Aquatic Enhancement
& Survey, Inc.

Draft Aquatic Vegetation Management Plan Update 2008
for
Wall Lake, LaGrange County

Prepared for the Wall Lake Fisherman's Association
By
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1. Executive Summary

Wall Lake is a 141 acre Indiana oligotrophic (ITSI rated) kettle lake in LaGrange County Indiana. It has a relatively small watershed of 753 acres comprised largely of wooded, developed and agricultural lands. Wall Lake has a relatively diverse aquatic flora with at least 20 separate species of submersed aquatic plants being identified in various surveys. This includes 18 native species. Fifteen years ago Wall Lake's flora was largely native, relatively stable, and user friendly. Only the lake's three excavated channels had aquatic plants in enough quantity to provide a major hindrance to recreational activities such as boating and fishing. In the mid 1990's Eurasian watermilfoil *Myriophyllum spicatum*, an exotic invasive species began to become more prominent in Wall Lake. From 1998 to 2003 the amount of Eurasian watermilfoil and the density of its growth increased despite effective lakewide treatments with both contact and systemic herbicides. In 2005 LARE cost share funding was utilized by the Wall Lake Fisherman's Association to develop an aquatic plant management plan for the lake. The plan contains the following primary goals:

Goal 1. • 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.

Goal 2. • Direct efforts to preventing and/or controlling the negative impacts of aquatic invasive species.

Goal 3. • Provide reasonable public recreational access while minimizing the negative impacts on plant, fish, and wildlife resources.

Under the 2005 plan another cost-share grant was obtained to perform a six part-per-billion fluridone treatment on Eurasian milfoil. The treatment was performed in May of 2005 and control of Wall Lake's Eurasian watermilfoil problem was complete by the end of that season. Wall Lake's plant community appears to have responded well to its 2005 whole lake treatment but was undergoing a slow regression back toward milfoil colonization. In 2006 five acres of returning Eurasian watermilfoil was treated to prevent a quick return to problem growth levels. In response to a growing prominence of the early season exotic plant Curlyleaf pondweed *Potamogeton crispus*, approximately 10 acres was treated with Aquathol K liquid aquatic contact herbicide in 2007. This Curlyleaf treatment was repeated in 2008. The goal of this treatment was to kill the Curlyleaf pondweed early in the season before turion (seed) production took place and thus reduce the amount of the next season's growth. In 2008 it was only necessary to treat approximately 2.5 acres of Eurasian watermilfoil. The results of both treatments were good, but the growth of non-target beneficial pondweeds in Wall Lake continues to lag. The amount of milfoil that will be present in 2008 is estimated to be 10 acres as it looks like this plant is still well under control. Repeating the 10 acre early season Curlyleaf treatment will also be a recommendation of this update.

1. Problem Statement

This approximately 141 acre mesotrophic glacial lake has been colonized by the invasive submersed exotic aquatic plant Eurasian watermilfoil *Myriophyllum spicatum.* This invasive non-native species has been interfering with boating and fishing which are popular activities at the lake. Both lakeside residents and users who launch at the IDNR boat ramp have been affected by the problem. The heavily colonized areas of the lake totaled less than ten acres in 1996, but by 2003 approximately 27 acres needed treatment for the plant. As the infestation has progressed, a preexisting problem with stunted bluegill growth has persisted. Because excessive aquatic plant growth is sometimes associated with fish stunting, a persistent milfoil problem is likely to work against any possible increase in fish growth rates at Wall Lake.

2. Management History and Goals

Eurasian watermilfoil growth first became noticeable at Wall Lake about 1996 when approximately seven acres was mapped. Curlyleaf pondweed has been present for many years. The Wall Lake Fisherman's Association began treatments for milfoil in 1998. By 2004 despite continued annual treatments there was approximately 25 acres of dense milfoil growth. With funding assistance from LARE the Fisherman's Association developed a plant management plant that year and in 2005 per recommendation of the plan a 6 bump 6 "whole lake" fluridone treatment was performed. Control was achieved by the end of that season. In 2006 approximately five acres was treated to control scattered returning milfoil growth and the plant plan was updated. A diagnostic study was also compiled that year with additional LARE assistance. In 2007 an early-season Curlyleaf pondweed treatment was performed using Aquathol K liquid herbicide (10 acres) at the rate of one part-per-million (ppm) and approximately 10 acres of returning milfoil was treated with 2,4-D granular. Good control was achieved for both species.

The general purpose of this plant plan update and associated plant management activities at Wall Lake is to help the Wall Lake Fisherman's Association and IDNR direct management efforts toward the following set of goals:

1. Maintain a stable, diverse aquatic plant community that supports a good balance of predator and prey fish and wildlife species, good water quality.

2. Direct efforts to preventing and/or controlling the negative impacts of aquatic invasive species.

3. Provide reasonable public recreational access while minimizing the negative impacts on plant, fish, and wildlife resources.

Recommended management activities at Wall Lake for 2008 have been geared toward attainment of these goals and the following measurable benchmarks for success in that regard were applied to Wall Lake in 2008 per the 2007 season plan update:

1. Attain a Late season Tier II occurrence of five percent or less for both Curlyleaf pondweed and Eurasian watermilfoil.

2. Attain an increase in the occurrence of the majority of native pondweed species.

In 2008 10 acres of Curlyleaf pondweed growth was mapped and treated (Fig. one below) using .5 ppm Aquathol K liquid in the large basin of the lake and one ppm in the small basin. Approximately 2.5 acres of milfoil growth was mapped and spot treated using 2, 4-D granular at 100 pound per acre. (Figure 2 below) Both treatments showed good results. Benchmark number

one was met with Curlyleaf occurrence being below five percent in the Tier II survey (3.9 percent) and Eurasian watermilfoil occurrence also being below the five percent benchmark (two percent). Benchmark number two was not met. Sago pondweed did show a significant improvement but other native pondweed species did not.

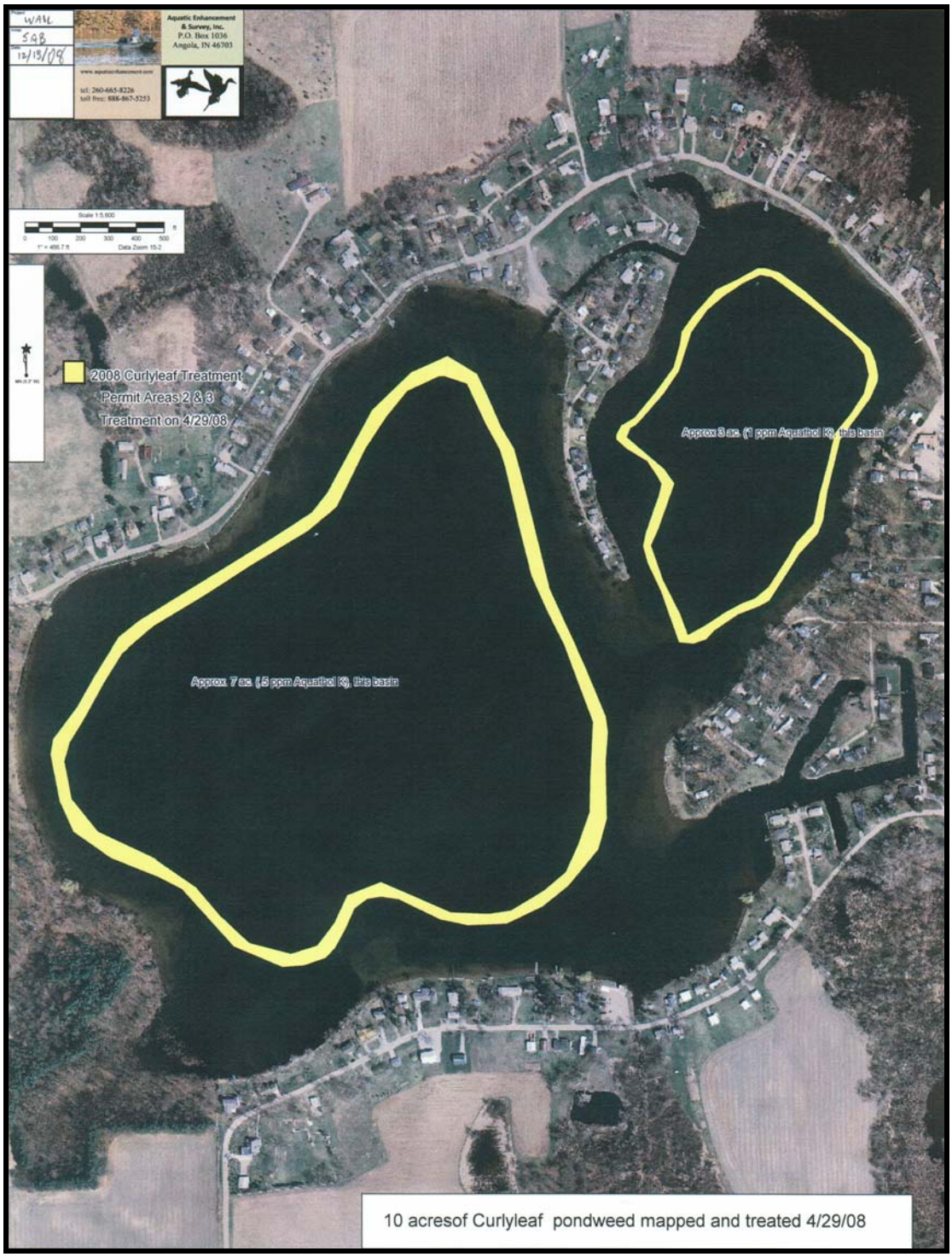

Figure 1 Wall Curlyleaf exotic plant growth map and treatment areas 4/29/08

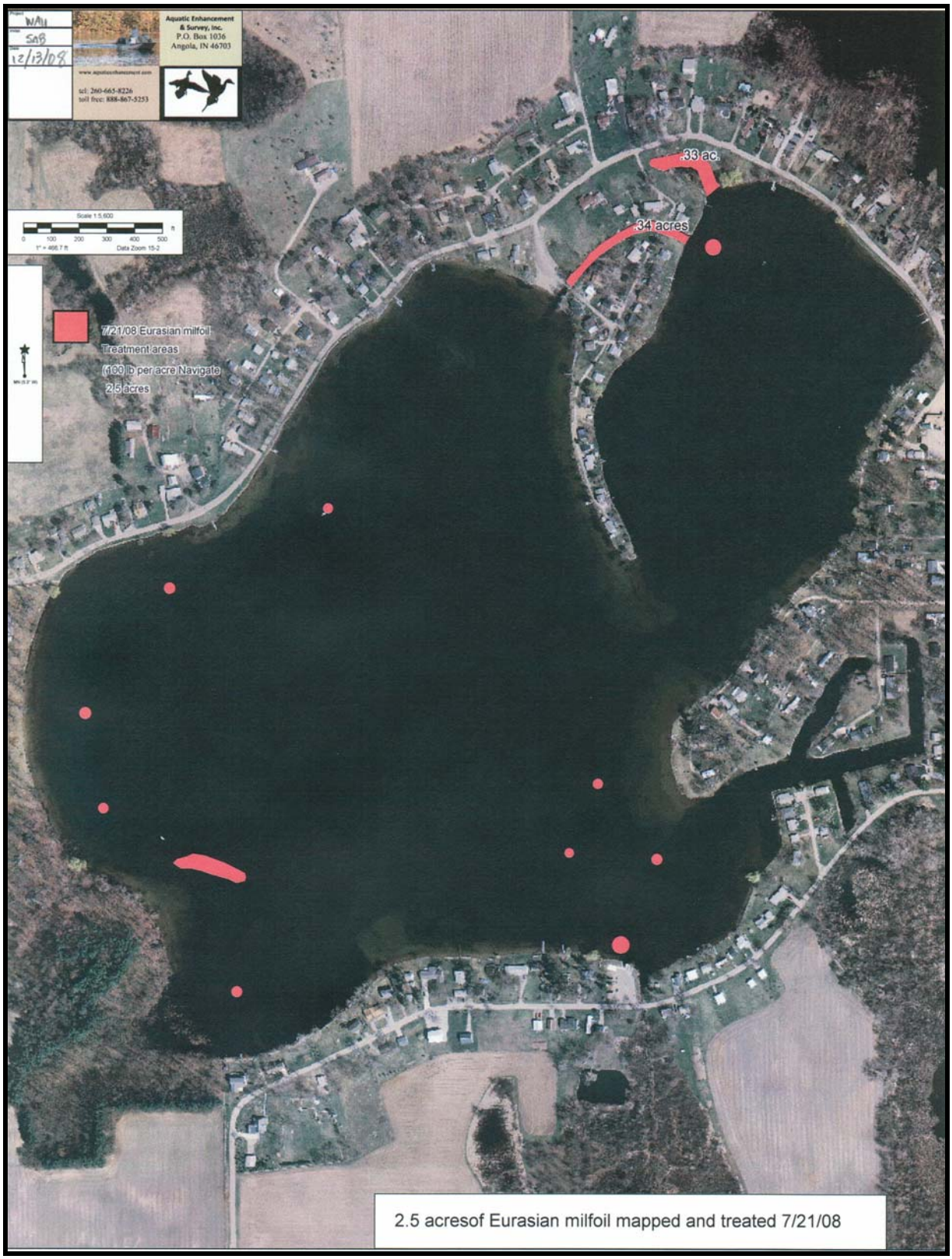

Figure 2 Wall Lake Eurasian watermilfoil growth areas (and treatment areas) 7/25/08

3. Watershed and Water Body Characteristics

Wall Lake has a surface area of approximately 141 acres. There are no significant changes in the 2008 season. For more detailed information see the original Wall Lake Plant Management Plan. (Aquatic Enhancement, Inc. 2005)

4. Present Water Body Uses

There are no significant changes in the 2008 season. For more detailed information see the original Wall Lake Plant Management Plan. (Aquatic Enhancement, Inc. 2005)

5. Aquatic Plant Community Characterization

6. Tier II Survey Methods

There are no significant changes or deviations in the 2008 season. For more detailed information see the original Wall Lake Plant Management Plan and the 2007 season update. (Aquatic Enhancement, Inc. 2005, 2007)

6.1 Tier II Survey Results

The 2008 Tier II survey for Wall Lake was conducted on August 18th in good weather conditions. A summary of results is contained in the table below. Water clarity was considered to be very good with a Secchi depth of 16.4 feet recorded. Plants were found to a depth of 17 feet. The 20 foot sampling depth for Wall Lake appears to be adequate. Nine species were identified in the survey. This is just above the average number of 8 species for a set of 21 other northern Indiana lakes compiled by IDNR.(Pearson 2004) The highest occurrence was Chara (58.8 percent) followed by Common naiad (23.5 percent) and Sago pondweed (21.6 percent). Curlyleaf pondweed occurrence was 3.9 percent and Eurasian watermilfoil was 2.0 percent. Overall the Wall Lake plant community appeared to be solidly dominated by native species. Plant maps for Eurasian watermilfoil, Curlyleaf pondweed, Chara, and Sago pondweed are in figures 3 through 6 below.

7. Description of Beneficial and Problem Plant Areas

Beneficial and problem plant areas were similar to previous seasons. All areas of dense Eurasian milfoil and Curlyleaf areas depicted in figures one and two above should be considered problem areas. All areas of native plant growth should be considered beneficial areas.

8. Aquatic Plant Management Alternatives

There are no significant changes in the 2008 season. For more information see the original Wall Lake Plant Management Plan (Aquatic Enhancement 2005).

Occurrence and Abundance of Submersed Aquatic Plants - Overall

Lake: Wall	Secchi(ft): 16.4	SE Mean species / site:	0.19
Date: 8/18/2008	Littoral sites with plants: 33	Mean natives / site:	1.45
Littoral Depth (ft): 17.0	Number of species: 9	SE Mean natives / site:	0.19
Littoral Sites: 38	Maximum species / site: 4	Species diversity:	0.77
Total Sites: 51	Mean species / site: 1.47	Native diversity:	0.76

Species	Frequency of Occurrence	Score Frequency 0	1	3	5	Dominance
Chara	58.8	41.2	17.6	5.9	35.3	42.4
Common naiad	23.5	76.5	19.6	2.0	2.0	7.1
Sago P.W.	21.6	78.4	17.6	0.0	3.9	7.5
Vallisneria	17.6	82.4	13.7	2.0	2.0	5.9
Elodea canadensis	9.8	90.2	7.8	2.0	0.0	2.7
Variable pondweed	7.8	92.2	7.8	0.0	0.0	1.6
Curlyleaf	3.9	96.1	3.9	0.0	0.0	0.8
Great Bladderwort	2.0	98.0	0.0	0.0	2.0	2.0
Eurasian watermilfoil	2.0	98.0	2.0	0.0	0.0	0.4

Occurrence and Abundance of Submersed Aquatic Plants - 0 to 5 ft.

Lake: Wall	Secchi(ft): 16.4	SE Mean species / site:	0.36
Date: 8/18/2008	Littoral sites with plants: 10	Mean natives / site:	2.20
Littoral Depth (ft): 17.0	Number of species: 6	SE Mean natives / site:	0.36
Littoral Sites: 10	Maximum species / site: 4	Species diversity:	0.71
Total Sites: 10	Mean species / site: 2.20	Native diversity:	0.71

Species	Frequency of Occurrence	Score Frequency 0	1	3	5	Dominance
Chara	100.0	0.0	10.0	20.0	70.0	84.0
Common naiad	40.0	60.0	40.0	0.0	0.0	8.0
Variable pondweed	40.0	60.0	40.0	0.0	0.0	8.0
Sago P.W.	20.0	80.0	20.0	0.0	0.0	4.0
Elodea canadensis	10.0	90.0	10.0	0.0	0.0	2.0
Vallisneria	10.0	90.0	10.0	0.0	0.0	2.0

Occurrence and Abundance of Submersed Aquatic Plants - 5 to 10 ft.

Lake: Wall	Secchi(ft): 16.4	SE Mean species / site:	0.27
Date: 8/18/2008	Littoral sites with plants: 11	Mean natives / site:	2.91
Littoral Depth (ft): 17.0	Number of species: 8	SE Mean natives / site:	0.25
Littoral Sites: 11	Maximum species / site: 4	Species diversity:	0.80
Total Sites: 11	Mean species / site: 3.00	Native diversity:	0.79

Species	Frequency of Occurrence	Score Frequency 0	1	3	5	Dominance
Chara	81.8	18.2	18.2	0.0	63.6	67.3
Sago P.W.	72.7	27.3	54.5	0.0	18.2	29.1
Vallisneria	63.6	36.4	45.5	9.1	9.1	23.6
Elodea canadensis	27.3	72.7	27.3	0.0	0.0	5.5
Common naiad	18.2	81.8	18.2	0.0	0.0	3.6
Curlyleaf	18.2	81.8	18.2	0.0	0.0	3.6
Great Bladderwort	9.1	90.9	0.0	0.0	9.1	9.1
Eurasian watermilfoil	9.1	90.9	9.1	0.0	0.0	1.8

Occurrence and Abundance of Submersed Aquatic Plants - 10 to 15 ft.

Lake: Wall	Secchi(ft): 16.4	SE Mean species / site:	0.31
Date: 8/18/2008	Littoral sites with plants: 8	Mean natives / site:	1.60
Littoral Depth (ft): 17.0	Number of species: 5	SE Mean natives / site:	0.31
Littoral Sites: 10	Maximum species / site: 3	Species diversity:	0.66
Total Sites: 10	Mean species / site: 1.60	Native diversity:	0.66

Species	Frequency of Occurrence	Score Frequency 0	1	3	5	Dominance
Chara	70.0	30.0	40.0	0.0	30.0	38.0
Common naiad	60.0	40.0	40.0	10.0	10.0	24.0
Elodea canadensis	10.0	90.0	0.0	10.0	0.0	6.0
Sago P.W.	10.0	90.0	10.0	0.0	0.0	2.0
Vallisneria	10.0	90.0	10.0	0.0	0.0	2.0

Occurrence and Abundance of Submersed Aquatic Plants - 15 to 20 ft.

Lake: Wall	Secchi(ft): 16.4	SE Mean species / site:	0.16
Date: 8/18/2008	Littoral sites with plants: 4	Mean natives / site:	0.40
Littoral Depth (ft): 17.0	Number of species: 1	SE Mean natives / site:	0.16
Littoral Sites: 7	Maximum species / site: 1	Species diversity:	0.00
Total Sites: 10	Mean species / site: 0.40	Native diversity:	0.00

Species	Frequency of Occurrence	Score Frequency 0	1	3	5	Dominance
Chara	40.0	60.0	20.0	10.0	10.0	20.0

Table 1 Summary of Tier II Survey Results

Figure 3 Wall Tier II Eurasian milfoil map

Figure 4 Wall Tier II Curlyleaf map

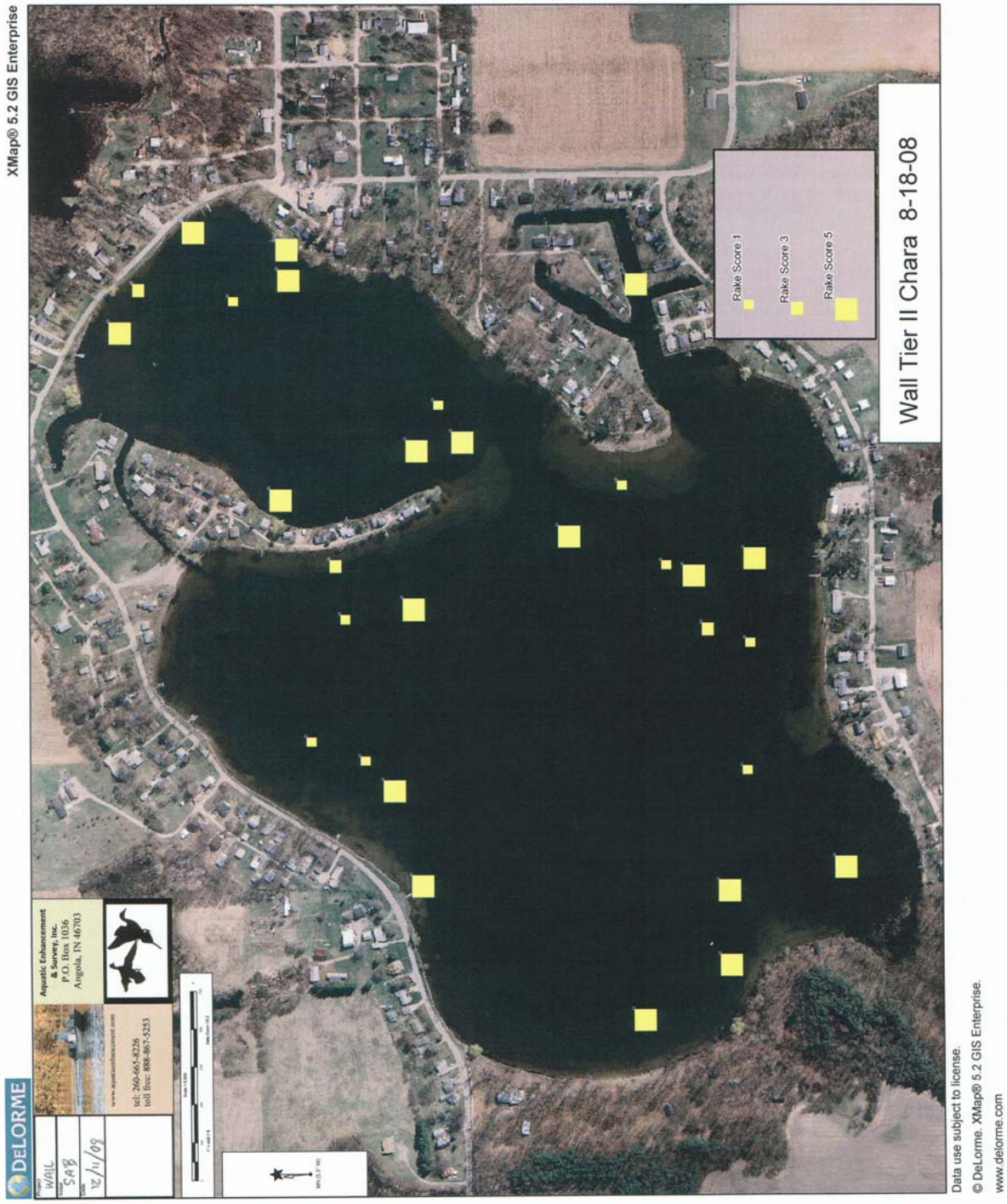

Figure 5 Wall Tier II Chara Map

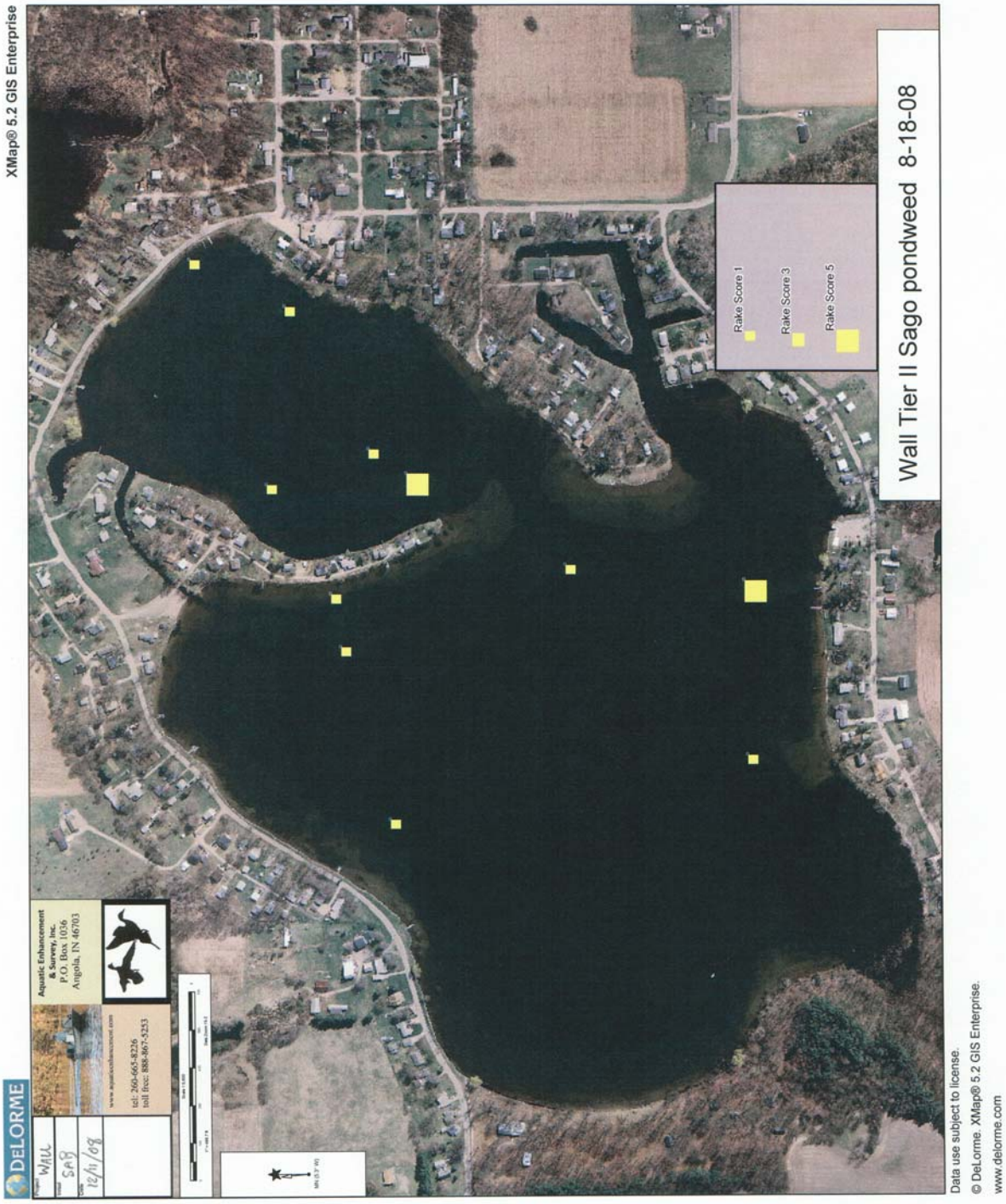

Figure 6 Wall Tier II Sago pondweed map

9. Public Involvement

A public meeting for Wall Lake was incorporated into a regular association event on 9/13/08. Approximately 40 were in attendance. A short discussion of the aquatic plant management program in general was held and results of the 2008 season Tier II survey were discussed. A link to an online user survey was sent to the Wall Lake Fisherman's Association's email list in December. Twenty-five responses were received. Questions and responses are below.

Are you a lake property owner? **Yes 25 No 0**

Are you currently a member of your lake association? **Yes 25**

How many years have you been at the lake?

2 or less **3**

2 to 5 **4**

5 to 10 **4**

over 10 **14**

How do you use the lake (mark all that apply)

Swimming **22**

Boating **22**

Irrigation (including lawn) **3**

Fishing **22**

View Wildlife **21**

Enjoy View and Atmosphere **25**

Do you feel that Wall Lake had Aquatic plants in nuisance quantities in the 2008 season? Yes **8** No **16**

Do you own or occupy property on a: Channel **1** Lakeshore **16** Neither **1** Both **6**

Do you feel the level of vegetation in the lake affects your property values? Yes **16** No **10**

Are you in favor of continuing efforts to control nuisance exotic vegetation on the lake? Yes **24** No **1**

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 **15** No **9**

Mark any of these you think are problems on your lake: Too much fishing **3** Canada Geese **20** Dredging Needed **10** Too many aquatic plants **8** Not enough aquatic plants **5** Poor water quality **3** Additional Boat Speed enforcement needed **9**

Have you caught any of the Walleye Stocked in Wall Lake? Yes **13** No **10**

10. Implementation of Action Plan

Elements of the Wall Lake action plan remain essentially the same as in 2007. Eurasian watermilfoil and Curlyleaf pondweed should be treated on a Seek and Destroy Basis with Curlyleaf treatments taking place in April (ultra early).

2009 Season **Treatment Response Benchmark:** Late season Tier II occurrence of five percent or less for both Curlyleaf pondweed and Eurasian watermilfoil			
Month	**Activity**	**Acreage**	**Cost Estimate**
April	Map Curlyleaf pondweed And Eurasian watermilfoil growth		900.00
April-May 1 if emerged. Not to be treated after May 1	Treat Curlyleaf pondweed as needed (.5 ppm Aquathol K)	10	3500.00
May	Eurasian treatment	10	4500.00
June	Treat perimeter of Lake for Purple Loosestrife	<1	500.00
July	Tier II Survey		1200.00
As arranged	Public Meeting		350.00
October/November	Permit Meeting		200.00
December	Plan Update Document Due		1500.00
	Total		**$12,650.00**

11. Education

In 2008 the overall Wall Lake plant control program was discussed at a Fall Lake Association event. Elements of the Wall Lake Plan were discussed and slides were shown to help lake residents identify invasive plant species. Educational efforts should continue through the regular Wall Lake Fisherman's Association meetings.

12. Monitoring and Evaluation of Plan

There are no significant changes for the 2009 season. Monitoring efforts should be continued as planned. For more information see the Wall Lake Aquatic Plant Management Plan Update for 2007. (Aquatic Enhancement 2007).

Literature Cited

Aquatic Enhancement, Inc. 2007. 2007 Aquatic Plant Management Plan Update for Wall Lake. LaGrange County, Indiana. Aquatic Enhancement & Survey, Inc. Angola, Indiana 46703