Aquatic Enhancement
& Survey, Inc.

Aquatic Vegetation Management Plan Update 2008

Stone and Brokesha Lakes, Lagrange County Indiana

Prepared for the Prepared for the Stone Lake Conservation Club
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December 7, 2008

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Acknowledgements

I would like to thank the following for making possible the 2008 season field work and preparation of this update: Jim Bugg, Richard Milewski and the other officers, and members of the Stone Lake Conservation Club., Neil Ledet, Larry Koza and Gwen White of the Indiana Department of Natural Resources Division of Fish and Wildlife. Field work for this document was performed by Scott Banfield and Joe Closson of Aquatic Enhancement & Survey, Inc.

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1. Executive Summary

Stone and Brokesha Lakes are two interconnected kettle lakes of 104 and 29 acres respectively located in LaGrange County Indiana. They are generally low in nutrients and have good warm season water clarity compared with most other northeast Indiana lakes. The shoreline of Stone Lake is nearly 100 percent developed with single family homes and cottages while the shoreline of Brokesha Lake is less than 10 percent developed. The public can gain access to both lakes through a County owned ramp on the Northwestern shore of Stone Lake. Boating, fishing, and swimming are all popular activities at the lakes. The Stone Lake Conservation Club acts as the primary advocate organization for both lakes working to improve and protect them. The lakes contain an aquatic flora of normal diversity, but both have a history of extensive colonization by the non-native plants Curlyleaf pondweed *Potamogeton crispus* and Eurasian watermilfoil *Myriophyllum spicatum*. Two invasive wetland plants, Purple loosestrife *Lythrum salicaria*, and Phragmites *Phragmites australis* have also begun to colonize riparian areas at the lakes. For several years prior to 2005 an excessive growth of Eurasian milfoil had seriously impaired the aesthetic quality of the lakes and provided a significant hindrance to the recreational activities of the lake's users. Beginning in the 2005 season the Stone Lake Conservation Club sought and obtained cost-share assistance from the IDNR Lake and River Enhancement Program (LARE) for the management of exotic plants. Exotic plant management is currently guided by a LARE cost-share funded Aquatic Plant Management Plan developed in 2007 (Aquatic Enhancement, Inc. 2007). The 2007 plan established the following goals for exotic plant management: 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. In addition the following benchmarks for exotic plant management success were established: 1. Eliminate all significant Curlyleaf stands within two weeks of treatment on both lakes. 2. Maintain a late season Tier II occurrence of Eurasian watermilfoil of 10% or less on Stone and 5% or less on Brokesha. This update document serves to compliment the 2007 plan, detail plant management activities in 2008, and utilize current information to adjust guidance for the course of plant management activities in 2009 and beyond. Both Lakes underwent their first "whole lake" treatment with the herbicide Sonar® (fluridone) in 2005 placing Eurasian watermilfoil under control by the end of that season. Since 2006 recolonization has begun, especially on Stone Lake with 23 acres of Stone Lake needing treatment in 2008. On Brokesha Lake less than one acre needed treatment during 2008. Stone Lake appears to be at or near its pre-fluridone growth pattern. Previous work listed the combined milfoil growth area for both lakes at 26 acres. However, the Stone Lake Conservation Club (SLCC) members indicate that the present growth does not match the density or height of the prior nuisance growth. The treatments being performed may be responsible for this. Granular 2, 4-D aquatic herbicide was applied to the affected areas of both lakes on June 12th with good results, however some regrowth was noted later on both lakes. No cost share funding was available for Curlyleaf pondweed control so it remained untreated in 2008. A post-treatment Tier II plant survey was performed on both lakes in mid-August. On Stone Lake overall diversity was good with 13 species identified in the survey and the lake was dominated by native species. Curlyleaf pondweed did not occur in the sampling. Eurasian watermilfoil occurrence was four percent meeting the established benchmark. On Brokesha Lake nine species were identified in the survey showing diversity slightly above average for northeast Indiana lakes. Curlyleaf pondweed and Eurasian watermilfoil did not occur in the sampling. Practical Options for management in 2009 include another whole lake fluridone treatment or retreatment of approximately the same areas as in 2008 with 2, 4-D granular aquatic herbicide. It is the recommendation of this update that another whole lake treatment be performed in 2009 using granular and liquid fluridone. Purple

loosestrife and Phragmites should also be treated to protect riparian wetland habitat at the lakes. The cost of treatment for the "whole lake" option in 2009 is estimated to be $27,045.00 with the cost of wetland plant treatment at $2950.00. For comparison the cost of using 2, 4-D on 23 acres of Eurasian milfoil again in 2009 is expected to be $10,350.00 with little carry-over control expected into 2010. Over three years this amounts to at least $31,050.00 in milfoil control efforts. The fluridone option may provide three seasons of control with a single application resulting in a significant cost savings. It is also recommended that the plan be updated again in 2009 to keep management strategies current into future seasons. The cost associated with a 2009 plan update is estimated to be $4988.00.

2. Problem Statement

Exotic plants provide impairment to Stone and Brokesha Lakes indirectly by out-competing more beneficial native species and potentially contributing to a loss of plant diversity or an alteration of aquatic community functioning. Exotic vegetation has a direct affect by impairing the recreational use and aesthetic appeal of the lakes.

3. Management History and Goals

Treatments for Eurasian watermilfoil have been ongoing at Stone and Brokesha Lakes since 2005. Prior to 2005 no active plant management was performed. In response to an increasing problem with Eurasian watermilfoil (26 acres both lakes combined) the Stone Lake Conservation Club worked with assistance from LARE and hired Weed Patrol Inc. to develop an aquatic plant management plan for the lakes. Curlyleaf pondweed, another exotic species was also present, but was not a major problem. In 2005 a "whole lake" 6 bump 6 fluridone (Sonar® A.S.) treatment was performed to control the Eurasian milfoil (also with LARE assistance) with good overall results. In 2006 approx. four acres of returning Eurasian watermilfoil growth was treated on Stone Lake. In 2007 Aquatic Enhancement & Survey, Inc. redeveloped the management plan and gained plan approval through IDNR and continued with treatments. Ten acres of milfoil was treated on Stone in 2007. A small amount (less than .25 acres) of Eurasian watermilfoil was noted and treated on Brokesha in 2007 as well. Milfoil maps for 2004, 2007, and 2008 are provided in figure three below for comparison. The general purpose of this plant plan update and associated plant management activities at Stone and Brokesha Lakes is to help the Stone Lake Conservation Club 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 Stone and Brokesha Lakes for 2008 have been geared toward attainment of these goals and the following measurable benchmarks for success in that regard were applied to the Lakes per their 2007 season plan update:

1. Elimination of all significant Curlyleaf stands within two weeks of treatment on both lakes. Significant stands are defined as those of a sufficient density and height that they impede the operation of watercraft and are perceived by the lake users to detract from the overall aesthetic quality of the lake.

2. Attain a Tier II occurrence of Eurasian watermilfoil of 10% or less on Stone and 5% or less on Brokesha.

On May 19, 2008 time was spent on the water to map the extent of significant Curlyleaf pondweed and Eurasian watermilfoil growth at Stone and Brokesha Lakes. Waypoints were also collected to be used to assist in staying over target plants during treatment. Approximately 23 acres of Eurasian watermilfoil growth was noted (Figure 1 below). On Stone this appears to be close to the same extent of colonization noted in 2004 prior to the fluridone treatment (Figure 2). On Brokesha it appears that milfoil has barely managed to recolonize any of it's former growth areas. Curlyleaf was also present to some extent on both lakes but growth was not dense in 2008. The pattern of growth for Eurasian milfoil was similar to that seen in 2007 although the mapped and treated areas were expanded to include areas of scattered growth, especially on the littoral flat on the Stone Lake's north side. As in 2007 little milfoil was noted in Brokesha. All 23 acres of noted Eurasian watermilfoil growth was treated with 100 pounds per acre 2, 4-D granular aquatic herbicide (Navigate®) on June 12. Since no cost-share funding was appropriated for Curlyleaf management it was not treated in 2008. Overall results of the milfoil treatment were good but some milfoil regrowth was noted in the treatment areas at the time of the August 14th Tier II surveys. The Eurasian watermilfoil benchmark was met for both lakes. On Stone the Tier II occurrence for milfoil was only four percent, well below the 10 percent benchmark. On Brokesha where the benchmark was five percent or fewer occurrences, no milfoil was collected in the survey.

Figure 1 Stone and Brokesha Lakes Eurasian milfoil map / treatment areas 6/12/08 (2,4-D gran.)

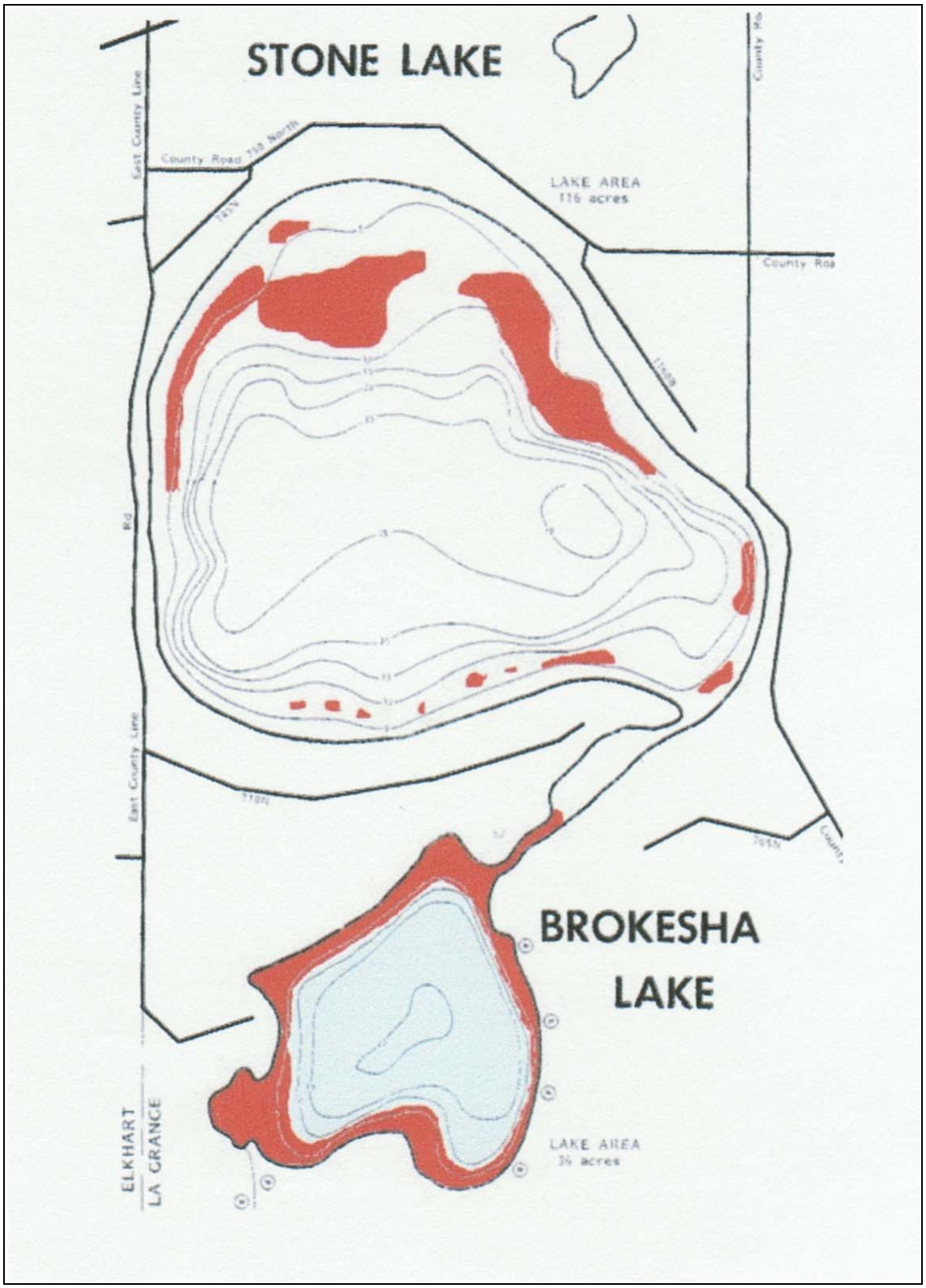

Figure 2 Pattern of Eurasian milfoil growth noted in 2004 (Weed Patrol, Inc.)

Figure 3 2004, 2007, and 2008 patterns of milfoil colonization (no map data was located for 2005/2006)

4.0 Watershed and Waterbody Characteristics

Stone and Brokesha Lakes are 104 and 29 acres respectively. They have a watershed of 746 acres, 640 of which drain directly through Brokesha before entering Stone. The area draining to Stone Lake without first moving through Brokesha is approximately 106 acres. There have been no major changes in the watershed that need to be taken into consideration for this update and no new studies of the lakes or watershed have been noted in 2008. To provide additional useful data for the lakes an estimate was calculated for the hydraulic residence time of each lake. The hydraulic residence (retention) time is the average time that a given drop of water finding its way to Stone and Brokesha Lakes would spend in the lakes before passing through their outflow stream.

Using annual precipitation data from the Midwestern Regional Climatic Center and data collected from a United States Geological Survey (USGS) operated stream flow gauging station stream in adjacent Steuben County a general runoff coefficient was calculated to provide an estimate of the average inches of runoff entering Brokesha Lake from its 640 acre watershed. This figure is then used to calculate the volume of estimated runoff entering the lake each year. Dividing the volume of water in the lake by the volume of water flowing into it each year produces a rough estimate of the average time that water spends in the lake (see figures in tables 1 and 2 below). The estimated residence time for waters in Brokesha Lake is .96 years (350 days). The hydraulic residence time for Stone Lake is estimated to be 4.69 years.

Because runoff or direct rainfall entering the lake during the summer warm season when the lake is thermally stratified is not likely to mix with the lower waters of the lake, but rather flow through roughly the upper 10 feet of the lake, a more conservative estimate for retention time can be produced assuming the lake to only be comprised of its upper ten feet of volume. In this case the retention time estimate produced for Brokesha is .61 years (223 days). The estimate for Stone's residence time is 2.22 years. When "whole lake" type herbicide treatments are performed it's typically required that the applied herbicide be retained in the waters of the lake for an extended period of time. The estimates for both lakes indicate that even in an especially wet year where an unusually large amount of runoff flows into the lakes, the residence time of both lake's waters will be long enough to insure sufficient herbicide retention.

Brokesha Hydraulic Residence time Calculation	
Watershed Acres	640
Est. Runoff Coefficient	0.16
Est. Annual Precip. (in)	38.89
Est. Annual Precip. (ft)	3.24
Annual Runoff (ft) (Ann. Precip.)*(runoff coeff)	.52
Ann. Runoff Vol. (ac-ft) (Ft. runoff)*(ac. watershed)	333
Lake Volume (29 ac @ 11 foot avg. depth)	319
Residence time (yrs) (Lk vol/ann. Runoff)	.96
Upper 10 ft Lake Volume (29 ac @ 7 foot depth)	203
Residence time of upper ten feet (yrs) assuming no mixing of rainfall/runoff below 10 feet	.61 (223 days)

Table 1 Hydraulic residence time data for Brokesha Lake

Stone Lake Hydraulic Residence time Calculation	
Watershed Acres	746
Est. Runoff Coefficient	0.16
Est. Annual Precip. (in)	38.89
Est. Annual Precip. (ft)	3.24
Annual Runoff (ft) (Ann. Precip.)*(runoff coeff)	.52
Ann. Runoff Vol. (ac-ft) (Ft. runoff)*(ac. watershed)	388
Lake Volume (104 ac @ 17.5 foot avg. depth)	1820
Residence time (yrs) (Lk vol/ann. Runoff)	4.69
Upper 10 ft Lake Volume (104 ac @ 8.3 foot depth)	863.2
Residence time of upper ten feet (yrs) assuming no mixing of rainfall/runoff below 10 feet	2.22

Table 2 Hydraulic residence time data for Stone Lake

5.0 Present Water Body Uses

There have been no significant changes in 2008 and no new fisheries studies have been completed at Stone and Brokesha in 2008. For background information see the original Stone and Brokesha aquatic plant management plan. (Aquatic Enhancement 2007)

6.0 Aquatic Plant Community Characterization

Tier II Survey Methods

Tier II survey methods used on Stone Lake were identical to the 2007 season. On Brokesha sampling sites beyond 15 feet were reallocated to shallower collection sites. This was done in response to a lack of plants growing beyond that depth in the previous season. Tier II sampling points are displayed in figure 10 below. For more detailed information on the Tier II survey procedure see the original Stone and Brokesha aquatic plant management plant (Aquatic Enhancement 2007).

Tier II Survey Results Stone Lake

The 2008 Tier II survey for Stone Lake was conducted on August 14th , 15th, and 16th, in good weather conditions. A summary of results are contained in table three below. Water clarity was considered to be very good with a Secchi depth of 15.3 feet recorded. Plants were found to a depth of 18 feet. The 25 foot sampling depth for Stone Lake appears to be appropriate. Thirteen species were identified in the survey. This 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 Chara (48 percent) followed by Variable pondweed (34 percent) and Slender naiad (30 percent). Curlyleaf pondweed did not occur in the sampling. Eurasian watermilfoil occurrence was four percent. Overall the Stone Lake plant community appeared to be of above average diversity in the survey and was dominated by native species. Tier II plant maps for Eurasian watermilfoil, Spiny naiad, Variable pondweed, and Chara are in figures 2 through 5 below. While plants were only found to a depth of 18 feet in 2008, chara was found growing to a depth of 22 feet in 2007. Because of this the 25 foot sampling depth should be retained. A summary of Stone Lake data collected since 2005 is displayed in table 3 below.

Summary of Season's Treatment		Note: 4 acres Eurasian milfoil treated 2006 (2,4-D)						
Eurasian watermilfoil	Flurid. 6ppb 16ac	2,4-D (10 ac.)			Flurid. 6ppb 16ac	2,4-D (10 ac.)	2,4-D (10 ac.)	2,4-D (23 ac.)
Curlyleaf pondweed	Flurid. 6ppb unk ac.				Flurid. 6ppb unk ac.			
Stone Lake	**WPI[1]**	**AES**		**WPI[1]**	**WPI[1]**	**IDNR**	**AES**	**AES**
Date	5/20/05	5/16/07		7/29/04	7/15/05	8/8/07	7/25/07	8/14-16/08
IDNR protocol 1 or 2	1	2		1	1	2	2	2
Depth range (ft)	0-25	0-25		0-20	0-20	0-20	0-25	0-25
Sample sites (n)	43	51		50	40	50	50	50
Secchi (ft)	12.5	22.3		9.1	10.0	15.5	17.0	15.3
Littoral depth (ft)	25.0	22.0		12.0	20.0	20.0	23.0	18.0
Occurence (%)	81.4	80.0		88.0	86.0	98.0	80.0	74.0
Species (N)	7	9		10	6	8	8	14
Native species (N)	5	7		8	5	7	7	13
Species/site (max)	4	3		6	4	5	5	5
Mean species/site	1.42	1.29		2.20	1.92	2.50	1.58	1.66
Mean Native species/site	1.05	1.14		1.98	1.68	2.28	1.44	1.62
Species diversity	n/d	0.72		n/d	n/d	0.80	0.76	0.82
Native diversity	n/d	0.65		n/d	n/d	0.77	0.72	0.81
Species occurrence								
Chara	54.3	60.8		38.0		86.0	68.0	48.0
Slender naiad		3.9		59*		42.0	16.0	30.0
Variable pondweed		21.6				36.0	20.0	34.0
Largeleaf pondweed	28.6	13.7		12.0	59.5	28.0	20.0	22.0
Eurasian watermilfoil	37.1	11.8		20.0	24.3	22.0	14.0	4.0
Flatstem pondweed				20.0	32.4	16.0		2.0
Sago pondweed	20.0			14.0	5.4	14.0	4.0	6.0
Brittle naiad						6.0		
Water stargrass		9.8					12.0	3.0
Curlyleaf pondweed	11.4	3.9		2.0				
Southern naiad		2.0						2.0
Horned pondweed		2.0						
Small pondweed								6.0
Great bladderwort				2.0				2.0
Illinois pondweed								2.0
Elodea	8.6							2.0
Spiny naiad							4.0	2.0
Leafy pondweed				20.0				
Coontail	17.1							
American (longleaf) p.w.					13.5			
Richardson's pondweed				34**	59.5**			
* Naiad species not specified, assumed to be Slender naiad								
** Not noted in other surveys, occurrence suggests may be Variable pondweed								
*** Dominance is not provided for WPI data								
n/d denotes no data								
[1] provided for comparison but please note Brokesha Lake Data is included with this set								
Algae occurrence (%)								
Species dominance* **								
Chara		42.0				43.6		28.8
Slender naiad		0.8				9.2		14.8
Variable pondweed		4.3				8.0		14.8
Largeleaf pondweed		3.5				10.4		15.6
Eurasian watermilfoil		6.3				7.6		0.8
Flatstem pondweed						5.6		0.4
Sago pondweed						2.8		1.2
Brittle naiad						1.2		
Water stargrass		9.8						2.4
Curlyleaf pondweed		0.8						
Southern naiad		0.4						0.4
Horned pondweed		0.4						
Small pondweed								1.2
Great bladderwort								2.0
Illinois pondweed								1.2
Elodea								0.4
Spiny naiad								0.4

Table 3 Summary of Stone Lake Tier II data collected 2004 to present

Tier II Survey Results Brokesha Lake

The 2008 Tier II survey for Brokesha Lake was conducted on August 14th and 16th, in good weather conditions. A summary of results is contained in the table 2 below. Water clarity was considered to be very good with a Secchi depth of 16 feet recorded on 8/14 and 16.75 feet recorded on 8/16. Plants were found to a depth of 13 feet. The 15 foot sampling depth used for Brokesha Lake appears to be appropriate. 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 Spiny naiad (53 percent) followed by Chara (43.3 percent) and Sago pondweed (16.7 percent). Curlyleaf pondweed and Eurasian watermilfoil did not occur in the sampling. Overall the Stone Lake plant community appeared to be of above average diversity in the survey and was dominated by native species. Tier II plant maps for Eurasian watermilfoil, Spiny naiad, Variable pondweed, and Chara are in figures 4 through 7 below. A summary of Brokesha Lake data collected in 2007 and 2008 is displayed in table 4 below. Prior to 2007 both lakes had been lumped into a single survey so no separate data exists for Brokesha prior to the 2007 season.

Summary of Season's Treatment		Note: Fluridone treatment (6ppb) performed in 2005 for app. 10 ac. Milfoil			
Eurasian watermilfoil	2,4-D (.1 acre)		2,4-D (.1 acre)	2,4-D (.1 acre)	2,4-D (.1 acre)
Curlyleaf pondweed					
Brokesha Lake	**AES**		**IDNR**	**AES**	**AES**
Date	5/16/07		8/8/07	7/25/07	8/14-16/08
IDNR protocol 1 or 2	2		2	2	2
Depth range (ft)	0-20		0-20	0-20	0-15
Sample sites (n)	31		30	30	30
Secchi (ft)	11.5		12.0	11.6	16.0
Littoral depth (ft)	11.0		14.0	14.0	13.0
Occurence (%)	55.0		80.0	83.0	93.0
Species (N)	4		7	8	9
Native species (N)	3		5	7	9
Species/site (max)	2		4	4	4
Mean species/site	0.61		1.43	1.37	1.43
Mean Native species/site	0.58		1.37	1.33	1.43
Species diversity	0.28		0.75	0.71	0.75
Native diversity	0.20		0.72	0.70	0.75
Species occurrence					
Brittle naiad			50.0		
Chara	51.6		43.3	46.7	43.3
Sago pondweed	3.2		23.3	16.7	16.7
Variable pondweed	3.2		13.3	6.7	3.3
Slender naiad			6.7	3.3	3.3
Curlyleaf pondweed	3.2		3.3	3.3	
Eurasian watermilfoil			3.3		
Spiny naiad					53.3
Great bladderwort					10.0
Illinois pondweed					6.7
Largeleaf pondweed					3.3
Small pondweed					3.3
Spiny naiad				53.3	
Floatingleaf pondweed				3.3	
Sagittaria sp. (submsd)				3.3	
Algae occurrence (%)					
Species dominance					
Brittle naiad	29.7		23.3		
Chara			35.3	41.3	32.7
Sago pondweed	0.6		4.7	3.3	10.0
Variable pondweed	0.6		5.3	2.7	0.7
Slender naiad			1.3	0.7	0.7
Curlyleaf pondweed	0.6		0.7	0.7	
Eurasian watermilfoil			2.0		
Spiny naiad					33.3
Great bladderwort					2.0
Illinois pondweed					4.0
Largeleaf pondweed					3.3
Small pondweed					0.7
Spiny naiad				14.7	
Floatingleaf pondweed				2.0	
Sagittaria sp. (submsd)				0.7	

Table 4 Summary of Brokesha Lake Tier II data collected 2007 to present (no data prior to 2007)

Occurrence and abundance of submersed aquatic plants in Stone Lake.					
County:	LaGrange	Sites with plants:	37	Mean species/site:	1.66
Date:	8/14,15,16/2008	Sites with native plants:	37	Standard error (ms/s):	0.20
Secchi (ft):	15.3	Number of species:	14	Mean native species/site:	1.62
Maximum depth (ft):	18	Number of native species:	13	Standard error (mns/s):	0.20
Trophic status:	Mesotrophic	Maximum species/site:	5	Species diversity:	0.82
Total sites:	50			Native species diversity:	0.81

All depths (0 to 20 ft)	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
Chara	48.0	52.0	22.0	4.0	22.0	28.8
Variable pondweed	34.0	66.0	20.0	8.0	6.0	14.8
Slender naiad	30.0	70.0	16.0	6.0	8.0	14.8
Largeleaf pondweed	22.0	78.0	6.0	4.0	12.0	15.6
Small pondweed	6.0	94.0	6.0	0.0	0.0	1.2
Sago pondweed	6.0	94.0	6.0	0.0	0.0	1.2
Water stargrass	4.0	96.0	2.0	0.0	2.0	2.4
Eurasian milfoil	4.0	96.0	4.0	0.0	0.0	0.0
Great bladderwort	2.0	98.0	0.0	0.0	2.0	2.0
Illinois pondweed	2.0	98.0	0.0	2.0	0.0	1.2
Elodea canadenses	2.0	98.0	2.0	0.0	0.0	0.4
Southern naiad	2.0	98.0	2.0	0.0	0.0	0.4
Spiny naiad	2.0	98.0	2.0	0.0	0.0	0.4
Flatstem pondweed	2.0	98.0	2.0	0.0	0.0	0.4

All depths (0 to 5 ft)	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
Chara	70.0	30.0	50.0	0.0	20.0	30.0
Slender naiad	60.0	40.0	20.0	10.0	30.0	40.0
Variable pondweed	30.0	70.0	20.0	10.0	0.0	10.0
Great bladderwort	10.0	90.0	0.0	0.0	10.0	10.0
Illinois pondweed	10.0	90.0	0.0	10.0	0.0	6.0
Elodea canadenses	10.0	90.0	10.0	0.0	0.0	2.0
Largeleaf pondweed	10.0	90.0	10.0	0.0	0.0	2.0
Small pondweed	10.0	90.0	10.0	0.0	0.0	2.0
Eurasian milfoil	0.0	100.0	0.0	0.0	0.0	0.0
Southern naiad	0.0	100.0	0.0	0.0	0.0	0.0
Spiny naiad	0.0	100.0	0.0	0.0	0.0	0.0

All depths (5 to 10 ft)	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
Variable pondweed	100.0	0.0	50.0	20.0	30.0	52.0
Largeleaf pondweed	70.0	30.0	10.0	0.0	60.0	62.0
Chara	50.0	50.0	10.0	20.0	20.0	34.0
Slender naiad	40.0	60.0	40.0	0.0	0.0	8.0
Water stargrass	20.0	80.0	10.0	0.0	10.0	12.0
Sago pondweed	20.0	80.0	20.0	0.0	0.0	4.0
Eurasian milfoil	10.0	90.0	10.0	0.0	0.0	2.0
Flatstem pondweed	10.0	90.0	10.0	0.0	0.0	2.0
Elodea canadenses	0.0	100.0	0.0	0.0	0.0	0.0
Southern naiad	0.0	100.0	0.0	0.0	0.0	0.0
Spiny naiad	0.0	100.0	0.0	0.0	0.0	0.0

All depths (10 to 15 ft)	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
Chara	60.0	40.0	20.0	0.0	40.0	44.0
Slender naiad	50.0	50.0	20.0	20.0	10.0	26.0
Largeleaf pondweed	30.0	70.0	10.0	20.0	0.0	14.0
Variable pondweed	30.0	70.0	20.0	10.0	0.0	10.0
Eurasian milfoil	10.0	90.0	10.0	0.0	0.0	2.0
Spiny naiad	10.0	90.0	10.0	0.0	0.0	2.0
Small pondweed	10.0	90.0	10.0	0.0	0.0	2.0
Sago pondweed	10.0	90.0	10.0	0.0	0.0	2.0
Elodea canadenses	0.0	100.0	0.0	0.0	0.0	0.0
Southern naiad	0.0	100.0	0.0	0.0	0.0	0.0

All depths (15 to 20 ft)	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
Chara	60.0	40.0	30.0	0.0	30.0	36.0
Southern naiad	10.0	90.0	10.0	0.0	0.0	2.0
Variable pondweed	10.0	90.0	10.0	0.0	0.0	2.0
Small pondweed	10.0	90.0	10.0	0.0	0.0	2.0
Elodea canadenses	0.0	100.0	0.0	0.0	0.0	0.0
Eurasian milfoil	0.0	100.0	0.0	0.0	0.0	0.0
Slender naiad	0.0	100.0	0.0	0.0	0.0	0.0
Spiny naiad	0.0	100.0	0.0	0.0	0.0	0.0

Table 5 Summary of Tier II data for Stone Lake

Occurrence and abundance of submersed aquatic plants in Brokesha Lake.						
County:	LaGrange	Sites with plants:	28	Mean species/site:		1.43
Date:	8/14,15,16/2008	Sites with native plants:	28	Standard error (ms/s):		0.15
Secchi (ft):	16	Number of species:	9	Mean native species/site:		1.43
Maximum depth (ft):	13	Number of native species:	9	Standard error (mns/s):		0.15
Trophic status:	Eutrophic	Maximum species/site:	4	Species diversity:		0.75
Total sites:	30			Native species diversity:		0.75

All depths (0 to 20 ft)	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
Spiny naiad	53.3	46.7	20.0	10.0	23.3	33.3
Chara	43.3	56.7	10.0	6.7	26.7	32.7
Sago pondweed	16.7	83.3	6.7	3.3	6.7	10.0
Great bladderwort	10.0	90.0	10.0	0.0	0.0	20.0
Illinois pondweed	6.7	93.3	3.3	0.0	3.3	40.0
Largeleaf pondweed	3.3	96.7	0.0	0.0	3.3	3.3
Slender naiad	3.3	96.7	3.3	0.0	0.0	0.7
Variable pondweed	3.3	96.7	3.3	0.0	0.0	0.7
Small pondweed	3.3	96.7	3.3	0.0	0.0	0.7

All depths (0 to 5 ft)	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
Chara	80.0	20.0	0.0	10.0	70.0	76.0
Spiny naiad	20.0	80.0	20.0	0.0	0.0	40.0
Great bladderwort	20.0	80.0	20.0	0.0	0.0	40.0
Largeleaf pondweed	10.0	90.0	0.0	0.0	10.0	10.0
Illinois pondweed	10.0	90.0	0.0	0.0	10.0	10.0
Sago pondweed	10.0	90.0	0.0	0.0	10.0	10.0
Slender naiad	10.0	90.0	10.0	0.0	0.0	2.0
Variable pondweed	10.0	90.0	10.0	0.0	0.0	2.0

All depths (5 to 10 ft)	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
Spiny naiad	90.0	10.0	0.0	30.0	60.0	78.0
Sago pondweed	30.0	70.0	10.0	10.0	10.0	18.0
Chara	20.0	80.0	20.0	0.0	0.0	4.0
Illinois pondweed	10.0	90.0	10.0	0.0	0.0	2.0
Great bladderwort	10.0	90.0	10.0	0.0	0.0	2.0
Slender naiad	0.0	100.0	0.0	0.0	0.0	0.0

All depths (10 to 15 ft)	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
Spiny naiad	50.0	50.0	40.0	0.0	10.0	18.0
Chara	30.0	70.0	10.0	10.0	10.0	18.0
Small pondweed	10.0	90.0	10.0	0.0	0.0	2.0
Sago pondweed	10.0	90.0	10.0	0.0	0.0	2.0

Table 6 Summary of Tier II data for Brokesha Lake

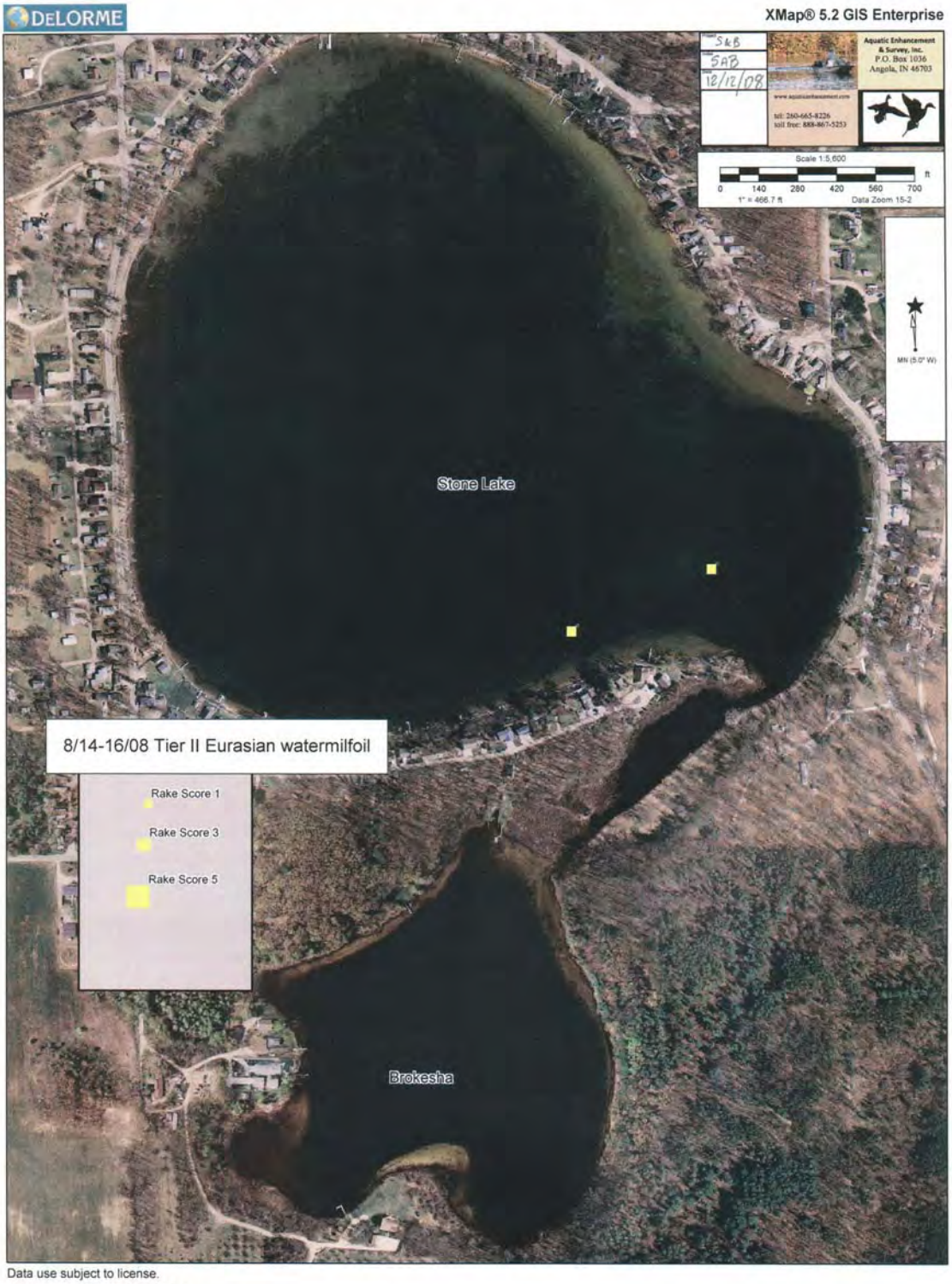

Figure 4 Stone & Brokesha Tier II Eurasian watermilfoil

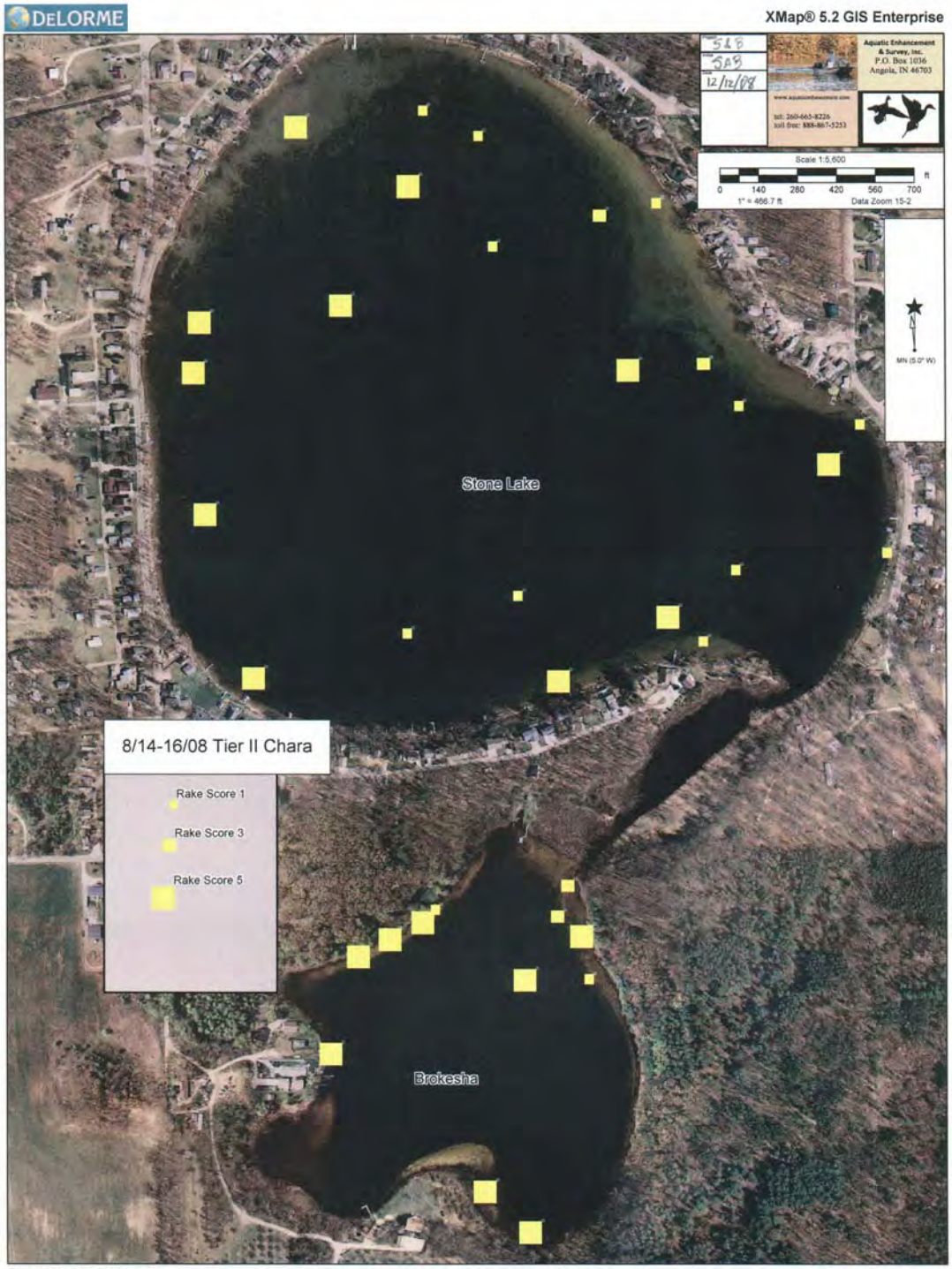

Figure 5 Stone & Brokesha Tier II Chara

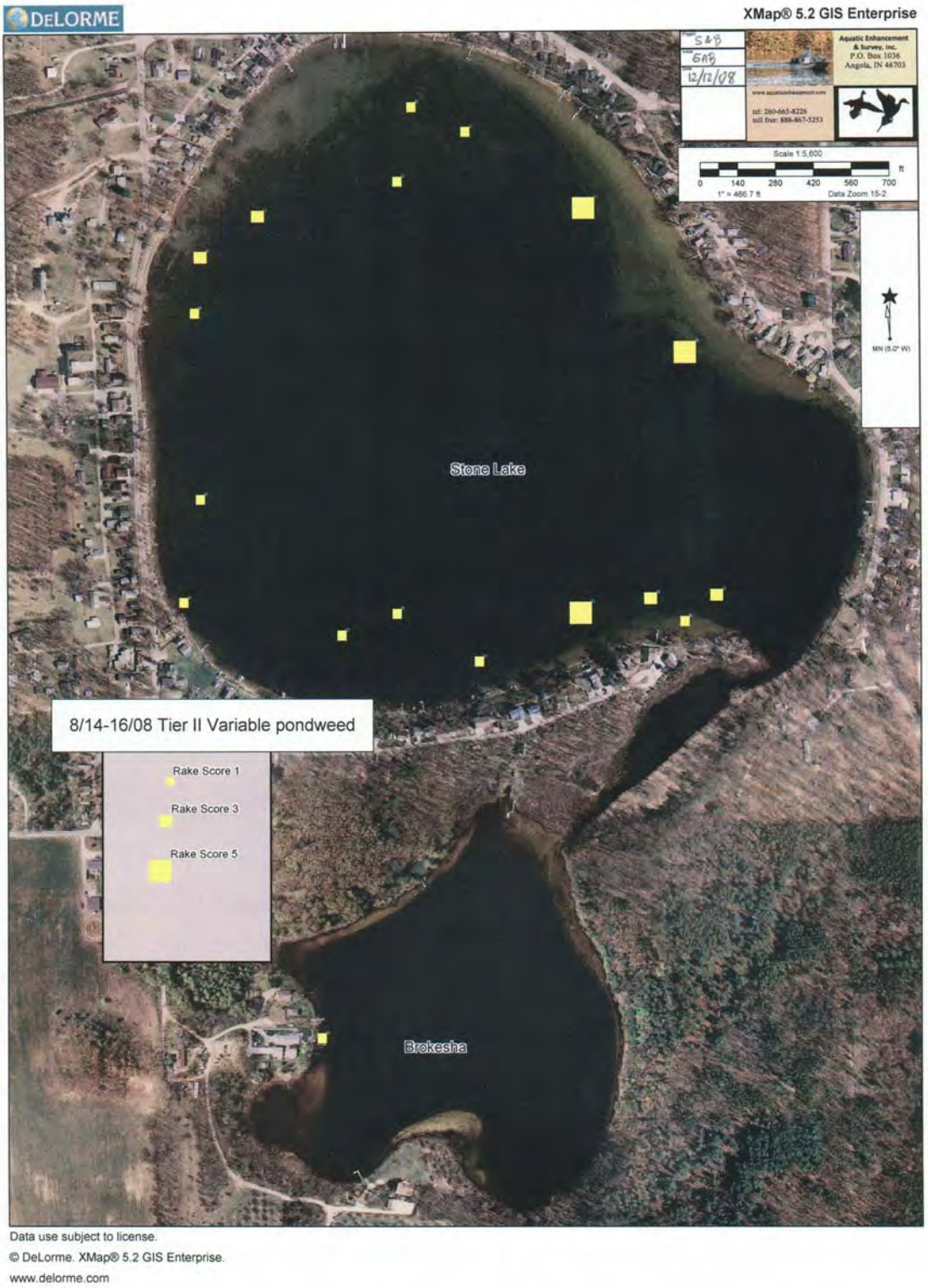

Figure 6 Stone & Brokesha Tier II Variable pondweed

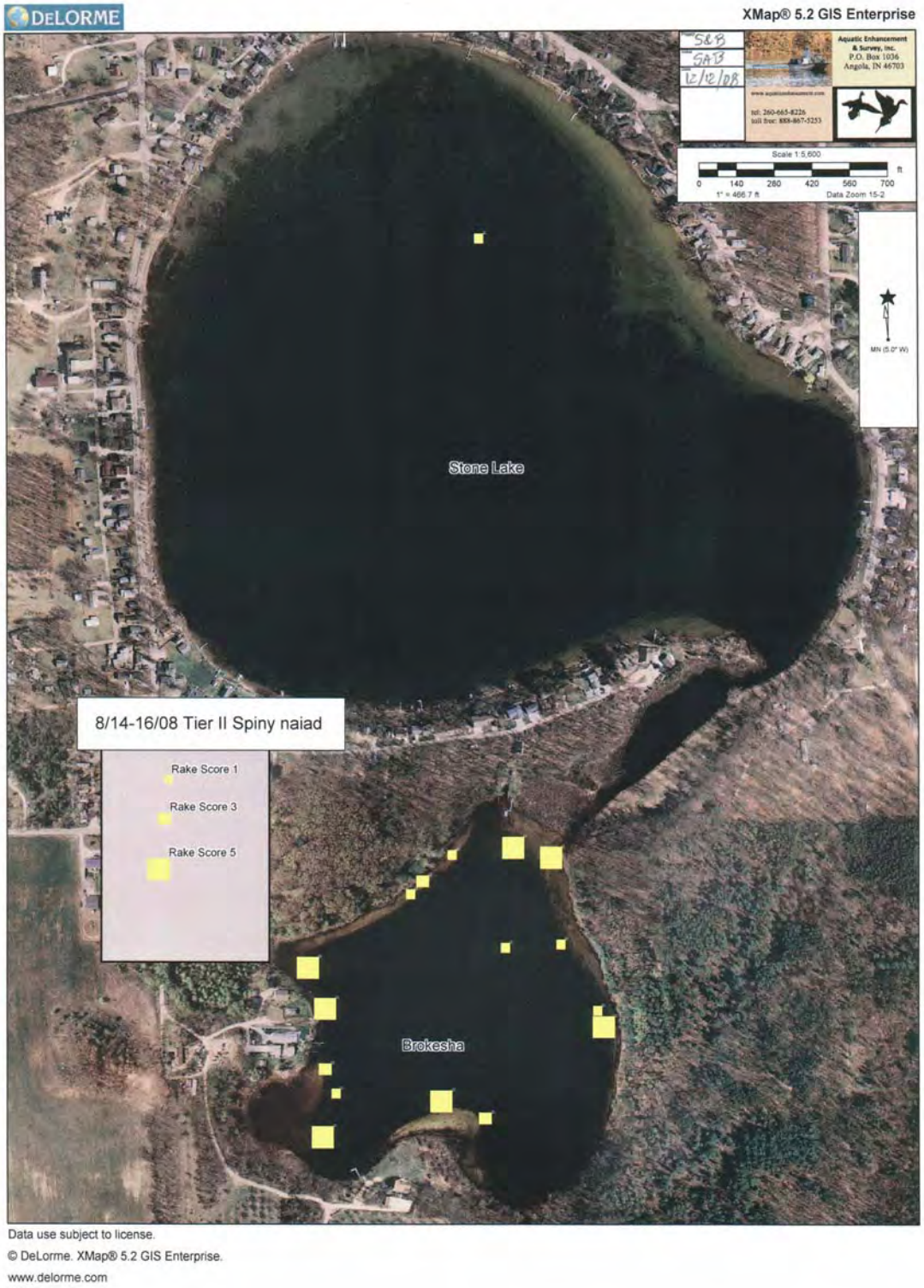

Figure 7 Stone & Brokesha Tier II Spiny naiad

6.1 Stone Lake Water Clarity

At Stone Lake Secchi data has been collected in 2003, 2004, 2005, 2007, and 2008 as part of LARE plant management work. No data was located for the 2006 season. In general Stone Lake has exhibited excellent water clarity and had shown a general trend toward improvement. Maintaining a healthy watershed free of major nutrient and sediment sources can help protect water clarity, ultimately preserving a healthy plant community.

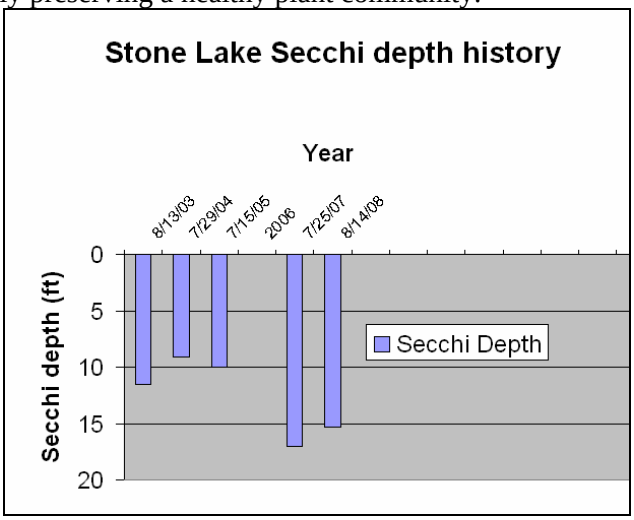

Figure 8 Secchi history for Stone Lake

6.2 Brokesha Lake Water Clarity

On Brokesha Lake Secchi data has been collected in 2004, 2007, and 2008 as part of LARE plant management work. No data was located for the 2005 or 2006 seasons. In general Brokesha Lake has exhibited good water clarity and has also shown a general trend toward improvement. Maintaining a healthy watershed free of major nutrient and sediment sources can help protect water clarity, ultimately preserving a healthy plant community in Brokesha Lake as well, especially since most of the runoff from the watershed for these two lakes drains to Brokesha before entering Stone. Localized algae blooms that were occurring on Brokesha in 2007 were not noted during the 2008 Tier II survey.

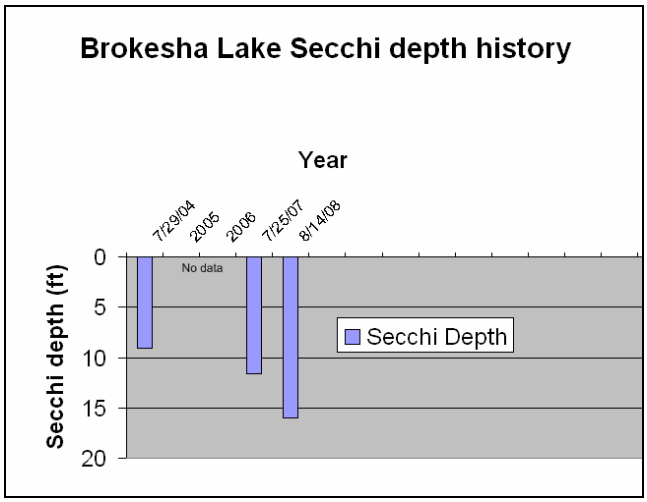

Figure 9 Secchi history for Brokesha Lake

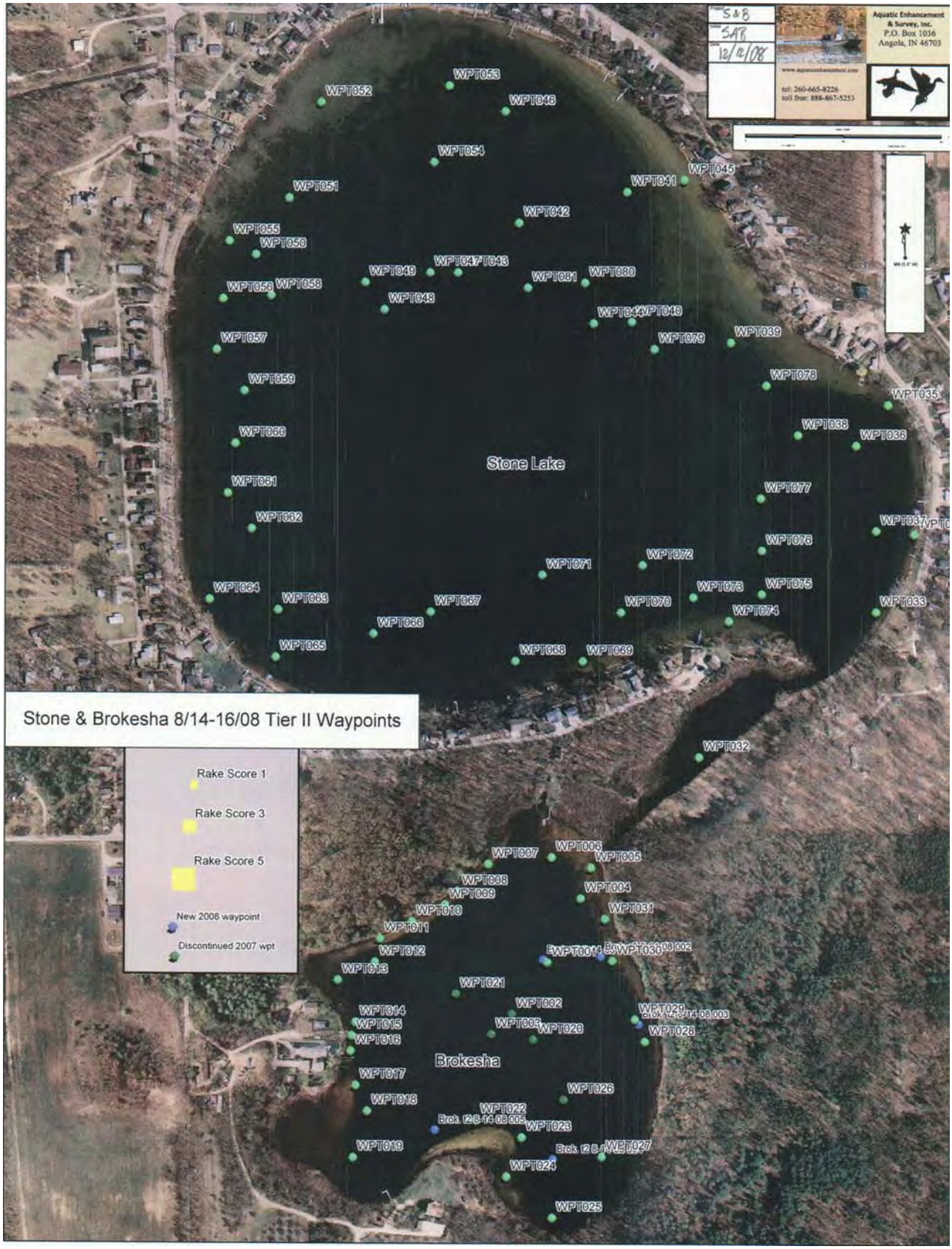

Figure 10 2008 Season Tier II sampling points

7. Rare, Threatened, and Endangered Species

No rare threatened or endangered plant species were collected in the Tier II surveys or noted at the lakes in time spent on the water in 2008. No voucher specimens were collected or submitted.

8. Description of Beneficial and Problem Plant Areas

Beneficial and problem plant areas were similar to the previous season. Areas of Eurasian milfoil growth on both Stone and Brokesha should be considered "problem areas". Curlyleaf pondweed tends to occur in more or less the same areas early in the season, but growth has not been severe. Following a common pattern Eurasian milfoil appears to have colonized mostly areas of Stone Lake between the five and thirteen foot depth contours. On Brokesha milfoil was almost completely extirpated by the 2005 fluridone treatment and recurrence has been limited to a very small area of growth. Stone Lake displays a typical growth pattern for Eurasian watermilfoil colonization and dense plant growth in glacial lakes in general. Submersed aquatic vegetation growth, especially Eurasian watermilfoil, favors fine-textured inorganic sediments with an intermediate sediment density while plants grow more poorly both on sands with a high sediment density and on highly organic sediments with a low sediment density (Barko and Smart 1985). Many of the shallowest areas of Stone and Brokesha Lakes have the mechanical influence of wave action continually influencing their substrate, sweeping finer soil particles and organic materials into deeper or quieter areas of the lake. Sandy substrates dominate the sediment's surface in some of the shallowest areas. It follows that the preferred intermediate substrate densities are present in deeper areas such as the lake's central basin or quieter areas such as emergent plant beds along the channel between the lakes. Beyond the thirteen foot contour lack of light begins to restrict plant colonization. With a lack of available light limiting growth on the deep side and less favorable substrates limiting growth on the shallow side the plant growth is naturally confined to this five to thirteen foot "weedline" zone. As recolonization occurs this zone has naturally been the location of new colony start-ups. Because this will continue it will be important to check these areas most carefully for exotic plant growth.

In examining Stone Lake late season Tier II data across the seasons since before the whole lake fluridone treatment took place it is notable that this treatment did not seem to produce a significant reduction in the sampling site occurrence for Eurasian watermilfoil in the seasons sampled. In 2004 prior to treatment the occurrence was 20 percent (both lakes combined in one survey). On July 15 of 2005 after the May 27 whole lake treatment the milfoil occurrence was 24.3 percent. Apparently the rather late treatment timing had delayed the drop of the plants. No data was available for 2006 so it is not known what the effects were in the season immediately after treatment. In an August 8, 2007 survey IDNR reported a Eurasian watermilfoil occurrence of 22 percent. Our own survey on July 25, 2007 recorded an occurrence of 14 percent. In response to the continued high occurrence the treatment area was increased from 10 acres in 2007 to 23 acres in 2008 and this produced an occurrence of only four percent in an August 14 survey. Without 2006 season data it is difficult to determine what the effect of the whole lake treatment was in terms of quantifiable data. The SLCC reports that the Eurasian watermilfoil growth was much worse prior to the whole lake treatment. On Brokesha the effect of the whole lake treatment appears to be a near complete eradication, which has lasted until present. IDNR recovered milfoil on one rake toss in that lake in 2007. Two small colonies of less than .1 acre appear to be the only Eurasian milfoil growth present.

Tier II data suggests that there may have been an effect by the fluridone treatment on Stone Lakes native plant community with a with a slight dip diversity occurring. In 2004 ten species were recorded, this dropped to six in July of 2005, rose to eight by the summer of 2007 with 14 species occurring in the 2008 late season Tier II. If there was indeed a dip in diversity as a result of the

treatment the lake appears to have rebounded. It should be noted that comparisons with 2004 and 2005 data may be of limited usefulness as both lakes were surveyed as one waterbody at that time and data was combined. This practice was discontinued in 2007.

On Brokesha where the fluridone treatment appears to have nearly eradicated Eurasian watermilfoil there is also a slight trend toward more diversity and a trend toward more plants in general. The Tier II species count with IDNR late in the 2007 season was seven. Aquatic Enhancement & Survey, Inc. (AES) had a count of eight in a late season survey that year. In 2008 this had climbed to nine species. Particularly notable was the presence of Spiny naid *Najas marina*. It occurred at 53.3 percent of sampling sites in 2008. This plant does not however appear to be causing a problem for residents at this point. In 2008 Great bladderwort *Utricularia macrorhiza*, Illinois pondweed *Potamogeton illinoensis*, Largeleaf pondweed *Potamogeton amplifolius*, and Small pondweed *Potamogeton pusillus* were all noted in Brokesha in 2008. These were not collected in either of the late season surveys performed in 2007 (IDNR and AES). These plants are considered beneficial and should be protected in the Brokesha Lake.

9. Aquatic Plant Management Alternatives

Herbicidal Alternative 1-(recommended) Whole Lake Fluridone Treatment, treatment of Purple Loosestrife, Phragmites

Treatment for Eurasian watermilfoil and Curlyleaf pondweed

The SLCC is advised to complete a six ppb (initial dose) fluridone application in 2009 for lakewide control of Eurasian watermilfoil and Curlyleaf pondweed. The major goal in this treatment is to retain a concentration of 3ppb or more in Stone and Brokesha Lakes for 90 days. This option offers the advantage of being less costly than a typical spot-treatment approach if the full extent of exotic plant growth is to be treated over the course of the next two to three seasons. An additional advantage includes the completeness of control. All target plants in contact with the treated lake waters for a sufficient period of time will typically be affected. Disadvantages include possible damage to non-target plants. In Stone and Brokesha effects on the native plant community are expected to be relatively minor, but some loss of diversity may be experienced in the short term. Water use restrictions are not generally applied when in-lake fluridone levels are below 10ppb so this treatment will not affect the use of the lake. On Stone Lake the initial fluridone treatment will involve two separate elements with the main application goal being to achieve a fluridone concentration of 3ppb or more for a period of 90 days. Treatment of the lake is to be completed in mid-April to early May when plants are actively growing using a combination of liquid fluridone herbicide at the rate of three ppb and granular fluridone (Sonar® Q) at the rate of 3 ppb for a combined dosage of 6 ppb. Granular fluridone is to be applied directly to the lake's milfoil problem areas with the liquid application to be applied evenly throughout the lake. A bump application is to be applied at 37 days after treatment (DAT) using a combination of granular and liquid fluridone to bring the lake's concentration back to 6 ppb. On Brokesha Lake where the use of liquid fluridone was highly successful in achieving a near eradication of Eurasian watermilfoil the use of granular fluridone is not necessary so a liquid fluridone formulation should be used exclusively. This application is expected to also provide control of Curlyleaf pondweed for the duration of the 2009 season. The granular component of the application was chosen to help concentrate fluridone where needed. Because milfoil tend to occupy deep areas in Stone Lake (to approx. 13 feet) it is suspected that it may be able to escape a fluridone dosage to some extent, having plants and stolons (roots) in or below the thermocline for part of the season. This could grant these plants refuge from a liquid fluridone treatment.

Granular product applied directly to the plants may be able to help enhance the dose these deeper plants receive.

Table seven page 32 displays estimated costs associated with curlyleaf pondweed and Eurasian watermilfoil management from 2009 through 2011. If two acres of milfoil is noted and treated in 2010 following a fluridone treatment and this becomes seven acres of milfoil in 2011 the total herbicidal management cost for all three years is estimated to be 35,505.00. With conventional 2, 4-D granular treatment essentially repeated every year (excluding retreatment) the cost for the same period is estimated to be 37,665.00. Because the cost is lower and the degree of control higher the SLCC is advised to consider alternative 1. Considering the present diversity of Stone and Brokesha lakes in the wake of a 2005 fluridone treatment it is unlikely a high enough degree of damage to the lakes' native plant communities will result from the use of fluridone to offset the potential advantages.

Treatment for Phragmites *Phragmites australis*
The locations of invasive wetland plant growth were mapped in 2008 and are displayed in figure 11 below. Whereas this plant can be invasive, crowding out more beneficial native plants, altering wetland habitat and potentially affecting water quality the SLCC is advised to begin a Phragmites treatment program. The area to be treated for Phragmites is less than one quarter acre in size. Growth has been slow, but this growth appears to have gotten slightly larger since the 2007 season. It consists of one small colony along the Stone Lake shoreline and additional scattered plants along the Brokesha Lake shoreline. Treatment of this plant with a glyphosate containing herbicide can be highly effective when coupled with a non-ionic surfactant to help aid in penetration. This treatment should be performed in mid to late August when vascular movement within the plants can best translocate the active ingredient of the herbicide to the plants root structure, resulting in a complete kill.

Treatment for Purple Loosestrife *Lythrum salicaria*
Approximately 3.5 acres of riparian wetlands and lake/channel edge on Brokesha Lake have been colonized by Purple loosestrife. In addition developed parts of the Stone and Brokesha Lake Shorelines contain scattered Purple loosestrife plants. Purple loosestrife is a non-native invasive wetland plant that can potentially degrade water quality and wildlife habitat by crowding out existing mixes of beneficial diverse native vegetation. The SLCC is advised to undertake a treatment program to control these plants. Purple loosestrife is susceptible to broadleaf specific herbicides containing the active ingredient triclopyr. Triclopyr also has the benefit of selectivity for broadleaf plants. Care should be taken not to apply this product to native broadleaf plants, but native grasses and sedges will not be affected. A non-ionic surfactant should also be employed to help enhance herbicide penetration. A combination of boat mounted power spray equipment and time spent backpack spraying can be used to effectively spot treat loosestrife plants on these lakes. A full round of spot treatments should be performed once during June and once during July to effectively complete an application to the majority of these plants present. Since many of these plants are growing in lake residents' yards it will be critical for the SLCC to help educate its membership about how to properly remove and dispose of these plants if they are found growing on their lakefront.

Herbicidal Alternative 2- Treatment of Eurasian watermilfoil with 2,4-D granular aquatic herbicide, Early Season Treatment of Curlyleaf pondweed with Endotholl, treatment of Purple Loosestrife, Phragmites

Treatment for Eurasian watermilfoil

Under this alternative the SLCC is advised to complete treatment of 23 acres of Eurasian watermilfoil growth with 2, 4-D aquatic herbicide allowing for the possible retreatment of up to ten acres of growth. The exact areas of the application should be designated by mapping the Eurasian watermilfoil growth in May of 2009. Estimated areas of treatment for 2009 are shown in figure 11 below. This is essentially the same milfoil treatment regime that was employed in 2008 with the retreatment of up to ten acres added. One advantage of this regime is a lower cost of treatment in the short term than fluridone application. A major disadvantage is that based on results in 2007 and 2008 it is unlikely that this regime will produce results lasting beyond the 2009 season. The full acreage of treatment may need to be repeated in 2010. This opinion is based on live milfoil growth noted in treated areas late in the season. Another disadvantage is the imposition of water-use restrictions. A restriction on swimming and the use of lake water for irrigation will be imposed after treatment.

Treatment for Curlyleaf Pondweed

Under this regime areas of emerging Curlyleaf pondweed should be treated early in the 2009 season using endotholl (Aquathol® K) liquid at the rate of 1 ppm. Treatment should take place when water temperatures are in the 50-55 degree F range. It has been demonstrated that this early-season treatment regime can destroy plants before turion development. The turion is this plants reproductive structure. Turions develop and become viable early in the season before conventional herbicide treatments typically take place. These drop off the parent plant and can remain in the hydrosoil at the bottom of the lake, becoming new plants in later seasons. Treating before turions become viable disrupts this process with the result being an overall reduction in turion numbers. Repeating this reduction for multiple seasons can eventually deplete the number of turions present to the point that treatment is no long required for one or more seasons. The area of this treatment is estimated to be seven acres based on past growth (Figure 12 below).

Treatment for Phragmites

The locations of invasive wetland plant growth were mapped in 2008 and are displayed in figure 13 below. Whereas this plant can be invasive, crowding out more beneficial native plants, altering wetland habitat and potentially affecting water quality the SLCC is advised to begin a Phragmites treatment program. The area to be treated for Phragmites is less than one quarter acre in size. Growth has been slow, but this growth appears to have gotten slightly larger since the 2007 season. It consists of one small colony along the Stone Lake shoreline and additional scattered plants along the Brokesha Lake shoreline. Treatment of this plant with a glyphosate containing herbicide can be highly effective when coupled with a non-ionic surfactant to help aid in penetration. This treatment should be performed in mid to late August when vascular movement within the plants can best translocate the active ingredient of the herbicide to the plants root structure, resulting in a complete kill.

Treatment for Purple Loosestrife

Approximately 3.5 acres of riparian wetlands and lake/channel edge on Brokesha Lake have been colonized by Purple loosestrife. In addition developed parts of the Stone and Brokesha Lake Shorelines contain scattered Purple loosestrife plants. Purple loosestrife is a non-native invasive wetland plant that can potentially degrade water quality and wildlife habitat by crowding out existing mixes of beneficial diverse native vegetation. The SLCC is advised to undertake a treatment program to control these plants. Purple loosestrife is susceptible to broadleaf specific

herbicides containing the active ingredient triclopyr. Triclopyr also has the benefit of selectivity for broadleaf plants. Care should be taken not to apply this product to native broadleaf plants, but native grasses and sedges will not be affected. A non-ionic surfactant should also be employed to help enhance herbicide penetration. A combination of boat mounted power spray equipment and time spent backpack spraying can be used to effectively spot treat loosestrife plants on these lakes. A full round of spot treatments should be performed once during June and once during July to effectively complete an application to the majority of these plants present. Since many of these plants are growing in lake residents' yards it will be critical for the SLCC to help educate its membership about how to properly remove and dispose of these plants if they are found growing on their lakefront.

Regardless of the path chosen for plant management in 2009 the SLCC should remain aware that ultimately the lakes water quality and plant communities are a produce of the lake's watersheds. Attention should be granted to preventing the erosive loss of soil from construction sites or agricultural areas of the watershed. Improving practices along the lakeshore can also be helpful. One important step is the implementation of a program to encourage lakeside property owner to use no phosphorus lawn fertilizers. For Stone and Brokesha maintaining good water clarity will be the key to maintaining good plant diversity and minimizing nutrients in the lake, especially phosphorus is a key to maintaining clear waters. Local LaGrange County Soil and Water Conservation District personnel can provide assistance in addressing nutrient sources in the watershed or searching for programs offered to area landowners to assist with the implementation of land use practices to improve water quality.

Figure 11 Expected Eurasian milfoil growth/treatment area in 2009

Figure 12 Estimated Curlyleaf pondweed growth/treatment area 2009

Figure 13 Noted Phragmites and Purple loosestrife growth in 2008

Herbicidal Alternative	Year	Estimated acres of Eurasian watermilfoil	Management cost	Estimated acres of Curlyleaf pondweed	Management cost	Total Management Cost
1. fluridone	2009	23	27,045.00	7		27,045.00
	2010	2	900.00	7	2205.00	3105.00
	2011	7	3150.00	7	2205.00	5355.00
					3 year cost	35505.00
2. 2, 4-D granular	2009	23 (retreatment excluded)	10,350.00	7	2205.00	12,555.00
	2010	23 (retreatment excluded)	10,350.00	7	2205.00	12,555.00
	2011	23 (retreatment excluded)	10,350.00	7	2205.00	12,555.00
					3 year cost	37,665.00

Table 7 Three year cost comparison for fluridone verses 2, 4-D granular treatment

10. Public Involvement

A public meeting was incorporated into a regular Stone Lake Conservation Club meeting on 8/16/08. Approximately 35 were in attendance. This was typical attendance for a meeting of these two small lakes. In 2007 40 people were present. Nearly all were residents of Stone or Brokesha Lakes. A discussion of the aquatic plant management program in general was held with Aquatic Enhancement & Survey, Inc. Overall residents expressed satisfaction with management efforts completed thus far on Stone and Brokesha. Information was presented to help residents recognize invasive exotic plants, including Purple loosestrife which grows in many of the yards on Stone and Brokesha. Residents expressed an interest in disposing of plants on their own property when they learned that this was an invasive and potentially ecologically destructive plant. A short survey was filled out by attendees and collected. Questions and responses are below. No survey results from prior to the 2007 season were available. The 2007 season survey results were similar to 2008. In both surveys 100 percent of respondents reported that they were in favor of continuing efforts to manage exotic plants at the lakes.

Stone & Brokesha Lakes User Survey 8/16/08

1. Are you a lake property owner? Yes___**22**_____ No_____

2. Are you currently a member of the Stone Lake Conservation Club? Yes _**21**__ No___

3. How many years have you been at the lake? (circle one) 0-5 years **6**
6-10 years
11-20 years **2**
more than 20 years **13**

4. Has the growth of aquatic plants on Either Lake ever negatively affected your enjoyment of the lake(s)? Yes__**14**___ No___**8**____

5. How do you use the lake(s)? (mark all that apply)
20 Swimming _6__Irrigation (including lawn) 22 Enjoy View and Atmosphere
_22_Boating _18_Fishing __16__View Wildlife __3___Skiing/boarding/Tubing

Other __Scuba_____

6. Do you feel that Either Lake has Aquatic plants in nuisance quantities at this time(2008)? Yes _14__ No _6__

7. Do you feel the level of vegetation in the lake affects your property values? Yes _17__ No _4__

8. Are you in favor of continuing efforts to control vegetation on the lake? Yes _21__
No ___

9. Mark any of these you think are problems on your lake:
__3_ Too much fishing
__15_ Canada Geese
_3__ Excessive boat traffic
_10__ Dredging needed
_10__ Too many aquatic plants
___ Not enough aquatic plants
_1__ Poor water clarity
_11__ Additional Speed enforcement needed

Other_____

Please add any additional comments on the back:

11. Implementation of Action Plan

Both alternatives offered have been acceptable to district fisheries managers thus far and the SLCC has expressed interest in Alternative 1. They are prepared to support the cost-share involved. If LARE cost-share support is not provided in 2009 they have indicated that they will continue with non-native plant management efforts but will need to scale back on treatment acreage somewhat in the 2009 season, prioritizing the areas of the most dense Eurasian watermilfoil growth.

Alternative 1 fluridone treatment (recommended)

2009 Season **●Success Benchmarks: Control of all Curlyleaf pondweed and Eurasian watermilfoil by the 2009 Tier II Survey**			
Month	**Activity**	**Acreage**	**Cost Estimate**
April	Map Curlyleaf pondweed And Eurasian watermilfoil growth		945.00
April/May	Initial dose fluridone A.S. and Q granular (Stone), A.S. only Brokesha 6 bump 6 50/50 mix dosage	All	27,045.00
July	Tier II Survey		1785.00
As arranged	Public Meeting		368.00
August	Purple loosestrife treatments		2700.000
August	Phragmites treatment		250.00
October/November	Permit Meeting		210.00
December	Plan Update Document Due		1680.00
	Total		**$34,983.00**

Alternative 2

2009 Season ●**Success Benchmarks:** Elimination of all significant Curlyleaf stands within two weeks of treatment on both lakes. A Tier II occurrence of Eurasian watermilfoil of 10% or less on Stone and 5% or less on Brokesha			
Month	**Activity**	**Acreage**	**Cost Estimate**
April	Map Curlyleaf pondweed And Eurasian watermilfoil growth		945.00
April/May (soon after emergence)	Treat Curlyleaf pondweed as needed (1ppm Aquathol K)	7	2205.00
May	Begin Eurasian treatments on main lake as needed (2,4-D granular)	23.00	10350.00
July	Tier II Survey		1785.00
July	Retreatments as needed (2,4-D granular)	10.00	4500.00
As arranged	Public Meeting		368.00
October/November	Permit Meeting		210.00
December	Plan Update Document Due		1680.00
	Total		**$22043.00**

Important program dates for the SLCC in the 2009 season are below. These dates are based on a timeline needed if the SLCC 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, 2009	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
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 8 Important dates for LARE planning

12. Education

In 2008 the overall Stone and Brokesha Lakes plant control program was discussed at a summer Stone Lake Conservation Club meeting. Elements of the Stone and Brokesha Lake Plan were discussed and Curlyleaf pondweed and Eurasian watermilfoil plants were shown to help lake residents identify invasive plant species. Educational efforts should continue through the regular Conservation Club meetings.

13. Monitoring and Evaluation of Plan

Monitoring efforts should be continued as planned utilizing visual/GPS mapping of exotic plantbeds and Tier II surveys. The original Stone and Brokesha Plan Goals are listed below for review:

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.

Acceptable plant community diversity was present in both lakes in 2008 with water clarity being excellent in both lakes. There is no indication of an adverse affect of plant management activities on fish or wildlife resources. Goal one appears to have been met. Eurasian watermilfoil did not cause a significant problem to recreational users of the lakes in 2008. This has been achieved through management activities thus far so goal two appears to also have been met. Keep exotic plant growth limited has prevented a hindrance to recreational public access and long term non-

target damage does not appear to have occurred at Stone and Brokesha Lakes. Goal three also appears to have been met. With goals having been met the SLCC is advised to continue with plant management as spelled out in this update. The use of aquatic herbicides for the management of invasive plants appears to have accomplished its objectives. The SLCC should plan to continue with these efforts keeping an eye toward new control methods and aquatic products that may show promise in efficacy in the coming years.

Literature Cited

Aquatic Enhancement 2007. Aquatic Plant Management Plan for Stone and Brokesha Lakes 2007-2011, Lagrange County, Indiana. Aquatic Enhancement & Survey, Inc. Angola, Indiana 46703

Barko, John. W. and Smart R. Michael. Environmental Laboratory, Waterways Experiment Station, Vicksburg, Mississippi 39180, U.S.A. Sediment composition: Effects on growth of submersed aquatic vegetation. Proceedings 1st international symposium on watermilfoil (*Myriophyllum spicatum*) and related Haloragaceae species. July 23 and 24 – Vancouver, B.C. Aquatic Plant Management Society, Inc. Post Office Box 16 Vicksburg, Mississippi 39180. pp.72-78

Appendix A
Aquatic 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 3
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: Al Stealy, Stone Lake Conservation Club	Lake Assoc. Name: Stone Lake Conservation Club	
Rural Route or Street: 11690 W 750 N		Phone Number: 574-825-3912
City and State: Middlebury, IN		ZIP Code: 46540
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): Stone	Nearest Town: Middlebury	County: Lagrange
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 see map	
Total acres to be [illegible]lled up to 25	Proposed shoreline treatment length (ft) see map	Perpendicular distance from shoreline (ft) see map
[illegible]num Depth of Treatment (ft) 17 ft	Expected date(s) of treatment(s) 5/25/09, 7/25/09	

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. Navigate 2,4-D granular, general littoral seek and destroy on Eurasian watermilfoil

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

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Chara		30
Largeleaf pondweed		15
Variable pondweed		15
Slender naiad		10
Eurasian watermilfoil	x	10
Waterstargrass		10
Spiny naiad		5
Sago pondweed		5

Treatment Area # 3	LAT/LONG or UTM's whole lake	
Total acres to be controlled whole lake	Proposed shoreline treatment length (ft) n/a	Perpendicular distance from shoreline (ft) n/a
Maximum Depth of Treatment (ft)	Expected date(s) of treatment(s) 5/10/2009	

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. Whole lake 6 bump 6 sonar a.s. liquid and Sonar Q granular 50/50

Plant survey method: [ ] Rake [ ] Visual [ ] Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Chara		30
Largeleaf pondweed		15
Variable pondweed		15
Slender naiad		5
Eurasian watermilfoil	x	10
Waterstargrass		10
Spiny naiad		5
Sago pondweed		5
Curlyleaf pondweed		5

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)	

Treatment method: [ ] 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)

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

Treatment Area # 2	LAT/LONG or UTM's See map		
Total acres to be lled up to 10	Proposed shoreline treatment length (ft) see map	Perpendicular distance from shoreline (ft) see map	
num Depth of Treatment (ft) 15	Expected date(s) of treatment(s) 4/25/2009		

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. Early season low dose Aquathol K treatment for Curlyleaf pondweed

Plant survey method: [X] Rake [X] Visual [ ] Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Chara		40
Variable pondweed		0
Largeleaf pondweed		10
Eurasian watermilfoil		5
Water stargrass		5
Slender naiad		5
Curlyleaf pondweed	x	5
Southern naiad		5
Horned pondweed		5

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

Aquatic Enhancement
& Survey, Inc.
P.O. Box 1036
Angola, IN 46703
tel: 260-665-8226
toll free: 888-867-5253
Scale 1:4,400
0 120 240 360 480 600 ft
1" = 366.7 ft
Data Zoom 15-5
MN (5.0° W)
Stone Lake
Area 1 general littoral seek and destroy (E. milfoil) up to 25 ac. 2,4-D gran.

Aquatic Enhancement & Survey, Inc.
P.O. Box 1036
Angola, IN 46703
Scale 1:4,400
0 120 240 360 480 600 ft
1" = 366.7 ft
Data Zoom 15-5
MN (5.0° W)
Stone Lake
Area 2 general littoral seek and destroy (Curlyleaf) up to 10 acres

Data use subject to license.

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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 3
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: Al Stealy, Stone Lake Conservation Club	Lake Assoc. Name: Stone Lake Conservation Club	
Rural Route or Street: 11690 W 750 N		Phone Number: 574-825-3912
City and State: Middlebury, IN		ZIP Code: 46540
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): Brokesha	Nearest Town: Middlebury	County: Lagrange
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 see map		
Total acres to be lled up to 5	Proposed shoreline treatment length (ft) see map	Perpendicular distance from shoreline (ft) see map	
..mum Depth of Treatment (ft) 15 ft	Expected date(s) of treatment(s) 5/25/09, 7/25/09		

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. Navigate 2,4-D granular, general littoral seek and destroy on Eurasian watermilfoil

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

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Chara		40
Spiny naiad		30
Variable pondweed		19
Sago pondweed		10
Eurasian watermilfoil	x	1

Treatment Area # 2	LAT/LONG or UTM's See map		
Total acres to be ...lled up to 2	Proposed shoreline treatment length (ft) see map	Perpendicular distance from shoreline (ft) see map	
...num Depth of Treatment (ft) 12	Expected date(s) of treatment(s) 4/25/2009		

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. Early season low dose Aquathol K treatment for Curlyleaf pondweed

Plant survey method: [X] Rake [X] Visual [ ] Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Chara		40
Spiny naiad		30
Variable pondweed		16
Sago pondweed		10
Eurasian watermilfoil		1
Curlyleaf pondweed	x	3

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

Treatment Area # 3	LAT/LONG or UTM's whole lake	
Total acres to be controlled whole lake	Proposed shoreline treatment length (ft) n/a	Perpendicular distance from shoreline (ft) n/a
Maximum Depth of Treatment (ft)	Expected date(s) of treatment(s) 5/10/2009	

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. Whole lake 6 bump 6 sonar a.s. liquid

Plant survey method: [ ] Rake [ ] Visual [ ] Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Chara		40
Spiny naiad		30
Variable pondweed		16
Sago pondweed		10
Eurasian watermilfoil	X	1
Curlyleaf pondweed	x	3

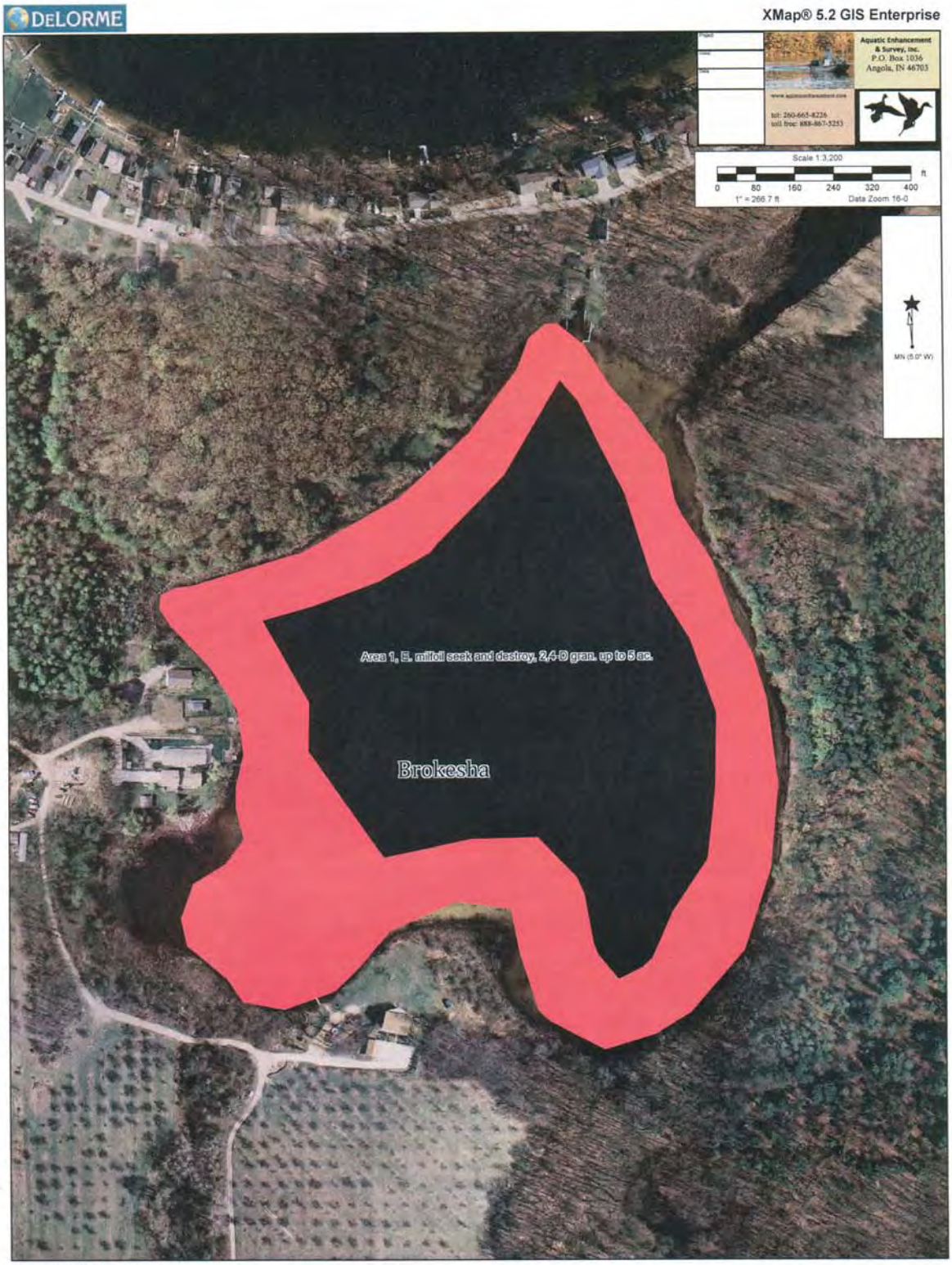
Treatment Area #	LAT/LONG or UTM's	
Total acres to be controlled	Proposed shoreline treatment length (ft)	Perpendicular distance from shoreline (ft)
Maximum Depth of Treatment (ft)	Expected date(s) of treatment(s)	

Treatment method: [ ] 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)

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



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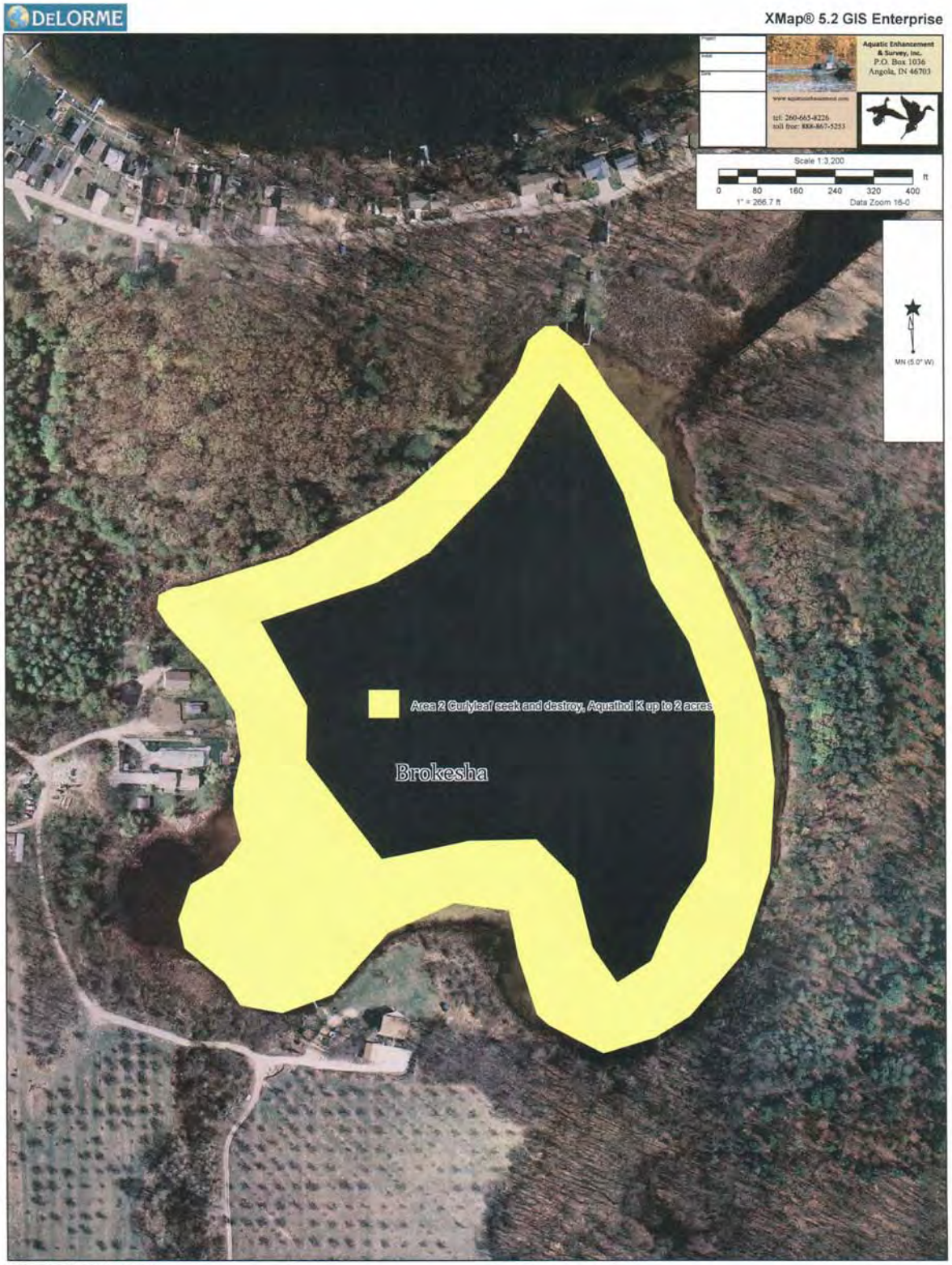

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Appendix B
Tier II Raw Data Sheets

Aquatic Vegetation Random Sampling (Tier 2)

Waterbody Cover Sheet

Surveying Organization: AQUATIC ENHANCEMENT

Contact Information: 260-665-8226

Waterbody Name: STONE LAKE

Lake ID:

County(s): LAGRANGE

Date: 8/14-16/08

Habitat Stratum: IL

Avg. Lake Depth (ft):

Lake Level:

GPS Metadata

Datum: WGS 84

Zone: 16

Accuracy: ±1m

Crew Leader: SCOTT BANFIELD

Recorder: JOE CLOSSEN

Method: W

Secchi Depth (ft):

Total # of Points Surveyed:

Total # of Species:

Littoral Zone Size (acres):

- ☐ Measured
- ☐ Estimated

Littoral Zone Max. Depth (ft):

- ☐ Measured
- ☐ Estimate (historical Secchi)
- ☐ Estimated (current Secchi)

Notable Conditions:

Submersed Aquatic Vegetation Survey (Tier II) Datasheet

Page 1 of 2

WATERBODY NAME: STONE LAKE	DATE: (8-14-08) 8-15-08 8-16-08
COUNTY:	SECCHI DEPTH (FT): (13' 11") taken 8-14 / 15' 4" → on 8-16
SITE ID:	MAX PLANT DEPTH (FT):
SURVEYING ORGANIZATION: Aquatic Enhancement	WEATHER: 80°, Sunny, NE 10
CREW LEADER: Scott Banfield	COMMENTS (Include voucher codes - V1, V2...):
RECORDER: Joseph Clesson	
CONTACT INFO: (260) 665 - 8226	Rake score (1, 3, 5). 9 = algae, emergent or species observed but not sampled.

Species Codes: CLARA, STUPEC, MYRSPI, POTAMP, POTGRA, NASFLE, ~~ALGA~~ ZOSDUB, POTPUS, ~~Notes~~ NASMAR, POTZOS

	Point #	R/T	Latitude	Longitude	Depth	CLARA	STUPEC	MYRSPI	POTAMP	POTGRA	NASFLE	~~ALGA~~ ZOSDUB	POTPUS	~~Notes~~ NASMAR	POTZOS
+	32				3						1		1		
+	33				3.5						5				
+	34				2	1					3				
+	35				3.5	1					1				
+	36			-	17	5									
+	37				13.5						3				
+	38				22										
+	39				7	3				5					
+	40				13.5						3				
+	41				7	3	1			5	1				
+	42				10.5	1	1				1			1	
+	43				16.5										
+	44				23										
+	45				2.5	1									
+	46				5.5	1			1	1	1				
+	47			+	17.5								1		
+	48				23										
+	49			+	18	5									
+	50				11						5				
+	51				6.5		1		5	3		1			
-	52				4	5									
-	53				4.9	1				1	5				
-	54				6	5				1					
-	55				4.9				1	3	5				
-	56				9.5	5			5	1					
-	57				12	5			1						
-	58				18										
-	59				23										
-	60				21.5										
-	61				11	5				1					
-	62				23										
-	63				21										
-	64				6.5				5	1	1				

Other plant species observed at lake:

- = taken 8-15
+ = taken 8-16

Submersed Aquatic Vegetation Survey (Tier II) Datasheet

Page 2 of 2

WATERBODY NAME: Stone Lake	DATE: 8-15-08
COUNTY:	SECCHI DEPTH (FT): 15' 4" → taken 8-15
SITE ID:	MAX PLANT DEPTH (FT):
SURVEYING ORGANIZATION: Aquatic Enhancement	WEATHER: 80° Sunny NE 10
CREW LEADER: Scott Banfield	COMMENTS (Include voucher codes - V1, V2...):
RECORDER: Joseph Glossom	
CONTACT INFO: (260) 665-8226	*Rake score (1, 3, 5). 9 = algae, emergent or species observed but not sampled.*

Species Codes:

Point #	R/T	Latitude	Longitude	Depth	CHARA	STUPEC	MYRSPI	POTAMP	POTGRA	NAS FLE	ALGA	ZOS DUB	NAS GUA ~~Notes~~ POTPUS
65				12	5			3					
66				12					1				1
67				17	1				1				1
68				7.5				5	1			5	
69				4.5	5								
70				8.5			1	5	5	1			
71				17	1								
72				22									
73				11	5			3	3	1			
74				4	1				1				
75				7				5	3				
76				12	1		1						
77				24									
78				16	1								
79				17	5								
80				21.5							9		
81				18.5									

Other plant species observed at lake:

Aquatic Vegetation Random Sampling (Tier 2)

Waterbody Cover Sheet

Surveying Organization: AQUATIC ENHANCEMENT

Contact Information: 260-665-8226

Waterbody Name: BROKESHA LK.

Lake ID:

County(s): LAGRANGE

Date: 8/14-16/08

Habitat Stratum: IL

Avg. Lake Depth (ft):

Lake Level:

GPS Metadata

Datum: WGS 84

Zone: 16

Accuracy: ±1m

Crew Leader: SCOTT BANFIELD

Recorder: JOE COSSEN

Method: W

Secchi Depth (ft):

Total # of Points Surveyed:

Total # of Species:

Littoral Zone Size (acres):

- ☐ Measured
- ☐ Estimated

Littoral Zone Max. Depth (ft):

- ☐ Measured
- ☐ Estimate (historical Secchi)
- ☐ Estimated (current Secchi)

Notable Conditions:

0-5
5-10
10-15

Submersed Aquatic Vegetation Survey (Tier II) Datasheet

Page 1 of 1

WATERBODY NAME: BROKESHA LAKE
COUNTY: LAGRANGE
SITE ID: ~~7-185-10~~
SURVEYING ORGANIZATION: AQUATIC ENHANCEMENT, INC.
CREW LEADER: SB
RECORDER: JC
CONTACT INFO: 260-665-8226

DATE: (8-14-08) 8-16-08
SECCHI DEPTH (FT): (16' on 8-14) 16' 9" on 8-16
MAX PLANT DEPTH (FT):
WEATHER: Partly Cloudy, 80°, Calm
COMMENTS (Include voucher codes - V1, V2...):

Rake score (1, 3, 5). 9 = algae, emergent or species observed but not sampled.

Species Codes: NASFLE

New WPT's	Point #	R/T	Latitude	Longitude	Depth	CHARA	~~CERDEM~~	MYRSPI	NASMAR	STUPEC	ALGA	UTRMAC	POTILL	POTPUS Notes	POTAMP	POTGRA
0	~~2~~				11	1			1	1						
1	~~3~~				11.5	5										
+	4				11.5	3										
+	5				3.5	3						1				
+	6				8				5		9					
+	7				2				1			1				
+	8				7.5	1			3							
+	9				3	5			1							
+	10				2	5										
+	11				2.5	5							5			
+	12				12				5							
+	13				7				5	5						
+	14				9				5							
+	15				3.5	5										
+	16				2.5		1			5					5	1
+	17				7.5				3							
+	18				13				1							
+	19				8				5	1						
2	~~20~~				12.5				1							
3	~~21~~				12				1							
+	22				7.5				5	3						
+	23				8				3			1				
+	24				2	5										
+	25				4.9	5										
4	~~26~~				14						9					
*	27				14											
+	28				9				5							
+	29				14						9			1		
+	30				7.5	1							1			
+	31				3	5										

Other plant species observed at lake: POTAMP, POTNAT

+ NEW WPT'S done on 8-14 all others on 8-16

Appendix C
Tier II Sampling Waypoint Coordinates

New Brokesha waypoints 2008
41.739378,-85.654722,Brok. t2 8-14-08,BLUE DOT
41.739412,-85.653967,Brok. t2 8-14-08 002,BLUE DOT
41.738739,-85.653467,Brok. t2 8-14-08 003,BLUE DOT
41.737423,-85.654589,Brok. t2 8-14-08 004,BLUE DOT
41.737704,-85.656140,Brok. t2 8-14-08 005,BLUE DOT
END

BEGIN WAYPOINT Discontinued waypoint in 2008
41.739350,-85.654667,WPT001,GREEN DOT
41.738833,-85.655133,WPT002,GREEN DOT
41.738633,-85.655400,WPT003,GREEN DOT
41.739983,-85.654233,WPT004,GREEN DOT
41.740283,-85.654100,WPT005,GREEN DOT
41.740383,-85.654617,WPT006,GREEN DOT
41.740317,-85.655450,WPT007,GREEN DOT
41.740050,-85.655850,WPT008,GREEN DOT
41.739917,-85.656017,WPT009,GREEN DOT
41.739750,-85.656450,WPT010,GREEN DOT
41.739583,-85.656867,WPT011,GREEN DOT
41.739350,-85.656933,WPT012,GREEN DOT
41.739167,-85.657417,WPT013,GREEN DOT
41.738750,-85.657183,WPT014,GREEN DOT
41.738617,-85.657233,WPT015,GREEN DOT
41.738467,-85.657250,WPT016,GREEN DOT
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