

Lake Benton Executive Summary

Plan for addressing curly leaf pond weed & other water quality issues - 2003

Executive Summary

Lake Benton is a 2,875-acre recreational lake located on the crossroads of U.S. HWY 75 and U.S. HWY 14. It has an average depth of seven feet with a maximum depth of nine feet. Over the last ten years, curly-leaf pondweed (*potamogeton crispus*) has invaded Lake Benton and turned a lake that was once for fishing and recreation into an unusable environment. If this situation is not reversed, Lake Benton will become completely unsuitable for recreational use as well as an unfit habitat for fish and native plants.

The removal of this invasive, exotic plant is critical for the survival of the lake and critical for the economic revival of the Lake Benton area, including Tyler and the city of Lake Benton. The lake has deteriorated to the point that all native plants have disappeared due to the fact that the lake's temperature, water depth, and nutrient levels are ideal for the propagation of curly-leaf pondweed. Local businesses, tourism and property owners have all been affected by the curly-leaf pondweed, thus impacting economic growth and property values. For example, Lake Benton land values have increased by only 1% a year whereas land values for Lake Shetek have increased by 25% each year for the past five years. The property values of Lake Benton are lagging far behind the growth seen for properties on similar lakes.

The MBA students at SMSU have thoroughly researched various control and eradication methods for curly-leaf pondweed and how these methods affect the fish. These methods include mechanical, biological, and chemical controls. The mechanical methods included harvesting/raking, rotovation, plastic shading, dredging/drainage and winter draining. These methods were found to be too costly, killed both the curly-leaf and native plants, or took years for the lake to recover. Some of these methods, such as plastic shading, are not permitted by the DNR.

The biological method considered was the stocking of triploid grass carp (white amur), a native fish of China and the USSR. Even though grass carp was found to be the least expensive method that has been successfully used for controlling curly-leaf in other states, such as Florida, North Carolina and Michigan, the DNR will not allow even sterile grass carp to be stocked in Minnesota lakes.

Chemical methods of control include seeding with iron filings and the use of herbicides such as Aquathol K and fluridone. The iron filings were found to stunt the growth of the curly-leaf; however, there are not many studies on long-term effectiveness as well as the long-term effects on the native habitat, fish, and wildlife. Other iron filing concerns are on the patents and may require further exploration and expert legal advice. Aquathol K is an endothall-based herbicide approved by DNR. This herbicide has been found to be an effective and ideal method when applied in early spring. If applied in early spring, Aquathol K will not harm the native plants since curly-leaf is the first plant to grow in the spring. It dissipates quickly leaving no residue and does not bio-accumulate in fish or hydro-soil. This treatment should kill curly-leaf, reduce or eliminate seed and turion production in the treated areas, and have less negative impact on native plants than treatments done later in summer.

Aquathol K was rejected because it is an expensive herbicide, perhaps costing as much as \$840,000 annually for a five year period in Lake Benton. After extensive research, we have concluded that fluridone is the best solution for controlling curly-leaf pondweed. There is significant evidence that fluridone could control curly-leaf pondweed with limited impact on native plants and the fish population. Fluridone is an aquatic herbicide commonly used to control

nuisance plants. It is absorbed by the leaves, shoots, and roots of the plants and kills susceptible plants by inhibiting their ability to form carotene, a substance which plants need to maintain essential levels of chlorophyll. Fluridone breaks down the curly-leaf life cycle and prevents turion formation, which is the primary means of reproduction. The prevention of turion production will reduce the viable turions in the lake. However, curly-leaf studies estimate that the turions embedded in lake sediments will remain viable up to 5 years, requiring fluridone applications over several years. This cost is estimated at \$200,000 or less annually.

Ongoing research by the DNR indicates that a 4-parts per billion application of fluridone in early spring will produce a comprehensive kill of the weed since its growing season begins much earlier than native plants. The 4 parts per billion should be maintained for 60 days, which might require additional "booster" applications. Wendy Crowell from the Minnesota DNR office also recommended follow-up applications of 2-parts per billion concentrations for 4 to 5 years to control the re-infestation of curly-leaf while allowing some return of native plants. The level of concentration of the fluridone in subsequent years would depend on the outcome of the first year results. Wendy also cautions that the prolonged residual of fluridone may impact native plant growth if not dissipated before the growing season.

The use of fluridone requires a permit from the Minnesota DNR. The DNR regulates the destruction of aquatic plants by serving as the permit issuing agency. Current regulations allow permits to treat up to 15% of the littoral zone (Lake Benton is considered a littoral zone) but the DNR Commissioner may issue a variance to allow treatment of greater than 15% of the littoral zone. We strongly recommend that DNR issue a variance to allow whole-lake treatment beginning in 2004. Although treatment may not begin until 2005, a variance is urgently needed in order to apply for grant dollars. The DNR has issued about eight variances for Metro-area residential lakes, providing the research support that Lake Benton needs to validate whole-lake treatment.

It is important that treatment methods be undertaken in partnership with the DNR. They have requested and should be provided a Lake Management Plan. When all affected parties agree to a plan, the first action will be a lake survey by DNR in Spring 2004, to assess the current plant population in the lake. The survey would take 3 - 4 days and when completed, treatment of the lake could begin.

The lakeshore residents have already undertaken steps to create a Lake Management District in 2004 and our MBA class has provided the research documents to support development of a Lake Management Plan. These steps will create opportunities to raise funds through grants and taxation and coordinate future planning efforts. This new Lake Management District should establish partnerships with Lincoln County, Minnesota Lake Management Association, DNR, University of Minnesota, chemical producers, and other interested parties. This Lake Management Plan will be successful when it meets the needs of community groups, individuals, landowners, and the government. This will also demonstrate commitment to implementing a solution and supporting the DNR's plant research program, The Plan represents a long-term commitment and a long-term investment for the control of aquatic nuisances.

Various funding methods looked at included taxation of county citizens for a period of no more than 5 years, donations/contributions, various fundraising activities, low interest loans, and grants. The Lake Management District to be formed by April of 2004 should have the power to levy taxes on shoreline property owners; however, it is the shoreline property owners that have final authority by voting on the taxes with a majority vote of 51%. Hopefully, this will include rezoning all lake front property as residential. With the new Lake Management District established and the DNR survey completed, then the targeted date to start treatment would be March/April 2005.

The initial funds raised through various activities may not seem adequate but will go a long way in helping to pay for the initial expenses such as travel expense, and for grant writing. The optimal approach to this would be to have resources in place so that a Minnesota LCMR grant application could be submitted prior to their March, 2004 deadline for the 2005 funds. This could greatly diminish the need for new taxes.

Since we have been told that this will be the first large Minnesota lake to be managed this way, Lincoln County Commissioner Larry Hansen will be seeking additional research support from a University of Minnesota biologist. Also, the Lake Management Plan must include a decision tree that allows for alternative treatments in subsequent years depending on the response of the curly-leaf to proposed treatments. For example, an alternative in subsequent years would be to switch from fluridone and use the quickly dissipating chemical Aquathol K.

To summarize the recommendations:

1. Write a long-term strategic Lake Management Plan before 3/2004
2. Obtain a variance for whole-lake treatment from DNR before 3/2004
3. Write a grant for Minnesota LCMR funds by the March, 2004 deadline
4. Create a lake management district by summer, 2004
5. Funding sources determined by summer, 2004
6. Whole-lake fluridone treatment, commencing March/April 2005
7. Rezone entire lake-front as residential when development opportunities warrant