

	A	B	C	D	E	F	G	H	I	J	K	L
1	READ ME		last updated 10/29/2009									
2												
3	<i>The worksheets:</i>											
4	"FIELD SHEET" is a suggested field data sheet; it does not list any species besides EWM & CLP. Field workers enter species as encountered.											
5	Collecting data:											
6		Top of Form:	For each data entry sheet, enter names of observers and hours they worked on that lake.									
7			Under Header (View>Header and Footer>Custom Header) record lake name, Waterbody Identification									
8		Site number	1,2,3...total number of sites									
9		Depth (in feet)	You may want to mark the rake for easy depth measurement determination.									
10		Dominant sediment type	Record as Muck (M), Sand (S), or Rock (R).									
11		Rake pole (P) or rake rope (R)	Note whether you used the rake pole (P) or tossed the rake head on a rope (R).									
12		Total Rake Fullness	Record a total rake fullness rating on the sample:									
13			1 = few plants on rake head									
14			2 = rake head ~1/2 full, between 1 & 2									
15			3 = overflowing, can't see top of rake head.									
16			Leave blank if nothing found									
17			Do not include fil. algae, moss, or sponge in the total rake fullness									
18		EWM, CLP	Two exotic invasive species, Eurasian water-milfoil (<i>Myriophyllum spicatum</i>) and curly-leaf pondweed (<i>Potamogeton crispus</i>) are at the far left of the entry sheet,									
19			and are not in alphabetical order									
20												
21		All species:	A. In first row, list species encountered. You will have to re-write species as found on subsequent field									
22			B. Record rake fullness rating for each species encountered at site:									
23			1 = few plants on rake head									
24			2 = rake head ~1/2 full, between 1 & 2									
25			3 = overflowing, can't see top of rake head.									
26			Leave blank if nothing found									
27			C. Record rake fullness for all species uprooted by the rake and that then floated to the suruface.									
28			D. Record individual rake fullness raings for fil. algae, moss, or sponge on speices list.									
29			E. If you can see another species within 6 feet of the boat, but did not collect or uproot it with a rake,									
30			please record "V" for Visual.									
31												
32			Note: You must write plant names at top of each sheet used									
33												
34			"ENTRY" sheet is the Excel file onto which the field worker transfers the field data.									
35			Transfer all data from field sheet and add comments as necessary (list of standarized comments visible when column is clicked on).									
36			Be sure to copy latitude and longitude data from the GPS text file for each site (as decimal degrees).									
37			Be sure to enter lake name, county name, WBIC and survey date									
38			"BOAT SURVEY" is a data sheet to add any other species seen on site but not directly sampled with the rake.									
39			However, if these species that are seen but not sampled are associated with a sampling site,									
40			note them with a "V" (for Visual") on the field sheet as requested above.									
41			If you see other species not associated with a particular site, (along the shore or some distance away), note them on the boat survey.									
42			Be as specific as possible in explaining geographic location (e.g. list location as nearest to, or between sampling points).									
43			Note that these species on the Boat Survey or noted as "Visual" are not included in the statistics (unless noted as specifically including									
44			"STATS" sheet automatically calculates statistics using the data entered into the "ENTRY" sheet.									

	A	B	C	D	E	F	G	H	I	J	K	L
45		"MAX DEPTH GRAPH" displays a distribution of the presence of plants vs. water depth. This graph should be carefully examined to note										
46		any potential outliers in the plant distribution.										
47		"CALCULATE FQI" sheet automatically calculates the Floristic Quality Index (FQI) based upon the species listed on the "ENTRY" spreadsheet.										
48												
49												
50	<i>Instructions:</i>											
51		Print as many copies of "Field Sheet" to take out onto the lake and record data. Be sure to keep the data sheets.										
52		After returning from the lake, enter data on "ENTRY" sheet. The statistics will appear automatically on the STATS sheet.										
53		If you recorded any "V" species on the Filed Sheet, record them as "V" on the ENTRY sheet as well.										
54	<i>The statistics:</i>											
55		Total number of sites visited: Total number of sites where the boat stopped, even if much too deep to have plants.										
56		Total number of sites with vegetation: Total number of sites where at least one plant was found										
57		Total number of sites shallower than maximum depth of plants: Number of sites where the depth was										
58		less than or equal to the maximum depth where plants were found.										
59		This value is used for Frequency of occurrence at sites shallower than maximum depth of plants.										
60		Frequency of occurrence within vegetated areas (%): Number of times a species was seen in a										
61		vegetated area divided by the total number of vegetated sites.										
62		Frequency of occurrence at sites shallower than maximum depth of plants: Number of times a species was seen										
63		divided by the total number of sites shallower than maximum depth of plants										
64		Simpson Diversity Index is a nonparametric estimator of community heterogeneity. It is based on Relative										
65		Frequency and thus is not sensitive to whether all sampled sites (including non-vegetated sites) are included.										
66		The closer the Simpson Diversity Index is to 1, the more diverse the community.										
67		Maximum depth of plants (ft) is the depth of the deepest site sampled at which vegetation was present.										
68		Number of sites sampled using rake on rope (R)										
69		Number of sites sampled using rake on Pole (P)										
70		Average number of all species per site (shallower than max depth)										
71		Average number of all species per site (vegetated sites only)										
72		Average number of native species per site (shallower than max depth)										
73		Average number of native species per site (vegetated sites only)										
74		Species Richness: Total number of species collected. Does not include visual sightings.										
75		Species Richness (including visuals): Total number of species collected including visual sightings.										
76												
77	<i>Please note:</i>											
78		1. Adding rows or columns into the ENTRY or STATS worksheets will cause errors in the embedded formulas. DO NOT ADD ROWS OR										
79		2. Frequency of Occurrence is sensitive to whether all sampled sites are included.										
80		Including non-vegetated sites will lower the frequency of occurrence										
81		3. Relative Frequency is not sensitive to whether all sampled sites, including non-vegetated sites, are included.										
82		Including non-vegetated sites will not change the relative frequency.										
83		4. We use rake fullness for all species.										
84		4. There are 7 hidden columns in "ENTRY" that have intermediate calculations for the statistics. Please do not modify these.										
85		5. Please enter the latitude and longitude of each sample site on the "ENTRY" sheet.										
86		6. In the "ENTRY" worksheet, you may want to use freeze panes feature for easy scrolling.										
87		You can turn this feature on and off by selecting "Unfreeze Panes" in the "Window" menu.										

	M	N	O	P
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7	h Code (WBIC), county and date			
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78	R COLUMNS TO THE WORKSHEETS!			
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	A	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Entry		1											
2	Name		2											
3	County		3											
4	WBIC		4											
5	Date		5											
6	Field Crew		6											
7			7											
8			8											
9			9											
10			10											
11			11											
12			12											
13			13											
14			14											
15			15											
16			16											
17			17											
18			18											
19			19											
20			20											
21			21											
22			22											
23			23											
24			24											

sampling point
 Latitude (need electronic copy of site locations)
 Longitude (need electronic copy of site locations)

Depth (ft)
 Dominant sediment type (M=muck, S=Sand, R=Rock)
 Sampled holding rake pole (P) or rake rope (R)?
 comments

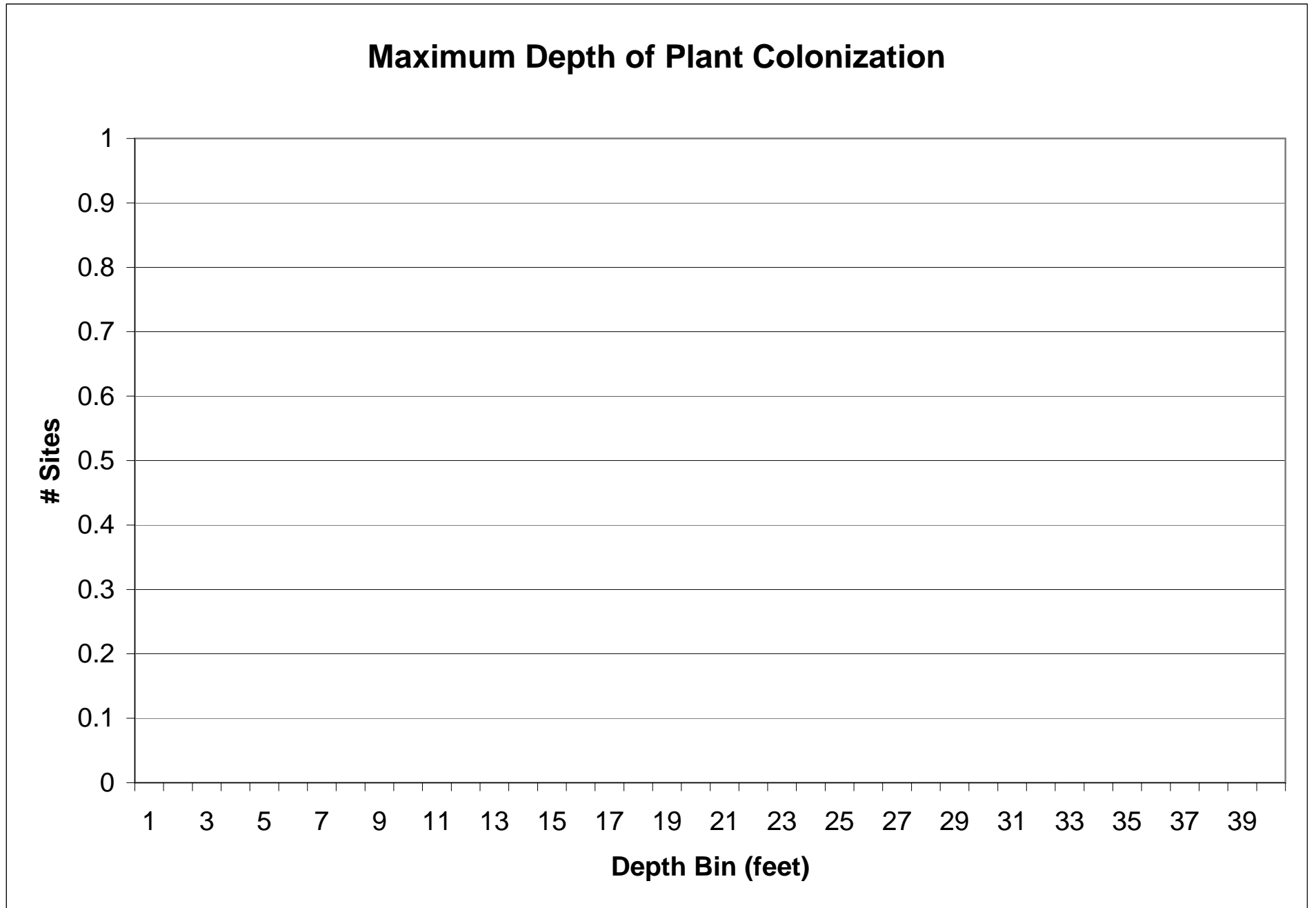
Total Rake Fullness
 Myriophyllum spicatum , Eurasian water-milfoil
 Potamogeton crispus , Curly-leaved
 Acorus americanus
 Alism

	A	B	C
1	Boat Survey		
2	Lake		
3	County		
4	WBIC		
5	Date of Survey		
6	Field Crew		
7			
8			
9			
10	Nearest Point	Species seen, habitat information	
11			
12			
13			
14			
15			

	P	Q	R	S	T	U
1	er- Common water- lily, Common water- lily, Bottle brush sedge Ceratophyllum demersum, Brook grass Ceratophyllum demersum, Coontail Chara sp., Muskgrasses Comarum palustre, Marsh cinquefoil Decodon verticillatus, Swamp loosestrife					
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DEPTH BIN (FT) # SITES (NO ENTRY)

1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
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27	0
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29	0
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31	0
32	0
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37	0
38	0
39	0
40	0



Note: The X-axis (Depth Bin) can be scaled to better fit the plant distribution data.
Click on the outermost portion of the graph, and adjust the selection box in Column A.

Lake
County
Date
Township
Range
Section

Species	Common Name	C	species present=1	
<i>Acorus americanus</i>	Sweet-flag	7	0	0
<i>Alisma triviale</i>	Northern water-plantain	4	0	0
<i>Bidens beckii</i>	Water marigold	8	0	0
<i>Bolboschoenus fluviatilis</i>	River bulrush	6	0	0
<i>Brasenia schreberi</i>	Watershield	6	0	0
<i>Calla palustris</i>	Wild calla	9	0	0
<i>Callitriche hermaphroditica</i>	Autumnal water-starwort	9	0	0
<i>Callitriche heterophylla</i>	Large water-starwort	9	0	0
<i>Callitriche palustris</i>	Common water-starwort	8	0	0
<i>Carex comosa</i>	Bottle brush sedge	5	0	0
<i>Catabrosa aquatica</i>	Brook grass	10	0	0
<i>Ceratophyllum demersum</i>	Coontail	3	0	0
<i>Ceratophyllum echinatum</i>	Spiny hornwort	10	0	0
<i>Chara</i>	Muskgrasses	7	0	0
<i>Dulichium arundinaceum</i>	Three-way sedge	9	0	0
<i>Elatine minima</i>	Waterwort	9	0	0
<i>Elatine triandra</i>	Greater waterwort	9	0	0
<i>Eleocharis acicularis</i>	Needle spikerush	5	0	0
<i>Eleocharis erythropoda</i>	Bald spikerush	3	0	0
<i>Eleocharis palustris</i>	Creeping spikerush	6	0	0
<i>Elodea canadensis</i>	Common waterweed	3	0	0
<i>Elodea nuttallii</i>	Slender waterweed	7	0	0
<i>Equisetum fluviatile</i>	Water horsetail	7	0	0
<i>Eriocaulon aquaticum</i>	Pipewort	9	0	0
<i>Glyceria borealis</i>	Northern manna grass	8	0	0
<i>Gratiola aurea</i>	Golden hedge-hyssop	10	0	0
<i>Heteranthera dubia</i>	Water star-grass	6	0	0
<i>Isoetes echinospora</i>	Spiny-spored quillwort	8	0	0
<i>Isoetes lacustris</i>	Lake quillwort	8	0	0
<i>Isoetes sp.</i>	Quillwort	8	0	0
<i>Juncus pelocarpus f. submersus</i>	Brown-fruited rush	8	0	0
<i>Juncus torreyi</i>	Torrey's rush	4	0	0
<i>Lemna minor</i>	Small duckweed	4	0	0
<i>Lemna perpusilla</i>	Least duckweed	10	0	0
<i>Lemna trisulca</i>	Forked duckweed	6	0	0
<i>Littorella uniflora</i>	Littorella	10	0	0
<i>Lobelia dortmanna</i>	Water lobelia	10	0	0
<i>Ludwigia palustris</i>	Marsh purslane	4	0	0
<i>Myriophyllum alterniflorum</i>	Alternate-flowered water-milfoil	10	0	0
<i>Myriophyllum farwellii</i>	Farwell's water-milfoil	8	0	0
<i>Myriophyllum heterophyllum</i>	Various-leaved water-milfoil	7	0	0
<i>Myriophyllum sibiricum</i>	Northern water-milfoil	6	0	0
<i>Myriophyllum tenellum</i>	Dwarf water-milfoil	10	0	0
<i>Myriophyllum verticillatum</i>	Whorled water-milfoil	8	0	0

<i>Najas flexilis</i>	Slender naiad	6	0	0
<i>Najas gracillima</i>	Northern naiad	7	0	0
<i>Najas guadalupensis</i>	Southern naiad	8	0	0
<i>Nelumbo lutea</i>	American lotus	7	0	0
<i>Nitella</i>	Nitella	7	0	0
<i>Nuphar advena</i>	Yellow pond lily	8	0	0
<i>Nuphar microphylla</i>	Small pond lily	9	0	0
<i>Nuphar X rubrodiscalis</i>	Intermediate pond lily	9	0	0
<i>Nuphar variegata</i>	Spatterdock	6	0	0
<i>Nymphaea odorata</i>	White water lily	6	0	0
<i>Phragmites australis</i>	Common reed	1	0	0
<i>Polygonum amphibium</i>	Water smartweed	5	0	0
<i>Polygonum punctatum</i>	Dotted smartweed	5	0	0
<i>Pontederia cordata</i>	Pickerelweed	8	0	0
<i>Potamogeton alpinus</i>	Alpine pondweed	9	0	0
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	7	0	0
<i>Potamogeton bicupulatus</i>	Snail-seed pondweed	9	0	0
<i>Potamogeton confervoides</i>	Algal-leaved pondweed	10	0	0
<i>Potamogeton diversifolius</i>	Water-thread pondweed	8	0	0
<i>Potamogeton epihydrus</i>	Ribbon-leaf pondweed	8	0	0
<i>Potamogeton foliosus</i>	Leafy pondweed	6	0	0
<i>Potamogeton friesii</i>	Fries' pondweed	8	0	0
<i>Potamogeton gramineus</i>	Variable pondweed	7	0	0
<i>Potamogeton hillii</i>	Hill's pondweed	9	0	0
<i>Potamogeton illinoensis</i>	Illinois pondweed	6	0	0
<i>Potamogeton natans</i>	Floating-leaf pondweed	5	0	0
<i>Potamogeton nodosus</i>	Long-leaf pondweed	7	0	0
<i>Potamogeton oakesianus</i>	Oakes' pondweed	10	0	0
<i>Potamogeton obtusifolius</i>	Blunt-leaf pondweed	9	0	0
<i>Potamogeton praelongus</i>	White-stem pondweed	8	0	0
<i>Potamogeton pulcher</i>	Spotted pondweed	10	0	0
<i>Potamogeton pusillus</i>	Small pondweed	7	0	0
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	5	0	0
<i>Potamogeton robbinsii</i>	Fern pondweed	8	0	0
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	8	0	0
<i>Potamogeton strictifolius</i>	Stiff pondweed	8	0	0
<i>Potamogeton vaseyi</i>	Vasey's pondweed	10	0	0
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	6	0	0
<i>Ranunculus aquatilis</i>	White water crowfoot	8	0	0
<i>Ranunculus flabellaris</i>	Yellow water crowfoot	8	0	0
<i>Ranunculus flammula</i>	Creeping spearwort	9	0	0
<i>Riccia fluitans</i>	Slender riccia	7	0	0
<i>Ruppia cirrhosa</i>	Ditch grass	8	0	0
<i>Sagittaria brevisrostra</i>	Midwestern arrowhead	9	0	0
<i>Sagittaria cuneata</i>	Arum-leaved arrowhead	7	0	0
<i>Sagittaria graminea</i>	Grass-leaved arrowhead	9	0	0
<i>Sagittaria latifolia</i>	Common arrowhead	3	0	0
<i>Sagittaria rigida</i>	Sessile-fruited arrowhead	8	0	0
<i>Schoenoplectus acutus</i>	Hardstem bulrush	6	0	0
<i>Schoenoplectus heterochaetus</i>	Slender bulrush	10	0	0
<i>Schoenoplectus pungens</i>	Three-square bulrush	5	0	0
<i>Schoenoplectus subterminalis</i>	Water bulrush	9	0	0
<i>Schoenoplectus tabernaemontani</i>	Softstem bulrush	4	0	0

<i>Sparganium americanum</i>	American bur-reed	8	0	0
<i>Sparganium androcladum</i>	Branched bur-reed	8	0	0
<i>Sparganium angustifolium</i>	Narrow-leaved bur-reed	9	0	0
<i>Sparganium emersum</i>	Short-stemmed bur-reed	8	0	0
<i>Sparganium eurycarpum</i>	Common bur-reed	5	0	0
<i>Sparganium fluctuans</i>	Floating-leaf bur-reed	10	0	0
<i>Sparganium natans</i>	Small bur-reed	9	0	0
<i>Spirodela polyrhiza</i>	Large duckweed	5	0	0
<i>Stuckenia filiformis</i>	Fine-leaved pondweed	8	0	0
<i>Stuckenia pectinata</i>	Sago pondweed	3	0	0
<i>Stuckenia vaginata</i>	Sheathed pondweed	9	0	0
<i>Typha angustifolium</i>	Narrow-leaved cattail	1	0	0
<i>Typha latifolia</i>	Broad-leaved cattail	1	0	0
<i>Typha</i> sp.	Cattail	1	0	0
<i>Utricularia cornuta</i>	Horned bladderwort	10	0	0
<i>Utricularia geminiscapa</i>	Twin-stemmed bladderwort	9	0	0
<i>Utricularia gibba</i>	Creeping bladderwort	9	0	0
<i>Utricularia intermedia</i>	Flat-leaf bladderwort	9	0	0
<i>Utricularia minor</i>	Small bladderwort	10	0	0
<i>Utricularia purpurea</i>	Large purple bladderwort	9	0	0
<i>Utricularia resupinata</i>	Small purple bladderwort	9	0	0
<i>Utricularia vulgaris</i>	Common bladderwort	7	0	0
<i>Vallisneria americana</i>	Wild celery	6	0	0
<i>Wolffia borealis</i>	Northern watermeal	6	0	0
<i>Wolffia columbiana</i>	Common watermeal	5	0	0
<i>Zannichellia palustris</i>	Horned pondweed	7	0	0
<i>Zizania aquatica</i>	Southern wild rice	8	0	0
<i>Zizania palustris</i>	Northern wild rice	8	0	0
<i>Zizania</i> sp.	Wild rice	8	0	0

N

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#DIV/0!

FQI

#DIV/0!

CITATION: Nichols, SA. 1999. Floristic Quality Assessment of Wisconsin Lake Plant Communities with Example Applications. *Journal of Lake and Reservoir Management*, 15(2):133-141.

CITATION: University of Wisconsin-Madison, 2001. Wisconsin Floristic Quality Assessment (WFQA). Retrived October 27, 2009 from: <http://www.botany.wisc.edu/WFQA.asp>