

**Curly-leaf Pondweed P/I, Bed Mapping, and  
Pre/Post Herbicide Surveys  
Balsam Lake WBIC: 2620600  
Polk County, Wisconsin**



Project Initiated by:

Balsam Lake Protection and Rehabilitation District, Harmony Environmental, and  
the Wisconsin Department of Natural Resources



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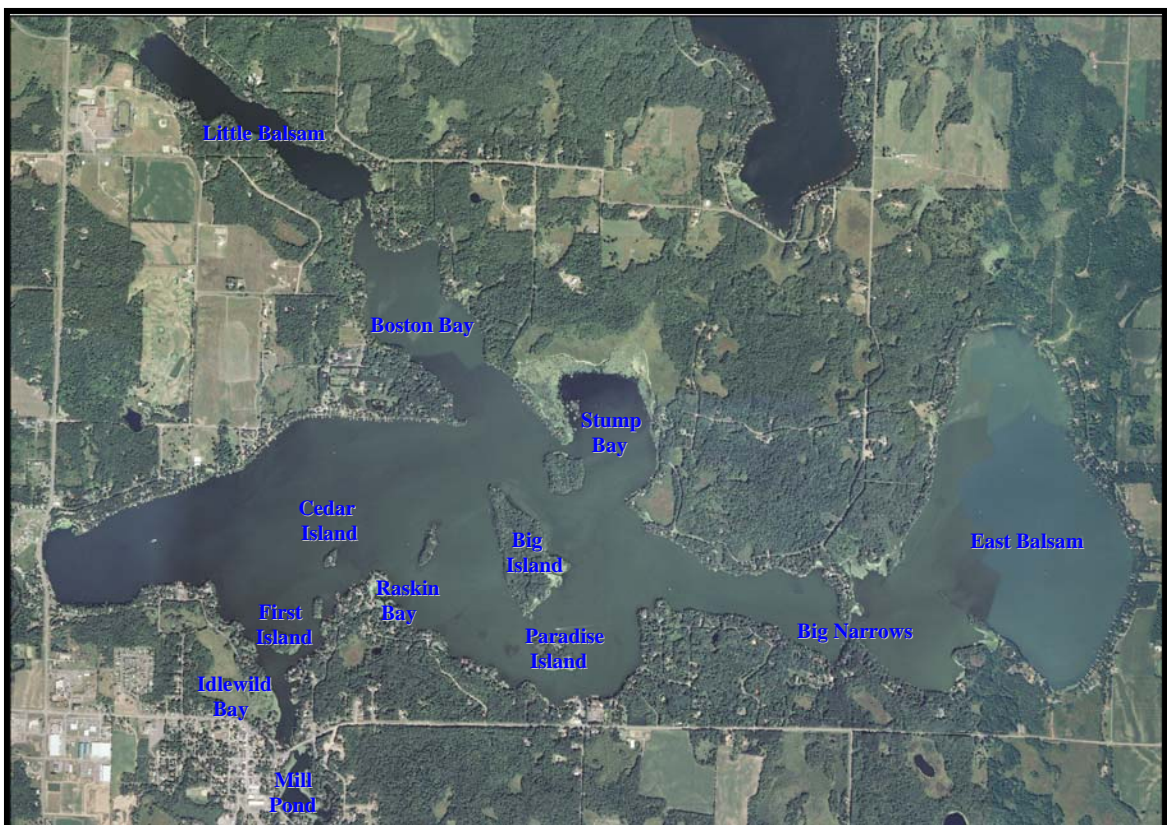
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## INTRODUCTION:

Balsam Lake (WBIC 2656200) is a 2,054 acre stratified drainage lake in central Polk County, Wisconsin in the Towns of Balsam Lake, Milltown, Georgetown, and Apple River (T34N R17W S10 NE NE). The lake reaches its maximum depth of 37ft north of Cedar Island in the western basin and has an average depth of 20ft (Hopke et al, 1964). Balsam Lake is mesotrophic bordering on eutrophic in nature and water clarity is fair with historical summer Secchi readings averaging 6ft in East Balsam, 7ft in Little Balsam, and 8ft in the deep hole north of Cedar Island. In 2009, the early season littoral zone reached approximately 11ft in Balsam, 10ft in Little Balsam and 12ft in East Balsam. Bottom substrate was variable with muck bottoms in most bays and rock/sand bars in the narrows and around the lake's many islands.






**Figure 1: Aerial Photo of Balsam Lake**

The Balsam Lake Protection and Rehabilitation District, Harmony Environmental, and Wisconsin Department of Natural Resources (WDNR) authorized a series of Curly-leaf pondweed (*Potamogeton crispus*) (CLP) surveys as part of developing an Aquatic Plant Management Plan (APMP) in 2009. A full lake CLP density survey was conducted from June 2-6, CLP bed mapping surveys took place on June 9 and 10, and pre/post herbicide surveys were conducted on April 27 and June 10. This report is the summary analysis of these field surveys.

## METHODS:

### Curly-leaf pondweed Density Survey:

Using a standard formula that takes into account the shoreline shape and distance, islands, water clarity, depth and total lake acreage, Michelle Nault (WDNR) generated a 1083 point sampling grid for Balsam Lake (Appendix I). Using this grid, we completed a density survey where we recorded the level of CLP at each point in the lake's littoral zone. We located each survey point using a handheld mapping GPS unit (Garmin 76CSx), and used a rake to sample an approximately 2.5ft section of the bottom. CLP was assigned a rake fullness value of 1-3 as an estimation of abundance (Figure 2). We also recorded visual sightings of CLP within six feet of the sample point.

<u>Rating</u>	<u>Coverage</u>	<u>Description</u>
1		A few plants on rake head
2		Rake head is about ½ full Can easily see top of rake head
3		Overflowing Cannot see top of rake head

**Figure 2: Rake Fullness Ratings (UWEX, 2009)**

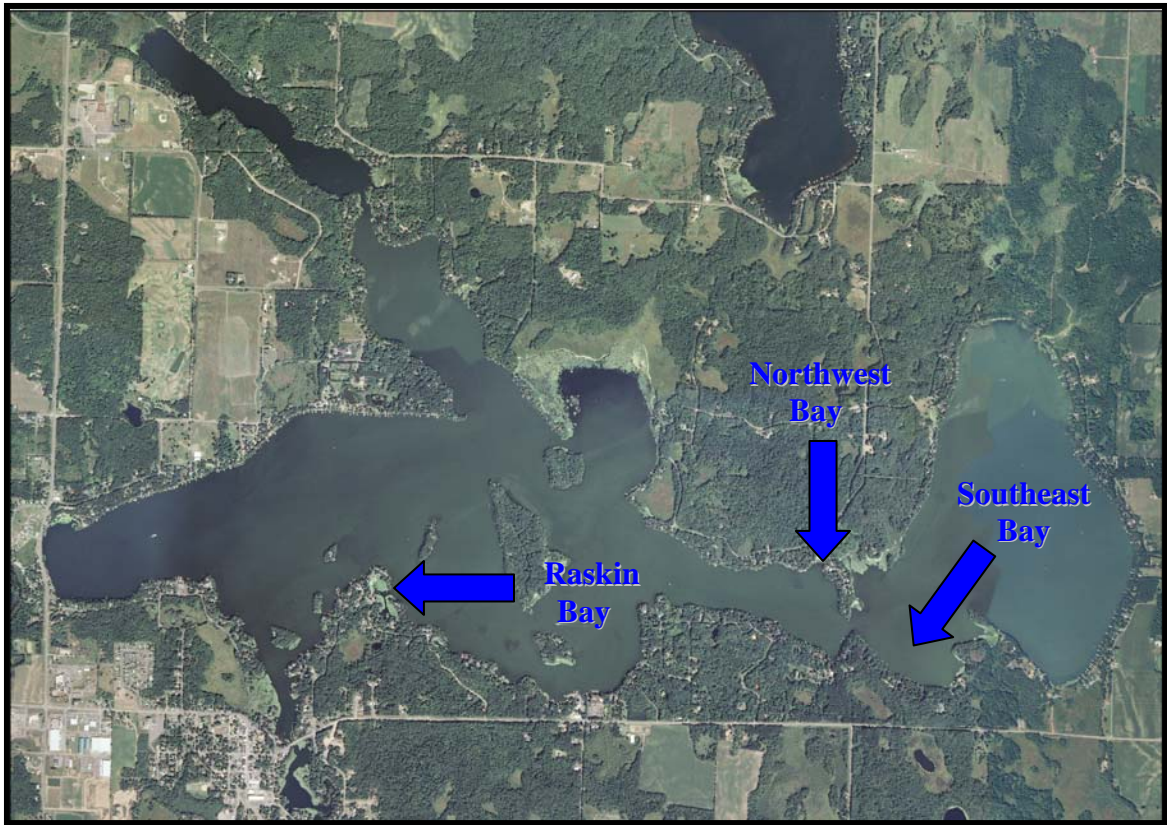
### CLP Bed Mapping Survey:

Following the density survey, we used the resulting map coupled with a meandering shoreline survey to locate and map all significant beds of CLP on Balsam Lake. We defined a bed based on the following two criteria: CLP plants made up greater than 50% of all aquatic plants in the bed, and the CLP had canopied at the surface or was close enough to the surface that it would likely interfere with normal boat traffic.

Using a GPS unit, we recorded a string of waypoints that circled around the edges of the beds. We then uploaded these points into ArcMap, created bed shapefiles, and determined the total acreage and perimeter of the bed to the nearest tenth of an acre and meter respectively.

### **Pre/Post Herbicide Survey:**

Frank Koshere of the WDNR authorized three areas to be surveyed as potential CLP herbicide treatment areas (Figure 3). For each of these areas, we used Forestry Tools Extension to ArcMap 9.3 to generate pre/post survey points based on the size and shape of the bay: Raskin Bay's 5.5 acres produced a 29 point grid, the 1.0 acre bay northwest of the Big Narrows produced a nine point grid, and the 11.4 acre bay southeast of the Big Narrows produced a 113 point grid (Appendix II).



**Figure 3: Pre/Post Survey Areas**

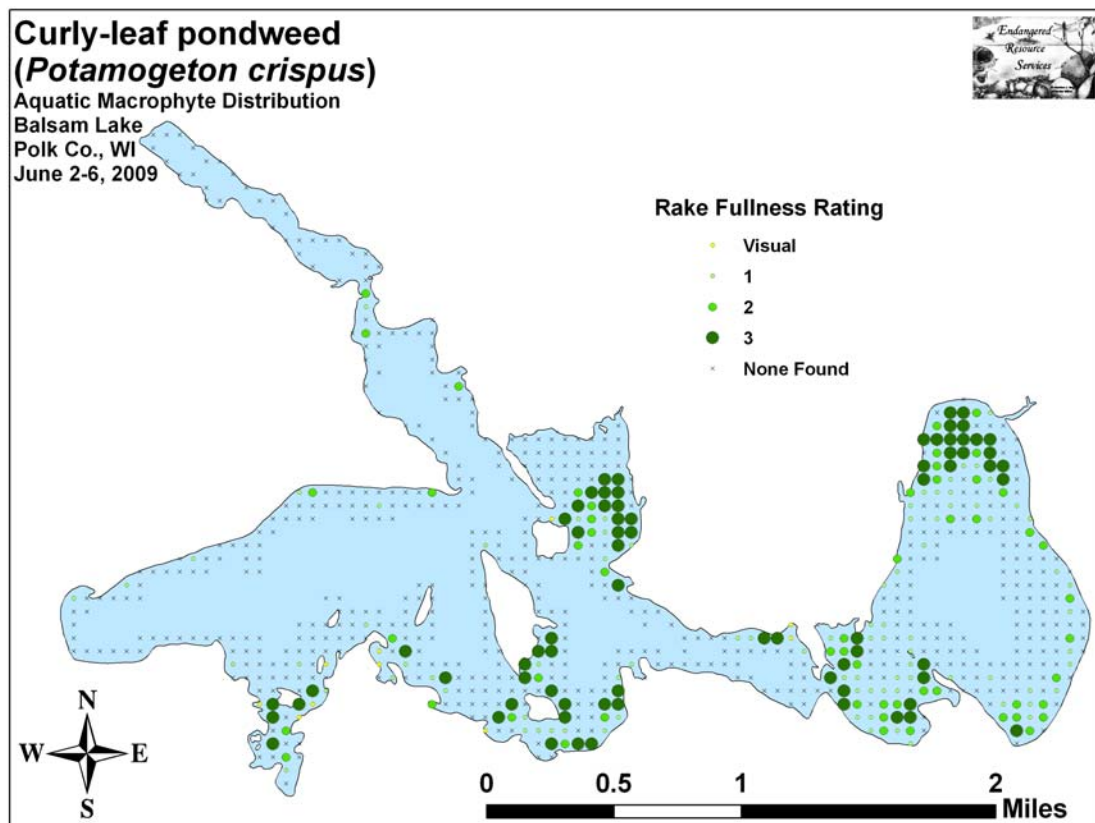
At each point, we recorded the depth and bottom substrate. As in the CLP density survey, we took a rake sample and assigned a rake fullness value of 1-3 as an estimation of abundance for all species found (Figure 2). We also recorded visual sightings of species within six feet of the sample point.

We entered all data collected into the standard APM spreadsheet (Appendix III) (UWEX, 2009). Data was analyzed using the linked statistical summary sheet and the WDNR pre/post analysis worksheet (UWEX, 2009). Pre/post differences were determined to be significant at  $p < .05$ , moderately significant at  $p < .01$  and highly significant at  $p < .005$ .

## RESULTS AND DISCUSSION:

### Curly-leaf pondweed Density Survey:

We surveyed 756 points that potentially could have fallen in the littoral zone. We found CLP present in the rake sample at 212 locations and it was visual at an additional 10 points (Figure 4) (Appendix IV). This extrapolates to CLP being present in approximately 20% of the lake. Of these points, 72 had a rake fullness rating of 3 and another 54 rated a 2 indicating 11.6% of the lake had a significant infestation. Although widely distributed throughout Balsam and East Balsam, we did not observe CLP anywhere in Little Balsam. We found it growing in all bottom types, but it achieved its greatest densities in sheltered bays with muck bottoms in water from 1-2.5m deep



**Figure 4: Balsam Lake CLP Density**

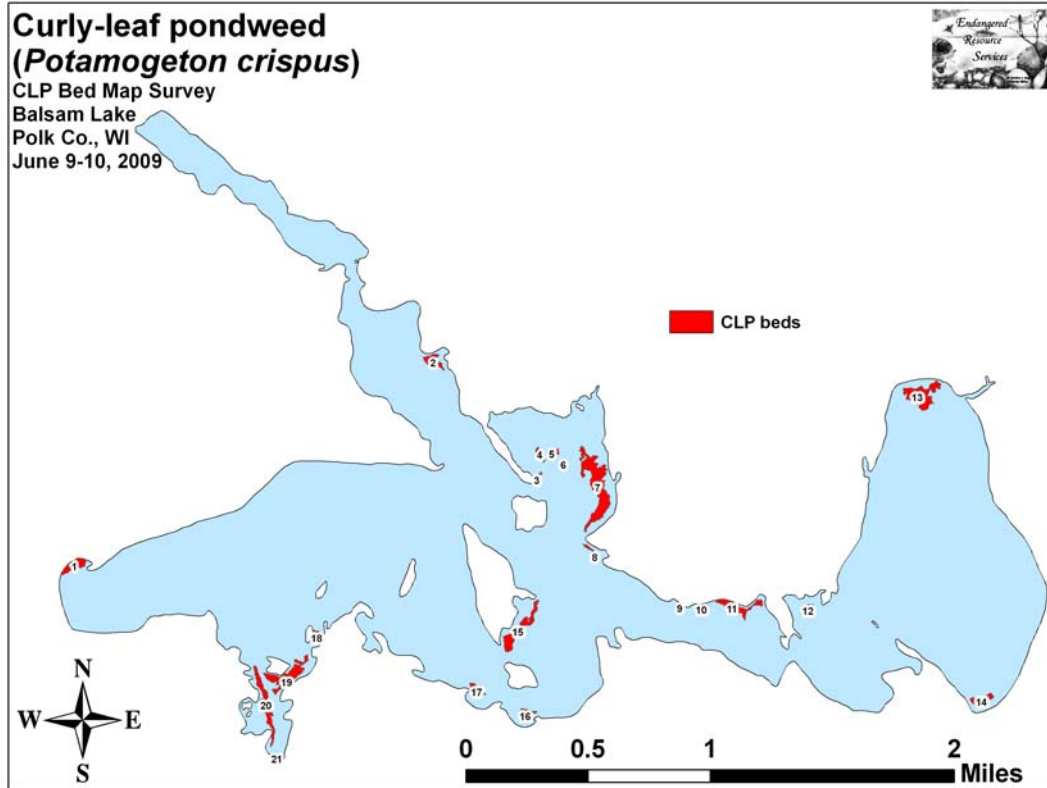
### CLP Bed Mapping Survey:

We located and mapped a total of 21 beds on Balsam Lake ranging in size from 0.1 acre (Beds 6 and 9) to 10.1 acres (Bed 7) (Appendix V). All combined, these beds covered a total of 41.2 acres or just over 2% of the lake's 2,053 total acres (Table 1) (Figure 5). Although many additional areas of the lake had CLP, either it was not invasive to the point of excluding natives (density <50%) or the beds were located well below the surface and thus would not interfere with watercraft.



**Table 1: CLP Bed Summary**  
**Balsam Lake, Polk Co. June 9-10, 2009**

<b>Bed Number</b>	<b>Acreage</b>	<b>Perimeter (m)</b>
1	1.8	461
2	1.7	428
3	0.2	186
4	0.7	308
5	0.3	246
6	0.1	98
7	10.1	2,008
8	0.6	350
9	0.1	88
10	0.2	169
11	2.8	868
12	0.7	212
13	5.3	1,040
14	1.3	393
15	3.5	1,080
16	1.2	400
17	0.7	303
18	0.6	253
19	4.8	1,265
20	4.2	1,273
21	0.3	160
<b>Total Acres</b>	41.2	



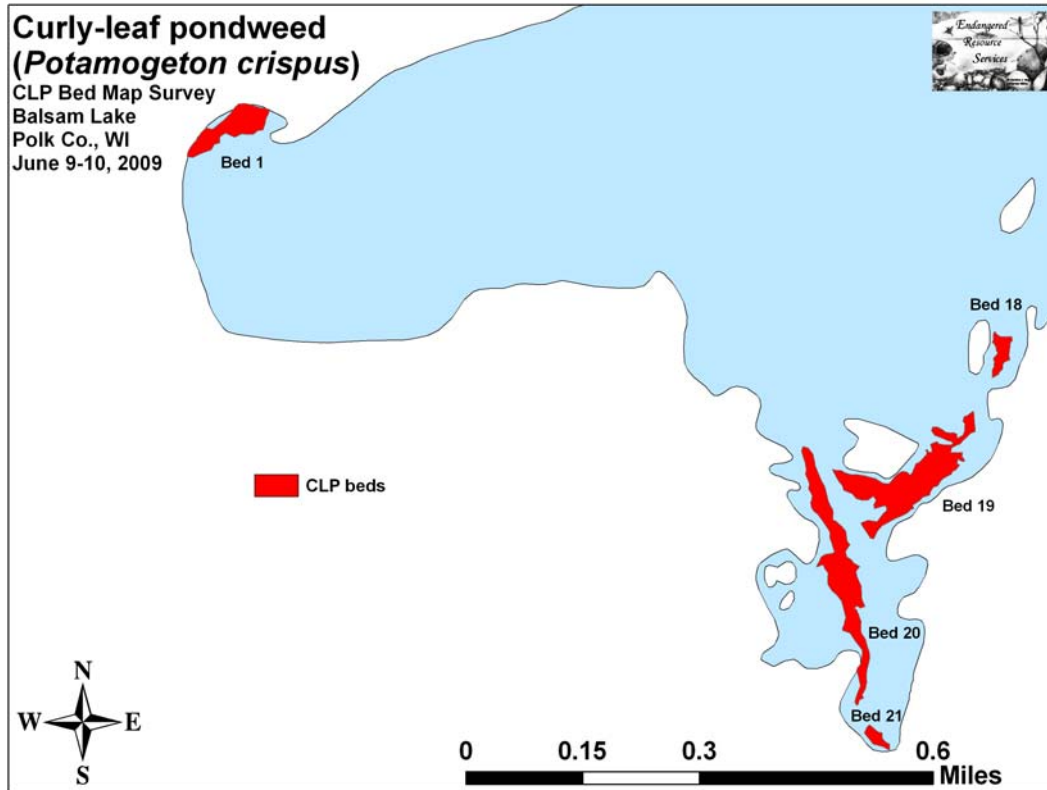
**Figure 5: Balsam Lake CLP Bed Map**

**Description of Beds and Notable Areas with CLP:**

Bed 1 – Located just out from the west boat landing, the bed was dense, monotypic and canopied for approximately 35m extending out from the lily pads (*Nuphar variegata* and *Nymphaea odorata*) in front of Ward’s Resort. Beyond this, the bed was still dense and monotypic, but was approximately .5m below the surface. Many plants showed evidence of being clipped by boat props (Figure 6).

Little Narrows between Boston Bay and Little Balsam Lake – CLP was located in the narrows near the “Slow No Wake” buoys, but it did not form beds and was mixed in with an abundance of high quality native species like Large-leaf pondweed (*Potamogeton amplifolius*) and Fern Pondweed (*Potamogeton robbinsii*) (Figure 4).

Bed 2 – The bed encompassing pt. 411 in Boston Bay was mostly located just below the surface, although some areas were beginning to canopy. Plants were dense and monotypic except on the very edges of the bed. This area may interfere with cabin resident’s access to the main lake, but is not likely to impact other boaters as the bed is relatively small and outside of observed main traffic areas (Figure 7).

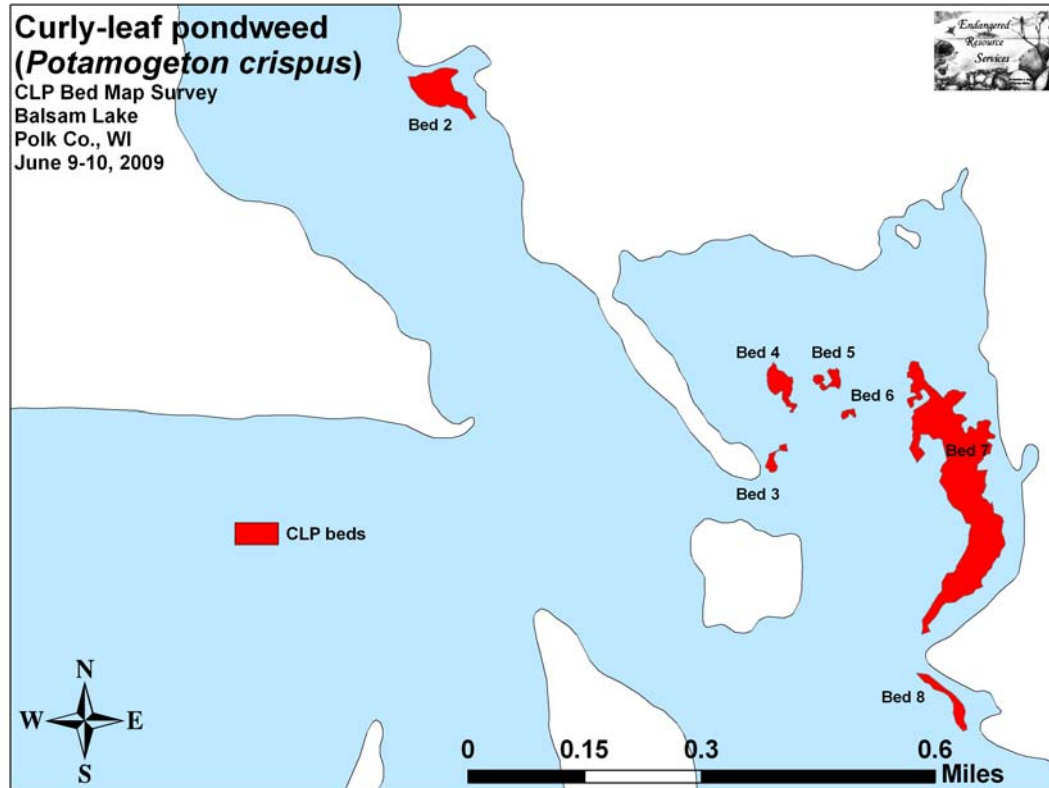


**Figure 6: West Balsam Lake CLP Beds**

Beds 3, 4, 5 and 6 – The far west and north side of “Stump Bay” had few CLP plants with the exception of these four small beds. Although dense, they were easily avoided, were mixed with some natives, and supported visible schools of panfish and their spawn beds. With native species just beginning to grow, CLP likely provides these and other fish important early season habitat in this bay as well as in other parts of the lake (Figure 7).

Bed 7 and the Rest of Stump Bay – Bed 7 was the biggest bed on the lake at over 7 acres. On the north and east sides of the bed, CLP was extremely dense, non-navigable, and had excluded most if not all native species. On the west and south sides where the bay sloped into deeper water, its dominance shrunk to only about 50% of the macrophyte community, and the edge of the bed became difficult to define as densities varied wildly over short distances. On the outside edges, the bed was a favorite spot for people to fish, and we needed to “wait our turn” to access the area for both surveys. There is a navigable area on the inside edge of the bed, but it likely is an inconvenience for property owners in the area. Because it is also shallow, large boats may have trouble navigating it. Although the rake sample survey suggested the entire south end of Stump Bay supported CLP, these plants were not canopied (most were well over a meter below the surface) and did not seem likely to do so as they should be starting to senesce by the middle of June (Figure 7).

Bed 8 – This thin ribbon of canopied CLP was navigable on all four sides and quickly disappeared at the sharp drop off into the main lake. It likely isn’t negatively affecting anyone (Figure 7).

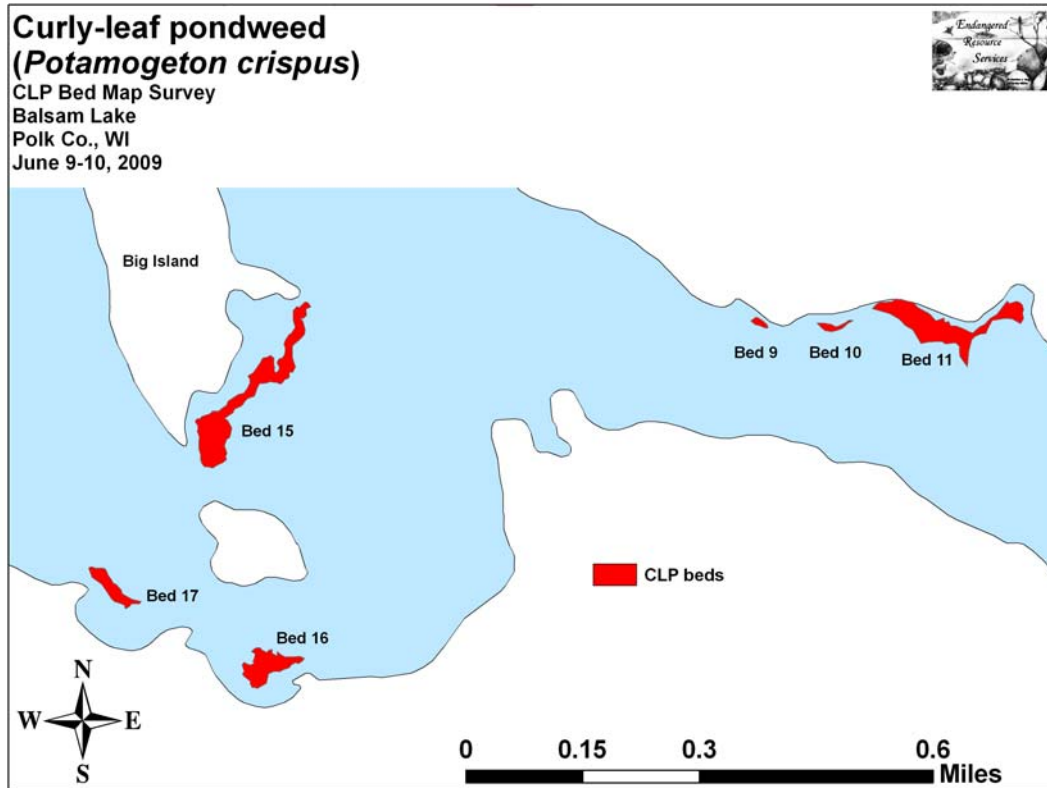


**Figure 7: Boston and Stump Bay CLP Beds**

Beds 9, 10, and 11 – These three beds were all dense and monotypic; especially on the inshore side. They had few areas that would allow a boat to travel through them and likely were a significant inconvenience to property owner in the area. Bed 11 broke up near the small bay northwest of the Big Narrows where it was opted against using herbicide treatment in spring 2009 based on our pretreatment survey. This bay had some CLP, but it was very patchy, and did not interfere with navigation (Figure 8).

Bed 12 – Located just north of the Big Narrows, this bed had limited canopied CLP, supported numbers and diversity of native species as well, and was navigable on both the inner and outer edges (Figure 9).

Bed 13 and the North Bay of East Balsam – The edges of the CLP portion of this bed were extremely difficult to define. A large portion of the bay has canopied plants, but most of them were natives where CLP was only a component. Coontail (*Ceratophyllum demersum*) was common to abundant on the north edge of the bed, and open beds of Illinois pondweed (*Potamogeton illinoensis*) and Claspingleaf pondweed (*Potamogeton richardsonii*) were mixed in throughout before becoming dominant on the edges of the canopied CLP bed areas. This area supported large schools of panfish, and we observed it to be heavily targeted for fishing. We found CLP to be present to the edge of the littoral zone, but it became uncommon to rare at points beyond 3m of water before disappearing altogether in 4m (Figure 9).



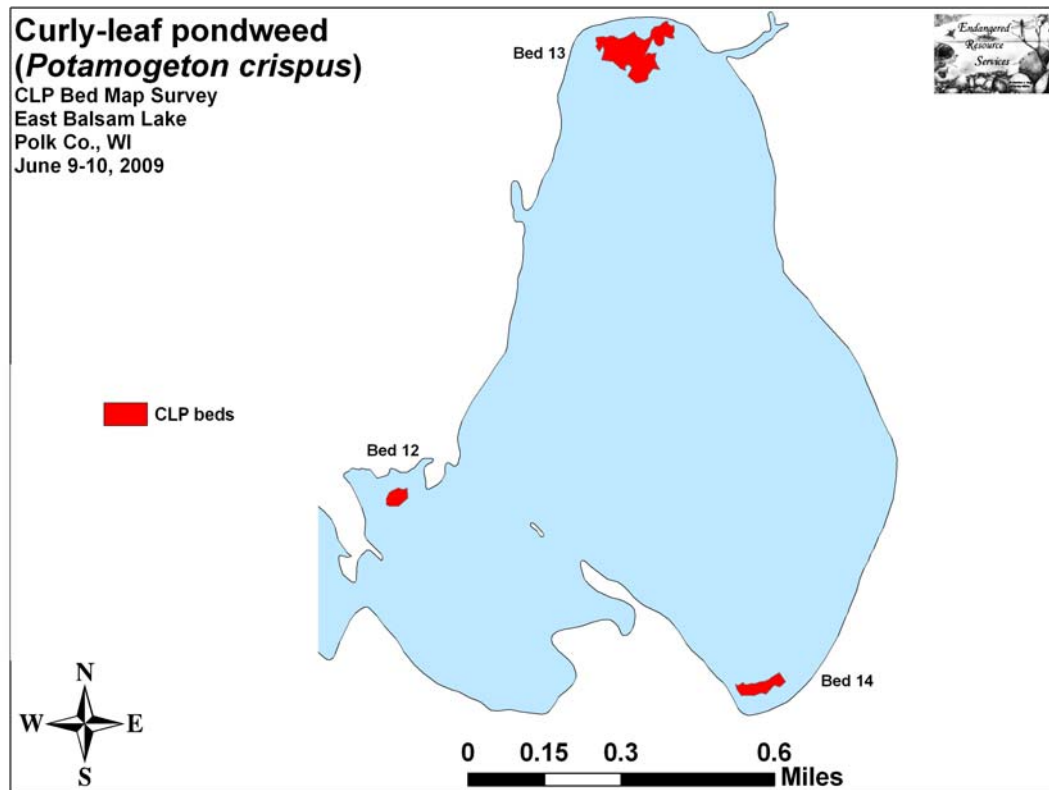
**Figure 8: East End of Balsam Lake, Big and Paradise Island CLP Beds**

Bed 14 – This bed was not overly dense except in the very center. The edges had many native plants mixed in. It may or may not be of concern to local residents (Figure 9).

Treated Southwest Bay- CLP was not visibly canopied anywhere in the bay. Some CLP and native plants along the edge of the treatment zone were still alive, but, for the most part, both CLP and native plants appeared to have been eliminated from the treatment zone. One exception was forked duckweed (*Lemna trisulca*) which formed a thick mat over the bottom of the bay (Figure 4).

Bed 15 - Located on the southeast shore of Big Island, this bed was dense, canopied, mostly monotypic, and had well defined borders where the lake dropped off into deep water. Like the CLP bed in Stump Bay, it was loaded with panfish and was difficult to survey because there were so many boats fishing in the area. The bed may make access to the few cabins on the island more difficult, but it is likely not an issue for most boaters (Figure 8).

Bay North of Paradise Landing/East of Paradise Island – The rake survey showed both wide distribution and dense areas of CLP at this location. However, it wasn't canopied anywhere, was not an impediment to navigation elsewhere in the bay, and was just another plant in the local macrophyte community that was dominated by Illinois and Claspingleaf pondweed (Figure 8).



**Figure 9: East Balsam Lake CLP Beds**

Bed 16 – This area between the landing and Paradise Island was an impediment for local property owner’s lake access. The bed was dense, monotypic and showed evidence of repeated prop clipping. It was only canopied in a few places, but we believe that was because it had been hit by motors so many times (Figure 8).

Bed 17 – This bed was small, popular for fishing, and easily avoided as there were channels all around it (Figure 8).

Beds 18, 19 and 20 - We found these beds to be a significant impediment to boat traffic. Prop trails were visible through the beds, and people launching their boats from the south landing by the Mill Pond have little choice but to plow through them. If treatment or mechanical removal is performed in this area, care should be taken to avoid the native plant beds on the west side of Bed 20 which contain several sensitive species that are not found anywhere else on the lake (Figure 6).

Bed 21 – This small patch near shore just east of the boat landing was only a problem if someone were fishing from shore. Plants were growing too shallow for a boat to easily move through the area with a motor, and the bed didn’t extend out very far into the lake (Figure 6).

## CLP Pre/Post Herbicide Survey:

### Raskin Bay:

Raskin Bay is a shallow muck bottom bay with sand borders along the entrance of the main lake (Figure 10) (Appendix VI). During the pretreatment survey, we found CLP in only two rake surveys and the levels were low (Appendix VII). Because of this, it was decided not to treat the bay. We conducted a pretreatment survey follow up to look at how the bay changed over that time in the absence of chemical treatments (Appendix VIII). The follow up survey produced nine points with CLP, but they again had low density except for one small 10ft<sup>2</sup> bed at point RB22 (Figure 11).

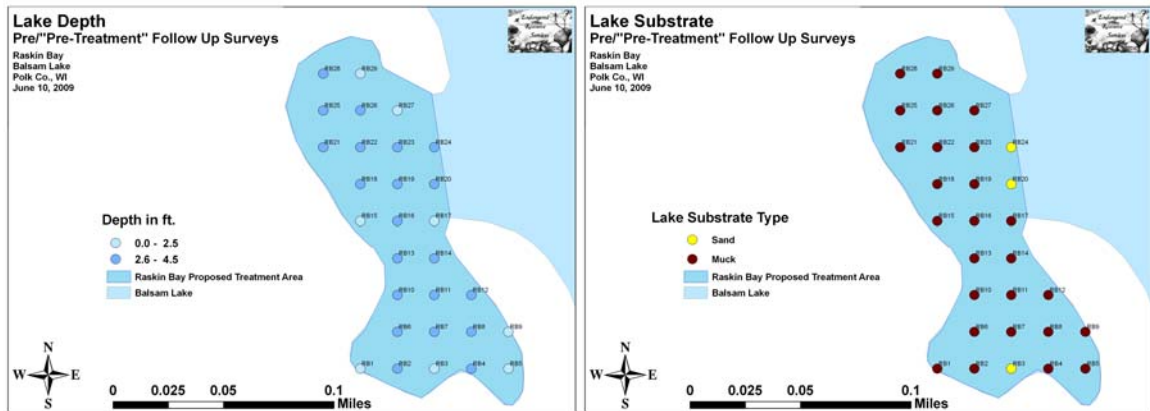


Figure 10: Raskin Bay Depth and Bottom Substrate

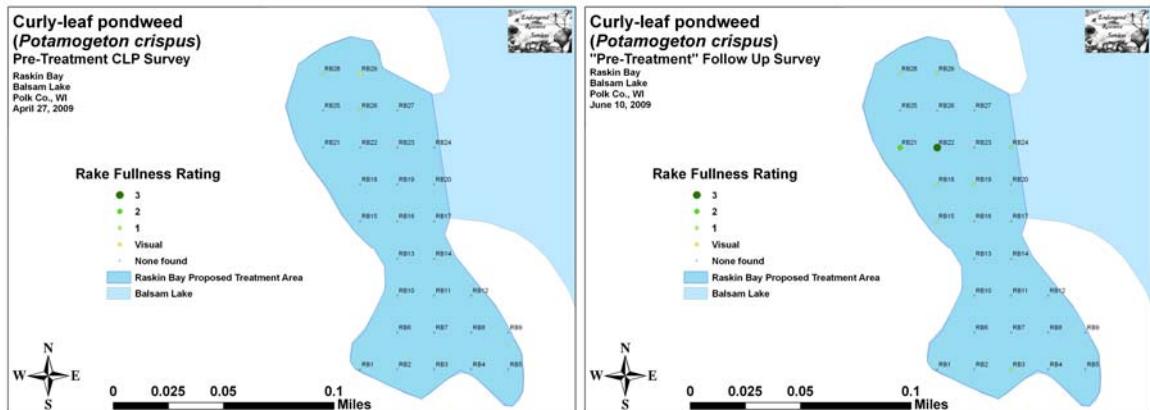
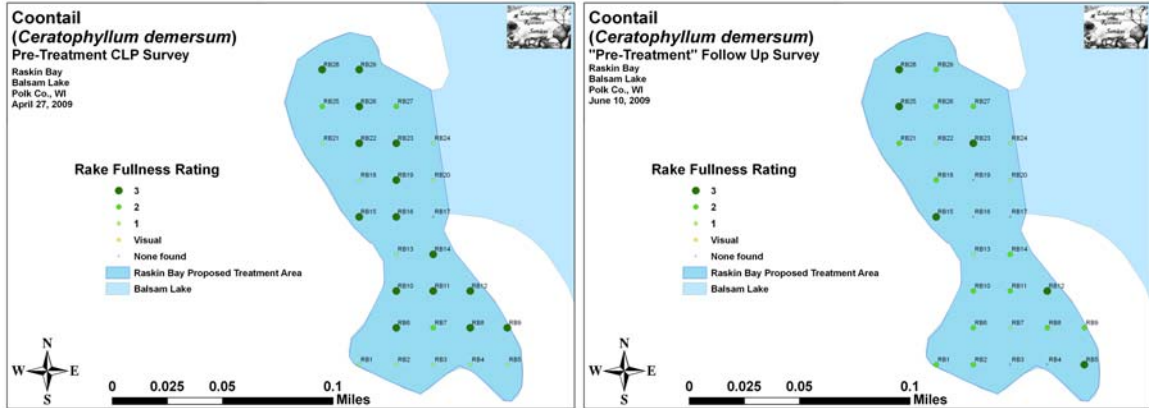


Figure 11: Raskin Bay Pre/Pre Follow Up CLP Distribution

Native species richness in Raskin Bay was extremely high averaging 5.00 species/site on the follow up survey (Table 2). Despite not having much CLP, the bay proved to be dominated by dense beds of Coontail (Tables 3 and 4). By the time of the follow up survey, several channels had been cut through the beds by boat traffic and many lake shore owners had raked out plants in front of their properties (Figure 12). This resulted in point 3 being raked clean so we excluded it from analysis.



**Figure 12: Raskin Bay Pre/Pre Follow Up Coontail Distribution**

**Table 2: Pre/Post Survey Summary Statistics  
Raskin Bay - Balsam Lake, Polk County  
April 27, and June 10, 2009**

Summary Statistics:	Pre	Post
Total number of points sampled	29	29
Total number of sites with vegetation	29	28
Total number of sites shallower than the maximum depth of plants	29	29
Frequency of occurrence at sites shallower than maximum depth of plants	100.00	96.55
Simpson Diversity Index	0.78	0.92
Maximum depth of plants (ft)	4.50	4.50
Number of sites sampled using rope rake (R)	0	0
Number of sites sampled using pole rake (P)	29	29
Average number of all species per site (shallower than max depth)	3.52	5.90
Average number of all species per site (veg. sites only)	3.52	6.11
Average number of native species per site (shallower than max depth)	3.45	5.00
Average number of native species per site (veg. sites only)	3.45	5.18
Species Richness	7	19
Species Richness (including visuals)	7	19

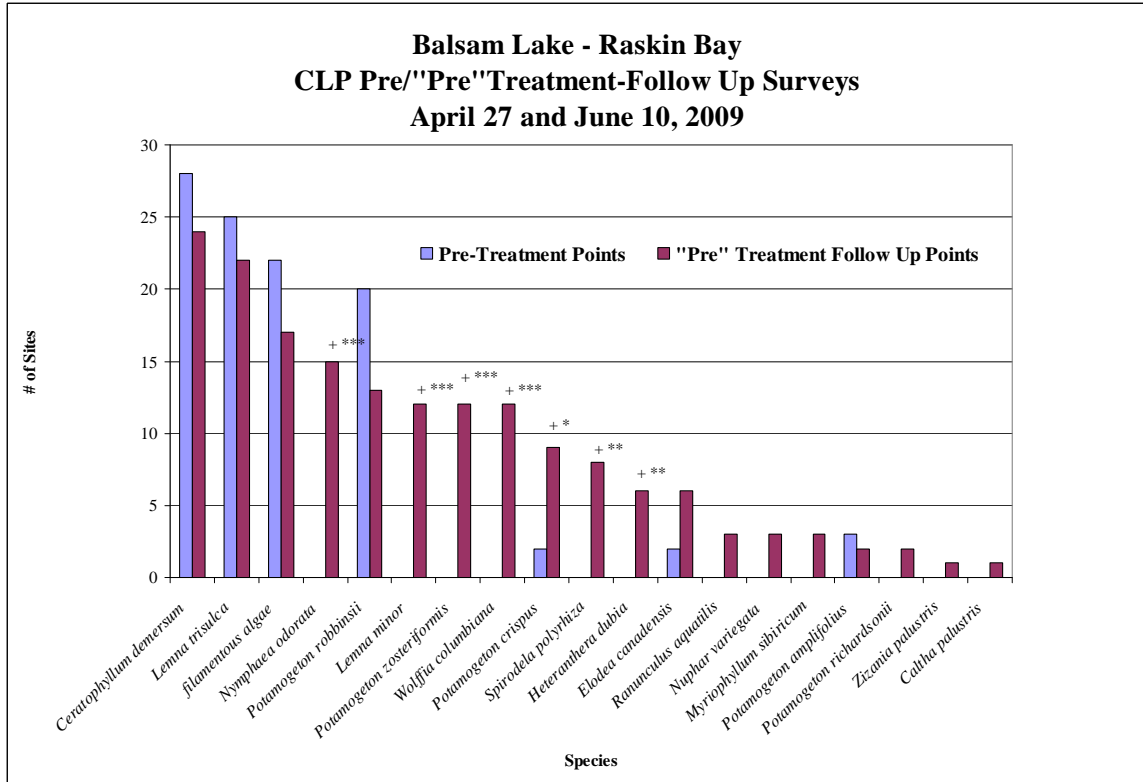


**Table 3: Frequencies and Mean Rake Sample of Aquatic Macrophytes  
Pretreatment Survey Raskin Bay - Balsam Lake, Polk County  
April 27, 2009**

Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake
<i>Ceratophyllum demersum</i>	Coontail	28	27.45	96.55	96.55	2.18
<i>Lemna trisulca</i>	Forked duckweed	25	24.51	86.21	86.21	1.40
	Filamentous algae	22	21.57	75.86	75.86	1.59
<i>Potamogeton robbinsii</i>	Robbins pondweed	20	19.61	68.97	68.97	1.40
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	3	2.94	10.34	10.34	1.33
<i>Elodea canadensis</i>	Common waterweed	2	1.96	6.90	6.90	1.00
<i>Potamogeton crispus</i>	Curly-leaf pondweed	2	1.96	6.90	6.90	1.00

**Table 4: Frequencies and Mean Rake Sample of Aquatic Macrophytes  
 “Pretreatment” Follow-up Survey Raskin Bay - Balsam Lake, Polk County  
 June 10, 2009**

Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake
<i>Ceratophyllum demersum</i>	Coontail	24	14.04	85.71	85.71	2.04
<i>Lemna trisulca</i>	Forked duckweed	22	12.87	78.57	78.57	1.55
	Filamentous algae	17	9.94	60.71	60.71	2.29
<i>Nymphaea odorata</i>	White water lily	15	8.77	53.57	53.57	1.40
<i>Potamogeton robbinsii</i>	Robbins pondweed	13	7.60	46.43	46.43	1.23
<i>Lemna minor</i>	Small duckweed	12	7.02	42.86	42.86	1.25
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	12	7.02	42.86	42.86	1.17
<i>Wolffia columbiana</i>	Common watermeal	12	7.02	42.86	42.86	1.17
<i>Potamogeton crispus</i>	Curly-leaf pondweed	9	5.26	32.14	32.14	1.33
<i>Spirodela polyrhiza</i>	Large duckweed	8	4.68	28.57	28.57	1.50
<i>Heteranthera dubia</i>	Water star-grass	6	3.51	21.43	21.43	1.17
<i>Elodea canadensis</i>	Common waterweed	6	3.51	21.43	21.43	1.50
<i>Ranunculus aquatilis</i>	Stiff water crowfoot	3	1.75	10.71	10.71	1.33
<i>Nuphar variegata</i>	Spatterdock	3	1.75	10.71	10.71	1.00
<i>Myriophyllum sibiricum</i>	Northern water milfoil	3	1.75	10.71	10.71	1.33
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	2	1.17	7.14	7.14	1.50
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	2	1.17	7.14	7.14	2.00
<i>Zizania palustris</i>	Northern wild rice	1	0.58	3.57	3.57	1.00
<i>Caltha palustris</i>	Water arum	1	0.58	3.57	3.57	1.00

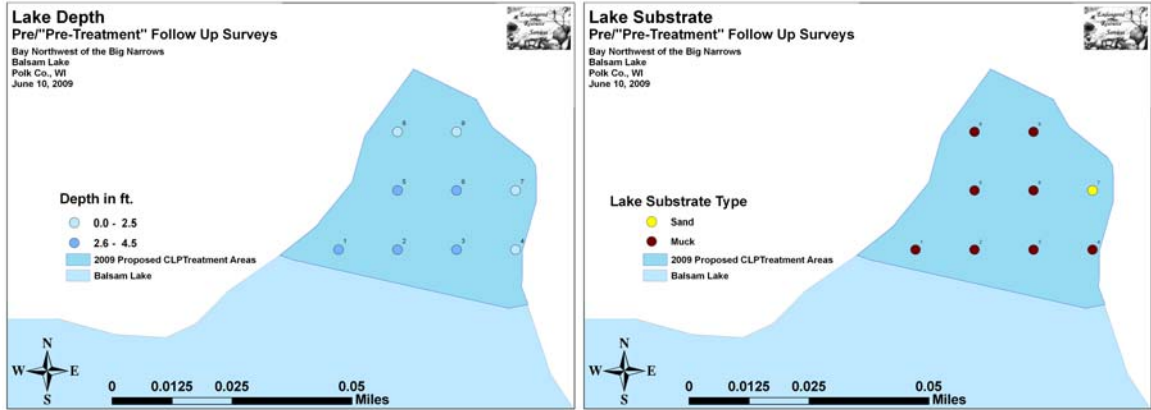


**Figure 13: Significant Macrophyte Changes in Raskin Bay**

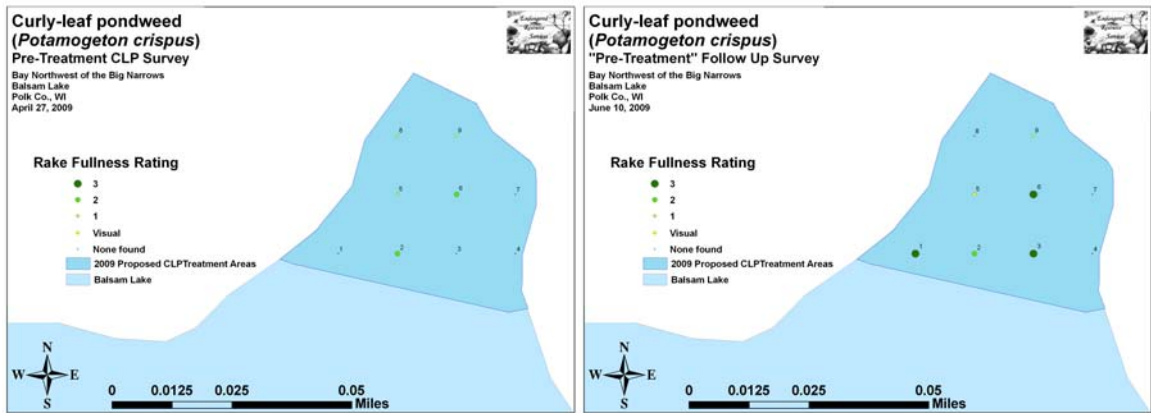
From the pretreatment to the follow up survey, White water lily, Small duckweed (*Lemna minor*), Flat-stem pondweed (*Potamogeton zosteriformis*), Common watermeal (*Wolffia columbiana*), Curly-leaf pondweed, Large duckweed (*Spirodela polyrhiza*), and Water star-grass (*Heteranthera dubia*) all increased significantly. As the pretreatment survey was early in the growing season and all these species generally do not overwinter their leaves, this change is likely what would be expected over the course of any April-June period. The reduction (insignificant) of the four dominant species found in the pretreatment survey is likely the result of channels being cut by propellers and manual removal by lakeshore owners.

**Bay Northwest of the Big Narrows:**

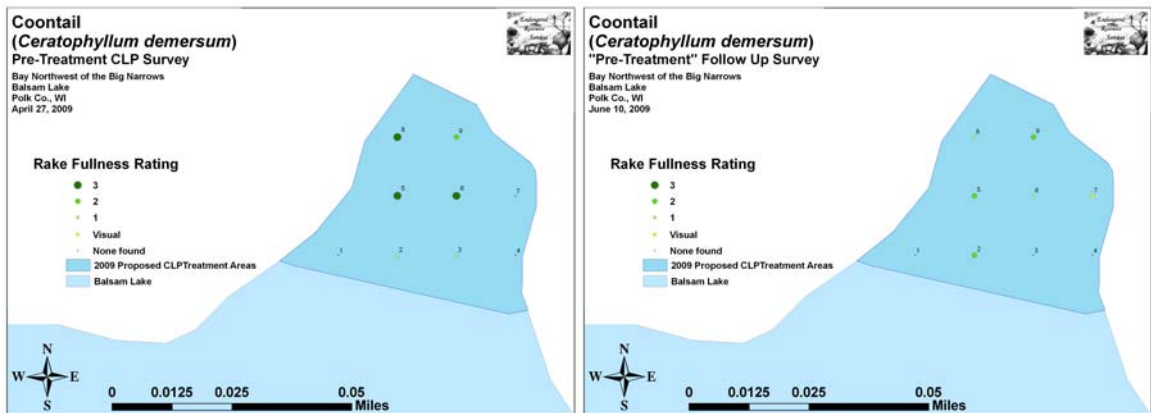
The shallow bay northwest of the Big Narrows is generally muck bottomed with a sand border along the eastern margin (Figure 14) (Appendix VI). Native species richness was low averaging 2.00 species/site on the follow up survey (Table 5). During the pretreatment survey, we found CLP at five sites, but the level was low with a mean rake fullness of 1.40 (Table 6) (Appendix IX). Because of this, it was also decided not to treat the bay. We again conducted a follow up survey to look at changes over that time in the absence of chemical treatments (Table 7) (Appendix X). The follow up survey also produced five points with CLP. The mean rake fullness had increased to 2.40, but this difference was not significant (Figure 15). In addition to this modest amount of CLP, the bay had scattered beds of Coontail (Figure 16). At this time, they didn't appear to be interfering with boat traffic, but could conceivably do so later in the growing season.



**Figure 14: Bay Northwest of the Big Narrows Depth and Bottom Substrate**



**Figure 15: Bay Northwest of the Big Narrows Pre/Pre Follow Up CLP**

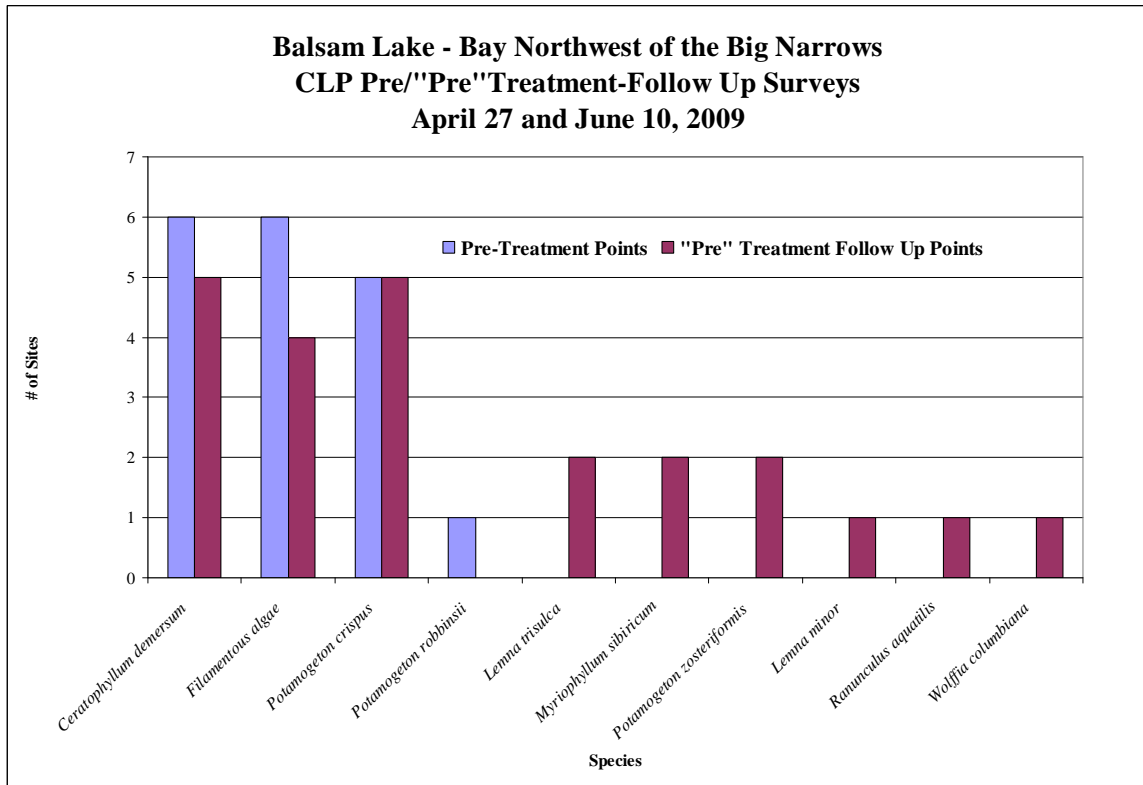


**Figure 16: Bay Northwest of the Big Narrows Pre/Pre Follow Up Coontail**

We found no significant differences in species between surveys (Figure 17). The increased presence of Northern water milfoil (*Myriophyllum sibiricum*), Stiff water crowfoot (*Ranunculus aquatilis*), Flat-stem pondweed and the “duckweeds” is again likely due to normal changes in plants throughout the growing season.

**Table 5: Pre/Post Survey Summary Statistics  
Bay Northwest of the Big Narrows - Balsam Lake, Polk County  
April 27, and June 10, 2009**

Summary Statistics:	Pre	Post
Total number of points sampled	9	9
Total number of sites with vegetation	6	8
Total number of sites shallower than the maximum depth of plants	9	9
Frequency of occurrence at sites shallower than maximum depth of plants	66.67	88.89
Simpson Diversity Index	0.70	0.85
Maximum depth of plants (ft)	4.00	4.00
Number of sites sampled using rope rake (R)	0	0
Number of sites sampled using pole rake (P)	9	9
Average number of all species per site (shallower than max depth)	2.00	2.56
Average number of all species per site (veg. sites only)	3.00	2.88
Average number of native species per site (shallower than max depth)	1.44	2.00
Average number of native species per site (veg. sites only)	2.17	2.57
Species Richness	4	9
Species Richness (including visuals)	4	10



Significant differences = \* p < .05, \*\* p < .01, \*\*\* p < .005

**Figure 17: Macrophyte Changes in Bay Northwest of the Big Narrows**

**Table 6: Frequencies and Mean Rake Sample of Aquatic Macrophytes  
Pretreatment Survey Bay Northwest of the Big Narrows - Balsam Lake, Polk County  
April 27, 2009**

Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake
<i>Ceratophyllum demersum</i>	Coontail	6	33.33	100.00	66.67	2.17
	Filamentous algae	6	33.33	100.00	66.67	2.17
<i>Potamogeton crispus</i>	Curly-leaf pondweed	5	27.78	83.33	55.56	1.40
<i>Potamogeton robbinsii</i>	Robbins pondweed	1	5.56	16.67	11.11	1.00

**Table 7: Frequencies and Mean Rake Sample of Aquatic Macrophytes  
“Pretreatment” Follow-up Survey Bay Northwest of the Big Narrows - Balsam Lake, Polk County  
June 10, 2009**

Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake
<i>Ceratophyllum demersum</i>	Coontail	5	62.50	55.56	21.74	1.60
<i>Potamogeton crispus</i>	Curly-leaf pondweed	5	62.50	55.56	21.74	2.40
	Filamentous algae	4	50.00	44.44	17.39	2.50
<i>Lemna trisulca</i>	Forked duckweed	2	25.00	22.22	8.70	1.00
<i>Myriophyllum sibiricum</i>	Northern water milfoil	2	25.00	22.22	8.70	1.50
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	2	25.00	22.22	8.70	1.00
<i>Lemna minor</i>	Small duckweed	1	12.50	11.11	4.35	2.00
<i>Ranunculus aquatilis</i>	Stiff water crowfoot	1	12.50	11.11	4.35	2.00
<i>Wolffia columbiana</i>	Common watermeal	1	12.50	11.11	4.35	1.00
<i>Nymphaea odorata</i>	White water lily	**	**	**	**	**
** = Visual only						

### Bay Southeast of the Big Narrows:

The bay southeast of the Big Narrows gradually slopes into the main basin of East Balsam. The rock/sand substrate along the south shore is gradually replaced with organic muck (Figure 18) (Appendix VI). Native species richness was relatively low averaging 1.81 species/site on the pretreatment survey and 1.95 species/site on the post treatment survey (Table 8). During the pretreatment survey, we found CLP in 62 rake samples, with a mean fullness of 1.85 (Table 9) (Appendix XI). Because of this, it was decided to treat the bay. Several weeks after chemical treatment, we conducted a post treatment survey (Table 10) (Appendix XII). The results documented a highly significant decline in both CLP distribution and density finding it at 20 sites with a mean rake fullness of 1.15 (Figure 19). Breakout analysis showed that the reductions in rake fullness results of both 3 and 2 were highly significant while there was actually no significant change in samples with a rake fullness of 1 (Figure 20). We also noted highly significant declines in Coontail (Figure 21). The slightly significant increase in the presence of Forked duckweed may be in response to the loss of other macrophytes. Other species that increased between surveys such as Wild Celery (*Vallisneria americana*), Stiff water crowfoot, White water lily and Spatterdock are likely due to normal increases in spring plant growth patterns (Figure 22).

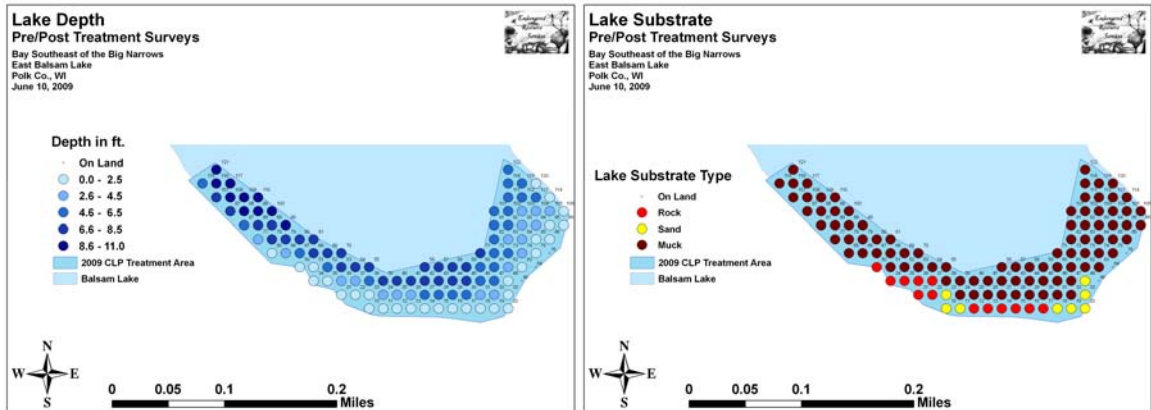


Figure 18: Bay Southeast of the Big Narrows Depth and Bottom Substrate

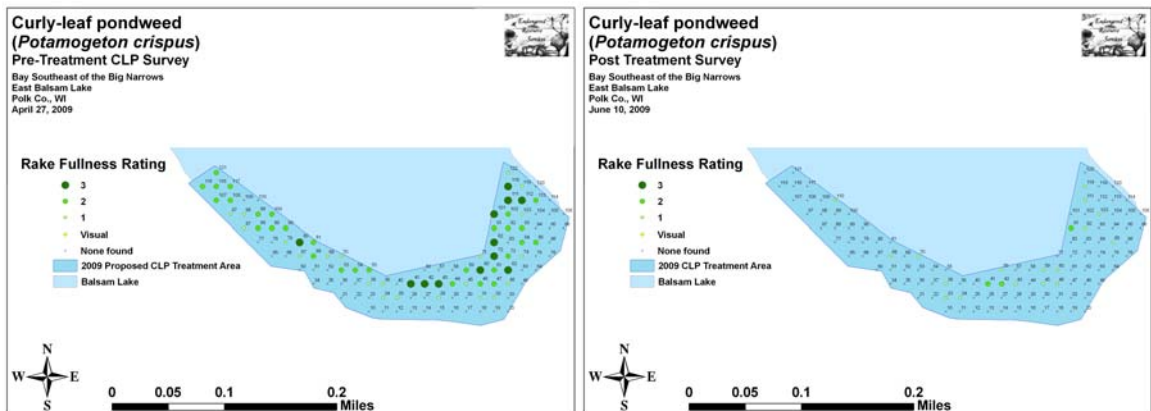
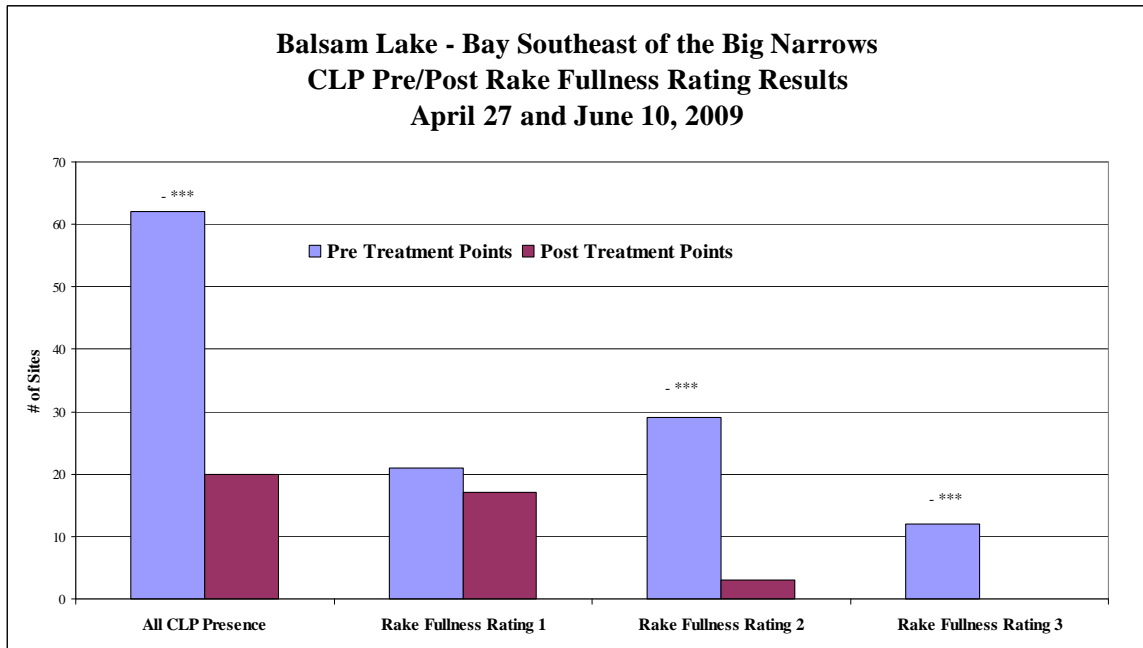


Figure 19: Bay Southeast of the Big Narrows Pre/Post CLP Distribution

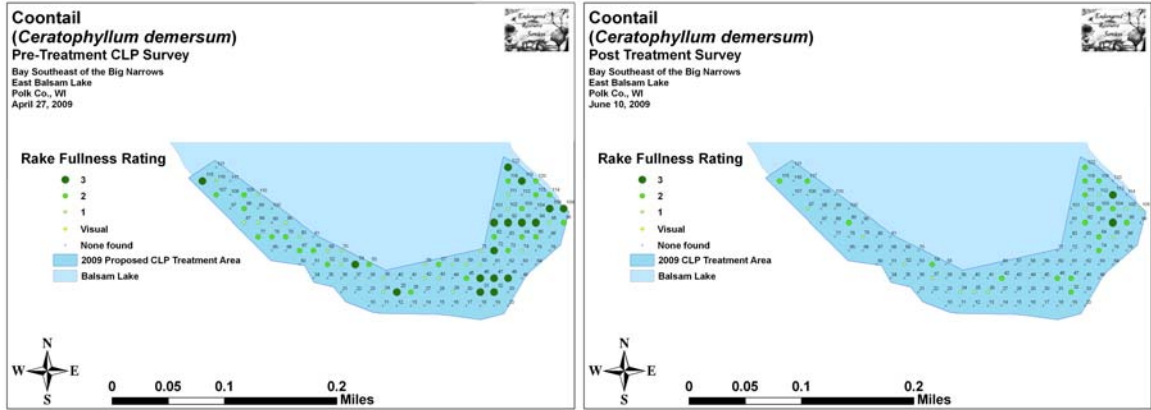
**Table 8: Pre/Post Survey Summary Statistics  
Bay Southeast of the Big Narrows – East Balsam Lake, Polk County  
April 27, and June 10, 2009**

Summary Statistics:	Pre	Post
Total number of points sampled	110	110
Total number of sites with vegetation	87	90
Total number of sites shallower than the maximum depth of plants	110	110
Frequency of occurrence at sites shallower than maximum depth of plants	79.09	81.82
Simpson Diversity Index	0.81	0.84
Maximum depth of plants (ft)	11.00	11.00
Number of sites sampled using rope rake (R)	0	0
Number of sites sampled using pole rake (P)	110	110
Average number of all species per site (shallower than max depth)	2.37	2.13
Average number of all species per site (veg. sites only)	3.00	2.60
Average number of native species per site (shallower than max depth)	1.81	1.95
Average number of native species per site (veg. sites only)	2.29	2.38
Species Richness	12	22
Species Richness (including visuals)	12	22

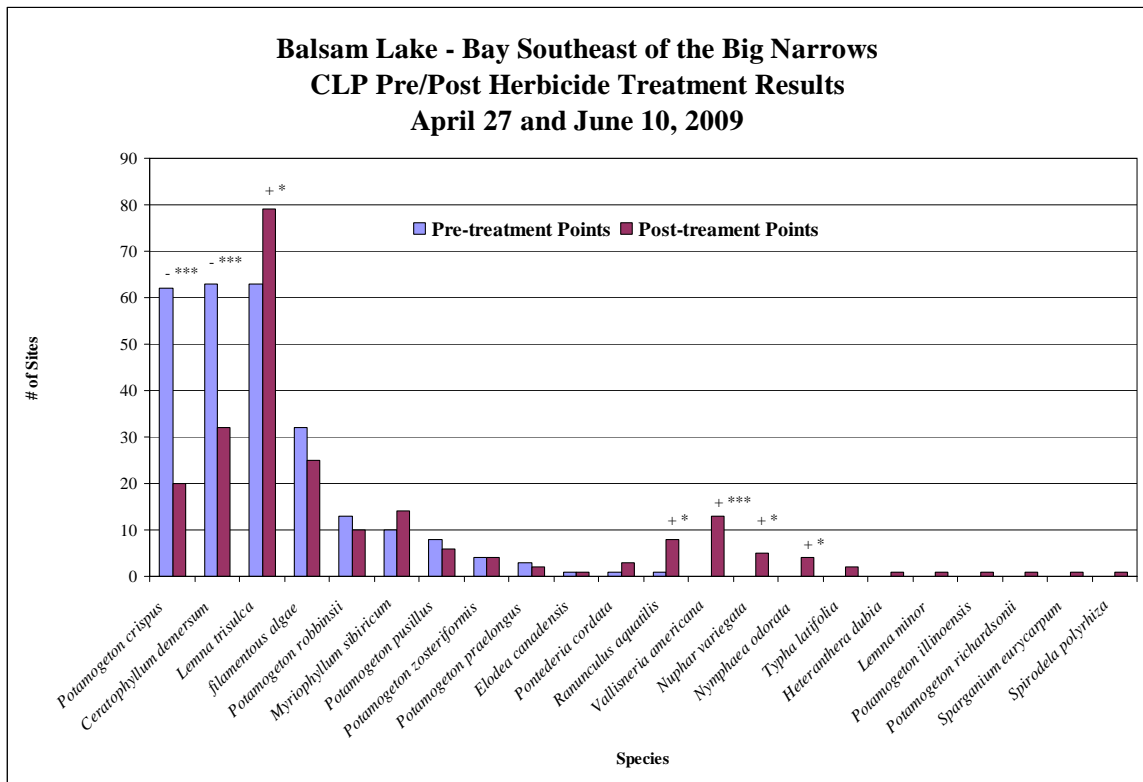


**Figure 20: Significant Changes in Rake Fullness Ratings for CLP in the Bay Southeast of the Big Narrows**





**Figure 21: Bay Southeast of Big Narrows Pre/Post Coontail Distribution**



Significant differences = \* p < .05, \*\* p < .01, \*\*\* p < .005

**Figure 22: Significant Macrophyte Changes in the Bay Southeast of the Big Narrows**

**Table 9: Frequencies and Mean Rake Sample of Aquatic Macrophytes  
Pretreatment Survey Bay Southeast of the Big Narrows – East Balsam Lake, Polk County  
April 27, 2009**

Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake
<i>Ceratophyllum demersum</i>	Coontail	63	72.41	57.27	24.14	1.90
<i>Lemna trisulca</i>	Forked duckweed	63	72.41	57.27	24.14	2.13
<i>Potamogeton crispus</i>	Curly-leaf pondweed	62	71.26	56.36	23.75	1.85
	Filamentous algae	32	36.78	29.09	12.26	2.16
<i>Potamogeton robbinsii</i>	Robbins pondweed	13	14.94	11.82	4.98	1.77
<i>Myriophyllum sibiricum</i>	Northern water milfoil	10	11.49	9.09	3.83	1.10
<i>Potamogeton pusillus</i>	Small pondweed	8	9.20	7.27	3.07	1.13
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	4	4.60	3.64	1.53	1.00
<i>Potamogeton praelongus</i>	White-stem pondweed	3	3.45	2.73	1.15	1.33
<i>Elodea canadensis</i>	Common waterweed	1	1.15	0.91	0.38	1.00
<i>Pontederia cordata</i>	Pickeralweed	1	1.15	0.91	0.38	3.00
<i>Ranunculus aquatilis</i>	Stiff water crowfoot	1	1.15	0.91	0.38	2.00

**Table 10: Frequencies and Mean Rake Sample of Aquatic Macrophytes  
Post-Treatment Survey Bay Southeast of the Big Narrows – East Balsam Lake, Polk County  
June 10, 2009**

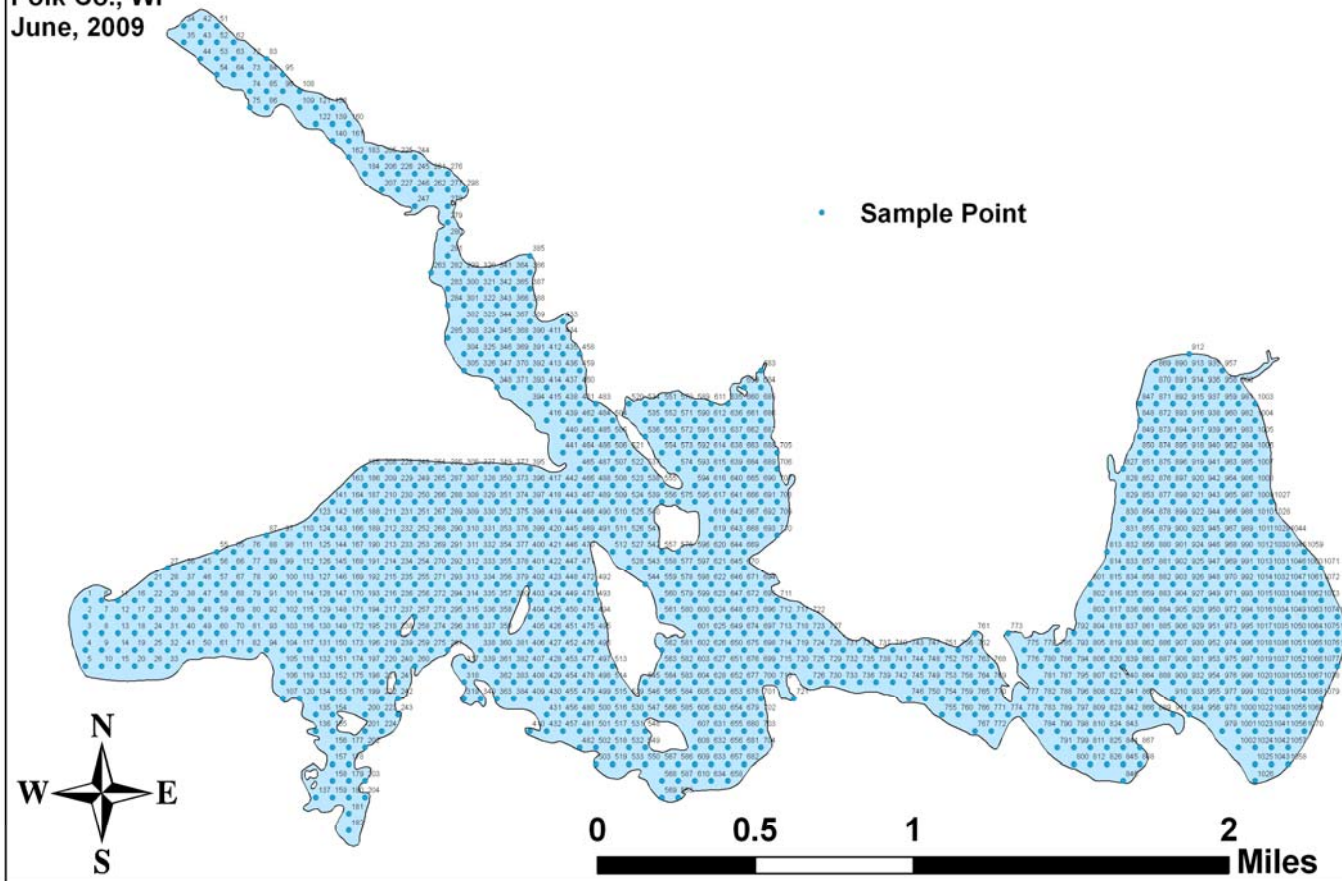
Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake
<i>Lemna trisulca</i>	Forked duckweed	79	33.76	87.78	71.82	2.43
<i>Ceratophyllum demersum</i>	Coontail	32	13.68	35.56	29.09	1.69
	Filamentous algae	25	10.68	27.78	22.73	2.28
<i>Potamogeton crispus</i>	Curly-leaf pondweed	20	8.55	22.22	18.18	1.15
<i>Myriophyllum sibiricum</i>	Northern water milfoil	14	5.98	15.56	12.73	1.36
<i>Vallisneria americana</i>	Wild celery	13	5.56	14.44	11.82	1.23
<i>Potamogeton robbinsii</i>	Robbins pondweed	10	4.27	11.11	9.09	1.70
<i>Ranunculus aquatilis</i>	Stiff water crowfoot	8	3.42	8.89	7.27	1.75
<i>Potamogeton pusillus</i>	Small pondweed	6	2.56	6.67	5.45	1.17
<i>Nuphar variegata</i>	Spatardock	5	2.14	5.56	4.55	1.00
<i>Nymphaea odorata</i>	White water lily	4	1.71	4.44	3.64	1.50
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	4	1.71	4.44	3.64	1.50
<i>Pontederia cordata</i>	Pickerelweed	3	1.28	3.33	2.73	2.67
<i>Potamogeton praelongus</i>	White-stem pondweed	2	0.85	2.22	1.82	1.00
<i>Typha latifolia</i>	Broad-leaved cattail	2	0.85	2.22	1.82	2.00
<i>Elodea canadensis</i>	Common waterweed	1	0.43	1.11	0.91	1.00
<i>Heteranthera dubia</i>	Water star-grass	1	0.43	1.11	0.91	1.00
<i>Lemna minor</i>	Small duckweed	1	0.43	1.11	0.91	1.00
<i>Potamogeton illinoensis</i>	Illinois pondweed	1	0.43	1.11	0.91	1.00
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	1	0.43	1.11	0.91	2.00
<i>Sparganium eurycarpum</i>	Common bur-reed	1	0.43	1.11	0.91	1.00
<i>Spirodela polyrhiza</i>	Large duckweed	1	0.43	1.11	0.91	1.00

## LITERATURE CITED

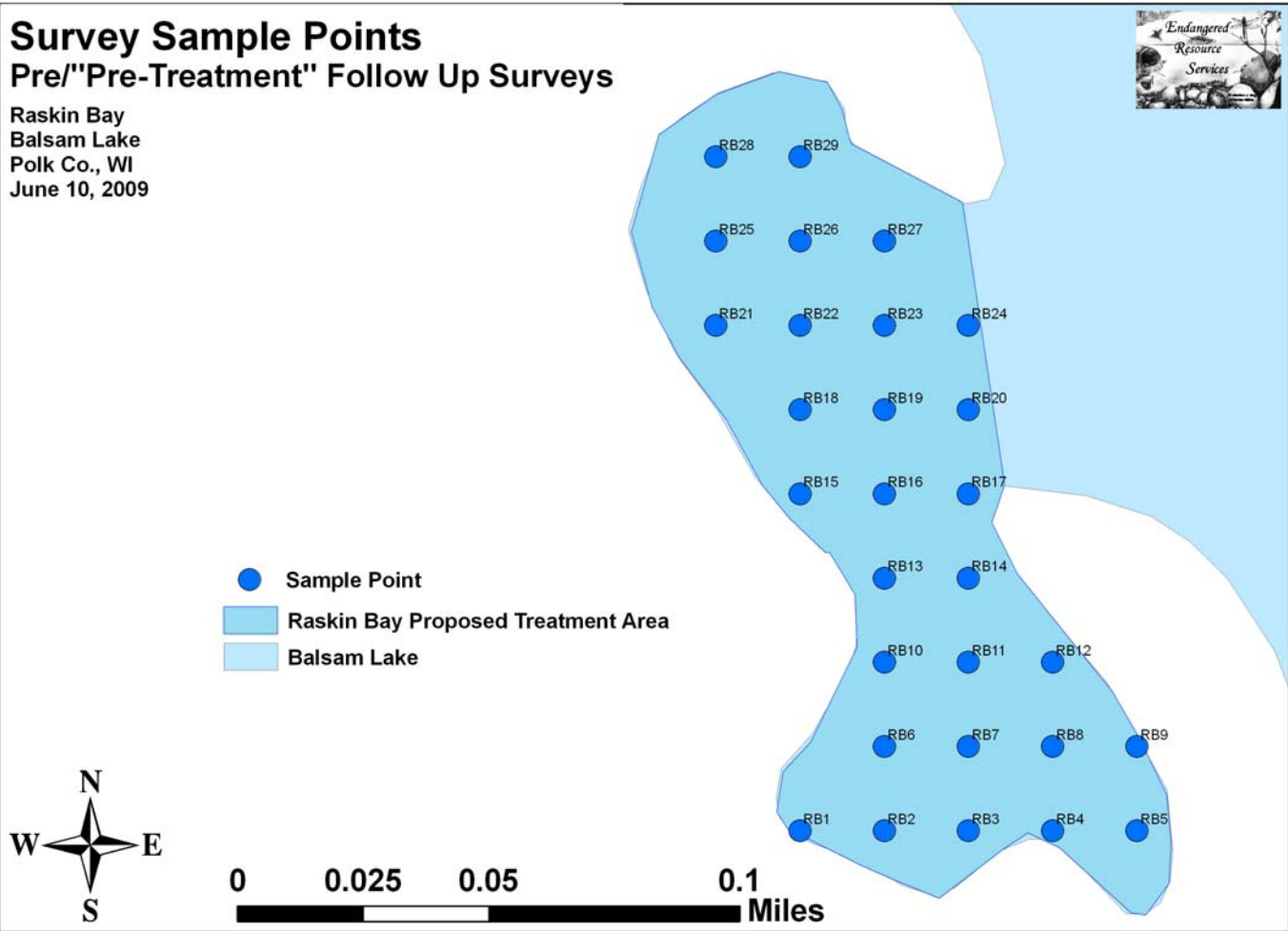
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**Appendix I: Balsam Lake Map with Survey Sample Points**

**Survey Sample Points**  
**Aquatic Macrophyte Distribution**  
**Balsam Lake**  
**Polk Co., WI**  
**June, 2009**



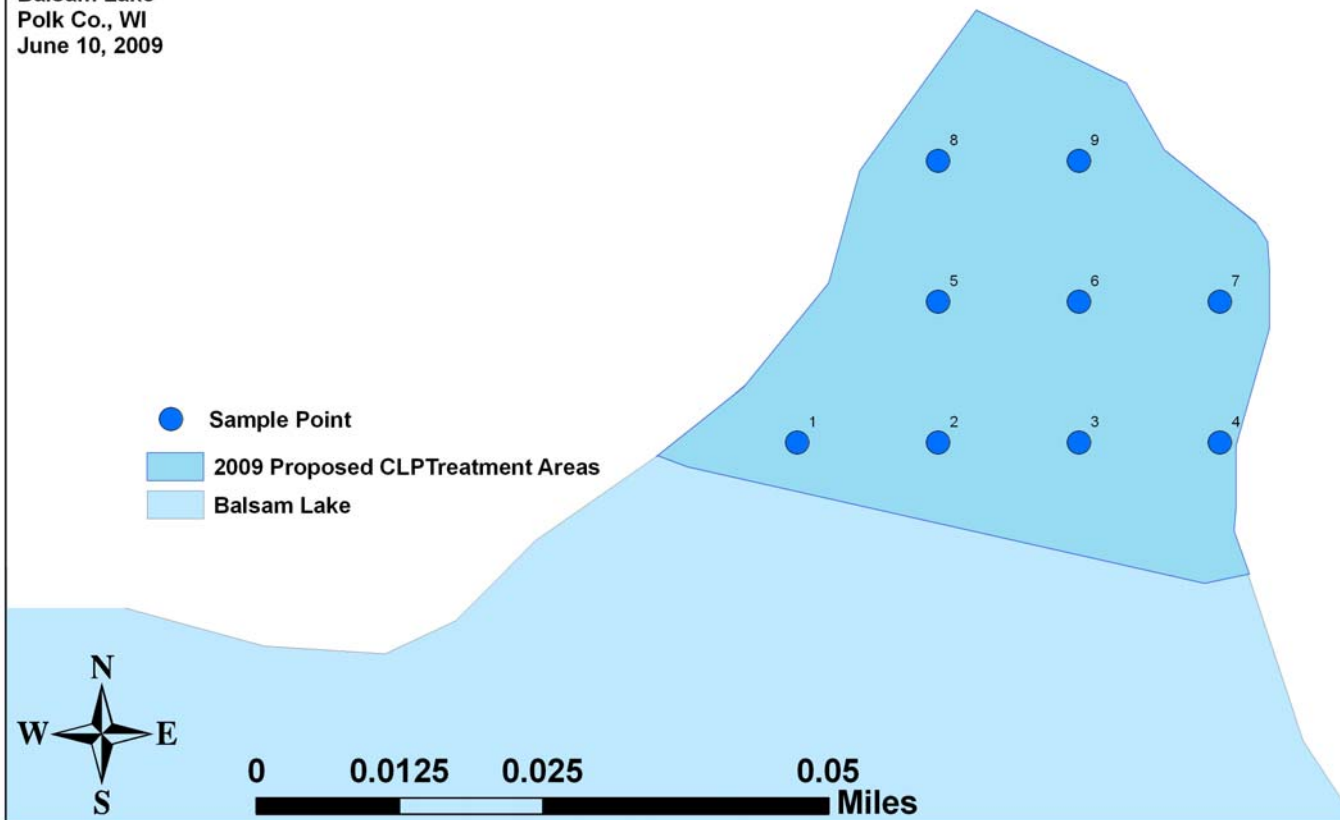
**Appendix II: CLP Pre/Post Survey Areas with Survey Sample Points**





# Survey Sample Points Pre/"Pre-Treatment" Follow Up Surveys

Bay Northwest of the Big Narrows  
Balsam Lake  
Polk Co., WI  
June 10, 2009

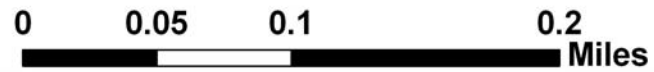


# Survey Sample Points Pre/Post Treatment Surveys

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



- Sample Point
- 2009 CLP Treatment Area
- Balsam Lake



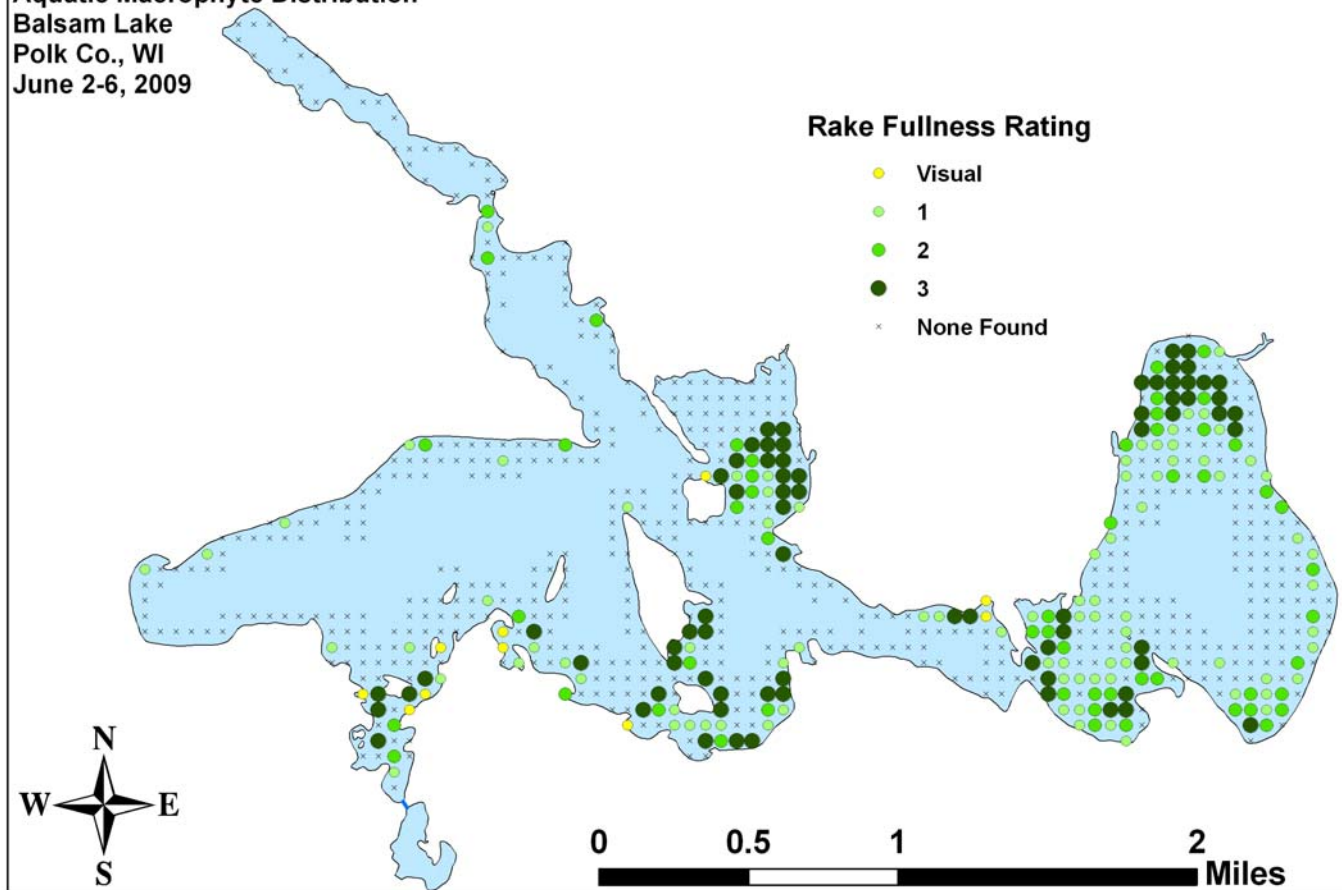
**Appendix III: Vegetative Survey Data Sheet**

Observers for this lake: names and hours worked by each:																										
Lake:		WBIC														County		Date:								
Site #	Depth (ft)	Muck (M), Sand (S), Rock (R)	Rake pole (P) or rake rope (R)	Total Rake Fullness	EWM	CLP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1																										
2																										
3																										
4																										
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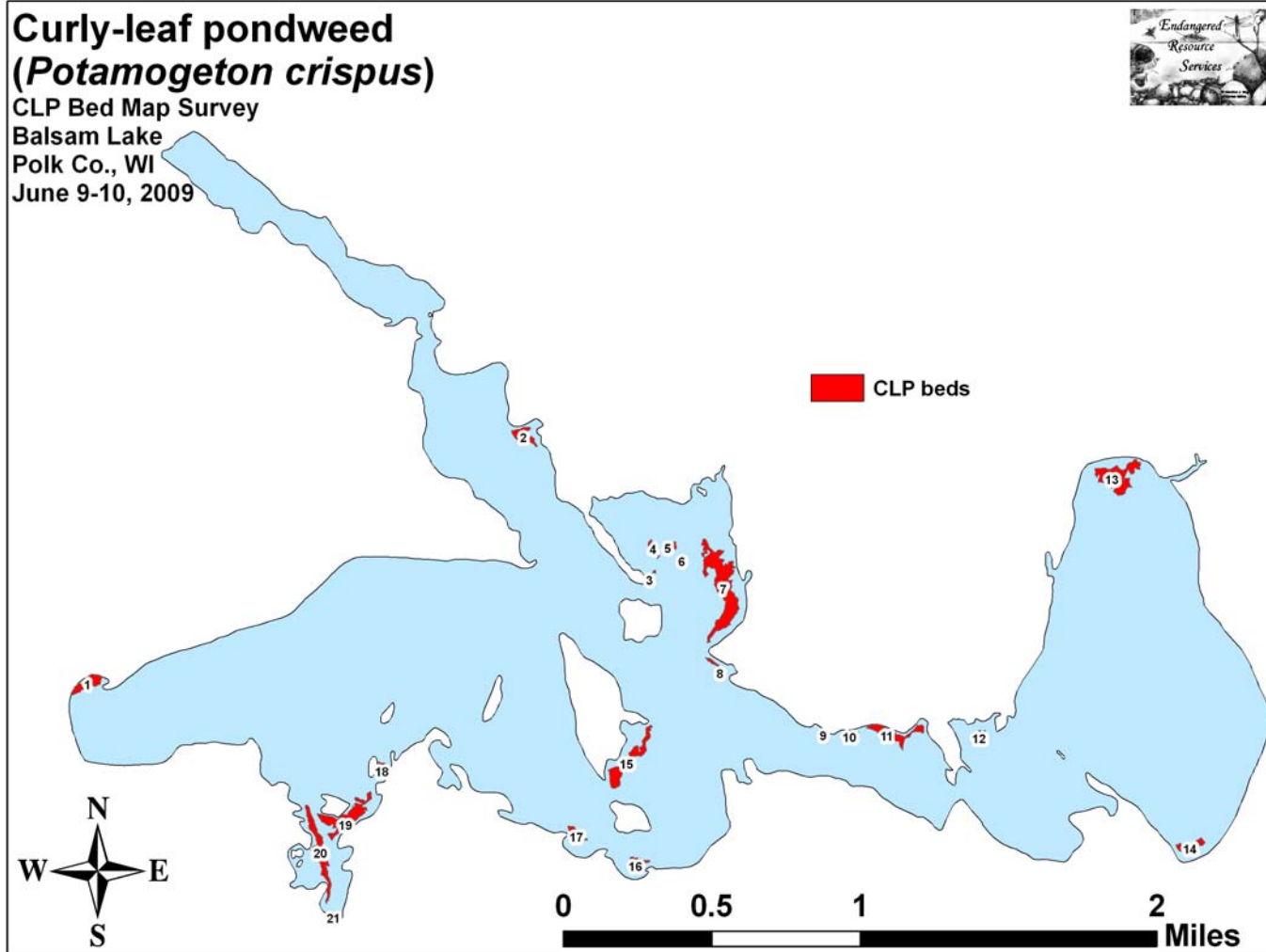
**Appendix IV: Balsam Lake CLP Density**

# Curly-leaf pondweed (*Potamogeton crispus*)

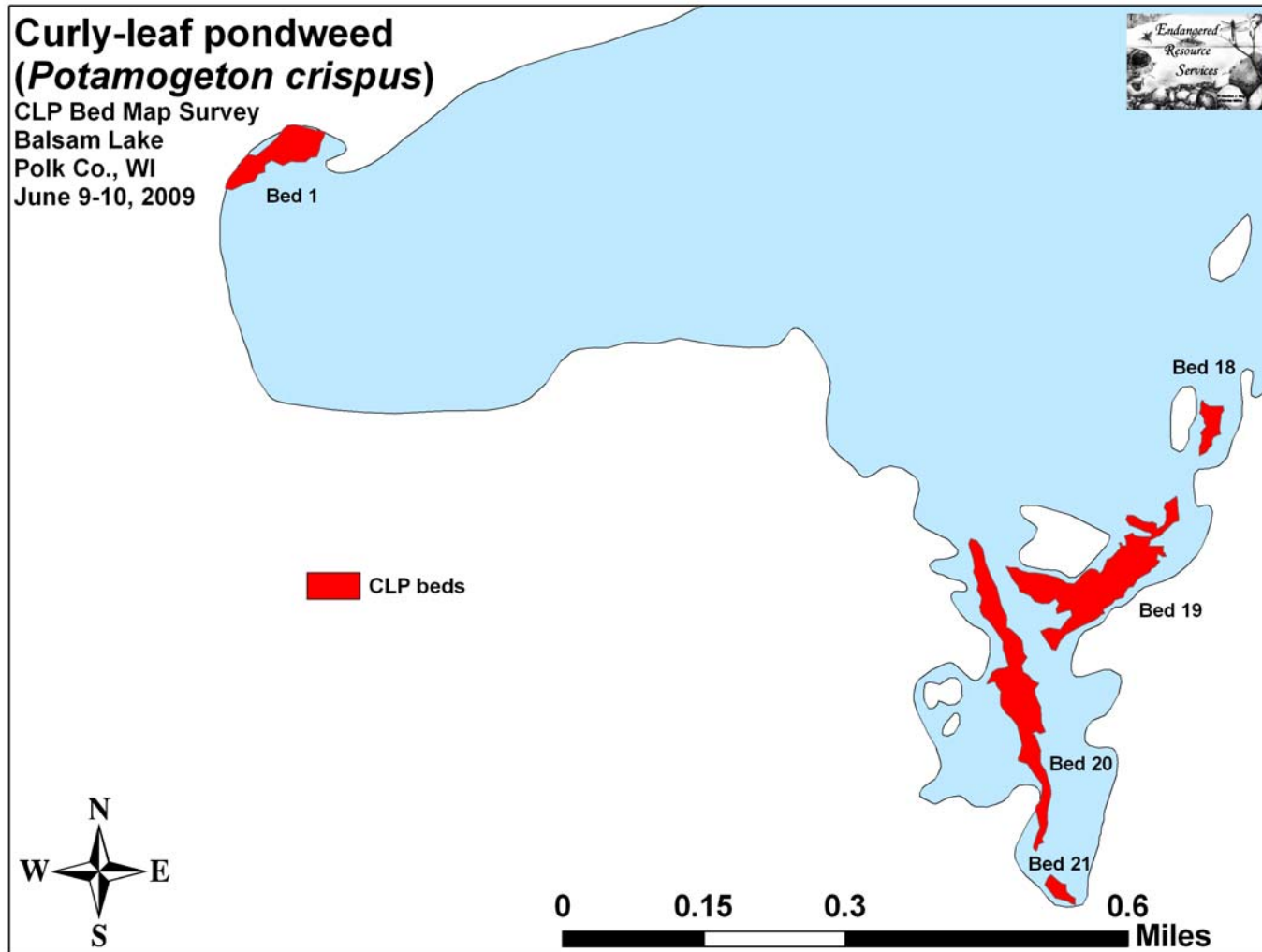
Aquatic Macrophyte Distribution  
Balsam Lake  
Polk Co., WI  
June 2-6, 2009

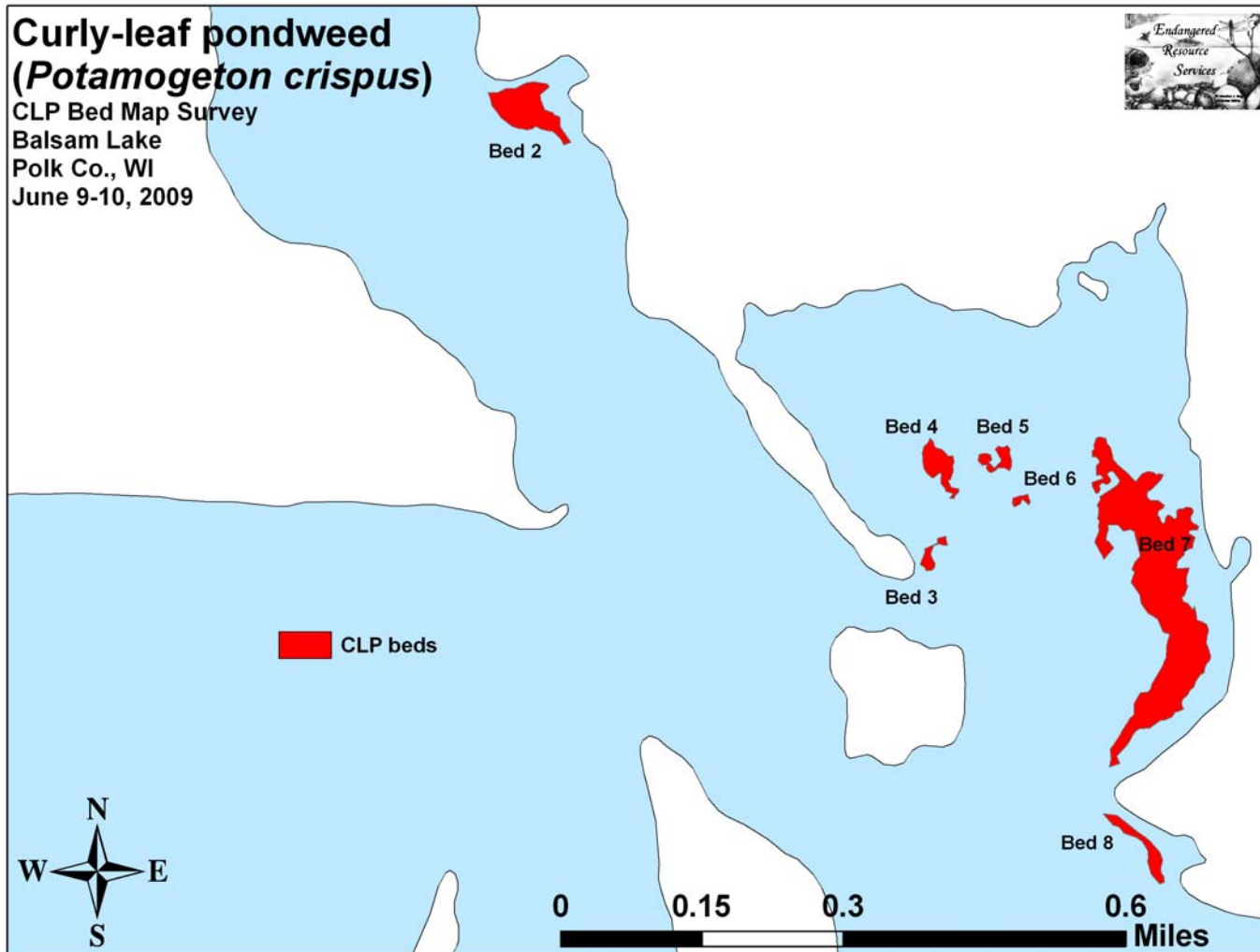


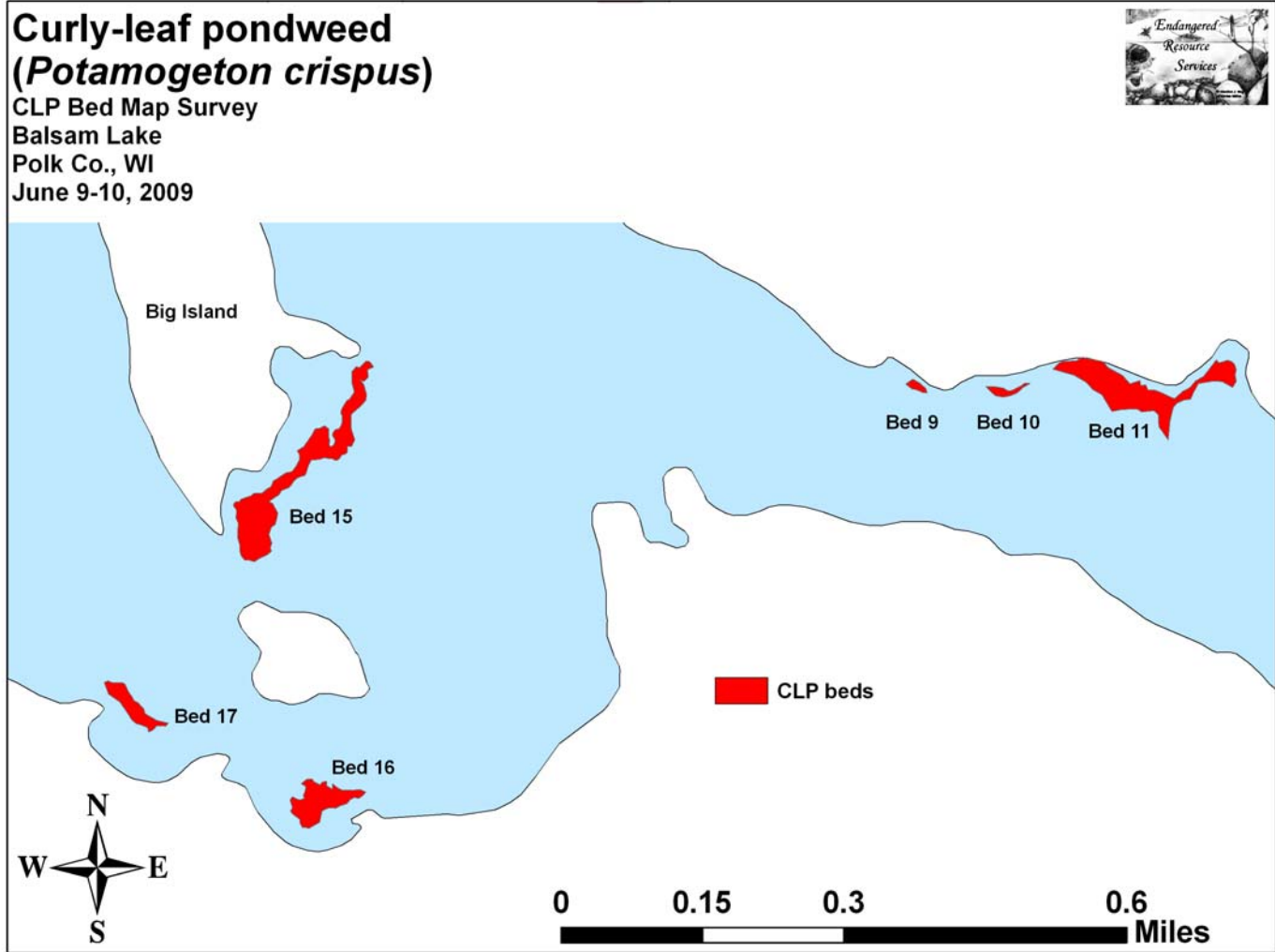
**Appendix V: Balsam Lake CLP Bed Maps**

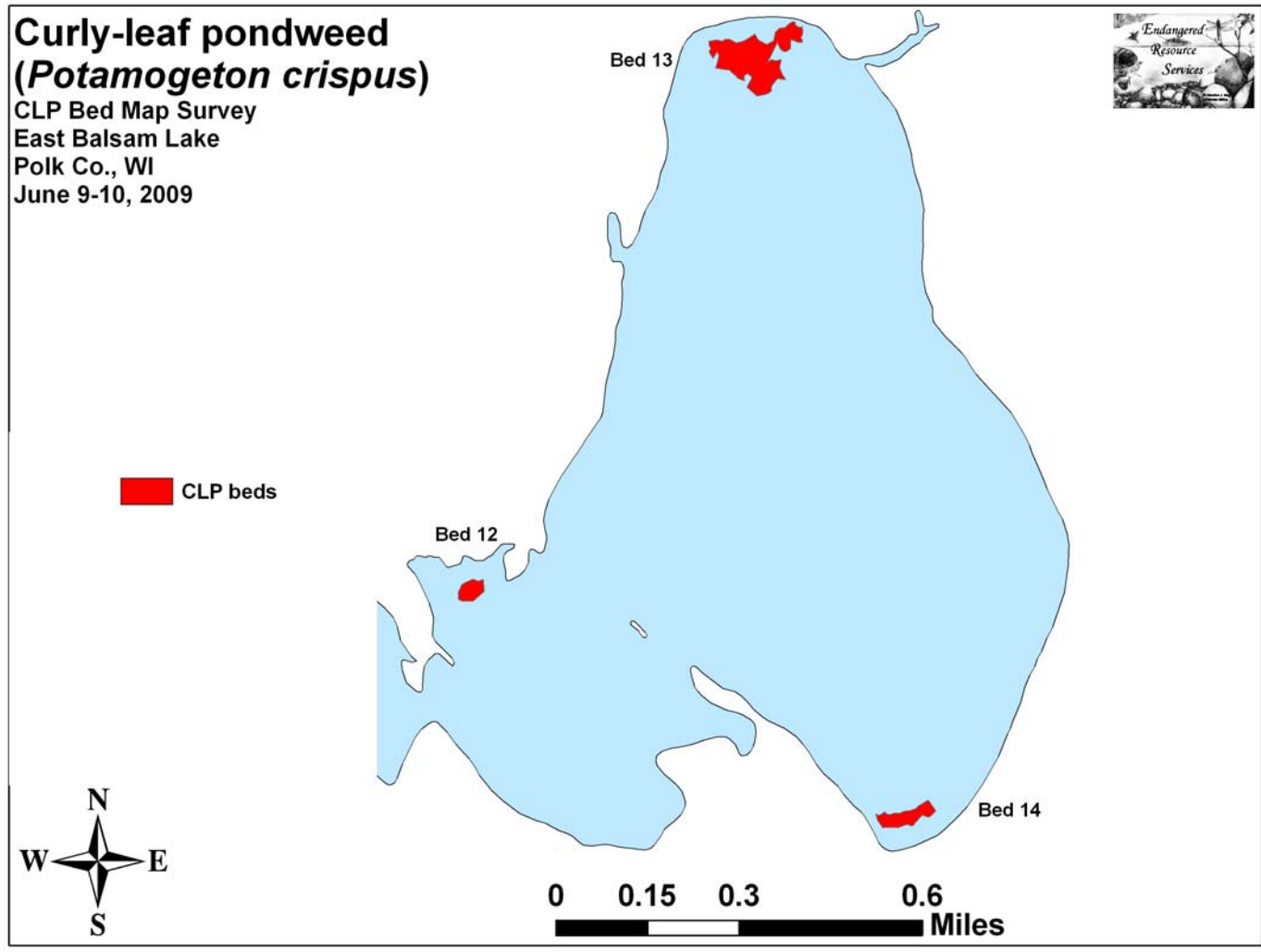




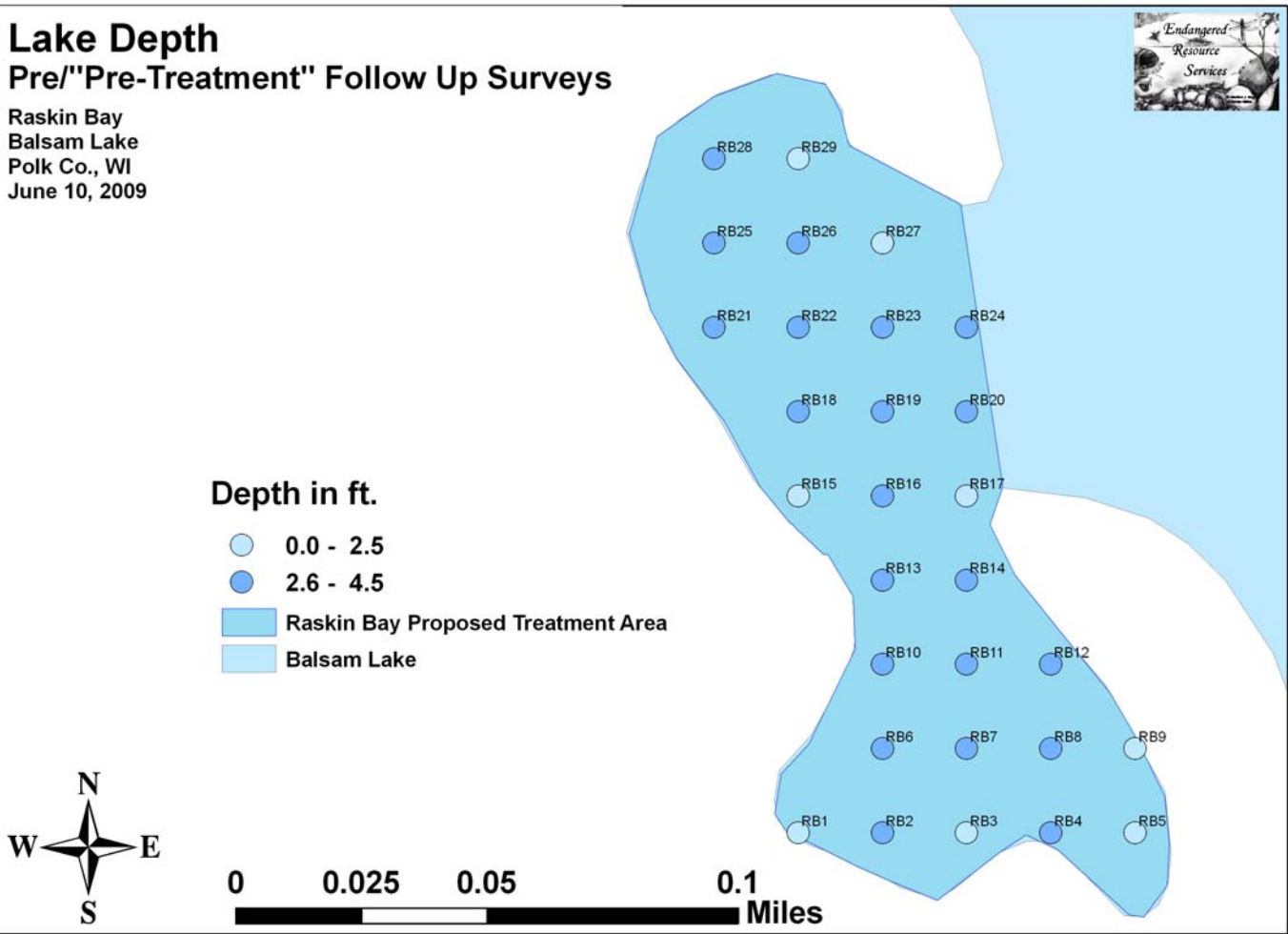


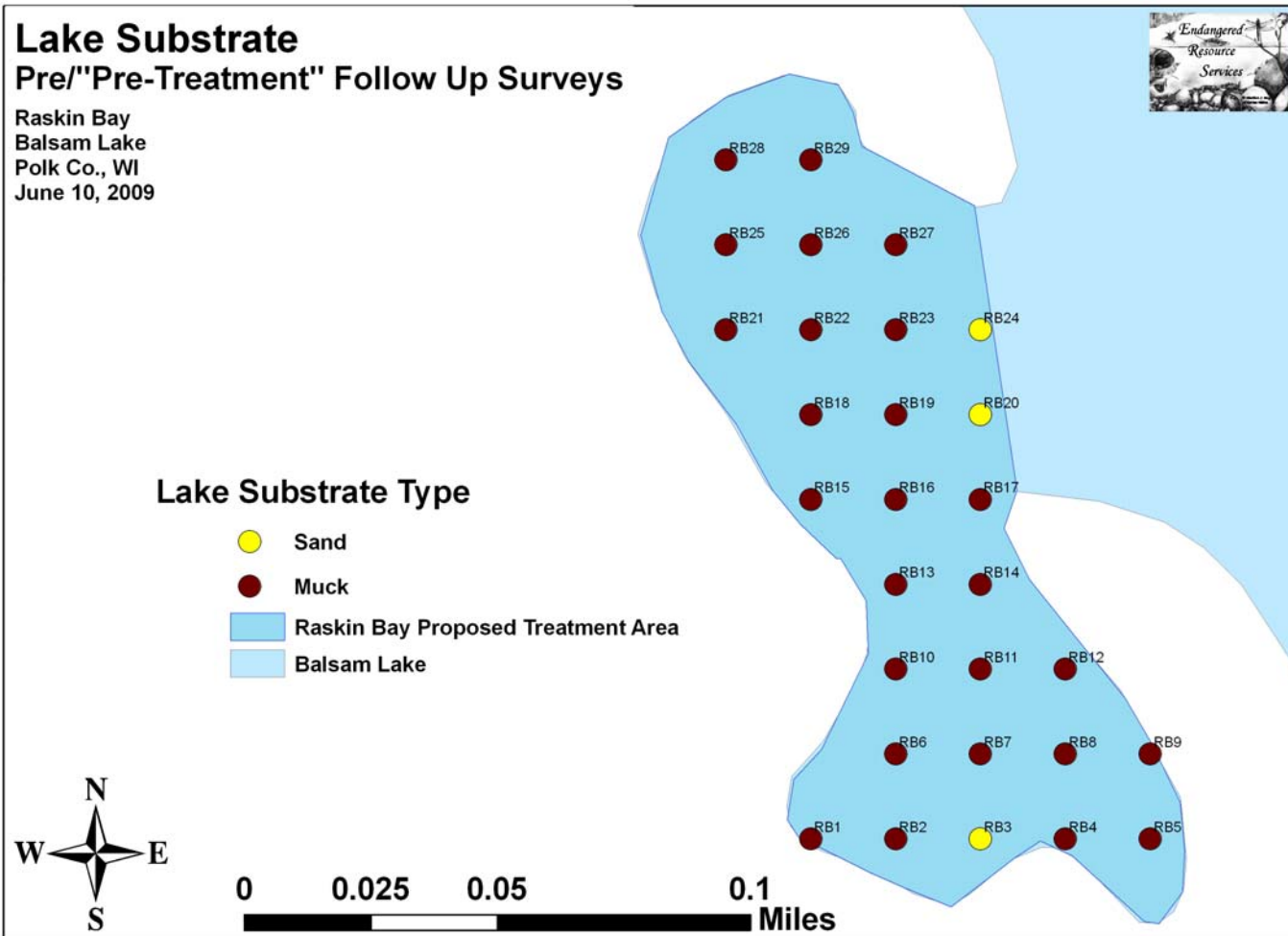


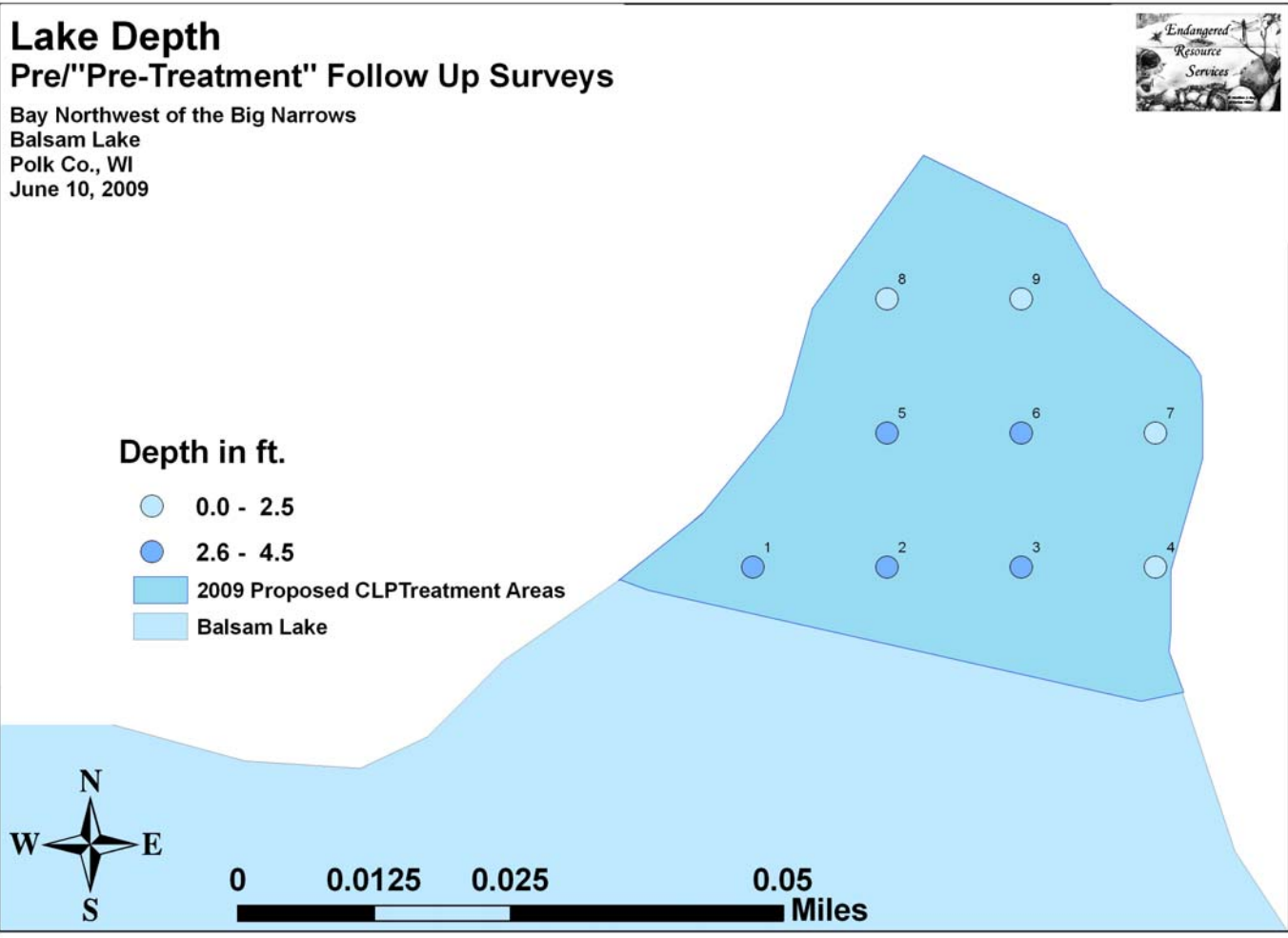




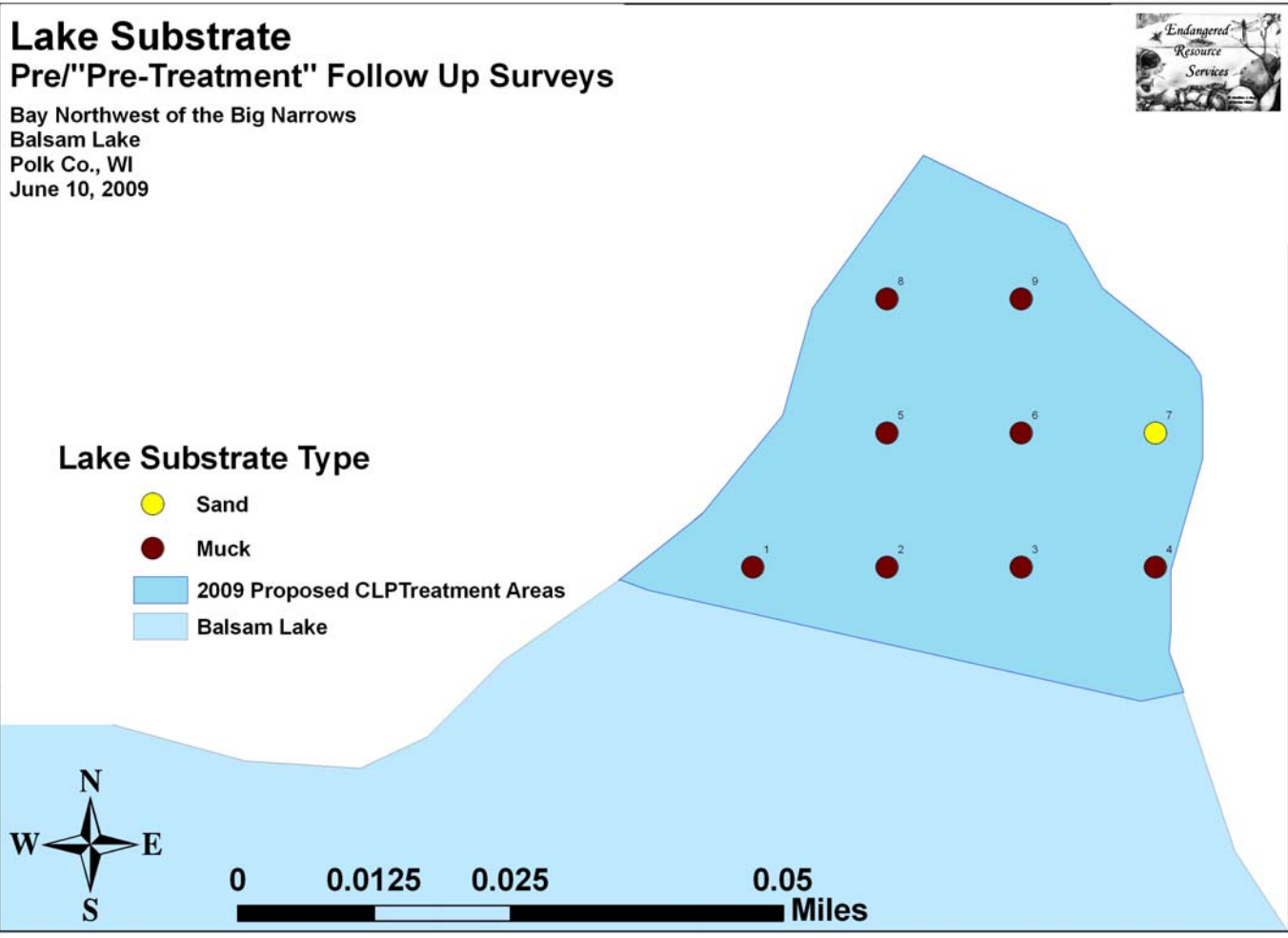
## **Appendix VI: Pre/Post Habitat Variable Maps**











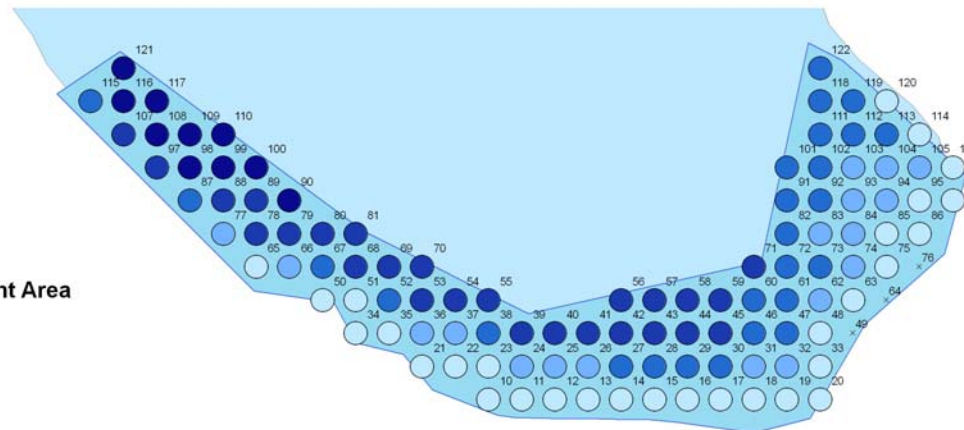
# Lake Depth Pre/Post Treatment Surveys

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Depth in ft.

- × On Land
- 0.0 - 2.5
- 2.6 - 4.5
- 4.6 - 6.5
- 6.6 - 8.5
- 8.6 - 11.0
- 2009 CLP Treatment Area
- Balsam Lake



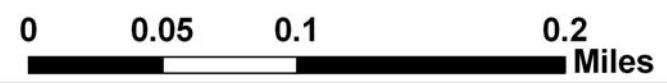
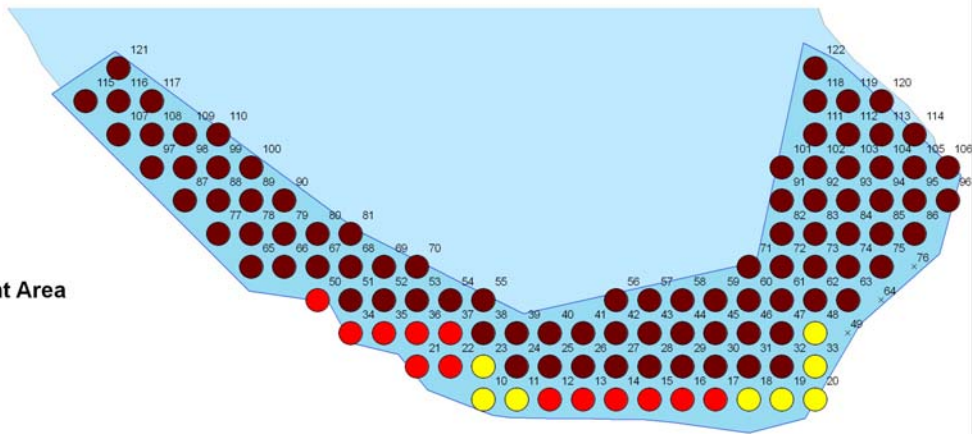
# Lake Substrate Pre/Post Treatment Surveys

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009

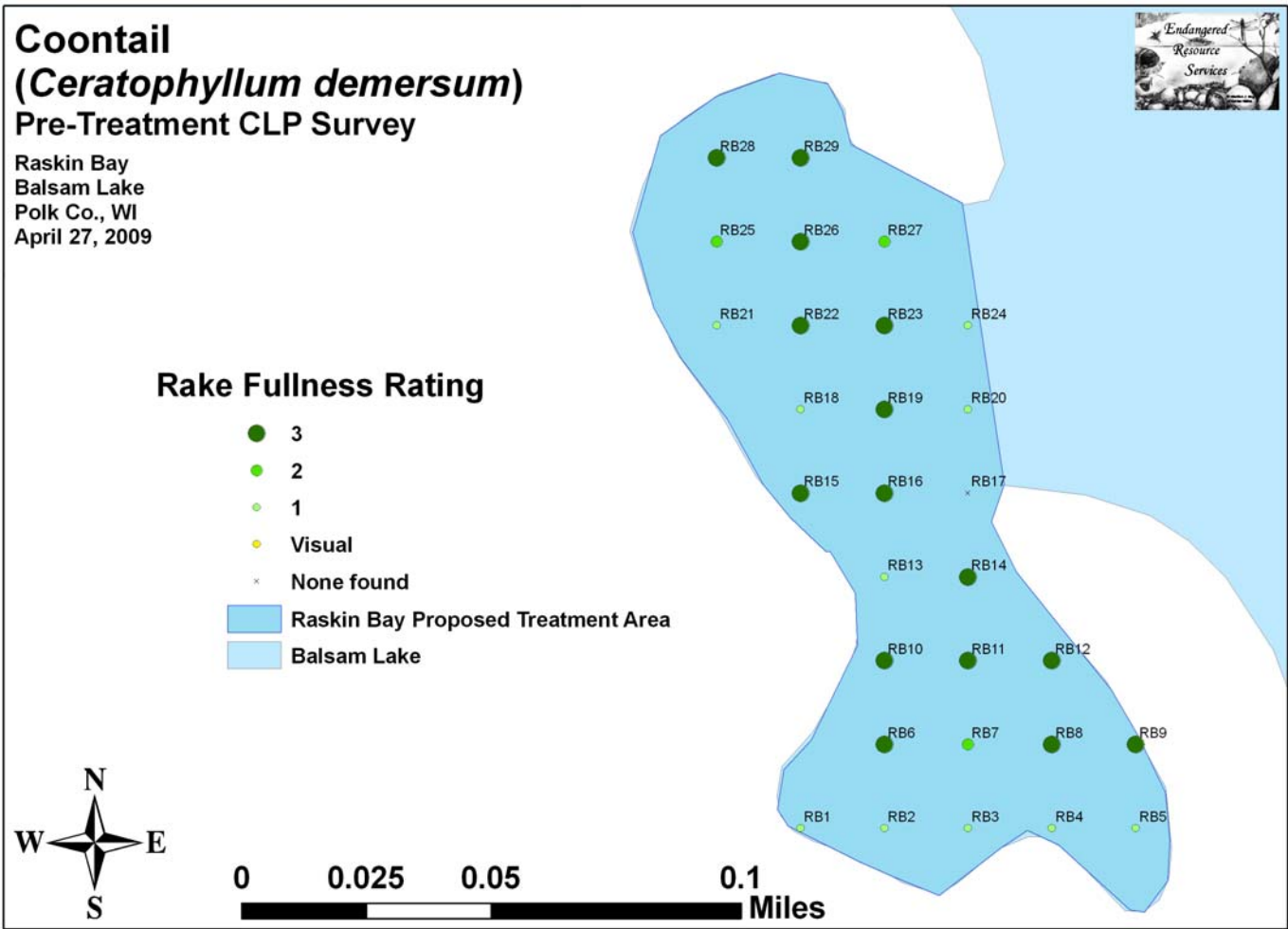


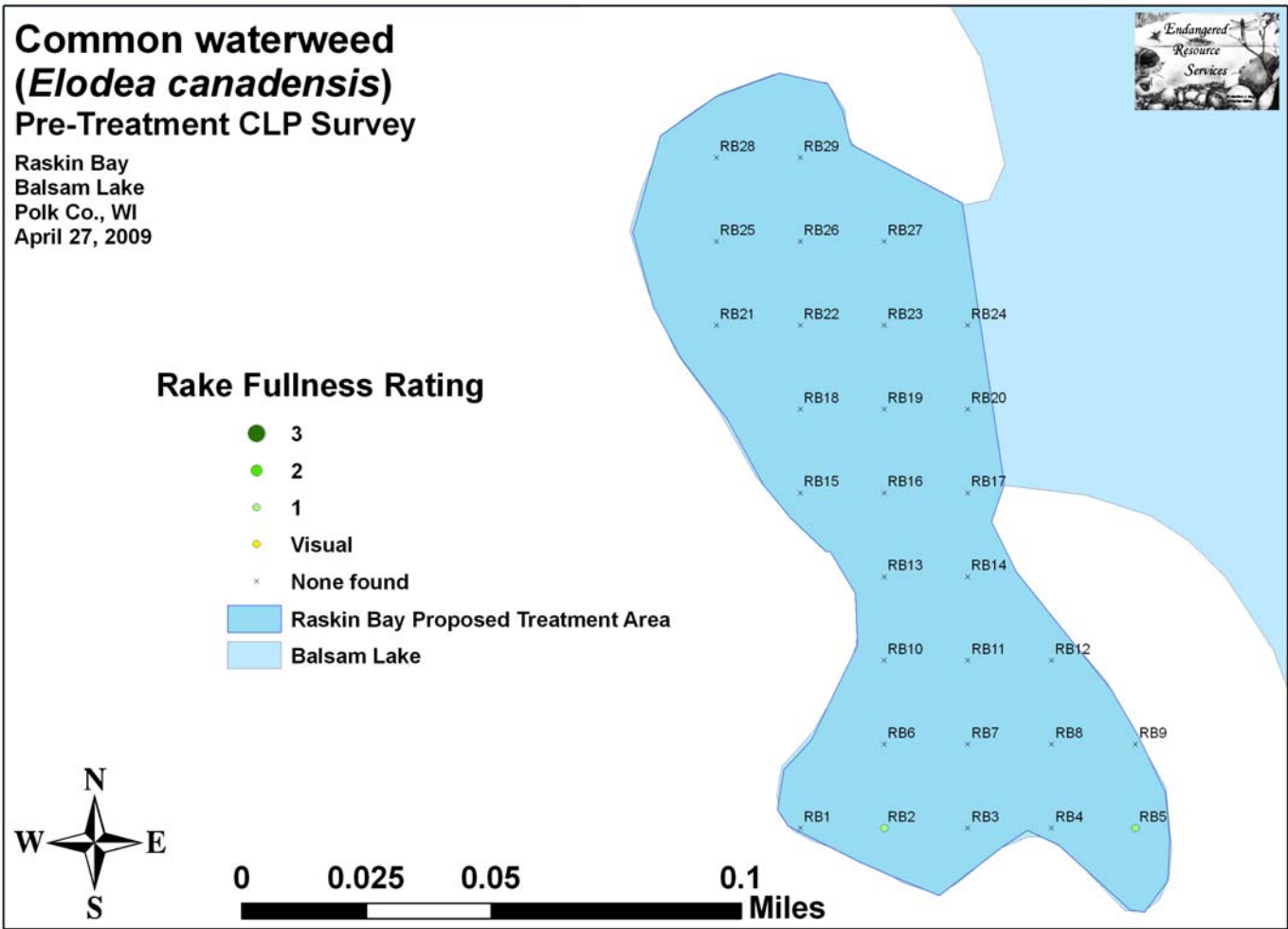
## Lake Substrate Type

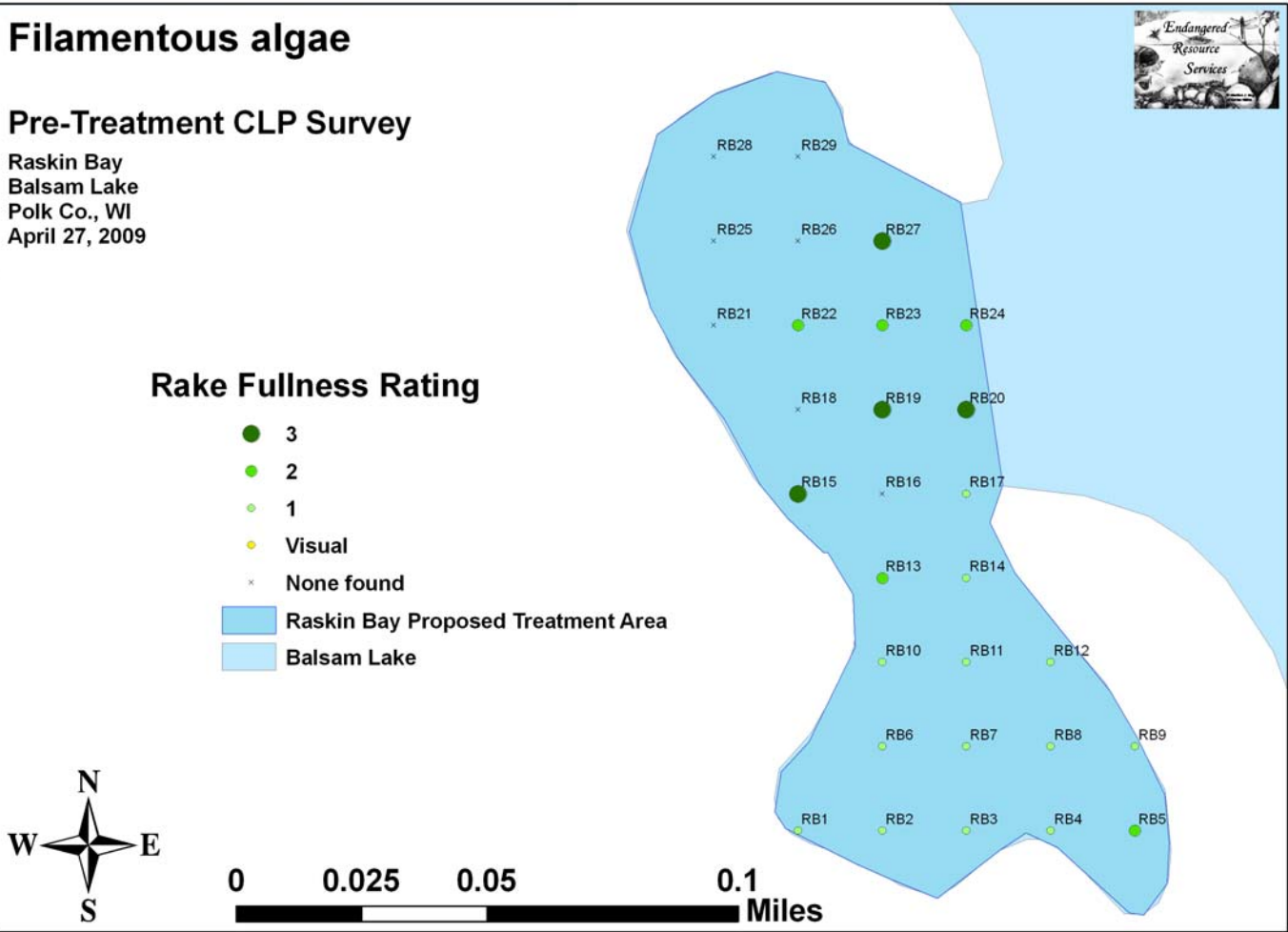
- × On Land
- Rock
- Sand
- Muck
- 2009 CLP Treatment Area
- Balsam Lake

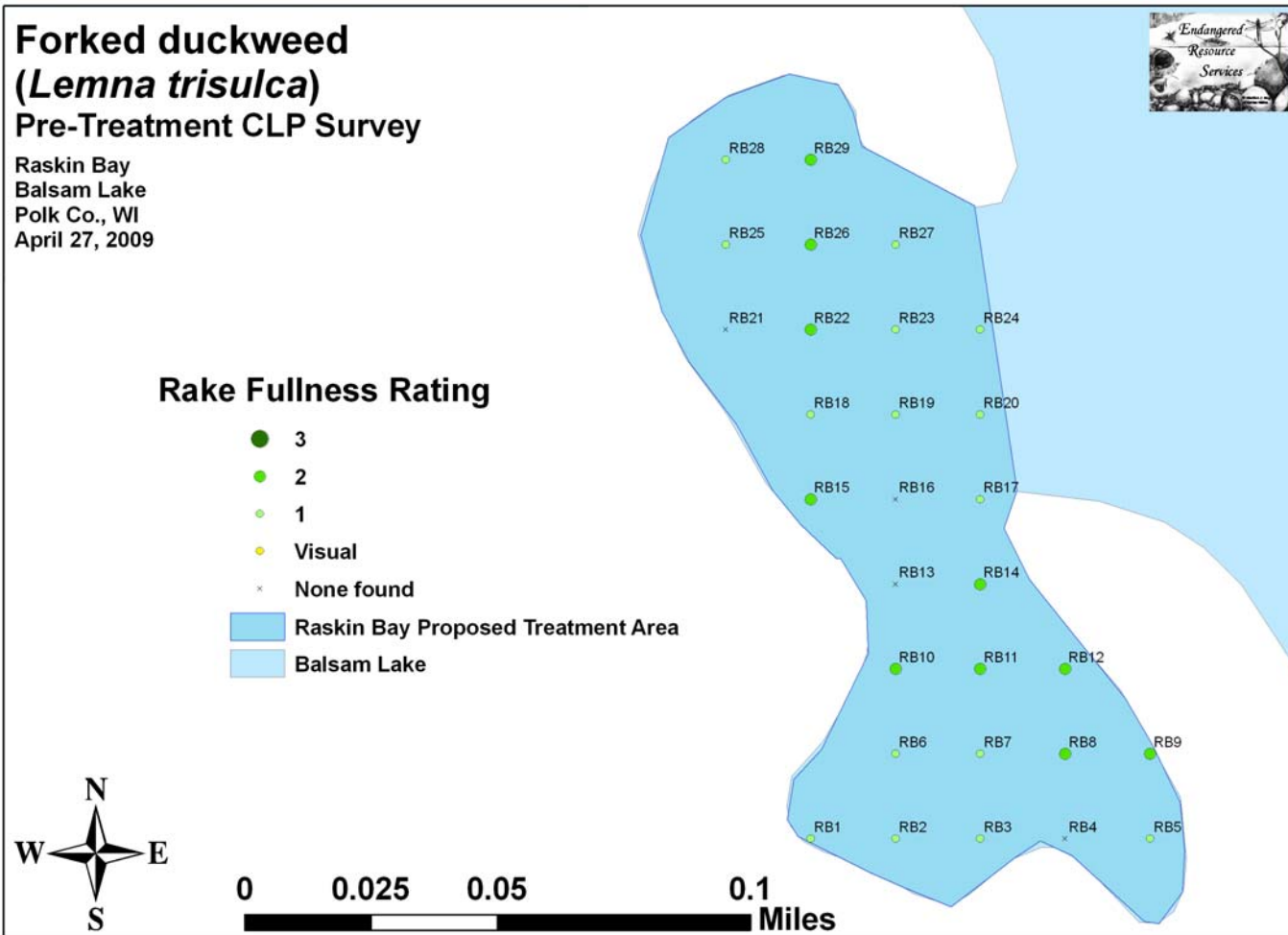


**Appendix VII: Raskin Bay Pretreatment Species Distribution Maps**

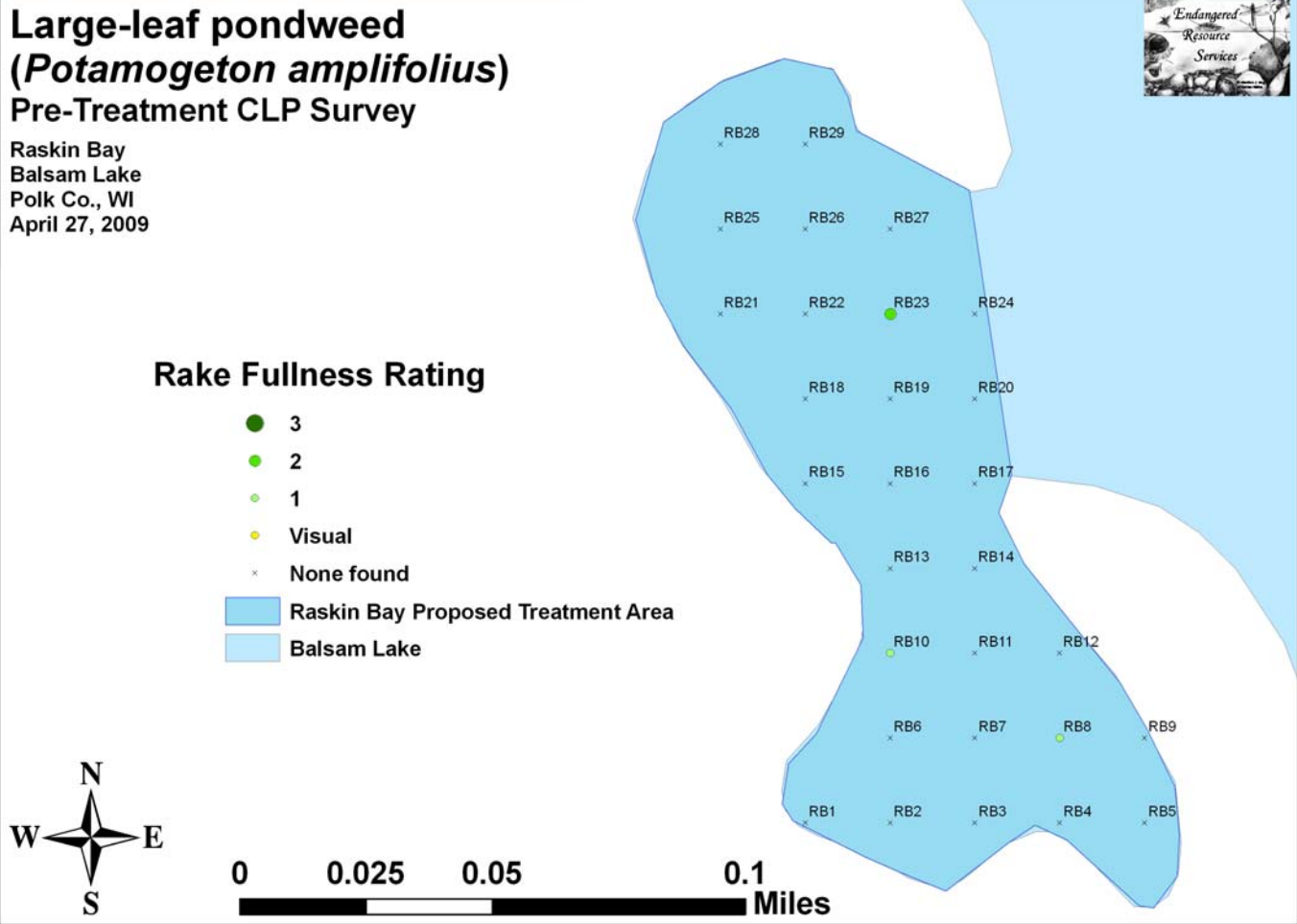


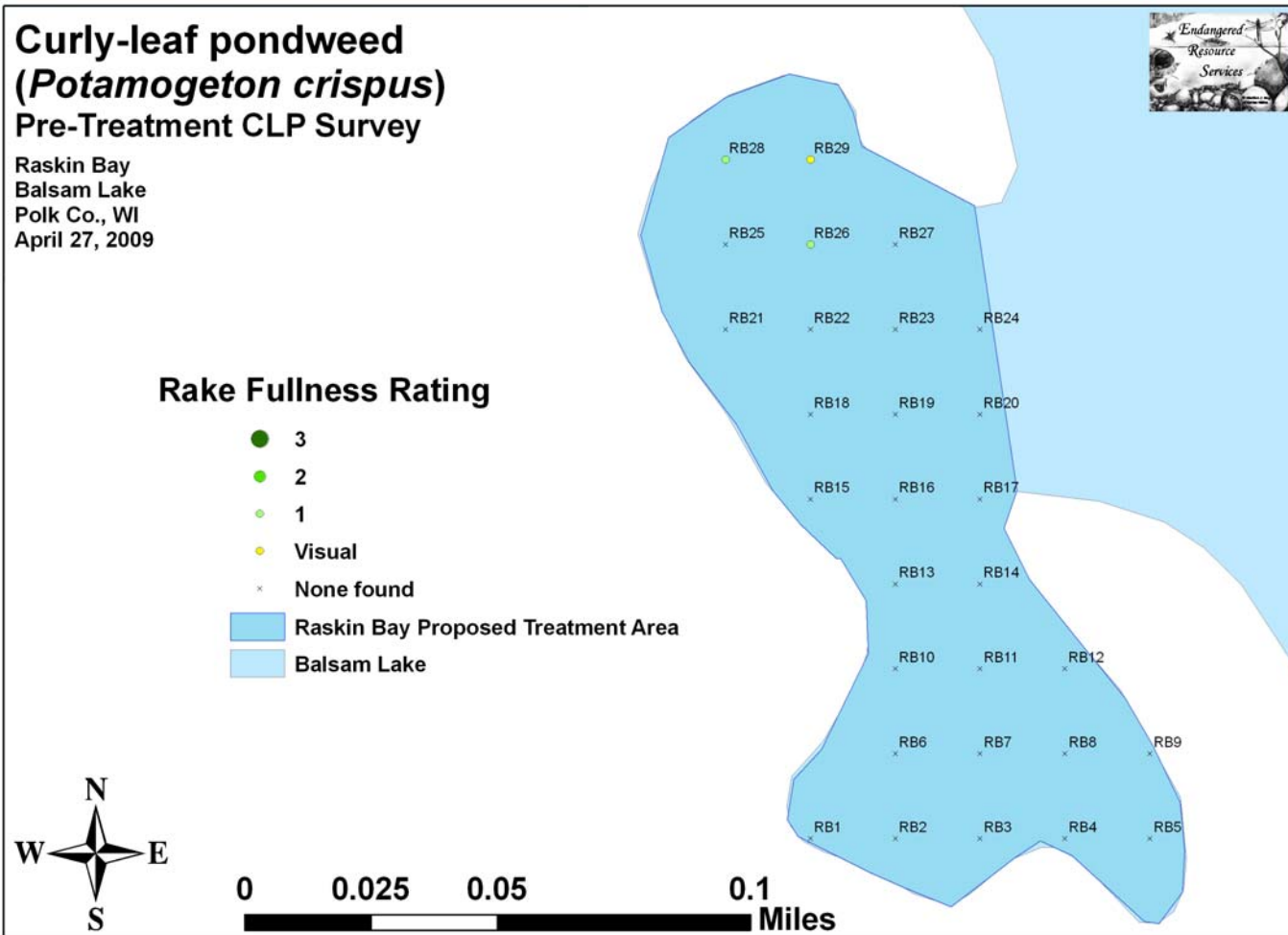


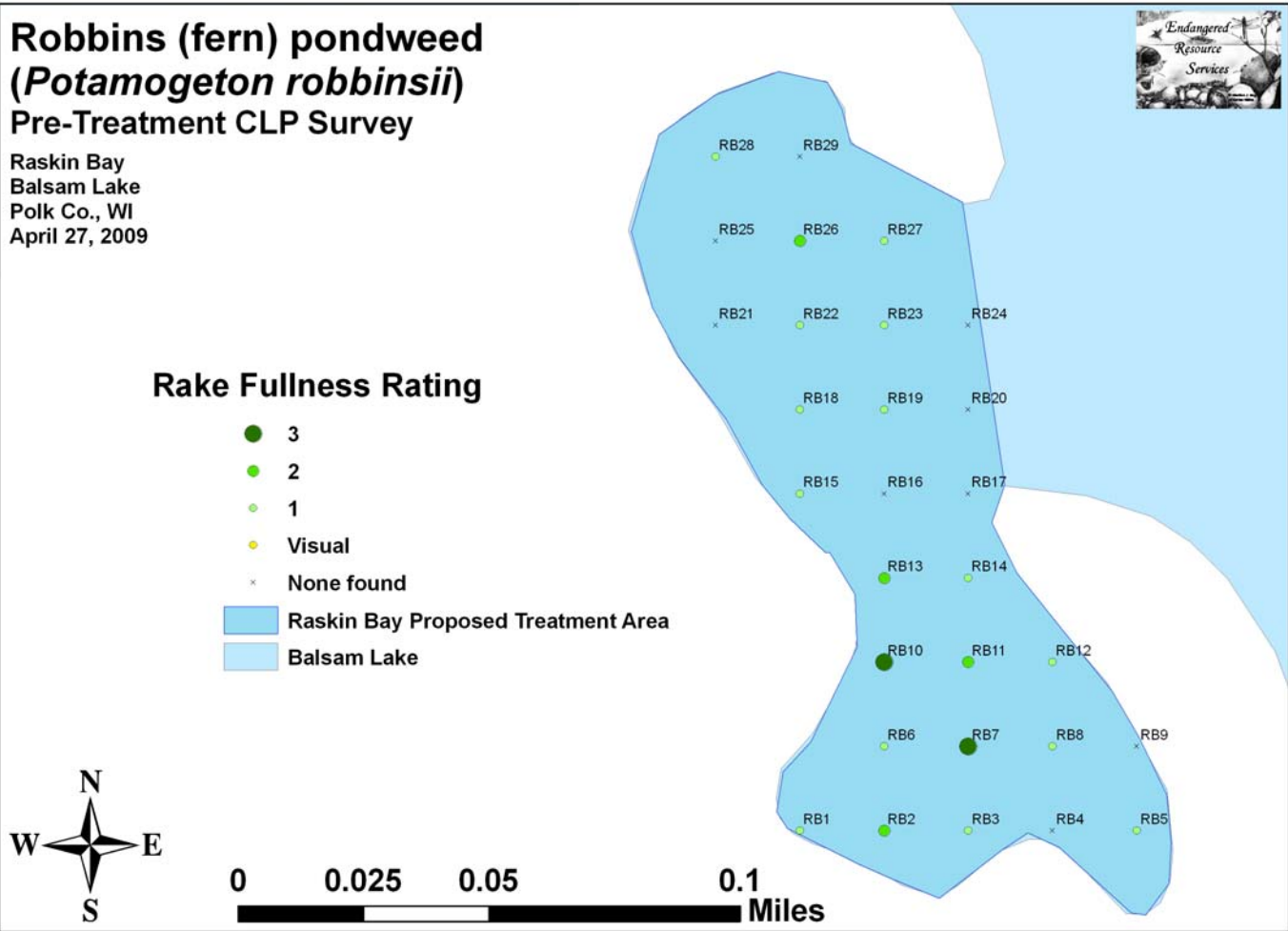




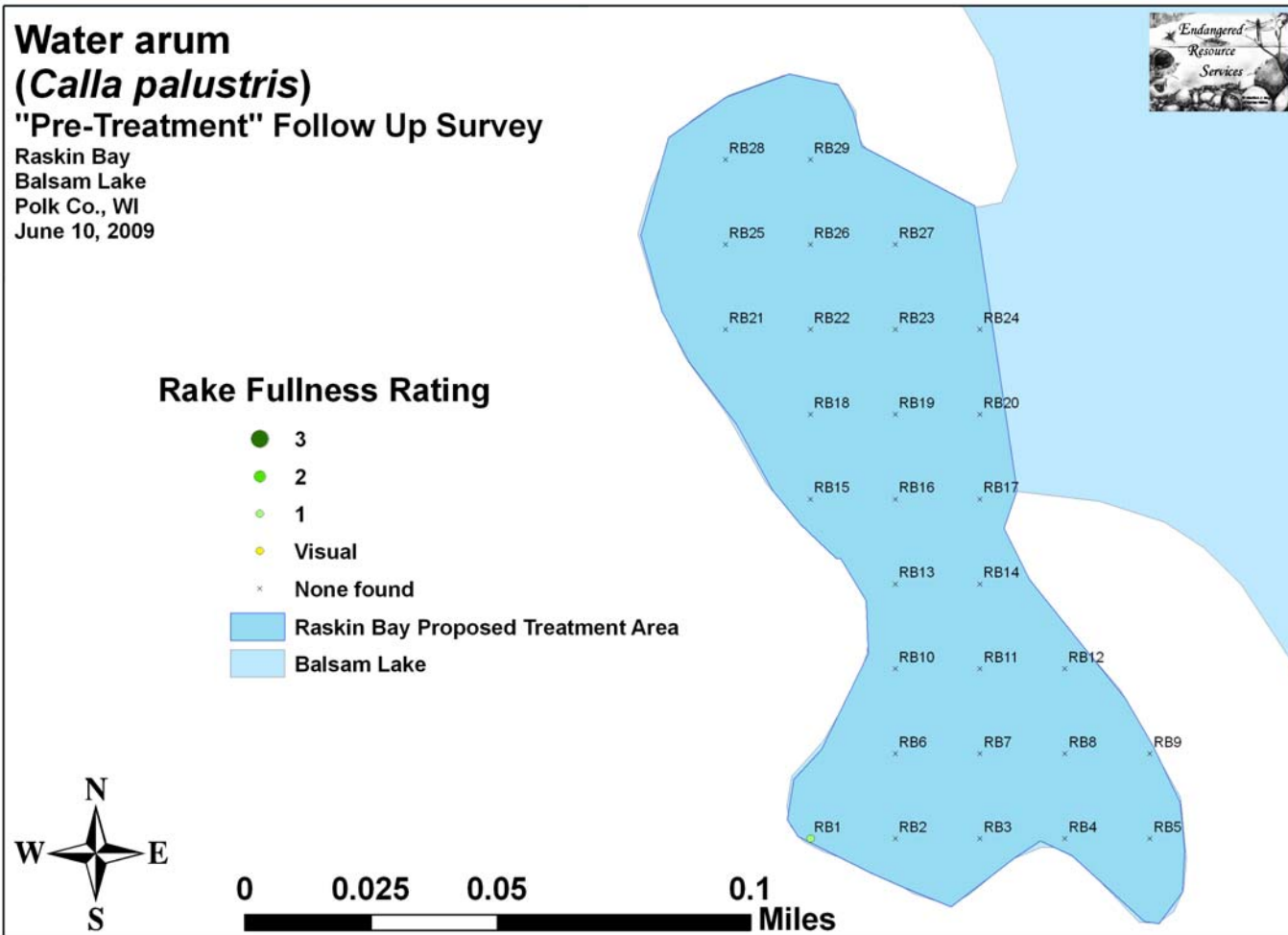








**Appendix VIII: Raskin Bay Follow Up Species Distribution Maps**



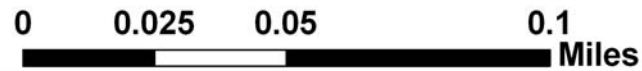
**Coontail**  
**(*Ceratophyllum demersum*)**  
**"Pre-Treatment" Follow Up Survey**

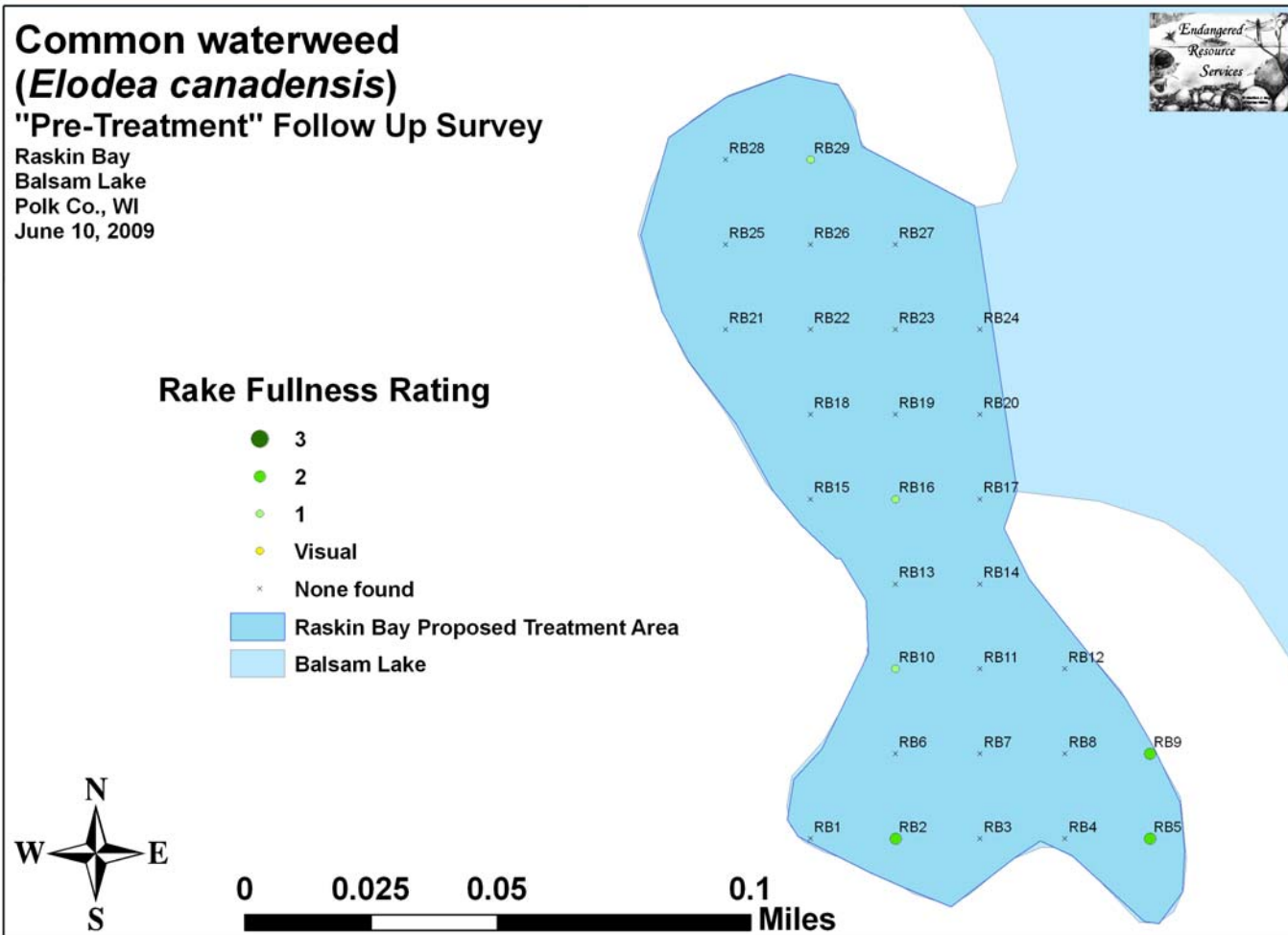
Raskin Bay  
 Balsam Lake  
 Polk Co., WI  
 June 10, 2009



**Rake Fullness Rating**

- 3
- 2
- 1
- Visual
- × None found
- Raskin Bay Proposed Treatment Area
- Balsam Lake





# Filamentous algae

## "Pre-Treatment" Follow Up Survey

Raskin Bay  
Balsam Lake  
Polk Co., WI  
June 10, 2009

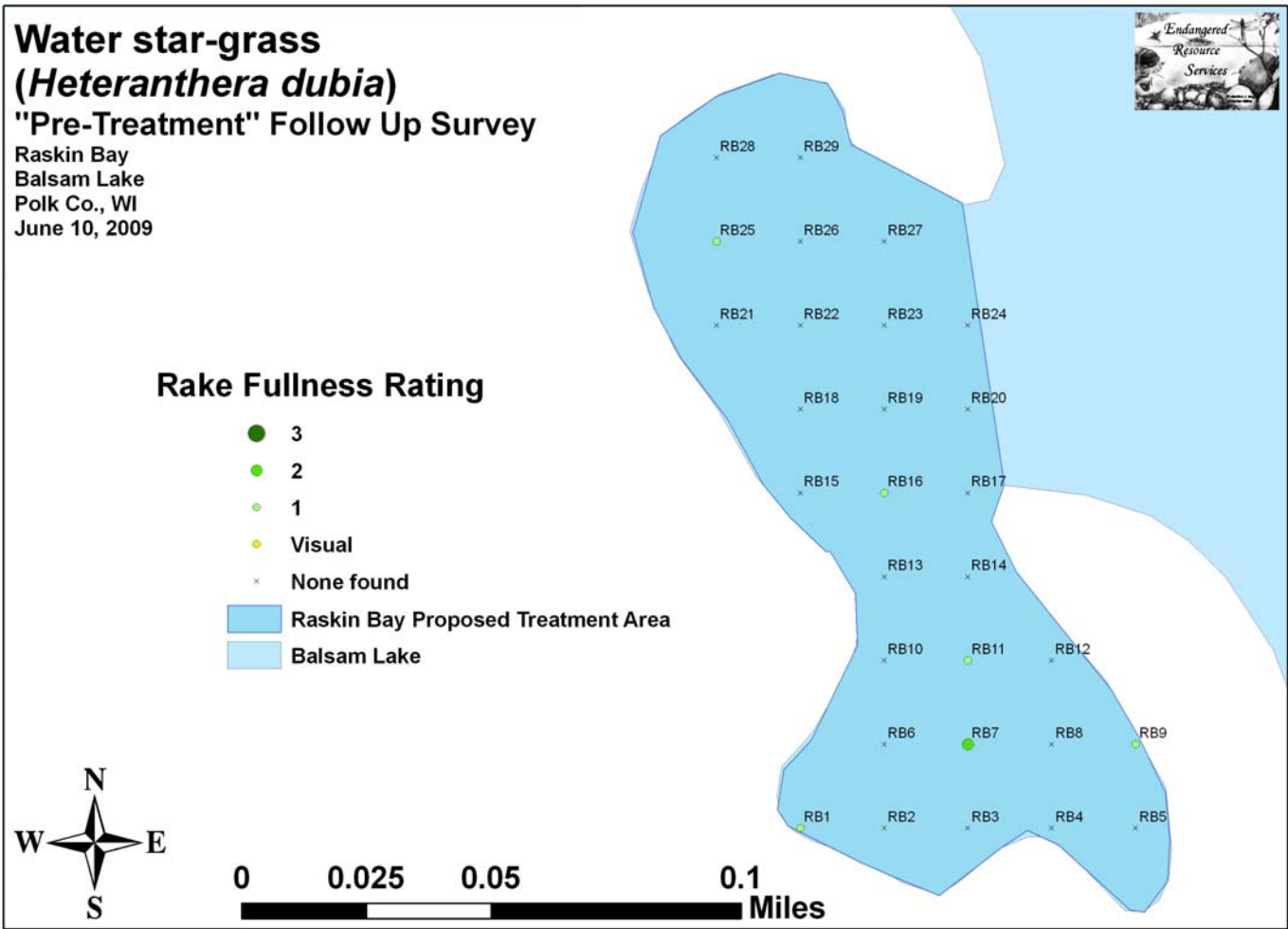


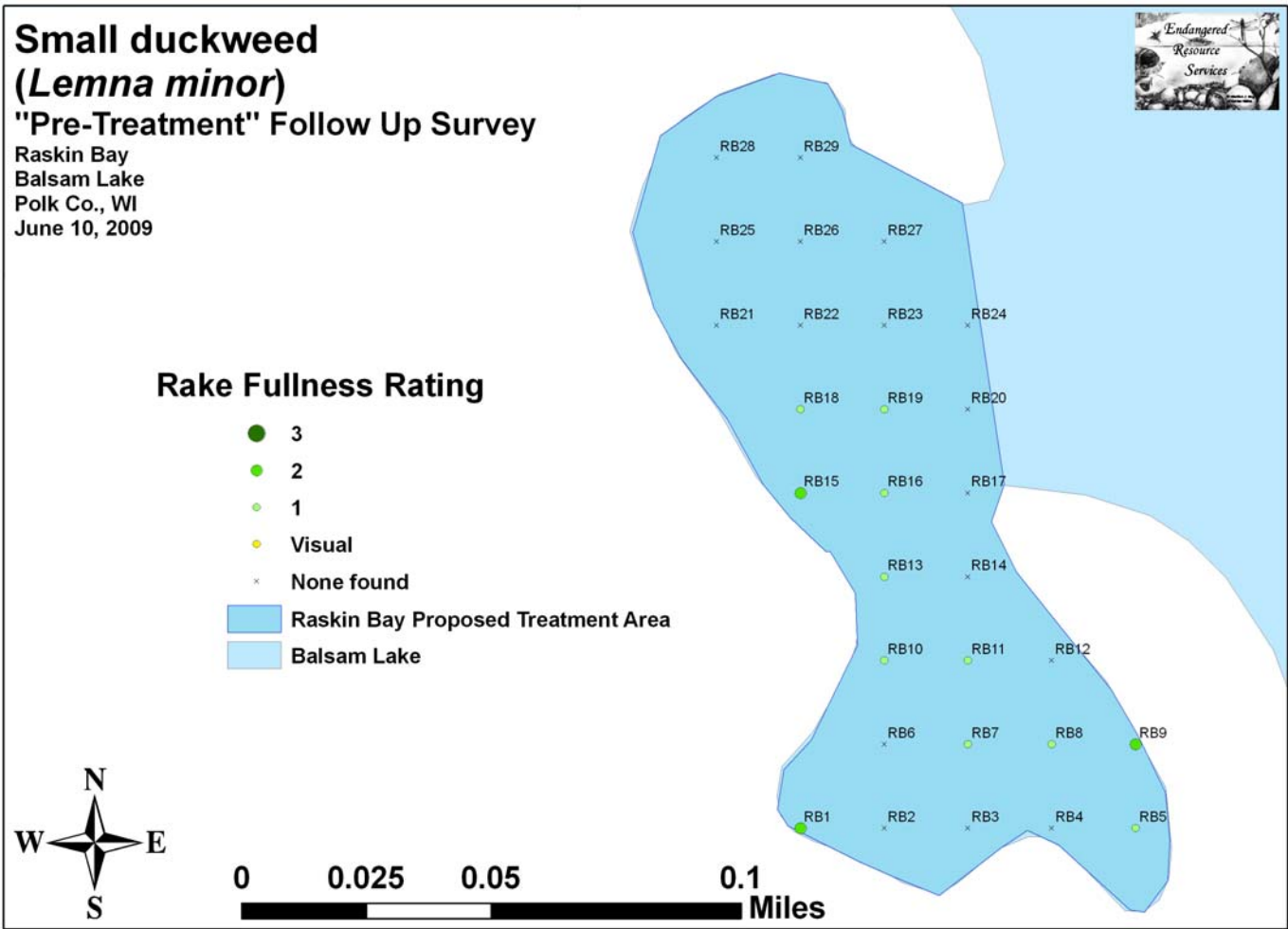
### Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- Raskin Bay Proposed Treatment Area
- Balsam Lake









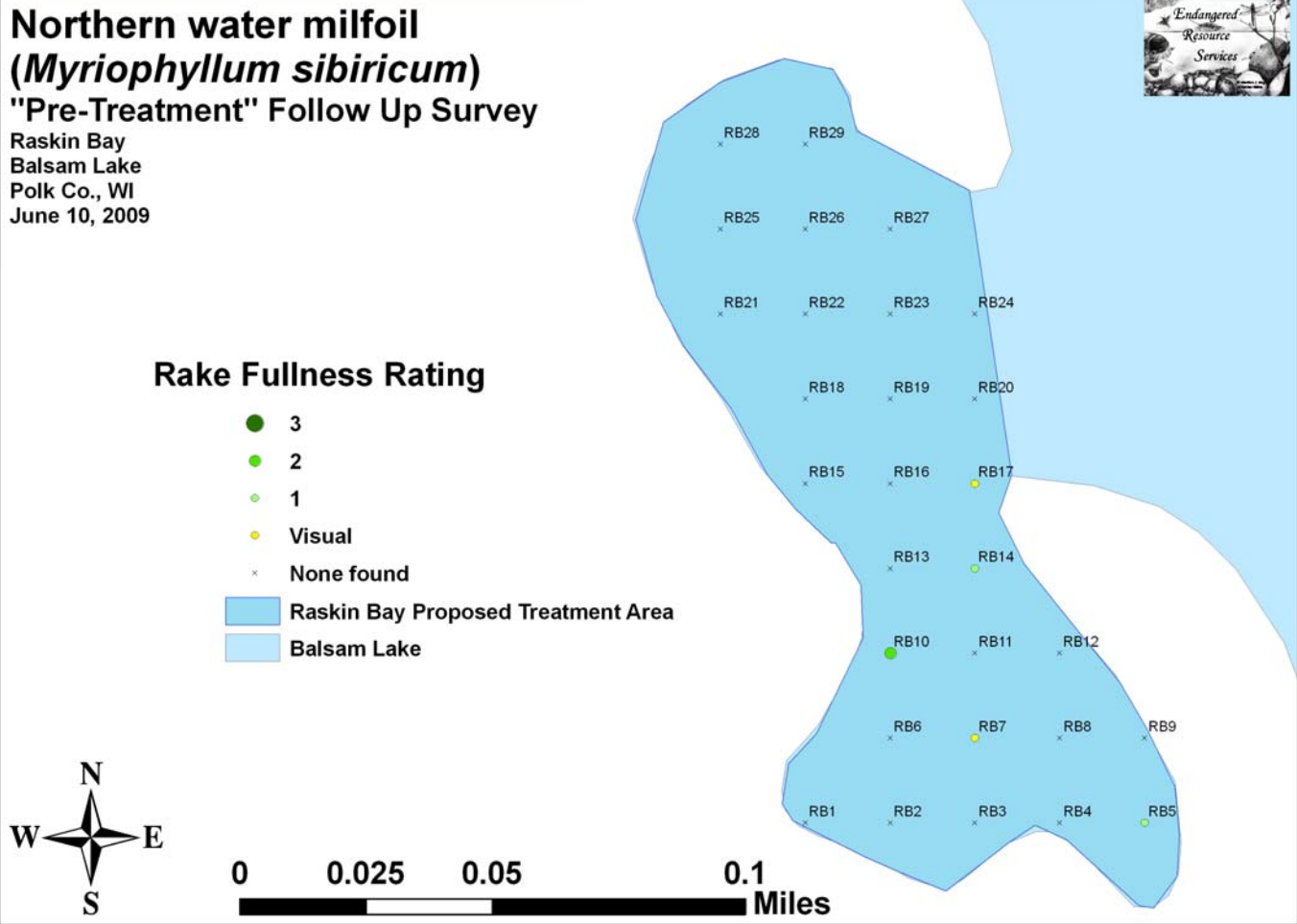
**Forked duckweed**  
**(*Lemna trisulca*)**  
**"Pre-Treatment" Follow Up Survey**  
 Raskin Bay  
 Balsam Lake  
 Polk Co., WI  
 June 10, 2009

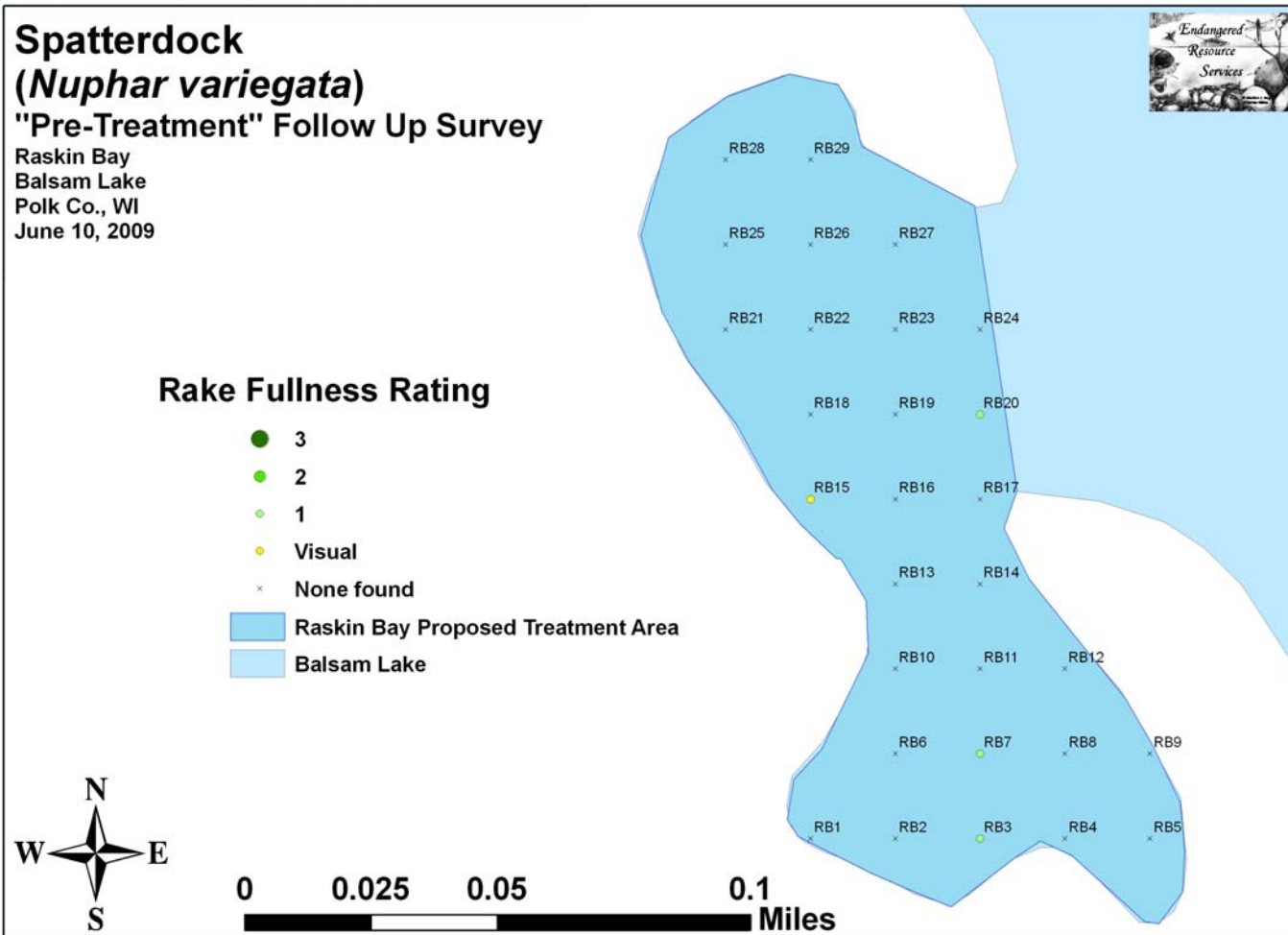


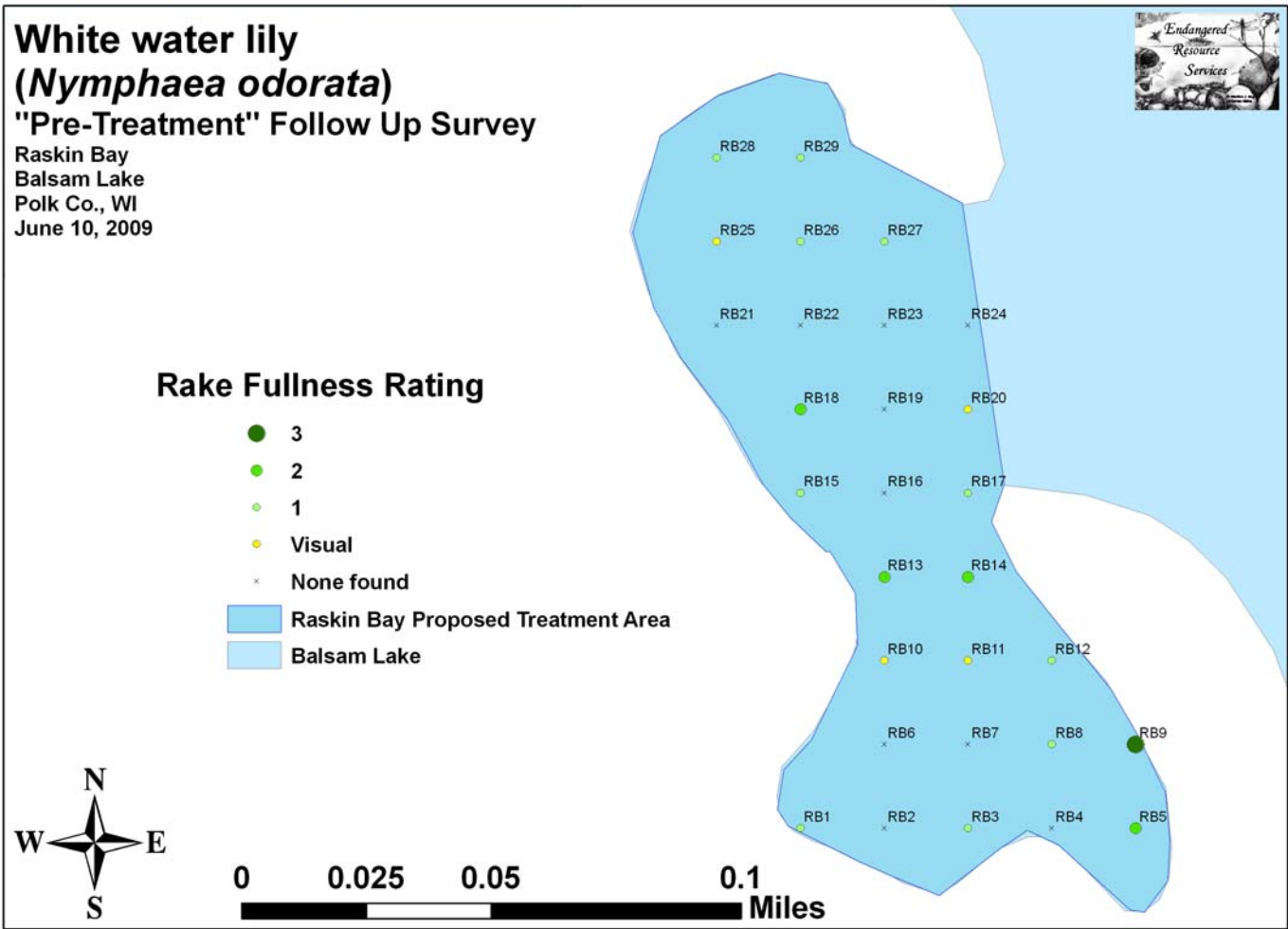
**Rake Fullness Rating**

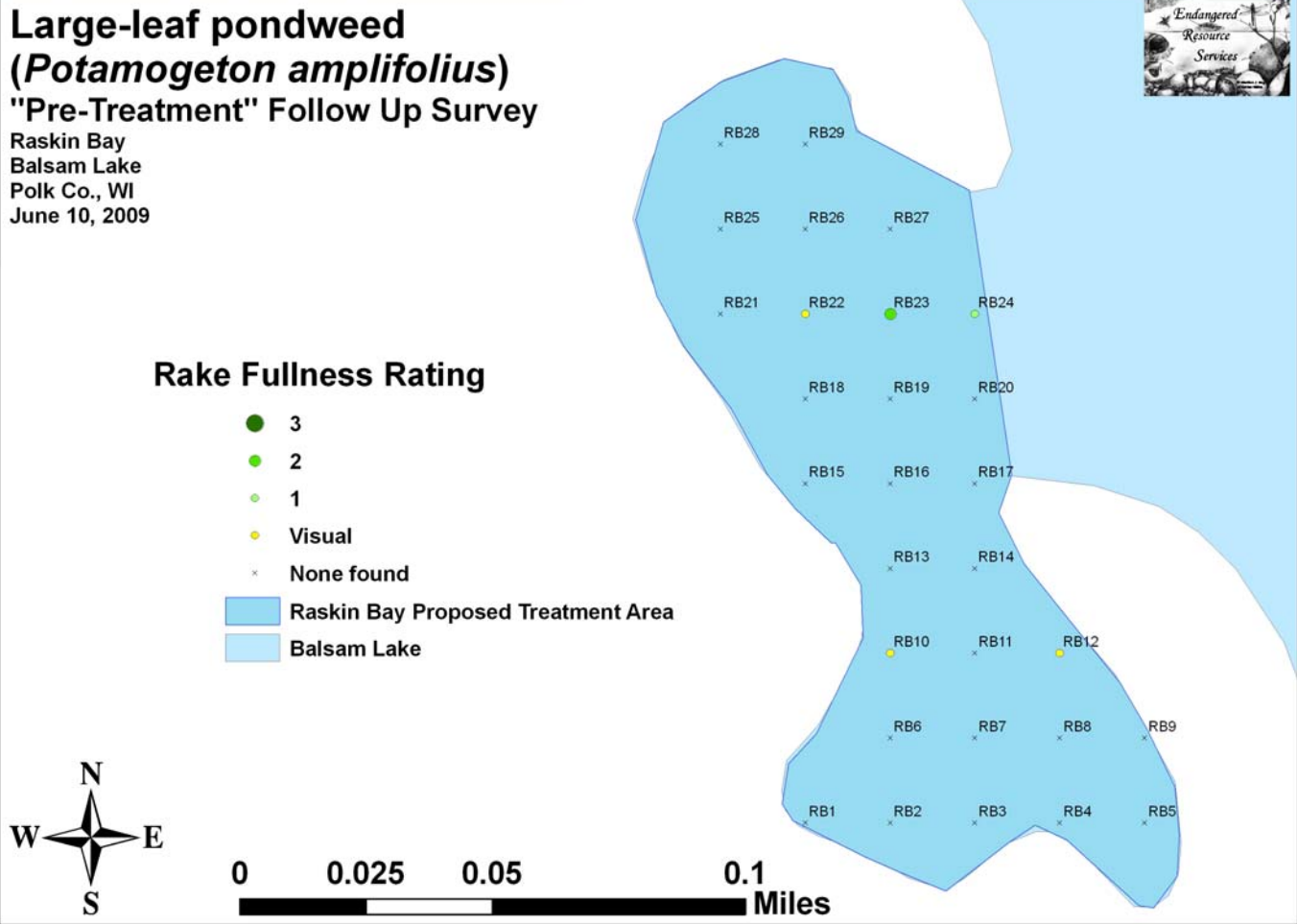
- 3
- 2
- 1
- Visual
- × None found
- Raskin Bay Proposed Treatment Area
- Balsam Lake

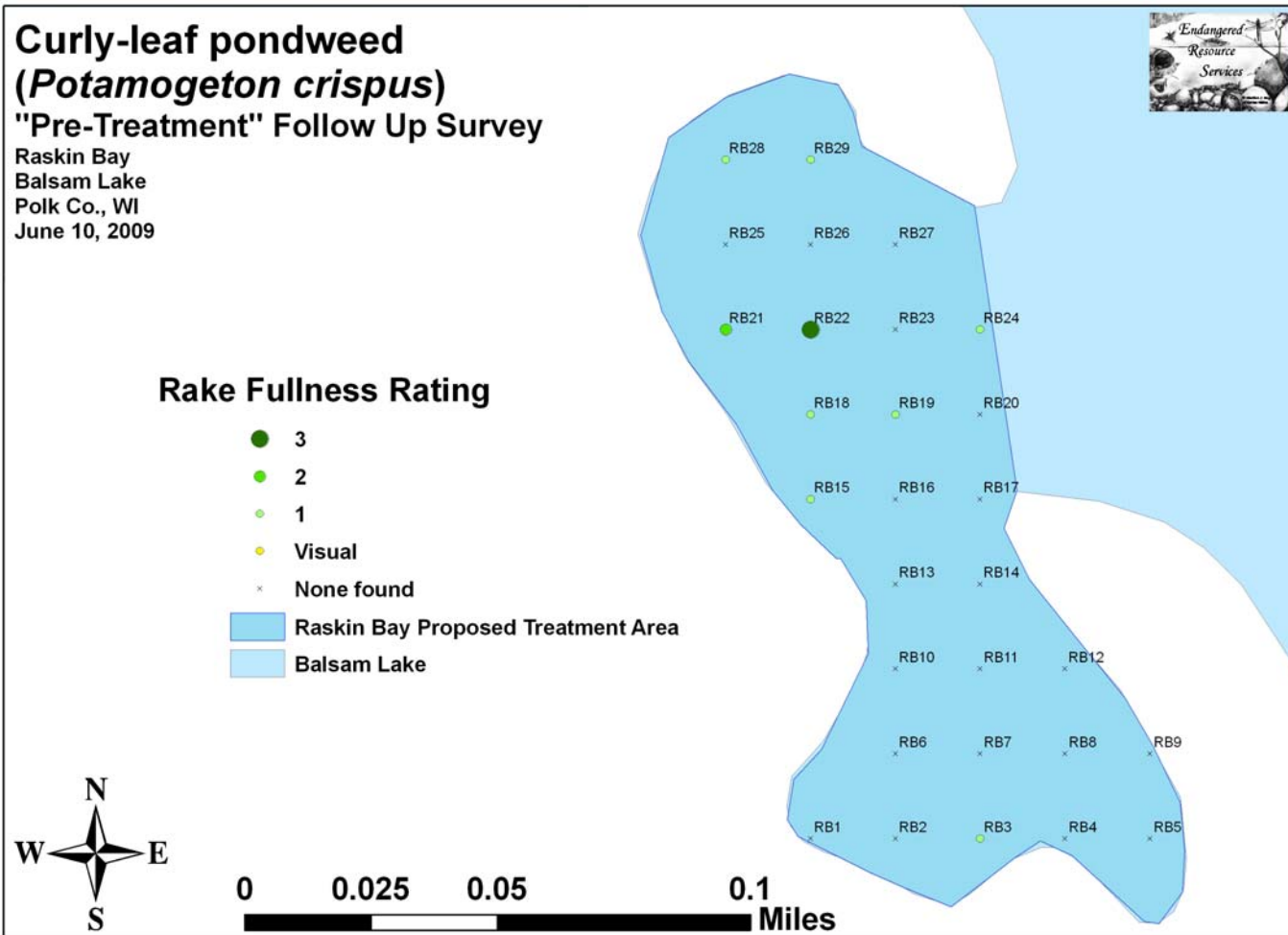




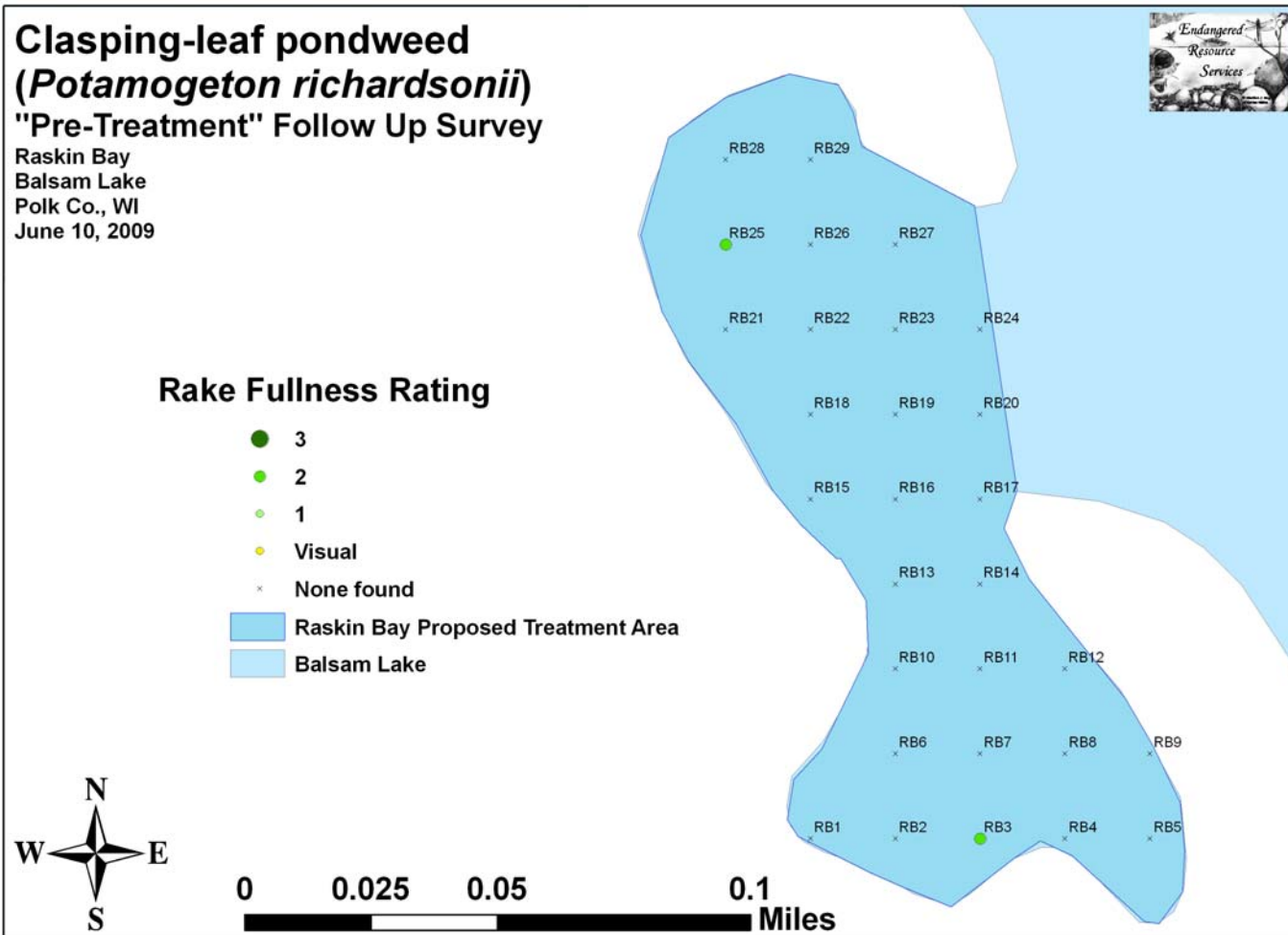


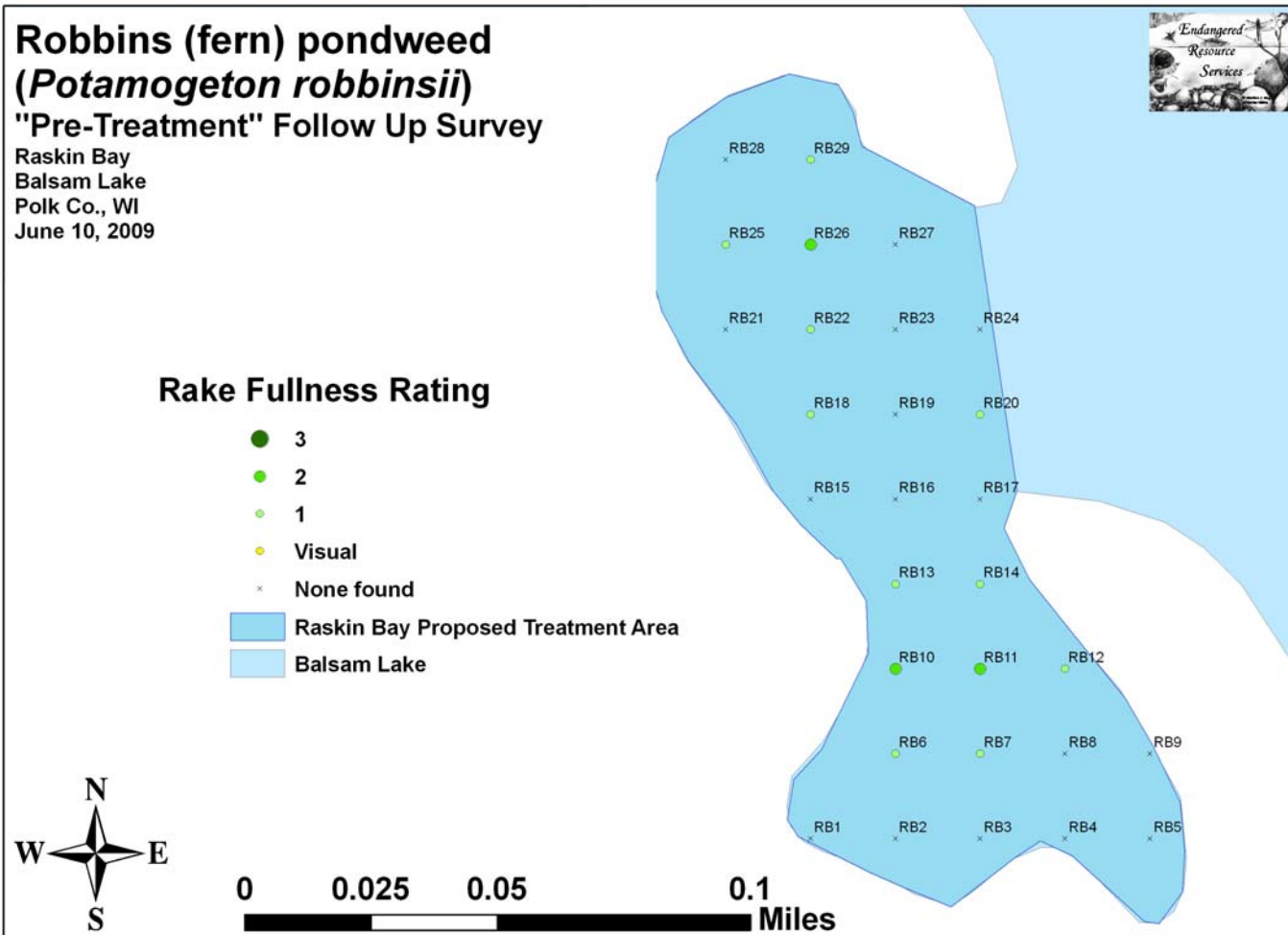












**Flat-stem pondweed  
(*Potamogeton zosteriformis*)  
"Pre-Treatment" Follow Up Survey**

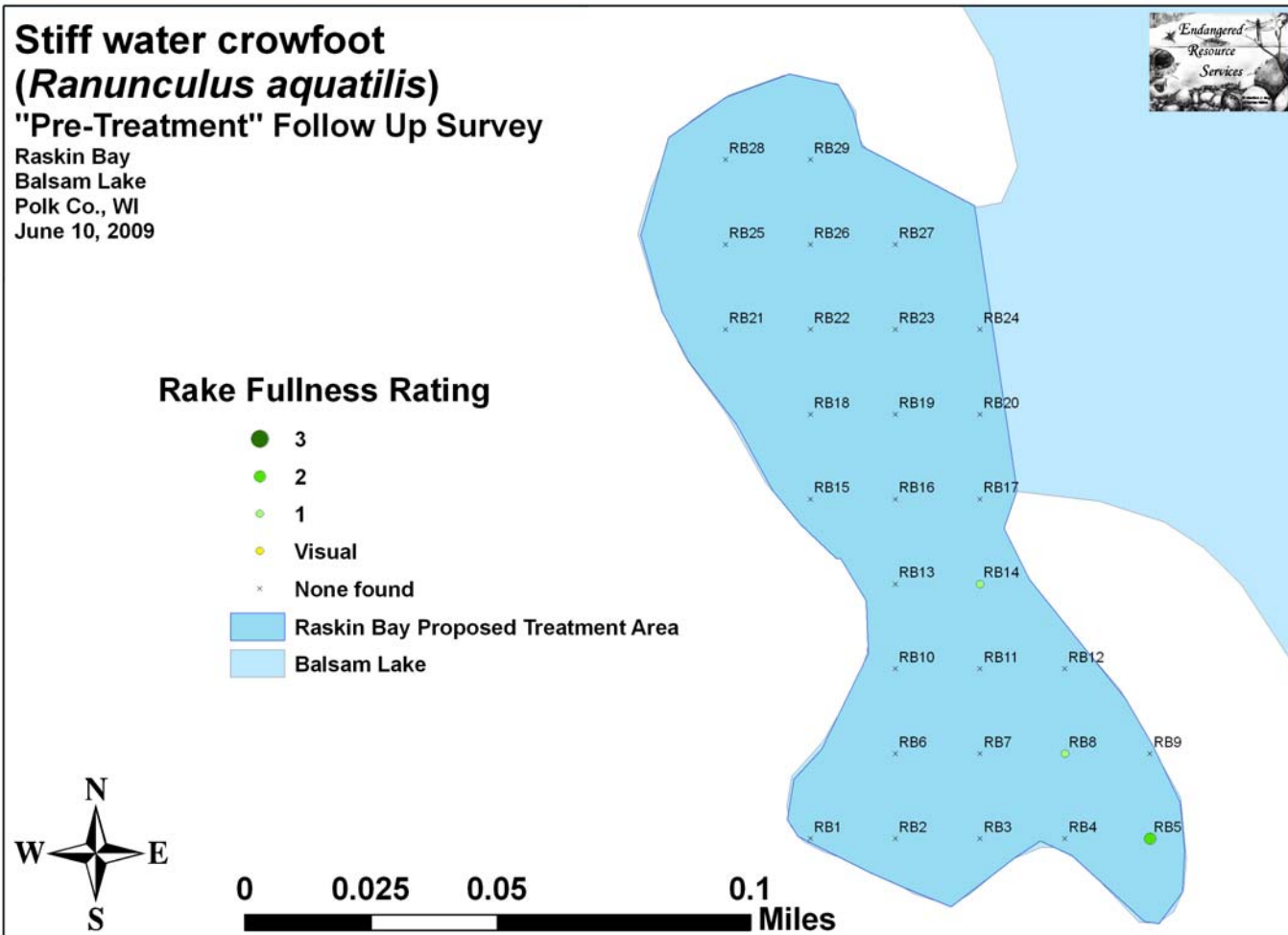
Raskin Bay  
Balsam Lake  
Polk Co., WI  
June 10, 2009

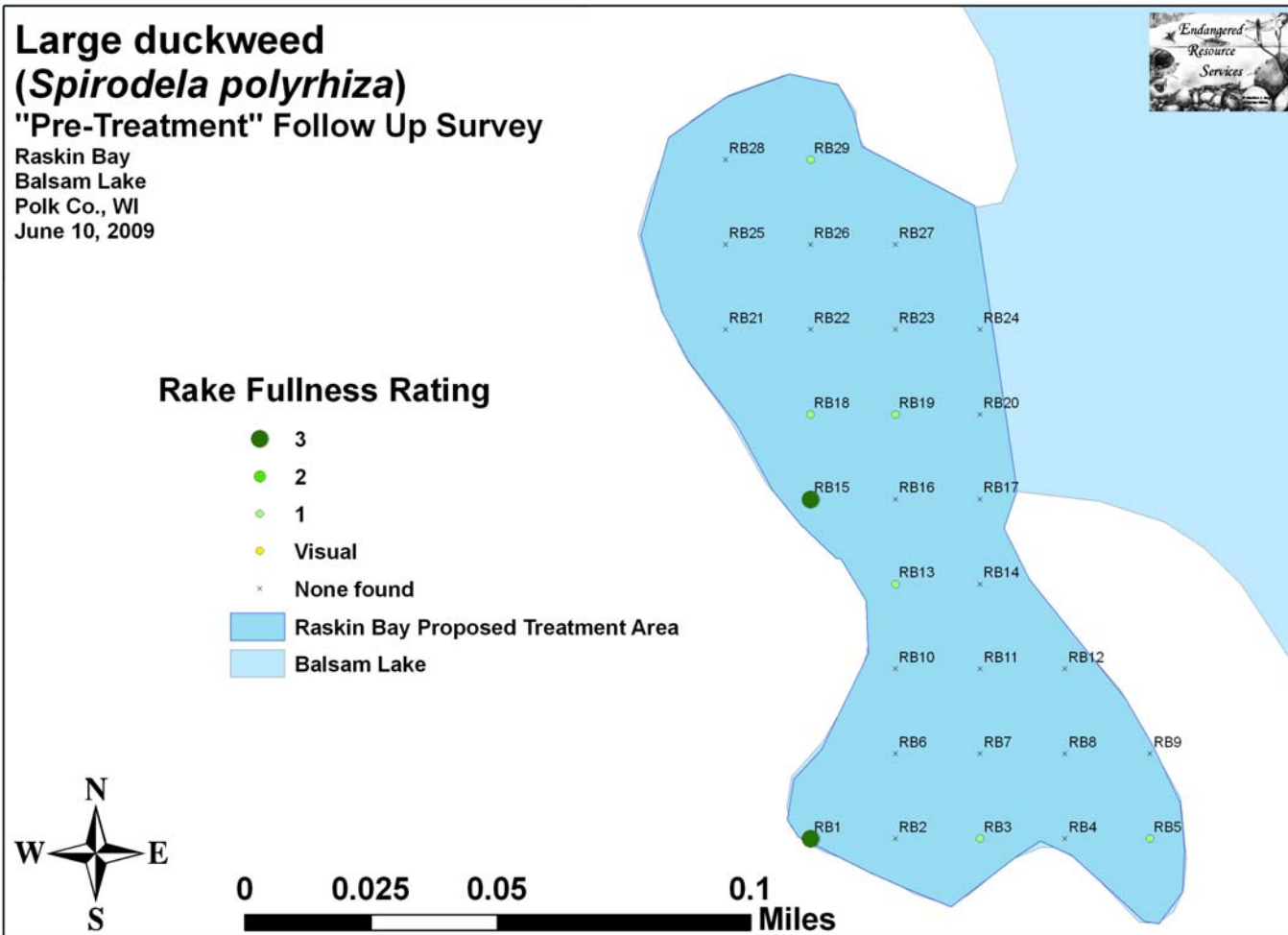


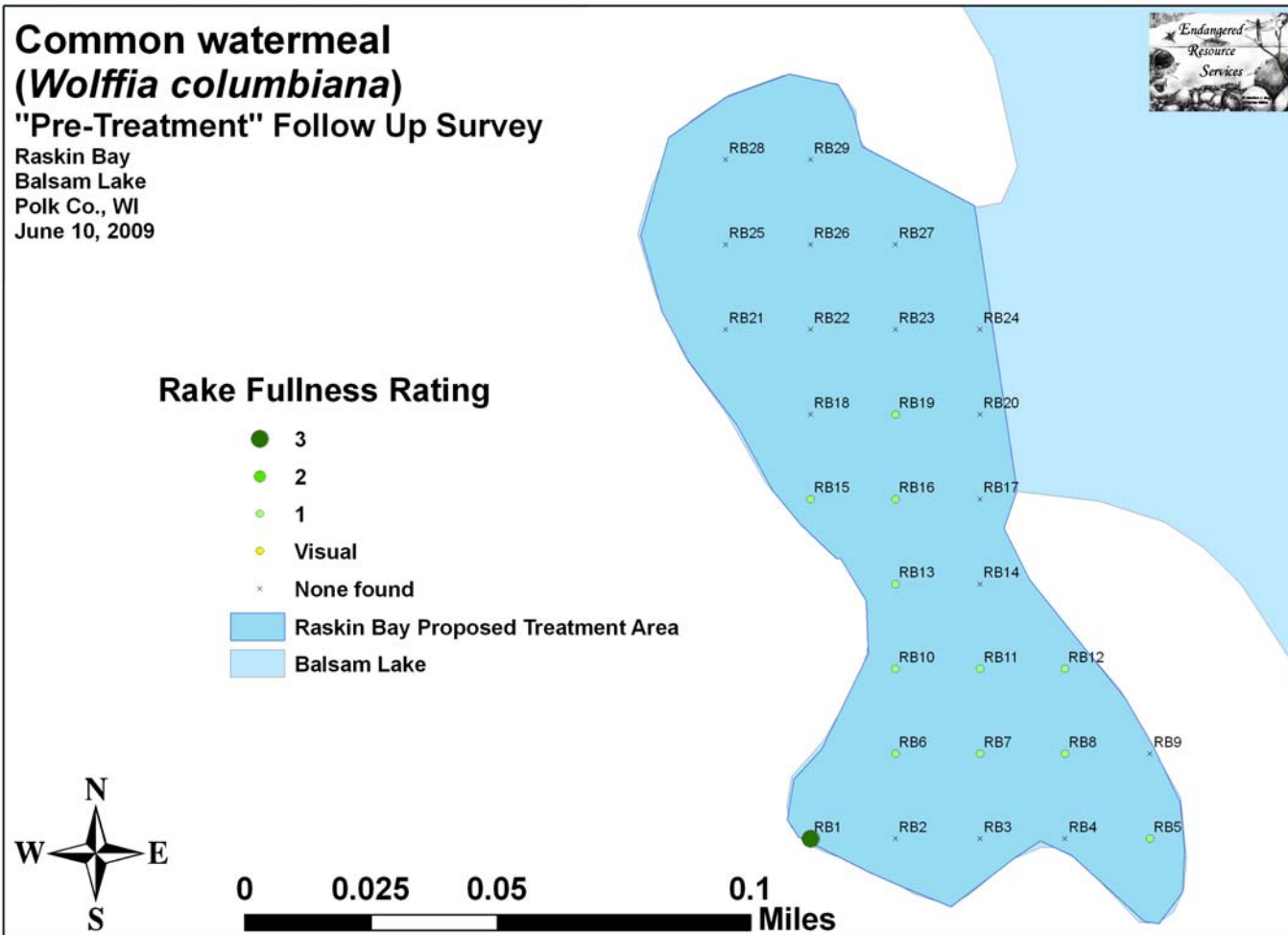
**Rake Fullness Rating**

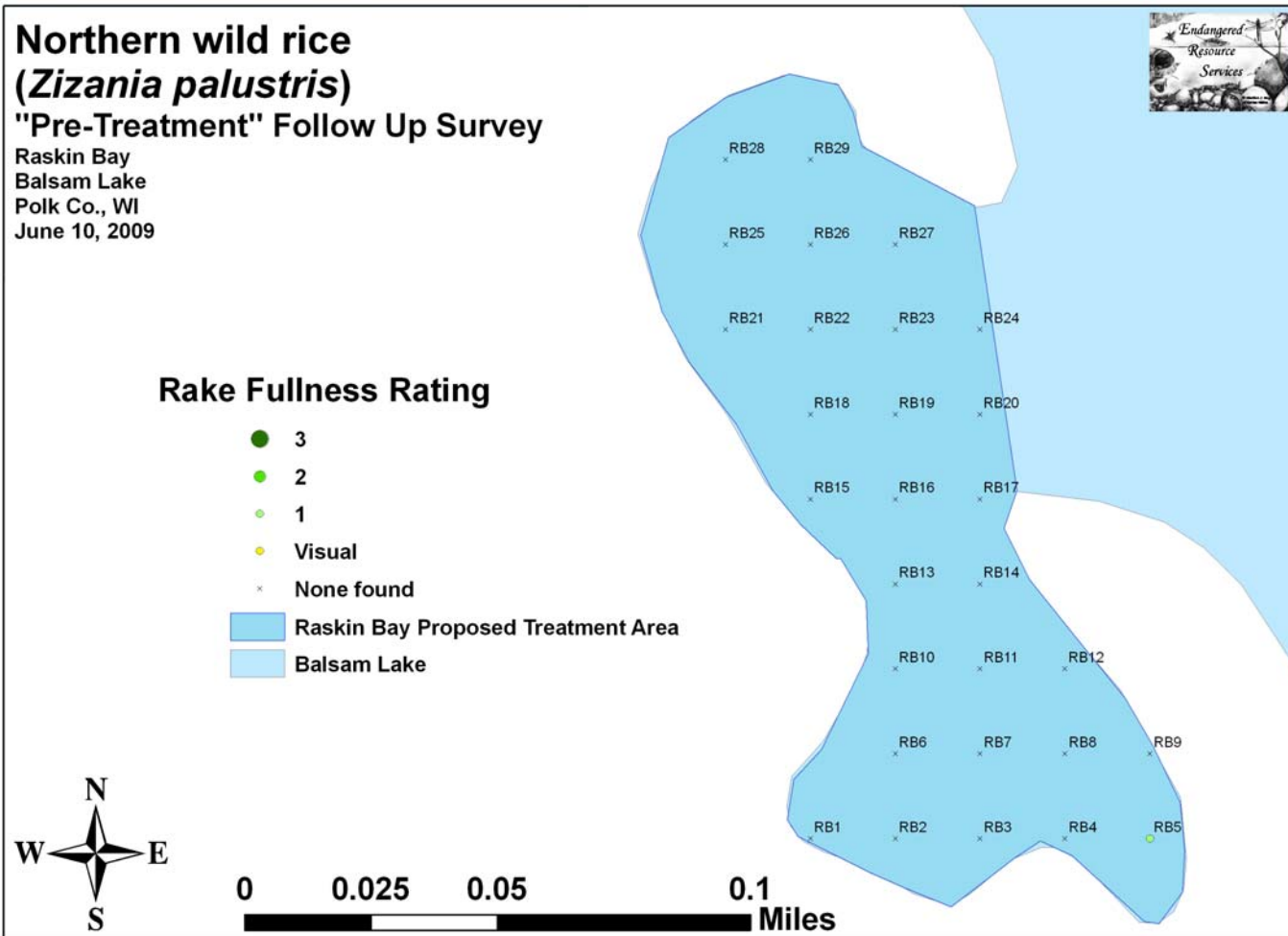
- 3
- 2
- 1
- Visual
- × None found
- Raskin Bay Proposed Treatment Area
- Balsam Lake





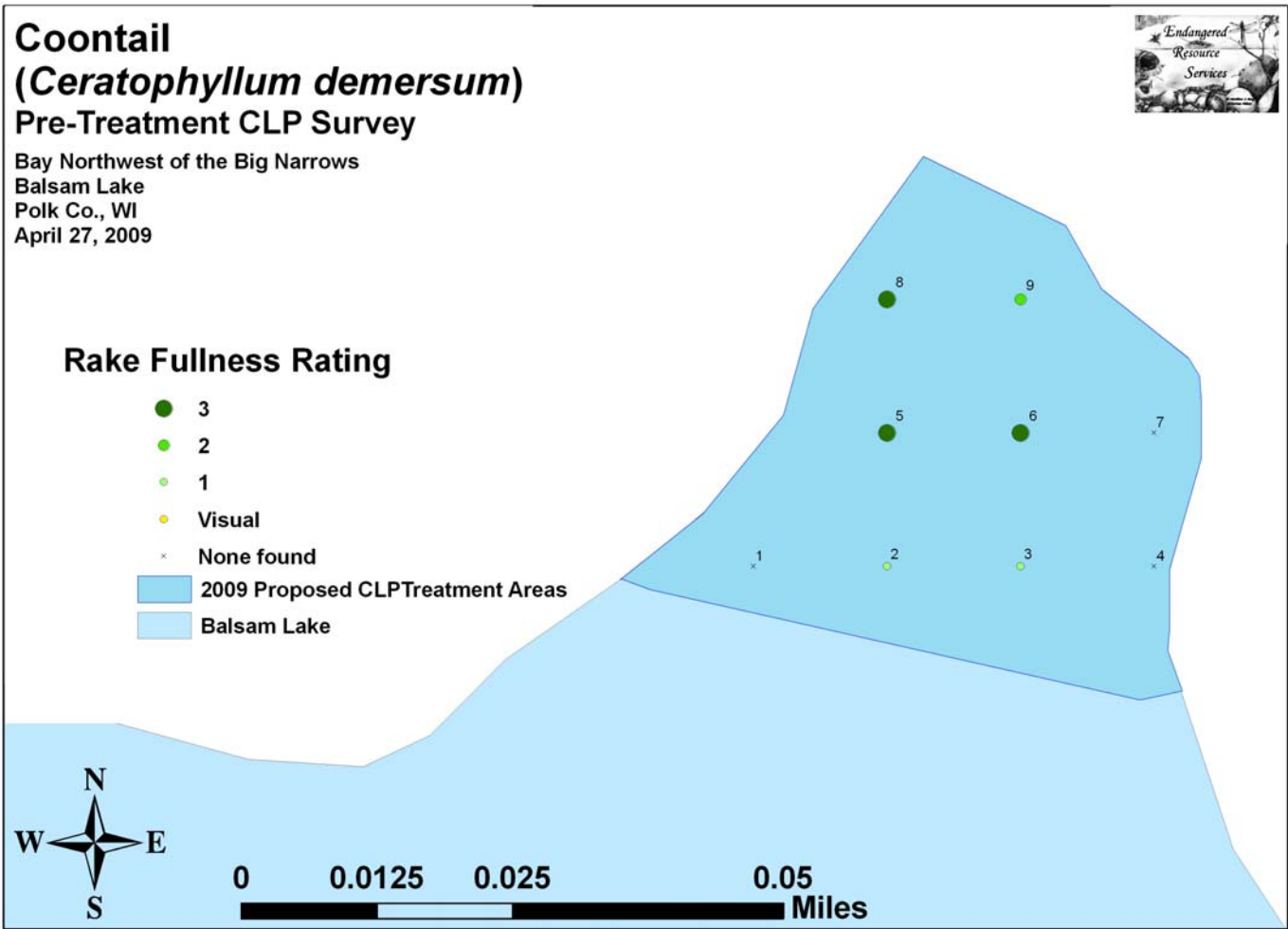






**Appendix IX: Bay Northwest of the Big Narrows  
Pretreatment Species Distribution Maps**





# Filamentous algae

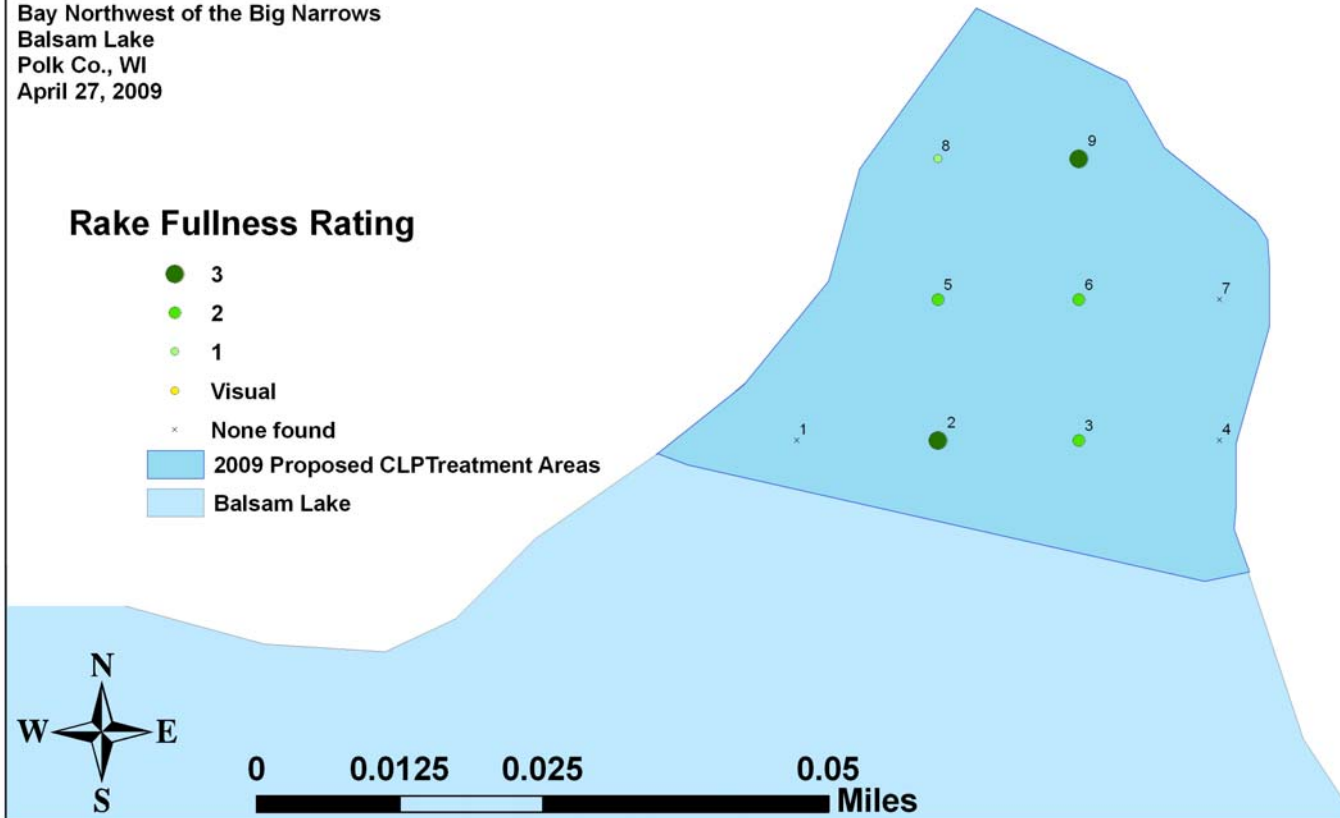
## Pre-Treatment CLP Survey

Bay Northwest of the Big Narrows  
Balsam Lake  
Polk Co., WI  
April 27, 2009



### Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Areas
- Balsam Lake



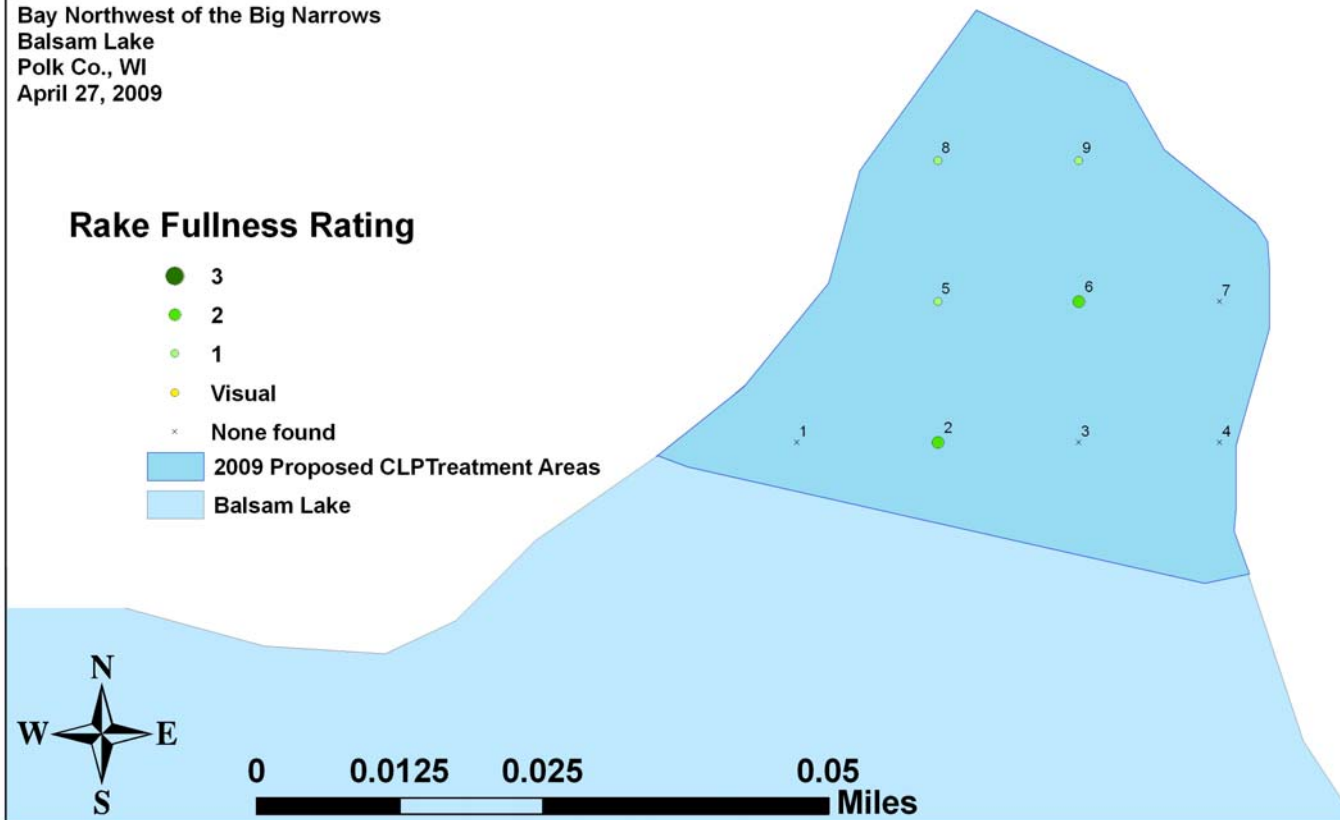
# Curly-leaf pondweed (*Potamogeton crispus*) Pre-Treatment CLP Survey

Bay Northwest of the Big Narrows  
Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Areas
- Balsam Lake



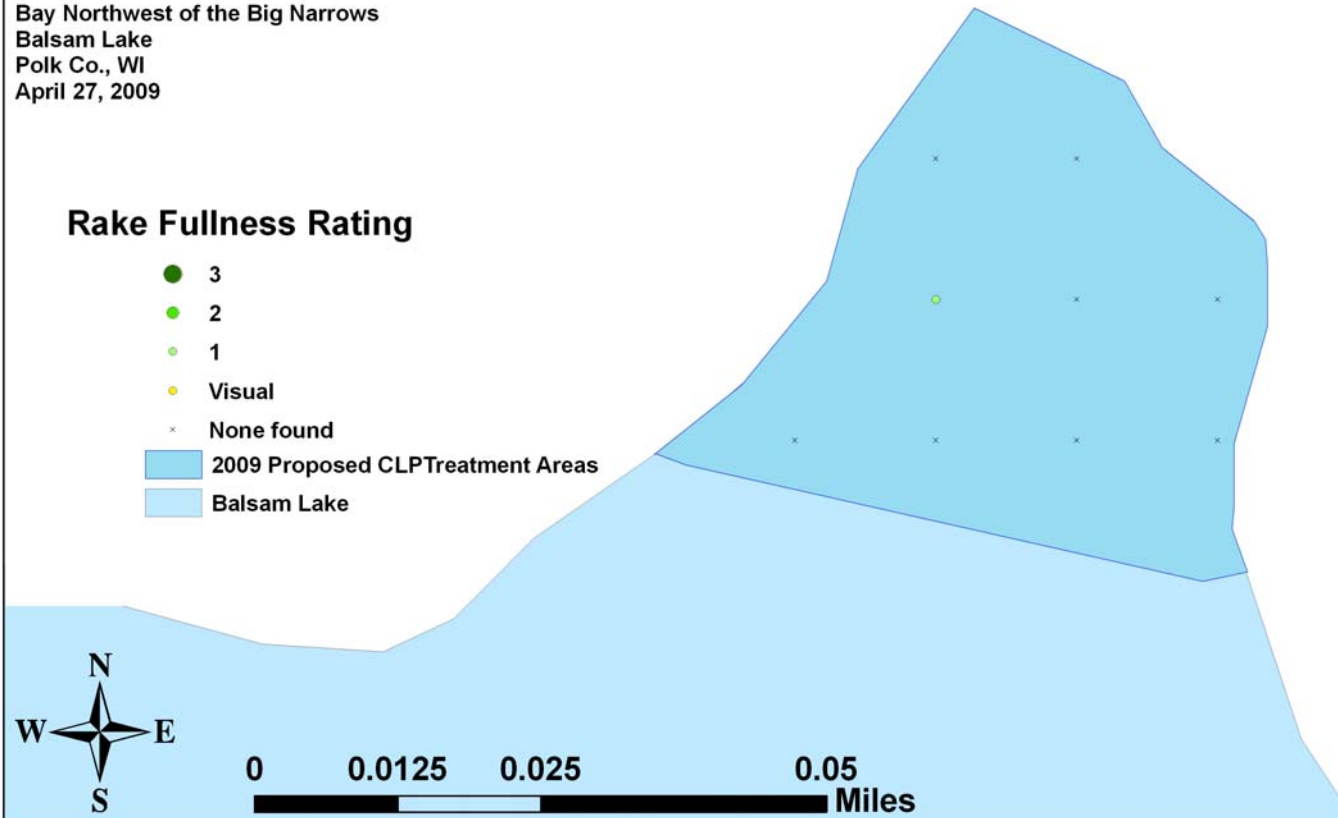
# Robbins (fern) pondweed (*Potamogeton robbinsii*) Pre-Treatment CLP Survey

Bay Northwest of the Big Narrows  
Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Areas
- Balsam Lake



**Appendix X: Bay Northwest of the Big Narrows  
Follow Up Species Distribution Maps**

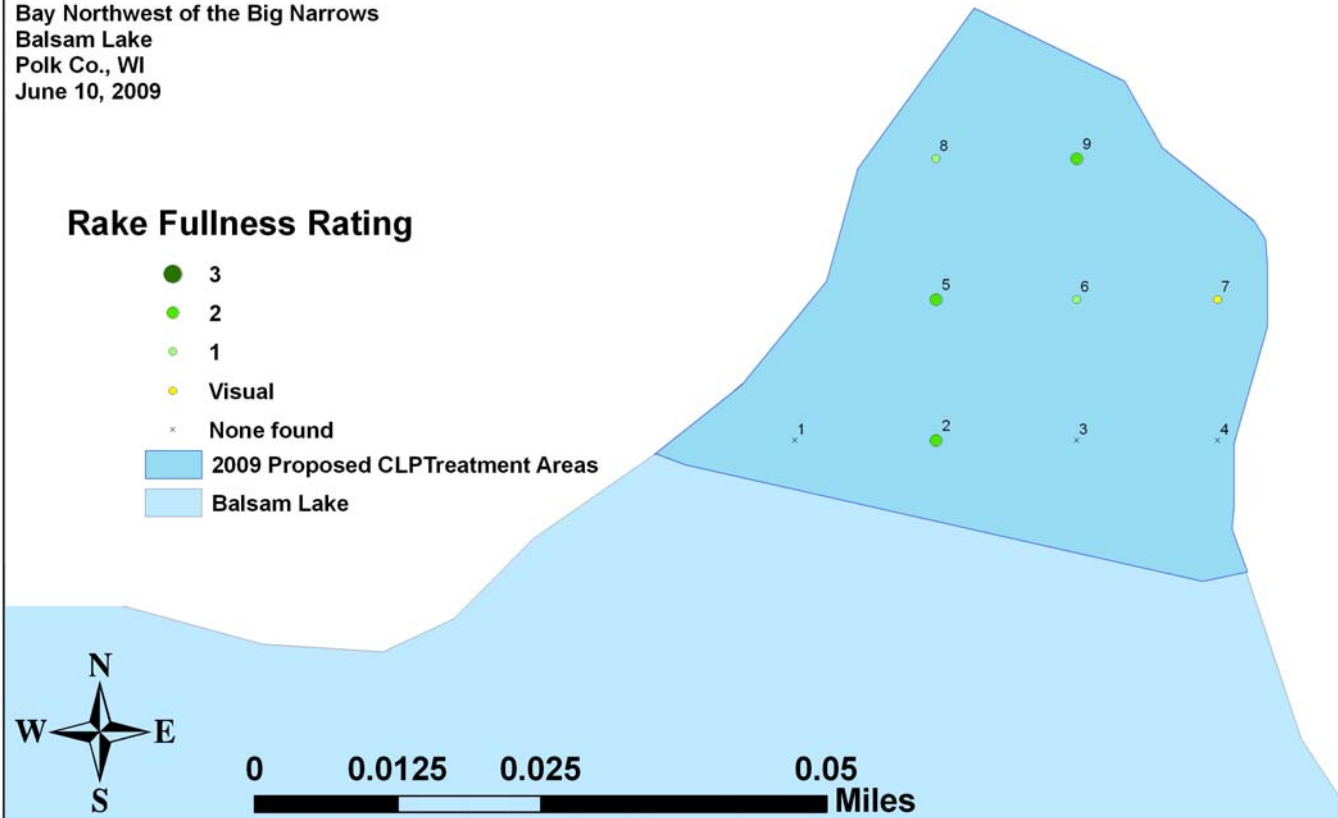
# Coontail (*Ceratophyllum demersum*) "Pre-Treatment" Follow Up Survey

Bay Northwest of the Big Narrows  
Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLPTreatment Areas
- Balsam Lake



# Filamentous algae

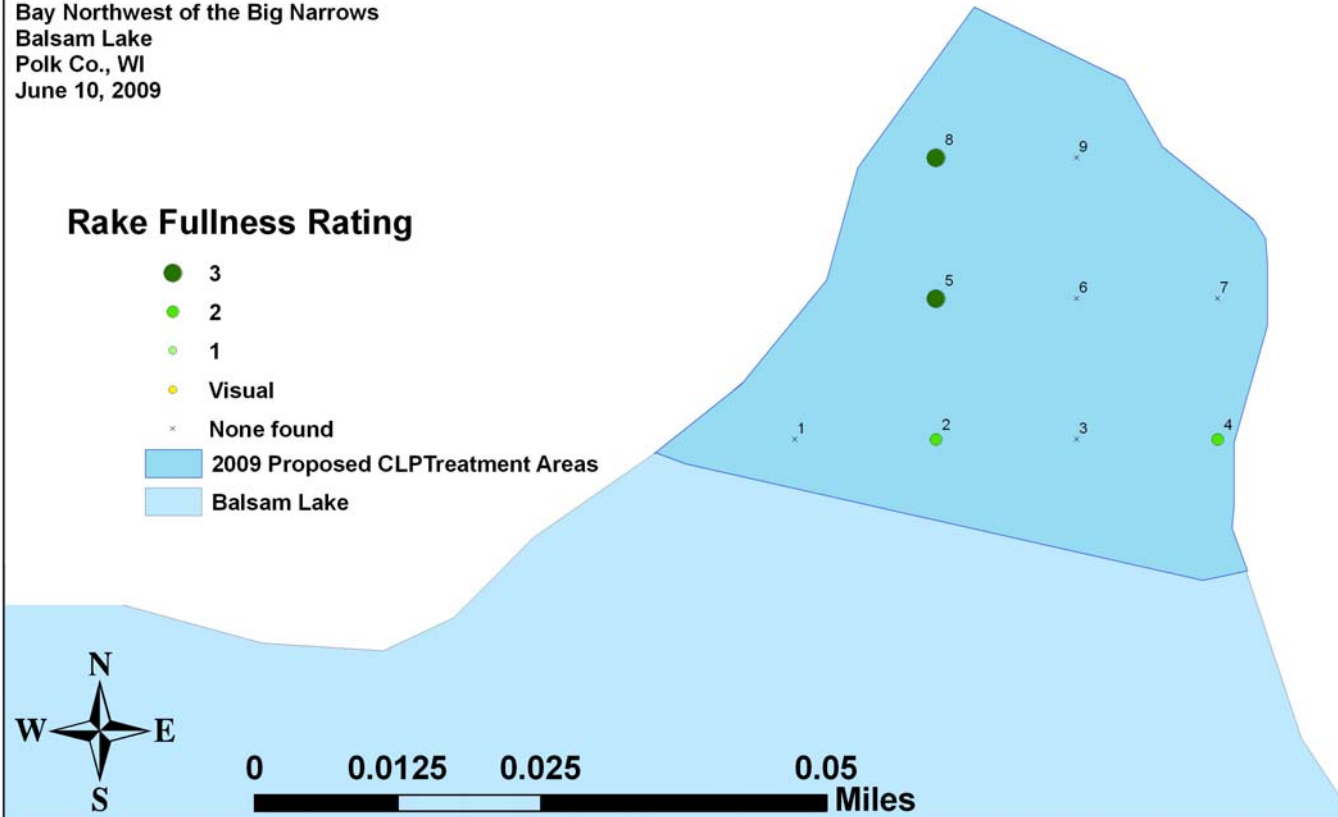


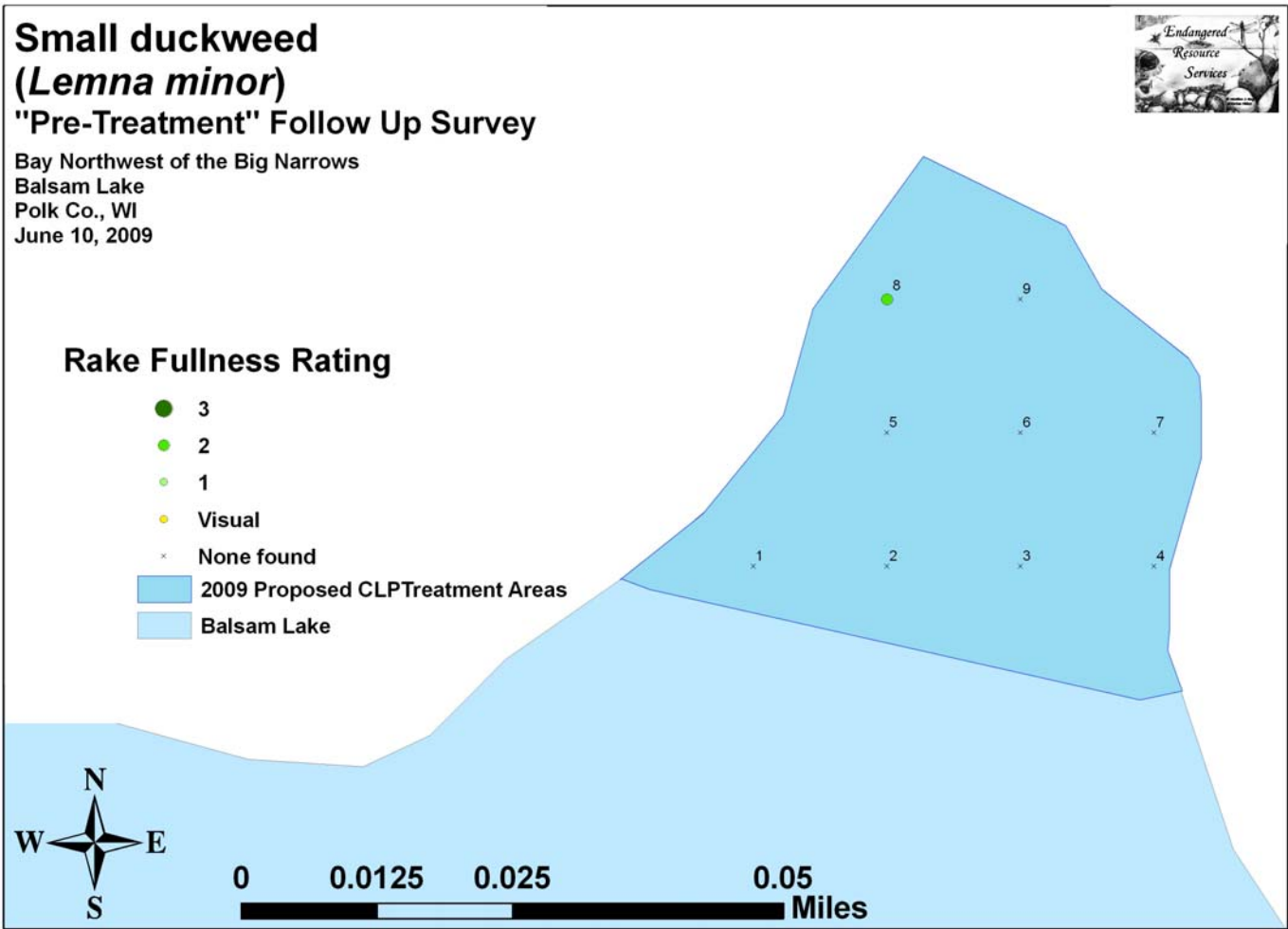
## "Pre-Treatment" Follow Up Survey

Bay Northwest of the Big Narrows  
Balsam Lake  
Polk Co., WI  
June 10, 2009

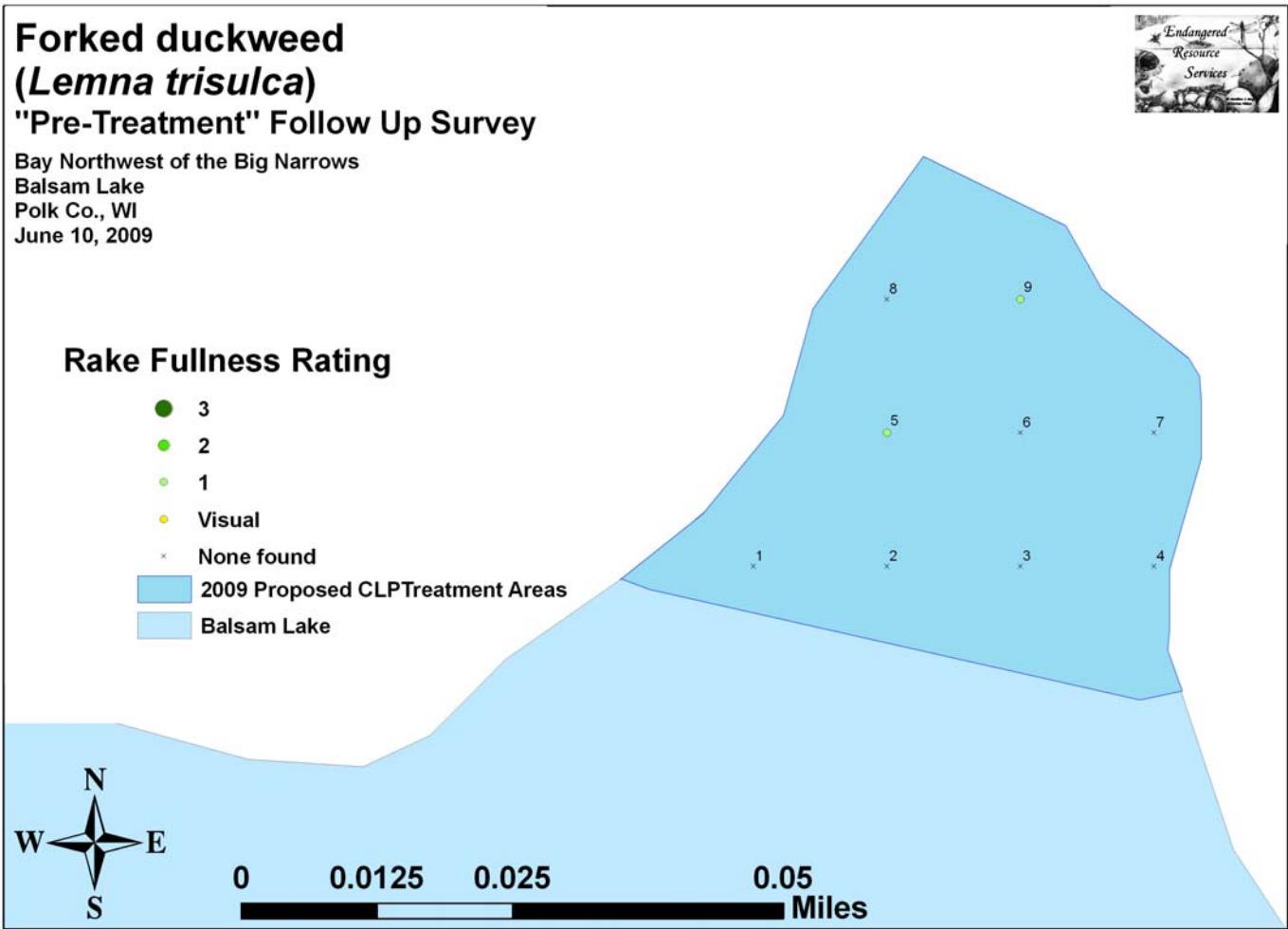
### Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLPTreatment Areas
- Balsam Lake









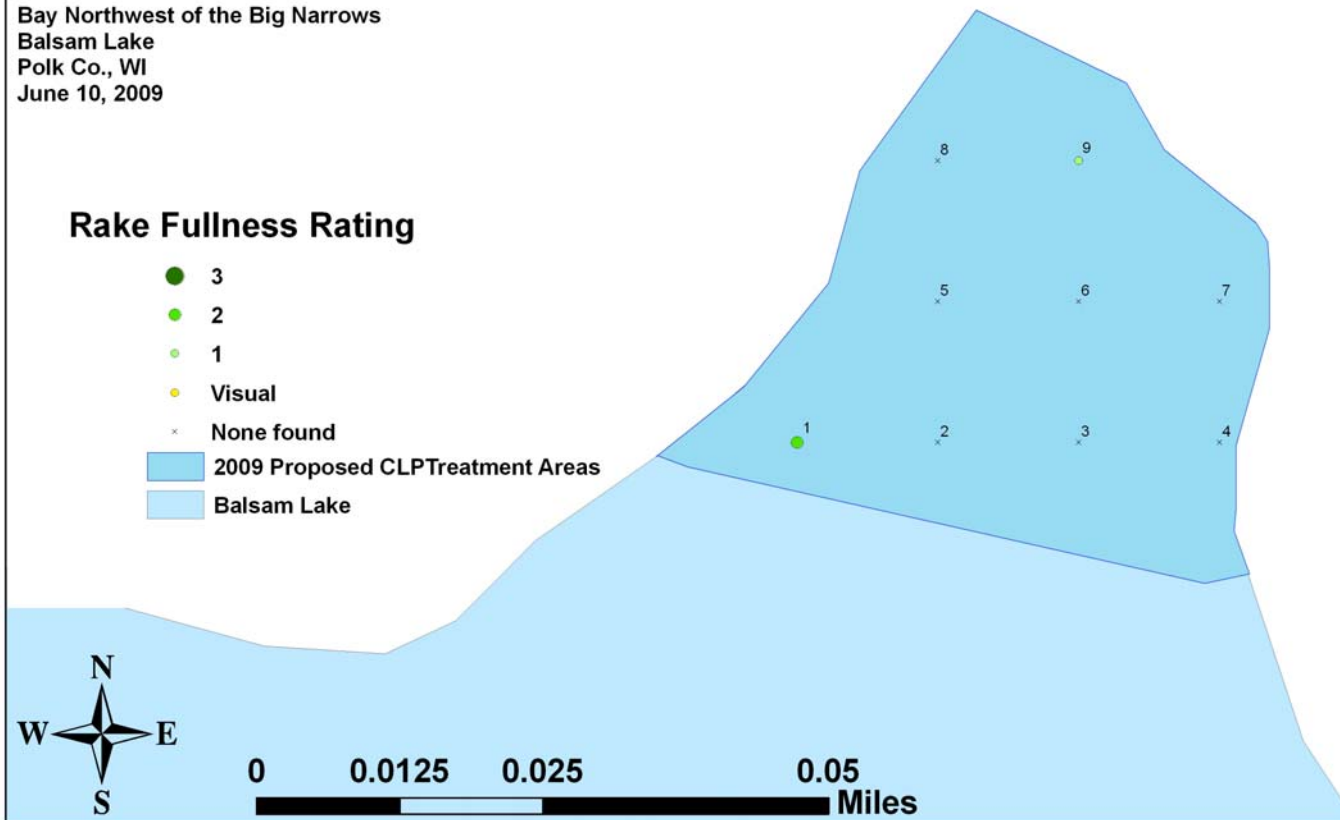
# Northern water milfoil (*Myriophyllum sibiricum*) "Pre-Treatment" Follow Up Survey



Bay Northwest of the Big Narrows  
Balsam Lake  
Polk Co., WI  
June 10, 2009

## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLPTreatment Areas
- Balsam Lake



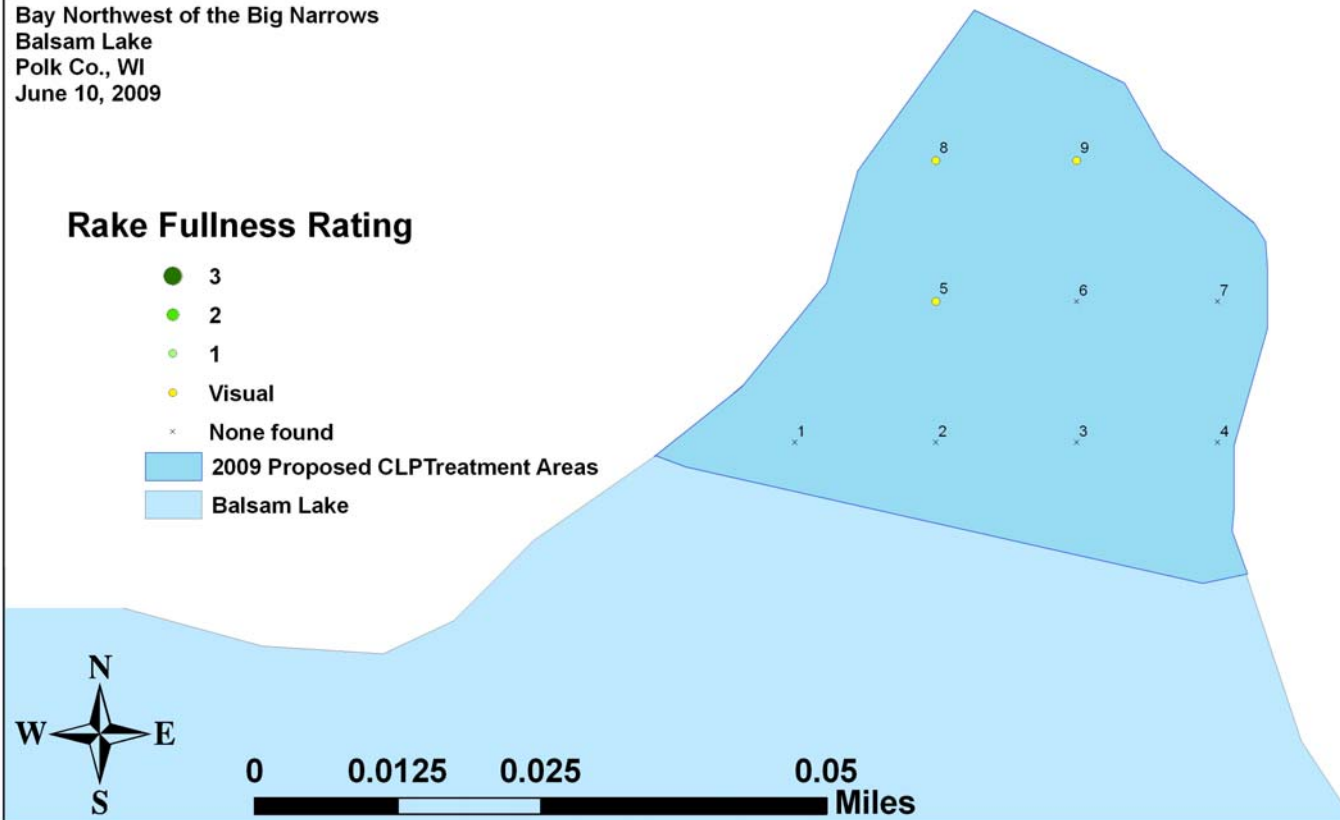
# White water lily (*Nymphaea odorata*) "Pre-Treatment" Follow Up Survey

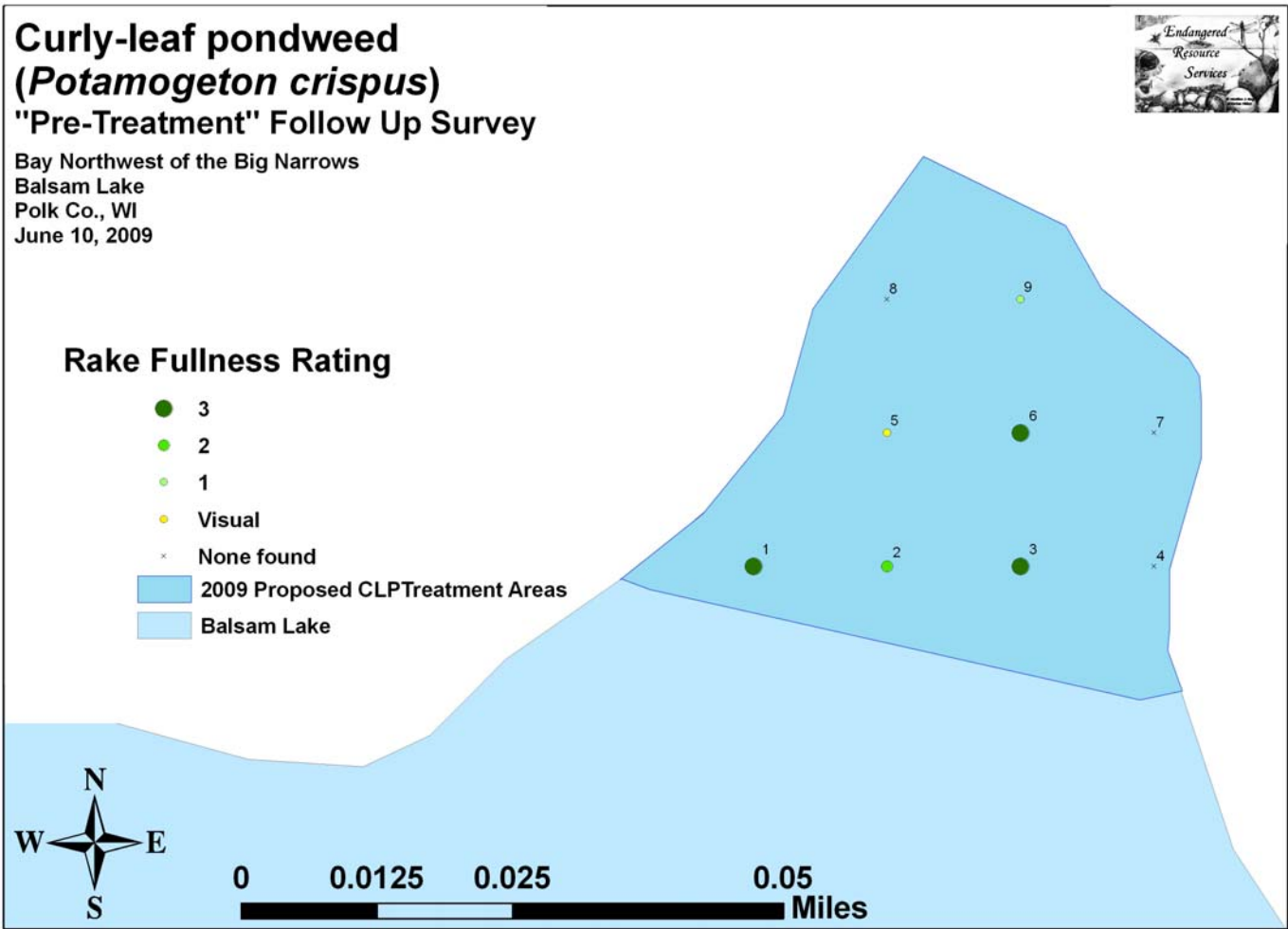
Bay Northwest of the Big Narrows  
Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLPTreatment Areas
- Balsam Lake





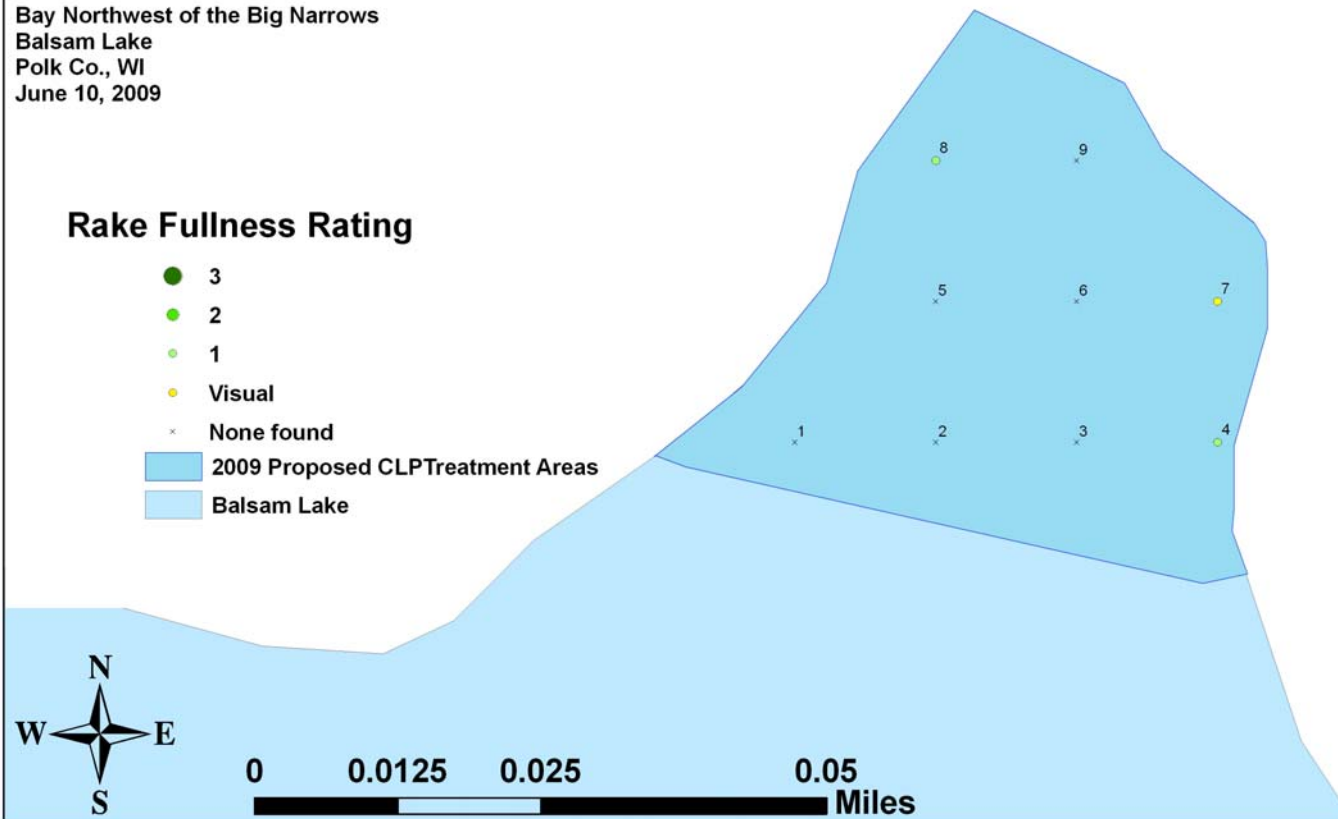
# Flat-stem pondweed (*Potamogeton zosteriformis*) "Pre-Treatment" Follow Up Survey

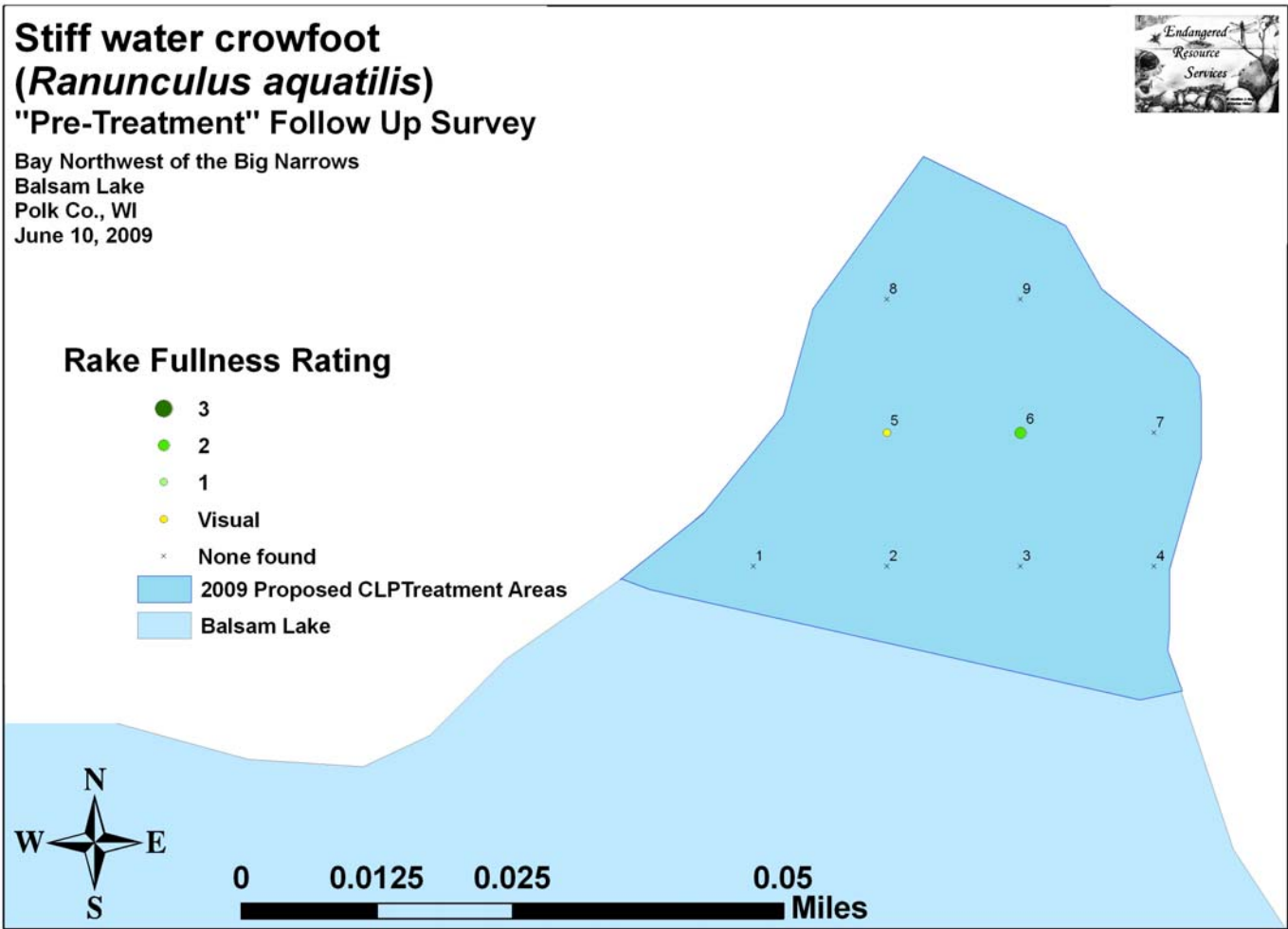
Bay Northwest of the Big Narrows  
Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLPTreatment Areas
- Balsam Lake





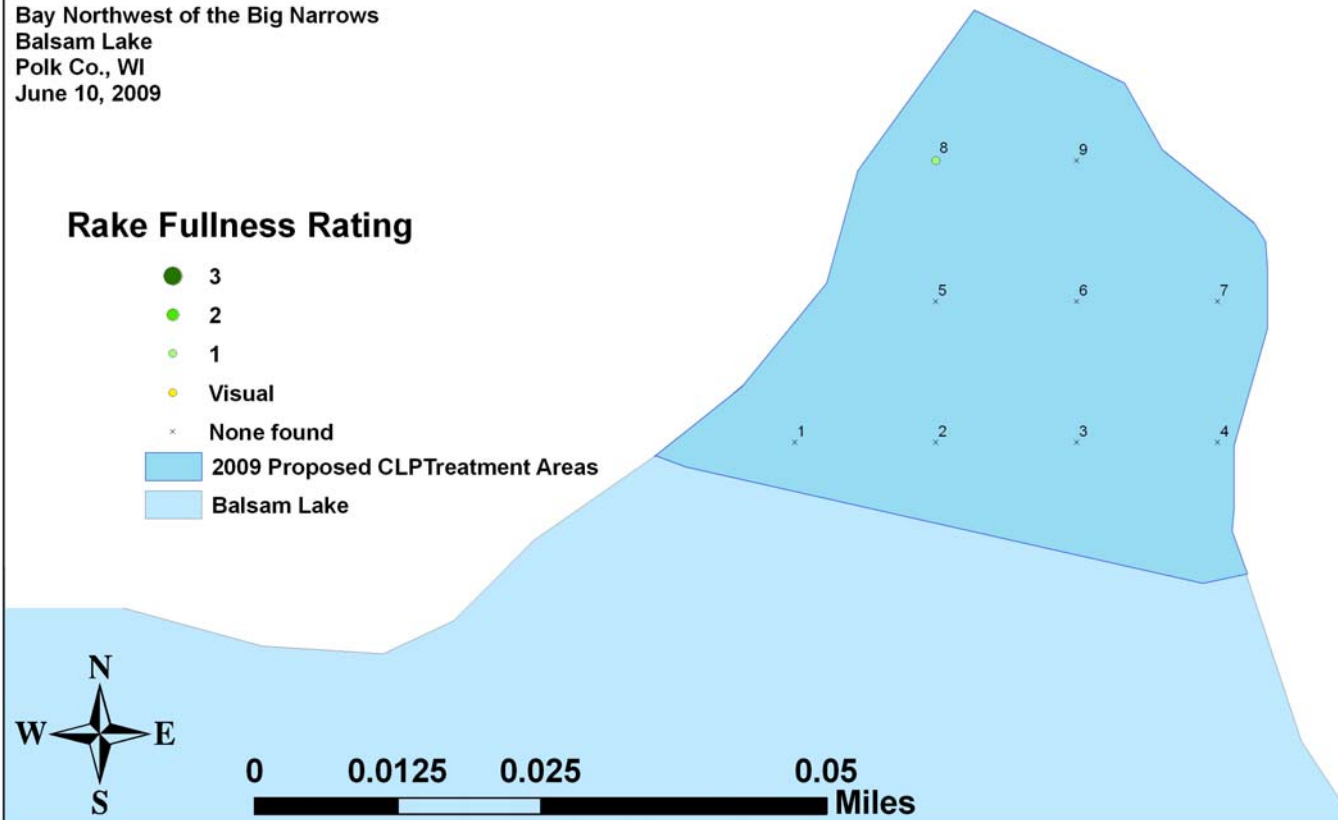
# Common watermeal (*Wolffia columbiana*) "Pre-Treatment" Follow Up Survey

Bay Northwest of the Big Narrows  
Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLPTreatment Areas
- Balsam Lake



**Appendix XI: Bay Southeast of the Big Narrows  
Pretreatment Species Distribution Maps**



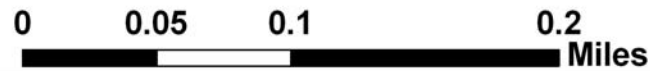
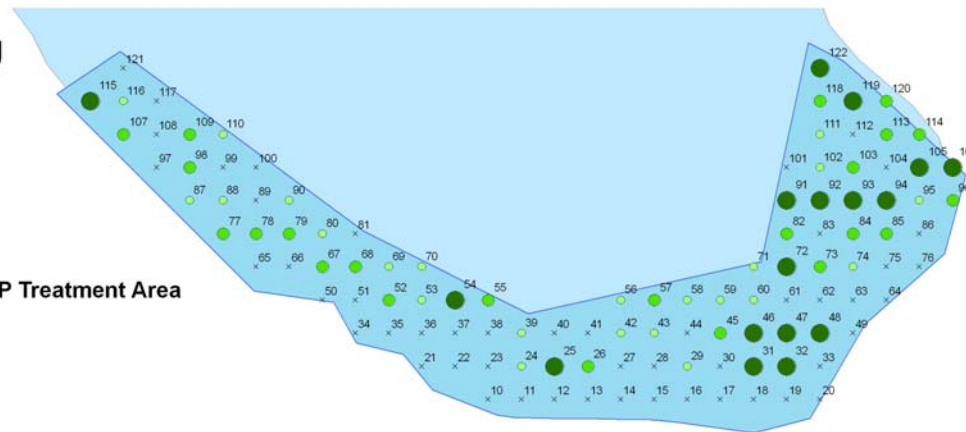
# Coontail (*Ceratophyllum demersum*) Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



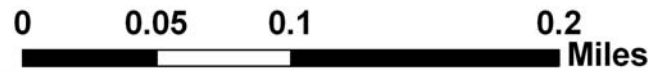
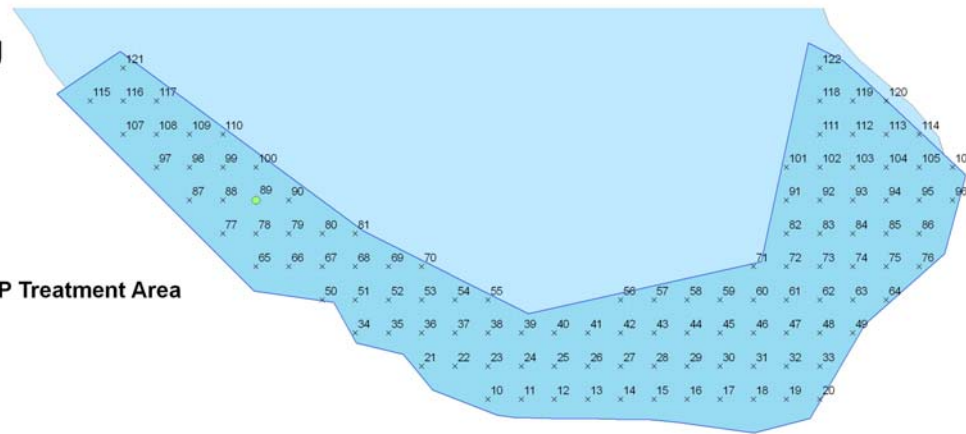
# Common waterweed (*Elodea canadensis*) Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



# Filamentous algae

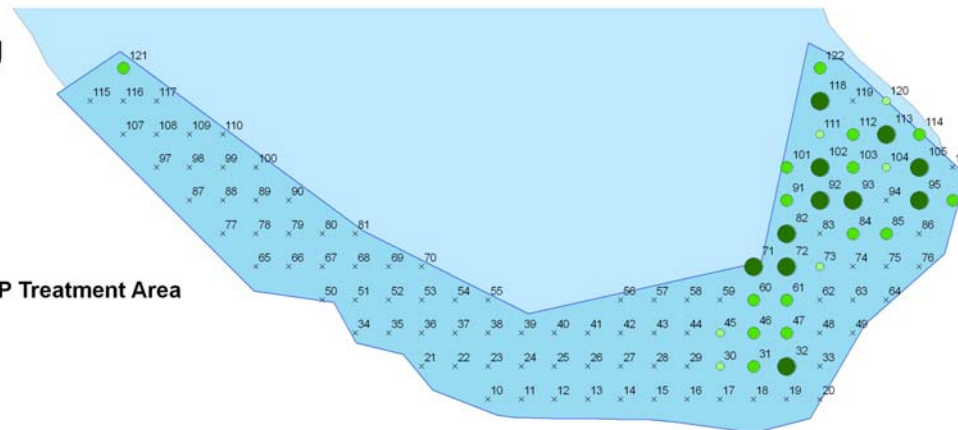


## Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009

### Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



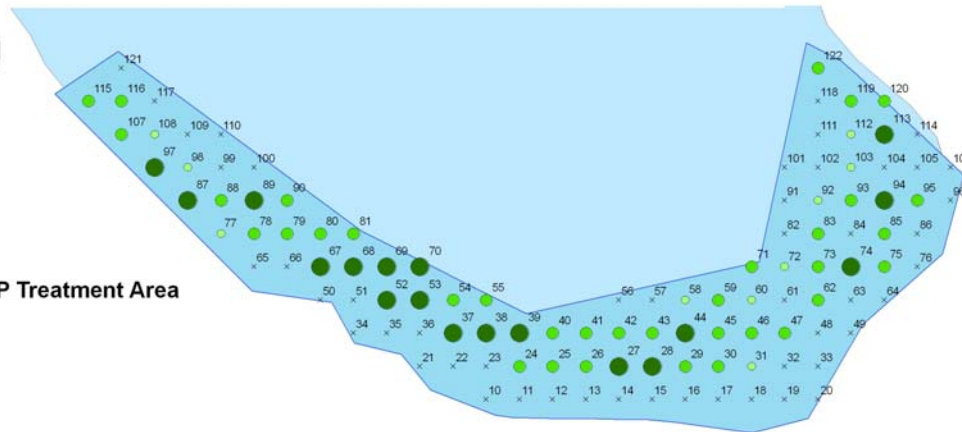
# Forked duckweed (*Lemna trisulca*) Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



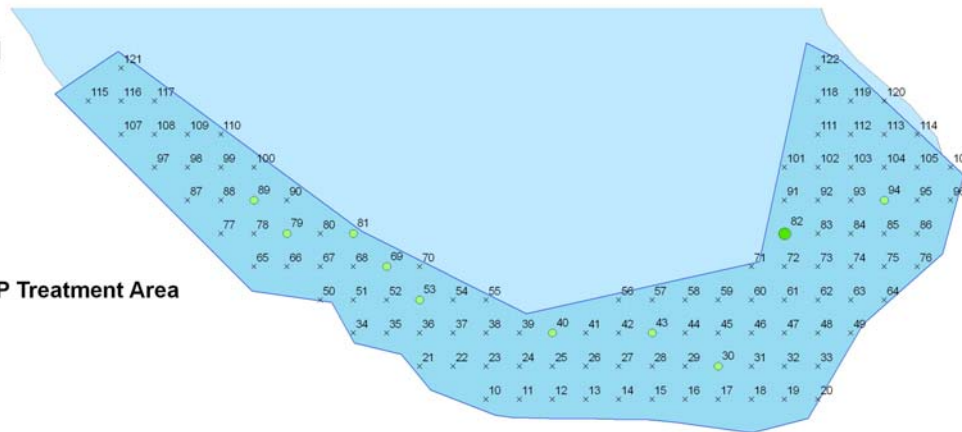
# Northern water milfoil (*Myriophyllum sibiricum*) Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



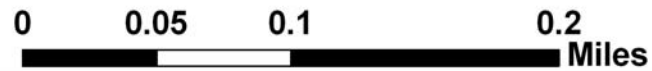
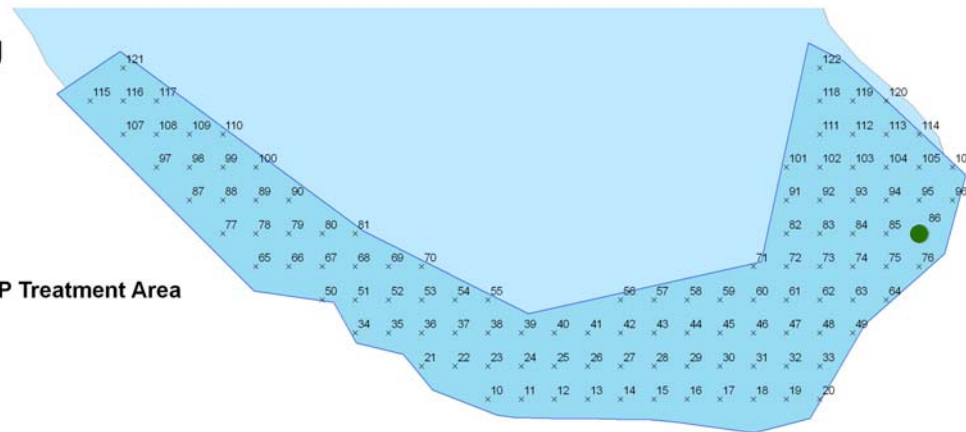
# Pickeralweed (*Pontederia cordata*) Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



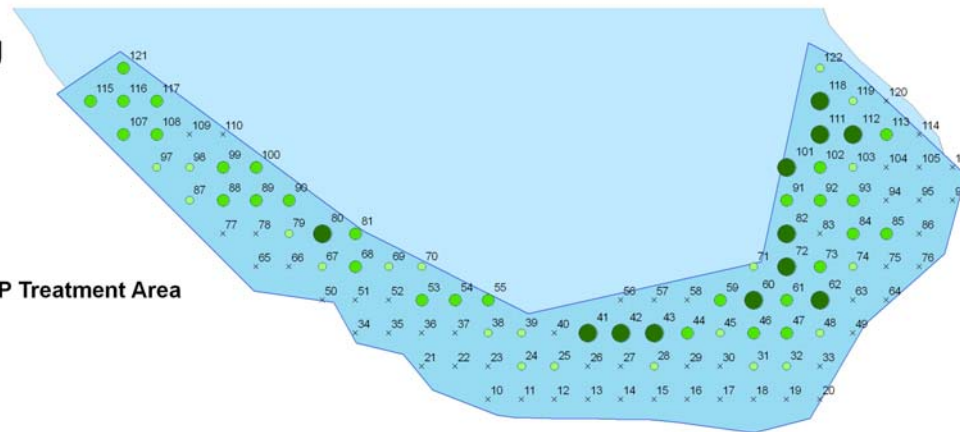
# Curly-leaf pondweed (*Potamogeton crispus*) Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



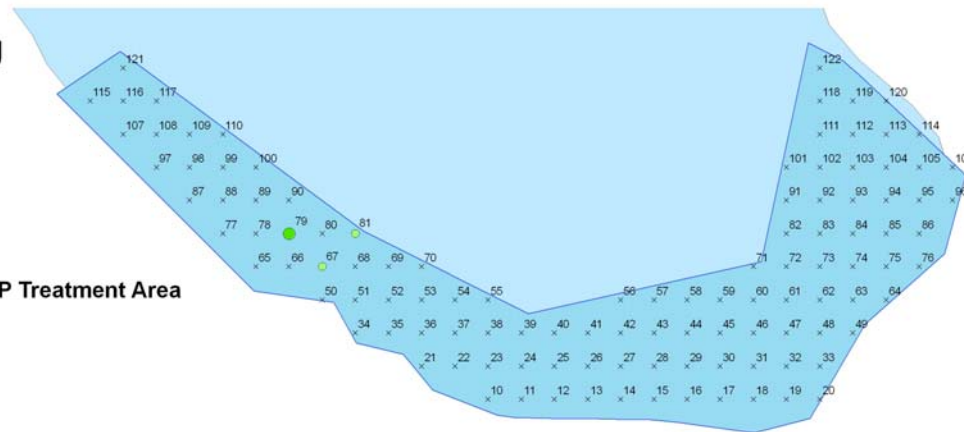
# White-stem pondweed (*Potamogeton praelongus*) Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake





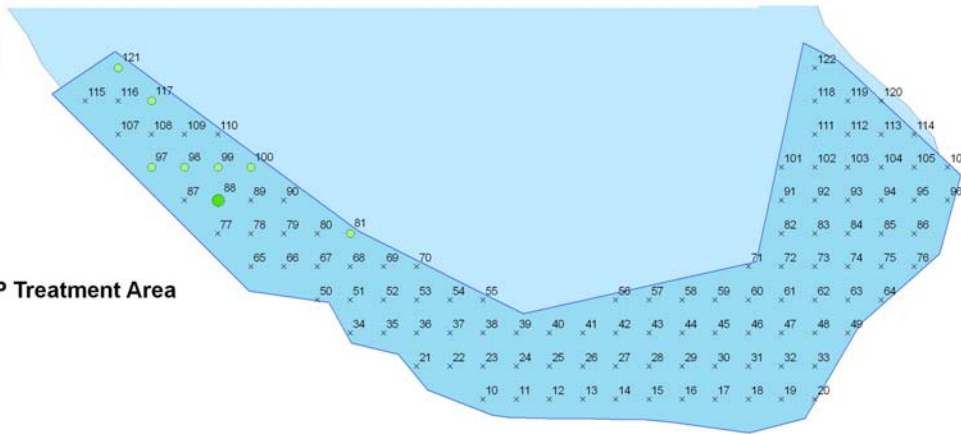
# Small pondweed (*Potamogeton pusillus*) Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



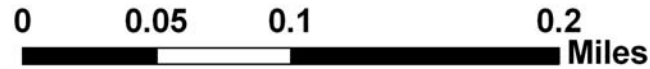
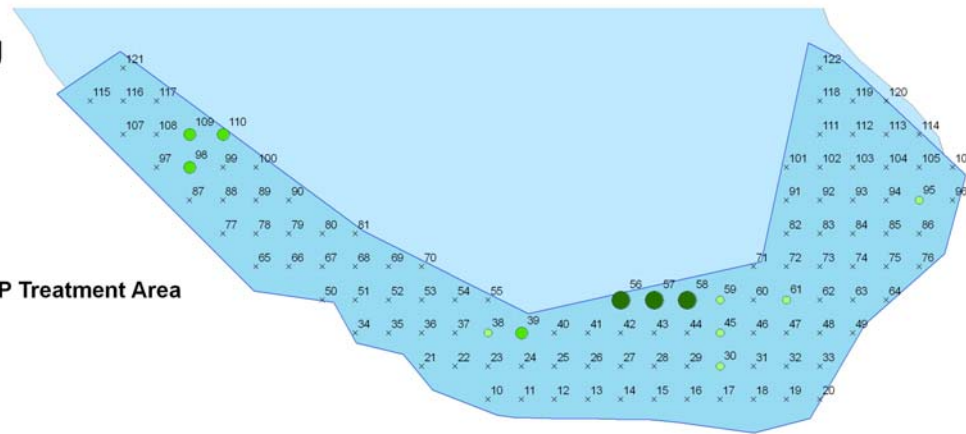
# Robbins (fern) pondweed (*Potamogeton robbinsii*) Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



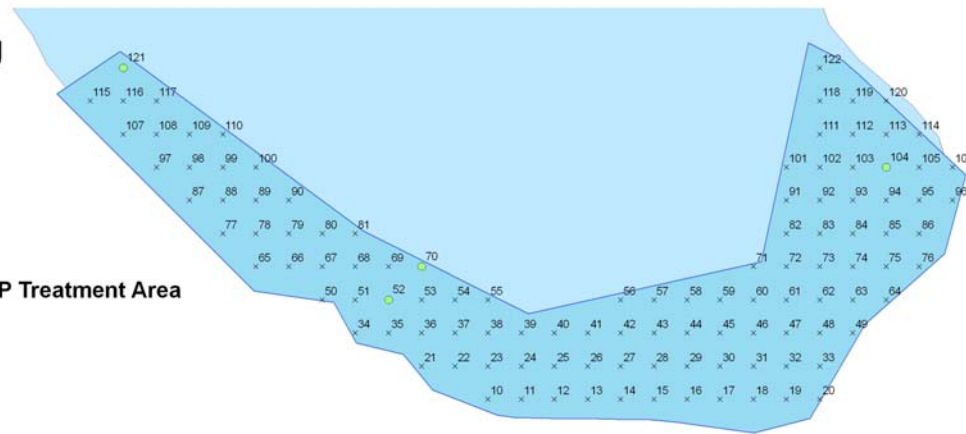
# Flat-stem pondweed (*Potamogeton zosteriformis*) Pre-Treatment CLP Survey



Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009

## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



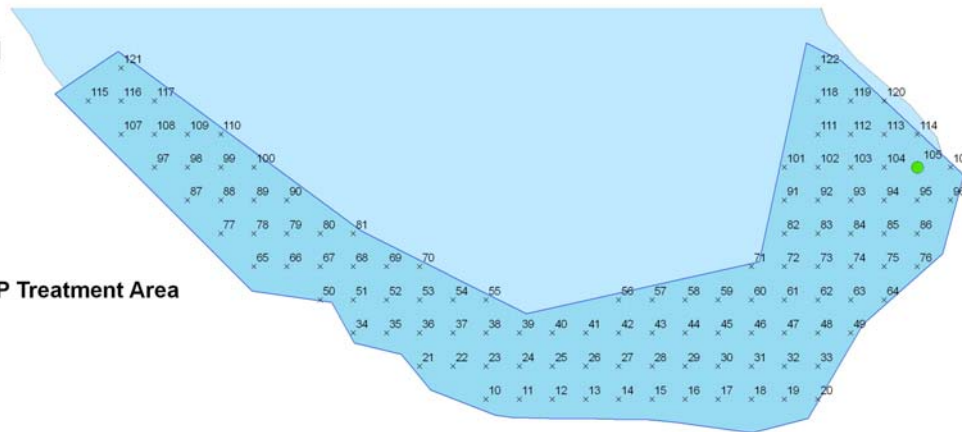
# Stiff water crowfoot (*Ranunculus aquatilis*) Pre-Treatment CLP Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
April 27, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 Proposed CLP Treatment Area
- Balsam Lake



**Appendix XII: Bay Southeast of the Big Narrows  
Post-Treatment Species Distribution Maps**

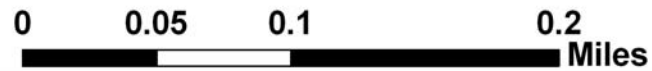
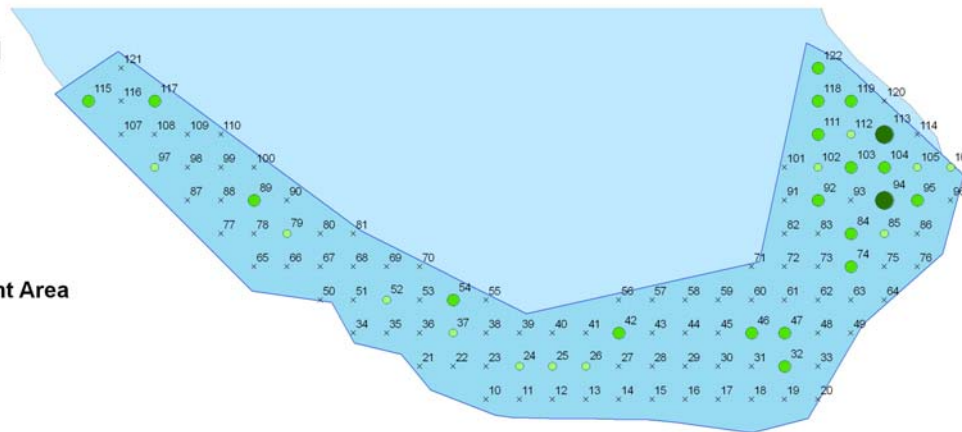
# Coontail (*Ceratophyllum demersum*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



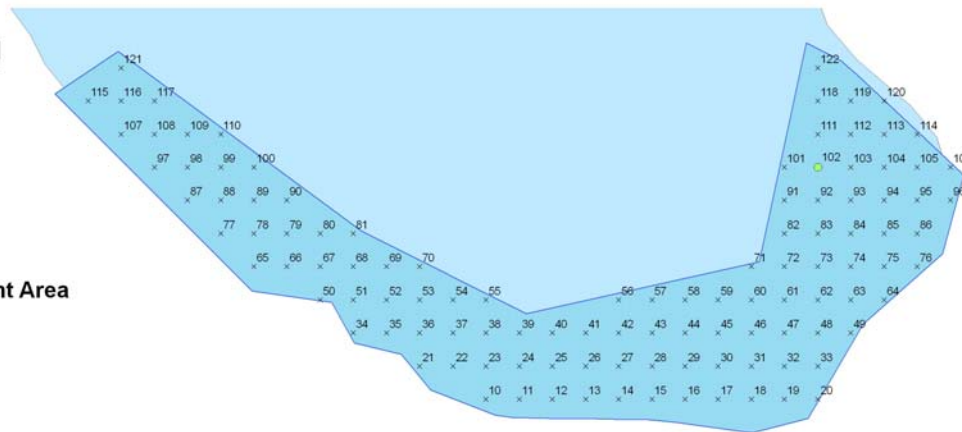
# Common waterweed (*Elodea canadensis*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



# Filamentous algae

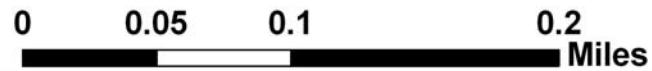
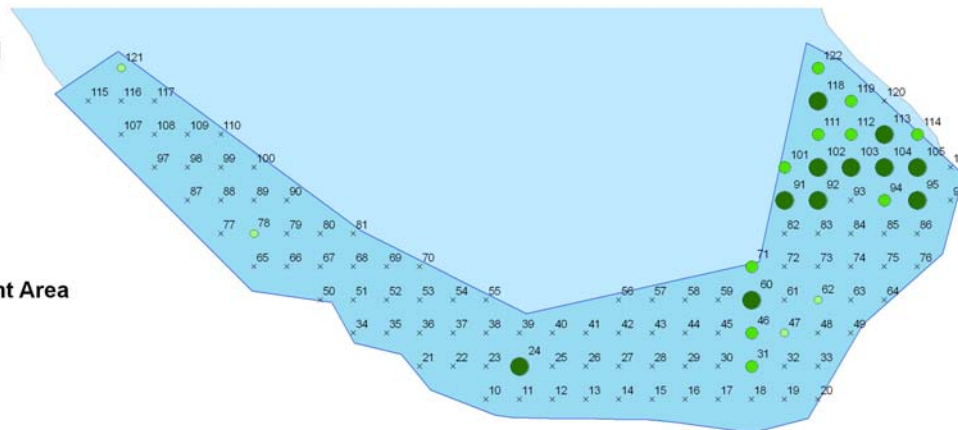
## Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



### Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake





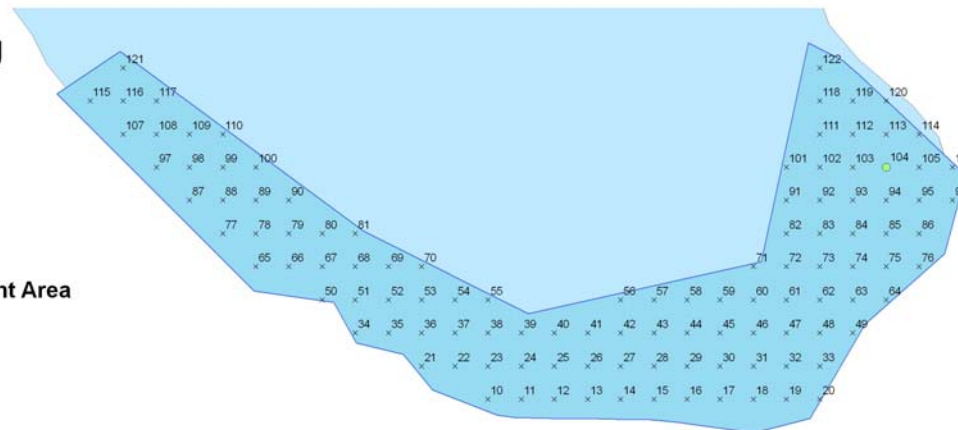
# Water star-grass (*Heteranthera dubia*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



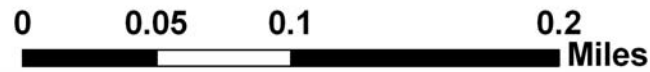
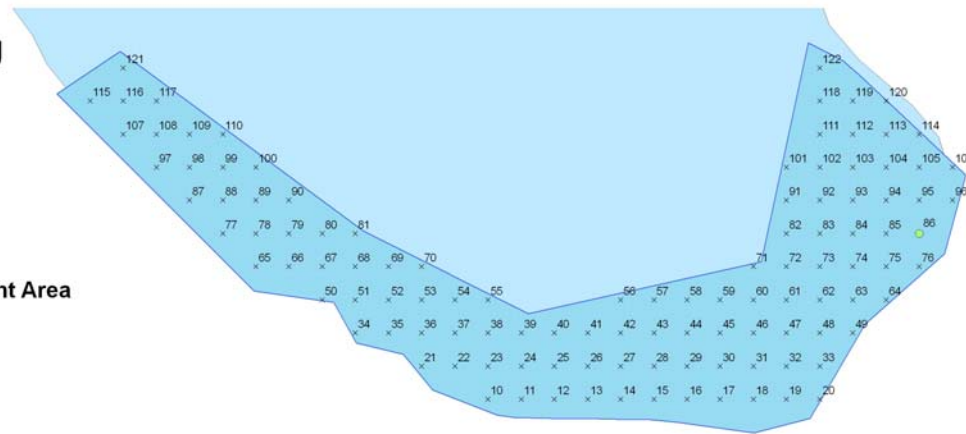
# Small duckweed (*Lemna minor*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



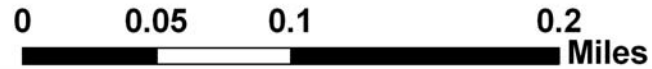
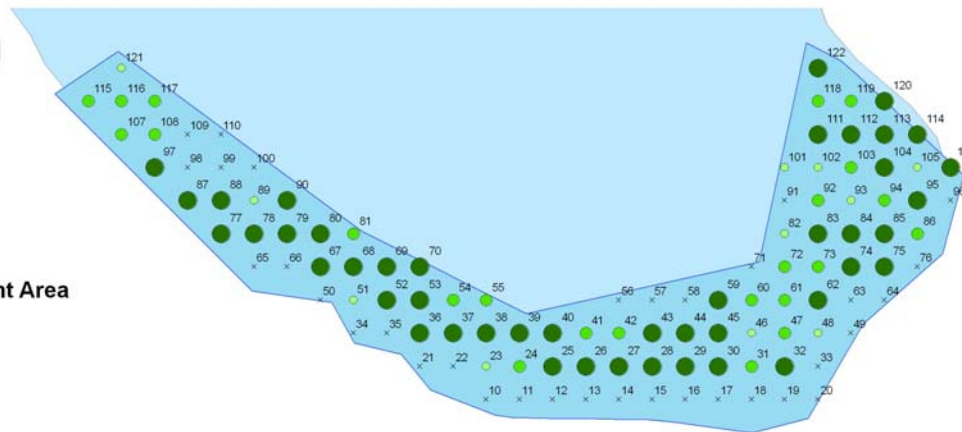
# Forked duckweed (*Lemna trisulca*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



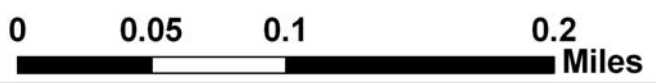
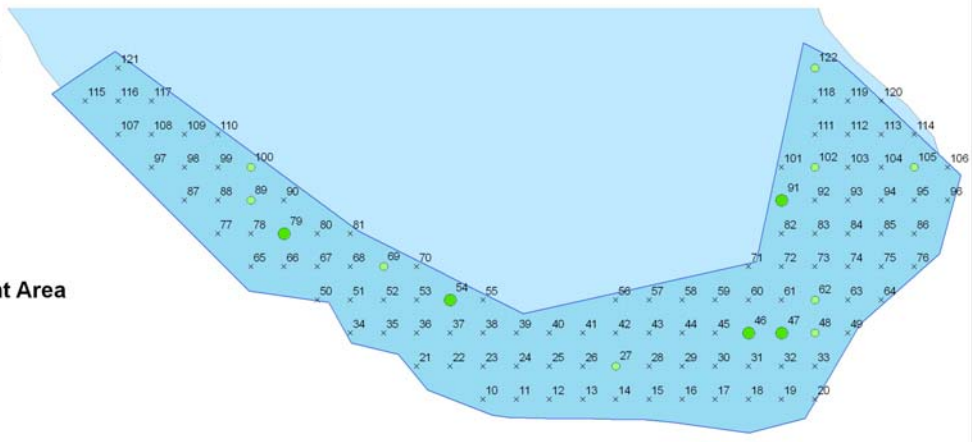
# Northern water milfoil (*Myriophyllum sibiricum*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



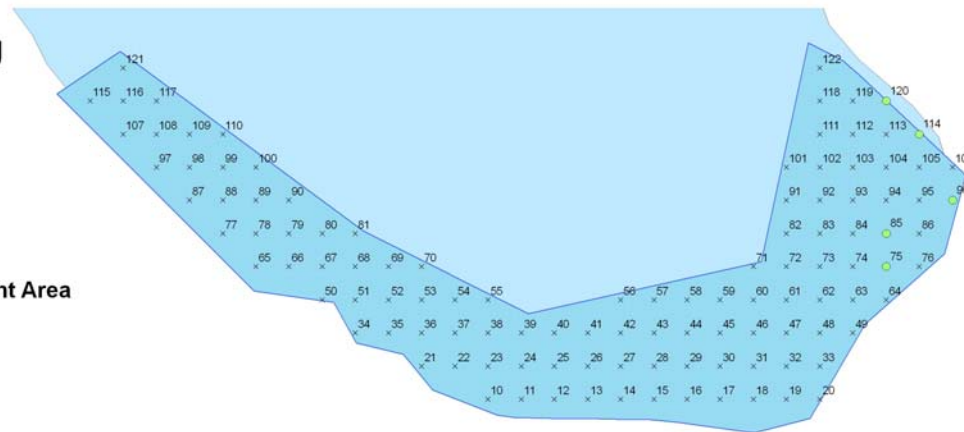
# Spatterdock (*Nuphar variegata*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



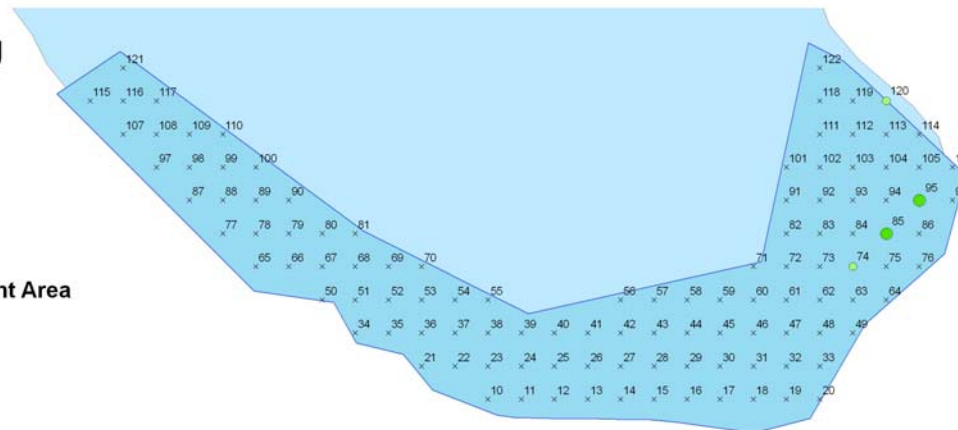
# White water lily (*Nymphaea odorata*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



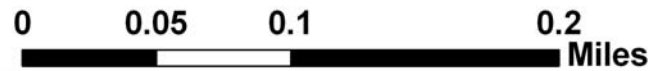
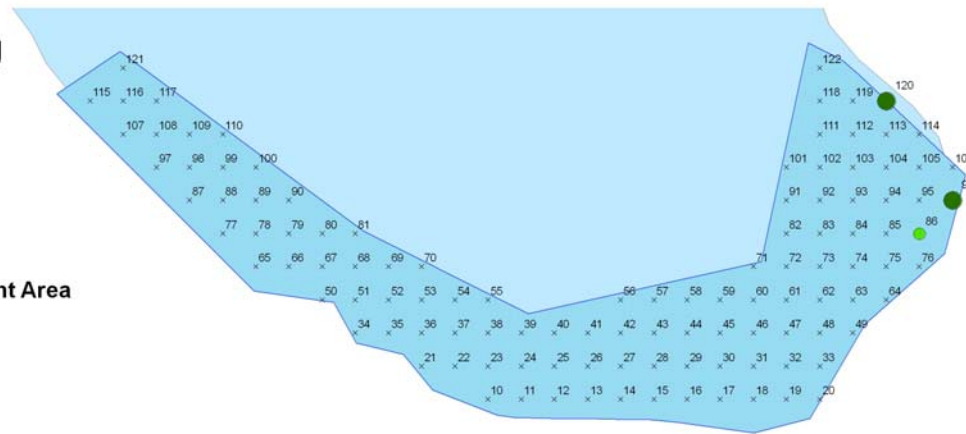
# Pickeralweed (*Pontederia cordata*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



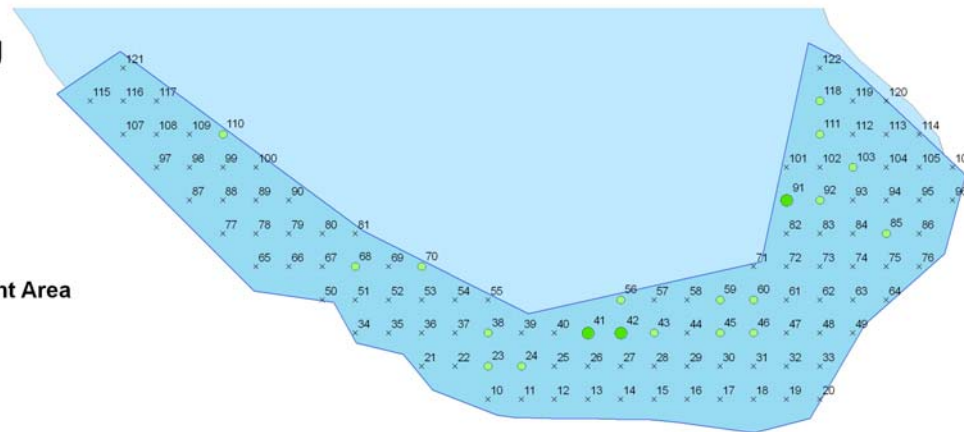
# Curly-leaf pondweed (*Potamogeton crispus*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake





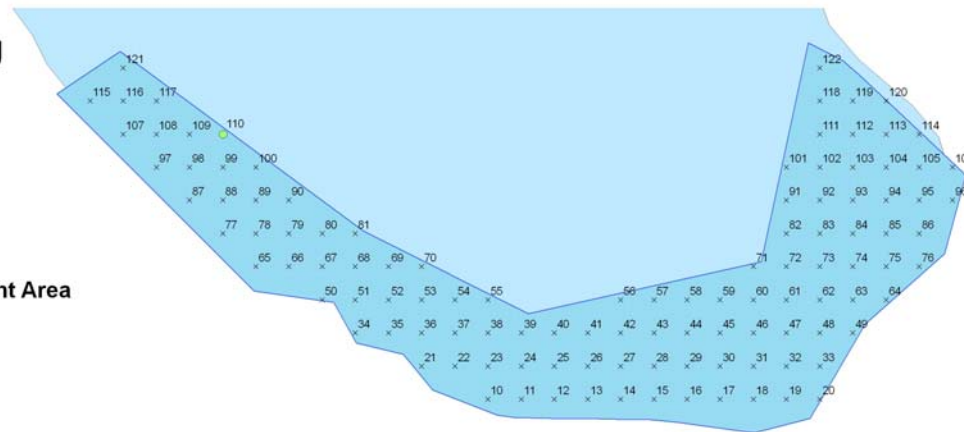
# Illinois pondweed (*Potamogeton illinoensis*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



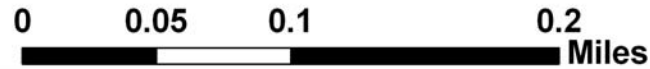
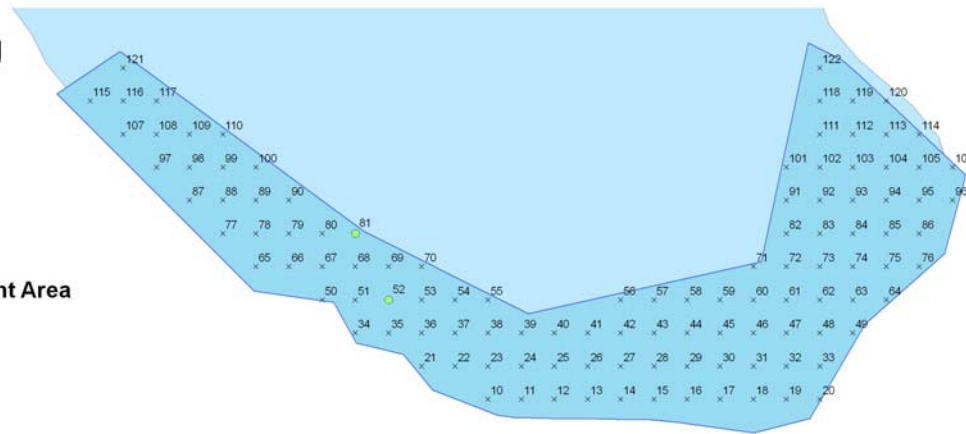
# White-stem pondweed (*Potamogeton praelongus*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



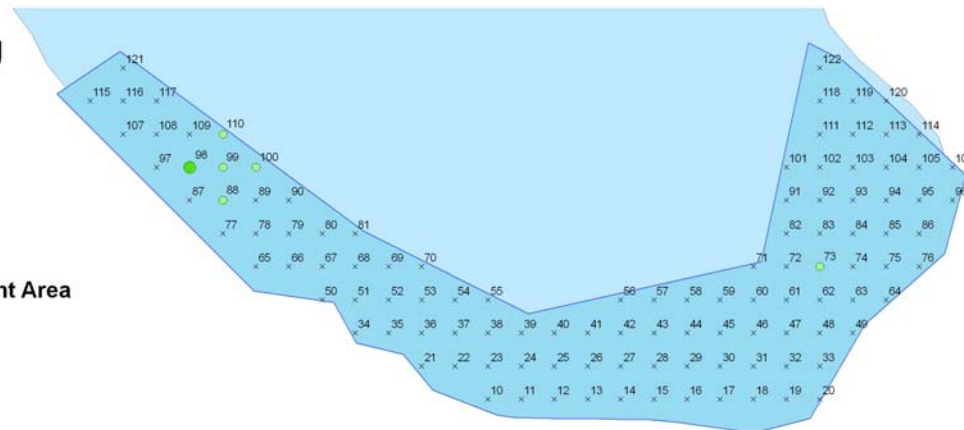
# Small pondweed (*Potamogeton pusillus*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



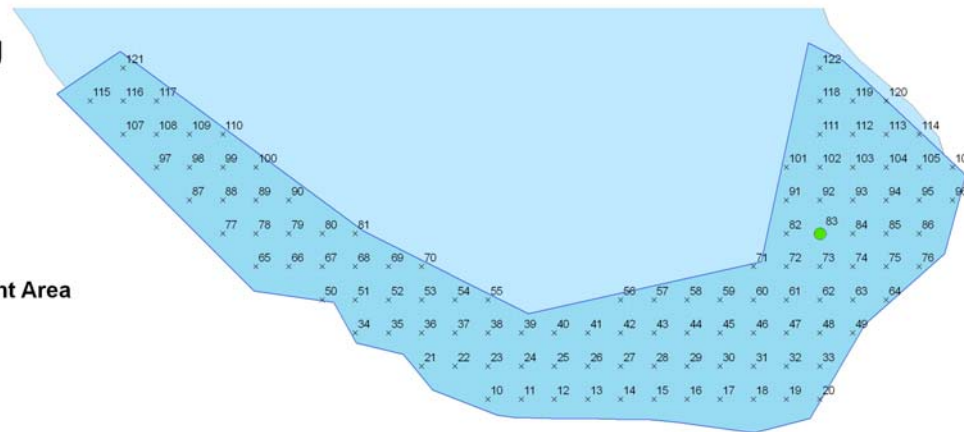
# Clasping-leaf pondweed (*Potamogeton richardsonii*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



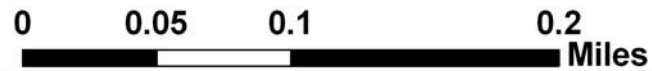
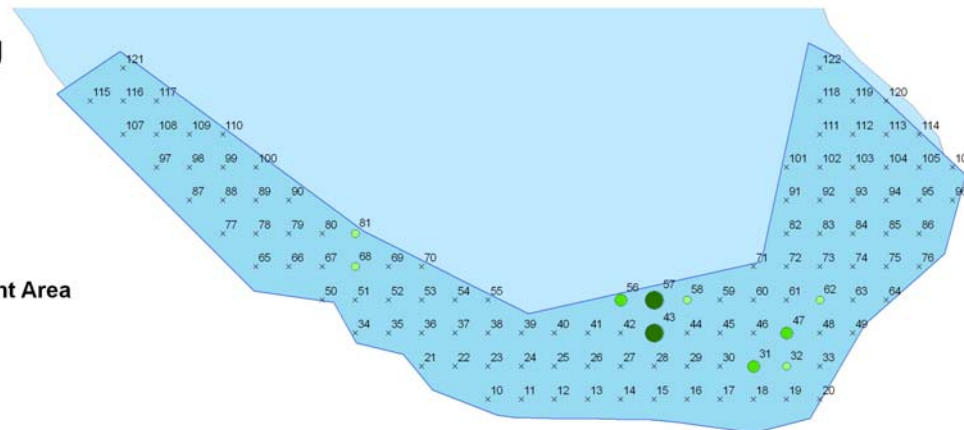
# Robbins (fern) pondweed (*Potamogeton robbinsii*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



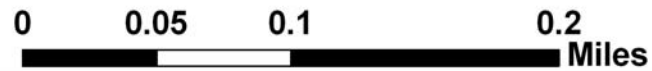
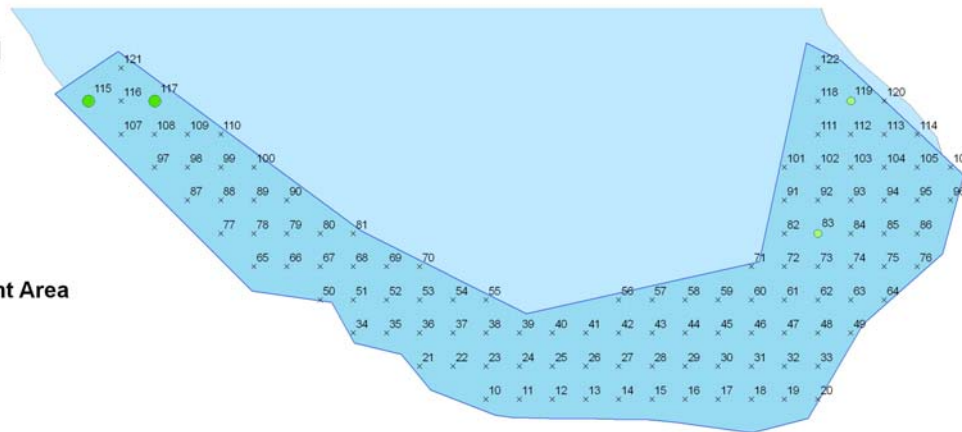
# Flat-stem pondweed (*Potamogeton zosteriformis*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



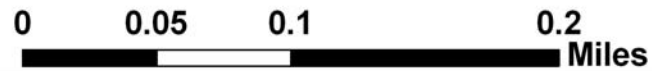
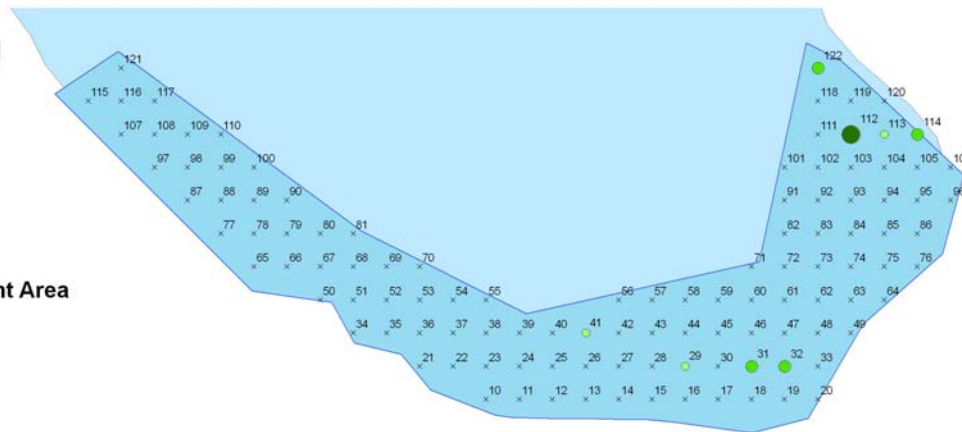
# Stiff water crowfoot (*Ranunculus aquatilis*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



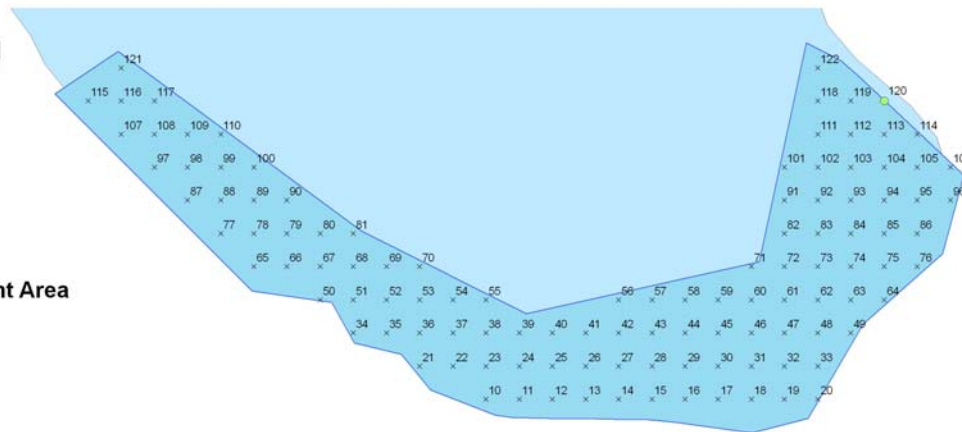
# Common bur-reed (*Sparganium eurycarpum*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake





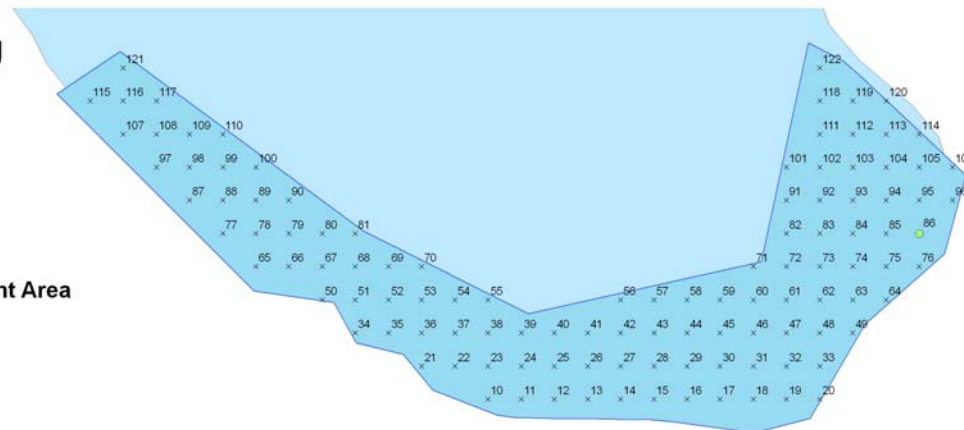
# Large duckweed (*Spirodela polyrhiza*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



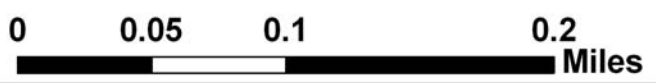
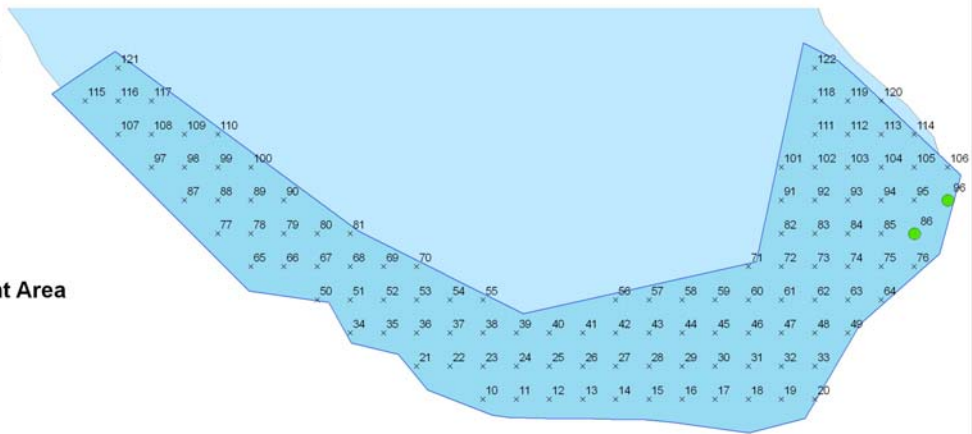
# Broad-leaved cattail (*Typha latifolia*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake



# Wild celery (*Vallisneria americana*) Post Treatment Survey

Bay Southeast of the Big Narrows  
East Balsam Lake  
Polk Co., WI  
June 10, 2009



## Rake Fullness Rating

- 3
- 2
- 1
- Visual
- × None found
- 2009 CLP Treatment Area
- Balsam Lake

