



# Lake Manitou Association Process & Procedure Documentation

## Weed Control

<b>Process 6</b>	The electronic version of this document is controlled; all other versions are uncontrolled (reference only)	
Process Owner:	Date Approved:	Version Number:
Lake Manitou President	09/09/06	1.1

### 1. OBJECTIVE/PURPOSE:

The purpose of the Weed Control process is to support the management and treatment of aquatic weeds and control of algae in Lake Manitou. The weed control process balances the environmental need for weeds with the recreational and economic interests of our Association members.

### 2. RESPONSIBILITIES:

**Employment Committee Chairperson** – responsible for directing the Association employees in following the chemical and mechanical harvesting strategies with input from the Board and Association members to address particular areas of concern, responsible for training the Association employees in the safe and proper application of weed control chemicals/algacides and in the safe operation of the weedcutter.

**Chemical Control Committee Chairperson** – responsible to conduct the weed inventory and assessment with the chemical supplier, ordering of sufficient chemicals for application, monitoring of the chemical usage throughout the year, and submission of the chemical usage report to the Board for review and submission to the DEQ at the end of October summarizing the chemical application for the year.

**Lake Manitou Board of Directors (Board)** – Approval of all payments, establishment of the weed control strategy, authorization to execute the weed control strategy, approval of the annual chemical usage report.

### 3. DEFINITIONS:

**Macrophytes** –the rooted plants found in a lake or pond

### 4. PROCEDURE / DESCRIPTION:

Aquatic plants are a vital part of any lake or pond. They convert sunlight and chemical elements into living plant tissue. Fish, waterfowl, insects, mammals, and microscopic animals use the plants for food. Plants also replenish the aquatic environment with oxygen, which is essential to aquatic animals. Additionally, rooted plants create a varied aquatic environment in which fish food organisms reside. They also provide cover for spawning fish, nesting waterfowl, shoreline mammals, and their young.

Although they are important to the aquatic environment, plants frequently conflict with recreational and economic interests. A need, therefore, exists for proper aquatic plant management in Lake Manitou to ensure that the natural environment and resident's interests are mutually protected.

The distribution and abundance of aquatic plants in our lake is dependent upon the lake's chemical and physical properties including:

- the amount of light available
- water levels
- water temperatures
- type of lake bottom sediments
- current or wave action
- the concentration of dissolved gasses and nutrients

The weed control process starts with the establishment of a comprehensive weed management strategy that originates from the Lake Manitou Board. This strategy defines the initiatives, parameters, tactics, and budget to implement the strategy. This strategy and Board direction is what authorizes the Chemical Committee and Employment Committee chairperson(s) to utilize the Association's resources in the execution of the strategy.



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**Conducting a “weed inventory”** is the first step in this process to determine what types of weeds populate Lake Manitou. As with every living thing, our lake changes over time. In some years, the weed growth has been negligible with poor water clarity, and in other years, the lake is full of weeds with very good water clarity.

To be unambiguous, we need weeds in order for our lake to be a healthy ecological system. Having too many weeds is not good for lake recreation and having too few detracts from fish habitat and water clarity. The key is finding the right balance between having too many and too few.

The weed inventory is important as it helps to confirm our weed control strategy. For example, if we detected Eurasian Water Milfoil, which is a non-native invasive plant species, we would likely recommend a chemical or biological program to specifically target removal of this plant type as it becomes very dominant and difficult to control as it spreads. Mechanical harvesting of this weed is typically counterproductive as Milfoil fragments will spread, root, and become new plants.

The weed inventory is conducted in the spring with the assistance of our primary chemical supplier who is trained in weed identification. The supplier meets with the Chemical Control Chairperson and tours the lake to determine what weeds and weed types are present.

The primary macrophytes identified in Lake Manitou are Chara and Curly-leaf Pondweed.

**Submission of Chemical application license** is the next step. This application is completed with support of our chemical supplier. The license submission includes the types and quantity of chemicals to apply, the source of the chemicals, the method of chemical application, and who will be applying the chemicals. The fee for the application is \$\_\_\_\_\_ and the application is submitted to:

Michigan DEQ, \_\_\_\_\_, Lansing, Michigan ZIP

The Lake Manitou chemical application permit number is: # \_\_\_\_\_.

**Weed Cutting and Chemical Application on the Lake** are the next steps. Mechanical harvesting involves the pulling or cutting and removal of macrophytes from selected areas of the lake. It employs hand tools and highly sophisticated motorized cutting or rotovating devices. The mechanical harvesting of algae from the lake is economically infeasible primarily due to very high energy costs to remove the microscopic plants from water.

When large areas of aquatic plants are harvested, the cut material should be removed from the lake. If left in the lake, the cut plant parts will decompose, sometimes only partially, and contribute nutrients and organic material to the lake bottom. This, in turn, helps to nourish new plant growth. In addition, during biological decomposition of the cut plant material, dissolved oxygen levels may be lowered. This can affect the delicate balance between the water and sediment chemistry. Low oxygen levels also affect fish and fish-food organisms. Removing cut material from the lake improves water quality if the amount of nutrients removed (in plant material and algae attached to the macrophyte) is greater than the amount of nutrients entering the lake from the watershed.

Mechanical harvesting has drawbacks which must be considered. Harvesting could aid the spread of a plant problem, since fragments of certain plants can drift into unaffected areas, take root and grow. The Lake Manitou Board considers the benefits of mechanical harvesting to outweigh the potential drawbacks and have incorporated mechanical harvesting control as the primary on-going element of our weed control strategy.



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The mechanical harvesting primarily involves the use of a diesel powered weed cutter that is capable of cutting a 4 ft x 8 ft area below the surface of the water. Due to the forward motion of the weed cutter, the cut plant material is directed onto a self contained conveyer on the weed cutter for immediate storage. When the conveyer becomes full, the weed cutter operator will empty the weeds from the conveyer into a dump truck located on shore. The weeds are then taken to a nearby field and dumped to dry and decompose. This removes a substantial amount of nutrients and attached algae from the lake.

**Chemical control** is another means of temporarily controlling aquatic plants and algae. There are a number of chemicals available which offer varying degrees of action time, persistence, cost, selectivity and safety to humans, other mammals, and aquatic animal life.

When herbicides are part of an aquatic plant management program, special care must be taken to protect both the environment and individuals involved, since herbicides are potentially dangerous to both. It is important that herbicides be used with extreme care. Herbicides require special handling such as protective clothing for application and posting of treated water so that swimmers or fishermen are not inadvertently exposed to potentially harmful chemicals. The applicator takes special note of all warnings on the label to avoid any personal injury and disposes of all empty chemical containers as directed. The product label also explains the best method(s) for using the product, as well as rate of application and a list of plants that may be controlled by the product.

It is important to point out that the use of herbicides to control aquatic plants has certain drawbacks. Most herbicides **control all forms of plant life** to some extent. Beneficial aquatic plants will likely be killed along with the nuisance plants. It is also difficult to control the drift of herbicides, consequently plants may be killed over a much wider area than intended and herbicides give only temporary control. In lakes where herbicides are used repeatedly on a large scale, dramatic shifts in plant populations can occur which may seriously alter the lake's ecology. This is the primary reason why the Lake Manitou Board has chosen to selectively apply the herbicides ourselves - to limit the variables and risks associated with over-application of herbicides in our lake.

Herbicides are used to control weeds in the shallow areas that are not accessible by the mechanical harvester and are applied by the Association employees from the pontoon sprayer.

Algae are microscopic single celled forms of plant life that are introduced into the water by wind and rain from the atmosphere. There are 30,000 different varieties of algae all containing chlorophyll. They are one of the hardiest and most widespread living organisms on the planet. Algaecides are chemicals added to the water to control algae. While algaecides can kill algae at high dosages, most are utilized as algaestats, which prevent the algae formation. One type of algaecide is Copper Salt. Copper Salts (copper ions (Cu<sup>++</sup>)) are very effective algaecides that are used in ponds, lagoons and lakes to kill and prevent algae formation.

In addition to trying to manage the inflow of nutrients into Lake Manitou, we incorporate the use of algaecides as a component of our weed control strategy. The algaecides are also applied by the Association employees using the pontoon sprayer.

The Employment Committee Chairperson is responsible for directing the Association employees in following the chemical and mechanical harvesting strategies with input from the Board and Association members to address particular areas of concern. The chairperson is also responsible for training the Association employees in the safe and proper application of weed control chemicals/algaecides and in the safe operation of the weedcutter.



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The Chemical Control Chairperson is responsible to conduct the weed inventory and assessment with the chemical supplier, ordering of sufficient chemicals for application, monitoring of the chemical usage throughout the year, and submission of the chemical usage report to the Board for review and submission to the DEQ at the end of October summarizing the chemical application for the year.

**Summary:** To summarize the Board’s direction regarding weed control in Lake Manitou, we use a three pronged approach consisting of:

1. Cutting and removing weeds using a mechanical harvester
2. Chemical herbicidal treatment of the shallow areas that the weedcutter cannot access
3. Chemical algaecide treatment for algae

Each year seems to bring unique challenges to managing the early weed growth. Our spring weed growth is intensified with our 2.2 times lake flushing rate, which is very high for lakes, and brings in nutrients from the surrounding agricultural watershed. We will likely continue to struggle with the spring nutrient load as long as we have an active farmer in our watershed.

Under typical circumstances, there will be two to three weeks in the spring where weeds initially come up faster than they can be cut and is likely that this will always be the situation in the early spring. It is also difficult to effectively cut weeds when jets skis and boats populate the lake on busy weekends thereby limiting the amount of time that weeds can be effectively harvested.

As with any complex mechanical device, our weed harvester, sprayer, dump truck, and trailer are subject to equipment breakdowns and other problems that must be overcome on a daily basis. While we pay our summer help to spray, rake, and remove weeds, we do not compensate the Employment Committee or Chemical Control Committee Chairperson who volunteer their time and effort to keep the lake a desirable place to live. These chairpersons pay the same dues as we all do and get **no compensation** for the aggravation of dealing with all the aspects of managing our weed control program. Without them and other volunteers who keep our equipment operational, we would not have the quality of riparian resource that we enjoy today.

Our lake is a living and changing environment and most of our Association members have no idea what is required or the effort that is expended to get and keep the lake quality that we have. We should all have a reasonable and appropriate expectation of what a comprehensive lake management strategy can deliver versus having a lake that looks like a filtered swimming pool. Our lake may never be “perfect” in everyone’s eyes, but the Board believes that we manage it more actively and better than most other lakes affiliated with the Michigan Lake & Steam Associations.

### 5. REQUIREMENTS / NOTIFICATION:

- Chemical application permit
- Chemical usage report
- Resident postings prior to the application of certain weed control chemicals

### 6. REFERENCES, SUPPORTING PROCESSES, AND TOOLS:

- Lake Manitou Water Quality Management (Process 4)
- Lake Association Equipment Usage (Process 2)
- Lake Manitou Equipment Operation (Process 9)



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### 7. KEY CRITICAL SUCCESS FACTORS:

- Timely survey of the lake weeds with the chemical supplier to confirm the lake weed population
- Timely submission of the chemical application license
- Maintenance of all association equipment ensuring all safety devices are operational
- Safety training, energized equipment training, chemical application training, and reinforcement of "safety first" to the Association employees
- Sufficient weeds to help remove nutrients

### 8. CHANGE CONTROL:

Version	Changed By	Date	Description
1.1	J. Forsythe	09/09/2006	Initial Release
1.0	J. Forsythe	06/25/2006	Initial Draft