

SECTION 5

LAKE IMPROVEMENT RECOMMENDATIONS

Draft

A. GOALS AND OBJECTIVES DISCUSSION

The research performed with this study bears out the fact that Walled Lake functions as a thriving, viable water body. As with any viable lake, an ecological balance must be maintained in order for the lake to survive. The resources utilized behind the research performed have been varied but all necessary to accurately assess Walled Lake's current condition and improvements to the lake that are necessary in order for it to survive and thrive.

In addition to research detailed in prior sections, discussions with the Walled Lake Board identified overall goals and objectives for lake improvement. These included:

- Reduction in aquatic weed growth
- Reduce/eliminate closing of E.V. Mercer Beach due to high E.coli levels

The primary objective for this section of our report is to summarize deficiencies within the Lake and provide practical and economical lake improvement recommendations given the stated goals and objectives of the Lake Board. As with most Lake Improvement Boards, funding for construction improvements is limited. Therefore, a thoughtful approach to remediate the identified lake problems is necessary. Our recommendations are therefore categorized into Short Term and Long Term Lake Management plans.

Short Term Improvements constitute those activities which can be performed with minimal cost and construction impacts to the Lake. These improvements require little if any design or regulatory effort (permits, approvals, etc.). These improvements are intended to be implemented on a yearly basis for the most part.

Long Term Improvements include those activities which will typically require more expense and longer construction timing and which may pose complicated access issues to the lake. The lead time necessary to raise funding for these types of improvements can extend well beyond 1 year. For these reasons we consider Long Term Improvements to be those implemented for year 3 and beyond of the Lake Management Plan.

The Lake Management Plan (Short and Long Term Improvements) timing and costs should constitute the basis behind a Lake Area Special Assessment District for Walled Lake.

Our research on Walled Lake has found that the following conditions exist:

- Low Nutrient Levels

SECTION 5

**LAKE IMPROVEMENT
RECOMMENDATIONS**

- Greater weed growths in depth of 5 to 16 feet in depth and silty and marly bottom substrates
- Abundant Zebra Muscles, which are invasive species

Our Lake Management recommendations include detailed descriptions of the treatment, estimated costs to apply, and the frequency recommended for the treatment. Finally, implementation options and procedures for the management plans are outlined.

B. LAKE MANAGEMENT PLAN

OVERVIEW - Discussion with the Walled Lake Board indicates that the majority of residents of Walled Lake would like to eradicate or reduce the growth of lake weeds in Walled Lake. Short term recommended actions include:

Herbicide Treatment Program - We recommend that an herbicide treatment program be implemented annually. Applications may have to be performed two to three times annually as needed.

The MDEQ Water Bureau has produced a table containing information about the herbicides permitted for aquatic plant and algae control in Michigan (see Appendix I). Considering the August 3rd and 5th vegetation survey results, it appears that an annual application of herbicides may be needed at Walled Lake to control early and mid season growth of Eurasian water-milfoil.

It is important to note that complete eradication of all aquatic plants in a lake is not the objective of an herbicide treatment program. Most plants play a very important role as part of the ecological health of a lake system. Therefore, the purpose of an aquatic plant management program is to manage the growth and proliferation of aquatic nuisance plants from only selected areas. The areas that are to be managed should be based upon those parcels that have existing homes and those areas that need to be cleared for access to the lake.

It is recommended that a product such as 2,4-D, Fluridone, or Diquat Dibromide be used to control the Eurasian Water Milfoil in the areas identified as densely populated. It is estimated that the densely populated encompasses 30 acres of the Lake. The application should be performed in the spring (mid-May), while the Milfoil is still relatively small and won't leave as much decaying plant matter on the bottom of the lake. Approximately 30 days, after the initial application, a second application should be applied as needed to follow up and to control any remaining Milfoil growth. The process will probably have to be applied on an annual basis but the overall treatment area may decrease base on

SECTION 5

LAKE IMPROVEMENT
RECOMMENDATIONS

the effectiveness of the previous year's application, thereby resulting in a reduction of yearly management costs.

The use of contact herbicides should be avoided when using 2,4-D to control the growth of Eurasian Milfoil. The main reason for this concern is that 2,4-D acts as a systemic control method, whereas contact herbicides may kill the tops of the plants and interfere with the systemic action of 2,4-D.

Please refer to Figure 2.6, 2.7 and 2.8 which illustrates the Aquatic Plant densities for Walled Lake, based upon the August 3, 2009, plant survey. The chemical applicator should conduct a pretreatment survey with a representative as designated by the Lake Board, in order to confirm the general limits of the plant growth and finalize the treatment plans.

In addition to recommended herbicide treatment modifications an annual aquatic plant survey should be performed, at least for the first three treatment seasons, in order that a plant response can be observed and recorded. These observations will allow the herbicide treatment program to be further modified as needed and may provide an early indication as to the success of the program. A state licensed herbicide applicator can perform this task once the program begins, and can include these observations along with the permit application to the MDEQ.

ESTIMATED COST:

<i>Aquatic Herbicide Treatment Program (Milfoil) – Initial Application</i>	
\$375/Acre x 30 Acres	\$11,250.00
Permit Fee	<u>\$ 1,500.00</u>
	\$12,750.00

<i>Aquatic Herbicide Treatment Program (Milfoil) – Follow Up Application</i>	
\$375/Acre x 10 Acres	\$ 3,750.00
Project Total (Annual Cost)	\$16,500.00

APPLICATION FREQUENCY - Annually

Mechanical Weed Harvesting – The implementation of a mechanical weed harvesting program would assist in providing aquatic weed control near the top 5 to 6 feet of the lake. This method would not eradicate the invasive plants, such as Eurasian Milfoil, but would have a similar effect as mowing a lawn. It is anticipated that it would be necessary to have a minimum of two subsequent follow up harvestings to manage the aquatic weeds due to regrowth. The level and speed of regrowth will be affected by climatic conditions and can vary from year to year. It should be noted that if the harvesting operation distributes fragmented pieces of Eurasian Milfoil that the Lake may experience new growth from the fragments.

It is recommended that a weed harvesting program is implemented to control excessive weed growth for areas that are not treated by the

SECTION 5

**LAKE IMPROVEMENT
RECOMMENDATIONS**

herbicide program. It is estimated that this area encompasses 120 acres. The initial harvesting program should be conducted two times annually to further evaluate the aquatic weeds response.

ESTIMATED COST:

Mechanical Weed Harvesting (Approximately 120 acres)
\$325.00/Acre x 120 Acres \$39,000.00

Assume 2 times per year

Project Total (Annual Cost) \$78,000.00

FREQUENCY – Annually

Waterfowl Management Program - We recommend that a waterfowl management program be implemented annually to assist in controlling E.coli levels within Walled Lake. A spring and summer program may need to be implemented.

A waterfowl management program is permitted through the Michigan Department of Natural Resources (MDNR). Currently there is not a permit fee but it is anticipated that a fee of approximately \$200 will be required in the future. A waterfowl management company can assist in controlling waterfowl populations. These practices typically include a spring time swan and goose nest destruction. These activities can be performed by residents according to the MDNR parameters and permit.

A follow up goose round up may be required during the summer. (Swans are not controlled in this manner.) The geese are collected during the summer before the young geese are able to fly and when the adult geese have lost their flight feathers. Geese are relocated to swamps, ponds, and lakes throughout Michigan as directed by the MDNR. A select few may be sent to local soup kitchens.

This program is recommended on an annual basis but may be re-evaluated annually upon the effectiveness of the waterfowl removal in preceding years.

A waterfowl management program will reduce the E.coli level contributions from waterfowl, though they may not be the only source of E.coli contributions to the lake. Existing programs, as required through the National Pollutant Discharge Elimination Program, are in effect that require Municipalities to identify and correct sources of E.coli from illicit connections.

ESTIMATED COST:

Spring Nest Destruction
Permit Fee \$ 200.00

Draft

SECTION 5

**LAKE IMPROVEMENT
RECOMMENDATIONS**

Appearance Fee (for Geese)	\$ 100.00
Appearance Fee (for Swans)	\$ 200.00
\$30/nest x 10 nests	<u>\$ 300.00</u>
	\$ 800.00

Summer Goose Round Up

Appearance Fee	\$ 100.00
100 geese	<u>\$1,100.00</u>
Project Total (Annual Cost)	\$2,000.00

Self-Help Program - The MDEQ has developed a program that has been entitled the Cooperative Lakes Monitoring Program http://www.michigan.gov/deq/1,1607,7-135-3313_3686_3731-14766--,00.html. It is recommended that the Lake Improvement Board for Walled Lake, begin such a program on the lake. The data that is collected by the residents of Walled Lake will assist in developing a historical data, by which future projects will be based upon. Several of the items that can be included in such a program are: Secchi disks observations, lake level water observations, temperature, pH, and dissolved oxygen levels, among others. Self imposed restrictions may also be developed that will benefit the lake water quality such as: limited use of phosphorus based fertilizers, encourage the raking of leaves adjacent to shoreline (to prevent the leaves from being blown into the lake), restricted yard waste burning, irrigation schedules and the development of neighborhood environmental awareness programs. A vegetative buffer zone should also be considered as a best management practice (BMP).

These programs also offer the most important aspect that can be available to any organization that share common goals, and that is networking. The association will be able to make contact with other associations and lake improvement boards that have already implemented some of the programs and projects that the residents may be in the process of considering.

ESTIMATED COST – Costs to develop this program can vary. If performed by residents, it is recommended that a budget of \$2,000 be established for year 1 and \$500 for subsequent years.

FREQUENCY – Year 1, updated annually.

C. BUDGETS AND FINANCING OPTIONS

The budgets that are developed below are to be used for estimating purposes only. As one begins the process of planning, designing, construction and maintenance phases of projects involving lakes, a word of advice would be to proceed, prudently.

SECTION 5

**LAKE IMPROVEMENT
RECOMMENDATIONS**

If the projects are to be financed for a period of several years, then interest cost would need to be accounted for and added to the cost shown below.

Lake Management Budget

Year 1

A.	Herbicide Treatment (40 acres)	\$ 16,500.00
B.	Mechanical Weed Harvesting (120 acres)	\$ 78,000.00
C.	Waterfowl Management Program	\$ 2,000.00
D.	Self Help Program (year 1)	\$ 2,000.00
E.	Lake Improvement Study	\$ 16,115.00
F.	Administrative/Legal Fees	\$ 20,000.00
G.	Lake Management Fees	\$ 1,500.00
	Year 1 Total	\$ 136,115.00

Subsequent Years

A.	Herbicide Treatment (20 acres)	\$ 9,000.00
B.	Mechanical Weed Harvesting (120 acres)	\$ 78,000.00
D.	Waterfowl Management Program	\$ 2,000.00
D.	Self Help Program (year 1)	\$ 500.00
E.	Administrative/Legal Fees	\$ 10,000.00
F.	Lake Management Fees	\$ 1,500.00
	Subsequent Year Annual	\$101,000.00

D. IMPLEMENTATION

Since it is unknown how the Walled Lake Improvement Board will develop the special assessment district (SAD) at the time of writing of this report a cost distribution per riparian parcel will be used to assist in planning purposes. If the cost is distributed equally amongst the riparian parcels each parcel would be assessed approximately \$362.00 for year 1 and \$268.00 for subsequent years.

In order to implement any one of the above outlined projects on a conceptual basis, the Lake Improvement Board will need to take the following actions:

1. Adopt a project or program and its estimated budget.
2. Set a date for the Hearing of Practicability. During this meeting, the Lake Improvement Board for Walled Lake approves a project and its associated estimated budget.
3. Set a date for the Assessment Hearing. During this meeting, the Board approves the assessment formula, and the associated

SECTION 5

**LAKE IMPROVEMENT
RECOMMENDATIONS**

Assessment Roll. Once approved, the roll is forwarded to the City Clerks with authorization to spread the approved assessments.

4. Contract Documents are usually prepared next. The contract documents generally include the plans and specifications for the approved project.
5. A bid opening date is set and the project is then advertised.
6. The bids received are opened and the bids are evaluated.
7. The project is awarded.
8. The project begins.

Items 1 - 8, listed above are but a simple summary of all of the tasks and events that generally need to take place when proceeding with project associated with lake improvements.

When the project implementation process has been completed for a particular project or program, the above noted items will generally need to be repeated on an annual basis.

F. CLOSING REMARKS

The project would like to thank the Walled Lake Improvement Board for having given our project team the opportunity to prepare this report.

Walled Lake is a beautiful Lake. The fact that its residents have made a commitment to take the initial steps to preserve the lake and its water quality is a clear indication that Walled Lake is in good hands. We wish you all the best of times.