



Big Round Lake, 2009 (Google Earth)

Aquatic Invasive Species Management Guidelines For Big Round Lake, Polk County, Wisconsin

Prepared for Big Round Lake District

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May 2011



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Overview of seven aquatic invasive species that could impact Big Round Lake are listed below. As of 2010, curlyleaf pondweed is the only invasive species known to be present in Big Round Lake.

Species	Lake Status	Potential for Nuisance Colonization in Big Round Lake	Management Action	
			Short Term	Long Term
Plants				
1. Curlyleaf pondweed	Established for a number of years	low to moderate	annual surveys by consultant or residents	selective treatment for nuisance growth conditions
2. Eurasian watermilfoil	No Eurasian watermilfoil currently observed	low to moderate	annual surveys by consultant or residents	selective treatment for nuisance growth conditions
3. Purple loosestrife	In the vicinity	low to moderate	annual surveys by residents	spot control and use of beetles for large area control
Invertebrate				
4. Zebra mussels	absent	moderate	mussel monitoring devices for early detection	contingency funds for aggressive rapid response
5. Rusty crayfish	absent	moderate	crayfish traps for early detection	use fish to control rusty crayfish
Species to Watch				
6. VHS	absent	moderate to high	inform and educ	
7. Hydrilla	absent	low to moderate	inform and educ	



Curlyleaf Pondweed



Eurasian Watermilfoil



Zebra Mussel

Curlyleaf Pondweed Growth Potential Based on Lake Sediments

In early summer, the most abundant plant in Big Round Lake has been curlyleaf pondweed and it is fairly widespread but the abundance is light to moderate. The long-term predicted growth conditions are similar to the actual conditions observed.

Table 1. Big Round Lake sediment data and ratings for potential heavy curlyleaf pondweed growth.

Sample ID	Bulk density (g/cm ³)	Organic Matter (%)	pH (su)	Mn:Fe Ratio	Potential for Nuisance Curlyleaf Pondweed Growth
light growth	1.04	5	6.8	0.22	Low
moderate growth	0.94	11	6.2	0.17	Med
heavy growth	<0.51	>20	>7.7	>0.64	High
1	0.6	13.2	5.6	0.03	Medium
2	1.47	0.4	7.1	1.55	Medium
3	1.53	0.4	8	0.1	Medium
4	1.41	0.9	7.4	0.09	Low
5	1.23	0.8	8.1	0.14	Medium
6	1.44	0.7	7.7	0.25	Medium
7	1.49	0.3	7.7	0.12	Medium
8	1.46	0.4	7.7	0.2	Medium
9	1.49	0.3	7.8	0.17	Medium
10	1.13	3.3	7	0.15	Low
11	0.87	10.7	7	0.19	Low
12	0.67	6.7	6.7	0.14	Medium
13	1.5	0.5	7.5	0.14	Medium
14	1.31	1	7.7	0.12	Medium
15	1.01	1.7	7.7	0.22	Medium
16	1.37	1	7.4	0.14	Low
17	1.44	0.6	7.7	0.18	Medium
18	1.51	0.5	7.7	0.15	Medium
19	0.77	2.6	7.7	0.37	Medium
20	1.26	1.8	7.5	0.2	Low
21	0.41	51.5	6.7	0.06	Medium
22	0.74	8.4	7.5	1.11	Medium
23	0.4	37.7	6.7	0.11	Medium
24	0.42	35.9	6.8	0.1	Medium
25	1.24	1.6	7.3	0.1	Low
26	1.03	2.3	7.3	0.16	Low

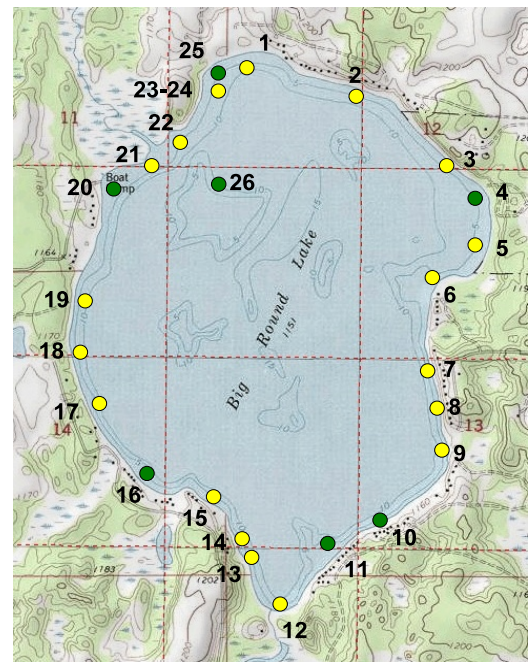


Figure 2. Sediment sample locations are shown with dots. The dot color indicates the potential for heavy growth of curlyleaf pondweed at that site. Key: green dot = low; yellow dot = medium; red dot = high potential.

Eurasian Watermilfoil Growth Potential Based on Lake Sediments

Eurasian watermilfoil is not currently found in Big Round Lake. If it were to invade, it is predicted heavy growth would only occur at the north and south ends of the lake (Figure 3). Potential growth in Big Round Lake is predicted to be light on a long term basis.

Table 2. Big Round Lake sediment data and ratings for potential heavy EWM growth.

Sample Number	NH ₄ (µg/cm ³)	Organic Matter (%)	Potential for Heavy EWM Growth
light or moderate growth	<10	>20	Low (green) to Medium (yellow)
heavy growth	>10	<20	High (red)
1	10.1	13.2	High
2	1.9	0.4	Low
3	1.6	0.4	Low
4	1.8	0.9	Low
5	1.5	0.8	Low
6	1.5	0.7	Low
7	1.6	0.3	Low
8	1.7	0.4	Low
9	1.5	0.3	Low
10	4.4	3.3	Low
11	4.7	10.7	Medium
12	14.1	6.7	High
13	3.7	0.5	Low
14	4.2	1	Low
15	4.5	1.7	Low
16	2	1	Low
17	2.6	0.6	Low
18	1.7	0.5	Low
19	6	2.6	Medium
20	3.5	1.8	Low
21	9.9	51.5	Medium
22	3.8	8.4	Medium
23	11.2	37.7	Medium
24	9.6	35.9	Medium
25	4.4	1.6	Medium
26	6.1	2.3	Medium

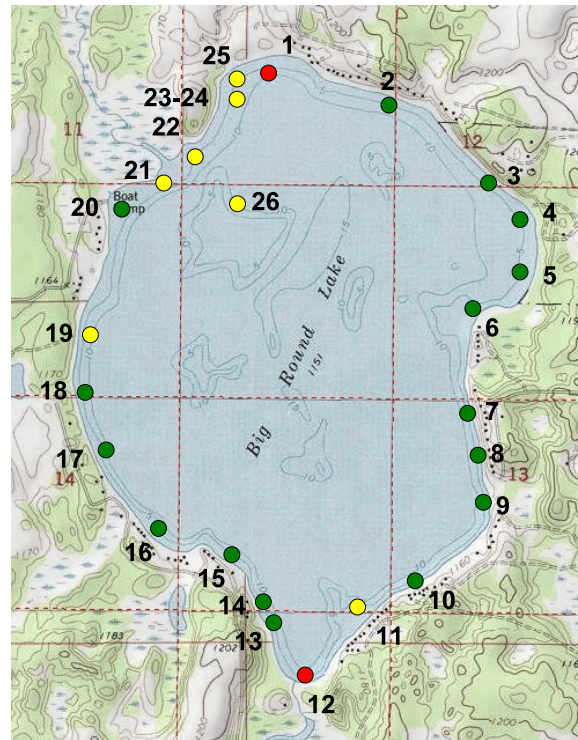


Figure 3. Sediment sample locations are shown with dots. The dot color indicates the potential for heavy growth of Eurasian watermilfoil at that site. Key: green dot=low; yellow dot =medium; red dot=high potential.

Zebra Mussel Growth Potential Based on Water Column Conditions

Zebra mussels are not currently found in Big Round Lake. If they were to invade, their growth potential is considered to be low to moderate. The calcium concentration at around 22 mg/l would support shell production at a moderate level. However, the food availability is not optimal for zebra mussels in Big Round. The algae, as expressed with chlorophyll, are high, indicating blue-green algae are likely dominant. Zebra mussels do not handle blue-green algae very well and this could limit zebra mussel growth.

Table 3. Water column zebra mussel suitability criteria and Big Round Lake water column conditions. Conditions for moderate growth seem to dominate.

		Little Potential for Adult Survival	Little Potential for Larval Development	Moderate (survivable, but will not flourish)	High (favorable for optimal growth)
Calcium (mg/l)	Big Round Lake			21.5	
	Mackie and Claudi 2010	<8	8 - 15	15 - 30	>30
Dissolved oxygen (mg/l)	Big Round Lake				0-4m
	Mackie and Claudi 2010	<3	3 - 7	7 - 8	>8
Temperature (°C)	Big Round Lake				21.0 (summer)
	Mackie and Claudi 2010	<10 or >32	26 - 32	10 - 20	20 - 26
pH	Big Round Lake			8.1	
	Mackie and Claudi 2010	<7.0 or >9.5	7.0 - 7.8 or 9.0 - 9.5	7.8 - 8.2 or 8.8 - 9.0	8.2 - 8.8
Potassium* (mg/l)	Big Round Lake				
	(Bartell et al 2007)	>100	>50 (prevents settlement)	40 - 50	<40
Hardness* (mg/l)	Big Round Lake				
	Mackie and Claudi 2010	<30	30 - 35	55 - 100	100 - 280
Alkalinity* (as mg CaCO ₃ /l)	Big Round Lake				
	Mackie and Claudi 2010	<30	30 - 55	55 - 100	100 - 280
Conductivity (umhos)	Big Round Lake				194
	Mackie and Claudi 2010	<30	30 - 60	60 - 110	>110
Secchi depth (m)	Big Round Lake	0.7 m (summer avg)			
	Mackie and Claudi 2010	<1 or >8	1 - 2 or 6 - 8	4 - 6	2 - 4
Chlorophyll a (ug/l)(food source)	Big Round Lake	27			
	Mackie and Claudi 2010	<2.5 or >25	2.0 - 2.5 or 20 - 25	8 - 20	2.5 - 8
Total phosphorus (ppb)	Big Round Lake	58			
	Mackie and Claudi 2010	<5 or >50	5 - 10 or 35 - 50	10 - 25	25 - 35

* not tested at this time