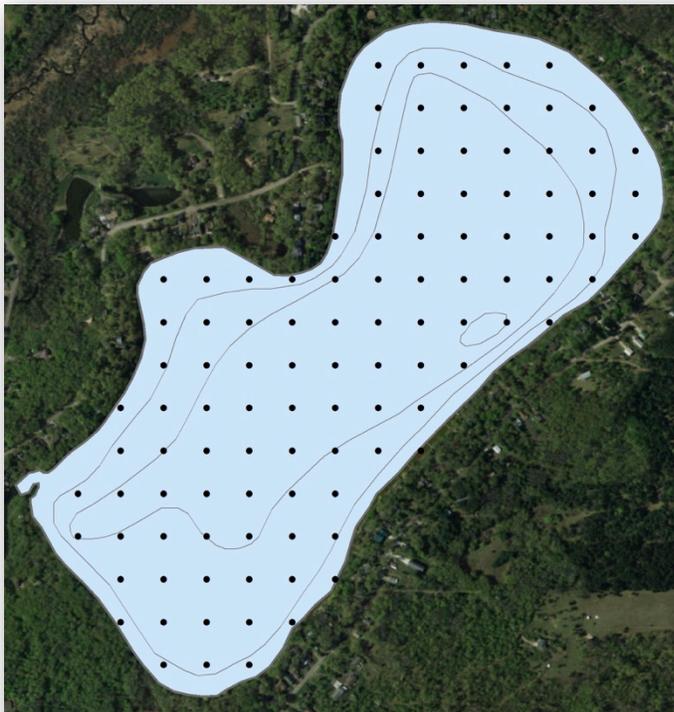# Aquatic Plant Community of Julia Lake: 2019

Julia Lake *(#71-0145)*
Sherburne County, MN

Surveyed August 2, 2019

Survey, Analysis, and Reporting by:
James A. Johnson – *Aquatic Ecologist, Freshwater Scientific Services, LLC*

NALMS Certified Lake Manager
www.NALMS.org

Funding Provided by:
Three Lake Improvement District – Clear Lake, MN

Survey & Analysis Methods

Point-Intercept Survey

Freshwater Scientific Services, LLC surveyed plants in Julia Lake on Aug 2, 2019 using the point-intercept method described by Madsen (1999). This survey incorporated assessments at a total of 106 sample points (all littoral; ≤15 ft) arranged in a uniform grid (75-m spacing; Figs 1 and 2). We generated these sample points using desktop GIS software to project a grid of points over an aerial images of the lake. We then loaded the selected sample locations onto a handheld GPS unit (Garmin GPSMAP-78) for navigation to each point while in the field.

At each designated sample location, we collected plants using a double-headed, 14-tine rake on a on a rope. For each rake sample, we dragged the rake over the lake bottom for approximately 5 ft before retrieving. Retrieved plants were piled on top of the rake head and assigned density scores from 1 to 4 based upon rake head coverage (Table 3) for each individual species and for all plants collectively.

We calculated the littoral frequency (≤15 ft, % occurrence) and littoral mean density score (plant abundance) for each encountered plant species (Table 1), as well as lake-wide and littoral community metrics (Table 2). We also used desktop GIS software to map the distribution and abundance of plants in the lake (pages 5–10). Additional species that were observed floating or growing in the vicinity of a sample point but not retrieved on the rake were given a rating of zero for that location. These "zero" species were noted as being present on the plant distribution maps (shown as an "X"), but "zero" ratings were excluded from calculations of plant community metrics and statistics (not treated as denoting presence). At each location, we also documented water depth and overall plant height.

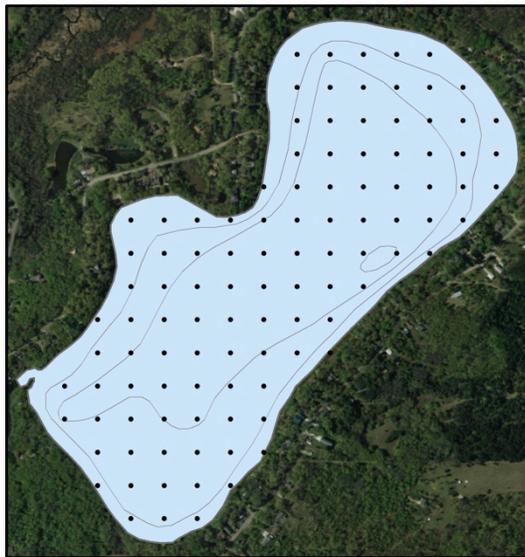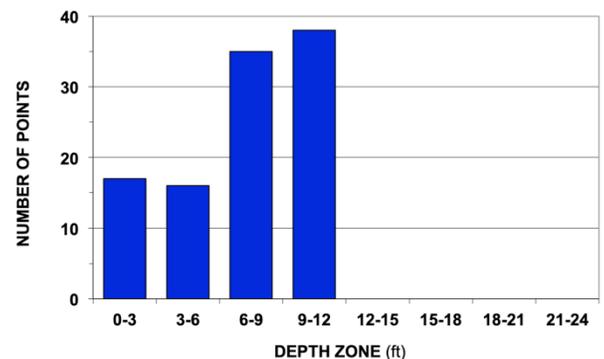**Figure 1.** Designated sample locations for the 2019 Julia Lake plant survey.

Figure 2. Sampling effort (number of locations sampled) within successive 3-ft depth zones

Results

Statistical Summary of Findings

Table 1. Littoral frequency (% occurrence) and abundance (mean density score) of plant species found in Julia Lake (Sherburne Co., MN) during the 2019 survey. *% Occurrence* and *Mean Density* (1-4 scale) were calculated using all littoral points (water depth ≤15 ft).

PLANT TAXA	COMMON NAME	% OCCURRENCE	MEAN DENSITY
SUBMERSED TAXA			
Chara sp.	Muskgrass	19	0.4
Heteranthera dubia	Water stargrass	16	0.2
Myriophyllum sibiricum	Northern watermilfoil	16	0.2
Ceratophyllum demersum	Coontail	15	0.3
Vallisneria americana	Wild celery	11	0.1
Najas flexilis	Slender naiad	8	0.1
Najas guadalupensis	Southern naiad	4	0.1
Potamogeton illinoensis	Illinois pondweed	4	<0.1
Potamogeton richardsonii	Clasping-leaf pondweed	4	<0.1
Potamogeton crispus	Curly-leaf pondweed	2	<0.1
Potamogeton foliosus	Leafy pondweed	2	<0.1
Stuckenia pectinata	Sago pondweed	1	–
FLOATING TAXA			
Nymphaea odorata	White waterlily	3	<0.1

Table 2. Summary of Julia Lake plant community metrics from 2019 survey.

	JULIA LAKE
WHOLE-LAKE METRICS	**2019**
Lake Area (acres)	151
Total Points Sampled	106
% Points Vegetated	28%
% Points Veg. to Surface	21%
Max Depth of Growth (95%)	6.3 ft
Native Submersed Taxa	11
Native Floating/Emergent Taxa	1
Non-Native Submersed Taxa	1
LITTORAL METRICS *(≤15 ft)*	
Littoral Area (acres)	151
Littoral Points Sampled	106
% Littoral Points Vegetated	28
Mean Plant Height (ft)	0.7
% of Max Littoral Biovolume	23%
Mean Native Taxa / Point	1.0
Simpson's Diversity	88
Floristic Quality (FQI)	16.9
AMCI Score (Nichols et al. 2000)	31.0

Table 3. Overview of rake density scores used to document plant abundance during point-intercept surveys.

Density Score	Rake Coverage	Description
1		Only a few plants retrieved
2		Full length of rake head covered, but tines only partially covered
3		Plants completely cover the rake head and tines
4		Enough plants to cover rake head and tines multiple times

Julia Lake – Aquatic Plant Community

All Vegetation

Density (1-4)

× No Plants
· 1
• 2
● 3
⬤ 4

N ↑
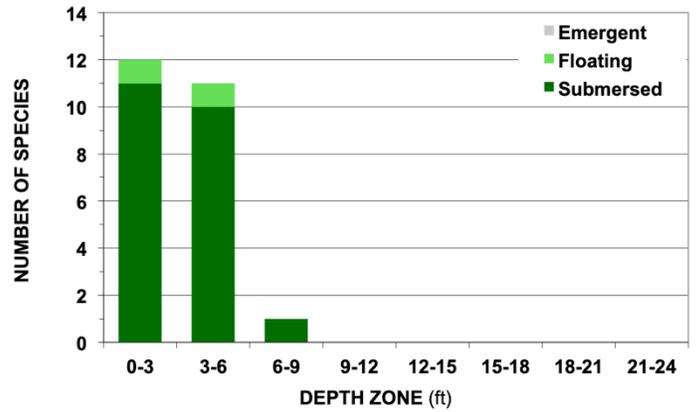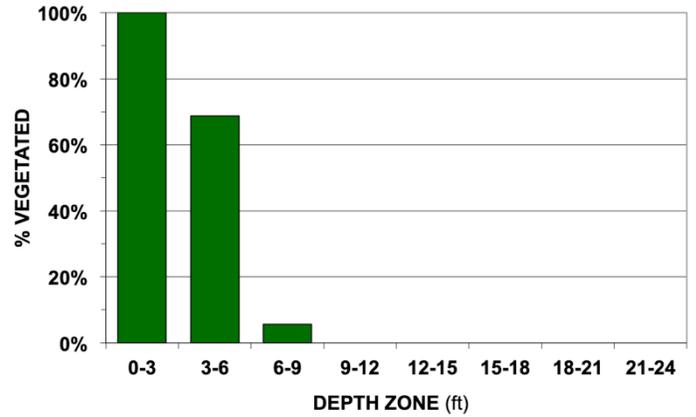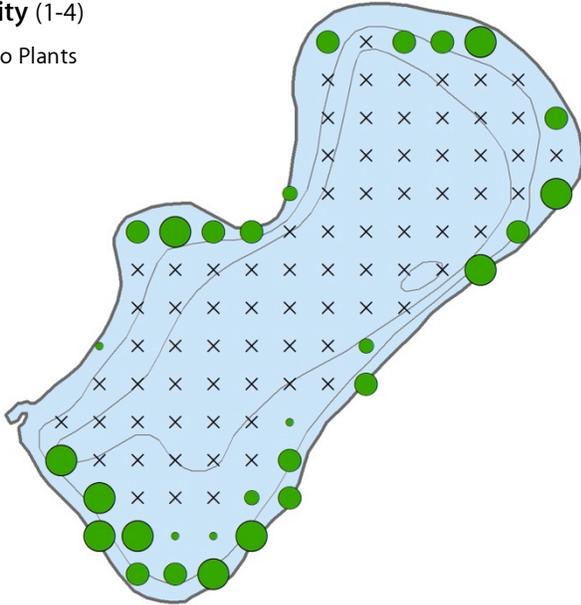
Native Taxa Per Point

Native Taxa

× None
· 1-2
• 3-4
⬤ 5-6
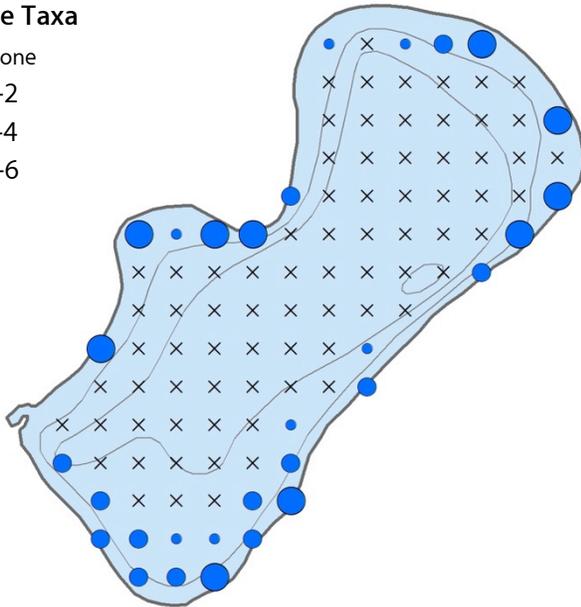
Surveyed: Aug 2, 2019
Methods: Rake, Sonar
Surveyor: JA Johnson

NALMS **Certified Lake Manager**
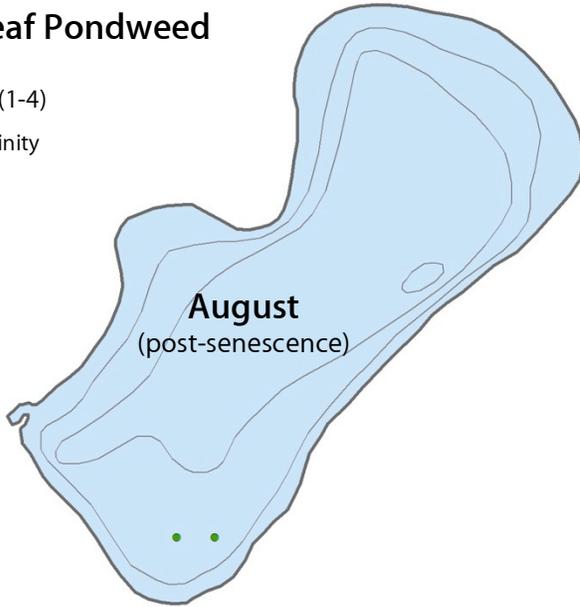www.NALMS.org

Julia Lake – Invasive Aquatic Plants

Curlyleaf Pondweed

Density (1-4)

× In vicinity
• 1
• 2
● 3
● 4

August
(post-senescence)

Julia Lake – Native Aquatic Plants

Muskgrass
(Chara)

Density (1-4)

× In vicinity
· 1
• 2
● 3
● 4

% Occurrence — ■ Muskgrass

Abundance — ■ Muskgrass
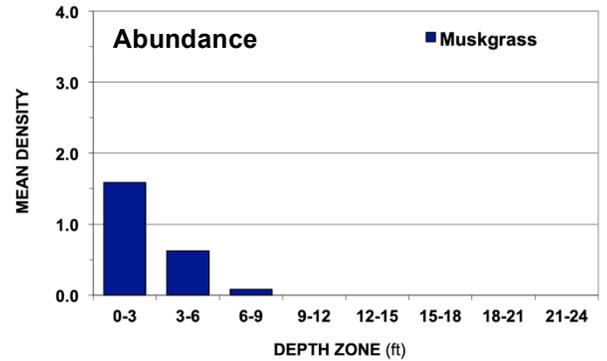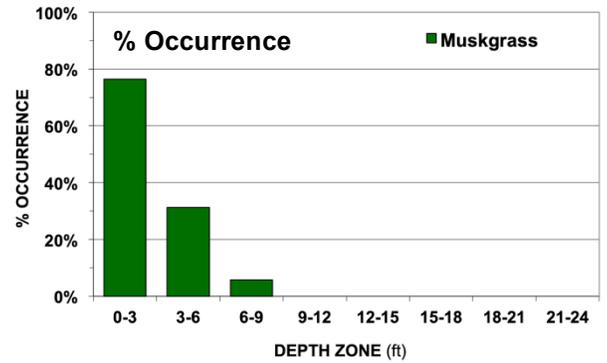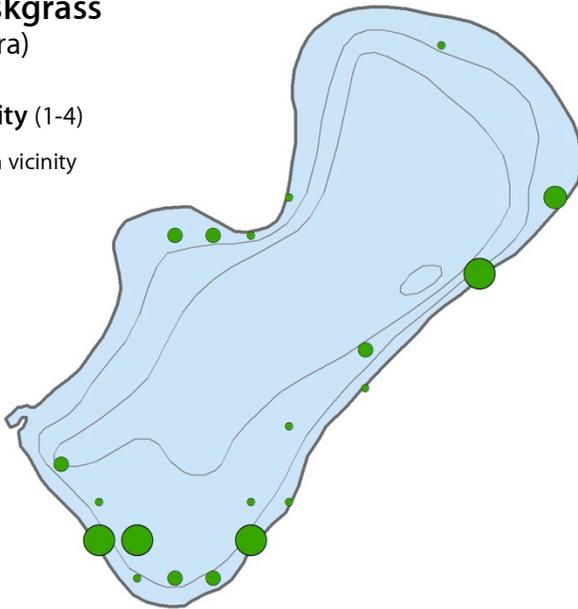
Water Stargrass

Density (1-4)

× In vicinity
· 1
• 2
● 3
● 4

% Occurrence — ■ Water stargrass

Abundance — ■ Water stargrass
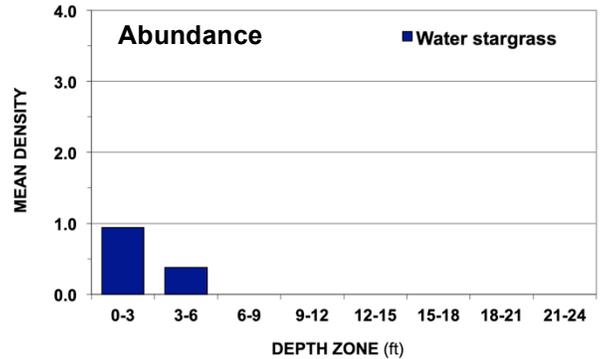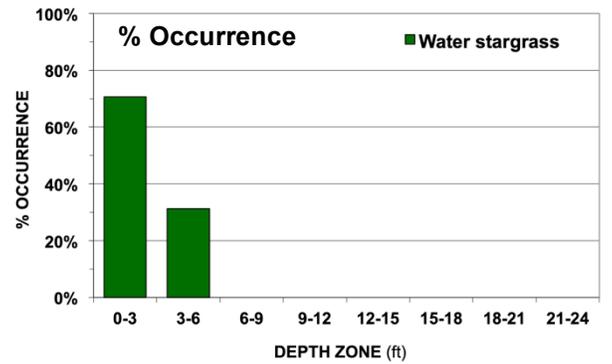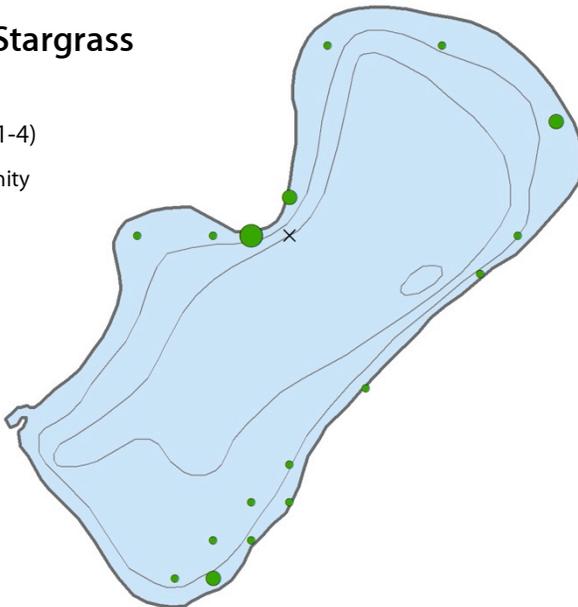
Julia Lake – Native Aquatic Plants

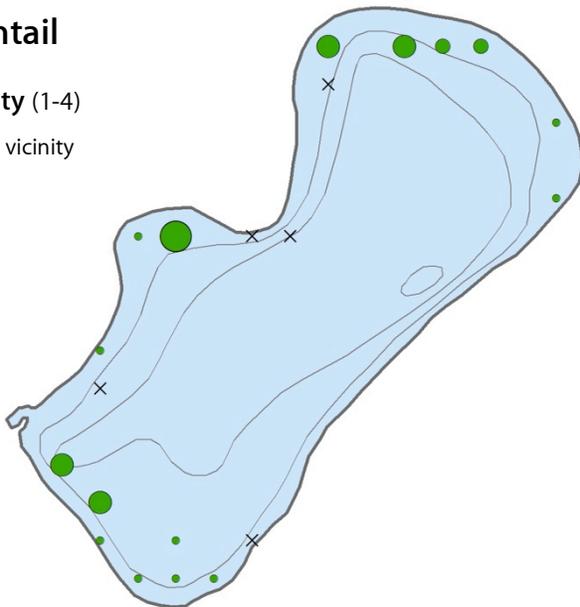## Northern Watermilfoil

Density (1-4)

×   In vicinity
•   1
•   2
●   3
●   4
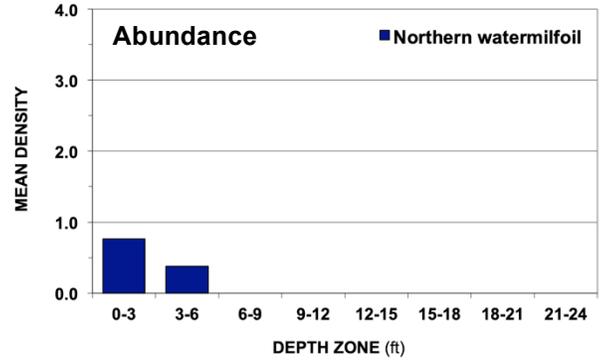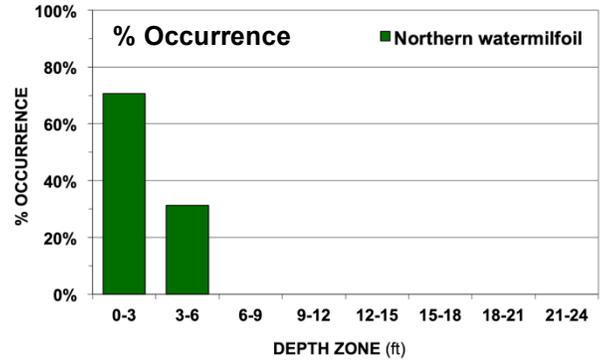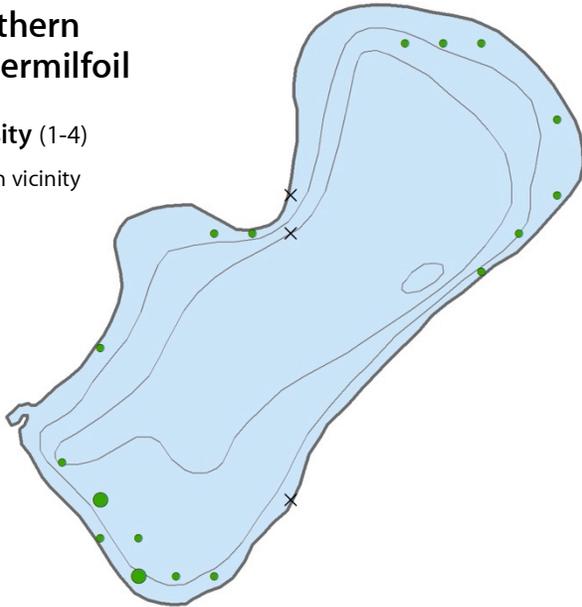
Coontail

Density (1-4)

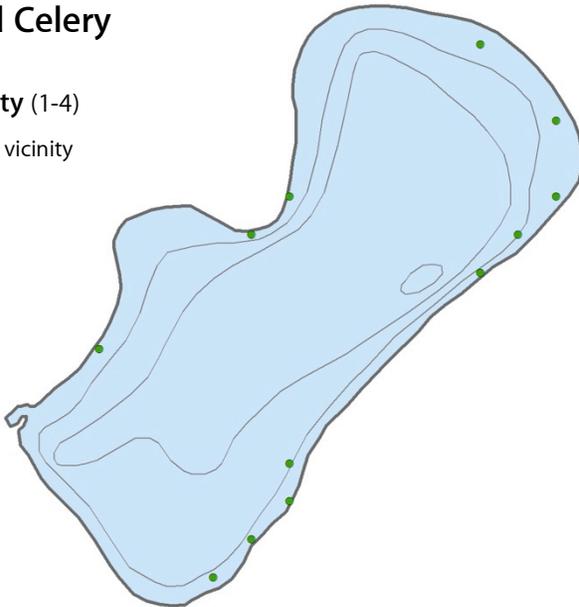×   In vicinity
•   1
•   2
●   3
●   4
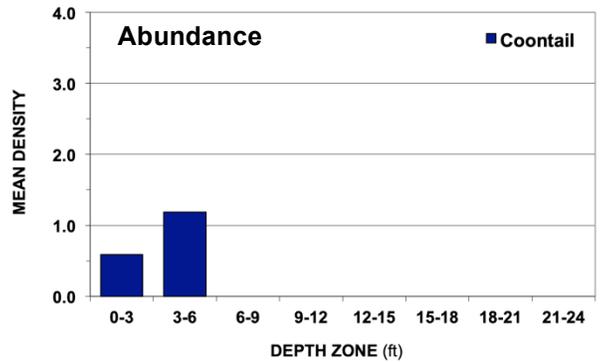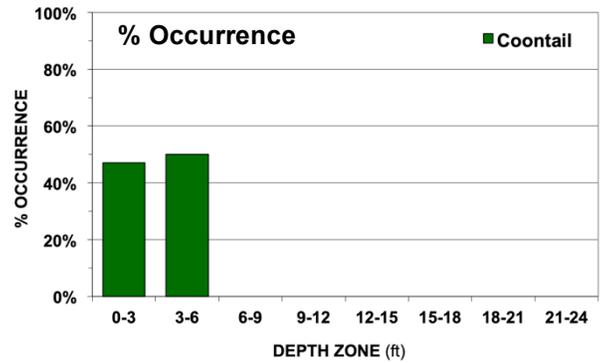
Julia Lake – Native Aquatic Plants
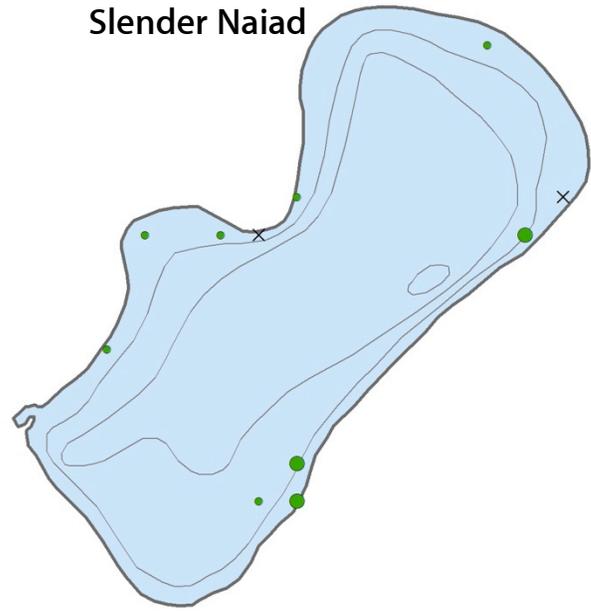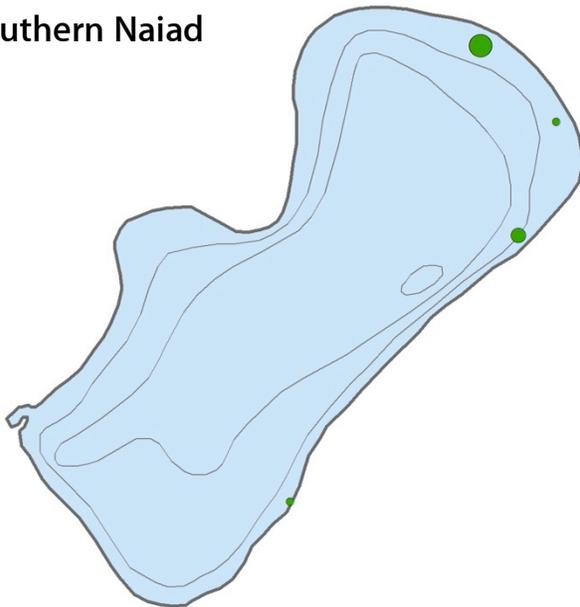
Wild Celery

Density (1-4)

× In vicinity
· 1
• 2
● 3
● 4

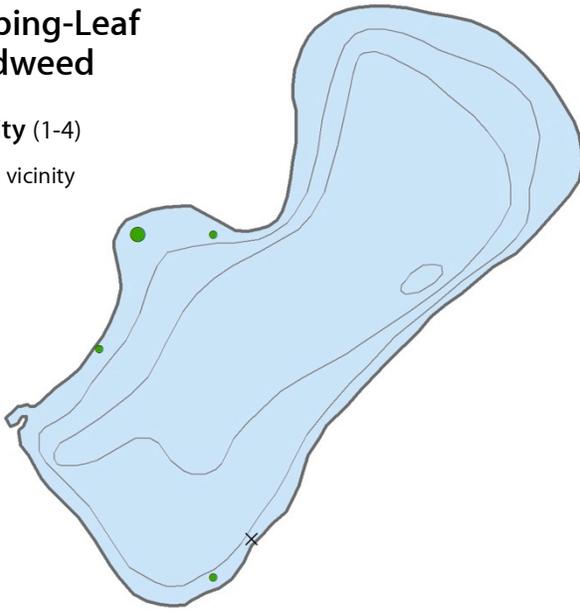## Slender Naiad

Southern Naiad

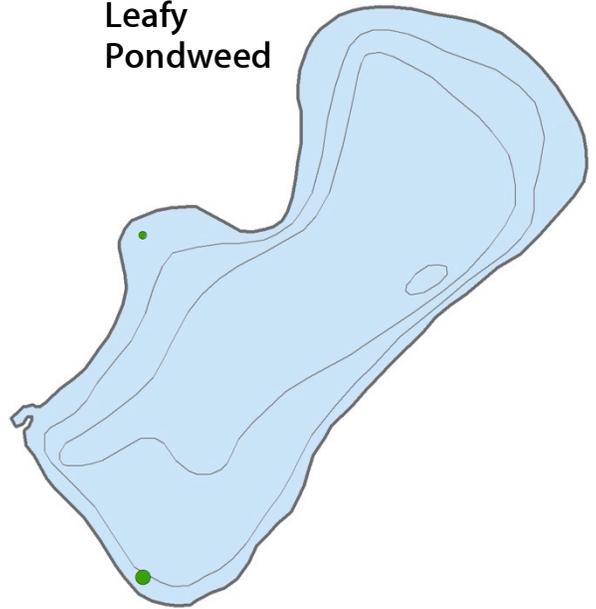## Illinois Pondweed

Julia Lake – Native Aquatic Plants

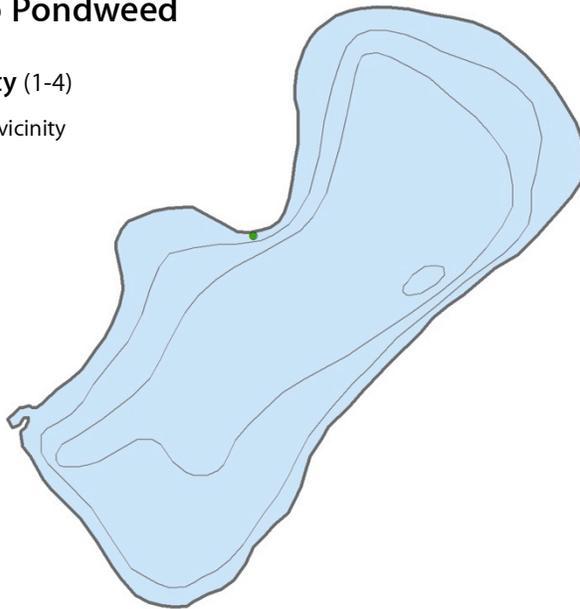## Clasping-Leaf Pondweed

Density (1-4)

✕ In vicinity
· 1
· 2
● 3
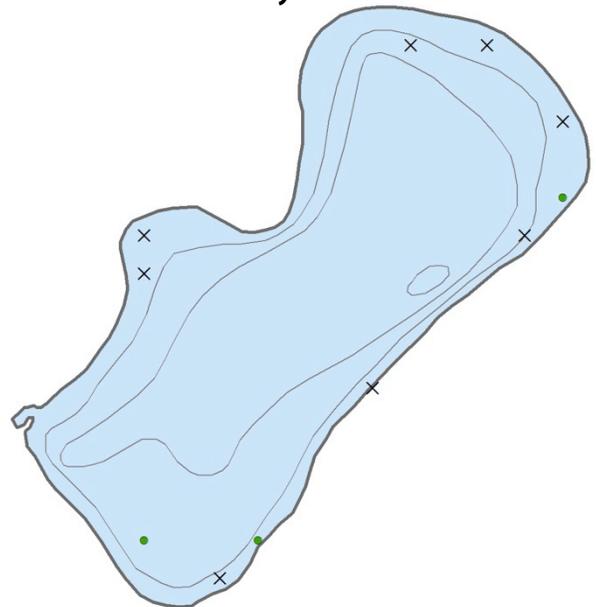● 4

Leafy Pondweed

Sago Pondweed

Density (1-4)

✕ In vicinity
· 1
· 2
● 3
● 4

White Waterlily

References

Madsen JD. 1999. Point intercept and line intercept methods for aquatic plant management. APCRT Technical Notes Collection. U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Nichols SA, Weber S, Shaw B. 2000. A proposed aquatic plant community biotic index for Wisconsin Lakes. Env Manage 26: 491-502.