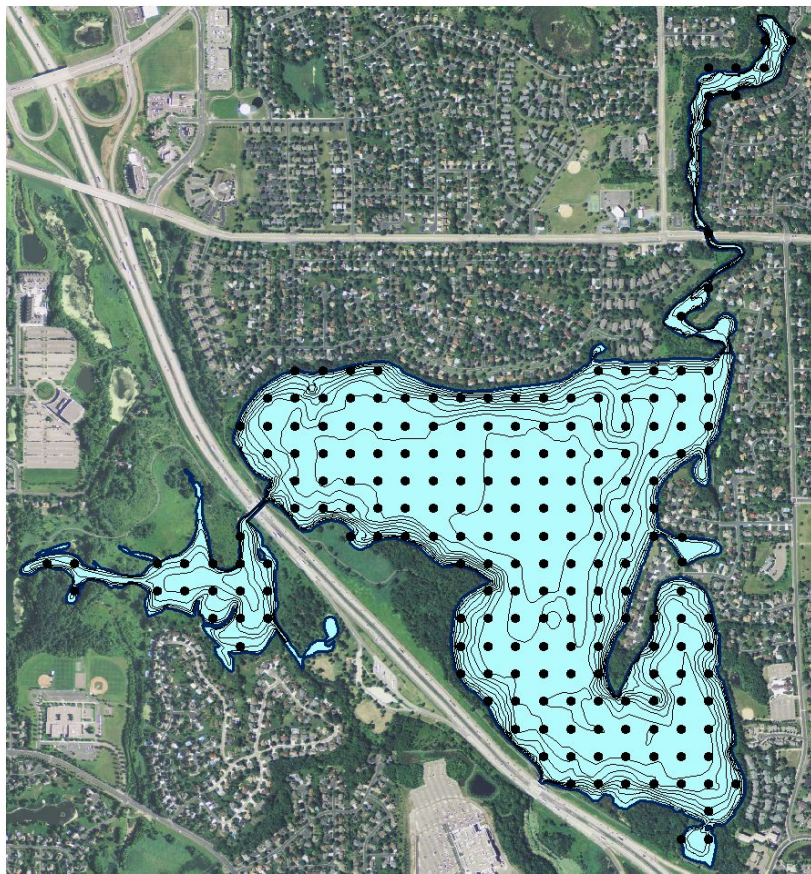


Aquatic Plant Community in Rice Lake: 2014 Hennepin County, MN (#27-0116)

Surveyed July 25, 2014



Surveying, Analysis, and Reporting by:
James A. Johnson – Freshwater Scientific Services, LLC



Funded by:
*Rice Lake Area Association – Maple Grove, MN
with assistance from City of Maple Grove*

Survey & Analysis Methods

Point-Intercept Survey

Freshwater Scientific Services conducted a lake-wide aquatic plant survey for Rice Lake on July 25, 2014 using the point-intercept method described by Madsen (1999). For this survey, we generated a total of 207 sample points arranged in a uniform grid (280-ft spacing; Fig 1) using desktop GIS software and the MDNR *Random Sample Generator* extension to project a grid of points over 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 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 2014 Rice Lake plant survey.

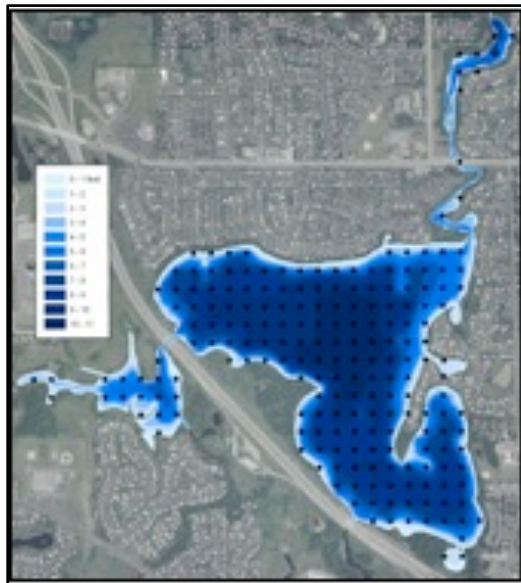
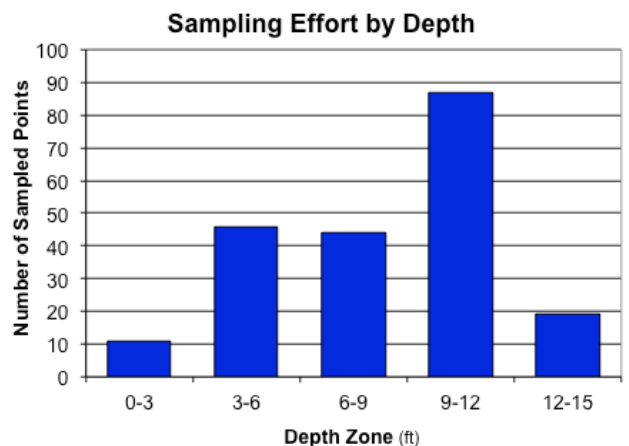


Figure 2. Sampling effort (number of locations sampled) within successive 3-ft depth zones; Rice Lake, Jul 25, 2014



Results

Statistical Summary of Findings

Table 1. Littoral frequency (% occurrence) and abundance (mean density score) of plant species found in Rice Lake (Hennepin Co., MN) during the Jul 25, 2014 survey. % *Occurrence* and *Mean Density* (0-4 scale) were calculated using all littoral points (water depth ≤15 ft). Plant taxa that were observed growing in the lake but not retrieved in any rake samples are noted as being present (P).





PLANT TAXA	COMMON NAME	% OCCURRENCE	MEAN DENSITY
ALL TAXA (combined)		35	0.9
SUBMERSED TAXA			
<i>Ceratophyllum demersum</i>	Coontail	31	0.6
<i>Potamogeton crispus</i> *	Curlyleaf Pondweed	29	0.2
<i>Stuckenia pectinata</i>	Sago Pondweed	12	0.2
<i>Elodea canadensis</i>	Common Waterweed	10	0.1
<i>Potamogeton zosteriformis</i>	Flat-stem Pondweed	8	0.1
<i>Mriophyllum spicatum</i> *	Eurasian Watermilfoil	8	0.1
<i>Lemna trisulca</i>	Star Duckweed	7	0.1
<i>Potamogeton foliosus</i>	Leafy Pondweed	5	0.1
<i>Zosterella dubia</i>	Water Stargrass	2	<0.1
<i>Zanichellia palustris</i>	Horned Pondweed	2	<0.1
<i>Najas flexilis</i>	Slender Naiad	1	<0.1
FLOATING TAXA			
<i>Lemna minor</i>	Small Duckweed	13	0.1
<i>Spirodella polyrhiza</i>	Greater Duckweed	12	0.1
<i>Wolffia</i> sp.	Watermeal	10	0.1
<i>Nymphaea odorata</i>	White Waterlily	2	<0.1
<i>Polygonum amphibium</i>	Water Smartweed	P	–
EMERGENT TAXA			
<i>Alisma triviale</i>	Water Plantain	P	–
<i>Sparganium</i> sp.	Bur-reed	P	–
<i>Typha</i> sp.	Cattail	P	–

* Invasive, non-native species

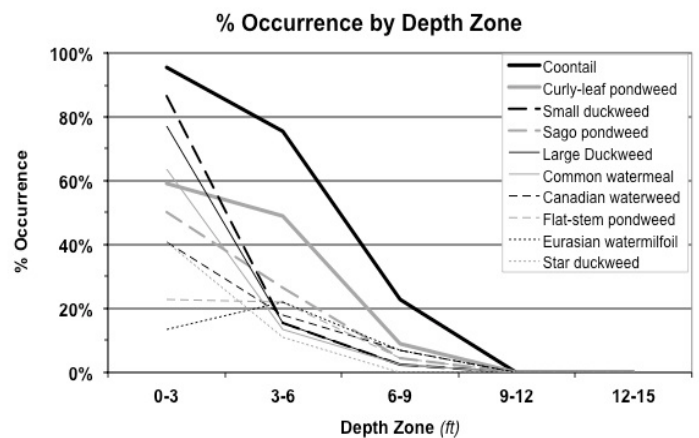
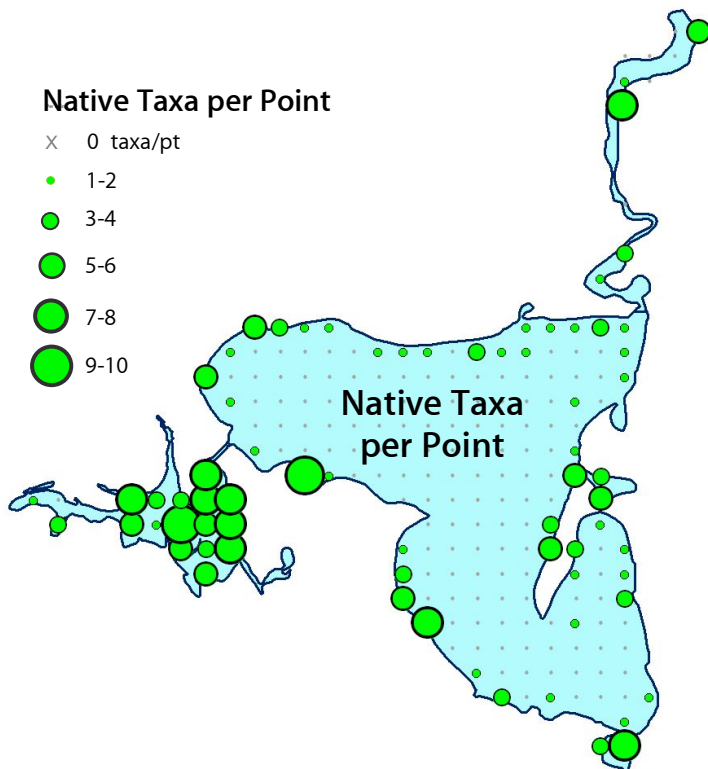
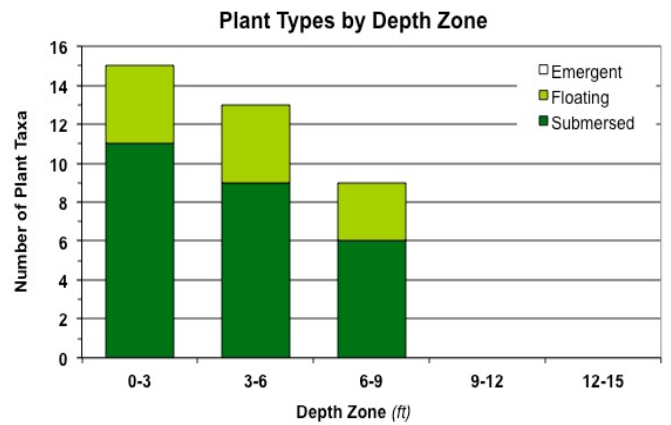
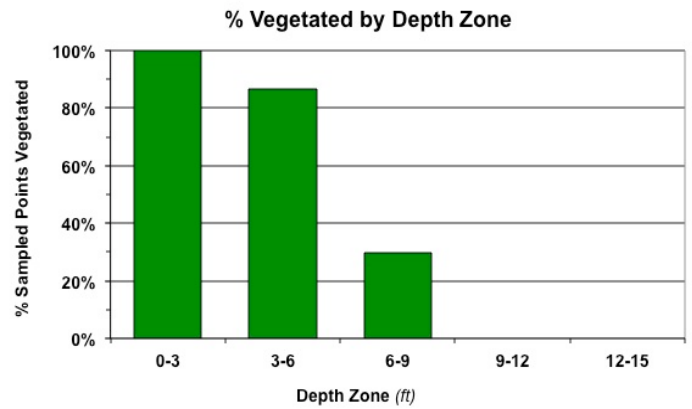
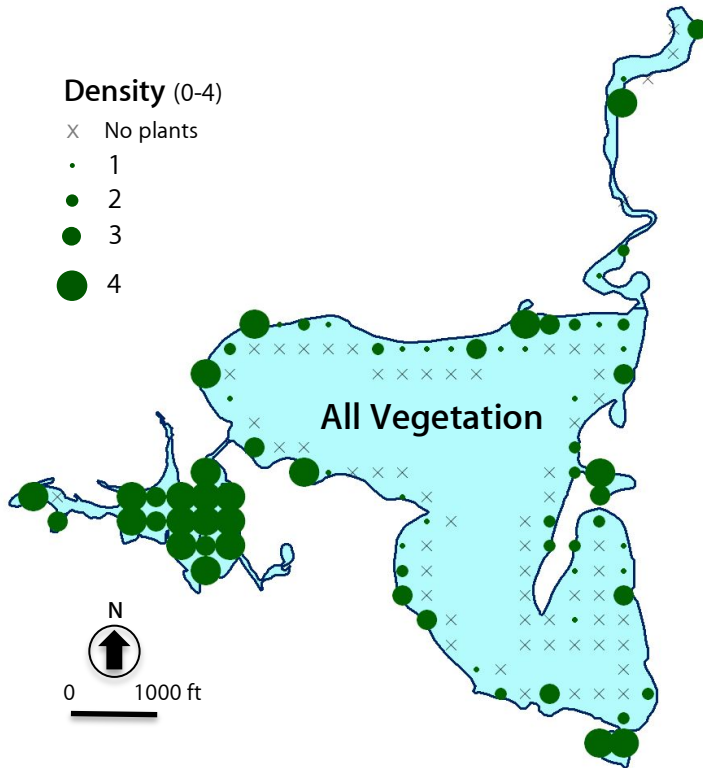
Table 2. Summary of Rice Lake plant community metrics from the Jul 25, 2014 survey.

RICE LAKE	2014
WHOLE-LAKE METRICS (<i>all littoral</i>)	
Lake Area	365 acres
Total Points Sampled	207
Vegetated Area	128 acres (35%)
Area with Veg. to Surface	80 acres (22%)
Max Depth of Growth (95%)	8 ft
Mean Plant Height	1.2 ft
Mean Plant Density (0-4)	0.9
% of Max Littoral Biovolume	16%
Native Submersed Taxa	9
Native Floating/Emergent Taxa	8
Non-Native Submersed Taxa	2
Mean Native Taxa / Point	0.8
Simpson's Diversity	0.89
Floristic Quality (FQI)	15.8
AMCI Score (Nichols et al. 2000)	39

Table 3. Overview of rake density scores used to document plant abundance

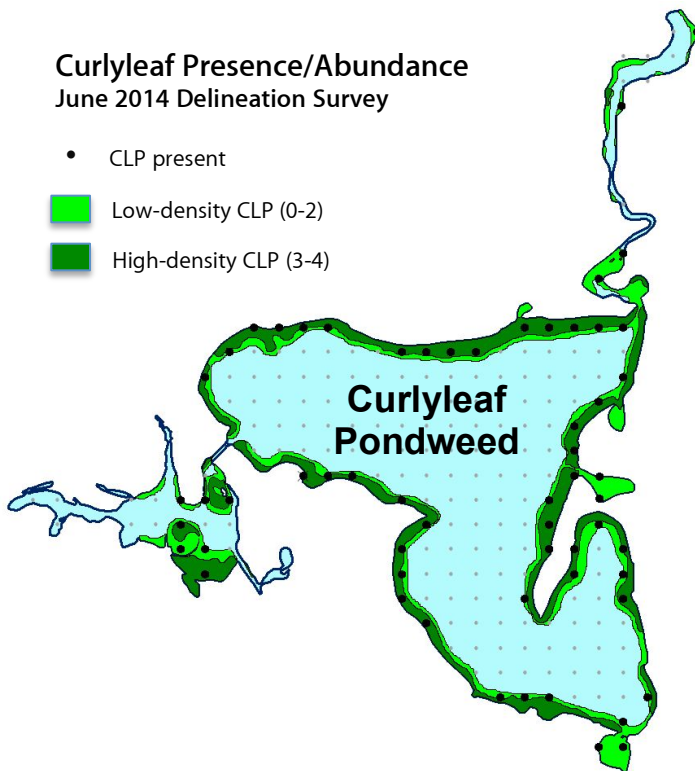
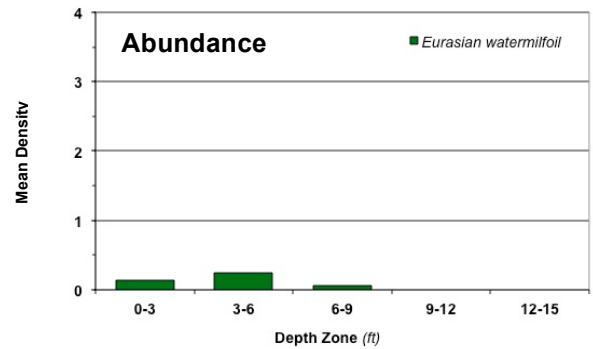
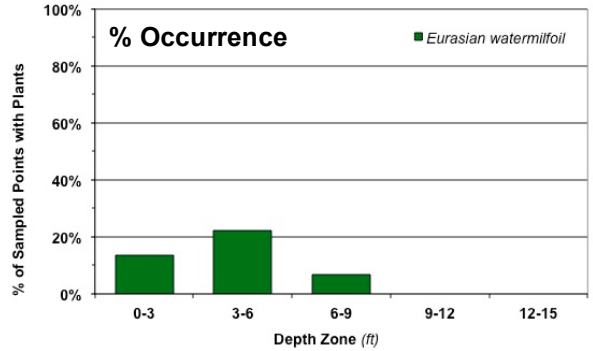
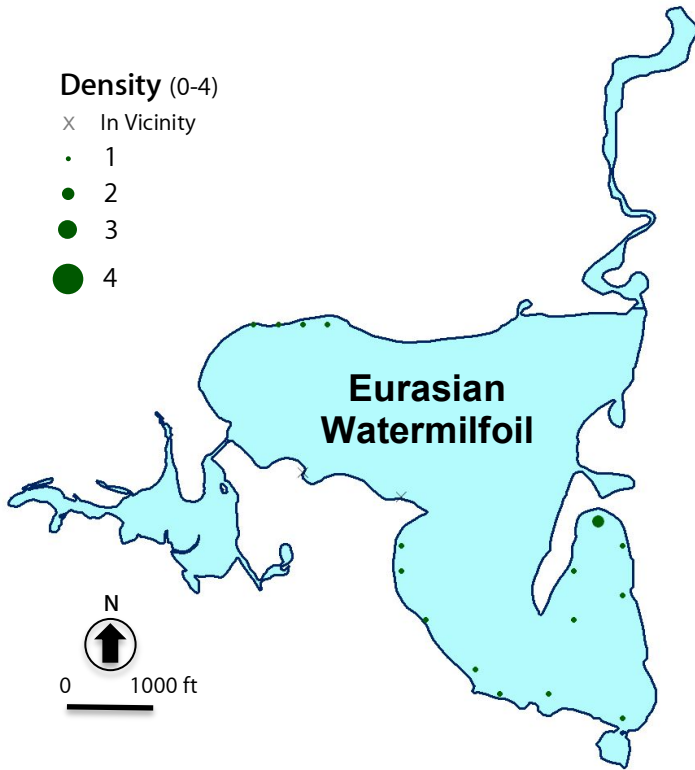
Density Score	Rake Coverage	Description
1		Only a few plants retrieved
2		Full length of rake head covered, but tines only partially covered
3		Plants completely cover the rake head and tines
4		Enough plants to cover rake head and tines multiple times

Rice Lake – Aquatic Plant Community



Surveyed: Jul 25, 2014
 Surveyor: J.A. Johnson
 Affiliation: Freshwater Scientific Services, LLC
 Methods: Rake, Sonar, Depth Rod

Rice Lake – Invasive Aquatic Plants

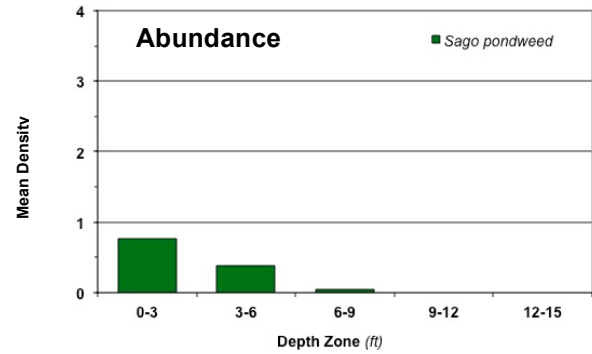
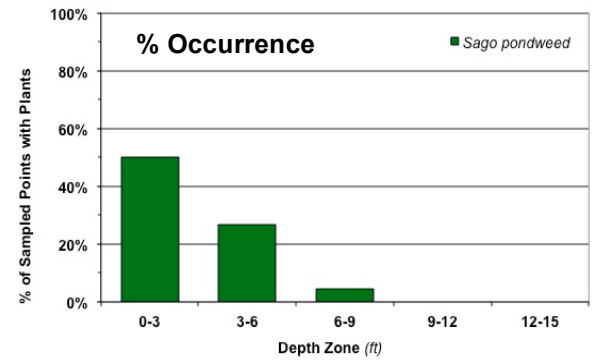
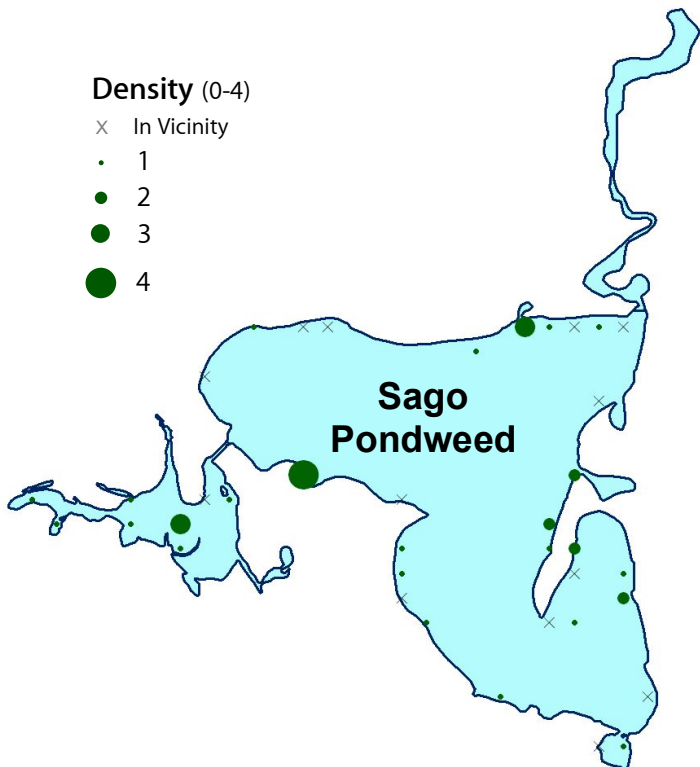
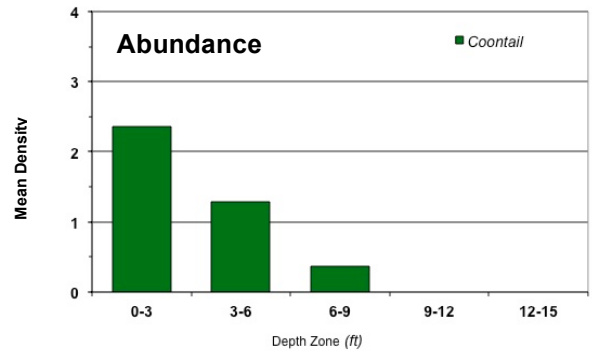
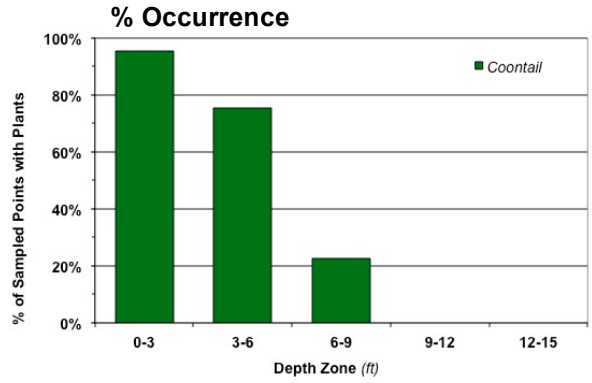
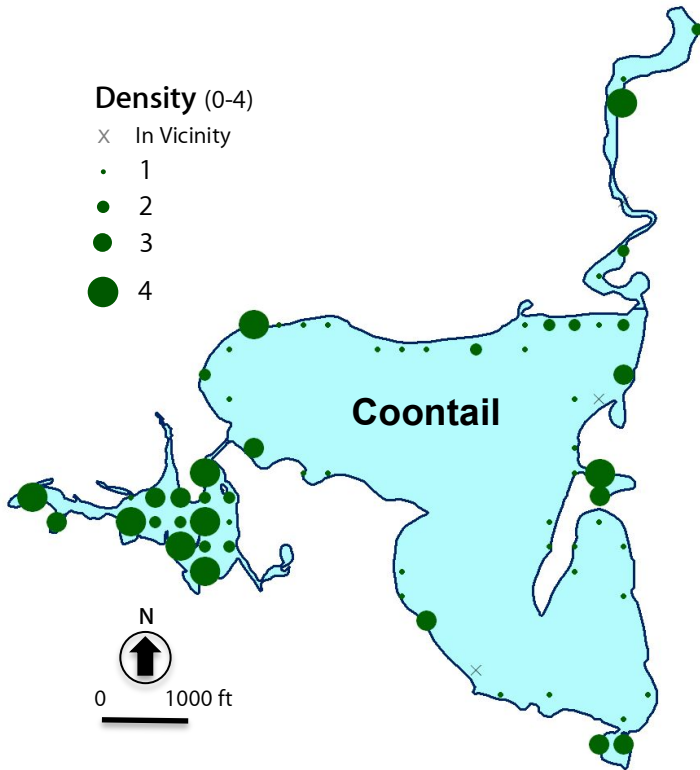


Spring CLP Delineation Survey (June)

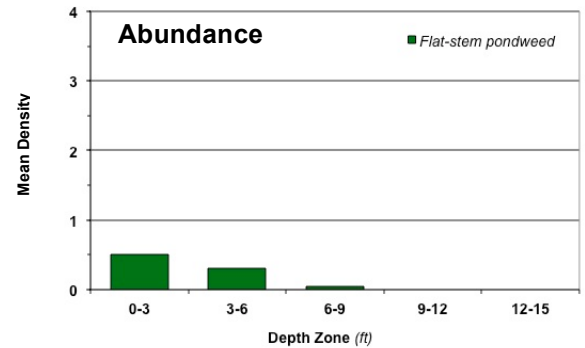
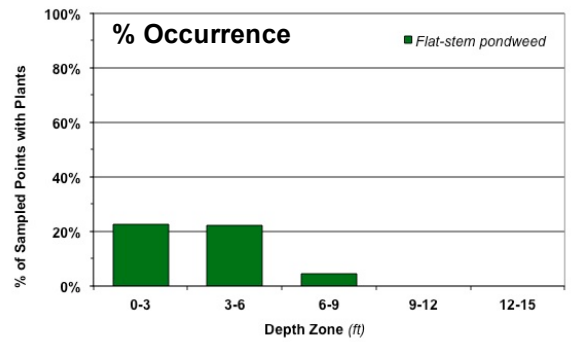
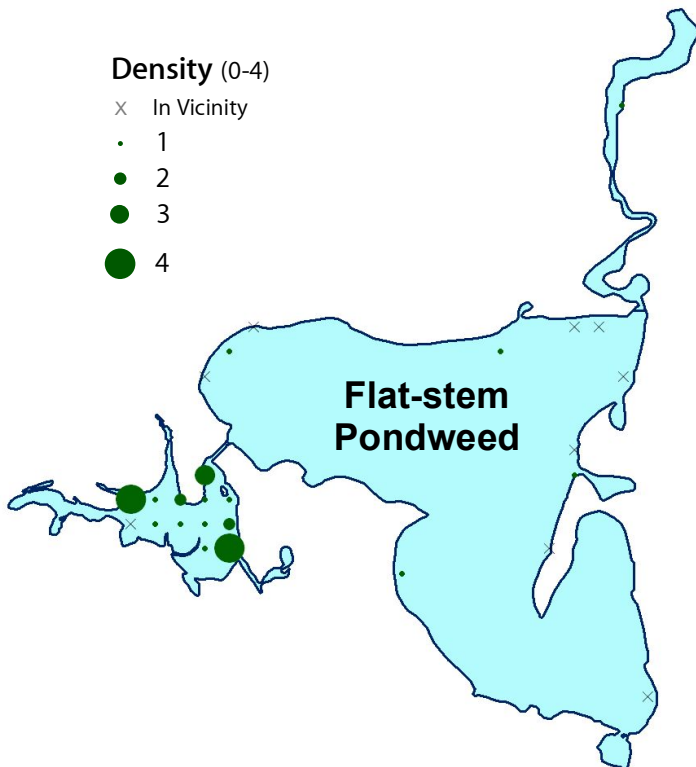
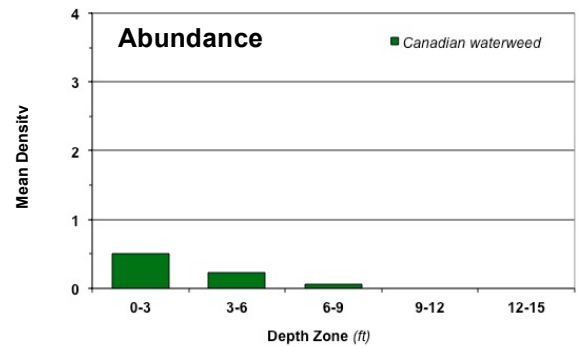
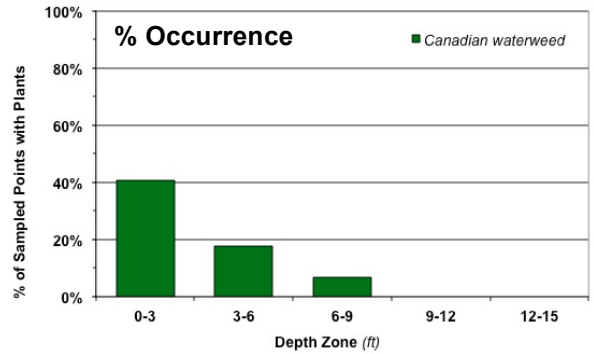
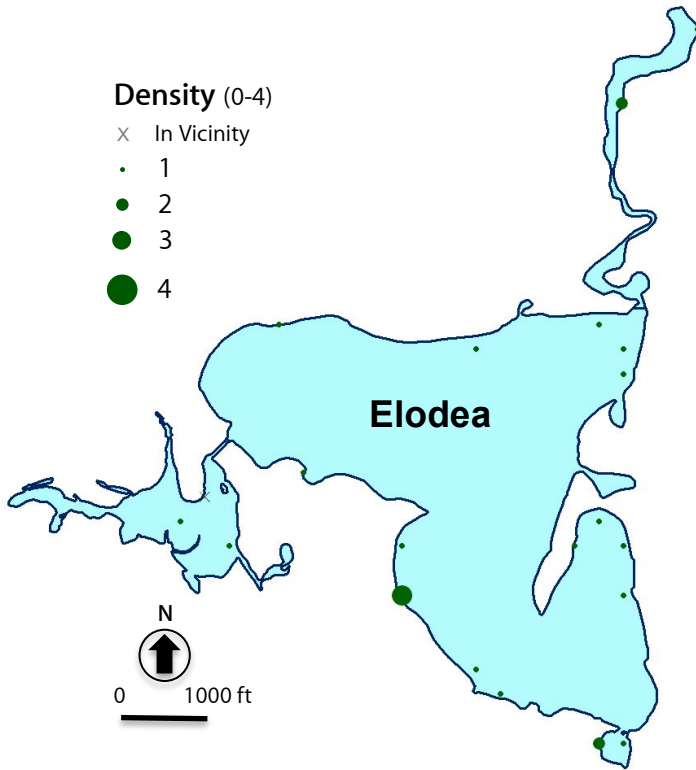
Although we found curlyleaf at many points during the July 25 point-intercept survey, it was several weeks past its peak abundance and most of the collected curlyleaf plants were quite broken down. To better assess peak curlyleaf distribution and abundance in the lake, we conducted a curlyleaf bed delineation survey on June 9, 2014. Based upon this earlier survey, we found the following:

- 95 acres of curlyleaf throughout lake
- 51 acres of dense, surface-matted curlyleaf throughout the lake; 44 acres in main basin
- In main lake basin, most areas <5 ft deep supported dense, surface-matted curlyleaf
- Very little curlyleaf found in areas >7 ft deep

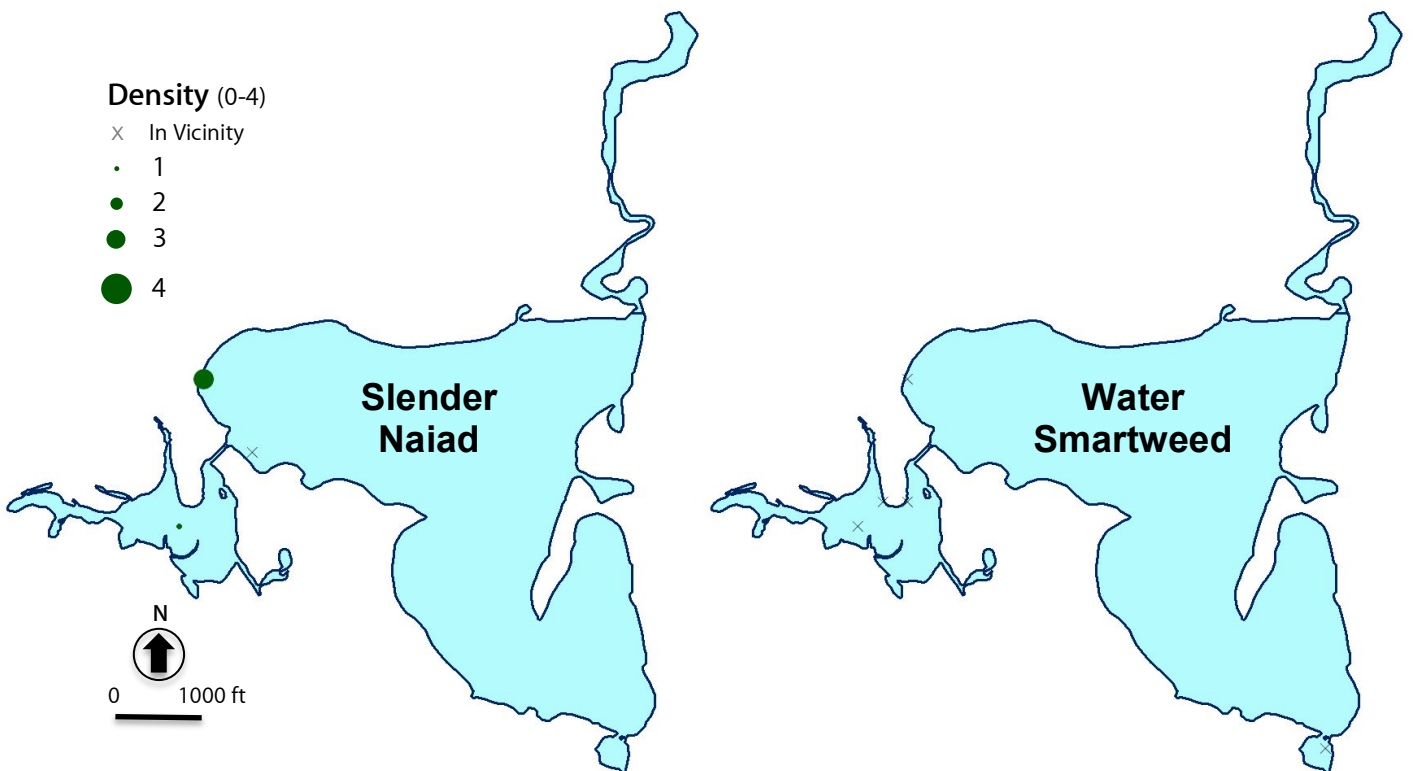
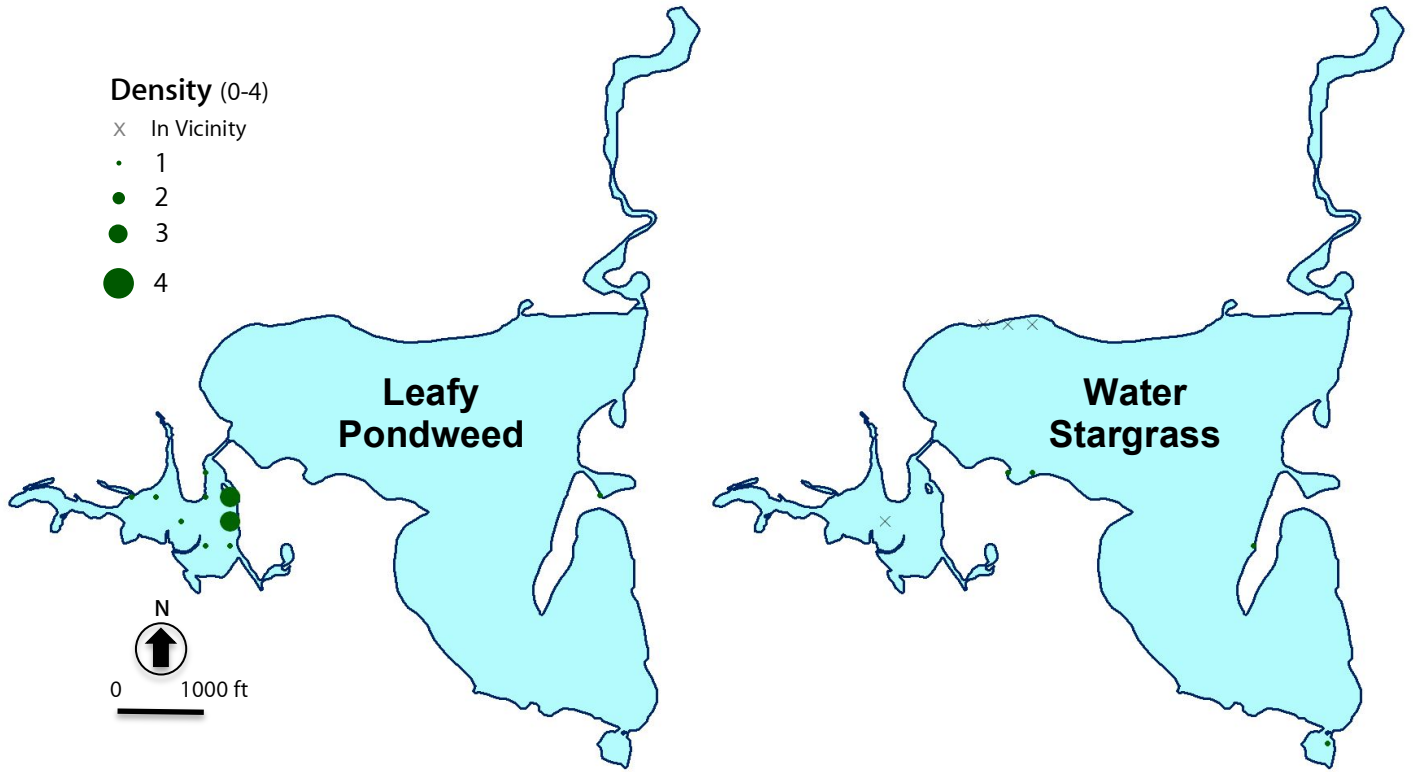
Rice Lake – Native Aquatic Plants



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Rice Lake – Native Aquatic Plants

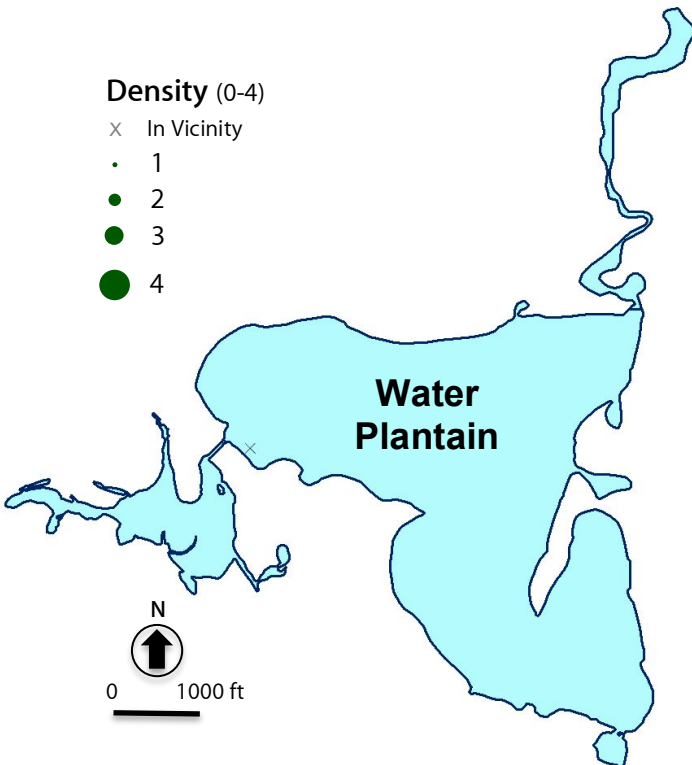
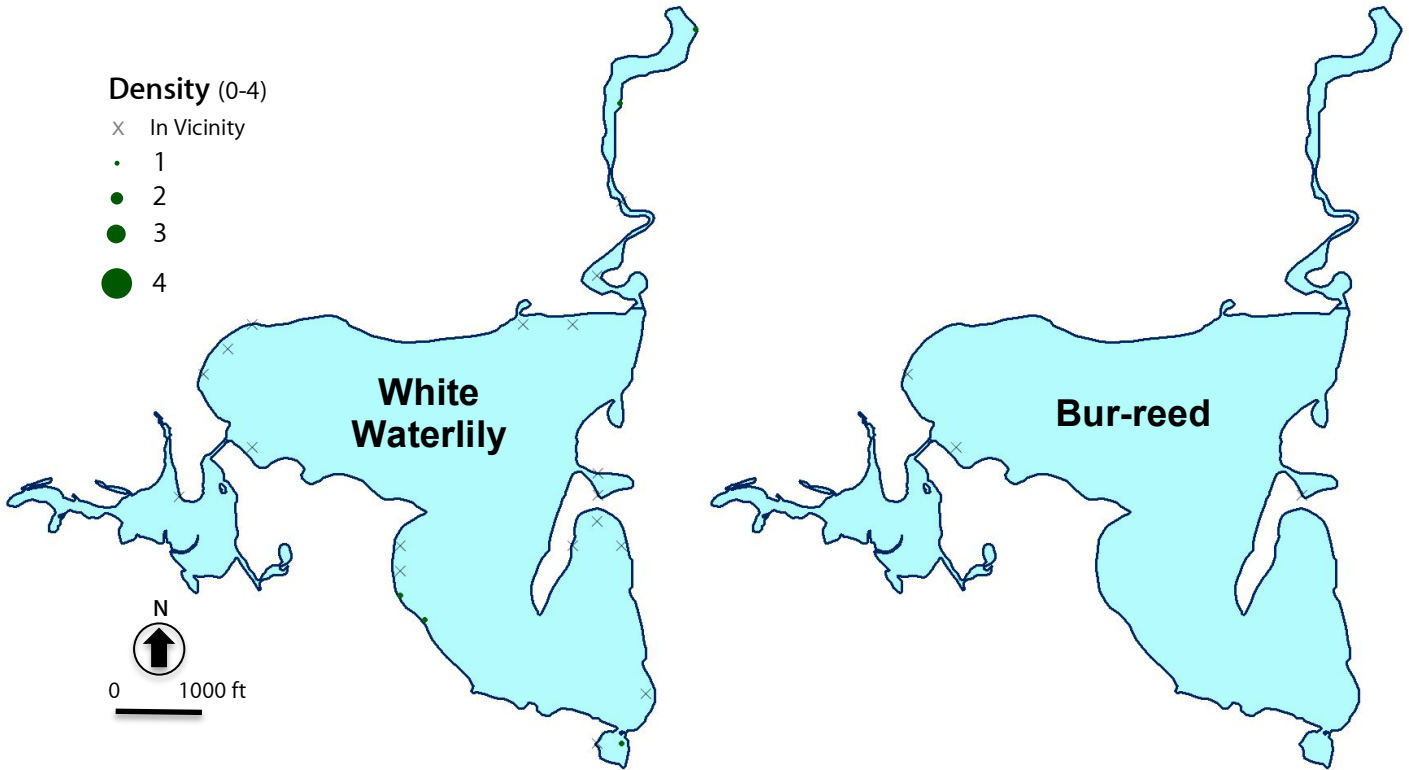
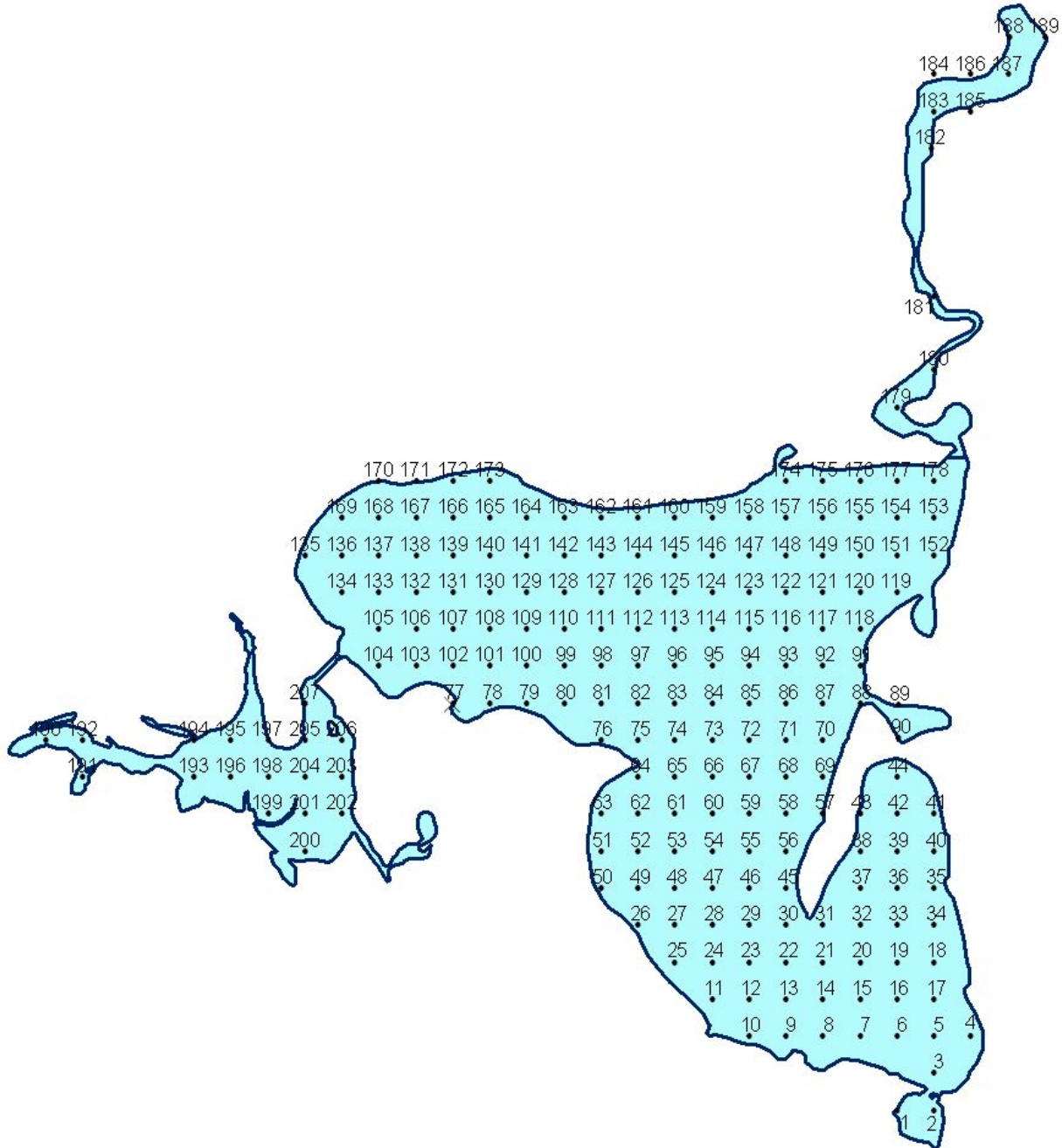


Figure 3. Sample locations and point numbering for the July 25, 2014 vegetation survey of Rice Lake (Hennepin Co., MN)



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.