BLUE LAKE AQUATIC PLANT SURVEY 2013-2014

One of the recommendations of the 2011 Lake Management Plan for Blue Lake, Minocqua, WI was that comprehensive aquatic plant surveys should be done every five years. This report covers the second survey that was done five years after the original survey.

During the summer of 2013 the East lobe of Blue Lake was surveyed and during the summer of 2014 the West lobe was surveyed. As in the past, a two sided rake was thrown and allowed to reach the bottom of the lake. It was then retrieved and the plants on it were identified and ranked according concentration, both a total rake fullness rating, and the concentration of each species found on the rake.

Blue Lake has 962 different sampling points and each was sampled except for a small number that were skipped. If, in a particular area, the rake came up empty of vegetation for three consecutive throws, thereafter every other point was sampled until some vegetation was found. At this time the last point skipped was then sampled to insure nothing was missed.

Although the sample points were identified by latitude and longitude in both the original survey and this one, various factors, such as GPS accuracy limits or boat drift during sampling, affected where the rake actually touched bottom. We allow that there would be some differences in readings from one survey to the next. That being said, we found no great surprises. WE FOUND NO EVIDENCE OF ANY NON-NATIVE (INVASIVE) PLANTS DURING THIS SURVEY. As always, one must not let down their guard and must stay aware of the possibility of their introduction. Make sure all boats are not bringing any aquatic invasive species into the lake. When on or in the water, look for evidence of non-native plants. Become familiar with what the most common invasives look like, especially Eurasian Water Milfoil and Curly Leaf Pondweed.

The total number of species identified during this survey increased over the first go around. This is mainly attributed to the higher experience level of the samplers. Many things learned the first time around were used to improve the sampling methods used and thus made things work more efficiently and accurately. The East lobe had 24 species identified and the West lobe had 29 species identified.

The Floristic Quality Index (FQI) for the East lobe was 32.25 compared with 26.59 five years before. Again, we attribute the increase mainly to better sampling techniques. For the West lobe the FQI was 36.21 compared with 36.33, for the most part no change. For a more detailed explanation of the Floristic Quality Index, please refer to the Lake Management Plan for Blue Lake, Minocqua, WI, submitted January 2, 2011. Since all of the species found in the East lobe were also found in the west lobe, the overall lake FQI is also 36.21.

The pages following (Part I) will show a graphic representation of plant species found at each sampling point. The size and intensity of the dots represent the concentration of the different species as measured by rake fullness of the sampling rake. The Total Rake Fullness chart depicts the relative concentration of all species at a given point.

Additional pages (Part II) will show the species found at each sampling point (Raw Data).

Further (Part III) will show the Floristic Quality Index (FQI) for this survey.

PEOPLE WHO HELPED WITH THE 2013-2014

AQUATIC PLANT SURVEY

SPECIAL THANKS ARE IN ORDER FOR THE FOLLOWING WHO GRACIOUSLY OFFERED TIME AND TALENT:

BLUE LAKE

Bill Clark

Fred Haag

Cheryl Kamba

Sylvia Knust

Janine Myers

Mayra Myers

Dan Pagel

Sue Pagel

DNR/UW-EXTENSION/UWSP

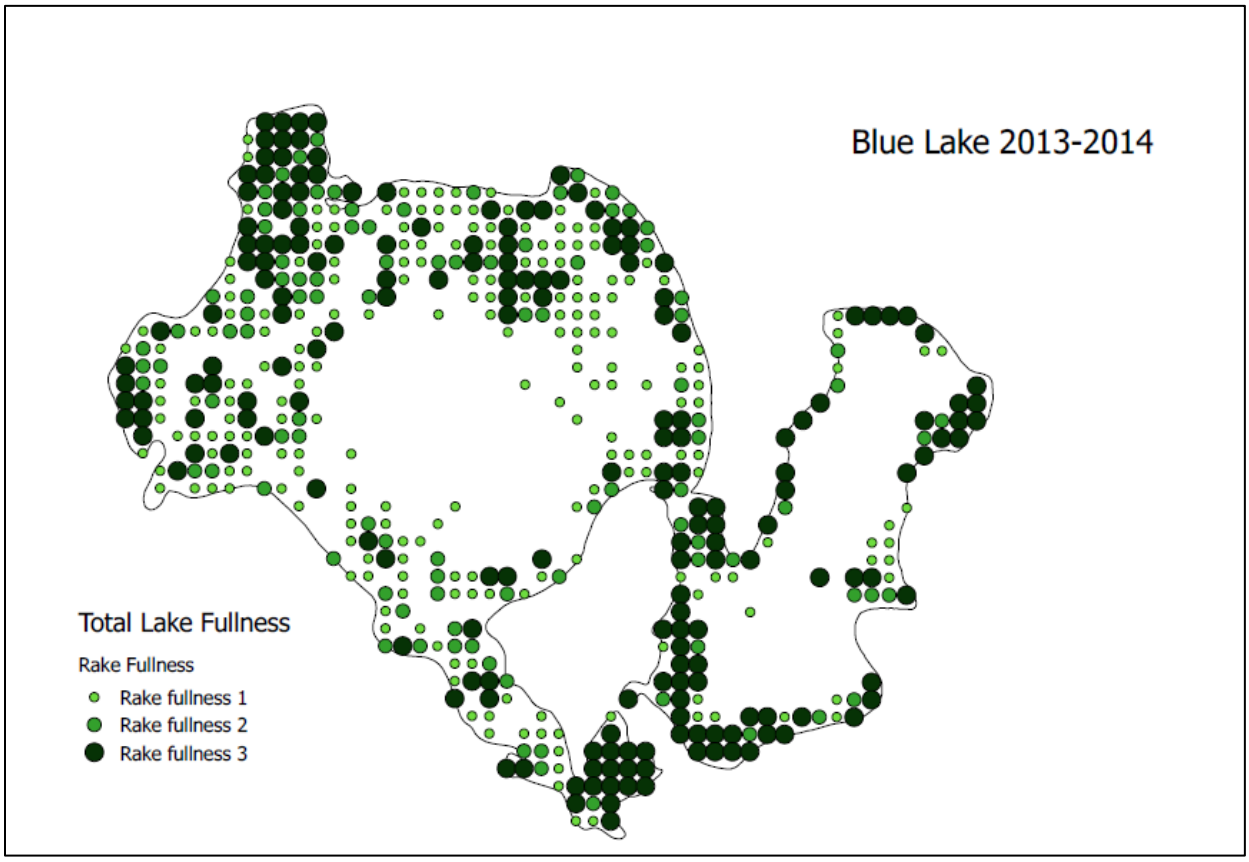
Paul Frater

Christine Koeller

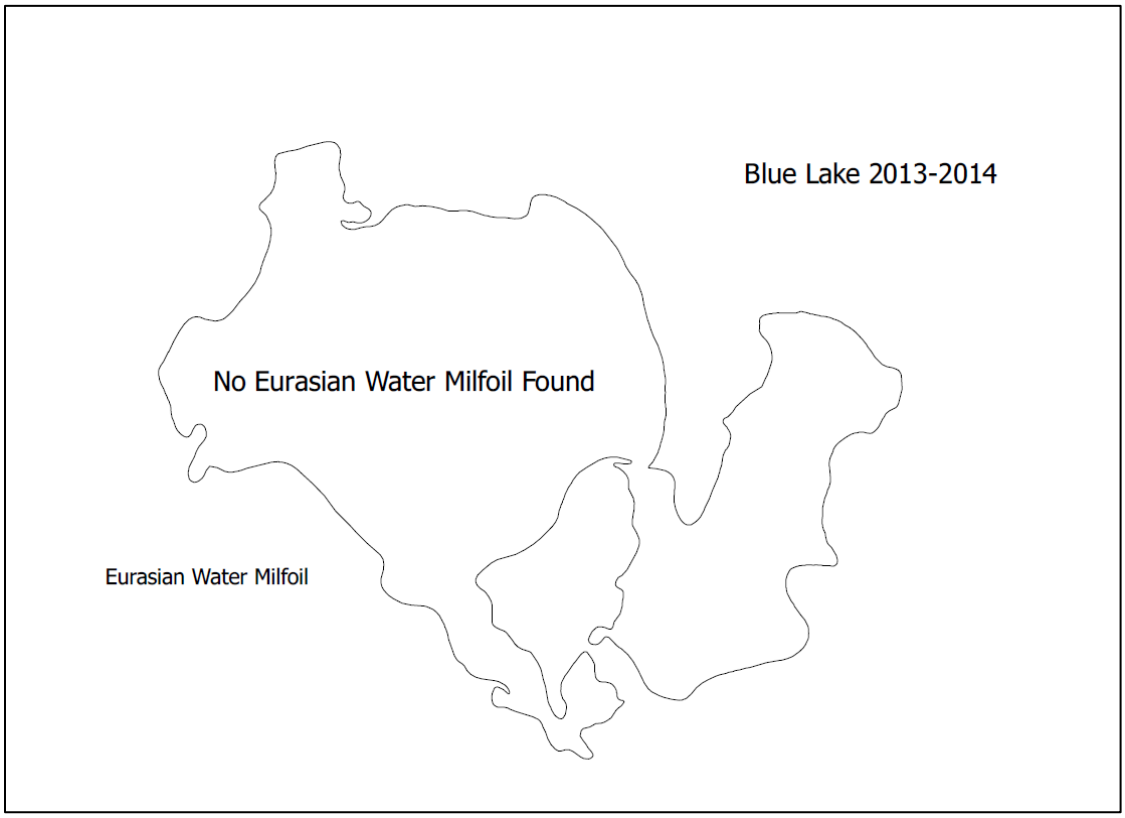
Sandy Wickman

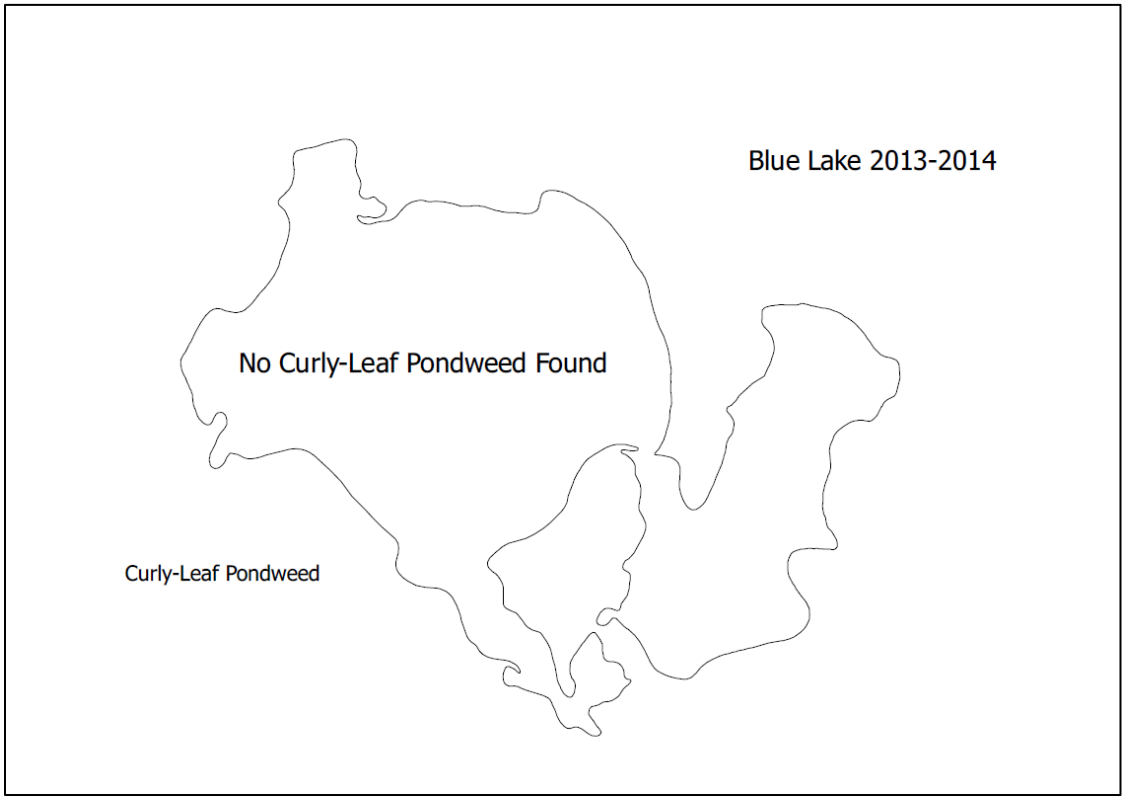
Part I Aquatic Plant Survey 2013-2014

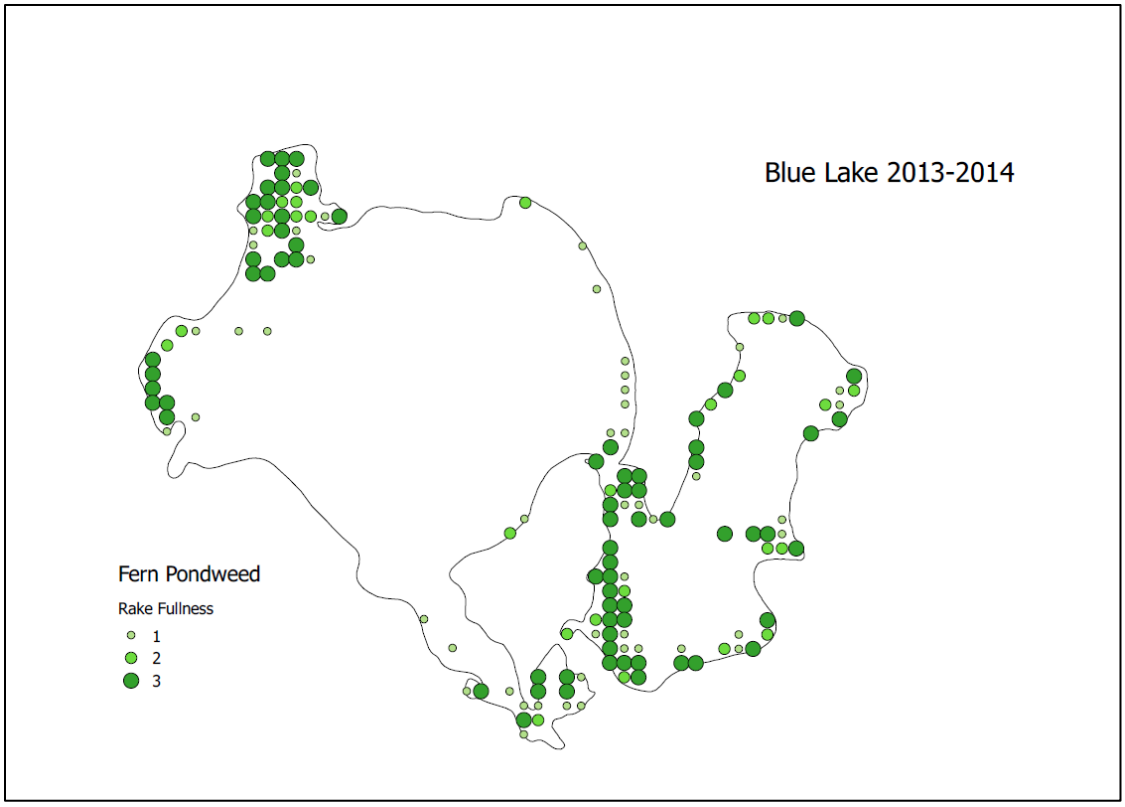
The slide immediately below is the total rake fullness of all plants at a particular sampling point.

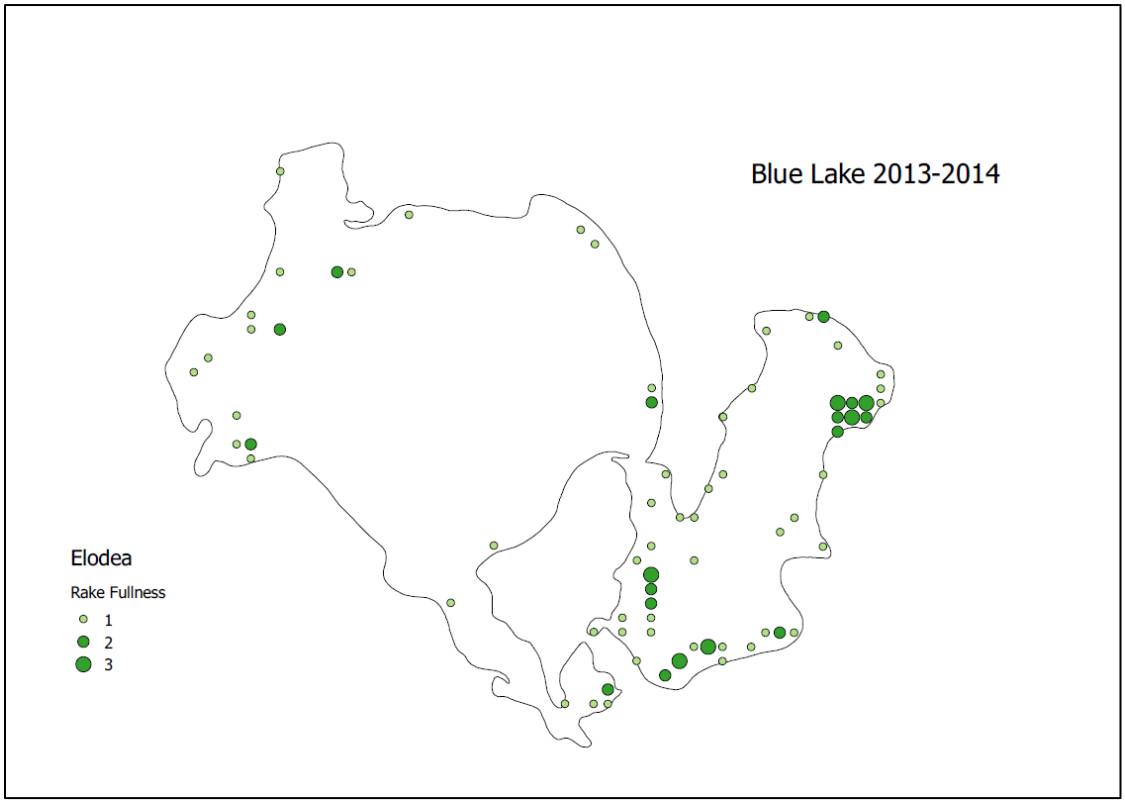


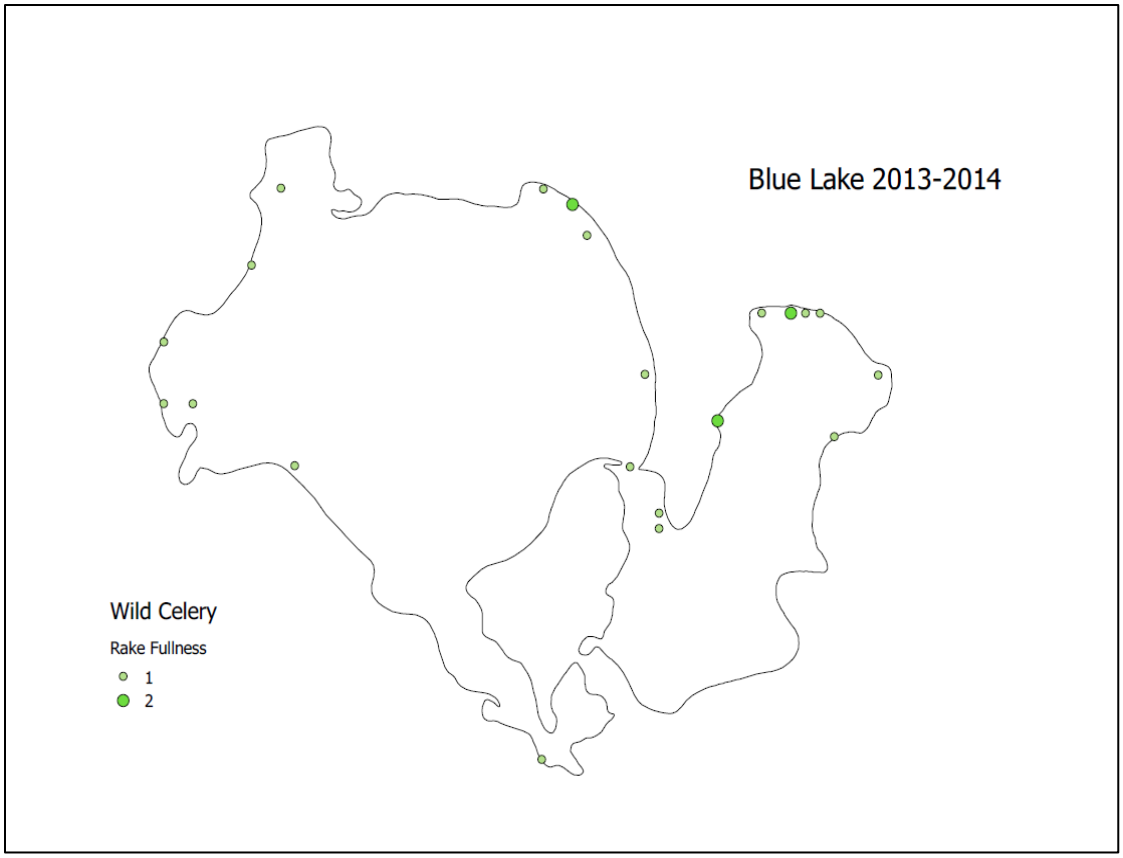
On the following pages, each plant species is represented individually.

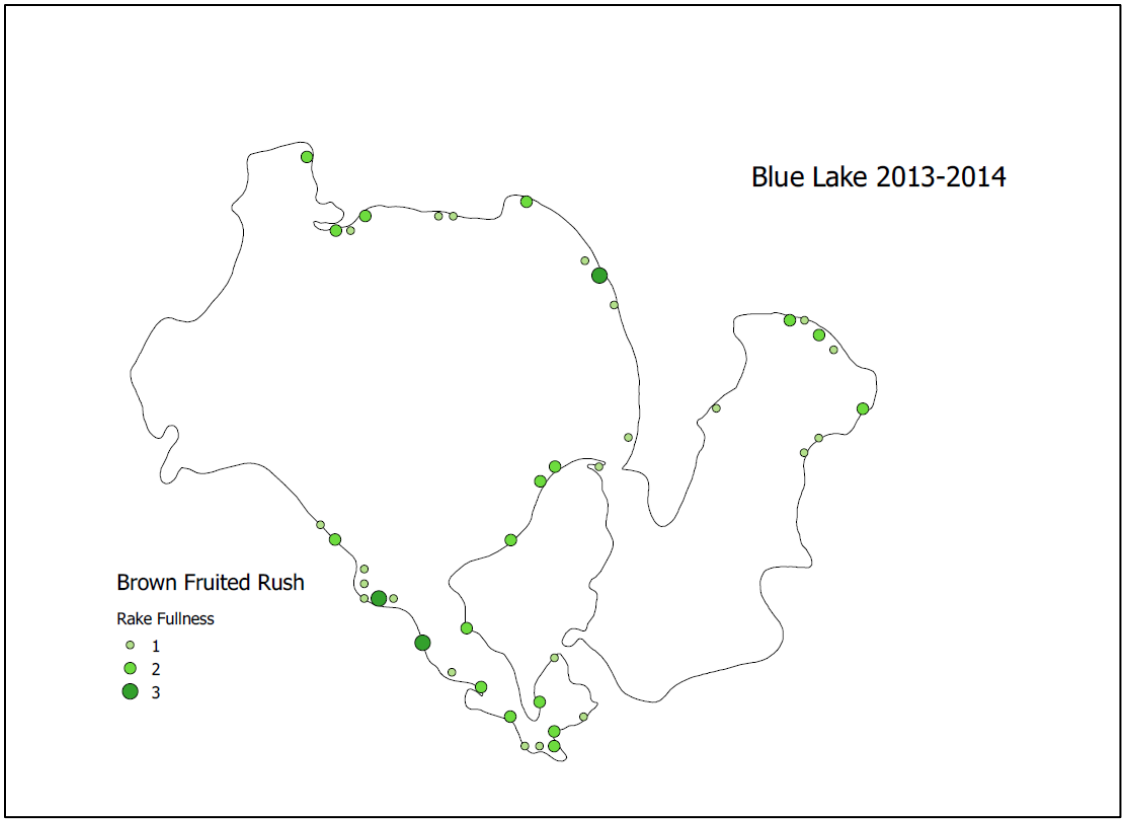

Blue Lake 2013-2014
No Eurasian Water Milfoil Found
Eurasian Water Milfoil

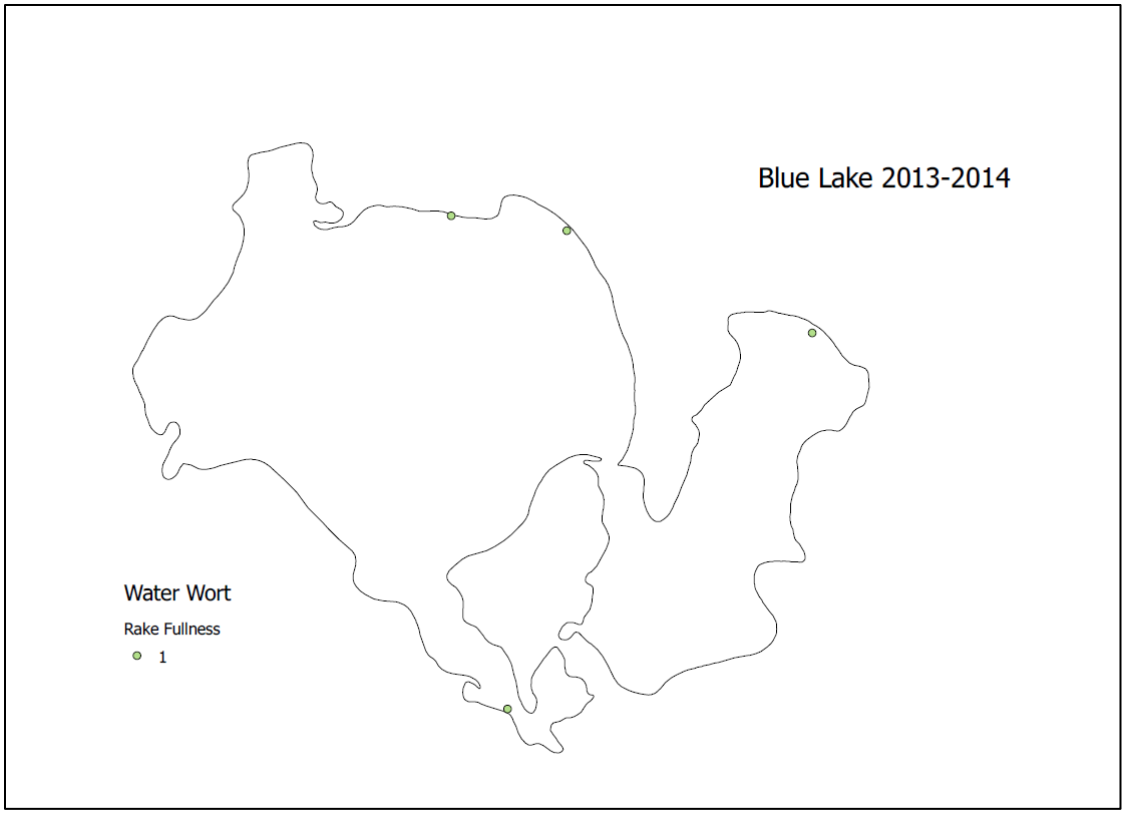

Blue Lake 2013-2014
No Curly-Leaf Pondweed Found
Curly-Leaf Pondweed

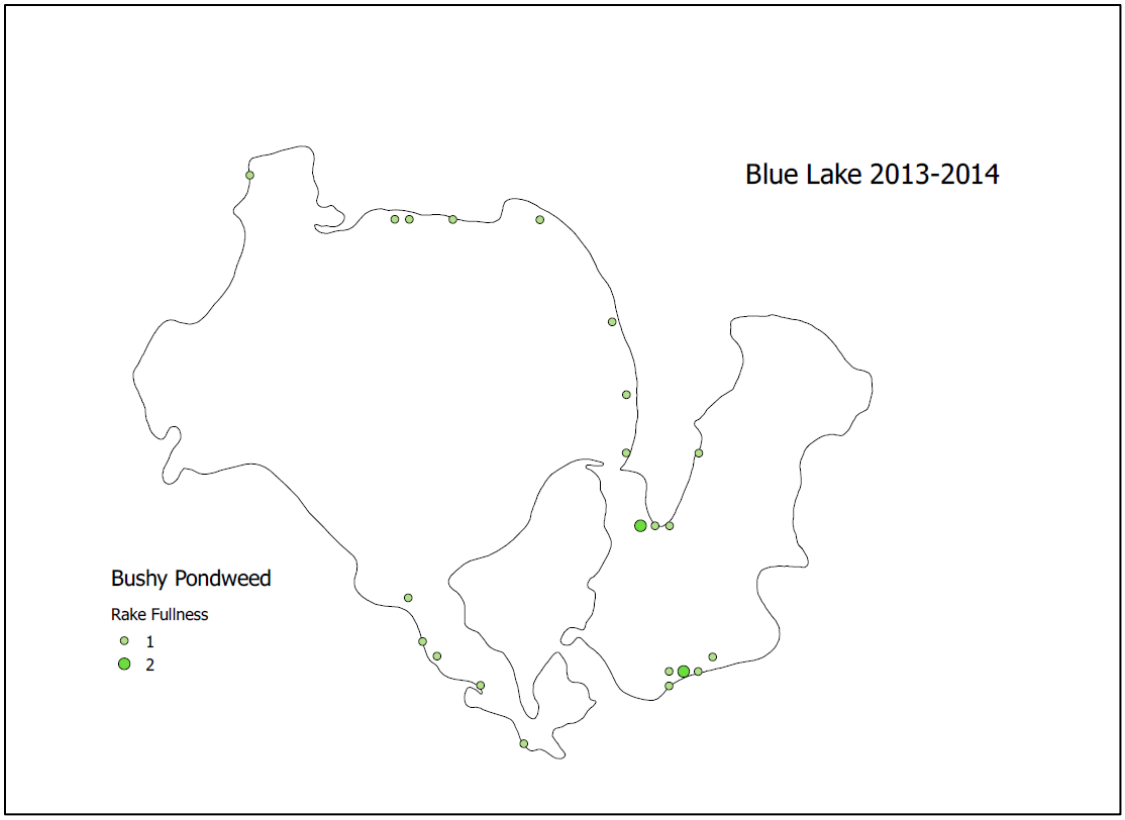

Blue Lake 2013-2014
Fern Pondweed
Rake Fullness
1
2
3

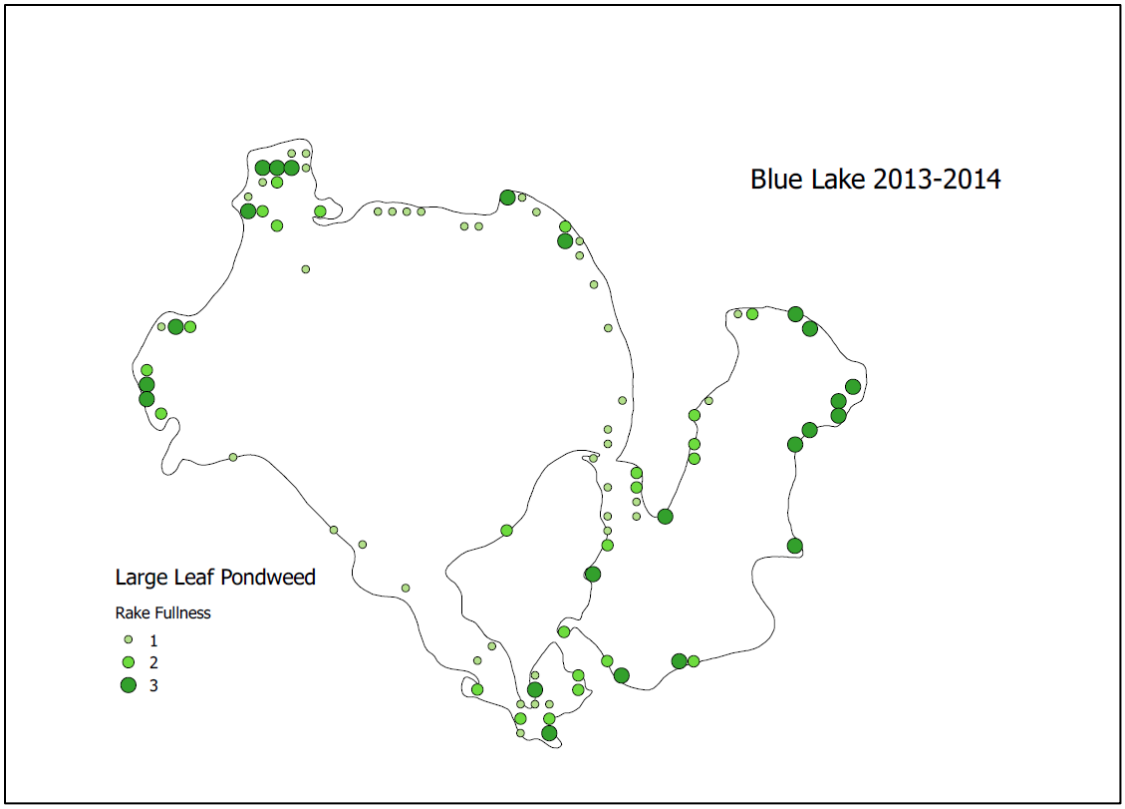

Blue Lake 2013-2014
Elodea
Rake Fullness
1
2
3

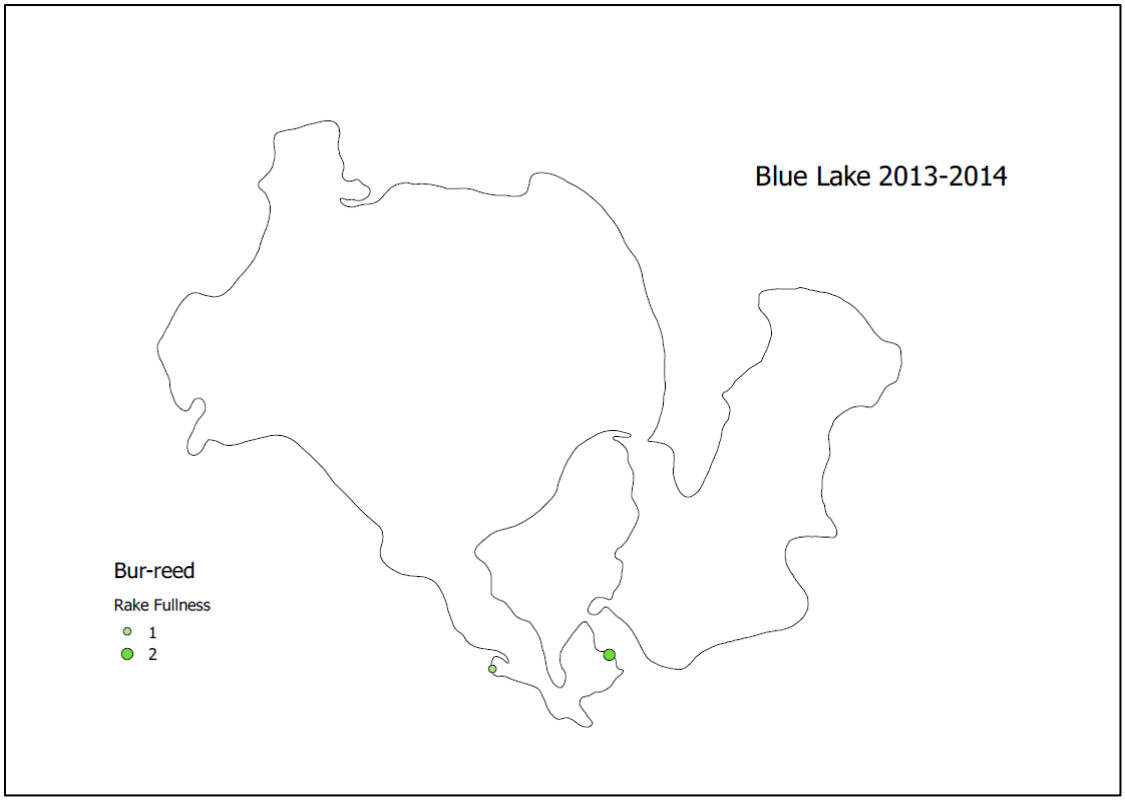

Blue Lake 2013-2014
Wild Celery
Rake Fullness
1
2

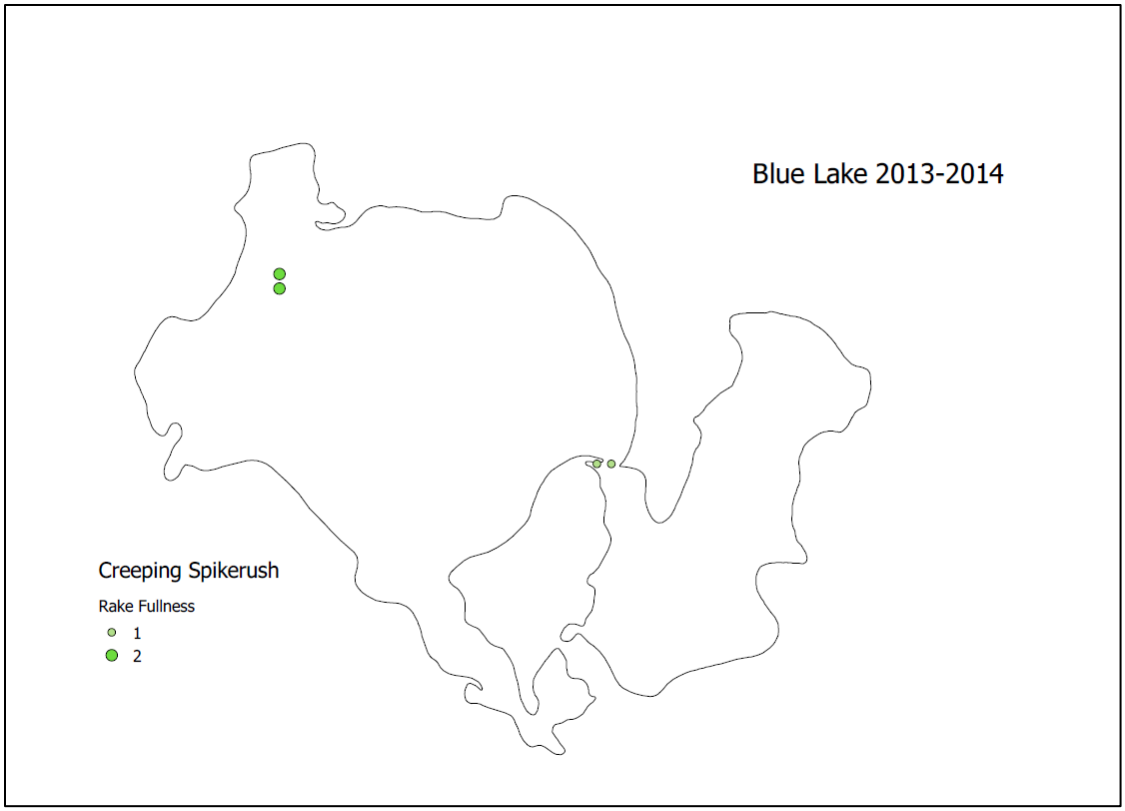

Blue Lake 2013-2014
Brown Fruited Rush
Rake Fullness
1
2
3

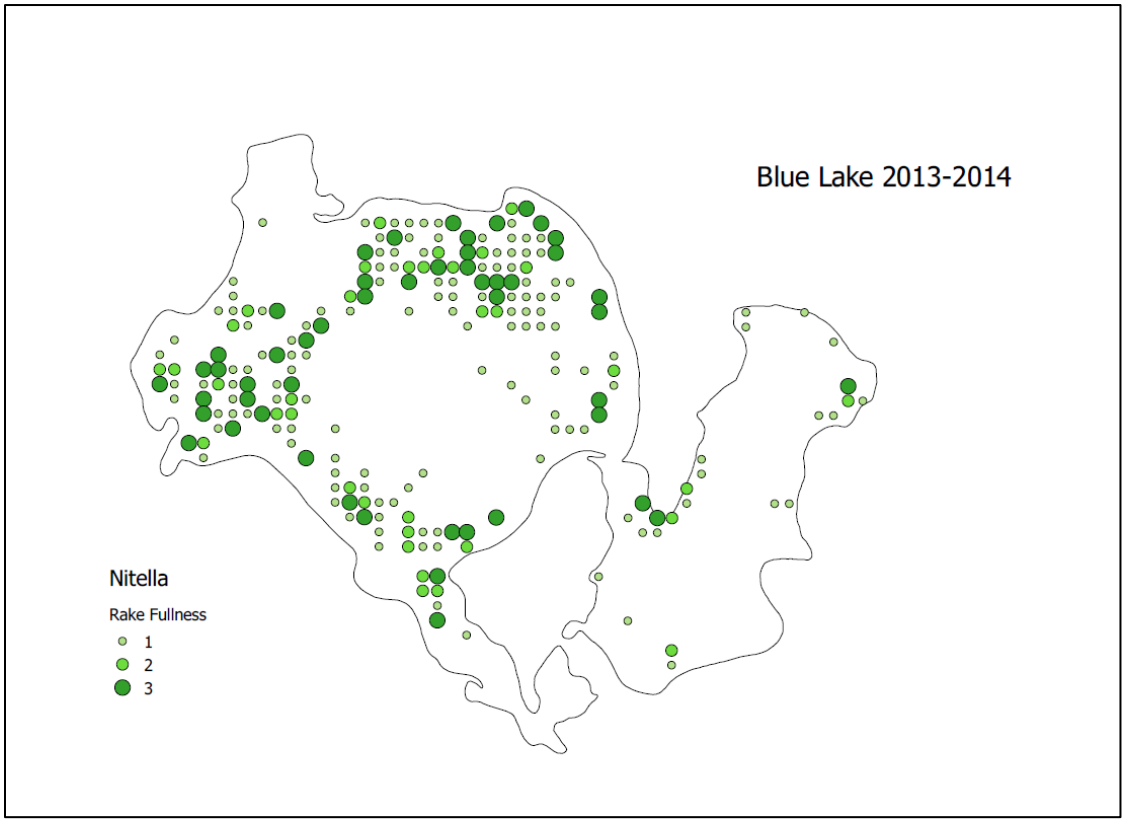

Blue Lake 2013-2014
Water Wort
Rake Fullness
1

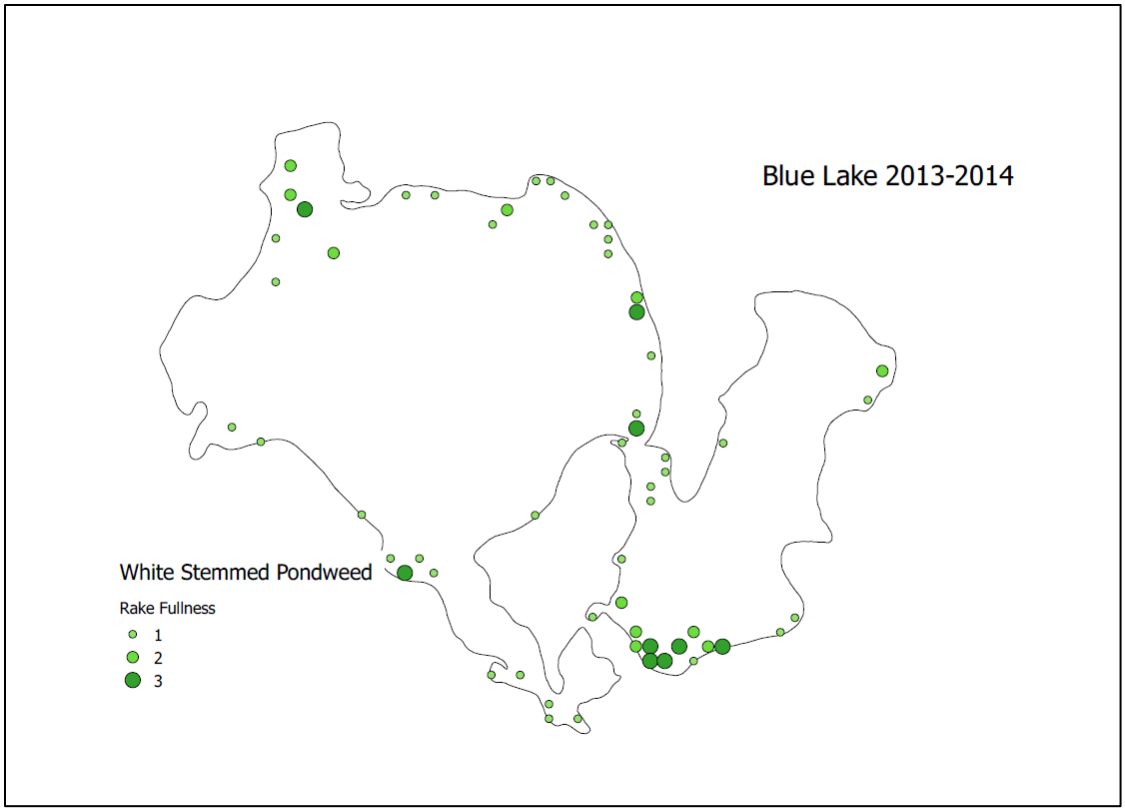

Blue Lake 2013-2014
Bushy Pondweed
Rake Fullness
1
2

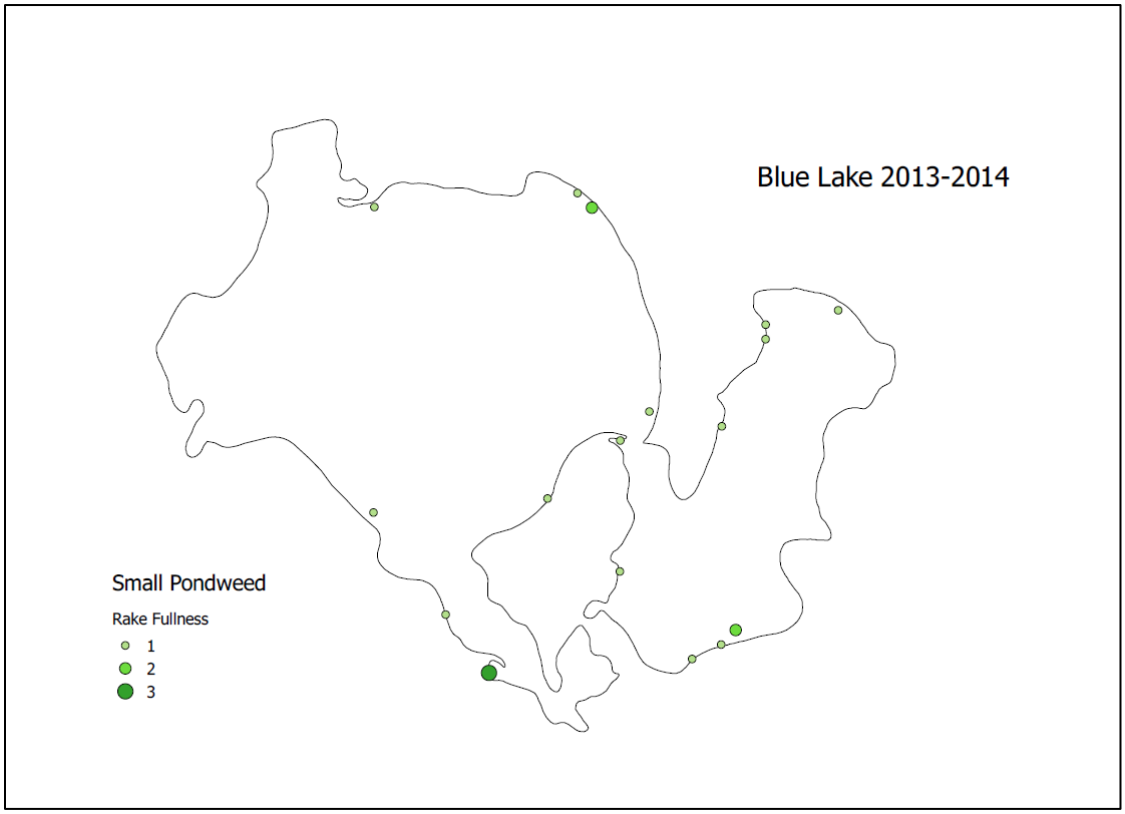

Blue Lake 2013-2014
Large Leaf Pondweed
Rake Fullness
1
2
3

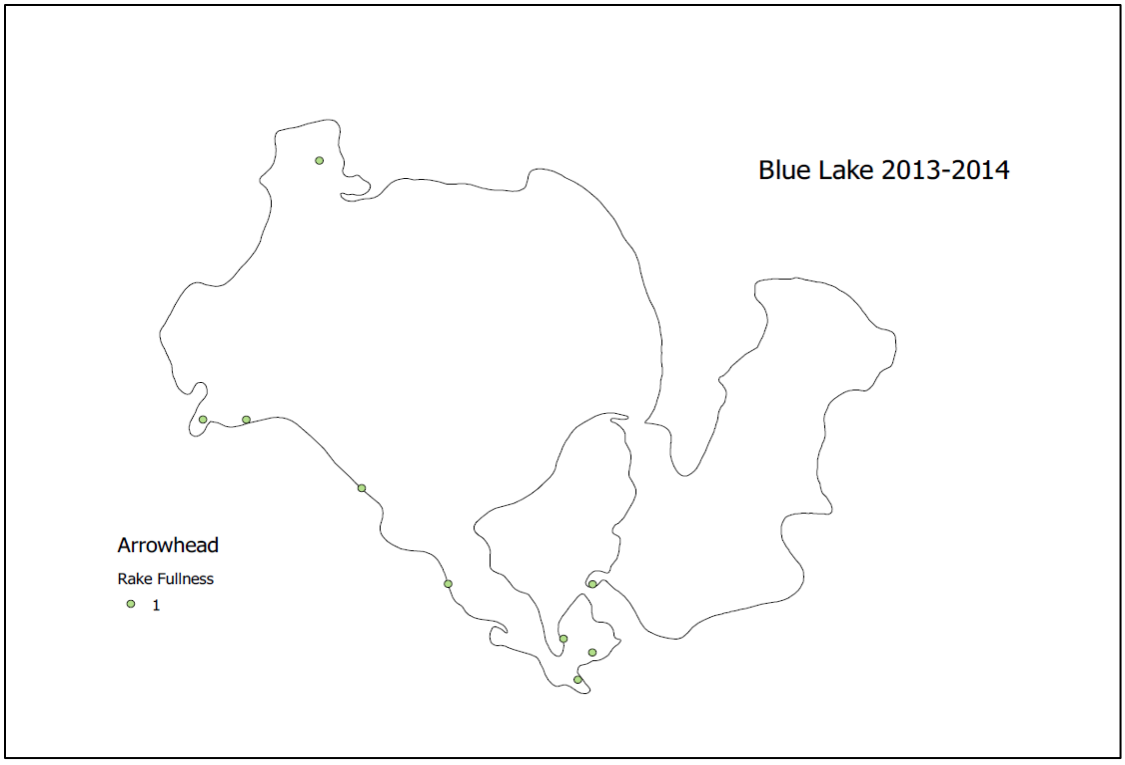

Blue Lake 2013-2014
Bur-reed
Rake Fullness
1
2

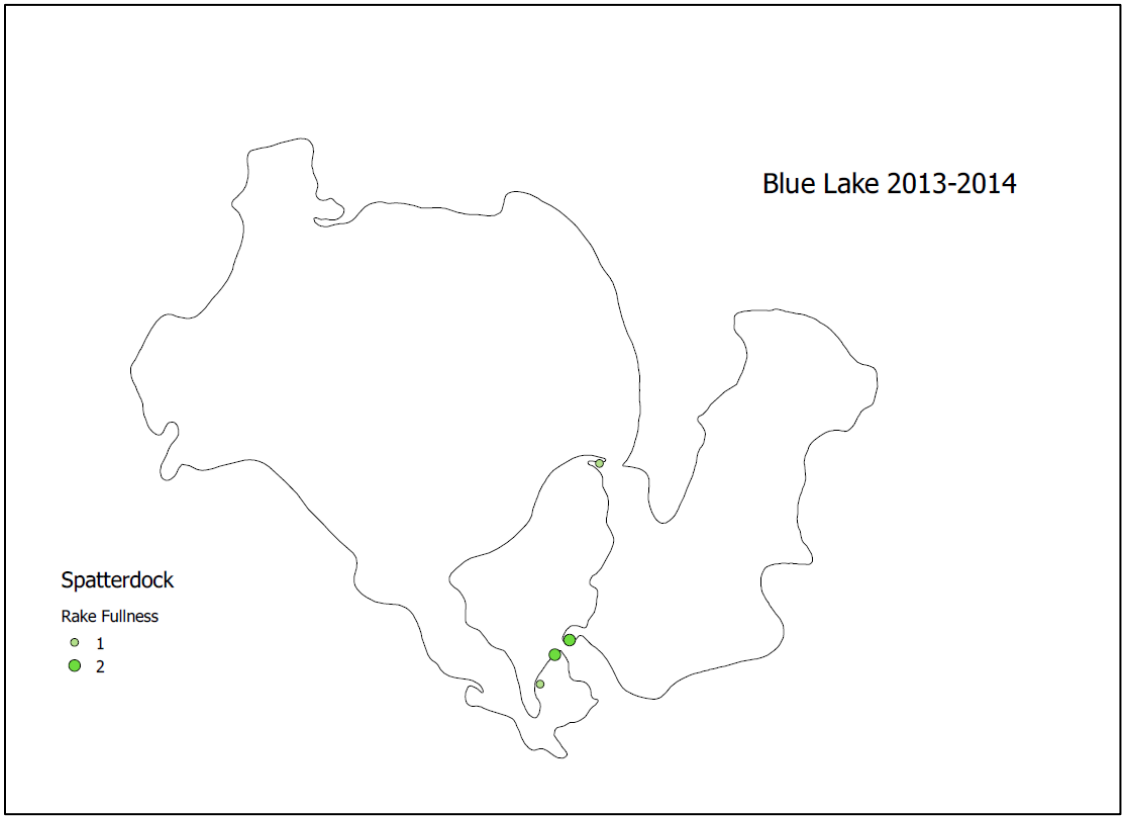

Blue Lake 2013-2014
Creeping Spikerush
Rake Fullness
1
2

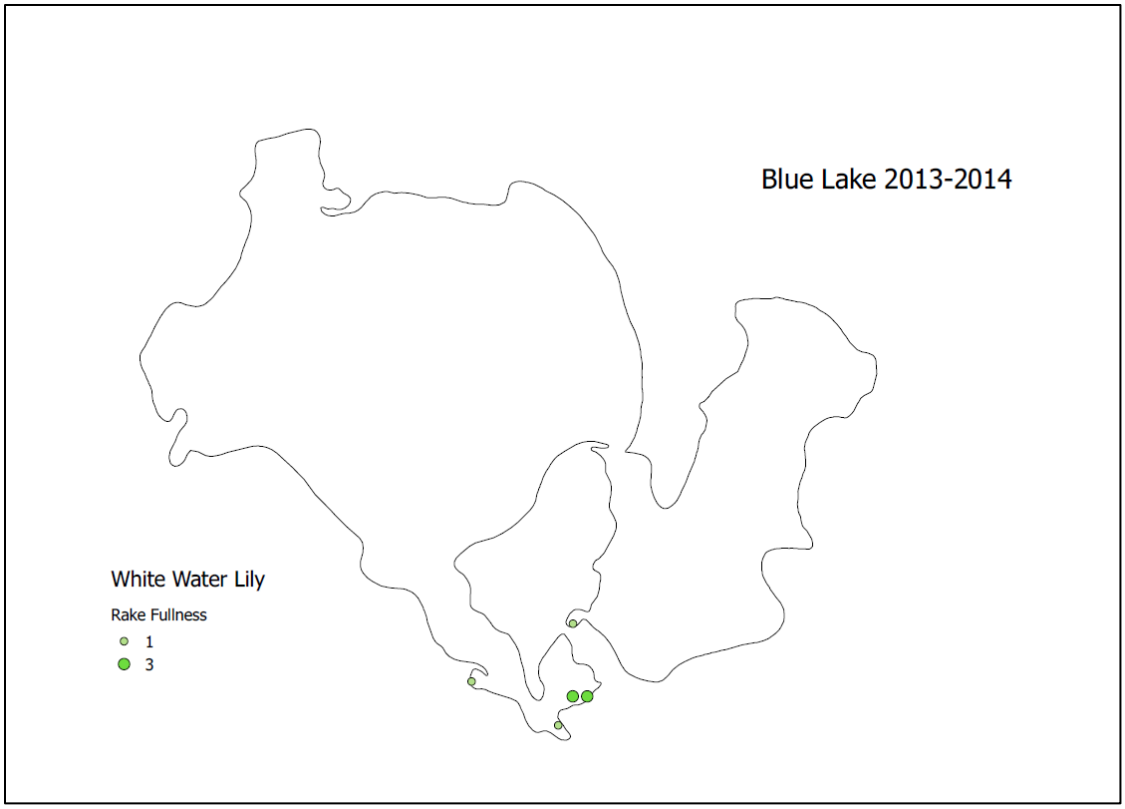

Blue Lake 2013-2014
Nitella
Rake Fullness
1
2
3

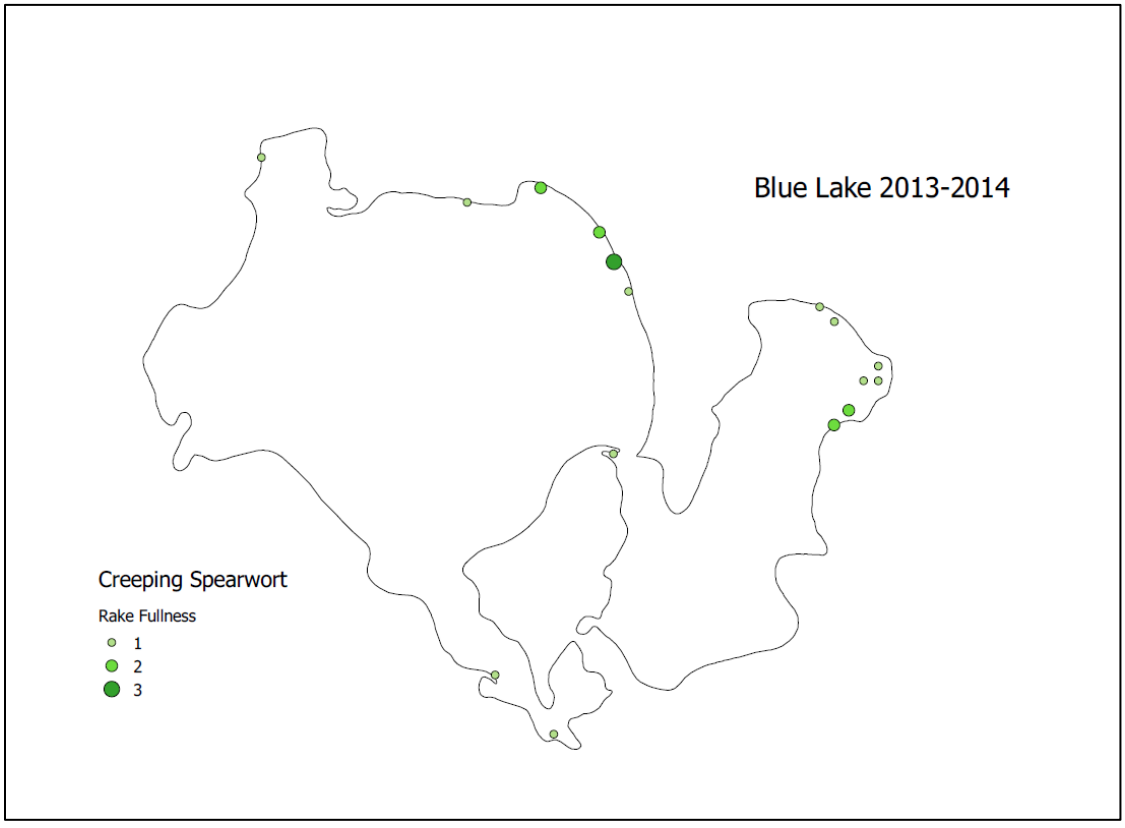

Blue Lake 2013-2014
White Stemmed Pondweed
Rake Fullness
1
2
3

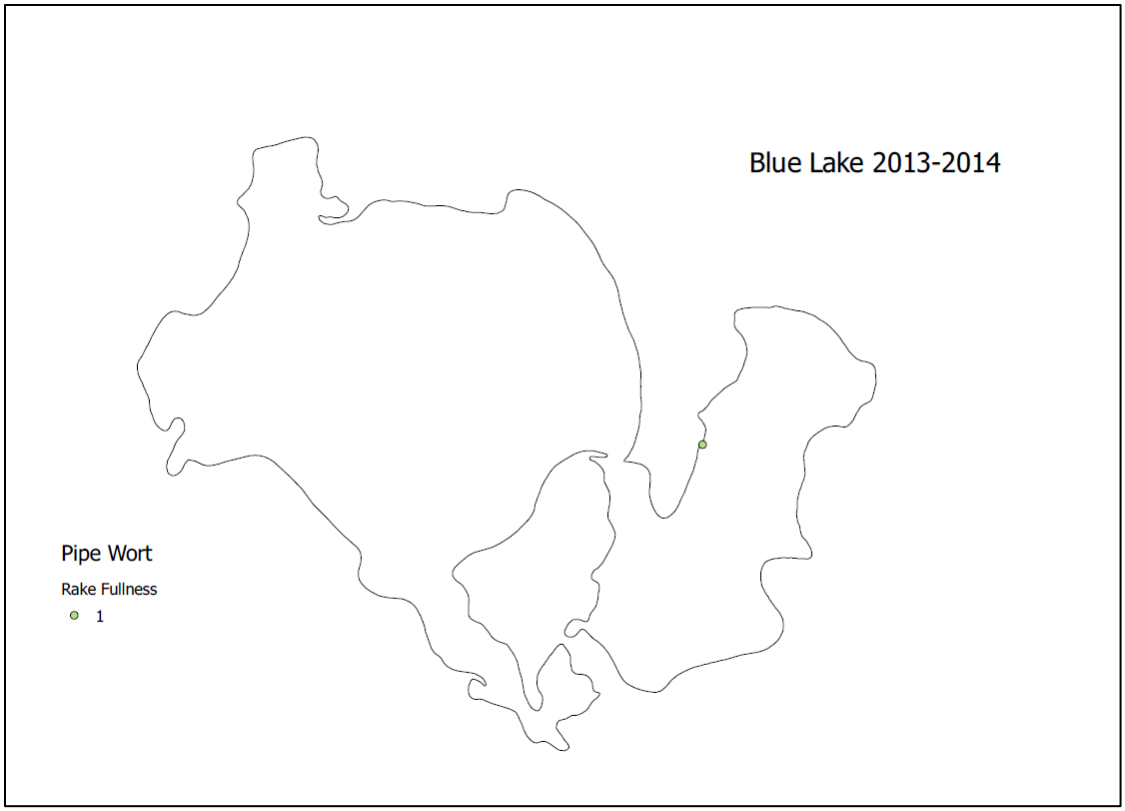

Blue Lake 2013-2014
Small Pondweed
Rake Fullness
1
2
3

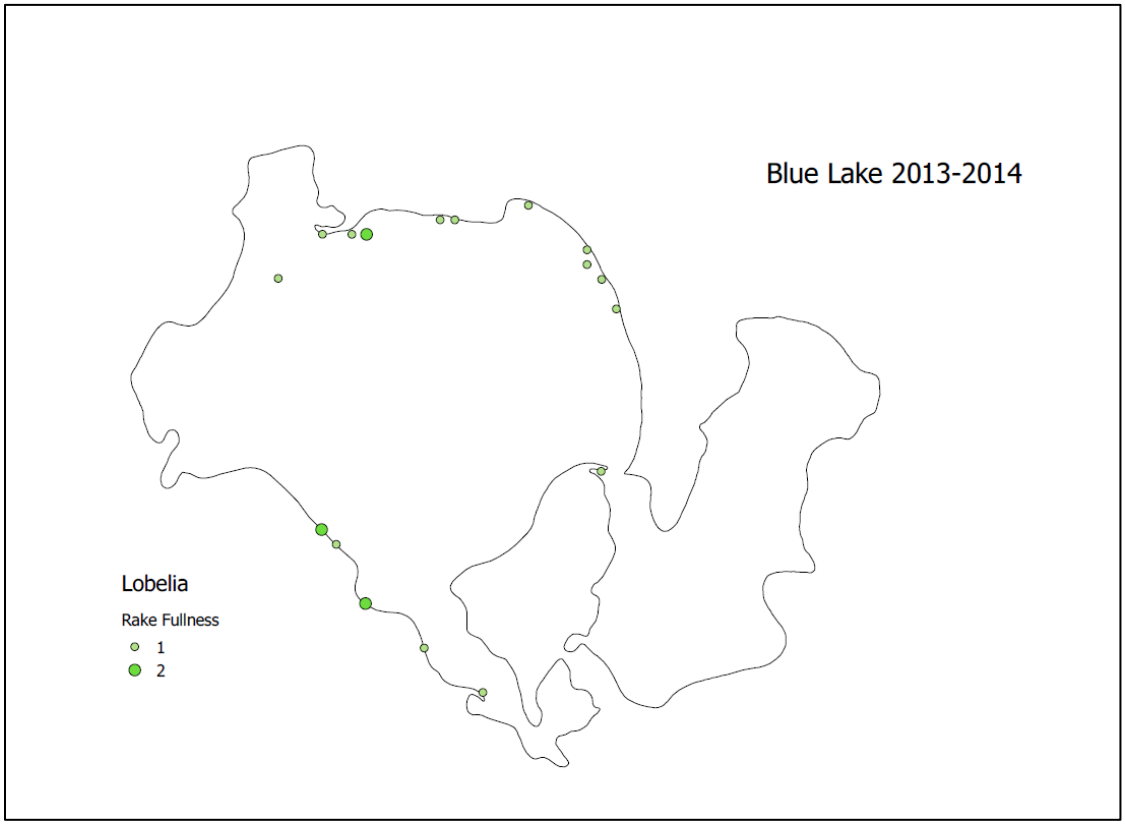

Blue Lake 2013-2014
Arrowhead
Rake Fullness
1

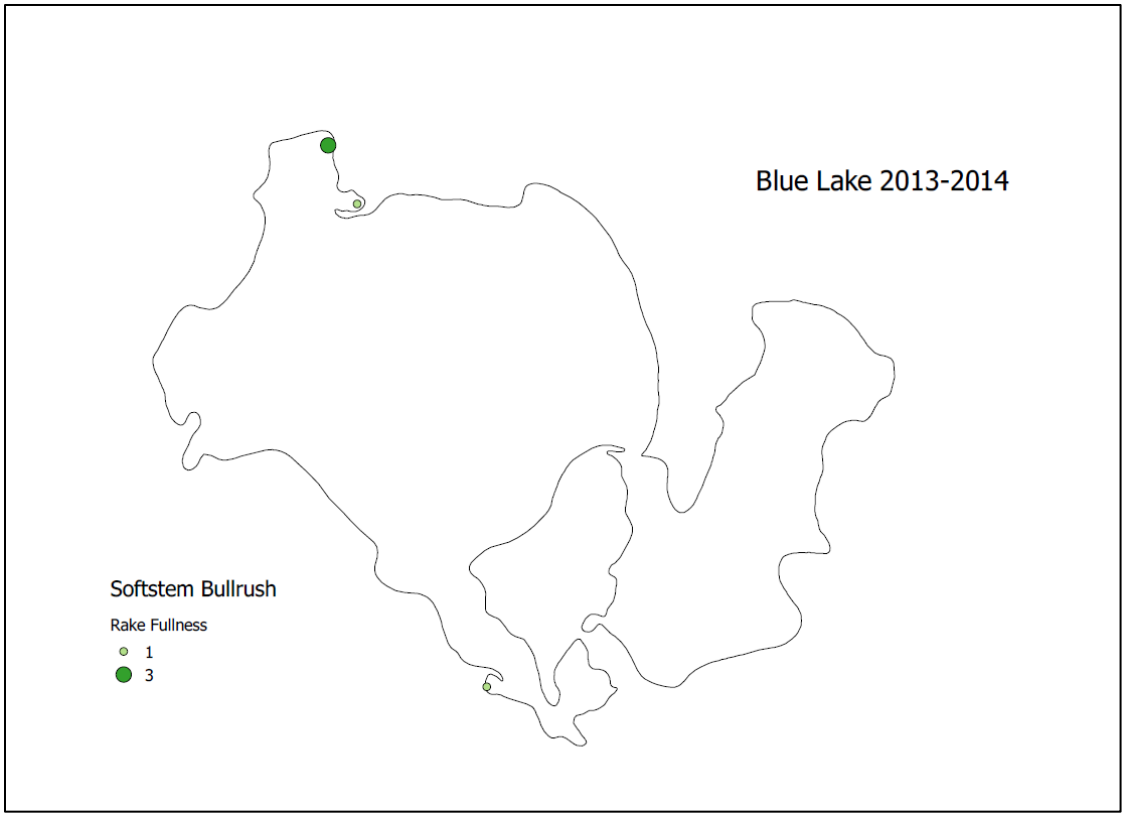

Blue Lake 2013-2014
Spatterdock
Rake Fullness
1
2

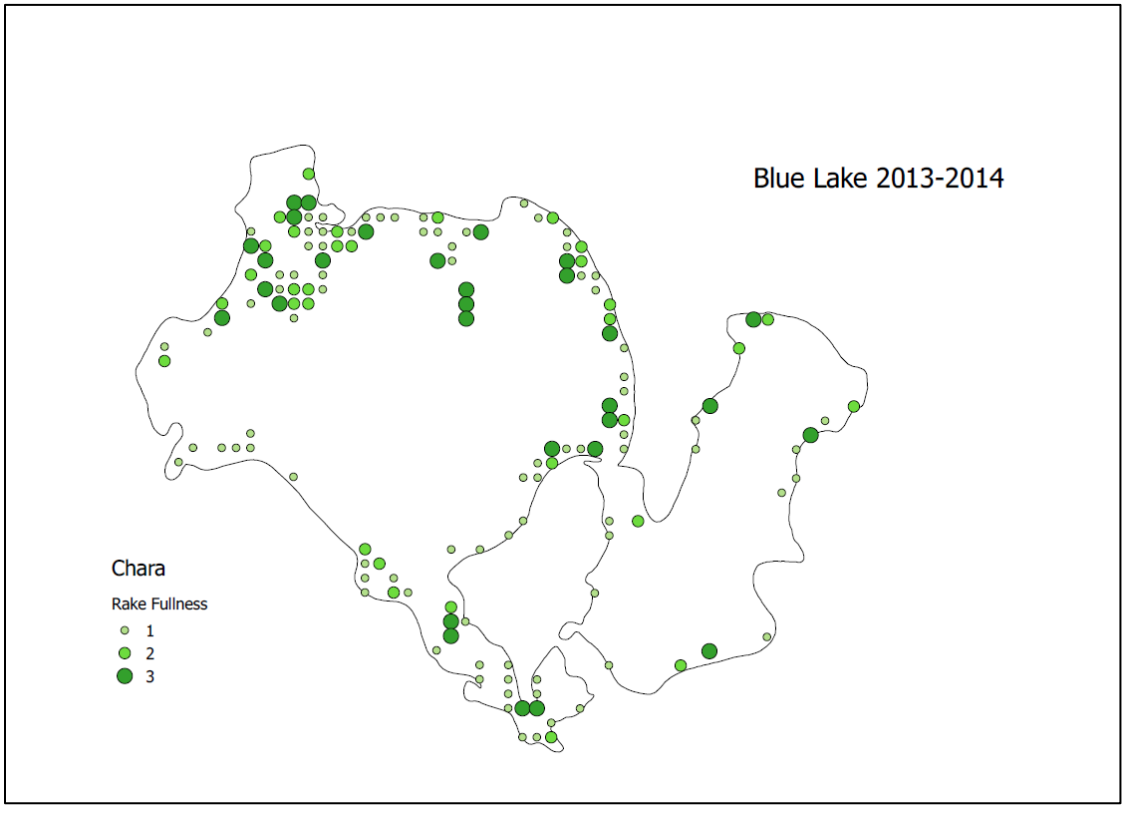

Blue Lake 2013-2014
White Water Lily
Rake Fullness
1
3

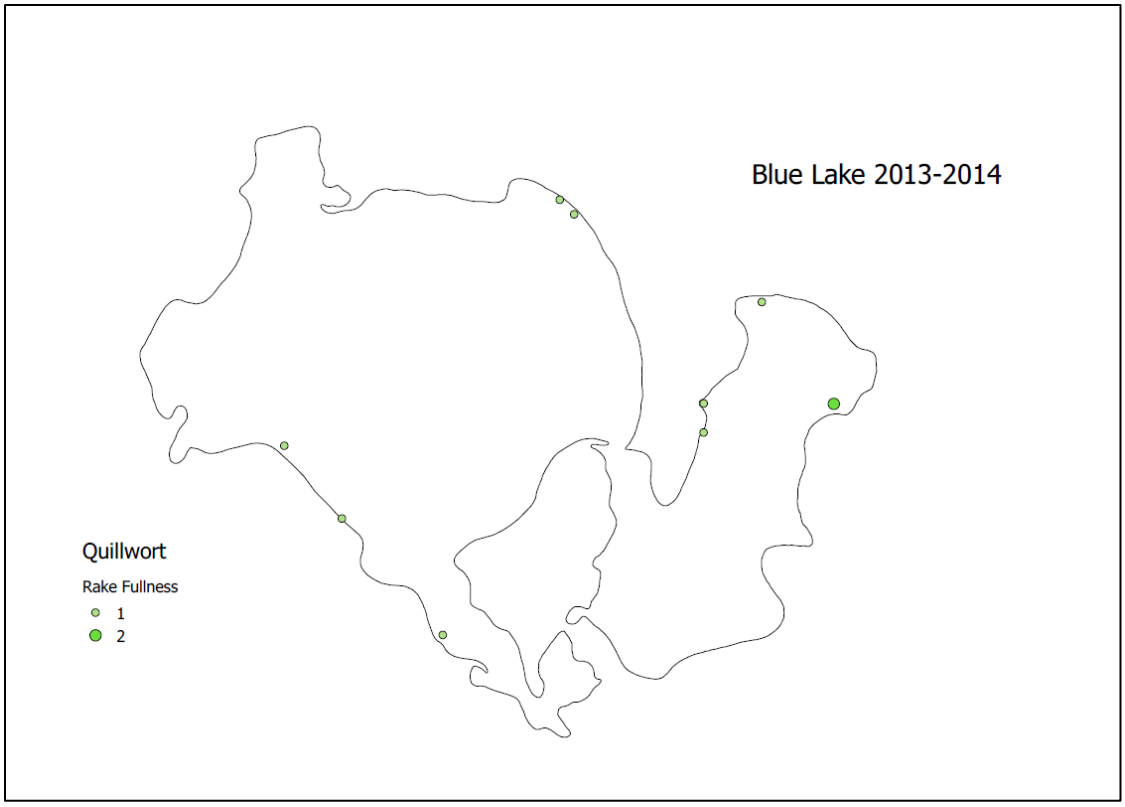

Blue Lake 2013-2014
Creeping Spearwort
Rake Fullness
1
2
3

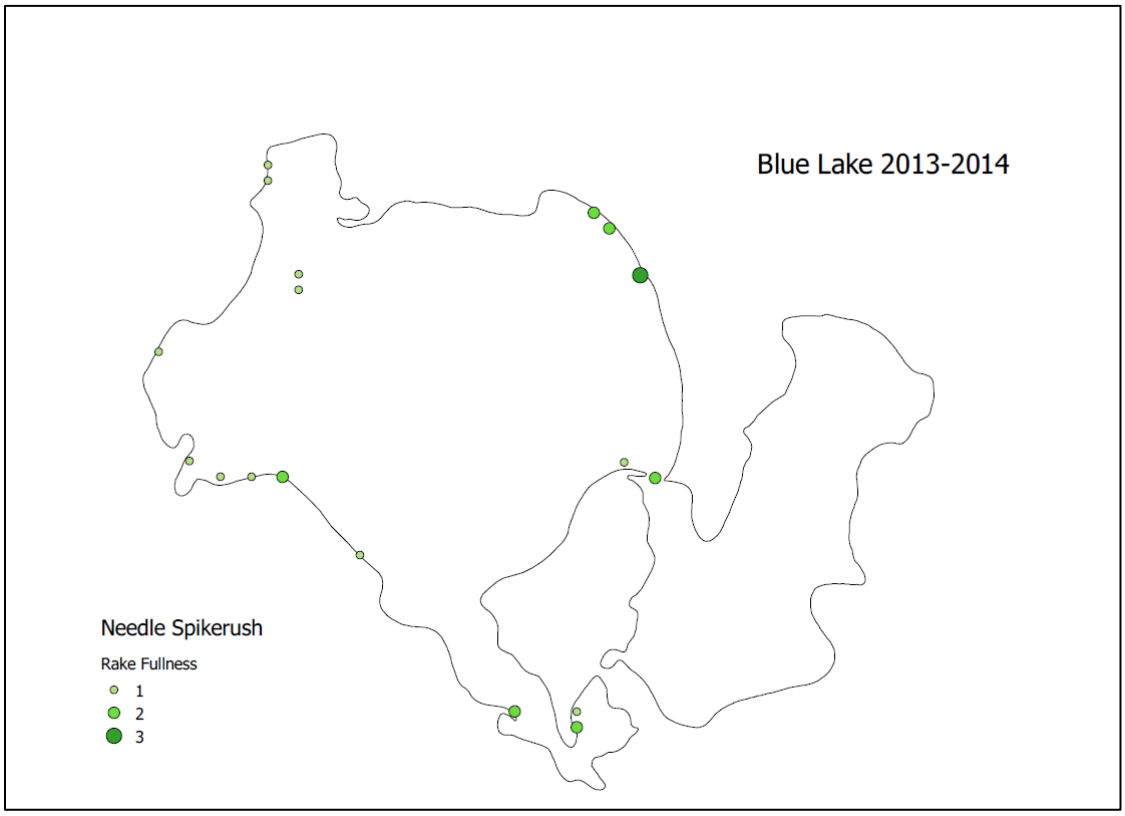

Blue Lake 2013-2014
Pipe Wort
Rake Fullness
1

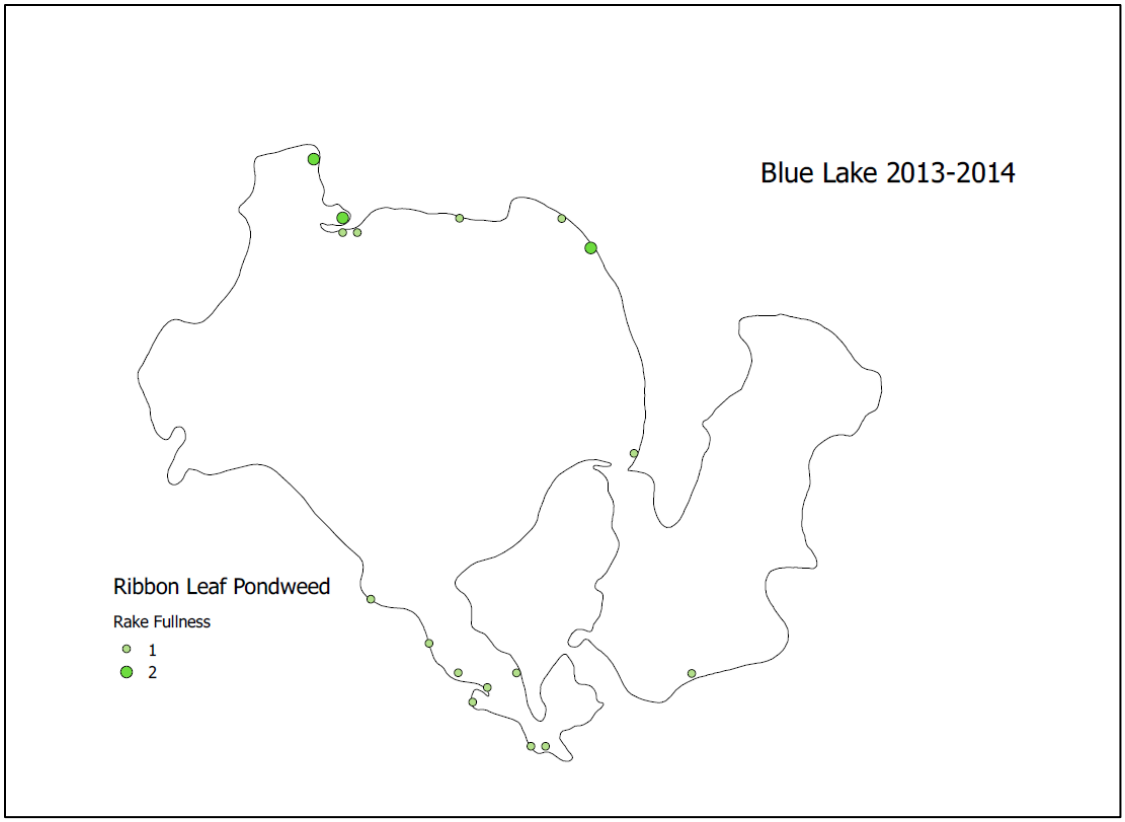

Blue Lake 2013-2014
Lobelia
Rake Fullness
1
2

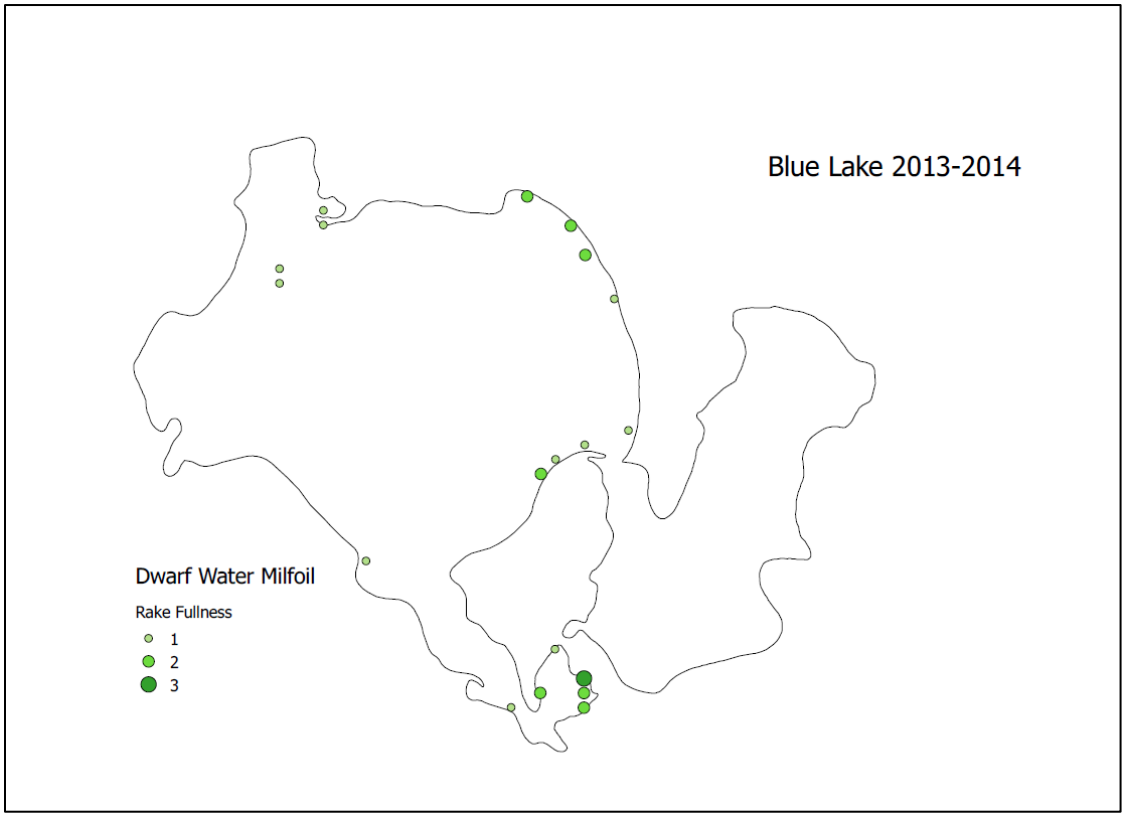

Blue Lake 2013-2014
Softstem Bullrush
Rake Fullness
1
3

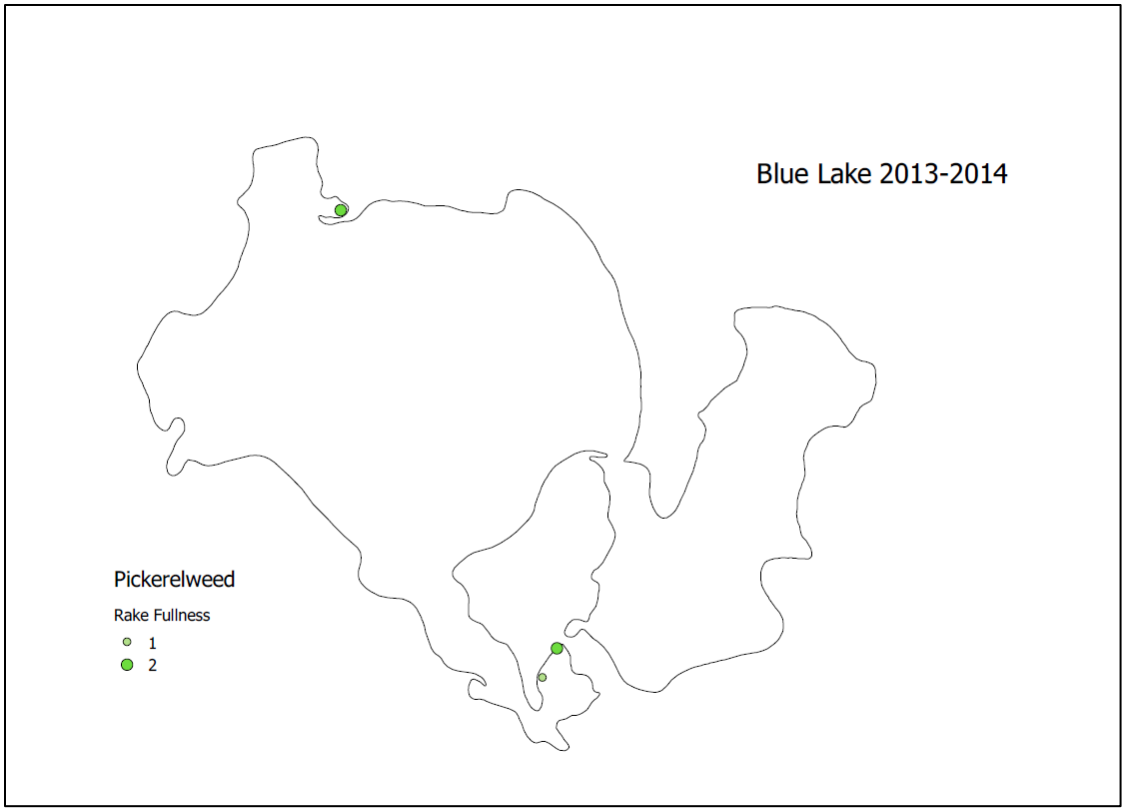

Blue Lake 2013-2014
Chara
Rake Fullness
1
2
3

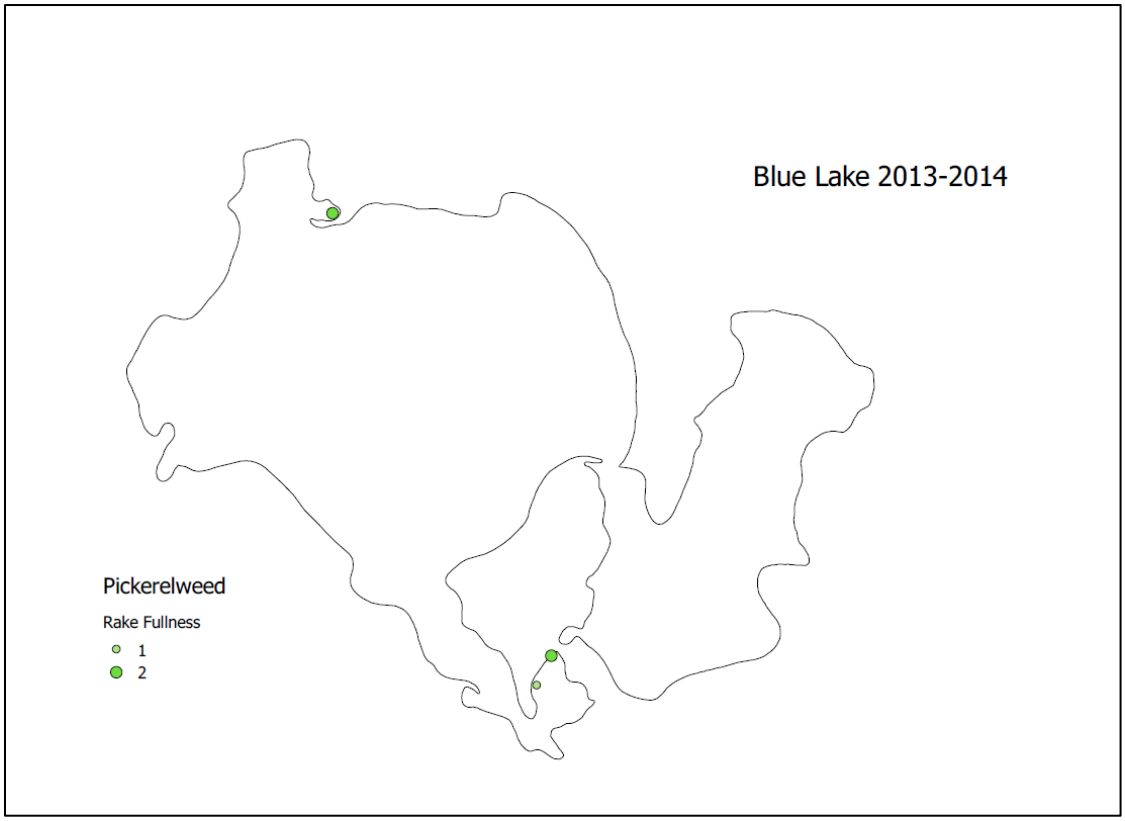

Blue Lake 2013-2014
Quillwort
Rake Fullness
1
2

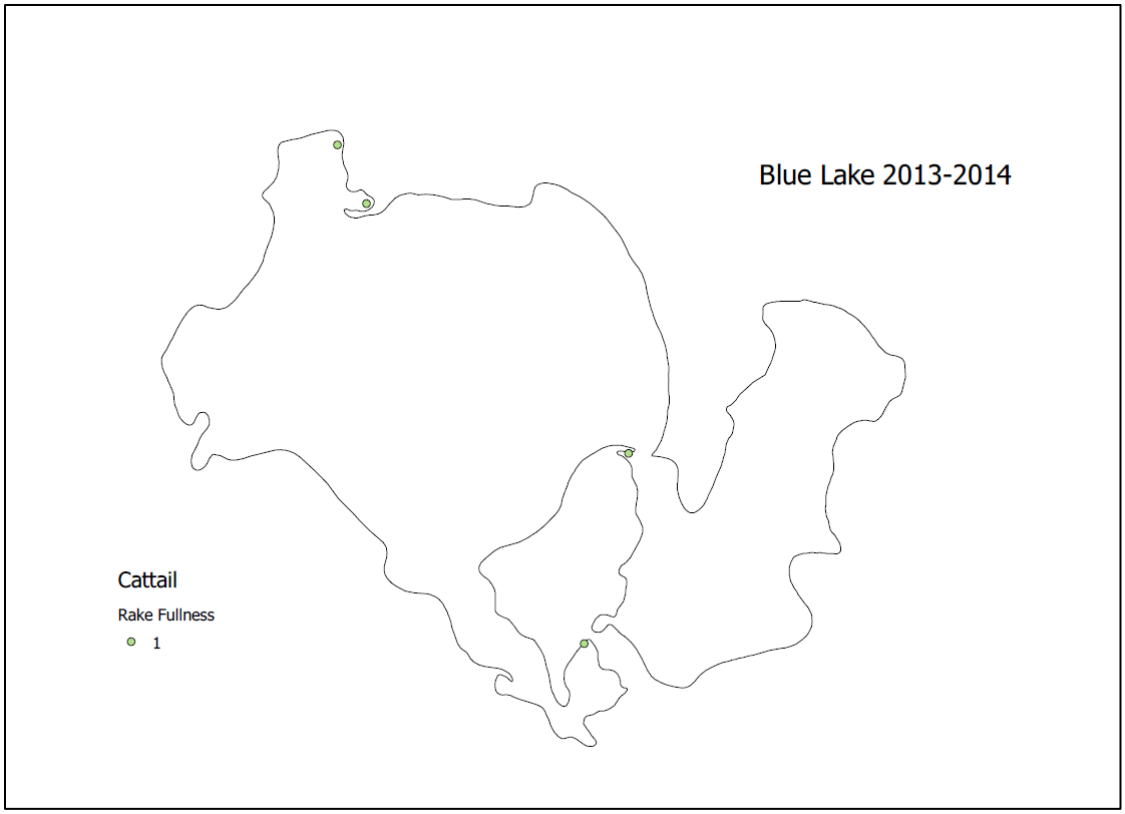

Blue Lake 2013-2014
Needle Spikerush
Rake Fullness
1
2
3

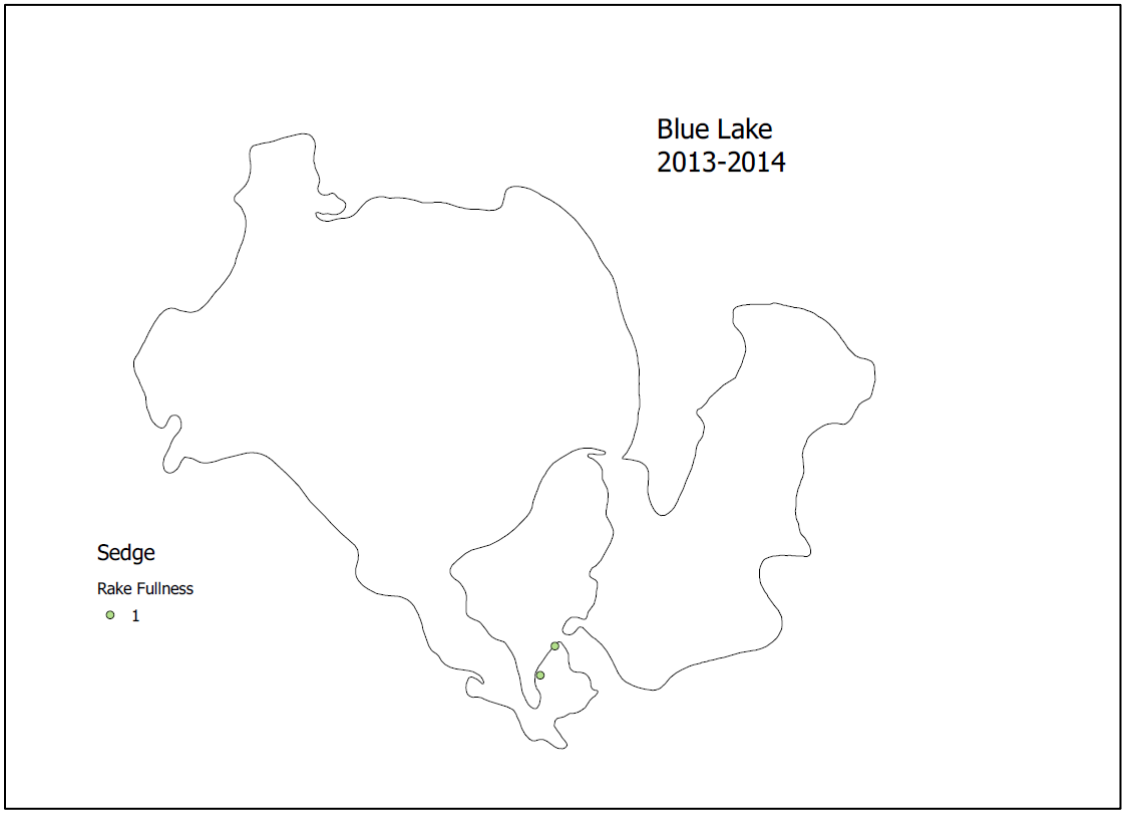

Blue Lake 2013-2014
Ribbon Leaf Pondweed
Rake Fullness
1
2

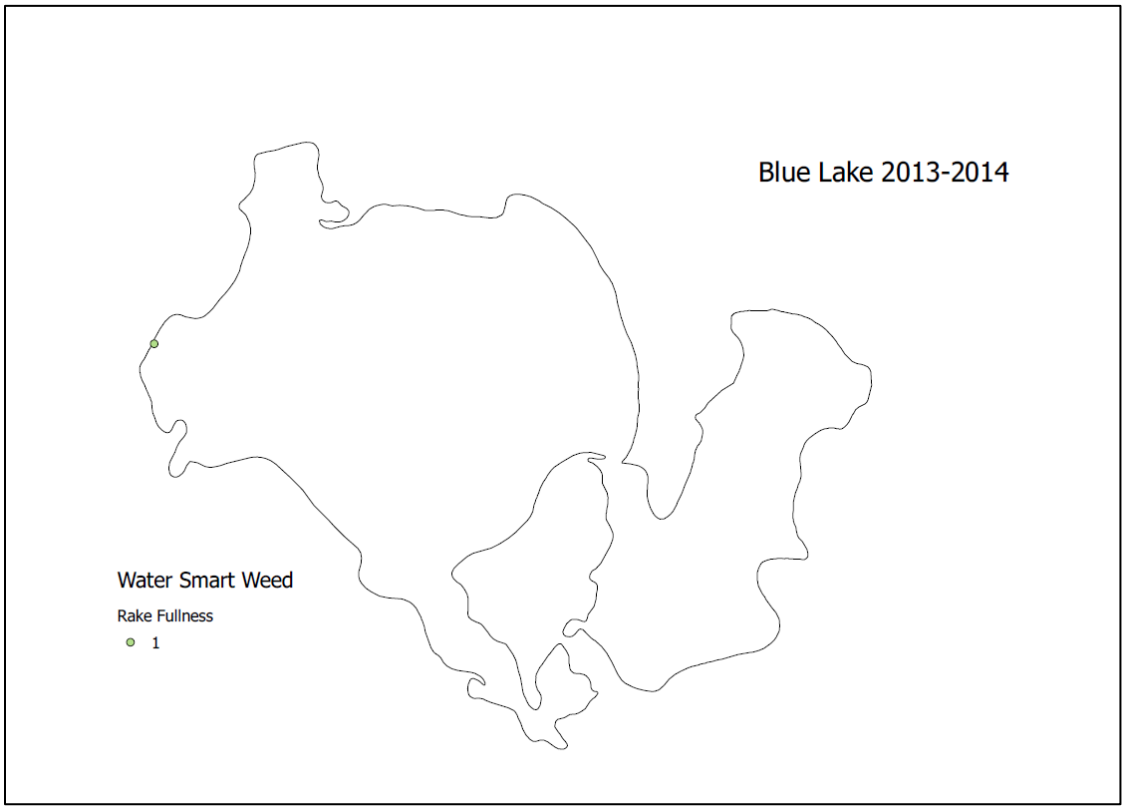

Blue Lake 2013-2014
Dwarf Water Milfoil
Rake Fullness
1
2
3


Blue Lake 2013-2014
Pickerelweed
Rake Fullness
1
2


Blue Lake 2013-2014
Pickerelweed
Rake Fullness
1
2


Blue Lake 2013-2014
Cattail
Rake Fullness
1


Blue Lake
2013-2014
Sedge
Rake Fullness
1


Blue Lake 2013-2014
Water Smart Weed
Rake Fullness
1

Part II Aquatic Plant Survey 2013-2014

Species Found at each Sampling Point

Sampling Point	Depth (ft)	Total Rake Fullness	No. of Species Found										
1	6	1	3	5	17	36							
2	8	3	1	28									
3	7	3	2	20	28								
4	8	3	2	20	28								
5	4	3	3	20	28	36							
6	7	1	1	20									
7	14	2	2	2	28								
8	15	2	2	2	14								
9	15	2	2	7	14								
10	16	3	1	14									
11	13	3	1	28									
12	9	3	2	20	28								
13	2	1	1	28									
14	11	3	2	20	28								
15	17	1	1	14									
16	17	2	1	7									
17	17	1	1	14									
18	18	1	1	14									
19	15	1	2	14	36								
21	6	1	1	5									
22	3	1	2	2	31								
23	11	2	2	20	28								
29	14	1	1	28									
31	9	3	2	2	14								
34	9	1	1	2									
37	23	3	1	14									
38	22	1	1	14									
39	23	3	1	14									
40	22	1	2	7	14								
42	14	2	3	7	14	24							
43	4	1	2	5	14								
44	8	2	1	2									
45	18	3	3	2	7	14							
46	19	1	1	7									
48	20	3	1	14									
49	20	3	1	14									
50	21	2	1	14									
52	24	1	1	14									
53	22	1	1	14									
54	15	2	2	2	7								
55	6	1	2	7	31								
56	1	1	1	36									
57	7	1	1	14									
58	14	1	1	14									
59	22	1	1	14									
60	21	2	2	14	28								
63	17	1	1	14									
64	18	1	1	14									
65	25	1	1	14									
66	25	1	1	14									
67	21	3	1	14									
68	11	1	1	2									
69	3	1	3	5	20	24							
70	2	1	4	5	7	13	29						
71	2	1	1	5									
72	7	3	2	20	28								
73	7	3	2	20	28								
74	5	1	2	2	28								
75	6	3	2	2	28								

Key	Common Name	Species
1	Bottle brush sedge	Carex comosa
2	Muskgrasses	Chara sp.
3	Waterwort	Elatine minima
4	Greater waterwort	Elatine triandra
5	Needle spikerush	Eleocharis acicularis
6	Creeping spikerush	Eleocharis palustris
7	Common waterweed	Elodea canadensis
8	Pipewort	Eriocaulon aquaticum
9	Quillwort	Isoetes sp.
10	Brown-fruited rush	Juncus pelocarpus f. submersus
11	Water lobelia	Lobelia dortmanna
12	Dwarf water-milfoil	Myriophyllum tenellum
13	Slender naiad	Najas flexilis
14	Nitella	Nitella sp.
15	Spatterdock	Nuphar variegata
16	White water lily	Nymphaea odorata
17	Water smartweed	Polygonum amphibium
18	Dotted smartweed	Polygonum punctatum
19	Pickerelweed	Pontederia cordata
20	Large-leaf pondweed	Potamogeton amplifolius
21	Ribbon-leaf pondweed	Potamogeton epihydrus
22	Leafy pondweed	Potamogeton foliosus
23	Variable pondweed	Potamogeton gramineus
24	White-stem pondweed	Potamogeton praelongus
25	Spotted pondweed	Potamogeton pulcher
26	Small pondweed	Potamogeton pusillus
27	Clasping-leaf pondweed	Potamogeton richardsonii
28	Fern pondweed	Potamogeton robbinsii
29	Creeping spearwort	Ranunculus flammula
30	Sessile-fruited arrowhead	Sagittaria rigida
31	Arrowhead	Sagittaria sp.
32	Water bulrush	Schoenoplectus subterminalis
33	Softstem bulrush	Schoenoplectus tabernaemontani
34	Floating-leaf bur-reed	Sparganium fluctuans
35	Cattail	Typha sp.
36	Wild celery	Vallisneria americana

Sampling Point	Depth (ft)	Total Rake Fullness	No. of Species Found										
76	10	3	2	24	28								
77	12	3	3	2	7	28							
79	12	2	2	2	24								
80	22	2	1	14									
81	21	2	2	7	14								
84	9	1	1	14									
85	13	3	1	14									
86	27	3	1	14									
87	27	1	1	14									
88	22	1	1	2									
89	11	1	1	2									
90	5	3	1	28									
91	7	3	1	20									
92	9	3	3	20	24	28							
93	10	3	2	28	36								
94	9	2	3	20	24	28							
95	9	2	2	14	28								
96	10	2	1	2									
97	12	3	1	2									
98	10	3	1	28									
99	7	3	1	2									
101	25	1	1	14									
102	22	1	1	28									
104	26	1	1	14									
108	29	3	1	14									
111	3	2	1	5									
112	6	3	1	28									
113	9	3	2	20	28								
114	10	3	2	20	28								
115	10	2	1	28									
116	10	3	2	2	28								
117	11	3	3	20	24	28							
119	12	3	1	28									
120	2	2	5	2	5	6	11	12					
121	6	2	4	2	5	6	12						
122	22	3	1	2									
123	23	3	1	14									
126	33	3	1	14									
128	28	1	1	14									
129	31	1	1	14									
130	33	2	1	14									
131	27	1	1	14									
133	3	1	2	9	36								
134	7	3	2	20	28								
135	9	3	2	20	28								
136	10	2	2	28	31								
137	10	3	2	2	28								
138	9	3	2	2	28								
139	10	2	2	2	28								
140	11	3	1	28									
141	13	3	1	28									
142	6	1	1	2									
143	4	2	1	2									
144	16	2	1	2									
145	18	1	1	2									
147	35	1	1	14									
148	36	1	1	14									
149	36	1	1	14									
150	35	3	1	14									

Key	Common Name	Species
1	Bottle brush sedge	Carex comosa
2	Muskgrasses	Chara sp.
3	Waterwort	Elatine minima
4	Greater waterwort	Elatine triandra
5	Needle spikerush	Eleocharis acicularis
6	Creeping spikerush	Eleocharis palustris
7	Common waterweed	Elodea canadensis
8	Pipewort	Eriocaulon aquaticum
9	Quillwort	Isoetes sp.
10	Brown-fruited rush	Juncus pelocarpus f. submersus
11	Water lobelia	Lobelia dortmanna
12	Dwarf water-milfoil	Myriophyllum tenellum
13	Slender naiad	Najas flexilis
14	Nitella	Nitella sp.
15	Spatterdock	Nuphar variegata
16	White water lily	Nymphaea odorata
17	Water smartweed	Polygonum amphibium
18	Dotted smartweed	Polygonum punctatum
19	Pickerelweed	Pontederia cordata
20	Large-leaf pondweed	Potamogeton amplifolius
21	Ribbon-leaf pondweed	Potamogeton epihydrus
22	Leafy pondweed	Potamogeton foliosus
23	Variable pondweed	Potamogeton gramineus
24	White-stem pondweed	Potamogeton praelongus
25	Spotted pondweed	Potamogeton pulcher
26	Small pondweed	Potamogeton pusillus
27	Clasping-leaf pondweed	Potamogeton richardsonii
28	Fern pondweed	Potamogeton robbinsii
29	Creeping spearwort	Ranunculus flammula
30	Sessile-fruited arrowhead	Sagittaria rigida
31	Arrowhead	Sagittaria sp.
32	Water bulrush	Schoenoplectus subterminalis
33	Softstem bulrush	Schoenoplectus tabernaemontani
34	Floating-leaf bur-reed	Sparganium fluctuans
35	Cattail	Typha sp.
36	Wild celery	Vallisneria americana

Sampling Point	Depth (ft)	Total Rake Fullness	No. of Species Found									
151	36	2	1	14								
152	36	2	1	14								
153	34	1	1	14								
154	28	1	1	14								
156	6	1	1	2								
157	3	3	6	10	20	21	30	33	35			
158	3	2	2	2	20							
159	6	3	2	22	28							
160	7	3	1	2								
161	6	2	3	2	22	28						
162	4	1	1	2								
163	9	1	1	2								
164	13	1	1	28								
165	11	3	3	7	20	24						
166	6	2	1	2								
167	12	2	1	2								
169	32	1	1	14								
170	36	3	1	14								
171	38	1	1	14								
174	39	1	1	14								
178	35	3	1	14								
181	4	2	4	2	12	20	28					
182	2	1	3	2	11	12						
183	9	1	1	2								
184	9	3	1	2								
185	12	1	2	2	7							
186	15	1	1	2								
188	26	1	1	14								
189	35	3	1	14								
202	3	2	2	10	11							
203	4	3	6	19	21	28	30	33	35			
204	5	2	3	2	10	21						
205	7	2	1	2								
218	42	1	1	14								
220	42	1	1	14								
221	40	1	1	14								
222	36	1	1	14								
223	27	1	1	14								
225	2	1	7	5	9	10	11	20	24	31		
226	2	1	5	2	10	11	21	26				
227	16	2	1	2								
231	39	2	1	14								
232	40	1	1	14								
244	39	2	1	14								
245	32	3	1	14								
246	20	1	1	14								
247	12	1	1	26								
248	3	3	2	2	10							
249	26	1	3	2	11	14						
251	32	3	1	14								
252	36	2	1	14								
253	38	3	1	14								
254	44	3	1	14								
266	43	1	1	14								
267	42	1	1	14								
268	38	2	1	14								
269	31	3	1	14								
271	9	2	2	2	20							
272	5	1	3	2	10	12						

Key	Common Name	Species
1	Bottle brush sedge	Carex comosa
2	Muskgrasses	Chara sp.
3	Waterwort	Elatine minima
4	Greater waterwort	Elatine triandra
5	Needle spikerush	Eleocharis acicularis
6	Creeping spikerush	Eleocharis palustris
7	Common waterweed	Elodea canadensis
8	Pipewort	Eriocaulon aquaticum
9	Quillwort	Isoetes sp.
10	Brown-fruited rush	Juncus pelocarpus f. submersus
11	Water lobelia	Lobelia dortmanna
12	Dwarf water-milfoil	Myriophyllum tenellum
13	Slender naiad	Najas flexilis
14	Nitella	Nitella sp.
15	Spatterdock	Nuphar variegata
16	White water lily	Nymphaea odorata
17	Water smartweed	Polygonum amphibium
18	Dotted smartweed	Polygonum punctatum
19	Pickerelweed	Pontederia cordata
20	Large-leaf pondweed	Potamogeton amplifolius
21	Ribbon-leaf pondweed	Potamogeton epihydrus
22	Leafy pondweed	Potamogeton foliosus
23	Variable pondweed	Potamogeton gramineus
24	White-stem pondweed	Potamogeton praelongus
25	Spotted pondweed	Potamogeton pulcher
26	Small pondweed	Potamogeton pusillus
27	Clasping-leaf pondweed	Potamogeton richardsonii
28	Fern pondweed	Potamogeton robbinsii
29	Creeping spearwort	Ranunculus flammula
30	Sessile-fruited arrowhead	Sagittaria rigida
31	Arrowhead	Sagittaria sp.
32	Water bulrush	Schoenoplectus subterminalis
33	Softstem bulrush	Schoenoplectus tabernaemontani
34	Floating-leaf bur-reed	Sparganium fluctuans
35	Cattail	Typha sp.
36	Wild celery	Vallisneria americana

Sampling Point	Depth (ft)	Total Rake Fullness	No. of Species Found									
273	5	1	3	2	10	24						
274	2	2	4	2	10	11	21					
275	8	1	4	2	7	20	24					
276	30	2	1	14								
277	34	1	1	14								
278	35	1	1	14								
279	37	1	1	14								
280	39	1	1	14								
295	40	1	1	14								
296	35	1	1	14								
297	28	1	1	14								
298	24	1	1	14								
299	18	2	1	2								
301	6	3	2	10	24							
302	13	1	3	2	13	20						
303	32	1	1	14								
304	33	3	1	14								
305	37	1	1	14								
306	40	1	1	14								
322	39	1	1	14								
327	11	1	2	2	24							
328	5	2	2	2	10							
329	10	1	3	13	20	24						
330	27	1	1	14								
331	28	1	1	14								
333	39	2	1	14								
334	40	3	1	14								
336	42	1	1	14								
348	41	1	1	14								
350	38	2	1	14								
351	35	2	1	14								
352	33	2	1	14								
355	8	1	4	2	13	20	24					
356	10	1	2	2	20							
357	21	1	2	2	14							
359	32	1	1	14								
360	38	2	1	14								
374	43	1	1	14								
378	37	1	1	14								
379	35	1	1	14								
381	27	2	1	14								
382	24	2	1	14								
383	16	1	1	7								
384	9	1	1	28								
385	2	3	6	10	11	13	21	26	31			
386	6	2	3	2	10	11						
387	23	1	2	2	14							
388	20	1	1	14								
389	18	3	2	2	14							
390	35	3	1	14								
391	36	1	1	14								
392	38	1	1	14								
408	39	1	1	14								
409	33	1	1	14								
411	25	3	1	14								
412	28	2	1	14								
413	28	1	1	14								
414	27	3	1	14								
416	2	1	3	2	9	13						

Key	Common Name	Species
1	Bottle brush sedge	Carex comosa
2	Muskgrasses	Chara sp.
3	Waterwort	Elatine minima
4	Greater waterwort	Elatine triandra
5	Needle spikerush	Eleocharis acicularis
6	Creeping spikerush	Eleocharis palustris
7	Common waterweed	Elodea canadensis
8	Pipewort	Eriocaulon aquaticum
9	Quillwort	Isoetes sp.
10	Brown-fruited rush	Juncus pelocarpus f. submersus
11	Water lobelia	Lobelia dortmanna
12	Dwarf water-milfoil	Myriophyllum tenellum
13	Slender naiad	Najas flexilis
14	Nitella	Nitella sp.
15	Spatterdock	Nuphar variegata
16	White water lily	Nymphaea odorata
17	Water smartweed	Polygonum amphibium
18	Dotted smartweed	Polygonum punctatum
19	Pickerelweed	Pontederia cordata
20	Large-leaf pondweed	Potamogeton amplifolius
21	Ribbon-leaf pondweed	Potamogeton epihydrus
22	Leafy pondweed	Potamogeton foliosus
23	Variable pondweed	Potamogeton gramineus
24	White-stem pondweed	Potamogeton praelongus
25	Spotted pondweed	Potamogeton pulcher
26	Small pondweed	Potamogeton pusillus
27	Clasping-leaf pondweed	Potamogeton richardsonii
28	Fern pondweed	Potamogeton robbinsii
29	Creeping spearwort	Ranunculus flammula
30	Sessile-fruited arrowhead	Sagittaria rigida
31	Arrowhead	Sagittaria sp.
32	Water bulrush	Schoenoplectus subterminalis
33	Softstem bulrush	Schoenoplectus tabernaemontani
34	Floating-leaf bur-reed	Sparganium fluctuans
35	Cattail	Typha sp.
36	Wild celery	Vallisneria americana

Sampling Point	Depth (ft)	Total Rake Fullness	No. of Species Found										
417	2	1	6	3	10	11	13	21	29				
418	20	3	1	14									
419	17	1	1	2									
420	20	1	1	2									
421	28	2	1	14									
422	29	1	1	14									
423	30	1	1	14									
424	35	1	1	14									
439	36	3	1	14									
440	16	1	1	2									
443	17	2	1	2									
444	26	3	1	2									
445	27	3	1	2									
446	22	1	1	28									
447	8	1	2	10	21								
448	9	1	2	2	20								
449	13	3	2	14	24								
450	22	3	1	14									
451	24	3	1	14									
452	21	3	1	2									
453	21	3	1	2									
454	26	3	1	2									
455	36	1	1	14									
469	33	3	1	14									
470	7	2	2	7	14								
471	3	2	3	2	4	10							
472	27	1	1	14									
475	2	3	7	16	21	24	26	28	33	34			
476	6	3	3	2	20	24							
477	22	1	1	14									
478	34	2	1	14									
479	30	1	1	14									
480	23	3	1	14									
481	24	1	1	14									
482	27	2	1	14									
486	45	1	1	14									
498	7	1	1	2									
501	13	1	2	2	20								
502	3	2	7	2	5	10	11	13	21	29			
503	5	3	2	20	28								
504	22	3	1	14									
506	40	1	1	14									
507	39	1	1	14									
508	36	3	1	14									
509	36	3	1	14									
510	38	2	1	14									
524	38	3	1	14									
525	23	1	1	27									
526	9	1	2	20	27								
528	12	2	1	27									
529	9	2	2	24	27								
530	13	3	3	20	24	27							
531	26	2	1	14									
532	37	1	1	14									
533	41	1	1	14									
534	41	1	1	14									
535	39	1	1	14									
536	39	3	1	14									
537	40	1	1	14									

Key	Common Name	Species
1	Bottle brush sedge	Carex comosa
2	Muskgrasses	Chara sp.
3	Waterwort	Elatine minima
4	Greater waterwort	Elatine triandra
5	Needle spikerush	Eleocharis acicularis
6	Creeping spikerush	Eleocharis palustris
7	Common waterweed	Elodea canadensis
8	Pipewort	Eriocaulon aquaticum
9	Quillwort	Isoetes sp.
10	Brown-fruited rush	Juncus pelocarpus f. submersus
11	Water lobelia	Lobelia dortmanna
12	Dwarf water-milfoil	Myriophyllum tenellum
13	Slender naiad	Najas flexilis
14	Nitella	Nitella sp.
15	Spatterdock	Nuphar variegata
16	White water lily	Nymphaea odorata
17	Water smartweed	Polygonum amphibium
18	Dotted smartweed	Polygonum punctatum
19	Pickerelweed	Pontederia cordata
20	Large-leaf pondweed	Potamogeton amplifolius
21	Ribbon-leaf pondweed	Potamogeton epihydrus
22	Leafy pondweed	Potamogeton foliosus
23	Variable pondweed	Potamogeton gramineus
24	White-stem pondweed	Potamogeton praelongus
25	Spotted pondweed	Potamogeton pulcher
26	Small pondweed	Potamogeton pusillus
27	Clasping-leaf pondweed	Potamogeton richardsonii
28	Fern pondweed	Potamogeton robbinsii
29	Creeping spearwort	Ranunculus flammula
30	Sessile-fruited arrowhead	Sagittaria rigida
31	Arrowhead	Sagittaria sp.
32	Water bulrush	Schoenoplectus subterminalis
33	Softstem bulrush	Schoenoplectus tabernaemontani
34	Floating-leaf bur-reed	Sparganium fluctuans
35	Cattail	Typha sp.
36	Wild celery	Vallisneria americana

Sampling Point	Depth (ft)	Total Rake Fullness	No. of Species Found									
538	40	1	1	14								
539	40	1	1	14								
543	43	1	1	14								
553	4	2	5	2	10	20	24	28				
554	7	1	2	2	21							
555	8	1	1	2								
556	10	1	2	2	28							
557	2	1	4	2	3	10	12					
558	4	2	9	2	10	11	12	20	24	28	29	36
559	27	3	1	14								
561	41	1	1	14								
562	41	1	1	14								
563	40	2	1	14								
564	40	1	1	14								
565	40	1	1	14								
566	40	1	1	14								
567	40	1	1	14								
572	40	1	1	14								
577	28	1	1	2								
580	2	1	3	2	26	28						
581	4	3	3	2	20	28						
582	7	3	3	20	24	28						
583	2	1	8	2	10	13	20	21	24	28	36	
584	25	1	4	2	13	20	24					
585	33	3	1	14								
586	37	1	1	14								
587	40	1	1	14								
590	41	1	1	14								
591	40	1	1	14								
592	41	1	1	14								
601	21	1	2	2	14							
602	8	2	3	2	10	12						
603	3	3	7	1	2	5	15	19	20	28		
604	3	3	7	2	5	10	12	20	28	31		
605	4	3	4	2	7	20	28					
606	7	2	1	28								
607	2	1	4	2	10	21	29					
608	3	2	6	2	5	9	21	26	36			
609	15	2	2	7	27							
610	23	3	1	14								
611	34	3	1	14								
613	42	1	1	14								
614	41	1	1	14								
616	42	1	1	14								
618	35	1	1	14								
619	38	1	1	14								
622	43	1	1	14								
623	40	1	1	14								
624	20	3	1	2								
625	4	2	3	2	10	12						
626	2	1	6	1	10	12	15	19	35			
627	6	3	1	27								
628	7	3	1	27								
629	6	3	1	27								
630	6	3	2	20	27							
631	2	3	4	2	10	20	27					
632	3	3	7	2	10	16	20	24	27	31		
633	2	2	7	2	3	5	9	12	20	26		
634	12	3	6	2	7	20	24	27	36			

Key	Common Name	Species
1	Bottle brush sedge	Carex comosa
2	Muskgrasses	Chara sp.
3	Waterwort	Elatine minima
4	Greater waterwort	Elatine triandra
5	Needle spikerush	Eleocharis acicularis
6	Creeping spikerush	Eleocharis palustris
7	Common waterweed	Elodea canadensis
8	Pipewort	Eriocaulon aquaticum
9	Quillwort	Isoetes sp.
10	Brown-fruited rush	Juncus pelocarpus f. submersus
11	Water lobelia	Lobelia dortmanna
12	Dwarf water-milfoil	Myriophyllum tenellum
13	Slender naiad	Najas flexilis
14	Nitella	Nitella sp.
15	Spatterdock	Nuphar variegata
16	White water lily	Nymphaea odorata
17	Water smartweed	Polygonum amphibium
18	Dotted smartweed	Polygonum punctatum
19	Pickerelweed	Pontederia cordata
20	Large-leaf pondweed	Potamogeton amplifolius
21	Ribbon-leaf pondweed	Potamogeton epihydrus
22	Leafy pondweed	Potamogeton foliosus
23	Variable pondweed	Potamogeton gramineus
24	White-stem pondweed	Potamogeton praelongus
25	Spotted pondweed	Potamogeton pulcher
26	Small pondweed	Potamogeton pusillus
27	Clasping-leaf pondweed	Potamogeton richardsonii
28	Fern pondweed	Potamogeton robbinsii
29	Creeping spearwort	Ranunculus flammula
30	Sessile-fruited arrowhead	Sagittaria rigida
31	Arrowhead	Sagittaria sp.
32	Water bulrush	Schoenoplectus subterminalis
33	Softstem bulrush	Schoenoplectus tabernaemontani
34	Floating-leaf bur-reed	Sparganium fluctuans
35	Cattail	Typha sp.
36	Wild celery	Vallisneria americana

Sampling Point	Depth (ft)	Total Rake Fullness	No. of Species Found										
635	19	3	1	2									
636	29	3	1	2									
637	39	1	1	14									
647	36	1	1	14									
648	8	1	1	2									
649	2	3	8	7	15	16	20	24	25	28	31		
650	6	3	1	28									
651	6	3	1	28									
652	5	3	5	7	16	22	28	31					
653	2	2	7	2	11	20	21	24	28	29			
654	8	2	6	2	10	11	12	20	24				
655	14	1	2	2	24								
662	41	1	1	14									
666	37	1	1	14									
667	6	1	3	2	5	12							
668	3	3	4	12	20	28	34						
669	5	3	3	7	12	20							
670	2	3	8	2	7	10	12	16	18	22	28		
671	2	3	5	2	5	10	11	29					
672	11	1	3	2	20	28							
673	25	3	1	14									
674	33	3	1	14									
680	35	3	1	14									
681	28	3	1	14									
683	12	3	1	2									
684	4	3	10	6	10	11	15	20	24	26	28	29	35
685	3	3	4	14	20	24	28						
686	4	1	2	2	26								
688	11	3	3	7	24	28							
689	8	2	2	7	28								
690	3	2	5	2	10	11	12	29					
691	6	2	3	2	13	24							
692	12	3	3	2	20	24							
694	34	1	1	14									
695	36	2	1	14									
696	34	1	1	14									
697	26	3	1	2									
698	15	3	1	2									
699	15	1	3	20	24	28							
700	13	3	3	20	24	28							
701	2	2	3	5	6	36							
703	10	2	2	20	28								
704	12	3	1	28									
705	7	3	3	2	20	28							
706	2	1	2	2	20								
707	8	3	2	20	28								
708	16	3	2	7	28								
709	16	3	1	28									
710	14	3	1	28									
711	13	3	1	28									
712	14	3	1	28									
713	16	3	1	28									
714	11	3	2	24	28								
715	3	3	5	2	7	20	24	28					
716	6	1	1	2									
717	12	1	1	28									
718	13	1	4	2	24	28	36						
719	7	1	4	2	7	13	28						
720	8	2	3	7	20	28							

Key	Common Name	Species
1	Bottle brush sedge	Carex comosa
2	Muskgrasses	Chara sp.
3	Waterwort	Elatine minima
4	Greater waterwort	Elatine triandra
5	Needle spikerush	Eleocharis acicularis
6	Creeping spikerush	Eleocharis palustris
7	Common waterweed	Elodea canadensis
8	Pipewort	Eriocaulon aquaticum
9	Quillwort	Isoetes sp.
10	Brown-fruited rush	Juncus pelocarpus f. submersus
11	Water lobelia	Lobelia dortmanna
12	Dwarf water-milfoil	Myriophyllum tenellum
13	Slender naiad	Najas flexilis
14	Nitella	Nitella sp.
15	Spatterdock	Nuphar variegata
16	White water lily	Nymphaea odorata
17	Water smartweed	Polygonum amphibium
18	Dotted smartweed	Polygonum punctatum
19	Pickerelweed	Pontederia cordata
20	Large-leaf pondweed	Potamogeton amplifolius
21	Ribbon-leaf pondweed	Potamogeton epihydrus
22	Leafy pondweed	Potamogeton foliosus
23	Variable pondweed	Potamogeton gramineus
24	White-stem pondweed	Potamogeton praelongus
25	Spotted pondweed	Potamogeton pulcher
26	Small pondweed	Potamogeton pusillus
27	Clasping-leaf pondweed	Potamogeton richardsonii
28	Fern pondweed	Potamogeton robbinsii
29	Creeping spearwort	Ranunculus flammula
30	Sessile-fruited arrowhead	Sagittaria rigida
31	Arrowhead	Sagittaria sp.
32	Water bulrush	Schoenoplectus subterminalis
33	Softstem bulrush	Schoenoplectus tabernaemontani
34	Floating-leaf bur-reed	Sparganium fluctuans
35	Cattail	Typha sp.
36	Wild celery	Vallisneria americana

Sampling Point	Depth (ft)	Total Rake Fullness	No. of Species Found										
721	7	2	1	2									
722	6	1	5	2	10	12	26	28					
723	2	1	3	2	13	21							
724	9	3	1	28									
725	11	3	1	28									
726	15	2	3	7	24	28							
727	20	2	2	14	24								
729	22	1	1	7									
731	22	3	2	7	28								
732	20	2	2	7	28								
733	17	3	2	7	28								
734	17	3	3	7	14	28							
735	21	1	2	7	28								
736	19	1	1	28									
737	11	3	2	24	28								
738	5	3	3	20	24	28							
739	7	3	4	7	20	24	28						
740	6	3	3	20	24	28							
741	8	3	4	14	20	28	36						
742	17	3	5	2	13	20	28	36					
743	22	1	1	14									
751	22	1	1	28									
752	16	3	1	28									
753	8	3	3	7	24	28							
754	3	2	4	7	13	14	28						
755	23	1	1	14									
764	14	3	2	7	24								
766	10	3	5	7	13	14	20	28					
769	26	1	1	7									
775	19	3	3	7	14	24							
776	10	2	2	13	14								
777	2	3	3	13	24	26							
778	8	3	2	7	14								
779	23	1	1	14									
789	16	3	2	7	28								
790	4	3	6	2	13	20	21	24	28				
791	4	3	6	2	7	9	20	28	36				
792	11	3	8	2	8	9	13	20	23	26	28		
793	18	3	4	14	20	24	28						
794	22	2	3	7	14	28							
806	22	1	1	7									
807	4	3	6	7	13	20	24	26	28				
808	10	3	4	2	10	20	28						
825	18	3	3	2	13	26							
826	14	3	2	7	28								
836	15	3	1	28									
844	11	2	2	7	28								
845	6	1	3	14	20	36							
846	16	1	2	7	14								
847	9	2	3	2	26	28							
848	2	1	1	26									
849	14	2	1	28									
867	23	1	2	7	28								
868	11	1	1	28									
869	14	3	4	2	9	20	28						
884	18	3	2	7	28								
891	24	2	1	7									
892	11	3	2	24	28								
893	13	3	3	2	28	36							

Key	Common Name	Species
1	Bottle brush sedge	Carex comosa
2	Muskgrasses	Chara sp.
3	Waterwort	Elatine minima
4	Greater waterwort	Elatine triandra
5	Needle spikerush	Eleocharis acicularis
6	Creeping spikerush	Eleocharis palustris
7	Common waterweed	Elodea canadensis
8	Pipewort	Eriocaulon aquaticum
9	Quillwort	Isoetes sp.
10	Brown-fruited rush	Juncus pelocarpus f. submersus
11	Water lobelia	Lobelia dortmanna
12	Dwarf water-milfoil	Myriophyllum tenellum
13	Slender naiad	Najas flexilis
14	Nitella	Nitella sp.
15	Spatterdock	Nuphar variegata
16	White water lily	Nymphaea odorata
17	Water smartweed	Polygonum amphibium
18	Dotted smartweed	Polygonum punctatum
19	Pickerelweed	Pontederia cordata
20	Large-leaf pondweed	Potamogeton amplifolius
21	Ribbon-leaf pondweed	Potamogeton epihydrus
22	Leafy pondweed	Potamogeton foliosus
23	Variable pondweed	Potamogeton gramineus
24	White-stem pondweed	Potamogeton praelongus
25	Spotted pondweed	Potamogeton pulcher
26	Small pondweed	Potamogeton pusillus
27	Clasping-leaf pondweed	Potamogeton richardsonii
28	Fern pondweed	Potamogeton robbinsii
29	Creeping spearwort	Ranunculus flammula
30	Sessile-fruited arrowhead	Sagittaria rigida
31	Arrowhead	Sagittaria sp.
32	Water bulrush	Schoenoplectus subterminalis
33	Softstem bulrush	Schoenoplectus tabernaemontani
34	Floating-leaf bur-reed	Sparganium fluctuans
35	Cattail	Typha sp.
36	Wild celery	Vallisneria americana

Sampling Point	Depth (ft)	Total Rake Fullness	No. of Species Found									
906	19	1	1	14								
907	18	1	1	7								
908	16	3	1	28								
909	16	2	1	28								
910	15	3	1	28								
911	12	3	4	2	7	24	28					
912	12	3	4	7	10	28	36					
924	19	1	1	2								
925	15	1	1	14								
926	16	1	1	28								
927	15	1	1	28								
928	15	2	1	28								
929	3	3	7	7	10	14	20	28	29	36		
938	5	3	3	2	10	20						
939	4	1	2	2	7							
940	6	3	3	7	20	28						
941	3	3	5	3	10	20	26	29				
942	26	1	1	7								
946	22	3	1	7								
947	16	2	2	7	14							
948	4	3	7	2	7	10	20	28	29	36		
949	9	1	2	10	14							
953	14	2	2	7	28							
954	6	3	5	2	7	9	14	29				
957	9	3	3	14	28	29						
958	8	3	4	7	14	20	28					
959	7	3	4	7	20	24	28					
960	11	3	5	7	28	29	32	36				
961	8	3	5	7	20	24	28	29				
962	5	3	4	2	7	10	14					

Key	Common Name	Species
1	Bottle brush sedge	Carex comosa
2	Muskgrasses	Chara sp.
3	Waterwort	Elatine minima
4	Greater waterwort	Elatine triandra
5	Needle spikerush	Eleocharis acicularis
6	Creeping spikerush	Eleocharis palustris
7	Common waterweed	Elodea canadensis
8	Pipewort	Eriocaulon aquaticum
9	Quillwort	Isoetes sp.
10	Brown-fruited rush	Juncus pelocarpus f. submersus
11	Water lobelia	Lobelia dortmanna
12	Dwarf water-milfoil	Myriophyllum tenellum
13	Slender naiad	Najas flexilis
14	Nitella	Nitella sp.
15	Spatterdock	Nuphar variegata
16	White water lily	Nymphaea odorata
17	Water smartweed	Polygonum amphibium
18	Dotted smartweed	Polygonum punctatum
19	Pickerelweed	Pontederia cordata
20	Large-leaf pondweed	Potamogeton amplifolius
21	Ribbon-leaf pondweed	Potamogeton epihydrus
22	Leafy pondweed	Potamogeton foliosus
23	Variable pondweed	Potamogeton gramineus
24	White-stem pondweed	Potamogeton praelongus
25	Spotted pondweed	Potamogeton pulcher
26	Small pondweed	Potamogeton pusillus
27	Clasping-leaf pondweed	Potamogeton richardsonii
28	Fern pondweed	Potamogeton robbinsii
29	Creeping spearwort	Ranunculus flammula
30	Sessile-fruited arrowhead	Sagittaria rigida
31	Arrowhead	Sagittaria sp.
32	Water bulrush	Schoenoplectus subterminalis
33	Softstem bulrush	Schoenoplectus tabernaemontani
34	Floating-leaf bur-reed	Sparganium fluctuans
35	Cattail	Typha sp.
36	Wild celery	Vallisneria americana

Part III Aquatic Plant Survey 2013-2014

Floristic Quality Index (FQI)

Floristic Quality Index (FQI) West Lobe				
Species	**Common Name**	**C**	**Present?**	**FQI**
Carex comosa	Bottle brush sedge	5	Y	5
Chara	Muskgrasses	7	Y	7
Elatine minima	Waterwort	9	Y	9
Eleocharis acicularis	Needle spikerush	5	Y	5
Eleocharis palustris	Creeping spikerush	6	Y	6
Elodea canadensis	Common waterweed	3	Y	3
Eriocaulon aquaticum	Pipewort	9	Y	9
Isoetes sp.	Quillwort	8	Y	8
Juncus pelocarpus f. submersus	Brown-fruited rush	8	Y	8
Lobelia dortmanna	Water lobelia	10	Y	10
Myriophyllum tenellum	Dwarf water-milfoil	10	Y	10
Najas flexilis	Slender naiad	6	Y	6
Nitella	Nitella	7	Y	7
Nuphar variegata	Spatterdock	6	Y	6
Nymphaea odorata	White water lily	6	Y	6
Polygonum amphibium	Water smartweed	5	Y	5
Pontederia cordata	Pickerelweed	8	Y	8
Potamogeton amplifolius	Large-leaf pondweed	7	Y	7
Potamogeton epihydrus	Ribbon-leaf pondweed	8	Y	8
Potamogeton foliosus	Leafy pondweed	6	Y	6
Potamogeton praelongus	White-stem pondweed	8	Y	8
Potamogeton pusillus	Small pondweed	7	Y	7
Potamogeton robbinsii	Fern pondweed	8	Y	8
Ranunculus flammula	Creeping spearwort	9	Y	9
Sagittaria latifolia	Common arrowhead	3	Y	3
Schoenoplectus tabernaemontani	Softstem bulrush	4	Y	4
Sparganium fluctuans	Floating-leaf bur-reed	10	Y	10
Typha sp.	Cattail	1	Y	1
Vallisneria americana	Wild celery	6	Y	6
N			**29**	
mean C				**6.724138**
FQI				**36.21059**

Floristic Quality Index (FQI) East Lobe				
Species	**Common Name**	**C**	**Present?**	**FQI**
Chara	Muskgrasses	7	Y	7
Elatine minima	Waterwort	9	Y	9
Eleocharis acicularis	Needle spikerush	5	Y	5
Eleocharis palustris	Creeping spikerush	6	Y	6
Elodea canadensis	Common waterweed	3	Y	3
Eriocaulon aquaticum	Pipewort	9	Y	9
Isoetes sp.	Quillwort	8	Y	8
Juncus pelocarpus f. submersus	Brown-fruited rush	8	Y	8
Lobelia dortmanna	Water lobelia	10	Y	10
Najas flexilis	Slender naiad	6	Y	6
Nitella	Nitella	7	Y	7
Nuphar variegata	Spatterdock	6	Y	6
Nymphaea odorata	White water lily	6	Y	6
Pontederia cordata	Pickerelweed	8	Y	8
Potamogeton amplifolius	Large-leaf pondweed	7	Y	7
Potamogeton epihydrus	Ribbon-leaf pondweed	8	Y	8
Potamogeton foliosus	Leafy pondweed	6	Y	6
Potamogeton praelongus	White-stem pondweed	8	Y	8
Potamogeton robbinsii	Fern pondweed	8	Y	8
Ranunculus flammula	Creeping spearwort	9	Y	9
Sagittaria latifolia	Common arrowhead	3	Y	3
Schoenoplectus tabernaemontani	Softstem bulrush	4	Y	4
Typha sp.	Cattail	1	Y	1
Vallisneria americana	Wild celery	6	Y	6
N			**24**	
Mean C				**6.583333**
FQI				**32.25161**