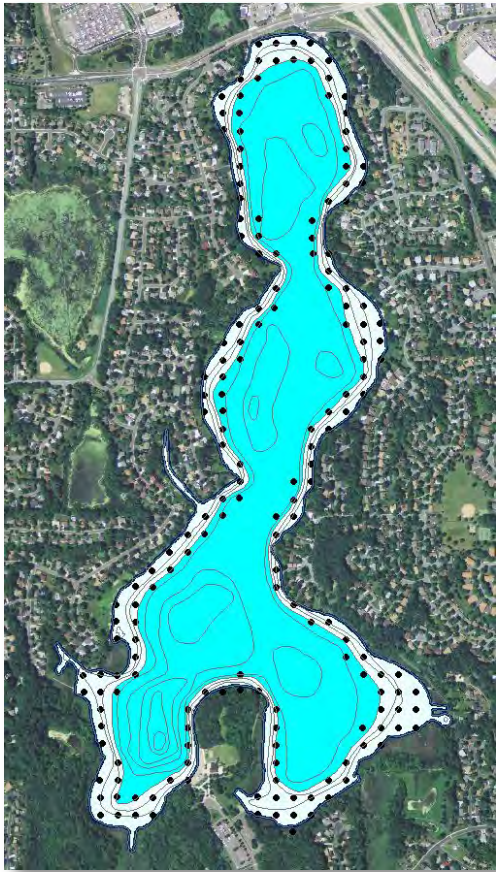


# Aquatic Plant Community of Fish Lake: 2014

## Hennepin County, MN (#27-0118)

Surveyed July 29, 2014



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



**Certified Lake Manager**  
[www.NALMS.org](http://www.NALMS.org)

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

## Survey & Analysis Methods

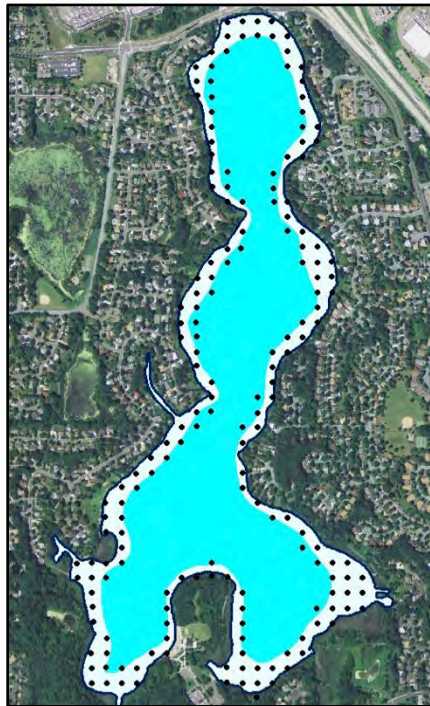
### Point-Intercept Survey

Freshwater Scientific Services conducted a lake-wide aquatic plant survey for Fish Lake on July 29, 2014 using the point-intercept method described by Madsen (1999). For this survey, we generated sample points by projecting a uniform grid of points over an aerial image of the lake (50-m spacing; Fig 1) using desktop GIS software and the MDNR *Random Sample Generator* extension. We then selected 181 points in areas shallower than 25 feet (Figs 1 and 2) and loaded these selected locations onto a handheld GPS unit (Garmin GPSMAP-78) for navigation to each point. Points in areas deeper than 25 feet were not sampled.

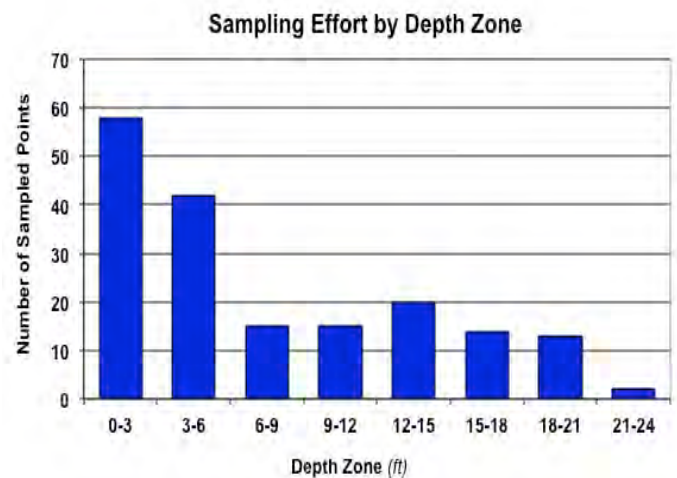
At each selected sample location, we collected plants using a double-headed, 14-tine rake on a rope. For each rake sample, we dragged the rake over the lake bottom for approximately 5 ft before retrieving. Retrieved plants were piled on top of the rake head and assigned density scores from 1 to 4 based upon rake head coverage (Table 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 (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.** Sample locations for the 2014 Fish Lake plant survey. Area deeper than 20 ft shaded.



**Figure 2.** Sampling effort (number of locations sampled) within successive 3-ft depth zones; Fish Lake, Jul 29, 2014



## Results

### Statistical Summary of Findings

**Table 1.** Littoral frequency (% occurrence) and abundance (mean density score) of plant species found in Fish Lake (Hennepin Co., MN) during the Jul 29, 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
<b>ALL TAXA</b> (combined)		67	1.8
<b>SUBMERSED TAXA</b>			
<i>Ceratophyllum demersum</i>	Coontail	58	1.5
<i>Myriophyllum spicatum</i> *	Eurasian Watermilfoil	33	0.4
<i>Potamogeton crispus</i> *	Curlyleaf Pondweed	9	0.1
<i>Potamogeton foliosus</i>	Leafy Pondweed	5	0.1
<i>Stuckenia pectinata</i>	Sago Pondweed	5	0.1
<i>Najas guadalupensis</i>	Southern Naiad	3	<0.1
<i>Zanichellia palustris</i>	Horned Pondweed	2	<0.1
<i>Najas flexilis</i>	Slender Naiad	1	<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
<b>FLOATING TAXA</b>			
<i>Nymphaea odorata</i>	White Waterlily	27	0.3
<i>Lemna minor</i>	Small Duckweed	4	<0.1
<i>Spirodella polyrhiza</i>	Giant duckweed	1	<0.1
<i>Nuphar variegata</i>	Spatterdock	1	<0.1
<i>Wolfia columbiana</i>	Watermeal	1	<0.1
<i>Polygonum amphibium</i>	Water Smartweed	P	–
<b>EMERGENT TAXA</b>			
<i>Schoenoplectus acutus</i>	Hard-stem Bulrush	1	<0.1
<i>Eleocharis acicularis</i>	Needle spikerush	1	<0.1
<i>Typha</i> sp.	Cattail	1	<0.1
<i>Lythrum salicaria</i> *	Purple Loosestrife	P	–
<i>Carex</i> sp.	Sedge	P	–

\* *Invasive, non-native species*

**Table 2.** Summary of Fish Lake plant community metrics from the Jul 29, 2014 survey.

<b>FISH LAKE</b>		<b>2014</b>
<b>WHOLE-LAKE METRICS</b>		
Lake Area		238 acres
Total Points Sampled		181
Total Area Vegetated		57 acres (24%)
Area with Plants to Surface		36 acres (15%)
Max Depth of Plant Growth		10.8 ft
<b>LITTORAL METRICS (≤15 ft)</b>		
Mean Plant Height		1.9 ft
Mean Plant Density (0-4)		1.8
% of Max Littoral Biovolume		35%
Native Submersed Taxa		9
Native Floating/Emergent Taxa		10
Non-Native Submersed Taxa		2
Mean Native Taxa / Point		1.1
Simpson's Diversity		0.77
Floristic Quality (FQI)		17.7
AMCI Score (Nichols et al. 2000)		32

**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

## Fish Lake – Aquatic Plant Community

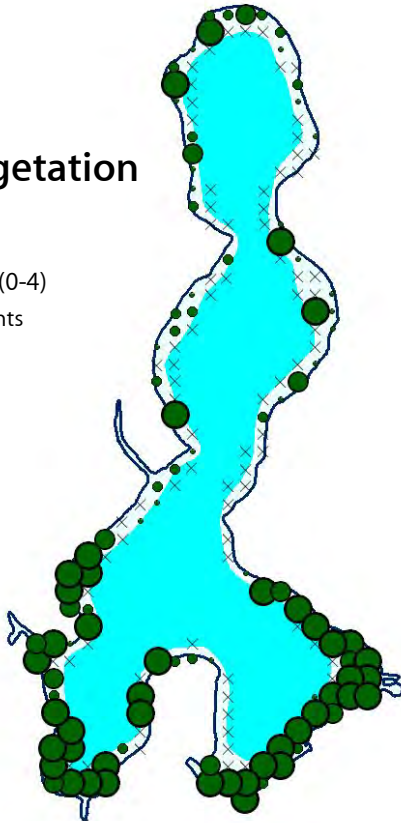
### All Vegetation

#### Density (0-4)

- x No plants
- 1
- 2
- 3
- 4



0 500 ft



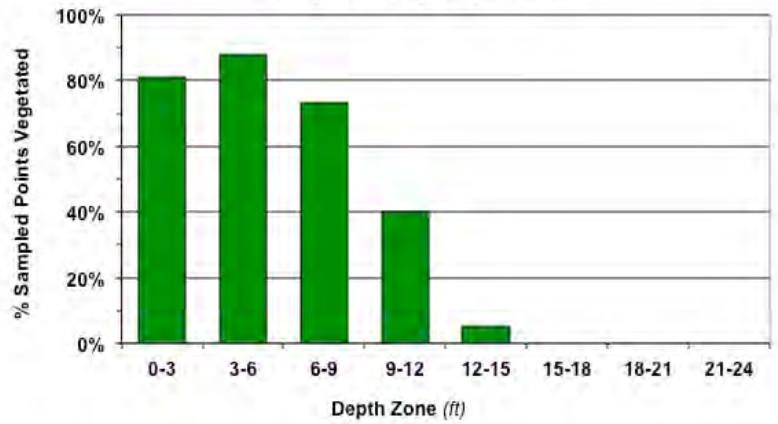
### Native Plants

#### Native Taxa per Point

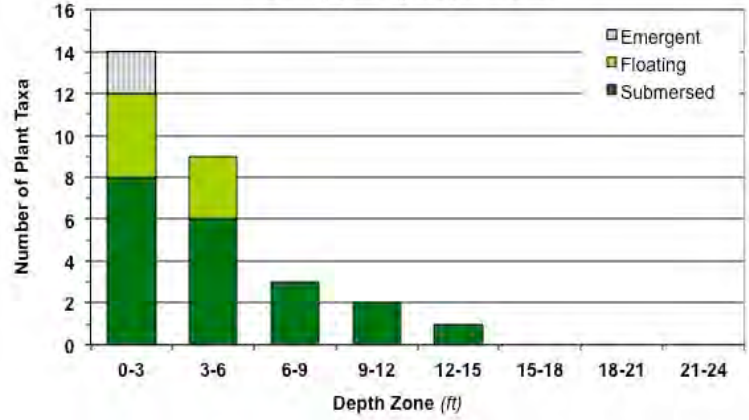
- 0 taxa/pt
- 1-2
- 3-4
- 5-6



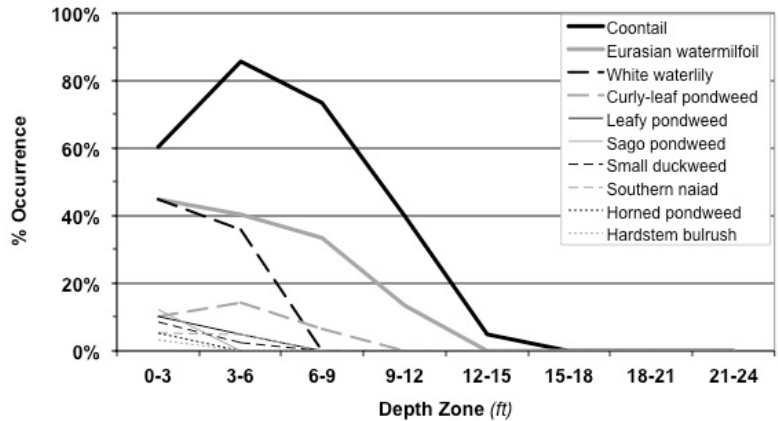
### % Vegetated by Depth Zone



### Plant Types by Depth Zone



### % Occurrence by Depth Zone



Surveyed: Jul 29, 2014

Surveyor: J.A. Johnson

Affiliation: Freshwater Scientific Services, LLC

Methods: Rake, Sonar, Depth Rod

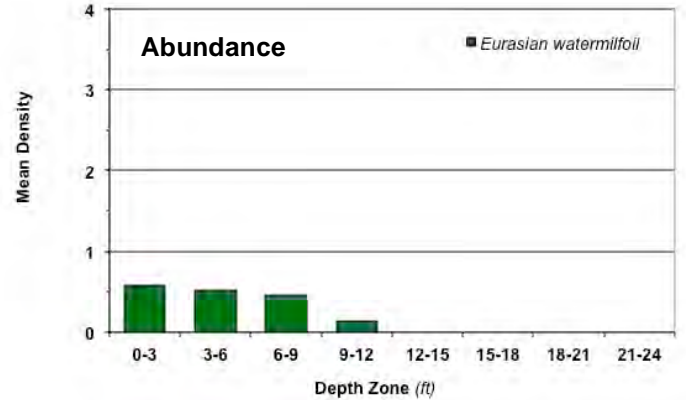
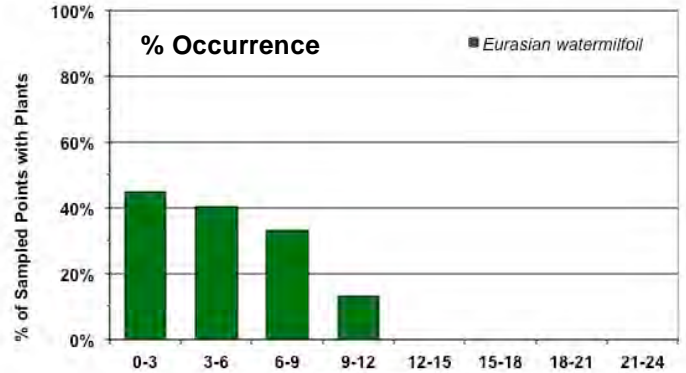
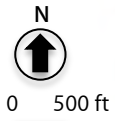
## Fish Lake – Aquatic Plant Species

### Eurasian Watermilfoil

#### Density (0-4)

× In Vicinity

- 1
- 2
- 3
- 4

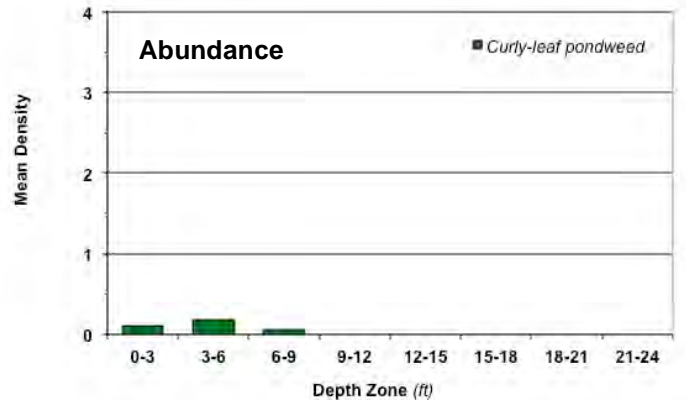
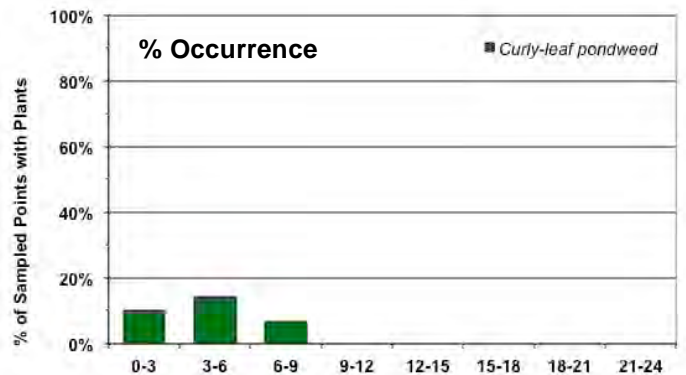
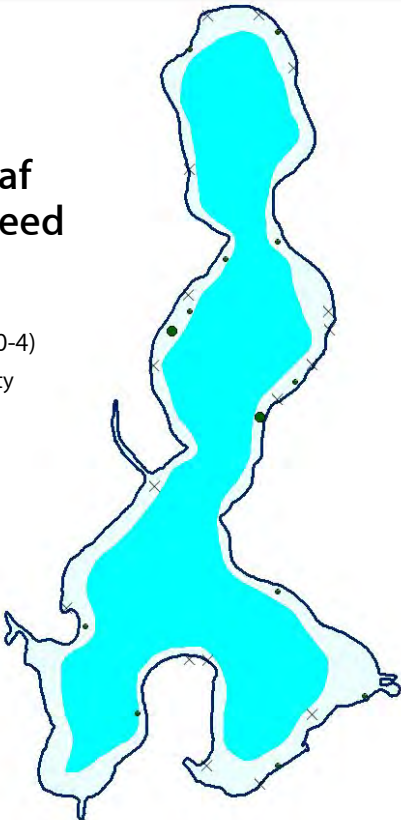


### Curlyleaf Pondweed

#### Density (0-4)

× In Vicinity

- 1
- 2
- 3
- 4



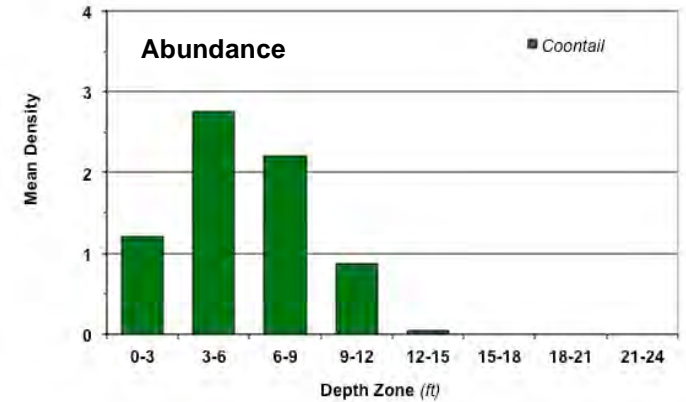
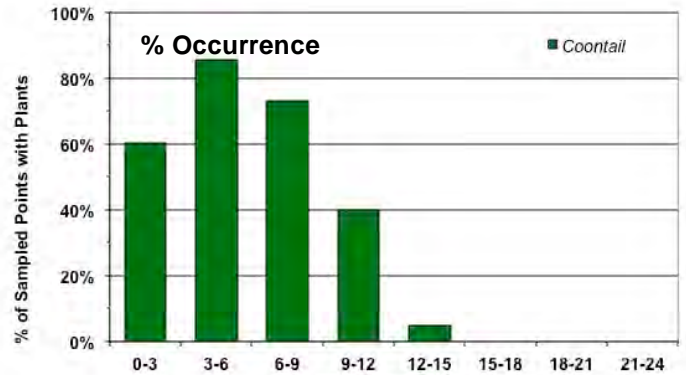
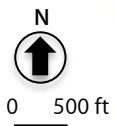
## Fish Lake – Aquatic Plant Species

### Coontail

#### Density (0-4)

× In Vicinity

- 1
- 2
- 3
- 4

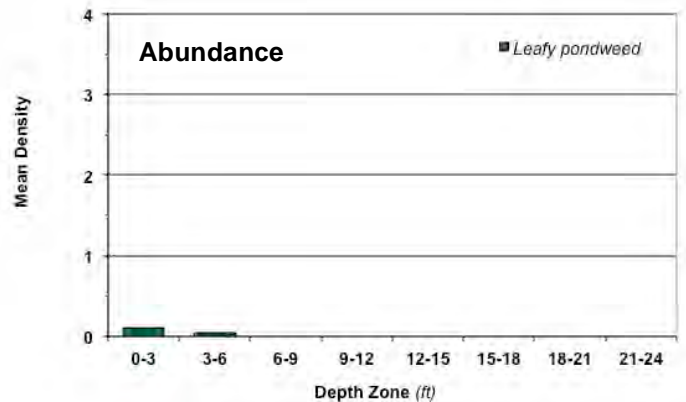
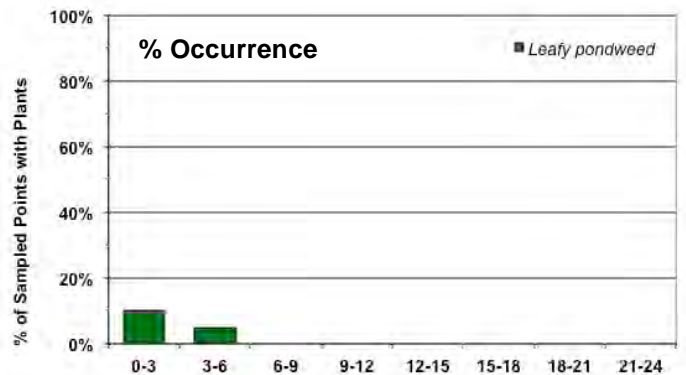
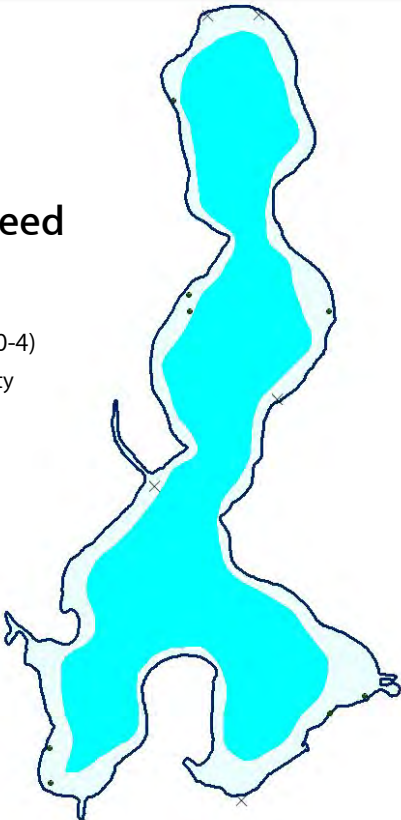


### Leafy Pondweed

#### Density (0-4)

× In Vicinity

- 1
- 2
- 3
- 4



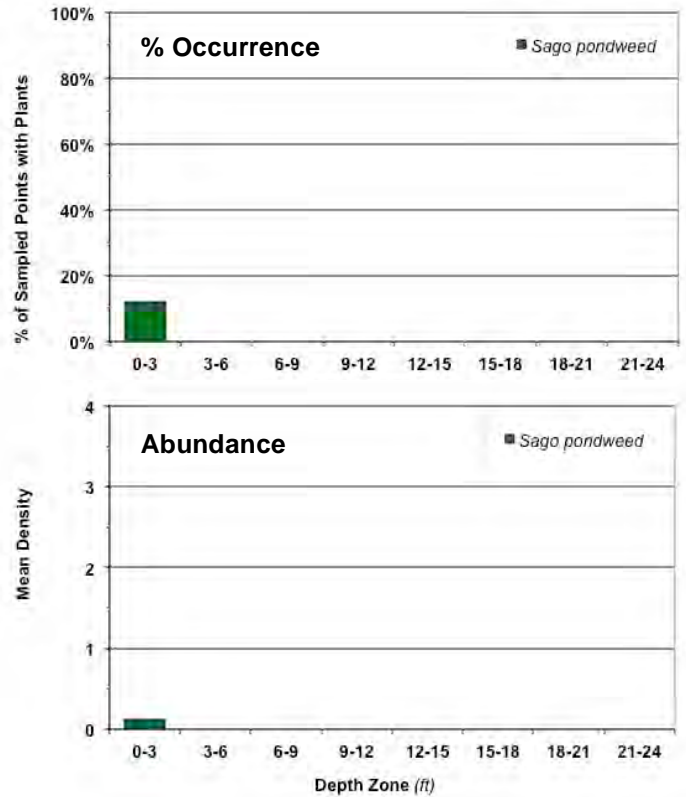
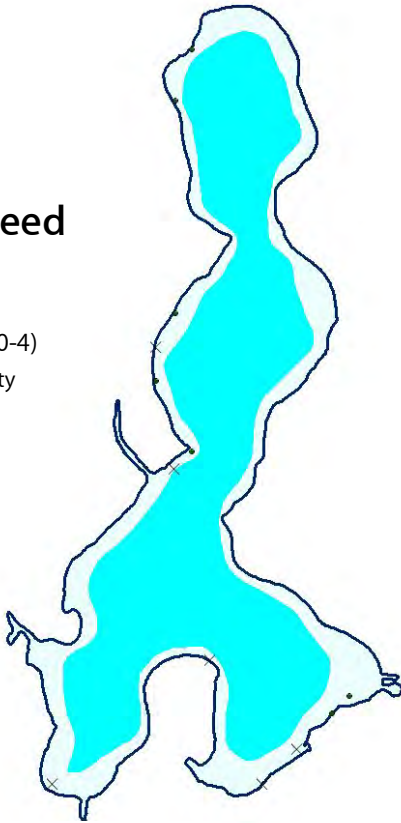
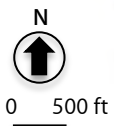
## Fish Lake – Aquatic Plant Species

### Sago Pondweed

#### Density (0-4)

x In Vicinity

- 1
- 2
- 3
- 4

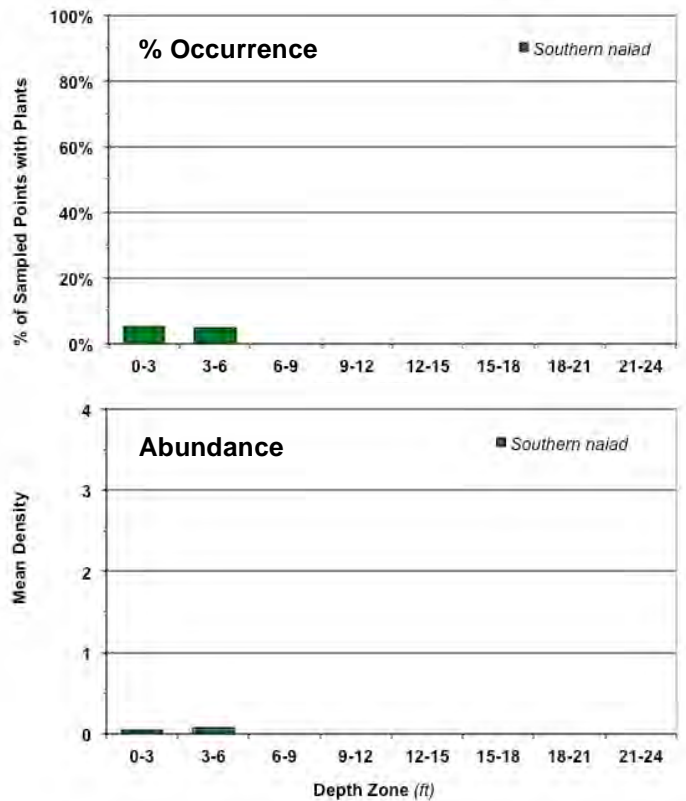
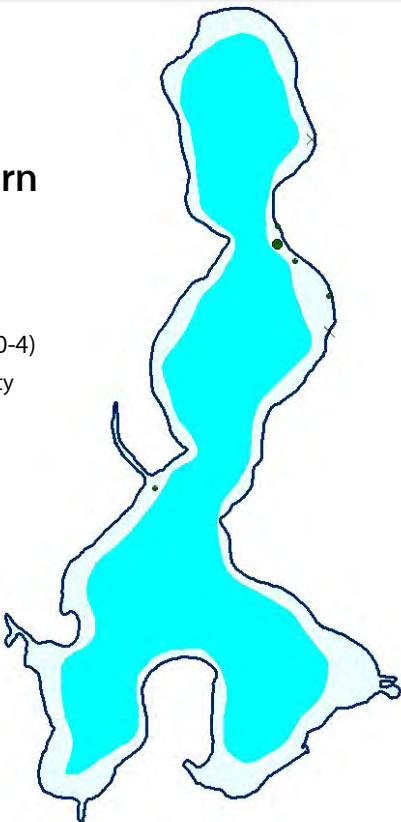


### Southern Naiad

#### Density (0-4)

x In Vicinity

- 1
- 2
- 3
- 4





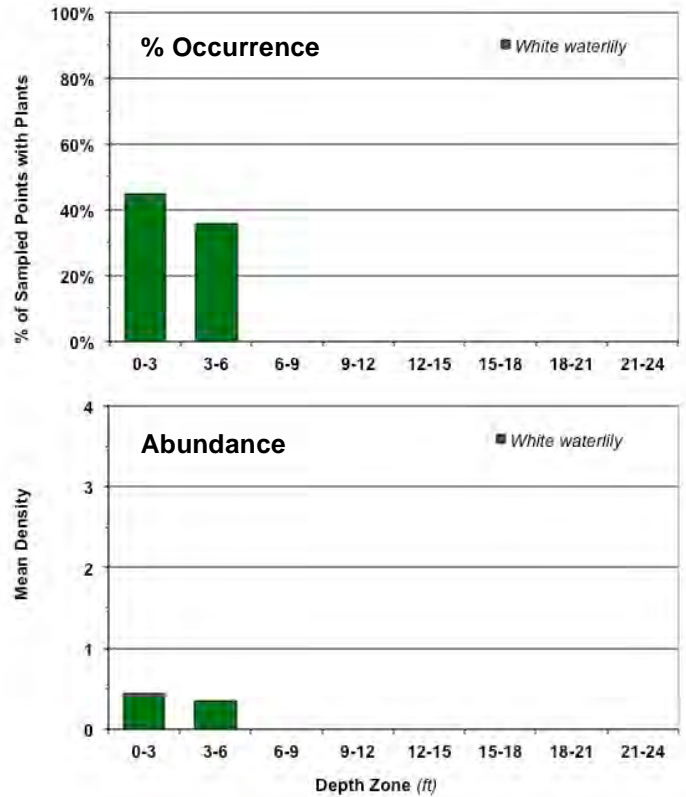
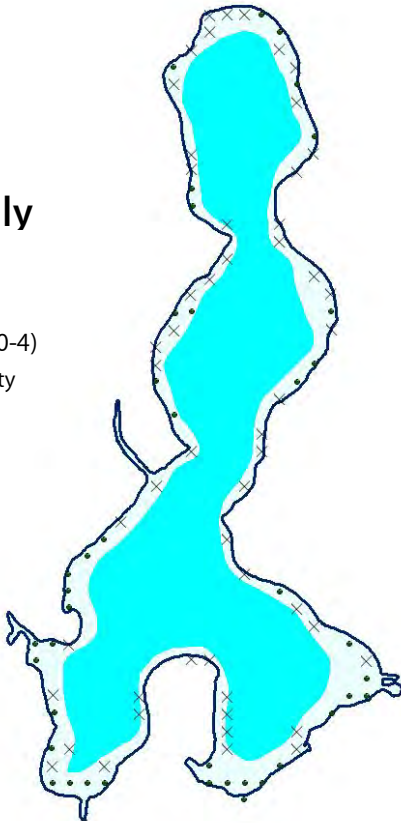
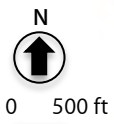
## Fish Lake – Aquatic Plant Species

### White Waterlily

#### Density (0-4)

× In Vicinity

- 1
- 2
- 3
- 4

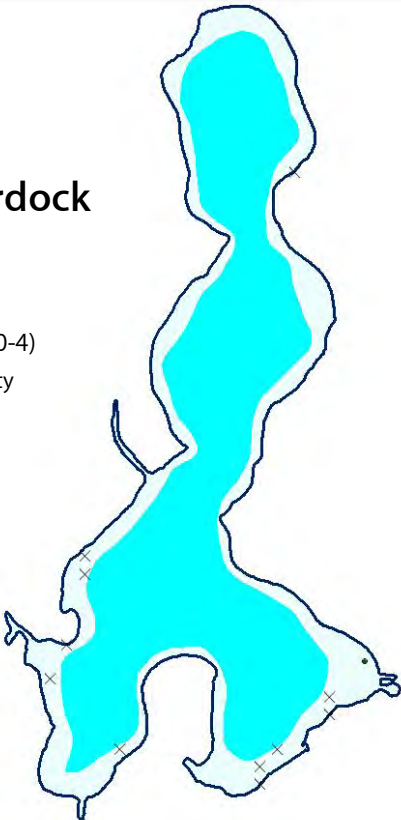


### Spatterdock

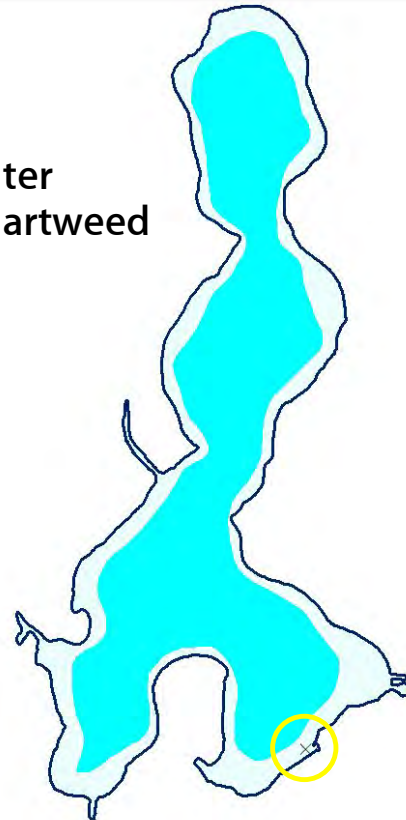
#### Density (0-4)

× In Vicinity

- 1
- 2
- 3
- 4



### Water Smartweed



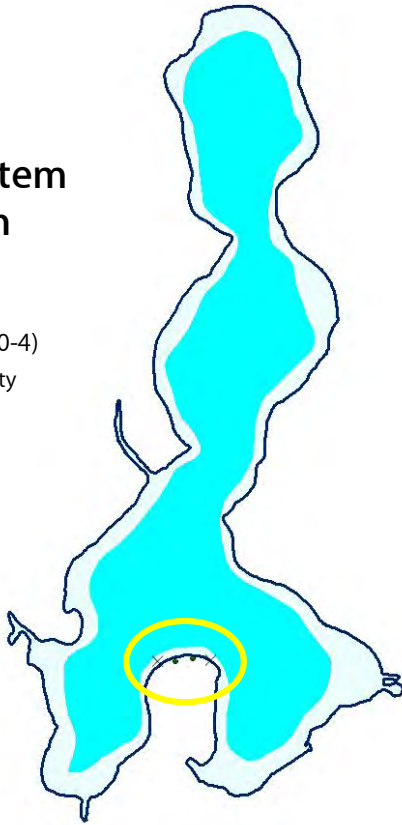
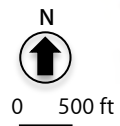
## Fish Lake – Aquatic Plant Species

### Hard-Stem Bulrush

#### Density (0-4)

× In Vicinity

- 1
- 2
- 3
- 4



### Purple Loosestrife



## 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.

**Figure 3.** Sample locations used for the July 29, 2014 vegetation survey of Fish Lake (Hennepin Co., MN)

