
- Eurasian Watermilfoil
- Curly-leaf Pondweed
- Starry Stonewort
- Hydrilla
- European Frog-bit



Additional copies available
for \$10
(or free download)
through the
MSU Extension Bookstore

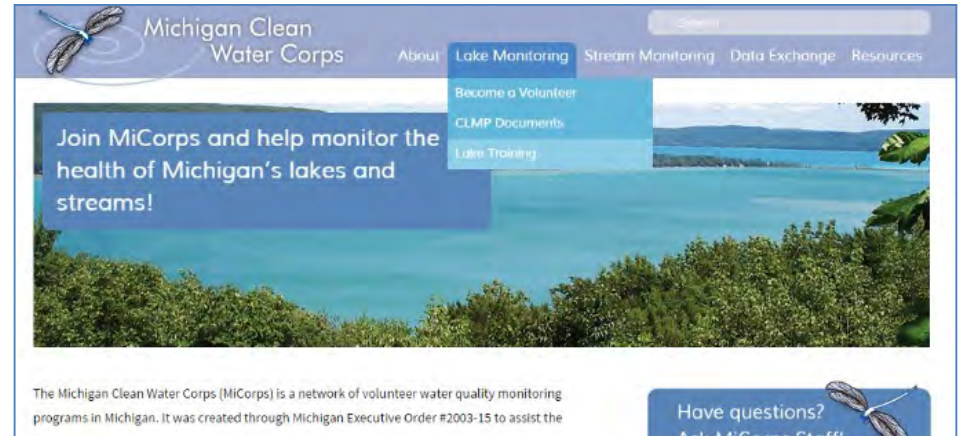
<http://shop.msu.edu>

Search for “E3189”



Video!

- Program description
- ID tips and tricks
- Sampling protocol
- On the “Lake Training” page on www.micorps.net, and our YouTube channel!



Exotic Aquatic Plant Watch



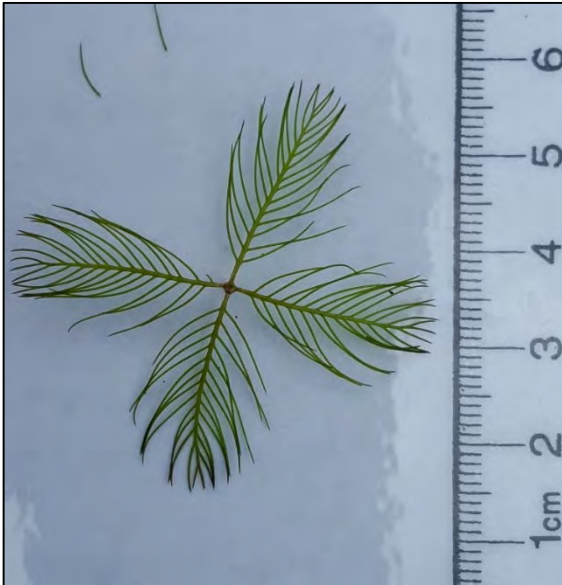
Let's Meet the Exotics!



Established Aquatic Invasive Plants in Michigan

Eurasian milfoil

Myriophyllum spicatum



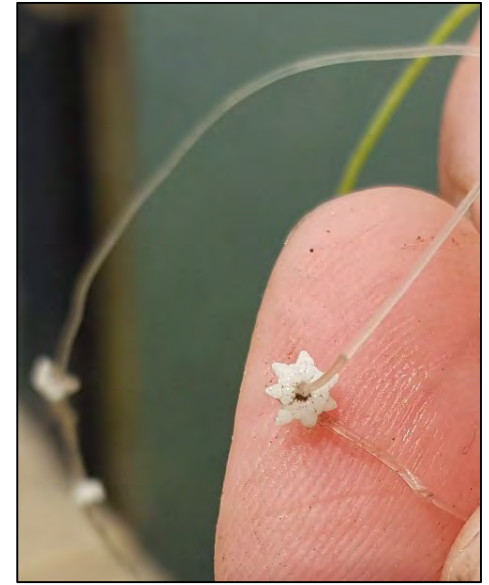
Curly-leaf pondweed

Potamogeton crispus



Starry stonewort

Nitellopsis obtusa



Not in Michigan and a recent invader

Hydrilla

Hydrilla verticillata



European Frog-bit

Hydrocharis morsus-ranae



EAPW Watch List Species

Eurasian Watermilfoil– *Myriophyllum spicatum*

Photo by:
Richard Old
www.xidservices.com

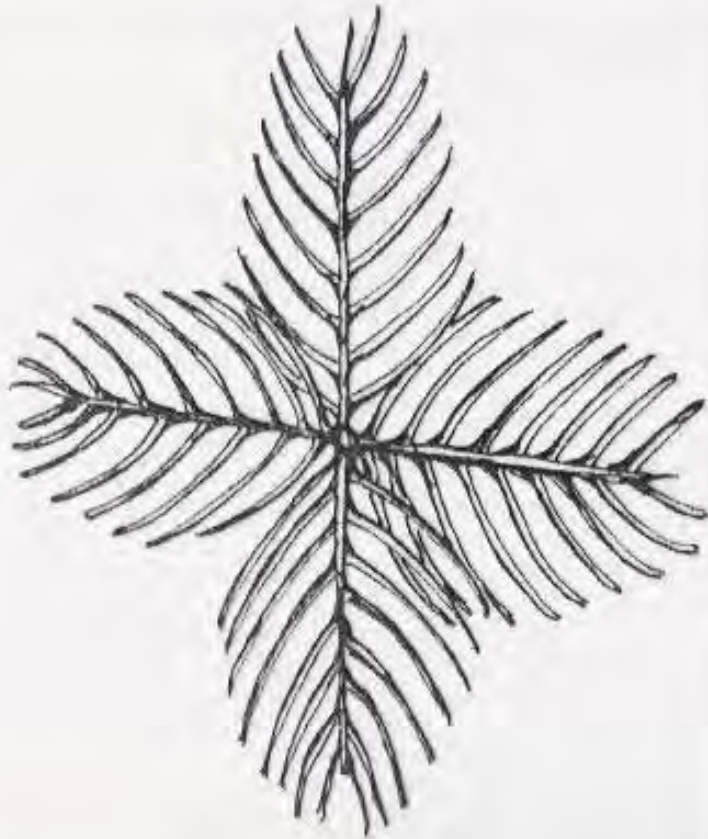


Key Characters:

- Feather-like leaves
- Leaves with **12 – 21** pairs of leaflets
- Whorled leaf arrangement
- Leaves limp out of water



Native Milfoil



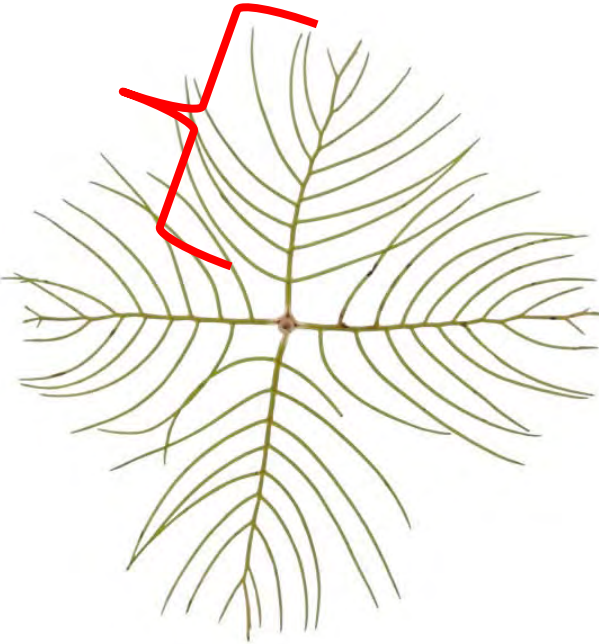
Eurasian Milfoil



What about “Hybrid Milfoils”??

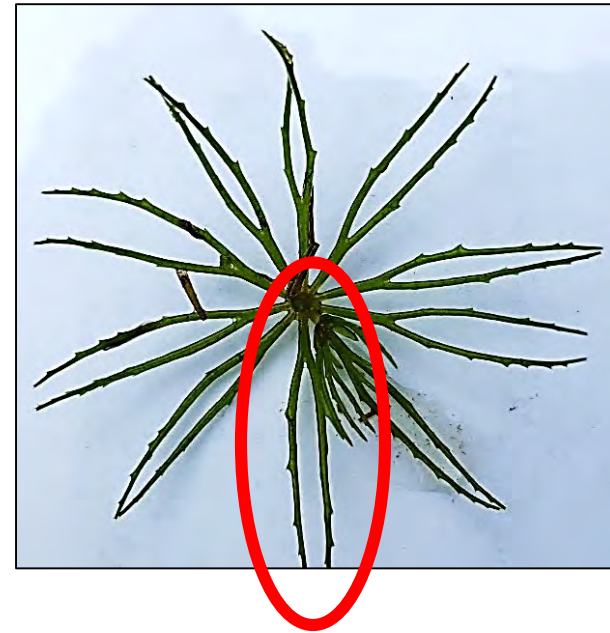
These are not Eurasian Milfoil

Only 8 leaflets



Bladders

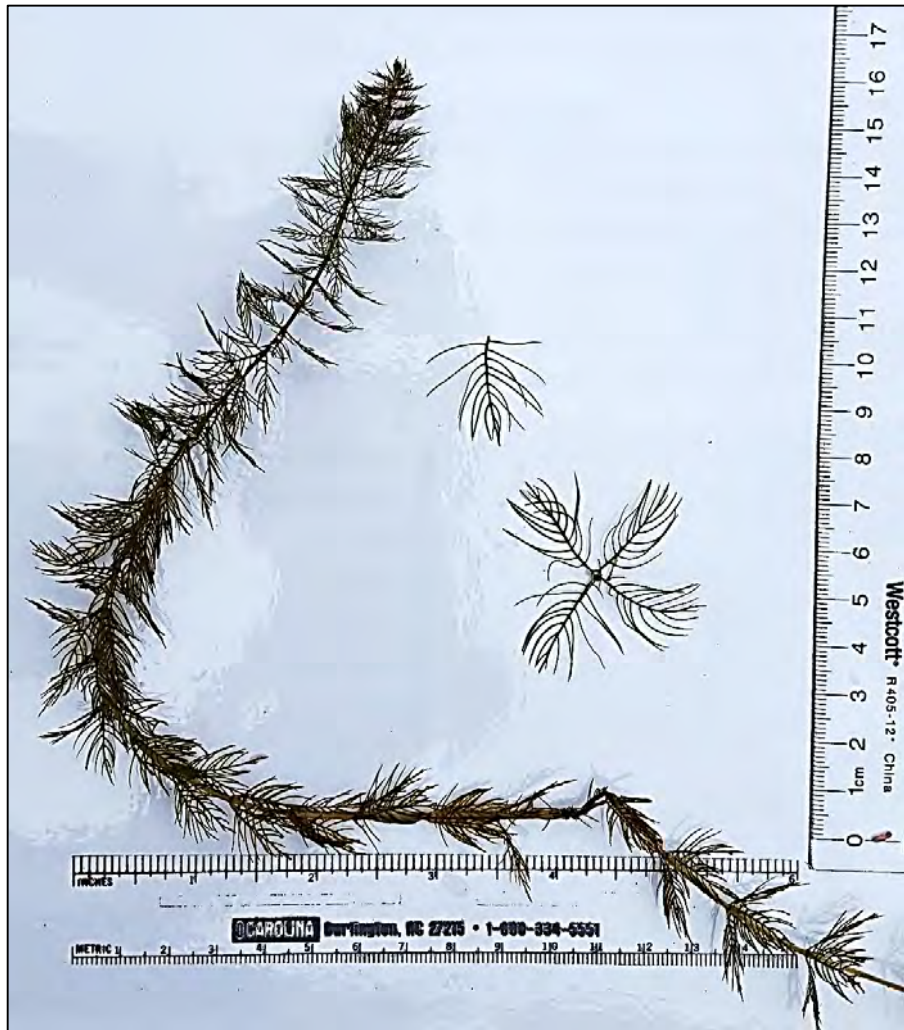
Also, too much branching to look like a feather



Leaf looks like a wishbone

Which plant is Eurasian watermilfoil?

A



B



EAPW Watch List Species

Curly-leaf Pondweed – *Potamogeton crispus*



P. Skawinski

Key Characters:

- Leaves 2-3 inches long and $\frac{1}{4}$ to $\frac{3}{8}$ inch wide
- Prominent midvein
- Alternate leaf arrangement
- **Serrated leaf margin**

These are not Curly-leaf pondweed



Lots of branching and
No teeth



No Teeth

No obvious midvein



©2005 Gary Fewless



©2004 Gary Fewless

Which plant is Curly-leaf Pondweed?

A

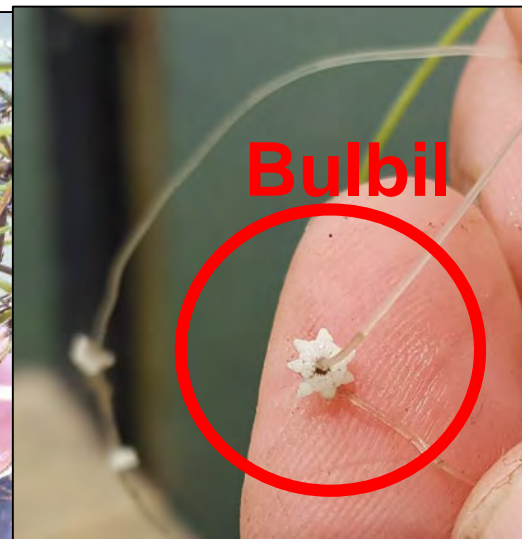
B



EAPW Watch List Species

Starry stonewort – *Nitellopsis obtusa*

- Tiny star-shaped, tan or white **bulbils** produced on rhizoids (clear filaments)
- Long, **uneven** length branchlets
- Smooth stem
- Brittle





Scott Brown

Starry Look-a-like: Native Muskgrass (*Chara*)

- Macroalgae
- **No star bulbils**
- “Smells skunky”
- **Shorter ‘branching’**
(i.e. reach) of the plant compared to Starry
- Rough feel



No Smell? Then it might be Starry!

STARRY LOOK-A-LIKE: NATIVE *NITELLA*



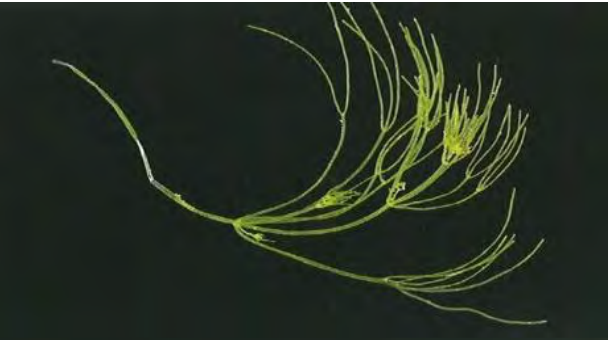
Nitella furcata stem section.

J. M. DiTOMASO



Nitella clavata stem section.

J. M. DiTOMASO



- Macroalgae
- **No star bulbils**
- **Even branching**
- Shorter 'branching' (i.e. reach) of the plant compared to Starry



Nitella mucronata

Which one is Starry stonewort?

A



B



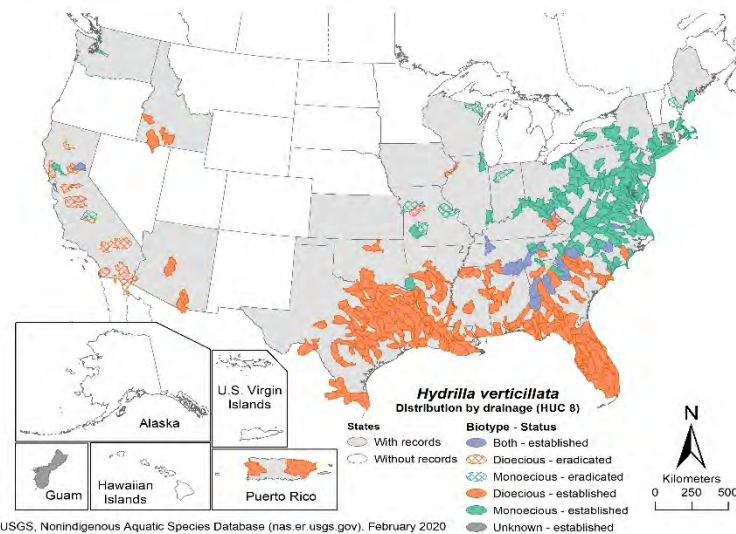
EAPW Watch List Species

Hydrilla— *Hydrilla verticillata*

- **Whorls of 4-8 leaves** around the stem
- **Serrated** leaf edge
- **Teeth are also produced underneath the leaf**, along the midvein



Illustration by Bruce Kerr





Hydrilla (exotic)

Elodea (native)



**Four or more leaves
at each node.**

**Three leaves at each
node.**

**Leaves margins
clearly toothed and
spines on mid vein.**

**Leaves margins not
clearly toothed and
no spines on mid
vein.**



THIS IS NOT
HYDRILLA

Only 3 leaves per whorl



Which plant is Hydrilla?

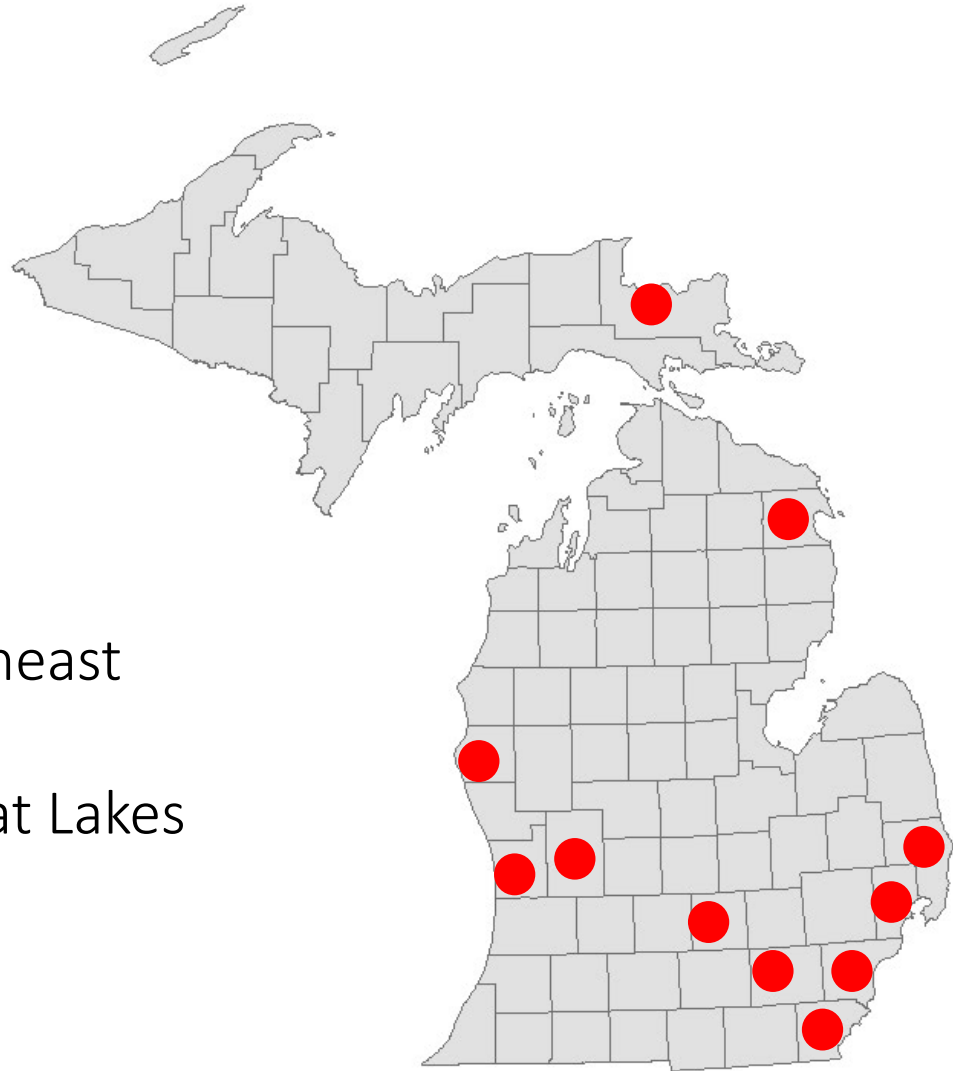
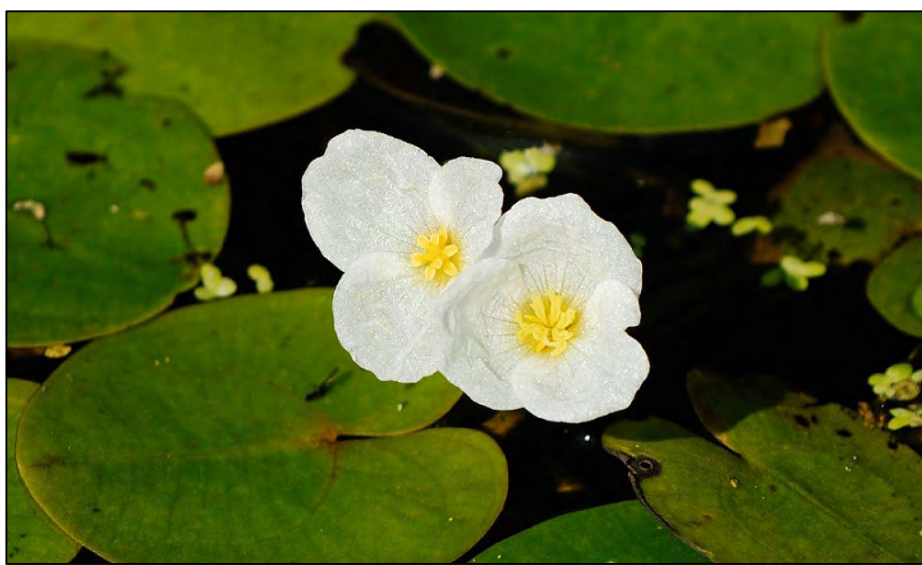
A

B



New Threat: European Frog-bit

Hydrocharis morsus-ranae

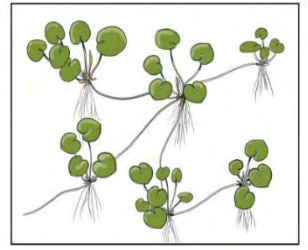


- ✗ First discovered in 1996 in Southeast Michigan
- ✗ Currently predominantly in Great Lakes wetlands
- ✗ High threat to our inland waters

European Frogbit

Hydrocharis morsus-ranae

- **Free-floating rosette**, roots hang below
- Small, heart-shaped leaves (**2-3"**)
- Small, white flower, 3 petals

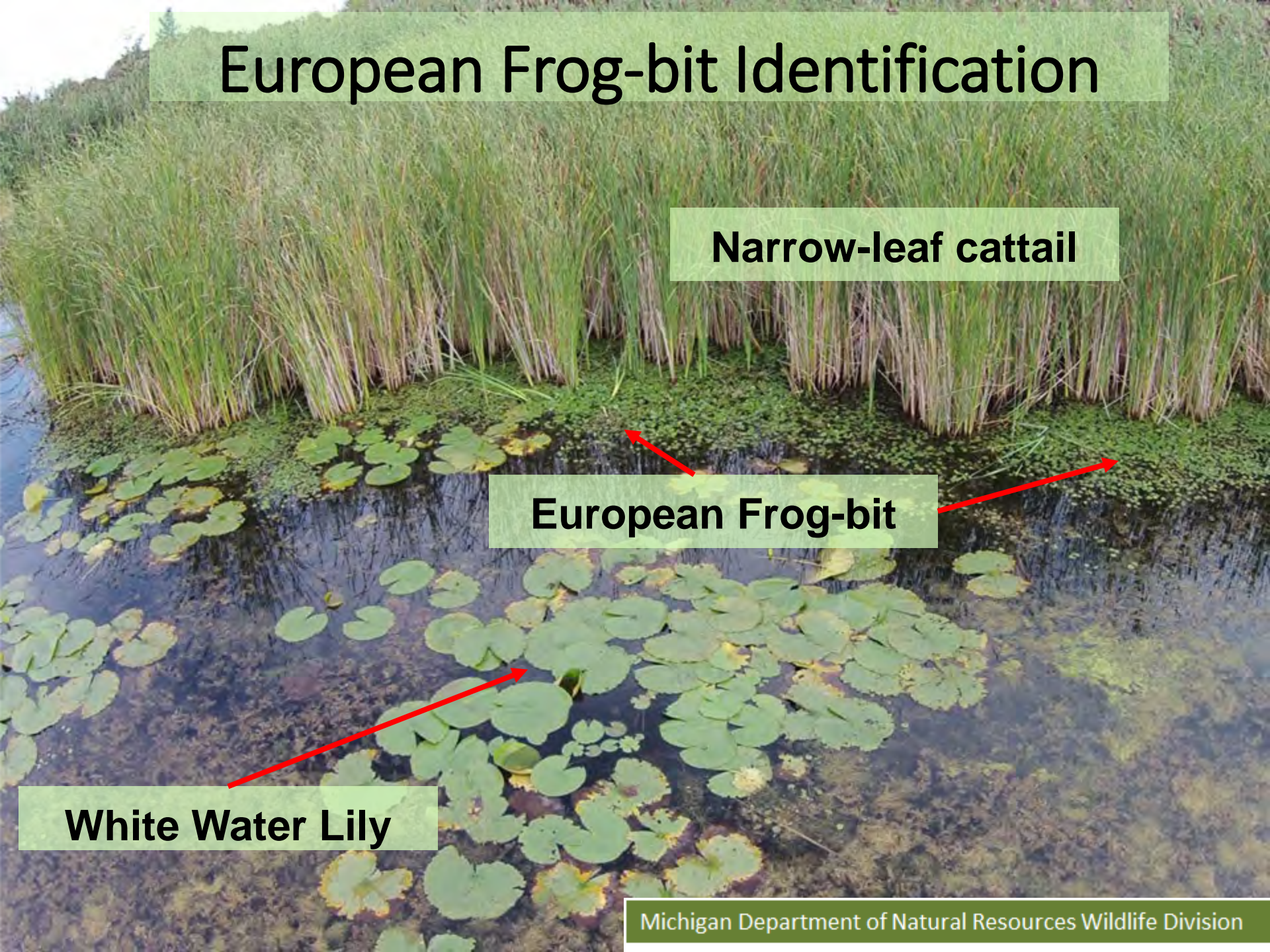


European Frog-bit Identification

Narrow-leaf cattail

European Frog-bit

White Water Lily

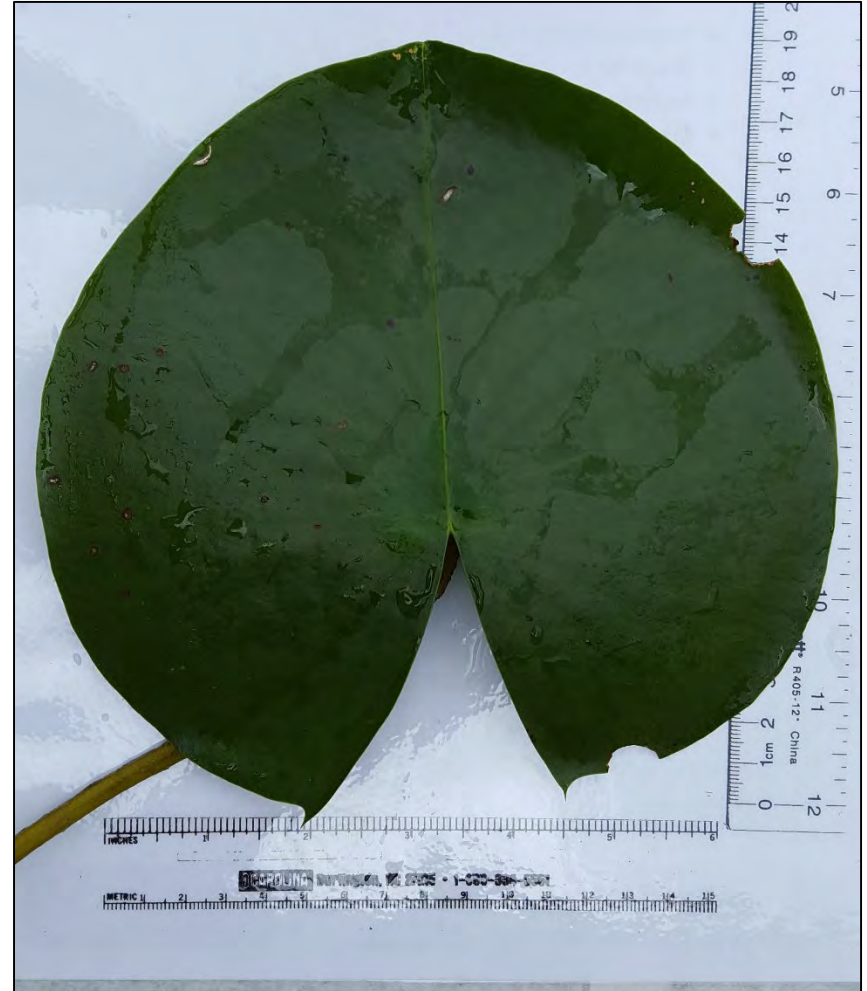


Which plant is European frog-bit?

A



B



WATCH FOR THESE Aquatic Invaders!

HYDRILLA



Leaves are whorled in groups of 4-8
Leaves are rough and have visible saw-toothed margins

Photo: Robert Viallet, Dormicum.KIT.ru, Bugwood.org

WATER CHESTNUT



Green, floating leaves with sharply serrated edges
Small, white 4-petaled flowers

Photo: Leslie J. Merriott, University of Connecticut, Bugwood.org

BRAZILIAN ELODEA



Generally 4 leaves per whorl
Submerged

Photo: V. Morgan, PSU-CLIR

EUROPEAN FROGBIT



Leathery, heart-shaped leaves
Free-floating
Leaf size: 1/2 - 2 1/4 in. across

Photo: V. Morgan, PSU-CLIR

WATER HYACINTH



Rounded, shiny green leaves with spongy stalks
Lavender flowers with central yellow fleck
Free-floating

Photo: MDNR

WATER SOLDIER



Leaves are 16 in. long, sword-shaped, sharply serrated edges, bright green
Leaves may be emergent or submerged

Photo: Barbara Sklar

WATER LETTUCE



Free-floating - forms a rosette of leaves that resembles an open head of lettuce
Fuzzy light green leaves with long feathery roots

Photo: MDNR

PARROT FEATHER



Spikes of stiff, feathery leaves grow in whorls of 4-6
Bright green upper stem emerges up to 1 foot above water

Photo: MDNR

EUROPEAN WATER CLOVER



Resembles a four leaf clover
Leaves are smooth and can be floating, submerged, or emergent
Leaf size up to 1 in. across

Photo: MDNR

YELLOW FLOATING HEART



Flowers are bright yellow with 5 petals
Leaves are 2-6 in. across with scalloped edges

Photo: MDNR

These 3 species are legal for sale and possession. Please only report sightings outside of cultivation.

MICHIGAN WATCH LIST SPECIES

- Never detected in the wild or
- Limited distribution
- High potential for negative impacts
- Early detection and response

For more information and to report sightings, visit michigan.gov/invasives

MAPPING EXOTIC PLANTS IN YOUR LAKE



Exotic Watch Packet

All paperwork needed can be found at www.micorps.net under Lakes > CLMP Documents

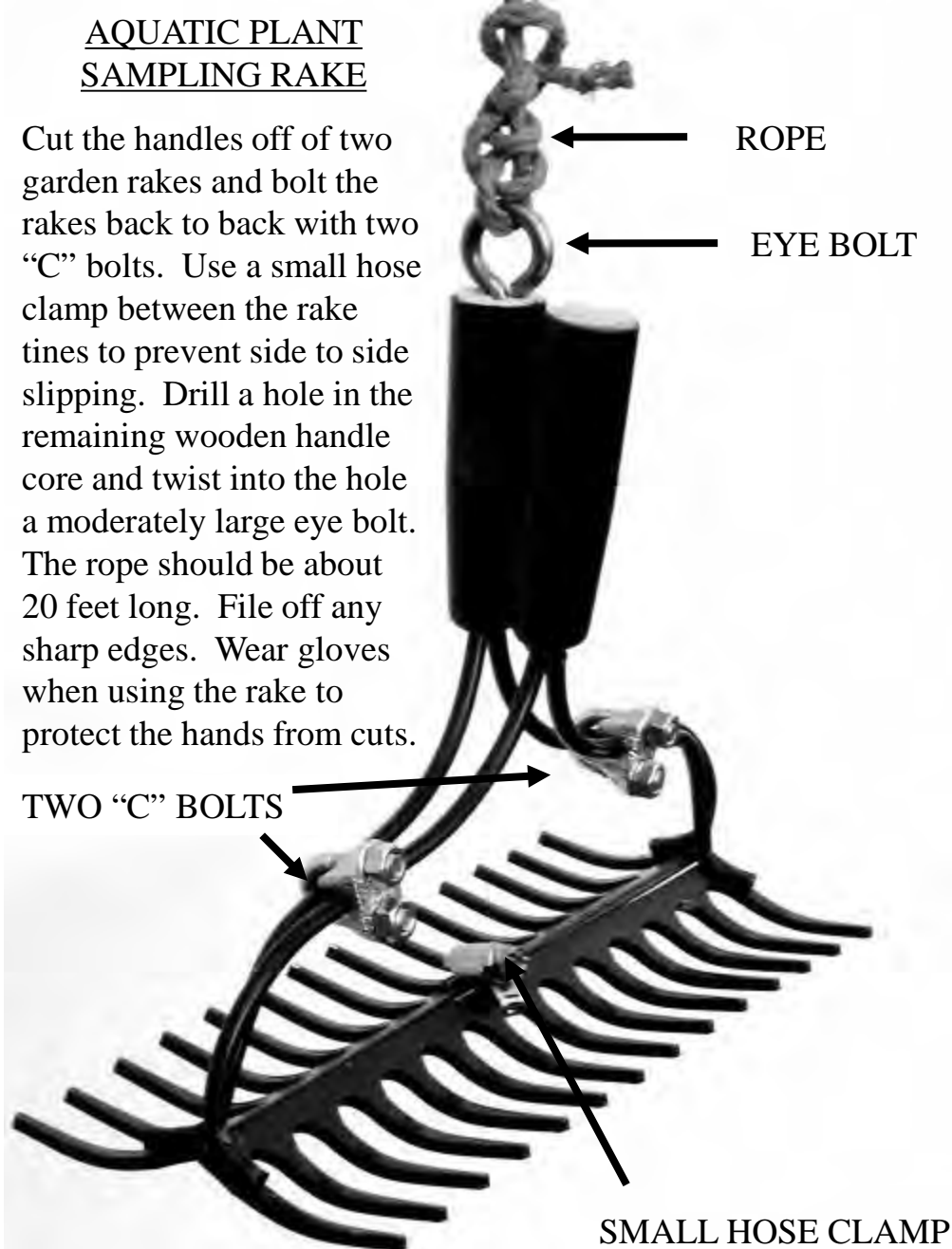
- Data Form
- Rake building instructions
- A Michigan Boater's Guide to Selected Aquatic Invasive Plants
- Plant photography card (to laminate)
- Michigan's Aquatic Invasive Plant Watch List
- EAPW brochure

Additional Equipment Checklist

- ☐ Boating safety equipment and anchor
- ☐ Plant ID guide(s)
- ☐ Depth map of lake
- ☐ GPS unit (optional)
- ☐ Camera (optional; digital if possible)
- ☐ Weighted sounding line
- ☐ Rake and retrieving line
- ☐ Zip-lock bags, and marker for labeling
- ☐ Trash bags
- ☐ Clipboard
 - ☐ Data forms/note paper
 - ☐ Monitoring procedures
- ☐ Pencil or indelible ink pen

AQUATIC PLANT SAMPLING RAKE

Cut the handles off of two garden rakes and bolt the rakes back to back with two “C” bolts. Use a small hose clamp between the rake tines to prevent side to side slipping. Drill a hole in the remaining wooden handle core and twist into the hole a moderately large eye bolt. The rope should be about 20 feet long. File off any sharp edges. Wear gloves when using the rake to protect the hands from cuts.



When to sample?

- Mid-June to August
 - ▣ Northern lakes can begin later
- Additional surveys can be done later in the summer

June

Sunday	Monday	Tuesday	Wednesday
30	31	1	
6	7	8	
13	14	15	
20 Father's Day	21	22	
27	28	29	

July

Sunday	Monday	Tuesday	Wednesday
27	28	29	
4 Independence Day	5 Independence Day Holiday	6	
11	12	13	
18	19	20	
25	26	27	

August

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4

Where to sample?

How do I start?

1. Get a map!

2. Locate:

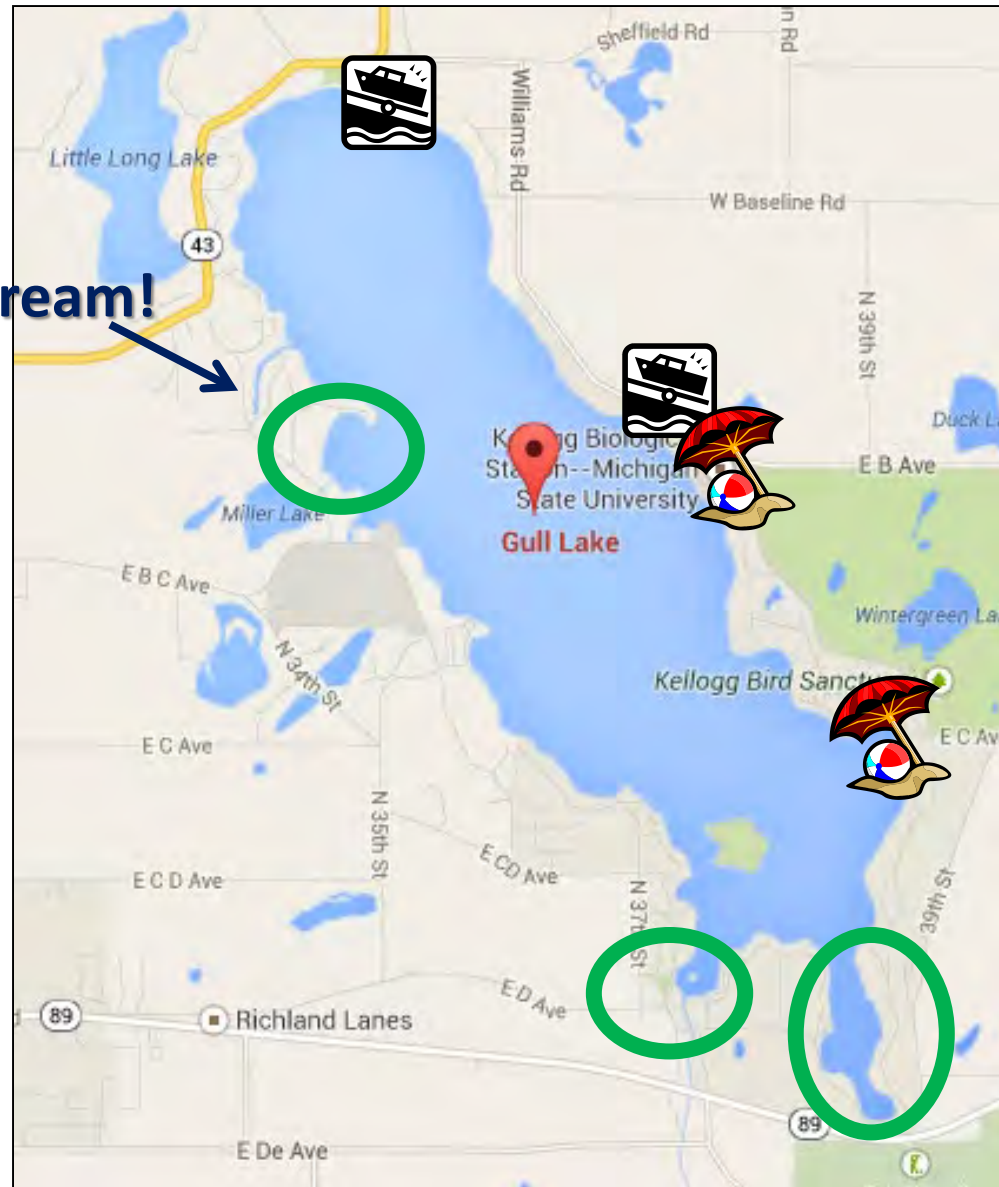
Required

- 1) Boat Ramps
- 2) Public Beaches / Parks
- 3) Attached inlets (streams, creeks, canals)

Optional

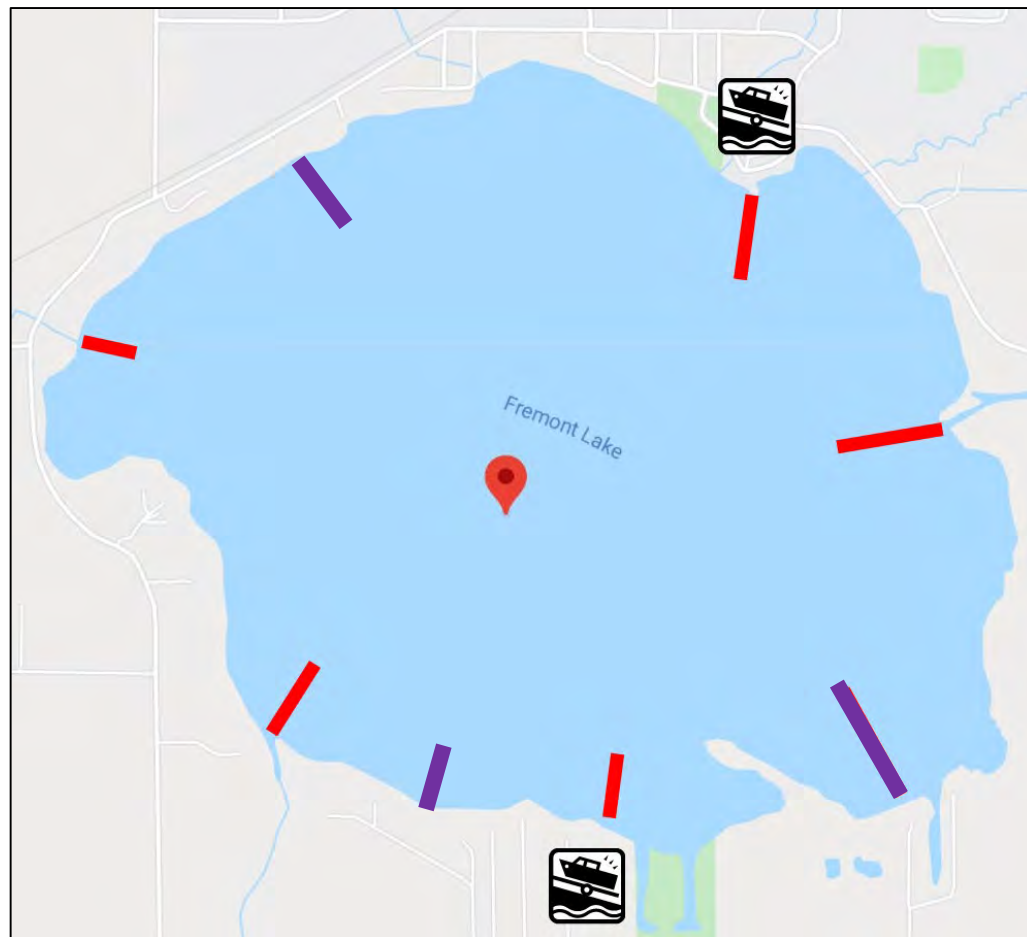
- 4) Quiet Bays and Coves
- 5) In between transects

Inlet Stream!



Focus on high-risk areas

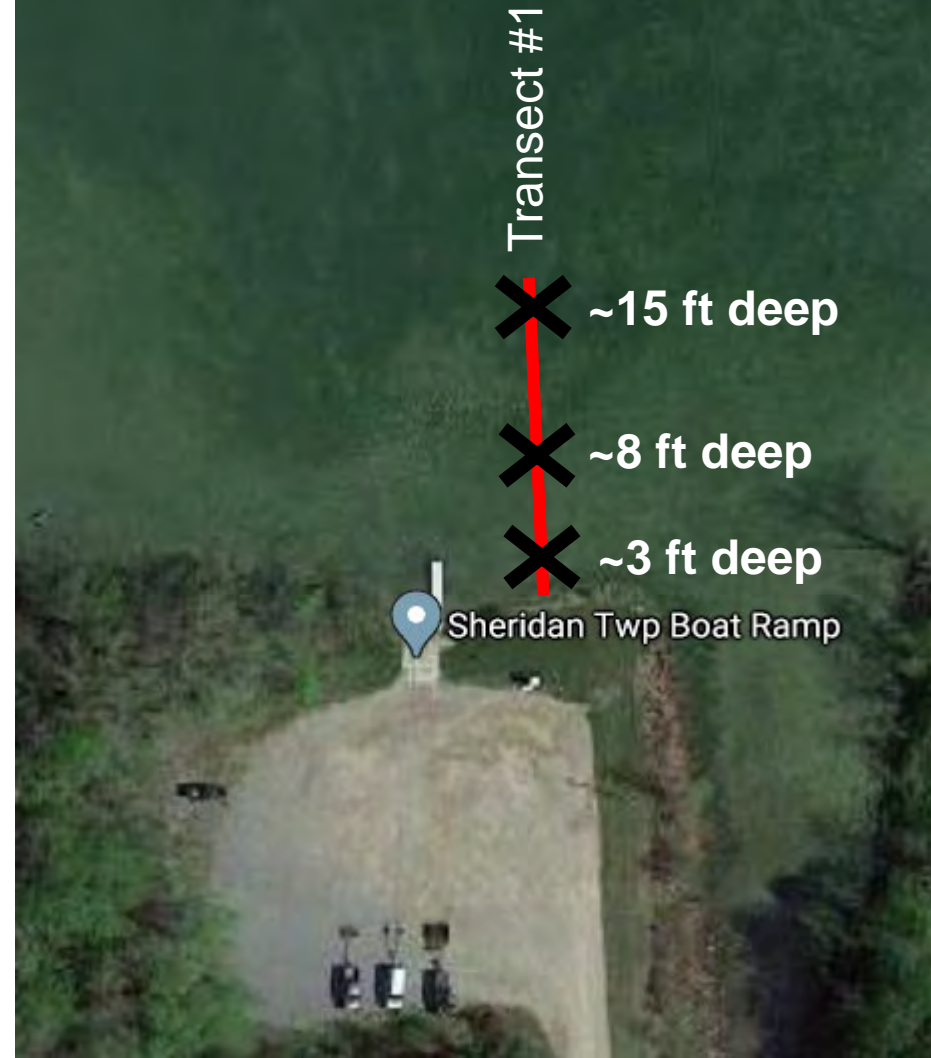
REMEMBER: Even some data is useful; it's ok if you can't cover the entire lake



How to sample

- How to sample a transect?
- How many tosses?
- How far do I throw it?
- How do I dispose of the plants?

**Sample different depths
along a transect
(line perpendicular to the
shore)**





EXOTIC AQUATIC PLANT WATCH



Lake Name: _____ County: _____

Township: _____

Lake Sampling Site (Field ID) Number: _____

Volunteer Monitor Name(s): _____

Date(s) of Survey : _____ Time: _____

Comments (unusual conditions, recent weed treatments, etc.): _____

-
- ❖ If *no exotic aquatic plants were found* during the survey, check here:
Use Page 2 to document the locations you surveyed on your lake.



- ❖ If exotic plants were found, check the species found below:
- | | |
|--|---|
| <input type="checkbox"/> Eurasian milfoil | <input type="checkbox"/> Starry Stonewort |
| <input type="checkbox"/> Curly-leaf pondweed | <input type="checkbox"/> European frog-bit (*new) |
| <input type="checkbox"/> Hydrilla | <input type="checkbox"/> Other _____ |

Include the following items in your report:

- ☐ This completed data form (Pages 1 and 2)
- ☐ Lake map with numbered site locations
- ☐ Any photographs taken of collected plants

**Send your complete report to the CLMP contact listed in the project procedures.
Keep a copy of the report for your records.**

Use this table to document the results of your survey. You may also create your own table; just be sure to include a copy in your Survey Report.



Site / Transect # (match to sites on your map)	Latitude (or location description)	Longitude	List any exotics found in this transect (or “None”)	Any photos taken at this site?	Notes
1	43°40'16.34N	89 15'48.24W	CLP, EWM	Yes (2)	Sparse
2	43°40'21.38N	89 15'47.02W	None	No	

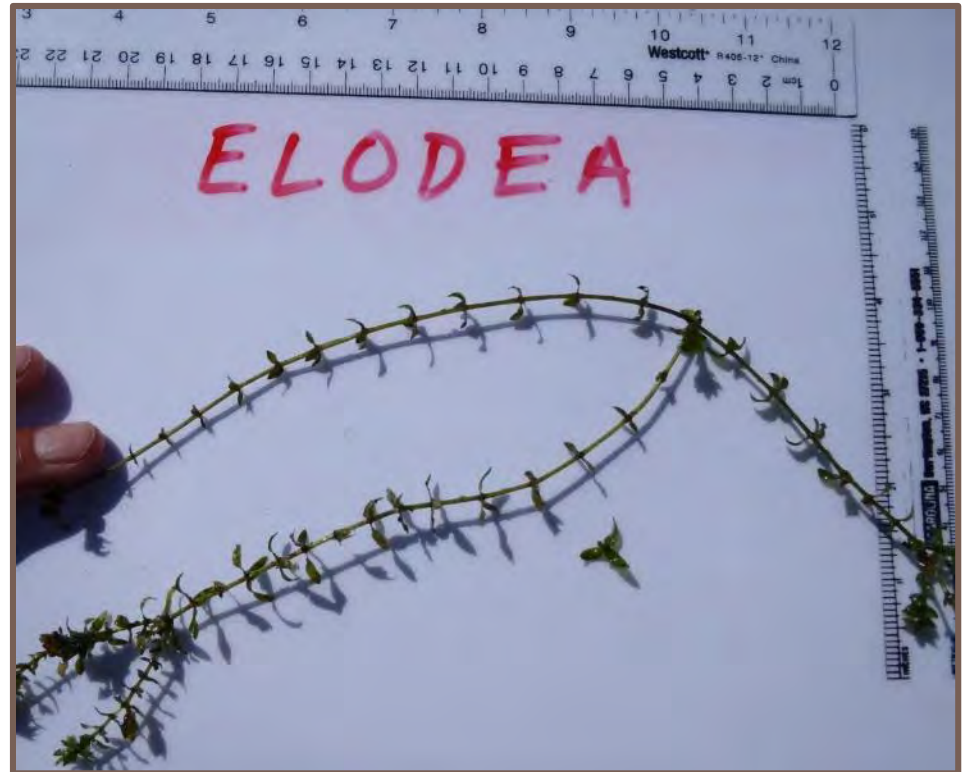
Plant Identification Photography

Required Photographs:

- At minimum, **one** representative photo of each invasive species found in your lake
- Label photos
- Make sure the photos are clear
 - ***Need to show identifying characters***
- Great for ID verification and documentation



Use photography card



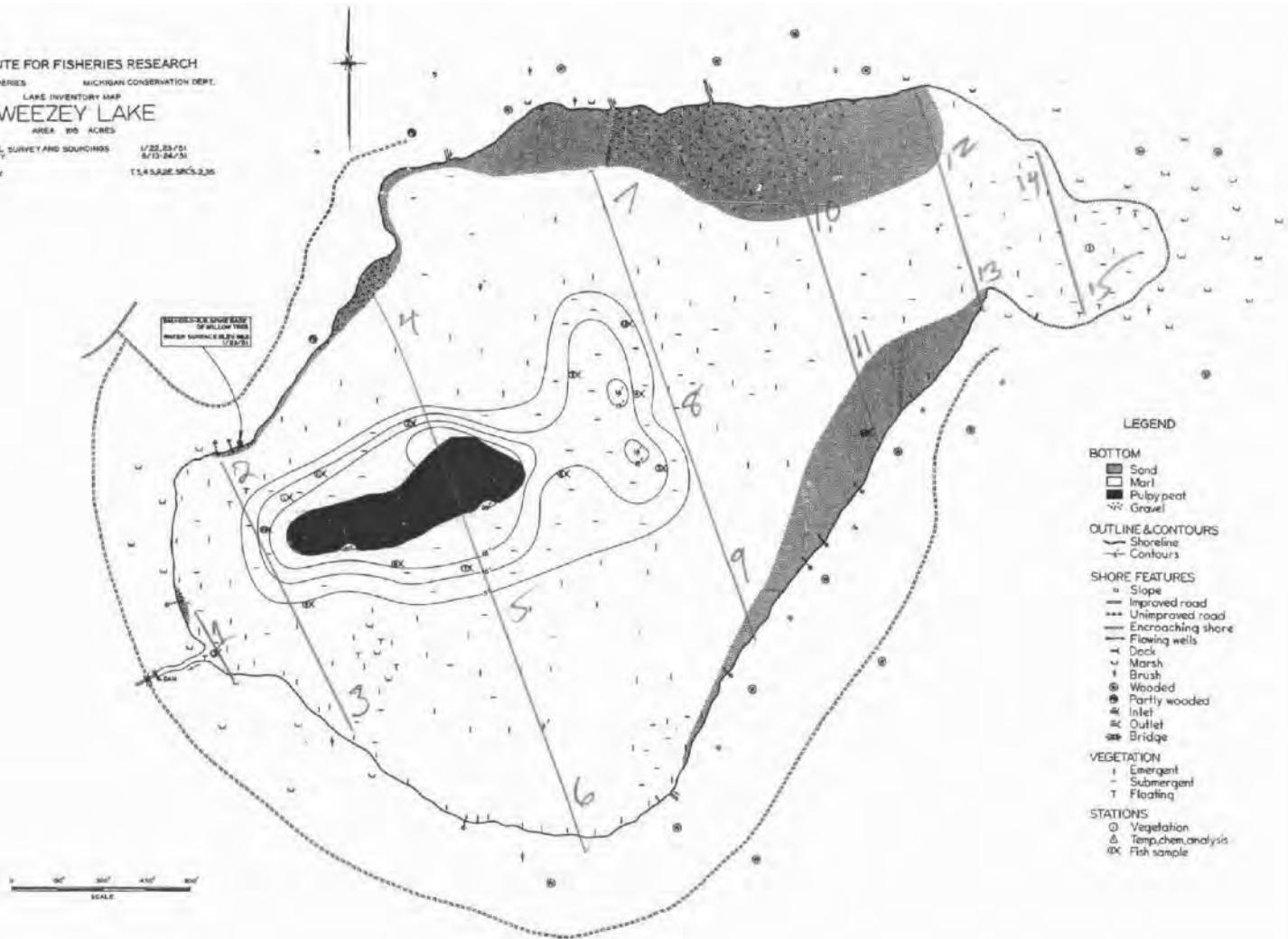
Volunteer photos:
(Left) Lotus & Maceday Lake in Oakland Co.
(Top) Bristol Lake in Barry Co.

No ruler? A hand will do!



Mapping Options: By Hand

INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES MICHIGAN CONSERVATION DEPT.
LAKE INVENTORY MAP
SWEZEY LAKE
AREA 895 ACRES
MARSHAL SURVEY AND SOURCES 1/25, 25/51
INVENTORY 8/13-24/51
JACKSON COUNTY T.34 S.2 E. S.2, 35



Mapping Options: Google Maps

Google maps

Find businesses, addresses and places of interest.

Search Maps

[Show search options](#)

[Get Directions](#) [My Maps](#)

By [Julie](#) - 2 Collaborators

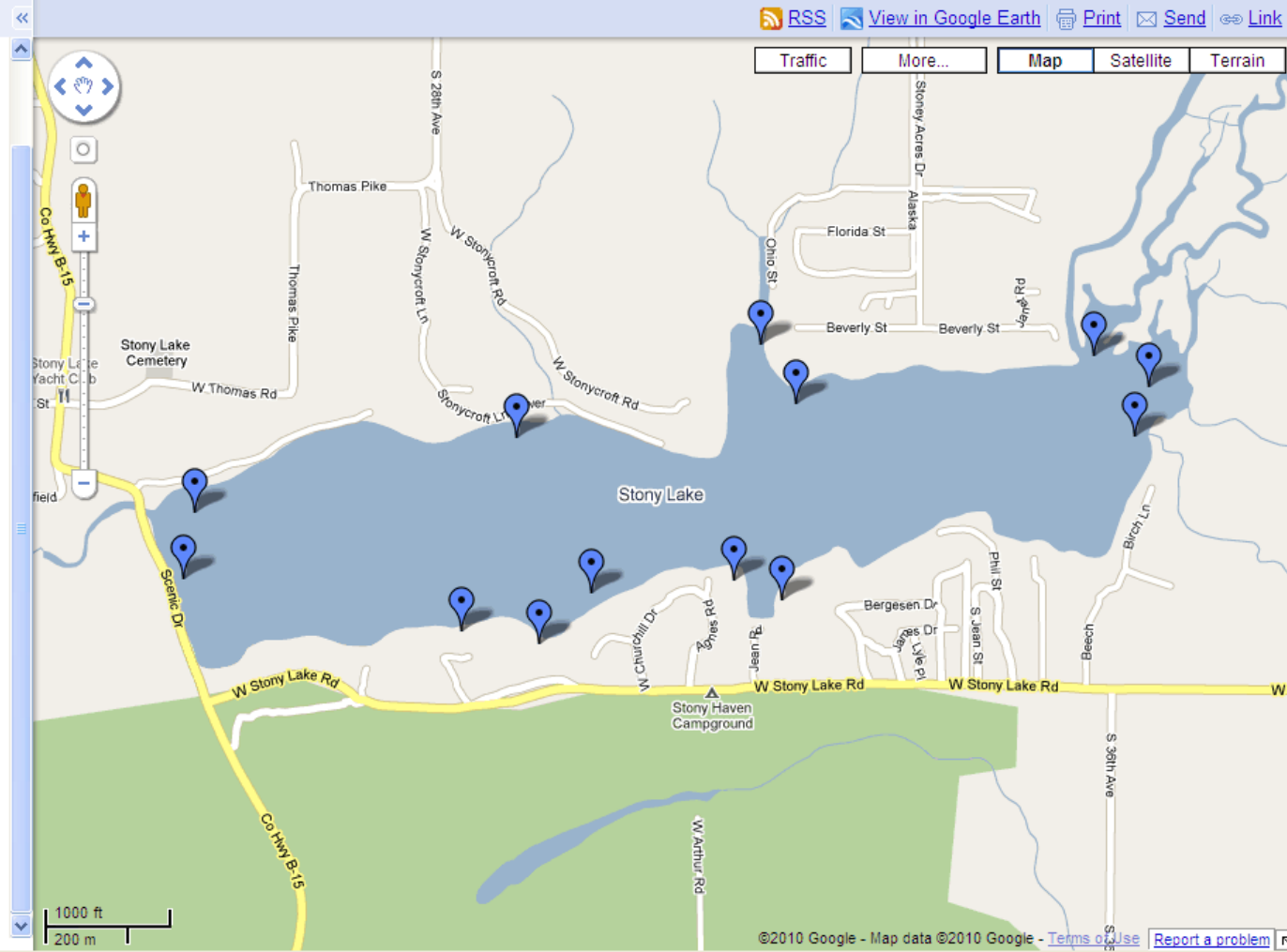
[Rate this map](#) - [Write a comment](#)

[RSS](#) [View in Google Earth](#) [Print](#) [Send](#) [Link](#)

[Traffic](#) [More...](#) [Map](#) [Satellite](#) [Terrain](#)

- [Log cabin dock](#)
4823240 / 0541753 CLPW (lots) June 25
- [Green Point Bayou](#)
4823479 / 0542093 EWMF June 25, CLPW July 3 &
- [Public Beach](#)
4823051 / 0540658 EWMF & CLPW June 25; EWM
- [East Lagoon Inlet](#)
N43.33.791 W086.28.133 CLPW abundant July 3
- [East End Marsh](#)
43.33.761 / 86.28.069 CLPW (lots) July 3
- [Southeast end marsh](#)
43.33.723 / 86.28.077 CLPW abundant July 3
- [Public Boat Access](#)
- [Bauers Dock](#)
4822942 / 0542070 CLPW July 16
- [Airplane Dock](#)
4822883 / 0541821 CLPW July 16; Aug. 13 N43.33
- [Larmores Bay](#)
4822778 / 0541608 CLPW & EWMF July 16; Aug.
- [Point of Excess east side](#)
4823343 / 0542232 CLPW & EWMF July 19
- [Merrywood](#)
4822736 / 0541147 CLPW July 21; Aug. 13 N43.33.
- [Robinwood](#)
4823019 / 0540660 EWMF abundant Aug. 13

[Report a problem](#)



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Mapping Options: Google Earth



Submitting Your Data

1. Make copies of your data for your records.
2. Enter your data into the online MiCorps Data Exchange (www.micorps.net) by October 31.
3. Send complete report to MiCorps
 - a. Completed data form (pages 1 and 2)
 - b. Lake map with numbered locations
 - c. Any photographs

Value of Teamwork

- Many volunteers struggle when attempting EAPW alone
- Volunteer teams are more likely to complete sampling, submit data and continue in the program
- **Fun = The more the merrier!**

Materials to help recruit volunteers

WATCH FOR THESE Aquatic Invaders!

HYDRILLA  Leaves are whorled in groups of 4-8 Leaves are rough and have visible saw-toothed margins <small>Photo: Richard Dooly, DoolyMedia.org</small>	WATER CHESTNUT  Green, floating leaves with sharply serrated edges Small, white 4-petaled flowers <small>Photo: Leslie J. Mahanoff, University of Connecticut, BigWood.org</small>
BRAZILIAN ELODEA  Generally 4 leaves per whorl Submerged <small>Photo: V. Moulton, PAUOLP</small>	EUROPEAN FROGBIT  Leathery, heart-shaped leaves Free-floating Leaf size: 1/2 - 2 1/4 in. across <small>Photo: J. Moulton, POUOLP</small>
WATER HYACINTH  Rounded, shiny green leaves with spongy stalks Lavender flowers with central yellow fleck Free-floating <small>Photo: MDC</small>	WATER SOLDIER  Leaves are 16 in. long, sword-shaped, sharply serrated edges, bright green Leaves may be emergent or submerged <small>Photo: Doreen Saxon</small>
WATER LETTUCE  Free-floating - forms a rosette of leaves that resembles an open head of lettuce Fuzzy light green leaves with long feathery roots <small>Photo: MDC</small>	PARROT FEATHER  Spikes of stiff, leathery leaves grow in whorls of 4-6 Bright green upper stem emerges up to 1 foot above water <small>Photo: MDC</small>
EUROPEAN WATER CLOVER  Resembles a four leaf clover Leaves are smooth and can be floating, submerged, or emergent Leaf size up to 1 in. across <small>Photo: MDC</small>	YELLOW FLOATING HEART  Flowers are bright yellow with 5 petals Leaves are 2-6 in. across with scalloped edges <small>Photo: MDC</small>

These 3 species are legal for sale and possession. Please only report sightings outside of cultivation.

For more information and to report sightings, visit michigan.gov/invasives



MiCorps Factsheet

Exotic Plant Watch

Are invasive plants threatening your lake?

As our plants grow for a while, they can become a part of the lake, just as grasses, cattails, and trees are a natural part of the landscape. However, a lake is invaded by a regular, more common, but is not native to Michigan. Some of these invaders are: European Frogbit, Water Hyacinth, and Water Lettuce. These plants can be very difficult to control and can cause a lot of damage to the lake.

Through the Exotic Plant Watch, a volunteer-based program, you can help identify these plants and help to control them. The program is open to anyone who is interested in helping to protect the lake.

1. **Identify the plant.** If you see a plant that you think is an exotic plant, take a photo and note the location. If you are not sure, you can ask a local expert or contact the Michigan Department of Natural Resources.

2. **Report the sighting.** Contact the Michigan Department of Natural Resources or the Michigan Invasive Plant Society to report the sighting.

3. **Monitor the plant.** If you report a sighting, you will be asked to monitor the plant and report any changes.

4. **Control the plant.** If you are able, you can help to control the plant by pulling it out or using herbicides.

5. **Share the information.** Share the information you have learned with others who are interested in protecting the lake.

6. **Join the program.** If you are interested in joining the program, contact the Michigan Department of Natural Resources or the Michigan Invasive Plant Society.

7. **Get the facts.** Visit the Michigan Department of Natural Resources website for more information.

8. **Get the facts.** Visit the Michigan Department of Natural Resources website for more information.

9. **Get the facts.** Visit the Michigan Department of Natural Resources website for more information.

10. **Get the facts.** Visit the Michigan Department of Natural Resources website for more information.

Michigan Clean Water Corps

Exotic Aquatic Plant Watch

Are invasive plants threatening your lake?

These 3 species are legal for sale and possession. Please only report sightings outside of cultivation.

DEQ

Michigan State University Extension

Potential sources of volunteers

- Lake associations
- Watershed groups
- Scouts
- Michigan Garden Clubs
- Michigan Botanical Club
- Master Gardeners
- 4-H
- Student groups
- MSUE Conservation Stewards



Staff Field Visits



- We may visit your lake to:
 - ▣ Help kick off your survey
 - ▣ Assist with plant identification
 - ▣ Answer questions and get your feedback
- Will be arranged in early summer
 - ▣ **Not all lakes can be visited**
 - ▣ **New lakes are top priority**



Good luck and happy sampling!

