

Big Chetac Chain Lake Association
Lake Management Plan Recommendation
Lake Management Plan Committee
November, 2010

Committee Members:

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Purpose of Committee: To evaluate the Comprehensive Lake Management Plan prepared by SEH in June 2010, along with the Aquatic Macrophyte Survey of Lake Chetac prepared during the Summer of 2008, and formulate a recommendation on how and what to implement to best address the findings of these two reports, the concerns of the members of the Big Chetac and Birch Lake Association, and all the stakeholders impacted by the poor water quality of Lake Chetac.

Summary of Attached Report: No 'Silver Bullet' exists which will permanently 'Fix' the issues that we face surrounding water quality and navigability. However, there is a proven, effective and economically viable option that, if implemented, can improve both water quality and navigability of our lake while at the same time protect and or enhance the active fishery, native plant growth and overall usability of the lake. The unique nature of our lake and the magnitude of the problem we have limits our viable options.

We recommend the adoption of a lake management plan that actively pursues the reduction and control of Curly Leaf Pondweed (CLP) primarily through the use of Chemical Treatment. Since CLP germinates earlier than any of our native plants, an early season chemical treatment (of Liquid Auquathal in a 1.5 parts per million concentration) has been proven effective to reduce and subsequently control the amount of CLP in bodies of water while not negatively impacting the growth of other plant life. In addition, the use of chemical treatment at the concentrations required to treat CLP has been found to be safe for fish, other animal life and humans. The use of chemical treatment also qualifies for grant funding through the WIDNR and is the primary recommendation made by the WIDNR for tackling our problem.

We also recommend the testing of a few other options, and leaving certain options available to try should they become economically viable to try. However, we have determined that the use of chemical treatment for CLP is currently really our only viable option.

In conjunction with this treatment, we also recommend implementing a property owner and lake user educational program as well. The more informed everyone is about the impact we can each have, both positive and negative, to the lake's health is essential.

In order to implement this plan we need money. We need to raise funds and apply for additional grants to offset the costs. The recommended solution is eligible for grants, which will cover 75% of the cost of treatment. We also recommend fund raising start immediately to help offset these costs.

Please read the full report below for a complete understanding of the issues and our recommendations.

Overview

While the Comprehensive Lake Management Plan prepared by SEH goes into great detail as to the reasons that Big Chetac suffers poor water quality, clarity and impediments to navigation, for purposes of this recommendation, we will be summarizing the findings of that report in the briefest of ways. For additional information, please read the reports referenced within this report. They can be accessed directly at <http://www.sehinc.com/online/bigchetac/index.htm> . However, a basic understanding of the reasons we have a green lake are essential to understand what can and what cannot be done to mitigate the problems we face.

Big Chetac Lake suffers poor water quality as of the result of two primary factors: Existing Excess Nutrient Loading (mostly of phosphorous and nitrogen) in the Lake and the annual addition of Nutrient Loading from the growth, death and decomposition of Curly-leaf Pondweed an Invasive non-native plant. This plant is estimated to currently take up some 600 of our 1900+ acres of lake on Chetac and if left unchecked will continue to spread.

These nutrients provide the food for the algae in the lake. We have been told that not all Algae is bad; however, due to the extreme amount of nutrients we have, we also have an extreme amount of Algae. That Algae is the reason that the lake turns green each summer. As the water warms, the algae multiplies, thus making the lake look greener the later in the summer it gets. In addition to good Algae, we also have a Blue/Green Algae that is bad. Blue/Green Algae is unhealthy and, as we have experienced, can turn the water toxic to both animals and humans.

The topography of the lake and the way in which water enters/feeds and subsequently leaves the lake is also part of the reason we have the problems we have. The Comprehensive Lake Management Plan refers to the amount of time it takes for 100% of the lake to renew its' water volume. Lake Chetac has very slow water turn over compared to other lakes. As a result, we end up with more debris (nutrient sources) floating to the bottom and decomposing than most other lakes. CLP, unlike our native plant population, dies off each and every season adding to our nutrient levels.

Overall, the report says that Big Chetac has had water quality/clarity issues since the beginning of time for all intents and purposes. In fact, the water quality/clarity is better today than it was in the early nineteen hundreds. Lots has transpired and changed since the early 1900's. Logging and related industries have ceased, we now have a dam, there has been extensive shoreline development, and the list goes on. All of the above impacts the ecosystem of the lake and its resulting water quality (some to the good and some to the bad). This makes comparison to early times somewhat pointless. While we can say that the lake is better today than it was in the early 1900's, we can also say that the lake is currently degrading each year as more and more Curly Pondweed (CLP) spreads throughout the lake.

Therefore, we have a real growing concern (pardon the pun) with the addition of Curly-Pond leaf. It is not only an impediment to navigation, a killer of native plant species, adds to the amount of nutrient loading we already have, but is an ever-growing problem (it is already covering approximately 1/3 of the lakes surface area). The bottom line is that to address the water quality, clarity and navigability of the lake, we have to address the curly-pondweed issue. In doing so, we will also address the amount of overall nutrient loading the lake has.

The Comprehensive Lake Management Plan recommended Six Goals

1. Reduce the Number of Days the Lake Experiences Severe Algae Blooms that Impact Lake Use

Possible solutions include:

- a. Sediment Sealing – using a chemical called Alum, which would seal all the existing sediment at the bottom of the lake and prevent it from decomposing and releasing phosphorous. This treatment is very expensive (\$950,000 per one bid received) and would be expected to last between 5 and 8 years, so it would have to be redone every 5 to 8 years (the contractor bidding expected it to last 7 years). Therefore, if \$950,000, an annualized cost for us could range between \$118,750 and \$190,000 depending on how long the treatment actually lasted. The report suggested that perhaps just doing the north end of the lake, past the sandbar, as a viable option. A quote received for doing the north ¼ of the overall lake came in at \$237,500 or approximately \$500 per acre of treatment.
- b. Barley Straw – never been done on a lake our size and the results are not conclusive as to benefit. This is something that we could test in an area at little cost. The cost per bale is around \$3. The application is done by breaking the bales apart and putting them in netting which is attached to poles mounted in the lake. The barley somehow prevents the growth of algae. While not viable for the entire lake, it may be worth trying in a small area.
- c. Water Movement- Solar Bee. This technology keeps water flowing and inhibits blue green algae's ability to feed and therefore bloom. It also has been shown to reduce the growth of Curly-leaf Pondweed. One unit costs approximately \$50,000 and covers up to 35 acres. This would not be considered a total lake solution, but could work in certain areas. Cost would be a reason that we might not want to pursue this option. Solar Bee has proposed both a purchase and a lease option. In addition to cost, annual maintenance, installation, removal and storage might also be considered inhibiting factors. On top of that, there are no grant monies available currently which would cover any of this cost (the WIDNR has yet agreed to buy into this technology).
- d. Aeration – Our lake size inhibits this solution. However, this might be worth trying in an area to see what benefit it has. However, it would possibly negatively impact the growth of other plant species. Like the Solar Bee technology, there are no grant monies available to cover any of this cost. Yet, the cost of aeration units is a fraction of the cost of what Solar Bee is, so this technology may be worth testing.
- e. Other solutions were discussed, but none of them appear to be practical or even proven for a lake of our size (dredging the bottom, sucking the muck off the bottom).

2. Aquatic Plant Management to Reduce the Impact of Curly-leaf Pondweed

Possible Solutions Include:

- a. Chemical Treatment – Early season only to just impact Curly Pond Leaf and avoid negatively impacting our native plants. Three bids received, \$392, \$560 & \$600 per acre of treatment (based on a 1.5 parts per million of liquid Aquathal Super K, with an average water depth of 5 feet). All three vendors are on the DNR's list of licensed vendors. The low bid came from the company who treated Rice Lake with Chemical this last season.
- b. Mechanical Treatment – Later in Curly-leaf season before Turions (seedpods) form. We could not find any vendor who would contract this out, so the only option would be to purchase a harvester and do it ourselves. Very costly solution and the WIDNR is not in favor of this being tried on a large scale. See DNR's recommendations later in this document.
- c. Lake Level Draw Down – Not proven to work, could backfire and can potentially kill other plants and animals. However, proper lake level control should be monitored and insured. As we have seen this past year, the dam operator is not consistently maintaining lake levels.
- d. Manual Weeding – Not realistic.

3. Protect and Enhance the Native Plant Diversity and Distribution

In deciding how to proceed in meeting Goals 1 and 2, we need to make sure that we protect the existing native plants and if possible help them to grow and or reestablish themselves. The Curly-leaf Pondweed has killed off (or greatly reduced the diversity and distribution of) our Native Plants.

4. Aquatic Invasive Species Monitoring and Rapid Response Planning

In deciding how to proceed in meeting Goals 1 and 2, we should also be concerned with doing what we can to make sure we do not end up with other invasive species, like Eurasian Milfoil or Zebra mussels.

5. Maintain and Enhance the Current Fishery

In deciding how to proceed, we need to insure that we do nothing to endanger the excellent fishing grounds that lake Chetac provides. We obviously have seen an increase in some species as a result of the Curly-leaf Pondweed. However, we have also seen a drop in species like Walleye in that same time frame. An argument for leaving the curly-leaf alone is that the crappies and sunnies really like the weeds. Unfortunately, you can't catch what you can't access. All that said, we need to make sure that any chemicals used in the lake are not harmful to the fish and other wildlife.

6. Community, lake user, and lake riparian owner education

In deciding how to proceed, we need to incorporate some form of educational component into what we do. While only around 1% of our problem comes from homes on the lake, it is still worth

addressing. In addition, insuring everyone access to the information surrounding the environmental factors that impact our lake is an excellent idea. While we may positively impact that 1% with educational measures, we will also be strengthening our relationship with the community.

WIDNR's Recommendations on How to Proceed

We received a letter from Jim Kreitlow (dated 9/10/2010) summarizing the DNR's thoughts on how to proceed (I have cut and pasted those thoughts below):

The following are some recommendations/implementation options to start with:

1. Consider applying for a lake planning grant (or AIS established control grant if the cost is not too high) to complete the Bathtub Model that would provide information on the in-lake response (improvement) you would expect to achieve implementing different nutrient reduction options. For example how would the lake respond (Total Phosphorus/Chlorophyll A) if you controlled a certain amount of the CLP, or conducted an alum treatment in the North Basin? Would we achieve a desired in-lake benefit that would justify the cost?
2. We recommend early season chemical treatments (one to two sites/plots for treatment and one as a control) of CLP over a 3-5 year period. These would be smaller in scale and provide information on ability to control CLP, and evaluate native plant response. It would also require a pre/post monitoring evaluation as a component. These items along with other activities (Clean Boats/Clean Waters, Citizen Lake Monitoring, Shoreline Restoration and near shore runoff control) would be eligible under an AIS Established Control Grant.
3. We might consider harvesting as a control technique on a smaller scale. The problem is that there is a short window and that harvesting needs to be done early before turion production. We are currently evaluating a couple of other projects that conducted harvesting to see if they were successful.
4. Start conducting a feasibility analysis of an alum treatment in the North Basin.
5. Promote and implement watershed and near shore best management practices (BMP's).

Our Committees' Actions and Recommendations

We see goals 1 & 2 of the 'Lake Management Plan' report to be too closely tied together to separate them. We believe that anything we do to reduce the amount of Curly-leaf Pondweed (Goal 2) will directly help us in minimizing the number and duration of Blue/Green Algae Blooms during the summer (Goal 1). In addition, there were only three possible solutions to addressing Goal 1 by itself, which we can actually use today (Barley Straw & possibly Solar Bee [if the price is right] and Aeration).

We went out to vendors to get bids and/or gather cost information regarding the various options. Our recommendations have been guided by not only the prepared reports and the recommendations of the WIDNR but from what we found in the process of trying to find vendors to perform these services.

As indicated earlier in this report, we did get one bid for Sediment Sealing (Alum - a Goal 1 treatment). We only had one vendor willing to price it out. Neither they nor the other vendor we tried to get a bid from thought it was worth pursuing. Both companies are in the business of doing these treatments, and neither thought that doing a partial lake or whole lake treatment was viable given the size and

topography of our lake. So, while the WIDNR suggested we explore the feasibility of a partial lake treatment (for the north end), we have concluded that this treatment is not in fact currently economically and possibly not even environmentally feasible. We have come to that conclusion based upon the reaction from the scientists we asked for bids from.

While both the SEH Lake Management Plan and the DNR have suggested testing of various alternatives like Mechanical Harvesting in addition to Chemical Treatment of the CLP, we were not able to find any vendors who would contract out for harvesting. The only alternative then if we were to pursue harvesting as a potential treatment would be to purchase a harvester, which like the Solar Bee equipment is quite an upfront investment. If we were to take it on ourselves, we would have to add in maintenance, operating and storage costs. In addition, we would have to deal with disposal issues and costs for the CLP we harvested. We do not believe that we should pursue harvesting at this time as an option.

Given all the above, we are recommending the following to be tested using a three year test (Three years to allow for the germination of existing Turions - curly-leaf seed pods) that are on the bottom of the lake:

Each of the following would be tried in a separate designated location. Any test that is performed needs to have pre and post testing done in accordance with guidelines established by the DNR. The person who prepared our Plant Survey (Matt Berg) would be contracted with to do this testing. The cost of this testing qualifies for partial funding under any grants which we may apply for.

- 1. Chemical Treatment of CLP:** We suggest trying the chemical treatment of CLP in several different locations around the lake, like the DNR launch, the bullpen area, the north end, or the entrance to the channel to Birch. We would look to the vendor and the DNR for help in selecting the areas to be tested, and which would provide the largest bang for our buck. For instance, shallower areas are cheaper to treat than deeper ones, and there may be some limited positive downstream impact to treatments as well (given that water does not remain motionless and the chemical has some limited shelf life).

From subsequent communications with the WIDNR, they are suggesting we choose two test areas to treat with chemical and one control area to compare the results against for a running three years. Each of the three areas would be included for pre and post testing. The DNR suggested areas ranging from 25 to 45 acres as good testing options. Based upon the results of this testing we would decide on how to proceed. We might, after two seasons, start planning how to expand the program. This would mean initially treating between 70 and 90 acres of lake surface area (which represents between 11.67% and 15% of the 600 acres of existing CLP). This would appear to be a meaningful start.

Our committee feels strongly that we need to treat as many acres as possible in our test given the progressive problem that the growth of CLP represents. Waiting to take action will result in fewer surviving native plants, less navigable water and less water quality leading to decreases in property values and potentially catastrophic impact to the local economy.

The amount of acres we initially tackle is limited by two primary factors, the WI DNR and the amount that we can afford to treat. We are eligible for up to \$200,000 per year in funding

with a 25% match of our own funds. The WIDNR has suggested we request one grant to cover all three years. The reason for one grant versus three separate grants is to not only save us time in regard to paper work, but to avoid the risk of funding availability being cut in future years.

The quoted cost per acre (based on three bids) ranges from \$392 to \$600 based on an average water depth of 5 feet (CLP lives in shallower water for the most part). The total cost for treated areas will be determined based on the vendor selected, and the actual water depth (based on volume of chemical needed to treat the area to maintain 1.5 parts per million of chemical concentration). The chemical itself is very expensive. The table below shows the estimated total cost for treating 70 and 90 acres with an average water depth of 5 feet:

Description	70 Acres	90 Acres
Chemical Treatment	\$27,440 to \$35,280	\$42,000 to \$54,000
Pre/Post Testing	\$5,000	\$5,640
Total Cost Per Year	\$32,440 to \$40,280	\$45,640 to \$59,640
Cost to Lake Assoc-25%/YR	\$6,860 to \$8,820	\$10,500 to \$13,500
Total for Three Year Test	\$97,320 to \$120,840	\$136,920 to \$178,920
Total Cost to Lake Assoc-25%	\$24,330 to \$30,210	\$34,230 to \$44,730

The cost of treatment and testing both qualify for WIDNR grant monies. If approved, we would only have to come up with 25% of the annualized cost, with the DNR grant monies covering 75% of the cost. We will have to raise funds to fully cover a three year test. However, with monies currently in hand and available from the Township of Edgewater, we should have the first years portion already covered. There may also be some permitting costs associated with the above due to some recent law changes. Those would need to be incorporated into any grant that we apply for as well.

2. **Barley Straw** – Placed in the area by culverts on the West Shore of the Lake where County Road F gets the closest to the lake. This area is called out as being a potentially high source of Blue/Green Algae Blooms. This needs to happen early in the season to give the barley time to start to decompose and do its work.
3. **Water Flow** – Solar Bee. Should Solar Bee come back with an economical way for us to test their product, we would like to give it a try. If Solar Bee were to offer us a free one to try as a test, then we would like to try it.
4. **Aeration** – Should a group of lake residents raise the money for a test of this technology in an area, we would support the incorporation of this into our overall three year test (as long as it was not in an area we were going to be using for one of the other tests addressed above).

All of these recommendations speak to improving the quality and clarity of the water in the lake. They all do so while at the same time insuring that native plant species are protected and potentially enhanced, and, also protecting the fishery. In addition to the above, we would like to see the Lake Association adopt a plan to help educate the users of the lake. We can do this in several ways:

1. Place educational materials on our associations' website.
2. Have the same information placed on the surrounding communities' websites.
3. Provide a package to all new property owners along with membership information for the association.
4. Have a membership drive that includes an effort to educate lakeshore property owners.

The only goal from the SEH report our recommendation does not directly address is Goal 4 Monitoring the Landings Ins-and- Outs. While a good goal, we would leave this to others to address. We have signs at all the landings that instruct users as to the importance of cleaning their boats, etc... When registering watercraft with the WIDNR, boaters also get information in regard to the transportation of invasive species. To somehow man the landings to insure boater education and inspect the boats, is better left to the proper authorities to address (the WIDNR). Take Lake Minnetonka (in MN) for example: After the introduction of Eurasian Milfoil, they introduced an inspection/monitoring system, like that proposed by SEH. It had a huge cost associated with it, yet they just recently discovered the establishment of Zebra Mussels in the lake. Therefore, despite their best efforts and the time, money and energy of many, they were unable to prevent this tragic circumstance from happening.

Conclusion

The above is the official 'Lake Management Action Plan' we would like the Big Chetac Lake Association to Adopt. We would like to see a grant applied for which meets the February 2011 deadline for grant applications for funding for Spring 2011. With a formal plan in place, we would like to see a fund raising effort be put in place immediately to fund the plan.

Whether we qualify for DNR grant monies or not, we believe that the Chemical Treatment of CLP is really our best if not only real viable solution to the water quality and navigability issues we have on Big Chetac. We currently have around \$8,000 in the Association's accounts and possible another \$8,000 committed for by the Township of Edgewater. We need to contact all our members and potential members for help. There are many other stakeholders who should also be contacted for their support as well. It is in the best interest of the local community, county and state that we successfully implement this plan.