



Water Lilies in Comfort Lake on August 28, 2019

Point Intercept Plant Survey For Comfort Lake, Chisago County, 2019

Summer Point Intercept Survey: August 28, 2019

Prepared for:
Comfort Lake/Forest
Lake Watershed District
Forest Lake, Minnesota



Prepared by:
Steve McComas
Blue Water Science
St. Paul, MN 55116

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Point Intercept Plant Survey for Comfort Lake, Chisago County, 2019

Summary

Summer Aquatic Plant Point Intercept Survey

On August 28, 2019 a full point intercept aquatic plant survey was conducted on Comfort Lake. A total of 139 sites out to 15 feet deep were monitored. Comfort Lake has a fair diversity of aquatic plants, with 9 submerged species (including EWM) and 2 water lily species. A summary of plant occurrence and relative densities is listed in Tables S1 and S2. The most common submerged aquatic plants in the lake are EWM and coontail. A map of aquatic plant species richness (species/site) is shown below. The south end of Comfort Lake has the highest diversity.

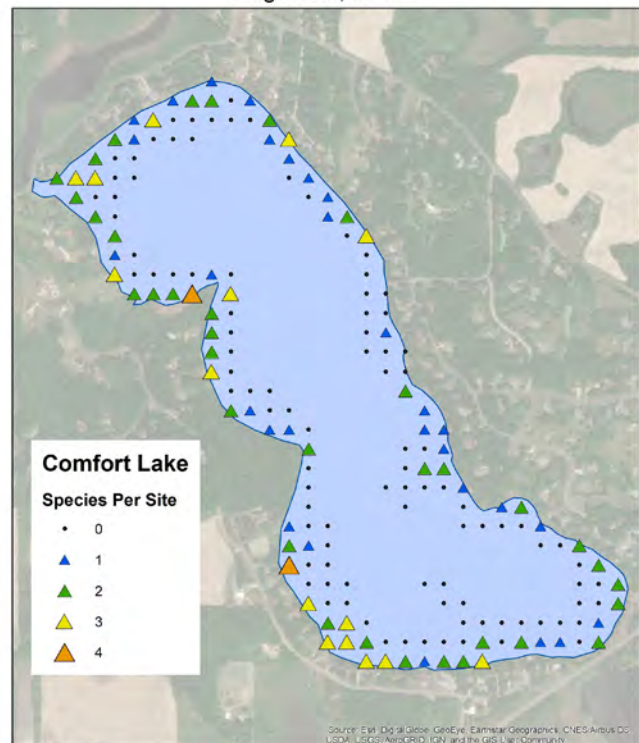
Table S1. Comfort Lake aquatic plant statistics for the August 28, 2019 survey.

Total # Points Sampled	180
Depth Range of Rooted Veg	2-6 feet
Maximum Depth of Growth (95%) in feet	5.0
# Points in Max Depth Range	87
# Points in Littoral Zone (0-15 feet)	180
% Points w/ Native Submersed Taxa	33
Mean Native Submersed Taxa/Point	0.4
Mean Density of Native Submersed Taxa	1.1
# Submersed Native Taxa	8

Table S2. Comfort Lake aquatic plant occurrences and densities for the August 28, 2019 survey.
Density ratings are 1-3 with 1 being low and 3 being most dense.

	All Stations (n=180 points 0-15 feet)		
	Occur	% Occur	Density
Spatterdock (<i>Nuphar variegatum</i>)	38	21	2
White waterlily (<i>Nymphaea sp</i>)	21	12	1
Coontail (<i>Ceratophyllum demersum</i>)	32	18	1
Water stargrass (<i>Heteranthera dubia</i>)	1	1	1
Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	36	20	1
Naiad (<i>Najas flexilis</i>)	1	1	1
Cabbage (<i>Potamogeton amplifolius</i>)	4	2	1
Illinois pondweed (<i>P. illinoensis</i>)	10	6	1
Stringy pondweed (<i>P. sp</i>)	1	1	1
Flatstem pondweed (<i>P. zosteriformis</i>)	7	4	1
Sago pondweed (<i>Stuckenia pectinata</i>)	1	1	1

Comfort Lake Species Richness
August 28, 2019



Point Intercept Plant Survey for Comfort Lake, Chisago County, 2019

Introduction

Comfort Lake has an area of 218 acres with a littoral area of 90 acres (MnDNR). The maximum depth of Comfort Lake is 37 feet. The objective of the point intercept survey was to determine the distribution and abundance of aquatic plants in Comfort Lake.

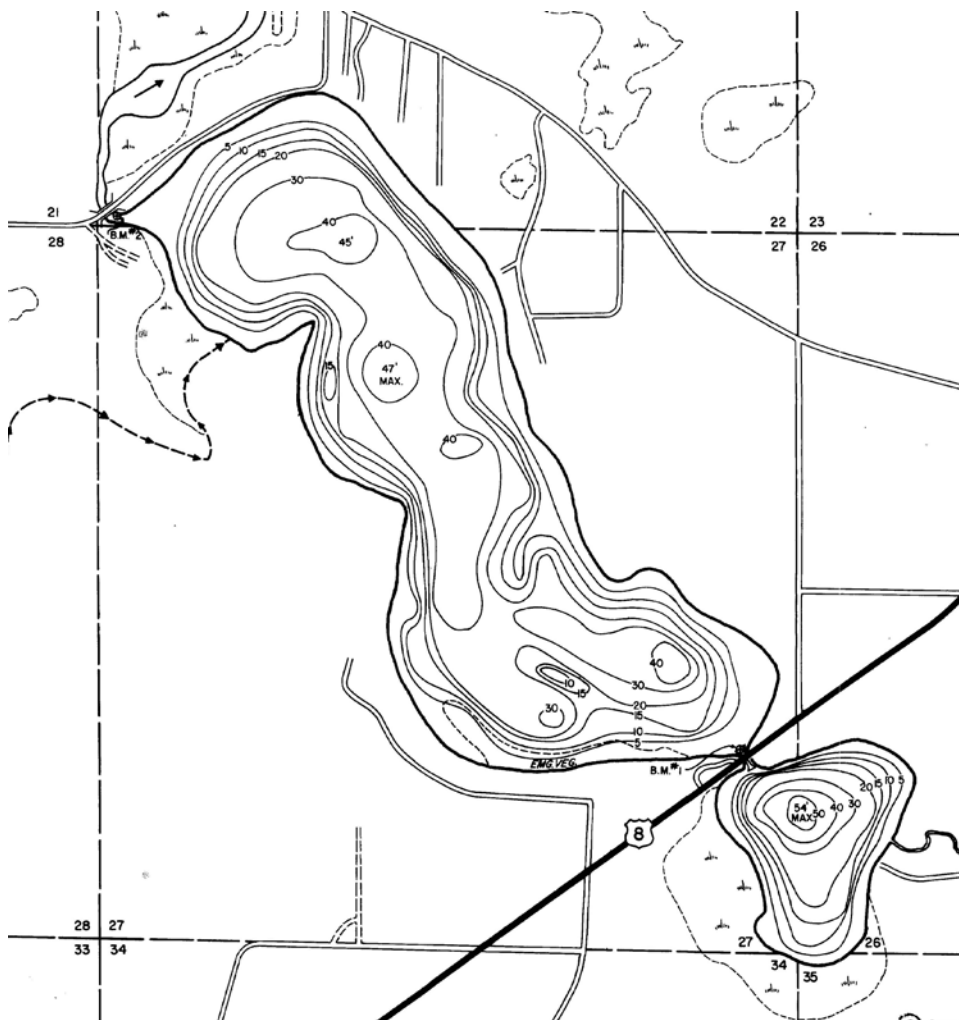


Figure 1. Contour map of Comfort Lake (source: MnDNR).

Point-Intercept Survey Methods

A point intercept aquatic plant survey of Comfort Lake was conducted by Blue Water Science on August 28, 2019 and 180 points were sampled out to 15 feet of water depth (Figure 2). The deepest depth of plant colonization in Comfort Lake was out to 6 feet, although all sites were sampled. Sample points were placed 50 meters apart on a grid that covered the lake. Each sample point was equal to 0.62 acres. At each sample point, a sampling rake was lowered into the water and a plant sample was taken. The plant species were recorded and the density of each species was assigned. Densities were based on the coverage on the teeth of the rake. Density ratings were from 1 to 3 with 1 being sparse and 3 being a matted nuisance. Based on these sample sites, plant distribution maps were constructed.

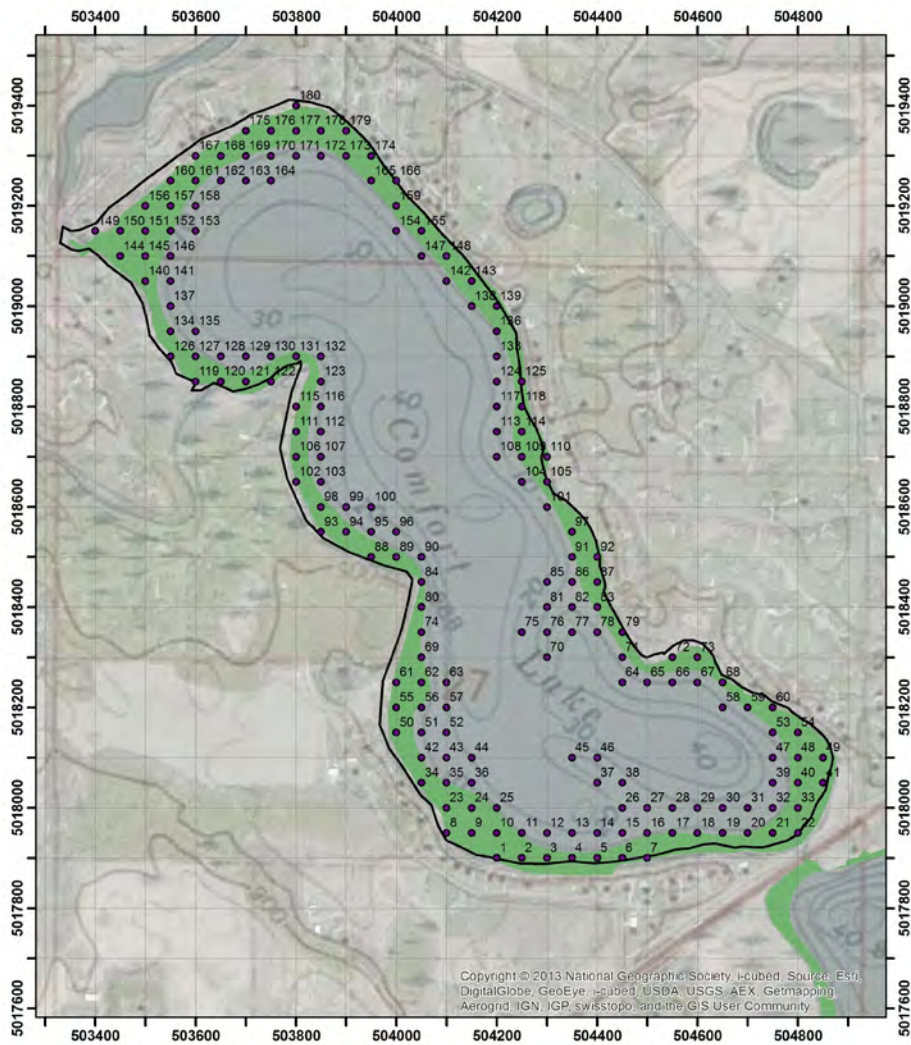


Figure 2. Sample location map for the aquatic plant surveys conducted on Comfort Lake. Green shading represents the littoral zone of Comfort Lake.

Comfort Lake Aquatic Plant Point Intercept Survey Results

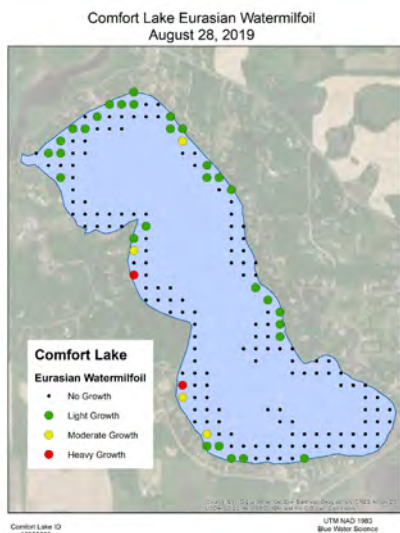
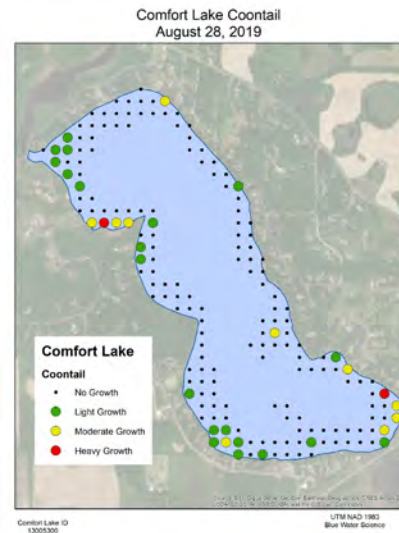
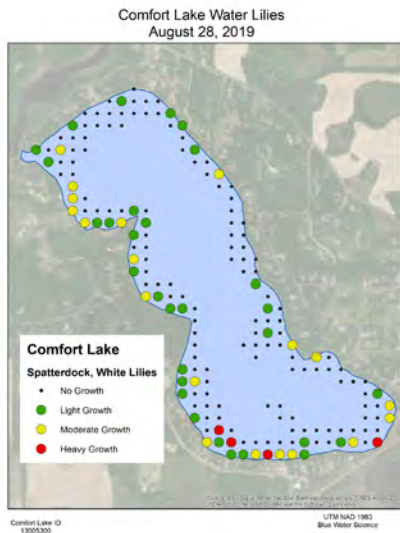
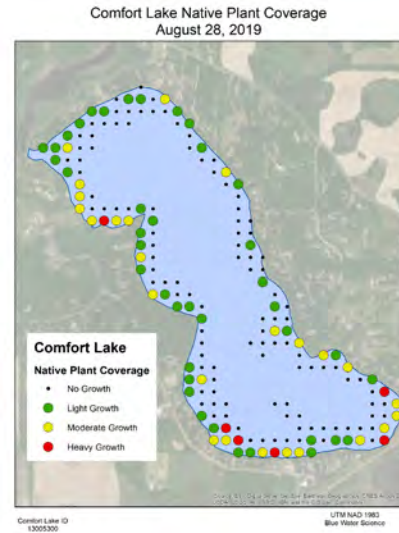
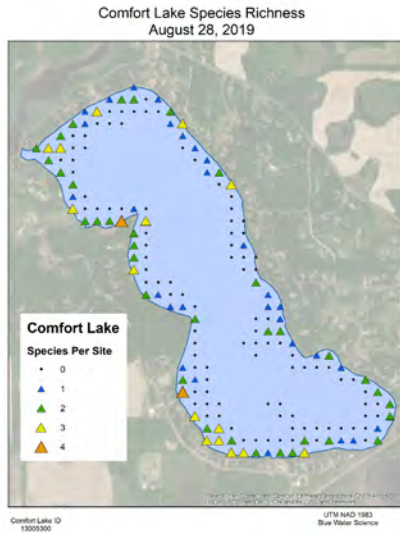
On August 28, 2019 a full point-intercept aquatic plant survey was conducted on Comfort Lake. A total of 180 sites were monitored.

Comfort Lake has a fair diversity of aquatic plants, with 9 submerged species (including curlyleaf pondweed and Eurasian watermilfoil) and 2 water lily species. A summary of plant occurrence and relative densities is listed in Table 1. The most common native submerged aquatic plants in the lake was coontail.

Table 1. Comfort Lake aquatic plant occurrences and densities for the August 28, 2019 survey. Density ratings are 1-3 with 1 being low and 3 being most dense. Plants grew to a depth of 6 feet.

	All Stations (n=180)		
	Occur	% Occur	Density
Spatterdock (<i>Nuphar variegatum</i>)	38	21	2
White waterlily (<i>Nymphaea</i> sp)	21	12	1
Coontail (<i>Ceratophyllum demersum</i>)	32	18	1
Water stargrass (<i>Heteranthera dubia</i>)	1	1	1
Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	36	20	1
Naiads (<i>Najas flexilis</i>)	1	1	1
Cabbage (<i>Potamogeton amplifolius</i>)	4	2	1
Illinois pondweed (<i>P. Illinoensis</i>)	10	6	1
Stringy pondweed (<i>P. sp</i>)	1	1	1
Flatstem pondweed (<i>P. zosteriformis</i>)	7	4	1
Sago pondweed (<i>Stuckenia pectinata</i>)	1	1	1

Aquatic Plant Maps of Comfort Lake from the August 28, 2019 Plant Survey



Plant diversity was above average in Comfort Lake with a total of 9 submerged aquatic plant species (Table 2). Eurasian watermilfoil was the most common plant followed by coontail.

Table 2. Aquatic plant occurrence and density for individual sample points in Comfort Lake, Aug 28, 2019.

Site	Depth (ft)	Spatter-dock	White lilies	Cabbage	Coontail	EWM	Flatstem	Illinois	Naiad	Sago	Stringy	Water stargrass	No plants
1	3		1		1	1							
2	3		1	1		1							
3	4	2			1								
4	3	3											
5	4	2						1					
6	3	2	1										
7	3	1	1			1							
8	3		2		1	1							
9	3	1			2	1							
10	4	3			1								
11	12												1
12													1
13	11												1
14	12												1
15	5												1
16	4	1			1								
17	4												1
18	4						1	1					
19	4	1											
20	4	2											
21	8												1
22	3	3			1								
23	3				1	2							
24	4	3			1		1						
25													1
26													1
27													1
28													1
29													1
30													1
31													1
32	10												1
33	5				2								
34	4		1	1			1						
35	8												1
36	19												1
37													1
38													1
39													1
40	7												1
41	4	2			2								
42	8												1
43													1
44													1
45													1
46													1
47													1
48	8												1
49	4	2			2								
50	3		1		1	2	1						
51	12												1
52													1
53													1
54	4	1			3								
55	4		1			3							
56	5	2											
57													1
58													1
59	10												1
60	4			1				1					
61	3		1										
62	7												1
63													1
64													1
65	13												1
66	13												1
67	10												1

Table 2. Aquatic plant occurrence and density for individual sample points in Comfort Lake, Aug 28, 2019.

Site	Depth (ft)	Spatter-dock	White lilies	Cabbage	Coontail	EWM	Flatstem	Illinois	Naiad	Sago	Stringy	Water stargrass	No plants
68	3				2								
69	8												1
70													1
71	5												1
72	2	2											
73	3				1							1	
74	12												1
75													1
76													1
77	14												1
78	6												1
79	3	2											
80	8												1
81	8												1
82	5	1			2								
83	3					1		1					
84	4						1	1					
85	9												1
86	6												1
87	4					1							
88	3		1										
89	5	1											
90													1
91	4	1											
92	3					1							
93	3	2	1										
94	3	1											
95	12												1
96													1
97	3					1							
98	8												1
99	20												1
100													1
101	5	1				1							
102	3		1			3	1						
103	11												1
104	8												1
105	3												1
106	4	2			1								
107	13												1
108													1
109	3												1
110	2												1
111	4				1	2							
112													1
113	8												1
114	3							1					
115	3		1			1							
116	6												1
117	8												1
118	3												1
119	4		2		2								
120	4		1		3								
121	5		1		2								
122	3	2	1	1	2								
123	5	1			1	1							
124	10												1
125	3												1
126	2	2	1								1		
127	11												1
128	15												1
129	10												1
130	9												1
131	6	1											
132	9												1
133	8												1
134	6		2										
135	18												1
136	6												1
137	5	2			1								
138	9												1
139	3				1	1		1					
140	6				1	1							
141													1

Table 2. Aquatic plant occurrence and density for individual sample points in Comfort Lake, Aug 28, 2019.

Site	Depth (ft)	Spatter-dock	White lilies	Cabbage	Coontail	EWM	Flatstem	Illinois	Naiad	Sago	Stringy	Water stargrass	No plants
142	5					1							
143	3	2				1							
144	3		1		1								
145	9												1
146													1
147	9												
148	3					1							
149	3	1	1										
150	3				1	1	1						
151	4	2			1	1							
152													1
153													1
154	16												1
155	4	1											
156	3				1	1							
157	8												1
158	12												1
159	5					2							
160	3	1				1							
161	6					1							
162	8												1
163	13												1
164													1
165	5					1							
166	3	1				1		1					
167	4							1					
168	3					1			1	1			
169	6												1
170													1
171													1
172	8												1
173	5												1
174	3	1				1							
175	2					1							
176	4	1				1							
177	5					1		1					
178	5												1
179	3				2								
180	3					1							
Average		2	1	1	1	1	1	1	1	1	1	1	
Occur (180 sites)		38	21	4	32	36	7	10	1	1	1	1	98
% occur		21	12	2	18	20	4	6	1	1	1	1	