



Bed of Curlyleaf Pondweed, Moody Lake, Chisago County, Minnesota, June 1, 2023

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# Curlyleaf Pondweed Delineation and Assessment Surveys for Moody Lake, Chisago County, Minnesota, 2023

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Curlyleaf Pondweed Delineation: April 25, 2023

**Curlyleaf Treatment: No Treatment in 2023**

Curlyleaf Pondweed Assessment: June 1, 2023

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



Prepared by:  
Steve McComas  
Jo Stuckert  
Connor McComas  
Blue Water Science

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# Curlyleaf Pondweed Delineation and Assessment Surveys for Moody Lake, Chisago County, Minnesota, 2023

## Summary

**Curlyleaf Pondweed Delineation:** Moody Lake (MnDNR ID #13-0023) is a 45 acre lake located in Chisago County, Minnesota. Water clarity has a summer average of 4.2 feet in 2022 (source: CLFLWD). A full point intercept survey were conducted on April 25, 2023 by Blue Water Science. Data from the point intercept survey was used to determine areas for curlyleaf pondweed treatment and to look for Eurasian watermilfoil. Results of the curlyleaf delineation found curlyleaf pondweed was found in a few sample sites but at mostly low projected growth (Figure 1). No treatment for curlyleaf pondweed was conducted in 2023.

**Curlyleaf Pondweed Assessment:** A point intercept survey was used for the curlyleaf pondweed assessment and was conducted on June 1, 2023 by Blue Water Science (Figure 1). Results of the curlyleaf pondweed assessment found curlyleaf pondweed in Moody Lake had expanded slightly and was growing at light to heavy densities. Heaviest curlyleaf growth was on the west side of the lake. Also, in June, Moody Lake had a low diversity of submerged aquatic plants, with chara, coontail, elodea, and flatstem pondweed the only other submerged aquatic plant species observed.

Moody Lake Curlyleaf Pondweed Delineation  
April 25, 2023

Moody Lake Curlyleaf Pondweed  
June 1, 2023

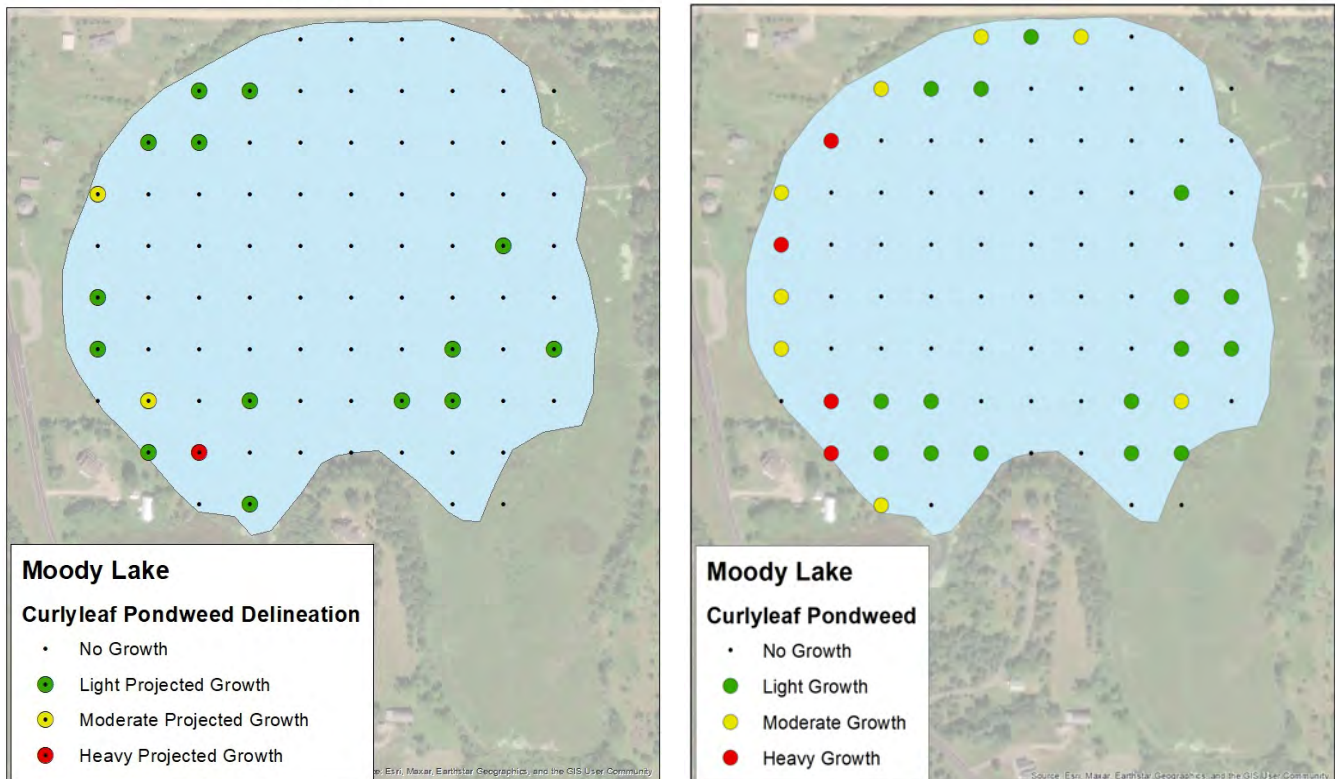


Figure 1. [left] Curlyleaf pondweed treatment areas Moody Lake that were delineated on April 25, 2023. [right] Curlyleaf pondweed coverage for Moody Lake on June 1, 2023.

Key: green dots = light growth, yellow dots = moderate growth, red dots = heavy growth, and black dots = sample site without plants.



# Curlyleaf Pondweed Delineation and Assessment Surveys for Moody Lake, Chisago County, Minnesota, 2023

**Moody Lake, Chisago County (ID: 13-0023)**

**Size: 45 acres (MnDNR)**

**Littoral area: 22 acres (MnDNR)**

**Maximum depth: 48 ft (MnDNR)**

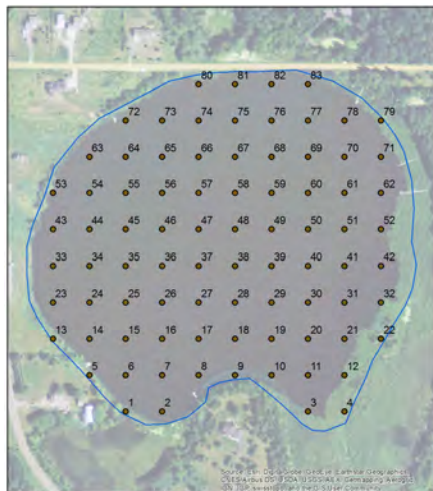
## Introduction

A curlyleaf pondweed delineation was conducted on April 25, 2023 on 45 acre Moody Lake, Chisago County. The objective of the delineation was to check the distribution and abundance of curlyleaf pondweed. A curlyleaf pondweed assessment was conducted on June 1, 2023 again to check the distribution and abundance of curlyleaf pondweed and Eurasian watermilfoil and to characterize all native plants.

## Methods

**Curlyleaf Pondweed Delineation:** At the time of the spring CLP delineations, only a fraction of the peak curlyleaf biomass is present. For spot treatments, the areas to be treated should be delineated prior to curlyleaf developing peak biomass. Curlyleaf stem counts on a rake sampler were used to identify areas that had a potential to produce dense curlyleaf. After a short sweep of about 1-foot (30 cm), 4 curlyleaf stems or more per rake sample generally indicated some CLP plants had developed runners and would likely produce heavy growth in the next few weeks. Alternatively, sites where 3 stems or less were collected per rake sample were not predicted to produce dense growth at the peak growing period. These areas were not treated. This delineation method was used for spot lake treatments in Gleason Lake and has worked for other lakes as well (McComas et al, 2015\*).

**Point Intercept Surveys and the Curlyleaf Pondweed Assessment:** Two point intercept surveys were conducted by Blue Water Science on April 25



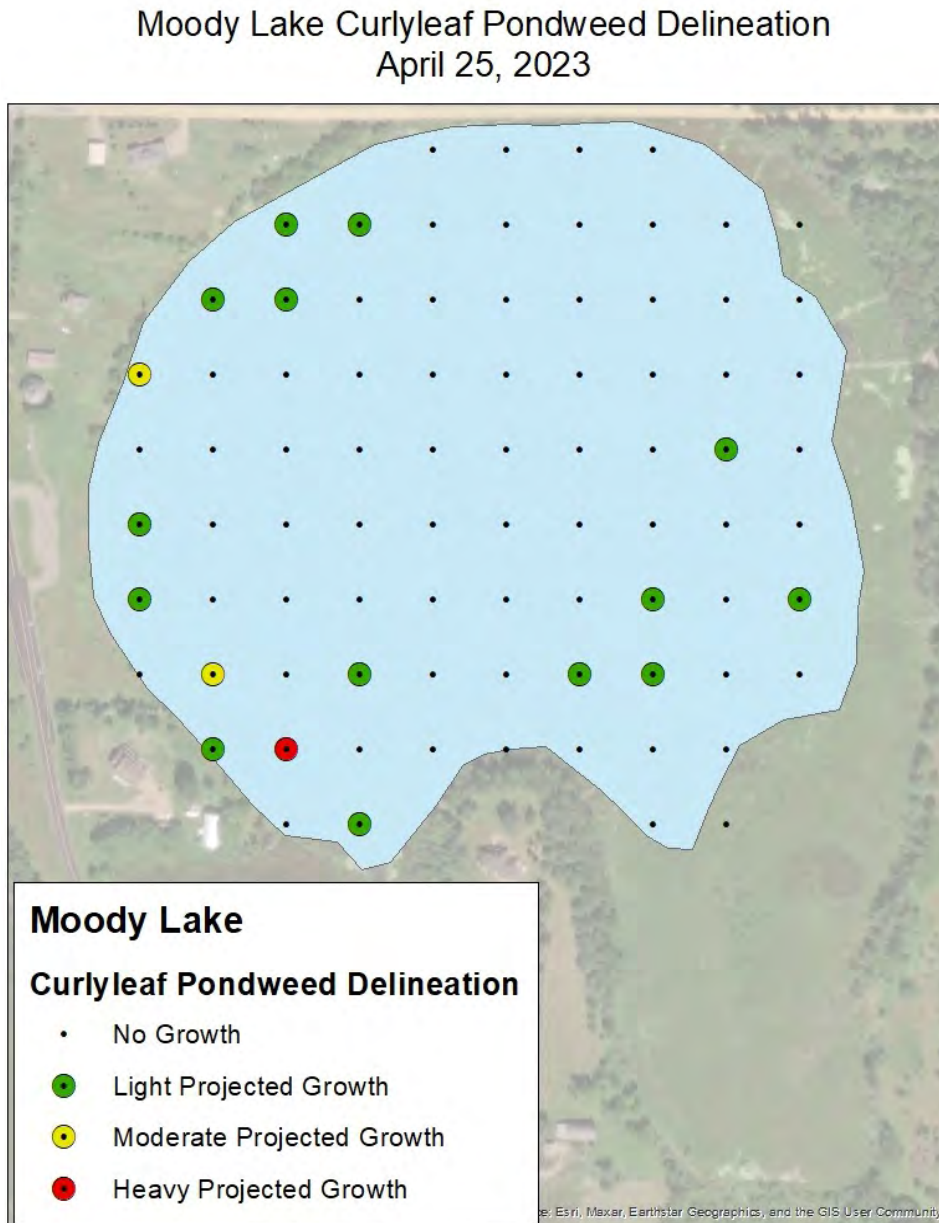
and June 1, 2023. Grid spacing was 50 meters. The plant species were recorded and the density of each species was assigned. Densities were based on the coverage on the teeth of the rake. Density ratings were from 1 to 3 with 1 being sparse and 3 being a nuisance. Based on these sample sites, plant distribution maps were constructed.

**Figure 2. Point intercept site map for Moody Lake.**

\*McComas, S.R., Y.E. Christianson, and U. Singh. 2015. Effects of curlyleaf pondweed control on water quality and coontail abundance in Gleason Lake, Minnesota. *Lake and Reservoir Management*. 31:109-114.

## Results for the CLP Delineation: April 21, 2022

A point intercept survey was conducted to delineate CLP on April 21, 2022 (Figure 3). Results from the survey found that CLP stem densities at most of the sites were not predicted to produce heavy growth of CLP abundance in June therefore no areas were delineated for treatment. No treatment occurred in 2022. Coontail and elodea was the only other submerged plant species observed (Tables 1 and 2).



**Figure 3. Curlyleaf pondweed from the point intercept survey conducted on April 25, 2023.**  
Key: Green dots = light growth, red dots = heavy growth, and black dot = sample site, no plants.

**Table 1. Moody Lake aquatic plant occurrences and densities for the April 25, 2023 point intercept survey based on 83 sites. Density ratings are 1-3 with 1 being low and 3 being most dense.**

	All Stations (n=83)		
	Occur	% Occur	Density
Coontail ( <i>Ceratophyllum demersum</i> )	33	40	1.2
Chara ( <i>Chara sp</i> )	3	4	1.3
Elodea ( <i>Elodea canadensis</i> )	34	41	1.2
Curlyleaf pondweed - stems ( <i>Potamogeton crispus</i> )	17	20	1.7

**Table 2. Aquatic plant occurrence and stem density for the point intercept sample points in Moody Lake, April 25, 2023.**

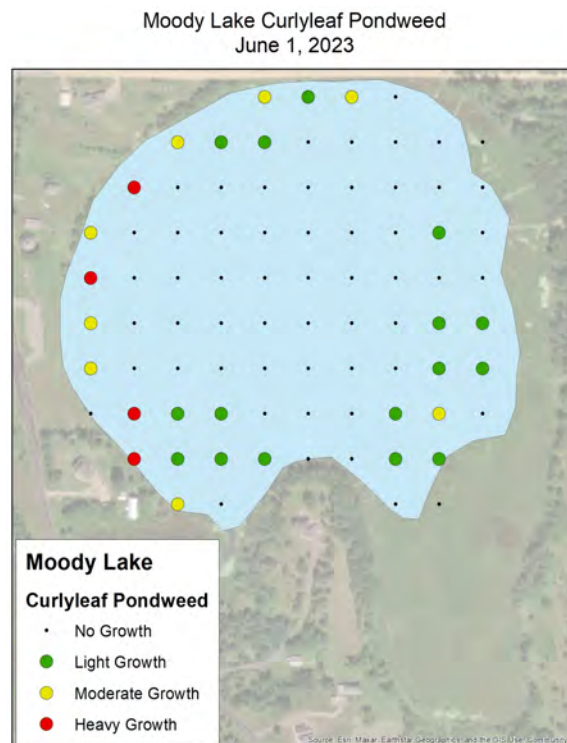
Site	Depth (ft)	Chara	Coontail	CLP Stems	Elodea
1	4		1		
2	4		1	1	
3	3		1		1
5	4		1	2	1
6	4			4	
7	6		1		2
8	6		1		2
9	3		1		
10	4				1
11	4				1
12	3		1		1
13	3		1		1
14	6		1	3	1
15	8		1		
16	9			1	
17	7		1		2
18	7				1
19	6	2	1	1	1
20	6			1	1
21	4				1
22	5		2		
23	5		1	2	
24	7		1		1
25	23				
27	22				
28	12				
29	8				
30	7	1	1	1	
31	6				2
32	5		2	1	1
33	6		1	1	1
34	17				
35	27				
39	15				
40	8				1
41	6	1			1
42	5		2		
43	5		1		1
44	13				
50	10				
51	6			2	2
52	5		1		1
53	4				1
54	7				2
60	11				
61	7				1
62	5				1
63	5				2
64	7				1
70	6				2
71	3				1
72	5				1
73	6				1
74	6				2
75	8				
76	10				
77	13				
78	6				1
80	4				
81	4				
82	5				1
83	6				1
Average		1.3	1.2	1.7	1.2
Occur (83 sites)		3	33	17	34
% occurrence		4	40	20	41

## Results for the June 1, 2023 Point Intercept Survey and CLP Assessment

Results of the June 1, 2023 assessment using a point intercept survey found there were 5 submerged plant species, chara, coontail, curlyleaf pondweed, elodea, and flatstem pondweed with coontail being the dominant plant (Tables 3 and 4). No CLP treatment occurred in 2023 and CLP distribution increased from 17 sites to 28 sites. The heaviest CLP growth was on the west side of Moody Lake (Table 3 and Figure 4). Results from the assessment found native plants growing out to a depth of 11 feet (Table 4).

**Table 3. Moody Lake aquatic plant occurrences and densities for the June 1, 2023 survey based on 83 sites. Density ratings are 1-3 with 1 being low and 3 being most dense.**

	All Stations (n=83)		
	Occur	% Occur	Density
Cattails ( <i>Typha sp</i> )	2	2	1.0
White waterlily ( <i>Nymphaea ordata</i> )	3	4	1.0
Coontail ( <i>Ceratophyllum demersum</i> )	48	58	1.7
Chara ( <i>Chara sp</i> )	7	8	1.1
Elodea ( <i>Elodea canadensis</i> )	36	43	1.3
Curlyleaf pondweed ( <i>Potamogeton crispus</i> )	28	34	1.6
Flatstem pondweed ( <i>P. zosteriformis</i> )	1	1	1.0



**Figure 4. Curlyleaf pondweed coverage for Moody Lake on June 1, 2023. Key: black dots = no growth, green dot = light growth, yellow dots = moderate growth, and red dots = heavy growth.**



# Aquatic Plant Conditions

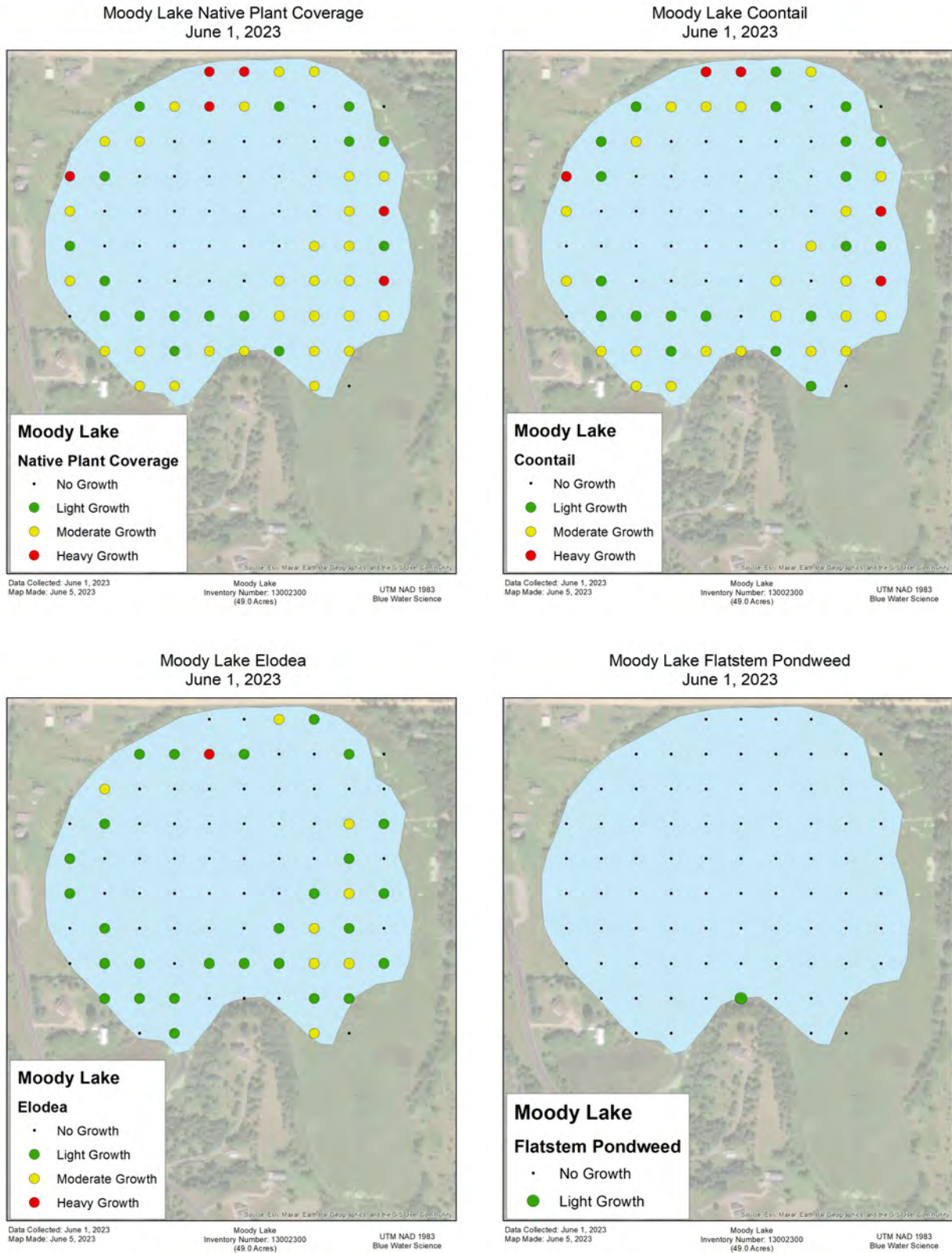


Figure 5. Aquatic plant conditions on June 1, 2023.

**Table 4. Aquatic plant occurrence and density for the point intercept sample points in Moody Lake, June 1, 2023.**

Site	Depth (ft)	Cat-tails	White lily	Chara	Coon-tail	CLP	Elodea	Flat-stem	Fila algae
1	1	1	1		2	2			1
2	2		1		2		1		1
3	2				1		2		
4	0								
5	3				2	3	1		
6	5				2	1	1		
7	5				1	1	1		
8	5				2	1			
9	3				2			1	
10	3				1				
11				1	2	1	1		
12	1				2	1	1		2
13	0								
14	5				1	3	1		
15	7				1	1	1		
16	8				1	1			
17	6				1		1		
18	6						1		
19	6			2	2		1		
20	5				1	1	2		
21	5				2	2	2		
22	4				2		1		
23	4				2	2			
24	8			1	1		1		
25	22								
26	27								
27	22								
28	13								
29	7				2		1		
30	6						2		1
31	5				2	1	1		
32	3				3	1			2
33	5					2	1		
34	16								
38	23								
39	17								
40	7			1	2		1		
41	6			1	1	1	2		
42	4			1	1	1	1		1
43	5				2	3	1		
44	17								
45	26								
50	11								
51	6				2		1		
52	4				3				1
53	3		1		3	2			
54	6			1	1		1		
55	18								
60	12								
61	6				1	1	2		
62	4				2		1		
63	6				1	3	2		
64	7				2				
65	9								
66	9								
67	14								
68	26								
69	18								

Site	Depth (ft)	Cat-tails	White lily	Chara	Coon-tail	CLP	Elodea	Flat-stem	Fila algae
70	5				1				
71	3				1				
72	5				1	2	1		
73	6				2	1	1		
74	6				2	1	3		
75	7				2		1		
76	10				1				
77	9								
78	5				1		1		
79	1	1							
80	4				3	2			
81	3				3	1			
82	5				1	2	2		
83	4				2		1		
Average		1.0	1.0	1.1	1.7	1.6	1.3	1.0	1.3
Occur (83 sites)		2	3	7	48	28	36	1	7
% occur		2	4	8	58	34	43	1	8

