SCHNEIDER LAKE, STEARNS COUNTY:
2020 AQUATIC VEGETATION MANAGEMENT REPORT

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

Prepared by:
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Project Details

Lake: Schneider (DOW# 73008200)

Lake Surface Area: 65.5 acres

Littoral Area: 25.1 acres

County: Stearns County

Survey Type: Point-intercept

Date of Survey (most recent): June 17, 2020

Observer[s]: MN DNR: Emelia Hauck Jacobs and Chris Jurek (2020), Nathan Olson (2009- 2011), Josh Knopik (2007)

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Report Details

C. Jurek and E. Hauck Jacobs. 2021. Schneider Lake, Stearns County: 2020 MN DNR Aquatic Vegetation Report. Minnesota Department of Natural Resources, Division of Ecological and Water Resources, Invasive Species Program, 1035 South Benton Drive, Sauk Rapids, MN 56379. 13 pp.

Summary

The most recent aquatic vegetation point-intercept survey of Schneider Lake (DOW #73008200) occurred on June 17, 2020. Plants were present throughout the lake to a depth of 12 feet. Within the littoral zone (zone in lake from the 0-15 foot depth range), 97% of the points had native submersed taxa. The average number of native submersed taxa per sample point was 2.9. In total, nine submersed native taxa, one invasive taxa, and one floating-leaf and free-floating taxa were observed during the 2020 survey.

Lake Description

Schneider Lake is a 65.5- acre lake located 2 miles west of Cold Spring, MN in Stearns County. The lake has one invasive plant species: curly-leaf pondweed (*Potamogeton crispus*). The maximum depth of water in Schneider Lake is 52 feet, and 38% 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 6.5 feet over the past ten years. According to surveys from the Minnesota Pollution Control Agency (MPCA, 2020), Schneider Lake is classified as a lower eutrophic lake, based on its Trophic State Index (TSI) of approximately 59. For more information on water quality, go to Schneider Lake water quality on the MPCA website (https://webapp.pca.state.mn.us/surface-water/station/73-0082-00-202).

Management History

Invasive aquatic plant management in Schneider Lake has focused on Curly-leaf pondweed using an endothall herbicide. The most recent treatment was for curly-leaf pondweed in 2020 was for 1.7 acres, organized by the Sauk River Chain of Lakes Association (Table 1). Past treatments have ranged from 1.7 to 23.0 acres.

Table 1 - Invasive Plant Management Summary. Characteristics and history of partial lake invasive plant treatments for Schneider Lake, Stearns County (DOW#73008200). Total acres: 65.5, Littoral acres: 25.1, 15% of Littoral acres: 3.8). 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
2009	CLP	23.0	Endothall	PLM
2010	CLP	18.3	Endothall	PLM
2011	CLP	12.4	Endothall	PLM
2012	CLP	3.6	Endothall	PLM
2013	CLP	15.9	Endothall	PLM
2014	CLP	3.8	Endothall	PLM
2015	CLP	3.8	Endothall	Clarke Aquatic Services
2016	CLP	3.8	Endothall	Clarke Aquatic Services
2017	CLP	2.6	Endothall	Clarke Aquatic Services
2020	CLP	1.7	Endothall	Clarke Aquatic Services

Survey Objectives

A point-intercept survey was used to assess the distribution of aquatic plants in Schneider Lake. The primary purpose for this type of survey is to 1) document the frequency and distribution of invasive aquatic plants, 2)develop baseline knowledge of the current plant community in a lake, and over time, 3) 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

In 2020, MN DNR surveyors used a point-intercept survey method developed by John Madsen in "Aquatic Plant Control Technical Note MI-02, 1999". Sampling points were placed 50 meters apart using a Geographic Information System. A total of 43 points within 20 feet were established on a grid (Figure 1). 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.

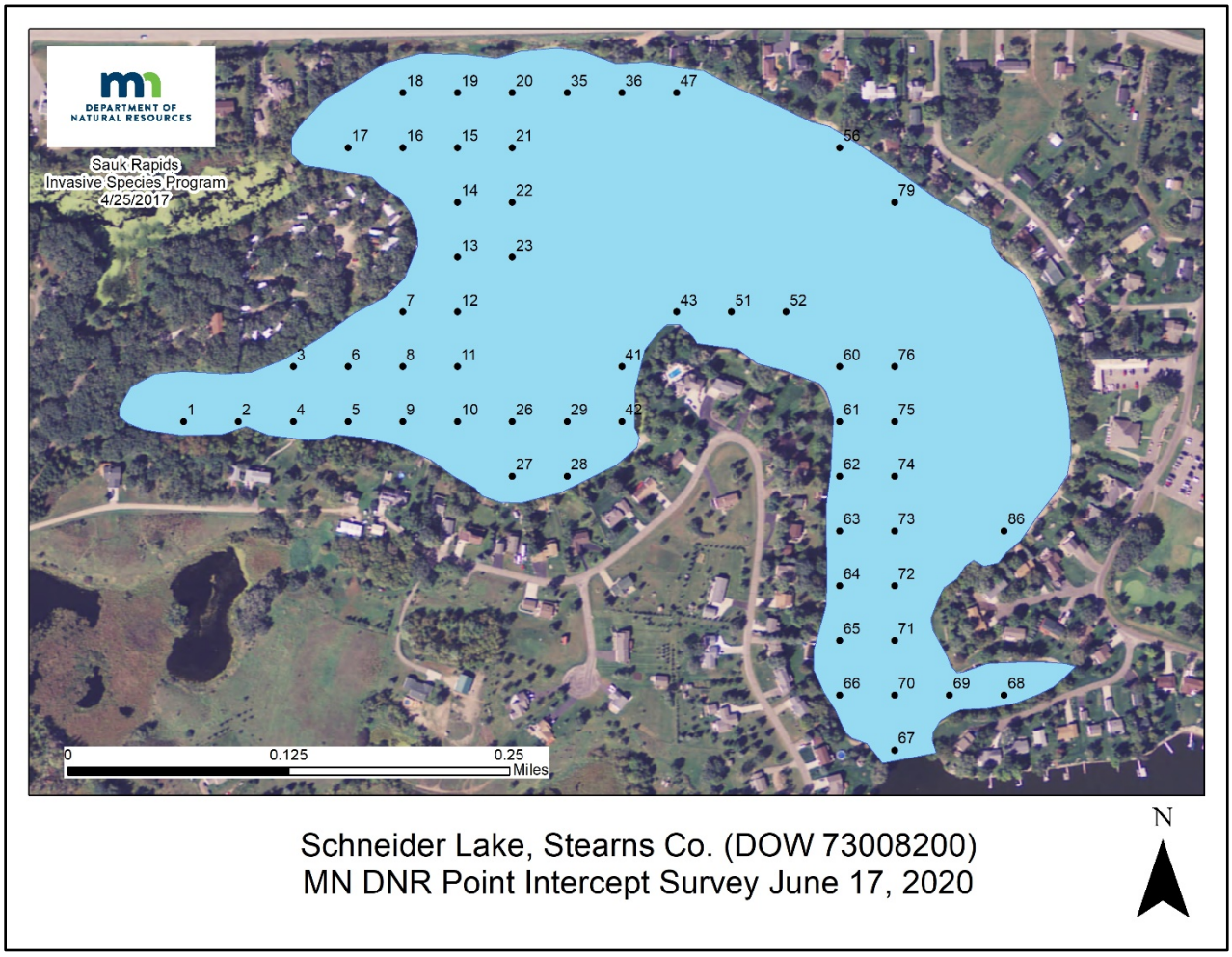

Figure 1 – Point-intercept Survey Grid. Point-intercept survey grid for Schneider Lake, Stearns County (DOW#73008200). Due to the computer programming, the placement of points on the east shoreline were lacking because of the narrow littoral zone.

Survey Observations

In 2020, we found plants in Schneider Lake in a range of water depth from 1 to 12 feet. In the littoral zone, 97% of the surveyed points had submersed native vegetation (Table 2). In total, we found nine submersed taxa and one floating-leaf species and free- floating species during the survey (Table 3). Coontail (*Ceratophyllum demersum*) was the most commonly occurring plant, at 82% of all sites in the littoral zone (Figure 2), followed by star duckweed (*Lemna trisulca*, Figure 3), bladderwort (*Utricularia* species, Figure 4) and buttercup (*Ranunculus* species). Curly- leaf pondweed is the only invasive species at 38% (Figure 5). Schneider Lake has a moderately diverse aquatic plant community with an average of 2.9 species per a sampling site (Figure 6). In addition to the point-intercept survey conducted by the Invasive Species Program in 2020, Invasive species Program also conducted point-intercept aquatic plant surveys in 2007, 2009, 2010, and 2011 (Table 2 and 3) for a MN DNR Pilot Program targeting large- scale curly- leaf pondweed. Based on the surveys in 2007 and 2020, this invasive taxa has decreased by 31%, although annual variations may had occurred within these two surveys. Overall, the mean submersed native taxa per a point has increased and the percent of submersed native taxa by 9%.

Table 2 - Point-intercept Metrics. Summary of point-intercept metrics for Schneider Lake, Stearns County (DOW#73008200). Shaded values were calculated from littoral depth range (0-15 feet).

Metric	JUNE 2007	JULY 2009	JULY 2010	JULY 2011	JUNE 2020
Surveyor	MN DNR	MN DNR	MN DNR	MN DNR	MN DNR
Total # Points Sampled	49	91	47	46	43
Depth Range of Rooted Veg (ft.)	1 - 18	1 - 13	1 - 13	2 - 13	1 - 12
# Points in Littoral (0-15 feet)	42	46	47	45	39
% Points w/ Submersed Native Taxa	88	67	87	96	97
Mean Submersed Native Taxa/ Point	1.45	1.02	2.36	2.49	2.92
# Submersed Native Taxa	8	8	11	7	9
# Submersed Non-Native Taxa	1	1	1	1	1
% Points w/ Submersed Non- native Taxa	69	9	23	7	38

Table 3 - Plant Frequency of Occurrence. Percent frequency of occurrence for observed plant species within the littoral zone (0-15 feet) in Schneider Lake, Stearns County (DOW#73008200).

Taxonomic Name	Common Name	JUNE 2007	JULY 2009	JULY 2010	JULY 2011	JUNE 2020
SUBMERSED NON-NATIVE						
Potamogeton crispus	Curly-leaf pondweed	69	9	23	7	38
SUBMERSED NATIVE						
Ceratophyllum demersum	Coontail	74	67	85	96	82
Chara sp.	Muskgrass	0	0	6	0	38
Elodea canadensis	Canadian waterweed	7	15	34	56	15
Heteranthera dubia	Water star-grass	0	2	34	33	15
Myriophyllum sibiricum	Northern watermilfoil	10	2	34	7	26
Potamogeton illinoensis	Illinois pondweed	0	0	2	0	0
Potamogeton richardsonii	Clasping-leaf pondweed	10	2	2	0	0
Potamogeton sp.	Narrowleaf pondweed	14	0	4	0	13
Potamogeton zosteriformis	Flatstem pondweed	7	0	0	0	5
Stuckenia pectinata	Sago pondweed	17	4	0	4	0
Ranunculus sp.	Buttercup species	5	7	13	29	41
Utricularia sp.	Common bladderwort	0	2	9	24	56
Vallisneria americana	Wild Celery	0	0	13	0	0
FLOATING-LEAF						
Nuphar variegata	Yellow waterlily	5	15	15	18	13
Nymphaea odorata	White waterlily	5	20	9	20	0
Lemna sp.	Duckweed species	0	30	32	0	0
Spirodelia polyrhiza	Greater duckweed	40	0	0	0	0
Wolffia sp.	Watermeal species	0	17	32	40	0

Comparison to previous years

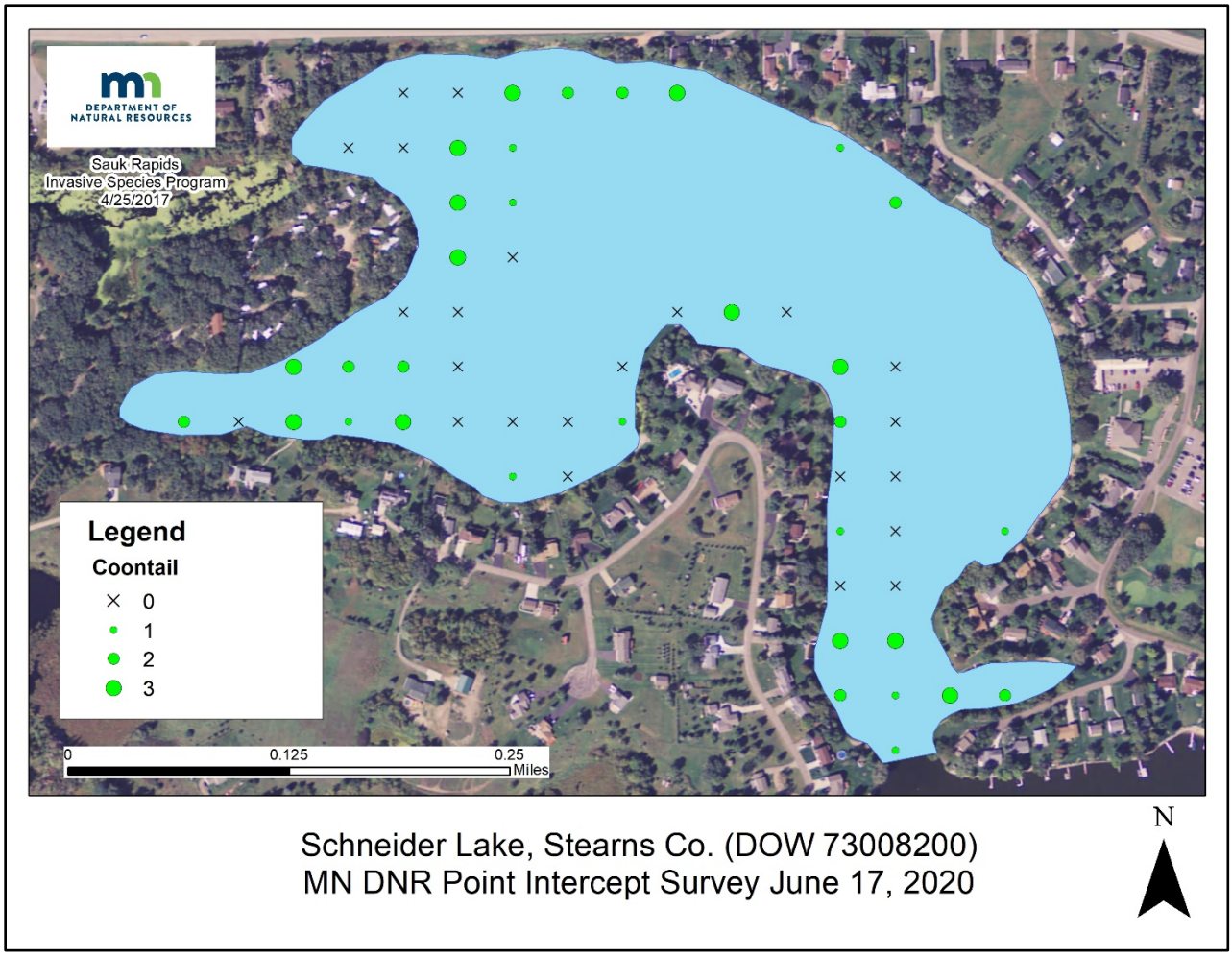

Figure 2 – 2020 Coontail Distribution. Plant distribution from the 2020 point-intercept survey for coontail in Schneider Lake, Stearns County (DOW#73008200). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

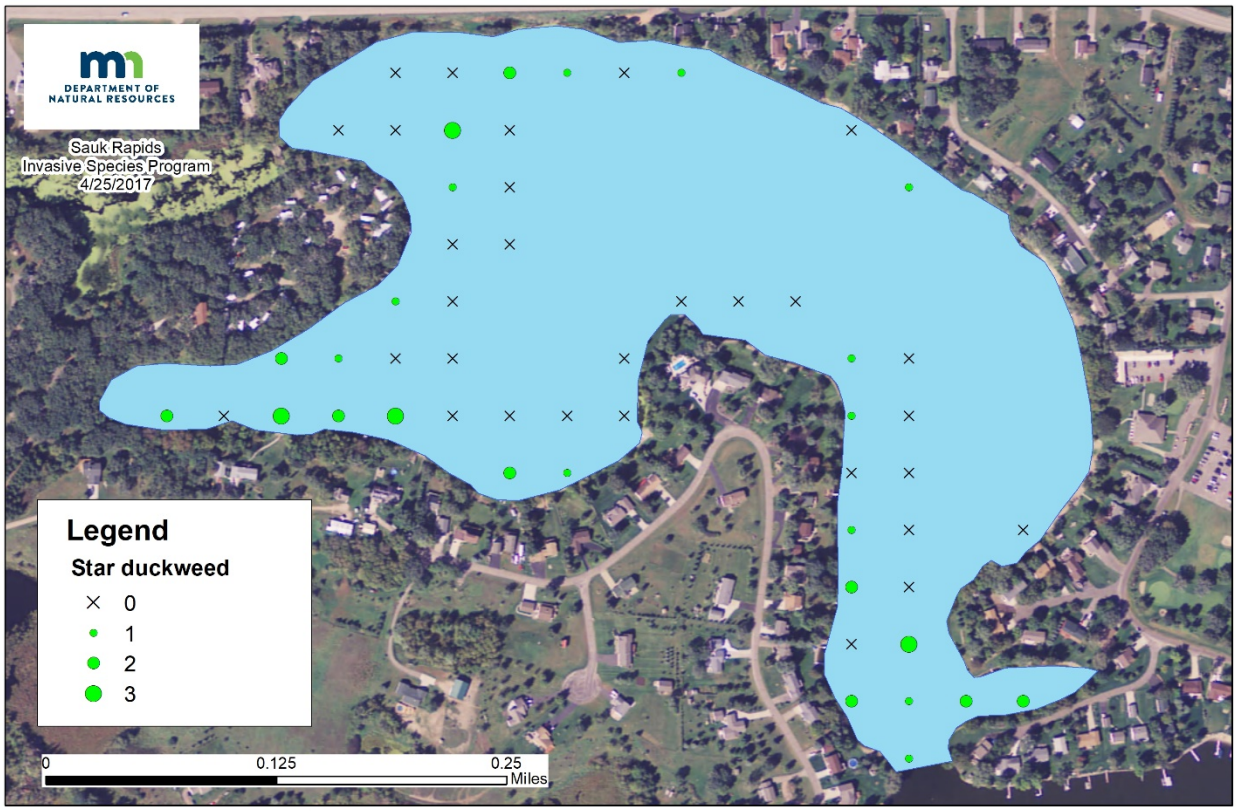

Figure 3 – 2020 Star duckweed Distribution. Plant distribution from the 2020 point-intercept survey for star duckweed in Schneider Lake, Stearns County (DOW#73008200). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

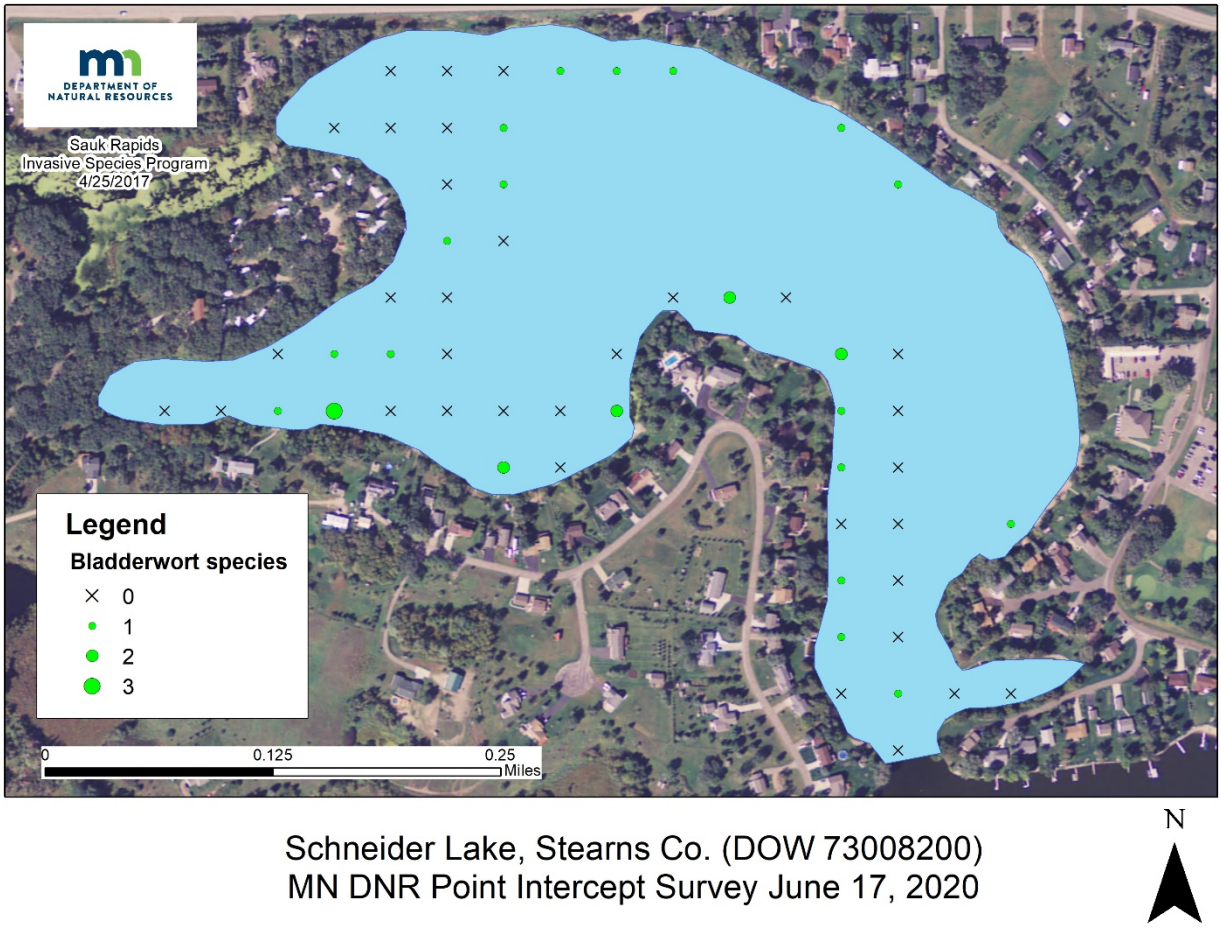

Figure 4 – 2020 Bladderwort Distribution. Plant distribution from the 2020 point-intercept survey for bladderwort in Schneider Lake, Stearns County (DOW#73008200). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

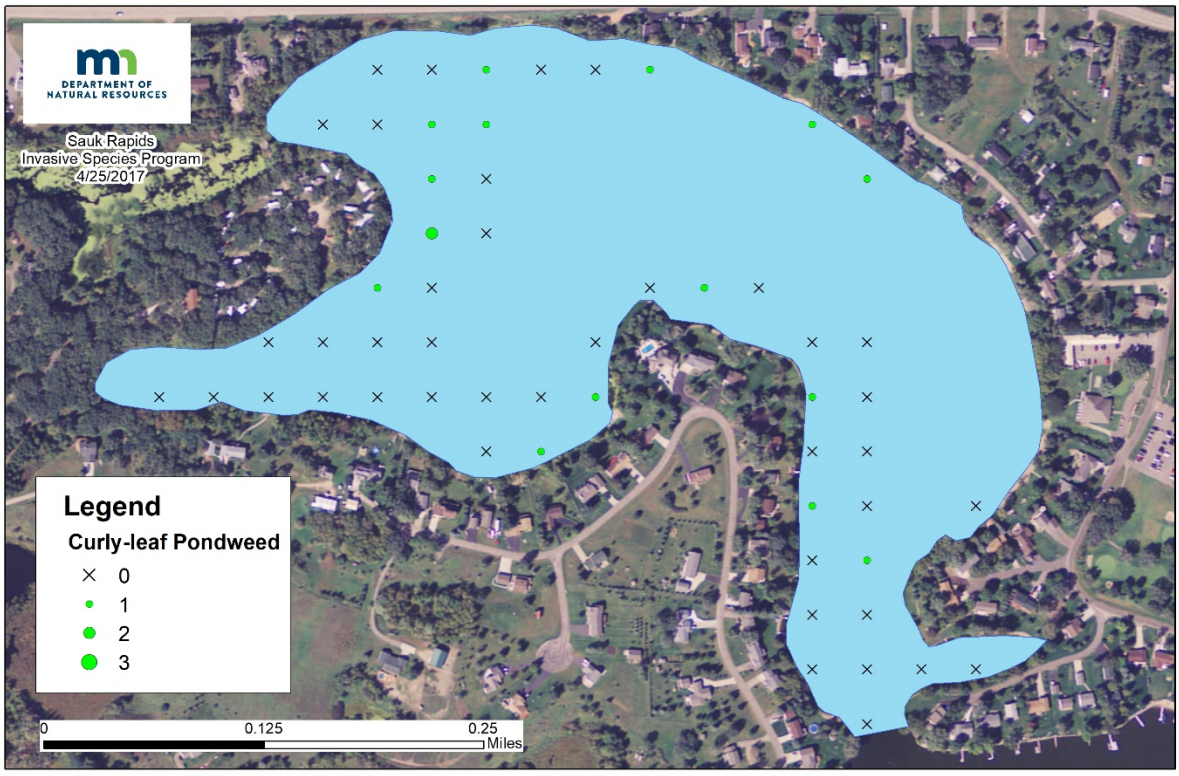

Figure 5 – 2020 Curly-leaf pondweed Distribution. Plant distribution from the 2020 point-intercept survey for curly-leaf pondweed in Schneider Lake, Stearns County (DOW#73008200). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

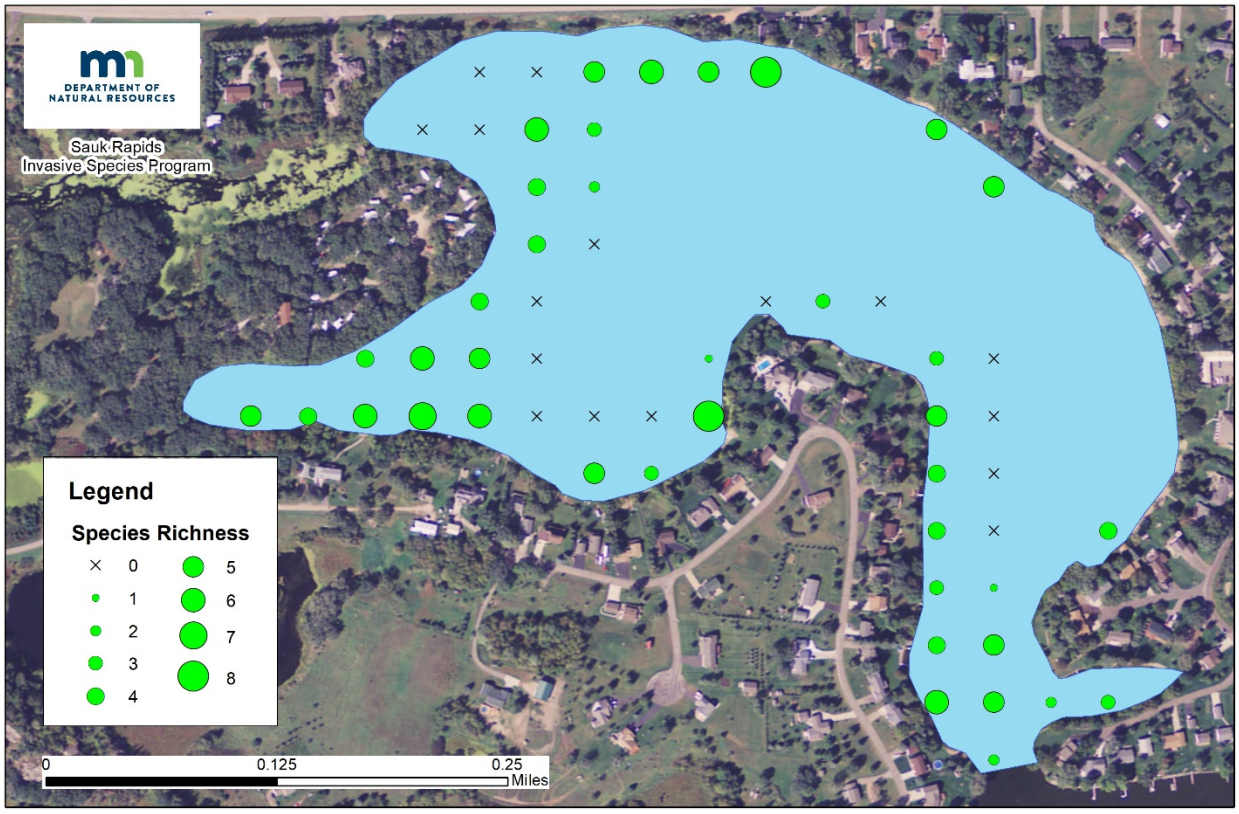

Figure 6 – Number of species per site. Maps of number of species from the 2020 point-intercept survey in Schneider Lake, Stearns County (DOW#73008200).

Literature Cited

Crow, G.E. and C.B. Hellquist. (2000). *Aquatic and wetland plants of Northeastern North America*. (Vols. 1 & 2). Madison, WI: The University of Wisconsin Press.

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