
**WDNR Lake Planning Grant Proposal
Large-Scale Project**

**Finger Lake Stewardship Program:
Phases 1 and 2 – Ecosystem Status, Adaptive Management
Plan, and Aquatic Plant Management Plan**

Submitted to:

Wisconsin Department of Natural Resources
Attention: Kevin J. Gauthier; Lakes Management Coordinator
Wisconsin Department of Natural Resources
8770 Hwy J
Woodruff, WI 54568

Phone: (715) 356-5211 EXT 214; E-mail: Kevin.GauthierSr@wisconsin.gov

Prepared and Submitted by:

Friends of Finger Lake
Principal Contact: William Abba
E9434 Justin Trail
Fremont, WI 54940

Phone: 920-667-4953; Email: billabba@centurytel.net

And

White Water Associates, Inc.
Contact: Dean B. Premo, Ph.D., President
429 River Lane, P.O. Box 27
Amasa, Michigan 49903

Phone: (906) 822-7889; E-mail: dean.premo@white-water-associates.com

Date: January 2014

TABLE OF CONTENTS

1. INTRODUCTION	1
2. PROJECT AREA.....	3
3. PROBLEM STATEMENT	7
4. PROJECT GOALS AND OBJECTIVES	8
5. METHODS AND ACTIVITIES	13
6. PROJECT PRODUCTS.....	21
7. DATA TO BE COLLECTED	22
8. EXISTING AND PROPOSED PARTNERSHIPS	22
9. ROLE OF PROJECT IN PLANNING & MANAGEMENT OF LAKE	22
10. TIMETABLE FOR IMPLEMENTATION OF KEY ACTIVITIES.....	23
11. PLAN FOR SHARING PROJECT RESULTS.....	25
12. BUDGET FOR PHASES 1 AND 2	25
13. SUPPLEMENTAL INFORMATION IN SUPPORT OF PROJECT.....	28

1. INTRODUCTION

This proposal seeks a large-scale lake management planning grant from the Wisconsin Department of Natural Resources (WDNR) Lake Planning Grants program. Our long-term vision is to ensure the perpetuation of a healthy Finger Lake. The tool by which to realize this vision is an adaptive management plan and associated aquatic plant management plan. In this proposal we describe the first two phases of a stewardship program that sets the stage for long-term lake stewardship. Objectives and tasks are established for the program along with detailed budgets.

An important component of the proposed adaptive plan is an aquatic plant management plan (APMP). The underpinning of the aquatic plant management plan is information from two point-intercept aquatic plant surveys conducted by Dr. Susan Knight (WDNR and UW-Trout Lake Research Scientist). More specific mapping and population assessment of the Southern Naiad (*Najas quadalupensis*) is proposed and will augment the point intercept survey data. Documented increases in the Finger Lake population of this native species is of keen interest to the *Friends of Finger Lake* (hereafter, FOFL) and the proposed study will compare the two point-intercept surveys and characterize changes in the Finger Lake aquatic plant community. We envision the Finger Lake Stewardship Program as an ongoing endeavor. Present and future phases will continue progress toward the overall vision. In the proposed effort, we plan to increase our understanding of the Finger Lake ecosystem by undertaking several activities, including:

- Gather existing information about fish and aquatic life,
- Gather information about rare species,
- Gather existing water quality information and conduct water sampling,
- Verify lake bathymetry at deep point(s) and tie to stage height,
- Analyze and compare aquatic plant survey data from 2009 and 2013 surveys,
- Map and document southern naiad populations in 2014 and 2015,
- Gather information about and delineate the watershed,
- Initiate a frog/toad survey,
- Initiate a volunteer anglers journal program, and
- Qualitatively and quantitatively document the littoral zone and riparian area.

These activities are detailed in this proposal along with possible activities for future program phases.

This proposal is presented by the FOFL with technical assistance provided by White Water Associates, Inc. The FOFL has committed to stewardship of Finger Lake by undertaking the proposed work and expressing its desire to adopt a formal management plan for the lake. With the Finger Lake Stewardship Program, we adopt 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. Subsequent program phases will continue acquisition of baseline data on Finger Lake and its watershed. An adaptive management plan is a dynamic entity that will successively evolve and improve to fit the needs of Finger Lake and the FOFL.

The FOFL has had a long history of stewardship for Finger Lake. It was incorporated in 1997 and is a qualified lake association. FOFL has had an active presence on Finger Lake since its establishment. A core group of lake residents has continued to provide leadership throughout the organization’s existence. More significant projects led by the association include re-zoning properties adjoining the lake to the most stringent R1 residential zoning designation, fish population studies, a detailed history of lake residents, aquatic plant studies, fish stocking, loon nesting studies, lake mapping initiatives, invasive species education and monitoring, adopt-a-highway projects, and citizen water monitoring program. The FOFL is actively involved with the *Vilas County Lakes Association* and is a member of *Wisconsin Lakes*.

Since 2009, the FOFL has teamed with Dr. Susan Knight in gathering data about the aquatic plant community of the lake. Observing a marked change in the population of Southern Naiad in Finger Lake, the FOFL has researched the topic and reached out to other lake associations that are experiencing similar phenomena. The FOFL interviewed several consulting firms in fall 2013 and selected White Water Associates (www.white-water-associates.com) as its lake consultant. White Water has prepared this technical proposal.

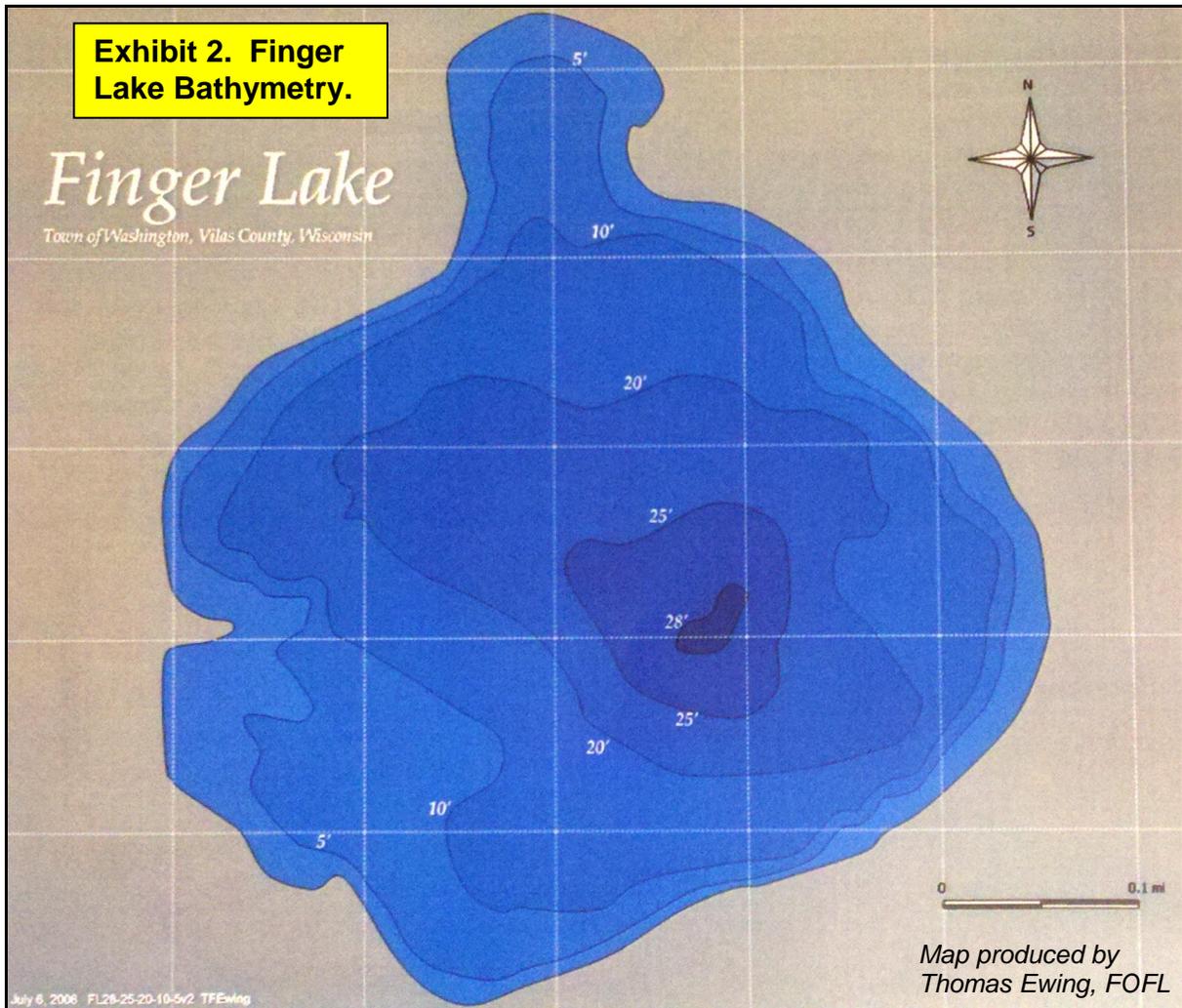
We organize this proposal by the several topics outlined in the WDNR Lake Management Grant Application including (1) Introduction, (2) Project Area, (3) Problem Statement, (4) Project Goals and Objectives, (5) Methods and Activities, (6) Project Products, (7) Data to be Collected, (8) Existing and Proposed Partnerships, (9) Role of Project in Planning and/or Management of Lake, (10) Timetable for Implementation of Key Activities, (11) Plan for Sharing Project Results, (12) Budget, and (13) Supplemental Information in Support of Project.

2. PROJECT AREA

Finger Lake in Vilas Co., Wisconsin is the subject of the proposed program (Exhibit 1). It is located in Washington Township just northeast of Eagle River. The Water Body Identification Code (WBIC) is 984700. Finger Lake is an 87 acre seepage lake with a maximum depth of 30 feet. As a seepage lake, it has no inlet or outlet and relies on springs, precipitation, and runoff from the watershed for its water. Finger Lake substrate is reported as 80% sand, 5% gravel, 5% rock, and 10% muck. A bathymetric map of Finger Lake was created as a FOFL project in 2006 (see Exhibit 2). Water quality data has been collected on Finger Lake since 1995. It is classified as mesotrophic (but is borderline oligotrophic). There is no public access to Finger Lake.



The proposed program views Finger Lake as part of a larger landscape ecosystem. This is a “lake rich” area with many lakes in the immediate landscape. Some of the lakes are part of the Eagle River Chain of Lakes. This interconnected water landscape is a target for migrating and breeding waterfowl and other birds. Finger Lake has value and function in this larger landscape.



The Finger Lake system appears to have a high diversity of aquatic habitats and as far as is documented, does not contain aquatic invasive plant or animal species.¹ Aquatic plant surveys in 2009 and 2013 (done by point-intercept method) provide a baseline of botanical information for Finger Lake. Dr. Susan Knight interpreted the 2009 baseline plant data on Finger Lake in the following points:

- Good species diversity,
- No threatened or endangered species,
- One special concern species (Vasey's pondweed),
- Aquatic macrophyte community index is very good.

¹ On 11/8/13, Dean Premo (White Water Associates) collected the AIS Chinese mystery snail from Finger Lake.

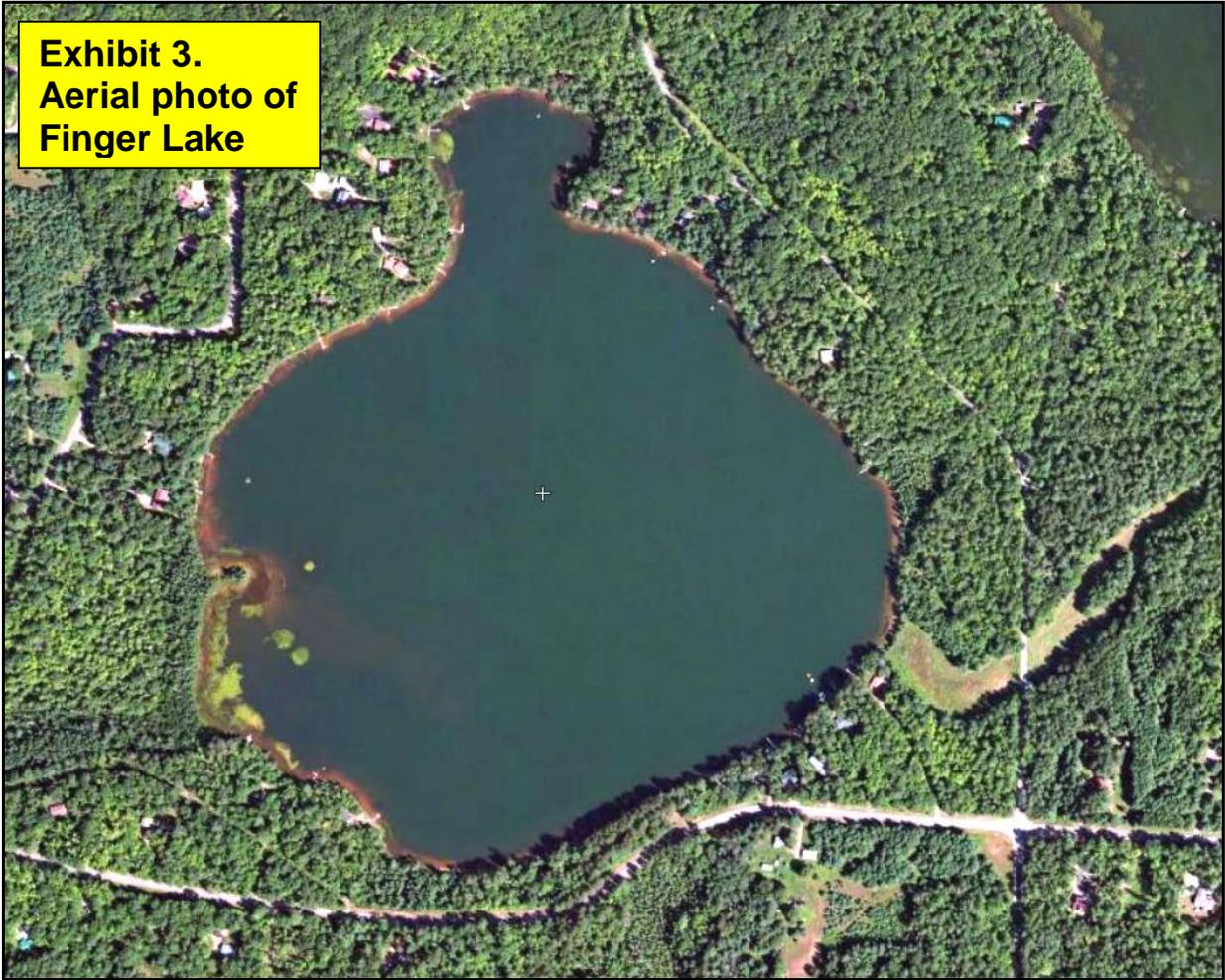
Finger Lake supports a good fishery that includes walleye, bluegill, smallmouth bass, largemouth bass, black crappie, rock bass, yellow perch, northern pike, white suckers, shiners, and sculpin. The WDNR designates the walleye fishery as “NR2” (that is, natural reproduction, but with limited and irregular spawning success). The last historical planting of walleye in Finger Lake was conducted in 1946. Since that time a self-sustaining walleye fishery has existed. In recent years, however, relatively low water level in Finger Lake has diminished walleye spawning habitat. To offset the reduced walleye recruitment, the FOFL did a planting of 250 walleyes in November 2013 (the first planting since 1946). Each planted walleye was given a distinctive fin clip. No non-native fishes are known to occur in Finger Lake.

According to Finger Lake residents, bald eagles, ospreys, double-crested cormorants, and common loons use Finger Lake. Common loons occasionally nest on the lake. Supercanopy red and white pine offer good perches and potential nesting sites for eagles and ospreys. Great blue herons are present and use nearby wetlands. Waterfowl use the lake during migration. Because of the high quality riparian area, migratory and resident songbird diversity is high. Gray wolves and their sign are occasionally seen at Finger Lake and nearby surroundings.

In terms of the human community at Finger Lake, there are thirty-six waterfront properties with direct access to the lake. Of these, twenty-five properties have human-habitable buildings (homes). There are six full-time residents on the lake with the rest being seasonal. An adjacent subdivision consisting of fourteen properties has deeded access to Finger Lake via an unimproved boat landing.

As can be seen from the aerial photo (Exhibit 3), Finger Lake has a fairly intact forest riparian area. This is an extremely valuable asset in protecting and maintaining high water quality. The various attributes of the Finger Lake watershed described above combine to make this area of great importance to the waterscape of Vilas County. It is a valuable water resource and worthy of scientific understanding of its baseline condition and changing conditions (such as the southern naiad population). This understanding has great relevance beyond Finger Lake. It is the goal management plan that serves to perpetuate this ecosystem in a healthy and productive state far into the future. The next section describes the opportunities we now have to progress toward this goal.

**Exhibit 3.
Aerial photo of
Finger Lake**



3. PROBLEM STATEMENT

The Finger Lake Stewardship Program will gather existing and new information about the ecosystem and nearby surroundings. There are information gaps that are recognized by the FOFL and its consultant (White Water). Concern exists regarding possible establishment of aquatic invasive species (AIS) and the status of the native aquatic plants. An additional specific concern focuses on the southern naiad population. An opportunity exists to monitor changes in the aquatic plant community because of thorough aquatic plant surveys conducted in 2009 and 2013. These concerns and opportunities give an aquatic plant management plan high priority in Finger Lake stewardship. The proposed stewardship program begins the process. This strategy positions the FOFL with information that allows an efficient and planned response to aquatic invasive plant discoveries in the future and an informed approach toward native plant conservation.

Other sentinels of aquatic ecosystem health are aquatic and water-related animals: fish, invertebrates, anurans (frogs and toads) and rare water-related birds (common loon, American bittern, bald eagle, and osprey). Having a baseline of information on these biotic communities allow us to track environmental conditions and strengthen management recommendations that seek to perpetuate healthy conditions and restore aspects of the Finger Lake ecosystem.

The FOFL would also like to compile and interpret the existing water quality and fisheries information that has been collected by various sources on Finger Lake. This will both serve the aquatic plant management plan and allow identification of information gaps. Future water quality monitoring will be designed to fill such gaps and complement historic water quality and fisheries information.

As far as is known, Finger Lake does not currently contain aquatic invasive plant or animal species (with the exception of the aforementioned Chinese mystery snail). The threat to Finger Lake posed by noxious AIS is very real. Nearby aquatic ecosystems have AIS that can be accidentally transported to other water bodies (including Finger Lake). The recent population growth of southern naiad is a phenomenon that indicates some kind of ecological factors are changing in Finger Lake. If these changes reduce the stable biodiversity of the native plant community, the lake may be even more vulnerable to AIS establishment.

The opportunity for success with the Finger Lake Stewardship Program is strengthened by a dedicated set of program partners. These partners include members of the FOFL, the ecologists of White Water Associates, the Aquatic Invasives Coordinator, Land & Water Conservation Department for Vilas County, and the WDNR.

The mantra of watershed restoration groups across North America is, “Protect the best and restore the rest.” Finger Lake and its watershed have high quality areas that are worthy of a management plan that protects this high quality condition. Other aspects may need more active restoration. Funding this program that seeks to guide lake stewardship with an effective plan is a good investment by the WDNR. Characterization of Finger Lake conditions will define restoration and protection needs of the lake. Lessons learned regarding the southern naiad population of Finger Lake will have value to all northern Wisconsin lakes. The next section addresses specific goals and objectives.

4. PROJECT GOALS AND OBJECTIVES

The overarching goal of the Finger Lake Stewardship Program is to perpetuate the quality of Finger Lake and the surrounding watershed ecosystem into the future. The FOFL recognizes that sometimes this will mean protecting what is good about the lake and sometimes it may mean restoring features that have been degraded. This implies protecting and rehabilitating sufficient components of the ecosystem so that it functions in natural way, provides habitat for native biota, and supports reasonable human uses. The Stewardship Program objectives and actions outlined below are designed to support this goal.

The specific objectives and related tasks for the first two to three years of the Finger Lake Stewardship Program are detailed in this section. The anticipated timing of each task and associated objective is indicated in a calendar later in this proposal.

Objective 1. Develop a strategy to perpetuate lakes and watershed quality.

Task 1A: Articulate a general strategy in Lake Planning Grant proposal.

Task 1B: Meet with project partners to identify and prioritize management needs.

Task 1C: Meet with project partners to develop strategy and approach.

Task 1D: Finalize assignment of tasks to project partners.

Objective 2. Gather/manage information about fish, aquatic life, & habitats.

Task 2A: Collect/review historical information regarding fish.

Task 2B: Interview fish biologists (WDNR) for detailed information.

Task 2C: Conduct qualitative survey for native freshwater mussels and zebra mussels.

Task 2D: Collect/review information about aquatic and wetland habitats.

Objective 3. Gather/manage information about rare species.

Task 3A: Evaluate use of the lake by Common Loons.

Task 3B: Evaluate use of the lake by Bald Eagles.

Task 3C: Evaluate use of the lake by other rare species.

Task 3D: Assess habitat features appropriate to rare species.

Task 3E: Develop recommendations for rare species habitat.

Objective 4. Gather/manage water quality information.

Task 4A: Collect/review existing limnological information.

Task 4B: Verify lake bathymetry at deep point(s) and tie to stage height

Task 4C: Prepare a regimen of water quality sampling.

Task 4D: Conduct water quality sampling.

Task 4E: Conduct a littoral zone specific conductance study.

Task 4F: Summarize water quality and trophic status.

Objective 5. Characterize the aquatic plant community.

Task 5A: Obtain data for 2009 and 2013 PI aquatic plant surveys.

Task 5B: Process and manage plant data.

Task 5C: Analyze plant data and map substrate & plant community (floating & emergent).

Task 5D: Compare results of 2009 and 2013 plant surveys.

Task 5E: Conduct mapping and density characterization of southern naiad in 2014 & 2015.

Task 5F: Using various data, characterize changes in southern naiad distribution & density.

Objective 6. Gather/manage information about the watershed.

Task 6A: Delineate the Finger Lake watershed.

Task 6B: Map watershed land cover/use & soils.

Task 6C: Map slopes to identify runoff patterns.

Task 6D: Review existing institutional programs.

Task 6E: Determine critical sites and/or activities.

Objective 7. Initiate frog/toad monitoring program.

Task 7A: Develop frog/toad monitoring protocol.

Task 7B: Train volunteers to conduct frog/toad monitoring.

Task 7C: Select appropriate monitoring sites.

Task 7D: Carry out the frog and toad monitoring (2014-2015).

Task 7E: Analyze 2014 monitoring data and revise protocol (if needed).

Task 7F: Summarize 2014-2015 monitoring results.

Objective 8. Apply a volunteer angler journal program.

Task 8A: Customize volunteer angler's journal.

Task 8B: Provide protocol and angler forms to volunteers.

Task 8C: Train volunteer group in data collection/management.

Task 8D: Conduct volunteer angler's journal program (2014-2015).

Task 8E: Summarize the 2014-2015 angler's journal results.

Objective 9. Lake stage height and drainage basin/lake area ratio.

Task 9A: Establish hard structure for lake stage measurement.

Task 9B: Determine drainage basin/lake area ratio.

Task 9C: Research existing hydrological information as it pertains to Finger Lake levels.

Objective 10. Develop and conduct lake user survey.

Task 10A: Develop draft lake user survey questions.

Task 10B: Provide draft questions for WDNR review.

Task 10C: Distribute survey to stakeholders.

Task 10D: Summarize stakeholder responses.

Objective 11. Apply WiLMS or alternative modeling system.

Task 11A: Run appropriate modeling elements from WiLMS.

Task 11B: Incorporate findings into educational program.

Task 11C: Incorporate findings into management plan.

Objective 12. Meet with partners each year to assess progress.

Task 12A: Develop annual progress report.

Task 12B: Distribute the annual progress report.

Task 12C: Meet with partners once/year to discuss status.

Objective 13. Deliver a workshop on littoral zone and riparian area.

Task 13A: Prepare a half-day workshop on littoral zone and riparian area.

Task 13B: Establish workshop date and promote attendance.

Task 13C: Deliver the workshop.

Objective 14. Document littoral and riparian area condition using digital photography.

Task 14A: Train volunteer work team to conduct photography/GPS fieldwork.

Task 14B: Train volunteer work team to manage digital photography data.

Task 14C: Volunteer team collects digital photos of the shoreline.

Task 14D: Integrate photos into an interactive electronic archive.

Task 14E: Submit interactive electronic archive to WDNR.

Objective 15. Qualitatively document littoral & riparian areas & review written history.

Task 15A: Train volunteer team to conduct assessment and manage data.

Task 15B: Volunteer team deploys to collect data.

Task 15C: Integrate qualitative information into electronic photo archive.

Task 15D: Submit interactive electronic archive to WDNR.

Task 15E: Review existing written history of the lake for application in stewardship.

Objective 16. Quantitatively document littoral and riparian areas.

Task 16A: Establish ten physical habitat (“P-Hab”) stations.

Task 16B: Conduct USEPA measurements.

Task 16C: Conduct WDNR measurements.

Task 16D: Manage assessment data and summarize.

Objective 17. Prepare aquatic plant management plan.

Task 17A: Summarize plant community data.

Task 17B: Create an APM Report and Plan.

Task 17C: Incorporate APM Plan into Adapt. Mgt Plan.

Objective 18. Create Adaptive Management Plan.

Task 18A: Write Adaptive Management Plan.

Task 18B: Prepare initial management actions.

Objective 19. Contribute recommendations to L&W Resources Management Plan.

Task 19A: Review the Vilas County L&W Resources Management Plan.

Task 19B: Communicate with the L&W Conservation Department.

Objective 20. Deliver education program.

Task 20A: Provide written & verbal education material to lake volunteers.

Task 20B: Contribute materials to lake association newsletter/website.

Task 20C: Prepare one press release/year for local news outlet(s).

Objective 21. Aquatic Invasive Species (AIS) awareness and protection.

Task 21A: Staff boat landing(s) at nearby lakes with volunteer CB/CW inspectors.

Task 21B: Solicit lake steward volunteers to augment boat inspections for future years.

Task 21C: Review documentation for known AIS in Finger Lake system.

Task 21D: Conduct analysis of lake susceptibility to zebra and quagga mussels.

Task 21E. Document AIS review and zebra mussel analysis in Adaptive Management Plan.

Task 21F: Incorporate AIS findings into education program.

Task 21G: Recommend AIS monitoring needs.

By adopting the “adaptive management” paradigm, we anticipate that the planning, implementation, and monitoring process will be ongoing and the Adaptive Management Plan will be designed to accommodate future findings and management directions. Future phases will build on the foundation established in the work outlined in this proposal. Other aspects of the lake ecosystem will be explored. For example, future phases might address AIS mapping, watershed wetlands, riparian vegetation assessment, and education of lake users. Future phases will include revisions to the lake management plan and monitoring tasks that support adaptive management. The timeline provided in Exhibit 4 illustrates the various anticipated project phases.

Exhibit 4. Timeline for representative actions in phases of the Lake Stewardship Program.				
<i>Years 1 and 2 are covered in this proposal</i>		<i>Future Phases</i>		
Year 1	Year 2	Year 3	Year 4	Year 5
Existing info on biota & water quality; water sampling; aq. plant survey; begin rare species research, watershed delineation & research, frog/toad monitoring, angler's journal; education program; watercraft inspection; stage height; conduct lake user survey; progress mtg.	Riparian area-littoral zone qualitative assessment; photo documentation of shoreline; EPA/DNR habitat assessment; littoral-riparian zone workshop; continue water sampling, frog/toad monitoring; angler's journal; rare species research, educ. program, watercraft inspection; progress meeting; WiLMS; aquatic plant management plan & adaptive mgt plan; AIS awareness and protection.	Water quality sampling & analysis; monitoring indicators; implement adaptive mgt plan; AIS monitoring	Water quality sampling and analysis; implement adaptive mgt plan; AIS monitoring	Water quality sampling and analysis; implement adaptive mgt plan; AIS monitoring

5. METHODS AND ACTIVITIES

In this section, we discuss the methods and activities that will be undertaken to meet the goals and objectives. We also provide task assignments. White Water and the FOFL will conduct project tasks (Table 1). Information will be gathered, reviewed, and summarized. Where appropriate, scientific literature will document project recommendations.

TABLE 1. TASKS AND RESPONSIBILITIES FOR PHASES 1 AND 2		
<i>1=Primary responsibility; 2=Secondary responsibility</i>		
<i>Key to Organizations: Spread Eagle Chain of Lakes Association (FOFL); White Water Associates, Inc. (WWA)</i>		
TASK	FOFL	WWA
Task 1A: Articulate a general strategy in Lake Planning Grant proposal.	1	1
Task 1B: Meet with project partners to identify and prioritize management needs.	1	1
Task 1C: Meet with project partners to develop strategy and approach.	1	1
Task 1D: Finalize assignment of tasks to project partners.	1	1
Task 2A: Collect/review historical information regarding fish.		1
Task 2B: Interview fish biologists (WDNR) for detailed information.		1
Task 2C: Conduct qualitative survey for native freshwater mussels and zebra mussels.		1
Task 2D: Collect/review information about aquatic and wetland habitats.		1
Task 3A: Evaluate use of the lake by Common Loons.	1	1
Task 3B: Evaluate use of the lake by Bald Eagles.	1	1
Task 3C: Evaluate use of the lake by other rare species.	2	1
Task 3D: Assess habitat features appropriate to rare species.	2	1
Task 3E: Develop recommendations for rare species habitat.	2	1
Task 4A: Collect/review existing limnological information.		1
Task 4B: Verify lake bathymetry at deep point(s) and tie to stage height		1
Task 4C: Prepare a regimen of water quality sampling.		1
Task 4D: Conduct water quality sampling.		1
Task 4E: Conduct a littoral zone specific conductance study.		1
Task 4F: Summarize water quality and trophic status.		1
Task 5A: Obtain data for 2009 and 2013 PI aquatic plant surveys.		1
Task 5B: Process and manage plant data.		1
Task 5C: Further analyze plant data and map (substrate, emergent and floating, etc)		1
Task 5D: Compare results of 2009 and 2013 plant surveys.		1
Task 5E: Conduct mapping & density characterization of southern naiad in 2014 & 2015.		1
Task 5F: Using various data, characterize changes in s. naiad distribution & density.		1
Task 6A: Delineate the Finger Lake watershed.		1
Task 6B: Map watershed land cover/use & soils.		1
Task 6C: Map slopes to identify runoff patterns.		1
Task 6D: Review existing institutional programs.		1
Task 6E: Determine critical sites and/or activities.		1

TABLE 1. TASKS AND RESPONSIBILITIES FOR PHASES 1 AND 2		
<i>1=Primary responsibility; 2=Secondary responsibility</i>		
<i>Key to Organizations: Spread Eagle Chain of Lakes Association (FOFL); White Water Associates, Inc. (WWA)</i>		
TASK	FOFL	WWA
Task 7A: Develop frog/toad monitoring protocol.		1
Task 7B: Train volunteers to conduct frog/toad monitoring.		1
Task 7C: Select appropriate monitoring sites.	2	1
Task 7D: Carry out the frog and toad monitoring (2014-2015).	1	
Task 7E: Analyze 2014 monitoring data and revise protocol (if needed).		1
Task 7F: Summarize 2014-2015 monitoring results.		1
Task 8A: Customize volunteer angler's journal.	2	1
Task 8B: Provide protocol and angler forms to volunteers.		1
Task 8C: Train volunteer group in data collection/management.		1
Task 8D: Conduct volunteer angler's journal program (2014-2015).	1	
Task 8E: Summarize the 2014-2015 angler's journal results.		1
Task 9A: Establish hard structure for lake stage measurement.	1	2
Task 9B: Determine drainage basin/lake area ratio.		1
Task 9C: Research existing hydrological information as it pertains to Finger Lake levels.	2	1
Task 10A: Develop draft lake user survey questions.	2	1
Task 10B: Provide draft questions for WDNR review.		1
Task 10C: Distribute survey to stakeholders.	1	
Task 10D: Summarize stakeholder responses.	1	2
Task 11A: Run appropriate modeling elements from WiLMS.		1
Task 11B: Incorporate findings into educational program.		1
Task 11C: Incorporate findings into management plan.		1
Task 12A: Develop annual progress report.		1
Task 12B: Distribute the annual progress report.		1
Task 12C: Meet with partners once/year to discuss status.	1	1
Task 13A: Prepare a half-day workshop on littoral zone and riparian area.		1
Task 13B: Establish workshop date and promote attendance.	1	2
Task 13C: Deliver the workshop.		1
Task 14A: Train volunteer work team to conduct photography/GPS fieldwork.		1
Task 14B: Train volunteer work team to manage digital photography data.		1
Task 14C: Volunteer team collects digital photos of the shoreline.	1	
Task 14D: Integrate photos into an interactive electronic archive.		1
Task 14E: Submit interactive electronic archive to WDNR.		1
Task 15A: Train volunteer team to conduct assessment and manage data.		1
Task 15B: Volunteer team deploys to collect data.	1	
Task 15C: Integrate qualitative information into electronic photo archive.		1
Task 15D: Submit interactive electronic archive to WDNR.		1
Task 15E: Review the existing written history of the lake for application in stewardship.	1	1
Task 16A: Establish ten physical habitat ("P-Hab") stations.		1

TABLE 1. TASKS AND RESPONSIBILITIES FOR PHASES 1 AND 2		
<i>1=Primary responsibility; 2=Secondary responsibility</i>		
<i>Key to Organizations: Spread Eagle Chain of Lakes Association (FOFL); White Water Associates, Inc. (WWA)</i>		
TASK	FOFL	WWA
Task 16B: Conduct USEPA measurements.		1
Task 16C: Conduct WDNR measurements.		1
Task 16D: Manage assessment data and summarize.		1
Task 17A: Summarize plant community data.		1
Task 17B: Create an APM Report and Plan.		1
Task 17C: Incorporate APM Plan into Adapt. Mgt Plan.		1
Task 18A: Write Adaptive Management Plan.		1
Task 18B: Prepare initial management actions.	2	1
Task 19A: Review the Vilas County L&W Resources Management Plan.	1	1
Task 19B: Communicate with the L&W Conservation Department.	1	1
Task 20A: Provide written & verbal education material to lake volunteers.	2	1
Task 20B: Contribute materials to lake association newsletter/website.	1	2
Task 20C: Prepare one press release/year for local news outlet(s).	1	2
Task 21A: Staff boat landing(s) with volunteer CB/CW inspectors.	1	
Task 21B: Solicit lake steward volunteers to augment boat inspections for future years.	1	
Task 21C: Review documentation for known AIS in lake system.		1
Task 21D: Conduct analysis of lake susceptibility to zebra and quagga mussels.		1
Task 21E: Document AIS review & zebra mussel analysis in Adaptive Management Plan.		1
Task 21F: Incorporate AIS findings into education program.		1
Task 21G: Recommend AIS monitoring needs.		1

Point-Intercept Aquatic Plant Survey and Intensive Survey for Southern Naiad - A primary question for the field investigation of the Finger Lake aquatic plant community is “What is the composition, density, and geographic distribution of the aquatic plant community in the lake and how has it changed?” The WDNR has a rigorous approach in how it deals with aquatic plant surveys. First, it was realized that many citizens and lake groups requested permits every year to harvest or chemically treat nuisance plants, with no accounting of how successful they were. Second, the WDNR realized that they could get more information from their own routine plant sampling surveys by using new technologies such as Global Positioning System (GPS). As result, the WDNR developed a point-intercept plant survey system designed to systematically examine all parts of the lake. The protocol calls for using a rake sampler to determine what species are present, where they occur, at what depths they are found, and in what kind of substrate. The information is used to create a variety of ecologically based maps such as the location of an invasive plant, where the plants grow most densely, or how a species of special concern is

distributed. The survey serves as a baseline for the future, and will be important should there be changes in the lake (e.g., water level or AIS). A lake group that creates an aquatic plant management plan, requests a permit to do large scale chemical treatment, or requests WDNR assistance with aquatic plants must perform a point intercept plant survey.

This WDNR survey protocol is called a point-intercept sampling scheme because data is collected from all over the lake, instead of sampling along a few straight lines laid out perpendicular to the shore (as was done by WDNR prior to 2005). The WDNR's Integrated Science Services conducts the first step, laying out an electronic grid over a map of the lake and determines the number of sampling points on this grid. This sampling density depends on the lake size and depth contours along with 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 field team uses a GPS unit, sampling rakes, and data sheets, to conduct the survey. The boat driver uses GPS 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 allow calculation of metrics such as number of sites where a plant species is found, percent frequency of occurrence, frequency of occurrence in vegetated areas, frequency of occurrence at all sites, and maximum depth at which plants are found. The data also allow calculation of a variety 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, average number of all species per site, average number of native species per site, and species richness. Illustrative maps will be derived from this data (including lake substrate and distribution of floating and emergent leaved aquatic plant communities in the lake).

In the case of Finger Lake, two P.I. surveys have been completed (2009 and 2013). White Water Associates will obtain the data from the WDNR and analyze and interpret the data as part of this proposed study (this effort will include mapping of several features such as substrate,

floating and emergent vegetation, and more). As it happens, the 2009 P.I. survey occurred prior to the southern naiad population expansion (in fact, southern naiad was not recorded in the 2009 survey). The 2013 survey included the time when southern naiad population size was high. This allows an understanding of the effects of southern naiad on the Finger Lake plant community.

To augment the plant community data obtained from the P.I. surveys, we plan to conduct specific targeted surveys of the Finger Lake southern naiad populations in 2014 and 2015. This effort will include use of GPS to delineate boundaries of major colonies of the species. We also plan to record visual estimates of density of southern naiad. Surveys for this species have not occurred on Finger Lake and it is critical to understand how the population is changing. It is our understanding that Dr. Susan Knight plans to collect southern naiad specimens during winter of 2014 (through the ice). It is currently unknown if southern naiad remains green and metabolically active in winter in the northern part of its range.

Volunteer Frog and Toad Surveys - A component of the project is the implementation of two volunteer-based monitoring programs of: (1) frogs and toads and (2) fish. Monitoring of these taxa provide important information for lake and watershed management. In the case of frog and toad surveys, a standard protocol has been developed and tested at Lake Alice in Lincoln County, Spectacle Lake (Vilas County), and Margaret Lake (Oneida County). The protocol was adopted from existing Wisconsin protocols in consultation with Mike Meyer (WDNR researcher). We will apply that protocol in the proposed project using volunteer monitors.

Volunteer-based Anglers' Journal - In the case of a volunteer based angler's journal, we have also developed a protocol and implemented it at Lake Alice and other lakes. We believe this will also be an appropriate tool by which to gather information about fish community. The protocol was developed in concert with WDNR scientists and managers. Volunteer derived fish data can augment fish data collected by agencies. An advantage of such data is it they come from on-going angling activity rather than periodic surveys. 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.

Watershed Modeling Using WiLMS – The Wisconsin Lake Modeling Suite (WiLMS) is a lake water quality-planning tool with direct applications for understanding the influence of watershed land-cover type on lake water quality. White Water Associates will take principal responsibility for conducting this modeling exercise and integrating results of the effort into the education program and the adaptive management plan.

An Image-Based Waterfront Archive – Digital photography provides an efficient tool for application in documenting existing shoreline conditions. Add this to the technology of “global positioning systems” or “GPS” and a qualitative assessment of shoreline conditions and we have a useful archive of lakefront conditions that can be used to monitor long and short term changes. In fact, a prototype of this image-based waterfront archive has been developed by White Water Associates with funding and guidance from the WDNR and has been applied to other Wisconsin Lakes under planning grants. We will apply this approach in the proposed project.

In 2001, the WDNR contracted White Water Associates to develop a prototype of using digital photography to document shoreland conditions. Scattering Rice Lake in northern Wisconsin was the subject lake. The WDNR felt that documenting existing shoreline condition of inland lakes in Wisconsin was a valuable goal to pursue. The product of White Water’s 2001 effort is contained in a web-based application that demonstrates an approach to photographic documentation of lakeshore. The Finger Lake system provides ideal circumstances under which to apply this model again. Further, we propose this is an excellent circumstance to use volunteer labor for a considerable proportion of the effort.

The idea of a waterfront archive has considerable application possibilities, but must be done well. An image-based waterfront archive as conceived herein should be scientifically defensible and therefore has important issues of data quality assurance and quality control (QA/QC). The goal of an image-based waterfront archive is to document current shoreline conditions for the purpose of verifying extent and origin of future human-caused changes or natural changes. The 2001 work conducted by White Water Associates provides a feasible methodology for collection, storage, and retrieval of data appropriate to the future goal. Importantly, with proper training, volunteer staff from the lake association can conduct the fieldwork portion of this effort. We have conducted two other projects using volunteers to carry out the field work components.

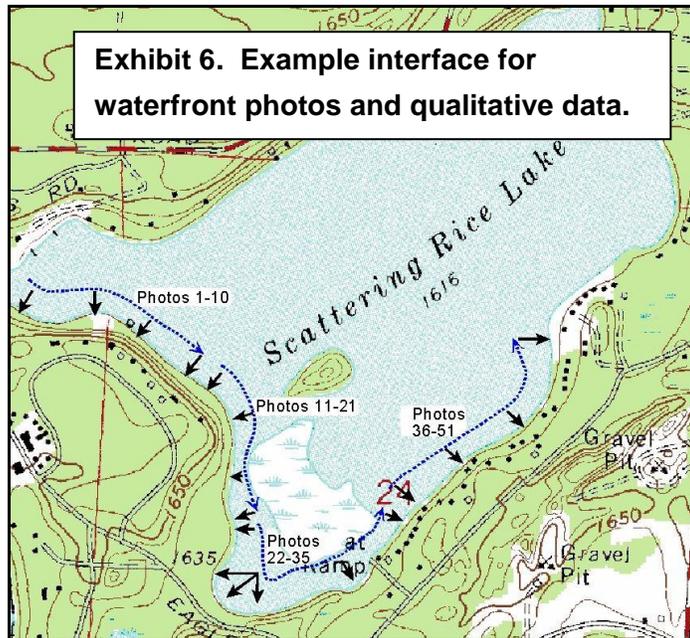
The field effort itself will involve a team aboard a pontoon boat or other suitable watercraft and armed with digital camera, GPS, map, and data forms for recording qualitative data collected on specific stretches of waterfront. The watercraft will be positioned approximately 200 feet from

shore. Every 250-300 feet a GPS reading will be obtained and a photograph taken perpendicular to the shore at a standardized focal length. A simple checklist (Exhibit 5) will then be completed that qualitatively records current conditions of the waterfront.

Data storage and retrieval are critical to the value of an archive program and deserve careful consideration in the image-based waterfront archive. We propose to use a similar web-based product as was used in 2001 (in the pilot program) and in subsequent applications at Black Oak Lake (Vilas County), Lake Julia (Oneida County), and other lakes. The interface to access photos of the waterfront is a topographic map as shown in Exhibit 6. Arrows show where the photographs were taken and in the actual product, clicking on a group of photos brings up the photos and the qualitative assessment data for each waterfront segment. Aerial photography will also be used as part of the product. The final product can be accessed, navigated, and reviewed from CD-ROM or made available on a website. The information collected in this aspect of the program can be used to develop a shoreland restoration and protection program for Finger Lake.

Exhibit 5. Example qualitative assessment checklist for the waterfront archive.

<p>Record of Riparian Area</p> <p>record no: <input type="text" value="1"/></p> <p>waterbody: <input type="text" value="Scattering Rice La"/></p> <p>date: <input type="text" value="6/22/01"/></p> <p>observer: <input type="text" value="Dean Premo, Kent"/></p> <p>photo ID: <input type="text" value="1"/></p> <p>gpsmark ID: <input type="text" value="1"/></p> <p>Ncoord: <input type="text" value="45.93999"/></p> <p>Wcoord: <input type="text" value="-89.19878"/></p>	<p>Development</p> <p><input checked="" type="checkbox"/> none</p> <p><input type="checkbox"/> house</p> <p><input type="checkbox"/> shed</p> <p><input type="checkbox"/> garage</p> <p><input type="checkbox"/> gravel drive</p> <p><input type="checkbox"/> paved drive</p> <p><input type="checkbox"/> lawn</p> <p><input type="checkbox"/> other</p> <p><input type="text"/></p>	<p>Structures</p> <p><input checked="" type="checkbox"/> none</p> <p><input type="checkbox"/> dock</p> <p><input type="checkbox"/> breakwater</p> <p><input type="checkbox"/> stormwall</p> <p><input type="checkbox"/> boathouse</p> <p><input type="checkbox"/> rip-rap</p> <p><input type="checkbox"/> boat lift</p> <p><input type="checkbox"/> boat slip</p> <p><input type="checkbox"/> other</p> <p><input type="text"/></p>	<p>Shoreline Access</p> <p><input checked="" type="checkbox"/> none</p> <p><input type="checkbox"/> unimproved path</p> <p><input type="checkbox"/> gravel path</p> <p><input type="checkbox"/> chip path</p> <p><input type="checkbox"/> paved path</p> <p><input type="checkbox"/> boardwalk</p> <p><input type="checkbox"/> grass path</p> <p><input type="checkbox"/> lawn to lake</p> <p><input type="checkbox"/> stairs</p> <p><input type="checkbox"/> other</p> <p><input type="text"/></p>
<p>Beach</p> <p><input checked="" type="checkbox"/> none</p> <p><input type="checkbox"/> natural</p> <p><input type="checkbox"/> artificial</p> <p><input type="checkbox"/> stable</p> <p><input type="checkbox"/> eroding</p> <p><input type="checkbox"/> other</p> <p><input type="text"/></p>	<p>Vegetation</p> <p><input checked="" type="checkbox"/> upland</p> <p><input type="checkbox"/> wetland</p> <p><input checked="" type="checkbox"/> forested</p> <p><input type="checkbox"/> shrub</p> <p><input type="checkbox"/> natural openings</p> <p><input type="checkbox"/> stream/drainage</p> <p><input type="checkbox"/> some clearings</p> <p><input type="checkbox"/> extensive clearings</p> <p><input type="checkbox"/> other</p> <p><input type="text"/></p>	<p>Shoreline Buffer</p> <p><input type="checkbox"/> none</p> <p><input type="checkbox"/> 1-3f</p> <p><input type="checkbox"/> 4-10f</p> <p><input checked="" type="checkbox"/> above 10f</p>	<p>Shoreline Erosion</p> <p><input checked="" type="checkbox"/> none</p> <p><input type="checkbox"/> undercut</p> <p><input type="checkbox"/> furrows</p> <p><input type="checkbox"/> bare</p> <p><input type="checkbox"/> other</p> <p><input type="text"/></p>



Quantitative Assessment of Littoral and Riparian area of Finger Lake – The USEPA has developed a methodology for surveying the Nation’s lakes (USEPA. 2007. *Survey of the Nation's Lakes. Field Operations Manual. EPA 841-B-07-004. U.S. Environmental Protection Agency, Washington, DC.*)². This method is applied in various states and in 2007 White Water assisted the Michigan Dept. of Env. Qual. in applying this method on a lake in Sylvania Tract. For the purposes of the Finger Lake Stewardship Program, we propose conducting “Littoral and Shoreline Activities” aspects of the USEPA protocol. To characterize the near-shore habitats and conditions (both littoral zone and riparian area), the survey team establishes and evaluates ten evenly spaced “physical habitat” (“P-hab”) stations around the lake. Conditions and characteristics observed within a defined plot area are recorded. The protocol calls for making measures or observations of littoral and riparian physical habitat structure at the ten P-Hab stations, recording observations of invasive plants and macroinvertebrates, sampling benthic macroinvertebrates at each of the ten stations and combining as a single composite sample,³ and collecting a water sample at the last P-Hab station for fecal indicator (*Enterococci*) analysis.

The WDNR has developed a Supplemental Lakeshore Assessment Methodology to augment the USEPA National Lake Assessment. The WDNR protocol enhances some of the USEPA protocol and makes it more relevant to Wisconsin lakes. The WDNR protocol uses the

² Manual can be downloaded at: http://www.epa.gov/owow/lakes/lakesurvey/pdf/lakes_field_op_manual.pdf

³ The macroinvertebrate component of the technique may be omitted in this project.

“P-hab” stations established by the USEPA method to take further measures of woody debris, invasive species, and human development. The WDNR protocol also calls for aquatic plant surveys, but since a point-intercept plant survey is a separate task for Finger Lake, the aquatic plant survey will be excluded from the WDNR protocol.

6. PROJECT PRODUCTS

Each of the objectives results in a tangible product and each is described in Table 2.

Objective	Description of Program Product
Objective 1. Develop a strategy to perpetuate lake and watershed quality.	Lake Planning Grant Proposal (this document).
Objective 2. Gather/manage information about fish, aquatic life, & habitats.	Review of information to be reported in Adaptive Management Plan.
Objective 3. Gather/manage information about rare species.	Reported in the Adaptive Management Plan.
Objective 4. Gather/manage water quality information.	Reported in the Adaptive Management Plan.
Objective 5. Characterize the aquatic plant community.	Reported on in Aquatic Plant Management Plan
Objective 6. Gather/manage information about watershed.	Maps/narrative in the Adaptive Management Plan.
Objective 7. Initiate frog/toad monitoring program.	Reported in Adaptive Management Plan
Objective 8. Apply a volunteer angler journal program.	Report in Adaptive Management Plan.
Objective 9. Lake stage ht. & drainage basin/lake area ratio.	Reported in Adaptive Management Plan.
Objective 10. Develop and conduct lake user survey.	Discussion of results in Adapt. Management Plan.
Objective 11. Apply WiLMS or alternative modeling system.	Model output reported in Adapt. Mgt Plan.
Objective 12. Meet w/partners each year to assess progress.	Annual progress summary
Objective 13. Deliver workshop on littoral zone/riparian area.	Workshop
Objective 14. Document littoral and riparian area condition using digital photography.	Reported and summarized in the Adaptive Management Plan.
Objective 15. Qualitatively document littoral & riparian areas & review written history.	Reported in the Adaptive Management Plan.
Objective 16. Quantitatively document littoral/riparian areas.	Reported the Adaptive Management Plan.
Objective 17. Prepare aquatic plant management plan.	APMP includes aquatic plant report, analyses of plant community, and specific actions.
Objective 18. Create Adaptive Management Plan.	Incorporates newly collected/existing information. Houses most program products. Recommended actions to further progress toward program goals.
Objective 19. Recommendations to L&W Res Mgt Plan	Written recommendations submitted to the County.
Objective 20. Deliver education program.	Adapt mgt plan, APMP, articles for newsletter/other media are formal educational pieces. Training volunteers. Technical assistance.
Objective 21. Aquatic Invasive Species (AIS) awareness and protection.	Reported in Adapt Mgt Plan and used in education pieces. Watercraft inspection data will be reported.

7. DATA TO BE COLLECTED

The Finger Lake Stewardship Program will be a data-rich endeavor intended to increase understanding of the lake ecosystem. The 2009 and 2013 plant survey represents enormous data sets. Southern naiad surveys in 2014 and 2015 will likewise produce considerable data. Water quality monitoring data will add to the baseline information about Finger Lake as well. Frog-toad surveys and volunteer angler's journal likewise produce substantial data sets. New water quality information will also result from the proposed effort. Qualitative and quantitative information about the littoral zone and riparian area along with photographic archive represent will consist of very large data sets. The lake user survey will add new data to assist in development of the management plans for the lake. Data on fish, rare animals, and invertebrates in the lake will also add to the information about Finger Lake.

8. EXISTING AND PROPOSED PARTNERSHIPS

The proposed project will benefit from a partnership between the FOFL, White Water Associates, Vilas County AIS Coordinator, Vilas County Land Conservation Department, and the WDNR. These entities play complimentary roles in the proposed project. The FOFL has a committed membership and willing volunteers eager to contribute in a variety of ways to the project. White Water scientists bring landscape and aquatic ecology expertise and experience to this project. The Vilas County Land Conservation Department and Vilas County AIS Coordinator play a role as information resources and responders to observations of potential AIS on Finger Lake. WDNR plays an advisory role, providing direction for Finger Lake stewardship and in providing data from aquatic plant surveys.

9. ROLE OF PROJECT IN PLANNING & MANAGEMENT OF LAKE

The proposed program will establish a foundation for ongoing lake stewardship. It will gather and use existing information and new data to guide development of the aquatic plant management plan and the adaptive management plan. It will also help assess where information gaps exist. The program will educate project participants and users of Finger Lake and its watershed and promote interest and involvement in ongoing stewardship.

10. TIMETABLE FOR IMPLEMENTATION OF KEY ACTIVITIES

Table 3 provides timing and duration of major project tasks over the entire program. Oversight of scheduling and progress will be accomplished by a team consisting of the FOFL and White Water Associates with guidance provided by WDNR.

TABLE 3. PROJECT CALENDAR	
TASK	ESTIMATED CALENDAR
Task 1A: Articulate a general strategy in Lake Planning Grant proposal.	2/2014
Task 1B: Meet with project partners to identify and prioritize management needs.	4/2014
Task 1C: Meet with project partners to develop strategy and approach.	4/2014
Task 1D: Finalize assignment of tasks to project partners.	4/2014
Task 2A: Collect/review historical information regarding fish.	9/2014
Task 2B: Interview fish biologists (WDNR) for detailed information.	9/2014
Task 2C: Conduct qualitative survey for native freshwater mussels and zebra mussels.	6-9/2014
Task 2D: Collect/review information about aquatic and wetland habitats.	6-9/2014
Task 3A: Evaluate use of the lake by Common Loons.	6-11/2014
Task 3B: Evaluate use of the lake by Bald Eagles.	6-11/2014
Task 3C: Evaluate use of the lake by other rare species.	6-11/2014
Task 3D: Assess habitat features appropriate to rare species.	1-3/2015
Task 3E: Develop recommendations for rare species habitat.	1-3/2015
Task 4A: Collect/review existing limnological information.	6/2014
Task 4B: Verify lake bathymetry at deep point(s) and tie to stage height	7-8/2014
Task 4C: Prepare a regimen of water quality sampling.	2/2014
Task 4D: Conduct water quality sampling.	2014-2015
Task 4E: Conduct a littoral zone specific conductance study.	8/2015
Task 4F: Summarize water quality and trophic status.	1/2016
Task 5A: Obtain data for 2009 and 2013 PI aquatic plant surveys.	4/2014
Task 5B: Process and manage plant data.	5/2014
Task 5C: Further analyze plant data and map.	5/2014-11/2015
Task 5D: Compare results of 2009 and 2013 plant surveys.	5/2014-11/2015
Task 5E: Conduct mapping & density characterization of s. naiad in 2014 & 2015.	8/2014 & 8/2015
Task 5F: Using various data, characterize changes in s. naiad distribution & density.	11-12/2015
Task 6A: Delineate the Finger Lake watershed.	10/2014
Task 6B: Map watershed land cover/use & soils.	10/2014
Task 6C: Map slopes to identify runoff patterns.	10/2014
Task 6D: Review existing institutional programs.	11/2014
Task 6E: Determine critical sites and/or activities.	11/2014
Task 7A: Develop frog/toad monitoring protocol.	4/2014
Task 7B: Train volunteers to conduct frog/toad monitoring.	4/2014

TABLE 3. PROJECT CALENDAR	
TASK	ESTIMATED CALENDAR
Task 7C: Select appropriate monitoring sites.	4/2014
Task 7D: Carry out the frog and toad monitoring (2014-2015).	4-7/2014 & 2015
Task 7E: Analyze 2014 monitoring data and revise protocol (if needed).	11/2014
Task 7F: Summarize 2014-2015 monitoring results.	11/2015
Task 8A: Customize volunteer angler's journal.	4/2014
Task 8B: Provide protocol and angler forms to volunteers.	4/2014
Task 8C: Train volunteer group in data collection/management.	4/2014
Task 8D: Conduct volunteer angler's journal program (2014-2015).	4/2014-12/2015
Task 8E: Summarize the 2014-2015 angler's journal results.	1/2016
Task 9A: Establish hard structure for lake stage measurement.	6/2014
Task 9B: Determine drainage basin/lake area ratio.	10/2014
Task 9C: Research existing hydrological information as it pertains to Finger L. levels	10/2014
Task 10A: Develop draft lake user survey questions.	2/2015
Task 10B: Provide draft questions for WDNR review.	2/2015
Task 10C: Distribute survey to stakeholders.	11/2015
Task 10D: Summarize stakeholder responses.	12/2015
Task 11A: Run appropriate modeling elements from WiLMS.	1/2016
Task 11B: Incorporate findings into educational program.	1-3/2016
Task 11C: Incorporate findings into management plan.	3/2015 & 3/2016
Task 12A: Develop annual progress report.	3/2015 & 3/2016
Task 12B: Distribute the annual progress report.	2014 & 2015
Task 12C: Meet with partners once/year to discuss status.	6/2014
Task 13A: Prepare a half-day workshop on littoral zone and riparian area.	6/2014
Task 13B: Establish workshop date and promote attendance.	6/2014
Task 13C: Deliver the workshop.	6/2014
Task 14A: Train volunteer work team to conduct photography/GPS fieldwork.	6/2015
Task 14B: Train volunteer work team to manage digital photography data.	6/2015
Task 14C: Volunteer team collects digital photos of the shoreline.	7/2015
Task 14D: Integrate photos into an interactive electronic archive.	10-12/2015
Task 14E: Submit interactive electronic archive to WDNR.	6/2016
Task 15A: Train volunteer team to conduct assessment and manage data.	6/2015
Task 15B: Volunteer team deploys to collect data.	7/2015
Task 15C: Integrate qualitative information into electronic photo archive.	10-12/2015
Task 15D: Submit interactive electronic archive to WDNR.	6/2016
Task 15E: Review the existing written history of the lake for application in stewardship.	1/2015
Task 16A: Establish ten physical habitat ("P-Hab") stations.	7/2015
Task 16B: Conduct USEPA measurements.	9/2015
Task 16C: Conduct WDNR measurements.	9/2015
Task 16D: Manage assessment data and summarize.	11/2015
Task 17A: Summarize plant community data.	11/2015

TABLE 3. PROJECT CALENDAR	
TASK	ESTIMATED CALENDAR
Task 17B: Create an APM Report and Plan.	1-2/2016
Task 17C: Incorporate APM Plan into Adapt. Mgt Plan.	3/2016
Task 18A: Write Adaptive Management Plan.	3/2016
Task 18B: Prepare initial management actions.	1-2/2016
Task 19A: Review the Vilas County L&W Resources Management Plan.	2/2016
Task 19B: Communicate with the L&W Conservation Department.	10/2015
Task 20A: Provide written & verbal education material to lake volunteers.	10/2015
Task 20B: Contribute materials to lake association newsletter/website.	2014-2016
Task 20C: Prepare one press release/year for local news outlet(s).	2014-2016
Task 21A: Staff boat landing(s) with volunteer CB/CW inspectors.	2014 & 2015
Task 21B: Solicit lake steward volunteers to augment boat inspections for future.	2014 & 2015
Task 21C: Review documentation for known AIS in lake system.	2014 & 2015
Task 21D: Conduct analysis of lake susceptibility to zebra and quagga mussels.	6/2014
Task 21E: Document AIS review & zebra mussel analysis in Adap. Management Plan.	11/2015
Task 21F: Incorporate AIS findings into education program.	1/2016 2014-2016
Task 21G: Recommend AIS monitoring needs.	3/2016

11. PLAN FOR SHARING PROJECT RESULTS

As discussed in a previous section, education deliverables for the project have significant elements that share project results with stakeholders. Table 2 summarizes these products.

12. BUDGET FOR PHASES 1 and 2

The FOFL and White Water will contribute large in-kind value to the project. Requested funds will be used for reimbursement of consultant and State Laboratory of Hygiene laboratory analyses fees. We anticipate that these funds will be allocated into the categories and approximate effort presented in Tables 4 and 5 (on the following two pages). These tables also outline donated time and value and other donations such as mileage and other direct costs (ODCs). The FOFL will donate at least \$200 cash in Phases 1 and 2 as part of their match. The FOFL anticipates receiving a modest grant from the Town of Washington, if the proposed program is funded. The proposal anticipates funding for both phases, but if only Phase 1 is funded, the project team (in consultation with the WDNR) will revise project emphases and deliverables.

Table 4. Phase 1 Budget for Lake Stewardship Program								
Objective	WWA Staff Hours	WWA Staff Budget	WWA Donated Hours	WWA Donated Budget	LA Volunteer Hours	LA Volunteer Budget	ODCs (including mileage)	SLOH (testing) Budget
1. Strategy	6	\$510	6	\$510	12	\$144	\$68	
2. Fish/aquatic life	20	\$2,250	7	\$595	2	\$24	\$68	
3. Rare species	8	\$680	4	\$340	0	\$0	\$68	
4. Water quality	64	\$3,620	2	\$170	0	\$0	\$458	\$325
5. Aquatic Plants	102	\$6,780	12	\$1,020	4	\$48	\$68	
6. Watershed	29	\$2,185	5	\$425	0	\$0	\$0	
7. Frog/toad	29	\$2,465	17	\$1,445	48	\$576	\$68	
8. Angler journal	18	\$1,110	4	\$340	200	\$2,400	\$0	
9. Stage & basin	8	\$680	2	\$170	12	\$144	\$0	
10. Lake user survey	12	\$810	2	\$170	30	\$360	\$0	
11. Watershed modeling	0	\$0	0	\$0	0	\$0	\$0	
12. Progress meeting	12	\$1,020	4	\$340	14	\$168	\$68	
13. Workshop	0	\$0	0	\$0	0	\$0	\$0	
14. Lit-Rip photos	0	\$0	0	\$0	0	\$0	\$0	
15. Qualitative lit-rip	0	\$0	0	\$0	0	\$0	\$0	
16. Quantitative lit-rip	0	\$0	0	\$0	0	\$0	\$0	
17. Aq. Plant Mgt Plan	0	\$0	0	\$0	0	\$0	\$0	
18. Adaptive Mgt Plan	0	\$0	0	\$0	0	\$0	\$0	
19. Input to County	3	\$255	2	\$170	3	\$36	\$0	
20. Education program	11	\$935	5	\$425	36	\$432	\$0	
21. AIS	13	\$895	3	\$255	106	\$1,272	\$0	
TOTALS	335	\$24,195	75	\$6,375	467	\$5,604	\$864	\$325
BUDGET SUMMARY								
Total Phase 1 Request	\$24,520							
WWA Budget	\$24,195							
SLOH Cost	\$325							
CBCW Hire	\$0							
Total Phase 1 Match	\$12,843							
WWA Donated Services	\$6,375							
WWA Donated ODCs	\$864							
LA In-kind	\$5,604							
TOTAL PROJECT VALUE	\$37,363							
PERCENT WDNR	64.8							
PERCENT MATCH	35.2							

Table 5. Phase 2 Budget for Lake Stewardship Program								
Objective	WWA Staff Hours	WWA Staff Budget	WWA Donated Hours	WWA Donated Budget	LA Volunteer Hours	LA Volunteer Budget	ODCs (including mileage)	SLOH (testing) Budget
1. Strategy	0	\$0	0	\$0	0	\$0	\$0	
2. Fish/aquatic life	0	\$0	0	\$0	0	\$0	\$0	
3. Rare species	6	\$510	4	\$340	16	\$192	\$68	
4. Water quality	20	\$1,070	3	\$255	0	\$0	\$135	\$50
5. Aquatic Plants	25	\$1,565	3	\$255	4	\$48	\$68	
6. Watershed	0	\$0	0	\$0	0	\$0	\$0	
7. Frog/toad	12	\$1,020	5	\$425	52	\$624	\$0	
8. Angler journal	23	\$1,395	3	\$255	200	\$2,400	\$0	
9. Stage & basin	0	\$0	0	\$0	6	\$72	\$0	
10. Lake user survey	24	\$1,480	4	\$340	12	\$144	\$0	
11. Watershed modeling	17	\$885	1	\$85	0	\$0	\$0	
12. Progress meeting	6	\$510	2	\$170	12	\$144	\$68	
13. Workshop	10	\$850	6	\$510	26	\$312	\$68	
14. Lit-Rip photos	21	\$1,785	4	\$340	24	\$288	\$0	
15. Qualitative lit-rip	28	\$2,100	7	\$595	20	\$240	\$68	
16. Quantitative lit-rip	45	\$2,740	4	\$340	0	\$0	\$193	
17. Aq. Plant Mgt Plan	59	\$3,755	9	\$765	6	\$72	\$0	
18. Adaptive Mgt Plan	50	\$3,410	12	\$1,020	0	\$0	\$0	
19. Input to County	5	\$250	1	\$85	0	\$0	\$0	
20. Education program	7	\$595	5	\$425	30	\$360	\$0	
21. AIS	9	\$695	4	\$340	104	\$1,248	\$0	
TOTALS	367	\$24,615	77	\$6,545	512	\$6,144	\$666	\$50
BUDGET SUMMARY								
Total Phase 2 Request	\$24,665							
WWA Budget	\$24,615							
SLOH Cost	\$50							
CBCW Hire	\$0							
Total Phase 2 Match	\$13,355							
WWA Donated Services	\$6,545							
WWA Donated ODCs	\$666							
LA In-kind	\$6,144							
TOTAL PROJECT VALUE	\$38,020							
PERCENT WDNR	64.9							
PERCENT MATCH	35.1							

13. SUPPLEMENTAL INFORMATION IN SUPPORT OF PROJECT

In this section we provide information on each of the two project partners: (1) FOFL and (2) White Water Associates.

Friends of Finger Lake

Friends of Finger Lake (FOFL), a qualified lake association, was incorporated in 1997 and has had an active presence on Finger Lake in the years following. A core group of lake residents has continued to provide leadership throughout the organization's existence. The association has 30 members currently. The Board of Directors is comprised of a president, vice president, secretary/treasurer, and five directors at large. More significant projects led by the association include re-zoning properties adjoining the lake to the most stringent R1 residential zoning designation, electro-shocking to determine fish population and age distribution, a detailed history of the lake residents from the earliest settlers to today's residents, point-intercept plant studies, fish stocking of the walleye population, loon nesting studies, lake mapping initiatives, invasive species education and monitoring, adopt-a-highway projects, sponsoring lake clothing merchandising, citizen water monitoring program, and resolving lake issues such as a breach at the outflow of the lake. Dues are \$15 per property per year. Special projects, like walleye stocking, are funded on a case by case basis with interested residents covering the costs. The association conducts an annual meeting on the third Sunday of July and has other meetings as needed. An annual newsletter is distributed in the spring with other mailings to all lake residents as needed. The Board meets informally as needed over the course of the year with individual directors assuming responsibility for various projects. The association is actively involved with the Vilas County Lake Association and is a member of state level organizations as well. The association established a courtesy policy on the lake to help maintain the desired environment and as a rule these guidelines are followed.

White Water Associates, Inc. - Biographical Summaries for Selected Staff

Established in 1985, White Water Associates, Inc. comprises a seasoned team of science professionals that approaches environmental problem-solving systematically and objectively. White Water is an ecological consulting firm and analytical laboratory in northern Michigan. It is a certified small, disadvantaged business enterprise that teams well with other professionals and excels in clear, accurate communication. White Water carries necessary insurances to ensure protection for its clients, including Workers Compensation and Employers Liability; Commercial General Liability; Professional Liability, Errors and Omissions; and Automobile Liability insurance. White Water Associates' website is <http://www.white-water-associates.com>.

Dean Premo, Ph.D., is President and co-founder of White Water Associates, Inc. His academic training is in zoology and ecology. His undergraduate degree included certification for secondary science education. Dr. Premo has served as a consultant to the U.S. Environmental Protection Agency Science Advisory Board (Ecological Processes and Effects Committee, and Research Strategies Advisory Committee). He is a past member of the National Research Council (research arm of the National Academy of Sciences) Committee on Inland Aquatic Ecosystems. Dr. Premo's work regarding biodiversity and ecosystem health with forest managers has received regional and national recognition and has been featured in The New York Times. Dr. Premo served as a member of the Science Committee of Michigan's Relative Risk Assessment Project as an expert in biodiversity and landscape ecology. He served on the Project Advisory Committee for National Wildlife Federation's Lake Superior Biodiversity Project and later as a project scientist for the same endeavor. Dean Premo is a Certified Senior Ecologist (Ecological Society of America).

Kent Premo, M.S. is the systems support scientist, publications specialist, and technical editor for White Water Associates. His degrees bachelor's and master's degrees are in botany and plant pathology. In many water quality projects, Mr. Premo is responsible for deployment and maintenance of remote sensing devices for continuous monitoring of dissolved oxygen, temperature, and other water quality measures. This work includes data management and interpretation. Mr. Premo has considerable experience with scientific writing, education, and publication. Mr. Premo has edited two scientific review texts; one dealt with biomarkers for toxicological exposure and effects, the other with a modeling initiative involving the effects of such exposures to birds.

Bette Premo, Ph.D., is White Water Associates Chief Executive Officer, with graduate training in limnology (freshwater ecosystem science) and 21 years of professional experience. Her doctoral research involved watershed management as related to nonpoint source phosphorus inputs in agricultural landscapes. For her M.S. degree, Dr. Premo studied aquatic invertebrate communities. She spent 16 months as a research scientist in Java, Indonesia studying water quality problems as related to agriculture and other land management practices. Dr. Premo is a past member of Michigan Governor John Engler's Environmental Science Board and as such reviewed environmental issues and translated them for general public presentation, in formats that include white papers, handbooks and public hearings. For White Water Associates, Dr. Premo consults on hydrological studies of groundwater movement, lake and stream bathymetry, flow studies, water quality monitoring, baseline inventories and sediment contamination and transport. She has served as principal scientist for water quality studies and aquatic ecosystem habitat assessments related to FERC relicensing projects for major hydroelectric companies. Bette Premo is the president of the Iron County Watershed Coalition, a grassroots organization that coordinates and funds watershed restoration and education. Dr. Premo has been involved with many water quality and ecosystem health assessment projects at White Water Associates. In addition to her duties as White Water's CEO and project scientist, Bette manages White Water's laboratory staff and consults on data quality control issues.