

# 2017 Aquatic Plant Survey: Rice Marsh

(WBIC# 10-0001-00)

Surveyed August 7, 2017



**Surveying, Analysis, and Reporting by:**  
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**Certified Lake Manager**  
[www.NALMS.org](http://www.NALMS.org)

## Survey & Analysis Methods

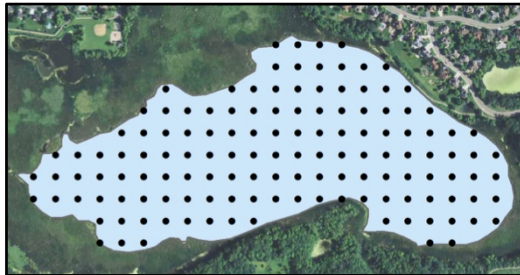
### Point-Intercept Survey

Freshwater Scientific Services, LLC surveyed the aquatic plant community of Rice Marsh (Carver Co., MN) on August 7, 2017 using the point-intercept survey method described by Madsen (1999). This survey was based upon 135 sample points arranged in a uniform grid (50-m spacing) across the entire lake (Figures 1 and 2).

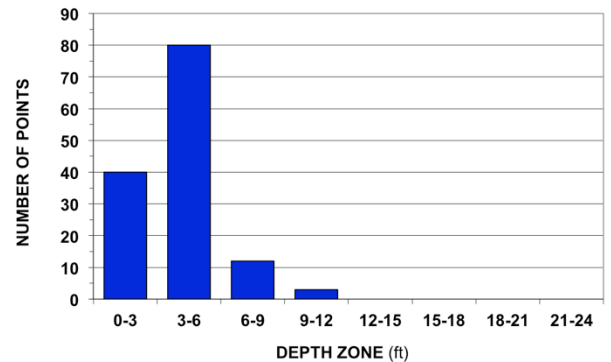
At each designated sample location, we collected plants using a 14-tine rake on an extendable pole. For each rake sample, we dragged the rake over the lake bottom for approximately 5 ft before retrieving. Retrieved plants were piled on top of the rake head and assigned density scores from 1 to 4 based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

We calculated the littoral frequency ( $\leq 15$  ft, % occurrence) and littoral mean plant abundance (density score) for each encountered plant species, as well as bay-wide and littoral community metrics (Tables 1 and 2). Plant species that were observed growing within 10 ft 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, but these “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.** Rice Marsh sample points for 2017



**Figure 2.** Sampling effort (number of locations sampled) within successive 3-ft depth zones. (Rice Marsh, 2017)



## Results

### Statistical Summary of Aquatic Plant Community in Rice Marsh

**Table 1.** Littoral frequency (% occurrence) and abundance (mean density score) of plant species found during the 2017 survey of Rice Marsh. % Occurrence and mean density (0-4 scale) were calculated using all littoral points (water depth ≤15 ft). "P" denotes taxa that were observed growing but not retrieved in any rake samples.





PLANT TAXA	COMMON NAME	% Occurrence	Littoral Density
<b>ALL TAXA (combined)</b>		<b>100</b>	<b>3.3</b>
<b>SUBMERSED TAXA</b>			
<i>Ceratophyllum demersum</i>	Coontail	99	2.8
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	74	1.0
<i>Potamogeton foliosus</i>	Leafy pondweed	14	0.1
<i>Stuckenia pectinata</i>	Sago pondweed	9	0.1
<i>Elodea canadensis</i>	Canadian waterweed	7	0.1
<i>Potamogeton crispus</i> *	Curly-leaf pondweed	4	0.1
<i>Heteranthera dubia</i>	Water stargrass	4	0.1
<i>Chara</i> sp.	Muskgrass	2	<0.1
<i>Najas flexilis</i>	Slender naiad	1	<0.1
<b>FLOATING/EMERGENT TAXA</b>			
<i>Wolffia columbiana</i>	Common watermeal	81	0.8
<i>Lemna minor</i>	Small duckweed	63	0.6
<i>Spirodela polyrhiza</i>	Large Duckweed	53	0.5
<i>Lemna trisulca</i>	Star duckweed	47	0.5
<i>Nymphaea odorata</i>	White waterlily	43	0.4
<i>Lythrum salicaria</i> *	Purple loosestrife	P	–
<i>Typha</i> sp.	Cattail	P	–

\* Aquatic invasive plant

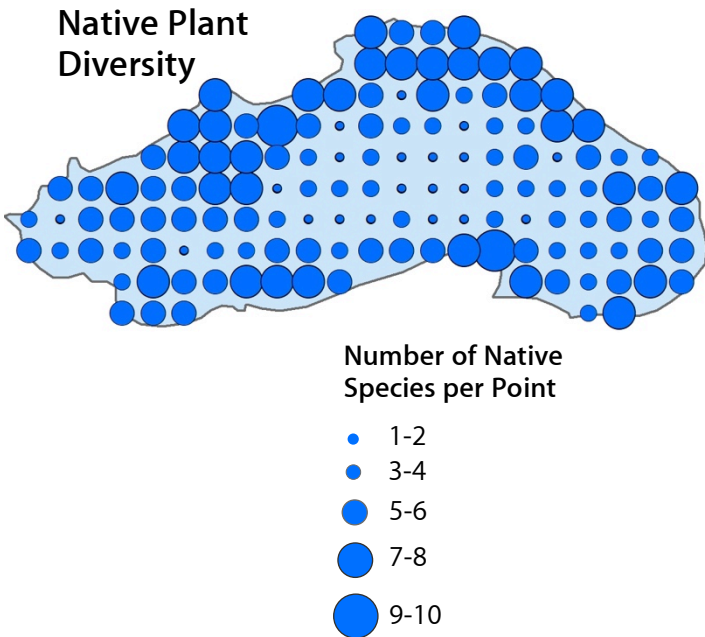
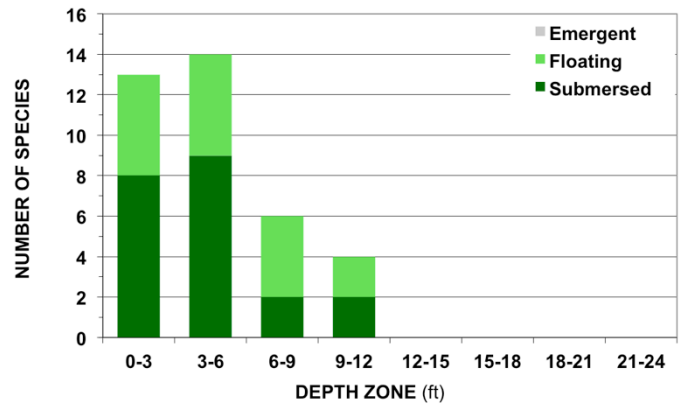
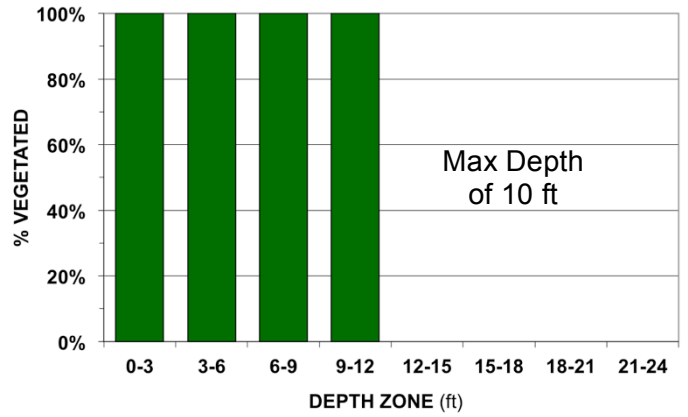
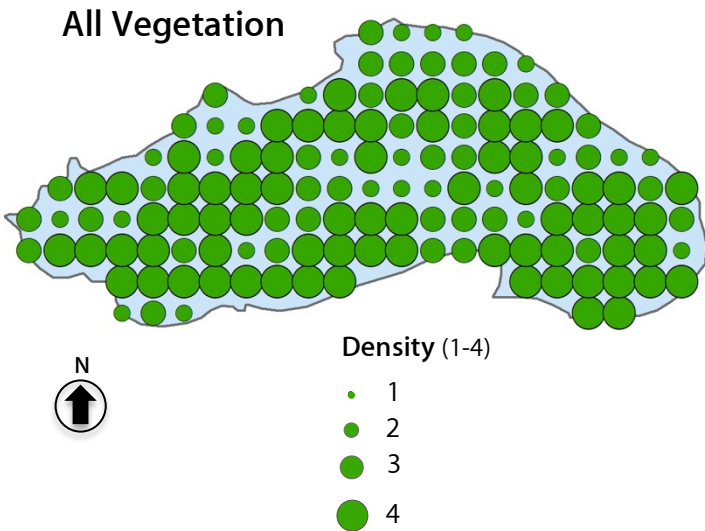
**Table 2.** Summary of plant community metrics for the 2017 survey conducted on Rice Marsh

<b>SURVEY RESULTS</b>	<b>2017</b>
<b>LAKE-WIDE METRICS</b>	
Lake Area (acres)	83
Total Points Sampled	135
% Lake Vegetated	100%
% Lake with Veg. to Surface	62%
Max Depth of Growth (95%)	7.2 ft
# Native Taxa	14
# Non-Native Taxa	2
<b>LITTORAL METRICS (≤15 ft)</b>	
Littoral Area (acres)	83
Littoral Points Sampled	135
% Littoral Points Vegetated	100%
Mean Littoral Plant Height (ft)	3.4 ft
% of Max Littoral Biovolume	86%
Mean Native Taxa / Point	5.0
Simpson's Diversity	0.87
Floristic Quality (FQI)	15.0
AMCI Score	50

**Figure 3.** Rake density scores used to assess 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

## Rice Marsh – Aquatic Plant Community



Surveyed: August 7, 2017  
 Methods: Rake, Sonar, Depth Rod  
 Surveyor: JA Johnson

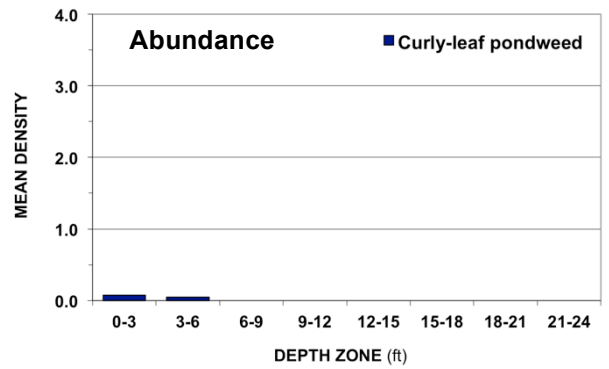
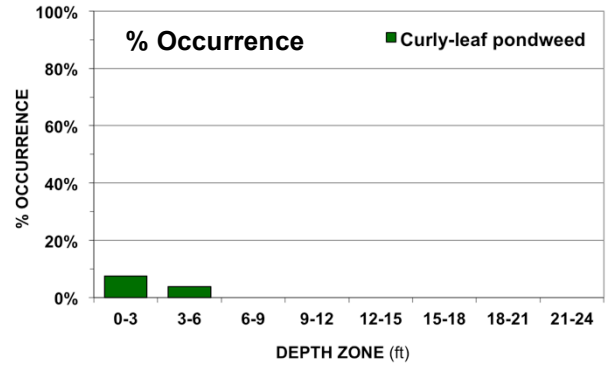
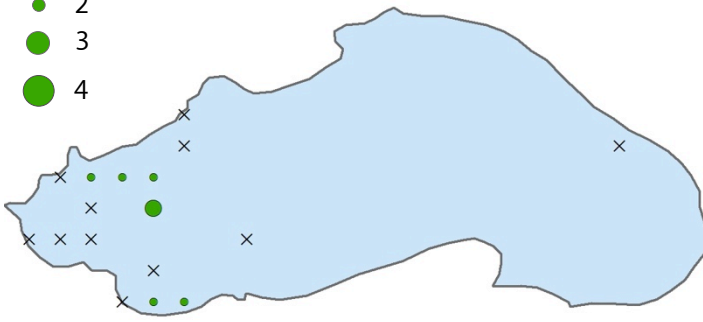


## Rice Marsh – Invasive Aquatic Plants

### Curlyleaf Pondweed (post-senescence)

#### Density (1-4)

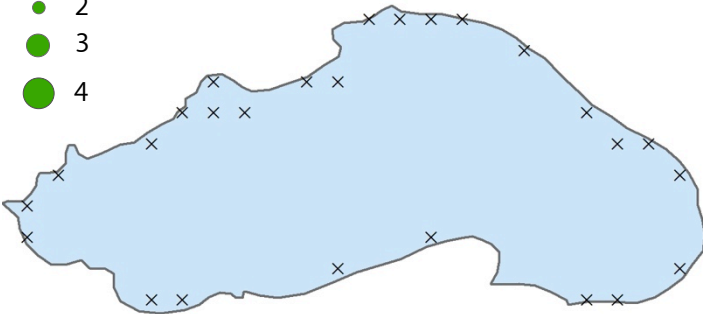
- x In vicinity
- 1
- 2
- 3
- 4



### Purple Loosestrife (on shore)

#### Density (1-4)

- x In vicinity
- 1
- 2
- 3
- 4



## Rice Marsh – Native Submersed Aquatic Plants

### Coontail

Density (1-4)

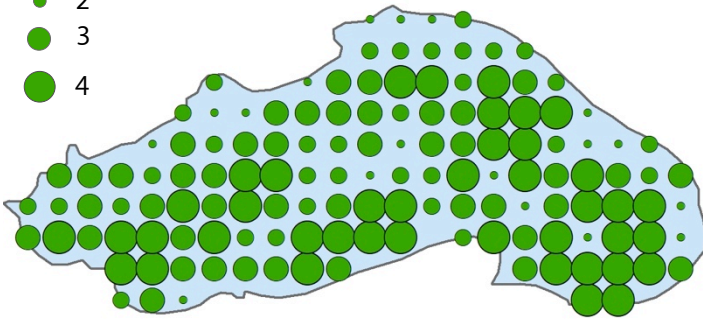
x In vicinity

• 1

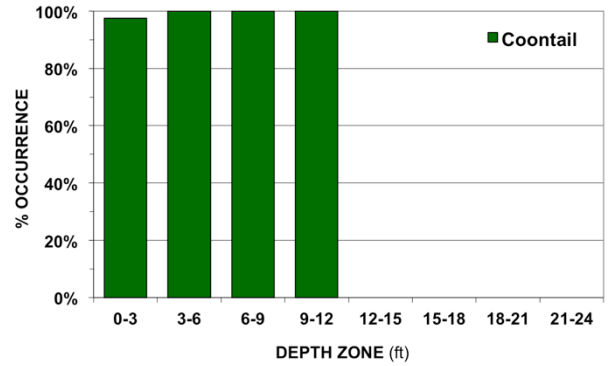
• 2

• 3

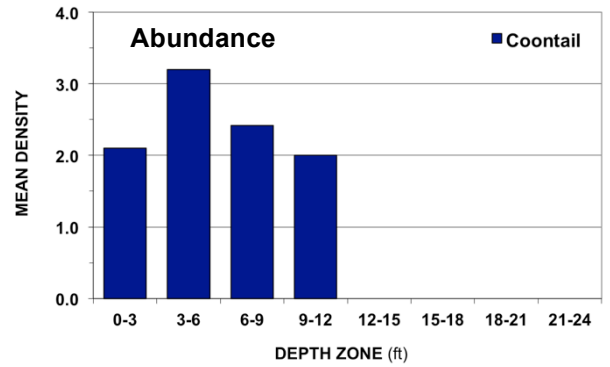
• 4



% Occurrence



Abundance



### Flat-Stem Pondweed

Density (1-4)

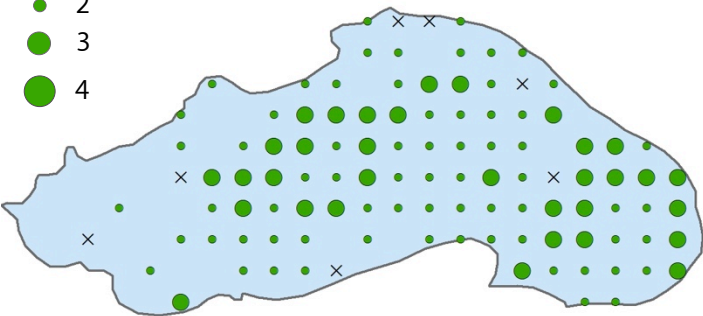
x In vicinity

• 1

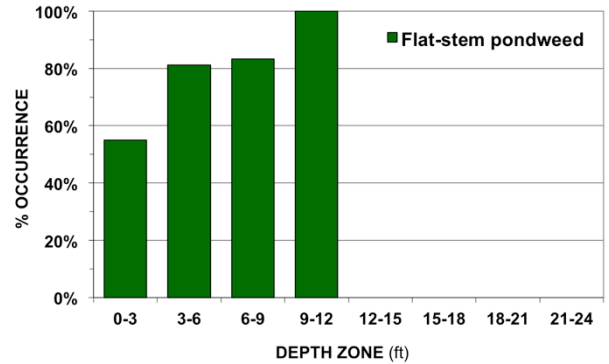
• 2

• 3

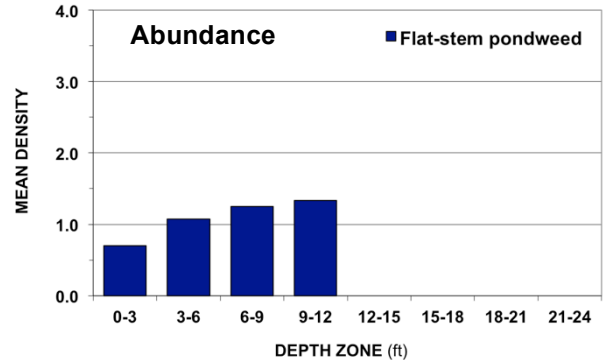
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% Occurrence



Abundance



## Rice Marsh – Native Submersed Aquatic Plants

### Leafy Pondweed

Density (1-4)

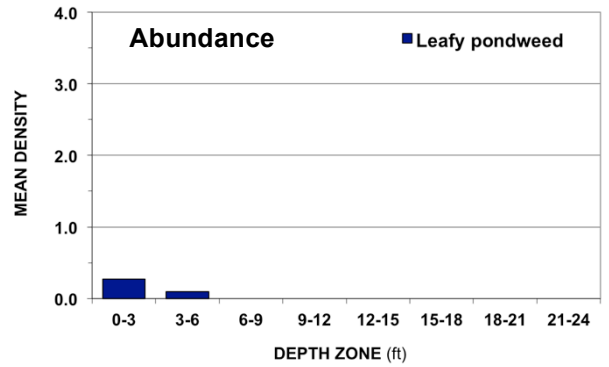
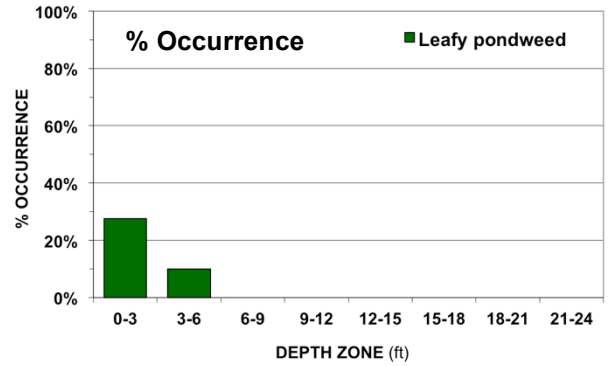
x In vicinity

• 1

• 2

• 3

• 4



### Sago Pondweed

Density (1-4)

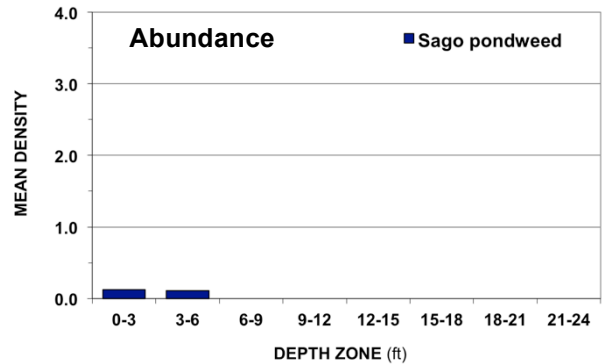
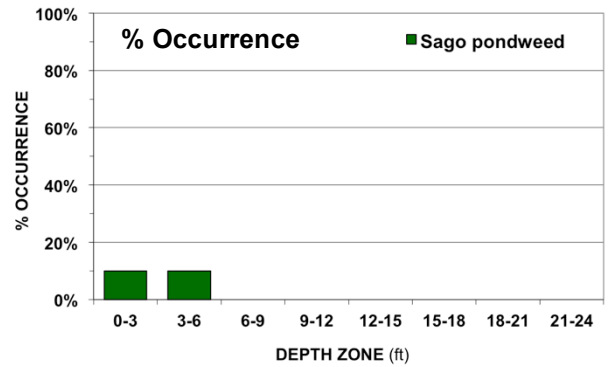
x In vicinity

• 1

• 2

• 3

• 4





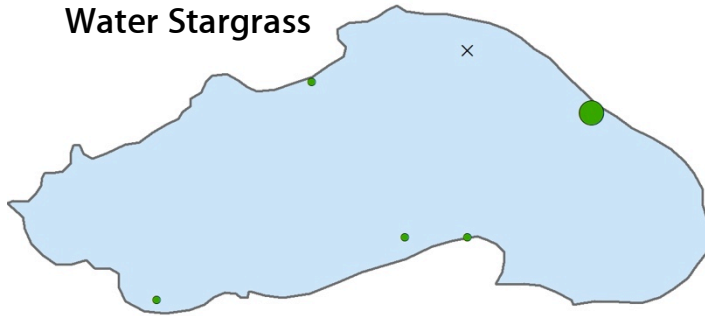
## Rice Marsh – Native Submersed Aquatic Plants

Density (1-4)

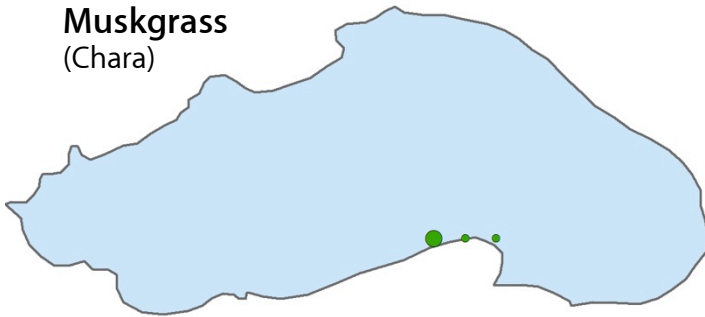
x In vicinity

- 1
- 2
- 3
- 4

### Water Stargrass



### Muskgrass (Chara)

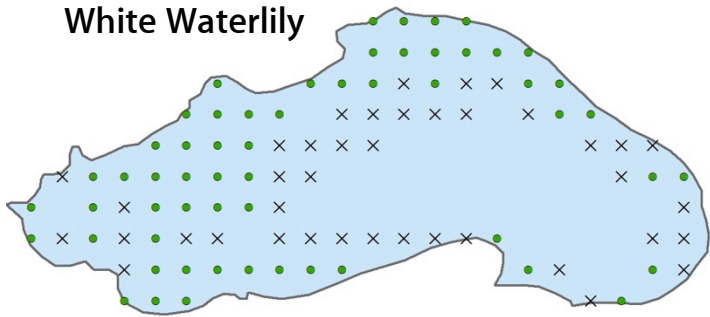


### Slender Naiad

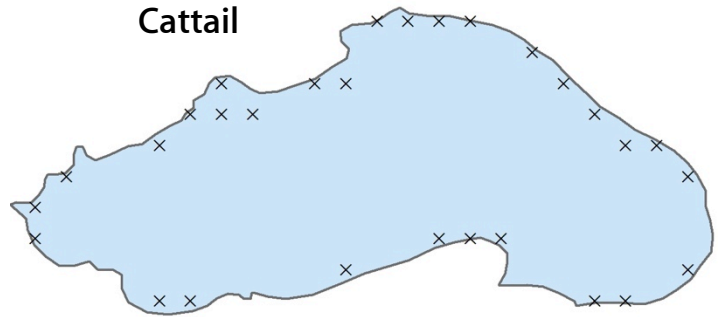


## Rice Marsh – Native Floating & Emergent Plants

### White Waterlily



### Cattail



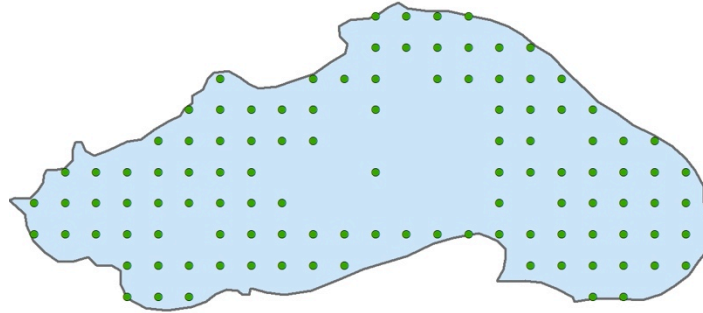
## Rice Marsh – Native Free-Floating Aquatic Plants

### Density (1-4)

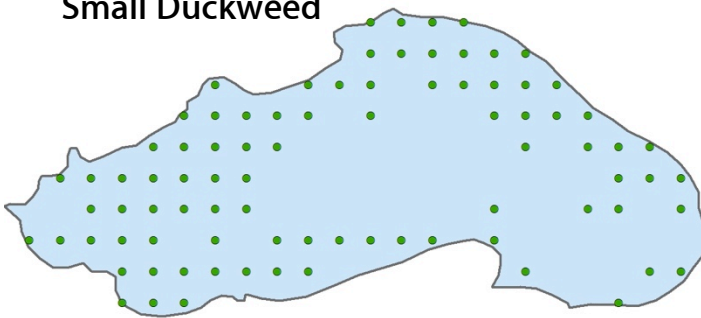
x In vicinity

- 1
- 2
- 3
- 4

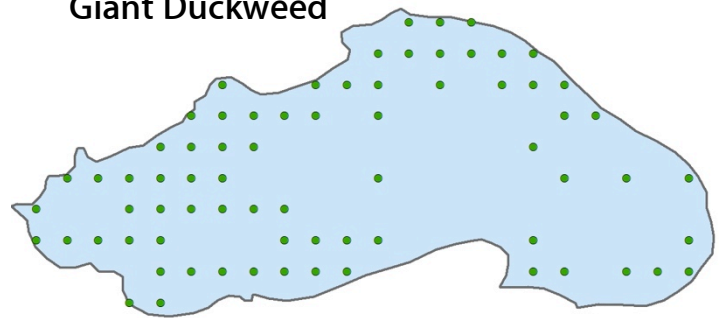
### Common Watermeal



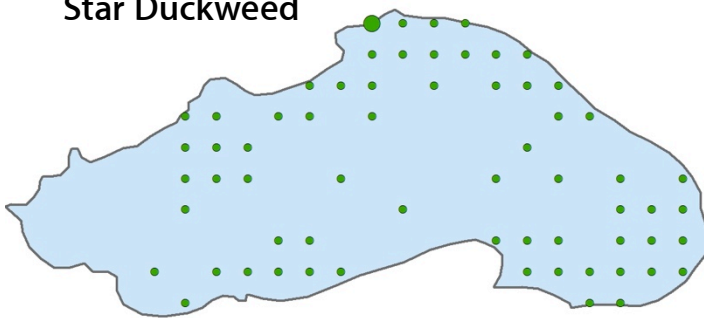
### Small Duckweed



### Giant Duckweed



### Star Duckweed



## 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.