

INTRODUCTION

Long Lake is an approximate 86-acre, drainage lake with a maximum depth of 35 feet and a mean depth of 19 feet.

In the summer of 2005, staff from the Wisconsin Department of Natural Resources (WDNR) verified the presence of Eurasian water milfoil (*Myriophyllum spicatum*, EWM), a potentially harmful exotic species in the lake. A baseline survey for EWM completed in September of that same year indicated that the invasive plant occurs in many locations throughout the lake.

Based on the findings of a baseline EWM inventory conducted by Onterra in September of 2005, a roughly 3-acre treatment of Navigate (2,4-D) at 100 pounds/acre was completed by Schmidt's Aquatic Plant Control during early May of 2006. Post treatment surveys conducted by Onterra revealed that EWM was negatively affected within the 2006 treatment areas, but a desired level of control was not achieved. One possible reason for the limited success of the 2006 chemical treatments involves the incomplete treatment of the entire EWM colony. Perhaps low-growing EWM occurred just outside of the 2006 treatment areas and contributed to recolonization during the summer. An unscheduled peak biomass EWM survey was conducted by Onterra at the end of August to gain a better understanding of the EWM in Long Lake.

Based on the 2006 peak biomass survey, an area of 6.8 acres served as the preliminary treatment area used to obtain a conditional chemical application permit from the WDNR (Map 1). Long Lake was visited in May of 2007 and the preliminary treatment areas were adjusted to more accurately target the EWM growing at that time. Based on this survey, Onterra recommended an 8.8-acre treatment (Map 1). We provided the necessary data to the applicator, Schmidt's Aquatic Plant Control, and an application of Navigate (2,4-D) was completed on May 31, 2007 at 100 lbs/acre. The winds were light (3-8 mph) and the water temperature was 15.5°C (60°F).

TREATMENT MONITORING

Determining the success or failure of chemical treatments on EWM is often a difficult task because the criteria used in determining success or failure is ambiguous. Most people involved with EWM management, whether professionals or laypersons, understand that the eradication of EWM from a lake, or even a specific area of a lake, is nearly, if not totally, impossible. Most understand that achieving control is the best criteria for success. A qualitative assessment was determined for each treatment site by comparing detailed notes of pre- and post treatment observations and spatial data collected with a sub-meter GPS datacollector.

Pretreatment Survey - May 25, 2007

The purpose of this survey was to refine the treatment areas used in the conditional permit to more accurately and effectively coordinate the control method. Full sun and low wind made conditions ideal for locating EWM. EWM and curly-leaf pondweed were easily observed from the surface. Five separate areas were proposed for treatment (Map 1).

Site A-07 EWM was easily observed and mapped from the surface. A portion of this site was treated in 2006 and remained dense. Along the northern shore of the lake, EWM was observed to the north east of this site and was mapped using the GPS technology described above (Map 1). An additional half acre was recommended for treatment in Site A.

nature of the treatment location may have lead to its successful treatment. This location is proposed as a secondary treatment location (A-08) and may warrant treatment based on a pretreatment survey in 2008 (Map 3).

Site D-07 This area was not treated in 2007 and is recommended for treatment in 2008. Although EWM is still scattered within this locations, many isolated, dense locations of EWM have emerged (Map 2). It is for this reason that B-08 is recommended for treatment. B-08 also encompasses a dense area, close to Site E-07 (Maps 2, 3).

Site E-07 One dense location was observed near a pier during previous site visits. During the post treatment survey, not a single EWM plant was observed in that area. However, EWM was located in slightly deeper water just to the east of this colony but within the treatment area (Map2). The proposed Site C-08 includes the remaining EWM colonies from Site E-07 that were not affected by the treatment. Because of the ineffectiveness of the 2007 treatment on these EWM locations, possibly relating to depth, an increased dosage may be warranted for C-08.

Additional Areas EWM was located between A-07 and B-07 during the 2007 pretreatment survey (Map 2). These areas developed into fairly dense colonies over the summer that now require treatment. The proposed treatment areas (Sites G-08, H-08, and I-08) may require an increased dosage because of plant density and water depth. Site L-08 comprises a highly scattered area of EWM along the southern shore (Maps 2, 3). This is one of the first colonies that have developed in this part of the lake and early control measures may be justified to limit its spread around the lake.

CONCLUSIONS AND RECOMMENDATIONS

Management of EWM on Long Lake has yielded mixed results. Some areas have responded well to the chemical application, and others have displayed minimal effect. On a site-by-site basis, treatment affects are quite apparent when looking at shifts in EWM density and location. However, on a lake-wide basis, treatment area is remaining largely the same and the conclusions that can be made are not as straight forward. On a positive note, EWM area has not been significantly increasing. However, EWM area is not significantly being reduced, either.

A primary goal of the Long Lake Aquatic Invasive Species Project is to raise stakeholder awareness of exotic species and empower the Long Lake Property Owners Association (LLPOA) to play a more active role by leading the management of EWM within their lake. Although the chemical treatments may not have yielded outstanding successes, the LLPOA has been provided the necessary tools to manage EWM on their lake, an obvious success of the current project. Volunteers on the lake have been trained on identifying EWM and other native and non native plants. All 2008 proposed treatment areas have been loaded on an association's GPS unit (Figure 1). This will allow volunteers to monitor treatments and possibly create effective treatment strategies with help from their chemical applicator.

Eventually the WDNR may request an approved lake management plan for Long Lake to be in place if large-scale manipulations like chemical treatments continue. This would be in the best interest of the LLOA since current management goals are not fully developed. EWM and CLP will most likely never be eradicated on Long Lake. Is the association's goal to continue to treat 5-10 acres of EWM on their lake to keep densities at a manageable level? Some may wish to see

Site	Final Acres	Proposed Acres	Difference	Average Depth
A-07	2.2	1.7	0.5	6 feet
B-07	5.5	3.9	1.6	6 feet
C-07	0.6	0.6	0.0	6 feet
D-07	0.0	0.6	-0.6	5 feet
E-07	0.5	0.1	0.4	4 feet
Total	8.8	6.9	1.9	

B

A

E



D

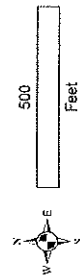
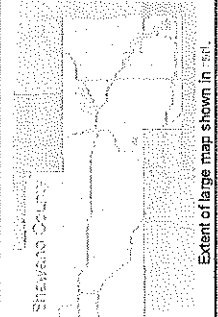
C

Please Note:

1. Entire area of lake used for fishing.
2. Proposed Treatment areas are used for all boating activities.

Legend

-  Proposed Chemical Treatment Area (From Conditional Permit)
-  Final Chemical Treatment Area



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Sources:
 Roads & Hydro: WDNR
 Aquatic Plants: Onterra, 2005-2007
 Map date: May 25, 2007

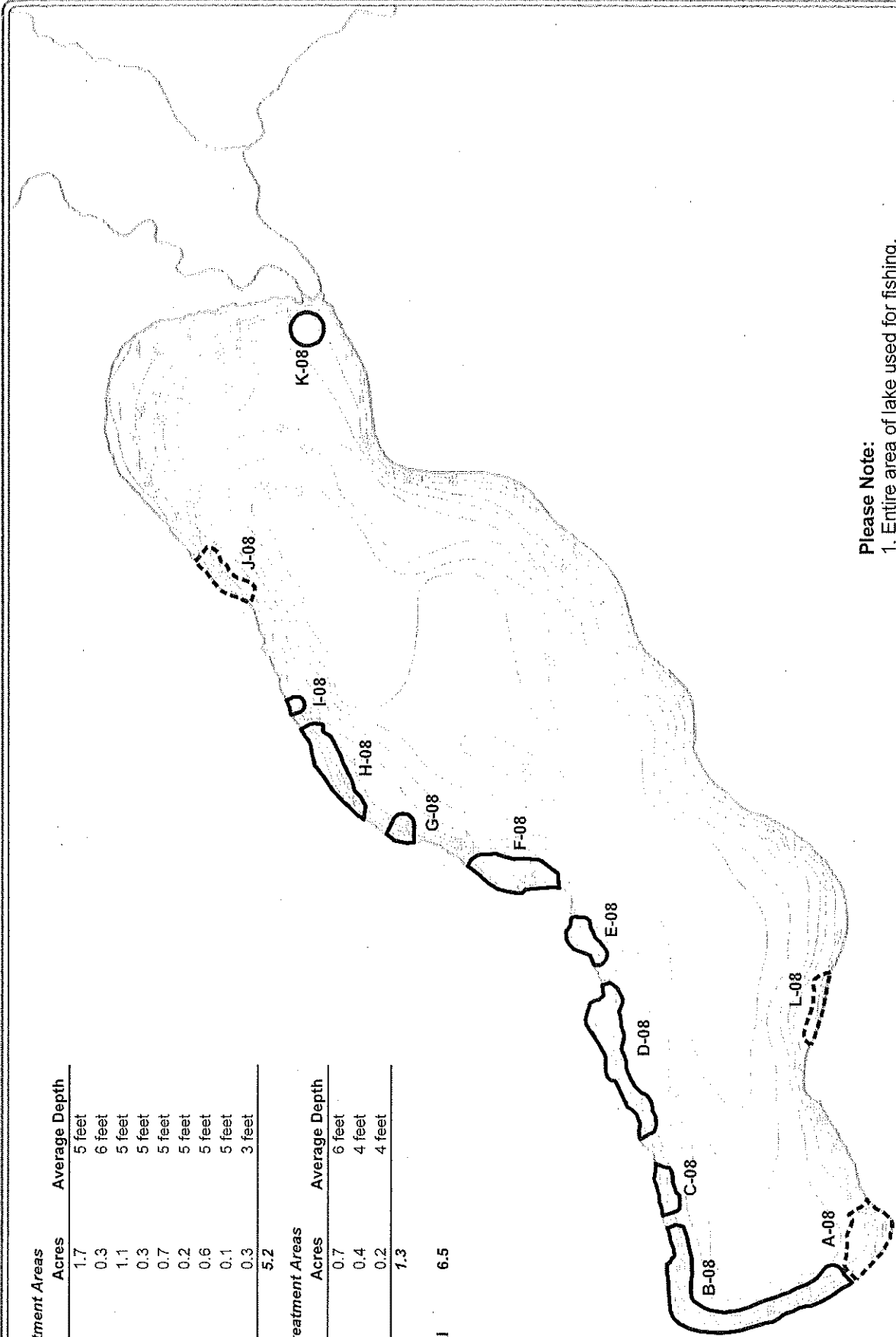
Extent of large map shown in inset.

Map 1
Long Lake
 Shawano County, Wisconsin
2007 EWM
Final Chemical Treatment Areas

Primary Treatment Areas		
Site	Acres	Average Depth
B-08	1.7	5 feet
C-08	0.3	6 feet
D-08	1.1	5 feet
E-08	0.3	5 feet
F-08	0.7	5 feet
G-08	0.2	5 feet
H-08	0.6	5 feet
I-08	0.1	5 feet
K-08	0.3	3 feet
Sub Total	5.2	

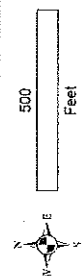
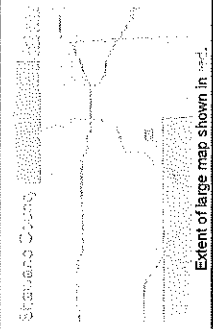
Secondary Treatment Areas		
Site	Acres	Average Depth
A-08	0.7	6 feet
J-08	0.4	4 feet
L-08	0.2	4 feet
Sub Total	1.3	

Grand Total 6.5



Please Note:

1. Entire area of lake used for fishing.
2. Proposed Treatment areas are used for all boating activities.



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Sources:
 Roads & hydro: WDNR
 Bathymetry: WDNR (Digitized by Onterra)
 Aquatic Plants: Onterra, 2005-2007
 Map date: October 8, 2007

Legend

- Primary Treatment Area (5.2 acres)
- Secondary Treatment Area (additional 1.3 acres)

Map 3
Long Lake
 Shawano County, Wisconsin
2008 EWM
Proposed Chemical Treatment Areas v.1