



*Aquatic Enhancement
& Survey, Inc.*



Aquatic Vegetation Management Plan Update 2009

Big Turkey Lake, LaGrange & Steuben County

Prepared for the Big Turkey Lake Improvement Association

By

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December 7, 2009

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Acknowledgements

This work was made possible through cost-share funding provided by a grant from the Indiana Department of Natural Resources, Division of Fish and Wildlife, Lake and River Enhancement (LARE) Program and the Big Turkey Lake Improvement Association. I would like to thank the following persons who contributed time, data, and literature necessary for the preparation of this update: Fred Burkhalter, Randy Book, Gwen Lucas, Marlene Henry and the other officers, directors and members of the Big Turkey Lake Improvement Association, Neil Ledet, Larry Koza and Gwen White of the Indiana Department of Natural Resources Division of Fish and Wildlife, Dr. Robin Scribailo and Mitchell Alix of Purdue University North Central. Field work for this document was performed by Scott Banfield and Joseph Closson of Aquatic Enhancement & Survey, Inc.

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Table of Contents

1. Executive Summary.....	5
2. Problem Statement.....	6
3. Management History and Goals.....	6
4. Watershed and Water Body Characteristics.....	7
5. Present Water Body Uses.....	9
6. Plant Community Characterization.....	9
6.1 8/14/09 (late season) Tier II Survey Results.....	9
6.2 Threatened and Endangered Species Surveys.....	10
7. Description of Beneficial and Problem Plant Areas.....	24
8. Aquatic Plant Management Alternatives.....	24
9. Public Involvement.....	25
10. Implementation of Action Plan.....	27
11. Education.....	29
12. Monitoring and Evaluation Plan.....	29
13. Literature Cited.....	30
Appendix A Application for Aquatic Vegetation Control Permit, Big Turkey Lake	
Appendix B Application for Aquatic Vegetation Control Permit, Henry Lake	
Appendix C Tier II Survey Data Sheets	
Appendix D Tier II Survey Waypoint Coordinates	

List of Figures

Figure 1. Henry Lake location map.....	8
Figure 2. Henry Lake contour map.....	9
Figure 3. Curlyleaf pondweed growth pattern in the 2009 season	11
Figure 4. Eurasian watermilfoil growth pattern and 5-21-09 treatment area	12
Figure 5. Eurasian watermilfoil treatment area 7-6-09.....	13
Figure 6. Henry Lake Eurasian watermilfoil growth and treatment 7-30-09.....	14
Figure 7. Big Turkey Secchi Data history (volunteer July/August mean through 2006 and AES August reading thereafter).	15
Figure 8. Tier II sampling points for Big Turkey Lake	16
Figure 9. Tier II Coontail map.....	19
Figure 10. Tier II Variable watermilfoil map.....	20
Figure 11. Tier II Sago pondweed map.....	21
Figure 12. Tier II Curlyleaf pondweed map.....	22
Figure 13. Tier II Eurasian watermilfoil map.....	23
Figure 14. Semptember 5, 2009 public meeting survey data for Big Turkey Lake....	26
Figure 15. Problems noted at the lake by survey respondents.....	27

List of Tables

Table 1. Summary of 8/14/09 Tier II results.....	17
Table 2. Summary of Big Turkey Lake Tier II data.....	18
Table 3. Estimated Big Turkey Lake OTF dosing 2010.....	25
Table 4. Estimated Henry Lake OTF dosing 2010.....	25
Table 5. Problems noted by respondents, not listed on survey form.	27
Table 6. 2010 season timeline and cost schedule for Big Turkey Lake.....	28
Table 7. Important dates in 2010 for the Big Turkey Lake Improvement Association.	29

1. Executive Summary

Big Turkey Lake is a 450 acre kettle lake located in Steuben County Indiana. Big Turkey Lake is generally nutrient rich (eutrophic) and has moderate warm season water clarity. It has an average depth of 16 feet and a maximum depth of 65 feet. Big Turkey has been colonized by the non-native plants Curlyleaf pondweed (*Potamogeton crispus*) and Eurasian watermilfoil (*Myriophyllum spicatum*). For several years these plants have produced thick growth in certain areas of the lake providing a hindrance to recreational activities. In the 2006 season the Big Turkey Lake Association sought and was granted cost-share assistance from the IDNR Lake and River Enhancement Program (LARE) to develop an Aquatic Plant Management Plan. The plan was completed in 2008 and established the following overall 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.

The plan also established the following measurable benchmarks for management success:

1. Limit the amount of the Big Turkey Lake littoral area in dense exotic plant growth to five percent or less (Based on post-treatment exotic plant mapping).
2. Limit the occurrence of Curlyleaf pondweed and Eurasian watermilfoil in July Tier II sampling to five percent or less.

For 2008 the Big Turkey Lake Association applied to the LARE program to produce a plan update, treat 15 acres of Eurasian watermilfoil, and treat 40.5 acres of Curlyleaf pondweed. Funding was granted to treat 15 acres of Eurasian watermilfoil growth with Navigate® granular 2,4-D herbicide. Results were good, but regrowth was noted late in the 2008 season.

For 2009, it was recommended that the Big Turkey Lake Association plan to treat approximately 27 acres of Eurasian watermilfoil and up to 40.5 acres of problem Curlyleaf pondweed growth with Aquathol® K. A switch to a granular triclopyr (Renovate® 3 OTF) herbicide for milfoil control was recommended to see if longer lasting results can be achieved. Because it is represented by the Big Turkey Lake Association it was also recommended that Henry Lake, a 19 acre glacial lake connected to Big Turkey Lake, via DeWitt Ditch, be checked for the presence of invasive exotic plants in 2009 to see if management is needed there.

On Big Turkey in May of 2009 approximately 40.5 acres of Curlyleaf were noted and approximately 27 acres of Eurasian watermilfoil. The milfoil areas were treated with Renovate OTF® at the rate of 120 pounds per acre. Results were excellent at the south end of Big Turkey Lake. Small parts of the treatment areas, however, still showed significant milfoil plants a few weeks after treatment. A touch-up treatment was planned for July 7 again using Renovate OTF® at the higher rate of 260 lbs per acre. When July 7th arrived it was found that most target plants had gone down. If any plants or plant stems were spotted, Renovate OTF® was applied at the rate of 260 pounds per acre. A small area of new growth in the southwest corner of the lake and milfoil noted in Turkey Creek at the south end of the lake were also treated. Non-target damage to White water lilies (*Nymphaea odorata subsp. tuberosa*) was evident at the south end of the lake where Renovate OTF® was applied to milfoil growing within emergent plantbeds. Lily density was significantly reduced in, and adjacent to, the treatment areas. Spatterdock (*Nuphar*

variegata), another native non-target emergent plant in and near the treatment areas, appeared to be unaffected.

In June, Henry Lake was checked for exotic plant growth and significant Eurasian watermilfoil growth was noted in a band around the perimeter of the lake. This area was treated on July 7 using Navigate® 2, 4-D at the rate of 100 pounds per acre. Funding was provided by the Big Turkey Lake Improvement Association.

A tier II plant survey was performed on Big Turkey on August 14. The survey revealed excellent diversity in 2009 with 18 total species and 16 native species noted. A benchmark of five percent or less of the Big Turkey Lake littoral area in dense exotic plant growth was met for both Eurasian watermilfoil and Curlyleaf pondweed. No dense growth was noted at the time of the Tier II. A treatment response benchmark of five percent or less occurrence of Eurasian watermilfoil in a late-season Tier II survey was also met, with milfoil occurring at only 1.2 percent of sample sites.

For 2010, it is recommended that an early-season Curlyleaf pondweed treatment be initiated on the 40.5 acres of typical growth using Aquathol K® liquid aquatic herbicide at the rate of 1 ppm. Renovate OTF® should again be used on areas of significant Eurasian watermilfoil growth. Dosage rates should be increased in small treatment areas or areas of water movement. Treatment of the Henry Lake milfoil should be continued using Renovate OTF®. Planning activities including a tier II survey should be performed on both Big Turkey and Henry Lake. The cost of all proposed management activities in 2010 is estimated to be \$47,463.00.

2. Problem Statement

Exotic plants can provide impairment to Big Turkey Lake directly and indirectly by out-competing the luxuriant growth of more beneficial native species for resources, contributing to a loss of diversity, impairing recreational use, and providing a complex habitat that can alter fish community functioning. Additionally, the eutrophic conditions of Big Turkey Lake can potentially be exacerbated if dense invasive vegetation is allowed to increase its area of colonization. Management of these plants via herbicide application during the summer months can release nutrients that contribute to a plant community biomass is dominated by blue-green or filamentous algae. Blue-green dominated systems can cause odor problems, oxygen problems, and poor water clarity.

3. Management History and Goals

Prior to 2007 Big Turkey Lake did not have a lakewide comprehensive program to control invasive aquatic plants. The lake association developed a plan to do so in 2007 with assistance from the LARE program and began exotic plant control activities under plan in 2008. The general purpose of this plant plan update and associated plant management activities at Big Turkey Lake is to help the Big Turkey Lake 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 Big Turkey Lake for 2009 have been geared toward attainment of these goals and the following measurable benchmarks for success in that regard were applied to Big Turkey Lake:

1. Limit the amount of the Big Turkey Lake littoral area in dense exotic plant growth to five percent or less. (Based on post-treatment exotic plantbed mapping)
2. Limit the occurrence of Curlyleaf pondweed and Eurasian watermilfoil in July Tier II sampling to five percent or less.

In May of 2009 the extent of significant Curlyleaf pondweed and Eurasian watermilfoil growth at Big Turkey Lake was mapped. Approximately 40.5 acres of Curlyleaf pondweed growth was noted. No cost-share funding was available for Curlyleaf at Big Turkey so most of this area remained untreated. This was the same pattern of growth seen in 2007 and 2008. A total of 27 acres of Eurasian watermilfoil growth was noted and treated on May 21 with 120 pounds per acre with granular Renovate OTF triclopyr herbicide. Results were excellent at the south end of Big Turkey Lake. Small parts of the treatment areas, however, still showed significant milfoil plants a few weeks after treatment. A touch-up treatment was planned for July 7 again using Renovate OTF® at the higher rate of 260 lbs per acre. When July 7th arrived it was found that most target plants had gone down. If any plants or plant stems were spotted at that time Renovate 3® was applied at the rate of 260 pounds per acre. A small area of new growth in the southwest corner of the lake and milfoil noted in Turkey Creek at the south end of the lake were also treated. The July 7 treatments included approximately 1.5 acres. In June Henry Lake, a small glacial lake connected to Big Turkey via Mud Creek (Dewitt Ditch), was checked for exotic plant growth and significant Eurasian watermilfoil growth was noted in a band around the perimeter of the lake. This 4.5 acre area was treated on July 7 using Navigate® 2, 4-D at the rate of 100 pounds per acre. Funding was provided by the Big Turkey Lake Improvement Association.

Results for both treatments were good with few milfoil plants noted in the treatment areas at the time of the August 20th Tier II survey. A goal of five percent or less of the Big Turkey Lake littoral area in dense exotic plant growth was met for both Eurasian watermilfoil and Curlyleaf pondweed. No dense growth for either plant was noted at the time of the Tier II. A treatment response benchmark of five percent or less occurrence of Eurasian watermilfoil in a late-season Tier II survey was also met, with milfoil occurring at only 1.2% of sample sites. The same benchmark set for Curlyleaf was not met since no significant curlyleaf control was initiated. Curlyleaf occurred at 11.9 % of sampling sites. Non-target damage to white water lilies was evident at the south end of the lake where Renovate OTF® was applied to milfoil growing within emergent plantbeds. Lily density was significantly reduced in, and adjacent to the treatment areas. Spatterdock, another native non-target emergent plant in and near the treatment areas, appeared to be unaffected.

4. Watershed and Water Body Characteristics

Big Turkey Lake has a surface area of approximately 450 acres. The Big Turkey Lake watershed area is approximately 22,624 acres. The Lake underwent some changes in the 2008 season in the form of hydraulic dredging in five channel areas. This change was unlikely to have a large impact on plant management on Big Turkey Lake as a whole, but dredged areas were watched as possible sites for the growth of invasive plants in the 2009 season. Plant growth in the dredged areas appeared to be similar to growth in these areas before dredging and a significant increase in the growth of non-native aquatic plants was not noted. No new studies are known to have been completed at Big Turkey Lake or in the Big Turkey Lake watershed in 2009.

Henry Lake, a 19 acre glacial lake connected to Big Turkey via DeWitt Ditch, was included in Eurasian watermilfoil management efforts in 2009. Henry Lake is located approximately 800 feet south of the southeast corner of Big Turkey Lake (Figure 1). It has a maximum depth of 20 feet and a mean depth of approximately 14 feet (Figure 2). DeWitt Ditch runs through Henry Lake in a northwesterly direction before flowing north through a channel into Big Turkey Lake. A large culvert under County Road West 475 South allows the passage of smaller boats from Big Turkey Lake into Henry Lake.

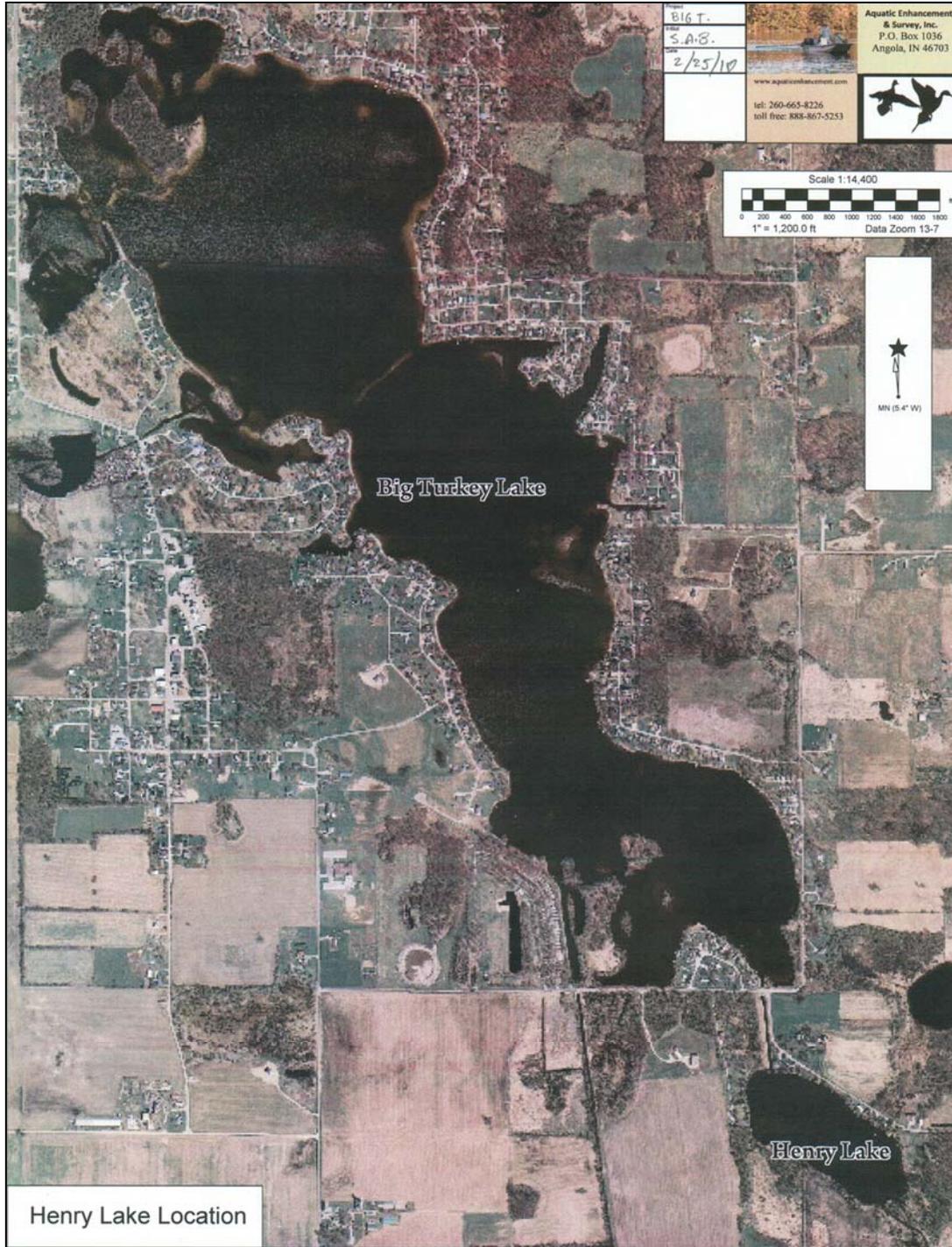


Figure 10. Henry Lake location map.

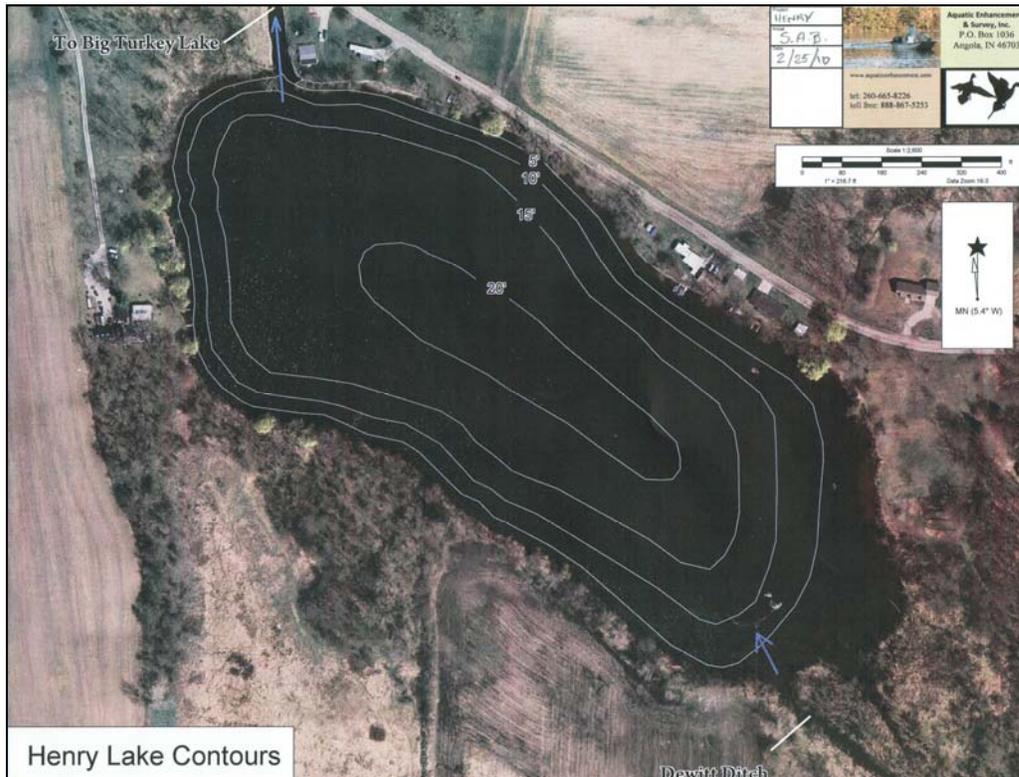


Figure 2. Henry Lake contour map.

5. Present Water Body Uses

Water body uses at Big Turkey Lake remain essentially the same as in the previous season and the original 2007 APMP. There have been no significant changes in priority uses for activities, the fish community, or important habitat areas. No new fish community data was compiled for Big Turkey Lake in 2009. For more information see the original 2007 APMP (Aquatic Enhancement, Inc. 2007).

6. Plant Community Characterization

6.1. 8/14/09 (late season) Tier II Survey Results

The 2009 Tier II survey for Big Turkey Lake was conducted on August 14th in good weather conditions. The survey sampling points are shown in figure 8. For an overview of Tier II protocol see the original Big Turkey Lake Plant Management Plan (Aquatic Enhancement 2007). The 80 sampling points used were identical to those used in the late season 2007 and 2008 Tier II surveys with one minor change. To improve sampling point distribution waypoint 26 was eliminated. It was in close enough proximity to waypoint 28 to be considered redundant. Waypoint 81 was added to replace it. A summary of survey results is contained in table 1.

Water clarity was considered to be relatively low with a Secchi depth of 3.2 feet recorded. The 2009 clarity figure was consistent with the majority of summer measurements running back to 1999. The Secchi history for Big Turkey Lake is graphed in figure 7. Plants were found to a depth of 13 feet. Water clarity at Big Turkey Lake tends to be relatively good early in the season but declines substantially in mid to late summer. An exception occurred in 2007 when good water clarity seemed to last longer than normal. A Secchi measurement of seven feet was recorded in August of that season. This clarity seemed to have a very noticeable effect on the lake's plant community. During 2007, problems with mat-forming growths of variable watermilfoil were reported to have been much worse than normal. Curlyleaf pondweed growth

was also much denser in 2007 causing significant problems with navigation and other forms of recreation on Big Turkey Lake.

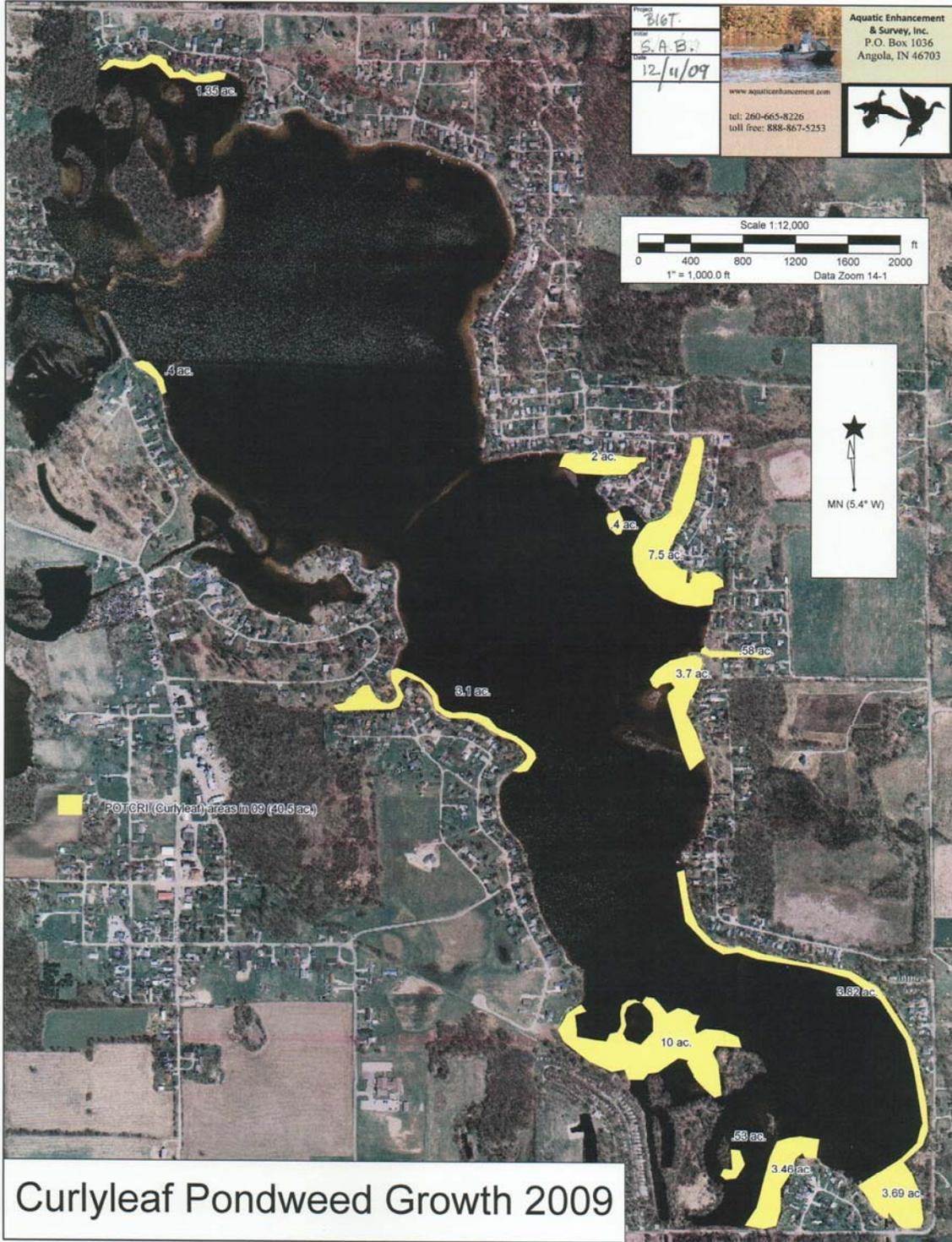
The 15 foot sampling depth for Big Turkey Lake appears to be appropriate. Eighteen species were identified in the survey. Sixteen were native species. The number of species collected at Big Turkey Lake in 2009 is well above the average number of 8 species for a set of 21 other northern Indiana lakes compiled by IDNR (Pearson 2004). The highest occurrence was Coontail (*Ceratophyllum demersum*) (45 percent) followed by Variable watermilfoil (*Potamogeton gramineus*) (31.3 percent) and Sago pondweed (*Stuckenia pectinata*) (30.0 percent). Curlyleaf pondweed occurrence was 12.5 percent and Eurasian watermilfoil was 1.3 percent. A growth pattern map for Curlyleaf pondweed is displayed in figure 3. A growth pattern and initial treatment map for Eurasian watermilfoil in displayed in figure 4. A map showing touch-up treatment areas for Big Turkey is shown in figure three below and a treatment and Eurasian milfoil growth map for connected Henry Lake is displayed in figure 6. In figures 4, 5, and 6 growth areas and treatment areas (shown in red) are identical as all noted growth was treated.

The mean species per site in 2009 was 2.46 this exceeds the 1.61 average for the set of 21 other Indiana lakes and has remained consistent with the 2007 and 2008 means being 2.49 and 2.19 respectively. The species diversity index (SDI) score for 2009 was .90, well above the 21 lake set mean of .66. This was also consistent with 2007 and 2008 scores for Big Turkey lake which were .90 and .87 respectively. Overall the Big Turkey Lake plant community appeared to be of well above average diversity and was dominated by native species.

Diversity does not appear to have been significantly affected by the selective plant control that has taken place with assistance from LARE in 2008 and 2009. The target of the control efforts, Eurasian watermilfoil appears to have been significantly diminished as a presence in the Big Turkey Lake plant community. In 2003 IDNR Tier II data it's occurrence was 12.2 percent. In 2007 it occurred at five percent of sites. After treatment in 2008 it occurred at only 3.8 percent of sites and in the post treatment period in 2009 it was only present at 1.3 percent of sites. In terms of dominance the same pattern is apparent. It's dominance in 2003 was 5.1 and in 2007 it was one. After treatment in 2008 it was .8 and in the post treatment period in 2009 it was only .3. Plant maps for coontail, variable watermilfoil, sago pondweed, curlyleaf pondweed, and Eurasian watermilfoil are shown in figures 9 through 13. A summary of tier II plant data collected at Big Turkey lake in 2007 through 2009 is displayed in table two.

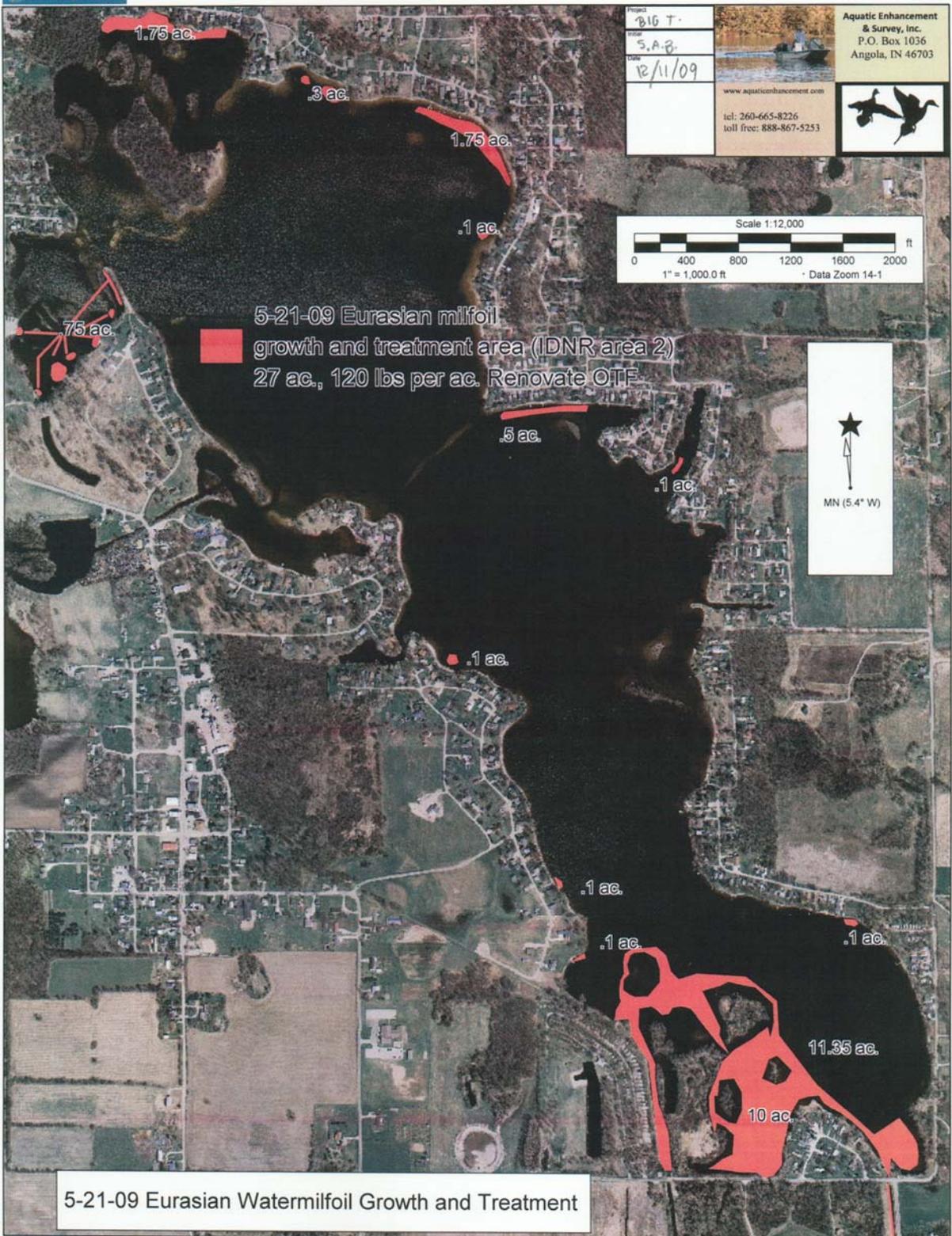
6.2. Threatened and Endangered Species Surveys

Whitestem pondweed (*Potamogeton praelongus*) has been noted in the 2008 and 2009 surveys for Big Turkey Lake. Whitestem pondweed is listed on the IDNR Division of Nature Preserves list of Rare, Threatened, and Endangered species with a "threatened" status. In 2009 it appeared to be especially numerous in comparison with past seasons. This was supported by the tier II data. Whitestem pondweed occurred at 7.1 percent of sampling sites compared to 6.3 percent of sites in 2008 and zero sites in 2007. Richardson's pondweed (*Potamogeton richardsonii*) is also present in Big Turkey Lake. It was collected during the 2003, 2007 and 2008 surveys, but did not appear in the survey in 2009. Richardson's pondweed is listed as a "Rare" species. No voucher specimen's of these plants were collected for preservation during 2009. Samples of each of these plants should be collected for preservation and documentation as part of 2010 management activities. Both these native pondweeds can be considered to provide beneficial habitat in Big Turkey Lake. Because these plants are not generally tolerant of a high amount of cultural disturbance preserving and improving water quality, managing invasive competing species, and generally maintaining stable aquatic habitat and good water clarity at Big Turkey Lake will be key in preserving the presence of these species.



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Figure 3. Curlyleaf pondweed growth pattern in the 2009 season.



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Figure 4. Eurasian watermilfoil growth pattern and 5-21-09 treatment area.



Figure 5. Eurasian watermilfoil treatment area 7-6-09.

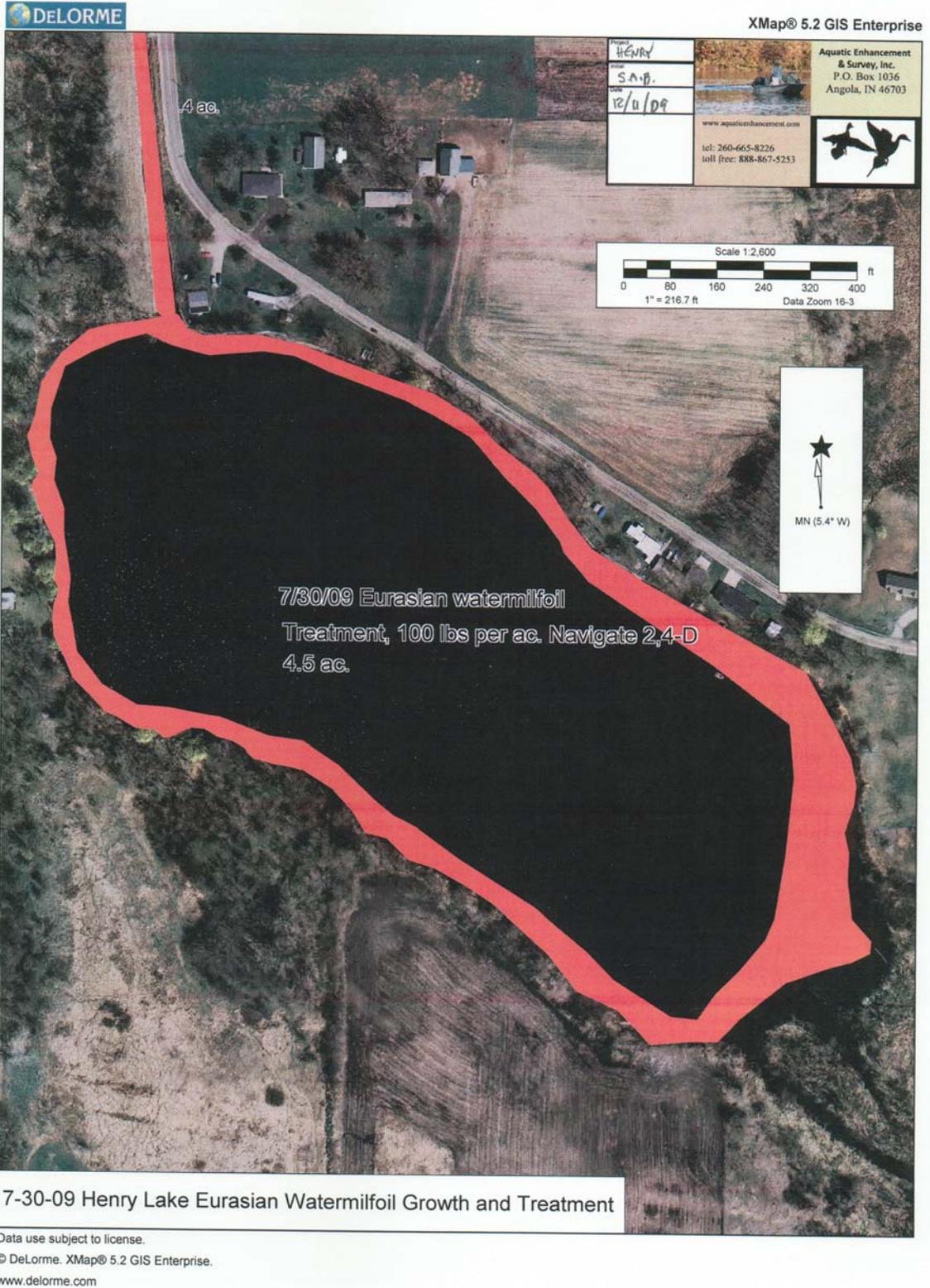


Figure 6. Henry Lake Eurasian watermilfoil growth and treatment 7-30-09.

Big Turkey Lake Secchi depth history

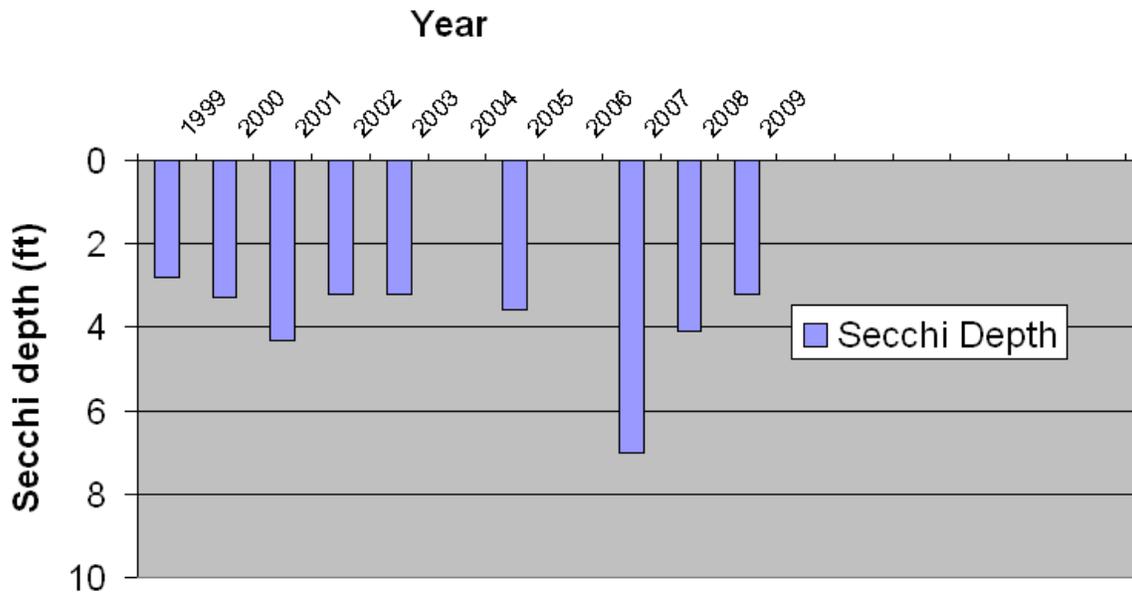


Figure 7. Big Turkey Secchi Data history (volunteer July/August mean through 2006 and AES August readings thereafter).

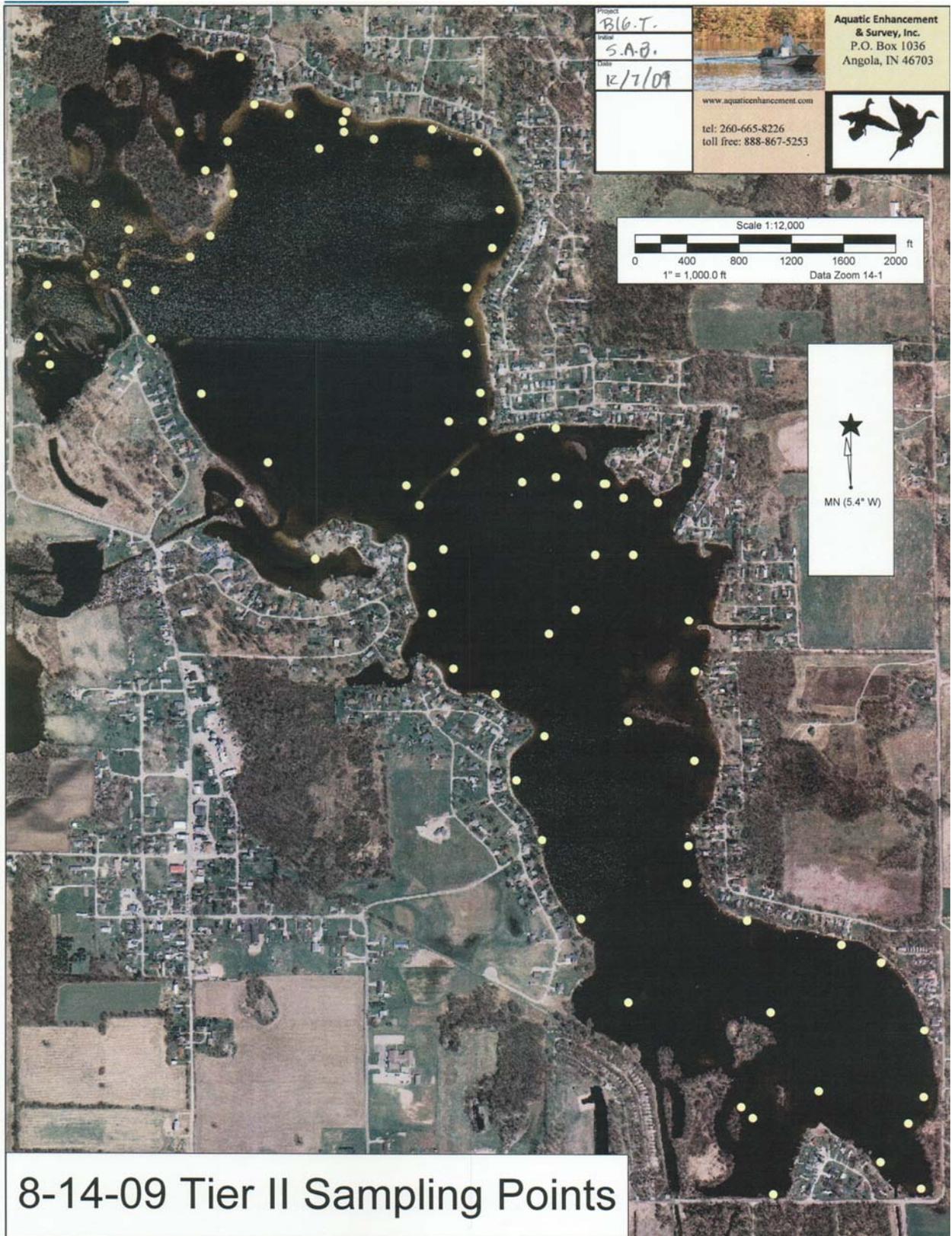


Figure 8. Tier II sampling points for Big Turkey Lake.

Occurrence and Abundance of Submersed Aquatic Plants in Big Turkey Lake

County: Stub/LaGrge	Total Sites: 80	Mean species/site: 2.46
Date: 8/14/2009	Sites with plants: 70	SE Mean species/site: 0.17
Secchi (ft): 3.2	Sites with native plants: 70	Mean native species/site: 2.33
Maximum Plant Depth (ft): 13.0	Number of species: 18	SE Mean natives/site: 0.16
Trophic Status: Eutrophic	Number of native species: 16	Species diversity: 0.90
	Maximum species/site: 6	Native species diversity: 0.89

All Depths (0 to 15 ft) Species	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
		0	1	3	5	
coontail	45.0	55.0	18.8	3.8	22.5	28.5
variable watermilfoil	31.3	68.8	15.0	1.3	15.0	18.8
sago pondweed	30.0	70.0	18.8	3.8	7.5	13.5
flatstem pondweed	22.5	77.5	17.5	3.8	1.3	7.0
chara	18.8	81.3	6.3	3.8	8.8	12.3
small pondweed	17.5	82.5	17.5	0.0	0.0	3.5
common naiad	16.3	83.8	8.8	3.8	3.8	7.8
spiny naiad	12.5	87.5	5.0	5.0	2.5	6.5
curlyleaf pondweed	12.5	87.5	10.0	2.5	0.0	3.5
whitestem pondweed	7.5	92.5	2.5	0.0	5.0	5.5
common bladderwort	6.3	93.8	2.5	2.5	1.3	3.3
variable pondweed	6.3	93.8	6.3	0.0	0.0	1.3
Illinois pondweed	6.3	93.8	3.8	0.0	2.5	3.3
elodea	5.0	95.0	3.8	0.0	1.3	2.0
southern naiad	3.8	96.3	2.5	0.0	1.3	1.8
horned pondweed	2.5	97.5	2.5	0.0	0.0	0.5
Eurasian watermilfoil	1.3	98.8	1.3	0.0	0.0	0.3
arrowhead (submersed)	1.3	98.8	1.3	0.0	0.0	0.3
Depth: 0 to 5 ft	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species	Occurrence	0	1	3	5	Dominance
coontail	46.8	53.2	19.1	4.3	23.4	29.8
variable watermilfoil	40.4	59.6	21.3	2.1	17.0	22.6
sago pondweed	36.2	63.8	25.5	4.3	6.4	14.0
flatstem pondweed	34.0	66.0	27.7	6.4	0.0	9.4
chara	23.4	76.6	10.6	4.3	8.5	13.2
common naiad	21.3	78.7	10.6	4.3	6.4	11.1
spiny naiad	14.9	85.1	6.4	4.3	4.3	8.1
curlyleaf pondweed	17.0	83.0	12.8	4.3	0.0	5.1
small pondweed	14.9	85.1	14.9	0.0	0.0	3.0
variable pondweed	10.6	89.4	10.6	0.0	0.0	2.1
elodea	8.5	91.5	6.4	0.0	2.1	3.4
Illinois pondweed	8.5	91.5	4.3	0.0	4.3	5.1
whitestem pondweed	8.5	91.5	4.3	0.0	4.3	5.1
southern naiad	6.4	93.6	4.3	0.0	2.1	3.0
common bladderwort	4.3	95.7	2.1	2.1	0.0	1.7
horned pondweed	4.3	95.7	4.3	0.0	0.0	0.9
Eurasian watermilfoil	2.1	97.9	2.1	0.0	0.0	0.4
Depth: 5 to 10 ft	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species	Occurrence	0	1	3	5	Dominance
coontail	52.2	47.8	21.7	4.3	26.1	33.0
sago pondweed	26.1	73.9	8.7	4.3	13.0	17.4
variable watermilfoil	21.7	78.3	8.7	0.0	13.0	14.8
small pondweed	21.7	78.3	21.7	0.0	0.0	4.3
chara	17.4	82.6	0.0	4.3	13.0	15.7
spiny naiad	13.0	87.0	4.3	8.7	0.0	6.1
common bladderwort	13.0	87.0	4.3	4.3	4.3	7.8
curlyleaf pondweed	8.7	91.3	8.7	0.0	0.0	1.7
whitestem pondweed	8.7	91.3	0.0	0.0	8.7	8.7
flatstem pondweed	8.7	91.3	4.3	0.0	4.3	5.2
common naiad	4.3	95.7	4.3	0.0	0.0	0.9
Illinois pondweed	4.3	95.7	4.3	0.0	0.0	0.9
arrowhead (submersed)	4.3	95.7	4.3	0.0	0.0	0.9
Depth: 10 to 15 ft	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species	Occurrence	0	1	3	5	Dominance
coontail	25.0	75.0	12.5	0.0	12.5	15.0
common naiad	25.0	75.0	12.5	12.5	0.0	10.0
small pondweed	25.0	75.0	25.0	0.0	0.0	5.0
variable watermilfoil	12.5	87.5	0.0	0.0	12.5	12.5
sago pondweed	12.5	87.5	12.5	0.0	0.0	2.5
Filamentous Algae	8.8					

Table 1. Summary of 8/14/09 Tier II results.

Summary of Season's Treatments

Eurasian watermilfoil	15 acres noted			15 acres noted	7.4(1) 15 acres 27 noted	Pen OTF 27 acres
Curlyleaf pondweed	40.5 acres noted			40.5 acres noted	40.5 acres noted	40.5 acres noted
Big Turkey Lake		AES	IDNR	AES	AES	AES
Date	6/9/07		7/31/03	8/10/07	8/20,27/08	8/14/09
IDNR protocol 1 or 2	2		1	2	2	2
Depth range (ft)	0-15		0-15	0-15	0-15	0-15
Sample sites (n)	80		85	80	80	80
Secchi (ft)	7.0		n/d	7.0	4.1	3.2
Littoral depth (ft)	11.0		14.0	14.5	15.0	13.0
Occurrence (%)	83.0		87.0	90.0	90.0	87.5
Species (N)	12		17	14	16	18
Native species (N)	10		14	12	14	16
Species/site (max)	6		6	7	7	6
Mean species/site	2.01		2.09	2.49	2.19	2.46
Mean Native species/site	1.58		1.91	1.86	2.10	2.33
Species diversity	0.87		0.86	0.90	0.87	0.90
Native diversity	0.83		0.84	0.86	0.86	0.89
Species occurrence						
coontail	36.3		58.5	31.3	47.5	45.0
variable watermilfoil*	31.3		31.7	23.8	27.5	31.3
brittle naiad			20.7			
chara	21.3		14.6	30.0	31.3	18.8
Eurasian watermilfoil	5		12.2	5.0	3.8	1.3
flatstem pondweed	7.5		18.3	8.8	22.5	22.5
sago pondweed	27.5		12.2	25.0	1.3	30.0
small pondweed	17.5		9.8	25.0	16.3	17.5
slender (common)naiad	3.8		7.3	30.0	16.3	16.3
variable pondweed	3.8		4.9	3.8	1.3	6.3
elodea			4.9	2.5	2.5	5.0
curlyleaf pondweed	37.5		4.9	27.5	5.0	12.5
Illinois pondweed			3.7	1.3	3.8	6.3
nitella			1.2			
great (common) bladderwort	3.8		1.2		1.3	6.3
leafy pondweed			1.2			
Richardson's pondweed			1.2	1.3	1.3	
spiny naiad	3.8			30.0	31.3	12.5
whitestem pondweed	1.3				6.3	7.5
water stargrass				3.8		
horned pondweed						2.5
southern naiad						3.8
arrowhead(submersed)						1.3
algae occurrence (%)	6.3			3.8	7.5	
Species dominance						
coontail	12.8		28.0	18.3	33.5	28.5
variable watermilfoil*	13.8		15.4	10.3	15.5	18.8
brittle naiad			11.2			
chara	6.8		8.8	15.0	21.3	12.3
Eurasian watermilfoil	2		5.1	1.0	0.8	0.3
flatstem pondweed	2.5		5.1	3.8	8.0	7.0
sago pondweed	12		5.1	9.0	0.3	13.5
small pondweed	4.5		4.6	13.5	5.8	3.5
slender (common)naiad	0.8		3.9	15.5	10.8	7.8
variable pondweed	0.8		2.2	0.8	0.3	1.3
elodea			1.7	0.5	1.0	2.0
curlyleaf pondweed	12.5		1.5	8.0	1.0	3.5
Illinois pondweed			1.2	0.3	0.8	3.3
nitella			1.0			
great (common) bladderwort	0.8		0.5		0.3	3.3
leafy pondweed			0.5			
Richardson's pondweed			0.2	0.3	0.3	
spiny naiad	0.8			21.0	15.8	6.5
whitestem pondweed	1.3				3.3	5.5
water stargrass				1.3		
horned pondweed						0.5
southern naiad						1.8
arrowhead(submersed)						0.3

* listed as northern milfoil on IDNR data

Table 2. Summary of Big Turkey Lake Tier II data.

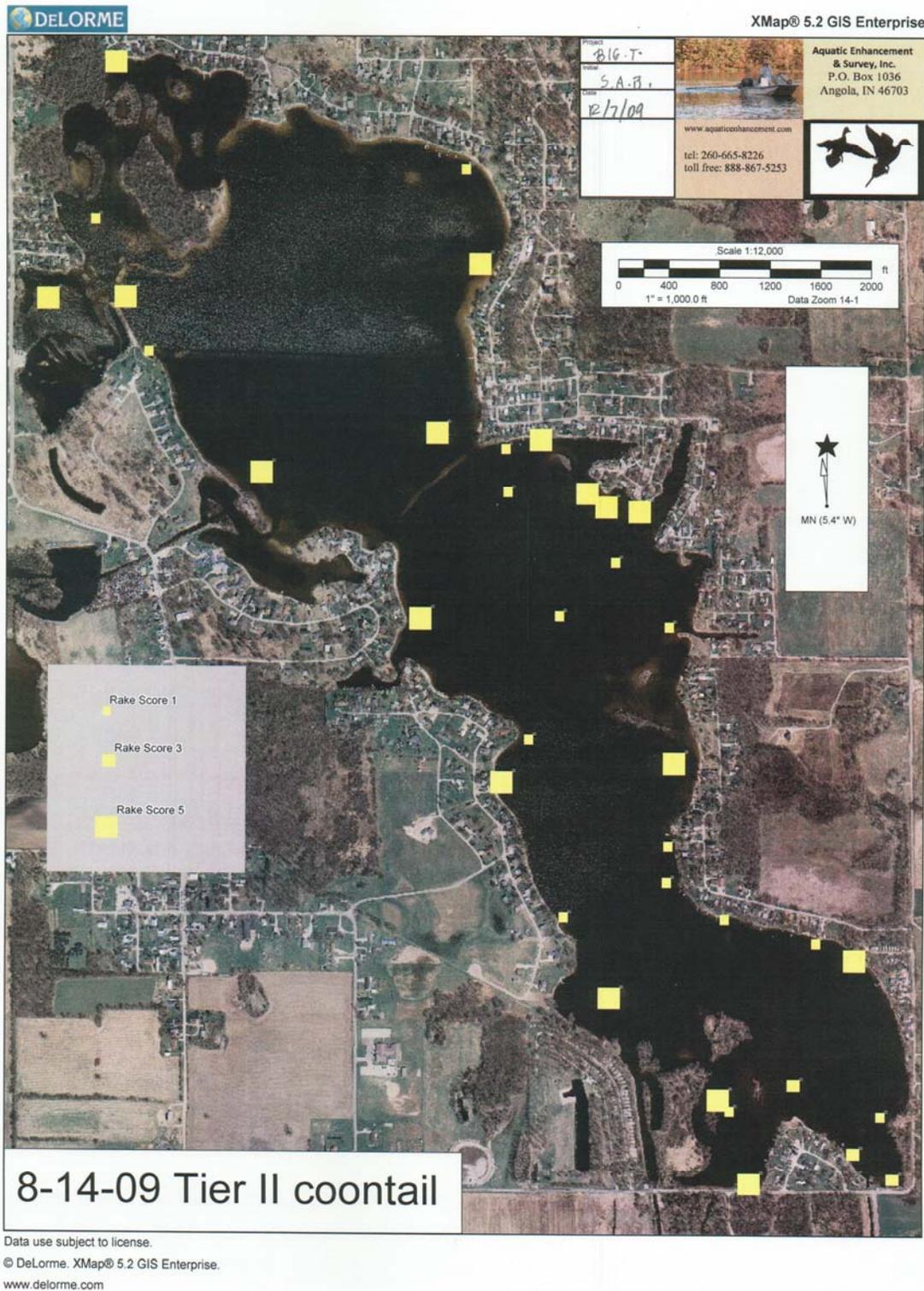


Figure 9. Tier II Coontail map.

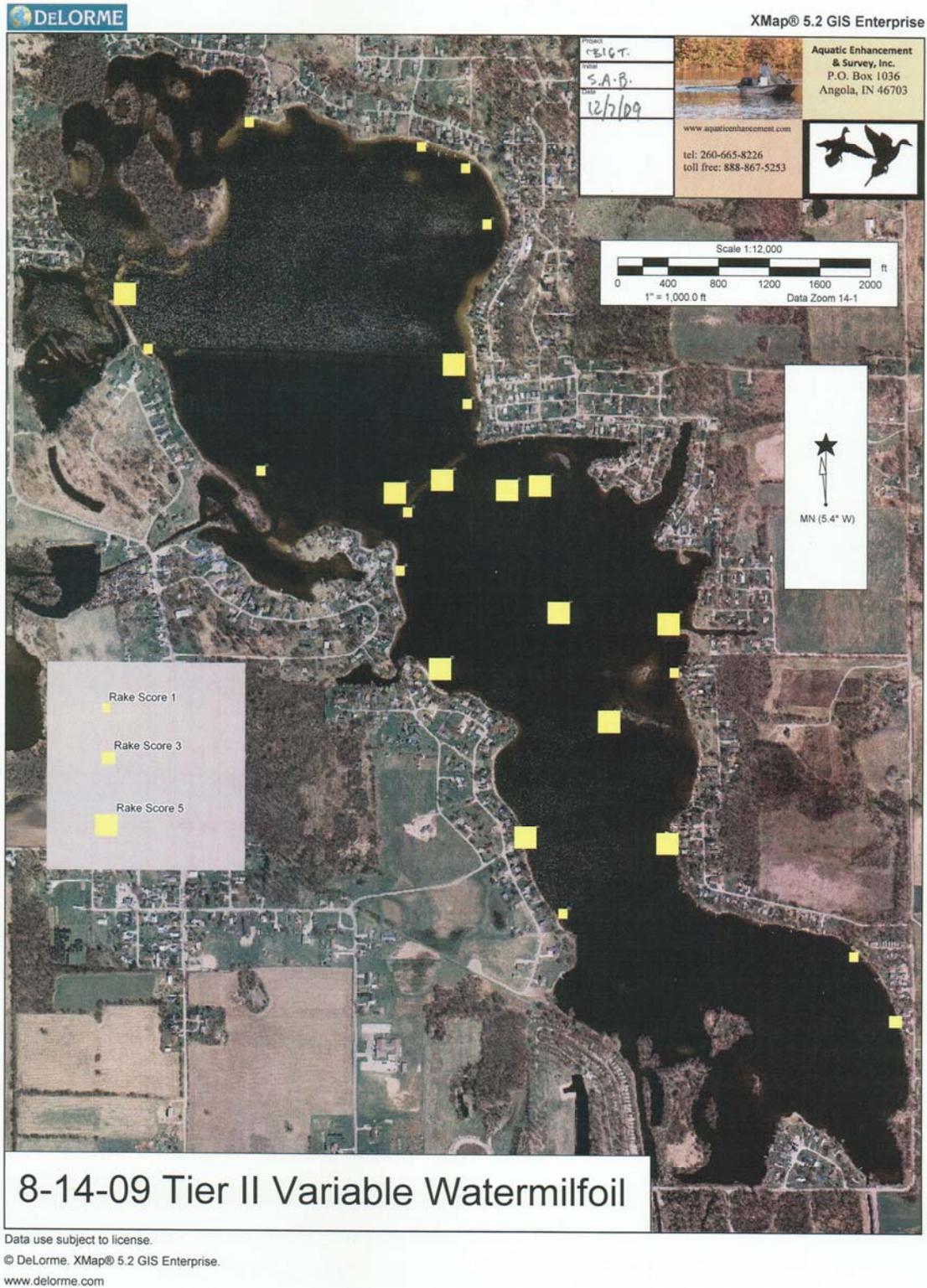


Figure 10. Tier II Variable watermilfoil map.

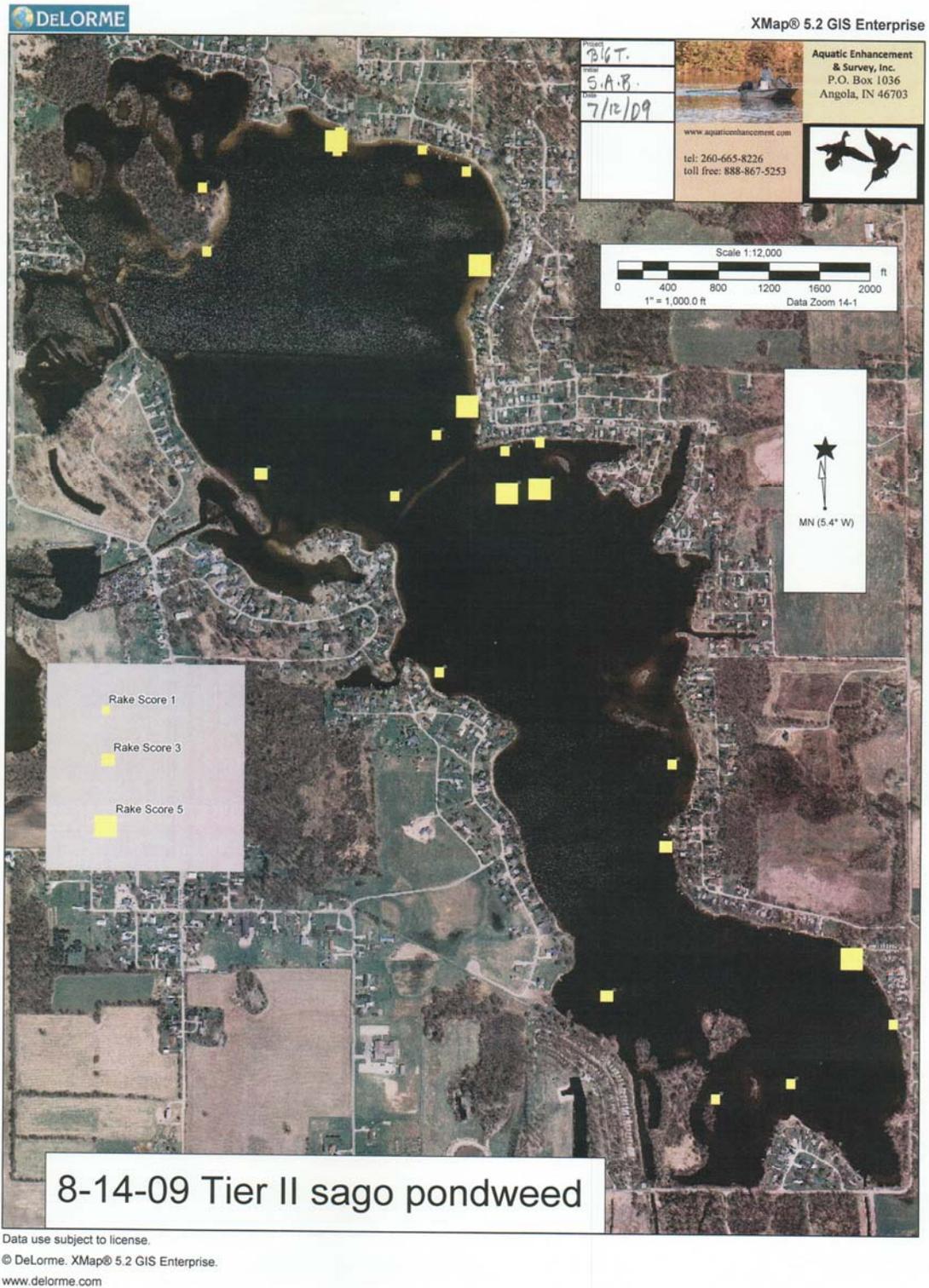
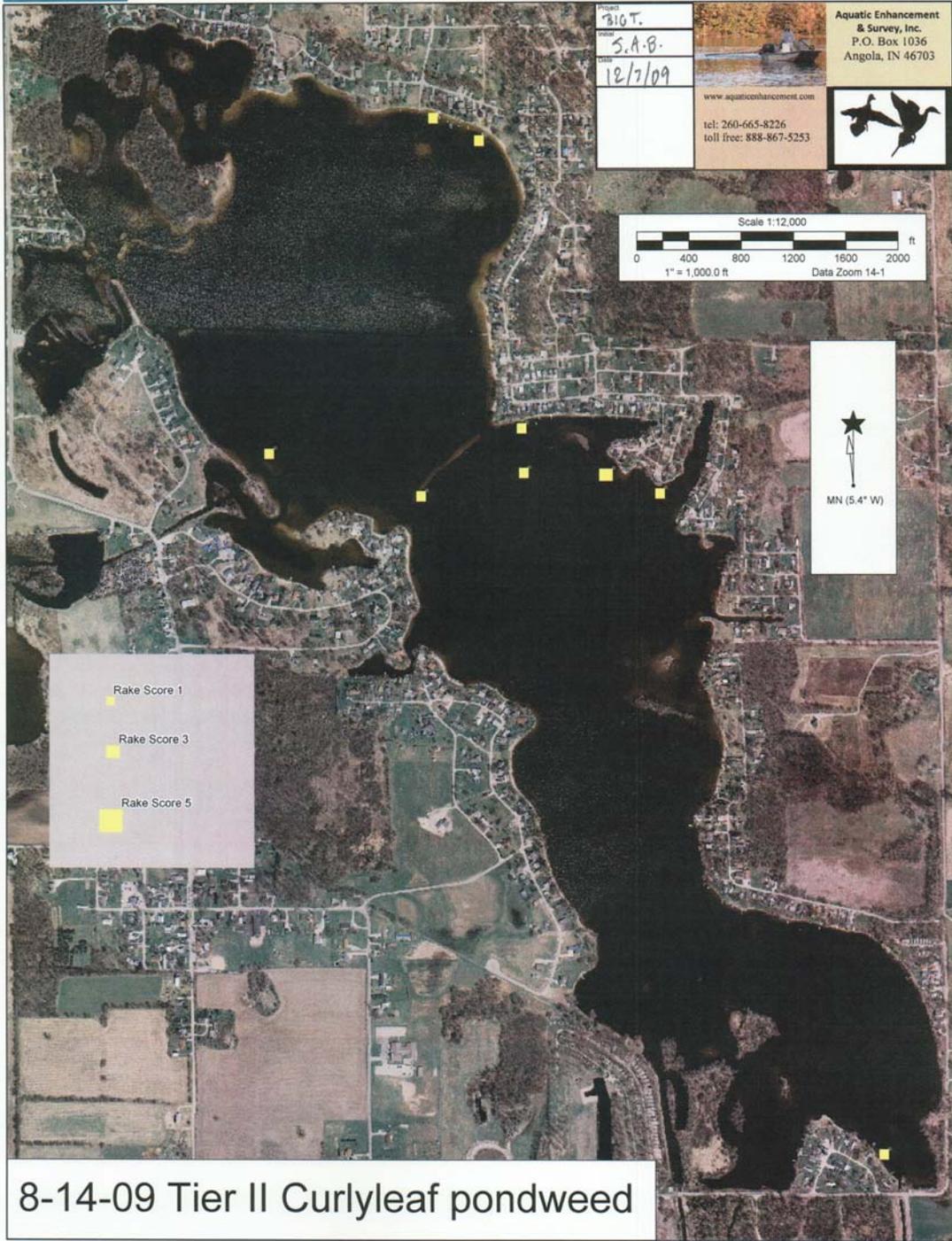


Figure 11. Tier II Sago pondweed map.



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Figure 12. Tier II Curlyleaf pondweed map.

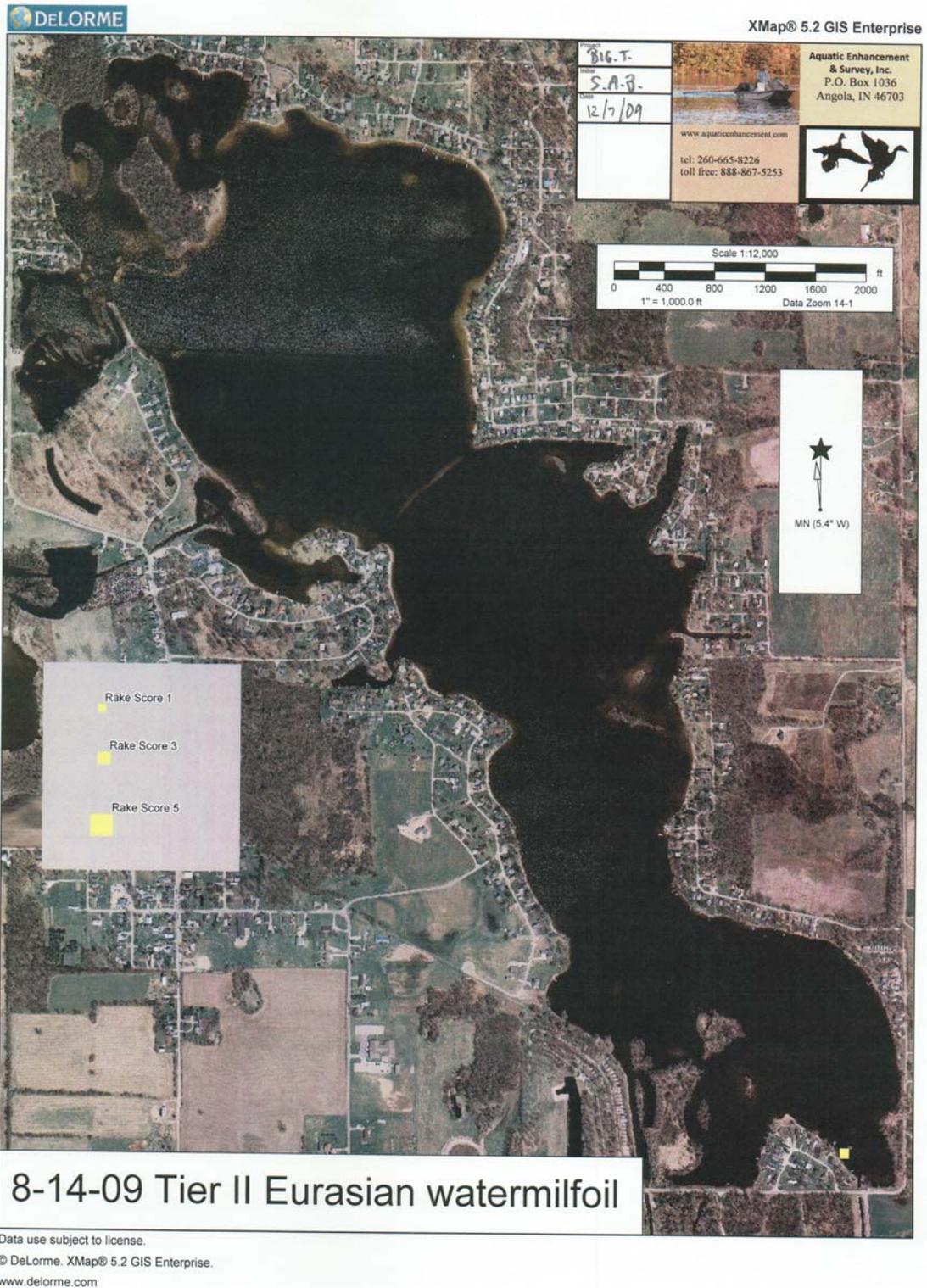


Figure 13. Tier II Eurasian watermilfoil map.

7. Description of Beneficial and Problem Plant Areas

Beneficial and problem plant areas were similar to 2008. All areas of dense Eurasian milfoil and Curlyleaf areas depicted in figures one through four above should be considered problem areas. All areas of native plant growth that do not seriously hinder recreational activities should be considered beneficial areas.

8. Aquatic Plant Management Alternatives

Continued active management of invasive plants is recommended at Big Turkey Lake and Henry Lake. If no action is taken Eurasian watermilfoil and Curlyleaf pondweed will continue to provide a significant hindrance to recreational activities and could negatively affect the ecological integrity of the lakes' plant communities. These plants are also more likely to increase their area of colonization if no controls are implemented.

For the 2010 season control of Curlyleaf pondweed and Eurasian watermilfoil using aquatic herbicides is again recommended. Due to lack of funding Curlyleaf pondweed was not treated in 2009 but recommendations for its treatment remain as in the original plan. Treatment of the 40.5 acres of dense growth should proceed in April using Aquathol K® liquid herbicide at the rate of 1 ppm. This treatment should take place when water temperatures are in the 50-55 degree range to insure the destruction of developing turions. Four to five years of turion- reducing early treatments are recommended as they can potentially deplete the turion bank available in Big Turkey Lake's hydrosol, allowing for a substantial decrease in returning growth.

It is recommended again that triclopyr (Renovate OTF®) be used for Eurasian watermilfoil control on all areas of significant growth. It is hoped that the triclopyr can produce multi-seasonal results in some areas where Navigate® 2,4-D failed to do so in 2008. The triclopyr application in 2009 also appeared to result in less late-season regrowth than the Navigate® did at the 100 pound per acre application rate used in 2008. In the spring of 2010 and 2011 lasting results from the 2009 and 2010 season can be assessed. Multi-seasonal control will become evident if areas of colonization have been significantly reduced. If no reduction in the area of milfoil colonization is evident at that time more cost effective maintenance treatments should be considered. The Renovate OTF® application in 2009 resulted in significant damage to White water lily plants at the south end of Big Turkey Lake. This is probably primarily due to the product being applied directly to milfoil growing within stands of White water lilies. To minimize damage to White water lilies applications directly into emergent plant beds should be avoided in 2010. Diffusive dosing from triclopyr granular applied outside the lily beds may be sufficient to provide control of milfoil growing within white water lily stands while reducing damage to the lilies themselves. It is likely that an alternative treatment with Navigate® 2,4-D would have the same effect if applied at full label rates directly within the lily stands, so a switch to that herbicide will not necessarily prevent non-target effects. Because it was determined in 2009 that Henry Lake, draining to Big Turkey Lake, contains Eurasian watermilfoil, treatment should be extended to that water body. A separate Tier II survey should also be performed for Henry Lake in 2010. Residents at Henry Lake are included in the Big Turkey Lake Improvement Association.

Dosage rates in Big Turkey should be varied as needed with a two acre area near the Dewitt Ditch and Turkey Creek inlets dosed at 260 pounds per acre to insure control is not defeated by water movement. The remaining large treatment area at the south end of the lake should be dosed at 120 pounds per acre. Other treatment areas larger than one acre in size should be dosed at the rate of 200 pounds per acre with treatment areas less than one acre treated at 260 pounds per acre. The channel leading from Henry Lake (approximately .4 acres) should be included, bringing the total acreage on Big Turkey to 27.4. Treatment of the Henry Lake milfoil should be continued using Renovate OTF® at the rate of 260 pounds per acre near the inlet and outlet (2 ac.) and 200

pounds per acre in the remaining shoreline areas (2.5 ac.). A dosing chart for the estimated 2010 treatment acreages is contained in tables three and four below.

Limited herbicide treatments are done for native plants on Big Turkey Lake each season. Variable watermilfoil (*Myriophyllum heterophyllum*) can be especially troublesome, forming vegetative surface mats during some seasons, seriously impeding boat traffic. Treatments with Navigate® 2, 4-D granular have proven very effective on this plant and typically provide satisfactory seasonal control. The Big Turkey Lake Improvement Association considered implementing a control program for this plant in some high traffic areas of the lake but problem growth was not extensive in these areas in 2009.

Coontail and Chara, while being particularly abundant in the survey data, do not seem to provide a significant hindrance to navigation or other recreational activities in the lake as a whole. Residents with very shallow slow-tapering bottoms in their docking areas do occasionally experience problems with Chara and it provides an annoyance where it occupies the bottom in swimming areas. Coontail growing near the south end of the lake does occasionally provide problems in areas where it reaches the surface, especially around shallow docking areas.

As stated in the original plan The Big Turkey Lake Improvement Association has completed a number of steps toward improving their watershed. The Association is advised to continue following up on recommendations from the work completed so far to continue reducing nutrient and sediment loads from the watershed. Recommendations should be reviewed periodically. Opportunities for potential projects may arise as landownership and land uses in the watershed change.

Big Turkey Milfoil Dose	Acres
120 pounds OTF per acre	17.35
200 pounds OTF per acre	3.5
260 pounds OTF per acre	6.55

Table 3. Estimated Big Turkey Lake OTF dosing 2010.

Henry Lake	Acres
200 pounds OTF per acre	2
260 pounds OTF per acre	2.5

Table 4. Estimated Henry Lake OTF dosing 2010.

9. Public Involvement

Aquatic Enhancement & Survey, Inc. attended a total of two Big Turkey Lake Improvement Association meetings in 2009. A public meeting was incorporated into a regular association meeting on 9/5/09. Approximately 69 were in attendance nearly all of whom were lake residents. A discussion of the aquatic plant management program in general was held with Aquatic Enhancement & Survey, Inc. A short survey was filled out by attendees and collected. Questions and responses are below. Residents generally expressed sentiments toward reducing the amount of aquatic plant growth in the lake. Approval and support for continuing to manage exotic plants on a lake-wide basis overall was strong.

9/5/09 Meeting, Big Turkey Lake Survey Results , 35 total respondents

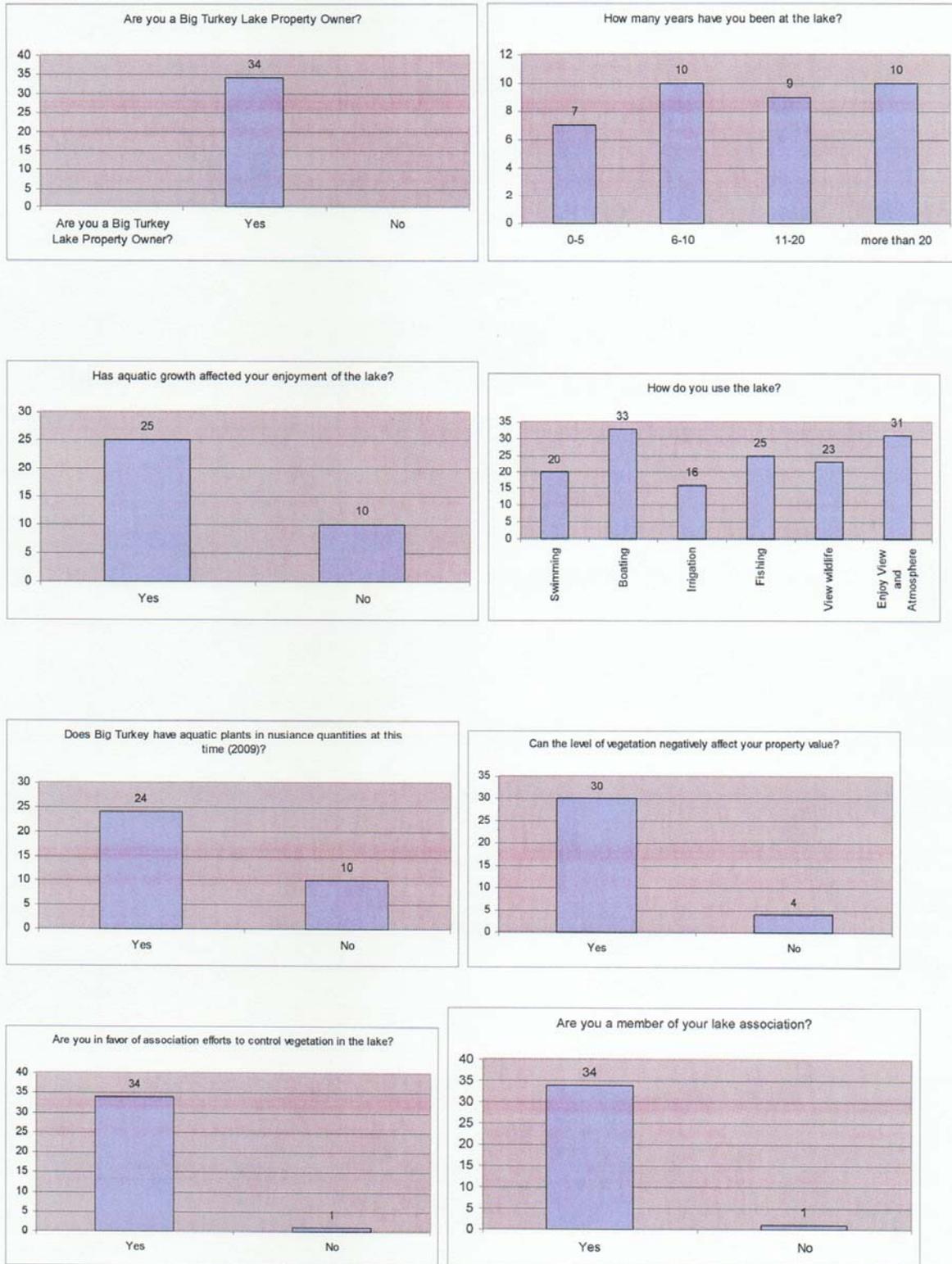


Figure 14. September 5, 2009 public meeting survey data for Big Turkey Lake.

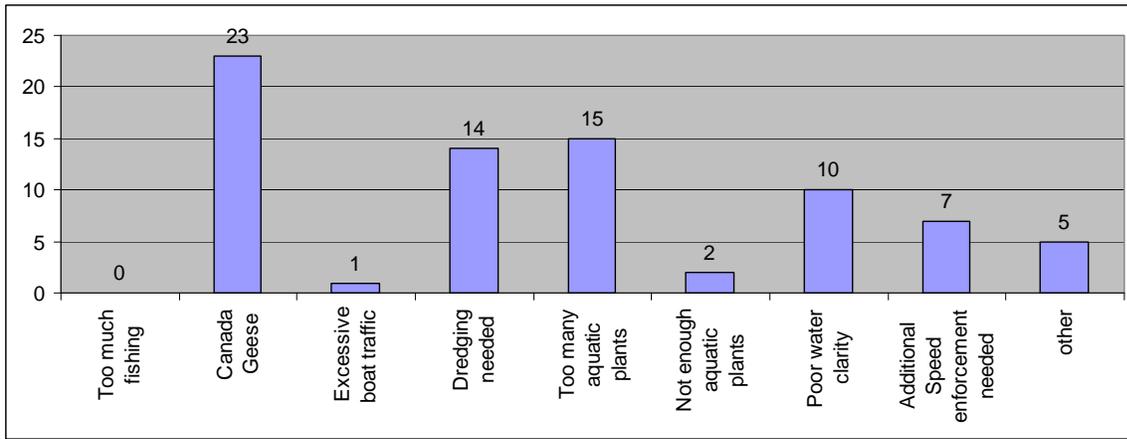


Figure 15. Problems noted at the lake by survey respondents.

Other problems noted by respondents	Low water level (2)
	enforce shoreline boating
	Wake Boats
	Fishing too close to piers

Table 5. Problems noted by respondents, not listed on survey form.

10. Implementation of Action Plan

Elements of the Big Turkey Lake action plan remain much the same as in the original 2007 Big Turkey Lake Management Plan. Eurasian watermilfoil and Curlyleaf pondweed should be treated on a seek and destroy basis with curlyleaf treatment taking place early to prevent turion production. However, the original plan designated 2,4-D granular for Eurasian watermilfoil treatment. Because regrowth had occurred in 2008 in some 2,4-D treatment areas a switch to triclopyr (Renovate OTF®) as a control took place in 2009 with good results. This regime is expected to be repeated through 2012. This is a more expensive product than the granular 2,4-D used in 2008, but if control/longevity of control is improved, the long-term costs associated with controlling this plant is expected to decrease. It is possible that the triclopyr treatments performed in 2009 will result in a lower acreage of milfoil growth in 2010, but this will not be known until after plant mapping takes place this spring. The Big Turkey Lake Improvement Association is in agreement with this course of action and is prepared to provide the associated 10 percent cost-share. Important dates for the Big Turkey Lake Improvement Association are listed in table 7.

It should be noted that LARE funding may not be available to assist the Big Turkey Lake Improvement Association in any given year. Requests for funding from LARE far exceed available funds. The Big Turkey Lake Improvement Association should explore other avenues for generating revenue to continue with management efforts in the event that LARE funds become unavailable. Possibilities include the solicitation of volunteer donations from lake residents or businesses in close proximity to the lake, or the holding of dedicated fund raiser events. The formation of a conservancy district is also a potential pathway to securing funds. A conservancy district provides a taxing body that can assess lake or watershed residents to provide funding for a specified environmental mission.

2010 Season •Big Turkey Success Benchmarks: 5% of littoral area or less in dense exotic plant growth (8 acres post treatment) 5% or less occurrence of Curlyleaf and Eurasian milfoil in July or August Tier II Survey •Henry Success Benchmarks: 5% or less occurrence of Curlyleaf and Eurasian milfoil in July or August Tier II Survey				
Month	Activity	Est. Acreage	Price per acre	Cost Estimate
April	Map Curlyleaf pondweed And Eurasian watermilfoil growth			1000.00
April/May (H2O Temp. approx. 55 or shortly after emergence)	Treat Curlyleaf pondweed as needed (1 ppm Aquathol K)	40.5	350.00	14175.00
May, Big Turkey Eurasian milfoil treatment	120 pounds OTF per acre	17.35	670.00	11624.00
	200 pounds OTF per acre	3.5	935.00	3274.00
	260 pounds OTF per acre	6.55	1134.00	7432.00
May, Henry Lake Eurasian milfoil treatment	200 pounds OTF per acre	2	935.00	1871.00
	260 pounds OTF per acre	2.5	1134.00	2837.00
July/August	Big Turkey Tier II Survey			1900.00
July/August	Henry Lake Tier II Survey			800.00
As arranged	Public Meeting			350.00
October/November	Permit Meeting			200.00
December	Plan Update Document Due			2000.00
	Total			\$47463.00

Table 6. 2010 season timeline and cost schedule for Big Turkey Lake.

Important program dates for the ALA in the 2010 season are below. These dates are based on a timeline needed if the ALA intends to have an early-season Curlyleaf treatment done. There is considerably more flexibility in timing if only a milfoil treatment is being performed as milfoil treatments generally do not begin until May.

March 1	Send in treatment permit form to IDNR
March 15, 2010	IDNR funding decisions
March 20	Send a request for proposals to planning and application contractors due in one week
March 27	Receive bids from contractors
March 31	Select and notify contractor(s) and call IDNR to have application contractor noted on permit (260-244-6805)
April 10	Obtain signed contract(s)
May 15	Schedule Lake Association Meeting with contractor (s)
November 1	Last day for contractors to provide maps for management plan or plan updates and schedule a meeting with DNR Fisheries and LARE biologists
December 15	First draft of management plan or plan updates due from contractors
January 15	Grant application due for current year funding
March 1	Final copy of revised plan or update due from contractors

Table 7. Important dates in 2010 for the Big Turkey Lake Improvement Association.

11. Education

In 2009, plant control was discussed at two Association meetings. Elements of the Big Turkey Lake Plan were discussed and slides were shown to help lake residents identify invasive plant species. In 2008, another species was added to the list of non-native invasive aquatic plants colonizing Indiana's natural lakes. Parrot feather (*Myriophyllum aquaticum*) was discovered growing in Meserve Lake in Steuben County. These plants are often introduced through the aquarium industry where they are marketed for use in fish tanks and garden ponds. Big Turkey Lake residents and users should be made aware of the extensive ecological damage that can occur if imported plants are discarded in the lake or intentionally transplanted. Raising awareness of this mode of introduction of problem species in the Big Turkey Lake newsletter and at association meetings in coming seasons can help prevent new introductions that can be extremely costly in future years.

12. Monitoring and Evaluation Plan

Changes in the 2010 season will include the addition of Henry Lake to spring exotic plant mapping and late-season Tier II surveys. Otherwise monitoring efforts should be continued as planned in the original Big Turkey Lake Plan. For more information see the original Big Turkey Lake Plant Management Plan (Aquatic Enhancement 2007).

13. Literature Cited

Aquatic Enhancement & Survey, Inc. 2007, Aquatic Plant Management Plan 2007-2011. Big Turkey Lake. LaGrange, Steuben County, Indiana. Aquatic Enhancement & Survey, Inc. Angola, Indiana 46703.

Aquatic Enhancement & Survey, Inc. 2008, Aquatic Vegetation Management Plan Update 2008 Big Turkey Lake, LaGrange & Steuben County, Aquatic Enhancement & Survey, Inc. Angola, Indiana 46703.

IDNR 2007. Tier II Aquatic Vegetation Survey Protocol, May 2007, Indiana Department of Natural Resources, Division of Fish and Wildlife, 402 W. Washington St. Rm W-273, Indianapolis, IN 46204.

Pearson, J. 2004, A sampling method to assess occurrence, abundance and distribution of submersed aquatic plants in Indiana lakes, Indiana Department of Natural Resources, Division of Fish and Wildlife, Tri-Lakes Fisheries Station, 5570 North Hatchery Road Columbia City, Indiana 46725.

Appendix A
Application for Aquatic Vegetation Control Permit
Big Turkey Lake



APPLICATION FOR AQUATIC VEGETATION CONTROL PERMIT

State Form 26727 (R / 11-03)
 Approved State Board of Accounts 1987
 Whole Lake 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

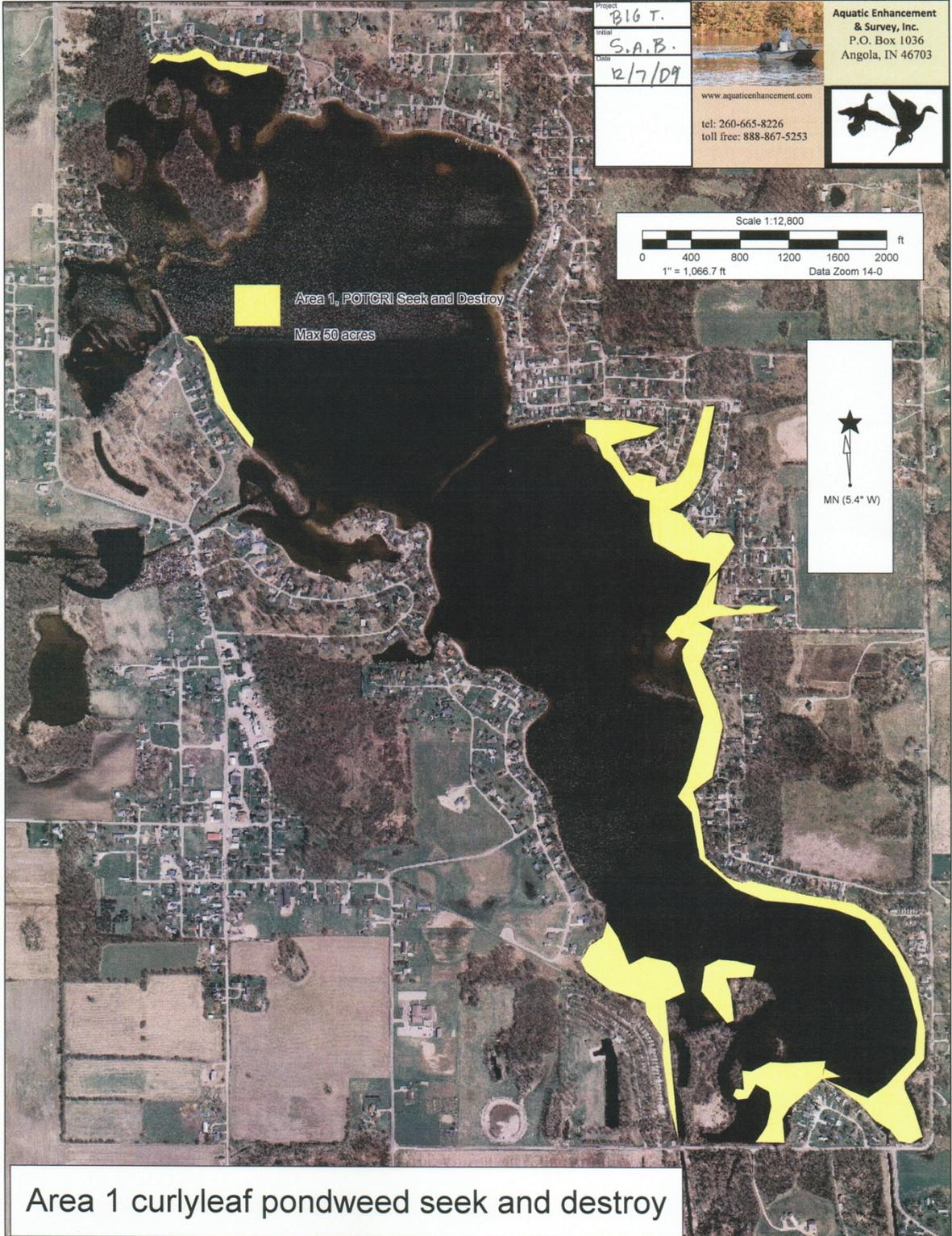
FEE: \$5.00

Applicant's Name Big Turkey Lake Association		Lake Assoc. Name Big Turkey Lake Association	
Rural Route or Street P.O. Box 186		Phone Number 260-351-3573	
City and State Stroh, IN		ZIP Code 46789	
Certified Applicator (if applicable)		Company or Inc. Name	
Rural Route or Street		Phone Number	
City and State		ZIP Code	
Lake (One application per lake) Big Turkey		Nearest Town Stroh	
		County Lagrange	
Does water flow into a water supply		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 N 41 deg 35.257' W85 deg 11.118'		
Total acres to be controlled	Up to 50	Proposed shoreline treatment length (ft)	Up to 16K	Perpendicular distance from shoreline (ft) Varies
Maximum Depth of Treatment (ft)	10 ft	Expected date(s) of treatment(s) 28-Apr-10		
Treatment method:	<input checked="" type="checkbox"/> Chemical	<input type="checkbox"/> Physical	<input type="checkbox"/> Biological Control	<input type="checkbox"/> 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. Aquathol K low dose early season Curlyleaf treatment, per LARE Plan				
Plant survey method:	<input checked="" type="checkbox"/> Rake	<input checked="" type="checkbox"/> Visual	<input type="checkbox"/> Other (specify)	

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Curlyleaf	x	40
Coontail		20
Variable milfoil		10
Sago pondweed		10
Chara		10
Small pondweed		10

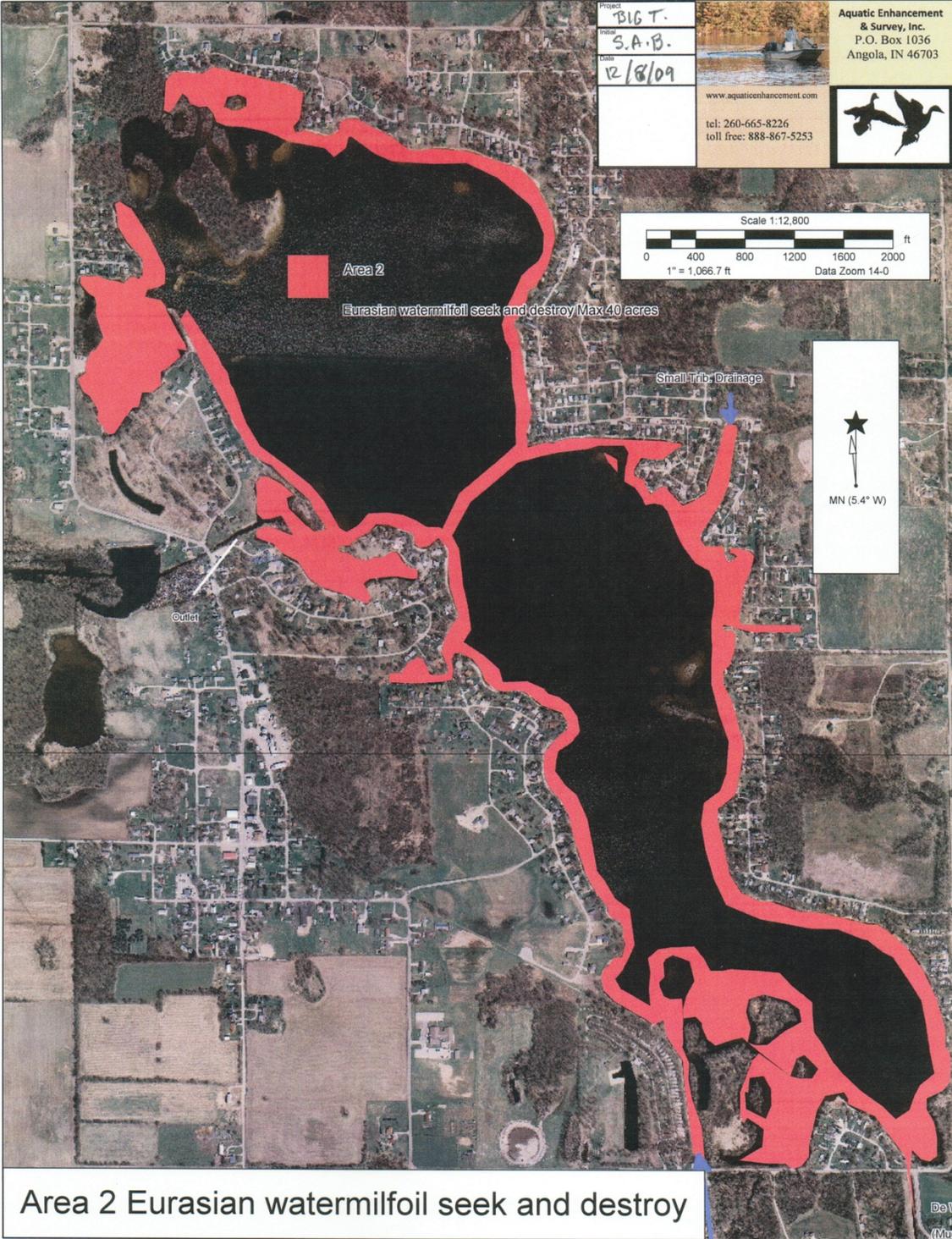


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Project	BIG T.
Initial	S.A.B.
Date	12/8/09

www.aquaticenhancement.com
 tel: 260-665-8226
 toll free: 888-867-5253

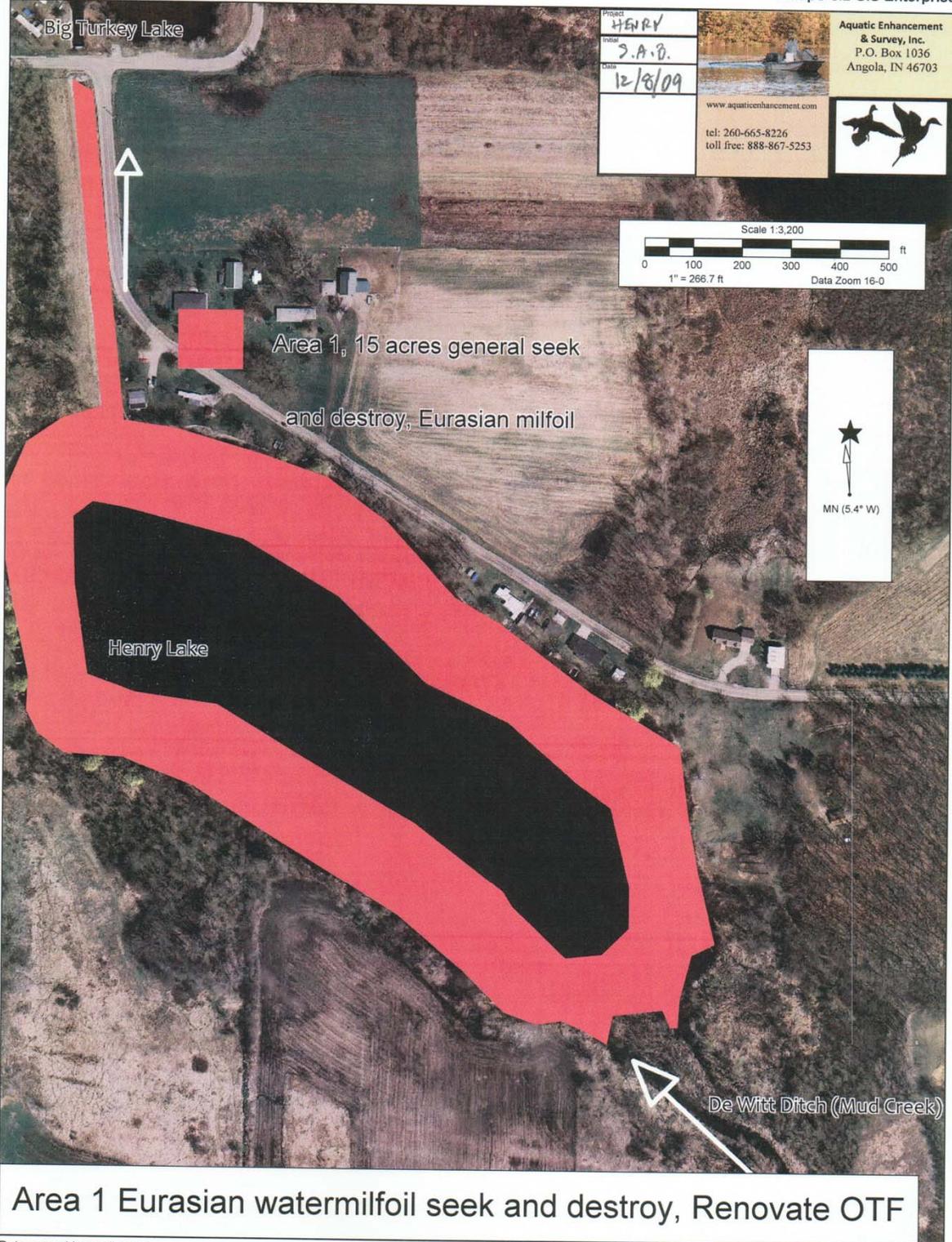
Aquatic Enhancement & Survey, Inc.
 P.O. Box 1036
 Angola, IN 46703

Area 2 Eurasian watermilfoil seek and destroy

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Appendix B
Application for Aquatic Vegetation Control Permit
Henry Lake



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Appendix C
Tier II Survey Data Sheets

Submersed Aquatic Vegetation Survey (Tier II) Datasheet

WATERBODY NAME: <u>Big Turkey Lake</u>					DATE: <u>8-14-09</u>													
COUNTY: <u>Stauben & LaGrange</u>					SECCHI DEPTH (FT):													
SITE ID:					MAX PLANT DEPTH (FT):													
SURVEYING ORGANIZATION: <u>Aquatic Enhancement</u>					WEATHER: <u>Sunny 70° Calm</u>													
CREW LEADER: <u>Scott Banfield</u>					COMMENTS (Include voucher codes - V1, V2...):													
RECORDER: <u>Joseph Closson</u>																		
CONTACT INFO: <u>(260) 665-8226</u>					Rake score (1, 3, 5). 9 = algae, emergent or species observed but not sampled.													
					Species Codes:													
Point #	R/T	Latitude	Longitude	Depth (ft)	CHARA	URVAC	NASMAR	CERDEM	POTGKA	STUPEC	POTDIL	ZANPAL	MYRHET	POTPUS	POTCRI	NASFLIE	POTZOS	Notes
1	T			5.1	5	5	1											
2	T			5.1	5	3	3											
3	T			9				5										
4	T			3	3				1									
85	T			3.5			1	1										
84	T			1	5	1	1											
82	T			2	5													
5	T			2	3		1			1								
81	T			1					1		1							
80	T			1	5	1	3			1								
6	T			4.5			3											
7	T			2	5		1					1						
8	T			6		1		5										
9	T			3	1		1											
79	T			1.5	5								1					
78	T			2.5														
10	T			23.5														
75	T			6	3					1	1							
76	T			7.5			3			5								
77	T			4			5		1	1								
11	T			6.5	5													
74	T			4.5					+	1	1		1	1	1	1		
73	T			4				1		1			1		1	1	1	
72	T			4.1	1								1			1		
12	T			6				5		5								
71	T			10.5														
13	T			5.1										1				
70	T		12 ft	16.5									5	1		3		
14	T			4						5		1	1		1	1		
15	T			12.5				5		1				1		1		
Other plant species observed at lake:																		

Note: 6
Match numbers with 2008

Submersed Aquatic Vegetation Survey (Tier II) Datasheet

MYK 712
FORM IN HAND DATA

WATERBODY NAME: <u>Big Turkey Lake</u>	DATE: <u>8-14-09</u>
COUNTY:	SECCHI DEPTH (FT): <u>3' 2"</u>
SITE ID:	MAX PLANT DEPTH (FT):
SURVEYING ORGANIZATION:	WEATHER:
CREW LEADER:	COMMENTS (Include voucher codes - V1, V2...):
RECORDER:	<u>V1 @ 42 N 41° 34.5' 70 min W 085° 10.7410 min</u>

CONTACT INFO: _____
 Rake score (1, 3, 5). 9 = algae, emergent or species observed but not sampled.
 Species Codes: _____

Point #	R/T	ELOCAN Latitude	HETDOB Longitude	Depth (ft)	CHARA	UTR/MAC	NAS/MAR	CER/DEM	POT/GR	STU/EL	POT/ILL	ZAN/PAL	MYR/HET	POT/PUS	POT/CR	NAS/FL	POT/205	Notes
69	T			4	5						5	5						
24	T		5	4				1		1					1			1
25	T	1		2				5		1				1		1		
68	T			5.5						5			5	1		1		
61	T			5				1		5			5		1			
62	T			12														
27	T			4.5				5							3			1
28	T			4.5				5							3			1
67	T			4				5						1		5		1
66	T			3				5						1	1	5		
65	T			3														
29	T			10				1						1				
63	T			14														
30	T			8.5				1					5					
64	T			16														
31	T			5				1					5					1
32	T			3									1					
34	T			2.5									5					9
33	T			4.5				5		1								1
35	T			2.5				1	1	3			5					1 9
36	T			13				1										
37	T			3				1										5
38	T			8.5				1										5
39	T			4				5		5			1					3
40	T	1	1	1						1			3			5		
41	T			6														9 1
42	T			1				1										
44	T	5		5				3							1			1
43	T			1.5				3						1				3 9
45	T			9.5				3		1								

Other plant species observed at lake: _____

ALGAE
POT/PR
SH/GR

Submersed Aquatic Vegetation Survey (Tier II) Datasheet

MYRSPL

WATERBODY NAME: <u>Big Turkey Lake</u>		DATE: <u>8-14-09</u>																			
COUNTY:		SECCHI DEPTH (FT):																			
SITE ID:		MAX PLANT DEPTH (FT):																			
SURVEYING ORGANIZATION:		WEATHER:																			
CREW LEADER:		COMMENTS (Include voucher codes - V1, V2...):																			
RECORDER:																					
CONTACT INFO:		Rake score (1, 3, 5). 9 = algae, emergent or species observed but not sampled.																			
		Species Codes:																			
Point #	R/T	Latitude	Longitude	Depth (ft)	CHARA	POTRMA	NASMAR	CERDEM	POTGRA	STOPEC	POTLUC	ZANPAL	MYRHET	POTPUS	POTKRD	NASTLE	POTZOS	Notes	ALGAE	POTPRA	SA6GRA
48	T			9				1													
47	T			3.5				5		1								1		9	
49	T			1.5				5													
46	T			13.5																	
50	T			4.5				5		3								3			
51	T		1	4.5				1	1		5		1					3			
52	T			3									5					1		9	
53	T			5				5						1				1		9	
54	T			5.1				1										1		5	
55	T			1	1												3			1	
56	T			4.5						1			5					1			
57	T			7				5						1						5	
58	T			3									1								
59	T			14.5																	
60	T			7									1		1			5			
23	T		1	5									5								
16	T			4.5						1			5	1							
19	T			4	1		5														
18	T			8																	
17	T			7				5		3			1		1						
20	T		1	10																	
21	T		5	5	1			1					1								1
23	T			21																	
22	T			6				5					5								
Other plant species observed at lake:																					

(517) 369-1632

Appendix D
Tier II Survey Waypoint Coordinates

41.591616,-85.203116,WPT001,GREEN DOT
41.592216,-85.203416,WPT002,GREEN DOT
41.593317,-85.203183,WPT003,GREEN DOT
41.593533,-85.201850,WPT004,GREEN DOT
41.594349,-85.198600,WPT005,GREEN DOT
41.596333,-85.198100,WPT006,GREEN DOT
41.596533,-85.199449,WPT007,GREEN DOT
41.598432,-85.201216,WPT008,GREEN DOT
41.598082,-85.197750,WPT009,GREEN DOT
41.596183,-85.195532,WPT010,GREEN DOT
41.596382,-85.194000,WPT011,GREEN DOT
41.594083,-85.190683,WPT012,GREEN DOT
41.592515,-85.191349,WPT013,GREEN DOT
41.591015,-85.191033,WPT014,GREEN DOT
41.590400,-85.191917,WPT015,GREEN DOT
41.589049,-85.193116,WPT016,GREEN DOT
41.589533,-85.196999,WPT017,GREEN DOT
41.588683,-85.197816,WPT018,GREEN DOT
41.587516,-85.195683,WPT019,GREEN DOT
41.590999,-85.198866,WPT020,GREEN DOT
41.592166,-85.200266,WPT021,GREEN DOT
41.593349,-85.200949,WPT022,GREEN DOT
41.589332,-85.191749,WPT023,GREEN DOT
41.590066,-85.189932,WPT024,GREEN DOT
41.590249,-85.188917,WPT025,GREEN DOT
41.589083,-85.187566,WPT027,GREEN DOT
41.589083,-85.187566,WPT028,GREEN DOT
41.587599,-85.186749,WPT029,GREEN DOT
41.586450,-85.188367,WPT030,GREEN DOT
41.586216,-85.185183,WPT031,GREEN DOT
41.585149,-85.185016,WPT032,GREEN DOT
41.583250,-85.185033,WPT033,GREEN DOT
41.584083,-85.186900,WPT034,GREEN DOT
41.581450,-85.185199,WPT035,GREEN DOT
41.580666,-85.185232,WPT036,GREEN DOT
41.579883,-85.183549,WPT037,GREEN DOT
41.579383,-85.180900,WPT038,GREEN DOT
41.579017,-85.179783,WPT039,GREEN DOT
41.577600,-85.178567,WPT040,GREEN DOT
41.576183,-85.178583,WPT041,GREEN DOT
41.575617,-85.179016,WPT042,GREEN DOT
41.574233,-85.178666,WPT043,GREEN DOT
41.574799,-85.179800,WPT044,GREEN DOT
41.576299,-85.181533,WPT045,GREEN DOT
41.577966,-85.182883,WPT046,GREEN DOT
41.575949,-85.183716,WPT047,GREEN DOT
41.575716,-85.183382,WPT048,GREEN DOT
41.574100,-85.182816,WPT049,GREEN DOT
41.578166,-85.186882,WPT050,GREEN DOT
41.579916,-85.188216,WPT051,GREEN DOT
41.581566,-85.189317,WPT052,GREEN DOT
41.582833,-85.190033,WPT053,GREEN DOT
41.583766,-85.189249,WPT054,GREEN DOT

41.584667,-85.190616,WPT055,GREEN DOT
41.585199,-85.191799,WPT056,GREEN DOT
41.586383,-85.192399,WPT057,GREEN DOT
41.587366,-85.192966,WPT058,GREEN DOT
41.587716,-85.192083,WPT059,GREEN DOT
41.588633,-85.192749,WPT060,GREEN DOT
41.589116,-85.189867,WPT061,GREEN DOT
41.588649,-85.188299,WPT062,GREEN DOT
41.587599,-85.187817,WPT063,GREEN DOT
41.585933,-85.189116,WPT064,GREEN DOT
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41.588683,-85.186050,WPT066,GREEN DOT
41.588783,-85.187016,WPT067,GREEN DOT
41.589216,-85.188917,WPT068,GREEN DOT
41.590400,-85.190967,WPT069,GREEN DOT
41.591849,-85.191416,WPT070,GREEN DOT
41.593249,-85.191399,WPT071,GREEN DOT
41.594900,-85.190466,WPT072,GREEN DOT
41.596116,-85.191083,WPT073,GREEN DOT
41.596582,-85.192366,WPT074,GREEN DOT
41.596533,-85.194833,WPT075,GREEN DOT
41.596749,-85.194866,WPT076,GREEN DOT
41.596950,-85.194766,WPT077,GREEN DOT
41.596899,-85.196366,WPT078,GREEN DOT
41.597100,-85.197349,WPT079,GREEN DOT
41.595733,-85.198733,WPT080,GREEN DOT
41.595249,-85.197949,WPT081,GREEN DOT