LAKE IMPROVEMENT PROGRAM

WABEEK LAKE

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BACKGROUND

Wabeek Lake is located in Section 18 of Bloomfield Township. It has a surface area of approximately 28 acres and an overall watershed including the lake area of approximately 132 acres. There is approximately .9 mile of shoreline.

SCOPE

There have been various aquatic weed control methods practiced in past years on Wabeek Lake. The purpose of this report is to define these and other available methods and to recommend a control program for 1989.

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:

1. Chemical Treatment

There are various aquatic plants indigenous to waters of this region. These include commonly found algae such as Chara and macrophytes such as Eurasian Milfoil, Duckweed, Coontail, Elodea, and several species of Pondweed. 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. 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, Coontail, Elodea, 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

Harvesting is a procedure to cut and remove nuisance rooted plants and associated filamentous algae. 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. Dredging a lake does remove nuisance plants and their root systems. It also removes nutrient laden soil from the lake bottom. It should be recognized, however, that it also removes desirable food plants for fish and water fowl. Widespread removal of plant life will result in decreased photosynthesis and lower oxygen concentrations which as previously pointed out is quite disruptive to the ecosystem. Dredging should only be considered in controlled locations within a lake and never in a widespread manner. It also has demonstrated to be very expensive and more than likely the least cost effective treatment alternative. Another method involves winter drawdown of the 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.). It is known that carp will feed on desirable plant foods, eating Milfoil for instance as a last resort. There has to date been very little experience in the State of Michigan with biological control and reluctance on the part of the Department of Natural Resources to promote this as a viable treatment alternative.

CONCLUSION

The most commonly applied treatment methods for control of aquatic weeds in waters of this region are chemical application and mechanical harvesting. There is an ongoing debate in this field of endeavor as to which methodology is more suitable to achieving the desired results. Every lake has its own unique environment. There are important factors to consider which vary from lake to lake such as area, depth, and the various species of plant native to that particular lake. The selected treatment program must therefore be specifically geared towards the lake in question. Chemical treatment must be viewed strictly as a short term solution. It does not remove nutrients from the lake environment. On the contrary, the soils become nutrient laden and therefore even more susceptible to future weed and algal blooms. Mechanical harvesting, on the other hand, has been contended to result in a reduction of regrowth rate over a period of years due to the reduction of biomass. Harvesting still should be considered a short term solution to the weed infestation problem. It may take a number of years with a controlled harvesting program to realize any long term benefit.

RECOMMENDED TREATMENT PROGRAM

Wabeek Lake varies significantly in depth. It is shallow at the east end. Chara is prevalent in this area and historically has been a predominant species for this lake. It is not desirous to completely eradicate this plant although it may hinder recreation uses of the lake. Chara is considered beneficial vegetation as it filters nutrients out of the water column thereby reducing nutrient levels available for other nuisance plants. Eliminating this plant might result in the increased presence of Eurasian Milfoil, for example, which is an even greater nuisance. The selected treatment program for Wabeek Lake is mechanical harvesting. Two cuttings are proposed. The first harvest is to occur around the end of June or first part of July. The second cutting is to be scheduled around the middle of August. Harvesting will not eliminate the plant, leaving much of the root system intact. It will however improve the aesthetics and recreational uses. It also will not have the significant impact on dissolved oxygen concentrations and therefore fish habitat as widespread chemical use might. It might be desirous to use limited quantities of copper sulfate to control Chara in shoreline areas that the harvester has difficulty maneuvering in, or to control the presence of planktonic or filamentous forms of algae. Caution and discretion in the use of chemicals is imperative. The treatment of this lake in oncoming years needs to be closely monitored in terms of effectiveness; and there needs to be flexibility in the selection of control program as environmental factors may change over time. It is important to recognize that the goal of aquatic plant management is to maintain a proper balance of plants within a lake and still retain the lake's recreational and economic importance.

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