Aquatic Plant Mapping

Erick Elgin and Jo Latimore


An Underwater Forest
High diversity
Improves water quality
Valuable fish and wildlife habitat

About Us

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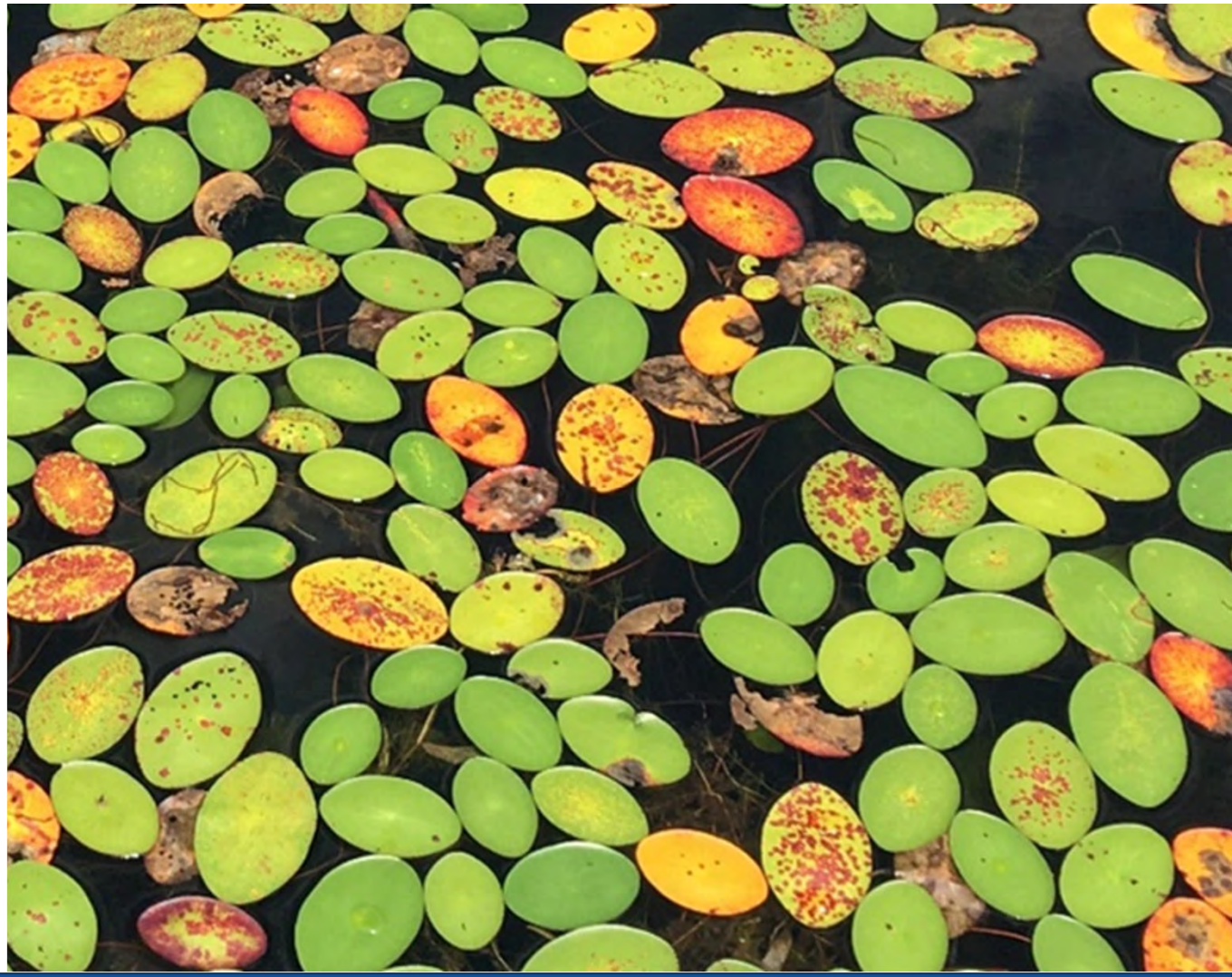
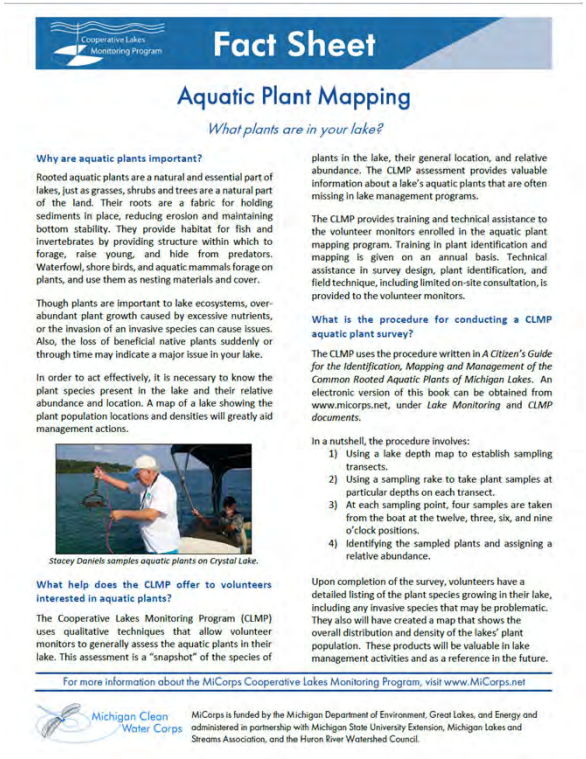


Why map aquatic plants?



Cooperative Lakes Monitoring Program

Fact Sheet

Aquatic Plant Mapping

What plants are in your lake?

Why are aquatic plants important?

Rooted aquatic plants are a natural and essential part of lakes, just as grasses, shrubs and trees are a natural part of the land. Their roots are a fabric for holding sediments in place, reducing erosion and maintaining bottom stability. They provide habitat for fish and invertebrates by providing structure within which to forage, raise young, and hide from predators. Waterfowl, shore birds, and aquatic mammals forage on plants, and use them as nesting materials and cover.

Though plants are important to lake ecosystems, over-abundant plant growth caused by excessive nutrients, or the invasion of an invasive species can cause issues. Also, the loss of beneficial native plants suddenly or through time may indicate a major issue in your lake.

In order to act effectively, it is necessary to know the plant species present in the lake and their relative abundance and location. A map of a lake showing the plant population locations and densities will greatly aid management actions.

Stacey Daniels samples aquatic plants on Crystal Lake.

What help does the CLMP offer to volunteers interested in aquatic plants?

The Cooperative Lakes Monitoring Program (CLMP) uses qualitative techniques that allow volunteer monitors to generally assess the aquatic plants in their lake. This assessment is a "snapshot" of the species of plants in the lake, their general location, and relative abundance. The CLMP assessment provides valuable information about a lake's aquatic plants that are often missing in lake management programs.

The CLMP provides training and technical assistance to the volunteer monitors enrolled in the aquatic plant mapping program. Training in plant identification and mapping is given on an annual basis. Technical assistance in survey design, plant identification, and field technique, including limited on-site consultation, is provided to the volunteer monitors.

What is the procedure for conducting a CLMP aquatic plant survey?

The CLMP uses the procedure written in *A Citizen's Guide for the Identification, Mapping and Management of the Common Rooted Aquatic Plants of Michigan Lakes*. An electronic version of this book can be obtained from www.micorps.net, under *Lake Monitoring* and *CLMP documents*.

In a nutshell, the procedure involves:

1) Using a lake depth map to establish sampling transects.
2) Using a sampling rake to take plant samples at particular depths on each transect.
3) At each sampling point, four samples are taken from the boat at the twelve, three, six, and nine o'clock positions.
4) Identifying the sampled plants and assigning a relative abundance.

Upon completion of the survey, volunteers have a detailed listing of the plant species growing in their lake, including any invasive species that may be problematic. They also will have created a map that shows the overall distribution and density of the lakes' plant population. These products will be valuable in lake management activities and as a reference in the future.

For more information about the MiCorps Cooperative Lakes Monitoring Program, visit www.MiCorps.net

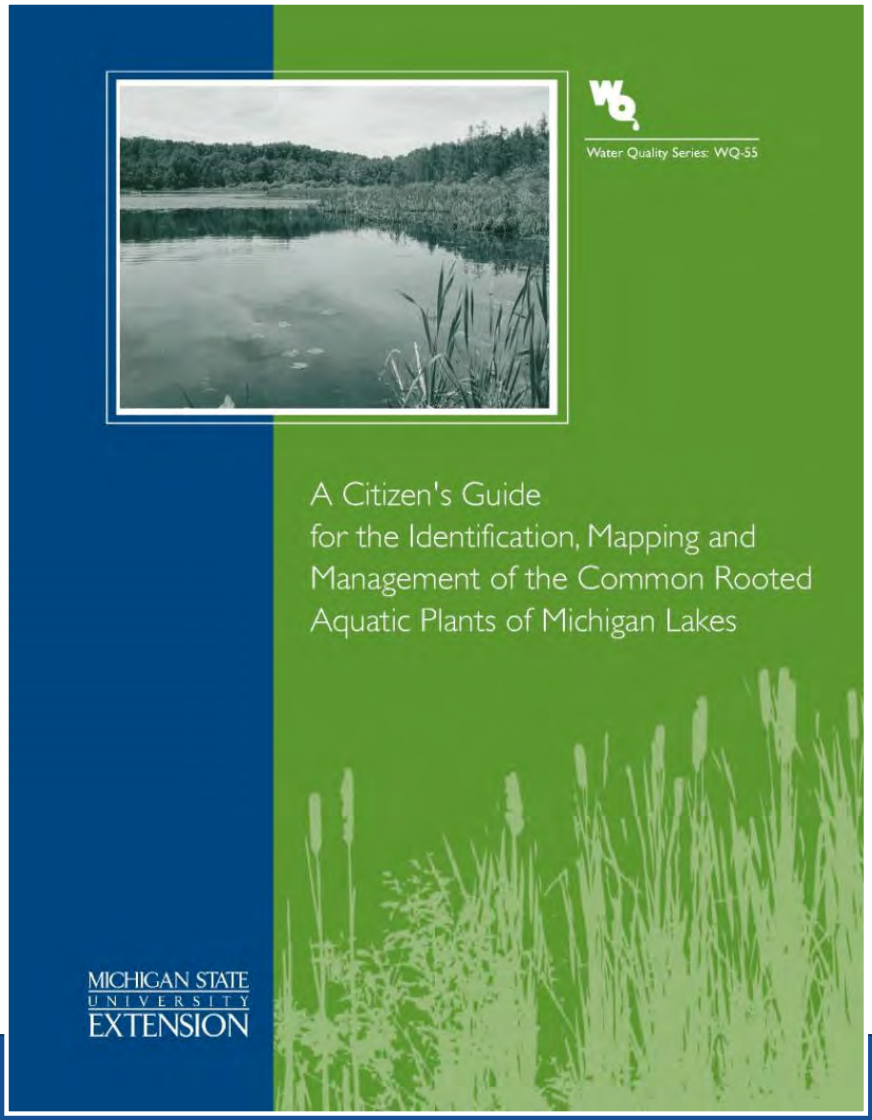
Michigan Clean Water Corps

MiCorps is funded by the Michigan Department of Environment, Great Lakes, and Energy and administered in partnership with Michigan State University Extension, Michigan Lakes and Streams Association, and the Huron River Watershed Council.

- Plants are a beneficial part of a lake ecosystem
- Excess nutrients, invasive species, and other disturbances can upset their balance
- A plant map provides a basis for comparison, informs management, and reveals problems

Benefits of Aquatic Plant Mapping

- Learn the plants in your lake
- Standard procedure
- Hands-on training
- One day of field assistance from MiCorps staff
- Ongoing assistance with plant ID, field procedures, and data reporting
- Data are shared with EGLE
- Baseline information for future lake management
- 2023 enrollment cost –$250



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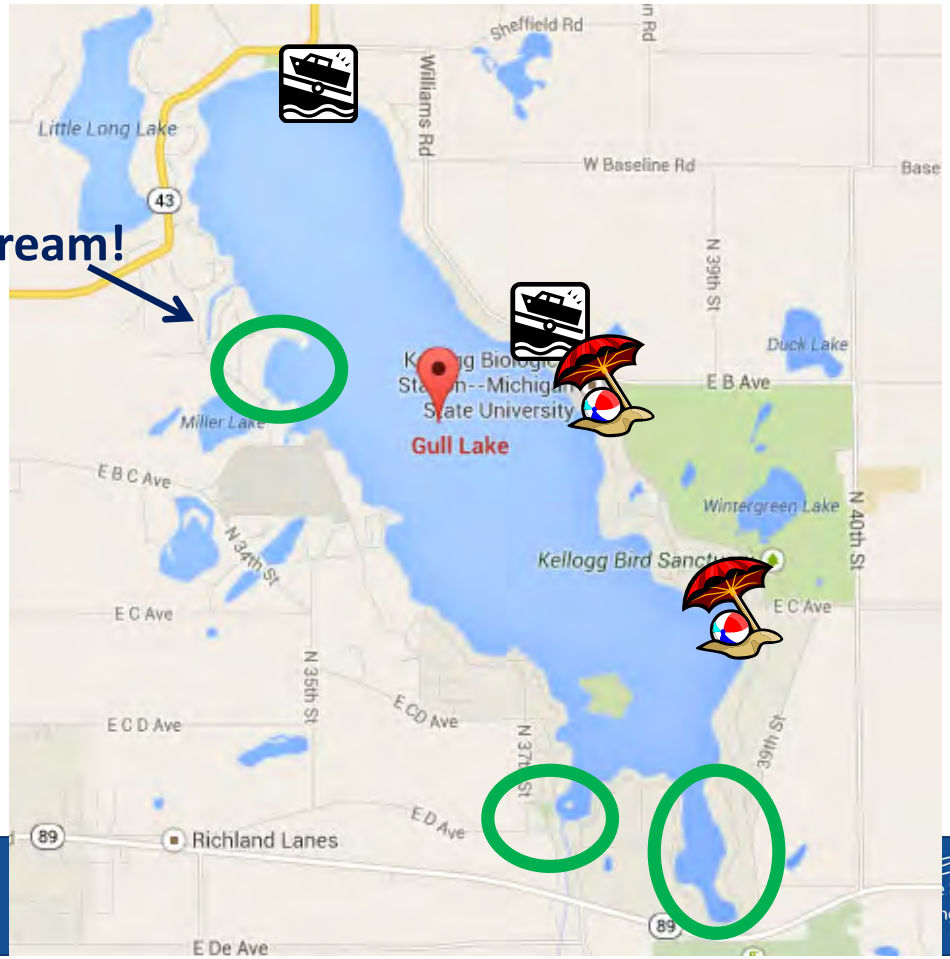
Where to sample?

- 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



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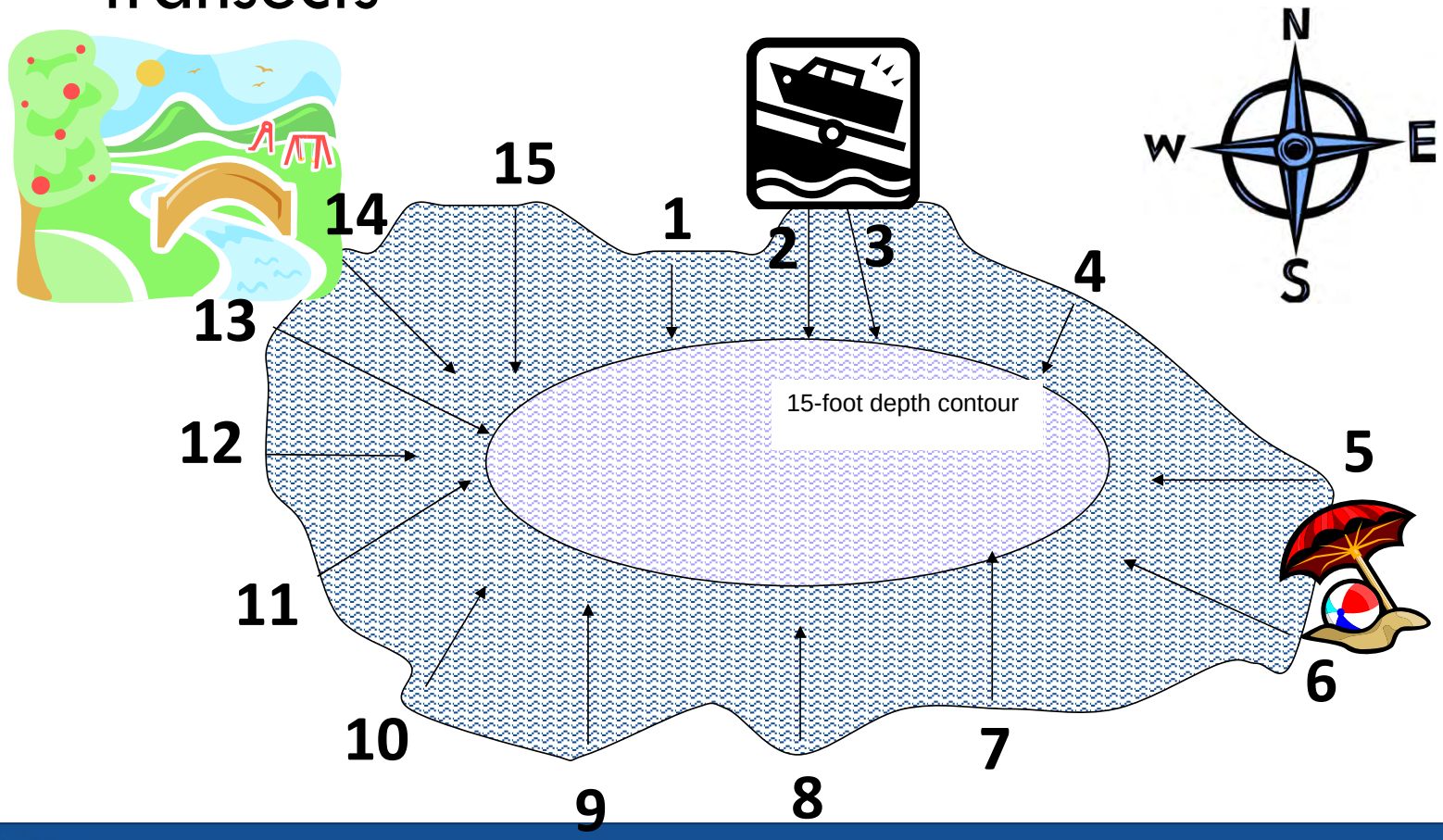
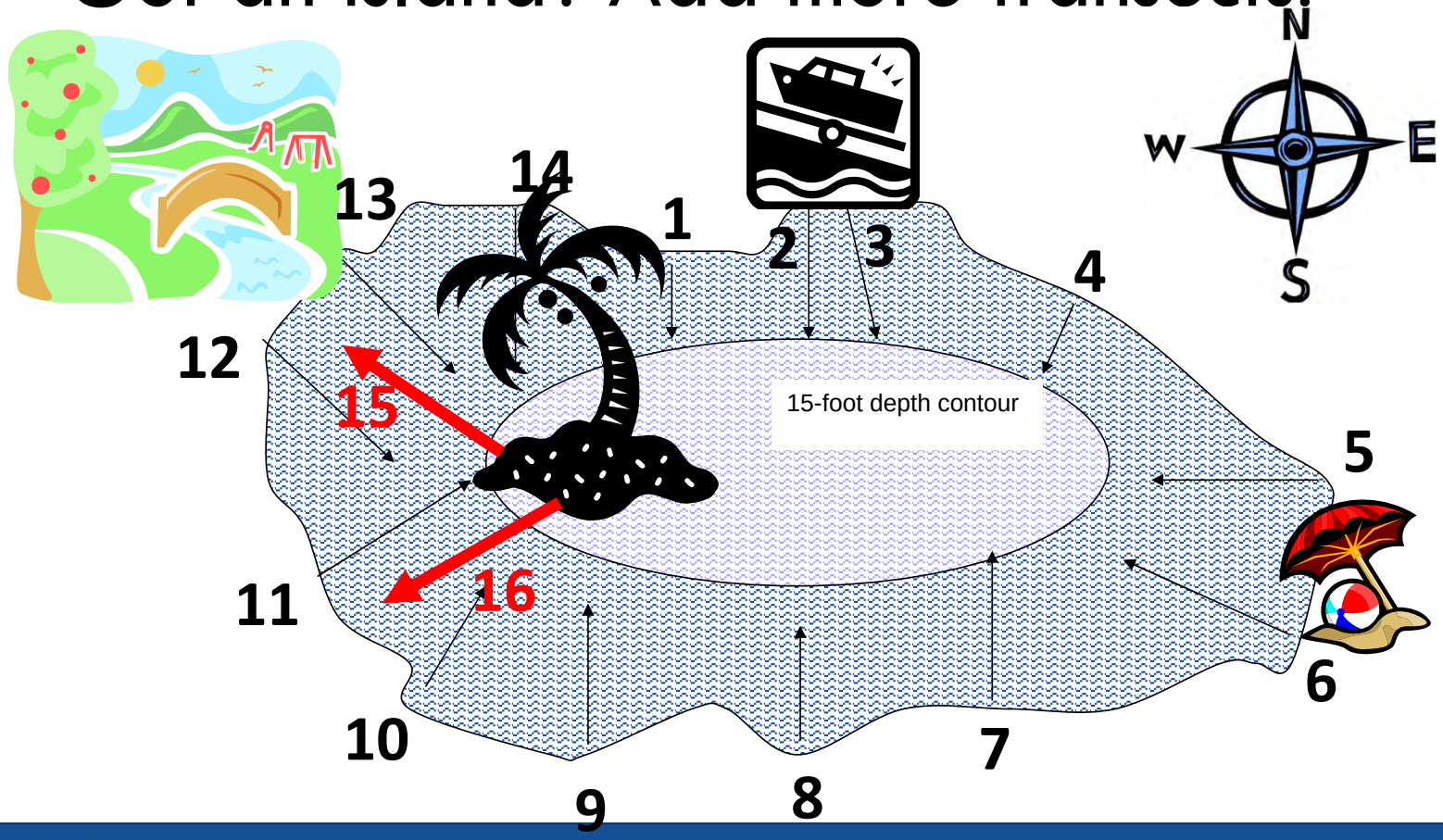
Example Lake < 100 acres = 15 transects



How Many Transects?

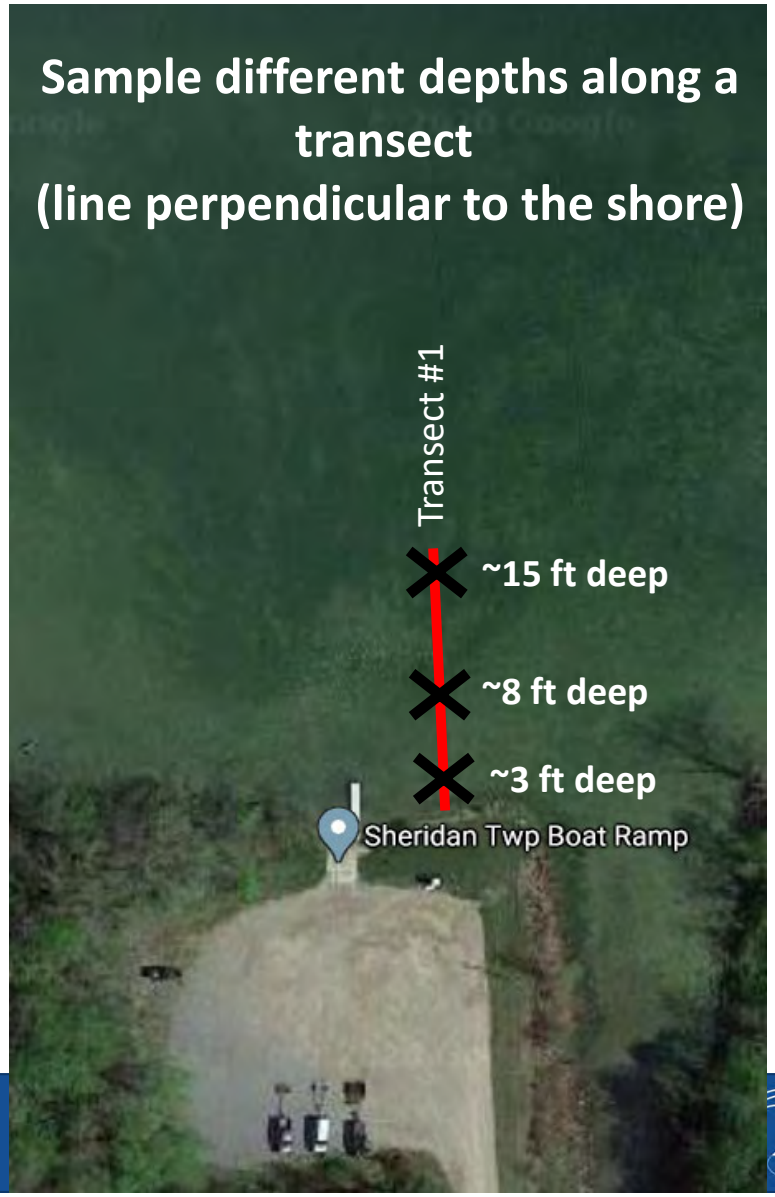
Lake Size (Acres)	**No. of Transects**
▪ Less than 100	▪ 5 to 15
▪ 100 to 500	▪ 15 to 30
▪ Over 500	▪ 30 to 50

Got an island? Add more transects!



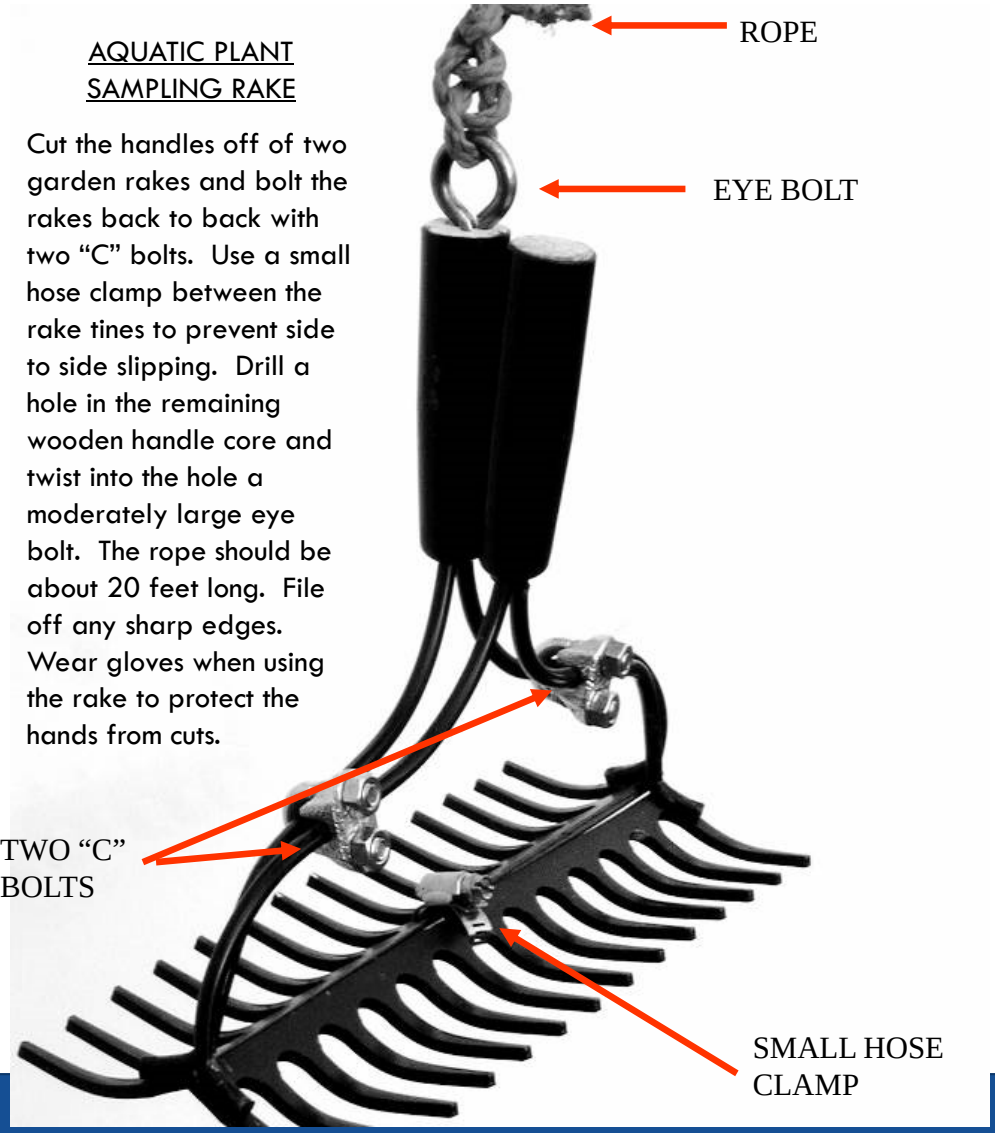
What is a transect?

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

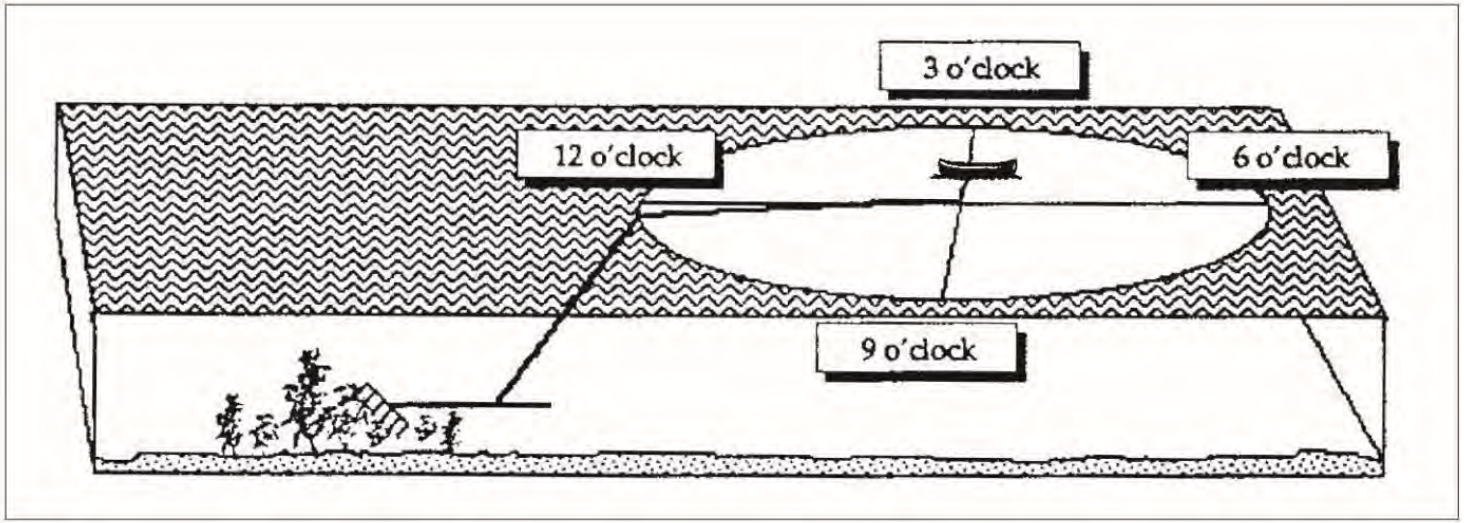


AQUATIC PLANT SAMPLING RAKE

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.



1. Pitch rake at each clock position and drag along lake bottom.
2. Haul rake back to boat.
3. Sort collected plants.



Adapted from: Simpson, J.T. 1991. Volunteer Lake Monitoring: a methods manual. EPA 440/4-91-002.

Example Field Recording Sheet

(p. 51)

Fig. 5.2. **Example field recording sheet.**

Lake name:	County name:
Sampling date:	
Names of volunteers:	

Density rating chart	
Rake recovery of aquatic plant	Density rating
Taken in all 4 casts (teeth of rake full)	Dense (D)
Taken in 4 casts	Heavy (H)
Taken in 3 casts	Moderate (M)
Taken in 2 casts	Sparse (S)
Taken in 1 cast	Found (F)

Transect line no. _____

Position on transect line

1 foot ☐

4 foot ☐

8 foot ☐

Plant name or identification number, if known	Collected in 12 o'clock position	Collected in 3 o'clock position	Collected in 6 o'clock position	Collected in 9 o'clock position	Density rating

Transect line no.	Position on transect line
3	1 foot ☐ 4 foot ☐ 8 foot ☒

Plant name or identification number, if known	Collected in 12 o'clock position	Collected in 3 o'clock position	Collected in 6 o'clock position	Collected in 9 o'clock position	Density rating
Chara	X	X			
Coontail	X	X	X	X	

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Aquatic Plant Density Rating

Dense	Species fills rake in all 4 casts
Heavy	Species found, mixed with other plants, in all 4 casts
Moderate	Species found in 3 casts
Sparse	Species found in 2 casts
Found	Species found in 1 cast

Transect line no.	Position on transect line
3	1 foot ☐ 4 foot ☐ 8 foot ☒

Plant name or identification number, if known	Collected in 12 o'clock position	Collected in 3 o'clock position	Collected in 6 o'clock position	Collected in 9 o'clock position	Density rating
Stonewort	X	X			Sparse
Coontail	X	X	X	X	Heavy/ Dense

Transect line no.	Position on transect line
3	1 foot ☐ 4 foot ☐ 8 foot ☒

Plant name or identification number, if known	Collected in 12 o'clock position	Collected in 3 o'clock position	Collected in 6 o'clock position	Collected in 9 o'clock position	Density rating
Stonewort	X	X			Sparse
Coontail	X	X	X	X	* Moderate

* Found on all rake throws but only in minor amounts.

How to Show Your Data

- 45 field sheets not very practical
- Map: Shows distribution
- Table: Shows relative abundance
- Do both!

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p. 55

Box 5.3. **Aquatic Plants Numbered by Growth Pattern.**

Free floating

1 - Watermeal	(0)
2 - Star duckweed	(0)
3 - Lesser duckweed	(0)
4 - Big duckweed	(0)

Shoreline (emergent)

6 - Cattail	(+)
7 - Bulrush	(+)
8 - Arrow arum	(+)
9 - Arrowhead	(+)
10 - Pickerelweed	(+)
11 - Smartweed	(+)
12 - White water lily	(+)
13 - Yellow water lily	(+)
14 - Water shield	(+)

Low growing (1 to 3 feet)

20 - Stonewort	(+)
21 - Bushy pondweed	(+)
22 - Fern pondweed	(+)

Mid-water growing (2 to 5 feet)

30 - Large-leaf pondweed	(+)
31 - Variable pondweed	(+)
32 - Thin-leaf pondweed	(+)
33 - Flat-stemmed pondweed	(+)
34 - Wild celery	(+)
35 - Water star grass	(+)
36 - Waterweed	(+)

Tall growing (4 to 10 feet); open scattered growth pattern

40 - Native milfoil	(0/–)
41 - Coontail	(0/–)
42 - Clasping-leaf pondweed	(0)
43 - Floating-leaf pondweed	(+)
44 - Whitestem pondweed	(0)
45 - American pondweed	(+)
46 - Illinois pondweed	(+)
47 - Water marigold	(0)
48 - Bladderwort	(0)
49 - Buttercup	(0)

Tall growing (4 to 10 feet); dense canopy growth pattern

50 - Eurasian milfoil	(–)
51 - Curly-leaf pondweed	(–)
52 - Sago pondweed	(0/–)
53 - Hydrilla	(–)

(+) = generally beneficial, (0) = generally neutral, (–) generally a nuisance

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Data Codes for Your Map

Transect 5

1-foot depth: White water lily (Sparse), Stonewort (Found)

4-foot depth: Stonewort (Found), Large-leaf pondweed (Sparse), Coontail (Sparse)

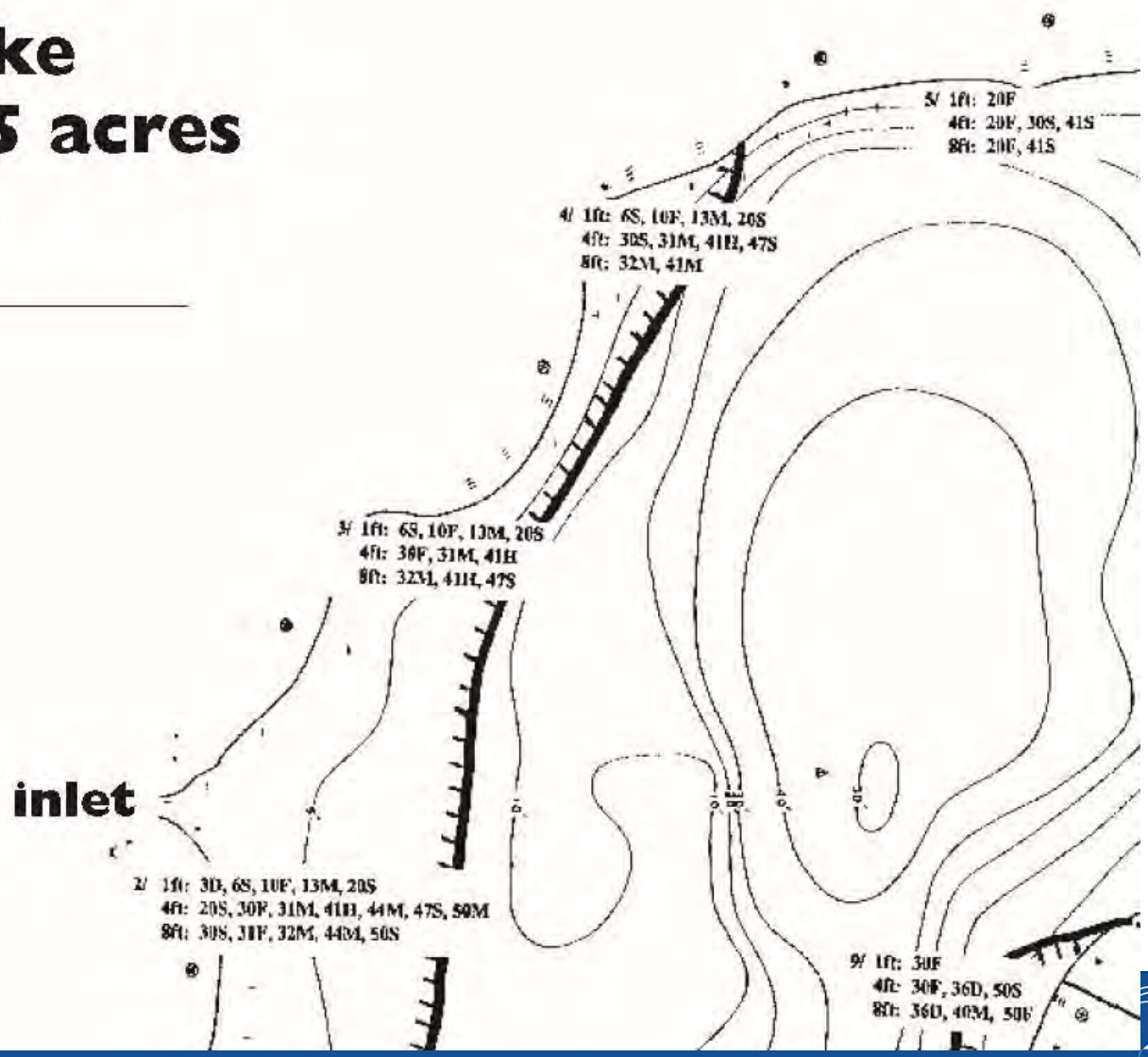
8-foot depth: Wild celery (Sparse), Native milfoil (Moderate), Illinois pondweed (Sparse)

Becomes...

5/ 1ft: 12S, 20F
4ft: 20F, 30S, 41S
8ft: 34S, 40M, 46S

Ideal Lake
area 135 acres

Date sampled _____



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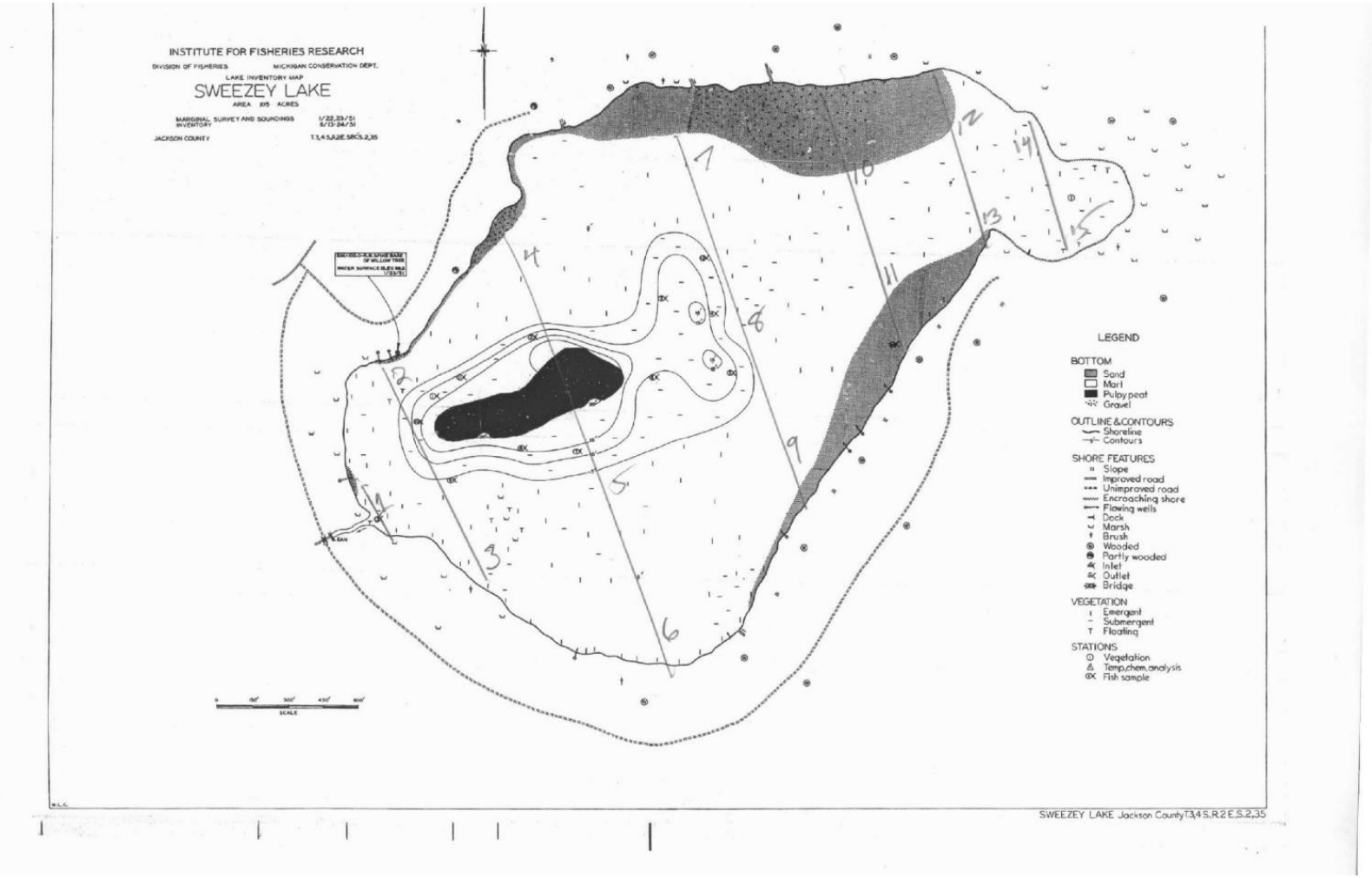
Mapping Options: By Hand



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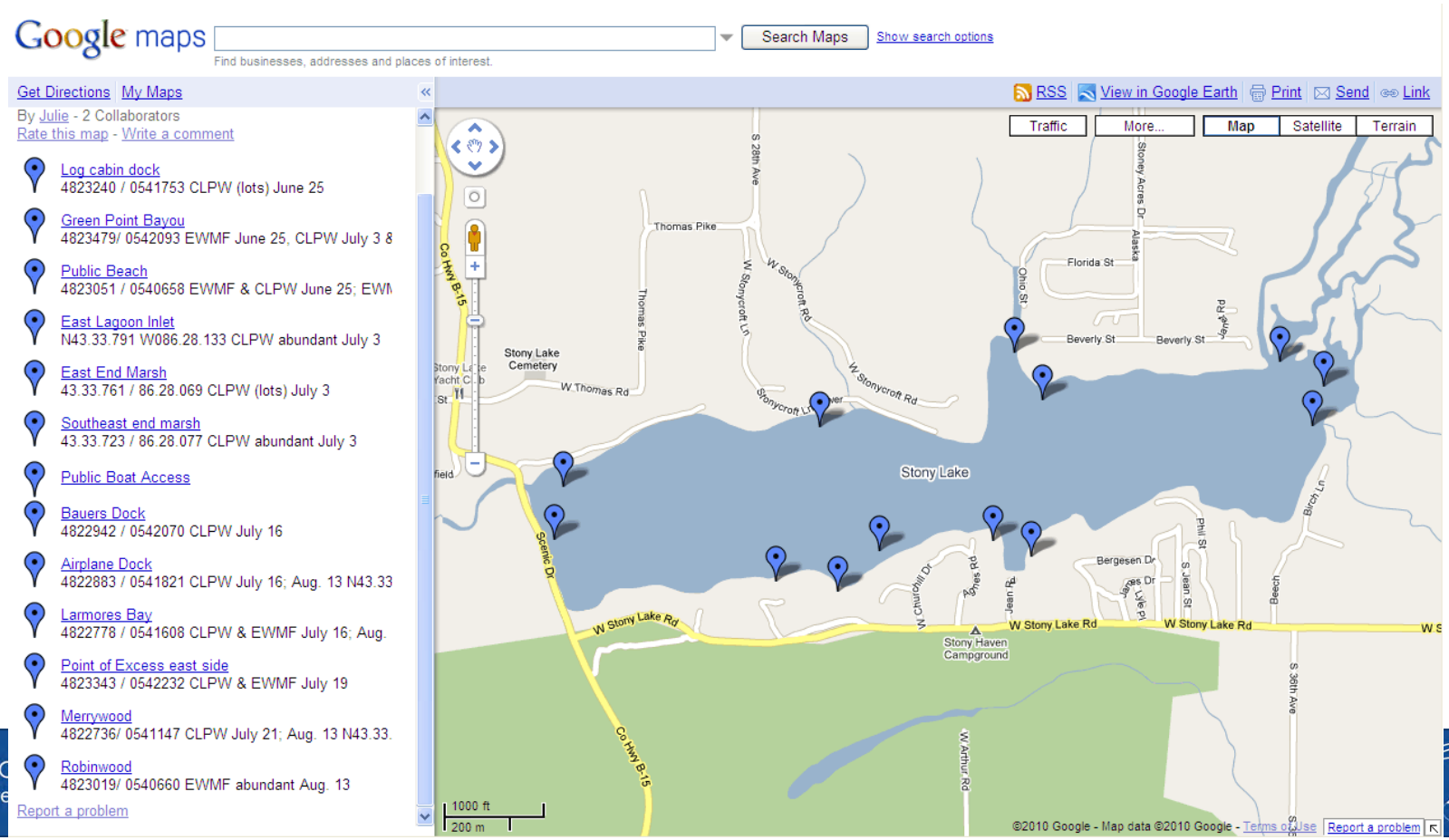
Mapping Options: Google Maps



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Mapping Options: Google Earth

Example Data Table

(p. 58)

Fig. 5.6. **Example data sheet.**

Lake name/county			Sampling date	
Data sheet for:	Whole lake	Near shore	Mid-depth	Deep water
Number of transects			Number of sampling sites	

Plant number	Plant name	Distribution (number of sites where observed)	Average density

Other plants known to be in the lake at the time of the survey but not collected in the survey.

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Example Data Sheet Calculation

(p. 57)

There were 15 sampling transects in the lake, giving 45 sampling sites. Coontail was present 19 sites in the densities identified below.

Density	Number of observations	Multiplication factor	Total density points
Found	2	1	2
Sparse	10	2	20
Moderate	2	3	6
Heavy	3	4	12
Dense	2	5	10
TOTAL	19		50

50 (total density points) / 45 (sampling sites)
= 1.1 (lakewide density rating)

An average lakewide density rating of 1.1 is slightly above the "found" level.

Record observations 19 and average lakewide density rating (1.1) on the data sheet.

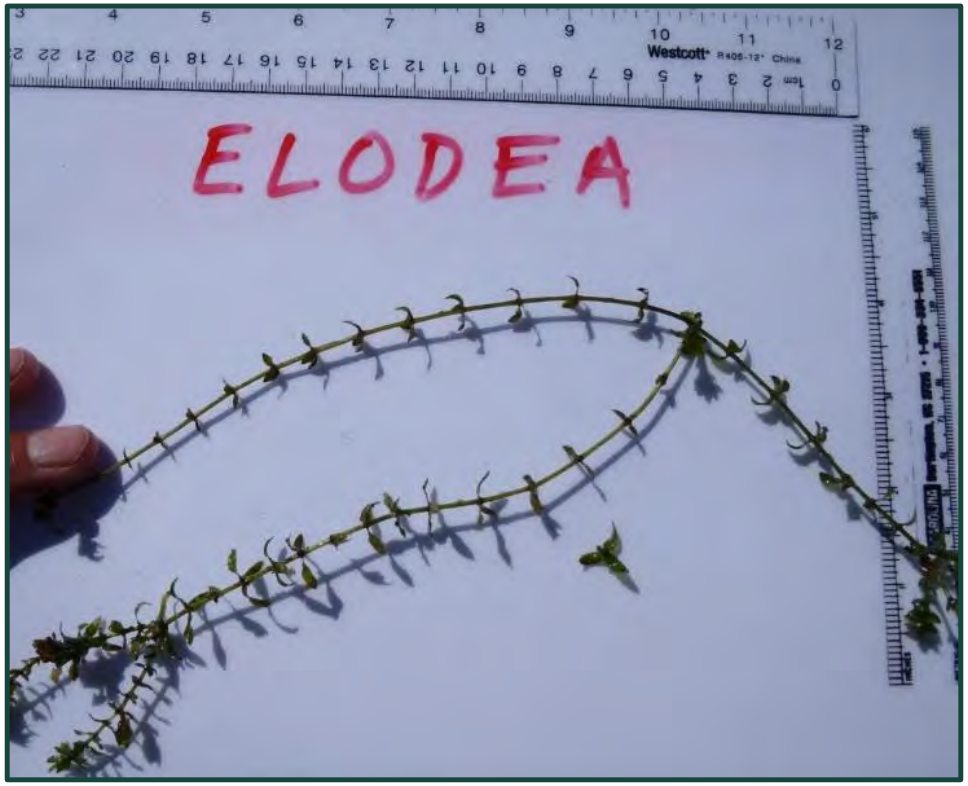
Plant number	Plant name	Distribution (number of sites where observed)	Average density
41	Coontail	20	1.1
20	Stonewort	23	0.9

Other plants known to be in the lake at the time of the survey but not collected in the survey
36 Waterweed

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



No ruler? A hand will do!

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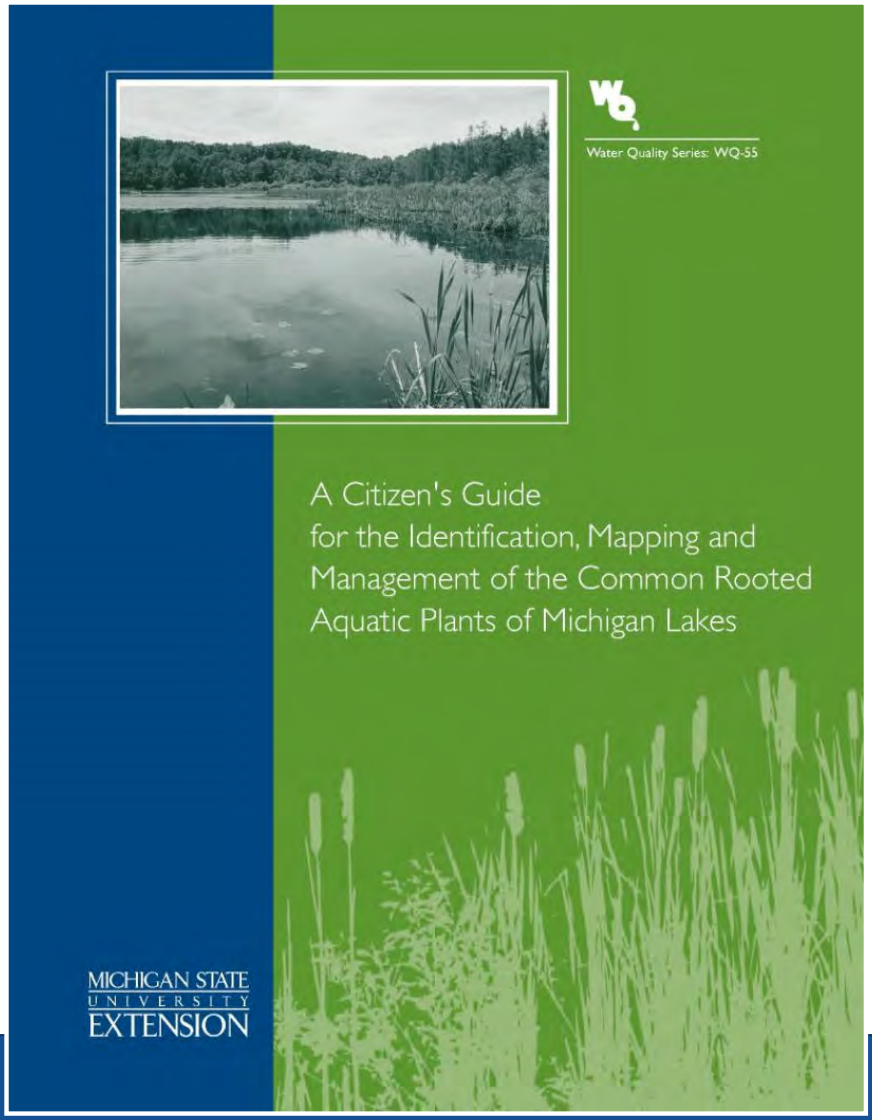
Submitting Your Data

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 report and map
   b. Any photographs

Available Resources



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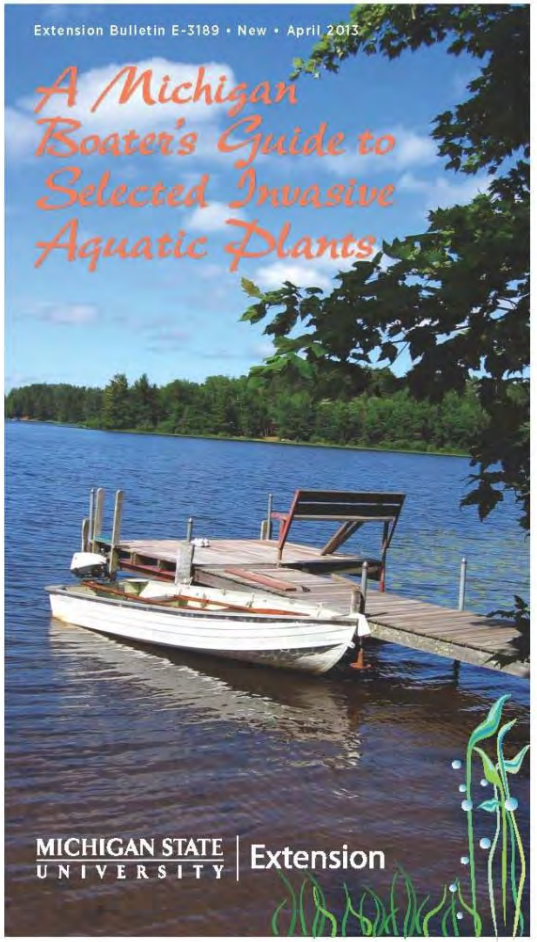
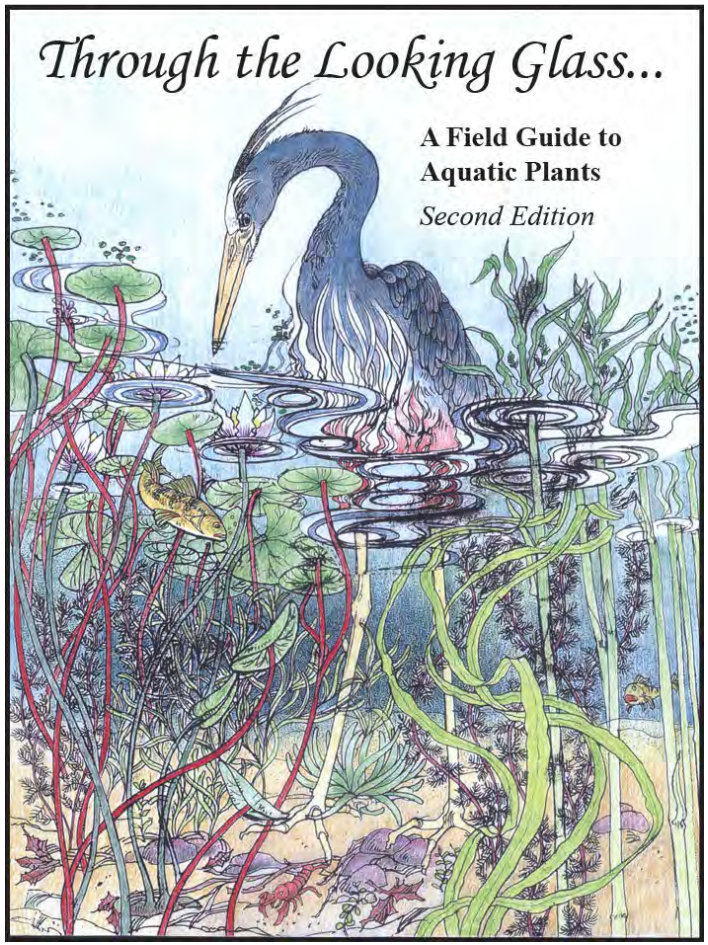


University of Wisconsin-Extension Lakes or Amazon

$29.95

www.uwsp.edu/uwexlakes



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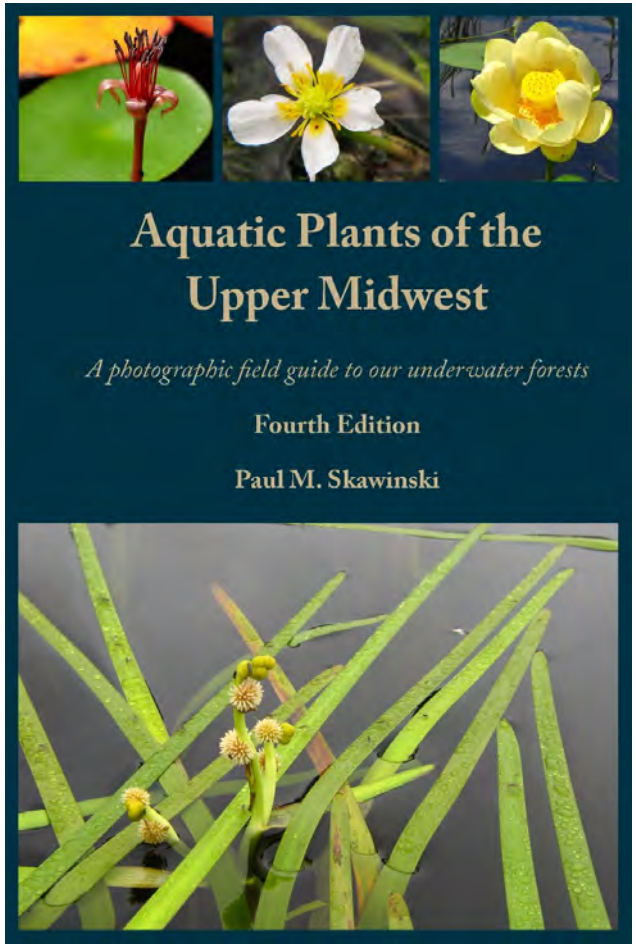
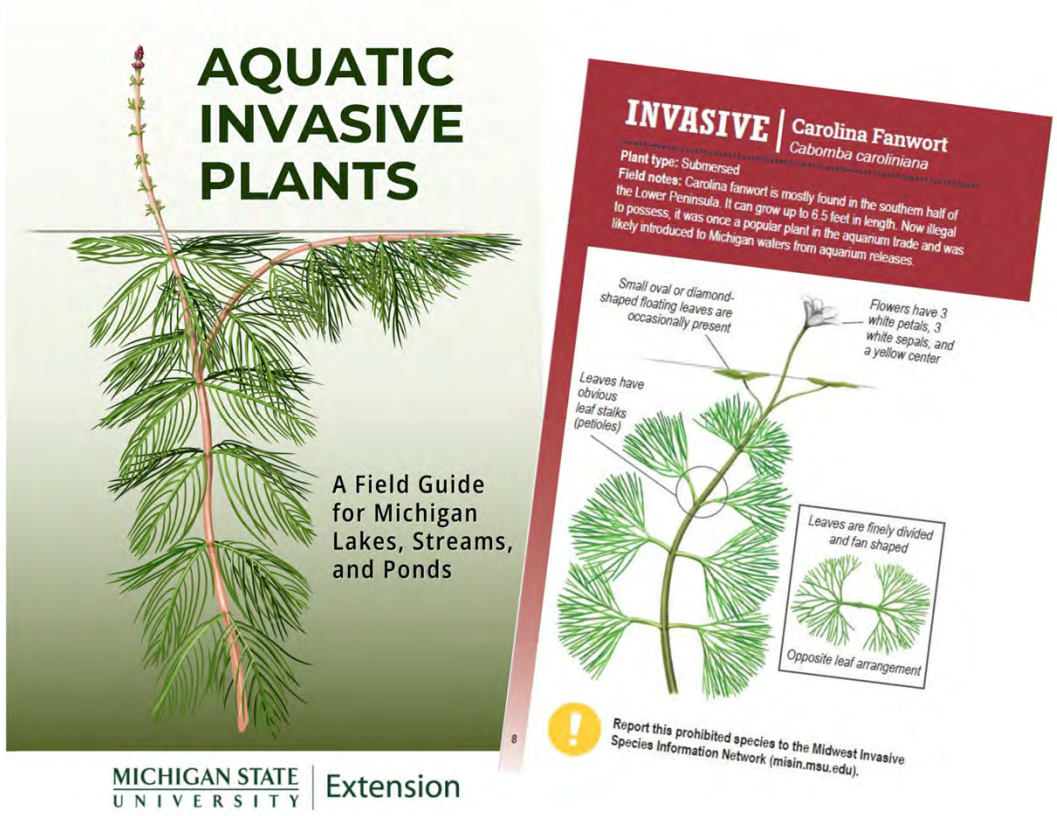


New identification cards

- Pick them up for free today
- Large quantities available for organizations

Coming soon…

- "Aquatic Invasive Plants: A Field Guide for Michigan Lakes, Streams, and Ponds" from MSU Extension
- Available now for free download
- In print later this year



Field visits for first-time lakes

Questions?

To learn more about the Cooperative Lakes Monitoring Program, visit:

MiCorps.net

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