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**Synopsis of Activities**  
**Aquatic Invasive Species – Established Infestation Grant**  
**Project No. ALPT-007-04**  
**Loon Lake, Shawano County**

Loon Lake is a 305-acre natural lake located in Shawano County, Wisconsin. The primary concern of the Loon Lake Management District has been control of Eurasian watermilfoil (*Myriophyllum spicatum*), an invasive exotic plant that has been present in the lake since at least 1995. Eurasian watermilfoil quickly reached nuisance levels in this shallow lake - greatly impairing recreational uses and aesthetics. Early management efforts directed at controlling Eurasian watermilfoil included mechanical weed harvesting and then stocking of the milfoil weevil (*Euhrychiopsis lecontei*). Neither method was effective in controlling the plant. In June 2003, chemical treatment of milfoil with granular 2,4-D (Navigate<sup>®</sup>) began with an 88 acre treatment.

In September 2003, 48.6 acres of Eurasian watermilfoil were found in Loon Lake during a post-treatment survey. However, DNA analysis determined that the remaining milfoil was a hybrid form; a cross between Eurasian watermilfoil and a native milfoil. This hybrid appears to have exhibited the aggressive growth characteristics of Eurasian watermilfoil as well as the higher tolerance to herbicides that native milfoils species exhibit. It should be noted that this apparent tolerance has not been scientifically documented and that the difficulty in management may be a result of other factors. One theory has suggested that milfoil may be regrowing from seed.

In February 2004, the Loon Lake Management District applied for and received a three-year (2004-2006) Established Infestation Aquatic Invasive Species grant from the Wisconsin DNR. This project included various Eurasian watermilfoil treatments, annual aquatic plant surveys and extensive exotic species mapping efforts. This project also included several volunteer activities directed at education and prevention.

**2004 Activities**

In an effort to increase effectiveness of treatments, on May 5, 2004, an experimental treatment of Eurasian watermilfoil with liquid endothal (Aquathol K<sup>®</sup>) was conducted on 49 acres at a rate of 1.0 ppm. By September 15 acres of regrowth were found and treated with Navigate<sup>®</sup> at a rate of 150 lbs/acre. On October 13, 2004, two small experimental fall treatments were conducted on Loon Lake. A two-acre plot along the north shore was

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treated with Aquathol K<sup>®</sup> at a rate of 1.0 ppm while a one-acre plot in the southeast portion of the lake was treated with Navigate at a rate of 150 lbs/acre. Results of these experimental plots indicated little if any success with the Aquathol K<sup>®</sup> treatment and a high level of success with the fall Navigate<sup>®</sup> treatment.

Statistical analysis of plant survey data collected in 2002, 2003, and following treatment in 2004 found a steady reduction in Eurasian watermilfoil and its hybrids. By July 6, 2004, the frequency of occurrence for milfoil had dropped below 15%. Overall, milfoil had declined in Loon Lake by 77%. In 2002, curly-leaf pondweed, another exotic plant species, was found at 6.8% frequency. However, by 2004 it appeared to have been eliminated likely as a result of endothall herbicide treatments.

### **2005 Activities**

Since the goal of reducing the frequency of Eurasian watermilfoil to below 15% was achieved. It was recommended that a shift in the management strategy for Loon Lake be implemented. On May 31 and June 1, 2005 milfoil was again treated with Navigate<sup>®</sup>. To increase efficacy, higher rates were applied where it was possible to do so without harming native plants. In sensitive areas, such as in the lily beds, this treatment was conducted at 125 lbs/acre. Additionally, because of the resistance to herbicides exhibited by the hybrid milfoil, remaining milfoil beds outside of the lilies were treated at elevated rates up to 200 lbs per acre. A total of 20 acres were treated.

Two follow-up aquatic plant surveys were completed in July and September, 2005 to assess the effectiveness of treatment. It was determined that about 25 acres of EWM remained in the lake.

### **2006 Activities**

Survey and selective treatment for milfoil took place on May 15, 2006. Approximately 61.75 acres of EWM were treated with a combination of Aquathol K<sup>®</sup> at 1.0 ppm and Weedar 64<sup>®</sup> (liquid 2,4-D) at 0.5 ppm.

Observations of plants throughout the summer showed very slow die off (compared to other treatments in the past); most noticeable effects were seen around 5 weeks after treatment. After observing the conditions on Loon Lake in August, 2006, John Skogerboe of the U.S. Army Corps of Engineers suggested that wind speed may have been a factor on the day of treatment. He suggested that increased wind speed led to reduced product concentrations and reduced contact time between the product and the plants. These reduced concentrations would lead to the observed partial die off of the plants.

The DNR performed a point-intercept survey of Loon Lake in July, 2006 which was duplicated in part on November 6, 2006. Combining the results of the November survey

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with an additional fall boat survey, it was determined that approximately 88 acres of milfoil still infest Loon Lake.

### **Summary**

From the onset of this project, the level of control of the hybrid milfoil in Loon Lake has been less than predicted in the original grant narrative. As a result, changes in strategy were again made in an attempt to improve the effects of management efforts. However, it is evident that the hybrid strain of milfoil in Loon Lake is particularly resilient to herbicide treatments.

Loon Lake has been a valuable asset to researchers investigating options for chemical control of Eurasian watermilfoil and its hybrids. The Loon Lake Management District has sponsored a number of spring and fall treatments utilizing a number of herbicides both individually and combined. Many of the treatments since 2003, were effective in that they allowed for full recreational use of the lake throughout the summer. Prior to 2003, much of the lake had become unusable for recreation.

The Loon Lake Management District plans to continue with chemical treatment of milfoil in the lake. In 2007, early spring application of endothall and 2,4-D will again be used to selectively control hybrid milfoil. It is believed that environmental factors such as wind speed and water temperature will play a crucial role in the effectiveness of treatment. Additionally, researchers from the U.S. Army Corps of Engineers will use this treatment as a further research tool to evaluate the relative sensitivity of Loon Lake hybrid milfoil to the early spring dual herbicide approach.

### **Summary of Finances**

The total project cost for the 2004 grant was approximately \$74,400. Originally, it was expected that the treatment approach for this project would result in the steady decline of milfoil to below nuisance levels. However, the level of milfoil continued to fluctuate while remaining resistant to treatments. As a result, the actual project costs were much higher than anticipated and the Loon Lake Management District assumed the additional costs for treatments.

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