Long Lake
Aquatic Vegetation Management Plan
2008 Update
Porter County, Indiana

February 12, 2009

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Executive Summary

Aquatic Control was contracted by the Valparaiso Lakes Area Conservancy District (VLACD) to complete aquatic vegetation sampling in order to update the Long Lake Aquatic Vegetation Management Plan 2007-2011 (Aquatic Control, 2008). Funding for the update of this plan was obtained from the VLACD and the Indiana Department of Natural Resources-Division of Fish and Wildlife as part of the Lake and River Enhancement program (LARE).

Native aquatic vegetation is an important component of Indiana Lakes. Native vegetation provides fish habitat, food for wildlife, prevents erosion, and can improve overall water quality. However, invasive species can negatively impact lake use, including fishing, boating, swimming, aesthetic, and lakefront property values. Long Lake is a natural lake that is part of the Valparaiso Chain of Lakes in Porter County, Indiana. Long Lake has a surface area of approximately 65 acres and has a maximum depth of 26 feet and an average depth of approximately 8 feet. The primary species of concern within Long Lake is the invasive plant Eurasian watermilfoil (*Myriophyllum spicatum*), which was present at 20% of Tier II survey sites in the summer of 2007.

The vegetation management goals of the Long Lake Aquatic Vegetation Management Plan are listed below:

- Maintain a stable, diverse aquatic plant community that supports a good balance of predator and prey fish and wildlife species, good water quality, and is resistant to minor habitat disturbances and invasive species
- Direct efforts to preventing and controlling the negative impacts of aquatic invasive species
- Provide reasonable public recreational access while minimizing the negative impacts on plant and fish and wildlife resources

Below is a list of more specific objectives created to help achieve the original goals of the plan:

- Maintain and enhance the diversity of rooted floating and emergent plant species
- Maintain density and diversity of native submersed vegetation
- Reduce the density and abundance of Eurasian watermilfoil to less than 5% of the littoral zone surface area
- Prevent further spread of purple loosestrife
- Monitor curlyleaf pondweed abundance and control if necessary
- Create public awareness of potential for hydrilla invasion and post signs for cleaning off boats at all private and public access sites
- Control nuisance vegetation around docks and the boat ramp in order to allow for boat access

In 2008, VLACD received an $8,100 grant from LARE in order to update the vegetation management plan and complete control of Eurasian watermilfoil. VLACD selected Aquatic Control Inc. to complete sampling, perform treatments on milfoil, and update the management plan. On May 29, 2008, an invasive species mapping survey was

completed. Eurasian watermilfoil was documented in 9.7 acres of the lake. On June 11, 9.7 acres of Eurasian watermilfoil was treated with Renovate 3 aquatic herbicide (active ingredient triclopyr). The treatment successfully controlled the Eurasian watermilfoil within Long Lake. On August 7, 2008, a Tier II survey was conducted. Seven native species were collected and common coontail (*Ceratophyllum demersum*) was the most abundant. Eurasian watermilfoil was not found during the summer survey.

A public meeting was held on September 17, 2008 in order to inform lake users of the plant management activities and gain their input on the direction of the plan. Another meeting was conducted on November 6, 2008 with LARE biologists, District Fisheries Biologists, and representatives from the VLACD. Sampling and treatment data along with a potential budget and action plan were presented and discussed at this meeting.

The following is a list of actions designed to continue successful management of aquatic vegetation in Long Lake.

1. Complete a pretreatment invasive species mapping survey prior to any vegetation management in early spring 2009 and continue these surveys through 2012 in order to assess the success of controls and locate potential treatment areas.
2. Treat Eurasian watermilfoil wherever it is detected with Renovate aquatic herbicide in an effort to maintain Eurasian watermilfoil to less than 5% of the littoral zone surface area.
3. Complete Tier II surveys in mid to late summer in order to document changes in the native community and asses the effectiveness of vegetation management techniques performed earlier in the year. Include mapping of purple loosestrife with this survey.
4. Continue to assess, adjust, and update the Long Lake Management Plan through 2012.

Acknowledgements

Funding for the vegetation sampling and preparation of an aquatic vegetation management plan was provided by the Valparaiso Lakes Area Conservancy District (VLACD) and the Indiana Department of Natural Resources (IDNR) Lake and River Enhancement Program (LARE). Aquatic Control, Inc. completed the fieldwork, data processing, and map generation. Special thanks are due to Bob Minarich and the VLACD for their help in initiating and completing this project. Special thanks are given to Bob Robertson and Chip Long, Fisheries Biologists from the IDNR-Division of Fish and Wildlife, for their assistance and review of this plan. Special thanks are also given to Gwen White and Angela Studevant, Aquatic Biologist from the LARE program for their review and assistance on this plan. Author of this report is Brendan Hastie of Aquatic Control. The author would like to acknowledge the valuable input from Brian Isaacs, Nathan Long, and Barbie Huber of Aquatic Control for their field assistance, map generation, review, and editing of this report.

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1.0 INTRODUCTION

This report was created in order to update the Long Lake Aquatic Vegetation Management Plan. The plan update was funded by the Indiana Department of Natural Resources Lake and River Enhancement Program (LARE) and the Valparaiso Lakes Area Conservancy District. The update serves as a tool to track changes in the vegetation community, to adjust the action plan as needed, and to maintain eligibility for additional LARE funds. Major items covered include the 2008 sampling results, a review of the 2008 vegetation controls, and updates to the budget and action plans. Once reviewed and approved, the update should be included in the original vegetation management plan following the reference section and prior to the appendix.

Long Lake is the second largest lake within a chain of natural lakes located just north of Valparaiso in Porter County, Indiana. Long Lake is approximately 65 acres with a maximum depth of 26 feet, average depth of 8 feet. Long Lake has a direct watershed of 409.8 acres and total watershed of 836.3 acres. The hydraulic retention time of Long Lake is 0.49 years. Emergent wetlands, emergent shrub wetlands, and forested land compose 137.2 acres of Long Lake's watershed. Approximately 70% of the residential areas are high density areas (JFNew 2003).

2.0 PROBLEM STATEMENT

Native aquatic vegetation is an important component of lakes in Indiana. However, invasive species can negatively impact the present uses of the lake including fishing, boating, swimming, aesthetic, and lakefront property values. The primary nuisance species within Long Lake is the invasive species Eurasian watermilfoil. Curlyleaf pondweed is another submersed invasive species that is present in Long Lake at low levels. Purple loosestrife is an invasive exotic emergent species that was also detected during sampling. This species will not likely create nuisance conditions for lake users, but could have negative impacts on native wetland species in and around Long Lake.

3.0 2008 PLANT SAMPLING RESULTS

Two surveys were completed in 2008. An invasive species mapping survey was completed in May of 2008. This survey was designed to select treatment areas and document changes in the plant community. A Tier II survey was completed in August of the same year. The purpose of this survey was to monitor the effectiveness of the herbicide treatments, changes in the plant community, and to help plan for future plant management.

3.1 Spring Survey (Invasive Plant Mapping)

On May 29, 2008 an invasive plant mapping survey was completed on Long Lake. A Secchi depth was taken prior to sampling and was found to be 12.0 feet. The survey revealed that 9.7 acres of Eurasian watermilfoil (Figure 1) existed within Long Lake. Milfoil was distributed fairly evenly along the western, eastern, and northern shores. Milfoil was not found along the southern most shore.

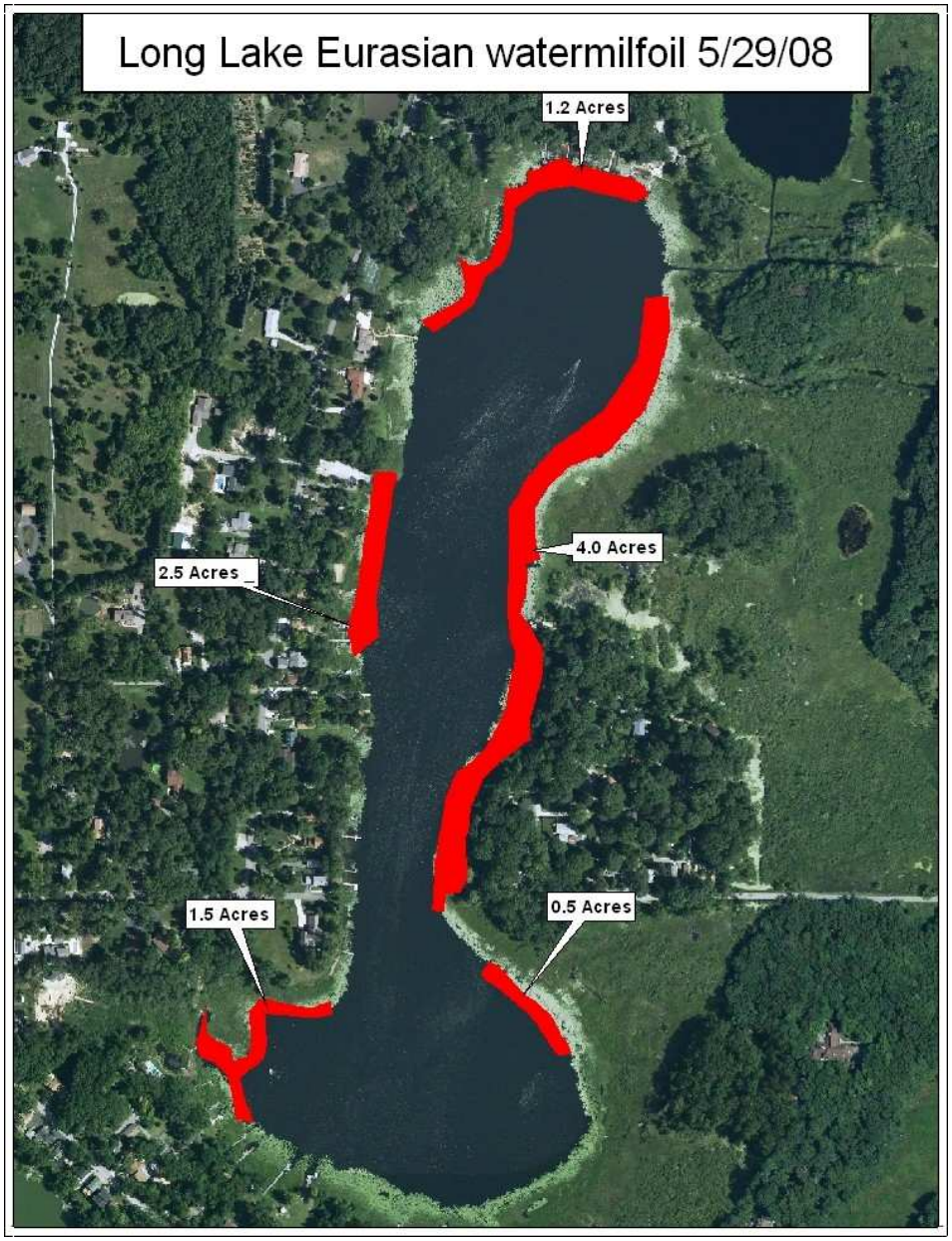


Figure 1. Pretreatment Eurasian watermilfoil beds, Long Lake, May 29, 2008.

Curlyleaf pondweed was also documented growing in 1.9 acres of Long Lake (Figure 2). This exotic species was confined to the northern and southern areas of the lake. The majority of the curlyleaf was found in the northern part of Long Lake (1.2 acres) while 0.7 acres was detected growing in the southern section of the lake. Curlyleaf pondweed was rather spotty in these areas and it appears that curlyleaf pondweed is not reaching nuisance levels within Long Lake. Another invasive species mapping survey should be completed in 2009. This survey will help for better assessment as to whether curlyleaf pondweed is spreading and in need of control.

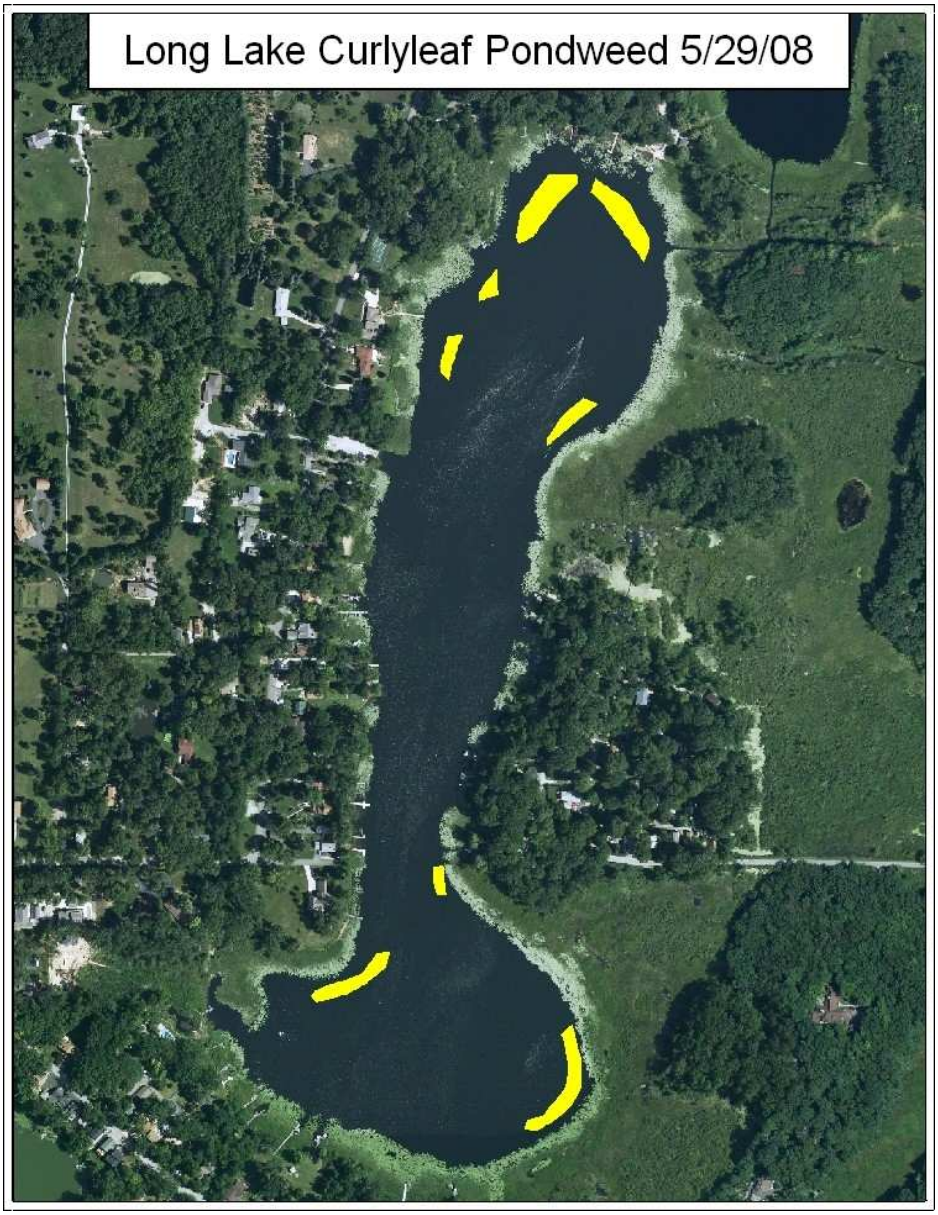


Figure 2. Pretreatment curlyleaf pondweed beds, Long Lake, May 29, 2008.

3.2 Summer Survey (Tier II Survey)

Tier II sampling took place on August 7, 2008. A Secchi disk reading was taken prior to sampling and was found to be 9.0 feet. Samples were collected from as deep as 20.0 feet, but plants were only present to a maximum of 17.0 feet. Forty sites were sampled throughout the littoral zone. The same points used in the 2007 Tier II survey were used again in the 2008 Tier II survey. A total of 7 species were collected of which all of the species were native. Thirty of the forty sites contained vegetation and the maximum number of species collected at a site was 6. The average number of species per site was 1.98. Table 1 shows the results from the Tier II survey.

Table 1. Occurrence and abundance of submersed aquatic plants in Long Lake August 7, 2008.

Occurrence and abundance of submersed aquatic plants in Long Lake

County:	Porter	Sites with plants:	30	Mean species/site:	1.98
Date:	8/7/2008	Sites with native plants:	30	Standard error (ms/s):	0.25
Secchi (ft):	9	Number of species:	7	Mean native species/site:	1.98
Maximum plant depth (ft):	17	Number of native species:	7	Standard error (mns/s):	0.25
Trophic status	Mesotrophic	Maximum species/site:	6	Species diversity:	0.76
Total sites:	40			Native species diversity:	0.76

Depths 0 to 20 ft	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
common coontail	75.0	25.0	10.0	17.5	47.5	60.0
flatstemmed pondweed	47.5	52.5	32.5	15.0	0.0	15.5
eel grass	25.0	75.0	10.0	12.5	2.5	12.0
common bladderwort	25.0	75.0	22.5	2.5	0.0	6.0
Richardson's pondweed	17.5	82.5	2.5	7.5	7.5	12.5
slender naiad	5.0	95.0	5.0	0.0	0.0	1.0
northern watermilfoil	2.5	97.5	2.5	0.0	0.0	0.5

Depths 0 to 5 ft	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
common coontail	100.0	0.0	0.0	54.5	45.5	78.2
flatstemmed pondweed	81.8	18.2	45.5	36.4	0.0	30.9
eel grass	72.7	27.3	18.2	45.5	9.1	40.0
Richardson's pondweed	54.5	45.5	9.1	27.3	18.2	36.4
common bladderwort	54.5	45.5	45.5	9.1	0.0	14.5
slender naiad	18.2	81.8	18.2	0.0	0.0	3.6

Depths 5 to 10 ft	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
common coontail	100.0	0.0	16.7	16.7	66.7	80.0
flatstemmed pondweed	66.7	33.3	66.7	0.0	0.0	13.3
eel grass	33.3	66.7	33.3	0.0	0.0	6.7
common bladderwort	33.3	66.7	33.3	0.0	0.0	6.7
Richardson's pondweed	16.7	83.3	0.0	0.0	16.7	16.7
northern milfoil	16.7	83.3	16.7	0.0	0.0	3.3

Depths 10 to 15 ft	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
common coontail	90.9	9.1	9.1	0.0	81.8	83.6
flatstemmed pondweed	54.5	45.5	36.4	18.2	0.0	18.2
common bladderwort	18.2	81.8	18.2	0.0	0.0	3.6

Depths 15 to 20 ft	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
common coontail	25.0	75.0	16.7	0.0	8.3	11.7

Other species observed: white water lily, pickerlweed, arrow arum, arrowhead, purple loostrife, iris, hibiscus spp., button bush, swamp loostrife, phragmites.

Coontail (*Ceratophyllum demersum*) was found at the highest percentage of sample sites (75.0%) for all depths (Figure 3). It also had the highest frequency of occurrence and

dominance ratings for each depth range. It was the only species to be found growing deeper than 15 feet. Flatstem pondweed (*Potamogeton zosteriformis*) was the second most frequently occurring species (47.5%) in Long Lake at all depths during the Tier II survey (Figure 4). This species was not found growing in water deeper than 10 feet. Eel grass (*Vallisneria americana*) ranked third in percent occurrence (25.0%) and was only found in water less than 10.0 feet deep (Figure 5). The next most frequently occurring species was common bladderwort (*Utricularia vulgaris*) (25%), followed by Richardson's pondweed (*Potamogeton richardsonii*) (17.5%) (Figure 6), slender naiad (*Najas flexillis*) (5.0%), and northern milfoil (*Myriophyllum sibiricum*) (2.5%).

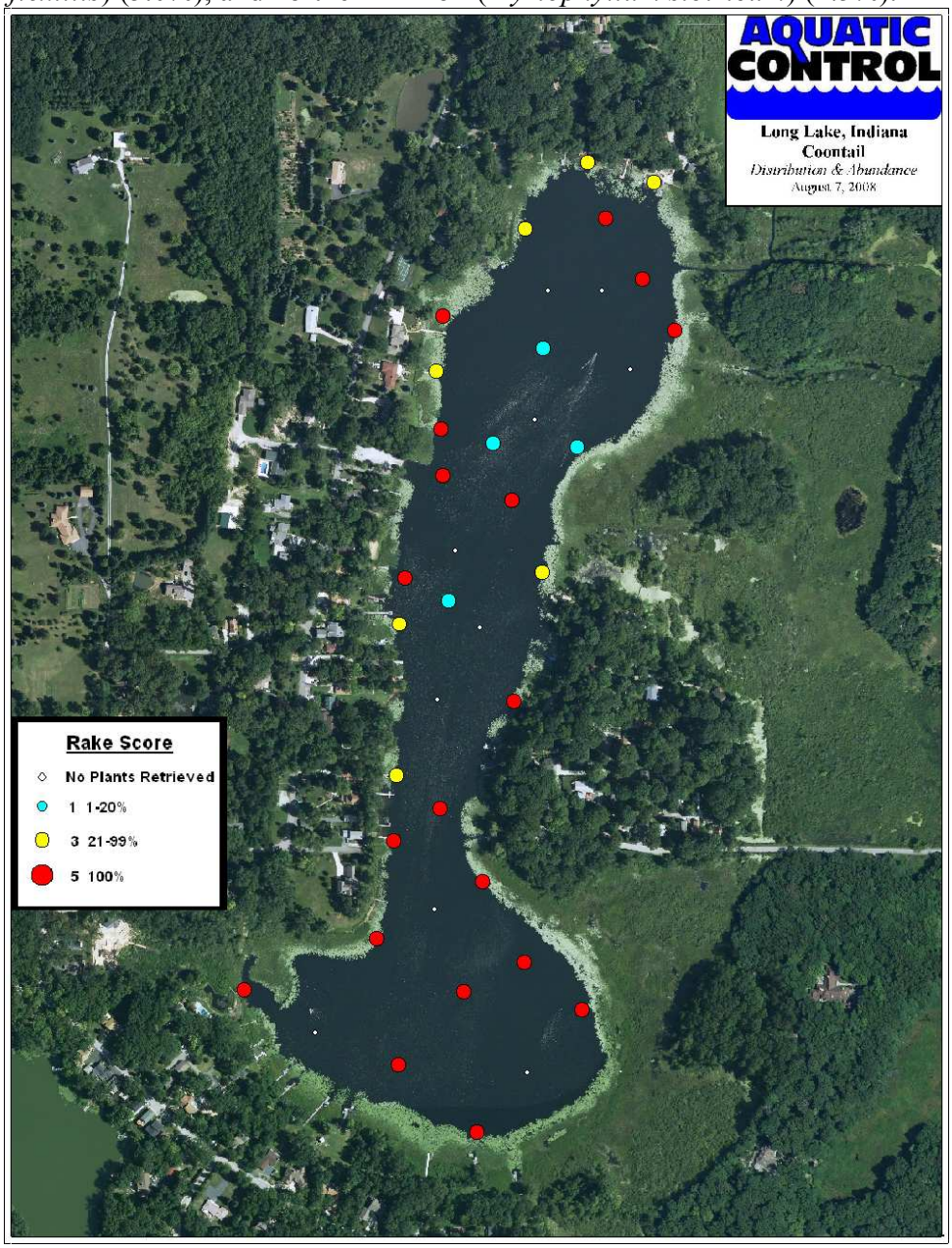


Figure 3. Long Lake, coontail distribution and abundance, August 7, 2008.

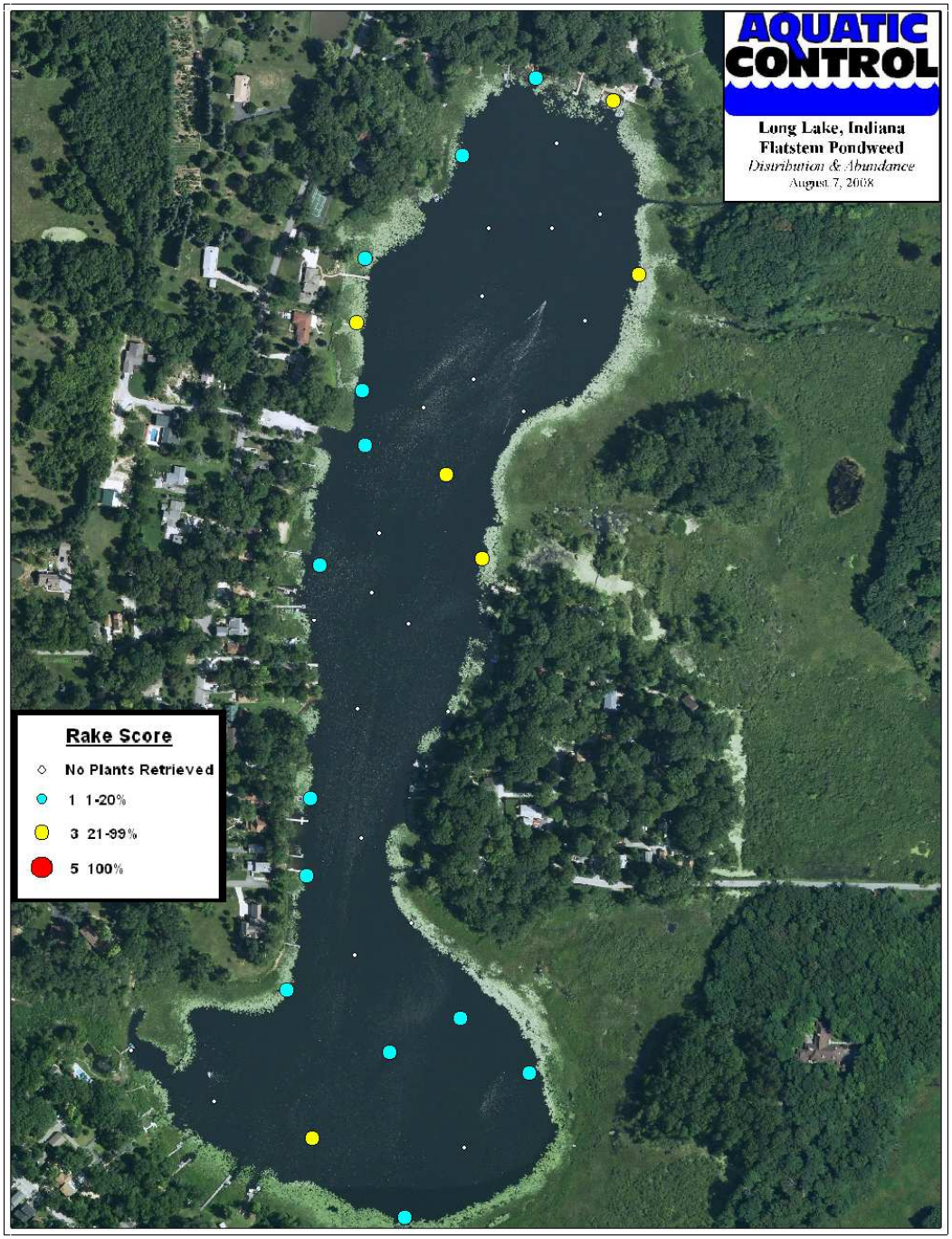


Figure 4. Long Lake, flatstem pondweed distribution and abundance, August 7, 2008.

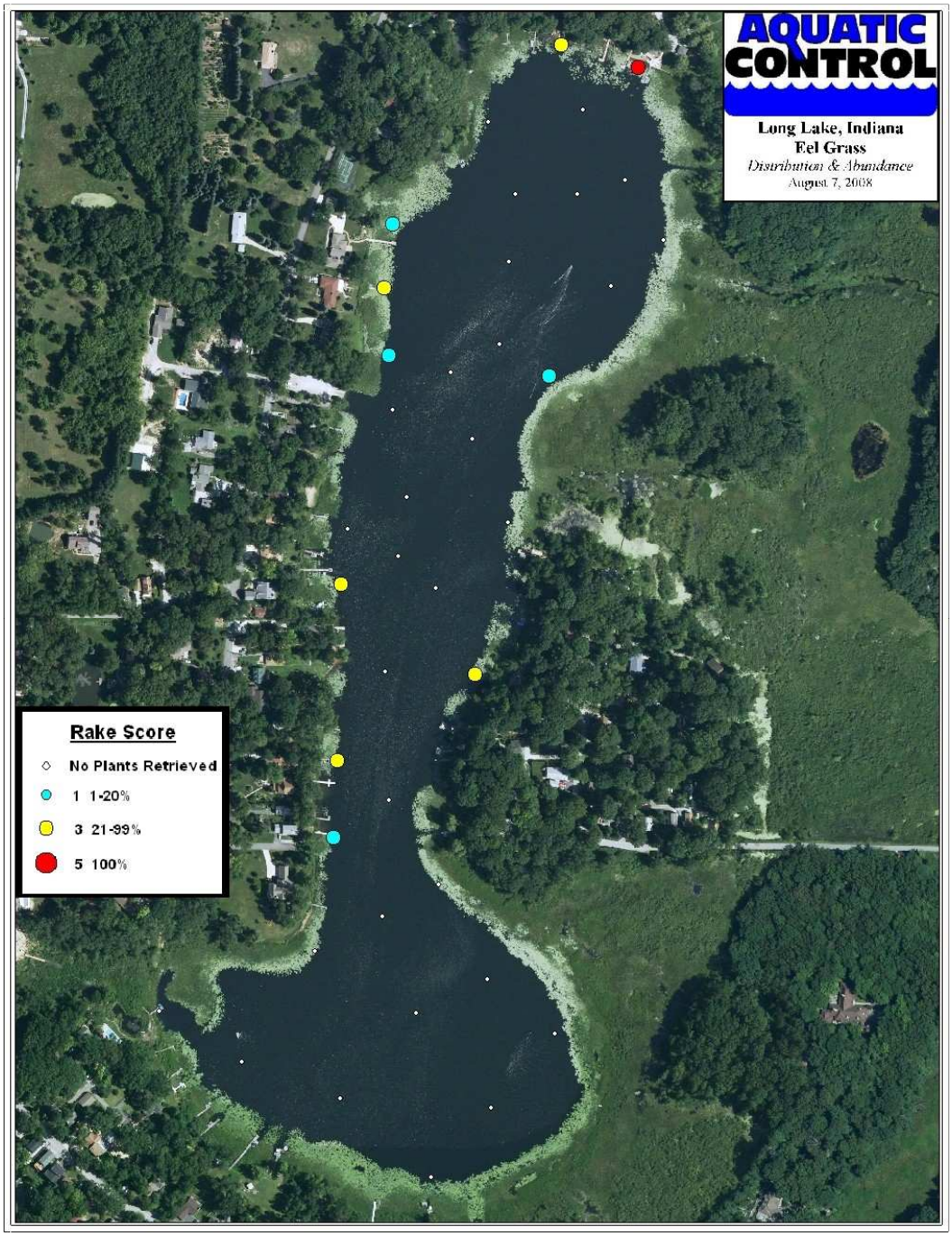


Figure 5. Long Lake, eel grass distribution and abundance, August 7, 2008.

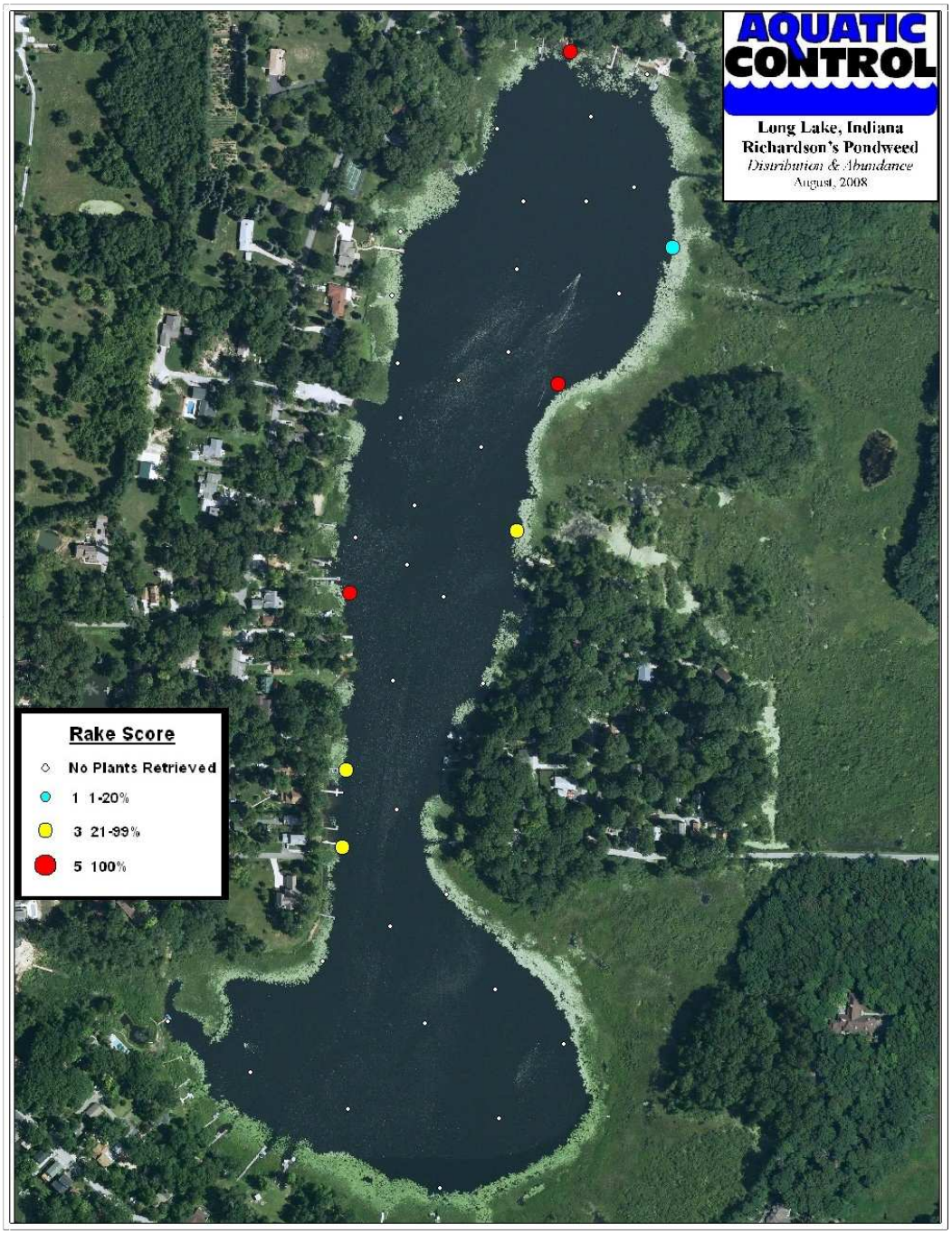


Figure 6. Long Lake, Richardson's pondweed distribution and abundance, August 7, 2008.

3.3 Aquatic Vegetation Sampling Discussion

One goal of the management plan is to direct efforts to preventing and controlling the negative impacts of aquatic invasive species. Comparison of invasive species mapping surveys from 2007 and 2008 reveals some changes in the abundance of curlyleaf pondweed and Eurasian watermilfoil. Curlyleaf pondweed was found in many of the same areas and exhibited some expansion from 1.25 acres in 2007 to 1.90 acres in 2008. Eurasian watermilfoil expanded from 0.58 acres in 2007 to 9.70 acres in 2008 (milfoil had expanded a great deal from the spring to summer of 2007). No actions to control

invasive species were taken prior to the 2008 survey, so future invasive species mapping surveys should be completed in order to assess the effectiveness of actions recommended by this plan.

Comparisons of Tier II data helps illustrate changes in the plant community and the effectiveness of management actions. Table 2 and Figure 7 illustrate the data collected from all Tier II surveys performed on Long Lake. Eurasian watermilfoil was found at 20.0% of the sites in the 2007 summer Tier II survey and 9.7 acres during the 2008 spring invasive species mapping survey. No Eurasian watermilfoil was found in Long Lake following the 2008 milfoil treatment. The treatment appears to have been successful at controlling this invasive species. This fact is also illustrated in Figure 8 which compares photographs taken in 2007 and 2008 from the same area.

Table 2. Long Lake, species percent occurrence in the last three Tier II surveys.

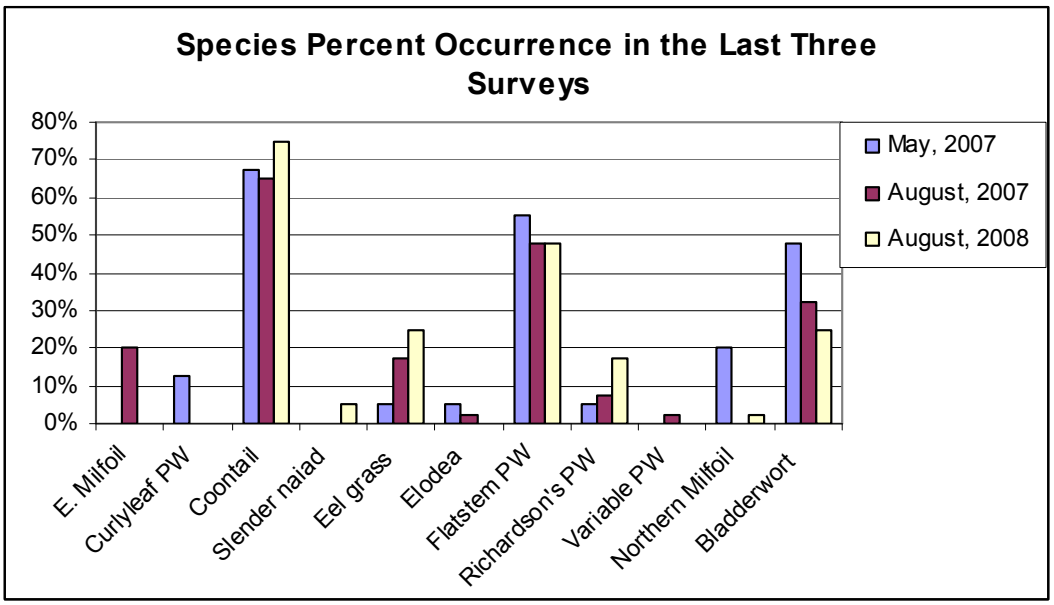


Figure 7. Long Lake, species percent occurrence in the last three Tier II surveys.

Figure 8. Photographs of the same area of Long Lake in August 2007 (left) & August 2008 (right).

Common coontail has been the most abundant native species within Long Lake. Coontail was at 67.5% of the sampling sites during the May 2007 Tier II survey and at 65.0% of sampling stations during the August 2007 Tier II survey. Coontail was increased to 75.0% of the sampling sites during the 2008 Tier II survey.

Richardson's pondweed was found at 7.5% of the sampling sites during the 2007 summer Tier II survey. A slight increase (17.5% frequency of occurrence) was noted during the 2008 Tier II survey. Richardson's pondweed is listed on the Endangered, Rare, and Extirpated Plants of Indiana as imperiled and rare. Special attention to its distribution and locations should be made in order to limit the amount of damage to this species through future management practices.

Variable pondweed had a 2.5% frequency of occurrence in 2007, but was not detected in the 2008 Tier II survey. Likewise, American elodea had been observed in 2007, but was not observed during the 2008 survey. Decreases in abundance were seen in bladderwort and northern milfoil. Bladderwort was found at 32.5% of the sites during the 2007 summer survey, but was only found at 25.0% abundance during the 2008 summer survey. The percent occurrence of northern milfoil has dropped from 20.0% in May of 2007 to 2.5% in August of 2008. Northern milfoil and bladderwort are susceptible to Renovate, so their reduction may have been a result of the treatment. Slender naiad was not detected during either of the Tier II surveys performed in 2007, but was found at 5% of the sample sites in the 2008 Tier II survey. The percent occurrence of eel grass had increased from 5.0% in 2007 to 25% in 2008. It appears that eel grass may be replacing milfoil in the shallow water control areas.

Table 3 shows the Tier II metrics from all surveys performed on Long Lake. The data indicates that water clarity on Long Lake has remained relatively constant over the past two summer surveys. The Table also shows that there has been little change in overall native abundance and diversity when comparing the last two summer surveys.

Table 3. Comparison of Tier II data from Long Lake.

Tier II Metric	May-07	Aug-07	Aug-08
Secchi	11	9.5	9
Max Plant Depth	17	17	17
Total Sites	40	40	40
Sites with Plants	29	28	30
Sites with Native Plants	29	28	30
Number of Species	8	8	7
Number of Native Species	7	7	7
Maximum Species/Site	5	5	6
Mean Species/Site	2.18	1.95	1.98
Mean Native Species/Site	2.18	1.75	1.98
Species Diversity Index	0.78	0.78	0.76
Native Species Diversity Index	0.75	0.74	0.76

There were no surveys completed that were designed to assess the diversity and abundance of rooted floating or emergent vegetation. However, these beds were observed around large areas of Long Lake and should be protected due to their benefits as

fish and wildlife habitat (Figure 9). Purple loosestrife should be mapped during future summer Tier II surveys.

Figure 9. Long Lake rooted floating and emergent plant beds.

4.0 2008 VEGETATION CONTROL

On June 11, 2008 a LARE funded treatment was completed by Aquatic Control Inc. targeting Eurasian watermilfoil. Treatment areas were selected from the spring pretreatment invasive plant mapping results. Eurasian watermilfoil beds were downloaded to handheld GPS units to ensure that the herbicide treatment would be as accurate as possible. Renovate 3 (active ingredient triclopyr) was applied via dropper hoses at a rate between 1.0 to1.75 ppm. A total of 9.7 acres of milfoil was treated (Figure 10). On August 8, the lake was inspected and no Eurasian watermilfoil was documented.

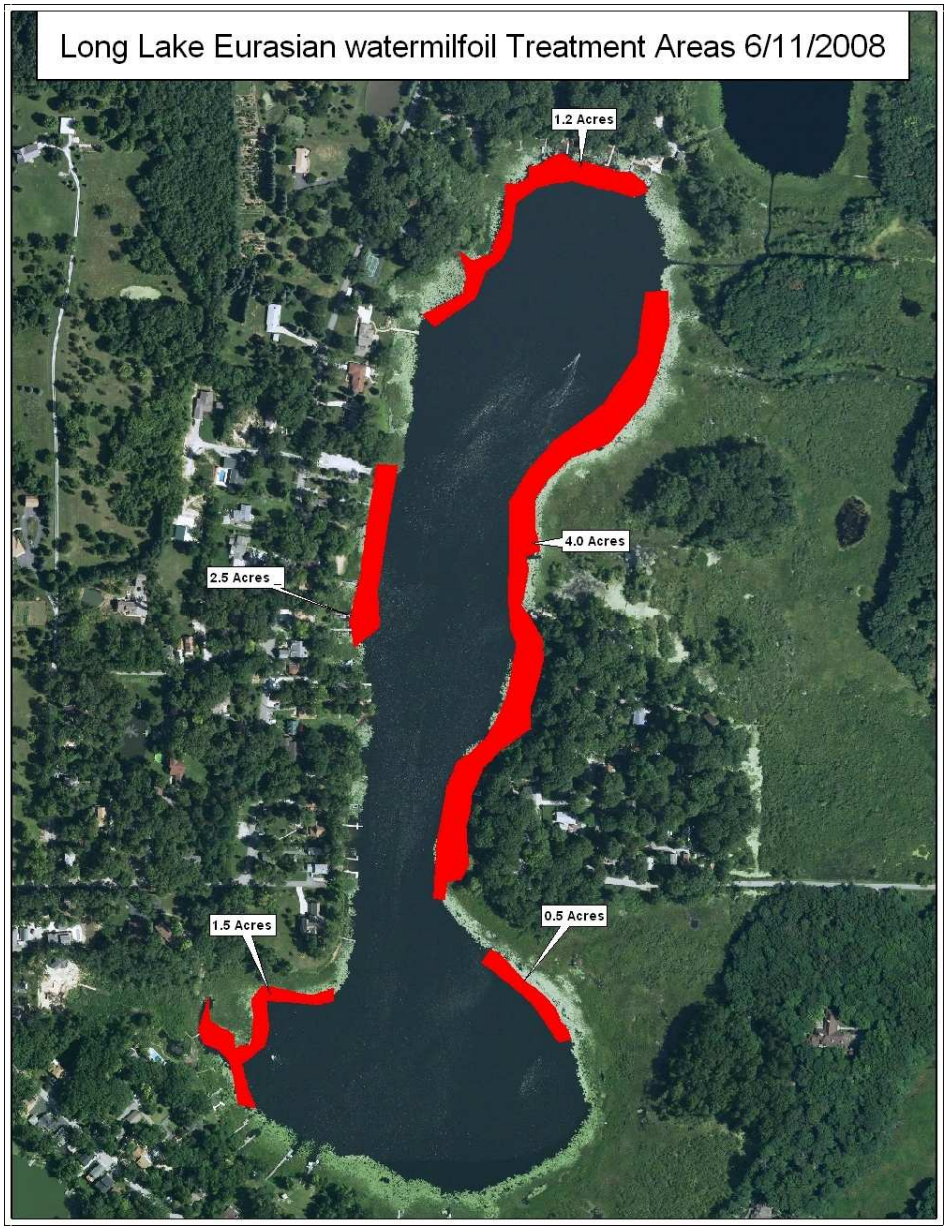


Figure 10. Long Lake, milfoil treatment area June 11, 2008 (a total of 9.7 acres treated).

5.0 ACTION PLAN AND BUDGET UPDATE

The 2008 actions fulfilled the objective of reducing milfoil coverage to less than 5% of the littoral zone. It is recommended that the VLACD continue with similar plant management controls next season. At least two plant surveys should be completed in 2009. The first survey should be completed in late May or early June and be focused on mapping out invasive species beds. In addition to mapping milfoil treatment areas, this survey will also allow for documentation of curlyleaf pondweed in order to assess if it is continuing to spread and if controls will be needed. The second survey should be completed in late summer and focus on assessing the effects of the treatment on native and targeted invasive vegetation with a Tier II survey and map purple loosestrife areas.

Selective milfoil treatments should be completed shortly after the invasive plant sampling. Based on this year's sampling and past treatments, it is recommended that the association should request enough funds to treat up to 7 acres of milfoil with Renovate herbicide (Figure 11). The maximum cost of such a treatment would be $4,000.

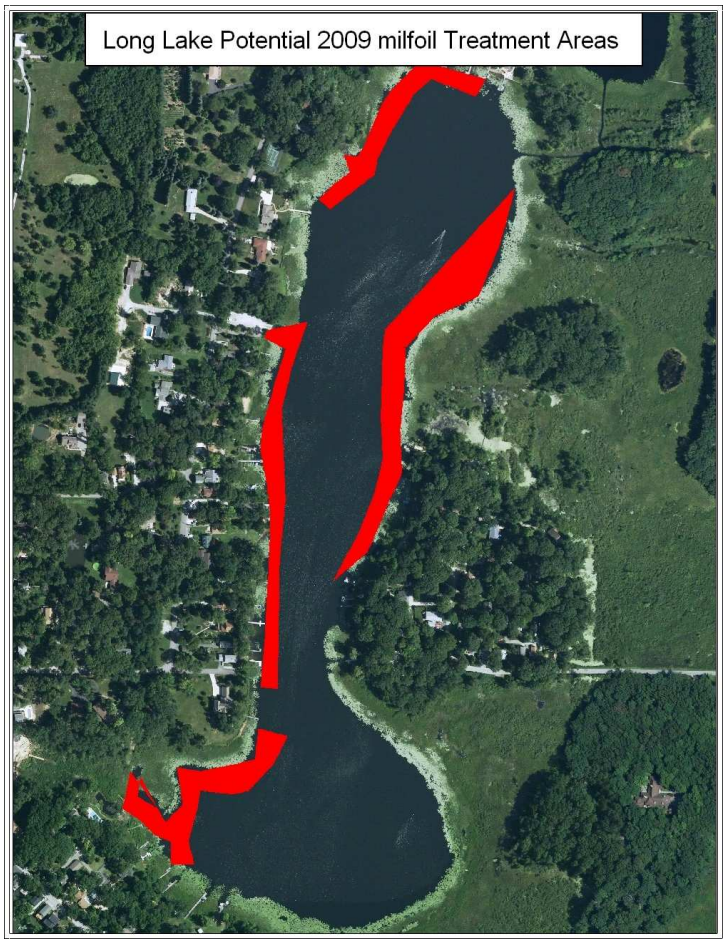


Figure 11. Long Lake, potential milfoil treatment areas for 2009 (total of 7.0 acres).

An update to the vegetation management plan should also be completed in 2009. The update should contain all 2009 survey data, discussion of vegetation controls, and necessary adjustments to the action plan. The cost of performing the update and necessary vegetation sampling will be $4,000. A budget outlining future actions is listed below in Table 4. This is the same budget from the original plan. VLACD and residents of Long Lake were pleased with the 2008 controls, support the 2009 proposed actions, and are prepared to pay the cost share if a grant is awarded. A permit for the potential treatment is included in the Appendix. The permit includes treatment of up to 12.0 acres of milfoil, but it is likely that far less acreage will be present.

Table 4. Budget estimates for management options

	2009	2010	2011	2012
Selective treatment of Eurasian watermilfoil with Renovate herbicide (7 acres in 2009)	$4,000	$3,000	$2,000	$1,000
Plant sampling and plan updates (potential LARE funding with 10% match)	$4,000	$4,000	$4,000	$4,000
Total:	**$8,000**	**$7,000**	**$6,000**	**$5,000**

6.0 PUBLIC PARTICIPATION

An effective aquatic vegetation management plan must include input from lake users. A public meeting was held on September 17, 2008 at the Flint Lake Church of Christ. The meeting was advertised in the local newspaper and on the VLACD website. The public meeting was held in order to gain input concerning the plan, educate lake users on the benefits of native vegetation, inform lake users about the 2008 vegetation controls, and to update lake users on potential 2009 plans. Twelve people were present for the meeting, primarily consisting of Conservancy Board members and only one homeowner from Long Lake. Three of those in attendance took the time to fill out a survey form. Table 5 shows the results from the survey. The survey respondents indicated that 33% were property owners. As far as uses of the lake, 100% of them used the lake for boating and 67% used the lake for fishing. Concerning problems with the lake, 67% said that there were too many plants in the lake. All of the individuals that responded to the question indicated that they were in favor of continuing with the aquatic plant treatments and were happy with the results thus far.

Table 5. Long Lake, September 17, 2008 Public meeting survey results

Long Lake September 17, 2008		
Are you a lake property owner?	Yes 33%	No 67%
Are you currently a member of your lake association?	Yes 0%	No 67%
How many years have you been at the lake?	2 or Less: 0%	5 to 10: 33%
	2 to 5: 0%	Over 10: 33%
How do you use the lake (mark all that apply)	Swimming 0%	Irrigation 0%
	Boating 100%	Drinking water 0%
	Fishing 67%	Other? _____
Do you have aquatic plants at your shoreline in nuisance quantities?	Yes: 67% No: 0%	
Does aquatic vegetation interfere with your use or enjoyment of the lake?	Yes: 67% No: 0%	
Does the level of vegetation in the lake affect your property values?	Yes: 0% No: 33%	
Are you in favor of continuing efforts to control vegetation on the lake?	Yes: 67% No: 0%	
Are you aware that the LARE funds will only apply to work controlling invasive exotic species, and more work may need to be privately funded?	Yes: 67% No: 0%	2 responded
Were you satisfied with the results of the LARE funded invasive treatments this season?	Yes: 67% No: 0%	2 responded
Mark any of these you think are problems on your lake:		
0% Too many boats access the lake		
0% Use of jet skis on the lake		
0% Too much fishing		
0% Fish population problem		
0% Dredging needed		
0% Overuse by nonresidents		
67% Too many aquatic plants		
0% Not enough aquatic plants		
0% Poor water quality		
0% Pier/funneling problem		

Another topic discussed at the public meeting was the recent discovery of hydrilla (*Hydrilla verticillata*) in Lake Manitou. Hydrilla is an invasive aquatic species that was originally discovered in Florida in the 1960's. There are many characteristics of hydrilla that make it a threat to Indiana waterways. This species can grow in lower light conditions than most native species, grows faster than most native species, and can shade out other species by forming a surface canopy. Hydrilla can be easily confused with native elodea. The best way to distinguish hydrilla from native elodea is that hydrilla typically has five leaves along each whorl along with visible serrated edges along the leaf margin (Figure 11). What makes controlling the spread of hydrilla difficult is the fact that it can be spread by fragments. That is why it is vitally important that lake users

remove all plants and sediment from their boats when entering and leaving the Valparaiso Chain of Lakes. At this time, hydrilla has not been discovered in Long Lake. More information about controlling the spread of hydrilla can be found at www.protectyourwaters.net.

Figure 11. Illustration of hydrilla on the left compared to native elodea on the right. Hydrilla typically contains five toothed leaves per whorl while native elodea typically has three leaves per whorl and the teeth are not visible on the leaves. (Illustrations provided by Applied Biochemist).

It should be noted that the VLACD has been very proactive about educating the public. The board of the VLACD has asked residents to correct erosion problems, and when ignored, has sought legal means to rectify the actions of irresponsible lot owners. The group has also been very aggressive with replacing the septic systems in the area with sewage service. The VLACD has ongoing plans to add more lakeside lots to the sewage system on Long Lake later this year. This board has been very active within the watershed as a whole. They have been promoting dialog between local government and commercial builders to ensure that best management practices are followed to protect their natural resources.

As indicated by the survey results, fishing is a very popular activity on Long Lake. No fisheries studies have been completed on the lake since the original plan was created; however, IDNR has plans to survey the lake in 2009.

7.0 REFERENCES CITED

Aquatic Control Inc. 2008. Long Lake Aquatic Vegetation Management Plan. Prepared for the Valparaiso Lakes Area Conservancy District. Valparaiso, IN.

Endangered, Threatened, and Rare Vascular Plant Species Documented from Indiana 10 April 1996. Division of Natural Preserves, Indiana Department of Natural Resources. 14 February 2008. < http://www.in.gov/dnr/naturepr/endanger/plant.html >

JFNew and Associates. 2003 Valparaiso Lakes Watershed Diagnostic Study. Prepared for the Valparaiso Area Lakes Association. Valparaiso, IN.

8.0 APPENDIX UPDATE

8.1 August Tier II Survey

Lake	Date	Latitude	Longitude	Depth	RAKE	common coontail (*Ceratophyllum demersum*) CEDE4	Slender naiad (*Najas flexilis*) NAFL	eel grass (*Vallisneria americana*) VAAM3	flatstemmed pondweed (*Potamogeton zosteriformis*) POZO	Richardson's pondweed (*Potamogeton richardsonii*) PORI2	northern watermilfoil (*Myriophyllum sibiricum*) MYSI	common bladderwort (*Utricularia vulgaris*) UTMA
Long	8/7/08	41.524315	-87.050612	11.0	5	5			1			
Long	8/7/08	41.523629	-87.050464	16.0	0							
Long	8/7/08	41.522943	-87.05115	5.0	5	3		3		5		1
Long	8/7/08	41.522247	-87.05069	15.0	0							
Long	8/7/08	41.521551	-87.051187	4.0	5	3	1	3	1	3		1
Long	8/7/08	41.520944	-87.051228	5.0	5	5		1	1	3		
Long	8/7/08	41.520321	-87.050718	16.0	0							
Long	8/7/08	41.52005	-87.051433	7.0	5	5			1		1	1
Long	8/7/08	41.519575	-87.053062	17.0	5	5						
Long	8/7/08	41.519179	-87.052194	19.0	0							
Long	8/7/08	41.518888	-87.051163	11.0	5	5			3			1
Long	8/7/08	41.518264	-87.0502	5.0	5	5			1			1
Long	8/7/08	41.518814	-87.049577	20.0	0							
Long	8/7/08	41.519394	-87.0489	9.0	5	5			1			
Long	8/7/08	41.519825	-87.049617	13.0	5	5			1			
Long	8/7/08	41.519562	-87.05036	13.0	5	5			1			
Long	8/7/08	41.520573	-87.05013	8.0	5	5						
Long	8/7/08	41.521239	-87.05065	11.0	5	5						
Long	8/7/08	41.522228	-87.049744	3.0	5	5	1	3				
Long	8/7/08	41.522915	-87.050158	20.0	0							
Long	8/7/08	41.523429	-87.049392	4.0	5	3			3	3		1
Long	8/7/08	41.524092	-87.049766	12.0	5	5			3			
Long	8/7/08	41.524582	-87.048958	6.0	5	1		1		5		1
Long	8/7/08	41.524832	-87.049481	16.0	0							
Long	8/7/08	41.525292	-87.04831	18.0	0							
Long	8/7/08	41.525657	-87.047754	5.0	5	5			3	1		1
Long	8/7/08	41.526126	-87.04816	11.0	5	5						1
Long	8/7/08	41.52602	-87.048662	20.0	0							
Long	8/7/08	41.527018	-87.048019	4.0	5	3		5	3			
Long	8/7/08	41.527195	-87.048828	4.0	5	3		3	1	5		
Long	8/7/08	41.526682	-87.048608	15.0	5	5						
Long	8/7/08	41.526589	-87.0496	10.0	3	3			1			
Long	8/7/08	41.526018	-87.049319	18.0	0							
Long	8/7/08	41.525489	-87.049385	16.0	1	1						
Long	8/7/08	41.525781	-87.050611	5.0	5	5		1	1			3
Long	8/7/08	41.525277	-87.050698	5.0	5	3		3	3			
Long	8/7/08	41.524744	-87.050644	7.0	5	5		1	1			
Long	8/7/08	41.524611	-87.049997	15.0	1	1						
Long	8/7/08	41.523378	-87.051083	12.0	5	5			1			
Long	8/7/08	41.523163	-87.050548	16.0	1	1						

8.2 2009 Vegetation Control Permit Application

APPLICATION FOR AQUATIC VEGETATION CONTROL PERMIT
State Form 26727 (R / 11-03)
Approved State Board of Accounts 1987
[ ] Whole Lake [X] Multiple Treatment Areas
Check type of permit

INSTRUCTIONS: Please print or type information

FOR OFFICE USE ONLY
License No.
Date Issued
Lake County

Return to: Page 1 of 2
DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife
Commercial License Clerk
402 West Washington Street, Room W273
Indianapolis, IN 46204

FEE: $5.00

Applicant's Name: Valparaiso Area Lakes Conservancy District	Lake Assoc. Name: Valparaiso Area Lakes Conservancy District	
Rural Route or Street: 1805 Burlington Beach Road		Phone Number: 219-464-3770
City and State: Valparaiso IN		ZIP Code: 48383
Certified Applicator (if applicable)	Company or Inc. Name	Certification Number
Rural Route or Street		Phone Number
City and State		ZIP Code

Lake (One application per lake): Long Lake	Nearest Town: Valparaiso	County: Porter
Does water flow into a water supply	[ ] Yes	[x] No

Please complete one section for *EACH* treatment area. Attach lake map showing treatment area and denote location of any water supply intake.

Treatment Area # 1	LAT/LONG or UTM's: Areas to be determined following spring survey (See AVMP)		
Total acres to be controlled <12	Proposed shoreline treatment length (ft) n.a.	Perpendicular distance from shoreline (ft) n.a.	
Maximum Depth of Treatment (ft) 12	Expected date(s) of treatment(s) late May to early June		

Treatment method: [x] Chemical [ ] Physical [ ] Biological Control [ ] Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. Renovate to selectively control Eurasian watermilfoil wherever it occurs

Plant survey method: [x] Rake [x] Visual [ ] Other (specify) Summarized from summer survey

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian watermilfoil	x	0
Common coontail		35
Bladderwort		10
eel grass		15
Richardsons pondweed		10
slender naiad		5
Flatstem pondweed		20
variable pondweed		5

Page 2 of 2

Treatment Area #	LAT/LONG or UTM's	
Total acres to be controlled	Proposed shoreline treatment length (ft)	Perpendicular distance from shoreline (ft)
Maximum Depth of Treatment (ft)	Expected date(s) of treatment(s) late April or early May	

Treatment method: [X] Chemical [ ] Physical [ ] Biological Control [ ] Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control.

Plant survey method: [ ] Rake [ ] Visual [ ] Other (specify) Summarized from August Sampling

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community

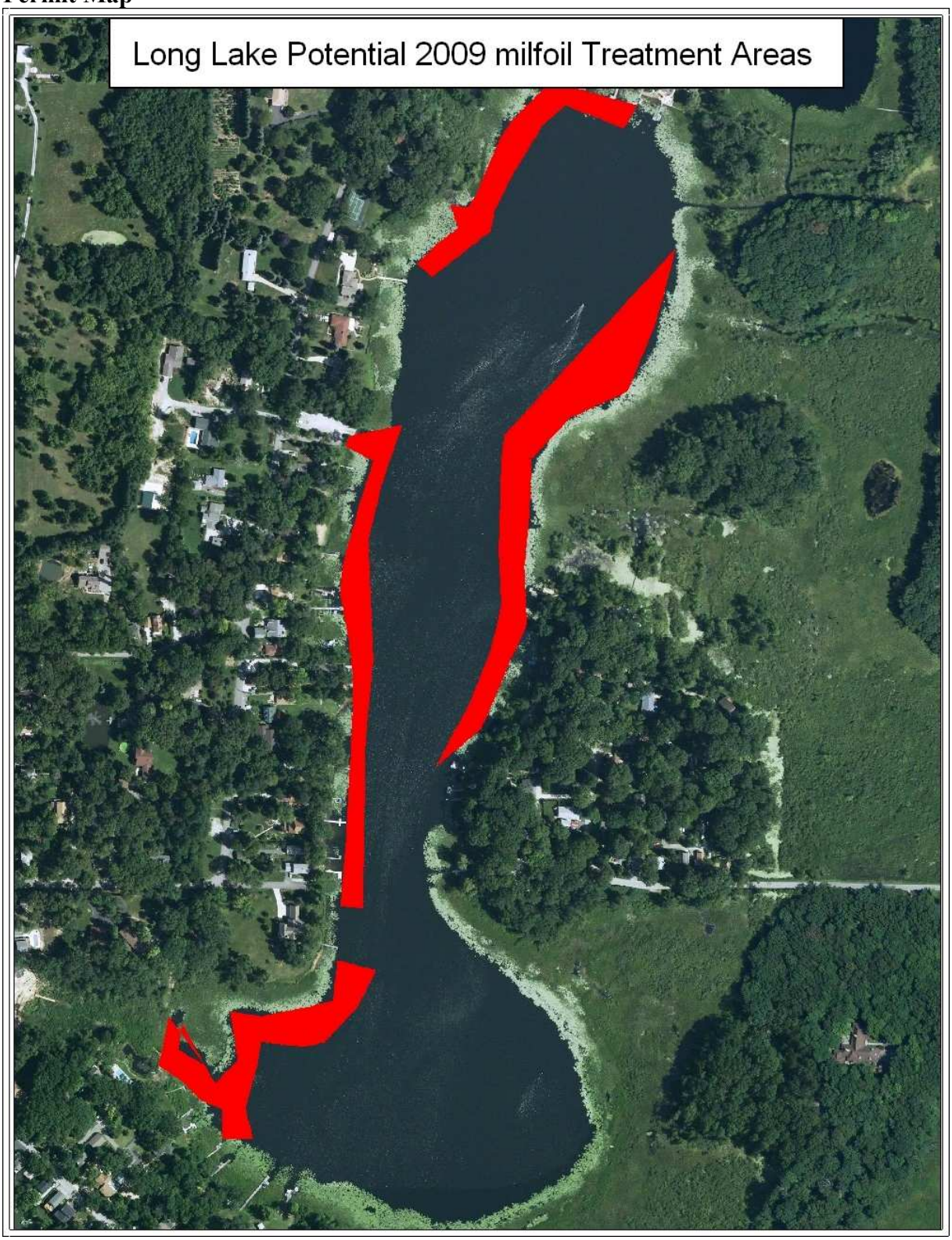
INSTRUCTIONS: Whoever treats the lake fills in "Applicant's Signature" unless they are a professional. If they are a professional company who specializes in lake treatment, they should sign on the "Certified Applicant" line.

Applicant Signature	Date
Certified Applicant's Signature	Date

FOR OFFICE ONLY

[ ] Approved [ ] Disapproved	Fisheries Staff Specialist
[ ] Approved [ ] Disapproved	Environmental Staff Specialist

Mail check or money order in the amount of $5.00 to:

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
COMMERCIAL LICENSE CLERK
402 WEST WASHINGTON STREET ROOM W273
INDIANAPOLIS, IN 46204

Permit Map