



# Aquatic Vegetation Assessment Standard Form

PLM Lake Land Management Corp  
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Dates of Assessment: August 9, 2010

## I. Lake Information

<b>Lake Name:</b> Crooked	<b>Division of waters #:</b> 02-0084-00	<b>Lake Size in Acres:</b> 118
<b>County:</b> Anoka	<b>Ecoregion:</b> North Central Hardwoods Forests	<b>Littoral Acres:</b> 86
<b>Nearest Town:</b> Andover	<b>Maximum Depth in Ft:</b> 26	

## II. Methods

### Data collection:

This assessment followed the point intercept sampling method suggested by the MnDNR as described in "Protocols for the collection of pre-treatment data accepted by the Minnesota Department of Natural Resources (MnDNR) for the MnDNR grant program "Pilot projects to control curly-leaf pondweed or Eurasian watermilfoil on a lake-wide basis for ecological benefits" in 2007".\*\* Using GIS software, sample points were created by overlaying a grid on top of an aerial image of the lake. At each of the intersecting lines a point was created and given a site number. These points were then transferred to a WAAS enabled GPS receiver located on the survey boat. This allowed for easy navigation to each point. At each point a depth measurement was taken using a ten foot pvc pole with .25 foot increments labeled. Depths greater than eight feet were recorded using a Lowrance 200 hz electronic depth finder. A double-headed garden rake tied to a 50 foot rope was used as the plant sampling device. Plant taxa were recorded to the corresponding point as well as the estimated abundance of each species. The estimated abundance was recorded by following ranking system identified in the above mentioned protocols but not used for the purposes of this assessment. Field data was reported on spreadsheets created using Microsoft Excel.

### Data analysis:

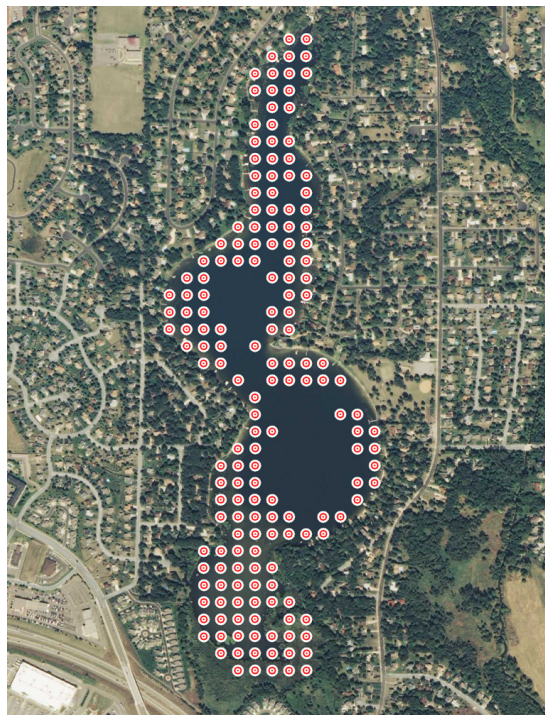
Field data was entered into a Microsoft Excel file for analysis and cross referenced in a Microsoft Access database used to create this report. The total number of sample sites was limited to the greatest depth at which plants were recorded. Frequency of occurrence was calculated for each species by taking the number of points in which a species occurred and dividing it by the total number of sample sites. Frequency was calculated for the entire sample sites. Sample points were also grouped by submerged, floating-leaved, and emergent. Points were also grouped by water depth and separated into depth zones 0 to 4.9 feet, 5 to 9.9 feet, 10 to 14.9 feet, 15 to 19.9 feet and 20 to 24.9 feet. The maximum depth in which plants were present was recorded. For analysis, all points to the maximum depth of recorded vegetation were included and all sites to the next one foot increment were included. For example if the maximum depth in which plants were recorded was 14.6 feet all points 15 foot or less were included in the sample size unless otherwise explained in this report. Standard error of the mean calculation: PLM calculated the standard error of the mean by dividing the standard deviation of the mean by the square root of n.  $SE = Sx / \text{square root } n$

\*\* Wendy Crowell, Minnesota Department of Natural Resources, November 6, 2006 Wendy.crowell@dnr.state.mn.us

### III. Results

Total number of sites used for this assessment:	149	Total Number of Native Species:	12
Number of sites that had vegetation:	132	Total Number of Aquatic Invasive Species:	1
Point Spacing in Meters:	150	Number of points in the 0 to 4.9 feet range:	117
Greatest Depth in feet which vegetation was recorded:	11.5	Number of points in the 5 to 9.9 feet range:	27
Number of sample sites wich had no vegetation but were under the maximum depth in which vegetation recorded:	17	Number of points in the 10 to 14.9 feet range:	5
		Number of points in the 15 to 19.9 feet range:	0
		Number of Points in the 20 to 24.9 feet range:	0
Average number of all species at each sample point:	1.971	Standard error for all species average:	0.148
Average number of native species at each sample point:	0.743	Standard error for native species average:	0.073
Average number of aquatic invasive species at each point:	1.228	Standard error for aquatic invasive species average:	0.08

Sites included in the assessment



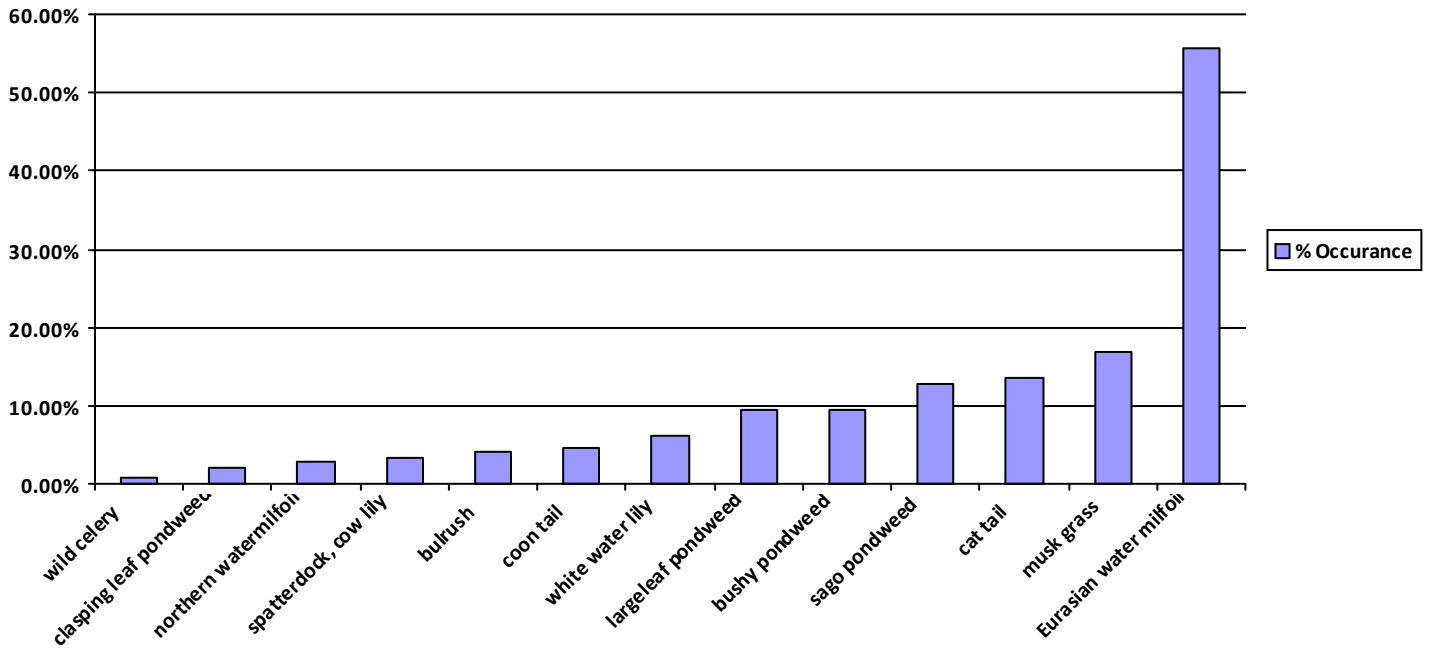
\*Due to variations in depth and plant growth, sample sites included may vary between surveys

\*Images are courtesy of USGS

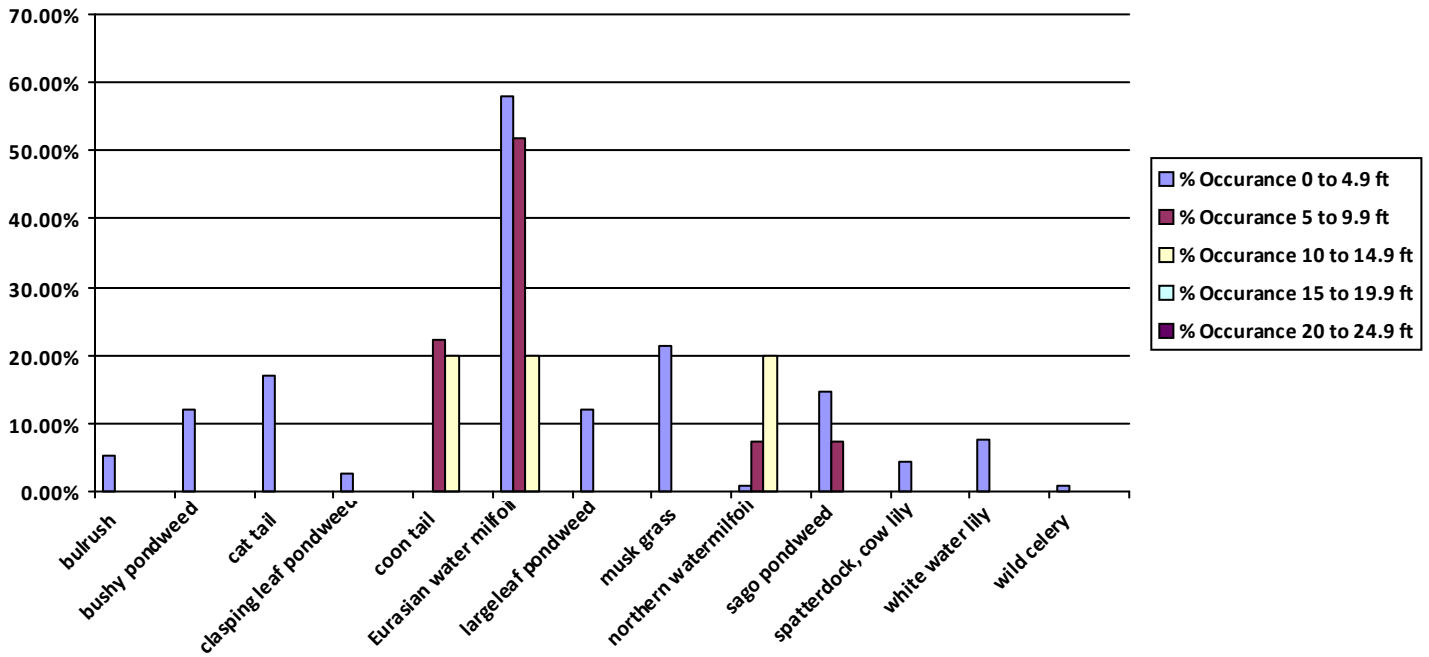
## Frequency of Occurance

Common Name	Scientific Name	% Occurance over all points	% Occurance 0 to 4.9 feet	% Occurance 5 to 9.9 feet	% Occurance 10 to 14.9 feet	% Occurance 15 to 19.9 feet	% Occurance 20 to 24.9 feet
bulrush	<i>Scirpus spp.</i>	4.03%	5.13%	0.00%	0.00%	0.00%	0.00%
bushy pondweed	<i>Najas guadalupensis</i>	9.40%	11.97%	0.00%	0.00%	0.00%	0.00%
cat tail	<i>Typha spp.</i>	13.42%	17.09%	0.00%	0.00%	0.00%	0.00%
clasping leaf pondweed	<i>Potamogeton perfoliatus</i>	2.01%	2.56%	0.00%	0.00%	0.00%	0.00%
coon tail	<i>Ceratophyllum demersu</i>	4.70%	0.00%	22.22%	20.00%	0.00%	0.00%
Eurasian water milfoil	<i>Myriophyllum spicatum</i>	55.70%	58.12%	51.85%	20.00%	0.00%	0.00%
largeleaf pondweed	<i>Potamogeton amplifolius</i>	9.40%	11.97%	0.00%	0.00%	0.00%	0.00%
musk grass	<i>Chara spp.</i>	16.78%	21.37%	0.00%	0.00%	0.00%	0.00%
northern watermilfoil	<i>Myriophyllum exalbescen</i>	2.68%	0.85%	7.41%	20.00%	0.00%	0.00%
sago pondweed	<i>Potamogeton pectinatus</i>	12.75%	14.53%	7.41%	0.00%	0.00%	0.00%
spatterdock, cow lily	<i>Nuphar lutea</i>	3.36%	4.27%	0.00%	0.00%	0.00%	0.00%
white water lily	<i>Nymphaea odorata</i>	6.04%	7.69%	0.00%	0.00%	0.00%	0.00%
wild celery	<i>Vallisneria americana</i>	0.67%	0.85%	0.00%	0.00%	0.00%	0.00%

Frequency of Occurance

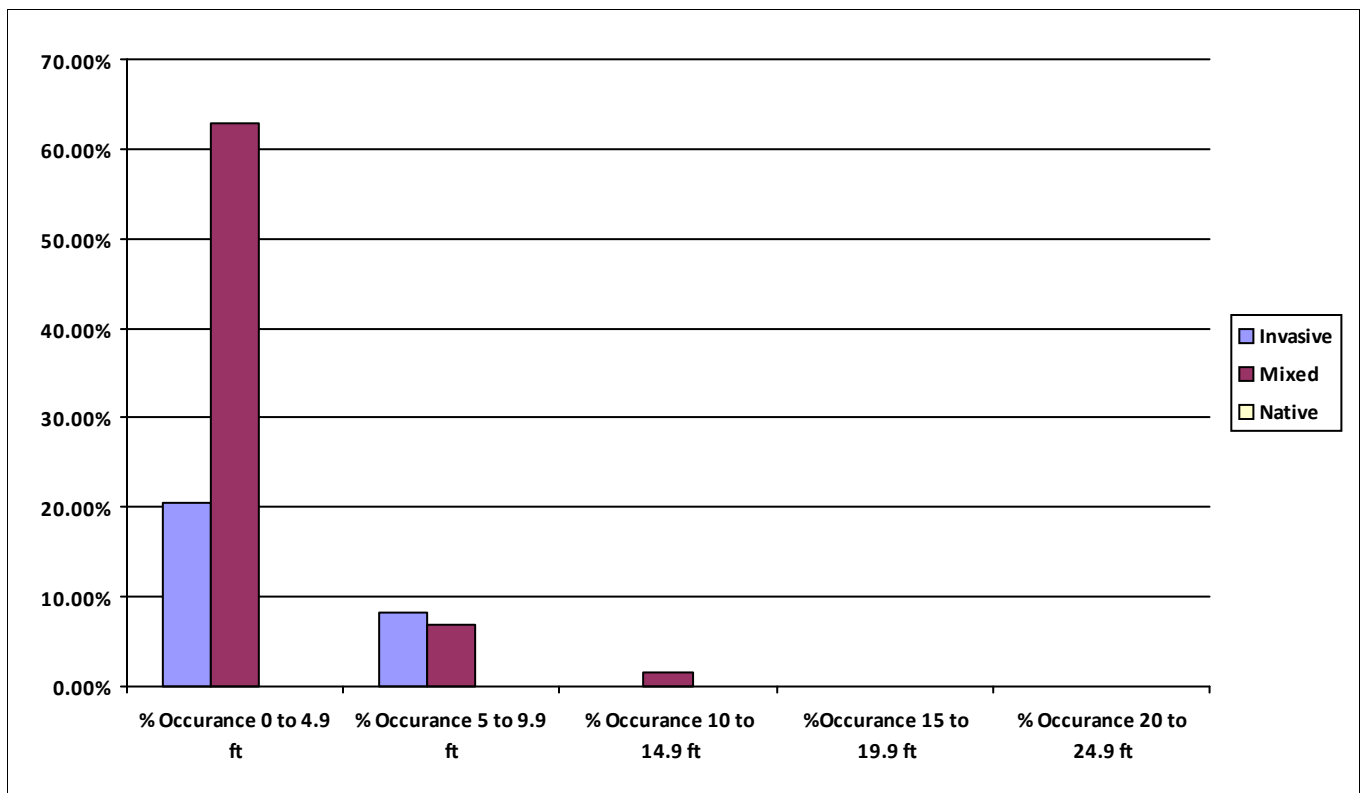


Occurance by Depth



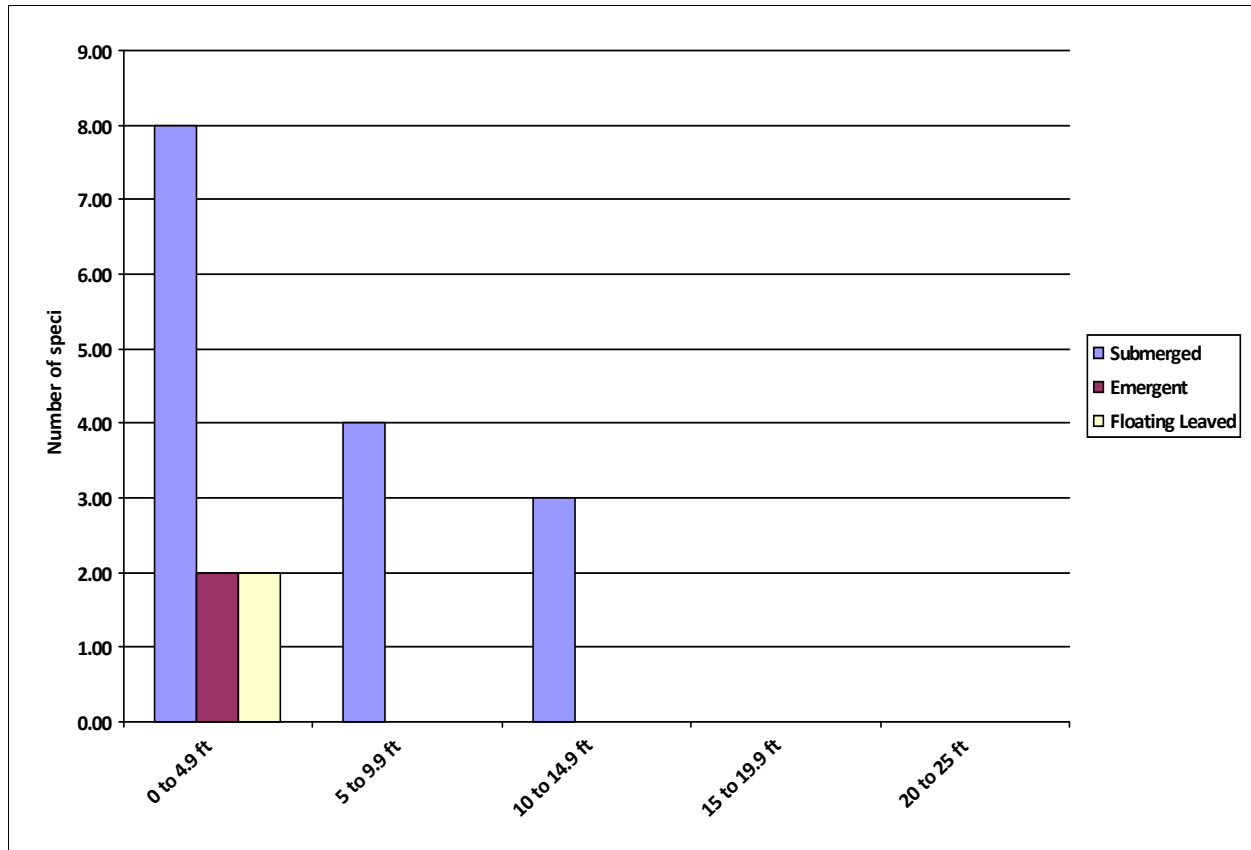
## Sites With Vegetation Classified by Invasive (Non Native), Native, Or Mixed

Type of Plants	Number of points 0 to 4.9 feet	Number of Points 5 to 9.9 feet	Number of Points 10 to 14.9 feet	Number of Points 15 to 19.9 feet	Number of Points 20 to 24.9 feet
Native	0	0	0	0	0
Mixed	83	9	2	0	0
Invasive	27	11	0	0	0



## Species Classified into Submerged, Floating Leaved and Emergent

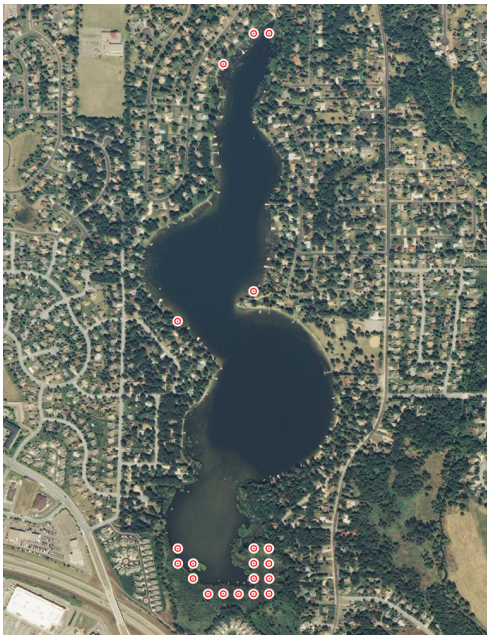
Category Name	Number of species 0 to 4.9 Feet	Number of species to 9.9 feet	Number of Species 10 to 14.9 feet	Number of species 15 to 19.9 feet	Number of species 20 to 25 Feet
Submerged	8	4	3	0	0
Floating Leaved	2	0	0	0	0
Emergent	2	0	0	0	0



# Distribution of Aquatic Invasive Species and Most Common Plants

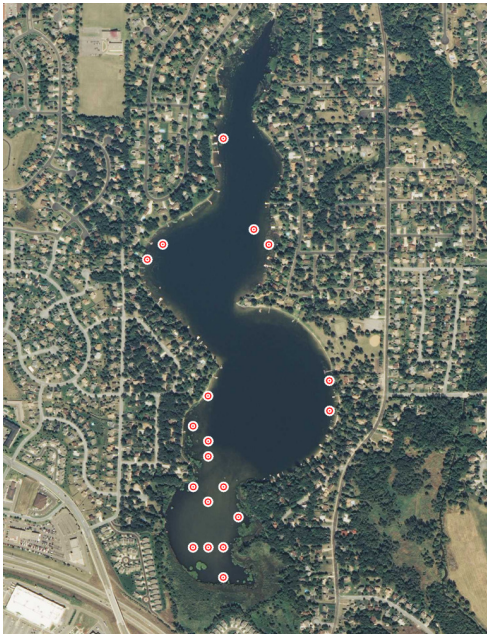
cat tail

*Typha spp.*



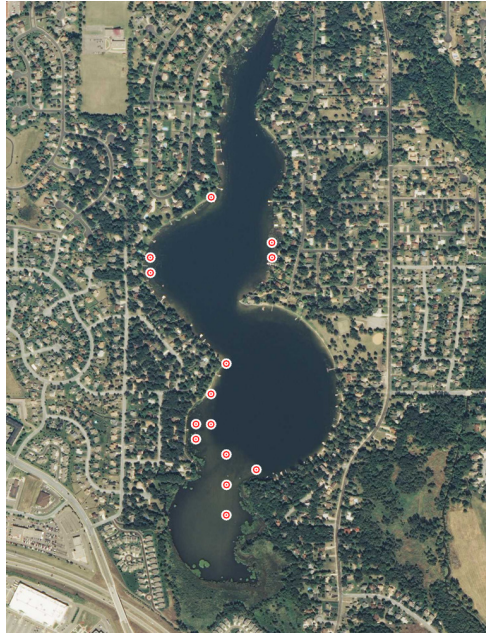
sago pondweed

*Potamogeton pectinatus*



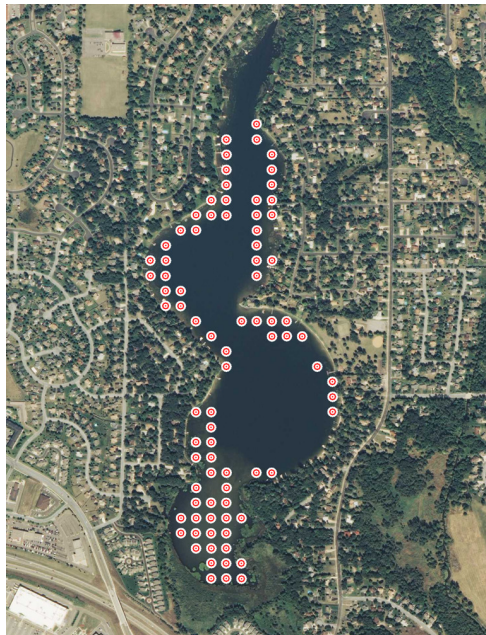
largeleaf pondweed

*Potamogeton amplifolius*



Eurasian water milfoil

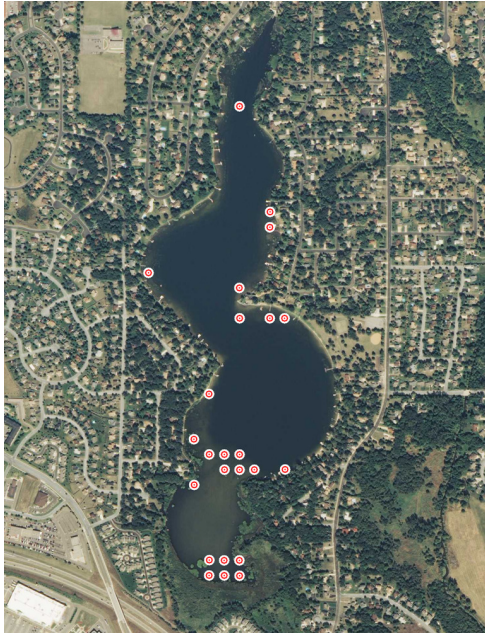
*Myriophyllum spicatum*





musk grass

*Chara spp.*



bushy pondweed

*Najas guadalupensis*

