



Buck Lake, Scott County, Minnesota, in 2021

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# Aquatic Plant Point Intercept Survey for Buck Lake, Scott County, Minnesota

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Point Intercept Plant Survey Conducted September 1, 2021

Prepared for:  
Prior Lake-Spring Lake  
Watershed District



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# Aquatic Plant Point Intercept Survey for Buck Lake, Scott County, Minnesota

## Summary

Buck Lake (MnDNR ID #70-006500) is a 23 acre lake located in Scott County, Minnesota. A point intercept aquatic plant survey was conducted on September 1, 2021 by Blue Water Science to characterize conditions of native aquatic plants and to look for the non-native plant species.

In 2021, Buck Lake was found to have a low diversity of submerged aquatic plants, with 4 species of rooted submerged plants observed. Curlyleaf pondweed had died back by September 1. Coontail was the most common plant followed by elodea.

No Eurasian watermilfoil was observed in this survey.

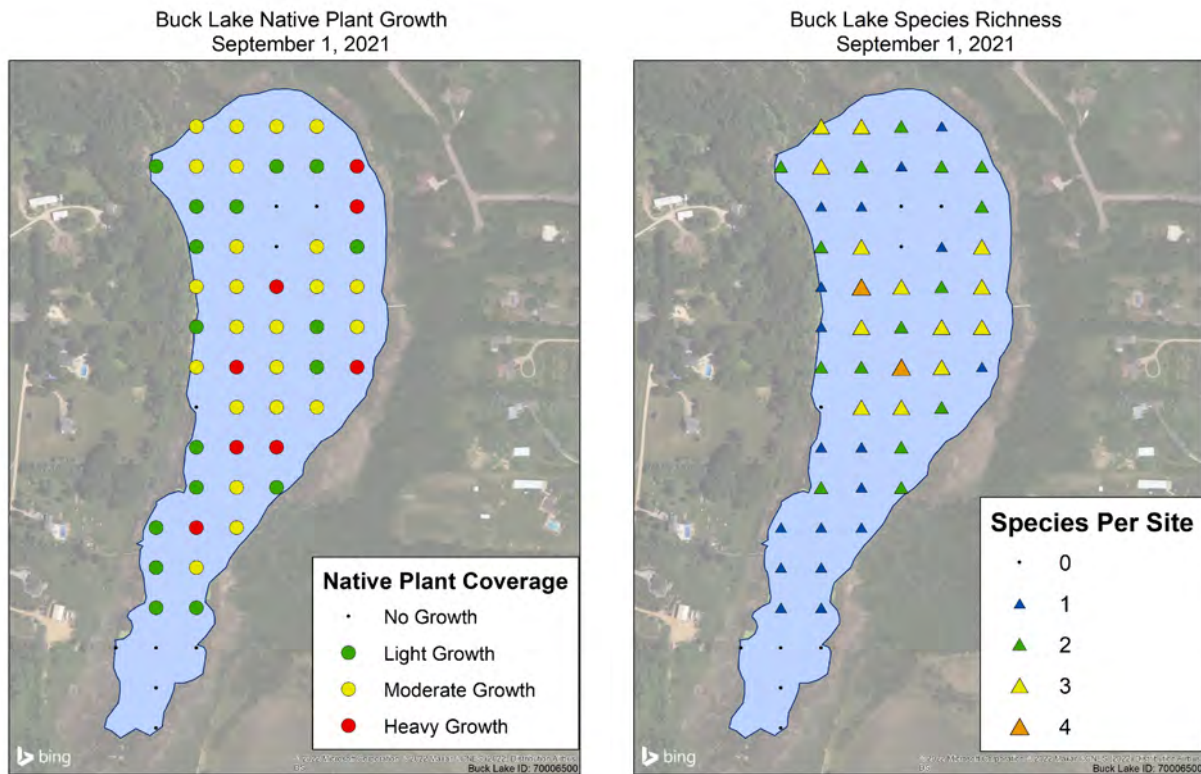


Figure 1. Native plant coverage (left) and species richness (right) maps for Buck Lake on September 1, 2021.

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Buck Lake, Scott County (MnDNR ID: 70-006500)

Size: 23 acres (source: PLSLWD website)

Maximum depth: 9 feet (source: PLSLWD website)

## Introduction

An aquatic plant point intercept survey were conducted on 23 acre Buck Lake, located in Scott County, in 2021. The objectives of the surveys were to characterize the aquatic plant community, assess changes in the plant community, and to look for non-native Eurasian watermilfoil.

## Methods

One survey was conducted on Buck lake in 2021. An aquatic plant point intercept survey of Buck Lake was conducted by Blue Water Science on September 1, 2021 and 57 points were sampled. Sample points were placed 50 meters apart on a grid that covered the lake (Figure 2).

At each sample point, a sampling rake was lowered into the water and a plant sample was taken. The point intercept grid allows year to year comparisons to be made in order to assess changes in the plant community. 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 heavy growth. Based on these sample sites, plant distribution maps were constructed.

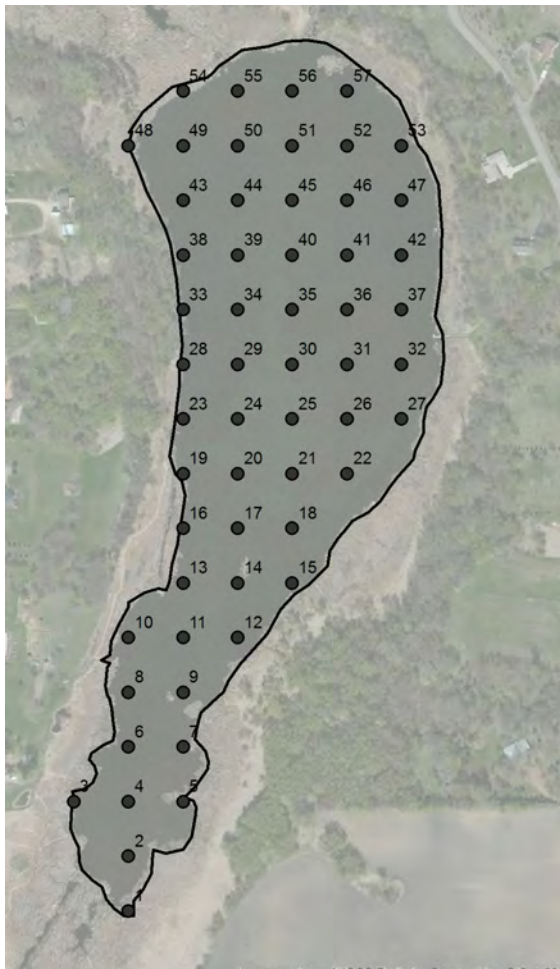


Figure 2. Sample locations for the point intercept survey site map.



# Results

**Point Intercept Survey, September 1, 2021:** Results of the summer aquatic plant point intercept survey conducted on September 1, 2021 found 4 submerged plants species (Table 1). Coontail was the most common plant followed by elodea and flatstem pondweed (Table 1). Duckweed was also very common. Maps of aquatic plants are shown in Figure 4.

Neither Eurasian watermilfoil nor curlyleaf pondweed were observed in the survey. Individual plant species data are shown in Table 2.

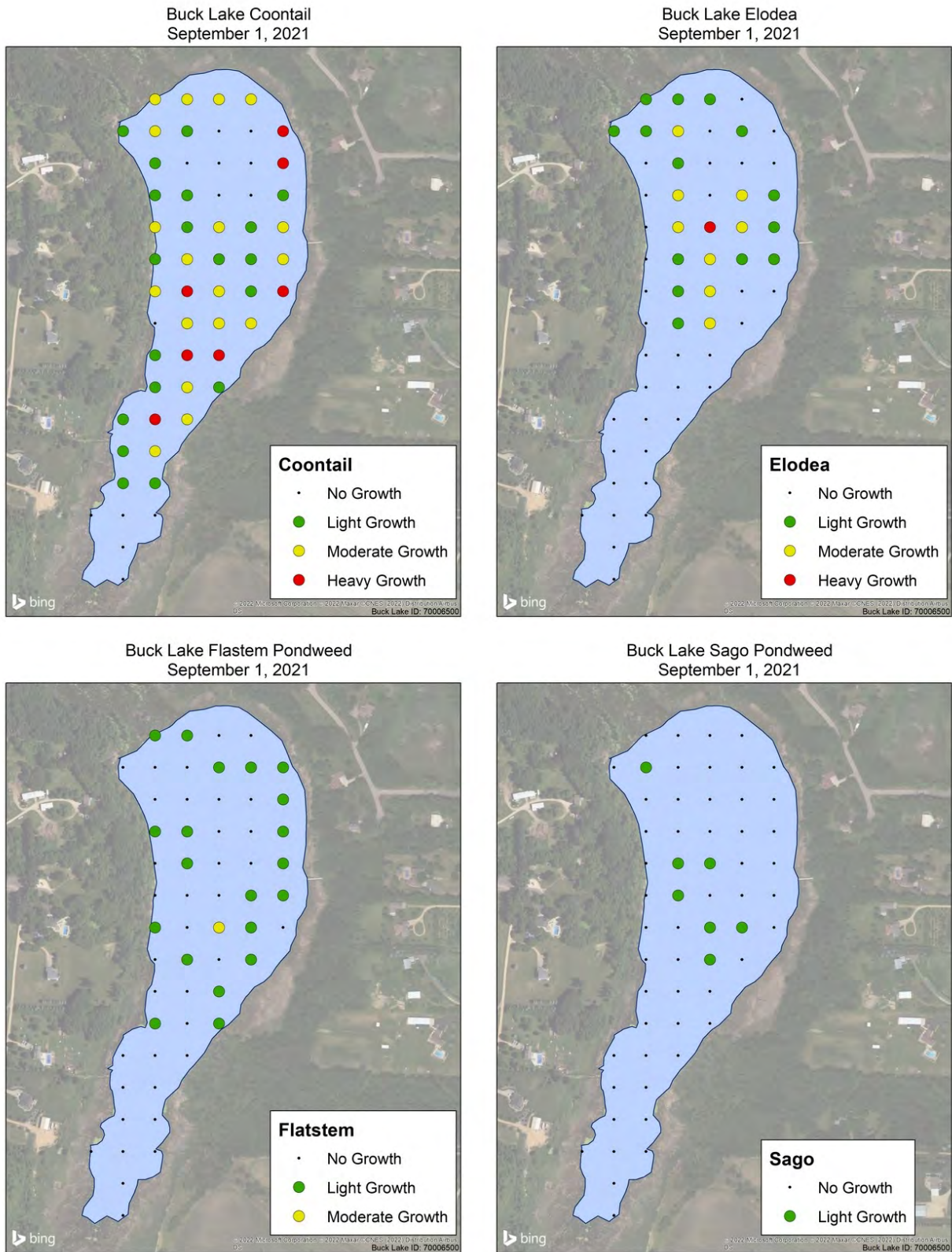
**Table 1. The percent occurrence and density of summer aquatic plants for Buck Lake on September 1, 2021. Percent occurrence is calculated based on the number of times a plant species occurs at a sampling station divided into the total number of stations for the survey.**

	Buck Lake September 1, 2021 (57 sites)		
	% Occurrence	Occurrence	Density
Duckweed ( <i>Lemna sp</i> )	49	28	2.2
Coontail ( <i>Ceratophyllum demersum</i> )	77	44	1.7
Elodea ( <i>Elodea canadensis</i> )	40	23	1.4
Flatstem pondweed ( <i>Potamogeton zosteriformis</i> )	37	37	1.0
Sago pondweed ( <i>Stuckenia pectinata</i> )	12	7	1.0
Aquatic Plant Coverage (ac)	19.8 ac		
Total submerged species	4		



**Figure 3. A mix of submerged aquatic plants on a sample rake. Coontail was the dominant plant.**

# Buck Lake Aquatic Plant Growth



**Figure 4. Buck Lake distribution and abundance maps for coontail (top-left), elodea (top-right), flatstem pondweed (bottom-left), and sago pondweed (bottom-right). Key: green = light growth, yellow = moderate growth, and red = heavy growth.**

**Table 2. Buck Lake, individual site data for the point intercept survey collected on September 1, 2021.**

Site	Depth (ft)	Duckweed/watermeal	Coontail	Elodea	Flatstem	Sago	FA	No Plants
1								1
2								1
3								1
4								1
5								1
6	0.3	2	1					
7	0.3	3	1					
8	0.3	3	1					
9	0.5	3	2					
10	1	3	1					
11	1	2	3					
12	2	3	2					
13	1	1	1		1			
14	2	1	2					
15	1	3	1		1			
16	1	3	1					
17	2	1	3					
18	2	1	3		1			
19	1	3						
20	3		2	1	1			
21	3		2	2		1		
22	2		2		1			
23	1	3	2		1			
24	3		3	1				
25	3	1	2	2	2	1		
26	2		1		1	1		
27	2	3	3					
28	1	3	1					
29	3		2	1		1		
30	3		1	2				
31	3		1	1	1			
32	2.5	1	2	1	1			
33	2	3	2					
34	4		1	2	1	1		
35	4		2	3		1		
36	4		1	2				
37	3	1	2	1	1			
38	2	1	1		1			
39	4		1	2	1			
40	7							1
41	8			2				
42	4		1	1	1			
43	3	3	1					
44	5			1				
45	7							1
46	7							1
47	4	1	3		1			
48	1	3	1	1				
49	2	1	2	1		1		
50	4		1	2				
51	6				1			
52	4			1	1			
53	3	2	3		1		1	
54	1	3	2	1	1			
55	2		2	1	1			
56	2		2	1				
57	2		2					
Average		2.2	1.7	1.4	1.0	1.0	1.0	
Occurrence (57 sites)		28	44	23	21	7	1	8
% occurrence		49	77	40	37	12	2	

## General Findings of This Study

- The shoreline around Buck lake is mostly native, has abundant emergent plant growth along the shoreline with and offers good wildlife habitat.
- Coontail was the dominant plant in 2010, 2016, 2019, and 2021. Coontail was often hitting the surface.
- Curlyleaf pondweed grows abundantly in spring and early summer but dies back in July and native plants dominate in Buck Lake.
- Overall aquatic plant coverage has remained about the same since 2010 (Table 3).
- The native plant community is in good shape and should continue to support good water quality.

**Table 3. Aquatic plant point intercept survey percent occurrence for 2010, 2016, 2019, and 2021 for Buck Lake.**

	Sept. 19, 2010 (60 sites)	August 31, 2016 (57 sites)	August 6, 2019 (57 sites)	Sept. 1, 2021 (57 sites)
	% Occurrence	% Occurrence	% Occurrence	% Occurrence
Cattails ( <i>Typha sp</i> )	12			
Duckweed ( <i>Lemna sp</i> )	55	14	81	49
Watermeal ( <i>Wolffia columbiana</i> )	53			
Coontail ( <i>Ceratophyllum demersum</i> )	73	95	91	77
Curlyleaf Pondweed ( <i>Potamogeton crispus</i> )			7	
Elodea ( <i>Elodea canadensis</i> )		46	23	40
Star duckweed ( <i>Lemna trisulca</i> )	13		40	
Stringy pondweed ( <i>Potamogeton sp</i> )	5		7	
Flatstem pondweed ( <i>Potamogeton zosteriformis</i> )	5	49	72	37
Sago pondweed ( <i>Stuckenia pectinata</i> )	5	19	41	12
Bladderwort ( <i>Utricularia sp</i> )		12	11	
Aquatic Plant Coverage (ac)	19.7	21.9	21.0	19.8
Total submerged species	5	5	8	4



# APPENDIX

## Results of the Lake Sediment Survey-2010

Buck Lake sediment results are fairly typical for lake sediments except for a couple of parameters. Sediment pH is a little lower than normal (where normal is 7.7). Both Olsen-phosphorus and ammonia nitrogen were elevated in the sediments (Table 4) and iron was also slightly elevated. With high Olsen-P concentrations, it appears Buck Lake sediments have a potential to release moderate amounts of phosphorus to the water column. Sulfate levels were normal except for Site B6 where there was a high concentration. Organic matter was normal for a shallow lake and results indicated sediments were generally a silty muck.

**Table 4. Lake sediment results for six locations.**

Sample Number	Bulk Density (wt/8.51)	Water pH	Organic Matter (%)	Bray-P (ppm)	Olsen-P (ppm)	Potassium (ppm)	Zinc (ppm)	Copper (ppm)	Iron (ppm)	Manganese (ppm)	Fe/Mn	Calcium (ppm)	Magnesium (ppm)	Boron (ppm)	Ammonia Nitrogen (ppm)	Sulfate (ppm)
B1	0.58	7.4	26.1	1	14	65	1.7	1.6	227.8	27.6	8.3	2,790	278	0.8	55.5	45
B2	0.76	7.3	14.9	7	19	147	3.4	3.8	263.3	47.8	5.5	3,285	462	0.9	171.9	39
B3	0.77	7.4	12.4	10	18	122	3.3	3.4	275.1	25.8	10.7	3,122	396	1.2	110.7	23
B4	0.59	7.5	19.5	2	12	69	1.9	1.9	177.1	26.2	6.8	2,712	298	0.9	62.7	61
B5	0.66	7.4	19.2	1	19	90	2.1	2.4	264.3	48.4	5.5	3,151	327	0.7	85.7	70
B6	0.72	7.2	19.0	2	49	100	2.2	2.4	399.6	71.8	5.6	3,647	472	1.1	61.7	215



**Figure 5. [left] Coontail was found growing to the surface in some areas of Buck Lake on September 16, 2010.**

**[right] Buck Lake plant conditions on September 16, 2010. Some plants were growing to the surface.**

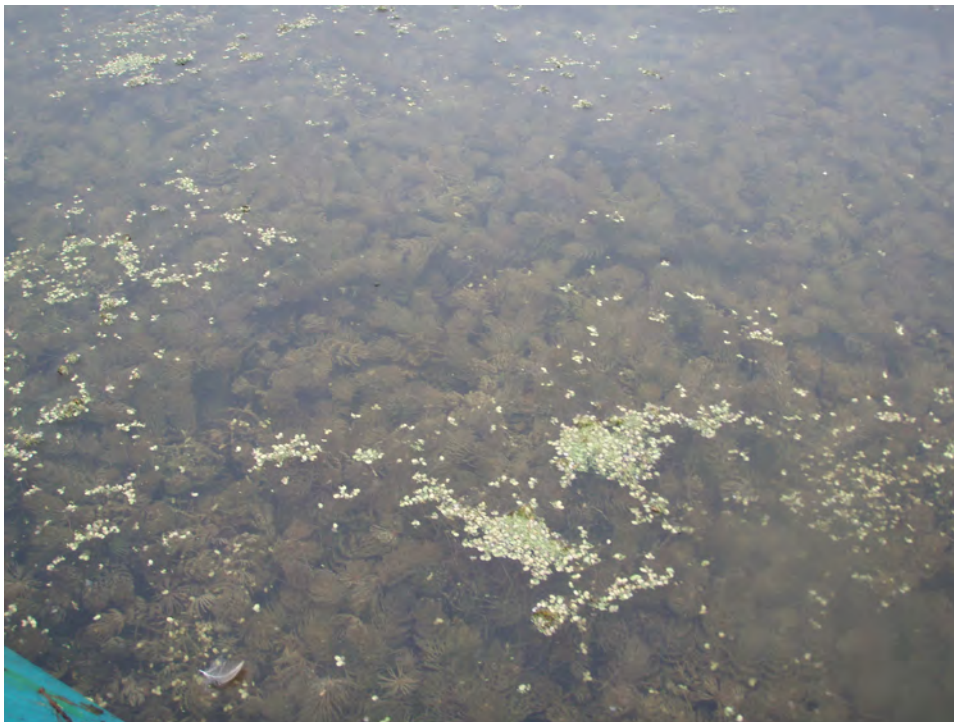


# Lake Sediment Conditions and Future Non-Native Plant Growth

The objective of this lake soil fertility survey was to characterize Buck Lake soils in the littoral zone in order to better predict where potential nuisance areas of milfoil and Curlyleaf growth could occur in the future.

**Table 5. Sediment survey summary. Based on lake sediment characteristics, curlyleaf pondweed has a low potential for heavy growth and Eurasian watermilfoil has a high potential for heavy growth.**

	Depth (ft)	Plants Observed at Sample Site	Curlyleaf Suitability for Heavy Growth	Eurasian watermilfoil Suitability for Heavy Growth
Site 1	5	Coontail "5" Stringy "1"	Moderate	Moderate
Site 2	5	Coontail "4"	Low	High
Site 3	3	--	Low	High
Site 4	4	Coontail "4"	Moderate	High
Site 5	5	Coontail "5" Sago "1"	Low	High
Site 6	8	Coontail "1"	Low	High



**Figure 6. Buck Lake has fairly good water clarity, especially in areas with thick coontail growth. Duckweed (shown floating on the water) was common as well.**

# Potential for Curlyleaf Pondweed Growth

Lake sediment sampling results from 1997 have been used to predict lake bottom areas that have the potential to support nuisance curlyleaf pondweed plant growth. Based on the key sediment parameters of pH, sediment bulk density, organic matter, and the Fe:Mn ratio (McComas, unpublished), the predicted growth characteristics of curlyleaf pondweed are shown in Table 6 and Figure 7.

Curlyleaf pondweed growth is predicted to produce mostly low to moderate nuisance growth (where plants top out) at only several locations (Figure 7).

**Table 6. Buck Lake sediment data and ratings for potential nuisance curlyleaf pondweed growth.**

Site	pH (su)	Bulk Density (g/cm <sup>3</sup> dry)	Organic Matter (%)	Fe:Mn Ratio	Potential for Curlyleaf Pondweed Growth
Light Growth	6.8	1.04	5	4.5	Light (green)
Moderate Growth	6.2	0.94	11	5.9	Moderate (yellow)
Heavy Growth	>7.7	<0.51	>20	<1.6	High (red)
1	7.4	0.579	26.1	5.3	Moderate
2	7.3	0.756	14.9	5.5	Light
3	7.4	0.766	12.4	10.7	Light
4	7.5	0.591	19.5	6.8	Moderate
5	7.4	0.662	19.2	5.5	Light
6	7.2	0.718	19.0	5.6	Light



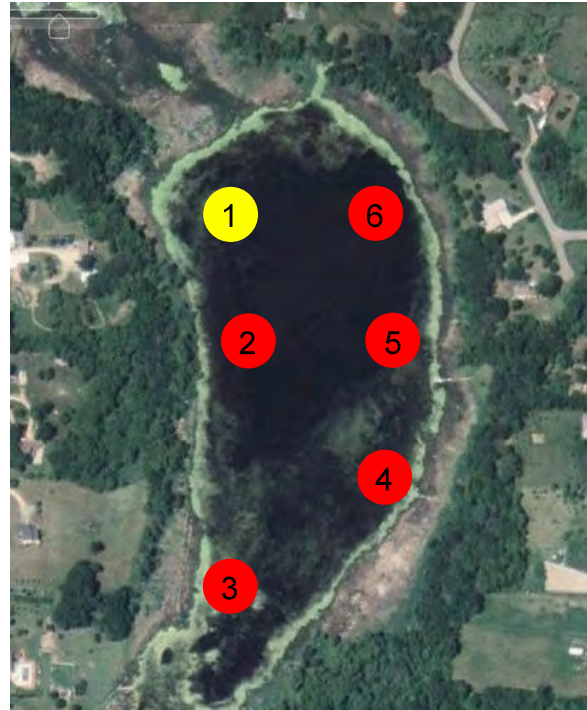
**Figure 7. Curlyleaf pondweed growth is predicted to be light to moderate based on lake sediment characteristics. Green circles = light growth and yellow circles = moderate growth.**

# Potential for Eurasian Watermilfoil Growth

Based on results from other lakes we predict that the combination of high organic matter and high nitrogen values (greater than 10 ppm as exchangeable ammonium) will sustain nuisance milfoil growth on an annual basis unless some other factor limits growth. Limiting factors include things such as milfoil weevils, light penetration, and other unknown variables. When lake bottom areas have moderate fertility (less than 6 ppm of exchangeable nitrogen), we predict there is the potential to support nuisance growth in some years, but not on a continuous basis.

**Table 7. Buck Lake sediment data and ratings for potential nuisance Eurasian watermilfoil growth.**

Site	NH <sub>4</sub> Conc (ppm)	Organic Matter (%)	Potential for Nuisance EWM Growth
Light Growth	<10	>20	Low (green) to Medium (yellow)
Heavy Growth	>10	<20	High (red)
1	56	26	Medium
2	172	15	High
3	111	12	High
4	63	20	High
5	86	19	High
6	62	19	High



**Figure 8. Eurasian watermilfoil growth is predicted to be moderate to heavy. Yellow circle = moderate growth and red circles = heavy growth.**