Lake Lemon
2013 Aquatic Vegetation Management Plan Update

Introduction & Treatment History

Lake Lemon is the 11th largest lake in Indiana covering 1,512 acres with an average depth of 9.5 feet. Aquatic vegetation can become quickly reach nuisance levels in such a shallow reservoir. The invasive species Eurasian watermilfoil (*Myriophyllum spicatum*) has traditionally been the primary problem species within the lake. Eurasian wartermilfoil typically encompasses between 100-400 acres of the Lake Lemon littoral zone, and reaches nuisance levels in many of these areas. Maintenance of the milfoil population began as far back as 1979 and has continued to present day. The Lake Lemon Conservancy District (LLCD) has headed up management efforts on the lake for the past several years. Table 1 outlines treatments completed since 1996.

Table 1. Lake Lemon Eurasian Treatment History.

	Acres of Milfoil, Coontail, and Pondweed Treated with Endothal	Acres of Milfoil Treated with Renovate	Total Submersed Acres Treated
1996	33	0	33
1997	53	0	53
1998	53	0	53
1999	0	0	0
2000	53	0	53
2001	72	0	72
2002	106	0	106
2003	0	76.5	76.5
2004	47.5	50.2	97.7
2005	0	126	126
2006	0	76.6	76.6
2007	76.5	52.8	129.3
2008	53.7	4.3	58
2009	28.7	12.2	40.9
2010	26.4	100.2	126.6
2011	18.7	0	18.7
2012	48.9	53.3	102.2
2013	38.8	64.74	103.5

AQUATIC CONTROL

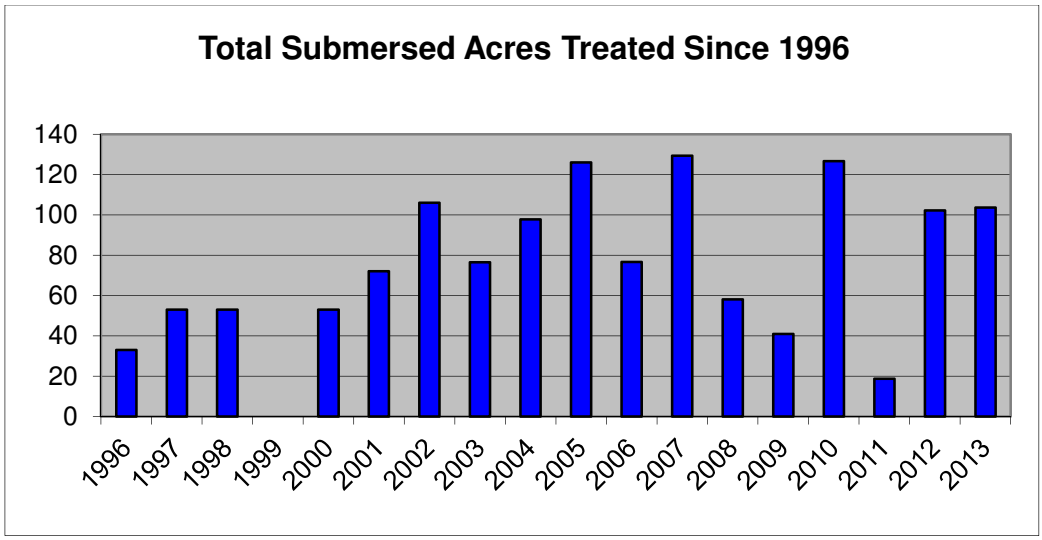

Figure 1. Total submersed acres treated since 1996.

2013 Treatment Summary

Large areas of Eurasian watermilfoil and other submersed vegetation were present during the 2013 invasive species mapping survey. Lake Lemon's water level was drawn down several feet during the winter of 2012/2013, but a hard freeze never occurred. A survey was completed and marked a total of 74.44 acres of submersed vegetation and 9.4 acres of spatterdock that needed treatment (Figure 2). Treatment areas were selected based on their potential impact on navigation and lake use. Not all areas of milfoil were treated as there was a great deal growing in off shore open water areas that were not considered to be of highest priority to control (rough estimate of 150 acres of milfoil). The first treatment was completed on June 6th. A total of 62.24 acres was treated with Renovate as it contained almost entirely milfoil, while 12.2 acres was treated with Aquathol K as it contained mixed vegetation. A 20 acre area of Eurasian watermilfoil in the northeast basin of the lake was funded by the Lake and River Enhancement (LARE) program (Figure 3). This 20 acre treatment actually controlled milfoil in a much larger area than expected, as much of the milfoil in the upper end died back following this application. A second treatment was completed on July 2nd to touch up a few areas that had only partial control and to treat 2.5 new acres of Eurasian watermilfoil and 7.9 acres of mixed vegetation (Figure 4). A third treatment was completed on July 22nd to 16.8 acres of lotus and 1 acre of mixed vegetation (Figure 5). A fourth treatment was completed on August 1st to treat 16.1 acres of mixed vegetation (Figure 6). A final treatment was completed on September 11th for control of 1.6 acres of mixed vegetation (Figure 7).

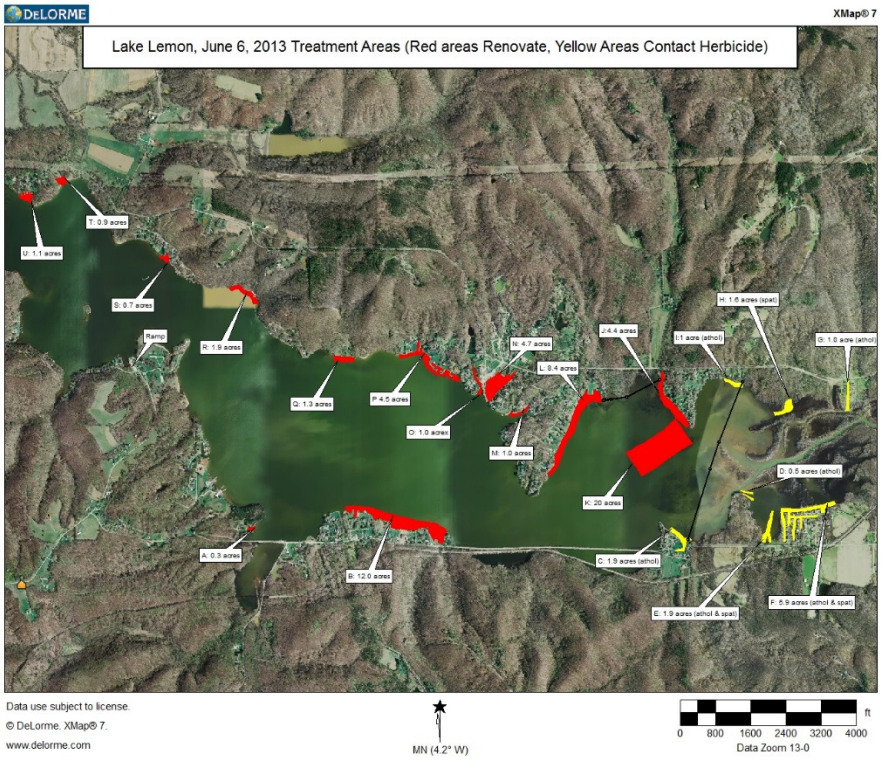

Figure 2. Lake Lemon submersed vegetation treatment, June 6, 2013.

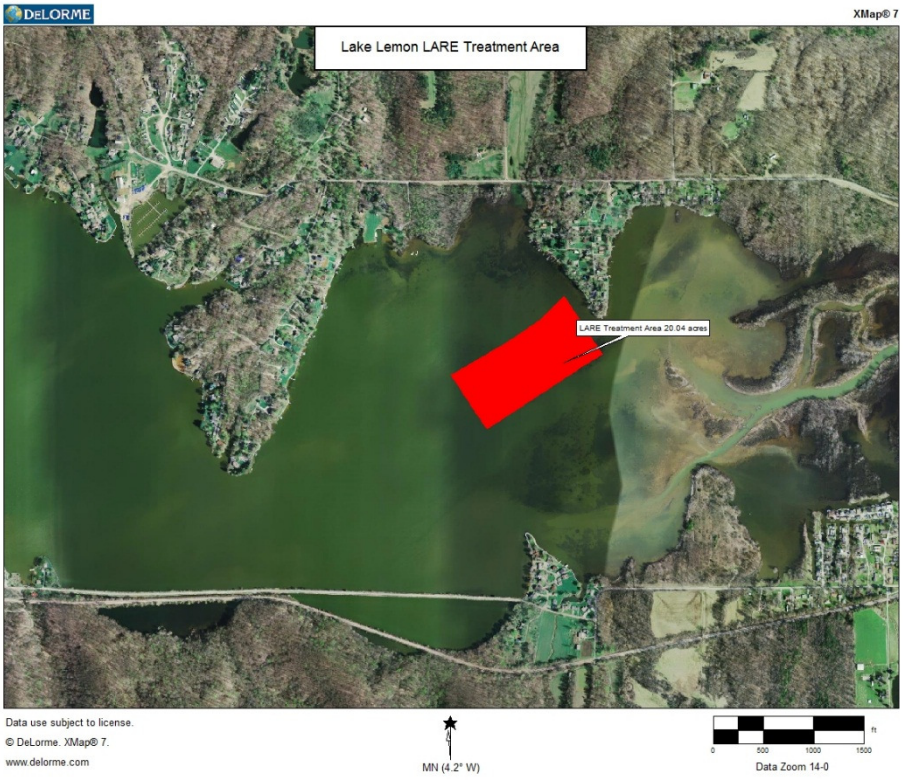

Figure 3. Lake Lemon LARE funded treatment area, June 6, 2013.

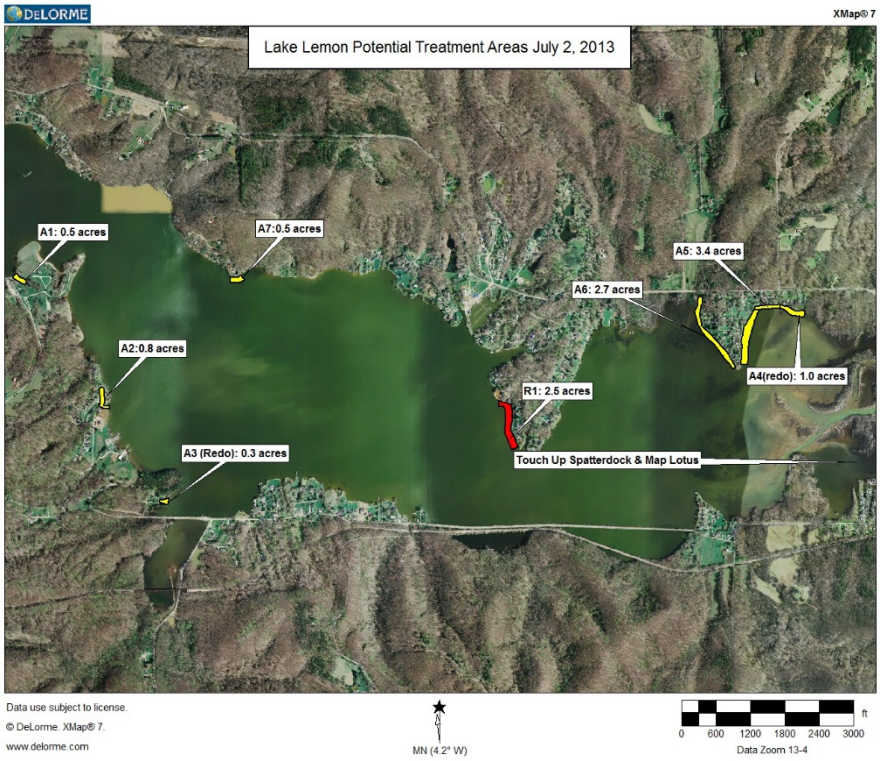

Figure 4. Lake Lemon treatment areas, July 2, 2013.

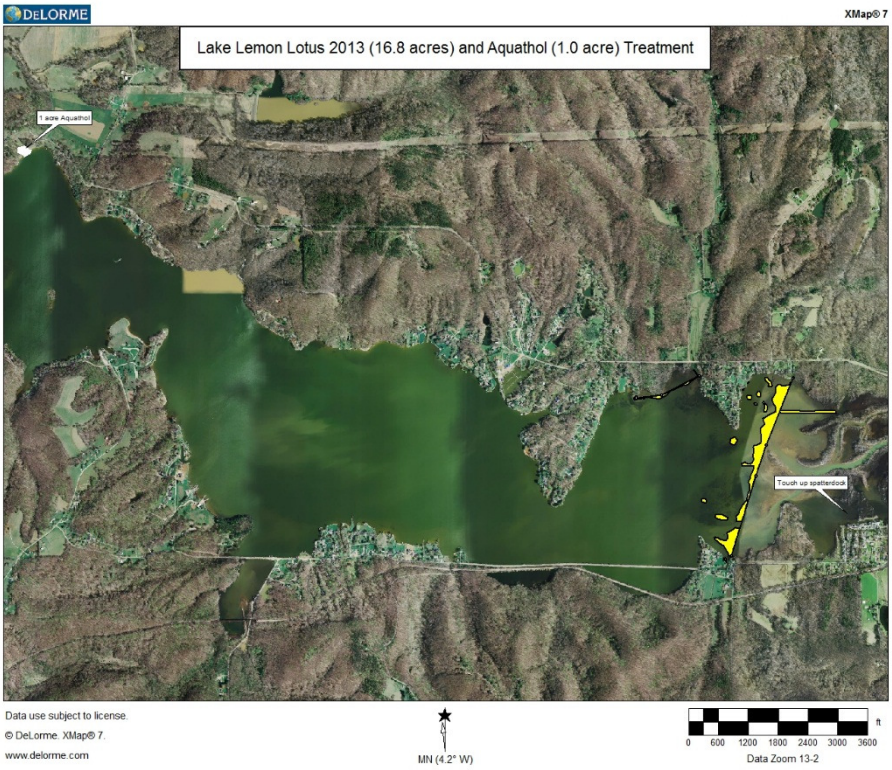

Figure 5. Lake Lemon lotus and mixed vegetation treatment areas, July 22, 2013.

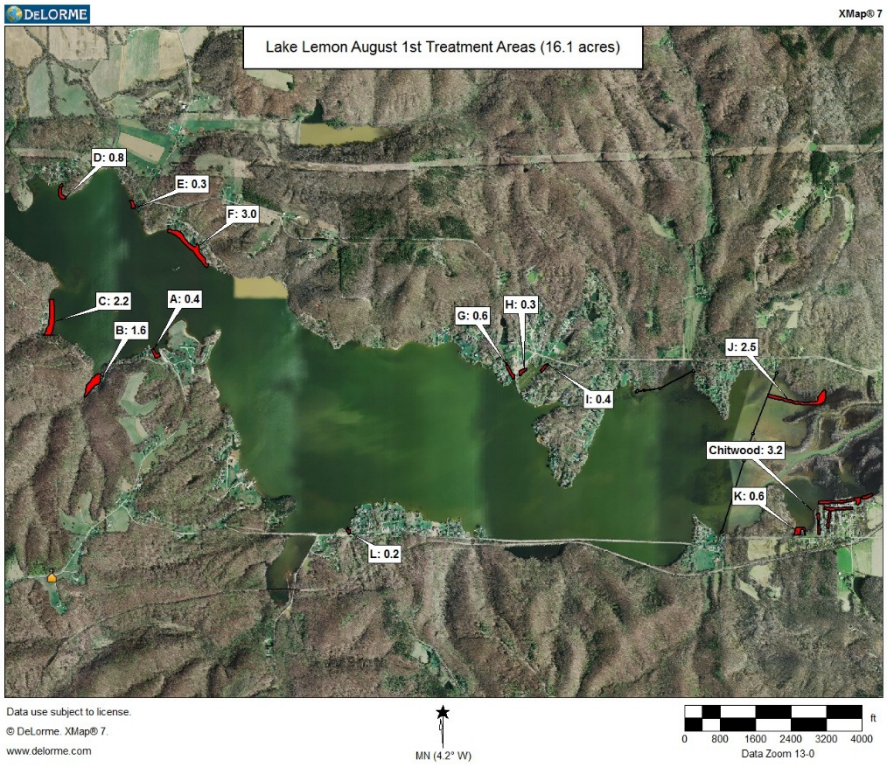

Figure 6. Lake Lemon treatment areas, August 1, 2013.

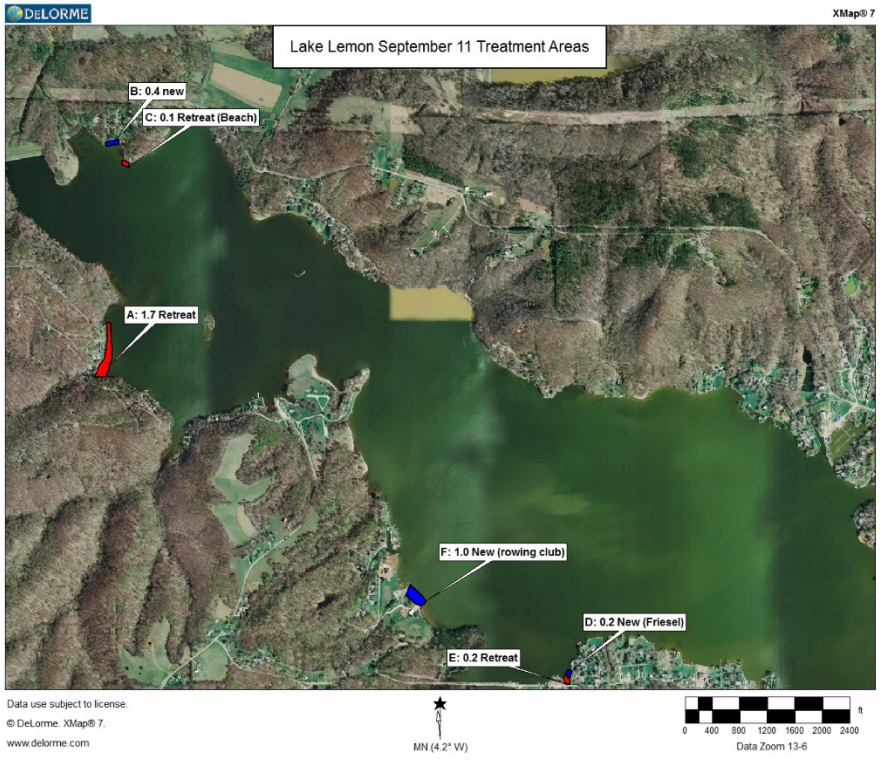

Figure 7. Lake Lemon treatment areas, September 11, 2013.

Table 2. Lake Lemon, 2013 Treatment Summary

Date	Acres Treated	Targeted Species	Products Applied
6/6/2013	83.84	Submersed (74.44) Spatterdock (9.4)	Aquathol, Renovate, and glyphosate
7/2/2013	10.4	Submersed	Aquathol and Renovate
7/22/2013	17.8	Lotus (16.8) Submersed (1.0)	Aquathol and glyphosate
8/1/2013	16.1	Submersed	Aquathol
9/11/2013	1.6	Submersed	Aquathol and Reward

2013 Action Plan and Budget

Large areas of near shore and high use areas were treated for nuisance vegetation in 2013. Also, a 20 acre area in the northeast basin of the lake was funded for treatment by LARE. It is expected that there will be some residual control of Eurasian watermilfoil in the areas where systemic herbicide was used. It is also expected that there will be regrowth of submersed vegetation where contact herbicides were applied and that there may be new areas of nuisance vegetative growth. If conditions are similar to 2013, there could be over 50 acres of dense milfoil in the spring of 2014. LARE funding may help offset some of these expenses. LARE funds have been used in the past to control offshore areas when not enough funds were available from LLCD. Up to $5,000 in LARE funds will likely be available again next season. If LARE funds are not available, LLCD will need to budget accordingly. Contact herbicide treatments should continue to be used in areas of mixed vegetation. The contact treatments should only focus on areas where lake access and boating lanes are impaired by plant growth. If control is needed before the Memorial Day Holiday, LLCD should expect re-growth by late summer if using contact herbicides. If milfoil is the dominant species in the nuisance areas, past results show that Renovate is the tool of choice. The Conservancy gets far more bang for its buck (up to 2 years control with Renovate vs. a few months with contacts). The estimated costs for 2014 actions include $30,000 for treatment of up to 57 acres with Renovate herbicide, $20,000 for near-shore contact herbicide treatments where mixed plant populations occur. It is recommended that you request $30,000 from LARE along with $4,000 for an update to your Aquatic Vegetation Management Plan. Plant sampling should consist of a spring Invasive Species Mapping Survey and a summer Tier 2 survey. A proposed maintenance budget is illustrated in Table 3 below.

Table 3. Updated Budget Estimate.

	2014	2015	2016
Milfoil Treatments	$30,000	$30,000	$10,000
Shoreline Nuisance Treatments (spatterdock, lotus, milfoil, coontail and pondweeds)	$20,000	$20,000	$20,000
Vegetation Sampling & Plan Update	$50,000	$50,000	$50,000