Hardwood Lake
Aquatic Plant Control Program
Annual Activity Summary

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Hardwood Lake Improvement Board
P.O. Box 358
Prescott, MI 48756-0358

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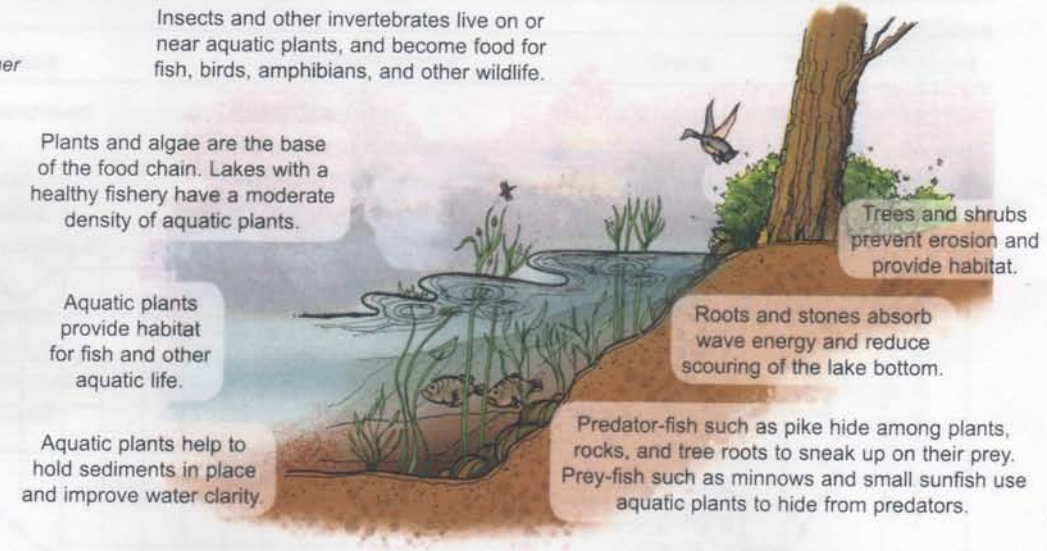
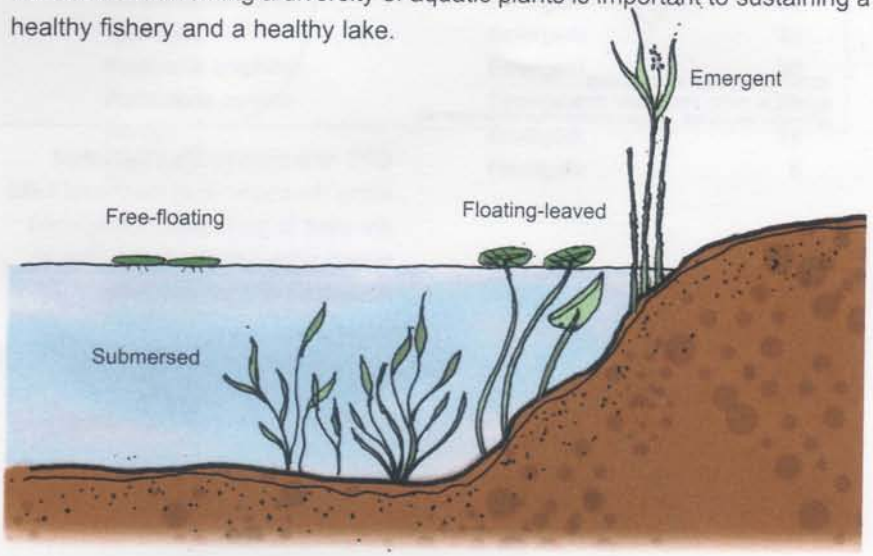
Since 1996, a nuisance plant control program has been ongoing on Hardwood Lake. The primary objective of the program is to prevent the spread of invasive aquatic plants while preserving beneficial plant species. The program is financed through special assessment of lake residents in accordance with the Lake Improvements portion of the Natural Resources and Environmental Protection Act. This report contains an overview of plant control activities conducted on Hardwood Lake in 2018.

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

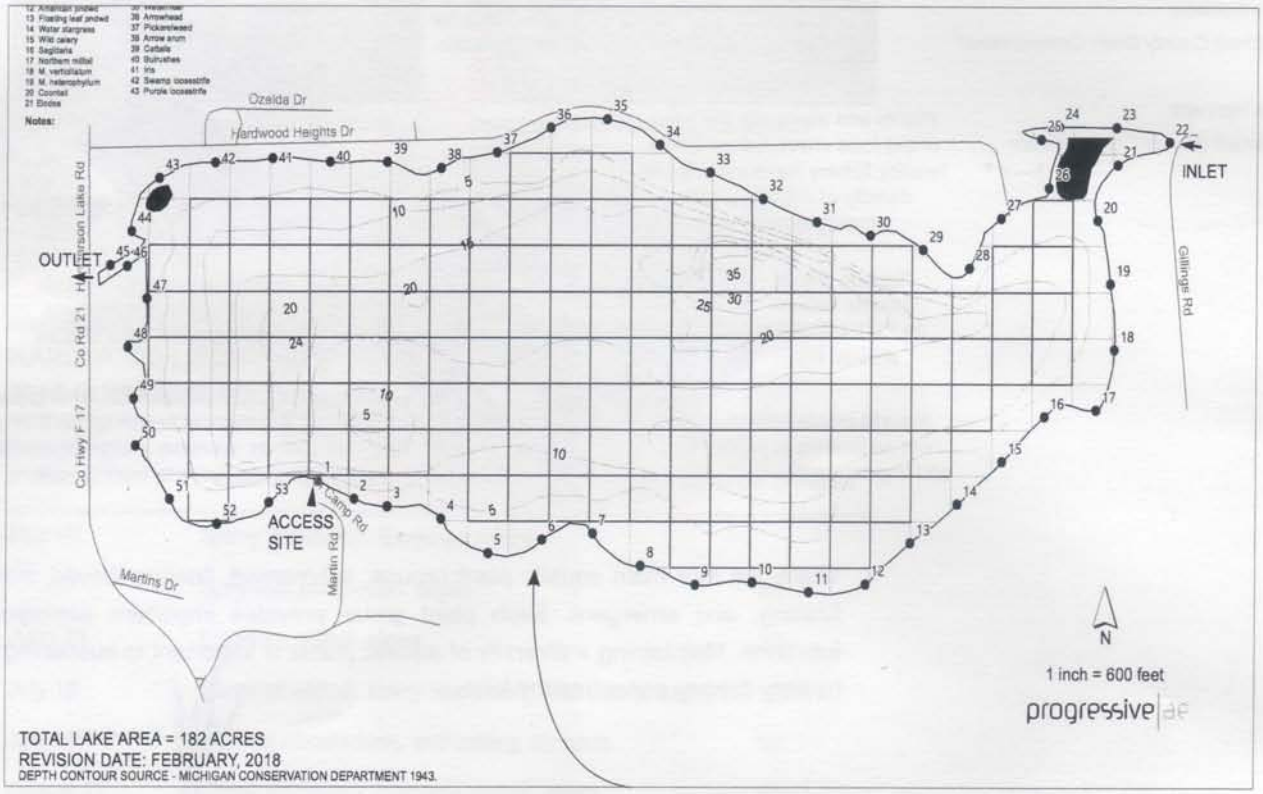


There are four main aquatic plant groups: submersed, floating-leaved, free-floating, and emergent. Each plant group provides important ecological functions. Maintaining a diversity of aquatic plants is important to sustaining a healthy fishery and a healthy lake.



Environmental Consultant
Progressive AE

Plant control in Hardwood Lake involves the select use of herbicides and mechanical harvesting to control invasive plant growth. Plant control activities are coordinated under the direction of an environmental consultant, Progressive AE. Biologists from Progressive conduct GPS-guided surveys of the lake to identify problem areas, and detailed treatment maps are provided to the plant control contractors, Aquatic Services for treatments and West Michigan Aquatic Weed Removal for mechanical harvesting. Follow-up surveys are conducted throughout the growing season to evaluate results and the need for additional treatments. In 2018, surveys of the lake were conducted on May 17, June 14, July 12, July 25, and August 16.



GPS reference points established along the shoreline of Hardwood Lake are used to guide plant surveys and to accurately identify the location of nuisance plant growth areas.

In addition to the surveys of the lake to identify invasive plant locations, a vegetation survey of Hardwood Lake was conducted on August 16, 2018 to evaluate the type and abundance of all plants in the lake. The table below lists each plant species observed during the survey and the relative abundance of each. At the time of the survey, 10 submersed species, two free-floating species, two floating-leaved species, and 6 emergent species were found in the lake. Hardwood Lake maintains a good diversity of beneficial, native plants species.

HARDWOOD LAKE AQUATIC PLANTS
August 16, 2018

Common Name	Scientific Name	Group	Percent of Sites Where Present
Thin-leaf pondweed	*Potamogeton* sp.	Submersed	78
Wild celery	*Vallisneria americana*	Submersed	34
Slender naiad	*Najas flexilis*	Submersed	24
Eurasian milfoil	*Myriophyllum spicatum*	Submersed	22
Large-leaf pondweed	*Potamogeton amplifolius*	Submersed	14
Coontail	*Ceratophyllum demersum*	Submersed	10
Water stargrass	*Heteranthera dubia*	Submersed	8
Flat-stem pondweed	*Potamogeton zosteriformis*	Submersed	2
Curly-leaf pondweed	*Potamogeton crispus*	Submersed	2
Starry stonewort	*Nitellopsis obtusa*	Submersed	2
Duckweed	*Lemna minor*	Free-floating	8
Watermeal	*Woffia* sp.	Free-floating	2
White waterlily	*Nymphaea odorata*	Floating-leaved	96
Yellow waterlily	*Nuphar* sp.	Floating-leaved	64
Bulrush	*Schoenoplectus* sp.	Emergent	32
Cattail	*Typha* sp.	Emergent	30
Water smartweed	Persicaria amphibia	Emergent	30
Pickerelweed	*Pontederia cordata*	Emergent	28
Iris	*Iris* sp.	Emergent	14
Arrowhead	*Sagittaria latifolia*	Emergent	6

Primary plants targeted for control in Hardwood Lake include Eurasian milfoil and starry stonewort. Both of these plants are non-native (exotic) species that tend to be highly invasive and have the potential to spread quickly if left unchecked.

Eurasian milfoil (*Myriophyllum spicatum*)

Starry stonewort (*Nitellopsis obtusa*)

Plant control activities conducted on Hardwood Lake in 2018 are summarized in the table below.

HARDWOOD LAKE
2018 NUISANCE AQUATIC PLANT CONTROL SUMMARY

Treatment Date	Plants Targeted	Acres Treated
May 23	Starry stonewort, Eurasian milfoil, curly-leaf pondweed, algae	25
June 25	Eurasian milfoil, algae	23
July 18	Eurasian milfoil, starry stonewort, wild celery, algae	7
July 25	Harvest pondweeds, wild celery, lily pads	12
August 27	Starry stonewort, Eurasian milfoil, algae	27
September 19	Phragmites	1
Total		95

More information on Hardwood Lake can be found on the Hardwood Lake Association's website (www.hardwoodlake.org).