



Underwater View of Coontail in Pike Lake (56.7 acres), Hennepin County, MN

Pike Lake, Hennepin County: 2021 Aquatic Plant Point Intercept Survey

Point Intercept Survey July 9, 2021

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Pike Lake, Hennepin County: 2021 Aquatic Plant Point Intercept Survey

Summary

On July 9, 2021, a point intercept survey was conducted on the 56.7 acre Pike Lake, Hennepin County. Plant growth was found to a depth of 11 feet and aquatic plants were estimated to cover 39 acres or 69% of Pike Lake. The most common submerged aquatic plant was coontail followed by flatstem pondweed. Coontail was observed at 24 sites (77% of the sites out to 11 feet). The aquatic plant community in 2021 had 3 species of submerged aquatic plants. This is a below average plant diversity condition for a lake in this setting. The number of individual plant species observed at sample points ranged from 0 to 4 with an average of 0.8 species/point (Figure S1).

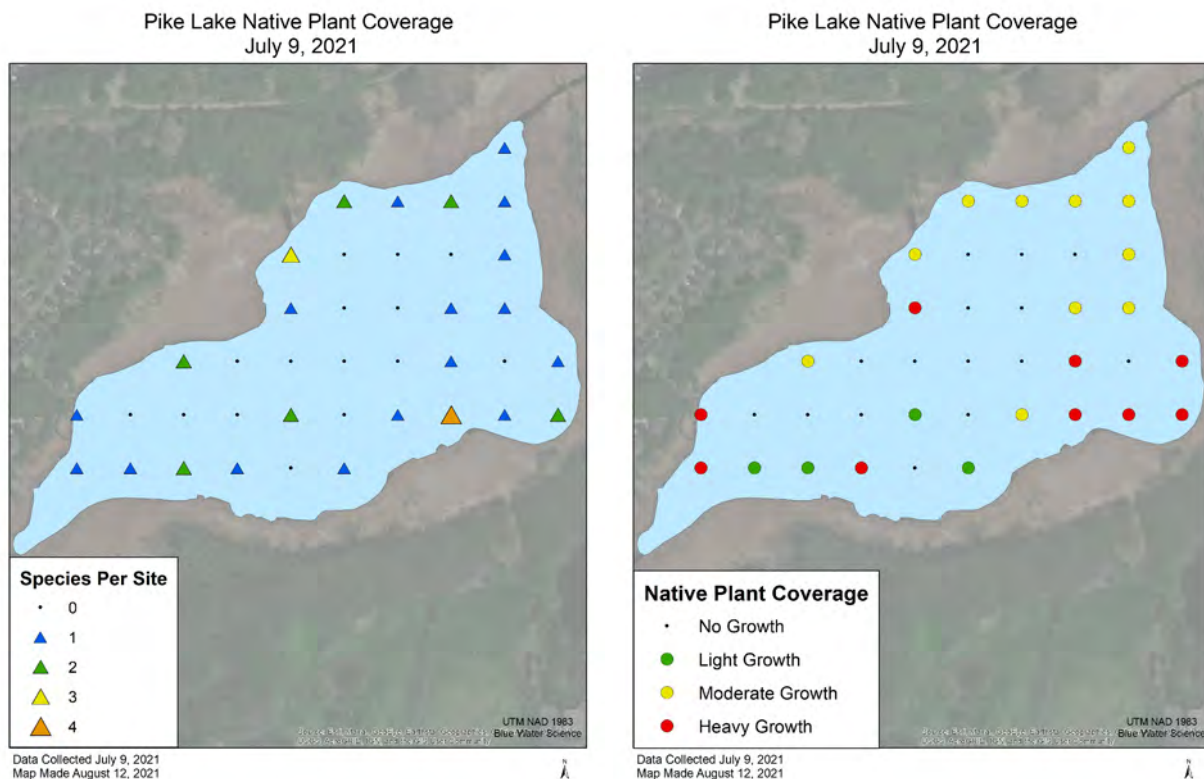


Figure S1. [left] Aquatic plant species richness for each sample site for Pike Lake on July 9, 2021. [right] Native aquatic plant distribution for July 9, 2021.

Table S1. Pike Lake aquatic plant occurrences and densities for the July 9, 2021 survey based on 31 sites in the plant growth zone, out to 11 feet of water depth for Pike Lake. Density ratings are 1-3 with 1 being low and 3 being most dense.

	All Stations (n=31 sites out to 11 feet)		
	Occurrence	% Occurrence	Density
Floatingleaf			
Duckweed (<i>Lemna minor</i>)	6	19	1.3
Spatterdock (<i>Nuphar variegata</i>)	1	3	2.0
White Lily (<i>Nymphaea odorata</i>)	6	19	1.3
Submergents			
Coontail (<i>Ceratophyllum demersum</i>)	24	77	2.2
Flatstem Pondweed (<i>Potamogeton zosteriformis</i>)	6	19	1.0
Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	1	3	1.0
Number of submerged species	3		



Figure S2. Channel between Eagle and Pike lakes.

Pike Lake, Hennepin County: 2021 Aquatic Plant Point Intercept Survey

Lake ID: 27-011-101

Size: 56.7 acres

Littoral area: 54.9 acres

Maximum depth: 22 feet

Mean depth: 8.6 feet

Introduction

Pike Lake is located within Hennepin County. An aquatic plant point intercept survey was conducted on July 9, 2021 with the objectives to characterize the aquatic plant community and to identify any new aquatic invasive species (AIS). Aquatic plant surveys also aid in characterizing distribution of native plants which help to sustain good water quality. As a general rule, if plant coverage is 40% or greater of the lake area, good water clarity is likely present. That was one parameter of many to be determined with the plant survey effort.

Pike Lake 75m Grid- 39 Sites

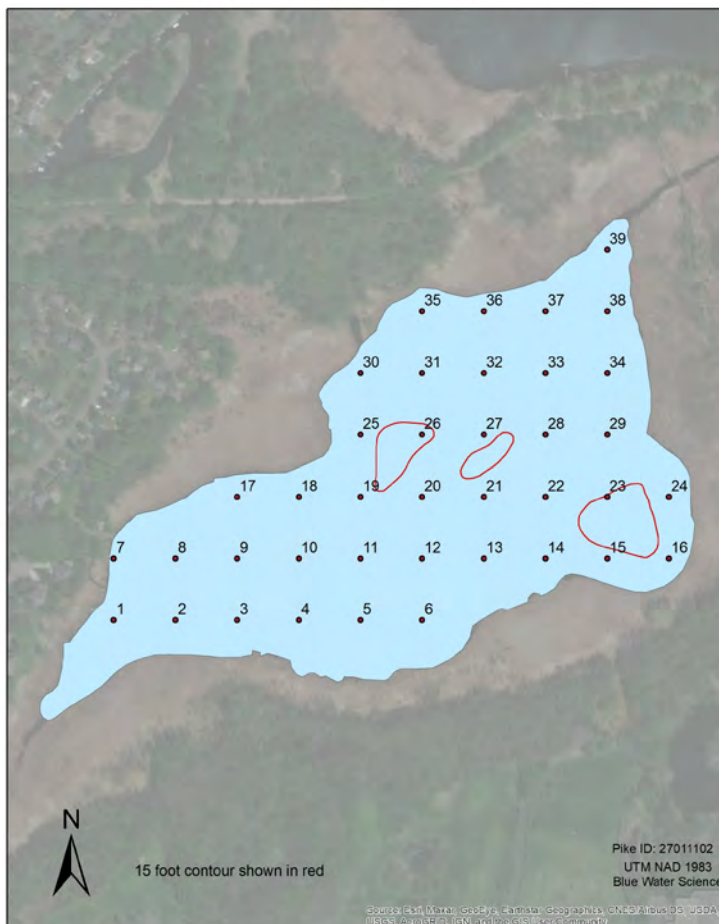


Figure 1. Sample locations for the point intercept aquatic plant survey based on 75 meter spacing, 15 foot contour line.

Methods - Aquatic Plant Surveys

Point Intercept Survey: An aquatic plant survey of Pike Lake using a point intercept sampling method was conducted by Blue Water Science on July 9, 2021. A map and sampling grid were prepared by Blue Water Science and consisted of a total of 39 points that were distributed throughout the lake. Points were spaced 75 meters apart. Each point represented about 1.4 acres. At each sample point, plants were sampled with a rake sampler. In water less than 15 feet, a fixed-head rake sampler on a telescoping pole was used. In water deeper than 15 feet, a double-ended rake sampler on a rope was tossed into the lake to sample plants. A plant density rating was assigned to each plant species on a scale from 1 to 3 (Figure 2). A density of a “1” indicated sparse growth and a “3” rating indicated heavy plant growth (Figure 2).

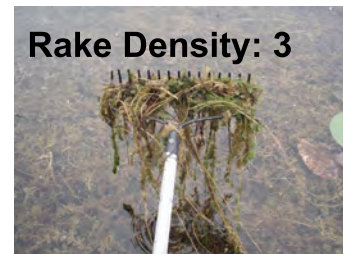


Figure 2. Aquatic plant density ratings from 1 to 3.



Figure 3. Two different rake samplers used during the Pike Lake surveys.
[left] Fixed head sampler.
[right] Double headed throw rake.

Point Intercept Survey - July 9, 2021

The submersed aquatic plants were common out to 11 feet and no plants were observed deeper than 11 feet in Pike Lake for the July 2021 point intercept plant survey. Coontail was the dominant plant in Pike Lake. Flatstem pondweed was also common. Eurasian watermilfoil was observed at one site. A total of 3 submersed aquatic plants and 3 floatingleaf species were found (Table 1 and Figure 4).

A summary of plant density and occurrence for individual species is shown in Table 1.

Table 1. Pike Lake aquatic plant occurrences and densities for the July 9, 2021 survey based on 31 sites in the plant growth zone, out to 11 feet of water depth for Pike Lake. Density ratings are 1-3 with 1 being low and 3 being most dense.

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Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	1	3	1.0
Number of submerged species	3		

Aquatic Plant Maps for Pike Lake

The number of aquatic plant species found at a sample point is referred to as species richness. The species richness in Pike Lake for each sample site is shown in Figure 4. The number of plant species at a sample point ranged from 0 to 4 with an average of 0.8 species per sample point. This is a below average species richness. Additional aquatic plant maps for individual plant species showing abundance and distribution are shown on the next page. Overall, aquatic plant abundance in Pike Lake is mostly light to moderate with coontail found with heavy growth in some areas.

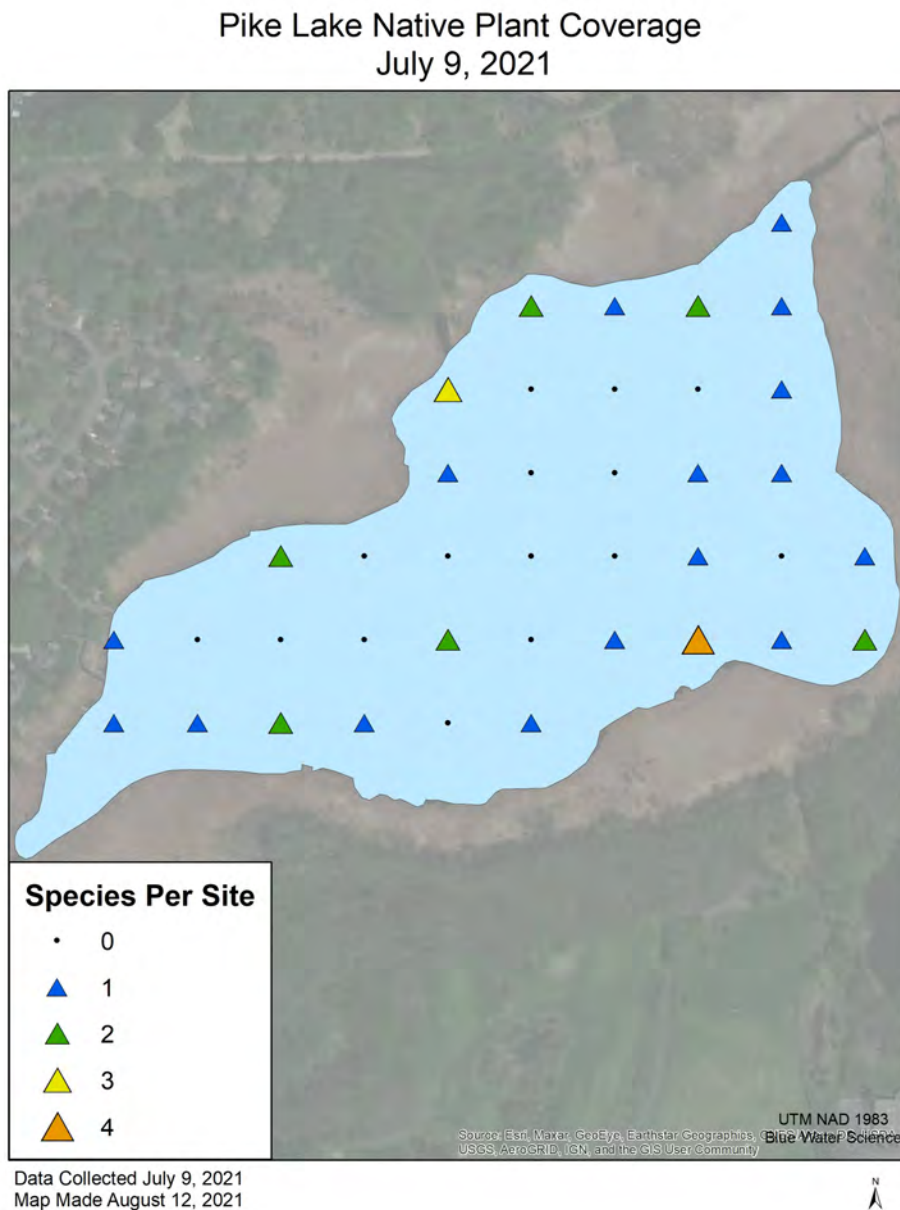
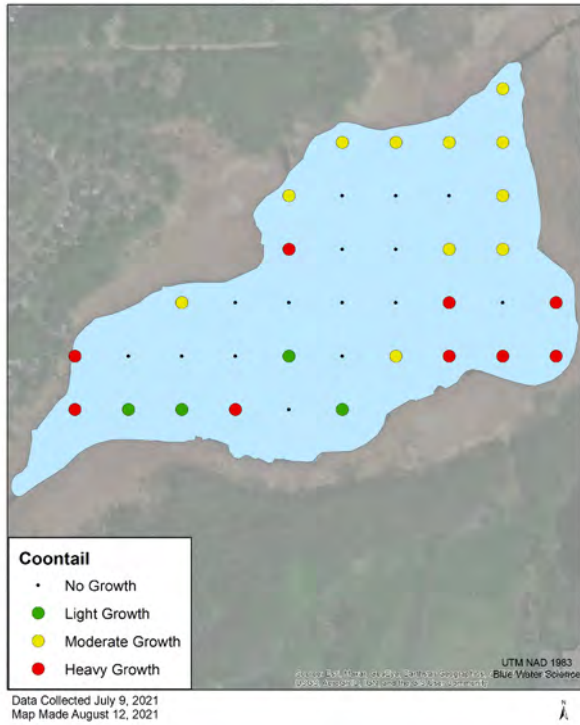


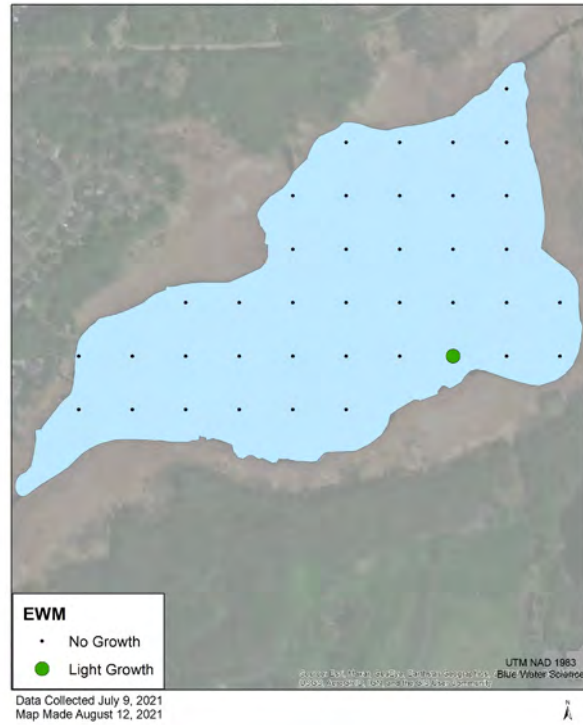
Figure 4. The number of aquatic plant species found at a sample point.

Aquatic Plant Abundance and Distribution

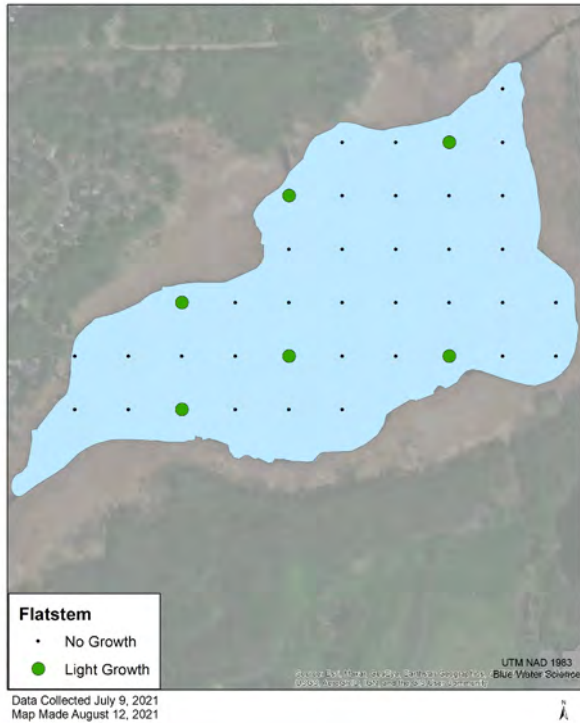
Pike Lake Coontail
July 9, 2021



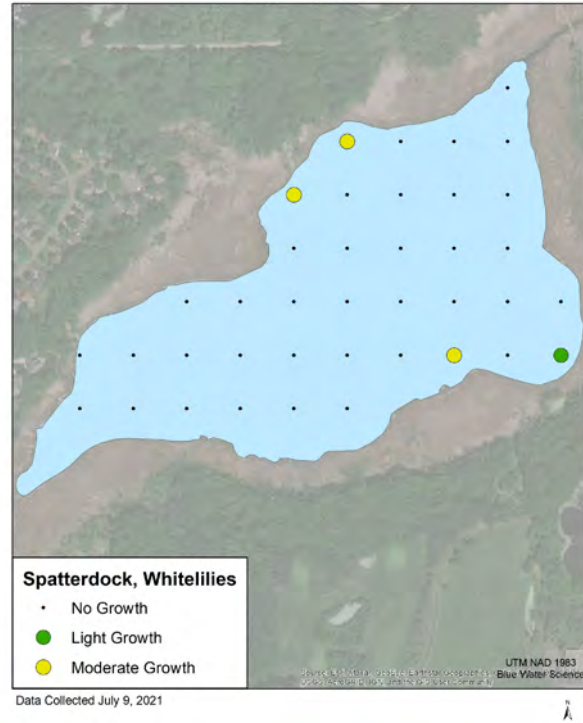
Pike Lake Eurasian Watermilfoil
July 9, 2021



Pike Lake Flatstem Pondweed
July 9, 2021



Pike Lake Lily Growth - White Lilies and Spatterdock
July 9, 2021



Pike Lake Point Intercept Survey Statistics

A summary of plant statistics from the point intercept survey is shown in Tables 2 and 3 and Figure 5. Plants were observed in depths up to 11 feet and a total of 39 points were sampled from 0 to 13 feet of depth. However, 95% of plant occurrences were recorded from 2 to 10 feet representing 25 points (Table 2).

The aquatic plant coverage of Pike Lake was estimated at 39 acres or 69% of the lake area. Since plant coverage does exceeds the 40% coverage criterium for good water clarity, Pike may be sensitive to excessive nutrient inputs and loss of clarity in the future.

Table 2. Pike Lake aquatic plant statistics (using MnDNR format).

Total # Points Sampled	39
Depth Range of Vegetation	3-11 ft
Maximum Depth of Growth (95%) in feet	10
# Points in Max Depth Range	25
# Points in Littoral Zone (0-15 feet)	36
% Points w/ Native Submersed Taxa	67
Mean Native Submersed Taxa/Point	0.8
Mean Density of Native Submersed Taxa	1.6
# Submersed Native Taxa	2

Table 3. Aquatic plants sampled by depth.

Depth (feet)	Number of Sites Sampled at that Depth	Percent Occurrence of Plants at that Depth
0	0	0
1	0	0
2	0	0
3	1	100%
4	1	100%
5	4	100%
6	4	100%
7	4	100%
8	4	100%
9	4	50%
10	3	100%
11	3	33%
12	0	0
13	5	0
14	2	0
15	1	0
16	2	0
17	0	0
18	1	0
19	0	0
20	0	0
All sites	39	

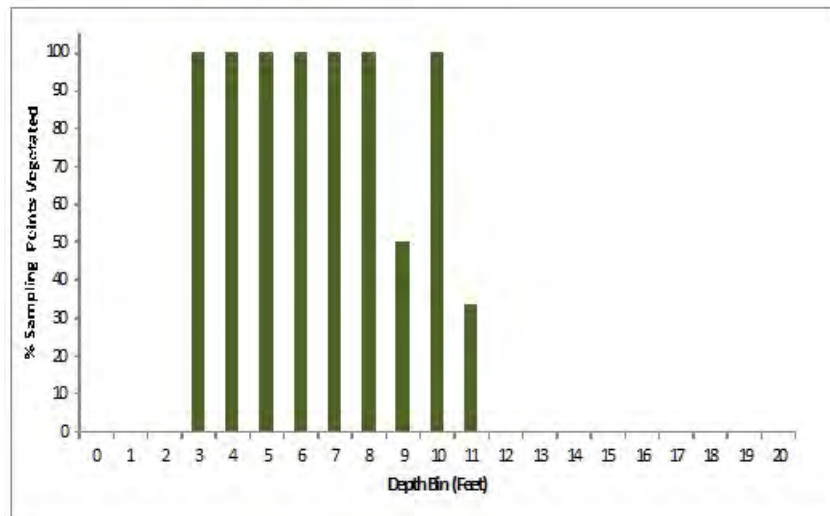


Figure 5. Growth depth of plant colonization out to 11 feet.

Representative Aquatic Plants in Pike Lake

A total of 3 submerged aquatic plant species and 3 floatingleaf species were observed in the Pike Lake aquatic plant survey. Representative aquatic plant conditions and species are in Figure 6.



Figure 6. Representative aquatic plants and conditions in Pike Lake in 2021.

APPENDIX

Individual Site Data for the Point Intercept Survey for Pike Lake, Hennepin Co

Table A1. Individual site data for July 9, 2021. Numbers indicate plant density.

Site	Depth (ft)	Duckweed	Spatterdock	White lilies	Coontail	EWM	Flatstem	No Plants
1	5	1			3			
2	11				1			
3	10				1		1	
4	8				3			
5	13							
6	10				1			
7	6	2			3			
8	16							
9	14							
10	9							
11	10				1		1	
12	13							
13	8				2			
14	5	1		2	3	1	1	
15	9				3			
16	7	1		1	3			
17	7				2		1	
18	13							1
19	9							
20	14							
21	13							
22	6				3			
23	18							
24	7				3			
25	7				3			
26	16							1
27	15							1
28	9				2			
29	8				2			
30	5	2	2		2		1	
31	11							1
32	11							1
33	13							1
34	8				2			
35	3	1		2	2			
36	5				2			
37	6				2		1	
38	6				2			
39	4				2			
Average		1.3	2.0	1.7	2.2	1.0	1.0	
Occurrence (39 sites)		6	1	3	24	1	6	6
% occurrence		15	3	8	62	3	15	