East Lake Sylvia, Wright County
2018 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: East Lake Sylvia (DOW# 86028900)

Lake Surface Area: 669 acres

Littoral Area: 209 acres

County: Wright County

Survey Type: Point-intercept

Date of Survey (most recent): August 14, 2018

Date of Report (updated): January 21, 2020

Observer[s]: MN DNR, Invasive Species Program (ISP): Emelia Hauck Jacobs and Aliesha Bradford

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Report Details

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Summary

The purpose of this report is to provide an overview of aquatic plant distribution and the management of invasive aquatic plants in East Lake Sylvia, Wright County. 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

East Lake Sylvia is a 669 acre lake located one mile southwest of the town of Annandale, in Wright County, MN. The maximum depth of water in East Lake Sylvia is 78 feet, and 31% 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 17.7 feet in 2017. According to surveys from the Minnesota Pollution Control Agency (MPCA, 2019), East Lake Sylvia is classified as a lower mesotrophic lake, based on its Trophic State Index (TSI) of approximately 38. 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 East Lake Sylvia's water quality data on the MPCA website (https://cf.pca.state.mn.us/water/cmp/resultDetail.cfm?siteid=86-0289-00-101&path=wdip).

Management History

The lake has two invasive plant species: Eurasian Milfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*). Eurasian Milfoil has been present in the lake for several years (first reported in 2008). To date, East Lake Sylvia does not have starry stonewort (*Nitellopsis obtusa)*, although it is documented in West Lake Sylvia. Invasive aquatic plant management in East Lake Sylvia has focused on Eurasian Watermilfoil, using a 2, 4-D herbicide and curly-leaf pondweed using endothall. Invasive aquatic plants have been relatively sparse and only partial- lake spot treatments have taken place. The most recent treatment was for

Eurasian milfoil was 0.9 acres in 2018, organized by the Greater Lake Sylvia Association (Table 1). Over time, the invasive aquatic plant community has not changed. Invasive aquatic plants tend to co-exist with other native aquatic plants in East Lake Sylvia. 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 East Lake Sylvia, Wright County (DOW#86028900). Abbreviations are as followed: curly-leaf pondweed (CLP) and Eurasian Watermilfoil (EWM). 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	EWM	0	2, 4-D	Lake Association
2013	EWM	0	Auxin-mimic herbicide	Lake Association
2014	EWM	0	Auxin-mimic herbicide	Lake Association
2015	EWM	0	2, 4-D	Professional Lake Mgmt.
2016	EWM	1	2, 4-D	Professional Lake Mgmt.
2017	EWM	0.9	2, 4-D	Lake Restoration
2018	EWM	0.9	2, 4-D	Lake Restoration
2012	CLP	0	n/a	n/a
2013	CLP	<1	Endothall	Lake Association
2014	CLP	0	n/a	n/a
2015	CLP	<3	Endothall	Professional Lake Mgmt.
2016	CLP	<3	Endothall	Professional Lake Mgmt.
2017	CLP	0	n/a	n/a
2018	CLP	0	Endothall	Lake Restoration

Survey Objectives

A point-intercept survey was used to assess the distribution of aquatic plants in East 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

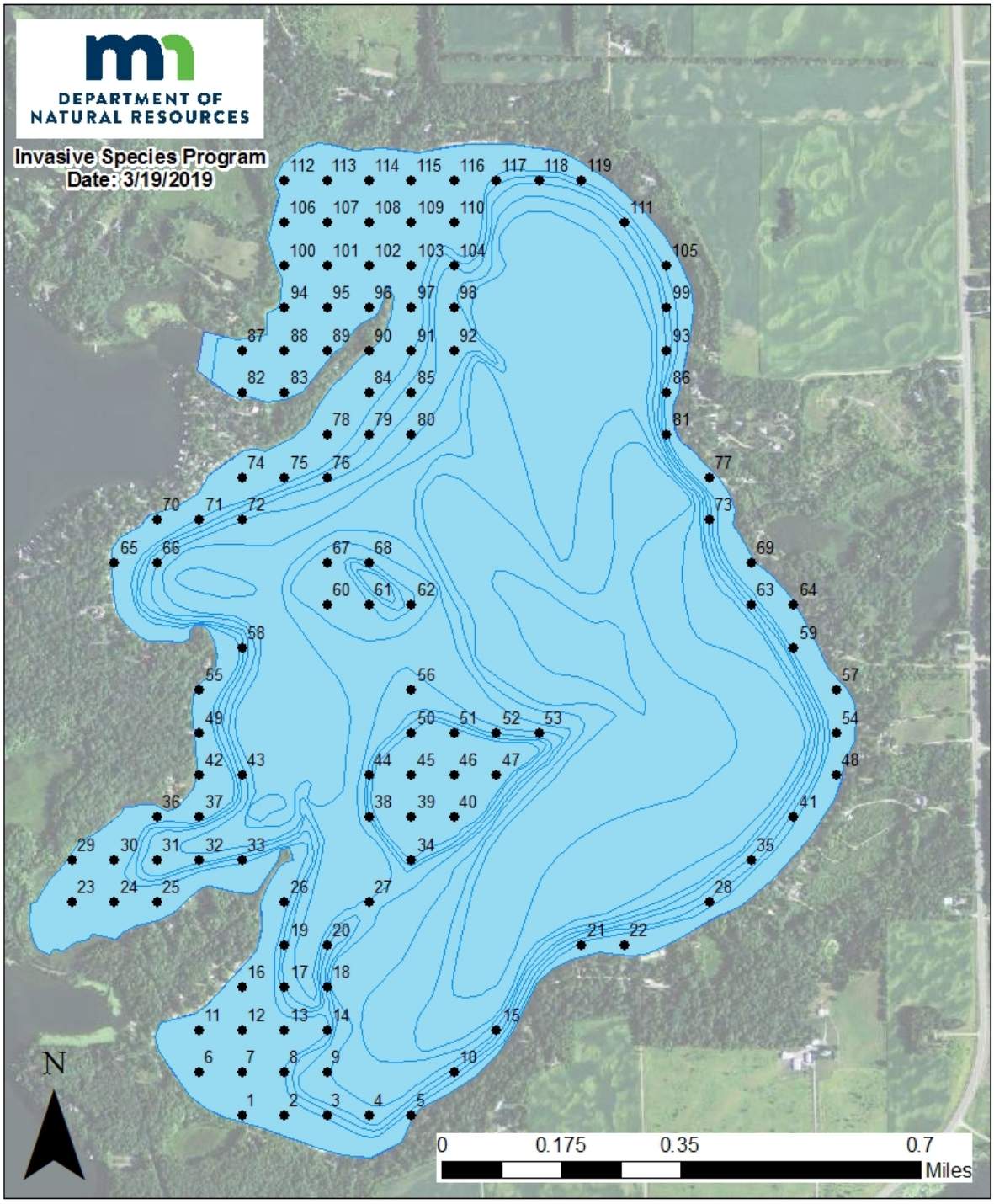
help the DNR and our partners to monitor native plant communities and evaluate possible responses to invasive aquatic plant management via herbicide control. It is important to note that distributions and occurrences of aquatic plants may vary from year to year due to natural variations (water clarity, snow cover, water temperatures, and natural fluctuation in plant species) or human induced alterations, such as, herbicide and shoreline management activities.

Survey Methods

In 2018, 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 91 points were sampled in depths up to 20 feet (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



East Lake Sylvia, Wright County (86028900)
MN DNR Point Intercept Survey

Figure 1 – Point-intercept Survey Grid. Point-intercept survey grid for East Lake Sylvia, Wright County (DOW#86028900). Point-intercept survey included 91 points, 100 meters apart.

Survey Observations

The most recent aquatic vegetation point-intercept survey of East Lake Sylvia (DOW #86028900) occurred on August 14, 2018. Plants were rooted to a maximum depth (95%) of 15.4 feet, with depths ranging from 2 to 20 feet. Most plants were growing in the depth range between 2 and 10 feet. In the littoral zone (water depth from 0 to 15 feet, where aquatic plants are likely to be found), 94% of the points had submersed native vegetation (Table 3) with a mean submersed native taxa per point of 2.6. East Lake Sylvia has up to 17 submersed native taxa (Table 4) and two non-native submerged taxa (curly-leaf pondweed and Eurasian watermilfoil), comprising of 1% of the littoral area.

Table 3 - Point-intercept Metrics. Summary of point-intercept metrics for East Lake Sylvia, Wright County (DOW#86028900). Shaded values were calculated from littoral depth range (0-15 feet).

Metric	AUG 2018
Treated (Y/N)	Y
Surveyor	MN DNR
Total # Points Sampled	91
Depth Range of Rooted Veg (ft.)	2- 20
Max Depth of Growth (95%)	15.4
# of Vegetated Points in Max Depth Range	79
# Points in Littoral (0-15 feet)	83
% Points w/ Submersed Native Taxa	94
Mean Submersed Native Taxa/ Point	2.6
# Submersed Native Taxa	17
# Submersed Non-Native Taxa	1
% Points w/ Submersed Non- native Taxa	1

Based on the 2018 point-intercept survey, the native plant community within the littoral area in East Lake Sylvia was primarily dominated by muskgrass (*Chara* sp.; Figure 2) at 63% of all sites, followed by northern watermilfoil (*Myriophyllum sibiricum*, Figure 3), coontail (*Ceretophyllum demersum*, Figure 4) and Illinois pondweed (*Potamogeton illinoensis*; Figure 5).). These aquatic plants are central to a healthy fish population, offering shelter and providing food and habitat to wildlife. One of the least common plants found was Eurasian watermilfoil (*Myriophyllum spicatum*, Figure 6) at 1%. East Lake Sylvia has a diverse aquatic plant community with an average of 2.6 species per a sampling site and up to seven species per a sampling site. Figure 7 displays the species richness and distribution in East Lake Sylvia.

Comparison to previous years

Two previous aquatic plant survey has taken place on East Lake Sylvia, in 2002 and 2008. The surveys were performed using transects by MN DNR fisheries and 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 East Lake Sylvia, Wright County (DOW#86028900).

Taxonomic Name	Common Name	AUG 2018
SUBMERSED NON-NATIVE		
Myriophyllum spicatum	Eurasian watermilfoil	1
SUBMERSED NATIVE		
Ceratophyllum demersum	coontail	28
Chara sp.	muskgrass	63
Elodea canadensis	Canadian waterweed	10
Heteranthera dubia	water star-grass	5
Myriophyllum sibiricum	northern watermilfoil	28
Nitella sp.	native stonewort species	1
Najas sp.	naiad species	25
Potamogeton amplifolius	large-leaved pondweed	1
Potamogeton friesii	Fries' pondweed	1
Potamogeton illinoensis	Illinois pondweed	28
Potamogeton richardsonii	clasping-leaved pondweed	6
Potamogeton robinsii	Robbin's pondweed	1
Potamogeton spp.	narrow-leaf pondweed	1
Potamogeton zosteriformis	flat-stemmed pondweed	20
Stuckenia pectinata	sago pondweed	24
Utricularia sp.	bladderwort species	2
Vallisneria americana	wild celery	16
FLOATING LEAF		
Nuphar variegata	yellow waterlily	5
Nymphaea odorata	white waterlily	5
EMERGENT		
Schoenoplectus sp.	bulrush species	2
Zizania palustris	wild rice	2

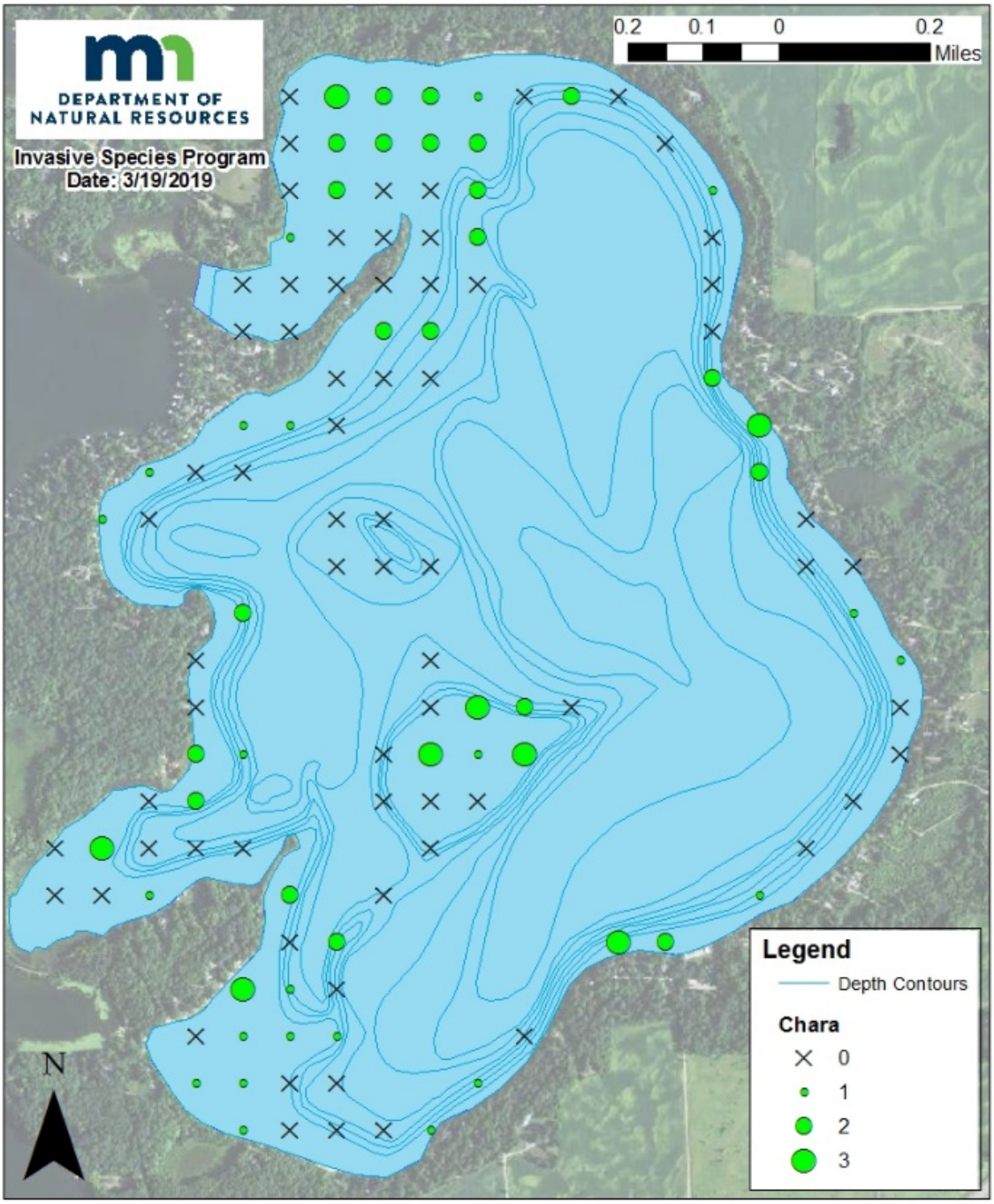


Figure 2 – Muskgrass Distribution. Plant distribution from the 2018 point-intercept survey for muskgrass in East Lake Sylvia, Wright County (DOW#86028900). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

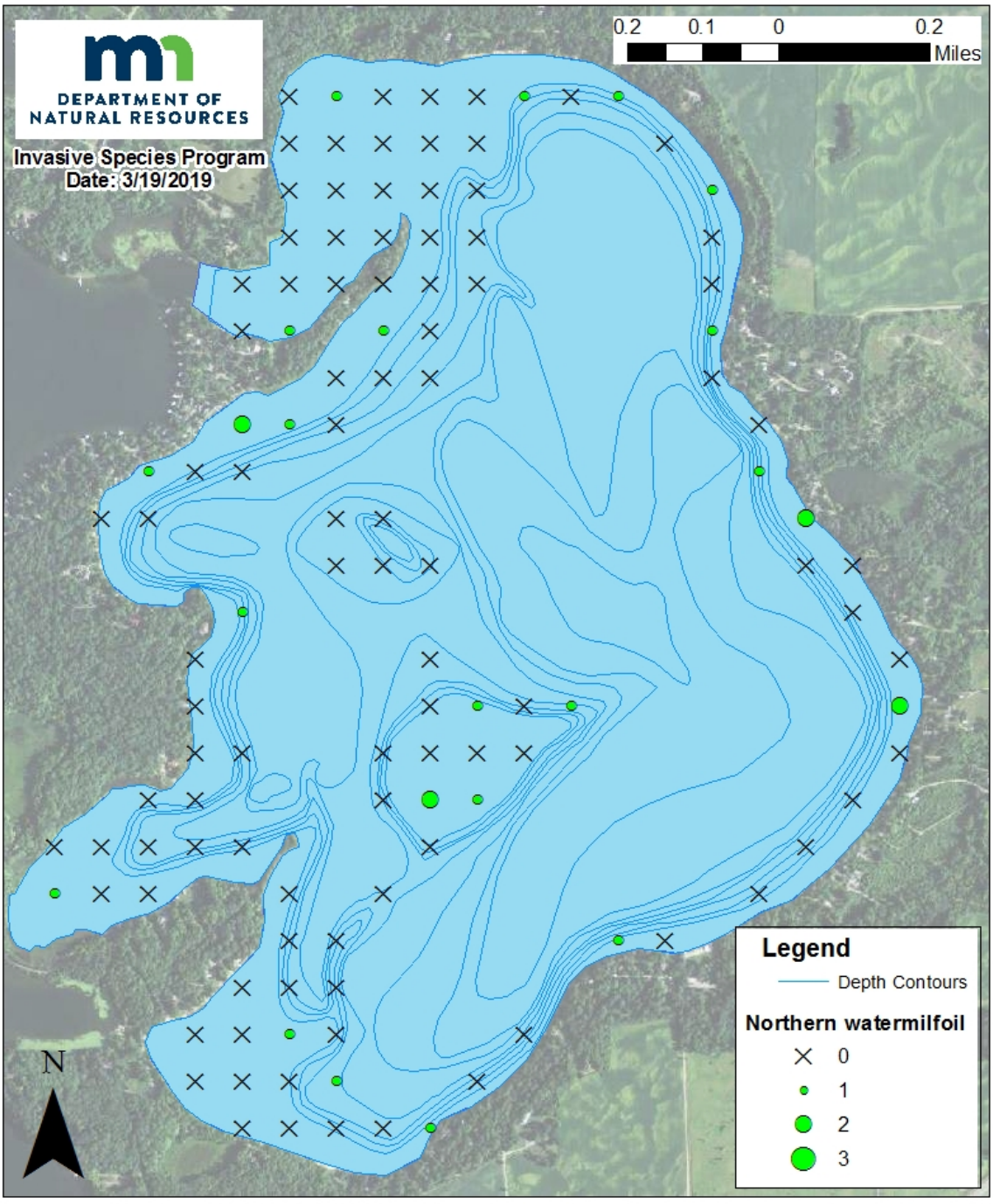
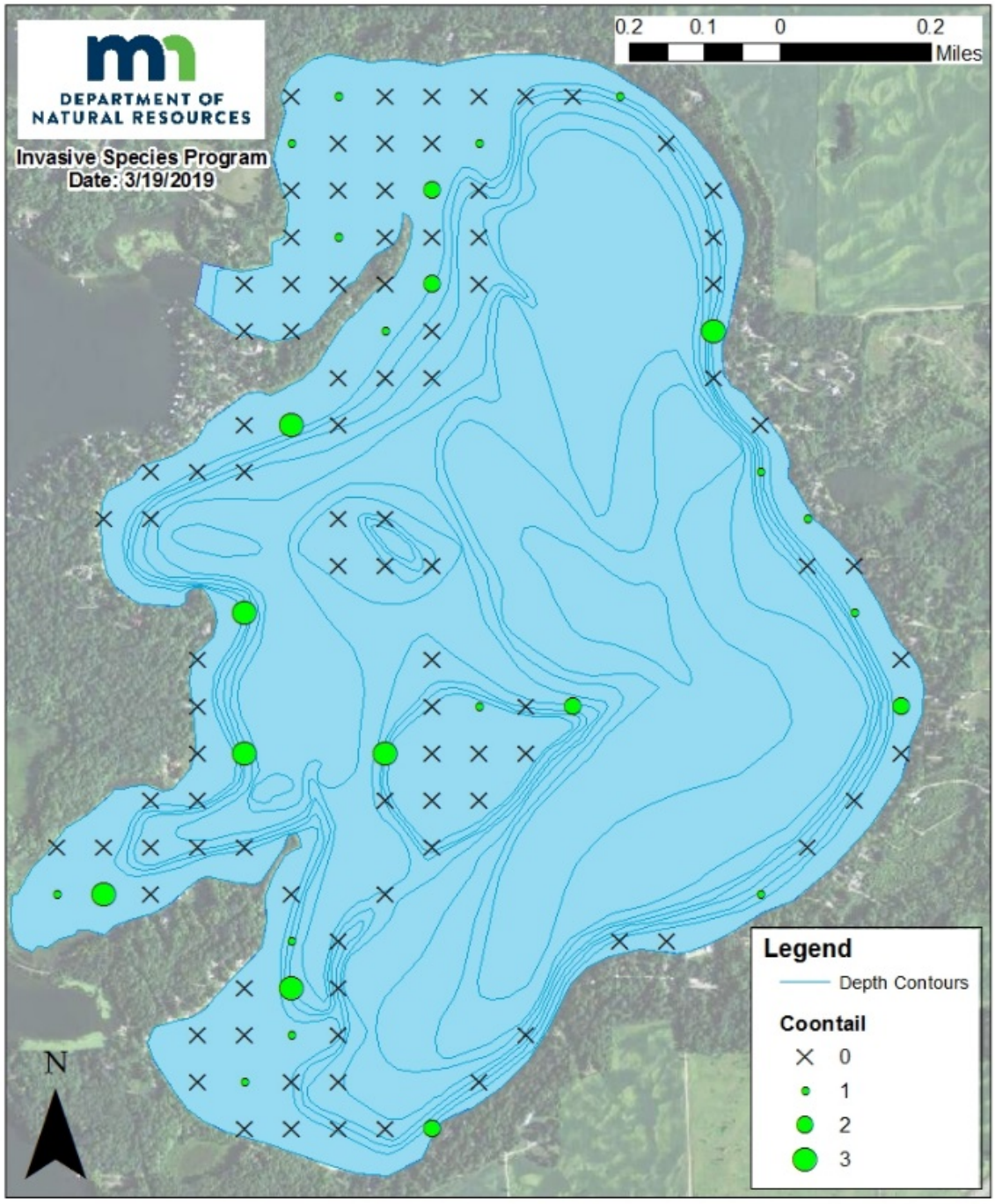


Figure 3 – Northern watermilfoil Distribution. Plant distribution from the 2018 point-intercept survey for northern watermilfoil in East Lake Sylvia, Wright County (DOW#86028900). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.



East Lake Sylvia, Wright County (86028900)
MN DNR Point Intercept Survey, August 14, 2018

Figure 4 – Coontail Distribution. Plant distribution from the 2018 point-intercept survey for coontail in East Lake Sylvia, Wright County (DOW#86028900). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

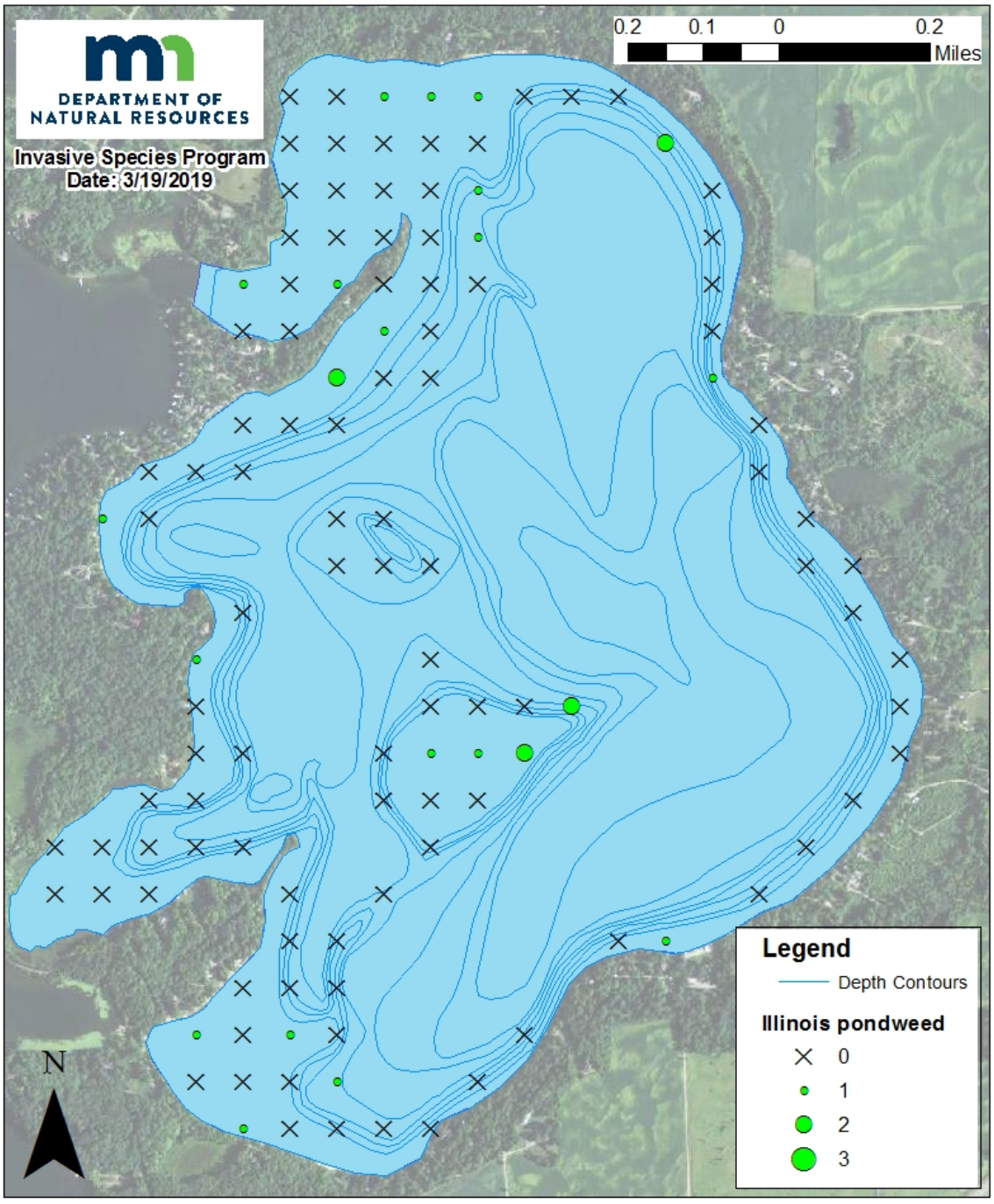
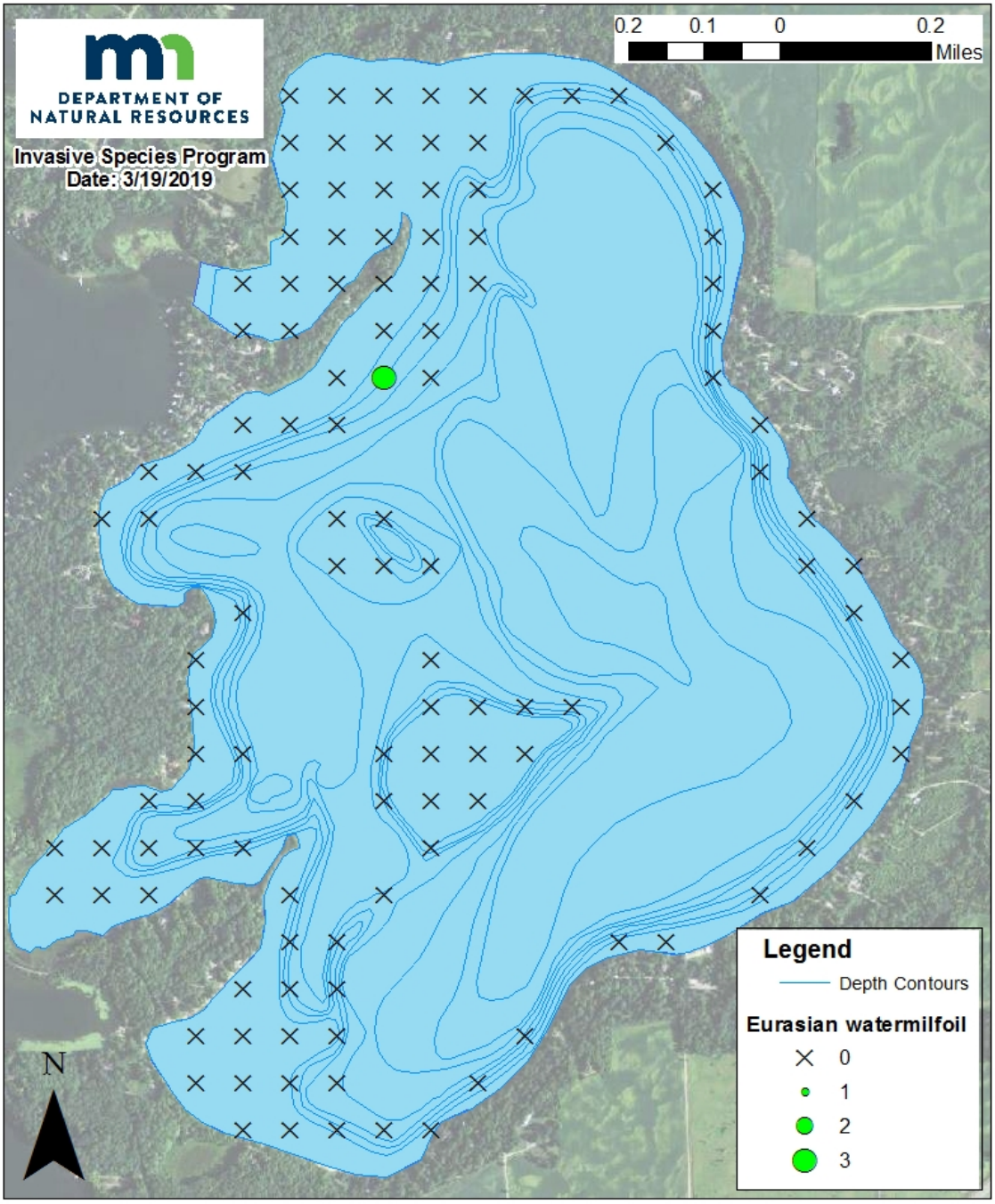


Figure 5 – Illinois pondweed Distribution. Plant distribution from the 2018 point-intercept survey for Illinois pondweed in East Lake Sylvia, Wright County (DOW#86028900). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.



East Lake Sylvia, Wright County (86028900)
MN DNR Point Intercept Survey, Aug 14, 2018

Figure 6 – Eurasian watermilfoil Distribution. Eurasian watermilfoil distribution maps from the 2018 point-intercept survey in East Lake Sylvia, Wright County (DOW#86028900). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants. Eurasian Watermilfoil was only found at one site and was considered very dense.

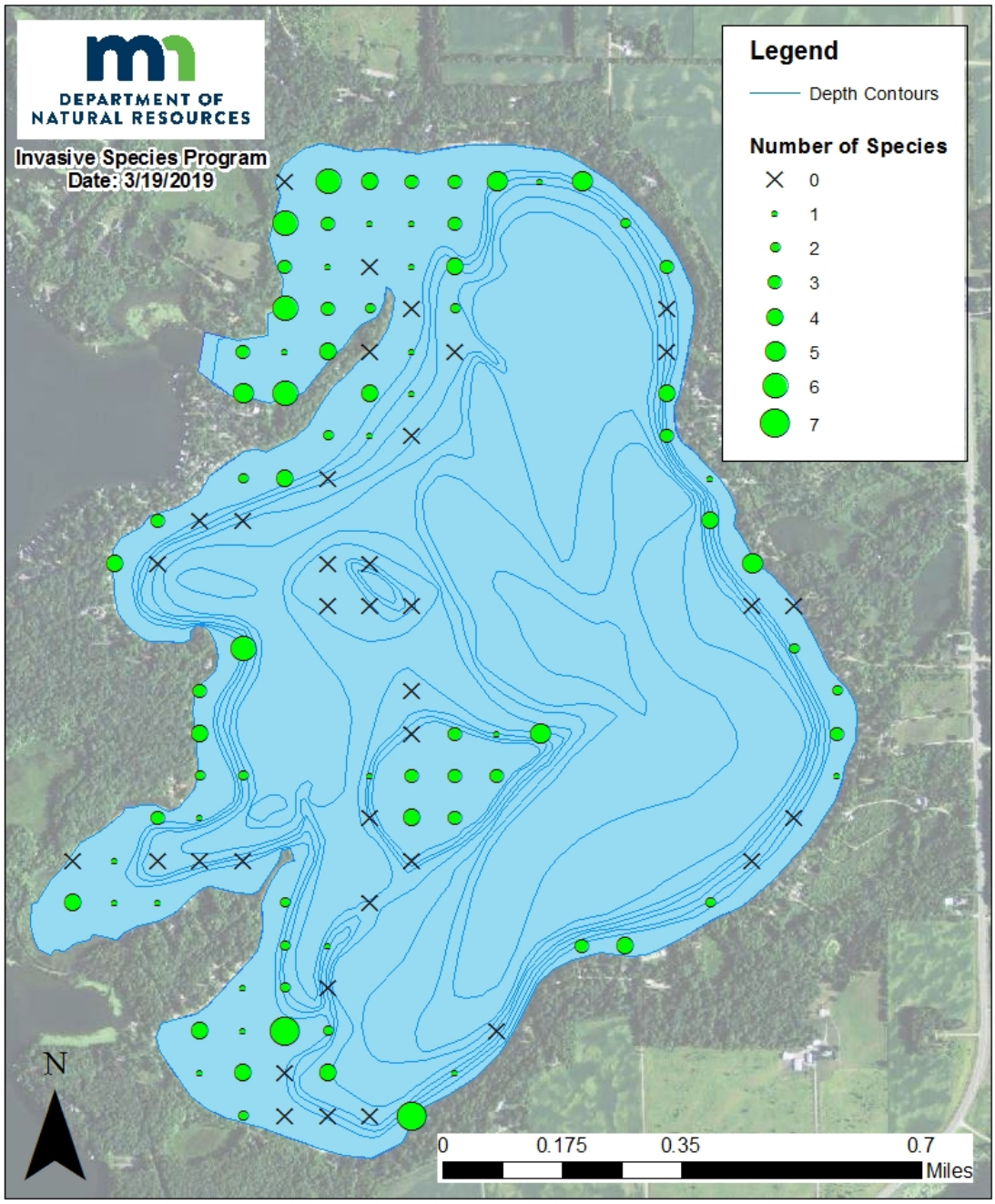


Figure 7 – Species Richness Distribution. Number of species per a sampling point based on the 2018 point-intercept survey in East Lake Sylvia, Wright County (DOW#86028900).

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.