COOPERATIVE LAKES MONITORING PROGRAM
TRAINING FOR
Exotic Aquatic Plant Watch (EAPW)
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Why get involved?

• Exotic/invasive species are a significant threat to Michigan’s lakes.

• Aquatic invasive species can be managed with...
  
    • Early Detection

    • Rapid Response
Where is monitoring most valuable?

- Lakes with no known invasive plants
- Lakes that are managing existing populations of invasive plants and have them under good control.
- Less valuable for lakes with invasive weeds covering large areas... but it can help you identify new invasives that may invade.
Late Detection and Slow Response
The key to Early Detection?
Know the Exotics!

• Eurasian Watermilfoil
• Curly-leaf Pondweed
• Starry Stonewort
• Hydrilla
• European Frog-bit (NEW!)
Let’s Meet the Exotics!
Additional copies available for $10 through the MSU Extension Bookstore

http://shop.msu.edu
Video!

- Program description
- ID tips and tricks
- Review sampling protocol
- On the “Lake Training” page on www.micorps.net
EAPW Watch List Species
Eurasian Watermilfoil—*Myriophyllum spicatum*

Key Characters:
- Feather-like leaves
- Leaves with 12 – 21 pairs of leaflets
- Leaves limp out of water
What about “Hybrid Milfoils”??
Curly-leaf Pondweed – *Potamogeton crispus*

Key Characters:
- Leaves 2-3 inches long and 1/4 to 3/8 inch wide
- Alternate leaf arrangement
- Serrated leaf margin
EAPW Watch List Species

Starry Stonewort – *Nitellopsis obtusa*
Starry Stonewort
Key Characters

• Macroalgae
• Tiny, white/cream colored star-shaped bulbils produced on clear filaments
• Long, uneven length branchlets
• Smooth stem

• Eurasian invasive; found in the St. Lawrence River in 1978
• Forms mats several feet thick, at depths 3-20’
• Crowds out other plants
• May prevent fish spawning
Starry Look-a-like Native Muskgrass (*Chara*)

- Macroalgae
- **No star bulbils**
- “Smells skunky”
- Shorter ‘branching’ or reach of the plant compared to Starry
- Feels rough

*No Smell? Then it might be Starry!*
Starry look-a-like = **NATIVE Nitella**

- Macroalgae
- **No star bulbils**
- Even branching
- Shorter ‘branching’ or reach of the plant compared to Starry Stonewort
EAPW Watch List Species
Hydrilla—*Hydrilla verticillata*

High Threat!
Reported sightings
**Hydrilla (exotic)**

- Four or more leaves at each node.
- Leaves margins clearly toothed and spines on mid vein.

**Elodea (native)**

- Three leaves at each node.
- Leaves margins not clearly toothed and no spines on mid vein.
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
Key Characteristics:

- Small (0.5-2.25 inches) round/heart shaped leaves
- White flower with three petals
- Free floating rosette (can be rooted in shallow water)
EUROPEAN FROG-BIT IDENTIFICATION

European Frog-bit

Narrow-leaf cattail

White Water Lily
**HYDRILLA**

- Leaves are whorled in groups of 4-9.
- Leaves are rough and have visible saw-toothed margins.

*Photo: Robert Vold, Department of Natural Resources*

**WATER CHESTNUT**

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

*Photo: Linda J. Wehrbein, University of Connecticut, Bugwood.org*

**BRAZILIAN ELODEA**

- Generally 4 leaves per whorl.
- Submerged.

*Photo: Y. Morgan, FSU-CLR*

**EUROPEAN FROGBIT**

- Leathery, heart-shaped leaves.
- Free-floating.
- Leaf size ½-2 ¼ in. across.

*Photo: Y. Morgan, FSU-CLR*

**WATER HYACINTH**

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

*Photo: MOH*

**WATER SOLDIER**

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

*Photo: Sherry Baker*

**WATER LETTUCE**

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

**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: MOH*

**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: MOH*

**YELLOW FLOATING HEART**

- Flowers are bright yellow with 5 petals.
- Leaves are 2-4 in. across with scalloped edges.

*Photo: MOH*

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For more information and to report sightings, visit michigan.gov/invasives
Practice with real plants
MAPPING EXOTIC PLANTS IN YOUR LAKE
Exotic Watch Packet

- Welcome letter
- Exotic Aquatic Plant Watch procedures
- Data Form
- Rake building instructions
- A Michigan Boater’s Guide to Selected Aquatic Invasive Plants
- Laminated plant photography card
- 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 early July
  - Northern lakes can begin later
- Additional surveys can be done later in the summer
Where to sample?

• How do I start?
  – Get a map!
  – Locate:
    1) Boat Ramps
    2) Public Beaches / Parks
    3) Attached inlets (streams, creeks, canals)
    4) Quiet Bays and Coves
Example Lake < 100 acres = 15 transects
### How Many Transects?

<table>
<thead>
<tr>
<th>Lake Size (Acres)</th>
<th>No. of Transects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 100</td>
<td>5 to 15</td>
</tr>
<tr>
<td>100 to 500</td>
<td>15 to 30</td>
</tr>
<tr>
<td>Over 500</td>
<td>30 to 50</td>
</tr>
</tbody>
</table>
Got an island? Add more transects!
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:
☐ Eurasian milfoil  ☐ Starry Stonewort
☐ Curly-leaf pondweed  ☐ European frog-bit (*new)
☐ Hydrilla  ☐ 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.

<table>
<thead>
<tr>
<th>Site / Transect # (match to sites on your map)</th>
<th>Latitude</th>
<th>Longitude</th>
<th>List any exotics found in this transect (or “None”)</th>
<th>Any photos taken at this site?</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>43°40′16.34N</td>
<td>89 15′48.24W</td>
<td>CLP, EWM</td>
<td>Yes (2)</td>
<td>Sparse</td>
</tr>
<tr>
<td>2</td>
<td>43°40′21.38N</td>
<td>89 15′47.02W</td>
<td>None</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
Plant Identification Photography

- Take lots of pictures
  - Delete blurry photos
- Include key characteristics
  - Ex.) milfoil leaflets
- Scale
- Location
Use photography guide

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
Mapping Options: Google Maps
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 30.
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!

<table>
<thead>
<tr>
<th>HYDRILLA</th>
<th>WATER CHESTNUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves are dark green and smooth</td>
<td>Leaves are long and have visible saw tooth margins</td>
</tr>
<tr>
<td>Stems are reddish-brown</td>
<td>Stems are yellowish-green</td>
</tr>
<tr>
<td>Long, ribbon-like leaves</td>
<td>Floating leaves with deeply notched edges</td>
</tr>
<tr>
<td>Small, white flowers</td>
<td>Small, white flowers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BRAZILIAN ELODEA</th>
<th>EUROPEAN FROG BIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrow leaves turned upward</td>
<td>Floating leaves</td>
</tr>
<tr>
<td>Floating leaves above water</td>
<td>Leaves are oval or heart-shaped</td>
</tr>
<tr>
<td>Floating leaves above water</td>
<td>Floating leaves</td>
</tr>
<tr>
<td>Leaves are long and pointed</td>
<td>Leaves are heart-shaped</td>
</tr>
<tr>
<td>Leaves are alsocorded</td>
<td>Leaves are alsocorded</td>
</tr>
</tbody>
</table>

WATER HYACINTH

Stems are tall and stout, with long, narrow leaves above water

WATER LETTUCE

Free-floating – leaves are long, narrow, and pointed

PARROT FEATHER

Leaves are long, narrow, and pointed

EUROPEAN WATER CLOVER

Leaves are long, narrow, and pointed

YELLOW FLOATING HEART

Flowers are yellow and long, narrow

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