
LAKE JOHANNA, RAMSEY COUNTY: 2019 AQUATIC VEGETATION REPORT

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

Lake: Johanna (DOW# 62007800)

Lake Surface Area: 215 acres

Littoral Area: 93 acres

County: Ramsey

Survey Type: Point-intercept

Date of Survey (most recent): July 16, 2019

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2019 Summary:

The most recent aquatic vegetation point-intercept survey of Lake Johanna (DOW #62007800) was completed on July 16, 2019. Submersed plants were identified out to a maximum depth of 3.35 meters (11 feet). Within the littoral zone [zone in lake from the 0-15 foot depth range (0-4.5 meters)], 70% of sampled points contained native submersed taxa. The average number of native submersed taxa per sample point was 2.0. Fifteen submersed plant species were observed during the 2019 survey. Eurasian watermilfoil was first discovered in Lake Johanna in 2009 but has not presented a recreational nuisance and has been left unmanaged.

Summary Table. Summary of aquatic submersed plants in Lake Johanna, Ramsey County, Minnesota (DOW# 62007800) as indicated by results of point-intercept surveys. Values were calculated from littoral depth range (0-15 feet).

PI Survey Date	% Frequency of EWM*	Max Depth of Growth in feet [95%] [†]	% Points w/ Native Submersed Taxa	Mean Native Submersed Taxa/ Point	# Submersed Taxa	AVG Secchi Depth [m]
MAY 2009	2	14	69	1.0	6	2.7
JUL 2013	0	11	87	2.3	10	2.5
JUL 2019	20	11	70	2.0	15	2.9

*EWM is short for Eurasian watermilfoil

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

Taxa refers to groups of submersed aquatic plant species or genera

AVG- average Secchi depth (water clarity measurement) from May-September

Lake Description:

Lake Johanna is a 215-acre lake located near Arden Hills, Minnesota. 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 3.35 meters (11 feet). Approximately 43% of the lake is littoral. For more information on Lake Johanna water quality see <https://lakes.rs.umn.edu/#62007800>

Table 1-Secchi Averages. Average Secchi disk observations in meters for Johanna (DOW #62007800). Data gathered from Ramsey County Environmental Services.

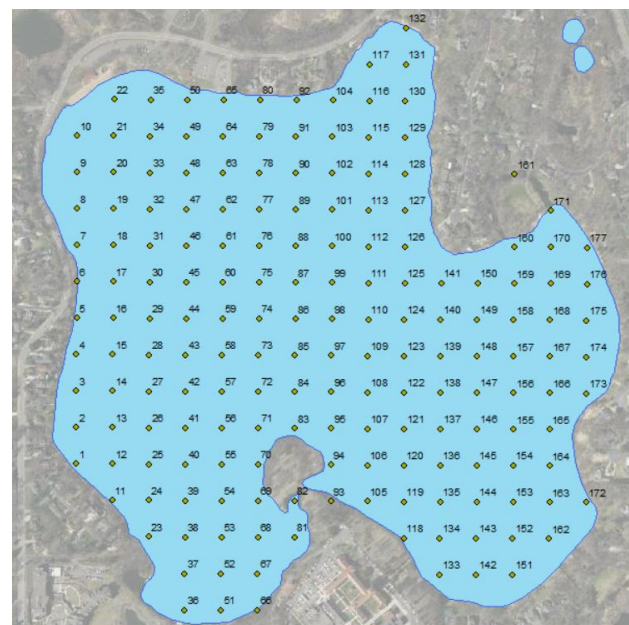
YEAR	MAY	JUNE	JULY	AUG	SEPT	Secchi Depth Average [May-Sept]
2009	4.8	3.1	1.6	1.8	2.1	2.7
2010	3.2	1.4	1.2	1.5	1.4	1.7
2011	2.0	3.3	2.4	1.0	1.0	1.9
2012	3.9	2.2	1.4	1.4	1.4	2.0
2013	1.6	4.1	1.8	2.3	2.9	2.5
2014	2.6	4.3	2.0	1.8	1.9	2.5
2015	5.9	3.1	1.7	1.5	1.5	2.7
2016	4.8	2.9	1.9	1.4	1.5	2.5
2017	3.2	2.6	1.7	1.5	1.7	2.1
2018	4.3	4.2	1.9	1.1	-	2.9
2019	6.0	4.4	1.2	1.5	1.3	2.9

Survey Objectives:

Point-intercept surveys were used to assess the distribution of aquatic plants in Lake Johanna. 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 monitor native plant communities and evaluate possible responses to invasive aquatic plant management efforts. 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 plant and water quality management.

Survey Methods:

We used a point intercept survey method developed by John Madsen in [“Aquatic Plant Control Technical Note MI-02, 1999”](#). Survey points were placed 55-70 meters apart using a Geographic Information System (GIS). This spacing allowed for placement of 92-144 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 plant species and rake fullness was used as a surrogate for density (scale of zero [no plants] to 3 [dense plants] was used in 2019 (MnDNR survey) and a zero to 5 scale in 2009 and 2013 (Ramsey Conservation District & Ramsey County Public Works). Frequencies of occurrence percentages



(i.e. how often a plant species was found in the lake) were calculated based on the littoral zone (the portion of the lake is less than 15 feet in depth).

Survey Observations:

A point intercept survey was conducted for the first time by the DNR in 2019. Historical surveys have been conducted by Ramsey Conservation District (RCD) and Ramsey County Public Works (RCPW). Lake Johanna serves as a non-treatment reference lake and can be compared to other area lakes where Eurasian watermilfoil and/or Curly-leaf-pondweed have been managed. Maximum depth of rooted vegetation ranged between 3.4 and 4.3 meters (11-14 feet) from 2009 to 2019 (see **Table 2-Point Intercept Metrics** for historical point-intercept survey calculations and **Figure 3** for plant growth depth ranges). Survey grids differ based on surveyor and year which resulted in spatial differences in species richness.

In 2019, 13 submersed native aquatic plant species were observed. Surveys in 2009 and 2013 have been dominated by coontail and in some years, northern milfoil, leafy pondweed, and water celery (see **Table 3-Plant Frequency Occurrence** for historical plant frequency observations). Three additional plant species were observed in the 2019 survey (Canadian waterweed, water stargrass and variable-leaf pondweed).

Eurasian watermilfoil and curly-leaf pondweed, both invasive plants, have been observed in Lake Johanna. Eurasian watermilfoil was first observed in 2009 at 2% frequency of occurrence (hereafter FOO) and has increased to 20% FOO over the last 10 years. Additional summer surveys may be completed to understand long term trends in aquatic plant communities and to track invasive plant abundance for future management.



Photos: Submersed aquatic plants observed during the 2013 summer survey taken by Ramsey County staff. Left- Illinois pondweed observed, Center- Leaf pondweed, Right- Coontail, Lake Johanna, Ramsey County

Table 2- Point Intercept Metrics. Summary of point intercepts metrics for Lake Johanna, Ramsey County, Minnesota (DOW# 62007800) Shaded values were calculated from littoral depth range. 2009 and 2013 were surveyed by Ramsey Conservation District (RCD) & Ramsey County Public Works Environmental Resources (RCPW) and 2019 was surveyed by the Minnesota Department of Natural Resources (MN DNR)

	MAY 2009	JUN 2013	JUL 2019
Treated (Y/N)	N	N	N
Surveyor	RCD and RCPW	RCD and RCPW	MN DNR
Total # Points Sampled	92	119	144
Max Depth of Growth (95%) in feet	14	11	11
# Point in Max Depth Range	77	93	53
# Points in Littoral (0-15 feet)	78	106	79
% Points w/ Submersed Native Taxa	69	87	70
Mean Submersed Native Taxa/ Point	1.0	2.3	2.0
# Submersed Native Taxa	4	10	13
# Submersed Non-Native Taxa	2	0	2

Table 3- Plant Frequency Occurrence. Historic percent frequency of occurrence for submersed vegetation within the littoral zone (0-15 feet) in Lake Johanna, Ramsey County, Minnesota (DOW# 62007800).

Taxonomic Name	Common Name	MAY 2009	JUL 2013	JUL 2019
SUBMERSED PLANTS				
<i>Myriophyllum spicatum</i> *	Eurasian watermilfoil*	2	0	20
<i>Potamogeton crispus</i> *	Curly-leaf pondweed*	10	0	13
<i>Ceratophyllum demersum</i>	Coontail	47	63	43
<i>Macroalgae</i>	Muskgrass and Stonewort	6	1	16
<i>Elodea canadensis</i>	Canadian waterweed	0	0	5
<i>Heteranthera dubia</i>	Water stargrass	0	0	9
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	24	5	13
<i>Najas spp.</i>	Naiad	13	0	16
<i>Potamogeton foliosus</i>	Leafy pondweed	0	32	5
<i>Potamogeton gramineus</i>	Variable-leaf pondweed	0	0	8
<i>Potamogeton illinoensis</i>	Illinois pondweed	0	6	0
<i>Potamogeton praelongus</i>	White-water pondweed	10	0	0
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	0	5	8
<i>Potamogeton strictifolius</i>	Narrowleaf pondweed	0	11	0
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	0	4	37
<i>Vallisneria americana</i>	Water celery	11	54	43
Floating, Free-floating & Emergent plants observed: <i>Lemna trisulca</i> (Forked duckweed), <i>Nymphaea odorata</i> (White waterlily), <i>Nuphar variegata</i> (Bullhead pond lily),				
Less common (< 5% frequency) submersed vegetation observed: <i>Stuckenia pectinata</i> (Sago pondweed) in 2013 and 2019				

* denotes invasive aquatic plant

Additional data for May 2013 from Ramsey County Public Works is available upon request

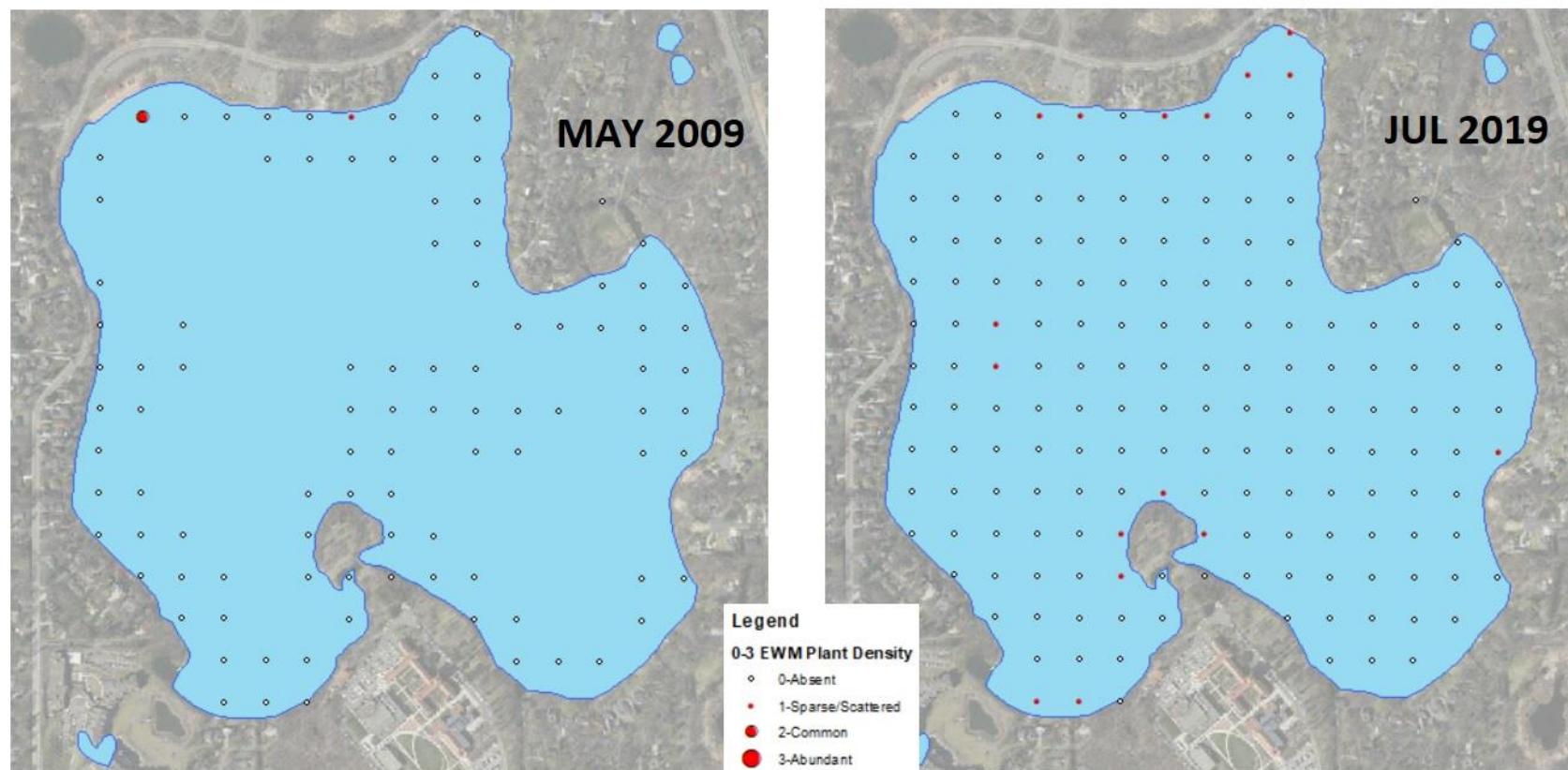


Figure 1. Spatial distribution and rake density per sample point of Eurasian watermilfoil. Dates correspond to month of point intercept survey. May 2009 and July 2013 (no EWM found) survey conducted by RCD and RCPW while July 2019 was performed by MnDNR. Lake Johanna, Ramsey County (DOW # 62007800).

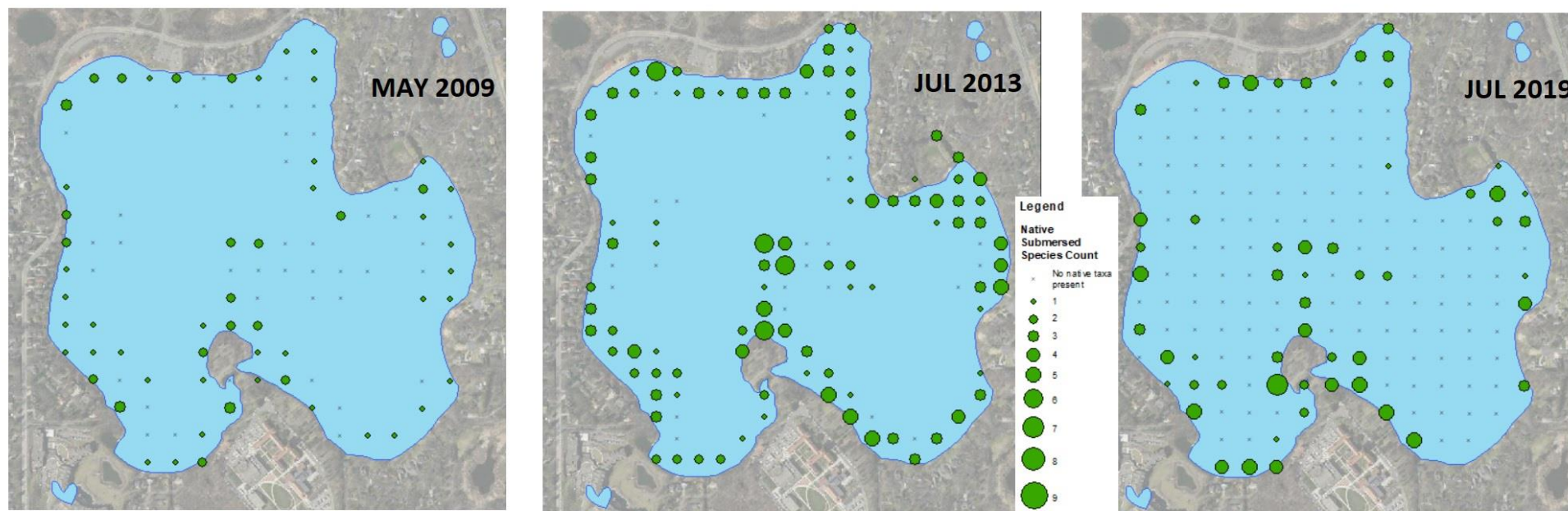


Figure 2. Spatial distribution and species richness (# of native submersed taxa per sample point). Dates correspond to month of point intercept survey. May 2009 and July 2013 survey conducted by RCD and RCPW while July 2019 was performed by MnDNR. Lake Johanna, Ramsey County (DOW # 62007800).

This information can be made available in alternative formats such as large print, braille or audio tape by emailing info.dnr@state.mn.us or by calling 651-259-5016.