
PLEASANT LAKE, WRIGHT COUNTY: 2019 AQUATIC VEGETATION REPORT

Report by Invasive Species Program

Division of Ecological and Water Resources

Minnesota Department of Natural Resources



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October 16, 2019

Project Details

Lake: Pleasant (DOW# 86025100)

Lake Surface Area: 597 acres

Littoral Area: 260 acres

County: Wright County

Survey Type: Point-intercept

Date of Survey (most recent): August 8, 2019

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Report updated October 28, 2019

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Report Details

C. Jurek and E. Hauck Jacobs. 2019. West Pleasant Lake, Wright County: 2019 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 Pleasant Lake (DOW #86025100) occurred on August 8, 2019. Plants were present throughout the lake to a depth of 19.4 feet. Within the littoral zone (zone in lake from the 0-15 foot depth range), 96% of the points had native submersed taxa. The average number of native submersed taxa per sample point was 2.7. In total, nineteen submersed taxa, one taxa of an invasive aquatic plant (Curly-leaf pondweed), two floating-leaf taxa, and no emergent taxa were observed during the 2019 survey.

Lake Description

Pleasant Lake is a 597 acre lake located two miles north of the town of Annandale, in Wright County, MN. The lake has three invasive plant species: Starry stonewort (*Nitellopsis obtusa*), Eurasian watermilfoil (*Myriophyllum spicatum*), and curly-leaf pondweed (*Potamogeton crispus*). Both invasive taxa, Eurasian watermilfoil (2017) and Starry stonewort (2018) were recently introduced into the lake.

The maximum depth of water in Pleasant Lake is 74 feet and 48.8% of the lake is littoral (water depth between 0 to 15 feet, where aquatic plants are most likely to grow). Water clarity during the summer averaged 10.8 feet in 2019. According to surveys from the Minnesota Pollution Control Agency (MPCA, 2019), Pleasant Lake is classified as a higher mesotrophic lake, based on its Trophic State Index (TSI) of approximately 47. For more information on water quality, go to the MPCA website: [Pleasant Lake water quality](#).

Management History

Invasive aquatic plant management in Pleasant Lake has focused on Eurasian Watermilfoil, using the auxin-mimic herbicides and curly-leaf pondweed using endothall and most recently starry stonewort control using chelated copper and physical removal. Curly-leaf pondweed treatment acreage has remained under 15 acres, Eurasian watermilfoil treatments have only been spot treatments and starry stonewort management had been limited to the north access.

Survey Objectives

Implementation of a point-intercept survey assessed the distribution of aquatic plants in Pleasant Lake. 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 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 Pleasant Lake, Wright County (DOW#86025100). Abbreviations are as followed: curly-leaf pondweed (CLP) 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
2012	CLP	10	Endothall	Lake Restoration
2013	CLP	10	Endothall	Lake Restoration
2014	CLP	10	Endothall	Lake Restoration
2015	CLP	13.46	Endothall	--
2016	CLP	15	Endothall	Lake Restoration
2017	CLP	15	Aquathol K	Lake Restoration
2018	CLP	14.9	Aquathol K	Lake Restoration
2019	CLP	15	Diquat	PLM
2017	EWM	5	2, 4-D	Lake Restoration
2018	EWM	1	Triclopyr	PLM
2019	EWM	1.4	ProcellaCOR	PLM
2018- 2019	SSW	1	Citrine Plus	Lake Restoration

Survey Methods

In 2019, 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 207 points were sampled within 20 feet (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.

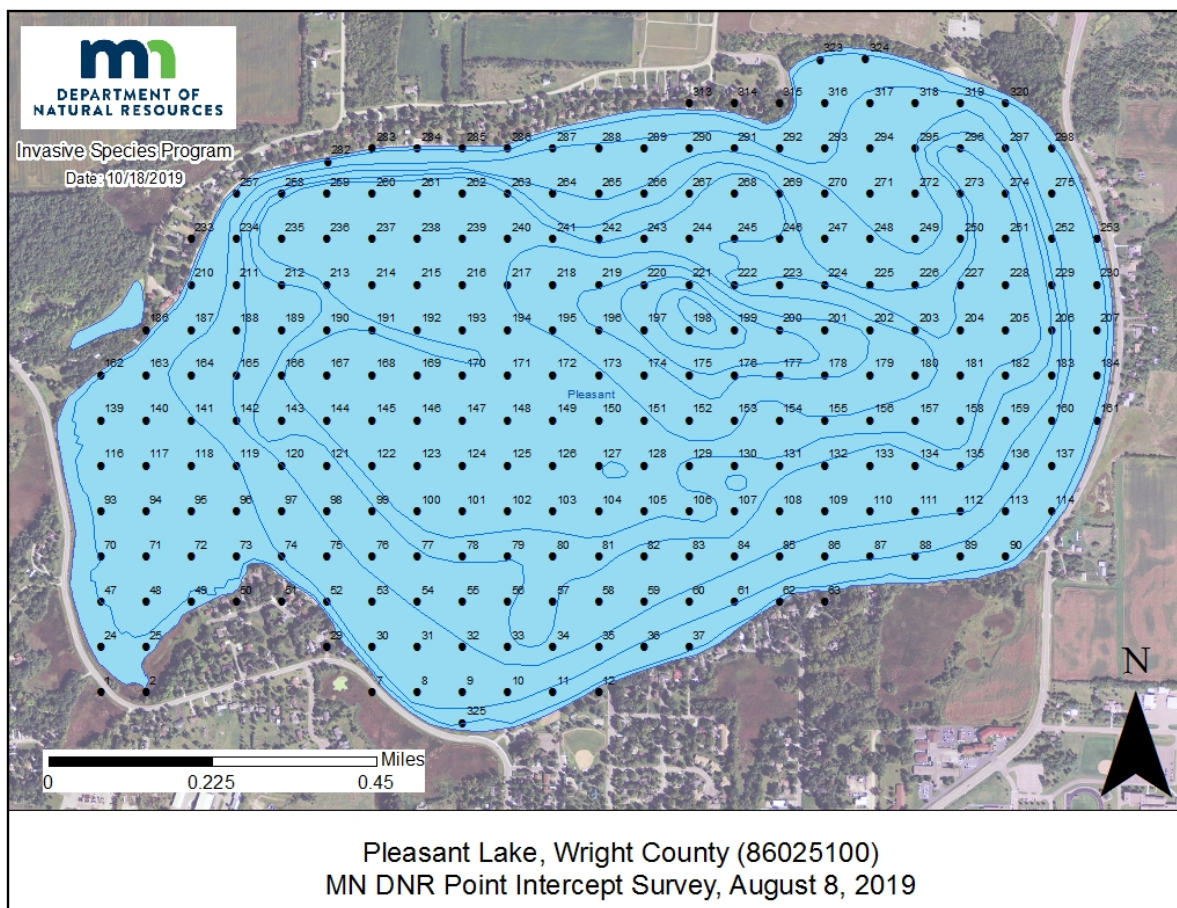


Figure 1 – Point-intercept Survey Grid. Point-intercept survey grid for Pleasant Lake, Wright County (DOW#86025100). Point intercept survey included 207 points, 100 meters apart.

Survey Observations

In 2019, we found plants in Pleasant Lake in a range of water depth from one to 20 feet. Most plants were growing in the depth range between two and 10 feet. In the littoral zone, 96% of the surveyed points had submersed native vegetation (Table 2). In total, we found nineteen submersed taxa, one floating-leaf species, and no emergent species during the survey (Table 3). Coontail (*Ceratophyllum demersum*) was the most commonly occurring plant, at 71% of all sites in the littoral zone (Figure 2), followed by naiad species (*Najas* sp.), Muskgrass species (*Chara* sp.) and Northern watermilfoil (*Myriophyllum sibiricum*; Figures 3-5). The only invasive aquatic plant found on the survey was curly- leaf pondweed (Figure 6). The number of species per site is displayed in Figure 7.

Table 2- Point-intercept Metrics. Summary of point-intercepts metrics for Pleasant Lake, Wright County (DOW#86025100). Shaded values were calculated from littoral depth range (0-15 feet).

	AUG 2019
Treated (Y/N)	Y
Surveyor	MN DNR
Total # Points Sampled	139
Depth Range of Rooted Veg (ft)	1 - 20
Max Depth of Growth (95%)	14
# Point in Max Depth Range	123
# Points in Littoral (0-15 feet)	133
% Points w/ Submersed Native Taxa	96
Mean Submersed Native Taxa/ Point	2.7
# Submersed Native Taxa	19
# Submersed Non-Native Taxa	1
% Points w/ Submersed Non- native Taxa	4

Comparison to previous years

There was only one previous survey performed on Pleasant Lake. The survey was done using transects by MnDNR fisheries and not included in this report.

Table 3- Plant Frequency Occurrence. Percent frequency of occurrence for observed plant species within the littoral zone (0-15 feet) in Pleasant Lake, Wright County (DOW#86025100).

Taxonomic Name	Common Name	AUG 2019
SUBMERSED NON-NATIVE		
<i>Potamogeton crispus</i>	Curly-leaf pondweed	4
SUBMERSED NATIVE		
<i>Ceratophyllum demersum</i>	Coontail	71
<i>Chara</i> sp.	Muskgrass	38
<i>Elodea canadensis</i>	Canada waterweed	4
<i>Heteranthera dubia</i>	Water stargrass	2
<i>Myriophyllum spicatum</i>	Northern watermilfoil	35
<i>Najas</i> sp.	Naiad species	33
<i>Potamogeton gramineus</i>	Variable pondweed	2
<i>Potamogeton illinoensis</i>	Illinois pondweed	3
<i>Potamogeton praelongus</i>	White-stem pondweed	5
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	5
<i>Potamogeton</i> sp.	Narrow-leaf pondweed	4
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	16
<i>Ranunculus</i> sp.	Buttercup species	2
<i>Stuckenia pectinata</i>	Sago pondweed	8
<i>Utricularia</i> sp.	Bladderwort	13
<i>Vallisneria americana</i>	Wild celery	8
<i>Watermoss</i>	Water moss group	1
FLOATING LEAF		
<i>Nuphar variegata</i>	Yellow waterlily	6
<i>Lemna trisulca</i>	Star duckweed	10

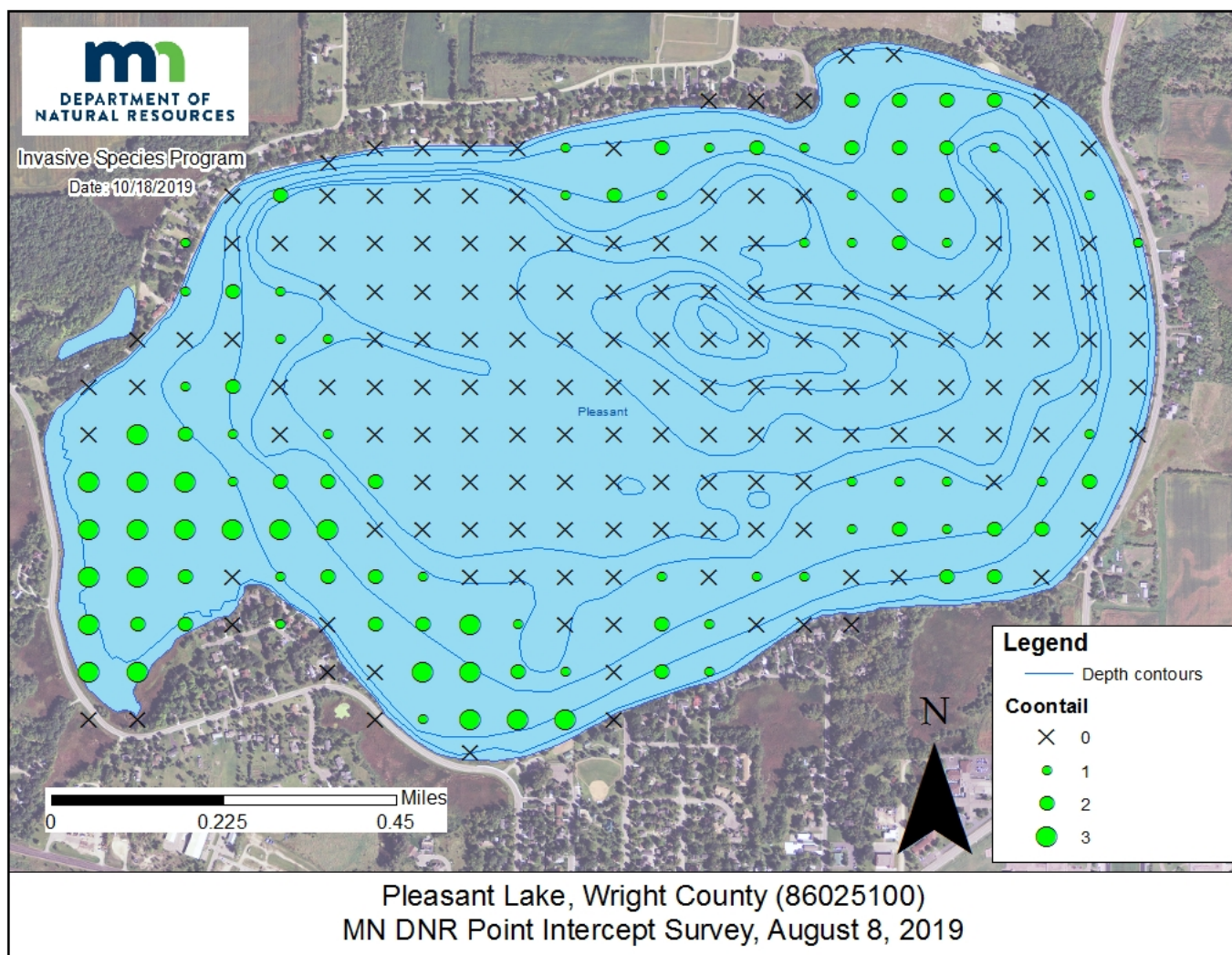


Figure 2 – 2019 Coontail Distribution. Plant distribution from the 2019 point-intercept survey for coontail in Pleasant Lake, Wright County (DOW#86025100). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

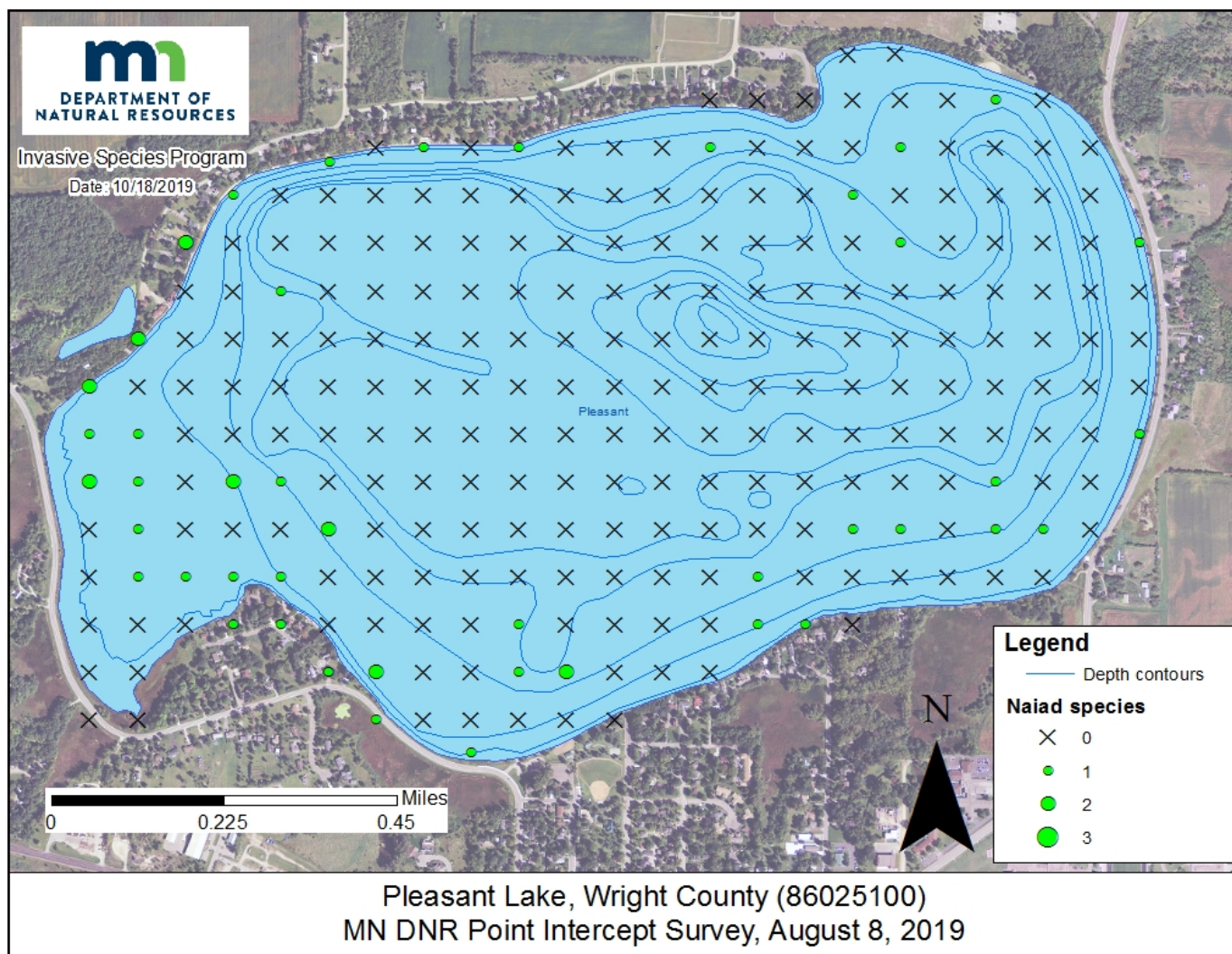


Figure 3 – 2019 Naiad species Distribution. Plant distribution from the 2019 point-intercept survey for naiads in Pleasant Lake, Wright County (DOW#86025100). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

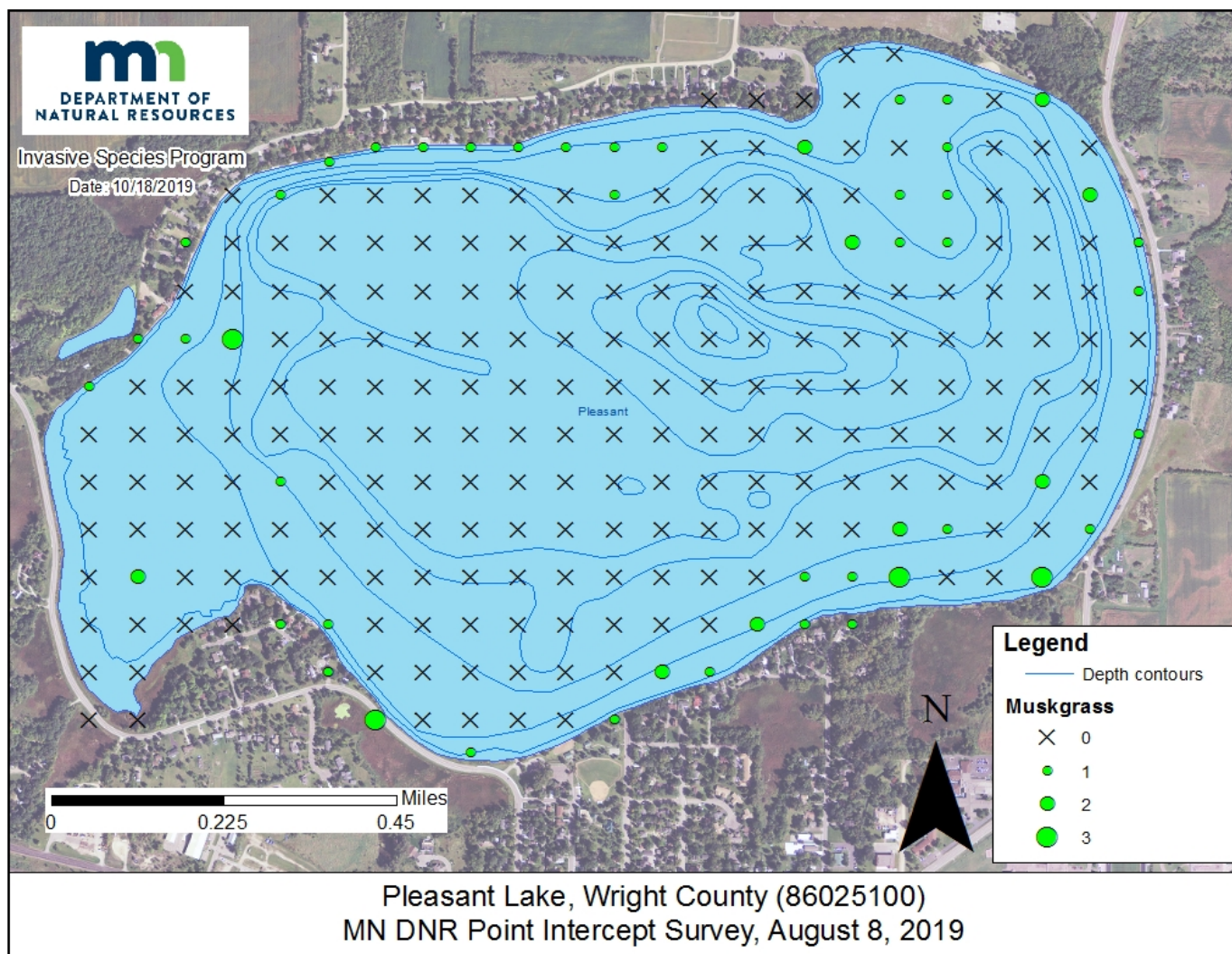


Figure 4 – 2019 Muskgrass Distribution. Plant distribution from the 2019 point-intercept survey for muskgrass in Pleasant Lake, Wright County (DOW#86025100). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

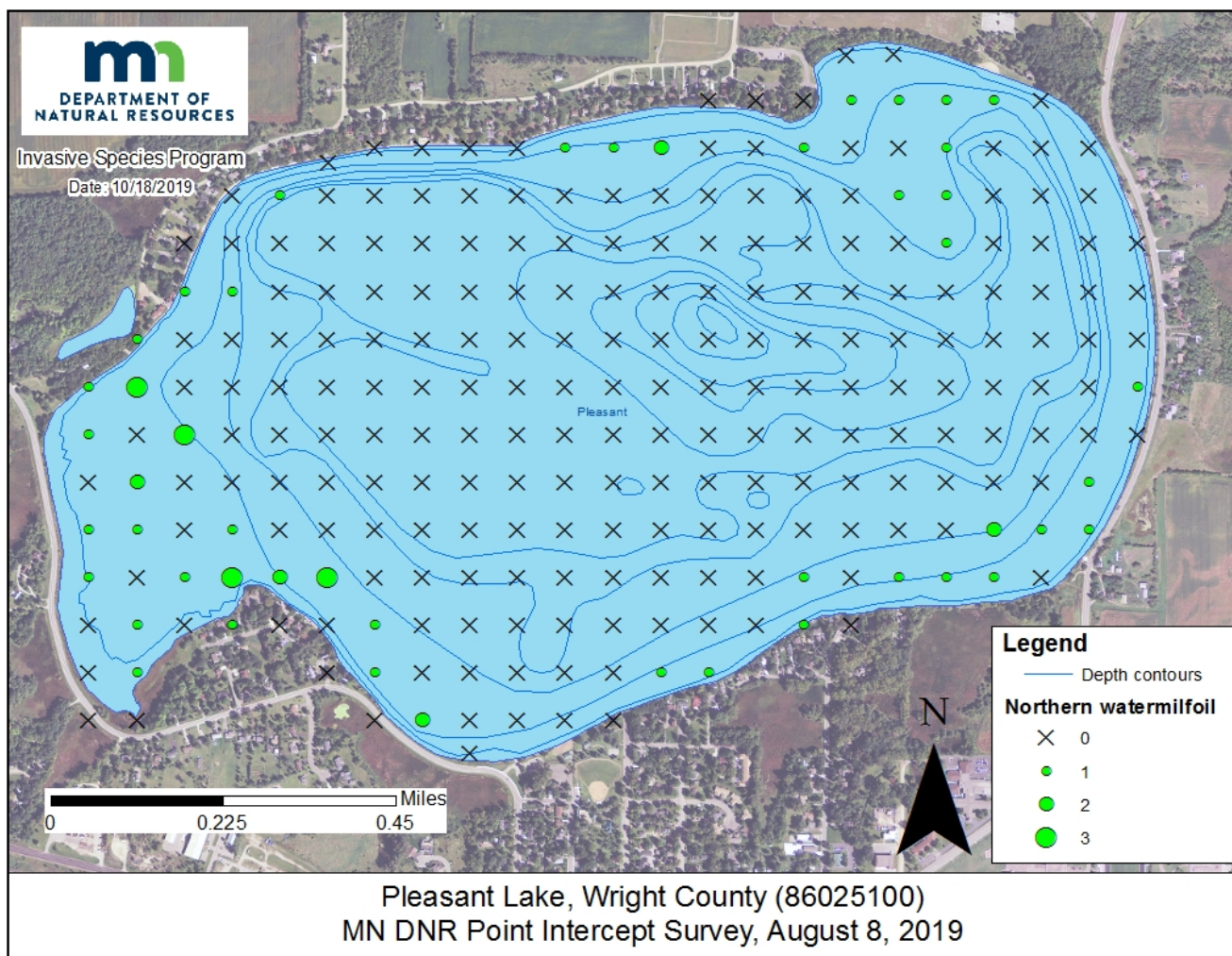


Figure 5 – 2019 Northern watermilfoil Distribution. Plant distribution from the 2019 point-intercept survey for Northern watermilfoil in Pleasant Lake, Wright County (DOW#86025100). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants.

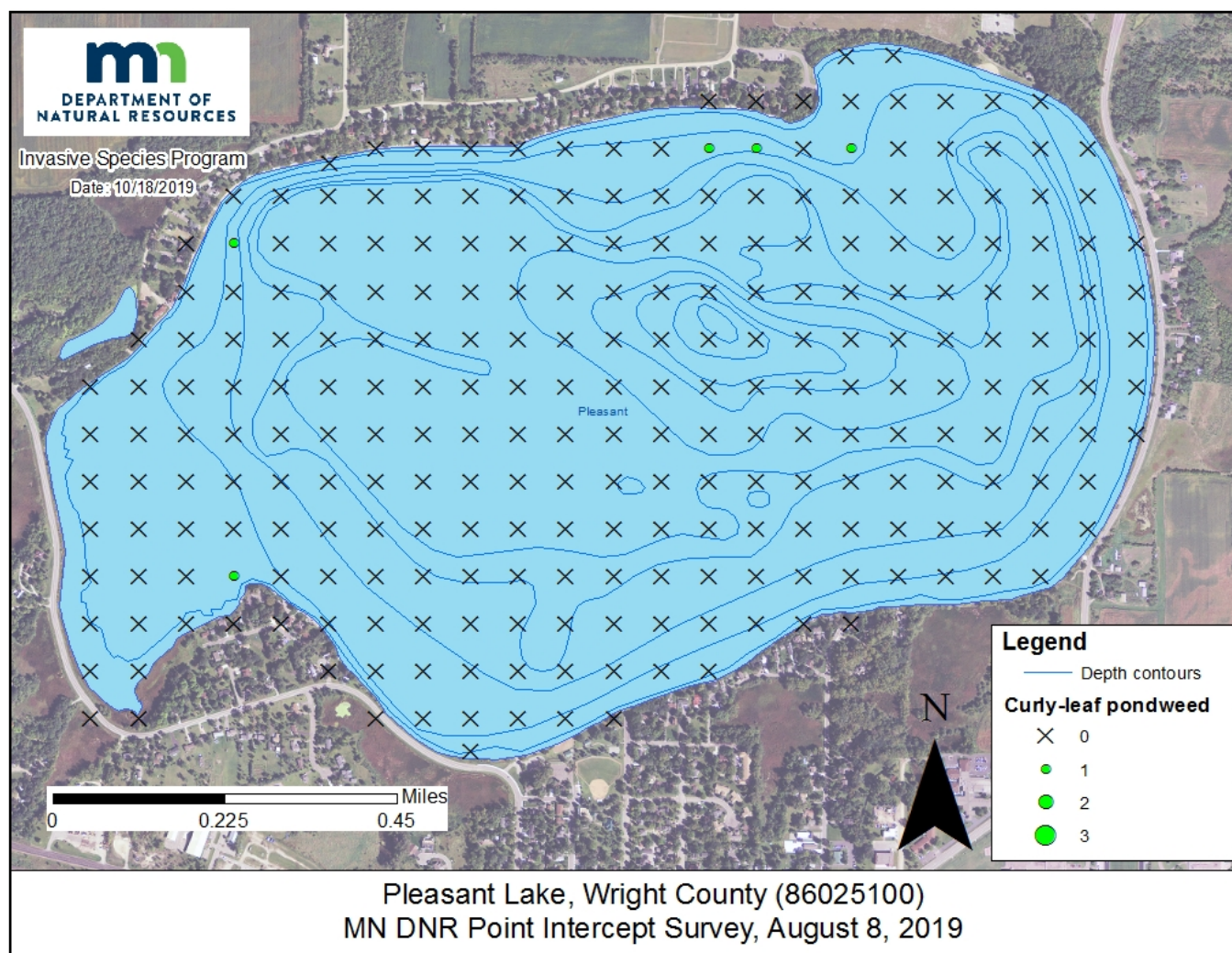


Figure 6 – Curly-leaf pondweed Distribution. Curly-leaf pondweed distribution maps from the 2019 point-intercept survey in Pleasant Lake, Wright County (DOW#86025100). Densities ranged from 0 to 3 at each point, with 3 indicating dense plant presence and 0 indicating no plants. Eurasian Watermilfoil was only found at one site and was considered very dense.

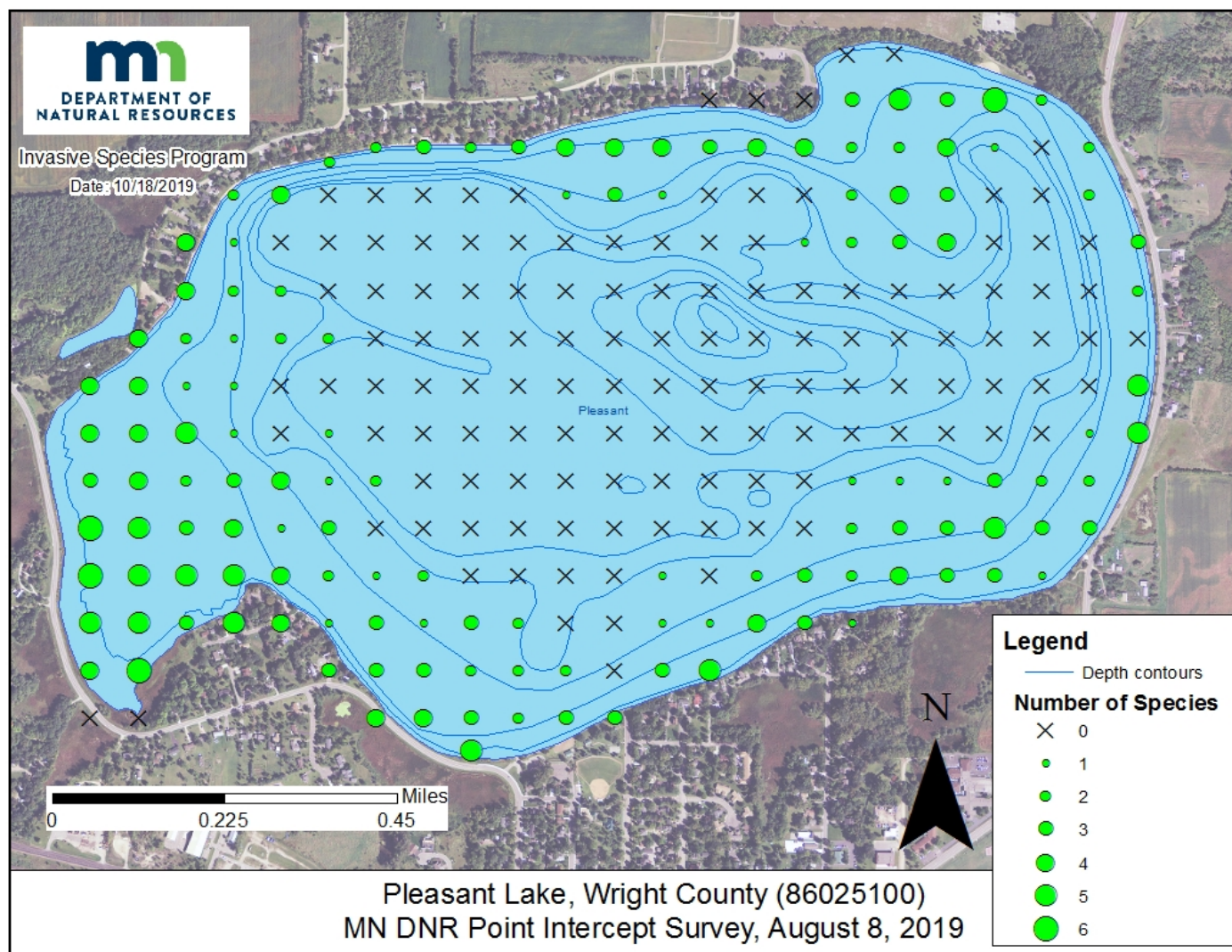


Figure 7 – Number of species per site. Maps of number of species from the 2019 point-intercept survey in Pleasant Lake, Wright County (DOW#86025100).