



Cason & Associates, LLC

Professional Resources for Management of Lakes, Ponds, Rivers and Wetlands

Results of the Aquatic Plant Survey Conducted on Maiden Lake, August 4 - 5, 2009

Recent Management

Eurasian watermilfoil was first identified in Maiden Lake during the summer of 2008. It totaled approximately one acre near the boat launch in Mosquito Bay. The Maiden Lake Association was able to obtain an Early Detection & Rapid Response Grant from the Wisconsin Department of Natural Resources (WDNR). A WDNR permit was then obtained to treat the milfoil in the identified location (**Figure 1**).

On June 2, 2009 the area was treated with Navigate[®], a granular 2,4-D herbicide. However, during the course of the treatment, additional locations of Eurasian watermilfoil were noted in Mosquito Bay. Permission from the WDNR to treat these new locations was quickly obtained, and they were treated on June 9, 2009. In all, approximately 1.5 acres of Eurasian watermilfoil were treated.

On June 25, 2009, an exotic species mapping survey was conducted by visually inspecting the entire shoreline for the presence of Eurasian watermilfoil and other exotics. No Eurasian watermilfoil or other exotic species were found during the survey. A complete submergent aquatic plant survey was requested by the WDNR to search for Eurasian watermilfoil in deeper locations on the lake, and to create baseline data for the aquatic plant community. With the help of Lake Association volunteers, the survey took place on August 4 and 5, 2009.

Methods

A plant survey map for Maiden Lake was provided by the WDNR (**Figure 2**). A series of 639 grid points were mapped across the lake. These points were loaded onto a GPS to locate them from a boat. At each of these locations, aquatic plant samples were collected with a single rake tow. The rake used consisted of two short-toothed garden rake heads welded together and attached to a rope. All plant samples collected were identified to genus and species whenever possible, and the information was recorded. An abundance rating of 1, 2 or 3 (sparse, moderate or dense) was also given for each species. Any species that were sighted but did not show up on the rake tow were recorded as having been visually observed (V). In addition to the plant data, depth and bottom substrate composition were recorded for each location. Data collected has been used to determine species composition, percent frequency and relative abundance.

LAKE SURVEY MAP

MAIDEN

LAKE

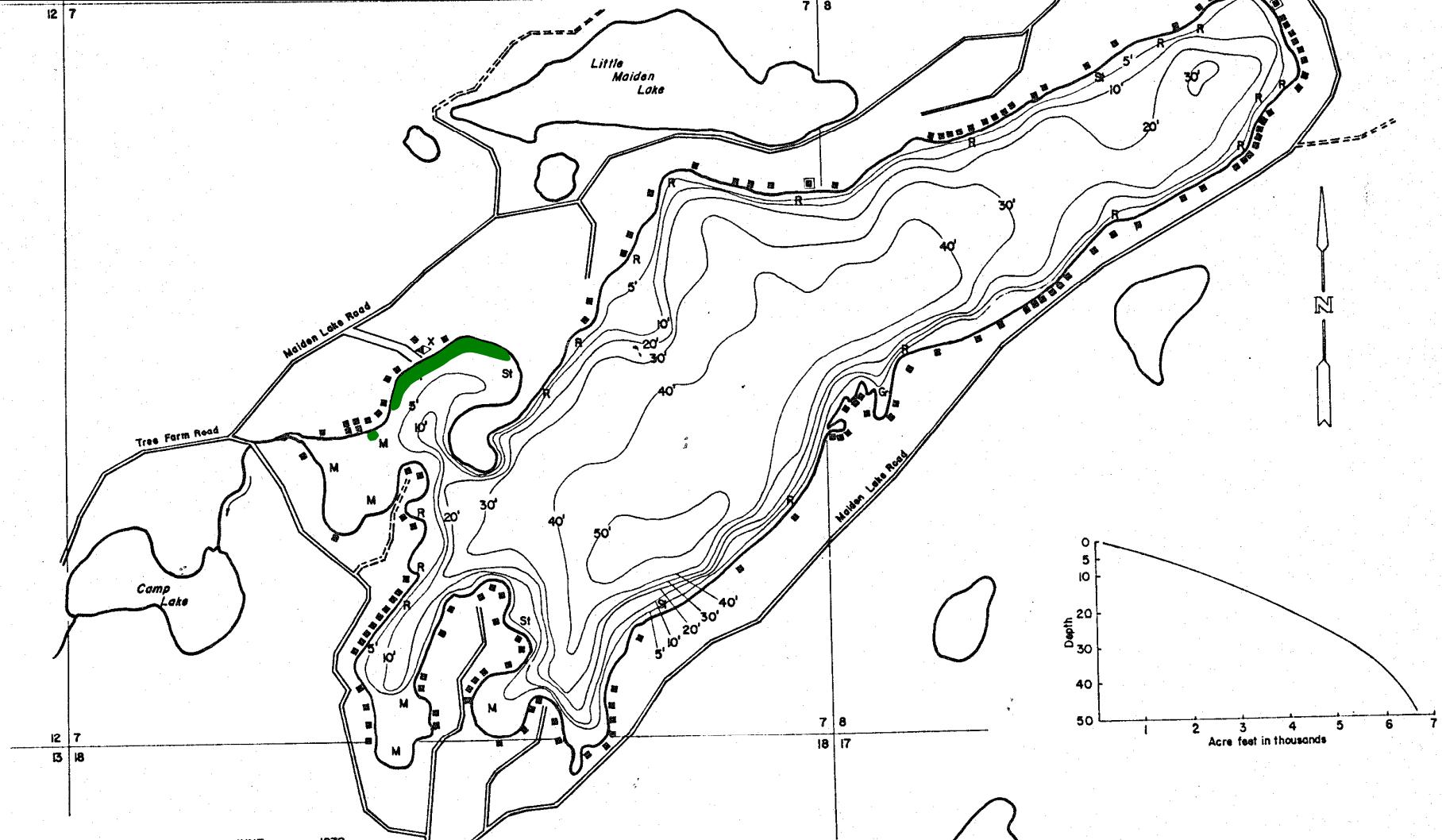
SEC. 5-7-8-1B

OCONTO

COUNTY

T. 32 N. R. 16 E.W.

Figure 1. Locations of Eurasian watermilfoil on Maiden Lake in Oconto County 2008-2009.



EQUIPMENT RECORDING SONAR MAPPED JUNE 1978
MONTH YEAR
LAKE BOTTOM SYMBOLS

TOPOGRAPHIC SYMBOLS	
(A) Brush	Steep slope
(W) Partially wooded	- Indefinite shoreline
(W) Wooded	— Marsh
(C) Cleared	— Spring
(P) Pastured	— Intermittent stream
(A) Agricultural	— Permanent inlet
B.M. Bench Mark	— Permanent outlet
D. Dwelling	— Dam
R. Resort	— State owned land
Camp	D.N.R. State owned land
P. Peat	B. Boulders
Mk. Muck	△ Stumps & Snags
C. Clay	● Rock danger to navigation
M. Marl	T. Submergent vegetation
Sd. Sand	1. Emergent vegetation
S. Silt	▲ Floating vegetation
Gr. Gravel	◆ Brush shelters
R. Rubble	
Bc. Bedrock	

500' 0 500' 1000' 1500' 2000'
SCALE

◆ Access □ Access with Parking ◆ Boat Livery

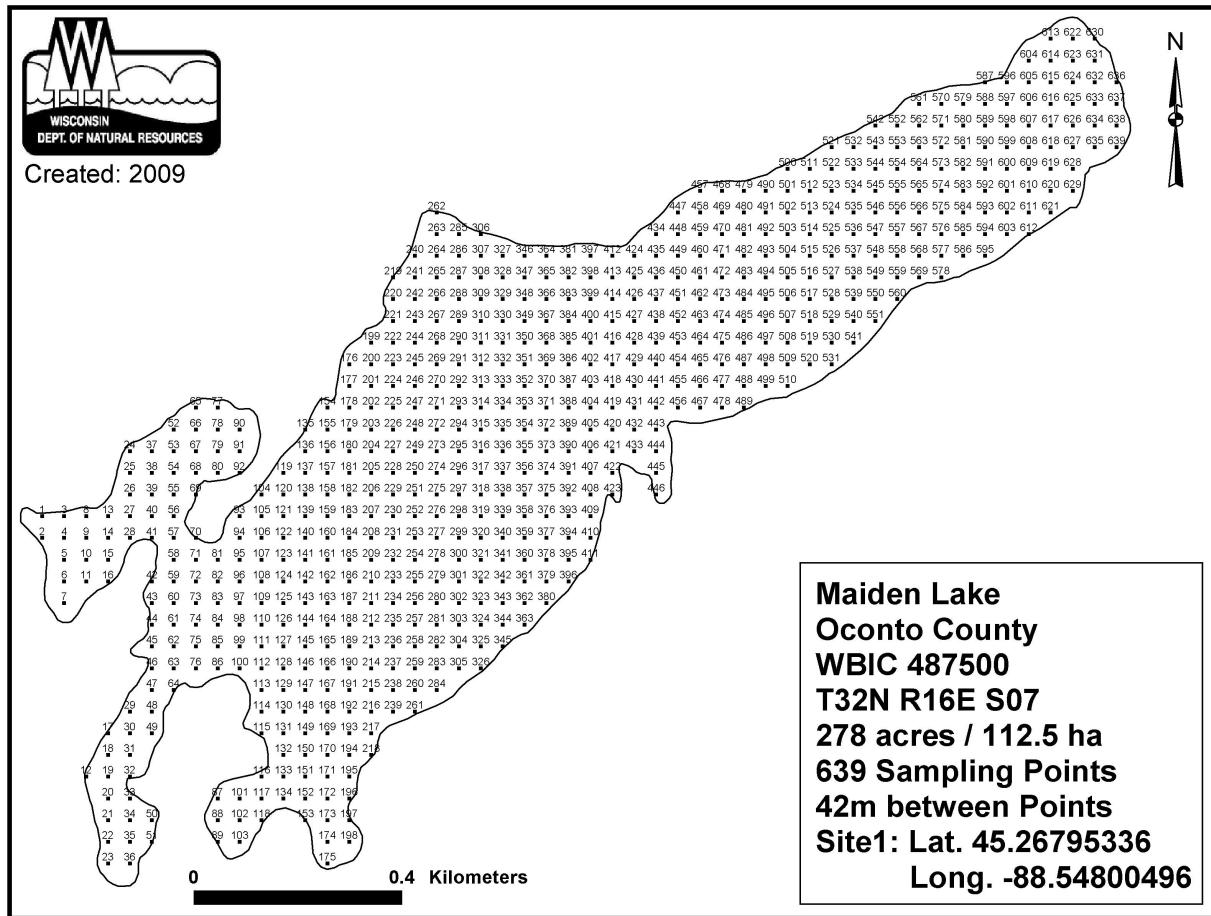
Drawn by: W. Berwig

Field work by: J. O'Brien-R. Thrun

SPECIES OF FISH		
Abundant	Common	Present
Muskie	X	
N. Pike	X	
Walleye	X	
L. M. Bass	X	
S. M. Bass	X	
Panfish	X	
Trout		

WATER AREA 269 ACRES
UNDER 5 FT. 19 %
OVER 20 FT. 39 %
MAX. DEPTH 52 FEET.
TOTAL ALK. 90.3 P.P.M.
VOLUME 65455 ACRE FT.
MAIN SHORELINE 5.6 MI.
ISLAND SHORELINE 0.0 MI.

Figure 2. Plant survey map developed by the WDNR for the August 4-5, 2009 survey



Results

Aquatic Plant Community

Although 639 points were mapped across Maiden Lake, vegetation was found at only 316 locations at the time of the survey. The maximum depth that plants were found was 34.5 feet. Half of the points sampled on Maiden Lake were too deep to sustain vegetation. A total of 15 aquatic plant species were found during the survey (**Table 1**). This is above the state-wide average of 13 species. Maiden Lake lies within the Northern Lakes and Forests region of Wisconsin (Nichols 1999). The average number of species found in lakes in this region is also 13 species. The most abundant plant species encountered in Maiden Lake were muskgrass (*Chara* sp.), and nitella (*Nitella* sp.). Muskgrass was by far the most abundant species found, being identified at 85.1% of the points sampled that contained vegetation. Nitella was found at 16.8% of the vegetated points sampled. Percent frequency values reflect the relationship between the number of locations where a particular species was found versus the total number of locations sampled. Relative

frequency values reflect the abundance of a particular species in relation to all other species found (**Table 1**).

Figure 3 presents the relative abundance of aquatic plant species found in Maiden Lake at the time of the 2009 survey. The raw data for the 2009 aquatic plant survey can be found in **Appendix A**.

Figure 3. Aquatic plant community composition for Maiden Lake, Oconto County, WI, on August 4-5, 2009

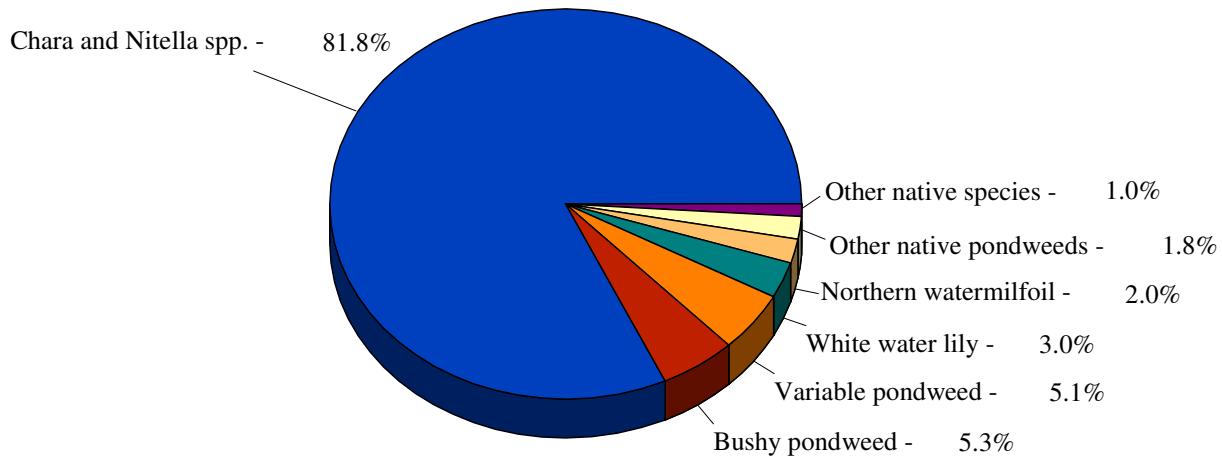


Table 1. Results of the aquatic plant survey conducted on Maiden Lake on August 4-5, 2009.

Species Scientific Name	Common Name	Percent Frequency	Relative Frequency
<i>Chara spp.</i>	Muskgasses	85.13	68.3
<i>Nitella spp.</i>	Nitella	16.77	13.5
<i>Najas flexilis</i>	Bushy pondweed	6.65	5.3
<i>Potamogeton gramineus</i>	Variable pondweed	6.33	5.1
<i>Nymphaea odorata</i>	White water lily	3.8	3
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	2.53	2
<i>Elodea canadensis</i>	Common waterweed	0.63	0.5
<i>Potamogeton natans</i>	Floating-leaf	0.63	0.5
<i>Potamogeton pusillus</i>	Small pondweed	0.63	0.5
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	0.63	0.5
<i>Schoenoplectus acutus</i>	Hardstem bulrush	0.63	0.5
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	0.32	0.3
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	visual	--
<i>Nuphar variegata</i>	Spatterdock	visual	--
<i>Polygonum amphibium</i>	Water smartweed	visual	--

Simpson Diversity Index

In order to estimate the diversity of the aquatic plant community, the Simpson Diversity Index takes into account both the number of species identified (richness) and the distribution or relative abundance of each species. With the Simpson Diversity Index (D), 1 represents infinite diversity and 0, no diversity. That is, the bigger the value of D, the higher the diversity. The value of D calculated for Maiden Lake based on the 2009 data was 0.51. That means that the aquatic plant community has average diversity in Maiden Lake. This is not surprising given the fact that most of the lake's littoral zone (zone sustaining plant growth) contains muskgrass (*Chara* spp.).

Assessment of Floristic Quality

The plant data collected for Maiden Lake were used to assess the *floristic quality* of the lake. The method used assigns a value to each native plant species called a *Coefficient of Conservatism*. Coefficient values range from 0-10 and reflect a particular species' likelihood of occurring in a relatively undisturbed landscape. Species with low coefficient values, such as common waterweed, are likely to be found in a variety of habitat types and can tolerate high levels of human disturbance. On the other hand, species with higher coefficient values, such as nitella, are much more likely to be restricted to high quality natural areas. By averaging the coefficient values available for the submergent and emergent species found in Maiden Lake, a lake-wide value of 6.0 was calculated (**Table 2**). The average value for lakes in Wisconsin is 6.0 while the combined average for lakes in the Northern Lakes and Forests region of Wisconsin which includes northern Oconto County is 6.7 (Nichols 1999).

Table 2. Maiden Lake Floristic Quality Index (FQI) analysis table

Scientific Name	Common Name	C
<i>Chara</i> spp.	Muskgrasses	7
<i>Elodea Canadensis</i>	Common waterweed	3
<i>Myriophyllum sibiricum</i>	Northern water-milfoil	7
<i>Najas flexilis</i>	Bushy pondweed	6
<i>Nitella</i> spp.	Nitella	7
<i>Nuphar variegata</i>	Spatterdock	6
<i>Nymphaea odorata</i>	White water lily	6
<i>Polygonum amphibium</i>	Water smartweed	5
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	7
<i>Potamogeton gramineus</i>	Variable pondweed	7
<i>Potamogeton natans</i>	Floating-leaf pondweed	5
<i>Potamogeton pusillus</i>	Small pondweed	7
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	6
<i>Schoenoplectus acutus</i>	Hardstem bulrush	5
	N	14
	mean C	6.0
	FQI	22.4
	Simpson Diversity Index	0.51

By utilizing the *Coefficients of Conservatism* for the plant species of Maiden Lake, further assessment of floristic quality can be made. By multiplying the average coefficient values for Maiden Lake by the square root of the number of plant species found, a *Floristic Quality Index* (FQI) was calculated to be 22.4 (**Table 2**). In general, higher FQI values reflect higher lake quality. The average for Wisconsin lakes is 22.2. The average for lakes in the Northern Lakes and Forests region is 24.3 (Nichols 1999). Both the *Coefficient of Conservatism* and the *Floristic Quality Index* values suggest the quality of Maiden Lake, specifically in terms of the plant community, is slightly below average.

Exotic Plant Distribution Mapping

Eurasian watermilfoil was sighted at only one sample point in Mosquito Bay, in an area that had been previously treated. One other Eurasian watermilfoil plant was located in the northeast corner of the lake near the private boat landing. This plant was growing in shallow enough water that it was hand-pulled by a Cason & Associates, LLC staff member at the time it was discovered. No other Eurasian watermilfoil plants could be found around the area. Also, no other exotic species were identified in Maiden Lake during the August 2009 survey.

Conclusions and Recommendations

Members of the Maiden Lake Association have done an excellent job at staying ahead of the Eurasian watermilfoil threat to the lake. The plant was identified early, and was successfully treated. This survey found only a small amount remaining in a recently treated area, and a single plant in a new area which was hand-pulled at the time of the survey. With exotic plant species present in nearby lakes, re-infestation of Eurasian watermilfoil could take place and should be anticipated. That is why it is important to continue monitoring for years to come.

At least one formal exotic species mapping survey should be conducted each year, preferably in fall at the end of the aquatic plant growing season. Lake volunteers should also be on the lookout for Eurasian watermilfoil and other exotic plants throughout the season. Along with annual monitoring, a full point-intercept survey, like the one completed in August, should be performed at least every five years. This survey will provide baseline data on the lake's aquatic plant community so that future changes can be accurately assessed. It will also provide data on aquatic plants in areas that are too deep to be observed from a boat.

Fragmentation is the primary mode of spread for Eurasian watermilfoil, and lake users should remove any floating fragments as well as hand-pull individual plants whenever possible. Because of the small amount of Eurasian watermilfoil growing in Maiden Lake, these efforts should not be too labor-intensive for the time being. Locations of hand-pulled plants should be recorded so that they can be inspected during a fall survey. For hand-pulling to be successful care must be taken to remove the entire root mass, along with the plant, or else it will quickly regenerate. If Eurasian watermilfoil is too abundant or too deep to hand-pull, it should again be treated with Navigate®. Herbicide

treatments should be conducted in spring or fall when water temperatures are cooler and Eurasian watermilfoil is most actively growing.

Education and prevention will be the most important means of protecting Maiden Lake. Education of lake users about the threats of exotic invasive species and methods for preventing their introduction should continue to be a priority for the Association. Lake volunteers should be encouraged to continue with the *Clean Boats – Clean Waters* program as well. Along with the public boat landing, attention should also be focused on the private boat landing in the northeast corner of the lake where the single Eurasian watermilfoil plant was found, as this could be another point of re-introduction.

Budgets

When considering a budget for the 2010 season, Association members should expect a similar amount to the 2009 budget, minus the full point-intercept survey. At least one visual boat survey (two surveys are recommended) and one treatment should be expected for the 2010 season. The cost to treat two acres would be approximately \$1,850. In addition, the cost of each survey including report preparation would be \$750.

Works Cited

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

Appendix A

Raw data for the aquatic plant survey, Maiden Lake, August 4-5, 2009.

sampling point	Depth (ft)	comments
1		< Chara ,Muskgrasses
2		<i>Elodea canadensis</i> ,Common waterweed
3	0.5	<i>Myriophyllum sibiricum</i> ,Northern water milfoil
4		<i>Myriophyllum spicatum</i> ,Eurasian water-milfoil
5		<i>Najas flexilis</i> ,Bushy pondweed
6	1	<i>Nitella</i> sp.,Nitella
7	2.4	<i>Nuphar variegata</i> ,Spatterdock
8	1.8	<i>Nymphaea odorata</i> ,White water lily
9	1	<i>Polygonum amphibium</i> ,Water smartweed
10	2.1	<i>Potamogeton amplifolius</i> ,Large-leaf pondweed
11	2.4	<i>Potamogeton gramineus</i> ,Variable pondweed
12	4.7	<i>Potamogeton natans</i> ,Floating-leaf pondweed
13	1	<i>Potamogeton pusillus</i> ,Small pondweed
14	2	<i>Potamogeton zosteriformis</i> ,Flat-stem pondweed
15		<i>Schoenoplectus acutus</i> ,Hardstem bulrush
16	1	
17	9.2	
18	11.4	
19	6.5	
20	4.2	
21	2.5	
22	2.7	
23	2.1	
24	2.1	
25	3.5	
26	4.7	
27	3.1	
28	2.9	
29	6.4	
30	1	
31	14.2	
32	3.3	
33	1.5	
34	1.4	
35	1	

		sampling point	Depth (ft)	comments	
		36	1		
		37	3.7		
		38	6.7		
		39	5.9		
		40	9.1		
		41	4.2		
		42	3.3		
		43	3.3		
		44	0.5		
		45	3.7		
		46	0.5		
		47	11.3		
		48	8.2		
		49	7		
		50	1		
		51	0.5		
		52	4.3		
		53	4.6		
		54	6.1		
		55	6.9		
		56	10.7		
		57	14.8		
		58	17.8		
		59	15.7		
		60	13.1		
		61	4.1		
		62	4.5		
		63	18.4		
		64	9.9		
		65	1		
		66	3.8		
		67	3.2		
		68	3.3		
		69	1.6		
70	1	No Plants			

sampling point	Depth (ft)	comments
71	27.8	No Plants
72	32.5	No Plants
73	20.2	
74	12.3	No Plants
75	21	
76	18.7	
77	1	
78	2.1	
79	4.1	
80	1	
81	22.3	
82	34.1	
83	28.7	No Plants
84	26.8	
85	28.9	
86	13.9	
87	1	
88	2.6	
89	1	
90	1.8	
91	2.7	
92	1.3	
93	9.5	No Plants
94	14.9	
95	21.9	
96	33.3	No Plants
97	37.5	No Plants
98	35	
99	29.2	
100	17.3	
101	2.3	
102	2.4	
103	1.1	
104	9	
105	22.1	

sampling point	Depth (ft)	comments
106	29.1	
107	33.9	No Plants
108	35.5	No Plants
109	37.7	No Plants
110	38.4	No Plants
111	25.4	
112	11.8	
113	4.4	
114	4	
115	4.4	
116	3.4	
117	3.3	
118	1.7	
119	1.9	
120	25	
121	31.4	No Plants
122	34.4	No Plants
123	35.4	No Plants
124	36.5	No Plants
125	38.2	No Plants
126	37.4	No Plants
127	34.1	
128	24	
129	19.5	
130	21	No Plants
131	22.8	
132	8.4	
133	6.7	
134	2.6	
135	5.5	
136	25	
137	32.4	No Plants
138	34.9	No Plants
139	35.7	No Plants
140	36.5	No Plants

sampling point	Depth (ft)	comments
141	37.6	No Plants
142	38.6	No Plants
143	37.5	No Plants
144	40.9	No Plants
145	40.4	No Plants
146	37.1	No Plants
147	35.1	No Plants
148	33.1	No Plants
149	35.2	No Plants
150	35.7	No Plants
151	22.5	
152	9.3	
153	1	
154	6.3	
155	22.1	
156	32.1	
157	36.6	No Plants
158	37.9	No Plants
159	37.9	No Plants
160	38.1	No Plants
161	38.7	No Plants
162	39	No Plants
163	40.4	No Plants
164	41.3	No Plants
165	44	No Plants
166	44.4	No Plants
167	42.9	No Plants
168	41.8	No Plants
169	41.1	No Plants
170	38.1	No Plants
171	32.1	
172	19.6	
173	6.7	
174	4.3	
175	2.8	
1	1	
1	1	
1	1	
v		
v		

sampling point	Depth (ft)	comments
176	3.6	
177	6.4	
178	20.5	
179	30.5	
180	34.5	
181	36.8	No Plants
182	39	No Plants
183	39.3	No Plants
184	39.5	No Plants
185	40.2	No Plants
186	40.7	No Plants
187	43.2	No Plants
188	46.5	No Plants
189	49.1	No Plants
190	50.1	No Plants
191	49.8	No Plants
192	45.1	No Plants
193	36.9	No Plants
194	30.5	No Plants
195	10	
196	10.8	
197	3.9	
198	3.1	
199	4.5	
200	7.8	
201	8.4	
202	18.6	
203	26.8	No Plants
204	34.5	No Plants
205	37.2	No Plants
206	39.4	No Plants
207	40.3	No Plants
208	40.4	No Plants
209	40.9	No Plants
210	42.7	No Plants

sampling point	Depth (ft)	comments
211	43.7	No Plants
212	46.5	No Plants
213	49.9	No Plants
214	51	No Plants
215	49	No Plants
216	28	
217	6.9	No Plants
218	10.8	
219	1	
220	1	
221	3.5	
222	9.1	
223	17.6	No Plants
224	20	
225	7.8	
226	17.8	No Plants
227	32.2	
228	37.8	No Plants
229	39.9	No Plants
230	41.2	No Plants
231	41.6	No Plants
232	42.5	No Plants
233	43.3	No Plants
234	45.2	No Plants
235	47.6	No Plants
236	49.9	No Plants
237	51	No Plants
238	49.1	No Plants
239	31.4	
240	7.4	
241	12.1	
242	14	
243	16	
244	19	No Plants
245	24.1	

sampling point	Depth (ft)	comments
246	27.6	
247	29.2	
248	33.3	No Plants
249	35.7	No Plants
250	38.8	No Plants
251	40.2	No Plants
252	42	No Plants
253	42.5	No Plants
254	43.5	No Plants
255	44.6	No Plants
256	45.8	No Plants
257	48.3	No Plants
258	49.8	No Plants
259	50.5	No Plants
260	46.5	No Plants
261	8.1	
262	5	
263	7.8	
264	7.9	No Plants
265	21.1	
266	21.8	No Plants
267	20.5	No Plants
268	23.5	No Plants
269	28.6	
270	31.6	
271	33.1	No Plants
272	35.2	No Plants
273	37.9	No Plants
274	40.6	No Plants
275	42.1	No Plants
276	42.6	No Plants
277	42.8	No Plants
278	43.5	No Plants
279	44.5	No Plants
280	46.6	No Plants

sampling point	Depth (ft)	comments	Chara ,Muskgrasses	
316	42.3	No Plants	<i>Elodea canadensis</i> ,Common waterweed	
317	43.5	No Plants	<i>Myriophyllum sibiricum</i> ,Northern water milfoil	
318	39	No Plants	<i>Myriophyllum spicatum</i> ,Eurasian water-milfoil	
319	41.6	No Plants	<i>Najas flexilis</i> ,Bushy pondweed	
320	43.2	No Plants	<i>Nitella</i> sp.,Nitella	
321	44.9	No Plants	<i>Nuphar variegata</i> ,Spatterdock	
322	45.5	No Plants	<i>Nymphaea odorata</i> ,White water lily	
323	46.9	No Plants	<i>Polygonum amphibium</i> ,Water smartweed	
324	45.3	No Plants	<i>Potamogeton amplifolius</i> ,Large-leaf pondweed	
325	39.6	No Plants	<i>Potamogeton gramineus</i> ,Variable pondweed	
326	4.7	No Plants	<i>Potamogeton natans</i> ,Floating-leaf pondweed	
327	18.7	No Plants	<i>Potamogeton pusillus</i> ,Small pondweed	
328	25.2		<i>Potamogeton zosteriformis</i> ,Flat-stem pondweed	
329	30.9	No Plants	<i>Schoenoplectus acutus</i> ,Hardstem bulrush	
330	32.2			
331	34.3			
332	35.4	No Plants		
333	36.7	No Plants		
334	39	No Plants		
335	42.8	No Plants		
336	44.7	No Plants		
337	44.5	No Plants		
338	42.9	No Plants		
339	44.1	No Plants		
340	42.7	No Plants		
341	40.9	No Plants		
342	42.2	No Plants		
343	40.1	No Plants		
344	25.5	No Plants		
345	11.2	No Plants		
346	17			
347	24.6			
348	30.9	No Plants		
349	33	No Plants		
350	34.8	No Plants		

sampling point	Depth (ft)	comments
351	37.1	No Plants
352	38.6	No Plants
353	41	No Plants
354	43.1	No Plants
355	45.2	No Plants
356	45.8	No Plants
357	45.6	No Plants
358	42.6	No Plants
359	39	No Plants
360	37.9	No Plants
361	36.8	No Plants
362	32.1	No Plants
363	11.1	No Plants
364	7.4	
365	22.4	
366	27.6	
367	34.4	
368	36.8	No Plants
369	40	No Plants
370	42.4	No Plants
371	43.8	No Plants
372	45.5	No Plants
373	46.4	No Plants
374	46.3	No Plants
375	44.4	No Plants
376	40.9	No Plants
377	37.4	No Plants
378	35.7	No Plants
379	27.3	
380	6.3	
381	6.3	
382	18.9	
383	29.9	No Plants
384	35.2	No Plants
385	38.8	No Plants

sampling point	Depth (ft)	comments
386	41.5	No Plants
387	43.4	No Plants
388	45.6	No Plants
389	46.2	No Plants
390	46.4	No Plants
391	45.8	No Plants
392	39.2	No Plants
393	36.7	No Plants
394	29.6	
395	24.7	
396	7.7	
397	9.8	
398	17.6	
399	31.9	
400	37.1	No Plants
401	42.1	No Plants
402	44.5	No Plants
403	45.8	No Plants
404	46.3	No Plants
405	45.9	No Plants
406	44.2	No Plants
407	38.3	No Plants
408	29.2	
409	22.4	2
410	18.3	No Plants
411	1	
412	8.5	1
413	22.7	3
414	30.9	
415	38.2	No Plants
416	42.9	No Plants
417	45	No Plants
418	46	No Plants
419	46.2	No Plants
420	44.2	No Plants

sampling point	Depth (ft)	comments
421	35.4	No Plants
422	8.4	
423	5.1	
424	21.3	No Plants
425	31.9	
426	37.5	No Plants
427	41.6	No Plants
428	44.9	No Plants
429	46.4	No Plants
430	46.5	No Plants
431	44.8	No Plants
432	38.1	No Plants
433	12.7	
434	14.1	No Plants
435	23.5	
436	32.9	No Plants
437	40.7	No Plants
438	43.7	No Plants
439	45.2	No Plants
440	46.3	No Plants
441	46.2	No Plants
442	42.3	No Plants
443	30	No Plants
444	15.7	
445	4.7	2
446	2.6	1 ✓
447	10.6	1
448	17.3	
449	27.5	
450	35.7	No Plants
451	28.6	No Plants
452	43.6	No Plants
453	45.8	No Plants
454	46.3	No Plants
455	43.5	No Plants

sampling point	Depth (ft)	comments
456	35.4	No Plants
457	5	
458	13	
459	21.4	No Plants
460	30.6	
461	32.6	
462	37	No Plants
463	40.9	No Plants
464	41.3	No Plants
465	40.3	No Plants
466	35.7	No Plants
467	8.5	
468	3.1	v
469	16.4	No Plants
470	24.6	No Plants
471	28.5	
472	28.5	
473	33	No Plants
474	35.5	No Plants
475	37	No Plants
476	33.4	No Plants
477	18.6	2
478	4.1	1
479	9.6	1
480	22.7	2
481	26.8	3
482	24.6	3
483	25.2	
484	28.4	No Plants
485	31.9	No Plants
486	28.1	No Plants
487	23.4	1
488	2.5	1
489	3.2	v
490	11.9	1

sampling point	Depth (ft)	comments
491	23.3	2
492	23.1	
493	23.9	
494	24.7	
495	23.3	
496	23.2	
497	22.5	
498	19	
499	9.8	
500	7.2	
501	18.5	
502	24	3
503	24.9	2
504	23.2	3
505	23.7	
506	19.1	
507	22	
508	21.4	
509	20.4	No Plants
510	15.9	No Plants
511	17.6	1
512	22.9	3
513	25	No Plants
514	26.6	2
515	24	2
516	21.3	No Plants
517	19.2	No Plants
518	19.7	No Plants
519	20.1	1
520	19.5	
521	4.4	1
522	15.2	1
523	25	No Plants
524	28.2	No Plants
525	27.6	No Plants

sampling point	Depth (ft)	comments
526	23.7	
527	21.1	
528	18.6	
529	18.9	
530	17.5	
531	14	
532	9.2	
533	13.1	
534	19.5	
535	25.7	No Plants
536	27.8	
537	24.5	
538	18.2	
539	15.4	
540	13.3	
541	13.4	
542	8	
543	11.9	
544	4.5	No Plants
545	15.1	
546	26	
547	27.8	No Plants
548	20.9	
549	8.7	
550	8.2	
551	9.5	
552	7.6	
553	11	
554	13.5	
555	13.8	
556	22.2	No Plants
557	27.9	No Plants
558	24	
559	10.5	
560	5.6	

sampling point	Depth (ft)	comments
561	6.2	
562	18	
563	19.3	
564	19.4	
565	21.5	
566	24	
567	28.2	No Plants
568	20.8	
569	13.5	No Plants
570	18.4	
571	24.5	No Plants
572	26.1	
573	25.4	No Plants
574	25.9	No Plants
575	27.5	No Plants
576	24.5	
577	22.4	
578	17	
579	20.3	
580	26.7	No Plants
581	25.6	No Plants
582	26.5	No Plants
583	24.7	
584	23.5	
585	21.5	No Plants
586	18.8	
587	8.6	
588	20.4	
589	28.1	No Plants
590	28	No Plants
591	23.2	No Plants
592	24	
593	20.6	
594	18.7	
595	12	

sampling point	Depth (ft)	comments
596	7.7	
597	21.9	
598	28.7	No Plants
599	28.1	No Plants
600	27.4	No Plants
601	21.1	
602	19.1	
603	15.4	
604	5.5	
605	9.6	No Plants
606	21.2	No Plants
607	28.8	No Plants
608	27	No Plants
609	21	
610	16.2	
611	15.5	
612	1	
613	6.3	
614	8.4	
615	11.8	
616	22.5	
617	27.1	No Plants
618	19	
619	14.5	
620	8.4	
621	8	
622	7.3	
623	9.8	
624	13.2	
625	20.9	
626	21.5	
627	16.3	
628	7.2	
629	4.9	
630	5.3	

sampling point	Depth (ft)	comments
631	8.8	
632	11.8	
633	13.4	
634	12.5	
635	8.6	
636	3	
637	4	
638	5.2	
639	3.6	
—	—	<i>Chara</i> ,Muskgrasses
—	—	<i>Elodea canadensis</i> ,Common waterweed
—	—	<i>Myriophyllum sibiricum</i> ,Northern water milfoil
—	—	<i>Myriophyllum spicatum</i> ,Eurasian water-milfoil
—	—	<i>Najas flexilis</i> ,Bushy pondweed
—	—	<i>Nitella</i> sp.,Nitella
—	—	<i>Nuphar variegata</i> ,Spatterdock
—	—	<i>Nymphaea odorata</i> ,White water lily
—	—	<i>Polygonum amphibium</i> ,Water smartweed
—	—	<i>Potamogeton amplifolius</i> ,Large-leaf pondweed
—	—	<i>Potamogeton gramineus</i> ,Variable pondweed
—	—	<i>Potamogeton natans</i> ,Floating-leaf pondweed
—	—	<i>Potamogeton pusillus</i> ,Small pondweed
—	—	<i>Potamogeton zosteriformis</i> ,Flat-stem pondweed
—	—	<i>Schoenoplectus acutus</i> ,Hardstem bulrush