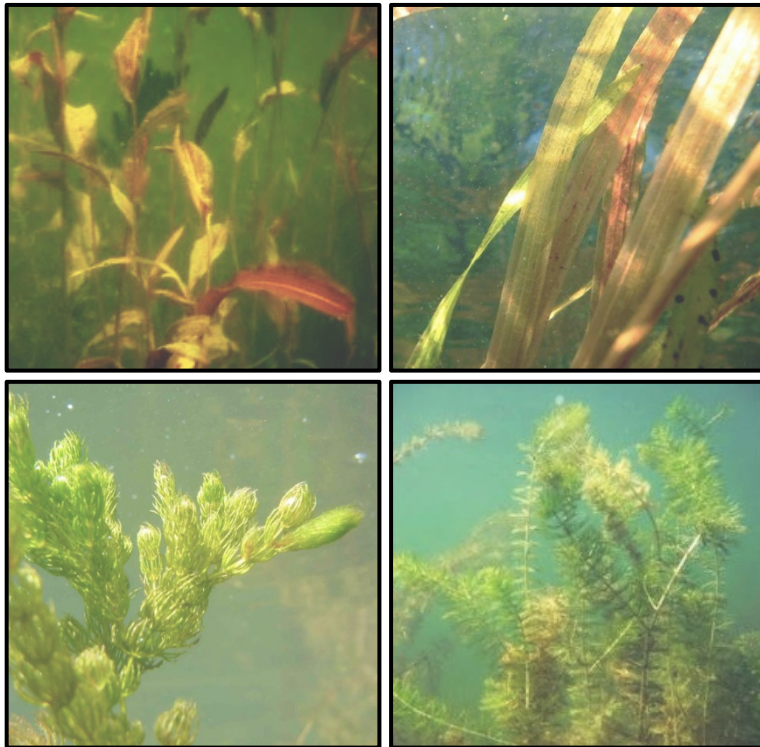


## 2014 Aquatic Plant Survey: Maple Lake (Annandale, MN)

Surveyed September 11-12, 2014



**Surveying, Analysis, and Reporting by:**  
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**Certified Lake Manager**  
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## Survey & Analysis Methods

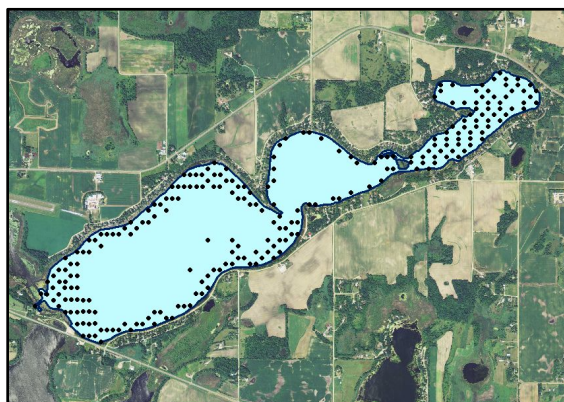
### Point-Intercept Survey

Freshwater Scientific Services, LLC surveyed the aquatic plant community of Maple Lake (Wright Co., MN) on September 11-12, 2014 using the point-intercept survey method described by Madsen (1999). This survey incorporated assessments at ~244 sample points that were selected from a uniform grid of points established for a previous plant survey (every-other row sampled, Figures 1 and 2).

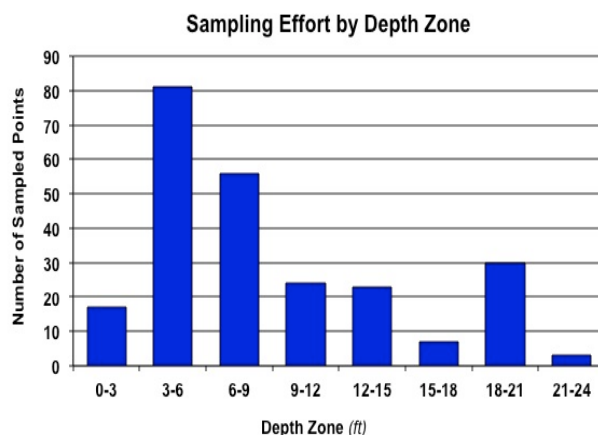
At each designated sample location, we collected plants using a double-headed, 14-tine rake on a rope. For each rake sample, we dragged the rake over the lake bottom for approximately 5 ft before retrieving. Retrieved plants were piled on top of the rake head and assigned density scores from 1 to 4 based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

We calculated the littoral frequency ( $\leq 15$  ft, % occurrence) and littoral mean density score (plant abundance) 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.** Designated sample locations for Maple Lake in 2014; subset of points selected from larger grid of points.



**Figure 2.** Sampling effort (number of locations sampled) within successive 3-ft depth zones for the Sept 2014 survey of Maple Lake.



## Results

### Statistical Summary of Findings





**Table 1.** Littoral frequency (% occurrence) and abundance (mean density score) of plant species found during the Sept 2014 survey of Maple Lake. % 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>99</b>	<b>3.0</b>
<b>SUBMERSED TAXA</b>			
<i>Ceratophyllum demersum</i>	Coontail	77	1.6
<i>Myriophyllum sibiricum</i>	Northern Watermilfoil	41	0.6
<i>Myriophyllum spicatum</i> *	Eurasian Watermilfoil	37	0.5
<i>Vallisneria americana</i>	Wild Celery	37	0.6
<i>Lemna trisulca</i>	Star Duckweed	35	0.4
<i>Potamogeton richardsonii</i>	Clasping-leaf Pondweed	27	0.3
<i>Potamogeton zosteriformis</i>	Flat-stem Pondweed	27	0.3
<i>Stuckenia pectinata</i>	Sago Pondweed	23	0.2
<i>Zosterella dubia</i>	Water Stargrass	13	0.2
<i>Bidens beckii</i>	Water Marigold	11	0.1
<i>Chara</i> sp.	Muskgrass	9	0.1
<i>Potamogeton praelongus</i>	White-stem Pondweed	8	0.1
<i>Najas guadalupensis</i>	Southern Naiad	7	0.1
<i>Najas flexilis</i>	Slender Naiad	6	0.1
<i>Potamogeton crispus</i> *	Curlyleaf Pondweed	5	0.1
<i>Ranunculus aquatilis</i>	Stiff Water-crowfoot	4	<0.1
<i>Potamogeton friesii</i>	Frie's Pondweed	3	<0.1
<i>Potamogeton gramineus</i>	Variable Pondweed	3	<0.1
<i>Potamogeton nodosus</i>	Long-leaf Pondweed	3	<0.1
<i>Elodea canadensis</i>	Canadian waterweed	2	<0.1
<i>Utricularia vulgaris</i>	Common Bladderwort	2	<0.1
<i>Aquatic Moss</i>	Moss	1	<0.1
<i>Potamogeton amplifolius</i>	Large-leaf Pondweed	1	<0.1
<i>Nitella</i> sp.	Stonewort	1	<0.1
<b>FLOATING / EMERGENT TAXA</b>			
<i>Nymphaea odorata</i>	White Waterlily	7	0.1
<i>Sagittaria</i> sp.	Arrowhead	1	<0.1
<i>Spirodella polyrhiza</i>	Giant Duckweed	1	<0.1
<i>Nuphar variegata</i>	Spatterdock	P	–
<i>Polygonum amphibium</i>	Water Smartweed	P	–
<i>Potamogeton natans</i>	Floating-leaf Pondweed	P	–
<i>Typha</i> sp.	Cattail	P	–

**Table 2.** Summary of plant community metrics for the 2014 survey (Sept 11-12) conducted on Maple Lake.

<b>2014 SURVEY RESULTS</b>	<b>Sept</b>
<b>LAKE-WIDE METRICS</b>	
Lake Area (acres)	645
Total Points Sampled	244
% Lake Vegetated	62%
% Lake with Veg. to Surface	9%
Max Depth of Growth (95%)	14.8 ft
# Native Taxa	29
# Non-Native Taxa	2
<b>LITTORAL METRICS (≤15 ft)</b>	
Littoral Area (acres)	385
Littoral Points Sampled	201
% Littoral Points Vegetated	99%
Mean Littoral Plant Height (ft)	3.8 ft
% of Max Littoral Biovolume	52%
Mean Native Taxa / Point	3.5
Simpson's Diversity	0.91
Floristic Quality (FQI)	26.3
AMCI Score	45

**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

## 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.