



McMAHON LAKE, SCOTT COUNTY: 2015 AQUATIC VEGETATION SURVEY

Report by the Invasive Species Program – Division of Ecological and Water Resources
Minnesota Department of Natural Resources

Lake: McMahan (DOW#70005000)
Lake Surface Area: 136 acres
Littoral Area: 110 acres
County: Scott
Survey Type: Point-intercept
Date of Survey (most recent): May 15, 2015
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Summary Table. Summary of aquatic submersed plants in McMahan Lake, Scott County, MN (DOW# 70005000) as indicated by results of Point-Intercept surveys. Values were calculated from littoral depth range (0-15 feet).

Survey Date	Treatment [W, P, N]	% Frequency of CLP*	Max Plant Growth Depth in feet [95%] [†]	% Points w/ Native Taxa	Mean Native Submersed Taxa/Point	# Submersed Taxa	Secchi Depth [m]
MAY 2014	P	68	15	31	0.5	7	1.6
MAY 2015	P	51	11	20	0.3	5	1.7

Treatment: W (whole lake), P (partial lake), N (no treatment)

*CLP is short for curly-leaf pondweed

[†]95th percentile calculated based on all vegetated sampling points

Taxa refers to groups of submersed aquatic plant species or genera

2015 Summary: The most recent aquatic vegetation point-intercept survey of McMahan Lake (DOW# 70005000) was completed on May 15, 2015. Plants were present throughout the lake to a maximum depth of 3.3 meters (11 feet). Within the littoral zone (zone in lake from the 0-4.5 meter (0-15 feet) depth range, 20% of sample points contained native submersed taxa. The average number of native submersed species per sample point was 0.3. Five submersed plant

species were documented during the 2015 survey and include two invasive plant species: Eurasian watermilfoil and curly-leaf pondweed (see **Summary Table** for historic data summary). Since 2014, curly-leaf pondweed has been managed in the west bay adjacent to the public access.

Lake Description:

McMahon Lake is a 136-acre lake located four miles south of Prior Lake, Minnesota in Spring Lake Township in the North Central Hardwoods Forest ecoregion. It has two invasive aquatic plant species: Eurasian watermilfoil (*Myriophyllum spicatum*, abbreviated as EWM) and curly-leaf pondweed (*Potamogeton crispus*, abbreviated as CLP). The maximum depth of water is 4.3 meters (14 feet, NOTE- lake levels were higher than average at the time of survey). Approximately 81% of the lake is littoral (water depth from 0-4.5 meters (0-15 feet) deep, where aquatic plants are likely to be found). Seasonal water clarity has remained the same over the past 3 years (see **Table 1-Secchi Averages** below for historic Secchi disk observations). For more information on water quality in McMahon Lake see: <http://cf.pca.state.mn.us/water/watershedweb/wdip/waterunit.cfm?wid=70-0050-00>

Table 1-Secchi Averages. Average Secchi disk observations in meters for McMahon Lake (DOW# 70005000). Data gathered from the Metropolitan Council Environmental Services.

YEAR	May	June	July	August	September	Average Secchi disk depth [May-Sept]
2013	3.0	3.0	1.5	1.0	0.5	1.8
2014	3.0	1.7	1.0	1.1	1.5	1.6
2015	3.2	2.2	1.6	0.7	1.0	1.7

Management History:

McMahon Lake is classified as a natural environment lake. In 2014, the DNR granted a 2-year variance to control curly-leaf pondweed using herbicide in 15% of the littoral area of the lake (west bay near the

public access). The most recent CLP herbicide treatment of 16.5 acres was organized by the Scott Watershed Management Organization in 2015 (see **Table 2-Invasive Plant Management Summary**).

Table 2-Invasive Plant Management Summary. Characteristics and history of herbicide treatment for McMahon Lake (DOW# 70005000, Total acres: 136, Littoral acres: 110, 15% Littoral acres: 16.5)

Date	Treatment [W,P,N]	Target Species	Total Acres Treated	Herbicide	Applicator
MAY 2014*	P	CLP	16.5	Endothall	PLM Lake and Land Mgmt Corp
MAY 2015*	P	CLP	16.5	Endothall	PLM Lake and Land Mgmt Corp

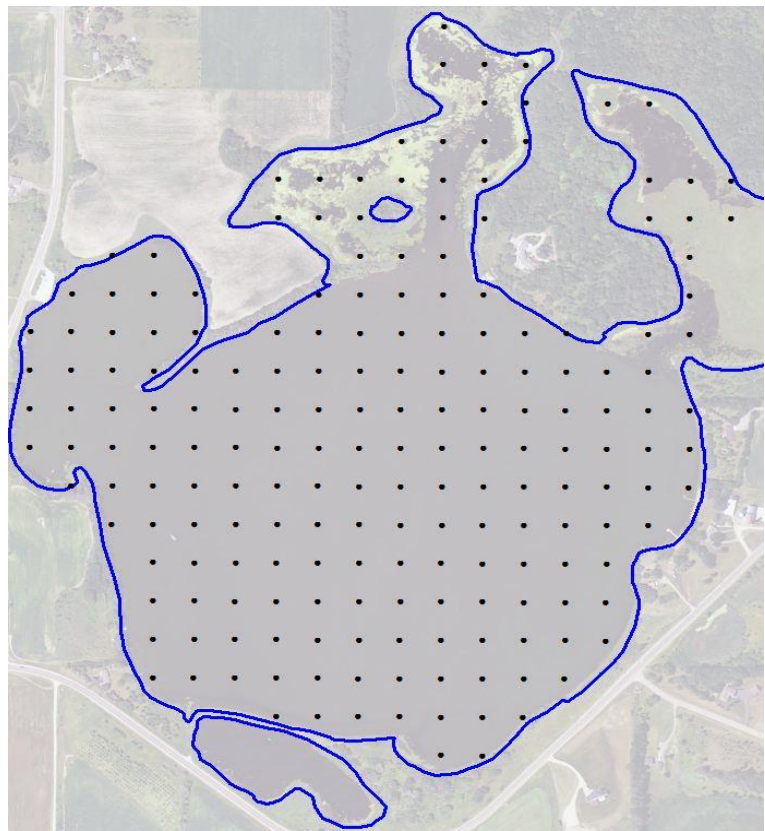
Treatment: W (whole lake), P (partial lake), N (no treatment)

CLP is an abbreviation for curly-leaf pondweed. EWM is an abbreviation for Eurasian watermilfoil

* variance year

Survey Objectives:

Point-intercept surveys were used to assess the distribution of aquatic plants in McMahon Lake. The primary purpose for this type of survey is to 1) develop baseline knowledge of the current plant community in a lake, and over time, 2) compare year to year plant variation (in plant presence and spatial location). Moreover, this survey will help the DNR and our partners to monitor native plant communities and evaluate possible responses to invasive aquatic plant management via herbicide control. It is important to note that distributions of aquatic plants may vary from year to year due to effects such as differences in weather, as well as the effects from management efforts.



Survey Methods:

We used a point intercept survey method developed by [Madsen 1999](#). Survey points were placed 60 meters apart using a Geographic Information System (GIS). This spacing allowed for placement of 187 points. Plant samples were collected by throwing and dragging a double-sided rake along the lake bottom at each point. Plant samples were assessed on the boat to determine species and density (scale of zero [no plants] to 4 [dense plant growth, matted on the surface]). Frequencies of occurrence percentages (i.e., how often a plant species was found in the lake) were calculated based on the littoral zone.

Survey Observations:

The MN DNR conducted a point-intercept survey for the first time on Lake McMahan in May 2014. Maximum depth of rooted vegetation was observed between 3.3-3.5 meters (11-15 feet) from 2014-2015 (see **Table 3-Point Intercept Metrics** for historical point-intercept survey calculations, **Table 4-Plant Frequency Occurrence** for individual plant species occurrences and **Figure 2** for plant growth depth ranges). Previous plant surveys (2007 & 2012) organized by Scott County Watershed Management Organization (SWMO) are not presented in this report but are available upon request. The spatial distribution of curly-leaf pondweed has remained constant from 2014-2015 however the rake density appears to have increased in 2015 (see **Figure 3**). In 2015, five submersed species were observed, including EWM and CLP. The native taxa were dominated by coontail and flat-stem pondweed.

Table 3-Point Intercept Metrics. Summary of point intercepts metrics for McMahan Lake, Scott (DOW# 70005000). Values outlined in grey were calculated from littoral depth range.

	Total # Points Sampled	Max Plant Growth Depth in feet [95%] [†]	# Point in Max Depth Range	% Points w/ Native Submersed Taxa	Mean Native Submersed Taxa/ Point	# Native Submersed Taxa	# Invasive Submersed Taxa
2014	187	15	113	31	0.5	5	2
2015	186	11	92	20	0.3	3	2

[†]95th percentile calculated based on all vegetated sampling points

Taxa refers to groups of submersed aquatic plant species or genera

Table 4-Plant Frequency Occurrence. Percent frequency of occurrence for submersed taxa (most identified to species) within the littoral zone (0-15 feet) in McMahon Lake, Scott (DOW# 70005000).

Year	Month	Number of Sample Points in Littoral	Surveyor	Invasive Aquatic Vegetation		Native Aquatic Vegetation	
				Eurasian watermilfoil	Curly- leaf pondweed	Coontail	Flat-stem pondweed
2014	19-May	117	MnDNR	7	68	26	18
2015	15-May	148	MnDNR	4	51	17	11

Most common plants include: Eurasian watermilfoil (*Myriophyllum spicatum*), Curly-leaf pondweed (*Potamogeton crispus*), Coontail (*Ceratophyllum demersum*), Flat-stem pondweed (*Potamogeton zosteriformis*)

Floating & Emergent plants observed: Forked duckweed (*Lemna trisulca*), Water smartweed (*Persicaria amphibia*), Hardstem bulrush (*Scirpus acutus*), Softstem bulrush (*Scirpus tabernaemontani*)

Less common (< 10% frequency) submersed vegetation observed: Leafy pondweed (*Potamogeton foliosus*) & Common bladderwort (*Utricularia macrorhiza*) in 2014; Canadian waterweed (*Elodea canadensis*) in 2014-2015.



Figure 1. Dense curly-leaf pondweed mats observed near the surface during 2015 PI survey. McMahon Lake, Scott County.

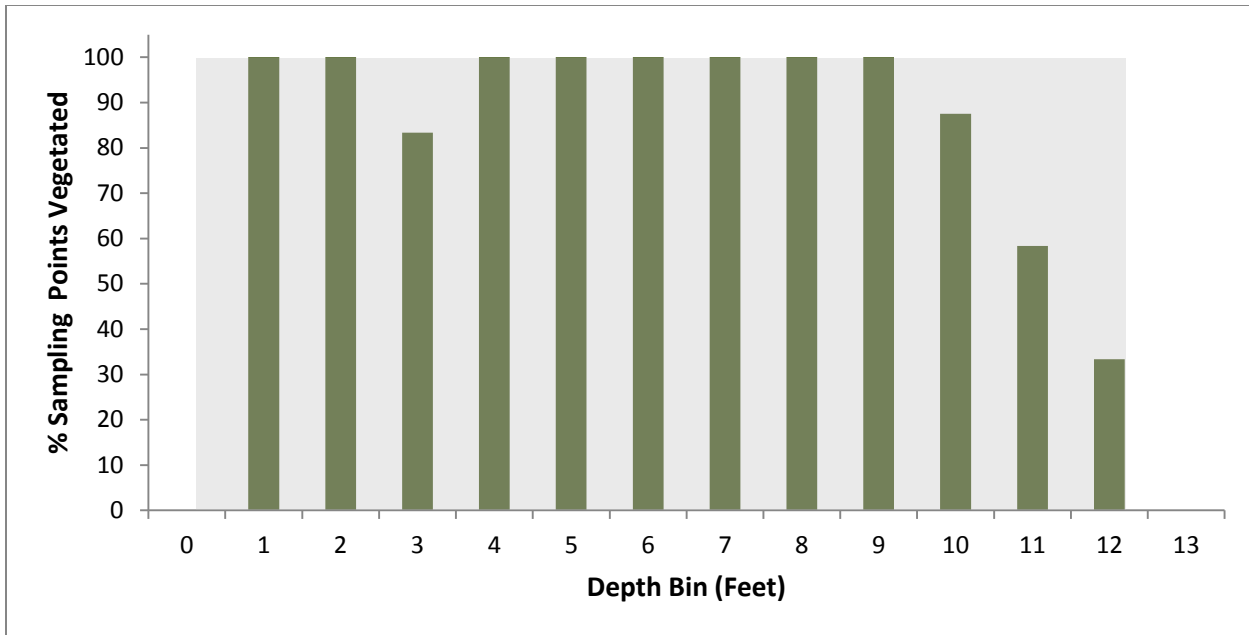


Figure 2. Maximum depth of plant colonization in feet during 2015 point intercept survey in Lake McMahon, Scott County (DOW# 70005000). Depths were binned in feet. Percent sampling points vegetated is defined as the number of sampling points with submersed vegetation divided by the total number of sampling points for each depth. Shaded area represents depth range of the 95th percentile of all submersed plants observed.

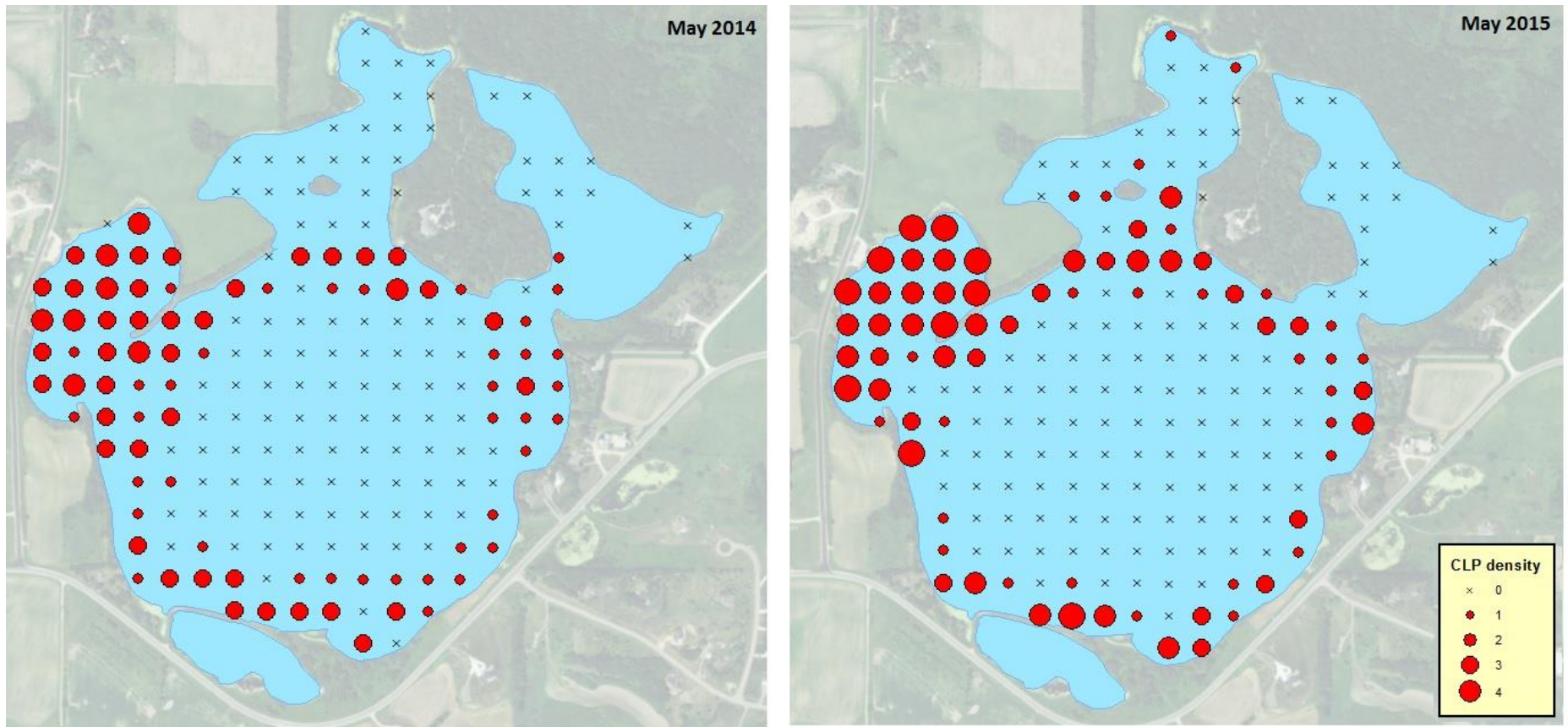


Figure 3. Spatial distribution and rake density rating of curly-leaf pondweed from 201-2015. Variance issued to control CLP from 2014-2015. Lake McMahon, Scott County (DOW# 70005000).

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