
BRIGGS LAKE, 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: Briggs (DOW# 71014600)

Lake Surface Area: 404 acres

Littoral Area: 220 acres

County: Sherburne County

Survey Type: Point-intercept

Date of Survey (most recent): August 11, 2020 (James Johnson, Freshwater Scientific Services)

Observer[s]: Minnesota Department of Natural Resources (MN DNR): Courtney Millaway
(Invasive Species Program and Peter Borash (Shallow Lakes Intern))

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Report Details

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Summary

The most recent aquatic vegetation point-intercept survey of Briggs Lake (DOW #71014600) occurred on August 11, 2020 by an independent contractor. Plants were present throughout the lake to a depth of 5.8 feet. Within the littoral zone (zone in lake from the 0-15 foot depth range), 57% of the points were vegetated. The average number of native submersed taxa per sample point was 1.7. In total, eleven native submersed taxa, one invasive taxa, five floating-leaf and two emergent taxa were observed during the 2020 survey.

Lake Description

Briggs Lake is a 404- 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 Briggs Lake is 25 feet, and 54% 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 4.5 feet in 2020. According to the Minnesota Pollution Control Agency (MPCA, 2019), Briggs Lake is classified as a eutrophic lake based on its Trophic State Index (TSI) of approximately 68. For more information on water quality, go to [Briggs Lake water quality](https://webapp.pca.state.mn.us/wqd/surface-water/waterunit-details?wid=71-0146-00) on the MPCA website (<https://webapp.pca.state.mn.us/wqd/surface-water/waterunit-details?wid=71-0146-00>).

Management History

Invasive aquatic plant management in Briggs Lake has focused on curly-leaf pondweed using an endothall herbicide, with the most recent treatment in 2021 for 32.3 acres. Management was organized by the Three Lake Improvement District (Figure 1, Table 1), with past treatments ranging from 3 to 32.3 acres.

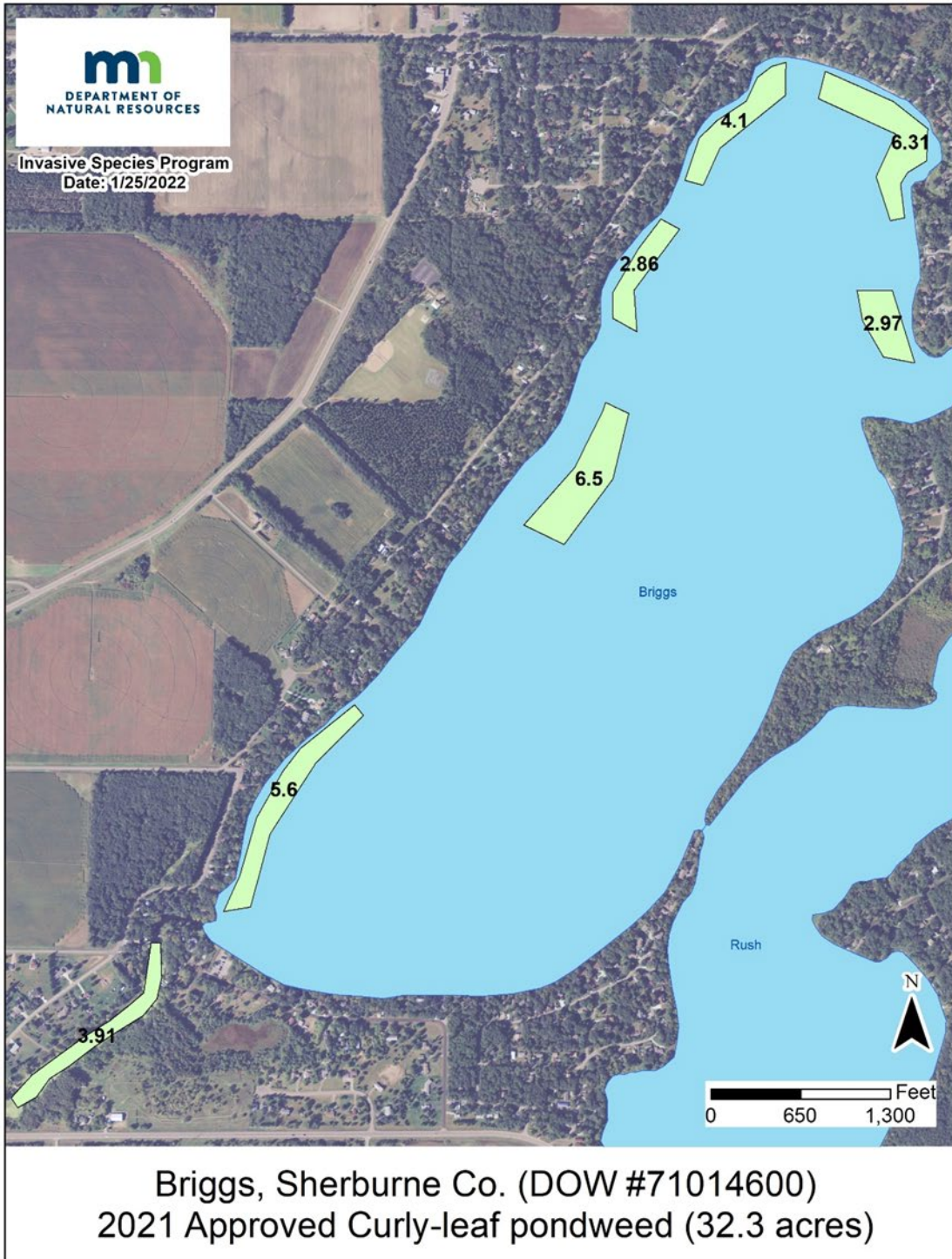


Figure 1 – 2021 Curly-leaf Pondweed Treatment for Briggs Lake, Sherburne County (DOW#71014600).

Survey Objectives

Point-intercept surveys were used to assess the distribution of aquatic plants in Briggs Lake in 2012 and 2020. 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.

Table 1 - Invasive Plant Management Summary. Characteristics and history of partial lake invasive plant treatments for Briggs Lake, Sherburne County (DOW#71014600). Total acres: 404, Littoral acres: 220, 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	7.7	Endothall	Lake Management
2013	CLP	10.0	Endothall	Lake Management
2014	CLP	22.0	Endothall	Lake Management
2015	CLP	22.0	Endothall	NA
2016	CLP	4.8	Endothall	Lake Management
2017	CLP	22.1	Endothall	Lake Management
2018	CLP	26.4	Endothall	Lake Management
2019	CLP	3.0	Endothall	Lake Management
2020	CLP	32.1	Endothall	Lake Management
2021	CLP	32.3	Endothall	Lake Management

Survey Methods

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 2021, plants were found in Briggs Lake at a maximum depth of 5.8 ft. (95%). In the littoral zone, 64% of the surveyed points had submersed vegetation (Table 2). In total, twelve submersed taxa and five floating-leaf species during the survey (Table 3). Slender naiad (*Najas flexillis*) was the most common taxa at 29%, followed by coontail (*Ceratophyllum demersum*) at 27% and northern watermilfoil (*Myriophyllum sibiricum*). Curly-leaf pondweed is the only invasive species and relatively sparse at 2% during the late summer. 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. Briggs Lake has a small aquatic plant community with an average of 1.7 species per a sampling site. Between 2012 and 2020, there has been an increase in the mean submersed native taxa per a point from 0.4 to 1.7 species, a large increase in the percent frequency of submerged aquatic plants from 26% to 64% and an increase of native taxa from 7 to 11 taxa.

Table 2 - Point-intercept Metrics. Summary of point-intercept metrics for Briggs Lake, Sherburne County (DOW#71014600). Shaded values were calculated from littoral depth range (0-15 feet). Freshwater Scientific Services (FSS*), Surveyor: James Johnson.

Metric	JULY 2012	AUG 2020
Surveyor	MN DNR	FSS
Total # Points Sampled	121	254
Depth Range of Rooted Veg (ft.)	1 – 4.1	1 – 5.8
# Points in Littoral (0-15 feet)	70	227
% Points w/ Submerged Native Vegetation	26	64*
Mean Submersed Native Taxa/ Point	0.4	1.7
# Submersed Native Taxa	7	11
# Submersed Non-Native Taxa	0	1
% Points w/ Submersed Non- native Taxa	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 Briggs Lake, Sherburne County (DOW#71014600).

Taxonomic Name	Common Name	JULY 2012	AUG 2020
SUBMERSED NON-NATIVE			
<i>Potamogeton crispus</i>	Curly-leaf pondweed	0	2
SUBMERSED NATIVE			
<i>Chara</i>	Muskgrass	4	19
<i>Ceratophyllum demersum</i>	Coontail	11	27
<i>Elodea canadensis</i>	Canadian waterweed	0	4
<i>Heteranthera dubia</i>	Water star-grass	0	18
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	9	23
<i>Najas flexilis</i>	Northern naiad	0	29
<i>Potamogeton foliosus</i>	Leafy pondweed	0	18
<i>Potamogeton richardsonii</i>	Clasping-leaved pondweed	1	5
<i>Stuckenia pectinata</i>	Sago pondweed	3	3
<i>Potamogeton zosteriformis</i>	Flat-stemmed pondweed	3	Present
<i>Valisneria americana</i>	Water celery	9	4
FLOATING LEAF			
<i>Lemna</i> sp.	Duckweed	0	3
<i>Spirodela polyrhiza</i>	Greater duckweed	0	4
<i>Nymphaea odorata</i>	White waterlily	4	4

Taxonomic Name	Common Name	JULY 2012	AUG 2020
<i>Nuphar variegata</i>	Yellow waterlily	0	1
<i>Wolffia</i> sp.	Watermeal species	0	4
EMERGENT			
<i>Schoenoplectus</i> sp.	Bulrush species	1	2
<i>Sagittaria</i> sp.	Arrowhead species	0	Present

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 Briggs Lake: 2020. Survey, Analysis and Report by Freshwater Scientific Services, LLC. 12pp

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.