Big Arb Management Plan Summary/Conclusions - Goals

4.0 Summary and Conclusions

The design of this project was intended to fulfill three objectives;

1) Collect baseline data to increase the general understanding of the Big Arbor Vitae Lake ecosystem.

2) Collect detailed information regarding invasive plant species within the lake, with the primary emphasis being on curly-leaf pondweed.

3) Collect sociological information from Big Arbor Vitae Lake stakeholders regarding their use of the lake and their thoughts pertaining to the past and current condition of the lake and its management.

The three objectives were fulfilled during the project and have led to a good understanding of the Big Arbor Vitae Lake ecosystem, the folks that care about the lakes, and what needs to be completed to protect and enhance them.

The studies conducted on Big Arbor Vitae Lake indicate that the lake is a fairly healthy ecosystem, albeit with several pressing issues that are of concern to lake residents. Concerns over the lake's water quality, native aquatic plant abundance and now the presence of non-native species have been voiced, rightfully so, by lake residents and other stakeholders. With baseline studies conducted and an initial understanding achieved regarding some of these issues, the BAVLA can begin moving towards management strategies. However, as many questions have been answered as to what is occurring ecologically within the lake, many answers have surfaced as well which will require further investigation.

Water quality analyses indicate that the lake is unexpectedly productive. Annual surface total phosphorus averages fall within 20 to 30 µg/L, which is slightly high for a deep, lowland drainage lake in Wisconsin. During the course of this study, hypolimnetic phosphorus values were observed to be quite high – reaching 220 µg/L during a stratified period in July of 2011 and then reaching nearly 800 µg/L in March of 2012, also during a time of stratification. Phosphorus concentrations were evenly distributed within the water column when oxygen was present in the hypolimnion. This is an indication that a phenomenon seen in some lakes, internal nutrient loading, may be occurring.

Watershed modeling was conducted upon the Big Arbor Vitae Lake to determine what the annual potential phosphorus load is to the lake, based upon the land cover acreages. With a watershed in great condition such as Big Arbor Vitae Lake's, it would be expected that the phosphorus load would be at its minimum. Indeed, this is what the model predicted – a minimal annual total load of 904 lbs. The model was also used to estimate in-lake phosphorus average concentration for the summer months as well as the entire growing season. This estimated average was much lower than what was observed through phosphorus analysis of the water column in 2011. Back-calculating through the model, it was estimated that roughly 1,091 lbs of phosphorus is loaded to the lake on an annual basis, however the model could not account for this additional source. This is a second indication that internal nutrient loading may be occurring in Big Arbor Vitae Lake.

Internal loading, as discussed in the Watershed Section, is a complicated process. Furthermore, many factors have to align in order for internal nutrient loading to impact a lake. A fair amount of lakes experience some amount of internal loading during which nutrients are released from the bottom sediments into the lower water column. In dimictic lakes, which stratify during the summer and winter and turnover only in spring and fall, the impacts of a nutrient-enriched water column may not be observed as algae are not actively growing during the spring and fall. Big Arbor Vitae Lake may turn over several times in a year, depending upon temperature and wind conditions. When this occurs in the mid to late summer, the impacts of nutrient rich water may be observed. The likely result is a dramatic increase in the algal content of the lake.

The algae content of the lake is similar to the median value for all Wisconsin lakes statewide; however, infrequent, intense algae blooms do occur. One such bloom occurred in late summer of 2012, and caused reason for health concern due to the type of algae that was observed – blue-green algae. Blue-green algae are a naturally occurring algal group that is found in Wisconsin lakes. Their numbers may flourish in times of nutrient enrichment, particularly with excessive phosphorus inputs. Phosphorus is the nutrient limiting plant growth in most Wisconsin lakes, but when excessive inputs of phosphorus occur, there are times when algal growth may require more nitrogen, as phosphorus concentrations are ample. Blue-green algae, which are able to utilize nitrogen from the atmosphere, obtain a competitive advantage during this time because they have ample phosphorus and now have a nitrogen source in the atmosphere that other algal forms cannot access. When phosphorus is released to the near-surface water layer via internal nutrient loading, this provides a perfect opportunity for blue-green algae to do well. Some, not all, blue-green algae species release toxins into the water. When their numbers are vast, these toxins may reach concentrations that are harmful to humans as well as dogs and other wildlife.

In addition to algae, native aquatic plants thrive under varying conditions as well. Onterra ecologists observed two very different situations during visits to Big Arbor Vitae Lake in 2011 and 2012. The climatic conditions during the summer of 2011 were relatively cold and fairly overcast. Ice persisted on the Northwoods Wisconsin lakes until late April that year. In contrast, during 2012, ice cover disappeared from many Wisconsin lakes in mid-March and aquatic plant growth started much sooner than normal. Furthermore, temperatures rose quickly and remained quite warm throughout much of the early and late summer. In short, conditions were less than ideal for aquatic plant growth in 2011, but were prime for growth of both plants and algae in 2012.

Big Arbor Vitae Lake stakeholders became very concerned over the levels of aquatic plant growth observed in 2012. During a late summer survey, Onterra ecologists noted several species (primarily coontail and northern water milfoil) had grown to the point of becoming matted on the surface of the lake. In some areas, navigation with watercraft was nearly impossible. The matter was discussed during planning meetings between Onterra staff, the BAVLA Planning Committee and the WDNR (Kevin Gauthier). It was discussed that these plants are growing in a nutrient rich lake, so a certain amount of aquatic plant growth needs to be expected. Exceptional conditions were experienced in 2012 climactically, and this translated into what was likely the worse-case scenario for aquatic plant growth on the lake. Excessive inputs of phosphorus due to internal nutrient loading, while clearly impacting

algae growth in the lake, are not expected to play a considerable role in excessive aquatic plant growth because these rooted plants have access to nutrient rich soils at all times. Management actions such as mechanical removal were debated upon during planning meeting discussions, but were deemed very expensive for a minimal payoff. The BAVLA Planning Committee agreed that manual removal of the plants was likely the best option for now, while monitoring of aquatic plant growth in the future was important. The Implementation Plan goes on to discuss means to address worsening conditions of aquatic plant growth, should it be observed in the future.

The growth of an invasive aquatic plant, curly-leaf pondweed, poses a different set of problems. Curly-leaf pondweed was first discovered and mapped by GLIFWC in 2008, and remapped in 2009 by Vilas County. During Vilas County's survey, curly-leaf pondweed was noted as being located at several point-intercept locations, and then mapped along the shoreline of the lake in several other areas of the lake's southeastern bay. In 2011, an Onterra curly-leaf pondweed survey identified five acres of colonized curly-leaf pondweed in the central part of the lake, with other scattered occurrences being found in the southeastern-most bay. While it is unknown to what extent colonization had been present in 2009, as this was not documented, it is safe to assume that according to the differences in density noticed between 2009 and 2011, the curly-leaf pondweed population has spread in both aerial coverage and density. The BAVLA Planning Committee discussed the matter during the course of this project, and has decided to follow a monitoring and control strategy as outlined in the Implementation Plan. This strategy will first accomplish further documentation of any changes that are occurring in the plant community and follow with an appropriate course of action.

As elaborated upon throughout this report, Big Arbor Vitae Lake stakeholders are facing several complicated management issues in the form of invasive species control, water quality issues and to a minor degree native aquatic plant growth. These issues, while identified and initially researched through the course of this study, require additional investigation to fully understand what management activities are appropriate and what kind of ecological impact is possible. Within the next section, the Implementation Plan, specific tasks are outlined which enacted will guide the BAVLA towards further understanding, and beginning the process of remediating, the Big Arbor Vitae Lake ecosystem.

5.0 Implementation Plan

The Implementation Plan presented below was created through the collaborative efforts of the BAVLA Planning Committee and ecologist/planners from Onterra. It represents the path the BAVLA will follow in order to meet their lake management goals. The goals detailed within the plan are realistic and based upon the findings of the studies completed in conjunction with this planning project and the needs of the Big Arbor Vitae Lake stakeholders as portrayed by the members of the Planning Committee, the returned stakeholder surveys, and numerous communications between Planning Committee members and the lake stakeholders. The Implementation Plan is a living document in that it will be under constant review and adjustment depending on the condition of the lake, the availability of funds, level of volunteer involvement, and the needs of the stakeholders.

Management Goal 1. Control and Contain the Current Curly-Leaf Pondweed Infestation and Prevent Future Aquatic Invasive Species Introductions to Big Arbor Vitae Lake.

Management Action: Continue Clean Boats Clean Waters watercraft inspections at Big Arbor Vitae Lake public access.

Timeframe: Continuation of current efforts.

Facilitator: Planning Committee.

Description: At this time, the only aquatic invasive plant known to exist within Big Arbor Vitae Lake is curly-leaf pondweed. This infestation is thought to be fairly recent, with the species first observed in 2008. Though the lake now holds approximately five acres of this invasive plant, further actions (described below) are being undertaken to control and monitor the population. Right now, an important aspect of managing Big Arbor Vitae Lake's ecosystem lies in prevention of the introduction of further aquatic invasive species. Additionally, it is of great importance that any invasive species (Big Arbor Vitae also holds rusty crayfish, banded mystery snail and Chinese mystery snail) are not transported from this lake to others nearby.

Members of the BAVLA have been trained on Clean Boats Clean Waters (CBCW) protocols and complete boat inspections at the public landings on a regular basis. Because this system is currently free of exotic species, the intent of the boat inspections is to prevent additional invasives from entering the lake through its public access point. The goal would be to cover the landing during the busiest times in order to maximize contact with lake users, spreading the word about the negative impacts of aquatic invasive species on our lakes and educating people about how they are the primary vector of its spread. In 2012, 40 boats were inspected during 17 hours of watercraft inspections at two boat landing locations.

Action Steps:

1. Members of association periodically attend Clean Boats Clean Waters training session through the volunteer AIS Coordinator (Erin McFarlane – 715.346.4978)

to update their skills to current standards.

2. Training of additional volunteers completed by those trained in previous summers.

3. Continue inspections during high-use weekends.

4. Report results to the WDNR and BAVLA

5. Promote enlistment and training of new volunteers to keep program fresh.

Management Action: Initiate assessment of shoreline and littoral areas of the lake for aquatic invasive species.

Timeframe: Begin Summer 2013

Facilitator: Planning Committee

Description: In lakes without Eurasian water milfoil and curly-leaf pondweed, early detection of these species commonly leads to successful control and in cases of small infestations, possible even eradication. Additionally, monitoring of current populations of curly-leaf pondweed is important as documentation of the spread of this plant is necessary.

One way in which lake residents can spot early infestations of aquatic invasive plants is through conducting "Lake Sweeps" on their lake. During a lake sweep, volunteers monitor the entire area of the system in which plants grow (littoral zone) annually in search of non-native plant species. This program uses an "adopt-a-shoreline" approach where volunteers are responsible for surveying specified areas of the lake.

In order for accurate data to be collected during these surveys, volunteers must be able to identify non-native species such as Eurasian water milfoil and curly-leaf pondweed. Distinguishing these plants from native look-a-likes is very important. Additionally, the collection of suspected invasive plant would need to be collected for verification, and, if possible, GPS coordinates should be collected.

Action Steps:

1. Volunteers from BAVLA update their skills by attending a training session conducted by WDNR/UW-Extension through the AIS Coordinator for Vilas County (Ted Ritter – 715.479.3738).

2. Trained volunteers recruit and train additional association members.

3. Complete surveys following protocols.

4. Report results to the WDNR, BAVLA and consultant if necessary.

Management Action: Contact Water Guard John Preuss regarding watercraft usage at Big Arbor Vitae public access.

Timeframe: Begin Summer 2013

Facilitator: Planning Committee

Description: During the planning process associated with this project, members of the Planning Committee expressed concern over a local watercraft sales business and their use of Big Arbor Vitae Lake to test-run watercraft. With bringing multiple watercraft to a lake and running them to ensure adequate motor function, it is important that the business be aware of and also adhere to standards and regulations set forth by the state of Wisconsin for watercraft use. Currently, it is the uncertainty of lake residents of how this business reduces transport of organisms and water from one lake to the next that is of chief concern.

A member of the Big Arbor Vitae Lake Planning Committee will contact local water guard John Preuss regarding this matter, to ascertain if Mr. Preuss has had prior discussions with this business owner about techniques to reduce transport of aquatic invasive species. This BAVLA member will then make friendly contact with the business owner to hold a discussion on the dangers and impacts of aquatic invasive species, and what might be done to limit spread of these species by the watercraft the business operates. If an amicable relationship is established, no further action may be needed. If difficulty is reached in coming to an agreement on the issue, further contact by Mr. Preuss or other regulatory entities may be necessary.

Action Steps:

1. See above description.

Management Action: Develop monitoring and control strategy for curly-leaf pondweed infestation in Big Arbor Vitae Lake.

Timeframe: Begin Summer 2013

Facilitator: Planning Committee

Description: Curly-leaf pondweed was first located in Big Arbor Vitae Lake in 2008, and has grown to a 2011 population of roughly five acres of colonized growth. Additional areas of single/few plants, clumps and small plant colonies exist. While still a recent introduction, the level of growth in Big Arbor Vitae Lake is beyond manual removal; eventually, if control efforts are to be initiated, an herbicide application will be the only reasonable means of combating this invasive plant.

In summer of 2013, a survey will be conducted to map the densities and locations of curly-leaf pondweed growth in Big Arbor Vitae Lake. This survey will occur in mid-June, or at a time when the plant has reached its peak growth but has not yet senesced (died off). This will give the WDNR, BAVLA and Onterra ecologists a good idea of how the population has changed between 2011 and this time period. From these survey results, one of two decisions will be made regarding further actions on the plant colonies. 1) If the colonies have expanded little or have changed in density very little, the BAVLA may elect to continue monitoring and forgo an herbicide treatment until the dynamics of the species in this lake are understood. In some northern Wisconsin lakes, curly-leaf pondweed expands very little and does not cause tremendous issues on the lake. 2) If colonial expansion or density increases are observed, the BAVLA may elect to proceed with herbicide treatments on areas delineated within the 2013 survey. These herbicide treatments would occur in 2014 using the methodology outlined below. The results of the 2013 survey would be used to approximate acreage for treatment.

2014 Curly-leaf Pondweed Pre-treatment Survey

In May 2014, Onterra ecologists would visit areas marked through the summer 2013 mapping survey to verify the growth of curly-leaf pondweed. This survey would determine if colonial expansion had occurred from the previous year and would be utilized to determine the final treatment areas.

Herbicide Concentration Monitoring

Following the application of the herbicide, trained BAVLA volunteers will collect water samples from both within the treatment area and outside of the treatment area at set intervals to understand the herbicide concentration in these areas. Samples would be collected following a study design determined by the United States Army Corps of Engineers (USACE). Following collection, properly preserved samples will then be sent to the USACE laboratory for analysis. The information obtained from this monitoring will tell the BAVLA if target concentrations were reached, how long the herbicide resided in the water column, how long it took to diffuse, etc. In short, this information would be useful for further herbicide decision making.

2014 Curly-leaf Pondweed Post-treatment Survey

In June 2014, when curly-leaf pondweed is at or near its peak growth, Onterra ecologists would again survey known areas of curly-leaf pondweed to qualitatively assess the effectiveness of the treatment. Because of curly-leaf pondweed's unique lifecycle, quantitative assessments following the treatment would not be able to differentiate mortality caused by the herbicide and the natural senescence of the plant at that time of year.

A Note on Curly-leaf Pondweed Herbicide Applications

Applying herbicide within the aquatic environment is much different than on a terrestrial environment. Successful control of the target plant is achieved when it is exposed to a lethal concentration of the herbicide for a specific duration of time. Spot treatments (such as what is proposed for Big Arbor Vitae Lake) that target a specific colony of that target plant have extremely short exposure times (hours) due to dilution of the herbicide within the lake. In spot treatments, a high herbicide dose is required to offset the short exposure time. Not surprisingly, a larger treatment area holds concentrations at a higher level for a longer time than smaller treatment areas.

In controlling curly-leaf pondweed, a contact herbicide is applied to the

target plant colonies. This herbicide works through contact with the tissue of the plant's structure, as opposed to a systemic herbicide which incorporates the herbicide into the plant. Contact herbicides are non-selective, meaning they may impact native species. For this reason, herbicide use is reserved for late spring, or until water temperatures have reached 60°F and native aquatic plants have begun actively growing. This reduces the impacts the native aquatic plant community may see as a result of the herbicide application.

Curly-leaf pondweed has been present in Big Arbor Vitae Lake for several years. As discussed in the Aquatic Plants Section, this plant has an unusual life cycle that is unlike Wisconsin's native plants. In mid-summer, the plant senesces and leaves behind small reproductive structures called turions. These turions fall to the sediment and produce next year's plants. After only several years, turions will build in the sediments of the lake. In subsequent years, these turions may sprout and produce plants long after their original host plant had perished. As a result, it takes several years to achieve success in curly-leaf pondweed control, because the goal is to deplete the turion base that has built up from previous years of deposition.

Control Project Applicable Funding

Costs for 2013 monitoring would be able to be collected should the BAVLA be successful in obtaining funds through the WDNR Aquatic Invasive Species Grant Program. Specifically, an Early Detection and Response Grant would be applicable to assist with partially funding this control program. This grant would provide funding for monitoring and treatment costs in a multi-year project, and would be written following 2013 surveys.

Action Steps:

1. Retain qualified professional assistance to develop a specific project design utilizing the cyclic series of steps discussed above.
2. Apply for a WDNR Aquatic Invasive Species Grant based on developed project design.
3. Initiate control plan.
4. Revisit control plan in 3-6 years.

5. Update management plan to reflect changes in control needs and those of the lake ecosystem.

Management Goal 2. Enhance Current Water Quality Conditions

Management Action: Monitoring of Big Arbor Vitae Lake's water quality through the WDNR Citizen Lake Monitoring Network.

Timeframe: Begin 2013.

Facilitator: Planning Committee

Description: Monitoring water quality is an important aspect of every lake management planning activity. Collection of water quality data at regular intervals aids in the management of the lake by building a database that can be used for long-term trend analysis. Early discovery of negative trends will likely aid in an earlier definition of what may be causing the trend.

The Citizen Lake Monitoring Network (CLMN) is a WDNR program in which volunteers are trained to collect water quality information on their lake. At this time, there are no BAVLA members currently collecting data as a part of the CLMN. Volunteers trained by the WDNR as a part of the CLMN program begin by collecting Secchi disk transparency data for at least one year, then if the WDNR has availability in the program, the volunteer may enter into the *advanced program* and collect water chemistry data including chlorophyll-a, and total phosphorus. The Secchi disk readings and water chemistry samples are collected three times during the summer and once during the spring. Note: as a part of this program, these data are automatically added to the WDNR database and available through their Surface Water Integrated Monitoring System (SWIMS).

It is the responsibility of the Planning Committee to coordinate new volunteers as needed. When a change in the collection volunteer occurs, it will be the responsibility of the Planning Committee to contact Sandra Wickman or the appropriate WDNR/UW-Extension staff to ensure the proper training occurs and the necessary sampling materials are received by the new volunteer. It is also important to note that as a part of this program, the data collected are automatically added to the WDNR database and available through their Surface Water Integrated Monitoring System (SWIMS) by the volunteer.

Action Steps:

1. Contact Sandra Wickman (715.365.8951) to determine if space is available in the CLMN program.
2. Board of Directors recruits volunteer coordinator from the BAVLA.
3. Coordinator directs water quality monitoring program efforts and volunteers.
4. Volunteers collect data and coordinator/volunteers report results to WDNR and to association members during annual meeting.

Management Action: Discover/Investigate unaccounted sources of phosphorus impacting Big and Little Arbor Vitae Lakes.

Timeframe: Begin 2014

Facilitator: Big Arbor Vitae Lake and Little Arbor Vitae Lake Boards of Directors

Description: As discussed in the Water Quality and Watershed sections, total phosphorus concentrations in Big Arbor Vitae Lake are unexpectedly high based upon watershed characteristics indicating an unaccounted source(s) of phosphorus is being delivered to the lake. Data collected in 2011 suggests that at least a portion of this phosphorus is originating from bottom sediments. Big Arbor Vitae Lake is polymictic, meaning it has the potential to break stratification and turnover multiple times throughout the growing season provided there is sufficient wind energy. When Big Arbor Vitae Lake becomes stratified, the lower layer of water (the hypolimnion) becomes anoxic and high levels of phosphorus are released from bottom sediments. Periodically throughout the growing season, likely during high-wind events, the lake breaks stratification and the high concentrations of phosphorus within the hypolimnion are mixed throughout the water column where it can fuel algae blooms. Little Arbor Vitae Lake is also polymictic and studies conducted in 2010 indicate higher than expected levels of phosphorus within the lake and that this same phenomenon of periodic phosphorus delivery from bottom sediments is also occurring.

Big Arbor Vitae and Little Arbor Vitae Lakes share much of the same watershed, and the high concentrations of phosphorus in Big Arbor Vitae

Lake are likely being delivered to Little Arbor Vitae Lake through Link Creek. For these reasons, Onterra proposes that a project involving both lakes be conducted simultaneously, with the BAVLA and Little Arbor Vitae Lake Protection and Rehabilitation District (LAVLPRD) dividing the costs. This study would include an intense sampling regime over the course of two growing seasons to determine from where the majority of the unaccounted phosphorus is originating. The BAVLA and LAVLPRD would apply for a Wisconsin Department of Natural Resources Lake Protection Grant under the Diagnostic/Feasibility Category as early as May of 2014. Instrumentation used for the project would be calibrated and tested during the summer of 2013, and the project would deploy during the growing seasons of 2014 and 2015 yielding two years of data. The study would include the following components:

Internal Phosphorus Load Modeling

As part of the internal load modeling component, total phosphorus samples would be collected from near-surface and near-bottom depths from both lakes every two weeks from mid-April through October by BAVLA and LAVLPRD volunteers. A dissolved oxygen and temperature profile would also be created during each of the sampling events.

Big Arbor Vitae and Little Arbor Vitae Lakes Tributaries Monitoring

Flow meters will be deployed at the mouths of the inlets flowing into both Big Arbor Vitae and Little Arbor Vitae Lakes to obtain continuous flow measurements. In addition, total phosphorus samples would be collected at these locations every two weeks and following storm events by BAVLA and LAVLPRD volunteers. These data will be processed using the United States Army Corps of Engineers FLUX model to estimate the loads of phosphorus entering through the inlets. It must be noted that this portion of the study will only be applicable if there is a suitable area where the equipment can be deployed.

Groundwater Flow and Nutrient Monitoring

In order to understand the contribution of groundwater to both Big Arbor Vitae Lake and Little Arbor Vitae Lake, monitoring would be conducted to determine groundwater flow direction, flow quantity and nutrient contribution to these systems. Piezometers would be deployed around both lakes and utilized to determine inflow, outflow and static areas of groundwater movement. These monitoring locations would provide access to flow quantity and quality measurements as well.

Sediment Core Analysis

Bottom sediment cores would be collected from 5-10 locations throughout the lake for phosphorus partitioning. This type of analysis determines the phosphorus constituents within the sediment based upon sediment depth. The analysis would be used to determine the amount of phosphorus that is available for release during internal loading. It is also important in understanding how an alum treatment would be dosed if completed.

Action Steps:

1. Participate in Scoping Meeting between BAVLA, LAVPRD and consultant. Meeting would be held to further answer any questions regarding the studies that have previously been conducted and begin discussion on further monitoring activities, including parameters to be tested, study timeframe, grant assistance, etc.
2. Consultant solidifies study design with assistance from WDNR and other agencies as applicable.
3. Create preliminary project cost estimate.
4. Study design is proposed to WDNR technical review team.
5. Apply for Lake Protection Grant in May 2014.

Management Goal 3. Gain Further Understanding of the Big Arbor Vitae Lake Fishery.

Management Action: Work with fisheries managers to understand and enhance fishery while communicating aspects of fishery studies to BAVLA members.

Timeframe: Ongoing.

Facilitator: Planning Committee.

Description: Fishing, a hobby that is no stranger to Wisconsin residents, was ranked as the second most important activity by Big Arbor Vitae Lake stakeholders in a 2011 survey (Appendix B, Question #13). The vast majority (70%) of survey

respondents indicated that they have fished the lake for a period longer than 15 years (Question #8), and indicated that walleye, crappie and other panfish species were their favorite to fish for (Question #10). Muskellunge was also a popular species.

BAVLA members wish for fishing conditions in the lake to remain the same or improve. To keep realistic expectations about the Big Arbor Vitae Lake fishery, an understanding of the habitat and population dynamics must be obtained. Fortunately, Big Arbor Vitae Lake is studied often by WDNR and GLIFWC biologists. Big Arbor Vitae Lake is considered a "trend" lake, meaning that a comprehensive survey takes place every three years to identify changes in the fish community. Because there are so many lakes in Wisconsin, many lakes do not receive this much attention from fishery managers with the WDNR. With so much attention being received from WDNR and GLIFWC biologists, the BAVLA has several knowledgeable biologists at hand to answer questions on the fishery, who themselves have data from numerous years to draw conclusions from.

The BAVLA would like to continue to strengthen its relationship with the WDNR and GLIFWC fisheries biologists, and learn of the monitoring studies each entity is conducting. A representative of the Planning Committee will be appointed to contact WDNR biologists (Steve Gilbert, WDNR Inland Fisheries Biologist Vilas County: 715-356-5211 ext. 229 and Dennis Scholl, WDNR Treaty Fisheries Supervisor: 715-356-5211 ext. 210) on an annual basis. The purpose of the contact would be to go over any surveys that are occurring that particular year, obtaining results from previous surveys, etc. The BAVLA volunteer will ask for a WDNR representative to come to a BAVLA meeting and deliver a short presentation on the fishery status of Big Arbor Vitae Lake, perhaps on an annual or bi-annual basis. Additionally, the BAVLA may discuss options for improving the fishery in Big Arbor Vitae Lake, which may include changes in angling regulations, habitat enhancements, or private stocking.

Action Steps:

1. See above description.

Management Goal 4. Solidify and Strengthen Big Arbor Vitae Lake Association Functionality.

Finalize 501(c)3 status, formalize by-laws.

Management Action:

Timeframe: Complete in 2013.

Facilitator: Board of Directors.

Description: At the second planning meeting, members of the BAVLA Board of Directors discussed the need to finalize several association formalities, including their 501(c)3 status and by-laws. Completing these tasks will improve functionality of the group. Board members will discuss these tasks during the winter of 2012/2013, with the goal of having these complete by summer 2013.

Action Steps:

1. See above description.

Increase membership and participation.

Management Action:

Timeframe: Complete in 2013.

Facilitator: Board of Directors.

Description: The effectiveness of a lake association is often a reflection of the time and talents of the individuals the association draws from. While it is true that several dedicated people can conduct a vast amount of association-related work, it is helpful to have a large pool of volunteers and talent to draw upon for various lake association and lake management related tasks.

The BAVLA is a fairly new organization, but has grown strong in its initial years, undertaking many large projects and drawing a good foundation of support from riparian property owners. The board of directors has discussed improving membership still, and also improving participation within the group. At the second planning meeting, these topics were discussed at length.

To increase membership within the BAVLA, volunteers from the association will meet with their neighbors face-to-face for friendly conversations about the benefits of membership, what a BAVLA membership entails, etc. This type of membership drive is not only more effective than a limited form of contact, but helps to build a sense of community and friendship amongst

neighbors. These face-to-face drives may be utilized to ask for assistance in volunteer-heavy tasks, such as the CBCW program.

Also discussed at the second meeting was the possibility of having a two-tier membership. Some "lake residents" live off of the lake and therefore do not see the need to become a member of the BAVLA. Current members discussed having an Associate Membership option, in addition to the full membership. The Associate Member would pay less in annual dues, but would be eligible for some (but not all) of the association benefits. The BAVLA Board of Directors will discuss the viability of a two-tier membership system, and determine payments, benefits included, etc. for each membership option.

Action Steps:

1. See above description.

Formalize Standing Committees.

Management Action:

Timeframe: Complete in 2013.

Facilitator: Board of Directors.

Description: With the BAVLA taking on many different lake related tasks (management plan, further nutrient studies, curly-leaf pondweed management, various social events, CBCW inventories, etc.), the distribution of these tasks amongst several people has become vital. Already, the group has moved towards forming committees to distribute this work load. Discussion at the second planning meeting resulted in four current, non-formal committees:

- Education and Communication Committee
- Membership Committee
- Social Committee
- Fundraising Committee

In 2013, the BAVLA Board of Directors will finalize their standing committees, including the committee descriptions which will include committee officers, tasks to work on, and goals to develop. The distribution of work will make the BAVLA more efficient in conducting lake-related business.

Action Steps:

1. See above description.

Management Goal 5. Assure Reasonable Access to Open Water Portions of Big Arbor Vitae Lake.

Management Action: Support reasonable and responsible actions by shoreland property owners to gain navigational access to open water areas of Big Arbor Vitae Lake

Timeframe: Initiate July of 2014

Facilitator: Planning Committee

Description: As discussed within the Aquatic Plant Section and the Summary and Conclusions Section, the potential for abundant aquatic plant growth exists on Big Arbor Vitae Lake. This was observed in 2012 when
conditions were very conducive for plant production. Members of the BAVLA believe that over the years, aquatic plant nuisance conditions have been worsening. The word "nuisance" is difficult to define because each person's tolerance is different in terms of aquatic plant growth. The WDNR's Northern Region Aquatic Plant Management
Strategy document (Appendix I) states that "severe impairment or nuisance will generally mean vegetation grows thickly and forms mats on the water's surface". In general, nuisance conditions are such that navigation of watercraft through aquatic plant beds is severely impeded. This would not be applicable to areas in which no homes are present; there is no reason to access shorelines in these areas.

When possible, Big Arbor Vitae Lake property owners are advised to use manual removal methods to clear nuisance aquatic plants from in front of their property. Manual removal of plants does not require a WDNR permit so much that the area of plant removal is no more than 30 feet wide and any piers, boatlifts, swim rafts, and other recreational and water use devices are located within that 30 feet. This action can be conducted up to 150 feet from shore. A permit is required, however, if wild rice is to be removed.

Should manual removal of plants not be practical for riparian property
owners, removal by mechanical means may be investigated.
Mechanical harvesting was discussed thoroughly during project meetings for its applicability. Some of the limitations, including logistics and cost, were discussed at length. Also discussed were the

benefits. The BAVLA sees the potential and applicability of harvesting in the future, if nuisance conditions worsen, and will follow the step-
wise procedure listed below to determine feasibility.

1) Annually, the BAVLA Board of Directors will discuss the need for harvesting by the end of July. If it is determined by the board that nuisance conditions exist, contact will be made with the WDNR Northern Region Lake Coordinator (Kevin Gauthier 715-365-8937) to schedule a time for a lake visit.

2) If the WDNR believes that nuisance conditions exist and that harvesting is a feasible option, the lake association will contact a firm that is capable of mapping the presence of nuisance aquatic plants and constructing a harvesting plan. Permits will need to be filed with the WDNR.

3) Because of the timing of lake surveys and time associated with permitting and logistics planning, the harvesting plan that is created will be applicable for the following summer. Note that if nuisance conditions do not exist the following summer, as determined by the WDNR and the BAVLA, harvesting will not occur. This would require another survey by WDNR personnel. Along with other state statues, the WDNR administrative code NR 109 is followed regarding permit issuance for removal of aquatic plants. The purpose of this code is to ensure that control of aquatic plants is permitted "in a manner consistent with sound ecosystem management, shall consider cumulative impacts, and shall minimize the loss of ecological values in the body of water." Excessive plant growth is often associated with increased nutrient levels. In order to minimize cumulative impacts to the ecosystem, shoreland best management practices (BMPs) for shoreland properties would need to be in place (or are in the process of being implemented) in the areas in which mechanical harvesting would occur. Shoreland property owners should use the information provided within the Shoreland Condition Assessment Section (3.3) as well as Appendix J to determine if their individual shoreland is in healthy condition and follows BMPs. The WDNR would likely conduct secondary site visits to confirm that shoreland BMPs are being followed in the areas requesting a permit.

<u>Action Steps:</u>

1. Assess need for mechanical harvesting annually, schedule WDNR lake visit.

2. Following site visit, contract with professional firm to create maps of potential harvesting areas.

3. Apply for pertinent permits over following winter.

4. WDNR reassesses areas the following summer to determine if nuisance conditions are still present.

5. Shoreland property owners requesting mechanical harvesting outside their property should determine if their shoreland follows practices outlined in Appendix J in order to meet compliance with NR 109 harvesting restrictions.