

Lake Lemon 2016 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 quickly reach nuisance levels in such a shallow reservoir. This dense vegetation negatively impacts boating, fishing, swimming, and property values. The invasive species Eurasian watermilfoil (*Myriophyllum spicatum*) has traditionally been the primary problem species within the lake. Eurasian watermilfoil typically covers 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 Treatment History.

| | Acres of Milfoil, Coontail, and Pondweed Treated with Endothal | Acres of Milfoil Treated with Renovate | Total Submersed Acres Treated |
|------|--|---|-------------------------------------|
| 1996 | 33.0 | 0.0 | 33.0 |
| 1997 | 53.0 | 0.0 | 53.0 |
| 1998 | 53.0 | 0.0 | 53.0 |
| 1999 | 0.0 | 0.0 | 0.0 |
| 2000 | 53.0 | 0.0 | 53.0 |
| 2001 | 72.0 | 0.0 | 72.0 |
| 2002 | 106.0 | 0.0 | 106.0 |
| 2003 | 0.0 | 76.5 | 76.5 |
| 2004 | 47.5 | 50.2 | 97.7 |
| 2005 | 0.0 | 126.0 | 126.0 |
| 2006 | 0.0 | 76.6 | 76.6 |
| 2007 | 76.5 | 52.8 | 129.3 |
| 2008 | 53.7 | 4.3 | 58.0 |
| 2009 | 28.7 | 12.2 | 40.9 |
| 2010 | 26.4 | 100.2 | 126.6 |
| 2011 | 18.7 | 0.0 | 18.7 |
| 2012 | 48.9 | 53.3 | 102.2 |
| 2013 | 38.8 | 64.7 | 103.5 |
| 2014 | 43.9 | 21.7 | 65.6 |
| 2015 | 34.3 | 22.0 | 56.3 |
| 2016 | 19.1 | 43.1 | 62.2 |

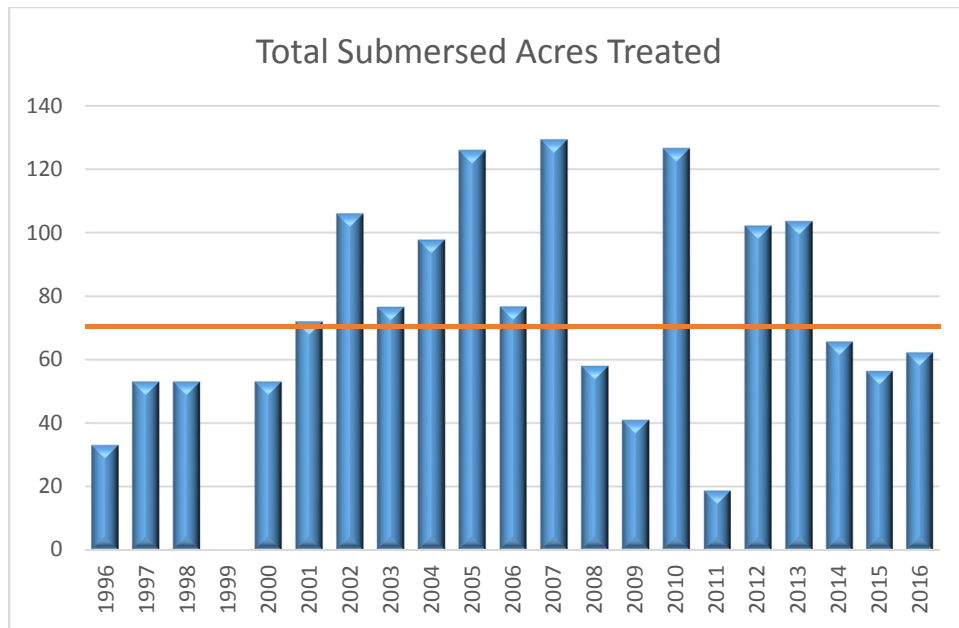


Figure 1. Total submersed acres treated since 1996 (red line is average acreage treated since 1996).

2016 Treatment Summary

LLCD received a 50% match \$5,000 maintenance grant from IDNR's LARE program for treatment of milfoil areas in 2016. Very little growth was noted until late spring. An initial survey was completed on June 10th and found very little offshore milfoil, but there were a few shallow areas of dense vegetation that were impacting lake use. A total of 38.5 acres of milfoil was treated on June 17th with Renovate herbicide. In addition, 0.2 acres of pondweed was treated with Aquathol herbicide (Figure 2). A second treatment was completed on July 22nd. A total of 37 acres was treated of which 0.5 acres treated with Renovate, 18.9 acres contact herbicide, and 17.6 acres of American lotus and spatterdock was treated with AquaPRO (Figure 3 & 4). A third and final application was completed on August 10th. A total of 4.3 acres of milfoil was treated at that time and the lotus/spatterdock treatment areas were touched up (Figure 5). These treatments are summarized in Table 2.

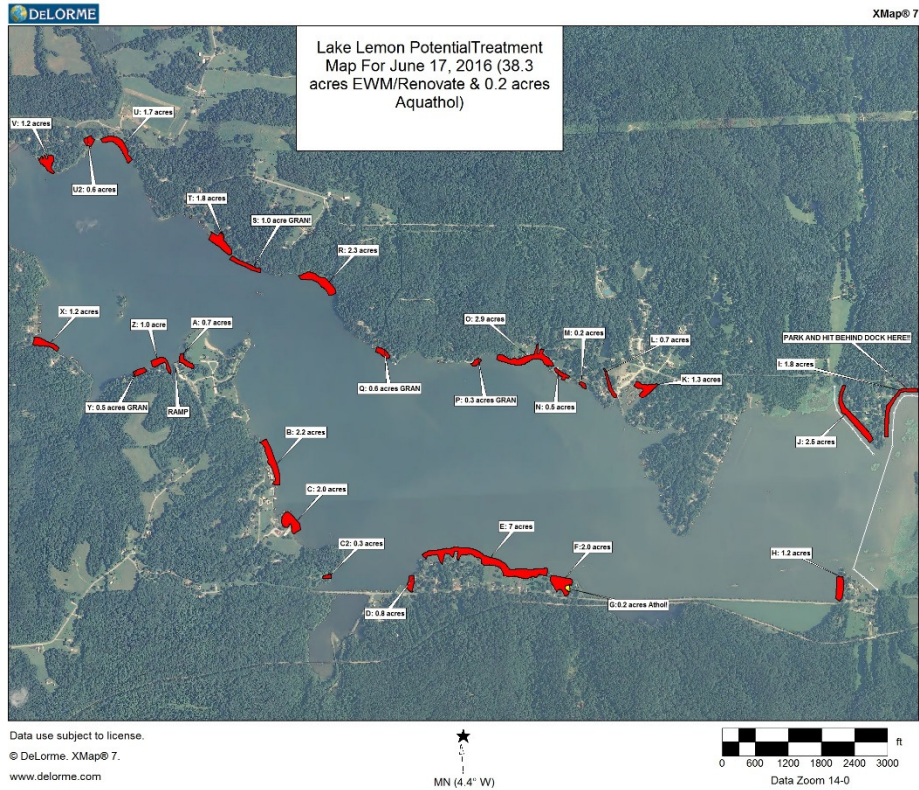


Figure 2. Lake Lemon treatment, June 17, 2016.

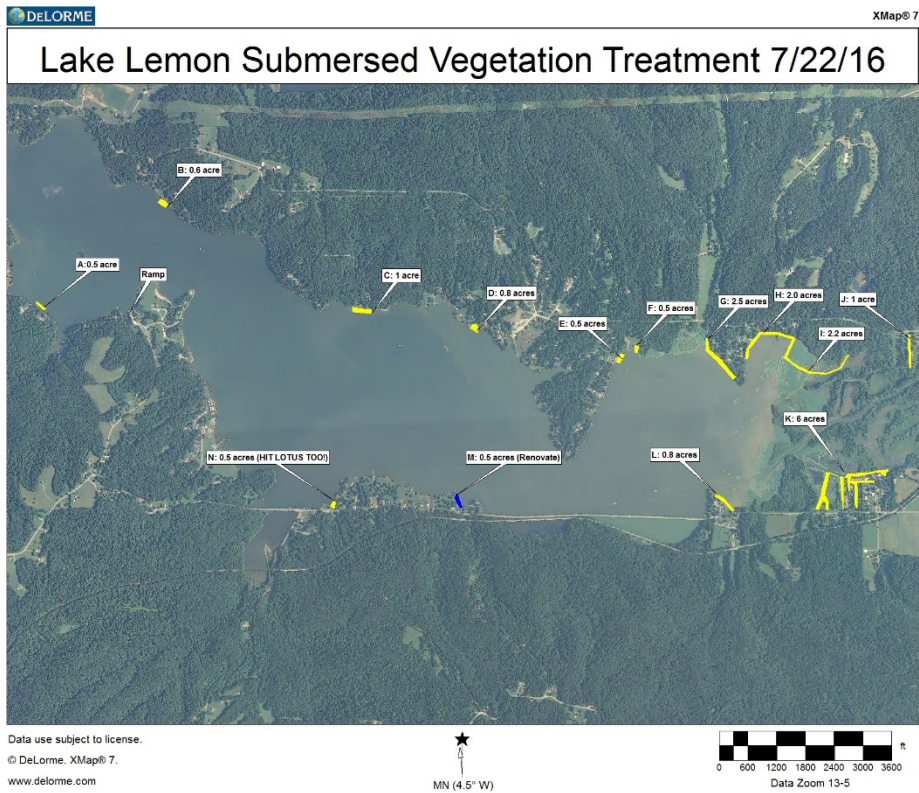


Figure 3. Lake Lemon submersed vegetation treatment areas, July 22, 2016.

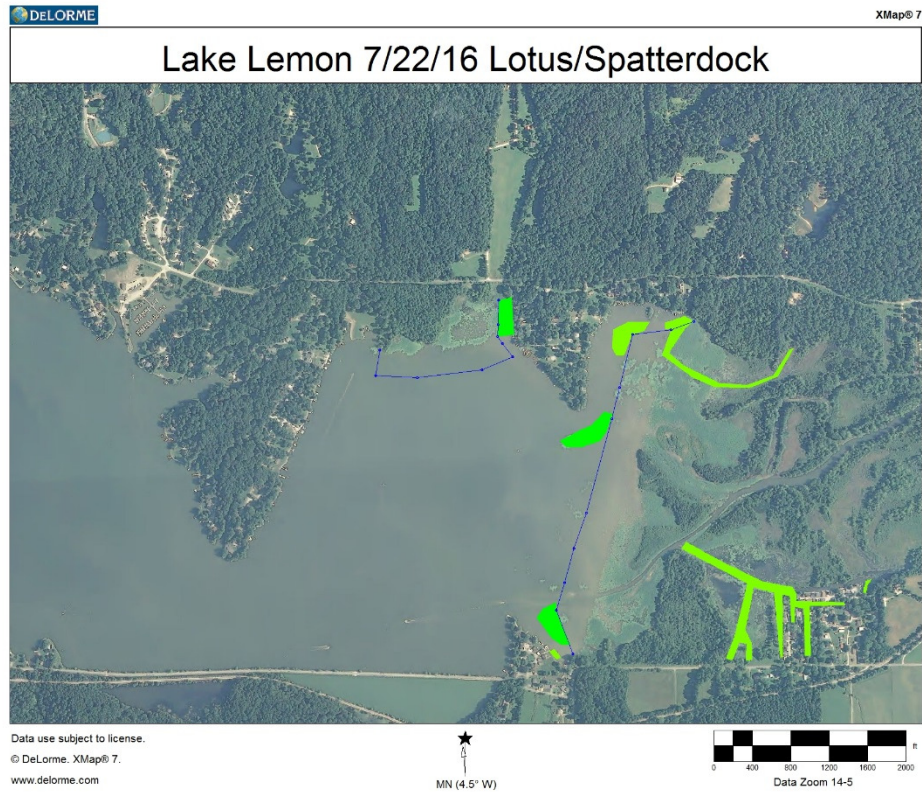


Figure 4. Lake Lemon American lotus/spatterdock treatment areas, July 22, 2016.

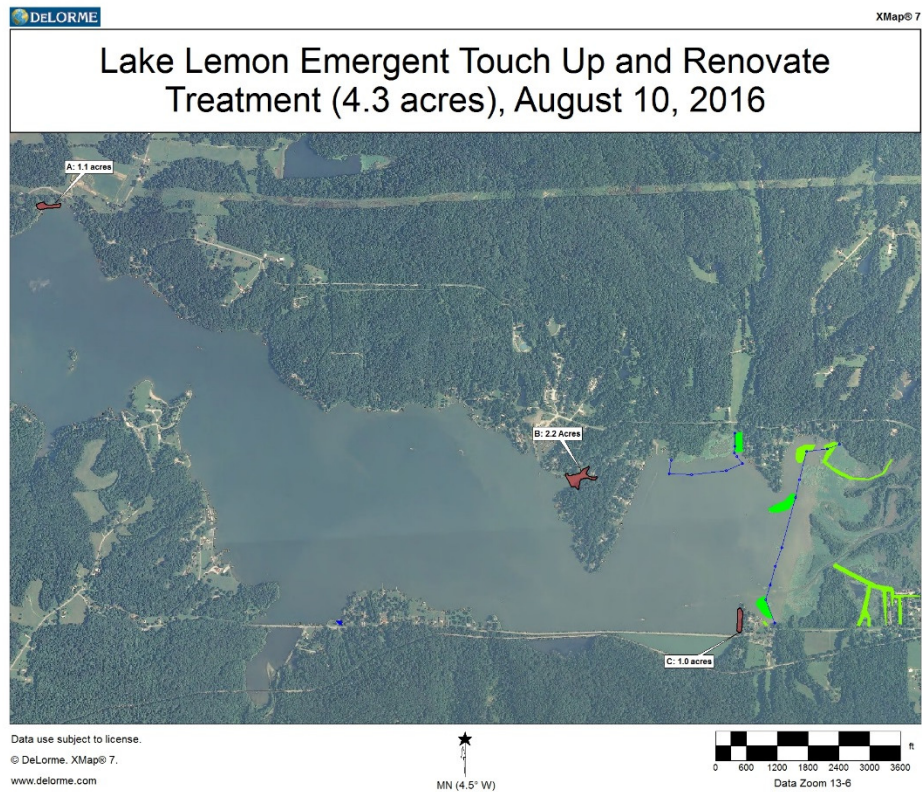


Figure 5. Lake Lemon treatment areas, August 10, 2016.

Table 2. Lake Lemon, 2016 Treatment Summary

| Date | Acres Treated | Targeted Vegetation | Products Applied |
|-----------|---------------|--|-----------------------------|
| 6/17/2016 | 38.5 | Submersed (38.5) | Renovate & Aquathol |
| 7/22/2016 | 37.0 | Submersed (19.4) Lotus/Spatterdock (17.6) | Aquathol, Renovate, AquaPRO |
| 8/10/2016 | 21.9 | Lotus (17.6) Submersed (4.3) | Renovate, Aquathol, AquaPRO |

2017 Action Plan and Budget

Since 2006, an average of 71.9 acres of submersed vegetation is treated on Lake Lemon. Only 62.2 acres was treated in 2016. Spring weather conditions and past treatments appear to play a significant role on the level of nuisance vegetation. 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. There was a significant amount of milfoil growth in the upper end of the lake by August, and this could lead an increase in problem areas in 2017. LARE funding may help offset some of these treatment 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, as the Conservancy gets far more bang for its buck. The estimated costs for 2017 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.

| | 2017 | 2018 | 2019 |
|---|----------|----------|----------|
| 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 | \$4,000 | \$4,000 | \$4,000 |