

White Bear Lake Aquatic Plant Surveys for 2002

Summary

Aquatic Plant Survey. Partial aquatic plant surveys to check Eurasian watermilfoil growth were conducted on May 27, July 15, and July 24 and a whole lake aquatic plant survey was conducted on September 9, 2002. For the whole lake survey, a total of 122 stations on 42 transects were surveyed for plants. We sampled three depths for most transects with depth intervals ranging from 0-5, 6-10, and 11-15 feet. Some transects had less than three sampling stations, depending on water depths.

In 2002, Eurasian watermilfoil was common in White Bear Lake, based on occurrence, showing up in 69 stations out of 122 (57% occurrence). It is the most common plant in the lake. This is similar compared to the 2000 and 2001 surveys (Table A). Eurasian watermilfoil generally was 1 to 3 feet below the water surface with a canopy height similar to the other native plants. Milfoil was not a recreational nuisance at most sites. In several shallow shoreline areas along the lower west side, single stems of milfoil reached the surface in 5 to 6 feet of water.

Evidence of milfoil damage attributed to the milfoil weevil, *Euhrychiopsis lecontei* was not observed this year in a survey of four locations and examining 60 milfoil stems. Another survey is scheduled for 2003. At this time it does not appear that the milfoil weevil is significantly curtailing milfoil growth.

Aquatic Plant Review. Eurasian watermilfoil has been in White Bear Lake since 1988. As of 2002, Eurasian watermilfoil is still found growing with native plants and has not been found to be displacing native plant species. Eurasian watermilfoil distribution was widespread in 2002, and has stabilized in distribution over the last few years. Growth in 1998, 2000, and 2001 probably represented a “heavy” milfoil season and growth in 1997 and 1999 probably represented a “light” milfoil season. Growth in 2002 was moderate. Many factors influence milfoil growth and the length of the growing season and possible buildup of nutrients are two primary factors. In 2002, above normal lake levels may have reduced the extent of milfoil canopy formation.

In years to come, we expect milfoil growth to vary from year to year depending on growing season variables, lake sediment fertility dynamics, and competition with native plants but we do not anticipate Eurasian watermilfoil becoming a greater nuisance than it is presently.

Table A. Semi-quantitative comparison of aquatic plant occurrence for 1973 (total stations= 45), 1997 (total stations=76), 1998 (total stations=110), 1999 (total stations=120), 2000 (total stations=125), 2001 (total stations =122), and 2002 (total stations =122).

	1973 % Occur	1984	1989	1997 % Occur	1998 % Occur	1999 % Occur	2000 % Occur	2001 % Occur	2002 % Occur	Changes from 2001 to 2002
Water marigold (<i>Bidens beckii</i>)			R	9	1	9	9	7	5	0
Coontail (<i>Ceratophyllum demersum</i>)	94	A	C	34	51	56	34	46	32	-
Chara (<i>Chara sp</i>)	67		C	30	34	42	38	40	35	0
Moss (<i>Drepanocladus sp</i>)				0	1	2				0
Needle spike rush (<i>Eleocharis acicularis</i>)								2		0
Elodea (<i>Elodea canadensis</i>)	18		O	3	5	6	5	3	2	0
Star duckweed (<i>Lemna trisulca</i>)	13			0	0	1				0
Eurasian milfoil (<i>Myriophyllum spicatum</i>)	--		P	21	56	35	55	63	57	-
Northern milfoil (<i>M. sibiricum</i>)	30	A	C	37	44	33	40	33	25	-
Naiads (<i>Najas sp</i>)	2	A	A	29	25	45	25	17	16	-
Nitella (<i>Nitella sp</i>)	13			0	1					0
White waterlily (<i>Nymphaea sp</i>)								1	1	0
Cabbage (<i>Potamogeton amplifolius</i>)	26	C	C	12	26	5	8	8	7	0
Curlyleaf pondweed (<i>P. crispus</i>)	51		P	3	0	2		2		0
Leafy pondweed (<i>P. foliosus</i>)		C								0
Variable pondweed (<i>P. gramineus</i>)	3			0	15	26	18	23	20	0
Illinois pondweed (<i>P. illinoensis</i>)						20	15	21	25	+
Floatingleaf pondweed (<i>P. natans</i>)			O							0
Whitestem pondweed (<i>P. praelongus</i>)	36						2	3	1	0
Claspingleaf pondweed (<i>P. richardsonii</i>)	2	C	C	30	32	27	42	28	33	+
Robbins pondweed (<i>P. robbinsii</i>)	42		O	20	17	24	33	28	15	-
Flatstem pondweed (<i>P. zosteriformis</i>)	78		C	29	29	43	8	15	24	+
Stringy pondweed (<i>P. sp</i>)	3			0	9	18	4	3	5	0
Buttercup (<i>Ranunculus sp</i>)	7			0	12	1	1	1	2	0
Slender arrowhead (<i>Sagittaria graminea</i>)				3	1		2	2		0
Three square (<i>Scirpus americanus</i>)								2		0
Sago pondweed (<i>Stuckenia pectinata</i>)		A	O	3	6	4	10	4	2	0
Bladderwort (<i>Utricularia sp</i>)									1	
Water celery (<i>Vallisneria americana</i>)	11	A	O	24	36	38	26	32	16	0
Water stargrass (<i>Zosterella dubia</i>)	14			29	15	12	17	8	5	-
Filamentous algae	27			?	?					-

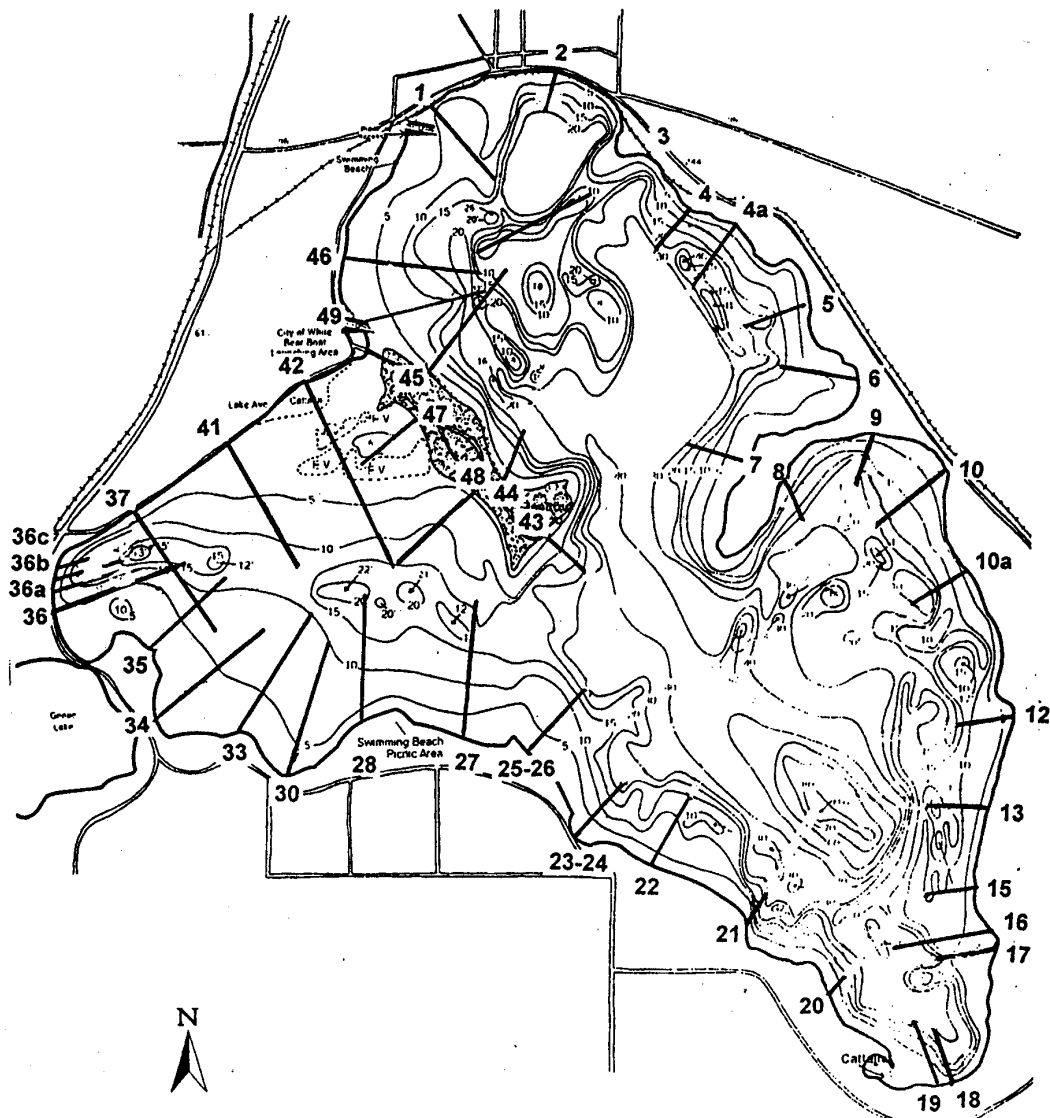


Figure 1. Location map of the aquatic plant survey transects in 2002. A total of 42 transects were surveyed.

2002 Comprehensive Aquatic Plant Survey

A full aquatic plant survey was conducted on September 9, 2002. A total of 122 stations on 42 transects were surveyed for plants (Table 4).

In 2002, Eurasian watermilfoil was common in White Bear Lake, showing up in 69 out of 122 stations (57%). Milfoil is the most common plant in White Bear Lake.

In 2001, Eurasian watermilfoil was also common, showing up in 77 out of 122 stations (63% occurrence)(Table 3). This was an increase compared to the 2000 survey where it was found at 69 stations. Eurasian watermilfoil, at most stations, was 1 to 4 feet below the water surface with a canopy height similar to the other native plants. Milfoil was not a recreational nuisance at most sites.

Although Eurasian watermilfoil is a common plant in White Bear Lake, we found 23 other species covering approximately 1,050 acres of lake bottom. Other common plants in White Bear Lake are claspingleaf pondweed, northern watermilfoil, chara, coontail, and fern pondweed.

Aquatic Plant Distribution in 2002

Aquatic plant distribution was similar to 2000 and 2001. Plants were found growing out to a depth of about 18 feet and cover about 1,050 acres of lake bottom or roughly 45% of the lake bottom (Figure 2).

Eurasian watermilfoil was found distributed around most of the littoral zone (water depths to about 15 feet) of White Bear Lake in 2002 (Figure 3).

Eurasian milfoil grew to the surface in several areas around White Bear Lake and in predictable spots. A lake sediment survey conducted in 1998 identified several areas around White Bear Lake with high nitrogen levels. These areas once again supported milfoil growth but not nuisance conditions. These areas included the Matoska Marsh, Commercial Bay area, Cottage Park, and some shallow shoreline areas on the NW and NE sides of Manitou Island. Although herbicides have been applied in some of these areas for control, milfoil generally returns the following year.

Nuisance growth of Eurasian watermilfoil further than 200 feet from shore or outside of the marshes was limited.

Overview of Eurasian Watermilfoil and Herbicide Control in White Bear Lake

Eurasian watermilfoil was first observed in White Bear Lake in 1988 at a single location and was treated. It was chemically treated in two areas in 1989 and thought to be eradicated. Four areas were treated in 1990. By 1991, milfoil was found scattered through most of White Bear Lake's littoral zone, but was only a nuisance in several locations.

Matting conditions have persisted at only one location around White Bear Lake since 1992, namely Cottage Park. At other locations over the years milfoil has appeared and disappeared. Sometimes chemical treatment was involved and sometimes it wasn't. In 2002 Eurasian watermilfoil was scattered around almost the entire littoral zone of White Bear Lake.

Based on diver observations and aquatic plant surveys from the last fifteen years, milfoil has disappeared and reappeared independent of herbicide applications (see maps for 1993-2002). Because milfoil can decline in areas even when herbicide is not applied (Table 9) a milfoil reduction in the following year after a herbicide treatment does not mean that herbicide caused the decline . . . the decline could have occurred even if herbicides had not been used. It does not appear that herbicide use has had long term milfoil control in White Bear Lake. Herbicide treatments can control or prevent nuisance conditions in the season they are applied, but even then they are not always successful.

Table 9. Eurasian watermilfoil (EWM) presence or absence from six locations in White Bear Lake with a history of herbicide use. Transect number is in parentheses.

	Matoska Marsh	Lion's Park	Cottage Park	Manitou Island	Lower East Side	Willernie
1988	no EWM	no EWM	no EWM	no EWM	no EWM	no EWM
1989	no EWM	no EWM	no EWM	no EWM	no EWM	no EWM
1990	no EWM	no EWM	no EWM	no EWM	no EWM	no EWM
1991	present	present	present	present	present	present/treated
1992	present/treated	present/treated	no survey	present/treated	no survey	present/treated
1993	present/treated	present/treated	present	present/treated	present	present/treated
1994	present	present/treated	present/treated	present/treated	no EWM*	present/treated
1995	present/treated	present/treated	present/treated	present	no survey	present/treated
1996	present	present/treated	present/treated	no survey	no survey	present
1997	present	present	present	present	no EWM	no EWM*
1998	present	present	present/treated	present	present	present
1999	present	present	present/treated	present/treated	present	present
2000	present	no EWM	present	present/treated	present	present
2001	present	no EWM	present/treated	present/treated	present	present
2002	present	no EWM	present/treated	present/treated	present	present

* example where EWM declined without a herbicide treatment.

Eurasian Watermilfoil Status and Projected Growth for 2003

Eurasian watermilfoil seems to have “boom” years and “off” years in White Bear Lake. In 2002, milfoil had a moderate year. However, no WBLCD management was required. The long growing seasons for 1999 - 2002 probably allowed milfoil to grow more vigorously compared to previous years that had shorter growing seasons. Observations from September 9, 2002 indicate there are several areas that could produce nuisance growth in 2003 if milfoil has a growth rate similar to 2002 and if the water level drops another foot or so. Those areas are along the southwest shoreline (Transects 20-23).

Because milfoil is growing close to the water surface in several areas around White Bear Lake, next year could be a big milfoil year under the right conditions. These conditions are low lake levels combined with high sediment nitrogen concentrations. For a worse-case scenario it is estimated that about 30 acres of milfoil could top out. Scouting the plant beds starting early in the summer will be used to quantify problem areas (nuisance conditions are defined in the Appendix B). The WBLCD would then decide if action is necessary.

However, a variety of things could occur in 2003 that would result in nonnuisance milfoil conditions. For example, the nitrogen pool in the lake sediments is not very great (Figure 7) with exchangeable ammonia concentrations generally less than 2 ppm (sampled in 1998). If the available nitrogen pool was depleted in 2000 - 2002 because of the moderately heavy milfoil growth, there may not be enough nitrogen to support nuisance growth in 2003. Another factor would be if lake levels go back up, the areas where milfoil would top out could be reduced.

Milfoil scouting will begin in May of 2003 and conditions will be monitored.

Aquatic Plant Management Recommendations

Eurasian watermilfoil is well established in White Bear Lake and most likely will not just go away. Although, it has been in the lake for fourteen years, it has persistently grown to the surface in only several areas where nitrogen is consistently high. For other areas around White Bear Lake, it grows within the native plant community, often not reaching the water surface. In areas where it is growing but not producing nuisance conditions, it probably doesn't need to be treated.

Short-term options for milfoil management include herbicides, mechanical harvesting, and a variety of cutting, pulling, and dragging techniques that lakeside residents could employ in shallow water. A long term strategy is to reduce overall sediment fertility to reduce the persistent nuisance growth and enhance habitat for the milfoil weevil. Management ideas are shown in Table 10.

Table 10. Aquatic plant management approaches for White Bear Lake.

	Seasonal Management Approach	Comments
Persistent Milfoil Locations		
Lions Park area (including the VFW fishing pier)	Cut channels or use bottom barriers to allow boat access and dock fishing.	Channels allow public fishing from pier, boat access for homeowners, and cutting maintains good aquatic plant diversity.
Cottage Park	Experiment with deep cuts.	Herbicides have not been very effective, deep cuts several years in a row may reduce intensity of nuisance.
Matoska Marsh	No action recommended.	There is persistent milfoil, sometimes with matting conditions, but this is an important nursery for the lake; plant conditions do not compromise lake use activities.
Occasional Nuisance Milfoil Conditions		
Water < 5 feet deep	Harvesting is first option, then herbicides if needed.	Harvesting will be effective, herbicides may work. Harvesting is better long term option.
Water > 5 feet deep	Selective cutting or harvesting is first choice. If harvesters are unavailable, herbicide treatment is an option.	In deeper water with scattered milfoil that reaches the surface, harvesting is cheaper and more effective than herbicides.
	Long-Term Management Approach	Comments
Lakewide	Reduce sediment nitrogen concentrations and enhance conditions for weevil control.	Reducing nutrients in White Bear Lake is a sound overall strategy.