Aquatic Plant Surveys: How and Why

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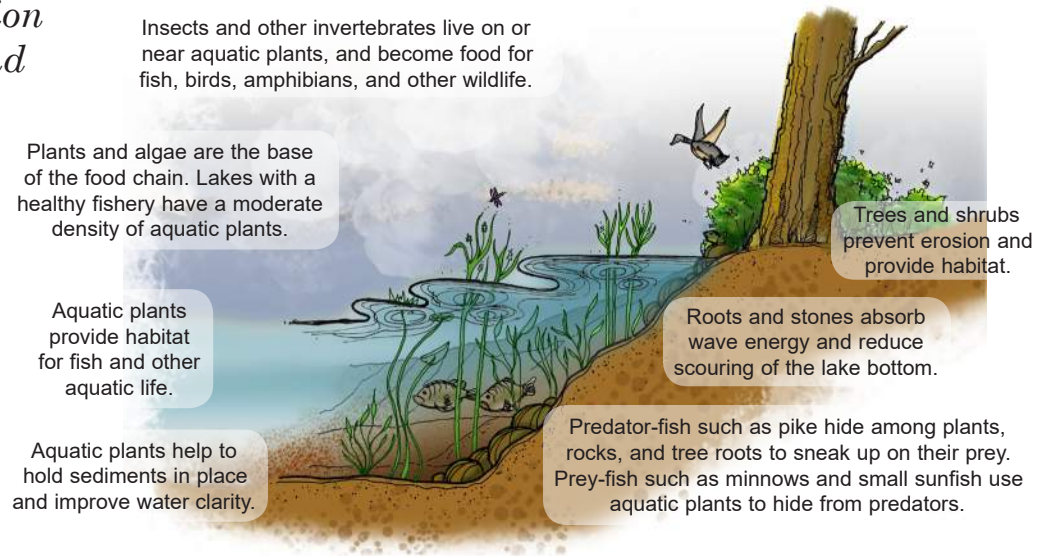
January 2018

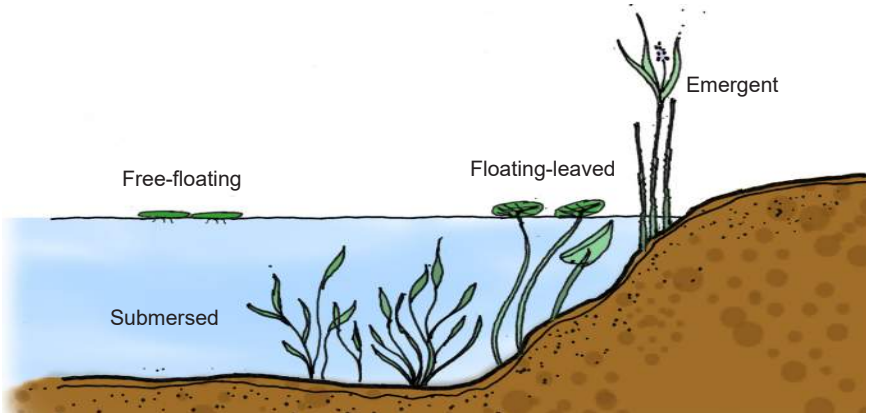
Aquatic plant surveys can provide valuable information about a lake. This publication provides background information about aquatic plants, aquatic plant survey methods, and explains how plant survey data may be useful in lake management and gauging lake health.

Aquatic plants are an important component of lakes ecosystems. They produce oxygen during photosynthesis, provide food, habitat and cover for fish, and help stabilize shoreline and bottom sediments.



The distribution and abundance of aquatic plants is dependent upon several variables including light penetration, bottom type, temperature, water levels, and the availability of plant nutrients. Rooted plants generally grow at depths of about 20 feet and less. In deep lakes, rooted plants are generally restricted to near-shore areas and along drop-offs. In shallow lakes, plants can colonize much of the bottomland and may be prevalent across the lake.

There are four main aquatic plant groups: submersed, floating-leaved, free-floating, and emergent. Usually, submersed plant species will be found in off-shore areas, while floating-leaved plants and free-floating are more common near shore. Emergent plants are found along the shoreline. Each plant group provides important ecological functions. Maintaining a diversity of aquatic plants is important to sustaining a healthy fishery and a healthy lake.



Invasive, exotic species are a statewide concern. If left unchecked, invasive species can outcompete beneficial native plants and spread quickly throughout a lake. Invasive species of primary concern in Michigan lakes include Eurasian milfoil, starry stonewort, and Phragmites. Eurasian milfoil and starry stonewort are submersed species and Phragmites is an emergent species.

Eurasian milfoil (*Myriophyllum spicatum*)

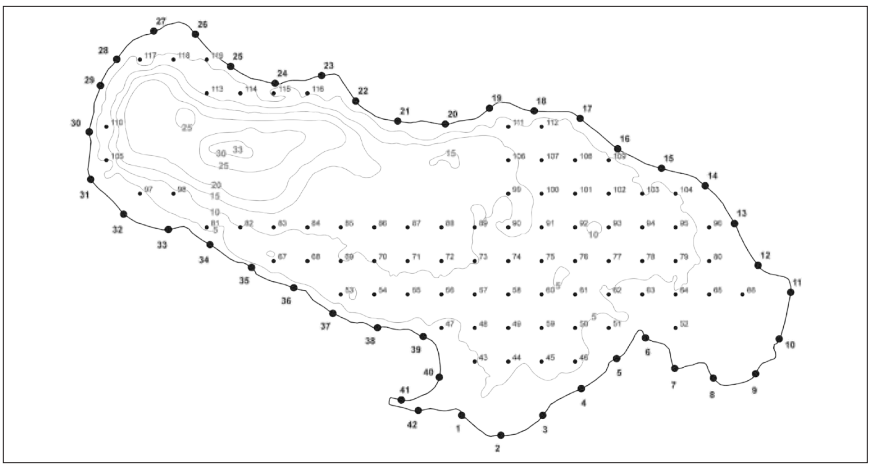
Starry stonewort (*Nitellopsis obtusa*)

Phragmites (*Phragmites australis*)

Aquatic Plant Surveys

Aquatic plant surveys can be beneficial for a variety of reasons. An aquatic plant survey can provide important information about the type and distribution of plants, detect the presence of invasive plant species, and help inform management decisions.

There are several aquatic plant survey methods. Some methods are relatively simple while some are more labor-intensive. With the widespread use of global positioning systems (GPS) in recent years, GPS-guided surveys are much more common. With this approach, GPS reference points or waypoints are established along the shoreline and the shallow-water portions of the lake, and plants are identified at each waypoint. This approach is referred to as the point-intercept method (Madsen and Wersal 2017). Many lake scientists rely on this method because it can provide reliable data that can be analyzed statistically.



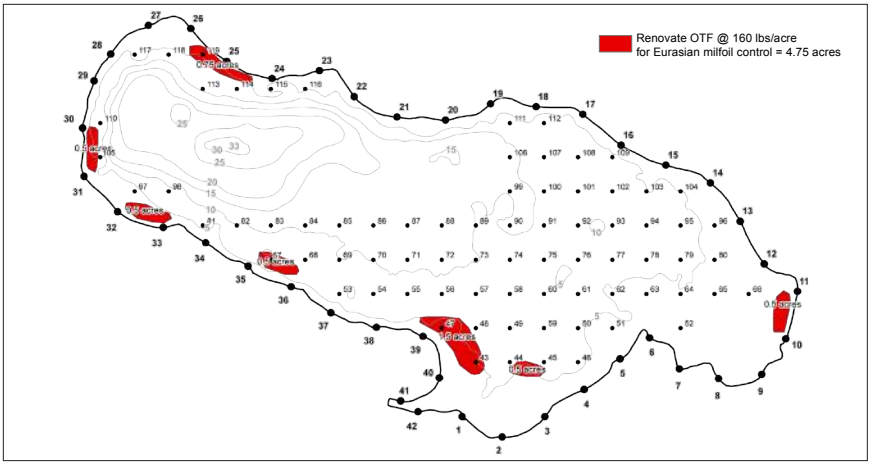
The map at the left shows the shoreline and off-shore GPS reference points on Clear Lake in Mecosta County. At each reference point, plant samples are collected to evaluate plant types.

Once plant types at each of the reference points in the lake have been identified, the information can be tabulated and the percent frequency of each plant species calculated. Percent frequency is the number of sites (or percent of sites) where each plant species is found, as shown in the table below. Annual plant surveys can be used to monitor changes in plant composition and location over time.

CLEAR LAKE AQUATIC PLANTS
June 15, 2015

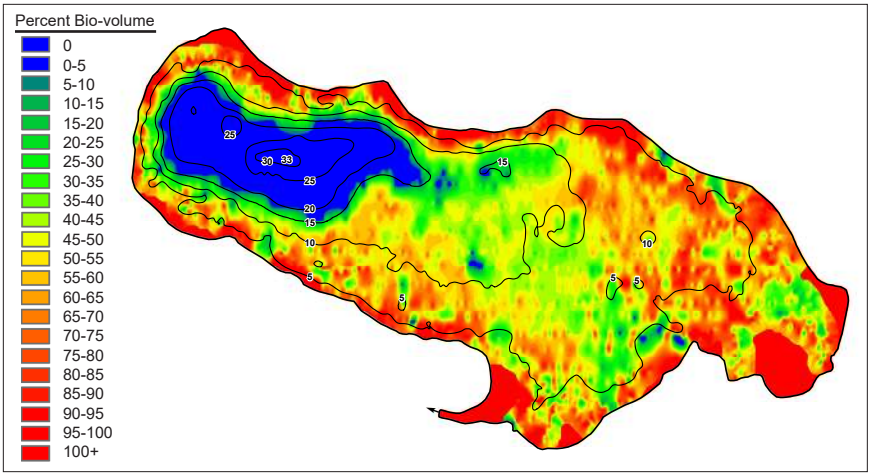
Common Name	Scientific Name	Group	Percent of Sites Where Present
Variable pondweed	*Potamogeton gramineus*	Submersed	83
Eurasian milfoil	*Myriophyllum spicatum*	Submersed	79
Robbins pondweed	*Potamogeton robbinsii*	Submersed	30
Large-leaf pondweed	*Potamogeton amplifolius*	Submersed	30
Elodea	*Elodea canadensis*	Submersed	26
Chara	*Chara* sp.	Submersed	25
Slender naiad	*Najas flexilis*	Submersed	18
Mini bladderwort	*Utricularia minor*	Submersed	10
Flat-stem pondweed	*Potamogeton zosteriformis*	Submersed	5
Sago pondweed	*Stuckenia pectinata*	Submersed	1
Water shield	*Brasenia schreberi*	Floating-leaved	39
White waterlily	*Nymphaea odorata*	Floating-leaved	17
Yellow waterlily	*Nuphar* sp.	Floating-leaved	9
Floating-leaf pondweed	*Potamogeton natans*	Floating-leaved	1
Arrowhead	*Sagittaria latifolia*	Emergent	12
Cattail	*Typha* sp.	Emergent	9
Bulrush	*Scirpus* sp.	Emergent	3
Arrow arum	*Peltandra virginica*	Emergent	1

One of the important uses of plant survey data is to identify the location of invasive plant species. With the use of GPS, herbicide treatments or other plant control methods can be targeted more accurately.



Clear Lake treatment map June 2017

Another plant survey tool that is gaining popularity is hydro-acoustic plant mapping. With this technique, a specially-equipped depth finder is used to map the location of plant beds and measure the height of the plants in the water column. Hydro-acoustic mapping can be coupled with a point-intercept survey to identify plant types and locations.



Clear Lake bio-volume map June 2015

Periodic monitoring of aquatic plants is an important element of a long-term lake management strategy. Plant surveys can provide valuable information regarding plant diversity, invasive plant introductions, fishery habitat and lake health. In lakes undergoing plant control, plant surveys are essential to informing management decisions and the efficacy and impacts of plant control measures.

Reference:

Madsen, J.D. and R.M. Wersal. 2017. A Review of Aquatic Plant Monitoring and Assessment Methods. Journal of Aquatic Plant Management 55: 1-12.