

# Long Lake, Becker County, MN 2023 Aquatic Vegetation Management Report

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**Prepared by:**

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## Project Details

**Lake:** Munson (EQuIS# 03-0383-00-201)

**Lake Surface Area:** 414.52 acres **Littoral Area:** 152 acres **County:** Becker

**Survey Type:** Point-intercept aquatic plant surveys (2023)

**Date of Survey (most recent):** July 20, 2023 (PRWD)

**Surveyor[s]:** Owen Reding & Oliver Kritzberger

**Report Updated:** January 5, 2023

**Author[s]:**

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## Report Details

G. L. Kemper. 2023. Long Lake, Becker County: 2023 Aquatic Vegetation Management Report. Water Resource Coordinator Pelican River Watershed District, 211 Holmes Street W., Detroit Lakes, MN 56501. 16 pp.

## Summary

The purpose of this report is to provide an overview of aquatic plant distribution and the management of invasive aquatic plants in Munson Lake, Becker County in 2023. Historical data on water quality, invasive aquatic plant management permits and point-intercept surveys are all summarized in this report. This summary will guide future invasive aquatic plant control projects and can evaluate changes in native plant communities.

## Lake Description

Long Lake is a 408-acre recreational development lake located at the head of its watershed area, with no surface water inputs, such as a river or a stream. Long Lake is fed primarily by stormwater runoff and groundwater interactions. It is a narrow, deep lake, with a maximum depth of 61 feet and with 37% of the lake surface area classified as littoral. Though a small lake relative to others which attract a large clientele, its elongated shape gives it a shoreline length that is exceeded in the District only by Big Detroit and Melissa.

Long Lake has good water quality with annual phosphorus levels ranging from 11 µg/L to 16 µg/L, and water clarity between 12 and 19 feet. 10-year summer mean for phosphorus and clarity is 12 µg/L and 4.5 feet, respectively.

Long Lake is known for its abundance of Northern Pike and Bluegill. The 2016 assessment showed Pike catches were higher than average and higher than other ecologically similar lakes. While there are no special regulations for Long Lake, anglers are encouraged to release Northern Pike over 24 inches. Since 2001, a Walleye stocking research study has been underway to attempt to determine the best stocking method for a given lake type, despite the efforts, Walleye abundance has continued to decline. Long Lake outlets via Joy Creek to St. Clair Lake, a lake impaired for excessive nutrients.

Long is a deep lake, with nearly 37% (11,690 feet) of the shoreline sloping steeply toward the lake. The natural shoreline has been greatly modified, including installation of riprap, sand blankets, and vegetation removal. Of the 183 parcels surveyed in 2010, 30 contained a retaining wall within the shore impact zone. 96 parcels (52%) were recorded as having moderately to greatly altered shorelines, including 83 with riprap shorelines and 60 with beach sand blankets. 87 parcels (47%) of the parcels remained in a natural or minimally altered condition.

The City of Detroit Lakes annexation of Long Lake has provided water and sewer to the east and south sides of the lake with services on the north completed in 2019. It is still unknown when City utilities will be connected on the west side of the lake. It is likely that improved water quality will continue to be observed with the transition from individual lot septic system to City sanitary sewers.

In the past 20 years, several resorts have been converted to large residential lots and all have been connected to City water and sewer. One RV campground still exists on the northwest side of the lake, and it is likely that it too will be subdivided. The City of Detroit Lakes owns Long Lake Park which contains over 2,200 feet of shoreline, located on the east side of the lake that, except for the public access, will remain in its natural condition. Along the west side of the lake, another parcel, owned by Concordia College, will also

remain in an unaltered condition that will protect over 2000 feet of shoreline.

There is an active gravel mine in the southern portion of the Long Lake watershed. In recent years, there has been interest by the company to expand to the north and west, closer to the lake. In 2018, Becker County denied a conditional use permit request to expand the mine, including gravel extraction below the water table.

In 2003, a water control structure was installed on a wetland outlet on the north side of the lake, allowing the wetland to serve as a water detention area significantly reducing nutrient loading from the wetland. This project drastically reduced localized nuisance algal blooms on the north side of the Lake and caused an increase in mean summer water clarity by nearly 2 feet.

### Management History

Long Lake has no known Aquatic Invasive Plant Species (AIS) currently (2023) PRWD will continue to monitor the lake for AIS.




### Survey Objectives

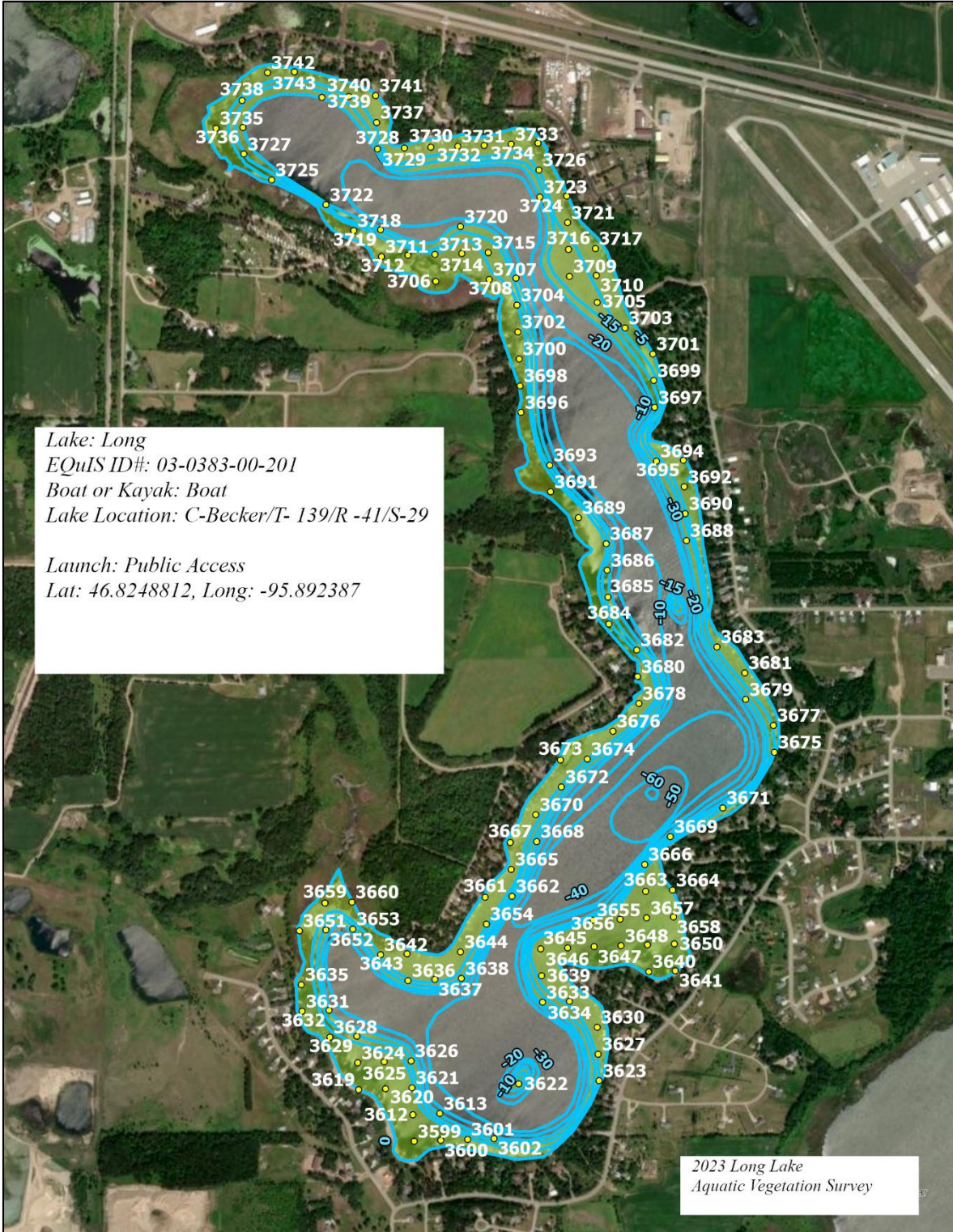
In 2023, a Point-intercept Survey assessed the distribution of aquatic plants in Long Lake. The primary purpose for this type of survey is to 1) develop baseline knowledge of the current plant community in a lake, and over time, 2) compare year to year plant variation (in plant presence and spatial location) and 3) track invasive aquatic plants. Moreover, this survey will help the PRWD 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

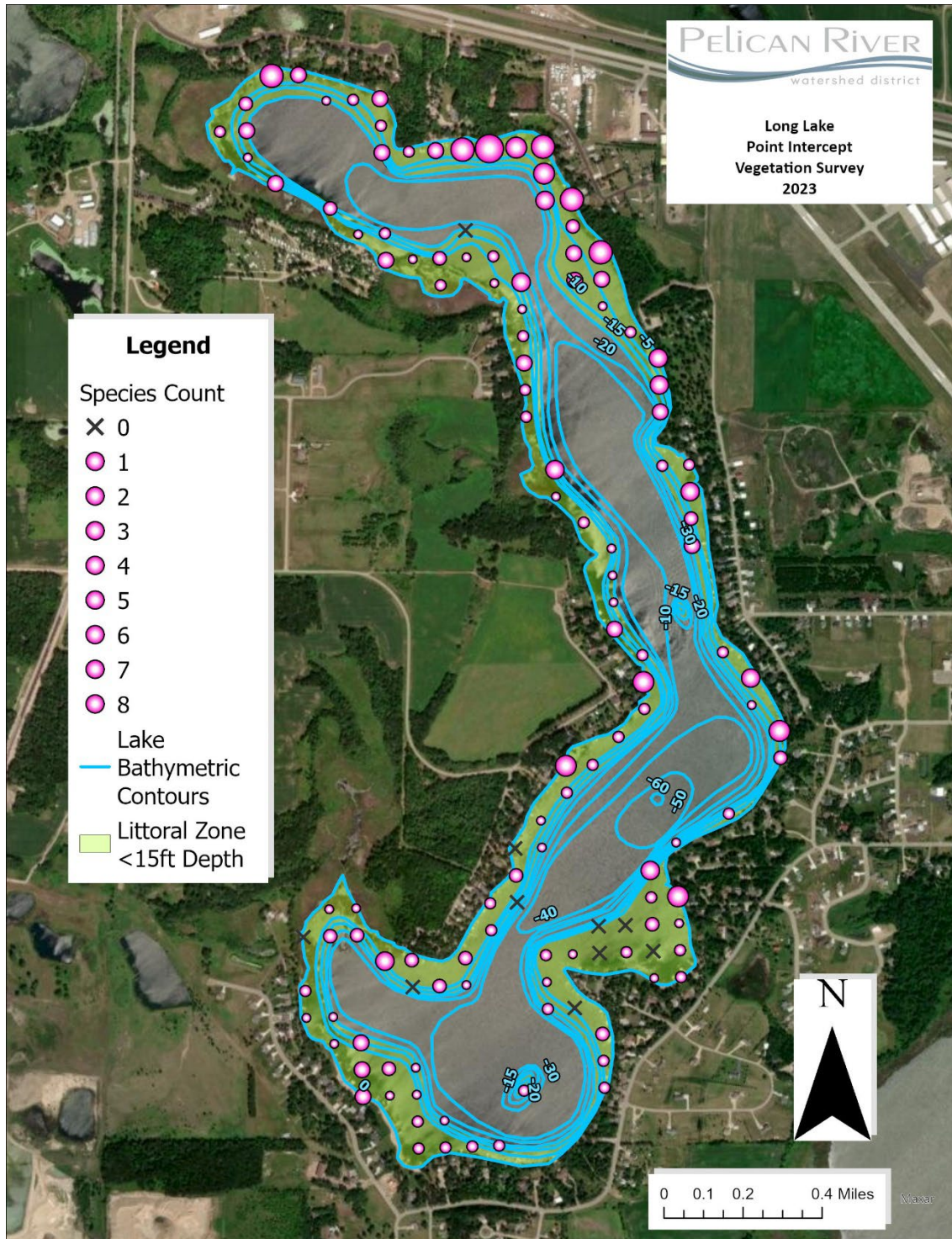
PRWD surveyors used a point-intercept survey method developed by John Madsen in “Aquatic Plant Control Technical Note MI-02, 1999” during the 2023 Survey. Points were placed 72 meters apart using a Geographic Information System (GIS), comprising of 131 points on a grid (Figure 1). Plant samples were 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 Skawinski (2018). 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 3). Frequencies of occurrence percentages (i.e., how often a plant species was sampled in the lake) were calculated based on the littoral zone.

**Table 1 - Quantitative rake abundance ranking** (0-3) used to estimate plant abundance for each species based on rake coverage and/or visual observation (PRWD). A zero (0) ranking indicates no target plants were retrieved or observed in a sample.

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



**Figure 1 – Point-intercept Survey Grid.** Point-intercept survey grid for Long Lake, Becker County (EQuIS# 03-0383-00-201). A total of 131 points were surveyed in 2023 at 72 meters apart.



**Figure 2 – Species Richness Distribution.** Number of species at each site from the 2023 point-intercept survey in Long Lake, Becker County (EQuIS# 03-0383-00-201). Densities ranged from 0 to 8 at each point, with an 8 indicating the richness in species presence and 0 indicating no species.

## Survey Observations

The first vegetation point-intercept survey of Long Lake (EQuIS# 03-0383-00-201) conducted by the PRWD occurred on July 20, 2023. There are 152 acres of the littoral zone (< 15 feet deep and where aquatic plants are likely to be found) for Long Lake. Of the 131 points sampled, 98% of the points had submersed native vegetation (Table 2) with a mean of 2.9 submersed native taxa per point (Table 2).

**Table 2 - Point-intercept Metrics.** Summary of PRWD point-intercepts Munson Lake, Becker County (EQuIS# 03-0383-00-201). Shaded values were calculated from littoral depth range (0-15 feet).

Metric	July 2023
Surveyor	PRWD
Total # Points Sampled	131
Max depth of growth	NA
Depth Range of Rooted Veg (ft.)	NA
# Points in Littoral (0-15 feet)	131
# of Vegetated Points in Littoral Zone	121
% Points w/ Submersed Native Taxa	98%
Mean Submersed Native Taxa/ Point	2.9
# Submersed Native Taxa	11
# Submersed Non-Native Taxa	0
% Points w/ Submersed Non- native Taxa	0%

Based on the 2023 point-intercept survey, there are 11 Submergent Native Taxa (Table 3) within the littoral area of Long Lake. The dominating Submergent species are Chara (*Chara sp.*) 85% (Figure 3), Bladderwort (*Utricularia spp.*) 40% (Figure 4), White-stem Pondweed (*Potamogeton Praelongus*) 16% (Figure 5), and Sago Pondweed (*Stuckenia pectinate*) 28% (Figure 6). These aquatic plants are central to a healthy fish population, offering shelter and providing food and habitat to wildlife. Long Lake also has the following Emergent Taxa: Bulrush (*Schoenoplectus sp.*) 21%, (Figure 7), Cattail (*Typha sp.*) 14%, and Wild Rice (*Zizania Palustris*) 8%. Floating-leaf Taxa: Water Lilies (*Nymphaeaceae spp.*) 15% (Figure 8).

Long Lake has an average of 4.4 species per sampling site. Figure 2 displays the spatial distribution and species richness (# of species per sample point) of all native species from the 2023 point-intercept survey.

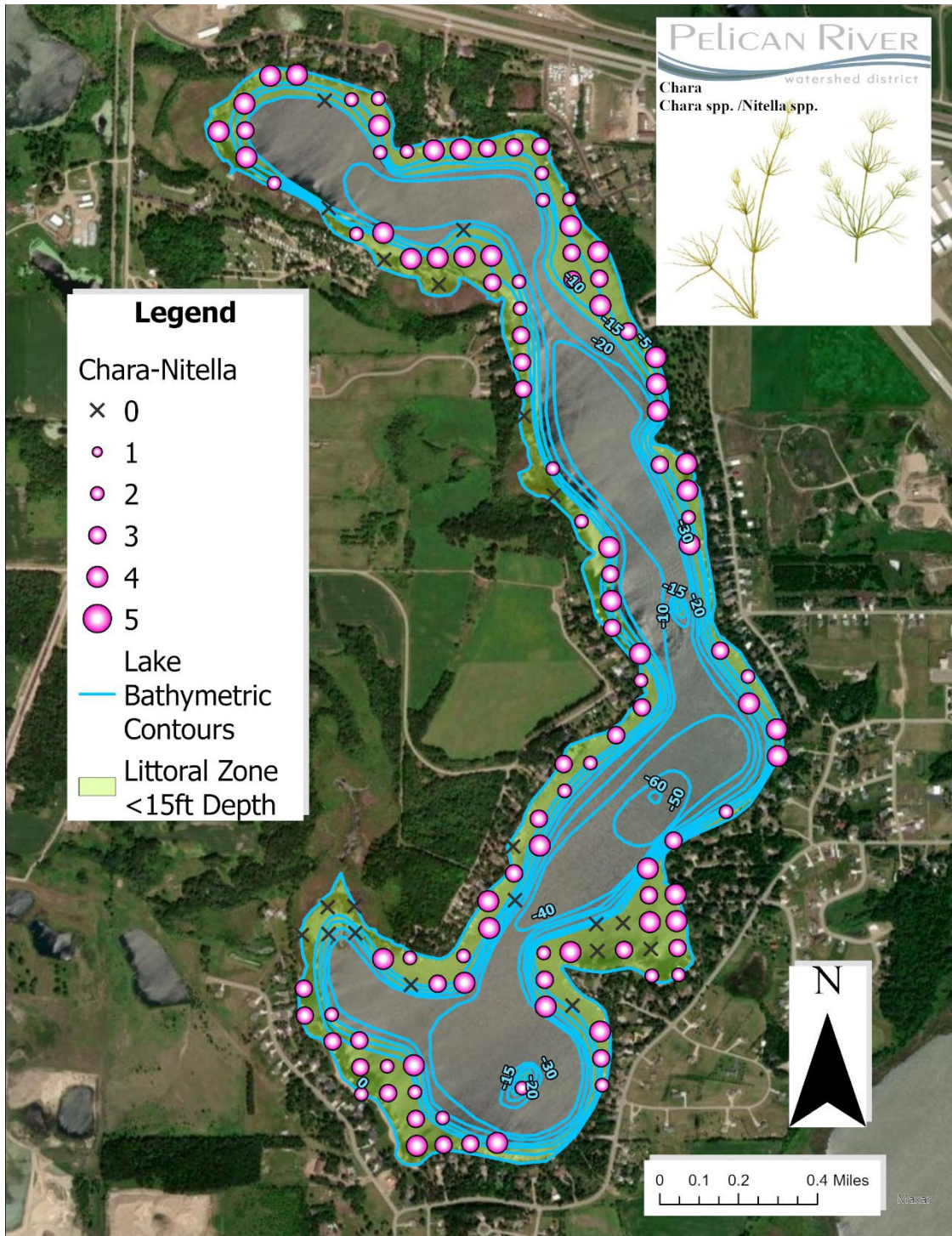


**Table 3 - Plant Frequency Occurrence.** Percent frequency of occurrence for observed plant species within the littoral zone (0-15 feet) in intercepts Long Lake, Becker County (EQuIS# 03-0383-00-201 ).

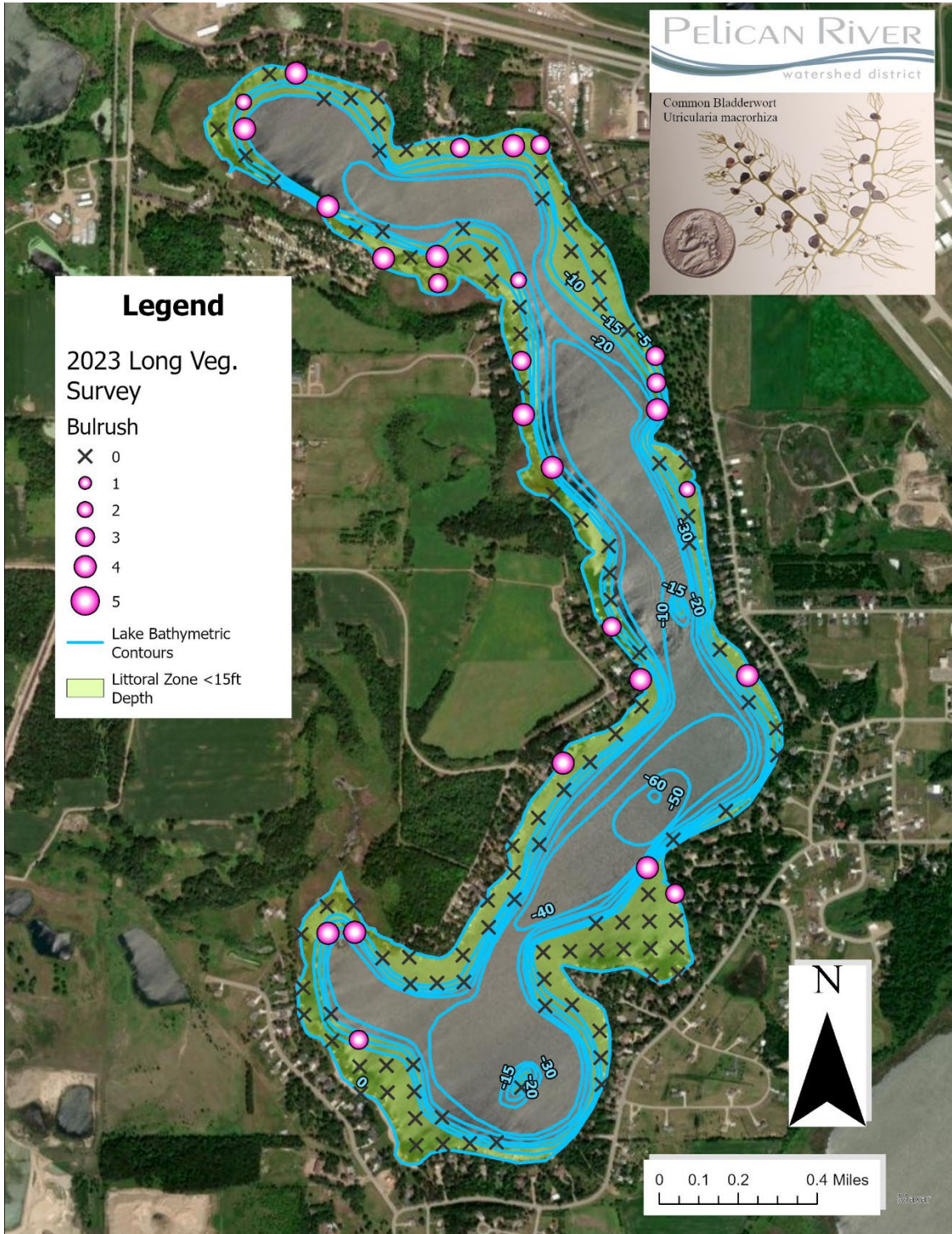
July 23 b

Taxonomic Name	Common Name	Frequency (%)
<b>SUBMERSED NON-NATIVE</b>		
<i>These plants spread or have been introduced beyond its native range and are either causing harm or have the potential to cause harm.</i>		
<b>SUBMERSED NATIVE</b>		
<i>These plants are rooted plants with flaccid or limp stems and most of their vegetative mass is below the water surface, although small portions may stick above the water.</i>		
<i>Utricularia spp.</i>	Bladderwort	40%
<i>Elodea canadensis</i>	Canada Waterweed	6%
<i>Chara spp./Nitella spp.</i>	Chara	85%
<i>Ceratophyllum demersum</i>	Coontail	4%
<i>Potamogeton zosteriformis</i>	Flat-stem Pondweed	5%
<i>Stuckenia pectinata</i>	Sago Pondweed	14%
<i>Najas gracillima</i>	Slender Waternymph	3%
<i>Potamogeton pusillus</i>	Small pondweed	4%
<i>Potamogeton praelongus</i>	White-stem Pondweed	16%
<i>myriophyllum verticillatum</i>	Whorled Watermilfoil	9%
<b>FLOATING-LEAF</b>		
<i>These plants are rooted in the lake bottom and have leaves that float on the water surface. Many have colorful flowers that extend above the water.</i>		
<i>Sagittaria cuneata</i>	Arum-leaved arrowhead	5%
<i>Nymphaeaceae spp.</i>	Water Lilies	15%
<i>Basenia schreberi</i>	Water-shield	2%
<i>Nuphar lutea</i>	Yellow Pond Lilly	7%
<b>EMERGENT</b>		
<i>These plants extend well above the water surface and are usually found in shallow water, near shore.</i>		
<i>Sparganium americanum</i>	American bur-reed	3%
<i>Schoenoplectus spp.</i>	Bulrush	21%
<i>Typha latifolia &amp; angustifolia</i>	Cattail	14%
<b>EMERGENT NON-NATIVE</b>		
<i>These plants spread or have been introduced beyond its native range and are either causing harm or have the potential to cause harm.</i>		
<b>FREE-FLOATING</b>		
<i>These plants float freely on the water surface. The entire plant is suspended on the water, allowing the plant to be moved around the pond by wind and water currents.</i>		

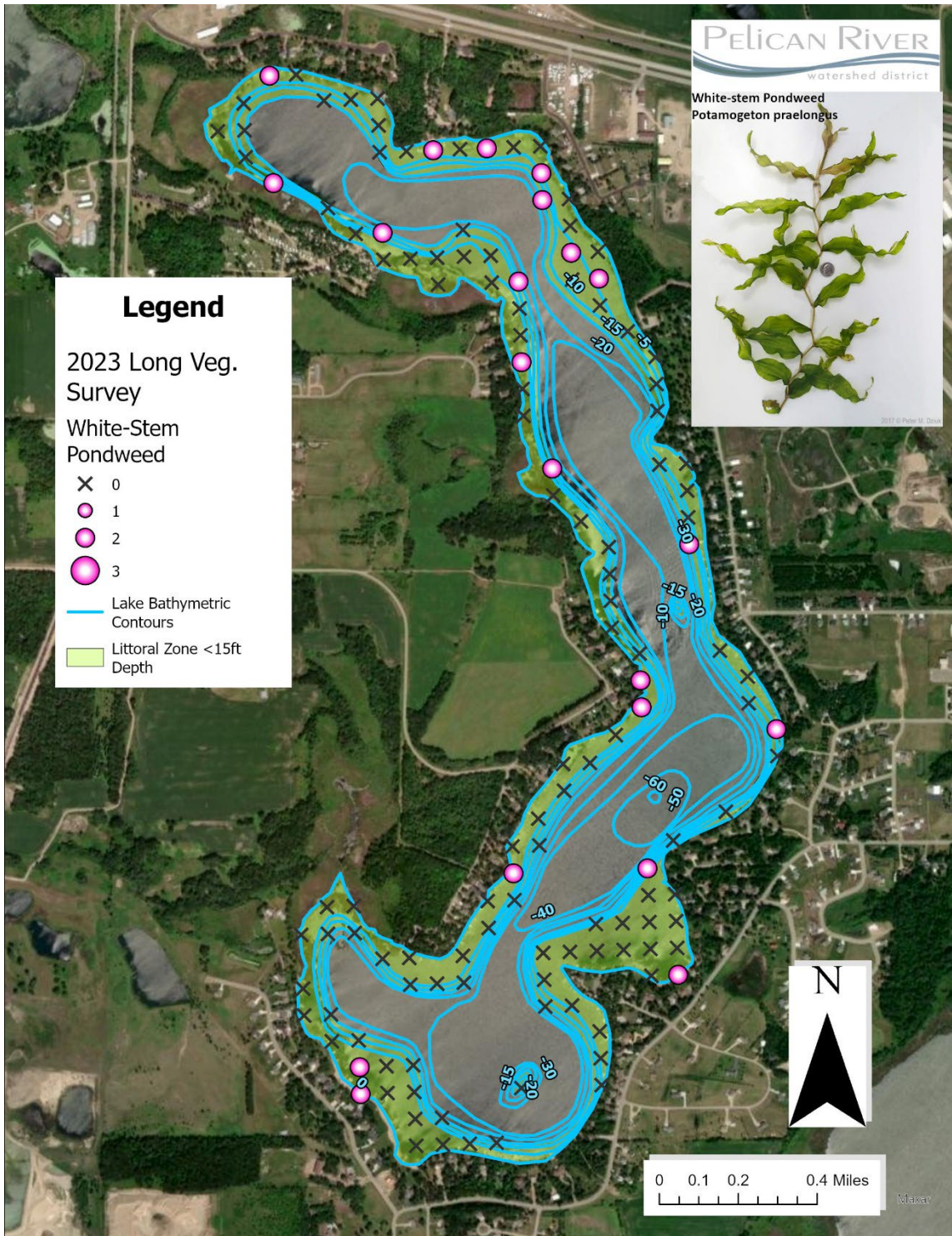
b Percent frequency for 2023 (PI Survey Method) calculated for 0-15 feet littoral zone.



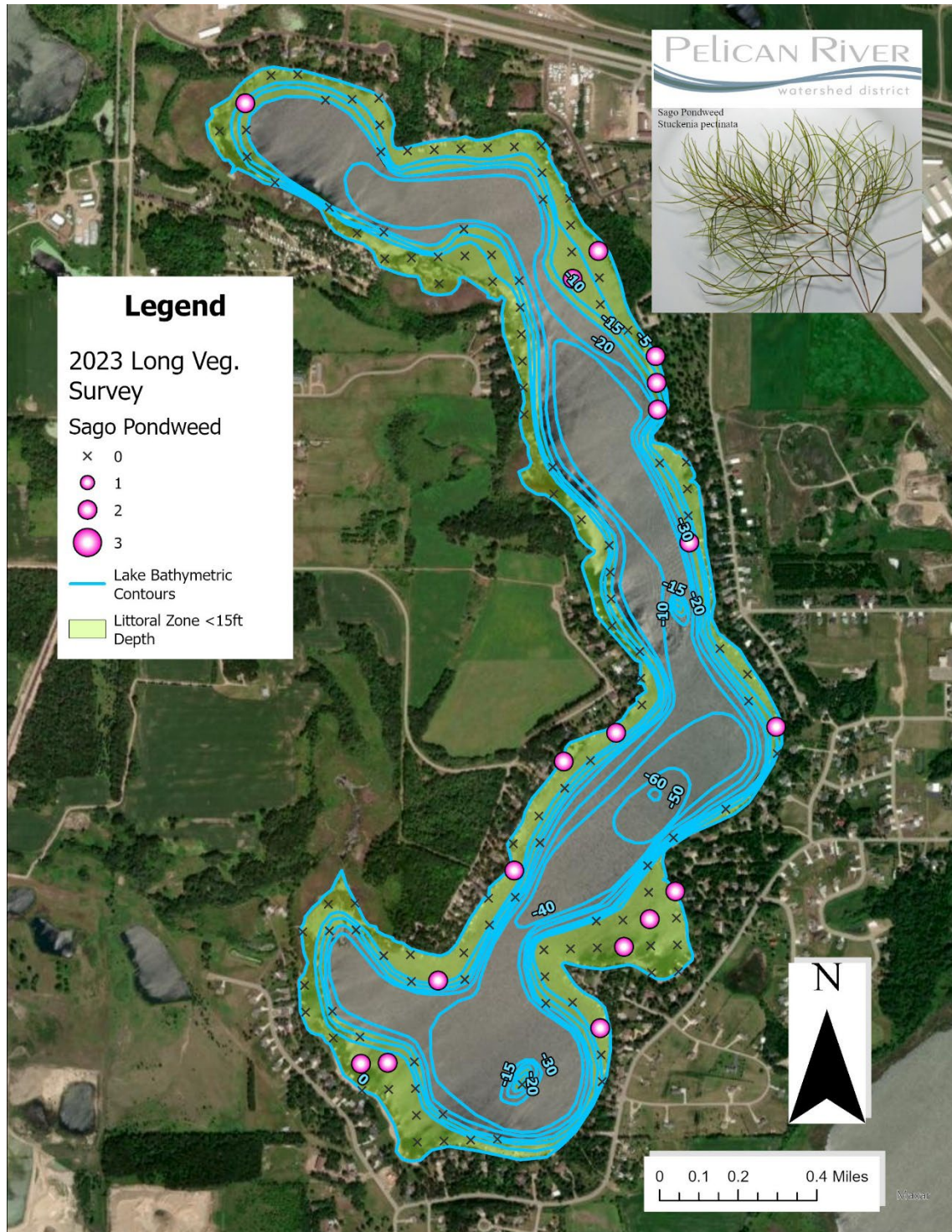
**Figure 3 – Chara Distribution.** Plant distribution from the 2022 point-intercept survey for Chara in intercepts Long Lake, Becker County (EQuIS# 03-0383-00-201). Densities ranged from 0 to 5 at each point, with a 5 indicating dense plant presence and 0 indicating no plants.



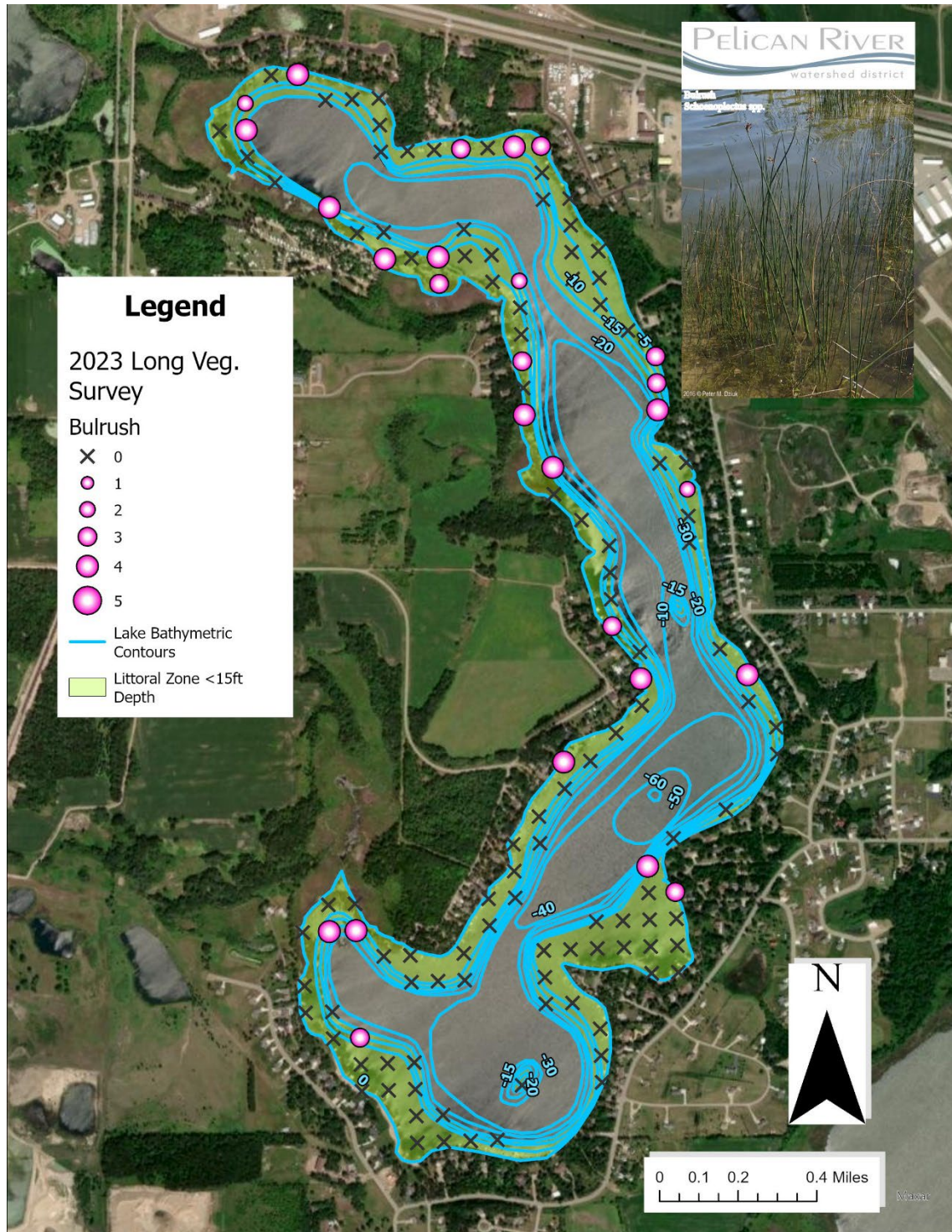
**Figure 4 – Bladderwort Distribution.** Plant distribution from the 2023 point-intercept survey for Bladderwort in intercepts Long Lake, Becker County (EQUIS# 03-0383-00-201). Densities ranged from 0 to 5 at each point, with a 5 indicating dense plant presence and 0 indicating no plants.



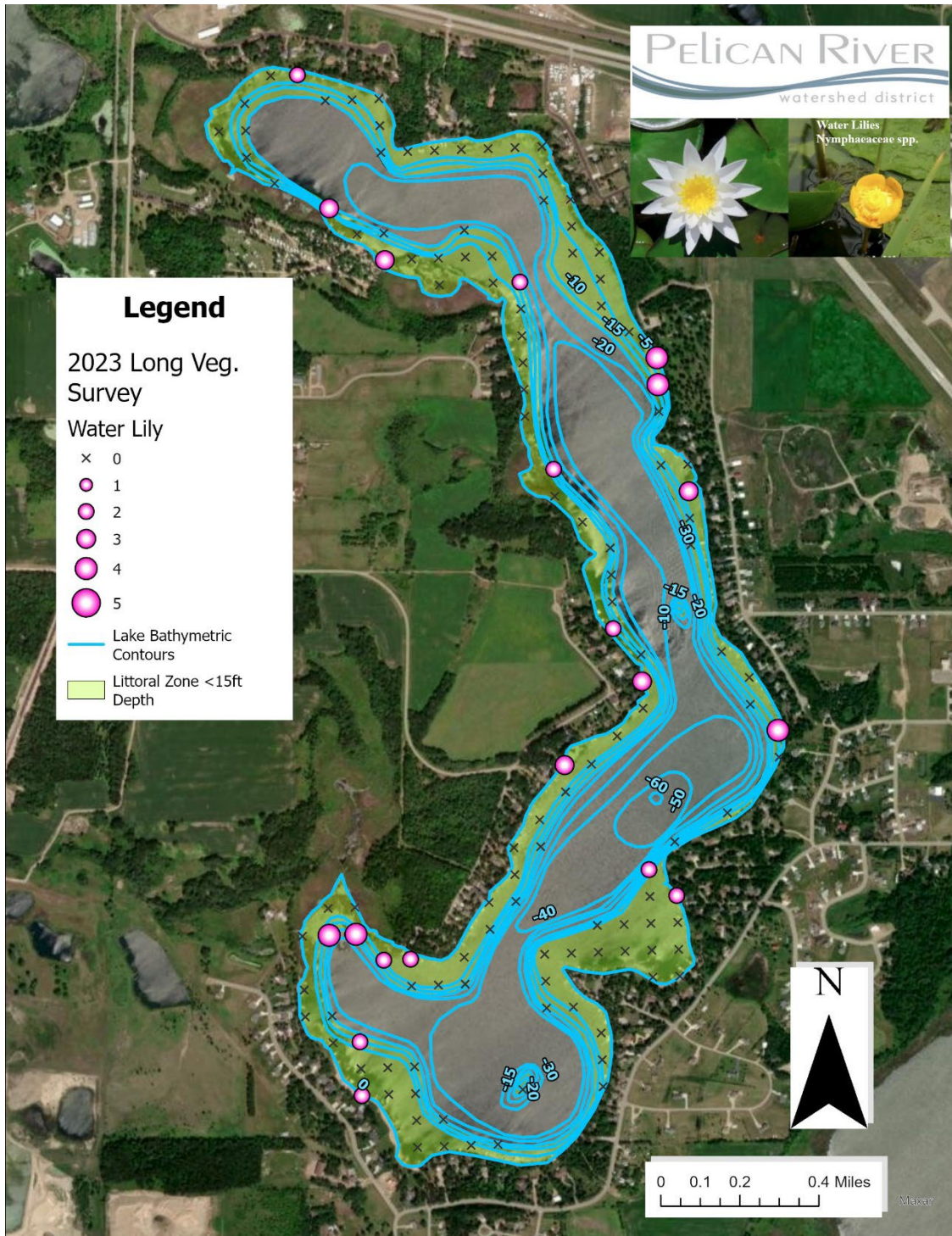
**Figure 5 – White-stem Pondweed** Plant distribution from the 2023 point-intercept survey for White-stem Pondweed in intercepts Long Lake, Becker County (EQUIS# 03-0383-00-201). Densities ranged from 0 to 3 at each point, with a 3 indicating dense plant presence and 0 indicating no plants.



**Figure 6 – Sago Pondweed Distribution.** Plant distribution from the 2023 point-intercept survey for Sago Pondweed in intercepts Long Lake, Becker County (EQUIS# 03-0383-00-201). Densities ranged from 0 to 3 at each point, with a 3 indicating dense plant presence and 0 indicating no plants.



**Figure 7 – Bulrush Distribution.** Plant distribution from the 2023 point-intercept survey for Bulrush in intercepts Long Lake, Becker County (EQUIS# 03-0383-00-201). Densities ranged from 0 to 5 at each point, with a 5 indicating dense plant presence and 0 indicating no plants.



**Figure 8 – Water Lily Distribution.** Plant distribution from the 2023 point-intercept survey for Water Lily in intercepts Long Lake, Becker County (EQuIS# 03-0383-00-201). Densities ranged from 0 to 5 at each point, with a 5 indicating dense plant presence and 0 indicating no plants.

## Literature Cited

Skawinski, Paul M. (2018). *Aquatic Plants of the Upper Midwest*. (Third Edition). Wisconsin: Paul M. Skawinski.

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.