



# Lake Vegetation Management Plan

- Variance Requested by Cooperator
- Variance Approved (see Section VI)

## Section I: Lake Information

Name: Lost Lake DOW Number: 27010300 County: Hennepin  
 Fisheries Area: West Metro Surface Acres: 20 Littoral Acres: 20  
 Classification:  Natural Environment  Recreational Development  General Development  
 Cooperator(s): Lost Lake Improvement Association, Bassetts Creek Watershed Management  
 Commission (BCWMC), City of Plymouth, and the MN DNR.

## Section II: Water Quality and Plant Community

### A. Water Quality

<input checked="" type="checkbox"/> Total Phosphorus: Mean: 174 ppb	Date: 1997	Jun-Sept Summer Avg.
<input checked="" type="checkbox"/> Secchi Disc: Mean: 1.1m	Date: 1997	Jun-Sept Summer Avg.
<input checked="" type="checkbox"/> chlorophyll 'a': Mean: 101 ppb	Date: 1997	Jun-Sept Summer Avg.

Narrative (describe water quality concerns, quantify TSI):

Carlson Trophic Status for Total Phosphorus: 78  
 Carlson Trophic Status for Chlorophyll-a: 75  
 Carlson Trophic Status for Secchi Disk: 58.0  
 Overall Trophic Status: Hypereutrophic

Lost Lake is a Hypereutrophic lake; the water quality is poor, and has been poor since at least the early 1970's. The poor water quality may be attributed in part to historical nutrient inputs and a general lack of aquatic plants in the lake. Historically Lost lake has received a high amount of aquatic plant and algae control, this most likely has resulted in a depauperate plant community, poor water quality and a hypereutrophic state.

### B. Plant Community:

Narrative (describe plant community, list common, rare, or other important aquatic plant species, list plant surveys): Aquatic plants are valuable for a number of ecological and biological functions including, stabilizing bottom sediments and shorelines, providing shelter for a variety of game and non-game fish and aquatic insects, and providing food for waterfowl and other wading birds and mammals.

The Bassetts Creek Watershed Management Commission (BCWMC) contracted Barr Engineering to conduct a plant survey 1997. In 1997 the plant community was non existant, the lake was and continues to be dominated by algal blooms as idicated by historicaly poor secchi disc readings and high levels of nutrients in the lake. In 2010 The MN DNR conducted two point intercept aquatic plant survys, one in early July and the other in late August. Canada Waterweed



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was the most abundant plant found in the lake and was documented at 73% of the sites in July but only 11% in August. The 2010 plant survey noted curly-leaf pondweed (CLP) was found at 6 sites at a frequency of 5% in June and was not found at all in the August survey, 27% of the sites were devoid of aquatic plants in the July survey. In the August survey, 88% of the sites contained no aquatic plants.

Currently, Lost Lake has few native aquatic plants and a low occurrence of invasive plants (CLP). Implementation strategies outlined in this plan will help to increase native aquatic plant populations and continue the trend of decline of non-native plants in Lost Lake. Strategies will also include built-in flexibility, to address management/control of invasive species if they become a problem in the future.

Summary of Plant Surveys from 2010 (percent frequency):

Taxa	July 2010	Aug 2010
Canada Waterweed	73.0%	11.0%
Muskgrass	2.0%	0.0%
Curlyleaf Pondweed	5.0%	0.0%
Narrow leaf pondweed grp	2.0%	0.0%
No Plants	27%	88.0%

### **Section III: Public Input Process** (narrative):

Letters were sent to the Lost Lake Improvement Association, City of Plymouth, State Representatives and Senators and Bassetts Creek Watershed Management Commission (BCWMC), explaining that the clause allowing Lost Lake to chemically treat a greater percentage of aquatic plants within the littoral area than in the rest of the lakes in Minnesota is set to expire by April 15, 2014. Before this clause expires, Minnesota DNR is required to create a lake vegetation management plan (LVMP) to identify aquatic plant management issues in Lost Lake and develop a specific plan to address the issues, if needed. The MN DNR is partnering with the Lost Lake Improvement Association, (BCWMC), and the City of Plymouth to create this lake vegetation management plan (LVMP) for Lost Lake.

DNR representatives met with the Lost Lake Improvement Association board, BCWMC and the city of Plymouth on November 22, 2010 and on January 5, 2011 to discuss the issues with the development and implementation of the LVMP and what the potential affects may be for the lakeshore owners. From the discussion there were two main goals identified. The first was to maintain/improve the ability to paddle and boat on the lake and the second was to reclaim the ability to swim in the lake. Lost Lake's water quality is poor and all parties recognize the need to improve the water quality. It was also noted during the meetings that it will be important to build flexibility into the plan to be able to address invasive species if they become a problem in the future.



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Once the Draft LVMP is developed, a public notice will be posted in the local paper, a public meeting will be held, and then a 30 day public comment period will be provided.

The drafting committee met on January 5, 2010 at the Plymouth City hall in Plymouth. The committee had representation from the City of Plymouth, University of St Thomas, Lost Lake Association and Lake Management Inc. and the DNR. The committee reviewed the draft lake vegetation management plan and made minor changes. The Plan was presented to the public on February 7, 2011 at the Plymouth City Hall. A notice was put in the the local news paper and a press release through the DNR. The plan was made available on the DNR website, and a 30-day comments period start February 7, 2011 and ended March 9, 2011. The Lost Lake Improvement Association recognizes that they will be responsible for organizing permit requests for treatment; obtaining permission from landowners for near shore property management (areas less than 150 feet from shore); ensuring that water quality and plant community monitoring is done in accordance with DNR guidelines (if required). Currently, there are no monitoring requirements because a variance has not been issued, however; if the plan is amended to include a variance with monitoring required then ultimately it will be the permittee's responsibility to make sure the data is collected and provided to the DNR.

## **Section IV: Problems to be Addressed in this Plan** (narrative):

The Minnesota Department of Natural Resources (DNR) revised the aquatic plant management (APM) rules on April 15, 2009 (MN Rule 6280). The clause within the revised rule allowing Lost Lake to chemically treat a greater percentage of littoral area than the rest of the lakes in Minnesota is set to expire by April 15, 2014. The DNR is required to develop a lake vegetation management plan (LVMP) for Lost Lake before the clause expires. This LVMP will serve as a guide for the management of aquatic plants in Lost Lake. The LVMP is a document the DNR develops in partnership with the public to address aquatic plant issues on a lake resulting in a targeted management plan to address those issues. The problems addressed in this LVMP include: maintaining/improving the recreational activities of swimming and boating and improving water quality, as well. Ensuring plan flexibility so invasive species management can be address if they become a problem in the future.

## **Section V: Goals for Management of Aquatic Plants** (narrative, include a description of efforts to protect rare features):

There are four goals to be addressed in this lake vegetation management plan to ensure the indentified problems are addressed:

- 1) Identify strategies to enhance recreational use of the lake (i.e. Swimming and boating etc...)
- 2) Increase abundance and distribution of native submersed aquatic plants throughout the growing season.
- 3) Improve water quality.
- 4) Build in flexibility to address invasive aquatic plants like Eurasian Watermilfoil (EWM) and CLP if they become a problem.

\* The Lost Lake Improvement Association is encouraged to actively pursue partnerships and potential grant opportunities to restore the vegetative buffer around Lost Lake. The DNR is supportive of this



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endeavor and encourages the Lake Improvement Association on this potential action. The DNR also encourages the Lake Association to pursue cost share and grant programs such as the MN DNR Shoreland Restoration Grants to achieve this outcome.



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## **Section VI: Treatment Plan** (map marked with areas where control of plants is anticipated):

### A. Commons Area (>150' from shore)

Mechanical Control: Maximum total treatment acres 10 acres to be treated, 50 % of littoral area

Narrative: Guidelines for aquatic plant management are described in MN rule 6280. Mechanical control of aquatic plants is allowed up to 50% of the littoral area. The cumulative amount of mechanical and chemical aquatic plant control may not exceed 50% of the littoral area. Currently, mechanical treatment is not anticipated

Herbicide Control: Maximum total acreage allowed with chemical treatment is 5 acres to be treated, 25 % of littoral area

Product(s): Endothall (such as Aquathol K or Aquathol Super K) for curlyleaf pondweed (CLP). Any MN Dept of Agriculture approved aquatic herbicides for nuisance control of aquatic plants.

Rate of Application: Endothall: 0.75 -1.0 ppm for Curly Leaf pondweed control, and approved herbicide label rates for nuisance control of aquatic plants.

Timing of Application: Early spring between the temperatures of 50-60 degrees F for Curly Leaf pondweed control, to reduce damage to native plants and to prevent turion development.

Narrative: Aquatic plants are valuable for a number of ecological and biological functions including utilizing nutrients that would otherwise be available to algae, stabilizing bottom sediments and shorelines, providing shelter for a variety of game and non-game fish and aquatic insects, and providing food for waterfowl and other wading birds. There is evidence that removal of submersed aquatic plant through the use of herbicide can harm lakes (such as reductions in populations of vegetation-dependent fish, removal of nursery habitat for fish, removal of habitat for invertebrates (food source for waterfowl and fish), and reductions in water quality). Cumulative loss of aquatic plants (especially when coupled with nutrient loading) can lead to drastic ecological changes in lakes causing the lake to have low water clarity, become algae dominated with little to no rooted aquatic plants, and shift to disturbance-tolerant fish species such as bullhead, carp and fathead minnows (Engle 1990; Wilcox and Meeker 1992; Scheffer and Carpenter 2003; Egertson and Downing 2004, Herwig et al 2004).

Pesticide control of aquatic plants in public water may not exceed 15% of the littoral area, except that on waters that are 20 acres and less (i.e. Lost lake; MN Rule 6280.0450 Subp.4A), pesticide control may be permitted on up to five acres or one-half the surface area, whichever is less. This is a level of plant control the DNR has confidence in that will allow riparian owners access to the lake while maintaining the basic functions and benefits that aquatic plants provide. Most lakes never reach the State wide 15% limit (i.e. for lakes 20 acres and larger per MN 6280.0450 Subp.4A) using chemicals to control aquatic plants. A variance is required to remove



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more than five acres or 25% of the littoral area in Lost Lake, and monitoring of the plant community and the water quality is required to ensure that cumulative impacts of aquatic plant removal are not resulting in harm to the lake.

One of the situations the DNR considers issuing a variance to the 15% limit is for the selective control of invasive species to enhance ecological and recreational benefits. Currently, invasive species (Curly leaf pondweed) do not make up a significant proportion of the plant community in Lost Lake and are not ecological or recreational nuisance within the lake at this time. If invasive species become an ecological or recreational problem, this LVMP may be amended to include a DNR approved treatment regime. There are no treatment regimes that are 100% selective for invasive species. However, there are some treatment regimes that are more selective using low dose, targeted herbicides, and timing of treatment to reduce the impacts to native plants. The above information on herbicides, timing, and target concentration are the current understanding of “selective control” for CLP and EWM. Selective control of invasive species is an evolving science and the treatment protocol may change as new information becomes available.

Other:            acres to be treated,            % of littoral area

Narrative:

## B. Individual Permit Standards (new permits)

Chemical Treatment of Submerged Vegetation: individual shorelines may be allowed to treat up to 100 feet or half the property’s shoreline whichever is less except for properties that have less than 70 feet of shoreline may treat up to 35 feet along shore 100 feet lakeward

Narrative: Permit requests are subject to inspection and the aforementioned limits are maximums allowed for native species control. Selective control of invasive submerged aquatic plant species may be allowed to treat up to the entire frontage of the shoreline given that the stand of invasive species is nearly a monoculture, very dense and matted, and there are not native species present that would be affected by the “selective treatment”.

Permit standards for individual shorelines are in place to ensure each shoreline retains some aquatic habitat. Near-shore habitat, which are the most frequent targets for control efforts by shoreline property owners, are particularly important for water quality improvement and maintenance and as habitat for young or small fish, and have the greatest diversity of non-game fish and amphibians (Poe et al. 1986; Bryan and Scarnecchia 1992; Weaver et al. 1992). Many species of mammals and waterfowl depend on these aquatic plants for food and nesting sites and are especially important for laying females whose reproductive success is closely tied to the availability of aquatic plants (Krull 1970; Bellrose 1976; Batt et al. 1992: 7-9). Development is increasing on lakes (particularly in the metro area) and entire reaches of near-shore habitat have been impacted through development. Having restrictions on the amount of shoreline individual properties can treat, allows each property owner to have access to the lake while retaining some of the near-shore habitat that is so critical for fish and wildlife and water quality. These



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restrictions also allow for an equitable distribution of aquatic plant management activities among all riparian property owners while mitigating negative cumulative impacts on the lake as a whole.

Treatment of Emergent Vegetation:                    feet along shore to open water

Narrative: Individuals who would like to remove emergent vegetation to maintain access to open water may apply for a permit to keep the the current level and amount of cattails. The necessity of removal to create an access channel will be assessed by the DNR before a permit is issued.

Other Treatment -                    :                    feet along shore                    feet lakeward

Narrative:

## **Section VII: Funding** [check all that apply]

- Lake Association
- DNR Grant
- Lake Improvement District (LID)
- Conservation District
- Other (please describe) \_\_\_\_\_



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**Section VIII:** The commissioner may issue APM permits with a variance from one or more of the provisions of parts 6280.0250, subpart 4, and 6280.0350, except that no variance may be issued for part 6280.0250, subpart 4, items B and C. Variances may be issued to control invasive aquatic plants, protect or improve aquatic resources, provide riparian access, or enhance recreational use on public waters (6280.1000, subpart 1). Variance(s) and Justification(s) [check all that apply]

- Application of pesticides to control submerged vegetation in more than 15 percent of the littoral area (M.R. 6280.0350, Subp. 4, A). (list justification below)
- Application of pesticides to control aquatic macrophytes in natural environment lakes established pursuant to part 6120.3000 (M.R. 6280.0250, Subp. 4, E.). (list justification below)
- Mechanical control of aquatic macrophytes in more than 50 percent of the littoral area (M.R. 6280.0350, Subp. 3, B). (list justification below)
- Other (please explain)

Justifications (identify which variance and provide the rational for all items checked above):

A variance has not been issued at this time for Lost Lake. However, if invasive species become an ecological and recreational problem, the DNR and the cooperators will evaluate the conditions of the lake to determine the best course of action. This LVMP may be amended at that time to include a variance and a DNR approved treatment regime to target the invasive species if that is the agreed upon course of action. If a variance is issued then monitoring would be required to ensure that the treatments are having the desired affect and that the treatment regime is not doing more harm to the lake then good. Required monitoring would be for water quality, invasive species, and native aquatic vegetation as described below.

- Variance approved without condition(s)
- Variance approved with following conditions(s):

Pretreatment data collection

**Narrative:** pre-treatment data would include a pre-treatment point intercept inventory of the aquatic plant community and water quality data to serve as baseline data to compare the effectiveness of the treatment regime and to determine the impacts on the lake.

Post treatment data collection

**Narrative:** At least one point-intercept survey will occur annually during the peak growth of native vegetation (late June through August). It will be the responsibility of the lake association to make sure a point intercept is conducted. Again, reliable water quality data must also be collected throughout the season. The survey reports and water quality data



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must be provided to the DNR, by the lake association, and other interested parties upon completion or by the fall of each year.

**Evaluation**

**Narrative:** The DNR, in conjunction with other interested parties, will review the point-intercept survey(s) and water quality results annually. If the point-intercept surveys or water quality data reveal that the herbicide treatments appear to be doing more harm than good, treatments may be ceased at the discretion of the DNR. Examples of reasons to stop treatments include, but are not limited to, notable decreases in water quality and obvious decreases in native vegetation. If treatments are ceased, the DNR will work with the association to develop an alternative management strategy.

**Other:**

**Narrative:**



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## **Section IX: Signatures**

This Lake Vegetation Management Plan is in effect for 5 years from date of Regional Fisheries approval. If the plan is not renewed then permits will be issued according to standards listed MR 6280.

DNR Approval

Submitted By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

_____	_____
Area Fisheries Supervisor	Date

_____	_____
Regional Fisheries Approval	Date

_____	_____
Regional Ecological Resources Approval	Date

I affirm that I am an authorized representative of Lost Lake Improvement Association and acknowledge participation in the development and implementation of this lake vegetation management plan.

_____	_____
Cooperator's Signature and Title	Date

Either party may terminate participation in this plan at any time, with or without cause, upon 30 days' written notice to the other party. If participation is terminated, permits will be issued according to standards listed MR 6280.



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## Glossary of Terms:

**Lake Vegetation Management Plan (LVMP):** An LVMP is a document the DNR develops with public input to address aquatic plant issues on a lake. It seeks to balance riparian property owners' interest in use of shoreland and access to the lake with the preservation of aquatic plants, which are important to a lake's ecological health.

**Total Phosphorus:** The measure of the total concentration of phosphorus present in a water sample. Phosphorus is typically the nutrient that limits aquatic plant and algae growth in freshwater lakes and enters a lake through both point-source and nonpoint-sources.

**Secchi Disc:** A circular disc used to measure water transparency in lakes. The disc is slowly lowered into the water and the depth at which it is no longer visible is recorded as the Secchi Depth and is an indicator of water clarity.

**Chlorophyll 'a':** The measure of primary productivity, the rate at which light energy is incorporated into plant cells. Chlorophyll is responsible for the green color of plants and leaves.

**Mesotrophic Lake:** A lake with an intermediate level of productivity. Located on the continuum between low productivity oligotrophic lakes and high productivity eutrophic or hyper-eutrophic lakes. These lakes typically have clear water and moderate levels of submerged aquatic plants.

**Transect Survey:** A sample methodology in which lines perpendicular to shore are sampled from the shoreline lakeward. Multiple transects located around the lake are used to give an indication of plant species present.

**Point-Intercept Survey:** A sample methodology in which a grid of evenly spaced points is overlaid over the lake and a sample is taken at each point to determine presence of aquatic plant species.

**Littoral Area:** The surface area of a body of water where the depth is 15 feet or less. This is the area of the lake where submerged aquatic plants grow.