



Underwater View of Coontail in Pleasant Lake, Ramsey County, Minnesota, July 15, 2015

Aquatic Plant Delineation for Pleasant Lake, Ramsey County, Minnesota, 2015

Delineation: July 15, 2015

Prepared for:
City of North Oaks, Minnesota



Prepared by:
Steve McComas
Jo Stuckert
Blue Water Science

Revised: August 15, 2015

Aquatic Plant Delineation for Pleasant Lake, Ramsey County, Minnesota, 2015

Summary

Aquatic Plant Delineation: Pleasant Lake (MnDNR ID #62-0046) is a 585 acre lake located in Ramsey County, Minnesota. An aquatic plant delineation was conducted on July 15, 2015 by Blue Water Science to characterize conditions of the aquatic plants. Results of the delineation on July 15, 2015 found coontail was the dominant plant found at 81 out of 102 sites (Table S1). Curlyleaf pondweed was present at 12 sample sites and Eurasian watermilfoil was found at 11 samples sites (Table S1). Both of these species are non-native plants. A total of 13 submerged plant species were observed.

Table S1. Pleasant Lake aquatic plant occurrences and densities for the July 15, 2015 survey based on 102 sites. Density ratings are 1-5 with 1 being low and 5 being most dense.

	All Stations (n=102)		
	Occur	% Occur	Density
White waterlily (<i>Nymphaea sp</i>)	1	1	2.0
Coontail (<i>Ceratophyllum demersum</i>)	81	79	2.9
Chara (<i>Chara sp</i>)	2	2	1.0
Elodea (<i>Elodea canadensis</i>)	13	13	1.2
Northern watermilfoil (<i>Myriophyllum sibiricum</i>)	8	8	1.0
Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	11	11	2.2
Curlyleaf pondweed (<i>Potamogeton crispus</i>)	12	12	1.4
Claspingleaf pondweed (<i>P. Richardsonii</i>)	7	7	1.4
Stringy pondweed (<i>P. sp</i>)	4	4	1.3
Flatstem pondweed (<i>P. zosteriformis</i>)	1	1	1.0
Buttercup (<i>Ranunculus sp</i>)	1	1	1.0
Sago pondweed (<i>Stuckenia pectinata</i>)	3	3	1.7
Water celery (<i>Vallisneria americana</i>)	9	9	2.4
Water stargrass (<i>Zosterella dubia</i>)	22	22	1.4

Recommendations: Coontail, a native plant, is the dominant plant in Pleasant Lake. It produces heavy growth in a number of areas in water depths in the 5 foot to 8 foot range. A map showing the areas of heavy coontail growth is shown in Figure S1. Heavy growth of Eurasian watermilfoil was found in one area (Sites 59, 60, 61)(Figure S1). Plant control in this area is not necessary as navigation is hardly restricted. However, three areas where coontail was at the water surface producing recreational limitations were delineated. In these areas, mechanical harvesting could be employed to remove the top two to three feet of the coontail mat. The mechanical harvester cutting bar could be adjusted to go down 3 feet rather than 5 feet. Cutting at a 3-foot depth enables the harvester to cover more area before the cargo area is filled with plants. For all three delineated areas a total of 11.7 acres could be harvested. Area 1 is the highest priority area (5.88 ac) and is in front of the swimming beach and launch area.

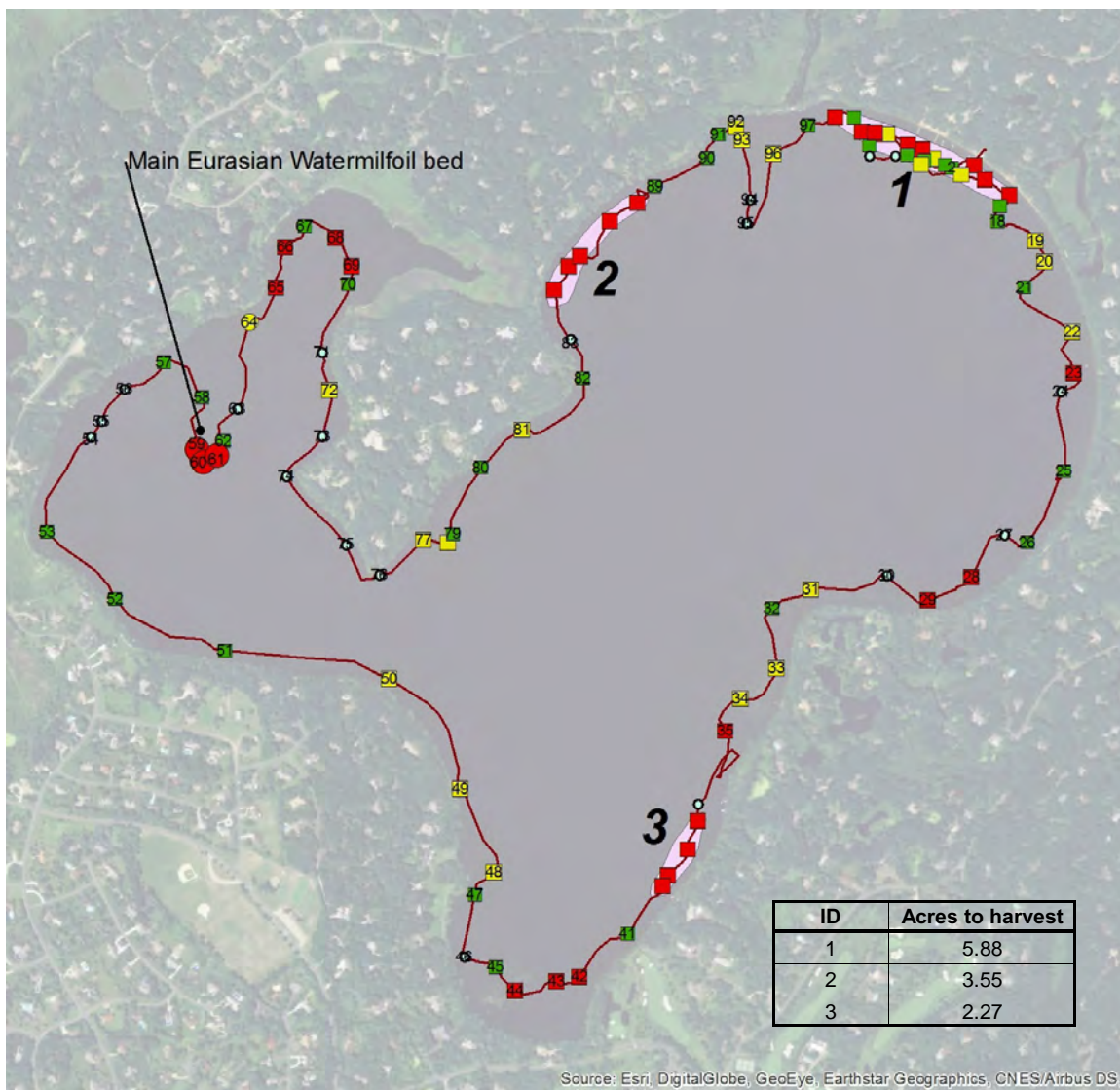


Figure S1. Aquatic plant coverage for Pleasant Lake on July 15, 2015.
Key: black dots = not plants, green = light growth, yellow = moderate growth, and red = heavy growth.

Aquatic Plant Delineation for Pleasant Lake, Ramsey County, Minnesota, 2015

Pleasant Lake, Ramsey County (ID: 62-0046)

Size: 585 acres (MnDNR)

Littoral area: 273 acres (MnDNR)

Maximum depth: 30 ft (MnDNR)

Introduction

An aquatic plant delineation was conducted on July 15, 2015 on 585 acre Pleasant Lake, Ramsey County. The objective of the delineation was to check the distribution and abundance of aquatic plants.

Methods

The aquatic plant delineation of Pleasant Lake was conducted by Blue Water Science on July 15, 2015. For the delineation 102 sites were sampled around Pleasant Lake. Sample sites were randomly selected in the littoral zone around Pleasant Lake (Figure 1). At each sample point, a sampling rake was lowered into the water and a plant sample was taken. The plant species were recorded and the density of each species was assigned.

Densities were based on the coverage on the teeth of the rake. Density ratings were from 1 to 5 with 1 being sparse and 5 being a nuisance. Based on these sample sites, a plant distribution map was constructed.

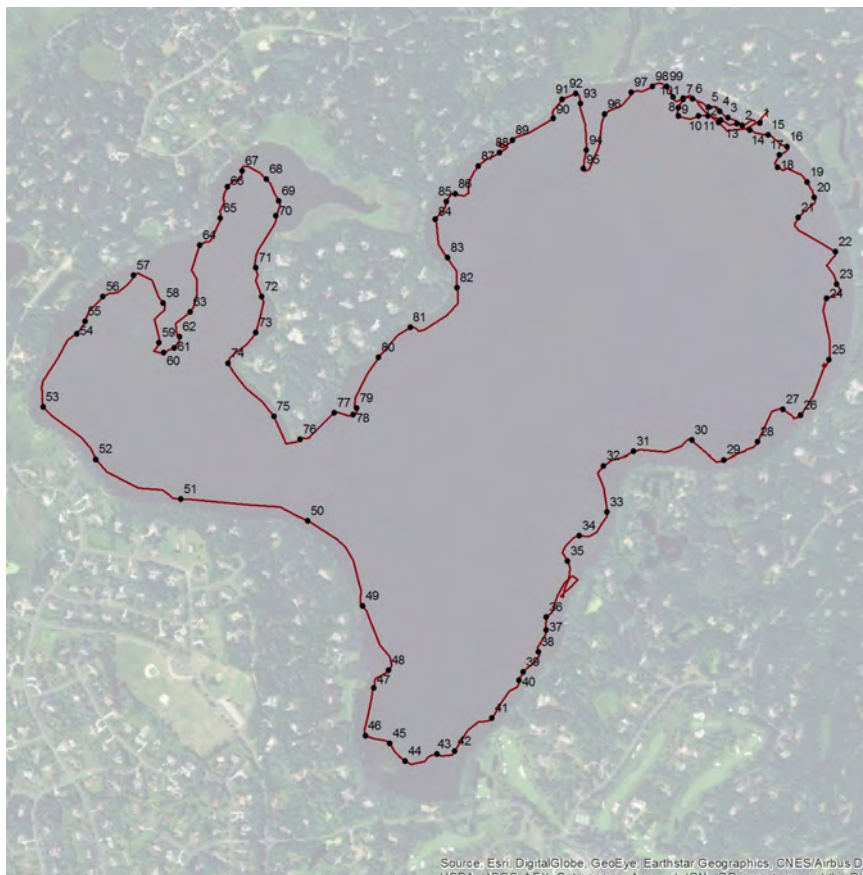


Figure 1. Sample location map for the aquatic plant delineation conducted on Pleasant Lake on July 15, 2015.

Results for the July 15, 2015 Delineation

Results of the delineation on July 15, 2015 found coontail was the dominant plant found at 81 out of 102 sites (Table 1). Curlyleaf pondweed was present at 12 sample sites and Eurasian watermilfoil was found at 11 samples sites (Table 1). Both of these species are non-native plants. A total of 13 submerged plant species were observed.

Table 1. Bone Lake aquatic plant occurrences and densities for the July 15, 2015 survey based on 102 sites. Density ratings are 1-5 with 1 being low and 5 being most dense.

	All Stations (n=102)		
	Occur	% Occur	Density
White waterlily (<i>Nymphaea</i> sp)	1	1	2.0
Coontail (<i>Ceratophyllum demersum</i>)	81	79	2.9
Chara (<i>Chara</i> sp)	2	2	1.0
Elodea (<i>Elodea canadensis</i>)	13	13	1.2
Northern watermilfoil (<i>Myriophyllum sibiricum</i>)	8	8	1.0
Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	11	11	2.2
Curlyleaf pondweed (<i>Potamogeton crispus</i>)	12	12	1.4
Claspingleaf pondweed (<i>P. Richardsonii</i>)	7	7	1.4
Stringy pondweed (<i>P. sp</i>)	4	4	1.3
Flatstem pondweed (<i>P. zosteriformis</i>)	1	1	1.0
Buttercup (<i>Ranunculus</i> sp)	1	1	1.0
Sago pondweed (<i>Stuckenia pectinata</i>)	3	3	1.7
Water celery (<i>Vallisneria americana</i>)	9	9	2.4
Water stargrass (<i>Zosterella dubia</i>)	22	22	1.4



Figure 2. Example of an aquatic plant sample collected on July 15, 2015. Here water celery was sampled at a density of a “1” and coontail was sampled at a density of “2”.

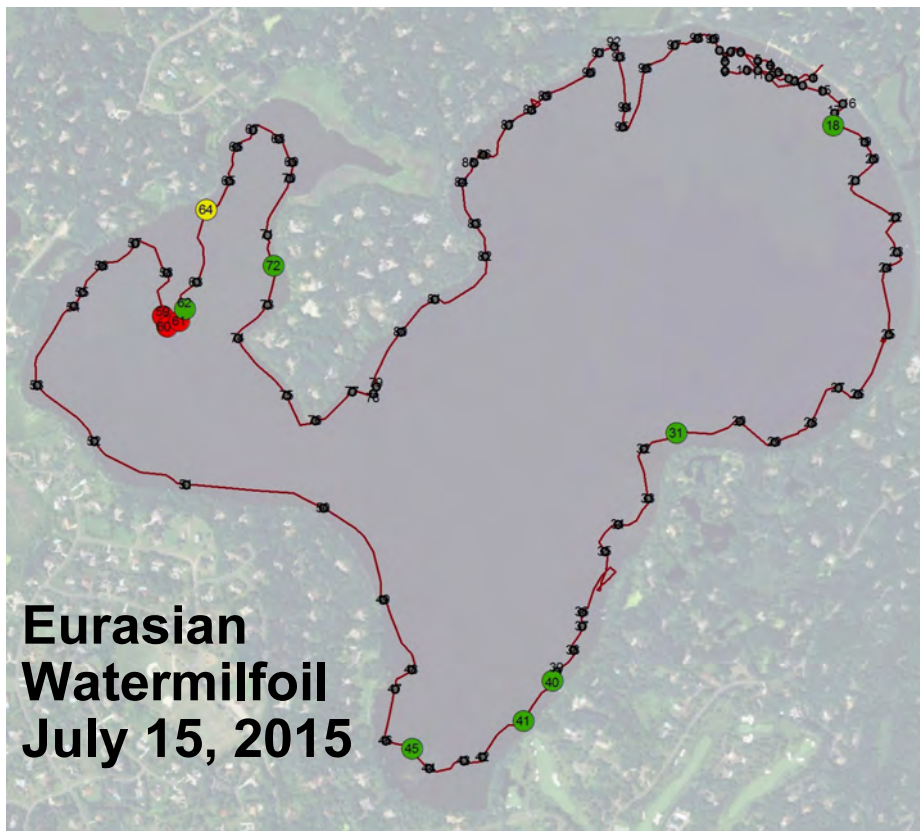
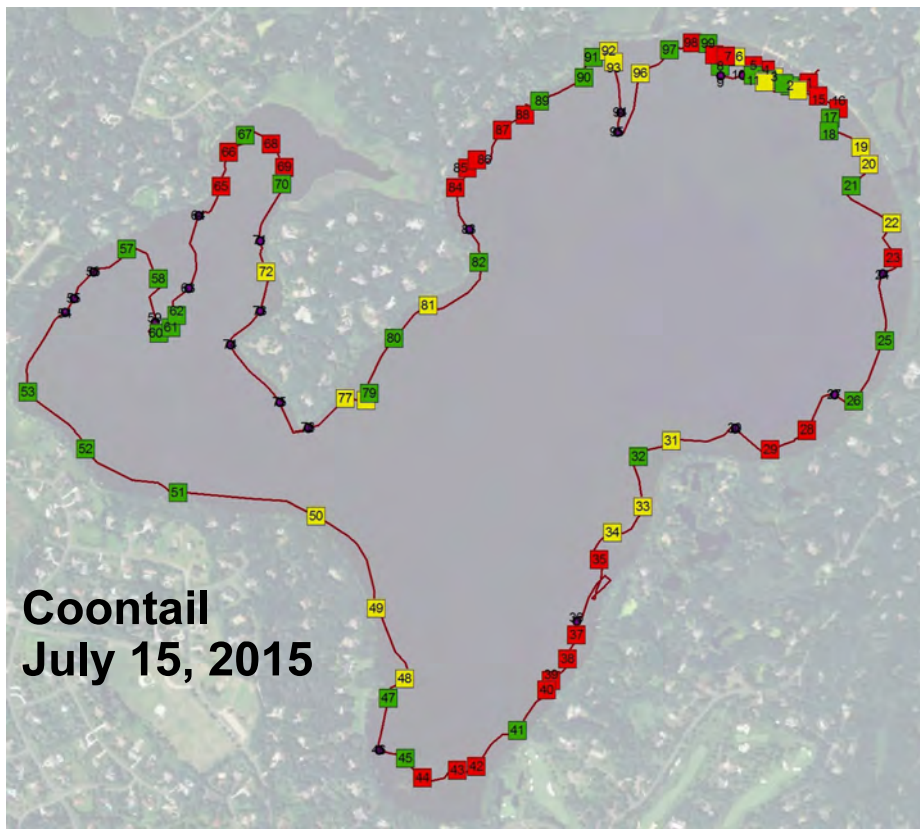


Figure 3. [top] Coontail coverage for Pleasant Lake on July 15, 2015. [bottom] Eurasian watermilfoil coverage for Pleasant Lake on July 15, 2015. Key: green = light growth, yellow = moderate growth, and red = heavy growth.

Individual Sample Point Plant Data

Moderate plant diversity was found in Pleasant Lake with a total of 13 submerged species observed. Coontail was the dominant plant and Eurasian watermilfoil and curlyleaf pondweed were the only non-native aquatic plant species observed on the July 15, 2015 delineation (Table 2).

Table 2. Aquatic plant occurrence and density for individual sample points in Pleasant Lake, July 15, 2015.

Site	Depth (ft)	EWM	Coontail	distance from surface	White lilies	Buttercup	Chara	Clasping leaf	CLP	Elodea	Flat-stem	NWM	Sago	Stringy	Water celery	Water star-grass	No Plants
1	6		4	0													
2	10		2	2													
3	10		3	0-2													
4	9		4	1-2													
5	9		4	0-1													
6	7		3	0-1													
7	9		5	0													
8	11		2	6													
9	13																1
10	13																1
11	11		2	4-6													
12	11		1	9													
13	11		2	8													
14	10		3	4-6													
15	5		4	0													
16	4		4	0													
17	8		2	3													
18	7	1	2	4-5					1							1	
19	4		3	0-2			1		1	1						1	
20	5		3	2-4				1		1			1		2		
21	8		2														
22	5		3	0-3						1		1					
23	5		4	0-2													
24	14																1
25	4		2					2		1			2	2	1	1	
26	4		2					2								2	
27	14																1
28	7		5	0								1					
29	7		4	1													
30	14																1
31	5	1	3	2-3												1	
32	9		2	4					1								
33	5		3	0-2													
34	7		3	1-3					1								
35	5		4									1				3	
36	11																1
37	7		4.5	0-1													
38	7		5	0											1		
39	7		5														
40	7	1	4														
41	6	1	1									1				1	
42	6		4														
43	7		4														
44	6		5														
45	8	1	2													2	
46	4				2					1		1	2		3		
47	4		2				1			2						1	
48	9		3														
49	4		3			1				1						2	
50	4		3							1						1	

Table 2. Aquatic plant occurrence and density for individual sample points in Pleasant Lake, July 15, 2015.

Site	Depth (ft)	EWM	Coon-tail	distance from surface	White lilies	Butter-cup	Chara	Clasping leaf	CLP	Elodea	Flat-stem	NWM	Sago	Stringy	Water celery	Water star-grass	No Plants
51	8		1													1	
52	6		2									1					
53	6		2						1								
54	7																1
55	7																1
56	7									1						1	
57	5		2						1			1				1	
58	5		1							1	1	1					
59	6	4.5															
60	6	4.5	1							1						2	
61	6	4.5	1							1							
62	4	1	1													1	
63	2									2						3	
64	5	3						1									
65	5		5					2	2								
66	5		5											1			
67	5		2						1								
68	6		4.5														
69	6		4.5														
70	7		1														
71	6								1					1		1	
72	6	2	3						1							1	
73	15																1
74	20																1
75	8																1
76	3							1						1	3	1	
77	4		3													1	
78	6		3														
79	8		1														
80	12		1														
81	6		3	3													
82	10		1														
83	16																1
84	7		4	0													
85	7		4.5	0													
86	8		4	0													
87	7		4.5														
88	8		4.5														
89	6		1													1	
90	5		2												3		
91	3		2												4		
92	4		3												3		
93	5		3														
94	7																1
95	10																1
96	6		3	0													
97	4		1					1	2								
98	4		4												2		
99	4		1						4								
100	8		4														
101	7		4.5														
102	11		3	5													
Average		2	3		2	1	1	1	1	1	1	1	2	1	2	1	
occurrence (102 sites)		11	81		1	1	2	7	12	13	1	8	3	4	9	22	14
% occurrence		11	79		1	1	2	7	12	13	1	8	3	4	9	22	

Aquatic Plant Conditions in Pleasant Lake, July 15, 2015



Nearshore shallow water (0-4 feet) has light plant growth.



Water depths of 5 to 8 feet have the potential for heavy coontail growth.



Coontail is the dominant plant in Pleasant Lake.



Coontail is a native aquatic plant.



Water celery is common in some areas in water depths of 2 to 4 feet.



Zebra mussel attach to coontail in some areas of Pleasant Lake.

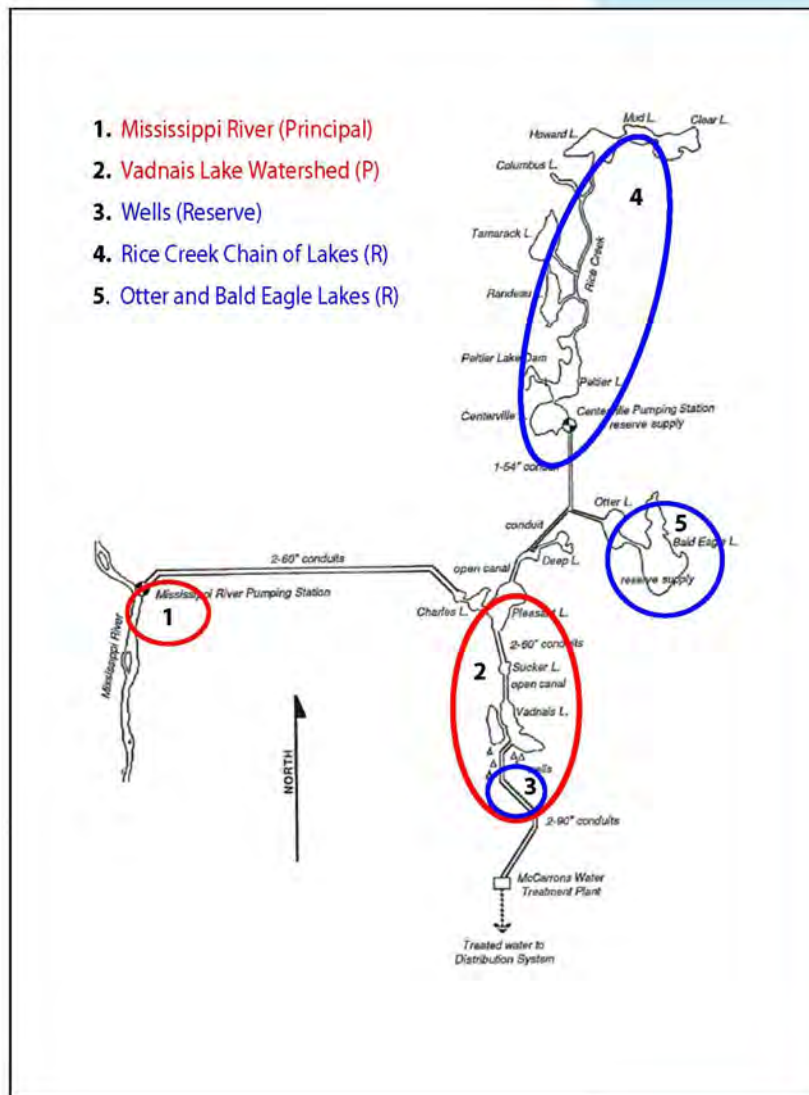
New Species Introductions and Potential Impacts to Pleasant Lake

Pleasant Lake has several non-native aquatic species including curlyleaf pondweed, Eurasian watermilfoil, and zebra mussels. For these non-native species, a number of sources of introduction are possible including:

1. Mississippi River water pumped to Charles Lake which flows into Pleasant Lake (Fig. 4).
2. Fishermen fishing from shore.
3. Boat owners bringing in new species on boats or trailers.
4. Waterfowl.

The most probable source of species introduction to Pleasant Lake is from unfiltered and untreated Mississippi River water that is pumped to Charles Lake and then flows into Pleasant Lake (Figure 4).

Zebra mussels are one of the non-native species that have invaded Pleasant Lake. They are abundant (picture of Pleasant Lake zebra mussels is shown on page 6) and are likely increasing water clarity in Pleasant Lake.



One of the potential impacts of clearer water is an increase in aquatic plant growth. On July 15, 2015 coontail was the dominant plant in Pleasant Lake. In addition, Eurasian watermilfoil often grows more abundantly with clearer water conditions as well. Many variables factor in to produce abundant coontail and milfoil growth and improved water clarity is a significant factor.

Figure 4. Lakes used in the drinking water supply by the St. Paul Regional Water Services (source: Water Resources Management, SPRWS).

Recommendations: Coontail, a native plant, is the dominant plant in Pleasant Lake. It produces heavy growth in a number of areas in water depths in the 5 foot to 8 foot range. A map showing the areas of heavy coontail growth is shown in Figure 5. Heavy growth of Eurasian watermilfoil was found in one area (Sites 59, 60, 61)(Figure 5). Plant control in this area is not necessary as navigation is hardly restricted. However, three areas where coontail was at the water surface producing recreational limitations were delineated. In these areas, mechanical harvesting could be employed to remove the top two to three feet of the coontail mat. The mechanical harvester cutting bar could be adjusted to go down 3 feet rather than 5 feet. Cutting at a 3-foot depth enables the harvester to cover more area before the cargo area is filled with plants. For all three delineated areas a total of 11.7 acres could be harvested. Area 1 is the highest priority area (5.88 ac) and is in front of the swimming beach and launch area.

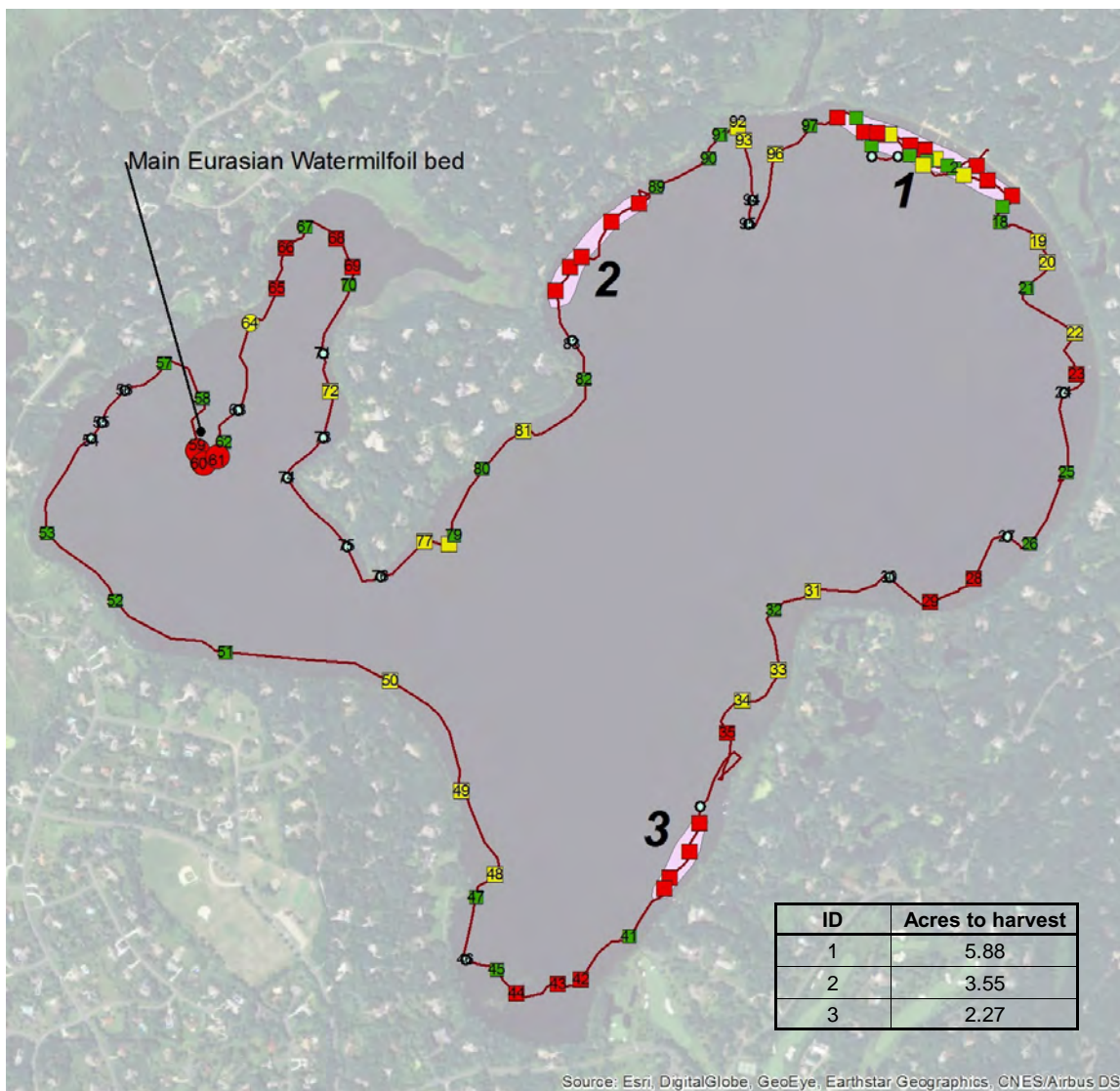


Figure 5. Aquatic plant coverage for Pleasant Lake on July 15, 2015.
Key: black dots = not plants, green = light growth, yellow = moderate growth, and red = heavy growth.