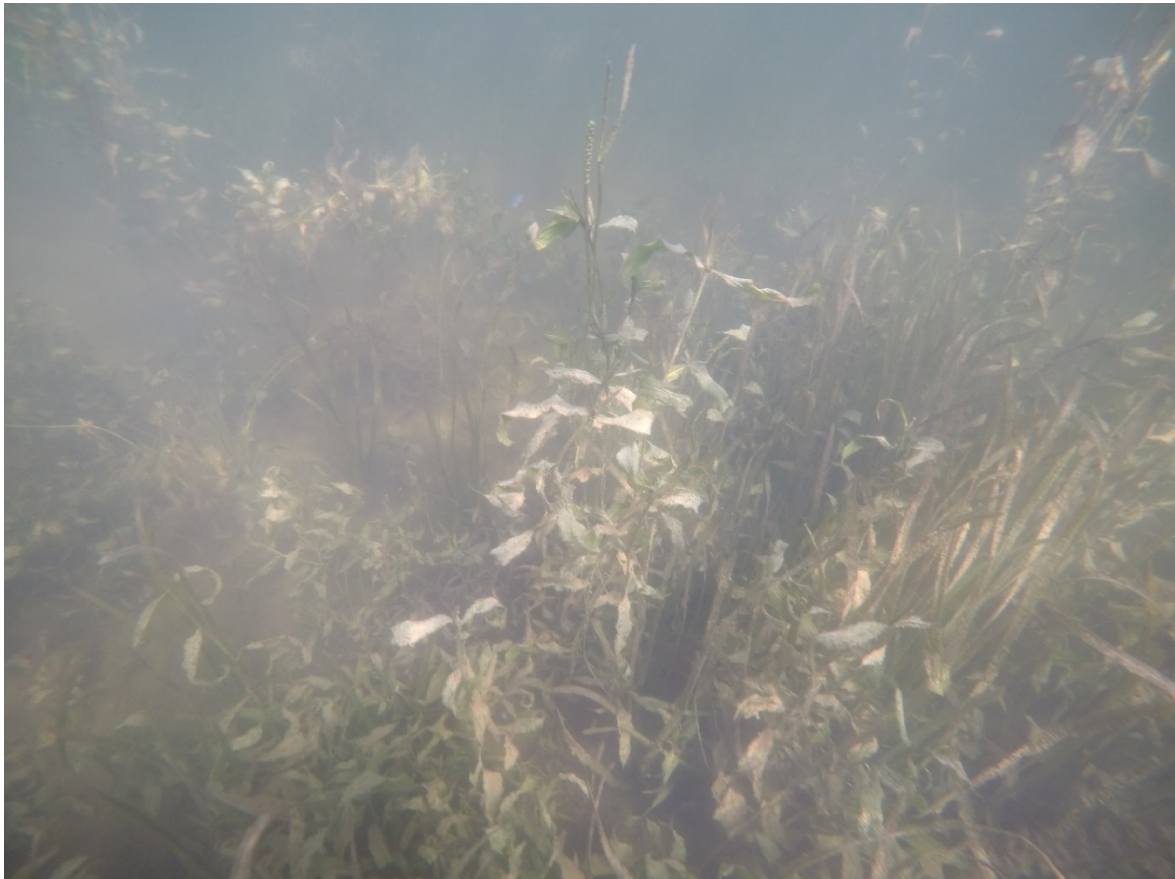

West Lake Sylvia, Wright County

2017 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: West Lake Sylvia (DOW# 86027900)

Lake Surface Area: 904 acres

Littoral Area: 297 acres

County: Wright County

Survey Type: Point-intercept

Date of Survey (most recent): September 12, 2017

Observer[s]: MN DNR, Invasive Species Program (ISP): Ty Riihiluoma and Eric Katzenmeyer;

MN DNR, Fisheries: Mark Pelham

Report Updated: January 21, 2020

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Report Details

C. Jurek, E. Hauck Jacobs and T. Riihiluoma. 2019. West Lake Sylvia, Wright County: 2017 MN DNR Aquatic Vegetation Management Report. Minnesota Department of Natural Resources, Division of Ecological and Water Resources, Invasive Species Program, 1035 South Benton Drive, Sauk Rapids, MN 56379. 18 pp.

Summary

The purpose of this report is to provide an overview of aquatic plant distribution and the management of invasive aquatic plants in West Lake Sylvia, Wright County between 2008 and 2019. Historical data on water quality, invasive aquatic plant management permits and point-intercept surveys are all summarized in this report. These summaries will guide future invasive aquatic plant control projects and can evaluate changes in native plant communities.

Lake Description

West Lake Sylvia is a 904 -acre Lake located one mile south of the town of South Haven, in Wright County, MN. The maximum depth of water in West Lake Sylvia is 97 feet, and 33% 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 has generally been high, averaging 19 feet in 2017. According to surveys from the Minnesota Pollution Control Agency (MPCA, 2019), West Lake Sylvia is classified as a mesotrophic lake, based on its Trophic State Index (TSI) of approximately 37. Mesotrophic lakes are lakes with an intermediate level of productivity and are typically clear water lakes with some summer algal blooms. The three parameters that are factored into the trophic state index are total phosphorus (nutrients in the water), chlorophyll-a (measure of the amount of algae growing in the water) and Secchi depths (water transparency). For more information on water quality, go to [West Lake Sylvia's water quality data](https://cf.pca.state.mn.us/water/cmp/resultDetail.cfm?siteid=86-0279-00-204) on the MPCA website (<https://cf.pca.state.mn.us/water/cmp/resultDetail.cfm?siteid=86-0279-00-204>).

Management History

The lake has three invasive plant species: Eurasian watermilfoil (*Myriophyllum spicatum*), curly-leaf pondweed (*Potamogeton crispus*), and starry stonewort (*Nitellopsis obtusa*). Starry stonewort was first reported in 2016. Invasive aquatic plant management in West Lake Sylvia has focused on Eurasian Watermilfoil using a 2, 4- D herbicide, curly-leaf pondweed (endothall), and starry stonewort (copper-based herbicides). Invasive aquatic plants have been relatively sparse and only partial- lake spot treatments have taken place. The most recent treatments for invasive aquatic plants occurred in 2019: Eurasian watermilfoil (3.0 acres), curly-leaf pondweed

(4.0 acres) and starry stonewort (1.7 acres), organized by the Greater Lake Sylvia Association (Table 1). Past treatments have varied depending on species, although the invasive aquatic plant community has not increased in recent years. Pre-treatment survey data (i.e. point-intercept surveys or lake-wide delineations that can be repeatable), collected over time, would be a recommended course of action for analyzing plant abundance and distribution trends into the future.

Table 1 - Invasive Plant Management Summary. Characteristics and history of partial lake invasive plant treatments for West Lake Sylvia, Wright County (DOW#86027900). Abbreviations are as followed: curly-leaf pondweed (CLP), Eurasian Watermilfoil (EWM), and starry stonewort (SSW). 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
2008	EWM	0.4	2, 4-D	n/a
2009	EWM	1.5	2, 4-D	n/a
2010	EWM	1.5	2, 4-D	n/a
2011	EWM	1.0	2, 4-D	n/a
2012	EWM	1.0	2, 4-D	Lake Association
2013	EWM	2.0	Auxin-mimic herbicide	Lake Association
2014	EWM	2.0	Auxin-mimic herbicide	Lake Association
2015	EWM	14.8	2, 4-D	Professional Lake Mgmt.
2016	EWM	15.8	2, 4-D	Professional Lake Mgmt.
2017	EWM	8.6	2, 4-D	Lake Restoration
2018	EWM	4.4	2, 4-D	Lake Restoration
2019	EWM	3.0	Auxin-mimic herbicide	Lake Restoration
2009	CLP	0.2	Aquathol Super K	n/a
2010	CLP	1.1	Endothall	n/a
2011	CLP	1.1	Endothall	n/a
2012	CLP	1.2	Endothall	Lake Association
2013	CLP	1.2	Endothall	Lake Association
2014	CLP	3.0	Endothall	Lake Association
2015	CLP	3.0	Endothall	Professional Lake Mgmt.
2016	CLP	3.0	Endothall	Professional Lake Mgmt.
2018	CLP	4.0	Endothall	Lake Restoration
2016	SSW	0.4	Copper Ethnolamine	Professional Lake Mgmt.
2017	SSW	1.7	Copper Ethnolamine	Lake Restoration
2018	SSW	1.7	Copper Ethnolamine	Lake Restoration
2019	SSW	1.7	Copper Sulfate	Lake Restoration




Survey Objectives

A point-intercept survey was used to assess the distribution of aquatic plants in West Lake Sylvia. 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) and 3) track invasive aquatic plants. 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 and occurrences of aquatic plants may vary from year to year due to natural variations (water clarity, snow cover, water temperatures, and natural fluctuation in plant species) or human induced alterations, such as, herbicide and shoreline management activities.

Survey Methods

In 2017, 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 100 meters apart using a Geographic Information System. A total of 167 points were placed throughout the lake (Figure 1). Plant samples were collected by throwing and dragging a double-sided rake along the lake bottom at each point. All plant taxa (submerged, floating-leaf, emergent and free floating) were recorded to species or genera during the survey following Crow and Hellquist (2000). Plant samples were assessed on the boat to determine species presence-absence and abundance. The abundance rake rating are as follows: 1: sparse, 2: common/ frequent/ occasional, and 3: abundant/matted (Table 2). Frequencies of occurrence percentages (i.e., how often a plant species was sampled in the lake) were calculated based on the littoral zone. Maximum depths were calculated at the 95th percentile for all vegetated sampling points.

Table 2- Quantitative rake abundance ranking (0-3) used to estimate plant abundance for each species based on rake coverage and/or visual observation (MN DNR). A zero (0) ranking indicates no target plants were retrieved or observed in a sample.

Abundance Ranking	Rake Coverage	Description
1		Sparse; plants covering <25% of the rake head
2		Common; plants covering 25%-75% of the rake head
3		Abundant; plants covering >75% of the rake head

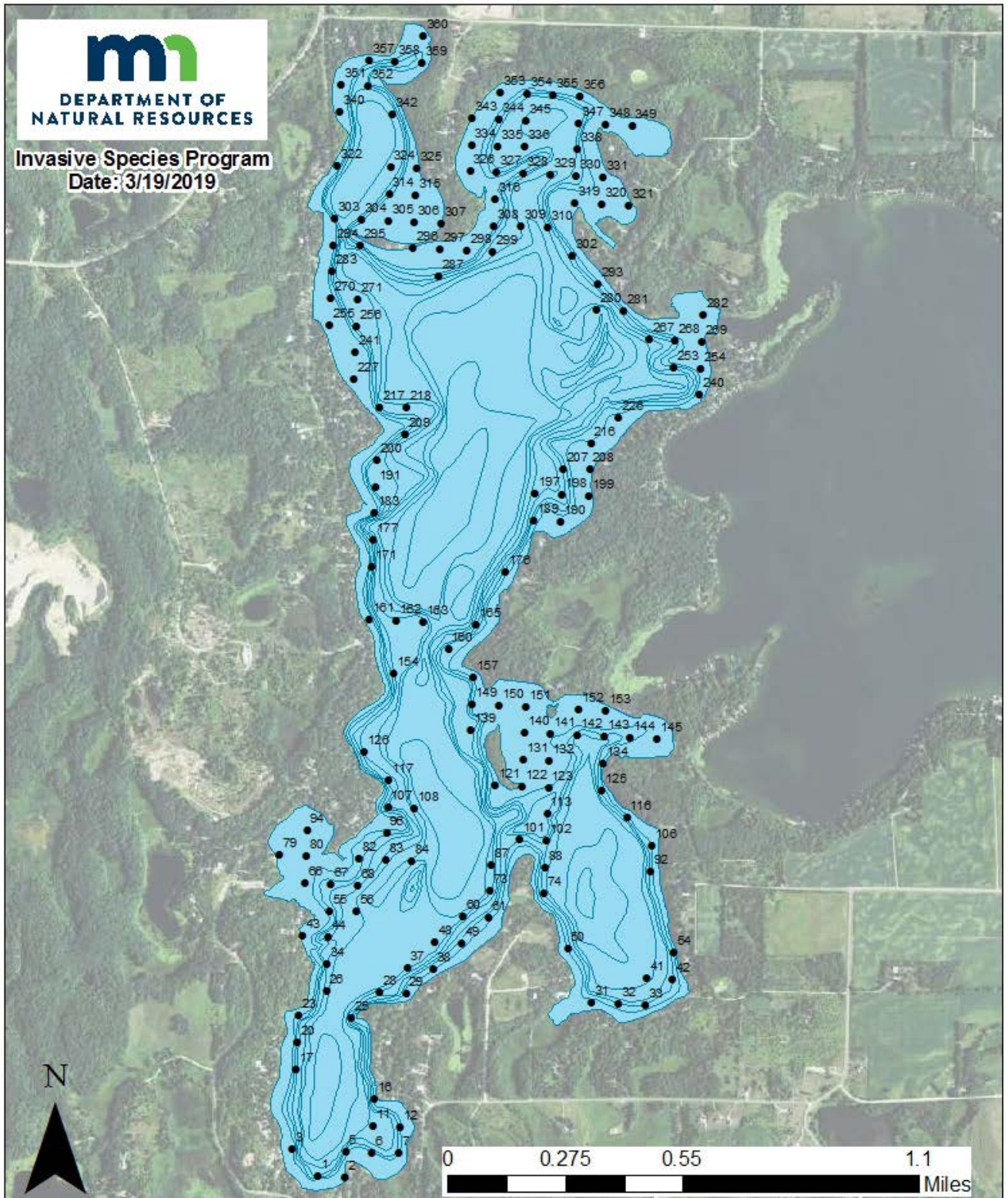


Figure 1 – Point-intercept Survey Grid. Point-intercept survey grid for West Lake Sylvia, Wright County (DOW#86027900). Point-intercept survey included 172 points, 100 meters apart.

Survey Observations

The most recent aquatic vegetation point-intercept survey of West Lake Sylvia (DOW #86027900) occurred on September 12, 2017. Plants were rooted to a maximum depth (95%) of 25 feet, with depths ranging from 2.5 to 30 feet. In the littoral zone (water depth from 0 to 15 feet, where aquatic plants are likely to be found), 100% of the points had submersed native vegetation (Table 3) with a mean submersed native taxa per point of 3.9. West Lake Sylvia has up to 20 submersed native taxa (Table 4) and three non-native submerged taxa.

Table 3 - Point-intercept Metrics. Summary of point-intercept metrics for West Lake Sylvia, Wright County (DOW#86027900). Shaded values were calculated from littoral depth range (0-15 feet).

Metric	AUG 2017
Surveyor	MN DNR
Total # Points Sampled	167
Depth Range of Rooted Veg (ft.)	2.5 - 30
Max Depth of Growth (95%)	25
# of Vegetated Points in Max Depth Range	131
# of Points in Littoral (0-15 feet)	100
% Points w/ Submersed Native Taxa	100
Mean Submersed Native Taxa/ Point	3.9
# Submersed Native Taxa	20
# Submersed Non-Native Taxa	2
% Points w/ Submersed Non- native Taxa	4

Based on the 2017 point-intercept survey, the native plant community within the littoral area in West Lake Sylvia was primarily dominated by muskgrass (*Chara* sp., Figure 2), sampled at 84% of sites in the littoral zone, followed by northern water-milfoil (*Myriophyllum sibiricum*, Figure 3) and flat-stemmed pondweed (*Potamogeton zosteriformis*, Figure 4). These aquatic plants are central to a healthy fish population, offering shelter and providing food and habitat to wildlife. West Lake Sylvia has a diverse aquatic plant community with an average of 3.9 species per a sampling site and up to 20 native submersed aquatic plant species. Figure 7 displays the spatial distribution and species richness (# of species per sample point) of all native submersed species from the point-intercept survey. West Lake Sylvia also has the following emergent and floating-leaf vegetation: yellow water lilies (*Nuphar variegata*), floating pondweed (*Potamogeton natans*) and wild rice (*Zizania palustris*). These emergent plants are especially good at

preventing shoreline erosion, habitat and providing food sources for waterfowl. Plants also absorb nutrients and reduce algae, thereby improving water quality. The invasive aquatic plant surveyed in the lake were Eurasian watermilfoil (*Myriophyllum spicatum*, Figure 5) and curly-leaf pondweed (*Potamogeton crispus*, Figure 6), comprising of less than 4% of the lake. Starry stonewort was not detected on the survey and remains limited to the public access. Three previous aquatic plant survey has taken place on West Lake Sylvia (2002, 2008, and 2015). The surveys were performed using transects by MN DNR fisheries and are not included in this report.

Table 4 - Plant Frequency of Occurrence. Percent frequency of occurrence for observed plant species within the littoral zone (0-15 feet) in West Lake Sylvia, Wright County (DOW#86027900).

Taxonomic Name	Common Name	AUG 2018
SUBMERSED NON-NATIVE		
<i>Potamogeton crispus</i>	curly-leaf pondweed	2
<i>Myriophyllum spicatum</i>	Eurasian water-milfoil	3
SUBMERSED NATIVE		
<i>Bidens beckii</i>	water marigold	5
<i>Chara</i> sp.	muskgrass	84
<i>Ceratophyllum demersum</i>	coontail	23
<i>Elodea canadensis</i>	Canada waterweed	17
<i>Heteranthera dubia</i>	water star-grass	9
<i>Myriophyllum sibiricum</i>	northern water-milfoil	48
<i>Najas</i> sp.	naiad species	21
<i>Potamogeton amplifolius</i>	large-leaved pondweed	2
<i>Potamogeton freisii</i>	Fries' pondweed	7
<i>Potamogeton gramineus</i>	variable pondweed	18
<i>Potamogeton illinoensis</i>	Illinois pondweed	35
<i>Potamogeton praelongus</i>	whitestem pondweed	7
<i>Potamogeton richardsonii</i>	clasping-leaved pondweed	10
<i>Potamogeton robbinsii</i>	Robbin's pondweed	5
<i>Potamogeton zosteriformis</i>	flat-stemmed pondweed	42
<i>Potamogeton</i> spp.	narrow-leaf pondweed	5
<i>Ranunculus</i> sp.	water crowfoot species	2
<i>Stuckenia pectinata</i>	sago pondweed	23
<i>Utricularia</i> sp.	bladderwort species	3
<i>Vallisneria americana</i>	water celery	19
FLOATING LEAF		
<i>Potamogeton natans</i>	floating-leaved pondweed	2
<i>Nuphar variegata</i>	yellow waterlily	2
EMERGENT		
<i>Zizania palustris</i>	wild rice	2

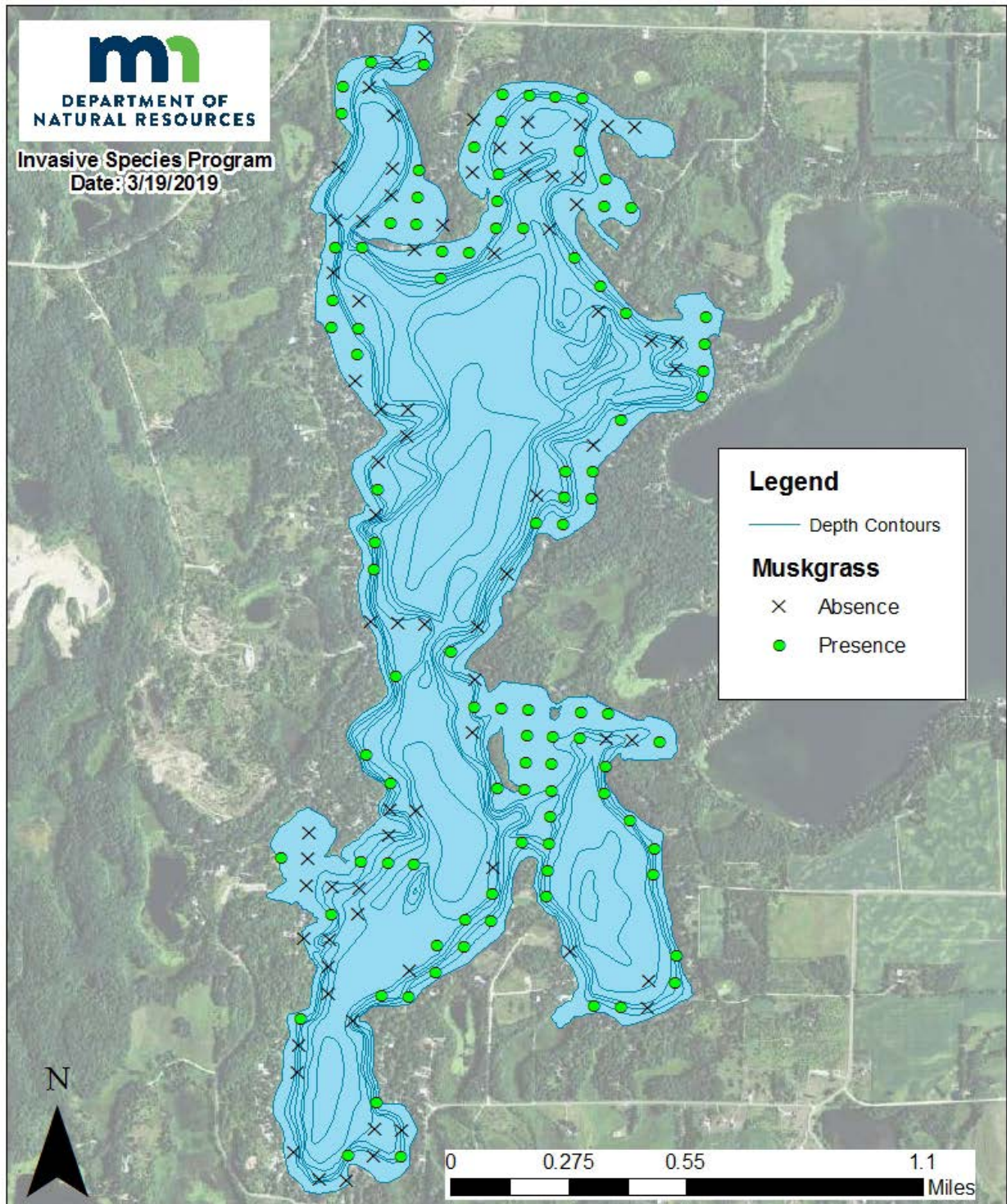


Figure 2 – Muskgrass Distribution. Plant distribution from the 2017 point-intercept survey for muskgrass in West Lake Sylvia, Wright County (DOW#86027900). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

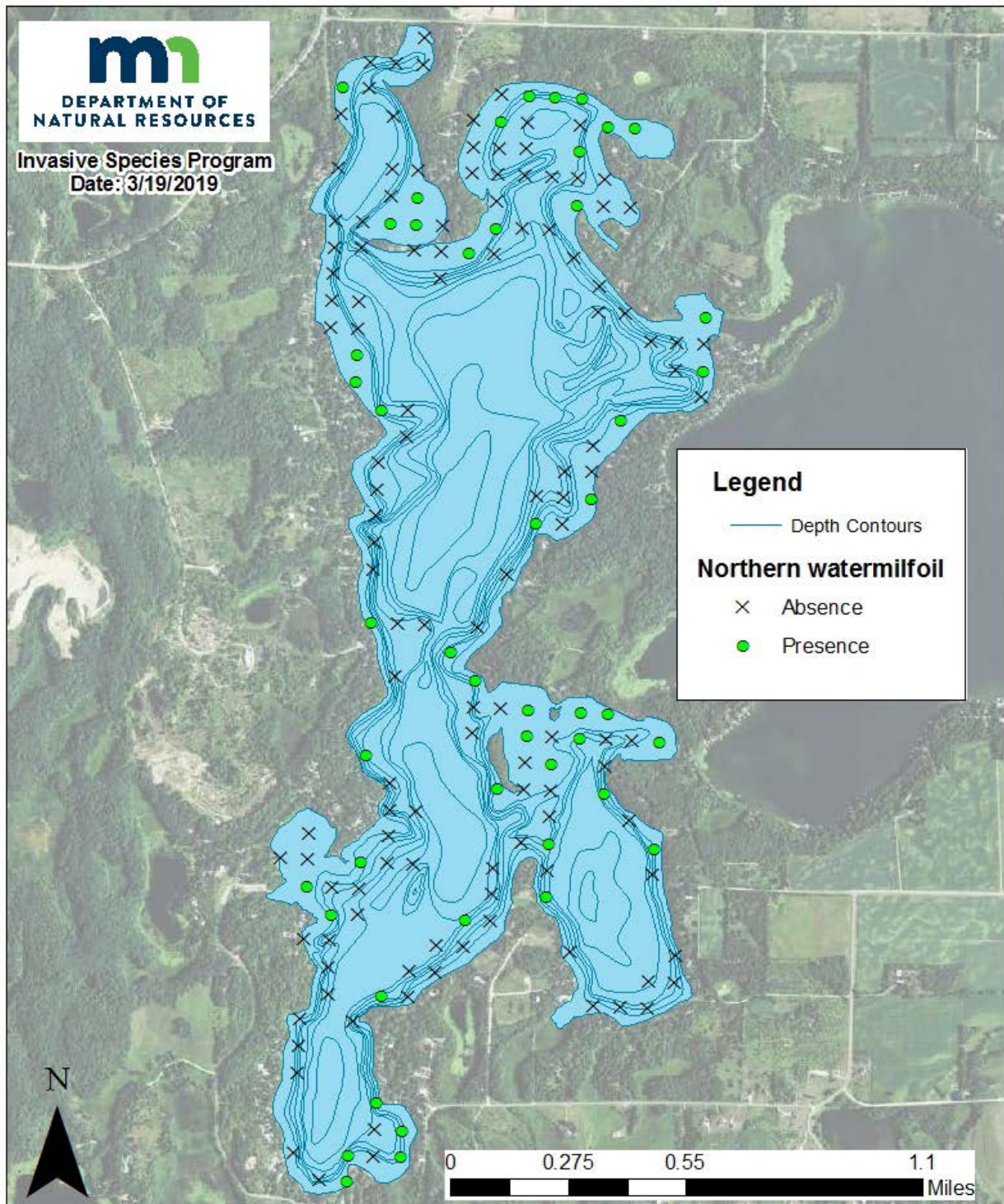


Figure 3 – Northern water-milfoil Distribution. Plant distribution from the 2017 point-intercept survey for northern water-milfoil in West Lake Sylvia, Wright County (DOW#86027900). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

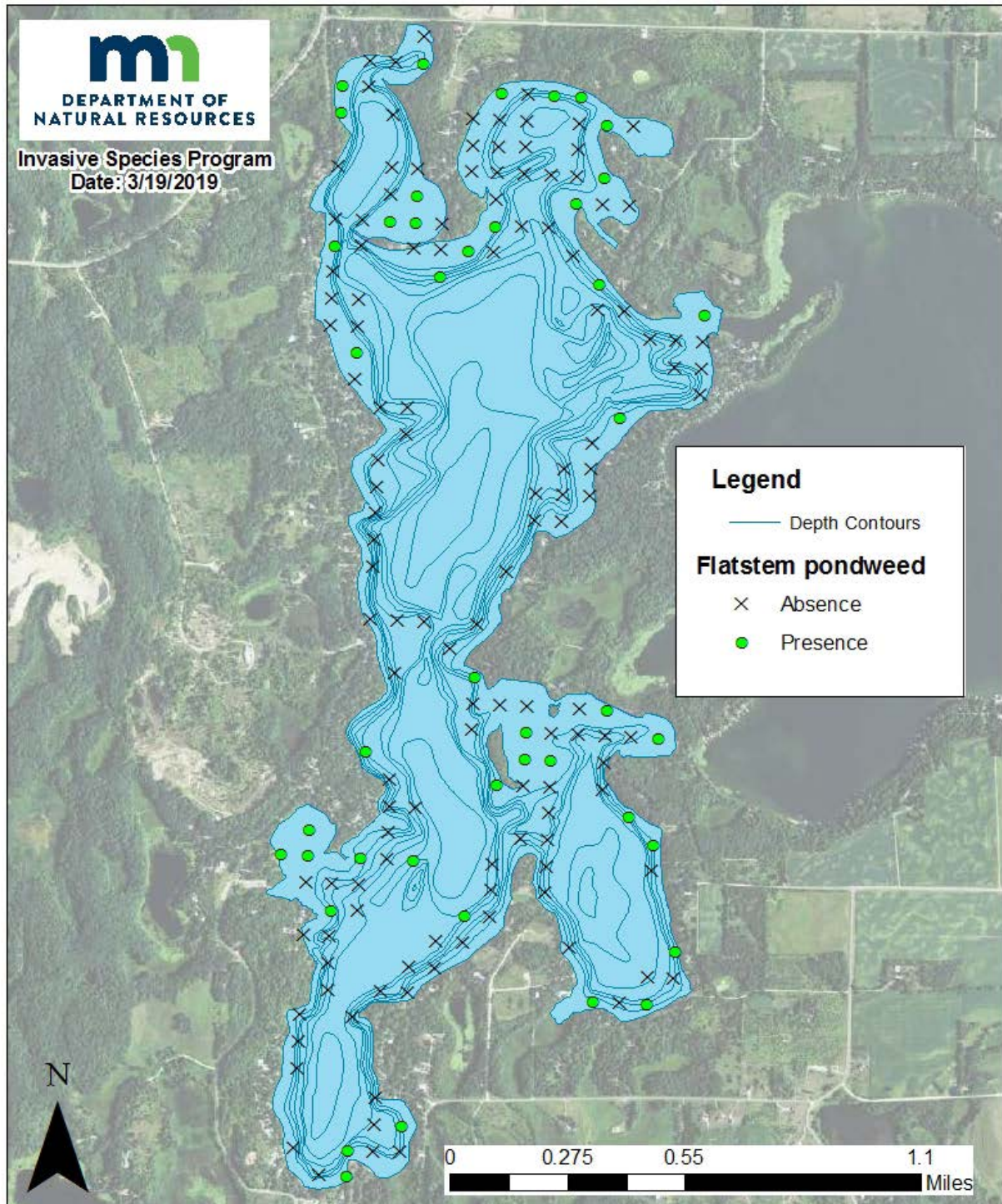


Figure 4 – Flat-stemmed pondweed Distribution. Plant distribution from the 2017 point-intercept survey for flat-stemmed pondweed in West Lake Sylvia, Wright County (DOW#86027900). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants

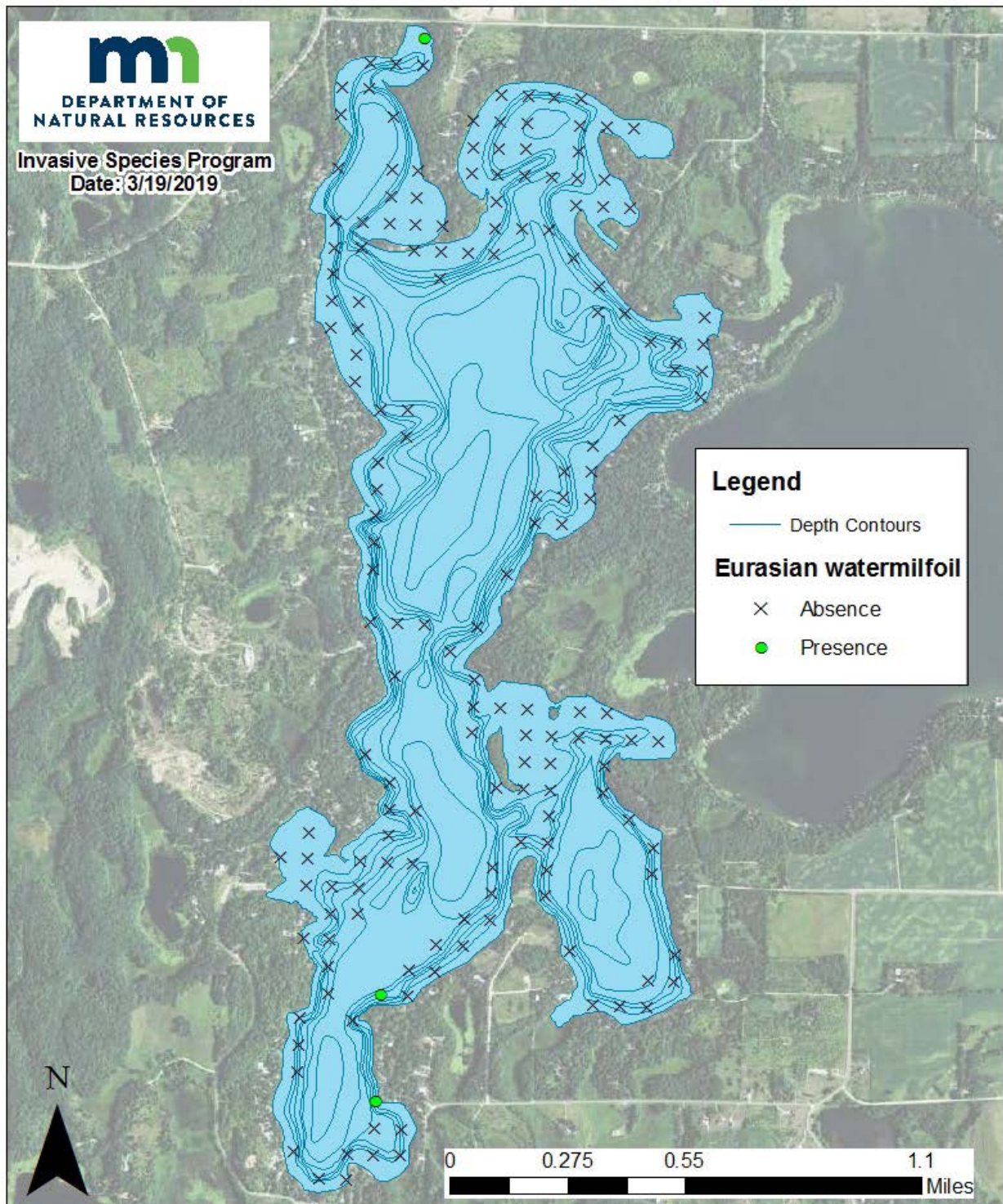


Figure 5 – Eurasian water-milfoil Distribution. Plant distribution from the 2017 point-intercept survey for Eurasian watermilfoil in West Lake Sylvia, Wright County (DOW#86027900). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

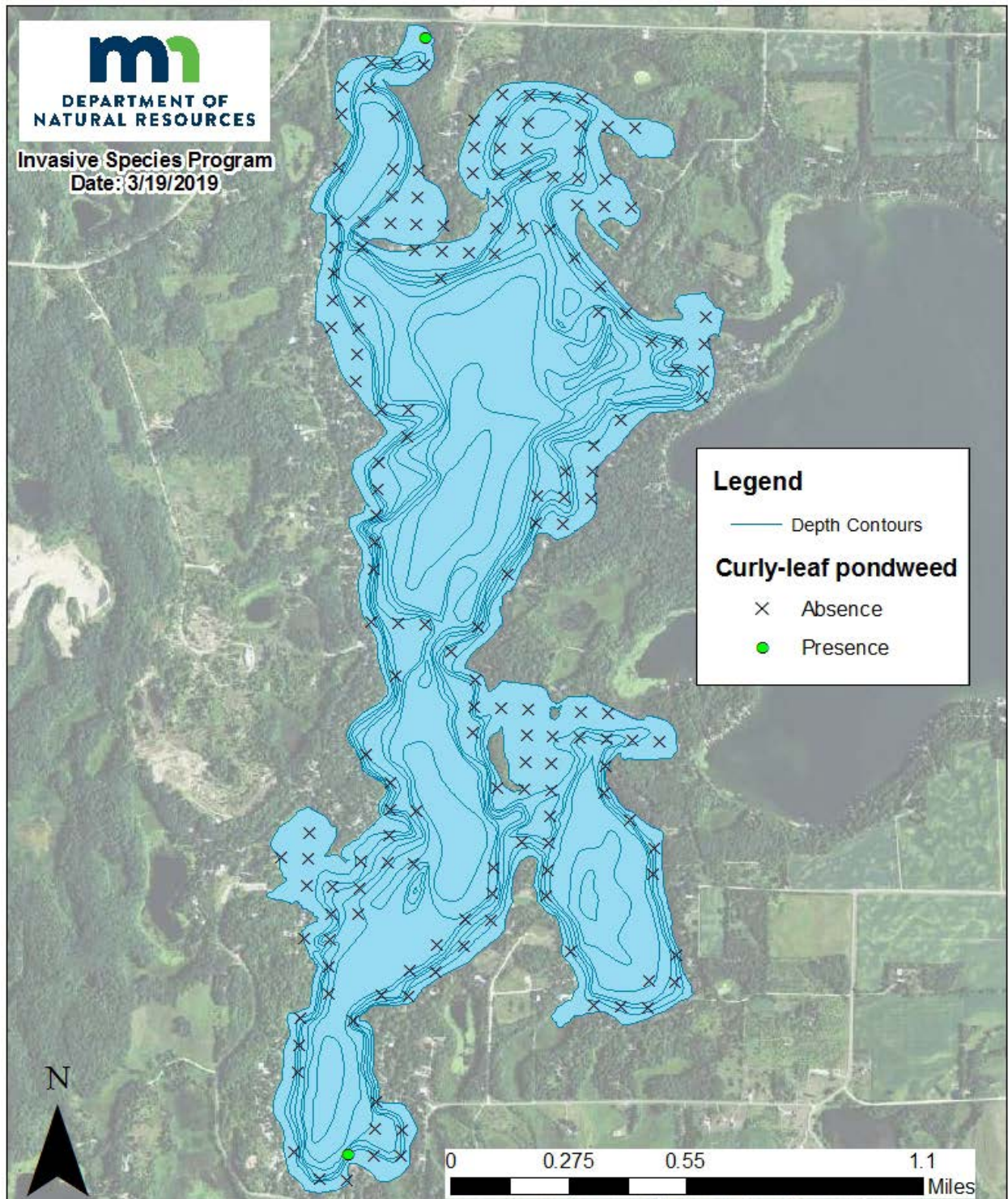


Figure 6 – Curly-leaf pondweed Distribution. Plant distribution from the 2017 point-intercept survey for curly-leaf pondweed in West Lake Sylvia, Wright County (DOW#86027900). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

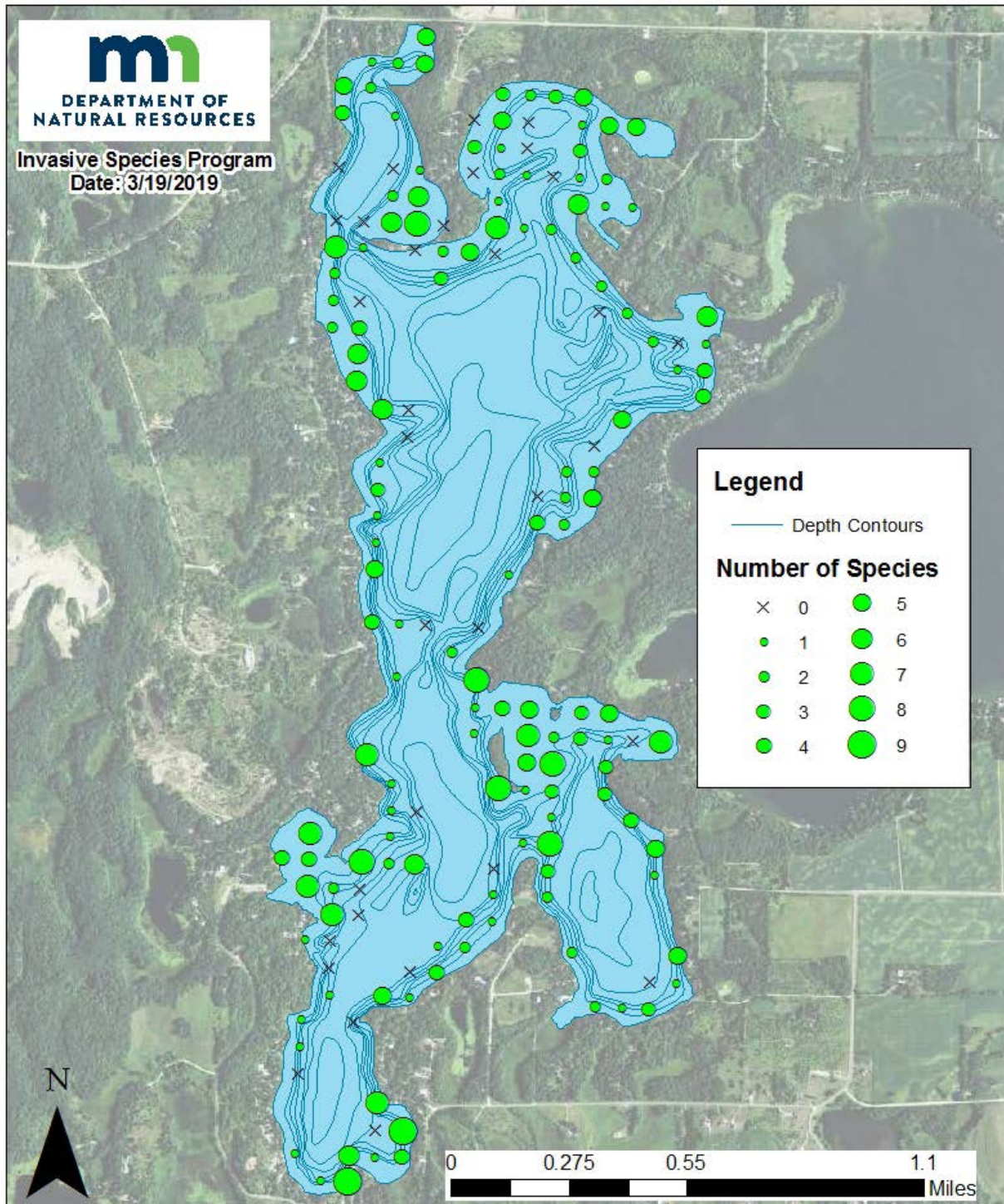


Figure 7 – Species Richness Distribution. Maps of number of species from the 2017 point-intercept survey in West Lake Sylvia, Wright County (DOW#86027900).

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.