LAKE JULIA, SHERBURNE COUNTY:
AQUATIC VEGETATION MANAGEMENT REPORT

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

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Project Details

Lake: Julia (DOW# 71014500)

Lake Surface Area: 154.5 acres

Littoral Area: 151.8 acres

County: Sherburne County

Survey Type: Point-intercept

Date of Survey (most recent): August 2, 2019 (James Johnson, Freshwater Scientific Services)

Observer[s]: Minnesota Department of Natural Resources (MN DNR):

MN DNR- 2003: Donna Perleberg and Audrey Kuchinksi; 2004: Wendy Crowell and Nick Proulx; 2005: Josh Knopik and Michele Mattson; 2010: Dan Swanson and Matt Pierce; 2012: Courtney Millaway and Peter Borash).

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Report Details

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Summary

The most recent aquatic vegetation point-intercept survey of Lake Julia (DOW #71014500) occurred on August 2, 2019. Maximum depth of plant growth was 6.3 ft (95%). Within the littoral zone (zone in lake from the 0-15 foot depth range), 28% of the points were vegetated. The average number of native submersed taxa per sample point was 1.0. In total, eleven native submersed taxa, one invasive taxa, and one floating-leaf taxa were observed during the 2019 survey.

Lake Description

Lake Julia is a 154.5- acre lake located 6 miles northeast of Clear Lake, MN in Sherburne County. The lake has one invasive plant species: curly-leaf pondweed (*Potamogeton crispus*). The maximum depth of water in Lake Julia is 16 feet, and 98% of the lake is classified as littoral (areas of water depth between 0 to 15 feet, where aquatic plants are most likely to grow). Water clarity during the summer averaged 2.7 feet in 2020. According to the Minnesota Pollution Control Agency (MPCA, 2019), Lake Julia is classified as a eutrophic lake based on its Trophic State Index (TSI) of approximately 63. For more information on water quality, go to Lake Julia water quality on the MPCA website (https://webapp.pca.state.mn.us/wqd/surface-water/waterunit-details?wid=71-0145-00).

Management History

Invasive aquatic plant management in Lake Julia has focused on curly-leaf pondweed using an endothall herbicide, with the most recent treatment in 2021 for 10.5 acres organized by the Three Lake Improvement District (Figure 1, Table 1). Past treatments have ranged from 8 to 18 acres.

Survey Objectives

Point-intercept surveys were used to assess the distribution of aquatic plants in Lake Julia between 2003 and 2019. 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, these surveys 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.

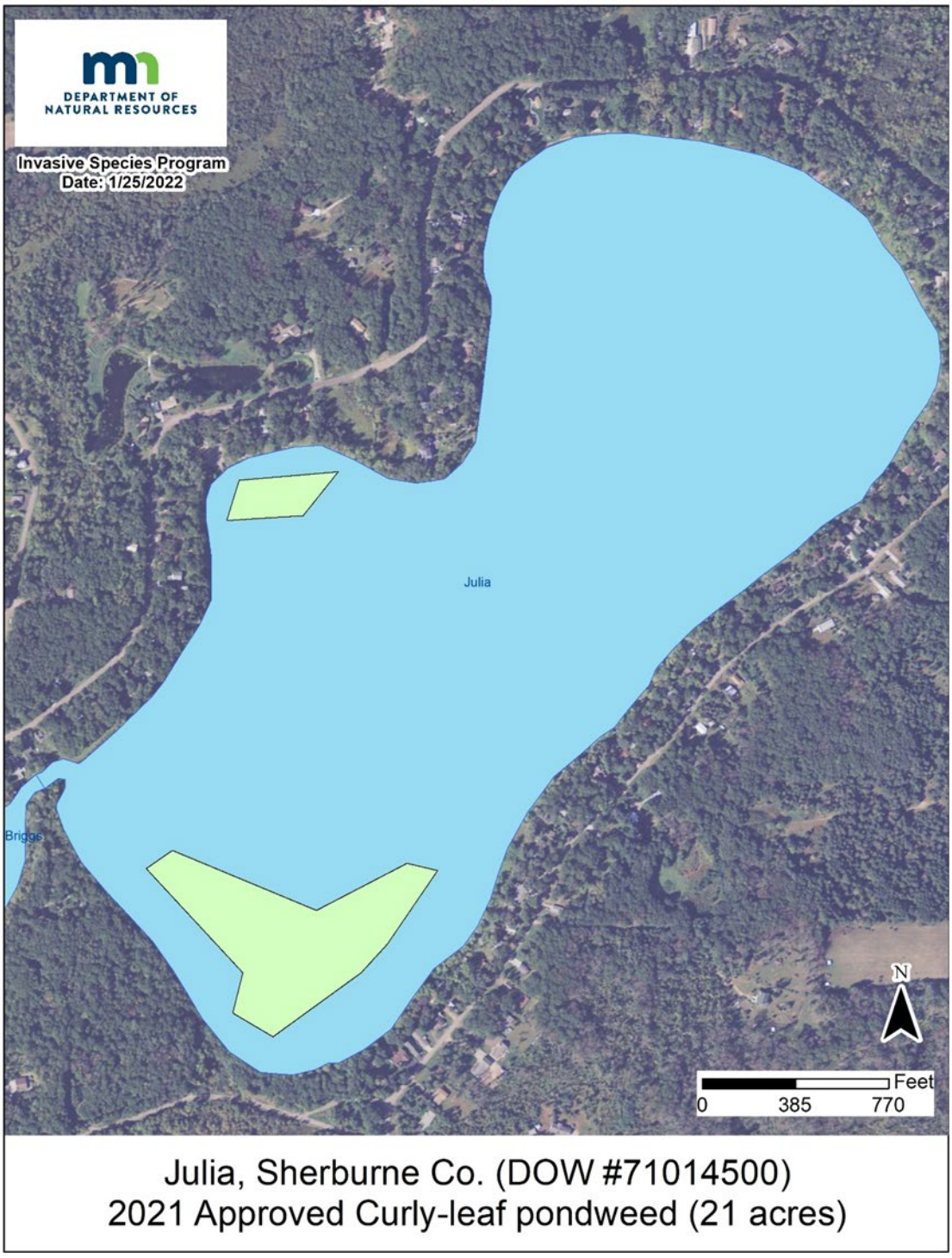

Figure 1 – 2021 Curly-leaf Pondweed Treatment for Lake Julia, Sherburne County (DOW#71014500).

Table 1 - Invasive Plant Management Summary. Characteristics and history of partial lake invasive plant treatments for Lake Julia, Sherburne County (DOW#71014500). Total acres: 154.5, Littoral acres: 151.8, 15% of Littoral acres: 33). Abbreviations are as followed: curly-leaf pondweed (CLP). Note: Total acres permitted does not reflect the actual treatment or known acreage of the taxa in the lake.

Date	Target Species	Total Acres Permitted	Herbicide	Licensed Commercial Applicator
2012	CLP	16.0	Endothall	Lake Management
2013	CLP	15.0	Endothall	Lake Management
2014	CLP	18.0	Endothall	Lake Management
2015	CLP	18.0	Endothall	NA
2016	CLP	18.0	Endothall	Lake Management
2017	CLP	18.0	Endothall	Lake Management
2018	CLP	14.5	Endothall	Lake Management
2020	CLP	8.0	Endothall	Lake Management
2021	CLP	10.5	Endothall	Lake Management

Survey Methods

The most recent point-intercept survey was conducted by Freshwater Scientific Services in 2019. Previously, the MN DNR surveyed the lake in 2003, 2004, 2005, 2010, and 2012. Surveyors used a point-intercept survey method developed by John Madsen in "Aquatic Plant Control Technical Note MI-02, 1999". Sampling points were pre-determined using Geographic Information System and varied among survey year and surveyor. Plant samples were collected by throwing and dragging a double-sided rake along the lake bottom at each point. Frequencies of occurrence percentages (i.e., how often a plant species was sampled in the lake) were calculated based on the littoral zone.

Survey Observations

In 2019, 28% of the surveyed points had vegetation in the littoral zone (Table 2). In total, eleven submersed native taxa, one invasive taxa and one floating-leaf species during the survey (Table 3). Muskgrass (*Chara*) was the most commonly occurring plant at 19% of all sites in the littoral

zone, followed by water stargrass (*Heteranthera dubia*), and northern watermilfoil (*Myriophyllum sibiricum*) with frequencies at 16%. Curly- leaf pondweed is the only invasive species and relatively sparse at 2%. Since this species senesces late June/ early July, the frequency of occurrence of curly- leaf pondweed would not be representative of the distribution of this species during this time. Lake Julia has a small aquatic plant community with an average of 1.0 species per a sampling site. Between 2003 and 2019, there has been an increase in the mean submersed native taxa per a point from 0.4 to 1.0 species and an increase of native taxa from 6 to 11 taxa.

Table 2 - Point-intercept Metrics. Summary of point-intercept metrics for Lake Julia, Sherburne County (DOW#71014500). Shaded values were calculated from littoral depth range (0-15 feet). Freshwater Scientific Services (FSS*), Surveyor: James Johnson.

Metric	**JULY 2003**	**MAY 2004**	**AUG 2005**	**AUG 2010**	**AUG 2012**	**AUG 2019**
Surveyor	MN DNR	MN DNR	MN DNR	MN DNR	MN DNR	FSS
Total # Points Sampled	104	106	103	54	47	106
Depth Range of Rooted Veg (ft.)- 95%	2 – 9	2 – 12	2 – 11	1 – 8	1 – 7	1 – 6
# Points in Littoral (0-15 feet)	104	105	103	54	47	106
% Points w/ Submersed Native Veg.	23	25	16	76	34	28*
Mean Submersed Native Taxa/ Point	0.4	0.3	0.2	1.7	0.7	1.0
# Submersed Native Taxa	6	4	4	6	8	11
# Submersed Non-Native Taxa	1	1	0	1	0	1
% Points w/ Submersed Non-native Taxa	1	41	0	4	0	2

*% of littoral points vegetated (native and non-native species)

Table 3 - Plant Frequency of Occurrence. Percent frequency of occurrence for observed plant species within the littoral zone (0-15 feet) in Lake Julia, Sherburne County (DOW#71014500).

Taxonomic Name	Common Name	JULY 2003	MAY 2004	AUG 2005	AUG 2010	AUG 2012	AUG 2019
SUBMERSED NON-NATIVE							
Potamogeton crispus	Curly-leaf pondweed	1	41	0	4	0	2
SUBMERSED NATIVE							
Chara	Muskgrass	18	15	4	31	21	19
Ceratophyllum demersum	Coontail	8	7	6	28	15	15
Elodea canadensis	Canadian waterweed	0	0	7	37	4	0
Heteranthera dubia	Water star-grass	0	1	0	0	6	16
Myriophyllum sibiricum	Northern milfoil	0	0	0	0	2	16
Najas flexilis	Northern naiad	8	0	8	65	11	8
Najas guadalupensis	Southern naiad	0	0	0	0	0	4
Potamogeton species	Narrow- leaved pondweed group	1	0	0	2	0	0
Potamogeton illinoensis	Illinois pondweed	0	0	0	0	0	4
Potamogeton richardsonii	Clasping-leaf pondweed	0	0	0	0	0	4
Potamogeton foliosis	Leafy pondweed	0	0	0	0	0	2
Stuckenia pectinata	Sago pondweed	1	0	0	6	2	1
Vallisneria americana	Wild celery	0	0	0	0	6	11
Zannichellia palustris	Horned pondweed	1	3	0	0	0	0
FLOATING LEAF							
Nymphaea odorata	White waterlily	1	0	0	0	6	3

Literature Cited

Crow, G.E. and C.B. Hellquist. 2000. Aquatic and wetland plants of Northeastern North America. 2 volumes. The University of Wisconsin Press.

Johnson, J. 2018. Aquatic Plant Community of Julia Lake: 2019. Survey, Analysis and Report by Freshwater Scientific Services, LLC. 11pp.

Madsen, J. 1999. Point intercept and line intercept methods for aquatic macrophytes management. APCRP Technical Notes Collection (TN APCRP-M1-02). U.S. Army Engineer Research and Development Center, Vicksburg, MS.