



McMahon Lake, Scott County, Minnesota (Google Earth)

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# Aquatic Plant Surveys for McMahon Lake, Scott Co, Minnesota, 2007

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[Early Summer Survey Conducted on May 18 and 29, 2007]

[Late Summer Survey Conducted on September 4, 2007]

Prepared for:  
**Scott County, Minnesota**

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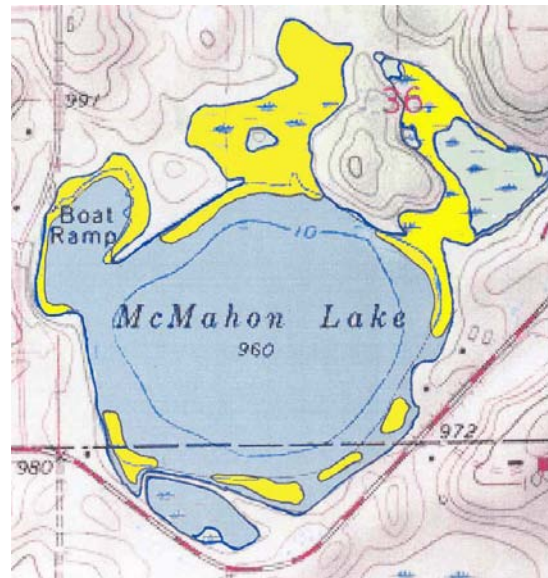
# Aquatic Plant Surveys for McMahon Lake, Scott Co, Minnesota, 2007

## Summary

McMahon Lake (MnDNR ID: 70-0050) is a 167 acre lake located in Scott County. The coverage of aquatic plants for early summer and late summer conditions is shown below based on point-intercept plant surveys. Plants (primarily curlyleaf pondweed) grew out to 12 feet of water depth in early summer. In late summer, after curlyleaf died back, plants were found out to 4-feet of water depth.

**Table 1. Summary of aquatic plant results from two plant surveys conducted in 2007.**

	May 18, 2007 (Secchi disc: 7.2 feet) (Est. plant coverage: 68 ac)			September 4, 2007 (Secchi disc: 2.0 feet) (Est. plant coverage: 52 ac)		
	Occurrence	Percent Occurrence (81 sites)	Average Density	Occurrence	Percent Occurrence (41 sites)	Average Density
White waterlily	--	--	--	18	44%	0.8
Coontail	--	--	--	10	24%	1.3
Elodea	--	--	--	4	10%	1.5
Eurasian watermilfoil	--	--	--	16	39%	1.5
Curlyleaf pondweed	72	89%	3.6	1	2%	0.5
Sago pondweed	--	--	--	3	7%	1.3
Filamentous algae	--	--	--	1	2%	1.0



[left] Early summer - curlyleaf pondweed coverage (red shading represents nuisance growth).  
[right] Late summer aquatic plant coverage (includes curlyleaf pondweed and native plants).

# Key to Curlyleaf Pondweed Growth Characteristics

(source: Steve McComas, Blue Water Science, unpublished)

## Light Growth Conditions

Plants rarely reach the surface.

Navigation and recreational activities are not generally hindered.

Stem density: 0 - 160 stems/m<sup>2</sup>

Biomass: 0 - 50 g-dry wt/m<sup>2</sup>

Estimated TP loading: <1.7 lbs/ac



*MnDNR rake sample density equivalent for light growth conditions: 1, 2, or 3.*

## Moderate Growth Conditions

Broken surface canopy conditions.

Navigation and recreational activities may be hindered.

Lake users may opt for control.

Stem density: 100 - 280 stems/m<sup>2</sup>

Biomass: 50 - 85 g-dry wt/m<sup>2</sup>

Estimated TP loading: 2.2 - 3.8 lbs/ac



*MnDNR rake sample density equivalent for moderate growth conditions: 3 or 4.*

## Heavy Growth Conditions

Solid or near solid surface canopy conditions.

Navigation and recreational activities are severely limited.

Control is necessary for navigation and/or recreation.

Stem density: 400+ stems/m<sup>2</sup>

Biomass: >300 g-dry wt/m<sup>2</sup>

Estimated TP loading: >6.7 lbs/ac



*MnDNR rake sample density has a scale from 1 to 4. For heavy growth conditions where plants top out at the surface, the scale has been extended: 4.5 is equivalent to a near solid surface canopy and a 5 is equivalent to a solid surface canopy.*

# McMahon Lake, Scott County (ID:70-0050)

Lake Area: 167 acres (Blue Water Science)

Littoral Area: 167 acres (Blue Water Science)

Maximum depth: 14 ft (MnDNR)

## Introduction

McMahon Lake is a recreational lake in Scott County. For overall lake management considerations, aquatic plants play an important role. There have not been recent plant surveys conducted in McMahon Lake. The objective of the 2007 plant evaluation was to conduct two plant surveys to characterize the aquatic plant community of McMahon Lake.

A USGS map for McMahon Lake is shown in Figure 1. The lake basin configuration has changed in recent years and the aerial photo with the present lake basin is shown on the right in Figure 1. For plant surveys conducted in 2007, the USGS map was revised to reflect the new lake basin configuration.

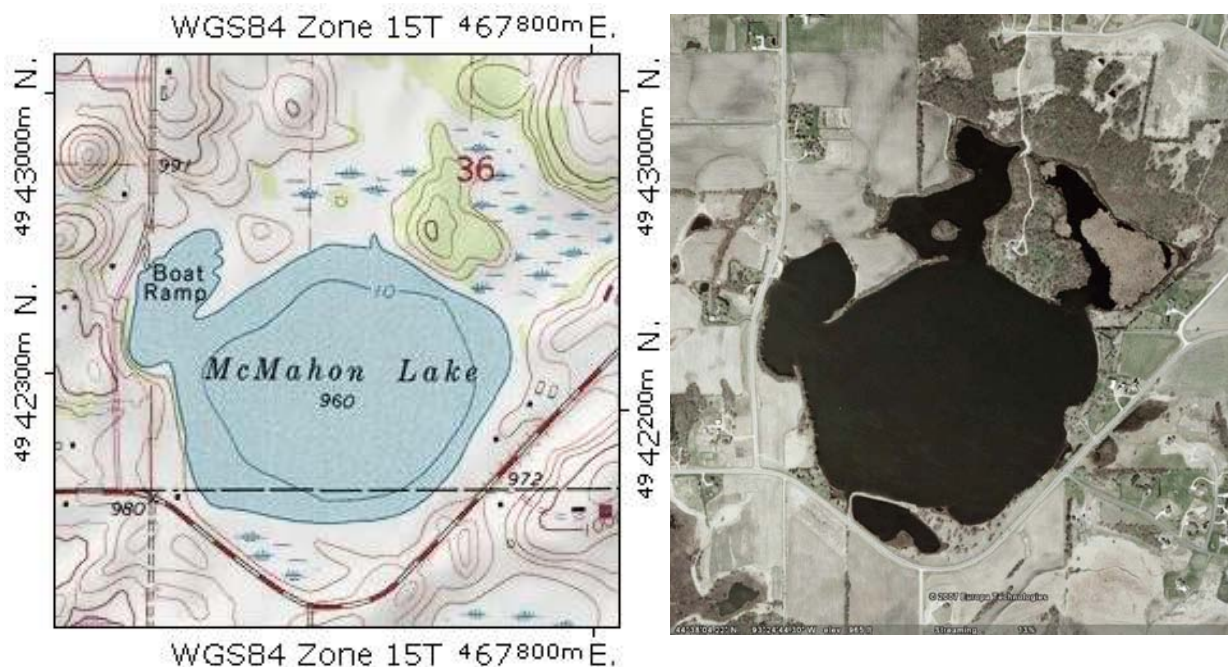
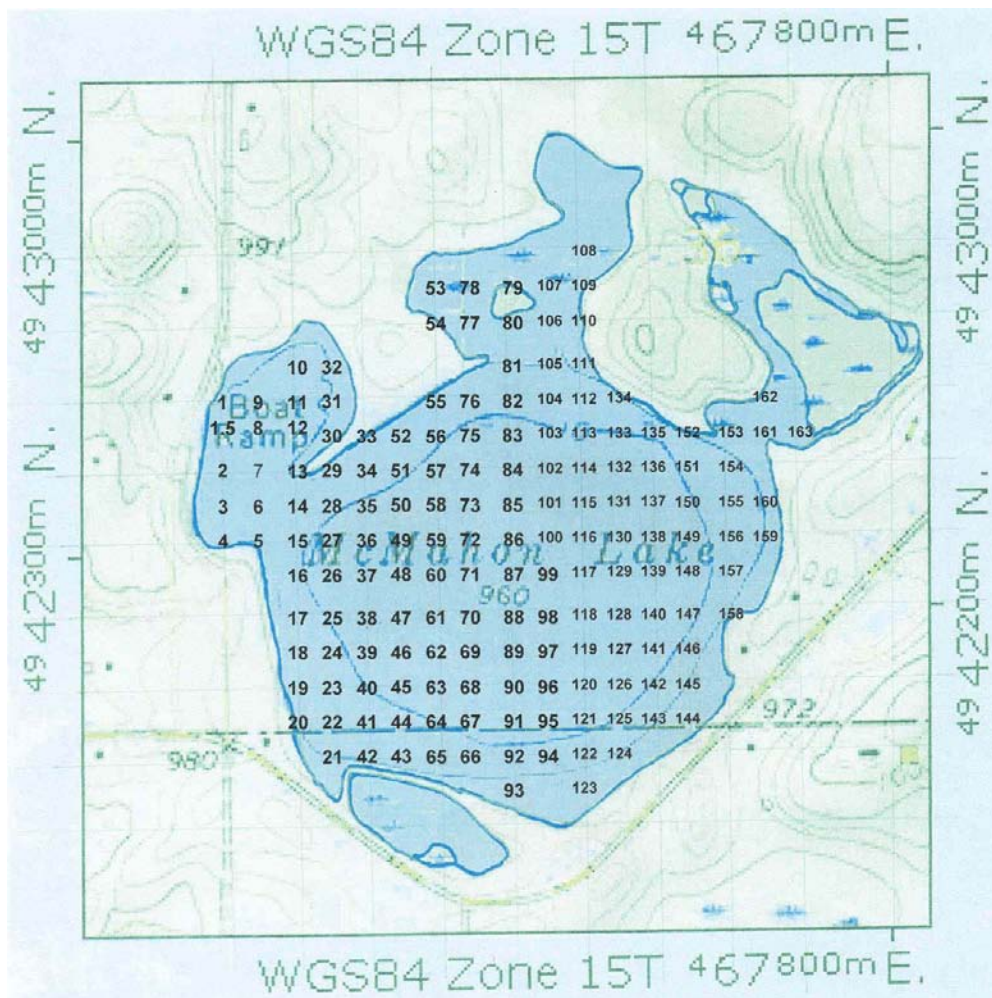


Figure 1. [left] U.S.G.S. topographic map of McMahon Lake, Scott County (1976).

[right] Aerial view of McMahon Lake, Scott County, Minnesota (source: Google Earth)(2007).

## Methods

Two aquatic plant surveys of McMahon Lake were conducted by Blue Water Science in 2007. The early season survey was conducted on May 18 and 29, 2007. The late summer survey was conducted on September 4, 2007. Each survey used a point-intercept survey method. A map was prepared by Blue Water Science and consisted of a total of 163 points that were distributed throughout the lake (Figure 2). Points were spaced 60 meters apart and each point represented an average of 1.0 acre of lake surface area ( $167 \text{ acres} \div 163 \text{ points} = 1.02 \text{ ac/pt}$ ). GPS coordinates used a UTM WGS84 datum. For each survey, the maximum depth of plant growth was found in the course of sampling. Then one point deeper was checked as well. For the May survey, plants were found to 12 feet and 81 sites were sampled at 12 feet or less. In the August survey, 81 sites were sampled again. At each sample point, plants were sampled with a rake sampler. A MnDNR plant density rating was assigned to each plant species on a scale from 1 to 4. A 4.5 or 5 rating indicated matting surface plant growth. Visual observations of surface growth were mapped in the field using a hand held GPS to verify locations.



**Figure 2. Point locations for the aquatic plant surveys. Lake map with UTM coordinates using the WGS84 datum.**

## Results of the May 18 and 29, 2007 Aquatic Plant Survey

Results of the early summer aquatic plant survey conducted on May 18 and 29, 2007 found that curlyleaf pondweed was the only plant in the survey (Table 1). However Eurasian watermilfoil was observed at one location not on the grid. It's presence was confirmed by the MnDNR.

Results from the point-intercept plant survey found that plants grew out to depth of 12 feet (Table 2 and Figure 3). Curlyleaf was found in depths from 4 to 12 feet.

The coverage of curlyleaf pondweed was estimated at 68 acres (Figure 3). The coverage of heavy growth of curlyleaf was estimated at 39 acres out of the 68 acres of curlyleaf.

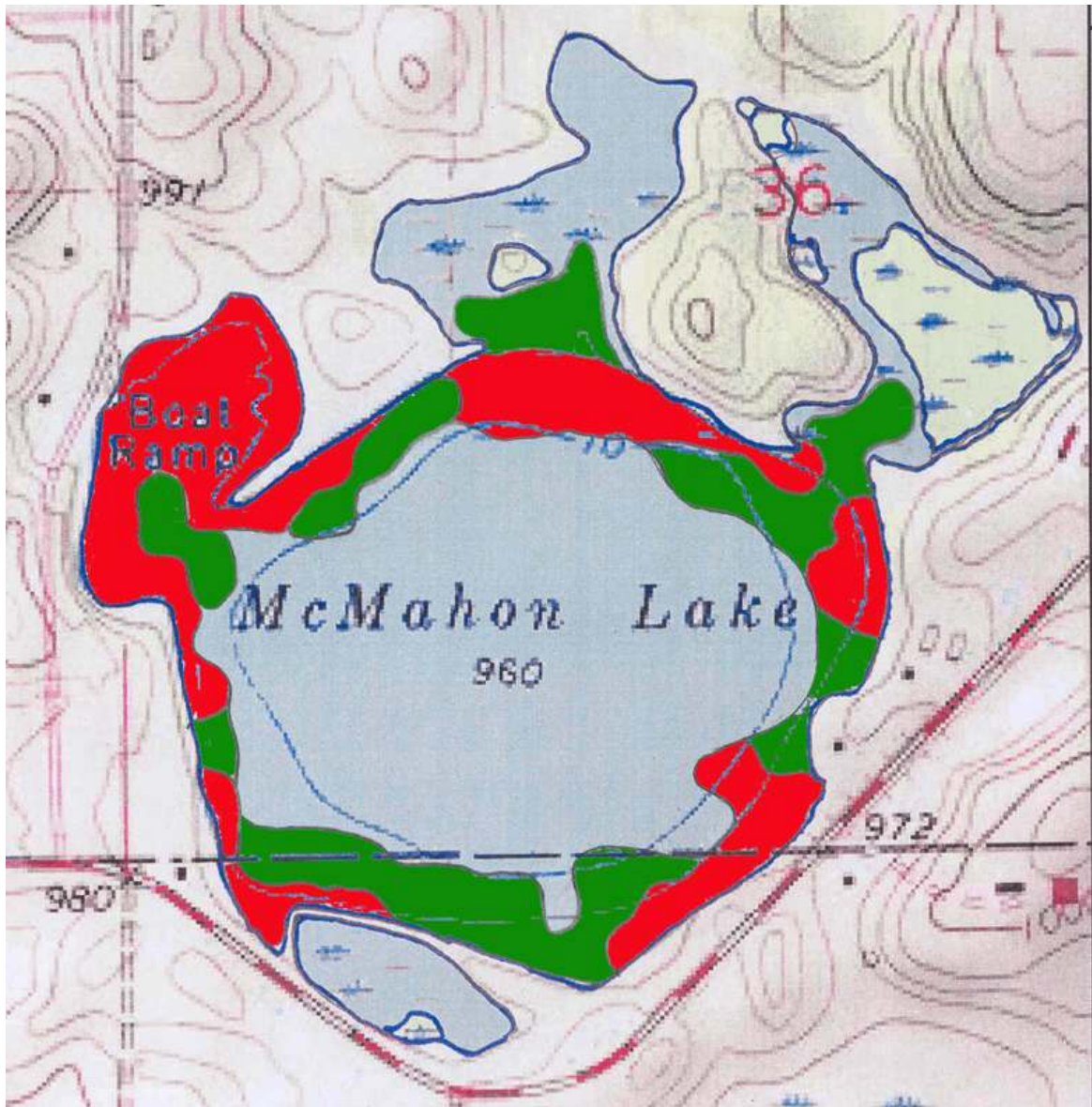
**Table 1. McMahan Lake aquatic plant occurrences and densities for the May 18 and 29, 2007 survey based on 81 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.**

	All Stations Sampled to Water Depth of 12 feet (n=81)		
	Occur	% Occur	Density
Curlyleaf pondweed ( <i>Potamogeton crispus</i> )	72	89%	3.6

**Table 2. Occurrence of plants by depth in McMahan Lake out to a depth of 12 feet. Number of sites sampled was 90 sites. Nine additional sites, shown in parenthesis, were inaccessible and not sampled in May 2007.**

Depth (feet)	Number of Sites	Curlyleaf Pondweed	Average Number of Species per Site
1	0 (2)		
2	2 (3)	2	1
3	3 (1)	3	1
4	22 (3)	22	1
5	5	5	1
6	5	5	1
7	3	3	1
8	9	9	1
9	11	10	0.9
10	5	5	1
11	10	7	0.7
12	6	1	0.2
13	7	0	0
14	4	0	0
All Depths with plants	81	72	

Individual point intercept data for McMahon Lake plants are shown in the Appendix. Curlyleaf was the only plant found at a site. Nuisance curlyleaf growth was typically found in water depths out to five feet with abundant growth out to 8 feet. Individual sites with nuisance growth, as defined with a density of a “4.5” or a “5” are shown with red shading in Figure 3. Curlyleaf pondweed covered an estimated 68 acres and heavy growth of curlyleaf was estimated at 39 acres.



**Figure 3. Curlyleaf pondweed coverage map for May 18 and 29, 2007. Curlyleaf pondweed coverage is shown in green with nuisance coverage shown in red. Curlyleaf pondweed covered about 68 acres.**



**Figure 4. [top] On May 18, 2007 curlyleaf pondweed was widespread and dense in some areas. [middle] Curlyleaf topping out on May 18, 2007. [bottom] May 29, 2007 conditions, looking north into the “new” lake area. This was not shown on the MnDNR lake map from 1971.**



## Results of the September 4, 2007 Aquatic Plant Survey

Results of the late summer aquatic plant survey (September 4, 2007) found vegetation conditions changed considerably compared to the early summer survey. The biggest change was the collapse of curlyleaf pondweed community and the increase in Eurasian watermilfoil.

Five submerged vascular aquatic plant species were identified in the late summer survey (Table 3). The most common plants were Eurasian watermilfoil and coontail. The curlyleaf that was found was sparse and had recently sprouted. It represented the new growth that will be present in 2008.

Overall, plant density was low and diversity was modest. The maximum depth of aquatic plant growth in McMahon Lake at the time of the survey was 7 feet. The bottom coverage of aquatic plants was estimated at 52 acres.

**Table 3. McMahon Lake aquatic plant occurrences and densities for the September 4, 2007 survey based on 90 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.**

	All Stations sampled to Water Depth of 4 feet (n=41)		
	Occur	% Occur	Density
White waterlily ( <i>Nymphaea tuberosa</i> )	18	44%	0.8
Coontail ( <i>Ceratophyllum demersum</i> )	10	24%	1.3
Elodea ( <i>Elodea canadensis</i> )	4	10%	1.5
Eurasian watermilfoil ( <i>Myriophyllum spicatum</i> )	16	39%	1.5
Curlyleaf pondweed ( <i>Potamogeton crispus</i> )	1	2%	0.5
Sago pondweed ( <i>Stuckenia pectinata</i> )	3	7%	1.3
Filamentous algae	1	2%	1.0

**Table 4. Occurrence of plants by depth in McMahon Lake on September 4, 2007.**

Depth (feet)	Number of Sites	White waterlily	Coontail	Elodea	Eurasian watermilfoil	Curlyleaf pondweed	Sago Pondweed	Average Number of Species per Site
1	2	2						0
2	7	4	2		3			1.5
3	15	4	3	2	8	1	2	1.5
4	17	8	5	2	5		1	0.7
5	5							0
6	5							0
7	3							0
8	9							0
All Depths with Plants	41	18	10	4	16	1	3	

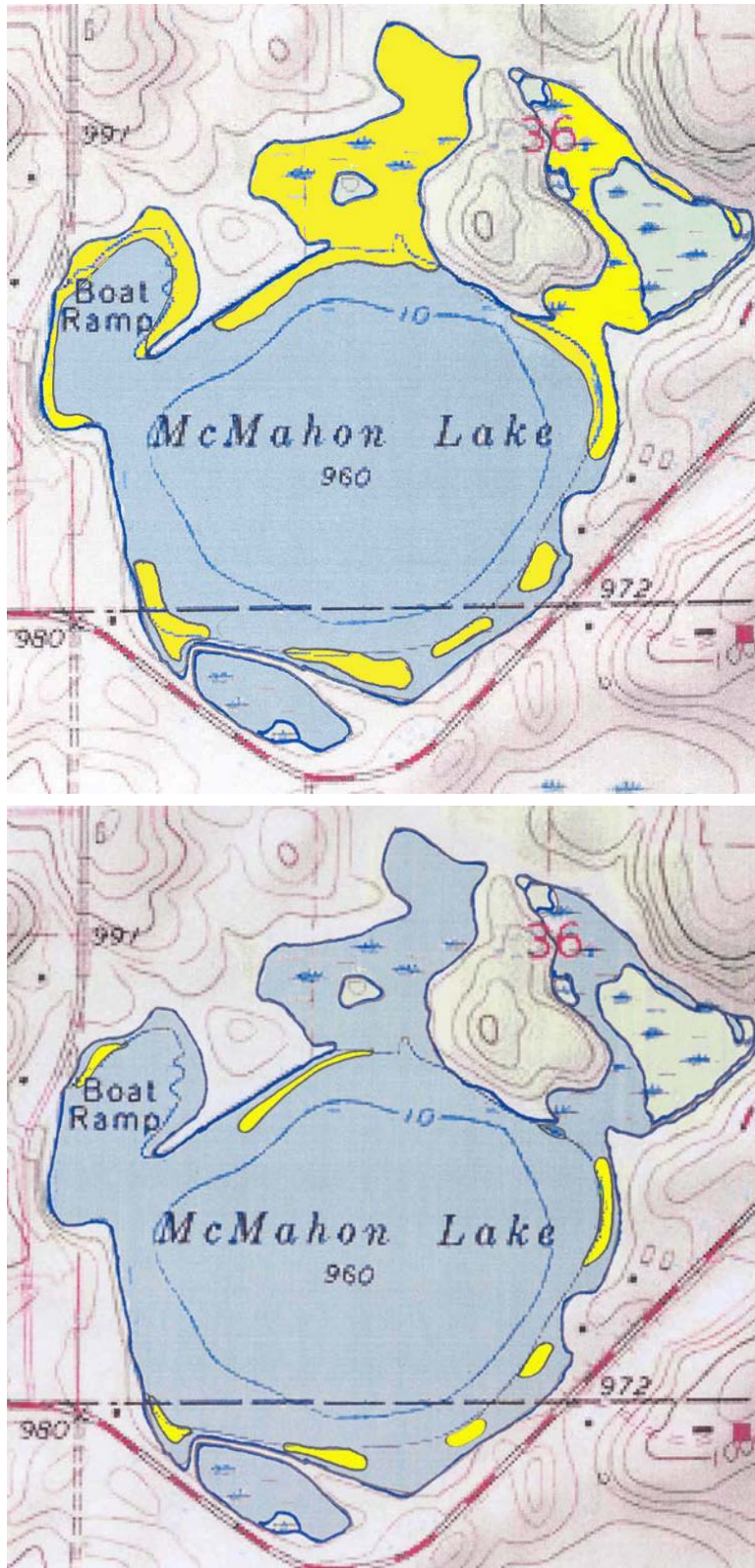
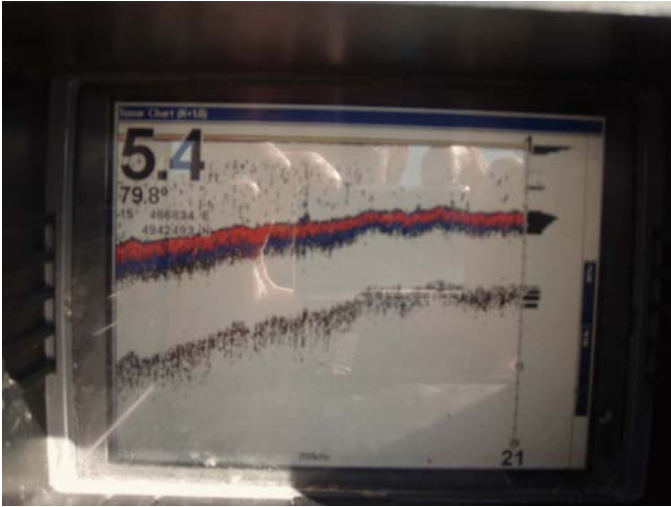


Figure 5. [top] Total aquatic plant coverage in the late summer survey of August 29, 2007 was estimated at 52 acres.  
[bottom] Eurasian watermilfoil coverage on September 29, 2007.



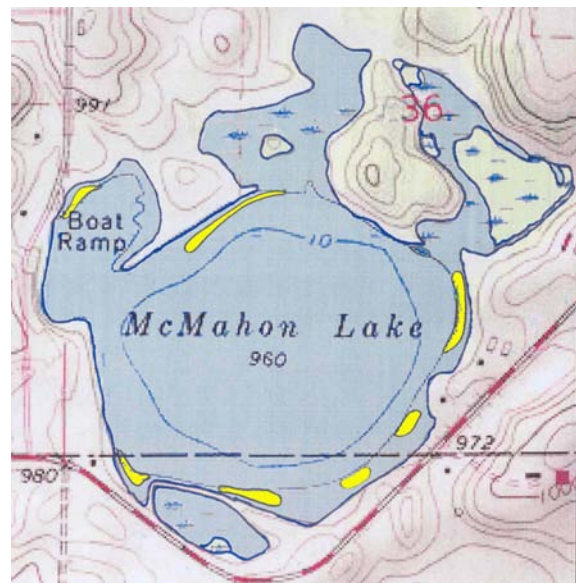
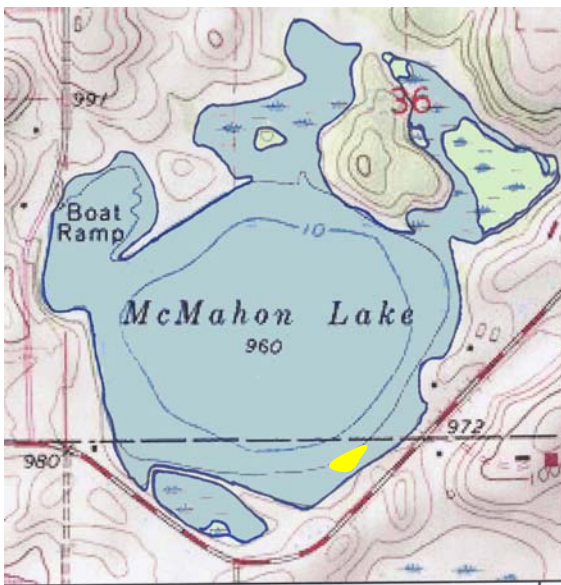
**Figure 6. [top] Eurasian watermilfoil and coontail were the most common aquatic plants on September 4, 2007. [middle] Aquatic plants were not found in water deeper than 5-feet. The sonar picture shows no plants at 5.4 feet. [bottom] Sample of Eurasian watermilfoil from McMahan Lake. Eurasian watermilfoil was found in McMahan Lake in 2007.**

# Summary

McMahon Lake (MnDNR ID: 70-0050) is a 167 acre lake located in Scott County. The coverage and occurrence of aquatic plants for early summer and late summer conditions were based on point-intercept plant surveys. Plants (primarily curlyleaf pondweed) grew out to 12-feet of water depth in early summer. In late summer, after curlyleaf died back, Eurasian watermilfoil, which was first found in 2007, was the dominant plant. Plants were found out to 4-feet of water depth.

**Table 5. Summary of aquatic plant results from two plant surveys conducted in 2007.**

	May 18, 2007 (Secchi disc: 7.2 feet) (Est. plant coverage: 68 ac)			September 4, 2007 (Secchi disc: 2.0 feet) (Est. plant coverage: 52 ac)		
	Occurrence	Percent Occurrence (81 sites)	Average Density	Occurrence	Percent Occurrence (41 sites)	Average Density
White waterlily	--	--	--	18	44%	0.8
Coontail	--	--	--	10	24%	1.3
Elodea	--	--	--	4	10%	1.5
Eurasian watermilfoil	--	--	--	16	39%	1.5
Curlyleaf pondweed	72	89%	3.6	1	2%	0.5
Sago pondweed	--	--	--	3	7%	1.3
Filamentous algae	--	--	--	1	2%	1.0



**Eurasian watermilfoil locations on May 29, 2007. Eurasian watermilfoil locations on September 29, 2007.**

# APPENDIX

## May 18 and 29, 2007

Site	Depth (ft)	Curlyleaf Pondweed	No Plants	Number species	Species per site
1	2	4			
1.5	4	5		1	1.0
2	8	4		1	1.0
3	8	4.5		1	1.0
4	4	5		1	1.0
5	4	5		1	1.0
6	10	2		1	1.0
7	10	1.5		1	1.0
8	8	4		1	1.0
9	8	5		1	1.0
10	4	5		1	1.0
10.5	4	5		1	1.0
11	8	5		1	1.0
12	7	4.5		1	1.0
13	5	5		1	1.0
14	11	1		1	1.0
15	11	1.5		1	1.0
16	12		1		
17	11	4		1	1.0
18	11	3		1	1.0
19	9	4		1	1.0
20	6	4		1	1.0
21	6	4		1	1.0
22	11	1.5		1	1.0
23	12		1		
24	13		1		
25	13		1		
26	13		1		
27	13		1		
28	12		1		
29	4	4		1	1.0
30	2	5			
31	5	5			
32	4	5			
33	4	4		1	1.0
34	10	1		1	1.0
35	13		1		
36	13		1		
41	12	0.5		1	1.0
42	4	5		1	1.0
43	7	4		1	1.0
44	10	2			
49	14		1		
50	14		1		
51	9	4		1	1.0
52	6	3.5		1	1.0
53	4		X		
54	1		X		
55	4	3.5		1	1.0
56	12		1		
65	10	3		1	1.0
66	11	2		1	1.0
76	9	4		1	1.0
77	4		X		
78	4		X		
79	2		X		
80	3	2			
81	4	2			
82	8	4		1	1.0
83	14		1		
92	11	2		1	1.0
93	5	2			
94	11		1		
95	12		1		
104	6	4			
105	4	3			
106	4	2			
107	3		X		

## May 18 and 29, 2007

Site	Depth (ft)	Curlyleaf Pondweed	No Plants	Number species	Species per site
108	2		X		
109	2		X		
110	1		X		
111	3	4			
112	8	4		1	1.0
122	9	3.5		1	1.0
123	5	3.5			
124	4	5		1	1.0
125	9	3.5		1	1.0
133	9	3.5		1	1.0
134	7	4		1	1.0
135	8	3.5		1	1.0
140	13		1		
141	8	4		1	1.0
142	14		1		
143	6	4			
145	4	4		1	1.0
146	9		1		
147	11		1		
148	11		1		
151	9	3.5		1	1.0
152	3	4			
154	4	4			
155	9	4		1	1.0
156	9	4			
157	5	3			
158	9	2		1	1.0
159	4	5		1	1.0
160	4	5		1	1.0
161	4	3			
162	4	3			
163	4	3			
Average Density		3.6			
Total sites (91)		72	20		
% occurrence (all sites)		72			
% occurrence (with plants)		89			

# September 4, 2007

Site	Depth (ft)	White Waterlily	Coontail	Elodea	Eurasian Watermilfoil	Curlyleaf Pondweed	Sago Pondweed	No Plants	FA
1	2		2		2				1
1.5	6							1	
2	8							1	
3	8							1	
4	5							1	
10	4		1		1				
11	7							1	
12	7							1	
16	4							1	
17	4							1	
18	4							1	
19	3	0.5							
20	2		2		2				
21	3				2	0.5	2		
42	3				2				
43	4			1	1		1		
52	4				2				
53	4	3							
54	1	3							
55	4				2				
65	7							1	
66	9							1	
77	4	3	3						
78	4	3							
79	2	3							
80	3	3	3						
81	3		0.5						
92	7							1	
93	3			1	1		1		
94	2	1							
105	4	2	1	1					
106	4	4							
107	3	4							
108	2	4							
109	2	2							
110	1	2							
111	3	2							
122	2.5							1	
124	2				1				
134	4.5							1	
143	6							1	
145	3				1				
146	9							1	
152	3		1		1				
153	4		2						
154	3.5				2				
157	3			2	1				
158	3							1	
159	3				2				
160	3				2				
161	4	3							
162	4	3	2						
163	4	2							
<b>Average</b>		<b>2.6</b>	<b>1.8</b>	<b>1.3</b>	<b>1.6</b>	<b>0.5</b>	<b>1.3</b>		<b>1.0</b>
Occurrence (53 sites)		18	10	4	16	1	3	17	1
% occurrence (all sites)		34	19	8	30	2	6		2
Occurrence (36 sites)		18	10	4	16	1	3		1
% occurrence (sites with plants)		50	28	11	44	3	8		3