

Aquatic Engineering, Inc.

Advancing the Science of Assessment, Management and Rehabilitation of our Aquatic Natural Resources!

2005 Montello Lake Aquatic Plant Management Plan Implementation Report

Prepared for:

Montello Lake Inland Protection and Rehabilitation District

Jim Neeb

*212 Carriage Road
Montello, WI 53949*

March 14, 2006

Prepared by:

Aquatic Engineering

Post Office Box 3634

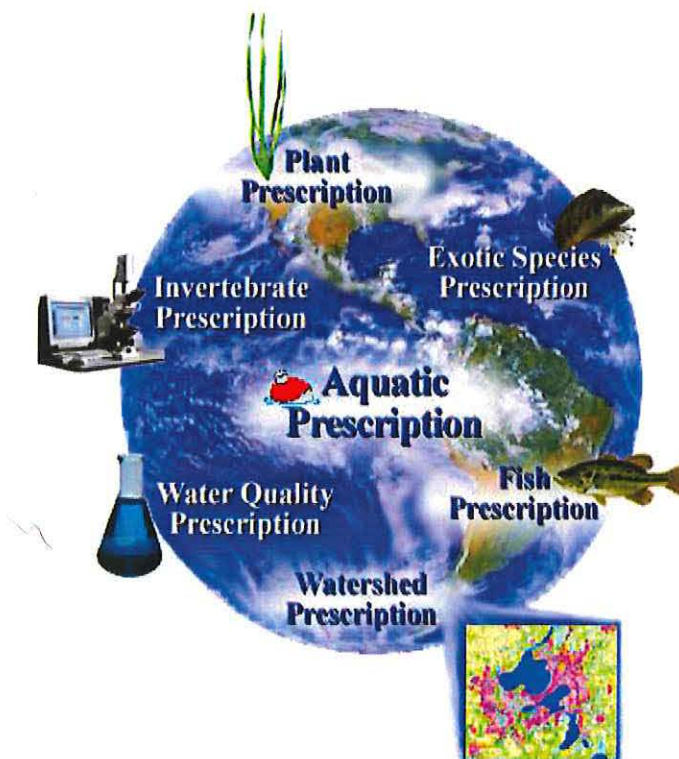
La Crosse, WI 54602-3634

Phone: 608-781-8770

Fax: 608-781-8771

E-mail: info@aquaticengineering.org

Web Site: www.aquaticengineering.org



2005 Montello Lake Aquatic Plant Management Plan Implementation Report

By R. C. Babe¹, and J. E. Britton²

March 14, 2006

In cooperation with the Wisconsin Department of Natural Resources and the Montello Lake Protection and Rehabilitation District

1 Aquatic Engineering, Inc.; rbabe@aquaticengineering.org
PO Box 3634, La Crosse, WI 54602-3634
Phone: 608-781-8770
www.aquaticengineering.org

Signature

Date

2 The Limnological Institute; jbritton@thelimnologicalinstitute.org
PO Box 304, La Crosse, WI 54602-0304
Phone: 800-485-1772
www.thelimnologicalinstitute.org

Signature

Date

TABLE OF CONTENTS

Executive Summary	5
Background	6
Overview	8
Methods	8
<i>Qualitative Surveys</i>	8
<i>Quantitative Surveys</i>	8
<i>Herbicide Application</i>	11
Results	11
<i>Phase One: Pre-Treatment Evaluation</i>	11
<i>Phase Two: Treatment</i>	12
<i>Phase Three: Post-Treatment Surveys</i>	14
<i>Phase Four: Report</i>	16
Discussion	16
Recommendations	17
References	18
Appendix A – Plant Survey Raw Data	19
Appendix B – Permit	45
Appendix C – Treatment Record	53
Appendix D – Product Labels & Material Safety Data Sheets	57

2005 Montello Lake Aquatic Plant Management Plan Implementation Report

Executive Summary

This report is a summary of the aquatic plant management activities that were implemented in 2005 following recommendations from Aquatic Engineering, Inc.'s (AEI's) *Montello Lake Aquatic Plant Management Plan* (AEI 2004). The report reviews recommendations from the plan, summarizes monitoring activities and results from the 2005 aquatic plant management activities on Montello Lake, and includes management suggestions for 2006.

The purpose of the plan was to present the Montello Lake Protection and Rehabilitation District (MLPRD) with an overview of past management activities; report on the success of current strategies; provide short-term, intermediate-term, and long-term management strategies; and provide guidance for future management practices. Specific activities from the aquatic plant management plan that were implemented in 2005 include lake-wide qualitative and quantitative surveys, herbicide treatment of Eurasian water-milfoil (EWM), and quantitative pre- and post-treatment aquatic plant surveys of the herbicide treatment zones. The qualitative survey was a visual survey of the lake to evaluate the effectiveness of treatments that occurred in 2004 and to assess the management strategy for 2005. The quantitative surveys utilized a point-intercept method with a rake sampling technique. They documented plant distribution and abundance before and after herbicide treatments in areas that were treated as well as lake-wide. Harvesting of curly-leaf pondweed (CLP) and nuisance levels of native aquatic vegetation was implemented by the MLPRD.

The surveys from AEI's aquatic plant management implementation activities found that the relative abundance of EWM and CLP have decreased since 2004, when levels of EWM began to recover from a drawdown that occurred in the winter of 2003-2004. CLP has consistently decreased in abundance each year since the drawdown. The reduction of EWM and CLP shows that the combined efforts of harvesting and herbicide treatments are reducing the level of exotic species on a lake-wide scale. However, the overall plant density on Montello Lake is still high due to inherent conditions that produce nuisance levels of native aquatic vegetation. AEI suggests that all recommendations from the aquatic plant management plan continue in 2006. In addition, a drawdown is recommended for the winter of 2006-2007.

Background

Montello Lake is a drainage lake located on the Montello River in Marquette County, Wisconsin. It is a eutrophic impoundment with a surface area of 286 acres and a maximum depth of 17 feet. Largemouth bass and panfish are common in the lake, while northern pike and crappie are also present. Known sources of impairment to Montello Lake include a large agriculturally-dominated watershed, stunted panfish, and exotic plants.

This report is a summary of the aquatic plant management activities that were implemented by Aquatic Engineering, Inc. (AEI) in 2005 following specific recommendations that were laid out in the *Montello Lake Aquatic Plant Management Plan* (AEI 2004). The purpose of the plan was to present the Montello Lake Protection and Rehabilitation District (MLPRD) with an overview of past management activities; report on the success of those strategies; provide short-term, intermediate-term, and long-term management strategies; and provide guidance for future management practices. The plan (1) summarized the 2003 and 2004 aquatic plant surveys conducted on Montello Lake by AEI; (2) compared the dominance of exotic species to levels recorded in a 1994 aquatic plant survey completed by Arons & Associates; (3) analyzed and discussed the results of the winter 2002-2003 water level drawdown, mechanical harvesting, and herbicide applications; and (4) provided an updated strategy for aquatic plant management activities throughout the implementation of a Wisconsin Department of Natural Resources (WDNR) Aquatic Invasive Species Grant and subsequent update to the *Montello Lake Aquatic Plant Management Plan* in 2006-2007.

Recommendations from the plan include the continuation of their integrated management approach that includes periodic lake level drawdown, selective herbicide applications, and mechanical harvesting, supplemented with monitoring of the aquatic plant community. Specific recommendations made in the plan are:

Harvesting

- An update to the current harvesting program
- Harvesting of CLP only in the spring before turions are released
- Harvesting CLP when 10 acres or more require management
- Harvesting of nuisance native species unless EWM is present
- No harvesting of EWM (to prevent spread by fragmentation) unless 60% or more of the littoral zone contains monotypic nuisance beds at greater than 60% relative abundance
- A winter drawdown should be planned for the winter after such harvesting (to control fragmented plants)
- Harvesting should be limited to areas no less than 5 feet deep (to minimize sediment disturbance and protect fish spawning habitat)
- Weekly surveys by the MLPRD in the summer to monitor for the presence of EWM
- The harvester should be equipped with a global positioning system (GPS), designated harvest areas should be mapped with a GPS, and the mapped areas should be used to direct the harvester during plant removal operations

Water Level Drawdown

- Drawdown as necessary to limit vegetation in shallow littoral areas
- Decision to drawdown should be made when plants dominate 30-60% of the littoral area
- Decision should be made when levels of EWM and native plant species reach the upper threshold of 60% littoral area and 60% abundance

Herbicides

- Herbicide treatment of monotypic beds of exotic species only
- Use of herbicide applications to control exotic species when 30% or less of the littoral area requires management
- Herbicide applications performed by companies licensed to perform pesticide applications and who use GPS to map treatment areas and direct pesticide application
- CLP herbicide applications after ice-out, ideally when the water temperature is from 50-58° F
- Injection of liquid Aquathol K to reach a target concentration of 1.0-1.5 parts per million (ppm)
- Avoid areas of high flow for increased efficacy
- Substitution of granular Aquathol K for the liquid formula if high flow cannot be avoided or such areas should be harvested
- Granular 2,4-D EWM treatments in areas less than one acre and where average depths are greater than 10 feet
- Granular application rates of 200 pounds per surface acre in all areas greater than 6 feet in average depth, 150 pounds per surface acre in areas where average depth is less than 6 feet, and 100 pounds per surface acre in areas with an average depth less than 3 feet
- Liquid 2,4-D injection of 2 gallons per acre-foot in areas of low flow that are greater than one acre and less than 10 feet in average depth
- Residual 2,4-D concentration bioassay testing at the center of each management zone, at any discharges downstream of the application, and at least one non-treated control site prior to removal of postings after all selective 2,4-D applications
- Use of liquid over granular 2,4-D products only when it is of financial benefit

Monitoring

- Qualitative lake surveys in May and August to map both exotic species and nuisance levels of native species, including rake toss sampling in areas known to contain exotic species
- Annual quantitative plant surveys, or at least before and after large-scale management activities, to document changes in the aquatic plant community
- Adoption of the point-intercept method for lake-wide surveys
- Periodic water quality monitoring
- Reinitiation of the Self-Help Monitoring Program through the WDNR to monitor pH, dissolved oxygen, temperature, total phosphorus, chlorophyll-*a*, and Secchi depth monthly from June to September

Fishery

- Focus fishery management efforts on education, fisherman cooperation, habitat management, and enhancement of predator populations
- A comprehensive lake-wide fish survey
- A greater effort in electro-fishing and the use of nets for targeting species that are difficult to electro-fish
- Inclusion of carp population monitoring on a regular basis
- Major consideration of aquatic plant management during future fish management planning

Overview

Several of the recommendations from the aquatic plant management plan were implemented by AEI in 2005. They included: (1) a qualitative survey to evaluate the effectiveness of treatments that occurred in 2004 and to assess the management strategy for 2005; (2) herbicide treatment of EWM; (3) quantitative pre- and post-treatment aquatic plant surveys of the herbicide treatment zones to evaluate the effectiveness of the treatments and the status of the native plant community; and (4) a quantitative whole-lake aquatic plant survey to document changes in the distribution and abundance of the plant community. Harvesting of CLP and nuisance levels of native aquatic vegetation was implemented by the MLPRD.

Methods

Qualitative Surveys

Prior to any management, representatives from AEI, the WDNR, and the MLPRD conducted a site investigation to evaluate the effectiveness of treatments that occurred in 2004. This was a qualitative survey to inspect the littoral zone for stands of exotic plants and record their locations with a GPS.

Quantitative Surveys

The quantitative aquatic plant surveys applied a point-intercept method (Madsen and Bloomfield 1993) with a variation on rake coverage techniques (Deppe and Lathrop 1992, Jessen and Lound 1962). GPS technology integrated with geographic information system (GIS) technology was used to identify and record sample sites. For the pre- and post-application surveys, sample sites were selected using a stratified, random process and GIS software. Forty-one sample points were evenly distributed over 40 acres of management zones (Figure 1). For the whole-lake survey, sample points were spread out over the entire lake on a 420 ft x 420 ft grid (Figure 2).

For all quantitative surveys, each sample point was a circle around the boat approximately 8 feet in diameter and divided into quadrants. A two-headed, weighted rake was extended from a boat to the furthest extent of each quadrant and then dragged along the bottom while being retrieved to collect plants. A general plant density rating was given on a scale from 0-5, depending on how much material was captured on the rake tines. Plant density ratings were assigned to individual plant species on the same scale. The density rating system is summarized below:

P = present at sample site, but not collected on rake toss (visually identified)

0 = no plants were recovered

1 = 1-20% coverage of rake tines

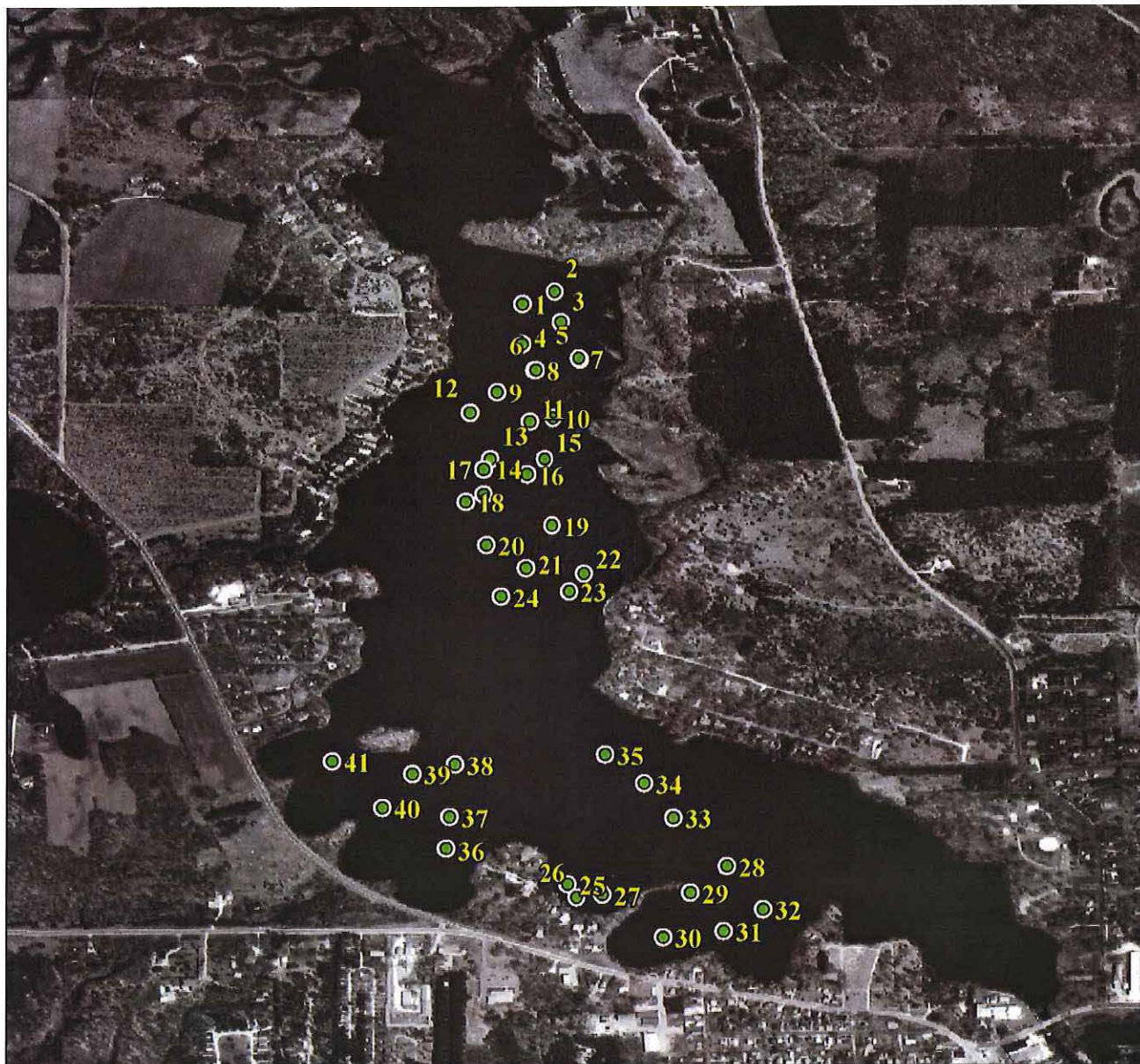
2 = 21-40% coverage

3 = 41-60% coverage

4 = 61-80% coverage

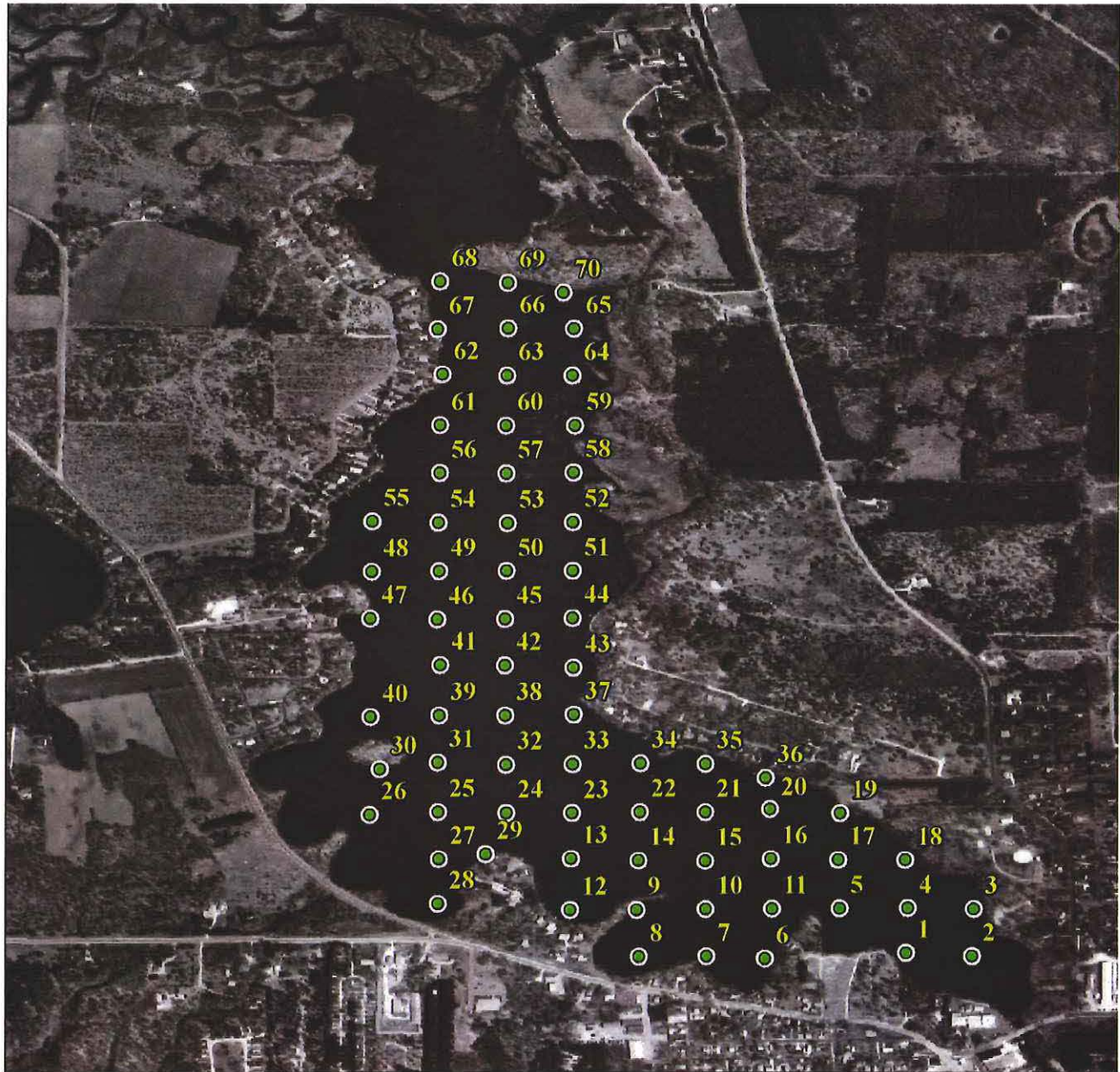
5 = 81-100% coverage

For comparison to past and future data, relative abundance was calculated for each species present in each survey. Relative abundance was calculated by dividing the sum of the rake densities for each species by the sum of all rake densities.



<p>Aquatic Engineering</p> <p>©Copyright 2004 Aquatic Engineering, Inc. All Rights Reserved.</p>	Pre- and Post-Treatment Aquatic Vegetation Survey Points	
	Montello Lake, Marquette County, Wisconsin	<i>GIS-Generated Map</i>
	Dates: May 4 and August 17, 2005	
Coordinate System GCS North American 1983 HARN		<p>Map Scale 1:14,000</p>

Figure 1. Pre- and post-treatment aquatic vegetation survey points, Montello Lake (Marquette County, WI) May 4 and August 17, 2005. Point numbers correspond with Auto ID numbers in appendix A.



<p>Aquatic Engineering</p> <p>©Copyright 2004 Aquatic Engineering, Inc. All Rights Reserved.</p>	Whole-Lake Survey Points	
	Montello Lake, Marquette County, Wisconsin <i>GIS-Generated Map</i>	
	Date: August 15-17, 2005	
Coordinate System <i>GCS North American 1983 HARN</i>		Map Scale 1:14,000

Figure 2. Whole-lake aquatic vegetation survey points, Montello Lake (Marquette County, WI) August 15-17, 2005. Point numbers correspond to auto ID numbers in appendix A.

The Limnological Institute



A conservation organization providing research and solutions for the preservation of our inland waters.

March 14, 2006

Wisconsin Department of Natural Resources
Scott Provost
427 East Tower Drive
Suite 100
Wautoma, WI 54982-6927

Dear Scott,

I have prepared and included two final copies of the 2005 Montello Lake Aquatic Plant Management Plan Implementation Report. I will be contacting you within the next few weeks to discuss any further questions you may have.

In the meantime, please don't hesitate to contact me at jbritton@TheLimnologicalInstitute.org or at 800-485-1772 if you have any questions or concerns.

Sincerely,

Joshua Britton

Joshua Britton / Lake Manager

JB:cb

Herbicide Application

A precision Aquatic Pesticide Application System (APAS) and methods (US Patent #6,778,887 B2; patents pending) were utilized to ensure precise application of herbicides within the lake. The APAS is capable of implementing variable application rate technology, which accounts for variations in specific lake attributes such as surface area, water quality parameters, plant species and densities, water depth, and volume. The APAS is composed of a floating vessel, a dispensing system, a GPS receiver, and a computer that continuously sends position and attribute data to the dispensing unit to dispense pesticide(s) to the body of water when the vessel is positioned over the application areas (Figure 3). Each treatment area was digitally recorded by GPS and GIS software at the time of application.



Figure 3. The precision Aquatic Pesticide Application System (APAS, US Patent #6,778,887 B2; patents pending).

Results

Phase One: Pre-Treatment Evaluation

The qualitative survey on April 21, 2005, found that of the 70 acres treated for CLP in 2004, only five acres contained nuisance levels of CLP. However, EWM occurred at common densities over approximately 36.5 acres. Based on this initial site investigation, representatives from the MLPRD, WDNR, and AEI decided to treat EWM with herbicides in 2005 and to harvest areas of CLP.

The pre-treatment quantitative aquatic plant survey on Montello Lake was conducted on May 4, 2005 (Appendix A). The three most abundant plants by relative percentage were common waterweed (*Elodea canadensis*), EWM, and coontail (*Ceratophyllum demersum*) (Figure 4).

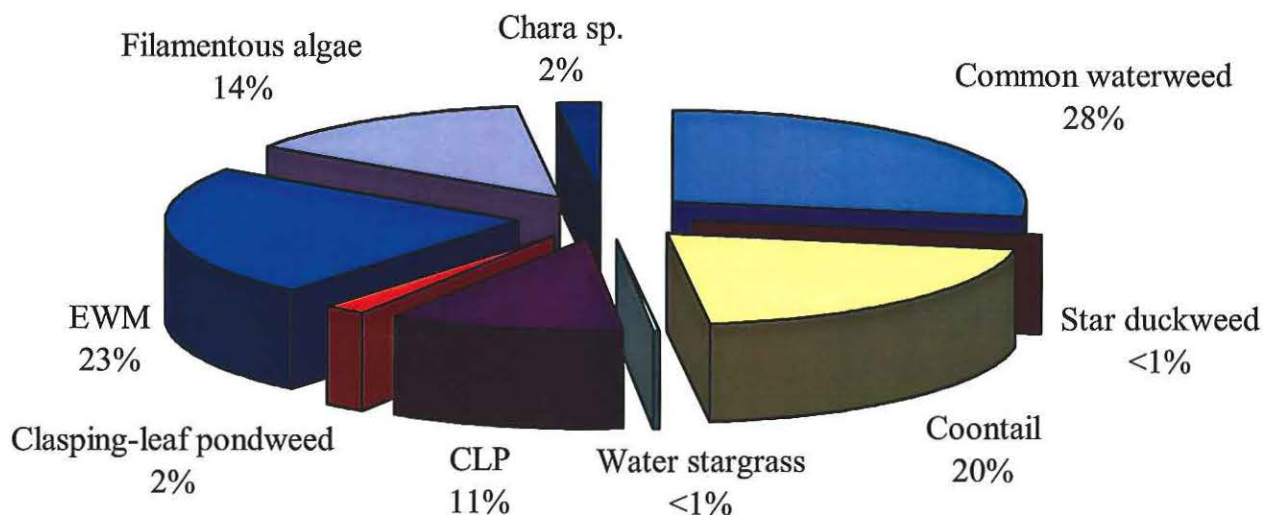


Figure 4. Relative abundance of aquatic plant/algae species from the pre-treatment survey, Montello Lake (Marquette County, WI) May 4, 2005.

Phase Two: Treatment

A permit to treat up to 40.0 acres of EWM was submitted to the WDNR on April 27, 2005 and was approved on May 12, 2005 (Appendix B). Treatments occurred on May 18, 2005 (Appendix C). Two distinct areas of EWM were treated with 242.5 gallons of the liquid 2,4-D product DMA4-IVM (Appendix D), which totaled 27.0 acres. A 1.0-acre area of EWM was treated with 150 lbs of the granular 2,4-D product Navigate. In total, 28.0 acres were treated and marked by GPS (Figure 5).

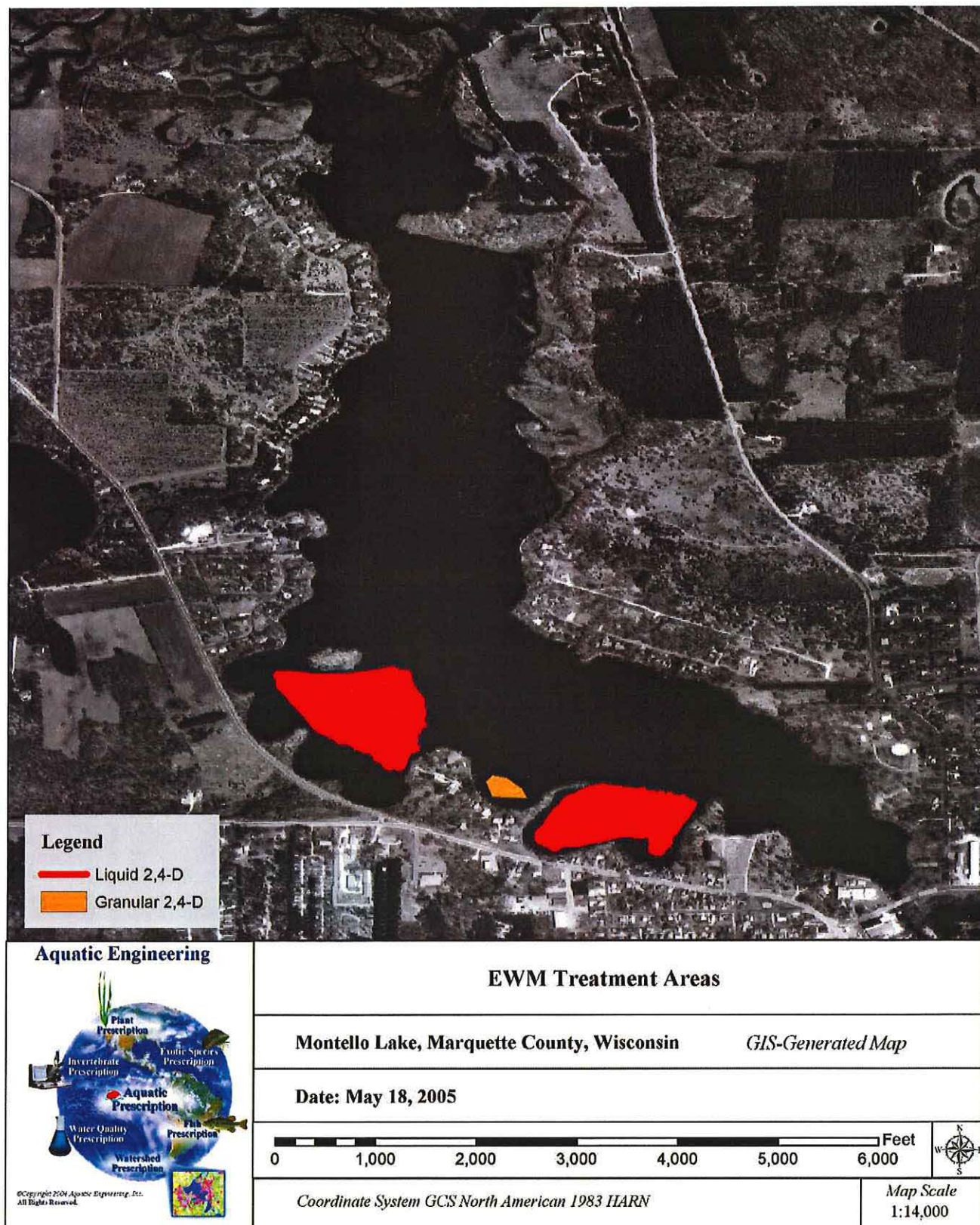


Figure 5. Eurasian water-milfoil treatment zones, Montello Lake (Marquette County, WI) May 18, 2005.

Phase Three: Post-Treatment Surveys

The three areas that received treatments for EWM were sampled on August 17, 2005, at the same points as the pre-treatment survey. The most common species found were coontail, common waterweed, and wild celery (*Vallisneria americana*) (Figure 6). The EWM in the treatment areas was reduced from 23% to 4% relative abundance.

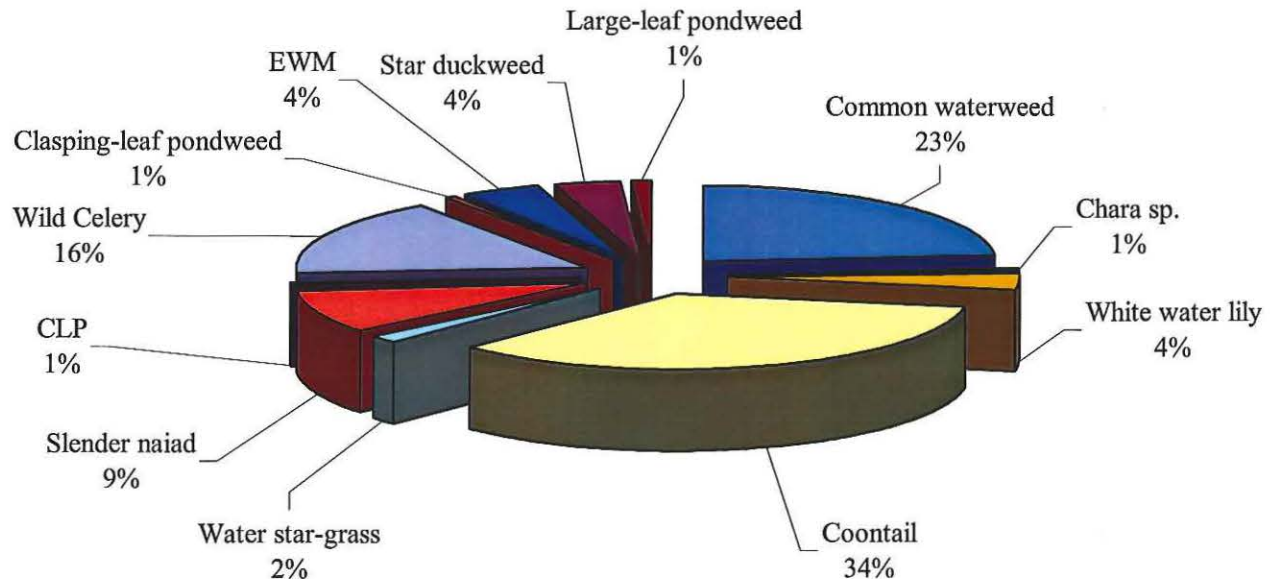


Figure 6. Relative abundance of aquatic plant/algae species from the post-treatment survey, Montello Lake (Marquette County, WI) August 17, 2005.

The whole-lake survey occurred on August 15-17, 2005. The most common species found were coontail, common waterweed, and wild celery (Figure 7). Eurasian water-milfoil was at 11% relative abundance lake-wide, and CLP abundance was at less than 1%. Both EWM and CLP decreased in abundance from the 2004 survey and had a rake density of 1 everywhere they were found (Figure 8). EWM abundance was higher in 2004 (14%) than after the drawdown in 2003, when it reached its lowest levels at 2% (Figure 9). The average total rake density in 2005 was 1.9 (38% abundance). In 2004, the average total rake density was 3.1 (62% abundance), and in 2003, it was 1.4 (28% abundance). The percentage of the littoral zone vegetated in 2005 was 100%, as it also was in 2003 and 2004.

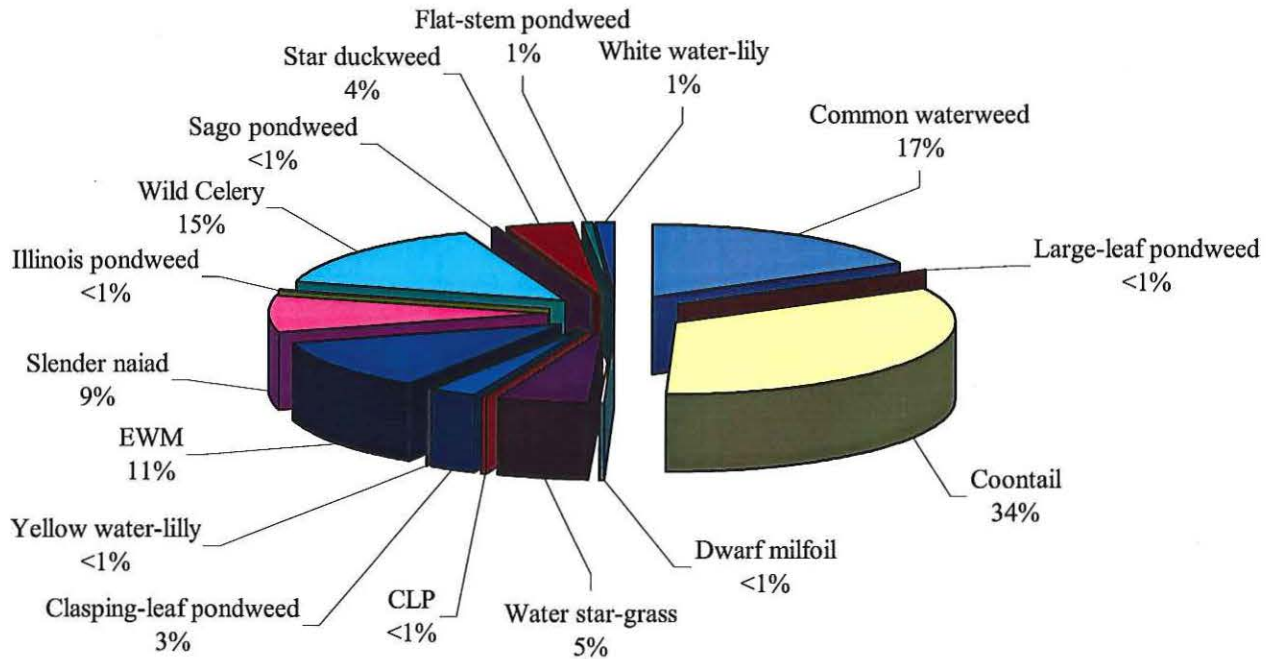


Figure 7. Relative abundance of aquatic plant species from the whole-lake survey, Montello Lake (Marquette County, WI) August 15-17, 2005.

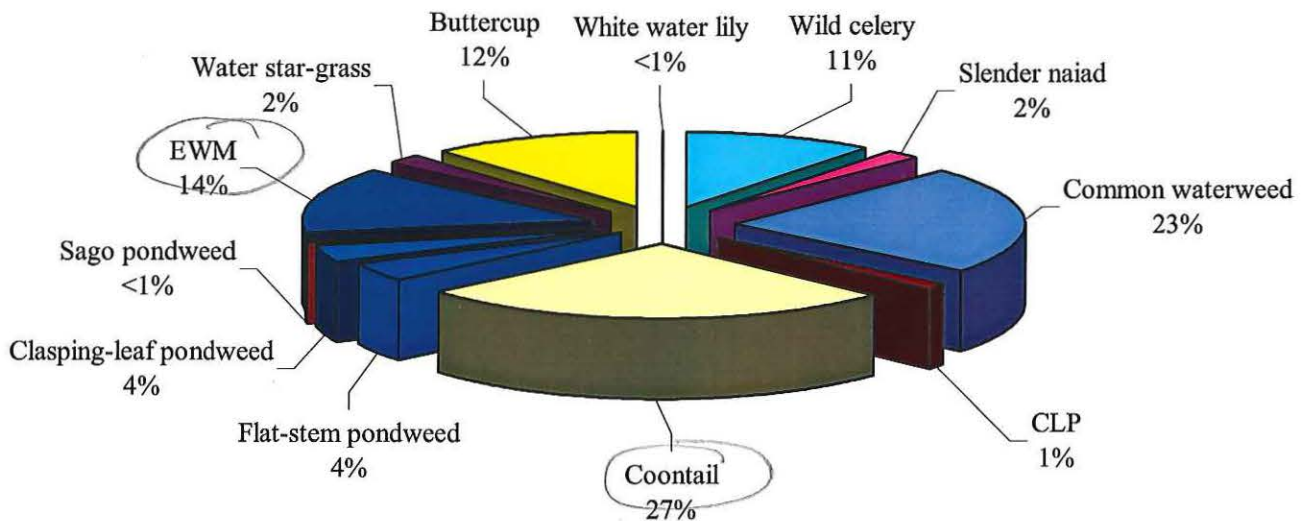


Figure 8. Relative abundance of aquatic plant species from whole-lake survey, Montello Lake (Marquette County, WI) July 20-21, 2004.

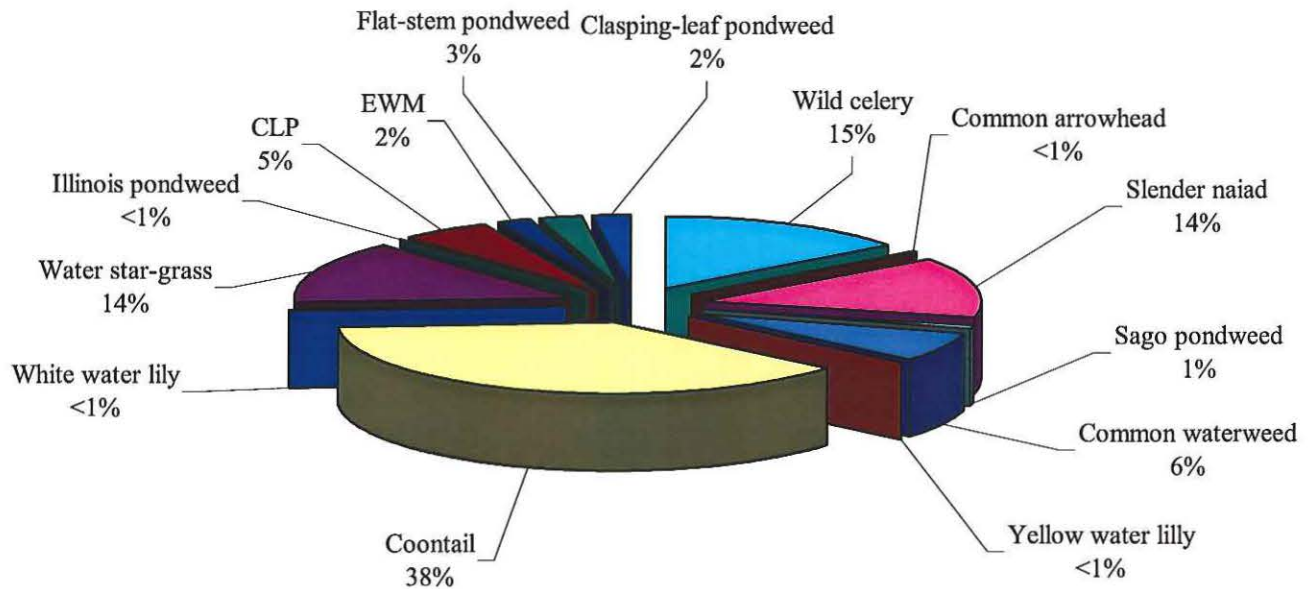


Figure 9. Relative abundance of aquatic plant/algae species from whole-lake survey on Montello Lake (Marquette County, WI) August 12-14, 2003.

Phase Four: Report

This technical report and GIS maps were processed and completed in the winter of 2005-2006. The report includes a brief review of existing lake information, a summary of the 2005 AEI aquatic plant management activities, and management recommendations for 2006.

Discussion

The dominant plant species on Montello Lake in 2005 were the native plants coontail, common waterweed, and wild celery. These plants are beneficial to the lake ecosystem, providing food and shelter for fish, wildlife, and invertebrates. Exotic plants like EWM and CLP can outcompete these native species and dominate large areas. However, native plants can also grow to nuisance levels under nutrient-rich conditions. This has been the case for Montello Lake over the last couple of years.

The 2005 whole-lake survey found that the relative abundance of EWM and CLP have decreased since 2004. This is an indication that the combined efforts of harvesting and herbicide treatments have been successful at reducing the level of exotic species on a lake-wide scale. However, the overall plant levels on Montello Lake are still higher than desired, with submersed vegetation occurring in 100% of the littoral zone at an overall abundance of 38%. This is well above the target levels specified in the aquatic plant management plan for implementation of a drawdown by the percent of the littoral zone vegetated (60%) and approximately 2/3 of the 60% level specified for abundance. The native plant coontail accounted for the greatest amount of this productivity.

In 2004, submersed vegetation also occurred in 100% of the littoral zone, and the overall plant abundance was 62%, but a drawdown did not occur. The lower plant abundance in 2005 may be due to climatic variation and/or influenced by a greater harvesting effort than in 2004. Monitoring activities in 2006 should help make this relationship more apparent.

Recommendations

All recommendations made in the *Montello Lake Aquatic Plant Management Plan* should continue. As an update to this plan, based on information gathered in 2005, there are additional activities that AEI recommends for 2006.

In addition to harvesting CLP and herbicide treatment of EWM, we recommend a 4-foot drawdown of the lake over the winter of 2006 to expose lake sediments, plants, and roots to the freezing temperatures. The drawdown will aid in plant control by causing drying and compaction of the lake sediment and by freezing plants and their seeds. It should begin in November, and water levels should return to normal after ice-off, as occurred in the winter of 2002-2003.

*m.d Oct to Mid Nov
End of April*

We also recommend following new guidelines established by the WDNR concerning monitoring in lakes with known invasive populations. Some of these guidelines are already standard practice, but others should be incorporated into future surveys. The guidelines are:

1. Sample more often.
 - Start sampling at ice-out.
 - Continue sampling monthly throughout the summer.
2. Sample using the rake sampling method at:
 - Known sites of previous infestation
 - Sampling intensity will correspond to the area of infestation. Be sure to sample beyond the area of known infestation. Sample transects through the area of known infestation to a maximum distance of 50 meters from point to point.
 - Major inflows
 - Sample a wedged-shaped area (pointing upstream) using a minimum of 10 points, 10 meters apart.
 - Known boat launch sites
 - Sample a wedged-shaped area (pointing at the boat landing) using a minimum of 20 points, 10 meters apart.
 - Identify all sites with rare, endangered, or sensitive aquatic plants, species of special concern, or areas with the Sensitive Area Designation.
3. Scale sampling to area. Be sure to sample beyond the margins (i.e., the western lobes of Montello Lake).
4. Note observed changes including major changes in the native plant community.

In accordance with these guidelines, sample points should be added to the whole-lake survey in the near-shore areas along the western lobes of the lake. These areas were not previously navigable by boat.

References

Aquatic Engineering Incorporated. 2004. 2004 Montello Lake aquatic plant management plan. La Crosse, WI.

Deppe, G.W., and R.C. Lathrop. 1992. A comparison of two rake sampling techniques for sampling aquatic macrophytes. Wis. Dept. Nat. Res. Mgt. Findings No. 32, 4pp.

Jessen, R., and R. Lound. 1962. An evaluation of a survey technique for submerged aquatic plants. Game Investigational Report. Minnesota Department of Conservation.

Madsen, J. D. and J. A. Bloomfield. 1993. Aquatic vegetation quantification symposium: an overview. Lake and Reservoir Management. 7:137-140.

Ramaker & Associates. 2002. Montello Lake Management Plan. Unpublished technical document.

Appendix A – Plant Survey Raw Data

5.03.05 pre-treatment survey

Auto_ID	Rake Toss	DO (mg/l)	Do %	pH	Cond	Temp F	Depth	Total Rake Density	Sediment	Elodea	Coontail	Water star-grass	CLP	Clasping-leaf pondweed	EWM	Naiad	Filamentous algae	Star duckweed	Chara sp.	White water lily
1	1	NA	NA	NA	NA	NA	3.50	3	mud	1	0	0	2	0	0	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.50	1	mud	1	0	0	0	0	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.50	3	mud	0	2	0	1	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.50	4	mud	0	2	0	1	0	1	0	1	0	0	0
2	1	NA	NA	NA	NA	NA	2.20	5	mud	1	3	0	2	0	0	0	1	0	0	0
	2	NA	NA	NA	NA	NA	2.20	3	mud	0	2	0	1	0	0	0	1	0	0	0
	3	NA	NA	NA	NA	NA	2.20	3	mud	1	1	0	1	0	0	0	1	0	0	0
	4	NA	NA	NA	NA	NA	2.20	3	mud	1	2	0	1	0	0	0	1	0	0	0
3	1	NA	NA	NA	NA	52.1	4.25	4	mud	1	0	3	0	1	1	0	1	1	0	0
	2	NA	NA	NA	NA	NA	4.25	3	mud	1	1	0	0	0	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	4.25	3	mud	2	1	0	0	0	0	0	1	0	0	0
	4	NA	NA	NA	NA	NA	4.25	3	mud	2	1	0	0	0	0	0	1	0	0	0
4	1	NA	NA	NA	NA	NA	3.70	3	mud	3	0	0	1	P	P	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.70	2	mud	2	0	0	0	0	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.70	5	mud	4	0	0	0	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.70	4	mud	2	1	0	0	0	2	0	1	0	0	0
5	1	NA	NA	NA	NA	NA	3.90	2	mud	0	2	0	0	0	1	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.90	1	mud	1	0	0	0	0	0	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.90	2	mud	2	1	0	0	0	0	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.90	2	mud	2	1	0	0	0	0	0	1	0	0	0
6	1	13.62	122	5.55	NA	10.69	4.00	5	mud	3	4	0	0	0	1	0	1	0	0	0
	2	13.62	122	6.00	NA	10.69	4.00	2	mud	1	1	0	1	0	1	0	1	0	0	0
	3	13.62	122	6.00	NA	10.69	4.00	3	mud	1	1	0	3	0	1	0	1	0	0	0
	4	13.62	122	6.00	NA	10.69	4.00	4	mud	4	0	0	1	0	0	0	1	0	0	0

Auto_ID	Rate Toss	DO (mg/l)	Do %	pH	Cond	Temp F	Depth	Total Rate Density	Sediment	Elodea	Coontail	Water star-grass	CLP	Clasping-leaf pondweed	EWM	Naiad	Filamentous algae	Star duckweed	Chara sp.	White water lily
7	1	NA	NA	NA	NA	NA	3.50	3	mud	1	0	0	1	0	1	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.50	3	mud	0	2	0	0	0	2	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.50	2	mud	1	1	0	0	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.50	1	mud	1	1	0	0	0	0	0	1	0	0	0
8	1	NA	NA	NA	NA	NA	4.20	2	mud	1	2	0	1	0	0	0	1	0	0	0
	2	NA	NA	NA	NA	NA	4.20	3	mud	1	0	0	1	0	2	0	1	0	0	0
	3	NA	NA	NA	NA	NA	4.20	3	mud	1	0	0	2	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	4.20	3	mud	0	3	0	1	0	1	0	1	0	0	0
9	1	NA	NA	NA	NA	NA	4.75	3	mud	3	0	0	0	0	1	0	1	0	0	0
	2	NA	NA	NA	NA	NA	4.75	3	mud	3	0	0	1	0	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	4.75	3	mud	3	0	0	0	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	4.75	3	mud	3	0	0	1	0	1	0	1	0	0	0
10	1	NA	NA	NA	NA	NA	2.25	1	sand/mud	1	1	0	0	0	0	0	1	0	0	0
	2	NA	NA	NA	NA	NA	2.25	2	sand/mud	1	1	0	0	0	0	0	1	0	0	0
	3	NA	NA	NA	NA	NA	2.25	1	sand/mud	1	1	0	0	0	0	0	1	0	0	0
	4	NA	NA	NA	NA	NA	2.25	2	sand/mud	2	1	0	0	0	1	0	1	0	0	0
11	1	NA	NA	NA	NA	NA	3.00	4	mud	4	0	0	0	0	1	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.00	4	mud	4	0	0	0	0	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.00	5	mud	5	1	0	0	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.00	3	mud	2	2	0	0	0	1	0	1	0	0	0
12	1	NA	NA	NA	NA	NA	5'2"	3	mud	0	2	0	1	1	0	0	1	0	0	0
	2	NA	NA	NA	NA	NA	5'2"	2	mud	1	1	0	1	1	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	5'2"	1	mud	1	1	0	1	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	5'2"	1	mud	1	1	0	1	0	1	0	1	0	0	0

Auto_ID	Rake Toss	DO (mg/l)	Do %	pH	Cond	Temp F	Depth	Total Rake Density	Sediment	Elodea	Coontail	Water star-grass	CLP	Clasping-leaf pondweed	EWM	Naiad	Filamentous algae	Star duckweed	Chara sp.	White water lily
13	1	NA	NA	NA	NA	NA	5.00	4	mud	3	1	0	2	0	1	0	1	0	0	0
	2	NA	NA	NA	NA	NA	5.00	4	mud	3	2	0	0	0	0	0	1	0	0	0
	3	NA	NA	NA	NA	NA	5.00	3	mud	0	1	0	1	0	3	0	1	0	0	0
	4	NA	NA	NA	NA	NA	5.00	3	mud	0	0	0	0	0	3	0	1	0	0	0
14	1	NA	NA	NA	NA	NA	7.00	C	mud	0	0	0	0	0	0	0	0	0	0	0
	2	NA	NA	NA	NA	NA	7.00	1	mud	1	1	0	0	0	0	0	0	0	0	0
	3	NA	NA	NA	NA	NA	7.00	C	mud	0	0	0	0	0	0	0	0	0	0	0
	4	NA	NA	NA	NA	NA	7.00	1	mud	0	0	0	1	0	0	0	0	0	0	0
15	1	NA	NA	NA	NA	NA	3.00	3	mud	3	2	0	0	0	0	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.00	3	mud	3	2	0	0	0	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.00	2	mud	1	1	0	1	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.00	5	mud	0	5	0	0	0	0	0	1	0	0	0
16	1	NA	NA	NA	NA	NA	3.00	3	mud	2	1	0	0	0	0	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.00	3	mud	3	1	0	1	0	0	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.00	4	mud	3	2	0	0	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.00	4	mud	2	2	0	0	0	1	0	1	0	0	0
17	1	NA	NA	NA	NA	NA	9.25	C	mud	0	0	0	0	P	0	0	0	0	0	0
	2	NA	NA	NA	NA	NA	9.25	C	mud	0	0	0	0	0	0	0	0	0	0	0
	3	NA	NA	NA	NA	NA	9.25	C	mud	0	0	0	0	0	P	0	0	0	0	0
	4	NA	NA	NA	NA	NA	9.25	C	mud	0	0	0	0	0	P	0	0	0	0	0
18	1	NA	NA	NA	NA	NA	4.50	2	mud	1	0	0	2	0	1	0	1	0	0	0
	2	NA	NA	NA	NA	NA	4.50	2	mud	2	0	0	0	0	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	4.50	1	mud	0	0	0	1	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	4.50	3	mud	2	0	0	1	0	1	0	1	0	0	0

Auto_ID	Rake Toss	DO (mg/l)	Do %	pH	Cond	Temp F	Depth	Total Rake Density	Sediment	Elodea	Coontail	Water star-grass	CLP	Clasping-leaf pondweed	EWM	Naiad	Filamentous algae	Star duckweed	Chara sp.	White water lily
19	1	NA	NA	NA	NA	NA	3.25	2	mud	2	0	0	0	0	1	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.25	3	mud	1	3	0	1	0	0	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.25	5	mud	0	5	0	P	0	0	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.25	3	mud	1	1	0	0	0	3	0	1	0	0	0
20	1	NA	NA	NA	NA	NA	4'2"	3	mud	2	0	0	1	0	2	0	1	0	0	0
	2	NA	NA	NA	NA	NA	4'2"	2	mud	2	1	0	0	0	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	4'2"	4	mud	3	2	0	0	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	4'2"	3	mud	3	2	0	0	0	1	0	1	0	0	0
21	1	NA	NA	NA	NA	NA	3.75	3	mud	3	2	0	0	0	1	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.75	4	mud	4	0	0	0	0	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.75	5	mud	4	1	0	0	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.75	3	mud	2	1	0	0	0	2	0	1	0	0	0
22	1	NA	NA	NA	NA	NA	3.50	1	mud	1	1	0	0	0	1	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.50	1	mud	2	0	0	0	0	0	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.50	3	mud	3	0	0	0	0	0	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.50	3	mud	3	0	0	0	0	0	0	1	0	0	0
23	1	NA	NA	NA	NA	NA	4.00	1	mud	1	0	0	0	0	0	0	1	0	0	0
	2	NA	NA	NA	NA	NA	4.00	2	mud	2	1	0	0	0	2	0	1	0	0	0
	3	NA	NA	NA	NA	NA	4.00	3	mud	1	3	0	0	0	0	0	1	0	0	0
	4	NA	NA	NA	NA	NA	4.00	3	mud	1	1	0	0	0	2	0	1	0	0	0
24	1	NA	NA	NA	NA	NA	N/R	2	mud	1	0	0	1	0	1	0	1	0	0	0
	2	NA	NA	NA	NA	NA	N/R	3	mud	1	1	0	0	1	2	0	1	0	0	0
	3	NA	NA	NA	NA	NA	N/R	3	mud	1	0	0	2	1	0	0	1	0	0	0
	4	NA	NA	NA	NA	NA	N/R	2	mud	1	1	0	2	0	1	0	1	0	0	0

Auto_ID	Rake Toss	DO (mg/l)	Do %	pH	Cond	Temp F	Depth	Total Rake Density	Sediment	Elodea	Coontail	Water star-grass	CLP	Clasping-leaf pondweed	EWM	Naiad	Filamentous algae	Star duckweed	Chara sp.	White water lily
25	1	NA	NA	NA	NA	NA	5.00	3	mud	1	0	0	0	0	3	0	0	0	0	0
	2	NA	NA	NA	NA	NA	5.00	3	mud	1	0	0	0	0	3	0	0	0	0	0
	3	NA	NA	NA	NA	NA	5.00	3	mud	1	1	0	0	0	3	0	0	0	0	0
	4	NA	NA	NA	NA	NA	5.00	3	mud	2	1	0	0	0	2	0	0	0	0	0
26	1	NA	NA	NA	NA	NA	5.00	3	mud	1	0	0	0	0	3	0	0	0	0	0
	2	NA	NA	NA	NA	NA	5.00	4	mud	1	1	0	0	0	4	0	0	0	0	0
	3	NA	NA	NA	NA	NA	5.00	4	mud	1	0	0	0	0	4	0	0	0	0	0
	4	NA	NA	NA	NA	NA	5.00	4	mud	0	0	0	0	0	4	0	0	0	0	0
27	1	NA	NA	NA	NA	NA	5'2"	5	mud	3	0	0	0	0	3	0	0	0	0	0
	2	NA	NA	NA	NA	NA	5'2"	3	mud	1	0	0	0	0	3	0	0	0	0	0
	3	NA	NA	NA	NA	NA	5'2"	4	mud	1	1	0	0	0	4	0	0	0	0	0
	4	NA	NA	NA	NA	NA	5'2"	4	mud	1	0	0	0	0	4	0	0	0	0	0
28	1	NA	NA	NA	NA	NA	5.50	3	mud	1	1	0	1	0	2	0	1	0	0	0
	2	NA	NA	NA	NA	NA	5.50	3	mud	1	2	0	1	0	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	5.50	3	mud	1	1	0	2	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	5.50	3	mud	1	1	0	1	0	2	0	1	0	0	0
29	1	NA	NA	NA	NA	NA	5'2"	4	mud	1	1	0	0	0	4	0	0	0	0	0
	2	NA	NA	NA	NA	NA	5'2"	4	mud	1	1	0	0	0	4	0	0	0	0	0
	3	NA	NA	NA	NA	NA	5'2"	3	mud	1	0	0	0	0	3	0	0	0	0	0
	4	NA	NA	NA	NA	NA	5'2"	3	mud	1	0	0	0	0	3	0	0	0	0	0
30	1	10.45	99	8.99	NA	11.82	5.50	3	mud	0	0	0	0	1	3	0	0	0	0	0
	2	10.45	99	8.99	NA	11.82	5.50	4	mud	2	1	0	0	0	4	0	0	0	0	0
	3	10.45	99	8.99	NA	11.82	5.50	3	mud	2	0	0	0	0	2	0	0	0	0	0
	4	10.45	99	8.99	NA	11.82	5.50	4	mud	2	0	0	0	0	3	0	0	0	0	0

Auto_ID	Auto_ID	DO (mg/l)	Do %	pH	Cond	Temp F	Depth	Total Rake Density	Sediment	Elodea	Coontail	Water star-grass	CLP	Clasping-leaf pondweed	EWM	Naiad	Filamentous algae	Star duckweed	Chara sp.	White water lily
31	1	NA	NA	NA	NA	NA	NR	3	mud	1	0	0	0	0	2	0	0	0	0	0
	2	NA	NA	NA	NA	NA	NR	4	mud	2	0	0	0	0	3	0	0	0	0	0
	3	NA	NA	NA	NA	NA	NR	3	mud	1	0	0	1	0	2	0	0	0	0	0
	4	NA	NA	NA	NA	NA	NR	4	mud	4	0	0	P	0	1	0	0	0	0	0
32	1	NA	NA	NA	NA	NA	5.75	3	mud	1	3	0	P	0	0	0	0	0	0	0
	2	NA	NA	NA	NA	NA	5.75	1	mud	0	0	0	P	0	1	0	0	0	0	0
	3	NA	NA	NA	NA	NA	5.75	2	mud	1	2	0	0	1	0	0	0	0	0	0
	4	NA	NA	NA	NA	NA	5.75	2	mud	1	2	0	0	1	0	0	0	0	0	0
33	1	NA	NA	NA	NA	NA	5.33	5	mud	0	0	0	5	0	P	0	0	0	0	0
	2	NA	NA	NA	NA	NA	5.33	4	mud	P	0	0	4	0	P	0	0	0	0	0
	3	NA	NA	NA	NA	NA	5.33	5	mud	1	1	0	4	0	1	0	0	0	0	0
	4	NA	NA	NA	NA	NA	5.33	5	mud	1	1	0	4	0	1	0	0	0	0	0
34	1	9.36	88	8.94	NA	12.34	5.50	3	mud	2	1	0	2	0	0	0	1	0	0	0
	2	9.36	88	8.94	NA	12.34	5.50	4	mud	2	1	0	1	3	0	0	1	0	0	0
	3	9.36	88	8.94	NA	12.34	5.50	4	mud	1	1	0	2	0	3	0	1	0	0	0
	4	9.36	88	8.94	NA	12.34	5.50	4	mud	1	2	0	2	1	3	0	1	0	0	0
35	1	NA	NA	NA	NA	NA	5.00	4	sand/mud	1	0	0	2	1	1	0	0	0	0	0
	2	NA	NA	NA	NA	NA	5.00	3	sand/mud	1	0	0	2	0	1	0	0	0	0	0
	3	NA	NA	NA	NA	NA	5.00	4	sand/mud	1	0	0	4	0	0	0	0	0	0	0
	4	NA	NA	NA	NA	NA	5.00	3	sand/mud	2	1	0	2	0	0	0	0	0	0	0
36	1	NA	NA	NA	NA	NA	3.25	4	sand	4	0	0	0	0	0	0	1	0	0	0
	2	NA	NA	NA	NA	NA	3.25	4	sand	2	1	0	0	0	2	0	1	0	0	0
	3	NA	NA	NA	NA	NA	3.25	3	sand	1	2	0	0	0	1	0	1	0	0	0
	4	NA	NA	NA	NA	NA	3.25	4	sand	2	3	0	0	0	1	0	1	0	0	0

Auto_ID	Rake Toss	DO (mg/l)	Do %	pH	Cond	Temp F	Depth	Total Rake Density	Sediment	Elodea	Coontail	Water star-grass	CLP	Clasping-leaf pondweed	EWM	Naiad	Filamentous algae	Star duckweed	Chara sp.	White water lily
37	1	8.90	84	9.22	NA	12.8	4.25	4	sand/mud	1	3	0	0	0	2	0	1	0	0	0
	2	8.90	84	9.22	NA	12.8	4.25	4	sand/mud	1	3	0	0	0	2	0	1	0	0	0
	3	8.90	84	9.22	NA	12.8	4.25	3	sand/mud	0	2	0	0	0	1	0	1	0	0	0
	4	8.90	84	9.22	NA	12.8	4.25	3	sand/mud	0	2	0	0	0	1	0	1	0	0	0
38	1	NA	NA	NA	NA	NA	5'2"	3	mud	0	0	0	1	1	2	0	1	0	0	0
	2	NA	NA	NA	NA	NA	5'2"	3	mud	1	0	0	1	2	1	0	1	0	0	0
	3	NA	NA	NA	NA	NA	5'2"	4	mud	1	0	0	2	1	2	0	1	0	0	0
	4	NA	NA	NA	NA	NA	5'2"	4	mud	3	0	0	1	0	1	0	1	0	0	0
39	1	NA	NA	NA	NA	NA	3'2"	3	mud	1	2	0	0	0	0	0	0	0	2	0
	2	NA	NA	NA	NA	NA	3'2"	0	mud	3	2	0	0	0	1	0	0	0	0	0
	3	NA	NA	NA	NA	NA	3'2"	0	mud	3	2	0	0	0	1	0	0	0	0	0
	4	NA	NA	NA	NA	NA	3'2"	3	mud	0	3	0	0	0	1	0	0	0	2	P
40	1	NA	NA	NA	NA	NA	4.00	2	N/R	1	1	0	0	0	1	0	1	0	1	0
	2	NA	NA	NA	NA	NA	4.00	4	N/R	0	3	0	0	0	1	0	1	0	2	0
	3	NA	NA	NA	NA	NA	4.00	2	N/R	1	1	0	0	0	1	0	1	0	1	0
	4	NA	NA	NA	NA	NA	4.00	0	N/R	1	1	0	0	0	1	0	1	0	1	P
41	1	NA	NA	NA	NA	NA	2.75	5	N/R	0	4	0	0	0	2	0	0	0	2	0
	2	NA	NA	NA	NA	NA	2.75	5	N/R	0	4	0	0	0	2	0	0	0	2	0
	3	NA	NA	NA	NA	NA	2.75	5	N/R	0	4	0	0	0	2	0	0	0	2	P
	4	NA	NA	NA	NA	NA	2.75	5	N/R	0	4	0	0	0	2	0	0	0	2	0

8.17.05 post-treatment survey

P = Present

Auto_ID	Rake Toss	DO (mg/l)	Do %	pH	Cond	Temp F	Depth	Total Rake Density	Sediment	Common waterweed	Coontail	Water star-grass	CLP	Clasping-leaf pondweed	EWM	Slender naiad	Filamentous algae	Wild Celery	Star duckweed	Watermeal	Duckweed	White water-lily	Large-leaf pondweed	Chara sp.
1	1	NA	NA	NA	NA	NA	5.00	1	muck	0	1	0	0	0	1	1	P	1	0	P	P	0	0	0
	2	NA	NA	NA	NA	NA	5.00	2	muck	1	1	0	0	0	0	1	P	2	0	P	P	0	0	0
	3	NA	NA	NA	NA	NA	5.00	2	muck	0	1	0	0	0	0	1	P	2	0	P	P	0	0	0
	4	NA	NA	NA	NA	NA	5.00	2	muck	1	1	0	0	0	0	1	P	1	0	P	P	0	0	0
2	1	6	71	7.94	0.315	24.99	5.25	1	muck	1	1	0	0	0	0	0	P	0	0	P	P	0	0	0
	2	6	71	7.94	0.315	24.99	5.25	1	muck	1	1	0	0	0	0	0	P	0	0	P	P	0	0	0
	3	6	71	7.94	0.315	24.99	5.25	1	muck	0	1	0	0	0	0	0	P	0	0	P	P	0	0	0
	4	6	71	7.94	0.315	24.99	5.25	1	muck	1	1	0	0	0	0	0	P	0	0	P	P	0	0	0
3	1	NA	NA	NA	NA	NA	5.00	1	muck	1	1	0	0	0	0	1	P	1	0	P	P	0	0	0
	2	NA	NA	NA	NA	NA	5.00	2	muck	1	2	0	0	0	0	0	P	1	0	P	P	0	0	0
	3	NA	NA	NA	NA	NA	5.00	1	muck	1	1	0	0	0	0	0	P	1	1	P	P	0	0	0
	4	NA	NA	NA	NA	NA	5.00	2	muck	1	2	0	0	0	0	0	P	1	0	P	P	0	0	0
4	1	NA	NA	NA	NA	NA	5.25	1	muck	1	1	0	0	0	0	0	P	1	0	P	P	0	0	0
	2	NA	NA	NA	NA	NA	5.25	1	muck	1	1	0	0	0	0	0	P	0	0	P	P	0	0	0
	3	NA	NA	NA	NA	NA	5.25	2	muck	2	1	0	0	0	0	0	P	0	1	P	P	0	0	0
	4	NA	NA	NA	NA	NA	5.25	2	muck	1	1	0	0	0	0	1	P	0	0	P	P	0	0	0
5	1	NA	NA	NA	NA	NA	5.00	1	muck	0	1	0	0	0	0	1	P	0	0	P	P	0	0	0
	2	NA	NA	NA	NA	NA	5.00	1	muck	1	1	0	0	0	0	0	P	1	0	P	P	0	0	0
	3	NA	NA	NA	NA	NA	5.00	2	muck	1	1	0	0	0	1	1	P	0	0	P	P	0	0	0
	4	NA	NA	NA	NA	NA	5.00	1	muck	1	1	0	0	0	1	0	P	0	0	P	P	0	0	0
6	1	5	61	8.46	0.320	25.16	5.00	1	muck	0	1	0	0	0	0	1	P	1	0	P	P	0	0	0
	2	5	61	8.46	0.320	25.16	5.00	1	muck	1	1	0	0	0	1	0	P	1	1	P	P	0	0	0
	3	5	61	8.46	0.320	25.16	5.00	1	muck	1	1	0	0	0	1	0	P	1	0	P	P	0	0	0
	4	5	61	8.46	0.320	25.16	5.00	1	muck	1	1	0	0	0	0	0	P	1	0	P	P	0	0	0

Auto_ID	Rake Toss	DO (mg/l)	Do %	pH	Cond	Temp F	Depth	Total Rake Density	Sediment	Common waterweed	Coontail	Water star-grass	CLP	Clasping-leaf pondweed	EWM	Slender naiad	Filamentous algae	Wild Celery	Star duckweed	Watermeal	Duckweed	White water-lily	Large-leaf pondweed	Chara sp.
7	1	NA	NA	NA	NA	NA	4.50	1	muck	1	1	0	0	0	0	1	P	1	0	P	P	0	0	0
	2	NA	NA	NA	NA	NA	4.50	2	muck	1	1	0	0	0	0	0	P	2	0	P	P	0	0	0
	3	NA	NA	NA	NA	NA	4.50	1	muck	1	1	1	0	0	0	1	P	0	1	P	P	0	0	0
	4	NA	NA	NA	NA	NA	4.50	2	muck	1	2	0	0	0	0	0	P	1	1	P	P	0	1	0
8	1	NA	NA	NA	NA	NA	4.00	1	muck	1	1	0	0	0	0	0	P	0	0	P	P	0	0	0
	2	NA	NA	NA	NA	NA	4.00	1	muck	1	1	0	0	0	0	0	P	0	0	P	P	0	0	0
	3	NA	NA	NA	NA	NA	4.00	1	muck	1	1	0	0	0	0	0	P	1	0	P	P	0	1	0
	4	NA	NA	NA	NA	NA	4.00	1	muck	1	1	0	0	0	0	0	P	0	0	P	P	1	0	0
9	1	NA	NA	NA	NA	NA	3.50	1	muck	0	1	0	0	0	0	0	P	1	0	P	P	0	0	0
	2	NA	NA	NA	NA	NA	3.50	2	muck	1	1	0	0	0	0	1	P	1	0	P	P	0	0	0
	3	NA	NA	NA	NA	NA	3.50	1	muck	1	1	0	0	0	0	0	P	1	0	P	P	0	0	0
	4	NA	NA	NA	NA	NA	3.50	1	muck	1	1	0	0	0	0	1	P	1	0	P	P	0	0	1
10	1	5	60	8.49	0.319	25.54	4.00	2	muck	0	2	0	0	0	0	0	P	0	0	P	P	0	0	0
	2	5	60	8.49	0.319	25.54	4.00	1	muck	0	1	0	0	0	0	0	P	0	0	P	P	1	0	0
	3	5	60	8.49	0.319	25.54	4.00	1	muck	0	1	0	0	0	0	0	P	0	0	P	P	1	0	0
	4	5	60	8.49	0.319	25.54	4.00	3	muck	1	3	0	0	0	0	0	P	1	0	P	P	1	0	0
11	1	NA	NA	NA	NA	NA	4.00	1	muck	0	1	0	0	0	0	0	P	1	0	P	P	0	0	0
	2	NA	NA	NA	NA	NA	4.00	1	muck	1	1	0	0	0	0	0	P	0	0	P	P	0	0	0
	3	NA	NA	NA	NA	NA	4.00	1	muck	1	1	0	0	0	0	0	P	0	0	P	P	0	0	0
	4	NA	NA	NA	NA	NA	4.00	1	muck	0	1	0	0	0	0	0	P	0	0	P	P	1	0	0
12	1	NA	NA	NA	NA	NA	5.00	1	muck	1	1	0	1	0	1	0	P	0	0	P	P	0	0	0
	2	NA	NA	NA	NA	NA	5.00	1	muck	1	1	1	0	1	1	1	P	0	0	P	P	0	0	0
	3	NA	NA	NA	NA	NA	5.00	1	muck	0	0	0	0	0	0	0	P	0	0	P	P	0	0	0
	4	NA	NA	NA	NA	NA	5.00	1	muck	1	1	1	0	0	0	1	P	0	0	P	P	0	0	0

Auto_ID	Rake Toss	DO (mg/l)	Do %	pH	Cond	Temp F	Depth	Total Rake Density	Sediment	Common waterweed	Coontail	Water star-grass	CLP	Clasping	EWM	Slender naiad	Filamentous algae	Wild Celery	Star Duck	Watermeal	Duckweed	Dwarf Milfoil	Flat-Stem pondweed	Sponge	Sago	White water Lily	Yellow water lily	Large leaf	Illinois pondweed	Chara sp.
25	1	NA	NA	NA	NA	79	3.50	1	muck	0	1	0	0	0	0	1	P	0	0	P	P	0	0	0	0	0	0	0	0	
	2	NA	NA	NA	NA	79	3.50	1	muck	1	1	0	0	0	0	0	P	0	0	P	P	0	0	0	1	0	0	0	0	
	3	NA	NA	NA	NA	79	3.50	1	muck	1	1	0	0	0	0	1	P	0	0	P	P	0	0	0	1	0	0	0	0	
	4	NA	NA	NA	NA	79	3.50	1	muck	0	1	0	1	0	1	0	P	0	0	P	P	0	0	0	1	0	0	0	0	
26	1	NA	NA	NA	NA	80	3.75	1	muck	1	1	0	0	0	0	1	P	0	1	P	P	0	1	0	P	P	0	0	0	
	2	NA	NA	NA	NA	80	3.75	1	muck	0	1	0	0	0	0	0	P	0	1	P	P	0	0	0	0	1	0	0	0	
	3	NA	NA	NA	NA	80	3.75	1	muck	0	1	0	0	0	0	0	P	0	1	P	P	0	0	0	0	P	0	0	0	
	4	NA	NA	NA	NA	80	3.75	1	muck	1	1	0	0	0	0	0	P	0	1	P	P	0	0	0	0	P	0	0	0	
27	1	NA	NA	NA	NA	NA	3.75	2	muck	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	NA	NA	NA	NA	NA	3.75	2	muck	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	NA	NA	NA	NA	NA	3.75	1	muck	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	NA	NA	NA	NA	NA	3.75	1	muck	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
28	1	NA	NA	NA	NA	NA	3.50	1	muck	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	
	2	NA	NA	NA	NA	NA	3.50	2	muck	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
	3	NA	NA	NA	NA	NA	3.50	2	muck	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
	4	NA	NA	NA	NA	NA	3.50	1	muck	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
29	1	NA	NA	NA	NA	NA	3.00	1	muck	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	
	2	NA	NA	NA	NA	NA	3.00	2	muck	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
	3	NA	NA	NA	NA	NA	3.00	3	muck	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
	4	NA	NA	NA	NA	NA	3.00	1	muck	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
30	1	NA	NA	NA	NA	75	3.00	1	muck	0	1	0	0	0	0	0	P	0	0	P	P	0	0	0	0	1	0	0	0	
	2	NA	NA	NA	NA	75	3.00	1	muck	0	1	0	0	0	0	0	P	0	0	P	P	0	0	0	0	0	0	0	0	
	3	NA	NA	NA	NA	75	3.00	1	muck	0	1	0	0	0	0	0	P	0	0	P	P	0	0	0	0	1	0	0	0	
	4	NA	NA	NA	NA	75	3.00	1	muck	0	1	0	0	0	0	1	P	0	0	P	P	0	0	0	0	1	0	0	0	

Appendix B – Permit



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
 Scott Hassett, Secretary
 Ronald W. Kazmierczak, Regional Director

Wautoma Service Center
 427 E. Tower Drive, Suite 100
 Wautoma, Wisconsin 54982-6927
 Telephone 920-787-4886
 FAX 920-787-2477

12 May 2005

Permit no. NBR-05-90-39
 fee received: \$1020.00

Montello Lake District
 Mr. Jim Neeb
 212 Carriage Road
 Monello, WI 53949

Re: Permit to apply herbicides for aquatic plant control in Montello Lake, Marquette County.

Dear Mr. Jim Neeb,

I have received your application to chemically treat aquatic plants in Montello Lake, Marquette County. The proposed treatment area totals 40 acres or 14% of the lake. The treatment areas are included in the application. Your permit application has been reviewed and meets the minimum requirements by law and a permit is being issued. Issuance of the permit is not an endorsement or approval for the action authorized. The following conditions must be followed.

PERMIT CONDITIONS

1. It is the responsibility of the Montello Lake District and Aquatic Engineering, Inc. to follow the treatment plan and permit conditions. Noncompliance with the plan can result in enforcement actions under State Statute 144.99 and restriction of aquatic plant management activities for subsequent years under Administrative Code NR 107. The conditions and treatment plan are required to ensure efficacy of the treatment is well documented.
2. Treatment must be in compliance with the APM plan on file at this office and conducted in preparation for a drawdown and/or other proposed winter management activities.
3. If pH exceeds 8.0 at the time of application of *Navigate* treatment may be postponed unless efficacy of product can be assured.
4. First treatment for EWM must be completed when the water temperature is near 60°F, or before native plants have become established. If the temperature is too warm (68°F+) and/or other plants have become established, treatment may be postponed or denied. *Navigate* treatment rates can not exceed 150#/acre.
5. Treatment for native species is prohibited.
6. Treatment can not conflict with holiday weekends (i.e. treatment during or within 3 days of Memorial Day, July 4th and/or Labor Day).
7. Public access cannot be blocked or entry denied. Treatment will have to be scheduled accordingly to increase efficacy and to achieve the desired outcome.

8. Proper notification to adjacent riparian owners must be completed. A complete list of riparian owners and those adjacent within 150 feet of the treatment area must be submitted to this office prior to treatment.
9. All areas treated with *Navigate* must remain posted until October 1, 2004, or unless a bio-assay shows concentrations of residual 2,4-D are below 70 ppb.
10. The permit holder, according to NR 107.08(8), shall submit the Aquatic Plant Management Treatment record for treatment as follows:
 1. Immediately, if any unusual circumstances occur during treatment.
 2. Within 30 days, if treatment occurs.
 3. By October 1 of this year if no treatment occurred.
11. Application is restricted to the permitted area as shown on the map included in the permit.

Any future treatments beyond this permit will require an additional permit from the Department. Future permit applications will be evaluated based the information at that time. The following chemicals are listed below along with the advisories:

Navigate: There are no established waiting periods in the State of Wisconsin for recreational activities such as, swimming and fishing in waters treated with 2,4-D formulations. A waiting period of up to 3 days is recommended, depending on concentration, for drinking water. Animal consumption waiting period of 1 day. Irrigation of non-food crop a waiting period of 1 to 3 days and 5 days for food crop irrigation.

Sources: FACT sheet publications and Factory Labels

Please feel free to contact me at 920-787-4686 ext. 3017 or by email at Scott.Provost@dnr.state.wi.us.

Sincerely,

WDNR



Scott Provost
Water Resource Specialist

cc: Aquatic Engineering, Inc. - La Crosse
Linda Hyatt, APMP file - Wautoma
Kathy Dax, Dick Sachs - Green Bay
Dave Algrem, Conservation Warden - Wautoma
Dave Bartz, Fisheries Biologist - Montello

State of Wisconsin
Department of Natural Resources
Aquatic Plant Manager

PERMIT APPLICATION FOR CHEMICAL
AQUATIC PLANT CONTROL
Form 3200-4 Rev.3-99

NOTE: Use of this form is required by the Department for any application filed pursuant s. 281.17(2), Wis. Stats. And Chapter NR 107, Wis. Adm. Code. The Department will not consider your application unless you complete and submit this application form. Personally identifiable information requested on this form is not likely to be used for purposes, other than that for which it is originally being collected.

SECTION I. APPLICATION DATA

Name of Permit Applicant. (Also indicate names and addresses of all individuals, associations, communities or town sanitary districts sponsoring treatment. Attach additional sheets if necessary.

DNR USE ONLY	
ID Number	NR-05-90-39
County Code	39
Waterbody Number	
DNR USE ONLY	
ID Number	
County Code	
Waterbody Number	

Home Address	Name Aquatic Engineering, Inc. consultant firm	Lake Address	Name Montello Lake Protection and Rehabilitation District
	Street or Route PO Box 3634		Street or Route 212 Carriage Road
	City, State, Zip La Crosse, WI 54602-3634		City, State, Zip Montello, WI 53949
	Telephone Number (include area code) 608-781-8770		Telephone Number (include area code) 608-296-9207
SECTION II. LOCATION OF PLANT CONTROL			
Waterbody To Be Treated (waterbody where treatment area is located) Montello Lake		Lake Surface Area 286 Acres	Estimated Surface Area That Is 10 Feet or Less in Depth 200 Acres
County Marquette		Names of Adjacent Riparian Property Owners (use additional sheets if necessary)	
Township Range Section 15N 9 & 10 8		1.	
Name of Applicant or Firm Aquatic Engineering, Inc.		2.	
Street or Route Post Office Box 3634		3.	
City, State, Zip Code La Crosse, WI 54602-3634		Name of Lake Property Owners' Association Representative or Lake District Representative (if none, please indicate)	
Telephone Number (include area code) Business: 608-781-8770		Montello Lake Protection and Rehabilitation District / Jim Neel	
Applicator Certification Number for Category 5, Aquatic Pesticide Application 9S 060133		DNR USE ONLY	Date Verified w/DATCP Certification Expiration
Business Location License Number (if applicable) 93-010527-000121			Date Verified w/DATCP Expiration Date
Restricted Use Pesticide License Number			Date Verified w/DATCP Expiration Date

Area(s) proposed for Control (Note details in permit cover letter for final permitted sizes of treatment areas.)

- A. Shore Length _____ Ft. x Distance From Shore _____ ft. + 43,560 ft = 15.5 Estimated Acreage. Average Depth _____ ft.
- B. Shore Length _____ Ft. x Distance From Shore _____ ft. + 43,560 ft = 1.0 Estimated Acreage. Average Depth _____ ft.
- C. Shore Length _____ Ft. x Distance From Shore _____ ft. + 43,560 ft = 11.5 Estimated Acreage. Average Depth _____ ft.
- D. Shore Length _____ Ft. x Distance From Shore _____ ft. + 43,560 ft = 12 Estimated Acreage. Average Depth _____ ft.
- E. Shore Length _____ Ft. x Distance From Shore _____ ft. + 43,560 ft = _____ Estimated Acreage. Average Depth _____ ft.

Total Estimated Acreage 40.00

If the estimated acreage is greater than 10 acres, or is greater than 10 percent of the estimated acre 10 feet or less in depth in Section II, please complete and attach Form 3200-4A, Large Scale Treatment Worksheet. Private pond treatments are exempted from this requirement.

Is this area within or adjacent to a sensitive area designated by the Department of Natural Resources?
 Yes No

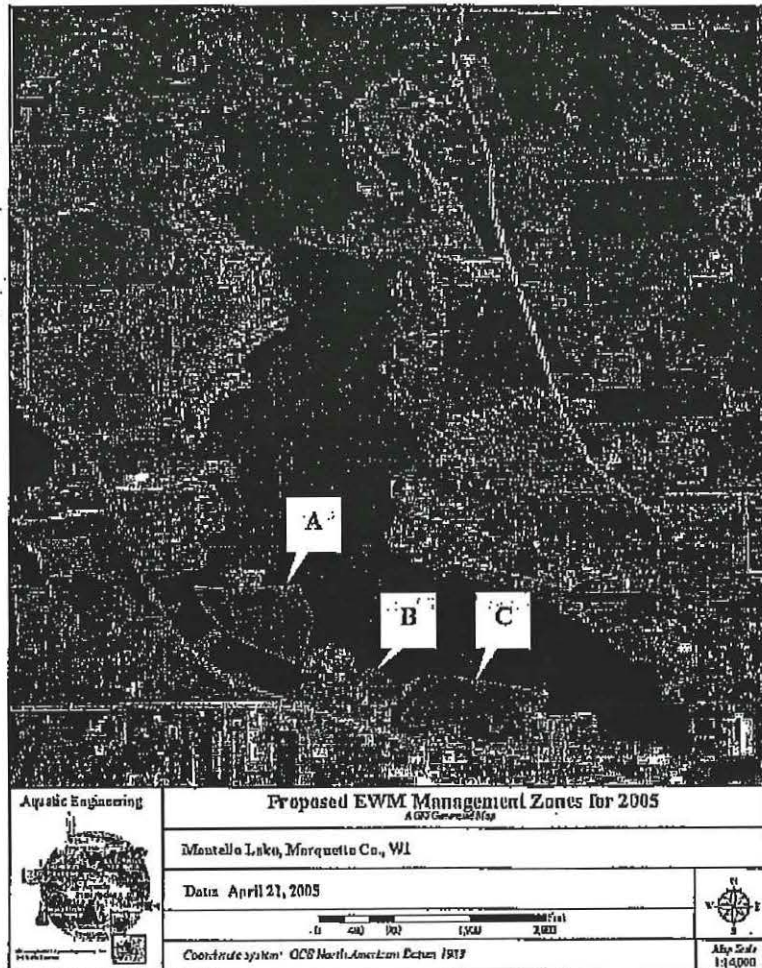
SECTION III. FEES

1. s. NR 107.11(1), Wis. Adm. Code. Lists the conditions under which the permit fee is included to the \$20 minimum charge.
2. s. NR 107.11(4), Wis. Adm. Code. Lists the uses that are exempt from permit requirements.
3. s. NR 107.04(2), Wis. Adm. Code. provides for a refund of acreage fees if the permit is denied or if no treatment occurs.
4. Fee calculations:

Base Permit Fee (non-refundable)	<u>\$ 20.00</u>
If proposed treatment is over 0.25 acre, calculate acreage fee (round up to nearest whole acre, to maximum of 50 acres.)	
40.0 acres X \$25 per acre = \$500.00	
If proposed treatment is ≤ 0.25 acre, acreage fee is \$0.00.	
Enter Acreage Fee (from above)	<u>\$1,000.00</u>
Total Fee Enclosed	<u>\$1,020.00</u>

Please include a sketch and/or a printed map of lake indicating area and dimensions of each individual area where plant control is desired. Also show location of property owners riparian to and adjacent to the treatment area. You may use the space below to sketch a map. Attach a separate list of owners and corresponding treatment dimensions coded to the lake map, if necessary.

Pursuant to the 2004 Montello Lake Aquatic Plant Management Plan and AIS Grant, Pretreatment monitoring will be performed in approved treatment areas for Eurasian Watermilfoil (*Myriophyllum spicatum*) selection will be determined cooperatively by AEI and the WDNR prior to treatment. Areas A, B and C have been selected for treatment. Area D accounts for 12 acres to be determined cooperatively at a later date.



SECTION IV. REASONS FOR AQUATIC PLANT CONTROL

<p>Purpose of aquatic Plant Control</p> <p><input type="checkbox"/> 1. Reduce nuisance algae accumulation</p> <p><input checked="" type="checkbox"/> 2. Maintain navigation channel for common use</p> <p><input type="checkbox"/> 3. Maintain private access for boating</p> <p><input type="checkbox"/> 4. Maintain private access for fishing</p> <p><input type="checkbox"/> 5. Improve swimming</p> <p><input type="checkbox"/> 6. Control of purple loosestrife</p> <p><input checked="" type="checkbox"/> 7. Other: _____</p>	<p>Nuisance Caused By</p> <p><input type="checkbox"/> 1. Algae</p> <p><input type="checkbox"/> 2. Emergent water plants (majority of leaves and stems growing above water surface, e.g. cattails, bulrushes)</p> <p><input type="checkbox"/> 3. Floating water plants (majority of leaves floating on water surface, e.g. waterlilies, duckweed)</p> <p><input checked="" type="checkbox"/> 4. Submerged water plants (leaves and stems below water surface, flowering parts may be exposed, e.g., milfoil, spottail)</p> <p><input type="checkbox"/> 5. Other: _____</p>
--	---

Name of Plants, if known

NOTE: Different plants require different chemicals for effective treatment. Do not purchase chemical before identifying plants.

Eurasian Watermilfoil (*Myriophyllum spicatum*)

SECTION V. CHEMICAL CONTROL

Alternatives to Chemical Control	Feasible?	If No, Why Not?
1. Mechanical harvesting	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<u>Spreads EWM fragments!</u>
2. Hand pulling	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>Too dense of an area!</u>
3. Hand raking	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>Too dense of an area!</u>
4. Hand cutting	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>Too dense of an area!</u>
5. Sediment screens/covers	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>Not effective!</u>
6. Dredging	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>Too costly!</u>
7. Lake drawdown	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<u>Not a control option for immediate concerns!</u>
8. Nutrient controls in watershed	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<u>Not a control option for immediate concerns!</u>
9. Other:	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____

NOTE: If proposed treatment involves multiple properties, please consider feasibility of EACH alternative for EACH property owner. If you checked yes to any of the alternatives listed above, please explain your decision to use chemical controls:

<p>Trade Name of Proposed Chemical(s)</p> <p>2,4-D Products:</p> <p>DMA 4 IVM / Navigate</p>	<p>Method of Application</p> <p>AEI's Aquatic Herbicide Application Systems</p>
<p>Which Chemicals or Other Control Options Have Been Tried Before On The Proposed Site, and What Were the Results</p> <p>Proposed 2,4-D herbicides have been used on Montello Lake <i>Myriophyllum spicatum</i> plant species by our firm and have been successful in controlling target plant species selectively with our aquatic herbicide application systems and personnel.</p>	

NOTE: Chemical fact sheets for aquatic pesticides used in Wisconsin are available from the Department of Natural Resources upon request.

Appendix C – Treatment Record


State of Wisconsin
 Department of Natural Resources

Aquatic Plant Management Herbicide Treatment Record
 Form 3200-111 (5/01) Page 1 of 2

Notice: Completion of this form is a condition of the permit and provides records required by WDNR (NR 107) and DATCP (ATCP 29.21 and 29.22). The Department may not issue you future permits unless you complete this form. Personally identifiable information required on this form is not likely to be used for purposes other than that for which it is originally being collected. It may also be made available to requesters under Wisconsin's Open Records law [ss.19.31 – 19.39, Wis. Stats.]

- Submit this form: (1) immediately if any unusual circumstances occurred during treatment
 (2) as soon after treatment as possible, no later than 30 days
 (3) by October 1 if no treatment occurred

Completion of this form along with the permit satisfies the requirements of WDNR (NR 107) and DATCP (ATCP 29.21 and 29.22)

General Permit Information						
Permit Number NER-05-90-39	Waterbody Name (including ponds, e.g., Smith Pond) Montello Lake					
County Marquette	Permit Holder Name Aquatic Engineering, Inc.					
Treatment Information						
Treatment Date 05.18.05	Starting Time (24 hr) 10:00	Ending Time (24 hr) 18:00	Water Temp (°C) 16.9 - 18C	Ambient Air Temp (°F) 60-69F	Wind Speed (mph) 5-10mph	Wind Direction SW
Other Conditions Noted (i.e., dead fish, spawning fish, algae bloom, etc.) Noted: 1 dead Carp and 1 dead Perch						
Onsite Supervision Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		If Yes, Supervisor Name				
Mixing and Loading Site Location (if other than business site or from prepackaged retail container or applied with equipment with a total capacity of not more than 5 gallons liquid or 50 pounds dry) Management Zones						
Herbicide Treatment and Water Use Restrictions Signs Posted In Accordance With NR 107? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
Applicator shall provide each customer with a free copy of each pesticide label used (if requested)						
Applicator Information						
Individual or Business Name Aquatic Engineering, Inc.					Telephone Number 608-781-8770	
Street Address Post Office Box 3634						
City La Crosse		State WI		Zip Code 54602-3634		
Individuals Making Pesticide Application:		Last Name Strasser		First Name Nick		Certification # #067648
Individuals Making Pesticide Application:		Last Name Babe		First Name Ryan		Certification # 071188
		Last Name		First Name		Certification #
Name of Person Completing Form Joshua Britton		Signature 			Date Signed May 26, 2005	

Appendix D – Product Labels & Material Safety Data Sheets

Specimen Label



DMA* 4 IVM

Herbicide

*Trademark of Dow AgroSciences LLC

Contains Dimethylamine Salt of 2,4-D†

For selective control of many broadleaf weeds in, forests, non-cropland, non-crop turf, and aquatic areas. Also for control of trees by injection.

Active Ingredient:

2,4-Dichlorophenoxyacetic acid, dimethylamine salt †	46.3%
Inert Ingredients	53.7%
Total Ingredients	100.0%

2,4-dichlorophenoxyacetic acid †† - 38.4% - 3.8 lb/gal
†† Isomer Specific by AOAC Method No. 978.05 (15th Edition)

† Salts are the least volatile forms of 2,4-D and do not release enough vapors from treated areas to reduce yield of adjacent susceptible crops.

EPA Reg. No. 62719-3

Keep Out of Reach of Children

DANGER PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Precautionary Statements

Hazards to Humans and Domestic Animals

Corrosive • Causes Irreversible Eye Damage • Harmful If Swallowed, Inhaled or Absorbed Through The Skin.

Do not get in eyes, on skin, or on clothing. Avoid breathing vapor or spray mist. Wash thoroughly with soap and water after handling.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Waterproof gloves
- Shoes plus socks
- Protective eyewear
- **Note: For containers of over 1 gallon, but less than 5 gallons:** Mixer and loaders who do not use a mechanical system (such as probe and pump or spigot) to transfer the contents of this container must wear coveralls or chemical-resistant apron in addition to other required PPE.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry. After each day of use, clothing or PPE must not be reused until it has been cleaned.

Engineering Controls Statements

For containers of 5 gallons or more: A mechanical system (such as probe and pump or spigot) must be used for transferring the contents of this container. If the contents of a non-refillable pesticide container are emptied, the probe must be rinsed before removal. If the mechanical system is used in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4)], the handler PPE requirements may be reduced or modified as specified in the WPS.

When handlers use enclosed cabs or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

First Aid

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

Environmental Hazards

This product is toxic to aquatic invertebrates. Drift or runoff may adversely affect aquatic invertebrates and non-target plants. For terrestrial uses, do not apply directly to water, to areas where surface water is present, or to intertidal area below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Mixing and Loading: Most cases of groundwater contamination involving phenoxy herbicides such as 2,4-D have been associated with mixing/loading and disposal sites. Caution should be exercised when handling 2,4-D pesticides at such sites to prevent contamination of groundwater supplies. Use of closed systems for mixing and transferring this pesticide will reduce the probability of spills. Placement of the mixing/loading equipment on an impervious pad to contain spills will help prevent groundwater contamination.

Notice: Read the entire label. Use only according to label directions. **Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" elsewhere on this label.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at www.dowagro.com.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Waterproof gloves
- Shoes plus socks
- Protective eyewear

Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for Agricultural Pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Entry Restrictions for Non-WPS Uses: When this product is applied to non-cropland areas, non-crop turf, by tree injection method only in forest sites, and when applied in aquatic areas, do not allow people (other than applicator) or pets on treatment area during application. Do not enter into treated areas until sprays have dried.

Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal.

Storage: Keep container tightly closed when not in use. If exposed to subfreezing temperatures, the product should be warmed to at least 40°F and mixed thoroughly before using.

Pesticide Disposal: Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law and may contaminate groundwater. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

Container Disposal (Metal): Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Container Disposal (Plastic containers 5-gals or less): Triple rinse (or equivalent). Then dispose of in a sanitary landfill, or by incineration, or, if allowed by local authorities, by burning. If burned stay out of smoke.

General: Consult federal, state, or local disposal authorities for approved alternative procedures.

General Information

DMA* 4 IVM herbicide is intended for selective control of many broadleaf weeds in forests, non-cropland, non-crop turf areas, and aquatic areas.

Apply DMA 4 IVM as a water or oil-water spray during warm weather when target weeds or woody plants are actively growing. Application under drought conditions will often give poor results. Use low spray pressure to minimize drift. Generally, the lower dosages recommended on this label will be satisfactory for young, succulent growth of susceptible weed species. For less susceptible species and under conditions where control is more difficult, use higher recommended rates. Deep-rooted perennial weeds such as Canada thistle and field bindweed and many woody plants usually require repeated applications for satisfactory control. Consult your State Agricultural Experiment stations or Extension Service Weed Specialists for recommendations from this label that best fit local conditions.

General Use Precautions and Restrictions

Be sure that use of DMA 4 IVM conforms to all application regulations.

Chemigation: Do not apply this product through any type of irrigation system.

Excessive amounts of 2,4-D in the soil may temporarily inhibit seed germination and plant growth.

Avoiding Injury to Non-target Plants

Spray drift produced during application is the responsibility of the applicator and care should be taken to minimize off-target movement of spray during application. A drift control agent suitable for agricultural use may be used with this product to aid in reducing spray drift. If used, follow all use recommendations and precautions on the product label.

Do not apply where drift may be a problem due to proximity to susceptible crops or other desirable broadleaf plants. Do not apply DMA 4 IVM directly to, or otherwise permit contact with cotton, flowers, fruit trees, grapes, ornamentals, vegetables, or other desirable plants which are susceptible to 2,4-D herbicides. Do not permit spray mist containing 2,4-D to contact susceptible plants since even very small quantities of the spray, which may not be visible, can cause severe injury during both active growth or dormant periods. Do not use in greenhouses.

Avoid Movement of Treated Soil: Avoid conditions under which soil from treated areas may be moved or blown to areas containing susceptible plants. Wind-blown dust containing 2,4-D may produce visible symptoms when deposited on susceptible plants, however, serious plant injury is unlikely. To minimize potential movement of 2,4-D on wind-blown dust, avoid treatment of powdery dry or light sandy soils until soil is settled by rainfall or irrigation or irrigate soon after application.

Do not store or handle other agricultural chemicals with the same containers used for DMA 4 IVM. Do not apply other agricultural chemicals or pesticides with equipment used to apply DMA 4 IVM unless equipment has been thoroughly cleaned to remove all traces of 2,4-D.

Spray Drift Management (Aerial Application)

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions. The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

In certain states, additional regulations may be applicable to aerial application of this product.

The applicator should be familiar with and take into account the information covered in the following Aerial Drift Reduction Advisory Information section.

Aerial Spray Drift Advisory Information

Importance of Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversion section of this label).

Controlling Droplet Size:

- **Volume**-Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure**-Use the lower spray pressures recommended for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of nozzles**-Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle Orientation**-Orienting nozzles so that the spray is released backwards, parallel to the airstream will produce larger droplets than other orientations. Significant deflection from the horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type**-Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce larger droplets than other nozzle types.
- **Boom Length**-For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.
- **Application**-Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment: When applications are made with a cross-wind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

Wind: Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect drift.

Temperature and Humidity: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions: Applications should not occur during a low level temperature inversion, because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a connected cloud (under low wind conditions) indicates an inversion, while smoke that moves upwards and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas: The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

Mixing

Mix DMA 4 IVM only with water, unless otherwise directed on this label. Add about half the water to the mixing tank, then add the DMA 4 IVM with agitation, and finally the rest of the water with continuing agitation.

Note: Adding oil, wetting agent, or other surfactant to the spray mixture may increase effectiveness on weeds, but also may reduce selectivity to crops resulting in crop damage.

Tank Mixing: When tank mixing, read and follow the label of each tank mix product used for precautionary statements, directions for use, weeds controlled, and geographic and other restrictions. Use in accordance with the most restrictive of label limitations and precautions. No label dosages should be exceeded. Do not tank mix this product with any product containing a label prohibition against tank mixing with 2,4-D.

Tank Mix Compatibility Testing: A jar test is recommended prior to tank mixing to ensure compatibility of this product and other pesticides. Use a clear glass quart jar with lid and mix the tank mix ingredients in their relative proportions. Invert the jar containing the mixture several times and observe the mixture for approximately 1/2 hour. If the mixture balls-up, forms flakes, sludges, jels, oily films or layers, or other precipitates, it is not compatible and the tank mix combination should not be used.

Sprayer Clean-Out

To avoid injury to desirable plants, equipment used to apply this product should be thoroughly cleaned before re-use or applying other chemicals.

1. Rinse and flush application equipment thoroughly after use at least three times with water. Dispose of all rinse water by application to treatment area or apply to non-cropland area away from water supplies.
2. During the second rinse, add 1 qt of household ammonia for every 25 gallons of water. Circulate the solution through the entire system so that all internal surfaces are contacted (15-20 min). Let the solution stand for several hours, preferably overnight.
3. Flush the solution out of the spray tank through the boom.
4. Rinse the system twice with clean water, recirculating and draining each time.
5. Remove nozzles and screens and clean separately.
6. If equipment is to be used to apply another pesticide or agricultural chemical to a 2,4-D susceptible crop, additional steps may be required to remove all traces of 2,4-D, including cleaning of disassembled parts and replacement of hoses or other fittings that may contain absorbed 2,4-D.

Application

Apply with calibrated air or ground equipment using sufficient spray volume to provide adequate coverage of target weeds or as otherwise directed in specific use directions. For broadcast application, use a spray volume of 3 or more gallons per acre by air and 10 or more gallons per acre for ground equipment. Where states have regulations which specify minimum spray volumes, they should be observed. In general, spray volume should be increased as crop canopy, height and weed density increase in order to obtain adequate spray coverage. **Do not apply less than 3 gallons total spray volume per acre.**

Rate Ranges and Application Timing

Generally, the lower dosages given will be satisfactory for young, succulent growth of sensitive weed species. For less sensitive species and under conditions where control is more difficult, the higher dosages will be needed. Apply DMA 4 IVM during warm weather when weeds are young and actively growing.

Spot Treatments

To prevent misapplication, spot treatments should be applied with a calibrated boom or with hand sprayers using a fixed spray volume per 1,000 sq ft as indicated below.

Hand-Held Sprayers: Hand-held sprayers may be used for spot applications of DMA 4 IVM. Care should be taken to apply the spray uniformly and at a rate equivalent to a broadcast application. Application rates in the table are based on the application rate for an area of 1,000 sq ft. Mix the amount of DMA 4 IVM (fl oz or ml) corresponding to the desired broadcast rate in 1 to 3 gallons of spray. To calculate the amount of DMA 4 IVM required for larger areas, multiply the table value (fl oz or ml) by the thousands of sq ft to be treated. An area of 1000 sq ft is approximately 10.5 X 10.5 yards (strides) in size.

Rate Conversion Table for Spot Treatment:

Label Broadcast Rate (pt/acre)							
1/2	2/3	3/4	1	2	3	4	8
Equivalent Amount of DMA 4 IVM per 1000 sq ft							
1/5 fl oz † (5.5 ml)	1/4 fl oz (7.3 ml)	1/3 fl oz (8.3 ml)	3/8 fl oz (11 ml)	3/4 fl oz (22 ml)	1 fl oz (33 ml)	1 1/2 fl oz (44 ml)	3 fl oz (88 ml)

† Conversion factors: 1 fl oz = 29.6 (30) ml

Weeds Controlled

Annual or Biennial Weeds

Beggarticks †
Bittercress, smallflowered
bitterweed
broomweed, common †
burdock, common
buttercup, smallflowered †
carpetweed
cinquefoil, common
cinquefoil, rough
cocklebur, common
coffeeweed
copperleaf, Virginia
croton, Texas
croton, woolly
flixweed
galinsoga
geranium, Carolina
hemp, wild
horseweed (marestail)
jewelweed
jimsonweed
knotweed †
kochia
lambsquarters, common
lettuce, prickly †
lettuce, wild
lupines
mallow, little †
mallow, Venice †
marshelder
morningglory, annual
morningglory, ivy

morningglory, woolly
mousetail
mustards (except blue mustard)
parsnip, wild
Pennycress, field
Pepperweed †
pigweeds (Amaranthus spp.) †
poorjoe
primrose, common
purslane, common
pusley, Florida
radish, wild
ragweed, common
ragweed, giant
rape, wild
rocket, yellow
salsify, common †
salsify, western †
shepherdspurse
sicklepod
smartweed (annual species) †
sneezeweed, bitter
sowthistle, annual
sowthistle, spiny
spanishneedles
sunflower
sweetclover
tansymustard
thistle, bull
thistle, musk †
thistle, Russian (tumbleweed) †
velvetleaf
vetches

Perennial Weeds

Alfalfa †
artichoke, Jerusalem †
aster, many-flower †
Austrian fieldcress †
bindweed (hedge, field
and European) †
blue lettuce
blueweed, Texas
broomweed
bullnettle †
carrot, wild †
catnip
chicory
clover, red †
coffeeweed
cress, hoary †
dandelion †
docks †
dogbanes †
goldenrod
eveningprimrose, cutleaf
garlic, wild †
hawkweed, orange †
healal
ironweed, western
ivy, ground †
Jerusalem-artichoke
loco, bigbend
nettles (including stinging) †
onion, wild †
pennywort
plantains
ragwort, tansy †
sowthistle, perennial
thistle, Canada †
vervains †
waterplantain
wormwood

† These weeds are only partially controlled and may require repeat applications and/or use of higher recommended rates of this product even under ideal conditions of application.

Specific Use Directions

Forestry, and Non-cropland, Uses

Agricultural Use Requirements for Forest Use (Except Tree Injection Use): For use in forests, follow PPE and Reentry instructions in the "Agricultural Use Requirements" section under the "Directions for Use" heading of this label.

Agricultural Use Requirements for Forestry (Tree Injection Only) and Non-cropland Areas: When this product is applied to non-cropland areas, non-crop turf, and by tree injection in forest sites, follow reentry requirements given in the "Non-Agricultural Use Requirements" section under the "Directions for Use" heading of this label.

Forestry Uses

Forest site preparation, forest roadsides, brush control, established conifer release (including Christmas trees and reforestation areas)

Treatment Site Method of Application	DMA 4 IVM	Specific Use Directions
Annual Weeds	2 to 4 pt/acre	Apply when weeds are small and growing actively before the bud stage. Apply when biennial and perennial species are in the seedling to rosette stage and before flower stalks appear. For difficult to control perennial broadleaf weeds and woody species, use up to 1 gallon DMA 4 IVM and 1 to 4 qt. Garlon* 3A herbicide per acre. For conifer release, make application in early spring before budbreak of conifers when weeds are small and actively growing.
Biennial and perennial broadleaf weeds and susceptible woody plants	4 to 8 pt/acre	
Spot Treatment to control broadleaf weeds	See Instructions for "Spot Treatment"	Note: To control broadleaf weeds in small areas with a hand sprayer, use an application rate equivalent to the recommended broadcast rate and spray to thoroughly wet all foliage. See rate conversion table and instructions for "Spot Treatment" and use of hand-held sprayers under "Application".
Conifer Release: Species such as white pine, ponderosa pine, jack pine, red pine, black spruce, white spruce, red spruce, and balsam fir	1 1/2 to 3 qt/acre	To control competing hardwood species such as alder, aspen, birch, hazel, and willow, apply from mid to late summer when growth of conifer trees has hardened off and woody plants are still actively growing. Apply with ground or air equipment, using sufficient spray volume to ensure complete coverage. Because this treatment may cause occasional conifer injury, do not apply if such injury cannot be tolerated.
Directed Spray: Conifer plantations including pine	4 qt/100 gal	Apply when brush or weeds are actively growing by directing the spray so as to avoid contact with conifer foliage and injurious amounts of spray. Apply in oil, oil-water, or water carrier in a spray volume of 10 to 100 gallons per acre.
Basal Spray (May also be used in noncropland)	8 qt/100 gal or	Thoroughly wet the base and root collar of all stems until the spray begins to accumulate around the root collar at the ground line. Wetting stems with the mixture may also aid in control.
Surface of Cut Stumps (May also be used in noncropland)	2.6 fl oz/gal of water	Apply as soon as possible after cutting trees. Thoroughly soak the entire stump with the 2,4-D mixture including cut surface, bark and exposed roots.
Frill and Girdle (May also be used in noncropland)		Cut frills (overlapping V-shaped notches cut downward through the bark in a continuous ring around the base of the tree) using an axe or other suitable tool. Treat freshly cut frills with as much of the 2,4-D mixture as they will hold.
Tree Injection Application (May also be used noncropland)	(1 to 2 ml per injection site)	To control unwanted hardwood trees such as elm, hickory, oak, and sweetgum in forests and other non-crop areas, apply by injecting at a rate of 1 ml of undiluted DMA 4 IVM per inch of trunk diameter at breast height (DBH) as measured approximately 4 1/2 ft above the ground. Make injections as close to the root collar as possible and the injection bit must penetrate the inner bark. Applications may be made throughout the year, but for best results apply between May 15 and October 15. Maples should not be treated during the spring sap flow. For hard to control species such as ash, maple, and dogwood use 2 ml of undiluted DMA 4 IVM per injection site or double the number of 1 ml injections. Note: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is directly injected into agricultural plants.

Precautions and Restrictions:

- Do not allow sprays to contact conifer shoot growth (current year's new growth) or injury may occur.
- Do not apply to nursery seed beds.
- For conifer release, do not use on plantations where pine or larch are among the desired species.
- For broadcast applications, do not apply more than 8.42 pt/acre of DMA 4 IVM (4.0 lb of acid equivalent) per 12 month period.

Non-cropland Areas

Such as fencerows, hedgerows, roadsides, drainage ditches, rights-of way, utility power lines, railroads, airports, and other non-crop areas

Treatment Site Method of Application	DMA 4 IVM (pt/acre)	Specific Use Directions
Annual broadleaf weeds	2 to 4	Apply when annual weeds are small and growing actively before the bud stage. Biennial and perennial weeds should be rosette to bud stage, but not flowering at the time of application. For difficult to control perennial broadleaf weeds and woody species, tank mix up to 1 gallon DMA 4 IVM plus 1 to 4 qt. Garlon® 3A herbicide per acre. For ground application: (High volume) apply a total of 100 to 400 gal per acre; (low volume) apply a total of 10 to 100 gal per acre. For helicopter: Apply a total of 5 to 30 gal per acre spray volume.
Biennial and perennial broadleaf weeds and susceptible woody plants	4 to 8	
Spot Treatment to control broadleaf weeds	See Instructions for "Spot Treatment"	Note: To control broadleaf weeds in small areas with a hand sprayer, use an application rate equivalent to the broadcast rate recommended for this treatment site and spray to thoroughly wet all foliage. See rate conversion table and instructions for "Spot Treatment" and use of hand-held sprayers under "Application".
Tree Injection Application		See instructions for tree injection application in "Forestry Uses" section.
Southern wild rose Broadcast application	up to 4	Broadcast: Apply in a spray volume of 5 or more gallons per acre by aircraft or 10 or more gallons per acre by ground equipment. Apply when foliage is well developed. Thorough coverage is required. Use 1 gallon of DMA 4 IVM plus 4 to 8 fluid ounces of an agricultural surfactant per 100 gallons of water. Two or more treatments may be required.
Spot treatment	1 gal/100 gal of spray	

Precautions and Restrictions:

- Do not apply to newly seeded areas until grass is well established.
- Bentgrass, St. Augustine, clover, legumes and dichondra may be severely injured or killed by this treatment.
- Do not apply more than 8.42 pt/acre of DMA 4 IVM (4.0 lb of acid equivalent) per use season.
- Do not reapply to a treated area within 30 days of a previous application.
- If grazing of meat or dairy animals or hay harvest is desired in non-crop areas, do not apply more than 4.21 pt/acre of DMA 4 IVM (2.0 lb of acid equivalent) and do not harvest forage for hay within 7 days of application.

Non-crop Turf Areas

Includes cemeteries and parks, airfields, roadsides, vacant lots, and drainage ditch banks

Use Requirements for Ornamental Turf Areas: When this product is applied to ornamental turf areas, follow PPE and reentry instructions in the "Non-agricultural Use Requirements" section of this label.

Treatment Site (Application Timing)	DMA 4 IVM (pt/acre)	Specific Use Directions
Ornamental Turf (Postemergence) Seedling grass (five-leaf stage or later)	3/4 to 1	Apply when weeds are small and actively growing. For best results, apply when soil moisture is adequate for active weed growth. Deep-rooted perennial weeds such as bindweed and Canada thistle may require repeat applications. Do not apply to newly seeded grasses until well established (five-leaf stage or later) and then use a maximum of 1 pt/acre. Cool season grasses are tolerant of higher rates.
Well-established grasses	2 to 4	
Biennial and perennial broadleaf weeds	4	

Precautions, Restrictions:

- Do not use on creeping grasses such as bent except as a spot treatment.
- Do not use on injury-sensitive southern grasses such as St. Augustinegrass.
- Do not use on dichondra or other herbaceous ground covers. Legumes may be damaged or killed.
- Do not reapply within 21 days of a previous application.
- Reseeding:** Delay reseeding at least 30 days following application. Preferably, with spring application, reseed in the fall and with fall application, reseed in the spring.
- Do not apply more than 2 broadcast applications per year per treatment site (does not include spot treatments).

Aquatic Uses

Use Requirements for Aquatic Areas: When this product is applied to aquatic areas, follow PPE and reentry instructions in the "Non-agricultural Use Requirements" section of this label.

Control of Weeds and Brush on Banks of Irrigation Canals and Ditches

Target Plants	DMA 4 IVM (pt/acre)	Specific Use Directions
Annual Weeds	2 to 4	<p>Apply using low pressure spray (10 to 40 psi) in a spray volume of 20 to 100 gallons per acre using power operated spray equipment. Apply when wind speed is low, 5 mph or less. Apply working upstream to avoid accidental concentration of spray into water. Cross-stream spraying to opposite banks is not permitted and avoid boom spraying over water surface. When spraying shoreline weeds, allow no more than 2 foot overspray onto water surface with an average of less than 1 foot of overspray to prevent significant water contamination.</p> <p>Apply when weeds are small and growing actively before the bud stage. Apply when biennial and perennial species are in the seedling to rosette stage and before flower stalks appear. For hard-to-control weeds, a repeat application after 30 days at the same rate may be needed.</p> <p>For woody species and patches of perennial weeds, mix 1 gallon of DMA 4 IVM per 64 to 150 gallons of total spray. Wet foliage by applying about 3 to 4 gallons of spray per 1000 sq ft (10.5 X 10.5 steps).</p>
Biennial and perennial broadleaf weeds and susceptible wood plants	4	

Restrictions and Limitations:

- Do not apply more than 2 treatments per season or reapply within 30 days.
- Do not use on small canals (less than 10 cfs) where water will be used for drinking purposes.
- Do not apply more than 8.42 pt/acre (4.0 lb of acid equivalent) per use season.

Aquatic Weed Control in Ponds, Lakes, Reservoirs, Marshes, Bayous, Drainage Ditches, Canals, Rivers and Streams that are Quiescent or Slow Moving, Including Programs of the Tennessee Valley Authority

Notice to Applicators: Before application, coordination and approval of local and state authorities may be required, either by letter or agreement or issuance of special permits for such use.

Emergent and Floating Aquatic Weeds: Including Water hyacinth (*Eichornia crassipe*)

Application Rate: 2 to 4 qt/acre.

Specific Use Directions

Application Timing: Spray weed mass only. Apply when water hyacinth plants are actively growing. Repeat application as necessary to kill regrowth and plants missed in previous operation. Use 4 qt/acre rate when plants are mature or when weed mass is dense.

Surface Application: Use power operated sprayers with boom or spray gun mounted on boat, tractor or truck. Thorough wetting of foliage is essential for maximum control. Use 100 to 400 gallons of spray mixture per acre. Special precautions such as use of low pressure, large nozzles and spray thickening agents should be taken to avoid spray drift to susceptible crops. Follow label directions for use of any drift control agent.

Aerial Application: Use drift control spray equipment or thickening agent mixed in the spray mixture. Apply 1 gallon of DMA 4 IVM per acre using standard boom systems using a minimum spray volume of 5 gallons per acre. For Microfoil® drift control spray systems, apply DMA 4 IVM in a total spray volume of 12 to 15 gallons per acre.

Submerged Aquatic Weeds: Including Eurasian Water Milfoil (*Myriophyllum spicatum*)

Treatment Site	Maximum Application Rate [†]	Specific Use Directions
Aquatic Weed Control in Ponds, Lakes, Reservoirs, Marshes, Bayous, Drainage Ditches, Canals, Rivers and Streams that are Quiescent or Slow Moving, Including Programs of the Tennessee Valley Authority	2.84 gallons (10.8 lb of acid equivalent) per acre foot	<p>Application Timing: For best results, apply in spring or early summer when aquatic weeds appear. Check for weed growth in areas heavily infested the previous year. A second application may be needed when weeds show signs of recovery, but no later than mid-August in most areas.</p> <p>Subsurface Application: Apply DMA 4 IVM undiluted directly to the water through a boat mounted distribution system. Shoreline areas should be treated by subsurface injection application by boat to avoid aerial drift.</p> <p>Surface Application: Use power operated boat mounted boom sprayer. If rate is less than 5 gallons per acre, dilute to a minimum spray volume of 5 gallons per surface acre.</p> <p>Aerial Application: Use drift control spray equipment or thickening agents mixed with sprays to reduce drift. Apply through standard boom systems in a minimum spray volume of 5 gallons per surface acre. For Microfoil® drift control spray systems, apply DMA 4 IVM in a total spray volume of 12 to 15 gallons per acre.</p> <p>Apply to attain a concentration of 2 to 4 ppm (see table below).</p>

[†]DMA 4 IVM contains 3.8 lb of acid equivalent per gallon of product.

Amount to Apply to Attain a Concentration of 2 to 4 ppm			
Surface Area	Average Depth (ft)	2,4-D Acid Equivalent to Apply (lb/acre)	Amount of DMA 4 IVM to Apply (gal/acre)
1 acre	1	5.4 to 10.8	1.42 to 2.84
	2	10.8 to 21.6	2.84 to 5.68
	3	16.2 to 32.4	4.26 to 8.53
	4	21.6 to 43.2	5.68 to 11.37
	5	27.0 to 54.0	7.10 to 14.21

Precautions and Restrictions for Aquatic Use:

- Do not treat areas that are not infested with aquatic weeds.
- Do not exceed 10.8 lb of acid equivalent (2.84 gallons) per acre foot of treated water.
- Do not apply within 1500 ft of an active potable or irrigation water intake.
- **Wind Speed:** Do not apply when wind speed is at or above 10 mph when making ground or surface applications. Do not aerially apply when wind speed is greater than 5 mph. Wind speed restrictions do not apply for subsurface applications used in submerged aquatic weed control programs.
- **Dissolved Oxygen Ratio:** Fish require oxygen dissolved in water for life processes and a favorable water-oxygen ratio must be maintained. Decaying weeds use up dissolved oxygen in water. Fish kill resulting from decaying plant material can be prevented by: (1) treating the entire area when the weed mass is sparse and the rate of decomposition will not be sufficient to disturb the water-oxygen ratio; or (2) If application is delayed until there is a dense weed mass, treat no more than one-half of a lake or pond at one time. For large bodies of weed-infested water, apply product in lanes, leaving buffers strips at least 100 feet wide which can be treated in 4 to 5 weeks or when vegetation in treated lanes has decomposed. During the growing season, decomposition of treated strips will usually occur in 2 to 3 weeks.
- **Irrigation:** Unless an approved assay indicates that the 2,4-D concentration is 100 ppb (0.1 ppm) acid or less, do not use water from treated areas for; (1) irrigation other than non-crop areas or those crops or plants labeled for direct application of 2,4-D; or (2) mixing sprays for agricultural or ornamental plants.
- **Potable Water:** Unless an approved assay indicates that the 2,4-D concentration is 70 ppb (0.07 ppm) acid or less, do not use water from treated areas for potable water (drinking water).
- **Other Uses of Treated Water:** Except as stated above, there are no restrictions on use of water from treated areas for fishing, watering of livestock, or other domestic purposes.

Warranty Disclaimer

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. All such risks shall be assumed by buyer.

Limitation of Remedies

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

- (1) Refund of purchase price paid by buyer or user for product bought, or
- (2) Replacement of amount of product used.

Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. In no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer above and this Limitation of Remedies cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or this Limitation of Remedies in any manner.

*Trademark of Dow AgroSciences LLC
Dow AgroSciences LLC • Indianapolis, IN 46268 U.S.A.

EPA-accepted 10/13/2000

Label Code: D02-141-001

Initial Printing

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Effective Date: 2/8/01
Product Code: 84631
MSDS: 000246

DMA* 4 IVM HERBICIDE

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: DMA* 4 IVM Herbicide

COMPANY IDENTIFICATION:

Dow AgroSciences
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. COMPOSITION/INFORMATION ON INGREDIENTS:

2,4-D Dimethylamine Salt:	CAS# 002008-39-1	46.3%
2,4-Dichlorophenoxyacetic Acid, Dimethylamine Salt		
Other Ingredients, Total, Including		53.7%
Dimethylamine	CAS# 000124-40-3	

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

3. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Hazardous chemical. Brown liquid with an amine odor. May cause severe eye irritation with corneal injury. The LD₅₀ for skin absorption in rabbits is >1000 mg/kg. The oral LD₅₀ for rats is ~1000 mg/kg.

EMERGENCY PHONE NUMBER: 800-992-5994

POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYE: May cause severe irritation with corneal injury, which may result in permanent impairment of vision, even blindness.

SKIN: Essentially non-irritating to skin. A single prolonged exposure may result in the material being absorbed in harmful amounts. The LD₅₀ for skin absorption in rabbits is >1000 mg/kg.

INGESTION: Single dose oral toxicity is low. The oral LD₅₀ for rats is ~1000 mg/kg. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

*Trademark of Dow AgroSciences

INHALATION: Single exposure to vapors is not likely to be hazardous.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS:

Excessive exposure may cause liver, kidney, and gastrointestinal and muscular effects. Signs and symptoms of excessive exposure may be nausea, vomiting, abdominal cramps, or diarrhea.

CANCER INFORMATION: 2,4-Dichlorophenoxyacetic acid did not cause cancer in laboratory animal studies.

TERATOLOGY (BIRTH DEFECTS): Birth defects are unlikely. Exposures having no effect on the mother should have no effect on the fetus. Did not cause birth defects in animals; other effects were seen in the fetus only at doses which caused toxic effects to the mother.

REPRODUCTIVE EFFECTS: Excessive dietary levels of 2,4-D acid have caused decreased weight and survival in offspring in a rat reproduction study.

4. FIRST AID:

EYES: Immediate and continuous irrigation with flowing water for at least 30 minutes is imperative. Prompt medical consultation is essential.

SKIN: Immediately flush skin with plenty of water while removing contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Destroy and dispose of contaminated leather items (i.e. shoes, belts, or watchbands).

INGESTION: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

INHALATION: Remove to fresh air if effects occur. Consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Effective Date: 2/8/01
Product Code: 84631
MSDS: 000246

DMA* 4 IVM HERBICIDE

5. FIRE FIGHTING MEASURES:

FLASH POINT: 190°F (88°C)

METHOD USED: TCC

FLAMMABLE LIMITS

LFL: Not determined

UFL: Not determined

EXTINGUISHING MEDIA: Water fog

FIRE & EXPLOSION HAZARDS: Noxious fumes may be produced under fire conditions. Contain water from fire fighting to prevent entry to surface or ground water.

FIRE-FIGHTING EQUIPMENT: Wear positive pressure, self-contained breathing apparatus and full protective equipment.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS/LEAKS: Absorb small spills in an absorbent material such as sawdust, sand or clay. Dike area of large spills and call Dow AgroSciences at 800-992-5994. Wear protective clothing and self-contained breathing apparatus if vapors are present. Do not use water to clean up.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep out of reach of children. Harmful if swallowed or absorbed through skin. Causes severe eye irritation. Avoid contact with eyes, skin and clothing. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Keep container tightly closed when not in use. Do not store below temperature of 25°F (-4°C). If frozen (crystallized), warm to 65-75°F (19-2°C) and re-dissolve before using by rolling or shaking the container. Store in a safe manner in original container only, in a cool, dry place. Reduce stacking height where local conditions can affect packaging strength. See product label for handling/storage precautions relative to the end use of this product.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINE:

2,4-D Dimethylamine Salt: None established; ACGIH TLV and OSHA PEL are 10 mg/M³ for the acid.

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS:

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guidelines. When respiratory protection is required for certain operations, use a NIOSH approved air-purifying respirator for organic vapors.

SKIN PROTECTION: Use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron, faceshield, or full-body suit will depend on operation. Remove contaminated clothing immediately, wash skin areas with soap and water, and launder clothing before reuse. Items, which cannot be decontaminated, such as shoes, belts and watchbands, should be removed, destroyed and disposed of.

EYE/FACE PROTECTION: Use chemical goggles. Eye wash fountain should be located in immediate work area.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Effective Date: 2/8/01
Product Code: 84631
MSDS: 000246

DMA* 4 IVM HERBICIDE

9. PHYSICAL AND CHEMICAL PROPERTIES:

BOILING POINT: >212°F (100°C)
VAPOR PRESSURE: 8.0 x 10⁻¹⁰ mmHg @ 25°C
VAPOR DENSITY: <1 water vapor
SOLUBILITY IN WATER: Infinite
SPECIFIC GRAVITY: 1.17 approx. @ 68/68°F (20°C)
APPEARANCE: Brown liquid
ODOR: Amine

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Stable under normal storage conditions. Avoid excessive heat.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID)
Acids and oxidizing materials.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride and nitrogen oxide under fire conditions.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

MUTAGENICITY (EFFECTS ON GENETIC MATERIAL):
In-vitro mutagenicity studies were negative. For 2,4-D acid: animal mutagenicity studies were predominantly negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING:

No bioconcentration is expected because of the relatively high water solubility.

DEGRADATION AND PERSISTENCE:

Biodegradation under aerobic static laboratory conditions is high (BOD₂₀ or BOD₂₈/ThOD >40%).

5-Day biochemical oxygen demand (BOD₅) is 0.47 p/p.

10-Day biochemical oxygen demand (BOD₁₀) is 0.50 p/p.

20-Day biochemical oxygen demand (BOD₂₀) is 0.57 p/p.

ECOTOXICOLOGY:

Material is practically non-toxic to aquatic organisms on an acute basis (LC₅₀ is >100 mg/L in most sensitive species). Acute LC₅₀ in fathead minnow (*Pimephales promelas*) is 707 mg/L.

Acute LC₅₀ in pink shrimp (*Penaeus duorarum*) is >1000 mg/L.

Acute LC₅₀ in rainbow trout (*Oncorhynchus mykiss*) is 377 mg/L.

Acute LC₅₀ in bluegill (*Lepomis macrochirus*) is 387 mg/L.

Dietary LC₅₀ in bobwhite (*Colinus virginianus*) is >4640 mg/L.

Dietary LC₅₀ in mallard (*Anas platyrhynchos*) is >4640 mg/L.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: Wastes are toxic. Improper disposal of excess waste, spray mixture, or rinsate is a violation of federal law and may contaminate groundwater. If these wastes cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency or the hazardous waste representative at the nearest EPA regional office for guidance.

14. TRANSPORT INFORMATION:

For DOT regulatory information, if required, consult transportation regulations, product-shipping papers, or contact your Dow AgroSciences representative.

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

DMA* 4 IVM HERBICIDE

Effective Date: 2/8/01
Product Code: 84631
MSDS: 000246

U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

<u>CHEMICAL NAME</u>	<u>CAS NUMBER</u>	<u>CONCENTRATION</u>
Dimethylamine	000124-40-3	1%

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard
A delayed health hazard
A fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

<u>CHEMICAL NAME</u>	<u>CAS NUMBER</u>	<u>LIST</u>
Proprietary Ingredient	Proprietary	NJ3 PA1 PA3
Dimethylamine	000124-40-3	NJ1 NJ2 NJ3 PA1 PA3

NJ1=New Jersey Special Health Hazard Substance (present at > or = to 0.1%).

NJ2=New Jersey Environmental Hazardous Substance (present at > or = to 1.0%).

NJ3=New Jersey Workplace Hazardous Substance (present at > or = to 1.0%).

PA1=Pennsylvania Hazardous Substance (present at > or = to 1.0%).

PA3=Pennsylvania Environmental Hazardous Substance (present at > or = to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

<u>Category</u>	<u>Rating</u>
Health	3
Flammability	2
Reactivity	1

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA, which may require reporting of release.

<u>CHEMICAL NAME</u>	<u>CAS NUMBER</u>	<u>RQ</u>	<u>% IN PRODUCT</u>
Dimethylamine	000124-40-3	1000	1%
Proprietary Ingredient	Proprietary	5000	3%

16. OTHER INFORMATION:

MSDS STATUS: New

Reference: DR-0115-0523

Replaces MSDS Dated: 4/14/99

Document Code: D03-141-001

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult Dow AgroSciences for Further Information.

NAVIGATE®

A SELECTIVE HERBICIDE FOR CONTROLLING CERTAIN UNWANTED AQUATIC PLANTS

ACTIVE INGREDIENTS:

Butoxyethyl ester, 2,4-Dichlorophenoxyacetic acid,27.6%

INERT INGREDIENTS:72.4%

TOTAL 100.0%

*Isomer specific by AOAC Method, Equivalent to 2,4-Dichlorophenoxyacetic Acid 19%

EPA Reg. No. 228-378-8959

EPA Est. No. 228-IL-1

**KEEP OUT OF REACH OF CHILDREN
CAUTION**

For Chemical Emergency, Spill, Leak, Fire, Exposure or Accident call Chemtrec Day or Night 1-800-424-9300

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION

Harmful if swallowed, absorbed through skin, or inhaled. Causes eye irritation. Avoid contact with skin, eyes or clothing. Avoid breathing dust. When handling this product, wear chemical resistant gloves. Wash thoroughly with soap and water after handling. When mixing, loading, or applying this product or repairing or cleaning equipment used with this product, wear eye protection (face shield or safety glasses), chemical resistant gloves, long-sleeved shirt, long pants, socks and shoes. It is recommended that safety glasses include front, brow and temple protection. Wash hands, face and arms with soap and water as soon as possible after mixing, loading, or applying this product. Wash hands, face and hands with soap and water before eating, smoking or drinking. Wash hands and arms before using toilet. After work, remove all clothing and shower using soap and water. Do not reuse clothing worn during the previous day's mixing and loading or application of this product without cleaning first. Clothing must be kept and washed separately from other household laundry. Remove saturated clothing as soon as possible and shower.

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. If person is unconscious, do not give anything by mouth and do not induce vomiting.

IF ON SKIN: Wash with plenty of soap and water. Get medical attention.

IF INHALED: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

IF IN EYES: Flush eyes with plenty of water. Call a physician if irritation persists.

ENVIRONMENTAL HAZARDS

This product is toxic to fish. Drift or runoff may adversely affect fish and non-target plants. Do not apply to water except as specified on this label. Do not contaminate water when disposing of equipment washwaters. Unless an approved assay indicates the 2,4-D concentration is 100 ppb (0.1 ppm) or less, or, only growing crops and non-crop areas labeled for direct treatment with 2,4-D will be affected, do not use water from treated areas for irrigating plants or mixing sprays for agricultural or ornamental plants. Unless an approved assay indicates the 2,4-D concentration is 70 ppb (0.07 ppm) or less, do not use water from treated areas for potable water (drinking water).

Clean spreader equipment thoroughly before using it for any other purposes. Vapors from this product may injure susceptible plants.

Most cases of ground water contamination involving phenoxy herbicides such as 2,4-D have been associated with mixing/loading and disposal sites. Caution should be exercised when handling 2,4-D pesticides at such sites to prevent contamination of ground water supplies. Use of closed systems for mixing or transferring this pesticide will reduce the probability of spills. Placement of the mixing/loading equipment on an impervious pad to contain spills will help prevent ground water contamination.

STORAGE AND DISPOSAL

STORAGE

Always use original container to store pesticides in a secure warehouse or building. Do not store near seeds, fertilizers, insecticides or fungicides. Do not stack more than two pallets high. Do not contaminate water, food or feed by storage or disposal. It is recommended that a SARA Title III emergency response plan be created for storage facilities. Do not transport in passenger compartment of any vehicle.

PESTICIDE DISPOSAL

Pesticide wastes are toxic. If container is damaged or if pesticide has leaked, clean up spilled material. Improper disposal of excess pesticide is a violation of Federal law and may contaminate ground water. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL

Do not reuse empty bag. Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If bag is burned, stay out of smoke.

MANUFACTURED FOR:



SEE ADDITIONAL PRECAUTIONS AND DIRECTIONS ON BACK

www.appliedbiochemists.com

NAVIGATE is a trademark of Applied Biochemists
NET WT. 50 LBS. (22.68 KG)

13529

DIRECTIONS FOR USE

**IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING.
READ THIS ENTIRE LABEL BEFORE USING THIS PRODUCT**

GENERAL PRECAUTIONS AND RESTRICTIONS

Do not use in or near a greenhouse.

OXYGEN RATIO

Fish breathe oxygen in the water and a water-oxygen ratio must be maintained. Decaying weeds use up oxygen, but during the period when NAVIGATE® should be used, the weed mass is fairly sparse and the weed decomposition rate is slow enough so that the water-oxygen ratio is not disturbed by treating the entire area at one time.

If treatments must be applied later in the season when the weed mass is dense and repeat treatments are needed spread granules in lanes, leaving buffer strips which can then be treated when vegetation in treated lanes has disintegrated. During the growing season, weeds decompose in a 2 to 3 week period following treatment.

Buffer lanes should be 50 to 100 feet wide. Treated lanes should be as wide as the buffer strips. (See illustration below)



WATER pH

Best results are generally obtained if the water to be treated has a pH less than 8. A pH of 8 or higher may reduce weed control. If regrowth occurs within a period of 6 to 8 weeks, a second application may be needed.

PERMIT TO USE CHEMICALS IN WATER

In many states, permits are required to control weeds by chemical means in public water. If permits are required, they may be obtained from the Chief, Fish Division, State Department of Conservation or the State Department of Public Health.

GENERAL INFORMATION

NAVIGATE® is formulated on special heat treated attaclay granules that resist rapid decomposition in water, sink quickly to lake or pond bottoms and release the weed killing chemical in the critical root zone area. This product is designed to selectively control the weeds listed on the label. While certain other weeds may be suppressed, control may be incomplete. Reduced control may occur in lakes where water replacement comes from bottom springs.

WHEN TO APPLY

For best results, spread NAVIGATE® in the spring and early summer, during the time weeds start to grow. If desired, this timing can be checked by sampling the lake bottom in areas heavily infested with weeds the year before. If treatments are delayed until weeds form a dense mat or reach the surface, two treatments may be necessary. Make the second treatment when weeds show signs of recovery. Treatments made after September may be less effective depending upon water temperatures and weed growth. Occasionally, a second application will be necessary if heavy regrowth occurs or weeds reinfest from untreated areas.

HOW TO APPLY

FOR LARGE AREAS: Use a fertilizer spreader or mechanical seeder such as the Gerber or Gandy or other equipment capable of uniformly applying this product. Before spreading any chemical, calibrate your method of application to be sure of spreading the proper amount. When using boats and power equipment, you must determine the proper combination of (1) boat speed (2) rate of delivery from the spreader, and (3) width of swath covered by the granules.

FOR SMALL AREAS: (Around Docks or Isolated Patches of Weeds): Use a portable spreader such as the Cyclone seeder or other equipment capable of uniformly applying this product. Estimate or measure out the area you want to treat. Weight out the amount of material needed and spread this uniformly over the area. More uniform coverage is obtained by dividing the required amount in two and covering the area twice, applying the second half at right angles to the first.

Use the following formula to calibrate your spreader's delivery in pounds of NAVIGATE PER MINUTE:

$$\frac{\text{Miles per hour} \times \text{spreader width} \times \text{pounds per acre}}{495} = \text{pounds per minute}$$

Example: To apply 100 pounds of NAVIGATE per acre using a spreader that covers a 20 foot swath from a boat traveling at 4 miles per hour, set the spreader to deliver 16 pounds of NAVIGATE granules per minute.

$$\frac{4 \text{ mph} \times 20 \text{ feet} \times 100 \text{ Lbs./A}}{495} = 16 \text{ Lbs/Min.}$$

AMOUNTS TO USE

Rates of application vary with resistance of weed species to the chemical, density of weed mass at time of treatment, stage of growth, water depth, and rate of water flow through the treated area. Use the higher rate for dense weeds, when water is more than 8 feet deep and where there is a large volume turnover.

	NAVIGATE POUNDS PER ACRE	NAVIGATE POUNDS PER 2000 SQ. FT.
SUSCEPTIBLE WEEDS		
Water Milfoil (Myriophyllum spp.)	100 TO 200	5
Water stargrass (Heteranthera dubia)		
SLIGHTLY TO MODERATELY RESISTANT WEEDS		
Bladderwort (Utricularia spp.)	150 to 200	7-1/2 to 10
White water Lily (Nymphaea spp.)		
Yellow water lily (Nuphar spp.)		
Or spatterdock*		
Water shield (Brasenia spp.)		
Water chestnut (Trapa natans)		
Coontail* (Ceratophyllum Demersum)		
*Repeat treatments may be needed		

LIMITED WARRANTY AND DISCLAIMER

The manufacturer warrants that this material conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use and Buyer assumes all risk of any use contrary to such directions. SELLER MAKES NO OTHER WARRANTY EXPRESSED OR IMPLIED AS TO FITNESS OR MERCHANTABILITY, AND NO AGENT OF SELLER IS AUTHORIZED TO DO SO EXCEPT IN WRITING WITH SPECIFIC REFERENCE TO THIS WARRANTY. In no event shall the Seller's liability for any breach of warranty exceed the purchase price of the material as to which a claim is made.

=====
 EMERGENCY
 =====

 FOR CHEMICAL EMERGENCY: SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CALL
 CHEMTREC - DAY or NIGHT - (800) 424-9300
 =====

 Product Name: **AB NAVIGATE** EPA Reg. No. 228-378-8959
 =====

 SECTION I - GENERAL INFORMATION
 =====

 Manufacturer's Name: APPLIED BIOCHEMISTS
 W175 N11163 Stonewood Drive
 Suite 234
 Germantown, WI 53022-4799
 (800) 558-5106
 Trade Name & Synonyms: **AB NAVIGATE**
 Chemical Name & Synonyms: 2,4-D: 2,4-DICHLOROPHENOXYACETIC ACID, BUTOXYETHYL
 ESTER
 Generic Description: AQUATIC HERBICIDE
 Formula: $C_{12}H_{18}Cl_2O_4$
 D.O.T. Proper Shipping Name: Not Regulated
 U.N. or N.A. Identification #: Not Regulated
 D.O.T. Hazard Class: Not Applicable
 D.O.T. Emergency Response Guide: Not Assigned
 Hazardous Mat'ls ID System Values (HMIS): Health -1 Flammability -1 Reactivity -0 Personal Protection -F
 Nat'l Fire Protection Assn. (NFPA 704M): Health -1 Flammability -1 Reactivity -0 Specific Hazard: None
 =====

 SECTION II - HAZARDOUS INGREDIENTS
 =====

Hazardous Component(s)	CAS#	PEL	TLV
2,4-Dichlorophenoxyacetate			
Acid, Butoxyethyl Ester	1929-73-3	10 mg/m ³	10 mg/m ³
Crystalline Silica	14808-60-7	0.1 mg/m ³	0.1 mg/m ³

Ingredients listed in this section have been determined to be hazardous as defined in 29 CFR 1910.1200. Materials determined to be health hazards are listed if they comprise 1% or more of the composition. Materials identified as carcinogens are listed if they comprise 0.1% or more of the composition. Information on proprietary materials is available as provided in 29 CFR 1910.1200 (i) (1).

 SECTION III - PHYSICAL DATA
 =====

Boiling Point (F):	NOT KNOWN	Specific Gravity (water = 1):	NOT KNOWN
Vapor Pressure (mm Hg):	NOT KNOWN	% Volatile (by Volume):	NOT DETERMINED
Vapor Density (air = 1):	NOT KNOWN	Evaporation Rate: (Ether = 1)	< 1
Melting Point (F):	NOT KNOWN		
Solubility in Water:	INSOLUBLE		
Appearance & Odor:	GRAY/TAN GRANULES WITH MILD PHENOLIC ODOR.		

 SECTION IV - FIRE & EXPLOSION DATA
 =====

Flash Point (F):	NOT FLAMMABLE	Method:	
Extinguishing Media:	CO ₂ , WATER, DRY CHEMICAL OR FOAM TO FIGHT FIRES IN WHICH THIS PRODUCT IS INVOLVED.		
Special Fire Fighting Procedures:	WEAR APPROVED SELF-CONTAINED BREATHING APPARATUS. DIKE TO PREVENT CONTAMINATION OF WATER SOURCES.		
Unusual Fire & Explosion Hazards:	THERMAL DECOMPOSITION PRODUCTS INCLUDE OXIDES OF CARBON, SULFUR DIOXIDES AND HYDROCHLORIC ACID.		

 SECTION V - REACTIVITY DATA
 =====

Stability -	Unstable	<u> X </u> Stable
Conditions to Avoid:	NONE KNOWN	
Incompatibility (Materials to Avoid):	ACIDS, BASES, OXIDIZERS.	
Hazardous Decomposition Products:	THERMAL DECOMPOSITION PRODUCTS INCLUDE OXIDES OF CARBON, SULFUR DIOXIDES AND HYDROCHLORIC ACID.	
Hazardous Polymerization:	<u> </u> Will Occur	<u> X </u> Will Not Occur
Conditions to Avoid:	NONE	

 =====

=====
SECTION VI - HEALTH HAZARD DATA
 =====

Acute Health Hazards: LD_{50(Rat)} >2000 mg/Kg
 Chronic Health Hazards: THIS PRODUCT CONTAINS CLAY. IARC HAS CLASSIFIED CRYSTALLINE SILICA (A COMPONENT OF CLAY) AS A PROBABLE HUMAN CARCINOGEN. PROLONGED CONTACT MAY CAUSE LIVER DAMAGE, KIDNEY DAMAGE, CHRONIC MUSCLE DAMAGE.

Signs & Symptoms of Exposure: EYE CONTACT MAY CAUSE TEARING AND REDNESS. MAY CAUSE SLIGHT SKIN IRRITATION. INHALATION OF DUST MAY CAUSE IRRITATION TO RESPIRATORY TRACT. INGESTION MAY CAUSE NAUSEA, VOMITING, ABDOMINAL PAIN, MUSCLE WEAKNESS MYOTONIA, AND A FALL IN BLOOD PRESSURE.

Medical Conditions Generally Aggravated by Exposure: MAY AGGRAVATE EXISTING CHRONIC RESPIRATORY PROBLEMS SUCH AS ASTHMA, EMPHYSEMA, OR BRONCHITIS; CONTACT MAY IRRITATE SKIN DISEASE.

Chemical Listed as Carcinogen or Potential Carcinogen by:

National Toxicology Program:	Yes:	No:	✓
I.A.R.C. Monographs:	Yes:	No:	✓
O.S.H.A.	Yes:	No:	✓

Emergency & First Aid Procedures: FOR PRINCIPLE ROUTE OF ENTRY, SEE APPROPRIATE EMERGENCY PROCEDURES BELOW.

Route of Entry: Inhalation: NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. REMOVE TO FRESH AIR, CONTACT A PHYSICIAN IF NECESSARY.
 Eyes: FLUSH WITH FRESH WATER FOR AT LEAST 15 MINUTES. CALL A PHYSICIAN.
 Skin: WASH SKIN WITH PLENTY OF SOAP AND WATER. WASH CLOTHES THOROUGHLY BEFORE REUSE.
 Ingestion: DRINK 2-3 GLASSES OF MILK OR WATER, INDUCE VOMITING. CALL A PHYSICIAN.

 =====
SECTION VII - SPILL OR LEAK PROCEDURES
 =====

Steps to be Taken in Case Material is Released or Spilled: SWEEP UP AND PLACE IN APPROVED CONTAINERS. DO NOT FLUSH AREA WITH WATER AS IT CAN CAUSE CONTAMINATION OF SEWER SYSTEM.

Waste Disposal Methods: DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. 100 LBS. RESULTS IN A REPORTABLE QUANTITY AS SPECIFIED BY D.O.T.

 =====
SECTION VIII - SPECIAL PROTECTION AND CONTROL MEASURES
 =====

Respiratory Protection (Specify Type): NOT REQUIRED
 Ventilation - Local Exhaust: MECHANICAL Special Exhaust: STAND DOWN WIND WHEN USING.
 Mechanical Exhaust: Other Exhaust:

Protective Equipment - Gloves: PLASTIC OR CHEMICAL RESISTANT
 Eye Protection: SAFETY GLASSES OR CHEMICAL GOGGLES
 Other Protective Equipment: PROTECTIVE CLOTHING
 Work or Hygienic Practices: USE SAFE CHEMICAL HANDLING PROCEDURES SUITABLE FOR THE HAZARDS PRESENTED BY THIS MATERIAL.

 =====
SECTION IX - SPECIAL PRECAUTIONS
 =====

Precautions to be Taken in Handling and Storage: DO NOT SWALLOW, BREATH DUST, STORE NEAR FOOD, CONTAMINATE WATER FOOD OR FEED, APPLY TO WATERS USED FOR IRRIGATION, AGRICULTURAL SPRAYS, WATERING DAIRY ANIMALS OR DOMESTIC WATER SUPPLIES.

Other Precautions: AVOID DRIFT TO SUSCEPTIBLE PLANTS. AVOID GETTING INTO EYES, ON SKIN OR CLOTHING. **KEEP OUT OF REACH OF CHILDREN**

THESE DATA ARE OFFERED IN GOOD FAITH AS TYPICAL VALUES AND NOT AS A PRODUCT SPECIFICATION. NO WARRANTY, EITHER EXPRESSED OR IMPLIED, IS HEREBY MADE. THE RECOMMENDED INDUSTRIAL HYGIENE AND SAFE HANDLING PROCEDURES ARE BELIEVED TO BE GENERALLY APPLICABLE. HOWEVER, EACH USER SHOULD REVIEW THESE RECOMMENDATIONS IN THE SPECIFIC CONTEXT OF THE INTENDED USE AND DETERMINE WHETHER THEY ARE APPROPRIATE.

DJK

Date of Last Revision: 9/30/99