Jay Connaway: *Lobsterman in Heavy Seas*

Aquatic Plant Surveys for Parker's Lake, Plymouth, Minnesota, 2008

Early Summer Survey: May 27, 2008
Late Summer Survey: August 14, 2008

Prepared for:
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Summary

Two plant surveys were conducted on Parkers Lake in 2008. The first survey was conducted on May 27, 2008 and consisted of 16 transects around Parkers Lake. Aquatic plants cover about 58% of the lake bottom (56 out of 97 acres). Nine plant species were identified in Parkers Lake with curlyleaf pondweed being the most common plant (Table I). Curlyleaf pondweed grew out to a water depth of 14 feet but at low densities and did not create surface matting.

The second aquatic plant survey was conducted later in the summer, on August 14, 2008 and consisted of 16 transects around Parkers Lake. By this time of the summer, curlyleaf pondweed and stringy pondweed had died back, although aquatic plants still covered about 57% of the lake bottom. Thirteen plant species were identified in Parkers Lake with coontail being the most common plant. Eurasian watermilfoil and the milfoil hybrid were common (Table II). Plants grew out to a water depth of 15 feet.

Eurasian watermilfoil (EWM) occurrence increased in Parkers Lake in 2008 was reduced compared to the distribution in 2007. Several acres of matted growth of EWM was observed in the 2008 August survey.

In late summer of 2008, aquatic plant growth in Parkers Lake was mostly subsurface. In 2007, milfoil was much more abundant.

A comparison of plant occurrence for early and late summer surveys from 1951 through 2008 is shown in Tables 1 and 2. Plant diversity has fluctuated over the years. One significant new species has been Eurasian watermilfoil (first discovered in 1991), but other species have come and gone as well. The herbicide, fluridone (trade name Sonar) was applied to Parkers Lake in 1994. In 2007, there was a significant increase in distribution and abundance of Eurasian watermilfoil, but in 2008, milfoil distribution and abundance was significantly lower.

Table 1. Parkers Lake aquatic plant frequency for transect occurrence (%) in early summer.

EARLY SUMMER SURVEYS Aquatic Plants	5.2. 1951	6.10. 1985	6.23. 1992	5.23. 1994 (sonar added)	5.30. 1995	5. 1996	6.14. 2000*	6.18. 2002	6.9. 2003	6.14. 2005	5.19. 2006	5.30. 2007	5.27. 2008
Coontail (*Ceratophyllum demersum*)		A	24				20	75	22	16	25	13	40
Chara (*Chara sp*)			2		7	23	47	50	11	4	6	2	
Elodea (*Elodea canadensis*)	X**	C	2				20	6					
Star duckweed (*Lemna trisulca*)												2	23
Northern watermilfoil (*Myriophyllum sibiricum*)			11				13	6	4	4			4
Eurasian watermilfoil (*Myriophyllum spicatum*)			32	19		7	40	81	49	11	6	89	21
Hybrid watermilfoil (*M. sp*)													15
Naiad (*Najas flexilis*)			8				33						
Curlyleaf pondweed (*Potamogeton crispus*)		C	47	70	97	93	73	56	47	47	50	54	66
Illinois pondweed (*P. illinoensis*)													2
Stringy pondweed (*P. foliosus/pusillus*)	X			15		7	80	100	67	76	94	26	21
Narrowleaf pondweed (*P. strictifolius*)			3				20						
Flatstem pondweed (*P. zosteriformis*)	X	R	32	52			67	69	60	69	94	7	13
Narrowleaf pondweed (*P. sp*)		C											
White water buttercup (*Ranunculus sp.*)			12	22		7	20	6	4	2			
Yellow water buttercup (*Ranunculus flagellaris*)			3										
Sago pondweed (*Stuckenia pectinata*)	X	A	21	37	13	23	60						
Water stargrass (*Zosterella dubia*)		A		4	13	47	93						
Number of Species	**4**	**7**	**12**	**7**	**3**	**6**	**13**	**9**	**8**	**8**	**6**	**7**	**9**
Investigator	**DNR**	**DNR**	**BCWMC**	**DNR**	**DNR**	**DNR**	**BCWMC**	**BWS**	**BWS**	**BWS**	**BWS**	**BWS**	**BWS**

* Data points from the Barr survey were assigned to transects set up by Blue Water Science.

** Referred to as western waterweed (*Anacharis occidentalis*)

Eurasian watermilfoil (EWM) was discovered in Parkers Lake in 1991 and in 1994 the MnDNR conducted a whole lake test of the herbicide fluridone (trade name: Sonar) to reduce the presence of milfoil. The herbicide application reduced Eurasian watermilfoil and several other plant species and their densities for about a year. EWM did come back and after 2 years from the fluridone treatment, its occurrence was close to pretreatment occurrence. It does not appear that any species were lost due to the herbicide treatment except maybe northern watermilfoil.

From 1975, the aquatic plant community has fluctuated over the years. For example, chara and stringy pondweed came in strong in 2000, but have decreased in the last few surveys.

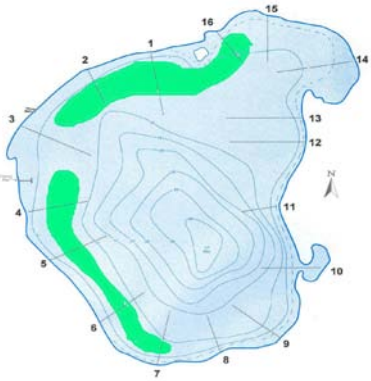
The aquatic plant community remains dynamic from the view that species abundance is variable from year to year.

Table 2. Parkers Lake aquatic plant frequency for transect occurrence (%) in late summer.

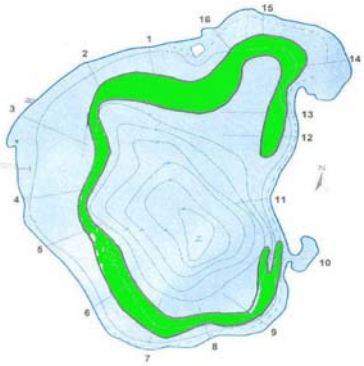
LATE SUMMER SURVEYS Aquatic Plants	8.7. 1975	8.19. 1992	7.15. 1993	8.24. 1993	7.1. 1994 (sonar added)	8.22. 1994	8.22. 1995	8.22. 1996	8.24. 2000*	10.26. 2002	8.13. 2003	9.6. 2005	8.9. 2006	7.16. 2007	8.14. 2008
Coontail (*Ceratophyllum demersum*)	A	48	53	63	10				33	63	42	11	27	46	77
Chara (*Chara sp*)			3		17	13	20	47	80	44	4	16	9		30
Elodea (*Elodea canadensis*)							3	7	27					2	
Star duckweed (*Lemna trisulca*)														15	26
Northern watermilfoil (*Myriophyllum sibiricum*)		9	30	37					13	19	7				9
Eurasian watermilfoil (*Myriophyllum spicatum*)		43	87	37			3	30	60	75	60	13	82	93	16
Hybrid watermilfoil (*M. sp*)															43
Naiad (*Najas flexilis*)		11	23				10	10	47						
Nitella (*Nitella sp*)															2
Berchtold's pondweed (*Potamogeton berchtoldi*)		7													
Curlyleaf pondweed (*P. crispus*)		2	73		7	13	47	27							5
Stringy pondweed (*P. foliosus/pusillus/sp*)			67	3	10		13	30	80		31		29		11
Narrowleaf pondweed (*P. strictifolius*)		4							27	31				2	
Flatstem pondweed (*P. zosteriformis*)		44	87	93	33	7	7	7	67	50	62	60	40	30	23
Narrowleaf pondweed (*P. sp*)															
White water buttercup (*Ranunculus sp.*)		9	47	30			7	10	27						
Yellow water buttercup (*Ranunculus flagellaris*)															
Sago pondweed (*Stuckenia pectinata*)		17	37		13		50	40	60		7	4	13	4	5
Water celery (*Vallisneria americana*)											2		4	4	7
Water stargrass (*Zosterella dubia*)				13	17	17	47	53	93	81	9	60	15		5
Number of Species	**1**	**10**	**9**	**7**	**6**	**3**	**9**	**9**	**12**	**7**	**9**	**6**	**8**	**8**	**13**
Investigator	DNR	BCW MC	DNR	DNR	DNR	DNR	DNR	DNR	BCW MC	BWS	BWS	BWS	BWS	BWS	BWS

* Data points from the Barr survey were assigned to transects set up by Blue Water Science.
** Referred to as western waterweed (*Anacharis occidentalis*)

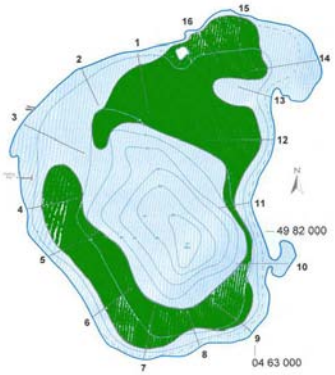
Distribution of Curlyleaf Pondweed in Parkers Lake in Early Summer



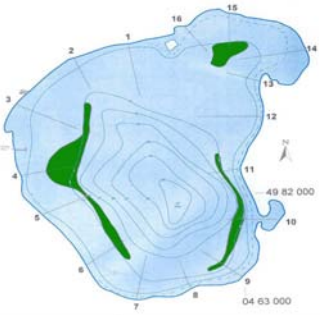
Curlyleaf pondweed coverage on June 18, 2002 was about 11 acres (shown in green). Curlyleaf did not "top out" in 2002.



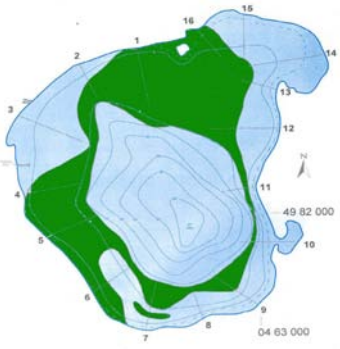
Curlyleaf pondweed coverage on June 9, 2003 was about 18 acres (shown in green). Curlyleaf topped out on Transect 15 in about 4 feet of water.



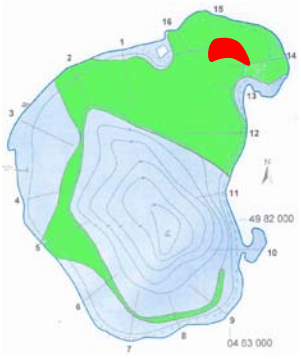
Curlyleaf pondweed coverage on June 14, 2005 increased to about 36 acres (shown in green). Curlyleaf did not "top out" in 2005.



Curlyleaf pondweed coverage on May 19, 2006 was estimated at 6 acres.

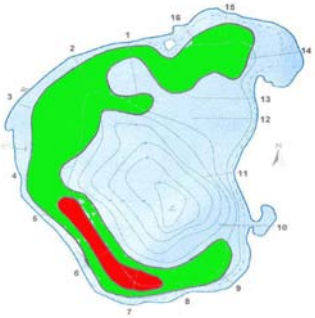


Curlyleaf pondweed coverage on May 30, 2007 was estimated at 36 acres. Curlyleaf did not grow to the surface in 2007, although Eurasian watermilfoil did on Transects 1, 2, and 8.

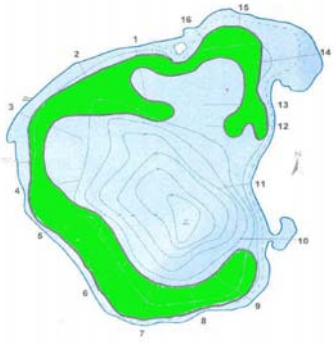


Curlyleaf pondweed coverage on May 27, 2008 was estimated at 39 acres with nuisance curlyleaf growth estimated at 1.5 acres (shown in red).

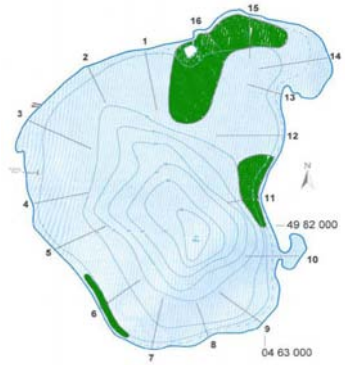
Distribution of Eurasian Watermilfoil in Parkers Lake in Late Summer



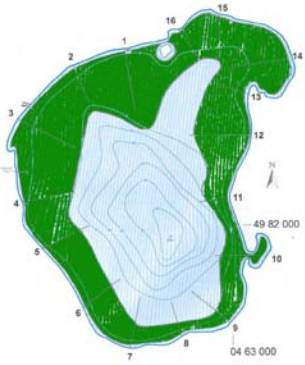
EWM distribution on October 26, 2002 was fairly widespread (shown in green) and covered 32 acres. Areas where Eurasian watermilfoil was topping out are shown in red shading (about 6 acres).



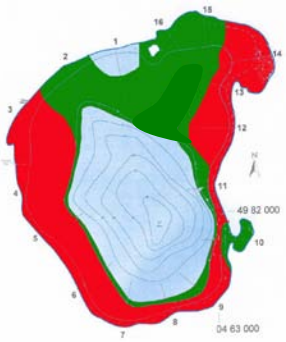
EWM distribution on August 13, 2003 was fairly widespread (shown in green) and covered 31 acres. There was no topping out of EWM in 2003.



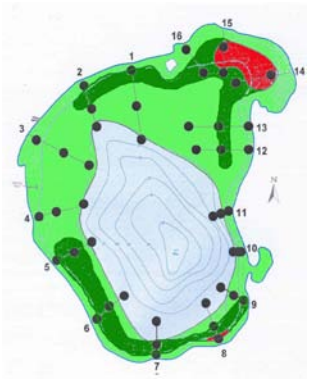
EWM distribution on September 6, 2005 (shown in green) decreased compared to 2002 and 2003. EWM covered about 13 acres in 2005, at a low density.



EWM distribution on August 8, 2006 was widespread (shown in green) and covered 57 acres. Some of the EWM growth was heavy by the end of the summer.



EWM distribution on July 16, 2007 was widespread (shown in red and green) and covered 63 acres total. Areas where EWM was a nuisance are shown in red and covered 40 acres.



EWM distribution on August 14, 2008 was estimated at 17 acres (shown in dark green). Nuisance growth of EWM was estimated at 2.6 acres (shown in red).

Aquatic Plant Recommendations for 2008: Eurasian watermilfoil continues to change in Parkers Lake. Because nuisance growth of Eurasian watermilfoil was observed in 2006 and 2007 it may need management in 2008. It is recommended to continue conducting spring and fall aquatic plant surveys to characterize dynamics of curlyleaf pondweed, Eurasian watermilfoil, nuisance native plants, as well as the rest of the native plant species. Either herbicides or harvesting nuisance vegetation are options if nonnative plants interfere with swimming or boating in the area by the public access.

Mechanical harvesting is an option for managing nuisance aquatic plant growth and was used in 2006, 2007, and 2008.

Parkers Lake, Plymouth, Minnesota

Lake ID: 27-010700
Lake size: 97 acres (MnDNR)
Littoral area: 67.7 acres (MnDNR)

Introduction

Parkers Lake (ID #27-010700) is a 97 acre lake in the City of Plymouth, Hennepin County. Eurasian watermilfoil was confirmed in Parkers Lake in 1991 by the MnDNR.

Two aquatic plant surveys were conducted on Parkers Lake in 2008 on May 27 and August 14. The objectives of the surveys were to characterize the aquatic plant community with the early summer survey emphasizing curlyleaf pondweed distribution and the late summer survey emphasizing the distribution and density of Eurasian watermilfoil (EWM). In addition, lake sediments have been collected in 2002, 2003, and 2005 and they help to predict potential nuisance growth conditions for curlyleaf pondweed and Eurasian watermilfoil. Together, the results of the plant and sediment surveys can be used to formulate aquatic plant management plans.

Aquatic Plant Survey Methods

Several techniques were used to characterize aquatic plants in Parkers Lake. The plant surveys used a line-transect method with a stratified random sampling component. We used 16 line trans ith se ing through previously known milfoil areas discove NR in 1). Up to three depth ranges (0-5 feet, 6-10 , and 11-15 feet) on each transect (where er depth allowed) were sampled with a rake to characterize species presence and is density. Several samples were randomly collected within a depth range. Plant density rating was assigned to each aquatic plant species on a scale of 1 to 5 with 5 representing dense nuisance growth. A recording sonar (Lowrance X-16) was used to delineate the depths of plant colonization.

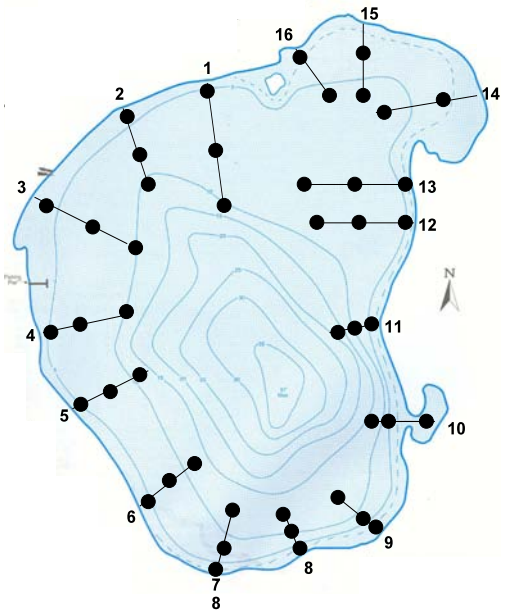


Figure 1. Transect map for the aquatic plant survey conducted on Parkers Lake.

Aquatic Plant Survey Results for 2008

Early Summer Survey - May 27, 2008: Results from the May 27, 2008 aquatic plant survey found curlyleaf pondweed, a non-native species, was the dominant submerged aquatic plant and covered about 39 acres. It's density was moderate with the densest growth around Transects 14 and 15 (Tables 1 and 2). Overall, plants grew out to a depth of 13 feet and covered about 58% of the lake bottom (56 out of 97 acres)(Figure 2).

Nine species of submerged aquatic plants were identified on May 27, 2008 (Table 1). The most common submerged plant found in Parkers Lake was curlyleaf pondweed followed by coontail (Table 1). Curlyleaf pondweed was dominant at two depths (from 6 to 15 feet) showing up in 25 out of 31 sample stations. Coontail was dominant in the shallow depth showing up at 50% of the stations (8 out of 16). The occurrence and density for aquatic plant species individual transects in 2008 are shown in Table 2.

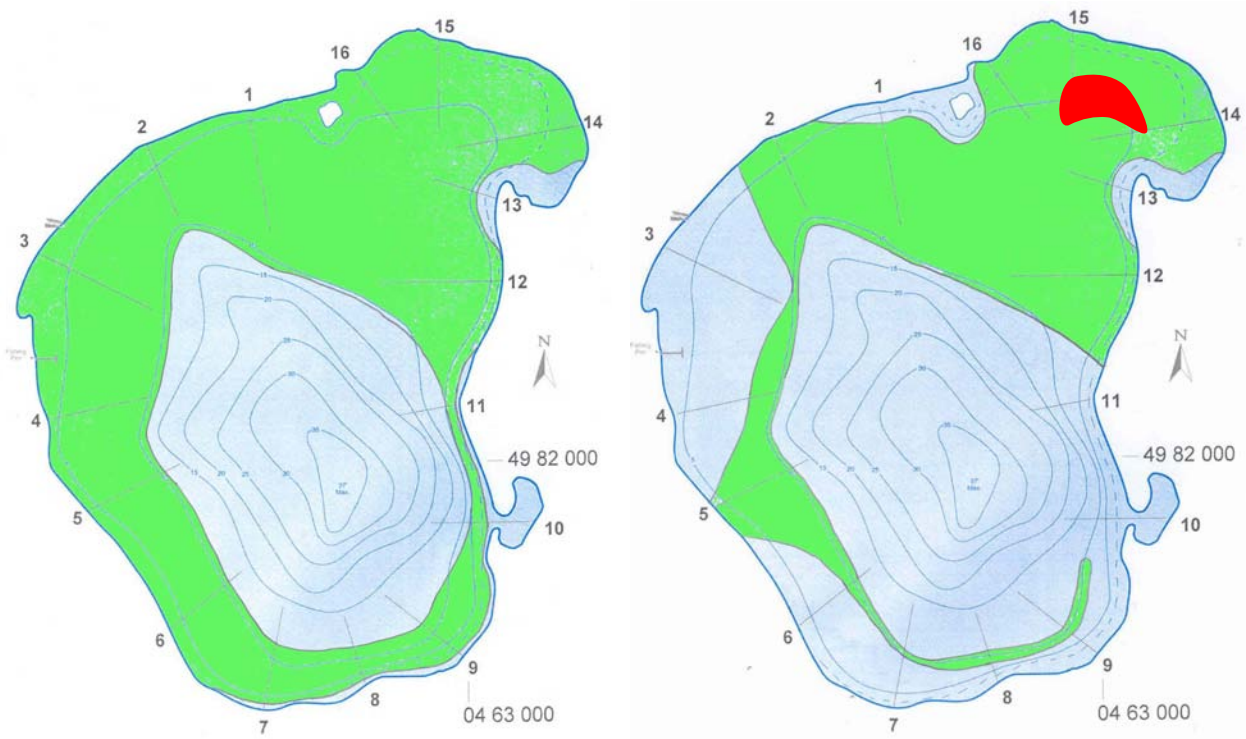


Figure 2. [left] Aquatic plant coverage for Parkers Lake on May 27, 2008 was about 56 acres (shown in green shading).
[right] Curlyleaf pondweed coverage on May 27, 2008 was estimated at 39 acres with 1.5 acres of matted growth (shown in red shading).

Table 1. Parkers Lake aquatic plant occurrences and densities for the May 27, 2008 survey based on 16 transects and 3 depths, for a total of 47 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=15)			All Stations (n=47)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Coontail (*Ceratophyllum demersum*)	8	50	1.1	7	44	1.1	4	27	1.3	19	40	1.1
Star duckweed (*Lemna trisulca*)	7	44	0.8	3	19	0.7	1	7	1.0	11	23	0.8
Northern watermilfoil (*Myriophyllum sibiricum*)	1	6	1.0	1	6	1.0	--	--	--	2	4	1.0
Eurasian watermilfoil (*M. spicatum*)	4	25	1.8	5	31	1.1	1	7	1.0	10	21	1.4
Hybrid watermilfoil (*M. sp*)	2	13	1.5	3	19	1.0	2	13	1.0	7	15	1.1
Curlyleaf pondweed (*Potamogeton crispus*)	6	38	2.5	12	75	2.2	13	87	2.9	31	66	2.6
Illinois pondweed (*P. illlinoensis*)	--	--	--	1	6	1.0	--	--	--	1	2	1.0
Stringy pondweed (*P. pusillus*)	4	25	1.1	5	31	1.0	1	7	0.5	10	21	1.0
Flatstem pondweed (*P. zosteriformis*)	3	19	1.3	3	19	1.2	--	--	--	6	13	1.3
Filamentous algae	1	6	2.0	1	6	0.5	--	--	--	2	4	1.3

Figure 3. Curlyleaf pondweed was the most common plant found during the May 27, 2008 survey showing up at 66% of the stations.

Table 2. Aquatic plant occurrence and density for individual transects in Parkers Lake, May 27, 2008.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail	0.5			0.5	2	1	0.5		2				1	1	1
Star duckweed	1									1			1		
Northern watermilfoil										1					
Eurasian watermilfoil							1				1			1	
Hybrid watermilfoil															
Curlyleaf pondweed		1.8	2.5	0.5	2	2			2		2	3.5	0.5	1	3.5
Illinois pondweed											1				
Stringy pondweed				1						2			1	2	
Flatstem pondweed							3	2			1				
Filamentous algae	2	0.5													

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail	1					1					1			1	
Star duckweed	1			0.5			0.5			0.3	0.5	1			
Northern watermilfoil		1													
Eurasian watermilfoil	2	0.5	1		2			1							
Hybrid watermilfoil					1		1	1	1			1			
Curlyleaf pondweed		1	3			3.5		1	4		3	2			
Illinois pondweed															
Stringy pondweed		0.5		0.5	1	0.5								1	
Flatstem pondweed										0.5					
Filamentous algae															

	T11			T12			T13			T14			T15			T16	
	0 - 5	6 - 10	11-15	0 - 5	6 - 10	11-15	0 - 5	6 - 10	11-15	0 - 5	6 -10	11-15	0 - 5	6-10	11-15	0 - 5	6 - 10
Coontail		0.5			1					2			2			1	1
Star duckweed		0.5			1												
Northern watermilfoil																	
Eurasian watermilfoil										2			2				
Hybrid watermilfoil					1											2	
Curlyleaf pondweed				0.5	1	3		2	3	5	4	3	5	4	3	2	4
Illinois pondweed																	
Stringy pondweed		0.5															
Flatstem pondweed				0.5				0.5									
Filamentous algae																	

Figure 4. [top] Curlyleaf pondweed, coontail, and milfoil reached the surface on June 17, 2008, about 3 weeks after the May 27, 2008 survey.
[bottom] Most of Parkers Lake did not have plants reaching the surface on June 17, 2008.

Late Summer Survey - August 14, 2008: In the late summer survey of August 14, 2008, aquatic plants grew out to a depth of twelve feet on 5 transects and covered about 57% of the lake bottom (55 out of 97 acres). Either Eurasian watermilfoil on the hybrid milfoil were found at 21 sites, with some matting conditions observed on Transect 8 and Transects 14 and 15. Plant coverage in the late summer of 2008 (Figure 5) was similar to coverage in previous years. Milfoil coverage of about 17 acres was less than was observed in 2007.

Thirteen species of submerged aquatic plants were identified. The most common submerged plant found in Parkers Lake in August was coontail (Table 3). Coontail was dominant at all depths. The occurrence and density for individual transects in 2008 are shown in Table 4.

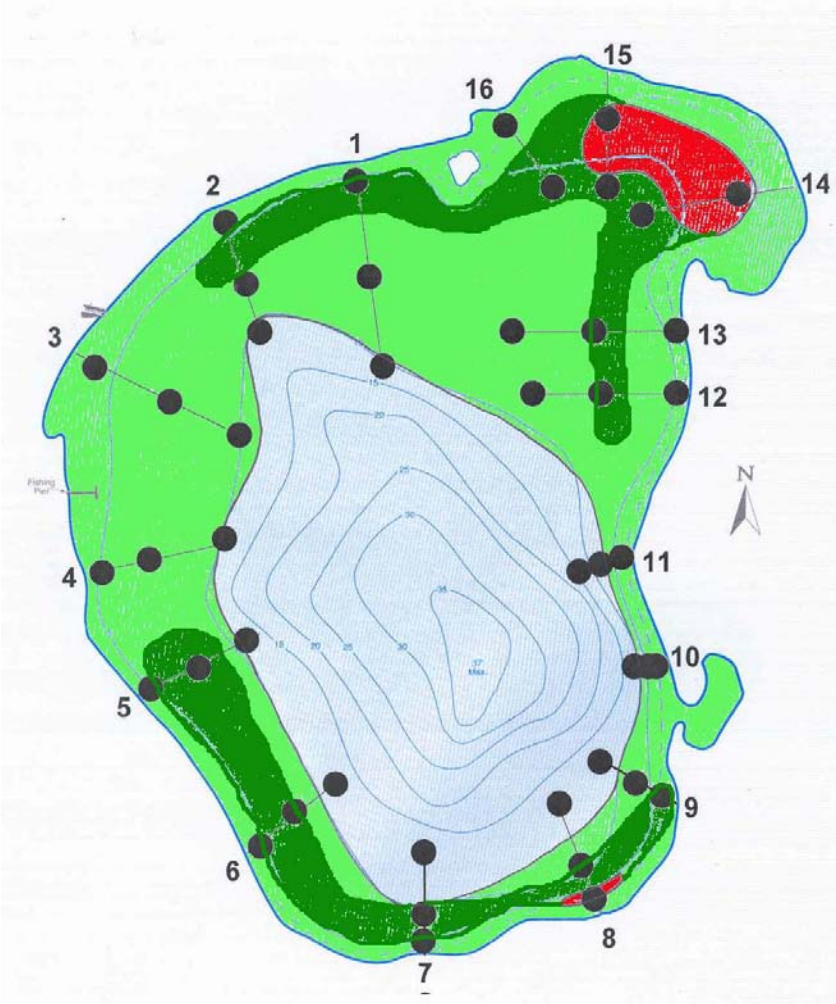


Figure 5. Aquatic plant coverage for August 14, 2008 is shown with light green shading and represents about 55 acres. Eurasian watermilfoil was observed growing in 17 acres (dark green shading), and nuisance growth covered about 2.6 acres (shown with red shading).

Table 3. Parkers Lake aquatic plant occurrences and densities for the August 14, 2008 survey based on 16 transects and 3 depths, for a total of 46 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=14)			All Stations (n=46)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Coontail (*Ceratophyllum demersum*)	13	81	2.1	16	100	1.9	5	42	1.1	34	77	1.9
Chara (*Chara sp*)	7	44	2.0	6	38	1.3	--	--	--	13	30	1.7
Star duckweed (*Lemna trisulca*)	6	38	1.6	5	31	0.6	--	--	--	11	26	1.1
Northern watermilfoil (*Myriophyllum sibiricum*)	3	19	0.8	1	6	0.3	--	--	--	4	9	0.7
Eurasian watermilfoil (*M. spicatum*)	3	19	2.8	4	25	1.0	--	--	--	7	16	1.8
Hybrid watermilfoil (*M. sp*)	10	63	2.2	9	56	1.5	--	--	--	19	43	1.8
Nitella (*Nitella sp*)	--	--	--	1	6	1.0	--	--	--	1	2	1.0
Curlyleaf pondweed (*Potamogeton crispus*)	--	--	--	2	13	0.2	--	--	--	2	5	0.2
Stringy pondweed (*P. sp*)	2	13	1.0	3	19	1.2	--	--	--	5	11	1.1
Flatstem pondweed (*P. zosteriformis*)	2	13	1.0	7	44	0.9	1	8	1.0	10	23	0.9
Sago pondweed (*Stuckenia pectinata*)	--	--	--	2	13	0.3	--	--	--	2	5	0.3
Water celery (*Vallisneria americana*)	3	25	1.3	--	--	--	--	--	--	3	7	1.3
Water stargrass (*Zosterella dubia*)	2	13	1.0	--	--	--	--	--	--	2	5	1.0
Filamentous algae	2	13	3.0	--	--	--	--	--	--	2	5	3.0

Figure 6. Chara was abundant at several sample sites.

Table 4. Aquatic plant occurrence and density for individual transects in Parkers Lake, August 14, 2008.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail	2	1	1	2	2.7			1.5	0.5	2	4			1.5	1.5
Chara								2						0.5	
Star duckweed	1	0.3						1		3				0.5	
Northern watermilfoil	1	0.3					1			0.5					
Eurasian watermilfoil	2			2										0.8	
Hybrid watermilfoil													1		
Nitella		1													
Curlyleaf pondweed															
Stringy pondweed		1.3		1	0.3		1								
Flatstem pondweed					0.7						1				
Sago pondweed					0.3										
Water celery															
Water stargrass							1								
Filamentous algae															

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail	2	1.6		2	1.3			1.5	2	1	2.5		2	2	
Chara	2	1					1			3	1.5		3		
Star duckweed							2						1		
Northern watermilfoil															
Eurasian watermilfoil		0.5			0.7		4.5	1.8							
Hybrid watermilfoil	2	0.8		1	0.3		2	1		1	1				
Nitella															
Curlyleaf pondweed		0.1			0.3										
Stringy pondweed															
Flatstem pondweed									1					1	
Sago pondweed		0.3													
Water celery										1			1		
Water stargrass															
Filamentous algae															

	T11			T12			T13			T14			T15		T16	
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6-10	11-15	0 - 5	6 - 10	0 - 5	6-10
Coontail	1	2		2	1.5	0.5	2	2		3	4		3	3	3	3
Chara	1	2		2			2	1								
Star duckweed				2	0.5		0.5	0.5								
Northern watermilfoil																
Eurasian watermilfoil																
Hybrid watermilfoil				1	2		1	0.5		4.5	2		4.5	3	4	3
Nitella																
Curlyleaf pondweed																
Stringy pondweed		2														
Flatstem pondweed				1	0.5			1					1	1		1
Sago pondweed																
Water celery	2															
Water stargrass				1												
Filamentous algae										3					3	

Figure 7. [top] Eurasian watermilfoil grew to the surface on July 16, 2007 on the west and south sides of Parkers Lake.
[bottom] Eurasian watermilfoil was not nearly the nuisance in 2008 compared to 2007. Milfoil reached the surface with a broken canopy on the south side of Parkers Lake.

Comparison of 2008 Aquatic Plant Surveys

Eight species of aquatic plants increased in occurrence from May to August and four decreased. Curlyleaf pondweed and stringy pondweed had the largest declines (Table 5). Coontail, chara, and the hybrid milfoil showed the greatest increase with several other species showing modest increases.

Table 5. Parkers Lake submerged aquatic plant occurrence for the summer surveys in 2008.

	Percent Occurrence - 2008	
	May 27 (47 stations)	August 14 (46 stations)
Coontail (*Ceratophyllum demersum*)	40	77
Chara (*Chara sp*)	--	30
Elodea (*Elodea canadensis*)	--	--
Star duckweed (*Lemna trisulca*)	23	26
Northern watermilfoil (*Myriophyllum sibiricum*)	4	9
Eurasian watermilfoil (*M. spicatum*)	21	16
Hybrid watermilfoil (*M. sp*)	15	43
Nitella (*Nitella sp*)	--	2
Curlyleaf pondweed (*Potamogeton crispus*)	66	5
Illinois pondweed (*P. illinoensis*)	2	--
Stringy pondweed (*P. pusillus*)	21	--
Stringy pondweed (*P. sp*)	--	11
Flatstem pondweed (*P. zosteriformis*)	13	23
Sago pondweed (*Stuckenia pectinata*)	--	5
Water celery (*Vallisneria americana*)	--	7
Water stargrass (*Zosterella dubia*)	--	5
Filamentous algae	4	5

Summary of Aquatic Plant Surveys from 1951-2008

A comparison of plant occurrence on for early and late summer surveys from 1951 through 2008 is shown in Table 6. Plant diversity has fluctuated over the years. One significant new species has been Eurasian watermilfoil (first discovered in 1991), but other species have come and gone as well. The herbicide, fluridone (trade name Sonar) was applied to Parkers Lake in 1994. In 2007, there was a significant increase in occurrence of Eurasian watermilfoil, with a significant decrease in stringy pondweed and flatstem pondweed compared to previous years. In 2008, Eurasian watermilfoil distribution decreased, compared to 2007.

Table 6. Parkers Lake aquatic plant frequency for transect occurrence (%) in early summer.

EARLY SUMMER SURVEYS Aquatic Plants	5.2. 1951	6.10. 1985	6.23. 1992	5.23. 1994 (sonar added)	5.30. 1995	5. 1996	6.14. 2000*	6.18. 2002	6.9. 2003	6.14. 2005	5.19. 2006	5.30. 2007	5.27. 2008
Coontail (*Ceratophyllum demersum*)		A	24				20	75	22	16	25	13	40
Chara (*Chara sp*)			2		7	23	47	50	11	4	6	2	
Elodea (*Elodea canadensis*)	X**	C	2				20	6					
Star duckweed (*Lemna trisulca*)												2	23
Northern watermilfoil (*Myriophyllum sibiricum*)			11				13	6	4	4			4
Eurasian watermilfoil (*Myriophyllum spicatum*)			32	19		7	40	81	49	11	6	89	21
Hybrid watermilfoil (*M. sp*)													15
Naiad (*Najas flexilis*)			8				33						
Curlyleaf pondweed (*Potamogeton crispus*)		C	47	70	97	93	73	56	47	47	50	54	66
Illinois pondweed (*P. illinoensis*)													2
Stringy pondweed (*P. foliosus/pusillus*)	X			15		7	80	100	67	76	94	26	21
Narrowleaf pondweed (*P. strictifolius*)			3				20						
Flatstem pondweed (*P. zosteriformis*)	X	R	32	52			67	69	60	69	94	7	13
Narrowleaf pondweed (*P. sp*)		C											
White water buttercup (*Ranunculus sp.*)			12	22		7	20	6	4	2			
Yellow water buttercup (*Ranunculus flagellaris*)			3										
Sago pondweed (*Stuckenia pectinata*)	X	A	21	37	13	23	60						
Water stargrass (*Zosterella dubia*)		A		4	13	47	93						
Number of Species	**4**	**7**	**12**	**7**	**3**	**6**	**13**	**9**	**8**	**8**	**6**	**7**	**9**
Investigator	**DNR**	**DNR**	**BCWMC**	**DNR**	**DNR**	**DNR**	**BCWMC**	**BWS**	**BWS**	**BWS**	**BWS**	**BWS**	**BWS**

* Data points from the Barr survey were assigned to transects set up by Blue Water Science.
** Referred to as western waterweed (*Anacharis occidentalis*)

Eurasian watermilfoil (EWM) was discovered in Parkers Lake in 1991 and in 1994 the MnDNR conducted a whole lake test of the herbicide fluridone (trade name: Sonar) to reduce the presence of milfoil. The herbicide application reduced Eurasian watermilfoil and several other plant species and their densities for about a year. EWM did come back and after 2 years from the fluridone treatment, its occurrence was close to pretreatment occurrence. It does not appear that any species were lost due to the herbicide treatment except maybe northern watermilfoil.

From 1975, the aquatic plant community has fluctuated over the years. For example, chara and stringy pondweed came in strong in 2000, but have decreased in the last few surveys.

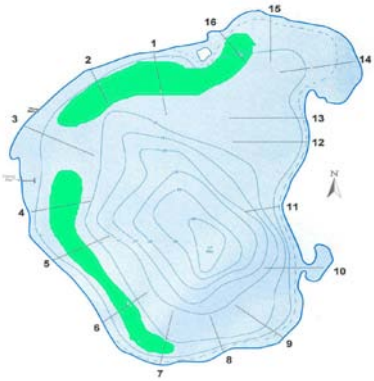
The aquatic plant community remains dynamic from the view that species abundance is variable from year to year.

Table 7. Parkers Lake aquatic plant frequency for transect occurrence (%) in late summer.

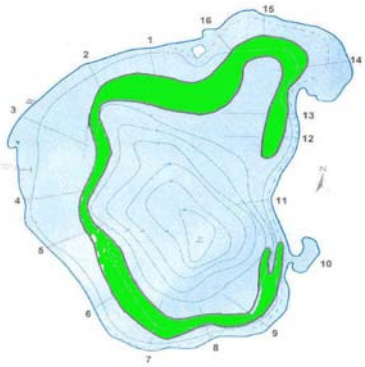
LATE SUMMER SURVEYS Aquatic Plants	8.7. 1975	8.19. 1992	7.15. 1993	8.24. 1993	7.1. 1994 (sonar added)	8.22. 1994	8.22. 1995	8.22. 1996	8.24. 2000*	10.26. 2002	8.13. 2003	9.6. 2005	8.9. 2006	7.16. 2007	8.14. 2008
Coontail (*Ceratophyllum demersum*)	A	48	53	63	10				33	63	42	11	27	46	77
Chara (*Chara sp*)			3		17	13	20	47	80	44	4	16	9		30
Elodea (*Elodea canadensis*)							3	7	27					2	
Star duckweed (*Lemna trisulca*)														15	26
Northern watermilfoil (*Myriophyllum sibiricum*)		9	30	37					13	19	7				9
Eurasian watermilfoil (*Myriophyllum spicatum*)		43	87	37			3	30	60	75	60	13	82	93	16
Hybrid watermilfoil (*M. sp*)															43
Naiad (*Najas flexilis*)		11	23				10	10	47						
Nitella (*Nitella sp*)															2
Berchtold's pondweed (*Potamogeton berchtoldi*)		7													
Curlyleaf pondweed (*P. crispus*)		2	73		7	13	47	27							5
Stringy pondweed (*P. foliosus/pusillus/sp*)			67	3	10		13	30	80		31		29		11
Narrowleaf pondweed (*P. strictifolius*)		4							27	31				2	
Flatstem pondweed (*P. zosteriformis*)		44	87	93	33	7	7	7	67	50	62	60	40	30	23
White water buttercup (*Ranunculus sp.*)		9	47	30			7	10	27						
Sago pondweed (*Stuckenia pectinata*)		17	37		13		50	40	60		7	4	13	4	5
Water celery (*Vallisneria americana*)											2		4	4	7
Water stargrass (*Zosterella dubia*)				13	17	17	47	53	93	81	9	60	15		5
Number of Species	**1**	**10**	**9**	**7**	**6**	**3**	**9**	**9**	**12**	**7**	**9**	**6**	**8**	**8**	**13**
Investigator	DNR	BCW MC	DNR	DNR	DNR	DNR	DNR	DNR	BCW MC	BWS	BWS	BWS	BWS	BWS	BWS

* Data points from the Barr survey were assigned to transects set up by Blue Water Science.
** Referred to as western waterweed (*Anacharis occidentalis*)

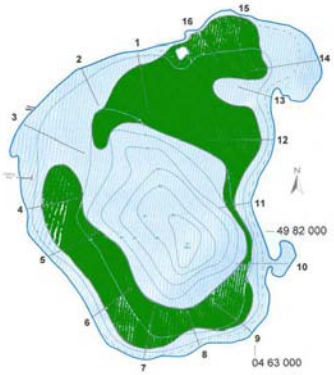
Distribution of Curlyleaf Pondweed in Parkers Lake in Early Summer



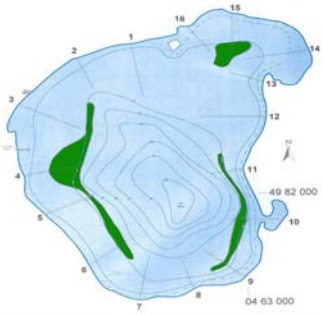
Curlyleaf pondweed coverage on June 18, 2002 was about 11 acres (shown in green). Curlyleaf did not "top out" in 2002.



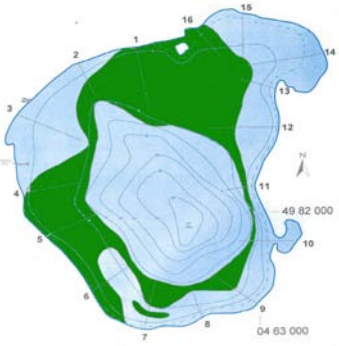
Curlyleaf pondweed coverage on June 9, 2003 was about 18 acres (shown in green). Curlyleaf topped out on Transect 15 in about 4 feet of water.



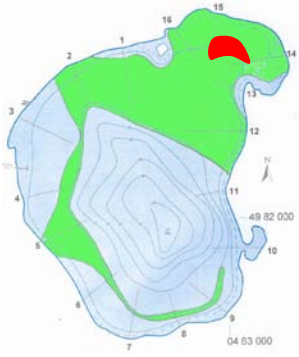
Curlyleaf pondweed coverage on June 14, 2005 increased to about 36 acres (shown in green). Curlyleaf did not "top out" in 2005.



Curlyleaf pondweed coverage on May 19, 2006 was estimated at 6 acres.

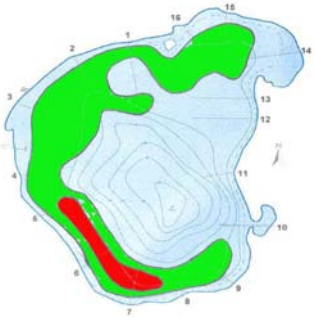


Curlyleaf pondweed coverage on May 30, 2007 was estimated at 36 acres. Curlyleaf did not grow to the surface in 2007, although Eurasian watermilfoil did on Transects 1, 2, and 8.

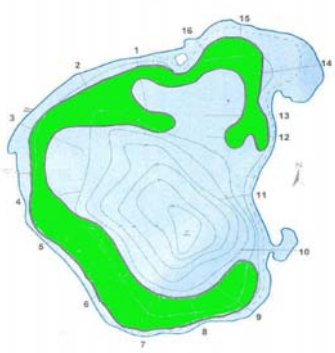


Curlyleaf pondweed coverage on May 27, 2008 was estimated at 39 acres with nuisance curlyleaf growth estimated at 1.5 acres (shown in red).

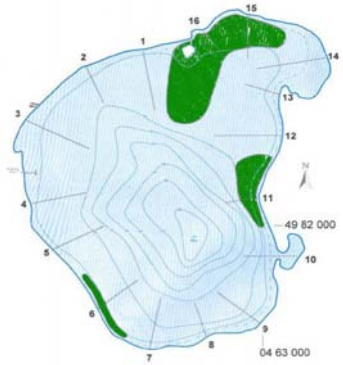
Distribution of Eurasian Watermilfoil in Parkers Lake in Late Summer



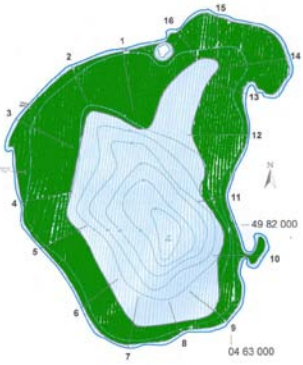
EWM distribution on October 26, 2002 was fairly widespread (shown in green) and covered 32 acres. Areas where Eurasian watermilfoil was topping out are shown in red shading (about 6 acres).



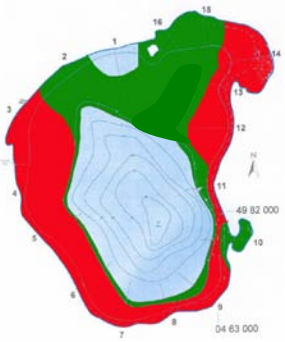
EWM distribution on August 13, 2003 was fairly widespread (shown in green) and covered 31 acres. There was no topping out of EWM in 2003.



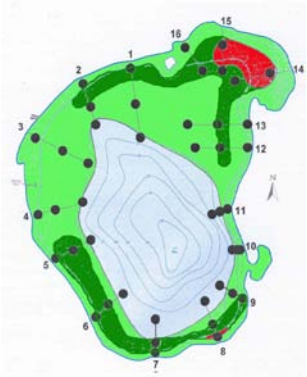
EWM distribution on September 6, 2005 (shown in green) decreased compared to 2002 and 2003. EWM covered about 13 acres in 2005, at a low density.



EWM distribution on August 8, 2006 was widespread (shown in green) and covered 57 acres. Some of the EWM growth was heavy by the end of the summer.



EWM distribution on July 16, 2007 was widespread (shown in red and green) and covered 63 acres total. Areas where EWM was a nuisance are shown in red and covered 40 acres.



EWM distribution on August 14, 2008 was estimated at 17 acres (dark green shading). Nuisance growth of EWM was estimated at 2.6 acres (shown in red).

Parkers Lake Water Quality Summary

Table 8. Lake goals from City of Plymouth Water Resources Management Plan.

Secchi Disc	Total Phosphorus	Chlorophyll a
1.4 m	38 ppb	10 ppb

Table 9. Water quality summary for Parkers Lake for May - September averages (source: CAMP, MPCA, and Three Rivers Park District).

	Secchi Disc (m)	Total Phosphorus (ppb)	Chlorophyll a (ppb)
1972	1.1 (n=2)	60 (n=2)	34 (n=2)
1977	0.5 (n=2)	118 (n=2)	48 (n=2)
1980	2.1 (n=3)	60 (n=3)	26 (n=3)
1982	2.2 (n=2)	84 (n=2)	5 (n=2)
1990	1.9 (n=6)		16 (n=5)
1992	1.7 (n=18)	40 (n=4)	21 (n=4)
1993	1.1 (n=5)	53 (n=5)	67 (n=5)
1994*	1.5 (n=6)	55 (n=6)	36 (n=6)
1995	1.2 (n=5)	39 (n=5)	36 (n=5)
1996	1.6 (n=6)	50 (n=6)	12 (n=6)
1999	2.0 (n=11)	33 (n=11)	18 (n=11)
2000	2.9 (n=11)	20 (n=11)	4 (n=11)
2002	3.5 (n=12)	19 (n=12)	5 (n=12)
2003	2.7 (n=12)	31 (n=12)	10 (n=12)
2004	2.1 (n=12)	27 (n=12)	8 (n=12)
2005	2.5 (n=9)	36 (n=9)	12 (n=8)
2006	3.2 (n=12)	38 (n=12)	5 (n=11)
2007	3.0 (n=11)	41 (n=11)	19 (n=11)
2008			

* whole lake fluridone (sonar) treatment

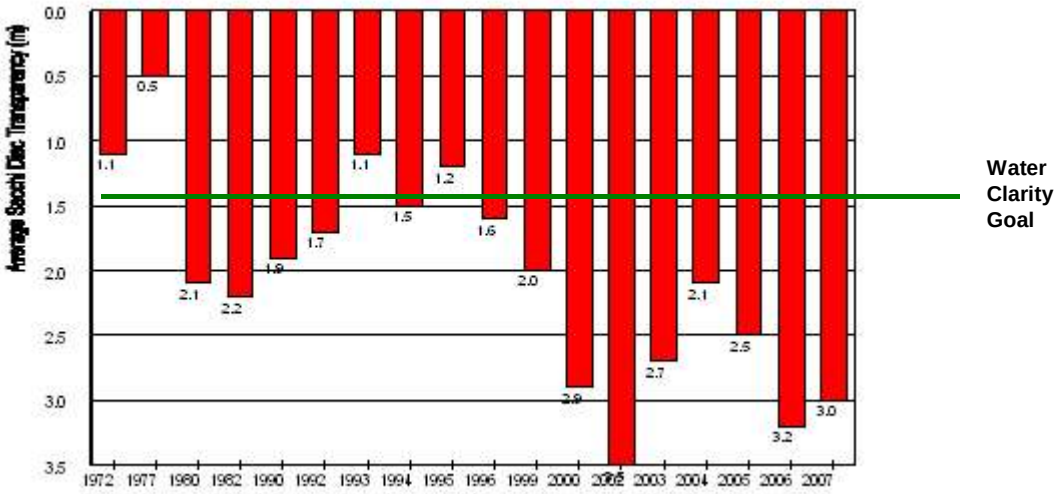


Figure 8. Water clarity summer averages, from May - September for Parkers Lake.

Aquatic Plant Recommendations

Aquatic plants are integral to maintaining good water clarity in Parkers Lake. Therefore, efforts are needed to accommodate their capacity to maintain water quality while providing for recreational enjoyment of Parkers Lake as well. In 2008, curlyleaf pondweed was present, but growing at non-nuisance conditions in early summer and then died back. Eurasian watermilfoil expanded it's typical range and was growing densely in a number of areas around Parkers Lake in 2007 but abundance was much less in 2008.

The main recommendation for 2009 is to monitor the distribution and abundance of the non-native aquatic plants. It is recommended that spring and fall aquatic plant surveys be conducted to characterize dynamics of curlyleaf pondweed, Eurasian watermilfoil, native plants growing to nuisance conditions as well as the rest of the native plant species.

Either harvesting or herbicide applications for controlling nuisance aquatic vegetation near the swimming beach and the public landing are options if recreational access is hindered.

Mechanical harvesting is an option for managing nuisance aquatic plant growth and was used in 2006, 2007, and 2008.

APPENDIX

A: Aquatic Plant Survey Results from 2002 through 2007

The milfoil weevil, *Euhrychiopis lecontei*, has been shown to limit Eurasian watermilfoil growth. Is it a factor in Parkers Lake? A weevil survey conducted in 2003 found weevils to be at low densities in Parkers Lake (photo by Laura Jester).

Appendix A: Aquatic Plant Survey Results from 2002 Through 2007

2002 Aquatic Plant Survey Results

2002: Parkers Lake aquatic plant occurrences and densities for the June 18, 2002 survey based on 16 transects and 3 depths, for a total of 44 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=13)			All Stations (n=45)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Bulrush (*Scirpus sp*)	1	6	1	--	--	--	--	--	--	1	2	1
Coontail (*Ceratophyllum demersum*)	2	13	1.5	5	31	1	9	69	1.4	16	36	1.3
Chara (*Chara sp*)	8	50	1.3	4	25	1.3	--	--	--	12	27	1.3
Elodea (*Elodea canadensis*)	1	6	0.5	--	--	--	--	--	--	1	2	0.5
Northern watermilfoil (*Myriophyllum sibiricum*)	--	--	--	--	--	--	1	8	0.5	1	2	0.5
Eurasian watermilfoil (*Myriophyllum spicatum*)	5	31	1.1	5	31	1.7	11	85	1.7	21	47	1.6
Curlyleaf pondweed (*Potamogeton crispus*)	2	13	1	7	44	1	5	38	0.6	14	31	0.9
Stringy pondweed (*P. pusillus*)	16	100	2.5	13	81	2.4	4	31	1	33	73	2.3
Flatstem pondweed (*P. zosteriformis*)	3	19	1.3	8	50	1.6	8	62	1.6	19	42	1.6
Water buttercup (*Ranunculus sp.*)	1	6	3	--	--	--	--	--	--	1	2	3
Filamentous algae	6	38	1.7	--	--	--	--	--	--	6	13	1.7

2002: Aquatic plant occurrence and density for individual transects in Parkers Lake, June 18, 2002.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15
Bulrush							1								
Coontail			2		0.5				2			1		1	2
Chara				1			1								
Elodea															
NWM												0.5			
EWM	0.5	0.5	1			0.5			2		1	2.5			2
Curlyleaf pondweed	1	1			1.5	0.5					0.5			1	0.5
Stringy pondweed	4	1.5	1	4	3		3	3.5		3	2.5		3	2	1
Flatstem pondweed		3	3		1	0.5		1	2		2	0.5			
Water buttercup															
Filamentous algae				2						1			2		

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15
Bulrush															
Coontail			1		1	2			1		0.5	1			1
Chara				3	2					2	1		2		
Elodea															
NWM															
EWM			2	0.5	2	2		3	2	3	2	1	0.5		
Curlyleaf pondweed			0.5		2	0.5			1		0.5				
Stringy pondweed	3	1.5		2			2	2		2	1.5	1	2	3	
Flatstem pondweed			2												1
Water buttercup															
Filamentous algae															

	T11			T12			T13			T14		T15		T16	
	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	0 - 5	6 - 10	0 - 5	6 - 10
Bulrush															
Coontail												1		2	2
Chara	0.5			0.5	1		0.5	1							
Elodea														0.5	
NWM															
EWM						2			2					1	
Curlyleaf pondweed														1	0.5
Stringy pondweed	4	2.5	1	2	3.5		2	3.5		2	1.5	1		1	
Flatstem pondweed					0.5	2	1	0.5	2	1	2.5	2			2
Water buttercup												3			
Filamentous algae	1									2		2			

2002: Parkers Lake aquatic plant occurrences and densities for the October 26, 2002 survey based on 16 transects and 3 depths, for a total of 44 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=12)			All Stations (n=44)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Bulrush (*Scirpus sp*)	1	6	1	--	--	--	--	--	--	1	2	1
Coontail (*Ceratophyllum demersum*)	1	6	2	6	38	1.2	9	75	1.2	16	36	1.2
Chara (*Chara sp*)	6	38	1.8	3	19	0.8	--	--	--	9	20	1.5
Northern watermilfoil (*Myriophyllum sibiricum*)	1	6	1	2	13	1	--	--	--	3	7	1
Eurasian watermilfoil (*Myriophyllum spicatum*)	4	25	1.1	10	63	2.8	8	67	1.3	22	50	1.9
Stringy pondweed (*Potamogeton foliosus/pusillus*)	3	19	1.3	3	19	1	1	8	1	7	16	1.1
Flatstem pondweed (*P. zosteriformis*)	2	13	1	8	50	1.2	3	25	1.5	13	30	1.2
Water stargrass (*Zosterella dubia*)	11	69	1.7	8	50	1.1	--	--	--	19	43	1.5
Filamentous algae	2	13	1.5	1	6	2	--	--	--	3	7	1.7

2002: Aquatic plant occurrence and density for individual transects in Parkers Lake, October 26, 2002.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15
Bulrush															
Coontail			1			1					0.5	2		2	1
Chara					0.5										
Northern watermilfoil	1														
Eurasian watermilfoil	2		1	0.5	1.5	1		1.5	2.5		1.5			5	0.5
Stringy pondweed				2	1.5			1		1					
Flatstem pondweed		3			0.5	1		0.5	0.5		0.5				
Water stargrass				2	0.5		2			2	1		3		
Filamentous algae															

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15
Bulrush															
Coontail		1	2			1		1	1		0.5	1			0.5
Chara										1	1.5		2	0.5	
Northern watermilfoil															
Eurasian watermilfoil		5	1		5	2		4	1		1.5	1			
Stringy pondweed	1													0.5	1
Flatstem pondweed													1	0.5	
Water stargrass	2						1	0.5			1			1.5	
Filamentous algae															

	T11			T12			T13		T14		T15		T16	
	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	11- 15	0 - 5	6 - 10	0 - 5	6 - 10	0 - 5	6 - 10	0 - 5	6 - 10
Bulrush				1										
Coontail													2	2
Chara				2			2		3				1	
Northern watermilfoil										1				1
Eurasian watermilfoil										1	1		1	2
Stringy pondweed														
Flatstem pondweed					1.5	3		2					1	1
Water stargrass	1	2		1	0.5		1		3	2	1			
Filamentous algae										2	2		1	

2003 Aquatic Plant Survey Results

Results of the Early Summer Survey, 2003

2003: Parkers Lake aquatic plant occurrences and densities for the June 9, 2003 survey based on 16 transects and 3 depths, for a total of 44 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=13)			All Stations (n=45)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Coontail (*Ceratophyllum demersum*)	2	13	0.8	--	--	---–	8	62	1.2	10	22	1.1
Chara (*Chara sp*)	4	25	1.8	1	6	3.0	--	--	--	5	11	2
Northern watermilfoil (*Myriophyllum sibiricum*)	--	--	--	1	6	0.5	1	8	0.5	2	4	0.5
Eurasian watermilfoil (*Myriophyllum spicatum*)	5	31	0.7	8	50	1.1	9	69	1.7	22	49	1.2
Curlyleaf pondweed (*Potamogeton crispus*)	3	19	2.7	12	75	0.7	6	46	1.3	21	47	1.1
Stringy pondweed (*P. pusillus*)	15	94	3.6	14	88	2.2	1	8	2.0	30	67	2.9
Flatstem pondweed (*P. zosteriformis*)	9	56	0.8	12	75	1.8	6	46	1.0	27	60	1.3
Water buttercup (*Ranunculus sp.*)	2	13	2.5	--	--	--	--	--	--	2	4	2.5
Filamentous algae	3	19	1.0	--	--	--	--	--	--	3	7	1.0

Stringy pondweed was the dominant early season aquatic plant in Parkers Lake on June 9, 2003.

2003: Aquatic plant occurrence and density for individual transects in Parkers Lake, June 9, 2003.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail			0.5			3			1			1			1
Chara	2			1									1		
NWM								0.5							
EWM		1	1		0.5				1.5	0.5	1	2	0.5	1	1
Curlyleaf pondweed		0.5			0.5				0.5		0.5			0.5	1
Stringy pondweed	4	2		3	1.5		4	4	2	4	2.5		4	2	
Flatstem pondweed	1	3	1	1	3	0.5	0.5								
Water buttercup															
Filamentous algae	1			1											

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail			1			1	0.5					1			
Chara														3	
NWM			0.5												
EWM		2.5	1.5	0.5	1.5	2		0.5	2	0.5	0.5				
Curlyleaf pondweed		1	0.5		0.5	0.5			1		0.5		0.5		0.5
Stringy pondweed	3			4			4	2.5		3	1.5		3.5	3	
Flatstem pondweed	0.5				1		0.5	0.5		1	1			2	1.5
Water buttercup															
Filamentous algae															

	T11			T12			T13			T14		T15		T16	
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	0 - 5	6 - 10	0 - 5	6 - 10
Coontail												1			
Chara										3					
NWM															
EWM						2			2					2	
Curlyleaf pondweed					0.5			0.5			1	4	1	3.5	1
Stringy pondweed	3	2.5		4	3		4	3			1	3	1	3.5	1
Flatstem pondweed		0.5	1	1	1	1	1	1	1	0.5	3		3		3
Water buttercup												3		2	
Filamentous algae												1			

Results of the Late Summer Survey, 2003

2003: Parkers Lake aquatic plant occurrences and densities for the August 13, 2003 survey based on 16 transects and 3 depths, for a total of 44 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=13)			All Stations (n=45)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Coontail (*Ceratophyllum demersum*)	2	13	1.8	9	44	1.2	8	61	1.2	19	42	1.2
Chara (*Chara sp*)	1	6	0.5	1	6	1.0	--	--	--	2	4	0.8
Northern watermilfoil (*Myriophyllum sibiricum*)	1	6	1.0	1	6	1.0	1	8	1.0	3	7	1.0
Eurasian watermilfoil (*Myriophyllum spicatum*)	12	75	1.3	8	50	1.4	7	54	1.1	27	60	1.3
Stringy pondweed (*Potamogeton pusillus*)	9	44	1.1	4	25	0.5	1	8	0.5	14	31	0.9
Flatstem pondweed (*P. zosteriformis*)	9	44	1.0	12	75	1.7	7	54	1.2	28	62	1.4
Sago pondweed (*Stuckenia pectinata*)	2	13	1.0	1	6	1.0	--	--	--	3	7	1.0
Water celery (*Vallisneria americana*)	--	--	--	1	6	0.5	--	--	--	1	2	0.5
Water stargrass (*Zosterella dubia*)	4	25	1.5	--	--	--	--	--	--	4	9	1.5
Filamentous algae	1	6	2.0	--	--	--	--	--	--	1	2	2.0

Water celery showed up for the first time since surveys have been taken in the August plant survey on Transect 9.

2003: Aquatic plant occurrence and density for individual transects in Parkers Lake, August 13, 2003.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail			1		1	1			0.5		0.5	2	0.5	1.5	2
Chara	0.5										1				
NWM				1							1				1
EWM	1		0.5	2	0.5		0.5			0.5	1		1	1.5	1
Stringy pondweed	2			1			1	0.5		0.5					0.5
Flatstem pondweed	0.5	2.5	2		1	1		0.5	1		1	0.5	0.5		
Sago pondweed				1											
Water celery															
Water stargrass															
No plants															
Filamentous algae															

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail		1	1		2	1		1				1			
Chara															
NWM															
EWM	0.5	1	1	4	3.5	1	1	2.5	3		0.5	1			
Stringy pondweed				0.5				0.5		2			0.5	0.5	
Flatstem pondweed	0.5	0.5					0.5	0.5	1			1	0.5		
Sago pondweed											1				
Water celery											0.5				
Water stargrass															
No plants															X
Filamentous algae															

	T11			T12			T13			T14		T15		T16	
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	0 - 5	6 - 10	0 - 5	6 - 10
Coontail											2	3	1		0.5
Chara															
NWM															
EWM				2		0.5	0.5				0.5	2		1	
Stringy pondweed	0.5	0.5					2								
Flatstem pondweed		0.5			2.5	2	1	2.5		0.5	2	1	4	4	3
Sago pondweed												1			
Water celery															
Water stargrass				1			1			3				1	
No plants			X												
Filamentous algae												2			

2005 Aquatic Plant Survey Results

Results of the Early Summer Survey, 2005

2005: Parkers Lake aquatic plant occurrences and densities for the June 14, 2005 survey based on 16 transects and 3 depths, for a total of 44 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=13)			All Stations (n=45)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Bulrush (*Scirpus sp*)	1	6	1.5	--	--	--	--	--	--	1	2	1.5
Star duckweed (*Lemna trisulca*)	1	6	1.0	--	--	--	--	--	--	1	2	1.0
Coontail (*Ceratophyllum demersum*)	4	25	1.3	--	--	--	3	23	0.7	7	16	1.0
Chara (*Chara sp*)	1	6	1.0	1	6	1.3	--	--	--	2	4	1.2
Northern watermilfoil (*Myriophyllum sibiricum*)	1	6	1.0	--	--	--	1	8	0.5	2	4	0.8
Eurasian watermilfoil (*Myriophyllum spicatum*)	2	13	2.0	1	6	0.5	2	15	1.0	5	11	1.3
Curlyleaf pondweed (*Potamogeton crispus*)	2	13	0.8	10	63	0.5	9	69	0.7	21	47	0.6
Stringy pondweed (*P. pusillus*)	14	88	3.2	16	100	2.3	4	31	1.8	34	76	2.6
Flatstem pondweed (*P. zosteriformis*)	7	44	1.4	15	94	1.6	9	69	1.8	31	69	1.6
Water buttercup (*Ranunculus sp.*)	1	6	1.0	--	--	--	--	--	--	1	2	1.0

Stringy pondweed and flatstem pondweed were found together in a number of sample stations in June.

2005: Aquatic plant occurrence and density for individual transects in Parkers Lake, June 14, 2005.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Bulrush															
Star duckweed															
Coontail	1								0.5			1			0.7
Chara							1	1.3							
Northern watermilfoil									0.5						
Eurasian watermilfoil												1			
Curlyleaf pondweed		0.5	0.5			1					0.5			0.8	1.5
Stringy pondweed	4	3		3	3		2	3		4	2.5		4	1	
Flatstem pondweed		2.5	4	1	2	1	1	0.3	0.5	1	0.8	3		1	0.7
Water buttercup															

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Bulrush															
Star duckweed															
Coontail															
Chara															
Northern watermilfoil															
Eurasian watermilfoil	1		1								0.5				
Curlyleaf pondweed		0.8	0.5		0.5	1			1		0.1	0.5			0.5
Stringy pondweed	4	1.8		4	3.5		4	2.7		4	2.3		3	2	0.5
Flatstem pondweed		0.5			0.5			1	1		1	1	1	1	
Water buttercup															

	T11			T12			T13			T14		T15		T16	
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 -10	0 - 5	6 - 10	0 - 5	6 - 10
Bulrush							1.5								
Star duckweed										1					
Coontail										1		2		1	
Chara															
Northern watermilfoil														1	
Eurasian watermilfoil														3	
Curlyleaf pondweed			0.2		0.2						0.5	1	0.5	0.5	0.5
Stringy pondweed	3	2.5	0.7	3	2.3	4	1.5	3.5	2	1	1		1		1
Flatstem pondweed					0.3	1		1.5	4	1	4	3	4	2	4
Water buttercup												1			

Results of the Late Summer Survey, 2005

2005: Parkers Lake aquatic plant occurrences and densities for the September 6, 2005 survey based on 16 transects and 3 depths, for a total of 45 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=13)			All Stations (n=45)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Star duckweed (*Lemna trisulca*)	3	19	1.3	2	13	0.3	1	8	1.0	6	13	0.9
Coontail (*Ceratophyllum demersum*)	2	13	0.5	2	13	0.8	1	8	0.5	5	11	0.6
Chara (*Chara sp*)	2	13	1.5	5	31	0.9	--	--	--	7	16	1.1
Eurasian watermilfoil (*Myriophyllum spicatum*)	4	25	1.4	2	13	1.3	--	--	--	6	13	1.3
Flatstem pondweed (*Potamogeton zosteriformis*)	3	19	1.2	13	81	0.7	11	85	1.0	27	60	0.9
Sago pondweed (*Stuckenia pectinata*)	2	13	0.5	--	--	--	--	--	--	2	4	0.5
Water stargrass (*Zosterella dubia*)	14	88	1.7	12	75	1.0	1	8	0.5	27	60	1.3

Water stargrass was the dominant plant in shallow water.

2005: Aquatic plant occurrence and density for individual transects in Parkers Lake, September 6, 2005.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Star duckweed	1	0.3						0.3	1						
Coontail											0.5				0.5
Chara	2													1.3	
Eurasian watermilfoil															
Flatstem pondweed		0.5	1		0.2	1		0.2	1		1	1.5		0.3	1
Sago pondweed															
Water stargrass	2	1.7		3	0.3		3	1.6		1	0.5		2		

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Star duckweed															
Coontail							0.5								
Chara		1			0.3						0.5		1	1.5	
Eurasian watermilfoil	0.5														
Flatstem pondweed		0.3	1		0.3	1		0.5	0.5			1			
Sago pondweed							0.5								
Water stargrass	0.3	0.1		2	1.7		1	0.5	0.5	2.5	0.5			0.5	

	T11			T12			T13			T14		T15		T16	
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	0 - 5	6 - 10	0 - 5	6-10
Star duckweed												2		1	
Coontail														0.5	1
Chara															
Eurasian watermilfoil	0.5	0.5										1		2.5	2
Flatstem pondweed					1	1.5	2	2	1		1	1	1	0.5	1
Sago pondweed				0.5											
Water stargrass	0.5	1		1.5	1		2			1		2			2

2006 Aquatic Plant Survey Results

Results of the Early Summer Survey, 2006

2006: Parkers Lake aquatic plant occurrences and densities for the May 29, 2006 survey based on 16 transects and 3 depths, for a total of 45 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=13)			All Stations (n=45)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Coontail (*Ceratophyllum demersum*)	2	13	0.8	1	6	0.5	1	15	0.8	5	11	0.7
Chara (*Chara sp*)	1	6	3.0	--	--	--	--	--	--	1	2	3.0
Star duckweed (*Lemna trisulca*)	3	19	1.2	2	13	0.6	1	8	0.5	6	13	0.9
Eurasian watermilfoil (*Myriophyllum spicatum*)	1	6	1.0	--	--	--	--	--	--	1	2	1.0
Curlyleaf pondweed (*Potamogeton crispus*)	1	6	2.0	3	19	1.2	7	54	1.0	11	24	1.6
Stringy pondweed (*P. pusillus*)	11	69	2.0	14	88	1.4	3	23	1.2	28	62	1.6
Flatstem pondweed (*P. zosteriformis*)	7	44	0.9	12	75	1.2	10	78	1.7	29	64	1.3
Filamentous algae	2	13	1.0	--	--	--	--	--	--	2	4	1.0

Chara and flatstem pondweed were found in May, 2006 at Transect 10.

2006: Aquatic plant occurrence and density for individual transects in Parkers Lake, May 19, 2006.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail									1					0.5	
Chara															
Star duckweed															
Eurasian watermilfoil															
Curlyleaf pondweed									1		2	1			1
Stringy pondweed	2	3	2	3	2.3	0.5	3	2	1	3	1		2		
Flatstem pondweed	1	1	2		0.7	3						1		0.5	1
Filamentous algae															

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail	0.5		0.5												
Chara													3		
Star duckweed					0.2	0.5									
Eurasian watermilfoil															
Curlyleaf pondweed		0.5	1									1		1	1
Stringy pondweed		0.3		2	1		1	1.5		1	1			1	
Flatstem pondweed	1	0.5		1	0.7	2	1	1	0.3		1	1	1		
Filamentous algae										1					

	T11			T12			T13			T14		T15		T16	
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 -10	0 - 5	6 - 10	0 - 5	6 - 10
Coontail														1	
Chara															
Star duckweed										0.5	1	1		2	
Eurasian watermilfoil														1	
Curlyleaf pondweed			1									2			
Stringy pondweed	1	3		2	0.5		2	0.5					1		1
Flatstem pondweed			0.5		1.6	3		2.3	3	0.5	1	1	2		2
Filamentous algae										1					

Results of the Late Summer Survey, 2006

2006: Parkers Lake aquatic plant occurrences and densities for the August 9, 2006 survey based on 16 transects and 3 depths, for a total of 44 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=13)			All Stations (n=45)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Coontail (*Ceratophyllum demersum*)	5	31	1.4	5	31	0.7	2	15	1.5	12	27	1.1
Chara (*Chara sp*)	2	13	1.0	2	13	1.0	--	--	--	4	9	1.0
Star duckweed (*Lemna trisulca*)	2	13	0.5	3	19	0.9	--	--	--	5	11	0.8
Eurasian watermilfoil (*Myriophyllum spicatum*)	16	100	1.8	16	100	1.2	5	38	1.5	37	82	1.5
Stringy pondweed (*Potamogeton strictifolius*)	5	31	1.2	7	44	0.6	1	8	1.0	13	29	0.8
Flatstem pondweed (*Potamogeton zosteriformis*)	3	19	2.0	8	50	2.0	7	54	2.1	18	40	2.1
Sago pondweed (*Stuckenia pectinata*)	2	13	1.0	2	13	0.8	2	15	1.0	6	13	0.9
Water celery (*Vallisneria americana*)	1	6	1.0	1	6	0.5	--	--	--	2	4	0.8
Water stargrass (*Zosterella dubia*)	6	38	1.0	1	6	0.3	--	--	--	7	15	0.9
Filamentous algae	3	19	1.0	1	6	0.3	2	15	0.9	6	13	0.9

Eurasian watermilfoil was the dominant plant in water shallower than 10 feet.

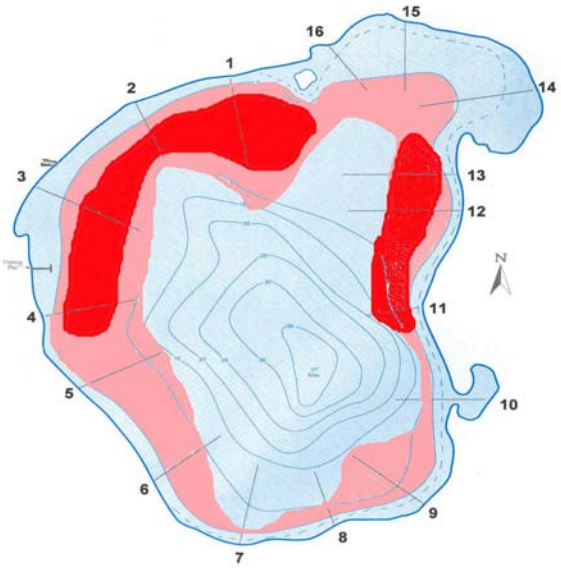
2006: Aquatic plant occurrence and density for individual transects in Parkers Lake, August 9, 2006.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail	1						1	0.5	1		0.3			1	2
Chara															
Star duckweed															
Eurasian watermilfoil	2	1	1	2	1	1	1	1	1	2	0.4		2	2	
Stringy pondweed					1	1	1				0.1			1	
Flatstem pondweed		3	3									2			2
Sago pondweed	1					2									
Water celery															
Water stargrass				1							0.3				
Filamentous algae															

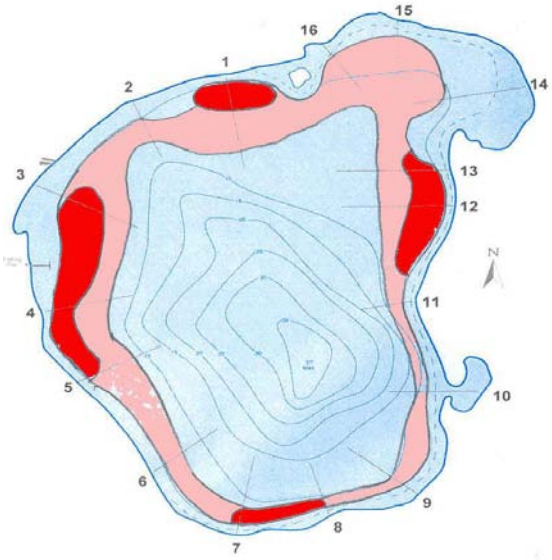
	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail	1	0.5					1								
Chara		1.5			0.5					1			1		
Star duckweed															
Eurasian watermilfoil	3	0.5		1	1.5		3	2		1	2		2	3	3.5
Stringy pondweed		0.5			0.5		2			1					
Flatstem pondweed		0.5	2		1	2			2			2			
Sago pondweed					0.5		1				1				1
Water celery															
Water stargrass				1						1			1		
Filamentous algae												1	1		

	T11			T12			T13			T14		T15		T16	
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	0 - 5	6 - 10	0 - 5	6-10
Coontail														3	1.3
Chara															
Star duckweed										0.5	1	0.5	1		0.8
Eurasian watermilfoil	1	1.5	1	3	1		2	0.5		0.5	1	0.5	1	2	0.5
Stringy pondweed	1	0.5		1	0.3										
Flatstem pondweed					0.7		3	1.5		1.5	3	1.5	3		3.5
Sago pondweed															
Water celery	1	0.5													
Water stargrass										1		1			
Filamentous algae					0.3					1		1			0.8

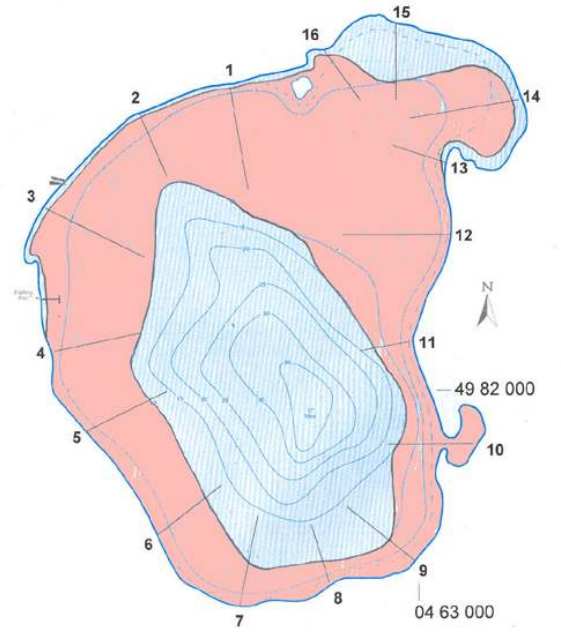
Distribution of Stringy Pondweed in Early Summer



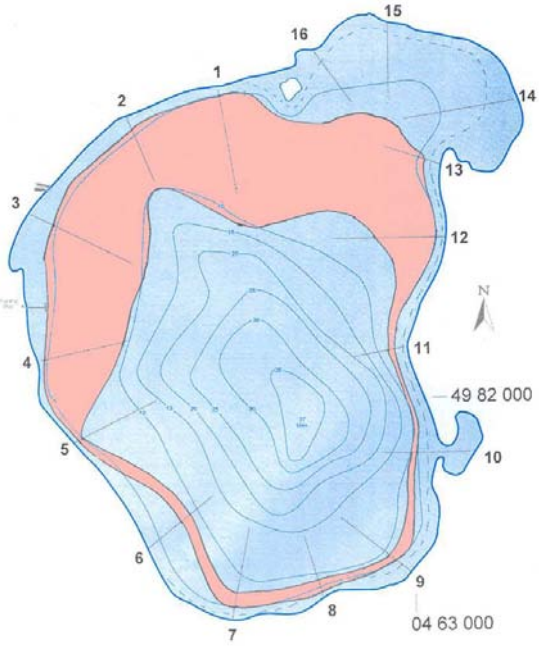
Stringy pondweed coverage on June 18, 2002 is shown in pink and red. Pink and red areas combined show stringy pondweed distribution (about 37 acres) and red areas represent where stringy pondweed was growing to the surface (about 13 acres).



Stringy pondweed coverage on June 9, 2003 is shown in pink and red. Pink and red areas combined show stringy pondweed distribution (about 29 acres) and red areas represent where stringy pondweed was growing to the surface (about 7 acres).



Stringy pondweed coverage on June 14, 2005 is shown in pink (58 acres).



Stringy pondweed coverage on May 19, 2006 is shown in pink.

Results of the Early Summer Survey, 2007

2007: Parkers Lake aquatic plant occurrences and densities for the May 30, 2007 survey based on 16 transects and 3 depths, for a total of 45 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=13)			All Stations (n=45)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Coontail (*Ceratophyllum demersum*)	1	6	3.0	3	19	0.8	2	15	2.5	6	13	1.7
Chara (*Chara sp*)	1	6	1.0	--	--	--	--	--	--	1	2	1.0
Star duckweed (*Lemna trisulca*)	--	--	--	--	--	--	1	8	0.3	1	2	0.3
Eurasian watermilfoil (*Myriophyllum spicatum*)	15	94	2.9	15	94	3.0	11	85	1.1	41	89	2.5
Curlyleaf pondweed (*Potamogeton crispus*)	7	44	0.9	5	31	1.0	13	100	2.1	25	54	1.5
Stringy pondweed (*P. pusillus*)	7	44	1.4	5	31	0.7	--	--	--	12	26	1.1
Flatstem pondweed (*P. zosteriformis*)	--	--	--	1	6	0.5	2	15	0.8	3	7	0.7
Filamentous algae	13	81	1.8	8	50	1.3	--	--	--	21	46	1.6

Eurasian watermilfoil was distributed throughout most of the growing zone on May 30, 2007.

2007: Aquatic plant occurrence and density for individual transects in Parkers Lake, May 30, 2007.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail					0.3	2			3					1	
Chara							1								
Star duckweed			0.3												
Eurasian watermilfoil	5	3	0.8	4.5	2.8			2	1	1	3	1	2	2.5	
Curlyleaf pondweed	0.5		2.3		1	1.3			1	0.5	0.5	2.5	1		3.5
Stringy pondweed								1		1	0.5		1		
Flatstem pondweed						1									
Filamentous algae	2	1		2	0.7		2	0.5		1	1		3		

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15
Coontail															
Chara															
Star duckweed															
Eurasian watermilfoil	1	2.3	1	3	3.2		4.5	4.3	1	3	3	0.5	2	3.5	1.5
Curlyleaf pondweed	1		2		1.5	2.5			1			2.3			0.5
Stringy pondweed	2	1		1			0.5	0.5		2					
Flatstem pondweed															
Filamentous algae	2	2		3	1.7		3	3		1			2		

	T11			T12			T13			T14			T15		T16	
	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 - 10	11 -15	0 - 5	6 -10	11-15	0 - 5	6 - 10	0 - 5	6 - 10
Coontail															3	1
Chara																
Star duckweed																
Eurasian watermilfoil	2	3	2.5	3	2	1	3	3.5	1	3	5	1	5		1.5	2
Curlyleaf pondweed	1				1	3	1		2.5			2.5			1	1
Stringy pondweed		0.5								2						
Flatstem pondweed					0.5	0.5										
Filamentous algae	1			1	0.5		1									

Results of the Late Summer Survey, 2007

2007: Parkers Lake aquatic plant occurrences and densities for the July 16, 2007 survey based on 16 transects and 3 depths, for a total of 46 stations. Density ratings are 1-5 with 1 being low and 5 being most dense.

	Depth 0-5 feet (n=16)			Depth 6-10 feet (n=16)			Depth 11-15 feet (n=14)			All Stations (n=46)		
	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density	Occur	% Occur	Density
Coontail (*Ceratophyllum demersum*)	8	50	1.4	6	38	1.2	7	50	1.3	21	46	1.3
Elodea (*Elodea canadensis*)	1	6	1.0	--	--	--	--	--	--	1	2	1.0
Star duckweed (*Lemna trisulca*)	4	25	1.0	2	13	1.0	1	7	1.0	7	15	1.0
Eurasian watermilfoil (*Myriophyllum spicatum*)	15	94	4.0	15	94	4.0	13	93	2.4	43	93	3.5
Stringy pondweed (*Potamogeton strictifolius*)	--	--	--	--	--	--	1	7	0.5	1	2	05
Flatstem pondweed (*Potamogeton zosteriformis*)	5	31	0.8	5	31	0.8	4	29	1.1	14	30	0.9
Sago pondweed (*Stuckenia pectinata*)	2	13	0.8	--	--	--	--	--	--	2	4	0.8
Water celery (*Vallisneria americana*)	2	13	1.0	--	--	--	--	--	--	2	4	1.0
Filamentous algae	5	31	2.0	2	13	1.5	--	--	--	7	15	1.9

Eurasian watermilfoil was the dominant plant in all water depths. Eurasian watermilfoil formed matted conditions at several locations around Parkers Lake in July 2007.

2007: Aquatic plant occurrence and density for individual transects in Parkers Lake, July 16, 2007.

	T1			T2			T3			T4			T5		
	0 - 5	6 - 10	11 - 15	0 - 5	6 - 10	11 - 15	0 - 5	6 - 10	11 - 15	0 - 5	6 - 10	11 - 15	0 - 5	6 - 10	11 - 15
Coontail	2	0.3		2	1	0.5		1.8	2	1	1	1			3
Elodea															
Star duckweed	1														
Eurasian watermilfoil		1	1	1.5	0.5		4.5	3.8	0.5	5	5	2	4.5	4.5	4
Stringy pondweed															
Flatstem pondweed	1		1		1	1		0.3				2			
Sago pondweed							1								
Water celery															
Filamentous algae	2			3	2						1				

	T6			T7			T8			T9			T10		
	0 - 5	6 - 10	11 - 15	0 - 5	6 - 10	11 - 15	0 - 5	6 - 10	11 - 15	0 - 5	6 - 10	11 - 15	0 - 5	6 - 10	11 - 15
Coontail			1						0.5				2		
Elodea															
Star duckweed															
Eurasian watermilfoil	5	4.5	2	5	5	4.5	5	5	4.5	5	5	3.5	1	4.3	1
Stringy pondweed									0.5						
Flatstem pondweed		0.5	0.5												
Sago pondweed															
Water celery													1		
Filamentous algae							2								

	T11			T12			T13			T14			T15		T16	
	0 - 5	6 - 10	11 - 15	0 - 5	6 - 10	11 - 15	0 - 5	6 - 10	11 - 15	0 - 5	6-10	11-15	0 - 5	6 - 10	0 - 5	6-10
Coontail							1			1	1	1	1		1	2
Elodea													1			
Star duckweed	1			1							1	1			1	1
Eurasian watermilfoil	5	3.5	2	5	5	2	4.5	5	2	4.5	4.5	2	2		3	3
Stringy pondweed																
Flatstem pondweed	1						0.5			0.5	1				1	1
Sago pondweed													0.5			
Water celery	1															
Filamentous algae				2									1			