



Aquatic Vegetation Assessment Standard Form

PLM Lake Land Management Cor
P.O. Box 326
Pequot Lakes, MN 56472
(218)568-5379

Dates of Assessment: 05/30/2012

I. Lake Information

Lake Name: Charlotte	Division of waters #: 86-0011-00	Lake Size in Acres: 245
County: Wright	Ecoregion: North Central Hardwoods Forests	Littoral Acres: 94
Nearest Town: Hanover	Maximum Depth in Ft: 46	
Minor Watershed: Mill Creek	Major Name (MNDNR): North Fork Crow River	
Minor Drainage Area (Sq Mi): 21.19	Major Drainage Area (Sq Mi): 1482.96	

II. Methods

Data collection:

This assessment followed the point intercept sampling method suggested by John Madsen as described in "Point Intercept and Line Intercept Methods for Aquatic Plant Management."** 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 Microft Excel.

Data anlysis:

Field data was entered into a Microsoft Excel file for anlysis 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 occurance was calculated for each species by taking the number of points in which a species ocured 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 seperated into depth zones 0 to4.9 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. $SE = Sx / \text{square root } n$

** Madsen, J.D. 1999. Point intercept and line intercept methods for aquatic plant Management.
US Army Engineer Waterways Experiment Station Aquatic Plant Control Research
Program Technical Note CC-02, Vicksburg, MS.

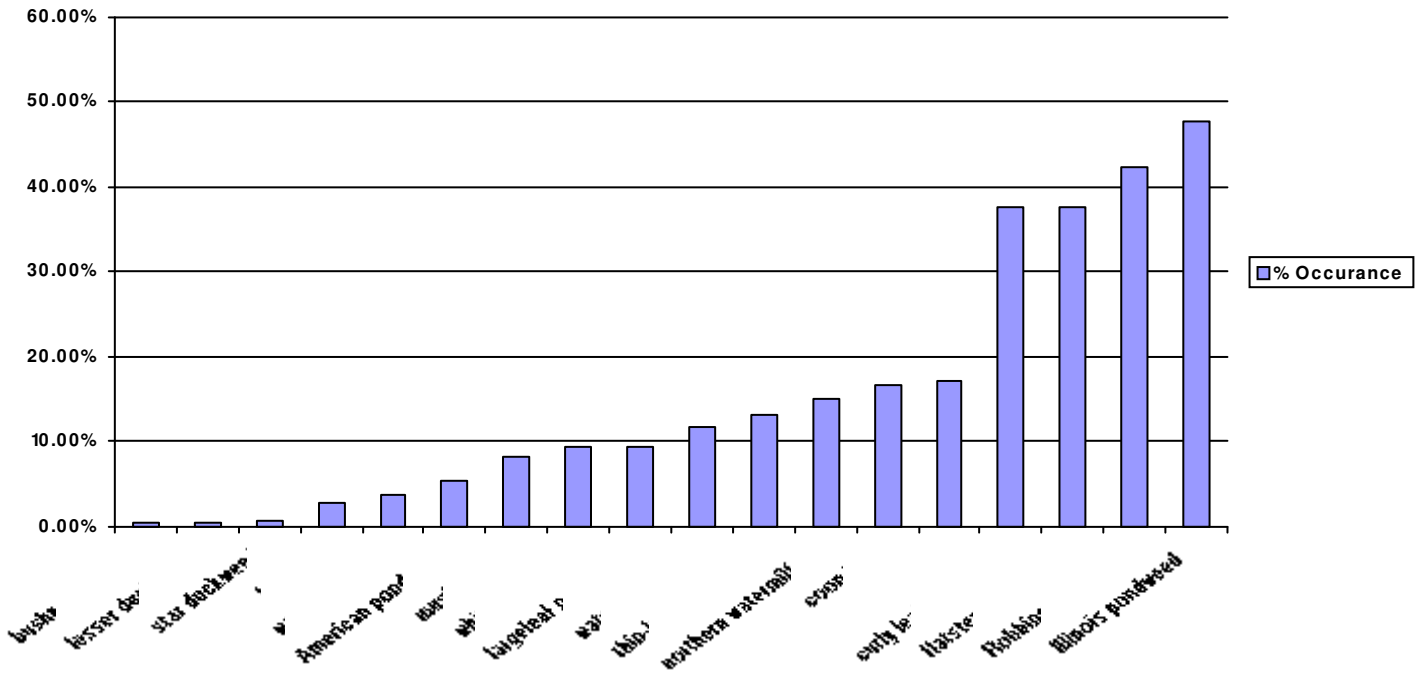
III. Results

Total number of sites used for this assessment:	245	Total Number of Native Species:	17
Number of sites that had vegetation:	226	Total Number of Aquatic Invasive Species:	1
Point Spacing:	40	Number of points in the 0 to 4.9 feet rang	67
Greatest Depth in feet which vegetation was recorded:	20.7	Number of points in the 5 to 9.9 feet rang	114
Number of sample sites wich had no vegetation but were under the maximum depth in which vegetation recorded:	19	Number of points in the 10 to 14.9 feet range:	35
		Number of points in the 15 to 19.9 feet range:	8
		Number of Points in the 20 to 24.9 feet range:	1
Average number of all species at each sample point:	2.42	Standard error for all species average:	0.083
Average number of native species at each sample point:	2.42	Standard error for native species average:	0.083
Average number of aquatic invasive species at each point:	0.375	Standard error for aquatic invasive species average:	0.031

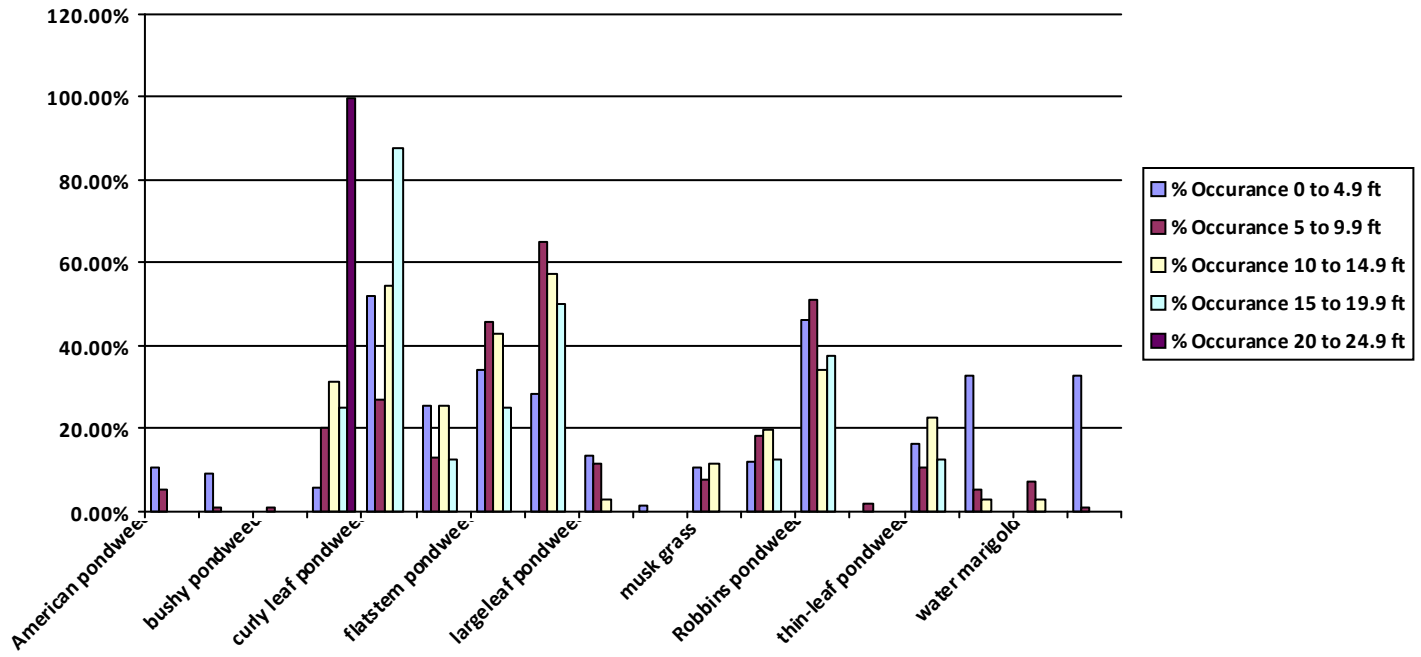
Frequency of Occurance

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
American pondweed	<i>Potamogeton nodosus</i>	5.31%	10.45%	5.26%	0.00%	0.00%	0.00%
bulrush	<i>Scirpus spp.</i>	2.86%	8.96%	0.88%	0.00%	0.00%	0.00%
bushy pondweed	<i>Najas spp.</i>	0.41%	0.00%	0.88%	0.00%	0.00%	0.00%
coon tail	<i>Ceratophyllum demersum</i>	16.73%	5.97%	20.18%	31.43%	25.00%	100.00%
curly leaf pondweed	<i>Potamogeton crispus</i>	37.55%	52.24%	27.19%	54.29%	87.50%	0.00%
elodea	<i>Elodea canadensis</i>	17.14%	25.37%	13.16%	25.71%	12.50%	0.00%
flatstem pondweed	<i>Potamogeton zosteriformis</i>	37.55%	34.33%	45.61%	42.86%	25.00%	0.00%
Illinois pondweed	<i>Potamogeton illinoensis</i>	47.76%	28.36%	64.91%	57.14%	50.00%	0.00%
largeleaf pondweed	<i>Potamogeton amplifolius</i>	9.39%	13.43%	11.40%	2.86%	0.00%	0.00%
lesser duckweed	<i>Lemna minor</i>	0.41%	1.49%	0.00%	0.00%	0.00%	0.00%
musk grass	<i>Chara spp.</i>	8.16%	10.45%	7.89%	11.43%	0.00%	0.00%
northern watermilfoil	<i>Myriophyllum exalbescens</i>	15.10%	11.94%	18.42%	20.00%	12.50%	0.00%
Robbins pondweed	<i>Potamogeton robbinsii</i>	42.45%	46.27%	50.88%	34.29%	37.50%	0.00%
star duckweed	<i>Lemna trisulca</i>	0.82%	0.00%	1.75%	0.00%	0.00%	0.00%
thin-leaf pondweed	<i>Potamogeton pusillus</i>	13.06%	16.42%	10.53%	22.86%	12.50%	0.00%
water buttercup	<i>Ranunculus spp.</i>	11.84%	32.84%	5.26%	2.86%	0.00%	0.00%
water marigold	<i>Bidens beckii</i>	3.67%	0.00%	7.02%	2.86%	0.00%	0.00%
white water lily	<i>Nymphaea odorata</i>	9.39%	32.84%	0.88%	0.00%	0.00%	0.00%

Frequency of Occurrence

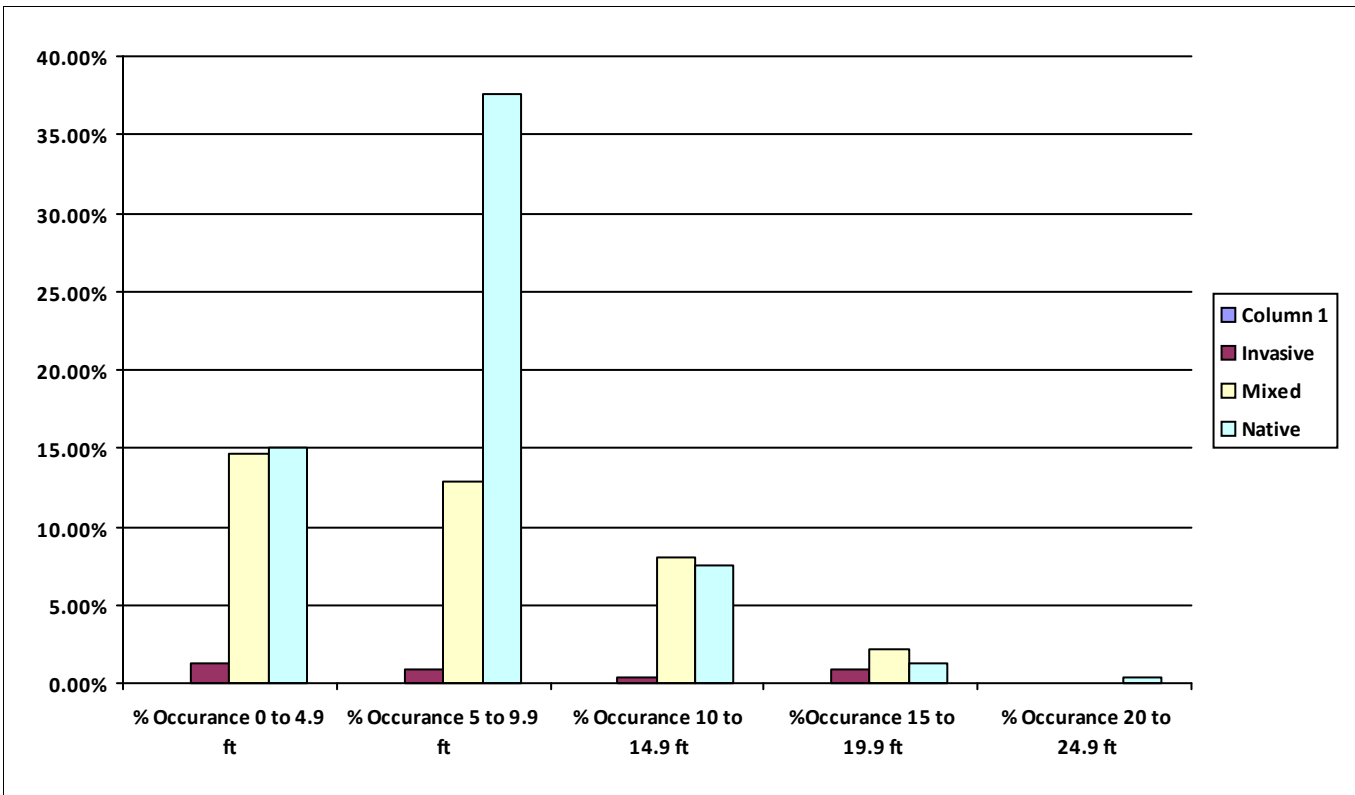


Occurance by Depth



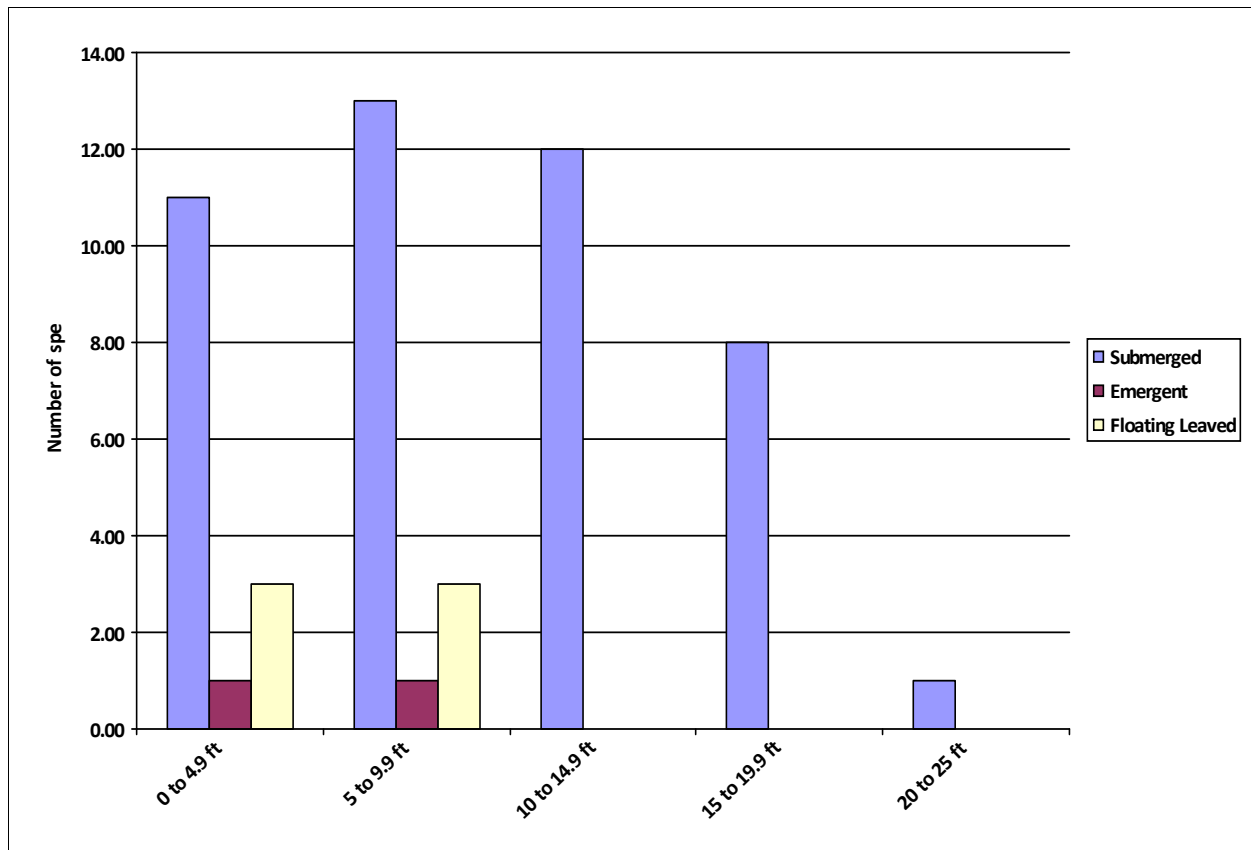
Sites With Vegetation Classified by Invasive (Non Native), Native, Or Mixed

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
	0	0	0	0	0
Native	34	85	17	3	1
Mixed	33	29	18	5	0
Invasive	3	2	1	2	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	11	13	12	8	1
Floating Leaved	3	3	0	0	0
Emergent	1	1	0	0	0





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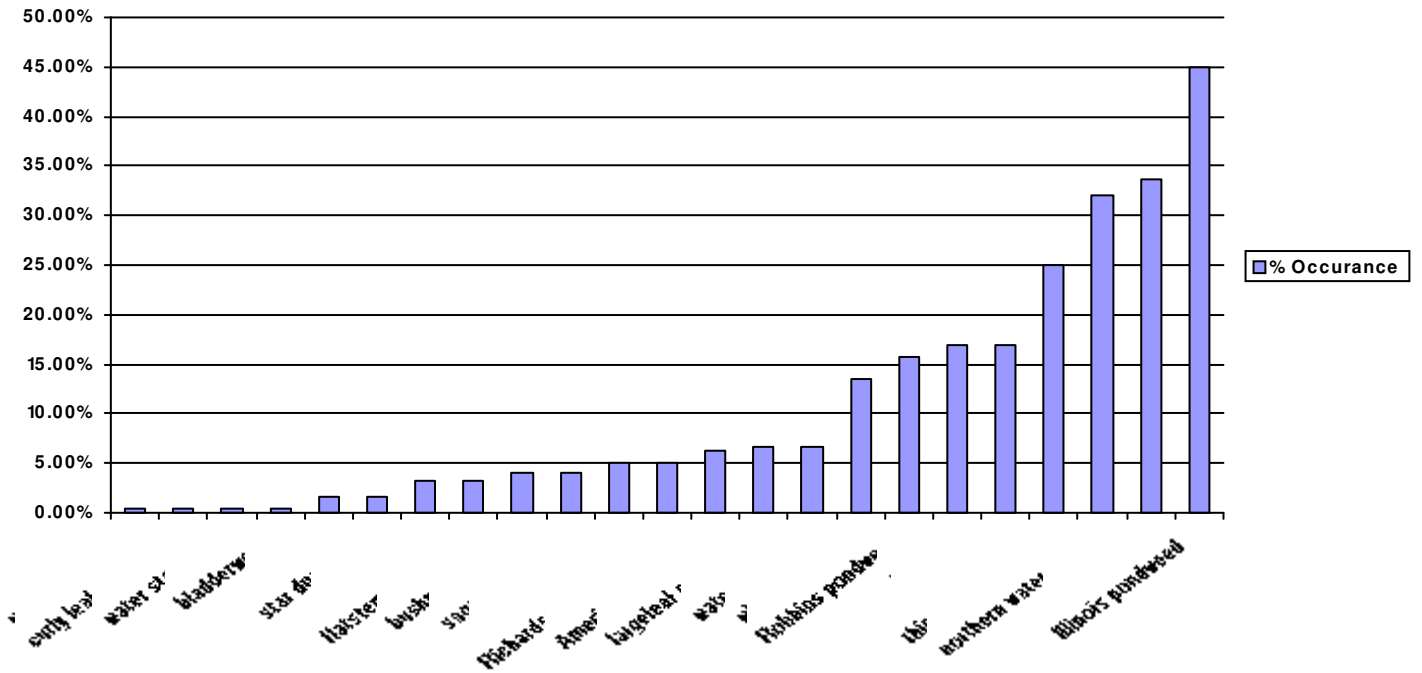
III. Results

Total number of sites used for this assessment:	253	Total Number of Native Species:	22
Number of sites that had vegetation:	240	Total Number of Aquatic Invasive Species:	1
Point Spacing:	40	Number of points in the 0 to 4.9 feet rang	68
Greatest Depth in feet which vegetation was recorded:	23	Number of points in the 5 to 9.9 feet rang	117
Number of sample sites wich had no vegetation but were under the maximum depth in which vegetation recorded:	13	Number of points in the 10 to 14.9 feet range:	36
		Number of points in the 15 to 19.9 feet range:	12
		Number of Points in the 20 to 24.9 feet range:	4
Average number of all species at each sample point:	2.486	Standard error for all species average:	0.073
Average number of native species at each sample point:	2.482	Standard error for native species average:	0.073
Average number of aquatic invasive species at each point:	0.0039	Standard error for aquatic invasive species average:	0.004

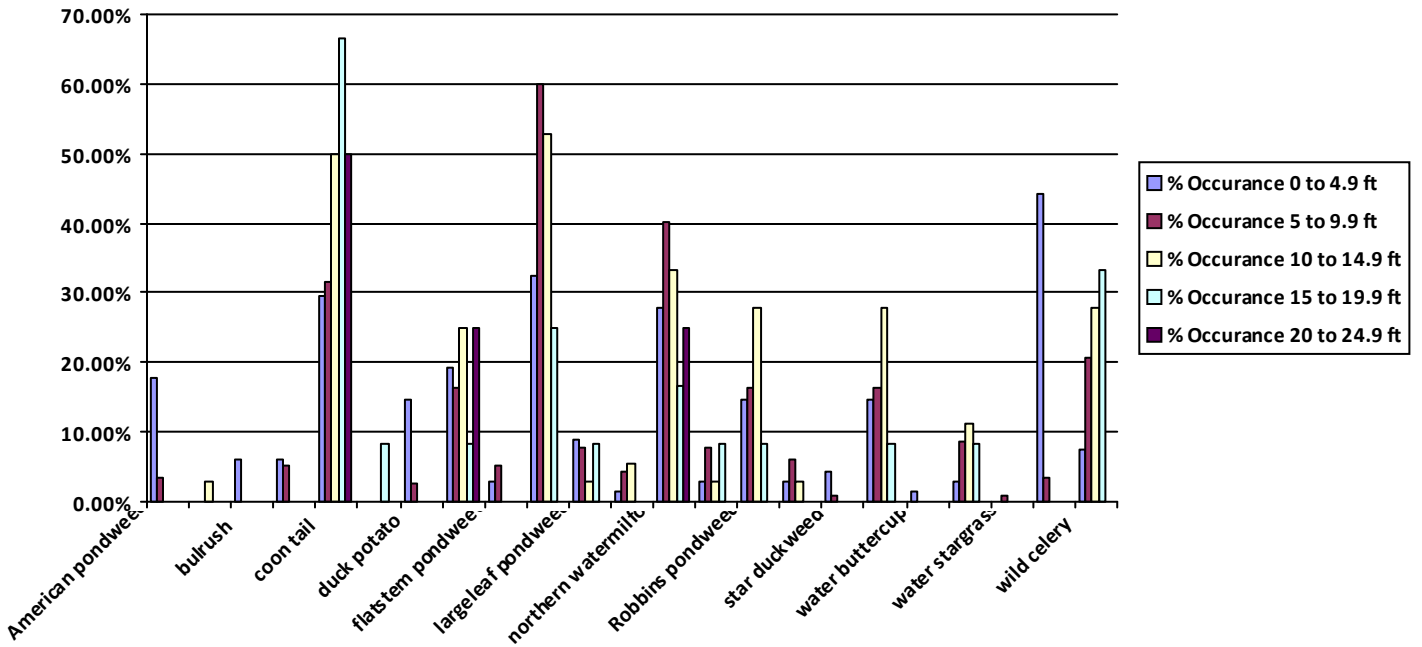
Frequency of Occurrence

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
American pondweed	<i>Potamogeton nodosus</i>	6.32%	17.65%	3.42%	0.00%	0.00%	0.00%
bladderwort	<i>Utricularia spp.</i>	0.40%	0.00%	0.00%	2.78%	0.00%	0.00%
bulrush	<i>Scirpus spp.</i>	1.58%	5.88%	0.00%	0.00%	0.00%	0.00%
bushy pondweed	<i>Najas spp.</i>	3.95%	5.88%	5.13%	0.00%	0.00%	0.00%
coon tail	<i>Ceratophyllum demersum</i>	33.60%	29.41%	31.62%	50.00%	66.67%	50.00%
curly leaf pondweed	<i>Potamogeton crispus</i>	0.40%	0.00%	0.00%	0.00%	8.33%	0.00%
duck potato	<i>Sagittaria lancifolia</i>	5.14%	14.71%	2.56%	0.00%	0.00%	0.00%
elodea	<i>Elodea canadensis</i>	17.00%	19.12%	16.24%	25.00%	8.33%	25.00%
flatstem pondweed	<i>Potamogeton zosteriformi</i>	3.16%	2.94%	5.13%	0.00%	0.00%	0.00%
Illinois pondweed	<i>Potamogeton illinoensis</i>	45.06%	32.35%	59.83%	52.78%	25.00%	0.00%
largeleaf pondweed	<i>Potamogeton amplifolius</i>	6.72%	8.82%	7.69%	2.78%	8.33%	0.00%
musk grass	<i>Chara spp.</i>	3.16%	1.47%	4.27%	5.56%	0.00%	0.00%
northern watermilfoil	<i>Myriophyllum exalbescen</i>	32.02%	27.94%	40.17%	33.33%	16.67%	25.00%
Richardson's pondweed	<i>Potamogeton richardsonii</i>	5.14%	2.94%	7.69%	2.78%	8.33%	0.00%
Robbins pondweed	<i>Potamogeton robbinsii</i>	15.81%	14.71%	16.24%	27.78%	8.33%	0.00%
sago pondweed	<i>Potamogeton pectinatus</i>	3.95%	2.94%	5.98%	2.78%	0.00%	0.00%
star duckweed	<i>Lemna trisulca</i>	1.58%	4.41%	0.85%	0.00%	0.00%	0.00%
thin-leaf pondweed	<i>Potamogeton pusillus</i>	24.90%	14.71%	16.24%	27.78%	8.33%	0.00%
water buttercup	<i>Ranunculus spp.</i>	0.40%	1.47%	0.00%	0.00%	0.00%	0.00%
water marigold	<i>Bidens beckii</i>	6.72%	2.94%	8.55%	11.11%	8.33%	0.00%
water stargrass	<i>Zosterella spp.</i>	0.40%	0.00%	0.85%	0.00%	0.00%	0.00%
white water lily	<i>Nymphaea odorata</i>	13.44%	44.12%	3.42%	0.00%	0.00%	0.00%
wild celery	<i>Vallisneria americana</i>	17.00%	7.35%	20.51%	27.78%	33.33%	0.00%

Frequency of Occurrence

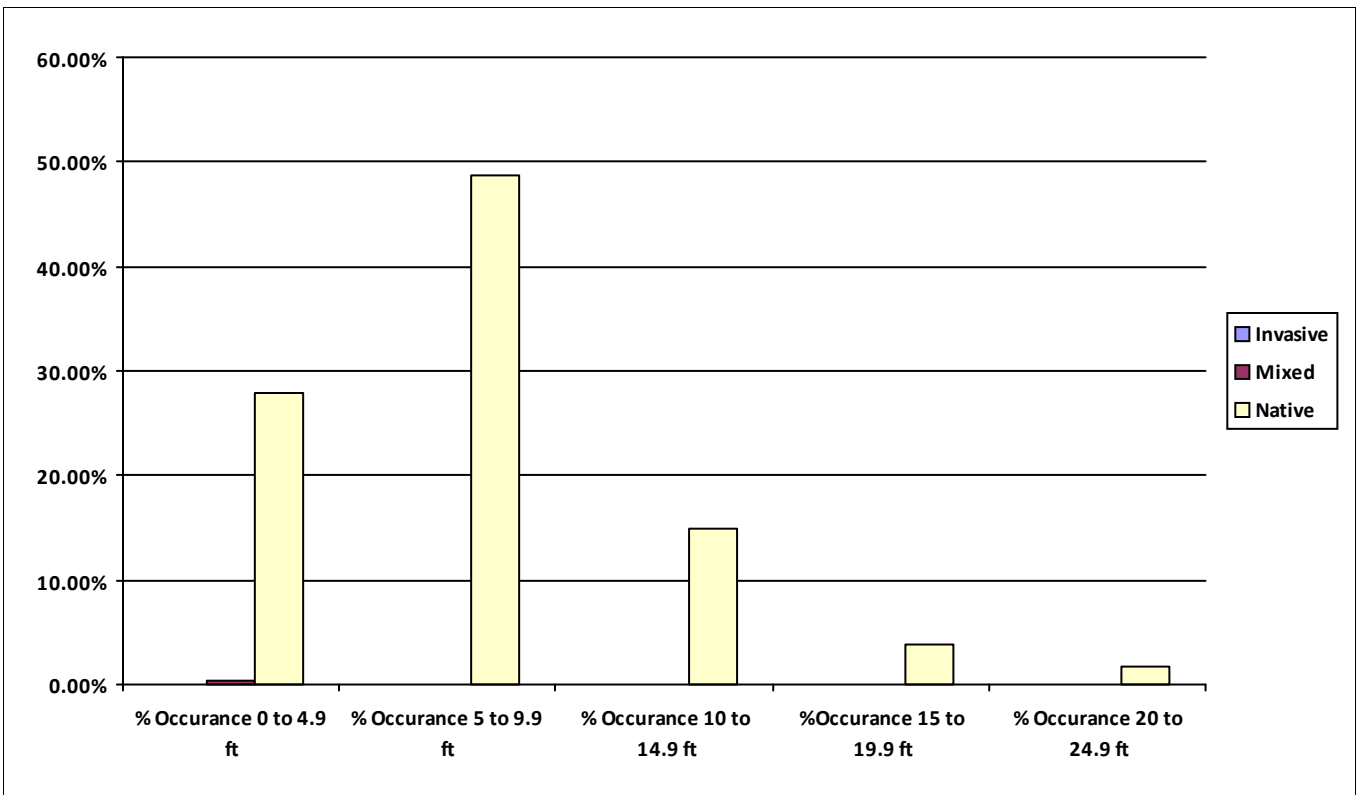


Occurance by Depth



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	67	117	36	9	4
Mixed	1	0	0	0	0
Invasive	0	0	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	15	15	13	11	3
Floating Leaved	3	3	0	0	0
Emergent	2	1	0	0	0

