

LAKE IMPROVEMENT PROGRAM

UPPER LONG LAKE

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May 9, 1984

BACKGROUND

Upper Long Lake is located in Sections 7 of Bloomfield Township and 12 of West Bloomfield Township. It has a surface area of approximately 123 acres and an immediate watershed of approximately 564 acres with 5.6 miles of shoreline.

SCOPE

There have been various aquatic weed control methods practiced in past years on Upper Long Lake. The purpose of this report is to define these and other available methods and to recommend a control program for 1984.

CONTROL METHODS

This report emphasizes short term lake management techniques. The weed infestation problem exists. The concern is how to effectively control the situation so as to improve the aesthetics and recreational uses of this valuable resource. There is no intent to discount the importance of prudent long term management. The crux of any weed infestation problem is the existence of high nutrient levels; specifically nitrogen and phosphorus. There are many long term practices which will retard the eutrophication process such as restricted lawn fertilization and implementation of erosion control measures. It is the responsibility of the residents within the watershed to educate themselves and practice these measures. The long term benefit will be a decreasing necessity for costly short term control measures. Following is a description of short term control alternatives:

I. Chemical Treatment

Various aquatic plant samples were collected from the lake in early May. Species present include Eurasian Milfoil, Chara, Common Duckweed, Whitestem Pondweed, and Curly Leaf Pondweed. There are undoubtedly other species present, but the above appeared quite prevalent. The following chemicals, all state and federal approved, have proven effective in controlling the above mentioned species: For Eurasian Milfoil the chemical 2,4-D has proven most effective. This is a translocated chemical in which the active ingredient migrates to the root of the plant. Experience has indicated more success with diminishing regrowth rates associated with use of this chemical as compared with contact herbicides. In fact, certain studies have demonstrated an increase in the regeneration of plant

biomass following treatment with a contact herbicide. This might be attributed to the fact that a contact herbicide will destroy plant foliage thereby increasing sunlight availability to the essentially unaltered root system of the Milfoil plant. The Milfoil plant will continue to grow and choke out other native plants more susceptible to the contact herbicide. Control of this species is most important as it is a nuisance macrophyte which is rapidly infesting the waters of this region. It also appears to be quite prevalent in Upper Long Lake. For pondweeds, the chemical group consisting of the active ingredient Salt of Endothall has proven very effective. The contact herbicide Diquat has proven effective in controlling Duckweed, and also is effectively used in follow up treatments to areas infested with Milfoil after treatment with 2,4-D. Chara, which is a weed-like algae, is effectively controlled with copper sulfate or chelated copper. Use of herbicides has proven most effective at a water temperature of 59 to 65°F, and prior to the weeds developing seeds. This makes late May and June an ideal time for first applications. One of the most serious considerations in any treatment program is the degree to which the lake ecosystem will be disrupted. With chemical treatment the oxygen-carbon dioxide balance will be upset because of decreasing photosynthesis and increased metabolism of dying vegetation. The result is decreased oxygen concentrations. There is a potential for fish kills where a large portion of a lake, heavily infested with weeds, is chemically treated. The decomposing weed matter will release nutrients which when combined with carbon dioxide and improved light penetration, resulting from weed control, might result in algal blooms including such species as Chara or other planktonic algae. Therefore it might be appropriate following chemical treatment for weed control to follow up with a copper sulfate treatment for algae control. Studies and experience with the use of all of the mentioned chemicals have demonstrated that when applied at controlled rates and under controlled conditions no fish kills should occur. The Environmental Protection Agency and Michigan Department of Natural Resources have established very strict guidelines and acceptable concentration levels for the herbicides and algacides proposed. Full compliance with all of their guidelines and established procedures is mandatory for any licensed chemical applicator so as to protect the public health and mitigate to the extent possible any detrimental impact to the lake environment.

II. Mechanical Treatment - Harvesting

Weed harvesting equipment consists of a mechanical harvester with conveyor system. A typical harvester will cut a swath approximately 8 feet wide and 4 to 5 feet deep, utilizing front and side mounted sickle bars. The severed weeds fall on a conveyor belt and are loaded into a hopper on the harvester. When the hopper is filled, the harvester will either return to shore for transferral of the biomass to a vehicle which will haul to a disposal site, or an intermediate transport vehicle will be utilized in hauling the material to shore. There are various positive and negative

environmental effects of harvesting. Positive effects include: (1) organic matter removed is no longer available to deplete oxygen supplies through decomposition; and (2) nutrients are not available for recycling upon plant decay. Negative effects include: (1) a temporary increase in turbidity; (2) increased growth due to removal of shading plant canopy; (3) release of nutrients from harvested plant stalks; and (4) potential for plant spread by vegetative means. It is this last effect or tendency which is of the utmost concern, especially as pertains to Eurasian Milfoil. There have been various studies undertaken by both United States and Canadian governmental agencies with regards to control of this aquatic plant. To date there is no consensus among aquatic biological experts as to whether or not in the long run harvesting is a truly effective means of controlling this species. Some experts contend that experience with a controlled annual harvesting program indicated a significant reduction of biomass and therefore regrowth rate over a period of time. Other experts have contended that harvesting tends to increase the biomass due to fragmentation. The harvested plant fragments not picked up by the harvester may drift into uninfested areas and take root creating new plants.

III. Miscellaneous Treatment Methods

There are other available means of aquatic plant control. One such method is mechanical dredging. This method has proven to be very costly and would very likely have a dramatic environmental impact on the aquatic ecosystem. Another method involves winter drawdown of lake waters as some species of plant are particularly susceptible to subfreezing temperatures. Although Milfoil appears to be successfully controlled by this method, there are numerous undesirables such as potential fish kills and elimination of desirable food plants for water fowl. Another method involves introduction of a biological control (e.g. shellfish, insects, fish such as common carp and grass carp, etc.). This method is not desirable at this time in as much as there is little history of the effectiveness of such programs.

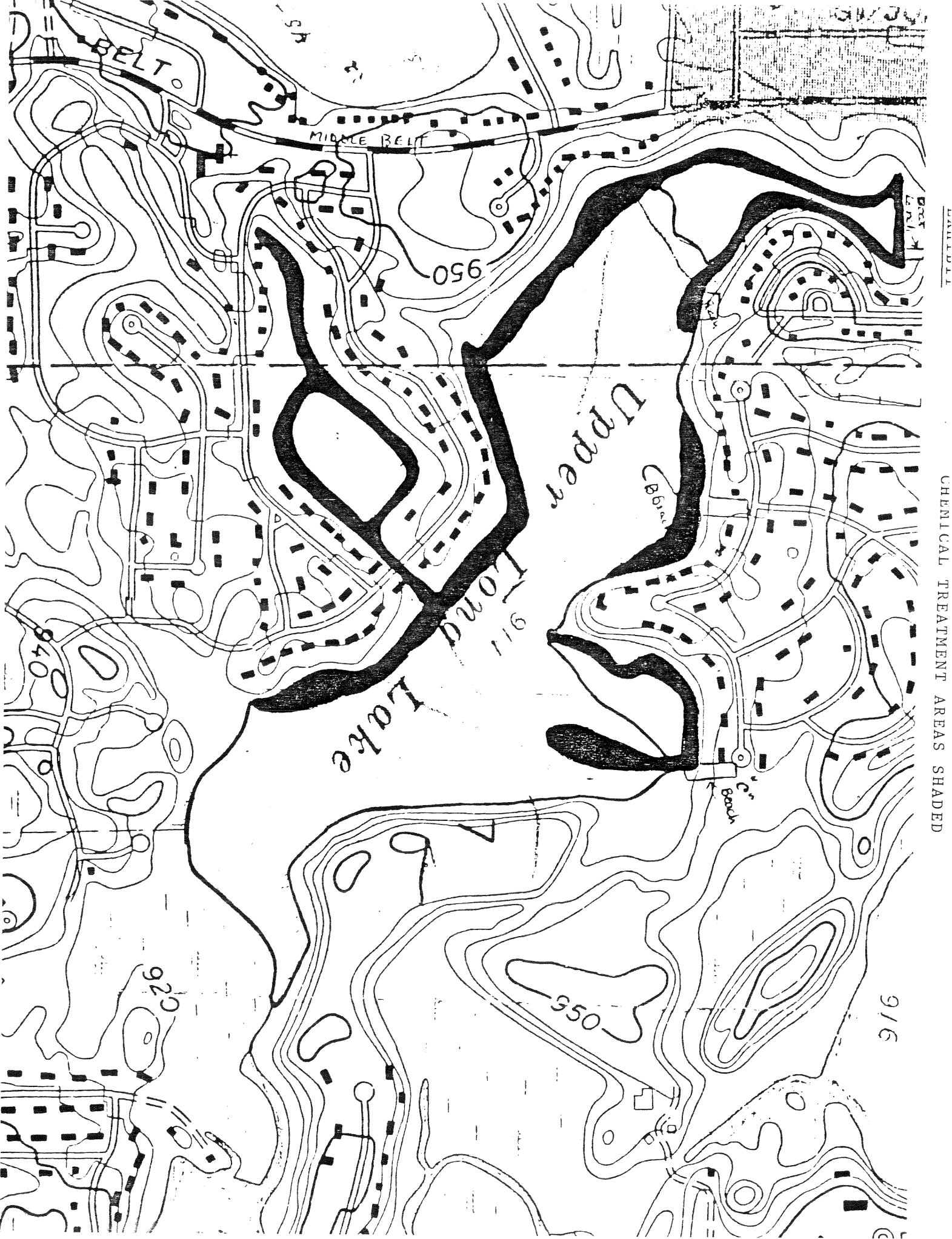
RECOMMENDED TREATMENT PROGRAM

The treatment program for Upper Long Lake will consist of chemical applications and mechanical weed harvesting. Caution should be exercised in the amount of chemical applied, as excessive dosages or widespread use will lower the dissolved oxygen levels below acceptable limits. The chemical treatment this season will be limited to shoreline and canal areas, as depicted on the attached exhibit. Better coverage of these areas is possible utilizing the chemicals in that mechanical harvesting equipment would have limited accessibility. Several chemical applications are proposed

which will result in more complete weed and algae kills. Copper sulfate will be used in later treatments in combating algae blooms which may occur as a result of decomposing weed matter. The applications are to be staggered from approximately May 15 to August 1. The chemicals previously suggested in this report are recommended; although there may be other suitable DNR approved substitutes. Mechanical harvesting is to be utilized in the balance or central portion of the lake. The harvesting program is to consist of two cuttings with the first from approximately June 6 through June 20 and the second from July 25 through August 4. Time schedules may need to be altered for both chemical and mechanical treatments to better coordinate the program. The success of this program will depend to a large extent on control of the prevalent Eurasian Milfoil. It may be necessary in future years to alter the treatment program to more effectively combat the spread of this species.

REFERENCES

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6. Nichols, S. A. and Shaw, B.H. 1982 Physical, Chemical, and Biological Control of Aquatic Macrophytes. North American Lake Management Society Oct. 26-29, 1982 Vancouver, British Columbia.
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CHEMICAL TREATMENT AREAS SHADED