



BRIGGS LAKE CHAIN ASSOCIATION

**DRAFT**

**HEALTHY LAKES  
PARTNERSHIP**

**Lake Management Plan:**

***SAVING OUR LAKES FOR  
THE FUTURE***

**2018--2020**

**APRIL, 2018**

## TABLE OF CONTENTS

May need adjustment when completed

	Page
Introduction.....	3
Description of the Watershed .....	4
Watersheds .....	7
Public Access Locations.....	8
Water Quality.....	9
Healthy Lakes Partnership Chart.....	11
Healthy Lakes Partnership.....	12
Goals, Objectives and Actions.....	13
Lake Monitoring Program.....	15
Appendix 1- Present Healthy Lake Goals.....	16
RREAP and Mass Balance Analysis Project descriptions.....	17

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**HEALTHY LAKES PARTNERSHIP  
BRIGGS LAKE CHAIN ASSOCIATION**

**INTRODUCTION**

The Briggs Lake Association adopted the 2003 Healthy Lakes Plan as part of the association's planning process, and has been implementing the plan each year since. The BLCA board updates it's vision annually and sets goals for the following calendar year. The Healthy Lakes Committee has taken the responsibility to manage and update the Healthy Lakes Plan for 2007 and beyond. Within the association the plan is referred to as our "lake management plan".

In 2017 the Three Lake Improvement District (TLID) began managing some of aquatic invasive species (AIS) and other projects for the upper three lakes.

**EXECUTIVE SUMMARY**

The overall purpose is to improve and maintain the water quality of the Briggs Lake Chain and connecting waterways. There are three primary goal areas addressing the water quality improvement strategy in the lake management plan.

Shoreline and In-water Vegetation  
Land Use and Zoning  
Water Quality Monitoring

Each goal area has one or more specific goals as stated in the BLCA yearly goals.( See appendix 1 for present goals.)

**SUMMARY OF LAKE CHARACTERISTICS**

The Briggs Lake Chain Association is made up of members from four lakes and the surrounding area. Briggs, Rush, Julia are lakes connected by channels and Big Elk Lake is located a short distance away and has water running into it from the Elk River and Lily Creek which is the out source from the other three lakes.

The sizes of the lakes are as follows: Big Elk Lake-352 acres with a watershed area of 154,381 acres, Briggs-406 acres, Julia-137 acres and Rush 161 acres with a watershed of 9,588 for all three. All four lakes are located in Sherburne County.

All of the lakes are considered shallow lakes with Briggs ranging from 25 feet to the others at about 15 feet or less.

Shoreland zoning for Big Elk is General Development and Briggs, Julia and Rush Recreational Development.

At present there are over 500 seasonal and permanent homes directly on the four lakes. In addition there are many homes near the lakes and in the watershed area.

## **DESCRIPTION OF THE WATERSHED**

### The Watershed and Hydrology of the Lakes

The Briggs Lake Chain and Big Elk Lake watersheds are sub-watersheds of the Elk River Watershed, which is part of the Upper Mississippi River Basin (Map 1). All of the lakes would be considered “drainage” or “flow through” lakes in that streams flow into and out of the lakes. Briggs Creek flows into Briggs Lake from the northeast and a small creek enters Lake Julia from the northeast. As stated, Lily Creek is the outflow for these three lakes. The Elk River flows through Big Elk Lake entering the lake at the northwest and exiting to the southeast. During periods of high water following spring runoff and heavy rains the Elk River often overflows its banks flowing into Briggs Lake through the “bayou”, a channel located at the southwest end of Briggs Lake.

Drainage lakes typically have relatively large watersheds. For comparison, seepage lakes, which receive most of their water from ground water and lack stream inlets and outlets have relatively small watersheds. The ratio of watershed size to lake area size is one predictor of expected water quality. Lakes with large watershed to lake area ratios are predicted to have higher levels of nutrients and productivity as compared to lakes with small watershed to lake area ratios that are otherwise similar in depth and land use.

### Precipitation

Precipitation is well distributed throughout the growing season. In Sherburne County, National Weather Service monitoring sites are located at the St. Cloud Airport, near Santiago and in Elk River. The 30-year average annual precipitation is 27.43 inches for St. Cloud, 30.63 inches for Santiago and 29.58 inches for Elk River. An average of 19.47 inches (for Santiago) falls during the growing season (May-Sept). Rainfall records from the EPA show an increase of 20% to 30% in our region since the earliest part of the twentieth century. This could cause more flooding of our lakes.

### Soils and Topography of the Briggs Lake Chain and Big Elk Lake Watershed

Deposits left by retreating glaciers formed the topography and soils of the watershed. The topography and soils of the watershed can be divided into two general areas. Glacial tills associated with moraines and drumlin fields comprise the upper portion of the watershed.

Soils are predominantly loamy in this area. On this landscape, soil infiltration rates are low and runoff tends to rapidly concentrate in low areas where intermittent streams carry runoff to main channels. These soils are susceptible to water erosion. The lower part of the watershed, which includes all four lakes, consists of sandy out wash and sand and gravel deposits associated with river terrace. Upland soils in this portion of the watershed are predominantly coarse textured and have a high infiltration rate. Because of the gently sloping topography and well-drained sandy soils, this part of the watershed is not as susceptible to erosion from water. Wind erosion, however, is a common problem. Because of the rapid movement of water through these soils the shallow ground water is susceptible to pollution from surface sources. Wetlands and lakes occupy low areas throughout the watershed. Approximately 9% of the total area of the watershed consists of wetlands and lakes. Wetlands are characterized by soils with high organic content.

Land Use

The approximate land use for the watersheds is:

	Forest	Water and Marsh	Pasture and Open	Cultivated	Urban Residential
Briggs Chain	23%	12%	25%	27%	13%
Big Elk Lake	13%	9%	34%	42%	2%
North Central Hardwoods Forest	6 – 25%	14 – 30%	11 – 25%	22 – 50%	2 – 9%

Many zoning regulations are based upon the Shoreland Management Act and/or the Minnesota Department of Natural Resources (DNR) classification of a given lake. The DNR has classified all lakes within Minnesota as General Development (GD), Recreational Development (RD), or Natural Environmental (NE) lakes, and assigned a unique identification number to the lake for ease of reference. Counties in turn have used these classifications as a tool to establish minimum lot area (width and setbacks) that is intended to protect and preserve the character reflected in the classification.

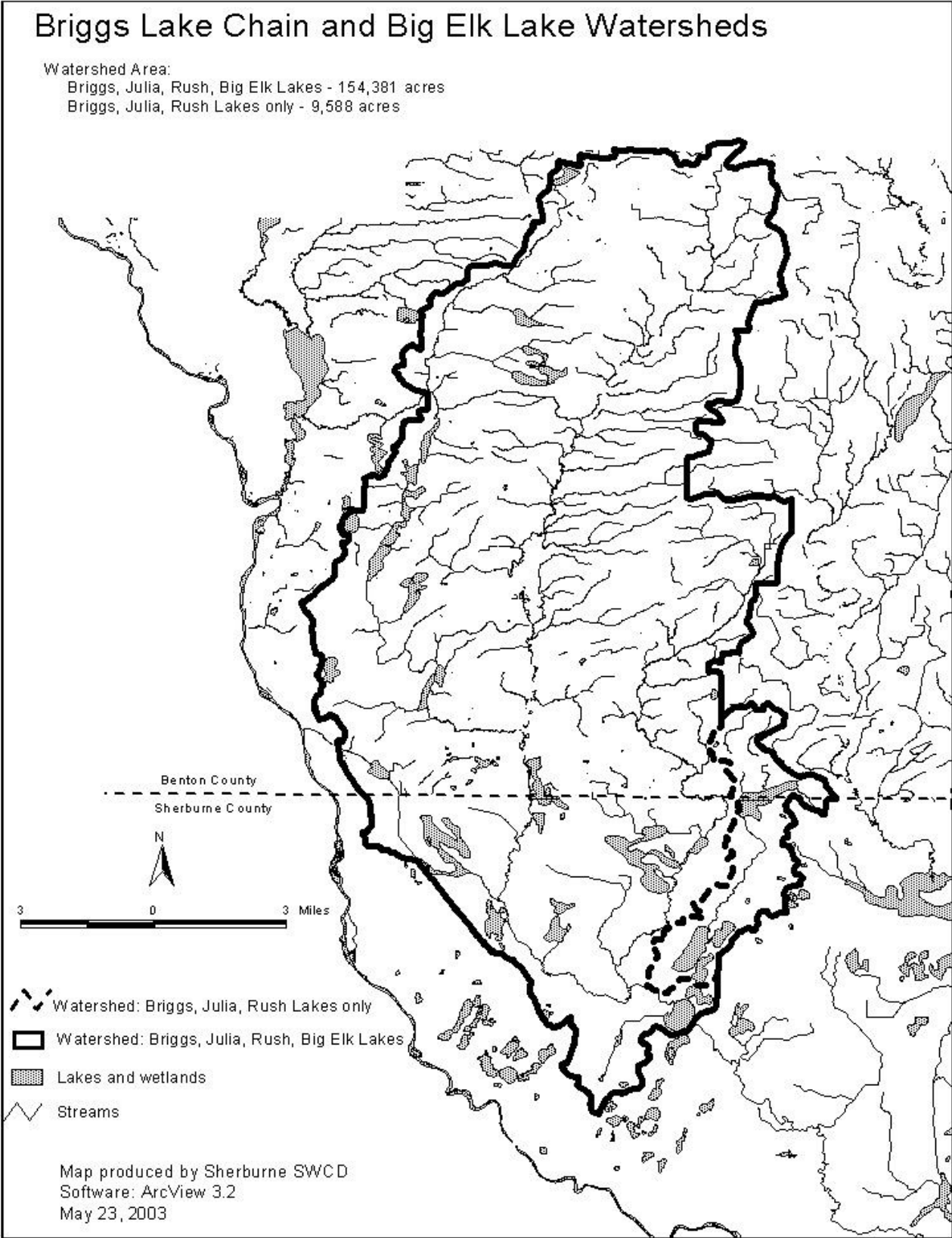
Big Elk Lake is a GD lake, and Briggs, Julia and Rush are RD. In Sherburne County the zoning standards associated with each water body class are:

Class	Min. Lot Size	Min. Lot Width (feet)	Structure Setback (feet)	Setback from Sewage Treatment
NE	* see note below	200	150	150
RD	* see note below	150	100	100
GD	* see note below	150	75	75

\* For new development, Sherburne County requires that lot sizes adhere to the underlying zoning requirement for the district. The Briggs Chain and Big Elk Lake are in the Agricultural District. The minimum lot size in the Agricultural District is 5 acres although lots may be smaller for Planned Unit Developments.

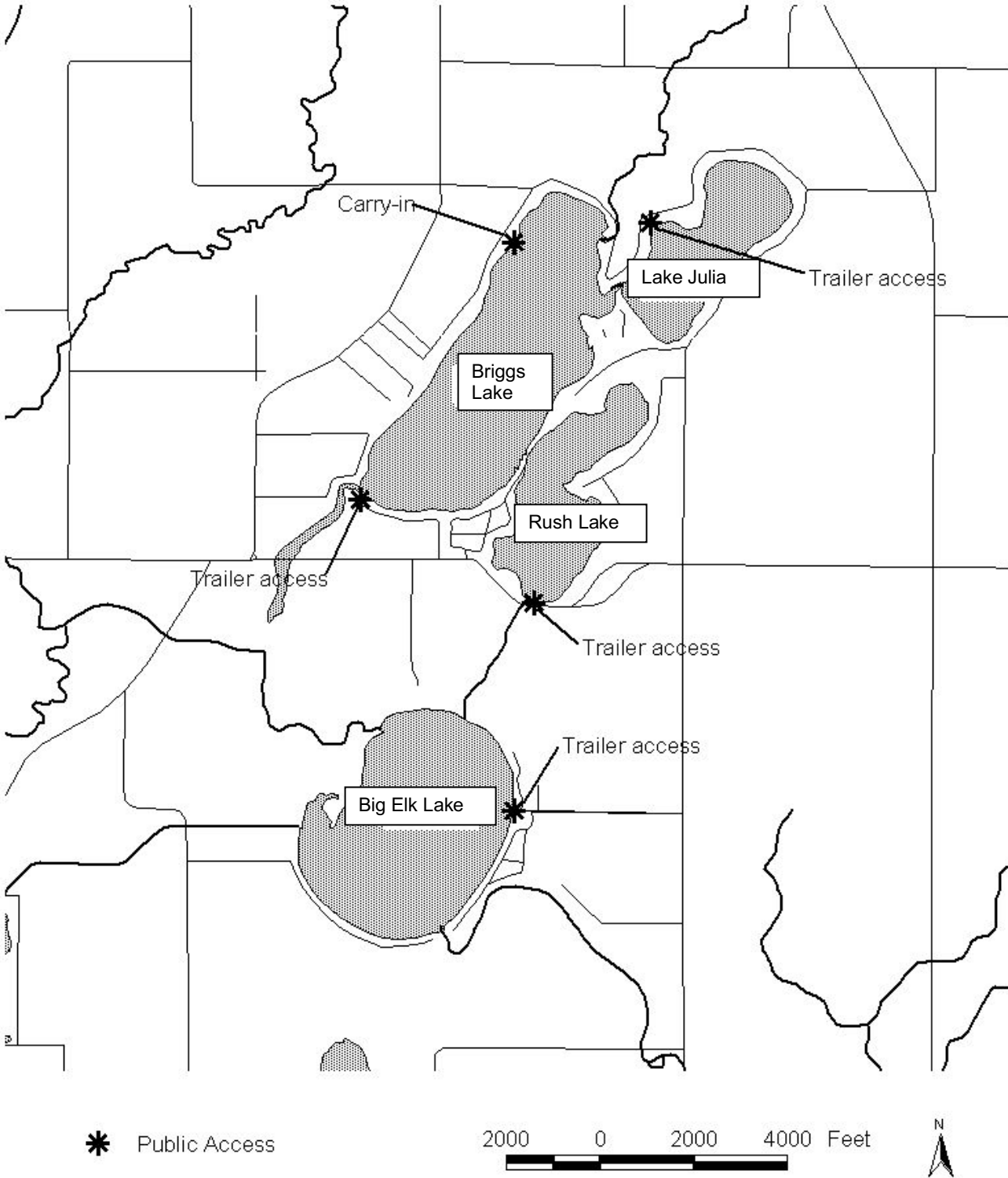
Most lakes have numerous properties that are “grand fathered,” or developed prior to the establishment of these restrictions. In general, these pre-existing uses are allowed to remain unless they are identified as a threat to human health or environment.

**Watersheds**



**Public Access Locations**

There are trailer accesses on Briggs, Julia, Rush and Big Elk and a canoe carry in access on Briggs.





## Water Quality

The lakes are located in the part of Minnesota known as the North Central Hardwoods Forest Ecoregion [NCHF]. This is significant for evaluating water quality data and expectations since typical ranges and predicted water quality are based on ecoregion data sets.

Secchi Disc monitoring provides information on a lake's water quality by gauging the transparency of the water. Secchi transparency data can be used to convey information on the quality of lakes and is directly related to the amount of algae (chlorophyll *a*) growth in the lake. The relative abundance of algae in a lake is dependent on the availability of plant nutrients. Generally phosphorus is the "limiting" or most important nutrient for algae growth in the NCHF Ecoregion.

Water quality data for the Briggs Lake Chain and Big Elk Lake is available from several sources. Sherburne County has contracted with St. Cloud State University to monitor water quality every 3 to 4 years starting in 1982. Secchi Disc data is also available from participation in the MPCA's Citizen Lake Monitoring Program (CLMP).

This information is available at the following sites:

MPCA—[HTTP://www.pca.state.mn.us/surface-water-data](http://www.pca.state.mn.us/surface-water-data)

DNR----[HTTP://www.dnr.state.mn.us/lakefind/results.html](http://www.dnr.state.mn.us/lakefind/results.html)

Lake ID Numbers:

Big Elk -----71-0141

Briggs-----71-0146

Rush-----71-0147

Julia-----71-0145

The typical range of Secchi Disc transparency for the NCHF ecoregion is 4.9 to 10.5 feet (the 25 to 75 percentile range).

The term "trophic status" refers to the level of productivity in a lake (the relative amount of algae growth) as measured by phosphorus content, algae abundance, and depth of light penetration measured with a Secchi Disc. Lakes are often classified according to four levels of trophic status:

OLIGOTROPHIC LAKE: A relatively nutrient-poor lake, it is clear and deep with bottom waters high in dissolved oxygen.

MESOTROPHIC LAKE: Midway in nutrient levels between the Eutrophic and Oligotrophic lakes.

EUTROPHIC LAKE: A nutrient-rich lake--usually shallow, "green", and with limited oxygen in the bottom layer of water.

HYPEREUTROPHIC LAKE: Has the highest nutrient concentrations and algae, and are often characterized as "green" with strong odors.

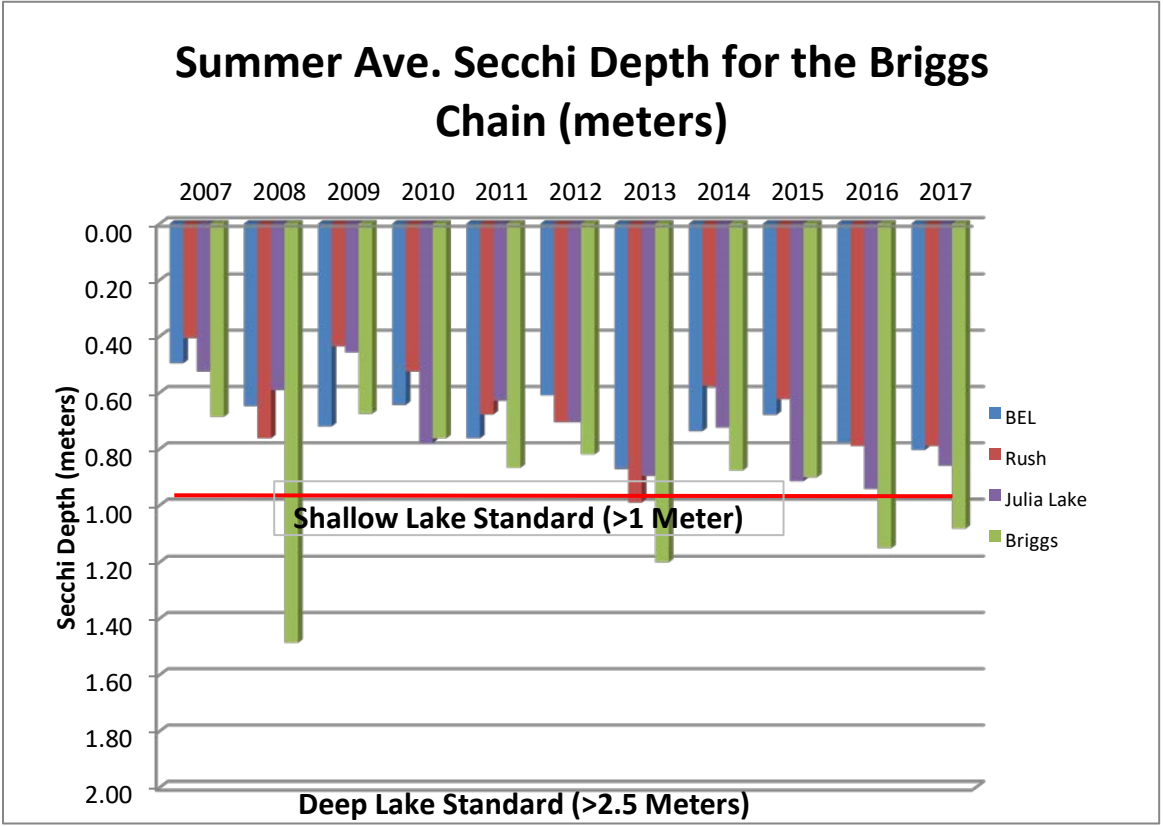
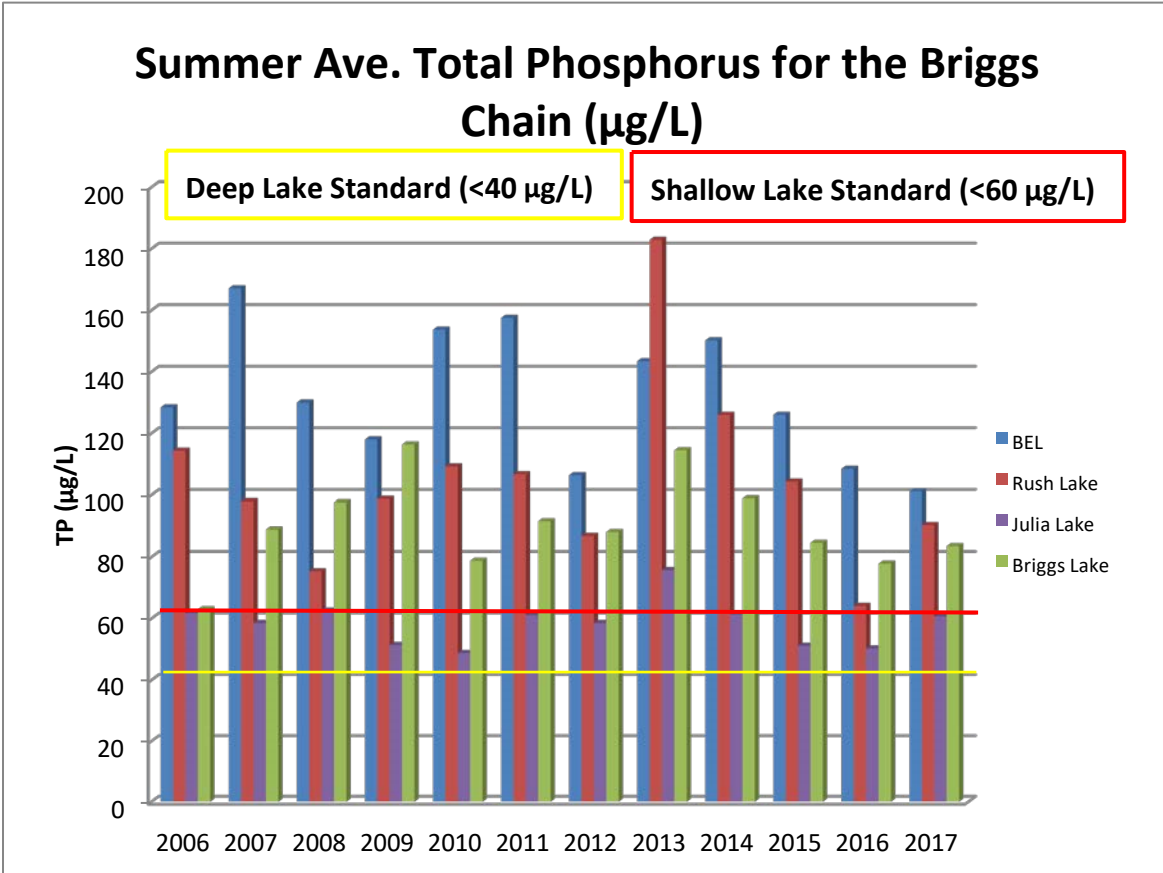
Carlson's Trophic State Index (TSI) is a common scale used for characterizing a lake's trophic status or productivity. The TSI can be calculated from the Secchi Disc transparency, chlorophyll-a, and total phosphorus measurements. All three parameters are available for the Briggs Chain of lakes and for Big Elk Lake. In addition to the Secchi disc data, phosphorus and chlorophyll-a data is available from monitoring done by St. Cloud State University and the MPCA. 7 years of phosphorus data are available for Briggs, Julia and Rush lakes and 6 years of phosphorus data are available for Big Elk Lake. 8 years of Chlorophyll-a data are available for Briggs, Julia and Rush lakes and 7 years of chlorophyll-a data are available for Big Elk Lake. These data were gathered from 1982 through 2002.

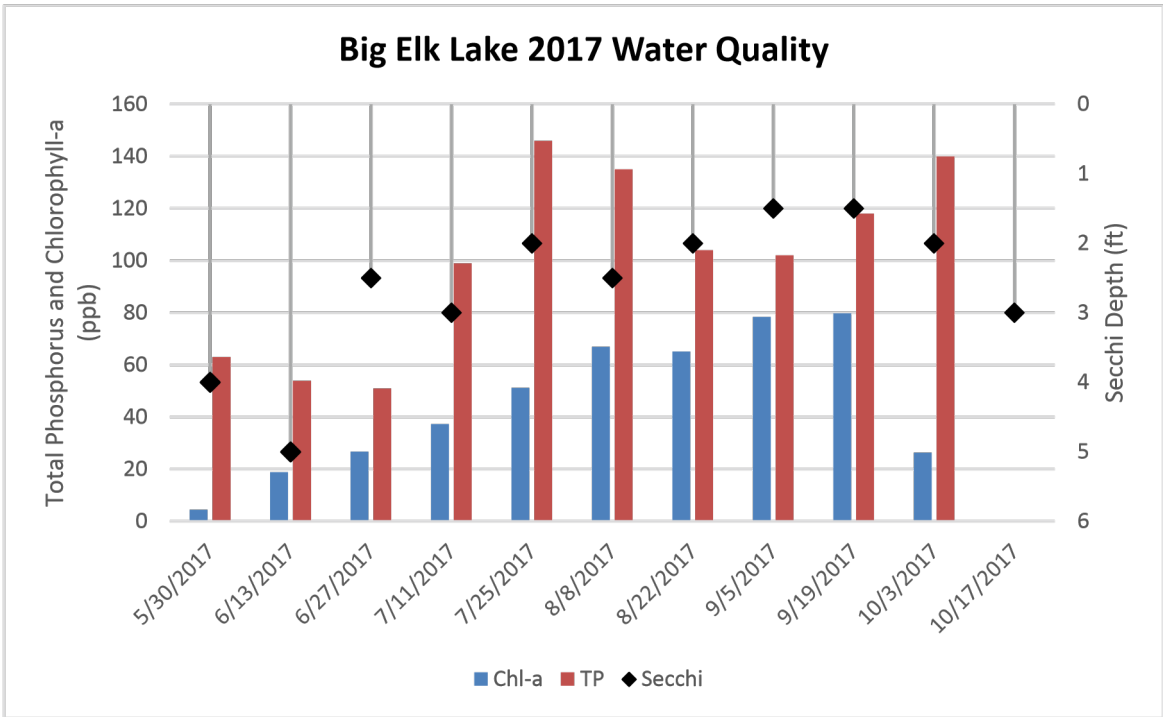
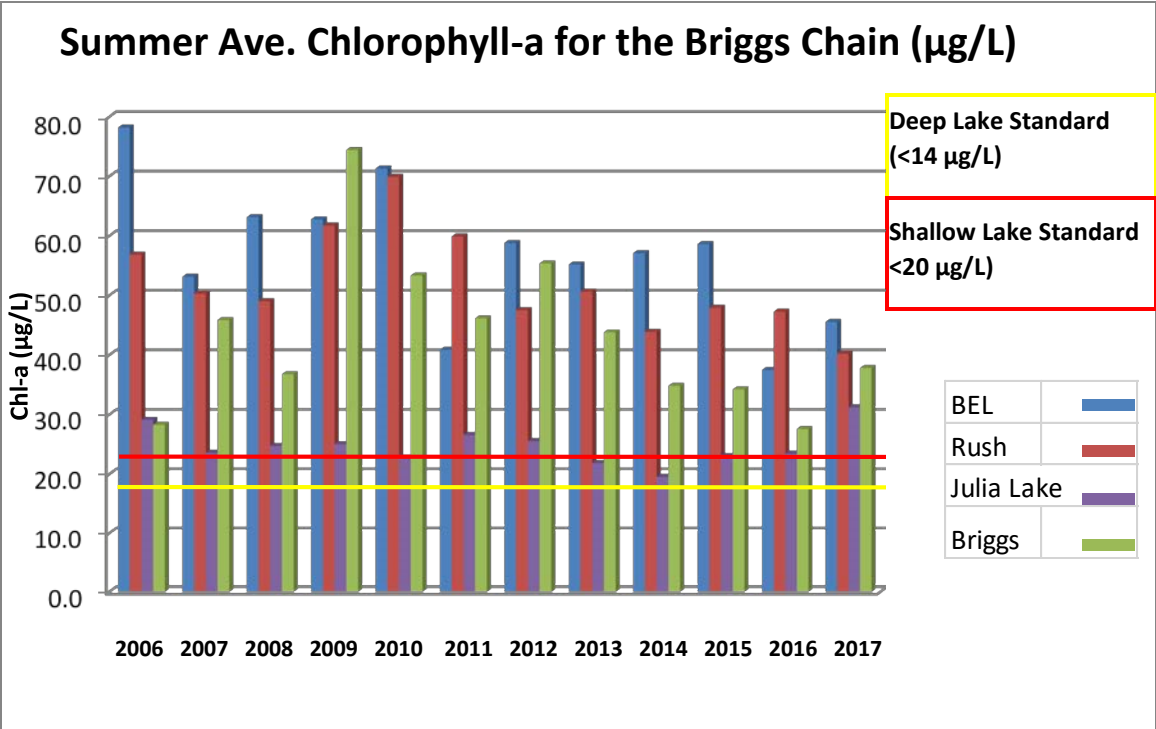
The following table provides an indication of the expected Trophic Status of lakes given one or more of three water quality parameters. The Trophic State Index can be calculated for a lake given any three of the indicators.

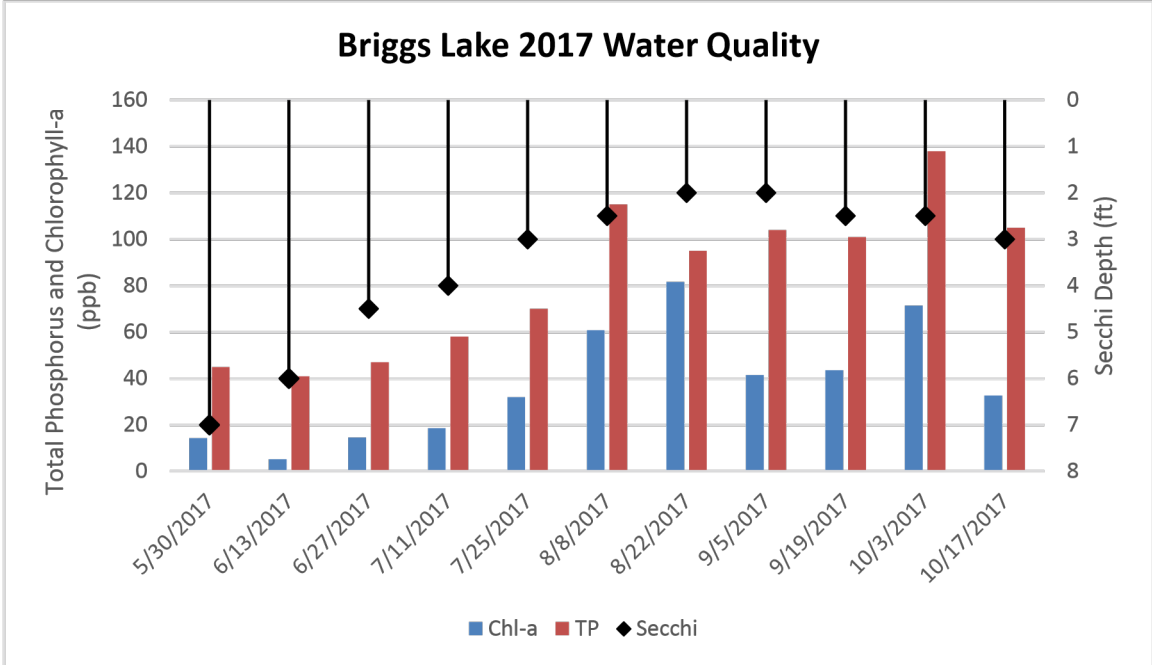
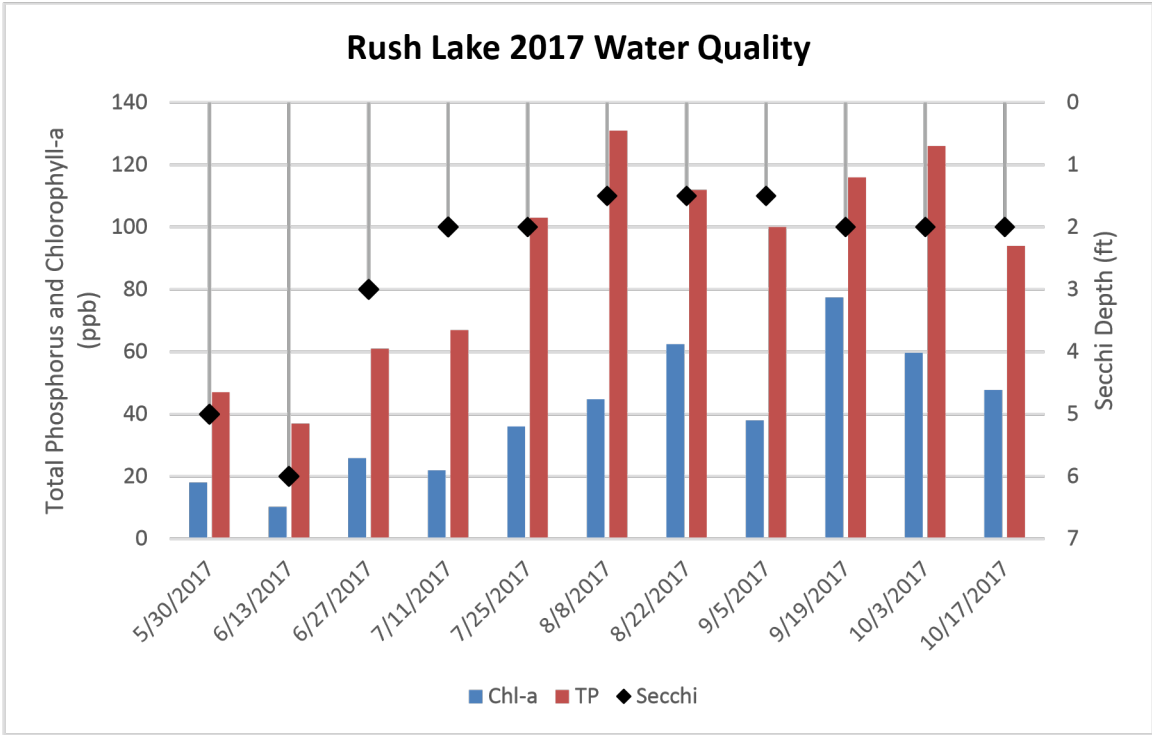
Relationship between trophic status and water quality parameters

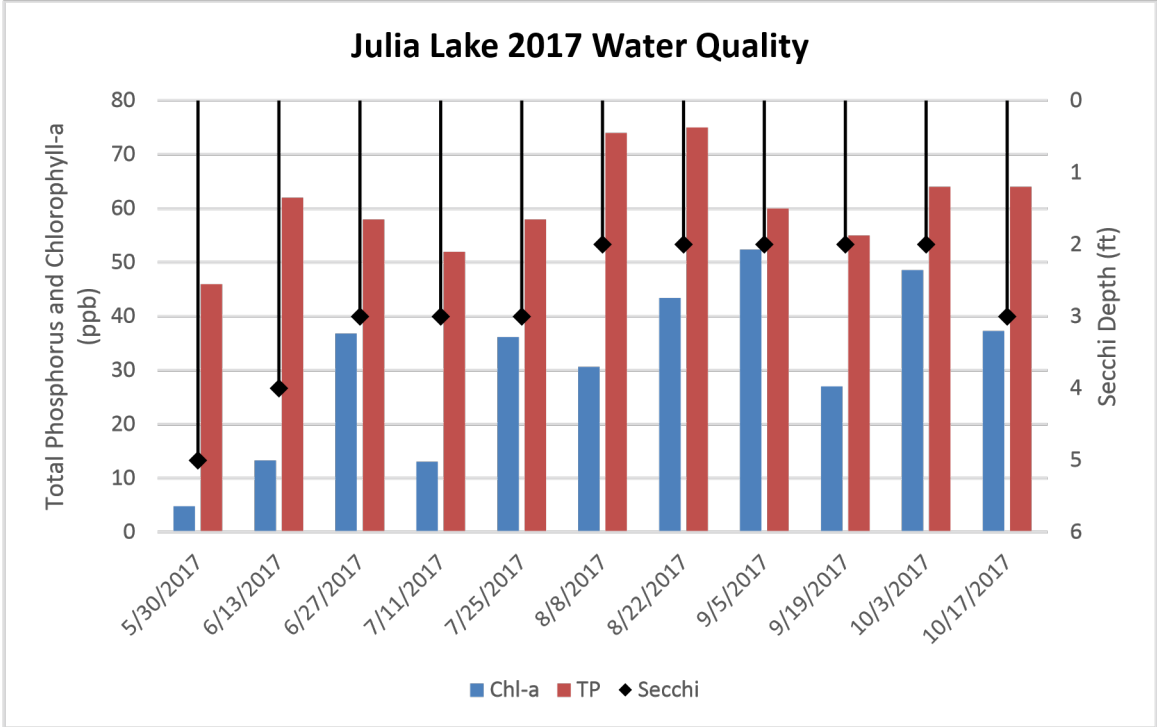
<b>Parameter</b>	<b>Oligotrophic</b>	<b>Mesotrophic</b>	<b>Eutrophic</b>	<b>Hypereutrophic</b>
Trophic State Index	<40	41-50	51-65	>65
Total Phosphorous (ug/L)	<12	13-25	26-66	>66
Chlorophyll-A (ug/L)	<3	3-7	8-33	>34
Secchi Transparency (ft)	>12.1	12.1 - 5.9	5.9 – 2.6	<2.6

Using the available data for Secchi disc transparency, total phosphorus and chlorophyll-a and the above table, the long term average TSI and trophic status of the lakes would be determined as:

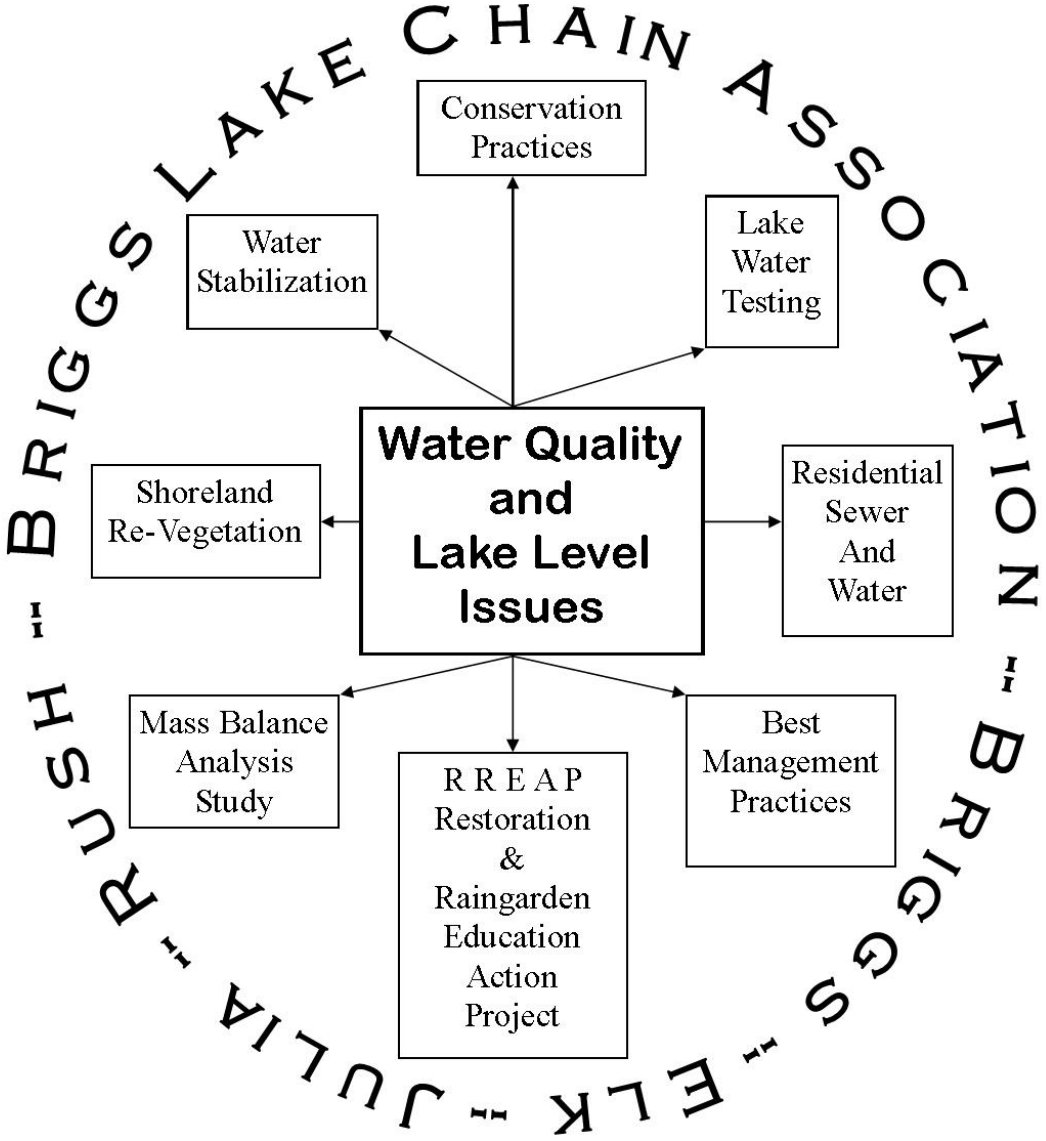








**Healthy Lakes Partnership  
Lake Management Plan — 2007**





## **THE HEALTHY LAKES PARTNERSHIP**

### **"SAVING OUR LAKES NOW AND FOR THE FUTURE"**

The Briggs Lake Chain Association entered into the Healthy Lakes Partnership with the Elk River Watershed Association and The Initiative Foundation for the purpose of improving the quality of our lakes and the surrounding property. These partnerships still exist and in addition others such as Palmer and Clear Lake Townships, Sherburne Soil and Water Conservation District, Minnesota Waters, Sherburne County Zoning and other local co-sponsors.

The Healthy Lakes Partnership Committee has set its initial goal of **Improving Our Water Quality**, and was incorporated into the Lake Management Plan. It remains a central focus of the Healthy Lakes Partnership, as well as the 2017 BLCA vision and annual goals.

There are three goal areas addressing water quality improvement:

#### **Shoreline and in-water vegetation Land Use and Zoning Water Quality Monitoring**

The BLCA Healthy Lakes Committee, which meets monthly, addresses each of these goal areas in their annual goals.

#### **Shoreline and In-Water Vegetation:**

All of the lakes in the Briggs Lake Chain are fed by mostly by water that comes from Agriculture lands, consequently providing an abundance of fertilizers in the run-off water. Although some of this problem is slowly being helped by better farming practices and legislation, which limits some use of commercial fertilizers, there still is a problem with the amount of fertilizers being deposited in the lakes from lakeshore properties.

The Healthy Lakes Committee will continue to work cooperatively with the Sherburne Soil and Water Conservation District, the Elk River Watershed Association and other interested entities to involve lakeshore owners and those living near the lakes and waterways to restore and improve vegetation to help catch and absorb some of the run-off before it gets into the lakes.

Information and training sessions are held periodically to help involved property owners learn more about lakeshore restoration and other "best management practices," such as rain gardens, healthy septic systems, non-phosphorous fertilizers and water runoff diversion.

#### **Land Use and Zoning:**

The focus of this goal area is the investigation of land use and zoning practices and related

issues. This will help determine what steps can and should be taken to improve the present conditions of our lakes, and to prepare for the inevitable future development of the Briggs Lake Chain and the surrounding watershed.

Goals include assisting new and existing lakeshore owners in proper shoreline maintenance through an educational newsletter delineating the most restrictive ordinances from the county, township, and DNR in a less confusing format.

Having this information in one place rather than in three different places makes it easier to improve and/or maintain our properties without fear of "missing something" in the regulations.

We will work cooperatively with the appropriate governmental organizations on watershed improvements and a water stabilization plan.

### **Water Quality Monitoring**

The focus of this goal area is to monitor, collect and analyze lake and stream data and turn it into useable information necessary for addressing the sources of poor water quality. The Healthy Lakes Committee has developed a working partnership with Sherburne Soil and Water and the Elk River Watershed Association to implement water quality monitoring plans.

### **GOALS OBJECTIVES and ACTIONS check on possible goal changes**

#### ***GOAL 1. Maintain and improve the water quality of all the Briggs Lake Chain Lakes***

**Objective 1:** Research and study what the water quality is at the present time and determine what can be done to improve it.

**Actions:**

- Secchi readings
- Phosphorous testing
- Chlorophyll testing

#### ***GOAL 2: Maintain ongoing education of Land Use and Zoning Ordinances for all lake property owners.***

**Objective 1:** Collect ordinances from all levels of governmental agencies and keep property owners aware of all ordinances and update them with any changes

**Actions:**

Collect data from State, County, Townships and DNR on all ordinances affecting our chain of lakes.

Educate lakeshore owners in proper shoreline maintenance through educational publications delineating the most restrictive ordinances and best management

practices.

Monitor land use and zoning by observation of what is occurring around the lakes and report concerns so persons do observe ordinances.

Maintain a Land Use and Zoning Committee.

**Goal 3: Maintain and improve water quality and shoreline stabilization by use of Shoreline and In-Water Vegetation.**

**Objective 1:** Work in cooperation with the Sherburne Soil and Water Conservation District and other entities to involve lakeshore owners and those living near the lakes in methods to help restore and improve vegetation that will help catch and absorb some of the run-off water and fertilizers before it gets into the lakes and also stabilize the shore line.

**Actions:**

Maintain a Shoreline and In-Water Vegetation Committee.

Inform all property owners how and where to acquire plants.

Educate how plants should be used for restoring shorelines by having workshops for lakeshore owners who are interested. This would be done at a local site with help of trained persons.

Monitoring sites and using the gathered information to inform members of successful sites.

**\*See Appendix 1 for Healthy Lakes Goals**

## **Lake Monitoring Program**

In 2004 several individuals from the lake association spent several weekends learning about collecting water quality data from lakes and streams to help in assessing the quality of the water. They learned the procedure for getting samples that could be analyzed for total phosphorous and chlorophyll "a".

This group developed a Briggs Lake Chain Monitoring program which allowed them to receive some grant money from the Minnesota Environment and Natural Resources Trust Fund that was used to acquire some testing equipment and train some individuals to take samples which were analyzed at a certified laboratory. This program was started in 2005 with sampling the four lakes and continued in 2006 with the lakes, but also added the rivers and streams at the inlets and outlets for the four lakes. This is planned to continue as the funding is available.

## **Lake Association Vegetation Control:**

In 2018 Lake Management Plan was developed which allowed the TLID to plan the spraying areas for curly leaf in Briggs Julia and Rush Lakes, as well as EWM in Rush.

A vegetation survey count of what types of plants and how many there are is done periodically. Results of this survey are available as they are produced.

## **MASS BALANCE ANALYSIS PROJECT**

The Mass Balance project periodically analyzes Briggs Lake Chain tributaries (Elk River, Briggs Creek and others) to identify sources of nutrients and develop and implement best management practices to mitigate identified problem sources. In addition, data from in-lake testing of the four lakes (total phosphorus, chlorophyll "a", and water clarity) along with lake level readings are analyzed yearly.

Based on study results, it should be possible to determine if the excessive nutrients that lead to increased algae growth come from upstream sources, and, if so, hopefully, arrive at ways to reduce the impact on our lakes and help control algae growth. Alternatively, if the study identifies few sources in the watershed, it may

suggest that septic systems and run-off from lawns and hard surfaces around the lake may be a major contributing factor.

**Gentle Footprints - RESTORATION AND RAINGARDEN EDUCATION PROJECT**

The Gentle Footprints is a program initiated by the BLCA in 2016 to encourage conservation projects on our chain of lakes. The program is two-part: the first workshop where area service providers learned more about conservation projects and how to assist their customers. Experts from Minnesota DNR, Sherburne County Zoning, and Sherburne Soil and Water Conservation District provided up-to-date information on rules and regulations, Best Management Practices, and descriptions of various conservation projects (raingardens, shoreline restoration, and run-off control options.) Workshop attendees may apply for funding to assist in paying for conservation projects on their properties.

The BLCA will also provide volunteer labor and technical assistance for some of these conservation projects.

### **Appendix 1- Healthy Lakes Goals**

2017 Healthy Lakes Goals –

1. Maintain Rush Lake dam throughout 2017 with funds from member and charitable donations.
2. Extend water quality monitoring data throughout 2017 as per Lake Management Plan, with cost sharing for testing from Palmer Township.
3. Have a net increase of 6 lakeshore buffer or other conservation projects by October 15, 2017, while utilizing SERP IV training and funding, BLCA Mini Grants and private funds.
4. Secure additional \$15,000 in funding from the DNR for shoreland projects, rain gardens and other conservation projects by June 30, 2017 for SERP IV [July 1, 2017 – June 30, 2017].
5. Complete plans for 3 runoff diversion projects by October 30, 2017 with funding from the Sherburne CWCD.
6. Participate with Sherburne County Zoning in 2017 to revise county shoreland regulations.
7. Participate in BLCA related Board of Adjustment hearings throughout 2017.
8. Organize and fund the control of aquatic invasive species (Eurasian watermilfoil, curly leaf pondweed, etc.) in 100% of DNR approved affected lake areas by September 30, 2017 with funding from individual donations, charitable donations and township cost sharing.
9. Publish a Healthy Lakes committee report in all 2017 Lake Report issues and post on BLCA website.
10. Groundtruth all remaining and any newly volunteered properties by October 31, 2017 with existing volunteers.
11. Conduct one conservation projects workshop and one shoreland maintenance workshop by September 15, 2017.
12. Conduct one fish stocking of Big Elk Lake by June 30, 2017 with funding from individual donations and charitable donations.
13. Explore available AIS (aquatic invasive species) related grants and other funding throughout 2017