

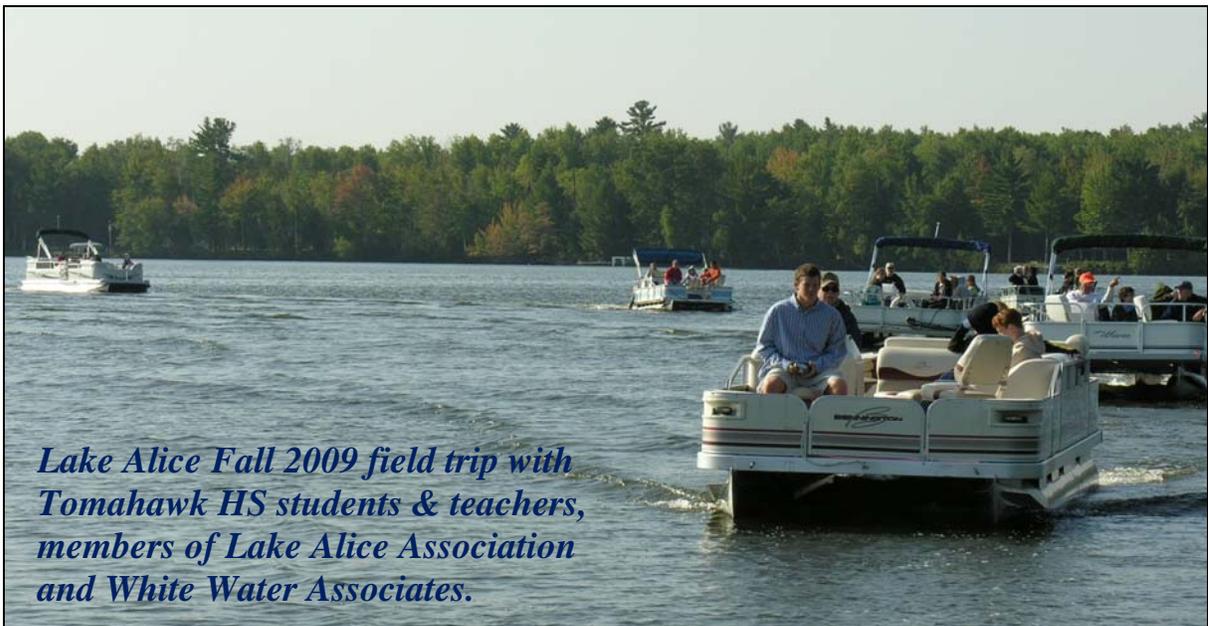
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## WDNR Lake Planning Grant Proposal

### Lake Alice Stewardship Program: Phase 2 – Understanding the Biota of Lake Alice

A Summary of the Technical Proposal Submitted to:  
Wisconsin Department of Natural Resources  
Attention: Kevin Gauthier, Lake Coordinator  
107 Sutliff Avenue  
Rhinelander, Wisconsin 54501

Submitted by: Lake Alice Association  
Prepared by: White Water Associates, Inc.



Date: December 28, 2009

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## PROPOSAL SUMMARY

In early 2010, the Lake Alice Association (with technical assistance from White Water Associates) will submit a proposal for a large-scale lake management planning grant from the Wisconsin Department of Natural Resources (WDNR) Lake Planning Grants program. This document summarizes that proposal.

Our long-term vision is to ensure the perpetuation of a healthy Lake Alice and its surrounding landscape far into the future. The tool by which to realize this vision is an adaptive management plan and the first iteration of this plan was a product of a 2009 Lake Planning Grant project for the Lake Alice watershed. In the second phase of the Lake Alice Stewardship Program, we plan to increase our understanding of Lake Alice biota by undertaking four activities: (1) systematically investigate the aquatic plant community, (2) prepare an aquatic plant management plan, (3) initiate a volunteer amphibian monitoring program, and (4) develop and initiate a volunteer angler survey. In addition to these activities we will prepare and implement a water quality sampling regimen.

In Phase 1 of the Lake Alice Stewardship Program, we adopted the concept of “adaptive management.” In this approach, findings from planned monitoring activities are used to inform future management actions and periodic refinement of the plan. An adaptive management plan accommodates new findings by integrating this information into successive iterations of the comprehensive plan. Phase 2 continues acquisition of baseline data on the Lake Alice watershed. The adaptive management plan is a dynamic entity and will successively evolve and improve to fit the needs of Lake Alice and its watershed.

Phase 1 of the Lake Alice Stewardship Plan took the first step in gathering information that existed about the Lake Alice watershed and organizing it into the first iteration of an adaptive lake management plan. That plan identified several information gaps in the Lake Alice watershed and outlined specific actions as part of plan implementation that seek to fill these gaps. After examining the existing data, gathered in Phase 1, our opinion regarding Lake Alice’s conditions remains unchanged: it is a healthy and functioning ecosystem. Nevertheless, more information about the aquatic plant community, amphibian community, fish community, and water quality will allow us to better track environmental conditions and strengthen management recommendations that seek to perpetuate healthy conditions and/or restore aspects of the ecosystem that have been degraded.

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The opportunity for continued success with the Lake Alice Stewardship Program continues with the set of program partners that came together in Phase 1 and remain devoted to realization of the program vision. These partners include the members of the Lake Alice Association, science faculty and students of Tomahawk High School, the ecological scientists of White Water Associates, Inc., and the WDNR. With Phase 1 completed, these partners have a good working relationship. A fall field trip with THS students and teachers, White Water staff, and Lake Alice Association members demonstrated the enthusiasm of these participants for Lake Alice stewardship. We feel confident about the continued devotion of these partners. This active group of Lake Alice stakeholders is a ready and willing source of in-kind talent for implementing and updating the Lake Alice management plan.

The mantra of watershed restoration groups across North America is, “Protect the best and restore the rest.” Lake Alice and its watershed has high quality areas that are worthy of a management plan that seeks to protect this high quality condition. Other aspects may need more active restoration.

Phase 1 of the Lake Alice Stewardship Program identified this basic goal: *to perpetuate the quality of Lake Alice and its watershed ecosystem into the future*. The Lake Alice Association recognizes that sometimes this will mean protecting what is good about the lake and its surroundings and sometimes it may mean restoring features that has been degraded. This implies rehabilitating and protecting sufficient components of the ecosystem so that it functions in a more or less natural way, provides habitat for native plants and animals, and supports reasonable human uses. The Lake Alice Stewardship Program objectives and actions will strive to support this goal.

The specific objectives in the second phase of the Lake Alice Stewardship Program are to (1) systematically investigate the aquatic plant community, (2) prepare an aquatic plant management plan, (3) prepare and implement a water quality sampling regimen, (4) initiate a volunteer amphibian monitoring program, and (5) develop and initiate a volunteer angler survey. An education component is also part of this proposed phase. Each of these objectives has several related works tasks to be undertaken by project partners.

This second Phase of the Lake Alice Stewardship Program is an ambitious undertaking. The three principal partners in the proposed Phase 2 project (Lake Alice Association, White Water scientists, and Tomahawk High School faculty and students) will conduct tasks outlined in Table 1.

**TABLE 1. TASKS AND RESPONSIBILITIES FOR PHASE I***1=Primary responsibility; 2=Secondary responsibility**Key to Organizations: Lake Alice Association (LAA), Tomahawk High School (THS), White Water Associates, Inc. (WWA)*

<b>TASK</b>	<b>LAA</b>	<b>THS</b>	<b>WWA</b>
Task 1A: Obtain point-intercept sampling grid coordinates from WDNR.			1
Task 1B: Deploy field team to conduct point-intercept survey.			1
Task 1C: Process and manage plant data; deliver data to WDNR.	2		1
Task 1D: Analyze plant data (include plant/substrate distribution maps).		2	1
Task 1E: Prepare plant voucher specimens.	2	2	1
Task 2A: Summarize plant community data.			1
Task 2B: Create an Aquatic Plant Management (APM) Plan.	2		1
Task 2C: Incorporate APM Plan into the Phase 2 Adaptive Mgt Plan.	2		1
Task 3A: Prepare a regimen of water quality sampling for Lake Alice.	2		1
Task 3B: Conduct water quality sampling on Lake Alice.	2	2	1
Task 3C: Summarize water quality and trophic status results.		2	1
Task 4A: Develop an amphibian (frog and toad) monitoring protocol.			1
Task 4B: Train Lake Alice volunteers for frog and toad monitoring.			1
Task 4C: Select and map appropriate frog/toad monitoring sites.	2		1
Task 4D: Carry out the 2010 frog and toad monitoring.	1	2	
Task 4E: Analyze 2010 frog/toad monitoring data and experience.	2	2	1
Task 4F: Summarize frog/toad results for Phase 2 Adaptive Mgt Plan.			1
Task 5A: Develop a volunteer angler survey protocol.	2		1
Task 5B: Prepare written angler protocol and monitoring forms.			1
Task 5C: Train core angler volunteers in data collection & management.	2		1
Task 5D: Carry out the 2010 volunteer angler survey.	1		
Task 5E: Summarize 2010 angler survey for Phase 2 Adaptive Mgt Plan.	1		2
Task 6A: Update the 2009 Adaptive Management Plan.			1
Task 6B: Include new/updated management actions in Plan	2	2	1
Task 7A: Provide formal & informal assistance to THS faculty & students.	1		1
Task 7B: Provide training/education material to Lake Alice volunteers.	2		1
Task 7C: Contribute materials to the Lake Alice Association website.	1		2
Task 7D: Conduct a Lake Alice field trip for THS students and faculty.	1	2	2

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A primary question that will organize the field investigation of the Lake Alice aquatic plant community is “What is the composition, density, and geographic distribution of the aquatic plant community in the lake?” In the last few years, the WDNR has developed a new and rigorous approach in how they deal with many aquatic plants. This WDNR survey protocol is called “point-intercept sampling” because data is collected from a predetermined grid of points distributed over the entire lake. The first step is to lay an electronic grid (like a sheet of graph paper) over a map of the lake. The sampling density depends on the acreage of the lake, the depth contours of the lake, and the convolutions of the shoreline. There is a latitude and longitude associated with each intersection point on the grid. These coordinates are loaded into a computer file and then loaded into a global positioning (GPS) unit for use in the field.

A White Water Associates’ field team, will use a GPS unit (loaded with GPS points spread over the lake), sampling rakes, and data sheets, to conduct the surveys. The sampling rake is a double-headed metal rake secured to a pole expandable to 15 feet. For deeper points, we will use another double-headed rake weighted and attached to a rope. The boat driver will use the GPS unit to navigate to each point. The navigator will also call out the depth from electronic depth finder so the sampler knows what sampling rake to use. At each point, the sampler will use the rake-on-a-pole (if the depth is less than 15 feet) or the rake-on-a-rope to scrape the lake bottom and haul up the catch of aquatic plants. The sampler will call out the depth and sediment type (muck, sand or rock), identify each plant caught on the rake, and give each species an abundance rating of 1 (few plants), 2 (moderate amount), or 3 (plants overflowing the rake). The data recorder will write down all the data and keep track of what points still need to be sampled. Non-native species will be carefully identified and characterized.

The data will allow calculation of distribution metrics such as number of sites where a plant species is found, relative percent frequency of species occurrence, frequency of occurrence within vegetated areas, frequency of occurrence at all sites, and maximum depth at which plants are found. The data will also allow calculation of metrics such as total number of points sampled, total number of sites with vegetation, total number of sites shallower than maximum depth of plants, frequency of occurrence at sites shallower than maximum depth of plants, Simpson Diversity Index, maximum depth of plants (feet), average number of all species per site, average number of native species per site, and species richness.

An innovative component of the Phase 2 project is the development and initiation of two volunteer-based monitoring programs of vertebrate indicator animals: anurans (frogs and toads)

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and fish. Monitoring of each of these taxa can provide important information for lake and watershed management.

In the case of frog and toad surveys, a standard protocol will be developed in close concert with Mike Meyer (WDNR researcher). Several existing volunteer based monitoring programs will provide important models and guidance for developing a program for monitoring amphibians in the Lake Alice watershed using trained volunteer monitors.

In the case of a volunteer based angler survey, models from other regions of the U.S. will provide guidance for producing appropriate protocols. This activity will be done in concert with WDNR scientists and managers. Volunteer derived fish data can augment fish data collected by WDNR fish studies on Lake Alice. An advantage of such data is it they come from on-going angling activity rather than periodic surveys (usually separated by several year intervals). Noteworthy occurrences (such as the discovery of an aquatic invasive species) or trends in fish sizes or numbers will be reflected in this volunteer data. As an example of the efficacy of this approach, a study reported in the American Fisheries Society Online Journals (Vol. 29, Issue 5) examined use of volunteer angler survey data for assessing length distribution and seasonal catch trends of trophy largemouth bass. Volunteer data were compared with agency collected data as a means to validate volunteer data and length distributions by inch-group. The study found no significant difference between survey methods, validating the fish length reported by volunteers.

There will be five principal products of Phase 2 of the Lake Alice Stewardship Program: (1) first revised version of the Adaptive Lake Management Plan integrating the findings and outcomes of Phase 2, (2) aquatic plant report and APM plan, (3) frog and toad monitoring report (including survey results and review of survey protocol), (4) fish survey monitoring report (including results and protocol review), and (5) educational program. Each is described below.

***Adaptive Lake Management Plan*** – A principal product of the Phase 2 effort will be the first revised version of the adaptive lake management plan for Lake Alice. This document will incorporate newly collected (or discovered) information relevant to Lake Alice. This Phase 2 version will update recommendations and actions to implement that are designed to further progress toward program goals.

***Aquatic Plant Report and Aquatic Plant Management Plan*** – This reports and associated APM plans will result from the point-intercept aquatic plant survey on Lake Alice. The report will contain analyses of specific plant community including diversity, distribution,

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composition, ecology, presence/absence of AIS or nuisance populations, fragile habitats, areas needing restoration, and discussion of management and alternatives. The report will be in the form of an aquatic plant management plan. Associated plant survey products include electronic data submitted to the WDNR and plant voucher specimens.

***Frog and Toad Monitoring Report*** – This report will be produced as a section of the Adaptive Management Plan. It will not only include survey results and a description of the field methods used, it will provide a review of survey protocol and include suggestions for refinement.

***Fish Survey Monitoring Report*** – This report will be produced as a section (or appendix) of the Adaptive Management Plan. Like the Frog and Toad Monitoring Report, it will include survey results, a description of the field methods used, and a review of survey protocol.

***Education Program*** – A featured component of the education program in Phase 2 will be a Lake Alice field trip for THS students and faculty. This formal field trip was a successful and popular component of the Phase 1 education program. It is an excellent means by which to encourage a new generation of Lake Alice Stewards. As in Phase 1, the Phase 2 educational program will have formal and informal components. The management plan itself will be a formal educational document. Tomahawk High School students and White Water staff will contribute materials to the Lake Alice Association website that reports project activities and other information. Some educational activities will take place as technical assistance provided via phone, e-mail, and at meetings (primarily between White Water scientists, Lake Alice Association members, and Tomahawk High School faculty and students). Project partners will develop written documents suitable for use as press releases and information summaries.

We anticipate that Phase 2 will take place from March 15, 2010 – March 15, 2011. Although it is difficult to accurately predict all aspects of project timing, Table 2 provides our best estimate of the timing and duration of major project tasks.

<b>TABLE 2. PROJECT CALENDAR</b>	
<b>TASK</b>	<b>CALENDAR</b>
Task 1A: Obtain point-intercept sampling grid coordinates from WDNR.	March 2010
Task 1B: Deploy field team to conduct point-intercept survey.	July – August 2010
Task 1C: Process and manage plant data; deliver data to WDNR.	August – October 2010
Task 1D: Analyze plant data (include plant/substrate distribution maps).	October – December 2010
Task 1E: Prepare plant voucher specimens.	September 2010
Task 2A: Summarize plant community data.	December 2010
Task 2B: Create an Aquatic Plant Management (APM) Plan.	January – February 2011
Task 2C: Incorporate APM Plan into the Phase 2 Adaptive Mgt Plan.	February 2011
Task 3A: Prepare a regimen of water quality sampling for Lake Alice.	March – April 2010
Task 3B: Conduct water quality sampling on Lake Alice.	April – September 2010
Task 3C: Summarize water quality and trophic status results.	December 2010
Task 4A: Develop an amphibian (frog and toad) monitoring protocol.	March 2010
Task 4B: Train Lake Alice volunteers for frog and toad monitoring.	April 2010
Task 4C: Select and map appropriate frog/toad monitoring sites.	April 2010
Task 4D: Carry out the 2010 frog and toad monitoring.	April – July 2010
Task 4E: Analyze 2010 frog/toad monitoring data and experience.	September 2010
Task 4F: Summarize frog/toad results for Phase 2 Adaptive Mgt Plan.	October 2010
Task 5A: Develop a volunteer angler survey protocol.	March 2010
Task 5B: Prepare written angler protocol and monitoring forms.	March 2010
Task 5C: Train core angler volunteers in data collection & management.	April 2010
Task 5D: Carry out the 2010 volunteer angler survey.	April– December 2010
Task 5E: Summarize 2010 angler survey for Phase 2 Adaptive Mgt Plan.	January 2011
Task 6A: Update the 2009 Adaptive Management Plan.	January – March 2011
Task 6B: Include new/updated management actions in Plan	January – March 2011
Task 7A: Provide formal & informal assistance to THS faculty & students.	March 2010 – March 2011
Task 7B: Provide training/education material to Lake Alice volunteers.	March 2010 – March 2011
Task 7C: Contribute materials to the Lake Alice Association website.	March 2010 – March 2011
Task 7D: Conduct a Lake Alice field trip for THS students and faculty.	September – October 2010