Loveless Lake Management Plan, 2016-2021



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Table of Contents

Background Information on Lakes, Studies, and Management Plans 5
Purpose of the Study 6
Introduction to Loveless Lake 7
Lake Classification 8
Designated Waters 9
Impaired Waters 10
Previous Lake Studies 11
Fishery 13
Lake Resident Survey 14
Lake Level and Precipitation Monitoring 18
Lake Mixing and Stratification: Background Information 19
Loveless Lake Deep Hole Sampling Procedure 21
Loveless Lake Deep Hole 2014 Summary Results 21
Temperature 22
Dissolved Oxygen 23
Secchi Depth 24
Phosphorus 26
Chlorophyll 28
Trophic State Index 30
Loveless Lake Outlet Sampling Procedure and Data 32
Stormwater Sampling 33
Land Use and Water Quality 36
Shoreline Inventory 38
Land Use in the Loveless Lake Watershed 44
Watershed and Lake Modeling 46
Nutrient Budget Summary 50
Areas Providing Water Quality Benefits to Loveless Lake 51
Summary of Rules and Legislation 52
Lake Management Plan 58

Appendixes

Appendix A: Lake Resident Survey and Results
Appendix B: Lake Level and Precipitation Monitoring
Appendix C: Deep Hole Chemical and Physical Data
Appendix D: Outlet Chemical and Physical Data
Appendix E: Stormwater Chemical and Physical Data
Appendix F: Shoreline Inventory
Appendix G: Modeling Data
Appendix H: Meeting Agendas and Materials
Appendix I: Newsletters
Appendix J: Public Comments

Background Information on Lakes, Studies, and Management Plans

Lakes are a product of the landscape they are situated in and of the actions that take place on the land which surrounds them. Factors such as lake size, lake depth, water sources, and geology all cause inherent differences in lake quality. As a result, lakes situated within feet of others can differ profoundly in the uses they support.

A landscape can be divided into watersheds and subwatersheds. These areas define the land that drains to a particular lake, flowage, stream, or river. Watersheds that preserve native vegetation and minimize impervious surfaces (cement, concrete, and other materials that water can't permeate) are less likely to cause negative impacts on lakes, rivers, and streams. This arises because rain and melting snow eventually end up in lakes and streams through surface runoff or groundwater infiltration. Rain and melting snow entering a waterbody is not inherently problematic. However, water has the ability to carry nutrients, bacteria, sediments, and chemicals into a waterbody. These inputs can impact aquatic organisms such as insects, fish, and wildlife and—especially in the case of the nutrient phosphorus—fuel problematic algae blooms.

Lake studies often examine the underlying factors that impact a lake's health, such as lake size, depth, water sources, and the land use in a lake's watershed. Many forms of data can be collected and analyzed to gauge a lake's health including: physical data (oxygen, temperature, etc.), chemical data (including nutrients such a phosphorus and nitrogen), biological data (algae, zooplankton, and aquatic plants), and land use within a lake's watershed.

Lake studies identify challenges and threats to a lake's health along with opportunities for improvement. These studies identify practices already being implemented by watershed residents to improve water quality and areas providing benefits to a lake's ecosystem. Additionally, these studies quantify practices or areas on the landscape that have the potential to negatively impact the health of a lake and identify best management practices for improvement.

The end product of a lake study is a **lake management plan** which identifies goals, objectives, and action items to either maintain or improve the health of a lake. These goals should be realistic based on inherent lake characteristics (lake size, depth, etc.) and should align with the goals of watershed residents. A management plan is designed to be a working document that is used to guide the actions which take place to manage a specific lake.

Purpose of the Study

Included in this document are the data and conclusions drawn from a 2014 lake study completed by the Polk County Land and Water Resources Department and Loveless Lake Association volunteers. This study collected and analyzed the following data to aid in the creation of a lake management plan for Loveless Lake:

- ✓ Lake resident survey
- ✓ Lake level and precipitation data
- ✓ In lake physical and chemical data
- ✓ Tributary monitoring results
- ✓ Stormwater sampling
- ✓ Shoreline land use results
- ✓ Watershed and subwatershed land use

Whenever possible, past lake studies completed on Loveless Lake are used as a baseline comparison for this study.

Introduction to Loveless Lake

Loveless (Bass) Lake (WBIC 2620000) is located in the Town of Balsam Lake (T34N, R17W) in sections 8 and 17, Polk County, Wisconsin. The lake has a surface area of 132 acres and a maximum depth of 20 feet. Water leaves Loveless Lake through an outlet on the southeast side of the lake, which drains to Little Bass Lake. The watershed to lake area ratio is approximately 3:1.

A public boat landing is located on the southeast side of the lake.

Loveless Lake Facts and Figures [1]

Area: 132 acres
Maximum depth: 20 feet
Mean depth: 15 feet
Bottom: 0% sand, 0% gravel, 0% rock, 99% muck
Hydrologic lake type: drainage [2]
Fish: Panfish, largemouth bass, and northern pike
Invasive species: curly-leaf pondweed, found in 2004
Trophic status: eutrophic

Oligotrophic lakes are generally clear, deep, and free of plants and large algae blooms.

Mesotrophic lakes lie between oligotrophic and eutrophic lakes. They usually have productive fisheries, healthy plant life, and occasional algae blooms.

Eutrophic lakes are generally high in nutrients and support a large number of plant and animal populations. They are usually very productive and subject to frequent algae blooms. Lakes can also be hypereutrophic. Hypereutrophic lakes are characterized by dense algae communities and can experience heavy blooms throughout the summer.

[1] http://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2620000&page=facts
[2] Drainage lakes are fed by streams, groundwater, precipitation, and runoff and are drained by a stream

Lake Classification

Lake classification in Polk County is a relatively simple model that considers:

- ✓ Lake surface area
- ✓ Maximum depth
- ✓ Lake type
- ✓ Watershed area
- ✓ Shoreline irregularity
- ✓ Existing level of shoreline development

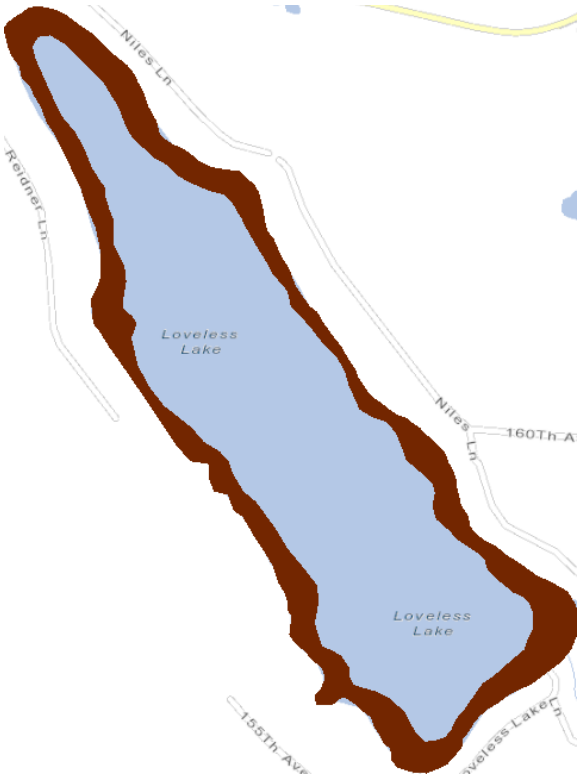
These parameters are used to classify lakes as class one, class two, or class three lakes. Loveless Lake is classified as a class one lake.

Class one lakes are large and highly developed.
Class two lakes are less developed and more sensitive to development pressure.
Class three lakes are usually small, have little or no development, and are very sensitive to development pressure.

Designated Waters

A designated water is a waterbody with special designations that affect permit requirements.

The entire shoreline of Loveless Lake is designated as a Public Rights Feature Sensitive Area of the Lake. The shoreline area provides the necessary requirements for bass, panfish, and northern pike spawning and nursery areas. Wildlife such as eagles, loons, herons, waterfowl, songbirds, furbearers, turtles, and amphibians rely upon this area for habitat. Additionally, the aquatic vegetation offers water quality or erosion control benefits. [3]



Special concern species listed in the Town of Balsam Lake (T34N, R17W) include: Trumpeter Swan (SC/M) and Prairie Skink (SC/H). [4]

[3] Loveless Lake Sensitive Area Survey Report and Management Guidelines http://dnr.wi.gov/lakes/criticalhabitat/Project.aspx?project=10419334

[4] http://dnr.wi.gov/topic/NHI/Data.asp?tool=township&mode=detail

Impaired Waters

Wisconsin lakes, rivers, and streams are managed to determine if their conditions are meeting state and federal water quality standards. Water samples are collected through monitoring studies and results are compared to guidelines designed to evaluate conditions as compared to state standards. General assessments place waters in four different categories: poor, fair, good, and excellent. The results of assessments can be used to determine which actions will ensure that water quality standards are being met (anti-degradation, maintenance, or restoration).

If a waterbody does not meet water quality standards, it is placed on Wisconsin's Impaired Waters List under the Federal Clean Water Act, Section 303(d). Every two years, the State of Wisconsin is required to submit list updates to the United States Environmental Protection Agency for approval.

Waterbodies can be listed as impaired based on pollutants such as total phosphorus, total suspended solids, and metals. Wisconsin waters are each assigned four uses (fish and aquatic life, recreation, public health and welfare, and wildlife) that carry with them a set of goals.

Impairment thresholds vary for each use and vary based on lake characteristics such as whether a waterbody is shallow versus deep and whether a waterbody is a drainage lake versus a seepage lake.

Loveless Lake was assessed during the 2012, 2014, and 2016 listing cycle. In 2012 both total phosphorus and chlorophyll data exceeded the Wisconsin Consolidated Assessment and Listing Methodology (WisCALM) thresholds for total phosphorus[5] and chlorophyll[6] for recreational use. In both 2014 and 2016, chlorophyll data exceeded the WisCALM thresholds for recreational use, however; total phosphorus data did not exceed the thresholds.

[5] 40 µg/L for recreation use and 100 µg/L for fish and aquatic life use

[6] 30% of days in the sampling season have nuisance algal blooms with chlorophyll values greater than 20 µg/L

Previous Lake Studies

Two previous WDNR grants were received to study Loveless Lake. The first grant was received in 2001 with the study being conducted by UW-Stevens Point and the Polk County Land and Water Resources Department (LWRD). The second grant was received in 2005 with the study being completed by LWRD.

Data for the 2001 grant was collected over the 2002 sampling season by LWRD and lake volunteers. Mid-lake water quality data included temperature, dissolved oxygen, specific conductance, secchi depth, chlorophyll, phosphorus, alkalinity, calcium, total hardness, and nitrogen. Additional data was collected to analyze lake level and precipitation, lake sediment, and aquatic macrophytes. The study also included a landowner survey and phosphorus modeling.

The final report indicated six steps that should be taken to protect and improve Loveless Lake:

- ✓ Long term in-lake monitoring
- ✓ Retaining the natural state of the north end of the lake, an area of deep groundwater inflow
- ✓ Implementing best management practices where development occurs and mitigating existing impervious surfaces to increase water infiltration
- ✓ Protecting existing terrestrial and aquatic plants and restoring 35 foot wide shoreland buffers on individual lots
- ✓ Minimizing disturbances through a restriction on boating
- ✓ Cleaning and stabilizing the culvert and road ditches on Niles Lane to prevent additional sediment loading and flooding

Data for the 2005 grant was collected over the 2006 sampling season. Mid-lake water quality data included temperature, secchi depth, chlorophyll, phosphorus, total hardness, nitrogen, and chloride. Data was collected to analyze lake level and precipitation, phytoplankton, zooplankton, macroinvertebrates, aquatic macrophytes, and terrestrial vegetation. The study also included phosphorus modeling which indicated that total phosphorus loading had increased since the 2002 study.

The study developed twenty management recommendations including:

- ✓ Pursuing a targeted runoff management grant
- ✓ Educating public and citizenry
- ✓ Monitoring aquatic plants
- ✓ Maintaining 35 foot buffers on individual lots
- ✓ Clearing road ditches of leaf debris and organic matter
- ✓ Completing a food web analysis
- ✓ Monitoring in-lake data
- ✓ Pursing a recreational survey
- ✓ Limiting impervious surfaces on individual properties
- ✓ Following VHS rules
- ✓ Installing proper erosion control measures for new developments
- ✓ Maintaining riparian vegetation, aquatic plants, and coarse woody habitat

- ✓ Implementing agricultural best management practices
- ✓ Developing relationships with lake organizations
- ✓ Providing information through newsletters and conferences
- ✓ Monitoring the biological community
- ✓ Educating new residents regarding local zoning laws
- ✓ Eliminating phosphorus fertilizers in shoreland areas
- ✓ Maintaining and checking septic systems
- ✓ Inspecting boating and fishing equipment for aquatic invasive species

Fishery

A fish survey was last completed on Loveless Lake by WDNR in September 1997. At this time, Loveless Lake supported a generally desirable fish population. The lake is now on a 12 year sampling rotation and is next scheduled to be surveyed in 2018.

Loveless Lake is one of the few lakes in the area that receives maintenance stocking of northern pike. The 1997 survey indicated that northern pike, along with largemouth bass, were present in good numbers and the size distributions of their populations were good. More large northern pike were present in the survey as compared to previous surveys, indicating that fishing regulations may have created a higher quality fishery. Total bass numbers were down in 1997 as compared to previous surveys, although the difference is likely due to natural population fluctuations. Consistent with most past surveys, bluegill size distribution in 1997 was only fair.

Lake Resident Survey

A Wisconsin Department of Natural Resources approved sociological survey was mailed to one hundred twenty-three property owners on Loveless Lake in May 2014. A second mailing was conducted in May because the first survey came apart in the mail. One survey came back noting that the respondent no longer lived on the lake so the sample size was reduced to one hundred twenty-two. Fifty-six surveys were returned (46% response rate) and data was entered and analyzed.

The survey was divided into three main sections: properties and property owners, property owner concerns about Loveless Lake, and willingness to contribute to maintaining and improving Loveless Lake.

Properties and property owners

Survey respondents have owned their property on Loveless Lake for an average of 21 years. The majority of respondents use their property part time, either as a weekend, vacation, and/or holiday residence (67%) or as a seasonal residence (11%). Less than one quarter (18%) use their property as a year round residence. Properties on Loveless Lake are used 139 days per year and occupied by 3 people.

Nearly two thirds of respondents characterized their property as having an even mix of lawn and trees (64%) and nearly one quarter characterized their property as mostly trees, shrubs, or meadow (wild and un-mowed) (22%). Nine percent characterized their property as mostly lawn and 4% characterized their property as mostly hard surfaces such as rooftops, driveways, and patios.

Respondents were asked to describe the first 35 feet of their shoreline. Nearly three quarters indicated that this area contained un-mowed vegetation (70%) and one quarter indicated that this area contained shrubs and trees (25%). Fewer respondents indicated the shoreland area contained undisturbed woods (17%) and a buffer zone/shoreline restoration (11%). Over one quarter indicated that the first 35 feet of their shoreline contained mowed lawn (28%) and stabilizing rip rap (28%). Nearly half of respondents have a pier or dock on their shoreline (47%).

None of the survey respondents use fertilizers containing phosphorus on their shorelines. Two-thirds don't use fertilizer (68%) and the remaining one-third use zero phosphorus fertilizer (32%).

Respondents were asked to rank their top three reasons for owning property on Loveless Lake from a list of 12 reasons. To analyze this data, each reason ranked first received 3 points, each reason ranked 2nd received 2 points, and each reason ranked third received 1 point. Total points were then added to determine a final rank by points. The most important reasons respondents own property on or near Loveless Lake are lake lifestyle (117 points) and scenic beauty/viewing nature (75 points).

What are the most important reasons you own property on or near Loveless Lake?	Points
Lake lifestyle	117
Scenic beauty/viewing nature	75
Fishing	32
Motorized water sports	31
Entertaining	22
Non-motorized water sports	14
Rural lifestyle	11

Financial (work or investment)	6
Winter activities	4
Sense of community	1
Farming	0
Hunting	0

The survey asked respondents which recreational activities they enjoy on Loveless Lake. Activities enjoyed by over half of respondents include: enjoying the view (83%), enjoying peace and tranquility (80%), swimming (76%), motorized boating (72%), open water fishing (67%), and observing wildlife (61%). Activities enjoyed by less than half of respondents include: non-motorized boating (48%), jet skiing/water boarding/waterskiing (35%), ice fishing (30%), cross country skiing (20%), snowmobiling (17%), and sailing or windsurfing (11%).

Property owner concerns about Loveless Lake

Respondents were asked to rank their degree of concern with sixteen issues as high, medium, low, issue exists but isn't a concern, and issue doesn't exist. Responses for this question were analyzed using a point system. Each issue ranked as high received 4 points, as medium received 3 points, as low received 2 points, as exists but not a concern received 1 point, and as not an issue received 0 points. Total points were averaged to determine a final rank.

Issues with a final ranking of medium/high concern included: excessive algae blooms, expansion of current invasive species, lack of water clarity or quality, decrease in overall lake health, increased nutrient pollution, excessive aquatic plant growth, and new invasive species entering the lake.

What is your degree of concern with each issue?	Rank
Excessive algae blooms	3.5
Expansion of current invasive species (curly leaf pondweed)	3.4
Lack of water clarity or quality	3.3
Decrease in overall lake health	3.3
Increased nutrient pollution	3.2
Excessive aquatic plant growth	3.2
New invasive species entering the lake	3.1
Loss of natural scenery/beauty	2.6
Decreased property values	2.6
Decreased fisheries	2.5
Increased development	2.5
Excessive noise level on the lake	2.4
Decreased wildlife populations	2.2
Unsafe use of motorized water craft	2.1
Disregard for slow-no-wake zones	2.1
Decreased lake level	2.0

Over half of survey respondents described the current water quality on Loveless Lake as fair (52%) and nearly one-third described the quality as good (30%). Of the remaining respondents, more described water quality as poor (11%) as compared with excellent (7%). A very small minority of respondents

described some improvement in water quality since living on the lake (2%). More noticed no change in water quality (35%), slightly degraded water quality (39%), and greatly degraded water quality (17%).

Over half of respondents believe there are too many plants in Loveless Lake (58%). This compares with one third of respondents who believe there are a healthy amount of plants in Loveless Lake (34%). The remaining 8% of respondents believe there are too few plants in Loveless Lake.

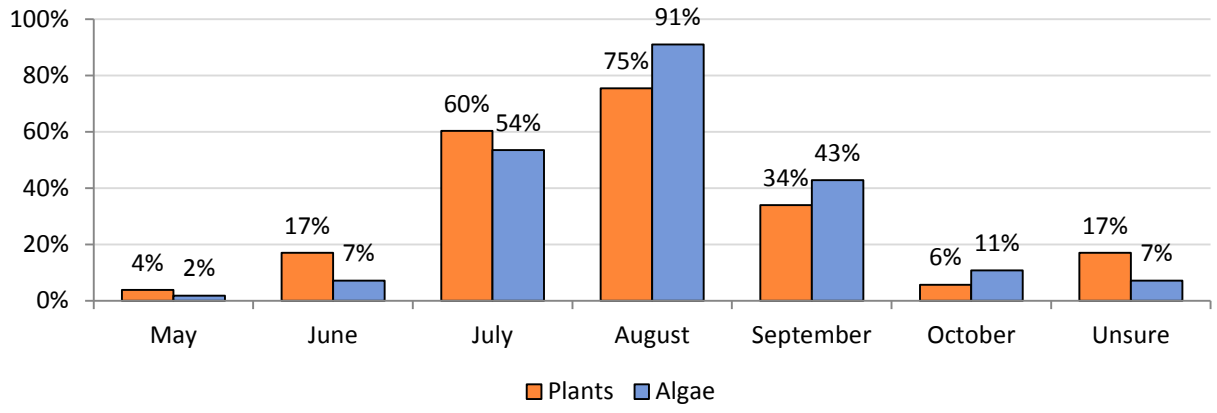
Respondent were asked which months of the year aquatic plants are problematic in Loveless Lake. Aquatic plants are considered problematic by three quarters of respondents in August (75%), two-thirds in July (60%), and one-third in September (34%). Fewer respondents described aquatic plants as problematic in May (4%), June (17%), and October (6%).

Over three-quarters of survey respondents indicated that swimming (83%) was impaired by aquatic plants on Loveless Lake and over half (57%) indicated that their overall enjoyment of the lake was impaired by aquatic plants. Close to half of respondents indicated that navigation (55%), boating (48%), and fishing (45%) are not impaired by aquatic plants.

Respondents were also asked which months of the year algae are problematic on Loveless Lake and which uses are impaired by algae. Algae was described as problematic in August by an overwhelming majority of respondents (91%). Close to half of respondents described algae as problematic in July (54%) and September (43%).

Uses most impaired by algae on Loveless Lake are swimming (91%), overall enjoyment of the lake (78%), dogs/animals using the water (47%), and fishing (44%). Half of respondents believe boating (50%) and navigation (55%) are not impaired by algae growth. Around one-third of respondents were unsure if fishing (36%), navigation (29%), and dogs/animals using the water (29%) were impaired by algae.

Which months of the season do you consider aquatic plant and algae growth to be problematic on Loveless Lake?



Loveless Lake survey respondents were divided in describing the current amount of mowed lawn on the shoreline of Loveless Lake. Nearly equal numbers of respondents felt there was too much lawn (34%), just the right amount of lawn (36%), or were unsure (29%). Only 2% of respondents felt there was not enough lawn on Loveless Lake. Two thirds of respondents believe that shoreline buffers, rain gardens,

and native plants have a positive impact on the water quality of Loveless Lake regardless of how many property owners participate (67%). Around one-quarter (22%) of respondents believe the impact is positive but only if all property owners participate.

Survey respondents were asked to indicate their familiarity with a list of landscaping practices designed to reduce runoff from their property and whether they had installed or were planning on installing each practice. Nearly two-thirds of respondents (61%) have already installed a native shoreline buffer or planting on their property and one quarter (25%) have installed water diversions (berms). Although over half of respondents are familiar with rain barrels (65%) and rain gardens (57%) very few have installed these practices (13% and 11%, respectively) or are planning to install them (12% and 11%, respectively). Many respondents are unfamiliar with infiltration/rock pits (40%), permeable pavers (38%), water diversions (27%), and rain gardens (21%) suggesting a possible information and education need.

Cost is the most common reason respondents have not installed practices to reduce waterfront runoff on their property (62%). Additionally, one-third of respondents were unsure how to install practices (36%). Fewer respondents indicated that their property doesn't impact the lake (13%) and that they don't believe the practices will help to improve water quality (13%).

The survey asked respondents which activities should be completed by the Loveless Lake Association to manage the lake. With the exception of enforcing slow-no-wake zones, all activities were supported by over half of survey respondents. Efforts supported by the most respondents include programs to prevent and monitor invasive species (83%), offering incentives to property owners for the installation of shoreline buffers and rain gardens (75%), and offering incentives to property owners to upgrade non-conforming septic systems (70%).

Should the following activities be completed by the Loveless Lake Association to manage Loveless Lake?	Yes	No	Unsure
Programs to prevent and monitor invasive species	83%	2%	15%
Offering incentives to property owners for the installation of shoreline buffers and rain gardens	75%	4%	21%
Offering incentives to property owners to upgrade non-conforming septic systems	70%	6%	25%
Practices to enhance fisheries	64%	6%	30%
Offering incentives to property owners for the installation of farmland conservation practices	63%	12%	25%
Lake fairs and workshops to share information	60%	6%	34%
Enforcement of slow-no-wake zones	35%	37%	29%

Willingness to contribute to maintaining and improving Loveless Lake

Over half of respondents (59%) would be willing to provide an average of $149 per year to maintain or improve the quality of Loveless Lake and its associated land resources.

In general respondents are satisfied with owning property on Loveless Lake, with 52% being highly satisfied and 40% being somewhat satisfied.

Lake Level and Precipitation Monitoring

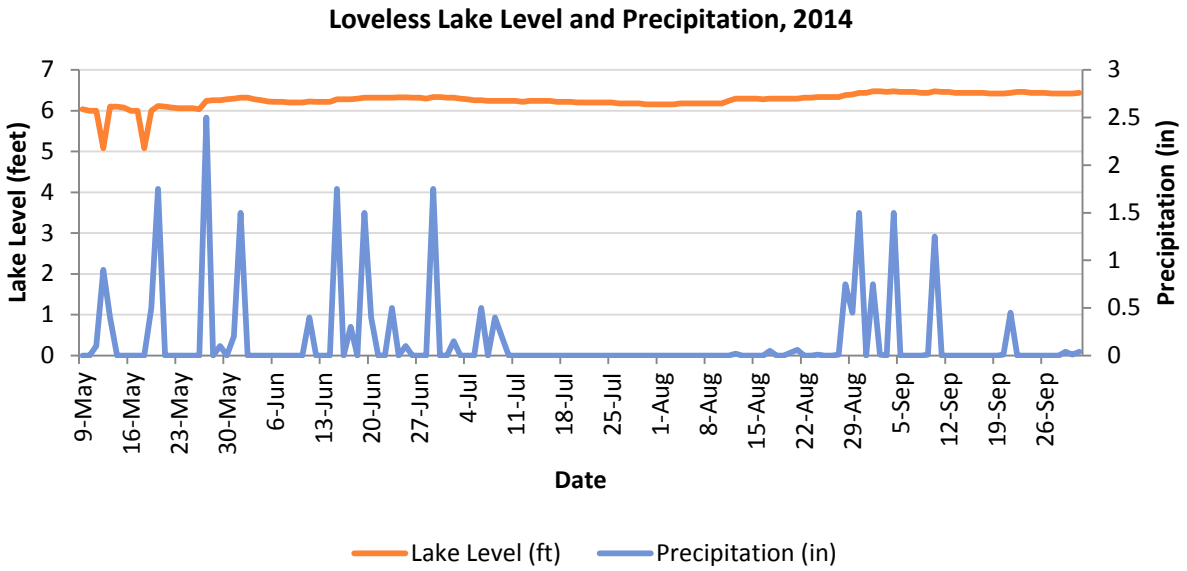
Lake water-level fluctuations are important to lake managers, lakeshore property owners, developers, and recreational users because they can have significant impacts on lake water quality and usability. Although lake levels naturally change from year to year, extreme high or low levels can present problems such as restricted water access, flooding, shoreline and structure damage, and changes in near shore vegetation.

Records of lake water elevations can be very useful in understanding changes that may occur in lakes. While some lakes respond almost immediately to precipitation, other lakes do not reflect changes in precipitation until months later.

Volunteers monitored lake level and precipitation on Loveless Lake in 2014. LWRD provided training on data collection and installed staff and rain gages. Monitoring began on May 9th and continued until October 1st.

Seasonal precipitation on Loveless Lake totaled 22.85 inches. Levels remained fairly constant over the sampling season. Lake level dropped on two separate occasions in May, possibly due to volunteer error.

Lake level and precipitation were also measured in 2002 and 2006. Consistent with 2014 data, lake level did not change substantially during either season. The Loveless Lake Planning Grant Report from June 2004 categorized Loveless Lake as a groundwater drainage lake, meaning the lake receives much of its water inflow from groundwater. Considerable spring activity creates a permanent outlet on the southeast end of Loveless Lake, with a rock dam creating a head of several feet. Additionally, the Loveless Lake Water Quality and Biological Assessment from 2006 concluded that the lake receives a large portion of water from groundwater sources, rather than from precipitation. Groundwater contributions to Loveless Lake were not measured in the 2014 study.



Lake Mixing and Stratification: Background Information

Water quality is affected by the degree to which the water in a lake mixes. Within a lake, mixing is most directly impacted by the temperature-density relationship of water. When comparing why certain lakes mix differently than others, lake area, depth, shape, and position in the landscape become important factors to consider.

Water reaches its greatest density at 3.9^{o}C (39^{o}F) and becomes less dense as temperatures increase and decrease. Compared to other liquids, the temperature-density relationship of water is unusual: liquid water is more dense than water in its solid form (ice). As a result, ice floats on liquid water.

When ice melts in the early spring, the temperature and density of the water will be constant from the top to the bottom of the lake. This uniformity in density allows a lake to completely mix. As a result, oxygen is brought to the bottom of a lake, and nutrients are re-suspended from the sediments. This event is termed **spring turnover**.

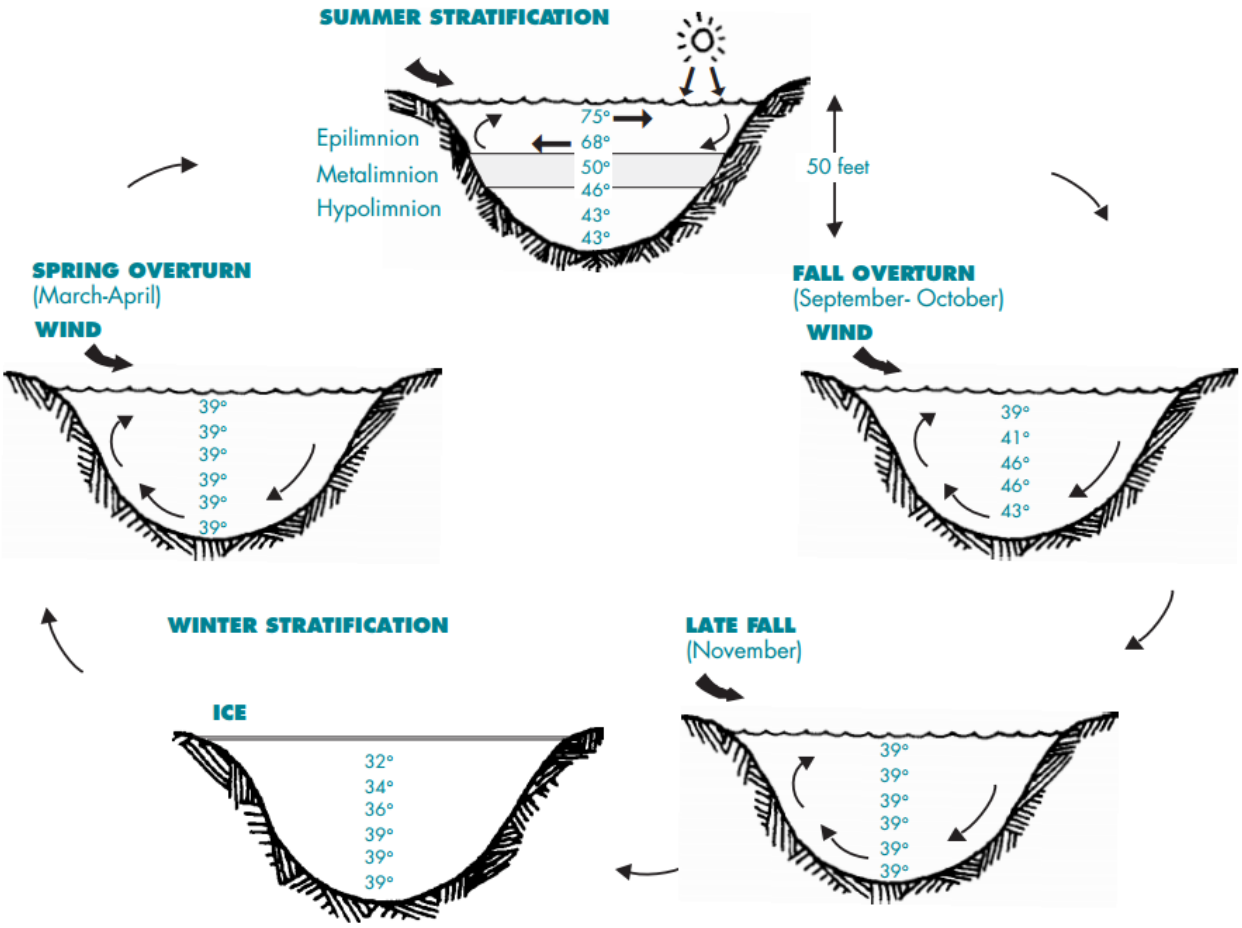
As the sun's rays warm the surface waters in the spring, the water becomes less dense and remains at the surface. Warmer water is mixed deeper into the water column through wind and wave action. However, these forces can only mix water to a depth of approximately twenty to thirty feet. Generally, in a shallow lake, the water may remain mixed all summer. However, a deeper lake usually experiences layering based on temperature differences, called **stratification**.

During the summer, lakes have the potential to divide into three distinct zones: the **epilimnion**, **thermocline** or **metalimnion**, and the **hypolimnion**. The epilimnion describes the warmer surface layer of a lake and the hypolimnion describes the cooler bottom area of a lake. The thermocline, or metalimnion, describes the transition area between the epilimnion and hypolimnion.

As surface waters cool in the fall, they become more dense and sink until the water temperature evens out from top to bottom. This process is called **fall turnover** and allows for a second mixing event to occur. Occasionally, algae blooms can occur at fall overturn when nutrients from the hypolimnion are made available throughout the water column.

Variations in density arising from differences in water temperatures can prevent warmer water from mixing with cooler water. As a result, nutrients released from the sediments can become trapped in the hypolimnion of a lake that stratifies. Additionally, since mixing is one of the main ways oxygen is distributed throughout a lake, lakes that don't mix have the potential to have very low levels of oxygen in the hypolimnion.

The absence of oxygen in the hypolimnion can have adverse effects on fisheries. Species of cold water fishes require the cooler waters that result from stratification. Cold water holds more oxygen as compared to warm water. As a result, the cooler waters of the hypolimnion can provide a refuge for cold water fisheries in the summer as long as oxygen is present. Respiration by plants, animals, and especially bacteria is the primary way oxygen is removed from the hypolimnion. A large algae bloom can cause oxygen depletion in the hypolimnion as algae die, sink, and decay. In the winter, stratification remains constant because ice cover prevents mixing by wind action.



[7]

[7] Figure from Understanding Lake Data (G3582), UW-Extension, Byron Shaw, Christine Mechenich, and Lowell Klessig, 2004

Loveless Lake Deep Hole Sampling Procedure

In-lake sampling in 2014 was conducted at the deep hole of Loveless Lake by volunteers.

Temperature and dissolved oxygen

Temperature and dissolved oxygen were recorded biweekly at meter increments with a digital professional series YSI meter.

Secchi depth

Secchi depth was recorded by volunteers using a secchi disk, which is an eight inch diameter round disk with alternating black and white quadrants. To record secchi depth, the disk was lowered into the lake on the shady side of a boat until just before it disappeared from sight. This depth was measured in feet and recorded as the secchi depth. Data were collected biweekly to correspond with dissolved oxygen and temperature readings. Additional secchi readings were taken by a second volunteer.

Phosphorus

Volunteers collected total phosphorus samples at the deep hole of Loveless Lake. Surface samples were collected with a six foot integrated sampler and bottom samples were collected with a Van Dorn sampler. Top and bottom samples taken on June 15th, July 14th, and August 11th were analyzed at the Wisconsin State Lab of Hygiene. Top samples were analyzed through the Citizen Lake Monitoring Network. Remaining samples were analyzed by Mary Walczak, Professor of Environmental Chemistry at St. Olaf College.

Chlorophyll

Chlorophyll samples were collected with a six foot integrated sampler on June 15th, July 14th, and August 11th. Samples were analyzed at the Wisconsin State Lab of Hygiene through the Citizen Lake Monitoring Network.

Data is presented for both the growing season (excludes turnover) and the summer index period (July 15 – September 15).

Loveless Lake Deep Hole 2014 Summary Results

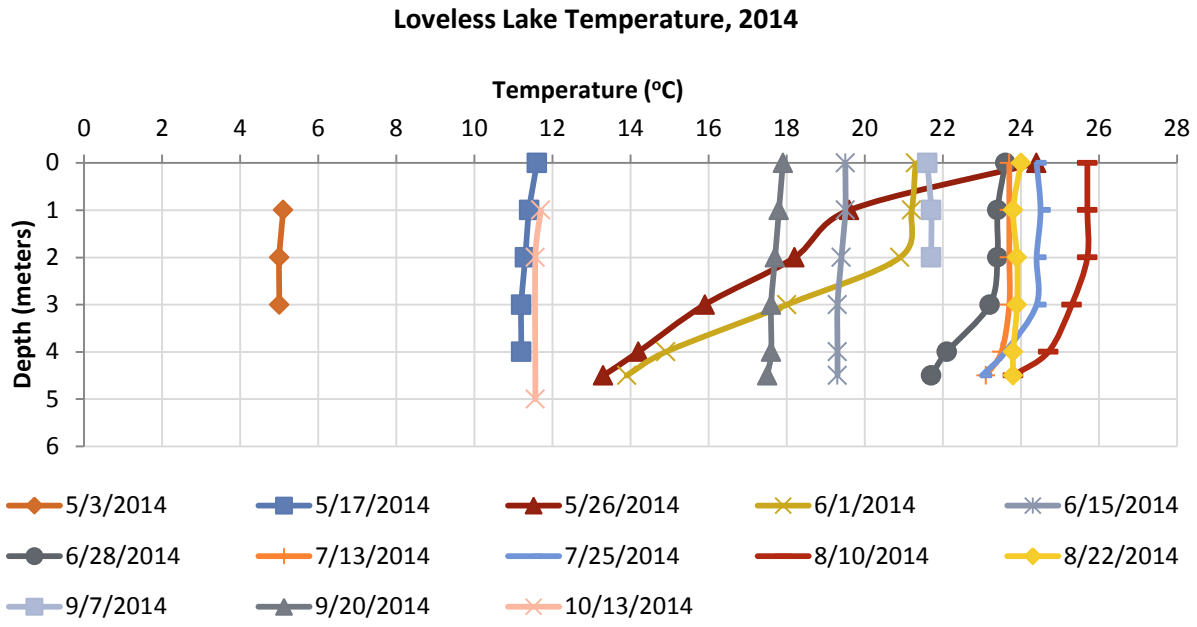
The average summer (July-Aug) secchi disk reading for Loveless Lake was 9 feet, which is slightly above the Northwest Geo-region average of 8.4 feet. The average summer total phosphorus was 21 µg/l. Lakes that have more than 20 µg/l of total phosphorus may experience noticeable algae blooms. The average summer chlorophyll a concentration was 6.4 µg/l, which is well below the Northwest Geo-region summer average of 16.6 µg/l. [8]

The overall Trophic State Index (based on chlorophyll) for Loveless Lake was 49. The TSI suggests that Loveless Lake was **mesotrophic**. Mesotrophic lakes are characterized by moderately clear water, but have an increasing chance of low dissolved oxygen in deep water during the summer.

[8] From WDNR website

Temperature

Loveless Lake reached its warmest surface temperature of 25.7°C on August 10th. Surface temperature increased 12.8°C from May 17th to May 26th with the lake stratifying on the 26th. The lake was stratified on June 1st, at which point surface temperature had fallen 3.1°C since May 26th. Loveless Lake was weakly stratified on June 28th, July 25th, and August 10th.



Dissolved Oxygen

Oxygen is required by all aquatic organisms for survival. The amount of oxygen dissolved in water depends on temperature, the amount of wind mixing that brings water into contact with the atmosphere, the biological activity that consumes or produces oxygen within a lake, and the composition of groundwater and surface water entering a lake.

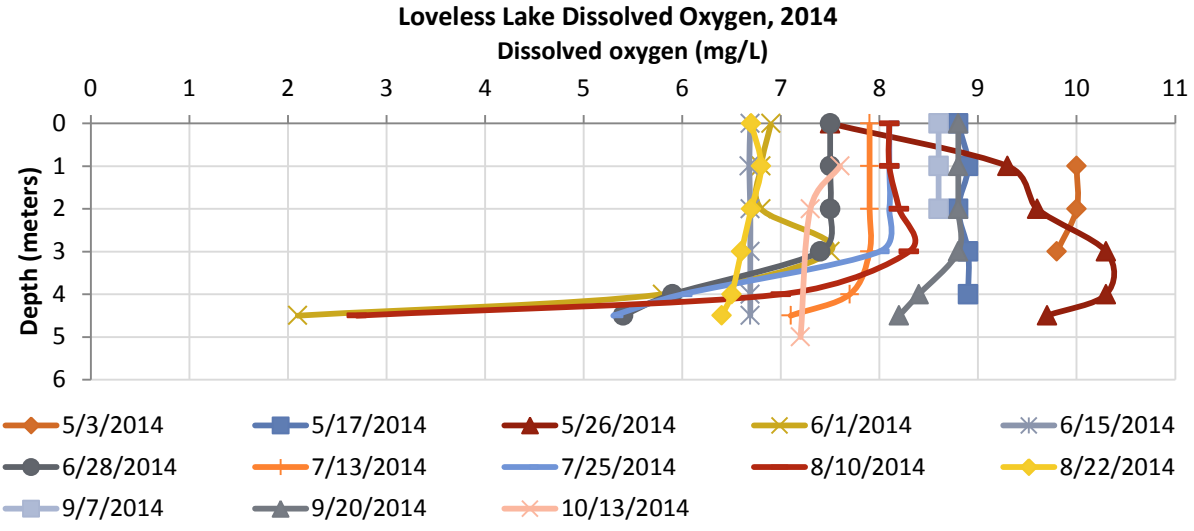
In a process called photosynthesis, plants use carbon, water, and the sun's energy to produce simple sugars and oxygen. Chlorophyll, the pigment in plants that captures the light energy necessary for photosynthesis, is the site where oxygen is produced. Since photosynthesis requires light, the oxygen producing process only occurs during the daylight hours and only at depths where sunlight can penetrate. Plants and animals also use oxygen in a process called respiration. During respiration, sugar and oxygen are used by plants and animals to produce carbon dioxide and water.

Cold water has a higher capacity for oxygen than warm water. However, although temperatures are coolest in the deepest part of a lake, these waters often do not contain the most oxygen. This arises because in the deepest parts of lakes, oxygen producing photosynthesis is not occurring, mixing is unable to introduce oxygen, and the only reaction occurring is oxygen consuming respiration. Therefore, it is not uncommon for oxygen depletion to occur in the hypolimnion.

During the sunlight hours, when photosynthesis is occurring, dissolved oxygen levels at a lake's surface may be quite high. Conversely, at night or early in the morning (when photosynthesis is not occurring), the dissolved oxygen values can be expected to be lower.

A water quality standard for dissolved oxygen in warm water lakes and streams is set at 5 mg/L. This standard is based on the minimum amount of oxygen required by fish for survival and growth. For cold water lakes supporting trout, the standard is set even higher at 7 mg/L.

The surface waters of Loveless Lake remained well oxygenated throughout the summer. Bottom waters fell below the 5 mg/L standard on June 1st and August 10th.

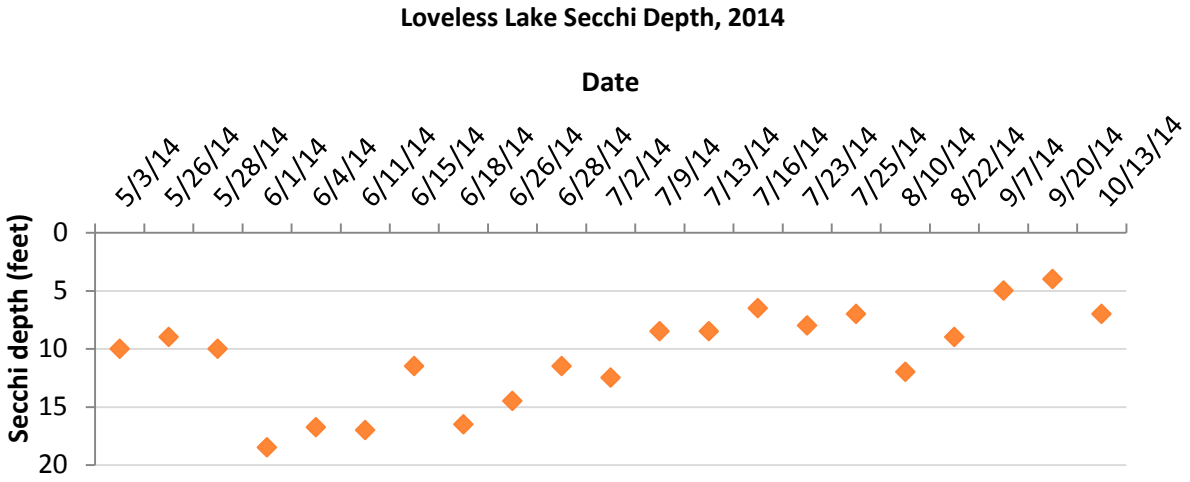


Secchi Depth

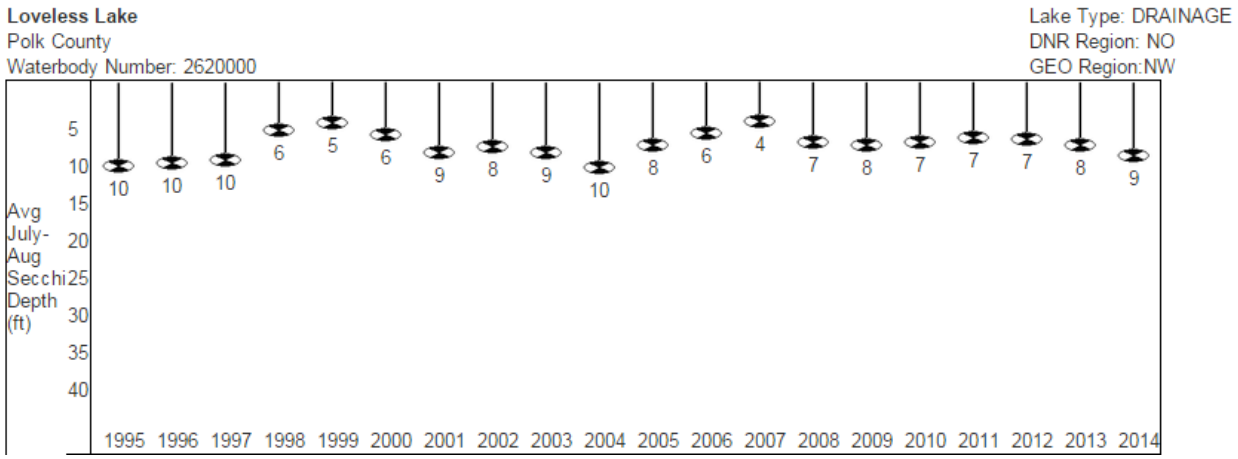
The depth which light can penetrate into lakes is affected by suspended particles, dissolved pigments, and absorbance by water. Often, the ability of light to penetrate the water column is determined by the abundance of algae or other photosynthetic organisms in a lake.

One method of measuring light penetration is with a secchi disk. A secchi disk is an eight inch diameter round disk with alternating black and white quadrants that is used to provide an estimate of water clarity. The depth at which the secchi disk is just visible is defined as the secchi depth. A greater secchi depth indicates greater water clarity.

The average 2014 growing season secchi depth was 10.9 feet and the average summer index period secchi depth was 7.9 feet. Water clarity, as indicated by secchi depth, was greatest in June and decreased as the sampling season progressed.

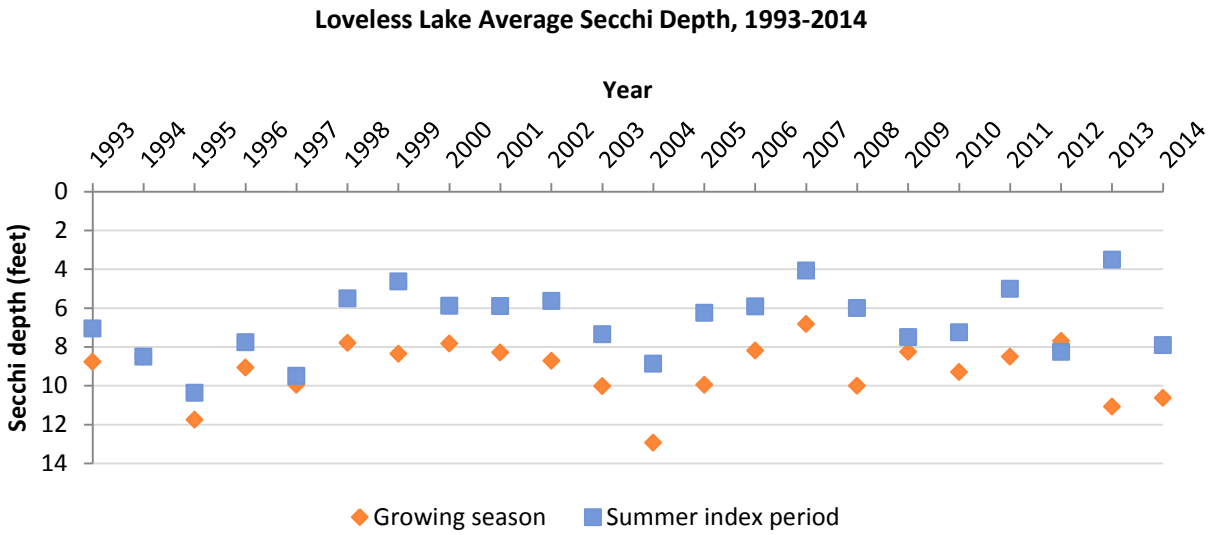


The Wisconsin Department of Natural Resources website provides historic secchi depth averages for the months of July and August. This data exists for Loveless Lake from 1995 through the present year. Averages over this time period range from a low of 4 feet in 2007 to a high of 10 feet in 1995-97 and 2004.

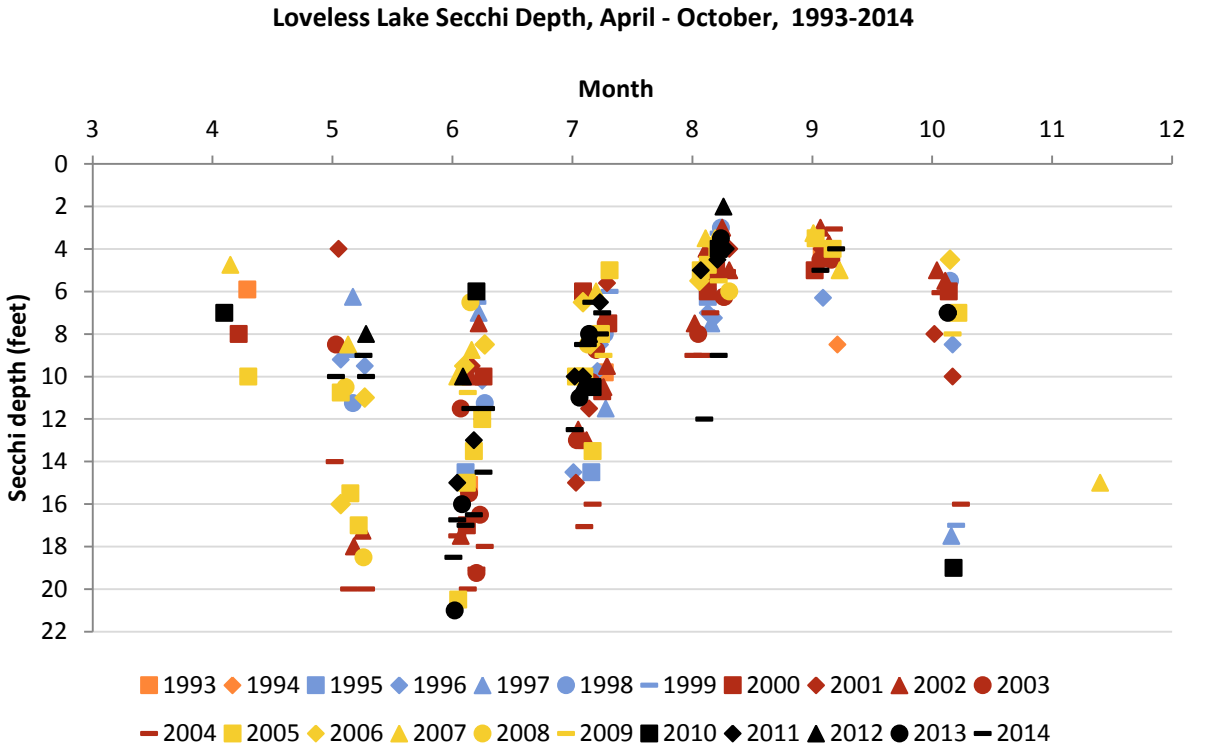


Average secchi depth has varied widely since 1993 with periods of increased water clarity followed by periods of decreased clarity. Growing season water clarity was approximately 10 feet or greater in 1995, 1997, 2003-2005, 2008, and 2013-2014.

Summer index period water clarity was approximately 10 feet or greater in 1995 and 1997 and was approximately four feet or less in 1999, 2007, and 2013.



Volunteers have been collecting secchi depth on Loveless Lake since 1993. Over this time period secchi depth and water clarity has been lowest during August and September.



Phosphorus

Phosphorus is an element present in lakes which is necessary for plant and algae growth. It occurs naturally in soil and rocks and in the atmosphere in the form of dust. Phosphorus can make its way into lakes through groundwater and human induced disturbances such as soil erosion. Additional sources of phosphorus inputs into a lake can include external sources such as fertilizer runoff from urban and agricultural settings and internal sources such as release from lake bottom sediments.

Phosphorus does not readily dissolve in water, instead it forms insoluble precipitates with calcium, iron, manganese, sulfur, and aluminum. If oxygen is available in the hypolimnion, iron forms sediment particles that store phosphorus in the sediments. However, when lakes lose oxygen in the winter or when the hypolimnion becomes anoxic in the summer, these particles dissolve and phosphorus is redistributed throughout the water column with strong wind action or turnover events.

Phosphorus is necessary for plant and animal growth. Excessive amounts can lead to an overabundance of growth which can decrease water clarity and lead to nutrient pollution in lakes.

Total phosphorus (TP) is a measure of all the phosphorus in a sample of water. In many cases total phosphorus is the preferred indicator of a lake's nutrient status because it remains more stable than other forms over an annual cycle.

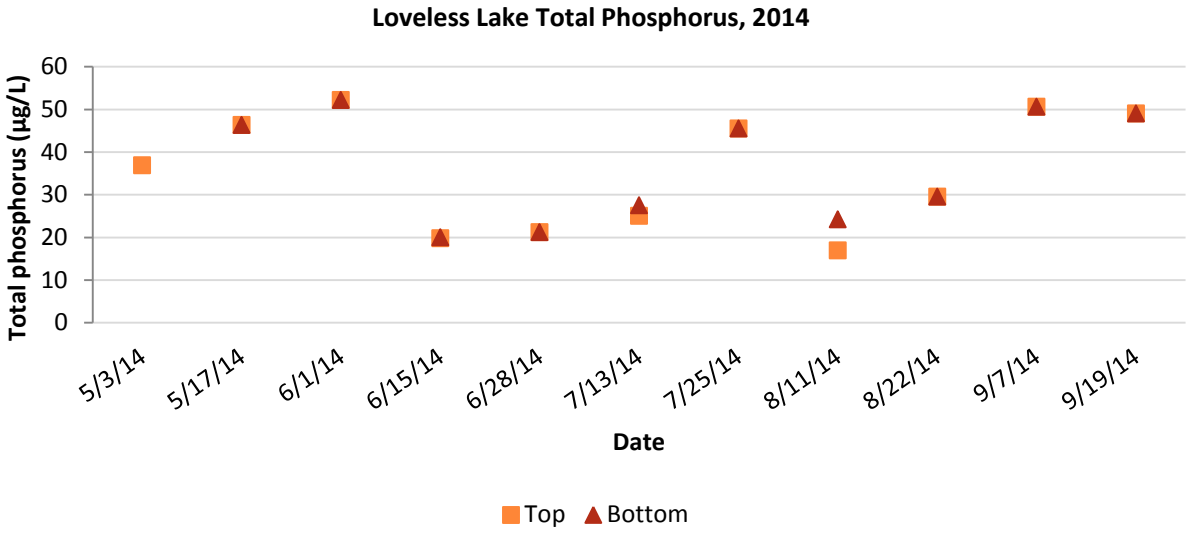
In lakes, a "healthy" limit of total phosphorus is set at 20 µg/L. If a value is above the healthy limit, it is more likely that a lake could support nuisance algae blooms.

Growing season average surface total phosphorus exceeded the healthy limit in 2014 but did not exceed the 40 µg/L threshold for impaired waters (surface samples: 35 µg/L and bottom samples: 35 µg/L).

Summer index period average surface total phosphorus exceeded the healthy limit in 2014 but did not exceed the 40 µg/L threshold for impaired waters (surface samples: 36 µg/L and bottom samples: 38 µg/L).

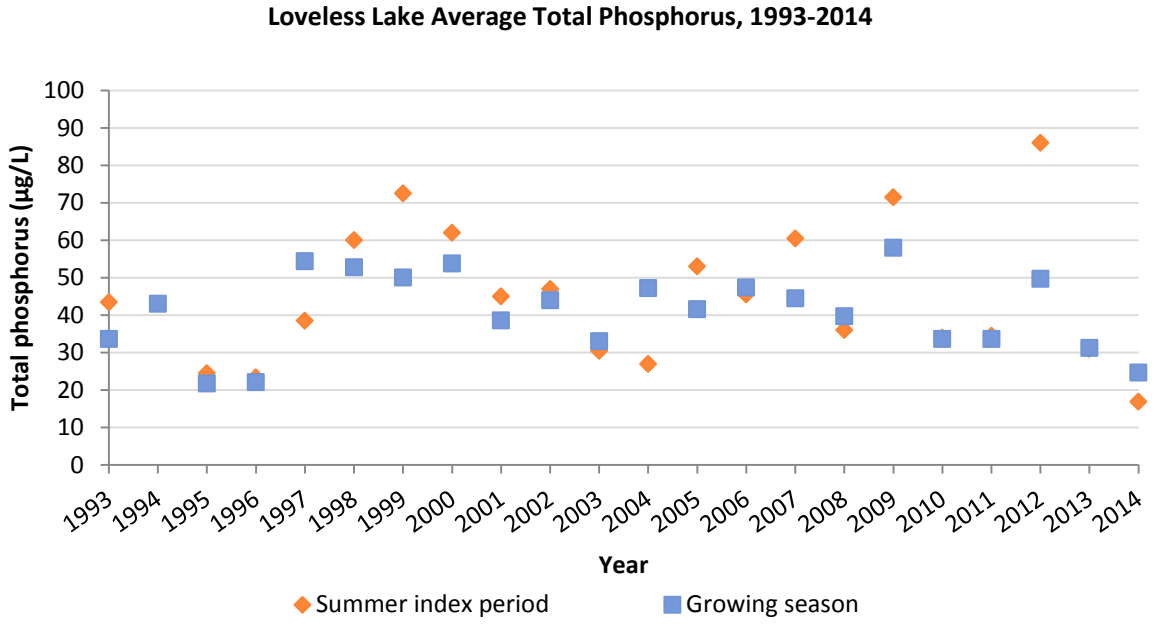
Surface total phosphorus concentrations varied widely across the 2014 growing season ranging from a low of 16.9 µg/L on August 11th to a high of 52.2 µg/L on June 1st. Over the fifteen day period between June 1st and 15th, total phosphorus concentrations dropped 32.4 µg/L. Additionally, over the eighteen day period between July 25th and August 11th, concentrations dropped 28.6 µg/L

Surface and bottom total phosphorus levels were fairly consistent, suggesting that Loveless Lake is fairly well mixed.



Historic average total phosphorus concentrations vary widely from year to year. Summer index period averages ranged from a low of 17 µg/L in 2014 to a high of 86 µg/L in 2012; whereas growing season averages ranged from a low of 22 µg/L in 1995 to a high of 58 µg/L in 2009.

Since 1993, total phosphorus averages were below 40 µg/L approximately half of the years sampling has taken place (48% over the summer index period, 45% over the growing season).

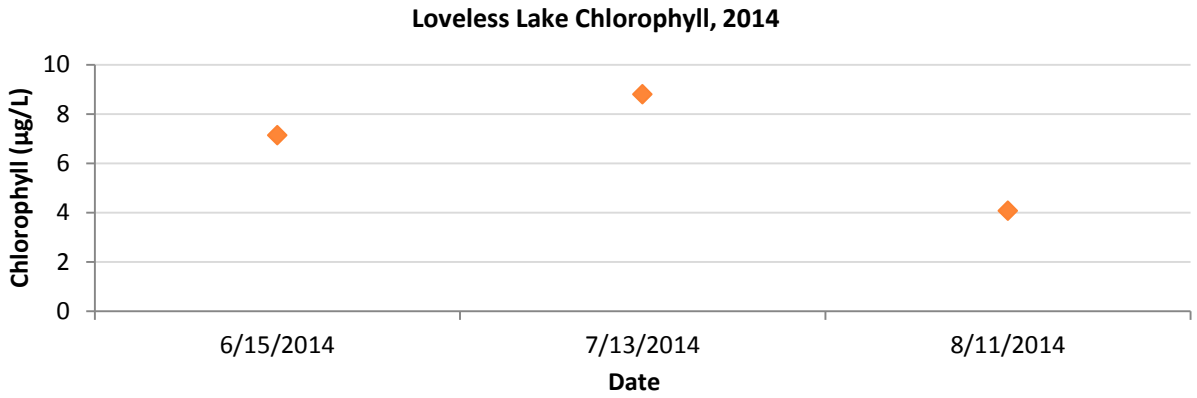


Chlorophyll

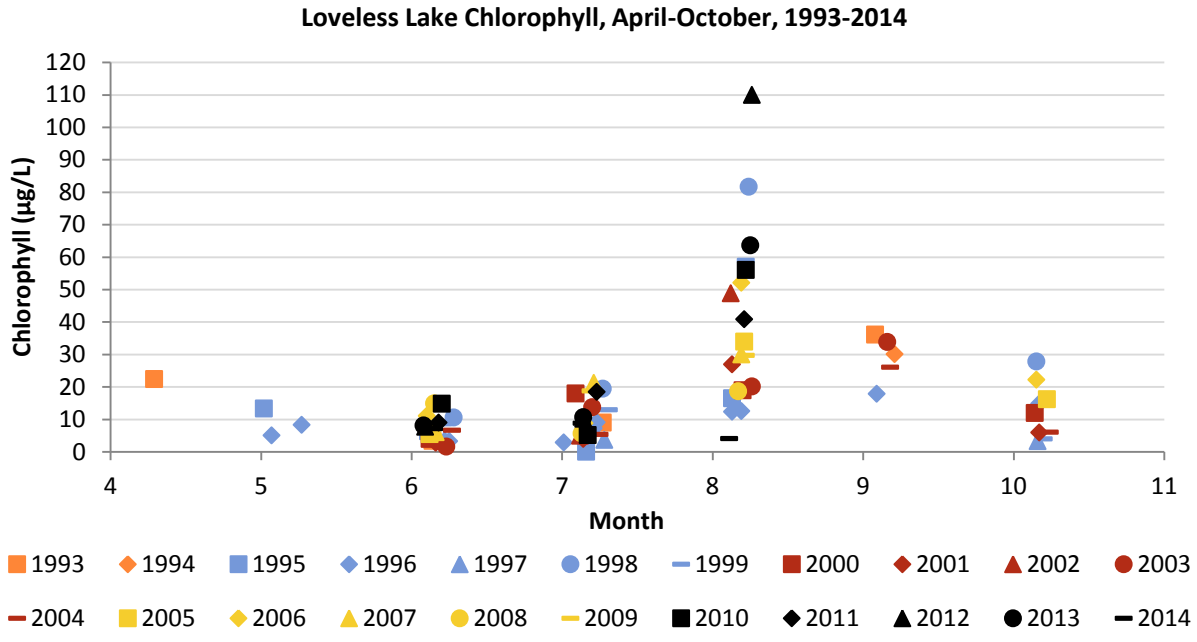
Chlorophyll is a pigment in plants and algae that is necessary for photosynthesis and is an indicator of water quality in a lake. Chlorophyll gives a general indication of the amount of algae growth in a lake, with greater values for chlorophyll indicating greater amounts of algae. However, since chlorophyll is present in sources other than algae— such as decaying plants— it does not serve as a direct indicator of algae biomass.

Chlorophyll seems to have the greatest impact on water clarity when levels exceed 30 µg/L. Lakes which appear clear generally have chlorophyll levels less than 15 µg/L. Additionally, a July 15 through September 15 chlorophyll threshold of 20 µg/L has been set for Loveless Lake for recreational use.

Chlorophyll data for Loveless Lake were below 15 µg/L on all sampling dates in 2014.

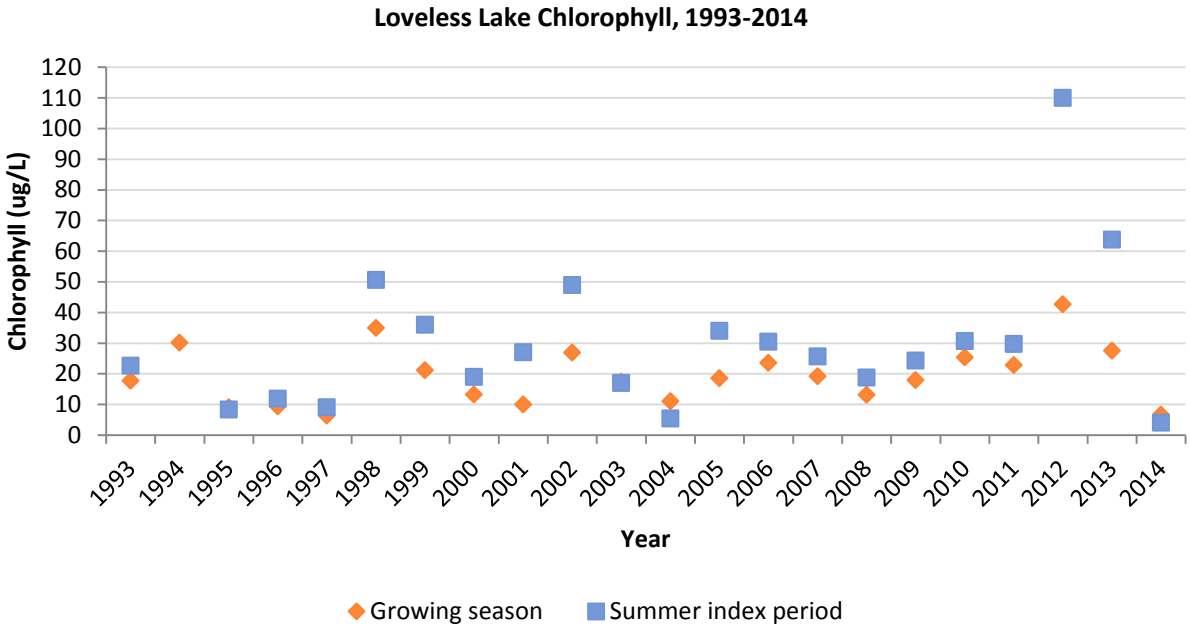


Volunteers have been collecting chlorophyll data on Loveless Lake since 1993. Historically, chlorophyll concentrations on Loveless Lake have remained below 25 µg/L through July and above 25 µg/L in August and September.



Historic average chlorophyll concentrations vary widely from year to year. Summer index period averages have ranged from a low of 4.07 µg/L in 2014 to a high of 110 µg/L in 2012; whereas growing season averages have ranged from a low of 6.28 µg/L in 1997 to a high of 42.6 µg/L in 2012.

Chlorophyll averages since 1993 were below 25 µg/L during the summer index period in 45% of the years sampling has taken place. Chlorophyll averages since 1993 were below 25 µg/L during the growing season in 73% of the years sampling has taken place.



Trophic State Index

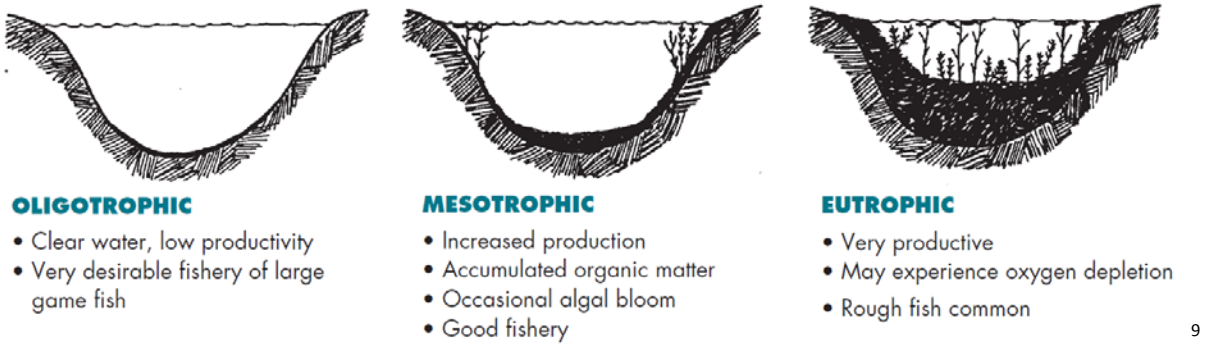
Lakes are divided into three categories based on their trophic states: oligotrophic, eutrophic, and mesotrophic. These categories reflect a lake's nutrient and clarity level and serve as an indicator of water quality. Each category is designed to serve as an overall interpretation of a lake's primary productivity.

Oligotrophic lakes are generally clear, deep, and free of weeds and large algae blooms. These types of lakes are often poor in nutrients and are unable to support large populations of fish. However, oligotrophic lakes can develop a food chain capable of supporting a desirable population of large game fish.

Eutrophic lakes are generally high in nutrients and support a large number of plants and animals. They are usually very productive and subject to frequent algae blooms. Eutrophic lakes often support large fish populations, but are susceptible to oxygen depletion.

Mesotrophic lakes lie between oligotrophic and eutrophic lakes. They usually have good fisheries and occasional algae blooms.

All lakes experience a natural aging process which causes a change from an oligotrophic to a eutrophic state. Human influences that introduce nutrients into a lake (agriculture, lawn fertilizers, and septic systems) can accelerate the process by which lakes age and become eutrophic.



[9]

A common method of determining a lake's trophic state is to compare total phosphorus (important for algae growth), chlorophyll (an indicator of the amount of algae present), and secchi disk readings (an indicator of water clarity). Although many factors influence these relationships, the link between total phosphorus, chlorophyll, and secchi disk readings is the basis of comparison for the trophic state index (TSI).

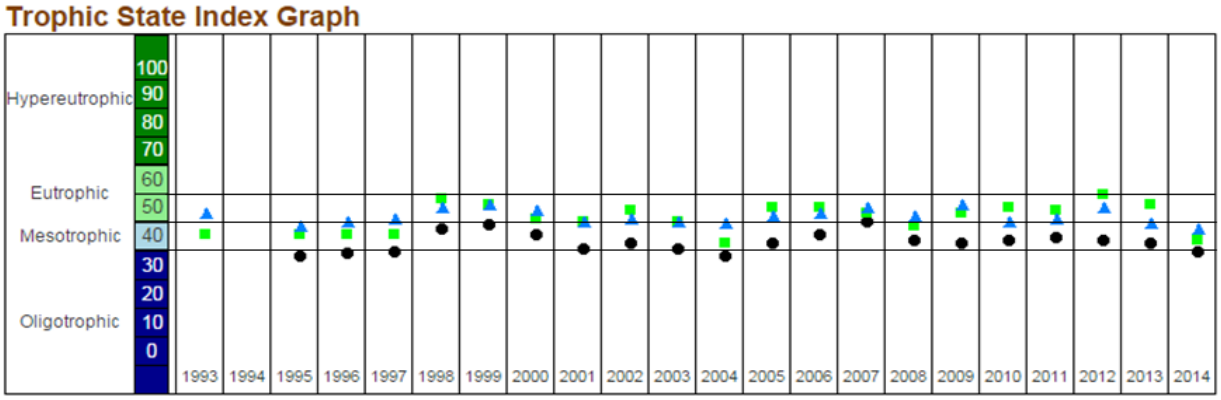
TSI is determined using a mathematic formula and ranges from 0 to 110. Lakes with the lowest numbers are oligotrophic and lakes with the highest values are eutrophic.

[9] Figure from Understanding Lake Data (G3582), UW-Extension, Byron Shaw, Christine Mechenich, and Lowell Klessig, 2004

The overall Trophic State Index (based on chlorophyll) for Loveless Lake Deep Hole was 49. The TSI suggests that Loveless Lake was mesotrophic. [10]

TSI	General Description
<30	Oligotrophic; clear water, high dissolved oxygen throughout the year/lake
30-40	Oligotrophic; clear water, possible periods of oxygen depletion in the lower depths of the lake
40-50	Mesotrophic; moderately clear water, increasing chance of anoxia near the bottom of the lake in summer, fully acceptable for all recreation/aesthetic uses
50-60	Mildly eutrophic; decreased water clarity, anoxic near the bottom, may have macrophyte problem, warm-water fisheries only
60-70	Eutrophic; blue-green algae dominance, scums possible, prolific aquatic plant growth, full body recreation may be decreased
70-80	Hypereutrophic; heavy algal blooms possible throughout the summer, dense algae and macrophytes
>80	Algal scums, summer fish kills, few aquatic plants due to algal shading, rough fish dominate

Monitoring TSI gives stakeholders a method by which to gauge lake productivity over time. Fortunately, complete TSI data exist for Loveless Lake from 1995 through 2014. Additionally, TSI chlorophyll and phosphorus data exist for 1993. Over this time the majority of data points (July and August) fall within the mesotrophic to mildly eutrophic range. Secchi TSI data always suggest that Loveless Lake is mesotrophic or oligotrophic. Phosphorus and chlorophyll TSI data more often suggest that Loveless Lake is eutrophic as compared to mesotrophic. Data from the most recent sampling season categorize Loveless Lake as mesotrophic.



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

[10] WDNR website

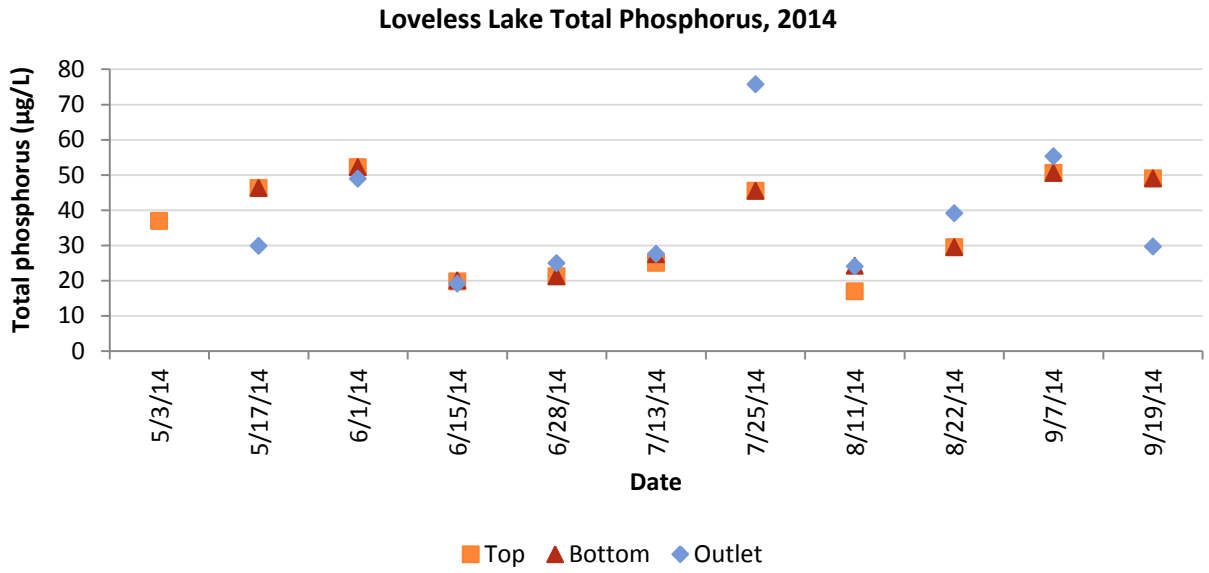
Loveless Lake Outlet Sampling Procedure and Data

Data was collected by volunteers on the outlet of Loveless Lake from May through September. Flow data was collected bi-weekly with a Flowatch Flowmeter. At each foot interval across the outlet, depth (ft) and velocity (ft/s) were measured. Grab samples were collected once monthly in June, July, and August. Samples were analyzed at the State Lab of Hygiene for total phosphorus.

The phosphorus data collected is specific to date and location and can be used to theoretically determine how much phosphorus is leaving Loveless Lake through the outlet. Values are established by multiplying the phosphorus concentration at a specific location by the volume of water that moves through a specific location, or the discharge in cubic feet per second. To determine the average instantaneous load of phosphorus leaving Loveless Lake, the average phosphorus concentration is multiplied by the average seasonal discharge. Units are then converted and expressed as lb/yr.

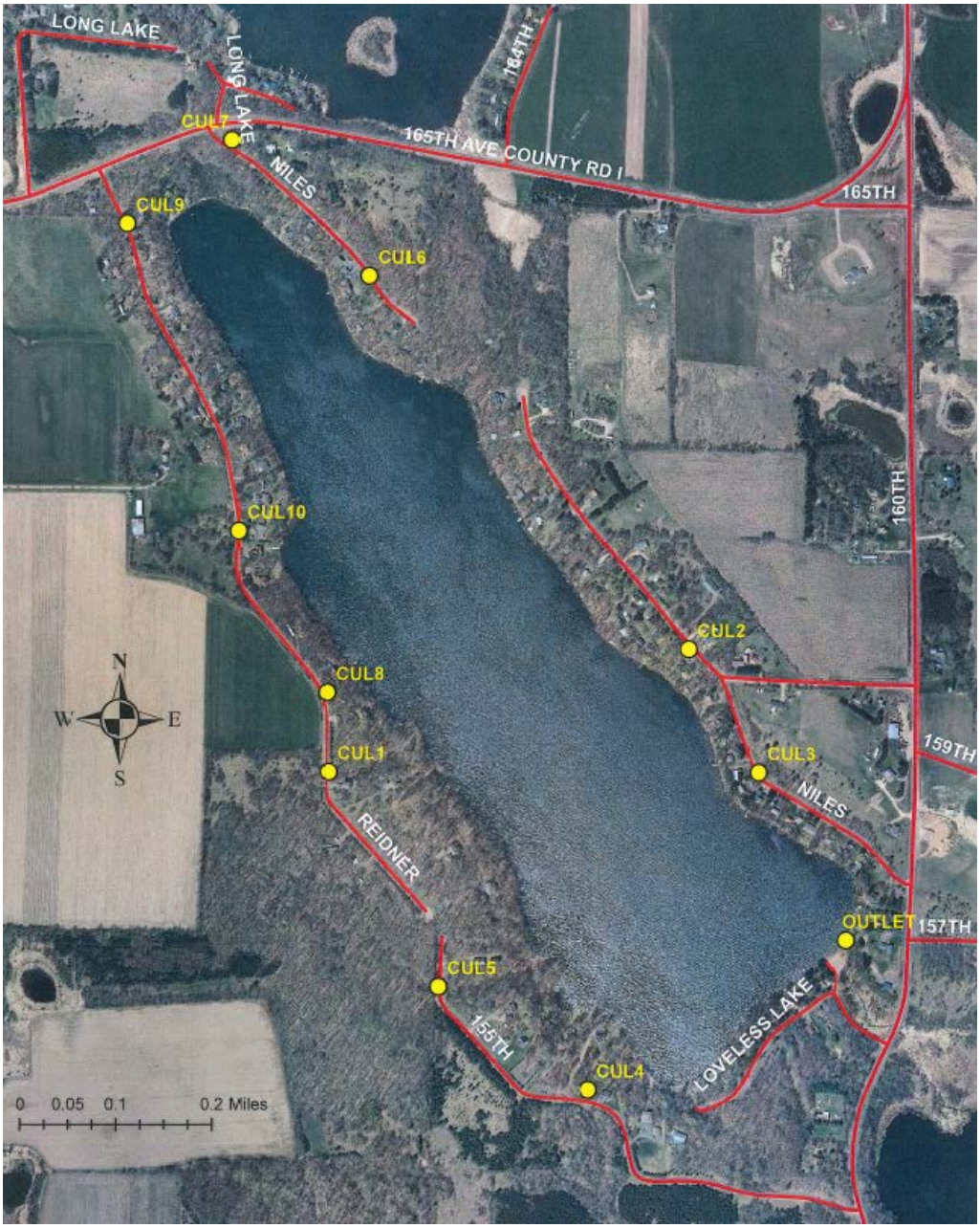
This analysis determined that 86.4 pounds of phosphorus are leaving Loveless Lake through the outlet per year.

Total phosphorus concentrations were generally similar at the top, bottom, and outlet of Loveless Lake. However, on May 17th and September 19th, total phosphorus levels were elevated at the deep hole as compared to the outlet and on July 25th total phosphorus levels were elevated at the outlet as compared to at the deep hole.

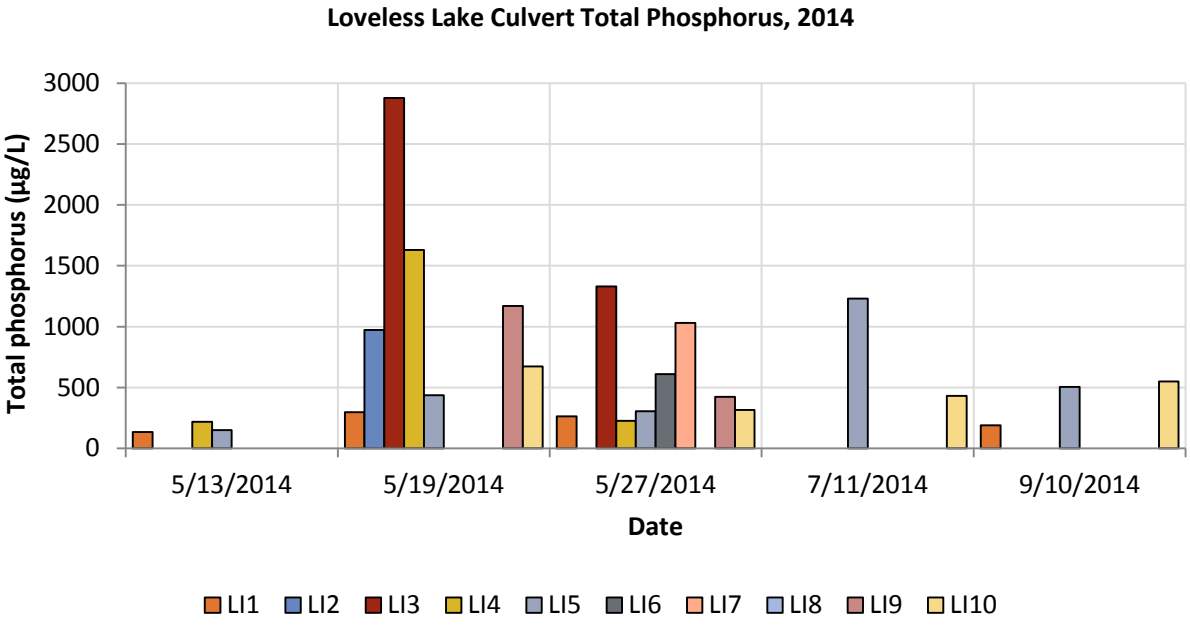


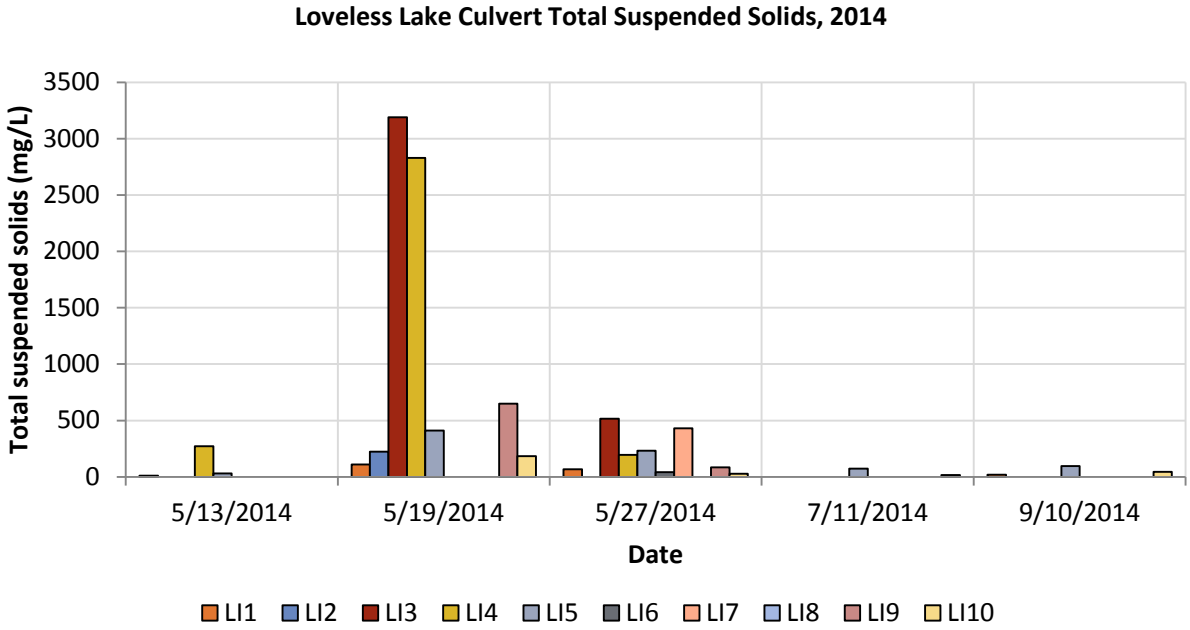
Stormwater Sampling

Grab samples were taken by the Polk County LWRD from ten culverts draining to Loveless Lake on five different dates during the summer of 2014. Samples were collected after rainfall events from culverts that had flow and analyzed at the State Lab of Hygiene for total phosphorus and total suspended solids. Flow was determined by timing how long it took to fill a quart sample bottle. Culvert eight never experienced flow.



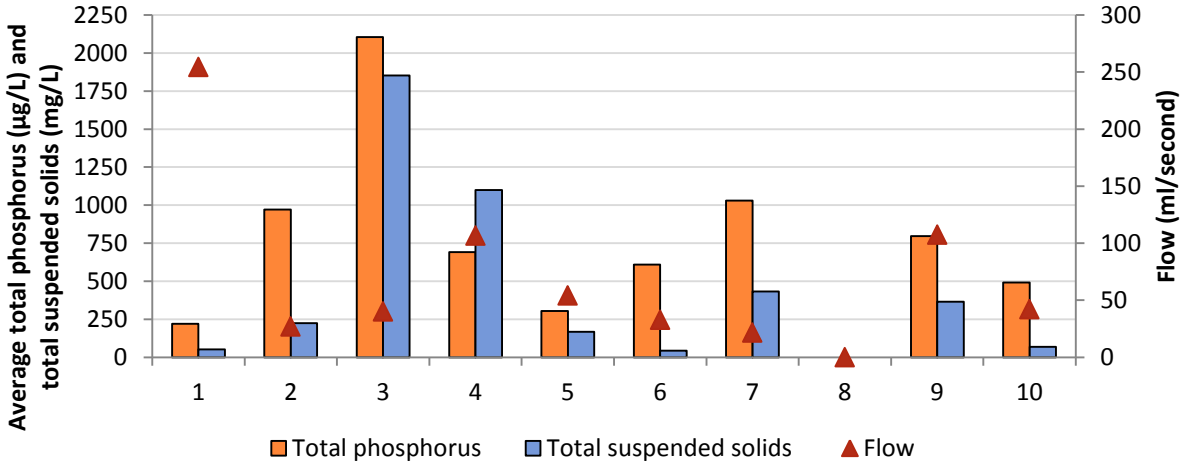
Total phosphorus and total suspended solids varied widely between sites and dates with the highest values occurring at culverts three and four on May 19th.





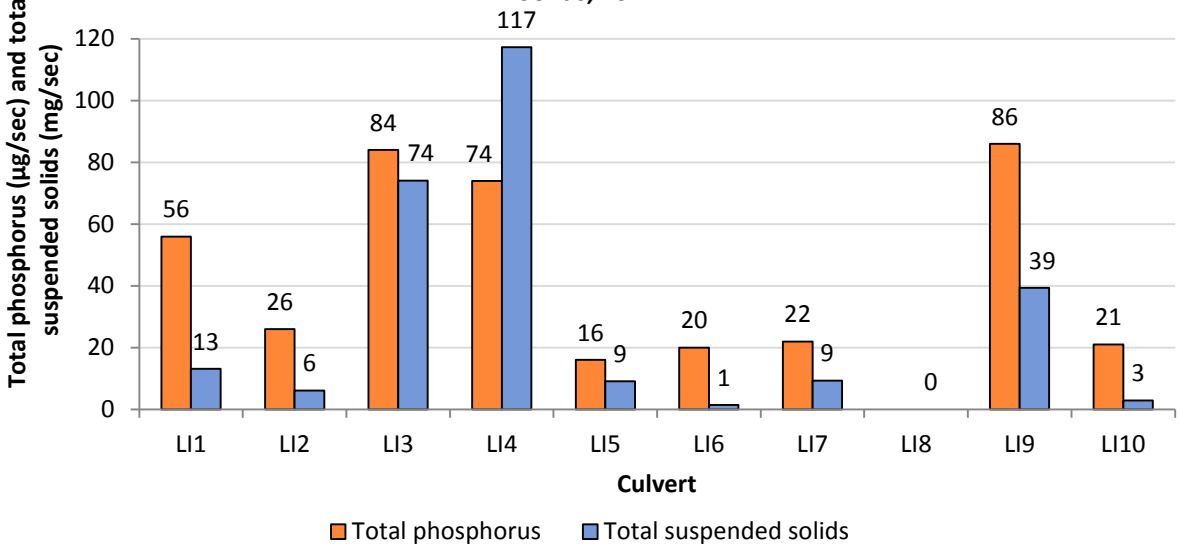
Average total phosphorus was highest in culvert three, followed by culvert seven, and two. Average total suspended solids were highest in culverts three, followed by culvert four. Flow was highest in culvert one, followed by culvert nine and four.

Loveless Lake Culvert Average Total Phosphorus, Average Total Suspended Solids, and Average Flow, 2014

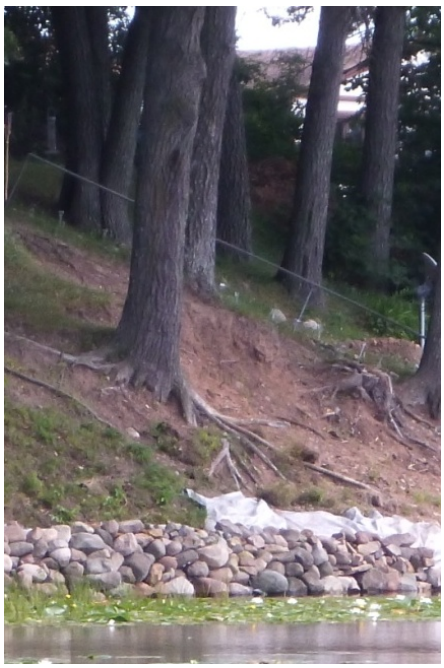


The instantaneous load of phosphorus and total suspended solids entering Loveless Lake through culverts was also determined. This value pairs chemical data with the amount of water flowing through a particular culvert. Using this data, it was determined that the culverts contributing the greatest amount of phosphorus are nine, three, four, and one and the culverts contributing the greatest amount of total suspended solids are four and three.

Loveless Lake Culvert Instantaneous Load Total Phosphorus and Total Suspended Solids, 2014



Land Use and Water Quality

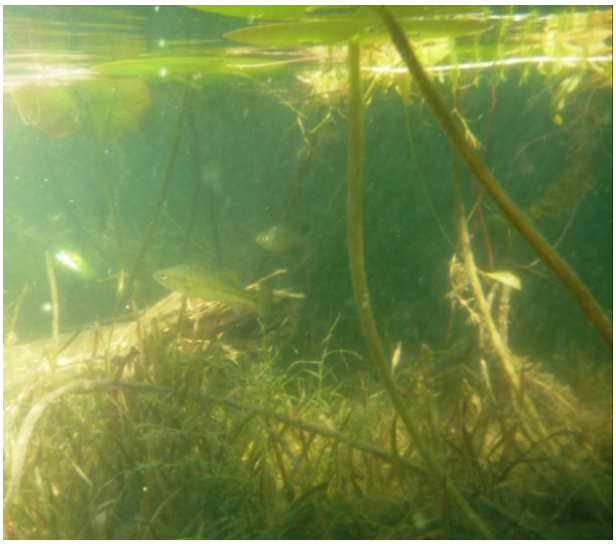


The health of water resources depends largely on the decisions that landowners make on their properties. When waterfront lots are developed, a shift from native plants and trees to impervious surfaces and lawn often occurs. Impervious surfaces are hard, man-made surfaces such as rooftops, paved driveways, and concreate patios that make it impossible for rain to infiltrate into the ground.

By making it impossible for rainwater to infiltrate into the soil, impervious surfaces increase the volume of rainwater that washes over the soil surface and runs off directly into lakes and streams. Rainwater runoff can carry pollutants such as sediment, lawn fertilizers, and car oils directly into a lake. Native vegetation can slow the speed of rainwater, giving it time to soak into the soil where it is filtered by soil microbes.

In extreme precipitation events, erosion and gullies can result. The signs of erosion are unattractive and can cause decreases in property values. Sediment can also have negative impacts on aquatic life: fish eggs will die when covered with sediment and sediment influxes to a lake can decrease water clarity making it difficult for predator fish species to locate food.

Increases in impervious surfaces and lawns cause a loss of habitat for birds and other wildlife. Over ninety percent of all lake life is born, raised, and fed in the area where land and water meet. Overdeveloped shorelines remove critical habitat which species such as loons, frogs, songbirds, ducks, otters, and mink depend on. Impervious surfaces and lawns can be thought of as biological desserts which lack food and shelter for birds and wildlife. Nuisance species such as Canada geese favor lawns over taller native grasses and flowers. Lawns provide geese with a ready food source (grass) and a sense of security from predators (open views).



Additionally, fish species depend on the area where land and water meet for spawning. The removal of coarse woody habitat, or trees and braches that fall into a lake, cause decreases in fisheries habitat.

Common lawn species, such as Kentucky bluegrass, are often dependent on chemical fertilizers and require mowing. Excess chemical fertilizers are washed directly into the adjacent water during precipitation events. The phosphorus and other nutrients in fertilizers, which produce lush vegetative growth on land, are

the same nutrients which fuel algae blooms and decrease water clarity in a lake. Additionally, since common lawn species have very shallow root systems, when lawns are located on steep slopes, soil capacity is reduced and the impacts of erosion can be intensified.

Avoiding establishing lawns can provide direct positive impacts on lake water quality. The creation of a buffer zone of native grasses, wildflowers, shrubs, and trees where the land meets the water can provide numerous benefits for water quality and restore valuable bird and wildlife habitat.

In Polk County, all new constructions on lakeshore properties require that a shoreland protection area be in place. A shoreland protection area is required to be 35 feet in depth as measured from the ordinary high water mark, which is defined as the point on the bank or shore up to which the water leaves a distinct mark (erosion, change in vegetation, etc.). These rules are in place largely to protect water quality and also provide benefits in terms of natural beauty and bird and wildlife viewing opportunities. Additionally, shoreline protection areas allow for a 35 foot maximum viewing corridor per 100 feet of shoreline, which can be established as lawn.

Shoreline Inventory

Twelve volunteers attended a two hour shoreline inventory training on September 2nd, 2014.

The shoreline inventory was completed using the methodology developed by the University of Wisconsin Stevens Point Center for Watershed Science and Education. Land and Water Resources Department (LWRD) completed the Shoreland Vegetation Survey and Shoreland Disturbance Survey Above and Below the Ordinary High Water Mark.

In the Shoreland Vegetation Survey LWRD characterized the general shoreline condition as disturbed or undisturbed; determined the dominant short vegetation ground condition[11]; characterized the presence or absence of each short shoreland vegetation ground condition; and established if tall shoreland vegetation was present or absent.

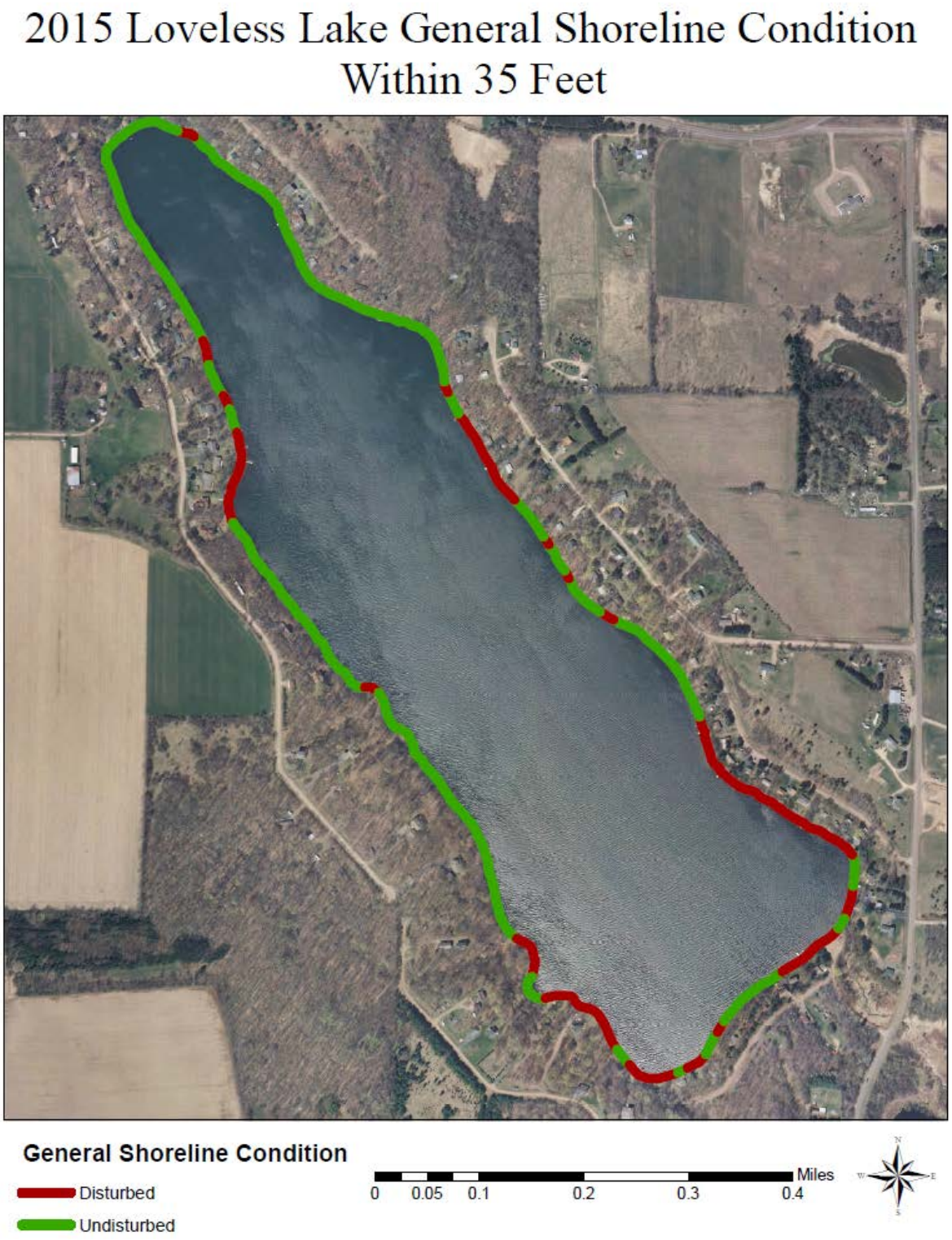
Using the Shoreland Vegetation Survey and Shoreland Disturbance Survey Above and Below the Ordinary High Water Mark, LWRD established the presence of shoreland alterations[12]; presence of erosion (undercut banks/slumping and furrows/gullies); culvert size, shape, and material; and characterized the areas below the ordinary high water mark[13].

[11] Short shoreland vegetation ground conditions include: organic-leaf pack/needles, barren/bare dirt (erosion), new shoreland restoration, mowed vegetation, short un-mowed vegetation < 3 feet tall, and impervious surface.

[12] Shoreland alterations include: dock/pier, seawall, rip-rap, artificial beach, boat landing, and dam/spillway.

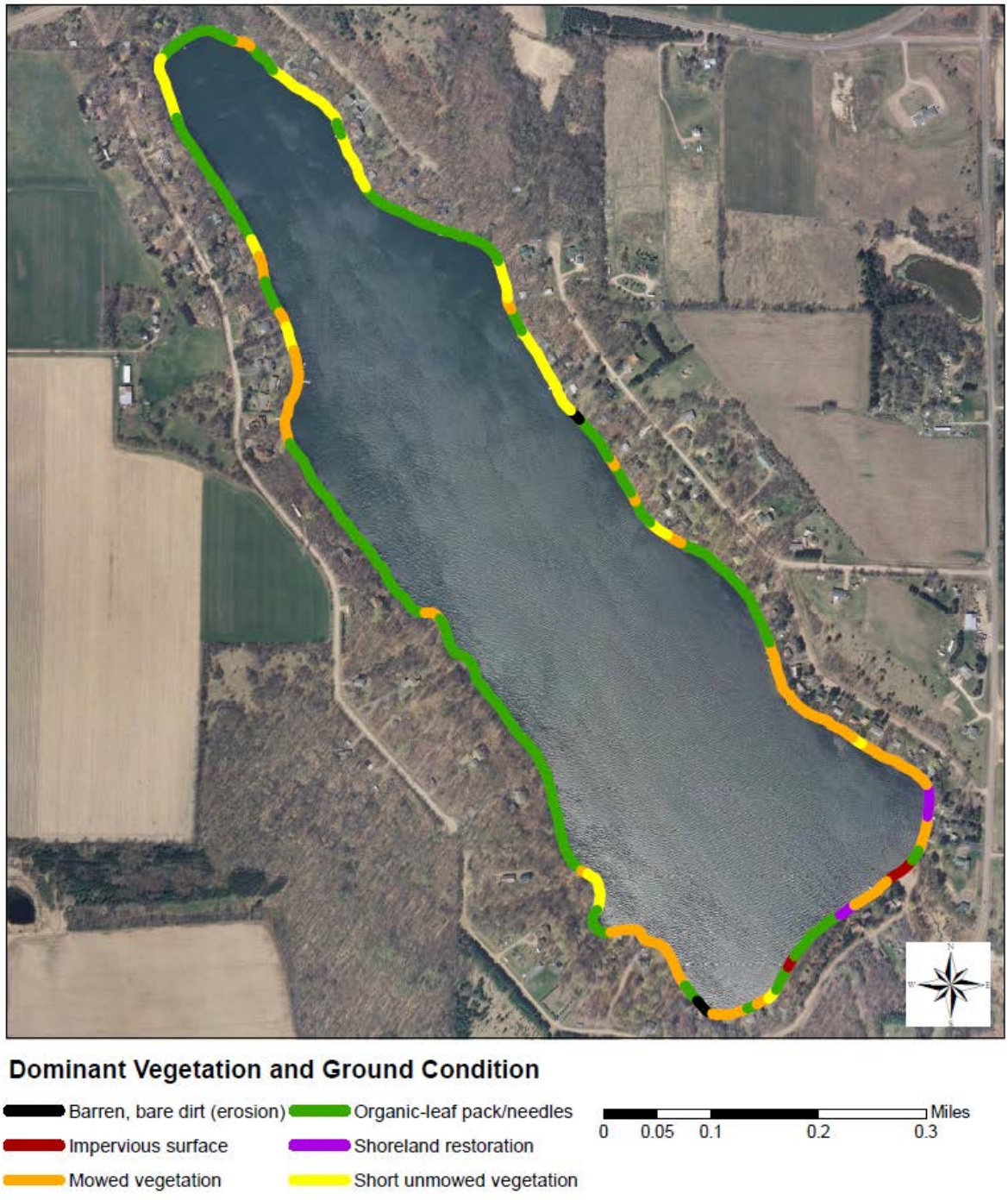
[13] The presence of the following were characterized for the area below the ordinary high water mark: cut/mowed area >30 feet wide, tilled/erosion, motor vehicle tire imprints, and woody structure.

Approximately one-third (34%) of the shoreline of Loveless Lake was characterized as disturbed, as compared to undisturbed (66%). In general, the north side of the lake is relatively undisturbed; whereas, the south side of the lake is comparatively disturbed. Significant areas of disturbance also exist on the northeast and northwest sides of the lake.



The dominant short shoreland vegetation and ground cover on Loveless Lake was organic-leaf pack/needles (53%), followed by mowed vegetation (25%), and short unmowed vegetation (17%). Less dominant vegetation and ground cover included shoreland restorations (2%), impervious surfaces (2%), and barren/bare dirt (erosion) (1%).

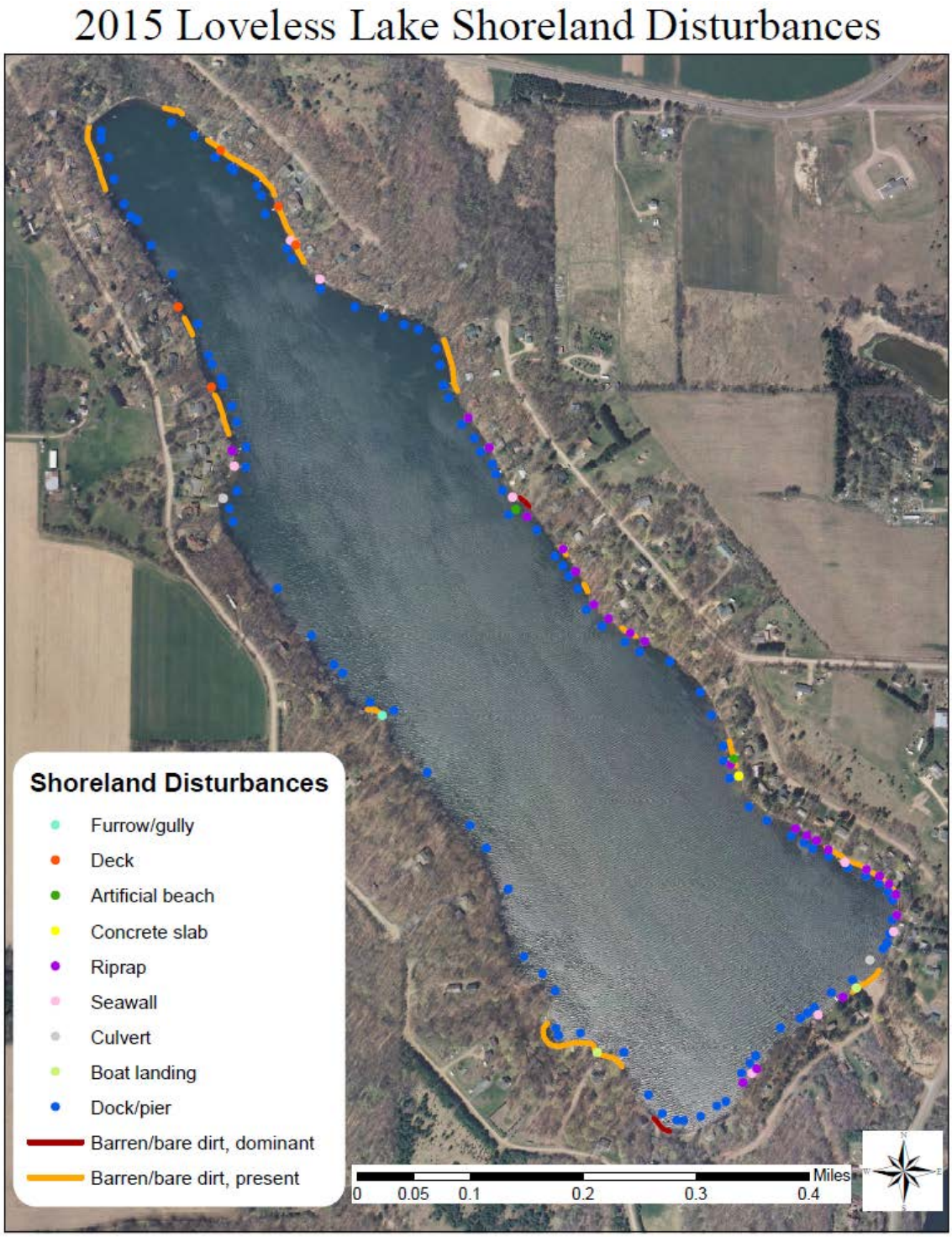
2015 Loveless Lake Dominant Shoreland Vegetation and Ground Cover



The vast majority of shoreline on Loveless Lake (97%) includes the presence of tall shoreland vegetation (trees/shrubs). Areas without tall shoreland vegetation exist on the south and east sides of Loveless Lake.

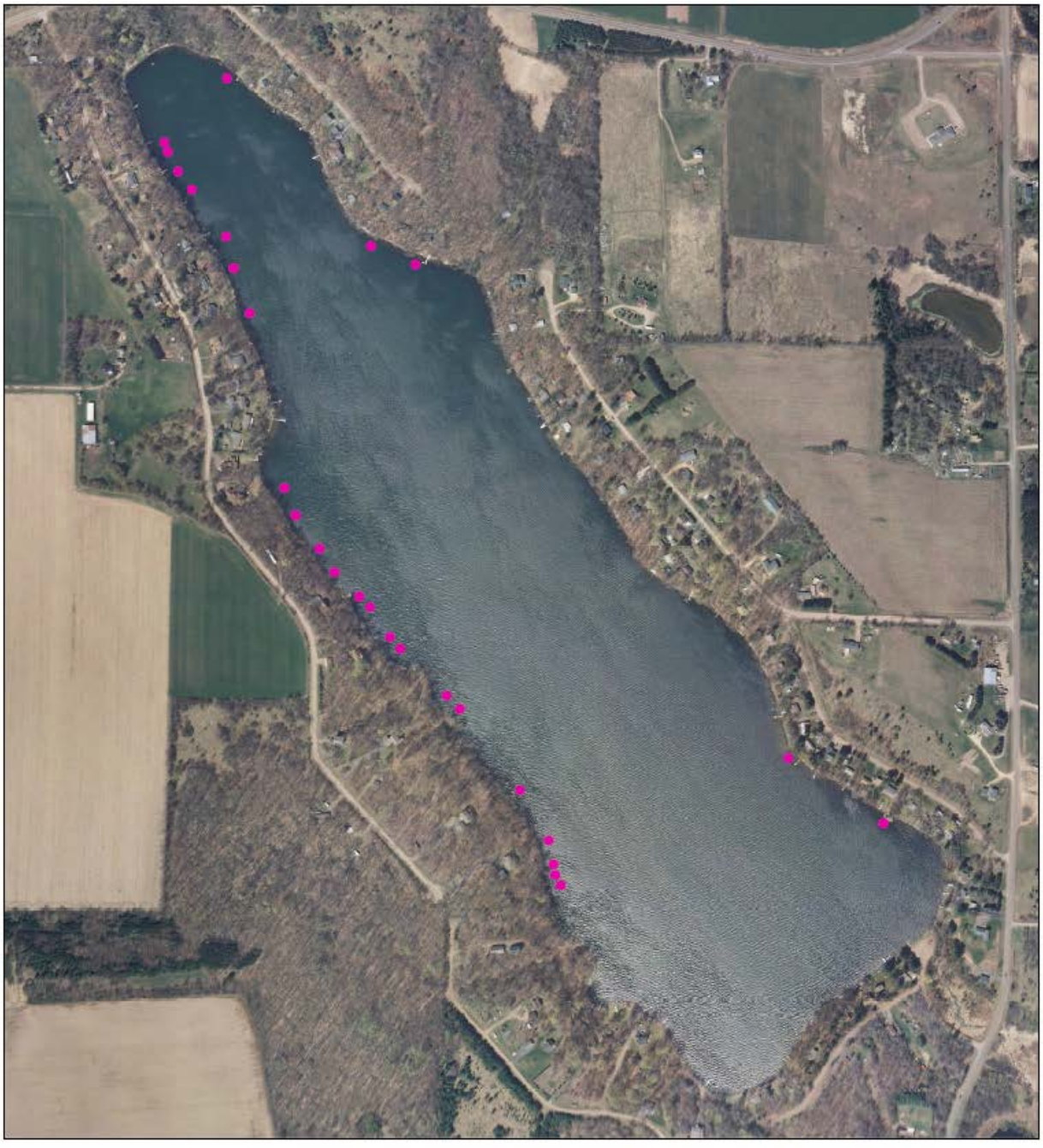


The shoreline inventory also characterized disturbances around Loveless Lake. There were a total of 110 docks/piers, 2 culverts, 5 decks, 2 boat landings, 2 artificial beaches, and 1 concrete slab. Additionally, there were 23 segments containing riprap and 8 segments containing seawalls. Two shoreline segments were dominated by bare dirt and 19 segments had bare dirt present, although it was not dominant.



There were 27 areas along the shoreline of Loveless Lake that included coarse woody structure. These areas provide important benefits for fish and wildlife. The majority of sites including coarse woody structure occur on the west side of Loveless Lake.

2015 Loveless Lake Woody Structure

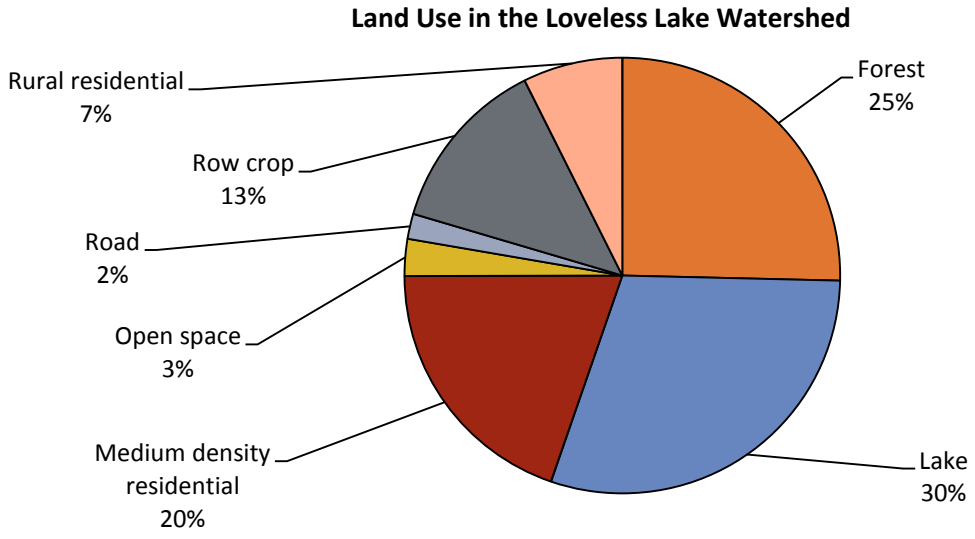


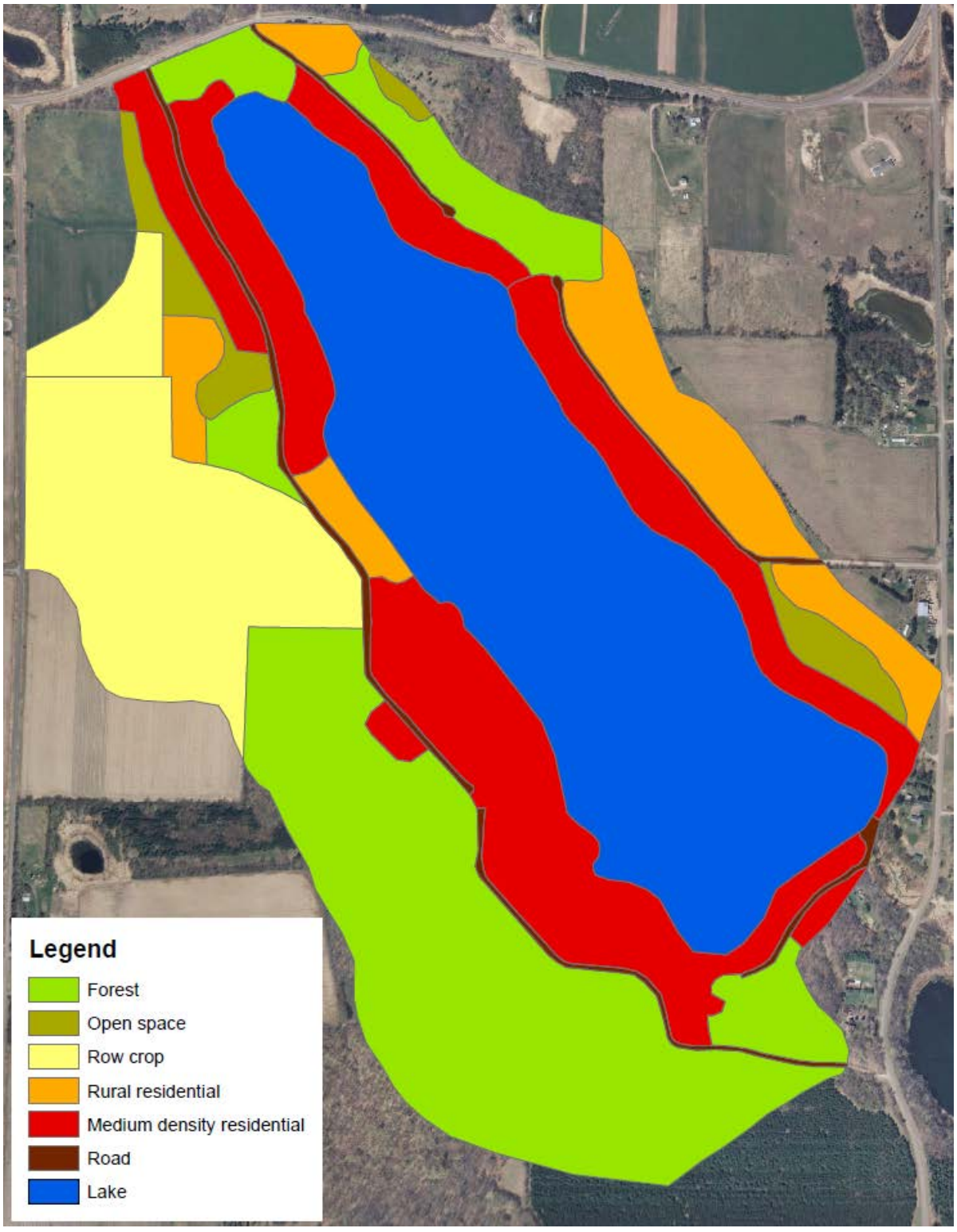
Land Use in the Loveless Lake Watershed

The area of land that drains to a lake is called a watershed. The Loveless Lake watershed was delineated from 2015 aerial photos. Land use was categorized as forest, open space, row crop, rural residential, medium density residential, and road.

The watershed area for Loveless Lake, including the lake, is 456 acres. The lake itself is 136 acres and represents 30% of the land use in the watershed. The largest land uses in the Loveless Lake watershed are forest (25%) and medium density residential (20%), followed by row crop (13%), rural residential (7%), open space (3%), and road (2%).

Land Use	Acres	Acres %
Forest	116	25%
Lake	136	30%
Medium density residential	90	20%
Open space (pasture/grass)	13	3%
Road	9	2%
Row crop	59	13%
Rural residential	34	7%



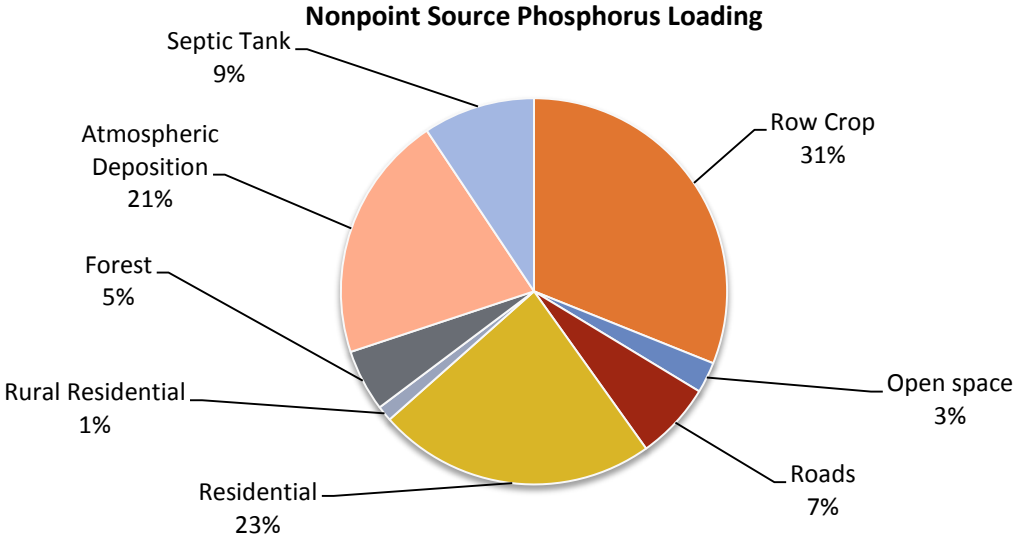

Legend
Forest
Open space
Row crop
Rural residential
Medium density residential
Road
Lake

Watershed and Lake Modeling

The Wisconsin Lake Modeling Suite (WiLMS) was used to model current conditions for Loveless Lake, verify monitoring, and estimate land use nutrient loading for the watershed. Phosphorus is the key parameter in the modeling scenarios used in WiLMS because it is the limiting nutrient for algal growth in most lakes.

Based on average evaporation, precipitation, and runoff coefficients for Polk County soils and land use WiLMS determined the annual nonpoint source load of phosphorus to Loveless Lake as 170 pounds.

Land Use	Total acres	Percent acres	Phosphorus Loading (lb/yr)	Phosphorus Percent Loading
Forest	116	25%	9	5%
Lake (atmospheric deposition)	136	30%	35	21%
Residential	90	20%	40	23%
Open space (pasture/ grass)	13	3%	4	3%
Road	9	2%	11	7%
Row crop	59	13%	53	31%
Rural residential	34	7%	2	1%
Septic systems			16	9%



The internal load for Loveless Lake was estimated using in-situ data and four methods were used to estimate internal loading.

The first method was a complete total phosphorus mass budget. This method calculated the internal load to be -9 pounds of phosphorus annually.

In the second method the internal load was estimated from growing season *in situ* phosphorus increases. This method calculated the internal load to be 0 pounds annually.

The third method estimated the internal load from in situ phosphorus increases in the fall. The annual load was calculated to be 264 pounds with a sediment release rate of 2111.3 mg/m^2-day. This is the most likely scenario and is closest to the actual scenario.

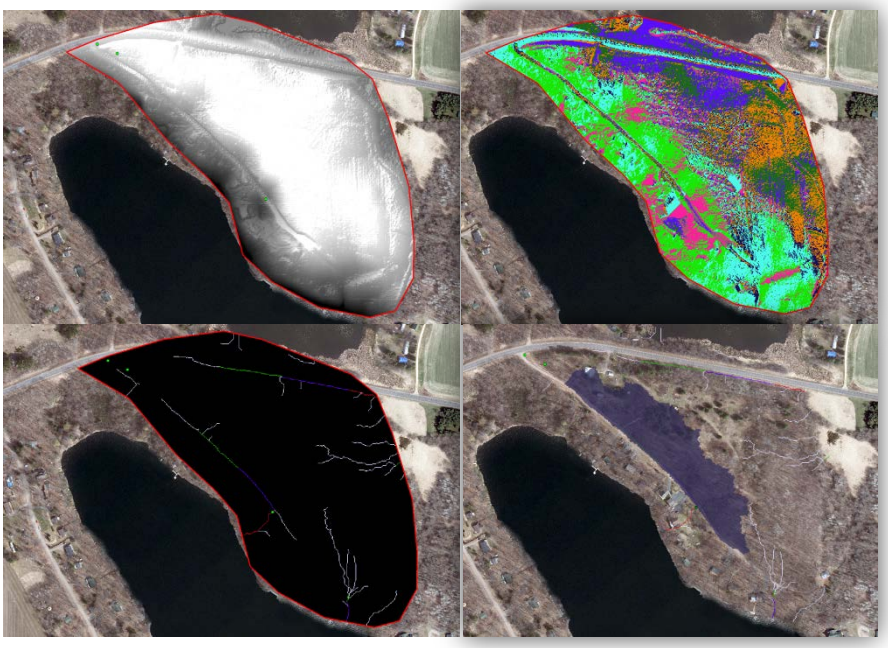
The fourth method used the average of the calculated phosphorus release rates and anoxic sediment area. This calculated the internal load to be 1 pound of phosphorus annually.

The 1984 Nurnberg model is commonly used to estimate the internal load for a lake. The Nurnberg total phosphorus model is $(P = \frac{L_{Ext}}{q_s}(1 - R) + \frac{L_{Int}}{q_s}$ where $R = \frac{15}{18+q_s})$. The model predicts the internal load to be 243 pounds which is very close to the in-situ increase measured in the fall.

This data can be used to model the likely phosphorus content of a lakes water column.

The model that fit best was the Vollenweider 1982 shallow lake and reservoir model which is: $P = 1.02\left[\frac{LT_w/z}{1+\sqrt{T_w}}\right]^{0.88}$ where *P* is the predicted mixed lake total phosphorus concentration, *L* is the areal total phosphorus load (mg/m^2-yr.), T_w is the lakes hydraulic retention time, and *z* is the lakes mean depth. This model was used to estimate total phosphorus under many different scenarios.

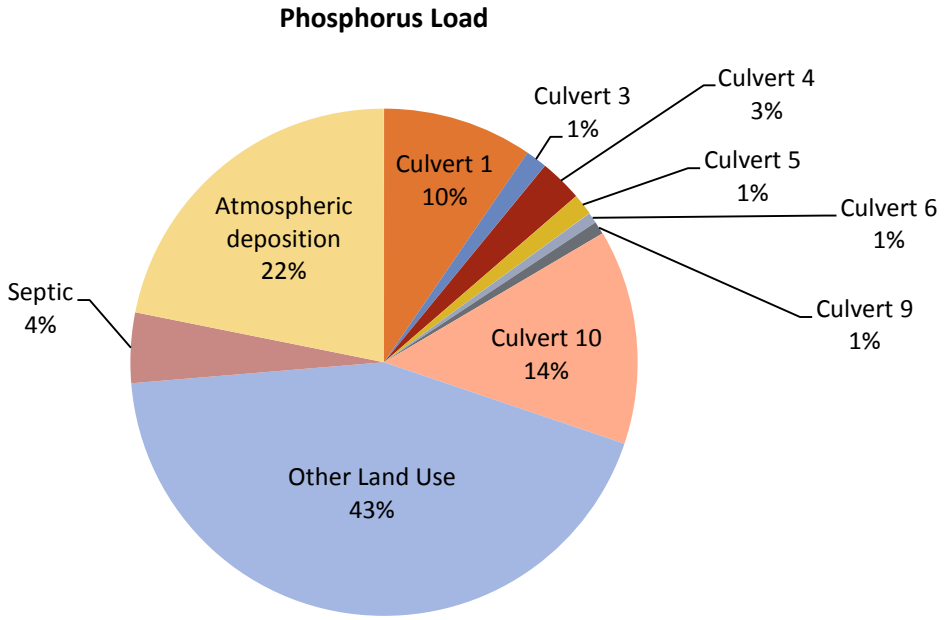
In order to model the water and phosphorus load from culverts draining to the lake, LiDAR was used to create a digital elevation model, calculate flow direction based on one meter pixels, calculate flow accumulation, and ultimately delineate the sub-watershed for each culvert.

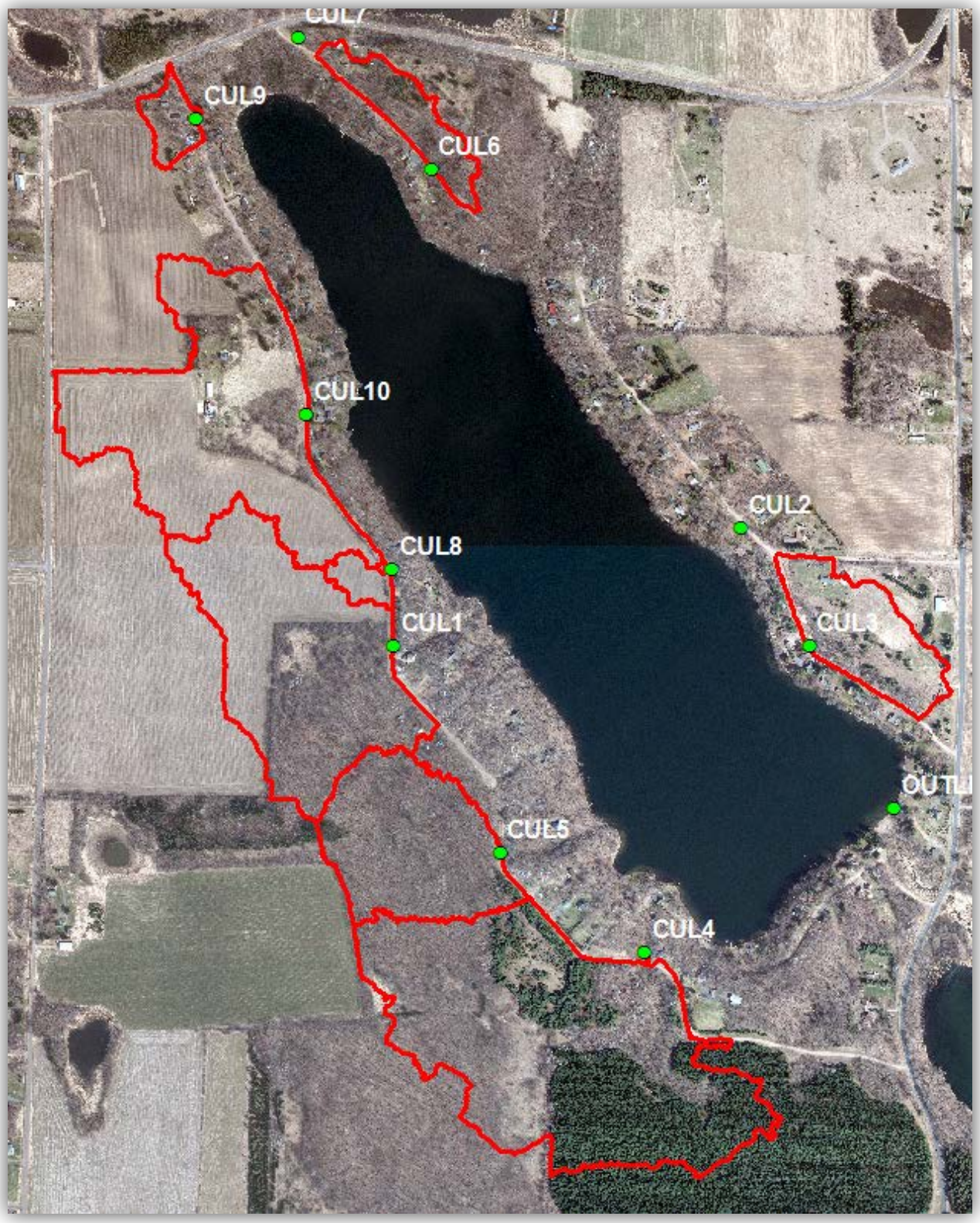


Land use was then clipped by each culverts watershed in order to model the phosphorus load and possible reductions for each location.

Culvert	Phosphorus Load (lb/year)	Percent Phosphorus Load
Culvert 1	15.43	10%
Culvert 3	2.21	1%
Culvert 4	4.41	3%
Culvert 5	2.21	1%
Culvert 6	1.1	1%
Culvert 9	1.32	1%
Culvert 10	22.1	14%
Other Land Use	70.22	43%
Septic	7.23	4%
Atmospheric deposition	35.27	22%

Modeling predicts the current water column concentration to be 40.26 µg/l as compared to the observed growing season mean concentration of 42.0 µg/l. Modeling was also performed to predict water quality changes resulting from a 15% reduction in land use loading to culvert inlets and a 15% reduction in residential land use loading with an additional 30% in agricultural loading. Water column phosphorus concentrations with reductions from the culvert loading were 30.89 µg/l, and when reductions of residential and agricultural loading were calculated the concentration was 25.57µg/l.




CUL7
CUL9
CUL6
CUL10
CUL2
CUL8
CUL1
CUL3
OUTLI
CUL5
CUL4

Nutrient Budget Summary

Modeling was used to estimate an annual phosphorus budget for Loveless Lake for external and internal sources of phosphorus.

Nonpoint Source Phosphorus Load: <u>162 pounds phosphorus/year</u>

- ✓ Culvert one: 15 pounds
- ✓ Culvert three: 2 pounds
- ✓ Culvert four: 4 pounds
- ✓ Culvert five: 2 pounds
- ✓ Culvert six: 1 pound
- ✓ Culvert nine: 1 pound
- ✓ Culvert ten: 22 pounds
- ✓ Other watershed land use: 70 pounds
- ✓ Septic system: 7 pounds
- ✓ Atmospheric deposition: 35 pounds

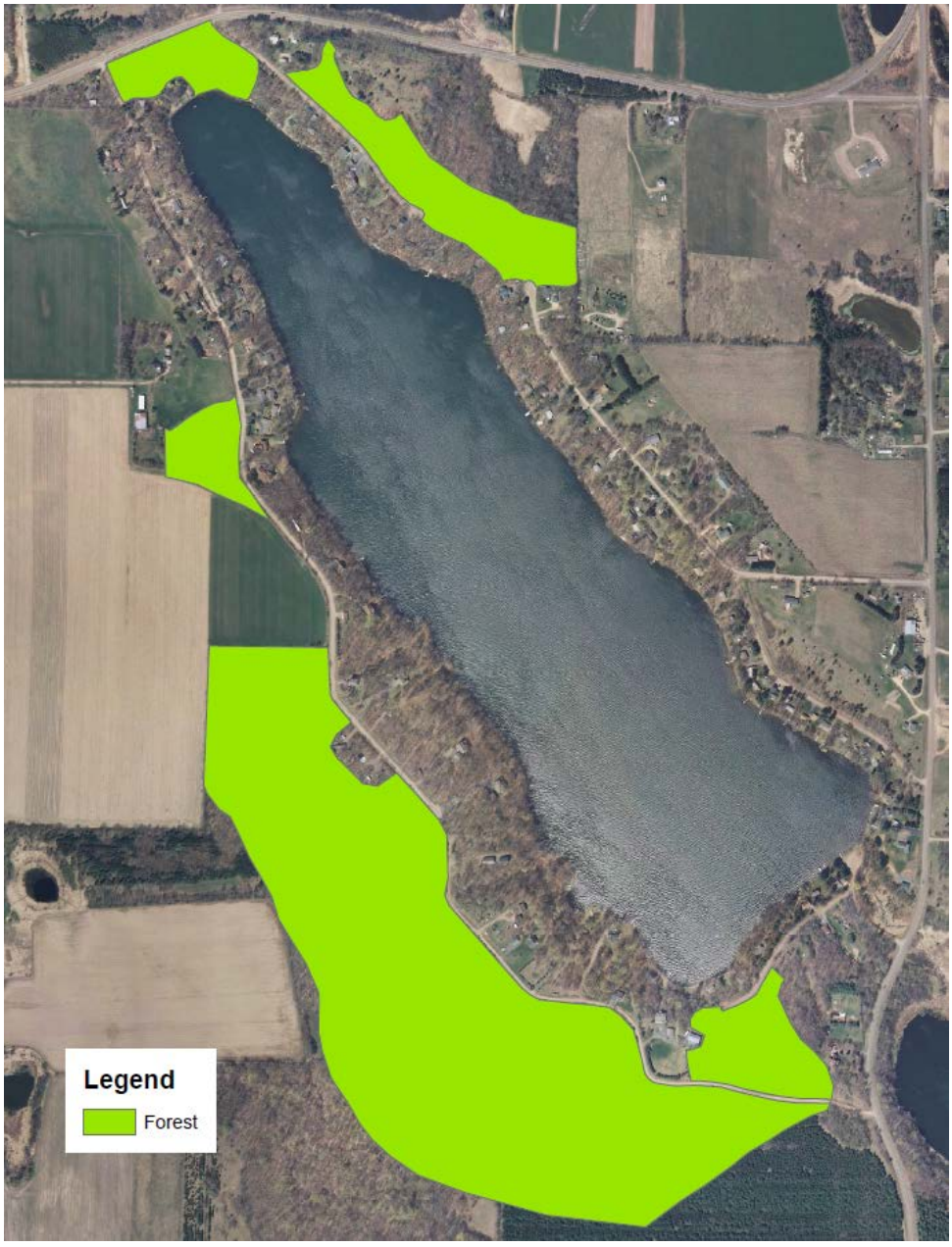
Internal Phosphorus Load: <u>243-264 pounds phosphorus/year</u>

Tributary load leaving Loveless Lake calculated using field collected phosphorus data: <u>86.4 pounds phosphorus/year</u>

Areas Providing Water Quality Benefits to Loveless Lake

Natural areas such as forests and wetlands allow for more infiltration of precipitation when compared with row cropped fields and developed residential sites containing lawns, rooftops, sidewalks, and driveways. This occurs because dense vegetation lessens the impact of raindrops on the soil surface, thereby reducing erosion and allowing for greater infiltration of water. Additionally, wetlands provide extensive benefits through their ability to filter nutrients and allow sediments to settle out before reaching lakes and rivers.

Forest makes up the largest land use in the Loveless Lake watershed (30%). These areas should be considered sensitive areas and preserved for the benefits they provide to the lake. No wetlands were delineated in the Loveless Lake watershed.



Summary of Rules and Legislation

Comprehensive Land Use Planning

The Polk County Comprehensive Land Use Plan was adopted in 2009. The plan includes an analysis of population, economy, housing, transportation, recreation, and land use trends. It also reports the physical features of Polk County. The purpose of the land use plan is to provide general guidance to achieve the desired future development of the county and direction for development decisions. The lakes classification outlines restriction on development according to lake features.

Plan information is available online at http://www.co.polk.wi.us <Departments < Land Information < Comprehensive Plan

Town, City and Village Comprehensive Plans are available at:
http://www.co.polk.wi.us < Departments < Land Information < Comprehensive Plan < City, Village, and Town Comprehensive Plans

Smart growth is a state mandated planning requirement to guide land use decisions and facilitate communication between municipalities. Wisconsin's Comprehensive Planning Law (Statute 66.1001, Wis. Stats.) was passed as part of the 1999 Budget Act. The law requires that if a local government engages in zoning, subdivision regulations, or official mapping, those local land use regulations must be consistent with that unit of local government's comprehensive plan beginning on January 1, 2010. The law defines a comprehensive plan as having at least the following nine elements:

- ✓ Issues and opportunities
- ✓ Housing
- ✓ Transportation
- ✓ Utilities and community facilities
- ✓ Agricultural, natural, and cultural resources
- ✓ Economic development
- ✓ Intergovernmental cooperation
- ✓ Land use
- ✓ Implementation
- ✓ Polk County added "Energy and Sustainability"

Polk County Comprehensive Land Use Ordinance

Polk County's oldest portions of the current zoning code are over 40 years old. Over the years, there have been numerous revisions to the original code. However, the current zoning code is in need of a comprehensive rewrite in order to address current and future issues in Polk County and to implement the vision set forth in the County's adopted comprehensive plan. Recognizing this, the County began a rewrite process in March 2010. A Zoning Citizen Advisory Committee (CAC) met to review the existing ordinances and make suggestions on how to appropriately rewrite them for the past 3+ years.

The State of Wisconsin's Administrative Rule NR115 dictates that counties must regulate lands within 1,000 feet of a lake, pond or flowage and 300 feet of a river or stream. The Shoreland Protection Zoning

Ordinance is also currently being rewritten as a part of the Comprehensive Land Use Ordinance due to the Comprehensive Plan and the State of Wisconsin passing a new version of NR 115 in 2010.

After reviewing the input of the advisory committees, public hearings and other changes, the Conservation, Development, Recreation and Education (CDRE) Committee, at their September 2, 2015 meeting, recommended that the ordinance be moved on to the County Board's agenda for consideration of passage at the September 15, 2015 meeting. At the September 15th, 2015 Polk County Board of Supervisors Meeting, the ordinance below was adopted.

Now that the ordinance has been passed, each Town within Polk County will have one calendar year to decide if they want to adopt county zoning or not. Each town participating in county zoning will be responsible for developing the zoning map for their town. Staff from the Land Information Department will be assisting the towns in this process over the next year.

The current Comprehensive Zoning Ordinance is available at:
http://www.co.polk.wi.us < Departments < Land Information < Ordinances (Zoning)

Subdivision Ordinance

The subdivision ordinance, adopted in 1996 and updated in 2005, requires a recorded certified survey map for any parcel less than 19 acres. The ordinance requires most new plats to incorporate storm water management practices with no net increase in runoff from development.

The ordinance is available online at:
http://www.co.polk.wi.us < Departments < Land Information < Ordinances (Zoning)

Animal Waste

The Polk County Manure and Water Quality Management Ordinance was revised in January 2000. A policy manual established minimum standards and specifications for animal waste storage facilities, feedlots, degraded pastures, and active livestock operations greater than 300 animal units for livestock producers regulated by the ordinances. The Land and Water Resource Department's objective was to have countywide compliance with the ordinance by 2006.

The ordinance is available online at:
http://www.co.polk.wi.us < Departments < Land & Water Resources < Ordinances.

Storm Water and Erosion Control

This ordinance, passed in December 2005, establishes planning and permitting requirements for erosion control on disturbed sites greater than 3,000 square feet, where more than 400 cubic yards of material is cut or filled, or where channels are used for 300 feet more of utility installation (with some exceptions). Storm water plans and implementation of best management practices are required for subdivisions, survey plats, and roads where more than ½ acre of impervious surface will result. The Polk

County Land and Water Resources Department administers the ordinance. The ordinance is a local mechanism to implement the Wisconsin Non-agricultural Runoff Performance Standards found in NR 151.

The ordinance is available online at:
http://www.co.polk.wi.us < Departments < Land & Water Resources < Ordinances.

WI Non-Agricultural Performance Standards (NR 151)

Construction Sites >1 acre – must control 80% of sediment load from sites

Storm water management plans (>1 acre)
- Total Suspended Solids
- Peak Discharge Rate
- Infiltration
- Buffers around water

Developed urban areas (>1000 persons/square mile)
- Public education
- Yard waste management
- Nutrient management
- Reduction of suspended solids

Polk County Land and Water Resources Management Plan

The Polk County Land and Water Resources Management Plan describes the strategy the Land and Water Resources Department (LWRD) will employ from 2009-2019 to address agriculture and non-agriculture runoff management, stormwater discharge, shoreline management, soil conservation, invasive species and other environmental degradation that affects the natural resources of Polk County. The plan specifies how LWRD will implement NR 151 (Runoff Management). It involves identifying critical sites, offering cost-share and other programs, identifying BMP's monitoring and evaluating projects for compliance, conducting enforcement activities, tracking progress, and providing information and education.

Polk County has local shoreland protection, zoning, subdivision, animal waste, and non-metallic mining ordinances. Enforcing these rules and assisting other agencies with programs are part of LWRD's ongoing activities. Other activities to implement the NR 151 Standards include: information and education strategies, write nutrient management plans, provide technical assistance to landowners and lakeshore owners, perform lake studies, collaborate with other agencies, work on a rivers classification system, set up demonstration sites of proper BMP's, control invasive species, and revise ordinances to offer better protection of resources.

WI Agricultural Performance Standards (NR 151)

For farmers who grow agricultural crops

- ✓ Meet "T" on cropped fields
- ✓ Starting in 2005 for high priority areas such as impaired or exceptional waters, and 2008 for all other areas, follow a nutrient management plan designed to limit entry of nutrients into waters of the state

For farmers who raise, feed, or house livestock

- ✓ No direct runoff from feedlots or stored manure into state waters
- ✓ No unlimited livestock access to waters of the state where high concentrations of animals prevent the maintenance of adequate or self-sustaining sod cover
- ✓ Starting in 2005 for high priority areas, and 2008 for all other areas, follow a nutrient management plan when applying or contracting to apply manure to limit entry of nutrients into waters of the state

For farmers who have or plan to build a manure storage structure

- ✓ Maintain a structure to prevent overflow, leakage, and structural failure
- ✓ Repair or upgrade a failing or leaking structure that poses an imminent health threat or violates groundwater standards
- ✓ Close a structure according to accepted standards
- ✓ Meet technical standards for a newly constructed or substantially-altered structure

For farmers with land in a water quality management area (defined as 300 feet from a stream, or 1,000 feet from a lake or areas susceptible to groundwater contamination)

- ✓ Do not stack manure in unconfined piles
- ✓ Divert clean water away from feedlots, manure storage areas, and barnyards located within this area

Boating Regulations

The Department of Natural Resources regulates boating in the state of Wisconsin.[14] Wisconsin conservation wardens enforce boating regulations. A few highlights of boating regulations are:

- ✓ Personal watercrafts (PWCs) may not operate from sunset to sunrise.
- ✓ PWC operators must be at least 12 years old.
- ✓ There are 100-foot restrictions between boats or PWCs and water skiers, towropes, and boats towing skiers.
- ✓ It is unlawful to operate within 100 feet of shore or of any dock, raft, pier, or buoyed restricted area at a speed in excess of "slow-no-wake."

[14] Boating regulations may be found online at www.dnr.wi.us/org/es/enforcement/docs/boating regs.pdf

- ✓ Speed must be reasonable and prudent under existing conditions to avoid colliding with any object or person.

A town or village may delegate the authority to adopt lake use regulations to a lake district. These may include regulation of boating equipment, use, or operation; aircraft; and travel on ice-bound lakes.[15] Local ordinances may now extend the slow-no-wake zone to within 200 feet of shore with passage of WI Act 31.

Dredging Regulations (Sec 30.20 Wis. Stats.) [16]

A general permit or an individual permit is required to dredge material from the bed of a navigable waterway. Local zoning permits and U.S. Army Corps of Engineers permits may also be required.

Wisconsin Transport Laws for Boaters and Anglers

In 2001, the Wisconsin Legislature directed the Department of Natural Resources to establish a statewide program to control invasive species and to promulgate rules to identify, classify, and control invasive species for purposes of the program. By 2004, the Wisconsin Council on Invasive Species formed to assist WDNR with this task.

As a result, on September 1, 2009 the WDNR created Wisconsin's Invasive Species Identification, Classification, and Control Rule, Chapter NR 40, Wisconsin Administrative Code. The rule helps citizens learn to identify and minimize the spread of plants, animals and diseases that can invade our lands and waters and cause significant damage.

The invasive species rule creates a comprehensive, science-based system with criteria to classify invasive species into two categories: prohibited and restricted. With certain exceptions, the transport, possession, transfer, and introduction of prohibited species is banned. Restricted species are also subject to a ban on transport, transfer, and introduction, although possession is allowed, with the exception of fish and crayfish.

Wisconsin has various laws in place to prevent the introduction and control the spread of AIS and diseases in Wisconsin.

Wisconsin Transport Laws for Boaters and Anglers

- ✓ INSPECT your boat, trailer and equipment.
- ✓ REMOVE any attached aquatic plants or animals (before launching, after loading and before transporting on a public highway).
- ✓ DRAIN all water from boats, motors, and all equipment.
- ✓ NEVER MOVE live fish away from a waterbody.
- ✓ DISPOSE of unwanted bait in the trash.

[15] Chapter 33. Wisconsin State Statutes

[16] Information from http://dnr.wi.gov.org/water/fhp/waterway/dredging

- ✓ BUY minnows from a Wisconsin bait dealer. You may take leftover minnows away from any state water and use them again on that same water. You may use leftover minnows on other waters only if no lake or river water, or other fish were added to their container.

Amended Illegal Transport of Aquatic Plants and Invasive Animals

In 2008, the Polk County Illegal Transport of Aquatic Plants and Invasive Animals Ordinance was adopted, making it illegal to operate or transport equipment with aquatic plants or invasive animals attached. Public input into the decision making process was sought through public meetings which were advertised in local papers. The Ordinance was amended in 2011 to include language regarding liability of a vehicle, watercraft, trailer, or equipment of the owner or lessor.

The ordinance is available online at:
http://www.co.polk.wi.us < Departments < Land & Water Resources < Ordinances

Lake Management Plan

Lake management plans help protect natural resource systems by encouraging partnerships between concerned citizens, lakeshore residents, watershed residents, agency staff, and diverse organizations. Lake management plans identify concerns of importance and set realistic goals, objectives, and action items to address each concern. Additionally, lake management plans identify roles and responsibilities for meeting each goal and provide a timeline for implementation.

Lake management plans are living documents which are under constant review and adjustment depending on the condition of a lake, available funding, level of volunteer commitments, and the needs of lake stakeholders.

The vision statement, guiding principles, and lake management plan goals presented below were created through collaborative efforts using current and past water quality data, a 2014 sociological survey regarding the needs of Loveless Lake residents, and a series of four meetings by the Loveless Lake Management Plan Committee. Key findings of the study and draft goals were presented at the 2016 Association Meeting on Saturday, May 21st. Additionally, attendees were asked to sign up for committees for implementing the lake management plan. The first agenda items for each committee will be to finish completing the lake management plan chart for each goal.

The draft plan was posted on the Loveless Lake and Polk County Land and Water Resources websites and opened for a 30 day public comment period ending on August 15, 2016. A notice of public comment was published in the Polk County Leader on July 13, 2016 and July 20, 2016. One public comment was recieved. The plan was approved by the Loveless Lake Association Board on September 28, 2016 and by the Wisconsin Department of Natural Resources on ***.

Vision: ***an overall statement for what you want Loveless Lake to look like***

Loveless Lake is minimally impacted by nuisance and invasive plant and algae growth and supports a lake lifestyle which balances natural shorelines and wildlife with recreational uses

Guiding Principles: ***provide guidance on how the lake management plan will be implemented***

Education, interest from residents, relationships between neighbors, and involvement in the Association is necessary to meet the vision for Loveless Lake

Lake management decisions are driven by an understanding of data and what is best for the resource

Goals for Loveless Lake are measurable, realistic, and achievable

Communication regarding lake management is easy to understand, concise, and frequent

Information is provided to understand the ever evolving nature of lake management, the complexity of issues, the status of projects and activities, the costs and benefits of actions, and the opportunity and techniques to reduce or prevent negative consequences of lake use and lakeside living

Goal 1. Improve water quality to reduce nuisance aquatic plant growth and algae blooms

Loveless Lake is currently on Wisconsin's Impaired Waters List for chlorophyll under the Federal Clean Water Act, Section 303(d). Watershed and internal sources of phosphorus should be reduced such that Loveless Lake is removed from the Impaired Waters List for chlorophyll (less than 30% of days in the sampling season have algae blooms and chlorophyll values less than 20 µg/L). Loveless Lake is not currently listed for phosphorus; although the lake was listed in 2012. Phosphorus sources should be maintained such that Loveless Lake is not relisted for phosphorus (less than 40 µg/L).

Install 25 shoreline native plantings, diversion practices, rock infiltrations practices or rain gardens (over 5 years)

- *Provide an educational message regarding the importance of native vegetation and diversion practices to reduce watershed sources of phosphorus*
- *Identify shoreland property owners interested in installing native vegetation and diversion practices*
- *Offer free annual Healthy Lakes property audits to identify property owners interested in installing practices*
- *Complete designs for Healthy Lakes practices*
- *Use the results of the 2015 shoreline inventory to prioritize installation of practices on properties with erosion*
- *Prepare a Healthy Lakes Grant application to fund projects up to 75%*
- *Install WDNR signage at Healthy Lakes project sites*
- *Organize a tour of properties where successful practices have been installed*

Install best management practices to address the culverts contributing the greatest concentration and amount of phosphorus to Loveless Lake

- *Review the need for maintenance to improve existing culverts*
- *Assess the site and select an appropriate best management practice*
- *Complete a field survey to inform the design of the appropriate best management practice*
- *Design the best management practice*
- *Request bids for the construction of the best management practice*
- *Ensure the installation of practices*
- *Ensure a maintenance plan is in place for new best management practices*

Engage shoreline property owners in improving water quality by developing and delivering educational messages

Topics include the negative impacts on water quality of:

- *Lawn fertilizer*
- *Failing septic systems*

- *Erosion or areas of bare dirt*
- *Near shore boat traffic and excessive speed*

Determine the possibility of purchasing highly erodible/ecologically sensitive land, if option arises

- *Form a committee to oversee the purchase of high erodible/ecologically sensitive land*
- *Identify parcels of highly erodible/ecologically sensitive land to acquire*
- *Research and explore the formation of a conservancy*
- *Research and explore grant opportunities for acquiring land*
- *Whenever possible, provide low impact recreational uses (walking trails, picnic shelter, public fishing pier, etc.) if land is purchased*

Goal 2. Protect and improve fish habitat to maintain Loveless Lake's natural fish population

Maintain and enhance desirable populations of fish by installing 3 habitat improvements

- *Work with fisheries biologist to determine locations for fish sticks and other habitat improvements*
- *Identify property owners interested in installing fish sticks and other habitat improvements*
- *Prepare a Healthy Lakes Grant application to fund the installation of fish sticks and other habitat improvements such as shoreline restoration*

Engage shoreline property owners in improving fish habitat by developing and delivering educational messages

Topics include the positive impacts on fish populations of:

- *Leaving fallen trees in the lake*
- *Observing slow-no-wake near shore*
- *Preventing erosion on the lakeshore*
- *Establishing no-mow areas on the lakeshore*

Goal 3. Maintain and enhance the natural beauty of Loveless Lake for the benefits provided to the lake lifestyle and wildlife

Maintain and expand undeveloped areas along the shoreline

- *Promote native plantings and no-mow areas to lake residents*
- *Determine the possibility of purchasing undeveloped, highly erodible, and/or ecologically sensitive land*
- *Prepare a Healthy Lakes Grant application to help fund shoreline plantings*

Maintain and expand in-lake habitat for wildlife

- *Post signs to promote slow no wake within 100 feet of the shoreline*
- *Research in-lake native plantings*

Engage residents and users in promoting a lake lifestyle

- *Provide information and education on options for shielding lights*
- *Provide information and education on boater safety*
- *Participate in public meetings if shoreline ordinances are rewritten*

Goal 4. Prevent the introduction, establishment, and spread of AIS in Loveless Lake

Ensure that lake users understand the steps necessary to prevent invasive species

- *Implement a Clean Boats, Clean Water monitoring and education program*
- *Participate in WDNR statewide programs including the Landing Blitz and Drain Campaign*
- *Ensure that signage at the boat landings is in place each year and updated as necessary*
- *Work with the Polk County Sheriff's Department to encourage enforcement of the Do Not Transport Ordinance*

Implement a monitoring program to quickly identify the introduction of new invasive species

- *Attend the countywide Citizen Lake Monitoring Network Training for invasive species which trains volunteers to identify and monitor for aquatic invasive species*
- *Form a committee of volunteers to monitor for invasive species over the course of the growing season with a focus on boat landings and other areas with high potential for introduction*
- *Contract with professionals to implement a monitoring program for aquatic invasive species*
- *Develop and implement a rapid response plan so that new populations are addressed quickly and efficiently*

Determine the current extend of curly leaf pondweed in Loveless Lake

- *Map curly leaf pondweed beds to determine if beds are expanding*

Goal 5. Provide education regarding lake ecology and management to Loveless Lake residents

Deliver focused educational messages to Loveless Lake residents using:

- *Newsletter articles focusing on 3-5 key items*
- *Guest speakers*
- *Events specifically geared towards kids*

Educational topics include:

- *WDNR regulations*
- *WDNR grants*
- *Native plantings/techniques (referring back to lake resident survey)*
- *Boat safety*
- *Slow-no-wake*
- *Lake District formation*
- *Effect of water quality on property value/resale*
- *Lake/watershed science*
- *Shoreland ordinance updates*
- *Current and trending news items*

Goal 6. Sustain the implementation of the plan and evaluate the progress of lake management efforts through monitoring and modeling

From committees to ensure that goals of the plan are met

- *Water quality*
- *Fish and wildlife*
- *Aquatic invasive species*
- *Information and education*
- *Social*

Annually review and document the progress made towards plan implementation

- *Identify action items that were completed*
- *Identify action items that were not completed*
- *If actions were not completed, identify why they were not completed*
- *Identify current and future barriers to implement the plan*
- *Report progress in the bi-annual newsletter*

Determine the possibility of forming a Lake District

- *Form a committee to gather information on becoming a Lake District*
- *Present information to residents regarding the pros and cons of becoming a Lake District*
- *Draft Lake District boundaries*
- *Gather membership support for forming a Lake District*

Continue current data collection efforts to evaluate progress

- *Continue Citizen Lake Monitoring Network data collection for total phosphorus, chlorophyll, secchi, temperature, and oxygen*

Expand data collection efforts depending on needs

- *Implement a culvert study to document phosphorus reductions*
- *Add nitrogen sampling to determine the TN:TP*
- *Implement a study to determine internal load (sediment study, bottom water samples)*
- *Collect a sediment core to determine historical water quality conditions*

	Timeline	$ Estimate	Volunteer hours	Responsible parties	Funding sources
Goal 1. Improve water quality to reduce nuisance aquatic plant growth and algae blooms					
Install 25 shoreline native plantings, diversion practices, rock infiltrations practices or rain gardens (over 5 years)				Water quality committee	Healthy Lakes Grant
Provide an educational message regarding the importance of native vegetation and diversion practices to reduce watershed sources of phosphorus	Spring/summer 2016				
Identify shoreland property owners interested in installing native vegetation and diversion practices	Spring/summer 2016				
Offer free annual Healthy Lakes property audits to identify property owners interested in installing practices	Summer/fall 2016			Consultant	
Complete designs for Healthy Lakes practices	Summer/fall 2016			Consultant or property owner	
Use the results of the 2015 shoreline inventory to prioritize installation of practices on properties with erosion	Ongoing				
Prepare a Healthy Lakes Grant application to fund projects up to 75%	February 1 2017, ongoing				
Install WDNR signage at Healthy Lakes project sites	After project completed				
Organize a tour of properties where successful practices have been installed	As needed, annually				
Install best management practices to address the culverts contributing the greatest concentration and amount of phosphorus to Loveless Lake				Water quality committee	Lake Protection Grant
Review the need for maintenance to improve existing culverts	Fall 2016			Town, Polk County LWRD or consultant	
Assess the site and select an appropriate best management practice	Fall 2016			Polk County LWRD or consultant	
Complete a field survey to inform the design of the appropriate best management practice	Fall 2016			Polk County LWRD or	

				consultant	
Design the best management practice	Fall 2016			Polk County LWRD or consultant	
Prepare a Lake Protection Grant application	Due February 1, 2017			Association, Polk County, or consultant	
Request bids for the construction of the best management practice	Dependent on grant funding and District formation			Polk County LWRD or consultant	
Ensure the installation of practices	Dependent on grant funding and District formation			Contractor	
Ensure a maintenance plan is in place for new best management practices				Polk County LWRD or consultant	
Engage shoreline property owners in improving water quality by developing and delivering educational messages				Water quality committee and social committee	
Topics include the negative impacts on water quality of: lawn fertilizer, failing septic systems, erosion or areas of bare dirt, near shore boat traffic and excessive speed, etc.	Ongoing, annual				
Determine the possibility of purchasing highly erodible/ecologically sensitive land, if option arises				Water quality sub-committee	
Form a committee to oversee the purchase of high erodible/ecologically sensitive land	Fall 2016				
Identify parcels of highly erodible/ecologically sensitive land to acquire	2018, ongoing				
Research and explore the formation of a conservancy	2018, ongoing				
Research and explore grant opportunities for acquiring land	2018, ongoing				
Whenever possible, provide low impact recreational uses (walking trails, picnic shelter, public fishing pier, etc.) if land is purchased	2018, ongoing				

	Timeline	$ Estimate	Volunteer hours	Responsible parties	Funding sources
Goal 2. Protect and improve fish habitat to maintain Loveless Lake's natural fish population					
Maintain and enhance desirable populations of fish by installing 3 habitat improvements				Fish and wildlife committee	Healthy Lakes Grant
Work with fisheries biologist to determine locations for fish sticks and other habitat improvements	Fall 2018				
Identify property owners interested in installing fish sticks and other habitat improvements	Fall 2018				
Prepare a Healthy Lakes Grant application to fund the installation of fish sticks and other habitat improvements such as shoreline restoration	February 1 2019				
Implement Healthy Lakes Grant	2019-2020				
Engage shoreline property owners in improving fish habitat by developing and delivering educational messages	Ongoing, annual			Fish and wildlife committee and Social committee	
Topics include the positive impacts on fish populations of: leaving fallen trees in the lake, observing slow-no-wake near shore, preventing erosion on the lakeshore, establishing no-mow areas on the lakeshore, etc.					

	Timeline	$ Estimate	Volunteer hours	Responsible parties	Funding sources
Goal 3. Maintain and enhance the natural beauty of Loveless Lake for the benefits provided to the lake lifestyle and wildlife					
Maintain and expand undeveloped areas along the shoreline				Fish and wildlife committee/water quality committee	Healthy Lakes Grant
Promote native plantings and no-mow areas to lake residents	Ongoing, annual				
Determine the possibility of purchasing undeveloped, highly erodible, and/or ecologically sensitive land	2018, ongoing				
Prepare a Healthy Lakes Grant application to help fund shoreline plantings	February 1 2017, ongoing				
Maintain and expand in-lake habitat for wildlife				Fish and wildlife committee	
Post signs to promote slow no wake within 100 feet of the shoreline, 200 feet for personal watercraft	2016				
Research in-lake native plantings	2019				
Engage residents and users in promoting a lake lifestyle	Ongoing, annual			Fish and wildlife committee OR Social committee	
Provide information and education on options for shielding lights					
Provide information and education on boater safety					
Participate in public meetings if shoreline ordinances are rewritten					

	Timeline	$ Estimate	Volunteer hours	Responsible parties	Funding sources
Goal 4. Prevent the introduction, establishment, and spread of AIS in Loveless Lake					
Ensure that lake users understand the steps necessary to prevent invasive species				Aquatic invasive species committee	AIS Education, Prevention, & Planning Grant
Implement a Clean Boats, Clean Water monitoring and education program	As needed, annually				
Participate in WDNR statewide programs including the Landing Blitz and Drain Campaign	Ongoing, annual				
Ensure that signage at the boat landings is in place each year and updated as necessary	Ongoing, annual				
Work with the Polk County Sheriff's Department to encourage enforcement of the Do Not Transport Ordinance	Ongoing, annual				
Implement a monitoring program to quickly identify the introduction of new invasive species				Aquatic invasive species committee	AIS Education, Prevention, and Planning Grant
Attend the countywide Citizen Lake Monitoring Network Training for invasive species which trains volunteers to identify and monitor for aquatic invasive species	Ongoing, annual				
Form a committee of volunteers to monitor for invasive species over the course of the growing season with a focus on boat landings and other areas with high potential for introduction	Fall 2016				
Contract with professionals to implement a monitoring program for aquatic invasive species	As needed				
Develop and implement a rapid response plan so that new populations are addressed quickly and efficiently	2017				
Determine the current extend of curly leaf pondweed in Loveless Lake				Aquatic invasive species committee	AIS Education, Prevention, & Planning Grant
Map curly leaf pondweed beds to determine if beds are expanding	Spring 2017				

	Timeline	$ Estimate	Volunteer hours	Responsible parties	Funding sources
Goal 5. Provide education regarding lake ecology and management to Loveless Lake residents					
Deliver focused educational messages to Loveless Lake residents using:	Ongoing, annual			Information and education committee	
Newsletter articles focusing on 3-5 key items	Biannual				
Guest speakers	Biannual				
Events specifically geared towards kids					
Educational topics include: WDNR regulations, WDNR grants, native plantings/techniques (referring back to lake resident survey), slow-no-wake, Lake District formation, effect of water quality on property value/resale, lake/watershed science, shoreland ordinance updates, current and trending news items, etc.					

	Timeline	$ Estimate	Volunteer hours	Responsible parties	Funding sources
Goal 6. Sustain the implementation of the plan and evaluate the progress of lake management efforts through monitoring and modeling					
From committees to ensure that goals of the plan are met	Fall 2016			Loveless Lake Association Board	
☐ Water quality					
☐ Fish and wildlife					
☐ Aquatic invasive species					
☐ Information and education					
☐ Social					
Annually review and document the progress made towards plan implementation	Ongoing, annual			Loveless Lake Association Board, Committee chairs	
Identify action items that were completed					
Identify action items that were not completed					
If actions were not completed, identify why they were not completed					
Identify current and future barriers to implement the plan					
Report progress in the bi-annual newsletter					
Determine the possibility of forming a Lake District				Loveless Lake Association Board	
Form a committee to gather information on becoming a Lake District	Fall 2016				

Present information to residents regarding the pros and cons of becoming a Lake District	Spring 2017				
Draft Lake District boundaries	Summer 2017				
Gather membership support for forming a Lake District	Summer 2017				
Continue current data collection efforts to evaluate progress	Ongoing, annual			Loveless Lake Association Board	WDNR Citizen Lake Monitoring Program
Continue Citizen Lake Monitoring Network data collection for total phosphorus, chlorophyll, secchi, temperature, and oxygen					
Expand data collection efforts depending on needs				Loveless Lake Association Board	Lake Planning Grant
Implement a culvert study to document phosphorus reductions	2019				
Add nitrogen sampling to determine the TN:TP	2017				
Implement a study to determine internal load (sediment study, bottom water samples)	2021				
Collect a sediment core to determine historical water quality conditions	2021				

Appendix A

Lake Resident Survey and Results

Loveless Lake Property Owner Survey, 2014

The following survey is a component of the Loveless Lake Planning Grant. The Loveless Lake Association, the Polk County Land and Water Resources Department (LWRD) and the Wisconsin Department of Natural Resources have partnered to gather data about Loveless Lake in Summer 2014. These data will be used by a group of residents and LWRD staff to develop a Lake Management Plan for Loveless Lake. The ultimate goal of the study is to identify ways to improve water quality on Loveless Lake. Your responses are very important and will help guide the future management of Loveless Lake and its watershed.

This survey should be completed by all persons who own property in the Loveless Lake Watershed. Surveys should be returned in the included self-addressed, stamped envelope by July 1st to:

LWRD
100 Polk County Plaza—Ste 120
Balsam Lake, WI 54810

PROPERTIES AND PROPERTY OWNERS

1. **How many years have you owned property on or near Loveless Lake? Note: if you own more than one property, please answer all questions for the property you have owned the longest.**
   ____ years

   *If you do not own property on or near Loveless Lake, check here and return the survey.
   ____ I do not own property on or near Loveless Lake.

2. **Which of the following best describes how you use your property? Please check one.**
   ___ Year round residence
   ___ Seasonal residence – continued occupancy for months at a time
   ___ Weekend, vacation and/or holiday residence
   ___ Rental property
   ___ Other (please specify) _____

3. **How many days in a typical year is your property used by you or others? Just provide your best estimate?**
   ____ days per year

4. **On an average day that your property is occupied, how many people occupy the property?**
   ____ people

5. **Is your property… Please check one.**
   ____ Mostly agricultural
   ____ Mostly mowed lawn
   ____ An even mix of lawn and trees
   ____ Mostly trees, shrubs, or meadow (wild and un-mowed)
   ____ Mostly hard surfaces such as rooftops, driveways, and patios

6. Do you own shoreline property on Loveless Lake?

____ No, please skip to question 8 ____ Yes

7. Which of the following describe the first 35 feet of your shoreline (the area located directly adjacent to the lake)? If you don't own shoreline property, please skip this question. Please check all that apply.

____ Mowed lawn
____ Un-mowed vegetation
____ Shrubs/trees
____ Undisturbed woods
____ Stabilizing rock/rip rap
____ Pier/dock
____ Buffer zone/shoreline restoration
____ Rain garden
____ Other, please describe_____

8. How would you describe your current use of fertilizer on your property?

____ I do not use any fertilizer on my property
____ I use zero phosphorus fertilizer on my property
____ I use fertilizer on my property but I'm unsure of its phosphorus content
____ I use fertilizer on my property that contains phosphorus
____ I use multiple types of fertilizers on my property that contain varying amounts of phosphorus

9. What are the most important reasons you own property on or near Loveless Lake? (List your top three reasons by writing the corresponding letter below, with 1st being most important.)

1st _____
2nd _____
3rd _____

A) Scenic beauty/viewing nature
B) Financial (work or investment)
C) Non-motorized water sports
D) Motorized water sports
E) Sense of community
F) Rural lifestyle
G) Lake lifestyle
H) Entertaining
I) Farming
J) Fishing
K) Hunting
L) Winter activities
M) Other, please describe_____

10. What recreational activities do you enjoy at Loveless Lake? Please check all that apply.

____ Open water fishing
____ Swimming
____ Enjoying peace and tranquility
____ Enjoying the view
____ Jet skiing/wake boarding/waterskiing
____ Non-motorized boating (canoe/kayak)
____ Motorized boating
____ Sailing or wind surfing
____ Hunting or trapping
____ Observing wildlife
____ Snowmobiling
____ Cross country skiing
____ Ice fishing
____ Other, please describe_____

PROPERTY OWNER CONCERNS ABOUT LOVELESS LAKE

11. What is your degree of concern with each issue listed below? If you believe the issue doesn't exist check the first column; if you believe the issue exists but is not a concern check the second column; and if the issue concerns you please rank your concern as low, medium, or high.

	Issue doesn't exist	Exists, but not a concern	Low concern	Medium concern	High concern
New invasive species entering the lake					
Expansion of current invasive species (curly leaf pondweed)					
Excessive aquatic plant growth					
Excessive algae blooms					
Lack of water clarity or quality					
Loss of natural scenery/beauty					
Excessive noise level on the lake					
Decreased wildlife populations					
Decreased fisheries					
Unsafe use of motorized water craft					
Disregard for slow-no-wake zones					
Decreased property values					
Increased development					
Increased nutrient pollution					
Decreased lake level					
Decrease in overall lake health					

12. How would you describe the current water quality of Loveless Lake?

____ Poor
____ Fair
____ Good
____ Excellent

13. Since you have lived on or near the lake, how would you describe the change in water quality?

____ Improved greatly
____ Improved slightly
____ No noticeable change
____ Degraded slightly
____ Degraded greatly
____ I have not been on the lake long enough to notice a change

14. Algae growth varies through the open water season. Which month(s) of the season do you consider algae growth (not including aquatic plants) to be problematic on Loveless Lake. Please check all that apply.

____ May
____ June
____ July
____ August
____ September
____ October
____ Unsure
____ Algae growth is never a problem, **skip to question 16**

15. Please indicate which of the following uses you believe are impaired by <u>algae growth</u> (not including aquatic plants) on Loveless Lake. If you are unsure, please check the last column.

	Yes	No	Unsure
Swimming			
Fishing			
Boating			
Navigation			
Dogs/animals using the water			
Overall enjoyment of the lake			

16. Overall, how would you describe <u>aquatic plant growth</u> (not including algae) on Loveless Lake?

____ Too few plants ____ Healthy amount of plants ____ Too many plants

17. Aquatic plant growth varies throughout the open water season. Which month(s) of the season do you consider <u>aquatic plant growth</u> (not including algae) to be problematic in Loveless Lake? Please check all that apply.

____ May ____ August ____ Unsure
____ June ____ September ____ Aquatic plant growth is never a
____ July ____ October problem, **skip to question 19**

18. Please indicate which of the following uses you believe are limited by <u>aquatic plants</u> (not including algae) on Loveless Lake. If you are unsure, please check the last column.

	Yes	No	Unsure
Swimming			
Fishing			
Boating			
Navigation			
Overall enjoyment of the lake			

19. How would you describe the current amount of mowed lawn on the shoreline of Loveless Lake?

____ Too much ____ Not enough
____ Just right ____ Unsure

20. What impact, if any, do you believe landowner landscaping practices such as shoreline buffers, rain gardens, and native plants have on the water quality of Loveless Lake?

____ Positive impact, but only if all property owners participate
____ Positive impact, regardless of how many property owners participate
____ Negative impact, please describe_____
____ No impact

21. Below is a list of landscaping practices designed to reduce runoff from your property. For each practice please indicate if you are unfamiliar with the practice, are familiar with the practice but have not installed it, have already installed the practice, or are planning to install the practice.

	Unfamiliar with the practice	Familiar but not installed	Already installed	Planning to install
Rain gardens				
Rain barrels				
Native shoreline buffers or plantings				
Infiltration/rock pits				
Water diversions (berms)				
Permeable pavers (allow water to infiltrate into the soil)				

22. From the list below, please indicate any reasons preventing you from installing practices to reduce waterfront runoff on your property. Please check all that apply.

____ My property doesn't impact the lake
____ I don't believe the practices will help to improve water quality
____ Takes too much time to install a practice
____ Not enough space on my lot
____ My neighbors may not like it
____ Unsure how to install a practice
____ Cost prohibitive
____ I don't want to install a practice, please describe why _____
____ Other, please describe _____

23. Please tell us if the following activities should be completed by the Loveless Lake Association to manage Loveless Lake. Most activities are eligible for grant funding.

	Yes	No	Unsure
Offering incentives to property owners for the installation of shoreline buffers and rain gardens			
Offering incentives to property owners for the installation of farmland conservation practices			
Lake fairs and workshops to share information			
Enforcement of slow-no-wake zones			
Practices to enhance fisheries			
Offering incentives to property owners to upgrade non-conforming septic systems			
Programs to prevent and monitor invasive species			

WILLINGNESS TO CONTRIBUTE TO MAINTAINING AND IMPROVING LOVELESS LAKE

24. Would you be willing to provide financial support to maintain or improve the quality of Loveless Lake and its associated land resources?

____ Yes ____ No, please skip to question 26

25. How much would you be willing to contribute each year to maintain or improve the quality of Loveless Lake and its associated land resources? This is just a measure of potential support and not a commitment.

_____ dollars per year

26. What is your overall satisfaction level with owning property on Loveless Lake?

____ Highly satisfied
____ Somewhat satisfied
____ Somewhat dissatisfied
____ Very dissatisfied

Thank you for your time and answers!

If you have any comments you would like to make regarding Loveless Lake and its surrounding lake resources, please use the space below.

LOVELESS LAKE RESIDENT SURVEY RESULTS

Surveys mailed: 223
Surveys returned: 56
Response Rate: 25%

PROPERTIES AND PROPERTY OWNERS

1. How many years have you owned property on or near Loveless Lake? Note: if you own more than one property, please answer all questions for the property you have owned the longest.
   55 respondents, 98%
   Averge: 21 years

2. Which of the following best describes how you use your property? Please check one.
   55 respondents, 98%

   Year round residence **10 respondents, 18%**
   Seasonal residence – continued occupancy for months at a time **6 respondents, 11%**
   Weekend, vacation and/or holiday residence **37 respondents, 67%**
   Rental property **1 respondent, 2%**
   Other (please specify) **1 respondent, 2%**
   Vacant lot

3. How many days in a typical year is your property used by you or others? Just provide your best estimate?
   54 respondents, 96%

   Average: 139 days per year

4. On an average day that your property is occupied, how many people occupy the property?
   54 respondents, 96%
   Average 3 people

5. Is your property… Please check one.
   55 respondents, 98%

   Mostly agricultural **1 respondent, 2%**
   Mostly mowed lawn **5 respondents, 9%**
   An even mix of lawn and trees **35 respondents, 64%**
   Mostly trees, shrubs, or meadow (wild and un-mowed) **12 respondents, 22%**
   Mostly hard surfaces such as rooftops, driveways, and patios **2 respondents, 4%**

6. Do you own shoreline property on Loveless Lake?
   55 respondents, 98%

   No, please skip to question 8 **0 respondents, 0%**
   Yes **55 respondents, 100%**

7. Which of the following describe the first 35 feet of your shoreline (the area located directly adjacent to the lake)? If you don't own shoreline property, please skip this question. Please check all that apply.
53 respondents, 95%

Mowed lawn **15 respondents, 28%**
Un-mowed vegetation **37 respondents, 70%**
Shrubs/trees **13 respondents, 25%**
Undisturbed woods **9 respondents, 17%**
Stabilizing rock/rip rap **15 respondents, 28%**
Pier/dock **25 respondents, 47%**
Buffer zone/shoreline restoration **6 respondents, 11%**
Rain garden **0 respondents, 0%**
Other, please describe **1 respondent, 2%**
Retaining wall

8. How would you describe your current use of fertilizer on your property?
53 respondents, 95%

I do not use any fertilizer on my property **36 respondents, 68%**
I use zero phosphorus fertilizer on my property **17 respondents, 32%**
I use fertilizer on my property but I'm unsure of its phosphorus content **0 respondents, 0%**
I use fertilizer on my property that contains phosphorus **0 respondents, 0%**
I use multiple types of fertilizers on my property that contain varying amounts of phosphorus **0 respondents, 0%**

9. What are the most important reasons you own property on or near Loveless Lake? (List your top three reasons by writing the corresponding letter below, with 1st being most important.)
55 responses, 98%

1st Lake lifestyle, 117 points
2nd Scenic beauty/viewing nature, 75 points
3rd Fishing, 32 points

A) Scenic beauty/viewing nature **75 points**
B) Financial (work or investment) **6 points**
C) Non-motorized water sports **14 points**
D) Motorized water sports **31 points**
E) Sense of community **1 point**
F) Rural lifestyle **11 points**
G) Lake lifestyle **117 points**
H) Entertaining **22 points**
I) Farming **0 points**
J) Fishing **32 points**
K) Hunting **0 points**

L) Winter activities **4 points**
M) Other, please describe **5 responses, 10 points**
Family gathering place
Family owned cabin since 1965
Family
Family use
Primary home

10. What recreational activities do you enjoy at Loveless Lake? Please check all that apply. **54 responses, 96%**

Open water fishing **36 respondents, 67%**
Swimming **41 respondents, 76%**
Enjoying peace and tranquility **43 respondents, 80%**
Enjoying the view **45 respondents, 83%**
Jet skiing/wake boarding/waterskiing **19 respondents, 35%**
Non-motorized boating (canoe/kayak) **26 respondents, 48%**
Motorized boating **39 respondents, 72%**
Sailing or wind surfing **6 respondents, 11%**
Hunting or trapping **1 respondent, 2%**
Observing wildlife **33 respondents, 61%**
Snowmobiling **9 respondents, 17%**
Cross country skiing **11 respondents, 20%**
Ice fishing **16 respondents, 30%**
Other, please describe **1 respondent, 2%**
Eating

PROPERTY OWNER CONCERNS ABOUT LOVELESS LAKE

11. What is your degree of concern with each issue listed below? If you believe the issue doesn't exist check the first column; if you believe the issue exists but is not a concern check the second column; and if the issue concerns you please rank your concern as low, medium, or high.

Values in the chart represent number of respondents and percentages for each issue listed below, respectively.

	Issue doesn't exist	Exists, but not a concern	Low concern	Medium concern	High concern
New invasive species entering the lake **51 respondents, 91%**	**5, 10%**	**0, 0%**	**8, 16%**	**10, 20%**	**28, 55%**
Expansion of current invasive species (curly leaf pondweed) **51 respondents, 91%**	**1, 2%**	**1, 2%**	**5, 10%**	**16, 31%**	**28, 55%**
Excessive aquatic plant growth **55 respondents, 98%**	**1, 2%**	**2, 4%**	**7, 13%**	**18, 33%**	**26, 47%**
Excessive algae blooms **54 respondents, 96%**	**1, 2%**	**1, 2%**	**3, 6%**	**14, 26%**	**35, 65%**
Lack of water clarity or quality **56 respondents, 100%**	**3, 5%**	**1, 2%**	**6, 11%**	**12, 21%**	**34, 61%**
Loss of natural scenery/beauty **53 respondents, 95%**	**8, 15%**	**1, 2%**	**12, 23%**	**16, 30%**	**16, 30%**
Excessive noise level on the lake **55 respondents, 98%**	**6, 11%**	**7, 13%**	**15, 27%**	**11, 20%**	**16, 29%**
Decreased wildlife populations **53 respondents, 95%**	**10, 19%**	**2, 4%**	**17, 32%**	**15, 28%**	**9, 17%**
Decreased fisheries **53 respondents, 95%**	**9, 17%**	**2, 4%**	**9, 17%**	**18, 34%**	**15, 28%**
Unsafe use of motorized water craft **56 respondents, 100%**	**13, 23%**	**5, 9%**	**14, 25%**	**9, 16%**	**15, 27%**
Disregard for slow-no-wake zones **56 respondents, 100%**	**11, 20%**	**7, 13%**	**11, 20%**	**9, 16%**	**16, 29%**
Decreased property values **52 respondents, 93%**	**7, 13%**	**4, 8%**	**10, 19%**	**14, 27%**	**17, 33%**
Increased development **53 respondents, 95%**	**7, 13%**	**3, 6%**	**16, 30%**	**12, 23%**	**15, 28%**
Increased nutrient pollution **54 respondents, 96%**	**3, 6%**	**2, 4%**	**8, 15%**	**10, 19%**	**31, 57%**
Decreased lake level **54 respondents, 96%**	**15, 28%**	**3, 6%**	**17, 31%**	**7, 13%**	**12, 22%**
Decrease in overall lake health **56 respondents, 100%**	**4, 7%**	**0, 0%**	**5, 9%**	**15, 27%**	**32, 57%**

12. How would you describe the current water quality of Loveless Lake?
    56 respondents, 100%

    Poor **6 respondents, 11%**
    Fair **29 respondents, 52%**
    Good **17 respondents, 30%**
    Excellent **4 respondents, 7%**

13. Since you have lived on or near the lake, how would you describe the change in water quality?
    54 respondents, 96%

    Improved greatly **0 respondents, 0%**
    Improved slightly **1 respondent, 2%**
    No noticeable change **19 respondents, 35%**
    Degraded slightly **21 respondents, 39%**
    Degraded greatly **9 respondents, 17%**
    I have not been on the lake long enough to notice a change **4 respondents, 7%**

14. Algae growth varies through the open water season. Which month(s) of the season do you consider algae growth (not including aquatic plants) to be problematic on Loveless Lake. Please check all that apply.
    56 respondents, 100%

    May **1 respondents, 2%**
    June **4 respondents, 7%**
    July **30 respondents, 54%**
    August **51 respondents, 91%**
    September **24 respondents, 43%**
    October **6 respondents, 11%**
    Unsure **4 respondents, 7%**
    Algae growth is never a problem, skip to question 16 **0 respondents, 0%**

15. Please indicate which of the following uses you believe are impaired by algae growth (not including aquatic plants) on Loveless Lake. If you are unsure, please check the last column.

Values in the chart represent number of respondents and percentages for each issue listed below, respectively.

	Yes	No	Unsure
Swimming **56 respondents, 100%**	**51, 91%**	**1, 2%**	**4, 7%**
Fishing **50 respondents, 89%**	**22, 44%**	**10, 20%**	**18, 36%**
Boating **50 respondents, 89%**	**18, 36%**	**25, 50%**	**7, 14%**
Navigation **49 respondents, 88%**	**8, 16%**	**27, 55%**	**14, 29%**
Dogs/animals using the water **51 respondents, 91%**	**24, 47%**	**12, 24%**	**15, 29%**
Overall enjoyment of the lake **55 respondents, 98%**	**43, 78%**	**5, 9%**	**7, 13%**

16. Overall, how would you describe aquatic plant growth (not including algae) on Loveless Lake?
53 respondents, 95%

Too few plants **4 respondents, 8%**
Healthy amount of plants **18 respondents, 34%**
Too many plants **31 respondents, 58%**

17. Aquatic plant growth varies throughout the open water season. Which month(s) of the season do you consider aquatic plant growth (not including algae) to be problematic in Loveless Lake? Please check all that apply.
53 respondents, 95%

May **2 respondents, 4%**
June **9 respondents, 17%**
July **32 respondents, 60%**
August **40 respondents, 75%**
September **18 respondents, 34%**
October **3 respondents, 6%**
Unsure **9 respondents, 17%**
Aquatic plant growth is never a problem, skip to question 19 **0 respondents, 0%**

18. Please indicate which of the following uses you believe are limited by aquatic plants (not including algae) on Loveless Lake. If you are unsure, please check the last column.

Values in the chart represent number of respondents and percentages for each issue listed below, respectively.

	Yes	No	Unsure
Swimming **54 respondents, 96%**	**45, 83%**	**5, 9%**	**4, 7%**
Fishing **49 respondents, 88%**	**15, 31%**	**22, 45%**	**12, 24%**
Boating **50 respondents, 89%**	**17, 34%**	**24, 48%**	**9, 18%**
Navigation **47 respondents, 84%**	**9, 19%**	**26, 55%**	**12, 26%**
Overall enjoyment of the lake **54 respondents, 96%**	**31, 57%**	**12, 22%**	**11, 20%**

19. How would you describe the current amount of mowed lawn on the shoreline of Loveless Lake?
56 respondents , 100%

Too much **19 respondents, 34%**
Just right **20 respondents, 36%**
Not enough **1 respondent, 2%**
Unsure **16 respondents, 29%**

20. What impact, if any, do you believe landowner landscaping practices such as shoreline buffers, rain gardens, and native plants have on the water quality of Loveless Lake?
55 respondents, 98%

Positive impact, but only if all property owners participate **12 respondents, 22%**
Positive impact, regardless of how many property owners participate **37 respondents, 67%**
Negative impact, please describe **1 respondent, 2%**
No impact **5 respondents, 9%**

21. Below is a list of landscaping practices designed to reduce runoff from your property. For each practice please indicate if you are unfamiliar with the practice, are familiar with the practice but have not installed it, have already installed the practice, or are planning to install the practice.

Values in the chart represent number of respondents and percentages for each issue listed below, respectively.

	Unfamiliar with the practice	Familiar but not installed	Already installed	Planning to install
Rain gardens **53 respondents, 95%**	**11, 21%**	**30, 57%**	**6, 11%**	**6, 11%**
Rain barrels **52 respondents, 93%**	**5, 10%**	**34, 65%**	**7, 13%**	**6, 12%**
Native shoreline buffers or plantings **51 respondents, 91%**	**2, 4%**	**14, 27%**	**31, 61%**	**4, 8%**
Infiltration/rock pits **52 respondents, 93%**	**21, 40%**	**23, 44%**	**7, 13%**	**1, 2%**
Water diversions (berms) **52 respondents, 93%**	**14, 27%**	**24, 46%**	**13, 25%**	**1, 2%**
Permeable pavers (allow water to infiltrate into the soil) **50 respondents, 89%**	**19, 38%**	**28, 56%**	**3, 6%**	**0, 0%**

22. From the list below, please indicate any reasons preventing you from installing practices to reduce waterfront runoff on your property. Please check all that apply.
45 respondents, 80%

My property doesn't impact the lake **6 respondents, 13%**
I don't believe the practices will help to improve water quality **6 respondents, 13%**
Takes too much time to install a practice **3 respondents, 7%**
Not enough space on my lot **2 respondents, 4%**
My neighbors may not like it **0 respondents, 0%**
Unsure how to install a practice **16 respondents, 36%**
Cost prohibitive **28 respondents, 62%**
I don't want to install a practice, please describe why **3 respondents, 7%**
We like it this way
Other, please describe **5 respondents, 11%**
Still building
We live across the street from lake home owners, don't live on the lake
Lot in natural state
Lazy, back hurts, loser, I promise to start
In the process of relandscaping

23. Please tell us if the following activities should be completed by the Loveless Lake Association to manage Loveless Lake. Most activities are eligible for grant funding. **Values in the chart represent number of respondents and percentages for each issue listed below, respectively.**

	Yes	No	Unsure
Offering incentives to property owners for the installation of shoreline buffers and rain gardens **52 respondents, 93%**	**39. 75%**	**2, 4%**	**11, 21%**
Offering incentives to property owners for the installation of farmland conservation practices **51 respondents, 91%**	**32, 63%**	**6, 12%**	**13, 25%**
Lake fairs and workshops to share information **50 respondents, 89%**	**30, 60%**	**3, 6%**	**17, 34%**
Enforcement of slow-no-wake zones **52 respondents, 93%**	**18, 35%**	**19, 37%**	**15, 29%**
Practices to enhance fisheries **53 respondents, 95%**	**34, 64%**	**3, 6%**	**16, 30%**
Offering incentives to property owners to upgrade non-conforming septic systems **53 respondents, 95%**	**37, 70%**	**3, 6%**	**13, 25%**
Programs to prevent and monitor invasive species **53 respondents, 95%**	**44, 83%**	**1, 2%**	**8, 15%**

WILLINGNESS TO CONTRIBUTE TO MAINTAINING AND IMPROVING LOVELESS LAKE

24. Would you be willing to provide financial support to maintain or improve the quality of Loveless Lake and its associated land resources?
51 respondents, 91%

Yes **30 respondents, 59%**
No, please skip to question 26 **21 respondents, 41%**

25. How much would you be willing to contribute each year to maintain or improve the quality of Loveless Lake and its associated land resources? This is just a measure of potential support and not a commitment.
25 respondents, 45%
Average: 149 dollars per year

26. What is your overall satisfaction level with owning property on Loveless Lake?
52 respondents, 93%

Highly satisfied **27 respondents, 52%**
Somewhat satisfied **21 respondents, 40%**
Somewhat dissatisfied **3 respondents, 6%**
Very dissatisfied **1 respondent, 2%**

Thank you for your time and answers!

If you have any comments you would like to make regarding Loveless Lake and its surrounding lake resources, please use the space below.

Lake property owners pay a disproportionate amount of property taxes in the county. I do not see any other service besides road maintenance that we get in return. Judging from the condition of the road, little is spent there. Let the county pick up the tab. The lake is open to the public.

Over the years there have been so many changes. Cabins have been replaces with year round houses and lawns have changed from low maintenance to perfectly manicured. Boats have gotten bigger and personal watercraft arrives. All of this has made cabin life and owning a cabin less desirable.

Year round home taxes. Weekend cabins. Taxes are high. Can barely afford to do most of the lake shoreline things that will help lake.

Noise pollution is worse, negative.

I would like to see more patrols of the DNR--especially on weekday evenings. Loveless is a small lake--yet some of the boats and motors would be better suited to a larger lake (just venting here). I am really afraid that our lone loon will soon be driven off the lake. For those of us that are year long, we see how heavily the lake is fished in the winter. I would like more DNR check-ins at this time also. Winter ice-fishing probably takes 75% of the fish.

Loveless Lake is a family lake with many families with children using it regularly. Clean water for swimming is super important for all kinds of lake activities. Its natural life continues and friendly lake practices I believe will not make much difference in its water quality. I think it would take generations to see adequate improvement of the water quality.

I am strongly opposed to any more limitations on boating. It is the only reason we purchased our vacation home. We should focus on boat use education.

If all owners would not mow grass down to the lake and allow native grass and plants to grow. Also protect their shoreline with riprap etc, I would consider a contribution.

Biggest problems are runoff from farmers fields, runoff on our road from heavy rain, and snow melt off old septic systems.

Sounds like big brother is coming!

The past 32 years we have lost lots of shoreline, as well as a nice gradual slope from the lake. Every boat launches, whether lake owners or visitors contribute to shoreline erosion in our front yard. Most other lake population enjoy sports that contribute to our loss and problems with shoreline demise. This is a serious problem for us. Solutions?

Appendix B

Lake Level and Precipitation Monitoring

Precipitation

Date	Lake Level (ft)	Precipitation (in)
9-May	6.04	0
10-May	6	0
11-May	6	0.1
12-May	5.08	0.9
13-May	6.1	0.4
14-May	6.1	0
15-May	6.08	0
16-May	6	0
17-May	6	0
18-May	5.08	0
19-May	6	0.5
20-May	6.12	1.75
21-May	6.1	0
22-May	6.08	0
23-May	6.06	0
24-May	6.06	0
25-May	6.06	0
26-May	6.04	0
27-May	6.24	2.5
28-May	6.26	0
29-May	6.26	0.1
30-May	6.28	0
31-May	6.3	0.2
1-Jun	6.32	1.5
2-Jun	6.32	0
3-Jun	6.28	0
4-Jun	6.26	0
5-Jun	6.23	0
6-Jun	6.22	0
7-Jun	6.22	0
8-Jun	6.2	0
9-Jun	6.2	0
10-Jun	6.2	0
11-Jun	6.23	0.4
12-Jun	6.22	0
13-Jun	6.22	0
14-Jun	6.22	0
15-Jun	6.28	1.75
16-Jun	6.28	0
17-Jun	6.28	0.3
18-Jun	6.3	0
19-Jun	6.32	1.5
20-Jun	6.32	0.4
21-Jun	6.32	0
22-Jun	6.32	0

Date	Lake Level (ft)	Precipitation (in)
23-Jun	6.32	0.5
24-Jun	6.33	0
25-Jun	6.33	0.1
26-Jun	6.32	0
27-Jun	6.32	0
28-Jun	6.3	0
29-Jun	6.34	1.75
30-Jun	6.34	0
1-Jul	6.32	0
2-Jul	6.32	0.15
3-Jul	6.3	0
4-Jul	6.28	0
5-Jul	6.26	0
6-Jul	6.26	0.5
7-Jul	6.24	0
8-Jul	6.24	0.4
9-Jul	6.24	0.2
10-Jul	6.24	0
11-Jul	6.24	0
12-Jul	6.22	0
13-Jul	6.24	0
14-Jul	6.24	0
15-Jul	6.24	0
16-Jul	6.24	0
17-Jul	6.22	0
18-Jul	6.22	0
19-Jul	6.22	0
20-Jul	6.2	0
21-Jul	6.2	0
22-Jul	6.2	0
23-Jul	6.2	0
24-Jul	6.2	0
25-Jul	6.2	0
26-Jul	6.18	0
27-Jul	6.18	0
28-Jul	6.18	0
29-Jul	6.18	0
30-Jul	6.16	0
31-Jul	6.16	0
1-Aug	6.16	0
2-Aug	6.16	0
3-Aug	6.16	0
4-Aug	6.18	0
5-Aug	6.18	0
6-Aug	6.18	0

Date	Lake Level (ft)	Precipitation (in)
7-Aug	6.18	0
8-Aug	6.18	0
9-Aug	6.18	0
10-Aug	6.18	0
11-Aug	6.24	0
12-Aug	6.3	0.02
13-Aug	6.3	0
14-Aug	6.3	0
15-Aug	6.3	0
16-Aug	6.28	0
17-Aug	6.3	0.05
18-Aug	6.3	0
19-Aug	6.3	0
20-Aug	6.3	0.03
21-Aug	6.3	0.06
22-Aug	6.32	0
23-Aug	6.32	0
24-Aug	6.34	0.01
25-Aug	6.34	0
26-Aug	6.34	0
27-Aug	6.34	0.01
28-Aug	6.38	0.75
29-Aug	6.4	0.45
30-Aug	6.44	1.5
31-Aug	6.44	0
1-Sep	6.48	0.75
2-Sep	6.48	0.01
3-Sep	6.46	0

Date	Lake Level (ft)	Precipitation (in)
4-Sep	6.48	1.5
5-Sep	6.46	0
6-Sep	6.46	0
7-Sep	6.46	0
8-Sep	6.44	0
9-Sep	6.44	0.01
10-Sep	6.48	1.25
11-Sep	6.46	0
12-Sep	6.46	0
13-Sep	6.44	0
14-Sep	6.44	0
15-Sep	6.44	0
16-Sep	6.44	0
17-Sep	6.44	0
18-Sep	6.42	0
19-Sep	6.42	0
20-Sep	6.42	0.01
21-Sep	6.44	0.45
22-Sep	6.46	0
23-Sep	6.46	0
24-Sep	6.44	0
25-Sep	6.44	0
26-Sep	6.44	0
27-Sep	6.42	0
28-Sep	6.42	0
29-Sep	6.42	0.04
30-Sep	6.42	0.01
1-Oct	6.44	0.04

Appendix C

Deep Hole Chemical and Physical Data

Loveless Lake Phosphorous Testing
Mary Walczak
Summer 2014

	Phosphorous Level (ppm)								
Date	**Deep**			**Outlet**			**Surface**		
5/17/14	0.0463	±	0.0046	0.0298	±	0.0067	0.0415	±	0.0033
6/1/14	0.0522	±	0.0007	0.0489	±	0.0042	0.0379	±	0.0013
6/28/14	0.0212	±	0.0002	0.0249	±	0.0028	0.0228	±	0.0032
7/25/14	0.0455	±	0.0021	0.0757	±	0.0777	0.0281	±	0.0001
8/22/14	0.0295	±	0.0026	0.0391	±	0.0094	0.0050	±	0.0026
9/7/14	0.0506	±	0.0009	0.0553	±	0.0090	0.0640	±	0.0005
9/19/14	0.0490	±	0.0038	0.0297	±	0.0412	0.0525	±	0.0003

Temperature and Dissolved Oxygen

Date	Meter	Temperature (^{o}C)	Dissolved Oxygen (mg/L)
5/3/2014	1	5.1	10
	2	5	10
	3	5	9.8
5/17/2014	0	11.6	8.8
	1	11.4	8.9
	2	11.3	8.8
	3	11.2	8.9
	4	11.2	8.9
5/26/2014	0	24.4	7.5
	1	19.6	9.3
	2	18.2	9.6
	3	15.9	10.3
	4	14.2	10.3
	4.5	13.3	9.7
6/1/2014	0	21.3	6.9
	1	21.2	6.8
	2	20.9	6.8
	3	18	7.5
	4	14.9	5.8
	4.5	13.9	2.1
6/15/2014	0	19.5	6.69
	1	19.5	6.68
	2	19.4	6.69
	3	19.3	6.69
	4	19.3	6.69
	4.5	19.3	6.69
6/28/2014	0	23.6	7.5
	1	23.4	7.5
	2	23.4	7.5
	3	23.2	7.4
	4	22.1	5.9
	4.5	21.7	5.4
7/13/2014	0	23.7	7.9
	1	23.7	7.9
	2	23.7	7.9
	3	23.7	7.9
	4	23.5	7.7
	4.5	23.1	7.1

Date	Meter	Temperature (°C)	Dissolved Oxygen (mg/L)
7/25/2014	0	24.4	8.1
	1	24.5	8.1
	2	24.4	8.1
	3	24.4	8
	4	23.6	6
	4.5	23	5.3
8/10/2014	0	25.7	8.1
	1	25.7	8.1
	2	25.7	8.2
	3	25.3	8.3
	4	24.7	7
	4.5	23.8	2.7
8/22/2014	0	24	6.7
	1	23.8	6.8
	2	23.9	6.7
	3	23.9	6.6
	4	23.8	6.5
	4.5	23.8	6.4
9/7/2014	0	21.6	8.6
	1	21.7	8.6
	2	21.7	8.6
9/20/2014	0	17.9	8.8
	1	17.8	8.8
	2	17.7	8.8
	3	17.6	8.8
	4	17.6	8.4
	4.5	17.5	8.2
10/13/2014	1	11.7	7.6
	2	11.56	7.3
	5	11.56	7.2

Secchi Depth

Start Date	Secchi (Feet)
5/3/14	10
5/26/14	9
5/28/14	10
6/1/14	18.5
6/4/14	16.75
6/11/14	17
6/15/14	11.5
6/18/14	16.5
6/26/14	14.5
6/28/14	11.5
7/2/14	12.5
7/9/14	8.5
7/13/14	8.5
7/16/14	6.5
7/23/14	8
7/25/14	7
8/10/14	12
8/22/14	9
9/7/14	5
9/20/14	4
10/13/14	7

Phosphorus

	Top	Bottom
5/3/2014	36.9	
5/17/2014	46.3	46.3
6/1/2014	52.2	52.2
6/15/2014	19.8	20
6/28/2014	21.2	21.2
7/13/2014	25	27.5
7/25/2014	45.5	45.5
8/11/2014	16.9	24.2
8/22/2014	29.5	29.5
9/7/2014	50.6	50.6
9/19/2014	49	49

Chlorophyll

Start Date	Chlorophyll(ug/l)
6/15/2014	7.14
7/13/2014	8.79
8/11/2014	4.07

Appendix D

Outlet Chemical and Physical Data

Chemical

Outlet

Data	Phosphorus Level (ppm)
5/17/14	0.0298
6/1/14	0.0489
6/15/14	0.0191
6/28/14	0.0249
7/13/14	0.0276
7/25/14	0.0757
8/11/14	0.0240
8/22/14	0.0391
9/7/14	0.0553
9/19/14	0.0297

Loveless Lake Phosphorous Testing
Mary Walczak
Summer 2014

	Phosphorous Level (ppm)								
Date	**Deep**			**Outlet**			**Surface**		
5/17/14	0.0463	±	0.0046	0.0298	±	0.0067	0.0415	±	0.0033
6/1/14	0.0522	±	0.0007	0.0489	±	0.0042	0.0379	±	0.0013
6/28/14	0.0212	±	0.0002	0.0249	±	0.0028	0.0228	±	0.0032
7/25/14	0.0455	±	0.0021	0.0757	±	0.0777	0.0281	±	0.0001
8/22/14	0.0295	±	0.0026	0.0391	±	0.0094	0.0050	±	0.0026
9/7/14	0.0506	±	0.0009	0.0553	±	0.0090	0.0640	±	0.0005
9/19/14	0.0490	±	0.0038	0.0297	±	0.0412	0.0525	±	0.0003

Loveless Lake Outlet Flow Monitoring
Summer 2014

Date	Time	Temp (˚C)	feet from north side	depth (in)	flow rate (m/s)	
5/17/2014	8:30 AM		0	2.4	0.04	m/s
			1	2.4	0.16	
			2	3.6	1.19	
			3	3.6	0.98	
			4	1.2	0.45	
6/15/2014	2:30 PM	20.0	0	5	0.3	m/s
			1	5	0.4	
			2	6	1.3	
			3	6	0.3	
			4	5	0.2	
6/28/2014	5:00 PM	24.3	0	4	0.3	m/s
			1	5.5	0.4	
			2	7.5	0.9	
			3	6.5	0.2	

			4	4	0.1	
7/12/2014	2:00 PM	21.9	0	3.5	2.2	ft/sec
			1	4.5	1.0	
			2	6	2.1	
			3	5	1.1	
			4	5	1.1	
7/25/2014	2:00 PM	24.2	0	3	1.5	ft/sec
			1	2.5	1.1	
			2	4	3.0	
			3	3	1.0	
			4	3	0.9	
8/10/2014	4:00 PM	28	0	1.5	2.0	ft/sec
			1	2.5	1.7	
			2	5	2.9	
			3	5	2.1	
			4	3.5	0.8	
8/22/2014	2:00 PM	23.9	0	3	2.4	ft/sec
			1	3.5	1.4	
			2	3	3.0	
			3	6	2.4	
			4	3.5	1.0	
9/7/2014	11:00 AM	21.9	0	3.5	2.5	ft/sec
			1	4	1.3	
			2	3.5	4.1	
			3	4.5	3.2	
			4	4.5	1.5	
9/20/2014	12:00pm	19.8	0	6	1.3	ft/sec
*Note: lost spinner on flow monitor so data are incomplete.			1	4		
			2	5	2.2	
			3	5.5		
			4			

Appendix E

Stormwater Chemical and Physical Data

Physical Data

	LI1	LI2	LI3	LI4	LI5	LI6	LI7	LI8	LI9	LI10
Culvert size (in)	**18**	**15**	**24**	**24**	**18**	**18**	**18**		**12**	**18**
5/13/2014										
TSS (mg/L)	9			272	30.5					
TP (mg/L)	0.133			0.217	0.149					
Fill quart (seconds)	4			18.5	4.5					
5/19/2014										
TSS (mg/L)	111	224	3190	2830	410				648	185
TP (mg/L)	0.297	0.972	2.88	1.63	0.436				1.17	0.672
Fill quart (seconds)	1.1	35	24	5	1.7				12.8	2.1
5/27/2014										
TSS (mg/L)	67		516	196	231	43	432		84	26.5
TP (mg/L)	0.262		1.33	0.225	0.304	0.61	1.03		0.422	0.316
Fill quart (seconds)	1.9		23.3	3.1	3.3	28.9	44		4.8	2.6
7/11/2014										
TSS (mg/L)					73.5					15.8
TP (mg/L)					0.123					0.432
Fill quart (seconds)					42					51
9/10/2014										
TSS (mg/L)	19.2				95					43.3
TP (mg/L)	0.19				0.506					0.549
Fill quart (seconds)	7.88				36.02					34.2
3/12/2015										
TSS (mg/L)	4.33	4.6		25	33.3		3.2	8.2	22.4	4.4
TP (mg/L)	0.292	0.473		0.79	0.404		1.17	0.214	1.07	1.19
Fill quart (seconds)	3.36	53.52		40.1	4.72		56.1	7.57	20.18	2.01

Appendix F

Shoreline Inventory

Loveless_outline

OBJECT	SHAPE_Le	Waypoint	Gen_shore_con	Short_shore_con	Tall_shore_veg	Barren_dirt
1	50.909918	345-346	Disturbed	Impervious surface	Absent	Present, not dominant
2	127.287441	312-313	Undisturbed	Short unmowed vegetation	Present	Present, not dominant
3	53.436016	289-290	Disturbed	Mowed vegetation	Present	Not present
4	48.390078	290-291	Undisturbed	Shoreland restoration	Present	Not present
5	117.182548	291-292	Disturbed	Mowed vegetation	Present	Present, not dominant
6	15.824032	292-293	Disturbed	Short unmowed vegetation	Present	Not present
7	19.452581	293-294	Disturbed	Mowed vegetation	Present	Not present
8	146.982821	294-295	Disturbed	Mowed vegetation	Present	Not present
9	36.788389	295-296	Disturbed	Mowed vegetation	Present	Present, not dominant
10	206.691777	296-297	Undisturbed	Organic-leaf pack/needles	Present	Not present
11	24.425475	297-298	Disturbed	Mowed vegetation	Present	Present, not dominant
12	31.505994	298-299	Undisturbed	Short unmowed vegetation	Present	Not present
13	39.858346	299-300	Undisturbed	Organic-leaf pack/needles	Present	Not present
14	13.937957	300-301	Disturbed	Mowed vegetation	Present	Present, not dominant
15	47.39909	301-302	Undisturbed	Organic-leaf pack/needles	Present	Not present
16	14.908523	302-303	Disturbed	Mowed vegetation	Absent	Present, not dominant
17	72.263961	303-304	Undisturbed	Organic-leaf pack/needles	Present	Not present
18	19.597522	304-305	Disturbed	Barren, bare dirt (erosion)	Absent	Dominant
19	140.800099	305-306	Disturbed	Short unmowed vegetation	Present	Not present
20	36.003404	306-307	Undisturbed	Organic-leaf pack/needles	Present	Not present
21	18.227777	307-308	Disturbed	Mowed vegetation	Present	Present, not dominant
22	57.271923	308-309	Undisturbed	Short unmowed vegetation	Present	Present, not dominant
23	234.50738	309-310	Undisturbed	Organic-leaf pack/needles	Present	Not present
24	88.342238	310-311	Undisturbed	Short unmowed vegetation	Present	Present, not dominant
25	18.396976	311-312	Undisturbed	Organic-leaf pack/needles	Present	Not present
26	50.527258	313-314	Undisturbed	Organic-leaf	Present	Not present

OBJECT	SHAPE_Le	Waypoint	Gen_shore_con	Short_shore_con	Tall_shore_veg	Barren_dirt
				pack/needles		
27	28.253228	314-315	Disturbed	Mowed vegetation	Present	Present, not dominant
28	22.053774	315-316a	Undisturbed	Organic-leaf pack/needles	Present	Not present
29	101.748135	315-316b	Undisturbed	Organic-leaf pack/needles	Present	Not present
30	18.519063	316-317	Undisturbed	Short unmowed vegetation	Present	Present, not dominant
31	75.816723	317-318	Undisturbed	Short unmowed vegetation	Present	Present, not dominant
32	214.123362	318-319	Undisturbed	Organic-leaf pack/needles	Present	Not present
33	27.655113	319-320	Undisturbed	Short unmowed vegetation	Present	Present, not dominant
34	38.389619	320-321	Disturbed	Mowed vegetation	Present	Not present
35	52.895518	321-322	Undisturbed	Organic-leaf pack/needles	Present	Not present
36	23.234741	322-323	Disturbed	Mowed vegetation	Present	Present, not dominant
37	37.476826	323-324	Undisturbed	Short unmowed vegetation	Present	Present, not dominant
38	145.404368	324-325	Disturbed	Mowed vegetation	Present	Not present
40	332.294737	325-327	Undisturbed	Organic-leaf pack/needles	Present	Not present
41	25.228975	327-328	Disturbed	Mowed vegetation	Present	Present, not dominant
42	447.024596	328-329	Undisturbed	Organic-leaf pack/needles	Present	Not present
43	9.853993	329-330	Disturbed	Mowed vegetation	Present	Not present
44	63.571214	330-331	Disturbed	Short unmowed vegetation	Present	Not present
45	55.064294	331-332	Undisturbed	Organic-leaf pack/needles	Present	Present, not dominant
46	100.127627	332-333	Disturbed	Mowed vegetation	Present	Present, not dominant
47	55.964344	333-334	Disturbed	Mowed vegetation	Present	Not present
48	29.430908	334-335	Undisturbed	Organic-leaf pack/needles	Present	Not present
49	31.163722	335-336	Disturbed	Barren, bare dirt (erosion)	Absent	Dominant
50	53.621057	336-337	Disturbed	Mowed vegetation	Present	Not present
51	15.618619	337-338	Undisturbed	Organic-leaf pack/needles	Present	Not present
52	18.938214	338-339	Disturbed	Mowed vegetation	Present	Not present
53	17.554252	339-340	Disturbed	Short unmowed vegetation	Present	Not present
54	38.308786	340-341	Undisturbed	Organic-leaf pack/needles	Present	Not present

OBJECT	SHAPE_Le	Waypoint	Gen_shore_con	Short_shore_con	Tall_shore_veg	Barren_dirt
55	19.753762	341-342	Disturbed	Impervious surface	Present	Not present
56	91.789275	342-343	Undisturbed	Organic-leaf pack/needles	Present	Not present
57	26.924845	343-344	Undisturbed	Shoreland restoration	Present	Not present
58	59.854703	344-345	Disturbed	Mowed vegetation	Present	Not present
59	16.647894	346-289	Undisturbed	Organic-leaf pack/needles	Present	Not present

all disturbances

Latitud	Longitu	Disturbanc	Riprap	Seawall	Concrete_s	Artificial	Deck	Furrow_gul	Boat_landi
45.435633	92.490538	- Culvert							
45.435798	92.490357	- Dock/pier							
45.435869	92.490307	- Dock/pier							
45.436019	92.490234	- Dock/pier		Seawall					
45.436219	92.490198	- Dock/pier	Riprap						
45.436422	92.490189	- Dock/pier	Riprap						
45.436503	92.490257	- Dock/pier	Riprap						
45.436601	92.490432	- Dock/pier	Riprap						
45.4367	92.490638	- Dock/pier	Riprap						
45.436831	92.490966	- Dock/pier		Seawall					
45.43685	92.491166	- Woody structure							
45.436935	92.491345	- Dock/pier	Riprap						
45.43712	92.491654	- Dock/pier	Riprap						
45.437153	92.491691	- Dock/pier	Riprap						
45.437247	92.491944	- Dock/pier	Riprap						
45.437418	92.492452	- Dock/pier							
45.437568	92.492796	- Dock/pier							
45.		- Woody							

Latitud	Longitu	Disturbanc	Riprap	Seawall	Concrete_s	Artificial	Deck	Furrow_gul	Boat_landi
437676	92. 492862	structure							
45. 437961	92. 493084	- Dock/pier			Concrete slab				
45. 438182	92. 493178	- Dock/pier	Riprap			Artificial beach			
45. 438375	92. 49325	- Dock/pier							
45. 438754	92. 493449	- Dock/pier							
45. 439003	92. 493664	- Dock/pier							
45. 439401	92. 494243	- Dock/pier							
45. 439603	92. 494731	- Dock/pier	Riprap						
45. 439723	92. 494955	- Dock/pier	Riprap						
45. 439911	92. 495403	- Dock/pier	Riprap						
45. 440149	92. 495666	- Dock/pier	Riprap						
45. 440389	92. 495834	- Dock/pier							
45. 440552	92. 495999	- Dock/pier	Riprap						
45. 440681	92. 496101	- Dock/pier							
45. 440823	92. 496229	- Dock/pier	Riprap						
45. 441166	92. 496564	- Dock/pier							
45. 441459	92. 496942	- Dock/pier	Riprap	Seawall		Artificial beach			
45. 44167	92. 497179	- Dock/pier							
45. 441861	92. 497372	- Dock/pier							

Latitud	Longitu	Disturbanc	Riprap	Seawall	Concrete_s	Artificial	Deck	Furrow_gul	Boat_landi
45.441958	-92.497445	Dock/pier							
45.442143	-92.497582	Dock/pier	Riprap						
45.442313	-92.497675	Dock/pier							
45.442522	-92.497965	Dock/pier	Riprap						
45.442835	-92.498184	Dock/pier							
45.442999	-92.498282	Dock/pier							
45.44326	-92.498299	Dock/pier							
45.443464	-92.498404	Dock/pier							
45.443731	-92.498714	Dock/pier							
45.443784	-92.498966	Dock/pier							
45.443875	-92.499358	Dock/pier							
45.443912	-92.499535	Woody structure							
45.444	-92.499888	Dock/pier							
45.444143	-92.500329	Woody structure							
45.444262	-92.500572	Dock/pier		Seawall					
45.444617	-92.501024	Dock/pier							
45.44475	-92.501119	Dock/pier		Seawall			Deck		
45.445197	-92.501507	Dock/pier					Deck		
45.445427	-92.	Dock/pier							

Latitud	Longitu	Disturbanc	Riprap	Seawall	Concrete_s	Artificial	Deck	Furrow_gul	Boat_landi
	501581								
45. 445553	92. 501665	- Dock/pier							
45. 445756	92. 502083	- Dock/pier							
45. 445783	92. 502136	- Dock/pier							
45. 445929	92. 502368	- Dock/pier					Deck		
45. 446195	92. 502797	- Dock/pier							
45. 446265	92. 50291	- Woody structure							
45. 446367	92. 503212	- Dock/pier							
45. 44626	92. 504486	- Dock/pier							
45. 44616	92. 504486	- Dock/pier							
45. 445914	92. 504357	- Dock/pier							
45. 445646	92. 504259	- Dock/pier							
45. 445455	92. 504031	- Woody structure							
45. 445384	92. 50399	- Dock/pier							
45. 445337	92. 503973	- Woody structure							
45. 445187	92. 503841	- Dock/pier							
45. 445119	92. 503841	- Dock/pier							
45. 445086	92. 503792	- Woody structure							
45. 444859	92. 50354	- Woody structure							
45.		- Dock/pier							

Latitud	Longitu	Disturbanc	Riprap	Seawall	Concrete_s	Artificial	Deck	Furrow_gul	Boat_landi
444827	92.503522								
45.444477	92.503119	- Dock/pier							
45.444266	92.502934	- Woody structure							
45.444059	92.502931	-					Deck		
45.443867	92.5028	- Woody structure							
45.443783	92.502735	- Dock/pier							
45.443382	92.502547	- Dock/pier							
45.4433	92.502507	- Woody structure							
45.443269	92.502478	- Dock/pier							
45.443055	92.502304	- Dock/pier					Deck		
45.443088	92.502309	- Dock/pier							
45.442751	92.502082	- Dock/pier							
45.442534	92.502032	- Dock/pier							
45.442208	92.501861	- Dock/pier	Riprap						
45.441977	92.501776	- Dock/pier		Seawall					
45.441641	92.501962	- Dock/pier							
45.441522	92.502041	- Culvert							
45.441455	92.502092	- Dock/pier							
45.441282	92.502072	- Dock/pier							

Latitud	Longitu	Disturbanc	Riprap	Seawall	Concrete_s	Artificial	Deck	Furrow_gul	Boat_landi
45.441092	-92.501894	Woody structure							
45.44075	-92.501698	Woody structure							
45.440377	-92.501331	Dock/pier							
45.440327	-92.501269	Woody structure							
45.440029	-92.500998	Woody structure							
45.439871	-92.500688	Dock/pier							
45.439724	-92.500555	Woody structure							
45.439587	-92.500356	Woody structure							
45.439413	-92.50032	Dock/pier							
45.439315	-92.500118	Dock/pier							
45.439213	-92.5	Woody structure							
45.439062	-92.499819	Woody structure							
45.438943	-92.499617	Dock/pier							
45.438835	-92.499192	Dock/pier						Furrow/gullies	
45.438473	-92.498992	Woody structure							
45.438299	-92.498755	Woody structure							
45.438027	-92.498619	Dock/pier							
45.437362	-92.497804	Dock/pier							
45.437273	-92.497675	Woody structure							

Latitud	Longitu	Disturbanc	Riprap	Seawall	Concrete_s	Artificial	Deck	Furrow_gul	Boat_landi
45.437076	92.497515	- Dock/pier							
45.43664	92.497159	- Woody structure							
45.436549	92.497116	- Dock/pier							
45.436344	92.49708	- Woody structure							
45.436205	92.49705	- Woody structure							
45.436075	92.496955	- Woody structure							
45.435685	92.496828	- Dock/pier							
45.435469	92.49649	- Dock/pier							
45.435242	92.496255	- Dock/pier							
45.434703	92.496237	- Dock/pier							
45.434672	92.496204	- Dock/pier							
45.434739	92.495802	- Dock/pier							
45.434606	92.495409	-							Boat landing
45.434456	92.495012	- Dock/pier							
45.433912	92.494568	- Dock/pier							
45.433669	92.494322	- Dock/pier							
45.43359	92.494004	- Dock/pier							
45.433581	92.493925	- Dock/pier							
45.433635	92.	- Dock/pier							

Latitud	Longitu	Disturbanc	Riprap	Seawall	Concrete_s	Artificial	Deck	Furrow_gul	Boat_landi
	493617								
45.	-	Dock/pier							
433766	92.								
	493319								
45.	-	Dock/pier							
433825	92.								
	493157								
45.	-	Dock/pier	Riprap	Seawall					
434179	92.								
	492818								
45.	-	Dock/pier	Riprap						
434314	92.								
	492725								
45.	-	Dock/pier							
434408	92.								
	492619								
45.	-	Dock/pier							
434765	92.								
	492166								
45.	-	Dock/pier							
434892	92.								
	491809								
45.	-	Dock/pier							
43496	92.								
	491674								
45.	-	Dock/pier		Seawall					
435026	92.								
	491547								
45.	-	Dock/pier	Riprap						
43521	92.								
	491077								
45.	-	Dock/pier							Boat
435379	92.								landing
	490853								

Appendix G

Modeling Data

Date: 4/28/2016 Scenario: Loveless Lake Culvert #1

Lake Id:
Watershed Id: 1

Hydrologic and Morphometric Data

Tributary Drainage Area: 29.3 acre
Total Unit Runoff: 8.00 in.
Annual Runoff Volume: 19.5 acre-ft
Lake Surface Area <As>: 132.0 acre
Lake Volume <V>: 1980.0 acre-ft
Lake Mean Depth <z>: 15.0 ft
Precipitation - Evaporation: 3.3 in.
Hydraulic Loading: 55.8 acre-ft/year
Areal Water Load <qs>: 0.4 ft/year
Lake Flushing Rate <p>: 0.03 1/year
Water Residence Time: 35.46 year
Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3
Observed growing season mean phosphorus (GSM): 42.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low	Most Likely	High	Loading %	Low	Most Likely	High
		Loading (kg/ha-year)				Loading (kg/year)		
Row Crop AG	13.9	0.50	1.00	3.00	24.9	3	6	17
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	0.0	0.10	0.30	0.50	0.0	0	0	0
HD Urban (1/8 Ac)	0.3	1.00	1.50	2.00	0.8	0	0	0
MD Urban (1/4 Ac)	1.0	0.30	0.50	0.80	0.9	0	0	0
Rural Res (>1 Ac)	0.0	0.05	0.10	0.25	0.0	0	0	0
Wetlands	0.0	0.10	0.10	0.10	0.0	0	0	0
Forest	14.1	0.05	0.09	0.18	2.3	0	1	1
Lake Surface	132.0	0.10	0.30	1.00	71.1	5	16	53

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	0.0				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.00	0.00	0.00	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	19.1	49.7	158.5	100.0
Total Loading (kg)	8.7	22.5	71.9	100.0
Areal Loading (lb/ac-year)	0.15	0.38	1.20	
Areal Loading (mg/m^2-year)	16.25	42.21	134.58	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	7.4	14.4	40.7	100.0
Total NPS Loading (kg)	3.3	6.5	18.5	100.0

Date: 4/28/2016 Scenario: Loveless Lake Culvert #3

Lake Id: Culvert 9
Watershed Id: 1

Hydrologic and Morphometric Data

Tributary Drainage Area: 10.2 acre
Total Unit Runoff: 8.00 in.
Annual Runoff Volume: 6.8 acre-ft
Lake Surface Area <As>: 132.0 acre
Lake Volume <V>: 1980.0 acre-ft
Lake Mean Depth <z>: 15.0 ft
Precipitation - Evaporation: 3.3 in.
Hydraulic Loading: 43.1 acre-ft/year
Areal Water Load <qs>: 0.3 ft/year
Lake Flushing Rate <p>: 0.02 1/year
Water Residence Time: 45.94 year
Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3
Observed growing season mean phosphorus (GSM): 42.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low Loading (kg/ha-year)	Most Likely Loading (kg/ha-year)	High Loading (kg/ha-year)	Loading %	Low Loading (kg/year)	Most Likely Loading (kg/year)	High Loading (kg/year)
Row Crop AG	0.0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	4.7	0.10	0.30	0.50	3.4	0	1	1
HD Urban (1/8 Ac)	0.15	1.00	1.50	2.00	0.5	0	0	0
MD Urban (1/4 Ac)	0.4	0.30	0.50	0.80	0.5	0	0	0
Rural Res (>1 Ac)	4.9	0.05	0.10	0.25	1.2	0	0	0
Wetlands	0.0	0.10	0.10	0.10	0.0	0	0	0
Forest	0.0	0.05	0.09	0.18	0.0	0	0	0
Lake Surface	132.0	0.10	0.30	1.00	94.5	5	16	53

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	0.0				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.00	0.00	0.00	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	12.7	37.4	121.5	100.0
Total Loading (kg)	5.7	17.0	55.1	100.0
Areal Loading (lb/ac-year)	0.10	0.28	0.92	
Areal Loading (mg/m^2-year)	10.75	31.76	103.18	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	0.9	2.1	3.7	100.0
Total NPS Loading (kg)	0.4	0.9	1.7	100.0

Date: 5/2/2016 Scenario: Loveless Lake Culvert #4

Lake Id: Culvert 9
Watershed Id: 1

Hydrologic and Morphometric Data

Tributary Drainage Area: 48.4 acre
Total Unit Runoff: 8.00 in.
Annual Runoff Volume: 32.3 acre-ft
Lake Surface Area <As>: 132.0 acre
Lake Volume <V>: 1980.0 acre-ft
Lake Mean Depth <z>: 15.0 ft
Precipitation - Evaporation: 3.3 in.
Hydraulic Loading: 68.6 acre-ft/year
Areal Water Load <qs>: 0.5 ft/year
Lake Flushing Rate <p>: 0.03 1/year
Water Residence Time: 28.88 year
Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3
Observed growing season mean phosphorus (GSM): 42.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low Loading (kg/ha-year)	Most Likely Loading (kg/ha-year)	High Loading (kg/ha-year)	Loading %	Low Loading (kg/year)	Most Likely Loading (kg/year)	High Loading (kg/year)
Row Crop AG	0.0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	0.0	0.10	0.30	0.50	0.0	0	0	0
HD Urban (1/8 Ac)	0.41	1.00	1.50	2.00	1.4	0	0	0
MD Urban (1/4 Ac)	0.1	0.30	0.50	0.80	0.1	0	0	0
Rural Res (>1 Ac)	0.0	0.05	0.10	0.25	0.0	0	0	0
Wetlands	0.0	0.10	0.10	0.10	0.0	0	0	0
Forest	47.93	0.05	0.09	0.18	9.7	1	2	3
Lake Surface	132.0	0.10	0.30	1.00	88.8	5	16	53

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	0.0				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.00	0.00	0.00	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	14.3	39.8	126.3	100.0
Total Loading (kg)	6.5	18.0	57.3	100.0
Areal Loading (lb/ac-year)	0.11	0.30	0.96	
Areal Loading (mg/m^2-year)	12.15	33.77	107.22	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	2.5	4.4	8.5	100.0
Total NPS Loading (kg)	1.1	2.0	3.9	100.0

Date: 5/2/2016 Scenario: Loveless Lake Culvert #5

Lake Id: Culvert 9
Watershed Id: 1

Hydrologic and Morphometric Data

Tributary Drainage Area: 18.0 acre
Total Unit Runoff: 8.00 in.
Annual Runoff Volume: 12.0 acre-ft
Lake Surface Area <As>: 132.0 acre
Lake Volume <V>: 1980.0 acre-ft
Lake Mean Depth <z>: 15.0 ft
Precipitation - Evaporation: 3.3 in.
Hydraulic Loading: 48.3 acre-ft/year
Areal Water Load <qs>: 0.4 ft/year
Lake Flushing Rate <p>: 0.02 1/year
Water Residence Time: 40.99 year
Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3
Observed growing season mean phosphorus (GSM): 42.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low Loading (kg/ha-year)	Most Likely Loading (kg/ha-year)	High Loading (kg/ha-year)	Loading %	Low Loading (kg/year)	Most Likely Loading (kg/year)	High Loading (kg/year)
Row Crop AG	0.0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	0	0.10	0.30	0.50	0.0	0	0	0
HD Urban (1/8 Ac)	0.12	1.00	1.50	2.00	0.4	0	0	0
MD Urban (1/4 Ac)	0	0.30	0.50	0.80	0.0	0	0	0
Rural Res (>1 Ac)	0	0.05	0.10	0.25	0.0	0	0	0
Wetlands	0.0	0.10	0.10	0.10	0.0	0	0	0
Forest	17.84	0.05	0.09	0.18	3.9	0	1	1
Lake Surface	132.0	0.10	0.30	1.00	95.7	5	16	53

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %

SEPTIC TANK DATA

Description	Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)	0.30	0.50	0.80	
# capita-years	0.0			
% Phosphorus Retained by Soil	98.0	90.0	80.0	
Septic Tank Loading (kg/year)	0.00	0.00	0.00	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	12.7	36.9	120.8	100.0
Total Loading (kg)	5.8	16.7	54.8	100.0
Areal Loading (lb/ac-year)	0.10	0.28	0.92	
Areal Loading (mg/m^2-year)	10.77	31.35	102.62	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	0.9	1.6	3.1	100.0
Total NPS Loading (kg)	0.4	0.7	1.4	100.0

Date: 5/2/2016 Scenario: Loveless Lake Culvert #6

Lake Id: Culvert 9
Watershed Id: 1

Hydrologic and Morphometric Data

Tributary Drainage Area: 6.0 acre
Total Unit Runoff: 8.00 in.
Annual Runoff Volume: 4.0 acre-ft
Lake Surface Area <As>: 132.0 acre
Lake Volume <V>: 1980.0 acre-ft
Lake Mean Depth <z>: 15.0 ft
Precipitation - Evaporation: 3.3 in.
Hydraulic Loading: 40.3 acre-ft/year
Areal Water Load <qs>: 0.3 ft/year
Lake Flushing Rate <p>: 0.02 1/year
Water Residence Time: 49.13 year
Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3
Observed growing season mean phosphorus (GSM): 42.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre	Low	Most Likely	High	Loading %	Low	Most Likely	High
	(ac)	Loading (kg/ha-year)				Loading (kg/year)		
Row Crop AG	0.0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	0.5	0.10	0.30	0.50	0.4	0	0	0
HD Urban (1/8 Ac)	0.4	1.00	1.50	2.00	1.5	0	0	0
MD Urban (1/4 Ac)	0	0.30	0.50	0.80	0.0	0	0	0
Rural Res (>1 Ac)	1	0.05	0.10	0.25	0.2	0	0	0
Wetlands	0.0	0.10	0.10	0.10	0.0	0	0	0
Forest	4.1	0.05	0.09	0.18	0.9	0	0	0
Lake Surface	132.0	0.10	0.30	1.00	97.0	5	16	53

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	0.0				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.00	0.00	0.00	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	12.4	36.4	119.6	100.0
Total Loading (kg)	5.6	16.5	54.2	100.0
Areal Loading (lb/ac-year)	0.09	0.28	0.91	
Areal Loading (mg/m^2-year)	10.53	30.92	101.55	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	0.6	1.1	1.8	100.0
Total NPS Loading (kg)	0.3	0.5	0.8	100.0

Date: 4/28/2016 Scenario: Loveless Lake Culvert #9

Lake Id: Culvert 9
Watershed Id: 1

Hydrologic and Morphometric Data

Tributary Drainage Area: 2.4 acre
Total Unit Runoff: 8.00 in.
Annual Runoff Volume: 1.6 acre-ft
Lake Surface Area <As>: 132.0 acre
Lake Volume <V>: 1980.0 acre-ft
Lake Mean Depth <z>: 15.0 ft
Precipitation - Evaporation: 3.3 in.
Hydraulic Loading: 37.9 acre-ft/year
Areal Water Load <qs>: 0.3 ft/year
Lake Flushing Rate <p>: 0.02 1/year
Water Residence Time: 52.24 year
Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3
Observed growing season mean phosphorus (GSM): 42.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre	Low	Most Likely	High	Loading %	Low	Most Likely	High
	(ac)	Loading (kg/ha-year)				Loading (kg/year)		
Row Crop AG	0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	0.54	0.10	0.30	0.50	0.4	0	0	0
HD Urban (1/8 Ac)	0.2	1.00	1.50	2.00	0.7	0	0	0
MD Urban (1/4 Ac)	1.7	0.30	0.50	0.80	2.1	0	0	1
Rural Res (>1 Ac)	0.0	0.05	0.10	0.25	0.0	0	0	0
Wetlands	0.0	0.10	0.10	0.10	0.0	0	0	0
Forest	0	0.05	0.09	0.18	0.0	0	0	0
Lake Surface	132.0	0.10	0.30	1.00	96.8	5	16	53

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	0.0				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.00	0.00	0.00	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	12.5	36.5	119.6	100.0
Total Loading (kg)	5.7	16.6	54.2	100.0
Areal Loading (lb/ac-year)	0.09	0.28	0.91	
Areal Loading (mg/m^2-year)	10.58	31.00	101.54	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	0.7	1.2	1.8	100.0
Total NPS Loading (kg)	0.3	0.5	0.8	100.0

Date: 4/28/2016 Scenario: Loveless Lake Culvert #10

Lake Id: Culvert 9
Watershed Id: 1

Hydrologic and Morphometric Data

Tributary Drainage Area: 35.9 acre
Total Unit Runoff: 8.00 in.
Annual Runoff Volume: 23.9 acre-ft
Lake Surface Area <As>: 132.0 acre
Lake Volume <V>: 1980.0 acre-ft
Lake Mean Depth <z>: 15.0 ft
Precipitation - Evaporation: 3.3 in.
Hydraulic Loading: 60.2 acre-ft/year
Areal Water Load <qs>: 0.5 ft/year
Lake Flushing Rate <p>: 0.03 1/year
Water Residence Time: 32.87 year
Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3
Observed growing season mean phosphorus (GSM): 42.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low Loading (kg/ha-year)	Most Likely Loading (kg/ha-year)	High Loading (kg/ha-year)	Loading %	Low Loading (kg/year)	Most Likely Loading (kg/year)	High Loading (kg/year)
Row Crop AG	19.98	0.50	1.00	3.00	31.0	4	8	24
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	4.32	0.10	0.30	0.50	2.0	0	1	1
HD Urban (1/8 Ac)	1.21	1.00	1.50	2.00	2.8	0	1	1
MD Urban (1/4 Ac)	2.12	0.30	0.50	0.80	1.6	0	0	1
Rural Res (>1 Ac)	4.2	0.05	0.10	0.25	0.7	0	0	0
Wetlands	0.0	0.10	0.10	0.10	0.0	0	0	0
Forest	4.1	0.05	0.09	0.18	0.6	0	0	0
Lake Surface	132.0	0.10	0.30	1.00	61.4	5	16	53

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	0.0				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.00	0.00	0.00	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	23.1	57.6	178.4	100.0
Total Loading (kg)	10.5	26.1	80.9	100.0
Areal Loading (lb/ac-year)	0.17	0.44	1.35	
Areal Loading (mg/m^2-year)	19.61	48.90	151.52	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	11.3	22.3	60.7	100.0
Total NPS Loading (kg)	5.1	10.1	27.5	100.0

Date: 4/14/2016 Scenario: Loveless 2016 correct septic data

Lake Id: Loveless Lake
Watershed Id: 1

Hydrologic and Morphometric Data

Tributary Drainage Area: 319.3 acre
Total Unit Runoff: 8.00 in.
Annual Runoff Volume: 212.9 acre-ft
Lake Surface Area <As>: 132.0 acre
Lake Volume <V>: 1980.0 acre-ft
Lake Mean Depth <z>: 15.0 ft
Precipitation - Evaporation: 3.3 in.
Hydraulic Loading: 249.2 acre-ft/year
Areal Water Load <qs>: 1.9 ft/year
Lake Flushing Rate <p>: 0.13 1/year
Water Residence Time: 7.95 year
Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3
Observed growing season mean phosphorus (GSM): 42.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low Loading (kg/ha-year)	Most Likely Loading (kg/ha-year)	High Loading (kg/ha-year)	Loading %	Low Loading (kg/year)	Most Likely Loading (kg/year)	High Loading (kg/year)
Row Crop AG	59.4	0.50	1.00	3.00	31.0	12	24	72
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	12.5	0.10	0.30	0.50	2.0	1	2	3
HD Urban (1/8 Ac)	8.5	1.00	1.50	2.00	6.7	3	5	7
MD Urban (1/4 Ac)	89.5	0.30	0.50	0.80	23.3	11	18	29
Rural Res (>1 Ac)	33.7	0.05	0.10	0.25	1.8	1	1	3
Wetlands	0.0	0.10	0.10	0.10	0.0	0	0	0
Forest	115.6	0.05	0.09	0.18	5.4	2	4	8
Lake Surface	132.0	0.10	0.30	1.00	20.6	5	16	53

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	144.7				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.87	7.23	23.15	9.3

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	79.5	171.3	438.6	100.0
Total Loading (kg)	36.1	77.7	198.9	100.0
Areal Loading (lb/ac-year)	0.60	1.30	3.32	
Areal Loading (mg/m^2-year)	67.53	145.42	372.41	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	65.8	120.0	269.8	90.7
Total NPS Loading (kg)	29.9	54.4	122.4	90.7

Wisconsin Internal Load Estimator

Date: 4/14/2016 Scenario: 18

Method 1 - A Complete Total Phosphorus Mass Budget

Method 1 - A Complete Total Phosphorus Mass Budget 35.718 mg/m^3
Phosphorus Inflow Concentration: 252.8 mg/m^3
Areal External Loading: 145.4 mg/m^2-year
Predicted Phosphorus Retention Coefficient: 0.81
Observed Phosphorus Retention Coefficient: 0.86
Internal Load: -9 Lb -4 kg

Method 2 - From Growing Season In Situ Phososphorus Increases

Start of Anoxia

Average Hypolimnetic Phosphorus Concentration: 46.3 mg/m^3
Hypolimnetic Volume: 1 acre-ft
Anoxia Sediment Area: 1 acres

Just Prior To The End of Stratification

Average Hypolimnetic Phosphorus Concentration: 49 mg/m^3
Hypolimnetic Volume: 1 acre-ft
Anoxia Sediment Area: 1 acres

Time Period of Stratification: 0 days
Sediment Phosphorus Release Rate: 0 mg/m^2-day 0 lb/acre-day
Internal Load: 0 Lb 0 kg

Method 3 - From In Situ Phososphorus Increases In The Fall

Start of Anoxia

Average Hypolimnetic Phosphorus Concentration: 46.3 mg/m^3
Hypolimnetic Volume: 1 acre-ft
Anoxia Sediment Area: 1 acres

Just Prior To The End of Stratification

Average Water Column Phosphorus Concentration: 49 mg/m^3
Lake Volume: 1980.0 acre-ft
Anoxia Sediment Area Just Before Turnover: 1 acres
Time Period Between Observations: 14 days
Sediment Phosphorus Release Rate: 2111.3 mg/m^2-day 5.74E+000 lb/acre-day
Internal Load: 264 Lb 120 kg

Method 4 - From Phososphorus Release Rate and Anoxic Area

Start of Anoxia Anoxic Sediment Area: 1 acre
End of Anoxia Anoxic Sediment Area: 1 acre
Phosphorus Release Rate As Calculated In Method 2: 0 mg/m^2-day
Phosphorus Release Rate As Calculated In Method 3: 0 mg/m^2-day
Average of Methods 2 and 3 Release Rates: 1056.0 mg/m^2-day
Period of Anoxia: 14 days
Default Areal Sediment Phosphorus Release Rates:

	Low	Most Likely	High
	6	14	24
Internal Load: (Lb)	0	1	1
Internal Load: (kg)	0	0	0

Internal Load Comparison (Percentanges are of the Total Estimate Load)

Total External Load: 171 Lb 78 kg

	Lb	kg	%
From A Complete Mass Budget:	-9	-4	-5.4
From Growing Season In Situ Phosphorus Increases:	0	0	0.0
From In Situ Phososphorus Increases In The Fall:	264	120	60.6
From Phososphorus Release Rate and Anoxic Area:	1	0	0.3

Predicted Water Column Total Phosphorus Concentration (ug/l)

Nurnberg+ 1984 Total Phosphorus Model:	Low	Most Likely	High
	10	243	125

Osgood, 1988 Lake Mixing Index: 6.3

Phosphorus Loading Summary:

	Low	Most Likely	High
Internal Load (Lb):	-9	131.9	1
Internal Load (kg):	-4	59.8	0
External Load (Lb):	80	171	439
External Load (kg):	36	78	199
Total Load (Lb):	71	303	439
Total Load (kg):	32	138	199

Phosphorus Prediction and Uncertainty Analysis Module

Date: 4/14/2016 Scenario: 14

Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3

Observed growing season mean phosphorus (GSM): 42.0 mg/m^3

Back calculation for SPO total phosphorus: 136.67 mg/m^3

Back calculation GSM phosphorus: 151.11 mg/m^3

% Confidence Range: 70%

Nurenberg Model Input - Est. Gross Int. Loading: 243 kg

Lake Phosphorus Model	**Low** Total P (mg/m^3)	**Most Likely** Total P (mg/m^3)	**High** Total P (mg/m^3)	**Predicted** -Observed (mg/m^3)	**% Dif.**
Walker, 1987 Reservoir	27	59	151	17	40
Canfield-Bachmann, 1981 Natural Lake	22	35	61	-7	-17
Canfield-Bachmann, 1981 Artificial Lake	22	32	49	-10	-24
Rechow, 1979 General	5	12	30	-30	-71
Rechow, 1977 Anoxic	47	102	261	60	143
Rechow, 1977 water load<50m/year	11	23	60	-19	-45
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	38	81	208	44	119
Vollenweider, 1982 Combined OECD	26	48	104	9	23
Dillon-Rigler-Kirchner	27	59	151	22	60
Vollenweider, 1982 Shallow Lake/Res.	21	41	93	2	5
Larsen-Mercier, 1976	31	66	169	29	79
Nurnberg, 1984 Oxic	813	839	915	797	1898

Lake Phosphorus Model	**Confidence** Lower Bound	**Confidence** Upper Bound	**Parameter** Fit?	**Back** Calculation (kg/year)	**Model** Type
Walker, 1987 Reservoir	34	119	Tw	200	GSM
Canfield-Bachmann, 1981 Natural Lake	11	101	FIT	966	GSM

Canfield-Bachmann, 1981 Artificial Lake	10	92	FIT	2559	GSM
Rechow, 1979 General	6	24	qs	992	GSM
Rechow, 1977 Anoxic	59	205	FIT	115	GSM
Rechow, 1977 water load<50m/year	13	47	FIT	505	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	40	172	FIT	131	SPO
Vollenweider, 1982 Combined OECD	23	95	FIT	295	ANN
Dillon-Rigler-Kirchner	34	119	P qs p	180	SPO
Vollenweider, 1982 Shallow Lake/Res.	20	82	FIT	331	ANN
Larsen-Mercier, 1976	40	132	P Pin	160	SPO
Nurnberg, 1984 Oxic	533	1278	P	-1021	ANN

Water and Nutrient Outflow Module

Date: 4/14/2016 Scenario: 12
Average Annual Surface Total Phosphorus: 35.72mg/m^3
Annual Discharge: 2.49E+002 AF => 3.07E+005 m^3
Annual Outflow Loading: 23.1 LB => 10.5 kg

Expanded Trophic Response Module

Date: 4/14/2016 Scenario: 30
Total Phosphorus: 35.72 mg/m^3
Growing Season
Chorophyll a: 6.67 mg/m^3
Secchi Disk Depth: 3.24 m

Carlson TSI Equations:

TSI (Total Phosphorus): 56 TSI (Chlorphyll a): 49 TSI (Secchi Disk Depth): 43

Expanded Trophic Response Module

Date: 4/14/2016 Scenario: 31
Total Phosphorus: 35.72 mg/m^3
Growing Season
Chorophyll a: 6.67 mg/m^3
Secchi Disk Depth: 3.24 m

Wisconsin Statewide Prediction Equations:

	Natural Lakes		Impoundments	
	Stratified	Mixed	Stratified	Mixed
Secchi Disk Depth using Chlorophyll_a:	2.4	1.9	2.0	1.4
Secchi Disk Depth using Total Phosphorus:	1.7	1.1	1.3	1.1
Chlorphyll_a using Total Phosphorus:	10.2	13.4	18.7	14.1

Expanded Trophic Response Module

Date: 4/14/2016 Scenario: 32
Total Phosphorus: 35.72 mg/m^3
Growing Season
Chorophyll a: 6.67 mg/m^3
Secchi Disk Depth: 3.24 m

Wisconsin Regional Prediction Equations:

		Stratified		Mixed	
	Region	Seepage	Drainage	Seepage	Drainage
Use Chlorophyll_a To Predict Secchi Disk Depth (m)	South	1.9	2.0	1.0	1.2
	Central	2.7	2.5	2.2	No Data
	North	2.6	2.3	2.2	1.5
Use Total Phosphorus To Predict Secchi Disk Depth (m)	South	1.6	1.2	0.7	0.8
	Central	2.8	0.7	0.9	No Data
	North	2.1	1.5	1.5	1.1
Use Total Phosphorus To Predict Chlorophyll_a (mg/m^3))	South	9.8	20.1	13.2	16.2
	Central	9.1	44.6	13.9	No Data
	North	7.3	11.6	11.4	11.1

Expanded Trophic Response Module

Date: 4/14/2016 Scenario: 33
Total Phosphorus: 35.72 mg/m^3
Growing Season
Chorophyll a: 6.67 mg/m^3
Secchi Disk Depth: 3.24 m

Cholorphyll a Nuisance Frequency

Chla Mean Min: 5
Chla Mean Max: 100
Chla Mean Increment: 5
Chla Temporal CV: 0.62
Chla Nuisance Criterion: 20

Mean	Freq %	ml	z	v	w	x
5	0.5	1.4	2.546	0.016	0.541	0.005
10	7.7	2.1	1.428	0.144	0.678	0.077
15	21.9	2.5	0.774	0.296	0.795	0.219
20	37.8	2.8	0.310	0.380	0.907	0.378
25	52.0	3.0	-0.050	0.398	0.984	0.480
30	63.5	3.2	-0.344	0.376	0.897	0.365
35	72.3	3.4	-0.593	0.335	0.835	0.277

40	79.0	3.5	-0.808	0.288	0.788	0.210
45	84.1	3.6	-0.998	0.242	0.751	0.159
50	87.9	3.7	-1.168	0.202	0.720	0.121
55	90.7	3.8	-1.322	0.167	0.695	0.093
60	92.8	3.9	-1.462	0.137	0.673	0.072
65	94.4	4.0	-1.591	0.112	0.654	0.056
70	95.6	4.1	-1.711	0.092	0.637	0.044
75	96.6	4.1	-1.822	0.076	0.623	0.034
80	97.3	4.2	-1.926	0.062	0.609	0.027
85	97.8	4.3	-2.024	0.051	0.598	0.022
90	98.3	4.3	-2.116	0.043	0.587	0.017
95	98.6	4.4	-2.203	0.035	0.577	0.014
100	98.9	4.4	-2.286	0.029	0.568	0.011

Date: 4/6/2016 Scenario: 29

Lake Id: Loveless Lake
Watershed Id: 1

Hydrologic and Morphometric Data

Tributary Drainage Area: 319.3 acre
Total Unit Runoff: 8.00 in.
Annual Runoff Volume: 212.9 acre-ft
Lake Surface Area <As>: 132.0 acre
Lake Volume <V>: 1980.0 acre-ft
Lake Mean Depth <z>: 15.0 ft
Precipitation - Evaporation: 3.3 in.
Hydraulic Loading: 249.2 acre-ft/year
Areal Water Load <qs>: 1.9 ft/year
Lake Flushing Rate <p>: 0.13 1/year
Water Residence Time: 7.95 year
Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3
Observed growing season mean phosphorus (GSM): 42.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low Loading (kg/ha-year)	Most Likely Loading (kg/ha-year)	High Loading (kg/ha-year)	Loading %	Low Loading (kg/year)	Most Likely Loading (kg/year)	High Loading (kg/year)
Row Crop AG	59.4	0.50	1.00	3.00	28.8	12	24	72
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	12.5	0.10	0.30	0.50	1.8	1	2	3
HD Urban (1/8 Ac)	8.5	1.00	1.50	2.00	6.2	3	5	7
MD Urban (1/4 Ac)	89.5	0.30	0.50	0.80	21.7	11	18	29
Rural Res (>1 Ac)	33.7	0.05	0.10	0.25	1.6	1	1	3
Wetlands	0.0	0.10	0.10	0.10	0.0	0	0	0
Forest	115.6	0.05	0.09	0.18	5.0	2	4	8
Lake Surface	132.0	0.10	0.30	1.00	19.2	5	16	53

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	262.4				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		1.57	13.12	41.99	15.7

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	81.1	184.2	480.1	100.0
Total Loading (kg)	36.8	83.6	217.8	100.0
Areal Loading (lb/ac-year)	0.61	1.40	3.64	
Areal Loading (mg/m^2-year)	68.85	156.44	407.67	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	65.8	120.0	269.8	84.3
Total NPS Loading (kg)	29.9	54.4	122.4	84.3

Wisconsin Internal Load Estimator

Date: 4/6/2016 Scenario: 17

Method 1 - A Complete Total Phosphorus Mass Budget

Method 1 - A Complete Total Phosphorus Mass Budget 35.71 mg/m^3
Phosphorus Inflow Concentration: 271.9 mg/m^3
Areal External Loading: 156.4 mg/m^2-year
Predicted Phosphorus Retention Coefficient: 0.81
Observed Phosphorus Retention Coefficient: 0.87
Internal Load: -11 Lb -5 kg

Method 2 - From Growing Season In Situ Phososphorus Increases

Start of Anoxia

Average Hypolimnetic Phosphorus Concentration: 0 mg/m^3
Hypolimnetic Volume: 0.0 acre-ft
Anoxia Sediment Area: 0.0 acres

Just Prior To The End of Stratification

Average Hypolimnetic Phosphorus Concentration: 0 mg/m^3
Hypolimnetic Volume: 0.0 acre-ft
Anoxia Sediment Area: 0.0 acres

Time Period of Stratification: 1 days
Sediment Phosphorus Release Rate: 0 mg/m^2-day 0 lb/acre-day
Internal Load: 0 Lb 0 kg

Method 3 - From In Situ Phososphorus Increases In The Fall

Start of Anoxia

Average Hypolimnetic Phosphorus Concentration: 0 mg/m^3
Hypolimnetic Volume: 0 acre-ft
Anoxia Sediment Area: 0 acres

Just Prior To The End of Stratification

Average Water Column Phosphorus Concentration: 49 mg/m^3
Lake Volume: 1980.0 acre-ft
Anoxia Sediment Area Just Before Turnover: 0 acres
Time Period Between Observations: 14 days
Sediment Phosphorus Release Rate: 0 mg/m^2-day 0 lb/acre-day
Internal Load: 264 Lb 120 kg

Method 4 - From Phososphorus Release Rate and Anoxic Area

Start of Anoxia Anoxic Sediment Area: 0 acre
End of Anoxia Anoxic Sediment Area: 0 acre
Phosphorus Release Rate As Calculated In Method 2: 0 mg/m^2-day
Phosphorus Release Rate As Calculated In Method 3: 0 mg/m^2-day
Average of Methods 2 and 3 Release Rates: 0.0 mg/m^2-day
Period of Anoxia: 0 days
Default Areal Sediment Phosphorus Release Rates:

	Low	Most Likely	High
	6	14	24
Internal Load: (Lb)	0	0	0
Internal Load: (kg)	0	0	0

Internal Load Comparison (Percentanges are of the Total Estimate Load)

Total External Load: 184 Lb 84 kg

	Lb	kg	%
From A Complete Mass Budget:	-11	-5	-6.5
From Growing Season In Situ Phosphorus Increases:	0	0	0
From In Situ Phososphorus Increases In The Fall:	264	120	58.9
From Phososphorus Release Rate and Anoxic Area:	0	0	0

Predicted Water Column Total Phosphorus Concentration (ug/l)

Nurnberg+ 1984 Total Phosphorus Model:	Low	Most Likely	High
	6	247	136

Osgood, 1988 Lake Mixing Index: 6.3

Phosphorus Loading Summary:

	Low	Most Likely	High
Internal Load (Lb):	-11	131.9	0
Internal Load (kg):	-5	59.8	0
External Load (Lb):	81	184	480
External Load (kg):	37	84	218
Total Load (Lb):	70	316	480
Total Load (kg):	32	143	218

Phosphorus Prediction and Uncertainty Analysis Module

Date: 4/6/2016 Scenario: 13

Observed spring overturn total phosphorus (SPO): 36.9 mg/m^3

Observed growing season mean phosphorus (GSM): 42.0 mg/m^3

Back calculation for SPO total phosphorus: 136.67 mg/m^3

Back calculation GSM phosphorus: 151.11 mg/m^3

% Confidence Range: 70%

Nurenberg Model Input - Est. Gross Int. Loading: 247 kg

Lake Phosphorus Model	**Low** Total P (mg/m^3)	**Most Likely** Total P (mg/m^3)	**High** Total P (mg/m^3)	**Predicted** -Observed (mg/m^3)	**% Dif.**
Walker, 1987 Reservoir	27	61	160	19	45
Canfield-Bachmann, 1981 Natural Lake	22	36	64	-6	-14
Canfield-Bachmann, 1981 Artificial Lake	22	33	52	-9	-21
Rechow, 1979 General	6	13	33	-29	-69
Rechow, 1977 Anoxic	48	110	286	68	162
Rechow, 1977 water load<50m/year	11	25	65	-17	-40
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	38	87	228	50	136
Vollenweider, 1982 Combined OECD	26	51	112	12	30
Dillon-Rigler-Kirchner	28	63	165	26	70
Vollenweider, 1982 Shallow Lake/Res.	21	44	101	5	13
Larsen-Mercier, 1976	31	71	186	34	92
Nurnberg, 1984 Oxic	827	856	940	814	1938

Lake Phosphorus Model	**Confidence** Lower Bound	**Confidence** Upper Bound	**Parameter** Fit?	**Back** Calculation (kg/year)	**Model** Type
Walker, 1987 Reservoir	34	125	Tw	206	GSM
Canfield-Bachmann, 1981 Natural Lake	11	104	FIT	966	GSM

Canfield-Bachmann, 1981 Artificial Lake	10	95	FIT	2559	GSM
Rechow, 1979 General	7	26	qs	992	GSM
Rechow, 1977 Anoxic	63	223	FIT	115	GSM
Rechow, 1977 water load<50m/year	14	51	FIT	505	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	41	187	FIT	131	SPO
Vollenweider, 1982 Combined OECD	24	102	FIT	295	ANN
Dillon-Rigler-Kirchner	36	129	P qs p	180	SPO
Vollenweider, 1982 Shallow Lake/Res.	21	89	FIT	331	ANN
Larsen-Mercier, 1976	41	144	P Pin	160	SPO
Nurnberg, 1984 Oxic	543	1305	P	-1042	ANN

Water and Nutrient Outflow Module

Date: 4/6/2016 Scenario: 11
Average Annual Surface Total Phosphorus: 35.72mg/m^3
Annual Discharge: 2.49E+002 AF => 3.07E+005 m^3
Annual Outflow Loading: 23.1 LB => 10.5 kg

Expanded Trophic Response Module

Date: 4/6/2016 Scenario: 25
Total Phosphorus: 35.71 mg/m^3
Growing Season
Chorophyll a: 6.67 mg/m^3
Secchi Disk Depth: 3.24 m

Carlson TSI Equations:

TSI (Total Phosphorus): 56 TSI (Chlorphyll a): 49 TSI (Secchi Disk Depth): 43

Expanded Trophic Response Module

Date: 4/6/2016 Scenario: 26
Total Phosphorus: 35.71 mg/m^3
Growing Season
Chorophyll a: 6.67 mg/m^3
Secchi Disk Depth: 3.24 m

Wisconsin Statewide Prediction Equations:

	Natural Lakes		Impoundments	
	Stratified	Mixed	Stratified	Mixed
Secchi Disk Depth using Chlorophyll_a:	2.4	1.9	2.0	1.4
Secchi Disk Depth using Total Phosphorus:	1.7	1.1	1.3	1.1
Chlorphyll_a using Total Phosphorus:	10.2	13.4	18.7	14.1

Expanded Trophic Response Module

Date: 4/6/2016 Scenario: 27
Total Phosphorus: 35.71 mg/m^3
Growing Season
Chorophyll a: 6.67 mg/m^3
Secchi Disk Depth: 3.24 m

Wisconsin Regional Prediction Equations:

		Stratified		Mixed	
	Region	Seepage	Drainage	Seepage	Drainage
Use Chlorophyll_a To Predict Secchi Disk Depth (m)	South	1.9	2.0	1.0	1.2
	Central	2.7	2.5	2.2	No Data
	North	2.6	2.3	2.2	1.5
Use Total Phosphorus To Predict Secchi Disk Depth (m)	South	1.6	1.2	0.7	0.8
	Central	2.8	0.7	0.9	No Data
	North	2.1	1.5	1.5	1.1
Use Total Phosphorus To Predict Chlorophyll_a (mg/m^3))	South	9.8	20.1	13.2	16.2
	Central	9.1	44.6	13.8	No Data
	North	7.3	11.6	11.4	11.1

Expanded Trophic Response Module

Date: 4/6/2016 Scenario: 28
Total Phosphorus: 35.71 mg/m^3
Growing Season
Chorophyll a: 6.67 mg/m^3
Secchi Disk Depth: 3.24 m

Other Prediction Equations:

Rast and Lee, 1978:: Chlorophyll_a = 8.3 mg/m^3 Secchi Disk Depth = 2.6 m
Bartsch and Gaksatter, 1978:: Chlorophyll_a = 11.5 mg/m^3

User Defined: Chlorophyll_a - Total Phosphorus Regression::

Use Total Phosphorus To Predict Chlorophyll_a = 0.0 x 35.71^0.0 = 0.0 mg/m^3
Use Chlorophyll_a To Predict Secchi Disk Depth = 0.0 x 6.67^0.0 = 0.0 m

Expanded Trophic Response Module

Date: 4/6/2016 Scenario: 29
Total Phosphorus: 35.71 mg/m^3
Growing Season
Chorophyll a: 6.67 mg/m^3
Secchi Disk Depth: 3.24 m

Cholorphyll a Nuisance Frequency

Chla Mean Min: 5
Chla Mean Max: 100
Chla Mean Increment: 5
Chla Temporal CV: 0.62
Chla Nuisance Criterion: 20

Mean	Freq %	ml	z	v	w	x
5	0.5	1.4	2.546	0.016	0.541	0.005
10	7.7	2.1	1.428	0.144	0.678	0.077
15	21.9	2.5	0.774	0.296	0.795	0.219
20	37.8	2.8	0.310	0.380	0.907	0.378
25	52.0	3.0	-0.050	0.398	0.984	0.480
30	63.5	3.2	-0.344	0.376	0.897	0.365
35	72.3	3.4	-0.593	0.335	0.835	0.277
40	79.0	3.5	-0.808	0.288	0.788	0.210
45	84.1	3.6	-0.998	0.242	0.751	0.159
50	87.9	3.7	-1.168	0.202	0.720	0.121
55	90.7	3.8	-1.322	0.167	0.695	0.093
60	92.8	3.9	-1.462	0.137	0.673	0.072
65	94.4	4.0	-1.591	0.112	0.654	0.056
70	95.6	4.1	-1.711	0.092	0.637	0.044
75	96.6	4.1	-1.822	0.076	0.623	0.034
80	97.3	4.2	-1.926	0.062	0.609	0.027
85	97.8	4.3	-2.024	0.051	0.598	0.022
90	98.3	4.3	-2.116	0.043	0.587	0.017
95	98.6	4.4	-2.203	0.035	0.577	0.014
100	98.9	4.4	-2.286	0.029	0.568	0.011

Appendix H

Meeting Agendas and Materials

Loveless Lake Management Plan Development
Committee Meeting 1

Tuesday, March 22nd
10 AM -12 PM
Polk County Government Center, North Conference Room

10:00 Introductions, roles, responsibilities, and purpose of the meeting (all)

10:15 Brainstorming session (Management Plan Committee)
- What do you value about Loveless Lake?
- What concerns/issues do you have for Loveless Lake?

11:15 Presentation (Polk County Land and Water Resources Department)
- Loveless Lake chemistry
- Loveless Lake level and precipitation
- Loveless Lake resident survey

11:55 Schedule future meetings—bring your calendar (all)

12:00 Adjourn

Katelin Holm
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katelin.holm@co.polk.wi.us

Jeremy Williamson
(715) 485-8639
jeremyw@co.polk.wi.us

Loveless Lake Management Plan Development Rules and Responsibilities

Overall Objective

Develop a Lake Management Plan for Loveless Lake

A management plan outlines goals and actions that everyone can live with

Ground Rules

Listen to what others are saying
Don't interrupt when others are speaking
Input is heard from everyone
Stay on topic and stick to the agenda

Management Plan Committee Responsibilities

Attend all meetings
Share your knowledge and concerns about Loveless Lake
Review background information and draft documents
Develop lake management strategies
Decide when draft document is ready to forward to board for approval

Land and Water Resources Department Responsibilities

Send out agendas and materials prior to meetings
Keep discussion on track, may need to interrupt to keep discussion focused
Summarize key study findings
Write goals, objectives, and action items for the plan using committee input
Write draft and final plan documents
Submit plan for public comment and WDNR review

Association Board Member Responsibilities

Participate as part of the committee
Review draft Management Plan
Approve draft Management Plan to forward to the WI DNR or disapprove draft Management Plan and return to committee

Loveless Lake Management Plan Development
Committee Meeting 1 Notes

Tuesday, March 22nd
10 AM -12 PM
Polk County Government Center, North Conference Room

Introductions, roles, responsibilities, and purpose of the meeting

Mary Walczak, John Kohner, Michelle Benson, David Benson, Jim Peterson, Susan Barnes, Debbie Cudd, Blaine Erickson, Katelin Holm, and Jeremy Williamson

Brainstorming session (Management Plan Committee)

What do you value about Loveless Lake?

Water quality
Geography—size, shape, wind protection
Lifestyle
Quietness
Wildlife
Natural shoreline (woods versus lawns)
Low drop-in traffic (transient boaters)
No restaurants, bars, business, resorts
Respectful and friendly neighbors
Community
Fishing
Recreation
Close to cities
Property value
Property maintenance and improvement

What concerns/issues do you have for Loveless Lake?

Zoning
Aging/maturing of the lake
Water quality (phosphorus)
Algae blooms (blue-green)
Weeds—vegetation
Need to swim in the middle of the lake
Runoff—erosion
Reidner being used as a parking lot
Lack of buffers on lots (why this is important)
Education (or lack of)
Aging septic systems
Lack of interest from new residents—specifically environmental issues
Floating weeds (boat traffic or cut?)
Surrounding farmland/watershed
Fertilizer on lawns
Removing aquatic vegetation and dumping in ditches
Piling leaves and grass clippings
Culverts
Snails
Replacing old septic systems
Non-conforming structures
Noise (suggested quite time)
Involvement in Association
Relationships
Safety—speed and close to shore
Enforce no wake
Association meetings—how to reach the absent people
Voluntary compliance
Fishing habitat—knowing it will be a panfish lake not musky/walleye

Begin to draft a Vision Statement for Loveless Lake

Presentation (Polk County Land and Water Resources Department)

Loveless Lake chemistry
Loveless Lake level and precipitation
Loveless Lake resident survey

Schedule future meetings

Tuesday, April 19th 10 AM -12 PM
Thursday, May 5th 10 AM -12 PM

Adjourn

Katelin Holm
(715) 485-8637
katelin.holm@co.polk.wi.us

Jeremy Williamson
(715) 485-8639
jeremyw@co.polk.wi.us



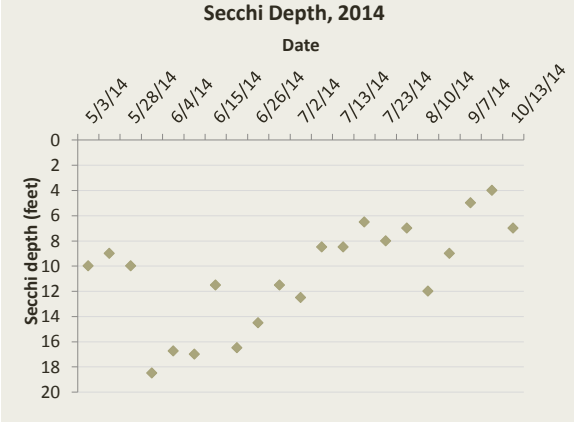


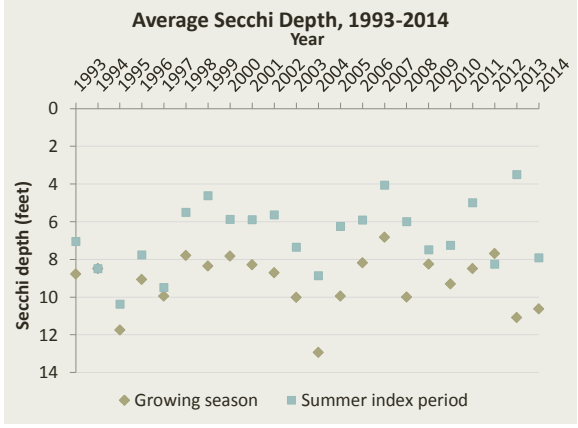
Secchi Depth

Measure of water clarity

Bigger numbers = greater clarity







Phosphorus (P)

Excess amounts can cause excessive plant and algae growth

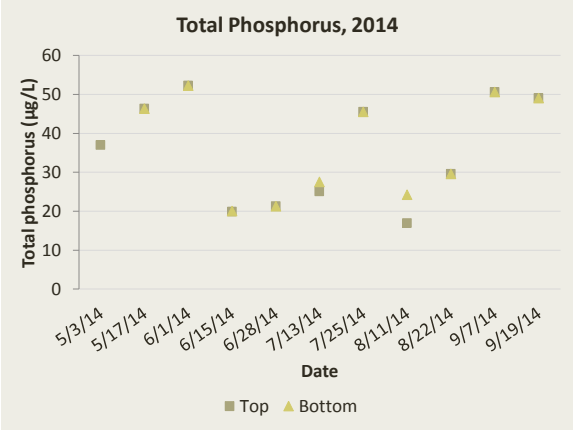
Occurs naturally in soil

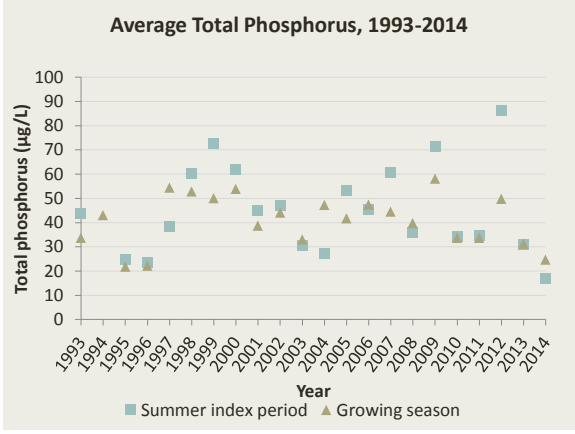
Component of fertilizer

Healthy limit of 20 µg/L









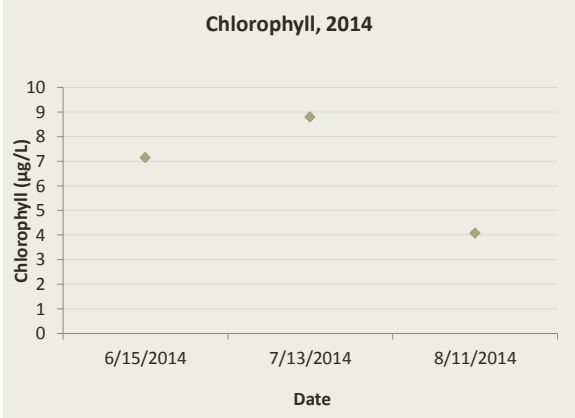
Chlorophyll

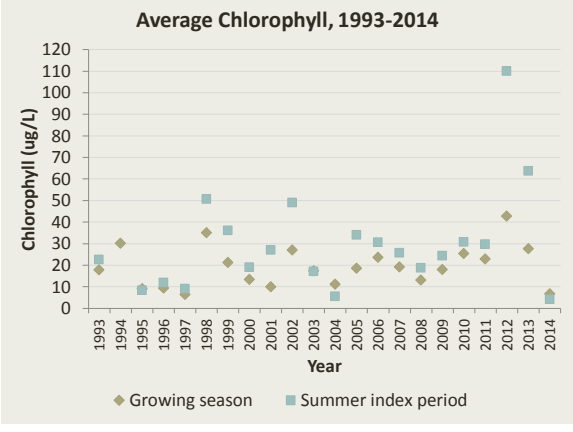
Pigment in plants and algae

Provides a general indication of the amount of algae in a lake

Higher values = more algae

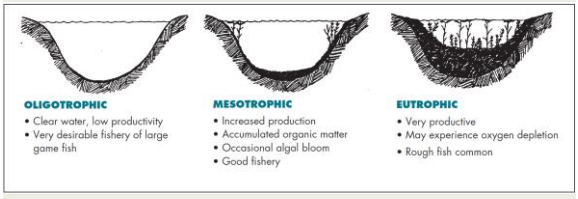
Clear lakes have levels less than 15 µg/L
Greatest impacts when levels exceed 30 µg/L



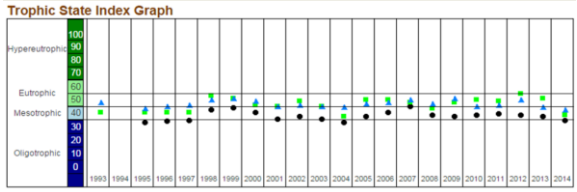


Trophic State Index

Serves as an indicator of water quality
– Reflects nutrient and clarity levels

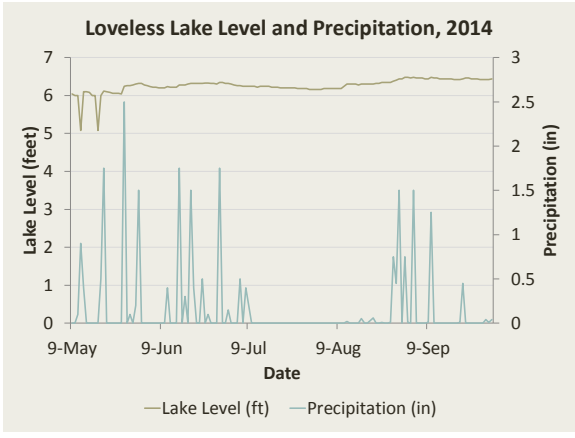


TSI	General Description
<30	**Oligotrophic**; clear water, high dissolved oxygen throughout the year/lake
30-40	**Oligotrophic**; clear water, possible periods of oxygen depletion in the lower depths of the lake
40-50	**Mesotrophic**; moderately clear water, increasing chance of anoxia near the bottom of the lake in summer, fully acceptable for all recreation/aesthetic uses
50-60	**Mildly eutrophic**; decreased water clarity, anoxic near the bottom, may have macrophyte problem, warm-water fisheries only
60-70	**Eutrophic**; blue-green algae dominance, scums possible, prolific aquatic plant growth, full body recreation may be decreased
70-80	**Hypereutrophic**; heavy algal blooms possible throughout the summer, dense algae and macrophytes
>80	**Algal scums**, summer fish kills, few aquatic plants due to algal shading, rough fish dominate

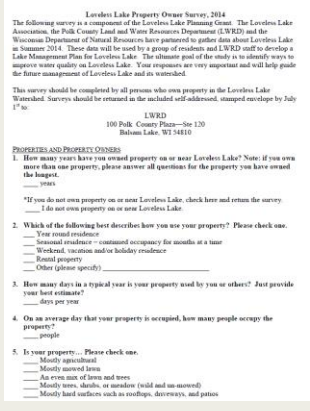


Monitoring Station: Loveless Lake - Deep Hole, Polk County
Past Summer (July-August) Trophic State Index (TSI) averages.









Loveless Lake Property Owner Survey, 2014

The following survey is a component of the Loveless Lake Planning Grant. The Loveless Lake Association, the Polk County Land and Water Resources Department (LWRD) and the Wisconsin Department of Natural Resources have partnered to gather data about Loveless Lake in Summer 2014. These data will be used by a group of residents and LWRD staff to develop a Lake Management Plan for Loveless Lake. The ultimate goal of the study is to identify ways to improve water quality on Loveless Lake. Your responses are very important and will help guide the future management of Loveless Lake and its watershed.

This survey should be completed by all persons who own property in the Loveless Lake Watershed. Surveys should be returned in the included self-addressed, stamped envelope by July 1st to:

LWRD
100 Polk County Plaza—Ste 120
Balsam Lake, WI 54810

PROPERTIES AND PROPERTY OWNERS

1. How many years have you owned property on or near Loveless Lake? Note: if you own more than one property, please answer all questions for the property you have owned the longest.
   ____ years

   *If you do not own property on or near Loveless Lake, check here and return the survey.
   ____ I do not own property on or near Loveless Lake.

2. Which of the following best describes how you use your property? Please check one.
   ___ Year round residence
   ___ Seasonal residence – continued occupancy for months at a time
   ___ Weekend, vacation and/or holiday residence
   ___ Rental property
   ___ Other (please specify) _____

3. How many days in a typical year is your property used by you or others? Just provide your best estimate?
   ____ days per year

4. On an average day that your property is occupied, how many people occupy the property?
   ____ people

5. Is your property… Please check one.
   ____ Mostly agricultural
   ____ Mostly mowed lawn
   ____ An even mix of lawn and trees
   ____ Mostly trees, shrubs, or meadow (wild and un-mowed)
   ____ Mostly hard surfaces such as rooftops, driveways, and patios

Mailed 224 surveys in May 2014

56 respondents, 25% response rate

Thank you!

Loveless Lake Owners

Property ownership: 21 years

People occupying property: 3

Number of days property is used: 139 days

Two thirds are weekend, vacation, and/or holiday residents (68%)

Less than a quarter are full time residents (18%)

What are the most important reasons you own property on/near Loveless Lake?	Points
Lake lifestyle	117
Scenic beauty/viewing nature	75
Fishing	32
Motorized water sports	31
Entertaining	22
Non-motorized water sports	14
Rural lifestyle	11
Financial (work or investment)	6
Winter activities	4
Sense of community	1

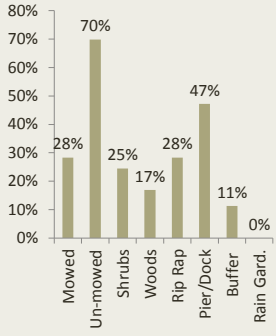
Which recreational activities do you enjoy on Loveless Lake?	Percent
Enjoying the view	83%
Enjoying peace and tranquility	80%
Swimming	76%
Motorized boating	72%
Open water fishing	67%
Observing wildlife	61%
Non motorized boating	48%
Jet skiing/water boarding/waterskiing	35%
Ice Fishing	30%
Cross county skiing	20%
Snowmobiling	17%
Sailing	11%
Hunting	2%

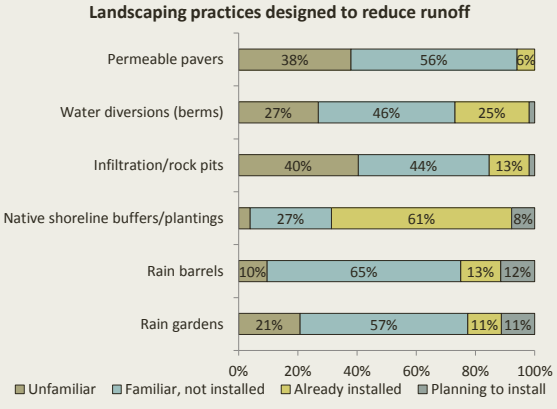
Characterizing the Shoreline

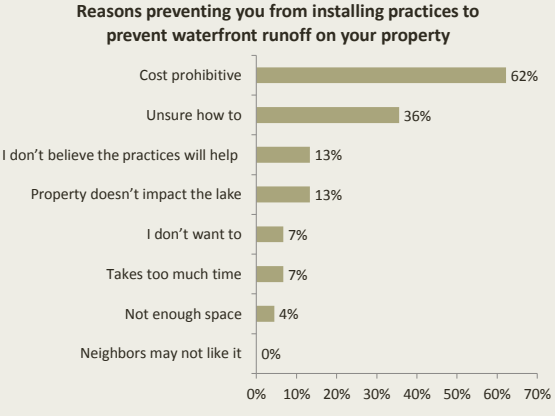
Property owners were divided in describing the amount of lawn on Loveless Lake

Two thirds believe that buffers, rain gardens, and native plants have a positive impact on the lake regardless of how many property owners participate (67%)

One quarter believe the impact is positive only if everyone participates (22%)







A Very Positive Note

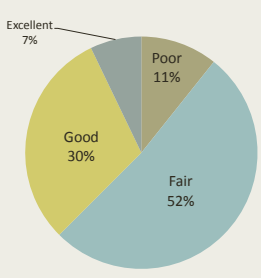
100% of survey respondents either don't use fertilizer (68%) or use phosphorus free fertilizers (32%)



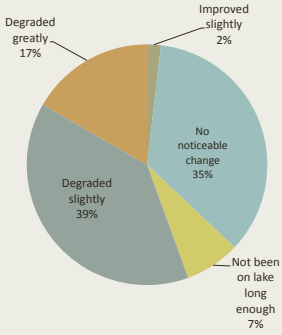


What is your degree of concern with each issue?	Rank
Excessive algae blooms	3.5
Expansion of current invasive species (curly leaf pondweed)	3.4
Lack of water clarity or quality	3.3
Decrease in overall lake health	3.3
Increased nutrient pollution	3.2
Excessive aquatic plant growth	3.2
New invasive species entering the lake	3.1
Loss of natural scenery/beauty	2.6
Decreased property values	2.6
Decreased fisheries	2.5
Increased development	2.5
Excessive noise level on the lake	2.4
Decreased wildlife populations	2.2
Unsafe use of motorized water craft	2.1
Disregard for slow-no-wake zones	2.1
Decreased lake level	2.0

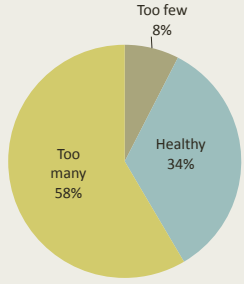
Current water quality



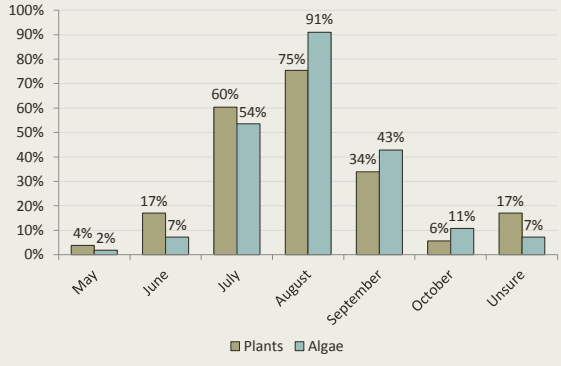
Change in water quality



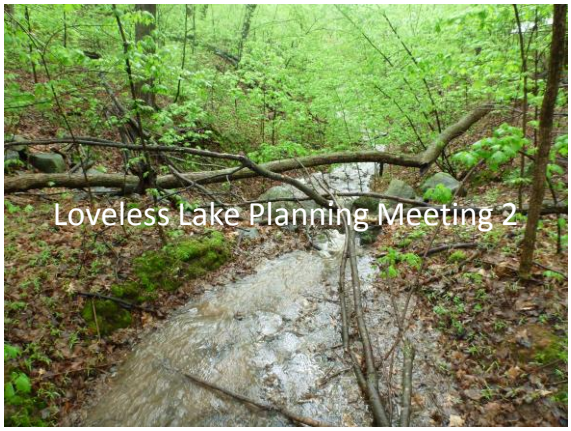
Amount of Aquatic Plants

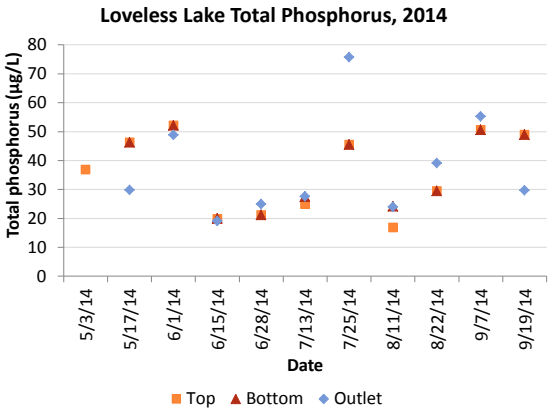


Which months of the season do you consider aquatic plant and algae growth to be problematic?

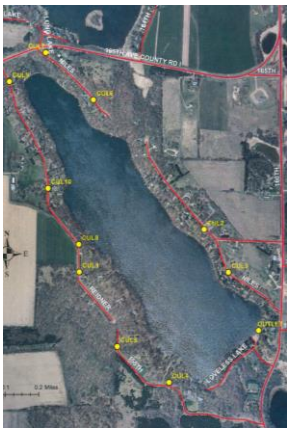


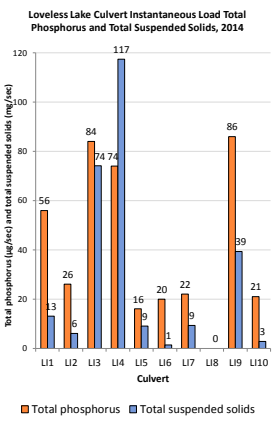
Should the following activities be completed by the Loveless Lake Association to manage the Lake?	Yes	No	Unsure
Programs to prevent and monitor invasive species	83%	2%	15%
Offering incentives for the installation of shoreline buffers and rain gardens	75%	4%	21%
Offering incentives to upgrade non-conforming septic systems	70%	6%	25%
Practices to enhance fisheries	64%	6%	30%
Offering incentives for the installation of farmland conservation practices	63%	12%	25%
Lake fairs and workshops to share information	60%	6%	34%
Enforcement of slow-no-wake zones	35%	37%	29%

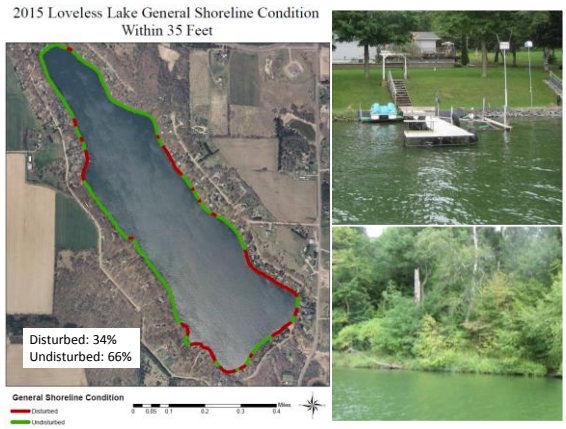

Loveless Lake Planning Meeting 2

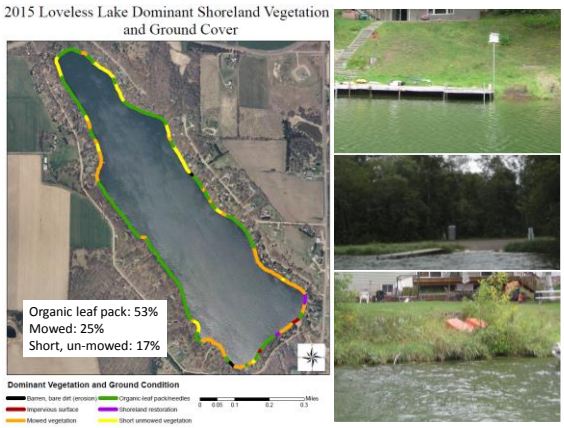

Loveless Lake Total Phosphorus, 2014
Total phosphorus (µg/L)
80
70
60
50
40
30
20
10
0
5/3/14
5/17/14
6/1/14
6/15/14
6/28/14
7/13/14
7/25/14
8/11/14
8/22/14
9/7/14
9/19/14
Date
Top
Bottom
Outlet






Loveless Lake Culvert Instantaneous Load Total Phosphorus and Total Suspended Solids, 2014
Total phosphorus (µg/sec) and total suspended solids (mg/sec)
120
100
80
60
40
20
0
56
13
26
6
84
74
74
117
16
9
20
1
22
9
0
86
39
21
3
LI1
LI2
LI3
LI4
LI5
LI6
LI7
LI8
LI9
LI10
Culvert
Total phosphorus
Total suspended solids

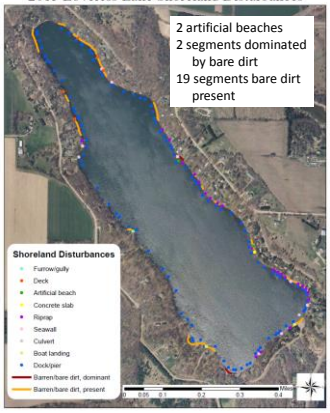

2015 Loveless Lake General Shoreline Condition Within 35 Feet
Disturbed: 34%
Undisturbed: 66%
General Shoreline Condition
Disturbed
Undisturbed


2015 Loveless Lake Dominant Shoreland Vegetation and Ground Cover
Organic leaf pack: 53%
Mowed: 25%
Short, un-mowed: 17%
Dominant Vegetation and Ground Condition

2015 Loveless Lake Tall Shoreland Vegetation

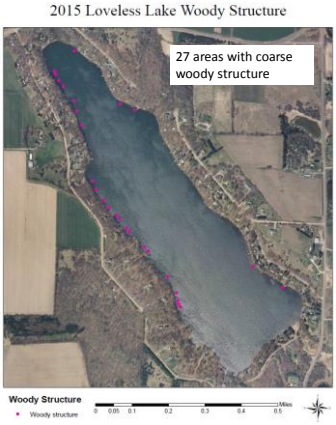


2015 Loveless Lake Shoreland Disturbances

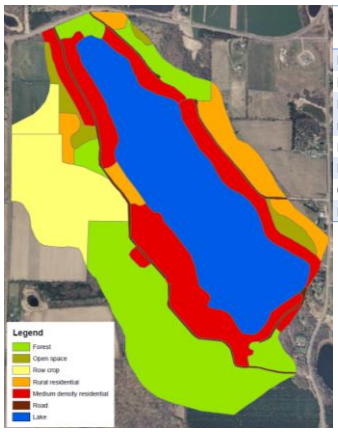




2015 Loveless Lake Woody Structure

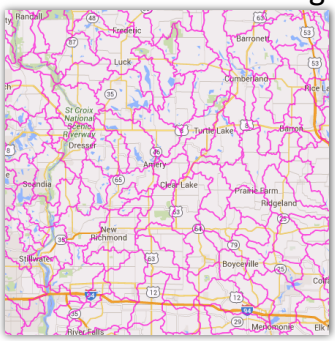


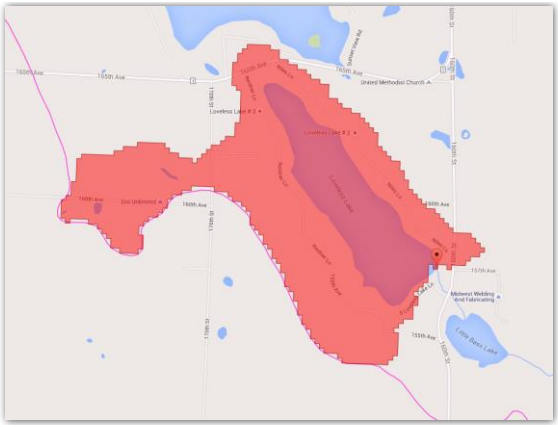


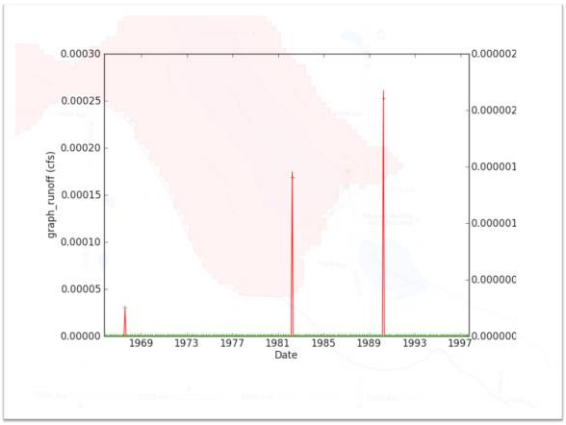


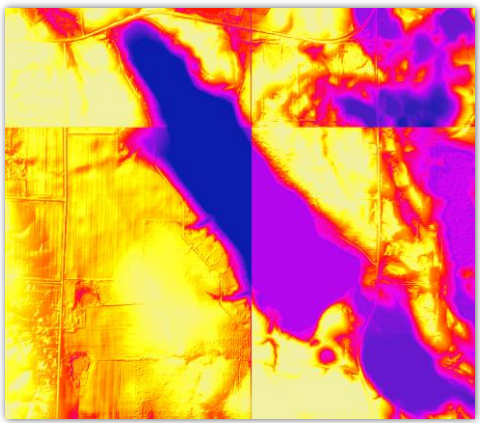
Land Use	Acres	Acres %
Lake	136	30%
Forest	116	25%
Medium density residential	90	20%
Row crop	59	13%
Rural residential	34	7%
Open space	13	3%
Road	9	2%

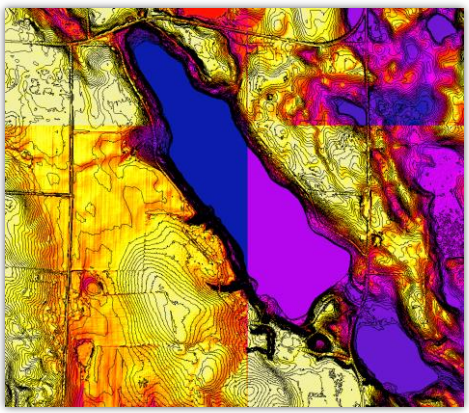
Watershed Modeling





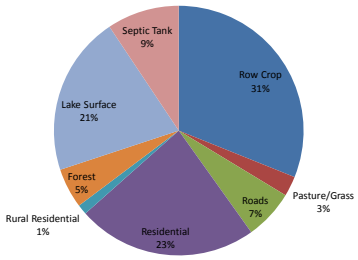








External Loading



Internal Loading



Nurnberg Model

$$P = \frac{L_{Ext}}{q_s}(1 - R) + \frac{L_{int}}{q_s}$$

Where $R = \frac{15}{18 + q_s}$

Canfield-Bachmann

1981 Natural Lakes Model

$$P = \frac{0.8L}{z\left(0.0942\,{}^{L}/_{z}{}^{0.422}\right) + p}$$

Vollenweider

1982 Combined OECD

$$P = 1.55\left[\frac{LT_w/z}{1 + \sqrt{T_w}}\right]^{0.88}$$

Vollenweider

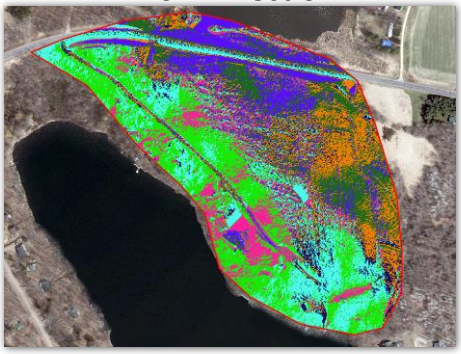
1982 Shallow Lake and Reservoir

$$P = 1.02\left[\frac{LT_w/z}{1 + \sqrt{T_w}}\right]^{0.88}$$

Digital Elevation Model



Flow Direction



Flow Accumulation



Culvert Watershed



Loveless Lake Management Plan Development
Committee Meeting 2

Tuesday, April 19th
10 AM -12 PM
Polk County Government Center, North Conference Room

10:00 Introductions

10:05 Develop vision statement, guiding principles, goals, objectives, and actions (all)

11:15 Presentation (Polk County Land and Water Resources Department)
- Loveless Lake bottom and culvert chemistry
- Loveless Lake shoreline inventory
- Loveless Lake land use
- Loveless Lake modeling

12:00 Adjourn

Next meeting: Thursday, May 5th, 10 AM – 12PM, Polk County Government Center

Katelin Holm
(715) 485-8637
katelin.holm@co.polk.wi.us

Jeremy Williamson
(715) 485-8639
jeremyw@co.polk.wi.us

Loveless Lake Management Plan Development
Committee Meeting 3

Thursday, May 5th
10 AM -12 PM
Polk County Government Center, North Conference Room

10:00 Introductions

10:05 Presentation (Polk County Land and Water Resources Department)
Nutrient Budget

10:35 Vision statement, guiding principles, goals, objectives, and actions (all)

12:00 Adjourn

Katelin Holm
(715) 485-8637
katelin.holm@co.polk.wi.us

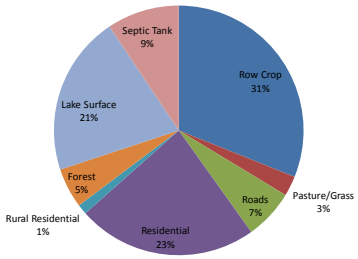
Jeremy Williamson
(715) 485-8639
jeremyw@co.polk.wi.us

Culvert Modeling





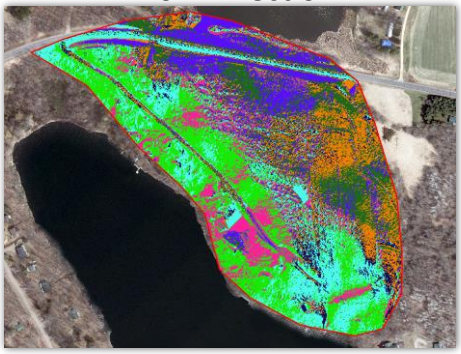
External Loading



Digital Elevation Model



Flow Direction

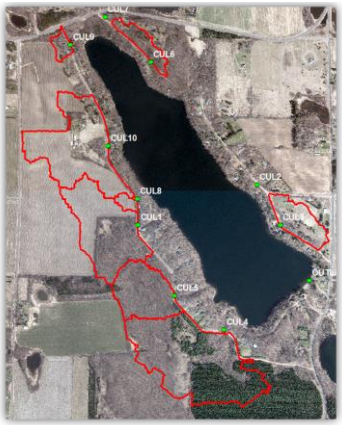


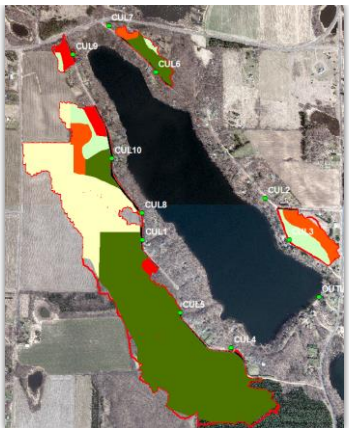
Flow Accumulation



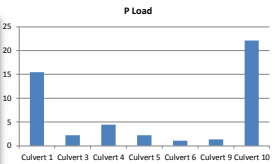
Culvert Watershed

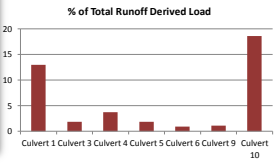


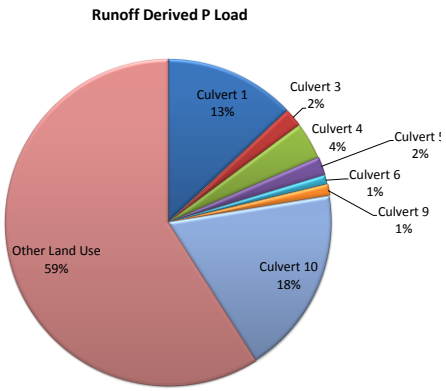


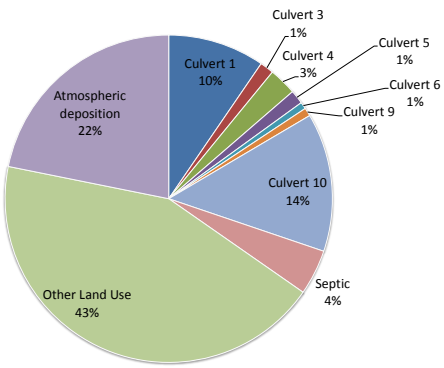


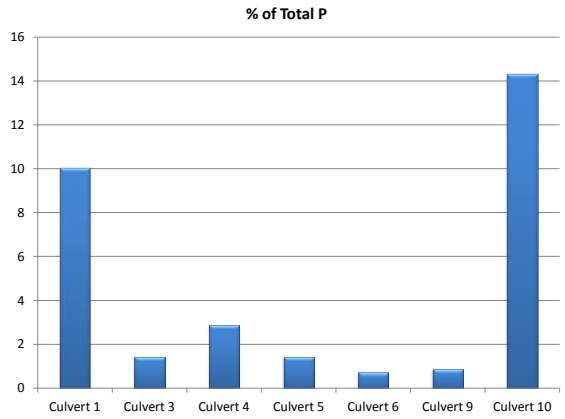












Vollenweider

1982 Shallow Lake and Reservoir

$$P = 1.02\left[\frac{LT_w/z}{1+\sqrt{T_w}}\right]^{0.88}$$

Questions?



Loveless Lake Management Plan Development Committee Meeting 4

Wednesday, June 8th
10 AM -12 PM
Polk County Government Center, County Board Room

10:00 Introductions

10:05 Review nutrient budget (Jeremy Williamson)

10:15 Complete goals spreadsheet (all)

12:00 Adjourn

Katelin Anderson
(715) 485-8637
katelin.anderson@co.polk.wi.us

Jeremy Williamson
(715) 485-8639
jeremyw@co.polk.wi.us

Appendix I

Newsletters

May 2013 Volume 19.1

Loveless Lake

Greetings from the President! Brett Ptacek

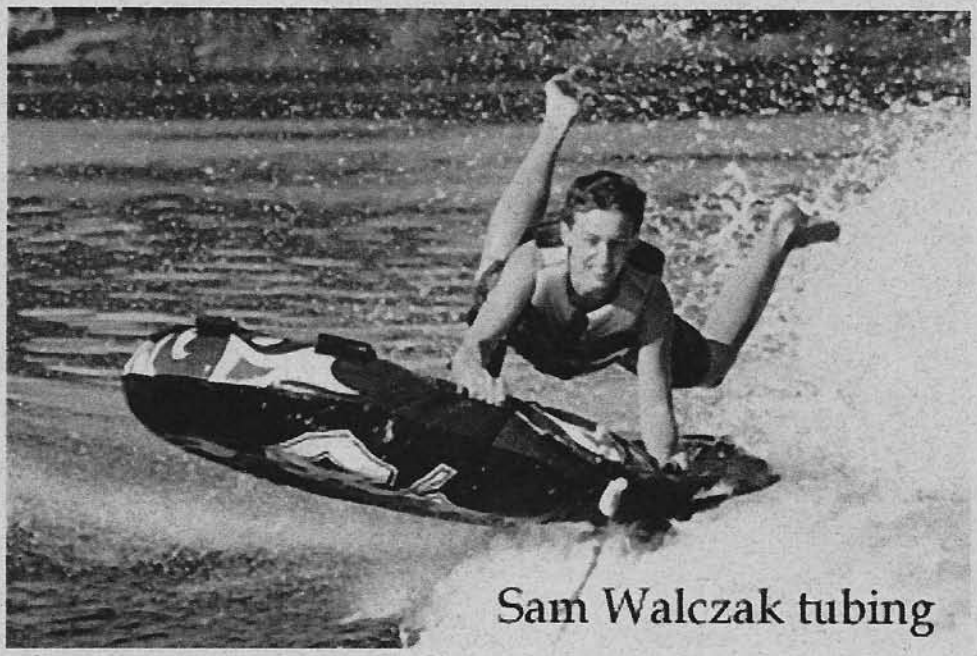


The winter that just wouldn't end..Western Wisconsin and Loveless Lake at its wildest. Just last year it was 80 degrees for St. Patty's Day, and this year May brings in solid ice for Loveless Lake and the faint whisper of more snow in the forecast.

Most of us are looking forward to the May 4th fishing opener; I trust your augers are in top condition? It appears the boats will have to wait a week or two, possibly even a month. With that said, at least our lake provided a bounty of bass and crappie for fishing this winter. A steady flow of ice anglers braved the frigid frost and found plenty of fish to fight. Everyone I've had the pleasure of speaking with had a good time on the lake this winter.

I see some summer faces reappearing and hear the cleaning and preparations around the lake. I trust everyone is looking forward to another beautiful summer on our beautiful Loveless Lake... I know I am. Let's hope the summer and fall will balance out the winter and spring we have endured.

Once again, I would like to personally extend an invitation to all Loveless Lake home owners who may be first time participants or regular contributors to join us for our association meeting on May 18th. Your support, concerns and comments are always welcomed. Your participation is what makes our association strong and relevant to the conservation and preservation of Loveless Lake and our properties. If you cannot make the meeting or simply just don't want to participate (that's okay) you can still have a positive impact on your property value and Loveless lake by making a tax deductible Lake contribution.



Sam Walczak tubing

Looking forward to a Great Summer with Great Neighbors on our Great Lake!

Brett

Wanted:
Email Addresses

If you have an email address and would like to be added to our list please email Debbie Cudd at: pndcudd@pressenter.com We will contact you via email regarding lake activity, information, and meeting updates. You may be emailed to report storm damage or a lost pet. Email addresses remain confidential.

Loveless Lake Meeting

Polk County Justice Center
Community Room

Saturday May 18th

9:00-10:30 am

Have you made your contribution for 2013?

This annual $20 donation is used for the preservation of our lake.

PLEASE MAIL TO:
Karen Peterson – Treasurer
2653 Oak Hills Drive
Rochester, MN 55902

News from your Neighbors

Three generations of the **Ken & Mae Mestad** family from Bloomington, MN celebrated 50 years of cabin life on Loveless Lake (Niles Lane) last August. Cottage living has changed significantly over the years but fortunately their little cabin built by Ken on a Scandinavian budget is much the same as it was in 1962.



The progress continues for the **Kohner Family's "Sommerbo"** at 1583B Niles Lane. The trailer was crushed, the old wooden structure was driven off the property, and their new vacation dwelling is under way. They now have plumbing connected to a new well and drain field, heat, and functional windows. The family is looking forward to the summer and hope the lake warms up before the 4th of July!! An invite is extended to inquisitive neighbors to stop by for a chat and check out the progress.



Michelle and Dave Benson celebrated their 30th anniversary with a trip to Hawaii, staying on the Big Island for 4 nights and on Maui for 6 nights. It was a great trip with a visit to Volcanoes National Park, lots of snorkeling, some whale watching, and a helicopter ride over West Maui and Molakai.



They returned home right before Easter hoping the lake would be losing its cover - no such luck!

Last fall the Benson's installed a wireless thermostat at the lake, which will keep them up to date on the inside temp, allowing them to raise the temp from a phone before they leave to go up, and contacts them by email if the inside temp drops below the set point. It paid off for them this year; they ran out of propane in February. The thermostat emailed them that it was getting cold inside and in less than three hours Dave was at the cabin, had an emergency propane fill, with everything back in working order. Very nice! If anyone is interested in the details they can contact the Benson's by email or pull them over on the lake to chat – if it ever melts.

What does the weary Upper Midwesterner do in February? Go South! **Kathy and Peter Frohnert** (1600 Reidner Lane) went South - way South - to meet up with our distant neighbors, see Antarctica and enjoy temperatures a bit higher than those at home. Crossing the gap between the Southern-most tip of South America and Antarctica was a "moving experience" with waves in excess of 36 feet but they made it and enjoyed their journey. It was a memorable experience for people used to the "wavelets" of Loveless Lake, WI.



Mommy Penguin feeding Junior

Rita Christenson's son, Justin, received his Eagle Scout Award February 24, 2013.



News from the **Dodge Lodge**: Dick & Jean's most exciting news this year is becoming GREAT grand-parents on April 27 to Evan Anthony Dodge. Jean wants to share a sure fire way to lose forty pounds – have your gallbladder out and go on a fat free diet! It worked for Dick last year and Jean is recuperating from her recent surgery. They live in Amery during the winter which makes it convenient for Dick to work on his projects at the lake while Jean plays bridge with friends at the senior center. Pat & Becky Dodge love being new grandparents to baby Evan. Becky recently bought a craft store in Bonduel WI, where she rents space to a variety of vendors while operating the store. They promise something for everyone. Check out their website: www.facebook.com/PeddlersPostBonduel. Their daughter, Melissa, received two first place finishes and a second place at the state level competition for Business Professionals of America (college level), qualifying her for her sixth trip to national competition, which is in Orlando FL.

The Mamer's enjoyed their fall visit to Bonita Springs, FL, spending 6 weeks in the gorgeous weather. Al had two back disc surgeries last fall, one in September that didn't work so had a redo in December. They were able to spend five weeks in Arizona during January and February, coming home with plenty of time to be a part of the wintry mix back in Wisconsin! They are anxious for spring to finally arrive and to spend some time at the lake, seeing friends once again!

CABIN FOR SALE:
1577A 160th Street. Beautiful east lot with walk down access to 100' of shoreline with WI watershed vegetation buffer to lake. 2 Bedroom/2 Bath home (1,100 sq/ft) and detached 24'X28' two car garage with enclosed storage area. Turn-key sale includes furniture and dock with boat lift. Private Sale. Contact Len & Margaret Hoffmann at (612) 532-8018 or (612) 532-0095.

Leone Frances Eichten

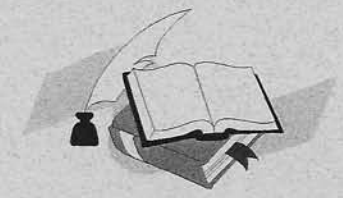
1623 Niles Lane
Age 73 ~ Of Bloomington
Passed away November 29, 2012 Survived by loving husband of 50 years, Don:



children, Ginny (Herb) Fox, John (Christi) Eichten, Mick (Beth) Eichten and Molly (Dean Karau) Eichten; grandchildren, Dani, Billy, Tom, Mike, Ali, Madi, Franny and Mathias; sisters, Pat Sheridan and Marie Stolpa.

PHOSPHORUS FREE – IT'S THE LAW! If you need to fertilize your yard this spring, please remember to use phosphorus-free fertilizer within 1000 feet of the lake. Phosphorus run-off in the lake is a leading cause of algae.





SPRING MEETING

Saturday, May 18, 2013
9 am – 11 am
Polk County Government Center, County Board Room, Balsam Lake

Agenda

1. Call to Order
2. Introductions
3. Approval of Minutes
4. Reports
   - Treasurer's Report
   - Presidents Report
   - Water Quality Report
5. Old Business
6. New Business
   - Elections
7. Questions, Comments, Announcements
   - Refreshments for Next Meeting
8. Adjournment

2012 LLA FALL MEETING MINUTES: 9/1/12

Submitted by Susan Barnes

Call to order by Jim Peterson (Brett was away, Peter not available) # of members in attendance – 21 Minutes from last meeting – unanimously approve. Treasurer's Report by Karen Peterson, Current balance is $7402.74, Transferred $5000 into a short term CD. Treasurer's report approved

Old Business:
Water Quality Report – Mary Walczak : Mary is part of the Wisconsin DNR Citizens Program and monitors Water Clarity, Phosphorus, Chlorophyll and Dissolved Oxygen in our lake throughout the summer. Water Clarity was measured at 2 feet at the end of August, the worst reading since she started. It is usually at about 4 feet right now. Record high water temps this summer – 89 degrees reported in early August

Catch Basin Update (Reidner Lane). Ted Bauer had it cleaned out but county tore off the cap designed to keep vegetation out this summer. We need to police the discharge area. Michele Benson mentioned that Deer Lake is buying up farm land surrounding the lake to protect it – something we should think about

By-laws - Lane Burke submitted the following changes: Meetings to be held on the Saturday before Memorial Day and the Saturday of Labor Day weekend. Meetings will be held at the Polk County Justice Center. Unanimously approved

Party Update – Judy. Party was a success. 50+ people attended. Jeff and Darlene Creuzer hosted. Flyers in mailboxes is illegal – next year we will send emails and put up signs 2 weeks before picnic. Use meeting signs with insert.Motion unanimously approved

Walking Path Update. No issues. Lane has spoken with the new home owners to assure they are OK with walkers. Reminder to stay on the easement property

New Business:
Wildlife. Loons have not been seen in several weeks. Most likely due to water clarity since they hunt by sight. Ospreys have been seen as well as several eagles. Bears have been in the area

Facebook Page – Lovlesslake (no e in loveless). Brett will look into creating a website

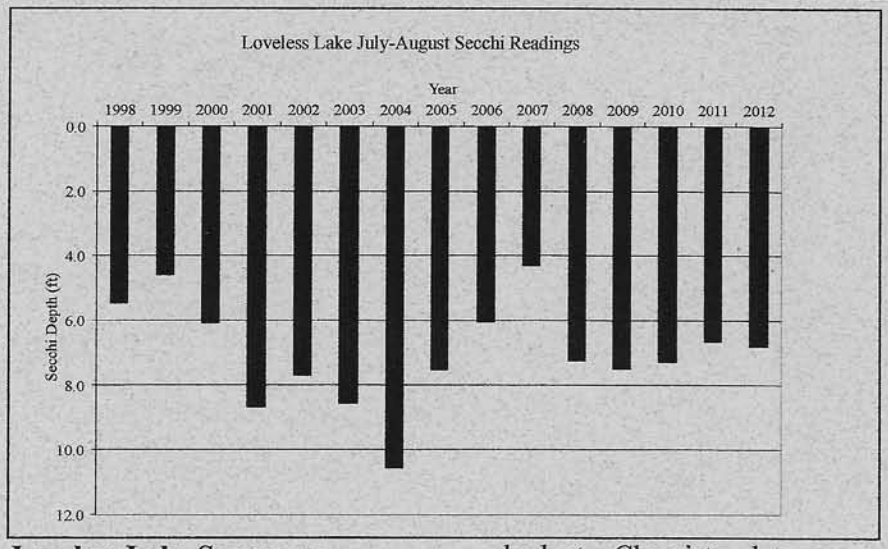
Stocking - Brett has met with county about stocking – they will do an analysis and make recommend-ations. Bret will update at the Spring meeting. Judy was told they will not stock Walleye.

Refreshments for next meeting – Kathy Donnelly. Thank you to Roger and Sharon for bring refreshments today

New neighbors – please talk to new neighbors about coming to the meetings. Reminder that Lane has packets for all new neighbors.

The Mestad's cabin (1641 N Niles) celebrated 50 years on the lake – congratulations!

Meeting adjourned



Loveless Lake Summary Report – Summer 2012 - Submitted by Mary Walczak - walczak@stolaf.edu

As part of the Wisconsin Citizen Lake Monitoring Network, I monitor the water quality of Loveless Lake throughout the season. Water clarity (Secchi Disk), temperature, chlorophyll levels, dissolved oxygen and total phosphorous are all monitored during the summer months.

The average summer (July-Aug) secchi disk reading for Loveless Lake - Deep Hole in 2011 was 6.83 feet. The average for the Northwest Georegion was 7.5 feet. Historic Secchi depth readings for Loveless Lake shown in the graph. Typically the summer (July-Aug) water was reported as **MURKY** and **GREEN**. This suggests that the secchi depth may be mostly impacted by algae. Algal blooms are generally considered to decrease the aesthetic.appeal of a lake because people prefer clearer water to swim in and look at. Chemistry data was collected on Loveless Lake – Deep Hole. The average summer Chlorophyll was 60.1 µg/L (compared to a Northwest Georegion summer average of 110.7 µg/L). The summer Total Phosphorus average was 62 µg/L. Lakes that have more than 20 µg/L and impoundments that have more than 30 µg/L of total phosphorus may experience noticable algae blooms. For comparison, the chlorophyll and the phosphorous levels in 2012 were 29.7 µg/L and 34.5 µg/L, respectively.

The overall Trophic State Index (based on chlorophyll) for Loveless Lake - Deep Hole was 66. The TSI suggests that Loveless Lake - Deep Hole was **eutrophic**. This TSI usually suggests decreased clarity, fewer algal species, oxygen-depleted bottom waters during the summer, plant overgrowth evident, warm-water fisheries pike, perch, bass, etc.) only.

NEWSLETTER NOTICE – Your input is needed and appreciated! Do you have news, articles, and stories, "For Sale" items or photos to share? Send them to Debbie Cudd at pndcudd@pressenter.com or mail to Debbie Cudd, 223 N 4th Street, River Falls, WI 54022.

REPORT VIOLATIONS:
Wildlife, recreational, and environmental.
1-800-TIP-WDNR
(1-800-847-9367)

Did You Know ?

The Polk County Land & Water Resources Department can help you with issues and projects that affect your property at the lake: 1) apply for grants and technical assistance to landowners and various entities for conservation projects. 2) Review, approve designs and supervise habitat /shoreline restoration projects. 3) Engineering: construction survey, design, layouts, bids, cost estimates, checks and certification. 4) Easements Check their website for a full list of programs and conservation efforts: www.co.polk.wi.us

Polk County has a great website with an abundance of information. There is a monthly calendar of fun things to do: festivals and local activities, area attractions, Wisconsin birding hotspots and more. Plus it includes lists of important phone numbers that you may need in the area. http://www.wisconline.com/counties/polk/events.html

On the Look-out for AIS (Aquatic Invasive Species)

Where do you go and what do you do if you find something "odd" in our lake and you think it might be invasive? The Wisconsin Department of Natural Resources (DNR) has created a website http://dnr.wi.gov/lakes/ais/whattodo/ for folks to find out just what to do, and where and/or how to send a specimen.

The 2nd Annual Loveless Lake Summer Social and Picnic, sponsored by LLA, will again be hosted by Jeff & Dar Creuzer at 1614 Niles Lane this summer. The date and picnic details are yet to be determined.

The 2013 Northwest Wisconsin Lakes Conference will be held Friday, June 21 at the Spooner High School, Spooner, WI. This conference is one of Wisconsin's premier lake events. The all day program is an opportunity for lake enthusiasts, local government officials and other interested in protecting our water resources to take in a number of educational presentations, visit informative exhibits, and network with conference attendees. Keynote address and breakout session topics include aquatic plant management, enforcing shoreline laws, changing water levels, aquatic invasive species, lake science & wildlife, lake policy and more. Register online at: www.wisconsinlakes.org or pick up a brochure at the Loveless Lake association meeting.

LAKE NOISE CONSERVATION

Minimize unnecessary noise and help keep a healthy retreat on your lake for wildlife and humans. Any noise around lakes is greatly amplified as it travels over water. Noise stresses animals and birds, which may force them to leave for quieter places. Respect your neighbors on the lake who may prefer nature and peaceful times. It is recommended that lakes have a quiet time. Be thoughtful, and avoid disturbing your neighbors and the wildlife. Typical disturbing noises: Yard equipment, noisy boats/watercraft, continually barking dogs, loud parties/events, loud music playing, firecrackers/guns, noisy vehicles.

Ice out record set!

We have been keeping Ice-out records for 33 years, and this year we had the latest Ice-out recorded. May 7, 2013.

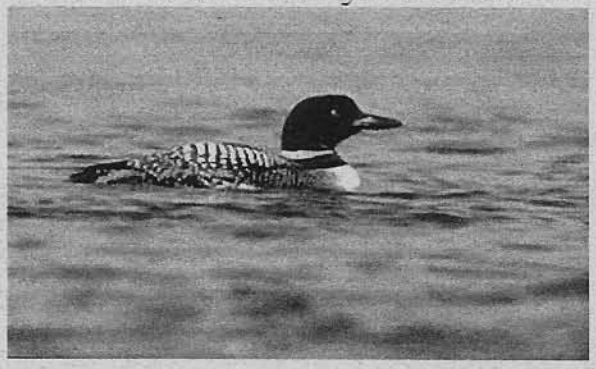
ICE OUT!

Year	Date	Year	Date
1980	4-18	1997	4-18
1981	4-31	1998	4-30
1982	4-22	1999	4-4
1983	4-12	2000	3-19
1984	4-13	2001	4-15
1985	4-10	2002	3-16
1986	4-8	2003	4-13
1987	3-25	2004	4-10
1988	4-8	2005	4-8
1989	4-21	2006	4-9
1990	4-11	2007	3-31
1991	4-6	2008	4-24
1992	4-9	2009	4-9
1993	4-18	2010	3-29
1994	4-10	2011	4-14
1995	4-15	2012	3-20
1996	4-25	**2013**	**5-7**

Advice From a Loon

Spend time at the lake ~ Enjoy a good swim
Call your friends ~ A little color goes a long way
Surround yourself with beauty ~ Enjoy time alone
Dive into life!

- Your True Nature - www.yourtruenature.com



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223 N 4th Street, River Falls, WI 54022 pndcudd@pressenter.com

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1594 Reidner Lane, Centuria, WI 54824 lanelane@yahoo.com

LOVE
LANE E
1594 RE
CENTURIA, WI 54824

USA
Equality
FOREVER

Eau Claire, WI 54703
WED 08 MAY 2013 PM

SUSAN AND ED BARNES
478 HOLLY AVENUE
ST. PAUL, MN 55102

Loveless Lake



REMINDER !

LOVELESS LAKE
ASSOCIATION MEETING !
POLK COUNTY JUSTICE
CENTER IN BASAM LAKE
-COMMUNITY ROOM-
9am - 10:30am,
Saturday, May 18th

August 2013 Volume 19.2

Loveless Lake

Greetings from the President! *Brett Ptacek*



This summer on Loveless Lake started later than most of us would have liked, but hopefully all enjoyed it that much more and I'm sure you are still making the most of every minute of it. It was nice to see everyone who participated in our annual summer picnic party. The food was great and the company even better. Please mark your calendars and join us all next year at the 3rd annual party.

Moving on quickly to the fall season and business at hand, I would like to invite everyone on the technological advancement of the Loveless Lake Association Website, and with that it brings to mind a quote from Albert Einstein..."It has become appalling clear that our technology has surpassed our humanity" or at least in my case the time to surpass the technology... the weather has been far, far too nice on the weekends I actually have been home to enjoy it. In either case, our Loveless Lake website can be found at Lovelesslake.org. It is our first step and the site will evolve over the next several months. Check-in periodically to see the progress and offer your ideas and suggestions.

In closing I would like to quote the great Vince Lombardi . . . . . "People who work together will win, whether it is against complex football defenses or the problems of modern society". And on that bit of wisdom, I would like to personally extend an invitation to all Loveless Lake home owners who may be first time participants or regular contributors to join us for our fall association meeting. Your support, concerns and comments are always welcomed and important to the conservation and preservation of Loveless Lake and our properties. If you cannot make the meeting or simply just don't want to participate (that's ok) you can still have a positive impact on your property value and Loveless lake by making a tax deductible Lake contribution.

Looking forward to another beautiful fall with all of you on Loveless Lake!

Brett



The Loveless Lake picnic was again a great success! A special thanks to Jeff and Darlene Crueuzer for hosting.

Loveless Lake Meeting

Polk County Justice Center Community Room

Saturday August 31st

9:00-10:30 am

News from your Neighbors

Richard (Dick) and Jean Dodge of Amery, WI celebrated their 60th wedding anniversary on August 10, 2013, at their lake home on Loveless Lake in Centuria. They were married August 8, 1953, in Staples, MN. Jean and Dick have 5 children: Jody (John) Halliday, Osseo, MN; Pat (Becky) Dodge, Green Bay, WI; Terri (Jerry) Grant, Rogers, MN; Mary (Rich) Kranick, Wichita, KS; and Dan (Liz) Dodge, Apple Valley, MN. They have 11 grandchildren: Kati and Sam Halliday, Carl (Amanda) and Melissa Dodge, Elizabeth and Jean Cormack (Terri Grant) and Sarah, Mary and Matthew Kranick, Allison and Tyler Dodge. They were just blessed with their first great-grandchild, born in May, 2013. Evan is the son of a very proud Carl and Amanda Dodge and grandson of Pat and Becky Dodge. Jean and Dick spent most of their married life in Wisconsin Rapids, WI, after starting out in Amery, WI. Dick taught and coached in the middle school while Jean taught third grade. They lived in a large house on the Wisconsin River. Both are enjoying their retirement years with family and friends on the lake in the summer and in Amery in the winter.

For the **Peissig family** this has been the year of the lost summer, oh it actually started last fall. The canopy cover for our boat lift was getting pretty tattered so it went to that big boat cover place in the sky (a dumpster). That was so it would not try to get back on the lift in the spring. Then when we serviced the motor we found moisture in the lower unit - well let's wait till spring and then get this fixed. One thing led to another and a new cover had to be special ordered which took some time and the boat was in the shop waiting for a seal kit for the lower unit. Now it's getting to be Memorial weekend and we still don't have a boat in the water or a cover on the lift. Pretty soon it's closing in on the 4th of July. All is well now, and it's almost time to shut down. One thing we did learn from this experience is that if you are late enough all the birds will nest in somebody else's boat lift.

It wasn't quite love at first sight when we first stumbled onto the overgrown and troubled property at Loveless Lake almost three years ago, but it was pretty close. Sure there were two rotten boats in the driveway, and more trash than you could imagine strewn across the land and inside the cabin – which had a busted out picture window, a gaping hole in its moss-covered roof and an enormous tree trunk splayed across the rickety deck.

But the lake was clear, the trek from our homes in the Twin Cities was manageable, and we figured all it would take was a strong stomach and fortitude to clean up the land. (Thank goodness my mate, Chris, had the strong stomach and fortitude.) And then, in an act of good timing (and a bit of a wild hair) I bought a prefab "glass house" that had been sitting on a frontage road in Siren for a number of years waiting for the right buyer. Suddenly, I found myself hiring a crane driver to haul it down Wisconsin Hwy. 35 and drop it onto my foundation.

Despite the lovely glass house upstairs, we are years away from having a finished place. We just say that we're on "Loveless Time," and that's just fine. We're more interested in spotting the eagles, listening to the loons and catching a bass or two than hanging drywall. (Though it would be nice to have that behind us, too.) This whole experience of trying to "do right" by Loveless Lake – cleaning up the land, restoring the lakeshore and being good neighbors -- has been a wondrous and rewarding adventure that is still unfolding. Please stop by and say hello when you're walking by. We'd love to show you around. – *Jackie Crosby*





Upcoming Local Events:

8/31/13: Outdoor Movie Night, Balsam Lake Rod & Gun Club; free admission; donations accepted; concessions available; bring your own blanket/chair; contact: Linda Heimstead, 715-485-3215

9/1/13, 10am-4pm: 2nd Annual Cruz In' Fest, Balsam Lake (various locations); Stop in, have a drink and receive one card at 5 of 10 different local bars to build your poker hand; contact: Nick Walton, 715-557-0211

The Balsam Lake Farmers Market is open Friday afternoons from 3PM-5PM, through October 11 at Our Lady of the Lakes Catholic Church parking lot, 507 Main Street-Hwy 46, Balsam Lake. It's a great time to take advantage of fresh homegrown produce.

2012 annual $20
DUES/DONATIONS
for **Lake Preservation**

Please pay at the Fall meeting or mail to our Treasurer.

If you can not attend the lake meetings, or wish not to join the Association, you can still contribute to the lake preservation by mailing your donation to the Treasurer.

Karen Peterson
2653 Oak Hills Drive SW
Rochester, MN 55902

Did you know?

Polk County is home to three wineries:

Chateau St. Croix Winery & Vineyard
1998A State Rd. 87
St. Croix Falls, WI 54024
1-866-654-9463
www.chateaustcroix.com

Dancing Dragonfly Winery
2013 120th Ave.
St. Croix Falls, WI 54024
1-715-483-WINE
www.dancingdragonflywinery.com

Autumn Winery
1385 220th Ave.
Milltown, WI 54858
1-715-825-4434
larsavl@lakeland.ws

Wanted: Current Email Addresses

If you have an email address and would like to be added to the Loveless Lake association list or have a change to your current email address, please notify Debbie Cudd at pndcudd@pressenter.com. You will be contacted twice a year to request newsletter submissions. We may also contact you for notification of special meetings, or a storm damage emergency notice, etc.

Newsletter Submissions

Your input is always needed, encouraged and appreciated!

Do you have news, articles or stories, "for sale" items or photos you can share for our bi-annual newsletter? You can send them throughout the year to Debbie Cudd at pndcudd@pressenter.com or 223 N 4th Street, River Falls, WI 54022. *Digital files are preferred.*



Advice from a Moon
Live life to the fullest
Be someone to look up to
Don't be phased by difficulties
Take time to reflect
Enjoy a little space
Honor the cycles of nature
Light up the night!

- Your True Nature
www.yourtruenature.com

PHOSPHORUS FREE PLEASE!

Just a reminder if you are fertilizing your yard this spring to obey the ban on phosphorus fertilizers within 1000 feet of the lake. By using phosphorus-free fertilizer, weed-and-feed, or crabgrass killer, shoreline property owners can dramatically reduce the phosphorus loading into our lake. Why phosphorus-free fertilizer? Consider this: One ton of dairy cow manure contains about 3 pounds of phosphorus. A 40lb bag of 10-10-10 lawn fertilizer contains 5 pounds of phosphorus. Dramatic but true.

Editor: Debbie Cudd
223 N 4th Street, River Falls, WI 54022
pndcudd@pressenter.com

Publisher: Lane Burke
1594 Reidner Lane, Centuria, WI 54824 –
lanelane@yahoo.com



August 31, 2013
MEETING AGENDA
9 am – 10:30 am
Polk County Government Center, County Board Room, Balsam Lake
Agenda
- Call to Order
- Introductions
- Approval of Minutes
- Reports
  - Treasurer's Report
  - Presidents Report
  - Water Quality Report
- Old Business
- New Business
- Elections
- Questions, Comments, Announcements
- Refreshments for Next Meeting
- Adjournment

2013 SPRING MEETING MINUTES – May 18, 2012
Submitted by Susan Barnes

Call to order by President Brett Ptacek - # of members in attendance – 23

- Minutes from last meeting – unanimously approved. Treasurer's Report by Karen Peterson. Current balance is $2269.76, with $5000.00 in a CD. Treasurer's report approved.

Old Business
- Water Quality Report – Mary Walczak. Mary is part of the Wisconsin DNR Citizens Program and monitors Water Clarity, Phosphorus, Chlorophyll and Dissolved Oxygen in our lake throughout the summer. Nothing new to report. Phosphorus levels are high. We are looking for volunteers to help Mary do more Secchi disk readings. She will look into getting a second secchi disk.

- We must continue to work on lake shore restoration. Native plants with deep roots are key to keeping lake healthy. Some residents noticed that the lake water has not been very clear since ice out on May 7. Is there a correlation between ice out dates and water clarity? It was noted that the lake flips 2 – 3 days after ice out and that the chunks of old algae floating in the water could be from this.

- PCCLAR Update. Blaine and Brett will cover meetings. Motion to become a member. Seconded and approved. Must become a district to take advantage of grant money, etc. Deer Lake has done this and is buying up farmland around the lake. Agreed that we are not looking to become a district at this time. Motion to have PCCLAR representative come to our Fall meeting to make presentation on how we can all help keep the lake healthy. Seconded and approved.

- Catch Basin Update (Reidner Lane). Cover was broken when the county thrashed the brush along the road. Brett will call Township chairman, Brad Mabry (715) 485-3844) to see about getting it repaired.

- By-laws review. Meetings to be held on the Saturday before Memorial Day and the Saturday of Labor Day weekend. Meetings will be held at the Polk County Justice Center. Elections: 2 year terms. Treasurer and Vice President elected at Spring meeting, President and Secretary at the Fall meeting. Treasurer – Karen Peterson graciously volunteered to be treasurer for another 2 years and was unanimously approved.

- Party Update. Party for 2013 unanimously approved. Jeff and Darlene Creuzer (1614 Niles) have agreed to host again. Motion approved for party committee to be formed. Blaine and Jeff will head up the committee and are looking for volunteers to help. Party date is August 10 at 4:00. LLA will provide meat. Everyone is asked to bring a dish to share and their own beverages. Susan will make postcards and mail to everyone on the lake. Lane will make labels. Motion unanimously approved.

- Garage Sale. Garage Sale date is July 13th. Anyone interested in holding a sale on that date, please contact Becky Christopherson and she will direct customers your way.

- Walking Path Update. No issues. Lane has spoken with the new homeowners to assure they are OK with walkers. Easement path is blocked but homeowners are OK with walkers using a short part of their driveway to pick up the path again

New Business
- Website - Moving ahead with developing a Loveless Lake website. Committee set up to develop – Brett Ptacek(chair), Susan Barnes and Mary. LovelessLake.org is available. Mary's brother can help design the site. Blaine proposed a $100 per year expenditure for developing and maintaining the website. Unanimously approved.

- Stocking - Bret has met with county about stocking – he will bring prices and recommendations to the fall meeting. We will vote at the Fall meeting on whether to move forward with stocking the lake. The DNR used to stock for free but due to budget cuts and the size of our lake we have been cut from the stocking list for the last 10 years.

- Cabin Life Magazine contacted Debbie Cudd about being part of their Lake Association Spotlight. Discuss at Fall Meeting.

- Thank you to Kathy Donnelly for bringing the refreshments. Refreshments for next meeting – Paul Furrer.

- New neighbors – please talk to new neighbors about coming to the meetings. Reminder that Lane has packets for all new neighbors. Welcome new neighbors Vicki Scarta at 1603 Niles and Jackie Crosby at 1632 Reidner.

- Meeting adjourned.

REPORT VIOLATIONS:
Wildlife, recreational, and environmental.
1-800-TIP-WDNR
(1-800-847-9367)

Keep Your Cabin Safe

Whether you are renting your cabin out to strangers, sharing it with relatives, or leaving it unoccupied until your next visit, you want to make sure it is safe. Windows and doors are the top two points of entry for residential/cabin burglaries. Forty percent of these burglaries are termed "no force" entries which means the burglar entered through an unlocked door or window. Here are a few tips to help keep your cabin safe.

- Make sure all of our doors and windows are securely locked when you leave.
- Illuminate all entrances (motion-sensored lights work well). Most intruders will not target a well-lit residence/cabin. Keep an indoor light on a programmable timer to show the appearance of someone being home.
- Install an alarm system which, when tripped, emits a loud sound bringing attention or law enforcement to the area.
- Make sure that valuables are out of sight, and use window shades/curtains that don't allow prying eyes to see what is inside.
- Keep all outdoor items picked up and put away. If you do not have storage space for your boats or larger outdoor equipment make sure you record the serial numbers, take pictures of them, and lock/chain them to secure objects.

Burglars usually spend under 60 seconds attempting to gain entry into a home. The more difficult you make your residence/cabin to enter, and the less visible you make your possessions, the greater the chance an intruder will just move on to an easier target.

LAKE NOISE CONSERVATION

Minimize unnecessary noise and help keep a healthy retreat on your lake for wildlife and humans. Any noise around lakes is greatly amplified as it travels over water. Noise stresses animals and birds, which may force them to leave for quieter places. Respect your neighbors on the lake who may prefer nature and peaceful times.

It is recommended that lakes have a quiet time. Be thoughtful, and avoid disturbing your neighbors and the wildlife. Typical disturbing noises: Yard equipment, noisy boats/watercraft, continually barking dogs, loud parties/events, loud music playing, firecrackers/guns, noisy vehicles.

Improper Speed or Distance

It is illegal to:

Operate a vessel at a distance from other vessels or at a speed that exceeds safe and reasonable limits given the waterway traffic, marked speed limits, weather, and other boating conditions.

Operate a vessel repeatedly in a circuitous manner within 200 feet of another vessel or person in the water.

Operate a vessel within 100 feet of the shoreline, any dock, raft, pier, or restricted area on any lake at greater than "slow, no wake speed."

Operate a vessel at greater than "slow, no wake speed" within 100 feet of a swimmer.

Operate a Personal Watercraft (PWC) faster than "slow, no wake speed" within 100 feet of any other vessel; 100 feet of a dock or raft; 200 feet of shore; 100 feet of a tow rope or person being towed.

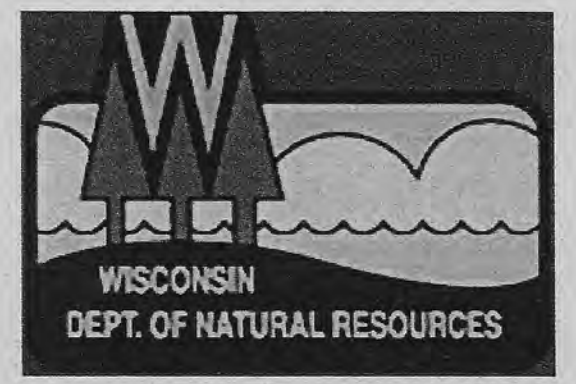
Vessels towing persons may not come within 100 feet of other vessels, or persons in the water, a swimming area, or a public boat landing.

Mufflers and Noise Level Limits

Vessel operators may not hear sound signals if the engine is not adequately muffled.

The exhaust of every internal combustion engine on any vessel must be effectively muffled. That is, the engine's exhaust must be muffled or suppressed at all times so as not to create excessive noise.

It is unlawful to operate a vessel that exceeds a noise level of 86 dBA. The use of cutouts is prohibited



LOVELESS LAKE NEWSLETTER
LANE BURKE
1594 REIDNER LANE
CENTURIA, WI 54824

EAU CLAIRE, WI
PM

USA FOREVER

SUSAN AND ED BARNES
478 HOLLY AVENUE
ST. PAUL, MN 55102

55102822O6 C003

Loveless Lake

REMINDER !

LOVELESS LAKE

ASSOCIATION MEETING !
POLK COUNTY JUSTICE
CENTER IN BASAM LAKE
-COMMUNITY ROOM-
9am - 10:30am,
Saturday, August 31st

May 2014 Volume 20.1

Loveless Lake

Greetings from the President!

Brett Ptacek

They say a harsh winter equals a much anticipated and favorable warm summer. I'm all in for a warm and safe summer and wish all of you the same! Let's continue to keep our lake, guests and residents safe and sound this season. One great way to do that is to understand and respect Wisconsin's water safety rules, regulations and or their educational courses which can be found at www.boat-ed.com/Wisconsin. One of those safety rules is the 100-200 feet No Wake Zone, which serves to not only keep all water goers safe, but also to preserve our valuable natural resources at home here on Loveless Lake.

Since I last wrote to you our Loveless Lake Association (Lake Team) has been busy working with our Polk County Land and Water Resources Department and has been awarded a significantly large grant. Congratulations to all! This grant will help quantify our most potentially hazardous run off contributors and is a step closer to us being able to preventatively control the risks and ensuring our futures most valuable resources, (Loveless Lake). Please do your part! Keep a stringent eye out for your copy of the Lake Survey. Please take the time to fill it out and return it. All Lake occupants, Lake Association members or not, will receive one.

Participation in the Lake Association is not mandatory, but your tax detectable membership contribution and/or your participation in any manner are always greatly appreciated! All are welcome to join us at our annual spring meeting. By working together we can maintain and improve the quality of Loveless Lake and the value of our properties. Want to make a difference or contribute? Contact me at bzptacek@gmail.com to learn how you can help.

In closing, let's keep a look out and have respect for all fellow water goers as we all help maintain a safe, ecological green, and enjoyable season.

Happy summer,

Brett

Wanted: Updated Contact Information

Please notify us of any changes to your address, phone and email. As landlines are eliminated, it is important that we have your current information. By sharing your email address with us we will contact you bi-annually with a request to submit news for the newsletter, for notification of special meetings or as an emergency contact in case of storm damage. If you have an email address and would like to be added to the association list please send it to Debbie Cudd at pndcudd@gmail.com.

Have you made your contribution for 2014?

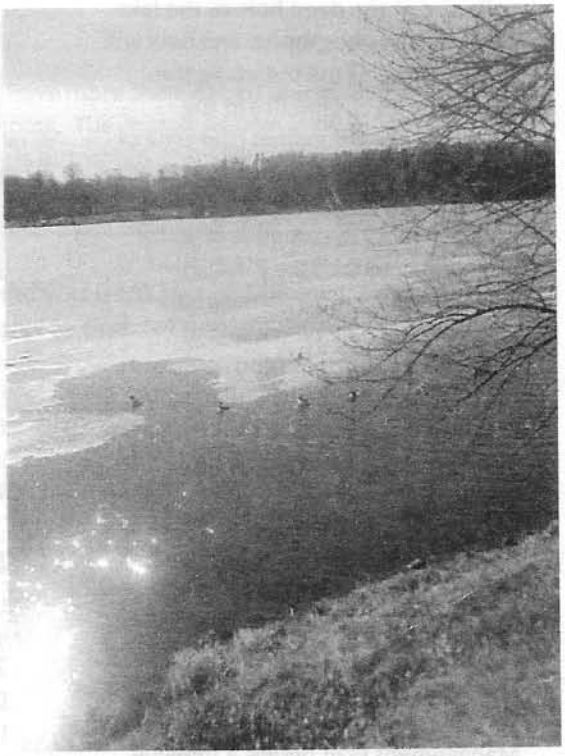
This annual $20 donation is used for the preservation of our lake.

Please mail to:
Karen Peterson --Treasurer
2653 Oak Hills Drive
Rochester, MN 55902

Loveless Lake Spring Meeting!

Polk County Government Center,
County Board Room
Balsam Lake, WI

Saturday, May 17, 2014
9:00-11:00 AM



Ducks on Lake with Ice

Photo submitted by Rita Christianson

Water Quality Study: Volunteers Needed!



With the onset of spring, the Land and Water Resources Department (LWRD) is gearing up to begin an intensive one year study on Loveless Lake. The study is funded by a Wisconsin DNR grant with match being provided by volunteer and staff time. The purpose of the study is to collect data to provide information on the water quality of Loveless Lake. Dissolved oxygen, temperature, clarity (measured with a secchi disk), phosphorus, and chlorophyll (an indicator of algae) data will be collected at the deep hole of the lake. Additionally, phosphorus and flow will be measured at the outlet. At the landscape level, land use in the Loveless Lake watershed (the area of land that drains to Loveless Lake) will be determined. Additionally, after rainfall events the amount of water discharging to the lake through culverts will be determined and a water sample will be taken and analyzed for nutrients and sediments. Combined, this data will be used to determine areas where best management practices can be installed to improve the water quality of Loveless Lake. After all the data has been collected and analyzed, an action committee made up of lake residents and stakeholders will meet to review the data and develop a Lake Management Plan, including goals, for Loveless Lake. A typical Lake Management Plan details a timeline, funding sources, and responsible parties to ensure that progress towards goals are achieved. Results from the Loveless Lake Property Owner Survey (enclosed with this newsletter) will be used to guide the Lake Management Plan so don't forgot to fill it out your survey and return it to LWRD. Volunteers are critical to the success of this project! A number of members have already signed up to volunteer for this project. Thank you to everyone who has already volunteered! Volunteers will help to monitor lake level and precipitation, collect stormwater samples, determine the health of the shoreline of Loveless Lake, and serve on the action committee to develop goals for Loveless Lake. It's not too late to sign up to help with this project! Plan to attend the Loveless Lake Spring Meeting at the Polk County Justice Center on May 17 at 9am to learn more about the Loveless Lake Study and how you can get involved.



Contact Katelin Holm [katelin.holm@co.polk.wi.us, 715-485-8637] or Jeremy Williamson [jeremyw@co.polk.wi.us, 715-485-8639] with LWRD for more information or to sign up to volunteer.

Lane Burke

Lane Burke, 63, of Centuria, WI, died in a car accident on November 8, 2013. He was born March 28, 1950 in Duluth, to Glenn and Adele Burke. Lane graduated from Duluth Central High School in 1968, and from the University of Minnesota, Duluth with a Bachelor of Science degree (Carpentry) in 1977, and a Masters of Safety degree in 1979. Lane was a member of the Boys Scouts of America and earned the rank of Eagle Scout in 1967. Lane was a member of the Minnesota National Guards for 10 years. He worked for the Duluth Missabe and Iron Range Railway for 17 years, working his way up from carpenter to Safety Supervisor. He was Safety Manager for Gillette Manufacturing in St. Paul for four years, and Safety Manager for The St. Paul Companies for 16 years. He was a board Certified Safety Professional (CSP). He also earned the Associate in Risk Management (ARM) and Associate in Loss Control Management (ALCM) designations. Lane enjoyed his many sailboats over the years and the time spent cruising around the Apostle Islands. Lane first came to Loveless Lake in 1992 and moved there full-time in 2006. He was keenly interested in issues of water quality, lake front preservation and noise pollution on the lake. He served as newsletter publisher for the Loveless Lake Association from 1996 until his death. In recent years, he was a member of the Polk County Museum board. He loved reading, canoeing and kayaking, and woodworking. He is survived by his daughters, Kelly Burke and Karly (Derek) Murphy, wife Lisa, a sister Linda (David) Spears of Duluth, and three brothers, Lyle of Scanlon, Loren (Lisa) of Atlanta, GA, and Lee of Duluth.



PHOSPHORUS FREE – IT'S THE LAW!

If you need to fertilize your yard this spring, please remember to use phosphorus-free fertilizer within 1000 feet of the lake. Phosphorus run-off in the lake is a leading cause of algae.

2013 LLA FALL MEETING MINUTES: 8/31/13

Submitted by Susan Barnes

Call to order by Brett Ptacek (President). # of members in attendance – 25.
Minutes from last meeting – unanimously approved.

Treasurer's Report by Karen Peterson:
Current balance is $2469.66; $5050.00 is in a CD. Treasurer's report approved. Tax form 990N to maintain tax exempt status has been filed this year. Primary contacts are David and Michele Benson, secondary contact is Karen Peterson. Form 990N must be filed every 3 years. We are filing every 2 years.

Presidents Report
Water Quality Report – Mary Walczak: Mary is part of the Wisconsin DNR Citizens Program and monitors water clarity, phosphorus, chlorophyll and dissolved oxygen in our lake throughout the summer. Dissolved oxygen was measured at 3, 9, and 15 feet. It was at 1.7 parts per million, and it should be around 9 parts per million or fish can't survive. As they come up for oxygen, lake temperature is too hot for them. Last year the reading was 4.4 parts per million at this time. Secchi reading on June 2 was good – 21 feet (it hit bottom). Secchi reading the third week of August was 3.5 feet. We must continue to work on lakeshore restoration. Native plants with deep roots are key to keeping lake healthy. Jeff Creuzer volunteered to help Mary with Secchi Disk readings.

Annual Picnic Update
35 attendees; fun had by all!

Old Business
Catch Basin Update (Reidner Lane)
Brad Maybry (715) 485-3844 from the township was going to review the culvert. We are still waiting to hear back from him. The culvert is fine under normal rainfall amounts but does not function properly in big rains. Discussion of exact circumstances led to need to talk to Ted, whose land it is on. Bret agreed to call Ted and get the facts.

Grant money available
Debbie Cudd brought up an article stating there may be funds available through a grant until the end of the year. Mary Walczak has written grants before and volunteered to help. Committee formed to contact Jeromy and Katelyn to help get grant money.Committee members: Debbie Cudd, Mary Walczak, Judy Dodge – all are co-chairs; Stephanie Decker.

Fish Stocking - Bret
Aaron Cole is contact. They would only stock fish that currently inhabit the lake. Walleye would not reproduce. Stocking would be 2-3 gram fingerlings. Cost is $2000 - $3000 per species. Discussion of whether we want to encourage outside fishermen to fish the lake. All agreed to wait for the official study and review of our lake, which will happen in the next year or so.

Web Site
Mike Selner has graciously agreed to help get our web site up and running. LovelessLake.org is our domain name. The purpose of web site will be to attract more enthusiasm for lake homeowners. Committee (Bret Ptacek, Susan Barnes, Mary Walczak, Mike Selner) will proceed. Stephanie Decker volunteered to help. Goal to have something to look at in the spring meeting. Half Moon and Church Pine lakes have good websites; look for ideas. Discussion of content – Web Site vs FaceBook. Website will have basic lake information, water quality information, history, LLA minutes, etc. Facebook will be the social component where people can post pictures, etc. Motion to redo our facebook page. Approved. Once new FB page is set up, Susan Barnes will monitor.

Cabin Life update – Debbie Cudd
They highlight a different lake association every month. We probably aren't ready for that yet.

New Business
1630 Niles Lane
Jeff Creuzer made the LLA aware of problems at this address including a possible puppy mill and drug activity. He has called the police several times. The police have said to keep calling when there are issues or complaints. (Call Balsam Lake Sherriff non-emergency line)

New neighbors
Please talk to new neighbors about coming to the meetings. Reminder that Lane has packets for all new neighbors

Meeting adjourned.

Spring Meeting Agenda
Saturday, May 17, 2014

1. Call to Order
2. Introductions
3. Guest Speaker – Kaitlin Holm, Polk County Land and Water Resources
4. Approval of Minutes
5. Reports
   --Treasurer's Report
   --Presidents Report
   --Water Quality Report
6. Old Business
7. New Business
   Elections
8. Questions, Comments, Announcements
   Refreshments for Next Meeting
9. Adjournment

REPORT VIOLATIONS:
Wildlife, recreational, and environmental!
1-800-TIP-WDNR
(1-800-847-9367)

NEWSLETTER NOTICE:
Your input is always needed and appreciated!

Please share your personal news, an article or story you think someone else would enjoy, or photos of your special lake time events. Send them to Debbie Cudd at pndcudd@gmail.com or 223 N 4th Street, River Falls, WI 54022. Digital files are preferred. Submitted photos will be returned.

ICE OUT!

Year	Date	Year	Date
1980	4-18	1998	4-18
1981	4-31	1999	4-4
1982	4-22	2000	3-19
1983	4-12	2001	4-15
1984	4-13	2002	3-16
1985	4-10	2003	4-13
1986	4-8	2004	4-10
1987	3-25	2005	4-8
1988	4-8	2006	4-9
1989	4-21	2007	3-31
1990	4-11	2008	4-24
1991	4-6	2009	4-9
1992	4-9	2010	3-29
1993	4-18	2011	4-14
1994	4-10	2012	3-20
1995	4-15	2013	5-7
1996	4-25	2014	4-27
1997	4-18		

Did You Know. . .

The **Polk County Land & Water Resources Department** can help you with issues and projects that affect your property at the lake:

- Apply for grants and technical assistance to landowners and various entities for conservation projects
- Review, approve designs and supervise habitat/shoreline restoration projects
- Engineering: construction survey, design, layouts, bids, cost estimates, checks and certification
- Easements
- Check their website for a full list of programs and conservation efforts: www.co.polk.wi.us

BLICS, the Balsam Lake Ice Cream Shoppe, is open for business at 104 First Ave E, Balsam Lake. Their hours are 1pm-9pm Monday-Sunday.

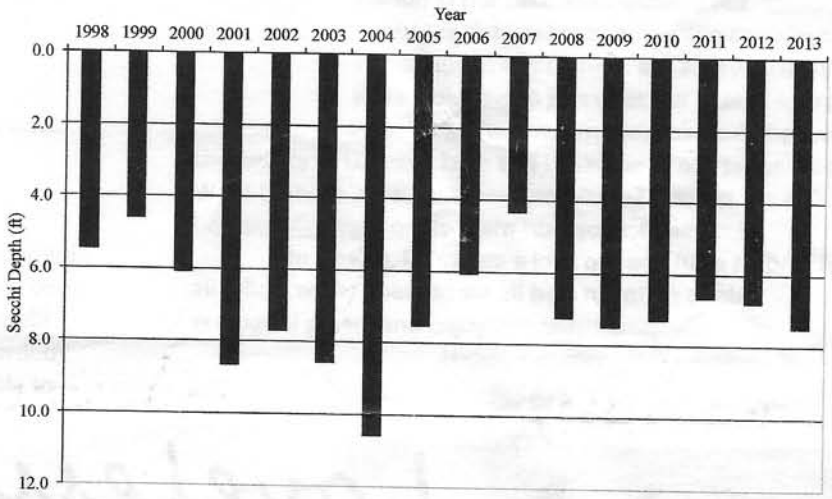
Water Quality Summary – Summer 2013

Submitted by Mary Walczak, walczak@stolaf.edu

Since 2005 I have been part of the Wisconsin Citizen Lake Monitoring Network, a state-wide group of volunteers that monitor the water quality of Wisconsin lakes. Each year I take water samples for phosphorous, chlorophyll and oxygen level testing. I also measure the water clarity using a Secchi Disk. Each spring I've reported on the results from the last season. This year I am especially excited because we are taking on the DNR-funded project with the Land and Water Resources Department. By working together to collect more data on the water quality of Loveless Lake, I hope we can identify strategies to improve the water quality of this treasured lake.

What did we see in 2013? The average Secchi Depth (how deep the black and white Secchi disk is lowered before it disappears from view) was 7.5 feet in July and August. The practice of averaging those months, where we know the water clarity is poorest, is protocol in this field. The readings in June were between 16-21 feet. As seen in the graph below, there has not been much change in the average Secchi readings over the last few years. In fact, there is no statistically significant difference in the Secchi depth.

Loveless Lake July-August Secchi Readings



In comparison with the 7.5 feet average Secchi reading for Loveless Lake, the average for the Northwest Georegion was 8.6 feet. The water was typically clear and green during July and August, suggesting that algae has the biggest impact on the Secchi depth. As we have experienced, algal blooms are generally considered to decrease the aesthetic appeal of a lake because people prefer to see, swim or boat in clearer water. Algae are always present in a balanced lake ecosystem. They are the photosynthetic basis of the food web. Algae are eaten by zooplankton, which are in turn eaten by fish.

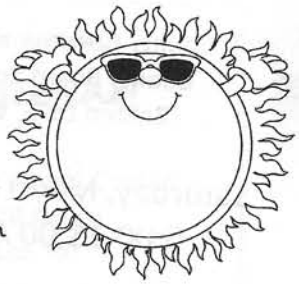
The chemistry data collected on Loveless Lake included Chlorophyll levels of 37.2 µg/L (compared to a Northwest Georegion summer average of 15.4 µg/L) and Total Phosphorus average of 27.9 µg/L. Lakes that have more than 20 µg/l and impoundments that have more than 30 µg/l of total phosphorus may experience noticeable algae blooms. The overall Trophic State Index (based on chlorophyll) for Loveless Lake - Deep Hole was 62. The TSI suggests that Loveless Lake is **eutrophic**. This TSI usually suggests blue-green algae become dominant and algal scums are possible, extensive plant overgrowth problems possible.

On the Look-out for AIS (Aquatic Invasive Species)

Where do you go and what do you do if you find something "odd" in our lake and you think it might be invasive? The Wisconsin Department of Natural Resources (DNR) has created a website for folks to find out just what to do, and where and/or how to send a specimen: http://dnr.wi.gov/lakes/ais/whattodo/

Advice from the Sun

Keep it light ~ Rise to the occasion
Look on the bright side ~ Set your sights high
Renew your energy ~ Keep a sunny disposition
Be Brilliant!



~ Your True Nature – www.yourtruenature.com

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Loveless Lake Newsletter
Rachel Walczak
2022 Royale Drive
Eagan, MN 55122



Susan And Ed Barnes
478 Holly Avenue
St. Paul, MN 55102



Loveless Lake

Reminder:
Loveless Lake
Spring Meeting!

Polk County Government Center,
County Board Room
Balsam Lake, WI

Saturday, May 17, 2014
9:00-11:00 AM

August 2014 Volume 20.2

Loveless Lake

Greetings from the President!

Brett Ptacek

The summer is setting fast and moving on to another beautiful season here on Loveless Lake. Nature's beauty at its finest, the call of the loons, the boating, the smell of barbeque, the sounds of family gatherings and the leaves changing colors... Each and every day, a little slice of paradise right here in our own lake neighborhood backyards.

From the current news section, our own Lake Study Team partnered with the Department of Natural Resources and Polk County Land and Water Resource is in the final analysis stage. We spent the summer monitoring the water quality and rain levels and are now tabulating the results. I look forward to getting their report including action plans which in turn is a step closer to preserving and protecting our lake's valuable resources. We will make it available to each and every resident on Loveless Lake.

You don't have to be a member of the Lake Association to be informed of the study, but I would like to personally extend an invitation to all Loveless Lake home owners to become involved in our association. Whether that is attending our upcoming fall or spring meetings, participating in an event, volunteering, or lending your financial support with a tax deductible contribution; they all have a positive impact on your property value and Loveless Lake.

In closing, I would like to quote the legendary Vince Lombardi who said, "The achievements of an organization are the results of the combined effort of each individual"

Yours truly,
Brett

Annual Dues

We hope everyone will support Loveless Lake by contributing $20 annually to the Lake Association. If you are unable to attend our meetings, please mail your contribution to the Treasurer, Karen Peterson, at 2653 Oak Hills Drive SW, Rochester, MN 55902.

Luke Peterson is proud of his catch!
Submitted by Jim and Karen Peterson



Loveless Lake Fall Meeting!

Polk County Government Center,
County Board Room
Balsam Lake, WI

Saturday, August 30, 2014
9:00-10:30 AM



Loveless Bald Eagle
Submitted by Niles Taylor



Northern Swimming Under Dock, August 2104
Submitted by Debbie Cudd

2014 LLA SPRING MEETING MINUTES: 5/17/2014

Submitted by Susan Barnes

Call to order by Brett Ptacek (President). # of members in attendance – 23.
Minutes from last meeting – unanimously approved.

Treasurer's Report by Karen Peterson:
Beginning balance was $2,469.66. Expenses were $404.43 (party, newsletter, postcards, doughnuts, ledger); dues deposit $185. Ending balance = $2,250.23. CD $5,071.17. Treasurer's report approved.

Guest Speaker: Katelin Holm, Polk County LWRD
As part of the DNR's Healthy Lake Initiative, Loveless Lake was awarded a grant to study the water quality of the lake. Grant money runs through the county and pays for 66% of the cost. The balance will be the responsibility of the association. Volunteer time counts against our part of the cost at $12/hour. Total cost of the project is $12,000. $8000 will be paid through the grant, $4000 in volunteer hours. There are 5 areas that will be studied. Volunteers are needed for all:

1. Outlet Sampling Flow – how much water is coming in and out of the lake after major rain events and what are the phosphorous levels? There are 10 culverts around the lake that will be sampled.
2. Lake Resident Survey – these have been sent to all lake residents. Please fill out and send in ASAP.
3. Shoreline Mapping Inventory. Volunteers are needed to look at shoreline and habitat in the fall. The DNR is working on a standardized process. Katelin and Jeremy will be trained on this in June.
4. Storm Water Sampling – determine where phosphorous is coming in to the lake. Phosphorous comes from soil erosion, burning wood on the lake shore (ashes contain phosphorous), fertilizers (although most today are phosphorous free).
5. Action Committee – once all the data is collected, we will form a committee to develop objectives and goals with an action timetable. We will prioritize goals, short and long term, along with funding opportunities. There will be 4 meetings over the winter to review data collected.

We discussed ways we can improve our lake quality and fish habitat. Katelin's department hosted a training session on how to monitor invasive species on June 11. Susan Barnes and Jim Peterson attended and were given a great kit that we can use to identify good and bad species in our lake. I have scanned the plant images from the kit and can send them to anyone interested.
What can we do to improve fish habitat?

1. Leave trees in the water when they fall.
2. Create fish sticks or cribs by dropping trees in a pile in a criss-cross pattern in the water.

President's Report
Form a committee to attend the Polk County Association of Lakes and Rivers (PCALR) meetings. Blaine Erickson, Jackie Crosby, Jim Peterson, and Peter Frohnert volunteered. PCALR membership is $25. We agreed that the LLA should pay for membership. Anyone interested is invited to attend the meetings, which are held as follows:

- April 30, 2014: - Review PCALR's contribution to the Governor's Fishing Opener media goody bag. - Ideas for speakers and programs for August and October meetings - Website updates discussion - WDNR Drain Campaign - New CBCW monitor forms.
- June 18, 2014:- Planning October meeting: finalize organizations and volunteers to contact them - PCALR scholarship to Wi Lakes Convention, application & eligibility - AIS planning, initiatives and volunteer opportunities Presentations: - Jane Malischke, DNR Environmental Grant Specialist, on grant changes - Jeremy Williamson on core sampling and value of historical data.
- August 20, 2014:- County Board Invitational meet and greet. The newly elected 15-seat Polk County Board of Supervisors will be invited. Lake organizations can present their lake management practices to the group. - Alex Smith, WDNR Lakes Biologist will present on the DNR's Impaired Waters List and the addition of Balsam, Bear Trap, Big, Long, North Pipe, Pipe and North Pipe, White Ash lakes and Friday Creek, along with 192 other WI bodies of water, to the list. The majority exceed total phosphorus criteria or rate in poor biological condition. You can find the data here: http://dnr.wi.gov/topic/ImpairedWaters/
- October 15, 2014: Annual wrap-up. Speaker & program to be announced.

Water Quality Report: Mary Walczak is part of the Wisconsin DNR Citizens Program and monitors water clarity, phosphorus, chlorophyll and dissolved oxygen in our lake throughout the summer. Jeff Creuzer will have 2nd Secchi disk and will take readings during the week. Mary will continue to monitor on the weekends. Mary will run phosphorus samples as part of the Citizen Lake Monitoring program. We must continue to work on lakeshore restoration. Native plants with deep roots are key to keeping lake healthy.

Old Business
Catch Basin Update (Reidner Lane)
Brad Maybry (715) 485-3844 from the township has looked at the site and feels the culvert is fine. We know from firsthand accounts that the culvert does not function properly in big rains. This continues to be our biggest concern. Ted Bauer, whose land it is on, will help monitor the culvert this summer

Fall Meeting Agenda: Saturday, August 30, 2014

1. Call to Order
2. Introductions
3. Additions to Agenda
4. Approval of Minutes
5. Treasurer's Report
6. Presidents Report
7. Water Quality Report
8. Ongoing Business
   8a. Update on Water Study
9. New Business
10. Questions, Comments, Announcements
11. Refreshments for Next Meeting
12. Adjournment

Lake Noise Conservation

Minimize unnecessary noise and help keep a healthy retreat on your lake for wildlife and humans. Any noise around lakes is greatly amplified as it travels over water. Noise stresses animals and birds, which may force them to leave for quieter places. Respect your neighbors on the lake who may prefer nature and peaceful times. Please be respectful by keeping quiet before 9am and after 6pm. Be thoughtful and avoid disturbing your neighbors and the wildlife. Typical disturbing noises include yard equipment, noisy boats/watercrafts, continually barking dogs, loud parties/events, fireworks/guns, and noisy vehicles.

Loveless Lake Water Quality Study Update With fall just around the corner, data collection efforts for Loveless Lake are well underway! Volunteers are collecting data biweekly at the deepest part of Loveless Lake and at the outlet. They are also monitoring the lake level and precipitation on a daily basis. Additionally, LWRD staff is collecting storm water samples at the culverts around Loveless Lake following rainstorm events. In early fall, volunteers will collect data to determine the health of the shoreline of Loveless Lake. A total of 55 lake resident surveys (45%) have been returned, which will assist lake residents and stakeholders in developing a Lake Management Plan and goals for Loveless Lake. Later this year, all data will be shared with lake residents interested in developing goals for Loveless Lake and prioritizing projects to improve the lake.
Contact Katelin Holm [katelin.holm@co.polk.wi.us or 715-485-8637] or Jeremy Williamson [jeremyw@co.polk.wi.us or 715-485-8639] with LWRD for more information or to get involved with this exciting project.

Advice from A Firefly:



~ Be full of brightness
~ Pulse with excitement
~ Have a healthy glow
~ Delight in summer evenings
~ Keep a childlike sense of wonder
~ Set a shining example
~ Lighten up!

Your True Nature :
www.yourtruenature.com

The "**Niles Lane Bear**" continues to make regular appearances at the Jeff Cruezer residence. These tips from the Wisconsin DNR can help you avoid attracting bears:

- Don't knowingly feed a bear.
- Remove bird feeders, even during the day, as bears are more active then.
- Reduce garbage odors by rinsing food cans before putting them in recyclin containers or trash cans.
- Keep meat scraps in the freezer until garbage day and keep trash can lids closed tightly.
- Keep barbeque grills and picnic tables clean and keep pet food inside.

If you find a bear near your home, the DNR advises: "Wave your arms and make noise to scare it away. Then back away slowly or go inside and wait for the bear to leave. When scaring the bear away, make sure it has a clear escap route. Never corner a bear."



Eric Knault
Barefoot Skiing!

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Publisher: Rachel Walczak
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News From Your Neighbors!

From The Knaults: This July, we hosted some of my co-workers from Gurgaon, India at our lake place for dinner. We are all engineering leaders working together on a joint venture (between Polaris and Eicher Motors) for a new product, along with a factory, that will be sold in the Indian market. Sandhya (female) and Sandeep (male) were visiting for our first Board of Directors meeting that was held in the United States at Polaris's Wyoming, MN office. I have had many home cooked meals at co-workers' homes while on business in India so Kelly and I decided to host them while they were here and tried to give them a memorable experience at the lake. Since Sandhya and Sandeep are strict vegetarians, we decided to have the meal catered by The Vegetarian in St. Croix Falls. The meal was perfect and they were impressed by the authenticity. Following the meal, we took them on their first pontoon boat ride around the lake and, as you can imagine, they could not get enough of it. You really gain a great appreciation for the life we have at the lake, and in America in general, when you see it through their eyes.



A "Garage Report" from Blaine & Barb Erickson: As of the first week of August, the "Barn" garage has the exterior work & painting done. Now the next phase is finishing off the retaining walls to raise the fill level to cover more of the slab and get the stairs built from the old slab. The interior work will continue until it's ready for the "grandkids" next spring; they need a place of their own "upstairs away from the old folks".



Jay Rupp lives on Loveless Lake and is also a Bob Ross Painting instructor. If any group on Loveless Lake would be interested in having a group painting class (minimum of 7 and maximum of 14 students), Jay would be available to have a class in their cabin or at yours. The cost is $50/student for a 3½ hour class. All needed materials are included: paints, 16X20 inch canvas and painting supplies. Jay says:

"I prefer to paint with people who have no experience painting, don't want to paint, and who can't draw stick men. If you are one of the 'anti-artist' types, you will have the most fun and be the most amazed! If your painting turns out really nice, (as I am sure it will) you may want to paint more paintings similar to your original masterpiece. If you are an experienced artist, welcome. There is always much to learn. The painting will be in oil, which is quite easy to work with. Your painting will be ready for you to frame and put on your wall at home when you finish. The oil painting will take 2 weeks to dry but can still be put into the frame of your choice and hung immediately on your favorite wall. The 'Joy of Painting' may be the highlight of your year!"

You can email Jay Rupp, certified Bob Ross Instructor, at jaysandyrupp@Q.com or call him at 651-329-7551 for more information. Also, check out his upcoming classes at the Hobby Lobby in Woodbury, MN!

New Neighbors! Niles and Sara Taylor: Thank you for the opportunity to introduce ourselves to the Loveless community, our names are Niles and Sara Taylor. We bought 1629 S. Niles Lane in May of 2013. It was previously owned by Tom and Nylla Hanson. Our permanent home is in Hudson. Sara works in public administration for a local city and I work as a CNC programmer at a tooling company in New Richmond.



Throughout our lifetime, Sara and I have both spent a lot of time on lakes at family cabins and long dreamed of one day having our own *cottage*, as Sara prefers to call it. Years ago we often would spend weekends investigating new lakes and properties, wondering if we could find the one that would be right for us. We became very interested in Loveless when we found Niles Lane. It had everything we were looking for. We spend as much time as we can at the cabin. We really enjoy being at the lake and all of the wonderful people we have met there. When we are at the lake, we spend our time updating and remodeling in the cabin. When we have free time from remodeling I enjoy getting out on the water to ski with Eric Knault and Dave Benson, as well as just about any other water sport. Sara enjoys being out on the dock or in the water soaking up the sun. When we give up weekends at Loveless, we are usually sailing with Sara's parents on Lake Superior out of Bayfield, WI. We enjoy the exhilaration of boating under sail power and taking in the grand beauty of the Apostle Islands National Lakeshore. We often spend

Culvert is located on the west side of the lake on Reidner Lane at the bottom of the paved section of road.

Web Site – Mike Selner

LovelessLake.org is our domain name and the web site is up and running. The purpose of web site will be to attract more enthusiasm for lake homeowners.

New Business

Picnic Date set for July 19 from 4pm until ??

Jeff and Darlene Creuzer have volunteered to host again. Susan Barnes will send a postcard to all residents in late June.

Lane Burke Memorial

Jackie Crosby motioned to do something lasting for a memorial, something that benefits the lake. Motion approved. We will have a Lane Burke Memorial walk around the lake on July 19th at 10:00.

Email addresses of lake residents needed

Emails can be entered through the website or by contacting Susan Barnes or Debbie Cudd. Secretary will be in charge of the address list.

Welcoming Committee

Brett will recreate Lane's original new neighbor packet.

Newsletter Publishing

Debbie Cudd will continue as Editor. Rachel Walczak will be publisher.

New neighbors

Please talk to new neighbors about getting involved in the Loveless Lake Association and coming to the meetings. We will have packets for all new neighbors.

Loveless Lake Sweatshirts and T shirts

Many residents would like to purchase Loveless Lake apparel. Roger will talk to Ted Bauer. Brett will contact T Shirt place in Balsam. We will report back at the fall meeting.

Refreshments for Fall meeting

Pat Dodge volunteered to bring refreshments. Brett will find the missing bin with the accessories in it.

Meeting adjourned.

REPORT VIOLATIONS:
Wildlife, recreational, and environmental!
1-800-TIP-WDNR
(1-800-847-9367)

FOR SALE: 1997 Bayliner Capri LS1700 with 120 HP Force (by Mercury) outboard, trailer and boat lift. Runs perfectly and well taken care of; a real "garage queen". It's just time to own a pontoon! Please call Al Mamer at 612-202-1034

We now have a website!
Check us out at www.LovelessLake.org

Invasive Species Update!

While collecting storm water samples, LWRD staff discovered **garlic mustard** on Niles Lake (off County Road I). This is one of the first instances of garlic mustard in Polk County. Garlic mustard is an invasive species that can quickly take over woodland areas. The best recommendation is to hand pull, bag, and dispose of the plants before they set seed. Residents are urged to learn more about this invasive species and actions that can be taken to control its spread.

Identification and Control information (below) from WDNR website:

http://dnr.wi.gov/topic/invasives/fact/garlicmustard.html



Leaves: First year plants have basal leaves that are dark green, heart or kidney-shaped, with scalloped-edges and wrinkled appearance. On second year plants, stem leaves on flowering plants are alternate, triangular, with large teeth, and up to 2-3" across. Leaves and stems smell like garlic when crushed.

Flowers: Small, white, 4-petaled, and abundant. Bloom throughout the spring.

Mechanical Control: Hand pull in early spring before seed set. If plants are flowering, place in plastic bags for trash disposal or burn. Cut plants at their base just after the flower stalks have elongated but before any flowers have opened; may have to cut more than once during a growing season. Place pulled/cut plants in plastic bags for trash disposal. Use controlled burns in fall or early spring.

Chemical Control: Foliar applications of glyphosate in early spring or late fall when native plants are dormant.

Around the Lake for Lane

By Jackie Crosby

More than two dozen Loveless Lakers gathered on July 19 for a memorial walk to honor our late friend and Loveless champion, Lane Burke, who was killed in a car crash last fall.



It was gloriously sunny and cool when we set out from the landing, some of us in a sprint, others in an amble. We so miss Lane around these parts – his friendship, leadership and his quest to document the lake's past while fighting for its future.

I used to run into Lane on his morning power walks as he headed toward his place down Reidner. The memorial event was a great way to meet others whose lives he touched, and yet another reminder of the warm welcome he gave me as a newcomer to Loveless Lake and cabin life just a few years ago.

Lane's widow, Lisa, laced up her sneakers for the event, and we were thrilled to see her. When I checked in with her later, Lisa said she spent nearly two hours making the 3-mile loop as she stopped to visit and catch up with old friends.

Way to show the love, Loveless.

Did You Know. . .

You can drop off or exchange your leftover paint from your 2014 lake projects at the **Polk County Recycling Center** until September 15. Requirements are as follows:

- Employees of the recycling center are required to inspect the paint before it is left.
- The paint must be in the original container
- Paint must be at least 1/3 full and have a readable label
- Paint has to have been stored in a warm area and never have been frozen.

*We cannot accept lead-based paint for the paint exchange. (Bring lead based paint to a Clean Sweep Event for disposal.)

Polk County Recycling Center
1302 208th Street, Hwy 8
St. Croix Falls, WI 54024
Phone: 715-483-1088
Fax: 715-483-1088
E-mail: polk.recreation@co.polk.wi.us

Office Hours:
M-TH, 6:30 AM to 4:30 PM
Memorial Day to Labor Day
M-F, 6:30 AM to 4:30 PM

ATTENTION BOOK LOVERS! The Book Nook Book Club meets on the fourth Friday of every month at 10:30 a.m. at the Mainstreet Cafe in Balsam Lake. We spend a short time discussing the books we've read and the remainder solving the world's problems. Come and join us. For more information, please contact Marilyn Lacy at (715) 646-2631 or cnv30131@centurytel.net.

The **Balsam Lake Farmers Market** is open Friday afternoons from 3PM-5PM, through October 10 at Our Lady of the Lakes Catholic Church parking lot: 507 Main Street-Hwy 46, Balsam Lake. It's a great time to take advantage of fresh homegrown produce!

multiple days out on the water in the sailboat and often cover more than 60 miles in a weekend outing.

The Cudd Family: There seems to be a black cloud hovering over the Cudd Family cabin this year. Pauly and Debbie arrived at their cabin this spring to find that the crazy spring freeze/thaw weather caused the east wall of their basement to crack and shift inward 1½". A new wall is to be installed yet this season. At the same time, they discovered that ice heaving moved their old boat lift onto the neighbor's property, breaking an axle. Unusable any longer, it was cut up and removed from the lake. Although it was expected to happen sometime, it just happened at the wrong time. Did you hear the super loud boom on the lake in the early morning hours on August 12? That was the Cudd cabin being struck by lightning!! As of this writing, the Cudds are meeting with an adjuster and electrician to access damages. The upside to all this drama was the 3-week long summer visit from their Alaskan Kids, Joe, Ami, & Maximus (9 mo)! Pauly and Debbie invite you to visit to ArtZ Gallery in Amery, WI this September, where Pauly's beautiful hand-blown glass will be on display. An artist's reception will be held on Friday, September 12.



Thank you to Jeff and Dar Cruezer for hosting the annual picnic! It was a beautiful July day to spend time with our Loveless Lake neighbors. Approximately 50 people came, some for the first time. The food was abundant and delicious. Although only one person RSVP'd, for a total of four people, enough meat had been ordered based on the numbers from last year, so no one went home hungry. A few items were left behind: two small coolers that were in the living room and one white Ikea plate. Owners can pick these items up any time at the Cruezers'. *(In photo below, L to R: Hailey Peterson, Maggie, Sawyer, and Hannah Cudd, Luke Peterson, and Jeff Cruezer as the wagon master.)*



Quiet Time, Please

Loveless Lake Association Members,

I would like to introduce myself; my name is Lynnette (McKenzie) Rogers. Many of you knew my father, Doug McKenzie. I first moved to Loveless Lake in 1970 with my parents and siblings. As an adult, I made a home for my family over on 160th Avenue and remained near the lake. About 10 years ago, I moved back into the place that many of you know as Doug's house.

For those of you who are not full-time residents and perhaps are unaware, this year again, Polk County is number 1 in Meth cases in the State of Wisconsin. Due to an overwhelming drug problem in our county, homes are needed for the infants and the children who are born drug affected. One of those homes is mine. About 10 years ago, I started caring for newborns that were affected by their mothers' pre-natal drug use. These infants experience a wide range of symptoms, some worse than others, but all seem to be hyper-sensitive to sensory stimulation and may take several hours to calm them down once over-stimulated. Some infants will improve, but for some, it lasts a lifetime, I have adopted 2 of them, and continue to take in drug-exposed infants.

I understand the fun of going to the cabin, and I don't begrudge anyone their rights to fully enjoy their property. But once again, tonight at 11:00 P.M., on a weekday, there were more fireworks going off down at the lake. For those of us who are full-time residents, we are trying to sleep so we can work tomorrow, and in my house it wakes the babies and causes a sensory overload, triggering hours of crying for an already sick baby.

I would like to add that, throughout the years I have always enjoyed the summertime sounds of the lake, the smell of campfires, the loon, and happy voices, but more and more it seems like there is no relief from the constant fireworks all summer. I am not sure what the answer is here or what I am asking, so please just keep in mind that on the hill overlooking the lake, are some very fragile special needs infants and children that need some rest at night. This is our life, and we are not on vacation with you.

Thank you,

Lynnette (McKenzie) Rogers

PHOSPHORUS-FREE: IT'S THE LAW!

If you plan on fertilizing your yard this fall, be sure to use phosphorous-free fertilizer within 1000 feet of the lake! Phosphorus running into the water is a leading cause of algae. Help us keep our lake clean!

SAINT PAUL MN 550

22 AUG 2014 PM 3 L



Loveless Lake Newsletter
Rachel & Mary Walczak
2022 Royale Drive
Eagan, MN 55122

Susan And Ed Barnes
478 Holly Avenue
St. Paul, MN 55102

55102220678



Loveless Lake

Reminder:
Loveless Lake Association
Fall Meeting!

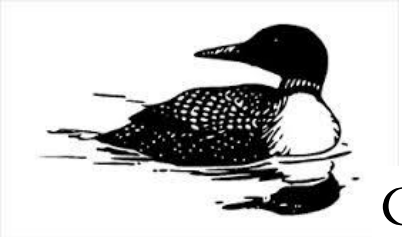
Polk County Government Center,
County Board Room
Balsam Lake, WI

Saturday, August 30, 2014
9:00-10:30 AM

Loveless Lake Association

Volume 21, Issue 1
May 2015

"Name that Newsletter"



Greetings from the President

INSIDE THIS ISSUE:

News From Your Neighbors	2
Ice Out!	2
2014 Fall Meeting Minutes	3
Picnic Update	4
Notices	4
Living with Loons	5
Board Members Contact Info	5

What a beautiful and welcomed early spring!!!! I'm all in for another unbelievably awesome summer on Loveless Lake. As always, let's continue to keep our lake, guests and residents safe and sound this season.

I wanted to thank every last individual involved with our Loveless Lake Association. This will be my last communication as "President". I want to thank you all for the opportunity to have served in that position and assisted in the advancement of the Loveless Lake Association. "Keep the ship out of the surf and spray, batten down the hatches, and keep on keeping on!!!"

Once again I would like to remind everyone that participation in the Lake Association is not mandatory,



but your tax detectable membership contribution and/or your participation in any manner are always greatly appreciated! All are welcome to join us at our annual spring meeting. By working together we can maintain and improve the quality of Loveless Lake.

In closing, thanks again and let's have a safe and respectful season.

Signing Off,

Brett Ptacek

Loveless Lake Spring Meeting

Saturday, May 16, 2015
9:00-11:00AM

Polk County Justice Center
Community Room
Balsam Lake, WI

Agenda:

1. Call to Order
2. Introductions
3. Approval of Minutes
4. Reports:
   - Treasurer's Report
   - President's Report
   - Water Quality Report
5. Old Business:
   - Water Quality Study Update: Jeremy Williamson, Polk County LWRD
   - Web Site Update
   - Other Committees
6. New Business:
   - Elections:
     - President
     - Treasurer
   7. Refreshments for fall meeting
8. Questions/Comments/ Announcements
9. Adjournment

Newsletter Changes

A few changes to the newsletter are in the works. First you will see that we need to come up with a new name. Please submit your suggestions to Debbie Cudd at pndcudd@pressenter.com by August 15st. A vote for your favorite one will take place at the fall association meeting.

Secondly, going forward, the fall edition will have a "themed" photo section dedicated to the way we live at the lake. The first theme will be titled "Summer Fun". Let's fill the pages of the newsletter with your pictures. All photos will need to be submitted by August 15th or inclusion in the newsletter.

PHOSPHORUS-FREE: IT'S THE LAW!
If you fertilize your lake property, be sure to use a phosphorous-free product to help keep our lake clean!

WE'RE ON THE WEB!
www.LovelessLake.org

News From Your Neighbors

Eric Nault shares a few early spring stats:

- Maximum ice thickness this year was 28”
- We launched our pontoon when the lake had about 30% ice coverage on March 31
- The ice was completely out at 5:45 pm on April 1
- First ski of the year was one hour later (6:45 on April 1) ☺ Ha, ha!
- We got our first snowfall of April on the 2nd. Nothing more disheartening than snow on your boat lift canopy and docks.



- We started taking runs on the slalom. As you can imagine we had the lake to ourselves.

Rita Christenson and her son, Justin, were at their cabin in early April and glad to see the ice out. Justin put their dock in and then tried his luck fishing. They can’t wait to officially open the cabin and get the place cleaned up for another great season!





Jim & Karen Peterson’s grandkids enjoying the inflatable water toy.

A Westside Tradition

submitted by Rodger Peissig

It started many years ago when a group of neighbors decided to all pull our docks out on the same day. Back then most of the group was school teachers. We chose to use their fall break weekend as the time to take out our docks, lifts, swim rafts etc. It’s now been going on for about 30 years.

The same group of property owners has continued with this tradition even though the ownerships have changed some over the years. Only two of the charter members remain: Jim & Becky Christopherson and Rodger & Sharon Peissig and their respective families. Since then Dave & Michelle Benson, Ted & Sally Bauer, Rick & Pam Atzmiller, and Joe & Sandy Commer have joined in the annual event. We even had an article printed in the Cabin Life magazine a few years ago about this event.

The ‘younger’ guys are usually in the water and the rest are on dry land guiding and stacking. Lucky for us the gals are around, without them we would be without any kind of supervision. Over the years we have lost wrenches, bolts, and other hardware much of it has been recovered but some is lost forever.

There aren’t any rules to follow, just a few guidelines: No starting before 9:30 AM, and the new guy gets the leaky waders!! This past fall we almost set a new world record for getting 8 boat lifts, 5 docks, and a swim raft out of the water and secured for the winter. We finished the whole process in less than 2 hours.

After the work is finished we cap it off with a brunch hosted by one of the members of the group. In some of the early years it was a champagne brunch. Things have tamed down a bit over time.

From the **Palewicz** corner of the lake, the winter was somewhat quiet this year. They did not see so many of the ice fishing towns that seemed to fill the lake every weekend--maybe there will be more fish for their grandkids this summer? Also, they are looking for about 16 ft of dock section; is anyone selling some? Last, but certainly not least, parking on S.Niles will be somewhat crowded on June 27. Frank & Micky are pleased to announce they will be hosting their daughter’s wedding in their yard at 3:00 that afternoon. Please pray for sunshine!!!

ICE OUT!

Year	Date	Year	Date
1980	4-18	1998	4-18
1981	4-31	1999	4-4
1982	4-22	2000	3-19
1983	4-12	2001	4-15
1984	4-13	2002	3-16
1985	4-10	2003	4-13
1986	4-8	2004	4-10
1987	3-25	2005	4-8
1988	4-8	2006	4-9
1989	4-21	2007	3-31
1990	4-11	2008	4-24
1991	4-6	2009	4-9
1992	4-9	2010	3-29
1993	4-18	2011	4-14
1994	4-10	2012	3-20
1995	4-15	2013	5-7
1996	4-25	2014	4-27
1997	4-18	2015	4-1

2014 LLA FALL MEETING MINUTES
August 29, 2014
Submitted by Susan Barnes

Call to order by Brett Ptacek (President)
23 members in attendance
Minutes from last meeting – unanimously approved

Treasurer's Report by Karen Peterson
Treasury Account Balance $2114.50
CD $5071.17
Treasurer's report approved

Presidents Report
PCALR – Polk County Association of Lakes and Rivers (Committee - Blaine Erickson, Jackie Crosby, Jim Peterson, Peter Frohnert)
- $25 membership dues were paid by LLA
- Jim Peterson attended August 20, 2014 meeting – general discussion of what's going on in the county
- County Board Invitational meet and greet. The newly elected 15-seat Polk County Board of Supervisors will be invited. Lake organizations can present their lake management practices to the group. - Alex Smith, WDNR Lakes Biologist will present on the DNR's Impaired Waters List and the addition of Balsam, Bear Trap, Big, Long, North Pipe, Pipe and North Pipe, White Ash lakes and Friday Creek, along with 192 other WI bodies of water, to the list. The majority exceed total phosphorus criteria or rate in poor biological condition. You can find the data here: http://dnr.wi.gov/topic/ImpairedWaters/.

Water Quality Report by Mary Walczak
Mary is part of the Wisconsin DNR Citizens Program and monitors water clarity, phosphorus, chlorophyll and dissolved oxygen in our lake throughout the summer
- Secchi readings were average for July/August timeframe – 9'. This is better than it has been due to weather pattern, rain and land near lake not presently being farmed
- Oxygen levels are of interest to everyone. On May 3, water temperature was 41 degrees and oxygen was 10 parts per million
- Plan to post water quality data on website
- Michele Benson voiced a concern over the county clear cutting practices along the road is not helping runoff situation
- Grant Project – Upcoming events:
  - Shoreline mapping
  - Action Committee
- Awareness Update of new Polk County Zoning Ordinance
  - Information regarding setbacks, run off ratios, etc. is available on line on the Polk County site

Old Business
- Catch Basin Update (Reidner Lane)
  - Brad Maybry (715) 485-3844 from the township has looked at the site and feels the culvert is fine. We know from first-hand accounts that the culvert does not function properly in big rains. This continues to be our biggest concern.
  - Ted Bauer, whose land it is on, will help monitor the culvert this summer.
  - Culvert is located on the west side of the lake on Reidner Lane at the bottom of the paved section of road
- Web Site – Mike Selner
  - LovelessLake.org is our web site. Primarily about lake stewardship with links to PCLAR and FB
  - Loveless Lake Facebook page for social content
  - Committee formed with Jackie Crosby as chair to determine mission statement and content. Stephanie Decker will start the process
  - Goal to present vision at spring meeting and get feedback from group
- Loveless Lake Apparel
  - Ted Bauer has some T-shirts ($10) and Sweatshirts ($15)
  - Discussed logos, etc. and whether we should have an "official" one
  - Caroline and Steven Rediske should be asked to visit a meeting to show what can be done
- Newsletter Update
  - Debbie Cudd thanked everyone for contributing, noting that input from everyone is important
  - It was also noted that the newsletter could be sent electronically as a PDF

New Business
Picnic Date set for 3rd weekend in July
  - Judy Halliday volunteered to head up committee
  - Also want to make walk an annual event – discuss at spring meeting

Welcoming Committee
  - Motion to have Michele Benson form a committee to make packets for all new neighbors
  - Materials can be found at Polk County
  - New neighbors – please talk to new neighbors about getting involved in the Loveless Lake Association and coming to the meetings.

Tax Exempt Certification
  - Must be done every 3 years
  - Michele Benson is currently listed as contact person. She must include a board member as well. It is currently Karen Peterson but will need to be someone else when Karen retires
  - Michele will file in time for May meeting

Spring meeting to be held on May 16, 2015
  - Refreshments to be provided by John Kohner
  - Thank you to the Dodges for bringing refreshments to the Fall 2014 meeting

Amery ArtZ Gallery is opening in September. Pauly Cudd's art glass will be featured there – check it out!
Meeting adjourned



Loveless Lake Annual Picnic
Saturday, July 18, 2015

Yay!! Summer has finally arrived and with it comes the annual picnic. It is held on the 3rd Saturday in July, which falls on 7.18.15 this year. I have volunteered to coordinate everything and the first item of business is that we need a place to hold the picnic. Jeff and Dar Creuzer have hosted it the last couple of years, which we are grateful for as it is a great place to have a picnic. They are going to let another family host this year, and I am looking for volunteers. We have had about 50 people or so attend in the past, give or take 15 people.

The meat and buns and drinks are provided by the committee, and everyone is asked to bring a dish to pass. So the host and hostess would provide space, maybe some tables and chairs, a grill or 2, etc. We could ask everyone to bring a chair and we can discuss how to get extra tables and grills.

All of our neighbors are welcome, on the lake and near the lake. This is a good time to encourage your neighbors that are not members to come and meet everyone and join the Association.

If you are interested in hosting, please come to the meeting on 5.16.15 or give me a call at 612.229.7946.
Thanks – Jody Halliday

ANNUAL DUES

Your 2015 association dues of $20 can be paid to our treasurer at the spring meeting or mail them to:

Karen Peterson, Treasurer
2653 Oak Hills Drive
Rochester, MN 55902

Advice From a Garden

Cultivate lasting friendships ~~ Sow seeds of kindness

Listen to sage advice ~~ Don't let the little things bug you

Be outstanding in your field ~~ Take thyme for yourself

No Vining!

www.yourtruenature.com



REPORT VIOLATIONS:
Wildlife, recreational, environmental
1-800-TIP-WDNR
(1-800-847-9367)

Wanted: Updated Contact Information

Please notify us of any changes to your address, phone and email. As land lines are eliminated, it is important that we have your current information. By sharing your email address with us we will contact you bi-annually with a request to submit news for the newsletter, for notification of special meetings or as an emergency contact in case of storm damage. If you have an email address and would like to be added to the association list please send it to Susan Barnes at sbarnes141@gmail.com.

This is the first article in a series about loons to educate residents, creating citizen awareness and help them make the connection between how loons use lakes and the ability of loons to flourish on those lakes.

Loveless Lake Association Board of Directors

President: *
Brett Ptacek
bzptacek@gmail.com
612-845-7638

Vice-President:
Jim Peterson
jnpetterson@charter.net
507-285-0734

Secretary:
Susan Barnes
sbarnes141@gmail.com
651-290-0127

Treasurer: *
Karen Peterson
karen@Petersoncabin.com
507-951-1704

❖ These positions are up for election at the spring meeting

Newsletter Editor & Publisher:

Debbie Cudd
223 N 4th Street
River Falls, WI 54022

pndcudd@pressenter.com
715-307-9513

Living with Loons

In Wisconsin, Michigan and Minnesota, loons typically begin to arrive on their nest lakes around mid-to-late April. The first order of business is to establish a territory then attract a mate. This is done during the last weeks of April and early in May – then nesting begins. Most loons in Wisconsin are nesting by mid-May, which means eggs begin to hatch one month later in early to mid-June. Some pairs that begin nesting later, or who lose their first nest and try a second time, will have eggs hatching into early July.

The first four weeks are the most critical in a young loon's life. This is the time when they are covered in downy feathers and are unable to maintain their internal body temperature. It is when the chicks are completely dependent upon their parents, so adults spend most of their time catching fish and feeding the chicks. This is also when chicks are learning to dive, so the typical way a loon avoids danger, diving, is not an option for them. Once the young loons reach four weeks of age, they have molted into their first set of feathers and can maintain a regular body temperature, and they are able to dive and are catching some of their own food. Once the young become self-sufficient, adults begin spending less time with them, as they prepare to leave on their fall migration. The young loons stay behind until almost ice-up, feeding and gaining strength to make the southward flight themselves.

Therefore, the most important time for loons, in terms of ensuring successful reproduction, is from May through mid-to-late July. This is when adults are sensitive to intrusions at the nest site, and, later, when young are most dependent on the parents. Any sustained disturbance during the nesting season or during the early stages of chick-rearing can be detrimental to a loon pair's nest success for that year. Because loons lay only two eggs per nest, and usually only have one or two (if the first nest is lost) opportunities to lay eggs each season, even one year of disturbance can have negative effects on an area's loon population over the long-term.

So what can we do? All of this does NOT mean that we cannot use a lake during the summer. It simply means that we have to be mindful of the fact that we share the lake with others – people and wildlife. Here are some things we can do to help loons while enjoying the lake ourselves:

- Observe loons from a distance with binoculars or a spotting scope rather than trying to get close to them. Stay 200 feet away from loons on nest or on the water whenever possible.
- Give islands and marshy areas of the lake a wide berth to avoid disturbing loons on nests.
- Post "Loon Alert" signs at public boat launches to let visitors know that loons use the lake and that the people who live there care enough to protect them.
- Protect or restore important loon nesting and chick rearing areas on a lake.
- Use alternatives to lead fishing tackle made from materials such as bismuth and steel. It only takes one lead sinker or jig to poison a loon.

Loons can be tolerant of human recreation and even raise young successfully on lakes that have regular recreational use. But people using the lake need to be mindful of the loon's presence and have the courtesy to give them some space. If we do this, we will be fortunate enough to have loons return to our lakes year after year, and we can be sure that the loon's call we hear floating on the morning mists or the evening air is one of life and harmony and not a sounding of the alarms that something is wrong.

LoonWatch, Sigurd Olson Environmental Institute

Loveless Lake Newsletter
Debbie Cudd
223 N 4th Street
River Falls, WI 54022

REMINDER!!

LOVELESS LAKE

ASSOCIATION MEETING

SATURDAY, MAY 16TH

9am – 11am

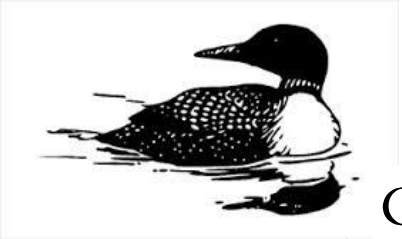
POLK COUNTY JUSTICE CENTER, BALSAM LAKE, WI

COMMUNITY ROOM

Volume 21, Issue 2
August 2015

LAKE TALK

Loveless Lake Association Newsletter



Greetings from the President

INSIDE THIS ISSUE:

News From Your Neighbors	2
Spring Meeting Minutes	3-5
Board Members Contact Info	5
Notices	5
Advice From. . .	5

I hope all of our Loveless Lake families are having another exciting fun filled summer.

The lake has been good considering the early ice out and warm summer. The weed growth has been greater than normal, but until now the lake has been ok for summer fun.

Our Polk county land and water people, Jeremy Williamson, attended the spring meeting to discuss the planned fall aerial survey and ascertain the best plan for lake conservation and repair. Jeremy showed us the run off locations and which were worst offenders. Last fall we did a shoreline mapping survey to review lake runoff and types of shoreline vegetation we have around the lake. These surveys will help us make better decisions about how to clean up the lake.



My goals as Loveless Lake president are:

1. Work to have more families active in Loveless Lake Association and cleaning up our lake.
2. I plan look at options for setting up a lake district to prepare for future lake clean-up work.
3. Help more lake families learn what to do to protect our lake.
4. Create a better future for Loveless Lake.

I also want to thank Jodi Halliday, our new treasurer, and the Dodge family for planning and hosting a great summer picnic at Pine Park.

Jim Peterson, President

Loveless Lake Fall Meeting

Saturday, August 29, 2015
9:00-11:00AM

Polk County Justice Center
Community Room
Balsam Lake, WI

Agenda:

- Call to Order
- Introductions
- Approval of Minutes
- Reports:
  - Treasurer's Report
  - President's Report
- Old Business:
  - Committee Updates
- New Business:
  - Fall Lake Survey
  - Refreshments for spring meeting
- Questions/Comments/ Announcements
- Adjournment

WE'RE ON THE WEB!

www.LovelessLake.org

- **LLA Purpose & By-laws**
- **History of Lake**
- **Lake Water Quality Info**
- **Links to Popular Resources**

ANNUAL DUES

Your 2015 association dues of $20 can be paid to our treasurer at the fall meeting or mail them to:

Jodi Halliday, Treasurer
425 Third Avenue NE
Osseo, MN 55369

PHOSPHORUS-FREE: IT'S THE LAW!

If you fertilize your lake property, be sure to use a phosphorous-free product to help keep our lake clean!

News From Your Neighbors



Niles Taylor with his two nephews Jacob, 8, and Jeffrey, 11 after getting them both up on skis for the first time 8/8/2015.



"I'm not gonna kiss him! You do it!" Twin granddaughters of Pauly & Debbie Cudd with their "prince".

Every day at the lake is a good day!

THE 2015 SUMMER PICNIC was a great success! We had about 20 people participate, and the park shelter was perfect! I vote that we use that in the future. There were more than enough tables and grills and electricity. The whole Dodge Lodge crew helped out to get everything in good shape. It was a lovely day and Rodger and Sharon Peissig brought their beautiful antique car to show everyone. I am hoping we have a bigger turnout next year!



The morning walk around the lake was also nice. We had about 10 people and some excitement. We found bear tracks (or a VERY large dog) on Niles Lane by the Jeff Cruezer and Blaine Erickson homes. They were fresh as it had rained the night before and they were very distinctive!

Jodi Halliday

Jeff & Dar Cruezer would like to remind everyone on the lake to check their roofs for hail damage from the early July storm. They are getting two new roofs put on in the next couple weeks due to the damage.

Solar Array Installed

The Sol-Lectric 3.92 Kilowatt pole mounted systems was installed at **Frank Kelly's** place by Energy Concepts out of Hudson. The system is up and running and they are already saving money on electricity costs. The solar array is connected to the utility and keeps track of the electricity produced and then they are credited for the production. The system does not have a battery stack installed, and thus is not a solution for blackouts. If you would like to have a look at the system, please contact Jeff at jeffbkelly17@gmail.com.



Submitted by Susan Barnes.



Luke Peterson learning to ski!

Wanted: Updated Contact Information

Please notify us of any changes to your address, phone and email. As land lines are eliminated, it is important that we have your current information. By sharing your email address with us we will contact you bi-annually with a request to submit news for the newsletter, for notification of special meetings or as an emergency contact in case of storm damage. If you have an email address and would like to be added to the association list please send it to Susan Barnes at sbarnes141@gmail.com.

MAY 16, 2015 SPRING MEETING MINUTES, Submitted by Susan Barnes

Call to order by Jim Peterson (Vice President)
Minutes from last meeting – unanimously approved; 29 members in attendance

Treasurer's Report by Karen Peterson

- Treasury Account
- Beginning Balance $2114.50
  - Newsletter – 221.82
  - Donuts - $26.00
  - Dues 280.00
- Ending Balance $2146.68
- CD $5085.52
- Treasurer's report approved

Presidents Report (Brett could not attend today's meeting so Jim Peterson stood in)
Guest Speaker – Jeremy Williamson Water Quality Specialist for Polk County

- Water Quality Study Update
  - Goal to manage the phosphorus
    - Jeremy provided charts showing
    - Phosphorous levels measured at top and bottom of lake last summer
    - Average total phosphorous by year from 1993 – 2014
    - Trophic State Index Graph
    - Average phosphorus levels coming out of culverts as measured last summer
  - Focus on the culverts and getting the incoming phosphorous to 0
    - Preliminary data shows we have several culverts that are problematic
    - Jeremy will be getting data from LIDAR (Light Detection and Ranging), a remote sensing technology that collects 3-dimensional point clouds of the Earth's surface. This technology is being used for a wide range of applications including high-resolution topographic mapping and 3-dimensional surface modeling as well as infrastructure and biomass studies. Polk County will be mapping the entire county.
    - The LIDAR readings will be able to determine the watershed areas that feed into the lake
    - Jeremy's recommendation is to put off our final lake management plan until after that data is gathered about where water is coming from for each culvert
  - Also need to look at the phosphorous that is on the bottom of the lake
    - Lake water mixes top and bottom every year in the beginning of July causing the phosphorous on the bottom to mix with water on the top. Mixing is caused by wind, boat traffic, etc.
    - Shallow lakes are more prone to this. Water doesn't mix in lake that are 36 feet deep or more
    - Jeremy will be able to estimate the amount of phosphorous coming from the bottom of the lake once the data is all in
    - Phosphorous at the bottom is most likely from farm land not being managed pre 1992
    - There are ways to control phosphorous on bottom that we can use if necessary. Long Lake is currently doing this. It's expensive but effective.
  - Septic systems – not usually a large contributor to the problem
    - We can add it to the management plan if we feel it is an issue
  - Other factors to consider
    - Clear cutting by county
    - Encouraging rain gardens, native shoreline restoration, etc especially where there are impervious surfaces around the lake like driveways and roofs
    - We need to continue to police culvert maintenance and contact the county or Jeremy's engineer if there are issues.
  - Next Steps
    - We will have accurate data in 8 – 12 months
    - Our reduction goals will be built based on this data
    - DNR will require we fix water coming in to the lake via the culverts first

(Spring Meeting Minutes continued)

- Discussion of becoming a Lake District
  - Ability to raise funds
  - More clout with county
- Upcoming Events – everyone is welcome! All events are free.
  Please contact Katelin Holm for more information. Katelin.holm@co.polk.wi.us, 715 485 8637
  - Polk County Aquatic Invasive Species Strategic Plan
    - Wednesday May 20th, 7-9pm, Polk County Justice Center
    - Wednesday June 17th, 7-9pm, Polk County Justice Center
  - Project RED Training – learn to monitor rivers and streams for invasive species
    - Classroom training: Thursday, June 11th, 6-8pm OR Tuesday, June 16th, 6-8pm, St Croix River Association, St Croix Falls
  - Aquatic Invasive Species Citizen Lake Monitoring Network
    - Wednesday, July 15th, 1-4pm, Polk County Government Center
  - Spotted Knapweed Training
    - Wednesday, July 29th, 2-4pm, Crex Meadows, Grantsburg
  - Aquatic Invasive Species Bridge Snapshot Day
    - Saturday, August 29th, 9am – 1pm, St Croix River Association, St Croix Falls

Old Business

- LovelessLake.org – Jackie Crosby, Chair
  - Ready to upload content
  - Opening screen – LLA purpose
  - Tabs – Lake Quality Issues, LLA Bylaws
  - Toolbox on left – links to resources like DNR, PCCLAR, County, links to information on rain gardens, etc, recreational links
  - History and lake family stories
  - Historical newsletter
  - Loveless Lake Facebook page will be used for current social content. Mike will add a link to FB from the website
  - Send content to jcrosby@usiwireless.
  - Please add your contact information to the Lake Talk list!!
- Picnic – July 18th
  - Jodi Dodge Halliday is chairman of the picnic committee
  - We are looking at having the picnic at Pine Park in Balsam Lake
  - LLA will pay for meat, buns, water, plates, napkins, etc.
  - BYO drinks
  - Lane Burke Memorial Walk will take place that same day at 10:00am. Meet at the landing
  - Susan Barnes will send out postcards to all residents about the picnic and the walk
- Lake Stocking Update
  - Jim will check on where we are and report back at the fall meeting
- LLA mailing list
  - Secretary has the master list. Please send any updates to Susan Barnes – sbarnes141@gmail.com
- Tax Update – Michele Benson
  - Michele has refilled the 990-N that retains our tax exempt status
  - Michele is the current contact person, Karen Peterson is listed as Treasurer
  - Dues are tax deductible
- Welcoming Committee – Michele Benson
  - Talk about at Fall meeting
  - Materials can be found at Polk County
  - Please talk to new neighbors and let them know about the picnic, LLA meetings and our website
- Newsletter Update
  - Debbie Cudd will continue as Publisher of the newsletter
  - Susan Barnes will be Editor
  - We need a name for the newsletter. Send in your ideas!
  - It was also noted that the newsletter could be sent electronically as a PDF but we don't have everyone's email addresses

(Spring Meeting Minutes, continued)

New Business

- Motion to create Lake District Committee
  - Purpose – to gather information and report back to LLA
  - This would be part of a long term plan. Steps to implement would include:
    - Draw up district boundaries
    - Vote – 51% of residents within the boundaries need to agree
    - Approval by the county board
  - Could be part of our action plan
  - Jeremy's office has information on district boundaries
  - Wisconsinlakes.org has more information
- Motion to create Water Quality Committee
  - Move discussion to Fall meeting
- Aquatic Invasive Species Committee - do we need to monitor the landing?
  - Discussion and plan to monitor the landing this summer to determine busiest times. Kathy Donnelly agreed to monitor
  - Talking about volunteers at the landing during peak times to educate and send a positive message about preventing the spread of invasive species
  - It is the law now – tickets can be issued for traveling with a trailered boat not properly drained, etc. The fines are big – up to $400

- Elections
  - Motion to elect Jim Peterson as President. Seconded and unanimously approved
  - Motion to elect Jodi Halliday as Treasurer. Seconded and unanimously approved
  - Motion to elect David Benson as Vice President. Seconded and unanimously approved
  - Congratulations everybody!!
- Motion to send Jeremy Williamson an honorarium of $35 Visa Gift Card for attending our meeting.
  - Unanimously approved
- Shirley Houston (1621 S Loveless) is celebrating 50 years on the lake this year – Congratulations Shirley!!!
- Snacks for Fall meeting to be handled by Jodi Halliday
- Thank you to Bruce Hanson for donuts and coffee
- Thank you to Paul Furrer for putting out the meeting signs
  - One idea – add our web address in case people don't know where the meetings are held
- Meeting adjourned

Loveless Lake Board of Directors

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651-730-1855

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Loveless Lake Newsletter
Debbie Cudd
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River Falls, WI 54022

ADDRESS CORECTION REQUESTED

REMINDER!!

LOVELESS LAKE

ASSOCIATION MEETING

SATURDAY, AUGUST 29, 2015

9am – 11am

POLK COUNTY JUSTICE CENTER, BALSAM LAKE, WI

COMMUNITY ROOM

Appendix J

Public Comments

Draft Lake Management Plan for Loveless Lake Available for Public Review and Comment

The public is invited to review and provide comments on the lake management plan for Loveless Lake. A hard copy of the plan is available at the Centuria, Balsam Lake, and Milltown Public Libraries and an online version is available on the Loveless Lake Association website (http://lovelesslake.org/) and the Polk County Land and Water Resources Department website (www.co.polk.wi.us\landwaterreports). Comments and suggestions should be submitted in writing or email and received by August 15th, 2016 to ensure that they are given proper consideration in the final plan. No telephone messages will be considered. Anyone interested in providing input should contact Katelin Anderson at 100 Polk County Plaza-Ste 120, Balsam Lake, WI 54810 or katelin.anderson@co.polk.wi.us.

My husband and I reviewed the draft lake management plan.

The plan is very thorough and we agree with the majority of the plan, but we do have a couple of comments/questions.

How does this plan reach all of the lake owners if they are not a part of the Lake Association? We would recommend either a mailer or hand delivering the information about the quality of our lake and some of the ways to improve it to all. Maybe there is a plan for this already.

In addition, we noticed under Goal #5, there is a bullet point to have events geared towards kids. Although this is a great idea, we feel the parent/grandparents/owners need to receive the education as well. One suggestion is to encourage all lake owners to join the association for a mere $20 a year and attend the lake association meetings. Then have these events for the kids during the biannual lake association meeting to coincide with what the parents/grandparents are learning. This may be an incentive for families with young kids to attend the bi-annual meeting.

Thank you.