The Sevenmile Lake Adaptive Management Plan

(Forest and Oneida County, Wisconsin)

Prepared for:
Sevenmile Lake Association
Gene Kucharski, President
P.O. Box 1814
Eagle River, Wisconsin 54521

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

Photo taken by Angie Stine, White Water Associates

Date: February 2016

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

The Sevenmile Lake Adaptive Management Plan (Forest and Oneida County, Wisconsin)

This document is a product of a WDNR Lake Planning Grant awarded to:

Sevenmile Lake Association
Gene Kucharski, President
P.O. Box 1814
Eagle River, Wisconsin 54521
Phone: (920)469-2611; Email: Sevenmile_lake@yahoo.com

Prepared for:
Sevenmile Lake Association
Gene Kucharski, President
P.O. Box 1814
Eagle River, Wisconsin 54521

Submitted to:
Wisconsin Dept. of Natural Resources
Kevin Gauthier, Water Resources Management Specialist
8770 Hwy J
Woodruff, WI 54568

Prepared by:
White Water Associates, Inc.
Contact: Dean Premo, Ph.D.
429 River Lane, P.O. Box 27
Amasa, Michigan 49903
Phone: (906) 822-7889

Cite as: *Premo, Dean, Angie Stine, Caitlin Clarke and Kent Premo. 2016. The Sevenmile Lake Adaptive Management Plan. White Water Associates, Inc.*

Page left intentionally blank

WHITE WATER ASSOCIATES, INC.

TABLE OF CONTENTS

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Sevenmile Lake Appendices

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

CHAPTER 1

What Is the Sevenmile Lake Adaptive Management Plan?

The *Sevenmile Lake Adaptive Management Plan* results from a large-scale project funded by a Wisconsin Department of Natural Resources (WDNR) Lake Planning Grant. The project was sponsored by the Sevenmile Lake Association (SLA) and coordinated by White Water Associates, Inc., an independent ecological consulting firm and environmental laboratory. Since Sevenmile Lake was a primary subject of this project, the SLA is the recipient of this adaptive management plan.

Project participants have embraced the concept of "adaptive management" in their approach to Sevenmile Lake stewardship. Simply stated, adaptive management uses findings from planned monitoring activities 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. The plan will therefore be a dynamic entity, successively evolving and improving to fit the needs of Sevenmile Lake and the SLA. A central premise of adaptive management is that scientific knowledge about natural ecosystems is uncertain and incomplete. It follows that a practical management plan allows for ongoing adjustments in management designed to "adapt" to changing conditions and new information or understanding. Monitoring the outcomes of plan implementation is essential to the process of adaptive management. It is the goal of the Sevenmile Lake plan that future monitoring will focus on tangible indicators.

It is appropriate that the SLA is the lead organization in the implementation of this plan. Success depends on a coalition of participants, each carrying out appropriate tasks and communicating needs and findings to other team members. Future projects and ongoing monitoring results will inspire updates to the plan. The overall vision of the SLA is a healthy, sustainable Sevenmile Lake. This plan is an important tool to realize that vision.

Besides this introductory chapter, this plan is organized in seven additional chapters. Chapter 2 describes the audience for the *Sevenmile Lake Adaptive Management Plan*. Chapter 3 addresses why there should be a plan and discusses adaptive management and the underlying assumptions of the approach. Chapter 4 details how the plan was created, including the methodology used. Chapter 5 presents the findings from efforts to gather existing and new information about Sevenmile Lake and its environs by providing summaries of information in eleven subsections. Chapter 6 (*What Goals Guide the Plan?*) presents the desired future condition and goals established by the Sevenmile Lake Association and the plan writers. Chapter 7 (*What Objectives and Actions Move Us Toward the Goals?*) offers a logical menu of practical management actions ready to be adopted and adapted by those interested in taking an active role in caring for Sevenmile Lake and its surroundings. Twelve appendices complete this document. Appendix A contains the *Literature Cited.* Appendix B contains the *Sevenmile Lake Aquatic Plant Management Plan*. Appendix C presents the *Sevenmile Lake Review of Water Quality*. Appendix D includes the *Sevenmile Lake Watershed, Water Quality, and WiLMS Modeling*. Appendix E encompasses the *Sevenmile Lake EPA Littoral and Shoreline Survey*. Appendix F is the *Summary of Sevenmile Lake Shoreline Photo Survey*. Appendix G presents the *Sevenmile Lake Fisheries Summary.* Appendix H is a description of the *Sevenmile Lake Stewardship Program Volunteer Anglers' Journal Report.* Appendix I provides information about the *Sevenmile Lake Frog and Toad Survey.* Appendix J consists of the *Review of Water Regulations and Planning Relevant to Sevenmile Lake.* Appendix K comprises a *Historical Review of Sevenmile Lake.* Finally, Appendix L reviews the *Lake User Survey* for Sevenmile Lake.

CHAPTER 2

Who Is the Audience for the Sevenmile Lake Adaptive Management Plan?

The title of Chapter 3 poses the question: "Why Have the *Sevenmile Lake Adaptive Management Plan*?" The short answer is "Because we care!" We believe that people working together in the stewardship of this lake can make a difference. We can protect and restore a healthy ecosystem if we take a long-term, strategic approach. That approach is presented in this adaptive plan. It is an adaptive plan in the sense that it will grow and evolve. Implemented actions will be monitored. The plan will be evaluated. It will be reviewed and refined as years go by and as new generations take up their stewardship responsibility.

People who care about the Sevenmile Lake watershed are the most direct audience for this plan. They will be the implementers and evaluators. They will be the reviewers and future plan writers. Many of them live in or near the watershed. These are the "grassroots" – the constituency most connected to Sevenmile Lake and its surroundings. People who care are also those who live beyond the watershed boundaries. Some of these people visit Sevenmile Lake for recreation and enjoyment. But the audience also includes foundations and other funding agencies, resource and regulatory agencies concerned with environmental quality, and other citizens that are working on their watersheds.

For those in the "grassroots" camp, this plan is intended to provide a practical approach to carrying out protection and restoration of Sevenmile Lake. The plan does not have all the answers (it doesn't even have all the questions). It does not recommend every conceivable rehabilitation or protection action. But the plan does provide plenty with which to get started and it leaves room for ideas and contributions from others. Our recipe mixes a pinch of the theoretical with a cupful of the practical. Those of you who are "hands-on" have plenty to do.

The mixed audience of this plan challenges the authors to present a plan that is scientifically grounded and technically oriented, but at the same time accessible and understandable by the public who will in large part be responsible for its implementation. Although scientists are the primary authors of the plan, the writing is aimed at non-scientists. We define terms where clarity is needed and cite other literature for those interested in the source of a statement, or in learning more about the topic. The SLA has interacted with the plan writers throughout the process and reviewed draft components of the plan. The SLA has encouraged our practical approach so that applications of the plan are conspicuous.

We will end this chapter with our strongest management recommendation:

Approach lake and watershed management with humility.

Lake and watershed ecosystems are enormously complex. Our understanding of how they work is not complete. Our ability to predict outcomes from specific actions is uncertain. New discoveries are made every day that have important implications for future watershed management. We may never know all we need, but that fact can’t stop us from starting work on Sevenmile Lake today. The fact that ecosystems are inherently resilient is to our great advantage. They are able to rebound from disturbance and repair themselves from injury. In fact, some of today’s best watershed managers state that “...successful restoration usually has less to do with skillful manipulation of ecosystems than it does with staying out of nature’s way” (Williams et al., 1997). This plan is intended to complement nature’s own processes.

CHAPTER 3

Why Have the Sevenmile Lake Adaptive Management Plan?

Why have the *Sevenmile Lake Adaptive Management Plan*? The gut-level answer ("because we care") was offered in Chapter 2, but the question deserves more thoughtful reflection – the focus of this chapter. This requires consideration of environment, economy, history, and culture. This chapter also defines some important terms and presents the process and underlying assumptions.

Part 1 - Why Should We Care?

The health of a watershed and the health of local economies like those that exist in the Sevenmile Lake Watershed are highly integrated. A sustainable economy depends on a healthy environment. In fact all social and economic benefits are based on the biological and physical properties of watersheds (Williams et al., 1997). In fact, our economy should be viewed as being nested inside our environment (Lanoo, 1996).

This link between a healthy environment and the economy is true at several scales. For example, most property owners on Sevenmile Lake have invested in an ecosystem. The reasons that they have purchased the property are typically linked to the quality of the environment. The economic value of their investment is linked to the health of lake and surroundings. If ecological health declines, so does the value of the property.

At a slightly larger scale, this same principal linking the environment and economy applies to municipalities. The Towns of Phelps, Hiles and Three Lakes are caretakers of many ecosystems including Sevenmile Lake. The long-term economic health of the municipality is tied to the health of Sevenmile Lake and other lakes and streams in the area. At even larger scales yet, this applies to Forest and Oneida County, to the State of Wisconsin, and so on.

The SLA and this plan aspire to cultivate a deep connection to the lake and its surroundings. It is the people of the watershed that will make the management plan work. Lake and watershed stewardship must be a cultural imperative. In some ways, watershed restoration is about cultural restoration – rejuvenating citizens' civic responsibility to care for the environment in which they live. This is what Aldo Leopold referred to as "...the oldest task in human history: to live on a piece of land without spoiling it" (Leopold, 1948).

People need to feel vital by working to improve, beautify, or build. Sometimes that need is expressed by gardening, caring for a lawn, or volunteering on civic projects. The SLA and this plan endeavor to harness that energy and apply it to restoration and protection actions focused on Sevenmile Lake and its landscape. Education, rehabilitation, and protection become outlets for this creative energy.

Why should you care about creating and implementing a practical resource plan? Because we realize the economy and the economic options available to citizens in the watershed are tied to a healthy environment. Because we are all connected to the Sevenmile Lake landscape in some way. Because we feel a civic responsibility to care for the lake. Because we realize Sevenmile Lake potentially affects other lakes. Because we can feel vital by doing meaningful work in the watershed. Because future generations depend on us to hand down a healthy Sevenmile Lake ecosystem for them to enjoy and use.

The adaptive management plan will be successful if it allows and organizes meaningful stewardship work for Sevenmile Lake. It needs to make provision for different kinds of approaches and different kinds of people who want to be part of the process. It has to be strategic and integrated so that various actions complement one another, and are consistent with the lake's natural processes. The plan should help avoid management actions that work at cross-purposes or whose outcomes are undesirable.

Part 2 - What Is an Adaptive Management Plan?

An adaptive management process (Walters, 1986) is an appropriate model to use in lake and watershed management. In adaptive management, a plan is made and implemented based on the best available information and well-defined goals and objectives. Outcomes of management actions are monitored to ascertain whether they are effective in meeting stated goals and objectives. Based on this evaluation the plan is adapted (modified) in a process of continuous learning and refining.

Adaptive management concedes and confronts a truth that resource managers are sometimes reluctant to acknowledge – uncertainty. Because natural systems are so diverse, so complex, and so variable, almost all management actions will have uncertain outcomes. An adaptive management approach essentially takes a position that says, "We will make our best attempt and get better as we go along. We'll listen to what the natural system tells us." In adaptive management, monitoring is crucial. Adaptive management uses information from monitoring to continually evaluate and refine management practices. Monitoring measures the success of restoration or management. Well-designed monitoring should indicate how effectively management measures are working and give us new insights into ecosystem structure and function. Monitoring should provide needed information to adapt management goals.

The *Sevenmile Lake Adaptive Management Plan* can be implemented through five kinds of management actions: protection, rehabilitation, enhancement, education, and research. Research actions have a special subset called "monitoring actions" that serve all of the management actions. Each kind of action is summarized in the following bullets.

- Protection actions are used when high quality areas or ecosystem are identified and need to be safeguarded. Since aspects of Sevenmile Lake and its surroundings are quite pristine, part of the Sevenmile Lake adaptive management could fall under this kind of action. There are numerous forms that protection actions can take including protecting water quality, conservation easements, buffer zones to prevent runoff into the lake, and so on.
- Rehabilitation actions are those that manipulate site-specific elements of ecosystems in order to repair some past impact. Examples include planting lakeside natural vegetation in areas of erosion, placing fish structure where large woody material has been removed from the lake, or healing an area of active erosion. Individual rehabilitation actions contribute to overall lake and watershed restoration.
- Enhancement actions are intended to improve some function or value of the ecosystem. In some cases, these actions are meant to benefit human users of the lake (for example, enhancing recreation values by planting fish or creating new fish habitat).
- Education actions are those activities that serve to promote lake stewardship and inform people about natural ecosystems. This includes this management plan as an education piece. These actions also include installation of interpretive kiosks or incorporation of Sevenmile Lake biology in curricula of area schools. Every person that visits Sevenmile Lake is an opportunity for education about healthy ecosystems and impacts to them.
- Research actions are employed to learn about the system being managed. Often we know very little about the plants, animals, habitats, ecosystems, and processes that our management actions are affecting. Research actions on water quality began at Sevenmile Lake years ago with basic water quality measures and are ongoing today. More recently, surveys for aquatic plants have contributed to our understanding of the Sevenmile Lake ecosystem. Monitoring actions (a subset of research actions) are those that serve to evaluate the outcomes of protection, rehabilitation, enhancement, and education actions. Monitoring actions guide future management.

One word of caution is warranted. Our society typically thinks a long-term planning horizon is twelve months. Unfortunately, this is out of synchrony with the way an ecosystem functions. An ecological clock ticks off time in years, decades, centuries, and even millennia. Lake and watershed management and restoration must be viewed from this perspective. In fact, the final outcomes of some of the good work put in place today might not be apparent until a new generation of lake stewards is on the scene.

Part 3 - What Are the Plan's Underlying Assumptions?

As an adaptive plan, a basic assumption is that the management actions will change over time under the influence of stakeholders. Through iterative refinement, the plan will more closely reflect the needs of the lake and the people who care about it. This plan has assumed a desired condition of sustainable lake health. The plan attempts to reflect the collective vision of the people and organizations that are concerned with the lake and the surroundings. The SLA, the Forest and Oneida Counties' Land & Water Conservation Departments, the North Central Wisconsin Regional Planning Commission, the Wisconsin Department of Natural Resources, and those living and recreating in the Sevenmile Lake watershed are among these stakeholders.

The Forest and Oneida Counties' Land & Water Conservation Departments provide a variety of land information and related services including: natural resource and water quality protection information, AIS information and assistance, geographic information, rural addressing, Public Land Survey System and surveying data, property ownership and tax assessment information and mapping products. This office can provide important assistance in during subsequent phases of Sevenmile Lake stewardship.

At a larger geographic scale, the WDNR published the *Headwaters Basin Integrated Management Plan* (WDNR et al., 2002) that provides a snapshot of current conditions of resources in the larger drainage basin that includes Sevenmile Lake. The Plan outlines nineteen issues of concern to the basin, including control of exotic species, shoreline development, resource inventory and monitoring, habitat loss, user conflicts, and protection of endangered, special concern, or unique species.

The integrating feature of this lake management plan is Sevenmile Lake and its surroundings. The plan assumes that proper planning in the beginning of the process will save time and money throughout the life of the program and that this can be accomplished by managing the causes rather than (or at least, in addition to) managing the symptoms of any impairments.

CHAPTER 4

How Was the Sevenmile Lake Management Plan Made?

In this chapter, we describe the methods that were employed to accomplish these tasks and objectives. A team of consulting scientists (White Water), in consultation with the SLA prepared this adaptive management plan. The methods that were used followed the goals, objectives, and tasks that were described in the grant proposal submitted to the WDNR. We describe these methods in this section under descriptive paragraph headings.

The effort included gathering, reviewing, and summarizing existing information relating to Sevenmile Lake biota and water quality. Existing information is found in many repositories and forms: anecdotal accounts of residents, resource agency reports and memos, municipal planning and zoning documents, scientific reports, old and new photographs, and government records.

Watershed - Sevenmile Lake watershed analysis included delineating the Sevenmile Lake watershed area, mapping land cover/use and soils of the watershed; and digital elevation models. This information is discussed further in the *Sevenmile Lake Aquatic Plant Management Plan*. We used existing layers of geographic information available from the WDNR and other sources and manipulated these data using geographical information system technology. We reviewed and summarized existing institutional programs that influence water quality (for example the *Headwaters Basin Integrated Management Plan*, Forest and Oneida Counties' *Land & Water Resources Management Plans*, and various township zoning ordinances).

Aquatic Plants - An aquatic plant survey was conducted on Sevenmile Lake in 2012 by White Water Associates biologists using the WDNR point-intercept protocol. These data allowed for calculation of ecological 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 also allow for 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, Floristic Quality Index, maximum depth of plants, average number of all species per site, average number of native species per site, and species richness. This data and the subsequent analyses were used in the creation of the *Aquatic Plant Management Plan* component of the *Sevenmile Lake Adaptive Management Plan*.

Aquatic Plant Management Plan - An important component of this project was our objective to prepare an *Aquatic Plant Management Plan* (APMP) for Sevenmile Lake. This involved interpreting and summarizing aquatic plant data for inclusion in the plan. We created an APMP that includes goals, objectives, historical plant management, monitoring, evaluation, plant community, nuisance species or AIS, management alternatives, and recommendations. Because of the relative size of the APMP, it is included as Appendix B of this plan.

Water Quality - One of our objectives was to gather, consolidate, assess, and manage information about Sevenmile Lake water quality and potential risks to water quality. To this end, we collected and reviewed existing limnological information about Sevenmile Lake, analyzed and summarized existing Sevenmile Lake water quality data, and collected additional water quality data and summarized in a water quality report. Having a baseline of water quality information is a solid starting point for adaptive lake management.

To develop additional baseline material pertaining to water quality, we applied the water quality-planning tool known as the *Wisconsin Lake Modeling Suite* (WiLMS). The model is comprised of four parts: the model setup, phosphorus prediction, internal loading and trophic response (Hassett et al., 2003). To view Sevenmile Lake's WiLMS analysis, see Appendix D.

Sevenmile Lake water levels are maintained by a dam located near the southwest end of the lake. In 1893 the Nine Mile Creek Improvement Company authorized to have a dam built under Chapter 86 of the Laws of Wisconsin, however, the actual date of dam construction is unknown (WVIC 2016). In 1907 the Wisconsin Valley Improvement Company (WVIC) acquired the dam. In 1917 the original wooden spillway was replaced with the current concrete/steel structure (WVIC 2016). Sevenmile Lake dam is operated by the WVIC under a federal license issued by the Federal Energy Regulatory Commission (FERC). This 30-year license (FERC Project P-2113) was issued in 1996. The WVIC records weekly water elevations, reservoir volume and any gains or losses during that week (WVIC, 2015). These data for Sevenmile Lake can be viewed in the *Review of Sevenmile Lake Water Quality* (Appendix C).

Littoral and Riparian Zones - Two assessments of Sevenmile Lake's littoral and riparian habitats (one quantitative and one qualitative) were conducted as part of this project. White Water Associates staff conducted a US Environmental Protection Agency (EPA) quantitative littoral zone and shoreline survey in 2013. This survey was augmented with components of the WDNR littoral zone and shoreline survey protocol, and is available as Appendix E of this plan.

With training from White Water staff, Sevenmile Lake volunteers conducted a qualitative assessment of the lake shoreline. This effort included survey of the human development and impacts as well as the natural setting. A photographic documentation of the Sevenmile Lake shoreline was also completed and integrated with other data to document the current conditions of the lake. A summary of this information is available in Appendix F. The complete data and photos are available as a CD-ROM.

Fisheries - As part of the adaptive management plan, White Water biologists gathered and summarized information about Sevenmile Lake fisheries. This objective was fulfilled by reviewing WDNR fisheries reports and interviewing the Forest and Oneida Counties' area WDNR fisheries biologist. White Water biologists summarized this information for inclusion in this adaptive management plan. See Appendix G, the *Sevenmile Lake Fisheries Summary.*

Another component of the adaptive management plan is to create a volunteer journal program. Volunteer anglers' journals can be used to collect meaningful fisheries data to augment WDNR fisheries surveys. It is the objective of the journals to engage Sevenmile Lake anglers in collecting fish data and to help understand the dynamics of fish populations. The *Sevenmile Lake Stewardship Program Volunteer Anglers' Journal* can be read in Appendix H.

Wildlife - As part of this project, a frog and toad survey was conducted near Sevenmile Lake in 2012. Volunteers were trained to monitor for frog and toad species. The design, methods, and results of the frog and toad monitoring can be read in Appendix I of this plan.

Other Related Plans - Because other organizations are involved with water resources planning and management in northern Wisconsin, an objective of the planning component of the project was to review recommendations from existing plans (for example, *Headwaters Basin Integrated Management Plan* and Forest and Oneida Counties' *Land & Water Resources Management Plans*) and review these in this *Adaptive Management Plan* where appropriate. We also reviewed federal, state, and local regulations and ordinances that serve to protect water quality.

Sevenmile Lake Historical Context – Human presence in the Sevenmile Lake area has influenced the look of the land and the quality of the lakes. In fact, humans have altered these ecosystems in many ways. As we look toward the future of Sevenmile Lake, an understanding of the history of the area is important. This gives us perspective as we consider how human stewardship might protect what is best about the lakes and restore aspects that need improvement. For more on the history of the Sevenmile Lake area, see Appendix K.

Sevenmile Lake Attributes and Risks – Another objective was to prepare a catalog of Sevenmile Lake environmental, cultural, and aesthetic attributes with a qualitative evaluation of the quality and associated potential threats. This objective included three tasks: (1) Through collaboration with the SLA and other Sevenmile Lake area stakeholders, list water-related environmental, cultural, and aesthetic attributes and describe each; (2) qualitatively evaluate each of the attributes; (3) identify and describe potential threats to the Sevenmile Lake attributes.

Educational Outreach - A planning objective was to support the educational program efforts where related to Sevenmile Lake and other management elements. Toward this end, White Water staff was available for phone consultation with members of the SLA and other stakeholders. We endeavored to increase support, capacity, and involvement of the SLA and other stakeholders in long-term stewardship of Sevenmile Lake through communication of project progress and findings. Finally, White Water staff attended public meetings that reported and discussed Sevenmile Lake planning process and other project-related issues.

Lake User Survey – White Water staff, in consultation with SLA and WDNR, prepared a lake user survey. The SLA distributed the survey and White Water staff analyzed the returned data. These results are presented as Appendix L of this document.

Adaptive Management Plan – An important project objective called for the creation of this initial adaptive management plan for Sevenmile Lake that will help ensure high quality lake management and will serve as a firm foundation for future iterations of the plan. The adaptive management plan integrates the APMP with other information about Sevenmile Lake and its watershed. This objective was guided by two basic tasks. The first task was to develop management recommendations for Sevenmile Lake. These recommendations include topics such as water quality, fish habitat, special species habitat (rare plants and animals), sensitive areas, non-native species, and ecological threats. The second task was to prepare a practical written plan, grounded in science that includes sections on implementation, monitoring, and adaptive management. The plan will lay the basis for its expansion in future phases. It will identify where more information is required. White Water scientists carried out tasks under this objective.

CHAPTER 5

What is the State of Sevenmile Lake and its Watershed?

An understanding of the features and conditions of the Sevenmile Lake and its landscape is the foundation for developing and implementing strategies that seek to protect and restore the biological health of the area. We have sought information useful to devising the lake's adaptive management plan. Future project phases will collect and incorporate additional information.

This chapter is intended to teach us about Sevenmile Lake. What is the lake like? What is the surrounding landscape? What organisms live here? How healthy is the lake? How have humans contributed (or detracted) from that health? Do threats to watershed health exist? This chapter identifies and organizes existing information and reports on new findings

If you are new to Sevenmile Lake and its surroundings, this chapter will make you familiar with features and conditions that exist here and provide some insight as to why things are the way they are. If you are a life-long resident of the Sevenmile Lake area, you may be familiar with parts of the discussion in this chapter. You may have things to contribute or correct. This would be a welcome response. Become engaged! Improve the understanding of the watershed by adding your knowledge in future iterations of this plan.

We present Chapter 5 in eleven Parts, each part reflecting the following topics: the lake and surroundings; aquatic plants; water quality; littoral and riparian zones; fisheries; wildlife; non-native invasive species; regional plans, special attributes, environmental threats, and the lake user survey. Various appendices are referenced from the text.

Part 1. Sevenmile Lake and the Surrounding Area

Sevenmile Lake is located on the border of Forest and Oneida Counties, Wisconsin about 10 miles southeast of the town of Eagle River, Wisconsin and approximately 16 miles south of the Michigan-Wisconsin border. Other lakes, both large and small, are in this landscape. This interconnected water landscape is a target for migrating and breeding waterfowl and other birds. Sevenmile Lake has value and function in this larger landscape as well as its own watershed.

Sevenmile Lake has a 6.1 mile shoreline and 518 acres surface area. There is Nicolet National Forest land along the southeast shore, and around the western bay of the lake. There are two public boat accesses—one on the west side of the lake and one on the east side. The lake is fairly developed with permanent homes and cottages, although areas of more natural riparian area also exist. Exhibit 1 shows the Sevenmile Lake area and identifies major landmarks.

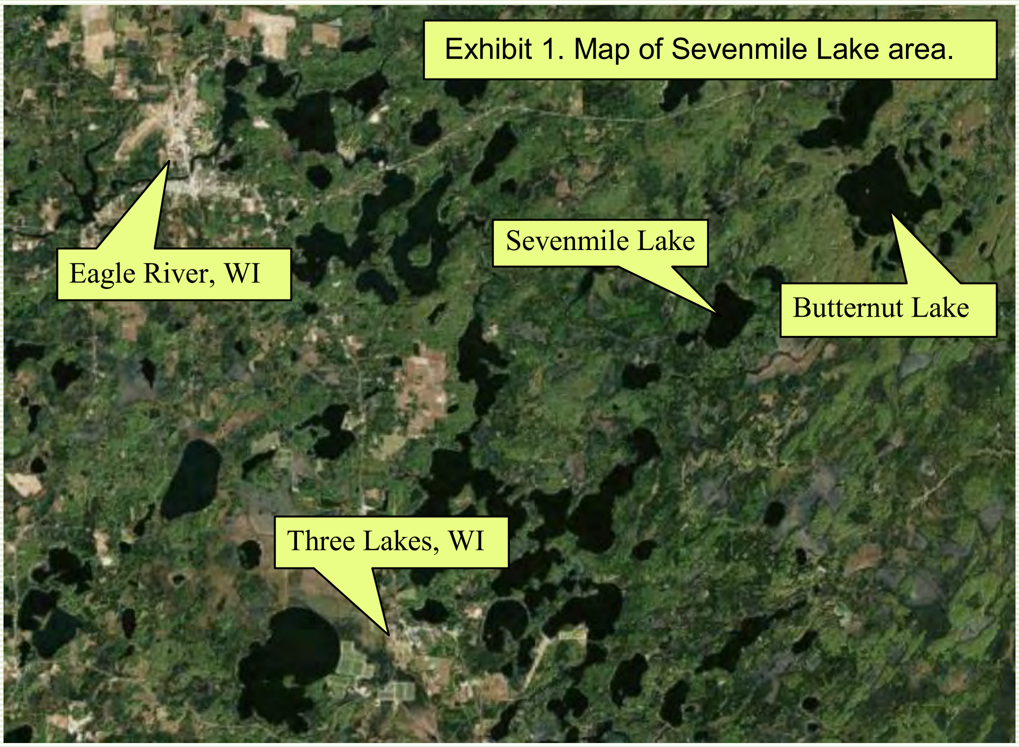


Exhibit 1. Map of Sevenmile Lake area.

The Aquatic Plant Management Plan (APMP) for Sevenmile Lake (Appendix B) contains a thorough treatment of the watershed size and composition. Cover type, land use, soils, and elevations are described and illustrated in the APMP.

Part 2. Aquatic Plants and Aquatic Plant Management Plan

As far as we can determine, no systematic or large-scale plant management activity has ever taken place in Sevenmile Lake. Over the years, no particular aquatic plant nuisance issues have demanded control action. An aquatic plant survey was conducted on Sevenmile Lake in 2012 by White Water Associates. The point-intercept aquatic plant survey recorded 25 species. The aquatic plant community was diverse and had high floristic quality. These findings support the contention that the Sevenmile Lake plant community is healthy and diverse. One Special

Concern species was observed: small purple bladderwort (*Utricularia resupinata*). The aquatic plant survey is discussed in more detail in the Sevenmile Lake APMP, followed by supporting tables and figures.

Part 3. Sevenmile Lake Water Quality

Sevenmile Lake has a maximum depth of 43 feet and a complex bathymetry (Exhibit 2). The water body identification code (WBIC) is 1605800.

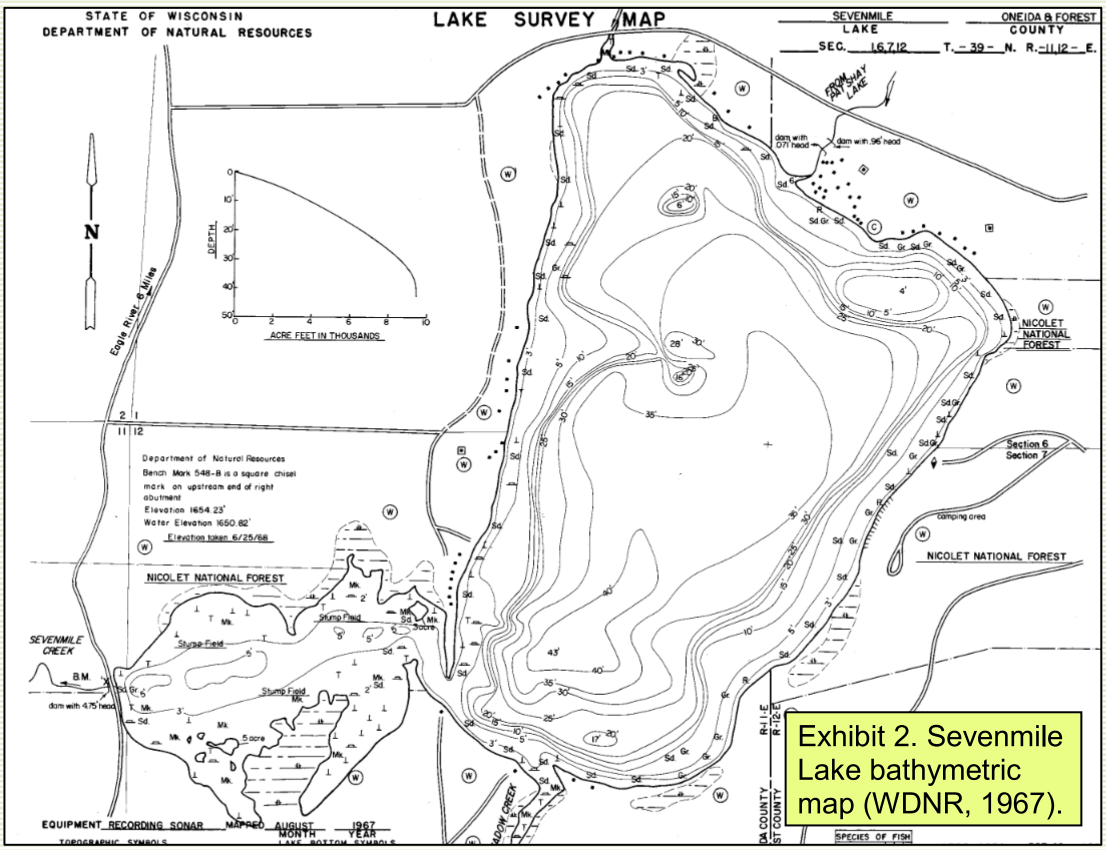


Exhibit 2. Sevenmile Lake bathymetric map (WDNR, 1967).

Existing water quality information includes data from in the WDNR SWIMS database from 1979 to present, with most of water quality data coming from Citizen Lake Monitoring Network (CLMN) volunteers. Baseline monitoring was conducted by the WDNR in 2000, 2001, and 2002. The Wisconsin Valley Improvement Corps monitored Sevenmile Lake in 2002, and from 2010 to 2013. White Water Associates collected water quality in 2012 to 2014.

Temperature and dissolved oxygen showed stratification in Sevenmile Lake. Water clarity is considered "good," with a 2013 average Secchi reading of 9 ft. The trophic state is mesotrophic (Exhibit 3). Average chlorophyll *a* values (a measure of the amount of algae), nitrogen, conductivity, calcium, and alkalinity (a measure of a lake's buffering capacity against acid rain) are considered low. The range of pH values in Sevenmile Lake are 7.6 (July, 1979) and 8.17 (July, 2012). In 2014, Sevenmile Lake was proposed to be placed on the 303 (d) list of Impaired Waters, due to its high phosphorus levels. Sevenmile Lake water quality data is more fully interpreted in Appendix C.

As mentioned previously, the *Wisconsin Lake Modeling Suite (WiLMS)* was used as a lake water quality planning and education tool for Sevenmile Lake. WiLMS is a computer program into which the user enters information about the lake (e.g., surface area, depth, and nutrient measures) and the watershed (e.g., acreage and cover types). The model also has information about average rainfall, aerial deposition of materials, and cover type characteristics that it uses to help predict nutrient (phosphorus) loading scenarios to the lake. Typical to many lakes in northern Wisconsin, WiLMS predicted that most of the phosphorus delivered to Sevenmile Lake comes from forest cover, the most common cover type in the watershed.

Exhibit 3. Trophic Status

Trophic state *of a lake is an indicator of water quality. Lakes are typically divided into three categories of trophic state: oligotrophic, eutrophic, and mesotrophic.*

Oligotrophic *lakes are clear, deep, and free of weeds or large algal blooms. They are low in nutrients and do not support large fish populations, but they can develop a food web capable of sustaining a desirable fishery.*

Eutrophic *lakes are high in nutrients and support large biomass (plants and animals). They are usually weedy or subject to large algal blooms or both. Eutrophic lakes can support large fish populations, but are also susceptible to oxygen depletion. Small, shallow, eutrophic lakes are especially vulnerable to winterkill.*

Mesotrophic *lakes are intermediate between the oligotrophic and eutrophic. The deepest levels become devoid of oxygen in late summer and limit coldwater fish. Anoxic conditions at the water-sediment interface causes phosphorus to be released from the sediments.*

Over long periods of time, lakes go through natural aging from oligotrophic through mesotrophic to eutrophic. As part of this process, they begin to fill in. This aging process can be sped up by introductions of sediments and nutrients. (Shaw et al., 2004).

Appendix D provides more results and analyses of WiLMS predictions on Sevenmile Lake.

Part 4. Sevenmile Lake Littoral Zone and Riparian Area

The littoral zone is a critical part in maintaining a healthy lake ecosystem. This zone can be generally defined as the area nearest to a lake's shore in which it is usually shallowest, warmest and where sufficient sunlight to sustain rooted aquatic plants can penetrate to the bottom. These factors usually allow for aquatic plant growth. Aquatic plants provide habitat for invertebrates and fish in lakes, provide a food source for wildlife species, dampen the impact of waves, and absorb nutrients that would otherwise be used by algae. Bottom substrates also play an important role in the littoral zone. Substrates can include bedrock, cobble, sand, muck and woody material. These substrates provide habitat for invertebrates, amphibians, crustaceans and fish. The shoreline development index is one calculation used to indicate the amount of potentially productive littoral zone habitat relative to the overall acreage of a lake.

The shoreline development index is a quantitative expression derived from the shape and surface area of a lake. It is defined as the ratio of the shoreline length to the length of the circumference of a circle of the same area as the lake. A perfectly round lake would have an index of 1. Increasing irregularity of shoreline development in the form of embayments and projections of the shore is shown by numbers greater than 1. For example, fjord lakes with extremely irregularly shaped shorelines sometimes have SDI's exceeding 5. The Shoreline development index for Sevenmile Lake is 1.9. This number indicates that the lake has a moderate amount of potentially productive littoral zone habitat relative to the overall acreage of the lake.

Riparian zones make up the area where aquatic ecosystems converge with terrestrial ecosystems. It is one of the most structurally diverse and naturally dynamic ecosystems making it sensitive to environmental or human-cause changes. Like the littoral zone, the riparian zone provides shelter and food sources for wildlife, and improves water quality by retarding runoff, reducing erosion and absorbing pollutants. Riparian areas are so important that the Wisconsin Administrative Code requires at least 35 feet of land inland from the ordinary high water mark (OHW) be a vegetative buffer (State of Wisconsin Legislature).

In a national assessment of lakes, the United States Environmental Protection Agency (USEPA) evaluated hundreds of lakes across the United States assessing water quality, recreational suitability, and ecological integrity (USEPA, 2009). Important findings of that assessment included (1) poor lakeshore habitat (riparian vegetation) is the number one stressor of lake ecosystems nation-wide and (2) poor shallow water (littoral zone) habitat is the number two stressor. For the lake steward, by managing for sound lakeshores (both littoral and riparian components), we can make a difference in lake biological integrity (lake health). This means both development standards (e.g., NR115 and county shoreland ordinances) as well as best management practices (e.g., leave wood in place and minimize clearing of aquatic vegetation). See results of the *Sevenmile Lake EPA Littoral and Shoreline Survey* in Appendix E.

In 2012, Sevenmile Lake volunteers conducted a qualitative assessment and photographic documentation of the entire lake shoreline. This information has been integrated and made available as a CD-ROM deliverable of this project. A summary of the qualitative results is provided in Appendix F.

Part 5. Sevenmile Lake Fisheries

Various fish surveys have been conducted on Sevenmile Lake as early as the 1980s. The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) and the Wisconsin DNR have been involved in conducting spearing, creel, fyke net, boom shock and mark-recapture surveys on Sevenmile Lake. For more information regarding Sevenmile Lake fisheries, see Appendix G.

A Volunteer Anglers' Journal can be used to collect meaningful fisheries data to augment WDNR fish surveys. This volunteer angler journal program was designed so that anglers can systematically record their fishing experiences. It is hoped that this activity will engage anglers in collecting fish data and understanding the dynamics of fish populations. The objectives for the angler journal program include providing information on:

- Species of fish caught while angling on Sevenmile Lake;
- Size distribution of fishes caught on Sevenmile Lake;
- Fishing emphases of Sevenmile Lake anglers (time spent on panfish, walleyes, bass, etc.);
- Fishing techniques used on Sevenmile Lake (trolling, bait fishing, spin fishing, etc.);
- Relative amount of catch and release fishing; and
- Catch-per-effort (CPE) for various Sevenmile Lake fish species.

A field data form was provided for Sevenmile Lake anglers to fill out. No journals were completed at the finalization of this project, however a report describing the Volunteer Anglers' Journal can be read in Appendix H.

Part 6. Sevenmile Lake Wildlife

For many reasons, lakes attract a variety of wildlife species. Some of these species require a lake as a prime habitat component. Some live in or near the lake permanently, while others visit only at times in order to obtain crucial resources. Lakes provide food in the form of plants, insects, fishes, and other organisms. Lakes provide breeding and nesting sites. Lakes provide shelter and protection. Some of the wildlife species that use lakes are common (for example, green frogs, painted turtles, tree swallows, belted kingfishers, mink, and raccoons). In contrast, other lake-dependent wildlife species are relatively rare (for example, common loons, bald eagles, and osprey). In this section, we focus on two species (common loon and bald eagle) that in many ways represent the quintessential image of a northern Wisconsin lake. These species, when present also provide a strong indication of a healthy lake. This section also references the frog and toad survey conducted by Sevenmile Lake volunteers.

The common loon (*Gavia immer*) has one of the most distinct plumages of North American birds. It is a large bird with spotted black and white body, and a black/iridescent green head. The loon has many distinct calls for guarding territories, communicating with other loons, and warding of threats. Loons spend most of their life in the water. Unlike most birds, loons have solid bones allowing them to dive as deep as 250 feet in search of food (MNDNR, 2015). With legs positioned fairly far back on their body, loons are good swimmers. The position of the legs, however, means that walking on land is difficult for a loon. Perhaps because of their awkwardness on land, loon nests are built close to shore (Cornell). Loon nests are made of grasses, rushes, and twigs. Loons are quite territorial. A small lake (5-50ha) can accommodate one pair of breeding loons. Larger lakes may have more than one pair, with each pair occupying a bay or different section of the lake (Loon Pres. Comm., 2015). LoonWatch, a program of the Sigurd Olson Environmental Institute, has hundreds of volunteers monitoring loon nests and territories throughout Wisconsin. In 2010, volunteers observed approximately 3,373 adult loons and 805 chicks throughout surveyed Wisconsin lakes (LoonWatch, 2015). In 2012 and 2013, Sevenmile Lake had two territorial pairs, one of which was a nesting pair. In both years, the nesting pair did not rear any chicks (LoonWatch, 2013). In 2014, one territorial and nesting pair was observed. This pair reared two chicks which made it to eight weeks old. Six “floater” loons (adult loons that are not territorial and usually searching for a mate or are relatively young) were observed on Sevenmile Lake (LoonWatch, 2014).

The bald eagle (*Haliaeetus leucocephalus*) is listed as a Special Concern species in Wisconsin, and is federally protected by the Bald & Golden Eagle Act (WDNR, 2014). Bald eagles live near water and eat small animals, carrion, and fish (preferring fish). They are believed to mate for life. Eagles create their nests in tall trees, using sticks and other debris. Eagle territories can be 1 to 2 square miles. In Wisconsin, bald eagle nest and territory surveys are conducted by plane. In 2013, there were 1,344 known bald eagle nest territories occupied by breeding adults (NHI, 2014). This was an increase of 57 pairs from 2011, and an increase of 7 from 2012 (NHI, 2014). In 2014, there were 1,279 known bald eagle nest territories occupied by breeding adults (NHI, 2014). This was a decrease of 65 pairs from 2013 (NHI, 2014). Sevenmile Lake has 1 known nest in 1 known territory (Ron Eckstein, email). The Wisconsin Natural Heritage Inventory (NHI) assesses the rarity of species by using State and Global ranks. The State and Global ranks of the bald eagle can be described as: "Apparently secure in Wisconsin, with many occurrences (Breeding and Non-breeding)," and "Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery."

Other rare species and communities exist near Sevenmile Lake. The Wisconsin Natural Heritage Inventory (NHI) lists these rare species and communities and Exhibit 4 shows those found in the same township(s) as Sevenmile Lake.

Exhibit 4. Rare Species and Communities located near Sevenmile Lake.

Common Name	*Scientific Name*	*State Status*[1]	*Group Name*
Trumpeter swan	*Cygnus buccinators*	SC/M	Bird
Boreal chickadee	*Poecile hudsonicus*	SC/M	Bird
Spruce grouse	*Falcipennis canadensis*	THR	Bird
Bald eagle	*Haliaeetus leucocephalus*	SC/P	Bird
American marten	*Martes americana*	END	Mammal
Little goblin moonwort	*Botrychium mormo*	END	Plant
Vasey's pondweed	*Potamogeton vaseyi*	SC	Plant
Algae-like pondweed	*Potamogeton confervoides*	THR	Plant
Black spruce swamp		NA	Community
Ephemeral pond		NA	Community
Lake-shallow, soft, seepage		NA	Community
Lake-spring		NA	Community
Mesic cedar forest		NA	Community
Muskeg		NA	Community
Northern dry-mesic forest		NA	Community
Northern mesic forest		NA	Community
Northern wet forest		NA	Community
Open bog		NA	Community

Sevenmile Lake has some nicely intact riparian forest comprised of mixed mature hardwoods and conifer uplands and high quality wetlands. Dean Premo (White Water Associates) highlighted the areas of particular high quality (primarily Nicolet National Forest

1 **END**=Endangered; **THR**=Threatened; **SC**=Special Concern; **SC/P**=fully protected; **SC/N**=no laws regulating use, possession or harvesting; **SC/H**=take regulated by establishment of open/closed seasons; **SC/FL**=federally protected as endangered or threatened, but not so designated by DNR; **SC/M**=fully protected by federal and state laws under Migratory Bird Act (WDNR, 2015b).

land) in Exhibit 5. Because of its proximity to water, this habitat may be suitable for red-shouldered hawk nesting. They are certainly suitable for many Neotropical migrant bird species.

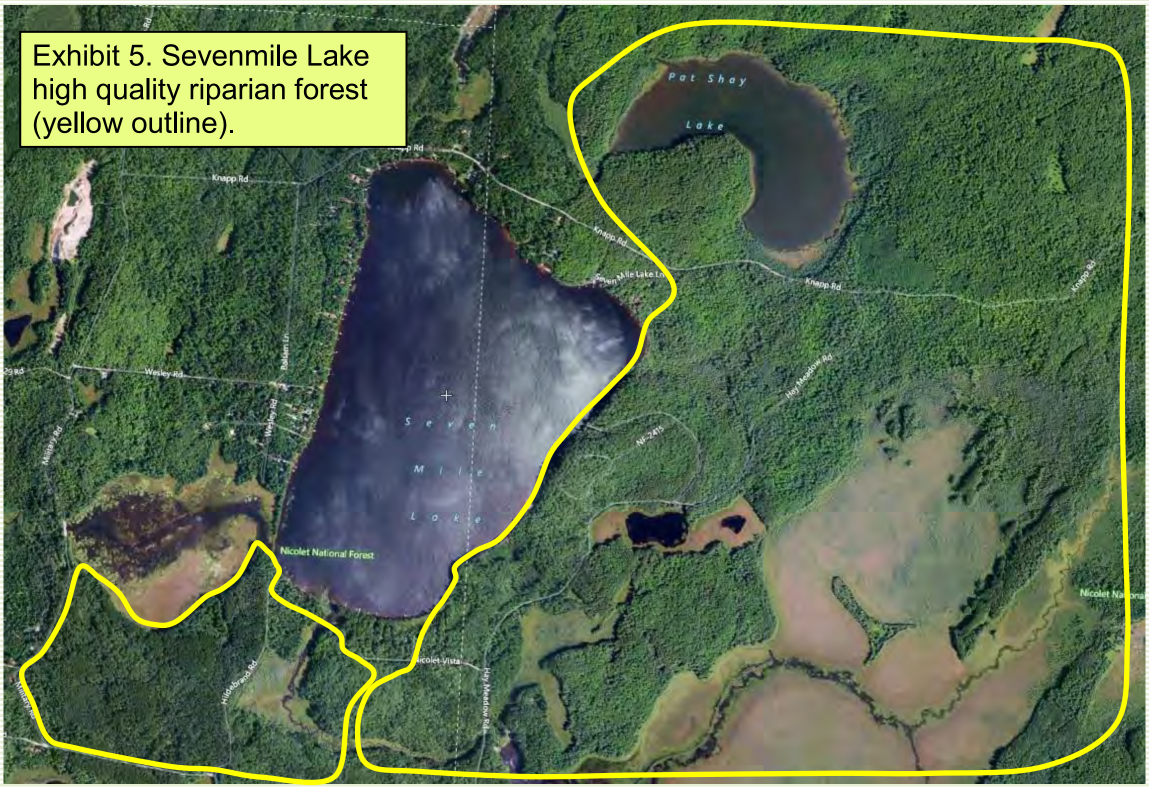


Exhibit 5. Sevenmile Lake high quality riparian forest (yellow outline).

Frog and toad surveys were conducted near Sevenmile Lake in 2012. Working in consultation with lake stewardship volunteers with local knowledge of area wetlands, Dean Premo (a trained herpetologist) selected ten sites in the immediate landscape of Sevenmile Lake as prospective frog and toad survey wetlands. Volunteers then surveyed these sites and record species and count. The field data was then conveyed to White Water Associates for analysis and reporting. Results of the Sevenmile Lake frog and toad survey can be viewed in Appendix I of the *Sevenmile Lake Adaptive Management Plan*.

Part 7. Sevenmile Lake Aquatic Invasive Species

Rusty crayfish (*Orconectes rusticus)* was found in Sevenmile Lake in 2002. Rusty crayfish are a Restricted species in Wisconsin. A Restricted species is one that has already been established in the state and causes or has the potential to cause significant environmental or economic harm or harm to human health. Restricted species may be possessed, but may not be transported, transferred or introduced without a permit (WDNR, 2015a). More information about invasive species and prevention of invasive species can be viewed in Appendix C.

Part 8. Water Resource Regulations and Planning Relevant to Sevenmile Lake

For the purposes of this plan we reviewed documents of other organizations involved with water resources regulations, planning, and management in northern Wisconsin. Appendix J contains our documentation of these reviews and provides substantive information on (1) federal, state, and county regulations and ordinances that influence water quality, (2) WDNR programs that strive to preserve and restore land and water resources (including Fisheries Management and Habitat Protection, Watershed, Wastewater, Nonpoint Source Pollution Abatement, Drinking and Groundwater, Wildlife, Endangered Resources, and Forestry), and (3) a review of Forest and Oneida Counties' *Land & Water Resource Management Plans* (North Central Wisconsin Regional Planning Commission, 2012a and 2012b). These reviews discuss federal, state, and local agencies and the mechanisms by which they protect water resources. The discussion ranges from the federal Clean Water Act of 1972 to Wisconsin's NR115 to County ordinances.

Part 9. Sevenmile Lake Area Special Attributes

An objective for future iterations of the Sevenmile Lake Adaptive Management Plan will be to develop a description of specific environmental, cultural, and aesthetic attributes along with an assessment of the threats to the quality of these attributes. Environmental quality attributes can be organized in three categories: (1) environmental (ecological), (2) cultural and (3) aesthetic (Redding, 1973). Some resources may display all three conditions and others may contain only one. More complete definitions (Redding, 1973) of the three categories are as follows:

1. Environmental (ecological) attributes are components of the environment and the interactions among all its living and nonliving components that directly or indirectly sustain dynamic, diverse, and viable ecosystems. Included are functional and structural aspects of the environment.

2. Cultural attributes are evidence of past and present habitation that can be used to reconstruct or preserve human lifeways. Included are structures, sites, artifacts, and environments.
3. Aesthetic attributes are perceptual stimuli that provide diverse and pleasant surroundings for human annulment and appreciation. Included are sights, sounds, scents, tastes, and tactile impressions.

The first two attributes (ecological and cultural) are more tangible than the third but aesthetic attributes are important when it comes to how people feel about a feature and are compelled to protect a feature or otherwise act as stewards. The importance of preserving aesthetic resources is emphatically expressed in the National Environmental Policy Act 1969 that requires the "Federal Government to use all practicable means ….. (to) …. assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings… and to… preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice" (NEPA Sec. 101 (b) (2, 4)). Aesthetic quality is a subjective attribute. Something that has high aesthetic value for one person may not receive the same consideration from another. Some hold high aesthetic value in a manicured lawn where others prefer a more natural ground cover. Aldo Leopold (1948) expresses his love for nature and its beauty and the need for a land ethic to protect natural beauty and "quality of life."

As has been outlined in various parts of this Adaptive Management Plan, Sevenmile Lake is a high quality ecosystem with respect to components of water quality, aquatic plants, fish community, and wildlife habitat. These attributes combine to influence a high aesthetic quality. The next part outlines some of the potential environmental threats to this high quality.

Part 10. Environmental Threats to Sevenmile Lake

As outlined in the previous part, the Sevenmile Lake watershed ecosystem has numerous attributes of high ecological and aesthetic significance. These attributes combine to help make Sevenmile Lake a unique and special place. Sevenmile Lake and its surroundings, however, are subject to environmental threats from a variety of sources. We outline some of these threats in this part of the Sevenmile Lake plan.

Recreational pressure –Sevenmile Lake is a light to moderately used fishing and recreation lake for people from near and far. The campground brings new visitors each year. In recent years, the campground has been shut down due to lack of funding, however, if resources become available, the campground will remain open. If so, an expanding base of admirers will result in increasing recreational pressures. Increased traffic in and out of the lake increases opportunities for AIS.

Development pressure – Sevenmile Lake has some areas of residential development as well as areas with predominantly natural vegetation and broad and diverse riparian areas. In some areas of the lake, old-style lawns, cropped short and in close proximity to the shore indicate a need for educational effort to inform residents about more ecologically friendly waterfront vegetation. Likewise, well-intended activities meant to “clean up” the shoreline or shallow water zone of the lake diminish the habitat quality for invertebrates and fish and could be addressed with some targeted education. Some of the undeveloped property on the lake is private and future development of these areas has potential for impacting the lake.

Water quality inputs – The water quality and aquatic ecosystem functioning of Sevenmile Lake is affected by all inputs of water (groundwater, precipitation, streams, and overland runoff). All of these sources have potential to carry pollutants of various kinds to Sevenmile Lake. Sevenmile Lake has good water quality and a long record of water quality monitoring. Nevertheless, non-point source pollution (see next paragraph) represent an important threat to Sevenmile Lake water quality.

Non-point source pollution – Surface runoff from the land, roadways, parking lots and other surfaces flows into Sevenmile Lake. This runoff carries with it sediment, nutrients (for example, from fertilizers) and contaminants (for example, herbicides) that can have detrimental effects on the Sevenmile Lake ecosystem. These materials can also enter the lake from incoming streams. Known as non-point source pollution (because it does not emanate from a discrete point like an effluent pipe from a paper mill), this kind of runoff can come from lawns, agricultural fields, clear-cuts, and impervious surfaces (for example, roads and paved parking lots). Sometimes the impact is physical, such as sediment covering gravel spawning areas. Sometimes it is chemical such as excess phosphorus from lawn fertilizers that might invoke an algal bloom. This type of pollution can be best controlled through education and protection of riparian buffers (natural vegetation near the waterways that absorb the pollutants before they reach the water).

Aquatic invasive species – Non-native plant and animal species have become a grave concern for aquatic, wetland, and terrestrial ecosystems. As more populations of aquatic plant and animal invasive species become established in lakes and streams in the region, the likelihood of AIS coming to Sevenmile Lake increases. When it comes to non-native aquatic plant invaders, the best defense against establishment is a healthy community of native plants. A diverse native plant community presently exists and serves this protective role. Ironically, the native plant community in the lake serves as a food source for the invasive rusty crayfish. Monitoring the plant community is important to keep track of rusty crayfish impacts. Effective education and diligent monitoring are important factors in avoiding establishment of aquatic invasive species.

Riparian ecosystem integrity – Healthy riparian areas (the naturally vegetated land near the water) provide numerous important functions and values to Sevenmile Lake. For example, they serve as habitat for many species, contribute important habitat to the lake (e.g., large wood), filter out non-point source pollution from entering the lake, armors the shores against erosion, and encourages healthy native plant populations. Educating riparian owners around Sevenmile Lake as to the importance of riparian areas is crucial to the maintenance of these critical areas.

Littoral zone ecosystem quality – Much of the productivity of a lake comes from the shallow water areas known as the littoral zone. This is where plants grow, invertebrates live, fishes spawn, and aquatic birds and mammals spend much of their time. The presence of good aquatic vegetation, diverse substrate, and dead woody material (logs and branches) is crucial to this littoral zone ecosystem. Sometimes the human temptation is to "clean up" these areas, but in fact this process diminishes the habitat quality greatly. It is important to educate landowners and others about how to protect the littoral zone from degradation. Piers and swimming areas impact the littoral zone as well, but can coexist with a quality shallow water habitat.

Habitat degradation of nearby aquatic and wetland habitats (ponds, streams) – The wetland habitats, streams, small lakes, and ponds in the vicinity of Sevenmile Lake all potentially contribute to the high quality of the lake. These smaller ecosystems are often overlooked in terms of their importance and therefore deserve some special attention. One of the first protective measures to take is to identify where these features are and characterize their size and ecological composition. This informs future protection and restoration efforts.

Part 11. Lake User Survey

In order to maintain the high quality condition of Sevenmile Lake, input from stakeholders is needed. This input helps us to understand the needs, knowledge base, concerns and desires of people who use Sevenmile Lake. In this regard, a lake user survey was created and distributed to Sevenmile Lake Association members. The results of this survey are available as Appendix L of this document.

Page left intentionally blank

CHAPTER 6

What Goals Guide the Sevenmile Lake Adaptive Management Plan?

"Protect the Best and Restore the Rest" has become the credo of successful watershed managers across the country. This simple phrase acknowledges that watershed management is more than identifying the worst areas and trying to rehabilitate them. It recognizes that of equal or greater importance is identifying those areas that are of high or moderate quality in the watershed and establishing mechanisms to maintain that quality. "Protect the Best and Restore the Rest" also implies the importance of identifying imminent threats to watershed health and working to eliminate them. This simple principal is founded on the restoration ecology fact that the most certain way to successfully restore the structure and function of part of a broken watershed ecosystem is to rely on intact areas of the watershed to serve as the donors of healthy "parts" (such as aquatic insect species or good quality water). "Protecting the Best" allows us to "Restore the Rest" more effectively and economically. But, protecting the best is prerequisite.

The primary goal of the *Sevenmile Lake Adaptive Management Plan* is to perpetuate the quality of Sevenmile Lake and its watershed ecosystem into the future. Sometimes this will mean protecting what is good about the lake and its surroundings and sometimes it may mean restoring some feature that has been degraded. Restoration is reestablishment of the structure and function of an ecosystem including its natural diversity (Cairns, 1988; National Research Council, 1992). It 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 *Sevenmile Lake Adaptive Management Plan* offers several supporting goals. In an adaptive plan, new goals can be adopted as the plan evolves. We conclude this chapter by presenting these goals organized under topical headings.

Restoration – Apply rehabilitation, protection, and education actions under the direction of specific objectives identified specific areas in the Sevenmile Lake watershed.

Research – Gather information that is useful in planning and monitoring restoration actions and devising education programs.

Monitoring – Establish a monitoring system in the Sevenmile Lake watershed that will provide data that reveals the quality of the system and establishes a means to evaluate the effectiveness of management efforts.

Cultural Climate – Encourage a cultural and political atmosphere that allows and promotes good watershed stewardship including cooperation between citizens, businesses, public agencies, and municipalities.

Sustainable Economy – Foster an environment that promotes a sustainable economy, provides a diversity of economic options for the residents of the watershed, and does not diminish opportunities for future generations of watershed residents.

Recreation – Promote a sustainable recreation in Sevenmile Lake where all citizens (now and in the future) can enjoy the opportunities of the natural and human-sustained environment while respecting the environment and the rights of fellow citizens.

Program Maintenance – Foster a stewardship culture that engages people to donate time, talent, and money sufficient to support the implementation and periodic update of the *Sevenmile Lake Adaptive Management Plan*.

In the final chapter of this plan, we present possible objectives and actions that will serve to move toward these goals. This is not an exhaustive treatment, but a starting point, integrated with monitoring so that adaptive management can take place in subsequent years.

CHAPTER 7

What Objectives and Actions Move Us Toward Our Goals?

The Sevenmile Lake watershed is healthy, diverse, and productive. Our challenge through this adaptive management plan is to perpetuate that condition into the future. The challenge will be met by a capable set of program partners that are prepared to devote themselves to Sevenmile Lake stewardship. These partners include the members of The Sevenmile Lake Association, the Forest and Oneida County Land & Water Conservation Departments, the North Central Wisconsin Regional Planning Commission, the ecological scientists of White Water Associates, the WDNR, and others who care about Sevenmile Lake.

Abraham Lincoln is attributed with the following wisdom: "If I had an hour to cut down a tree, I'd spend the first 45 minutes sharpening my ax." Planning and preparation are important for any task, but especially when working with a system as complex as a lake or watershed. The vision and goals described in the previous chapter provide the basis for developing objectives and actions to achieve the desired future for the Sevenmile Lake watershed. In keeping with the spirit of an adaptive management plan, we present several actions and associated objectives that can be undertaken as human and financial resources allow in subsequent phases of the program. Desired outcomes of each action are also stated. The actions, objectives, and outcomes each need to be further developed so that appropriate methodology and accurate estimates of required effort can be described. The Sevenmile Lake Association is in control of the plan. The plan is flexible and allows the insertion of new actions at any point along the path of lake management. The pace of implementation of the plan is also flexible and will be influenced by availability of volunteer time, grant monies, and other factors.

Recommended Actions for the Sevenmile Lake APM Plan

Action #1 (Education): Work with WDNR to understand and manage the Sevenmile L. fishery.

Objective: To support scientific and effective perpetuation of a quality fishery.

Outcome: Document meetings and other contacts made to the WDNR and others.

Status: Action included in *Adaptive Management Plan*. This is an ongoing activity.

Action #2 (Research): Conduct a second point-intercept plan survey in 2017 (5 years after the first survey) when water levels allow access to the western bay. Analyze and compare data to the 2011 survey to determine changes in the aquatic plant community.

Objective: To understand the diversity and abundance of the native aquatic plant community in Sevenmile Lake and understand how this community changes over time.

Outcome: Updated *Aquatic Plant Management Plan* for Sevenmile Lake.

Status: Action included in *Adaptive Management Plan* and would be conducted in a future phase of the Sevenmile Lake stewardship effort.

Action #3 (Research): Conduct annual assessments of Sevenmile Lake for aquatic invasive plant and animal species.

Objective: To provide an early warning of new introductions of aquatic invasive species to allow rehabilitation actions to occur when populations are still small.

Outcome: Document the number and timing of surveys and maintain record of findings.

Status: This is an ongoing activity.

Action #4 (Research): Every 3-5 years (or more often if interest allows), repeat the frog-toad survey.

Objective: To understand the diversity and abundance of the frog-toad community in wetlands in the Sevenmile Lake area determine how this community changes over time.

Outcome: Updated report in Adaptive Management Plan for Sevenmile Lake.

Status: Action included in *Adaptive Management Plan* and would be conducted in a future phase of the Sevenmile Lake stewardship effort.

Recommended Actions for the Sevenmile Lake APM Plan
Action #5 (Research): Continue Clean Lakes Monitoring of Sevenmile Lake water quality. ***Objective:*** To monitor lake water quality and detect changes over time. ***Outcome:*** Updated report in Adaptive Management Plan for Sevenmile Lake. ***Status:*** Action included in *Adaptive Management Plan* and would be conducted in a future phases of the Sevenmile Lake stewardship effort and preferably on an annual basis.
Action #6 (Education): Establish an award or recognition of riparian owners that preserve or rehabilitate "natural shoreline" habitat on their property. This could be recognized in SLA newsletter along with an article about the ecological benefits of natural shorelines. ***Objective:*** To encourage good shoreline stewardship by riparian owners and improve the riparian area quality of Sevenmile Lake. ***Outcome:*** Monitor by general awareness of landowners and changes in shoreline maintenance behaviors. ***Status:*** Action included in *Adaptive Management Plan* and would be conducted in a future phases of the Sevenmile Lake stewardship effort and preferably on an annual basis.
Action #7 (Protection): Develop a storm water and shoreland habitat plan. ***Objective:*** To maintain and improve the health of Sevenmile Lake. ***Outcome:*** Will be a future component of the Sevenmile Lake Adaptive Management Plan. ***Status:*** Action included in *Adaptive Management Plan* and would be conducted in a future phases of the Sevenmile Lake stewardship effort.
Action #8 (Protection): Adopt and implement the *Aquatic Plant Management Plan* prepared as result of the current project. **Objective:** To protect and maintain a high quality aquatic plant community in Sevenmile Lake, and reduce opportunities for introduction of aquatic invasive plant species. **Outcome:** A healthy, diverse Sevenmile Lake aquatic plant community and a human community that is actively engaged in monitoring and protecting native aquatic plants. **Status:** Action included *Adaptive Management Plan*. The *Aquatic Plant Management Plan* is intended for adoption in 2015.

Future phases of Sevenmile Lake Stewardship will build on the foundation established in this *Adaptive Management Plan*. Additional aspects of the Sevenmile Lake watershed ecosystem will be explored. Future phases will include revisions to the lake management plan, and the aquatic plant management plan.

Sevenmile Lake and its watershed serve its human residents well. But, in order for future generations to enjoy all that the watershed can provide, this adaptive plan should be embraced, developed, and implemented. It may seem slow at first, but considerable momentum already exists because of the hard work that has already occurred.

Appendix A
Literature Cited

Page left intentionally blank

Literature Cited

Cairns, J. Jr. 1988. *Increasing diversity by restoring damaged ecosystems.* Pages 333-343 in E.O. Wilson, editor. Biodiversity. National Academy Press, Washington, DC.

Cornell Lab of Ornithology. *Common Loon*. Retrieved 2015. <http://www.allaboutbirds.org/guide/common_loon/lifehistory>

Eckstein, Ronald. Regional DNR contact. *Eagle surveys*. Retrieved Nov 2013. E-mail.

Hassett, Scott, William H. Smith, Elizabeth Kluesner, Todd L. Ambs, Michael D. Staggs, and Jeff B. Bode. 2003. *Wisconsin Lake Modeling Suite*. Wisconsin DNR. Retrieved 2014. <http://dnr.wi.gov/lakes/Model/WiLMSDocumentation.pdf>

Lanoo, Michael J. 1996. *Okoboji Wetlands – A Lesson in Natural History*. University of Iowa Press. 156 pages.

Leopold, Aldo. 1948. *A Sand County Almanac and Sketches Here and There.* Oxford University Press, New York.

LoonWatch. *Wisconsin Loon Population Survey.* Retrieved 2015. <http://www.northland.edu/lake-monitoring-program.htm>

Minnesota Department of Natural Resources. 2015. *Common Loon (Gavia immer).* Retrieved 2015. <http://www.dnr.state.mn.us/birds/commonloon.html>

National Environmental Policy Act (NEPA). 1969. Public Law 91-190, 83 Stat. 852-856.

National Research Council. 1992. *Restoration of aquatic ecosystems: science, technology, and public policy.* National Academy Press, Washington, DC.

Natural Heritage Inventory (NHI). 2014. Wisconsin *Bald Eagle and Osprey Surveys 2014*. Retrieved 2015. <http://dnr.wi.gov/topic/WildlifeHabitat/documents/reports/eagleospreysurv2.pdf>

North Central Wisconsin Regional Planning Commission. 2012a. Forest *County Land and Water Resource Management Plan.* Retrieved 2015. <http://www.co.forest.wi.gov/docview.asp?docid=13063&locid=145>

North Central Wisconsin Regional Planning Commission. 2012b. Oneida *County Land and Water Resource Management Plan.* Retrieved 2015. <http://www.co.oneida.wi.gov/docview.asp?docid=10421 >

Redding, Martin J. 1973. *Aesthetics in Environmental Planning.* Office of Research and Development. U.S. EPA EPA-600/5-73-009.

Shaw, B. Mechenich, C, and Klessig, L. 2004. *Understanding Lake Data (G3582).* Board of Regents of the University of Wisconsin System. Madison, WI.

State of Wisconsin Legislature. NR 115. Wisc. Admin. Code § 115.01. *Wisconsin's Shoreland Protection Program, Purpose*.

The Loon Preservation Committee. 2015. *The Loon's Family and Social Life*. Retrieved 2015. <http://www.loon.org/loon-family.php>

U.S. Environmental Protection Agency (USEPA). 2009. *National Lakes Assessment: A Collaborative Survey of the Nation's Lakes. EPA 841-R-09-001*. U.S. Environmental Protection Agency, Office of Water and Office of Research and Development, Washington, D.C. Available on-line at: http://water.epa.gov/type/lakes/upload/nla_newlowres_fullrpt.pdf

Walters, C. 1986. *Objectives, constraints, and problem bounding.* In W.M. Getz, ed., Adaptive Management of Renewable Resources. Macmillan Publishing Company. New York. p. 13+.

Williams, Jack E., Christopher A. Wood, and Michael P. Dombeck, eds. 1997. *Watershed Restoration: Principles and Practices.* American Fisheries Society, Bethesda, Maryland.

Wisconsin Department of Natural Resources. 1967. *Sevenmile Lake Survey Map*. Retrieved 2014. < http://dnr.wi.gov/lakes/maps/DNR/1605800a.pdf >

Wisconsin Department of Natural Resources, Headwaters Basin Partnership Team and Stakeholders--DRAFT. 2002. *Headwaters Basin Integrated Management Plan*. Retrieved 2014. 259 pages. <http://dnr.wi.gov/water/basin/upwis/>

Wisconsin Department of Natural Resources. 2014. *Bald Eagle (Haliaeetus leucocephalus).* Retrieved 2015. <http://dnr.wi.gov/topic/endangeredresources/animals.asp?mode=detail&speccode=abnkc10010>

Wisconsin Department of Natural Resources. 2015. *Rusty Crayfish*. Retrieved 2015. <http://dnr.wi.gov/lakes/invasives/AISDetail.aspx?roiseq=22589194>

Wisconsin Department of Natural Resources. 2015. *Natural Heritage Inventory-Township tool*. Retrieved 2015. <http://dnr.wi.gov/topic/NHI/data.asp?tool=township>

Wisconsin Valley Improvement Company. 2015. *Wisconsin River Reservoir System Data.* Retrieved 2015. <http://www.wvic.com/index.cfm>

Wisconsin Valley Improvement Company. 2016. *Wisconsin Valley Improvement Company Comments.* Retrieved 2016. Cathy Wendt and Ben Niffenegger. Comments to Sevenmile Lake Plan-DRAFT.

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Appendix B
Sevenmile Lake Aquatic Plant Management Plan

Page left intentionally blank

WHITE WATER ASSOCIATES, INC.

Sevenmile Lake Stewardship Program

Aquatic Plant Management Plan – Sevenmile Lake

Prepared for:

Sevenmile Lake Association
Gene Kucharski, President
P.O. Box 1814
Eagle River, Wisconsin 54521

Prepared by:

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

Sevenmile Lake (Angie Stine photo)

Date: February 2016

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Sevenmile Lake Stewardship Program

Aquatic Plant Management Plan – Sevenmile Lake

This plan is a product of a WDNR Lake Planning Grant
(Subchapter II – Education, Prevention, and Planning Projects) awarded to:

Sevenmile Lake Association
Gene Kucharski, President
P.O. Box 1814
Eagle River, Wisconsin 54521
Phone: (920)469-2611; Email: Sevenmile_lake@yahoo.com

Submitted to:
Wisconsin Department of Natural Resources
Attention: Kevin Gauthier, Sr., Water Resource Management Specialist
8770 Hwy J
Woodruff, WI 54568
Phone: (715) 365-5211 ext. 214; Email: Kevin.GauthierSr@wisconsin.gov

Prepared by:
White Water Associates, Inc.
Dean Premo, Ph.D., Angie Stine, B.S., Caitlin Clarke, B.S., and Kent Premo, M.S.
429 River Lane, P.O. Box 27
Amasa, Michigan 49903
Phone: (906) 822-7889; E-mail: dean.premo@white-water-associates.com

Cite as: *Premo, Dean, Angie Stine, Caitlin Clarke and Kent Premo. 2016. Sevenmile Lake Stewardship Program: Sevenmile Lake Aquatic Plant Management Plan. White Water Associates, Inc.*

Page left intentionally blank

TABLE OF CONTENTS

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

CHAPTER 1

Introduction

The ***Sevenmile Lake Stewardship Program*** results from the efforts of the Sevenmile Lake Association (SLA) and its consultant White Water Associates. The Sevenmile Lake Stewardship Program views stewardship of lakes as an ongoing endeavor that is integrated, coordinated, and administered by the SLA. This broader perspective accommodates the appropriate range of geographic scales from which to approach lake stewardship: a discrete "lake specific" focus that goes hand-in-hand with waterscape-wide awareness.

This aquatic plant management plan addresses Sevenmile Lake. Despite this specificity, it maintains the waterscape perspective crucial to effective lake stewardship. This is especially important when it comes to preventing introduction and establishment of aquatic invasive species (AIS). The closely related *Sevenmile Lake Adaptive Management Plan* (Premo et al., 2016) provides additional overarching waterscape level examination that allows greater opportunity and efficiency in water resource management and education.

A systematic survey of aquatic plants using the Wisconsin Department of Natural Resources (WDNR) "point-intercept" method was an important underpinning of this aquatic plant management plan. An analysis of the plant data along with water quality and other lake information allowed the preparation of the plan.

Aquatic plants rarely get the respect they merit, although this is slowly changing. We still call an aquatic plant bed a "weed bed." Many aquatic plants have "weed" in their names (e.g., duckweed, pondweed, or musky weed). Likely this term was borrowed from "seaweed" and not intended as derogatory, but in today's use, "weed" connotes an unwanted, aggressively growing plant. Such is not the case for the vast majority of aquatic plants. In fact, aquatic plants are a vital part of a lake ecosystem, recycling nutrients, providing vertical and horizontal structure, and creating habitat for animal life. Invertebrates, including crustaceans and insects, live on or within this "aquatic forest." Fish find food and shelter within aquatic plant beds. Waterfowl eat parts of plants directly as well as feed on invertebrates associated with the plants. Muskrats eat aquatic plants and particularly love cattails and bulrushes. Otter and mink hunt invertebrates and small vertebrates within the shelter of submergent and emergent beds. In shallow water, great blue herons find fishes among the plants.

In lakes that receive an excess of nutrients (particularly from fertilizers or leaking septic tanks), plant growth can become too lush or dominated by only a few species. As these abundant plants die, their decomposition can depress dissolved oxygen levels and diminish suitability for fish. Algae can respond rapidly to nutrient influxes and create nuisance conditions. These phenomena can cause humans to view all aquatic plants in a negative light.

On another negative front, non-native plant species, transported on boats and trailers or dumped from home aquariums, private ponds and water gardens may come to dominate a water body to the exclusion of a healthy diversity of native species. Eurasian water-milfoil (*Myriophyllum spicatum*) is one of the better known examples of aquatic invasive plant species.

For most lakes, native aquatic plants are an overwhelmingly positive attribute, greatly enhancing the aesthetics of the lake and providing good opportunities for fishing, boating, swimming, snorkeling, sight-seeing, and hunting.

When it comes to aquatic plant management, it is useful to heed the mantra of the medical profession: "First, do no harm." It is both a social and scientific convention that aquatic plant management is more effective and beneficial when a lake is considered as an entire and integrated ecosystem. Anyone involved in aquatic plant management should be aware that a permit may be required to remove, add, or control aquatic plants. In addition, anyone using Wisconsin's lakes must comply with the "Boat Launch Law" that addresses transport of aquatic plants on boat trailers and other equipment. A good review of the laws, permits, and regulations that affect management and behavior surrounding aquatic plants can be found in the WDNR guidelines called ***Aquatic Plant Management in Wisconsin***.[1]

In preparing this plan, we followed guidelines in ***Aquatic Plant Management in Wisconsin***. The resulting plan is an adaptive plan (Walters, 1986). Simply put, it will be modified as new information becomes available. The WDNR Guidance document outlines three objectives that may influence preparation of an aquatic plant management plan:

- ***Protection*** - preventing the introduction of nuisance or invasive species into waters where these plants are not currently present;
- ***Maintenance*** - continuing the patterns of recreational use that have developed historically on and around a lake; and
- ***Rehabilitation*** - controlling an imbalance in the aquatic plant community leading to the dominance of a few plant species, frequently associated with the introduction of invasive non-native species.

[1] *http://www4.uwsp.edu/cnr/uwexlakes/ecology/APM/APMguideFull2010.pdf*

Currently, the motivation for this plan lies in the first two objectives. Sevenmile Lake is a tremendous resource with moderate water quality and a diverse and interesting community of aquatic plants. It also has a recreational history and current human use that has caused only moderate degradation to the ecosystem.

During projects with the WDNR Planning Grant Program and through past efforts, the Sevenmile Lake Association has followed the first five steps in the seven-step plan outlined in the Guidance Document for developing an aquatic plant management plan:

1. Goal setting – Getting the effort organized, identifying problems to be addressed, and agreeing on the goals;
2. Inventory – Collecting baseline information to define the past and existing conditions;
3. Analysis – Synthesizing the information, quantifying and comparing the current conditions to desired conditions, researching opportunities and constraints, and setting directions to achieving the goals;
4. Alternatives – Listing possible management alternatives and evaluating their strengths, weaknesses and general feasibility;
5. Recommendations – Prioritizing and selecting preferred management options, setting objectives, drafting the plan;
6. Implementation – Formally adopting the plan, lining up funding, and scheduling activities for taking action to achieve the goals;
7. Monitor & Modify – Developing a mechanism for tracking activities and adjusting the plan as it evolves.

Besides this introductory chapter, this plan is organized in six Chapters. The study area is described in Chapter 2. Chapter 3 states the purpose and goals for the plan. Chapter 4 presents an inventory and analysis of information that pertain to the plan including the results of the aquatic plant survey. Chapter 5 provides recommendations that support the overall goals and establish the stewardship component of plan. Finally, Chapter 6 presents actions and objectives for implementing the plan. Three appendices complete this document. Appendix 1 contains literature cited, Appendix 2 contains tables and figures for the aquatic plant survey, and Appendix 3 contains a *Review of Sevenmile Lake Water Quality*.

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

CHAPTER 2

Study Area

Sevenmile Lake is located on the border of Forest and Oneida Counties, Wisconsin about 10 miles southeast of Eagle River, Wisconsin and approximately 16 miles south of the Michigan-Wisconsin border. The water body identification code (WBIC) is 1605800. Exhibit 1 is an aerial view of the Sevenmile Lake landscape showing Eagle River and other water features. This interconnected water landscape is a target for migrating and breeding waterfowl and other birds. Sevenmile Lake has value and function in this larger landscape as well as its own watershed.

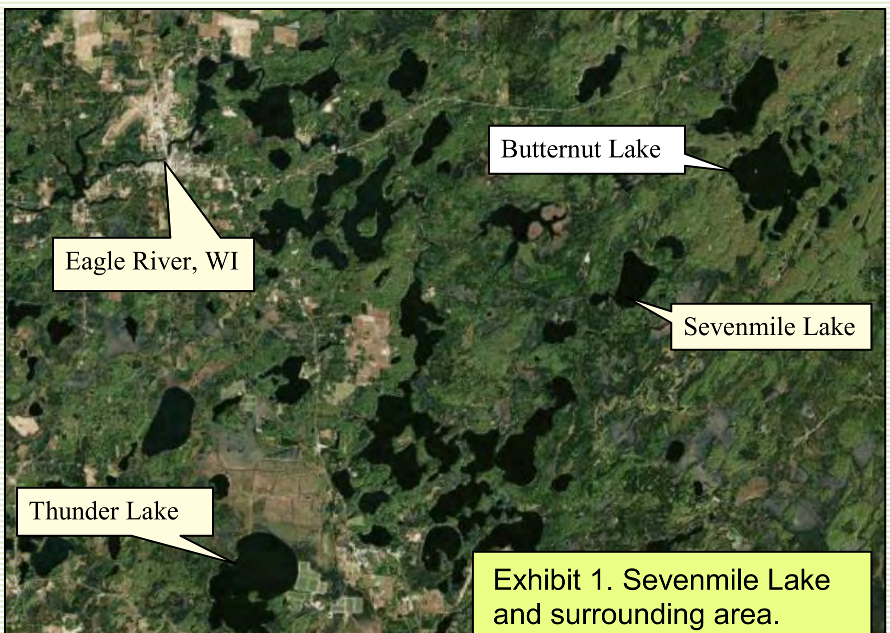


Exhibit 1. Sevenmile Lake and surrounding area.

Descriptive parameters for Sevenmile Lake are in Exhibit 2. It is a drainage lake of about 518 acres and has a maximum depth of 43 feet. An unnamed stream enters from the north and Hay Meadow Creek enters from the south. According to Article 404 of Wisconsin Valley

Improvement Company's FERC License, the Licensee shall release from Seven Mile dam into the Seven Mile Creek a minimum flow of 5.0 cfs year-round for the protection and enhancement of fish and wildlife resources and vegetation in the Seven Mile Creek (WVIC, 2016). More information about the Sevenmile dam is available in the Adaptive Management Plan.

Sevenmile Lake has a low shoreline development index (SDI). The SDI is a quantitative expression derived from the shape of the lake. It is defined as the ratio of the shoreline length to the length of the circumference of a circle of the same area as the lake. A perfectly round lake would have an index of 1. Increasing irregularity of shoreline development in the form of bays and projections of the shore is shown by numbers greater than 1. For example, fjord lakes with extremely irregularly shaped shorelines sometimes have SDI's exceeding 5. A higher shoreline development index indicates that a lake has relatively more productive littoral zone habitat.

Exhibit 2. Water Body Parameters.	
Water Body Name	Sevenmile
Counties	Forest and Oneida
Township/Range/Section	T39N-R11E-S1,S12 T39N-R12E-S6,S7
Water Body Identification Code	1605800
Lake Type	Drainage
Surface Area (acres)	518
Maximum Depth (feet)	43
Maximum Length (miles)	1.2
Maximum Width (miles)	0.8
Shoreline Length (miles)	6.1
Shoreline Development Index	1.9
Total Number of Piers (EPA study)	65
Number of Piers / Mile of Shoreline	10.7
Total Number of Homes (2013 aerial)	65
Number of Homes / Mile of Shoreline	10.7

Sevenmile Lake has a two public access sites: one on the west side of the lake and one on the east side of the lake near the Sevenmile Lake campground. We observe 65 piers on the shoreline of Sevenmile Lake from the 2013 EPA shoreline study or about 10.7 piers per mile of shoreline. The riparian area consists of both upland and wetland areas (Exhibit 3).

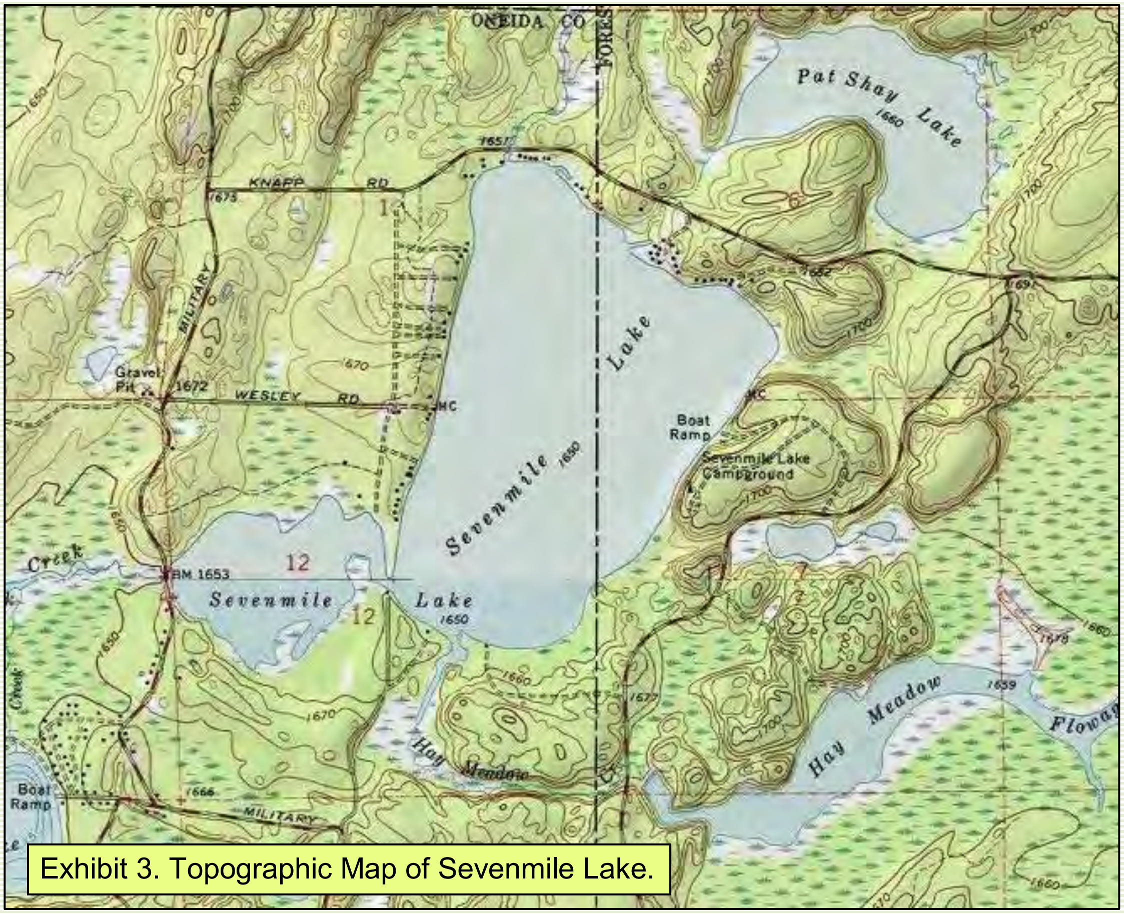


Exhibit 3. Topographic Map of Sevenmile Lake.

Page left intentionally blank

CHAPTER 3

Purpose and Goal Statements

This plan approaches aquatic plant management with a healthy dose of humility. We do not always understand the causes of environmental phenomena or the effects of our actions to manage the environment. With that thought in mind, we have crafted a statement of purpose and for this plan:

> ***Sevenmile Lake has a very healthy and diverse aquatic plant community that was documented by a point-intercept aquatic plant survey. This plant community is essential to, and part of, a high quality aquatic ecosystem that benefits the human community with its recreational and aesthetic features. The purpose of this aquatic plant management plan is to maintain the aquatic plant community in its present high quality state.***

Supporting this purpose, the goals of this aquatic plant management plan are:

> ***(1) Monitor and protect the native aquatic plant community;***
> ***(2) Prevent establishment of AIS and nuisance levels of native plants;***
> ***(3) Promote and interpret APM efforts; and***
> ***(4) Educate riparian owners and lake users on preventing AIS introduction, reducing nutrient inputs that potentially alter the plant community, and minimizing physical removal of native riparian and littoral zone plants.***

The purpose and goals are the foundation for the aquatic plant management plan presented in this document. They inform the objectives and actions outlined in Chapter 5 and are the principal motivation of Sevenmile Lake stewards.

Page left intentionally blank

CHAPTER 4

Information and Analysis

Our efforts in the Sevenmile Lake Stewardship Program have compiled information about historical and current conditions of the Sevenmile Lake ecosystem and its surrounding watershed. Of particular importance to this aquatic plant management plan is the aquatic plant survey that was conducted in using the ***WDNR Protocol for Aquatic Plant Survey, Collecting, Mapping, Preserving, and Data Entry*** (Hauxwell et al., 2010). The results of this comprehensive "point-intercept" survey along with relevant components of other information are presented in this chapter under nine respective subheadings: watershed, aquatic plant management history, aquatic plant community description, fish community, water quality and trophic status, water use, riparian area, wildlife, and stakeholders.

Part 1. Watershed

Sevenmile Lake and its watershed are very small components of a large-scale watershed landscape. The continental United States is divided into 18 watershed regions (Exhibit 4). Two watershed regions lie within Wisconsin: the Upper Mississippi and Great Lakes regions. Sevenmile Lake is located in the Upper Mississippi region, but is very close to the Great Lakes regional border. The Upper Mississippi region is made up of many sub-regions and basins. The Wisconsin sub-region (HUC#0707), and the Wisconsin River basin (HUC#070700) (Exhibit 5) contain Sevenmile Lake. Within the Wisconsin River basin is the Upper Wisconsin sub-basin (HUC#07070001) (Exhibit 6), which can be further divided into watersheds and sub-watersheds. Sevenmile Lake is located in the Eagle River watershed (HUC#0707000102). Finally, the Eagle River watershed is divided into federal hydrologic sub-watersheds, designated by 12-digit HUC codes. Sevenmile Lake is located in the Ninemile Creek-Eagle River sub-watershed (HUC#070700010204), which can be seen in Exhibit 7. Exhibit 8 displays Sevenmile Lake with its watershed.

Exhibit 4. United States watershed regions (USGS, 2014).

Exhibit 5. Wisconsin River basin (HUC#070700). The Upper Wisconsin sub-basin is also visible (USEPA, 2009).

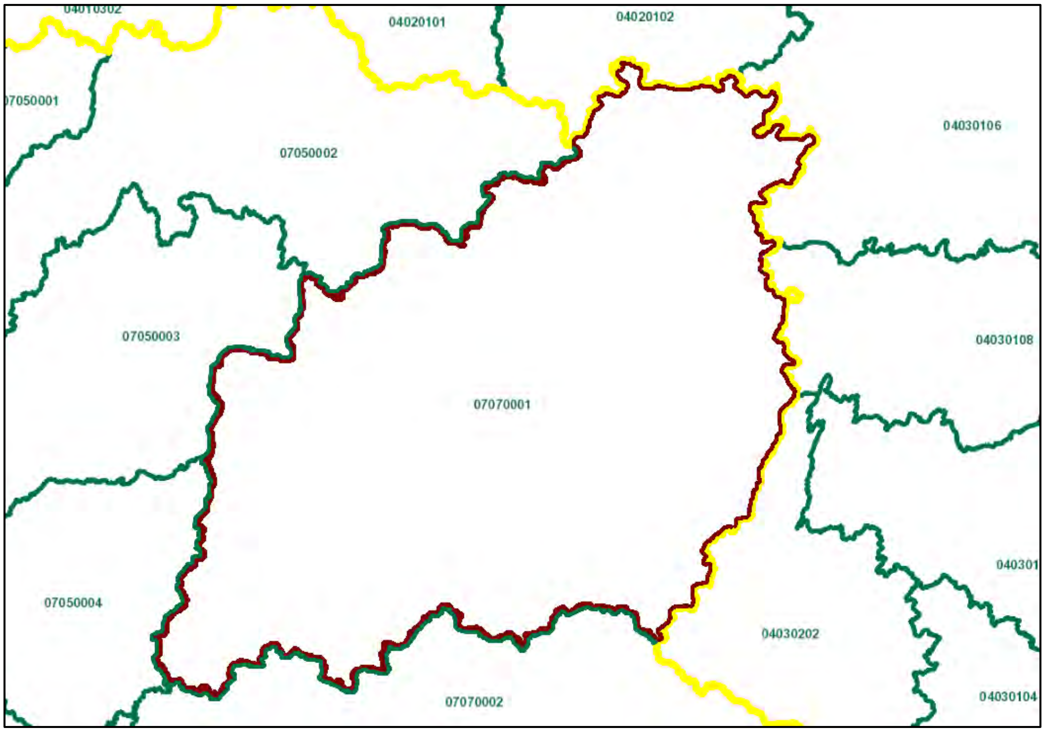


Exhibit 6. Upper Wisconsin sub-basin (red) lies on the border of the Upper Mississippi region (prefix "07") and the Great Lakes region (prefix "04").

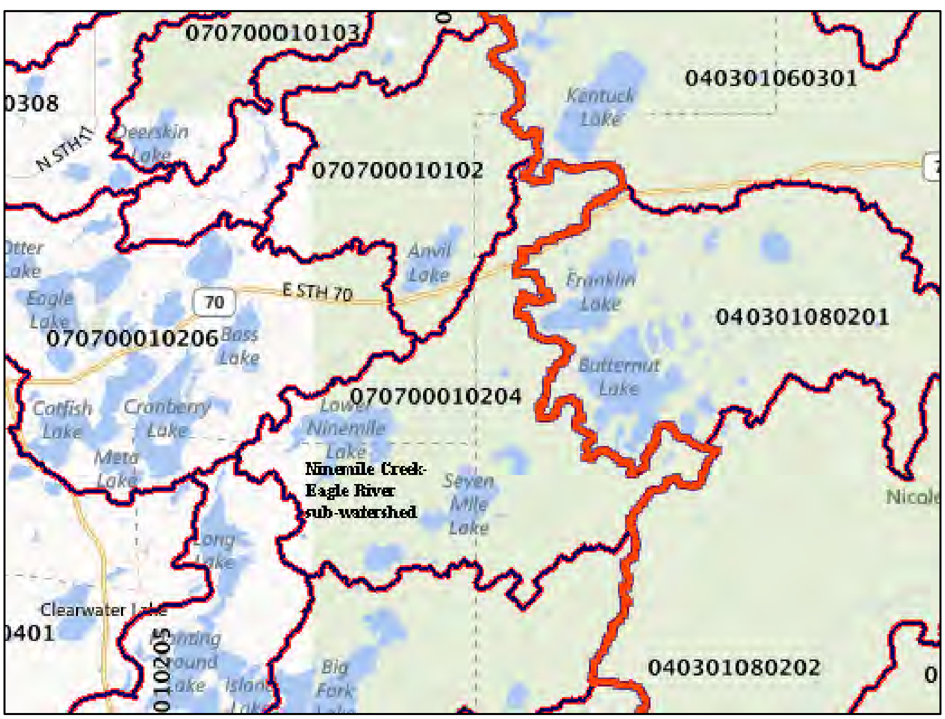


Exhibit 7. Ninemile Creek-Eagle River sub-watershed. The orange line delineates the Great Lakes Region (east of line) from the Upper Mississippi Region (west of line).

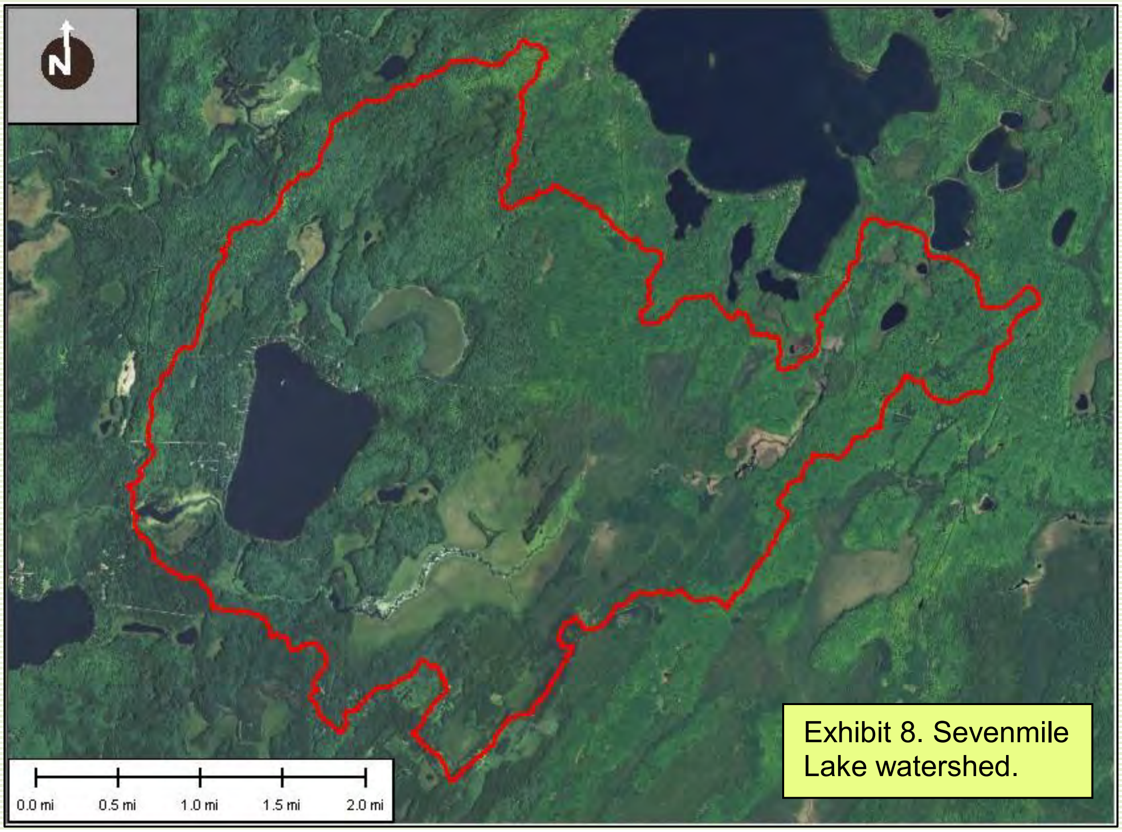


Exhibit 8. Sevenmile Lake watershed.

The elevation of the Sevenmile Lake watershed ranges from around 1,600 feet above sea level to about 1,800 feet above sea level. A digital elevation model is provided as Exhibit 9 and shows the relative elevations for the area with orange areas of the landscape being the highest elevations and greens and blues being the lowest elevations.

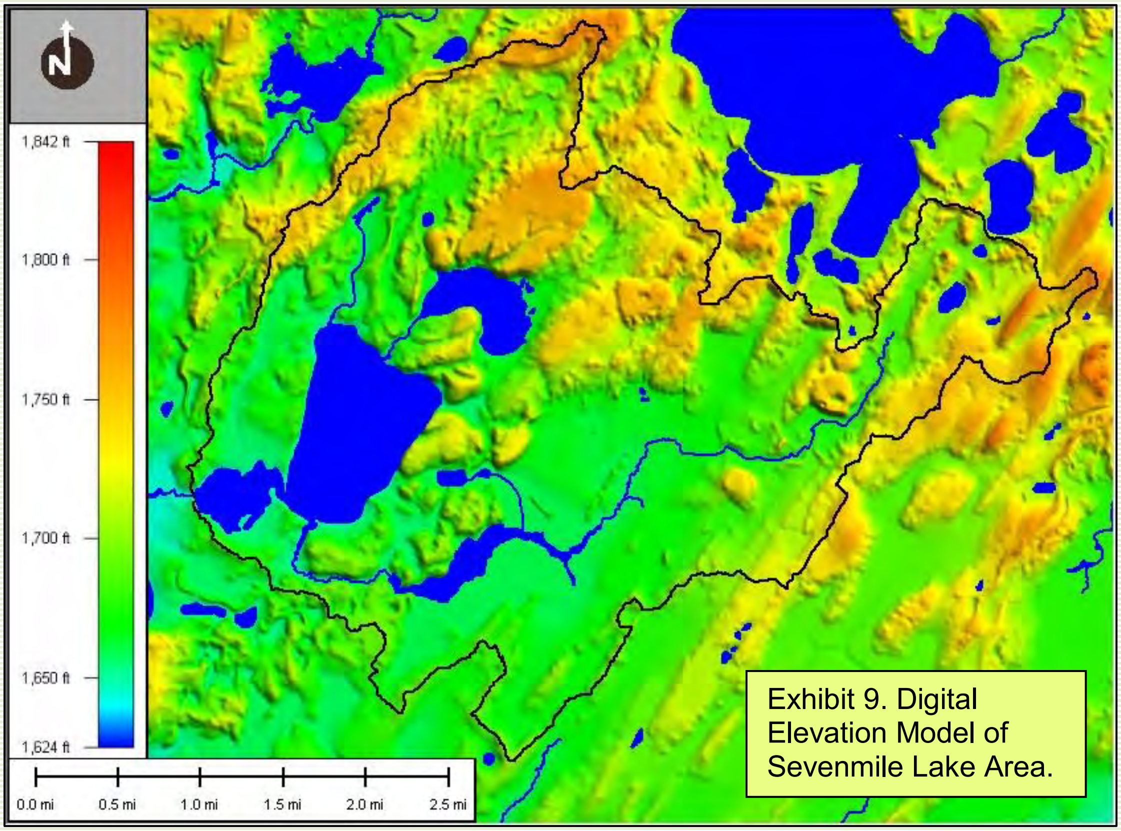


Exhibit 9. Digital Elevation Model of Sevenmile Lake Area.

The watershed (drainage basin) is all of the land and water areas that drain toward a particular river or lake. A water body is greatly influenced by its watershed. Watershed size, topography, geology, land use, soil fertility and erodibility, and vegetation are all factors that influence water quality. The Sevenmile Lake watershed is about 7,250 acres. It is identified in Exhibit 8. The cover types in the watershed are presented in Exhibit 10. Forest and surface water comprise the largest components. Soil groups A, B and D are present in the watershed. Soil group B makes up half the watershed. Soil group D has the lowest infiltration capacity, and the highest runoff potential. Conversely, soil group A has the highest infiltration capacity, and the lowest runoff potential. The watershed to lake area ratio is 14:1. Water quality often decreases with an increasing ratio of watershed area to lake area. As the watershed to lake area increases there are more sources and amounts of runoff. In larger watersheds, runoff water can leach more minerals and nutrients and carry them to the lake. The runoff to a lake (such as after a rainstorm or snowmelt) differs greatly among land uses. Forest cover is the most protective as it exports much less soil (through erosion) and nutrients (such as phosphorus and nitrogen) to the lake than agricultural or urban land use.

Exhibit 10. Cover Types and Soil Groups of the Sevenmile Lake Watershed.

Cover Type	Acres	Percent
Agriculture	0	0
Commercial	0	0
Forest	3978.4	54.9
Grass/Pasture	1.1	0.02
High-density Residential	0	0
Low-density Residential	176.3	2.4
Water	3096.9	42.7
Total	7252.7	100.0

Soil Group	Acres	Percent	**Hydrologic Soil Groups** - Soils are classified by the Natural Resource Conservation Service into four Hydrologic Soil Groups* based on the soil's runoff potential. The four Hydrologic Soils Groups are A, B, C and D. Where A has the smallest runoff potential and D the greatest.
A	1147.7	15.8	**Group A** is sand, loamy sand or sandy loam types of soils. It has low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission.
B	3628.3	50.0	**Group B** is silt loam or loam. It has a moderate infiltration rate when thoroughly wetted and consists chiefly or moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures.
C	0.0	0.0	**Group C** soils are sandy clay loam. They have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine structure.
D	2476.7	34.1	**Group D** soils are clay loam, silty clay loam, sandy clay, silty clay or clay. This soil has the highest runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material.

(USDA, Natural Resources Conservation Service, 1986)

Part 2. Aquatic Plant Management History

As far as we can determine, no systematic or large-scale plant management activity has ever taken place in Sevenmile Lake. Over the years, no particular nuisance issues have demanded control action. It is our understanding that the plant survey conducted in 2012 was the first effort of its kind on this water body.

Part 3. Aquatic Plant Community Description

Why do lakes need aquatic plants? In many ways, they are underwater forests. Aquatic plants provide vertical and horizontal structure in the lake just like the many forms and variety of trees do in a forest. Imagine how diminished a forest's biodiversity becomes in the advent of a clear-cut. Similarly, a lake's biodiversity in large part depends on a diversity of plants.

Aquatic plants are beneficial in many ways. Areas with plants produce more food for fish (insect larvae, snails, and other invertebrates). Aquatic vegetation offers fish shelter and spawning habitat. Many submerged plants provide food for waterfowl and habitat for insects on which some waterfowl feed. Aquatic plants further benefit lakes by producing oxygen and absorbing nutrients (phosphorus and nitrogen) from runoff. Aquatic plants also protect shorelines and lake bottoms by dampening wave action and stabilizing sediments.

The distribution of plants within a lake is generally limited by light availability, which is, in turn, controlled by water clarity. Aquatic biologists often estimate the depth to which rooted aquatic plants can exist as about two times the average Secchi clarity depth. For example, if the average Secchi depth is eight feet then it is fairly accurate to estimate that rooted plants might exist in water as deep as sixteen feet. At depths greater than that (in our hypothetical example), light is insufficient for rooted plants to grow. In addition to available light, the type of substrate influences the distribution of rooted aquatic plants. Plants are more likely to be found in muddy or soft sediments containing organic matter, and less likely to occur where the substrate is sand, gravel, or rock. Finally, water chemistry influences which plants are found in a body of water. Some species prefer alkaline lakes and some prefer more acidic lakes. The presence of nutrients like phosphorous and nitrogen also influence plant community composition.

As mentioned earlier, non-native invasive plant species can reach high densities and wide distribution within a lake. This diminishes the native plant community and the related habitat. At times, even a native plant species can reach nuisance levels with respect to certain kinds of human recreation. These cases may warrant some kind of plant management.

A WDNR point-intercept aquatic plant survey was conducted on Sevenmile Lake in 2012. This formal survey assessed the plant species composition on a grid of several hundred points distributed evenly over the lake. Using latitude-longitude coordinates and a handheld GPS unit, we navigated to the points and used a rake mounted on a pole or rope to sample plants. These were identified, recorded, and put into a dedicated spreadsheet for storage and data analysis. This systematic survey provides baseline data about the lake. Future monitoring will be able to identify and track changes in the plant community. Changes in a lake environment might manifest as loss of species, change in species abundance or distribution, difference in the relative composition of various plant life forms (emergent, floating leaf, or submergent plants), and/or appearance of an AIS or change in its population size. Monitoring can track changes and provide valuable insight on which to base management decisions. In the remainder of this section (Part 3) we report the findings of the point-intercept aquatic plant survey. The supporting tables and figures for the aquatic plant survey are provided in Appendix 2.

Species richness refers to the total number of species recorded. Twenty-five species of aquatic plants were observed. Of these, 24 were collected at sampling sites and the others were observed from the boat. Table 1 displays summary statistics for the survey. Table 2 provides a list of the species encountered, including common and scientific name along with summarizing statistics.[2] The number of species encountered at any given sample point ranged from 0 to 8 and 159 sample points were found to have aquatic vegetation present. The average number of species encountered at these vegetated sites was 3.25. The actual number of species encountered at each of the vegetated sites is graphically displayed on Figure 1. Plant density is estimated by a "rake fullness" metric (3 being the highest possible density). These densities (considering all species) are displayed for each sampling site on Figure 2.

The maximum depth of plant colonization is 14 feet (Table 1 and Figure 3). Rooted vegetation was found at 159 of the 201 sample sites with depth ≤ the maximum depth of plant colonization (79.1% of sites). These sites are displayed as a black dot within a circle on Figure 4. This indicates that although availability of appropriate depth may limit the distribution of plants, it is not the only habitat factor involved. Substrate is another feature that influences plant distribution (e.g., soft substrate often harbors more plants than hard substrate). Figure 5 presents the substrates encountered during the aquatic plant survey (mud, sand, or rock).

---

[2] *If you are interested in learning more about the plant species found in the lake, visit the University of Wisconsin Steven Point Freckmann Herbarium website at: http://wisplants.uwsp.edu/ or obtain a copy of "Through the Looking Glass (A Field Guide to the Aquatic Plants in Wisconsin)."*

Table 2 provides information about the frequency of occurrence of the plant species recorded in the lake. Several metrics are provided, including total number of sites in which each species was found and frequency of occurrence at sites ≤ the maximum depth of rooted vegetation. This frequency metric is standardized as a "relative frequency" (also shown in Table 2) by dividing the frequency of occurrence for a given species by the sum of frequency of occurrence for all plants and multiplying by 100 to form a percentage. The resulting relative frequencies for all species total 100%. The relative frequencies for the plant species collected with a rake are graphically displayed in descending order on Figure 6. This display shows that variable pondweed (*Potamogeton gramineus*) had the highest relative frequency followed by water star-grass (*Heteranthera dubia*). The lowest relative frequencies are at the far right of the graph. As examples of individual species distributions, we show the occurrences of a few of the most frequently and least frequently encountered plants in Figures 8-15.

Species richness (total number of plants recorded at the lake) is a measure of species diversity, but it doesn't tell the whole story. As an example, consider the plant communities of two hypothetical ponds each with 1,000 individual plants representing ten plant species (in other words, richness is 10). In the first pond each of the ten species populations is comprised of 100 individuals. In the second pond, Species #1 has a population of 991 individuals and each of the other nine species is represented by one individual plant. Intuitively, we would say that first pond is more diverse because there is more "even" distribution of individual species. The "Simpson Diversity Index" takes into account both richness and evenness in estimating diversity. It is based on a plant's relative frequency in a lake. The closer the Simpson Diversity Index is to 1, the more diverse the plant community. The Simpson Diversity Index for Sevenmile Lake aquatic plants is 0.93 (Table 1) which indicates a highly diverse aquatic plant community.

Another measure of floristic diversity and quality is the *Floristic Quality Index* (FQI). Floristic quality is an assessment metric designed to evaluate the closeness that the flora of an area is to that of undisturbed conditions (Nichols, 1999). Among other applications, it forms a standardized metric that can be used to compare the quality of different lakes (or different locations within a single lake) and monitor long-term changes in a lake's plant community (an indicator of lake health). The FQI for a lake is determined by using the average *coefficient of conservatism* times the square root of the number of native plant species present in the lake. Knowledgeable botanists have assigned to each native aquatic plant a *coefficient of conservatism* representing the probability that a plant is likely to occur in pristine environments (relatively unaltered from presettlement conditions). The coefficients range from 0 to 10, with 10 being assigned to those species most sensitive to disturbance. As more environmental disturbance occurs, the less conservative species become more prevalent.

Nichols (1999) analyzed aquatic plant community data from 554 Wisconsin Lakes to ascertain geographic (ecoregional) characteristics of the FQI metric. This is useful for considering how the Sevenmile Lake FQI (32.7) compares to other lakes and regions. The statewide medians for number of species and FQI are 13 and 22.2, respectively. Sevenmile Lake values are high compared to these statewide values. Nichols (1999) determined that there are four ecoregional-lake types groups in Wisconsin: (1) Northern Lakes and Forests lakes, (2) Northern Lakes and Forests flowages, (3) North Central Hardwoods and Southeastern Till Plain lakes and flowages, and (4) Driftless Area and Mississippi River Backwater lakes. Sevenmile Lake is located in the Northern Lakes and Forests lakes group. Nichols (1999) found species numbers for the Northern Lakes and Forests lakes group had a median value of 13. Sevenmile Lake data is consistent with that find. Finally, the Sevenmile Lake FQI (32.7) is significantly higher than the median value for the Northern Lakes and Forests lakes group (24.3). These findings support the contention that the Sevenmile Lake plant community is very healthy and diverse.

Small purple bladderwort (*Utricularia resupinata*) was observed at two sites during the aquatic plant survey. Small purple bladderwort is considered a *Special Concern* species in Wisconsin. Special concern species are those species about which some problem of abundance or distribution is suspected but not yet proved (WDNR, 2014). The survey found no aquatic invasive plant species.

Wild rice (*Zizania palustris*) was observed at 5 sites (as a boat survey find) in the Sevenmile Lake aquatic plant survey. Four of the sites with wild rice were located at the south end of the lake near the outlet stream. A fifth site that had wild rice was in the narrow waters between the western bay and the main lake. In a 1988 survey by WVIC, no wild rice was observed (WVIC 2016).

Wild rice is an important food source for many waterfowl and animals. It also has cultural significance to the Anishinaabe (Chippewa or Ojibwe), who call it *manoomin* (GLIFWC, *Wild Rice* brochure). Because of its ecological and cultural importance, the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) has systematically collected wild rice data, including: acreage, density, pounds collected by tribal and state harvesters, and other useful data. According to the *Wisconsin Ceded Territory Manoomin Inventory*, Sevenmile Lake is "Sevenmile Lake was not considered an established rice water in the 2010 inventory, but it was noted that a small bed was present in 2009 as a result from a seeding conducted by the Wisconsin Waterfowl Association in 2008. Rice has been observed in fair abundance each year since in either ground or air surveys. All of the rice is located in the western bay of this lake, with the largest bed occurring near the northeast shoreline of this bay. GLIFWC now considers this an established wild rice water. Watch status is medium" (David, 2010, Version 2). GLIFWC also conducts aerial surveys of rice beds. In 2012, GLIFWC conducted an aerial survey of Sevenmile Lake and estimated there was 10 acres of medium-dense wild rice stands (David, 2013).

Part 4. Fish Community

Fish surveys have been conducted on Sevenmile Lake as early as the 1980s. The Great Lakes Indian Fish and Wildlife Commission and the Wisconsin DNR have been involved in conducting spearing, creel, fyke net, boom shock and mark-recapture surveys on Sevenmile Lake. A volunteer anglers' journal was also kept to collect additional fisheries data to augment the GLIFWC and WDNR surveys. For more information on Sevenmile Lake fisheries and data collected in the anglers' journals, see Appendix G and H of the *Sevenmile Lake Adaptive Management Plan*.

Part 5. Water Quality and Trophic Status

Sevenmile Lake is a 518 acre drainage lake with a maximum depth of 43 feet. Existing water quality information dates as far back as 1973. The Wisconsin Valley Improvement Company (WVIC) sampled Sevenmile Lake as part of their quarterly water quality monitoring program from 1973-1976 and from 1979-1983 (WVIC 2016). WVIC conducted baseline TSI monitoring from 2000 to 2002 and again from 2010-2012. Currently, WVIC samples the lake every three years out of ten during the term of their 30-year FERC license (WVIC 2016). White Water Associates collected water quality samples in 2012 to 2014.

Temperature and dissolved oxygen samples showed stratification in Sevenmile Lake in the ice-free season. Water clarity is considered "good," with a 2013 average Secchi reading of 9 ft. The trophic state is mesotrophic. Average chlorophyll *a* values (a measure of the amount of algae) are lower than Wisconsin natural lakes. Nitrogen, conductivity, calcium, magnesium, and alkalinity (a measure of a lake's buffering capacity against acid rain) are considered low. The pH of Sevenmile Lake ranged from 7.6 (July, 1979) to 8.17 (July, 2012).

In 2014, Sevenmile Lake was listed as an impaired water. The Wisconsin DNR impaired waters detail page (WDNR, 2014c) states: *Sevenmile Lake was previously on the 303(d) lists due* *to mercury, but was delisted 2006 because new data verify general fish consumption advisory only, not specific advisory. Sevenmile Lake was assessed during the 2014 listing cycle and total phosphorus sample data exceed the 2014 Wisconsin Consolidated Assessment and Listing Methods (WisCALM) listing thresholds for the Recreation use of Fish and Aquatic Life use. Chlorophyll data do not exceed REC or FAL thresholds.* Sevenmile Lake water quality data is more fully interpreted in Appendix 3.

One water quality-planning tool used to analyze Sevenmile Lake's water quality is the Wisconsin Lake Modeling Suite (WiLMS). The model is comprised of four parts: the model setup, phosphorus prediction, internal loading and trophic response. The WiLMS model was run for Sevenmile Lake water quality purposes. See Appendix D of the *Sevenmile Lake Adaptive Management Plan* for the results of the WiLMS model.

Part 6. Water Use

Sevenmile Lake has two public access sites: one on the west side of the lake and one on the east side of the lake near the Sevenmile Lake campground. There is Nicolet National Forest land along the southeast shore, and around the western bay of the lake. There is no State of Wisconsin land. Sevenmile Lake dam is in operation at the southwest end of the lake. The Sevenmile Lake dam is operated by the Wisconsin Valley Improvement Company (WVIC) under a federal license issued by the Federal Energy Regulatory Commission (FERC). This 30-year license for FERC Project P-2113 was issued in 1996. For more information about the Sevenmile Lake Dam, see the Adaptive Management Plan.

Part 7. Riparian Area

Part 1 (Watershed) describes the larger riparian area context of Sevenmile Lake. The near shore riparian area can be appreciated by viewing Exhibits 2 and 4. Based on this image, the lake appears lightly developed with a fairly intact forested riparian zone that extends for hundreds of feet back from the lake. The forest is a mixture of coniferous and deciduous trees and shrubs. Our review of 2013 aerial photography reveals 65 houses on the lake. This intact riparian area provides numerous important functions and values to the lake. It effectively filters runoff to the lake. It provides excellent habitat for birds and mammals. Trees that fall into the lake from the riparian zone contribute important habitat elements to the lake. Educating riparian owners as to the value of riparian areas is important to the maintenance of these critical areas.

As part of this project, the riparian area was assessed both qualitatively (by lake volunteers) and quantitatively (by White Water Associates staff). In addition, the entire shoreline was photographically documented. These assessments are more fully described in the *Sevenmile Lake Adaptive Management Plan*.

Part 8. Wildlife

Eagle and loon studies have been conducted by the Wisconsin Department of Natural Resources and by many volunteers as part of programs such as LoonWatch. Rare species and communities have also been identified by the WDNR. These data can be viewed in the *Sevenmile Lake Adaptive Management Plan.*

Frog and toad surveys were conducted in wetlands near Sevenmile Lake in 2012. Working in consultation with lake stewardship volunteers with local knowledge of area wetlands, White Water Associates' scientist Dean Premo (a trained herpetologist) selected ten sites in the immediate landscape of Sevenmile Lake as prospective frog and toad survey wetlands. Volunteers then surveyed these sites and record species and counts. The field data was conveyed to Dr. Premo for analysis and reporting. Results of the Sevenmile Lake frog and toad survey can be viewed in Appendix I of the *Sevenmile Lake Adaptive Management Plan*.

In the future it would be desirable to monitor other wetland and water oriented wildlife such as waterfowl, fish-eating birds, aquatic and semi-aquatic mammals, and invertebrate animals. Also of special importance would be monitoring the populations of aquatic invasive animal species that already exist in the lake (rusty crayfish). Finally, it is essential to monitor Sevenmile Lake for the presence of new aquatic invasive animal species (for example, spiny water flea, zebra mussels, banded mystery snail, and Chinese mystery snail).

Sevenmile Lake is currently designated as an *area of special natural resource interest* (ASNRI) and a *priority navigable water* (PNW) (WDNR, 2015). A water body designated as an Area of Special Natural Resource Interest can be any of the following: WDNR trout streams; Outstanding or Exceptional Resource Waters (ORW/ERW); waters or portions of waters inhabited by endangered, threatened, special concern species or unique ecological communities; wild rice waters; waters in ecologically significant coastal wetlands along Lake Michigan and Superior; or federal or state waters designated as wild or scenic rivers (WDNR, 2015). Sevenmile Lake is considered an ASNRI because it hosts state or federally designated threatened or endangered species. These species are described in the *Sevenmile Lake Adaptive Management Plan*.

Priority Navigable Waters meet any of these standards: navigable waterways, or portions thereof, that are considered OWR/EWR or trout streams; lakes less than 50 acres in size; tributaries and rivers connecting to inland lakes containing naturally-reproducing lake sturgeon populations; waters with self-sustaining walleye populations in ceded territories; waters with self-sustaining musky populations; or perennial tributaries to trout streams (WDNR, 2015). Sevenmile Lake is considered a PNW with self-sustaining musky and walleye populations.

Part 9. Stakeholders

At this juncture in the ongoing aquatic plant management planning process, the SLA has represented the Sevenmile Lake stakeholders. Additional stakeholders and interested citizens are invited to participate as the plan is refined and updated in order to broaden input, build consensus, and encourage participation in stewardship. No contentious direct plant management actions (for example, harvesting or use of herbicides) are a component of the current plan. The SLA solicited input from Sevenmile Lake residents to better understand the needs, knowledge base, concerns and desires of the various water body users. The results of these lake user surveys are presented in the overarching *Sevenmile Lake Adaptive Management Plan*.

CHAPTER 5

Recommendations, Actions, and Objectives

In this chapter we provide recommendations for specific objectives and associated actions to support the APM Plan's goals stated in Chapter 3 and re-stated here for convenient reference:

(1) Monitor and protect the native aquatic plant community;

(2) Prevent establishment of AIS and nuisance levels of native plants;

(3) Promote and interpret APM efforts; and

(4) Educate riparian owners and lake users on preventing AIS introduction, reducing nutrient inputs that potentially alter the plant community, and minimizing physical removal of native riparian and littoral zone plants.

Since Sevenmile Lake is a very healthy and diverse ecosystem, we could simply recommend an alternative of "no action." In other words, Sevenmile Lake continues without any effort or intervention on part of lake stewards. Nevertheless, we consider the "no action" alternative imprudent. Many forces threaten the quality of the lake and Sevenmile Lake Stewardship Program and the Sevenmile Lake Association feels a great responsibility to minimize the threats. We therefore outline in this section a set of actions and related management objectives that will actively engage lake stewards in the process of management.

The actions are presented in tabular form. Each "action" consists of a set of four statements: (1) a declarative "action" statement that specifies the action (2) a statement of the "objective" that the action serves, (3) a "monitoring" statement that specifies the party responsible for carrying out the action and maintaining data, and (4) a "status" statement that suggests a timeline/calendar and indicates status (not yet started, ongoing, or completed).

At this time, we recommend no direct manipulation of plant populations in Sevenmile Lake. No aquatic invasive plant species are known to be present and no native plants exhibit nuisance population size or distribution.

Recommended Actions for the Sevenmile Lake APM Plan

Action #1: Formally adopt the Aquatic Plant Management Plan.

Objective: To provide foundation for long-term native plant community conservation and stewardship and to be prepared for response to AIS introductions.

Monitoring: The Sevenmile Lake Association oversees activity and maintains the plan.

Status: Planned for 2015.

Action #2: Monitor water quality.

Objective: Continue with collection and analysis of water quality parameters to detect trends. Expand monitoring to include parameters for which little information exists (see Appendix C for individual parameters).

Monitoring: The Sevenmile Lake Association oversees activity and maintains the data.

Status: Ongoing.

Action #3: Monitor the lake for aquatic invasive plant species.

Objective: To understand the lake's biotic community, provide for early detection of AIS and continue monitoring any existing populations of AIS.

Monitoring: The Sevenmile Lake Association oversees activity and maintains data.

Status: Ongoing.

Action #4: Form an Aquatic Invasive Species Rapid Response Team and interface with the AIS Rapid Response Coordinator.

Objective: To be prepared for AIS discovery and efficient response.

Monitoring: The Sevenmile Lake Association coordinates activity.

Status: Planned for 2016.

Recommended Actions for the Sevenmile Lake APM Plan

Action #5: Conduct quantitative plant survey every five years (when water levels allow access to the western bay) using WDNR Point-Intercept Methodology.

Objective: To watch for changes in native species diversity, floristic quality, plant abundance, and plant distribution and to check for the occurrence of non-native, invasive plant species and the presence of rare plants.

Monitoring: The Sevenmile Lake Association oversees activity and maintains the data; copies to WDNR.

Status: Anticipated in 2017.

Action #6: Update the APM plan approximately every five years or as needed to reflect new plant information from plant surveys and monitoring.

Objective: To have current information and management science included in the plan.

Monitoring: The Sevenmile Lake Association oversees activity and maintains the data; copies to WDNR.

Status: Ongoing.

Action #7: Develop a Citizen Lake Monitoring Network to monitor for invasive species in Sevenmile and nearby lakes and develop strategies including education and monitoring activities (see http://www.uwsp.edu/cnr/uwexlakes/clmn for additional ideas).

Objective: To create a trained volunteer corps to monitor aquatic invasive species and to educate recreational users regarding AIS.

Monitoring: The Lake Association oversees activity and reports instances of possible introductions of AIS.

Status: Anticipated to begin in 2016.

Action #8: Become familiar with and recognize the water quality and habitat values of ordinances and requirements on boating, septic, and property development.

Objective: To protect native aquatic plants, water quality, and riparian habitat.

Monitoring: Lake residents and other stakeholders.

Status: Ongoing.

Recommended Actions for the Sevenmile Lake APM Plan

Action #9: Create an education plan for the property owners and other stakeholders that will address issues of healthy aquatic and riparian plant communities.

Objective: To educate stakeholders about issues and topics that affect the lake's aquatic and riparian plant communities, including topics such as: (1) the importance of the aquatic plant community; (2) no or minimal mechanical removal of plants along the shoreline is desirable and that any plant removal should conform to Wisconsin regulations; (3) the value of a natural shoreline in protecting the aquatic plant community and lake health; (4) nutrient sources to the lake and the role excess nutrients play in degradation of the aquatic plant community; (5) the importance of reducing or eliminating use of fertilizers on lake front property; (6) the importance of minimizing transfer of AIS to the lake by having dedicated watercraft and cleaning boats that visit the lake.

Monitoring: The Sevenmile Lake Association oversees activity and assesses effectiveness.

Status: Anticipated to begin in 2016.

Action #10: Monitor the lake watershed for purple loosestrife.

Objective: Identify purple loosestrife populations before they reach large size.

Monitoring: The Sevenmile Lake Association oversees activity and maintains the data.

Status: Anticipated in 2016.

CHAPTER 6

Contingency Plan for AIS

Unfortunately, sources of aquatic invasive plants and other AIS are numerous in Wisconsin. Some infested lakes are quite close to Sevenmile Lake. There is an increasing likelihood of accidental introduction of AIS through conveyance of life stages by boats, trailers, and other vectors. It is important for the Sevenmile Lake Association and other lake stewards to be prepared for the contingency of aquatic invasive plant species colonization in Sevenmile Lake.

For riparian owners and users of a lake ecosystem, the discovery of AIS invokes a sense of tragedy that elicits an immediate desire to “fix the problem.” Although strong emotions may be evoked by such a discovery, a deliberate and systematic approach is required to appropriately and effectively address the situation. An aquatic plant management plan (one including a contingency plan for AIS) is the best tool by which the process can be navigated. In fact the APM plan is a requirement in Wisconsin for some kinds of aquatic plant management actions. One of the actions outlined in the previous chapter was to establish an Aquatic Invasive Species Rapid Response Team. This team and its coordinator are integral to the management process. It is important for this team to be multi-dimensional (or at least have quick access to the expertise that may be required). AIS invade not just a single lake, but an entire region since the new infestation is an outpost from which the AIS can more easily colonize other nearby water bodies. For this reason it is strategic for the Rapid Response Team to include representation from regional stakeholders.

Exhibit 11 provides a flowchart outlining an appropriate rapid response to the suspected discovery of an aquatic invasive plant species. The response will be most efficient if an AIS Rapid Response Team has already been established and is familiar with the contingency plan. In the remainder of this chapter we further describe the approach.

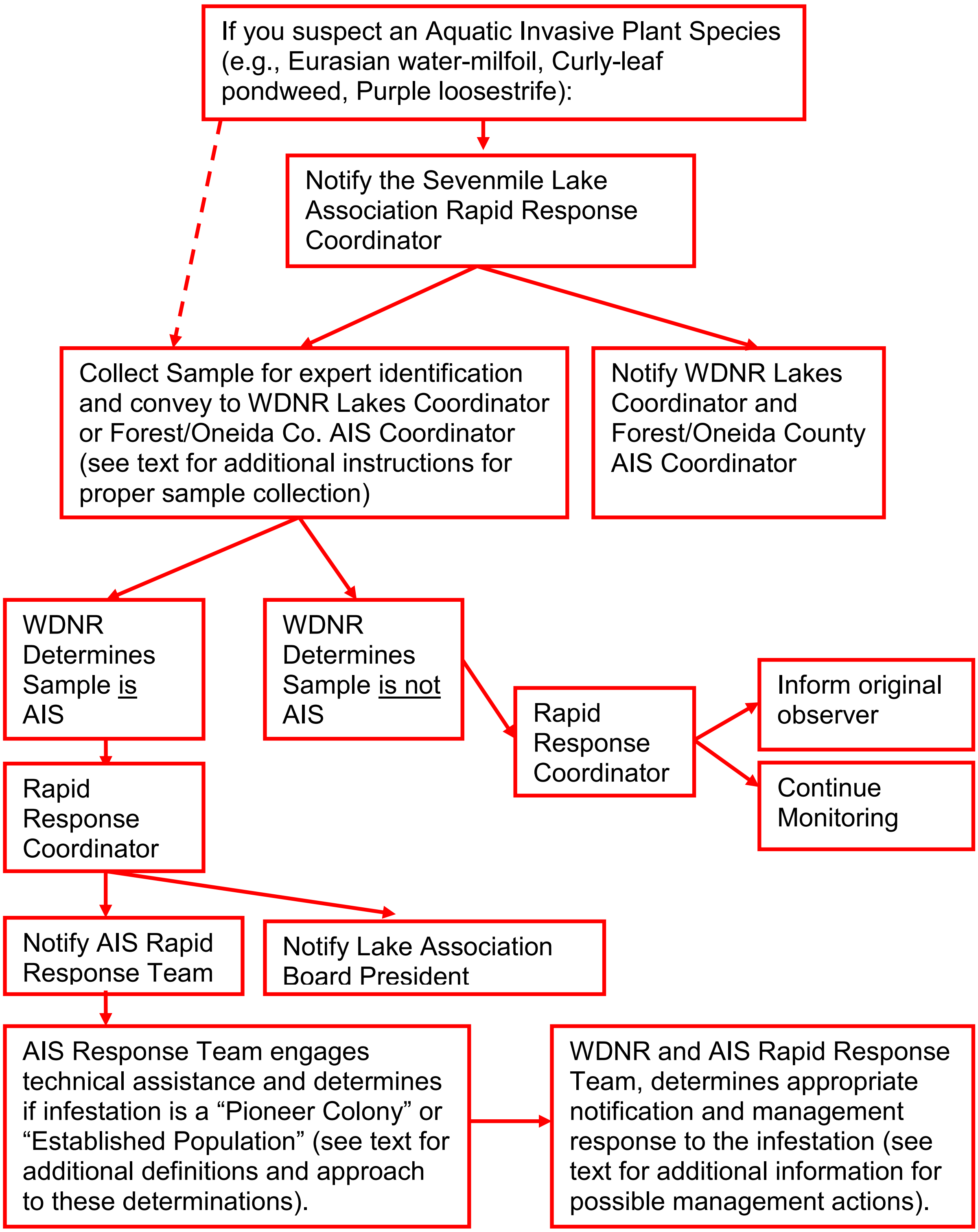
When a suspect aquatic invasive plant species is found, either the original observer or a member of the Rapid Response Team (likely the coordinator) should collect an entire plant specimen including roots, stems, and flowers (if present). The sample should be placed in a sealable bag with a small amount of water to keep it moist. Place a label in the bag written in pencil with date, time, collector’s name, lake name, location, town, and county. Attach a lake map to the bag that has the location of the suspect AIS marked and GPS coordinates recorded (if GPS is available). The sample should be placed on ice in a cooler or in a refrigerator. Deliver the sample to the WDNR Lakes Management Coordinator (Kevin Gauthier in Woodruff or Jim Kreitlow in Rhinelander), the Forest County AIS Coordinator (John Preuss) or the Oneida County AIS Coordinator (Michele Sadauskas) as soon as possible (at least within three days). The WDNR or their botanical expert(s) will determine the species and confirm whether or not it is an aquatic invasive plant species.

If the suspect specimen is determined to be an invasive plant species, the next step is to determine the extent and density of the population since the management response will vary accordingly. The Rapid Response Team should conduct (or have its consultant conduct) a survey to define the colony's perimeter and estimate density. If less than five acres (or <5% of the lake surface area), it is designated a "Pioneer Colony." If greater than five acres (or >5% of the lake surface area) then it is designated an "Established Population." Once the infestation is characterized, "at risk" areas should also be determined and marked on a map. For example, nearby boat landing sites and areas of high boat traffic should be indicated.

When "pioneer" or "established" status has been determined, the WDNR Lakes Coordinator should be consulted in order to determine appropriate notifications and management responses to the infestation. Determining whether hand-pulling or chemical treatment will be used is an important and early decision. Necessary notifications of landowners, governmental officials, and recreationists (at boat landings) will be determined. Whether the population's perimeter needs to be marked with buoys will be decided by the WDNR. Funding sources will be identified and consultants and contractors will be contacted where necessary. The WDNR will determine if a further baseline plant survey is required (depending on type of treatment). A post treatment monitoring plan will be discussed and established to determine the efficacy of the selected treatment.

Once the Rapid Response Team is organized, one of its first tasks is to develop a list of contacts and associated contact information (phone numbers and email addresses). At a minimum, this contact list should include: the Rapid Response Coordinator, members of the Rapid Response Team, County AIS Coordinator, WDNR Lakes Management Coordinator, Lake Association Presidents (or other points of contact), local WDNR warden, local government official(s), other experts, chemical treatment contractors, and consultant(s).

Exhibit 11. Aquatic Invasive Plant Species Rapid Response



Page left intentionally blank

White Water Associates, Inc.

Appendix 1
Literature Cited

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Literature Cited

Great Lakes Indian Fish and Wildlife Commission (GLIFWC). *Wild Rice. Ecology. Harvest. Management.* [Brochure].

David, Peter. Wildlife Biologist, GLIFWC. 2010-Version 2. *Wisconsin Ceded Territory Manoomin Inventory*. GLIFWC Project Report 2010-1.

David, Peter. Wildlife Biologist, GLIFWC. 2013. *Manoomin (Wild Rice) Abundance and Harvest in Northern Wisconsin in 2012.* Retrieved 2014. <http://www.glifwc.org/Reports/Administrative%20Report%2013-08.pdf>

Hauxwell, J., S. Knight, K. Wagner, A. Mikulyuk, M. Nault, M. Porzky and S. Chase. 2010. *Recommended baseline monitoring of aquatic plants in Wisconsin: sampling design, field and laboratory procedures, data entry and analysis, and applications.* Wisconsin Department of Natural Resources Bureau of Science Services. Madison, WI.

Nichols, Stanley A. 1999. *Floristic Quality Assessment of Wisconsin Lake Plant Communities with Example Applications.* Journal of Lake and Reservoir Management 15(2): 133-141.

Premo, Dean, Angie Stine, Caitlin Clarke, and Kent Premo. 2016. *The Sevenmile Lake Adaptive Management Plan.* White Water Associates, Inc. Amasa, MI.

US Department of Agriculture, Natural Resources Conservation Service. June 1986. *Urban Hydrology for Small Watersheds.* Technical Release–55.

US Environmental Protection Agency. 2009. A Watershed Perspective on Water Quality Impairments—A Working Draft Report. Retrieved 2014. <http://www.epa.gov/sectors/sectorinfo/sectorprofiles/agribusiness/watershed.pdf>

US Geological Survey. 2014. *Locate your watershed.* Retrieved 2015. <http://water.usgs.gov/wsc/map_index.html>

Walters, C. 1986. *Objectives, constraints, and problem bounding.* In W.M. Getz, ed., Adaptive Management of Renewable Resources. Macmillan Publishing Company. New York. p. 13+.

Wisconsin Department of Natural Resources. 2014. *Wisconsin Natural Heritage Working List*. Retrieved 2015. <http://dnr.wi.gov/topic/nhi/wlist.html>

Wisconsin Department of Natural Resources. 2015. *About Designated Waters.* Retrieved 2015. <http://dnr.wi.gov/topic/SurfaceWater/swdv/documents/Designated%20Waters%20Workflow.pdf >

Wisconsin Valley Improvement Company. 2016. *Wisconsin Valley Improvement Company Comments.* Retrieved 2016. Cathy Wendt and Ben Niffenegger. Comments to Sevenmile Lake Plan-DRAFT.

Appendix 2

Aquatic Plant Survey Tables and Figures

Page left intentionally blank

White Water Associates, Inc.

Appendix 2

Aquatic Plant Survey Tables and Figures

Table of Contents

Page left intentionally blank

WHITE WATER ASSOCIATES, INC.

Table 1. Summary statistics for the 2012 point-intercept aquatic plant survey for Sevenmile Lake.

Summary Statistic	Value	Notes
Total number of sites on grid	832	Total number of sites on the original grid (not necessarily visited)
Total number of sites visited	472	Total number of sites where the boat stopped, even if much too deep to have plants.
Total number of sites with vegetation	159	Total number of sites where at least one plant was found
Total number of sites shallower than maximum depth of plants	201	Number of sites where depth was less than or equal to the maximum depth where plants were found. This value is used for Frequency of occurrence at sites shallower than maximum depth of plants.
Frequency of occurrence at sites shallower than maximum depth of plants	79.10	Number of times a species was seen divided by the total number of sites shallower than maximum depth of plants.
Simpson Diversity Index	0.93	A nonparametric estimator of community heterogeneity. It is based on Relative Frequency and thus is not sensitive to whether all sampled sites (including non-vegetated sites) are included. The closer the Simpson Diversity Index is to 1, the more diverse the community.
Maximum depth of plants (ft.)	14.00	The depth of the deepest site sampled at which vegetation was present.
Number of sites sampled with rake on rope	29	
Number of sites sampled with rake on pole	217	
Average number of all species per site (shallower than max depth)	2.57	
Average number of all species per site (vegetated sites only)	3.25	
Average number of native species per site (shallower than max depth)	2.57	Total number of species collected. Does not include visual sightings.
Average number of native species per site (vegetated sites only)	3.25	Total number of species collected including visual sightings.
Species Richness	24	
Species Richness (including visuals)	25	
Floristic Quality Index (FQI)	32.7	

Table 2. Plant species recorded and distribution statistics for the 2012 Sevenmile Lake aquatic plant survey[1].

Common name	Scientific name	Frequency of occurrence at sites less than or equal to maximum depth of plants	Frequency of occurrence within vegetated areas (%)	Relative Frequency (%)	Number of sites where species found	Number of sites where species found (including visuals)	Average Rake Fullness
Variable pondweed	*Potamogeton gramineus*	30.85	38.99	12.02	62	63	1.00
Water star-grass	*Heteranthera dubia*	23.88	30.19	9.30	48	50	1.00
Slender naiad	*Najas flexilis*	23.38	29.56	9.11	47	48	1.00
Fern pondweed	*Potamogeton robbinsii*	20.40	25.79	7.95	41	41	1.05
Wild celery	*Vallisneria americana*	18.91	23.90	7.36	38	39	1.00
Common waterweed	*Elodea canadensis*	16.92	21.38	6.59	34	35	1.15
Small pondweed	*Potamogeton pusillus*	16.42	20.75	6.40	33	33	1.00
Muskgrasses	*Chara* sp.	15.92	20.13	6.20	32	32	1.00
Clasping-leaf pondweed	*Potamogeton richardsonii*	14.93	18.87	5.81	30	32	1.03
Spiny spored-quillwort	*Isoetes echinospora*	11.94	15.09	4.65	24	25	1.00
Flat-stem pondweed	*Potamogeton zosteriformis*	10.45	13.21	4.07	21	29	1.00
Northern water-milfoil	*Myriophyllum sibiricum*	9.95	12.58	3.88	20	33	1.00
Water marigold	*Bidens beckii* (formerly *Megalodonta)*	6.97	8.81	2.71	14	14	1.00
Needle spikerush	*Eleocharis acicularis*	6.97	8.81	2.71	14	14	1.00
Large-leaf pondweed	*Potamogeton amplifolius*	5.97	7.55	2.33	12	23	1.00
Nitella	*Nitella* sp.	5.47	6.92	2.13	11	11	1.00
White-stem pondweed	*Potamogeton praelongus*	4.98	6.29	1.94	10	11	1.00
Arum-leaved arrowhead	*Sagittaria cuneata*	3.98	5.03	1.55	8	8	1.00
Fries' pondweed	*Potamogeton friesii*	3.48	4.40	1.36	7	7	1.00
Spiral-fruited pondweed	*Potamogeton spirillus*	1.49	1.89	0.58	3	3	1.00
Spatterdock	*Nuphar variegata*	1.00	1.26	0.39	2	4	1.00
Narrow-leaved bur-reed	*Sparganium angustifolium*	1.00	1.26	0.39	2	2	1.00

Frequency of occurrence within vegetated areas (%): Number of times a species was seen in a vegetated area divided by the total number of vegetated sites.

[1] All specimens were verified by Dr. Robert Freckmann, UW Stevens Pointe.

Table 2. Continued.

Common name	Scientific name	Frequency of occurrence at sites less than or equal to maximum depth of plants	Frequency of occurrence within vegetated areas (%)	Relative Frequency (%)	Number of sites where species found	Number of sites where species found (including visuals)	Average Rake Fullness
Small purple bladderwort	*Utricularia resupinata*	1.00	1.26	0.39	2	2	1.00
Coontail	*Ceratophyllum demersum*	0.50	0.63	0.19	1	1	1.00
Bur-reed (floating)	*Sparganium* sp. (floating)				Visual	1	
Hard-stem bulrush	*Schoenoplectus acutus*				Boat Survey		
Creeping spikerush	*Eleocharis palustris*				Boat Survey		
Wild rice	*Zizania palustris*				Boat Survey		
Broad-leaved cattail	*Typha latifolia*				Boat Survey		
White water lily	*Nymphaea odorata*				Boat Survey		
Bur-reed	*Sparganium* sp.				Boat Survey		

Frequency of occurrence within vegetated areas (%): Number of times a species was seen in a vegetated area divided by the total number of vegetated sites.

Utricularia resupinata is considered a Special Concern species in Wisconsin.

Figure 1. Number of plant species recorded at Sevenmile Lake sample sites (2012).

Figure 2. Rake fullness ratings for Sevenmile Lake sample sites (2012).

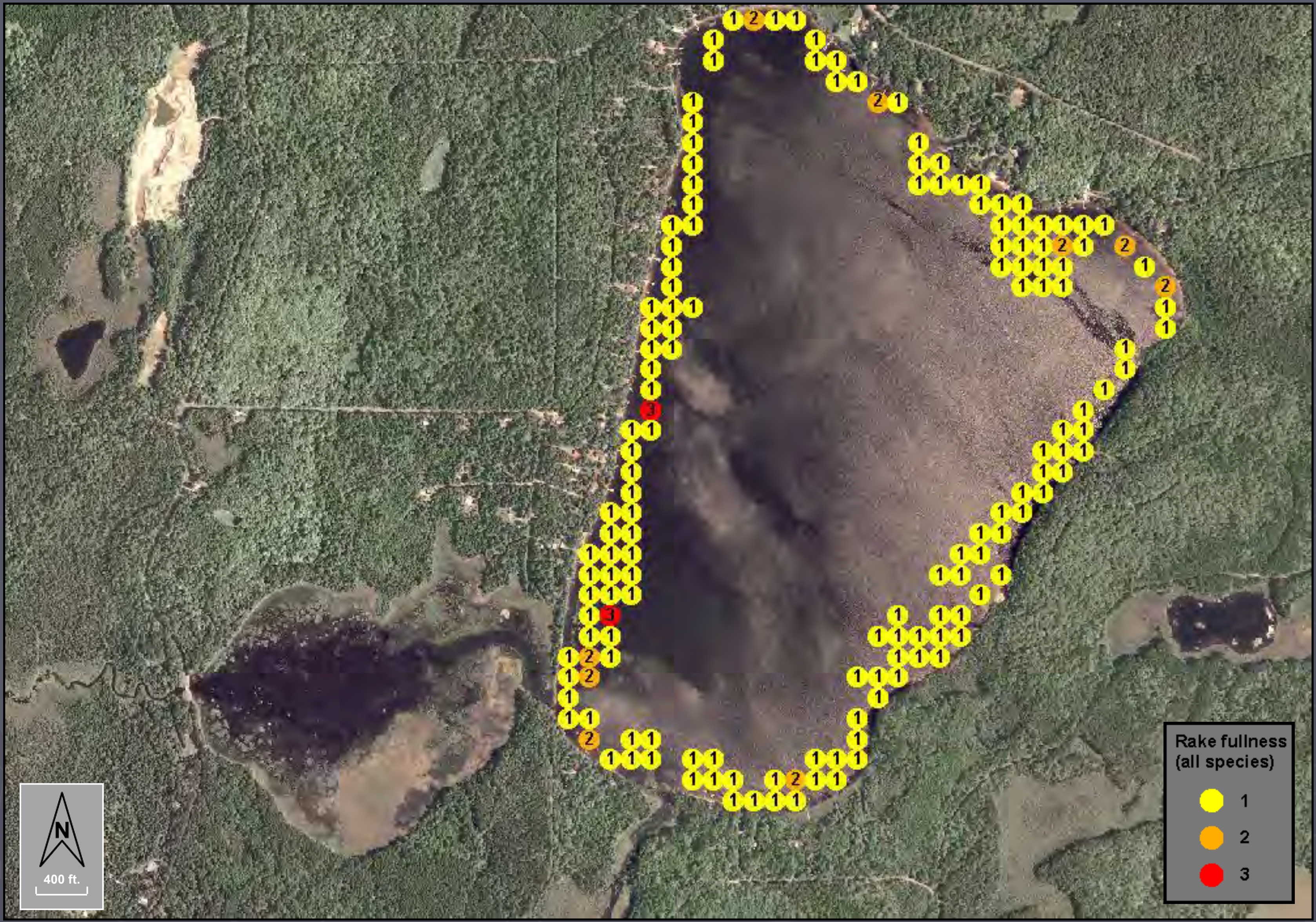


Figure 3. Maximum Depth of Plant Colonization in Sevenmile Lake.

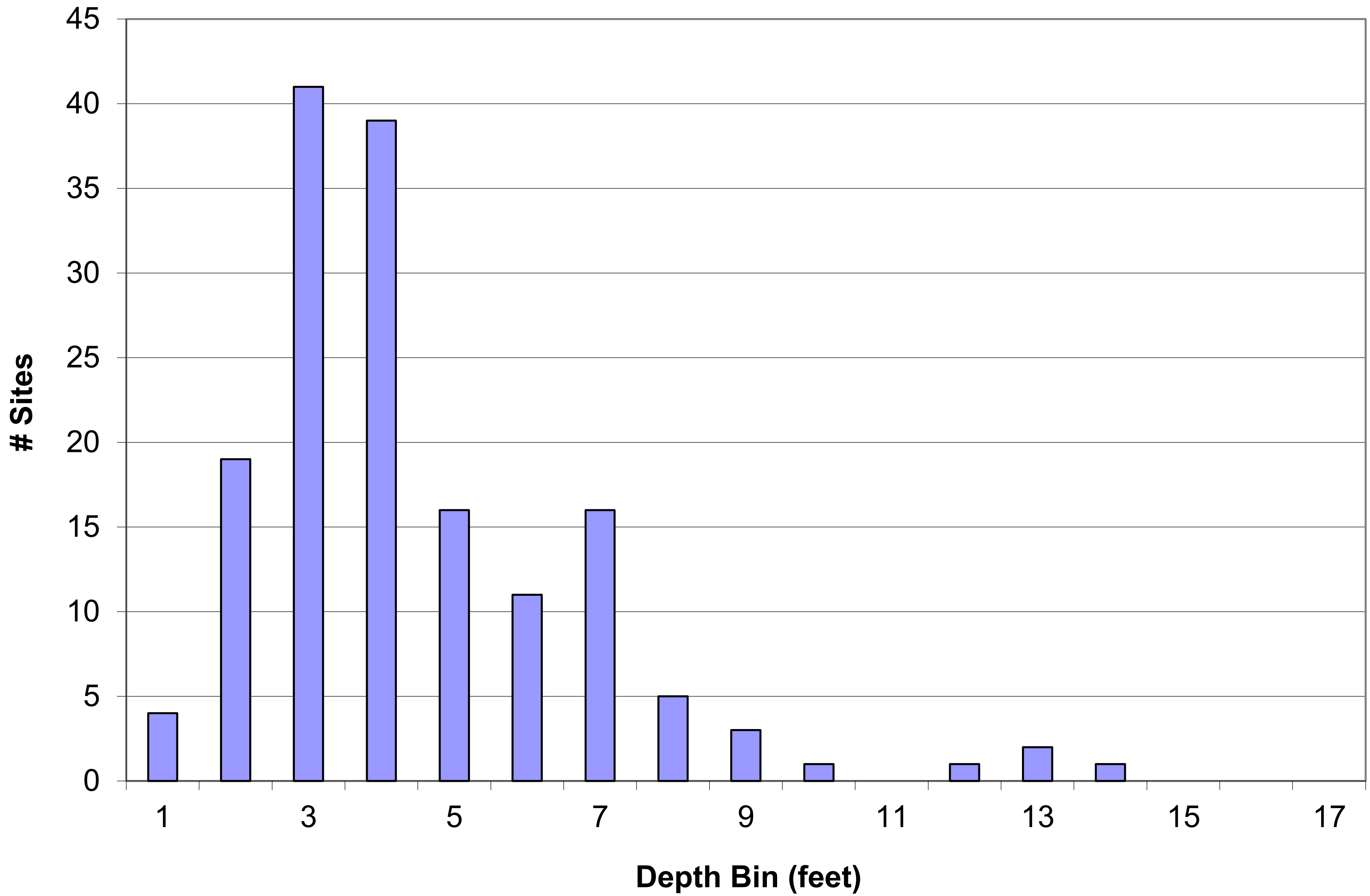


Figure 4. Sevenmile Lake sampling sites less than or equal to maximum depth of rooted vegetation (2012).

Figure 5. Sevenmile Lake substrate encountered at point-intercept plant sampling sites (2012).

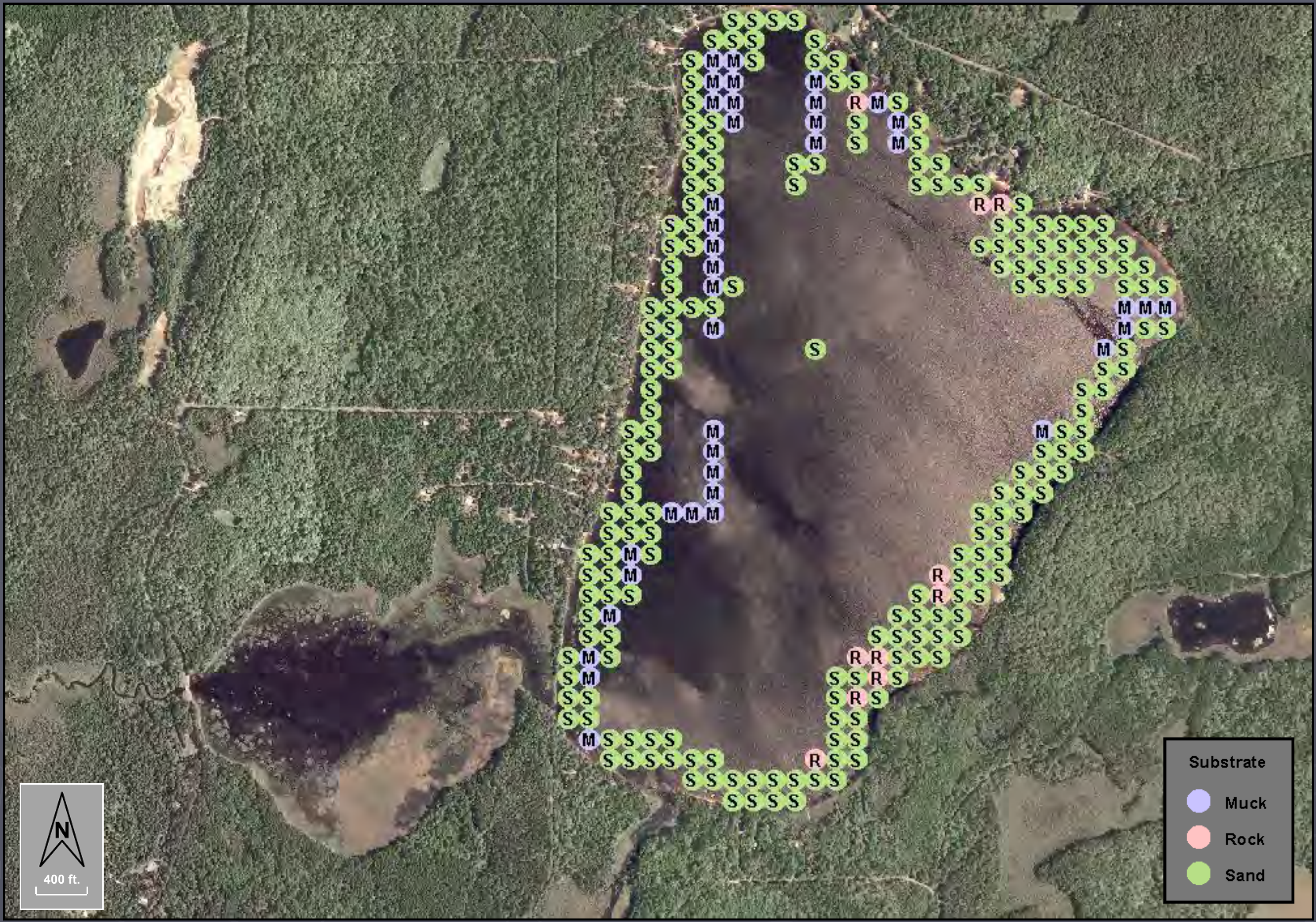


Figure 6. Sevenmile Lake aquatic plant occurrences for 2012 point-intercept survey data.

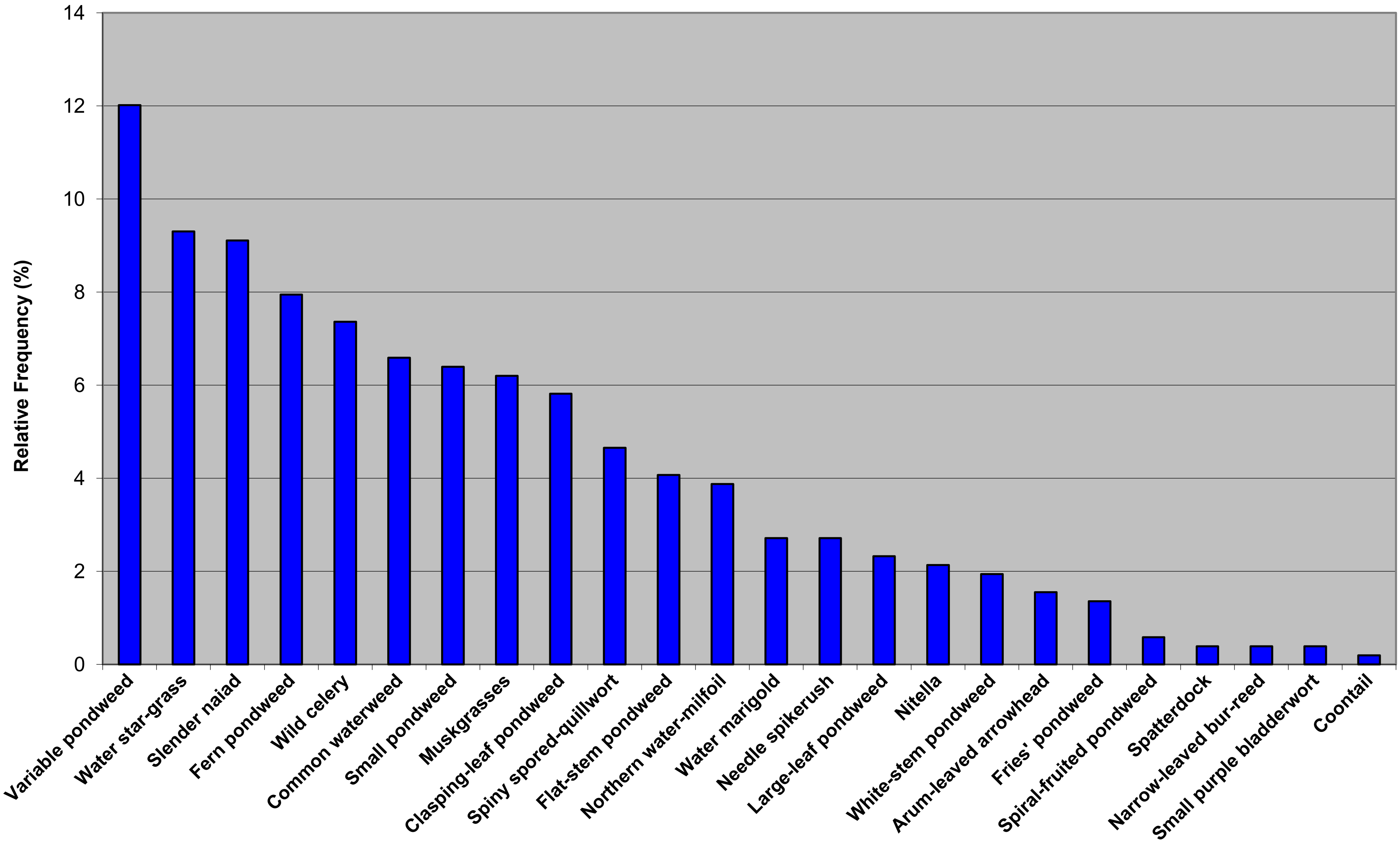


Figure 7. Sevenmile Lake point-intercept plant sampling sites with emergent and floating aquatic plants (2012).

Figure 8. Distribution of plant species, Sevenmile Lake (2012).

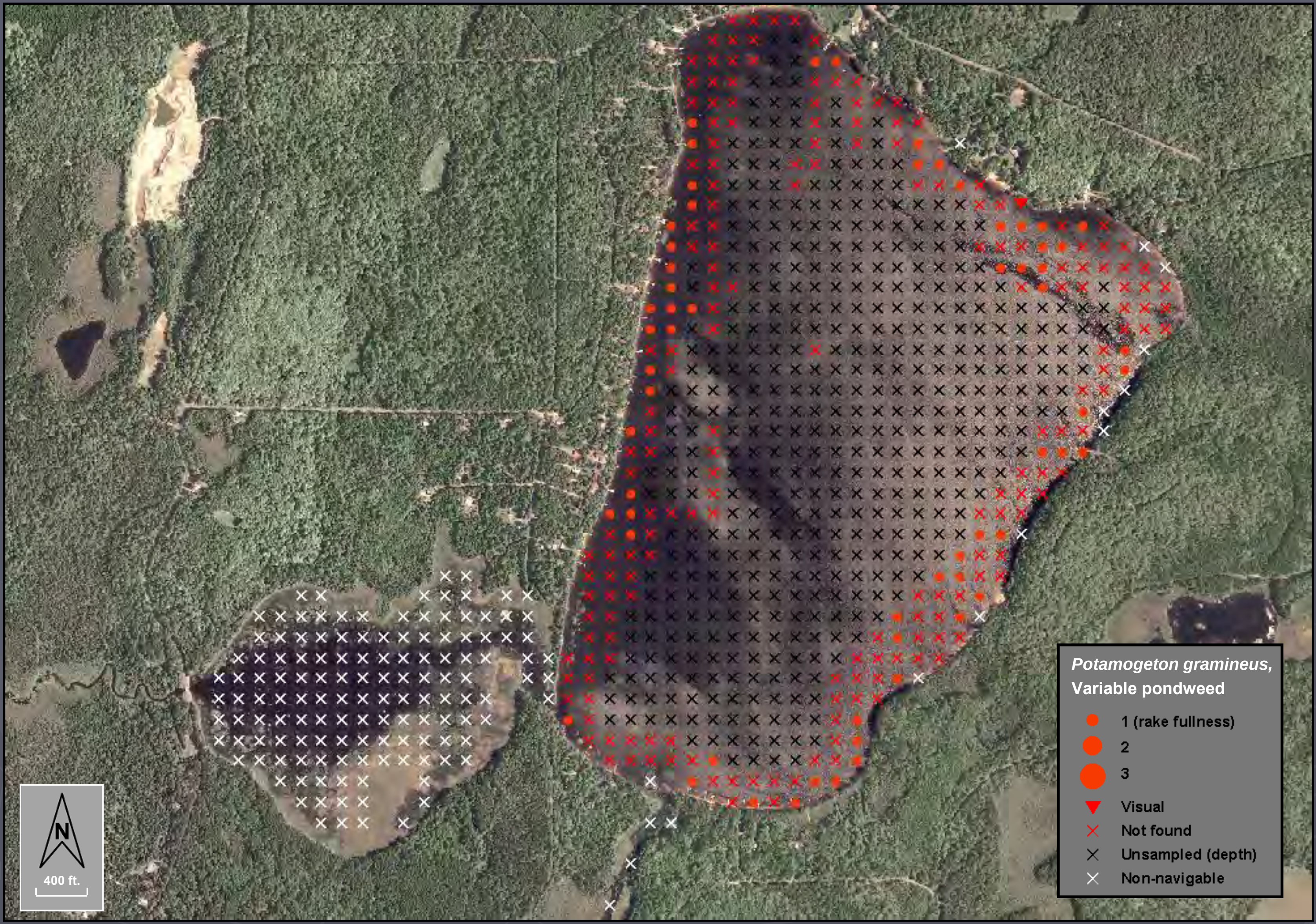


Figure 9. Distribution of plant species, Sevenmile Lake (2012).

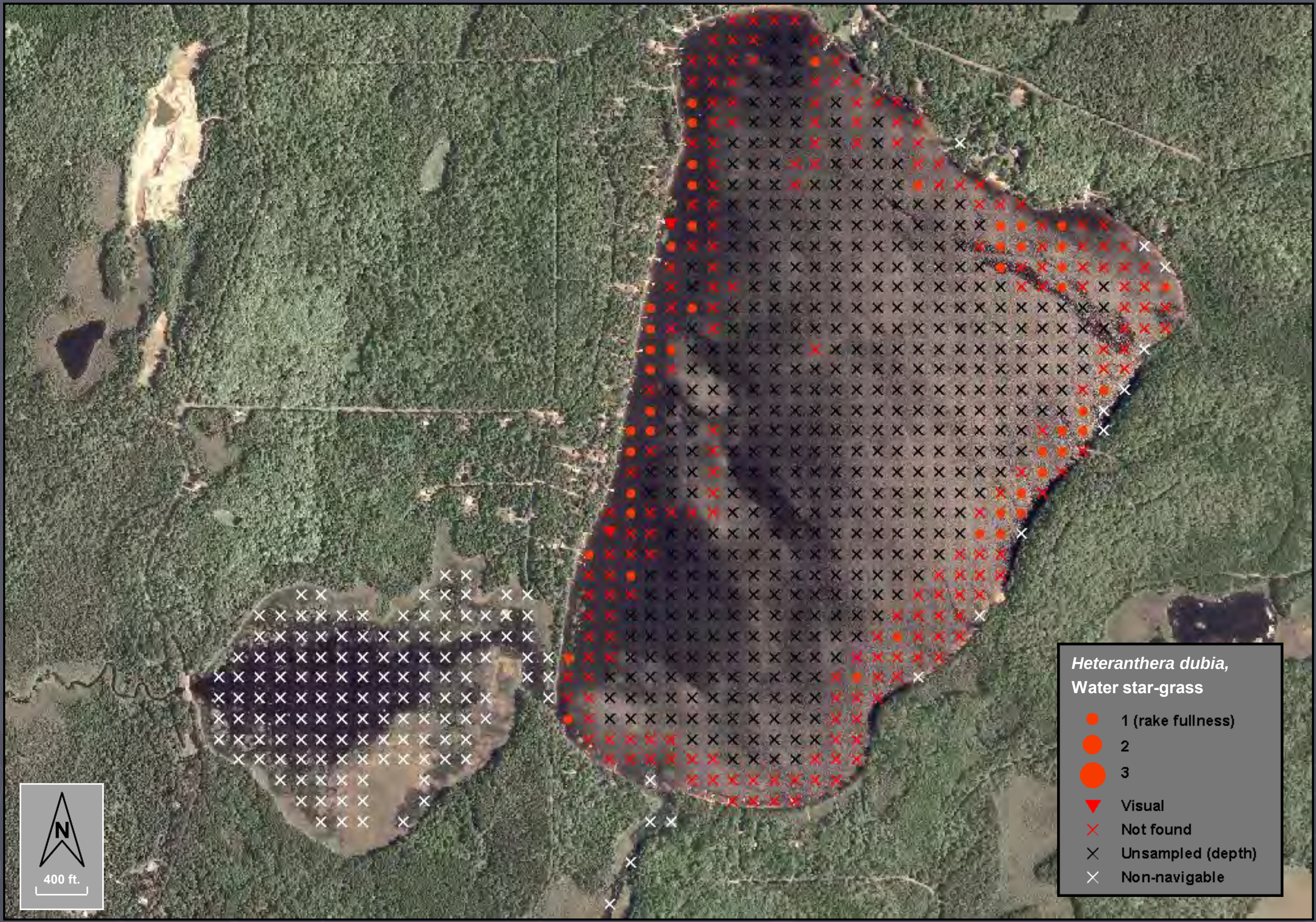


Figure 10. Distribution of plant species, Sevenmile Lake (2012).

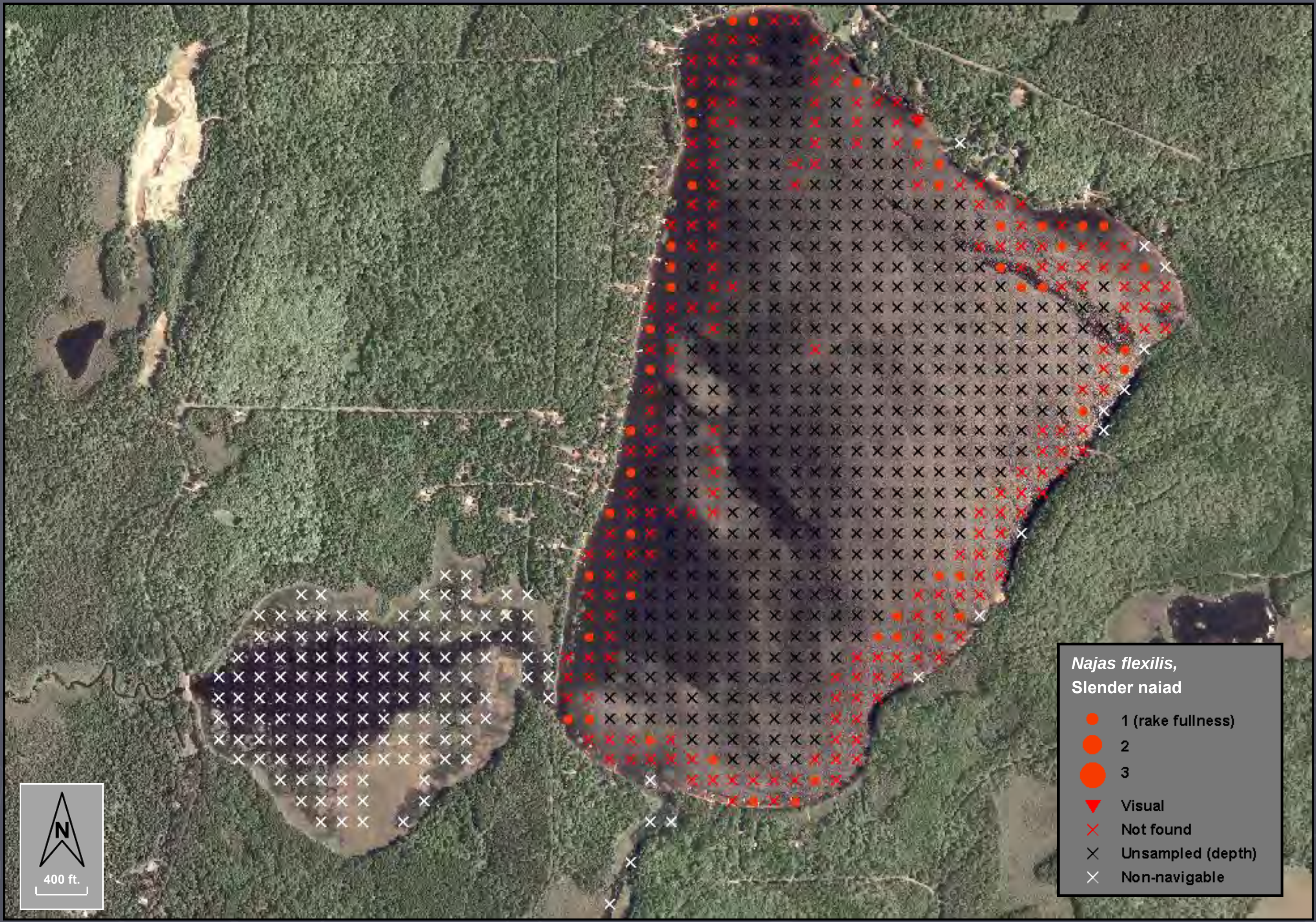


Figure 11. Distribution of plant species, Sevenmile Lake (2012).

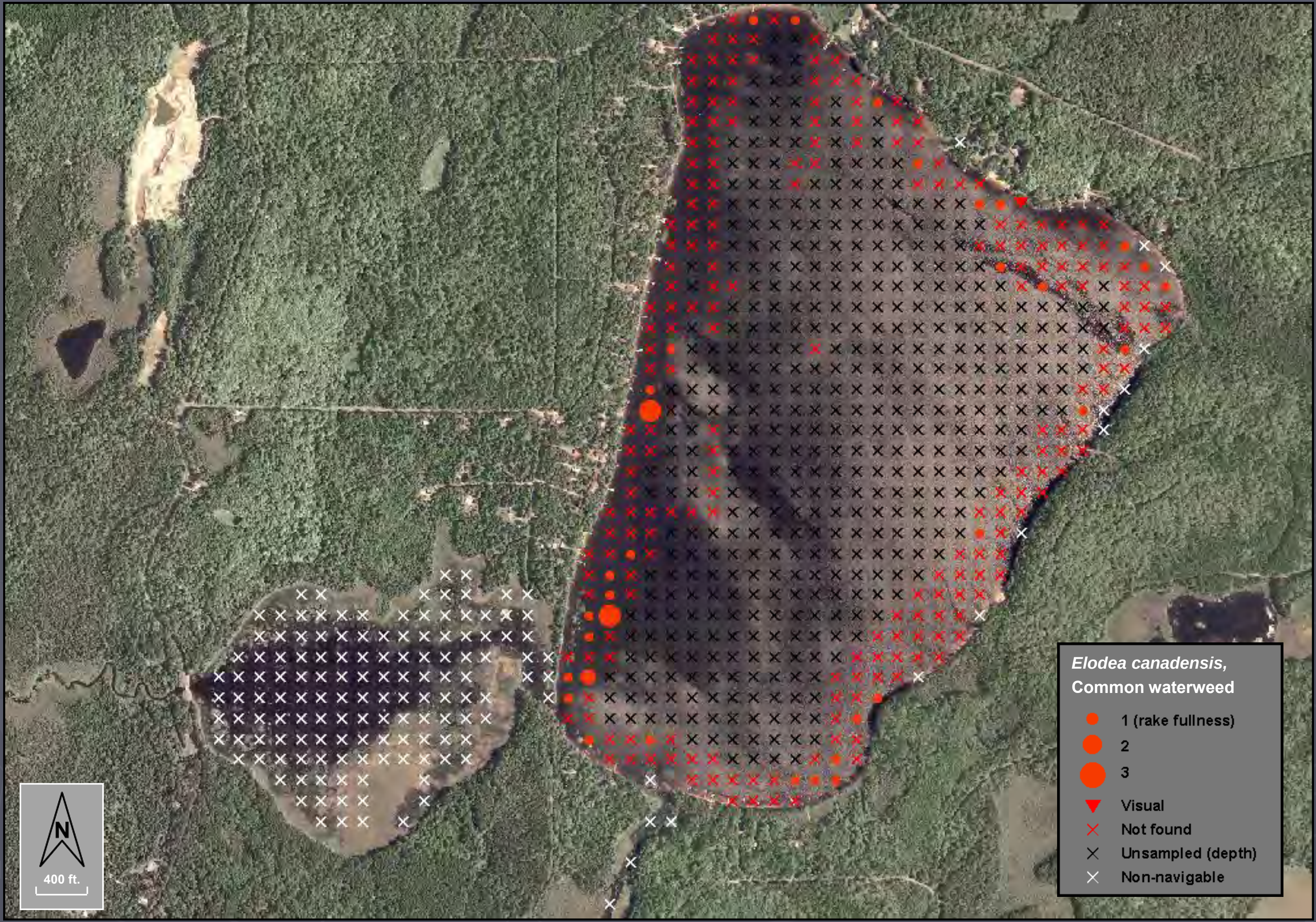


Figure 12. Distribution of plant species, Sevenmile Lake (2012).

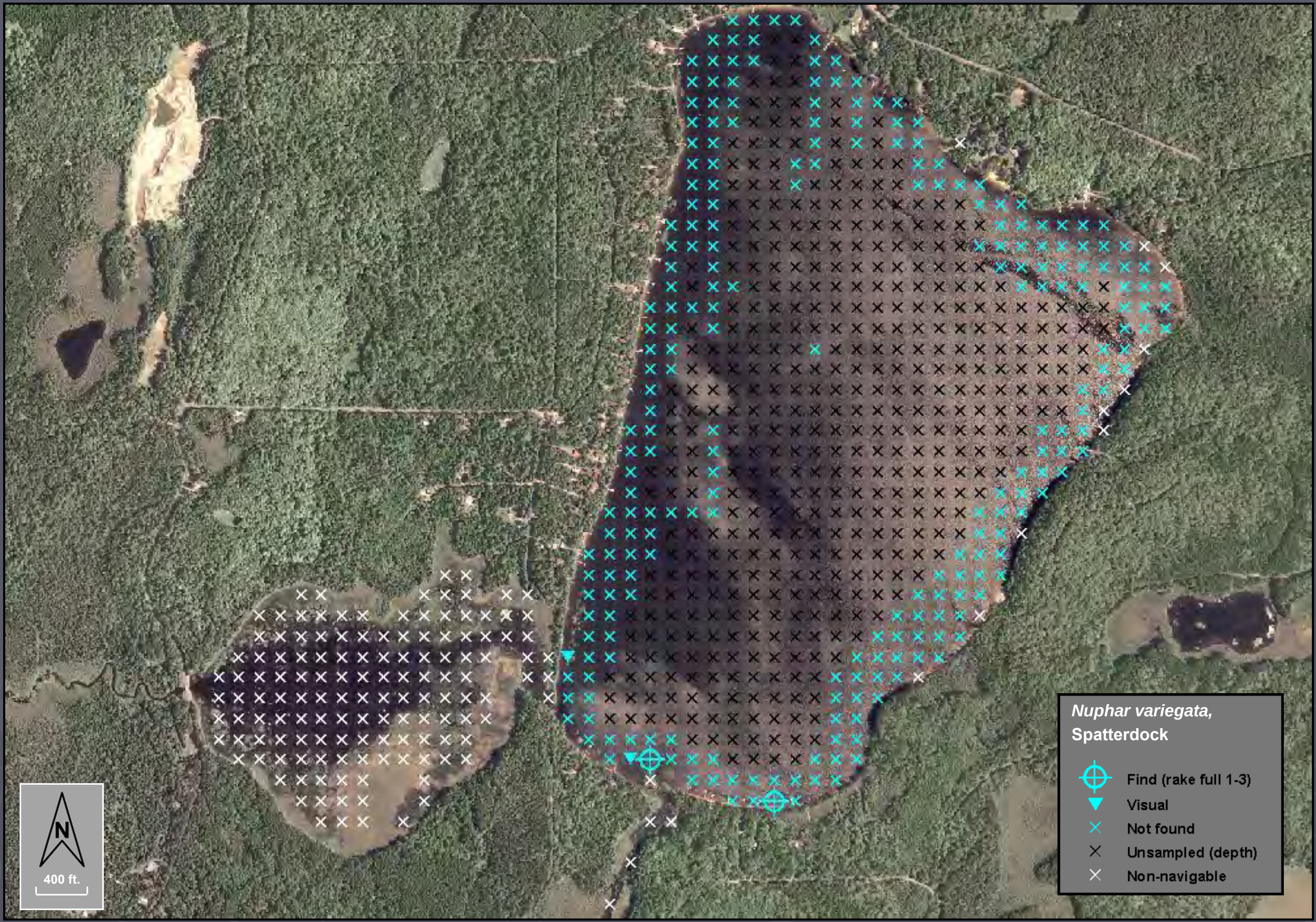


Figure 13. Distribution of plant species, Sevenmile Lake (2012).

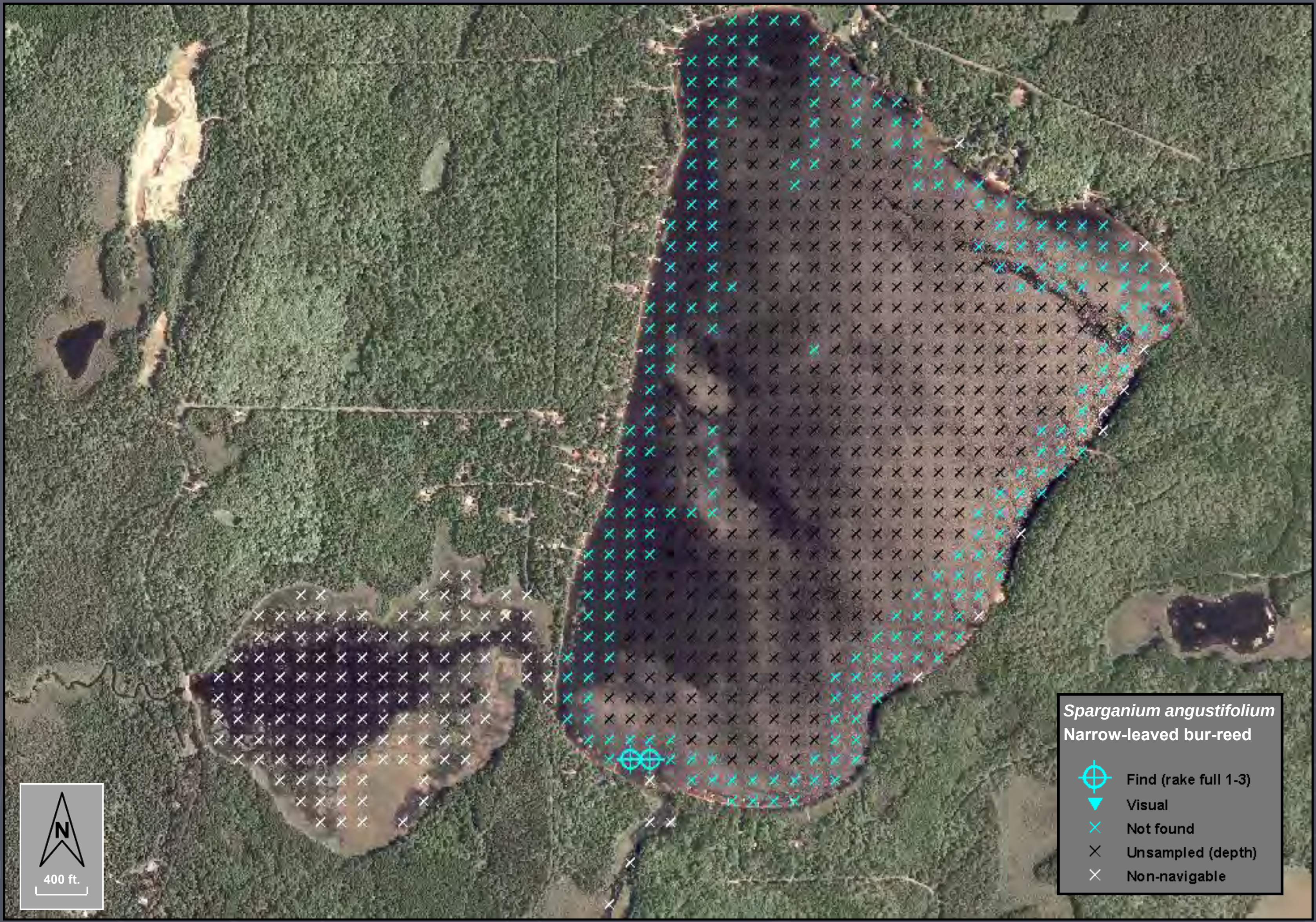


Figure 14. Distribution of plant species, Sevenmile Lake (2012).

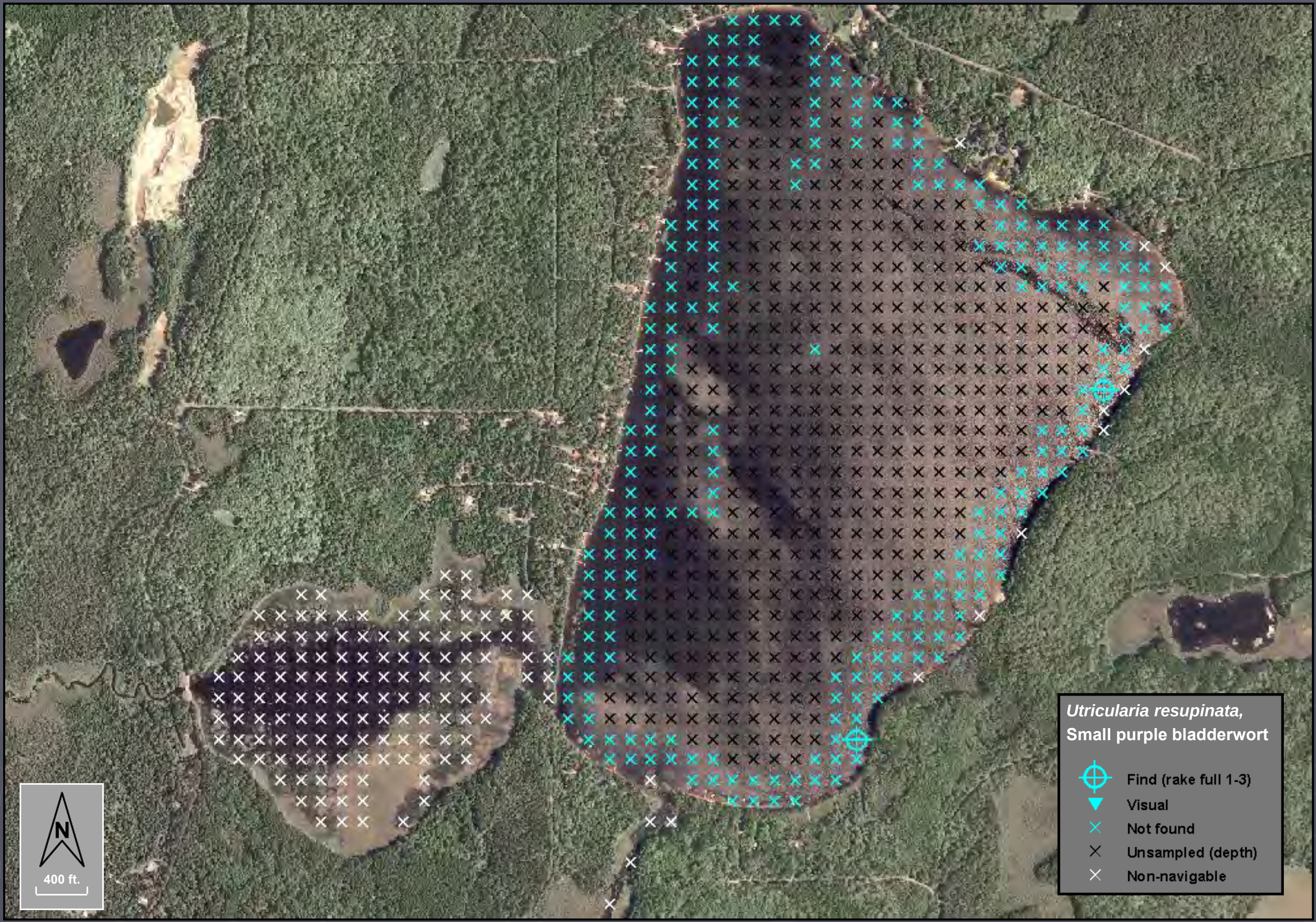
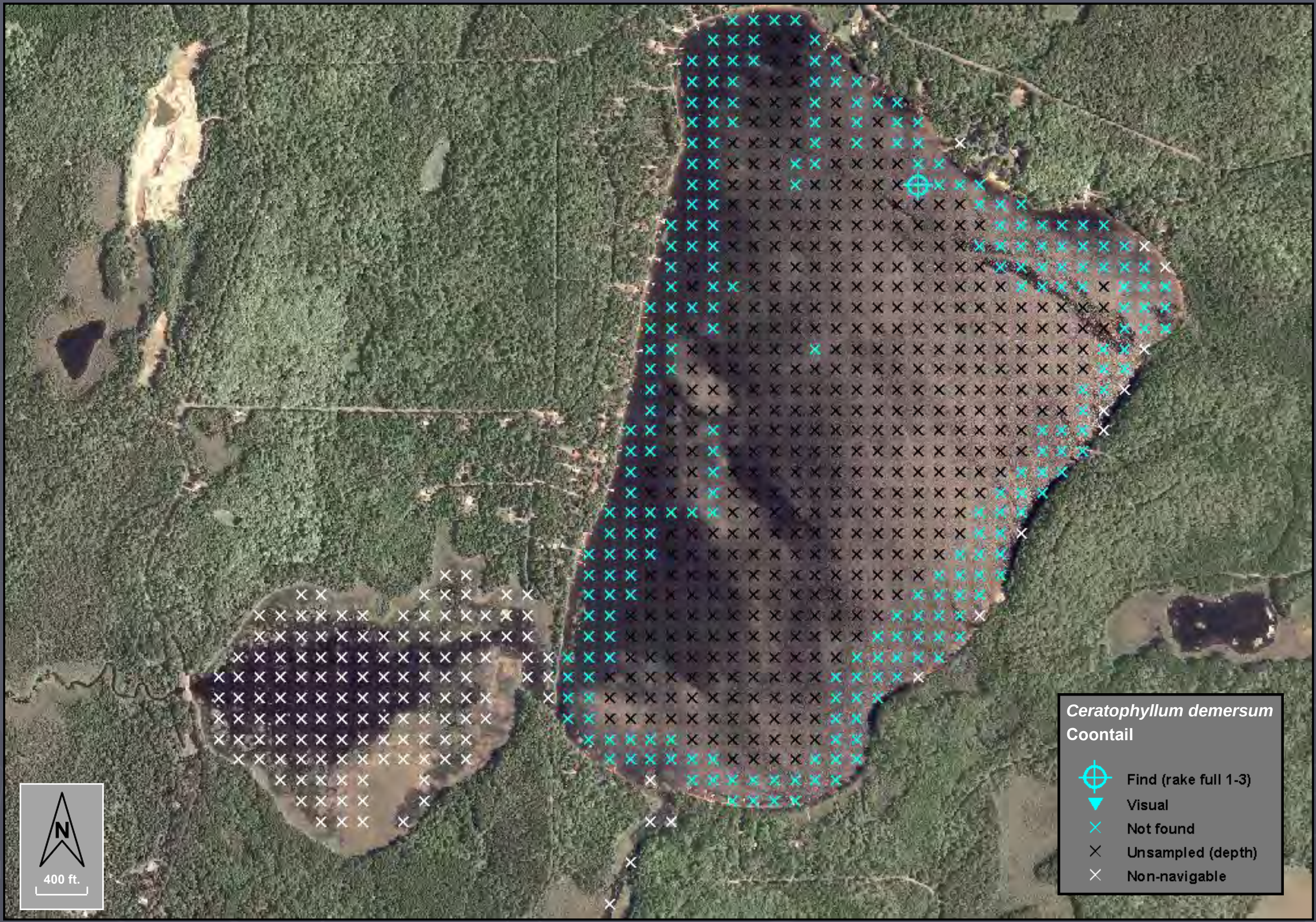


Figure 15. Distribution of plant species, Sevenmile Lake (2012).



Appendix 3

Review of Sevenmile Lake Water Quality

Note: This document is available as Appendix C of the

Sevenmile Lake Adaptive Management Plan

(starts on following page)

Page left intentionally blank

White Water Associates, Inc.

Appendix C

Sevenmile Lake Review of Water Quality

Page left intentionally blank

Appendix C

Review of Lake Water Quality

Table of Contents

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Review of Sevenmile Lake Water Quality

Prepared by Angie Stine, B.S., and Caitlin Clarke, B.S., White Water Associates, Inc.

Introduction

Sevenmile Lake is located on the border of Forest and Oneida County, Wisconsin. It is a 518 acre drainage lake with a maximum depth of 43 feet. The Waterbody Identification Code (WBIC) is 1605800. The purpose of this study is to develop baseline data. Our goal is to collect existing water quality data and continue to monitor Sevenmile Lake for a comparison of environmental and human changes. Existing water quality information dates as far back as 1973. The Wisconsin Valley Improvement Company (WVIC) sampled Sevenmile Lake as part of their quarterly water quality monitoring program from 1973-1976 and from 1979-1983 (WVIC 2016). WVIC conducted baseline TSI monitoring from 2000 to 2002 and again from 2010-2012. Currently, WVIC samples the lake every three years out of ten during the term of their 30-year FERC license (WVIC 2016). Citizen Lake Monitoring has been conducted by volunteers on Sevenmile Lake since 1991. White Water Associates collected water quality samples from 2012 to 2014.

Comparison of Sevenmile Lake with other datasets

Lillie and Mason's *Limnological Characteristics of Wisconsin Lakes* (1983) is a great source to compare lakes within our region to a subset of lakes that have been sampled in Wisconsin. Wisconsin is divided into five regions of sampling lakes. Oneida and Forest County lakes are in the Northeast Region (Figure 1) and were among 243 lakes randomly selected and analyzed for water quality.

Figure 1. Wisconsin regions in terms of water quality.

Temperature

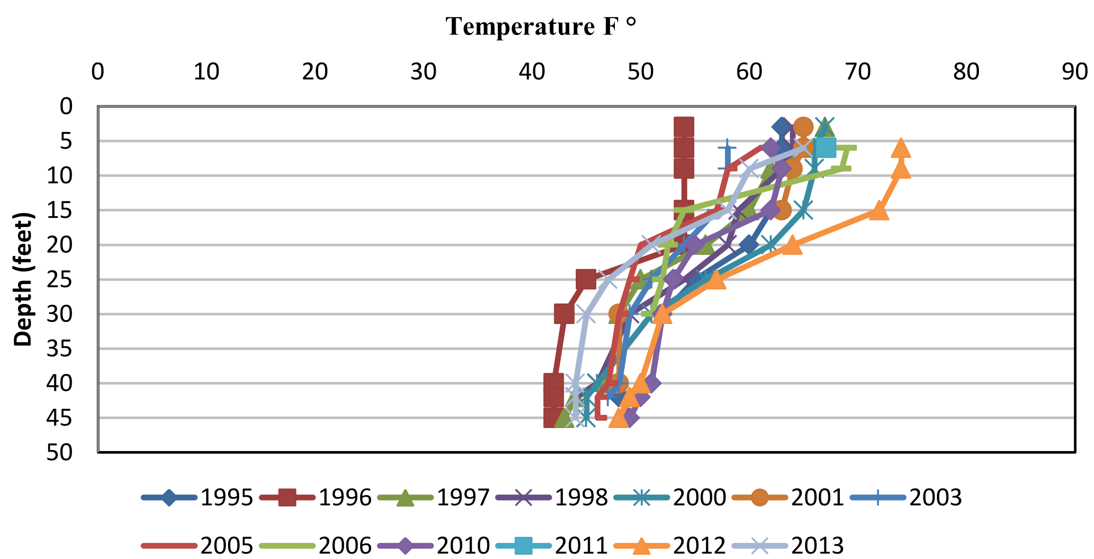
Measuring the temperature of a lake at different depths will determine the influence it has on the physical, biological, and chemical aspects of the lake. Lake water temperature influences the rate of decomposition, nutrient recycling, lake stratification, and dissolved oxygen (D.O.) concentration. Temperature can also affect the distribution of fish species throughout a lake. Table 1 indicates the average, minimum and maximum spring, summer, fall and winter water temperatures in Sevenmile Lake. This data was collected by WVIC from 1972 to 1976 and from 1979 to 1983.

Table 1. Summary of Seven Mile Reservoir Temperature for 1972-1976 and 1979-1983 (WVIC 1983).

Parameter	Spring		Summer		Fall		Winter	
	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
Temperatures (F) (Average, Min-Max)	47.3, 43.88-51.26	44.42, 42.98-47.84	73.04, 69.26-46.64	47.48, 44.6-50.18	50.0, 44.42-60.44	47.66, 44.42-50.54	34.34, 33.8-34.88	38.66, 37.4-39.38

Figure 2 indicates the changes in water temperature in June, from 1995 to 2003, 2005 and 2006, and from 2010 to 2013. Figure 3 indicates the changes in water temperature in July, 1979, and from 1995 to 2003. Figure 4 continues to display July water temperatures from 2004-2014. Figure 5 displays the August water temperatures from 1994 to 2001 and Figure 6 displays from 2004, 2006-2012. Figure 7 indicates the temperature changes in September from 1996, 1998, 1999, from 2002 to 2007, 2009, 2011and 2012. Sevenmile Lake shows stratification in June, July and August. In September, fall mixing occurred and in 1996, 2006, and 2012, when the temperature was consistent from surface to bottom.

Figure 2. Sevenmile Lake temperature Profile, June.



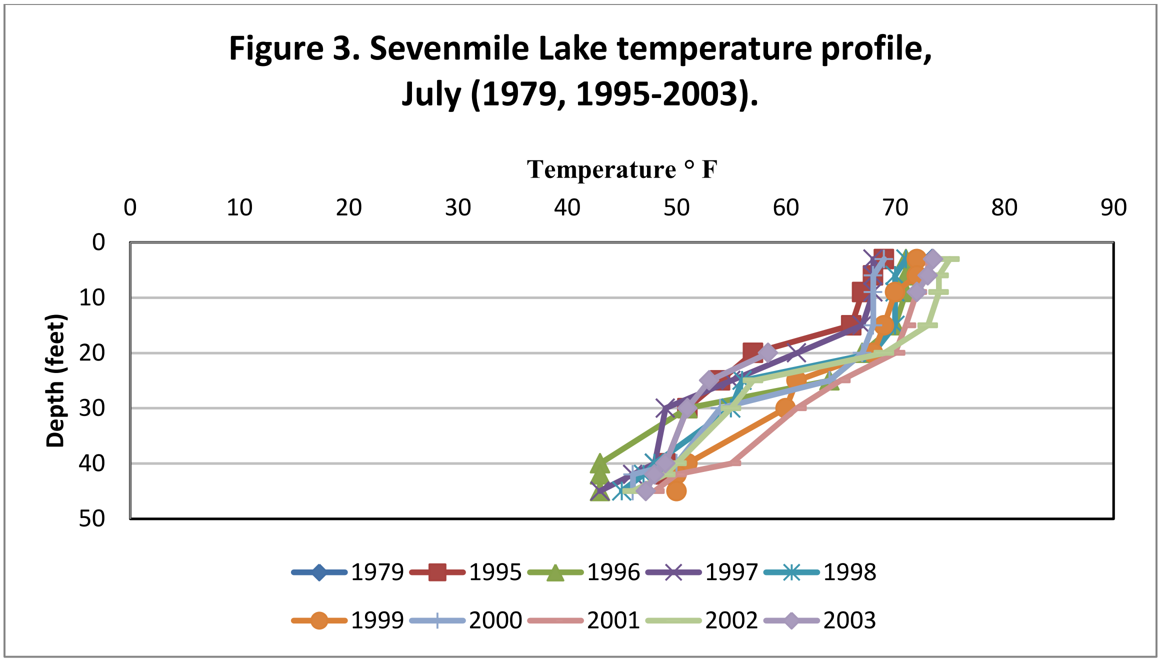


Figure 3. Sevenmile Lake temperature profile, July (1979, 1995-2003).
Temperature ° F
0
10
20
30
40
50
60
70
80
90
Depth (feet)
0
10
20
30
40
50
1979
1995
1996
1997
1998
1999
2000
2001
2002
2003

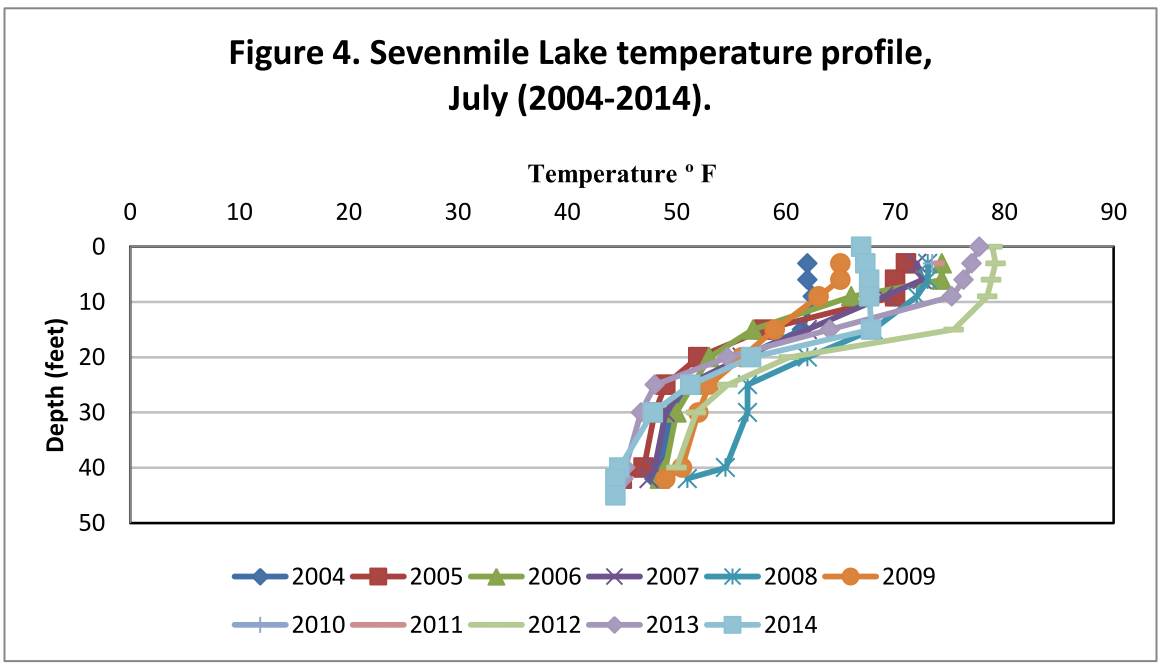


Figure 4. Sevenmile Lake temperature profile, July (2004-2014).
Temperature º F
0
10
20
30
40
50
60
70
80
90
Depth (feet)
0
10
20
30
40
50
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

Figure 5. Sevenmile Lake temperature profile, August (1994-2001).

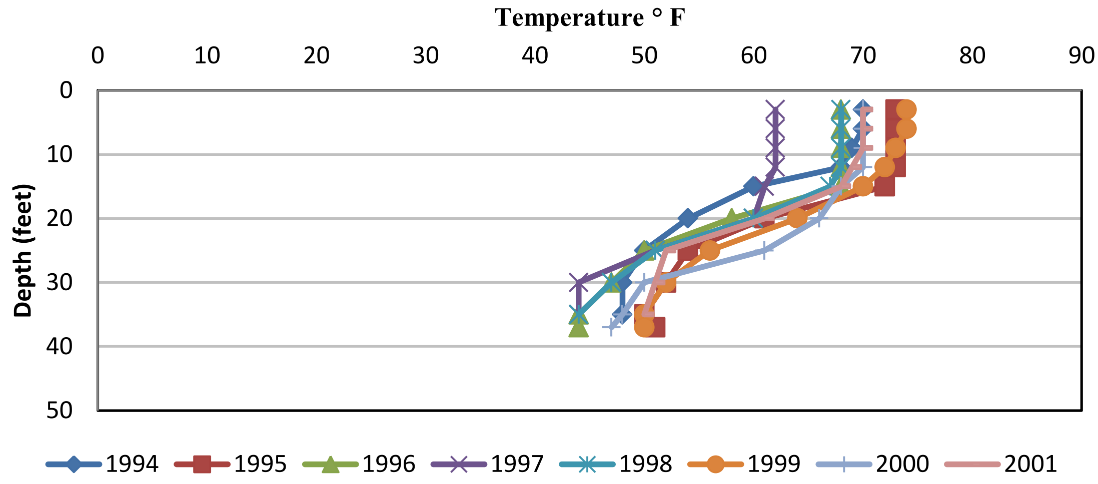


Figure 6. Sevenmile Lake temperature profile, August (2004, 2006-2012).

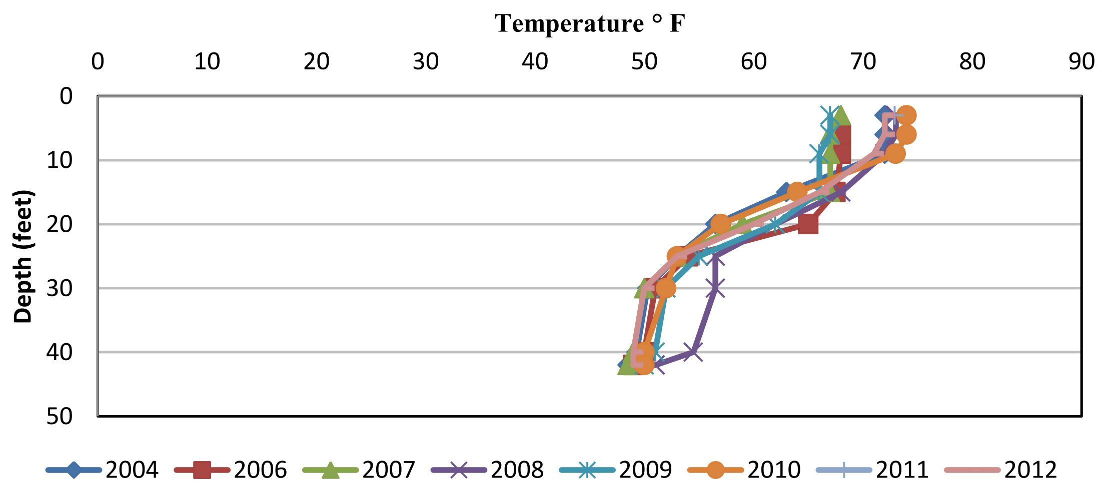
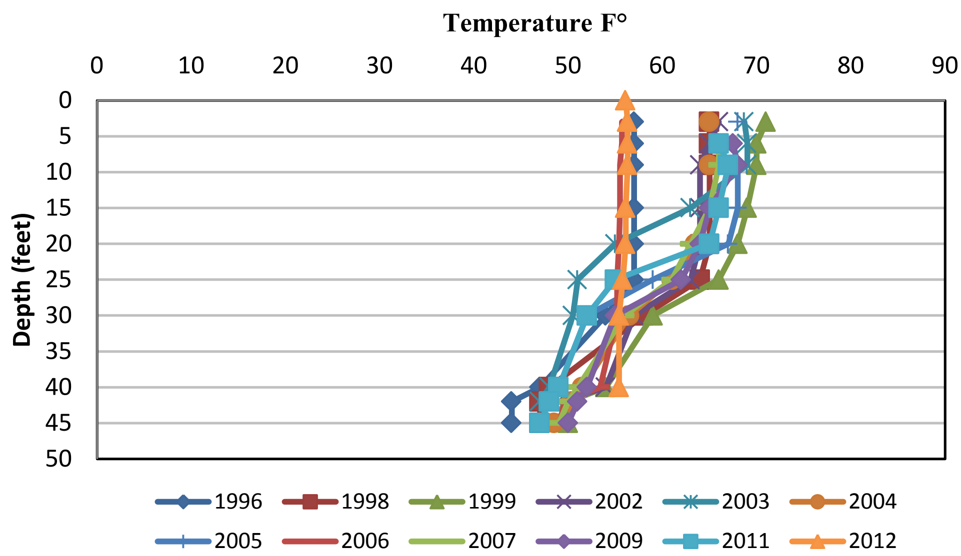


Figure 7. Sevenmile Lake temperature profile, September.



Dissolved Oxygen

The dissolved oxygen (D.O.) content of lake water is vital in determining presence of fish species and other aquatic organisms. Dissolved oxygen also has a strong influence on the chemical and physical conditions of a lake. The amount of dissolved oxygen is dependent on the water temperature, atmospheric pressure, and biological activity. Oxygen levels are increased by aquatic plant photosynthesis, but reduced by respiration of plants, decomposer organisms, fish, and invertebrates. The amount of dissolved oxygen available in a lake, particularly in the deeper parts of a lake, is critical to overall health. Table 2 indicates the average, minimum and maximum spring, summer, fall and winter dissolved oxygen levels in Sevenmile Lake, collected by WVIC from 1972 to 1976 and from 1979 to 1983.

Table 2. Summary of Seven Mile Reservoir Dissolved Oxygen from 1972-1976 and 1979-1983 (WVIC 1983).

Parameter	Spring		Summer		Fall		Winter	
	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
D.O. (mg/L) Average, Min-Max	10.8, 10.4-11.5	10.2, 9.2-10.6	8.2, 7.7-8.5	0.1, 0.1-0.3	9.2, 8.2-9.7	7.1, 0.1-9.7	11.6, 10.7-12.7	3.1, 0.1-9.1

Throughout sampled years, the D.O. levels were sufficient and began to taper off around 15 feet (Figure 8 (2009-2011) and Figure 9 (2012-2014)). D.O. levels were highest in February, 2013 with 12.0 mg/L at the surface. This is typical in winter months.

Figure 8. Sevenmile Lake dissolved oxygen profile, 2009-2011.

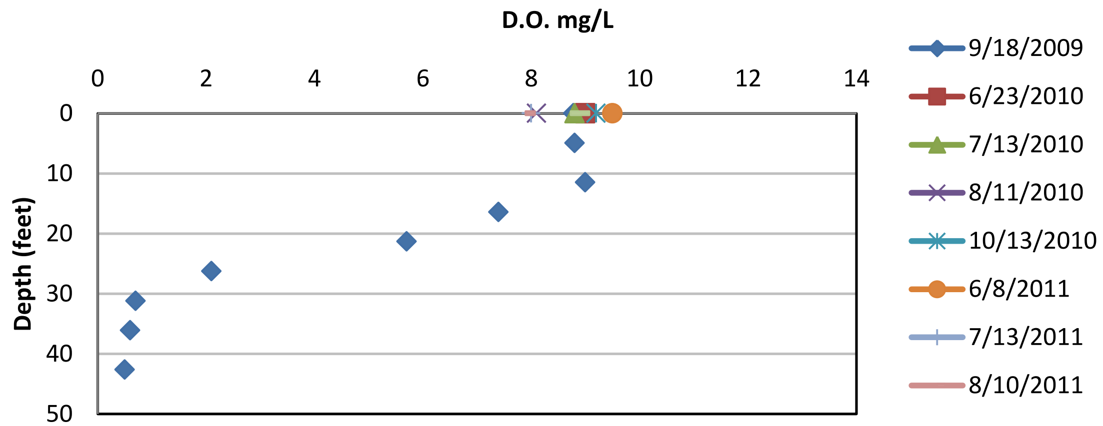
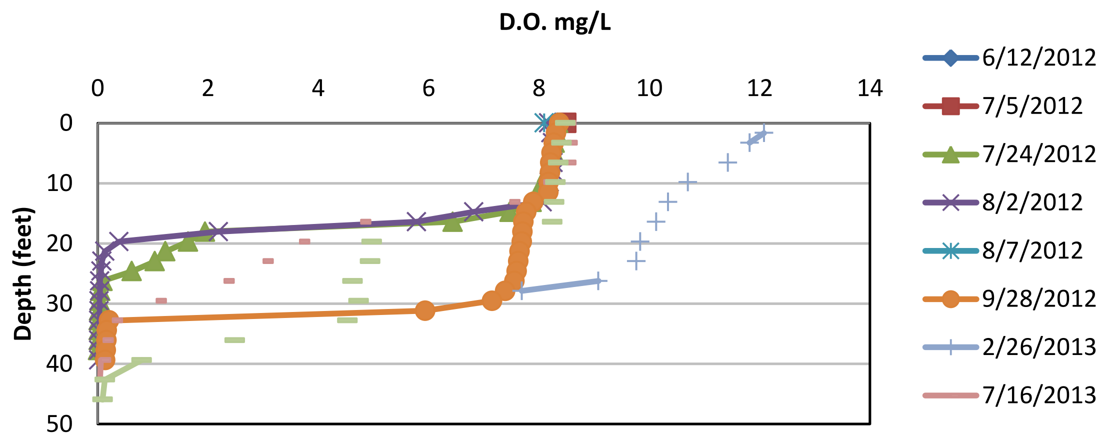


Figure 9. Sevenmile Lake dissolved oxygen profile, 2012-2014.

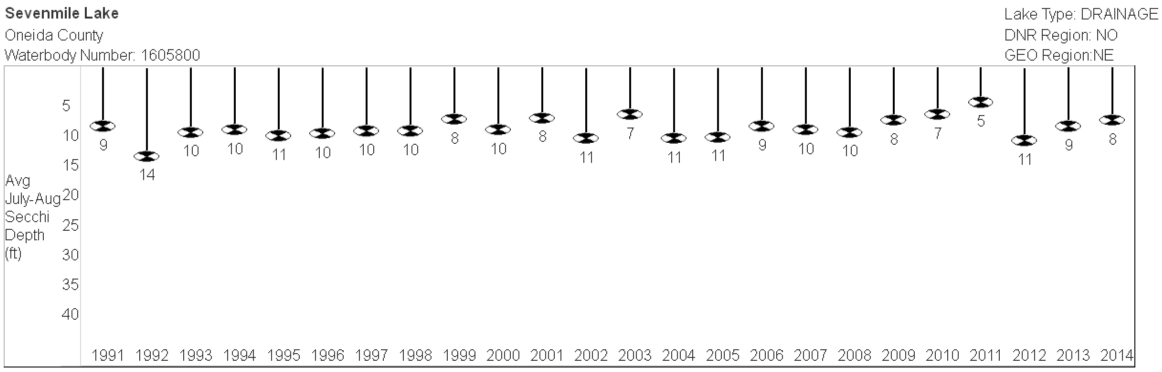


Water Clarity

Water clarity has two main components: turbidity (suspended materials such as algae and silt) and true color (materials dissolved in the water) (Shaw et al., 2004). Water clarity gives an indication of the overall water quality in a lake. Water clarity is typically measured using a Secchi disk (black and white disk) that is lowered into the water column on a tether. In simple terms, the depth at which the disk is no longer visible is recorded as the Secchi depth.

Figure 10 displays the July and August mean Secchi depths from 1991 to 2014. The shallowest mean Secchi depth was 5 feet in 2011, and the deepest mean depth was at 14 feet in 1992 (Figure 11). According to Table 3, Sevenmile Lake is considered “fair” with respect to 2014 water clarity.

Figure 10. Sevenmile Lake Secchi depth averages (July and August only).



(WDNR, 2014b)

Figure 11. Sevenmile Lake's July and August Secchi Data (1986-2014).

Year	Secchi Mean	Secchi Min	Secchi Max	Secchi Count
1991	8.92	8	10	6
1992	14	12.25	16.25	3
1993	10	10	10	1
1994	9.63	8.75	11.25	4
1995	10.67	9	12.25	3
1996	10.11	9	11.25	7
1997	9.75	8.25	11.25	2
1998	9.88	9.25	10.5	2
1999	7.88	7.5	8.25	2
2000	9.63	9.5	9.75	2
2001	7.67	6	9	3
2002	11	11	11	1
2003	7	7	7	1
2004	11	11	11	2
2005	10.75	10.75	10.75	1
2006	9	8	10	2
2007	9.5	9	10	2
2008	10	10	10	1
2009	8	8	8	3
2010	7	7	7	1
2011	5	5	5	2
2012	11.38	8	13.5	4
2013	9	8	9.5	3
2014	8	8	8	1

(WDNR, 2014b)

Table 3. Water clarity index (Shaw et al., 2004).

Water clarity	Secchi depth (ft.)
Very poor	3
Poor	5
Fair	7
Good	10
Very good	20
Excellent	32

Turbidity

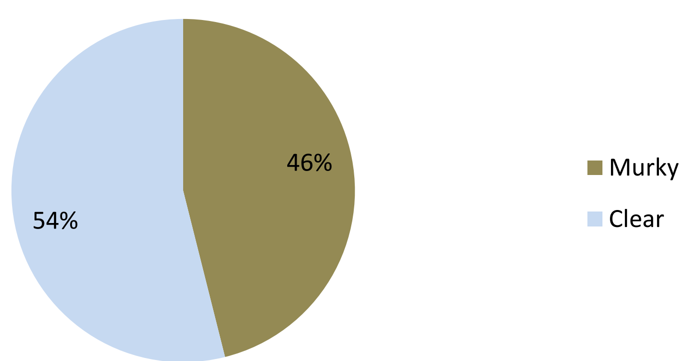
Turbidity is another measure of water clarity, but is caused by suspended particulate matter rather than dissolved organic compounds (Shaw et al., 2004). Particles suspended in the water dissipate light and reduce the depth at which the light can penetrate. This affects the depth at which plants can grow. Turbidity also affects the aesthetic quality of water. Water that runs off the watershed into a lake can increase turbidity by introducing suspended materials. Turbidity caused by algae is the most common reason for low Secchi readings (Shaw et al., 2004). In terms of biological health of a lake ecosystem, measurements less than 10 Nephelometric Turbidity Units (NTU) represent healthy conditions for fish and other organisms. Sevenmile Lake had a turbidity of 0.2 NTU at 1 meter from the surface and 9 NTU at 1 meter from the bottom in July, 1979 (WVIC, 1983). Table 4 indicates the average, minimum and maximum spring, summer, fall and winter turbidity levels in Sevenmile Lake, collected by WVIC from 1972 to 1976 and from 1979 to 1983.

Table 4. Summary of Seven Mile Reservoir Turbidity from 1972-1976 and 1979-1983 (WVIC 1983).

Parameter	Spring		Summer		Fall		Winter	
	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
Turbidity (NTU), Average, Min-Max	0.6, 0.2-1.1	0.8, 0.3-1.1	0.4, 0.1-1.2	8.5, 8.2-9.0	2.7, 0.1-8.9	2.8, 0.1-9.7	1.1, 0.3-2.0	7.5, No min. or max.

While collecting water clarity samples, CLMN volunteers also rated the water clarity and described the water as “clear” or “murky.” Since 1996, 54% of volunteers described the water as “clear” (Figure 12).

Figure 12. Sevenmile Lake water column appearance, 1996-2013.



Water Color

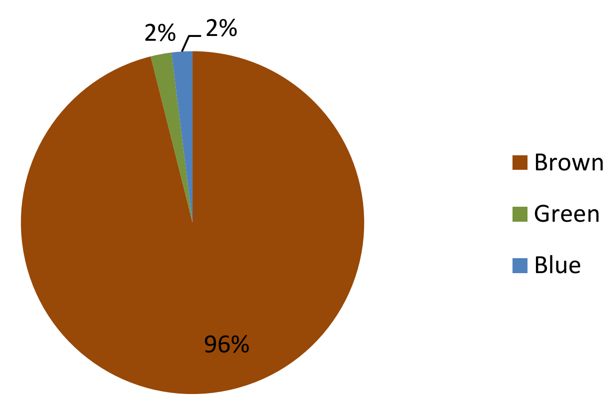
Color of lake water is related to the type and amount of dissolved organic chemicals. Its main significance is aesthetics, although it may also influence light penetration and in turn affect aquatic plant and algal growth. Many lakes have naturally occurring color compounds from decomposition of plant material in the watershed (Shaw et al., 2004). Units of color are determined from the platinum-cobalt scale and are therefore recorded as Pt-Co units. Shaw states that a water color between 0 and 40 Pt-Co units is low. Sevenmile Lake had color samples recorded in the SWIMS database in July, 1979 (35 Pt-Co) and in July, 2012 (15 Pt-Co). Table 5 indicates the average, minimum and maximum spring, summer, fall and winter color levels observed in Sevenmile Lake, collected by WVIC from 1972 to 1976 and from 1979 to 1983.

Table 5. Summary of Seven Mile Reservoir Color from 1972-1976 and 1979-1983 (WVIC 1983).

Parameter	Spring		Summer		Fall		Winter	
	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
Color (Pt-Co), Average, Min-Max	60, 50-75	56, 40-75	48, 31-75	146, 60-225	59, 40-75	98, 44-200	55, 32-70	102, 35-138

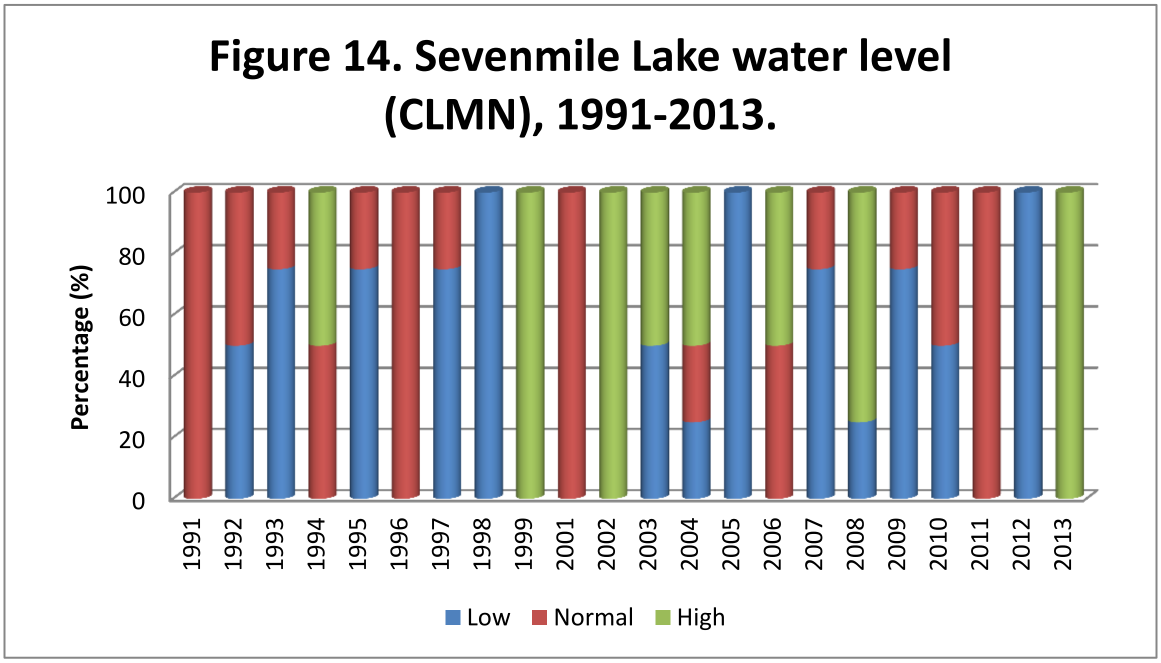
CLMN volunteers provided their opinion on the water color and recorded it as "brown," "blue," or "green." The majority of volunteers viewed Sevenmile Lake water as "brown" (Figure 13).

Figure 13. Sevenmile Lake visual water color, 1991-2013.



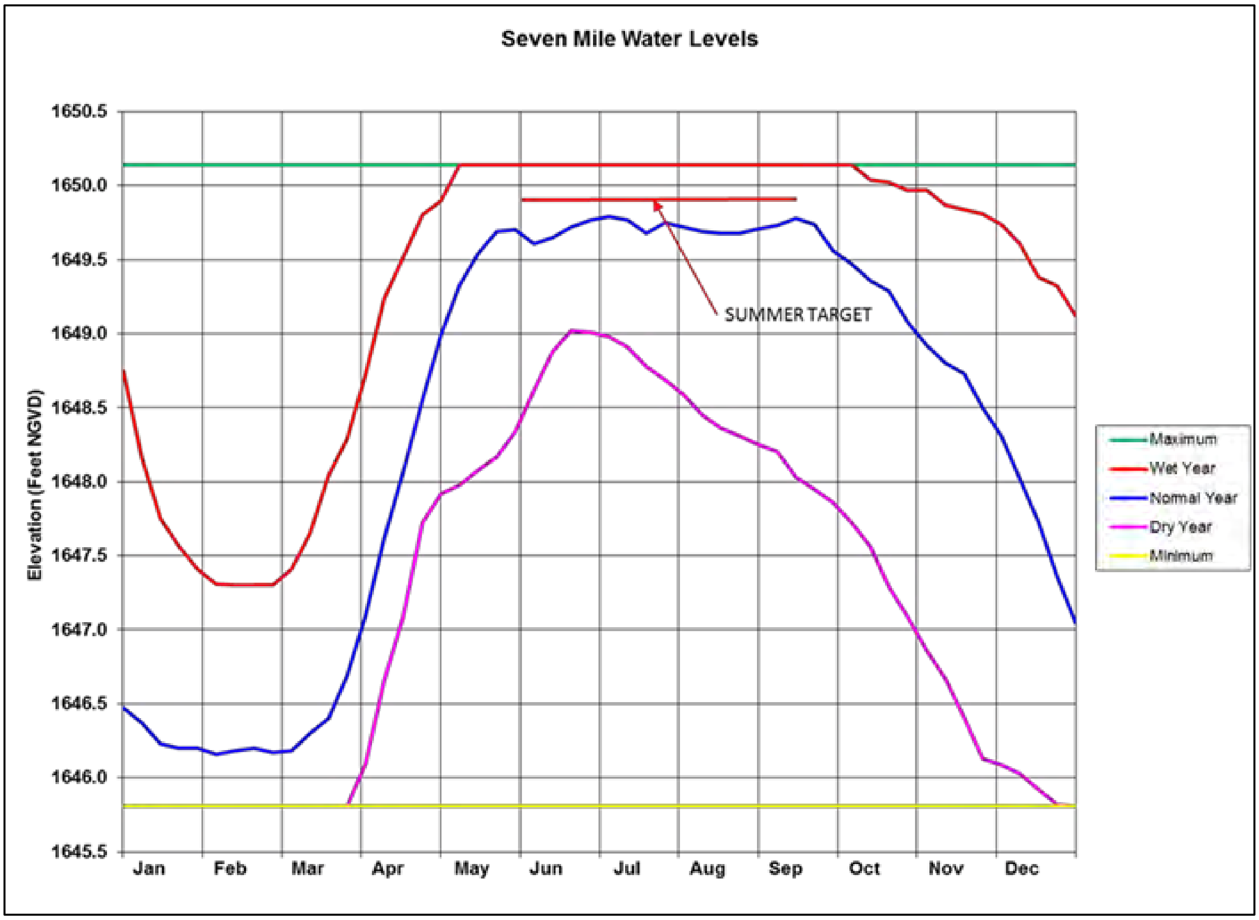
Water Level

CLMN volunteers recorded the lake level as "high," "normal," or "low." Figure 14 shows that in 1991, 1996, and 2011, 100% of volunteers viewed Sevenmile Lake as having "normal" water levels. In 1998 and 2012, all volunteers viewed the water levels as "low." In 1999, 2002, and 2013 volunteers said the water level appeared "high."



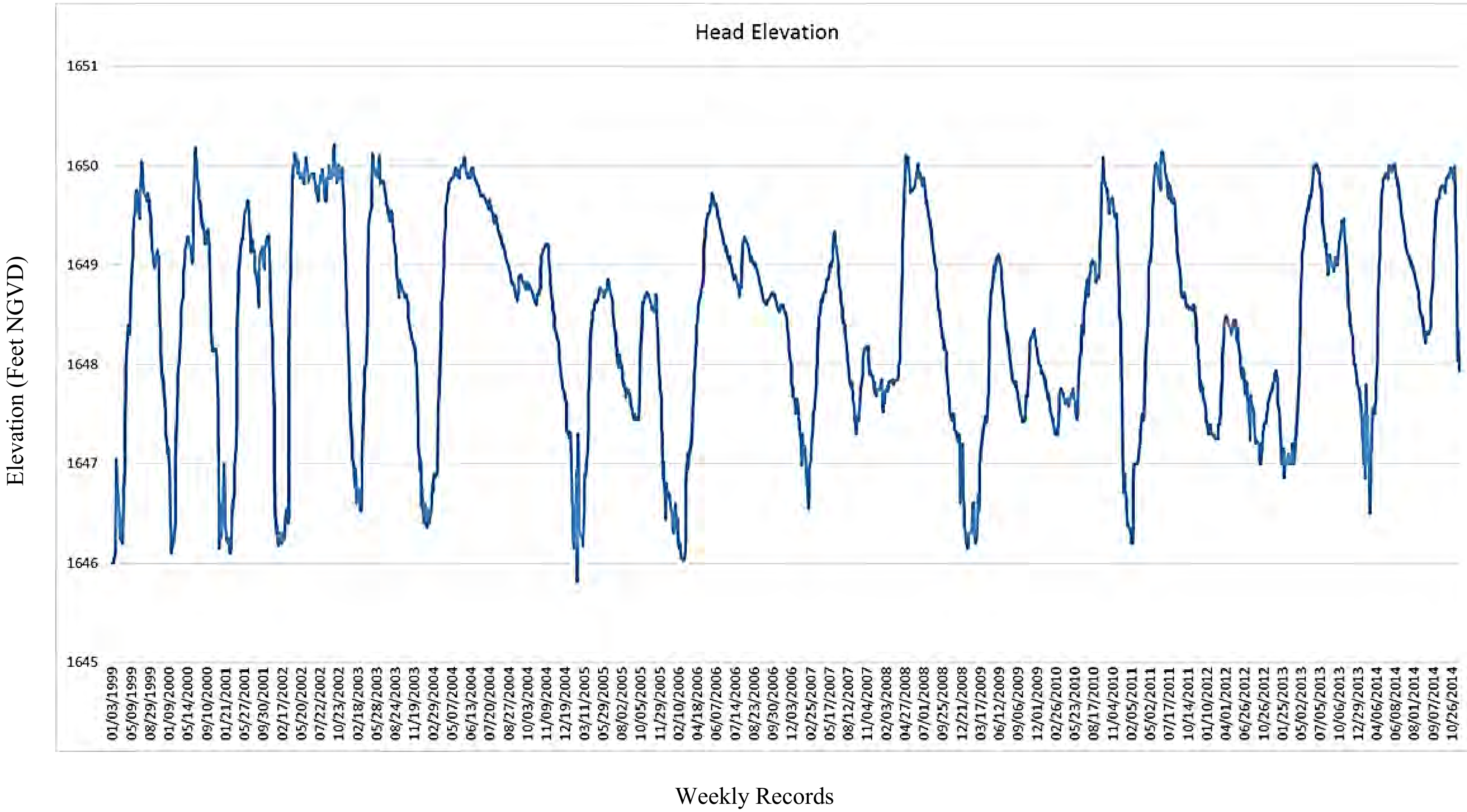
CLMN observations water level are beneficial to record, but it should be noted that differences in perception may change depending on the time of year when observations are recorded or seasonal fluctuations. Figure 15 illustrates the expected water levels during wet, normal and dry years.

Figure 15. Expected Water Levels of Sevenmile Lake in Wet, Normal or Dry Years (WVIC 2016).



The Wisconsin Valley Improvement Company records weekly water levels (elevation) for many reservoirs on the Wisconsin River, including Sevenmile Lake. They also record the volume of the reservoir and any gain or losses observed during that time. Figure 16 displays Sevenmile Lake's weekly water level data from 2012 to 2015. For more information about Sevenmile Lake's dam data, visit http://www.wvic.com/index.cfm.

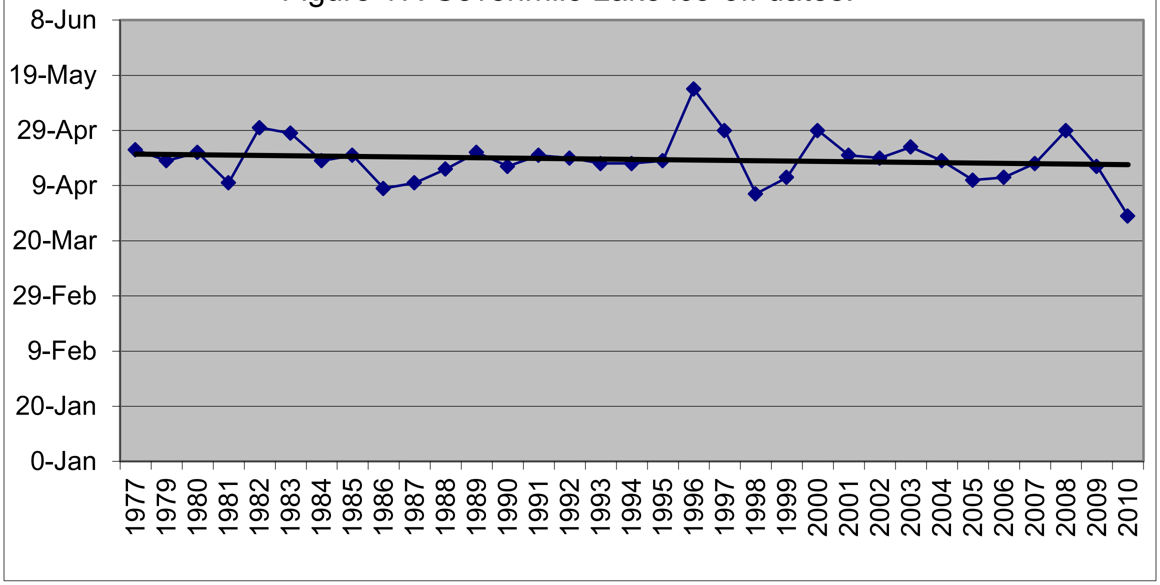
Figure 16. Weekly Water Levels (Elevation) of Sevenmile Lake, 1999-2014, collected by WVIC (2016).



Ice-off

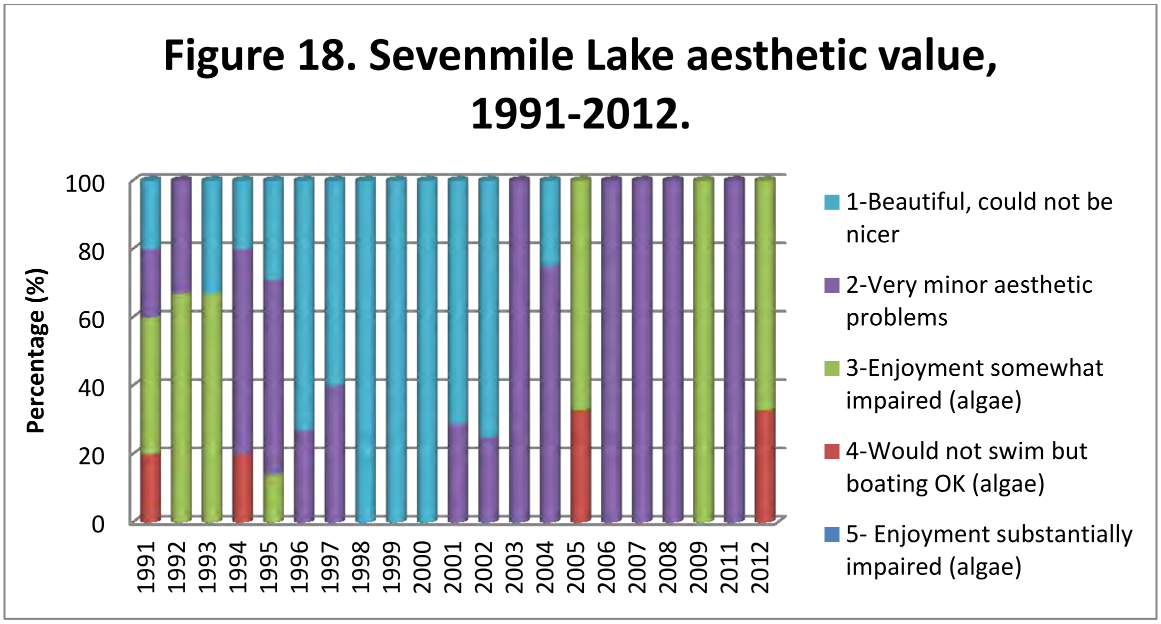
CLMN volunteers have measured the ice-off date for Sevenmile Lake from 1977 to 2010 (Figure 17). On average, the ice-off date for Sevenmile Lake is in the second week of April.

Figure 17. Sevenmile Lake ice-off dates.



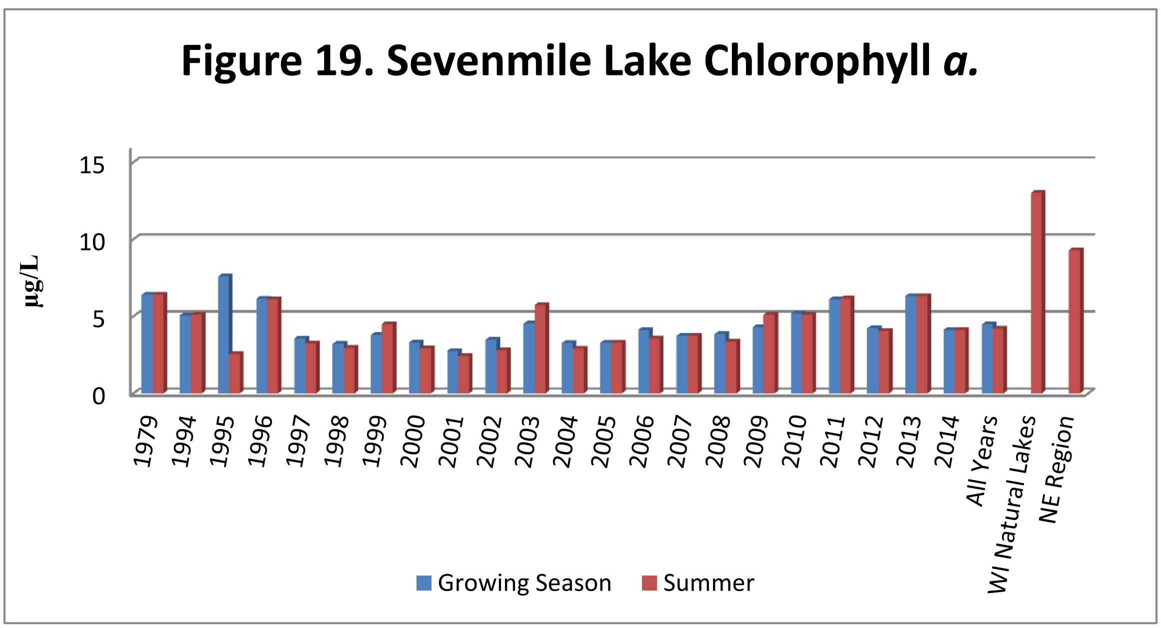
User Perceptions

The CLMN also recorded their perceptions of the water, based on the physical appearance and the recreational suitability. These perceptions can be compared to water quality parameters to see how the lake user would experience the lake at that time. When interpreting this data, we see that when the Secchi depth decreases, the rating of the lake's physical appearance also decreases. These perceptions of recreational suitability are displayed by year in Figure 18. From 1998 to 2000, 100% of CLMN volunteers recorded Sevenmile Lake to be "beautiful, could not be nicer." In 2003, 2011 and from 2006 to 2008, 100% of the CLMN recorded that there were "very minor aesthetic problems." In 2009, 100% of volunteers said their "enjoyment was somewhat impaired (algae)."



Chlorophyll *a*

Chlorophyll *a* is the photosynthetic pigment that makes plants and algae green. Chlorophyll *a* in lake water is an indicator of the amount of algae. Chlorophyll *a* concentrations greater than 10 µg/L are perceived as a mild algae bloom, while concentrations greater than 20 µg/L are perceived as a nuisance. Chlorophyll *a* has been monitored in Sevenmile Lake extensively during the growing season (April-May) and summer season (June-Sept.) (Figure 19).



Phosphorus

In more than 80% of Wisconsin's lakes, phosphorus is the key nutrient affecting the amount of algae and plant growth. If phosphorus levels are high, excessive aquatic plant growth can occur.

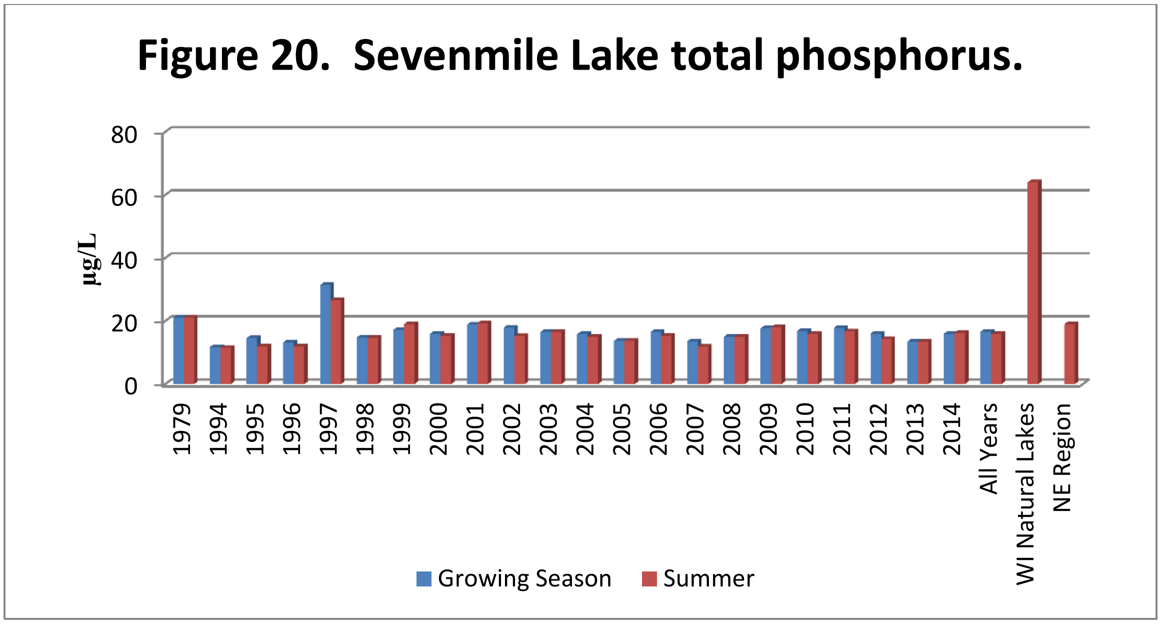
Phosphorus originates from a variety of sources, many of which are related to human activities. These sources include human and animal wastes, soil erosion, detergents, septic systems and runoff from farmland or lawns (Shaw et al., 2004). Phosphorus provokes complex reactions in lakes. An analysis of phosphorus often includes both soluble reactive phosphorus and total phosphorus. Soluble reactive phosphorus dissolves in the water and directly influences plant growth (Shaw et al., 2004). Its concentration varies in most lakes over short periods of time as plants take it up and release it. Total phosphorus is considered a better indicator of a lake's nutrient status than soluble reactive phosphorus because its levels remain more stable (Shaw et al., 2004). Total phosphorus includes soluble phosphorus and the phosphorus in plant and animal fragments suspended in lake water. Ideally, soluble reactive phosphorus concentrations should be 10 µg/L or less at spring turnover to prevent summer algae blooms (Shaw et al., 2004). A concentration of total phosphorus below 20 µg/L for lakes should be maintained to prevent nuisance algal blooms (Shaw et al., 2004).

Table 6 indicates the average, minimum and maximum spring, summer, fall and winter total phosphorus levels in Sevenmile Lake, collected by WVIC from 1972 to 1976 and from 1979 to 1983.

Table 6. Summary of Seven Mile Reservoir Total Phosphorus from 1972-1976 and 1979-1983 (WVIC 1983).

Parameter	Spring		Summer		Fall		Winter	
	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
Total Phosphorus (µg/L), Average, Min-Max	40, 23-53	34, 25-43	24, 8-36	48, 30-73	31, 17-60	59, 14-199	28, 10-49	344, 43-938

The total phosphorus levels were low for both the growing season and the summer season in Sevenmile Lake (Figure 20). In 2014, Sevenmile Lake was listed as impaired water. The Wisconsin DNR impaired waters detail page (WDNR, 2014c) states: *Sevenmile Lake was previously on the 303(d) lists due to mercury, but was delisted 2006 because new data verify general fish consumption advisory only, not specific advisory. Sevenmile Lake was assessed during the 2014 listing cycle and total phosphorus sample data exceed the 2014 Wisconsin Consolidated Assessment and Listing Methods (WisCALM) listing thresholds for the Recreation use of Fish and Aquatic Life use. Chlorophyll data do not exceed REC or FAL thresholds.*



Trophic State

Trophic state is another indicator of water quality (Carlson, 1977). Lakes can be divided into three categories based on trophic state – oligotrophic, mesotrophic, and eutrophic. These categories reflect a lake's nutrient and clarity levels (Shaw et al., 2004).

Researchers use various methods to calculate the trophic state of lakes. Common characteristics used to make the determination are: total phosphorus (important for algae growth), chlorophyll *a* concentration (a measure of the amount of algae present), and Secchi disk readings (an indicator of water clarity) (Shaw et al., 2004) (Table 7).

Table 7. Trophic classification of Wisconsin Lakes based on chlorophyll *a*, water clarity measurements, and total phosphorus values (Shaw et al., 2004).

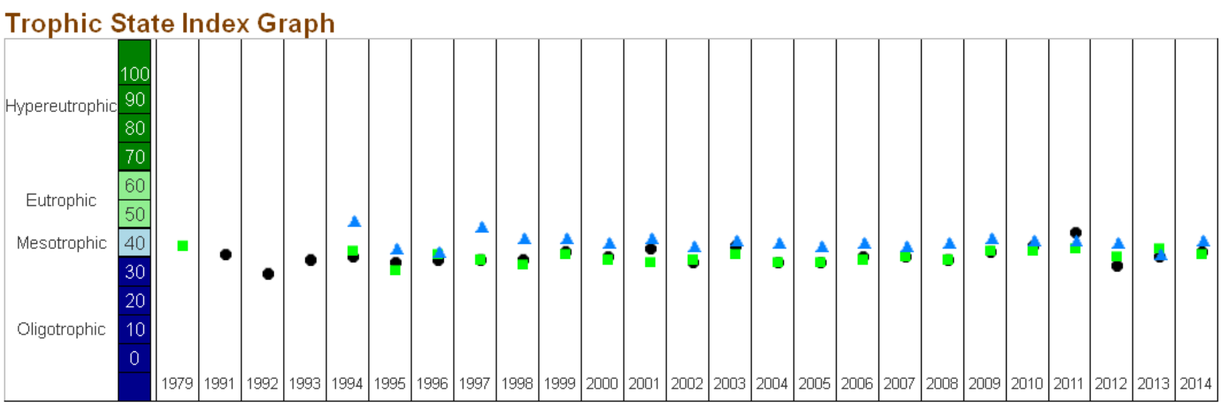
Trophic class	Total phosphorus µg/L	Chlorophyll *a* µg/L	Secchi Disk (ft.)
Oligotrophic	3	2	12
	10	5	8
Mesotrophic	18	8	6
	27	10	6
Eutrophic	30	11	5
	50	15	4

Trophic State Index (TSI) was calculated by the WDNR using Secchi, chlorophyll *a* and total phosphorus measurements collected from the CLMN. The July and August average TSI were consistent in sampled years (Figure 21), classifying Sevenmile Lake as mesotrophic (Table 8).

Table 8. Trophic State Index.	
30-40	**Oligotrophic:** clear, deep water; possible oxygen depletion in lower depths; few aquatic plants or algal blooms; low in nutrients; large game fish usual fishery
40-50	**Mesotrophic:** moderately clear water; mixed fishery, esp. panfish; moderate aquatic plant growth and occasional algal blooms; may have low oxygen levels near bottom in summer
50-60	**Mildly Eutrophic:** decreased water clarity; anoxic near bottom; may have heavy algal bloom and plant growth; high in nutrients; shallow eutrophic lakes may have winterkill of fish; rough fish common
60-70	**Eutrophic:** dominated by blue-green algae; algae scums common; prolific aquatic plant growth; high nutrient levels; rough fish common; susceptible to oxygen depletion and winter fishkill
70-80	**Hypereutrophic:** heavy algal blooms through most of summer; dense aquatic plant growth; poor water clarity; high nutrient levels

(WDNR, 2014b)

Figure 21. Sevenmile Lake, Trophic State Index CLMN (1979, 1991-2013).



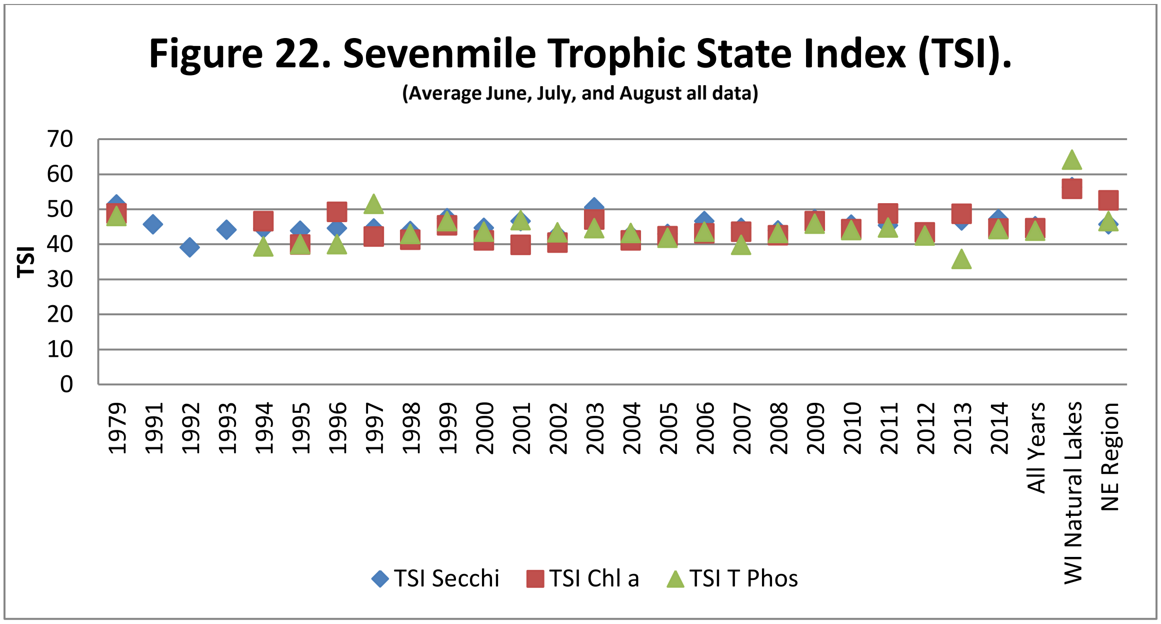
Monitoring Station: Sevenmile Lake - Deep Hole, Oneida County
Past Summer (July-August) Trophic State Index (TSI) averages.

● = Secchi ■ = Chlorophyll ▲ = Total Phosphorus

TSI(Chl) = TSI(TP) = TSI(Sec)	It is likely that algae dominate light attenuation.
TSI(Chl) > TSI(Sec)	Large particulates, such as Aphanizomenon flakes dominate
TSI(TP) = TSI(Sec) > TSI(Chl)	Non-algal particulate or color dominate light attenuation
TSI(Sec) = TSI(Chl) >= TSI(TP)	The algae biomass in your lake is limited by phosphorus
TSI(TP) > TSI(Chl) = TSI(Sec)	Zooplankton grazing, nitrogen, or some factor other than phosphorus is limiting algae biomass

(WDNR, 2014b)

Figure 22 takes another look at the TSI calculated, using all of the summer (June, July, and August) average values from the SWIMS database.



Nitrogen

Nitrogen is second only to phosphorus as an important nutrient for aquatic plant and algae growth (Shaw et al., 2004). Human activities on the landscape greatly influence the amount of nitrogen in a lake. Nitrogen may come from lawn fertilizer, septic systems near the lake, or from agricultural activities in the watershed. Nitrogen may enter a lake from surface runoff or groundwater sources.

Nitrogen exists in lakes in several forms. Sevenmile Lake was analyzed for total Kjeldahl nitrogen in July, 1979 (0.779 mg/L 1 m from the surface and 0.890 mg/L 1 meter from the bottom) and July, 2012 (0.45 mg/L); total nitrite (0.46 mg/L) in July, 1979; and nitrate-nitrite in July, 1979 (0.01 mg/L) and July, 2012 (not-detected). Nitrogen is a major component of all organic (plant and animal) matter. Decomposing organic matter releases ammonia, which is converted to nitrate if oxygen if present (Shaw et al., 2004). All inorganic forms of nitrogen can be used by aquatic plants and algae (Shaw et al., 2004). If these inorganic forms of nitrogen exceed 0.3 mg/L (as N) in spring, there is sufficient nitrogen to support summer algae blooms (Shaw et al., 2004). Elevated concentrations of ammonium, nitrate, and nitrite, derived from human activities, can stimulate or enhance the development, maintenance and proliferation of primary producers (phytoplankton, benthic algae, marcrophytes), contributing to the widespread phenomenon of the cultural (human-made) eutrophication of aquatic ecosystems (Camargo et al., 2007). The nutrient enrichment can cause important ecological effects on aquatic communities, since the overproduction of organic matter, and its subsequent decomposition, usually lead to low dissolved oxygen concentrations in bottom waters, and sediments of eutrophic and hypereutrophic aquatic ecosystems with low turnover rates (Camargo et al., 2007). Sevenmile Lake's total nitrogen values were low compared to Wisconsin natural lakes (0.82 mg/L) and Northeast Wisconsin lakes (0.66 mg/L).

Chloride

The presence of chloride (Cl^-) where it does not occur naturally indicates possible water pollution (Shaw et al., 2004). Chloride does not affect plant and algae growth and is not toxic to aquatic organisms at most of the levels found in Wisconsin (Shaw et al., 2004). Because chloride data is unknown for Sevenmile Lake, future water quality sampling could include measurement of this parameter.

Sulfate

Sulfate in lake water is primarily related to the types of minerals found in the watershed, and to acid rain (Shaw et al., 2004). Sulfate concentrations are noted to be less than 10 mg/L in the Northeast region (Lillie and Mason, 1983). Because sulfate data is unknown for Sevenmile Lake, future water quality sampling could include measurement of this parameter.

Sodium and Potassium

Sodium and potassium are possible indicators of human pollution in a lake, since naturally occurring levels of these ions in soils and water are very low. Sodium is often associated with chloride, and gets into lakes from road salting, fertilizations, and human and animal waste (Shaw et al., 2004). Potassium is the key component of commonly-used potash fertilizer, and is abundant in animal waste. Both of these elements are held by soils to a greater extent than is chloride or nitrate; therefore, they are not as useful as indicators of pollution impacts (Shaw et al., 2004). Although not normally toxic themselves, they provide a strong indication of possible contamination by more damaging compounds (Shaw et al., 2004). Because sodium and potassium data are unknown for Sevenmile Lake, future water quality sampling could include measurement of this parameter.

Conductivity

Conductivity is a measure of the ability of water to conduct an electric current. Conductivity is reported in micromhos per centimeter **(**µmhos/cm) and is directly related to the total dissolved inorganic chemicals in the water. Usually, values are approximately two times the water hardness, unless the water is receiving high concentrations of human-induced contaminants (Shaw et al., 2004). Conductivity was measured in July, 1979 (75 µmhos/cm) and July, 2012 (99 µmhos/cm). Table 9 indicates the average, minimum and maximum spring, summer, fall and winter conductivity levels in Sevenmile Lake, collected by WVIC from 1972 to 1976 and from 1979 to 1983.

Table 9. Summary of Seven Mile Reservoir Conductivity from 1972-1976 and 1979-1983 (WVIC 1983).

Parameter	Spring		Summer		Fall		Winter	
	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
Conductivity (µmhos/cm), Average, Min-Max	68, 59-75	72, 66-76	70, 64-74	81, 76-87	70, 69-74	71, 68-77	81, 78-85	89, 82-97

pH

The acidity level of a lake's water regulates the solubility of many minerals. A pH level of 7 is considered neutral. The pH level in Wisconsin lakes ranges from 4.5 in acid, bog lakes to 8.4 in hard water lakes (Shaw et al., 2004). Natural rainfall in Wisconsin averages a pH of 5.6. Some minerals become available under low pH (especially aluminum, zinc, and mercury) and can inhibit fish reproduction or survival. Mercury and aluminum are not only toxic to many kinds of wildlife, but also to humans (especially those that eat tainted fish). The pH scale is logarithmic, so every 1.0 unit change in pH increases the acidity tenfold. Water with a pH of 6 is 10 times more acidic than water with pH of 7. A lake's pH level is important for the release of potentially harmful substances and affects plant growth, fish reproduction and survival. A lake with neutral or slightly alkaline pH is a good lake for fish and plant survival. The pH of Sevenmile Lake ranged from 6.6 (WVIC 1983) to 8.17 (July, 2012). Table 10 indicates the spring, summer, fall and winter pH ranges in Sevenmile Lake, collected by WVIC from 1972 to 1976 and from 1979 to 1983.

Table 10. Summary of Seven Mile Reservoir pH Range for 1972-1976 and 1979-1983 (WVIC 1983).

Parameter	Spring		Summer		Fall		Winter	
	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
pH Range	6.6-7.3	6.6-7.1	6.3-7.7	5.8-7.5	6.2-7.3	6.3-7.3	7.0-7.2	6.7-6.8

Table 11 indicates the effects pH levels less than 6.5 will have on fish. While moderately low pH does not usually harm fish, the metals that become soluble under low pH can be important. In low pH waters, aluminum, zinc, and mercury concentrations increase if they are present in lake sediment or watershed solids (Shaw et al., 2004).

Table 11. Effects of acidity on fish species (Olszyk, 1980).

Water pH	*Effects*
6.5	Walleye spawning inhibited
5.8	Lake trout spawning inhibited
5.5	Smallmouth bass disappear
5.2	Walleye & lake trout disappear
5	Spawning inhibited in most fish
4.7	Northern pike, sucker, bullhead, pumpkinseed, sunfish & rock bass disappear
4.5	Perch spawning inhibited
3.5	Perch disappear
3	Toxic to all fish

Alkalinity

Alkalinity levels in a lake are affected by the soil minerals, bedrock type in the watershed, and frequency of contact between lake water and these materials (Shaw et al., 2004). Alkalinity is important in a lake to buffer the effects of acidification from the atmosphere. Acid rain has long been a problem with lakes that have low alkalinity levels and high potential sources of acid deposition. Table 12 indicates the average, minimum and maximum spring, summer, fall and winter alkalinity levels in Sevenmile Lake, collected by WVIC from 1972 to 1976 and from 1979 to 1983.

Table 12. Summary of Seven Mile Reservoir Alkalinity from 1972-1976 and 1979-1983 (WVIC 1983).

Parameter	Spring		Summer		Fall		Winter	
	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
Alkalinity (mg/L), Average, Min-Max	28.5, 25.5-33.6	29.1, 26.4-34.8	28.1, 25.4-34.4	34.6, 28.9-43.4	34.2, 25.3-54.2	40.3, 26.0-76.4	33.1, 30.3-36.9	36.9, 35.7-38.4

Data from the SWIMS database reports alkalinity in July, 2012 as 44.7 mg/L $CaCO_3$. According to Table 13, Sevenmile Lake is not sensitive to acid rain based on its alkalinity.

Table 13. Sensitivity of Lakes to Acid Rain (Shaw et al., 2004).

Sensitivity to acid rain	*Alkalinity value (mg/L or ppm $CaCO_3$)*
High	0-2
Moderate	2-10
Low	10-25
Non-sensitive	>25

Hardness

Hardness levels in a lake are affected by the soil minerals, bedrock type in the watershed, and frequency of contact between lake water and these materials (Shaw et al., 2004). One method of evaluating hardness is to test for calcium carbonate ($CaCO_3$). Hardness data is unknown for Sevenmile Lake, so future water quality sampling should include measurement of this parameter.

Calcium and Magnesium Hardness

The carbonate system provides acid buffering through two alkaline compounds: bicarbonate and carbonate. These compounds are usually found with two hardness ions: calcium and magnesium (Shaw et al., 2004). Calcium is the most abundant cation found in Wisconsin lakes. Its abundance is related to the presence of calcium-bearing minerals in the lake watershed (Shaw et al., 2004). Aquatic organisms such as native mussels use calcium in their shells. The aquatic invasive zebra mussel tends to need calcium levels greater than 20 mg/L to maintain shell growth. Sevenmile Lake had a calcium level of 10.5 mg/L in

July, 2012, so it is unlikely zebra mussels could flourish if introduced. Magnesium was 4 mg/L in July, 2012.

Sodium and Potassium

Sodium and potassium are possible indicators of human pollution in a lake, since naturally occurring levels of these ions in soils and water are very low. Sodium is often associated with chloride and gets into lakes from road salting, fertilizations, and human and animal waste (Shaw et al., 2004). Potassium is the key component of commonly-used potash fertilizer, and is abundant in animal waste. Both of these elements are held by soils to a greater extent than is chloride or nitrate; therefore, they are not as useful as indicators of pollution impacts (Shaw et al., 2004). Although not normally toxic themselves, they provide a strong indication of possible contamination by more damaging compounds (Shaw et al., 2004). Because sodium and potassium data are unknown for Sevenmile Lake, future water quality sampling should include measurement of this parameter.

Dissolved Organic Carbon

Dissolved Organic Carbon (DOC) is a food supplement, supporting growth of microorganisms, and plays an important role in global carbon cycle through the microbial loop (Kirchman et al., 1991). In general, organic carbon compounds are a result of decomposition processes from dead organic matter such as plants. When water contacts highly organic soils, these components can drain into rivers and lakes as DOC. DOC is also extremely important in the transport of metals in aquatic systems. Metals form extremely strong complexes with DOC, enhancing metal solubility while also reducing metal bioavailability. Baseflow concentrations of DOC in undisturbed watersheds generally range from 1 to 20 mg/L carbon. Sevenmile Lake DOC has not been tested, and should be included in future water quality sampling.

Silica

The earth's crust is abundant with silicates or other compounds of silicon. The water in lakes dissolves the silica and pH can be a key factor in regulating the amount of silica that is dissolved. Silica concentrations are usually within the range of 5 to 25 mg/L. Generally lakes that are fed by groundwater have higher levels of silica. Because silica data is unknown for Sevenmile Lake, future water quality sampling should include measurement of this parameter.

Aluminum

Aluminum occurs naturally in soils and sediments. In low pH (acidic) environments aluminum solubility increases greatly. With a low pH and increased aluminum values, fish health can become impaired. This can have impacts on the entire food web. Aluminum also plays an important role in phosphorus cycling in lakes. When aluminum precipitates with phosphorus in lake sediments, the phosphorus will not dissolve back into the water column as readily. Because aluminum levels are unknown in Sevenmile Lake, future water quality sampling should include measurement of this parameter.

Iron

Iron also forms sediment particles that store phosphorus when dissolved oxygen is present. When oxygen concentration gets low (for example, in winter or in the deep water near sediments) the iron and phosphorus dissolve in water. This phosphorus is available for algal blooms. Sevenmile Lake iron levels have not been tested, and should be included in future water quality sampling.

Manganese

Manganese is a mineral that occurs naturally in rocks and soil. In lakes, manganese is usually in particulate form. When the dissolved oxygen levels decrease, manganese can convert from an insoluble form to soluble ions. A manganese concentration of 0.05 mg/L can cause color and staining problems. Manganese data is unknown for Sevenmile Lake, so future water quality sampling should include this parameter.

Sediment

Lake bottom sediments are sometimes analyzed for chemical constituents that they contain. This is especially true for potentially toxic metals such as mercury, chromium, selenium, and others. Lake sediments also tend to record past events as particulates settle down and become part of the sediment. Biological clues for the historic conditions in the lake can be gleaned from sediment samples. Examples include analysis of pollen or diatoms that might help understand past climate or trophic states in the lake. Sediment data was not collected for Sevenmile Lake, and future sampling should include this parameter.

Total Suspended Solids

Total suspended solids are all particles suspended in lake water. Silt, plankton, and wastes are examples of these solids and can come from runoff of agricultural land, erosion, and can be produced by bottom-feeding fish. As the suspended solid levels increase, they absorb heat from sunlight which can increase the water temperature. They can also block the sunlight that plants need for photosynthesis. These events can in turn affect the amount of dissolved oxygen in the lake. Lakes with total suspended solids levels less than 20 mg/L are considered “clear,” while levels between 40 and 80 mg/L are “cloudy.” Because total suspended solids data is unknown for Sevenmile Lake, future water quality sampling should include measurement of this parameter.

Aquatic Invasive Species

In 2002, the invasive rusty crayfish was found in Sevenmile Lake. Rusty crayfish are native to parts of Ohio, Tennessee, Kentucky and Indiana, and were likely introduced to Wisconsin waters by fishermen using the crayfish as bait (Gunderson, 2008). Rusty crayfish negatively affect other native crayfish species, cause destruction to aquatic plant beds, reduce fish populations by eating eggs, and cause shoreland owners recreational problems (Gunderson, 2008). It is illegal to possess both live crayfish and angling equipment simultaneously on any inland Wisconsin water (except Mississippi River) (WDNR, 2015). It is also illegal to release crayfish into a water body without a permit (WDNR, 2015).

The University of Wisconsin-Madison's Aquatic Invasive Species Smart Prevention program classifies Sevenmile Lake as "not suitable" for zebra mussels, based on calcium and conductivity levels found in the lake (UW-Madison).

Aquatic invasive species monitoring was conducted by the WDNR in June, 2009. The searched for zebra mussel veligers and spiny water fleas. Neither invasive species was observed. Baseline State Monitoring for early detection of aquatic invasives was conducted on Sevenmile Lake August, 2009 looking for zebra mussel veligers, spiny water fleas, and fish hook water fleas. Again, none of these invasive species were observed. A citizen aquatic invasive monitor scoped the lake in 2010 looking for the Chinese mystery snail, curly-leaf pondweed, Eurasian water-milfoil, purple loosestrife, hydrilla, freshwater jellyfish, and the rusty crayfish. No invasive species were observed.

Clean Boats Clean Waters (CBCW) is a program that inspects boats for aquatic invasive species and in the process, educates the public on how to help stop the spread of these species. In 2004, 2005, and from 2011 to 2014, the CBCW conducted inspections at Sevenmile Lake (Figures 23-31).

Figure 23. Clean Boats Clean Waters Sevenmile Lake (WDNR 2014a).

Figure 24. Clean Boats Clean Waters Sevenmile Lake (WDNR, 2014a).

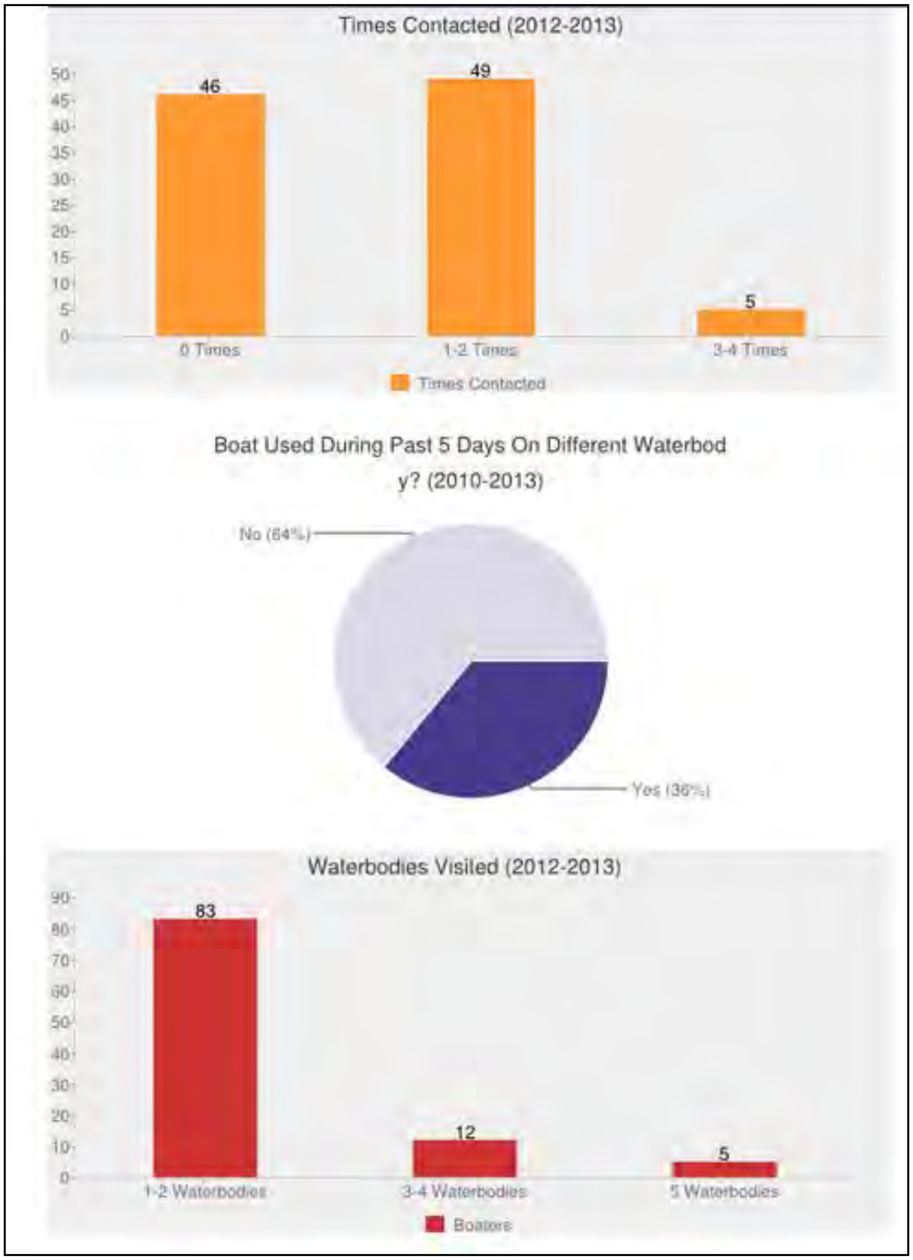


Figure 25. Clean Boats Clean Waters Sevenmile Lake (WDNR, 2014a).

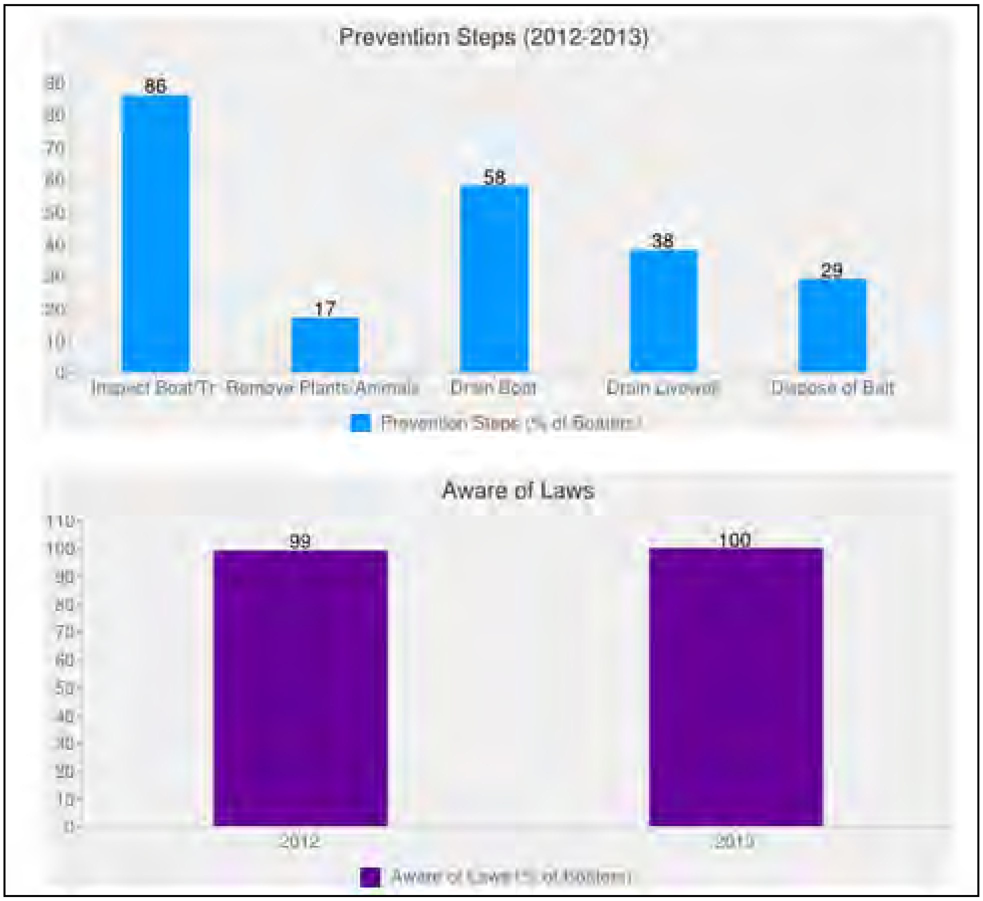


Figure 26. Sevenmile Lake Clean Boats Clean Waters (WDNR, 2014a).

Figure 27. Sevenmile Lake Clean Boats Clean Waters (WDNR, 2014a).

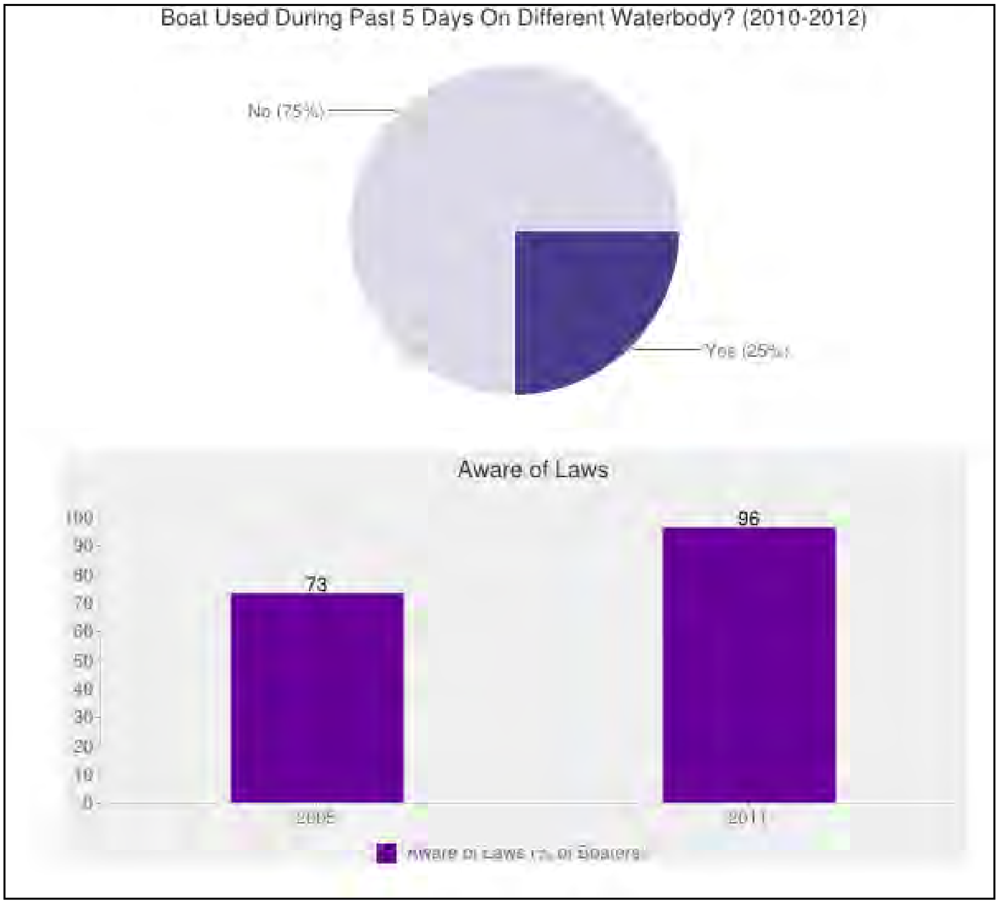


Figure 28. Clean Boats Clean Waters Sevenmile (WDNR, 2014a).

Figure 29. Clean Boats Clean Waters Sevenmile (WDNR, 2014a).

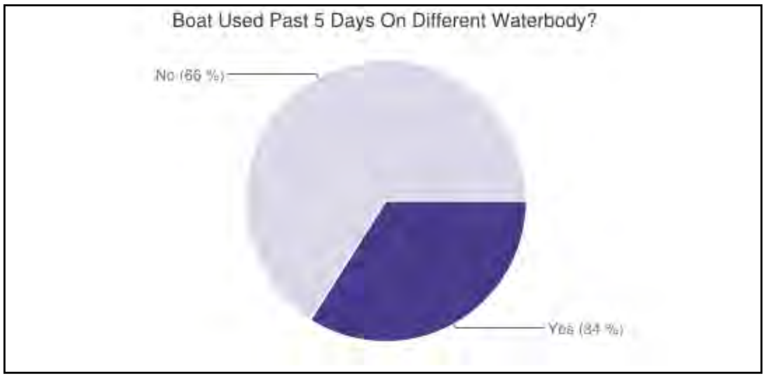


Figure 30. Clean Boats Clean Waters Sevenmile Lake at end of Sevenmile road (WDNR, 2014a).

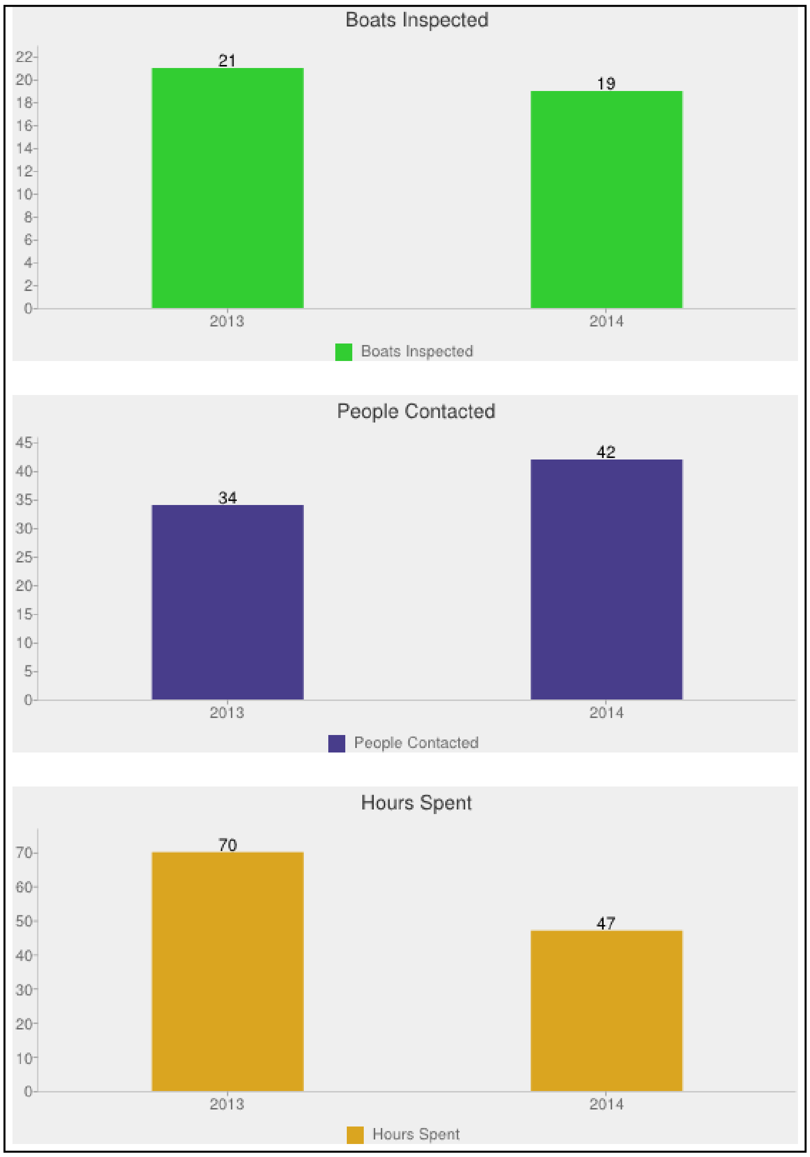
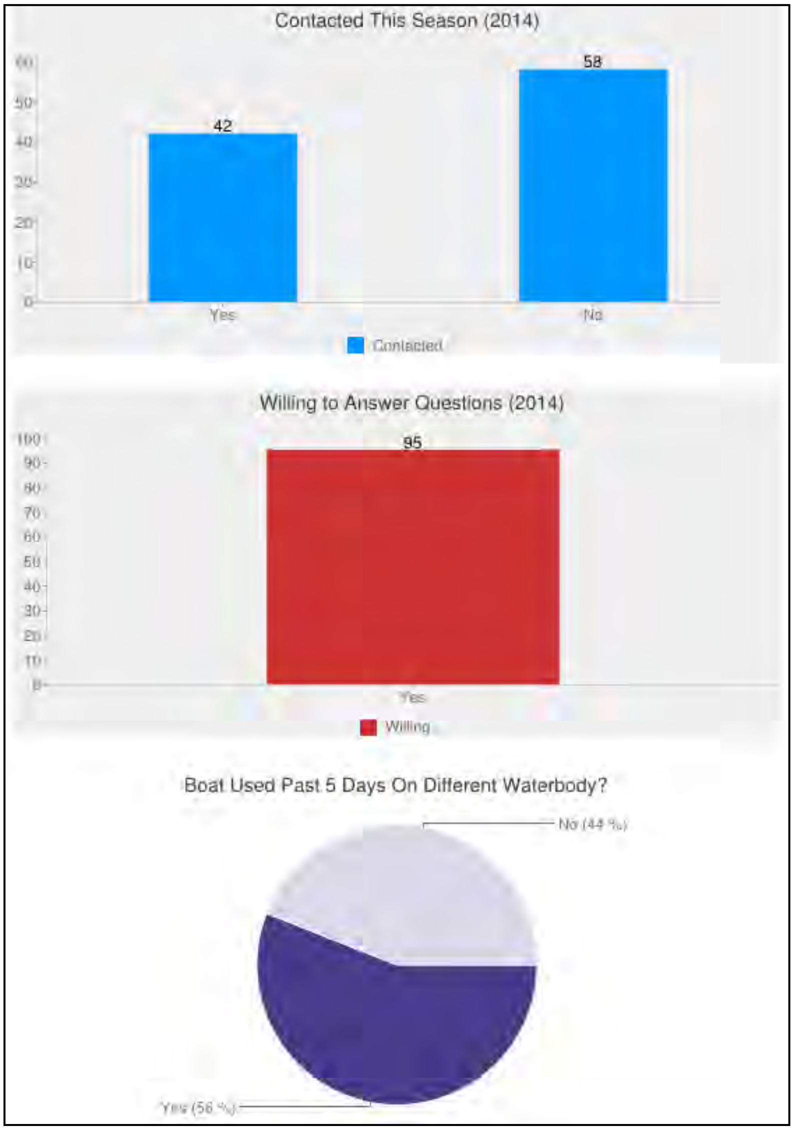


Figure 31. Clean Boats Clean Waters Sevenmile Lake (WDNR, 2014a).



Literature Cited

Camargo, Julio A., Álvaro Alonso (Lead Author); Raphael D. Sagarin (Topic Editor). 02 April 2007. *Inorganic nitrogen pollution in aquatic ecosystems: causes and consequences.* In: Encyclopedia of Earth. Eds. Cutler J. Cleveland (Washington, D.C.: Environmental Information Coalition, National Council for Science and the Environment). Retrieved 2015. <http://www.eoearth.org/article/Inorganic_nitrogen_pollution_in_aquatic_ecosystems:_causes_and_consequences>

Carlson, R.E. 1977. *A Trophic State Index for Lakes.* Limnology and Oceanography. 22: 361-369.

Gunderson, Jeff. 2008. *Rusty Crayfish: A Nasty Invader*. Minnesota Sea Grant. Retrieved 2015. <http://www.seagrant.umn.edu/ais/rustycrayfish_invader>

Kirchman, David L.; Suzuki, Yoshimi, Garside, Christopher, Ducklow, Hugh W. (15). 1991. *High turnover rates of dissolved organic carbon during a spring phytoplankton bloom.* Nature 352 (6336): 612–614. Doi:10.1038/352612a0. Retrieved 2015. <http://www.nature.com/nature/journal/v352/n6336/abs/352612a0.html.>

Lillie, R. A. and J. W. Mason. 1983. *Limnological Characteristics of Wisconsin Lakes.* Wis. Dept. of Natural Resources Tech. Bull. Page 138. Madison, WI.

Olszyk, D. 1980. *Biological Effects of Acid Rain*. Testimony, Wis. Public Service Commission Docket No. 05-EP-2. 5 pp.

Shaw, B. Mechenich, C, and Klessig, L. 2004. *Understanding Lake Data (G3582).* Board of Regents of the University of Wisconsin System. Madison, WI.

University of Wisconsin-Madison, Center for Limnology, Vander Zanden Lab. *Aquatic Invasive Species Smart Prevention.* Retrieved 2015. <http://www.aissmartprevention.wisc.edu/>

Wisconsin Department of Natural Resources. 2014a. *Clean Boats, Clean Waters*. Retrieved 2015. <http://dnr.wi.gov/lakes/cbcw/>

Wisconsin Department of Natural Resources. 2014b. *Surface Water Integrated Monitoring Systems (SWIMS) Database.* Retrieved 2015. <http://dnr.wi.gov/topic/surfacewater/swims>

Wisconsin Department of Natural Resources. 2014c. *Impaired Water Detail.* Retrieved 2015. <http://dnr.wi.gov/water/impairedsearch.aspx/>

Wisconsin Department of Natural Resources. 2015. *Rusty Crayfish-Sevenmile Lake*. Retrieved 2015. < http://dnr.wi.gov/lakes/invasives/AISDetail.aspx?roiseq=22706381>

Wisconsin Valley Improvement Company. 1983. *Wisconsin Valley Improvement Company Environmental Report.* E. 2.35-37.

Wisconsin Valley Improvement Company. 2016. *Wisconsin Valley Improvement Company Comments.* Retrieved 2016. Cathy Wendt and Ben Niffenegger. Comments to Sevenmile Lake Plan-DRAFT.

Page left intentionally blank

WHITE WATER ASSOCIATES, INC.

Appendix D
Sevenmile Lake Watershed, Water Quality, and WiLMS Modeling

Page left intentionally blank

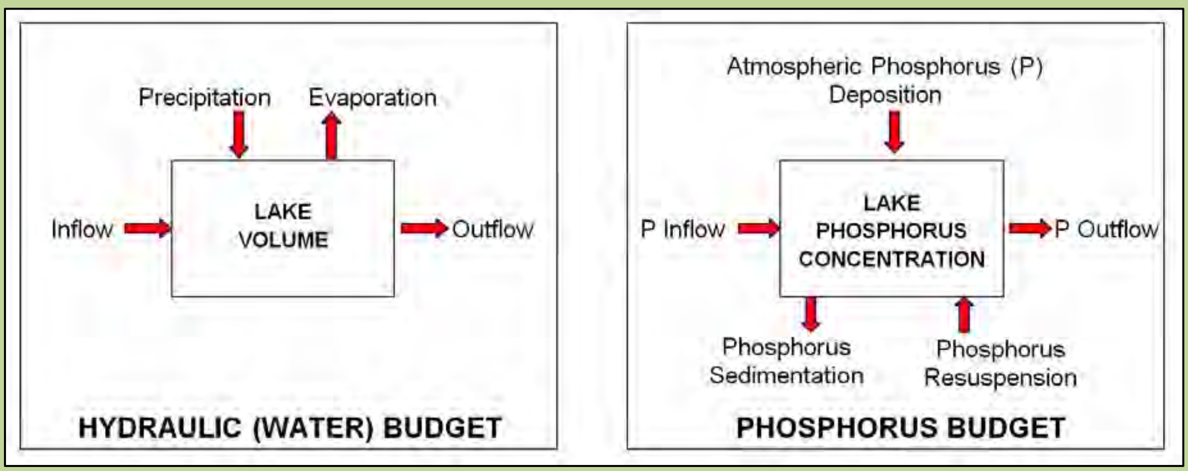
WHITE WATER ASSOCIATES, INC.

Watershed, Water Quality, and WiLMS Modeling

Freshwater algae and rooted aquatic plants (macrophytes) require a number of nutrients in order to grow. Two of these nutrients, phosphorus and nitrogen, are often present in small amounts and limit algae and macrophyte growth. In fact, phosphorus is the nutrient that most often limits the growth of aquatic plants in freshwater systems and, when present in high concentrations, is most often responsible for algal blooms, rampant growth of rooted plants, and lake eutrophication. This is the reason that phosphorus is such a focus when it comes to concerns of lake water quality.

The water (hydraulic) budget of a lake is closely associated with the phosphorus budget (both illustrated in Figure 1. The graphics show in general terms the overall movement of water and phosphorus into and out of a lake ecosystem.

Figure 1. Hydraulic (water) and phosphorus budgets in lakes.



Modified from Brylinsky (2004)

Several interrelated factors are at play when it comes to the water quality of a lake. These include water source, watershed size, retention time, watershed cover types, and internal loading. Because each lake and its watershed have unique characteristics and interactions, no two lakes behave in exactly the same way. Nevertheless, being familiar with these factors and how they interrelate is helpful for lake planning and stewardship.

The sources of water for a lake strongly influence the lake's water quality because the water carries with it nutrients such as phosphorus. The four water sources include precipitation, runoff from the surrounding land, upwelling groundwater, and inflow from a stream. The relative importance of each of these sources depends on several things. For example some lakes have no incoming stream, so these lakes depend on precipitation, runoff, and groundwater. A lake with a small drainage basin (watershed) receives relatively less water as runoff. Water can leave a lake through an outflow, evaporation, and groundwater seeping back into the aquifer (water table).

Water source is the factor that lake scientists use to classify lakes into four categories (Shaw et al 2004). A "seepage lake" is fed by precipitation, limited runoff, and groundwater and has no inlet or outlet. A "groundwater drainage lake" is fed by groundwater, precipitation, and limited runoff and has a stream outlet. A "drainage lake" is fed by one or more streams, groundwater, precipitation, and runoff and has a stream outlet. Finally, an "impoundment" is a manmade lake formed by damming a stream and is also drained by a stream. When water comes into a lake from its various sources, it also carries other materials to the lake. Some of these are dissolved in the water (like phosphorus, nitrogen, and calcium). Some of the materials are suspended in the water (like silt and small bits of detritus). Precipitation (rain and snow) also carries with it dissolved and suspended materials to the lake (acid precipitation and dust are examples).

The size of a lake's watershed (drainage basin) relative to the lake's surface area is important in determining the amount of nutrients and other materials that come into the lake (Shaw et al 2004). This ratio of drainage basin area to lake area is a measure of how important the watershed is as the lake's source of water, nutrients (like phosphorus), and other materials. A higher DB/LA ratio means the watershed is relatively more important and runoff contributes more water and nutrients to the lake. With their small watersheds, seepage lakes receive fewer nutrients from runoff than drainage lakes and tend to be higher in water quality.

Another important concept in a lake's water and nutrient "budget" (that is, inputs and outputs) is "retention time" (also called "water residence time"), the average length of time that water stays in the lake. This is determined by a lake's size (volume), water sources, and watershed size. For some lakes and impoundments, retention time can be quite short (days or weeks). In other lakes, retention time can be as long as decades or centuries. Retention time also indicates how long nutrients stay in the lake. In short retention time lakes, nutrients are flushed through the system rather quickly. In long retention time lakes, nutrients stay around a longer time and can move into the sediments where they become a long-term part of the lake's chemistry.

The type of land cover (for example, forest, grassland, row crops, or human development) is also an important variable in determining amounts and kinds of materials (like nutrients and sediment) that are carried off the land and into the water. This is especially important close to the lake (the riparian area), but the entire watershed is a contributor and we often map the cover types and measure their acreages to give us some idea of how at risk the lake might be to receiving unwanted materials. Certain kinds of agriculture (tilled row crops) and urban areas (with their impervious surfaces) have a tendency to give up sediments and nutrients to runoff. In contrast, native vegetation (forests, wetlands, and grasslands), tend to slow runoff of water and nutrients, allowing the soil to absorb them. When excessive nutrients and sediment reach a lake they can cause increased growth of aquatic plants, algal blooms, and reduced water clarity.

The DB/LA (drainage basin/lake area) ratio interacts in an interesting way with drainage basin cover type when it comes to nutrient runoff to a lake. For lakes where the ratio is relatively high (greater than 15:1), the role of drainage basin size in delivering water and nutrients to the lake tends to dominate the role of cover type. In small ratio lakes, the kind of cover type on the watershed has the greater influence than the absolute size of the watershed. For these small DB/LA ratio lakes maintaining or restoring good quality native cover type in the watershed will likely have a positive and observable influence on the lake.

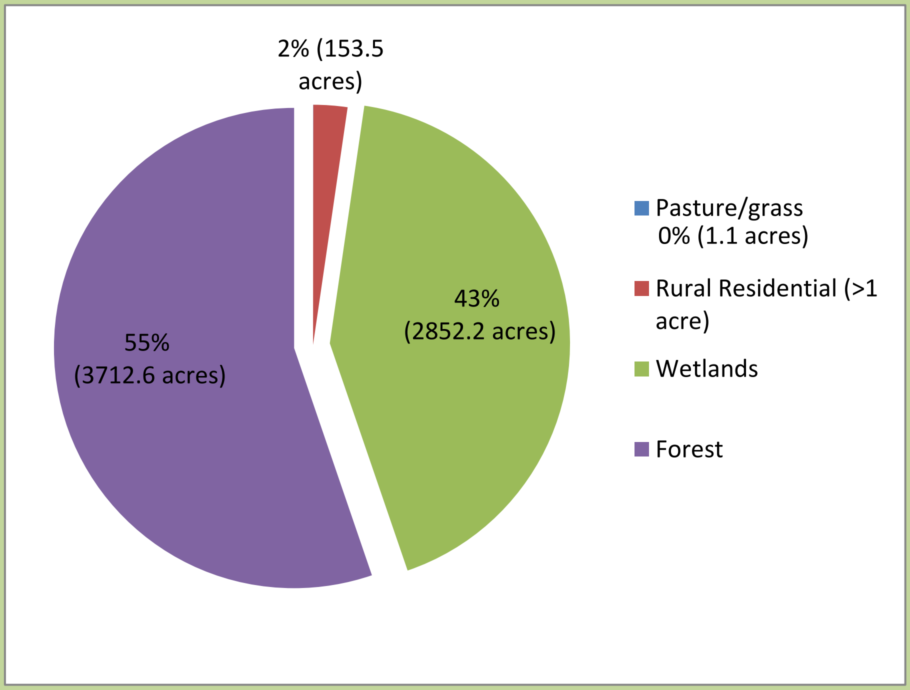
Internal loading refers to phosphorus (and other nutrients) that are present in the lake bottom sediment. Some of the phosphorus in a lake ecosystem continually falls to the bottom and becomes part of the sediment layer and is generally unavailable for plants. Under conditions of low dissolved oxygen, however, this phosphorus can go back into the water column and be taken up by algae and macrophytes. The amount of phosphorus contained in the sediment can be quite high, resulting from centuries of deposition. The phenomenon of internal loading can therefore make available a large amount of phosphorus to the algae and plants of the lake and typically happens at spring and fall overturn periods. Even if sources of phosphorus outside of the lake are reduced, the internal loading can still enrich the lake and cause eutrophic conditions.

Because it is often challenging to work out how these several factors interact to influence the water quality of a specific lake, the Wisconsin Department of Natural Resources developed the "Wisconsin Lake Modeling Suite" (WiLMS) as a lake water quality planning tool (WDNR 2003). WiLMS is a computer program into which the user enters information about the lake (e.g., surface area, depth, and nutrient measures) and the watershed (e.g., acreage and cover type). The model also has information about average rainfall, aerial deposition of materials, and cover type characteristics that it uses to help predict nutrient (phosphorus) loading scenarios to the lake.

In this project, we applied the WiLMS models to Sevenmile Lake. The 518 acre lake has a watershed of 6719.4 acres and a drainage basin/lake area ratio of about 13 to 1. This is a moderate size ratio. Lakes with this size ratio combined with a mostly natural watershed cover type are likely to tend toward mesotrophic characteristics, which is the case with Sevenmile Lake. The lake volume is 9449.6 acre-feet and the mean lake depth is 18.8 feet. The WiLMS model calculates the annual runoff volume as 7,335.3 acre-feet and the annual difference between precipitation and evaporation (precipitation minus evaporation) as 5.3 inches. The hydraulic loading for Sevenmile Lake is 7,557.7 acre-feet per year and the areal water load is 15 feet per year. The WiLMS model calculates the annual lake flushing rate as 0.8 times per year and the water residence time (retention time) as 1.25 year.

The cover types in the Sevenmile Lake watershed are shown in Figure 2 with their respective acreages. Forest cover type is the predominant land cover at 55%. Wetland cover is also important, comprising about 43% of the watershed.

Figure 2. Sevenmile Lake watershed land cover types.



Note: the "wetlands" category also includes the surface area of the lake.

Table 1 presents output from the WiLMS model for non-point source phosphorus input to Sevenmile Lake. No point-source data is available for Sevenmile Lake. The WiLMS model indicated that 317 kg (699 pounds) of phosphorus are most likely delivered to the lake each year from watershed runoff and from direct deposition onto the lake surface (via precipitation and airborne particles). The

WiLMS model predicts that most of the phosphorus delivered to Sevenmile Lake comes from forest and wetland cover types.

Table 1. WiLMS estimated non-point source phosphorus loading based on watershed land use type and acres.

Land Use	Land Use Acres	Loading (kg/ha-year)				Loading kg/year		
		Low	Most Likely	High	Loading %	Low	Most Likely	High
Row Crop Ag.	0	0.5	1	3	0	0	0	0
Mixed Agricultural	0	0.3	0.8	1.4	0	0	0	0
Pasture/Grass	1.1	0.1	0.3	0.5	0	0	0	0
High Density Urban (1/8 acre)	0	1	1.5	2	0	0	0	0
Mid Density Urban (1/4 acre)	0	0.3	0.5	0.8	0	0	0	0
Rural Residential (>1 acre)	153.5	0.05	0.10	0.25	2	3	6	16
Wetlands	2852.2	0.1	0.1	0.1	36.3	115	115	115
Forest	3712.6	0.05	0.09	0.18	42.5	75	135	270
Lake Surface	518	0.1	0.3	1	19.2	20	61	204
				Totals	100.0	213	317	605

The WiLMS generated an estimate of internal loading of phosphorus. These data are presented in Table 2. The model predicts that about 110 pounds (50 kg) of phosphorus are released each year from Sevenmile Lake sediments and available to algae and aquatic plants. The model calculates a predicted phosphorus retention coefficient as 0.66 (this represents the fraction of phosphorus entering the lake that is lost by settling to the sediment). The observed phosphorus retention coefficient is 0.51 indicating that phosphorus is more readily available than predicted. These data are fairly consistent with the observed trophic status of Sevenmile Lake.

Table 2. WiLMS Method 1 – Complete Phosphorus Mass Budget.	
Parameter	**Value**
Phosphorus Concentration of Lake (input into model)	16.8 mg/m^3
Phosphorus Inflow Concentration	34.1 mg/m^3
Areal External Loading	156.2 mg/m^2-year
Predicted Phosphorus Retention Coefficient *(the predicted fraction of phosphorus entering the lake that is lost by settling to the sediment)*	0.66
Observed Phosphorus Retention Coefficient	0.51
Internal Load (amount released annually from the sediment)	110 pounds (50 kg)

The WiLMS also allow us to manipulate the cover type acreages as an illustration of how watershed cover can influence the delivery of phosphorus to a lake. As an example, we re-ran the non-point source data model, but altered landscape composition to simulate the effect of converting 200 acres of the forest cover type to row crop agriculture. The results are dramatic as the most likely total pounds of phosphorus delivered to the lake from non-point source was calculated at 330.7 kg (compared to the 257.0 kg under the actual conditions in the watershed).

Literature Cited

Brylinsky, M. 2004 User's Manual for Prediction of Phosphorus Concentration In Nova Scotia Lakes: A Tool for Decision Making. Version 1.0. Prepared For The Nova Scotia Water Quality Objectives and Model Development Steering Committee, Nova Scotia Department of Environment and Labour. Prepared by Acadia Centre for Estuarine Research Acadia University Wolfville, Nova Scotia B4P 2R6 January 2004.

Shaw, B. Mechenich, C, and Klessig, L. 2004. Understanding Lake Data (G3582). Board of Regents of the University of Wisconsin System. Madison, WI.

WDNR. 2003. Wisconsin Lake Modeling Suite. PUBL-WR-363-94.

Appendix E
Sevenmile Lake EPA Littoral and Shoreline Survey

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Sevenmile Lake Littoral and Shoreline Activities

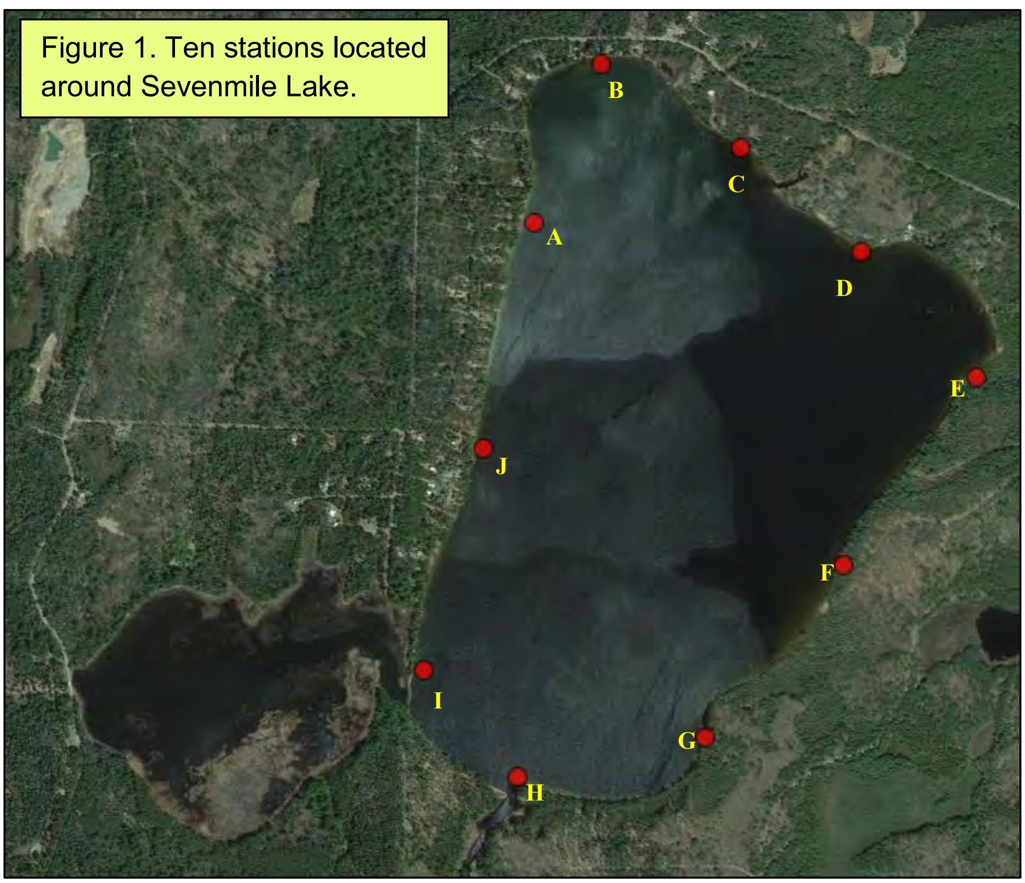
Introduction

Sevenmile Lake's littoral and shoreline zones were assessed in 2013 by White Water field staff using the US Environmental Protection Agency's (EPA) National Lakes Assessment (NLA) protocol and the Wisconsin Department of Natural Resources (WDNR) Supplemental Lakeshore Assessment protocol. The intention of the National Lakes Assessment (NLA) project was to provide a comprehensive State of the Lakes assessment for lakes, ponds, and reservoirs across the United States (USEPA, 2009). This assessment at Sevenmile Lake will stand as a baseline against which future changes can be measured and can be used to compare Sevenmile Lake with other lakes measured using the same protocols.

Methods

Ten physical habitat (P-Hab) stations were spaced equidistantly around the lake (Figures 1 and 2) (the western lobe of Sevenmile Lake was not included due to limitations of accessibility). At each site, White Water biologists recorded information about the littoral zone bottom substrate, littoral zone aquatic macrophytes (plants), littoral zone fish cover, riparian zone canopy, understory and ground cover, shoreline substrates, human influences, classification of fish habitat, bank features, any invasive species observed (terrestrial or aquatic), land cover, human development and the number of piers between sites. A photo was also taken at each site.

Figure 1. Ten stations located around Sevenmile Lake.



At each P-Hab site, biologists collected macroinvertebrates for later identification. A fecal indicator sample was collected at one site to be analyzed for levels of *E. coli*.

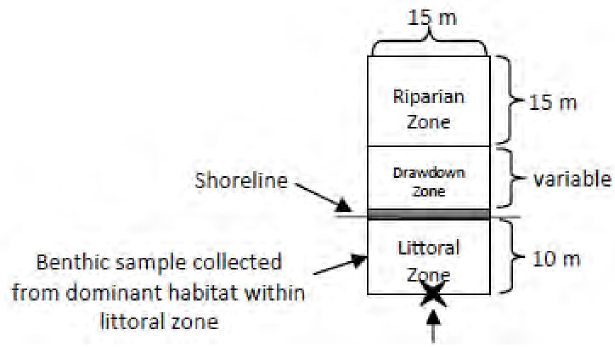


Figure 2. Dimensions and layout of a P-Hab station.

Results

The average depth of the ten stations was 2.72 feet (the range was from 1.9 to 3.4 feet). No surface film was observed at eight of the ten stations. Two stations had a slight algae film at the surface.

Table 1 contains the littoral zone bottom substrate data collected from the ten Sevenmile Lake sampling stations. Bedrock was not observed as a bottom substrate in any of the ten stations. Boulders were sparse at two stations. Cobble was present eight stations. Gravel was present at six stations. Sand was present at all ten stations with it being very heavy at all, but one had moderate coverage. Silt, clay, muck was not encountered. Woody debris was present at all stations and was sparse. Brown colored sediment was encountered at all stations. No odor was associated with the bottom substrate in any station.

Table 1. USEPA Habitat Characterization – Littoral Zone Bottom Substrate.

Station	A	B	C	D	E	F	G	H	I	J
Bedrock	0	0	0	0	0	0	0	0	0	0
Boulders	0	0	0	1	0	1	0	0	0	0
Cobble	1	1	1	1	0	3	1	1	0	1
Gravel	1	0	1	1	0	3	4	0	1	0
Sand	4	4	4	4	4	2	4	4	4	4
Silt, Clay, Muck	0	0	0	0	0	0	0	0	0	0
Woody Debris	1	1	1	1	1	1	1	1	1	1
Color	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Odor	None	None	None	None	None	None	None	None	None	None

Bedrock (>4000mm); Boulders (250-4000mm); Cobble (64-250mm); Gravel (2-64mm); Sand (0.02-2mm); Silt, Clay, or Muck (<0.06mm, not gritty). 0=Absent (0%); 1=Sparse (<10%); 2=Moderate (10-40%); 3=Heavy (40-75%); 4=Very Heavy (>75%)

Table 2 presents the observations made on aquatic macrophytes in the littoral zone. Submergent macrophytes were observed at all stations. Emergent macrophytes were observed at eight stations. Six stations had floating macrophytes present. Total macrophyte cover was sparse at four stations, moderate at three stations, and heavy at three stations. Macrophytes extended lakeward at nine stations.

Table 2. USEPA Habitat Characterization – Littoral Zone Aquatic Macrophytes.										
Station	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Submergent	1	2	1	1	1	1	1	3	1	2
Emergent	2	1	1	0	3	0	1	3	2	3
Floating	0	2	1	1	0	0	1	1	2	0
Total Aquatic Macrophyte Cover	2	2	1	1	3	1	1	3	2	3
Do macrophytes extend lakeward from plot?	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
0=Absent (0%); 1=Sparse (<10%); 2=Moderate (10-40%); 3=Heavy (40-75%); 4=Very Heavy (>75%)										

Littoral zone fish cover observations are presented in Table 3. Aquatic and/or inundated herbaceous vegetation was observed at nine stations. Woody debris and snags > 0.3 meters in diameter were observed at six stations. Woody brush/woody debris < 0.3 meters in diameter was found at eight stations. Inundated live trees (> 0.3 meters in diameter) were observed at five stations. Overhanging vegetation within one meter of the surface was observed at all stations. Ledges or sharp drop-offs were observed at one of station. Boulders were observed at four stations. Finally, human structures (such as docks) were observed as fish cover at three stations.

Table 3. USEPA Habitat Characterization – Littoral Zone Fish Cover.										
Station	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Aquatic & Inundated Herbaceous Cover	2	3	1	1	3	0	1	3	2	4
Woody Debris/Snags >0.3 m dia.	1	0	1	1	1	0	1	0	1	0
Woody Brush/ Woody Debris <0.3 m dia.	1	1	1	1	0	1	1	0	1	1
Inundated Live Trees >0.3 m dia.	0	0	3	1	1	0	2	0	1	0
Overhanging veg. w/in 1 m of surface	1	1	2	3	3	3	1	4	3	1
Ledges or Sharp Drop-offs	0	0	0	0	0	0	1	0	0	0
Boulders	1	1	0	1	0	2	0	0	0	0
Human Structures (docks, landings, etc.)	2	2	0	0	0	0	0	0	0	1
0=Absent (0%); 1=Sparse (<10%); 2=Moderate (10-40%); 3=Heavy (40-75%); 4=Very Heavy (>75%)										

Table 4 presents observations made on the riparian zone canopy (> 5 meters high), understory (0.5 to 5 meters high), and ground cover (<0.5 meters high). Mixed (conifer and deciduous) canopy type was observed in nine stations and coniferous was observed at one station. The coverage of big trees (>0.3 meters diameter) was sparse at two stations, moderate at four stations, heavy at two stations, and very heavy at ten stations. The coverage of small trees (<0.3 meters diameter) was sparse at four stations, moderate at three stations, and heavy at two stations. Mixed (conifer and deciduous) understory type was observed at nine stations and coniferous was observed at one station. Coverage of understory woody shrubs and saplings was sparse at three stations, moderate at two stations, heavy at two stations, and very heavy at three stations. Tall herbs, grasses, and forbs were present at eight stations with sparse at two stations, moderate at four stations, and heavy at one station. Ground cover: woody shrubs and saplings were observed at all ten stations with coverage's of sparse at six stations and moderate at four stations. Groundcover herbs, grasses, and forbs were observed at nine stations with coverage's of sparse at three stations, moderate at six stations. Standing water or inundated vegetation was observed at four stations. Barren, bare, dirt, or buildings was observed at two stations.

Table 4. USEPA Habitat Characterization – Riparian Zone.

Station	A	B	C	D	E	F	G	H	I	J
CANOPY (>5 m high)										
Type	Mix	Mix	Mix	Mix	Mix	Mix	Mix	Con	Mix	Mix
Big Trees (Trunk >0.3 m dia.	2	3	4	3	2	3	2	1	1	2
Small Trees (Trunk <0.3 m dia.	3	1	1	2	2	2	3	0	1	1
UNDERSTORY (0.5 to 5 m high)										
Type	Mix	Con	Mix	Mix	Mix	Mix	Mix	Mix	Mix	Mix
Woody Shrubs and Saplings	1	1	1	2	3	4	4	4	2	3
Tall Herbs, Grasses, Forbes	2	1	0	0	2	0	2	3	1	2
GROUND COVER (<0.5 m high)										
Woody Shrubs and Saplings	1	1	1	2	2	1	2	1	2	1
Herbs, Grasses and Forbes	1	2	1	0	2	1	2	2	2	2
Standing Water/ Inundated Veg.	0	0	0	0	1	0	2	3	2	0
Barren, Bare Dirt, or Buildings	1	2	0	0	0	0	0	0	0	0

0=Absent (0%); 1=Sparse (<10%); 2=Moderate (10-40%); 3=Heavy (40-75%); 4=Very Heavy (>75%); Mix = Mixed conifer and deciduous; Dec = Deciduous

Table 5 presents observations recorded on the riparian shoreline substrate zone. Bedrock was not observed at any of the stations. Boulders were observed at two stations with moderate and very heavy coverage. Cobble substrate was observed at four stations with sparse (one station), moderate (two stations), and heavy at one station. Gravel substrate was observed at two stations and was sparse and had moderate coverage. Sand substrate was observed at three stations and was sparse, moderate, and had very heavy coverage. Silt, clay, or muck substrate was not observed. Woody debris was observed at eight stations with sparse (seven stations) and moderate (one station) coverage. Vegetation or other was observed at all stations with sparse (one station), moderate (two stations), heavy (two stations), and very heavy (five stations) coverage.

Table 5. USEPA Habitat Characterization – Riparian Zone – Shoreline Substrate Zone.

Station	A	B	C	D	E	F	G	H	I	J
Bedrock	0	0	0	0	0	0	0	0	0	0
Boulders	2	0	0	0	0	4	0	0	0	0
Cobble	2	3	0	0	0	0	0	1	0	2
Gravel	1	0	0	0	0	0	2	0	0	0
Sand	1	0	2	4	0	0	0	0	0	0
Silt, Clay, Muck	0	0	0	0	0	0	0	0	0	0
Woody Debris	1	0	2	1	1	1	1	1	1	0
Vegetation or other	2	2	3	3	4	1	4	4	4	4

0=Absent (0%); 1=Sparse (<10%); 2=Moderate (10-40%); 3=Heavy (40-75%); 4=Very Heavy (>75%)

Observations on human influence in the riparian zone are shown in Table 6. Human influence was quite low. Buildings were observed outside of the plot at four stations and present inside the plot at two stations. Commercial was observed outside the plot at one station. Parks facilities/manmade beach were present outside the plot at one station. Docks or boats were observed inside the plot at three stations and outside the plot at five stations. Walls, dykes, revetments were located within the plot at two stations and outside the plot at four stations. Lawn was observed inside the plot at two stations and outside the plot at four stations. All other human influences (roads and railroads, powerline, row crops, pasture/range/hayfield, and orchards) were not observed at any stations.

Table 6. USEPA Habitat Characterization – Riparian Zone – Human Influence Zone.										
Station	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Buildings	PC	PC	P	0	0	0	0	0	0	P
Commercial	0	0	0	P	0	0	0	0	0	0
Park Facilities/ manmade beach	0	0	0	0	0	P	0	0	0	0
Docks/Boats	PC	PC	P	P	0	0	0	0	0	PC
Walls, dykes, revetments	PC	PC	P	0	0	0	P	0	0	0
Landfill/Trash	0	0	C	0	0	0	0	0	0	C
Roads or Railroad	0	0	0	0	0	0	0	0	0	0
Powerline	0	0	0	0	0	0	0	0	0	0
Rowcrops	0	0	0	0	0	0	0	0	0	0
Pasture/Range/Hayfield	0	0	0	0	0	0	0	0	0	0
Orchard	0	0	0	0	0	0	0	0	0	0
Lawn	0	PC	P	P	0	0	0	0	0	PC
0 = Not Present; P = Present outside plot; C = Present within plot										

Table 7 reports the observations made for littoral fish macrohabitat. Human disturbance was observed at three stations and was moderate. Cover class was recorded as patchy at seven stations, and as continuous at three stations. Cover type was recorded as woody and vegetation at all stations, artificial at three stations, and boulder at five stations. Dominant substrate was recorded as sand/gravel at nine stations and cobble/boulder at one station.

Table 7. USEPA Habitat Characterization – Littoral Zone Macrohabitat Classification.										
Station	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Human Disturbance	Mod	Mod	None	None	None	None	None	None	None	Mod
Cover Class	Patchy	Patchy	Patchy	Patchy	Cont	Patchy	Patchy	Cont	Cont	Patchy
Cover Type	Art Bould Woody Veg	Art Bould Woody Veg	Woody Veg	Bould Woody Veg	Woody Veg	Bould Woody Veg	Woody Veg	Woody Veg	Woody Veg	Art Bould Woody Veg
Dominant Substrate	S/G	SG	S/G	S/G	S/G	C/B	S/G	S/G	S/G	S/G
Mod = Moderate; Cont = Continuous Cover; Art = Artificial; No/Lit = No or Little Cover; Bould = Boulder; Veg = Vegetation; M/M = Mud/Muck; C/B = Cobble/Boulder; S/G = Sand/Gravel										

Plot bank features are presented in Table 8. Bank angle was considered flat at one station, gradual at four stations, steep at three stations, and near vertical at two stations. The vertical height from waterline to the high water mark varied at all stations. The horizontal distance from waterline to the high water mark was zero except at one station was a 0.6 m distance.

Table 8. USEPA Habitat Characterization – Within Plot Bank Features.

Station	A	B	C	D	E	F	G	H	I	J
Angle	Grad	Steep	NV	NV	Grad	Steep	Steep	Flat	Grad	Grad
Vertical Height (m) to HWM	0.1	0	0.05	0.05	0	0.05	0.06	0	0.254	0.05
Horizontal Distance (m) to HWM	0.6	0	0	0	0	0	0	0	0	0

HWM = High Water Mark; Flat = <5 degrees; Grad = Gradual (5-30 degrees); Steep (30-75 degrees)

Table 9 displays the invasive plant and invertebrate species found in Sevenmile Lake. No invasive species were observed in the shoreline/riparian plot in nine stations. *Cirsium* sp. (a thistle species) was found at one station and twelve plants were observed.

Table 9. USEPA Habitat Characterization – Invasive Plant and Invertebrate Species.

Station	A	B	C	D	E	F	G	H	I	J
Target Invasive Species in Littoral Plot	None	None	None	None	None	None	None	None	None	None
Target Invasive Species in Shoreline/Riparian Plot	None	None	*Cirsium* sp. (12 plants)	None	None	None	None	None	None	None

Target Invasive Species include: Zebra or Quagga Mussel, Eurasian Water-milfoil, Hydrilla, Curly Pondweed, African Waterweed, Brazilian Waterweed, European Water Chestnut, Water Hyacinth, Parrot Feather, Yellow Floating Heart, Giant Salvinia, Purple Loosestrife, Knotweed (Giant or Japanese), Hairy Willow Herb, Flowering Rush, Cirsium sp. (Thistle)

The WDNR Supplemental Methodology data are presented in Tables 10 and 11. At eight littoral zone transects, 119 pieces of small woody material (>5cm diameter) were counted. Twenty-seven pieces of large woody (>10 cm diameter) material were found at eight stations. *Cirsium* sp. (thistle) plants were found at one of the stations.

Table 10. WDNR Supplemental Methodology– Wood and Invasive Plant Species.										
Station	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Wood: >5cm diameter	1	3	31	20	0	38	18	4	4	0
Wood: >10cm diameter	1	1	8	8	1	4	2	0	2	0
Invasive: Japanese stiltgrass	No	No	No	No	No	No	No	No	No	No
Invasive: Reed canary grass	No	No	No	No	No	No	No	No	No	No
Invasive: Phragmites	No	No	No	No	No	No	No	No	No	No
Invasive: Cattails	No	No	No	No	No	No	No	No	No	No
Invasive: Yellow Iris	No	No	No	No	No	No	No	No	No	No
Other: Cirsium sp.	No	No	Yes	No	No	No	No	No	No	No

Table 11 tabulates that seawalls (one station), riprap (two stations), and lawn (three stations) were found in Sevenmile Lake. Artificial beach and pavement were not present. Residences were observed in the riparian plot of one station and were observed in the upland plot of five stations. Commercial buildings were observed in the upland plot for one station. Structures were observed at one station in the riparian plot and three stations in the upland plot. A boat lift was observed at two stations and a dock was observed at two stations. There were no swim rafts observed at the stations. The WDNR protocol called for counting piers between each of the ten stations. Sixty-five piers were counted on the entire perimeter of Sevenmile Lake.

Table 11. WDNR Supplemental Methodology– Land cover, Human Development, and Piers.										
Station	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
LANDCOVER Key: 0 (0-1%), 1 (>1-10%), 2 (>10-40%), 3 (>40-75%), 4 (>75%)										
Seawall	2	0	0	0	0	0	0	0	0	0
Rip Rap	3	2	0	0	0	0	0	0	0	0
Artificial beach	0	0	0	0	0	0	0	0	0	0
Lawn	0	2/2	0/1	0	0	0	0	0	0	1/3
Pavement	0	0	0	0	0	0	0	0	0	0
HUMAN DEVELOPMENT (1 number given for riparian plot; if 2 numbers, 1st for riparian plot & 2nd for upland plot)										
Residences	0/1	1/2	0/1	0/1	0	0	0	0	0	0/2
Commercial buildings	0	0	0	0/1	0	0	0	0	0	0
Structures (sheds/boat houses)	1/0	0/1	0/1	0	0	0	0	0	0	0/2
Boat lifts	1	1	0	0	0	0	0	0	0	0
Swim rafts	0	0	0	0	0	0	0	0	0	0
Docks	1	1	0	0	0	0	0	0	0	0
NUMBER OF PIERS BETWEEN STATIONS										
From:	A-B	B-C	C-D	D-E	E-F	F-G	G-H	H-I	I-J	J-A
Count	14	6	4	7	0	0	9	4	8	13

The USEPA protocol called for a composite sample of aquatic benthic macroinvertebrates, combining net sweeps from each station into one sample. Table 12 provides the identified invertebrate taxa and counts of individuals by taxa for the composite sample. A total of twenty-one taxa and 244 individual organisms were identified.

Table 12. Composite Benthic Macroinvertebrate Sample from Sevenmile Lake.			
Taxon	**Count**	**Taxon**	**Count**
Nematomorpha	2	Hemiptera: Pleidae	1
Annelida: Oligochaeta	1	Trichoptera (caddisflies): Leptoceridae	4
Crustacea: Amphipoda	64	Lepidoptera: Noctuidae	1
Arachnoidea: Hydracarina	2	Coleoptera (aquatic beetles): Haliplidae (2 adults), Hydrophilidae (2)	4
Ephemeroptera (mayflies): Caenidae (22), and Ephemerellidae (15)	37	Diptera (true flies): Chaoboridae (3), Chironomidae (107), Culicidae (1), TIpulidae (2)	113
Odonata: Anisoptera: Gomphidae (3), Libellulidae (2)	5	Mollusca: Gastropoda: Hydrobiidae (1), Physidae (2), Planorbidae (5)	8
Odonata: Zygoptera (damselflies): Coenagrionidae	2	**Total Taxa**	**21**

Finally, the USEPA protocol called for a fecal indicator sample at the final sampling station (Station J). In the case of Sevenmile Lake, we analyzed the sample collected for *Escherichia coli* (*E. coli)*. The *E. coli* analysis resulted in values of 83 CFU (Colony Forming Units) per 100 milliliters of sample. To place this value in context, the USEPA recommends a water quality advisory (for swimming) when a level of the indicator bacterium *E. coli* exceeds a limit is 235 CFU per 100 milliliters of water.

A photo was taken, by White Water Associate staff, of each of the ten stations. The station photos are displayed below and are labeled Station A-J. Table 13 indicates the coordinates of the stations.

Table 13. Sevenmile Lake USEPA & WDNR Physical Habitat Locations.		
Station	*Latitude*	*Longitude*
A	45.88615	-89.05398
B	45.88989	-89.05168
C	45.88790	-89.04698
D	45.88547	-89.04290
E	45.88249	-89.03899
F	45.87807	-89.04347
G	45.87401	-89.04816
H	45.87309	-89.05450
I	45.87561	-89.05771
J	45.88084	-89.05566

Station A – Sevenmile Lake

USEPA & WDNR Physical Habitat Assessment, June 18, 2013, White Water Associates, Inc.

Station B – Sevenmile Lake

USEPA & WDNR Physical Habitat Assessment, June 18, 2013, White Water Associates, Inc.

Station C – Sevenmile Lake

USEPA & WDNR Physical Habitat Assessment, June 18, 2013, White Water Associates, Inc.

Station D – Sevenmile Lake

USEPA & WDNR Physical Habitat Assessment, June 18, 2013, White Water Associates, Inc.

Station E – Sevenmile Lake

USEPA & WDNR Physical Habitat Assessment, June 18, 2013, White Water Associates, Inc.

Station F – Sevenmile Lake

USEPA & WDNR Physical Habitat Assessment, June 18, 2013, White Water Associates, Inc.

Station G – Sevenmile Lake

USEPA & WDNR Physical Habitat Assessment, June 18, 2013, White Water Associates, Inc.

Station H – Sevenmile Lake

USEPA & WDNR Physical Habitat Assessment, June 18, 2013, White Water Associates, Inc.

Station I – Sevenmile Lake

USEPA & WDNR Physical Habitat Assessment, June 18, 2013, White Water Associates, Inc.

Station J – Sevenmile Lake

USEPA & WDNR Physical Habitat Assessment, June 18, 2013, White Water Associates, Inc.

Literature Cited

United States Environmental Protection Agency (USEPA). 2009. *National Lakes Assessment: A Collaborative Survey of the Nation's lakes.* EPA 841-R-09-001. U.S. Environmental Protection Agency, Office of Water and Office of Research and Development, Washington, D.C. Retrieved 2015. <water.epa.gov/type/lakes/upload/nla_newlowres_fullrpt.pdf>

Page left intentionally blank

Appendix F
Summary of Sevenmile Lake Shoreline Photo Survey

Page left intentionally blank

Sevenmile Lake Shoreline Summary

A photo survey was conducted on Sevenmile Lake in August, 2012. This survey was done to systematically document the littoral zone and riparian area condition of the lake. Documenting the shoreline condition of the lake helps to determine the extent of future changes and impacts, and assess the efficacy of regulatory programs intended to protect the riparian area and lake. One-hundred twenty-six (126) shoreline segments (each 200 feet long) were assessed for a variety of shoreline parameters by members of the Sevenmile Lake Association. The data and photographs of each segment are provided in CD-ROM format. This data summary is included as an addendum to that report. This data will be a useful tool in identifying and planning restoration projects in the Sevenmile Lake riparian area and for monitoring long-term change.

Sevenmile Lake Shoreline – Development		
Type	Number of records	% records
house	66	52%
shed	10	8%
garage	5	4%
gravel drive	1	1%
paved drive	2	2%
lawn	18	14%
other	17	13%

At 66 sites, a house was observed (52% of sites).

Sevenmile Lake Shoreline – Structures		
Type	Number of records	% records
dock	58	46%
breakwater	0	0%
storm wall	17	13%
boathouse	3	2%
rip-rap	29	23%
other	32	25%

At 58 sites, a dock was observed (46% of sites).

Sevenmile Lake Shoreline – Access		
Type	Number of records	% records
none	43	34%
unimproved path	55	44%
gravel path	1	1%
chip path	0	0%
paved path	4	3%
boardwalk	0	0%
stairs	24	19%
other	34	27%

At 43 sites, no access was noted (34% of sites).

Sevenmile Lake Shoreline – Beach		
Type	Number of records	% records
none	116	92%
natural	117	93%
artificial	6	5%
stable	123	98%
eroding	1	1%
other	0	0%

The majority of sites had natural, stable shorelines.

Sevenmile Lake Shoreline – Vegetation		
Type	Number of records	% records
upland	118	94%
wetland	12	10%
forested	117	93%
shrub	73	58%
natural openings	4	3%
stream	6	5%
other	0	0%

The majority of sites had upland, forested vegetation present (around 93% of sites)

Sevenmile Lake Shoreline – Buffer		
Type	Number of records	% records
none	14	11%
1-3 ft	4	3%
4-10 ft	4	3%
above 10 ft	100	79%
type: herbaceous	0	0%
type: shrubs	43	34%
type: trees	52	41%
type: other	7	6%

At 100 sites, the shoreline buffer was "above 10 ft." (79% of sites).

Sevenmile Lake Shoreline – Erosion		
Type	Number of records	% records
none	123	98%
undercut banks/slumping	0	0%
furrows/gullies	1	1%
bare earth	1	1%
other	0	0%

Erosion was not observed at 123 sites along the shoreline (98% of sites).

Sevenmile Lake Shoreline – Bank Height		
Type	Number of records	% records
none	9	7%
slight (< 2 ft.)	45	36%
abrupt ($\geq$ 2 ft.)	69	55%

The bank height was abrupt ($\geq$ 2 ft.) at 69 sites (55% of sites).

Page left intentionally blank

WHITE WATER ASSOCIATES, INC.

Appendix G
Sevenmile Lake Fisheries Report

Page left intentionally blank

WHITE WATER ASSOCIATES, INC.

Review of Sevenmile Lake Fishery

Table of Contents

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Review of Sevenmile Lake Fishery

Prepared by Angie Stine, B.S., White Water Associates, Inc.

Introduction

Sevenmile Lake fishery has changed over the years. A variety of fisheries data has been collected as early as the 1980s. The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) has collected walleye and muskie spearing data since 1999. Creel Survey information was available from the WDNR SWIMS database from 1992 to 2008. The Wisconsin Department of Natural Resources conducted fyke net surveys from April 30 to May 27, 2008. Other various surveys including mark-recaptures and boom shocking have been conducted on Sevenmile Lake to determine the status of its fishery. Fish structures have also been placed in Sevenmile Lake historically.

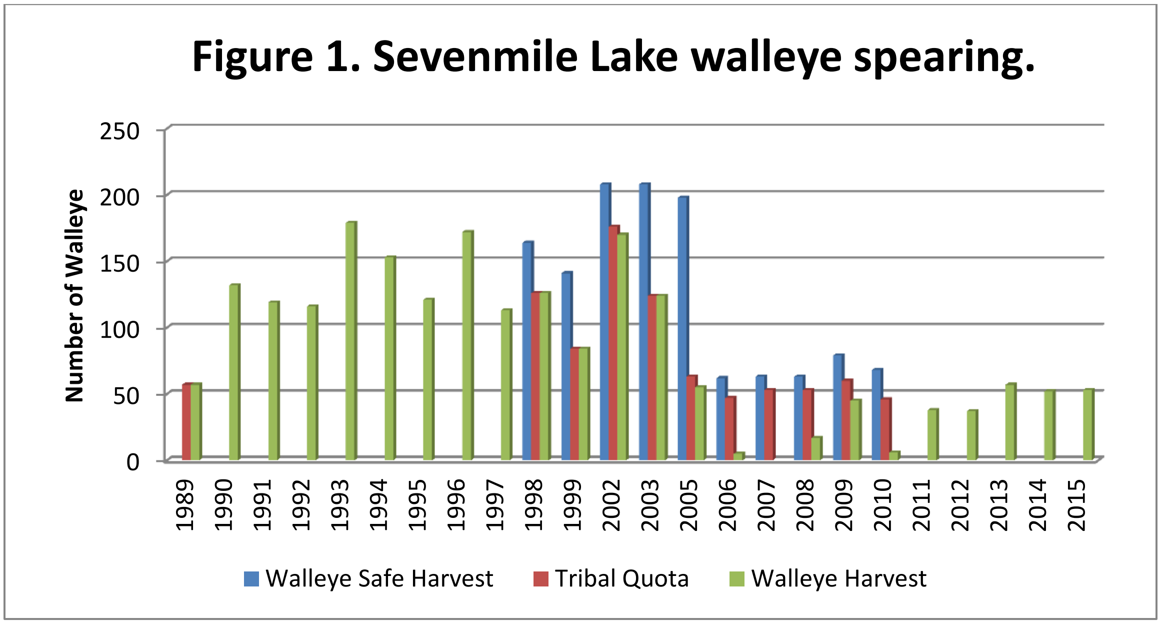
Spearing

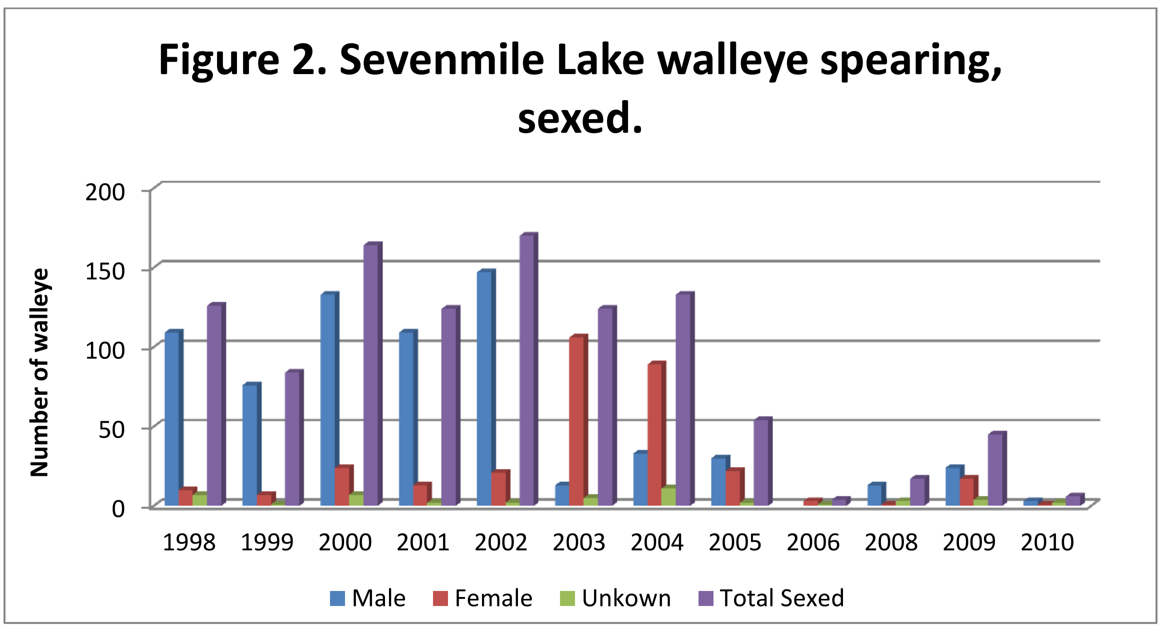
Walleye, muskellunge and other species of fish can be harvested each spring by spearing. This fishery is highly regulated and controlled with: individual lake quotas, nightly permitting system, only specified boat landings to be used, and the stationing of tribal creel clerks and wardens at every landing to count all fish harvested (GLIFWC 2015). Quotas are adjusted daily based on the previous night's harvest to ensure that they are not exceeded (GLIFWC 2015). With such a system, a wealth of information for describing the tribal fishery and the impact of that fishery on individual walleye populations have been collected (GLIFWC 2015).

Data is available for Sevenmile Lake walleye and musky spearing in 1989 to 2015. Figures 1 and 2 display the walleye spearing data for Sevenmile Lake. Muskie were harvested as follows 2000 (1 muskie), 2001 (1 muskie), 2005 (1 muskie), 2006 (1 muskie), and 2009 (2 muskie).

Each year, a value of "walleye safe harvest" and "tribal quota" are specified. In all survey years, the true amount of walleye harvested was less than the walleye safe harvest and tribal quota numbers (Figure 1). Figure 2 displays the total walleye harvested along with identification of sexes. It can be observed that in every year, except 2003 and 2004, that very few female fish were harvested. Tribal quotas and harvest change dramatically in 2006 because the recruitment category was changed from "natural reproduction" to "stocked" (Kubisiak 2016). Lakes supported primarily by natural reproduction tend to have higher walleye populations and are given higher quotas than lakes supported primarily by stocking (Kubisiak 2016). Prior to 2006, Sevenmile was considered primarily a natural reproduction lake (with some contribution from stocking), while from 2006 on it was considered a stoked lake (with some natural reproduction)

(Kubisiak 2016). Data for Figure 1 and 2 were retrieved from GLIFWC reports (Krueger 1998-2015).





Creel Surveys

Creel surveys, which are conducted to sample the fishing pressure of anglers on a body of water and to make projections of harvest, were conducted on Sevenmile Lake by the Wisconsin DNR. Table 1 shows the creel information for Sevenmile Lake from 1992 to 2008.

Table 1. Sevenmile Lake Creel Summary (WDNR 2014).

SPECIES	SURVEY YEAR	TOTAL ANGLER EFFORT/ACRE (HOURS)	DIRECTED EFFORT/ACRE (HOURS)	CATCH	CATCH/ACRE	HARVEST	HARVEST/ACRE	HOURS OF DIRECTED EFFORT/FISH CAUGHT	HOURS OF DIRECTED EFFORT/FISH HARVESTED
LARGEMOUTH BASS	1992	26.1	0.4	0	0	0	0		
	1997	25.1	0.9	5	0	0	0	102	
	2008	24.4	0.9	183	0.4	13	0	6.7	100
MUSKELLUNGE	1992	26.1	7.3	114	0.2	0	0	140.8	
	1997	25.1	10.5	365	0.7	5	0	17.2	1,111.10
	2008	24.4	2.5	241	0.5	5	0	25	
NORTHERN PIKE	1992	26.1	4.2	137	0.3	102	0.2	15.5	20.8
	1997	25.1	3.8	214	0.4	92	0.2	12	29.2
	2008	24.4	0.9	440	0.9	135	0.3	5.9	7.1
SMALLMOUTH BASS	1992	26.1	0.2	9	0	9	0		
	1997	25.1	0.7	37	0.1	9	0	20	78.7
	2008	24.4	0.1	586	1.2	20	0	2.6	50
WALLEYE	1992	26.1	14.1	1442	2.9	276	0.5	4.9	25.6
	1997	25.1	10.9	1240	2.5	429	0.9	4.5	12.9
	2008	24.4	6.4	313	0.6	230	0.5	11.1	14.3

Table 2 shows the fishing effort per species during the creel survey. In 2008, anglers spent 12,251 hours or 24.4 hours per acre sampling (Tobias 2008-2009). Many effort hours have been dedicated to conducting creel surveys on Sevenmile Lake. The average angler hours per acre spent on Sevenmile Lake in 2008-2009 was lower than the Oneida County average hours per acre spent sampling. The complete 2008-2009 Sevenmile Lake creel report can be found on the Wisconsin DNR website (http://dnr.wi.gov/topic/fishing/north/trtycrlsrvys.html).

Table 2. Sportfishing effort summary, Sevenmile Lake, 2008-2009 (Tobias 2008-2009).

Month	Total Angler Hours	Total Angler Hours/Acre	Oneida County Avg. Hours/Acre	Statewide Avg. Hours/Acre
May	967	1.9	5.4	5.8
June	2514	5.0	7.3	6.1
July	2598	5.2	8.3	6.4
August	3290	6.5	6.3	5.4
September	1061	2.1	3.7	3.8
October	851	1.2	1.7	1.6
December	432	0.9	1.2	1.7
January	330	0.7	1.5	1.5
February	480	1.0	1.5	1.3
March	0	0.0	0.2	
Summer Total*	11010	21.9	32.8	29.1
Winter Total*	1242	2.5	4.4	4.5
Grand Total	12251	24.4	37.2	33.6

*Summer is from May-October; Winter is from December-March

In 2008, fyke netting was conducted on Sevenmile Lake from April 30 to May 27. The adult walleye population was estimated at 647 or 1.3 walleye per acre in 2008, 2.7 per acre in 1997, and 4.9 per acre in 1992 (fyke nets to mark and electrofishing to recapture) (Coshun 2008, Kubisiak 2016). Approximately 98% of the adult walleye caught were 14 inches or larger, with the largest being a 29.2 inch female (Coshun 2008). While smallmouth bass were not a primary target for the fyke net survey, 9 smallmouth bass were caught. The largest smallmouth bass captured was 21.4 inches (Coshun 2008). Similarly, largemouth bass were not targeted in this survey. Sixteen largemouth bass were capture, and the largest was 17.5 inches. A total 19 northern pike were netted. Of those, 17 were smaller than 26 inches. The largest northern pike was 26.2 inches (Coshun 2008). Muskellunge were also captured, totaling 41 adults. Nearly 81% of musky netted were larger than 34 inches. The largest musky was a 46.1 inch female (Coshun 2008). Other fish species including bluegill, pumpkinseed, rock bass, black bullhead, black crappie, creek chub, golden shiner, white sucker, and yellow perch were caught in the fyke nets but numbers were not analyzed. The full 2008 fyke net report can be found at the WDNR website.

Fifteen females, 13 males and one unknown sex musky were marked in 2007 (WDNR 2009). In the 2008 recapture phase, 45 musky were captured, while only 5 had the mark from 2007. The 2007 adult muskellunge population (including fish 30 inches and larger) was estimated at 215, but the coefficient of variation was fairly large, at 35% (Kubisiak 2016). Muskie's don't electrofish well, so scientists take a year off between marking and recapture. For example, muskies were captured with nets and marked in 2007 and recapture with nets in 2008 (Kubisiak 2016).

Walleye recruitment studies were conducted in 2010 and 2012. Tables 3 and 4 display the 2010 and 2012 results. Figures 3 and 4 show the 2010 and 2012 walleye length distributions. Fall electrofishing is used for an index of recruitment (how many young fish are coming up, especially walleye) (Kubisiak 2016). Surveys were also conducted in 2014 and 2015.

Table 3. Fishing results, October 4, 2010 (Coshun 2011).

Species	*Number captured*	*Size Range (inches)*	*Catch/Unit*
Walleye (Age 0+)	80	5.7-7.6	29.63/hr. 19.51/mile
Walleye (Age 1+)	7	9.1-10.9	2.59/hr. 1.71/mile
Walleye other	15	11.5-14.5	5.56/hr. 0.98/mile
Smallmouth Bass	4	3.0-13.4	1.48/hr. 0.98/mile
Largemouth Bass	4	3.0-13.4	1.48/hr. 0.98/mile
Muskellunge	1	18.0-18.4	0.37/hr. 0.24/mile
Northern Pike	8	15.5-21.4	2.96/hr. 1.95/mile

Table 4. Fishing results, September 20, 2012 (Coshun 2012).

Species	*Number captured*	*Size Range*	*Catch/Unit*
Walleye (Age 0+)	32	5.7-7.5	21.33/hr. 9.14/mile
Walleye (Age 1+)	2	9.7-10.3	1.33/hr. 0.57/mile
Walleye other	11	11.0-22.9	7.33/hr. 3.14/mile
Smallmouth Bass	0		0/hr. 0/mile
Largemouth Bass	4	9.0-12.4	2.67/hr. 1.14/mile
Muskellunge	1	23.0-23.4	0.67/hr. 0.29/mile
Northern Pike	11	15.0-26.9	7.33/hr. 3.14/mile

Figure 3. Walleye Length Distribution, October 4, 2010 (Coshun 2011).

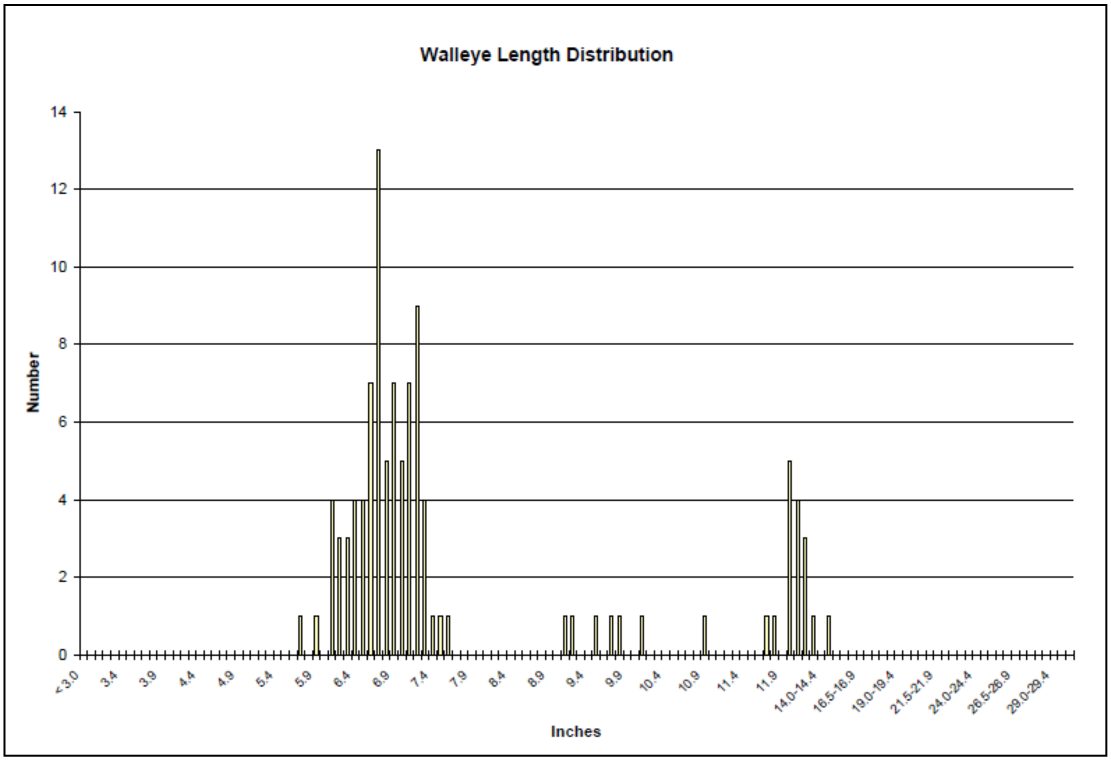
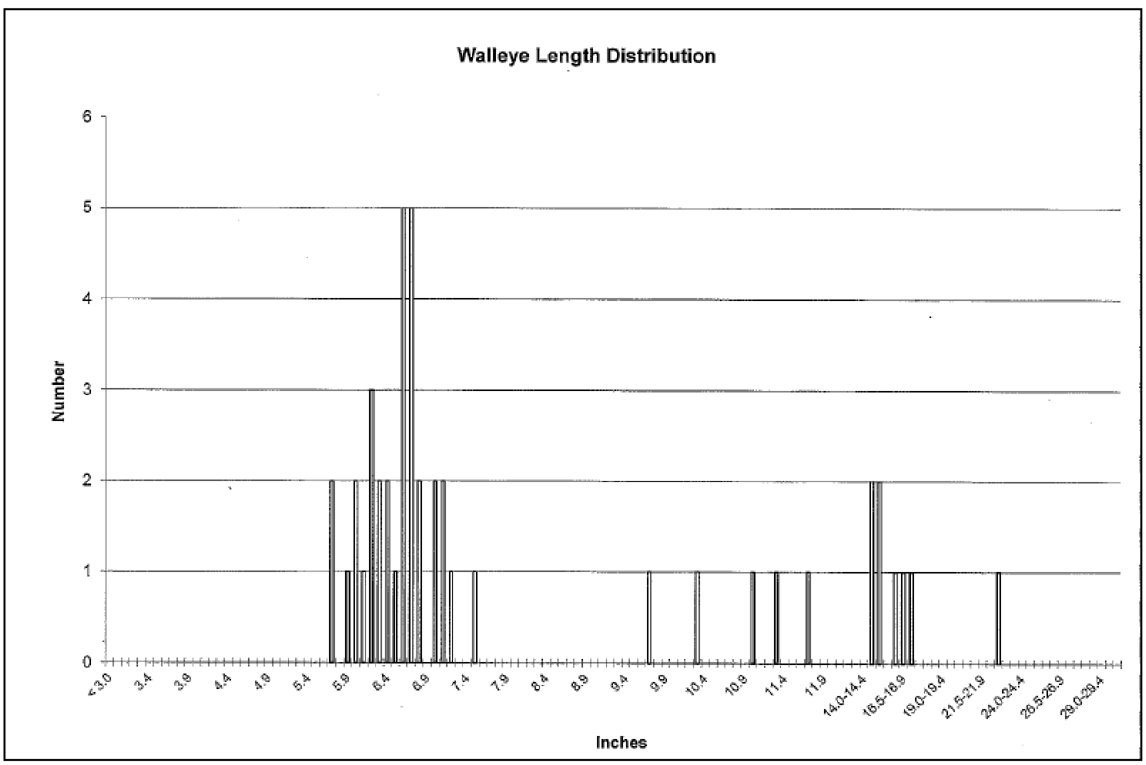


Figure 4. Walleye Length Distribution, September 20, 2012 (Coshun 2012).



Status of Sevenmile Lake Fishery

Discussion was initiated by White Water Associates with John Kubisiak, a WDNR Fisheries Biologist, regarding the status of the Sevenmile Lake fishery. Kubisiak (2012) stated that the WDNR started stocking walleye in Sevenmile Lake in even-numbered years beginning in 2004. All hatchery fish were marked before release with oxytetracycline (OTC), an antibiotic drug that will fluoresce when exposed to UV light. In all survey years, very high percentages of young-of-year (YOY) walleye were recaptured (Kubisiak, 2013). The stocking and recapturing information is located in Table 5.

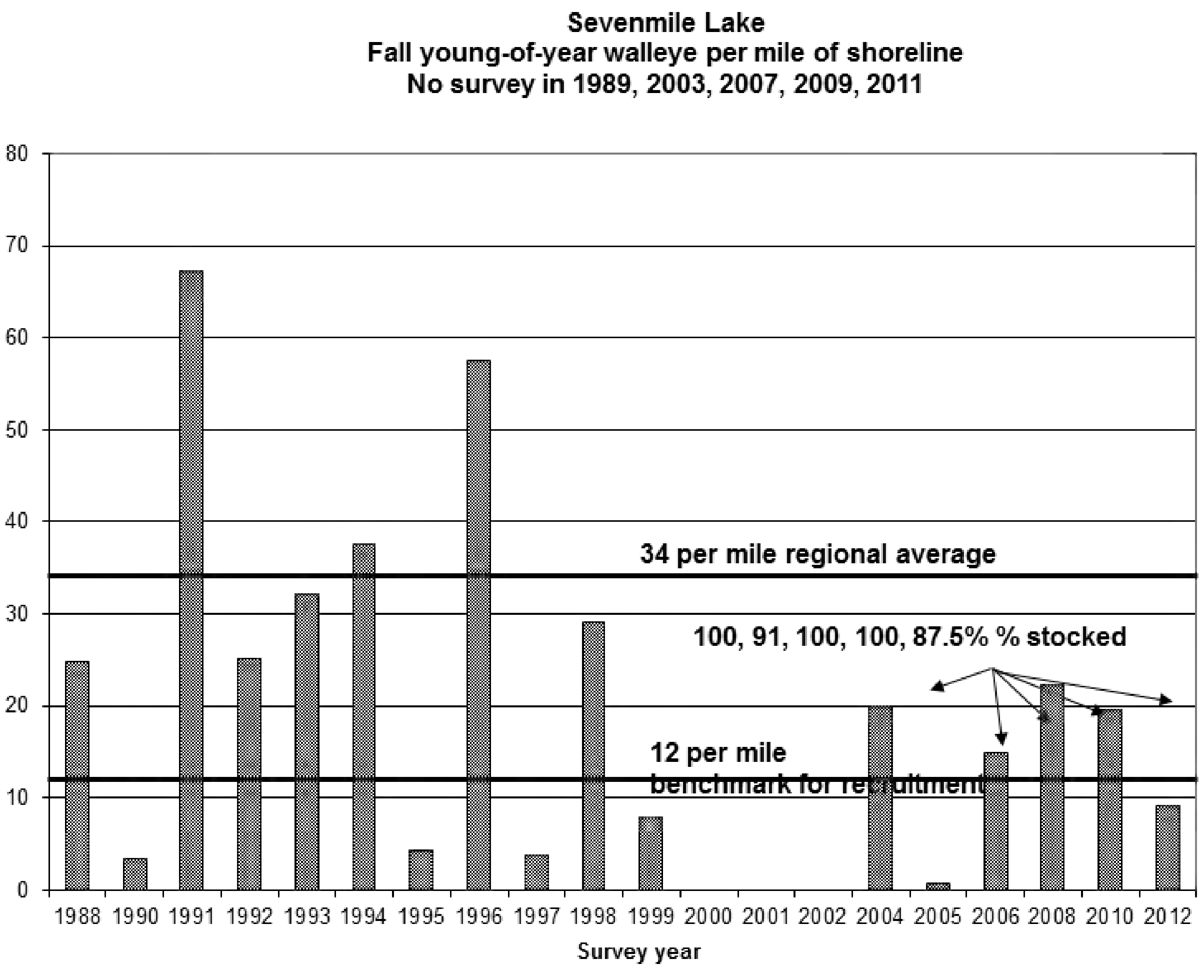
Table 5. Sevenmile Lake stocking young of the year (YOY), 2004-2012 (Kubisiak 2013).

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012
YOY/mile	19.8	0.7	14.9	N/A	22.2	N/A	19.51	N/A	9.14
1+/mile	4.85	0.2	4.9		0		1.71		0.57
YOY - OTC fraction	100% OTC		91% OTC		100% OTC		100% OTC		87.5% OTC

Kubisiak (2013) stated that Sevenmile had good, natural walleye reproduction through 1999, but poor since. He noted that the WDNR has looked at stocked versus natural contribution in every stocked year. Figure 5 shows the number of young-of-year walleye captured per mile of shoreline. Kubisiak observed that 87.5% of the YOY collected during in the 2012 survey were of stocked origin.

Kubisiak (2016) found that when walleye were reproducing naturally (prior to 2000), they did not pull off a strong natural year class if the spring water level at 4 days after ice-out (around peak of spawning) was lower than about 1.5 feet below full pool. After 2000, there were no strong natural year classes no matter what the water level (Kubisiak 2016).

Figure 5. Sevenmile Lake fall young-of-year walleye (Kubisiak 2013).



On May 26, 2012, Kubisiak attended the Sevenmile Lake Association meeting to talk about potential for placing a walleye spawning reef on private frontage on Sevenmile Lake instead of stocking fish, but he also pointed out the uncertainties.

Kubisiak toured the shoreline with WDNR Fisheries Technician, Steve Timler, and US Forest Service Biologist (USFS), Mike Peczinski on September 26, 2011 to inventory what spawning area was present and potential for improvement (Figure 6). They determined that the US Forest Service (USFS) frontage has clean gravel and should not be disturbed, but that there is potential to create additional habitat on some of the private frontage (Kubisiak 2013). Kubisiak toured the shoreline again on May 10, 2012 with others.

Figure 6. Walleye Spawning Areas Located Along US Forest Service Frontage (Peczynski 2013).

The USFS placed some trees in the lake. Kubisiak shared some maps of locations of fish habitat that was placed. He mentioned the color map (Figure 7) could be from the 1950s and the Clarkson map from the 1970s or 80s (Figure 8).

Figure 7. Sevenmile Lake Improvement Structures Map (Kubisiak 2013).

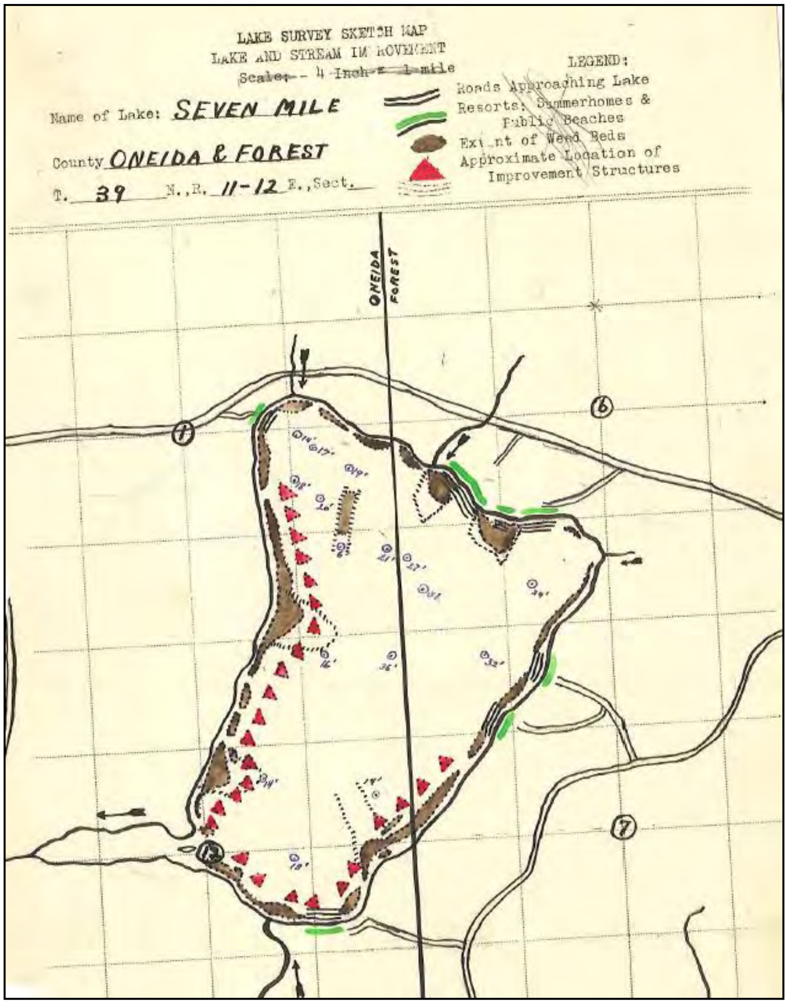
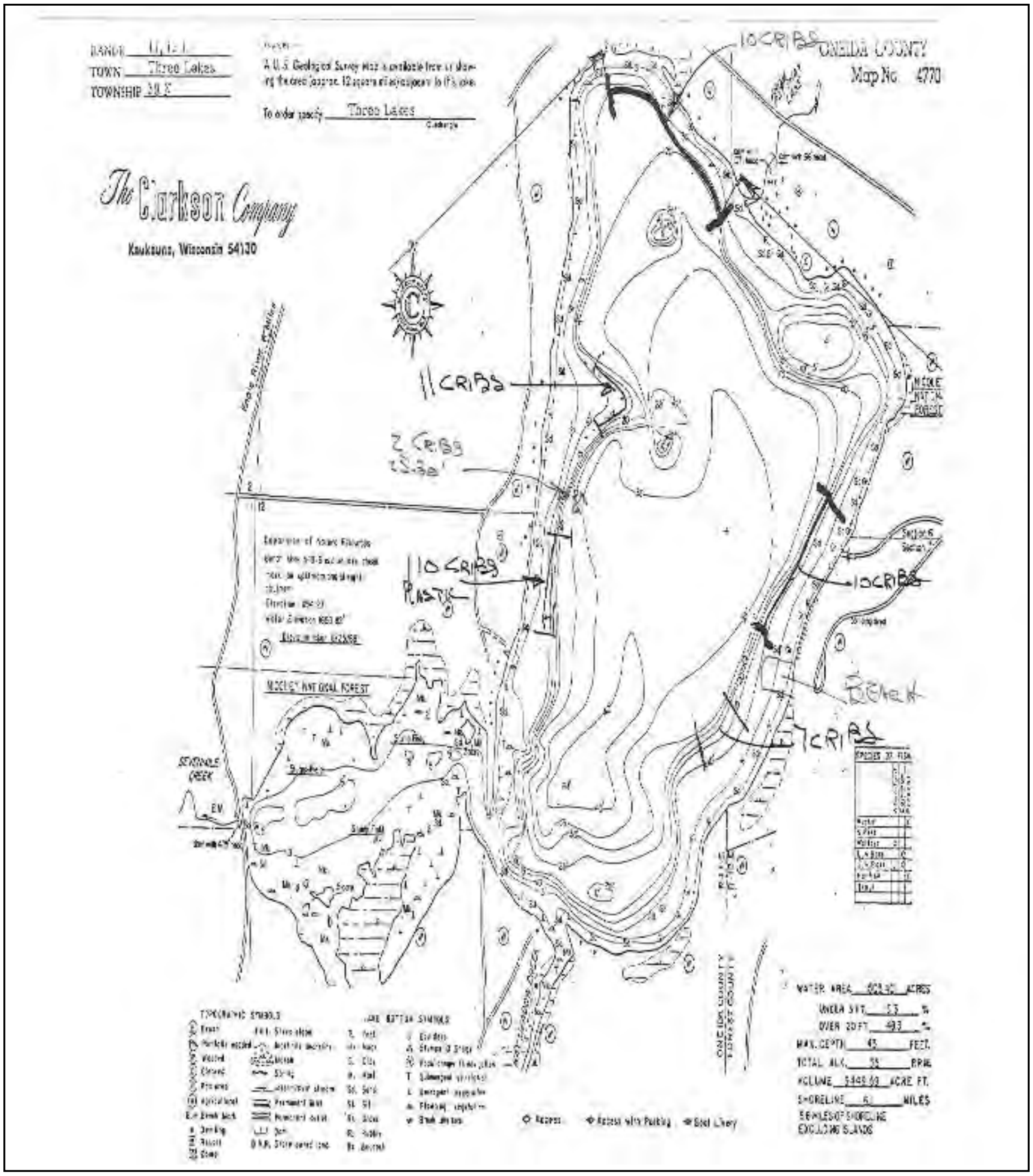
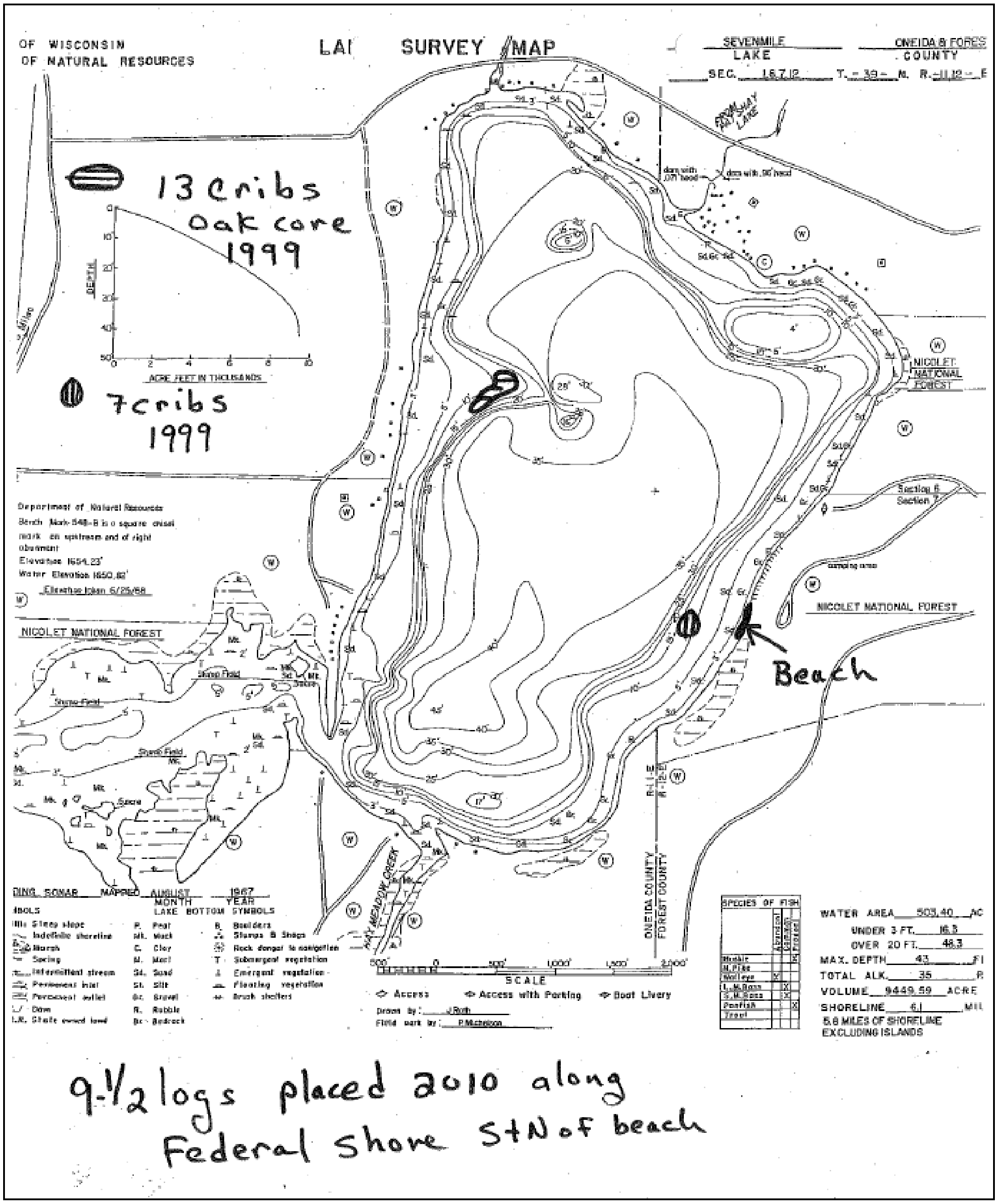


Figure 8. Sevenmile Lake Fish Crib Locations (Kubisiak 2013).



Peczynski (2013) said that in 1999, the US Forest Service placed 7 fish cribs at 15 feet deep off the southeast corner of the Forest Service beach (Figure 9). An additional 13 cribs were placed in 15-18 feet deep about 700 feet out from the west shore. The cribs were placed fairly close together extending over a large area. The cribs were made of oak cores stuffed with brush. Peczynski (2013) states that there were also black plastic cardboard box-like cribs placed by local landowners. Also visible is Peczynski's note that in 2010, 9.5 logs were placed along the USFS shore, north and south of the beach.

Figure 9. Sevenmile Lake Crib and Log Locations, 1999 and 2010 (Peczynski 2013).



Literature Cited

Coshun, Mike. 2008. *Wisconsin DNR Fisheries Information Sheet Sevenmile Lake.* Wisconsin Department of Natural Resources.

Coshun, Mike. 2011. *Summary Fishing Record*. Wisconsin Department of Natural Resources.

Coshun, Mike. 2012. *Summary Fishing Record*. Wisconsin Department of Natural Resources.

Great Lakes Indian Fish and Wildlife Commission. 2015. *Tribal Harvest Management.* Retrieved 2015. <http://www.glifwc.org/Fisheries/Inland/inland.html>

Krueger, Jennifer. 1999-2011. *Open Water Spearing in Northern Wisconsin by Chippewa Indians during 1999-2011*. Great Lakes Indian Fish and Wildlife Commission. Retrieved 2015. <https://data.glifwc.org/reports/>

Kubisiak, John. October 16, 2012. Wisconsin Department of Natural Resources. Personal communication.

Kubisiak, John. February 8, 2013. Wisconsin Department of Natural Resources. Personal communication.

Kubisiak, John. 2016. [Comments to report draft.] Wisconsin Department of Natural Resources.

Peczynski, Mike. 2013. US Forest Service Biologist. E-mail and personal communication.

Tobias, Tim. 2008-09. *Wisconsin Department of Natural Resources Creel Survey Report, Sevenmile Lake, Oneida County*. Treat Fisheries Publication. Retrieved 2015. <http://dnr.wi.gov/topic/fishing/north/trtycrlsrvys.html>

Wisconsin Department of Natural Resources. 2009. *Muskellunge Population Estimate.*

Wisconsin Department of Natural Resources. 2014. *Surface Water Integrated Monitoring Systems (SWIMS) Database.* Retrieved 2015. <http://dnr.wi.gov/topic/surfacewater/swims/>

Page left intentionally blank

Appendix H
Sevenmile Lake Stewardship Program
Volunteer Anglers' Journals Report

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Sevenmile Lake Association (SLA):
Sevenmile Lake Stewardship Program
Volunteer Anglers' Journal Report


Photo by Dean Premo

Table of Contents

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Introduction

One component of the Sevenmile Lake Stewardship Program was to establish a means by which anglers could collect meaningful fisheries data. Members of the Sevenmile Lake Association (SLA) and their consultant (White Water Associates) worked with the Wisconsin Department of Natural Resources (WDNR) to develop the Volunteer Anglers' Journal. The goal of the journals (and the resulting data) was to augment the periodic WDNR fish surveys (including Fyke nets, electroshocking, and creel surveys) with continuously collected and annually reported fishing data from systematically recorded angler journals. This report documents the methods and findings for 2012, 2013, and 2014 volunteer fish monitoring in Sevenmile Lake.

Methods

This volunteer angler journal program was designed so that volunteer anglers can systematically record their fishing experiences. The program was conceived and designed by White Water Associates although components of the program (and field form) were drawn from literature sources (similar programs have been established in other states). Review by WDNR fisheries staff (Dennis Scholl and David Seibel) and WDNR Water Resources Management Specialist (Kevin Gauthier) resulted in several meaningful modifications.

We hope that participating anglers will be engaged in the journaling process on an ongoing basis, however, the system can also accommodate anglers who participate for one fishing trip only. This activity will engage anglers in collecting fish data and contribute to the understanding of fish population dynamics. The objectives for the angler journal program include providing information on:

- Species of fish caught while angling on Sevenmile Lake;
- Size distribution of fishes caught on Sevenmile Lake;
- Fishing emphases of Sevenmile Lake anglers (time spent on panfish, walleyes, bass, etc.);
- Fishing techniques used on Sevenmile Lake (trolling, bait fishing, spin fishing, etc.);
- Relative amount of catch and release fishing; and
- Catch-per-effort for various Sevenmile Lake fish species

Volunteer anglers participating in the journal program were provided with field data forms and specific instructions on how to fill out the forms (Figure 1).

Figure 1. Volunteer Anglers' Journal field data form.

VOLUNTEER ANGLERS JOURNAL FIELD DATA FORM

Important Instructions (*see Angler Journal Description for details*)
Fill sheet out only for yourself (a partner fills out a separate sheet). Use new sheet for each fishing trip. Record unsuccessful trips too. Measure and record all gamefish caught and indicate if kept/released. For panfish, measure the length of the first ten of each species and indicate if kept or released. For additional panfish, count number kept and number released and record. Complete a journal form every time you fish.

Angler and Fishing Trip Data		
Angler Name:	Phone:	Date:
Time start (actual fishing time):	Time end (actual fishing time):	Total time fishing (excluding lunch break, etc.):
List fish species sought and % time spent for each. If you are seeking all species listed during your entire outing, list "100%" by each.		
Watercraft (circle one): Ice Pontoon Fishing boat Canoe Kayak Other (specify):		
Fishing Style (circle 1 or more): Tip-up Jigging Trolling Casting Bait Fly Other (specify):		
Weather Conditions: Sunny ____ Partly Cloudy ____ Overcast ____ Air temp (°F) ____ Water temp (°F) ____ Rainy ____	Calm winds ____ Moderate winds ____ Strong winds ____	Wind Direction ____ Other weather notes:
Level of satisfaction (circle one): Low Medium High Explain:		

Record Fish Caught on Trip										
Catch #	Fish Species Common Name	Length (nearest ¼ inch)	Check one: Kept	Released	Catch #	Fish Species Common Name	Length (nearest ¼ inch)	Check one: Kept	Released	Counts of unmeasured panfish
1					11					Bluegill
2					12					
3					13					Pumpkinseed
4					14					
5					15					Crappie
6					16					
7					17					Yellow Perch
8					18					
9					19					Other (specify)
10					20					

Data continued on second page? (circle one): YES NO Note: If you need more space, indicate by circling "YES" and then record data on back of this sheet or on a 2nd data form.

Important instructions to the volunteers were summarized on the data form and emphasized on a separate handout. These instructions included the following:

- Fill out the data form only for yourself (if they wish, a fishing partner should fill out his/her own);
- Use a new sheet for each fishing outing;
- Record all trips including unsuccessful trips (even if you have caught no or few fish);
- Record actual time spent fishing (boating to and from your fishing areas and time spent doing reconnaissance with sonar are considered fishing activities and you should include the time spent on these activities even though you may not have a line in the water). Don't include non-fishing activity such as a lunch break or time spent swimming);

- Measure all fish caught (even tiny ones) in inches from tip of the snout to tip of the tail. Measure to the nearest one-quarter (1/4) inch. We want to understand the population size structure;
- Indicate if the fish was kept or released;
- Be consistent; fill out a journal field data sheet every time you fish;
- List the fish species you are seeking during a fishing trip and estimate a percentage of time devoted to each. If you are seeking all species listed during your entire outing, record "100%" by each species;
- Measure and record all game fish species caught. For panfish species, measure the length of the first ten of each species and indicate if kept or released. For additional panfish (beyond 10), simply count (don't measure) the number kept and number released. Record these numbers;
- If you need additional space for recording fish, indicated "continued on another page" and then record on back of the Field Data Form or on a second Field Data Form.

As with any biological sampling (whether done by professionals or volunteers), appropriate scientific and resource management use of data must recognize possible limitations of the data. In the case of the Sevenmile Lake Volunteer Anglers' Journal, data will be most valid and useful if volunteers: (1) carefully follow directions regarding data recording, (2) accurately identify fish and measure fish length, (3) honestly record all data (big fish, little fish, many fish, and few fish), (4) consistently use the journal on all fishing outings, and (5) participate for multiple years.

Results

General Statistics

Sevenmile Lake is a 518 acre lake with a maximum depth of 43 feet. It is located in Forest, Oneida County and is a mesotrophic, drainage lake. The volunteer anglers' journal endeavor began with a small number of participants, but we anticipate that this number will grow. The scientific value of the information collected will increase with a greater number of participants and participation of several years. In 2012, there were 65 angler journals by 14 participants. In 2013, 37 angler journals were completed by 5 participants. Lastly, in 2014, 71 angler journals were submitted by 6 participants. The completed journal entries represent fishing trips (outings). The journal periods referred to in this report were from May 2, 2012 to September 30, 2012; May 18, 2013 to August 4, 2013; and March 4, 2014 to September 4, 2014.

Table 1. Sport fishing effort summary, Sevenmile Lake, 2012-14 season.						
Month	*Total Angler Hrs. (Angler Journal)*			*Total Angler Hrs./Acre (Angler Journal)*		
	2012	*2013*	*2014*	*2012*	*2013*	*2014*
March			18.0			0.03
May	48.5	12.5	16.3	0.09	0.02	0.03
June	32.3	23.5	61.5	0.06	0.05	0.12
July	60.5	45.8	83.5	0.12	0.16	0.16
August	2.3	18.0		0.00	0.03	
September	31.8			0.06		
Total	**175.4**	**99.8**	**179.3**	**0.31**	**0.26**	**0.34**

Table 1 displays the fishing effort of anglers on Sevenmile Lake in 2012, 2013, and 2014. Total angler hours are the estimated number of hours that anglers spent fishing on Sevenmile Lake during each month. Total angler hours/acre is the total angler hours divided by the area of the lake in acres.

Figure 2 illustrates the fishing effort reported on Sevenmile Lake by month. July had the most fished time recorded by anglers in 2012 (60.5 hrs), 2013 (45.8 hrs), and 2014 (83.5 hrs).

Figure 2. Fishing effort, 2012-2014.

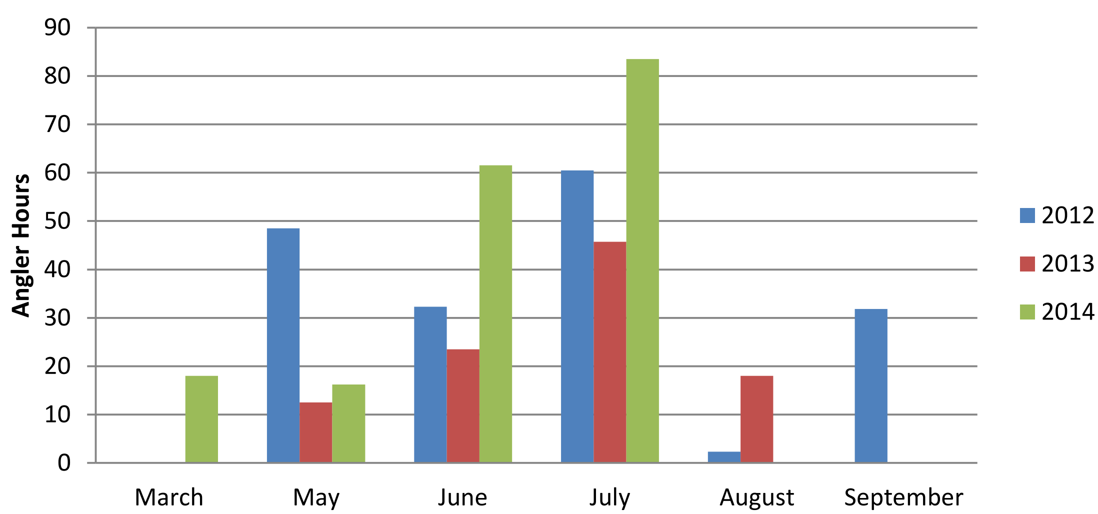
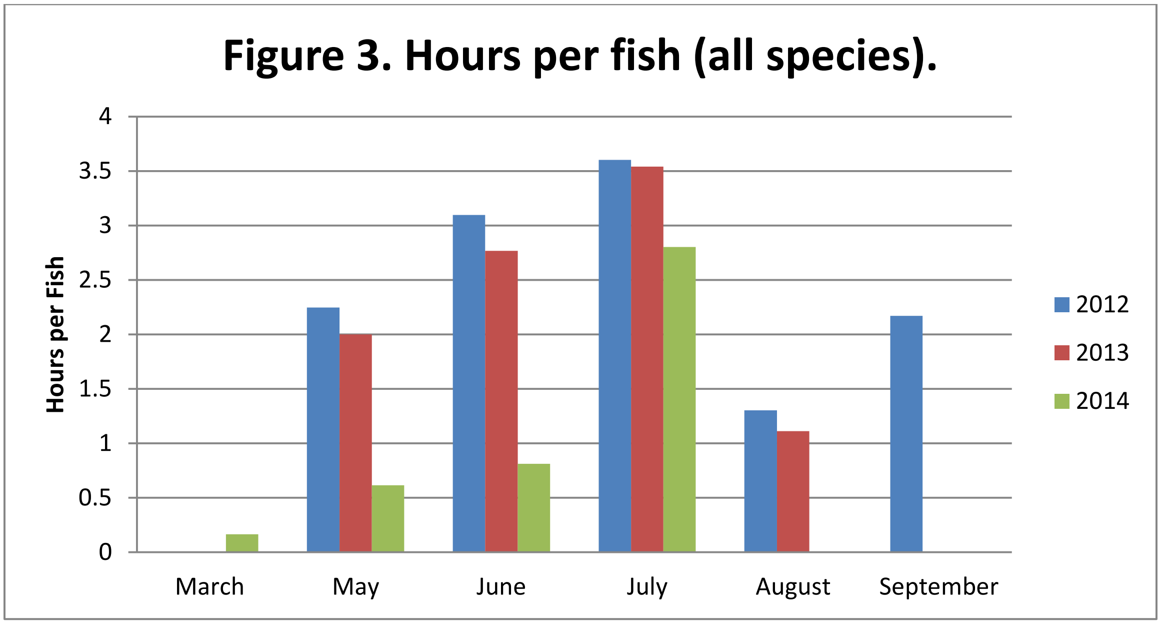
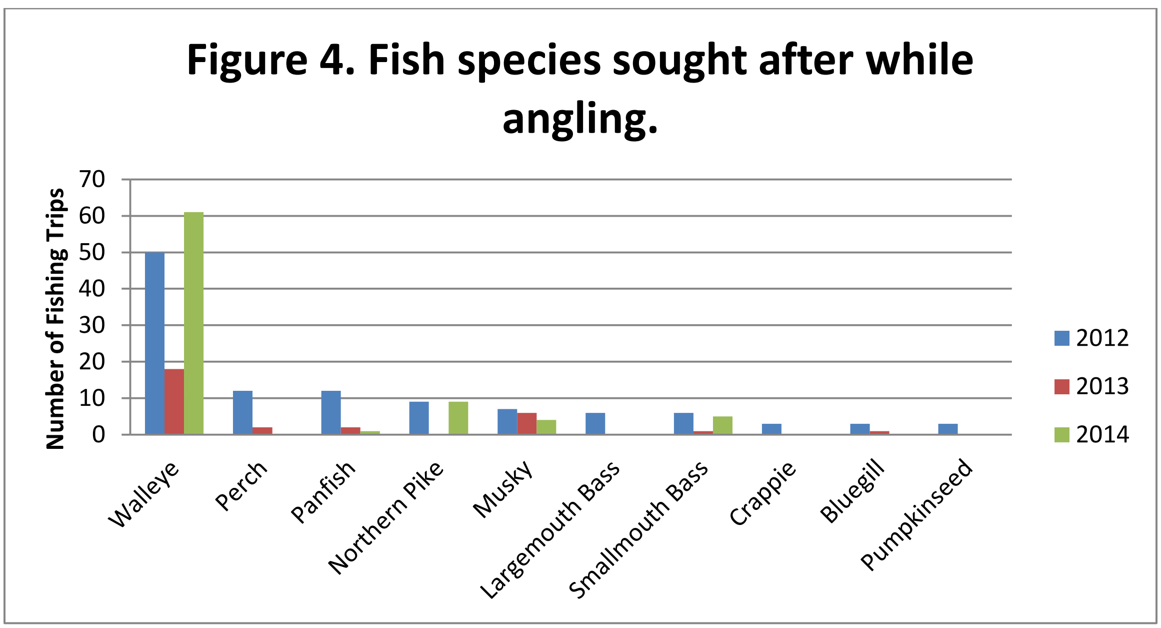


Figure 3 indicates the hours spent per fish in 2012, 2013, and 2014. July had the highest effort per fish rate in all three years.



Anglers indicated (with a percentage) what species of fish they were intending to catch (Figure 4). In some cases, it was recorded that anglers intended to catch different species in the same outing. Walleye was the most sought after fish.



Anglers recorded the platforms from which they fished. Their responses were: fishing boat, kayak, pontoon, pier, and shore. A few anglers made no mention of what platform they fished off of. The majority of reporting anglers fished from a fishing boat (Figure 5).

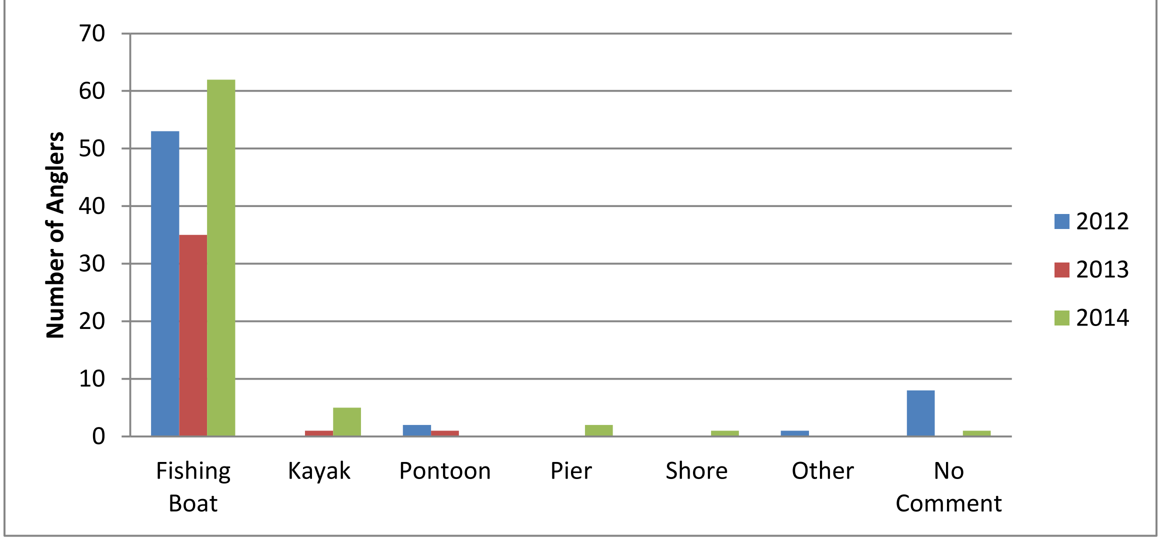


Figure 5. Platform used for fishing.

Figure 6 displays different techniques of fishing used by anglers. The most common technique was casting, followed by jigging.

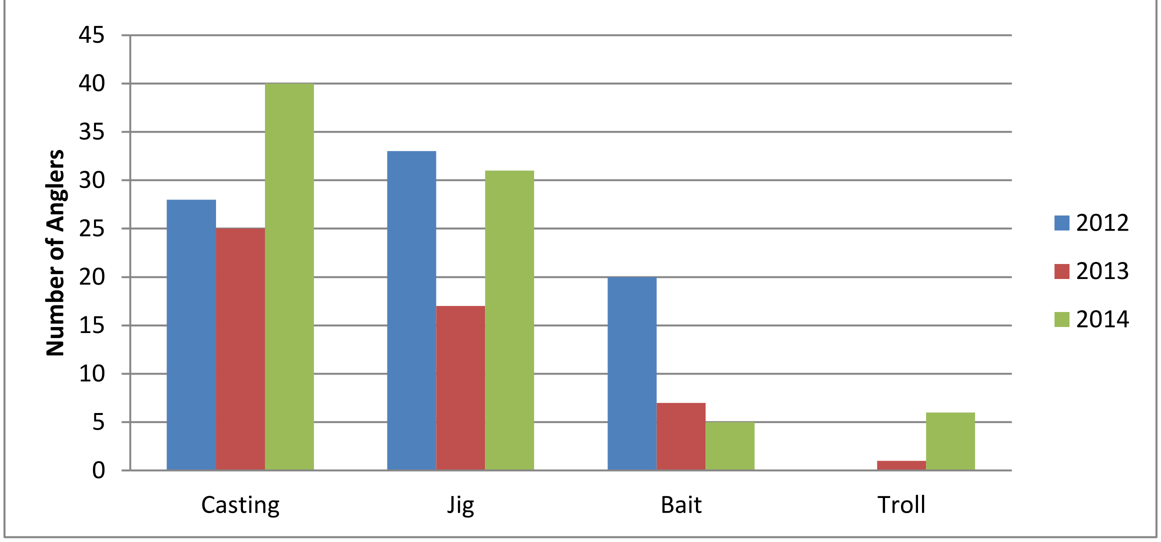
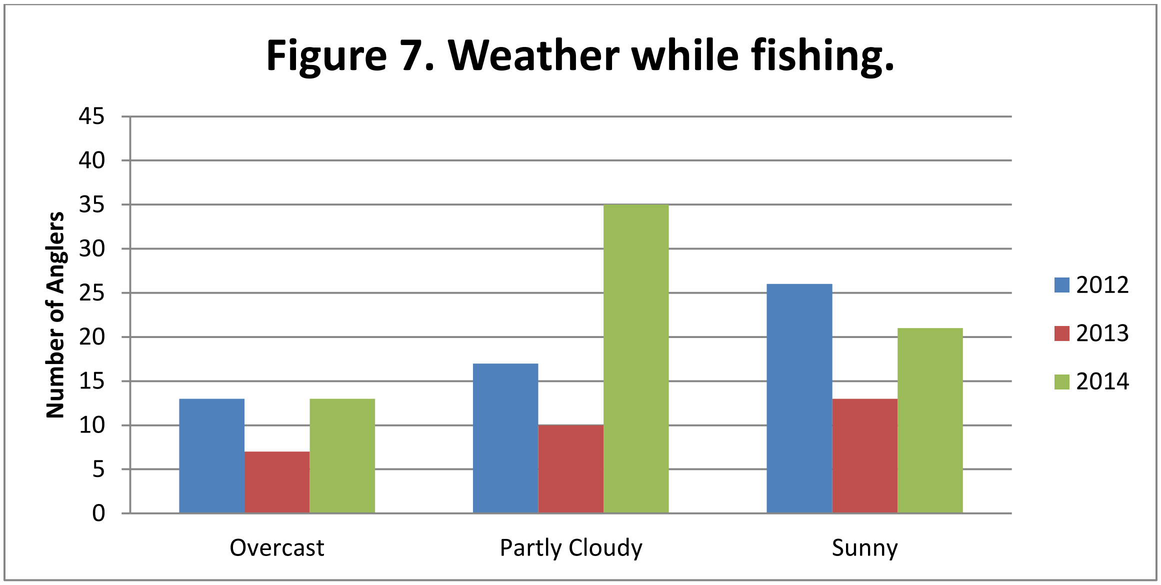
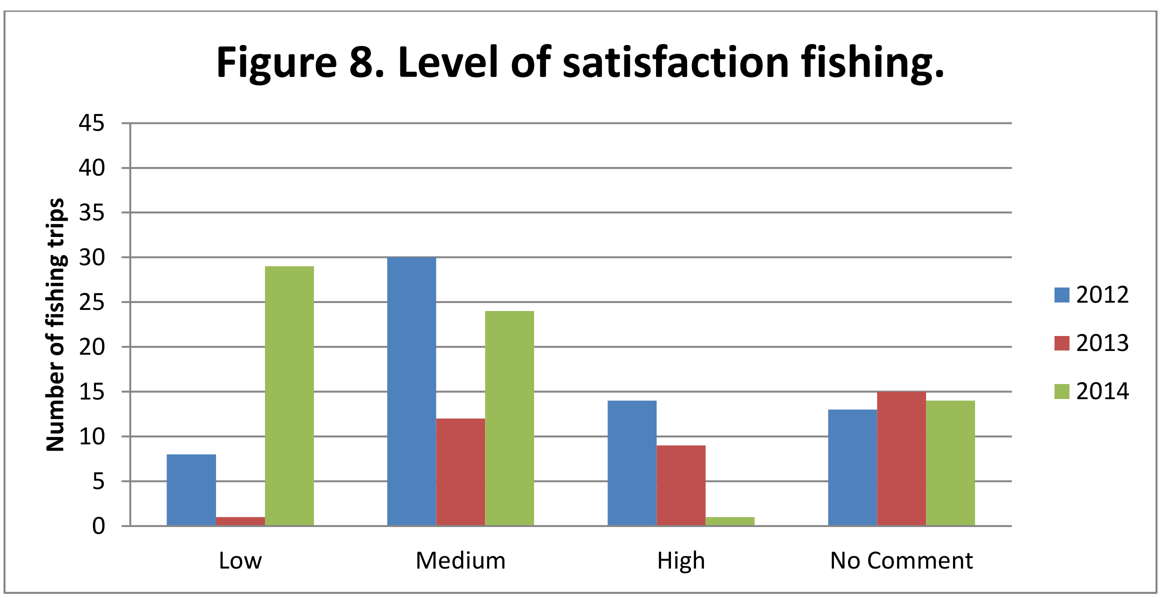


Figure 6. Techniques of fishing.

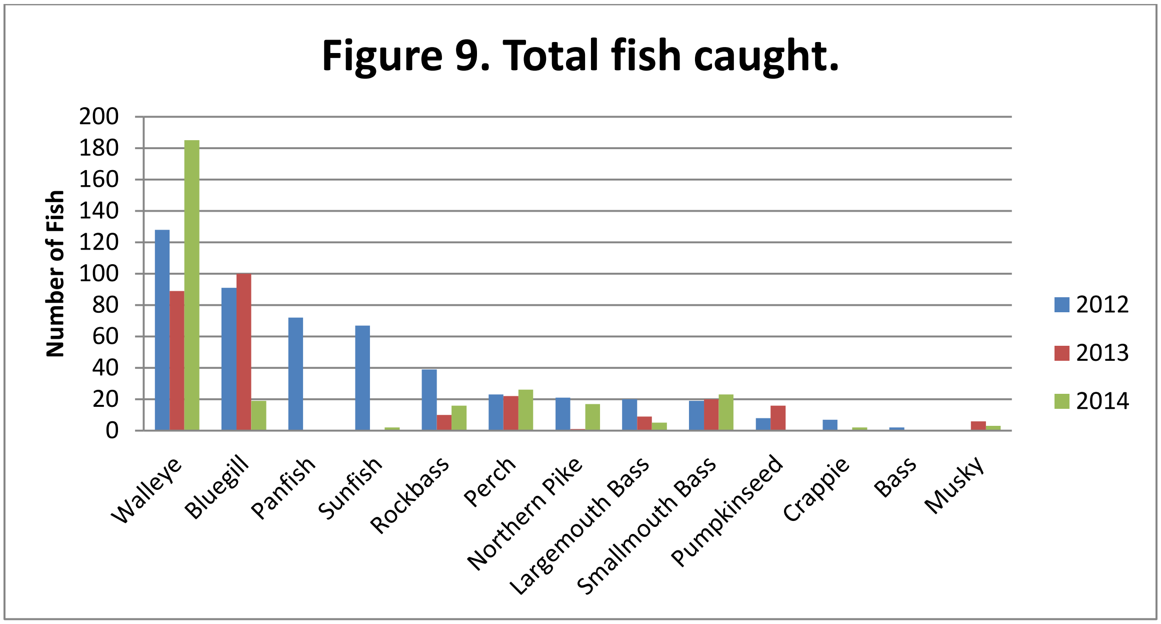
Weather data was also recorded as part of the anglers' journals. Weather conditions did not seem to affect when anglers went out fishing (Figure 7).



Anglers rated their level of satisfaction fishing as low, medium, or high (Figure 8). In 2012, nearly half of the fishing trips rated satisfaction as "medium" and about 22% of trips were rated as "high" satisfaction. In 2013, 32% of the fishing trips were rated as "medium" satisfaction, 24% rated as "high," and 3% were rated "low" satisfaction. In 2014, 43% of the fishing trips were rated as "low" satisfaction, 35% was rated "medium" satisfaction, and 1.5% were rated as "high" satisfaction.



A total of 497 fish were recorded in the anglers' journals in 2012; 273 fish were recorded in 2013; and 298 were recorded in 2014 (1068 total fish in three years). Walleye and bluegill were the top two fish species caught (Figure 9). Other fish species caught included: rock bass, perch, northern pike, largemouth bass, smallmouth bass, pumpkinseed, crappie, and musky. Some anglers identified fish caught as panfish, sunfish, and bass so those results are included in the figure below. There was one record of a 50 inch musky that was caught in July, 2014.



Species-specific data

For each fish species caught in Sevenmile Lake, several statistics were recorded. These statistics include: number caught and harvested, average and longest length of fish both released and harvested, and length distributions. Catch and harvest numbers are the calculated number of fish (of the indicated species) caught regardless of targeted species. Average and longest length of fish caught and harvested is the monthly longest and average length of fish caught and/or harvested fish species. Length distribution is all fish of a species that were measured by the anglers from March to September (depending on the year). Fish species with these data are: walleye, bluegill, rock bass, yellow perch, northern pike, largemouth bass, smallmouth bass, crappie, musky, and pumpkinseed.

WALLEYE

In 2012, 128 walleye were caught and 15 were harvested (Figure 10). In 2013, 89 walleye were caught and 10 were harvested (Figure 11). In 2014, 185 walleye were caught and 30 were harvested (Figure 12).

Figure 10. Walleye caught, 2012.

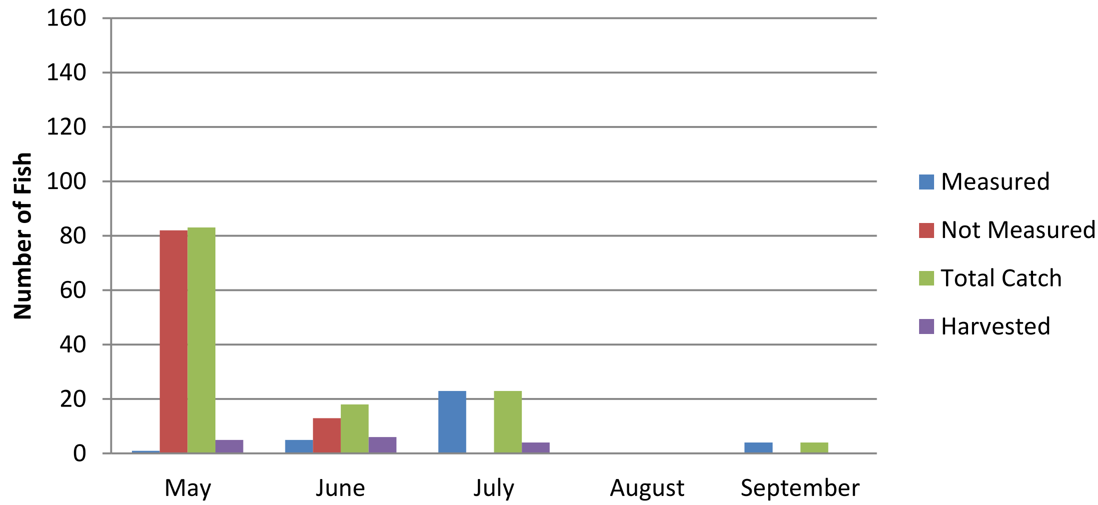
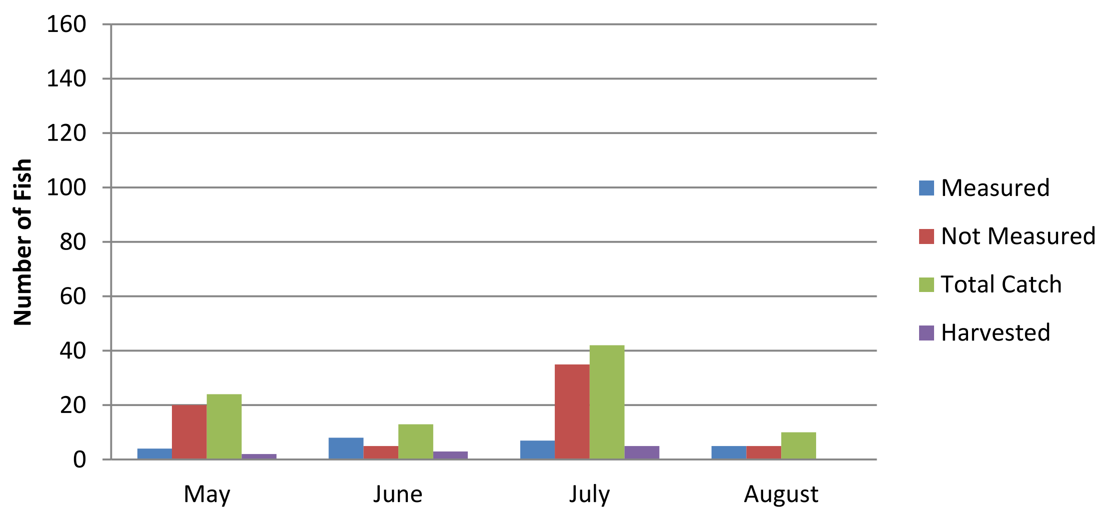
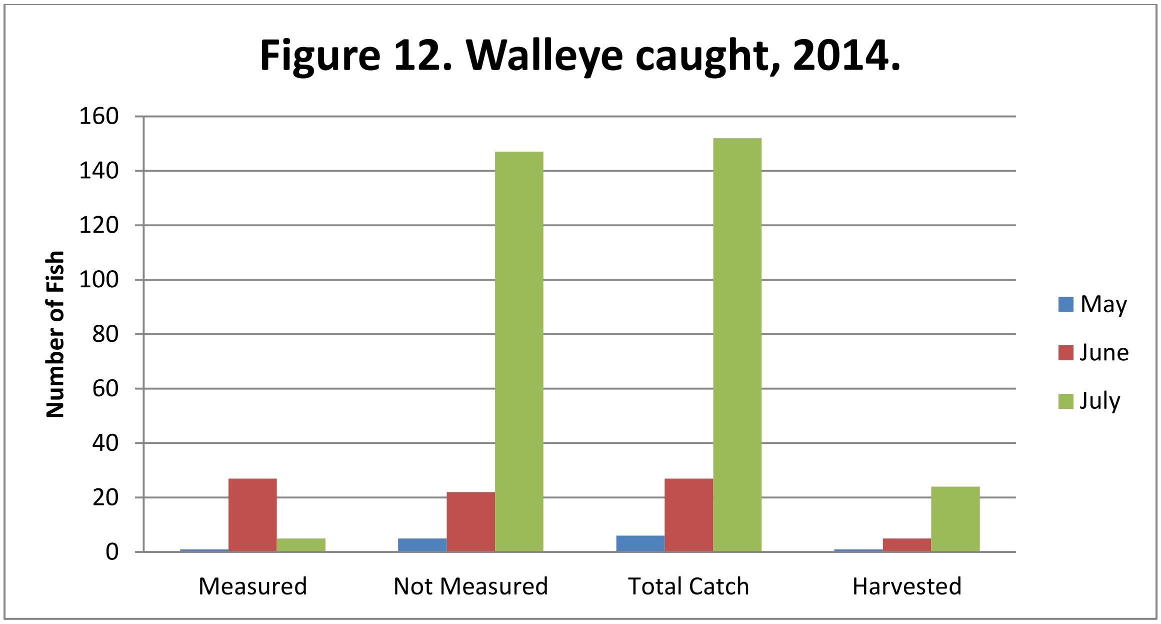
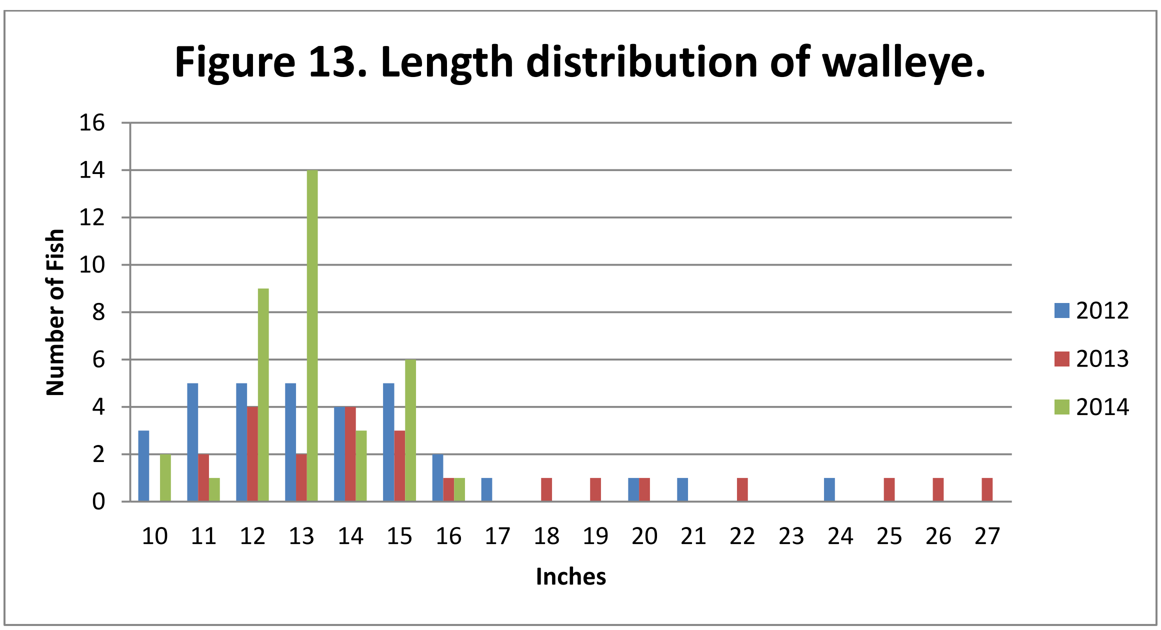


Figure 11. Walleye caught, 2013.



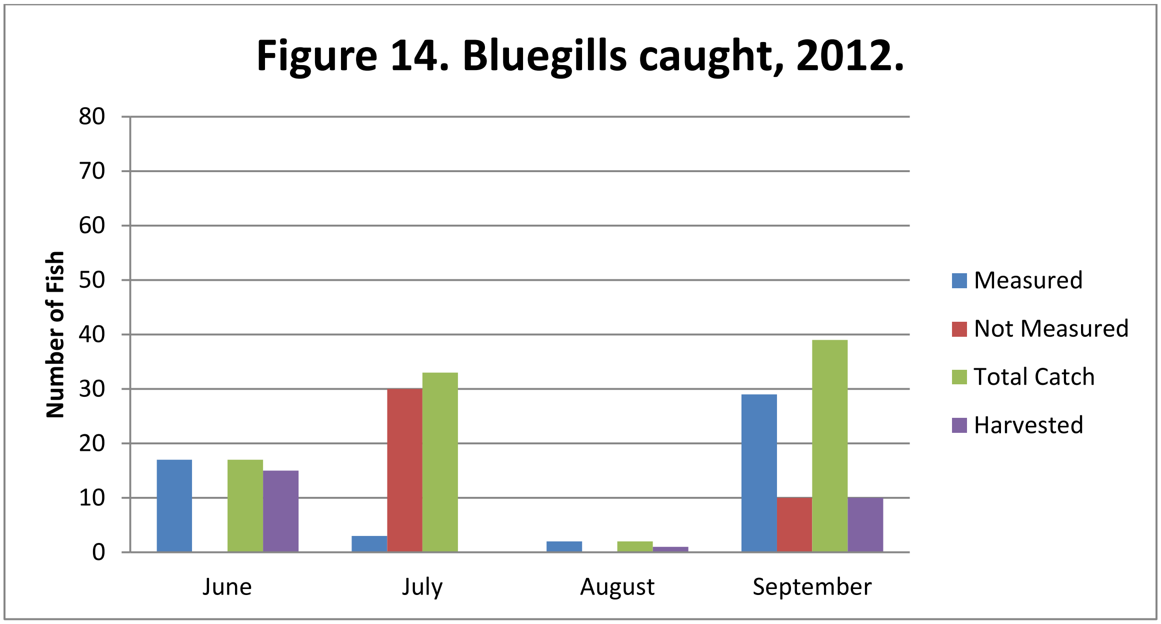


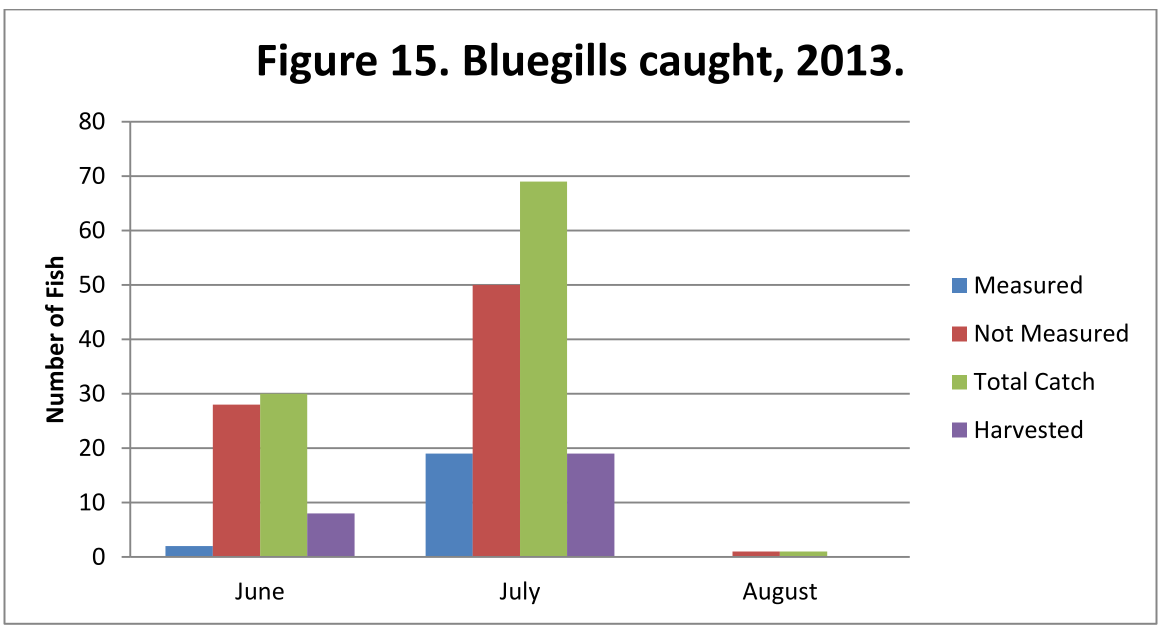
The largest walleye caught in 2012 was 24 inches (Figure 13). The largest caught in 2013 was 27 inches. In 2014, the largest walleye caught was 16 inches. The length of walleye caught in 2012 ranged from 10 to 24 inches. In 2013, the range was from 11 and 27 inches. In 2014, the range of walleye was from 9 to 16 inches (Figure 13).



BLUEGILL

In 2012, 91 bluegill were caught and 26 were harvested (Figure 14). The total number of bluegill caught in 2013 was 100 and 27 were harvested (Figure 15). In 2014, 19 bluegill were caught and 0 were harvested (Figure 16). The largest bluegill caught in 2012 was 9 inches (Figure 17). In 2013, the largest bluegill caught was 6 inches (Figure 18). In 2014, the largest bluegill caught was 7 inches (Figure 19).





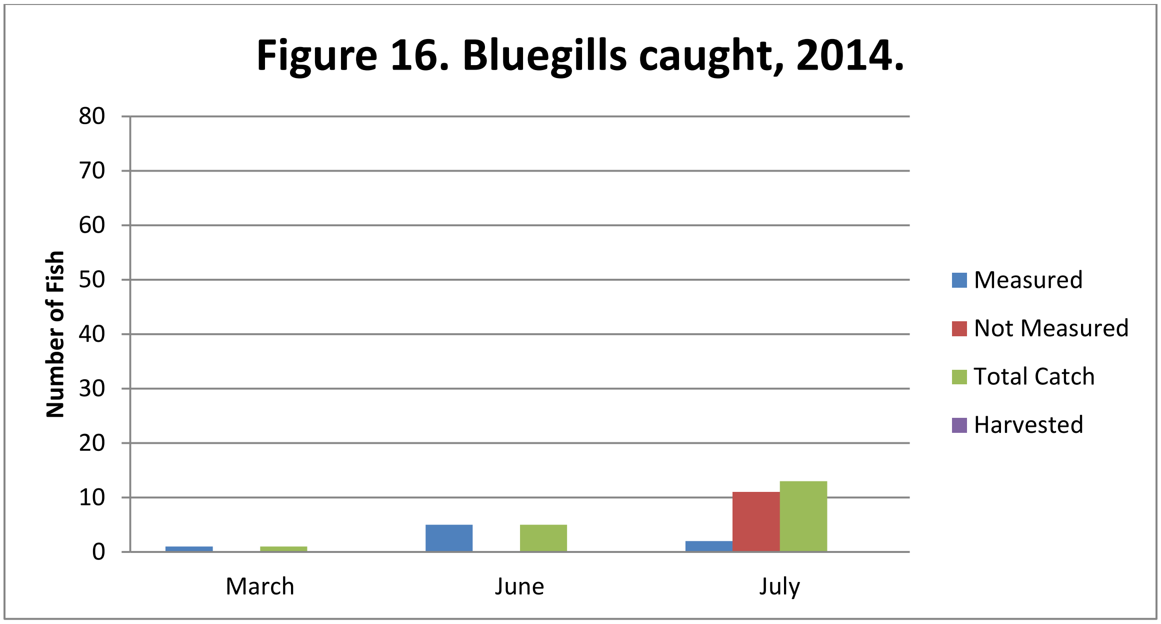


Figure 16. Bluegills caught, 2014.
Number of Fish
80
70
60
50
40
30
20
10
0
March
June
July
Measured
Not Measured
Total Catch
Harvested

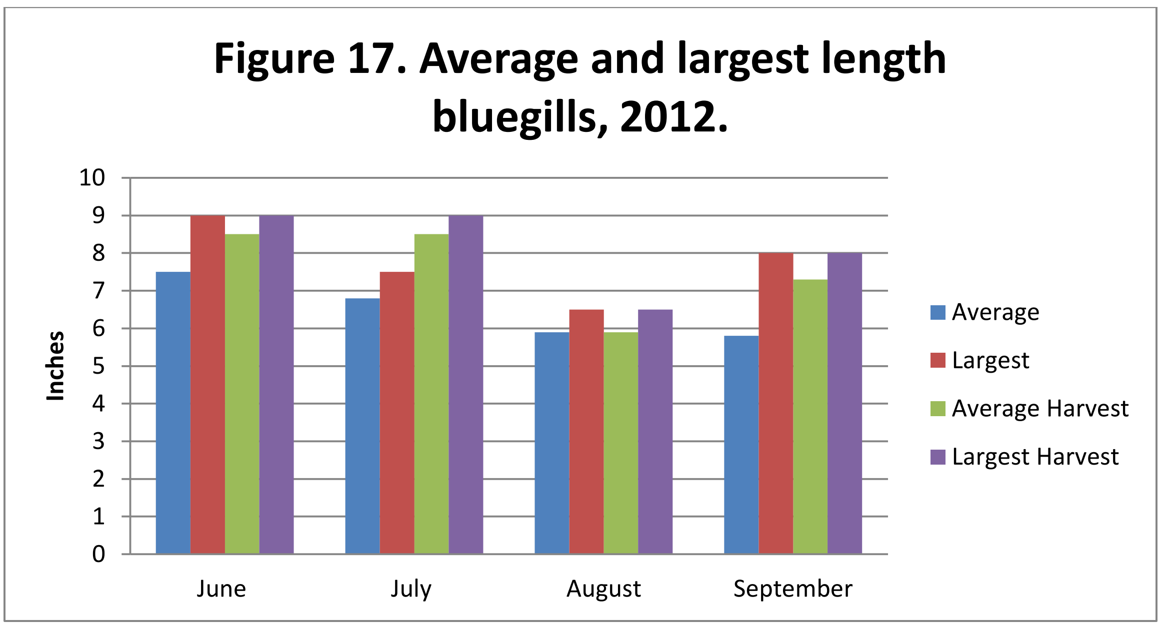
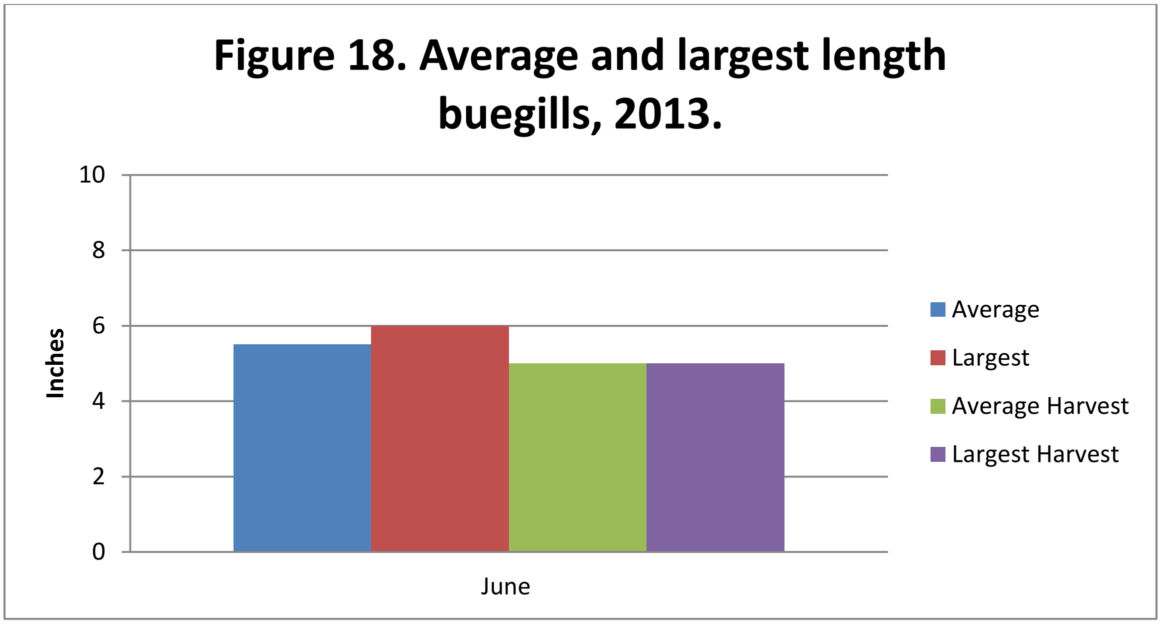
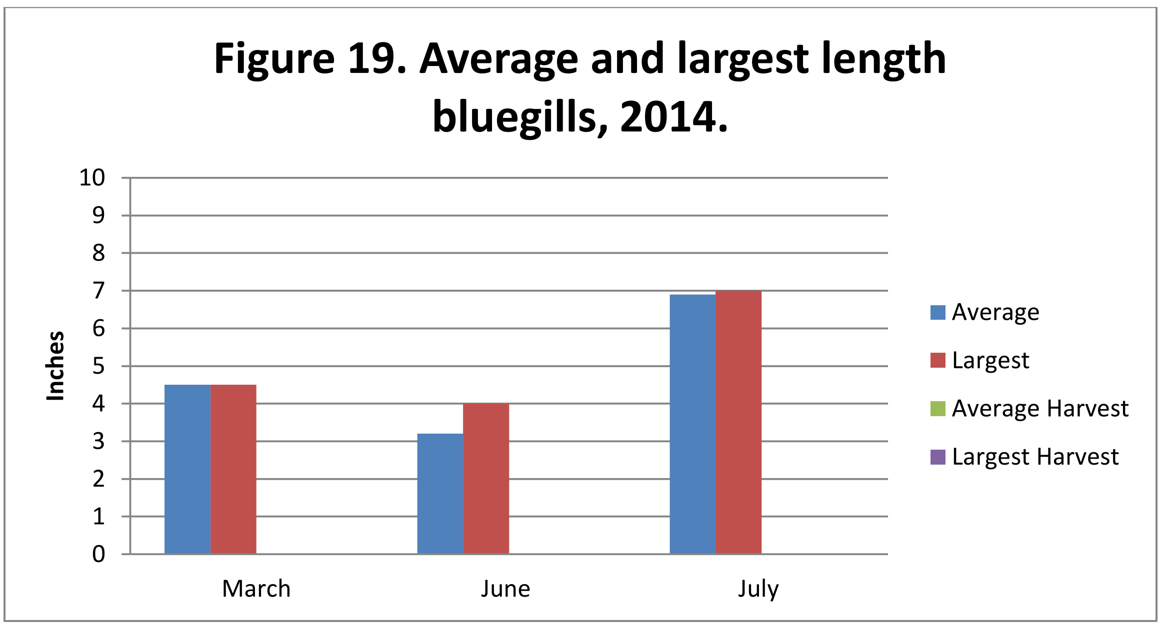
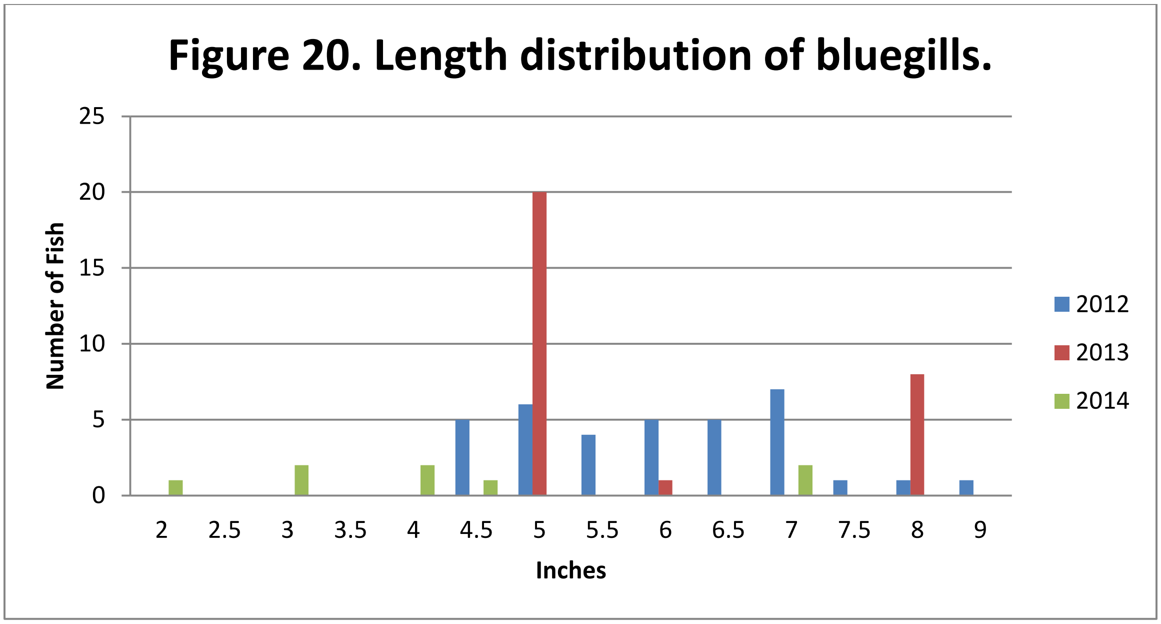


Figure 17. Average and largest length bluegills, 2012.
Inches
10
9
8
7
6
5
4
3
2
1
0
June
July
August
September
Average
Largest
Average Harvest
Largest Harvest



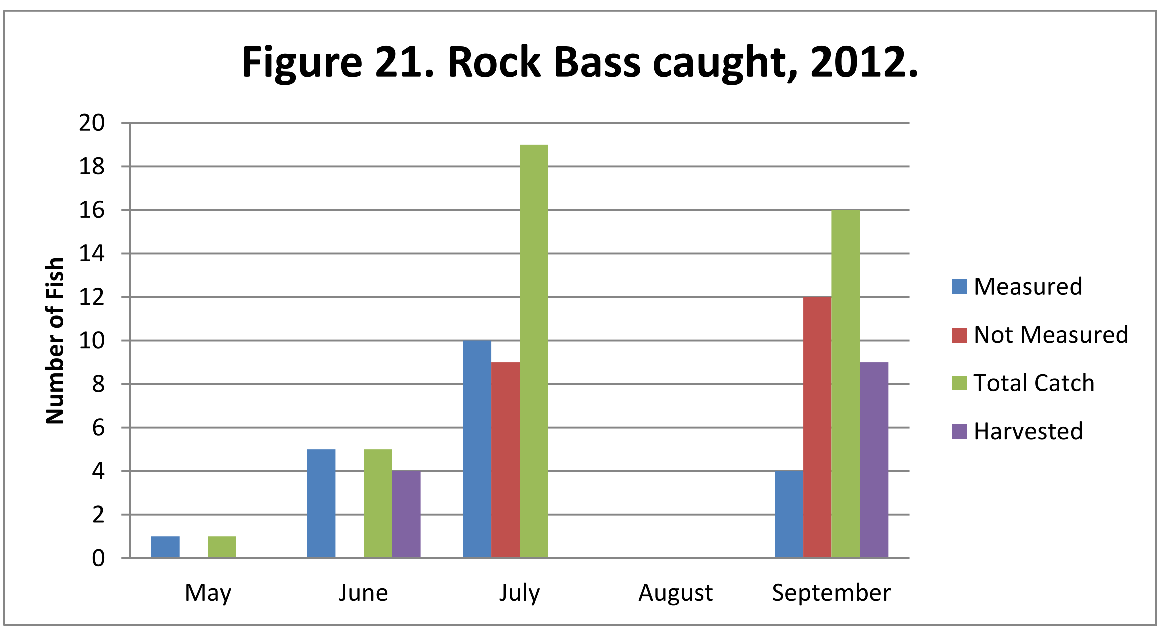


In 2012, the bluegill size ranged from 4.5 inches to 9 inches (Figure 20). In 2013, the size ranged from 5 to 8 inches. In 2014, the bluegill size ranged from 2 to 7 inches (Figure 20).



ROCK BASS

In 2012, 41 rock bass were caught and 13 were harvested (Figure 21). In 2013, 10 rock bass were caught and 0 were harvested (Figure 22). In 2014, 16 rock bass were caught and 0 were harvested (Figure 23). The largest rock bass caught in 2012 was 9 inches (Figure 24). The largest caught in 2013 was 8 inches (Figure 25). In 2014, the largest rock bass caught was 10 inches (Figure 26).



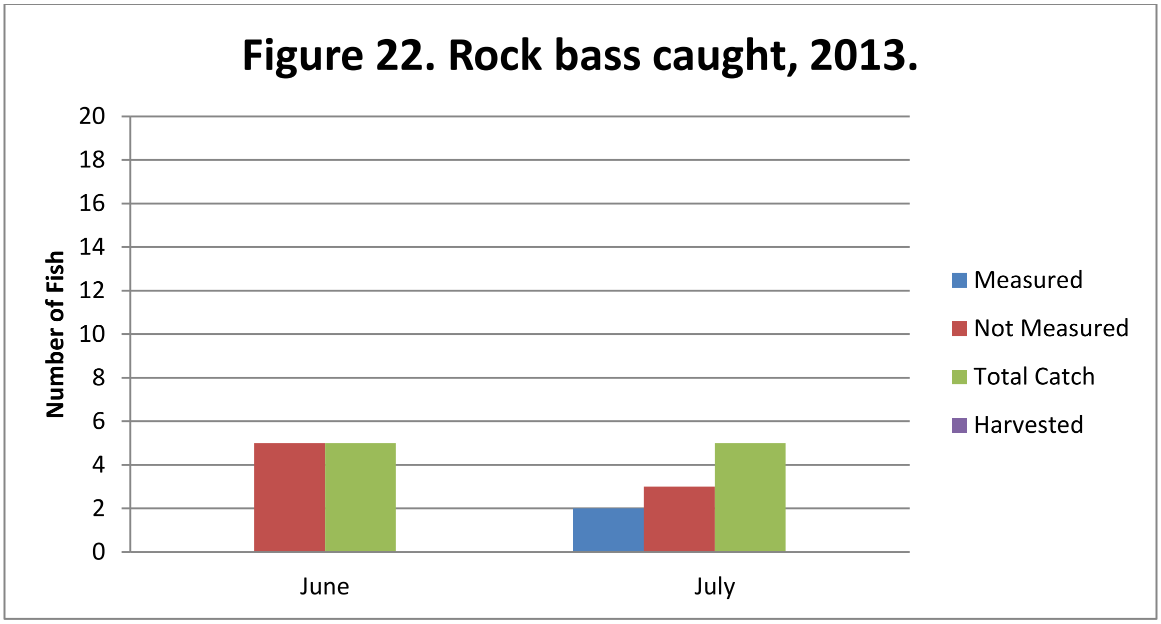


Figure 22. Rock bass caught, 2013.
Number of Fish
0
2
4
6
8
10
12
14
16
18
20
June
July
Measured
Not Measured
Total Catch
Harvested

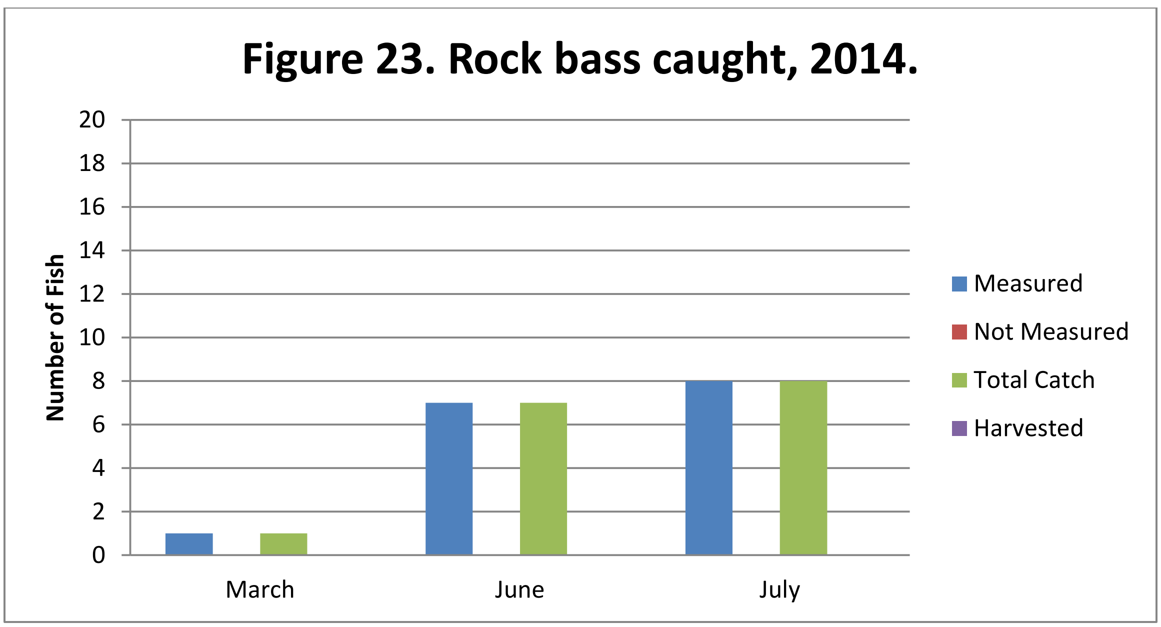


Figure 23. Rock bass caught, 2014.
Number of Fish
0
2
4
6
8
10
12
14
16
18
20
March
June
July
Measured
Not Measured
Total Catch
Harvested

Figure 24. Average and longest length of rock bass, 2012.

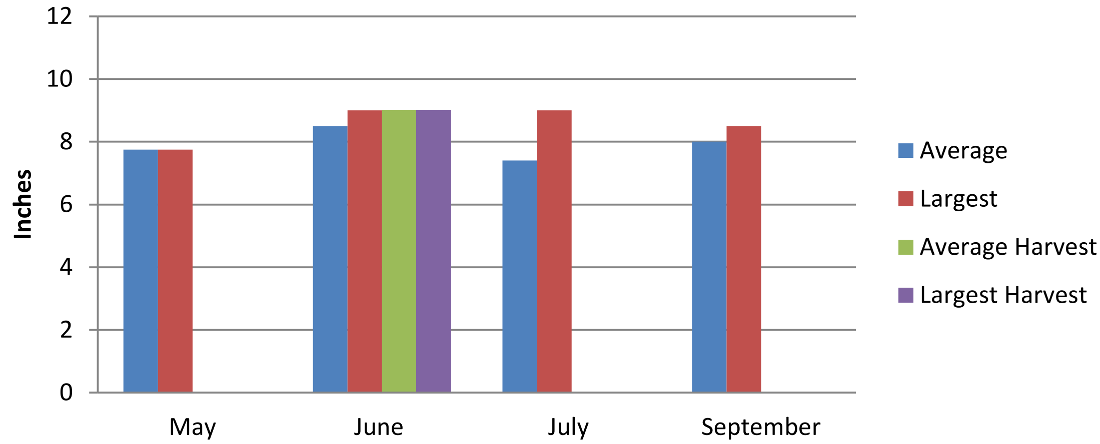
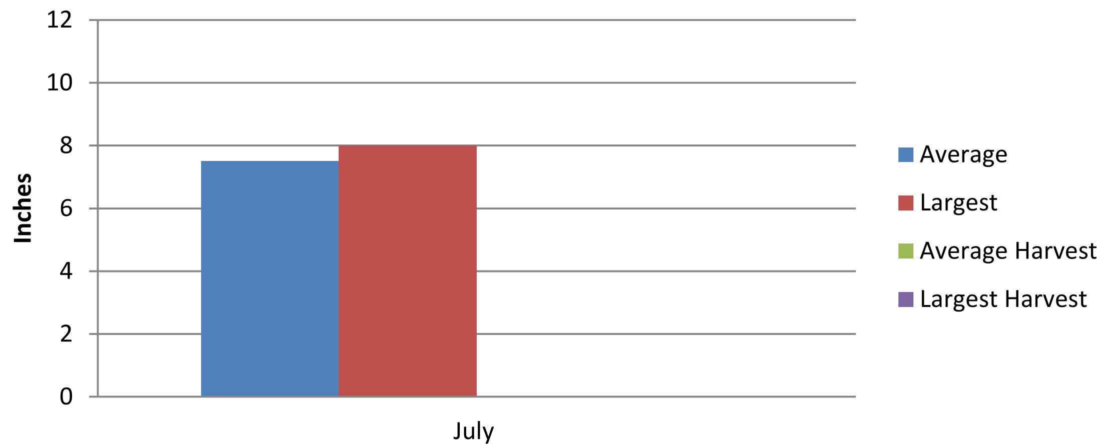
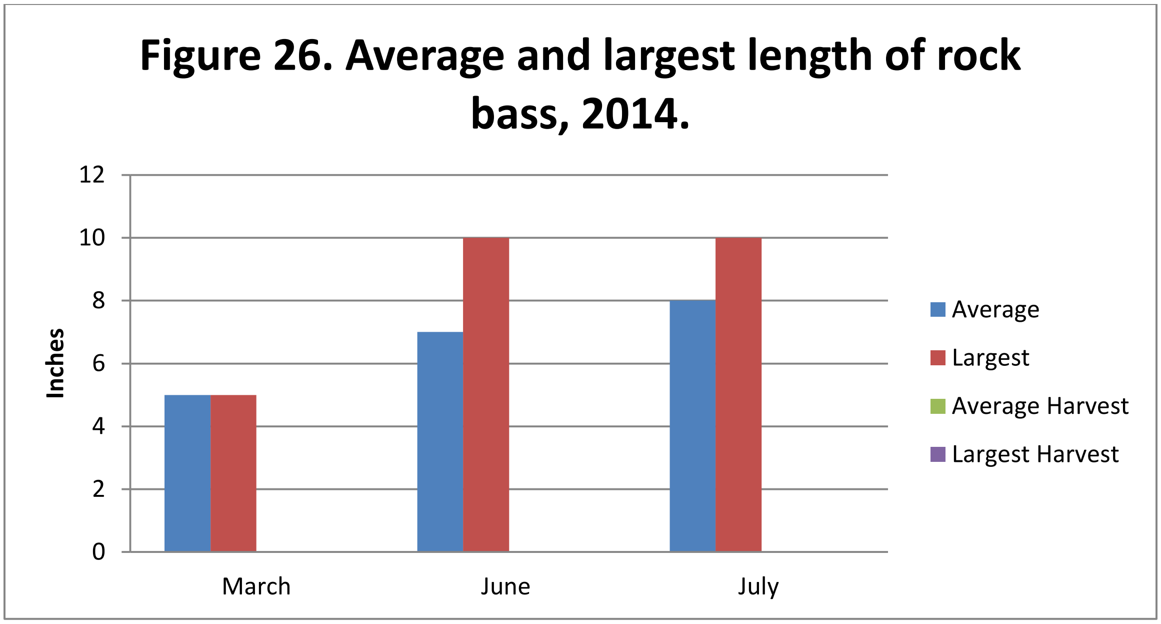
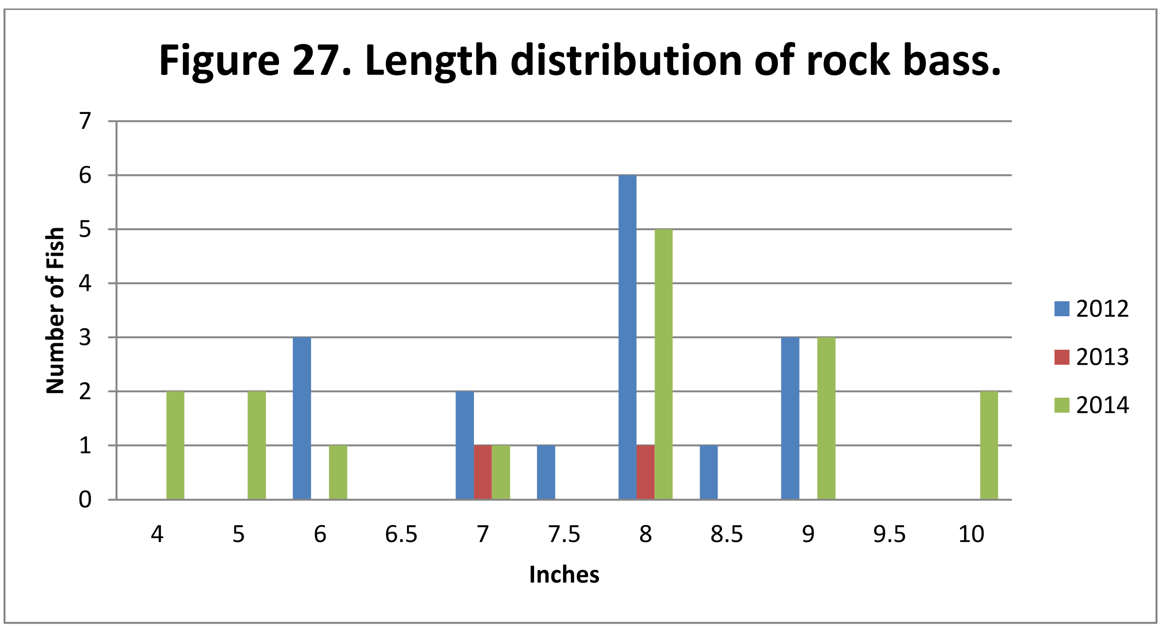


Figure 25. Average and largest length of rock bass, 2013.



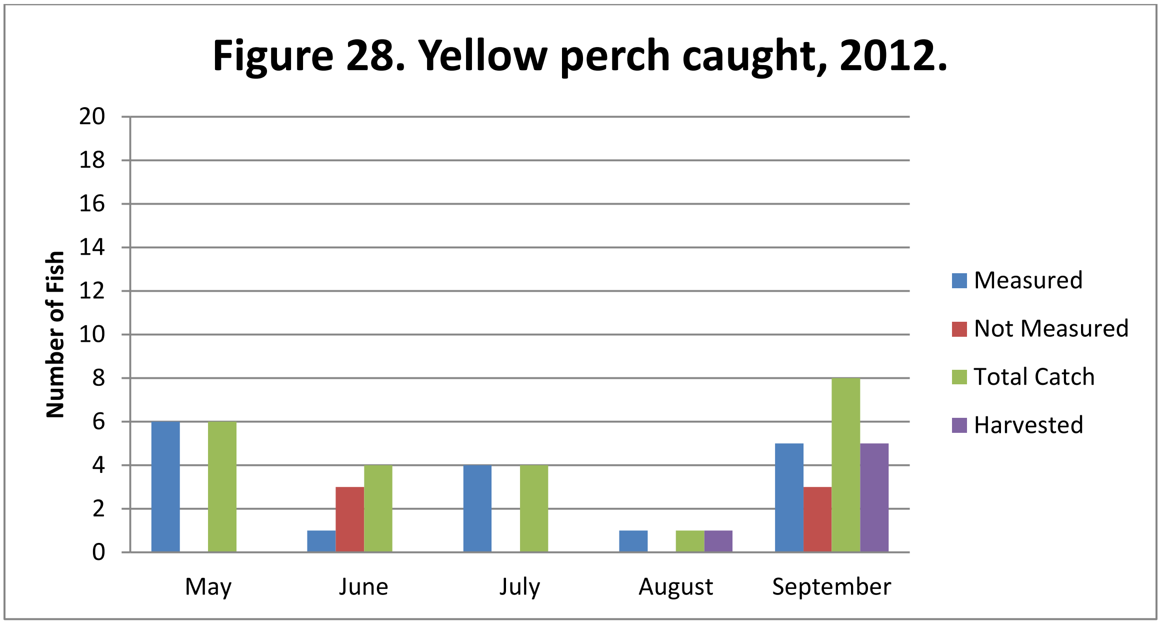


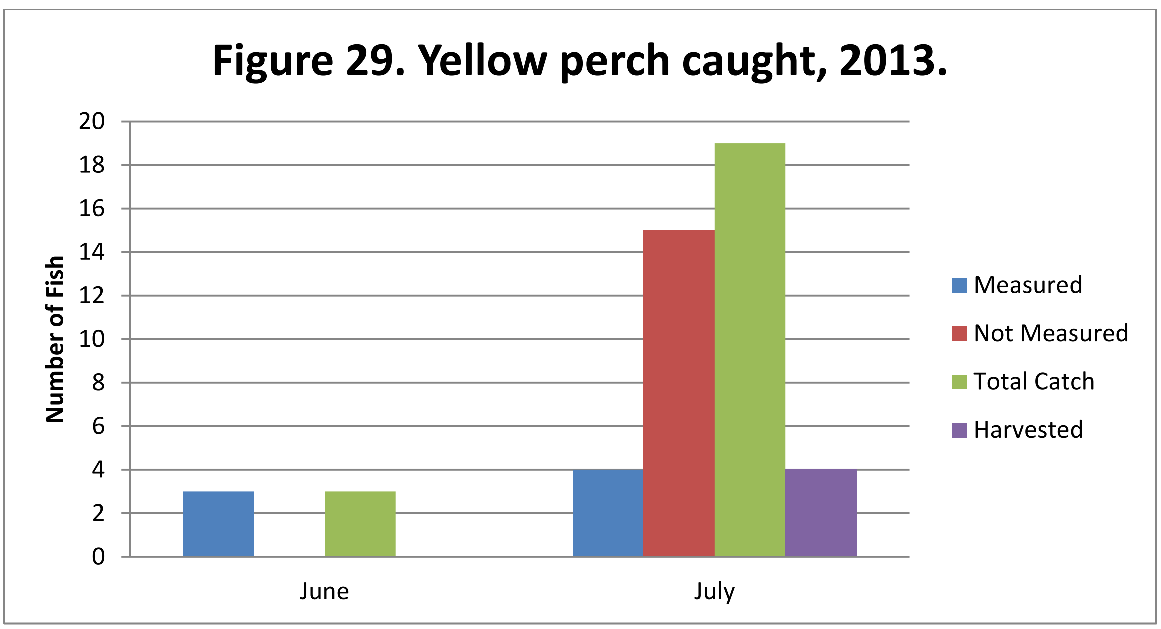
The length of rock bass caught in 2012 ranged from 6 to 9 inches. In 2013, the lengths of rock bass caught were 7 and 8 inches. In 2014, the length of rock bass ranged from 4 to 10 inches (Figure 27).



YELLOW PERCH

In 2012, 23 yellow perch were caught and 6 were harvested (Figure 28). In 2013, 22 yellow perch were caught and 4 were harvested (Figure 29). In 2014, 12 yellow perch were caught and 0 were harvested (Figure 30). The largest yellow perch caught in 2012 was 9 inches (Figure 31). The largest yellow perch caught in 2013 was 8 inches (Figure 32). In 2014, the largest yellow perch was 9 inches (Figure 33).





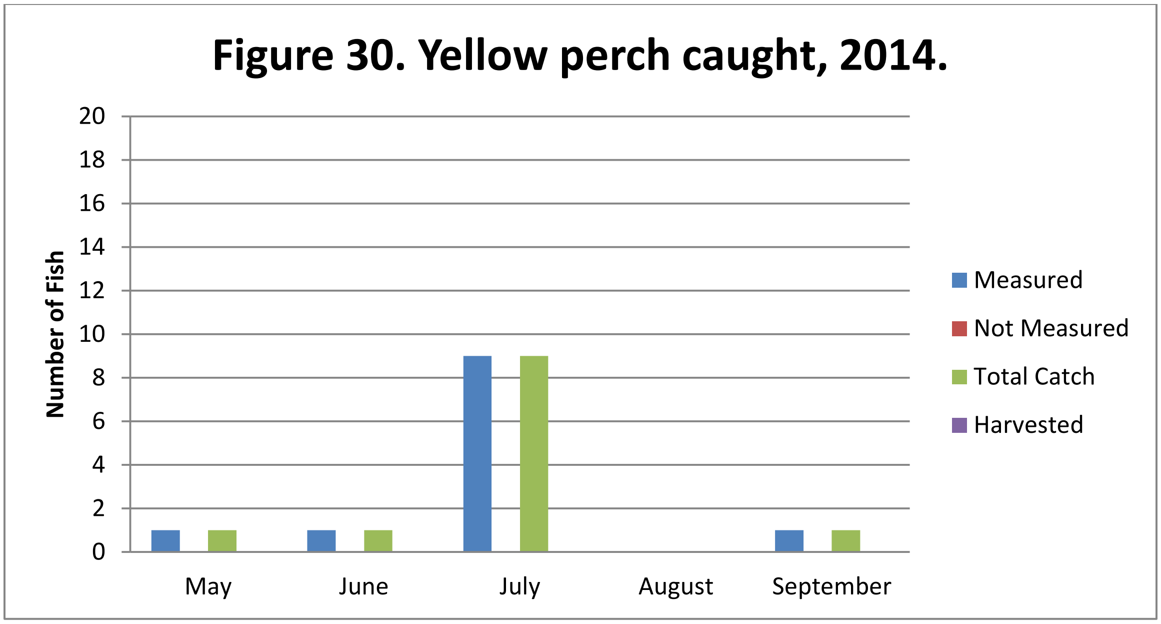


Figure 30. Yellow perch caught, 2014.
Number of Fish
20
18
16
14
12
10
8
6
4
2
0
May
June
July
August
September
Measured
Not Measured
Total Catch
Harvested

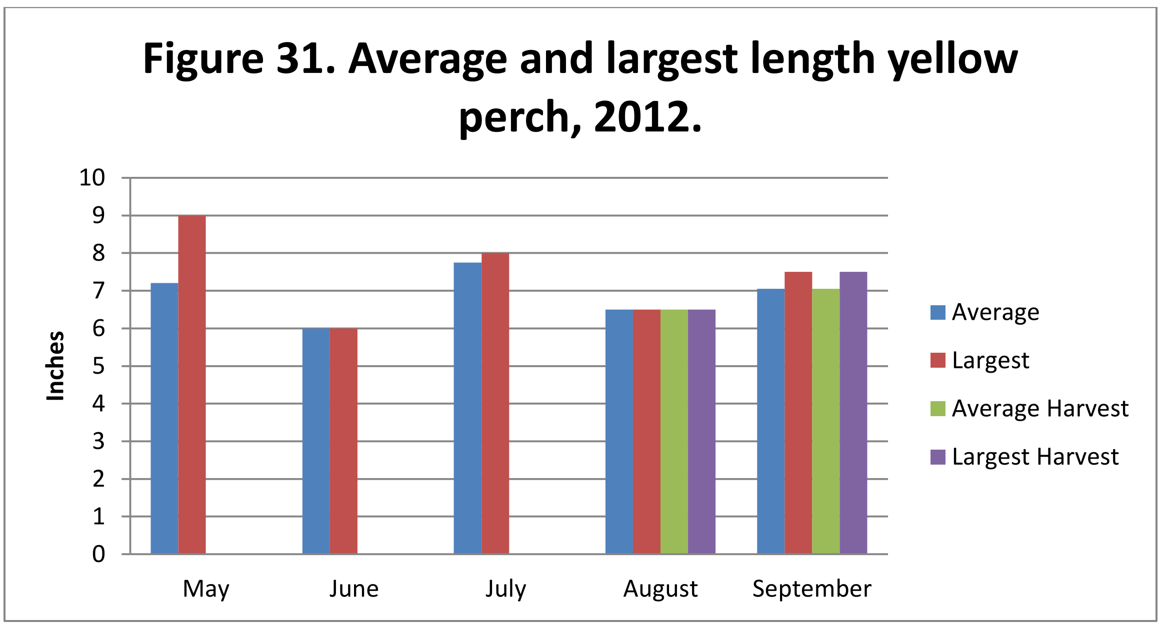


Figure 31. Average and largest length yellow perch, 2012.
Inches
10
9
8
7
6
5
4
3
2
1
0
May
June
July
August
September
Average
Largest
Average Harvest
Largest Harvest

Figure 32. Average and largest length yellow perch, 2013.

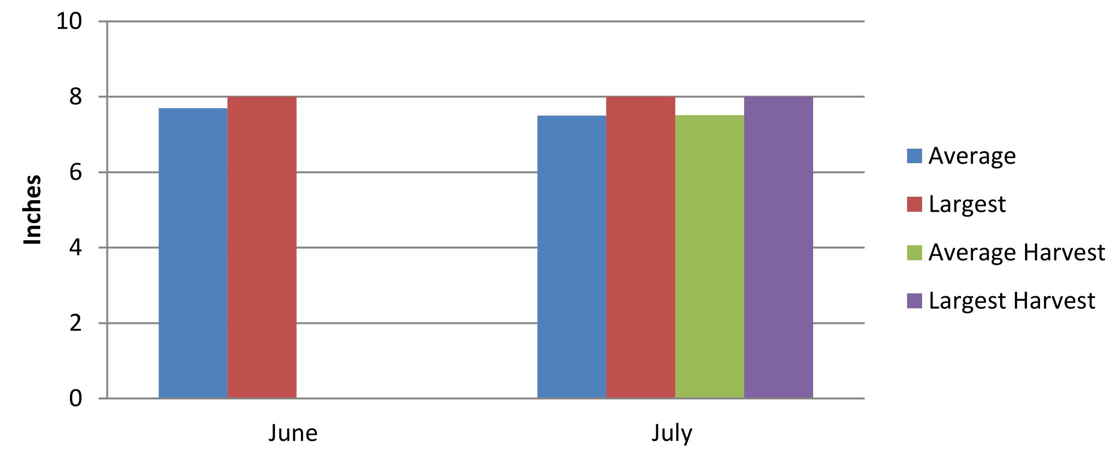
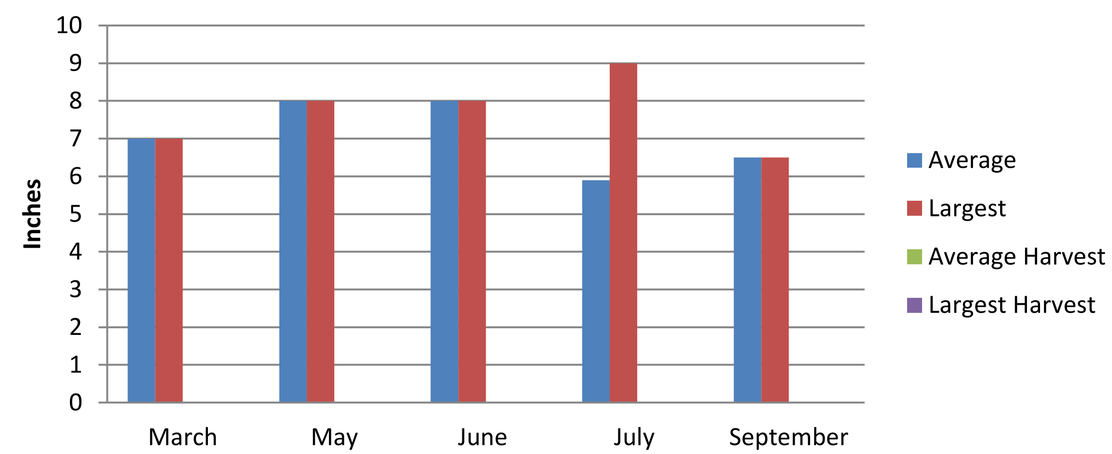
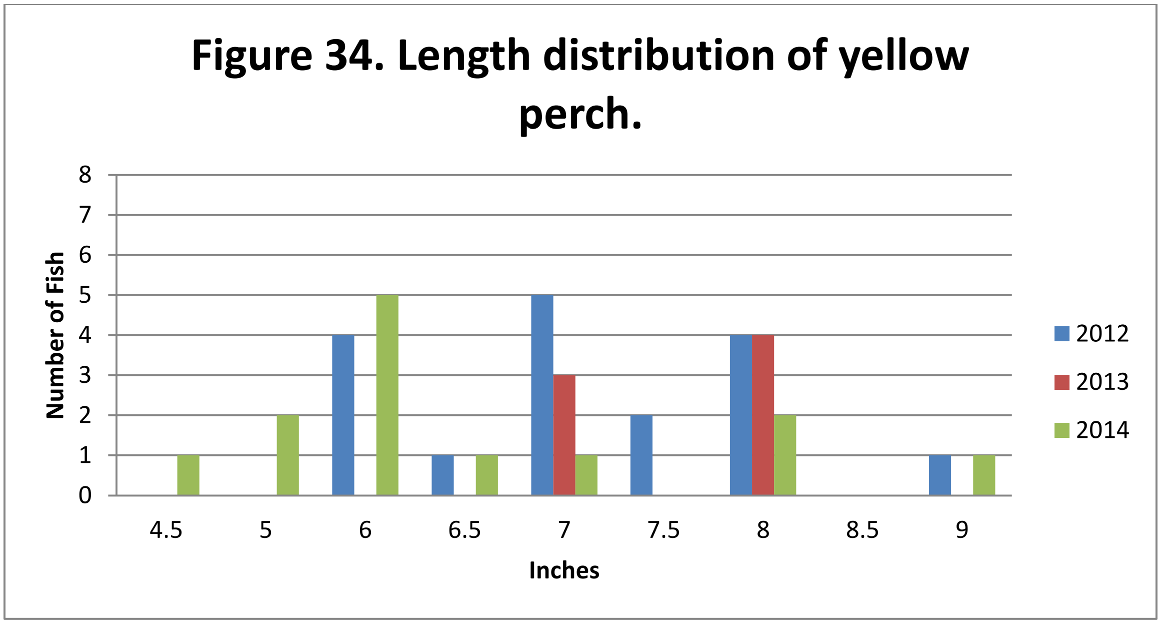


Figure 33. Average and largest length yellow perch, 2014.



The length of yellow perch caught in 2012 ranged from 4.5 to 9 inches. In 2013, the length of yellow perch ranged from 7 to 8 inches. In 2014, the length of yellow perch ranged from 4.5 to 9 inches (Figure 34).



NORTHERN PIKE

In 2012, there were 21 northern pike caught and 6 harvested, with the majority caught in July (Figure 35). In 2013, there was 1 caught and it was released. In 2014, there were 17 northern pike caught and 2 harvested (Figure 36). The largest northern pike caught in 2012 was 27 inches (Figure 37). The largest northern pike caught in 2014 was 25 inches (Figure 38).

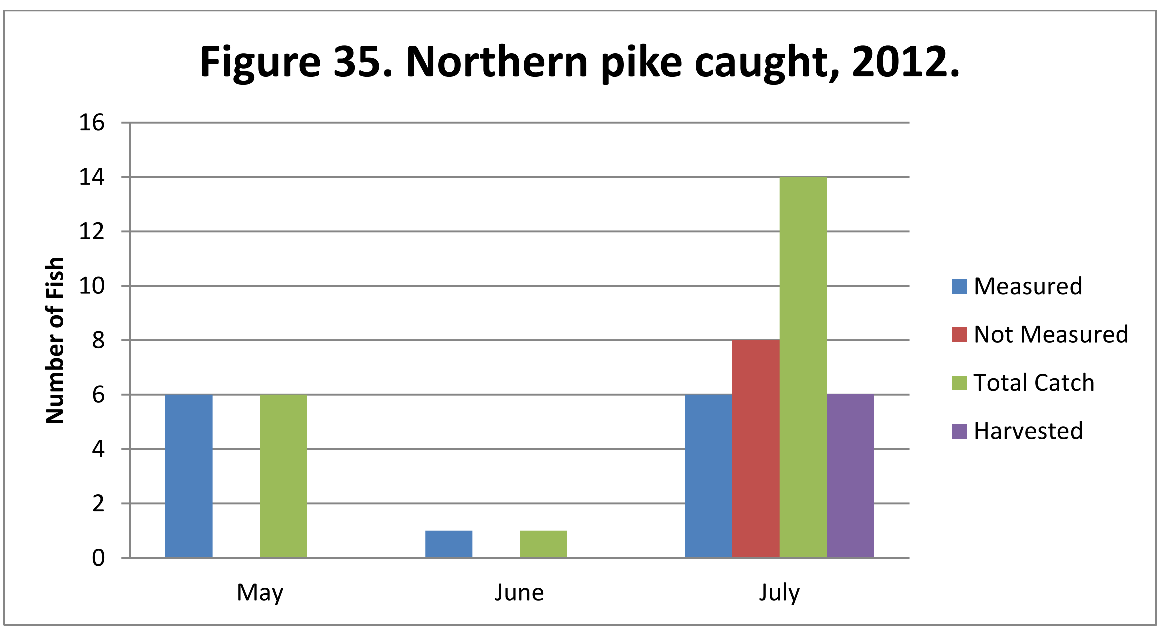


Figure 36. Northern pike caught, 2014.

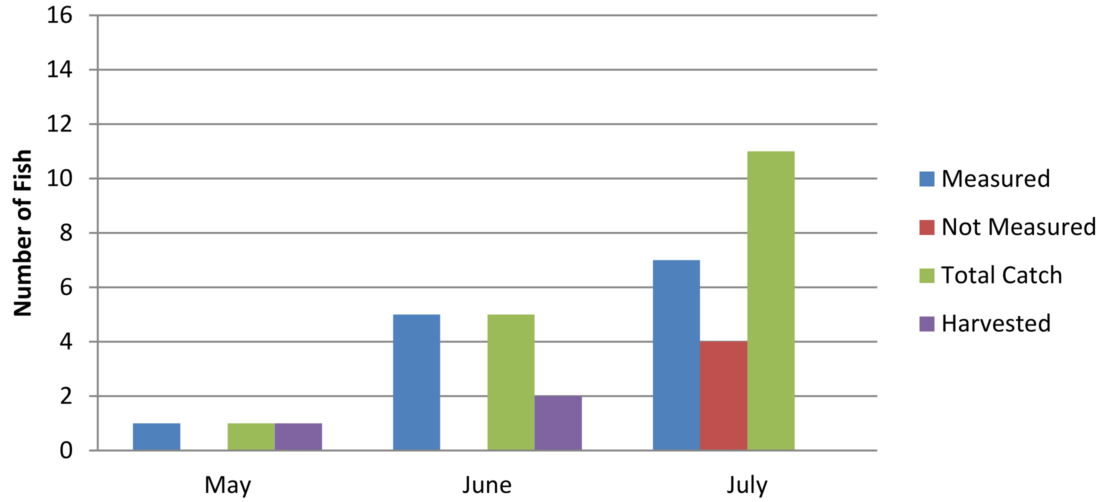
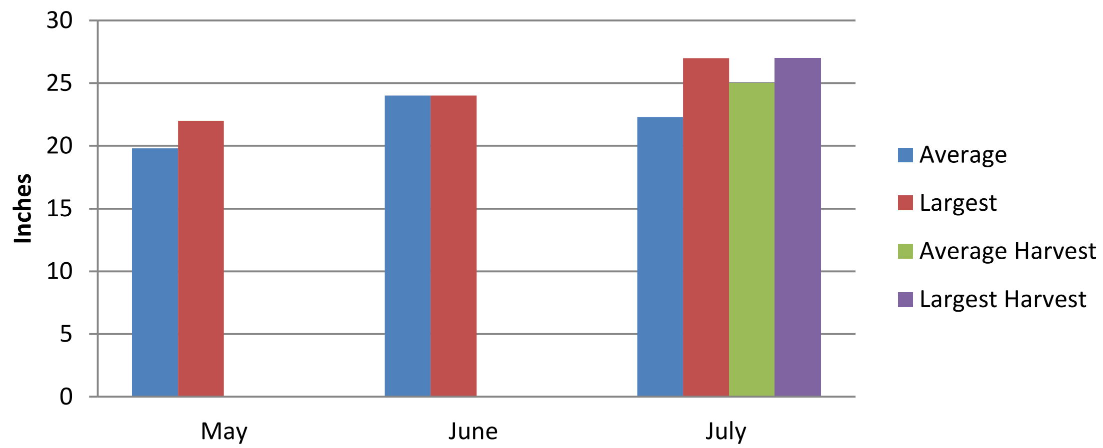
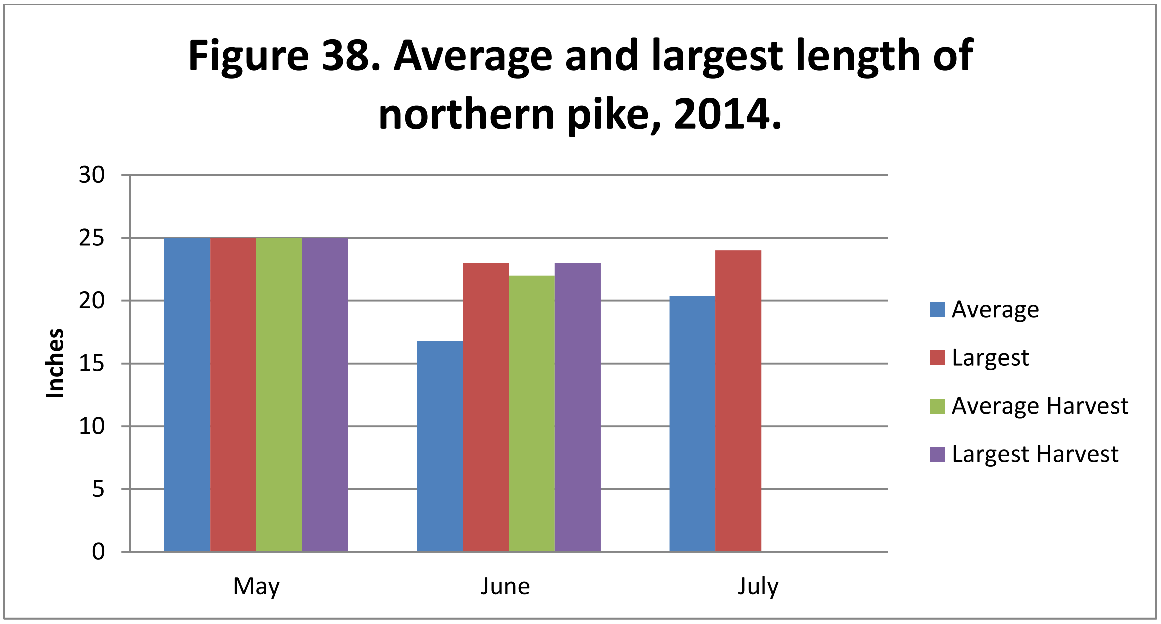
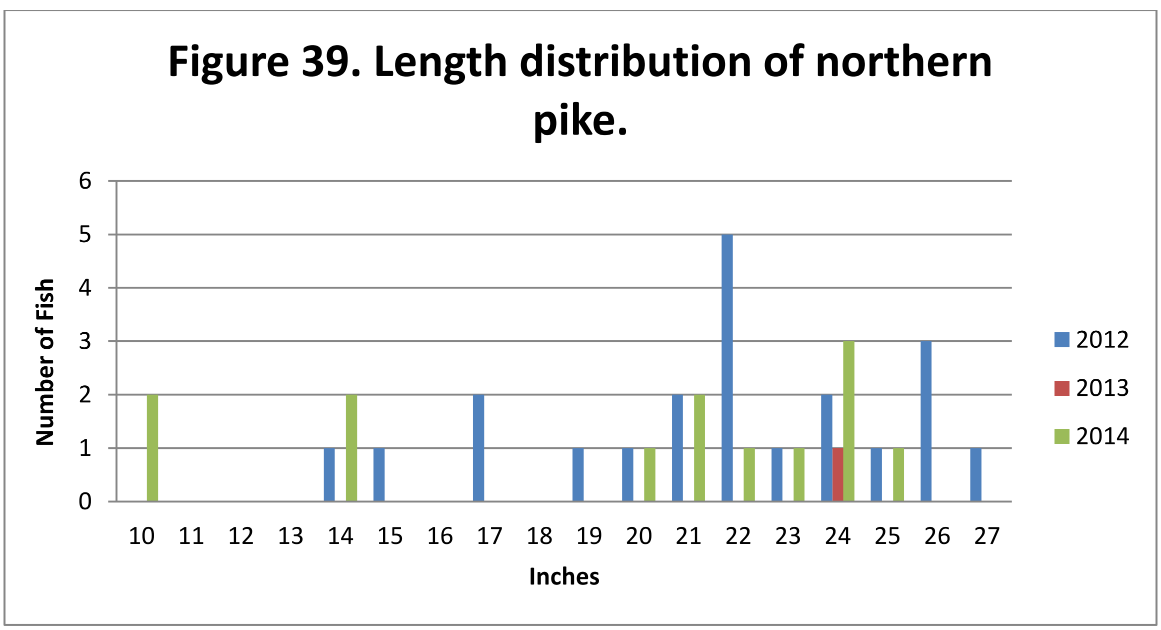


Figure 37. Average and largest length of northern pike, 2012.





The length of northern pike caught in 2012 ranged from 14 to 27 inches, in 2014 ranged from 10 to 25 inches (Figure 39). The one northern pike caught in 2013 was 24 inches. In 2012, the majority of northern pike caught measured 22 inches. In 2014, the majority of northern pike caught were 24 inches long.



LARGEMOUTH BASS

In 2012, there were 20 largemouth bass caught and there were no harvest of largemouth that year (Figure 40). The highest catch of largemouth bass in 2012 occurred in July with 9 caught. In 2013, 9 largemouth bass were caught and 0 were harvested (Figure 41). The highest catch of largemouth bass in 2013 occurred in July. In July 2014, there were 5 largemouth bass caught there were none harvested that year (Figure 42).

Figure 40. Largemouth bass caught, 2012.

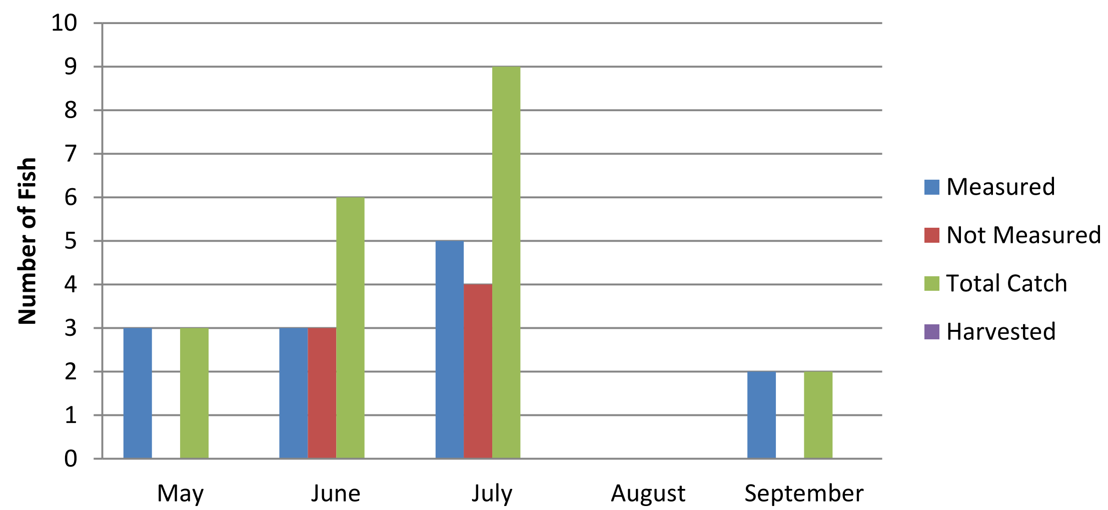
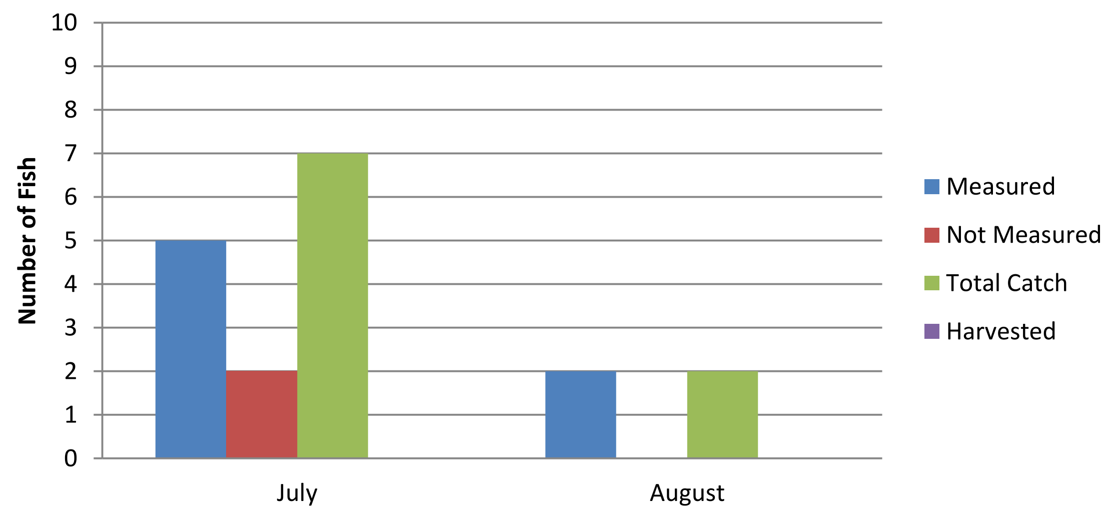
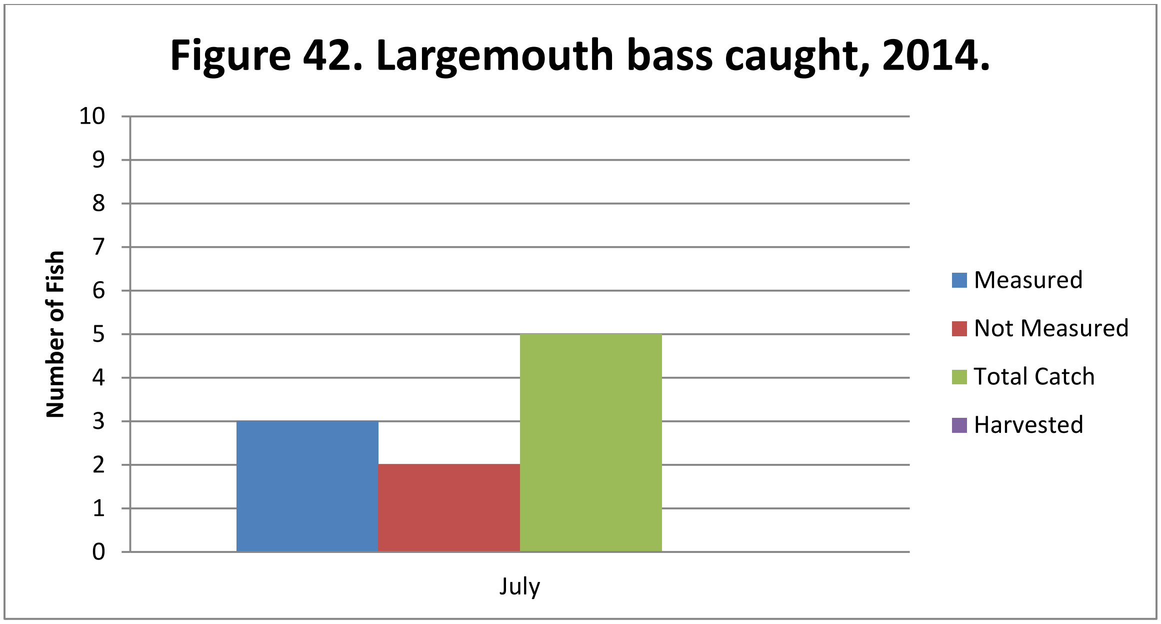


Figure 41. Largemouth Bass caught, 2013.





The largest largemouth bass caught in 2012 was 17 inches (Figure 43). The largest caught in 2013 was 13 inches (Figure 44). In 2014 the largest largemouth bass caught was 11 inches (Figure 45). In Figure 46, we see that the size range of largemouth bass caught in Sevenmile Lake was between 10 and 17 inches.

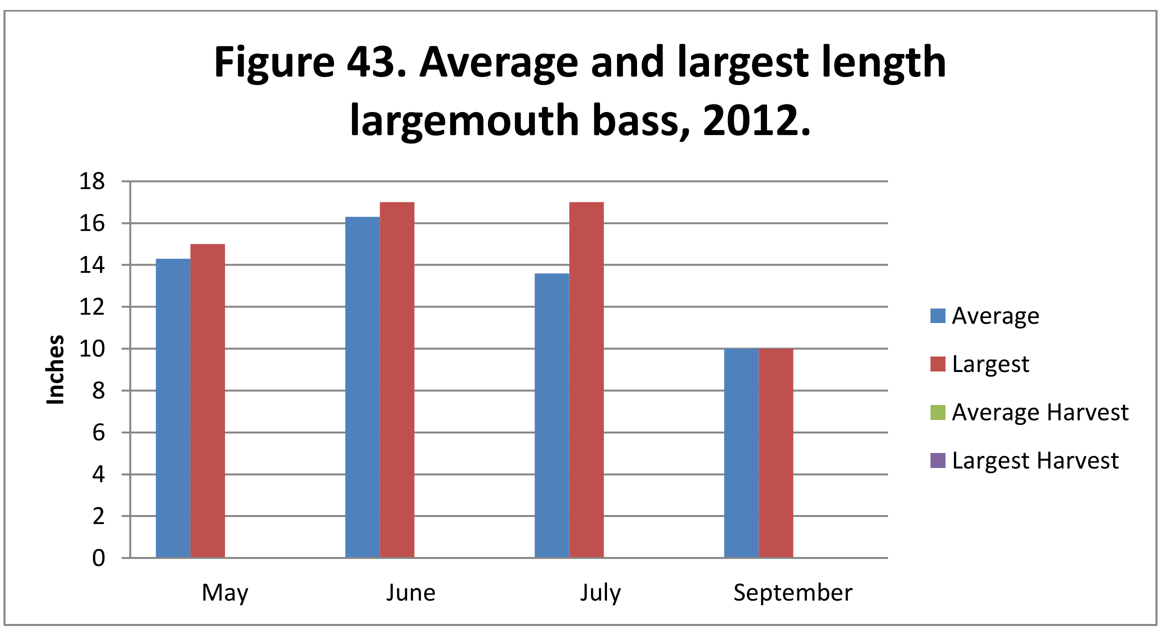


Figure 44. Average and largest length largemouth bass, 2013.

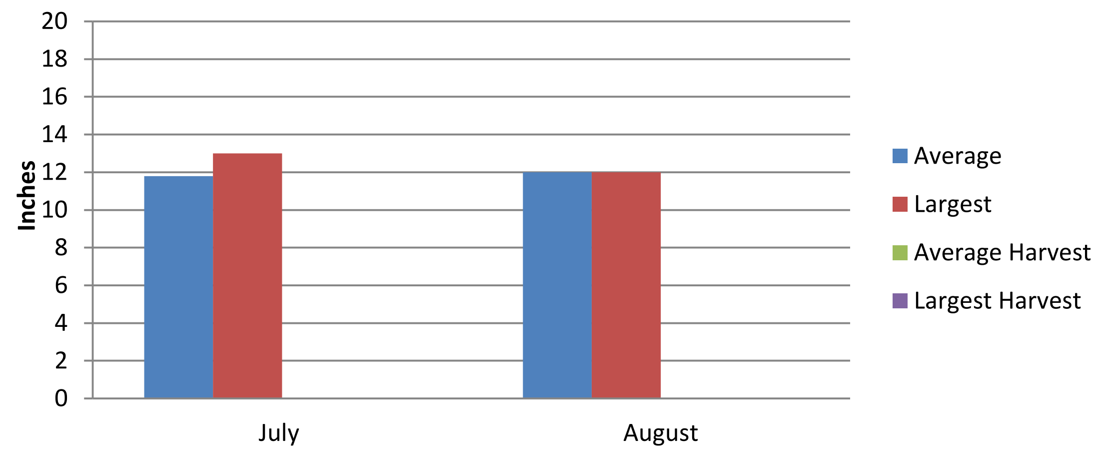
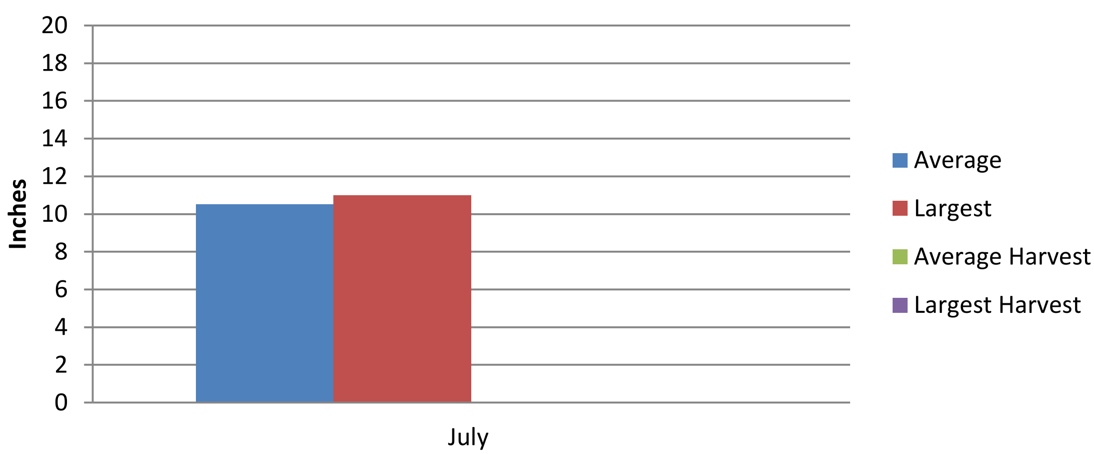
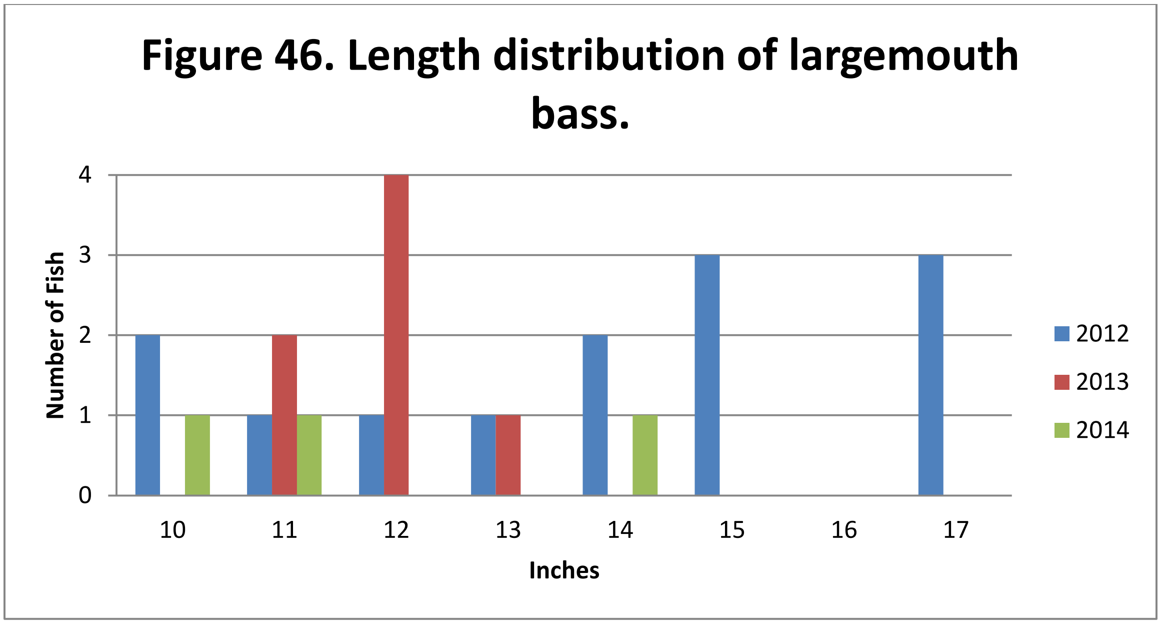


Figure 45. Average and largest length largemouth bass, 2014.





SMALLMOUTH BASS

In 2012, 19 smallmouth bass were caught and 3 were harvested (Figure 47). In 2013, 20 smallmouth bass were caught and 0 were harvested (Figure 48). In 2014, 23 smallmouth bass were caught and 0 were harvested (Figure 49). The largest smallmouth bass caught in 2012 was 20 inches (Figure 50). The largest caught in 2013 was 18 inches (Figure 51). In 2014, the largest smallmouth bass caught was 19 inches (Figure 52).

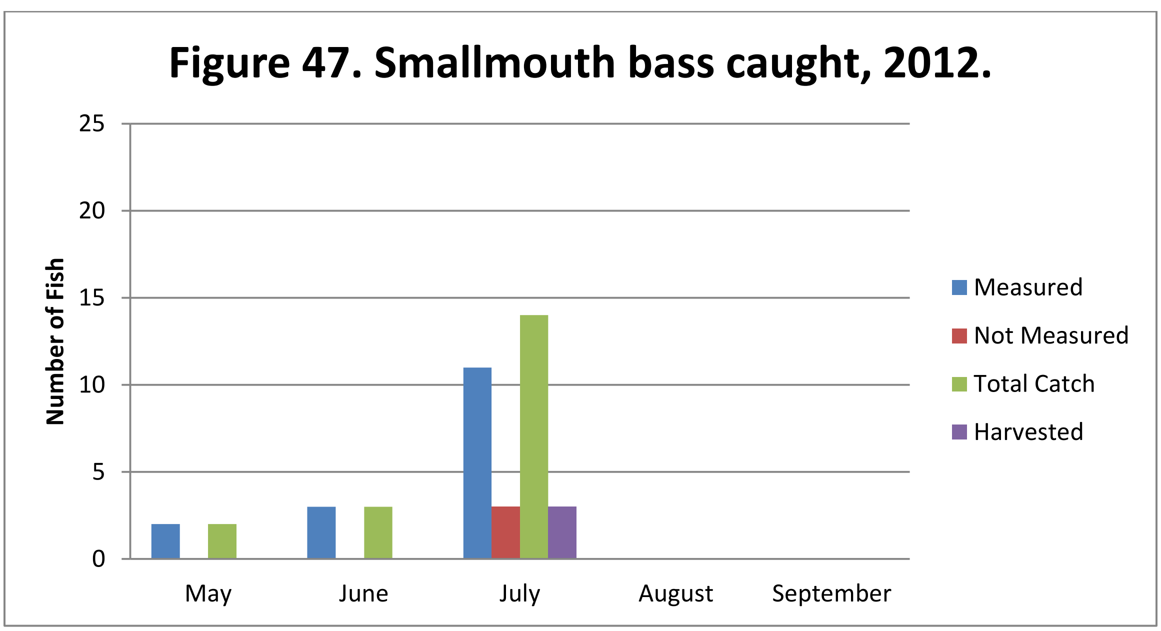


Figure 48. Smallmouth bass caught, 2013.

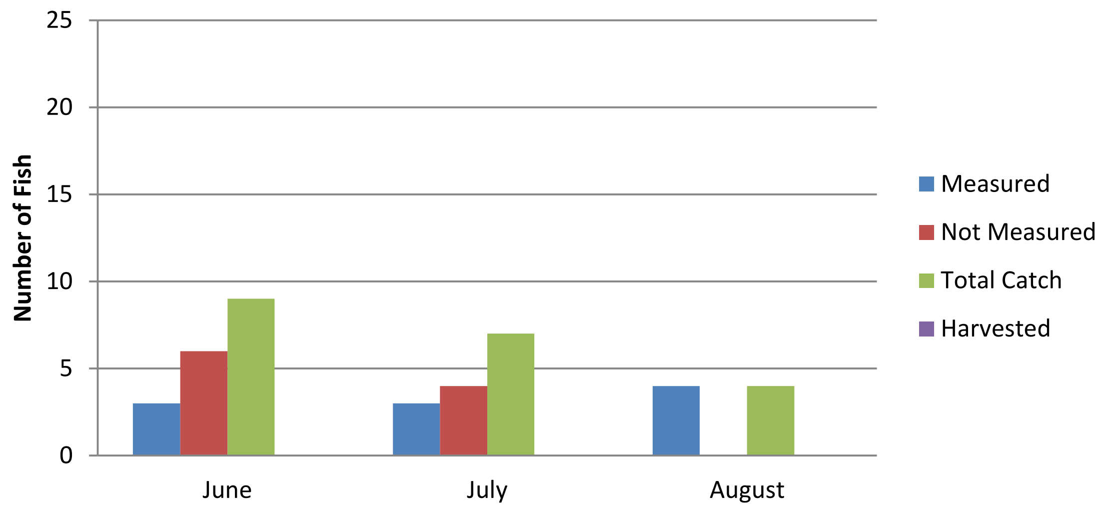


Figure 49. Smallmouth bass caught, 2014.

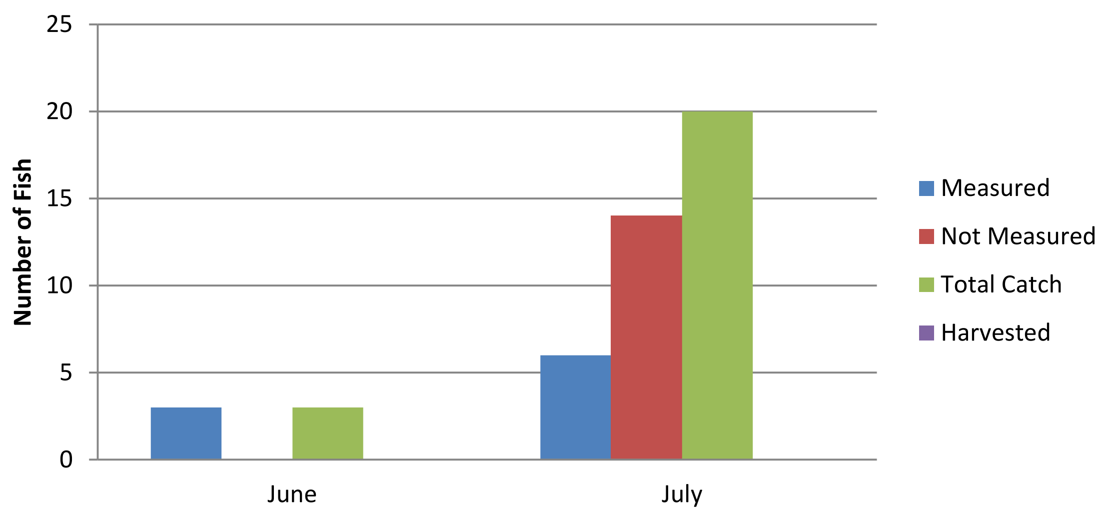


Figure 50. Average and largest length smallmouth bass, 2012.

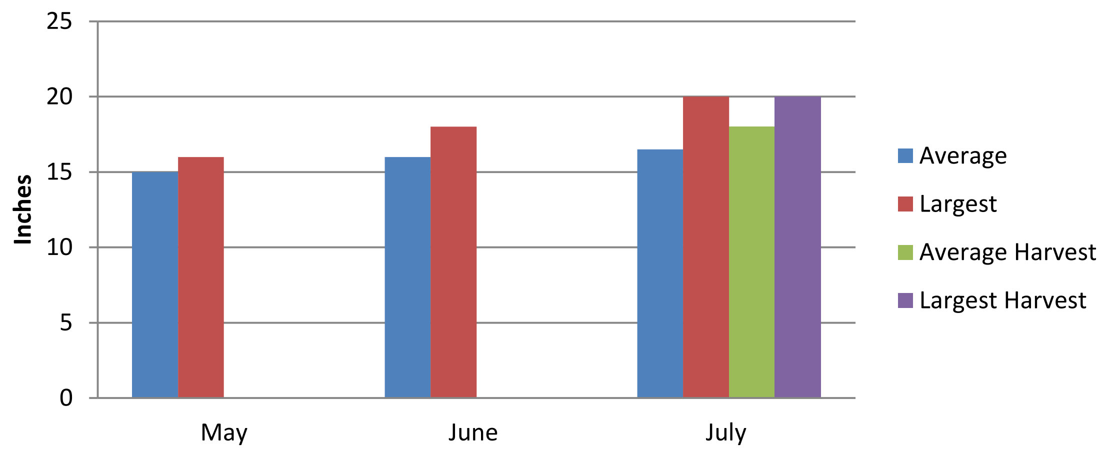
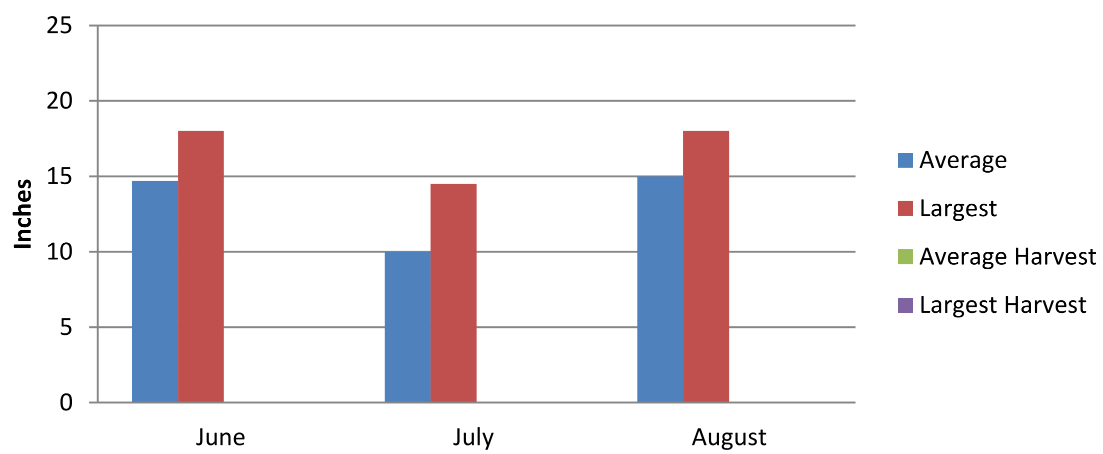
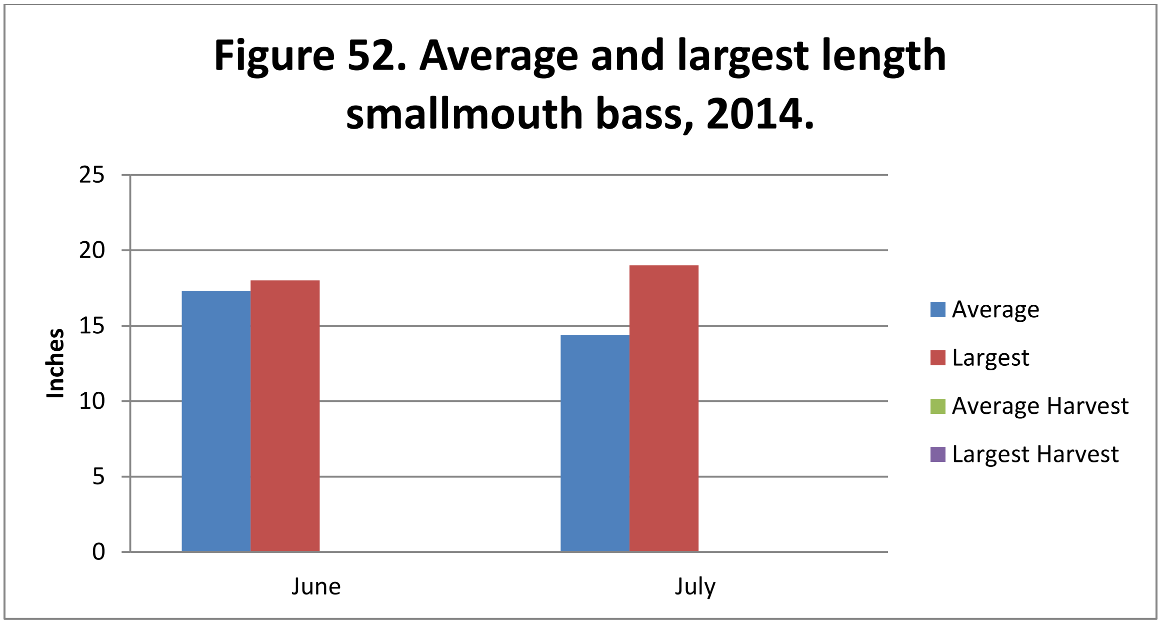
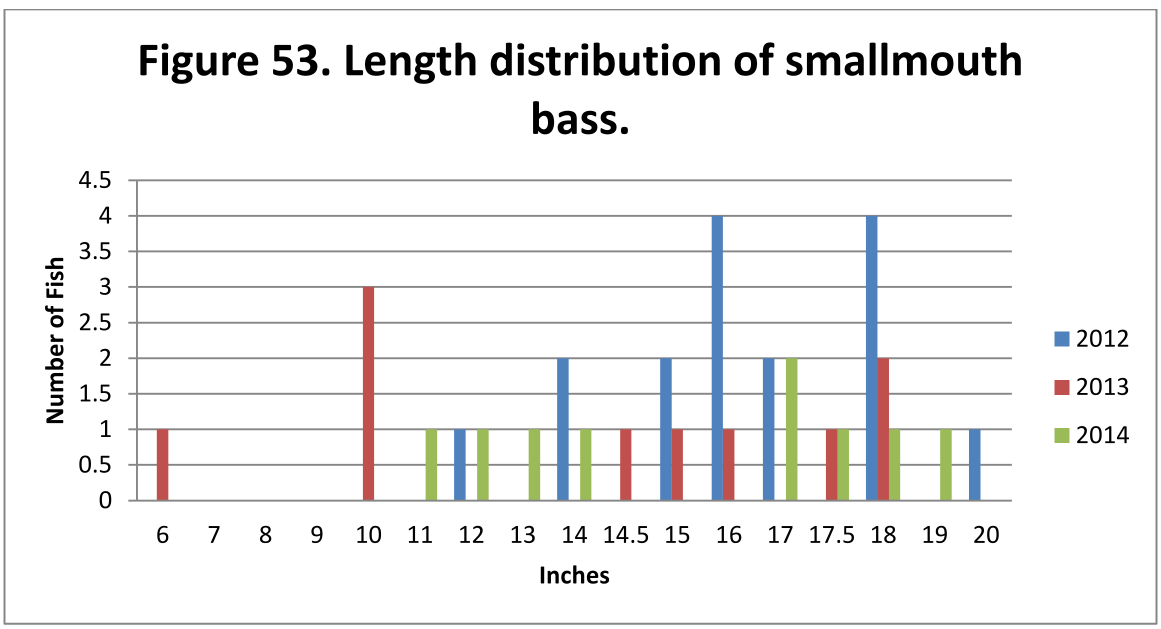


Figure 51. Average and largest length smallmouth bass, 2013.



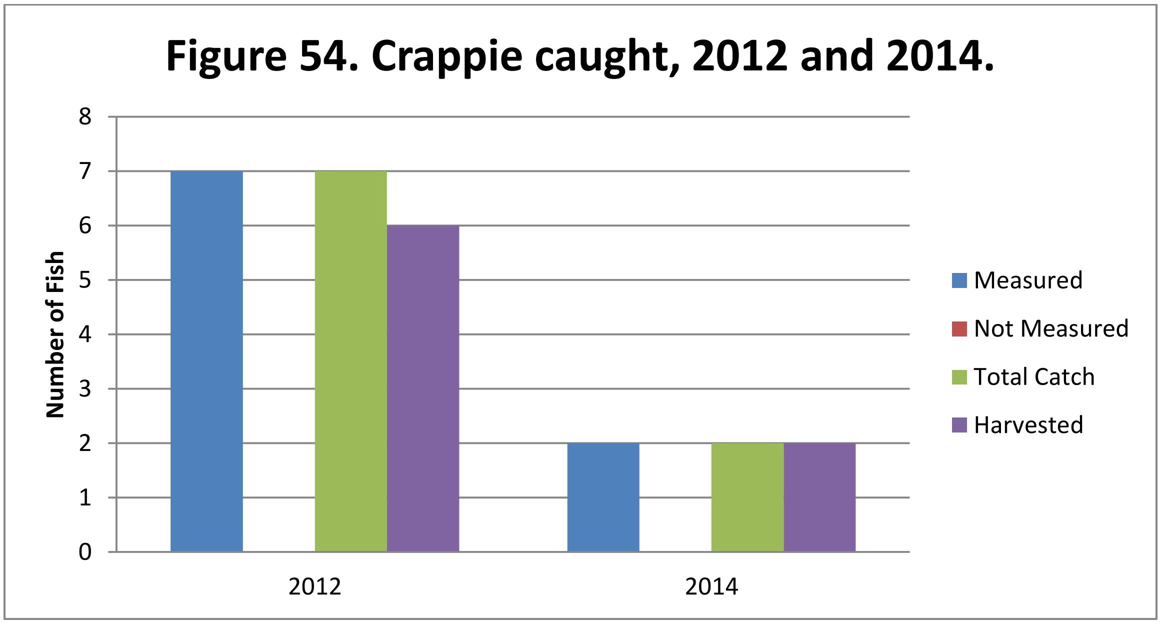


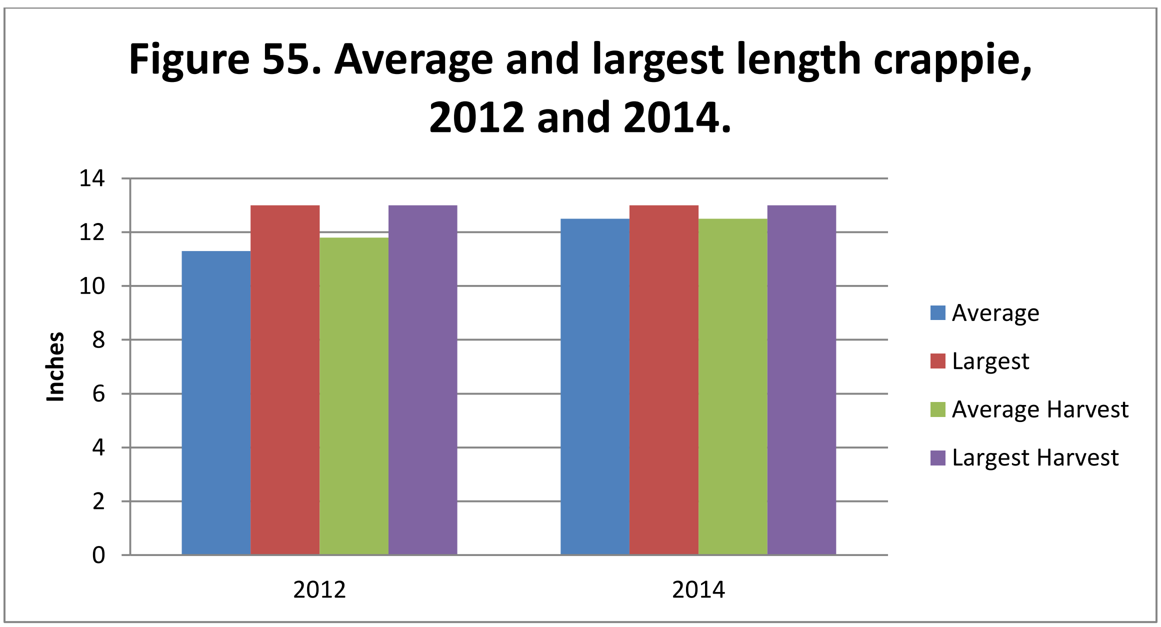
The length of smallmouth bass caught in 2012 ranged from 12 to 20 inches. In 2013, the length of smallmouth bass ranged from 6 and 18 inches. In 2014, smallmouth bass ranged in size from 11 to 19 inches (Figure 53).



CRAPPIE

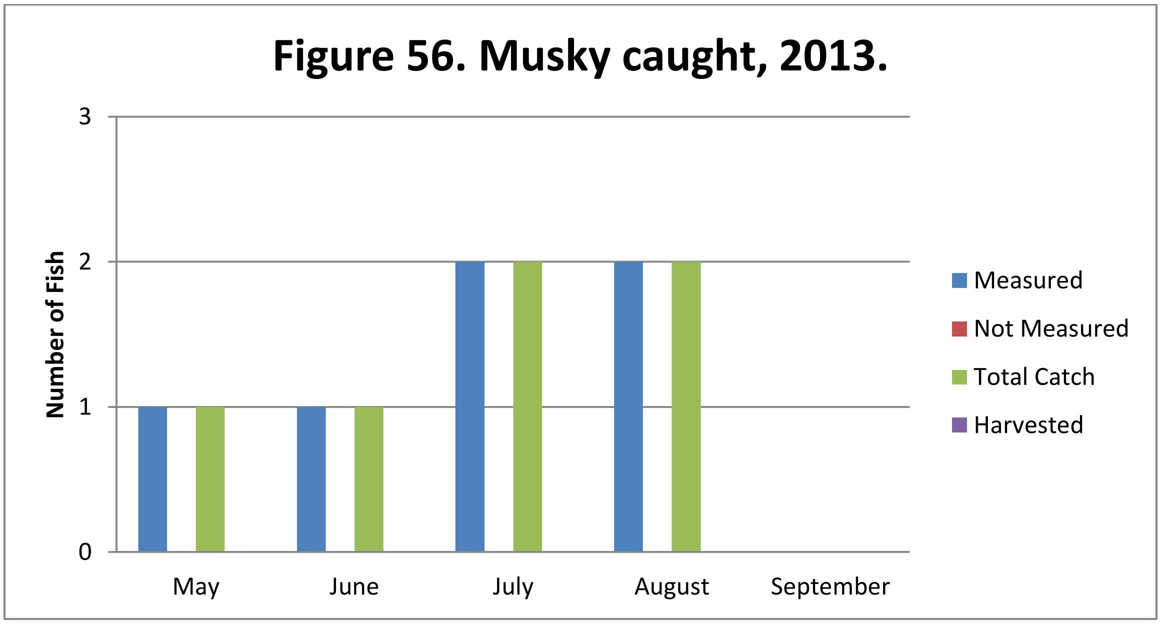
Seven crappies were caught in 2012 and of those, six were harvested (Figure 54). In 2014, two were caught and both harvested (Figure 54). In 2012, the length of crappies caught ranged from 8.0 inches to 13.0 inches (Figure 55). In 2014, the largest harvested crappie was 13.0 inches long (Figure 55).





MUSKY

In 2012, there were no musky caught. In 2013, there were 6 musky caught, but 0 harvested (Figure 56). In 2014, there were 3 musky caught and 1 harvested (Figure 57). The largest musky caught in 2013 was 43 inches (Figure 58). In 2014, the largest caught was 50 inches (Figure 59). The lengths of musky caught in 2013 ranged from 32 to 43 inches and in 2014 ranged from 32 to 50 inches (Figure 60).



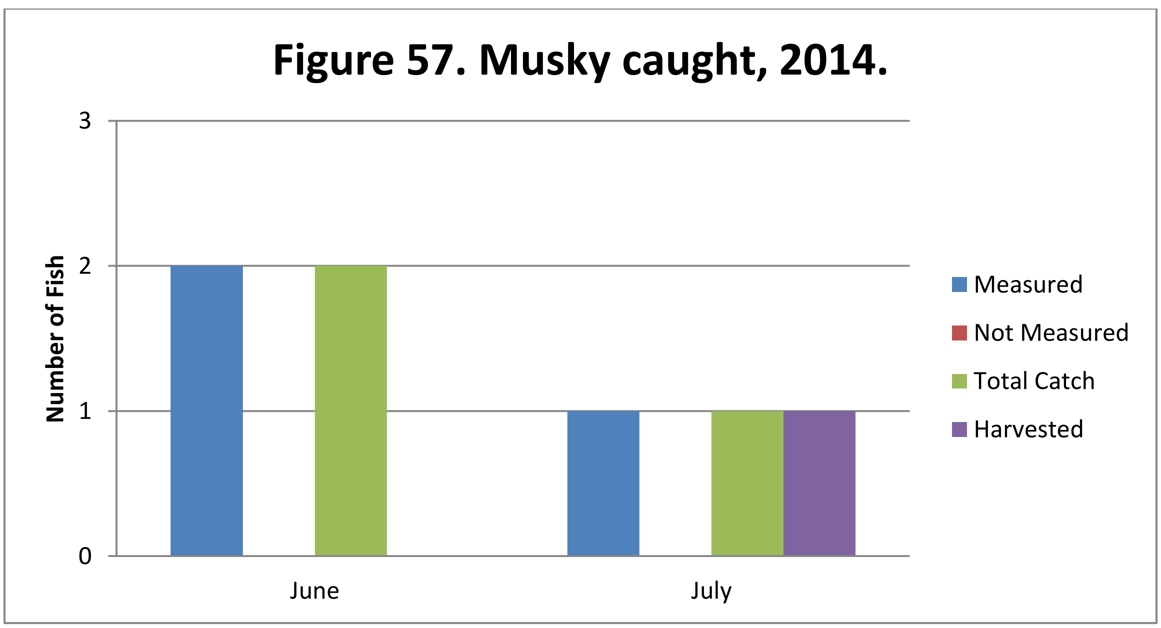


Figure 58. Average and largest length musky, 2013.

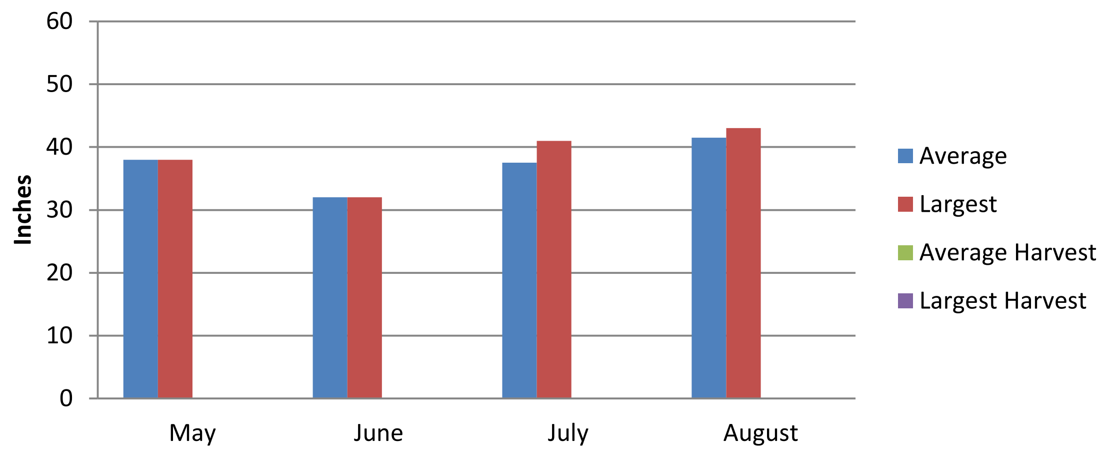
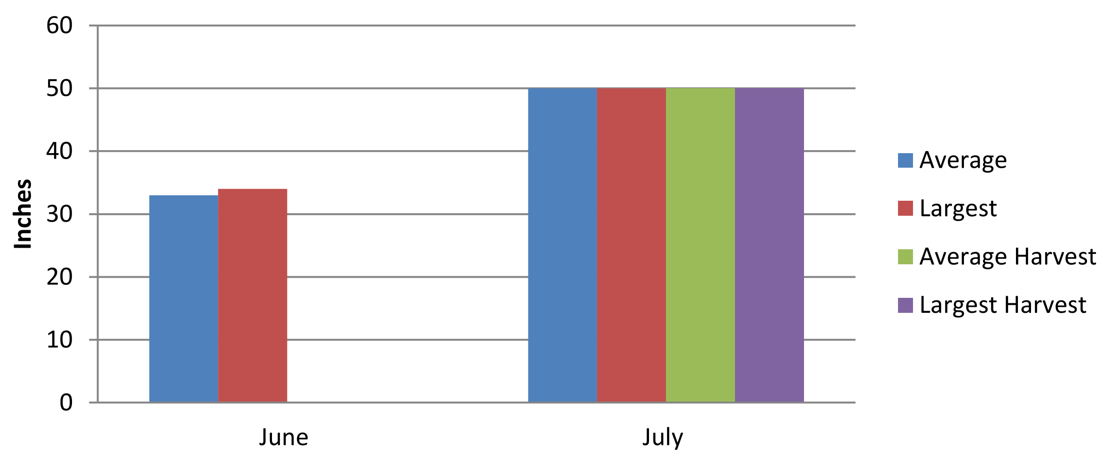
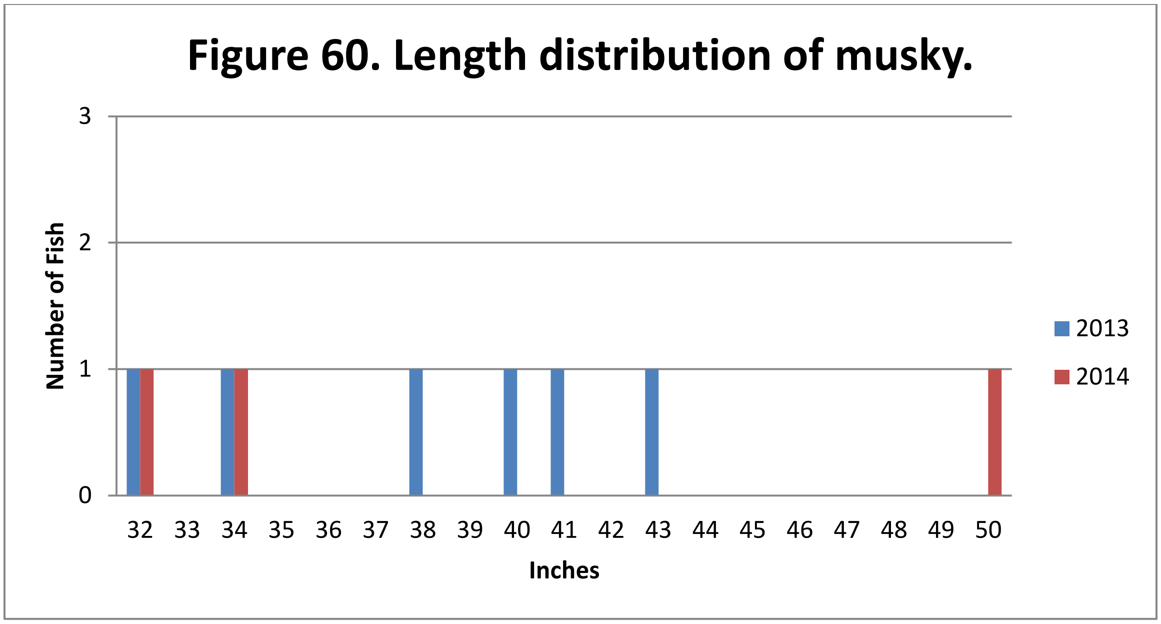


Figure 59. Average and largest length musky, 2014.





PUMPKINSEED

In 2013, 6 pumpkinseeds were caught and 0 were harvested. No measurements were made for pumpkinseeds caught.

Appendix I
Sevenmile Lake Frog and Toad Survey

Page left intentionally blank

WHITE WATER ASSOCIATES, INC.

Sevenmile Lake Stewardship Program
Frog & Toad Survey

This document is a product of a WDNR Lake Planning Grant awarded to:

Sevenmile Lake Association
Gene Kucharski, President
P.O. Box 1814
Eagle River, Wisconsin 54521
Phone: (920)469-2611; Email: Sevenmile_lake@yahoo.com

Submitted to:

Wisconsin Department of Natural Resources
Attention: Kevin Gauthier, Sr., Water Resource Management Specialist
8770 Hwy J
Woodruff, WI 54568
Phone: (715) 365-5211 ext. 214; Email: Kevin.GauthierSr@wisconsin.gov

Prepared by:

White Water Associates, Inc.
Dean Premo, Ph.D.
429 River Lane, P.O. Box 27
Amasa, Michigan 49903
Phone: 906-822-7889
E-mail: dean.premo@white-water-associates.com

Date: April 2015

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Introduction

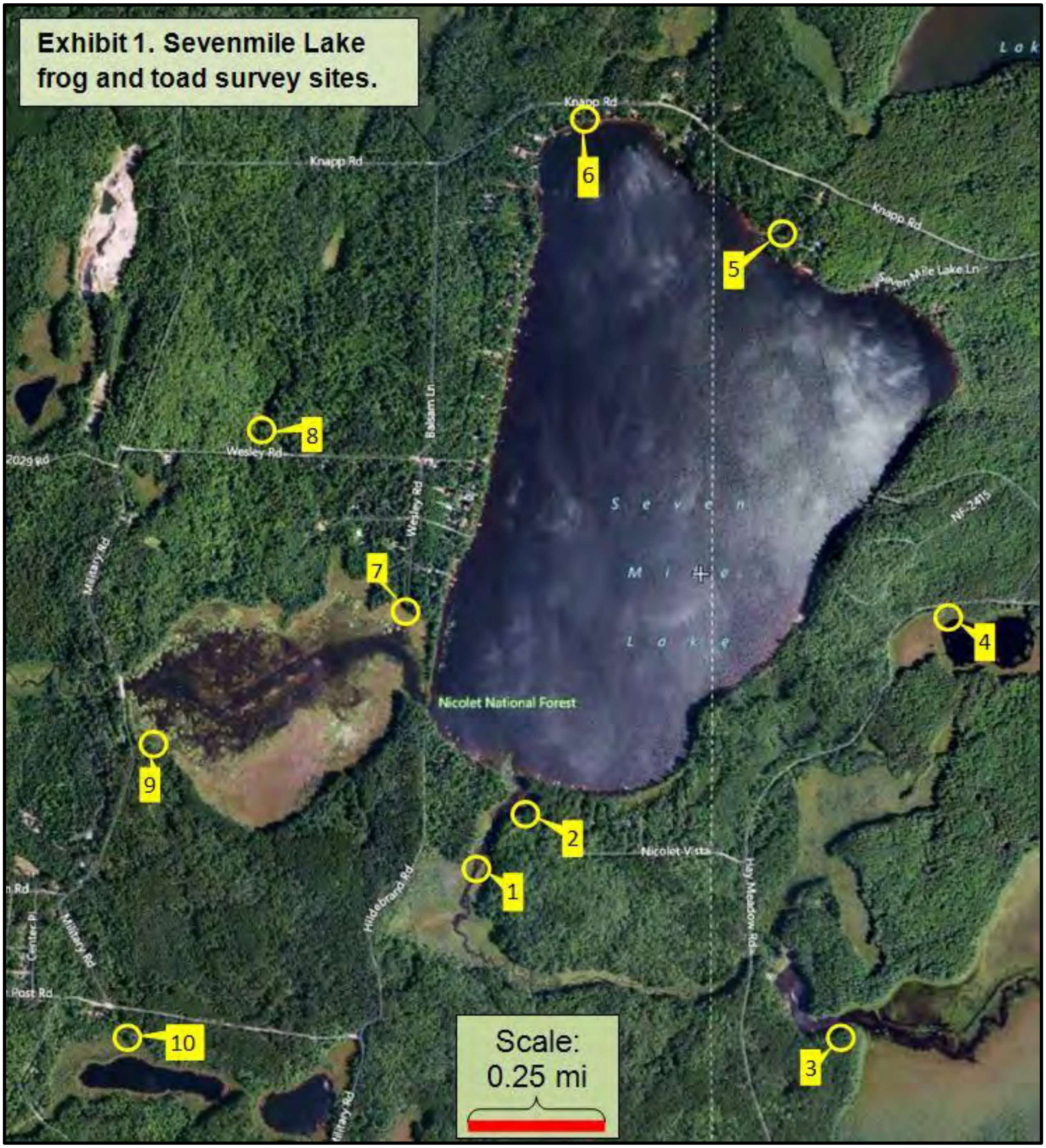
One component of the Sevenmile Lake Stewardship Program was to establish a volunteer frog and toad survey of habitats in the vicinity of Sevenmile Lake. Frogs and toads are sensitive to environmental changes and are good indicators of overall ecosystem health. Monitoring frogs and toads in the vicinity of Sevenmile Lake provides information about the health of the watershed. The decline of amphibian populations in many areas in North America has prompted monitoring of local frog and toad populations. Many states (including Wisconsin) have developed frog and toad survey protocols for this purpose. This report documents the methods and findings for the frog and toad monitoring around Sevenmile Lake.

Methods

We followed the Wisconsin Frog and Toad Survey Manual[1] for site selection and field methodology. Working in consultation with lake stewardship volunteers (John and Sara Klein) with local knowledge of area wetlands, Dean Premo (a trained herpetologist) selected ten sites in the immediate landscape of Sevenmile Lake as frog and toad survey wetlands. These sites are shown in Exhibit 1.

Lake steward volunteers offered their efforts for the “swing-shift” duty of surveying for frogs and toads (frog and toad monitoring typically starts after dark and may go late into the night). The volunteers were instructed by Dean Premo who also provided recordings of frog calls from which to study. *First run*, *second run*, and *third run* dates are established in an attempt to capture the breeding phenology (seasonal timing) of all frog and toad species potentially present in the area. Monitoring was conducted under weather conditions conducive to frog/toad activity and to hearing the breeding males vocalize. For this project, monitoring was conducted in 2012.

[1] Paloski, R.A. T.L.E. Bergeson, M. Mossman, and R. Hay (eds). 2006. Wisconsin Frog and Toad Survey Manual PUB-ER-649. Bureau of Endangered Resources, Wisconsin Department of Natural Resources, Madison, WI. 25 pp.



According to range maps in the scientific literature and the Frog and Toad Survey Manual, nine anuran (frogs and toads) species have been documented in Forest and Oneida Counties. Exhibit 2 provides this list. These species are the most likely anurans to be heard in the Sevenmile Lake watershed. The volunteers became familiar with their vocalizations.

Exhibit 2. Frogs and Toads (Anurans) of Forest & Oneida Counties.

Anurans for which Forest and Oneida County Records Exist

1. Eastern American Toad (*Bufo americanus*)
2. Northern Spring Peeper (*Pseudacris crucifer*)
3. Gray Treefrog (*Hyla versicolor*)
4. Bullfrog (*Lithobates catesbeiana*)*
5. Green Frog (*Lithobates clamitans*)
6. Wood Frog (*Lithobates sylvatica*)
7. Northern Leopard Frog (*Lithobates pipiens*)*
8. Mink Frog (*Lithobates septentrionalis*)*
9. Boreal Chorus Frog (*Pseudacris maculata*)

***** *Wisconsin's Natural Heritage Inventory current working list designates this species as SC/H=special concern/take regulated by establishment of open closed seasons*

Note: The Pickerel Frog *(Lithobates palustris)* has not been documented in Forest or Oneida Counties, but has been documented in the adjacent counties to the south.

Results

Field data collected is presented in the site data summary exhibits provided at the end of this report. These site summary sheets also show the location of the wetland on a USGS topographic map, an aerial photograph of the wetland, and describe the habitat.

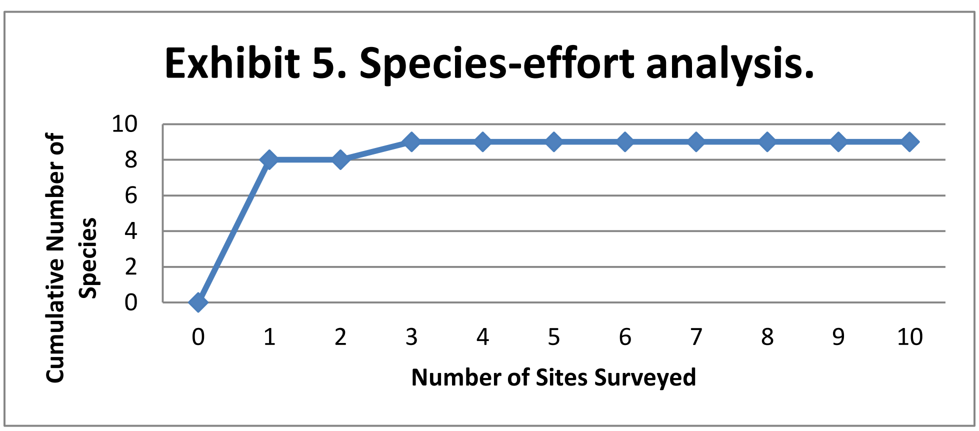
A total of nine anuran species were detected during the auditory surveys of 2012. The species detected are listed in Exhibit 3. Four species were recorded at all ten monitoring sites. The bullfrog was found at two of the sites.

Exhibit 3. Anuran species detected in the Sevenmile Lake Watershed in 2012	
Anuran Species	Number of Sites Detected
Wood Frog (*Lithobates sylvatica*)	10
Boreal Chorus Frog (*Pseudacris maculate)*	9
Northern Spring Peeper (*Pseudacris crucifer*)	10
Northern Leopard Frog (*Lithobates pipiens*)	10
Eastern American Toad (*Bufo americanus*)	10
Gray Treefrog (*Hyla versicolor*)	3
Mink Frog (*Lithobates septentrionalis*)	7
Green Frog (*Lithobates clamitans*)	4
Bullfrog (*Lithobates catesbeiana*)	2

Exhibit 4 displays the species detected at each of the ten study sites in 2012. The mean number of species per site in 2012 was 6.5.

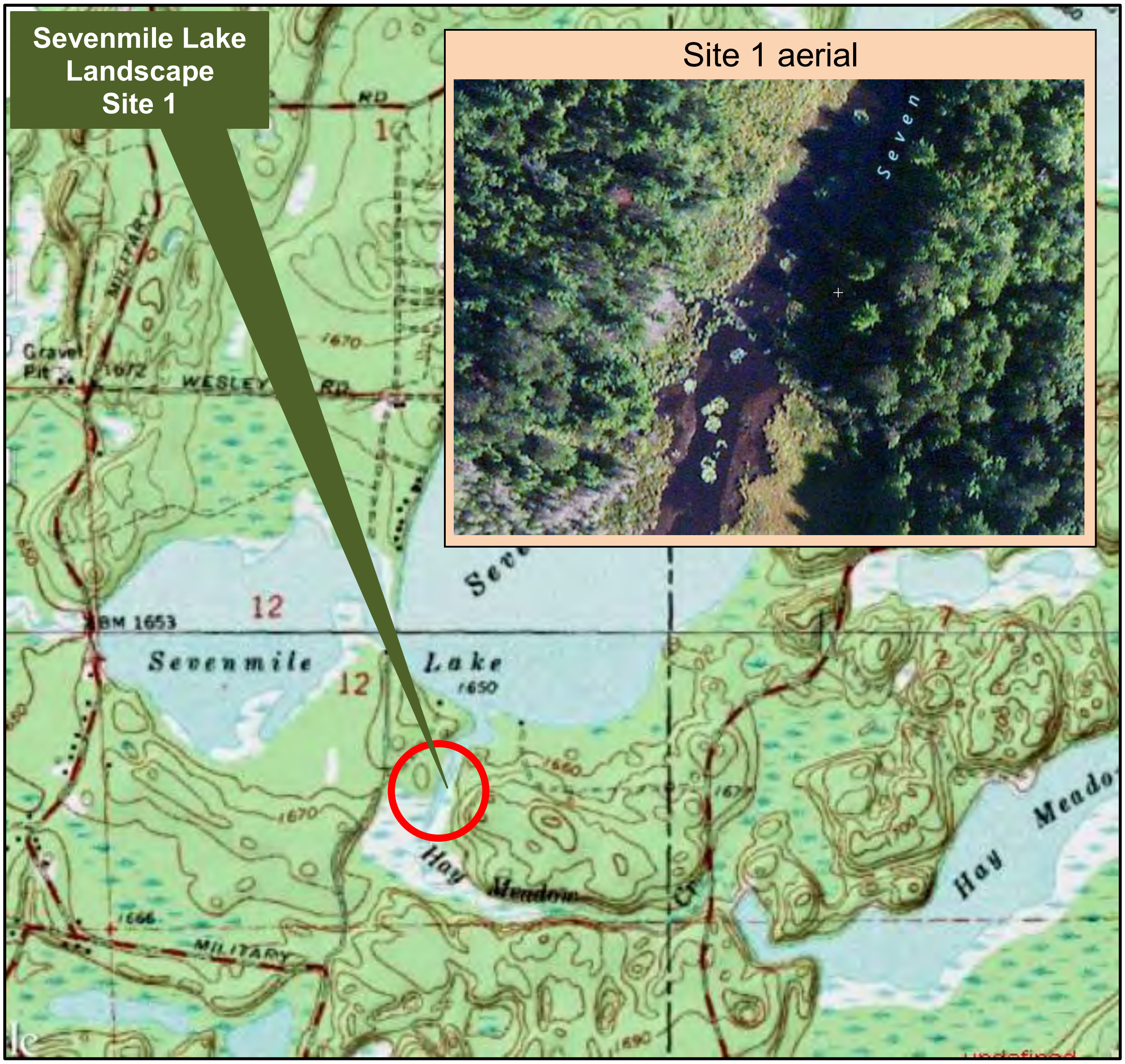
Exhibit 4. Anuran species distribution across Sevenmile Lake area study sites in 2012.										
Site	**Total Species**	**Wood Frog**	**Chorus Frog**	**Spring Peeper**	**Leopard Frog**	**American Toad**	**Gray Treefrog**	**Mink Frog**	**Green Frog**	**Bullfrog**
1	8	X	X	X	X	X	X	X	X	
2	8	X	X	X	X	X	X	X	X	
3	9	X	X	X	X	X	X	X	X	X
4	5	X	X	X	X	X				
5	7	X	X	X	X	X		X	X	
6	5	X	X	X	X	X				
7	5	X	X	X	X	X				
8	6	X	X	X	X	X		X		
9	7	X	X	X	X	X		X		X
10	5	X		X	X	X		X		
Number of sites each species was observed		10	9	10	10	10	3	7	4	2

Finally, as a measure of survey thoroughness, we present an analysis of species detected and effort expended (as measured by the number of sites surveyed). Exhibit 5 shows a graph of cumulative number of species plotted against number of sites visited. The curve levels off after only three sites indicating that the number of sites was more than adequate to measure the diversity of anurans.



The habitats for each of the eleven monitoring sites are described in Exhibits 6-15.

Exhibit 6. Sevenmile Lake Frog & Toad Survey - Site Summary.



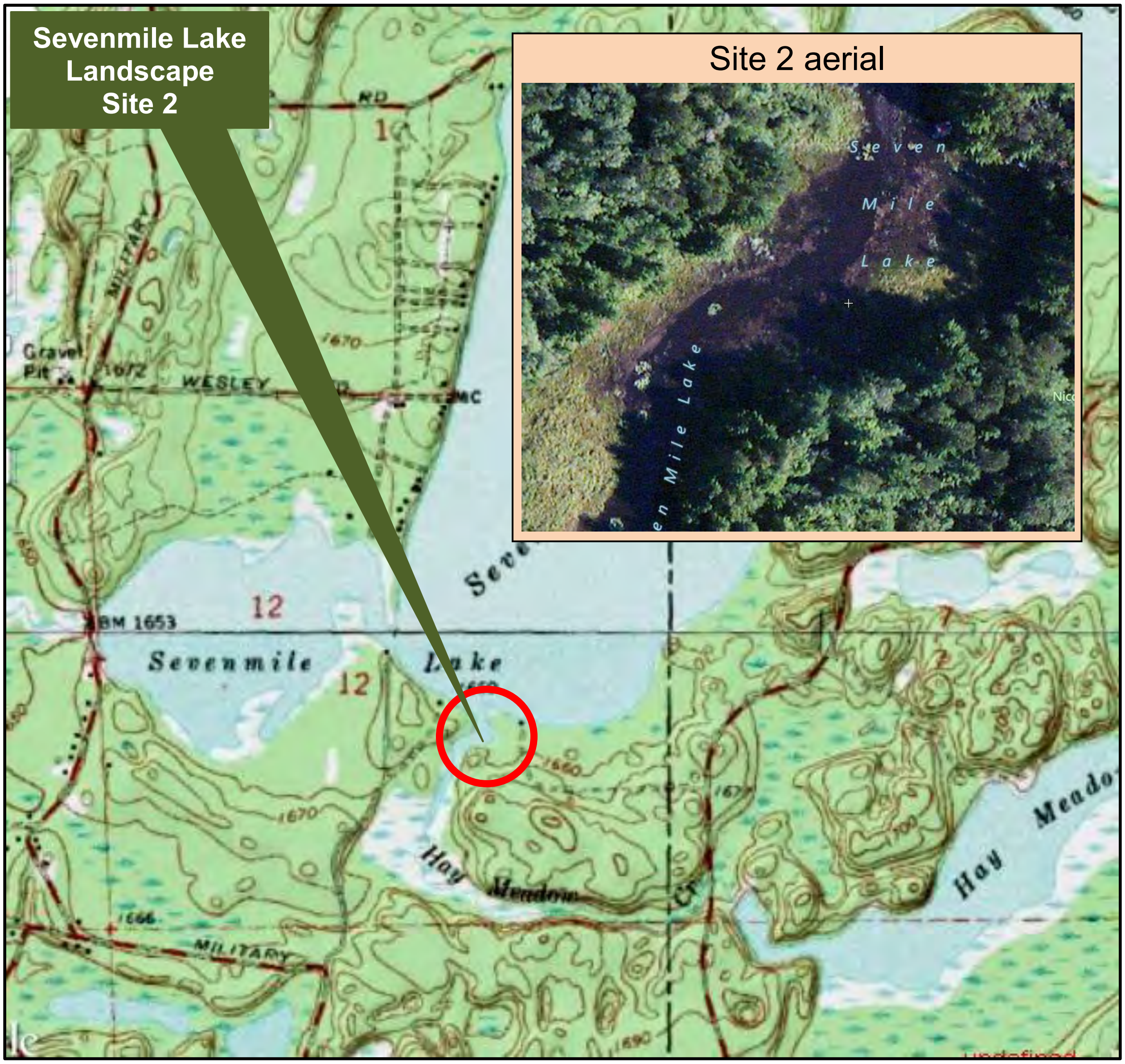
Site Number: 1 Site Location: Hay Meadow Creek

Site Coordinates: 45.870965; -89.056154

Habitat Description: Marsh and ponded water of Hay Meadow Creek. Surrounded by mixed upland hardwood

Species Detected: Wood Frog, Boreal Chorus Frog, Spring Peeper, Northern Leopard Frog, Eastern American Toad, Gray Treefrog, Mink Frog, Green Frog

Exhibit 7. Sevenmile Lake Frog & Toad Survey - Site Summary.

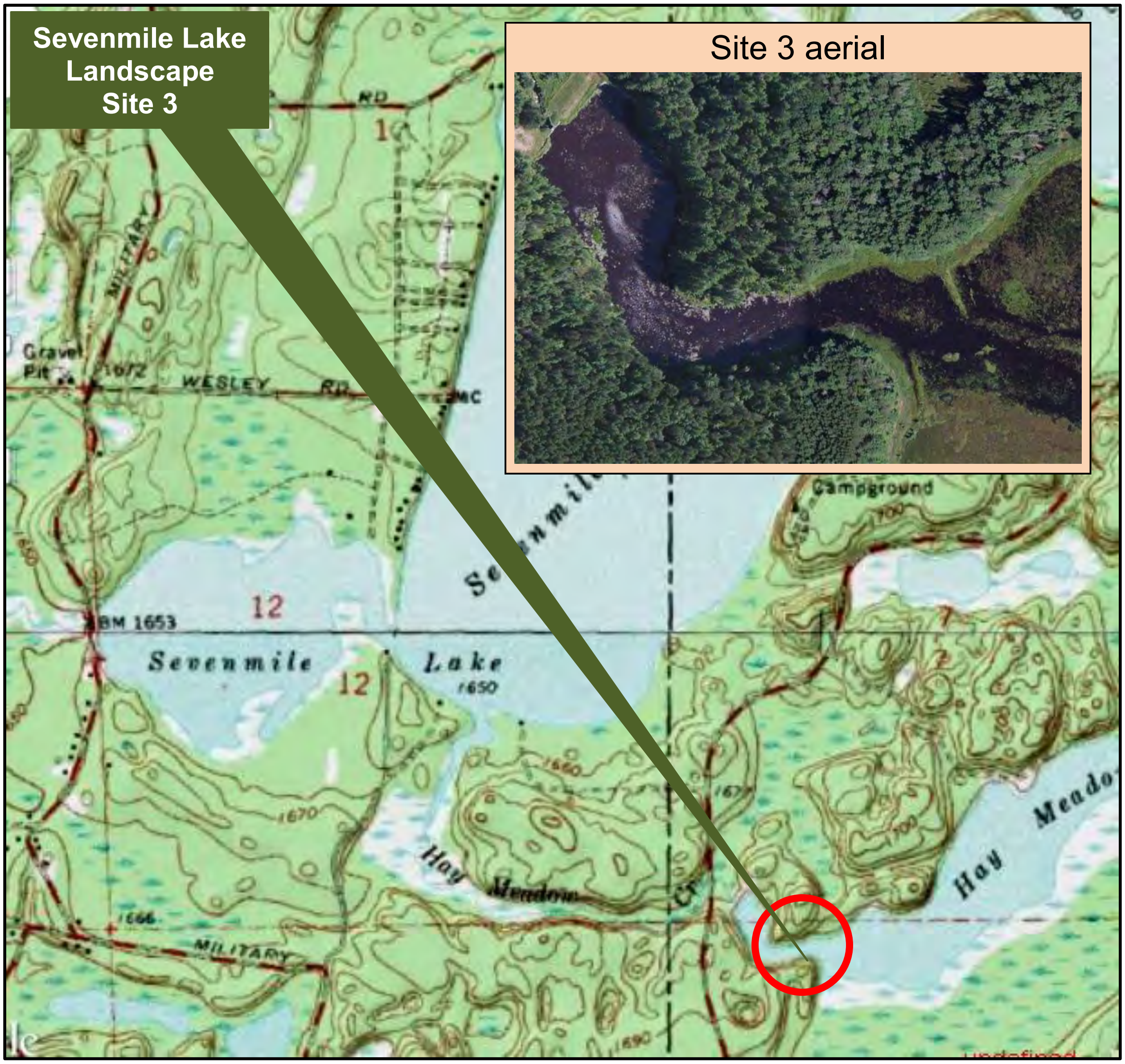


Site Number: 2	Site Location: Hay Meadow Creek, off Nicolet Vista Road
Site Coordinates:	45.972163; -89.054306

Habitat Description: Marsh and emergents in ponded area of Hay Meadow Cr. just upstream of where it enters Sevenmile Lake. Mixed conifer-hardwood surroundings.

Species Detected: Wood Frog, Boreal Chorus Frog, Spring Peeper, Northern Leopard Frog, Eastern American Toad, Gray Treefrog, Mink Frog, Green Frog

Exhibit 8. Sevenmile Lake Frog & Toad Survey - Site Summary.

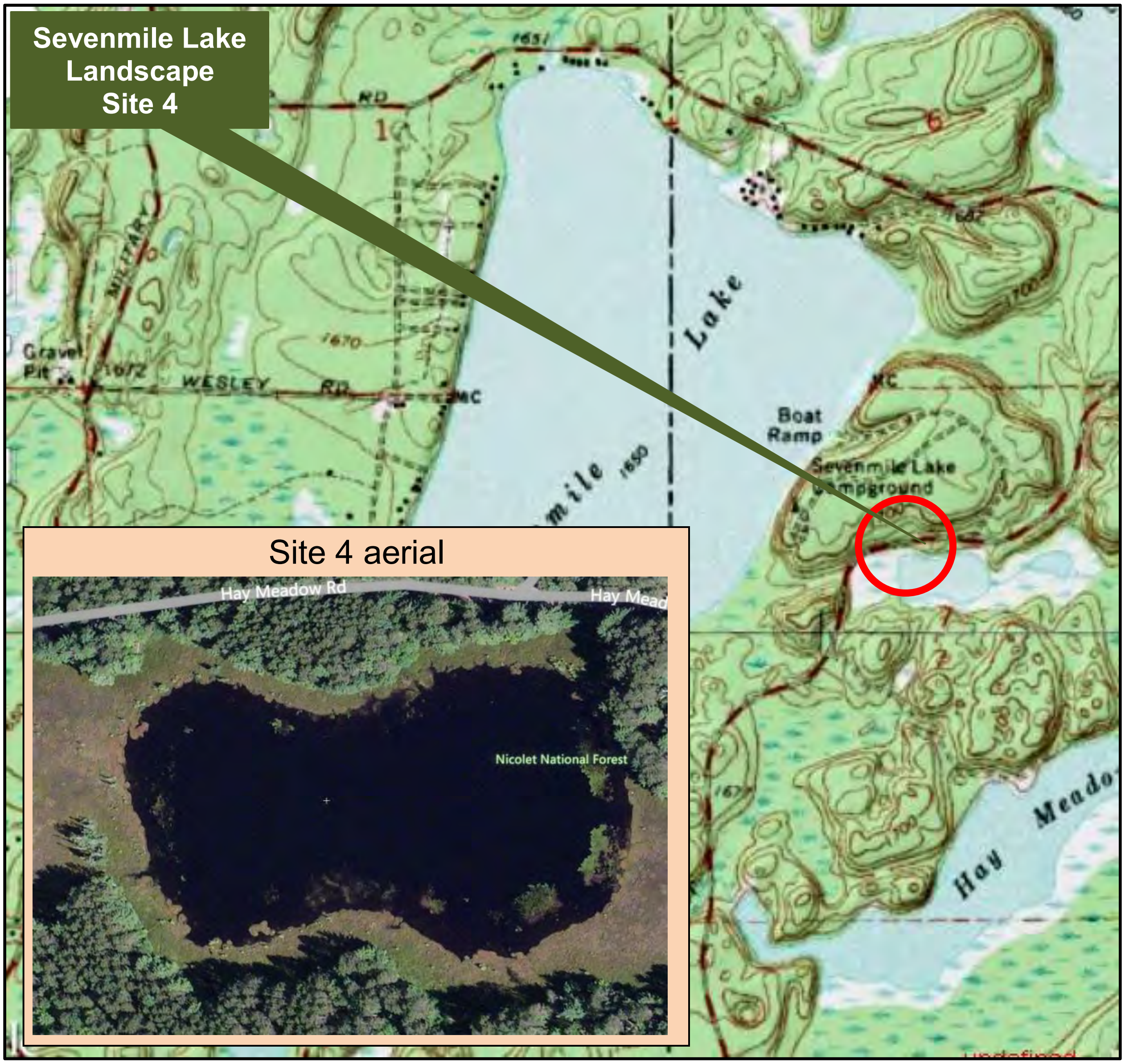


Site Number: 3	Site Location: Hay Meadow Creek, Hay Meadow Dam
Site Coordinates:	45.866384; -89.04227

Habitat Description: Human-made impoundment on Hay Meadow Cr. Permanent water with mergent plants, floating plants, meadow. Mixed hardwood riparian area.

Species Detected: Wood Frog, Boreal Chorus Frog, Spring Peeper, Northern Leopard Frog, Eastern American Toad, Gray Treefrog, Mink Frog, Green Frog, Bullfrog

Exhibit 9. Sevenmile Lake Frog & Toad Survey - Site Summary.



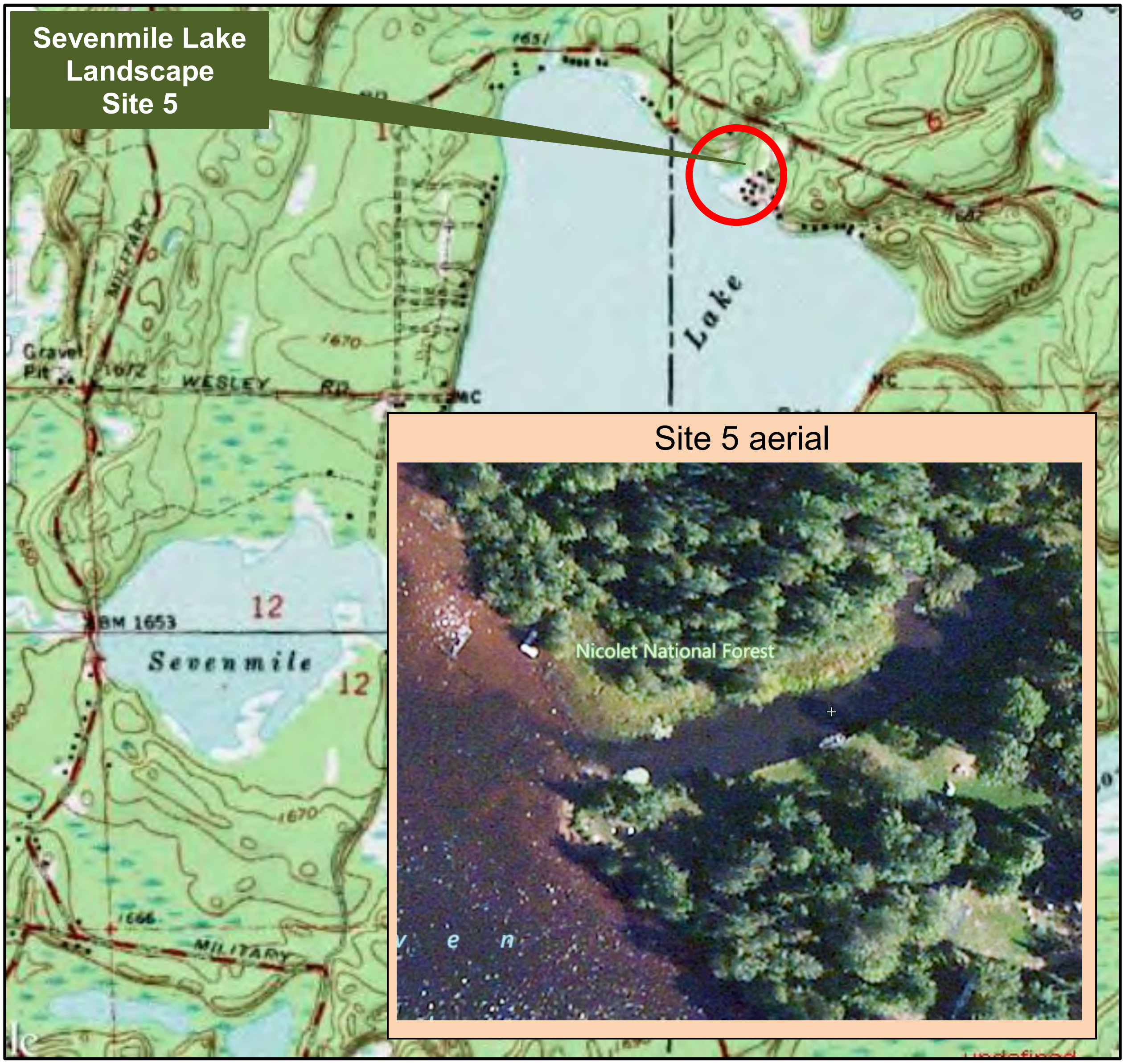
Site Number: 4 Site Location: Hay Meadow Rd, Near Sevenmile Lk Campgrnd.

Site Coordinates: 45.877207; -89.037935

Habitat Description: Permanent pond/lake with broad, open, wetland fringe. Northern hardwoods forest comprises the riparian area.

Species Detected: Wood Frog, Boreal Chorus Frog, Spring Peeper, Northern Leopard Frog, Eastern American Toad

Exhibit 10. Sevenmile Lake Frog & Toad Survey - Site Summary.



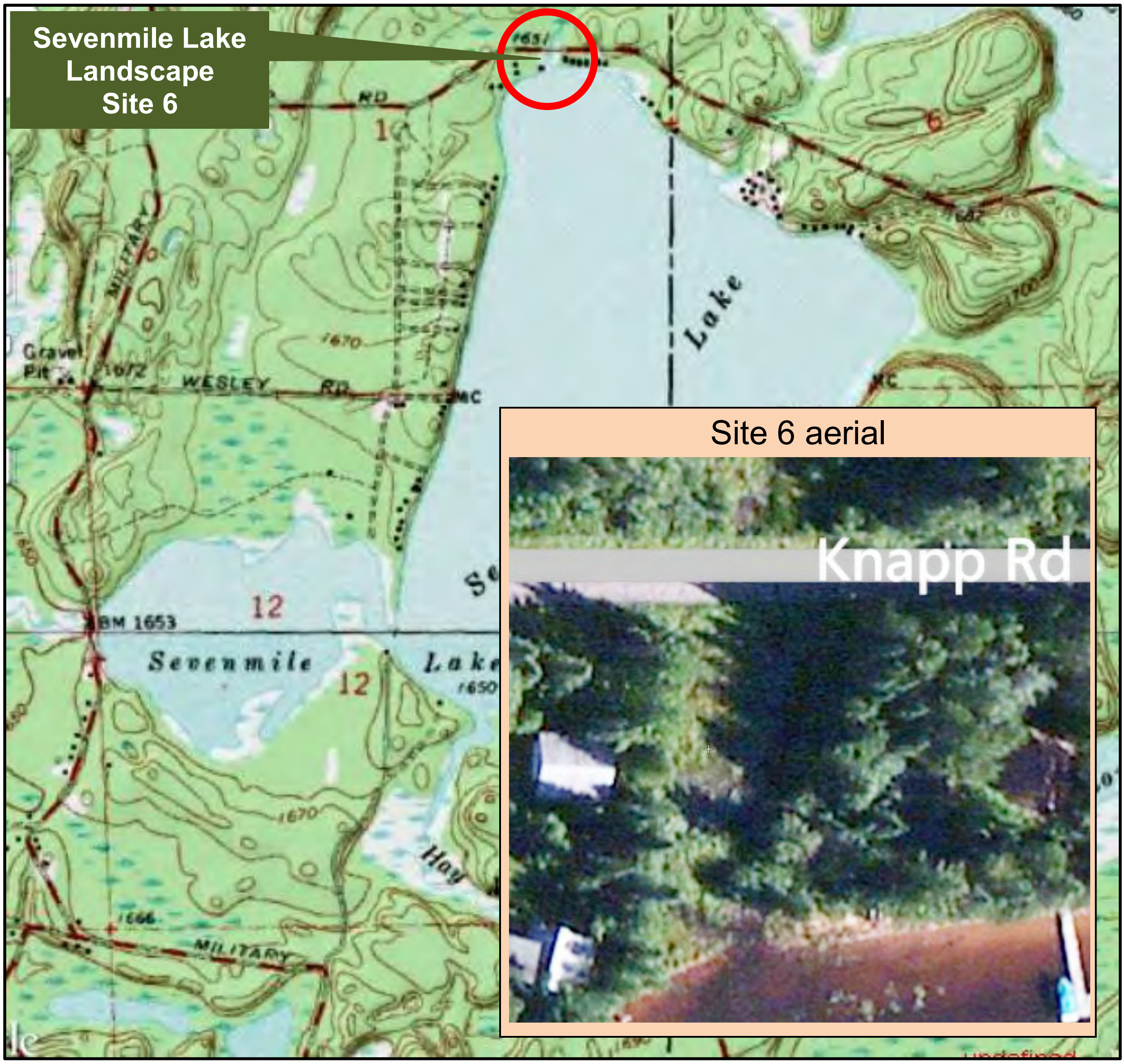
Site Number: 5 Site Location: Knapp Rd, stream emanates from Pat Shay Lake

Site Coordinates: 45.8871; -89.04508

Habitat Description: Broad shallow stream where it enters Sevenmile Lake. Some human development present. Mixed conifer-hardwood riparian area.

Species Detected: Wood Frog, Boreal Chorus Frog, Spring Peeper, Northern Leopard Frog, Eastern American Toad, Mink Frog, Green Frog

Exhibit 11. Sevenmile Lake Frog & Toad Survey - Site Summary.



Site Number: 6 Site Location: Small stream, flows under Knapp Rd. from north

Site Coordinates: 45.890397; -89.052156

Habitat Description: Marshy area on stream between Knapp Rd & Sevenmile Lake. Emergent/submergent aquatic plants. Mixed hardwood riparian area/houses.

Species Detected: Wood Frog, Boreal Chorus Frog, Spring Peeper, Northern Leopard Frog, Eastern American Toad

Exhibit 12. Sevenmile Lake Frog & Toad Survey - Site Summary.

Site Number: 7 Site Location: Sevenmile Lake at southern extent of Wesley Rd.

Site Coordinates: 45.877385; -89.058925

Habitat Description: Secluded bay of Sevenmile Lake. Lots of aquatic vegetation and surrounded by hardwood forest. Undeveloped riparian area.

Species Detected: Wood Frog, Boreal Chorus Frog, Spring Peeper, Northern Leopard Frog, Eastern American Toad

Exhibit 13. Sevenmile Lake Frog & Toad Survey - Site Summary.

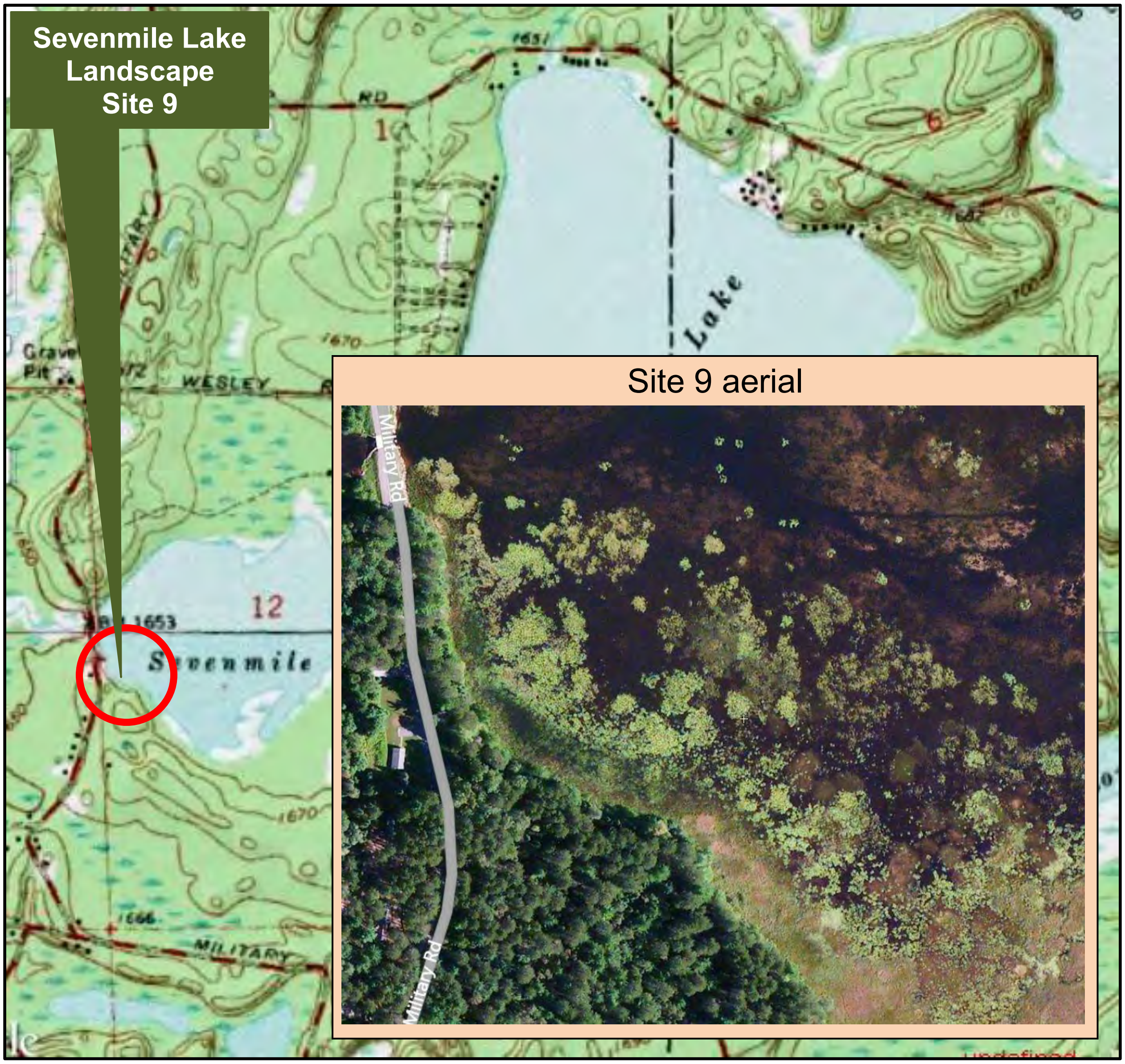
Site Number: 8	Site Location: Woodland pond off Wesley Road

Site Coordinates:	45.881487; -89.064765

Habitat Description: Woodland pond (likely temporary water). Surrounded by lowland and upland hardwood forest.

Species Detected: Wood Frog, Boreal Chorus Frog, Spring Peeper, Northern Leopard Frog, Eastern American Toad, Mink Frog

Exhibit 14. Sevenmile Lake Frog & Toad Survey - Site Summary.



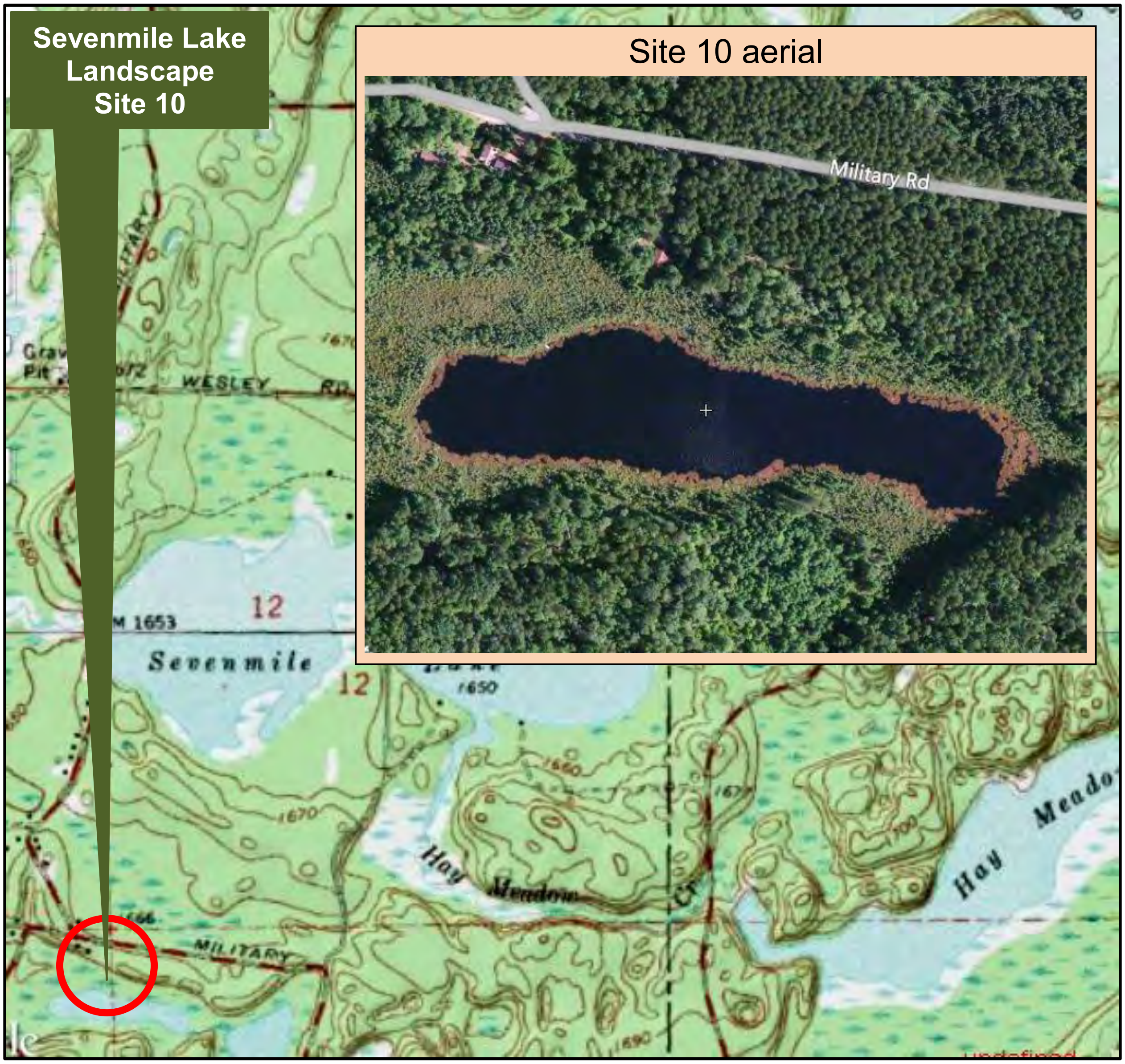
Site Number: 9   Site Location: Sevenmile Lake, near stumpy bay dam

Site Coordinates: 45.873962; -89.06904

Habitat Description: Secluded bay of Sevenmile Lake. Lots of aquatic vegetation and surrounded by hardwood forest. Undeveloped riparian area.

Species Detected: Wood Frog, Boreal Chorus Frog, Spring Peeper, Northern Leopard Frog, Eastern American Toad, Mink Frog, Bullfrog

Exhibit 15. Sevenmile Lake Frog & Toad Survey - Site Summary.



Site Number: 10 Site Location: Pothole lake off Military Road

Site Coordinates: 45.865977; -89.06929

Habitat Description: Small lake with floating vegetation and broad treeless wetland fringe. Mixed conifer-hardwood riparian area.

Species Detected: Wood Frog, Spring Peeper, Northern Leopard Frog, Eastern American Toad, Mink Frog

Appendix J
Review of Water Regulations and Planning Relevant to Sevenmile Lake

Page left intentionally blank

White Water Associates, Inc.

Review of Water Resource Regulations and Planning Relevant to Sevenmile Lake

In this appendix, we provide reviews of documents created to preserve and protect Wisconsin waters, including Sevenmile Lake. These reviews were developed from documents created by a variety of sources, including: the Environmental Protection Agency, the Wisconsin Administrative Code, the Wisconsin Department of Natural Resources, the Federal Energy Regulatory Commission (FERC), the Forest and Oneida County Planning and Zoning Departments, the North Central Wisconsin Regional Planning Commission, and the Forest and Oneida County Boards.

The first part of this appendix is a review of the federal, state and county regulations and ordinances that influence the water quality of Sevenmile Lake. Second is a review of the *Headwaters Basin Integrated Management Plan*. This plan describes issues of concern within the Headwaters Basin (where Sevenmile Lake is located), and provides examples of how the WDNR strives to preserve and restore the land and water resources. The third part of this appendix is two letters. One sent to the Forest County Land and Water Conservation Department and one sent to the North Central Wisconsin Regional Planning Commission, providing recommendations to enhance their already well-documented and comprehensive Forest and Oneida County Land & Water Resource Management Plans.

Regulations and Ordinances that Protect the Water Quality of Sevenmile Lake

Federal

The Army Corps of Engineers oversees projects that alter waterways-including discharges to wetlands, and the Environmental Protection Agency (EPA) regulates water quality pollution and drinking water standards. The EPA revised The Clean Water Act in 1972 in order to reduce pollutant discharges into waterways and mange polluted runoff. It has set waste water standards for industries, and for all contaminants in surface waters. The Clean Water Act deemed it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. You can view parts of the Clean Water Act at the EPA's website (http://www.epa.gov/npdes/pubs/cwatxt.txt).

Sevenmile Lake dam is operated by the Wisconsin Valley Improvement Company (WVIC) under a federal license issued by the Federal Energy Regulatory Commission (FERC). This 30-year license for FERC Project P-2113 was issued in 1996. Included in the license are several plans including an Operations Plan, Water Quality Monitoring Plan, Fish and Wildlife Management Plan, Recreation Plan, Shoreline Erosion Control Plan, and Land Resources Management Plan (WVIC 2016). For further information regarding FERC regulations, please contact WVIC to view these plans.

State

For any given lake in Wisconsin, shoreland protection regulations can be set by the county, town or lake association; however, they must *at least* follow the regulations listed under the State of Wisconsin's Administrative Code, Chapter NR115: Wisconsin's Shoreland Protection Program. The purpose of this Program is to: "establish minimum shoreland zoning standards for ordinances…and to limit the direct and cumulative impacts of shoreland development on water quality; near—shore aquatic, wetland and upland wildlife habitat; and natural scenic beauty" (State of Wisconsin Legislature-a). This document states that a setback of 75 feet from the ordinary high-water mark (OHWM) of any navigable waters is required for all buildings and structures. It also states that the county will be in charge of establishing ordinances that consider the effect of vegetation removal on water quality, including soil erosion, and the flow of effluents, sediments and nutrients. Lastly, it says that a minimum of 35 feet vegetative buffer zone is required from the OHWM (State of Wisconsin Legislature-a).

Changes to the Wisconsin Administrative Code have limited the amount of phosphorus running off into waterbodies. Chapter 151 now restricts the amount of phosphorus farmers can have come off their fields. Moreover, in 2009-2010, Wisconsin legislatures passed laws so that fertilizers with phosphorus would be banned from use on lawns or turfs, and that phosphorus levels in dishwater detergent were reduced considerably (State of Wisconsin Legislature-b).

The Wisconsin Department of Natural Resources (WDNR) has developed the Wisconsin Pollutant Discharge Elimination System (WPDES) program. This program regulates the discharge of pollutants into waters. Types of permits issued are: individual, general (including ballast water discharge, pesticide pollutant discharge, etc.), storm water and agricultural (WDNR, 2014).

The WDNR also requires permits for specific aquatic plant control techniques. Permits are required for aquatic plant control when: chemicals are used, biological controls are used, and physical techniques (such as barriers) are used; when wild rice is involved; when plants are mechanically removed, or when plants are removed from an area greater than 30 feet in width along a shoreline.

Personal Watercrafts (PWCs) are restricted to slow, to no-wake speed when within 200 feet of a shoreline, while boats must be at slow, to no-wake speed within 100 feet. These regulations can be more stringent under county or town ordinances (WDNR, 2013).

County

Forest County

Regulations and ordinances set by Forest County can be found in the *Forest County Zoning Ordinance.* This document provides detailed information about zoning and planning in Forest County. Furthermore, the *Forest County Zoning Ordinance, Chapter 5: Shoreland Zoning Ordinance* provides information about regulations for shorelands in the County. The following is a brief summary of some of these counties' regulations that inherently protect the water quality of Sevenmile Lake.

According to the Forest County Ordinance, shorelands are defined as lands within 1,000 feet from a lake, pond or flowage; and 300 feet from a river or stream (5.05.2-3). In general, all structures are required to be 75 feet from the ordinary high-water mark (OHWM) of a navigable waterbody. Privies, dry wells and drain fields must be no less than 50 feet from the OHWM (5.18). These regulations are set in place to prevent pollutants and contaminants from running off into the water.

Boathouses cannot be constructed where there is a slope of 20% or more, so that soils do not erode into the water (5.23). In addition, stairs, walkways and lifts, if allowed by the zoning administrator, must avoid environmentally sensitive areas, and vegetation that stabilizes slopes cannot be removed. Likewise, removal of dead, diseased or dying vegetation must be replaced with other vegetation that is equally effective in retarding runoff, preventing erosion and preserving natural beauty (5.21). In general, on each lot, a vegetation protection area is established by the ordinary high-water mark, and a line 35 feet from the ordinary high-water mark (5.21). By keeping this vegetation, soils are less likely to erode and pollutants and contaminants are less likely to enter the water.

Oneida County

Regulations and ordinances set by Oneida County can be found in the *Oneida County Zoning and Shoreland Protection Ordinance* (Oneida County Zoning Department, 2012). This document provides detailed information about zoning and planning near shoreland and wetland areas. The following is a brief summary of some of these regulations that inherently protect the water quality of Sevenmile Lake.

According to the Ordinance, Shorelands are defined as lands within 1,000 feet from a lake, pond or flowage; and 300 feet from a river or stream (Oneida County Zoning, p. 9-1). In general, all structures are required to be 75 feet from the ordinary high-water mark (OHWM) of a navigable waterbody. Privies, dry wells and drain fields must be no less than 50 feet from the OHWM (Oneida County Zoning, p. 9-11). These regulations are set in place to prevent pollutants and contaminants from running off into the water.

To prevent erosion, Section 9.92 (Oneida County Zoning) states that “no grading or other land disturbing activities shall be permitted closer than 5 feet from the edge of a shoreland-wetland,” and that “grading or other land disturbing activities less than 25 feet from a shoreland-wetland shall require silt fencing. Boathouses cannot be constructed where there is a slope of 20% or more, so that soils do not erode into the water (Oneida County Zoning, p. 9-12). In addition, stairs, walkways and lifts, if allowed by the zoning administrator, must avoid environmentally sensitive areas, and vegetation that stabilizes slopes cannot be removed. Likewise, removal of dead, diseased or dying vegetation must be replaced with other vegetation that is equally effective in retarding runoff, preventing erosion and preserving natural beauty (Oneida County Zoning, p. 9-14).

In general, on each lot, a vegetation protection area is established by the ordinary high-water mark, and a line 35 feet from the ordinary high-water mark (Oneida County Zoning, p. 9-15). By keeping this vegetation, soils are less likely to erode and pollutants and contaminants are less likely to enter the water.

Local

The town of Three Lakes, Wisconsin has created Ordinance 54-3 & 54-4 with regards to summer and winter exhibitions and races on water bodies in Three Lakes. The ordinance states that “persons wishing to conduct exhibitions or races on or off water shall apply for a special permit” (Three Lakes, 2014). This ordinance was developed “to provide safe and healthful conditions…with public rights and interests” (Three Lakes, 2014).

Literature Cited

Forest County Zoning Land Use. 2011. *Florence County Zoning Ordinance.* Retrieved 2015. <http://www.co.forest.wi.gov/localgov_departments_details.asp?deptid=397&locid=145>

Oneida County Zoning Department. Amended Sept 2012. *Oneida County Zoning and Shoreland Protection Ordinance.* Retrieved 2014. <http://www.co.oneida.wi.gov/category.asp?linkcatid=427&linkid=1805&locid=135>

State of Wisconsin Legislature-a. NR 115. Wisc. Admin. Code § 115.01. *Wisconsin's Shoreland Protection Program, Purpose*. Page 145.

State of Wisconsin Legislature-b. NR 151. Wisc. Admin. Code § 151.001-151.32. *Runoff Management*. Pages 399-408.22.

Town of Three Lakes. 2014. *Sec 54-3 and Sec 54-4 Exhibitions and Races.* Retrieved 2015. <http://www.townofthreelakes.com/uploads/documents/Sec.%2054-3%20Summer%20&%20Sec.%2054-4%20Winter%20exhibition%20&%20races.pdf>

Wisconsin Department of Natural Resources. 2013. *The Handbook of Wisconsin Boating Laws and Responsibilities*. Boat Ed., Kalkorney, Inc. Dallas, TX. Retrieved 2015. <http://dnr.wi.gov/files/PDF/pubs/LE/LE0301.pdf>

Wisconsin Department of Natural Resources. 2014. *WPDES Permits*. Retrieved 2015. <http://dnr.wi.gov/topic/wastewater/permits.html>

Wisconsin Valley Improvement Company. 2016. *Wisconsin Valley Improvement Company Comments.* Retrieved 2016. Cathy Wendt and Ben Niffenegger. Comments to Sevenmile Lake Plan-DRAFT.

Review of *Headwaters Basin Integrated Management Plan* Relevant to Sevenmile Lake

The *Headwaters Basin Integrated Management Plan* provides information about the conditions of the land and water resources found in the basin, and addresses the programs that strive to preserve and restore those resources. In this section, we will discuss the programs that provide assistance and protection to the water quality of Wisconsin lakes, including Sevenmile Lake.

Of the 15,057 lakes in Wisconsin, 34% are located within the Headwaters Basin. The Basin spans Forest, Florence, Lincoln, Langlade, Oneida and Vilas Counties. There are 29 Outstanding Resource Waters (ORW) located within the Basin. Outstanding Resource Waters support valuable fisheries and wildlife habitats, have good water quality and are not significantly impacted by human activities (WDNR, 2013). Although Sevenmile Lake is not considered an ORW, four lakes within 15 miles of Sevenmile Lake are considered ORWs: Butternut Lake, Franklin Lake, North Twin Lake and South Twin Lake. In contrast, sixteen waterbodies within 10 miles of Sevenmile Lake are listed as Impaired Waters (303 (d)): Big Lake, Big Fork Lake, Big Stone Lake, Dog Lake, Fourmile Lake, Island Lake, Julia Lake, Kentuck Lake, Long Lake (Oneida), Planting Ground Lake, Range Line Lake, and Whitefish Lake (WDNR, 2014). These waterbodies are considered impaired because of mercury contamination in fish tissues. Sevenmile Lake was a previous listed Impaired Water due to high mercury levels, but was delisted in 2006. Presently, Sevenmile Lake has been proposed to be an Impaired Water due to high phosphorus levels (WDNR, 2014).

The Wisconsin Bureau of Fisheries Management and Habitat Protection, following the Wisconsin Administrative Code, protects Wisconsin lakes by processing permits required for protecting shorelines and grading banks of waterways, by helping interpret ordinances and regulations, and by providing biological and technical expertise to local units of government.

The Wisconsin Bureau of Watershed Management, Watershed Program, following the standards set by the Federal Clean Water Act, protects Wisconsin surface waters by writing plans for watersheds, such as: facilities plans, 305 (b) water quality reports to Congress, and aquatic nuisance and exotic species reports. They also create water quality modeling, such as: streams and lakes water quality modeling, contaminated sediment monitoring, and wasteload allocations.

The Watershed Program also proposes water quality standards and policies, such as: surface water quality classification and standards, contaminated sediment investigation, total maximum daily loads, and designation of 303 (d) waterbodies (WDNR et al., 2002).
The Wisconsin Bureau of Watershed Management, Wastewater Program, following the standards set by the Federal Clean Water Act, protects Wisconsin surface waters by issuing Wisconsin Pollutant Discharge Elimination System (WDPES) permits, by reviewing industrial and municipal baseline and annual reports, and by providing information to communities about their program and its benefits (WDNR et al., 2002).

The Wisconsin Bureau of Watershed Management, Nonpoint Source Pollution Abatement Program, following the standards set by the Wisconsin Administrative Code, protects Wisconsin surface waters by encouraging landowners to minimize nonpoint pollution sources on their properties, by providing information about the best management practices for both rural and urban areas, and by assisting counties with implementing their land and water resource management plans (WDNR et al., 2002).

The Wisconsin Bureau of Drinking and Groundwater, Drinking Water and Groundwater Program, following the standards set by the federal Safe Drinking Water Act and the Wisconsin Administrative Code protects Wisconsin waters by enforcing requirements for installed wells and pumps, by conducting surveys and inspections of water systems, and by reviewing drinking water quality monitoring reports (WDNR et al., 2002).

The Wisconsin Bureau of Wildlife Management, following the standards set by the Wisconsin Administrative Code, protects Wisconsin waters by establishing State Wildlife Areas and State Natural Areas, by conducting population and habitat surveys, developing wildlife management plans, monitoring threatened and endangered species, evaluating hunting and trapping regulations, and by providing educational programs to encourage responsible management techniques (WDNR et al., 2002).

The Wisconsin Bureau of Endangered Resources, following the standards set by the Wisconsin Administrative Code, protects Wisconsin waters by managing the Natural Heritage Inventory Program (NHI), which is used to determine the existence and location of native plant and animal communities, and of Endangered or Threatened Species of Special Concern, and by providing permits for incidental take of these species (WDNR et al., 2002).

The Wisconsin Bureau of Forestry, following the standards set by the Wisconsin Administrative Code, protects Wisconsin waters by providing technical assistance to county, state and private forest lands. The Bureau helps each county forest by developing a Ten Year Comprehensive Plan, and by assisting with timber sale, reforestation, development of wildlife habitat, and protection of endangered and threatened species. On the state level, the Bureau assists with establishing the best management practices of sustainable forestry, reforestation, and timber harvesting. With private landowners, they help with establishing best management practices of sustainable forestry, help protect endangered and threatened species, and provide assistance with forest disease and insect problems (WDNR et al., 2002).

These programs have been put in place the help preserve, protect and restore the water quality of all Headwater Basin lakes, including Sevenmile Lake.

Literature Cited

Wisconsin Department of Natural Resources, Headwaters Basin Partnership Team and Stakeholders--DRAFT. 2002. *Headwaters State of the Basin Report*. Retrieved 2014. <http://dnr.wi.gov/water/basin/upwis/>

Wisconsin Department of Natural Resources. 2013. *Outstanding and Exceptional Resource Waters*. Retrieved 2015. <http://dnr.wi.gov/topic/SurfaceWater/orwerw.html>

Wisconsin Department of Natural Resources. 2014. *Wisconsin's 2014 Impaired Waters List.* Retrieved 2015. < http://dnr.wi.gov/topic/impairedwaters/2014IR_IWList.html >

White Water Associates, Inc.
429 River Lane, P.O. Box 27
Amasa, Michigan 49903
(906)822-7889

March 1, 2013

Forest County Land and Water Conservation Department
200 E. Madison Street
Crandon, WI 54520
(715)478-7796

To whom it may concern:

As ecological consultants, White Water Associates works with lake associations to conduct studies, review data, and create lake management plans. We have helped organizations like the *Sevenmile Lake Association* collect water quality data, fisheries data, and invasive species data, and prepare reports conveying these data. We currently have a project with this association that is funded by the Wisconsin Department of Natural Resources. One of our tasks in this project was to review the Forest County Land & Water Resource Management Plan.[1] The purposes of that review are to (1) determine where our lake management efforts integrate with the county plan and (2) provide input to the county for how future iterations of the plan might better address water resource issues. It is with those purposes in mind that we submit this summary of recommendations for your consideration to further improve an already comprehensive plan.

Organization

It may be beneficial to create two major categories: Land Resources and Water Resources, which would integrate the majority of subjects you covered in the plan. These categories would still fall under the Resource Assessment heading, but would bring together the topics more effectively. In the Land Resources section you could include: Geology & Soils, and Land Use. In the Water Resources section you could have the remaining water resource topics, such as: Surface Water and Ground Water. Within the Surface Water section, I recommend adding a Wetlands section. Recommendations for this topic follow in the Content section.

I recommend moving Map 2 and Map 3 to be after discussion of their contents. For example, Map 3 "Water Features" is placed before the topic of surface water is discussed.

Lastly, I propose that Invasive Species becomes a new major category, placed under Resource Assessment. Since invasive species do not fall specifically under just one of these major categories,

[1] The Forest County Land & Water Resource Management Plan used for this review was found at http://www.forestcountywi.com/landconservation/index.htm

it merits a section of its own. It might be nice to create sub-sections for each Terrestrial and Aquatic Invasive Species. More description of this recommendation is in the Content section to follow.

Content

Under the Agriculture section, after listing the acreage of farmland, it would be beneficial to know if the farmland is considered cropland, livestock, etc. If there is cropland, I recommend listing the types of crops, acreage of crops, and where and which crop is most predominant in the county. If there is cranberry farming in Forest County, I suggest describing the methods for harvesting and the potentially harmful impacts it can have on water resources. Mentioning the NRCS Nutrient Management Conservation Practice Standard (the "590 Standard") would be prudent.

Under the Forestry section, I recommend talking about forest management (including timber harvesting). Since soil erosion from cropland is discussed elsewhere in the plan, addressing the specific soil erosion concerns stemming from silvicultural activities might be beneficial in this section.

In the Residential Development section, it is mentioned that "Forest County's year 2000 median age is higher than the state median." Listing this statistics would support this idea. Also, if it is projected that there will be additional housing needed by 2015, will this also lead to more developed areas? If so, how will this affect water quality in these areas?

Within the Commercial & Industrial Development section, it would be useful to expand on the paragraph describing brownfields sites. They are a potential contributor to water resource pollution and this should be addressed in this section. Providing sentences about restoration to these sites, and then adding that information as a Goal (Chapter 5) will help readers understand the detrimental effects these sites can have on water quality.

When discussing surface waters, if there are any rivers associated with the Northern Rivers Initiative (NRI), here would be a good place to inform the reader about NRI, and list the rivers involved.

In Map 3, ORWs and ERWs are shown, but it would also be helpful to see the Impaired Waters on this map too.

As recommended earlier, a Wetlands section would benefit this Plan. Within the Wetlands category, you might take advantage of a nice educational opportunity to explain the importance of wetlands. For example, how they positively affect water quality and how wetland plants can take up and store pollutants, which results in cleaner waters.

Another educational opportunity you could take advantage of is to add more information to the Invasive Species section. In general, invasive species are detrimental to the native communities around them, but describing in detail how aquatic and terrestrial invasives species specifically affect the water quality of nearby waterbodies is also important. In each the Aquatic and Terrestrial Invasive Species sections, I recommend first speaking generally about these species, then list which are found in Forest County with a short paragraph describing how they arrived, how they are spread, how they affect the native community, and where they are found in the county.

I would also suggest creating a goal regarding further education for the public. I recommend highlighting these possible techniques: presentations, school field trips, classroom talks, posters, brochures, etc.

I was very impressed with the detail you have incorporated in this plan. It is thorough and comprehensive. I am sure it serves the residents of Forest County well. If you have questions or comments regarding my recommendations, please contact me at the phone number given above.

Sincerely,

Caitlin Clarke
Biologist

White Water Associates, Inc.
429 River Lane, P.O. Box 27
Amasa, Michigan 49903
(906)822-7889

March 1, 2013

North Central Wisconsin Regional Planning Commission
210 McClellan Street
Wausau, WI 54403
(715)849-5510

To whom it may concern:

As ecological consultants, White Water Associates works with lake associations to conduct studies, review data, and create lake management plans. We have helped organizations like *Big Bearskin Lake Association, Sevenmile Lake Association* and *Margaret Lake Association* collect water quality data, fisheries data, and invasive species data, and prepare reports conveying these data. We have current projects with these associations that are funded by the Wisconsin Department of Natural Resources. One of our tasks in these projects was to review the Oneida County Land & Water Resource Management Plan.[2] The purposes of that review are to (1) determine where our lake management efforts integrate with the county plan and (2) provide input to the county for how future iterations of the plan might better address water resource issues. It is with those purposes in mind that we submit this summary of recommendations for your consideration to further improve an already comprehensive plan.

Organization

It may be beneficial to create two major categories: Land Resources and Water Resources, which would integrate the majority of subjects you covered in the plan. In the Land Resources section you could include: Geology & Soils, and Land Use. In the Water Resources section you could have the remaining subjects that are related to water resources. I also recommend discussing the major water types first: Basins & Watersheds, Groundwater, and Surface Waters (Lakes, Rivers and Streams, and Wetlands). After these sections, then address Impaired Water-303(d) Water, and Outstanding/Exceptional Resource Waters, since these subjects reflect a combination of lakes, rivers and wetlands.

[2] The Oneida County Land & Water Resource Management Plan used for this review was found at http://www.ncwrpc.org/oneida/lwrm.htm.

As mentioned, I recommend creating sub-categories within Surface Waters for subjects like Lakes, Streams and Wetlands. I will give recommendations for these sub-categories in the Content section to follow.
Lastly, I propose that Invasive Species becomes a new major category, placed after the Land and Water Resources sections. Since invasive species do not fall specifically under just one of these major categories, it merits a section of its own. It might be nice to create sub-sections for each Terrestrial and Aquatic Invasive Species.

Content

I recommend listing the total acreages for each type of land use, and then use a visual tool, like a pie chart, to show percent acreages of each land use category throughout Oneida County.

In the plan it is mentioned there was a 39.9% increase in cranberry farming land from 1997-2007. In a separate paragraph, I suggest describing the methods used for harvesting cranberries and the potentially harmful impacts it can have on water resources. Mentioning the NRCS Nutrient Management Conservation Practice Standard (the “590 Standard”) would also be beneficial.

Also in the plan, it is stated that “There will be an additional 202 acres converted to residential use in the county by 2015.” This might be a good place to describe the negative effects expanding residential areas can have on water quality.

Under the Forestry section, I recommend talking about forest management (including timber harvesting). Since soil erosion from cropland was discussed earlier in the plan, addressing the specific soil erosion concerns stemming from silvicultural activities might be beneficial in this section.

Within the new Lakes, Rivers and Streams and Wetlands sub-categories, you could provide information like: statistics, acreages, and address unique waterbodies, discuss the organizations/associates incorporated with the lakes and their efforts to maintain good water quality, and an overall statement regarding the quality waterbodies in these sub-categories. Additionally, within the Wetlands sub-category, you might take advantage of a nice educational opportunity to explain the importance of wetlands. For example, how they positively affect water quality and how wetland plants can take up and store pollutants, which results in cleaner waters.

Within the Rivers and Streams section, if there are any rivers associated with the Northern Rivers initiative (NRI), here would be a good place to inform the reader about NRI, and list the rivers involved.

Another educational opportunity you could take advantage of is to add more information to the Invasive Species section. In general, invasive species are detrimental to the native communities around them, but describing in detail how aquatic and terrestrial invasives species specifically affect the water quality of nearby waterbodies is also important. In each the Aquatic and Terrestrial Invasive Species sections, I recommend first speaking generally about these species, then list which are found in Florence County with a short paragraph describing how they arrived, how they are spread, how they affect the native community, and where they are found in Oneida County.

Within the Commercial & Industrial Development section, it would be useful to expand on the paragraph describing brownfields sites. They are a potential contributor to water resource pollution and this should be addressed in this section. Providing sentences about restoration to these sites, and then adding that information to Goal 4 (Chapter 5) will help readers understand the detrimental effects these sites can have on water quality.

I suggest expanding Goal 5 by providing examples of how you will educate the public. I recommend highlighting these possible techniques: presentations, school field trips, classroom talks, posters, brochures, etc.

I was very impressed with the detail you have incorporated in this plan. It is thorough and comprehensive. I am sure it serves the residents of Iron County well. If you have questions or comments regarding my recommendations, please contact me at the phone number given above.

Sincerely,

Caitlin Clarke
Biologist

Page left intentionally blank

WHITE WATER ASSOCIATES, INC.

Appendix K
Historical Review of Sevenmile Lake

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

History of Sevenmile Lake

Sevenmile Lake Association has undertaken the task of completing a Lake Management Plan with the assistance of White Water Associates Inc. and the Wisconsin Department of Natural Resources. As the president of the Sevenmile Lake Association I took on the task of preparing a history of the lake and the surrounding area. Let me first say that it was a challenging but rewarding undertaking. It should also be noted that I am far from being an accomplished historian. During the course of my research I was able to find some very well documented information, some very probable historical information and some plain historical speculation. Making the task more complicated is the fact that the lake lies in two separate counties and townships. My research was by necessity split between Forest County, the Town of Hiles and Oneida County the Town of Three Lakes. History of these locations is fairly well recorded but little of that history has to do with Sevenmile Lake or the surrounding area. In addition, a large part of the lake is under the ownership of the U.S. Forest Service in the form of the Nicolet Chequamegon National Forest.

I will be dividing up this history into several distinct areas, which will include the locations previously mentioned, and then some specific history of the lake and surrounding area. The final area that I will include with this history is information gained from several of the property owners on the lake giving the personal history of their property.

I will start with some information that I have gained regarding prerecorded history:

Some of the earliest settlers in this area were the members of several Indian tribes including, Chippewa's, Osawatomie's, Menominee's and Brother tons. These tribes wandered over the Northwood's hunting fishing and gathering food. They moved according to their needs for food.

The first white man to set foot in Wisconsin was Jean Nicolet in 1618.

There is a State Historical Area where Native Americans had an encampment on what is now known as Pat Shay Lake, just a few hundred yards north of Sevenmile Lake. The area is listed on the DNR website as a State Natural Area.

Military Road was the main route between Fort Howard in Green Bay and Fort Wilkins at the mouth of the Ontonogan River on Lake Superior. In 1863 the US Government made a land grant to the states of Michigan and Wisconsin for the purpose of building a "military wagon road" from fort to fort to ensure that supplies and mail could be transported from Green Bay to Lake Superior in case an enemy cut off the passage around the lake in a future war. In 1872 the road was completed. The road went from Green Bay To Shawano and then north to a trading post on Virgin Lake. The next known stop was at what is now known as Anvil Lake where there was a hunting cabin where travelers would spend the night.

Hiles – Pine Lake info

Centuries ago, the Copper Culture Indians followed the Wolf River up to the area of Hiles / Pine Lake then continuing on to the Copper outcropping along Lake Superior. Archeological investigations have found that later, the Woodland Indians had camps along the east shore of Pine Lake near a historical walking trail from Ontonagon on Lake Superior to Pine Lake and then along the Wolf River to Shawano and then on to Fort Howard in Green Bay.

By the 1850's loggers used Pine Lake and river to send logs down to the sawmills further south. Around this time Dan Gagen and his Chippewa wife established a trading post in the area of what is now the Sunset resort.

In 1863, during the Civil War, President Lincoln and Congress approved money to build an improved wagon road from Green Bay to Shawano and then north along the Wolf River, just east of Pine Lake and on to Virgin Lake in Three Lakes and finally on to Fort Wilkins on the Keweenaw Peninsula. Mr. Gagen was one of the contractors working on this road.

It is said that Fourmile Lake, Sevenmile Lake and Ninemile Lake got their names, as this was the distance from Dan Gagen's trading post to the respective lakes. In the case of the two Nine Miles we presume that was the distance to Nine Mile Creek where it is crossed by the Military Road.

The 1880's brought the Railroad to the area with the Soo Line building a rail bed from Minneapolis to the south end of Pine Lake. This prompted the first "official Resort" on Pine Lake to be started by Pete Johnson in 1892. About 10 years later the Town of Hiles was started in 1902.

During the Depression years of the 1930's Hiles became one of several "Transient Depots" operated by the State of Wisconsin and accommodated 300 to 600 men. These camps provided housing, meals and a recreation hall for the homeless men. When this project shut down, about 1934, most of the men moved on to Federal Programs such as CCC or WPA.

Three Lakes History

In the early 1860's Hi Polar, an English entrepreneur along with his Native American wife established a trading post a few miles east of Three Lakes on Virgin Lake at what was the Holiday Haven Resort on what was known, during the days of The Voyageur's, as the Lake Superior Trail. Some sources say that this trail dates back to prehistoric times and links up with the long-established trail network, which linked Indian tribes across what are now Canada and the United States.

From the 1881 "History of Northern Wisconsin"

Prior to 1879 Three Lakes was part of Oconto County. From March 3, 1879 to February 19, 1881 it was part of the "New County" which was attached to Shawano County for all judicial purposes. From February 19, 1881 to April 1885 it was part of Langlade County. On April 29, 1908 Three Lakes became part of Oneida County as it is today.

What was originally the Town of Piehl was created to consist of Township 37 North of Range 11 East, detached from the Towns of Gagen and Monico. The village of Gagen from that date on was in the Town of Piehl. On May 27, 1909 the name of the Town or Township of Gagen was changed to the Township of Three Lakes.

From the 1924 "History of Lincoln, Oneida, and Vilas Counties"

Three Lakes is an unincorporated village on the Chicago and North Western Railway in the Town of Three lakes. It is in Township 38 North of Range 11 east and therefore in Forest County.

THERE SEEMS TO BE SOME DISCREPANCY BETWEEN THESE TWO RESOURCES.

The area now known as the Chequamegon – Nicolet National Forest was devastated by logging companies and the forest fires that followed them during the Depression years of the 1930's President FDR sent the CCC (Civilian Conservation Corps) to the area establishing twenty-two camps of 200 men each to plant trees and rehabilitate the area. Our forest area alone had at least six of these camps within 10 miles of Three Lakes.

Information regarding an early 20th Century Croatian Community

There apparently was an abandoned Croatian farming community known as Velebit located on land now administered by the Forest Service. Many of the houses and farms were located in an area about eight miles east of Eagle River and between Anvil Lake on the north and Ninemile Lake on the south just west of Military Road. It was a farming community, which was settled by Croatians due to a land developer who advertised through the newspapers in different states. The area was similar to the land where they came from in Yugoslavia, land between the Adriatic Sea and the Velebit mountains. For further info look for a 1998 investigation by the National Forest Service cultural resource study team "Memories of the Croatian Settlers of Eagle River" (Keeler and Bubanovich 1984).

The first Post Office in the area

Joshua Fox opened a trading post; on the east shore of Catfish Lake two miles southeast of what is now Eagle River. His wife was the first known white woman to have set foot in the area. Another settler, C. L. Berry was located on Yellow Birch Lake and he was a carpenter. He was hired by Fox to construct several buildings for the post. This trading post was known as Kim-me-con, "Have you found-it" In this trading post was housed the famous bank of Kim-me-con and is where the first presidential votes were cast when Abraham Lincoln was elected in the fall of 1860. It was also the second Post Office between Wausau and Ontonagon on the old Ontonagon mail route.

Sevenmile Lake History

Wisconsin Valley Improvement Company, the controlling body of the Wisconsin River, began in 1907 as an experiment in natural resources stewardship. It was one of the first privately owned and financed corporations that is publicly chartered and regulated. Its purpose was to maintain the most uniform flow on the Wisconsin River as practical. Sevenmile Lake is one of the first lakes at the top of the huge natural and man made reservoir, which was created to assist in this endeavor. Prior to this time there was much disagreement and political maneuvering by various private industries related to the use of the water that flowed in the Wisconsin River.

In June 1907 Governor Davidson signed a bill-authorizing establishment of the Wisconsin Valley Improvement Company and established ownership, management and utilization on the use of waterpower from the Wisconsin River.

By the end of the year 1907 WVIC had already acquired the rights to reservoirs able to store more than 3 billion cubic feet of water. The Sevenmile Lake dam was one of the first to be included in this system along with Lac Vieux Desert, Twin Lakes, Long Lake, Deerskin Lake, and Ninemile Lake along with several others. Sevenmile Lake is listed as one of the natural lakes associated with this system, different from the man made or reservoir lakes on the system.

Sevenmile Lake is on the east side of the Wisconsin River basin an area which generally is more suited to lakes where water takes longer to make its way to the Wisconsin River so this area is less useful in releasing water into the Wisconsin River when needed. The west side of the Wisconsin River is more suited to store water, which is available when needed by use of reservoirs.

The old wooden dam on the Sevenmile Creek was replaced in 1917 with a new concrete dam.

In the 1920's and 1930's when tourism became more prevalent in the north woods Realtors, sportsman clubs, and property owners began showing concern of the fluctuation water levels. This eventually led to the establishment of a high and low water marks being established and that WVIC would make every effort to maintain these levels.

The watershed area of Sevenmile Lake is about 12.1 square miles. Rain and snowfall in this area eventually drains into Sevenmile Lake. The lake has a capacity of 425,00cubic feet of water with a surface area of 518 acres and 6.6 miles of shoreline with a maximum depth of 45 feet.

The lake level is measured by the nationally recognized units of feet above sea level. Licensing regulations dictate that the lake level should be maintained between a high of 1,650.14 feet and a low of 1,645.81 a variance of 4.33 feet.

Water from Sevenmile Lake is measured in many ways other than lake level. Also measured is difference in temperature from surface to bottom amount of oxygen, and the phosphorous level. The flow level at the dam is monitored and will continue to be monitored as the water flows down Sevenmile Creek into Ninemile Lake and at the Burnt Rollway dam into the Eagle River. At this point the water has entered the main flow of the Wisconsin River.

Found in a book of names article written by Glenn Moder

Curly Knapp knew Scar Faced Al Capone on Chicago's West side. Curley's Bakeries supplied premium bakery to the mob's hotels and restaurants. All deals were CASH and Curley Prospered

During the mid 1930's Curly Knapp came north with his accumulated savings. He located and bought premium land on the then sparsely populated Sevenmile Lake. Working hard he opened a lodge with a bar along with several rental cabins. A few slots and cheap local moonshine helped keep thing moving with the loggers and CCC crew trade at the time. The now vintage Rhinelander boats at Curley's docks were highly regarded by local guides who literally were rowing for a living at that time.

A stroke during a family Thanksgiving Day dinner handicapped Curley's wife Mary for several months before she died. Several years later Curley remarried. His second wife, Belle, out lived him. She subsequently sold the resort buildings and land in pieces as her main source of income. Knapp Road was named for Curley Knapp.

Pat Shay Lake was named for a Crandon resident who was a veteran of World War I. He later became Assessor of Forest County. The VFW Post in Crandon also bears his name.

MOONSHINE

Part of the roar in the prohibition twenties for the north came from those illegal moonshine stills deeply hidden in remote woodland locations. Research conducted by Tom Babcock points out that "Kentuck's" who emigrated from the hills of Kentucky brought with them the knowledge of how to make white lightening. His notes indicate that Lewis Rasmussen, owner of the Butternut Lake Lodge took advantage of the local Forest County suppliers in serving his guests. While the total number of stills operating in this area is not recorded the appropriately named, Kentuck Lake poses some thought as to what may have been going on in the nearby dense forest.

The Chicago Capone Mob was known to have a strong representation in the Eagle River area at that time. Local Sunday church collections also experienced some rather hefty bills in the collection basket from well-dressed people who did not really look like loggers. There was a rumor that there was a still somewhere behind Shay Lake and that floatplanes from Chicago would land to pick up moonshine and take it back to Chicago.

Pine Crest Resort

Myers Pine Crest Resort started as a humble hunting and fishing camp by the Boaze Family on the shores of Sevenmile Lake until it sold in 1909. Little is known about the property's tenure until it was turned into a Jewish Boy's camp during the Great Depression. During WWII the camp was closed and was purchased by Ralph and Grace Meyers in March of 1945. The cabins were in a state of disrepair and the Myers got busy with the necessary repairs and opened Meyer's Pine Crest Resort that summer with sixteen cabins ready for guests.

In 1971 Robert and Elaine Otterstatter bought the resort and named it 7 Mile Pinecrest Resort. Bob and Elaine's descendants still run the resort today. It is the perfect place to relax on a lake that isn't heavily developed and enjoy family while the pace slows in the Northwood's. There is a Meyers Pine Crest Resort web site at www.meyerspinecrestresort.com that has some interesting old photos and postcards from the resort.

The Otterstatter's were originally from Fort Atkinson Wisconsin and moved to Hiles in 1971 when they purchased Meyers Pine Crest Resort. They were once asked if they had anything to add to their history and their response was "Bless Company B and the Town of Hiles Fire Volunteers. The fire in May 1996 was limited to the garage. Other than some surrounding trees no other buildings were lost due to their hard work. They have included a more detailed history of their ownership in the residence section of this history.

With all of the research that I did I found that Sevenmile Lake was never really a destination in the written history. The native people passed through or stayed for a while to hunt or gather food but then moved on. More recently the loggers came to cut timber but also left the area once they had harvested what they came for. It occurred to me that the real history of Sevenmile Lake consists of the people who came here to live or for recreation. Those are the people who have really created a history and who are currently writing the future history. It seems that most of the people came shortly after the loggers in the late 1800 or early 1900,s with a few relatives or family members still remaining. I myself became aware of Sevenmile Lake from an uncle, Ray

cabin. A few years later I purchased my own place on the lake. With the fact that the real history of Sevenmile Lake is made up of all of the people who came here to stay I have included histories written by members of the lake association. I will conclude this history of Sevenmile Lake with their stories.

SEVENMILE LAKE HISTORY

**ONEIDA AND FOREST COUNTIES
WISCONSIN**

**PART 1
MAY, 2001**

SEVENMILE LAKE HISTORY

Table of Contents

SEVENMILE LAKE HISTORY

INTRODUCTION

By Pat Egan
May, 2001

There are legendary names on Sevenmile Lake.

Look for some of our first settlers...Curly Knapp and his wives, Mary and Belle...the Muellers, Wenzels, and the Meyers...and, of course, the Raven.

As we begin to read these pages, we can piece together the puzzle of many years past. It's a mosaic of old times and new. There are the legacies of families owning land and passing it on to their children and grandchildren to treasure. And there are the newcomers, who build or renovate where others have gone before.

The commonplace events of life years ago become nostalgic and magical. But who knows which details of our lives today our children will recall with a similar whimsical smile?

Enjoy your treasure hunt as you read...and perhaps this history will inspire you to some research of your own.

SEVENMILE LAKE HISTORY

CREDITS

Part 1 of our history was compiled from homeowners' histories, interviews, and newspaper clippings, along with hoarded facts, photos, and scraps of paper.

Thank you to all who contributed to Part 1 of our lake history, with particular kudos to the homeowners who took the time to participate. Your input brought color and life to dusty facts.

Although long time residents Sidney Hibbard and Pete Plaushines have passed on, their wit, vigor, and charm live on in these pages. We appreciate the meticulous records that they kept and the memories that they have given us.

A special thank you is due to Tom Babcock, a resident on Butternut Lake, who interviewed both Sid and Pete, and passed those interviews on to us.

Bob Curran, Lake Association Historian, participated with Tom Babcock in those interviews and many others, and provided much information for the lake history.

Thank you to Pat Egan, Lake Association Newsletter Editor, who put it all together and had it printed.

We have done our best to present the facts as factually as possible. If there are any errors, it was unintentional. Please advise Pat Egan if any corrections need to be made. (892 Oak St., Winnetka, Il., 60093. (847) 446-2482).

SEVENMILE LAKE HISTORY

Name(s) Lee & Donna Arndt

Lake Address: 101 Knapp Rd.

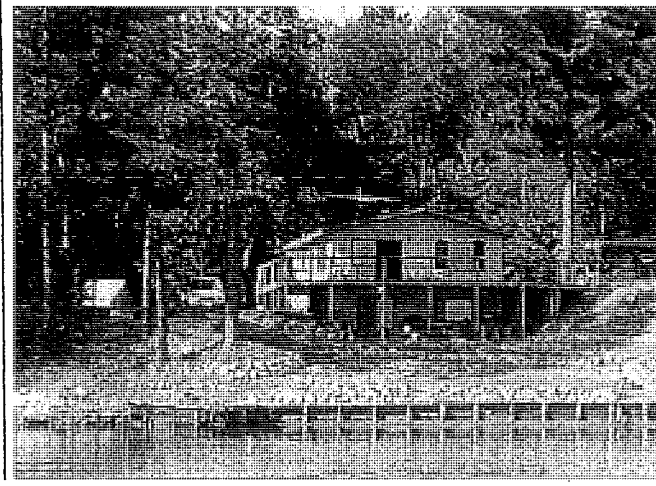
Lake Phone: 715 - 479 - 6759

Permanent Address: SAME

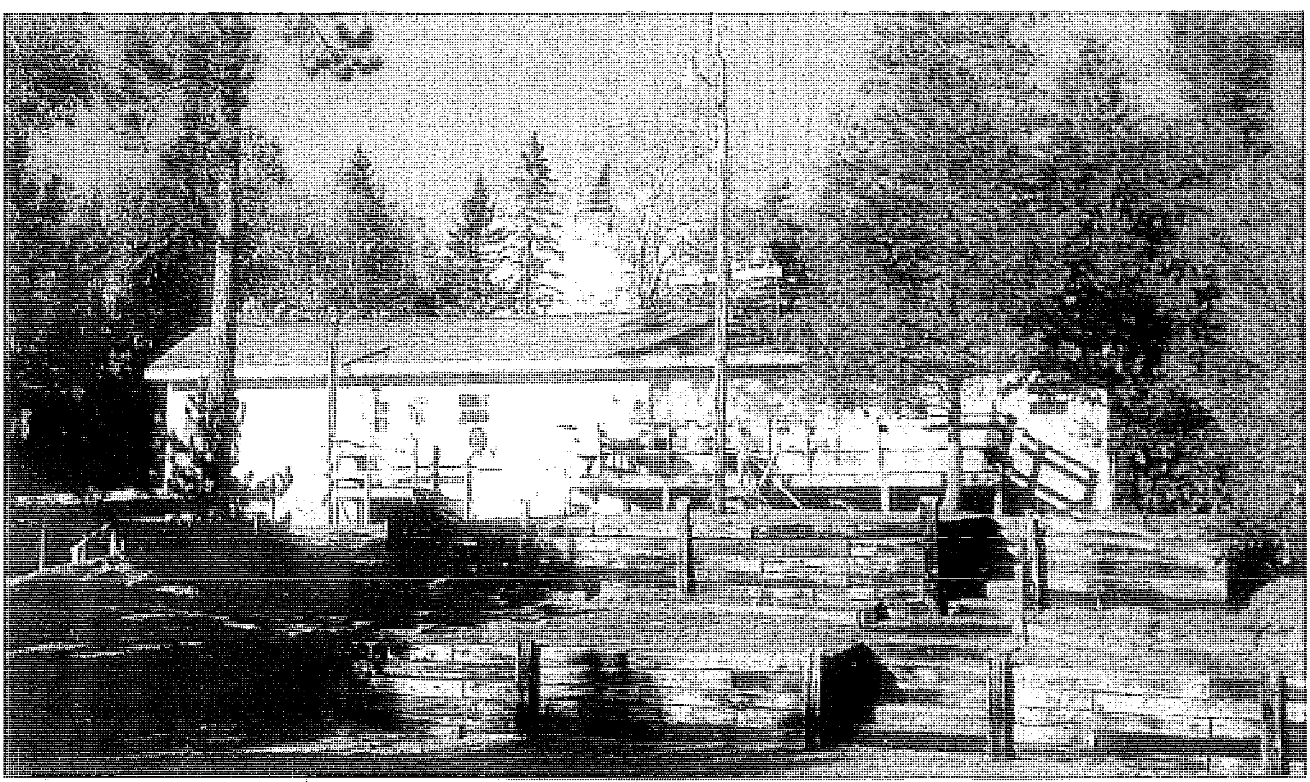
Home Phone: SAME

E-Mail: ARNDTSBAYVIEW@NNEX.NET

House or property nickname: Arndt's Bay View



We came up in 1956 for the first time. Bought 100 ft. of lake front property from Windy Meyers. (7- mile Pine Crest). Started building the cement block building the next year. Liveable in the spring of 1961. Enjoyed many weekends since. In 1979 we bought another acre to the west of the block cottage from Ray and M arie Borzykowski.; also 6 acres across the road.. In 1980 we bought a house trailer and put it on the 6 acre plot. Built our present home in 1994.. Sold the cement block cottage to Donna's sister Paulie , and the trailer to our son,Dean. Split the 6 acres into 2-3 acre lots and sold the other 3 to our Daughter and Son-in-Law Kevin and Terry Krueger.



Dean Arndt's home on Knapp Road.

SEVENMILE LAKE HISTORY

Name(s) Pat + Kip Cramer

Lake Address: 11893 Knapp Rd

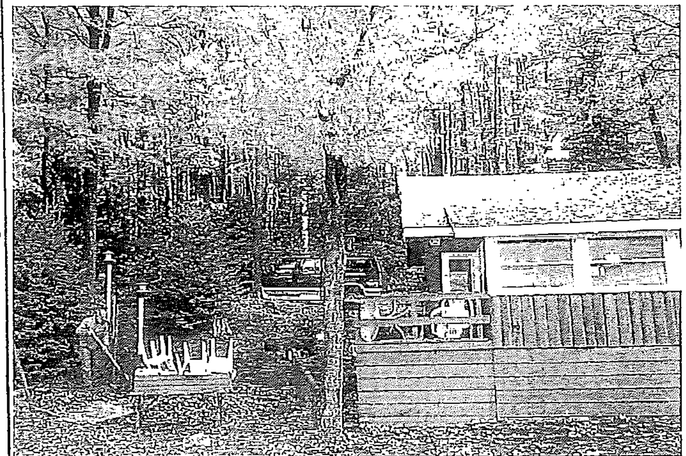
Lake Phone: 477 2091

Permanent Address: 715 7th Ave
Grafton WI 53024

Home Phone: 262 375 0308

E-Mail: —

House or property nickname: "Seventh Heaven"



We bought our cabin from Fred Farr late summer, 1995. It was the last one built as part of the Curly Knapp Lodge, we believe, and is at least 50 years old. The original screened porch is now enclosed, and we can tell plumbing was added after it was originally built. We fell in love with the cabin and the land it is on, & the beautiful of the national forest. Mr. Farr owned the cabin for about 20 years before we bought it.

We live in Grafton, Wis, but come up for most of the summer and often throughout the year. Kip is an avid fisherman year 'round. Our two adult children, Scott and Kathy, and their spouses, Joan & Bailey, love the place as much as we do. We already have many fond memories of entertaining family and friends. Our neighbors made us feel welcome even before we moved in, and we have enjoyed the warmth and friendliness of the Sevenmile Lake residents.

SEVENMILE LAKE HISTORY

****

Name(s) Dorothy and Bob Curran

****

Permanent Address: 242 Wesley Rd

Home Phone: (715) 479-6969

House or property nickname: "This Is It"

****

"This is it!" is what we said when we first saw our little split-log cabin in 1987. A perfect summer cottage! But several additions and renovations later, it became our permanent, year-round home in 1993.

The property was originally acquired in 1937 by the Wenzel and Miller families. The Wenzel section of the land ultimately became the Hibbard property. Millers left their share to their grandchildren, Ed Loomis and Joanne Baker. It was from these later owners, Loomis and Baker, that we purchased the cottage in 1987, and it became the Curran home.

Bob was born in Wausau, and grew up in Eagle River. He also has some ancestral ties to Rhinelander, as his great uncle, John Curran, a logger, was the first white settler in Rhinelander. Having a great love for the lakes and the Nicolet, he wanted to share this part of his background with our family. So, for years, we vacationed in the Three Lakes and Eagle River area. In fact, for a couple of summers, we rented a cottage at Sevenmile Pinecrest Resort. Little did we know that we would someday own a home in this wonderful setting.

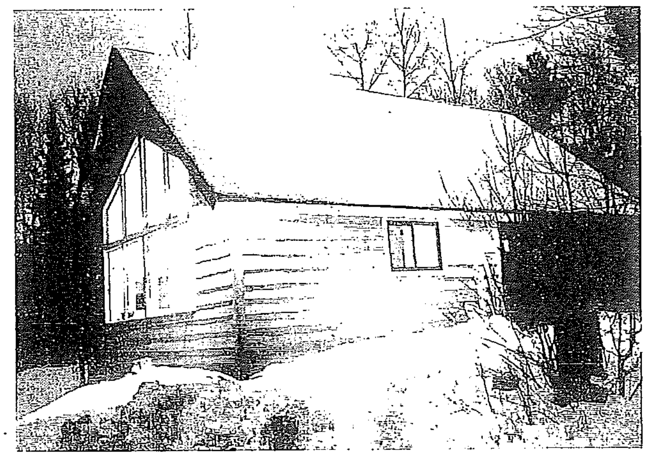
Our present kitchen was the original building on the property, and then, later on the great room was added. The pine paneling and tamarack beams in this room remain the same today. An adjacent "bunk house" was built just after that. When we bought the property, there was no running water -- only a pump in the yard, and an outhouse (which still stands today) "serviced" the clan. Adding a septic system, a bathroom and a few amenities in the kitchen made the cottage a perfect summer spot. But, as we spent more and more time here, we knew we would love living here year 'round, and, for us, truly, "this is it!"

SEVENMILE LAKE HISTORY

****

Name(s) Pat and Tod Egan

****



Lake Address: 142 Nicolet Vista

Lake Phone: (715) 479-8522

Permanent Address: 892 Oak. St.
Winnetka, Il. 60093

Home Phone: (847) 446-2482

E-Mail: Todegn@aol.com

House or property nickname: "Eagle House"

****

It all started with four sticks.

Since the late 1960's, Tod and I had been coming up to the Northwoods as often as we could. We'd been using a friend's house on Franklin Lake, and had come up late one summer in 1980 with two windsurfers strapped to the top of the car.

Unfortunately, it was one of those Northwoods' weeks when it rained every day, all day. The windsurfers never left the roof rack, but we decided to look for lake property instead. (Now, THAT is real Northwoods' dedication!)

During our search, we turned down Nicolet Vista Road bordering Sevenmile Lake, and saw an Al Block "for sale" sign. As we hiked down toward the lake, we were stopped by the wetlands. Undaunted, we grabbed our "four sticks," and, using them for balance to hop from log to log over the swamp, discovered our beautiful ice-dam formed lakefront. We immediately fell in love with the towering pines and shoreline, and purchased the property from John and Mary Burczyk of Conover.

In the summer of 1987, Tod set out to design and build our "dream house." A building contractor, he completely shut down his own business, and relocated to what we called "the little green house" on Military Road near the dam. At the Hideaway Bar, Barb Taberman had given him a lead on the owner, Marion Rockford, and she rented the house to Tod for four months. During those months, he worked 16-hour days with carpenter Tom Gutbrod to build the house, and Pat and our young daughter Katharine came up many weekends from Illinois to supervise.

Drama took a turn on August 1, 1987. A tornado came across Sevenmile Lake, forcing Tod to take shelter in his 1980 VW Dasher in the driveway. The tornado felled five trees onto the newly constructed roof, knocked the house out of square, and hemmed the car in tightly. Afterward, neighbors Pat Walsh and others helped Tod chain-saw his way out.

On October 15, 1987, Tod returned home just in time for Katharine's sixth birthday. We've been working piecemeal on our house in the woods ever since, finally installing a fireplace and chimney, and continuing to work on a stairway to our "loft." And, we still love it!

SEVENMILE LAKE HISTORY

Name(s) Marvin, Rose + Lee Hoppe

Lake Address: 8912 Balsam Lane

Lake Phone: None

Permanent Address: 232 N. Wilson
Fredonia, WI 53021

Home Phone: 262-692-9572

E-Mail:

House or property nickname:

Me and Lee started coming up North in 1948 Norman Mavis built some small cabins just ~~s~~ South of 7 Mile creek, on the west side of the road towards Lone Stone Lake. Then we rented cabins from Kate Wesley from 1963, when I (Marvin) married Rose, till 1968, when we moved into our cabin built by Ed and Chuck Wesley. We have been up there every year since, except for a couple years in the army.

The land north of Wesleys was owned by Schmelings, all the way down to Knap Road. We paid $28.00 a foot for frontage at that time. A few years latter Norm Mavis bought a lake lot way down by Knap Road. We have been home town friends from Clintonville. Many stories could be said about Kate Wesleys bar during deer hunting, etc. They had a Ice house right behind the old tavern that burned down.

Conveyance No. 55.

John Jacoby and Evadene Jacoby, his wife,	(Land Contract
	(Consideration $8,500.00
	(Dated September 13, 1947
-TO-	(Recorded September 17, 1947
	(At 1:55 o'clock P. M.
Edward Wesley and Catherine M. Wesley, his wife.	(In Vol. 4 of Land Contracts
	(On page 126.

Agrees to convey by good and sufficient Warranty Deed, in fee simple upon full payment of purchase price, except any liens, or encumbrances created by act or default of second parties, the following:

All of Government Lot 1 in Section No. 12, Township 39 North, of Range 11 East, in Oneida County, Wisconsin. Free and clear of all legal liens and incumbrances and with reiparian rights to Sevenmile Lake.

$4,000 paid to date at the ensealing and delivery hereof, the balance of $4,500 to be paid as follows: On or before 2 years at 4%.

It is understood by all parties concerned that there will be no timber cut on Government Lot 1, Section 12, Township 39 North, Range 11 East, until this is fully paid, except where clearing is made for building of cottages or other buildings. If it is necessary to use cottage timber, that portion lying West of the R. J. Mueller road that runs East and West, this timber can be used.

Second parties to pay taxes since January 1, 1947.

(Name of Notary Public is not typewritten in.)

SEVENMILE LAKE HISTORY

Name(s) David J. Leack

Permanent Address: 270 Wesley Road
Three Lakes, WI 54562

Home Phone: 715-477-2366

Lake Address: Same

Lake Phone: Same

E-Mail: dleack@newnorth.net
House or Property
Nickname: Lakewood

This property was first seen in late July 1996. It was discovered through a realtor while looking at many other properties in the Eagle River-Three Lakes Area. Ultimately, the property was purchased in October 1996 from Kurt and Linda Kennedy. The home was built in 1992 by Dan and Nancy Clifford.

In 1999 Sevenmile Lake became my permanent residence after having lived in the greater Milwaukee area. There are no other relatives on Sevenmile Lake but there are several relatives in the Eagle River – Three Lakes area.

The Three Lakes & Eagle River area has been a vacation spot for over 40 years. My family spent many summers on many area lakes.

ON THE LIGHTER SIDE: Even after all the years spent in the north around wildlife, one would think to be careful. In the summer of 2000, while cruising around the lake with the dog LULU, (a 12-pound bundle of fur) riding on the engine cover, I saw an eagle overhead and it was about the most beautiful sight one could see. It wasn't until the second pass by Mr. or Mrs. or Ms. Eagle flying at an altitude of 3 feet above my head, that I realized that he/she (gender didn't matter, and I didn't check) wasn't showing its beauty or its flying ability, but was truly interested in picking up LULU for a snack! Being astute in survival, an immediate change of course toward home was in order!

SEVENMILE LAKE HISTORY

****

Name(s) Fred and Virginia Merriman
****

Lake Address: 8920 Balsam Lane

Lake Phone: (715) 479-6304

****

The Merriman's Cottage

I, Virginia, first saw Sevenmile Lake as a teenager in the 40's, when I went with my uncle to fish offshore for walleyes. I was living in Three Lakes at the time where my mother was teaching school. She had grown up in Three Lakes, as her family had moved there about 1900. She had left there as a teenager to to to teacher's college, and had come back to teach after the depression started, and my father was unable to work because of a brain tumor.

When I saw the lake, I thought that it was a beautiful place with some virgin trees and few homes Of course, since my mother lived in Three Lakes, I had been coming up here since I went away to college. I remember one of the things we did when I came home was to go to the picnic area on the lake, which I think was there before the campground was built.

Fred was from Ohio, and we had met in Chicago, where we both were living some years before. After I met Fred, I brought him up here, and he loved the Northwoods as I did.

When Fred and I found out that we could buy a lot up here in the late 60's, we were both thrilled, especially when we found one on Sevenmile Lake. We bought in 1968.(We had been living in Antigo, after years of living in lower Michigan.) After we bought the lot, we put our kids to work pushing down the spindly balsams that had overrun part of the lot. In the meantime, Fred cut down bigger trees to make a long driveway. We had the shell of a cottage built in 1973, and for many years, Fred worked on weekends to finish the inside. (I think there is still some left to do!)

After the shell was up, we started spending most of our summers and many weekends up here. At first, we had nothing finished except the bathroom. We cooked on a camp stove and put up with a little inconvenience. Then, in 1990, after Fred retired from the school system, he built an addition (mostly by himself). It took a while, and we spent that winter in Antigo, finally moving up here in the spring of 1991 after we sold our house. We've loved it up here, in spite of the icy roads all winter. We've also loved meeting our neighbors, most of whom moved up here after we did and have become friends.

SEVENMILE LAKE HISTORY

Name(s) Bob and Bernardine Nemec

Lake Address: 231 Knapp Road
Three Lakes, WI 54562

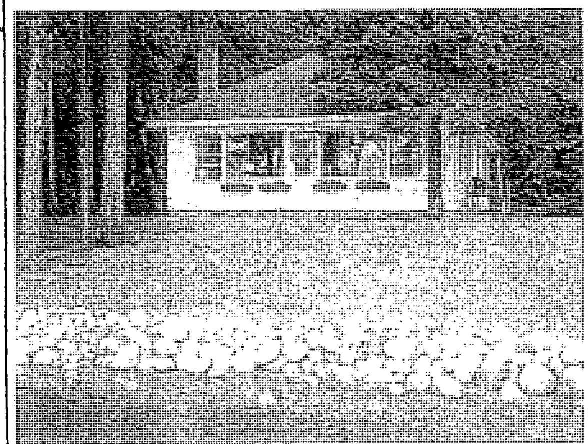
Lake Phone: 715-479-7961

Permanent Address: 3823 Bordeaux Dr.
Northbrook, IL 60062

Home Phone: 847-498-1881

E-Mail:

House or property nickname: THE NEMECS



'The Nemecs'

'*The Nemecs*', Sevenmile Lake retreat, is made up of three sections; a 200' lot on the lake's north shore containing a main house, boat/club house, guest house & garage, the 114' vacant lake lot to the west and approximately 15 wooded acres to the north across Knapp Rd.

George and Beatrice Dooley of Milwaukee once owned all of these properties. George Dooley was in the real estate business until retirement with a partner, Lundgren. Together, Dooley and Lundgren owned 700 or more feet of frontage on this side of Sevenmile Lake and 30 plus acres on the north side of Knapp Rd opposite the lake lots. In 1946 they built duplicate homes on two adjoining 200' parcels. Other than normal attrition of appliances and furnishings, a new well and a new septic system, the main house and boat/club house are essentially "Dooley's Dunrovin" of 1946.

About 1970 the Dooleys retired to Florida selling the 200' lot and buildings to Mr. & Mrs. Becker, who added a garage and converted a small building to a "guest house".

In 1974 we purchased the 114' lake lot with the intention of building our own "Up North". We had been vacationing on Sevenmile Lake as a family at Meyer's Pine Crest Resort every summer since 1953, sometimes coming back for "Colorama". (I even go further back in North Woods history, coming up in 1930 with high school friends whose family owned the "Blue Ribbon Resort" on Planting Ground Lake. In those days you reached the resorts via steam launch and mail was delivered by boat to a box on the owner's pier.)

When, in 1979, the Becker property became available it was eagerly purchased, as were the wooded acres north of Knapp Rd. when sold by Gehrke family, who owned the lake lot west of our 114' lot.

Bob & Bernardine Nemec

Some of the fonder memories include:

"SWIMMING THE LAKE" which involved a North to South swim of Sevenmile. This became a mark of distinction originated by our son Bob and his like-age group and carried on as the younger boys & girls grew to meet the challenge. A pine cutting inscribed denoting the event was awarded to Linda Gehrke and other achievers at a bonfire ceremony hosted by her father, Dick.

"SEVENMILE JUNIOR OLYMPICS" which grew from the fertile brains of Art & our daughter, Barbara Wachholz and was aided by neighbor young-marrieds with families, was centered here. The "Nemec's" was a convenient venue for both aquatic and field events. These contests were tailored to the ages, capabilities, and entertainment of the children involved. The day started with an early morning breakfast at one of the neighboring lake homes, then events until noon, a break for lunch and then more games. Close records and scores were kept for all events and after dark a torch light parade to the beach and a huge Dick Gehrke bonfire was held. Here the winning participants and their parents were rewarded and recognized. This "Junior Olympics" caught the attention of the *Eagle River News* which ran pictures and articles furnished by Jan Gehrke Weisbrod to provide lasting memories.

"SENIOR WATER SKI TEAM" a history making annual event, worthy of the *Guiness Book of Records*, involved Pete Plaushines, Al Smith and Bob Nemec Sr. We yearly laid claim to being the oldest, in years of the participants, of the Sevenmile Water Ski Team. Pete and Bob on the skis with Al driving the speedboat. I know we were well into an aggregate of **240** years before natured intervened. Pete with his son Pete Jr. and his son Eric carried on the ski tradition. This too was well documented and pictured in the *Eagle River News* with Pete well into his eighties.

All in all the clear, cool, (sometimes COLD) waters of Sevenmile Lake hold lasting charm to many of us oldsters and youngsters alike. To keep it this way must be our earnest endeavor and the prime goal of property holders who ring this jewel.

'The Nemecs', Bob & Bernardine, soon will be *'The Nemecs'* Jim & Vi, our son and his wife. Our daughter Barbara and husband Art Wachholz are planning their own retreat on the 114' vacant lot.

It is our great wish that *'The Nemecs'* will continue to be part of Sevenmile Lake presence for years to come.

SEVENMILE LAKE HISTORY

Name(s) LEROY & BARBARA PASSEHL

Lake Address: 259 WESLEY RD
THREE LAKES, WI 54562

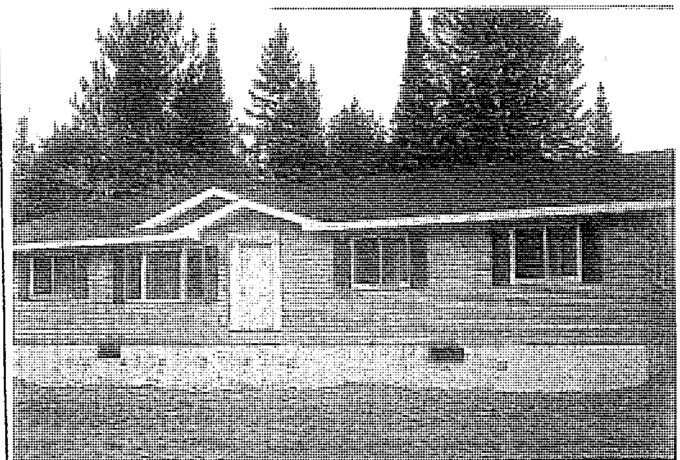
Lake Phone: 715-479-6848

Permanent Address:
2609 SO. CHICAGO AVE
SO. MILWAUKEE, WI 53172

Home Phone:
414-764-4828

E-Mail:

House or property nickname:



PURCHASED PROPERTY FROM JOHN & JANICE RYCHLOCK (ILL) OCT. 1991.

HOUSE BUILT OCT. 2000.

THIS WILL BE OUR PERMANENT RESIDENCE THIS YEAR (2001) AS SOON AS WE SELL OUR HOME IN SOUTH MILWAUKEE, WI.

LEROY'S HOME TOWN, CLINTONVILLE, WI

BARBARA'S HOME TOWN, MENASHA, WI

STARTED COMING TO SEVENMILE LAKE WITH FRANK GREB, EARLY 1960'S.

SEVENMILE LAKE HISTORY

Name(s) Dale + Lynn Samuelson

Lake Address: 295 Wesley Rd

Lake Phone: ****

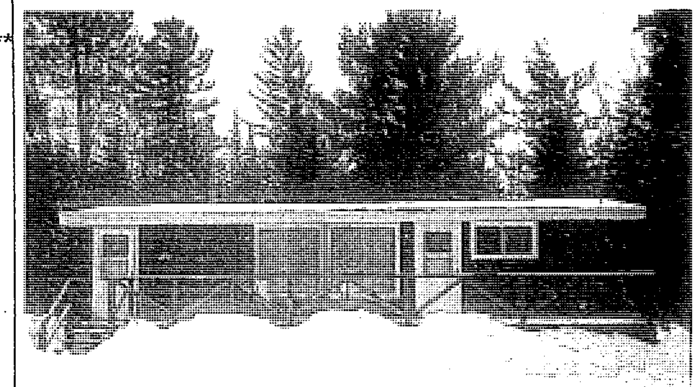
Permanent Address: W767 Mullen Dr

Oneida, WI 54155

Home Phone:

E-Mail:

House or property nickname: The cabin



This property was owned by Edward and Catherine Wesley.
Sold to Charles and Jean Wesley on January 30,1969.
They sold the property to Siegfried and Frances Weidacher, [Catherines neice], onMarch 30, 1973.
After Frances death we purchased this property on October 28, 1995.
The cabin was built by Charles Wesley for Fred Weidacher in 1977.
We added a porch in 1997 and a garage in 2000.
Dale's sister, Linda Nagle, lives on Sevenmile Lake.
They grew up in Three Lakes.

SEVENMILE LAKE HISTORY

Name(s) Martin Schmeling

Lake Address: 8972 Balsam Ln.
Three Lakes, WI

Lake Phone: 479-6062

Permanent Address: 7201 Wishop Rd.
Rockton, IL 61072

Home Phone: 815-629-2658

E-Mail:

House or property nickname: Schmeling Shack

Martin Schmeling

In the 1940's, Emil W. Schmeling, a lumber and coal dealer from Rockford, IL, contracted with the government to log land on the west side of Seven Mile Lake. (From what it appears on an old map, this extended from Knapp Rd. to Wesley Rd..) A logging trail was cut. (The map is not clear as to whether this is now Balsam Ln. or perhaps closer to the lake.) After the logs were cleared, the lake could clearly be seen from the logging trail. Part of these were shipped back to Rockford by rail for the construction of the (still standing) YMCA Log Lodge near the Rock River. In 1946, these 52 acres of land were purchased.

In 1964, after having sold off many acres, Mr. Schmeling divided the remaining 20 acres into parcels, distributing four separated parcels to each of his five sons. Family members occasionally visited the area, then gradually sold off their parcels.

In 1975, Emil's youngest son, Robert, began adapting a six-sided log cabin design into an octagonal shape. In 1976, he began to clear land at 8972 Balsam Lane. Construction was completed in 1977 with logs from Laramie, WY. Each room featured a different wood. Creating this home was "a labor of love" for Robert and his wife Elsa. Thereafter, they came up almost monthly to enjoy the Northwoods.

(To my knowledge, this is the only family who still owns a parcel.)

submitted by daughter-in-law: Judi Schmeling 3/24/01

SEVENMILE LAKE HISTORY

****

Names: Nancy and Fritz Schwartz

****

Permanent Address: 8612 Hildebrand Rd.

Home Phone:(715) 479-2879

****

The Schwartz family became acquainted with Sevenmile Lake through Walter and Frances Mueller, probably over a glass of beer at a VFW function in Waukesha around the late 30's.

Through that friendship, we were invited to spend the family vacation renting one of their cabins. Our first trip north was in our green four-door Oakland, which took us all day, leaving home before dawn, and stopping only when necessary. You know what I mean.

The trips north were always exciting, as we saw thing with adventure in our eyes and mind. Also the fact that Mom would pack a lot of food for snacks and lunch. The roads were all two lane, until we got to Military Rd -- that is when it became a single lane,sand path, which was a problem when meeting an oncoming car and no place to move over. Thank goodness, it didn't happen very often. My uncle Harv always came with us on vacation, so whatever wouldn't fit in the trunk (which wasn't very big), was put in a canvas pack and tied on the back.

Dad and Uncle Harv fished rain or shine, morn and night, and rested at noon telling stories with Wally Mueller. Us kids took to the water when weather permitted, and our job was walking to get the mail and milk at the corner of Military and Wesley. We often took hikes over to Lone Stone to picnic and swim when Frances and Mom needed to get away. It was always sad to see vacation end, as that meant school was about to start.

Frances and Wally were colorful people. Wally was a veteran of the Spanish American War, and a painter by trade. He was very talented with his hands. He made his own boats, cabins, bows, arrows, and whatever could be formed out of wood. Wally was always busy doing something, and when he rested, he was whittling. Frances seemed to be the rough, hard-working homesteader, always cooking, washing, cleaning, picking some kind of berry, and being a good friend to Mom.

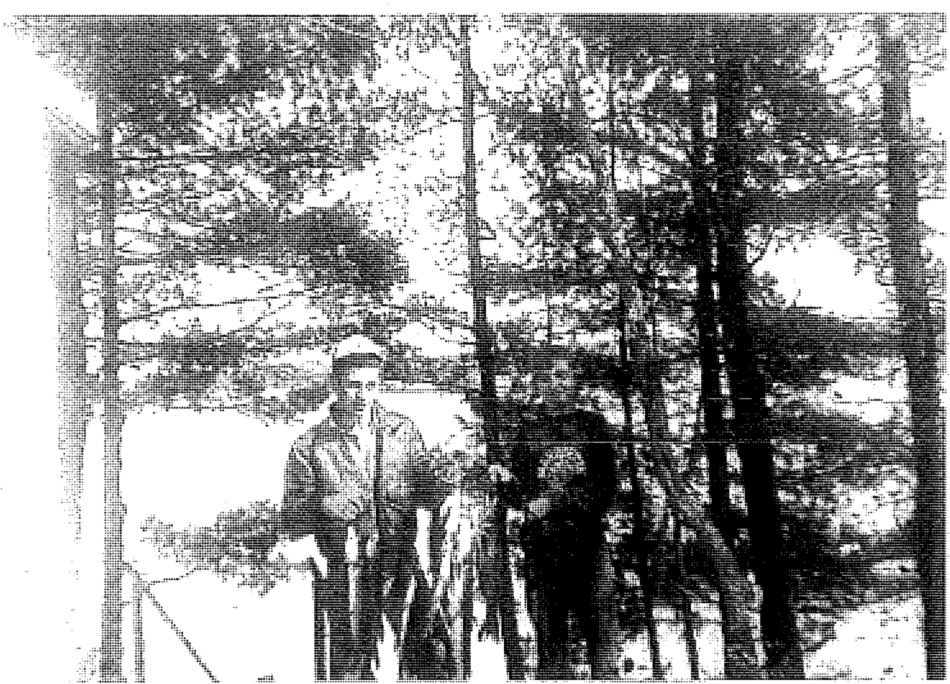
Sometime around 1951-2, Mom and Dad purchased some land from Wally and Frances to build their cabin in the woods. Soon after, trees were cut and land cleared with a plan in mind. With the help of friends and family, things got under way very quickly, and a two bedroom cabin went up. Each year or so it seemed to be upgraded. In time, a generator replaced oil lamps, indoor plumbing the outhouse, a third bedroom was added for more room and so on.

This cabin was a dream come true for Dad, as he loved it in the Northwoods. After his retirement, Mom and Dad came north on Mother's Day and stayed through Labor day. He spent most of his time fishing, watching the trees grow, working around the house, feeding his pet

1952: Group photo taken at Muellers (Now Currans).

Backrow: Ezra, Harvey, Russ, Charles Schwartz
2nd row: Walter Mueller, Frances Mueller, Viola Schwartz, Hank Hahm, Fritz Schwartz (straw hat)
Front row: JoAnn Schwartz, Marge and Frank Greb (back from their honeymoon).

Fritz and Nancy Schwartz - just married!
Nice catch!



MEMORIES OF PETE

Longtime summer resident Pete Plaushine died December 27, 1996, in Tampa, Florida. Born 82 years ago in Sommers, Wisconsin, he prepared for many years as a principal of Wisconsin and Illinois schools with a Bachelor's degree at the University of Wisconsin and a Master's degree at Marquette University.

He enjoyed all outdoor activities and was a professional soccer player at one time. As principal of the Jack Benny High School in Waukegan, Illinois, he arranged for Jack Benny to be present at the dedication, and was subsequently invited to Benny's home, where he was introduced to Lucille Ball.

The Lake Association was fortunate to have Pete as our Lake Historian, a post he was uniquely suited for as he spent from June to September for 54 years on the piece of land that he loved on Sevenmile Lake. Last year's annual meeting featured Pete as our speaker, and we'd like to publish just a few of his recollections. Others will be gathered and presented in our upcoming history of the Sevenmile Lake area.

In Pete's own words: " I will begin with Curley Knapp's. I worked at Curley Knapp's for about 15-18 years. Curley Knapp had six cabins and no electricity. Now what does that mean? It means that you got to have ice, so Curley hired someone to go out in the lake in winter, cut the ice, and bring it into the ice house. No metal boats. All we had were wooden boats, Rhinelander boats. Wooden boats mean that you have to paint them each year, and before you put them in, you've got to soak them. Curley had a steady clientele from the Chicago area year after year. There was no campground, so that was the center of activity as far as Sevenmile Lake was concerned...six cabins, a bar, and people coming in from the outside and spending the evening. There was a lot of camaraderie going on."

Pete was a vital spirit on our lake, waterskiing and bicycling into his eighties. He will be missed by all.

MORE MEMORIES FROM PETE PLAUSHINES

The following are excerpts from a speech that Pete gave as historian at the Memorial Day meeting of the Lake Association in May, 1996, and an interview with Pete in August, 1995 by Tom Babcock, a resident on Butternut Lake.

"Being a school principal, I was unemployed in the summers for about 56 years. So I spent from June to September for 54 years right here on Sevenmile."

HOW DID YOU FIND YOUR PROPERTY?

"I came up in this area as a kid on the Chicago and Northwestern train. I was a friend of a fellow who was a camp cook at a logging camp, and he sent me a ticket up to Eagle River. He picked me up with a team of horses, and we went over to a lake about 7-8 miles away, staying in a small old log cabin. I was quite enthused about about it and knew this was the area I wanted to be in.

"After I became a principal in Waukegan, Illinois, I talked to a realtor in Three Lakes in 1940-41. He had a piece on the north end of Sevenmile, and I could buy 800 feet, 18 acres, for $500.00. Hey, I grabbed it! But after I bought it, I became quite concerned. This was about a third of my income of $1750.00 a year! The next year I came up, I couldn't even find it!.

"But after the family saw the beach, it was okay with them. We couldn't build, so we bought a little cottage. It was so small, we couldn't even get a 9' by 12' rug in it. We added a porch, drove a well, had a kerosene stove because there was no electricity, and an ice box (we had to get our ice from Curly Knapp's).

TELL US ABOUT CURLY KNAPP...

"Curly had the only bar in the area and six cabins. It was a place that everyone knew about. I got to know him by some of the advice he gave me, and I respected the man. After I was here a year or two, I worked for him in the summers to keep body and soul together so we could make it financially.

DID YOU KNOW BOTH OF CURLY'S WIVES, MARY AND BELLE?

"This is what happened. Curly didn't stay every winter, but this year he stayed. At Easter, my wife prepared a huge ham for Easter dinner, and I invited Curley and his wife, Mary, for dinner. Of all things, Mary had a stroke at our place after dinner. At that time, there was only one doctor in Eagle River, Dr. Oldfield. 'Course, in those days, there was no phone. So I drove into town on slippery roads, and brought the doctor and his nurse back with me in my Plymouth.They made arrangements for an ambulance to come pick her up and take her to Rhinelander, where she was in a coma for at least a year after that. Curly used to go in most every day.

"Belle came along from Delavan, and stayed in one of his cabins. We would cut ice from the lake in winter, and get sawdust from the mills around to pack it in and put it in the ice house. That was our refrigeration until the gas refrigerators came in. So I would deliver the ice on his ton and a half Chevrolet flat bed truck. Curley would always leave me a note to remind me to deliver ice to Belle. So I thought something was going on. She died around 1992-3, at the age of 97.

WHAT WAS EAGLE RIVER LIKE IN THE FORTIES?

"To start out, this was quite a resort area. There were three large resorts in the area. Everett's Resort on Catfish Lake dated back to 1885, and was for the wealthy. Everett's had a huge dining room, and cabins along side of the dining room. People would come up on the train, and the resort would pick them up.

"Our neighbor on Butternut Lake was Rasmussen's Resort, which later became Cody's through marriage. They had quite an establishment -- they had guides who would take their customers fishing on Butternut Lake and Sevenmile. I'm told that they would come through Crossover Rd. in the early days, and walk over to fish at Sevenmile, and the place they would usually stop was Curly Knapp's.

"A third resort in area was on Lone Stone Lake.

"Now, you're asking, what about the Northenaire? That came a little later, in '43 or '44.

"In the town of Eagle River, there was a railroad station, which brought quite a few tourists up - they didn't all drive. There was one bank, the First National Bank. There was a small grocery store where the 5 & 10 is (now a T-shirt shop). Bonson's was over where Ace Hardware is. There was a park named after the only doctor, Dr. Oldfield.

WHAT ABOUT OTTERSTATTER'S SEVENMILE PINECREST RESORT?

"In the Depression, the government was buying land for a buck an acre after it had been logged. What is now the Otterstatter's Resort was an abandoned building. I was told that it was a Jewish boy's camp at the end of the thirties. The cabins were small buildings with porches attached, and were decorated the way boys would like, with Indian gear, feathers, and all the outdoor stuff.

"Ralph Meyers came along and it became Meyer's Resort for 27 years. Now the Otterstatters have had it now for 25 years (it's 30 years in 2001). The stone fireplace that is outside now at Sevenmile Pinecrest was in the dining room at the boy's camp.

WHAT ABOUT THE WATER LEVEL OF THE LAKE?

"When I first bought my property, I had about 15-20 feet wide of sandy beach. The creeks were just a trickle. Stumpy Bay was a forest at one time.

"But in the forties, the CCC put in a second dam (I don't know when the first dam went in). We tried to get signatures on a petition going, because we felt the public utilities were stealing our frontage. But the dam caused the water to rise and the lake and Stumpy Bay finally filled up.

IS IT TRUE THAT SOMEONE TRIED TO BUILD A FISH HATCHERY ON PAT SHAY LAKE?

"There was a trout hatchery built by the CCC (Civilian Conservation Corps). They also built the two bridges that run between Pat Shay and Sevenmile. Believe me, during the Depression, there were a lot of professional people who were unemployed, engineers and so on. They were hired to help out with road and bridge building."

PETE CLOSED HIS MEMORIAL DAY SPEECH WITH THIS HUMOROUS STORY:

"An older couple lived in a condo in a beautiful area. He was 94, and she was close to his age. She went on a trip, and made all the arrangements for a maid to come in and for everything to be taken care of while she was gone.

When she came back, she began to hear rumors about her husband having had an affair with the maid. Oh yes, it was quite scandalous. They had a balcony in their condo, so she got him out on the balcony and pushed him over.

Next thing you know, she was in front of the judge. The judge asked "Why did you do that?" She replied, "Well, I thought if he could have sex at his age, he could fly too!

THAT WAS PETE!

PETE'S SMALL CABIN
"It was so small, we couldn't even get a 9' by 12' rug in it!"

Pete Plaushines about 1953-54
"Walleye catch, early mornings, 5:30-9:00, most days. Guess who on the right?"

A REMINDER OF TIMES PAST

An old rock bridge, built by the CCC during the Depression off Knapp Road, is a reminder of how things were built decades ago. The creek flows into Sevenmile Lake, one of the Nicolet's fishing and recreational gems.

Photo by Gary Ridderbusch
from the Vilas County News-Review
Summer, 1996

THE LEGEND OF IRA CRAVEN

Ira Craven was a hermit whose business it was to make moonshine. He lived in a shanty across from Curly Knapp's, half buried in a hillside and very difficult to get to because of the swampy areas. Buyers of moonshine for Chicago speakeasies would fly into Pat Shay Lake on airplanes with pontoons and buy this stuff without being caught. He was known as "The Raven" and stole pots from local houses, taking them back to his place for his workers to use for cooking and making "bullets" (moonshine).

Around 1945, there was a little girl who was berry picking with her parents. They got separated and the child got lost. Since they were staying at Curly Knapp's, Curly organized a search party, but we had to call it off when it got dark, as we were getting lost walking through the woods.

Very early the next morning, around 5 or 6 a.m., the little girl comes along walking hand in hand with Ira Craven. He had found her, took care of her all night, and brought her back to safety in the morning.

I remember one or twice passing Ira on the road. He had a white horse, but I never saw him ride his horse. He just used to lead him into town, get supplies, and walk him back.
Ira became mad living totally by himself, and creating false trails and escapes from possible raids. His brother had him committed to an asylum in Madison.

From recollections of Tom Babcock, a resident on Butternut Lake.

HISTORY OF THE SEVENMILE LAKE ASSOCIATION

Founded 1993
Incorporated July 27, 1994

By Pat Egan

In a driving rainstorm on May 30, 1993, twenty-seven interested Sevenmile property owners drippingly trooped into Pat and Tod Egan's Nicolet Vista house.

We had come together to discuss the possibility of starting a lake association to protect our lake and its surroundings.

Pat and Tod had sent a flyer around to all the property owners (that they could locate) to see if there was any interest in beginning an association. We had toyed with the idea for years, since buying our property in 1980. We wondered: was there already one? how could it begin?

Fortunately, on a hiking trip around Sevenmile Lake one summer, Pat had the good luck to meet Ruth Kowalsky, walking with her family. Ruth was very friendly, and when the idea of an association was broached, very encouraging. She suggested that Fred Farr be called (he had the spot called Farr-a-way, which is now the Cramer's property.) He was positive as well.

So, on the strength and good wishes of these two homeowners, we had set up this exploratory meeting. Gulp!

Also at the meeting was Mary Bierman, the founder of the Butternut/Franklin Lake Association. She and her husband Arden had begun their association over 25 years ago on their front porch. At the time, Mary was also the president of the Wisconsin Association of Lakes, and founder and president of Forest County Association of Lakes. In addition, for added support and information, Bryan Pierce attended in his capacity as Community Resources Agent - Oneida County UW Extension.

After a two hour meeting and much discussion about how much the lake meant to us and to our children, there was a "Yea" vote. The Lake Association was born!

TIDBITS

UNSOLVED MYSTERY

**In January, 1968, two snowmobilers missing overnight in 25 below zero weather, were found safe in a cabin on Sevenmile Lake.
Whose cabin was it?**

From "Backward Glances" in the Vilas County News-Review, 1/7/98.

HOW DID PAT SHAY LAKE GET ITS NAME?

"Pat Shay lake was named after Patsy Shay, who was a great hero in World War I. He lived in Crandon and became the assessor of Forest County. The VFW post in Crandon is named after him also."
According to Tom Babcock, a Butternut Lake resident.

WISCONSIN
OFFICIAL MARKER

OLD MILITARY ROAD

In March, 1863, Abraham Lincoln signed an Act of Congress which enabled the states of Michigan and Wisconsin to begin construction of a road between Fort Howard at Green Bay and Fort Wilkins near Copper Harbor. It took one year to build the road from Fort Howard to Keshena. By 1869 it had reached the Michigan state line. First used for transporting federal troops and supplies, the road also was used by explorers, settlers, trappers and hunters. By the turn of the century it became an artery for the lumbering interests who kept the road repaired until it became a part of the state trunk highway system in 1923. Along this road are many points of historic legendary interest. Nine Mile Creek, Langlade and Lily were important logging centers. Way stations were established during the 1880's at the Otter Slide, three miles north of Sullivan Falls, the Gauthier Place near Shotgun Eddy, and Mag Lawe's station, two miles north of Keshena Falls, served both the lumber trade and weary travelers.

"I was working for Curly, getting ready for spring repairing piers and boats. In those days, we had nothing but wooden boats, by Rhinelander. Had to swell the boats for a good 3 days before you had a dry boat." Pete Plaushines, August, 1995.

"I've neglected to say one thing...about the time of the Chicago fire, we had a fire up here. I've got huge stumps on my property that I can tell were burned." Pete Plaushines, May 1996.

"Do you remember Curly Knapp?"

"Who could forget him?"

Interview with Sid Hibbard by Tom Babcock and Bob Curran, January 20, 1997

Sidney and Dolores Hibbard dug out a full basement under their house, by hand, using a wheelbarrow.

"Just feel that muscle!" Sid Hibbard,

January 10, 1997 interview by Tom Babcock and Bob Curran

SEVENMILE LAKE HISTORY

Name(s) **Bill, Angie, Neil & Dani Baumer**

Lake Address: **8908 Balsam Lane**

Lake Phone: **477-1275**

Permanent Address: **N51W14671 Lancaster Ave.**
Menomonee Falls, Wi 53051

Home Phone: **262-781-0978**

E-Mail: loonorth@myexcel.com

House or property nickname: **Up North**

HISTORICAL OR CURRENT PHOTO

ANY SIZE - PRINTER WILL ADJUST

DO NOT PASTE ON FORM

DO NOT WRITE ON BACK

It all started when Bill and Angie spent vacations since childhood all over upper Wisconsin, along with Angie staying on the Eagle River Chain in cabins and camping for 15 years with her parents and sister Deb. On Labor Day weekend in 1978, Bill and Angie visited 25 lake lots all over this area with our 1 year old son, Neil, and after seeing the sandy bottomed lakeshore and the two 30" walleyes tied to Fred Williamson's pier, we bought our 100 feet of Sevenmile Lake frontage from Mike Maslowski.

Bill's brother, John, and sister-in-law, Betty, helped cut down the trees for the driveway and our friend Joe brought up his skidster to clear the stumps in Nov. 1978. The following spring of 1979 an outhouse and a small, small camper and Angie's parents, Ralph and LaVerne's, camper found a comfy wooded spot on the middle of our land. We cleared a spot for our log cabin in the summer of 1979 and electricity was obtained this summer. The basement was dug, blocked and capped in the fall of 1979. Marvin Hoppe helped us with laying the cement for the basement floor.

During these early years, water was brought from home, gotten from the Hide Away Bar (Barb and Red), the Sevenmile State Campground and our great friend Bernice Williamson. Bernice not only gave us water, but we also borrowed lots of tools for building and her family and our family have become great friends. Bernice was a huge help.

Also in the fall of 1979, Bill and brother John, borrowed a logger's hauling trucks to bring our logs to Seven Mile from near Armstrong Creek. A gentleman in Armstrong Creek had all ready built his own log cabin. We were on our way to buy a stand of trees from near Pembine, WI, which would have meant that we would have had to cut down our own trees and trim them up. This fellow had acquired the trees from the State of Wis, because they were widening a road near Armstrong Creek. He used half of them and we bought the other half. Bill, Angie and 3 year old Neil proceeded to peel 2100 feet of red pine in front of the existing log cabin on Hwy 8 in November of 1979. We used long poled ice scrapers. The logs had to be peeled right away or bugs would become a problem. The logs laid there until spring 1980 when Bill and John hauled them to our lot. It was unbelievable that that huge pile of logs would turn into the walls of our cabin.

We started building the cabin on our one week vacation in May of 1980, with the help of Angie's parents, Ralph and LaVerne. It was a hot and dry spring and the Northwoods was afraid of forest fires happening. The whole week was extremely hot. A real rarity for up here. Ralph and LaVerne were huge helpers. Ralph would help Bill with building almost every time we came up and LaVerne would help with taking care of Neil. When Neil and Grandma weren't helping with building they were fishing or swimming. Angie's sister Deb and her husband Erv have always been there to help also.

Throughout the summer of 1980 many family members and friends visited and lots helped. Our small trailer and Ralph's camper and tents were used for visitors. This summer was full of every weekend up north, lots of work, lots of learning for Bill from his friend Greg's father,

Harry, on how to build a log cabin, lots of campfires (melted tennis shoe souls), went through lots of blades from the chain saw, lots of muscle power lifting and positioning really heavy logs, year of the family of skunks, visits to the Hideaway when not too tired, fun and a few beers when work was done.

The north and south side walls of the cabin were not too tricky to put up. But the front and back walls were a little different. With nothing to hold them up, they needed to be braced and "Please" no big winds. These walls and the ridge pole had to be put up all in one week, so the walls up to the peaks would not topple. Now lifting and placing the 40 foot ridge pole was a whole story in itself. It was a white pine acquired from our friend Joe in Mountain, Wi and it had been cut by him just that week. Not a good thing! Which meant it was very, very, very heavy. Bill, Ralph, brother-in-law, Erv, and John proceeded to position this monster. A huge red pine growing on the north side of the cabin and a strong maple growing on the south side were used to lift the pine with cables to the top of the cabin. It was lifted and pullied, log by log on the ends of the cabin. Each log braced the pine as it very slowly made it's way to the top of the peaks. This took a full day, with lots of figuring and patience and muscles and climbing up the walls on each end slowly lifting the pine up to each extended log. Lots of worrying was done on the women's part that that huge log could come loose any time from its cables and roll down the peaks and quite simply squash the fellas lifting it, or the two trees being used for the cables would bend and break. We gave out a big yell of relief and a lots of "Thank you God" when the pine reached the top.

Also during that summer of 1980, Bill worked on the engine of a tree chipper at Old World Wisconsin and upon talking with their staff, he acquired 40 younger and thinner red pines that we used for the rafters. These were peeled in our yard in Butler, Wi and then hauled to Mountain, Wi where our friend Joe has a sawmill and he planed one side of each of them to put up against the roof. Putting up the rafters was the last step to be completed in the late fall of 1980. So the shell of the cabin was completed in one year of working weekends and two full weeks of vacation throughout the spring, summer and fall.

The year of 1981 started with completing the roof and then we proceeded to put the insulation between each log and contained the insulation with wire meshing on inside and outside of log walls. This is called chinking the cabin. The inside walls were constructed and from then on through the proceeding years Bill has been working on completing the inside of the cabin with a little help here and there. His brother Pat helped give us light with his electrical expertise.

For three years straight Bill tried to get water with a portable hand well driller. In the third year, around 1990 or 91, when the hole that Bill and Ralph were standing in while pounding the portable driller, started caving in, Angie finally persuaded Bill to hire a well driller and get the job done. This did happen and after that even the sister-in-laws started coming up.

In August 1999 our garage was constructed with help from a group of friends. It was like a barn raising and they completed the whole building in 2 days. Lots of construction expertise in this group of guys and Neil now being a roofer finished it off the second day with the shingles.

A mini log cabin storage shed down by the lake was added in about 1990.

It is now 2002 and we're still working. We're completing the inside, because in 2001 thanks to almost the same group of guys that built our garage, they have now added onto the front of the cabin the full width by eight feet out.

Tons of memories and events have occurred in the last 25 years:

- Neil and Dani loving every minute of being here, through the work and the fun, Grandma and Grandpa taking care of them when young and we were too busy building they'd be swimming or fishing
- Neil and Dani bringing up friends whenever possible or just taking it easy and getting away from it all
- Neil's 41" musky, his 22" walleye caught with his Grandma along, and Dani's 22" bass, along with all the other catches throughout the years. When we were younger and had more energy and more fish in the lake, fishing from the pier starting at 10 pm and going to midnight or

later and catching at least 2 or 3 walleyes an evening. "Catch and Release" are practiced in this family

- **Angie getting fish hooks stuck in her body, including her nose**
- **The skunk family's den in our woods for three years which would put the walkers and campfire attendees on alert at all times. Our dog Mickey who was totally unfortunate and found out skunks are not play pals**
- **Friends and relation – lots of them have visisted, helped, partied and loved the up north woods and the lake as we do**
- **We've also made some great friends. Bernice Williamson became an immediate friend and huge help and a third Grandma to Dani and Neil. Lots of memories of her family and looking forward to making more with her, Fred, Sue and Freddy. We're glad to have become friends with the Hoppes, Barb and Red and family and the Lake Association's members also**
- **We want to THANK EVERYBODY WHO EVER HELPED WITH WHATEVER THROUGHOUT THE YEARS. WE TRULY APPRECIATE IT!**
- **One huge memory all the way from years ago staying in our little trailer to now being in our cabin, is the memory of praying and thanking God for giving us the ability and talent to have the opportunity to build a log cabin up north and to experience all that nature has to share**

History from Dani's viewpoint (Now 20 yrs old)

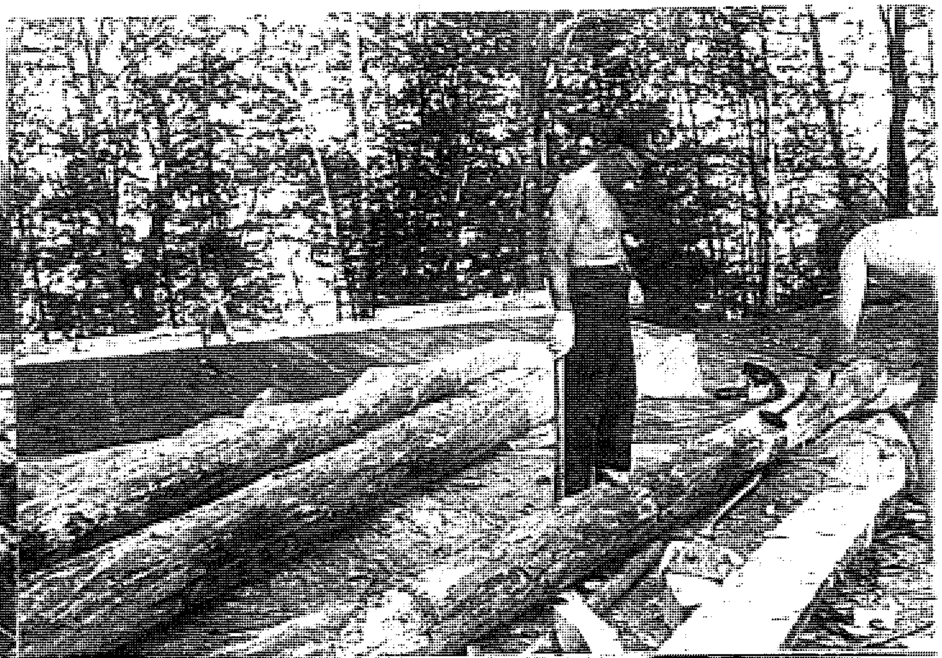
As a child I always loved it up north and still do. Coming up with my parents or my Grandma and Grandpa, either way I always had a good time. Going into town to ride the go-carts or going to the candy store was always a highlight of the vacation. I have to admit learning to waterski was always frightening to me. I never knew what those muskies were thinking about my bright colored swimming suit. I still have some doubts about that to this day. As long as I can remember we have always been working on our cabin or building garages and things, actually the adults were always involved in these building "projects". I was always the supervisor, but now as I'm growing older I'm taking a bigger role in these jobs. I can now say, after our latest experience with building the addition on the front of our cabin, and myself helping to lay the footings in the hottest part of summer, this is not the profession I want to go into. There are so many fond memories of friends and family it would take a book to recollect them all. But instead I have to go make some more great memories. Hope all of you enjoy the outdoors as I do. Dani – age 19

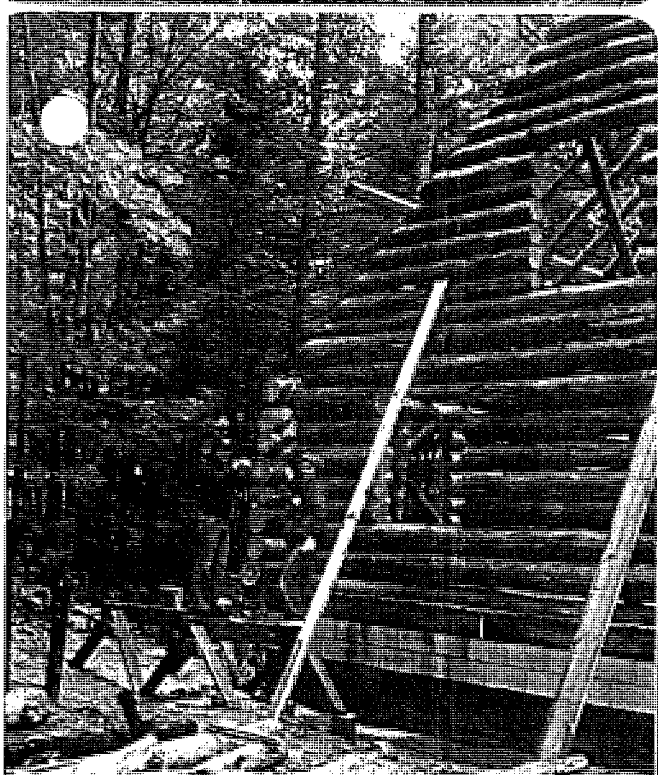
History from Neil's viewpoint (Now 27 years old) -

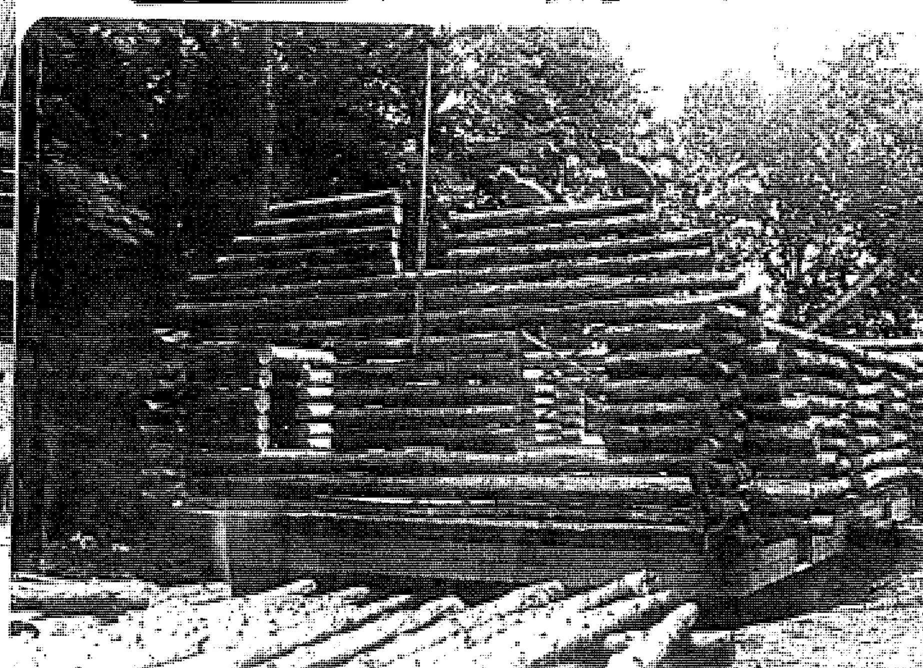
The things I remember about up north as a kid:
- playing on the big sand hill made from the extra fill from our cabin's basement
- falling asleep at the Hideaway Bar on a couple chairs stringed together after a day's hard work and playing
- seeing the big musky just after it was caught that used to hang in the Hideaway Bar when Barb and Red owned it
- fishing with my family, especially my Grandparents - I caught a 24" walleye while fishing with my Grandma LaVerne, when I was 12 years old. Grandma was so excited for me.
- learning how to waterski
- staying in the campers, my Mom and Dad's and my Grandparents until the cabin was built
- riding my mini-bike - and then my friend riding my mini-bike and crashing into a tree and cracking his chest bone
- shooting tin cans with my friend Jason with my air rifle that I got for my birthday
- going to the bathroom in the outhouse until we got water in the cabin
- swimming with my sister and my Grandma, even in pretty cold weather
- deer hunting with my Dad, Grandpa and Uncle Erv
- our outboard motor fell off our small fishing boat while in the middle of the lake with 50 feet of water and my Grandpa caught it before it sunk and held onto it until we made it back to shore
- one week a year we would go up with just my Grandma and Grandpa for a great vacation

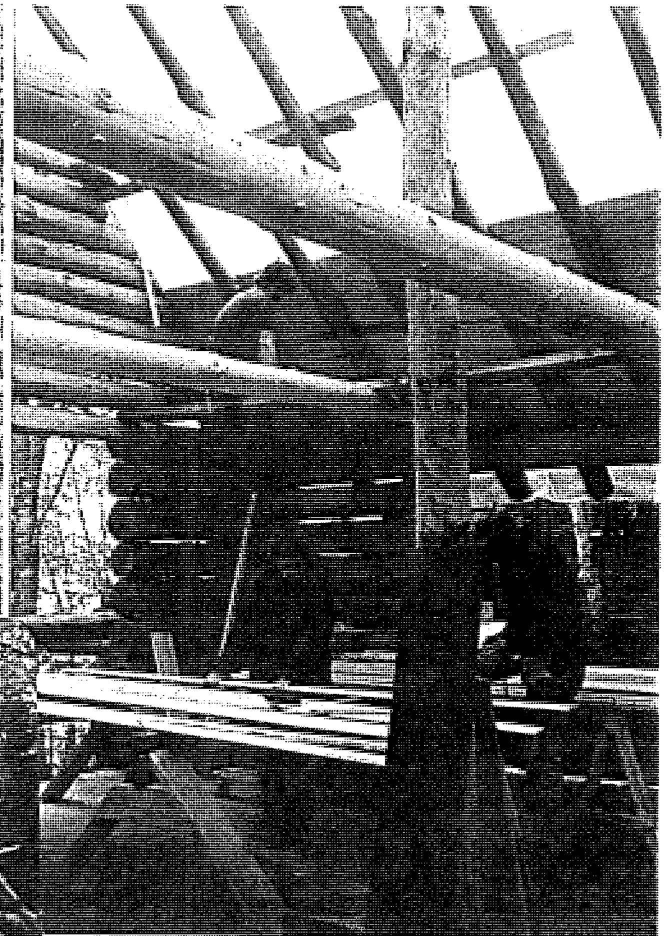
OTHER MEMORIES:

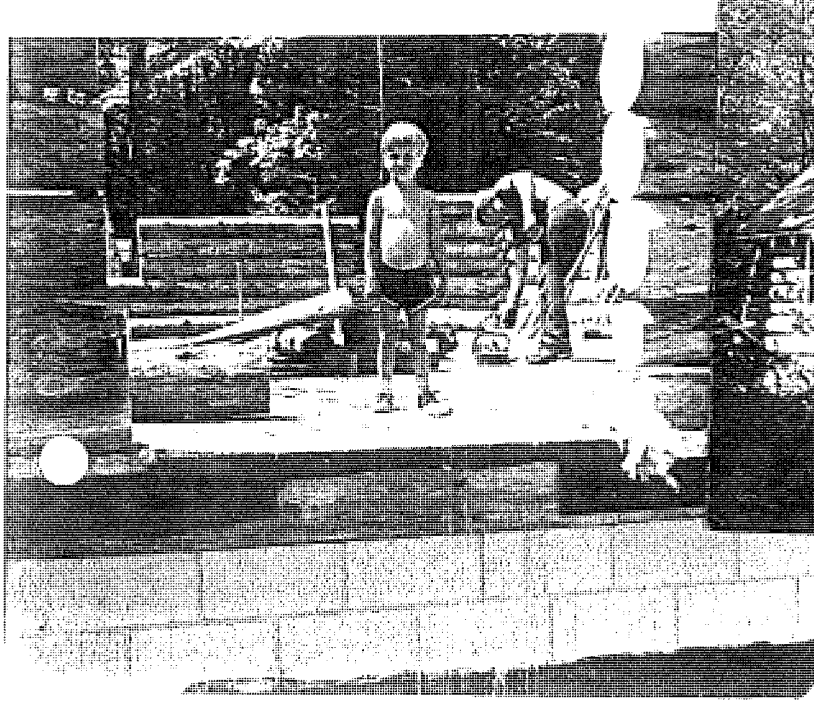
- Shelly's (Hideaway Bar) pet raccoon visiting us and checking out our outhouse and almost falling in it and Angie saving it and Ricky the Raccoon being unthankful for his savior with a bit to her hand
- Lots of years with the outhouse and all the visitor's reaction to it – we in the immediate family all adapted real well – kind of neat with the cold fresh wind blowing up your you-know-what
- The visits of our animal friends, the deer, bear, flying squirrels, fox, the huge owls that frequented our yard the first 10 years, eagles eating walleyes in Hoppe's tree right above us with fish parts dropping to the ground and lake, chippies we've fed, these huge downy feathered birds that ate out of Neil and Dani's hands
- Before water, when we would visit the Hideaway in the evening we would use the facilities to brush our teeth and wash up a wee bit
- Lots of loads of building supplies from home and one event when we tried taking up a huge load of railroad ties on our 4 place snowmobile trailer and the axle broke going over the railroad tracks just south of New London (what a mess)
- We use to spend Easters here also until one year we were watching a Disney World parade from sunny Fla on the TV and being that we were sick of winter by March and April we went south most of the time from then on at Easter. But one of the years we were there for Easter with Mom and Dad and probably Deb and Erv, it was very warm and the lake was open and we saw the spawning of the walleyes and musky. Quite a nature experience. Which is why we love Sevenmile. Nature experiences.
- Thanksgivings are spent up here along with a little deer hunting. Our guys have never gone one up here. Mom and Dad and Erv and Deb went in the beginning years and then Neil and Grandpa went quite a bit together. We've seen the feeding frenzy of the fish in Sevnmile before the ice comes in. That was really something. Dani and Angie walked around whole lake, even through the Hay Meadow inlet and the stumpy bay outlet without shoes and extremely freezing water. The lake was extremely low and lots of beach. Same year the 13 swans visited our lake.
- New Years eve weekend is spent up here also, but this is one weekend we don't work and just relax. Ice fishing (hardly any caught) snowmobiling and crosscountry skiing and sometimes the Brule when there's snow. Johnson's sometimes visit and Dani's and Neil's friends come up. Watched the Badgers in the Rose Bowl twice with the Williamson's.
- We remember the tornado which enabled us to see an additional cabin on the lake on the south end. And the fire on the south end jumping from tree top to tree top.
- Our eagle tree was the only tree blown down on the lake the Friday evening of the weekend the fellas came up to build our garage. We didn't have electricity until Monday night. Luckily a generator was there to run the saws and the airgun.











CHAMPIONS

Dear Pat,

This is something you have been patiently waiting for. I have procrastinated long enough. As I was setting bread dough this morning and thinking through the things on my "winter list of 'to do's", I found many still undone. This is one of them. I hope this is what you were looking for.

The Saga of 7-mile Pinecrest Resort.

After teaching at St. Paul's Lutheran School in Fort Atkinson, Wisconsin for 15 years, Bob Otterstatter decided it was time to do something else. After two years of searching the Northwoods for a resort, he and his wife, Elaine, found Meyer's Pine Crest. They made arrangements to purchase this resort, located on the North side of Sevenmile Lake.

The reason they sold their house in Fort was to purchase a resort. When they packed up all their belongings to move North, they planned to purchase Pine Crest in the fall, but not move there until the end of the summer season. A house in Eagle River was rented and that is where they lived for the summer. What transpired between those initial arrangements to purchase and the actual purchase is a story in itself. It will not be told here as it doesn't relate to the history of the property.

Labor Day weekend of 1971, the Otterstatters moved their entire household into the garage or rec room on the resort. With their five children, ranging in age from 12 to 3, they stayed in a cottage for a week while Mrs. Meyer, the former owner of Pine Crest moved out. She stayed on for three weeks in one of the cottages. Within the month, she left for Florida and the Otterstatters were on their own.

They learned fast and each year, a few more lessons were added. Financially, it was a struggle, but each and everyone in the family will attribute the success of each year to hard work, a lot of stress, being frugal, but most importantly, to a loving God in heaven above. There is absolutely no other explanation for these past 34 years of successful operation.

The blessings from these years were many. The five children grew to know and understand the importance of hard work and the value of money. They found out early it did not grow on trees, but came as a result of dedication and hard work. Now the next generation is learning those same valuable lessons.

This was a dream come true for Bob who lived to see it happen, but will not see it continue. For this we are thankful to have had him with us for 32 plus years. The legacy he left for his family will never be forgotten

But life goes on and a vacation place for many families continues under the direction of those five children who moved here so long ago, now grown and with children of their own.

When we purchased the resort from Grace Meyer, she gave us some historical background from the 27 years she lived at the resort. She and her husband, Ralph, were living in Chicago as WWII came to an end. They decided to buy some property in the Northwoods. They purchased this resort as it had been idle during the war years. They enclosed the cabins, modified the shower rooms to accommodate men and boys on one side and women and girls on the other, and installed a laundry. Through the years they remodeled all the buildings, some of them twice. The main house was added to and became a beautiful house. The two car garage became the 'rec room' during the summer and a garage and storage area when they left for the winter. Cutting and selling trees for Christmas gave them an income to live through the winter. When Ralph passed away in 1969, Grace decided the resort had to be sold. Her grandchildren would have loved to continue in their grandparents shoes, but it was not possible. They all helped to continue the running of the resort, until the Otterstatters came into the picture.

Two visits in the next few years added to the understanding and historical picture I am hoping to paint with these words:

One day in 1978, while closing up the units not rented in Fall, Bob and Elaine had a visitor. This gentleman had been a counselor when the resort had been a Jewish boys' camp. Sometime in the 30's it was operated as a camp for the boys, coming from many different cities. He told us how the boys occupied the eight cabins facing the lake. These cabins were nothing but glorified gazebos. The four sides were half walls and screening across the top half which kept the mosquitoes out. Some sort of roll up/down shades were used to give them privacy and keep the rain out. There was a common shower house and laundry located in the building that burned down in 1996. One unit was used for crafts, #9; one was the infirmary, #11; another the boat house, #13; the kitchen/dining room were #10, (the dining area of this building burned down sometime during this period.) The stone fireplace still standing was part of that building. Other units, 14 – 16 housed the counselors and the head of the camp stayed in #12. We are not certain when the main house was built. It was thought to have been there in the 30's and used by the landowner. The name of the camp, as recalled by this visitor, was 'Shabbanau' (sp?) The boys stayed for eight weeks at a cost of $125 per week. (Additional note regarding the name. A sign had been located with a similar name. I believe the spelling Shabbanoh was found there. Unfortunately, that signed burned in the 1996 fire.)

Sometime in the early 80's, the Otterstatters had another visitor who was able to share some history with them. This lady had lived with a sister and her parents on the land. They lived in a log cabin located on what is now the recreation field. She thought they moved there in 1898 and left before 1910. They catered to fishermen and deer hunters. There were some buildings closer to the lake, but she thought the lake level was much higher. She recalled fishing from the big rock in front of #7 and catching walleye and musky there. There was no beach as we know it today. From her description, we are thinking the water would have been at least another four to five foot higher then it is now. Is it possible? I wish I knew!

Every winter, her mother would pack up the two girls and move to town. It was difficult to live that far from school and supplies. So, while the girls attended school, their father stayed at the resort and guided the fishermen and deer hunters. (The pictures of the cabin with antlers around the doorway is found elsewhere in this history book.) The name at that time was 'Boaz Lodge'.

As she was telling us the story of her experiences at the resort, I was puzzled. Judging her to be in her mid-70's, I figured she could not have lived at the time she was describing. Curiosity got the best of me, and I had to ask, "How old are you?" We were all surprised when she told us she was 84 years old. She did not look it. She and her husband had left San Diego, California several weeks earlier. They had been to the Maine and Vermont and were now on their way home. Can you believe it? I hope I can travel cross country in a camper when I am 84.

I would love to latch on to the abstract for the property. Somehow, the copy we were to have gotten from Mrs. Meyer was never received. She couldn't find it and could not recall what happened to it. Perhaps some day this writer will pursue the idea of reading through such a record and find out more about this place.

So much for now.

[illegible] Otterstatter

WILDERNESS

IN THE RAW

TRANSPORTATION

TRAIN SERVICE. The Chicago North-Western Railroad will take you to the tonw of Three Lakes or Eagle River. We will meet you by appointment with our car and drive you to PINE CREST free of charge.

To reach our resort by car from Chicago, take Highway Route U.S. 45 to County Highway A, which is just before the town of Eagle River. Going east on County Highway A, follow signs leading to PINE CREST.

WE CATER TO HUNTERS IN THE HUNTING SEASON

For further information write—

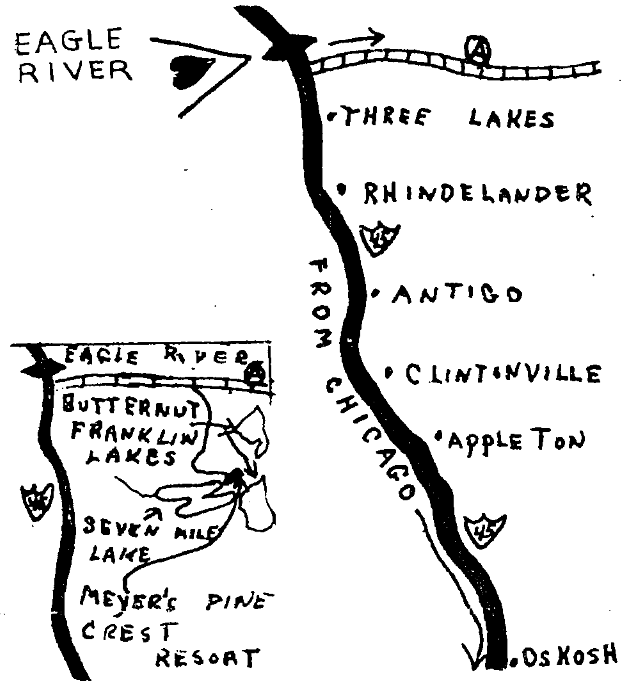
From June 15 to September 15

Meyer's Pine Crest Resort
Seven Mile Lake
Mr. and Mrs. Ralph Meyer
Three Lakes, Wisconsin

At all other times

Seven Mile Lake R. R. 2
Eagle River, Wisconsin

COME AND SEE US SOON



GENERAL

We have centralized showers and after you have been out on the lake and are exhausted from hauling in the big fish, you can come to shore and take a refreshing shower.

This part of the North Woods will supply you with many thrilling sights and new experiences, so come prepared to enjoy nature at its best. If you are planning to have a good time, bring your fishing, hiking, and swimming cloths. Also bring your camera and films, for there are many beautiful pictures which you can take here.

The waters of Seven Mile Lake are pure and clean with a sand bottom. We have a clean sand beach with a gradual slope for swimming free from weeds and scum.

Running water
Inside toilets
Electric
Gas for cooking
Grocery store
Deep freezing fdr fish (free)

Meyer's Pine Crest Resort

Mr. and Mrs. Ralph Meyer
Seven Mile Lake R. R. 2
Eagle River, Wisconsin

Pine Crest Resort

LOCATION

MEYER'S PINE CREST, on Seven Mile Lake, in Vilas County, Wisconsin. It is located about 350 miles from Chicago, on the beautiful North-Western end of Seven Mile Lake. About 12 miles from Eagle River and 13 miles from Three Lakes.

Have you ever had that tired feeling and you can't do another week's work? Well after a week or two at PINE CREST you will feel like taking on another years work very easily.

The nights at PINE CREST are cool and the days are warm. Also that beautiful fragrance of the pine trees in the air gives a person refreshing sleep and a good rest. This atmosphere is a very good Hay Fever Chaser.

RESERVATIONS

We suggest an early reservation to avoid disapointment. A 25 per cent deposit is repu'rcd to hold your cabin.

DEER ON THE TRAIL

AN AVERAGE DAY'S CATCH OF WALL EYES BY H. STERN AND R. JOHNSON OF CHICAGO.

SURROUNDINGS

Seven Mile Lake is one of the best lakes in Wisconsin for many reasons: some of these reasons are: It is a secluded spot off the main road about 7 miles. It is surrounded by thousands of evergreens and the lake has a deep blue color that everyone likes.

In this inland lake of ours there are bountiful supplies of Wall-eyed Pike, Northern Pike, and other fish. There are also scores of pan fish. But if you think that pan fish are easy to catch, then you should come and try your luck at fishing for those delicious tasting Wall-eyed Pike. They are just as easy to catch as pan fish up here at PINE CREST.

This lake is ideal for still fishing and plug casting. There are also scores of lakes just a few miles away that have Trout and Bass.

BOATS

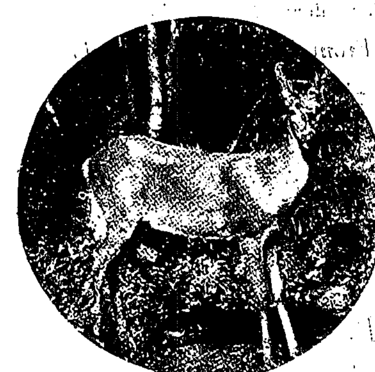
All of our boats are new, safe, sea-worthy THOMPSON. boats. All are very dry and well cared for. The baits and tackle that all fishermen need can be obtained at our camp. We also have new outboard motors which are available at the cost of $2.50 and up.

SPORTS

We have a very spacious recreation field, an all cement tennis court, volley ball games, swimming, horseshoes, baseball and many other sports that all will enjoy. If you like to play golf, there is a golf course near by that you can use.

ACCOMODATIONS

We have twenty cottages, completely furnished and ready for our guests. All are near the lake shore. Cottages run from $30.00 a week and up according to the number in the party. All use of boats is included in the fee, except when carried to other lakes.



A BEAUTIFUL POSE

SEVENMILE LAKE HISTORY – PART II

****

NAME(S) Jacqueline A. Kucharski and Eugene J. Kucharski and Family

****

HISTORICAL OR CURRENT
PHOTO – ANY SIZE.
PRINTER WILL ADJUST
DO NOT PASTE ON FORM
DO NOT WRITE ON BACK

Lake Address: 8936 Balsam Lane Three Lakes WI. 54562

Lake Phone: 715-479-3879

Permanent Address: For now 2931 Gilbert Drive Green Bay WI 54311 (Some day to be 8936 Balsam Lane Three Lakes WI.54562)

Home Phone: 920-469-2611 Cell phone 920-609-2931

E-Mail: ekucharski@new.rr.com

House or property nickname: Heaven

****

Ancient History:

After much procrastination we decided that it was time to do the history of our place. We thought that it might be interesting for the next generations of the Kucharski family to have the total history of the property as registered at the Oneida County Register of Deeds.

The first recorded owner, David Preston, purchased the property in 1882. In 1892 it was purchased by L. E. Evans. Later in 1892 the property was deeded to Arthur McKenzie. The property went back to Forest County 1896. In 1897 the property was transferred to "The Land and Loan Company" and sold by Oneida County to John K. Fish in 1898. In 1902 the property went back to "The Land and Loan Company". In 1917 "The Land and Loan Company" sold the property to B. Heinemann Lumber Company of Wausau. In 1924 it was sold to the Farm Land and Timber Company. In 1931 the property was sold to Earl L. Kennedy and his wife Florence Kennedy. In 1935 it went back to the Farm Land Timber Company and then in 1943 it was sold to Otto V. Raith and Leo Raith. In 1946 it was sold to C. V. Branham Lumber Company. Later in 1946 it went to Emil W. Schmeling of Illinois.

In 1955 it went to Elmer Schmeling also of Illinois. In 1964 it was sold to Lee Roy Dixson and his wife Carmella.

Remembered History:

Gene's uncle, Ray Borzykowski, had owned a property on the north side of the lake, then called "Ray's Bay" and on occasion the family would spend some vacation time there. Uncle Ray invited Gene up for his first deer hunt when he was 18 years old and he has been coming up here to hunt almost every year since that time. When we got married in 1970 Uncle Ray gave us a week at his place as a wedding gift and after our honey moon in April we spent the opening of fishing season that year on a second honey moon there.

In 1972 the property was sold to Herman Halverson and his wife Esther. They sold it to Jacqueline and Eugene Kucharski, my wife and I, in 1974. By the looks of the ancient history we have owned the property for the longest period of time, of any of the past owners, at least at the time of writing this history, June 2010.

We found the property which was listed with Halverson Soder Realty by an ad in the Milwaukee Journal and went to look at the property in the snow in March. We signed the papers in April and the property was ours and the Peoples State Bank's. At the time we were living in Milwaukee and would come up to the cottage for long weekends and vacations. Our son was 8 months old and our daughter was almost 2 years old when we purchased the place.

One story that I remember from back then is that we had come up to clean the place up in May of 1974 and stayed in a pickup camper that I owned at the time. The first evening was the first time that Jackie and the kids had heard a loon and they were afraid because they thought it was ghosts. They were reassured and accepted the sounds of the North since that time.

The place became the vacation spot for our family, spending our summer vacation time here. In the Spring and Fall it was dad and his buddies fishing and hunting camp for many years and still is for those who are still around. We continued to come up for vacation and fishing trips every chance we could from our home in Milwaukee until 1991 when we moved to Green Bay. Trips Up North became easier and were 2 hours less of travel time. This allowed us to come up more often and it was even possible to come up for a normal weekend, which we did whenever we had a chance. The place was a summer place and was usually closed up after deer season. Gene would come up on rare occasions to do some ice fishing but that was an unusual occurrence. Our kids grew up, went into the service and got married eventually having children of their own. They have many memories of their first fish, the skunk that dad had to shoot near the cottage and all of the other adventures that kids have. We now have 4 grandchildren who are growing up at the place and I am sure that they will have just as many "adventures" as our kids did.

The most recent change, in preparation for retirement, was the building of a new place that could be used year round. In October of 2005 we began to dig the basement for the new place. On November 30, 2005 a new Stratford Home was delivered and set onto the basement. Most of the rest of the year and the Spring of 2006 was spent finishing the inside and making the place habitable.

We are now "moved in" with 90% of the inside work done and 75% of the landscaping done. We are now able to come up most weekends and we keep the place open for the winter for fishing trips and sledding for the grandkids. This year 2010 at the annual 7 Mile Lake Association meeting Gene was elected president of the association and is working to keep up the excellent work that they have done in the past. Someday soon we are hoping to retire and move up here full time and keep the history going.

Appendix L
Lake User Survey

Page left intentionally blank

WHITE WATER
ASSOCIATES, INC.

Sevenmile Lake

Lake User Survey

Technical assistance by White Water Associates, Inc., July, 2013

A lake user survey was sent out to members of the Sevenmile Lake Association. A total of 25 surveys were sent out. This six-page questionnaire began with a single page of explanation (see italicized text below). In this report, we expand the original questionnaire in order to provide an analysis of results obtained from 21 respondents (84% returns).

Introduction to the Survey

We are writing to inform you about the Sevenmile Lake planning process that will have important outcomes for Sevenmile Lake and how you use and enjoy the lake. Please assist by completing this questionnaire and conveying your ideas. Please respond as soon as possible.

An aquatic plant survey was conducted in the summer of 2012 and it provided substantial information on plant presence and distribution in the lake. Sevenmile Lake currently has a healthy and diverse community of native aquatic plants and does not harbor any aquatic invasive plant species.

An aquatic plant bed is often termed a "weed bed." In fact, many aquatic species have "weed" as part of their names (e.g., duckweed, pondweed, musky weed). This usage is not meant to be derogatory, but unfortunately "weed" also connotes an unwanted plant, often one that grows rampantly. Such is not the case for the vast majority of native plants in lakes. In fact, aquatic plants are a vital part of a lake ecosystem. They provide habitat for fish and other animals, filter runoff, stabilize the shoreline against erosion, offer fish spawning areas, produce oxygen, absorb nutrients (making them less available for nuisance algae), provide food for many animals, and make it difficult for aquatic invasive plant species to become established.

In lakes that receive an overabundance of nutrients (particularly from excessive fertilizers or leaking septic tanks), plant growth can become too lush and dominated by only a few species. This process of accelerated lake plant growth (often caused by human influences) can give aquatic plants a bad name. Aquatic invasive plant species can be transported on boat motors or dumped from home aquariums and establish in a lake. Sometimes, they may come to dominate a lake and exclude other native species.

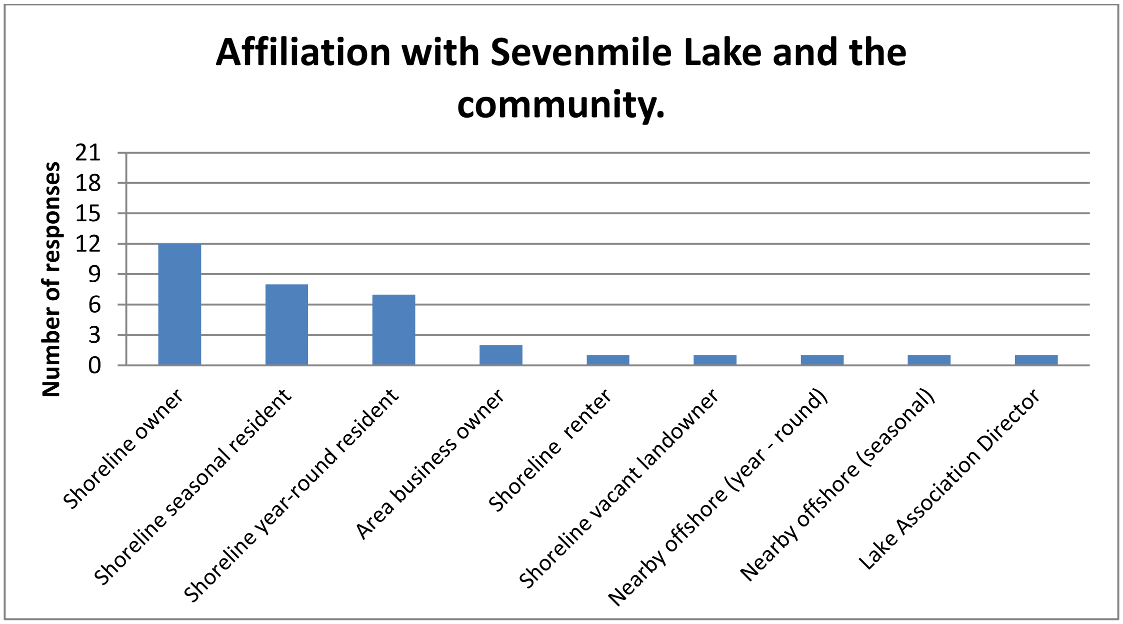
Aquatic invasive species (AIS) are non-native plants and animals that are introduced into our lakes and streams and can upset the natural balance of the ecosystem and decrease recreational opportunities. AIS examples include zebra mussels, carp, white perch, rusty crayfish, round goby, spiny water flea, Chinese mystery snail, Eurasian water milfoil, purple loosestrife, and curly-leaf pondweed. A helpful link: http://dnr.wi.gov/lakes/invasives/

Sevenmile Lake stakeholders want to maintain the high quality condition present in Sevenmile Lake and establish the foundation to conduct plant management should the need arise (for example if an aquatic invasive plant species is detected). An Aquatic Plant Management Plan is required by the WDNR prior to any plant management and Sevenmile Lake is in the process of creating such a plan. Public input is needed to refine the plant management goals and formulate reasonable management methods. Completing this survey will help guide the plan development and implementation. Please complete and return this form as soon as possible to the address provided on page 6.

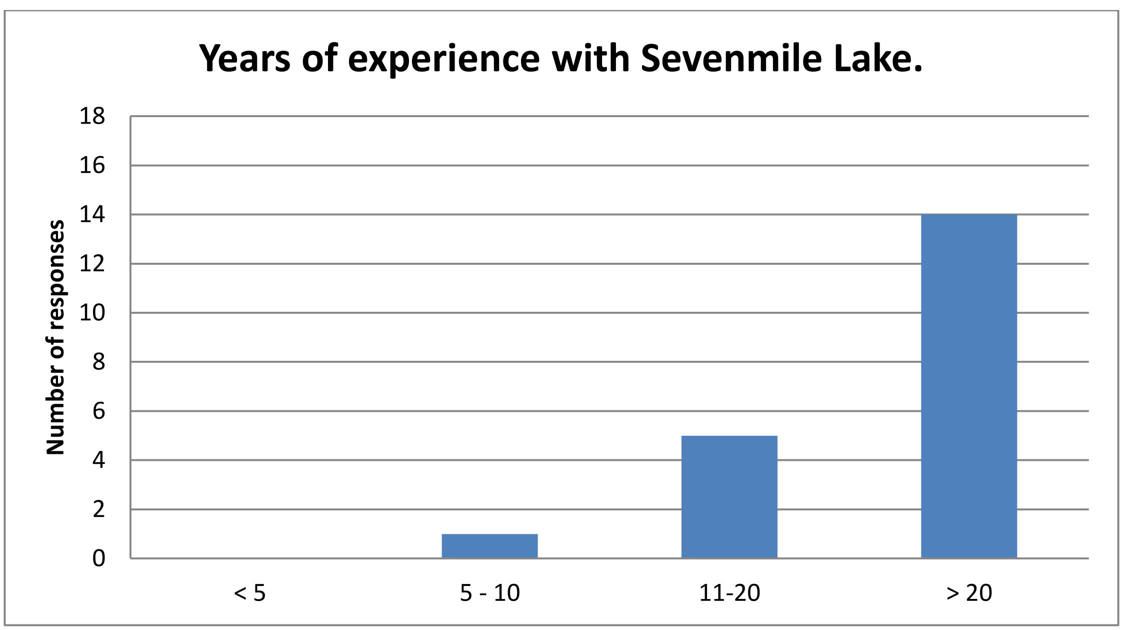
In the remainder of this document, each survey question is provided and an analysis of results immediately follows.

1. *Please circle the response(s) that describes your affiliation with Sevenmile Lake and the community.*

A. Shoreline home/cottage/apartment owner
B. Shoreline home/cottage/apartment renter
C. Shoreline vacant landowner
D. Shoreline year-round resident
E. Shoreline seasonal resident
F. Nearby offshore resident (year-round)
G. Nearby offshore resident (seasonal)
H. Area business owner
I. Tourist or vacationer
J. Other (specify) ________________________



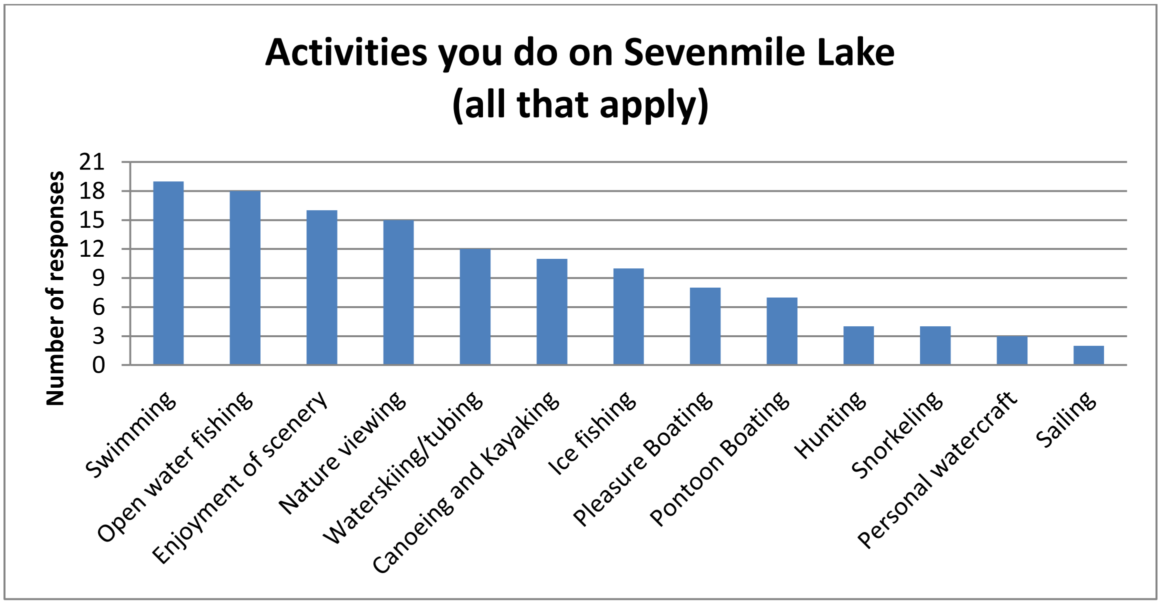
2. *How many years of experience do you have with Sevenmile Lake?*



There was 826 years of combined experience on Sevenmile Lake with the lowest being 8 years of experience, 76 years being the highest and 41 years being the average.

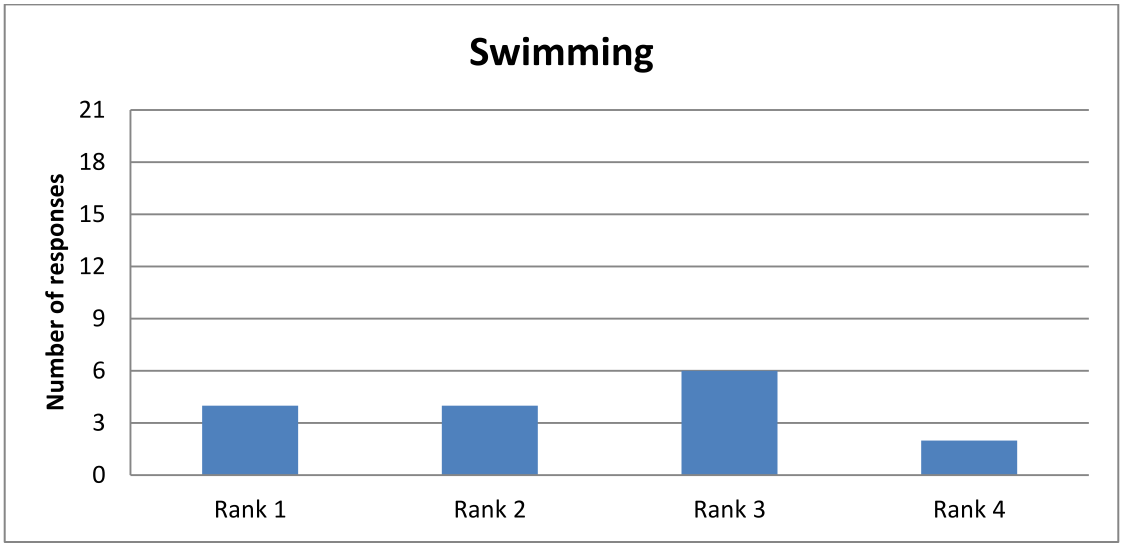
***3.** Please circle the activities that you do on Sevenmile Lake. (Circle all that apply)*

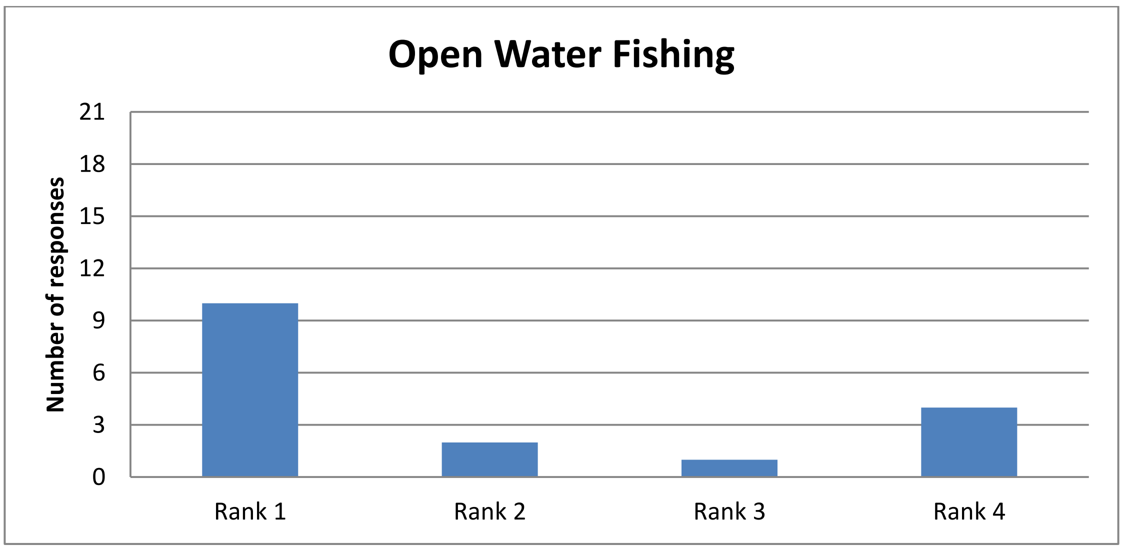
A. Open water fishing	F. Pontoon boating	K. Nature viewing
B. Ice fishing	G. Sailing	L. Enjoyment of scenery
C. Waterskiing/tubing	H. Pleasure boating	M. Hunting
D. Personal watercraft	I. Ice fishing	N. Snorkeling
E. Swimming	J. Canoeing & kayaking	O. Other

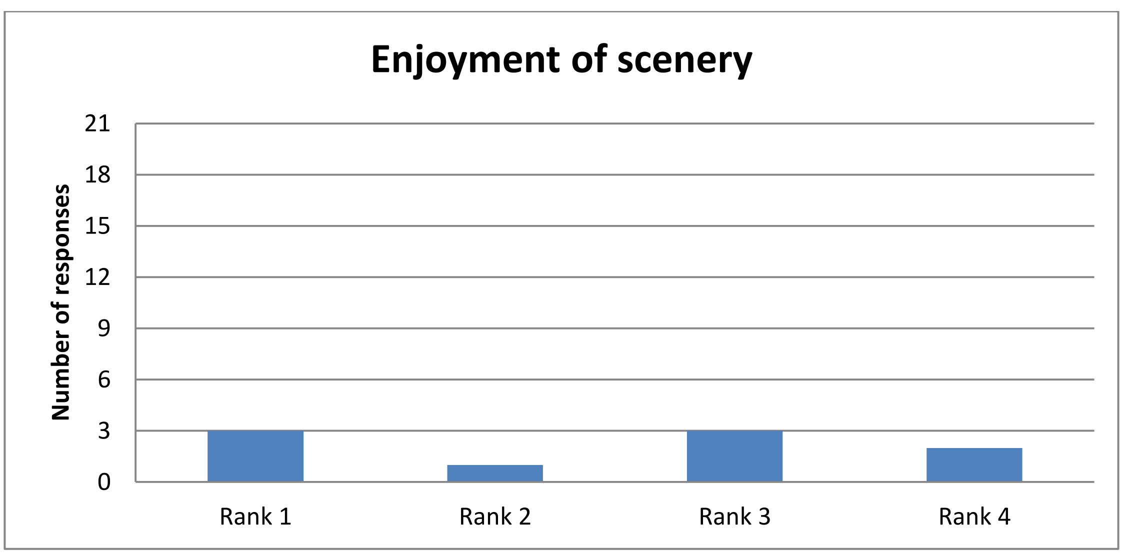


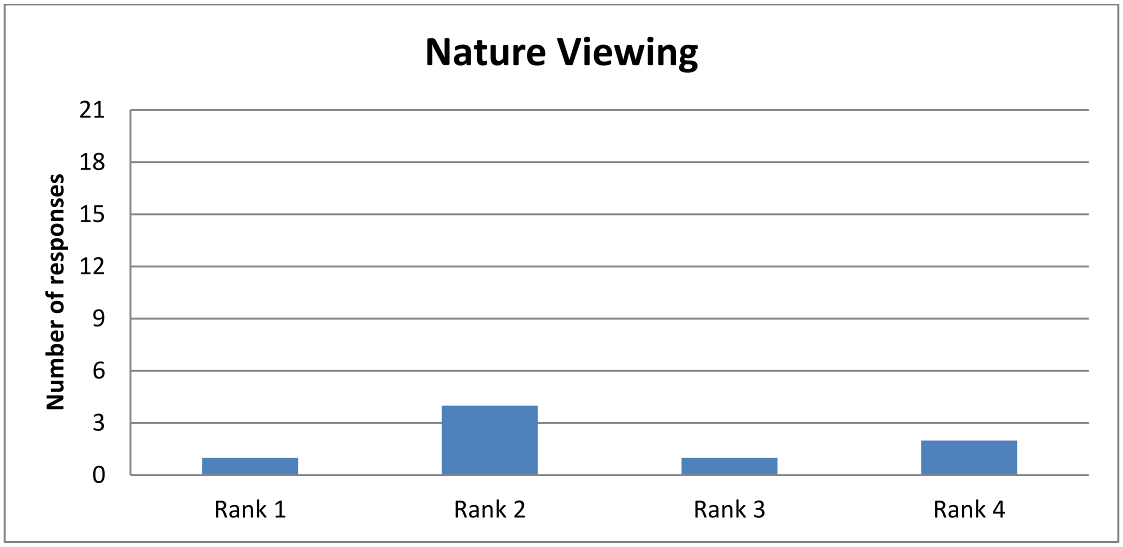
***4.** Please rank the four activities that are most important to you on Sevenmile Lake. (Use "1" for the most important, "2" for your next choice and so on.)*

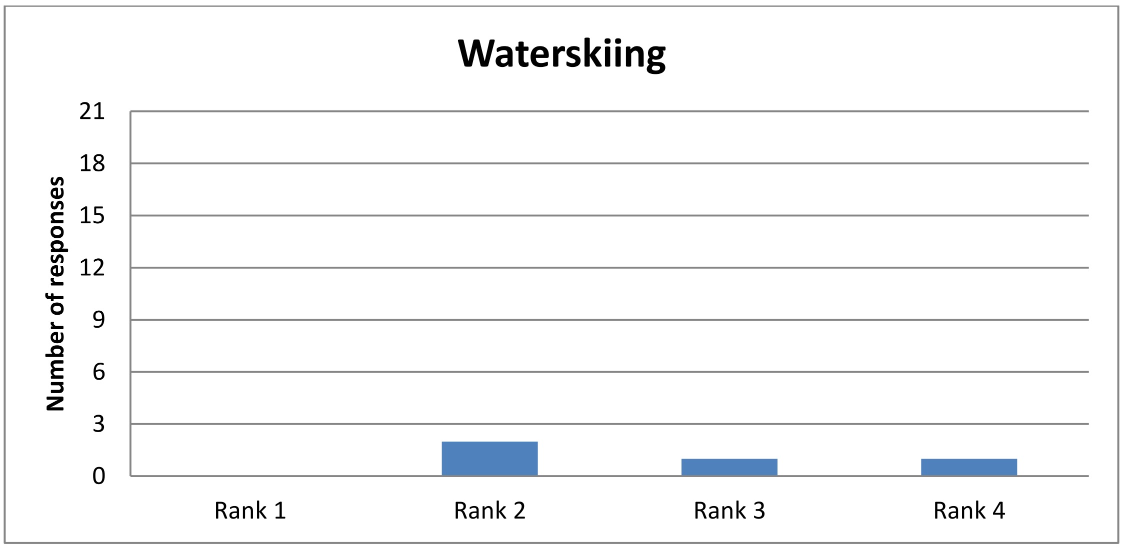
___Open water fishing	___Sailing	___Scenery
___ Waterskiing	___Pleasure boating	___Hunting
___Personal watercraft	___Ice fishing	___ Snorkeling
___ Swimming	___Canoeing & kayaking	___ SCUBA
___Pontoon boating	___Nature viewing	___ Other (specify)

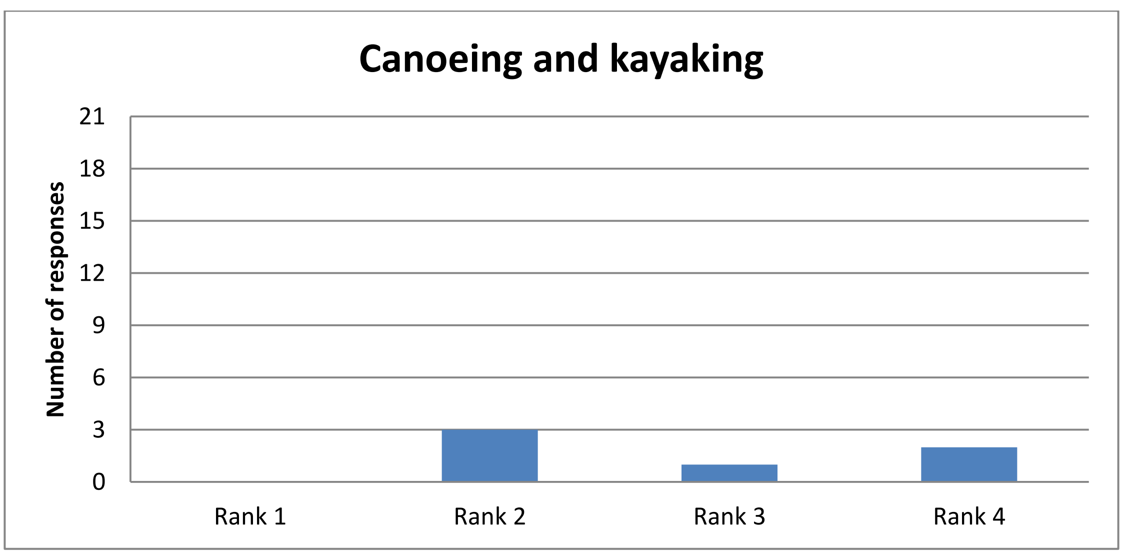

Swimming
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

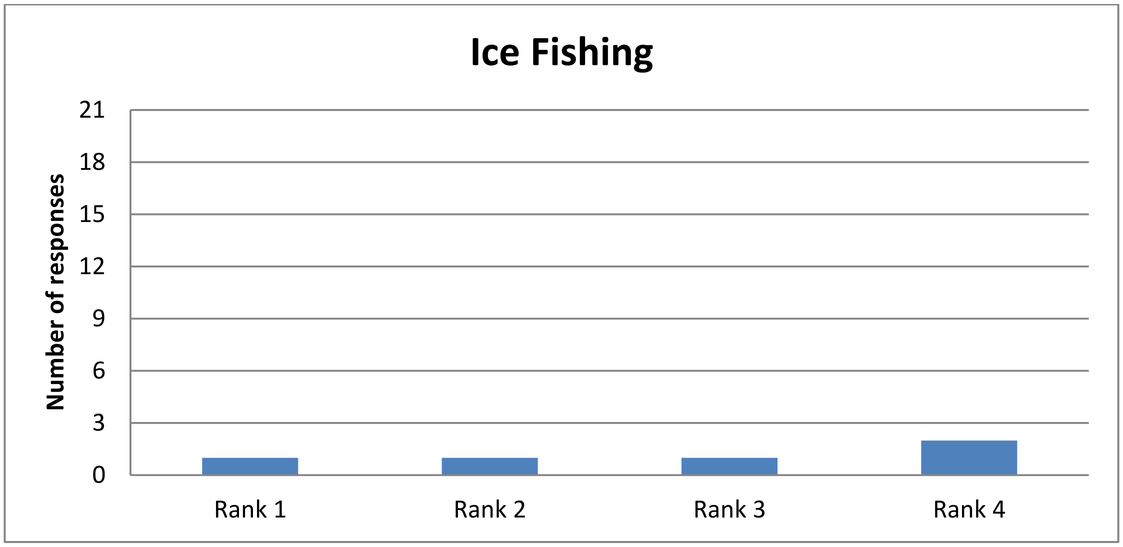

Open Water Fishing
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

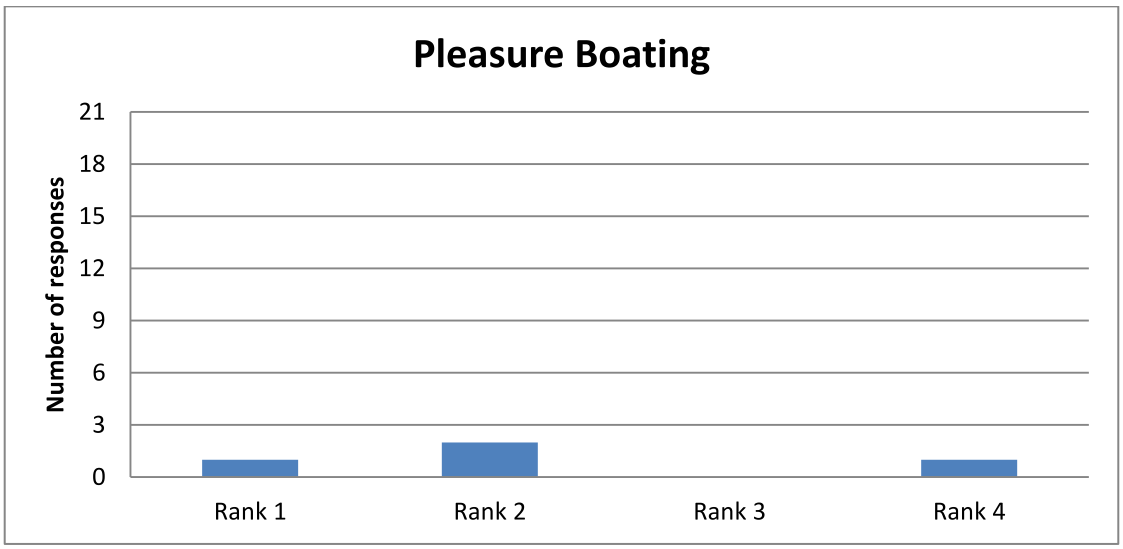

Enjoyment of scenery
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

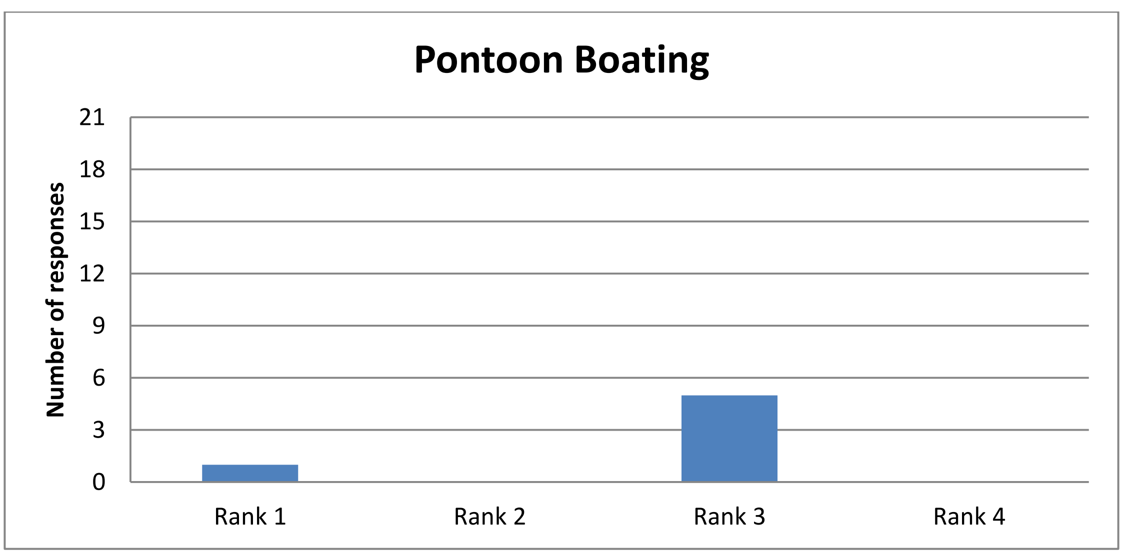

Nature Viewing
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

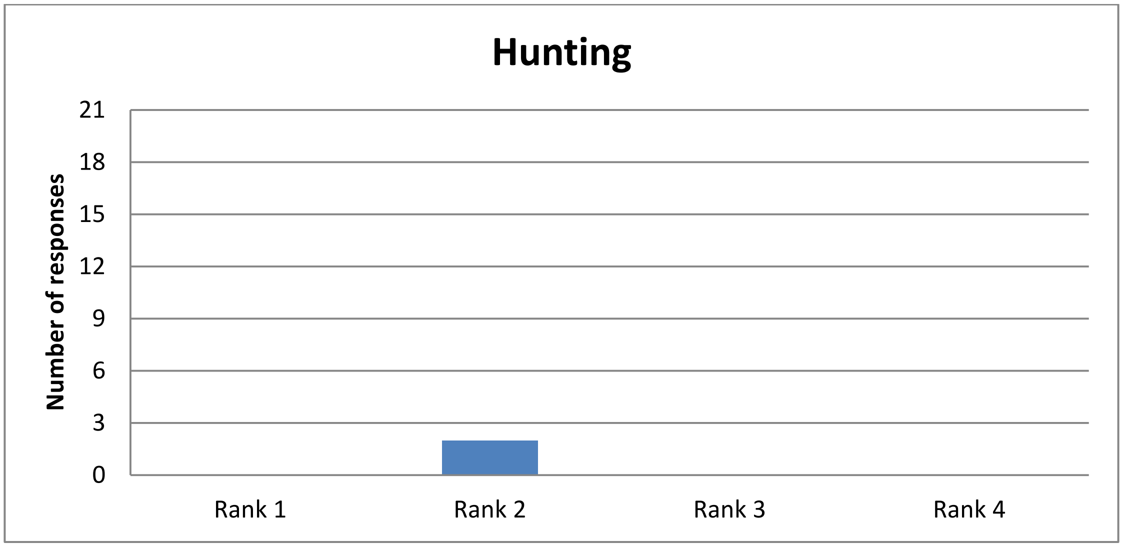

Waterskiing
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4


Canoeing and kayaking
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4


Ice Fishing
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4


Pleasure Boating
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

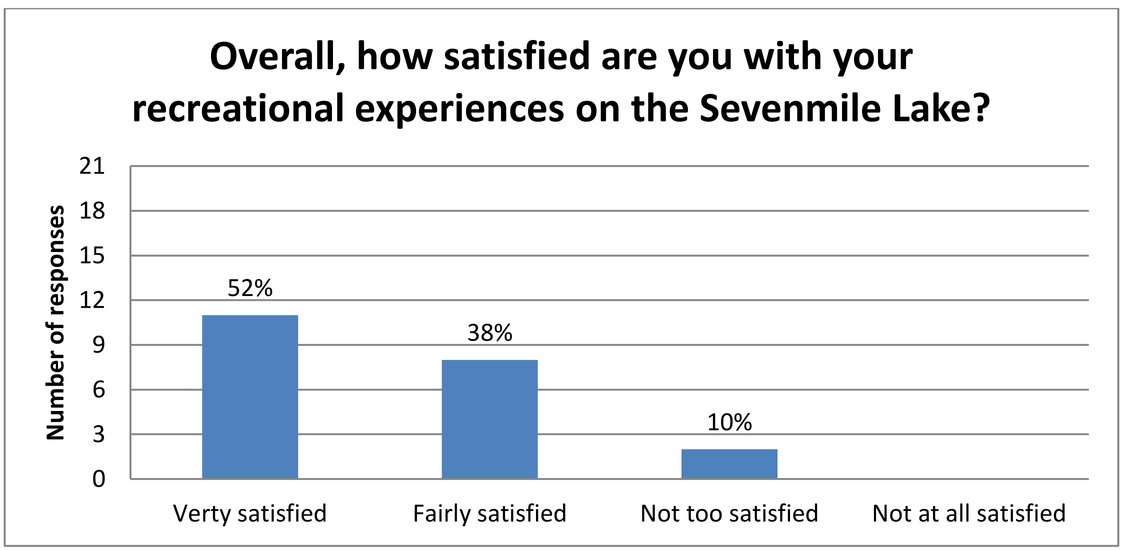

Pontoon Boating
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4



None of the respondents selected snorkeling, SCUBA, personal watercraft, or sailing as the top 4 activities they participate in.

***5.** Overall, how satisfied are you with your recreational experiences on Sevenmile Lake? (Circle only one)*

A. Very satisfied B. Fairly satisfied C. Not too satisfied D. Not at all satisfied



***6.** Please circle the statement that best describes how often you recreate on Sevenmile Lake during the summer (between Memorial Day and Labor Day).*

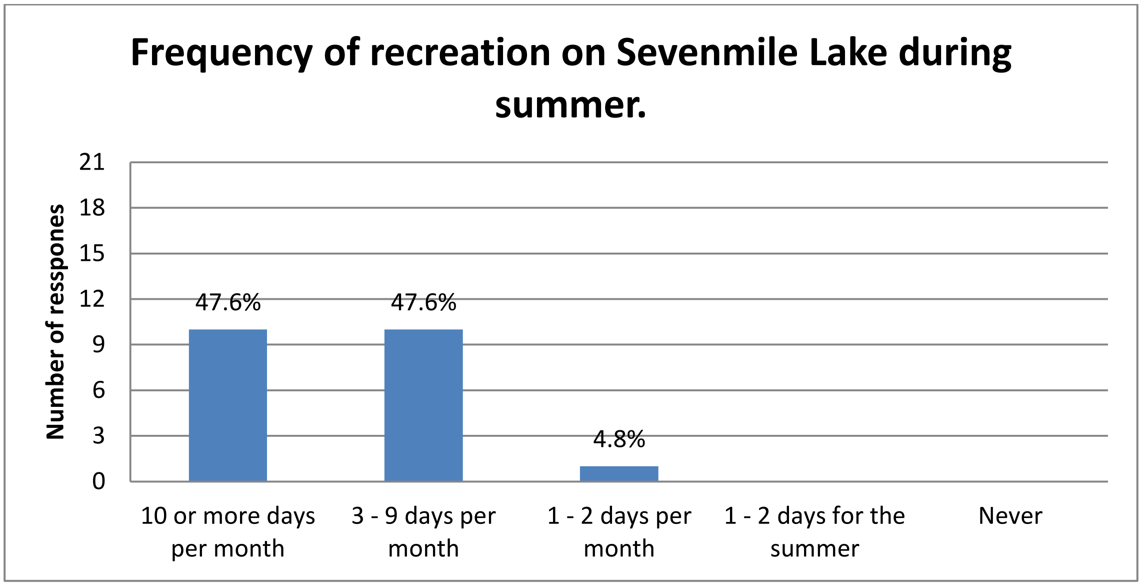
A. 10 or more days per month

B. 3-9 days per month

C. 1-2 days per month

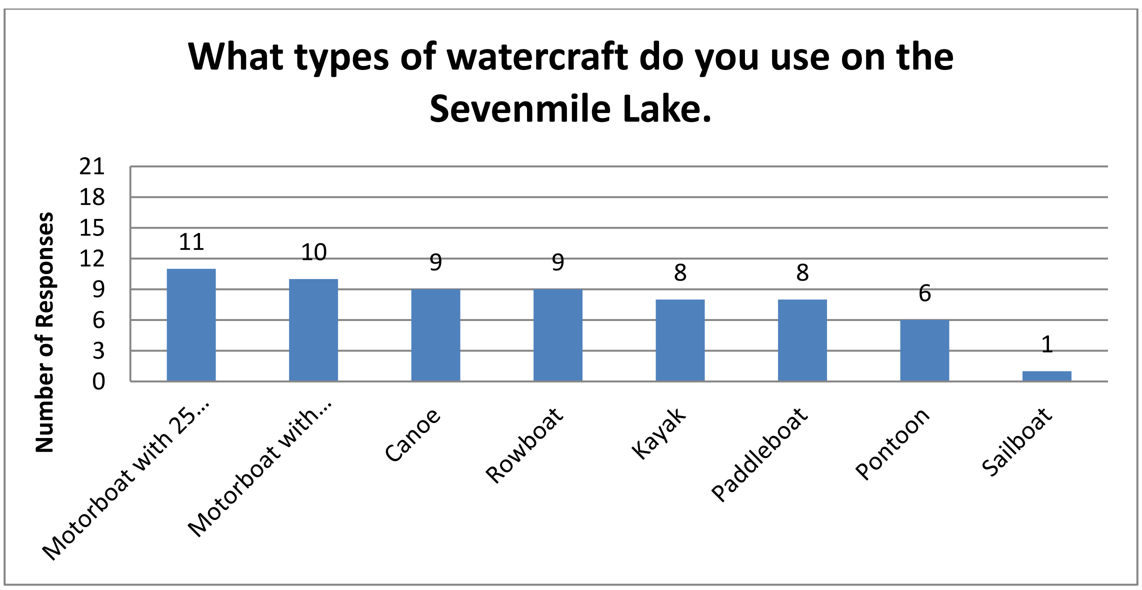
D. 1-2 days for the summer

E. Never



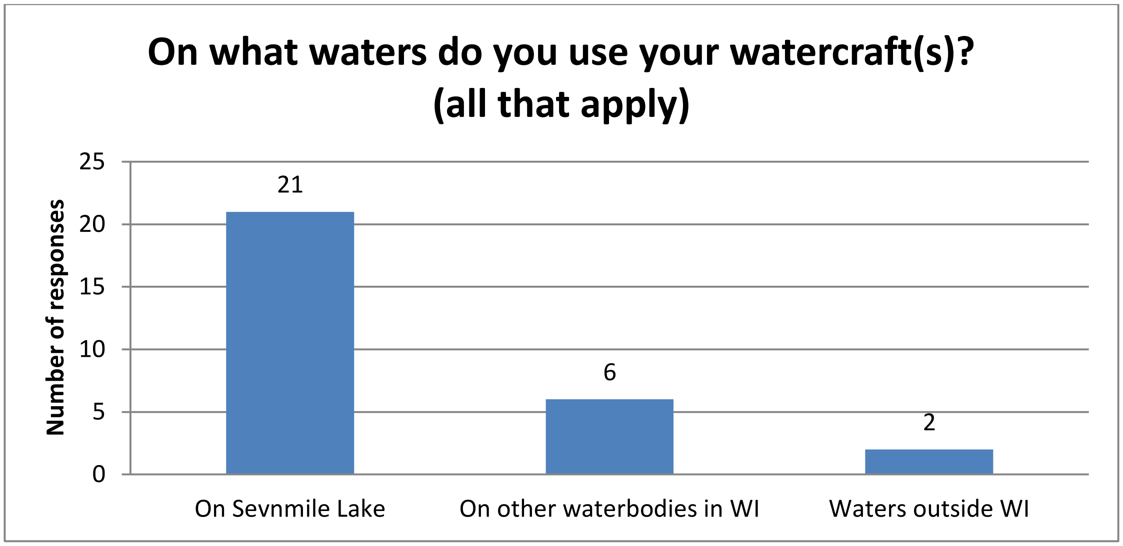
__7.__ What types of watercraft do you use on Sevenmile Lake?

___Do not use watercraft (please skip to question 9)
___Paddleboat
___ Sailboat
___ Canoe
___ Rowboat
___Kayak
___Motorboat with 25 hp or less
___ Motorboat with >25 hp
___Pontoon
___ Jet Ski (personal watercraft)



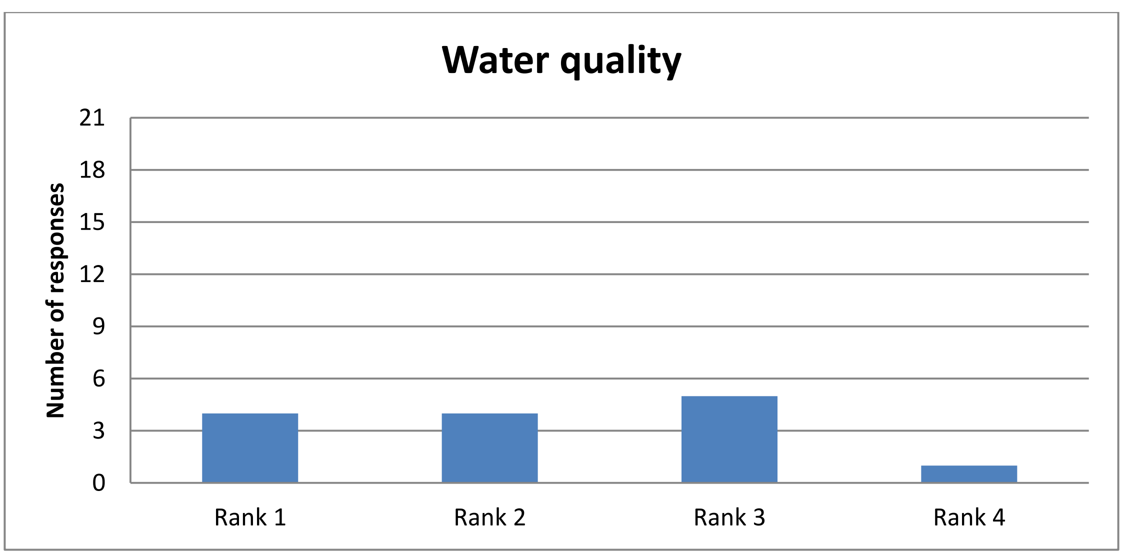
__8.__ On what waters do you use your watercraft(s)? (Check all that apply)

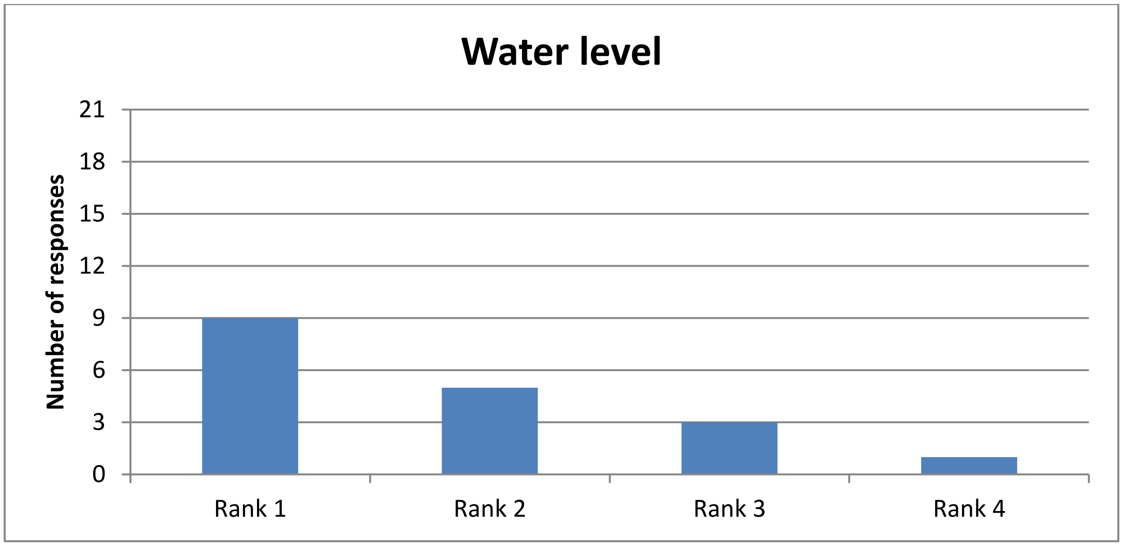
___I use my watercraft on Sevenmile Lake
___I use my watercraft on other water bodies in Wisconsin
___I also use my watercraft on water bodies outside of Wisconsin

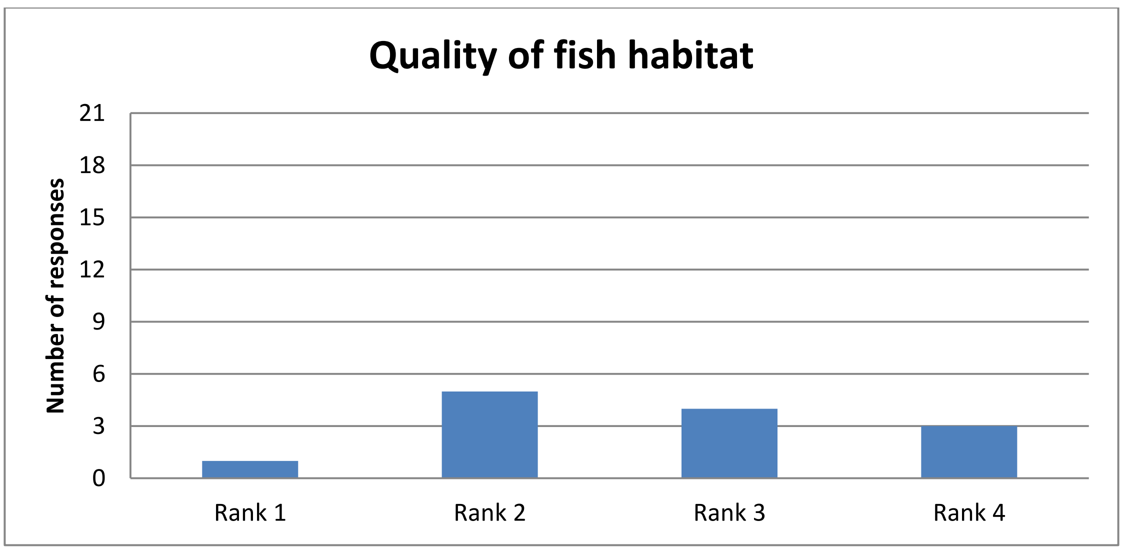


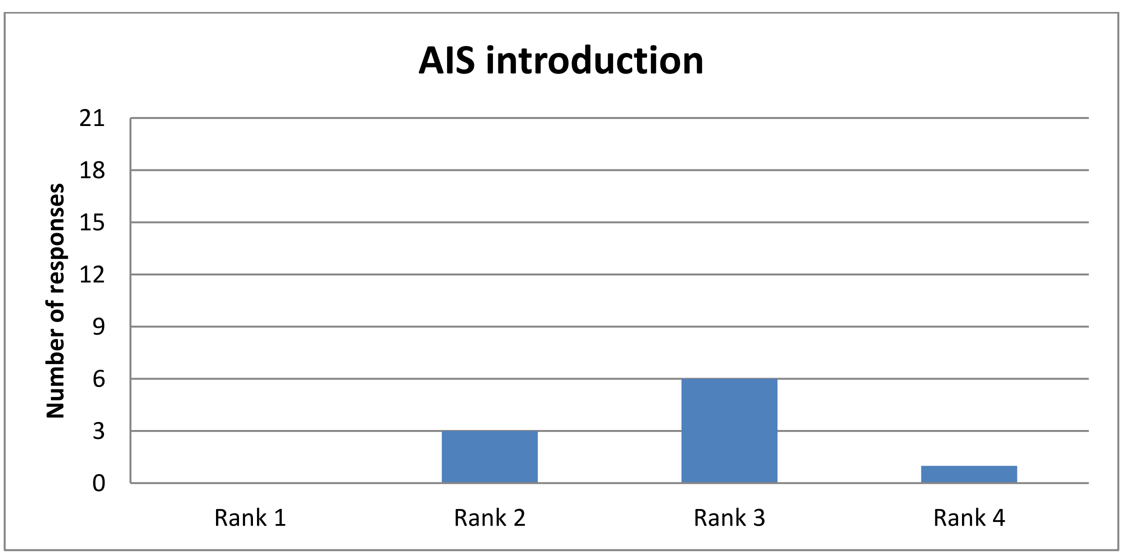
***9.** From the list below, please rank your top four (1, 2, 3, and 4) concerns for Sevenmile Lake. Write a 1 for your primary (most important) concern.*

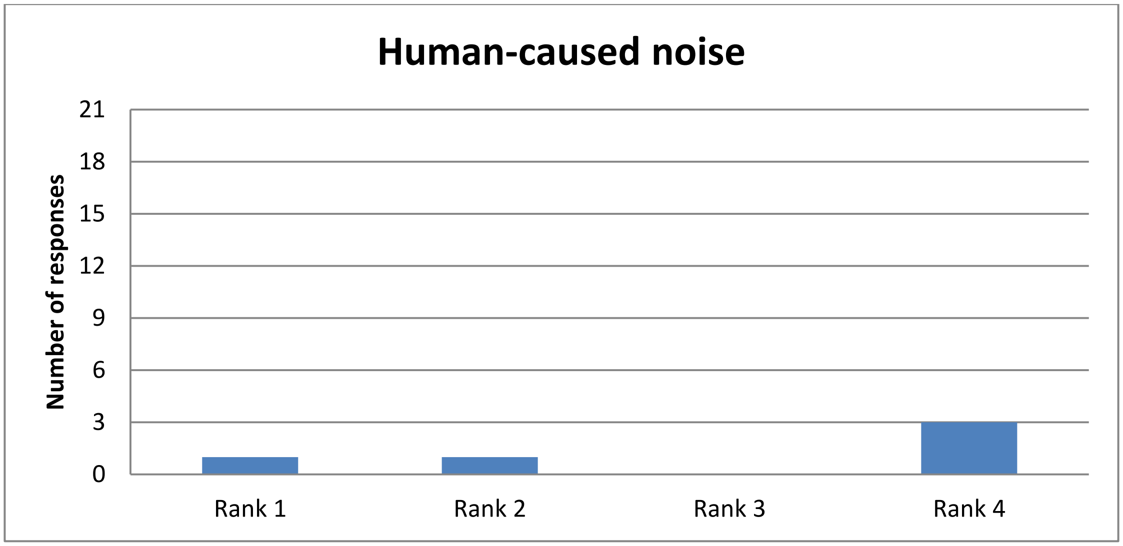
___ Water quality	___ Water level
___Quality of fish habitat	___ Near-shore human development
___ Human-caused noise	___ Human development on the greater watershed
___ Aquatic plant growth	___Boat traffic
___ Shoreline erosion	___ Shoreline vegetation removal
___ Algae growth	___Boating safety
___ Storm drain runoff	___Other (explain______________)
___Aquatic Invasive Species (AIS) introduction	

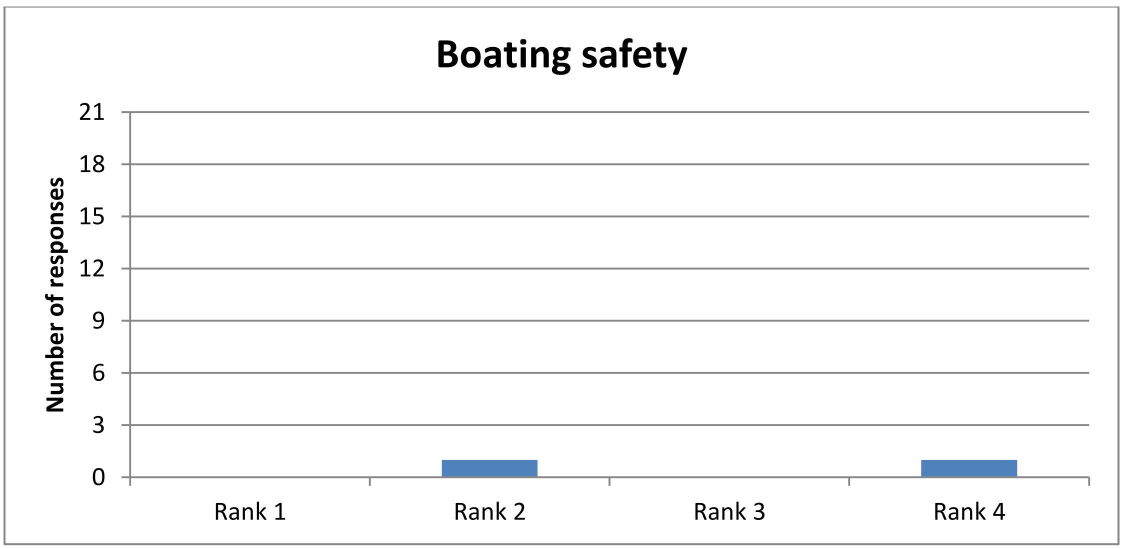


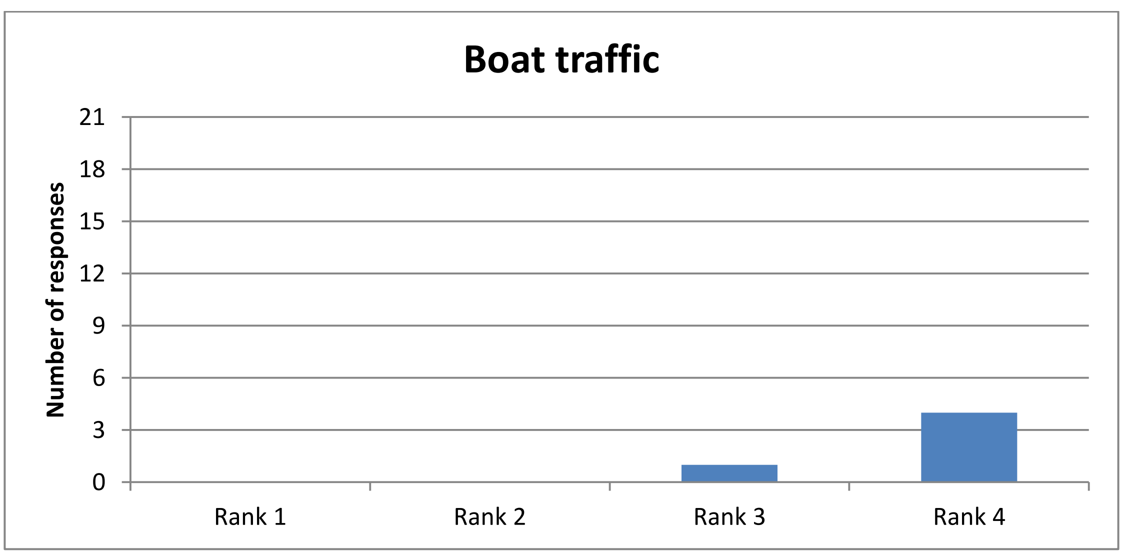

Water level
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

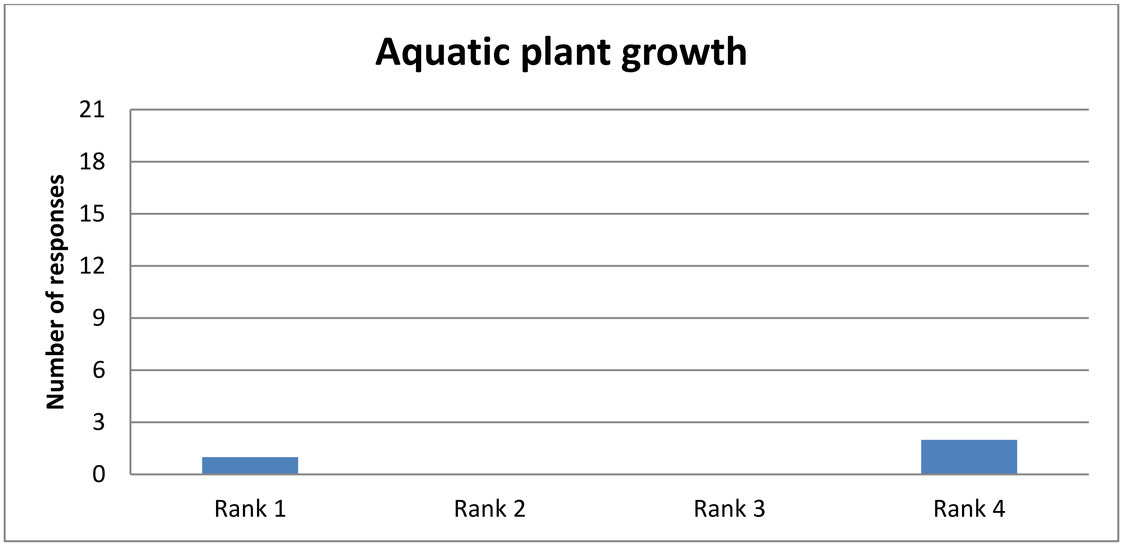

Quality of fish habitat
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

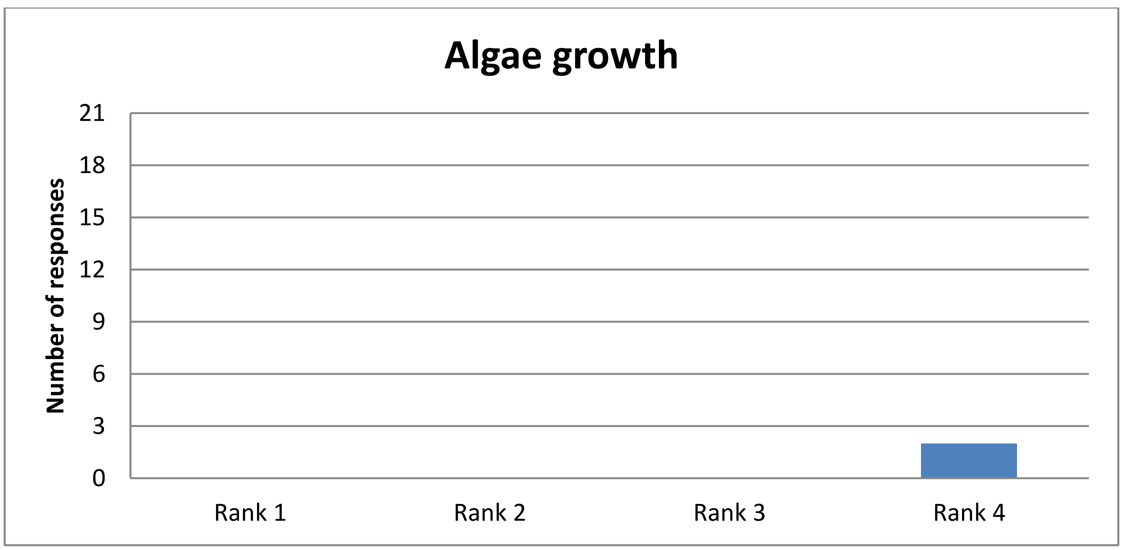

AIS introduction
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

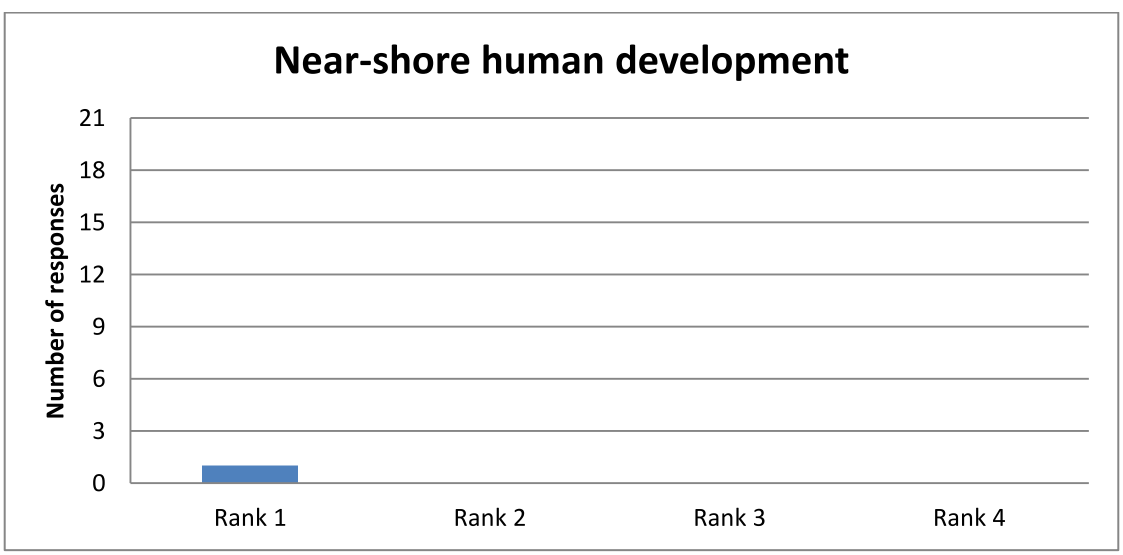

Human-caused noise
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

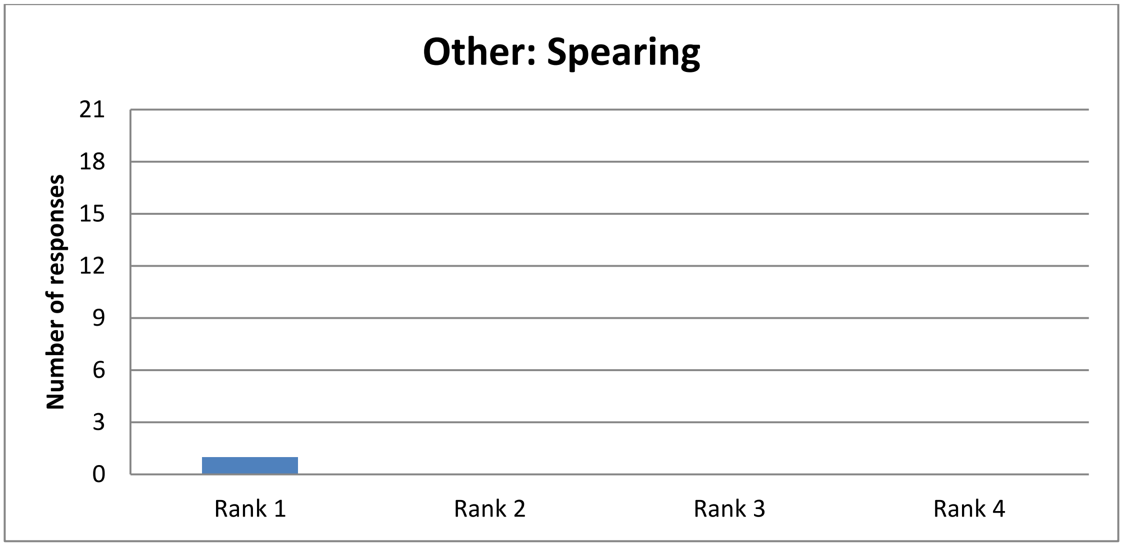

Boating safety
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

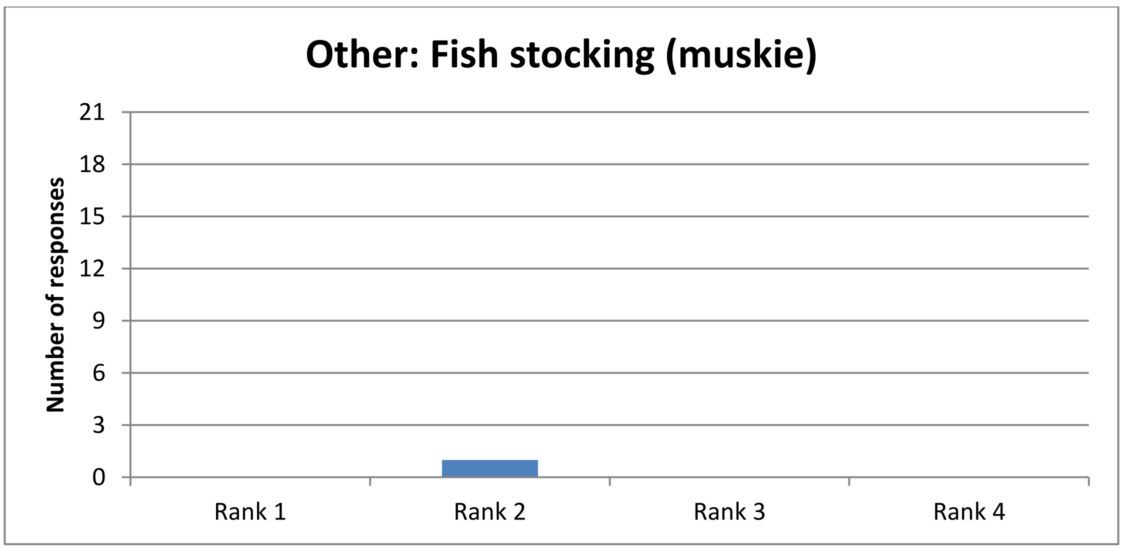

Boat traffic
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

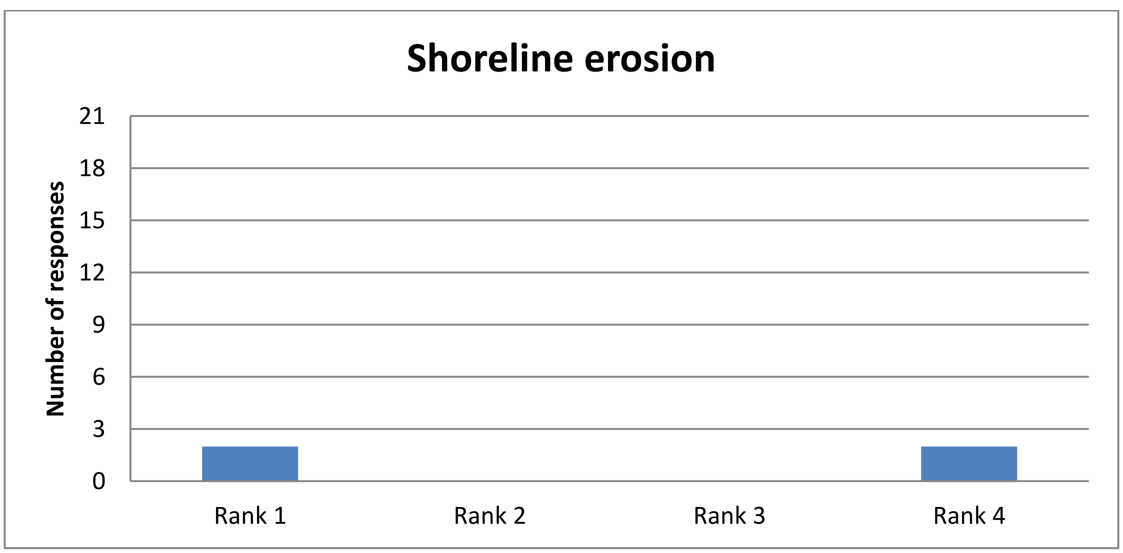

Aquatic plant growth
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

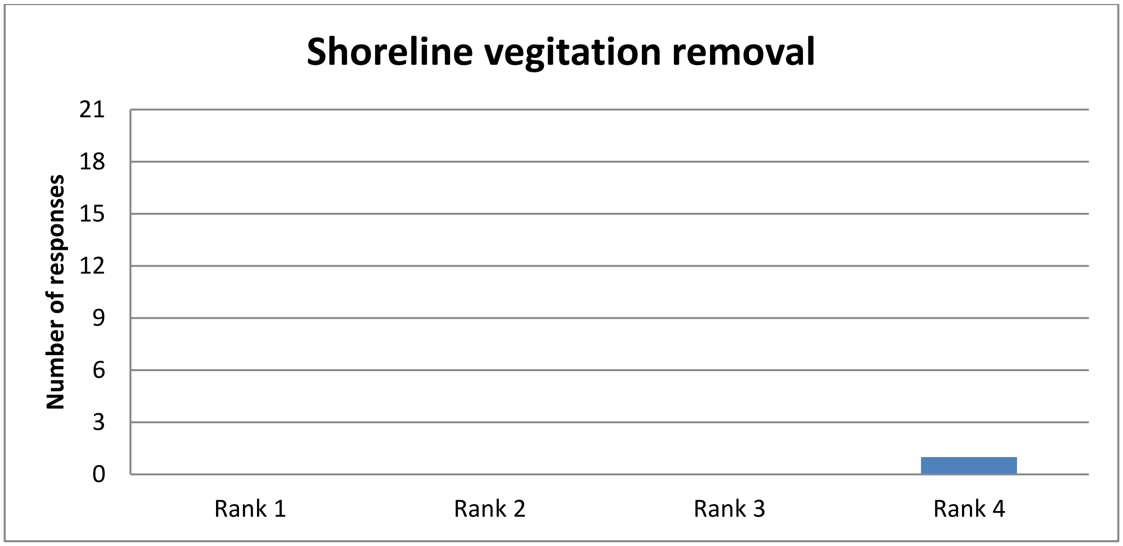

Algae growth
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4


Near-shore human development
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4


Other: Spearing
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4

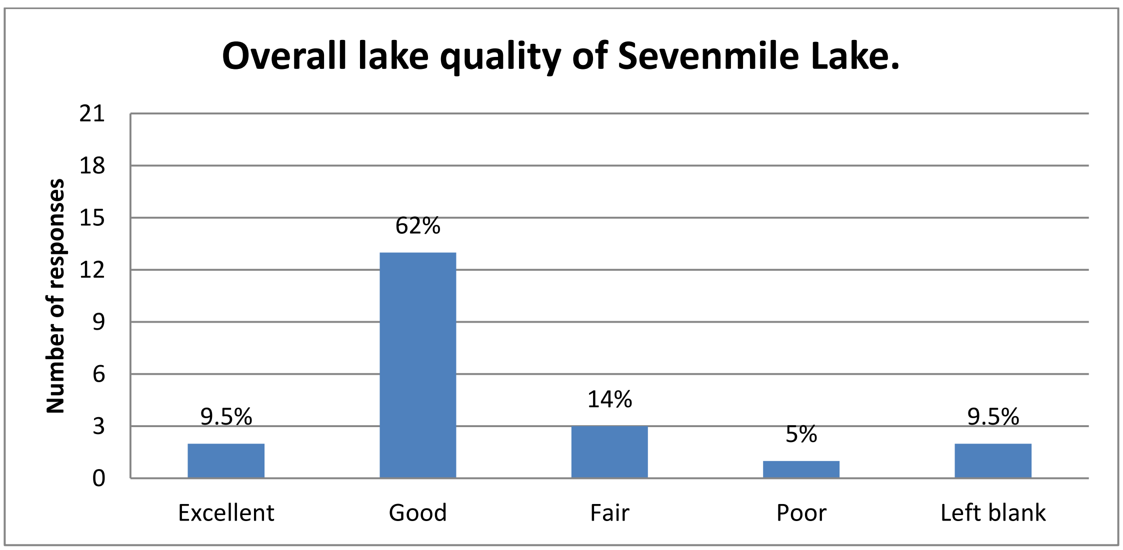

Other: Fish stocking (muskie)
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4


Shoreline erosion
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4



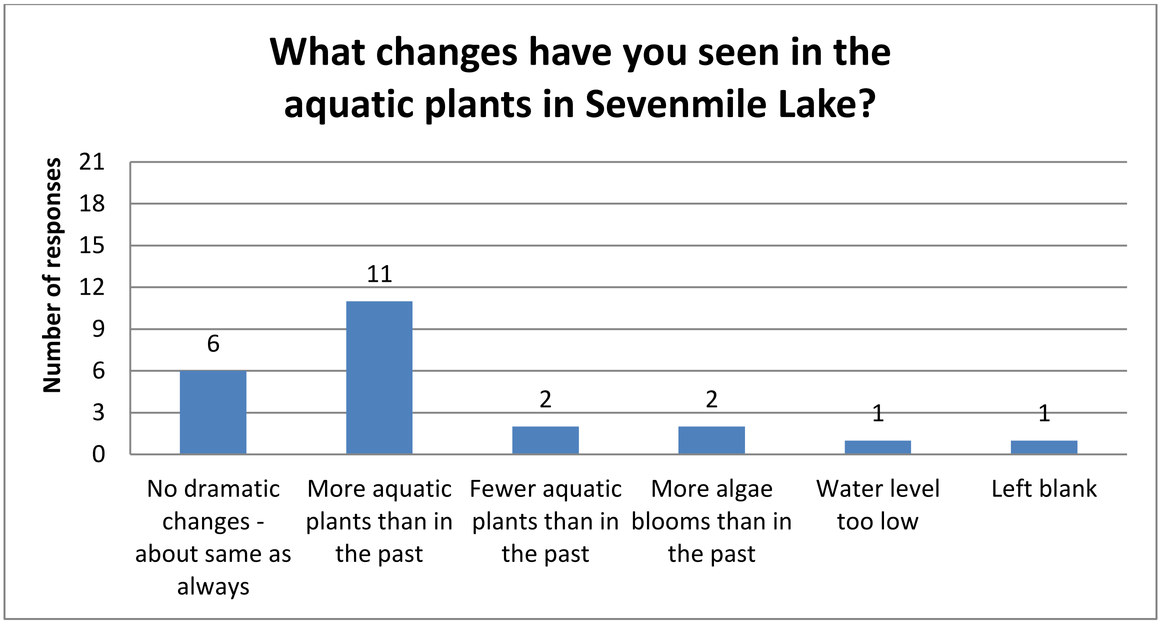
***10.** Considering the lake issues in question 9, please evaluate the overall lake quality. (Circle one)*

A. Excellent B. Good C. Fair D. Poor E. Unsure



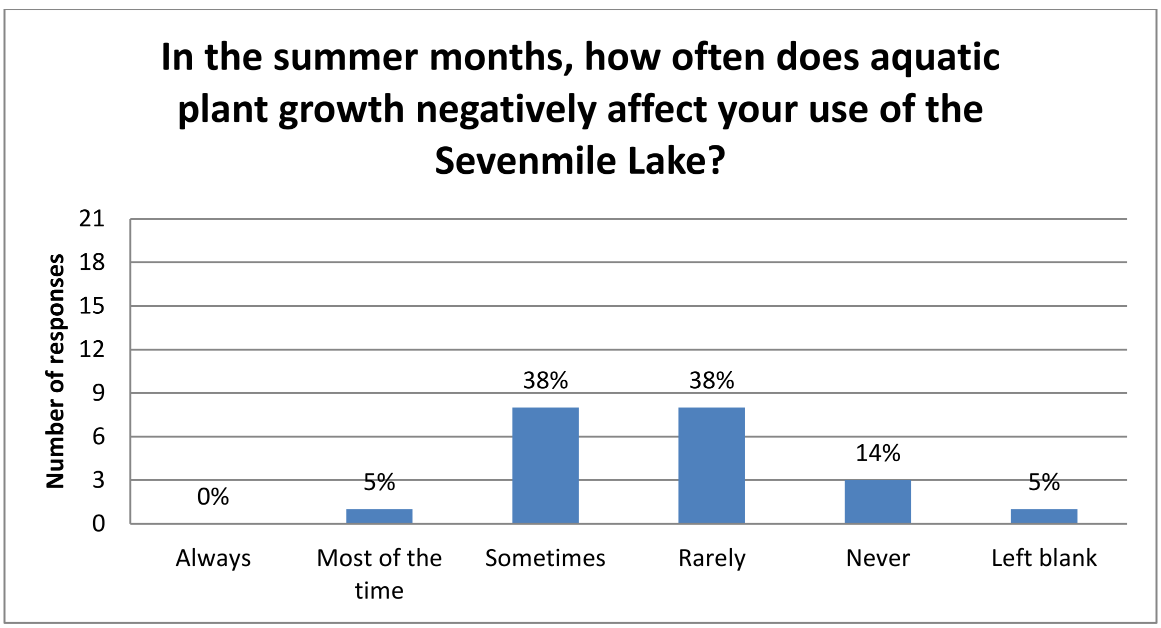
***11.** During the years you've been familiar with Sevenmile Lake, what changes have you seen in the aquatic plants? (cirlce all that apply)*

A. No dramatic changes – about the same as always.
B. More aquatic plants than in the past.
C. Fewer aquatic plants than in the past.
D. More algal blooms than in the past.
E. Fewer algal blooms than in the past.
F. Other (describe :________________________)



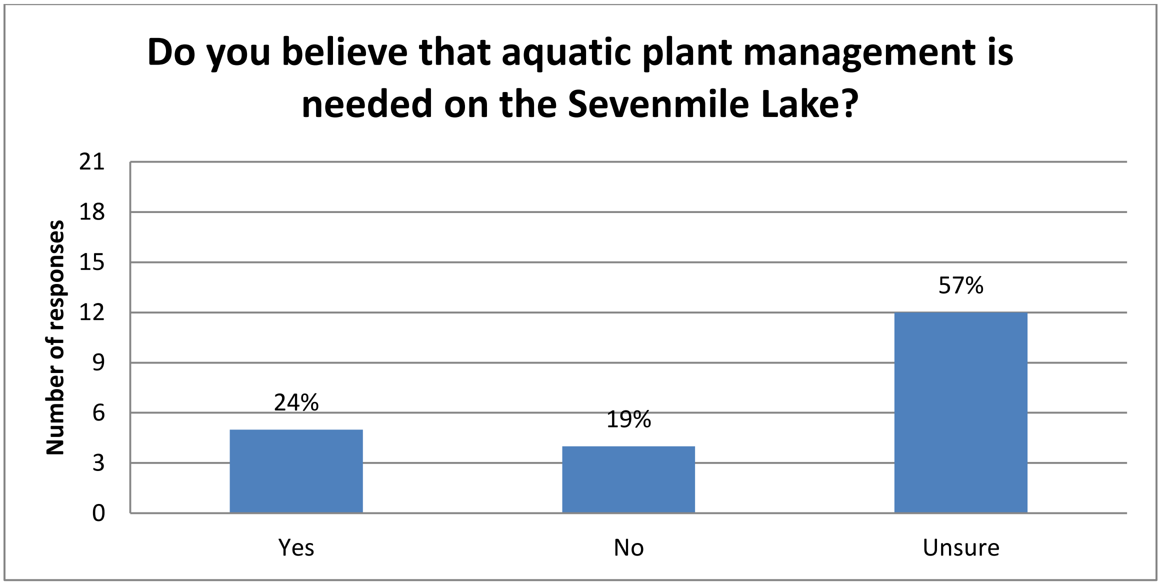
12. *In the summer months (Memorial Day through Labor Day), how often does aquatic plant growth negatively affect your use of Sevenmile Lake? (Circle one)*

A. Always B. Most of the time C. Sometimes D. Rarely E. Never

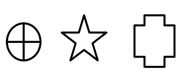


__13.__ Do you believe that aquatic plant management is needed on Sevenmile Lake? (Please circle only one)

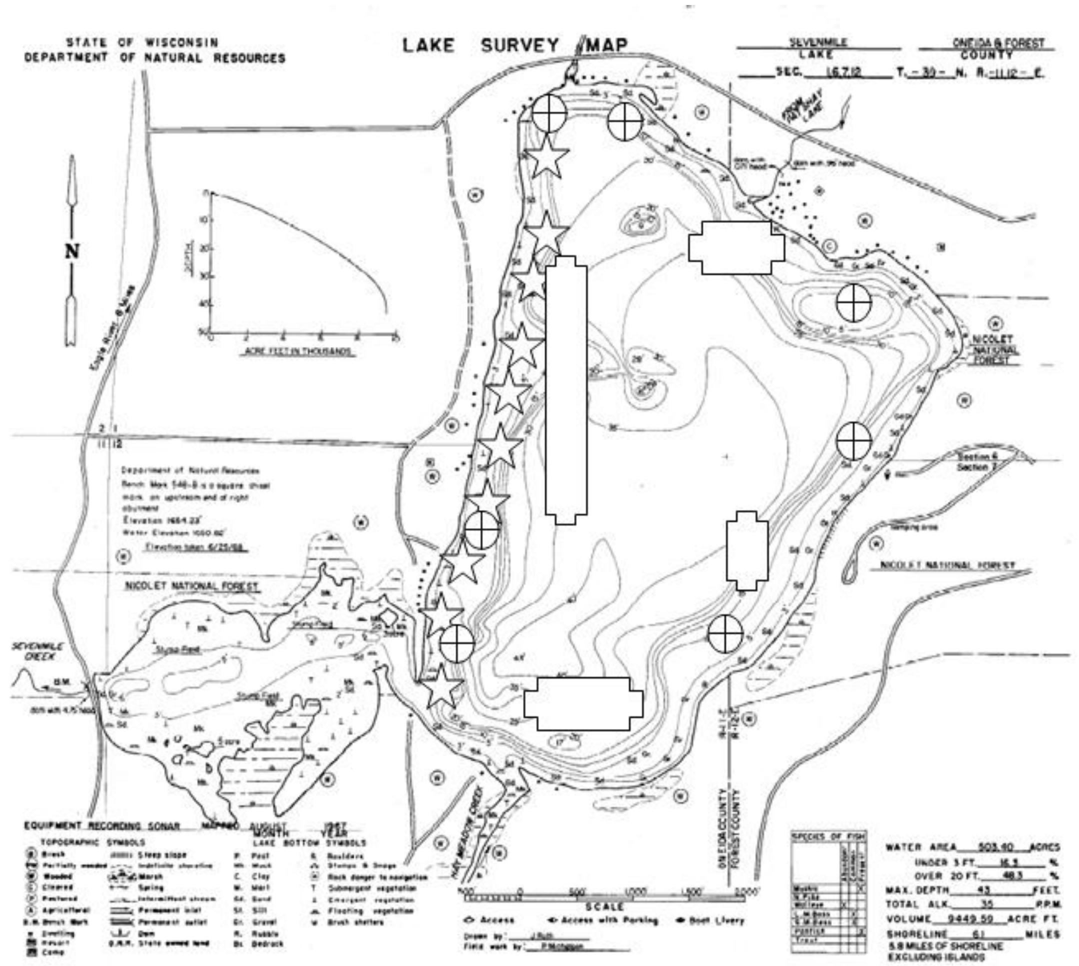
A. Yes B. No C. Unsure



Question 14 *asked the lake user to describe any problem on Sevenmile Lake that you believe requires aquatic plant management by labeling with an "X" with a description to the right.*



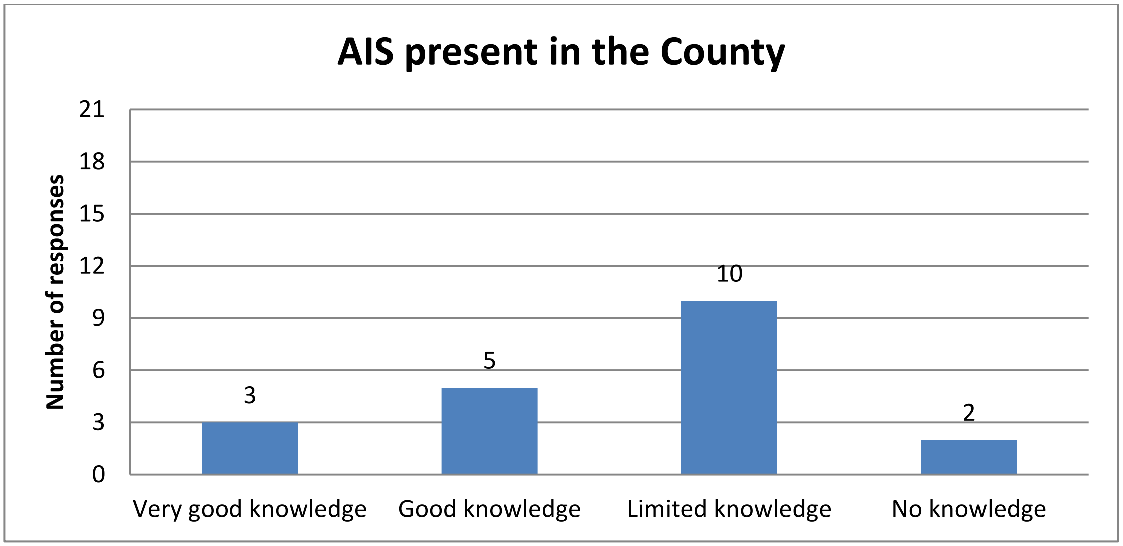
These three symbols depict where three stakeholders placed areas of concern. One comment was "aquatic plant management is needed to restrain the plants from taking over sandy shore areas, used for recreation." Another person stated "excessive weed growth."

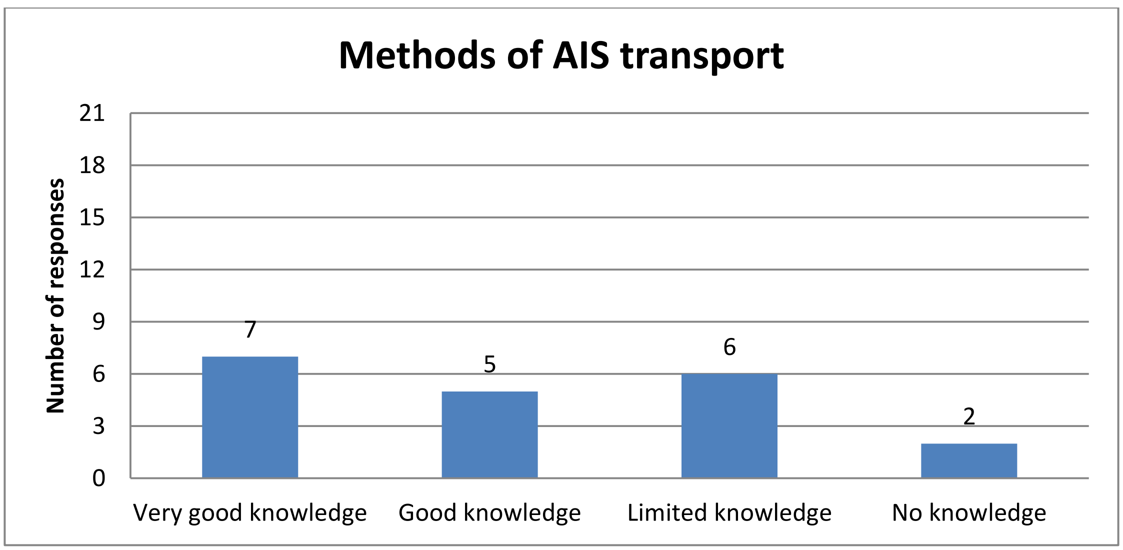


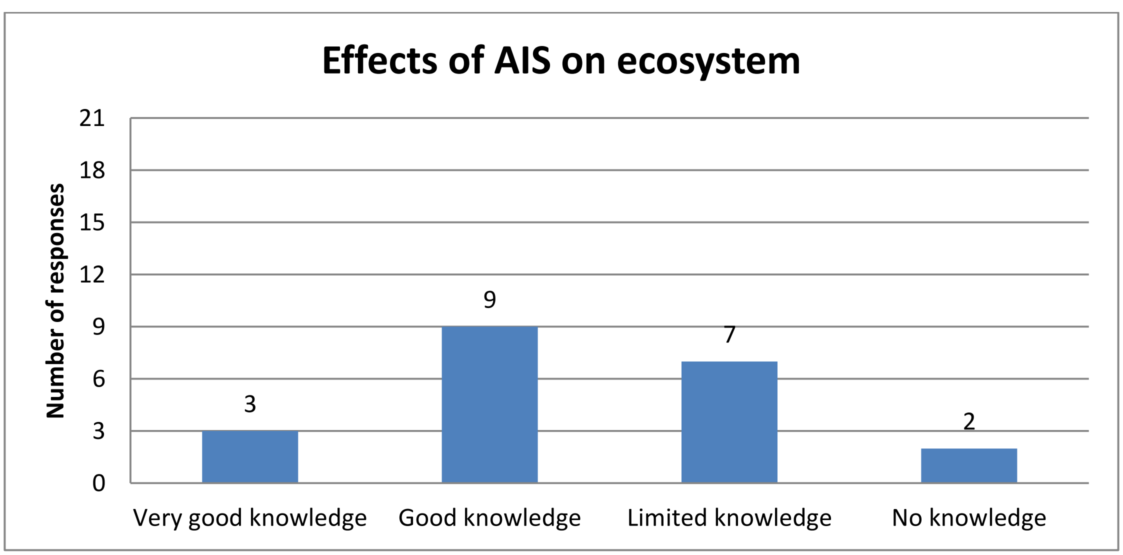
15. *Education is a fundamental component of Aquatic Plant Management (APM) planning projects. Please use the following scale to rank your understanding of the aquatic invasive species (AIS) topics listed below. (For example if you have little or no knowledge about methods of AIS transport, place a 4 next to that choice).*

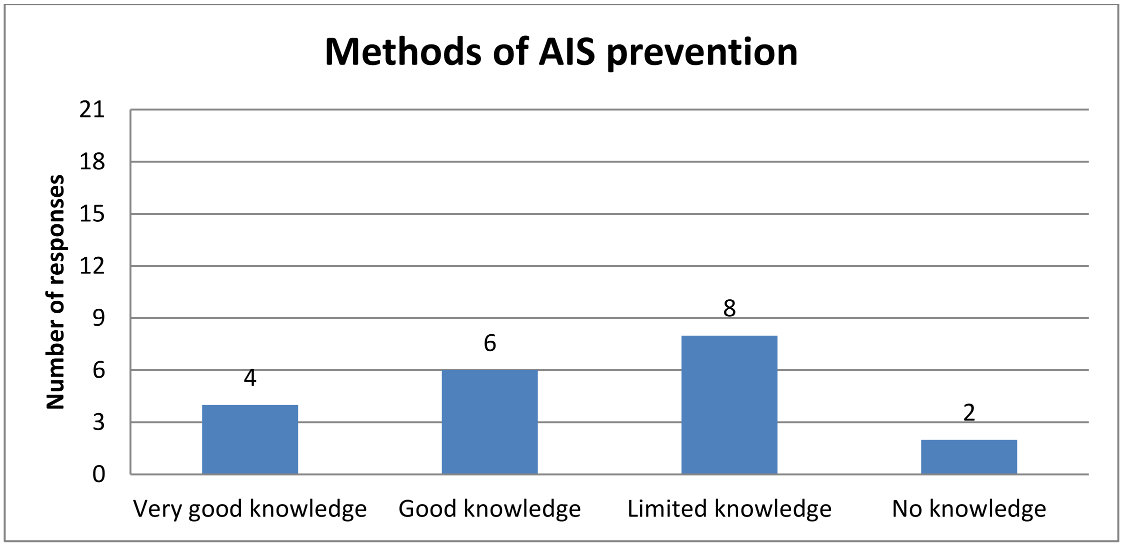
Scale 1. Very good knowledge of subject — 2. Limited knowledge of subject
3. Good knowledge of subject — 4. No knowledge of subject

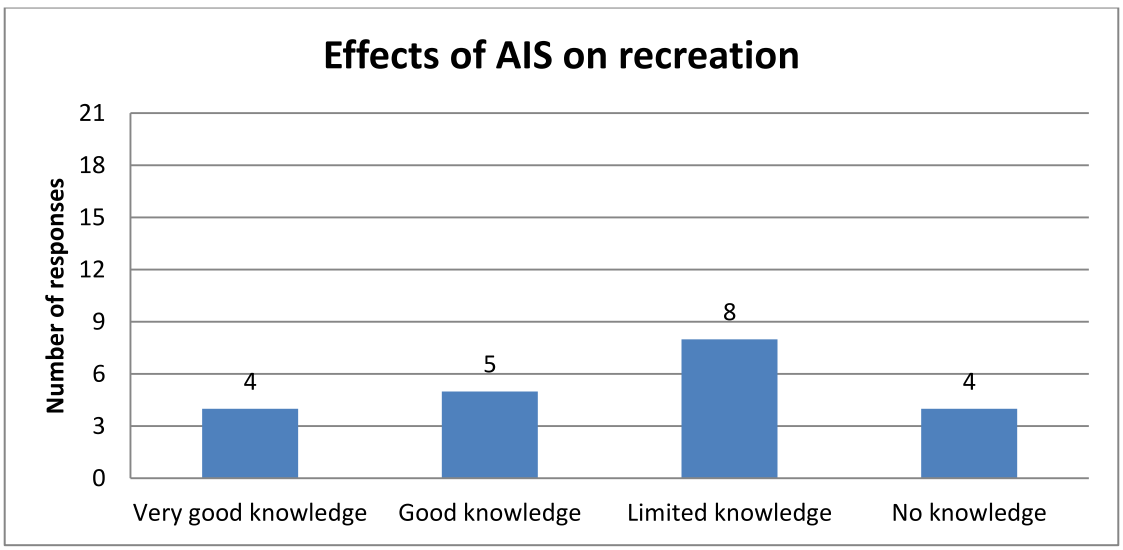
___ AIS present in the County	___Effects of AIS on recreation
___ Methods of AIS transport	___ Long term results of AIS control
___ Effects of AIS on ecosystem	___ Methods of AIS control
___ Methods of AIS prevention	___Able to identify AIS

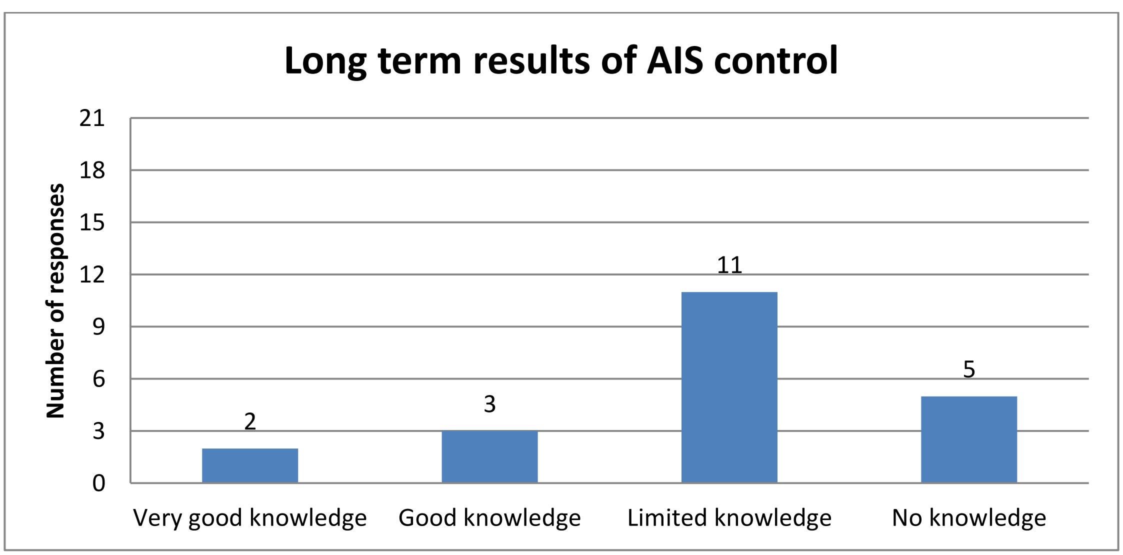

AIS present in the County
Number of responses
21
18
15
12
9
6
3
0
3
5
10
2
Very good knowledge
Good knowledge
Limited knowledge
No knowledge

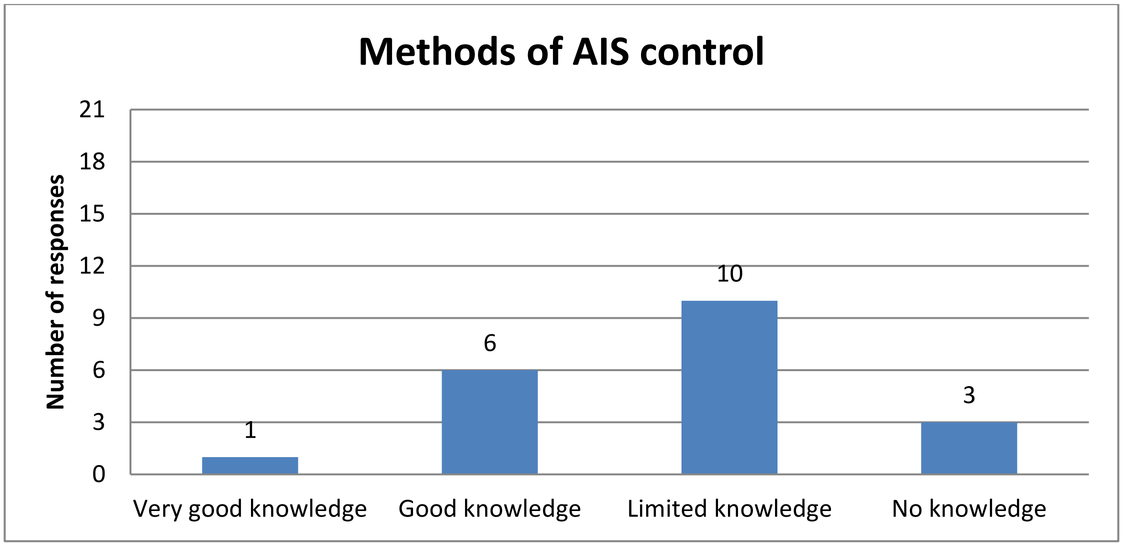

Methods of AIS transport
Number of responses
21
18
15
12
9
6
3
0
7
5
6
2
Very good knowledge
Good knowledge
Limited knowledge
No knowledge


Effects of AIS on ecosystem
Number of responses
21
18
15
12
9
6
3
0
3
9
7
2
Very good knowledge
Good knowledge
Limited knowledge
No knowledge

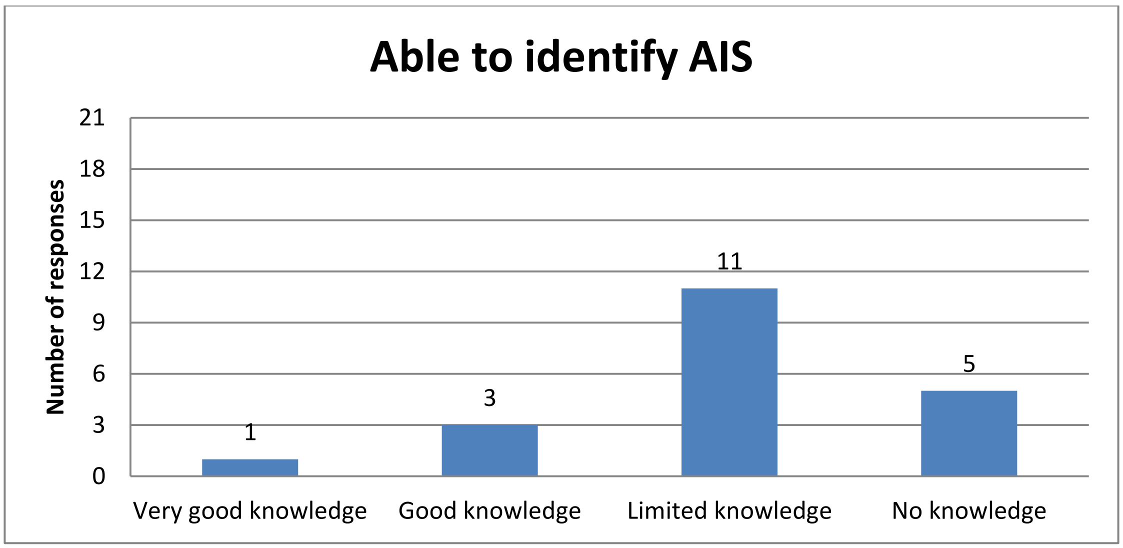

Methods of AIS prevention
Number of responses
21
18
15
12
9
6
3
0
4
6
8
2
Very good knowledge
Good knowledge
Limited knowledge
No knowledge


Effects of AIS on recreation
Number of responses
21
18
15
12
9
6
3
0
4
5
8
4
Very good knowledge
Good knowledge
Limited knowledge
No knowledge


Long term results of AIS control
Number of responses
21
18
15
12
9
6
3
0
2
3
11
5
Very good knowledge
Good knowledge
Limited knowledge
No knowledge



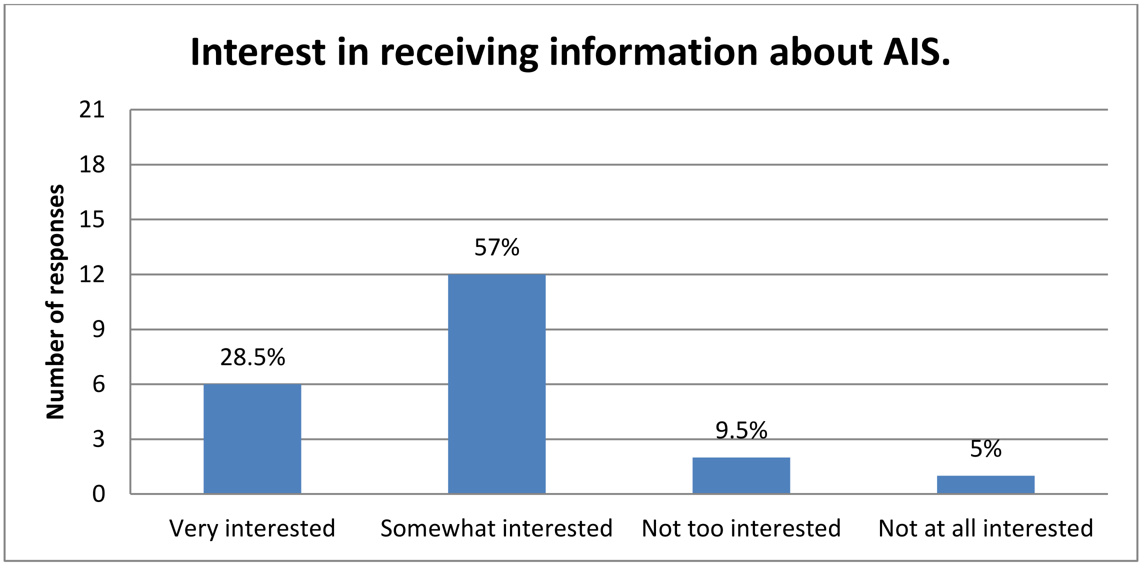
Methods of AIS control
Number of responses
21
18
15
12
9
6
3
0
1
6
10
3
Very good knowledge
Good knowledge
Limited knowledge
No knowledge



Able to identify AIS
Number of responses
21
18
15
12
9
6
3
0
1
3
11
5
Very good knowledge
Good knowledge
Limited knowledge
No knowledge

16. *How interested would you be in receiving information about aquatic invasive species? (Circle one)*

A. Very interested B. Somewhat interested C. Not to interested D. Not at all interested



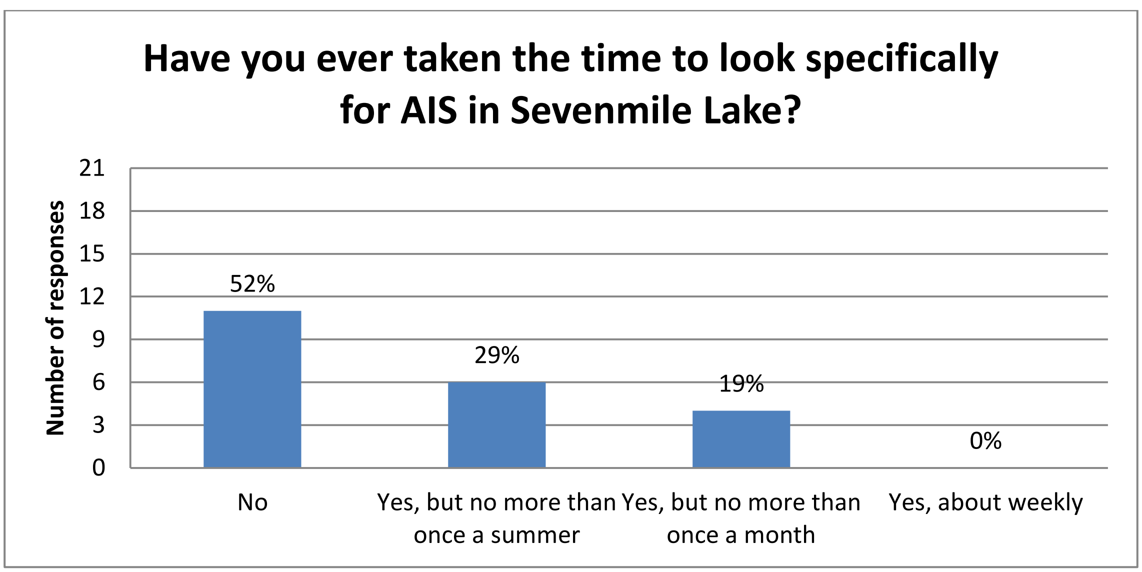
17. *Have you ever taken the time to look specifically for aquatic invasive species in Sevenmile Lake?*

A. No

B. Yes, but no more than once a summer

C. Yes, but no more than once a month

D. Yes, about weekly



One stakeholder mentioned he looks for zebra mussels, one stakeholder said they looked at aquatic invasive plants, and another said they did shoreline monitoring.

18. *Below are several methods used to manage aquatic invasive plant species. Using the following scale, please indicate your level of support or opposition for each control method.*

A. Definitely support   B. Probably support   C. Unsure   D. Probably oppose   E. Definitely oppose

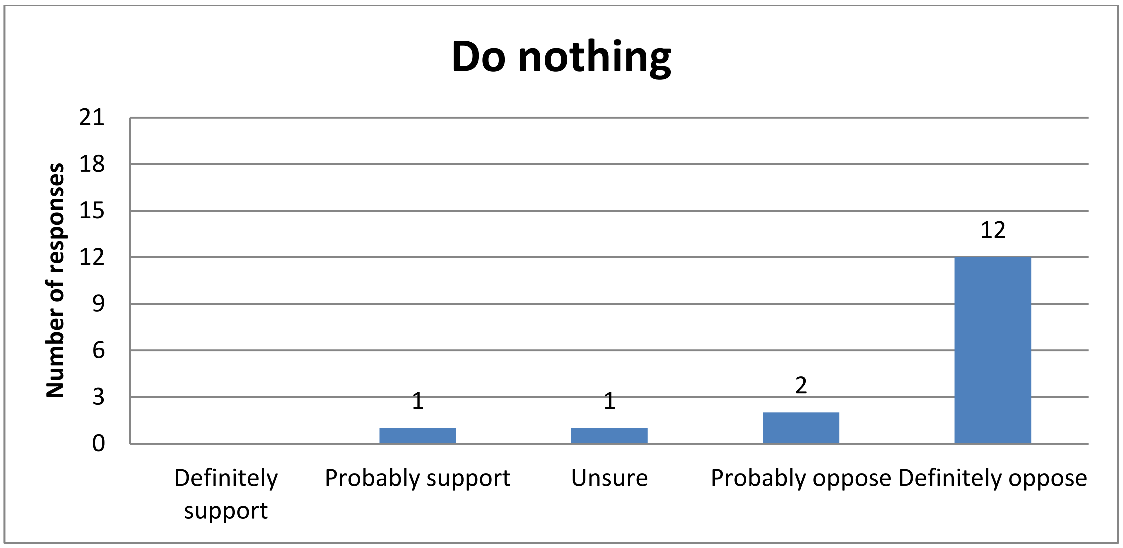
___Do nothing

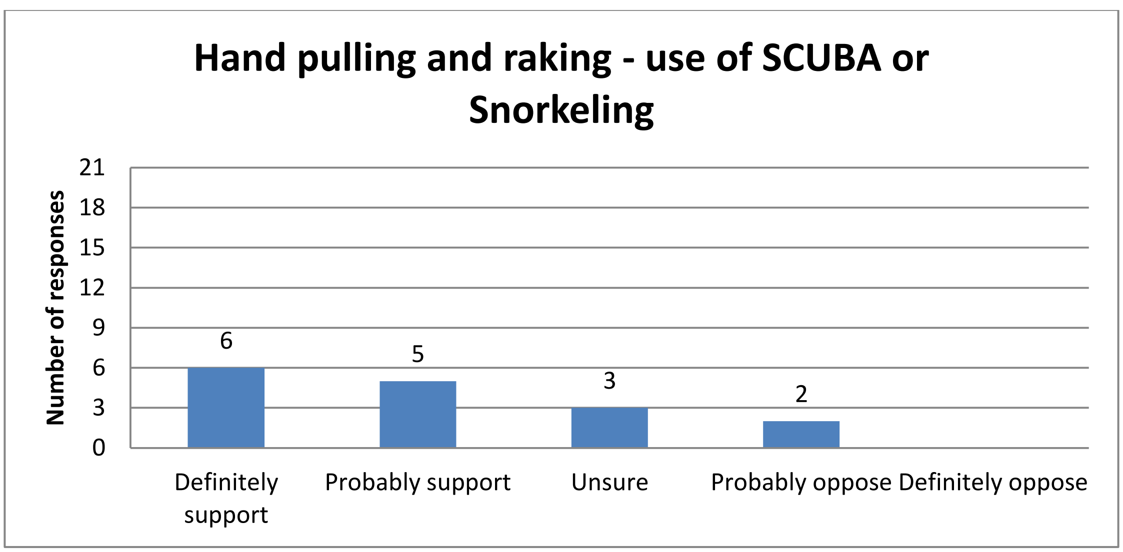
___Hand pulling and raking – use of SCUBA or Snorkeling

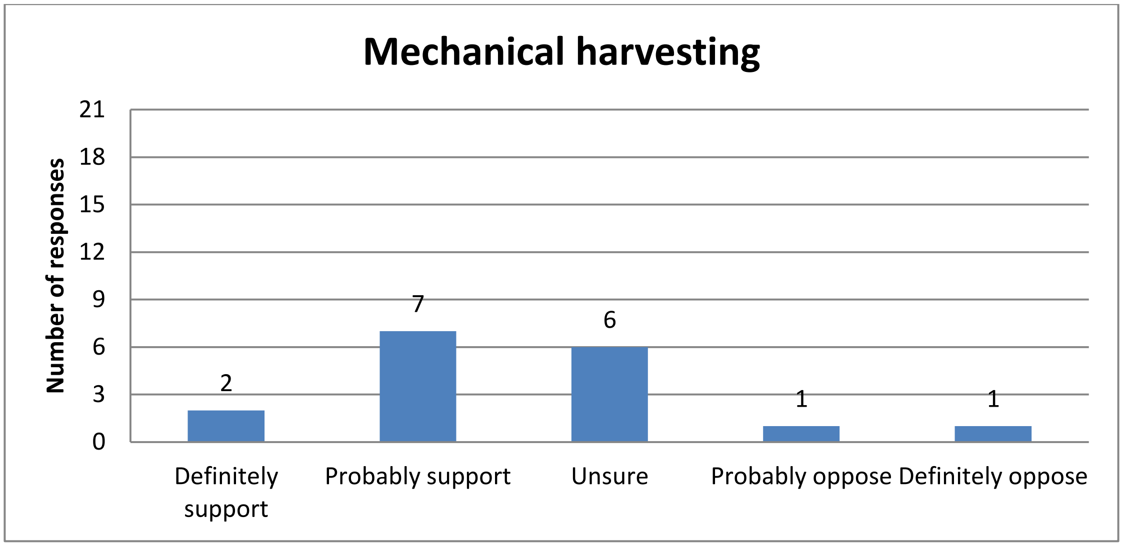
___Mechanical harvesting – use of a machine to eliminate invasive aquatic plants

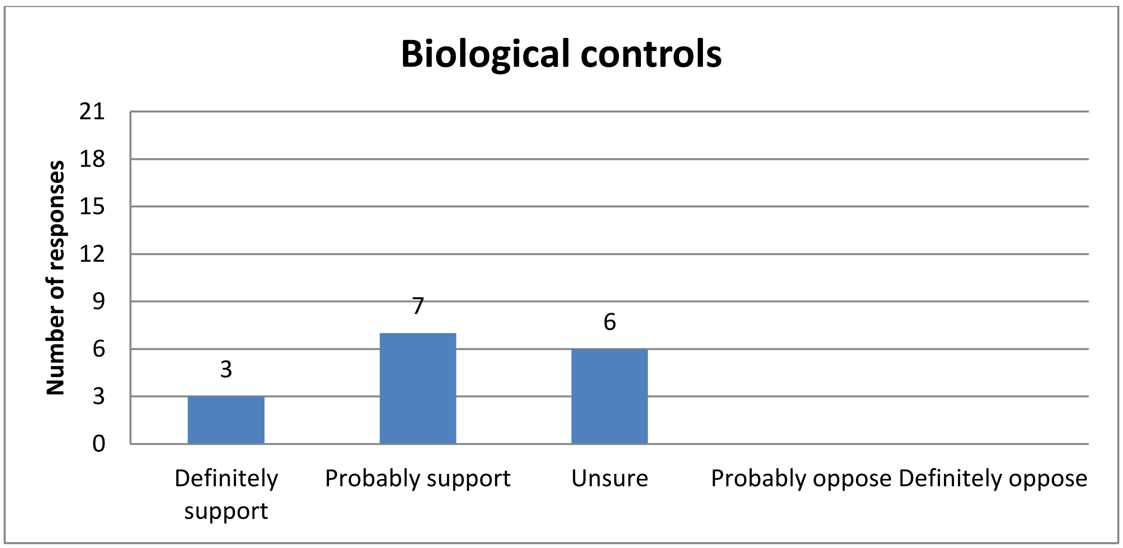
___Biological controls (native weevils) – placed in the lake to naturally control Eurasian water-milfoil

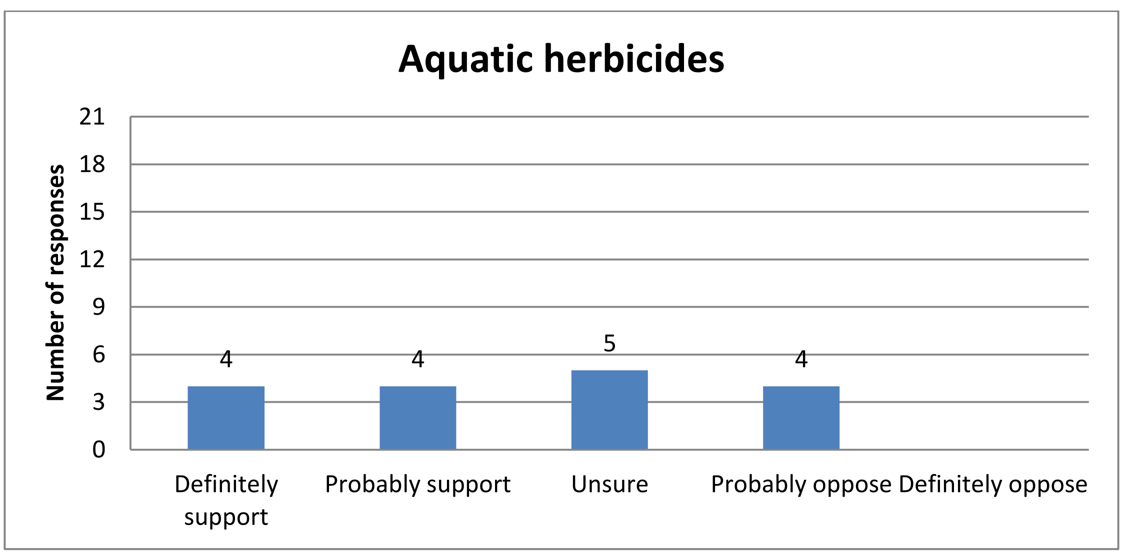
___Aquatic herbicides – applying herbicides to the AIS to control them






Mechanical harvesting
Number of responses
21
18
15
12
9
6
3
0
2
7
6
1
1
Definitely support
Probably support
Unsure
Probably oppose
Definitely oppose


Biological controls
Number of responses
21
18
15
12
9
6
3
0
3
7
6
Definitely support
Probably support
Unsure
Probably oppose
Definitely oppose


Aquatic herbicides
Number of responses
21
18
15
12
9
6
3
0
4
4
5
4
Definitely support
Probably support
Unsure
Probably oppose
Definitely oppose

19. *The Aquatic Plant Management (APM) Plan can have several goals. We would like to know where you think the Plan should place its emphasis.* ***Rank the following list of APM Plan goals*** *("1" being the most important and "6" being the least important).*

___Monitor Sevenmile Lake for changes in native plant composition and distribution.

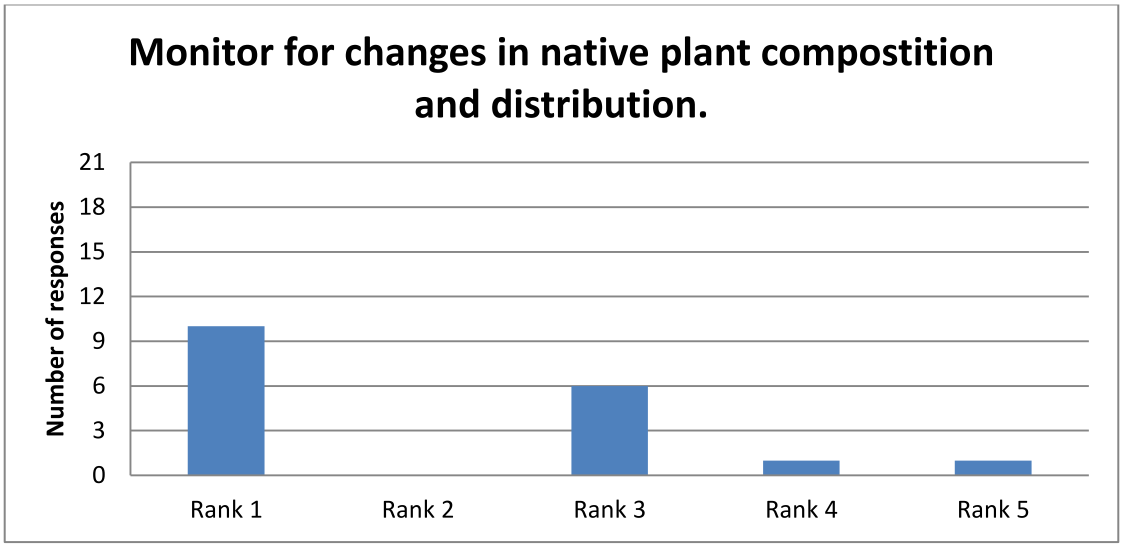
___Protect native plant species.

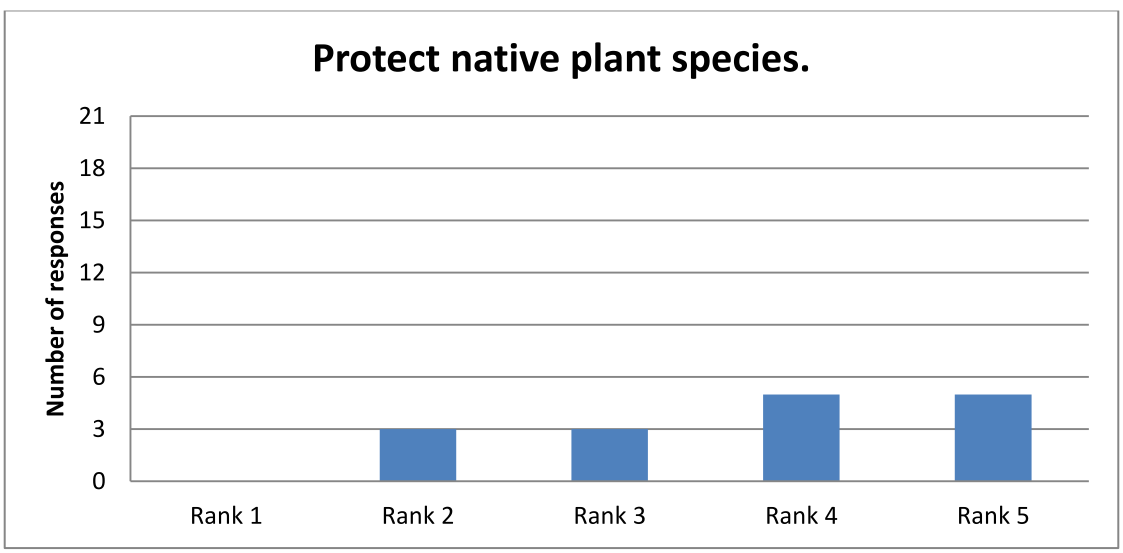
___Prevent the introduction of Aquatic Invasive Species.

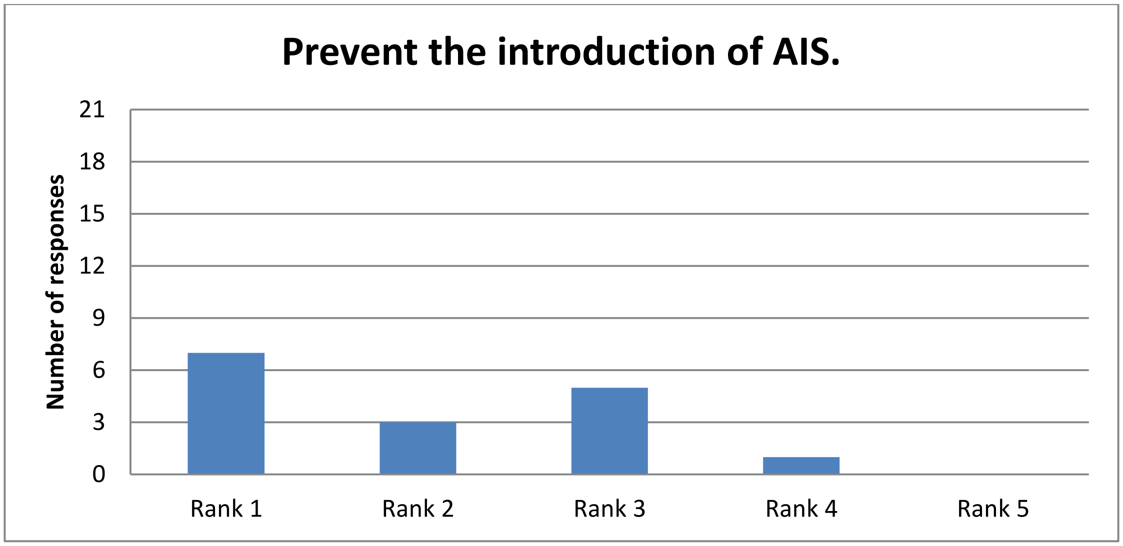
___Provide education to Sevenmile Lake stakeholders regarding the plant community.

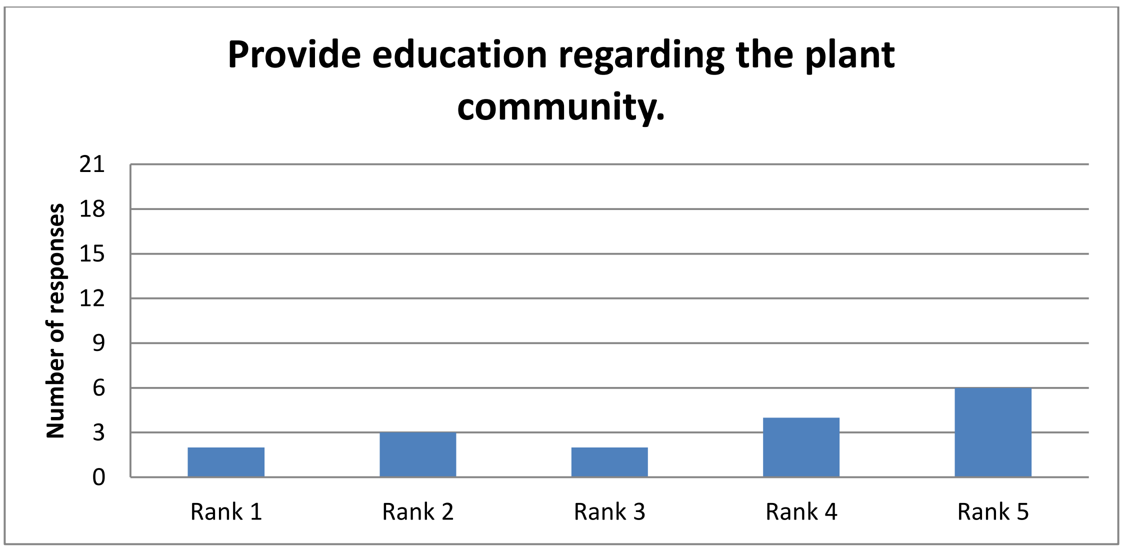
___Monitor recreational users to minimize introduction of Aquatic Invasive Species.

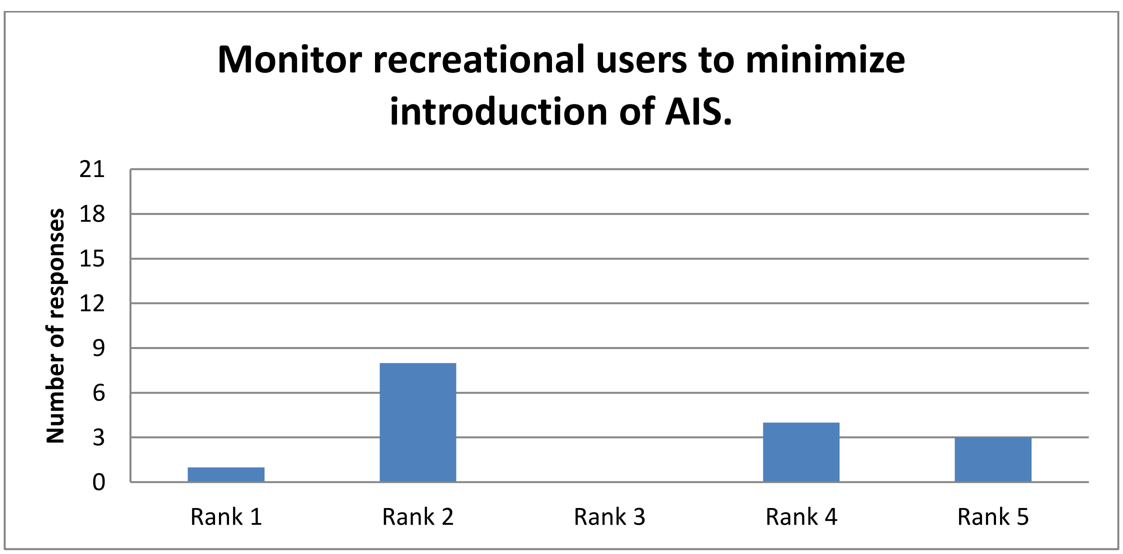
___Other_______________________________






Prevent the introduction of AIS.
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4
Rank 5


Provide education regarding the plant community.
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4
Rank 5


Monitor recreational users to minimize introduction of AIS.
Number of responses
21
18
15
12
9
6
3
0
Rank 1
Rank 2
Rank 3
Rank 4
Rank 5

20. *There are several opportunities for citizens to become actively involved in important roles during Aquatic Plant Management Plan implementation. From the list below, please identify which activities, if any, you would be interested in helping with. (Select all that apply) Your answers are not a commitment but only an indication of interest.*

A. Lake Aquatic Invasive Species Monitor (training can be provided) – possibilities might include

1. Placing a zebra mussel sampler off your dock and monitor for presence/absence
2. Looking for Eurasian water milfoil, curly-leaf pondweed, or purple loosestrife
3. Scanning the shoreline looking for any unusual snails or mussels
4. Observing the water for presence of the spiny water flea
5. Observing for the presence of the rusty crayfish
6. Report fish that have abnormalities or are a different species than you have seen
7. Use SCUBA to look for Aquatic Invasive Species (early detection monitoring)
8. Snorkeling to look for Aquatic Invasive Species (early detection monitoring)

B. Grant writing – help in finding money for planning and management on the lake

C. Citizen Lake Water quality Monitor

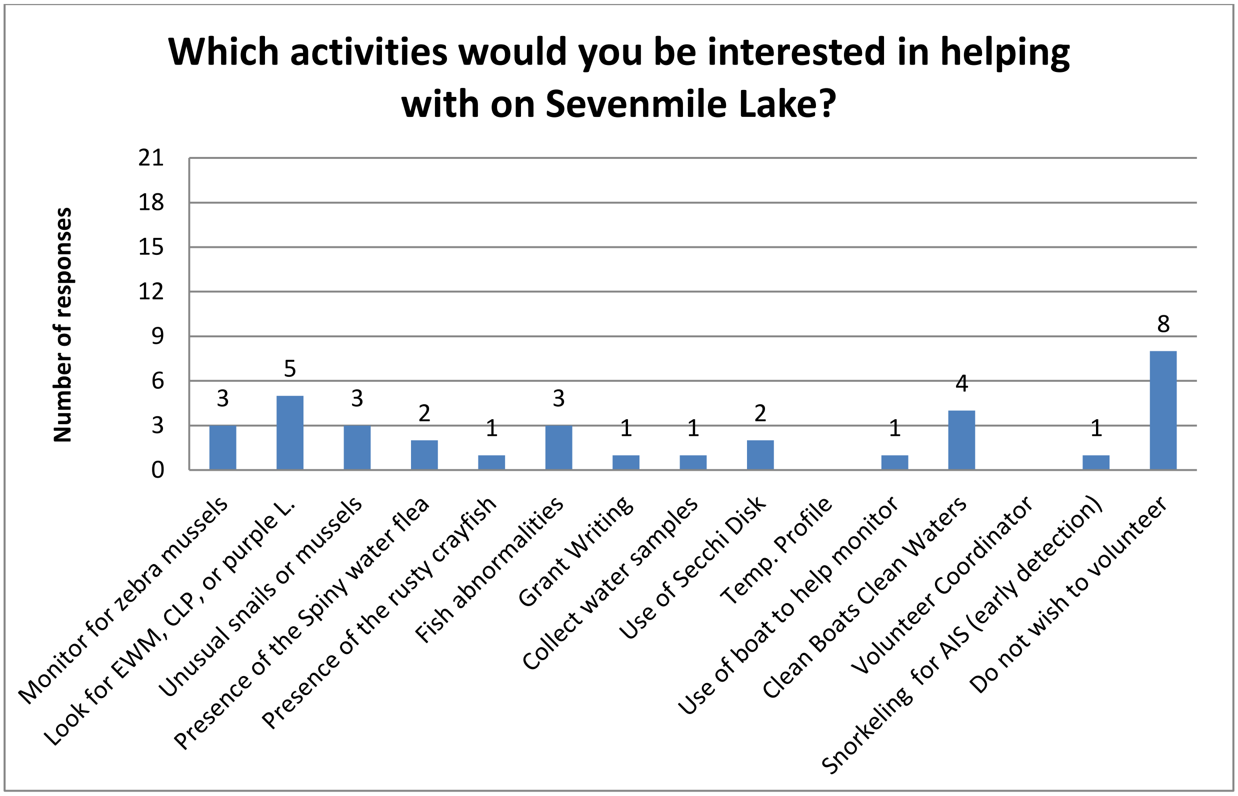
1. Collecting water samples
2. Using a Secchi disk (white and black disc dropped into the water to see how far down you can see determining the water clarity) – currently being done on Sevenmile Lake
3. Temperature/dissolved oxygen profile (using a meter to determine temperature and dissolved oxygen at various depths in the water column).
4. Use of your boat by scientists or volunteers for water quality monitoring activities.

D. Clean Boats Clean Waters – educate the boaters on AIS and inspect boats

E. Volunteer Coordinator – organize volunteers for specific tasks on the lake

E. Other (specify :____________________________)

F. Do not wish to volunteer



NOTE: If you checked any of the volunteer opportunities or would like more information on AIS, please provide your contact information.

10 of the 21 respondents provided contact information.

The graph above indicates there are stakeholders interested in volunteering on Sevenmile Lake.

21. *Please list any additional suggestions that you would like to see incorporated into the APM plan.*

No additional comments were written in this area.

Thank you for taking time to complete this survey. Return completed survey to:
Sevenmile Lake Association
Phil Hildebrand
8602 Hildebrand RD
Three Lakes, Wisconsin 54562