

Short-term Eurasian Water Milfoil Control & Monitoring Plan for Pleasant Lake

INTRODUCTION

The Pleasant Lake Management District (PLMD) has developed a short-term Eurasian water milfoil (EWM) control plan that includes herbicide treatments to be conducted during the spring of 2010, 2011, and 2012. EWM was first suspected to exist in Pleasant Lake during the summer of 2007 and later confirmed by WDNR staff. Approximately 2 acres were treated in 2008. In 2009 EWM was mapped by Onterra and 11.3 acres are proposed for treatment in 2010 (referred to as T2010) (Map 1). For budgeting purposes, the proposed treatment acreage has been rounded to 12 acres.

PROJECT SCOPE

Since the EWM infestation in Pleasant Lake has occurred only recently, an aggressive approach is proposed in which all contiguous EWM colonies (primary) and close aggregations of single plants (secondary) would be targeted the first year. The entirety of these areas will likely require follow-up treatment in 2011 and beyond. The treatments would occur each year before June 1 and/or water temperatures reach 65°F.

Although eradication of EWM from Pleasant Lake would be the best possible outcome, a more realistic objective is to seek to bring the EWM population down to a easily controlled level. In other words, our goal is to reduce the amount of EWM in Pleasant Lake to a level that would only require spot treatments to keep it under control. To achieve this objective, a cyclic series of steps would be used to plan and implement the treatment strategy. The series includes:

1. A lake-wide assessment of EWM completed while the plant is at peak biomass (July or August).
2. Development of treatment strategy for the following spring.
3. Verification and refinement of treatment plan immediately before treatments are implemented.
4. Completion of treatments.
5. Assessment of treatment results (summer after treatment).

Once Step 5 is completed, the process would begin again that same summer with the completion of a peak biomass survey. The survey results would then be used to formulate the next spring's treatment strategy.

Treatment Monitoring Strategy

The following section outlines success criteria to evaluate the EWM control methods. The impacts to native submersed species are believed to occur when the non-native species, in this case, EWM, reaches an aerial coverage of approximately 50% (dominance). Therefore, by minimizing the occurrence of these dense stands, the exotic's impact on the lake's ecology would also be minimized.

Two levels of criteria would be used to determine the success of this project on controlling EWM; 1) determining the success of annual treatments on a site-by-site basis, and 2) determining success of annual treatments on a lake-wide scale. In general, two methods are used to measure the effectiveness of the treatments, *qualitative* evaluations and *quantitative* sampling.

Qualitative Monitoring

The qualitative methodology is linked with the EWM mapping efforts and includes designating the EWM density of each area within a specific category based primarily on aerial coverage. The designations used in this project would include:

Scattered If the target plant occurs in an area that can be enclosed by some geographic boundary, such as a shoreline and a depth contour or in a small bay and that exotic's aerial coverage does not meet the density descriptions described below, then that area would be labeled as "scattered". Another way of looking at this description would be to consider a small bay that contained many occurrences of the exotic that could be represented with point-based mapping, but because there is some geographical boundary, the multiple occurrences can be enclosed using that boundary and GPS data.

Dominant This rating is used when the colony boundaries are distinct and the exotic appears to be at roughly 50 percent aerial coverage (meaning it is likely the dominant plant in the area).

Highly Dominant These colonies have exotic aerial coverage clearly exceeding 50 percent. The exotic is obviously the dominant species in these colonies, but there is no surface matting.

Surface Matting This rating would be reserved only for the densest colonies. In these colonies, exotic aerial coverage approaches 100 percent and the plants are canopied and matted on the surface. Boating in these areas may be difficult due to the mass of exotic plants at the surface.

Quantitative Monitoring

The quantitative treatment monitoring activities outlined would follow a protocol currently being developed by the WDNR and illustrated within Aquatic Plant Community Evaluation with Chemical Manipulation (Draft). This form of monitoring is required for all large scale herbicide applications (exceeding 10 acres in size or 10% of the area of the water body that is 10 feet or less in depth and treatment areas that are more than 150 feet from shore) and grant-funded projects where scientific and financial accountability are required.

The quantitative surveys of treatment areas utilize a modified point-intercept methodology in which sub-sample locations are placed over the treatment areas using a 20-meter resolution, resulting in approximately 4 points per treatment acre.

These data are analyzed in the following manner:

1. As a part of the treatment monitoring, the sub-sampling sites are visited before and after the treatments to produce the pre- and post treatment data. By comparing those results, expressed as frequency of occurrence, we can determine if there is more, less, or the same amount of EWM before and after the treatment. If there is a difference between the pre- and post treatment data, statistical analysis (see below) would be used to determine if the difference is sufficient to be attributed to the treatment or if

the difference may have occurred randomly. If the difference is sufficient, it is considered to be *significantly different*, if it is not sufficient, it is considered to be *insignificantly different*. In the end, a significant difference can be attributed to some factor, while an insignificant difference can only be attributed to random chance.

Due to the timing of this project, a pretreatment point-intercept survey would be conducted in May 2010 using the methodology described above. During this survey, only non-native plant abundances would be recorded as the majority of the native plants would not have emerged by the time of this survey. A post treatment point-intercept survey would be completed during August of 2010 utilizing the same sub-sample locations. Both native and non-native plant abundances would be recorded during this survey. Quantitative analysis of the 2010 treatment would compare the May 2010 to the August 2010 data. Quantitative analysis of the 2011 treatment would compare data collected during August prior to the treatment (2010) with data collected during August following the treatment (2011). It is most appropriate to compare summer to summer datasets and this would also allow a determination of changes to the native plant communities to be understood. But as stated above, due to the timing of the project, this would not be possible for the 2010 treatment (as we cannot go back in time and collect pretreatment data during this past summer (2009)). Because it is less useful and we have the ability to use the August 2010 data as a pretreatment survey for the 2011 treatment, quantitative data would not be collected during the spring pretreatment studies in May 2011.

A Chi-square distribution analysis ($\alpha = 0.05$) would be used to determine if the quantitative data collected before the treatment are statically different from the data collected after the treatment. The alpha value is set such that we consider the results statistically significant when the test is 95% confident that the results are truly different and non-random.

The number of sub-sample sites within a treatment area must be considered when evaluating the treatment impacts on that particular site. A higher sample size (N), leads to more credible results and conclusions. In general, sites containing 6 or less sub-sample locations are not considered sufficient for analysis; however, those data are considered valuable when pooled (combined) with the other sub-sample sites within the lake for the lake-wide analysis. When treatment areas fall below approximately 10 acres, the number of sub-sample points is reduced to a level where understanding differences becomes difficult. If subsequent treatments on Pleasant Lake fall below 10 acres, quantitative monitoring techniques may not be justified.

2. Rake fullness distribution would be charted as histograms with rake fullness on the x-axis and number of plots (frequency) on the y-axis. The charts would resemble length-frequency histograms for fish data. Both pre- and post treatment data would be plotted on the same chart. Comparisons would be made on individual sites, on a treatment-wide basis, and on a project-wide basis. Visual interpretation of the charts would need to be used to determine success and cannot be quantified here.

Both the qualitative and the quantitative methodologies would be used to judge treatment and project success. Within the project, the analysis results would be used to adjust or “tune” the next year’s treatment plan. The success analysis would be used to develop the long-term control strategy for Pleasant Lake which will be an important aspect of the lake’s management plan.

Treatment Evaluation Criteria

Qualitatively, a successful treatment on a particular site would include a reduction of EWM density as demonstrated by a decrease in density rating. For example, areas shown to be highly dominant would be required to decrease to at least dominant. In terms of a treatment as a whole, at least 75% of the acreage treated that year would decrease by one level of density as described above for an individual site.

Quantitatively, a successful treatment, on a specific site and as a whole, would include a significant reduction in EWM frequency following the treatments as exhibited by at least a 50% decrease in EWM frequency from the sub-sampling. In other words, if the EWM frequency of occurrence before the treatment was 80%, the post treatment frequency would need to be 40% or lower for the treatment to be considered a success for that particular site. Further, there would be a noticeable decrease in rake fullness ratings within the categories of 2 and 3 (see Point 2, above). Hopefully, there would be no rake tows completed during the post treatment surveys exhibiting a fullness of 2 or 3.

PROJECT DELIVERABLES

A report describing findings from the pre- and post treatment surveys would be completed during the winter of 2010-2011 and 2011-2012. All data collected, including GPS locations would be included in the report. Guidance for continued control actions would also be included within the document along with documentation of completion of the other tasks contained within the grant project scope.

Please note that Onterra does not conduct chemical treatments, but due to our GIS/GPS expertise, we are able to coordinate with any qualified chemical applicator. The success of this EWM control project relies heavily on the accurate and timely transmittal of spatial data between the applicator, the PLMD, and our lake management consultant, Onterra, LLC. Onterra is responsible for creating the EWM control strategy, including creation of herbicide treatment areas, and monitoring the effectiveness of those treatments. Onterra completes plant surveys prior to the treatment during the preceding growing season and during the spring for which treatment will occur. The results of the growing season survey are used to create the treatment areas described in the conditional chemical treatment permit. The results of the spring surveys are used to refine those conditional treatment areas. The refined treatment areas are provided to the PLMD, the WDNR, and the applicator immediately following the completion of the spring survey (normally 24 hours or more prior to the scheduled treatment) in the form of an updated map in Adobe’s Portable Document Format (.pdf). Once the refined treatment areas are approved by the WDNR and PLMD, they are then considered the final treatment areas and data will be provided by Onterra to the applicator in the appropriate format (GIS/GPS).

Further, we do not propose to complete the treatment permits or residual chemical testing. These tasks are best suited for a chemical applicator or possibly an external or volunteer-based effort.

2010 Proposed Treatment Areas

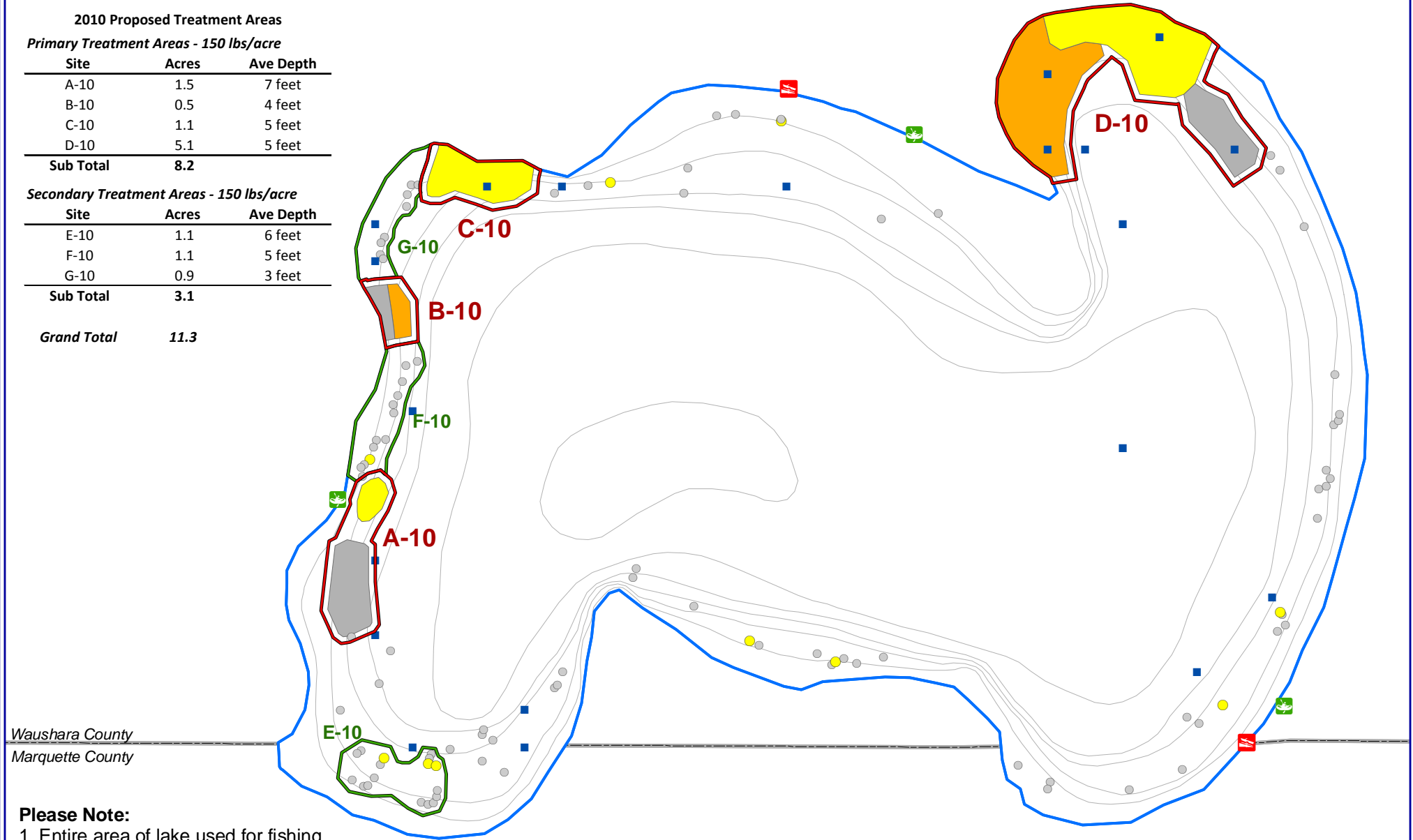
Primary Treatment Areas - 150 lbs/acre

Site	Acres	Ave Depth
A-10	1.5	7 feet
B-10	0.5	4 feet
C-10	1.1	5 feet
D-10	5.1	5 feet
Sub Total	8.2	

Secondary Treatment Areas - 150 lbs/acre

Site	Acres	Ave Depth
E-10	1.1	6 feet
F-10	1.1	5 feet
G-10	0.9	3 feet
Sub Total	3.1	

Grand Total 11.3



Waushara County
Marquette County

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 and Hydro: WDNR
Aquatic Plants: Onterra, 2009
Map Date: December 23, 2009
File Name: Pleasant_T2010_EWM_Cond1.mxd



Extent of large map shown in red.

2010 Proposed Treatment Areas

- Primary Treatment Area
- Secondary Treatment Area

Point-intercept Survey Results (Aug 2009)

- Contains Eurasian Water Milfoil

EWM Survey Results (Sept 2009)

- Single or Few Plants
- Clumps of Plants
- Scattered
- Dominant
- Highly Dominant
- Surface Matting (none found)

Map 1
Pleasant Lake
Waushara & Marquette Counties, Wisconsin
2009 EWM Survey Results
and 2010 Proposed Treatment