2010

Lions Lake Management Plan

Lions Lake Management Planning Committee

3/2/2010

Plan approved by the Lions Lake Management Planning Committee on

Adopted by Portage County on

A special thanks to all those who helped to create the Spring Lake Management Plan and provided the necessary data in the Portage County Lake Study.

Spring Lake Management Planning Committee Members and Resources

Lions Lake Management Planning Committee

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Scott Provost – Water Resources Management Specialist

University of Wisconsin –Stevens Point

Dr. Robert Freckmann – Professor Emeritus of Botany
Nancy Turyk Jen McNelly – Center for Watershed Science and Education
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Introduction

LionsLake is located in the Town of Alban, northeast of Rosholt, in Portage County, Wisconsin. Lions Lake is named for the Wisconsin Lions Foundation which owns all of the surrounding land and runs a camp for the handicapped on the lake. Due to the unique nature of the camp, Lions Lake is the only lake in Wisconsin that has a law protecting it from any public access purchase as long as the camp remains in operation.

The purpose of this management plan is to provide guidance to address existing problems and prevent future problems that may be detrimental to the Lions Lake ecosystem. This management plan was written as part of the second phase of the Portage County Lakes Study. The first phase of the Portage County Lakes Study involved data collection from Lions Lake and 28 other lakes throughout the county. The study provided information on water quality, shoreline development, amphibian habitat, fisheries, aquatic plants and other parameters.

The purpose of this plan is to provide guidance to address existing problems and prevent future problems that may be detrimental to the Spring Lake ecosystem.

The development of this plan utilized the information from the lake study and other studies and a committee of interested citizens, local organizations, and professionals. The members of the Spring Lake management planning committee learned about topics related the lake and developed this lake management plan.

The overall goal for the Lions Lake Management Plan is to manage and protect the natural beauty of Lions Lake while improving shorelands and water quality and ensuring the long term protection of lands surrounding Lions Lake.

Background Information

Information in this section was taken from the Portage County Lakes Study and from the citizen surveys. The complete lake study document and summarized survey results can be found at: http://www.co.portage.wi.us/planningzoning/PCL/Main%20Page/Main%20Page.shtml

The background information that is provided from the Portage County Lakes Study helps to provide us with a more complete understanding of Lions Lake. A healthy lake ecosystem is comprised of many components that include water quality and shorelands that support aquatic plants, fish, wildlife, and more. These components are not only found in lake but also extend to where the water meets the land and beyond into the watershed. A lake is a reflection of the health and activities that occur in the lake, near the shore and in the watershed.

Lions Lake is a groundwater drainage lake located in the town of Alban, WI. Lions Lake covers 43 acres, has an estimated volume of 188 acre-feet, and a maximum depth of 11 feet (WDNR 2005). The lake bottom consists primarily of marl, with sand and silt also present. Lions Lake has one navigable outlet, Bradley Creek, where a small dam maintains the water level six to eight inches above normal. There is no public access to Lions Lake and the only development present on the lake is the Wisconsin Lions Camp, which consists of cabins, campsites, dining and office facilities, a caretaker's residence, and a sand beach.

Watershed

Lions Lake's surface watershed, an area of land where water from precipitation drains from higher elevations towards the lake, is approximately 213 acres.

Figure 1. Spring Lake groundwater and surface watersheds.

Land use types and associated practices can have a significant impact on water quality. **Though land uses may not easily be changed, land management practices can be modified to improve water quality.** Land use within the watershed is predominantly forest (42%), followed by non-irrigated agriculture (30%), and shrub vegetation (22%). Residential development within the Spring Lake watershed has been increasing.

Most homes around the lake are set back away from the lake and towards the lake they have left generous natural vegetation in place that provides water quality benefits, habitat for a variety of plant and animal species, and privacy for the landowner and people on the lake.

A groundwater watershed is similar to a surface watershed, except that it is an area of land where the groundwater, instead of surface water, drains to Spring Lake. Often surface water watersheds and groundwater watersheds do not match each other, which is the case in Spring Lake. At approximately 4,739 acres the groundwater watershed for Spring Lake is much larger than the surface watershed and is primarily comprised of forested land (42%), non-irrigated crop land (32%) and shrub cover (18%). Much of the land in the groundwater and surface watersheds are located in the Town of Buena Vista.

Survey respondents indicated there were many motivators for changing how they manage their land with respect to Spring Lake. The top motivators included increasing property value, providing better fish and wildlife habitat, improving water quality, increasing the natural beauty of their property, and saving money.

Sensitive Areas

The sensitive areas associated with Spring Lake are defined by lands immediately adjacent to the lake that are particularly valuable or that would be significantly impacted by most disturbances or development. These areas include very large expanses of wetland that encompass the south side of the lake, steep slopes along the north shore that are prone to erosion, and a bald eagle nesting area on the western side of the lake (See Appendix A).

The habitats of amphibians and reptiles are of importance because they utilize both aquatic and terrestrial habitats and the shoreline interface between the two. **These areas of habitat are not only important for reptiles and amphibians but also other aquatic and terrestrial species.**

The primary amphibian habitat can be found in several locations around the lake, but sensitive areas include portions of the western and southwest shores. Key features of this habitat area include protected areas of marsh with large areas of submergent, emergent, and floating leaf vegetation. There are large areas of natural, undisturbed shoreline present on Spring Lake. However, small sections of the shoreline have been altered (See Appendix B).

Shoreline

Around Spring Lake approximately 97% or 7,257 feet of the 7,467 feet of shoreline around the millpond are considered healthy, undisturbed habitat comprised of a combination of native flowers, grasses, shrubs and trees. The remaining 3% of the shoreline has various levels of disturbance including two boat landings and one residential property.

While the majority of shorelines around Spring Lake are currently vegetated, if this changed it would likely impact the water quality in the lake, growth of algae and aquatic plants, and the fishery and other species that currently comprise the lake's ecosystem. Surfaces such as roofs, driveways, roads, patios, and compacted soils increase the amount of runoff moving across the landscape towards Spring Lake. The runoff that enters the lake can carry a variety of pollutants into the water. Some of the negative impacts on the lake due to additional runoff may include: increased nutrients (such as phosphorus) in the lake, which can cause algae blooms and excessive plant growth and an increased amount of sediment in the lake. This in turn can lead to cloudy or turbid water, sediment burying fish spawning areas and other critical habitat, and sediment transporting additional contaminants such as bacteria, debris, metals, and pesticides. The Portage County Lake Study indicates that there are elevated concentrations of phosphorus and nitrogen in Spring Lake. If shoreline vegetation were removed it could further increase these concentrations.

According to the citizen survey 11 of the 62 respondents owned shoreline property. All eleven of the respondents who owned shoreline property indicated that their shorelines were undeveloped or natural. The majority of shoreline owner respondents indicated that the depth of their buffer was greater than 35 feet, which meets the county/state shoreline zoning requirements. These special rules, the shoreland zoning ordinance, apply to the near shore area of the lake. These rules were developed to help protect water quality and habitat of lakes.

Aquatic Plants

Aquatic plants play many important roles in an aquatic ecosystems including providing habitat for aquatic and semi-aquatic organisms; providing food for fish, waterfowl, and other animals; taking up nutrients that would otherwise be used by algae; and modifying water temperatures on hot days.

According to R. Freckmann (UWSP), there are **30** species of aquatic macrophytes, or aquatic plants that have been identified in Spring Lake or on the wet areas of shore. This does not include the large bog and conifer swamp complex on the south shore of the lake.

Spring Lake has a relatively small flora comprised of relatively common species. However, the swamp complex on the south shore likely houses a significant number of plant species that haven't yet been identified around Spring Lake.

The aquatic invasive species curly leaf pondweed is established in Spring Lake. The die-off of curly leaf pondweed in late June release nutrients when the water is warm and fuels filamentous algae growth in the lake and downstream often for the rest of the summer. Once established, it is nearly impossible to eliminate an invasive species from a lake but if it becomes a nuisance there are ways to manage it.

It is important to keep an eye on the curly leaf pondweed and prevent other aquatic invasive species from entering Spring Lake.

When asked about the abundance of aquatic plants in Spring Lake, the majority of the 40 respondents to this question (62%) felt that the amount of plants were just about right or were unsure about the amount of plant growth in the lake. Respondents indicated that August and July were the months with the densest plant growth which is typical for most Wisconsin lakes. One person indicated that after using their boat on another lake they did not always clean them off before they used them in Spring Lake; although this is a very low number it indicates that boats are still a potential pathway for the spread of aquatic invasive species into Spring Lake.

Water Quality and Land Use

When asked about Spring Lake's water quality, the majority of survey respondents indicated that they felt the water quality was good or excellent. The majority of respondents also indicated that they felt that the water quality hadn't changed much since they had been visiting it. Survey respondents also indicated that the quality of lake water had major economic impacts and major impacts on their personal enjoyment of the lake.

Water quality assessment of a lake involves a number of measures including temperature, dissolved oxygen, water chemistry, chlorophyll *a*, and algae. Each of these measures plays a part in the lakes overall water quality.

Chloride concentrations, and to a lesser degree sodium and potassium concentrations, are commonly used as an indicator of how strongly a lake is being impacted by human activity. In Spring Lake chloride and sodium concentrations were elevated. Although these constituents are not detrimental to the aquatic ecosystem, they indicate that sources of contaminants (road salt, fertilizer, animal waste and/or septic system effluent) are entering the lake from surface runoff and groundwater.

Atrazine, an agricultural herbicide, was detected in Spring Lake. Some toxicity studies have indicated that even at low levels reproductive system abnormalities can occur in frogs. The presence of atrazine indicates that other agri-chemicals may also be entering Spring Lake.

The temperature in the Spring Lake is generally stratified in summer and winter and mixed from top to bottom in the spring and fall. During the periods of stratification, dissolved oxygen levels are low below 12 feet of water, making the lower portion of the lake undesirable for most aquatic organisms. This stratification is considered normal for many lakes in Wisconsin.

Water clarity is a measure of how deep light can penetrate the water. It is an aesthetic measure and is related to the depth that rooted aquatic plants can grow. Clarity measurements in Spring Lake ranged from six to nineteen feet. August had the best water clarity and May had the poorest water clarity. Fluctuations in water clarity throughout the summer are normal as algae and aquatic plant populations and sedimentation increase and decrease.

Chlorophyll a is a measure of algae in Spring Lake. Chlorophyll a concentrations in Spring Lake ranged from 2.0 to 25.87 mg/L. The measure of 25.87 mg/L was an unusual high that may have been related to an algae bloom resulting from the die-off of curly leaf pondweed. The corresponding water clarity reading taken at this time was approximately 7.0 feet which is poor for this lake. **Routine water quality monitoring by citizens would better characterize water quality in Spring Lake.**

The 40 algal genera identified during the sample periods were relatively common and none of those that reached numerical dominance in the sample counts were associated with toxins or health issues. The algal community when considered relative to the chlorophyll a, phosphorus, and nitrogen values for Spring Lake presents a picture of a very mesotrophic lake. The water clarity in Spring Lake was generally good during all algal sampling periods, which seems to conflict with the high chlorophyll a values, heavy algal densities, and water chemistry data. However, this is not an uncommon situation in stratified lakes like Spring Lake (B. Bell).

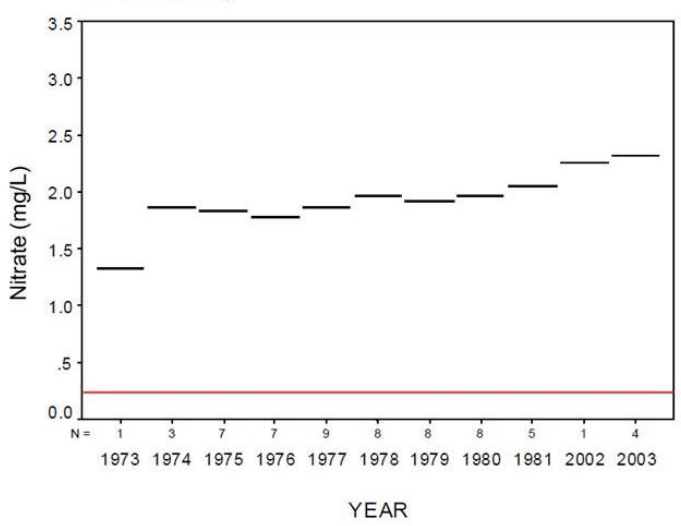
Nutrients (nitrogen and

Figure 2. Median Nitrate-N concentrations in Spring Lake, 1973 - 2003.

phosphorus) are important measures of water quality in lakes because they are used for growth by algae and aquatic plants.

In Spring Lake the phosphorus concentrations fluctuated throughout the year, but were high enough (greater than 0.3 mg/L) to fuel excessive algae blooms throughout the summer. Median nitrate concentrations have been increasing since 1973 (Figure 2).

Nitrogen concentrations in Spring Lake are high, especially in the form on nitrate, which is easily used for growth by aquatic plants and algae. Most of this nitrate appears to be entering Spring Lake in contaminated groundwater that feeds the lake.



Phosphorus is an element that is essential to most living organisms in trace amounts, including plants. Sources of phosphorus can include naturally occurring phosphorus in soils, wetlands, and small amounts in groundwater. Sources from human influence and include soil erosion,, agricultural and urban runoff, septic systems, and animal waste.

In Spring Lake the aquatic plant growth is most responsive to phosphorus due to its relative short supply with respect to other substances necessary for growth. Increases of small amounts of phosphorus result in an increase of growth rates and abundance of aquatic plants and algae.

Phosphorus concentrations in Spring Lake are variable throughout the year. Median total phosphorus concentrations in spring/fall for 2002-2003 were 30 and 35 ug/L, respectively (Figure 3) and winter averages were 49.3 ug/L. Concentrations this high are problematic and should be reduced.

Currently the Wisconsin DNR has proposed phosphorus criteria values for lakes in Wisconsin. The proposed criteria value for deep drainage lakes like Spring Lake is 40 ppb. Spring Lake had average summer total phosphorus concentrations of 41.2 in 2002/03. **Because Spring Lake routinely exceeds the phosphorus criteria value, steps should be taken to reduce internal and external phosphorus loading to the lake.**

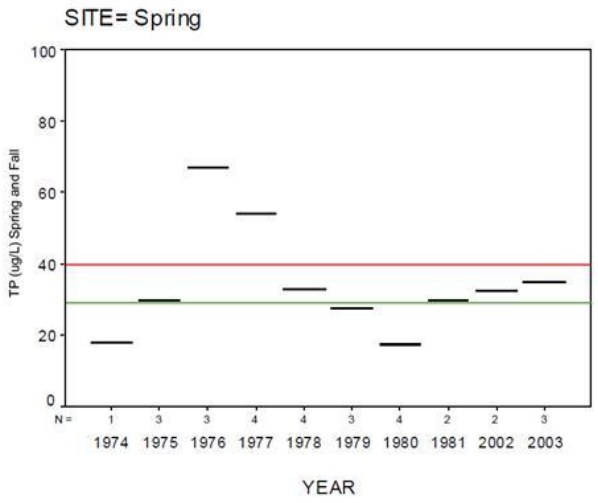


Figure 3. Median total phosphorus concentrations in Spring Lake in samples collected in spring and fall, 1974-2003.

The importance of managing phosphorus in the Spring Lake watershed is key to protecting the lake itself. Positive changes in land use practices and in land use types can both result in improved water quality in Spring Lake. Phosphorus inputs to the lake can be controlled through the use of many different Best Management Practices (BMP's) that minimize the movement of runoff and phosphorus to the lake. Changes in land use practices near shore and throughout the watershed should include the development of water quality based nutrient management plans, only applying phosphorus and nitrogen from fertilizer or manure based on soil tests for specific crops or turf, providing cover on the landscape and/or appropriate mitigation when open soils are necessary during construction or cropping, use of cover crops, properly storing manure, and spreading manure only when the ground is not frozen. Some of the near shore land use practices that can decrease the inputs of phosphorus to Spring Lake include leaving native vegetation (trees, bushes, and grasses), eliminating the use of fertilizer, minimizing runoff, and protecting exposed soil. The Portage County Land Conservation Department is one of numerous organizations that can provide assistance to landowners that want to reduce impacts to Spring Lake from their land.

Future degradation of water quality in Spring Lake can be minimized with thoughtful land use planning throughout the watershed. This includes locating roads away from the lake, diverting runoff from infrastructure in areas where it can infiltrate rather than runoff to the lake, and controlling runoff and nutrient inputs from new developments.

A "build out" of the current zoning in the watersheds (Towns of Buena Vista and Lanark) was conducted to estimate nutrient delivery to Spring Lake if the allowable development occurs. Additional build out scenarios included connecting more of the landscape to the lake through water diversion (such as culverts and roads). The development of a lake model allowed us to estimate phosphorus and algal changes within the lake based on various land use scenarios (Figure 4). Points displayed include (in order) undeveloped, current land use with 25% of the landscape using BMPs, current land use, built out watershed, and built out with two additional levels of connectedeness.

In Figure 4, the yellow line on the graph represent the proposed WDNR flag (warning) value for phosphorus in a drainage lake (28 ug/L)and the pink line shows the proposed WDNR criteria value for phosphorus (40 ug/L).

The goal for this plan is to reduce the average summer phosphorus concentrations to 35 ug/L and frequency of algae blooms to 39% of the

summer.

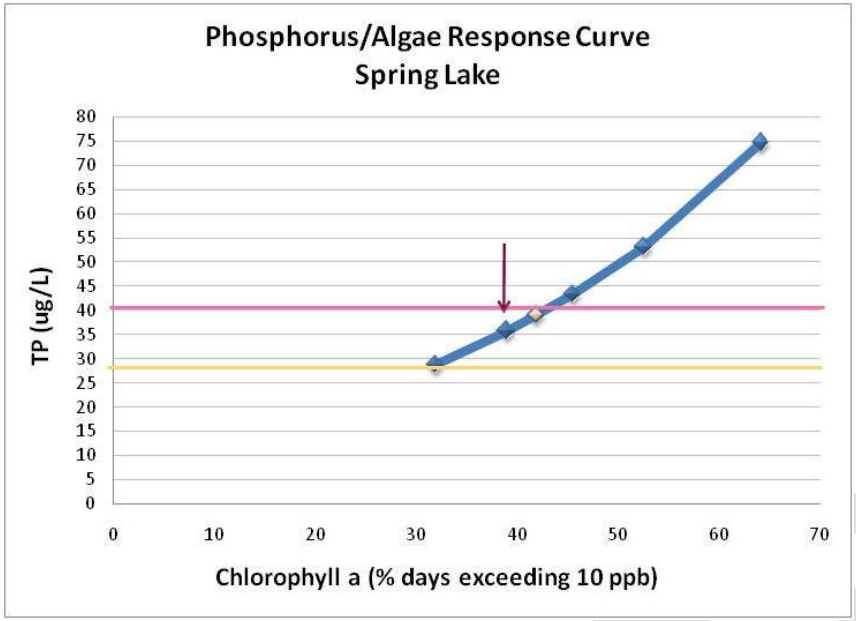


Figure 4. Phosphorus and related algae response to land use scenarios in the watershed

Recreation

According to respondents of the citizen survey**, the most popular activities at Spring Lake include fishing, enjoying wildlife, enjoying scenery, solitude, and ice fishing.**

Conflicts by users seems minimal on Spring Lake as very few survey respondents indicated that they were sometimes bothered by other lake users; the majority indicated that they saw others but were not bothered by them.

There were mixed perceptions about fishing quality by survey respondents. When asked to rate their fishing experiences in Spring Lake, 37% indicated fishing was fair, 30% indicated that fishing was very good, 27% indicated fishing was average, 3% indicated fishing was excellent and 3% indicated fishing was poor. The majority of survey respondents felt that the quality of fishing had declined over time and that aquatic plants, over fishing, and algae were attributed to the decline.

Tom Meronek, West Central Area Fisheries Manager, gave a brief overview of the fisheries on Spring Lake. The most recent fisheries survey of Spring Lake was conducted in 1985. Historically, Spring Lake has had a notable bluegill fishery. Spring Lake has also been and is currently stocked annually with trout. Survival rate of the stocked trout is uncertain due to the northern pike population present in the lake that most likely prey on them. Spring Lake is also not able to support a naturally reproducing trout population due to the fact that the lake is overall too warm, although cold pockets do exist.

Goals, Objectives and Actions

The overall goal for the Spring Lake Management Plan is to sustainably manage and protect the natural beauty of Spring Lake while improving fisheries and water quality.

The following goals, objectives and actions are derived from the values and concerns of the members of the Spring Lake Planning Committee and local citizens and are based on the science used to assess Spring Lake and its ecosystem. Implementing the goals, objectives and actions of the Spring Lake Management Plan will protect the scenic beauty, peacefulness, recreational opportunities, and will improve water quality, for current and future generations. These goals are intended to be met through implementation, education, encouragement, and incentives. Resources that are listed within the plan include primary organizations or individuals that would be able to provide information, suggestions, or services to accomplish the goals and objectives.

A management plan is a living document that changes over time to meet the current needs, challenges, and desires. **The goals, objectives, and actions listed in this plan will be reviewed by the Spring Lake planning committee, interested citizens, and representatives from municipalities and agencies annually in the fall and updated with any necessary changes.**

Aquatic Plants and Aquatic Invasive Species

In Spring Lake, fish and other aquatic or water dependent terrestrial life utilize aquatic plants for habitat, food, and spawning areas. Healthy aquatic plant communities, along with a vigilant watch, help to limit new aquatic invasive species from becoming established in Spring Lake. Most survey respondents didn't perceive the aquatic plants in Spring Lake as a nuisance. Currently the aquatic invasive species that are known on Spring Lake include Curly Leaf Pondweed and the Banded Mystery Snail. At this time, the 30 species aquatic plant community appears fairly stable.

Vision: The Spring Lake Planning Committee envisions a future of aquatic plant and algae control that meet the needs of the public as well as the needs of aquatic and terrestrial life and has no newly established aquatic invasive species.

Goal 1: Maintain the diversity and quality of native aquatic plants in Spring Lake.

Objective 1.1: Learn about the native aquatic plant communities in Spring Lake to understand what is present and if any additional protections are warranted.

Actions	Lead person/group	Start/end dates	Resources
Bogs and Wetlands around Spring Lake should be inventoried for additional species of aquatic plants.	Friends of Spring Lake make request of Dr. Freckmann	2010	Dr. Bob Freckmann – UWSP would do this if it was requested.
Learn about native and invasive aquatic plants in Spring Lake through plant identification workshops.	Friends of Spring Lake make request of Portage County AIS Specialist	2010	Portage County AIS Specialist
Develop and disseminate information about the importance and maintenance of bogs and wetlands around Spring Lake.	Friends of Spring Lake	2010	UWEX
Hire a consultant to conduct a plant survey on Spring Lake (Any survey conducted should utilize WDNR approved methods).	Friends of Spring Lake	2011	UWSP

Goal 2: Prevent any new aquatic invasive species from becoming established in Spring Lake.

Objective 2.1: Take steps to prevent any new aquatic invasive species from becoming established in Spring Lake and monitor existing aquatic plants.

Action	Lead person/group	Start/end dates	Resources
Learn to identify native and invasive species in Spring Lake through workshops annually.	Friends of Spring Lake	2010	Portage County AIS Specialist Dr. Freckmann, UWSP
Form a group of citizens to routinely monitor for new aquatic invasive species.	Friends of Spring Lake	Annually	Portage County AIS Specialist
Request the Town of Lanark to post a sign at all boat landings on Spring Lake about Aquatic Invasive Species (similar to signs posted at County boat landings).	Friends of Spring Lake	2010	Town of Lanark Portage County Parks Portage County AIS Specialist
Establish and implement a Clean Boats Clean Waters Program to prevent additional aquatic invasive species from entering and becoming established in the lake.	Friends of Spring Lake	2010	Portage County AIS Specialist
Annually map Curly Leaf Pondweed in Spring Lake in early June.	Friends of Spring Lake	Completed for 2009	Portage County AIS Specialist UWSP WDNR
Utilize the Aquatic Invasive Species Rapid Response Plan if new invasive species are found in Spring lake (see Appendix).	Friends of Spring Lake	Ongoing	Portage County AIS Specialist
Maintain and annually update the Aquatic Invasive Species Rapid Response Plan.	Friends of Spring Lake	Annually	Portage County AIS Specialist

Shorelands

Shorelands are some of the most important habitat for terrestrial and aquatic wildlife, including birds, near lakes. Intact vegetative shorelines also help to slow runoff moving to the lake and filter runoff before it enters the lake. Protecting and restoring shorelines help to provide scenery, solitude, and privacy, as well as natural space for lake residents to enjoy nature. Spring Lake is unique in that most of the developed properties are set back from the lake and have maintained more than a 35 foot vegetated buffer around the lake which provides privacy for landowners and lake users and creates the feeling of being on an undeveloped lake. Around Spring Lake approximately 97% or 7,257 feet of the 7,467 feet of shoreline around the millpond are considered healthy, undisturbed habitat comprised of a combination of native flowers, grasses, shrubs and trees. The remaining 3% of the shoreline has various levels of disturbance including two boat landings and one residential property. Fallen trees and branches that rest in the water provide habitat for young fish, frogs, turtles, birds, and other creatures.

Vision: The Spring Lake Planning Committee values the scenic beauty around Spring Lake, including the vegetated shorelines, the peacefulness of the lake and the clean water, and would like to see this maintained or in the few cases where disturbance occurs, improved.

Goal 3: Protect and restore healthy stable shoreland habitats near and around Spring Lake

Objective 3.1: Protect the healthy stable shorelands around Spring Lake

Actions	Lead person/group	Start/end dates	Resources
Talk with landowners around Spring lake to share information on vegetative buffers and increased setbacks and to find out intentions for protecting them.	Friends of Spring Lake	2010	Portage County Land Cons Dept North East Conservancy Trust North Central Conservancy Trust
Explore conservation easements for shoreline properties around Spring Lake.	Friends of Spring Lake	2011	North East Conservancy Trust North Central Conservancy Trust NRCS
Encourage landowners to protect steep shorelines on the north side of the lake through sharing information and working with the County.	Friends of Spring Lake	2010	Portage County Land Cons Dept Conservancy Trust
Pursue future shoreline protection strategies with the Town and County.	Friends of Spring Lake	2011	Portage County Town of Lanark UWEX Lakes/UWSP CLUE

Objective 3.2: Shorelands around Spring Lake will all meet state/county shoreland zoning ordinances

Actions	Lead person/group	Start/end dates	Resources
Provide information about the benefits of native shoreline buffers to shoreline owners through informational brochures, newsletters, and tours.	Friends of Spring Lake	Ongoing	UWSP, Town of Lanark, Portage County Planning and Zoning
Work to restore all shorelands to meet the County/State shoreland zoning ordinance (or better).	Friends of Spring Lake	Ongoing	Portage County Land Cons. Dept. Portage County Planning and Zoning WDNR

Critical Habitat

Critical habitat areas support wildlife habitat, provide mechanisms that protect water quality, harbor plant communities, and are especially susceptible to disruptions or development. Protection of these areas near Spring Lake is important because they exemplify the character and qualities of the lake as well as ensuring the long-term health of a lake.

Goal 4: Protect the critical habitat areas on Spring Lake.

Objective 4.1: Protect the critical habitat areas near Spring Lake that were identified in the Wisconsin DNR Critical Habitat Report and the Portage County Lake Study.

Actions	Lead person/group	Start/end dates	Resources
Review (and possibly endorse) the proposed critical habitat designations on Spring Lake when they become available.	Friends of Spring Lake	When critical habitat report is published	WI DNR
Seek conservation easements and/or stewardship funds for agreeable landowners who own property in critical habitat areas.	Friends of Spring Lake	After critical habitat report is published	North Central Conservancy Trust WDNR
Re-evaluate rules, ordinances, etc. to ensure they protect areas of critical habitat.	Friends of Spring Lake	After critical habitat report is published	Portage County Planning and Zoning Town of Lanark

Fisheries

Healthy lake ecosystems are valuable natural resources for all lake users. It is important to maintain a good fishery so that wildlife, anglers and families are able enjoy the fishery on Spring Lake, as fishing is the number one recreational activity on Spring Lake and is highly valued by lake users. A healthy fishery is comprised of healthy habitat, adequate forage, healthy spawning areas, and dynamic naturally reproducing fish populations. Survey respondents felt that the quality of fishing in Spring Lake was excellent, but had declined in recent years.

Goal 5: To have balanced healthy fish communities maintained through sustainable management practices

Objective 5.1: Protect and enhance fishery habitat in Spring Lake

Actions	Lead person/group	Start/end dates	Resources
Do not remove woody habitat that falls into the lake.	Friends of Spring Lake	Ongoing	WI DNR
Provide information to landowners and lake users about the benefits of woody materials as fish habitat.	Friends of Spring Lake	Ongoing	WI DNR Portage County Land Cons. Dept.

Objective 5.2: Determine the current characteristics of the fishery in Spring Lake and develop a sustainable management plan

Actions	Lead person/group	Start/end dates	Resources
Work with UWSP and WI DNR to conduct a fish survey on Spring Lake, Spring Creek, and Palmer's Pond to the dam that encompasses population counts, substrate and habitat assessments, and spawning habitat assessments.	Friends of Spring Lake	2010/2011	UWSP WDNR Izaac Walton League
Work with UWSP and WI DNR Develop a sustainable fisheries management plan that explores using funds previously used for fish stocking to pursue other management actions.	Friends of Spring Lake	2010/2011	Sportsmans Clubs
Revise size regulations as needed, based on results of fish survey.	Friends of Spring Lake	After fish survey	UWSP WNDR

Water Quality and Watershed Scale Land Use

Spring Lake is host to a wide variety of plants, insects, fish, amphibians, and a variety of other animals that all depend on good water quality. Survey respondents indicated that water quality influenced their enjoyment of the lake and impacted their perceived value of Spring Lake. The majority of survey respondents felt that the water quality in Spring Lake was good. Citizens who were familiar with the lake felt that overall the water quality in Spring Lake has stayed the same over time. Data shows that water quality in Spring Lake is beginning to degrade and could use improvement. Spring Lake currently has high concentrations of both phosphorus and nitrogen which can fuel excess plant and algae growth in the lake**.** Groundwater is the major source of nitrogen entering the lake. The group recognizes that changes in land use practices in the surface and groundwater watershed are needed to improve the water quality in Spring Lake.

Vision: The Spring Lake Planning Committee envisions improving the water quality in Spring Lake.

Goal 6: Reduce phosphorus concentrations in Spring Lake to 36 ug/L with algae blooms (chlorophyll a concentrations 10 ug/L) occurring 39% of the summer. This will be accomplished by reducing nutrient inputs through the implementation of BMPs on 25% of the agriculture and developed land in the watershed. We will know that we have achieved this goal when monitoring indicates that median summer (5 samples/summer) total phosphorus levels are less than 35 ug/L for 3 consecutive years.

Objective 6.1: Reduce nutrients that are applied to the Spring Lake watershed (s) landscape by partnering with watershed landowners and agencies that can provide assistance/information to landowners in the implantation of water quality based best management practices.

Action	Lead person/group	Start/end dates	Resources
Encourage the county to assist landowners in the development of water quality based nutrient management plans in the watersheds. Utilize a watershed phosphorus index of what are the largest phosphorus contributors to Spring Lake.	Friends of Spring Lake	2010	Portage County Land Cons. Dept. NRCS
Encourage landowners to work with the county or NRCS on erosion control methods and vegetated waterways around Spring Lake and in the watershed.	Friends of Spring Lake	Ongoing	Portage County Land Cons. Dept. NRCS

Action	Lead person/group	Start/end dates	Resources
Discourage the use of fertilizer on non-agricultural lands and encourage minimizing the use of fertilizer applied to agricultural lands in approved water quality based nutrient management plans.	Friends of Spring Lake	2010	Portage County Land Cons. Dept.
Work with UW Extension to encourage farmer education about BMP's.	Friends of Spring Lake		Portage County Land Cons. Dept. UWEX Agricultural Agent NRCS
Support current restrictions on livestock manure spreading near Spring Lake or waterways that drain to it.	Friends of Spring Lake		Portage County Land Cons. Dept.
Discuss nitrate reduction options with T. of Buena Vista and T. of Lanark Groundwater Citizen Advisory Committee reps.			

Objective 6.2: Reduce nutrient inputs from shoreline properties around Spring Lake

Action	Lead person/group	Start/end dates	Resources
Develop incentives to use. native vegetation buffers, native landscaping, and rain gardens to prevent runoff from shoreline properties from entering the lake.	Friends of Spring Lake		Portage County Land Cons. Dept. UWEX Lakes
Encourage limited use of fertilizer applications by farmers and homeowners, especially near shore.	Friends of Spring Lake		Portage County Land Cons. Dept. NRCS
Provide information to shoreland owners about less harmful	Friends of Spring Lake		UWSP

("green") products and household products that contain no phosphorus.			
Action	**Lead person/group**	**Start/end dates**	**Resources**
Educate about tertiary treatment options for septic systems around Spring Lake.	Friends of Spring Lake		Portage County Planning and Zoning Dept. Portage county Land Cons. Dept.

Objective 6.3: Monitor water quality in Spring Lake to measure success of implementation strategies and identify problems.

Action	**Lead person/group**	**Start/end dates**	**Resources**
Establish a citizen water quality monitoring program on Spring Lake to measure water clarity, phosphorus and chlorophyll a in the summer and nitrogen and phosphorus in the spring/fall.	Friends of Spring Lake		UWSP, WDNR

Objective 6.4: Towns of Buena Vista and Lanark will make informed decisions about land use in Spring Lake watersheds.

Action	**Lead person/group**	**Start/end dates**	**Resources**
Invite UWSP staff to present the results of the build-outs scenarios and related water quality results to the Town of Lanark and Buena Vista Boards and Plan Commissioners.	Friends of Spring Lake		UWSP Center for Land Use Education

Objective 6.5: Protect the healthy stable shorelands around Spring Lake

Actions	Lead person/group	Start/end dates	Resources
Talk with landowners around Spring lake to share information on vegetative buffers and increased setbacks and to find out intentions for protecting them.	Friends of Spring Lake		North East Conservancy Trusts North Central Conservancy Trusts
Encourage landowners to protect steep shorelines on the west and north side of the lake through sharing information and working with the county.	Friends of Spring Lake		Conservancy Trusts
Pursue future shoreline protection strategies with the Town and County.			Portage County Town of Lanark

Objective 6.6: Shorelands around Spring Lake will all meet state/county shoreland zoning ordinances

Actions	Lead person/group	Start/end dates	Resources
Provide information about the benefits of native shoreline buffers to shoreline owners through informational brochures, newsletters, and tours.	Friends of Spring Lake	Ongoing	UWSP, Town of Lanark, Portage County Planning and Zoning
Work to restore all shorelands to meet the County/State shoreland zoning ordinance (or better).	Friends of Spring Lake		Portage County Land Cons. Dept Portage County Planning and Zoning

Recreation

Spring Lake residents and users enjoy many different recreational opportunities on Spring Lake. Based on survey results, the most popular recreational activities on Spring Lake included fishing, enjoying wildlife, enjoying scenery, solitude, and ice fishing. Recreational needs and uses on Spring Lake will likely continue to increase as populations and development in the area increases. While there is currently a no wake rule in place on Spring Lake, the public and the Spring Lake Planning Committee would like to see better enforcement of this rule to the support the peaceful nature of the popular activities listed above.

Vision: The Spring Lake Planning Committee envisions keeping the peacefulness, scenic nature, and solitude of Spring Lake for future generations while supporting recreational uses of Spring Lake that do not cause conflicts among users.

Goal 7: Provide recreational opportunities on Spring Lake that do not conflict with the scenic nature and peacefulness of Spring Lake.

Objective 7.1: Provide recreational opportunities to enjoy Spring Lake while minimizing conflicts between users and protecting lake water quality and habitat.

Action	Lead person/group	Start/end dates	Resources
Request the Town of Lanark post a no-wake sign on Spring Lake at the boat landing on the north side of Spring Lake that cites state statute.	Friends of Spring Lake		Town of Lanark WDNR
Establish a group of citizens to monitor the no-wake rule on Spring Lake.	Friends of Spring Lake		WDNR Warden
Work with WDNR to make south side lake access carry-in only through some type of barricade and signage.	Friends of Spring Lake		Town of Lanark WDNR
Explore an electric motor-only rule on Spring Lake.	Friends of Spring Lake		Town of Lanark

Implementation

The implementation of the Spring Lake Management Plan will require the involvement of watershed residents, riparian landowners and lake users, and land use decisions made by Portage County officials and local town boards. The involvement of these multiple parties will ultimately help to make informed decisions that will result in a healthy ecosystem in Spring Lake that is enjoyed by many people.

Goal 8: Develop a core group of people that are interested in the health and well being of the Spring Lake ecosystem and continue activities that develop knowledge. No formal group currently exists on Spring Lake, but one is in the process of being formed.

Action	Lead person/group	Start/end dates	Resources
Establish a Friends of Spring Lake/Spring Creek organization that will reach out to all landowners in the Spring Lake and Spring Creek Watersheds. Notice of meetings will also be sent to the Town of Lanark Newsletter.	Margie Moore	First meeting will be held by May of 2010.	UWEX Lakes
Work with other lake and river citizens organizations that have similar goals.	Friends of Spring Lake		Friends of the Tomorrow/Waupaca River
Send representative to Lake Leaders Institute and/or State Lake convention.	Friends of Spring Lake		UWEX Lakes

Goal 9: Incorporate goals, objectives, and actions outlined in the Spring Lake Management Plan into local land management and comprehensive plans.

Action	Lead person/group	Start/end dates	Resources
Incorporate Spring Lake Management Plan into the Portage County Comprehensive Plan and the Portage County Land Management Plan			Portage County
Incorporate Spring Lake Management Plan into the Town of Lanark and Town of Buena Vista Comprehensive Plans			Town of Lanark Town of Buena Vista

Spring Lake Aquatic Invasive Species Rapid Response Plan 2009

Survey/Monitor

1. **Learn to survey/monitor the lake** from:

   Water Resources Management Specialist
   Wisconsin Dept. of Natural Resources
   Scott Provost
   473 Griffith Ave.
   Wisconsin Rapids, WI, 54494
   Phone: 715-421-7881
   E-Mail: Scott.provost@wisconsin.gov

   Portage County Aquatic Invasive Species (AIS) Coordinator
   Golden Sands RC& D
   1462 Strongs Ave.
   Stevens Point, WI 54481
   Phone: 715-343-6278
   E-Mail: skawinsp@co.portage.wi.us

2. **Survey the Lake monthly/seasonally/annually**

Here Is What to Do When You Find a Suspected Invasive Species

1. **Collect Specimens or Take Pictures**

   - Collect, press and dry a complete sample. This method is best because a plant expert can then examine the specimen

Or --

- Collect a fresh sample. Enclose in a plastic bag with a moist paper towel and refrigerate.

Or --

- Take detailed photos (digital or film) and send them by mail or email.

Regardless of method used, provide as much information as possible. Try to include flowers, seeds or fruit, buds, full leaves, stems roots and other distinctive features. In photos, place a coin, pencil or ruler for scale. Deliver or send specimen ASAP.

Note Location
(Provide one or more of the following)

- Latitude & Longitude
- UTM (Universal Transverse Mercator) coordinates
- County, Township, Range, Section, Part-section
- Precise written site description, noting nearest city & road names, landmarks, local topography

If possible, give the exact geographic location using a GPS (global positioning system) unit, topographic map, or the Wisconsin Gazetteer map book. If using a map, include a photocopy with a dot showing the plant's location. You can use TopoZone.com to find the precise location on a digital topographic map. Click the cursor on the exact collection site and note the coordinates (choose UTM or Latitude/Longitude).

Spring Lake Aquatic Invasive Species Rapid Response Plan 2009

2. **To Positively I.D. the species send or bring specimen and additional information**
    - Collection date & county
    - Your name, address, phone, email
    - Exact location (Latitude/Longitude or UTM preferred, or Township/Range/Section)
    - Plant name (common or scientific)
    - Land ownership (if known)
    - Population description (estimate number of plants, area covered)
    - Habitat type(s) where found (forest, field, prairie, wetland, open water)

Send or bring specimen to:

Portage County AIS Coordinator
Golden Sands RC& D
1462 Strongs Ave.
Stevens Point, WI 54481
Phone: 715-343-6214
E-Mail : skawinsp@co.portage.wi.us

UW-Stevens Point Herbarium
301 Daniel O. Trainer Natural Resources Building
Stevens Point, WI 54481
Phone: 715-346-4248
E-Mail: ejudziew@uwsp.edu

Wisconsin Dept. Natural Resources
Invasive Plant Education, Early Detection, and Mapping Specialist
Brendon Panke
WI Dept. of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921
Phone: (608) 267-7438
E-Mail: invasiveplants@mailplus.wisc.edu

3. **Once the specimen is dropped off or sent for confirmation, make sure to contact:**
Portage County AIS Coordinator
Golden Sands RC& D
Contact: Paul Skawinski
Address: 1462 Strongs Ave. Stevens Point, WI 54481
Phone: 715-343-6214
E-Mail : skawinsp@co.portage.wi.us

4. **If an invasive species is confirmed, Paul Skawinski will contact the following people along with the contact list of citizens.**

Wisconsin Department of Natural Resources
Water Resources Management Specialist
Scott Provost
473 Griffith Ave.
Wisconsin Rapids, WI, 54494
Phone: 715-421-7881
E-Mail: Scott.provost@wisconsin.gov
Who will contact them: Portage County AIS Coordinator

The town in which the waterbody is situated
Town of: Lanark
Contact: Theodore Marquardt - Chairperson
Phone: 715-366-2283
Who will contact them: Portage County AIS Coordinator

Town of: Buena Vista
Contact: Paul Cieslewicz - Chairperson
Phone: 715-366-4812 or 715-498-7551
Who will contact them: Portage County AIS Coordinator

Spring Lake Aquatic Invasive Species Rapid Response Plan 2009

University of Wisconsin-Stevens Point – Water Resource Scientist
Contact: Nancy Turyk
Address: 216 TNR 800 Reserve St. Stevens point, WI 54481
Telephone: 715-346-4155
E-mail: pclakes@uwsp.edu
Who will contact them: Portage County AIS Coordinator

Local Residents (See attached contact sheet)
Who will contact them: Portage County AIS Coordinator

Other Contacts of Interest

Newspapers
Who will contact them: Portage County AIS Coordinator
Amherst Community Spirit
Portage County Gazette
Stevens Point Journal

Post notice at the access points to the waterbody

Spring Lake Resident Contact Sheet

Name (First Last)	Address	Phone	E-Mail
Jerry & Rose Barbian	8846 Spring lake Rd. Amherst, WI	715-824-5188	Barbians2004@yahoo.com
Randy Kwiatowksi	9259 Spring Creek Rd. Amherst, WI	715-824-2088	randyk@jay-mar.com
John Droske	8840 Spring lake Rd. Amherst, WI	715-498-5081	johndroske@charter.net
Margaret Moore	5620 Riveredge Rd. Waunakee, WI 53597	608-850-5048	mimoore@TDS.net or call 608-712-7628

Literature Cited

Fassbender, R.L., and L.M. Nelson. 1971. Surface Water Resources of Portage County. Wisconsin Department of Natural Resources, Madison, Wisconsin.

Turyk, N; R. Bell; R. Cook; T. Ginnett; R. Crunkilton; L. Markham; P. McGinle; B. Shaw; and E. Wild; 2006. Final report to Portage County and Wisconsin DNR. http://www.co.portage.wi.us/plzo/lakes.html

Glossary

Algae:

One-celled (phytoplankton) or multicellular plants either suspended in water (Plankton) or attached to rocks and other substrates (periphyton). Their abundance, as measured by the amount of chlorophyll a (green pigment) in an open water sample, is commonly used to classify the trophic status of a lake. Numerous species occur. Algae are an essential part of the lake ecosystem and provides the food base for most lake organisms, including fish. Phytoplankton populations vary widely from day to day, as life cycles are short.

Atrazine:

A widely used herbicide.

Blue-Green Algae:

Algae that are often associated with problem blooms in lakes. Some produce chemicals toxic to other organisms, including humans. They often form floating scum as they die. Many can fix nitrogen (N2) from the air to provide their own nutrient.

Calcium (Ca++):

The most abundant cation found in Wisconsin lakes. Its abundance is related to the presence of calcium-bearing minerals in the lake watershed. Reported as milligrams per liter (mg/1) as calcium carbonate (CaCO3), or milligrams per liter as calcium ion (Ca++).

Chloride (Cl-):

Chlorine in the chloride ion (Cl-) form has very different properties from chlorine gas (Cl2), which is used for disinfecting. The chloride ion (Cl-) in lake water is commonly considered an indicator of human activity. Agricultural chemicals, human and animal wastes, and road salt are the major sources of chloride in lake water.

Chlorophyll a:

Green pigment present in all plant life and necessary for photosynthesis. The amount present in lake water depends on the amount of algae and is therefore used as a common indicator of algae and water quality.

Clarity:

see "Secchi disc."

Color:

Measured in color units that relate to a standard. A yellow-brown natural color is associated with lakes or rivers receiving wetland drainage. The average color value for Wisconsin lakes is 39 units, with the color of state lakes ranging from zero to 320 units. Color also affects light penetration and therefore the depth at which plants can grow.

Concentration units:

express the amount of a chemical dissolved in water. The most common ways chemical data is expressed is in milligrams per liter (mg/l) and micrograms per liter (ug/l). One milligram per liter is equal to one part per million (ppm). To convert micrograms per liter (ug/l) to milligrams per liter (mg/l), divide by 1000 (e.g. 30 ug/l = 0.03 mg/1). To convert milligrams per liter (mg/l) to micrograms per liter (ug/l), multiply by 1000 (e.g. 0.5 mg/l = 500 ug/l). Microequivalents per liter (ueq/l) is also sometimes used, especially for alkalinity; it is calculated by dividing the weight of the compound by 1000 and then dividing that number into the milligrams per liter.

Cyanobacteria:

See “Blue-Green Algae”

Dissolved Oxygen:

The amount of oxygen dissolved or carried in the water.

Drainage Basin:

The total land area that drains towards a lake.

Drainage lakes:

Lakes fed primarily by streams and with outlets into streams or rivers. They are more subject to surface runoff problems but generally have shorter residence times than seepage lakes. Watershed protection is usually needed to manage lake water quality.

Emergent:

A plant rooted in shallow water and having most of its vegetative growth above water.

Eutrophication:

The process by which lakes and streams are enriched by nutrients, and the resulting increase in plant and algae. The extent to which this process has occurred is reflected in a lake's trophic classification: oligotrophic (nutrient poor), mesotrophic (moderately productive), and eutrophic (very productive and fertile).

Groundwater drainage lake:

Often referred to a spring-fed lake, has large amounts of groundwater as its source, and a surface outlet. Areas of high groundwater inflow may be visible as springs or sand boils. Groundwater drainage lakes often have intermediate retention times with water quality dependent on groundwater quality.

Hardness:

The quantity of multivalent cations (cations with more than one +), primarily calcium (Ca++) and magnesium (Mg++) in the water expressed as milligrams per liter of CaCO3. Amount of hardness relates to the presence of soluble minerals, especially limestone, in the lake watershed.

Intermittent:

Coming and going at intervals, not continuous.

Macrophytes:

see "Rooted aquatic plants."

Marl:

White to gray accumulation on lake bottoms caused by precipitation of calcium carbonate (CaCO3) in hard water lakes. Marl may contain many snail and clam shells, which are also calcium carbonate. While it gradually fills in lakes, marl also precipitates phosphorus, resulting in low algae populations and good water clarity. In the past, marl was recovered and used to lime agricultural fields.

Mesotrophic:

A lake with an intermediate level of productivity. Commonly a clear water lakes and ponds with beds of submerged aquatic plants and mediums levels of nutrients. See also “eutrophication”.

Nitrate (NO3-):

An inorganic form of nitrogen important for plant growth. Nitrate often contaminates groundwater when water originates from manure, fertilized fields, lawns or septic systems. High levels of nitrate-nitrogen (over 10 mg/L) are dangerous to infants and expectant mothers. A concentration of nitrate-nitrogen (NO3-N) plus ammonium-nitrogen (NH4-N) of 0.3 mg/L in spring will support summer algae blooms if enough phosphorus is present.

Oligotrophic:

Lakes with low productivity, the result of low nutrients. Often these lakes have very clear waters with lots of oxygen and little vegetative growth. See also “eutrophication”.

Overturn:

Fall cooling and spring warming of surface water increases density, and gradually makes temperature and density uniform from top to bottom. This allows wind and wave action to mix the entire lake. Mixing allows bottom waters to contact the atmosphere, raising the water's oxygen content. However, warming may occur too rapidly in the spring for mixing to be effective, especially in small sheltered kettle lakes.

Phosphorus:

Key nutrient influencing plant growth in more than 80% of Wisconsin lakes. Soluble reactive phosphorus is the amount of phosphorus in solution that is available to plants. Total phosphorus includes the amount of phosphorus in solution (reactive) and in particulate form.

Rooted Aquatic Plants: (macrophytes)

Refers to higher (multi-celled) plants growing in or near water. Macrophytes are beneficial to lakes because they produce oxygen and provide substrate for fish habitat and aquatic insects. Overabundance of such plants, especially problem species, is related to shallow water depth and high nutrient levels.

Secchi Disc (Secchi Disk):

An 8-inch diameter plate with alternating quadrants painted black and white that is used to measure water clarity (light penetration). The disc is lowered into water until it disappears from view. It is then raised until just visible. An average of the two depths, taken from the shaded side of the boat, is recorded as the Secchi disc reading. For best results, the readings should be taken on sunny, calm days.

Sedimentation:

Materials are deposited after settling out of the water.

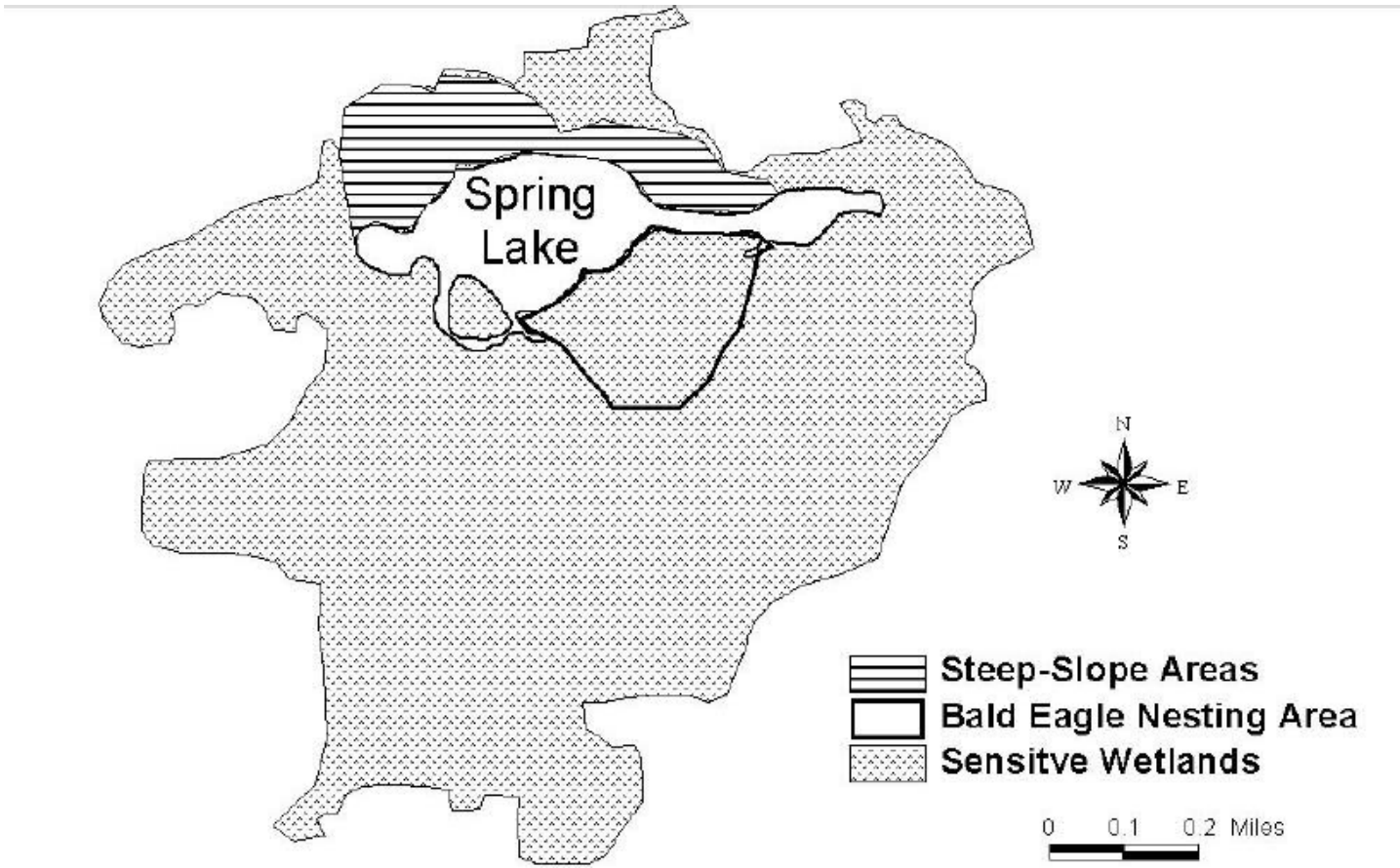
Stratification:

The layering of water due to differences in density. Water's greatest density occurs at 39 Deg.F (4 Deg.C). As water warms during the summer, it remains near the surface while colder water remains near the bottom. Wind mixing determines the thickness of the warm surface water layer (epilimnion), which usually extends to a depth of about 20 ft. The narrow transition zone between the epilimnion and cold bottom water (hypolimnion) is called the metalimnion or thermocline.

Watershed: See “drainage basin”

Appendix A

Spring Lake Sensitive Areas



Appendix B

Spring Lake Reptile and Amphibian Habitat (highlighted in red)