

	A	B	C	D	E	F	G	H	I	J	K	L
1	ID	Latitude	Longitude	Depth	Sediment	Littoral_Zone	Littoral_Zone_with_Plants	Native_Species_Richness	Total_Rake_Fullness	CLP	Bidens_beckii_Wa	Cerat
2	1	45.45629	-92.39974	5	M	1	1	4	2	0	0	1
3	2	45.45656	-92.40015	7.5	M	1	1	2	2	0	0	2
4	3	45.45657	-92.39975	5.5	M	1	1	3	2	0	0	1
5	4	45.45673	-92.39222	7.5	M	1	1	2	1	0	0	1
6	5	45.45673	-92.39183	8	M	1	1	2	2	0	0	0
7	6	45.45674	-92.39143	8	M	1	1	3	2	0	0	2
8	7	45.45675	-92.39103	7	M	1	1	1	1	0	0	1
9	8	45.45676	-92.39064	5	M	1	1	3	1	0	0	1
10	9	45.45683	-92.40055	8	M	1	1	2	2	0	0	2
11	10	45.45684	-92.40016	7	M	1	1	2	3	0	0	3
12	11	45.45685	-92.39976	6	M	1	1	2	2	0	0	2
13	12	45.45685	-92.39937	4.5	M	1	1	3	2	0	0	2
14	13	45.45700	-92.39223	9.5	M	1	1	2	1	0	0	1
15	14	45.45701	-92.39184	10	M	1	1	1	1	0	0	0
16	15	45.45702	-92.39144	10	M	1	1	2	2	0	0	2
17	16	45.45704	-92.39065	7.5	M	1	1	3	2	0	0	2
18	17	45.45705	-92.39025	6.5	M	1	1	1	1	0	0	0
19	18	45.45711	-92.40057	7.5	M	1	1	2	2	0	0	2
20	19	45.45712	-92.40017	7	M	1	1	2	2	0	0	1
21	20	45.45712	-92.39977	6.5	M	1	1	2	2	0	0	2

	A	B	C	D	E	F	G	H	I	J	K	L
22	21	45.45713	-92.39938	5.5	M	1	1	2	2	0	0	2
23	22	45.45714	-92.39898	5	M	1	1	3	2	0	0	2
24	23	45.45732	-92.39027	8	M	1	1	3	2	0	0	2

A	
1	<b>Boat Survey</b>
2	<b>Lake</b>
3	<b>County</b>
4	<b>WBIC</b>
5	<b>Date of Survey</b>
6	<b>Field Crew</b>
7	
8	
9	
10	<b>Nearest Point</b>
11	

	B
1	
2	Balsam Lake Pretreatment
3	Polk
4	2620600
5	15/05/2023
6	Matthew S. Berg
7	
8	
9	
10	<b>Species seen, habitat information</b>
11	

	C
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	

	A	B	C	D	E	F	G	H	I	J	K	L	M		
1	<b>Entry</b>														
		Total Number Species at Site (NO ENTRY!)	Total Number Species - veg sites only (NO ENTRY!)	Total Number Species - veg sites only (NO ENTRY!)	Total Number Species - veg sites only (NO ENTRY!)	Total Number Species at Site (shallower than max. depth) (NO ENTRY!)	Total Number Species at Site (shallower than max. depth) (NO ENTRY!)	Total Number Species at Site (shallower than max. depth) (NO ENTRY!)	Total Number Species at Site (shallower than max. depth) (NO ENTRY!)	Depth with some plants (NO ENTRY!)	Depths within vegetated range (NO ENTRY!)	sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth
2	<b>Name</b>	4	4	4	4	4	5	1	Balsam Lake Pretre	1	45.45629	-92.39974	5		
3	<b>County</b>	2	2	2	2	2	7.5	1	Polk	2	45.45656	-92.40015	7.5		
4	<b>WBIC</b>	3	3	3	3	3	5.5	1	2620600	3	45.45657	-92.39975	5.5		
5	<b>Date</b>	2	2	2	2	2	7.5	1	05/15/23	4	45.45673	-92.39222	7.5		
6	<b>Field Crew</b>	2	2	2	2	2	8	1	Matthew S. Berg	5	45.45673	-92.39183	8		
7		3	3	3	3	3	8	1	Adeline Dauer	6	45.45674	-92.39143	8		
8		1	1	1	1	1	7	1		7	45.45675	-92.39103	7		
9		3	3	3	3	3	5	1		8	45.45676	-92.39064	5		
10		2	2	2	2	2	8	1		9	45.45683	-92.40055	8		
11		2	2	2	2	2	7	1		10	45.45684	-92.40016	7		
12		2	2	2	2	2	6	1		11	45.45685	-92.39976	6		
13		3	3	3	3	3	4.5	1		12	45.45685	-92.39937	4.5		
14		2	2	2	2	2	9.5	1		13	45.45700	-92.39223	9.5		
15		1	1	1	1	1	10	1		14	45.45701	-92.39184	10		
16		2	2	2	2	2	10	1		15	45.45702	-92.39144	10		
17		3	3	3	3	3	7.5	1		16	45.45704	-92.39065	7.5		
18		1	1	1	1	1	6.5	1		17	45.45705	-92.39025	6.5		
19		2	2	2	2	2	7.5	1		18	45.45711	-92.40057	7.5		
20		2	2	2	2	2	7	1		19	45.45712	-92.40017	7		
21		2	2	2	2	2	6.5	1		20	45.45712	-92.39977	6.5		

	A	B	C	D	E	F	G	H	I	J	K	L	M
22		2	2	2	2	2	5.5	1		21	45.45713	-92.39938	5.5
23		3	3	3	3	3	5	1		22	45.45714	-92.39898	5
24		3	3	3	3	3	8	1		23	45.45732	-92.39027	8







	AC	AD	AE	AF	AG	AH	AI	AJ
1	<i>Autumnal water-starwort</i> <i>Large water-starwort</i> <i>Common water-starwort</i> <i>Carex comosa</i> , <i>Bottle brush sedge</i> <i>Catabrosa aquatica</i> , <i>Brook grass</i> <i>Ceratophyllum demersum</i> , <i>Coontail</i> <i>Ceratophyllum echinatum</i> , <i>Spiny hornwort</i> <i>Chara sp.</i> , <i>Muskgrass</i> <i>Comarum palustre</i> , <i>Marsh</i> <i>Decodon verticillatus</i> <i>Dulichium</i>							
2			1					
3			2					
4			1					
5			1					
6								
7			2					
8			1					
9			1					
10			2					
11			3					
12			2					
13			2					
14			1					
15								
16			2					
17			2					
18								
19			2					
20			1					
21			2					

	AC	AD	AE	AF	AG	AH	AI	AJ
22			2					
23			2					
24			2					

**STATS**

Balsam Lake Pretreatment

Polk

2620600

05/15/23

**INDIVIDUAL SPECIES STATS:****Number of sites where species found****Relative Frequency (%)****Frequency of occurrence within vegetated areas (%)****Frequency of occurrence at sites shallower than maximum depth of plants****Average Rake Fullness****#visual sightings****present (visual or collected)**

Relative Frequency (squared)

**SUMMARY STATS:****Total number of sites visited****Total number of sites with vegetation****Total number of sites shallower than maximum depth of plants****Frequency of occurrence at sites shallower than maximum depth of plants****Simpson Diversity Index****Maximum depth of plants (ft)\*\*****Number of sites sampled using rake on Rope (R)****Number of sites sampled using rake on Pole (P)****Average number of all species per site (shallower than max depth)****Average number of all species per site (veg. sites only)****Average number of native species per site (shallower than max depth)****Average number of native species per site (veg. sites only)****Species Richness****Species Richness (including visuals)****Species Richness (including visuals and boat survey)****Mean depth of plants (ft)****Median depth of plants (ft)****Mean rake fullness (veg. sites only)****\*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM**





# 1 STATS

2 Balsam Lake Pretreatment

3 Polk

4 2620600

5 05/15/23

## 6 INDIVIDUAL SPECIES STATS:

7 Number of sites where species found

8 Relative Frequency (%)

9 Frequency of occurrence within vegetated areas (%)

10 Frequency of occurrence at sites shallower than maximum depth of plants

11 Average Rake Fullness

12 #visual sightings

13 present (visual or collected)

14 Relative Frequency (squared)

15

## 16 SUMMARY STATS:

17 Total number of sites visited

18 Total number of sites with vegetation

19 Total number of sites shallower than maximum depth of plants

20 Frequency of occurrence at sites shallower than maximum depth of plants

21 Simpson Diversity Index

22 Maximum depth of plants (ft)\*\*

23 Number of sites sampled using rake on Rope (R)

24 Number of sites sampled using rake on Pole (P)

25 Average number of all species per site (shallower than max depth)

26 Average number of all species per site (veg. sites only)

27 Average number of native species per site (shallower than max depth)

28 Average number of native species per site (veg. sites only)

29 Species Richness

30 Species Richness (including visuals)

31 Species Richness (including visuals and boat survey)

32 Mean depth of plants (ft)

33 Median depth of plants (ft)

34 Mean rake fullness (veg. sites only)

35 \*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM

	C	D	E	F
1	Total vegetation	Potamogeton crispus, Curly-leaf pondw	Bidens beckii, Water ma	Ceratoph
2				
3				
4				
5				
6				
7		28	1	199
8		4.7	0.2	33.4
9		10.49	0.37	74.53
10		10.14	0.36	72.10
11	1.65	1.11	3.00	1.46
12		5		
13		present	present	present
14	0.23	0.00	0.00	0.11
15				
16				
17	276			
18	267		<i>Ceratoph</i>	Coontail
19	276		<i>Lemna tr</i>	Forked d
20	96.74			Filament
21	0.77		<i>Elodea ca</i>	Common
22	10.50		<i>Ranuncu</i>	White wa
23	0		<b>Potamog</b>	<b>Curly-lea</b>
24	276		<i>Myriophy</i>	Northern
25	2.16		<i>Heterant</i>	Water sta
26	2.23		<i>Potamog</i>	White-ste
27	2.05		<i>Nitella s</i>	Nitella
28	2.14		<i>Potamog</i>	Flat-stem
29	15			Aquatic r
30	15		<i>Nuphar v</i>	Spatterdo
31			<i>Bidens be</i>	Water ma
32	7.15		<i>Eleochar</i>	Needle sp
33	7.00		<i>Potamog</i>	Fries' poi
34	1.65		<i>Potamog</i>	Illinois p
35				



1 **STATS**

2 Balsam Lake Pretreatment

3 Polk

4 2620600

5 05/14/22

6 **INDIVIDUAL SPECIES STATS:**

7 **Number of sites where species found**

8 **Relative Frequency (%)**

9 **Frequency of occurrence within vegetated areas (%)**

10 **Frequency of occurrence at sites shallower than maximum depth of plants**

11 **Average Rake Fullness**

12 **#visual sightings**

13 **present (visual or collected)**

14 **Relative Frequency (squared)**

15

16 **SUMMARY STATS:**

17 **Total number of sites visited**

18 **Total number of sites with vegetation**

19 **Total number of sites shallower than maximum depth of plants**

20 **Frequency of occurrence at sites shallower than maximum depth of plants**

21 **Simpson Diversity Index**

22 **Maximum depth of plants (ft)\*\***

23 **Number of sites sampled using rake on Rope (R)**

24 **Number of sites sampled using rake on Pole (P)**

25 **Average number of all species per site (shallower than max depth)**

26 **Average number of all species per site (veg. sites only)**

27 **Average number of native species per site (shallower than max depth)**

28 **Average number of native species per site (veg. sites only)**

29 **Species Richness**

30 **Species Richness (including visuals)**

31 **Species Richness (including visuals and boat survey)**

32 **Mean depth of plants (ft)**

33 **Median depth of plants (ft)**

34 **Mean rake fullness (veg. sites only)**

35 **\*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM**

	C	D	E	F	G
1	Total vegetation				
2					
3					
4					
5					
6					
7		147	1	188	1
8		22.3	0.2	28.5	0.2
9		54.85	0.37	70.15	0.37
10		53.26	0.36	68.12	0.36
11	1.78	1.67	1.00	1.52	1.00
12					
13		present	present	present	present
14	0.22	0.05	0.00	0.08	0.00
15					
16					Number of
17	276		<i>Ceratoph</i>	Coontail	188
18	268		<i>Lemna tr</i>	Forked d	181
19	276		<i>Potamog</i>	Curly-lea	147
20	97.10			Filament	117
21	0.78		<i>Potamog</i>	Flat-stem	41
22	11.50		<i>Elodea ca</i>	Common	36
23	0		<i>Myriophy</i>	Northern	24
24	276		<i>Ranuncu</i>	White wa	20
25	2.39			Aquatic r	11
26	2.46		<i>Potamog</i>	Small po	5
27	1.86		<i>Nitella s</i>	Nitella	4
28	2.09		<i>Potamog</i>	White-ste	4
29	15		<i>Potamog</i>	Fries' poi	3
30	15		<i>Potamog</i>	Illinois p	3
31			<i>Heterant</i>	Water sta	2
32	7.39		<i>Bidens be</i>	Water ma	1
33	7.50		<i>Chara sp</i>	Muskgras	1
34	1.78				
35					* Exclud

# 1 STATS

2 Balsam Lake Pretreatment

3 Polk

4 2620600

5 05/01/21

## 6 INDIVIDUAL SPECIES STATS:

7 Number of sites where species found

8 Relative Frequency (%)

9 Frequency of occurrence within vegetated areas (%)

10 Frequency of occurrence at sites shallower than maximum depth of plants

11 Average Rake Fullness

12 #visual sightings

13 present (visual or collected)

14 Relative Frequency (squared)

15

## 16 SUMMARY STATS:

17 Total number of sites visited

18 Total number of sites with vegetation

19 Total number of sites shallower than maximum depth of plants

20 Frequency of occurrence at sites shallower than maximum depth of plants

21 Simpson Diversity Index

22 Maximum depth of plants (ft)\*\*

23 Number of sites sampled using rake on Rope (R)

24 Number of sites sampled using rake on Pole (P)

25 Average number of all species per site (shallower than max depth)

26 Average number of all species per site (veg. sites only)

27 Average number of native species per site (shallower than max depth)

28 Average number of native species per site (veg. sites only)

29 Species Richness

30 Species Richness (including visuals)

31 Species Richness (including visuals and boat survey)

32 Mean depth of plants (ft)

33 Median depth of plants (ft)

34 Mean rake fullness (veg. sites only)

35 \*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM

	C	D	E
	Total vegetation		
	Potamogeton crispus C		Ceratoph
1			
2			
3			
4			
5			
6			
7		83	155
8		14.8	27.6
9		34.44	64.32
10		30.18	56.36
11	1.49	1.37	1.45
12		3	
13		present	present
14	0.21	0.02	0.08
15			
16			
17	276		<i>Lemna tr</i>
18	241		<i>Ceratoph</i>
19	275		<i>Potamog</i>
20	87.64		
21	0.79		<i>Elodea ca</i>
22	11.50		<i>Ranuncu</i>
23	0		<i>Myriophy</i>
24	276		<i>Potamog</i>
25	2.04		
26	2.33		<i>Nitella s</i>
27	1.74		<i>Heteranti</i>
28	2.07		<i>Potamog</i>
29	14		<i>Potamog</i>
30	14		<i>Potamog</i>
31			<i>Potamog</i>
32	7.35		<i>Potamog</i>
33	7.50		
34	1.49		
35			

1 **STATS**

2 Balsam Lake Pretreatment

3 Polk

4 2620600

5 5/3,5/2020

6 **INDIVIDUAL SPECIES STATS:**

7 **Number of sites where species found**

8 **Relative Frequency (%)**

9 **Frequency of occurrence within vegetated areas (%)**

10 **Frequency of occurrence at sites shallower than maximum depth of plants**

11 **Average Rake Fullness**

12 **#visual sightings**

13 **present (visual or collected)**

14 **Relative Frequency (squared)**

15

16 **SUMMARY STATS:**

17 **Total number of sites visited**

18 **Total number of sites with vegetation**

19 **Total number of sites shallower than maximum depth of plants**

20 **Frequency of occurrence at sites shallower than maximum depth of plants**

21 **Simpson Diversity Index**

22 **Maximum depth of plants (ft)\*\***

23 **Number of sites sampled using rake on Rope (R)**

24 **Number of sites sampled using rake on Pole (P)**

25 **Average number of all species per site (shallower than max depth)**

26 **Average number of all species per site (veg. sites only)**

27 **Average number of native species per site (shallower than max depth)**

28 **Average number of native species per site (veg. sites only)**

29 **Species Richness**

30 **Species Richness (including visuals)**

31 **Species Richness (including visuals and boat survey)**

32 **Mean depth of plants (ft)**

33 **Median depth of plants (ft)**

34 **Mean rake fullness (veg. sites only)**

35 **\*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM**

	C	D	E
1	Total vegetation	Potamogeton crispus C	Ceratophyllum
2			
3			
4			
5			
6			
7		94	116
8		21.0	26.0
9		42.53	52.49
10		34.06	42.03
11	1.53	1.35	1.54
12		9	
13		present	present
14	0.24	0.04	0.07
15			
16			
17	276		<i>Lemna tr</i>
18	221		<i>Ceratoph</i>
19	276		
20	80.07		<i>Potamog</i>
21	0.76		<i>Myriophy</i>
22	12.00		
23	0		<i>Ranuncu</i>
24	276		<i>Elodea ca</i>
25	1.62		<i>Nitella s</i>
26	2.02		<i>Potamog</i>
27	1.28		<i>Potamog</i>
28	1.85		<i>Potamog</i>
29	12		<i>Heteranth</i>
30	12		<i>Potamog</i>
31	12		
32	7.53		
33	7.50		
34	1.53		
35			

**STATS**

Balsam Lake Pretreatment

Polk

2620600

5 5, 2019

**INDIVIDUAL SPECIES STATS:****Number of sites where species found****Relative Frequency (%)****Frequency of occurrence within vegetated areas (%)****Frequency of occurrence at sites shallower than maximum depth of plants****Average Rake Fullness****#visual sightings****present (visual or collected)**

Relative Frequency (squared)

**SUMMARY STATS:****Total number of sites visited****Total number of sites with vegetation****Total number of sites shallower than maximum depth of plants****Frequency of occurrence at sites shallower than maximum depth of plants****Simpson Diversity Index****Maximum depth of plants (ft)\*\*****Number of sites sampled using rake on Rope (R)****Number of sites sampled using rake on Pole (P)****Average number of all species per site (shallower than max depth)****Average number of all species per site (veg. sites only)****Average number of native species per site (shallower than max depth)****Average number of native species per site (veg. sites only)****Species Richness****Species Richness (including visuals)****Species Richness (including visuals and boat survey)****Mean depth of plants (ft)****Median depth of plants (ft)****Mean rake fullness (veg. sites only)****\*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM**

	C	D	E	F
1	Total vegetation			
2	Potamogeton crispus, Curly-leaf pondw			
3	Ceratophyllum demersu			
4	Chara sp.			
5				
6				
7		82	90	1
8		22.6	24.8	0.3
9		37.10	40.72	0.45
10		29.71	32.61	0.36
11	1.36	1.18	1.32	1.00
12		1		
13		present	present	present
14	0.31	0.05	0.06	0.00
15				
16				
17	276		<i>Lemna tr</i>	Forked d
18	221			Filament
19	276		<i>Ceratoph</i>	Coontail
20	80.07		<i>Potamog</i>	Curly-lea
21	0.69			Aquatic r
22	11.50		<i>Elodea ca</i>	Common
23	0		<i>Potamog</i>	White-ste
24	276		<i>Myriophy</i>	Northern
25	1.32		<i>Potamog</i>	Small po
26	1.64		<i>Chara sp</i>	Muskgras
27	1.02		<i>Potamog</i>	Flat-stem
28	1.43			
29	9			
30	9			
31				
32	7.61			
33	7.50			
34	1.36			
35				



**STATS**

Balsam Lake Pretreatment

Polk

2620600

5 17, 2018

**INDIVIDUAL SPECIES STATS:****Number of sites where species found****Relative Frequency (%)****Frequency of occurrence within vegetated areas (%)****Frequency of occurrence at sites shallower than maximum depth of plants****Average Rake Fullness****#visual sightings****present (visual or collected)**

Relative Frequency (squared)

**SUMMARY STATS:****Total number of sites visited****Total number of sites with vegetation****Total number of sites shallower than maximum depth of plants****Frequency of occurrence at sites shallower than maximum depth of plants****Simpson Diversity Index****Maximum depth of plants (ft)\*\*****Number of sites sampled using rake on Rope (R)****Number of sites sampled using rake on Pole (P)****Average number of all species per site (shallower than max depth)****Average number of all species per site (veg. sites only)****Average number of native species per site (shallower than max depth)****Average number of native species per site (veg. sites only)****Species Richness****Species Richness (including visuals)****Species Richness (including visuals and boat survey)****Mean depth of plants (ft)****Median depth of plants (ft)****Mean rake fullness (veg. sites only)****\*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM**

	C	D	E
1	Total vegetation	Potamogeton crispus C	Ceratophyllum
2			
3			
4			
5			
6			
7		53	94
8		13.4	23.7
9		23.56	41.78
10		19.20	34.06
11	1.36	1.21	1.49
12			
13		present	present
14	0.28	0.02	0.06
15			
16			
17	276		<i>Lemna tr</i>
18	225		
19	276		<i>Ceratoph</i>
20	81.52		<i>Potamog</i>
21	0.72		<i>Elodea ca</i>
22	11.00		
23	0		<i>Heteranth</i>
24	276		<i>Ranuncu</i>
25	1.43		<i>Potamog</i>
26	1.76		<i>Myriophy</i>
27	1.24		<i>Nitella s</i>
28	1.63		<i>Nuphar v</i>
29	11		<i>Potamog</i>
30	11		
31			
32	7.13		
33	7.00		
34	1.36		
35			

**STATS**

Balsam Lake Pretreatment

Polk

2620600

4 28, 2017

**INDIVIDUAL SPECIES STATS:****Number of sites where species found****Relative Frequency (%)****Frequency of occurrence within vegetated areas (%)****Frequency of occurrence at sites shallower than maximum depth of plants****Average Rake Fullness****#visual sightings****present (visual or collected)**

Relative Frequency (squared)

**SUMMARY STATS:****Total number of sites visited****Total number of sites with vegetation****Total number of sites shallower than maximum depth of plants****Frequency of occurrence at sites shallower than maximum depth of plants****Simpson Diversity Index****Maximum depth of plants (ft)\*\*****Number of sites sampled using rake on Rope (R)****Number of sites sampled using rake on Pole (P)****Average number of all species per site (shallower than max depth)****Average number of all species per site (veg. sites only)****Average number of native species per site (shallower than max depth)****Average number of native species per site (veg. sites only)****Species Richness****Species Richness (including visuals)****Species Richness (including visuals and boat survey)****Mean depth of plants (ft)****Median depth of plants (ft)****Mean rake fullness (veg. sites only)****\*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM**

	C	D	E
1	Total vegetation		
2	Potamogeton crispus C		
3	Ceratophyllum		
4			
5			
6			
7		192	39
8		50.9	10.3
9		81.36	16.53
10		69.57	14.13
11	1.66	1.59	1.41
12			
13		present	present
14	0.36	0.26	0.01
15			
16			
17	276		Potamog
18	236		
19	276		Lemna tr
20	85.51		Ceratoph
21	0.64		Elodea ca
22	11.00		
23	0		Heteranth
24	276		Nitella s
25	1.37		Potamog
26	1.60		
27	0.67		
28	1.35		
29	7		
30	7		
31			
32	7.45		
33	7.50		
34	1.66		
35			

1 **STATS**

2 Balsam Lake Pretreatment

3 Polk

4 2620600

5 4 24, 2016

6 **INDIVIDUAL SPECIES STATS:**

7 **Number of sites where species found**

8 **Relative Frequency (%)**

9 **Frequency of occurrence within vegetated areas (%)**

10 **Frequency of occurrence at sites shallower than maximum depth of plants**

11 **Average Rake Fullness**

12 **#visual sightings**

13 **present (visual or collected)**

14 **Relative Frequency (squared)**

15

16 **SUMMARY STATS:**

17 **Total number of sites visited**

18 **Total number of sites with vegetation**

19 **Total number of sites shallower than maximum depth of plants**

20 **Frequency of occurrence at sites shallower than maximum depth of plants**

21 **Simpson Diversity Index**

22 **Maximum depth of plants (ft)\*\***

23 **Number of sites sampled using rake on Rope (R)**

24 **Number of sites sampled using rake on Pole (P)**

25 **Average number of all species per site (shallower than max depth)**

26 **Average number of all species per site (veg. sites only)**

27 **Average number of native species per site (shallower than max depth)**

28 **Average number of native species per site (veg. sites only)**

29 **Species Richness**

30 **Species Richness (including visuals)**

31 **Species Richness (including visuals and boat survey)**

32 **Mean depth of plants (ft)**

33 **Median depth of plants (ft)**

34 **Mean rake fullness (veg. sites only)**

35 **\*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM**

	C	D	E
1	Total vegetation	Potamogeton crispus C	Ceratophyllum
2			
3			
4			
5			
6			
7		159	43
8		39.0	10.5
9		69.74	18.86
10		57.61	15.58
11	1.70	1.60	1.44
12			
13		present	present
14	0.32	0.15	0.01
15			
16			
17	276		Potamog
18	228		Lemna tr
19	276		
20	82.61		Ceratoph
21	0.68		Elodea ca
22	11.00		
23	0		Potamog
24	276		Ranuncu
25	1.48		Myriophy
26	1.79		Potamog
27	0.90		Potamog
28	1.42		
29	9		
30	9		
31			
32	6.86		
33	7.00		
34	1.70		
35			

1 **STATS**

2 Balsam Lake Pretreatment

3 Polk

4 2620600

5 4 24-25, 2015

6 **INDIVIDUAL SPECIES STATS:**

7 **Number of sites where species found**

8 **Relative Frequency (%)**

9 **Frequency of occurrence within vegetated areas (%)**

10 **Frequency of occurrence at sites shallower than maximum depth of plants**

11 **Average Rake Fullness**

12 **#visual sightings**

13 **present (visual or collected)**

14 **Relative Frequency (squared)**

15

16 **SUMMARY STATS:**

17 **Total number of sites visited**

18 **Total number of sites with vegetation**

19 **Total number of sites shallower than maximum depth of plants**

20 **Frequency of occurrence at sites shallower than maximum depth of plants**

21 **Simpson Diversity Index**

22 **Maximum depth of plants (ft)\*\***

23 **Number of sites sampled using rake on Rope (R)**

24 **Number of sites sampled using rake on Pole (P)**

25 **Average number of all species per site (shallower than max depth)**

26 **Average number of all species per site (veg. sites only)**

27 **Average number of native species per site (shallower than max depth)**

28 **Average number of native species per site (veg. sites only)**

29 **Species Richness**

30 **Species Richness (including visuals)**

31 **Species Richness (including visuals and boat survey)**

32 **Mean depth of plants (ft)**

33 **Median depth of plants (ft)**

34 **Mean rake fullness (veg. sites only)**

35 **\*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM**

	C	D	E
1	Total vegetation		
2	Potamogeton crispus C		
3	Ceratophyllum		
4			
5			
6			
7		208	44
8		43.8	9.3
9		81.25	17.19
10		75.36	15.94
11	1.84	1.78	1.36
12			
13		present	present
14	0.33	0.19	0.01
15			
16			
17	276		Potamog
18	256		Lemna tr
19	276		
20	92.75		Ceratoph
21	0.67		Elodea ca
22	11.50		
23	0		Potamog
24	276		Heteranth
25	1.72		Potamog
26	1.86		Myriophy
27	0.97		Ranuncu
28	1.38		
29	9		
30	9		
31			
32	7.84		
33	8.00		
34	1.61		
35			



**STATS**

Balsam Lake Pretreatment

Polk

2620600

5 16-17, 2014

**INDIVIDUAL SPECIES STATS:****Number of sites where species found****Relative Frequency (%)****Frequency of occurrence within vegetated areas (%)****Frequency of occurrence at sites shallower than maximum depth of plants****Average Rake Fullness****#visual sightings****present (visual or collected)**

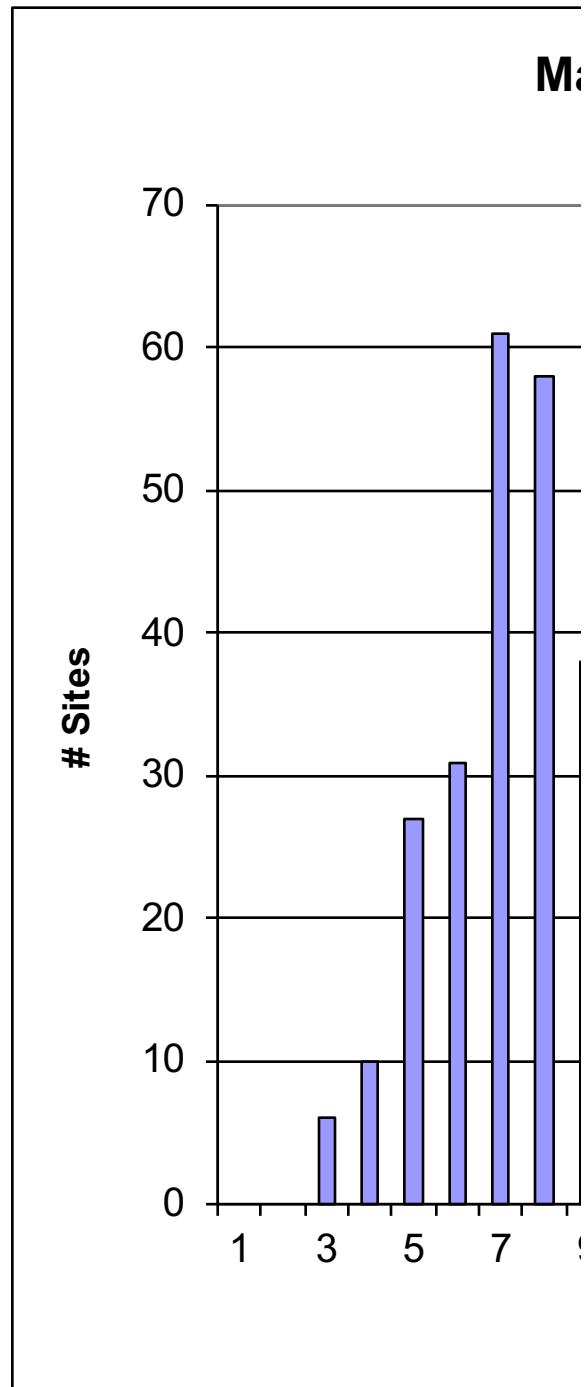
Relative Frequency (squared)

**SUMMARY STATS:****Total number of sites visited****Total number of sites with vegetation****Total number of sites shallower than maximum depth of plants****Frequency of occurrence at sites shallower than maximum depth of plants****Simpson Diversity Index****Maximum depth of plants (ft)\*\*****Number of sites sampled using rake on Rope (R)****Number of sites sampled using rake on Pole (P)****Average number of all species per site (shallower than max depth)****Average number of all species per site (veg. sites only)****Average number of native species per site (shallower than max depth)****Average number of native species per site (veg. sites only)****Species Richness****Species Richness (including visuals)****Species Richness (including visuals and boat survey)****Mean depth of plants (ft)****Median depth of plants (ft)****Mean rake fullness (veg. sites only)****\*\*SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM**

	C	D	E
1	Total vegetation		
2	Potamogeton crispus C		
3	Ceratophyllum		
4			
5			
6			
7		213	95
8		48.6	21.7
9		86.23	38.46
10		77.74	34.67
11	1.61	1.51	1.56
12			
13		present	present
14	0.35	0.24	0.05
15			
16			
17	276		Potamog
18	247		Lemna tr
19	274		Ceratoph
20	90.15		
21	0.65		Elodea ca
22	11.00		Potamog
23	0		Ranuncu
24	276		Heteranth
25	1.60		Nitella s
26	1.77		Potamog
27	0.82		Potamog
28	1.43		Potamog
29	11		
30	11		
31			
32	7.65		
33	8.00		
34	1.61		
35			

**DEPTH BIN (FT) # SITES (NO ENTRY)**

1	0
2	0
3	6
4	10
5	27
6	31
7	61
8	58
9	38
10	35
11	1
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0
26	0
27	0
28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0
37	0
38	0
39	0
40	0



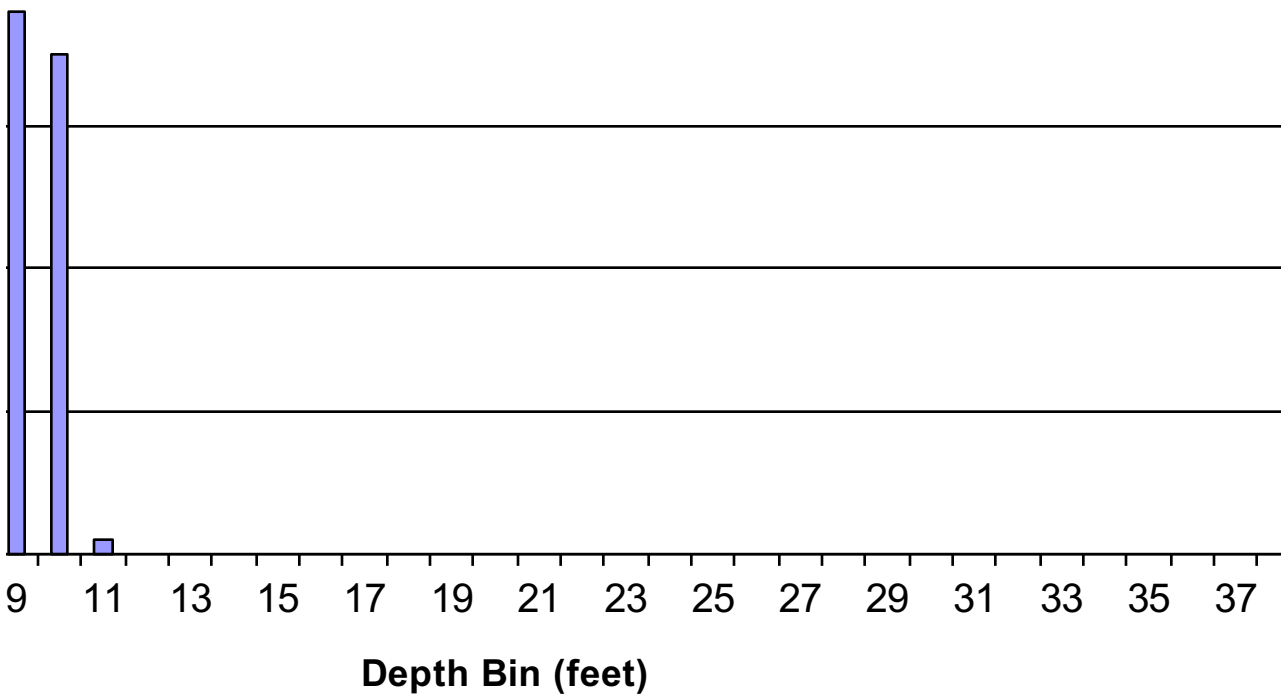
**M:**

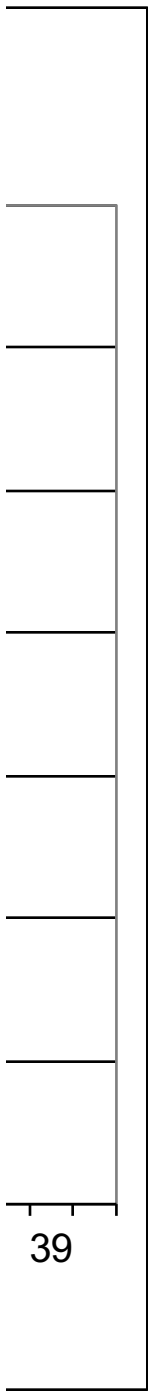
**Note:** The X-axis (Depth Bin) can be scaled to better fit the plant distribution data. Click on the outermost portion of the graph, and adjust the selection box in Column A.

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## Maximum Depth of Plant Colonization

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39

<b>Lake</b>
<b>County</b>
<b>Date</b>
<b>Township</b>
<b>Range</b>
<b>Section</b>

<b>Species</b>	<b>Common Name</b>	<b>C</b>
<i>Acorus americanus</i>	Sweet-flag	7
<i>Alisma triviale</i>	Northern water-plantain	4
<i>Bidens beckii</i>	Water marigold	8
<i>Bolboschoenus fluviatilis</i>	River bulrush	6
<i>Brasenia schreberi</i>	Watershield	6
<i>Calla palustris</i>	Wild calla	9
<i>Callitriche hermaphroditica</i>	Autumnal water-starwort	9
<i>Callitriche heterophylla</i>	Large water-starwort	9
<i>Callitriche palustris</i>	Common water-starwort	8
<i>Carex comosa</i>	Bottle brush sedge	5
<i>Catabrosa aquatica</i>	Brook grass	10
<i>Ceratophyllum demersum</i>	Coontail	3
<i>Ceratophyllum echinatum</i>	Spiny hornwort	10
<i>Chara</i> sp.	Muskgrasses	7
<i>Dulichium arundinaceum</i>	Three-way sedge	9
<i>Elatine minima</i>	Waterwort	9
<i>Elatine triandra</i>	Greater waterwort	9
<i>Eleocharis acicularis</i>	Needle spikerush	5
<i>Eleocharis erythropoda</i>	Bald spikerush	3
<i>Eleocharis palustris</i>	Creeping spikerush	6
<i>Elodea canadensis</i>	Common waterweed	3
<i>Elodea nuttallii</i>	Slender waterweed	7
<i>Equisetum fluviatile</i>	Water horsetail	7
<i>Eriocaulon aquaticum</i>	Pipewort	9
<i>Glyceria borealis</i>	Northern manna grass	8
<i>Gratiola aurea</i>	Golden hedge-hyssop	10
<i>Heteranthera dubia</i>	Water star-grass	6
<i>Isoetes echinospora</i>	Spiny-spored quillwort	8
<i>Isoetes lacustris</i>	Lake quillwort	8
<i>Isoetes</i> sp.	Quillwort	8
<i>Juncus pelocarpus</i> f. <i>submersus</i>	Brown-fruited rush	8
<i>Juncus torreyi</i>	Torrey's rush	4
<i>Lemna minor</i>	Small duckweed	4
<i>Lemna perpusilla</i>	Least duckweed	10
<i>Lemna trisulca</i>	Forked duckweed	6
<i>Littorella uniflora</i>	Littorella	10
<i>Lobelia dortmanna</i>	Water lobelia	10

<i>Ludwigia palustris</i>	Marsh purslane	4
<i>Myriophyllum alterniflorum</i>	Alternate-flowered water-milfoil	10
<i>Myriophyllum farwellii</i>	Farwell's water-milfoil	8
<i>Myriophyllum heterophyllum</i>	Various-leaved water-milfoil	7
<i>Myriophyllum sibiricum</i>	Northern water-milfoil	6
<i>Myriophyllum tenellum</i>	Dwarf water-milfoil	10
<i>Myriophyllum verticillatum</i>	Whorled water-milfoil	8
<i>Najas flexilis</i>	Slender naiad	6
<i>Najas gracillima</i>	Northern naiad	7
<i>Najas guadalupensis</i>	Southern naiad	8
<i>Nelumbo lutea</i>	American lotus	7
<i>Nitella</i> sp.	Nitella	7
<i>Nuphar advena</i>	Yellow pond lily	8
<i>Nuphar microphylla</i>	Small pond lily	9
<i>Nuphar X rubrodisca</i>	Intermediate pond lily	9
<i>Nuphar variegata</i>	Spatterdock	6
<i>Nymphaea odorata</i>	White water lily	6
<i>Phragmites australis</i>	Common reed	1
<i>Polygonum amphibium</i>	Water smartweed	5
<i>Polygonum punctatum</i>	Dotted smartweed	5
<i>Pontederia cordata</i>	Pickerelweed	8
<i>Potamogeton alpinus</i>	Alpine pondweed	9
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	7
<i>Potamogeton bicupulatus</i>	Snail-seed pondweed	9
<i>Potamogeton confervoides</i>	Algal-leaved pondweed	10
<i>Potamogeton diversifolius</i>	Water-thread pondweed	8
<i>Potamogeton epihydrus</i>	Ribbon-leaf pondweed	8
<i>Potamogeton foliosus</i>	Leafy pondweed	6
<i>Potamogeton friesii</i>	Fries' pondweed	8
<i>Potamogeton gramineus</i>	Variable pondweed	7
<i>Potamogeton hillii</i>	Hill's pondweed	9
<i>Potamogeton illinoensis</i>	Illinois pondweed	6
<i>Potamogeton natans</i>	Floating-leaf pondweed	5
<i>Potamogeton nodosus</i>	Long-leaf pondweed	7
<i>Potamogeton oakesianus</i>	Oakes' pondweed	10
<i>Potamogeton obtusifolius</i>	Blunt-leaf pondweed	9
<i>Potamogeton praelongus</i>	White-stem pondweed	8
<i>Potamogeton pulcher</i>	Spotted pondweed	10
<i>Potamogeton pusillus</i>	Small pondweed	7
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	5
<i>Potamogeton robbinsii</i>	Fern pondweed	8
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	8
<i>Potamogeton strictifolius</i>	Stiff pondweed	8
<i>Potamogeton vaseyi</i>	Vasey's pondweed	10
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	6
<i>Ranunculus aquatilis</i>	White water crowfoot	8

<i>Ranunculus flabellaris</i>	Yellow water crowfoot	8
<i>Ranunculus flammula</i>	Creeping spearwort	9
<i>Riccia fluitans</i>	Slender riccia	7
<i>Ruppia cirrhosa</i>	Ditch grass	8
<i>Sagittaria brevirostra</i>	Midwestern arrowhead	9
<i>Sagittaria cristata</i>	Crested arrowhead	9
<i>Sagittaria cuneata</i>	Arum-leaved arrowhead	7
<i>Sagittaria graminea</i>	Grass-leaved arrowhead	9
<i>Sagittaria latifolia</i>	Common arrowhead	3
<i>Sagittaria rigida</i>	Sessile-fruited arrowhead	8
<i>Schoenoplectus acutus</i>	Hardstem bulrush	6
<i>Schoenoplectus heterochaetus</i>	Slender bulrush	10
<i>Schoenoplectus pungens</i>	Three-square bulrush	5
<i>Schoenoplectus subterminalis</i>	Water bulrush	9
<i>Schoenoplectus tabernaemontani</i>	Softstem bulrush	4
<i>Sparganium americanum</i>	American bur-reed	8
<i>Sparganium androcladum</i>	Branched bur-reed	8
<i>Sparganium angustifolium</i>	Narrow-leaved bur-reed	9
<i>Sparganium emersum</i>	Short-stemmed bur-reed	8
<i>Sparganium eurycarpum</i>	Common bur-reed	5
<i>Sparganium fluctuans</i>	Floating-leaf bur-reed	10
<i>Sparganium natans</i>	Small bur-reed	9
<i>Spirodela polyrhiza</i>	Large duckweed	5
<i>Stuckenia filiformis</i>	Fine-leaved pondweed	8
<i>Stuckenia pectinata</i>	Sago pondweed	3
<i>Stuckenia vaginata</i>	Sheathed pondweed	9
<i>Typha angustifolium</i>	Narrow-leaved cattail	1
<i>Typha latifolia</i>	Broad-leaved cattail	1
<i>Typha</i> sp.	Cattail	1
<i>Utricularia cornuta</i>	Horned bladderwort	10
<i>Utricularia geminiscapa</i>	Twin-stemmed bladderwort	9
<i>Utricularia gibba</i>	Creeping bladderwort	9
<i>Utricularia intermedia</i>	Flat-leaf bladderwort	9
<i>Utricularia minor</i>	Small bladderwort	10
<i>Utricularia purpurea</i>	Large purple bladderwort	9
<i>Utricularia resupinata</i>	Small purple bladderwort	9
<i>Utricularia vulgaris</i>	Common bladderwort	7
<i>Vallisneria americana</i>	Wild celery	6
<i>Wolffia borealis</i>	Northern watermeal	6
<i>Wolffia columbiana</i>	Common watermeal	5
<i>Zannichellia palustris</i>	Horned pondweed	7
<i>Zizania aquatica</i>	Southern wild rice	8
<i>Zizania palustris</i>	Northern wild rice	8
<i>Zizania</i> sp.	Wild rice	8



mean C

**FQI**

**CITATION: Nichols, SA. 1999. Floristic Quality Assessment of Wisconsin Lake Plant Communities. *Journal of Lake and Reservoir Management*, 15(2):133-141.**

**CITATION: University of Wisconsin-Madison, 2001. Wisconsin Floristic Quality Assessment (VFQA) from: <http://www.botany.wisc.edu/WFQA.asp>**

Balsam Lake Pretreatment
Polk
05/15/23

species present=1	
0	0
0	0
1	8
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
1	3
0	0
0	0
0	0
0	0
0	0
1	5
0	0
0	0
1	3
0	0
0	0
0	0
0	0
0	0
1	6
0	0
0	0
0	0
0	0
0	0
0	0
0	0
1	6
0	0
0	0

0	0
0	0
0	0
0	0
1	6
0	0
0	0
0	0
0	0
0	0
0	0
1	7
0	0
0	0
0	0
1	6
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
1	8
0	0
0	0
1	6
0	0
0	0
0	0
0	0
1	8
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
1	6
1	8



6.1

23.0

**ities with Example Applications.**

**VFQA). Retrived October 27, 2009**

Lake
County
Date
Township
Range
Section

Species	Common Name	C
<i>Bidens beckii</i>	Water marigold	8
<i>Ceratophyllum demersum</i>	Coontail	3
<i>Eleocharis acicularis</i>	Needle spikerush	5
<i>Elodea canadensis</i>	Common waterweed	3
<i>Heteranthera dubia</i>	Water star-grass	6
<i>Lemna trisulca</i>	Forked duckweed	6
<i>Myriophyllum sibiricum</i>	Northern water-milfoil	6
<i>Nitella</i> sp.	Nitella	7
<i>Nuphar variegata</i>	Spatterdock	6
<i>Potamogeton friesii</i>	Fries' pondweed	8
<i>Potamogeton illinoensis</i>	Illinois pondweed	6
<i>Potamogeton praelongus</i>	White-stem pondweed	8
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	6
<i>Ranunculus aquatilis</i>	White water crowfoot	8

N  
mean C

**FQI**

CITATION: Nichols, SA. 1999. Floristic Quality Assessment of Wisconsin Lake Plant Communities. *Journal of Lake and Reservoir Management*, 15(2):133-141.

CITATION: University of Wisconsin-Madison, 2001. Wisconsin Floristic Quality Assessment (VFQA) from: <http://www.botany.wisc.edu/WFQA.asp>

Balsam Lake Pretreatment
Polk
05/15/23

species present=1	
1	8
1	3
1	5
1	3
1	6
1	6
1	6
1	7
1	6
1	8
1	6
1	8
1	6
1	8
14	6.1
	<b>23.0</b>

ities with Example Applications.

VFQA). Retrived October 27, 2009

Lake
County
Date
Township
Range
Section

Species	Common Name	C
<i>Bidens beckii</i>	Water marigold	8
<i>Ceratophyllum demersum</i>	Coontail	3
<i>Chara</i> sp.	Muskgrasses	7
<i>Elodea canadensis</i>	Common waterweed	3
<i>Heteranthera dubia</i>	Water star-grass	6
<i>Lemna trisulca</i>	Forked duckweed	6
<i>Myriophyllum sibiricum</i>	Northern water-milfoil	6
<i>Nitella</i> sp.	Nitella	7
<i>Potamogeton friesii</i>	Fries' pondweed	8
<i>Potamogeton illinoensis</i>	Illinois pondweed	6
<i>Potamogeton praelongus</i>	White-stem pondweed	8
<i>Potamogeton pusillus</i>	Small pondweed	7
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	6
<i>Ranunculus aquatilis</i>	White water crowfoot	8

N  
mean C

**FQI**

CITATION: Nichols, SA. 1999. Floristic Quality Assessment of Wisconsin Lake Plant Communities. *Journal of Lake and Reservoir Management*, 15(2):133-141.

CITATION: University of Wisconsin-Madison, 2001. Wisconsin Floristic Quality Assessment (VFQA) from: <http://www.botany.wisc.edu/WFQA.asp>



Balsam Lake Pretreatment
Polk
05/14/22

species present=1	
1	8
1	3
1	7
1	3
1	6
1	6
1	6
1	7
1	8
1	6
1	8
1	7
1	6
1	8
14	6.4
	23.8

ities with Example Applications.

VFQA). Retrived October 27, 2009

Lake
County
Date
Township
Range
Section

Species	Common Name	C
<i>Ceratophyllum demersum</i>	Coontail	3
<i>Elodea canadensis</i>	Common waterweed	3
<i>Heteranthera dubia</i>	Water star-grass	6
<i>Lemna trisulca</i>	Forked duckweed	6
<i>Myriophyllum sibiricum</i>	Northern water-milfoil	6
<i>Nitella</i> sp.	Nitella	7
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	7
<i>Potamogeton friesii</i>	Fries' pondweed	8
<i>Potamogeton illinoensis</i>	Illinois pondweed	6
<i>Potamogeton praelongus</i>	White-stem pondweed	8
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	5
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	6
<i>Ranunculus aquatilis</i>	White water crowfoot	8

N  
mean C

**FQI**

CITATION: Nichols, SA. 1999. Floristic Quality Assessment of Wisconsin Lake Plant Communities. *Journal of Lake and Reservoir Management*, 15(2):133-141.

CITATION: University of Wisconsin-Madison, 2001. Wisconsin Floristic Quality Assessment (VFQA) from: <http://www.botany.wisc.edu/WFQA.asp>

Balsam Lake Pretreatment
Polk
05/01/21

species present=1	
1	3
1	3
1	6
1	6
1	6
1	7
1	7
1	8
1	6
1	8
1	5
1	6
1	8
13	6.1
	21.9

ities with Example Applications.

VFQA). Retrived October 27, 2009

Lake
County
Date
Township
Range
Section

Species	Common Name	C
<i>Ceratophyllum demersum</i>	Coontail	3
<i>Elodea canadensis</i>	Common waterweed	3
<i>Heteranthera dubia</i>	Water star-grass	6
<i>Lemna trisulca</i>	Forked duckweed	6
<i>Myriophyllum sibiricum</i>	Northern water-milfoil	6
<i>Nitella</i> sp.	Nitella	7
<i>Potamogeton friesii</i>	Fries' pondweed	8
<i>Potamogeton illinoensis</i>	Illinois pondweed	6
<i>Potamogeton pusillus</i>	Small pondweed	7
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	6
<i>Ranunculus aquatilis</i>	White water crowfoot	8

N  
mean C

**FQI**

CITATION: Nichols, SA. 1999. Floristic Quality Assessment of Wisconsin Lake Plant Communities. *Journal of Lake and Reservoir Management*, 15(2):133-141.

CITATION: University of Wisconsin-Madison, 2001. Wisconsin Floristic Quality Assessment (VFQA) from: <http://www.botany.wisc.edu/WFQA.asp>

Balsam Lake Pretreatment
Polk
5/3,5/2020

species present=1	
1	3
1	3
1	6
1	6
1	6
1	7
1	8
1	6
1	7
1	6
1	8
11	6.0
	19.9

ities with Example Applications.

VFQA). Retrived October 27, 2009

Lake
County
Date
Township
Range
Section

Species	Common Name	C
<i>Ceratophyllum demersum</i>	Coontail	3
<i>Chara</i> sp.	Muskgrasses	7
<i>Elodea canadensis</i>	Common waterweed	3
<i>Lemna trisulca</i>	Forked duckweed	6
<i>Myriophyllum sibiricum</i>	Northern water-milfoil	6
<i>Potamogeton praelongus</i>	White-stem pondweed	8
<i>Potamogeton pusillus</i>	Small pondweed	7
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	6

N  
mean C

**FQI**

CITATION: Nichols, SA. 1999. Floristic Quality Assessment of Wisconsin Lake Plant Communities. *Journal of Lake and Reservoir Management*, 15(2):133-141.

CITATION: University of Wisconsin-Madison, 2001. Wisconsin Floristic Quality Assessment (VFQA) from: <http://www.botany.wisc.edu/WFQA.asp>

Balsam Lake Pretreatment
Polk
5 5, 2019

species present=1	
1	3
1	7
1	3
1	6
1	6
1	8
1	7
1	6
8	5.8
	16.3

**ities with Example Applications.**

**VFQA). Retrived October 27, 2009**