

Rice Lake, Google

Aquatic Plant Surveys for Rice Lake, Maple Grove, Minnesota in 2006

Early Summer Survey: May 24, 2006
Late Summer Survey: August 27, 2006

Prepared for:
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Maple Grove, Minnesota

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Summary

Two aquatic plant line transect surveys were conducted on Rice Lake (314 acres) in the summer of 2006. The May 24 survey was to evaluate curlyleaf pondweed and native plants and the August 27 survey was to look for Eurasian watermilfoil and characterize native plants.

In the early summer of 2006, Curlyleaf pondweed was found at 16 out of 41 stations (39% of the stations), growing out to about 5 feet of water. It did not produce nuisance matting conditions in Rice Lake.

In August, curlyleaf pondweed had died back. Sago pondweed was the most common plant in the August survey (Table 1) but was found only in shallow water. Plants grew out to about 6 feet of water.

The acreage of aquatic submerged plants in Rice Lake increased slightly from early to late summer (Table 1).

Table 1. The percent occurrence of aquatic plants for Rice Lake in 2006. 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. For example, if milfoil was found in 25 out of 50 stations, its percent occurrence would be 50%.

	May 24, 2006 % Occurrence (41 stations)	August 27, 2006 % Occurrence (41 stations)	Changes from May to August (+/-)
Coontail (<i>Ceratophyllum demersum</i>)	5	7	+
Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	--	7	+
Curlyleaf pondweed (<i>Potamogeton crispus</i>)	39	--	-
Stringy pondweed (<i>P. sp</i>)	41	--	-
Sago pondweed (<i>Stuckenia pectinata</i>)	--	27	+
Aquatic Plant Coverage (acres)	50	80	+
Secchi disc (ft)	3.8	3.0	-

Conclusions and Recommendations for Aquatic Plant Management in Rice Lake

The aquatic plant community had three species of submerged plants in early summer and three species in late summer. This is a low plant diversity condition. Both curlyleaf pondweed and Eurasian watermilfoil were found in the lake.

Curlyleaf pondweed covers 50 acres in early summer and then dies back. It grows sparsely and does not require control at this time. Eurasian watermilfoil was observed but is sparse and does not present a nuisance condition.

Native plant distribution is limited due to poor water clarity. If water clarity increased, native plant coverage would probably increase and possibly sustain long-term improved water clarity. There may be too many fish which are limiting aquatic plant growth. Rough fish removal is a potential project.

If curlyleaf grows to nuisance conditions in the future, a drawdown is recommended.

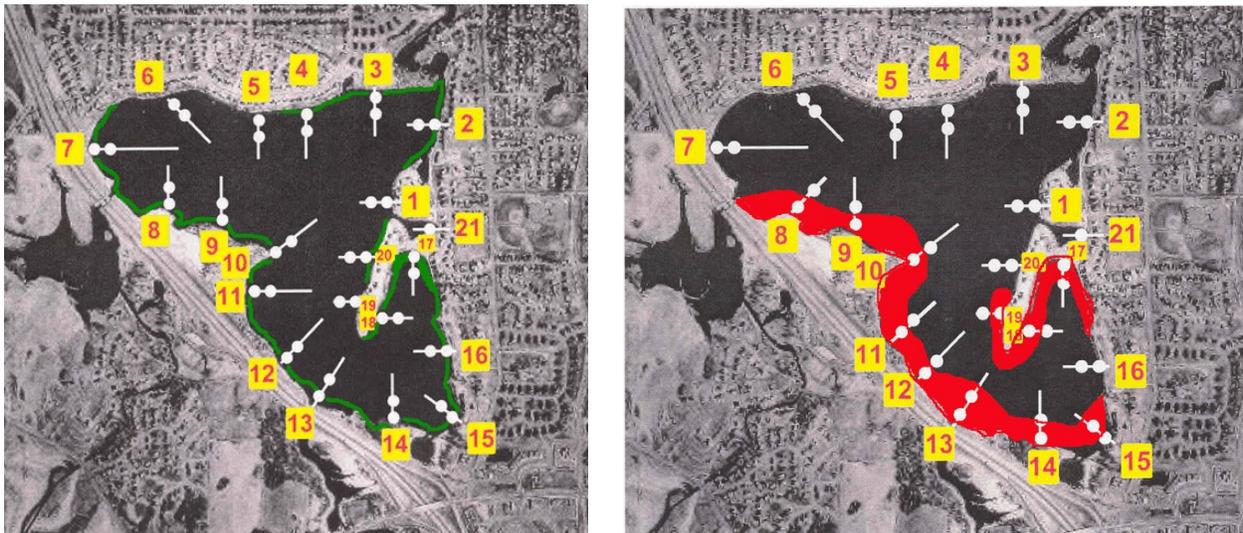


Figure 1. (left) Early summer aquatic plant coverage in 2006. Native plant coverage is shown and covers about 50 acres out of a total of 314 acres (shown in green). (right) Late summer aquatic plant coverage in 2006. The red area shows coverage of aquatic plants. Plants covered about 80 acres.

Rice Lake, Maple Grove, Minnesota

Lake ID: 27-0116

Size: 314 acres (source: MnDNR)

Littoral area: 314 acres (source: MnDNR)

Maximum depth: 11.5 ft (source: MnDNR)

Mean Depth: feet

Introduction

Rice Lake is a 314 acre moderately fertile lake in Maple Grove, Minnesota.

The aquatic plants of Rice Lake were sampled to evaluate curlyleaf pondweed and to look for Eurasian watermilfoil and to document the extent of native plant coverage. Steve McComas, Blue Water Science, conducted two aquatic plant surveys on Rice Lake on May 24 and August 27, 2006.

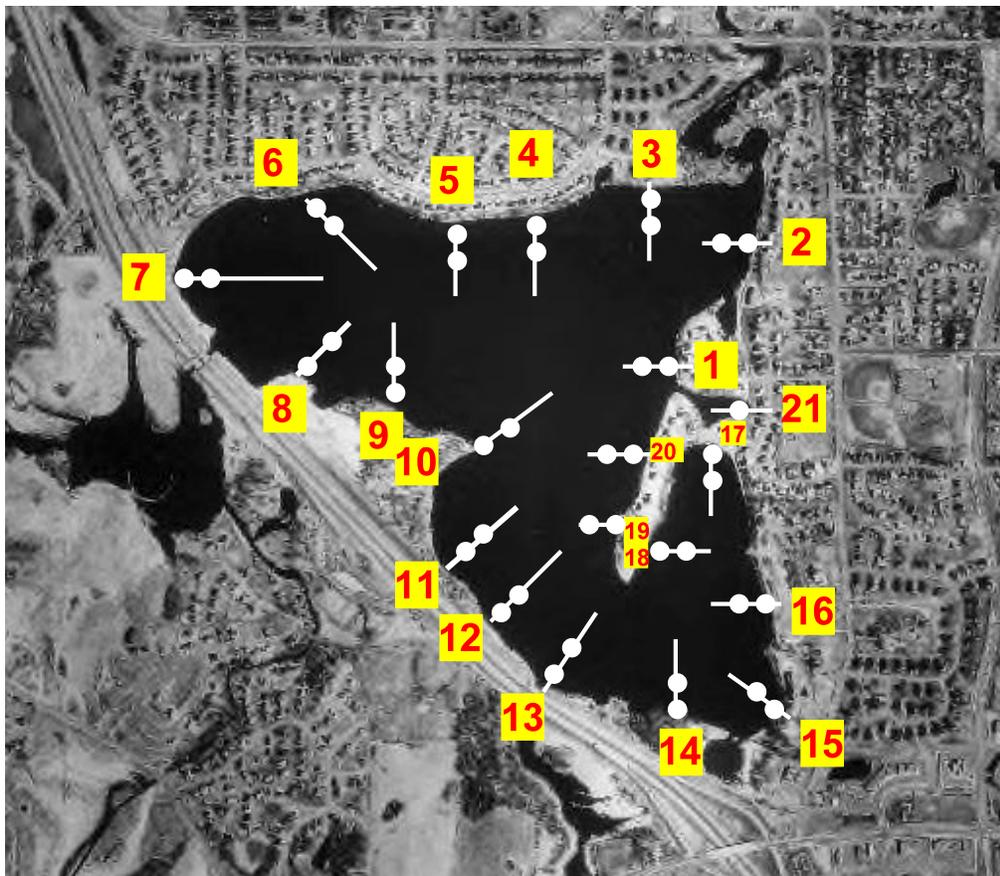


Figure 1. Transects for plant surveys on May 24 and August 27, 2006.

Methods

Several techniques were used to characterize aquatic plants in Rice Lake. We used 21 line transects (Figure 1). Two depths (0-4 feet and 5-9 feet) on a transect were randomly sampled with a rake to characterize species presence and density. A recording sonar (Lowrance X-16) was used to delineate the depths of weed colonization.

Aquatic plant density was estimated based on a scale from 1-5 with 1 being the less dense and 5 representing plants matting at the surface. An example of a plant density of a "1" and a "2" are shown in Figure 2. Plant density ratings were based on the amount of plants collected on a rake head. A single stem or a trace of an identifiable plant was rated at a density of "1". If plants were collected up to at least one half of the rake head (7 out of 14 tines) it was rated at a density of "2". If plants covered all of the rake tines, the density was a "3". If plants covered all 14 tines and was dense on all tines (even obscuring them) the density was a "4". A density of "5" was only assigned to plants matting at the surface.

Two to four rake samples were collected at each depth interval. A density for each plant species was determined for each rake sample and the species density was averaged based on the number of rake samples for a depth interval.

For plant surveys of this type, depth intervals are determined based on the maximum depth of plants found in the lake. Two depth intervals are used if plant growth is 10 feet or less and three depth intervals are used if plant growth is 12 feet or greater. Aquatic plants colonized out to 9 feet in Rice Lake, so the two depth zones were used and they were: 0-4 feet and 5-9 feet.



Figure 2. Aquatic plants were sampled with a rake. Here is a rake with curlyleaf pondweed at a density of a "1" and stringy pondweed at a density of a "2".

Results of the Early Summer Survey -- June 10

The most abundant plants in early summer in Rice Lake were curlyleaf pondweed and stringy pondweed and were found at about 40% of the 41 stations (Table 1). Curlyleaf pondweed was found growing out to water depths of 5 feet. No nuisance conditions were observed. Native plants were scarce in Rice Lake.

An aquatic plant coverage map is shown in Figure 3. Curlyleaf pondweed coverage is basically the same as the aquatic plant coverage map. Curlyleaf coverage is about 50 acres of the 314 acre Rice Lake.

A summary of plant density and occurrence for individual transects is shown in Table 2. Eurasian watermilfoil was not found in this survey.

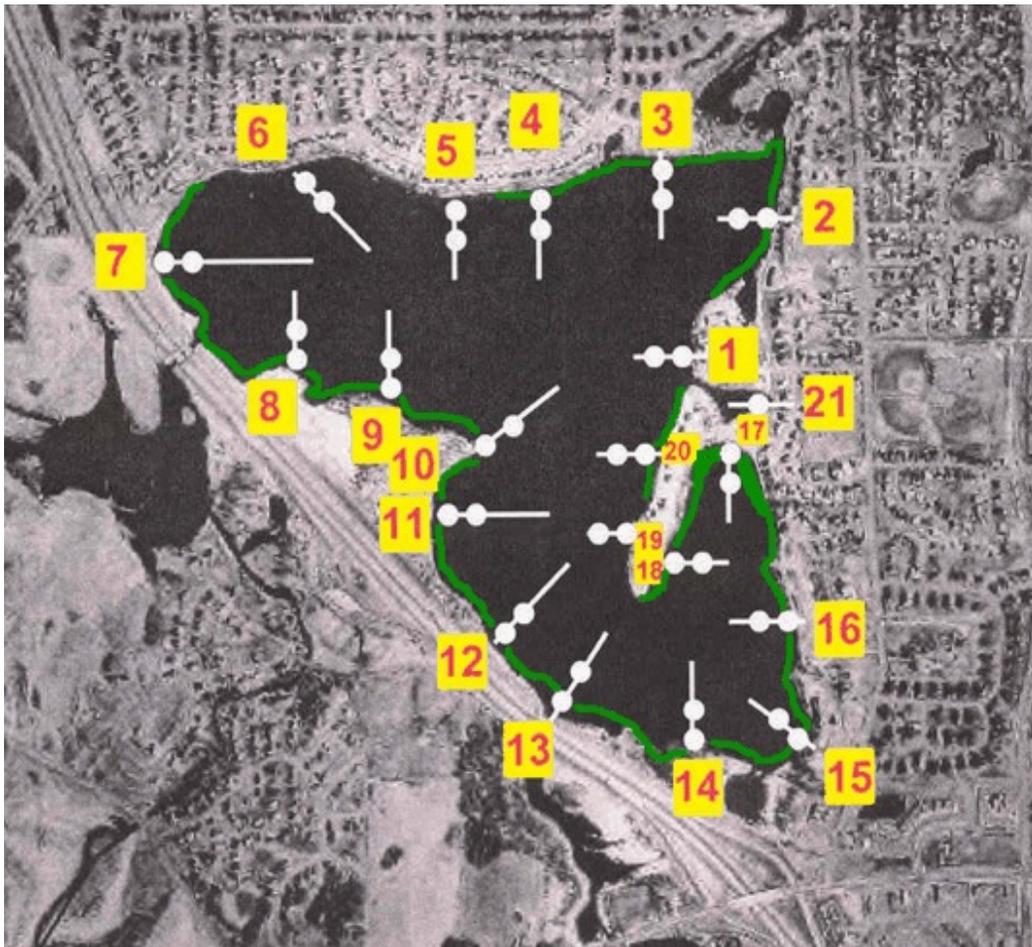


Figure 1. Early summer aquatic plant coverage in 2006. Native plant coverage is shown and covers about 50 acres out of a total of 314 acres (shown in green).

Table 1. Rice Lake aquatic plant occurrences and densities for the May 24, 2006 survey based on 21 transects and 2 depths, for a total of 41 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0 - 4 feet (n=21)			Depth 5 - 8 feet (n=20)			All Stations (n=41)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Coontail (<i>Ceratophyllum demersum</i>)	1	5	0.5	1	5	0.2	2	5	0.4
Curlyleaf pondweed (<i>Potamogeton crispus</i>)	12	57	1.4	4	20	0.7	16	39	1.2
Stringy pondweed (<i>P. sp</i>)	12	57	1.6	5	25	0.6	17	41	1.3

Table 2. Individual transect data for Rice Lake on May 24, 2006.

	T1		T2		T3		T4		T5		T6		T7	
	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8
Coontail														
Curlyleaf pondweed			1		2									0.5
Stringy pondweed					2	0.5	1.5						2	
No Plants	X	X		X				X	X	X	X	X		

	T8		T9		T10		T11		T12		T13		T14	
	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8
Coontail												0.2	0.5	
Curlyleaf pondweed	1		0.5		0.3		2	1	3	0.5			1	
Stringy pondweed	2		1						3	1.5			1	
No Plants		X		X		X					X			X

	T15		T16		T17		T18		T19		T20		T21
	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4	5 - 8	0 - 4
Coontail													
Curlyleaf pondweed	0.5		2		1	0.8	2						
Stringy pondweed	1	0.3		0.2	1	0.5	1		2		2		
No Plants								X		X		X	X

Results of the Late Summer Survey -- September 2

A significant change in the plant community was found in the September survey compared to the June survey. The growth of curlyleaf pondweed found in June had died back and only new curlyleaf growth was observed in September. However, curlyleaf only grew out to a water depth of about 5 feet, rather than the 9 feet found in June. This was due, in part, because of a change in water clarity. The Secchi reading was 3.9 feet on June 10 and was 1.2 feet on September 2. Coontail was the most common native plant found in Rice Lake in September (Table 3).

A map of aquatic plant coverage is shown in Figure 5. Aquatic plants covered about 26% of the bottom or roughly 80 acres. Within the 80 acres, submerged plants were scarce. Eurasian watermilfoil was found in this survey at three sites.

The occurrence and density of plants for individual transects are shown in Table 4.

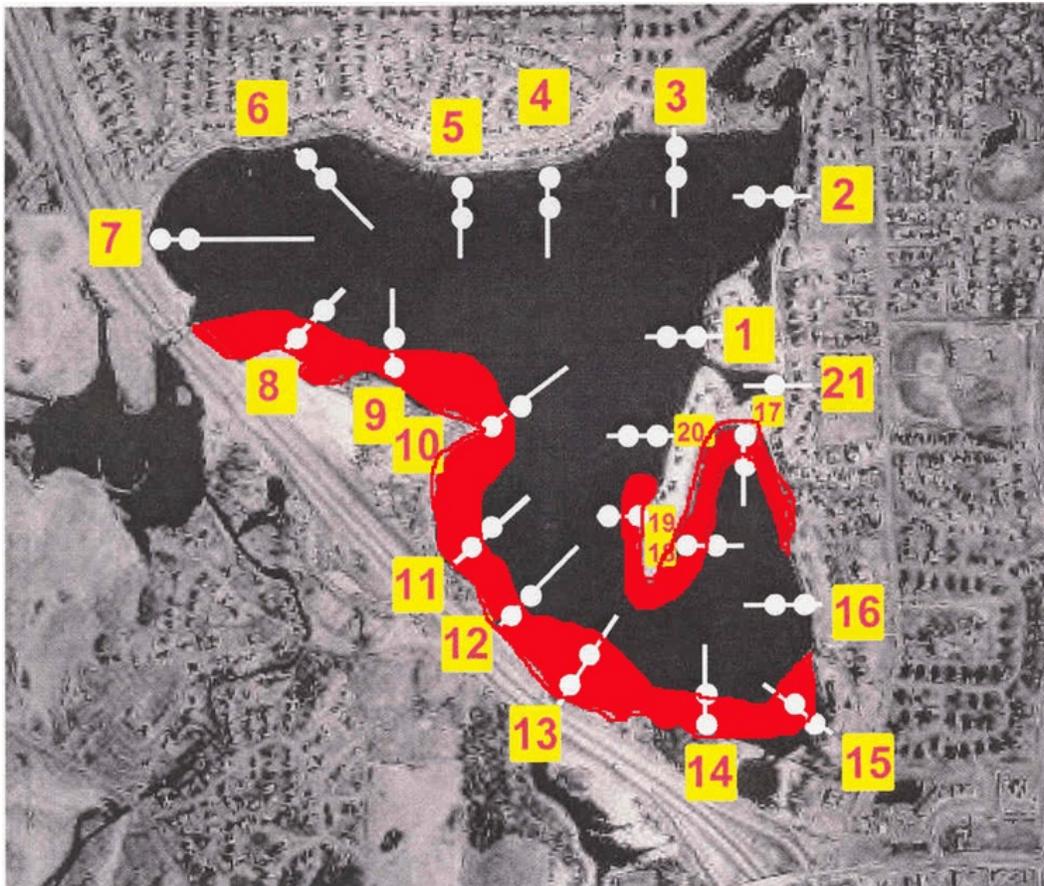


Figure 5. Late summer aquatic plant coverage in 2006. The red area shows coverage of aquatic plants. Plants covered about 80 acres.

Table 3. Rice Lake aquatic plant occurrences and densities for the August 27, 2006 survey based on 21 transects and 2 depths, for a total of 41 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0 - 4 feet (n=21)			Depth 5 - 8 feet (n=20)			All Stations (n=41)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Coontail (<i>Ceratophyllum demersum</i>)	2	10	0.8	1	5	0.5	3	7	0.7
Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	3	14	1.0	--	--	--	3	7	1.0
Sago pondweed (<i>Stuckenia pectinata</i>)	10	48	1.0	1	5	1.0	11	27	1.0

Table 4. Individual transect data for Rice Lake on August 27, 2006.

	T1		T2		T3		T4		T5		T6		T7	
	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8
Coontail														
Eurasian watermilfoil														
Sago pondweed														
No Plants	X	X	X	X	X	X	X	X	X	X	X	X	X	X

	T8		T9		T10		T11		T12		T13		T14	
	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8
Coontail													1	
Eurasian watermilfoil					0.3				2		1			
Sago pondweed	1		1		0.5		1.5		1		1	1	1	
No Plants		X		X		X		X		X				X

	T15		T16		T17		T18		T19		T20		T21
	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8	0-4	5-8	0-4
Coontail		0.5					0.5						
Eurasian watermilfoil													
Sago pondweed					0.3		1		2				
No Plants	X		X	X		X		X		X	X	X	X

Comparison of Early and Late Summer Aquatic Plant Surveys in 2006

In the early summer of 2006, Curlyleaf pondweed was found around most of the perimeter of Rice Lake and out to about 5 feet of water. It was not found to produce nuisance matted growth.

By the end of August, curlyleaf pondweed had died back. Sago pondweed was the most common plant in the August survey (Table 5).

The acreage of aquatic submerged plants in Rice Lake increased from early to late summer.

Table 5. The percent occurrence of aquatic plants for Rice Lake in 2006. 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. For example, if milfoil was found in 25 out of 50 stations, its percent occurrence would be 50%.

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Native plant distribution is limited due to poor water clarity. If water clarity increased, native plant coverage would probably increase and possibly sustain long-term improved water clarity. There may be too many fish which are limiting aquatic plant growth. Rough fish removal is a potential project.

If curlyleaf grows to nuisance conditions in the future, a drawdown is recommended.

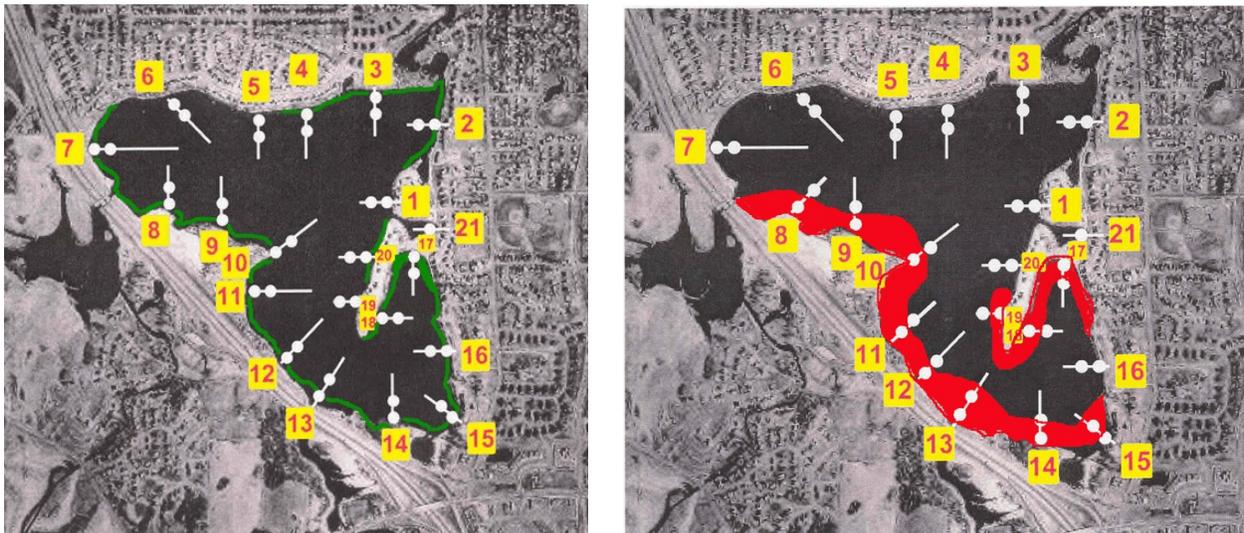
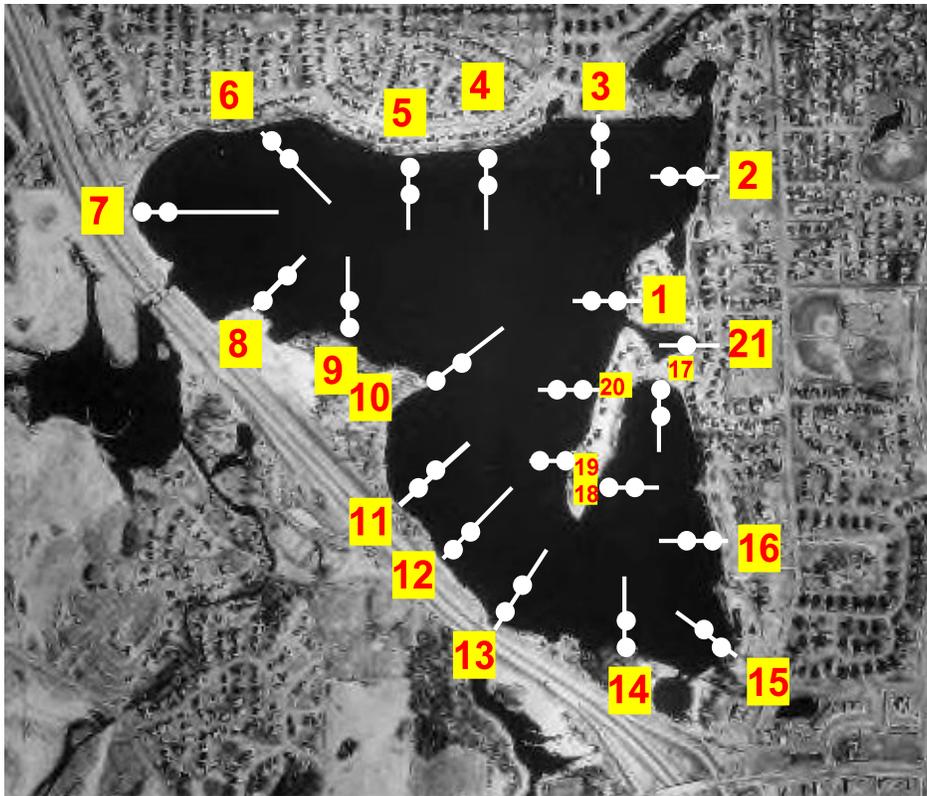


Figure 7. (left) Early summer aquatic plant coverage in 2006. Native plant coverage is shown and covers about 50 acres out of a total of 314 acres (shown in green). (right) Late summer aquatic plant coverage in 2006. The red area shows coverage of aquatic plants. Plants covered about 80 acres.

Appendix

Transect Descriptions



Transect Descriptions

Transect Number	GPS Coordinates (WGS 84)		Descriptions
	East	North	
1	04 63 566	49 95 944	Left of cove opening.
2	04 63 776	49 96 210	Left of cove opening.
3	04 63 519	49 96 343	Right of cove.
4	04 63 287	49 96 250	Left of brown wood framed house.
5	04 62 956	49 96 257	Right of tan house with wooden stairs to the lake.
6	04 62 661	49 96 266	Left of culvert.
7	04 62 943	49 96 143	Toward highway into a bunch of willows.
8	04 62 655	49 96 033	Overtured tree on the shoreline in cattails.
9	04 63 012	49 95 588	Middle of long shoreline.
10	04 63 212	49 95 683	Left of point.
11	04 63 103	49 95 480	In-between two dead tree stands.
12	04 63 186	49 95 306	Right of where trees stop.
13	04 63 365	49 95 185	Right in on bridge.
14	04 63 483	49 95 151	Tree with three trucks.
15	04 63 800	49 95 082	Left of cover, right on apartment building.
16	04 63 772	49 95 354	Cattail bed.
17	04 63 731	49 95 611	End of the bay.
18	04 63 655	49 95 443	Left of overhanging willow.
19	04 63 426	49 95 535	1 st house on peninsula.
20	04 63 568	49 95 821	2 nd house to the right of the cove opening.
21			In cove.